



Pyranometers

For the accurate measurement of solar irradiance

Scientists, researchers and commercial companies in renewable energy, climatology, weather, agriculture, water resources and environment all require accurate and reliable measurements of solar radiation. The measurement is made by pyranometers, which are radiometers designed for measuring the total (global) irradiance on a plane surface resulting from radiant fluxes in the wavelength range from 300 to 3000 nanometers (nm).

Kipp & Zonen has been manufacturing pyranometers for over 90 years. We produce models at all price and performance points, up to the very best available.

Our pyranometers are designed for a long operating life with simple maintenance. All models have built-in levelling facilities, except the CM4, and a wide range of accessories is available.

The SP Lite2 silicon photo-diode pyranometer, is compact and low cost and is ideal for use in solar energy applications, plant growth, evapo-transpiration and building automation.

The CM4 high temperature pyranometer has a thermopile detector and is specially designed for measuring solar or artificial light irradiance under the most extreme temperature conditions.

The CMP series of thermopile pyranometers are known for their ergonomic and user-friendly features to facilitate installation, maintenance, and exchange for recalibration.

The SMP series are the world's first smart pyranometers with built-in intelligence. Building on the proven CMP series design and measurement technology they add digital signal processing to improve performance and interfaces optimised for industrial data acquisition and control systems.

The smart interface that features Modbus® data communication for connection to programmable logic controllers (PLC's), inverters, digital control equipment and the latest generation of data loggers. Amplified Voltage or Current outputs are also included.

All models, except the SP Lite2, 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.

SP Lite2



SP Lite2 is designed for all-weather measurement of solar radiation. It has a specially shaped diffuser that gives very good directional response and is largely self-cleaning. The detector is a silicon photo-diode, so the spectral response is not as broad or flat as our CMP/SMP series pyranometers with thermopile detectors.

SP Lite2 is available either with a high sensitivity of 60 to 100 $\mu\text{V}/\text{W}/\text{m}^2$ or with a sensitivity adjusted to $10 \pm 0.5 \mu\text{V}/\text{W}/\text{m}^2$. In both cases the actual value is given on the calibration certificate and instrument label. The standard cable length is 5 m with an option of 15 m.

The mounting flange incorporates a bubble level and 3 adjustment screws for easy levelling. A threaded hole takes the accessory screw-in mounting rod for fitting to masts and poles with the CMB1 mounting bracket.

Two SP Lite2 instruments can easily be bolted back-to-back and fitted with the mounting rod to make a simple albedometer.

Specifications	
Spectral range (overall)	400 to 1100 nm
Sensitivity	60 to 100 $\mu\text{V}/\text{W}/\text{m}^2$
Sensitivity (10 $\mu\text{V}/\text{W}/\text{m}^2$ version)	10 $\pm 0.5 \mu\text{V}/\text{W}/\text{m}^2$
Impedance	50 Ω
Impedance (10 $\mu\text{V}/\text{W}/\text{m}^2$ version)	< 10 Ω
Expected output range (0 to 1500 W/m^2)	0 to 150 mV
Expected output range (10 $\mu\text{V}/\text{W}/\text{m}^2$ version)	0 to 15 mV
Maximum operational irradiance	2000 W/m^2
Response time (95%)	< 500 ns
Non-stability (change/year)	< 2%
Non-linearity (100 to 1000 W/m^2)	< 2.5%
Directional response (up to 80° with 1000 W/m^2 beam)	< 10 W/m^2
Temperature response	- 0.15%/°C
Field of view	180°
Accuracy of bubble level	< 0.2°
Detector type	Photo-diode
Operational temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100% non-condensing
Ingress Protection (IP) rating	67

Part number	Instrument
0339920-001	SP Lite2 Silicon Pyranometer • 5 m cable
0339920-003	SP Lite2 Silicon Pyranometer • 15 m cable
0339920-021	SP Lite2 Silicon Pyranometer • 10 $\mu\text{V}/\text{W}/\text{m}^2$ • 5 m cable
0339920-023	SP Lite2 Silicon Pyranometer • 10 $\mu\text{V}/\text{W}/\text{m}^2$ • 15 m cable
0339920-701	SP Lite2 Silicon Pyranometer • METEON • 5 m cable
0339920-703	SP Lite2 Silicon Pyranometer • METEON • 15 m cable
0339920-801	SP Lite2 Silicon Pyranometer • AMPBOX • 5 m cable
0339920-803	SP Lite2 Silicon Pyranometer • AMPBOX • 15 m cable

Note: AMPBOX is adjusted so that 4 to 20 mA output = 0 to 1600 W/m^2

SP Lite2 Silicon Albedometer	
A low-cost Silicon Albedometer can be self-assembled by ordering: 2x SP Lite2 Silicon Pyranometer + 1x Mounting Rod	
Note: SP Lite2 Albedometer can be used with the AMPBOX but it has two individual outputs, so 2x AMPBOX are required	

Part number	Accessories
0338720	Mounting Rod Screw-in 300 mm long x 12 mm ϕ
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall

CM4



CM4 is a high temperature pyranometer for measuring solar or artificial light irradiance under the most extreme temperature conditions. With an operating temperature range from -40 °C to +150 °C and measurement up to 4000 W/m² it 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. To optimize the accuracy in different applications the CM4 is supplied with calibration information split into temperature sections. Beside the standard calibration factor for +25 °C the following intervals are defined: -20 to +25, +25 to +75, +75 to +100, +100 to +150 °C. For each temperature range the sensitivity and the maximum temperature error (in %) are specified. CM4 is supplied as standard with 10 m of special high temperature signal cable.

CM4 is specifically designed for use in environmental chambers and solar simulators and materials testing. The CLF4 levelling fixture is a base with levelling screws and an accurately machined cap that can be placed over the pyranometer dome, and has a bubble level with 0.2° accuracy mounted on the top.

