

RS-TBQ-* -AL

Total solar radiation transmitter User Manual Analog type

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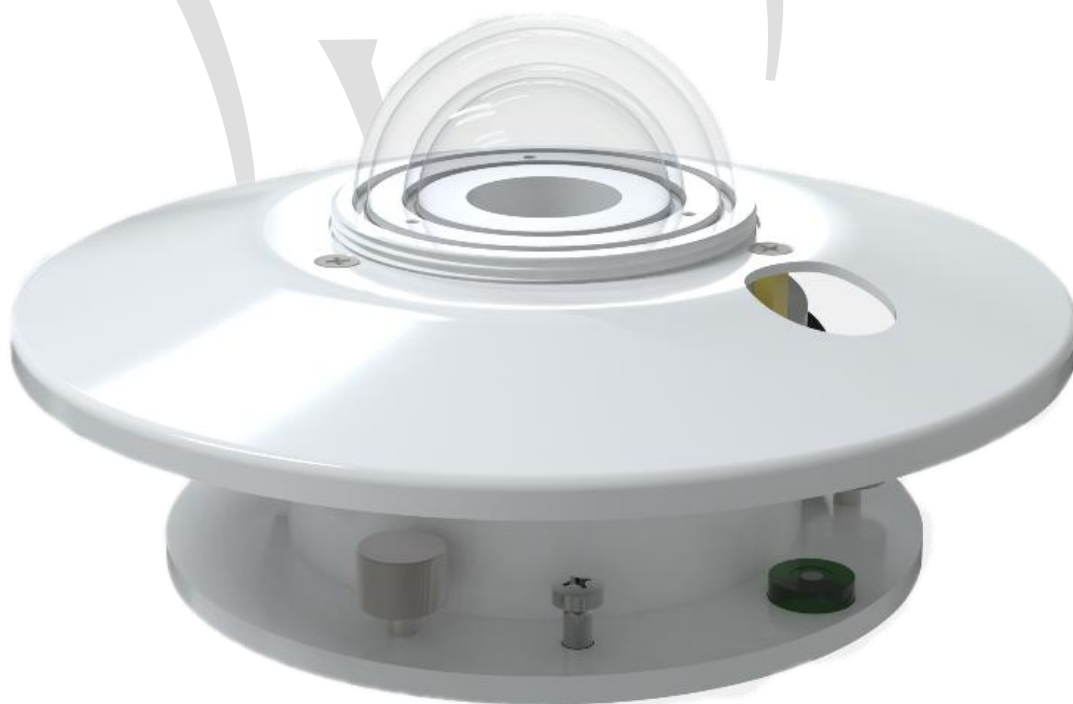


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1.product description

The RS-TRA-*-AL total solar radiation transmitter adopts the thermoelectric principle and can be used to measure solar radiation with a spectral range of $0.3\sim 3\ \mu\text{m}$. The sensing element adopts a wire-wound electroplating thermopile, and the sensing surface is a black layer with high absorptivity. Using the thermal effect of radiation, it absorbs solar radiation and converts it into thermoelectromotive force. It also has a temperature compensation function, which can accurately measure solar radiation. The double-layer glass cover above the sensing surface can not only reduce the influence of air convection on the device, but also block the radiation of the cover itself. And add a radiation shield to measure scattered radiation.

The product adopts analog output, which can read and convert the current solar radiation value, and the wiring method is simple. The appearance is beautiful, and the installation space is small. Products are widely used in solar energy utilization, meteorology, agriculture, building materials aging and air pollution and other departments to measure solar radiation energy.

