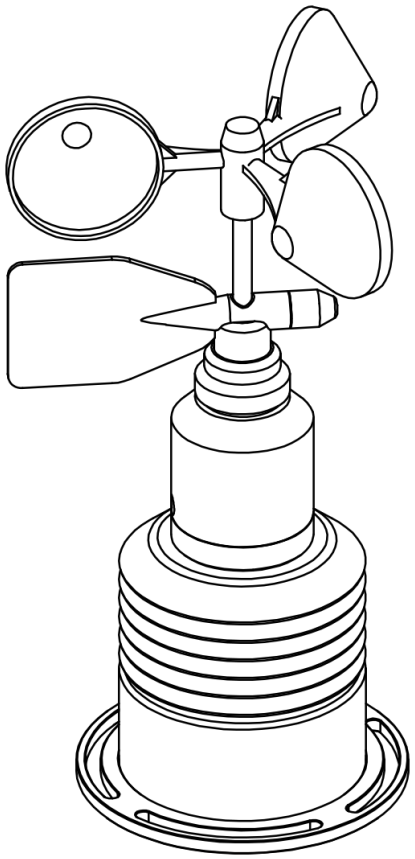
YGC-WSM
Mini All-in-One Weather Monitor
User Manual V.03



☞ This manual provides an introduction to the product specifications and applications of the YGC-WSM Mini All-in-One Weather Monitor. Please read and understand it carefully before use.

☞This manual also describes the methods for installing, connecting, and operating the device.

☞This manual includes details of the device's communication protocol.

☞Product upgrades and manual updates may be made without prior notice.

Product Description and Application

The YGC-WSM Mini All-in-One Weather Monitor is a compact and highly integrated weather and environmental monitoring sensor. Compared to traditional integrated environmental sensors, it features a smaller design while maintaining powerful functionality. It can quickly and accurately measure five key meteorological parameters, including wind speed, wind direction, air temperature, humidity, and atmospheric pressure. This device is suitable for meteorological and environmental monitoring in various fields, such as agriculture, meteorology, forestry, power systems, chemical plants, ports, railways, and highways.

Features

- All-in-one design, capable of simultaneously monitoring wind speed, wind direction, air temperature, humidity, and atmospheric pressure.
- Monitoring parameters can be customized as needed, with options for 2-element, 4-element, or 5-element combinations.
- Compact and lightweight design, with a height of approximately 17 cm, a maximum diameter of about 10 cm, and a weight of less than 0.25 kg, making it easy to install.
- Equipped with a high-efficiency filtering algorithm and special compensation technology for rainy and foggy weather, ensuring data stability and consistency.
- Each weather monitor is calibrated before delivery using wind tunnels and high-low temperature calibration chambers, ensuring that all five meteorological parameters meet national standards.
- Wide environmental adaptability, with rigorous testing for extreme temperatures, waterproofing, and salt spray resistance during product development.

General Specifications

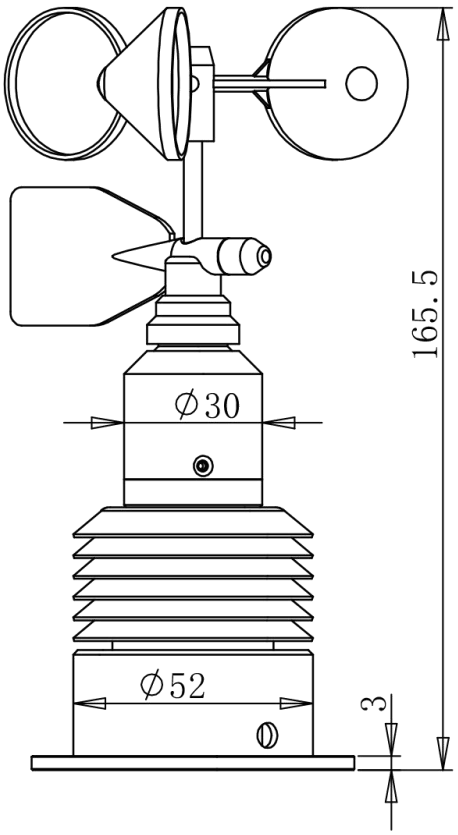
Measurement Parameters (Optional)	**Range**	**Accuracy**	**Resolution**	**Power Consumption**
☐Wind Speed	0-45m/s	Starting wind speed ≤0.8m/s	0.1m/s	40mW
☐Wind Direction	0-359°	±3°	1°	
☐Atmospheric Temperature	-40~80℃	±0.3℃	0.1℃	1mW
☐Atmospheric Humidity	0~100%RH	±5%RH	0.1%RH	
☐Atmospheric Pressure	300~1100hPa	±0.5 hPa（25℃）	0.1 hPa	0.1mW
Total Power Consumption of Sensor				<150mW

