Wind Direction Sensor

AST701
Product Manual

1 Introduction

The AST701 Wind Direction Sensor is used to measure the direction value of the wind and convert the physical signal into an electrical signal, which can be directly transmitted to the recording device for processing.

The sensor housing is made of aluminum material, which has high weather resistance, high strength, corrosion resistance and water resistance; the internal circuits are protected, and the entire sensor has good adaptability to harsh environments. The cable connector is a military plug, which has good anti-corrosion and anti-erosion performance, which can ensure the long-term use of the instrument. At the same time, it cooperates with the internal imported bearing system to ensure the accuracy of wind direction acquisition. The wind direction sensor adopts low inertia wind vane and precision potentiometer, which is sensitive and accurate. The precision signal processing unit can output various signals according to user needs. The circuit module PCB adopts military-grade A-grade materials to ensure the stability of the measurement parameters and the quality of electrical performance; the electronic components are all imported industrial-grade chips, which make the whole have extremely reliable anti-electromagnetic interference ability, and can ensure that the host can work normally in the range of -30°C-+70°C and humidity ＜100%RH (non-condensing).

After the product is upgraded, the output signals are various. The wired output includes: analog signal (voltage, current), digital signal RS485; the wireless output includes: LoRa, Bluetooth, WIFI, GPRS, 4G, NB-IOT, CAT-1, wireless output except LoRa, In addition to Bluetooth, the other four forms can be connected to the smart cloud platform to realize the monitoring and management of smart terminal data.

2 Characteristics

(1) The sensor has a compact design, high measurement accuracy, fast response speed and good interchangeability.

(2) Realize low cost, low price and high performance.

(3) The flange installation method can realize the bottom outlet and the side outlet, which is simple and convenient.

(4) High data transmission efficiency and reliable performance to ensure normal work.

(5) The power supply has a wide range of adaptation, good data information linearity, and long signal transmission distance.

(6) With two parameters of wind direction angle and wind direction, the data is comprehensive and reliable.

3 | Application

This product can measure any direction of indoor and outdoor environments with a resolution of 0.1°. It can be widely used in the field of construction machinery (cranes, crawler cranes, gantry cranes, tower cranes, etc.), the wind direction measurement in railway, port, wharf, power plant, meteorology, ropeway, environment, greenhouse, aquaculture, air conditioning, energy saving monitoring, agriculture, medical treatment, clean space and other fields.

4 | Product Data

4.1 Technical Parameters

Measurement Range: 0-360°

Accuracy: ±1°

Resolution: 0.1°

Start Wind Speed: ≤0.5m/s

Maximum Turning Radius: 100mm

Output Signal: A: Voltage signal (Choose one of: 0-2V, 0-5V, 0-10V)

B:4-20mA (Current loop)

C:RS485 (Standard Modbus-RTU protocol, default device address 01)

Supply Voltage: 5-24V DC (When the output signal is 0-2V, RS485)

12-24V DC (When the output signal is 0-5V, 0-10V, 4-20mA)

Working Environment: Temperature: -30°C-70°C; Humidity: ＜100%RH

Protection Level: IP65

4.2 Impedance Requirements for Current Signals

Supply Voltage	9V	12V	20V	24V
Maximum Impedance	125Ω	250Ω	500Ω	>500Ω

5 Using Method

The AST701 Wind Direction Sensor can be connected to various data collectors with differential input, data acquisition cards, remote data acquisition modules and other equipment. The wiring instructions are as follows:

(Voltage, 4-20mA)   (RS485)

