USER GUIDE FOR CDG-12B PAR SENSOR

This document is applied for the following products

SKU	CDG	HW Ver.	1.0	FW Ver.	1.0
Item Code	CDG-12B	PAR Sensor, 4-20mA RS485 0-5V Output, Aluminum alloy, 0-1500W/m2 0-5000μ*mol/m2*s,			

1. Introductions

The CDG-12B PAR Sensor is mainly used for measuring solar radiation within 400~700nm wavelength. It is easy installation and can work continuously in all weathers. When there is sunlight, voltage output proportional to incident light intensity will be generated by the silicon-photo detector in the sensor. Its sensitivity is proportional to the cosine of incident light direct angle. Each product is with one sensitivity coefficient respectively. It can directly output radiation value in unit of μ*mol/m2*ss.

2. Specification

Item		Specifications		
Spectral range		400～700nm		
Supply		12-24VDC		
Accuracy		±5% rdg		
Range		0-5000μmol*m-2* S-1,0-1500W/m2		
Output		0-1500mV	4-20mA(2-wires)	RS485
Sensitivity	0-5000μmol*m-2* S-1	0.8mV/μmol*m-2* S-1	6.4μA/μmol*m-2* S-1	
	0-1500W/m2	1mV/W/m2	8uA/W/m2	
Response time		＜1s（99%）		
Temperature effect		＜0.05%/℃		
Cosine correction		＜10%（until 80°）		
Non-linearity		<±2%		
Operating temperature		-40-+80℃		
Shell material		Aluminum alloy		
Storage Condition		10℃-60℃@20%-90%RH		

3.Working Process

The photoelectric sensor with high precision can accurately measure photosynthetically active radiation in the wavelength range of 400 ~ 700nm.The cosine corrector is used to ensure the accuracy of measuring the incident light at different angles, and the luminous flux density is proportional to the cosine of the direct Angle of the incident lights.

4. Electrical Connections

Cable	Voltage/Current	RS485
Red	V+	V+
Black	/	RS485A
Yellow	/	RS485B
Green	V-	V-
White	Signal	/

5. Dimensions

6. Installation

2 -M3*20 outer hex screws

2 -M3 nuts,2-M3 flat mat,2-M3 Spring washers

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.

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 The PAR Value(slave address:0x01)

Host Scan Order:
01 03 00 00 00 01 840A

Slave Response:
01 03 02 01 28 B9CA

PAR value:(0128)H=(296)D=296(μmol*m-2* S-1) or(W/m2)

7.2 The 06H Function Code Example: Modify the slave address

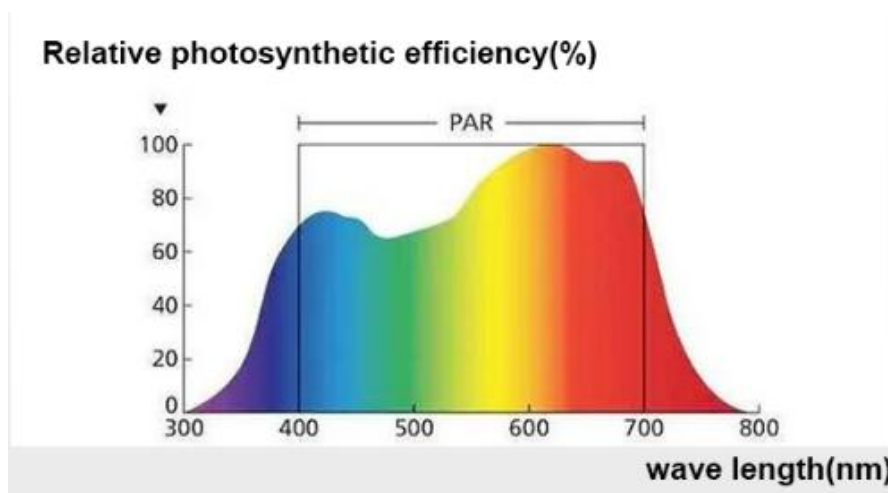**Host Scan Order (Changed from 01H to 02H):**
00 06 00 20 00 02 0810

Slave Response:
00 06 00 20 00 02 0810

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.

Relative photosynthetic efficiency(%)

7.3 OUTPUT CHARACTERISTICS

- **4-20mA**

Range:0-1500W/m2 PAR values(W/m2)=(I(μA)-4000μA)/8 (Where I is output current value,unit:μA)

Range:0-5000μmol*m-2* S-1 PAR values(μmol*m-2* S-1)= (I(μA)-4000μA)/6.4(Where I is output current value,unit:μA)

- **RS485**

MODBUS-RTU

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: