



Product Introduction

The Diffuse solar radiation sensors is composed of two parts: the pyranometer and the shading ring.

The function of the shading ring is to ensure that the direct radiation of the sun can be continuously blocked from sunrise to sunset.

The shading ring is composed of a shading ring, a ruler, a screw adjusting screw, a bracket, and a chassis.

The shading ring has a width of 65mm and a diameter of 400mm, which is fixed on the screw adjustment screw of the scale, and the scale is engraved with latitude and declination scales.

The ruler and bracket are fixed on the chassis and should be fixed according to the geographic latitude of the shooting site. It can be widely used in meteorological stations and scientific research departments to continuously measure the scattered radiation intensity of the sky.

Technical Parameters

Spectral range: 0.3-3 μ m

Measuring range: □ 0~2000W/m²

Power supply :

DC 5V or DC 12V-DC 24V

Output : RS485 or Voltage: 0~2.5V

Instrument cable length: 2.5 meters

Load capacity: current output impedance

$RL \leq 300\Omega$

Voltage type output impedance $RL \geq 1K\Omega$

Sensitivity: 7-14 μ V/W.m-2

Response time: <35S (99 % response)

Annual stability: no more than $\pm 2\%$

Cosine response: no more than $\pm 7\%$ (when the sun altitude angle is 10°)

Azimuth: no more than $\pm 5\%$ (when the sun's altitude angle is 10°)

Non-linearity: no more than $\pm 2\%$

Temperature coefficient: no more than $\pm 2\%$
(-10-40°C)

Latitude scale range: 0~50°

Declination range: $\pm 25^\circ$

Belt diameter: $\Phi 400$

Weight: 15kg

Working environment:

Temperature -50°C ~ 85°C

Humidity $\leq 100\%RH$

Calculation formula

Voltage type (0~2.5V):

$$F = (V/2.5) * 2000$$

F: radiation value, unit W/m², V: output voltage, unit V, radiation test range 0~2000W/m²

Connection method

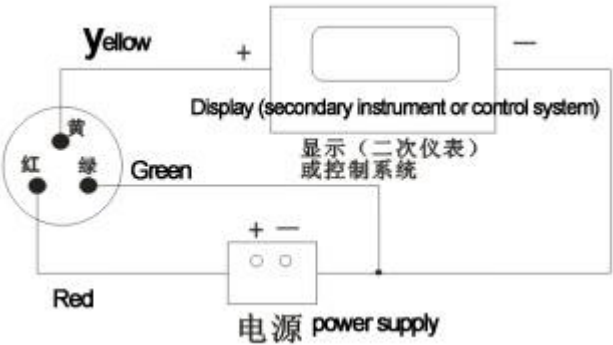
(1) If equipped with a weather station produced by our company, directly use the sensor line to connect the sensor to the corresponding interface on the weather station.

(2) If the transmitter is purchased separately, the wiring sequences of the transmitter supporting lines are as follows:



Line color	Output Signal		
	Voltage	Current Type	RS485 type
Red	+	Power +	Power +
Black (Green)	-	Power -	Power -
Yellow	Voltage signal	Current Signal	A+/TX
Blue			B-/RX

(3) Pulse voltage and current two output wiring methods:

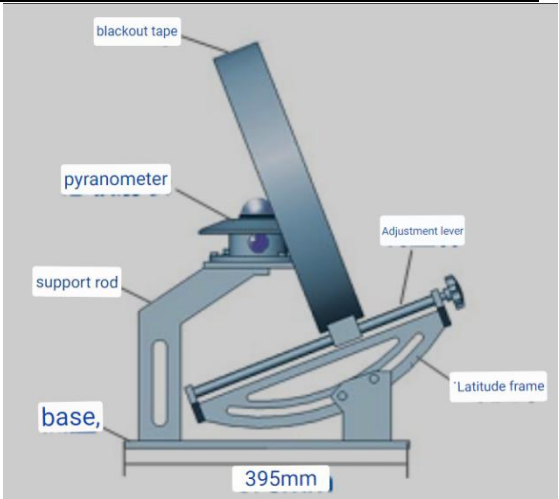


(voltage, pulse mode wiring)

Structural Dimensions

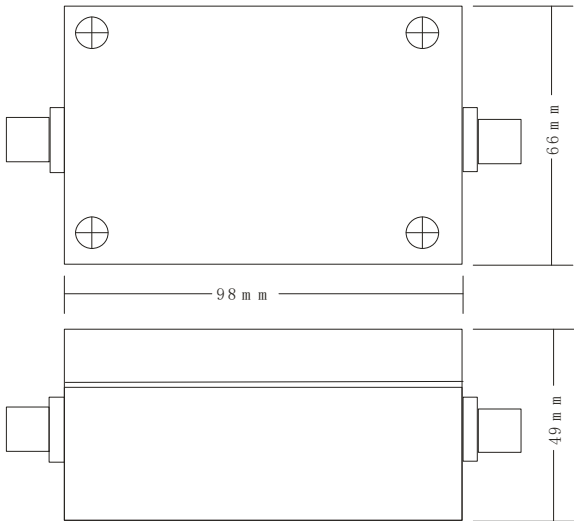


Shading Ring Dimensions



Function diagram

Transmitter Dimensions



MODBUS-RTU Communication Protocol

1. Serial Port Format
 - Data Bits: 8 bits
 - Stop Bits: 1 or 2 bits
 - Parity Bit: None
 - Baud Rate: 9600
 - Minimum interval between two communications: 1000 ms