6 Form Factor

R3.2mm
17mm
Φ67mm
Φ80mm

226mm
50mm
151mm
200mm
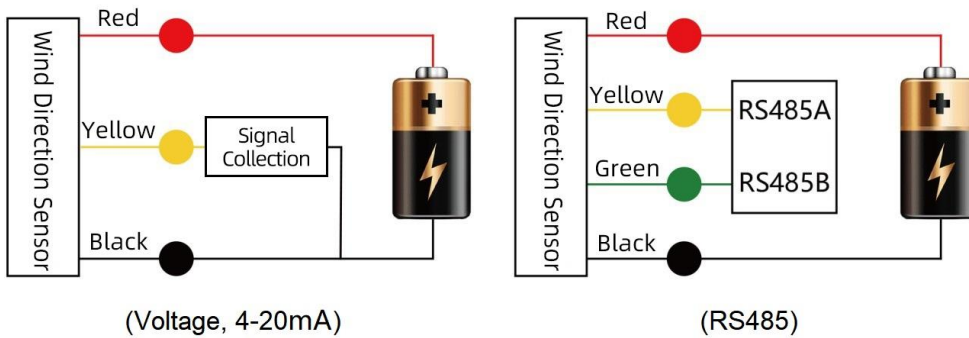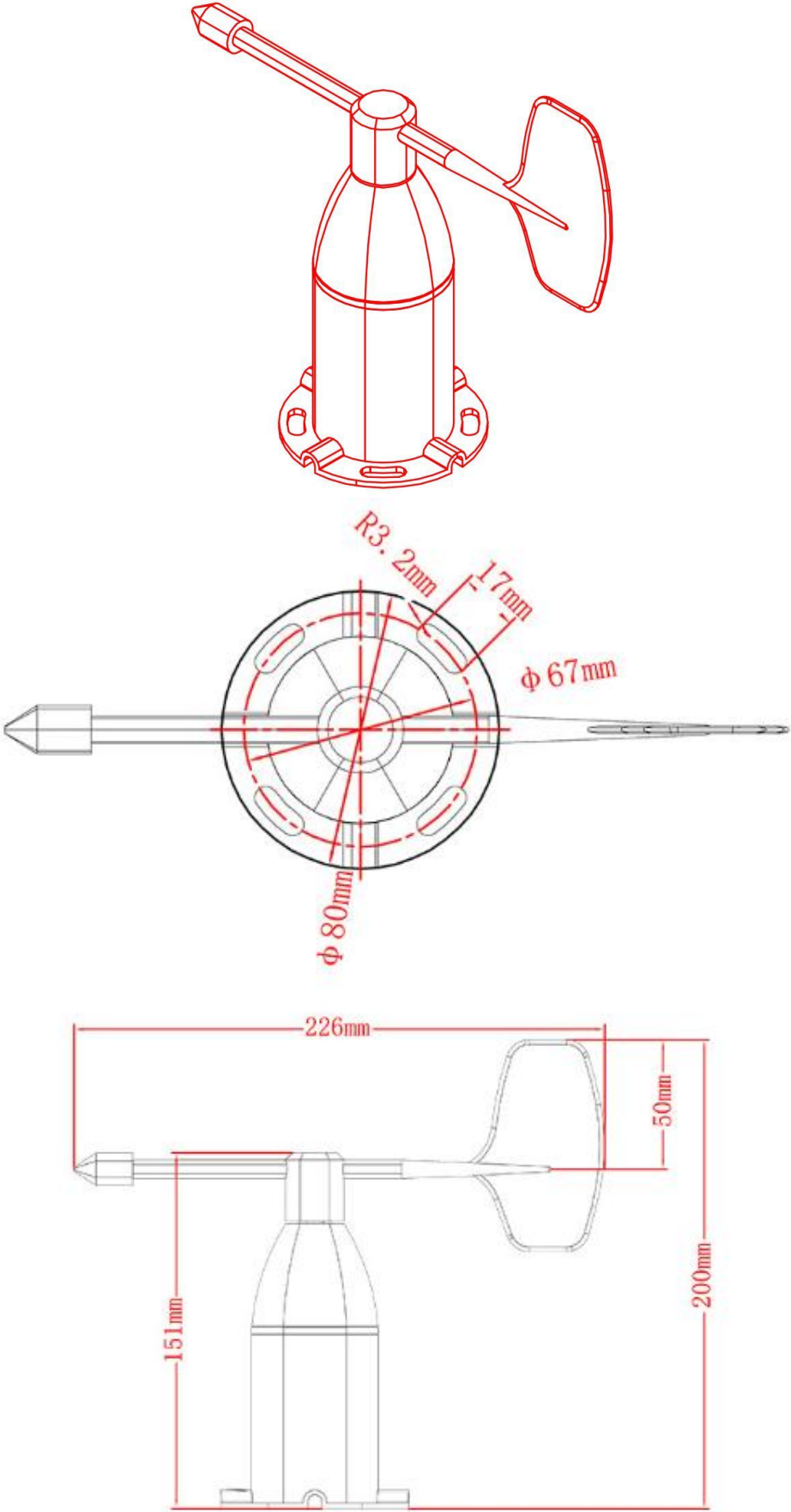
7 Data Conversion Method

