Working temperature: -40-65℃
Relative humidity: 0~100%RH
Sensitivity: 5～50μv/μmol·s¹
Internal resistance: <2K

## Calculation formula

Voltage type (0~2.5V output):
E= V /2. 5 × 2000
(E is the measured radiation value (W/m2), V is the output voltage (V))

## Connection method

(1) If equipped with the collector produced by our company, directly connect the sensor to the corresponding interface on the collector using the sensor cable.
(2) If the transmitter is purchased separately, the corresponding line sequences are:

| Line color | output signal | | |
|---|---|---|---|
| | Voltage | | Communications |
| Red | + | | + |
| Black （Green） | - | | - |
| Yellow | Voltage signal | | A+/TX |
| Blue | | | B-/RX |

(3) Transmitter voltage output wiringmethod:
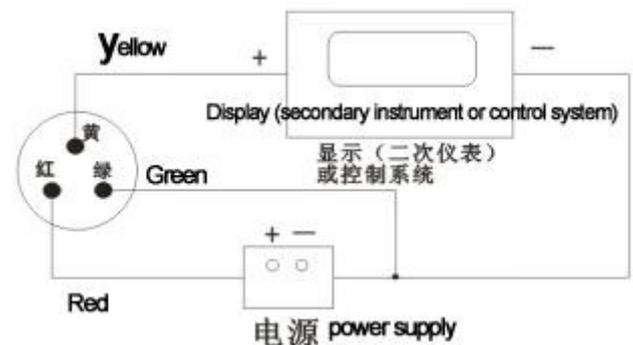


(Voltage output mode wiring)

## Product introduction

NBL-W-PARS photosynthetically active radiation meter, also known as light quantum number, is mainly used to measure the photosynthetically active radiation of natural light in the wavelength range of 400-700nm, and it is easy to use. conditions.
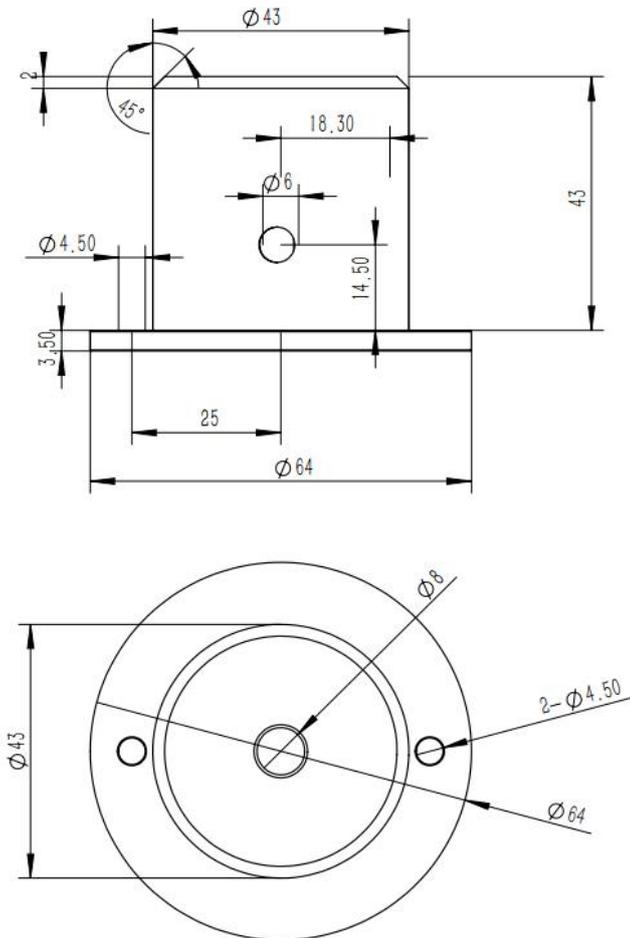
The watch uses a silicon photodetector and passes through a 400-700nm optical filter. When irradiated by light, a voltage signal proportional to the intensity of incident radiation is generated, and its sensitivity is proportional to the cosine of the direct angle of incident light. The unit of each photosynthetically active radiation meter is W/㎡. This meter is widely used in agriculture. Meteorology, research on crop growth.

## Technical Parameters

Spectral range: 400~700nm
Range: 0-2000 W/m2
Power supply mode: □ DC 12V-24V
　　　　　　□ other
Output form: □ Voltage: 0～2.5V
　　　　　　□ Voltage: 0~5V
　　　　　　□RS485
Instrument cable length: □ Standard configuration: 2.5 meters
□Other
Response time: about 1s (99%)
Temperature dependent: max. 0.05%/°C
Cosine correction: up to 80° incident angle

## Dimensions



## MODBUS-RTU Communication

## Protocol

1. Serial port format
Data bit 8 bits
1 or 2 stop bits
Check digit None
Baud rate 9600 The interval between two communications is at least 1000ms
2. Communication format
【1】 Write device address
Send: 00 10 Address CRC (5 bytes)
Return: 00 10 CRC (4 bytes)

