RK120-03 Ultrasonic Wind Speed & Direction Sensor User Manual

Revision time	Reviser	Current Version	Remarks
20250329	SUN	V5.0	

Hunan Rika Electronic Tech Co., Ltd
www.rikasensor.com
No. 268, Xinxing Road, Yuhua District,
Changsha City, China

info@rikasensor.com

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
Ultrasonic wind speed & direction sensor	1	
Cable	1	The length depends on the order

1. Product Introduction

RK120-03 is a measuring instrument that uses the time difference of ultrasonic propagation in air to measure wind speed, direction, and acoustic temperature. The built-in signal processing unit can output corresponding signals according to user needs, with a lightweight and compact structure, no moving parts, and a high-strength structural design that can accurately detect in harsh weather conditions, making the components precise and stable, easy to maintain, and using open communication protocols. It can be widely applied in fields such as meteorology, oceanography, environment, airports, ports, laboratories, industry and agriculture, transportation and other fields.

2. Product Features

- No moving parts, zero wear and tear
- Maintenance free, long service life
- ASA shell, more lightweight
- Probe heating, strong anti freezing ability
- Adopting acoustic phase compensation technology and random error identification technology to make the output smoother and more accurate
- Digital filtering technology with stronger resistance to electromagnetic interference

3. Applications

- Environmental monitoring
- Sea-going vessel
- Bridge & Tunnel
- Solar and wind power generation
- Wind resource assessment
- Drilling platform
- Automatic weather station
- Agriculture

4. Specification

Item	Technical Specification		
	Wind speed	Wind direction	Atmospheric pressure
Range	0-45m/s,0-60m/s,0-80m/s (extended range, not standard)	0-360°	300-1100hPa
Resolution	0.01m/s	1°	0.1hPa
Accuracy	≤10m/s:±0.2m/s >10m/s:<±2% the current value	±3°	±1hPa
Starting Threshold	0.1m/s	0.1m/s	
Power Supply	12-24VDC		
Power Consumption	0.12W(Normal mode), 0.008W(Sleep mode), 1.8W(Heating mode)		
Output Signal	RS485(Modbus/NMEA-0183)/RS232/SDI-12, 4-20mA/0-5V(Only for wind speed & direction optional)		
Baud Rate	4800-19200		
Data Update Cycle	1s(Default),other optional		
Operating	-40℃-+70℃		
Storage Temperature	-40℃-+80℃		
Working Humidity	0 - 100%		
Ingress Protection	IP66		
Electronic Compass	Optional		
Atmospheric	Optional		
Dimension	Φ144*148mm		
Weight(Unpacked)	0.8kg		
Main Material	ASA		

5. Electrical Connections

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

6. Output Types & Formulas

Current Type(Range:0-360°)	V=(I_s-4)/(20-4)*Range
	A(°)=(I_d-4)/(20-4)*360
Voltage Type (Range:0-360°)	V=U_s/(full scale voltage-zero point voltage)*Range
	A=(°)=U_d/(full scale voltage-zero point voltage)*360

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

7. Product Dimensions

Unit:mm

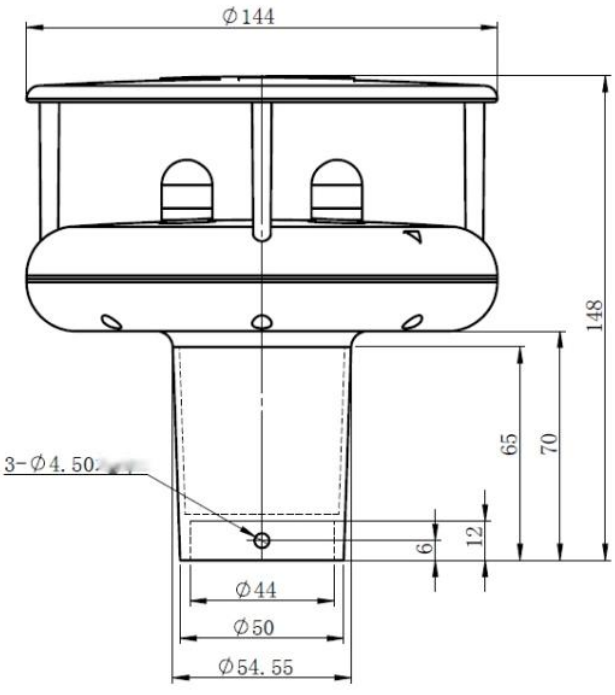

Figure 7.1
Dimensional Specifications

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 51 00 02 95DA

Return:

