Photothermopile Pyranometer radiation sensor

Model ： RD-TSRS

https://hondetec.en.alibaba.com/

1. Instructions before use

1.1 Safety Instructions

Installation and commissioning shall only be carried out by designated qualified professionals.

It is strictly forbidden to measure or touch live parts. Pay attention to the technical parameters and storage and operating conditions of the equipment.

1.2 Specified Use

The equipment must operate within the specified technical parameters. The operating conditions and use purpose of the equipment shall not violate its original design intention.Modification or modification of equipment will not ensure its safe and normal operation.

1.3 Warranty

The warranty period is 12 months, effective from the date of delivery. If the user uses the equipment for other than the specified purpose, the warranty will no longer be valid.

2. Product Features& Advantages

2.1 Product Features

The total solar radiation sensor can be used to measure the total solar radiation intensity in the spectral range of 0.28-3 μ m. The core device of radiation sensor is high-precision photosensitive element, which has good stability and high precision. At the same time, a quartz glass cover made by precision optical cold working is installed outside the induction element, which effectively prevents the influence of environmental factors on its performance. This product conforms to the requirements of ISO9060 and WMO CIMO Guide. It can be widely used in the measurement of solar radiation energy in meteorology, solar energy utilization, agriculture and forestry, aging of building materials and atmospheric environment monitoring.

2.2 Product advantages

1. The core induction element of the watch adopts a wire-wound electroplating multi-contact thermopile, and its surface is coated with a black coating with high absorption rate. The hot junction is on the sensing surface, while the cold junction is located in the body, and the cold and hot junctions generate thermoelectric potential. In the linear range, the output signal is proportional to the intensity of solar radiation.

2. High light transmittance K9 quartz cold-ground glass cover is used, with a tolerance of less than 0.1mm, ensuring light transmittance up to 99.7%, high absorption rate 3M coating, absorption rate up to 99.2%, do not miss any opportunity to absorb energy.

3. The design of the embedded female head of the watch body is beautiful, waterproof, dustproof, and safer for monitoring; the design of the rotating male head of the watch line avoids the risk of misoperation, and the pull-out plug-in method does not need to be manually rotated and fixed, which is safer ,faster. The overall appearance is naturally IP67 waterproof.

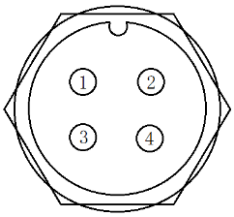
4. Built-in temperature compensation and built-in desiccant can improve the measurement error in special weather, and can ensure that the annual drift rate is less than 1%.

3. Product Parameter

Parameter name	Specification parameter	Description
Grade standard	Domestic secondary	
Time response (95%)	≤ 20s	
Internal resistance	≤ 800 Ω	
Insulation resistance	≥ 1 mega ohm M Ω	
Nonlinearity	≤ ± 3%	
Directional response error	≤ 30W · m-2	
Temperature response error	≤ 4%	
Zero offset	≤ 8W · m-2	
Tilt response error	≤ 5%	
Spectral response	285 ~ 3000nm	
Signal output	0 ~ 20mV	
	MODBUS	
Default cable length	2 meters	The others can be custom made
Working environment	Temperature range:-40 ~ 85 ℃	
	Humidity range: 5 ~ 90% RH	
Weight	0.4 kg	