Specifications	
Classification to ISO 9060:1990	Second Class
Spectral range (50 % points)	300 to 2800 nm
Sensitivity	4 to 10 μV/W/m ²
Impedance	200 to 2000 Ω
Expected output range (0 to 2500 W/m ²)	0 to 25 mV
Maximum operational irradiance	4000 W/m ²
Response time (63%)	< 2.5 s
Response time (95%)	< 8 s
Zero offsets	
(a) thermal radiation (at 200 W/m ²)	< 15 W/m ²
(b) temperature change (5 K/h)	< 4 W/m ²
Non-stability (change/year)	< 1%
Non-linearity (100 to 1000 W/m ²)	< 3%
Directional response (up to 80° with 1000 W/m ² beam)	< 20 W/m ²
Spectral selectivity (350 to 1500 nm)	< 3%
Temperature response (Over any 50°C interval in the range from -25°C to +150°C)	< 3%
Tilt response (0° to 90° at 1000 W/m ²)	< 1%
Field of view	180°
Temperature sensor output	Pt-100 4 wire
Detector type	Thermopile
Operating temperature range	-40°C to +150°C
Storage temperature range	-40°C to +150°C
Humidity range	0 to 100% non-condensing
Ingress Protection (IP) rating	67

Part number	Instrument
0356900-022	CM4 High Temperature Pyranometer • 10 m cable
0356900-722	CM4 High Temperature Pyranometer • METEON • 10 m cable
0356900-822	CM4 High Temperature Pyranometer • AMPBOX • 10 m cable
Note: AMPBOX is adjusted so that 4 to 20 mA output = 0 to 4000 W/m ²	
Note: AMPBOX and METEON are not suitable for use in extreme temperatures	

Part number	Accessories
2643960	Desiccant Refill Pack Contains 10 sachets
0356700	CLF4 Levelling Fixture High temperature design for CM4 only

CMP3



CMP3 is an ISO Second Class pyranometer designed for shortwave global solar radiation measurements in the spectral range from 300 to 2800 nm. The thermopile detector measures irradiance up to 2000 W/m² with a response time less than 18 seconds and typical sensitivity of 10 μV/W/m², that varies less than 5 % from -10 °C to +40 °C.

CMP3 is smaller and lighter than the other CMP series pyranometers. It has a robust 4 mm thick glass dome to protect the thermopile detector from external influences. The small size and sealed construction make this instrument the ideal choice for horticulture, monitoring solar energy installations, industrial applications, and entry level weather stations.

Two CMP3's can easily be mounted back-to-back and fitted with the accessory mounting rod to make a low-cost albedometer.

Specifications	
Classification to ISO 9060:1990	Second Class
Sensitivity	5 to 20 μV/W/m ²
Impedance	20 to 200 Ω
Expected output range (0 to 1500 W/m ²)	0 to 30 mV
Maximum operational irradiance	2000 W/m ²
Response time (63%)	< 6 s
Response time (95%)	< 18 s
Spectral range (20% points)	285 to 3000 nm
Spectral range (50% points)	300 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m ²)	< 15 W/m ²
(b) temperature change (5 K/h)	< 5 W/m ²
Non-stability (change/year)	< 1%
Non-linearity (100 to 1000 W/m ²)	< 1.5%
Directional response (up to 80° with 1000 W/m ² beam)	< 20 W/m ²
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m ²)	< 1%
Temperature response	< 5% (-10°C to +40°C)
Field of view	180°
Accuracy of bubble level	< 0.2°
Temperature sensor output	-
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Instrument
0338920-002	CMP3 Pyranometer • 10 m cable
0338920-000	CMP3 Pyranometer • no plug, no cable
0338920-702	CMP3 Pyranometer • METEON • 10 m cable
0338920-700	CMP3 Pyranometer • METEON • no plug, no cable
0338920-802	CMP3 Pyranometer • AMPBOX • 10 m cable
0338920-800	CMP3 Pyranometer • AMPBOX • no plug, no cable

Note: AMPBOX is adjusted so that 4 to 20 mA output = 0 to 1600 W/m²

CMP3 Second Class Albedometer	
An ISO Second Class Albedometer can be self-assembled by ordering: 2x CMP3 Pyranometer + 1x Mounting Rod	
Note: CMP3 Albedometer can be used with the AMPBOX but it has two individual outputs, so 2x AMPBOX are required	

Part number	Accessories
0338720	Mounting Rod Screw-in 300 mm long x 12 mm ø
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm ø
0367718	Adjustable Tilt Radiometer Mounting Kit For a CMP3 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement

Note: CMP3 cannot be used with the Glare Screen Kit

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

SMP3



SMP3 is our entry level smart pyranometer. It is ISO Second Class, with the same housing and detector design as the passive CMP3 model. SMP3 is equipped with a smart interface. There are two versions, one has an analogue output of 0 to 1 V, the other has 4 to 20 mA. Both have a 2-wire RS-485 interface with Modbus® (RTU) protocol. All the outputs are protected against short-circuits.

SMP series pyranometers have analog outputs that allow easy connection to virtually any data logger without the need for sensitive mV inputs. Modbus® interfaces directly to RTU's, PLC's, SCADA systems, industrial networks and controllers. An integrated temperature sensor and polynomial functions provide correction for the temperature sensitivity of the detector. The response time is improved and the output ranges are standardised.

Using Modbus® a range of instrument status and configuration information is available, with user-selectable options. SMP pyranometers have extremely low power consumption, so that internal heating does not affect the detector performance, and they operate from a wide range of supply voltages.

SMP3 is ideal for solar energy performance monitoring and for the new generation of all-digital automatic weather stations.

The included Smart Sensor Explorer Software allows up to 10 smart radiometers to be connected to a Windows™ computer; for configuration, testing, read-out of settings and parameters and basic data logging function.

Part number	Instrument
0374900-102	SMP3-V Smart Pyranometer • 0 to 1 V version • 10 m cable
0374900-100	SMP3-V Smart Pyranometer • 0 to 1 V version • no plug, no cable
0374900-202	SMP3-A Smart Pyranometer • 4 to 20 mA version • 10 m cable
0374900-200	SMP3-A Smart Pyranometer • 4 to 20 mA version • no plug, no cable

SMP3 Second Class Albedometer
 An ISO Second Class Albedometer can be self-assembled by ordering:
 2x SMP3 Pyranometer + 1x Mounting Rod

Specifications	
Classification to ISO 9060:1990	Second Class
Analogue output • V-version	0 to 1V
Analogue output range*	-200 to 2000 W/m ²
Analogue output • A-version	4 to 20 mA
Analogue output range*	0 to 1600 W/m ²
Serial output	RS-485 Modbus®
Serial output range	-400 to 2000 W/m ²
Response time (63%)	< 1.5 s
Response time (95%)	< 12 s
Spectral range (20% points)	285 to 3000 nm
Spectral range (50% points)	300 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m ²)	< 15 W/m ²
(b) temperature change (5 K/h)	< 5 W/m ²
Non-stability (change/year)	< 1%
Non-linearity (100 to 1000 W/m ²)	< 1.5%
Directional response (up to 80° with 1000 W/m ² beam)	< 20 W/m ²
Temperature response	< 2% (-20°C to +50°C) < 4% (-40°C to +70°C)
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m ²)	< 1%
Field of view	180°
Accuracy of bubble level	< 0.2°
Power consumption (at 12VDC)	V-version: 55 mW A-version: 100 mW
Software, Windows™	Smart Sensor Explorer Software, for configuration, test and data logging
Supply voltage	5 to 30 VDC
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Accessories
0338720	Mounting Rod Screw-in 300 mm long x 12 mm ø
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm ø
0367718	Adjustable Tilt Radiometer Mounting Kit For a SMP3 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement

Note: SMP3 cannot be used with the Glare Screen Kit

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

CMP6



CMP6 is an ISO First Class pyranometer. It has a similar detector to CMP3, but has improved performance due to the increased thermal mass and the double glass dome construction. The tilt response and levelling accuracy are also improved. The bubble level is visible through the snap-on white sun shield. The drying cartridge keeps the instrument free of internal condensation and is easily removable.

CMP6 is ideal for cost-effective, good quality, measurements in meteorological and hydrological networks and agriculture. Performance can be further improved by using the CVF4 Ventilation Unit.

A range of mounting accessories is available.

Specifications	
Classification to ISO 9060:1990	First Class
Sensitivity	5 to 20 $\mu\text{V}/\text{W}/\text{m}^2$
Impedance	20 to 200 Ω
Expected output range (0 to 1500 W/m^2)	0 to 30 mV
Maximum operational irradiance	2000 W/m^2
Response time (63%)	< 6 s
Response time (95%)	< 18 s
Spectral range (20% points)	270 to 3000 nm
Spectral range (50% points)	285 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m^2)	< 10 W/m^2
(b) temperature change (5 K/h)	< 4 W/m^2
Non-stability (change/year)	< 1%
Non-linearity (100 to 1000 W/m^2)	< 1%
Directional response (up to 80° with 1000 W/m^2 beam)	< 15 W/m^2
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m^2)	< 1%
Temperature response	< 4% (-10°C to +40°C)
Field of view	180°
Accuracy of bubble level	< 0.1°
Temperature sensor output	
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Instrument
0362900-002	CMP6 Pyranometer • 10 m cable
0362900-000	CMP6 Pyranometer • no plug, no cable
0362900-702	CMP6 Pyranometer • METEON • 10 m cable
0362900-700	CMP6 Pyranometer • METEON • no plug, no cable
0362900-802	CMP6 Pyranometer • AMPBOX • 10 m cable
0362900-800	CMP6 Pyranometer • AMPBOX • no plug, no cable

Note: AMPBOX is adjusted so that 4 to 20 mA output = 0 to 1600 W/m^2

CMP6 First Class Albedometer
 A ventilated ISO First Class Albedometer can be self-assembled by ordering:
 2x CMP6 Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit

Part number	Accessories
2643960	Desiccant Refill Pack Contains 10 sachets
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm \varnothing
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm \varnothing
0367718	Adjustable Tilt Radiometer Mounting Kit For a CMP6 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

SMP6



The SMP6 is a first class pyranometer that combines the sensor technology and housing from the CMP6. The SMP6 has both digital and analogue outputs, low maintenance, extremely robust and reliable and comes with 5 years warranty (*).

The SMP6 has an internal desiccant that will last for at least 10 years. This minimizes maintenance significantly.

The interval for dome cleaning can be extended, and the quality of measurements maximized, by fitting SMP6 with the CVF4 ventilation unit.

The SMP6 has a RS-485 Modbus® RTU interface, amplified analogue output, improved response time and temperature corrected measurement data. The wide and low power supply range from 5 to 30 VDC makes integration in meteorological and solar energy stations easy. The SMP6 is extreme robust and reliable and comes with 5 years warranty

Thanks to standardised output and connections of every SMP6, exchanging instruments for recalibration is easy.

SmartExplorer Windows™ software for data logging, display of data and Modbus® address setting is provided as standard.

Part number	Instrument
0374920-102	SMP6-V Smart Pyranometer • 0 to 1 V version • 10 m cable
0374920-100	SMP6-V Smart Pyranometer • 0 to 1 V version • no plug, no cable
0374920-202	SMP6-A Smart Pyranometer • 4 to 20 mA version • 10 m cable
0374920-200	SMP6-A Smart Pyranometer • 4 to 20 mA version • no plug, no cable

SMP6 First Class Smart Albedometer	
A ventilated ISO First Class Smart Albedometer can be self-assembled by ordering: 2x SMP6 Smart Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit	
An unventilated ISO First Class Smart Albedometer can be self-assembled by ordering: 2x SMP6 Smart Pyranometer + 1x CMF1 Mounting Fixture + 1x Glare Screen Kit	

Specifications	
Classification to ISO 9060:1990	First Class
Analogue output • V-version	0 to 1V
Analogue output range*	-200 to 2000 W/m ²
Analogue output • A-version	4 to 20 mA
Analogue output range*	0 to 1600 W/m ²
Serial output	RS-485 Modbus®
Serial output range	-400 to 2000 W/m ²
Response time (63%)	< 1.5 s
Response time (95%)	< 12 s
Spectral range (20% points)	270 to 3000 nm
Spectral range (50% points)	285 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m ²)	< 10 W/m ²
(b) temperature change (5 K/h)	< 4 W/m ²
Non-stability (change/year)	< 1%
Non-linearity (100 to 1000 W/m ²)	< 1%
Directional response (up to 80° with 1000 W/m ² beam)	< 15 W/m ²
Temperature response	< 1.5% (-20°C to +50°C) < 3% (-40°C to +70°C)
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m ²)	< 1%
Field of view	180°
Accuracy of bubble level	< 0.1°
Power consumption (at 12VDC)	V-version: 55 mW A-version: 100 mW
Software, Windows™	Smart Sensor Explorer Software, for configuration, test and data logging
Supply voltage	5 to 30 VDC
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Accessories
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm ø
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm ø
0367718	Adjustable Tilt Radiometer Mounting Kit For a SMP6 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

CMP10



CMP10 is the secondary standard pyranometer with the best price-quality-performance ratio on the market. Based on the established CMP11 technology, and with the same performance, CMP10 extends this quality to applications where maintenance is difficult and/or forms a major part of the cost of ownership.

The CMP10 has internal desiccant that will last for at least 10 years if the housing is not opened. This minimizes maintenance significantly.

The interval for dome cleaning can be extended, and the quality of measurements maximized, by fitting CMP10 with the CVF4 ventilation unit.

Kipp & Zonen provides every CMP10 with a 5-year warranty as standard. This warranty applies provided that the CMP10 is used only under atmospheric conditions, that the housing is not opened and that the Kipp & Zonen cable and connector is correctly fitted.

Specifications	
Classification to ISO 9060:1990	Secondary Standard
Sensitivity	7 to 14 $\mu\text{V}/\text{W}/\text{m}^2$
Impedance	10 to 100 Ω
Expected output range (0 to 1500 W/m^2)	0 to 20 mV
Maximum operational irradiance	4000 W/m^2
Response time (63%)	< 1.7 s
Response time (95%)	< 5 s
Spectral range (20% points)	270 to 3000 nm
Spectral range (50% points)	285 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m^2)	< 7 W/m^2
(b) temperature change (5 K/h)	< 2 W/m^2
Non-stability (change/year)	< 0.5%
Non-linearity (100 to 1000 W/m^2)	< 0.2%
Directional response (up to 80° with 1000 W/m^2 beam)	< 10 W/m^2
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m^2)	< 0.2%
Temperature response	< 1% (-10°C to +40°C)
Field of view	180°
Accuracy of bubble level	< 0.1°
Temperature sensor output	
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Instrument
0379900-002	CMP10 Pyranometer • 10 m cable
0379900-000	CMP10 Pyranometer • no plug, no cable
0379900-702	CMP10 Pyranometer • METEON • 10 m cable
0379900-700	CMP10 Pyranometer • METEON • no plug, no cable
0379900-802	CMP10 Pyranometer • AMPBOX • 10 m cable
0379900-800	CMP10 Pyranometer • AMPBOX • no plug, no cable

Note: AMPBOX is adjusted so that 4 to 20 mA output = 0 to 1600 W/m^2

CMP10 Secondary Standard Albedometer
 A ventilated ISO Secondary Standard Albedometer can be self-assembled by ordering:
 2x CMP10 Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit

Part number	Accessories
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm \varnothing
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm \varnothing
0367718	Adjustable Tilt Radiometer Mounting Kit For a CMP10 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

SMP10



SMP10 is a ISO Secondary Standard pyranometer that combines the sensor technology from the CMP11, the Smart interface from the SMP11 and the low maintenance from the CMP10.

The SMP10 has internal desiccant that will last for at least 10 years if the housing is not opened. This minimizes maintenance significantly.

The interval for dome cleaning can be extended, and the quality of measurements maximized, by fitting SMP10 with the CVF4 ventilation unit.

The SMP10 has Modbus® interface, amplified analogue output, improved response time and temperature corrected measurement data. The wide and low power supply range from 5 to 30 VDC makes integration in meteorological and solar energy stations easy. The SMP10 is protected against over voltage, reversed polarity and short circuiting.

Thanks to the identical sensitivity and connections of every SMP10, exchanging instruments for recalibration is easy.

The included Smart Sensor Explorer software allows up to 10 smart radiometers to be connected to a Windows™ computer; for configuration, testing, read-out of settings and parameters and basic data logging functions.

