

## EQ08-B & EQ08-BE PYRANOMETER

ISO Spectrally Flat Pyranometer of Class B for Solar GHI measurement



The Middleton EQ08-B is an affordable Pyranometer for measuring solar Global Horizontal Irradiance (GHI). It exceeds the International Organization for Standardization (ISO) specifications for a **Spectrally Flat Pyranometer of Class B**. Class B is the second highest accuracy Class. The EQ08-B has a proprietary thermoelectric sensor with a black carbon nanotube surface and a passive microvolt output. The EQ08-BE version has an in-built amplifier to give a millivolt output for easy signal measurement.

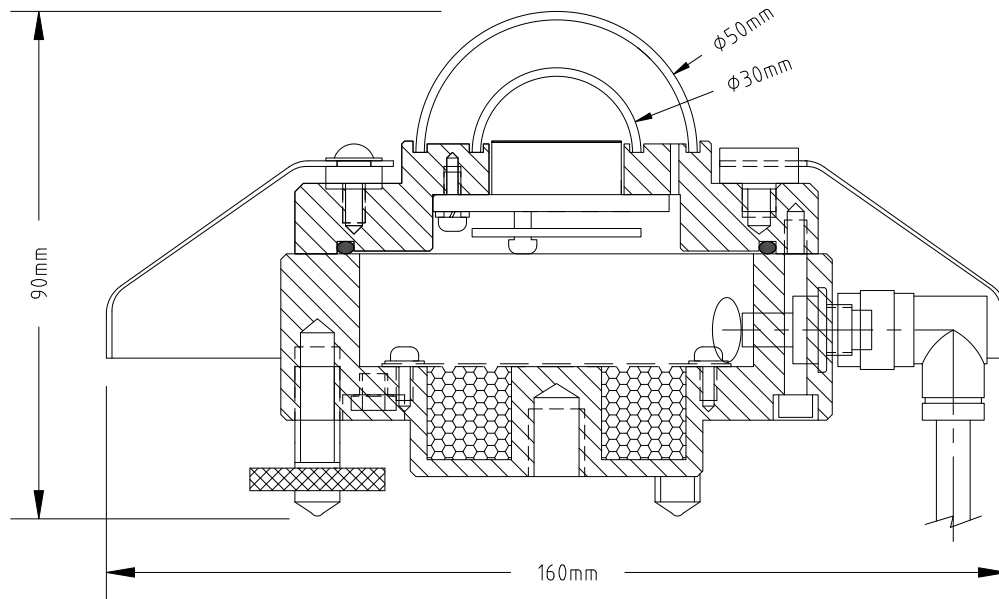
Performance Specification	ISO 9060:2018 <sup>1</sup> Spectrally Flat Class B <sup>2</sup>	EQ08-B & EQ08-BE
Response time (to 95%)	< 20 sec	7 ±1 sec
Zero off-set a) -200 W.m <sup>-2</sup> thermal rad.	± 15 W.m <sup>-2</sup>	< 4 W.m <sup>-2</sup> (unventilated)
Zero off-set b) 5 K.h <sup>-1</sup> ambient temp.	± 4 W.m <sup>-2</sup>	< ± 2 W.m <sup>-2</sup>
Zero off-set c) total response	± 21 W.m <sup>-2</sup>	< ± 7 W.m <sup>-2</sup>
Non-stability (1 year interval)	± 1.5 %	< ± 0.5 %
Non-linearity (100-1000 W.m <sup>-2</sup> )	± 1 %	< ± 0.5 %
Directional response (w.r.t. 1000 W.m <sup>-2</sup> )	± 20 W.m <sup>-2</sup>	< ± 20 W.m <sup>-2</sup>
Spectral error (280 to 4,000 nm)	± 1 W.m <sup>-2</sup>	< ± 0.4 W.m <sup>-2</sup>
Spectral selectivity (350 to 1,500 nm) <sup>3</sup>	< 3 %	< 3 %
Temperature response (-10 to +40 °C)	± 2 %	< ± 1.5 %
Tilt response (0-90°)	± 2 %	< ± 0.5 %
Additional signal processing errors	± 5 W.m <sup>-2</sup>	EQ08-B, not applicable EQ08-BE < ± 3 W.m <sup>-2</sup>

<sup>1</sup> ISO 9060:2018 Specification and classification of instruments for measuring hemispherical solar and direct solar radiation

<sup>2</sup> ISO 9060:2018 'Class B' roughly corresponds to superseded ISO 9060:1990 'First Class'

<sup>3</sup> This requirement designates a Pyranometer as 'spectrally flat' in ISO 9060:2018

## Middleton Solar EQ08-B & EQ08-BE Pyranometer Detailed Specification



Carbon nanotube (CNT) blackened sensor surface has flat spectral response and excellent stability.
Dual glass domes protect the sensor from air temperature fluctuations.
Proprietary translucent inner dome gives enhanced directional response.
User's Guide and Calibration Certificate included.

### General Specification

viewing angle	$2\pi$ steradians
irradiance	0 – 4,000 W/m <sup>2</sup>
spectral range	300 - 3000nm (nominal); 305 – 2,700nm (50% points)
sensitivity (typical)	EQ08-B: $9.5 \pm 1 \mu\text{V}/\text{W}\cdot\text{m}^{-2}$ ; EQ08-BE: $1.0 \text{ mV}/\text{W}\cdot\text{m}^{-2}$
calibration	outdoors to ISO 9847, traceable to WRR
achievable uncertainty (minute totals)	$U_{95} = 3\%$ (RSS of instrument, calibration, measurement)
operating temperature	-35 to +60°C
operating humidity	0-100% RH
output impedance	33 $\Omega$ (EQ08-B); 65 $\Omega$ (EQ08-BE)
measurement input impedance	>1 M $\Omega$
power requirement (EQ08-BE only)	5 to 15 VDC, 6mA
bubble level resolution	0.1°
level adjustment	one fixed foot, two adjustable feet
construction	anodised marine-grade aluminium & stainless steel
desiccant	orange silica gel (non-toxic); large capacity, in base
IP rating	sealed to IP67
mounting method	central M10 hole in base (mounting fastener included)
output lead	6m, with connector at instrument end
net weight	0.8Kg (excluding lead)
shipping size & weight	230 x 230 x 180mm, 2Kg
warranty	2 years (standard) / 5 years (conditional)

### Available Options

- temperature output (EQ08-B only), YSI 44031 thermistor (10K $\Omega$  @ 25°C)
- additional output lead length, up to 20m
- expanded operating temperature, -40 to +80°C