

Specifications to ISO 9060 / WMO standards

- Secondary Standard (CM 11B, CM 21, CM 22)
- First Class (CM 6B)
- Second Class (CMP 3)

Reliable all-weather performance

The widest range of pyranometers and accessories available



RADIATION MEASUREMENT FOR ATMOSPHERIC RESEARCH AND INDUSTRY



In the range of secondary standard pyranometers, Kipp & Zonen supplies equipment with special features; record breaking response time, exceptional levelling accuracy and a test certificate also covering the directional and temperature responses. These important parameters ensure the highest accuracy measurements.

Pyranometers are radiometers designed for measuring the irradiance on a plane surface resulting from radiant fluxes in the wavelength range from 300 to 3000 nanometers. Kipp & Zonen has been manufacturing pyranometers for over 75 years.

The instruments are used in meteorology, solar energy research, material testing, climate control in greenhouses, building physics science and many other applications. Kipp & Zonen can supply a full range of pyranometers and accessories, according to the ISO 9060 and World Meteorological Organisation (WMO) standards.

Common characteristics of the pyranometers are the robustness, and all-weather performance. The instruments are easy to use, require no power, and are all supplied with calibration certificates that are traceable to WRR (World Radiometric Reference).

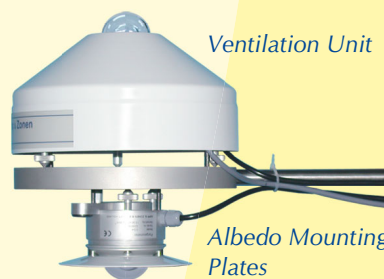
The comparison table shows the specifications, dimensions and options of the various types and helps selection of the right model for a specific application.



Sun Tracker



Shadow Ring



Ventilation Unit

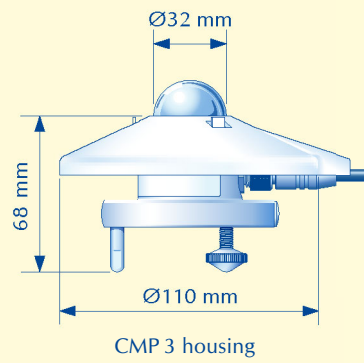
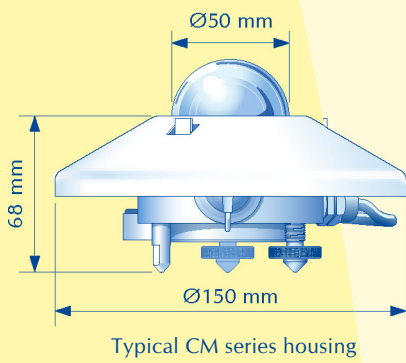
Albedo Mounting Plates



Mounting Rod

CM SERIES

PYRANOMETER RANGE



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

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

SPECIFICATIONS

| | CM 22 | CM 21 | CM 11B | CM 6B | CMP 3 |
|--|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| ISO CLASSIFICATION | Secondary Standard | Secondary Standard | Secondary Standard | First Class | Second Class |
| Response time (95 %) | 5 s | 5 s | 5 s | 18 s | 18 s |
| Zero offsets | | | | | |
| (a) thermal radiation (200 W/m ²) | ± 3 W/m ² | ± 7 W/m ² | ± 7 W/m ² | ± 15 W/m ² | ± 15 W/m ² |
| (b) temperature change (5 K/hr) | ± 1 W/m ² | ± 2 W/m ² | ± 2 W/m ² | ± 4 W/m ² | ± 5 W/m ² |
| Non-stability (change/year) | ± 0.5 % | ± 0.5 % | ± 0.5 % | ± 1 % | ± 1 % |
| Non-linearity (0 - 1000 W/m ²) | ± 0.2 % | ± 0.2 % | ± 0.5 % | ± 1 % | ± 2.5 % |
| Directional error (at 80 ° with 1000 W/m ² beam) | ± 5 W/m ² | ± 10 W/m ² | ± 10 W/m ² | ± 20 W/m ² | ± 20 W/m ² |
| Temperature dependence of sensitivity | ± 0.5 % (-20 to +50 °C) | ± 1 % (-20 to +50 °C) | ± 1 % (-10 to +40 °C) | ± 2 % (-10 to +40 °C) | ± 5 % (-10 to +40 °C) |
| Tilt error (at 1000 W/m ²) | ± 0.2 % | ± 0.2 % | ± 0.2 % | ± 1 % | ± 2 % |

OTHER SPECIFICATIONS

| | | | | | |
|---|---|--|--|--|---|
| Sensitivity | 7 - 14 μV/W/m ² | 7 - 17 μV/W/m ² | 7 - 14 μV/W/m ² | 5 - 15 μV/W/m ² | 5 - 15 μV/W/m ² |
| Impedance | 10 - 100 Ω | 40 - 100 Ω | 10 - 100 Ω | 30 - 100 Ω | 30 - 100 Ω |
| Level accuracy | 0.1 ° | 0.1 ° | 0.1 ° | 0.5 ° | 1 ° |
| Operating temperature | -40 to +80 °C | -40 to +80 °C | -40 to +80 °C | -40 to +80 °C | -40 to +80 °C |
| Spectral range (50 % points) | 200 - 3600 nm | 310 - 2800 nm | 310 - 2800 nm | 310 - 2800 nm | 310 - 2800 nm |
| Typical signal output for atmospheric applications | 0 - 15 mV | 0 - 15 mV | 0 - 15 mV | 0 - 15 mV | 0 - 15 mV |
| Maximum irradiance | 4000 W/m ² | 4000 W/m ² | 4000 W/m ² | 2000 W/m ² | 2000 W/m ² |
| Expected daily accuracy | ± 1 % | ± 2 % | ± 2 % | ± 5 % | ± 10 % |
| Recommended applications | Scientific research requiring the highest level of measure- ment accuracy and reliability | Meteorological net- works, reference measurements in extreme climates, polar or arid | Meteorological net- works, PV panel and thermal collector testing, materials testing | Good quality meas- urements for hydrology networks, greenhouse climate control | Economical solution for routine measurements in weather stations, field testing |

CM instruments have a standard cable length of 10 m. Optional cable 25 or 50 m
Optional 10 k Thermistor or Pt-100 temperature sensor with CM 21 and CM 22
Individual directional response and temperature dependence test data with CM 21 and CM 22
All can be used with 2AP Tracker or CM 121B Shadow Ring
All except CMP 3 can be used with CV 2 Ventilation Unit

CMP 3 has waterproof connector with
10 m cable. Optional cable length 25 m
CMP 3 has optional mounting rod.

SOLAR RADIATION INSTRUMENTS