

RK120-01 Combined Wind Speed & Direction Sensor User Manual



Revision time	Reviser	Current Version	Remarks
20250407	SUN	V5.0	

User Notice

Please read this manual carefully before use to ensure safe and optimal operation. Retain this manual for future reference.

Pre-Use Instructions

- Carefully review this manual and follow all operational and safety guidelines to prevent malfunctions and hazards.

Unpacking Inspection

- Upon receipt, carefully inspect the sensor device and accessories for any shipping damage.
- If damage is detected:
- Immediately notify the manufacturer and distributor.
- Retain all packaging materials for return or replacement processing.

Parts List

Item	Quantity	Remarks
Combined wind speed & direction sensor	1	
Cable	1	The length depends on the order
Install bracket	1	Default carry (Optional)
Hex key wrench	1	

1. Product Introduction

The RK120-01 combined wind speed and direction sensor is assembled with ABS and aluminum alloy precision machined parts, with high strength and easy installation. The wind speed section adopts a traditional three wind cup structure, which is made of ABS and has good starting performance, a large measurement range, good linearity, and stable reliability. The wind direction section adopts low inertia wind direction to respond to the wind direction. When the wind direction changes, the rear wheel drive angle sensor senses the change in azimuth, resulting in a change in electrical signal output. It has good linearity, high accuracy, and no blind spots.

2. Product Features

- Combined wind speed & direction sensor
- Low starting threshold
- Good corrosion resistance
- Compact and light design
- Easy installation

3. Applications

- Environmental monitoring
- Bridge & Tunnel
- Solar and wind power generation
- Wind resource assessment
- Automatic weather station
- Agriculture

4. Specifications

Item	Technical Specification	
	Wind speed	Wind direction
Range	0-45m/s (current or voltage output); 0-70m/s (pulse, RS485, RS232 output)	0-360°
Resolution	0.1m/s	1°
Accuracy	$\pm(0.3+0.03V)$ m/s, V is current wind speed	$\leq\pm 3^\circ$
Starting Wind Speed	$\leq 0.5\text{m/s}$	
Limited Wind Speed	75m/s	
Supply	5V (Only for digital output), 12-24VDC	
Output Signal	RS485, 4-20mA, 0-5V, RS232, pulse (NPN, only for wind speed)	
Power Consumption	0.7W max.	
Operating Temperature	-40°C - $+70^\circ\text{C}$	
Ingress Protection	IP65	
Main Material	Aluminum alloy and ABS	
Storage	$10-60^\circ\text{C}$ @ 20%-90%RH	
Cable Length	Default 2.5m, other length is optional	
Installation Bracket	Attached	
Weight(Unpacked)	1200g(With bracket)	

5. Electrical Connections

Cable	Voltage/Current	RS485	RS232
Red	V+	V+	V+
Green	V-	V-	V-
Black		RS485A	RXD
Yellow		RS485B	TXD
White	Signal(WS)		
Blue	Signal(WD)		

6. Output Types & Formulas

Current Type	Wind speed	$V=(I_s-4)/(20-4)*\text{Range}$
	Wind direction	$A=(I_d-4)/(20-4)*360$
Voltage Type	Wind speed	$V=U_s/(\text{full scale voltage-zero point voltage})*\text{Range}$
	Wind direction	$A=U_d/(\text{full scale voltage-zero point voltage})*360$
Pulse Type	Wind speed	$V=0.3 + 0.1 * F$

V: Wind speed data in m/s;

I_s : Wind speed current in mA;

A: Wind direction in degree;

I_d : Wind direction current in mA;

U_s :Wind speed voltage in V;

U_d :Wind direction voltage in V

F :Output pulse frequency(Hz)