01 03 04 00 36 01 28 1BB3

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 direction	0x0036(54°)
5	Data block	2	Wind speed	0x0128(2.96m/s)
6	Check block	2		0x1B 0xB3

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	0x42	0x00	0x02	0XA8	0X1F

Response:

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x01	0x06	0x00	0x42	0x00	0x02	0XA8	0X1F

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	0x40	0x00	0x05	0x49	0x55

Return:

Slave id	Function code	Address_H	Address_L	New Baud Rate		CRC_L	CRC_H
0x09	0x06	0x00	0x40	0x00	0x05	0x49	0x55

Register description

Code	Baud Rate	Code	Baud Rate
0	1200	6	28800
1	2400	7	38400
2	4800	8	56000
3	9600	9	57600
4	14400	10	115200
5	19200		

8.4 Modify Check Bit and Stop Bit

Client sends:(Change to NONE,1)

Slave id	Function code	Address_H	Address_L	New serial port		CRC_L	CRC_H
0x09	0x06	0x00	0x41	0x00	0x03	0x98	0x97

Return:

Slave id	Function code	Address_H	Address_L	New serial port		CRC_L	CRC_H
0x09	0x06	0x00	0x41	0x00	0x03	0x98	0x97

Register description

Code	Data Bits	Check Bit	Stop Bit
0	8	NONE	2
1	8	ODD	1
2	8	EVEN	1
3	8	NONE	1

9. Installation Guidelines

- Ensure no obstacles (e.g., buildings, trees, billboards) exist around the anemometer cups 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 has a rota-table installation hole at the bottom.

Without electronic compass function

- When installing the sensor, ensure that the indicator arrow on the sensor is facing towards the geographic north.

With electronic compass function

- Fixed installation method: The sensor can be installed in any orientation; it does not need to face north.
- Mobile installation method (for vehicles, ships, etc.): When installed on moving objects like vehicles or ships, the sensor's north indicator must be aligned with the direction of travel.