Note: 1. The address bit of the read/write address command must be 00.
2. Address is 1 byte, ranging from 0-255.
Example: send 00 10 01 BD C0
return 00 10 00 7C

【2】 Read device address
Send: 00 20 CRC (4 bytes)
Return: 00 20 Address CRC (5 bytes)
Description: Address is 1 byte, the range is 0-255
Example: Send 00 20 00 68
return 00 20 01 A9 C0

【3】 Read real-time data
Send: Address 03 00 00 00 01 XX XX
Description: As shown in the figure below:

| Code | Functional Definition | Remark |
|---|---|---|
| Address | Station number (address) | |
| 03 | Function code | |
| 00   00 | Start address | |
| 00   01 | Read points | |
| XX XX | CRC Check code, low front and high back | |

Return: Address 03 02 XX XX XX XX
Description:

| Code | Functional Definition | Remark |
|---|---|---|
| Address | Station number (address) | |
| 03 | Function code | |
| 02 | Read unit bytes | |
| XX   XX | Data (front high and back low) | Hex |
| XX   XX | CRC Check code | |

Example: Send 01 03 00 00 00 01 84 0A
Return 01 03 02 00 B4 B8 33
**Note: 00 B4 converted to decimal is 180, after data analysis, the actual photosynthetic active radiation value is 180 W/m2**

NBL-W-PARS  Photosynthetically Active Radiation Sensors
Changsha Zoko-Link Technology Co., Ltd.

NiuBoL

## Steps to calculate CRC code:

1. The preset 16-bit register is hexadecimal FFFF (that is, all 1). Call this register the CRC register;
2. XOR the first 8-bit data with the low bit of the 16-bit CRC register, and put the result in the CRC register;
3. Shift the content of the register to the right by one bit (towards the lower bit), fill the highest bit with 0, and check the lowest bit;
4. If the lowest bit is 0: repeat step 3 (shift again)

If the lowest bit is 1: XOR the CRC register with the polynomial A001 (1010 0000 0000 0001);

5. Repeat steps 3 and 4 until the right shift is 8 times, so that the entire 8-bit data has been processed;
6. Repeat steps 2 to 5 to process the next 8-bit data;
7. The final CRC register is the CRC code;
8. When putting the CRC result into the information frame, exchange the high and low bits, with the low bits first.

## RS485 Circuit
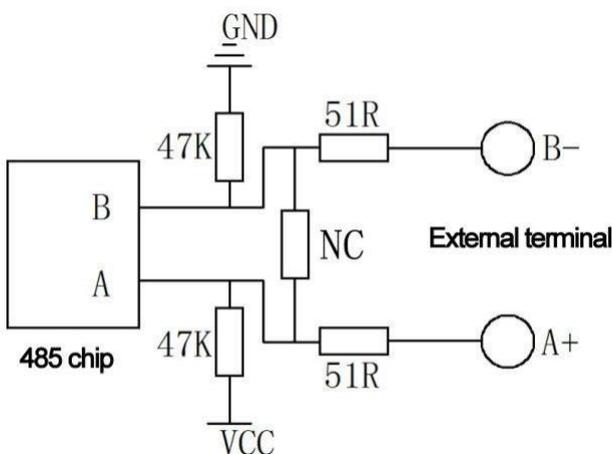


## Installation and Maintenance

1. Choose a venue

The ideal position of the photosynthetically active radiation meter should be that there are no obstacles on the upper end of its sensing element, to ensure that there are no obstacles with an elevation angle exceeding 5° in the azimuth of sunrise and sunset, and the phenomenon of shadows falling on the sensing surface should be avoided.

2. Install

It is recommended that the user check whether the delivered product has any damage caused by transportation before installation, and contact the manufacturer in time.
The PARS photosynthetically active radiation meter has 2 screw holes and is equipped with 2 stainless steel screws. First, fix the photosynthetically active radiation meter firmly on the bracket, adjust the horizontal position, and fasten it, then connect the output wire to the data collector box, and then observe.

3. Maintenance

Continuously working photosynthetically active radiation meters should be checked at least once a week. The content of the inspection mainly depends on whether the cosine correction sheet is clean. If ice, snow, dust, etc. appear, these deposits should be removed.
If it is measured with a digital voltmeter, the measured voltage value divided by the sensitivity coefficient of the photosynthetically active radiation meter is the radiation amount.

## 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 connect live wires, and power on after the wiring is completed and checked;
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. Please keep the verification certificate and qualification certificate, and return it with the product when repairing.

## Storage conditions

Indoor storage with a relative humidity below 80% and no corrosive or volatile substances.

## Contact Us

Contact: +8615367865107/+8618073152920

Zip code: 421000

Email: sales@niubol.com

Website: http://www.niubol.com

Address: Room 103, Area D, Houhu Industrial

Park, Yuelu District, Changsha City, Hunan

Province,China