	0-2V	0-5V	0-10V	4-20mA	RS485
North	1.9375-0.0625	4.84368-0.156255	9.6875-0.3125	19.5-4.5	0X00
North-northeast	0.0625-0.1875	0.156255-0.46875	0.3125-0.9375	4.5-5.5	0X01
Northeast	0.1875-0.3125	0.46875-0.781245	0.9375-1.5625	5.5-6.5	0X02
East-northeast	0.3125-0.4375	0.781245-1.09374	1.5625-2.1875	6.5-7.5	0X03
East	0.4375-0.5625	1.09374-1.406235	2.1875-2.8125	7.5-8.5	0X04
East-southeast	0.5625-0.6875	1.406235-1.71873	2.8125-3.4375	8.5-9.5	0X05
Southeast	0.6875-0.8125	1.71873-2.031225	3.4375-4.0625	9.5-10.5	0X06
South-southeast	0.8125-0.9375	2.031225-2.34372	4.0625-4.6875	10.5-11.5	0X07
South	0.9375-1.0625	2.34372-2.656215	4.6875-5.3125	11.5-12.5	0X08
South-southwest	1.0625-1.1875	2.656215-2.96871	5.3125-5.9375	12.5-13.5	0X09
Southwest	1.1875-1.3125	2.96871-3.281205	5.9375-6.5625	13.5-14.5	0X0A
West-southwest	1.3125-1.4375	3.281205-3.5937	6.5625-7.1875	14.5-15.5	0X0B
West	1.4375-1.5625	3.5937-3.906195	7.1875-7.8125	15.5-16.5	0X0C
West-northwest	1.5625-1.6875	3.906195-4.21869	7.8125-8.4375	16.5-17.5	0X0D
Northwest	1.6875-1.8125	4.21869-4.531185	8.4375-9.0625	17.5-18.5	0X0E
North-northwest	1.8125-1.9375	4.531185-4.84368	9.0625-9.6875	18.5-19.5	0X0F

RS485 signal(default address 01):

Standard Modbus-RTU protocol, baud rate: 9600; check bit: no; data bit: 8; stop bit: 1

7.1 Modification Address

For example: change the address of the sensor with address 1 to 2, host→slave

Original Address	Function Code	Start Register	Start Register	Start Address	Start Address	CRC16 Low	CRC16 High

		High	Low	High	Low		
0X01	0X06	0X00	0X30	0X00	0X02	0X08	0X04

If the sensor receives correctly, the data will be returned in the same way.

Note: If you forget the original address of the sensor, you can use the broadcast address 0XFE instead. When using 0XFE, the host can only connect to one slave, and the return address is still the original address, which can be used as a method for address query.

7.2 Query Data

Query the data (wind angle, wind direction) of the sensor (address 1), host→slave

Address	Function Code	Start Register Address High	Start Register Address Low	Register Length High	Register Length Low	CRC16 Low	CRC16 High
0X01	0X03	0X00	0X00	0X00	0X02	0XC4	0X0B

If the sensor receives correctly, the following data will be returned, slave→host.

Address	Function Code	Data Length	Wind Direction Angle High	Wind Direction Angle Low	Wind Direction High	Wind Direction Low	CRC16 Low	CRC16 High
0X01	0X03	0X04	0X02	0X9A	0X00	0X03	0X9B	0XA5
			Wind Direction Angle: 66.6°		Wind Direction: East-northeast			

8 Wind Direction 16 Azimuth Map

16 Orientation Diagram of Wind Direction Sensor
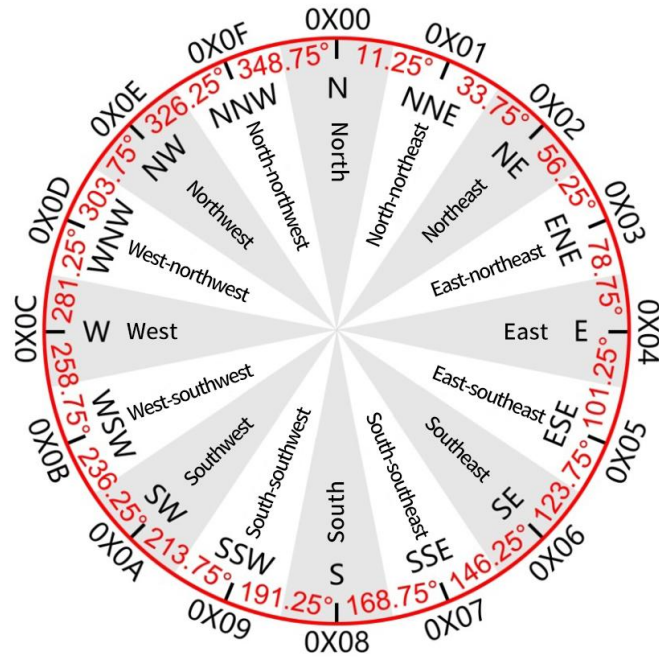
| 9 | **Precautions When Using** |

(1) Please read this manual carefully before use.

(2) Please check whether the packaging is in good condition, and check whether the sensor model and specifications are consistent with the products you purchased.

(3) No live wiring is allowed, and the power can be turned on after the wiring is checked and checked.

(4) The user should not change the components and wires that have been soldered after the product leaves the factory.

(5) The sensor is a precision device, please do not disassemble it by yourself when using it, let alone touch the diaphragm, so as to avoid damage to the product.

(6) Prevent sticky particles from entering the sensor and prevent moisture, so as not to affect the measurement performance.

| 10 | **Warranty** |

The warranty period for this product is one year. From the date of delivery, within 12 months, the company is responsible for free repair or replacement of the failure caused by the quality of the sensor (non-human damage), and only the cost will be charged after the warranty period.