RK200-13 Long Wave Radiation Sensor User Manual

Revision Time	Reviser	Current Version	Remarks
20250820	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
Sensor	1	
Cable	1	The length depends on the order
Mounting screw	1	Set

1. Product Introduction

The long-wave radiometer, also known as the terrestrial radiometer, is an instrument designed to measure the long-wave radiation incident or exiting from the hemisphere to the Earth. It is used in the measurement of the Earth's radiation. It can measure 3.5-50 μ m infrared rays from the sky and the ground, and output in the form of voltage. Adopting a standardized thermoelectric semiconductor process to ensure the accuracy of each product..

2. Product Features

- Conform to the WMO standard
- Suitable for harsh environment
- With horizontal bubble
- High sensitivity
- Passive accurate measurement
- Maintenance free
- Easy installation

3. Applications

- Solar energy & photovoltaic power generation
- Agriculture and forestry monitoring
- Crop growth monitoring
- Tourism eco
- Weather stations

4. Specifications

Item	Specification
Spectral Range	3500-50000nm
Range	0-2000W/m^2
Output	0-20mV,4-20mA,RS485
Internal Resistance	⩽30Ω
Response Time	≤10s
Cosine Correction	≤±3%
Non-linearity	≤±2%
Temperature Effect	±2%(-20℃-+40℃)
Stability	±2%/year
Operating Temperature	-40℃-+80℃
Weight(Unpacked)	0.8kg
Ingress Protection	IP65
Storage Condition	10℃-60℃@20%-90%RH

5. Electrical Connections

Connector(Cable)	Pulses /Current/Voltage	RS485
Red	V+	V+
Black	V-	V-
Yellow	Signal	RS485A
Green		RS485B

6. Output Types & Formulas

Single Header 0-20mV Voltage Output Type:	F=H/N*1000	
Current Type (0–2000 W/m²):	4-20mA	F=(I-4)/16*2000
Voltage Type (0–2000 W/m²):	0-2.5V	F=V/2.5*2000
	0-5V	F=V/5*2000

F: Radiation Data in W/m²;

H: Millivolt output voltage from the sensor head in mV;

N: Sensitivity of the sensor head in μV·m²/W;

V: Transmitter output voltage in V;

I: Transmitter output current in mA.

7. Product Dimensions(Unit:mm)

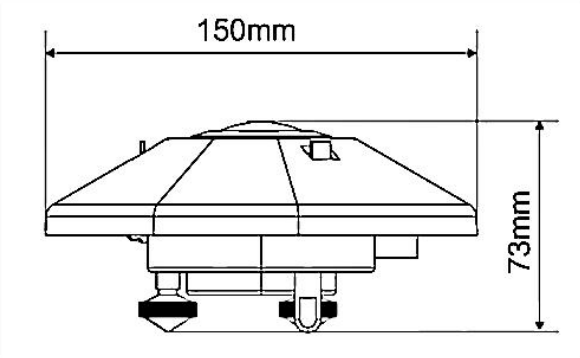

Figure7.1
Side View with Height and Width Dimensions

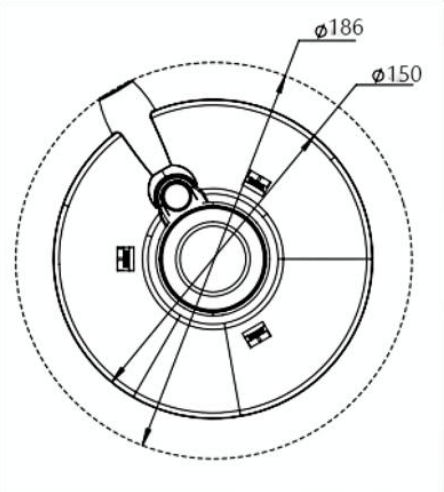

Figure7.2
Top View with Dimensional Details

8. Communication Protocol(MODBUS-RTU)

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

8.1 Read Real-time Data

Client sends:

01 03 00 00 00 01 840A

Return:

01 03 02 03 B4 B8 C3

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	0x02	2bytes
4	Data block	2	Radiation Data	0x03B4(948W/m^2)
5	Check block	2		0xB8 0xC3

8.1.2 Modify Slave Address(Example: Changing the sensor address from 01H to 02H.)

Client sends:

Slave id	Function code	Set Reg_H	Set Reg_L	Reg Num_H	Reg Num_L	Data Len	New Addr	Data Len	CRC_L	CRC_H
0x01	0x10	0x05	0x01	0x00	0x01	0x02	0x02	0x00	0xF3	0xE1

Response:

Slave id	Function code	Set Reg_H	Set Reg_L	Data Len_H	Data Len_L	CRC_L	CRC_H
0x01	0x10	0x00	0x05	0x01	0x10	0x11	0xFB

9. Precautions

Package and Model Verification

- Ensure the packaging is intact and verify the sensor model and specifications match your purchased product.

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

Environmental Protection

- Prevent sticky particles from entering the sensor.
- Avoid moisture exposure to maintain measurement performance.

Note: Unauthorized modifications void the warranty.

10. 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.

11. 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.

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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