Part number	Instrument
0374905-102	SMP10-V Smart Pyranometer • 0 to 1 V version • 10 m cable
0374905-100	SMP10-V Smart Pyranometer • 0 to 1 V version • no plug, no cable
0374905-202	SMP10-A Smart Pyranometer • 4 to 20 mA version • 10 m cable
0374905-200	SMP10-A Smart Pyranometer • 4 to 20 mA version • no plug, no cable

SMP10 Secondary Standard Smart Albedometer

A ventilated ISO Secondary Standard Smart Albedometer can be self-assembled by ordering:
2x SMP10 Smart Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit
An unventilated ISO Secondary Standard Smart Albedometer can be self-assembled by ordering:
2x SMP10 Smart Pyranometer + 1x CMF1 Mounting Fixture + 1x Glare Screen Kit

Specifications	
Classification to ISO 9060:1990	Secondary Standard
Analogue output • V-version	0 to 1V
Analogue output range*	-200 to 2000 W/m ²
Analogue output • A-version	4 to 20 mA
Analogue output range*	0 to 1600 W/m ²
Serial output	RS-485 Modbus®
Serial output range	-400 to 4000 W/m ²
Response time (63%)	< 0.7 s
Response time (95%)	< 2 s
Spectral range (20% points)	270 to 3000 nm
Spectral range (50% points)	285 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m ²)	< 7 W/m ²
(b) temperature change (5 K/h)	< 2 W/m ²
Non-stability (change/year)	< 0.5%
Non-linearity (100 to 1000 W/m ²)	< 0.2%
Directional response (up to 80° with 1000 W/m ² beam)	< 10 W/m ²
Temperature response	< 1% (-20°C to +50°C) < 2% (-40°C to +70°C)
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m ²)	< 0.2%
Field of view	180°
Accuracy of bubble level	< 0.1°
Power consumption (at 12VDC)	V-version: 55 mW A-version: 100 mW
Software, Windows™	Smart Sensor Explorer Software, for configuration, test and data logging
Supply voltage	5 to 30 VDC
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Accessories
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm ø
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm ø
0367718	Adjustable Tilt Radiometer Mounting Kit For a SMP10 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

CMP11



CMP11 is an ISO Secondary Standard pyranometer. Compared to the CMP6 the detector design is different with faster response, better linearity, and has temperature compensation for greater accuracy with temperature changes. The tilt response and levelling accuracy are also improved.

CMP11 is a step up in performance from CMP6 and is particularly suitable for upgrading meteorological networks. The fast response time of 1.7 seconds (63%) meets the requirements for solar energy research and development applications and materials testing.

CMP11 is ideal for use in sun tracker based solar monitoring stations.

Specifications	
Classification to ISO 9060:1990	Secondary Standard
Sensitivity	7 to 14 $\mu\text{V}/\text{W}/\text{m}^2$
Impedance	10 to 100 Ω
Expected output range (0 to 1500 W/m^2)	0 to 20 mV
Maximum operational irradiance	4000 W/m^2
Response time (63%)	< 1.7 s
Response time (95%)	< 5 s
Spectral range (20% points)	270 to 3000 nm
Spectral range (50% points)	285 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m^2)	< 7 W/m^2
(b) temperature change (5 K/h)	< 2 W/m^2
Non-stability (change/year)	< 0.5%
Non-linearity (100 to 1000 W/m^2)	< 0.2%
Directional response (up to 80° with 1000 W/m^2 beam)	< 10 W/m^2
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m^2)	< 0.2%
Temperature response	< 1% (-10°C to +40°C)
Field of view	180°
Accuracy of bubble level	< 0.1°
Temperature sensor output	
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Instrument
0362910-002	CMP11 Pyranometer • 10 m cable
0362910-000	CMP11 Pyranometer • no plug, no cable
0362910-702	CMP11 Pyranometer • METEON • 10 m cable
0362910-700	CMP11 Pyranometer • METEON • no plug, no cable
0362910-802	CMP11 Pyranometer • AMPBOX • 10 m cable
0362910-800	CMP11 Pyranometer • AMPBOX • no plug, no cable

Note: AMPBOX is adjusted so that 4 to 20 mA output = 0 to 1600 W/m^2

CMP11 Secondary Standard Albedometer
 A ventilated ISO Secondary Standard Albedometer can be self-assembled by ordering:
 2x CMP11 Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit

Part number	Accessories
2643960	Desiccant Refill Pack Contains 10 sachets
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm \varnothing
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm \varnothing
0367718	Adjustable Tilt Radiometer Mounting Kit For a CMP11 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

SMP11



SMP11 has the same housing and detector design as the passive CMP11 model and is an ISO Secondary Standard pyranometer. Like SMP3 and SMP10, the SMP11 is equipped with a smart interface and there are two versions, One has an analogue output of 0 to 1 V, the other has 4 to 20 mA. Both have a 2-wire RS-485 interface with Modbus® (RTU) protocol.

SMP11 has all the smart interface advantages and features of the SMP3 but a significantly higher level of performance, and also has a faster response than the CMP11. SMP series pyranometers can operate from a power supply in the range from 5 to 30 VDC and have both reverse polarity and over-voltage protection.

Through the Modbus® interface the user can access the pyranometer type and serial number, instrument settings, calibration history, status information, and more. Pyranometers can be assigned individual addresses and 'daisy-chained' together for use in site networks.

SMP11 is the best choice for site prospecting, technology research and high quality solar radiation monitoring in renewable energy applications. It is also particularly suitable for upgrading meteorological networks and for use in sun tracker based solar monitoring stations.

The included Smart Sensor Explorer software allows up to 10 smart radiometers to be connected to a Windows™ computer; for configuration, testing, read-out of settings and parameters and basic data logging functions.

