Sun Urja Energy Solution

A Complete Solar Solutions

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Datasheet & Installation Guide
Solar Irradiation Sensor [PYRA300V]

MODEL

PYRA 300 V

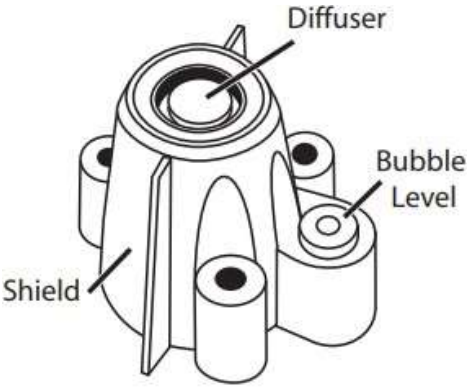
DATASHEET

Introduction

The solar irradiation sensor or solar pyranometer measures global radiation, the sum at the point of measurement of both the direct and diffuse components of solar irradiance. The sensor's transducer, which converts incident radiation to electrical current, is a silicon photodiode with wide spectral response. From the sensor's output voltage, the console calculates and displays solar irradiance. It also integrates the irradiance values and displays total incident energy over a set period of time.

The outer shell shields the sensor body from thermal radiation and provides an airflow path for convection cooling of the body, minimizing heating of the sensor interior. It includes a cutoff ring for cosine response, a level indicator, and fins to aid in aligning the sensor with the sun's rays. The space between the shield and the body also provides a runoff path for water, greatly reducing the possibility of rain or irrigation-water entrapment. The diffuser is welded to the body for a weather-tight seal; it provides an excellent cosine response. The transducer is a hermetically-sealed silicon photodiode with integrated amplifier. Spring-loaded mounting screws, in conjunction with the level indicator, enable rapid and accurate leveling of the sensor. Each sensor is calibrated against a secondary standard pyranometer in natural daylight.

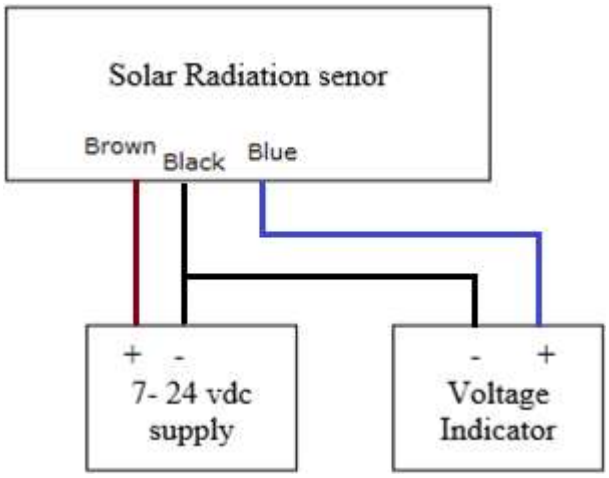
Operating Temperature	-40° to +65° C
Storage Temperature	-45° to +70°C
Transducer	Silicon photodiode
Spectral Response	400 to 1100 nanometers
Cosine Response	
Percent of Reading	±3% (0° to ±70°), ±10% (±70° to ±85°)
Percent of Full Scale	±2% (0° to ±90°)
Temperature Coefficient	+ 0.12% per °C
Reference temperature	25°C
Housing Material	UV-resistant PVC plastic
Weight	250 g
Range	0 to 1800 W/m2
Accuracy	± 5% of full scale
Drift	up to ±3% per year
Sensor Cable Length	2m
Output A, B, C are 3 different models	A. 0-5 V_{DC} (Voltage Type) B. 4-20 mA (Current Type) C. MODBUS RTU-RS485
Operating Voltage	7-24 V_{DC} , 2 to 5 mA
Recommended calibration interval	1 Year



Solar Radiation Sensor

I/O Specifications for 0-5V Sensor Output

- Brown- Input 12VDC
- Black- Ground
- Blue- Output (0 to 5 VDC);