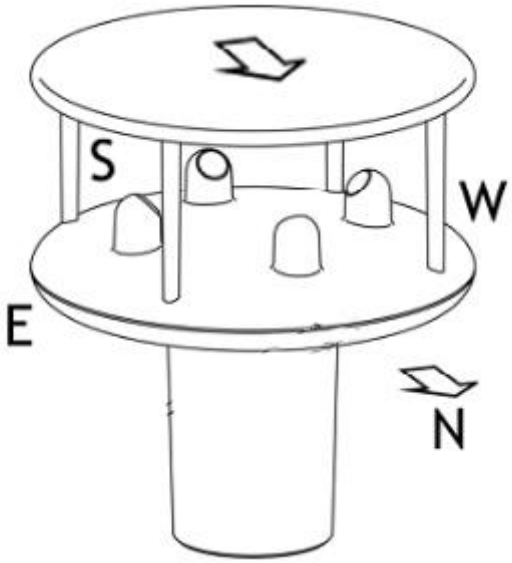

Figure 9.1.1 Mounting Orientation

9.2 Installation Method

- RK95-53 bracket

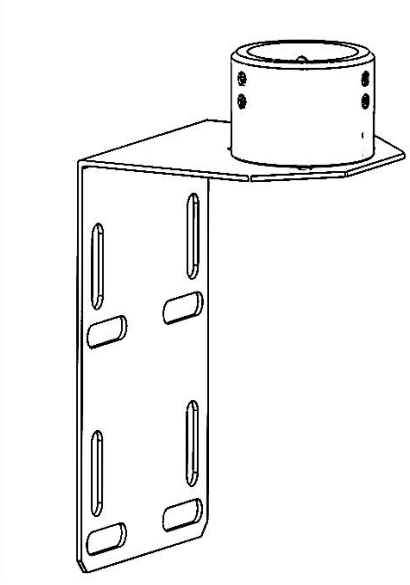

Figure 9.2.1
Bracket with slot-holed mounting plate

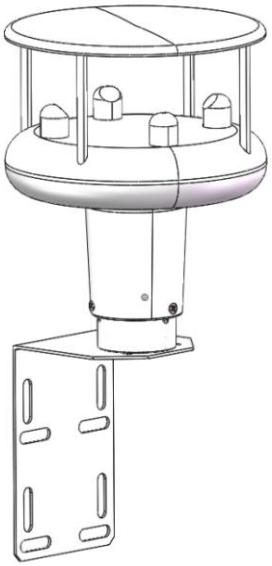

Figure 9.2.2
Bracket Mounting Diagram

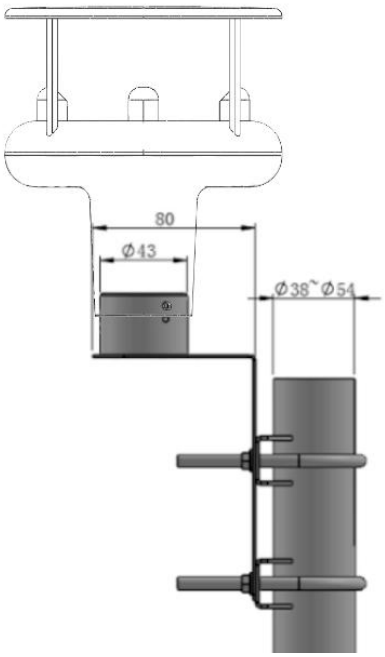

Figure 9.2.3
Pole mounting with clamp fixing
Suitable for mounting on poles ranging in diameter from 38mm to 54mm

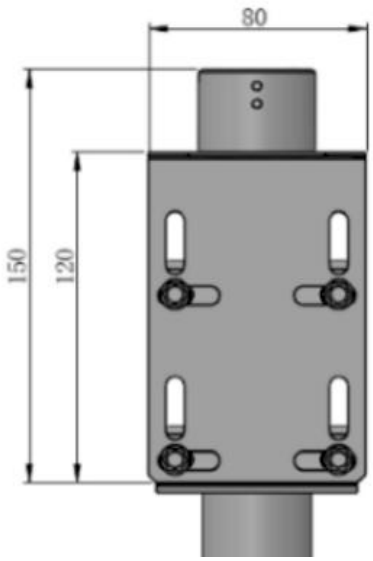

Figure 9.2.4
Bracket dimensions and hole spacing details

- RK95-54 bracket

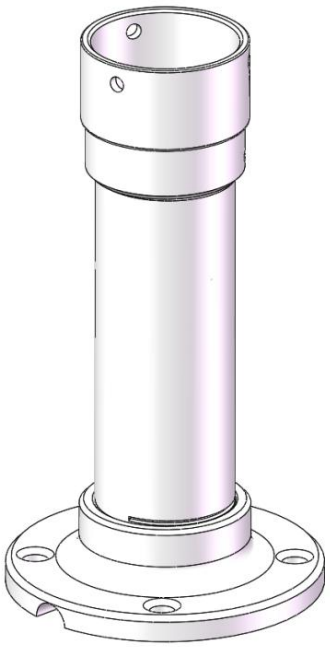

Figure 9.2.5
Bracket Diagram

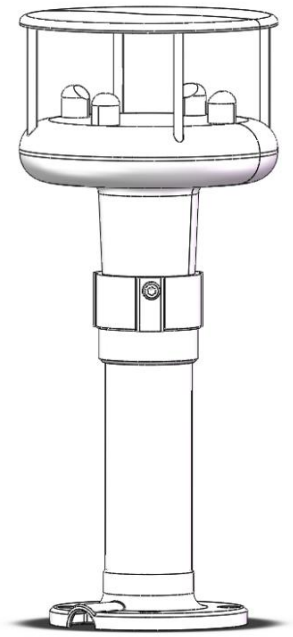

Figure 9.2.6
Bracket Mounting Diagram

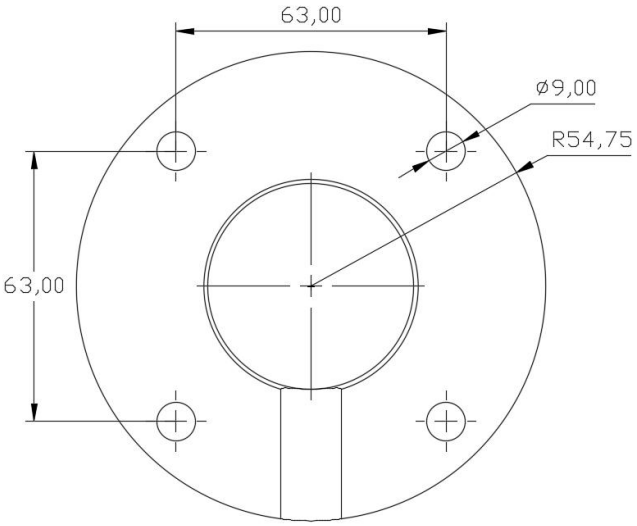

Figure 9.2.7
Bottom Dimension Diagram

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.

CE Complies with applicable CE directives.

Manual subject to change without notice.

Copyright © 2015 Hunan Rika Electronic Tech Co.,Ltd

Hunan Rika Electronic Tech Co., Ltd
www.rikasensor.com
No. 268, Xinxing Road, Yuhua District,
Changsha City, China

info@rikasensor.com