Part number	Instrument
0374910-102	SMP11-V Smart Pyranometer • 0 to 1 V version • 10 m cable
0374910-100	SMP11-V Smart Pyranometer • 0 to 1 V version • no plug, no cable
0374910-202	SMP11-A Smart Pyranometer • 4 to 20 mA version • 10 m cable
0374910-200	SMP11-A Smart Pyranometer • 4 to 20 mA version • no plug, no cable

SMP11 Secondary Standard Smart Albedometer	
A ventilated ISO Secondary Standard Smart Albedometer can be self-assembled by ordering: 2x SMP11 Smart Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit	
An unventilated ISO Secondary Standard Smart Albedometer can be self-assembled by ordering: 2x SMP11 Smart Pyranometer + 1x CMF1 Mounting Fixture + 1x Glare Screen Kit	

Specifications	
Classification to ISO 9060:1990	Secondary Standard
Analogue output • V-version	0 to 1V
Analogue output range*	-200 to 2000 W/m ²
Analogue output • A-version	4 to 20 mA
Analogue output range*	0 to 1600 W/m ²
Serial output	RS-485 Modbus®
Serial output range	-400 to 4000 W/m ²
Response time (63%)	< 0.7 s
Response time (95%)	< 2 s
Spectral range (20% points)	270 to 3000 nm
Spectral range (50% points)	285 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m ²)	< 7 W/m ²
(b) temperature change (5 K/h)	< 2 W/m ²
Non-stability (change/year)	< 0.5%
Non-linearity (100 to 1000 W/m ²)	< 0.2%
Directional response (up to 80° with 1000 W/m ² beam)	< 10 W/m ²
Temperature response	< 1% (-20°C to +50°C) < 2% (-40°C to +70°C)
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m ²)	< 0.2%
Field of view	180°
Accuracy of bubble level	< 0.1°
Power consumption (at 12VDC)	V-version: 55 mW A-version: 100 mW
Software, Windows™	Smart Sensor Explorer Software, for configuration, test and data logging
Supply voltage	5 to 30 VDC
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Accessories
2643960	Desiccant Refill Pack Contains 10 sachets
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm ø
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm ø
0367718	Adjustable Tilt Radiometer Mounting Kit For a SMP11 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

CMP21



CMP21 is a research grade instrument that exceeds the requirements for an ISO Secondary Standard pyranometer. It is similar to CMP11 but has individually optimised temperature compensation. A standard 10 k Ω thermistor sensor is fitted to monitor the housing temperature; a Pt-100 thermocouple sensor is optional.

Each instrument is supplied with its own temperature response, from -20 °C to +50 °C in 8 steps of 10 °C, and its directional (cosine) response data.

CMP21 is the choice for scientific use and in top level solar radiation monitoring networks such as the Baseline Surface Radiation Network (BSRN) of the World Meteorological Organisation. The excellent temperature response makes CMP21 particularly suitable for reference measurements in extreme climates, from deserts to the Antarctic.

Specifications	
Classification to ISO 9060:1990	Secondary Standard
Sensitivity	7 to 14 $\mu\text{V}/\text{W}/\text{m}^2$
Impedance	10 to 100 Ω
Expected output range (0 to 1500 W/m^2)	0 to 20 mV
Maximum operational irradiance	4000 W/m^2
Response time (63%)	< 1.7 s
Response time (95%)	< 5 s
Spectral range (20% points)	270 to 3000 nm
Spectral range (50% points)	285 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m^2)	< 7 W/m^2
(b) temperature change (5 K/h)	< 2 W/m^2
Non-stability (change/year)	< 0.5%
Non-linearity (100 to 1000 W/m^2)	< 0.2%
Directional response (up to 80° with 1000 W/m^2 beam)	< 10 W/m^2
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m^2)	< 0.2%
Temperature response	< 1% (-20 °C to +50 °C)
Field of view	180°
Accuracy of bubble level	< 0.1°
Temperature sensor output	10 k Thermistor (optional Pt-100)
Detector type	Thermopile
Operating temperature range	-40 °C to +80 °C
Storage temperature range	-40 °C to +80 °C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Instrument
0362920-012	CMP21 Pyranometer • 10 K • 10 m cable
0362920-010	CMP21 Pyranometer • 10 K • no plug, no cable
0362920-022	CMP21 Pyranometer • Pt-100 • 10 m cable
0362920-020	CMP21 Pyranometer • Pt-100 • no plug, no cable
0362920-712	CMP21 Pyranometer • METEON • 10 K • 10 m cable
0362920-710	CMP21 Pyranometer • METEON • 10 K • no plug, no cable
0362920-812	CMP21 Pyranometer • AMPBOX • 10 K • 10 m cable
0362920-810	CMP21 Pyranometer • AMPBOX • 10 K • no plug, no cable
0362920-822	CMP21 Pyranometer • AMPBOX • Pt-100 • 10 m cable
0362920-820	CMP21 Pyranometer • AMPBOX • Pt-100 • no plug, no cable

Note: AMPBOX is adjusted so that 4 to 20 mA output = 0 to 1600 W/m^2

CMP21 Scientific Secondary Standard Albedometer	
A ventilated ISO Secondary Standard Albedometer can be self-assembled by ordering: 2x CMP21 Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit	
An unventilated ISO Secondary Standard Albedometer can be self-assembled by ordering: 2x CMP21 Pyranometer + 1x CMF1 Mounting Fixture + 1x Glare Screen Kit	

Part number	Accessories
2643960	Desiccant Refill Pack Contains 10 sachets
0999920-3	Extended Temperature Test for CMP21 Temperature response from -40 °C to +50 °C in 10 steps of 10 °C
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm \varnothing
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm \varnothing
0367718	Adjustable Tilt Radiometer Mounting Kit For a CMP21 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

SMP21



The SMP21 is a Secondary Standard pyranometer that combines the sensor technology from the CMP21, has the RS-485 Modbus® interface, analogue output, low maintenance and 5 year warranty.

The SMP21 has an internal desiccant that will last for at least 10 years. This minimizes maintenance significantly.