1.1Features

- Using pyroelectric sensor elements, high measurement accuracy.
- The light transmittance is as high as 95%, and the transparent double-layer glass cover has good sensitivity and special surface treatment to prevent dust adsorption
- The spectral range reaches $0.3\sim 3\ \mu\text{m}$
- Short response time, small error and temperature compensation, more accurate measurement within the range

1.2Technical Parameters

Power supply range	10V~30V DC
Power consumption	Current output: 0.7W
	Voltage output: 0.22W
Operating temperature	-40℃~60℃
Working humidity	0%RH~95%RH non-condensing
Sensitivity	$7\sim 14\ \mu\text{V}\cdot\text{W}^{-1}\cdot\text{m}^2$
Internal resistance	250-400Ω
Response time (99%)	≤30s
Non-linear error	≤±3%
Directional Corresponding Error	≤±30W/m ²
Temperature response error	≤±3% (-30℃~+50℃)
Spectral range	$0.3\sim 3\ \mu\text{m}$

Measuring range	0-2000W/m ²
Resolution	1W/m ²
Precision	±3%
Yearly stability	≤ ± 3%
Cosine response error	≤ ± 5%
Tilt response error	≤ ± 2%
Zero drift	≤ 6 W/m ²
load capacity	Voltage output: output resistance ≤ 250 Ω
	Current output ≤ 600 Ω

1.3product model

RS-				Company code
	TBQ-			Total solar radiation transmitter
		I20-		4~20mA current output
		V05-		0~5V voltage output
		V10-		0~10V voltage output
			AL	Aluminum shell
			EX	Fixed code

2.Product installation and wiring

2.1Check before installation

- One set of total solar radiation transmitter equipment
- A pack of mounting screws
- One signal line
- One verification certificate
- One certificate of conformity
- One warranty card

2.2Installation method and function indication

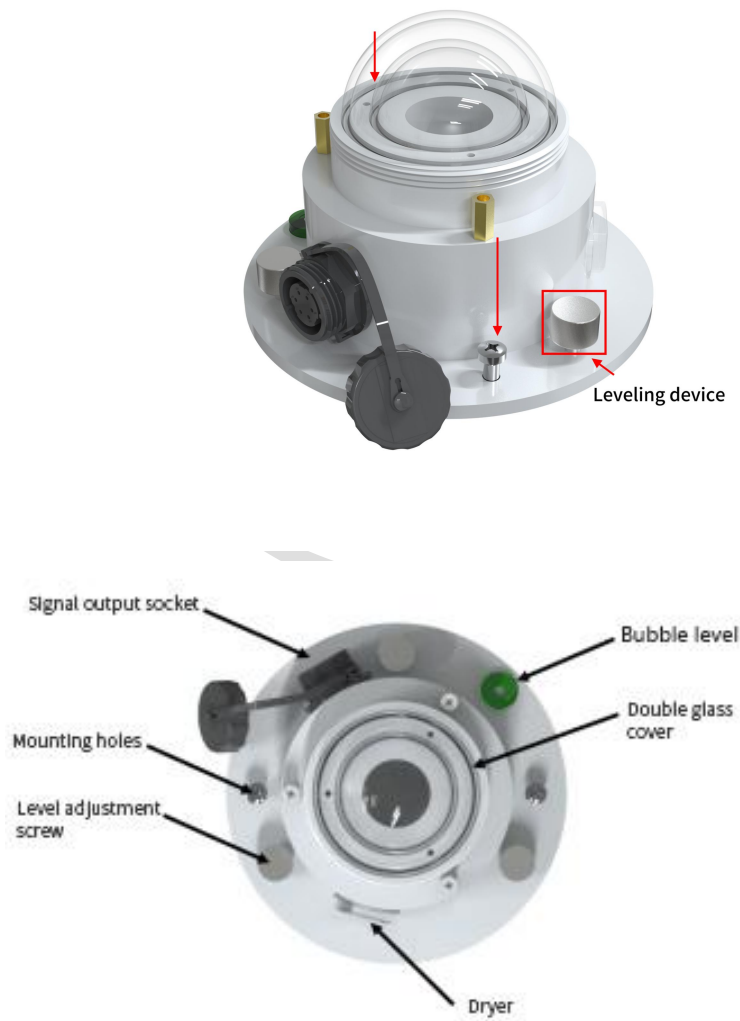
1. Make sure to install the bracket, and the radiation sensor is parallel to the ground
(leveling can be done through the leveling knob)
2. Use screws to pass through the mounting holes on the sensor to fix the sensor on the mounting bracket
3. After installation, remove the protective cover

