MODEL

DWR 8101

DATASHEET

Introduction

The pyranometer measures radiation received on a horizontal surface from both the sun and the sky. When exposed to radiation, the temperature of the blackened horizontal surface rises. Heat is lost from the blackened surface by conduction, convection and radiation. The equilibrium temperature reached is a measure of the radiation. This temperature is measured by a thermopile.

SENSOR: A thin metallic film blackened with a special paint (which absorbs energy completely in the range of 0.3 to 3 µm) is the sensor. A 72-element copper constantan thermopile is in thermal contact with this thin metal film. Alternate junctions of this thermopile are in thermal contact with the massive body of the instrument at ambient temperature which serves as the cold junction. This way a millivolt output proportional to the radiation received (about 4 mV/kW/m²) develops across the thermopile. the instrument has a time constant less than 22 seconds

Specifications

Brand	Dynalabs
Model No.	DWR 8101
Sensing	72 element thermopiles
Spectral range	0.3 to 3 µ meters
Measurement range	0 to 1400 watts / Sq. Meter
Sensitivity	~ 20 micro volts/W/M ².
Time constant	< 30 seconds.
Accuracy	± 2% of reading on clear cloudless days
Output	0 to 40 mv

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
- 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 spirit level on the sensor as a guide, adjust the sensor until it is level by tightening or loosening the screws.
- Final leveling of the sensor(s) should be done with the ISS mounted in its operating location
- 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:

Calibration

It is highly recommended that the calibration be checked annually

Sensor Maintenance

- The effectiveness of the radiation shield will be reduced if the surfaces of the shield are dirty. Wipe the surfaces of the shield with a damp cloth to remove dirt and dust. You can wash it using water and standard papers for lens, and if necessary using pure ETHYL alcohol. After using alcohol, clean again the dome with water only.
- Due to the sensitivity of ultraviolet and solar radiation sensors, it is common practice for manufacturers to recommend recalibration after a period of time. You can get approximately 3% drift per year on the readings from these sensors. For applications demanding higher accuracy, the sensors should be calibrated once every year.