The interval for dome cleaning can be extended, and the quality of measurements maximized, by fitting SMP21 with the CVF4 ventilation unit.

The SMP21 has Modbus® RTU interface, amplified analogue output, improved response time and individual temperature corrected measurement data. The SMP21 is supplied with individual measured cosine response data. The wide and low power supply range from 5 to 30 VDC makes integration in meteorological and solar energy stations easy. The SMP21 is protected against over voltage, reversed polarity and short circuiting.

Thanks to standardised output and connections of every SMP21, exchanging instruments for recalibration is easy.

SmartExplorer Windows™ software for data logging, display of data and Modbus® address setting is provided as standard.

Specifications	
Classification to ISO 9060:1990	Secondary Standard
Analogue output • V-version	0 to 1V
Analogue output range*	-200 to 2000 W/m ²
Analogue output • A-version	4 to 20 mA
Analogue output range*	0 to 1600 W/m ²
Serial output	RS-485 Modbus®
Serial output range	-400 to 4000 W/m ²
Response time (63%)	< 0.7 s
Response time (95%)	< 2 s
Spectral range (20% points)	270 to 3000 nm
Spectral range (50% points)	285 to 2800 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m ²)	< 7 W/m ²
(b) temperature change (5 K/h)	< 2 W/m ²
Non-stability (change/year)	< 0.5%
Non-linearity (100 to 1000 W/m ²)	< 0.2%
Directional response (up to 80° with 1000 W/m ² beam)	< 10 W/m ²
Temperature response	< 0.3% (-20°C to +50°C) < 0.3% (-40°C to +70°C)
Spectral selectivity (350 to 1500 nm)	< 1%
Tilt response (0° to 90° at 1000 W/m ²)	< 0.2%
Field of view	180°
Accuracy of bubble level	< 0.1°
Power consumption (at 12VDC)	V-version: 55 mW A-version: 100 mW
Software, Windows™	Smart Sensor Explorer Software, for configuration, test and data logging
Supply voltage	5 to 30 VDC
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Instrument
0374930-102	SMP21-V Smart Pyranometer • 0 to 1 V version • 10 m cable
0374930-100	SMP21-V Smart Pyranometer • 0 to 1 V version • no plug, no cable
0374930-202	SMP21-A Smart Pyranometer • 4 to 20 mA version • 10 m cable
0374930-200	SMP21-A Smart Pyranometer • 4 to 20 mA version • no plug, no cable

SMP22 Scientific Secondary Standard Albedometer	
A ventilated ISO Secondary Standard Smart Albedometer can be self-assembled by ordering: 2x SMP22 Smart Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit	
An unventilated ISO Secondary Standard Smart Albedometer can be self-assembled by ordering: 2x SMP22 Smart Pyranometer + 1x CMF1 Mounting Fixture + 1x Glare Screen Kit	

Part number	Accessories
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm ø
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm ø
0367718	Adjustable Tilt Radiometer Mounting Kit For a CMP21 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

CMP22



CMP22 is our highest quality pyranometer and it easily exceeds the requirements for an ISO Secondary Standard instrument. It has all the features of CMP21 but uses very high quality quartz domes for a wider spectral range, improved directional response, and reduced thermal offsets. Because of the high optical quality of these domes the directional response is reduced below 5 W/m² up to 80° solar zenith angle.

A standard 10 kΩ thermistor sensor is fitted to monitor the housing temperature; a Pt-100 thermocouple sensor is optional.

Each instrument is supplied with its own temperature response, from -20 °C to +50 °C in 8 steps of 10 °C, and its directional (cosine) response data.

Kipp & Zonen is confident that CMP22 is the best pyranometer currently available.

Specifications	
Classification to ISO 9060:1990	Secondary Standard
Sensitivity	7 to 14 μV/W/m ²
Impedance	10 to 100 Ω
Expected output range (0 to 1500 W/m ²)	0 to 20 mV
Maximum operational irradiance	4000 W/m ²
Response time (63%)	< 1.7 s
Response time (95%)	< 5 s
Spectral range (20% points)	210 to 3600 nm
Spectral range (50% points)	250 to 3500 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m ²)	< 3 W/m ²
(b) temperature change (5 K/h)	< 1 W/m ²
Non-stability (change/year)	< 0.5%
Non-linearity (100 to 1000 W/m ²)	< 0.2%
Directional response (up to 80° with 1000 W/m ² beam)	< 5 W/m ²
Spectral selectivity (350 to 1500 nm)	< 2%
Tilt response (0° to 90° at 1000 W/m ²)	< 0.2%
Temperature response	< 0.5% (-20 °C to +50 °C)
Field of view	180°
Accuracy of bubble level	< 0.1°
Temperature sensor output	10 k Thermistor (optional Pt-100)
Detector type	Thermopile
Operating temperature range	-40 °C to +80 °C
Storage temperature range	-40 °C to +80 °C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Instrument
0362930-012	CMP22 Pyranometer • 10 K • 10 m cable
0362930-010	CMP22 Pyranometer • 10 K • no plug, no cable
0362930-022	CMP22 Pyranometer • Pt-100 • 10 m cable
0362930-020	CMP22 Pyranometer • Pt-100 • no plug, no cable
0362930-712	CMP22 Pyranometer • METEON • 10 K • 10 m cable
0362930-710	CMP22 Pyranometer • METEON • 10 K • no plug, no cable
0362930-812	CMP22 Pyranometer • AMPBOX • 10 K • 10 m cable
0362930-810	CMP22 Pyranometer • AMPBOX • 10 K • no plug, no cable
0362930-822	CMP22 Pyranometer • AMPBOX • Pt-100 • 10 m cable
0362930-820	CMP22 Pyranometer • AMPBOX • Pt-100 • no plug, no cable

Note: AMPBOX is adjusted so that 4 to 20 mA output = 0 to 1600 W/m²

CMP22 Scientific Secondary Standard Albedometer	
A ventilated ISO Secondary Standard Albedometer can be self-assembled by ordering: 2x CMP22 Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit	
An unventilated ISO Secondary Standard Albedometer can be self-assembled by ordering: 2x CMP22 Pyranometer + 1x CMF1 Mounting Fixture + 1x Glare Screen Kit	

Part number	Accessories
2643960	Desiccant Refill Pack Contains 10 sachets
0999920-3	Extended Temperature Test for CMP22 Temperature response from -40 °C to +50 °C in 10 steps of 10 °C
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm ø
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm ø
0367718	Adjustable Tilt Radiometer Mounting Kit For a CMP22 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.

