

USER GUIDE FOR CDG-11B PYRANOMETER

CDG-11B-01-MN-10

SEP-2024

This document is applied for the following products

SKU	CDG	HW Ver.	1.0	FW Ver.	1.0
Item Code	CDG-11B	Pyranometer Sensor, 4-20mA RS485 0-5V 0-2V 0-20mV Output, Aluminum alloy, 0-2000W/m ²			

1. Introductions

CDG-11B Pyranometer is produced based thermopile principle; sensing elements are made by winding - plated thermopiles with multi contacts. Its surface is coated by black coating with high absorption rate. Hot contacts on the sensors surface, while the cold junction is located within the body, temperature difference between the hot and cold junction generates electromotive force, the thermoelectric effect is proportional to the solar radiation. In order to reduce the ambient temperature effect, temperature compensation circuit designed here to reduce the effects to products properties.

2. Specification

Item	Specifications
Spectral range	300~3200nm
Supply	12-24VDC
Range	0-2000W/m ²
Output	0-20mV,0-2.5V,0-5V,4-20mA,RS485
Sensitivity	7-14 μ V*W ⁻¹ *m ²
Internal resistance	350 Ω
Response time	\leq 20s(99%)
Cosine correction	\leq \pm 7%(Solar elevation angle=10 $^{\circ}$)
Measuring angle	2 π solid angle
Non-linear	\leq \pm 2%
Temperature effect	\pm 2%(-10 $^{\circ}$ C-+40 $^{\circ}$ C)
Stability	\leq \pm 2%/year
Operating Temperature	-40 $^{\circ}$ C-+60 $^{\circ}$ C
Ingress Protection	IP65
Weight(unpacked)	2.5kg
Dimension	\varnothing 165*120mm
Shell material	Aluminum alloy
Storage Condition	10 $^{\circ}$ C-60 $^{\circ}$ C@20%-90%RH

3. Working Process

The wavelength range of solar radiation energy can be measured is usually between 0.3 and 3 μ m, which can meet the observation needs of solar radiation.

With a temperature compensation unit or good temperature characteristics, accurate measurement data can be obtained over a wide temperature range. It has good waterproof and dust-proof performance and can work normally in various harsh environments.

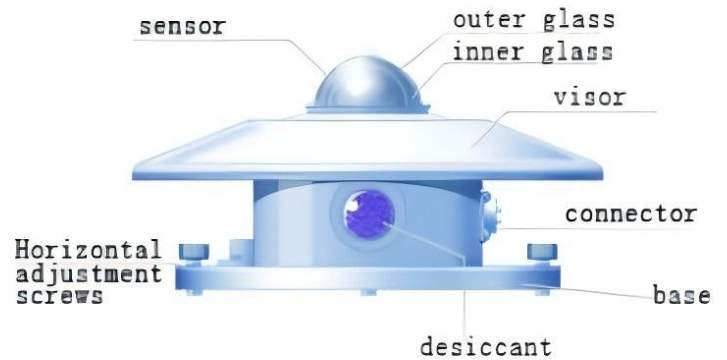
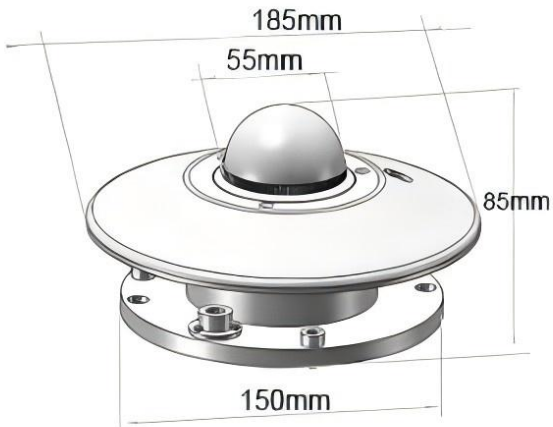


4. Electrical Connections

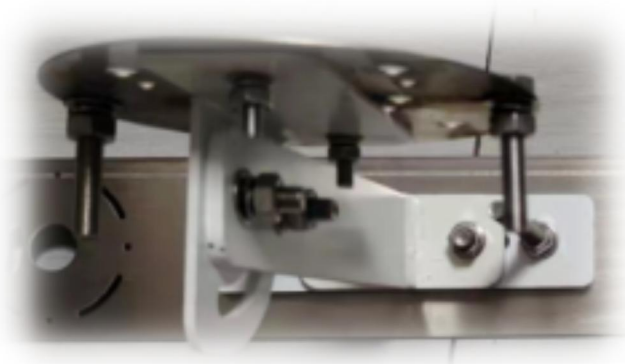
Cable	Voltage	Current	RS485
Red (Pin1)	V+	V+	V+
Yellow (Pin4)	Vout	Iout	RS485A
Black/Green (Pin2)	V-	V-	V-
Blue (Pin5)	/	/	RS485B



5. Dimensions



6. Installation



The sensor should be installed in the open air without any cover above the sensing surface.

The sensor connector should be faced to the north, fix it after the horizontal position is well adjusted.

Please check the filter cover regularly & make sure it is clean.

Please do not remove or loose the filter cover, otherwise the accuracy will be affected.

Please make sure the desiccant to be dry (If the color of desiccant is changed from orange to black, it should be replaced)
Protection cover is not necessary in general rainfall, but if prolonged heavy rains or hail, the protective cover is recommended to be installed.

7. Communication Protocol (MODBUS)

Transmission mode: MODBUS-RTU, **Baud rate:** 9600bps, **Data bits:** 8, **Stop bit:** 1, **Check bit:** no

Slave address: the factory default is 01H (set according to the need, 00H to FFH)

7.1 The 03H Function Code Example: Read Radiation Value

Host Scan Order(slave address:0x01)

01 03 00 00 00 01 840A

Slave Response

01 03 02 03 B4 91E7

Solar Radiation:(03B4)H=(984)D=948(W/m²)

7.2 The 10H Function Code Example: Modify the slave address

Host Scan Order (Changed to 01H, read and write address must be 00H):

00 10 01 BD C0

Slave Response:

00 10 007C

7.3 The 20H Function Code Example: Read The Slave Address

Host Scan Order:

00 20 00 68

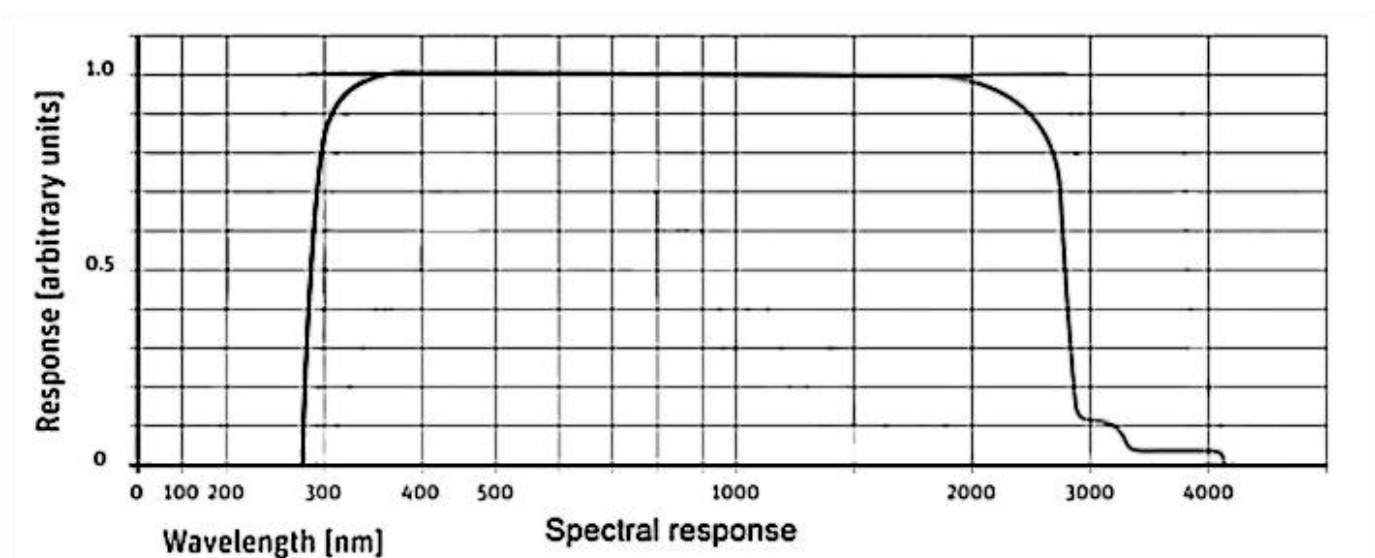
Slave Response(addr.=01H):

00 20 01 A9 C0

Note:

1. All underlined is fixed bit;
2. The last two bytes is CRC check command.

Note: This product has been tested and complies with European CE requirements for EMC directive.



7.3 OUTPUT CHARACTERISTICS

- **Voltage(0-5V,0-2.5V)**

0-5V:Solar radiation values(W/m²)=(V/5)*2000(Where V is output voltage value,unit:V)

0-2.5V:Solar radiation values(W/m²)=(V/2.5)*2000(Where V is output voltage value,unit:V)

- **Current(4-20mA)**

Solar radiation values(W/m²)=(I-4)/16*2000(Where I is output current value,unit:mA)

- **RS485**

MODBUS-RTU,See appendix for communication protocol.

8. Troubleshooting

If some error occurs, such as no output or unreliable. Please disconnect the sensor first, then check if the sensor installation and connection is correct with the instruction manual.

If still not successful, please contact our company.

9. Support contacts:



Complies with applicable CE directives.

Manual subject to change without notice. Version 1.0

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