0-5 Vdc Sensor Output Wiring Diagram

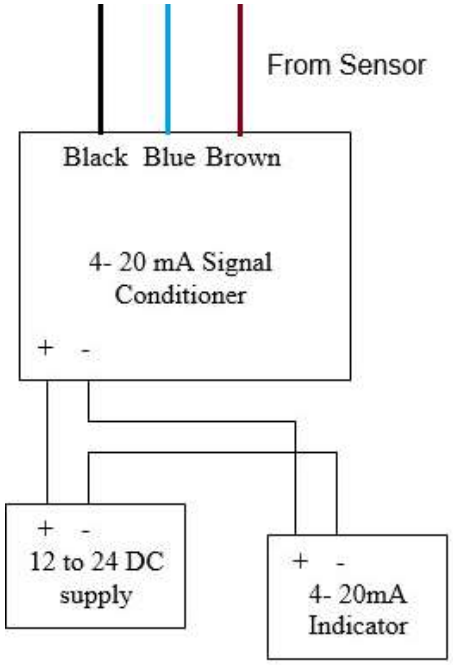
I/O Specifications for 4-20ma Sensor Output

Input
Raw Sensor Input

- Brown-, Black & Blue

Output

- + & - ports with 4-20ma Output



4-20ma Sensor Output Wiring Diagram

INSTALLATION

Guidelines

The following guidelines are recommended while installation of a pyranometer:

- Pyranometer is to be mounted in an easy-to-reach location in order to clean the dome regularly and carry out maintenance. At the same time, make sure that no buildings, constructions, trees or obstructions exceed the horizontal plane where the pyranometer lies. If this is not possible, select a site where obstructions in the path of the sun from sunrise to sunset do not exceed 5 degrees of elevation. N.B The presence of obstructions on the horizon line affects significantly the measurement of direct irradiance
- Pyranometer is to be located far from any kind of obstruction, which might reflect sunlight (or sun shadow) onto the pyranometer itself.
- The sunlight sensor must be installed at the same azimuth and tilt angle than the PV array.

Tools and Materials Needed

Please make sure you have all the necessary material as mentioned below:

- Wrench or pliers
- Wire cutters and stripper
- Multi meter
- Drill with 3/16 in drill bit (4.7 mm) to drill pilot holes
- Adjustable wrench or 11/32 in. wrench and 7/16 in
- Electrical Tapes to cover the wire

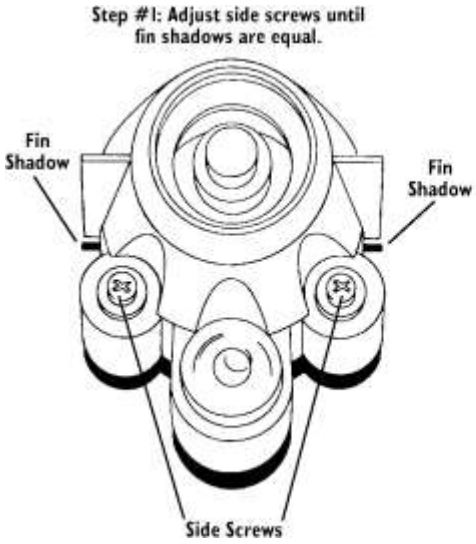
Location Recommendation

Use the following guidelines to determine the best location for mounting the Solar Radiation Sensor:

- The sunlight sensor must be installed at the same azimuth and tilt angle than the PV array (Drill it on the top of the panel).
- Pyranometer is to be located far from any kind of obstruction, which might reflect sunlight (or sun shadow) onto the pyranometer itself.

Mounting

- Using the bubble level on the sensor as a guide, adjust the sensor until it is level by tightening or loosening the screws.
- Small errors in alignment can produce significant errors. Be certain that the sensor is mounted level.
- Mount the sensor where it will not be in a shadow. Any obstruction should be below the plane of the sensor head. If that is not possible, try to limit obstructions to below 5 degrees, where the effect will be minimal.
- If possible, avoid locating the sensors in dusty locations. Dust, pollen, and salt residue that collect on the top of the sensor can significantly degrade accuracy.
- Ensure that the cables are free of crimps. Secure them to the support tubes with the provided cable ties so that they will not fray in the wind.
- Shade the sensor and make sure the reading changes
- If necessary, adjust the position of the sensor by tightening or loosening the leveling screws. When pointed directly at the sun, the shadows from the alignment fins should appear as shown in the illustration below:



Example Installations

Calibration

- If using Modbus sensor then the Pyranometer is factory calibrated.Output- 0-1800 W/m^2
- If using analog output senor then use the following info to calibrate.

  Output: 0 - 5 V_{DC} (0- 1800 W/m^2)

  Irradiance in W/m^2 = 360*Sensor Output voltage (in Volt)

  Output: 4-20mA (0-1800 W/m^2)

  Irradiance in W/m^2 = 112.5 (Output in mA - 4)

It is highly recommended that the calibration be checked annually