SMP22



The SMP22 is a Secondary Standard pyranometer that combines the new smart interface with quartz domes and sensor technology from the CMP22. Which has a proven track record of decades, making it the most accurate and reliable pyranometer in the world. The SMP22 has the widest spectral range, improved directional response, and reduced thermal offsets. Because of the highest optical quality domes the directional error is reduced below 5 W/m². The SMP22 comes standard with RS-485 Modbus[®] interface and 5 year warranty.

The SMP22 has internal desiccant that will last for at least 10 years. This minimizes maintenance significantly.

The interval for dome cleaning can be extended, and the quality of measurements maximized, by fitting SMP22 with the CVF4 ventilation unit.

The SMP22 has a digital interface, amplified analogue output, improved response time and individual temperature corrected measurement data. The SMP22 is supplied with individual measured cosine response data. The wide and low power supply range from 5 to 30 VDC makes integration in meteorological and solar energy stations easy. The SMP22 is extreme robust and comes with 5 years warranty.

Thanks to standardised output and connections of every SMP22, exchanging instruments for recalibration is easy.

SmartExplorer Windows[™] software for data logging, display of data and Modbus[®] address setting is provided as standard.

Part number	Instrument
0374940-102	SMP22-V Smart Pyranometer • 0 to 1 V version • 10 m cable
0374940-100	SMP22-V Smart Pyranometer • 0 to 1 V version • no plug, no cable
0374940-202	SMP22-A Smart Pyranometer • 4 to 20 mA version • 10 m cable
0374940-200	SMP22-A Smart Pyranometer • 4 to 20 mA version • no plug, no cable

SMP22 Scientific Secondary Standard Albedometer

A ventilated ISO Secondary Standard Smart Albedometer can be self-assembled by ordering:
2x SMP22 Smart Pyranometer + 1x CMF4 Mounting Fixture + 2x CVF4 Ventilation Unit

An unventilated ISO Secondary Standard Smart Albedometer can be self-assembled by ordering:
2x SMP22 Smart Pyranometer + 1x CMF1 Mounting Fixture + 1x Glare Screen Kit

Specifications	
Classification to ISO 9060:1990	Secondary Standard
Analogue output • V-version	0 to 1V
Analogue output range*	-200 to 2000 W/m ²
Analogue output • A-version	4 to 20 mA
Analogue output range*	0 to 1600 W/m ²
Serial output	RS-485 Modbus [®]
Serial output range	-400 to 4000 W/m ²
Response time (63%)	< 0.7 s
Response time (95%)	< 2 s
Spectral range (20% points)	210 to 3600 nm
Spectral range (50% points)	250 to 3500 nm
Zero offsets (unventilated)	
(a) thermal radiation (at 200 W/m ²)	< 3 W/m ²
(b) temperature change (5 K/h)	< 1 W/m ²
Non-stability (change/year)	< 0.5%
Non-linearity (100 to 1000 W/m ²)	< 0.2%
Directional response (up to 80° with 1000 W/m ² beam)	< 5 W/m ²
Temperature response	< 0.3% (-20°C to +50°C) < 0.3% (-40°C to +70°C)
Spectral selectivity (350 to 1500 nm)	< 2%
Tilt response (0° to 90° at 1000 W/m ²)	< 0.2%
Field of view	180°
Accuracy of bubble level	< 0.1°
Power consumption (at 12VDC)	V-version: 55 mW A-version: 100 mW
Software, Windows [™]	Smart Sensor Explorer Software, for configuration, test and data logging
Supply voltage	5 to 30 VDC
Detector type	Thermopile
Operating temperature range	-40°C to +80°C
Storage temperature range	-40°C to +80°C
Humidity range	0 to 100%
MTBF (Mean Time Between Failures)	> 10 years
Ingress Protection (IP) rating	67

Part number	Accessories
See accessories	CVF4 Ventilation Unit Recommended to reduce offsets and frequency of dome cleaning
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers (1 upper / 1 lower) Diameter 88 mm. Mounting rod 350 mm long x 16 mm ø
0362703	CMF4 Mounting Fixture For 1 or 2 ventilated or unventilated radiometers (1 upper / 1 lower) Length 375 mm, width 280 mm. Mounting rod 350 mm long x 20 mm ø
0367718	Adjustable Tilt Radiometer Mounting Kit For a CMP22 pyranometer to measure tilted diffuse radiation Zenith angle can be adjusted from 0° to 90° with graduated scale
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0346900	CM121B Shadow Ring for unventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Note: CM121B can not be used with CVF4 Ventilation Unit
0346901	CM121C Shadow Ring for ventilated radiometers Manually adjusted device provides diffuse sky irradiance measurement Mounts the radiometer at the correct height when used with a CVF4
0305722	Glare Screen Kit Sun protection screen for downward facing radiometers, with fixings

(*) This product will need to be registered by the end-user within 6 months of purchase to activate the warranty extension.