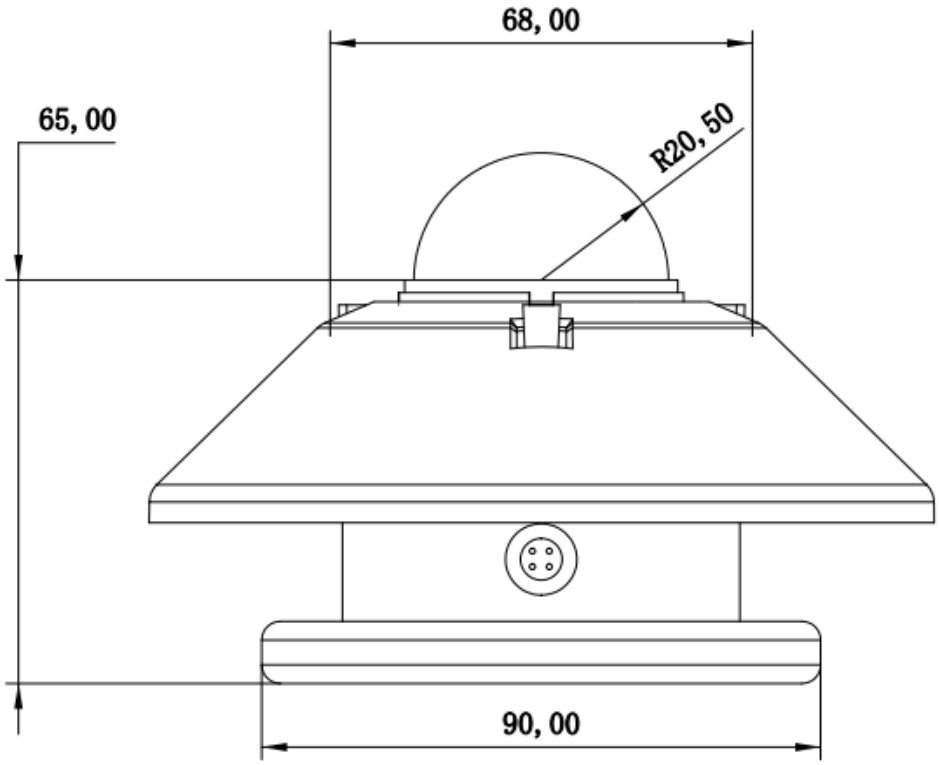
4. Wiring instructions

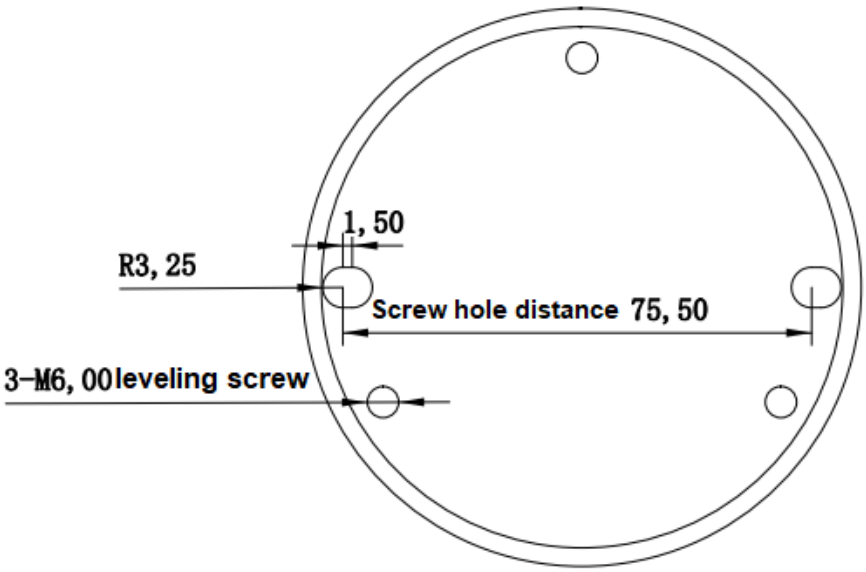
Model	Aerial insertion instructions	Line color description
TBQ-2J	1: Signal + 2: Signal- 3: Empty 4: Empty	Red: Signal + Black: Signal-
TBQ-2J + current	1: Current signal 2: Empty 3: V + 4: V-	Red: V + Black: V- Yellow: Current output
TBQ-2J +485	1: RS485A 2: RS485B 3: V + 4: V-	Yellow: RS485A Green: RS485B Red: V + Black: V-



The sensor line has an XS12-4 four-core aviation plug, and the pin definition corresponding to its pins is shown in the figure

5. Product size drawing





6. Technical parameters of RS485 MODBUS

6.1 Basic Parameters

Measuring item	All kinds of radiation sensors in our company
Measuring range	± 0-20mV
Resolution	0.01 mV
Precision	± 0.3%
Operating temperature	-30-60 ℃
Data protocol	Modbus-RTU
Communication mode	RS485
Operating voltage	DC 7-24V
Overall power consumption	< 0.2 W

6.2 Wiring Instructions

Red: Power Positive Black: Power Negative Yellow: 485A Blue 485B

6.3 MODBUS Communication Function Description:

The specific MODBUS-RTU table is as follows.