7. Product Dimensions

Unit: mm

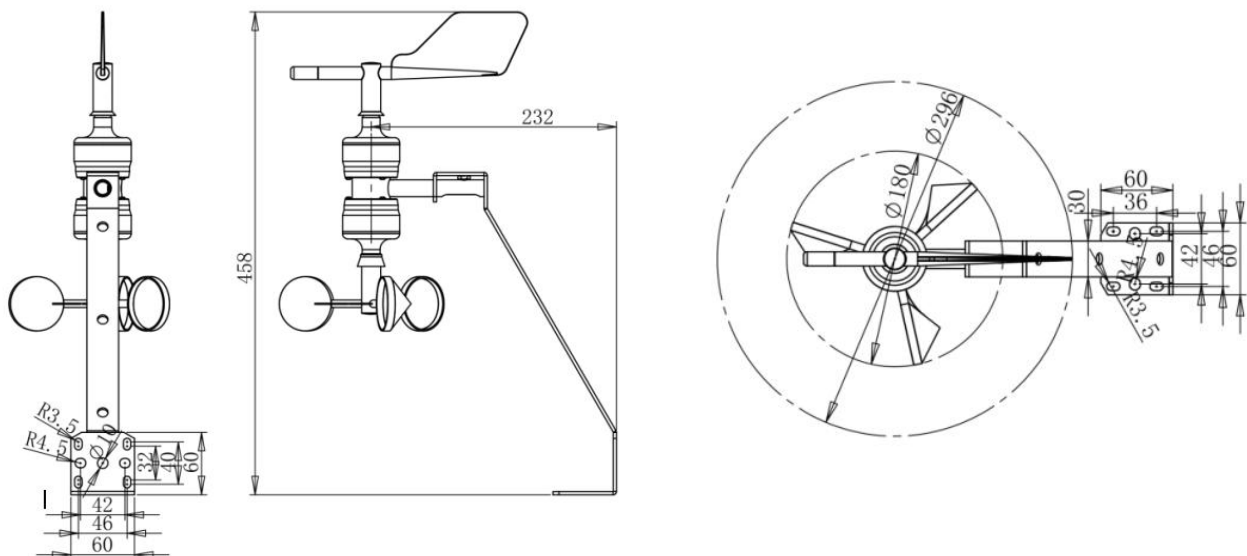


Figure 7.1
Dimensional Specifications

8. Communication Protocol (MODBUS-RTU)

Parameter	Value
Data Bits	8 bits
Check Bit	None
Stop Bit	1 bit
Baud Rate	9600 bps
Slave Address	0x01 (Factory Default)

8.1 Read Real-Time Data

Client sends:

01 03 00 00 00 02 C40B

Return:

01 03 04 01 5C 00 73 7A38

8.1.1 Description of Return Data Format

No.	Conception	Byte Number	Description	Remarks
1	Address block	1	Address(0x01)	0x01
2	Function code	1	Only read(0x03)	0x03
3	Number of bytes	1	0X04	4bytes
4	Data block	2	Wind speed	0x015C(34.8m/s)
5	Data block	2	Wind direction	0x0073(115°)
6	Check block	2		0x7A 0x38

8.2 Modify Slave Address

Client sends:(Change slave address from 01H to 02H)

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x01	0x06	0x00	0x20	0x00	0x02	0x09	0XC1

Response:

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x01	0x06	0x00	0x20	0x00	0x02	0x09	0XC1

Note: If you forget the original address, you should use the broadcast address(00H) (ensure that no other devices on the bus at this time.

8.3 Modify Baud Rate

Client sends:(Change to 19200)

Slave id	Function code	Address_H	Address_L	New Baud Rate		CRC_L	CRC_H
0x09	0x06	0x00	0x10	0x00	0x04	0x89	0xCC

Return:

Slave id	Function code	Address_H	Address_L	New Baud Rate		CRC_L	CRC_H
0x09	0x06	0x00	0x10	0x00	0x04	0x89	0xCC

Register description

Code	Baud Rate
0x0001	4800
0x0002	9600
0x0003	14400
0x0004	19200
0x0008	38400
0x000C	57600
0x0018	115200

9. Installation Guidelines

- Ensure no obstacles (e.g., buildings, trees, billboards) exist around the sensor to prevent local airflow interference.
- Avoid areas with strong electromagnetic interference (e.g., high-voltage power lines, motors) and corrosive environments.

9.1 Installation Method

- The sensor is equipped with an integrated mounting bracket and a hex key included with the shipment. Please check carefully upon unpacking.
- When installing the sensor, please ensure that the indicator arrow on the sensor bracket points towards the geographical south.
- The sensor supports multiple installation methods. During installation, ensure that the wind direction sensor faces upward.

