

Photosynthetically active radiation sensor

Product Manual
(V1.0)



● Product overview

Photosynthetically active radiation is the radiant energy of a certain band in the solar radiation spectrum that can be absorbed, transformed and used for the synthesis of organic substances by the plastid pigments of green plants. The sensor adopts a high-precision photosensitive element with a spectrum of 400nm-700nm. At the same time, a dust cover with high light transmittance is installed outside the sensing element. The surface of the sensor is made of opal glass with a cosine characteristic response, which can effectively prevent environmental factors from interfering with the internal components. More accurate measurement of photosynthetically active radiation. The product can adopt two reading methods of analog output and RS485 Modbus RTU protocol output to convert the current photosynthetically active radiation value.

● Technical indicators

Power supply range	10V~30V DC	
Output method	Digital output	RS485 (standard Modbus-RTU protocol)
	Current output	4-20mA
	Voltage output	0-5V、 0-10V
Operating temperature	-25°C~60°C	
Response spectrum	400nm~700nm	
Measuring range	0~2500umol/m ² ·s	
Precision	≤±3%FS	
Response time	≤0.1s	

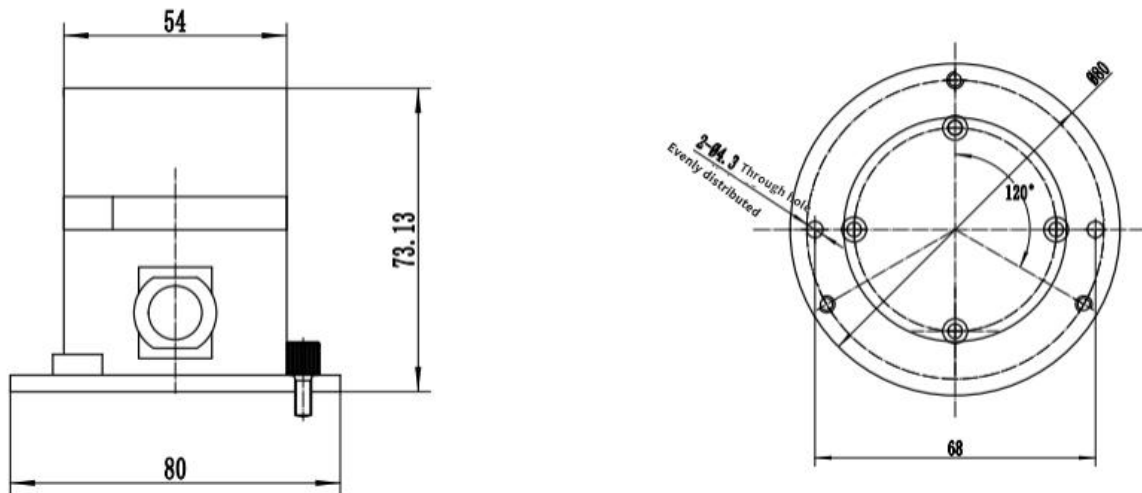
Resolution	1 μ mol/m ² ·s
Non-linearity	≤±3%
Annual stability	≤±3%
Electrical Interface	Direct line

● Product installation configuration list

Installation method

1. Use screws to pass through the mounting holes on the sensor, and fix the sensor on the mounting bracket
2. Make sure that the device is parallel to the ground (you can adjust the hand screw and check the state of the level bubble to determine whether it is parallel)
3. After the installation is complete, remove the protective cover

Equipment size (unit: m)



● Wiring

RS485 type

	Thread color	Illustrate
Power supply	Red	Positive power supply (10~30V DC)
	Black	Power negative

Communication	White	RS485-A
	Yellow	RS485-B

Analog type

	Thread color	Illustrate
Power supply	Red	Positive power supply (10~30V DC)
	Black	Power negative
Communication	White	Signal line (4-20mA, 0-5V, 0-10V)

Letter of agreement

● Communication Basic Parameters

Data bit	8 bits
Parity bit	None
Stop bit	1 person
Error checking	CRC (Redundant Cyclic Code)
Baud rate	2400bit/s, 4800bit/s, 9600bit/s, 115200bit/s can be set, the factory default is 9600bit/s

Host query frame structure :

Address code	Function code	Register start address	Register length	Check code low	Check code high
1 byte	1 byte	2 byte	2 byte	1 byte	1 byte

Slave response frame structure :

Address code	Function code	Effective bytes	Data area 2	Data area 2	Data N area	Check code low	Check code high
1 byte	1 byte	1 byte	2 byte	2 byte	2 byte	1 byte	1 byte

● **register address**

Register address	Content	Operate	Scope and Definitions
0x00	Radiation value (integer)	Read only	Real value (16-bit unsigned)
0x03	baud rate register	Read and write	24 is 2400; 48 is 4800; 96 is 9600 (default)
0x04	Address register	Read and write	1~255 (default 1, 200 is universal address)

● **Communication protocol example**

Read the current radiation value

Inquiry frame:

Address code	Function code	Register address	start	Register length	Check code low	Check code high
0x01	0x03	0x00	0x00	0x00	0x01	0x84

Response frame :

Address code	Function code	Effective bytes	Solar radiation value	Check code low	Check code high
0x01	0x03	0x00	0x00	0x84	0x0A

Radiation value: 0064 (hexadecimal) =100, radiation value = 100 umol/m²·s

● **Modify the current baud rate to 115200**

Inquiry frame :

Address code	Function code	Register start address	Change the data	Check code low	Check code high
0x01	0x06	0x00	0x0A	0x04	0x80

Response frame :

Address code	Function code	Effective bytes	Solar radiation value	Check code low	Check code high
0x01	0x06	0x00	0x0A	0x04	0x80

● **Calculation method**

Current-type output signal conversion calculation

For example, the range is 0-2500 umol/m²·s, 4~20mA output, when the output signal is 10mA, calculate the current radiation value. The span of this radiation value range is 2500 umol/m² s,

expressed by 16mA current signal, $2500/16\text{mA}=156.25 \text{ umol/m}^2 \text{ s}$, that is, the current 1mA represents a change of $156.25 \text{ umol/m}^2 \text{ s}$, and the measured value is $12\text{mA}-4\text{mA}= 8\text{mA}$, $8\text{mA} \times 156.25=1250 \text{ umol/m}^2 \text{ s}$.

Voltage type output signal conversion calculation

For example, the range is 0-2500 $\text{umol/m}^2\text{-s}$, the output is 0-10V, when the output signal is 4V, calculate the current radiation value. The span of this radiation value range is 2500 $\text{umol/m}^2 \text{ s}$, expressed by 10V signal, $2500/10\text{V}=250 \text{ umol/m}^2 \text{ s}$, that is, a voltage of 1V represents a change of 250 $\text{umol/m}^2 \text{ s}$, and the measured value is $4\text{V} \times 250 =1000 \text{ umol/m}^2 \text{ s}$.

● Precautions

1. After opening the product package, please check whether the appearance of the product is intact, check whether the relevant content of the product instruction manual is consistent with the product, and keep the product instruction manual for more than one year;
2. Wiring strictly according to the wiring diagram of the product, and work under the permissible excitation voltage of the product, and do not use it with overvoltage;
3. Do not knock the product, so as not to damage the appearance and internal structure of the ring;
4. The photosensitive surface of the product should be kept clean, and the surface dust and stains should be removed regularly if necessary;
5. The product has no customer-repairable parts, please contact our company in case of failure;
6. If the company's products fail under normal conditions, the warranty period is one year (13 months from the date of delivery by our company to the date of return). as the basis. For maintenance beyond the time limit, the company will charge a cost fee, and all products of the company will be maintained for life;
7. Please refer to our company website or call us for details.