Power Supply Options	□ DC5V □ DC9-30V	□ Other	
Communication Options	□ RS485（Modbus-RTU） □ RS232（Modbus-RTU） □ TTL（Modbus-RTU）		
Cable Length	□ Standard 2 meters □ Other	Weight	240 g
Operating Environment	0~100%RH, -40℃~+60℃	Protection Level	IP64

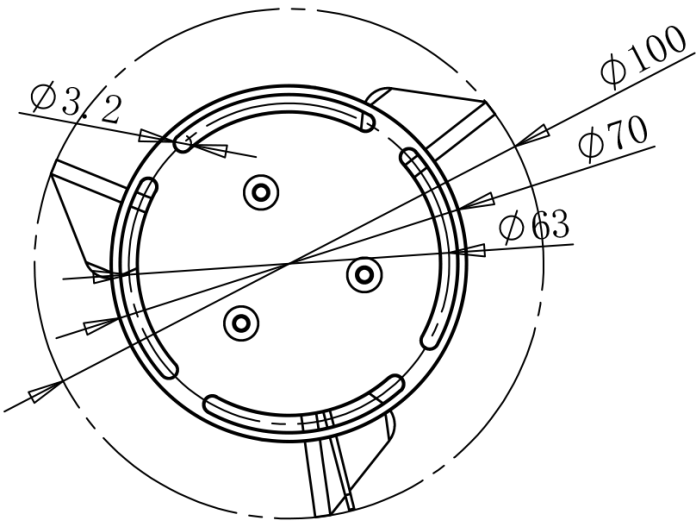
Mounting Dimensions

Dimensions Unit: Millimeters (mm)

front view



top view



Notes:

During installation, ensure the sensor is oriented to true south, with the sensor's cable outlet aligned with the geographic south direction. The mini all-in-one weather monitor is a precision instrument. Handle with care and avoid impacts or collisions.

Wiring Diagram

For 485, 232, or TTL signal output, the sensor wire definitions are as follows:

Red — Positive Power Supply (VCC)

Green — Negative Power Supply (GND)

Black — 485A+ / 232_T / TXD

Yellow — 485B- / 232_R / RXD

Notes: Ensure the wiring is correct before powering on the device.

Protocol

All MODBUS commands in the Mini All-in-One Weather Monitor Manual follow the MODBUS-RTU protocol format. The device is pre-configured at the factory. If protocol modifications are needed, refer to the relevant commands or seek assistance. The communication baud rate is 9600, with 8 data bits, 1 stop bit, and no parity check. The interval between two frames of data communication must be at least 500 ms. The default address is 1, and the MODBUS-RTU communication format is as follows:

Transmission	Address	Command	Register Address	Data	CRC Check
Byte Count	1 byte	1 byte	2 bytes	N bytes	2 bytes

(I) Register Address

The Mini All-in-One Weather Monitor can integrate five meteorological parameters: wind speed, wind direction, air temperature, air humidity, and atmospheric pressure. Each sensor has its own register address.

The correspondence between the MODBUS register addresses and channels is shown in the table below:

Register Address	Channel	Data Description
0x0000	Channel 1 (Wind Speed) Unsigned value 0-45.0m/s	0x7FFF (invalid/unconnected) 0x00 0x09=0.9m/s
0x0001	Channel 2 (Wind Direction) Unsigned value 0-359°	0x7FFF (invalid/unconnected) 0x00 0x09=9°
0x0002	Channel 3 (Digital Temperature) Signed value（-40~100℃）	0x7FFF (invalid/unconnected) 0x01 0x2C=30.0℃
0x0003	Channel 4 (Digital Humidity) Signed value（0~100%RH）	0x7FFF (invalid/unconnected) 0x02 0x8D=65.3%RH
0x0004	Channel 5 (Atmospheric Pressure) Signed value（300~1100hPa）	0x7FFF (invalid/unconnected) 0x25 0xF4=971.6 hPa
0x0010	Channel 17 (Baud Rate)，Supports baud rates: 4800、9600、14400、19200、38400、57600、115200	0x00 0x02 Baud Rate = 2*4800=9600
0x0014	Channel 21 (Protocol)， 0=YGSERVER 1= MODBUS-RTU 2=YG	0x00 0x01 MODBUS-RTU
0x0020	Channel 33 (Device Address) Unsigned value 1-254	0x00 0x01 Device Address 1

(II) Configuring Address and Baud Rate

The write command for setting the device address is the same for all Mini All-in-One Weather Monitors. For example, to set the device address to 1:

Send	00	06	00	20	00	01	48	11
Description	Address	Write Command	Register		New Device Address		CRC Check	
Return	00	06	00	20	00	01	48	11
Description	Address	Return 0x86 = Failed	Register		New Device Address		CRC Check	

If the returned command is identical to the sent command, the command has been successfully configured. If the return is 01 86 ****, the configuration has failed.

The command to write the baud rate for the mini multi-element weather minitor is the same for all configurations. For example, to set the baud rate to 9600.

Send	01	06	00	10	00	02	09	CE
Description	Address	Write Command	Register		New Device Baud Rate		CRC Check	
Return	01	06	00	10	00	02	09	CE
Description	Address	Return 0x86 = Failed	Register		New Device Baud Rate		CRC Check	

Baud Rate = Data × 4800. For example, if the returned data is 00 02, then Baud Rate = 4800 × 2 = 9600. Supported baud rates are 4800, 9600, 14400, 19200, 38400, 57600, and 115200. If the return is 01 86 ****, the configuration has failed. If the returned command is identical to the sent command, the configuration is successful.

(III) Retrieving Sensor Values

The mini all-in-one weather monitor can integrate up to 5 different sensors. By reading the values of Modbus register addresses, the real-time values of each sensor can be obtained. You can read one or multiple register values at a time. For example, send 01 03 00 00 00 01 84 0A to read only the wind speed value from the wind speed sensor. Or send 01 03 00 00 00 02 C4 0B to read the values of registers 0–1 (a total of 2 registers), including the wind speed and wind direction sensor values.

The conversion of negative sensor values (binary inversion and adding 1): For example, if the temperature is encoded in hexadecimal as FF 3D, convert it to binary as 11111111 00111101. The first bit of the binary value is 1, so it is a negative number. If the first bit is 0, it represents a positive number. The specific conversion steps are as follows:

(1) Replace the first bit of the binary value with 0 to get: 01111111 00111101

(2) Invert the remaining 15 bits to get: 00000000 11000010

(3) Add 1 to the result to get: 00000000 11000011

According to the positive number representation, the decimal value is 195. Because it is negative, the result is -195. For temperature values with one decimal place, divide the result by 10 to get -19.5. Therefore: FF 3D → -19.5℃.

Below is an explanation of commonly used commands for reading sensor values. All sensors have a default device address of 1, and all commands use the MODBUS-RTU format.

（1）、Wind Speed Sensor

The wind speed value is read from register 0.

Send	01	03	00	00	00	01	84	0A
Description	Address	Read Command	Starting Address		Number of Points to Read		CRC Check	
Return	01	03	02		00	1D	78	4D
Description	Address	Read Command	Data Length		Device Data		CRC Check	

The sensor returns data 0x001D, which converts to decimal as 29. The wind speed value is 2.9 m/s.

（2）、Digital Temperature Sensor

The temperature value is read from register 0. The read format for the sensor with address 1 is as follows:

Send	01	03	00	02	00	01	25	CA
Description	Address	Read Command	Starting Address		Number of Points to Read		CRC Check	
Return	01	03	02		00	26	39	9E
Description	Address	Read Command	Data Length		Device Data		CRC Check	

The sensor returns data 0x0026, which converts to decimal as 38. The temperature value is 3.8℃ (1 decimal place).

（3）、Five-in-One Sensor

The following command is used to read wind speed, wind direction, temperature, humidity, and atmospheric pressure.

Send	01	03	00	00	00	05			85	C9
Description	Address	Read Command	Starting Address		Number of Points to Read				CRC Check	
Return	01	03	0A		00	1D	00	AB	01	30	02	26
Description	Address	Read Command	Data Length		Wind Speed		Wind Direction		Temperature		Humidity	
Return	27	12	91				77					

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Description	Atmospheric Pressure	CRC Check

The sensor returns five groups of data from the registers. The data is in hexadecimal format, which is converted to decimal and then calculated based on the sensor's resolution and unit settings. The results are as follows:

Wind Speed: 0x001D = 29 = 2.9 m/s
Wind Direction: 0x00AB = 171 = 171°
Temperature: 0x0130 = 304 = 30.4℃
Humidity: 0x0226 = 550 = 55.0%RH
Atmospheric Pressure: 0x2712 = 10002 = 1000.2 hPa

(IV) Modbus CRC Check Procedure

1. Initialize a 16-bit register with the hexadecimal value FFFF, referred to as the "CRC Register".
2. XOR the first 8-bit data with the lower byte of the CRC Register, and store the result in the CRC Register.
3. Shift the contents of the register one bit to the right (towards the lower bits), fill the highest bit with 0, and check the lowest bit.
4. If the lowest bit is 0: repeat step 3 (shift again). If the lowest bit is 1: XOR the CRC Register with the polynomial A001 (1010 0000 0000 0001).
5. Repeat steps 3 and 4 until the register has been shifted 8 times, processing the entire 8-bit data.
6. Repeat steps 2 to 5 for the next 8-bit data.
7. The final value in the CRC Register is the CRC code (the resulting CRC code is in low-byte first, high-byte last format).

Precautions

1. Please check whether the packaging is intact and verify if the product model matches the selection criteria.
2. Do not connect wires while the device is powered. Only power on after completing the wiring and verifying that it is correct.
3. The sensor is a precision device. Users must not disassemble it, or touch the sensor surface with sharp objects or corrosive liquids, to avoid damaging the product.
4. Due to environmental influences, the bearings require regular maintenance to ensure their flexibility. For customers with extremely strict wind data requirements, it is recommended to send the device back to the factory for recalibration once a year.
5. Ensure the installation environment prevents interference from other operating devices, such as those that may not fully adhere to general standards (e.g., radio/radar transmission devices, ship engines, or motors).
6. Do not install on the same plane as any radar scanning device; maintain a minimum distance of 2 meters.
7. Avoid wake turbulence caused by surrounding structures such as trees, utility poles, or tall buildings, as this may affect the accuracy of the product.
8. Please retain the calibration certificate and the certificate of conformity. Send them back with the product in case of repairs.

Troubleshooting

1. RS485 output shows incorrect values on the instrument display. This may be caused by wiring issues or communication port faults, preventing the instrument from retrieving data correctly. Please check: Whether the wiring is correct and secure, whether the communication port is occupied and whether the communication port settings are correct.
2. If the issue is not caused by the above reasons, please contact the manufacturer.

Warranty

Warranty Commitment: The product is covered by a 12-month warranty from the date of delivery (excluding issues caused by failure to follow the technical requirements or other human actions).

After-Sales Commitment: Users can consult technical issues via phone and receive clear solutions. If the issue is determined to be a product quality issue, the product can be returned to the factory for repair or replacement.

Model Selection Table

Model	Power Supply	Signal Output	Optional Features	Description
YGC-WSM	KV-			9-30V Power Supply
	5V-			5V Power Supply
		W2		RS485
		W1		RS232
		TTL		TTL
			02	Wind speed and direction
			04	Wind speed, direction, temperature, and humidity
			05	Wind speed, direction, temperature, humidity, and pressure
For example: YGC-WSM-KV-W2-02 This represents: A mini multi-element weather station, powered by 9-30V, RS485 output, with optional features for wind speed and direction.				

Thank you for using our products. Wuhan Chenyun Technology Co., Ltd., as a professional brand specializing in intelligent IoT monitoring instruments, has earned the trust and admiration of users across various industries worldwide.

Please ensure that you read and fully understand the user manual before correctly using this product. Improper installation and usage may result in hazards such as fire or electric shock. Due to product improvements, specifications and models are subject to change without prior notice. We appreciate your understanding.