4. Please pay attention not to damage the glass cover during the installation process, so as not to affect the measurement accuracy

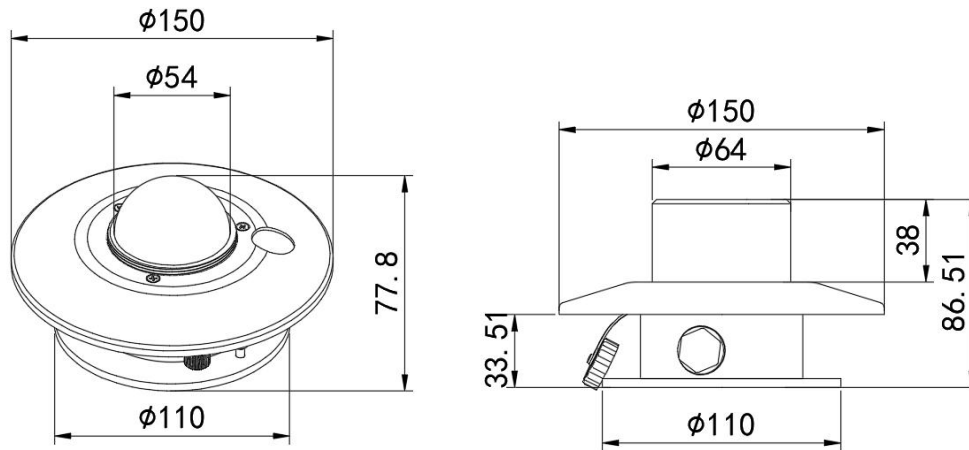
5. The installation location should be an open place all around and without any obstructions.

Note: The picture shows the installation method clearly, and the radiation shield is not shown in the picture.

