



# CM4 • High Temperature Pyranometer

for irradiance measurements at high temperatures

- Heat resistant instrument design
- Extended operating temperature range
- Excellent temperature dependency
- Built-in Pt-100 temperature sensor
- High irradiance measurement capacity

## Introduction

Environmental exposure affects products and materials. Testing these effects is done at outdoor weathering facilities or in special climate chambers. In these facilities solar radiation and environment are simulated to create the most extreme conditions and for accelerated ageing and heat load tests. These industrial tests require measuring devices to check or verify the light intensity (irradiance) at various positions within the test environment. The CM4 high temperature pyranometer is specially designed for measuring solar or artificial light irradiance under the most extreme temperature conditions.

Kipp & Zonen has been manufacturing pyranometers for over 75 years. We produce models at all price and performance points, up to the very best available. All comply with the requirements of ISO

9060:1990 and are fully traceable to the World Radiometric Reference (WRR) in Davos, Switzerland, where Kipp & Zonen instruments form part of the World Standard Group.

## CM4 High Temperature Pyranometer

With an operating temperature range from  $-40^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$  and measurement up to  $4000\text{W}/\text{m}^2$  the CM4 is a unique instrument. All the radiometer components are specially selected for their ability to withstand these extremely high temperature and irradiance levels.

CM4 has internal first-order temperature compensation, but it is also supplied with a built in Pt-100 temperature sensor to provide additional information on the measurement conditions.

CM4 is supplied with a calibration table that gives the instrument sensitivity for a number of measurement temperature ranges and the maximum error in the measured irradiance values within each range. Monitoring the temperature sensor during operations allows easy data correction afterwards for improved measurement.

## Applications

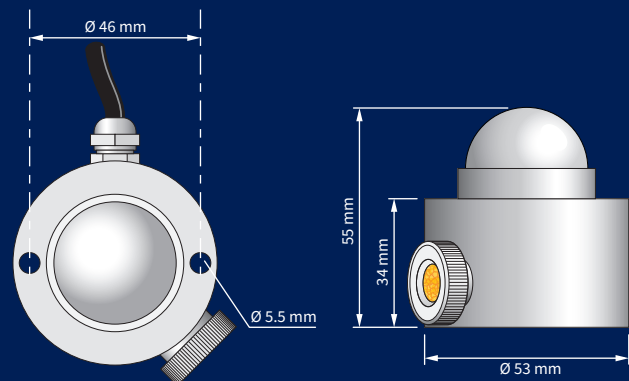
Climate chambers and other technical facilities with extreme conditions are typical environments for the CM4. For example, vehicles are tested in artificial climates for thermal stress and degradation of materials and systems.

The CM4 High Temperature Pyranometer is a radiometer specially designed for measuring solar or artificial light irradiance under the most extreme temperature conditions.

The CM4 is supplied fitted with a captive 10 m long special high temperature signal cable.

Specifications	
ISO 9060:1990 CLASSIFICATION	Second Class
Spectral range (50 % points)	300 to 2800 nm
Sensitivity (nominal)	4 to $10\ \mu\text{V}/\text{W}/\text{m}^2$
Response time (63%)	< 8 s
Non-stability (change/year)	< 1 %
Non-linearity (0 to $2500\text{W}/\text{m}^2$ )	< 3 %
Temperature dependence of sensitivity (over any $50^{\circ}\text{C}$ interval in the range from $-20^{\circ}\text{C}$ to $+150^{\circ}\text{C}$ )	< 3 %
Directional error (up to $80^{\circ}$ with $1000\text{W}/\text{m}^2$ beam)	< $20\text{W}/\text{m}^2$
Impedance	200 to $2000\ \Omega$
Field of view	$180^{\circ}$
Operating temperature	$-40^{\circ}\text{C}$ to $+150^{\circ}\text{C}$
Relative humidity	0 to 100 % RH
Zero offsets (a) thermal radiation ( $200\text{W}/\text{m}^2$ ) (b) temperature change (5K/h)	< $15\text{W}/\text{m}^2$ < $4\text{W}/\text{m}^2$
Tilt error	< 1 %
Maximum irradiance	$4000\text{W}/\text{m}^2$
Weight	250 g
Shock / vibration	ICE721-3-2-2m2
Cable length	10 m (captive)

Note: The performance specifications quoted are worst-case and/or maximum values



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Kipp & Zonen B.V. reserve the right to alter specifications of the equipment described in this documentation without prior notice

4414320-V1703