2. Communication Format

- [1] Writing Device Address
 - Send: 00 10 Address CRC (5 bytes)
 - Return: 00 10 CRC (4 bytes)

Explanation:

1. The address bit of the read/write address command must be 00.

2. Address is 1 byte, range: 0-255.

Example:

- Send: 00 10 01 BD C0

- Return: 00 10 00 7C

[2] Reading Device Address

- Send: 00 20 CRC (4 bytes)

- Return: 00 20 Address CRC (5 bytes)

Explanation:

Address is 1 byte, range: 0-255.

Example:

- Send: 00 20 00 68

- Return: 00 20 01 A9 C0

[3] Reading Real-Time Data

- Send: Address 03 00 00 00 01 XX XX

Explanation: As shown in the figure below:

Code	Function definition	Note
Adress	Station number (address)	
03	Function code	
00 00	Starting address	
00 01	Number of points to read	
XX XX	CRC check code, low at the beginning and high at the end	

Return: Adress 03 02 XX XX XX XX

Explanation:

Code	Function definition	Note
Adress	Station number (address)	
03	Function code	
02	Read unit byte	
XX XX	Data (high first, low second)	hexadecimal
XX XX	CRC check code	

For example: Send 01 03 00 00 00 01 84 0A

Return: 01 03 02 00 B4 B8 33

Note: 00 B4 converts to hexadecimal 180. After data parsing, the actual radiation value is 180 W/m².

Installation Method

1. The installation conditions of the pyranometer are the same as those of the pyranometer. Since the shading ring is heavy and the chassis is large, the instrument should be placed more firmly;
2. Install the shading ring frame on the observation platform first. The direction and level of the shading ring are very important. Therefore, when the shading ring is installed on the platform, the edge of the chassis must be aligned with the north-south direction, so that the instrument scale points to the true north-south (shading ring). The ring screw adjustment knob handle faces north). Then fix the bottom plate of the light-shielding ring on the observation bracket with bolts;
3. Fix the ruler position according to the local geographic latitude;
4. Install the pyranometer horizontally on the platform in the shading ring, so that the output head faces north, and its position should be just so that the blackened sensing surface of the pyranometer is located in the center of the shading ring. Adjust the pyranometer level and fix it;
5. Adjust the shading ring to the corresponding position according to the solar declination of the day. Make the shading ring completely cover the sensing surface and glass cover of the pyranometer;
6. The output line of the master meter is connected to the recorder;
7. Use and maintenance of the pyranometer The use and maintenance of the pyranometer is the same as that of the pyranometer. When

observing scattered radiation, turn the screw before sunrise. The screw rod is used to adjust the knob, and the shading ring is adjusted to the corresponding position of the scale according to the day's declination (sometimes once every few days), so that the shading ring can cover the direct radiation of the sun throughout the day. Check once a day in the morning and afternoon to check whether the shadow of the shading ring completely covers the sensing surface and the glass cover of the instrument, otherwise it should be adjusted in time;

8. Always keep the parts of the shading ring clean and the rotation of the screw rod flexible. When you find that the screw is dusty or the rotation is not flexible, especially after the wind and sand, wipe the screw with gasoline or alcohol. If it is not used for a long time, the shading ring should be removed or covered with a cover to avoid corrosion of the screw rod and related parts.

Notice

1. Please check whether the packaging is in good condition, and check whether the product model is consistent with the selected model;
2. Do not wire with power on. Only after the wiring is completed and checked are correct, can the power be turned on;
3. The length of the sensor wire will affect the output signal of the product. When using it, do not change the components or wires that have been welded when the product leaves the factory. If you need to change it, please contact the manufacturer;
4. The sensor is a precision device. When using it, please do not disassemble it by yourself, or touch the surface of the sensor with sharp objects or corrosive liquids, so as not to damage the product;
5. The pyranometer working continuously should

be checked at least once a day, and the content of the inspection mainly depends on whether the glass cover is broken. In case of freezing snow, frost, dew, etc., try to gently remove these deposits. In addition, you should regularly check the level, whether the desiccant is effective, whether there is moisture in the cover, etc.;

6. Please keep the verification certificate and qualification certificate, and return it with the product when repairing.

Troubleshoot

1. During analog output, the displayed value is obviously too large/small. Please check whether there is any dirt such as oil on the glass cover, and wipe it off with a clean rag;
2. During analog output, the display shows that the value is 0 or not within the range. The collector may not be able to obtain information correctly due to wiring problems. Please check whether the wiring is correct and firm;
3. If it is not the above reasons, please contact the manufacturer.

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