RK200-04 Solar Radiation Sensor

User Manual

Revision time	Reviser	Current Version	Remarks
20250407	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.
- Check that the packaging is intact and verify the product model matches the selected specifications.

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
Solar Radiation Sensor	1	
Cable	1	The length depends on the order

1. Product Introduction

RK200-04 Solar Radiation Sensor is designed on basis of silicon-cell principle. It is mainly used for measuring solar radiation within 300~1100nm wavelength. If the sensing face is downwards, it can test the reflected radiation and solar radiation on the incident to the inclined plane. If shad is added, it can test the scattered radiation. It is widely used to monitor the solar radiation in meteorology, solar energy, agriculture, construction materials aging and atmospheric pollution and etc..

2. Product Features

- Designed on silicon-cell principle
- Low response time
- High sensitivity
- Low power consumption
- Light weight, long service life
- Used as sunshine duration sensor

3. Specification

Item	SPECIFICATIONS
Spectral range	300-1100nm
Supply	5V,12-24VDC
Range	0-1500W/m^2
Resolution	1W/m^2
Output	0-2.5V,0-5V,4-20mA,RS485,SDI-12
Power consumption	0.2W
Response time	≤500nS(95%)
Cosine correction	≤±10%(Solar elevation angle=10°)
Non-linear	≤±2%
Temperature effect	±0.08%/℃
Stability	≤±2%/year
Operating	-40℃-+80℃
Ingress protection	IP67
Weight(unpacked)	420g
Shell material	Aluminum alloy
Storage condition	10℃-60℃@20%-90%RH

4. Electrical Connections

Cable	Voltage	Current	RS485
Red	V+	V+	V+
Green/Black	V-	V-	V-
Yellow	Signal+	Signal+	RS485A
Blue			RS485B

5. Output Types & Formulas

Current Type (0–1500 W/m²):	4-20mA	F=(I-4)/16*1500
Voltage Type (0–1500 W/m²):	0-2.5V	F=V/2.5*1500
	0-5V	F=V/5*1500

F: Solar radiation values in W/m²;

V: Transmitter output voltage in V;

I: Transmitter output current in mA.

6. Product Dimensions

Unit:mm

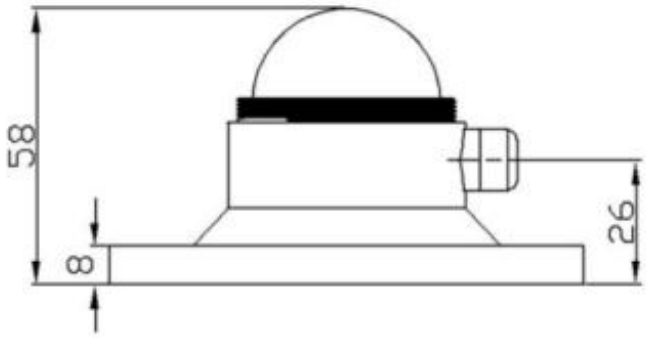

Figure 6.1 Side view

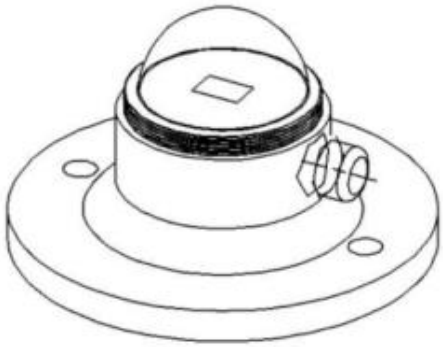

Figure 6.2 3D view

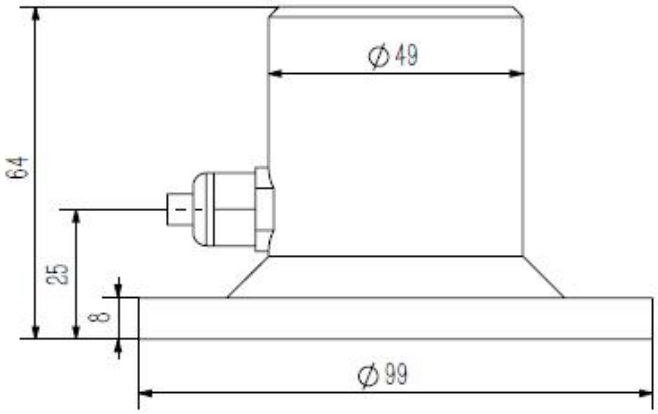

Figure 6.3
Side view with protective dome

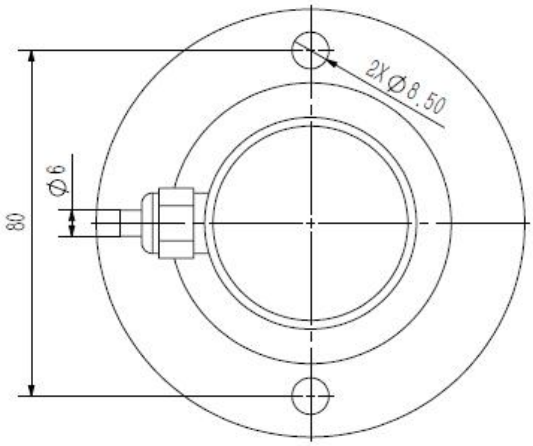

Figure 6.4
Top view with protective dome

7. 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)

7.1 Read Real-Time Data

Client sends:

01 03 00 00 00 01 840A

Return:

01 03 02 03 B4 B8 C3

7.1.1 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	0X02	2bytes
4	Data block	2	Radiation Data	0x03B4(948W/m^2)
5	Check block	2		0xB8 0xC3

7.2 Modify Slave Address

Client sends:(Change the slave address from 00H to 01H.)

Slave id	Function code	New Address	CRC_L	CRC_H
0x00	0x10	0x01	0xBD	0xC0

Response:

Slave id	Function code	CRC_L	CRC_H
0x00	0x10	0x00	0x7C

7.3 Read Sensor Address

Client sends:

Slave id	Function code	CRC_L	CRC_H
0x00	0x20	0x00	0x68

Return:

Slave id	Function code	Current Address	CRC_L	CRC_H
0x00	0x20	0x01	0xA9	0xC0

8. Installation Guidelines

- The sensor must be installed in an open area with no obstructions above its sensing surface.
- Level the radiation sensor horizontally, secure it firmly, remove the protective cover, and connect its output cable to the data acquisition system to initiate observation.

8.1 Installation Method

Use M6 screws and nuts to fix the sensor onto the mounting bracket through the two mounting holes on the sensor.

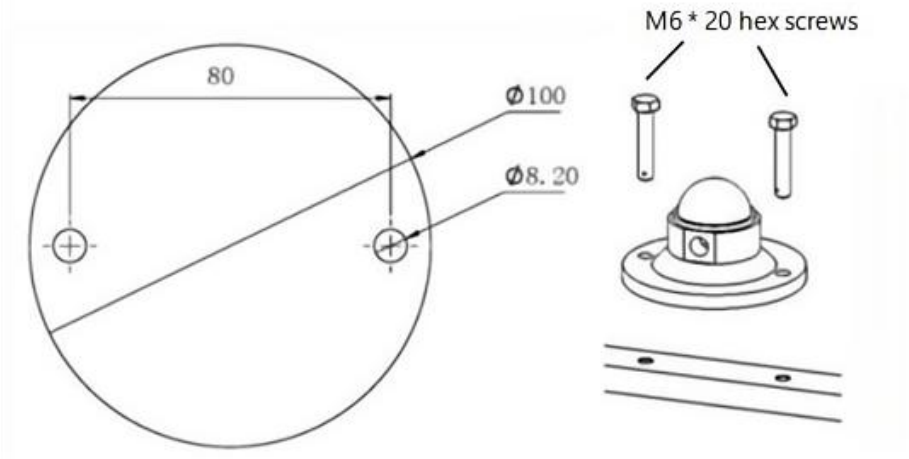

Figure 8.1.1
Installation Diagram

Tilted Installation Compatible with RK95-56 Bracket（Unit:mm）

9. 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.

10. Troubleshooting

Zero Reading on Display:

- Check if the protective cover is removed.
- Ensure the sensor is exposed to sunlight (if applicable).
- Do not discard the protective cover after removal.

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.

Note: Retain the protective cover for recalibration or storage.

11. Product Maintenance

- Handle the protective cover with extreme care when opening or closing it, as the filter glass cover is fragile and valuable. Regularly wipe the filter glass cover with a soft cloth to keep it clean and avoid affecting data accuracy.
- During heavy rain, snow, ice, or prolonged precipitation, cover the radiometer; remove the cover promptly after the weather clears.
- The sensitivity of the RK200-04 solar radiation sensor must be recalibrated by the manufacturer or a certified calibration institution after two years of use.
- Note: Follow these steps to ensure measurement accuracy and prolong device lifespan.

12. 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.

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