

Sensors • Directional Thermopile Sensor PMA2143

Measures the Total Radiant Power of
Incident Radiation
from 305 to 2800nm



Applications

- Flat Spectral Response Measurements
- Control Ovens
- Reference Measurements
- IR Applications

Features and Benefits

- Flat Spectral Response
- Portable
- Hermetic Enclosure
- Min / Max Tracking
- Dose Integration

The PMA2143, Thermopile is a photovoltaic detector. The sensor is a high quality blackened thermopile with a flat spectral response throughout the entire spectrum.

The sensor is a high quality blackened thermopile. Heating of the sensor by incoming solar radiation produces a signal in the microvolt range. Each sensor has its own calibration factor which along with the processing algorithm is programmed into a memory chip embedded into the sensor. Upon connection to the PMA2100 the processing algorithm is loaded into the meter and correct reading is immediately displayed on the LCD.

Thermopile type radiation sensors exhibit the widest and most uniform spectral response. It is limited mostly by the spectral transmission of the dome. They are useful to monitor the total radiant power or solar radiation as well as artificial sources. The sensitivity of this type of sensors is somewhat limited and measurements of radiant flux below 10W/m^2 are difficult.

Due to almost ideal flatness of the spectral response the pyranometer is often used with a set of low wavelength blocking filters in order to measure radiant power distribution in various bands. The difference between the total power and the power measured with the filter is the radiant power in the band blocked by the filter. A correction that accounts for energy reflected from the filter's surface is necessary.

In solar radiation studies the diffuse component of the total radiant flux can be measured by using a shadow-band casting a shadow on the pyranometer's entrance. The difference between the total power and the diffuse power measured with shadow-band is the direct component. For better accuracy a correction should be made for the part of diffuse radiation obstructed by the shadow-band itself.

Calibration

The PMA2143 is factory-calibrated by transfer from a first class pyranometer. The pyranometer measures the radiation flux by sensing the temperature differential between ambient and a black body exposed to the radiation. The temperature differential is proportional to the thermal resistance between ambient and the black body and to the radiant flux. This simple principle makes the instrument inherently stable so re-calibrations are necessary every 2 years.

The reading of the PMA2143 is affected by a rapid change in the ambient temperature (dynamic temperature coefficient) so the measurement should be performed after reaching thermal equilibrium.

Specifications	
Spectral Response	0.2-50 μm Figure 1
Angular Response	2% for angles $<70^\circ$, Figure 2
Range	1500 [MED/Hr], 150 [$\mu\text{W}/\text{cm}^2$]
Display Resolution	1 [W/m^2], 0.1 [mW/cm^2]
Operating Environment	-40 to 175 $^\circ\text{F}$ (-40 to +80 $^\circ\text{C}$), outdoors
Temperature Coefficient	6% (-10 to +40 $^\circ\text{C}$)
Cable	6 ft. Straight Cable (1.82m)
Diameter	1.6" (40.6mm)
Height	7.75" (196.9mm)
Weight	8 oz. (240 grams)
Length	4" (101.6 mm)
Ordering Information	
PMA2143	Directional Thermopile Sensor

SL/Sensors/PMA2143_09/2014

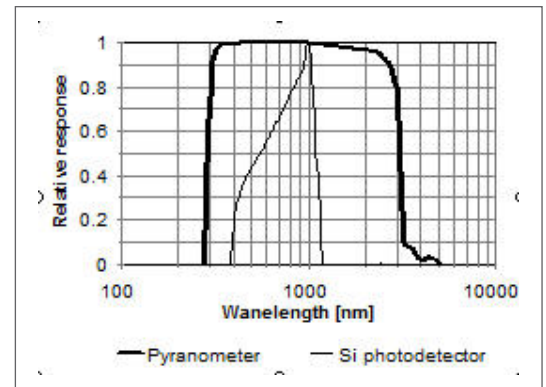


Fig. 1. PMA2143 Spectral Response

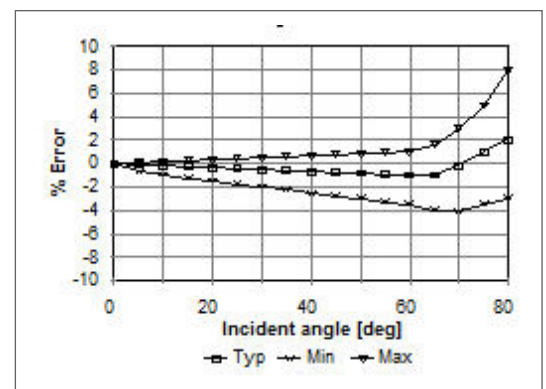


Fig. 2. PMA2143 Angular Response