Please read the fifth and sixth parts for specific maintenance and precautions



2.3 Equipment size

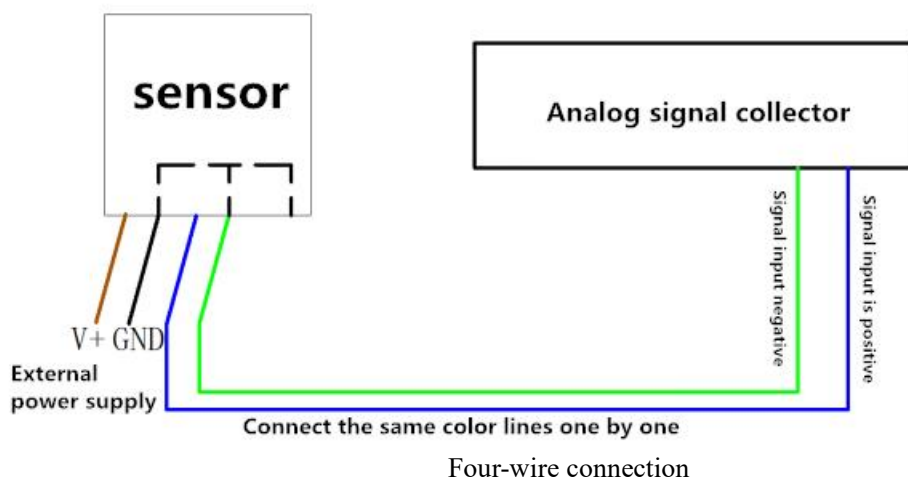


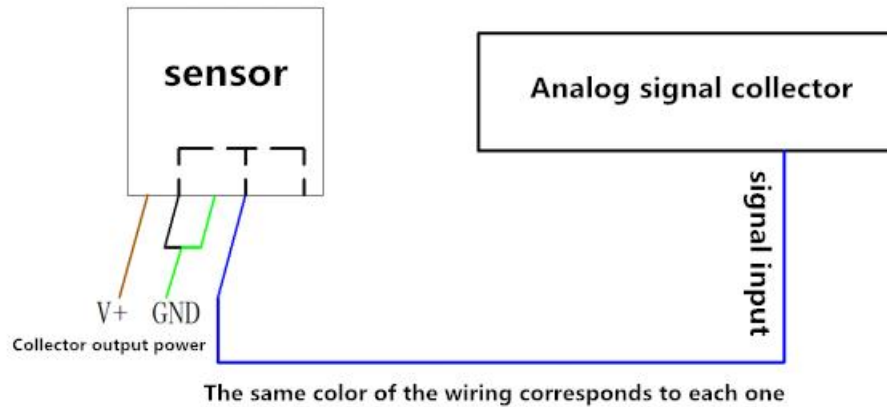
2.4Wiring

Special note: When the 10V voltage output is selected as the model, the 24~30VDC power supply must be used for the power supply.

	Thread color	Description
Electricity source	brown	Positive power supply (10~30V DC)
	black	Power negative
through letter	Green	Positive signal
	white	Negative signal

2.5Wiring example





Three-wire connection

3. Calculation formula

3.1 Current-type signal output calculation method

For example, the range is $0\sim 2000\text{W/m}^2$, $4\sim 20\text{mA}$ output, when the output signal is 12mA , calculate the current solar radiation value. The span of the solar radiation range is 2000W/m^2 , expressed by a 16mA current signal, $1800\text{W/m}^2/16\text{mA}=125\text{W/m}^2/\text{mA}$, that is, the current 1mA represents the solar radiation change 125W/m^2 , and the measured value is $12\text{mA}-4\text{mA}=8\text{mA}$, $8\text{mA}\times 125\text{W/m}^2/\text{mA}=900\text{W/m}^2$, the current solar radiation value is 1000W/m^2 .

3.2 Voltage signal output conversion calculation

For example, the range is $0\sim 2000\text{W/m}^2$, $0\sim 10\text{V}$ output, when the output signal is 5V , calculate the current solar radiation value. The solar radiation range span is 2000W/m^2 , expressed by a 10V voltage signal, $2000\text{W/m}^2/10\text{V}=200\text{W/m}^2/\text{V}$, that is, the voltage 1V represents the solar radiation change 200W/m^2 , and the measured value is $5\text{V}-0\text{V}=5\text{V}$, $5\text{V}\times 200\text{W/m}^2/\text{V}=1000\text{W/m}^2$, the current solar radiation value is 1000W/m^2 .

4. Precautions and troubleshooting

Precautions:

1. When the customer receives the product, please confirm the product model, etc.
2. Do not wire with power on, and power on can only be done after the wiring is checked and correct

3. The sensor is a precision device, please do not disassemble the glass cover at will

Troubleshooting:

1. If the read value shows 0, check whether the protective cover of the product is removed and whether there is sunlight
2. Please check if the 485 wiring is correct
3. Check whether the power supply meets the markings
4. Equipment damage

5.Product Maintenance

1. The glass cover should be kept smooth and clean, often wipe it with a soft cloth or fur
2. There should be no water in the glass cover. If it encounters heavy rain, snow, ice and other long-term weather, it is recommended to cover it
3. It is recommended to check whether the desiccant in the dryer has become damp at regular intervals. The specific manifestation is that the orange turns into a dark color. If this happens, replace the desiccant in time, or remove the desiccant to dry and put it back in use
4. The equipment has been used for more than two years, and the sensitivity must be re-calibrated by the manufacturer or measurement department

6. contact details

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7. Document History

V1.0 document creation