MODBUS-RTU	
Baud rate	4800, 9600 (default), 19200, 57600, 115200
Data bit	8-bit
Parity check	None
Stop bit	1-bit

Function code: 0x03

Register name	**Address Position**	**Read/write**	**Unit**	**Data Type**	**Length**	**Number of decimal points**
Instantaneous value of	0x00	R	W/㎡	Int	1	0
Host ID	0x100	R/W		UInt	1	0
Baud rate	0x101	R/W		UInt	1	0
High coefficients	0x108	R/W		UInt	1	0
Low coefficients	0x109	R/W		UInt	1	0

Radiation output: 2000 units w/㎡.

If you don't know the transmitter address, you can use ID 0 to get and set the address

Address: 1-254

Baud rate: 0 -4800, 1-9600 ,2-19200, 3-38400, 4-57600 ,5-115200

Coefficient calculation coefficient = (high X256 + low) * 0.01

6.4 . Examples

Send and accept characters are hexadecimal data data (0xXX) ASCII code need to be sent and accepted after background transcoding!

1. Read sensor id

Command : 01 Send 01 03 00 00 00 01 84 0A

Description: Id 01; Command 03; Register header address 00 00; Read the number of 00 01; CRC16 calibration 84 0A

Accepted 01 03 02 00 0A 38 43

Description: Id 01; Command 03; The number of data is 02; Heat flow data 00 0A (hexadecimal 0x000A decimal 10); CRC16 check value 38 43

Read data 10 W/㎡

2. Modify sensor address 1 to 2

Command: 01 06 01 00 00 02 09 F7

Description: Id 01; Command 06; Register header address 01 00; Modify data 00 02; CRC16 Calibration 09 F7

If feedback 01 06 01 00 00 02 09 F7 was modified successfully

3. Modify the baud rate. Modify the baud rate to 19200

Command: 01 06 01 01 00 02 58 37

Description: Id 01; Command 06; Register header address 01 01; Modify data 00 02; CRC16 Check 58 37

If feedback 01 06 01 01 00 02 58 37 was modified successfully

7. Daily maintenance

1. Check whether the glass window in quartz glass is clean in time every day. If there is dust and water vapor condensation, it should be blown with suction ear ball or wiped clean with soft cloth and optical lens paper.

2. Wipe clean water droplets after rain, and defrost frequently in winter to avoid numerical errors caused by refraction of water droplets.

3. Water vapor and moisture enter the table. If fine water mist is found in the table, it should be dried as

soon as possible (50 ~ 55 ℃), or the desiccant should be replaced, otherwise the accuracy of data will be reduced.

4. The total solar radiation sensor should be used correctly and maintained regularly. It is recommended to return to the factory for calibration and measurement accuracy after more than two years of use. Avoid not affect the accuracy of data.

8. Precautions

1. Please check whether the packaging is in good condition and check whether the product model is consistent with the selection;

2, do not live wiring, wiring after inspection is correct before electrification;

3. When installing, the plug of the meter should be placed towards the north, and the level should be adjusted first and then fixed;

4. Please take off the protective cover on the radiation meter when measuring radiation.

9. Installation method

1. The installation site of the total solar radiation sensor should be selected without any obstacles above the plane of the sensing element, so as to ensure that there are no obstacles with height angles exceeding 5 in the azimuth of sunrise and sunset, and avoid the phenomenon that shadows fall on the sensing surface. The meter should not be close to light-colored buildings or other objects that easily reflect sunlight, nor should it be close to artificial radiation sources.

2. When installing, the plug of the meter should be placed towards the north, adjusted horizontally first and then fixed.