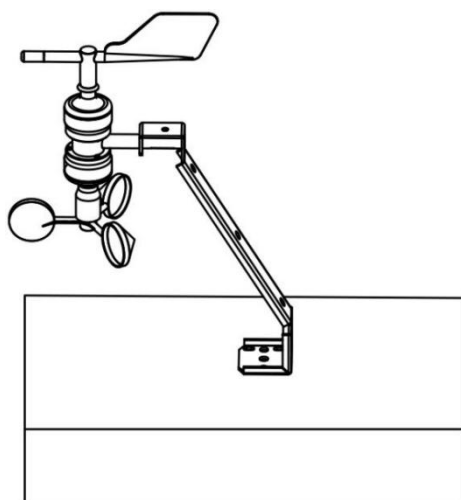


Figure 9.1.1
Horizontal Top Installation

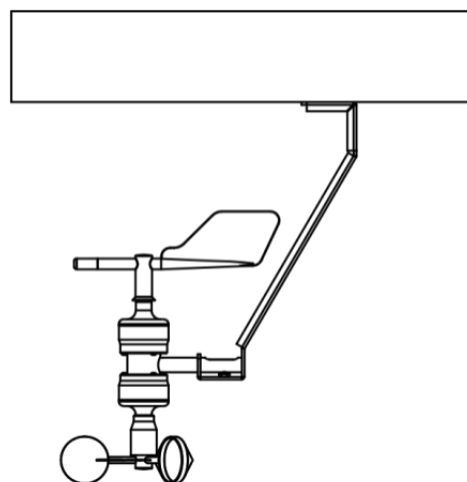


Figure 9.1.2
Horizontal Bottom Installation

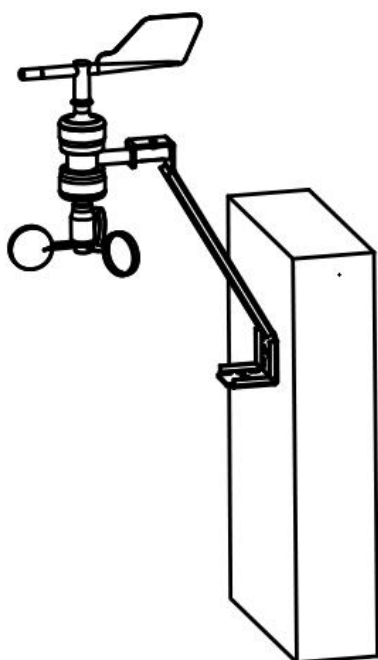


Figure 9.1.3
Vertical Side Installation

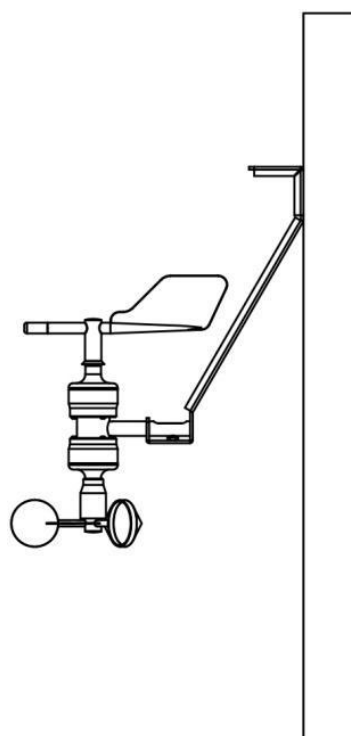


Figure 9.1.4
Pole Installation

10. Precautions

Powered Wiring Prohibition

- Do not connect wires while powered. Only energize the sensor after confirming correct wiring.

Component Modification Restriction

- Do not alter factory-soldered components or pre-connected wires.

Precision Handling Requirement

The sensor is a precision device. Avoid:

- Unauthorized disassembly
- Do not touch internal components to prevent product damage

Note: Unauthorized modifications void the warranty.

11. Troubleshooting

Incorrect Output Signals (Analog/RS232/RS485):

- Verify wiring correctness and secure connections.
- Check if the serial port is occupied or malfunctioning.
- Confirm serial port settings (baud rate, data/stop bits) match device requirements.

Persistent Issues:

- Contact the manufacturer if the above steps fail to resolve the problem.

12. Product Maintenance

Maintenance and Safety

- Regularly clean and inspect the sensor to maintain performance.
- Do not expose the sensor to extreme temperatures, moisture, or corrosive substances unless explicitly specified.
- Unauthorized disassembly, modification, or repairs may void the warranty and lead to malfunctions.

Troubleshooting Protocol

- In case of malfunction, refer to the troubleshooting section of this manual.
- Do not attempt unauthorized disassembly or repairs.
- Contact the manufacturer's after-sales department directly for technical support.

13. Warranty Terms

This product comes with a one-year warranty, starting from the date of delivery. Within twelve months, the Company shall be responsible for free repair or replacement of any failure caused by sensor quality issues (non-human damage). Fees will be charged for repairs or replacements after the warranty period expires.

 Complies with applicable CE directives.

Manual subject to change without notice.

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