

- ISO 9060 First Class Pyrheliometer
- Evaluation of CPV (Concentrated Photovoltaic) and CSP (Concentrated Solar Power)
- Ultra fast <1s response time
- Accurate temperature compensation
- Thermally balanced detector
- Built-in temperature sensor Pt-100 RTD
- Low-power 12V window heater



Description

Pyrheliometers are used to measure the direct irradiance emitted by the sun in a 5 degree angle. The ISO9060 First Class MS-56 is a research grade normal incidence direct solar irradiance sensor also known as a pyrheliometer or DNI sensor which highly suitable for routine operation on an automated sun tracker. The all-weather MS-56 is sensitive to solar irradiance throughout the spectral range 200 to 4,000nm and can work under most extreme conditions in a temperature range from -40°C to +80°C.

The pyrheliometer MS-56 is a high-quality DNI (Direct Normal Incidence) solar radiation sensor which is well-suitable to be used as a reference instrument for precise and accurate direct solar irradiance measurements and routine operation on a solar tracker.

The pyrheliometer includes a passive temperature compensation model to minimize the detector temperature dependency to less than $\pm 0.5\%$ over a wide temperature range (-20 ... +50°C). The detector temperature can be monitored with the built-in Pt-100 RTD.

The possibility of dew-deposition or condensation on the outside of the entrance optics can significantly be reduced with the built-in low power heater at the inside of the sensor.

Calculation of Irradiance

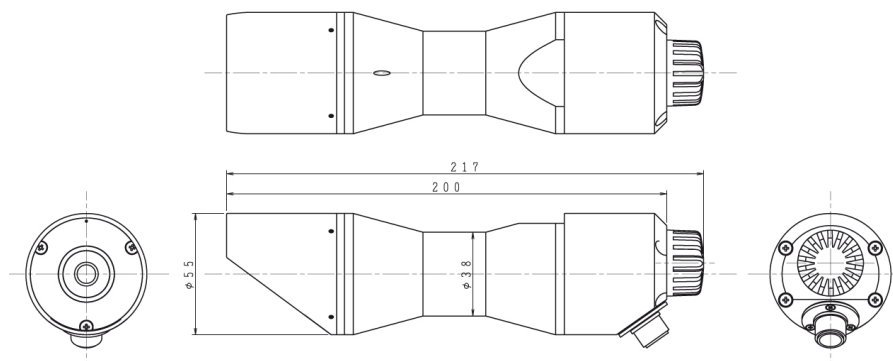
$$E = U / S$$

E [W/m²] = Irradiance

U [μV] = Output Voltage

S [μV/W/m²] = Sensitivity

Schematic



Specifications

Characteristic	Description
Classification	ISO 9060 First Class
Sensitivity	6 ... 10 $\mu\text{V}/\text{W}/\text{m}^2$ (see calibration protocol)
Spectral range (50% points)	200 ... 4000 nm
Maximum irradiance	2000 W/m^2
Typical signal output for atmospheric applications	0 ... 10 mV
Response time 95%	<1s
Zero offset - Thermal radiation (200 W/m^2)	0 W/m^2
Zero offset - Temperature change (5K/hr)	< ± 1 W/m^2
Non-stability (change/year)	< $\pm 0.5\%$
Non-linearity (100 ... 1000 W/m^2)	< $\pm 0.5\%$
Temperature dependence of sensitivity (-20 ... +50°C / @ 20°C)	< $\pm 0.5\%$
Impedance (@25°C)	~ 5 k Ω
Expected daily uncertainty	< $\pm 1\%$
Full operating view angle	5°
Slope angle	1°
Required tracking accuracy	0.1° (recommended)
Pt-100	Class A, IEC751 Compliance
Operating temperature	-40 ... +80°C
Protection	IP67
Dimension / Weight (without cable)	217 x 55mm / 0.6kg
Cable length	10m
Fitted with 10K thermistor and Pt-100 temperature sensor as standard (thermistor not connected with Meteo-40)	

Delivery includes calibration certificate and temperature dependency test report.

Sensor Connection

Function	Wire Colour (EKO)	Meteo-40 Analog Voltage / Current Source	Supply Sensor
Solar irradiance Output voltage	brown	Ax	
	red	Bx	
Pt-100 (3-wire) and Thermistor	blue	I+	
	grey	Ay	
	white	I- / By	
Thermistor	black	not connected	
Heater Input (12V DC)	yellow		Supply Sensor
Heater Input (12V DC)	green		Main Ground (GND)
Shield (Housing)	yellow / green		Main Ground (GND)

Last Modification: 25 March 2013