

# Solar Accessories

## Specially designed for our solar instruments

### Ventilation Units

Ventilation of radiometers improves the stability and quality of measurements and decreases the frequency of cleaning the domes. Our ventilation units also include heaters that can be externally switched on to clear frost and snow.

### Shadow Rings

To make measurements of diffuse solar radiation a pyranometer has its dome shaded from the direct solar irradiance. An alternative to an automatic sun tracker is to use a shadow ring. This does not need power, but requires regular manual adjustment to keep the dome correctly shaded.

### Power Supplies

Some of our instruments and accessories operate from 12 VDC power and for these we have power supply units available.

### Amplifier

For customers who require an industry standard output, or to use long cables, we have the AMPBOX signal amplifier which converts the low level instrument output to a 4 to 20 mA current loop signal.

### Mountings

Several of our instruments are supplied with a mounting rod, others have a rod available as an accessory. For instruments without these features we have mounting fixtures available which incorporate a rod and a plate to mount a radiometer on one side only, or on both sides (facing upwards and downwards). We also have a bracket available to enable easy attachment of a mounting rod to a pole or a wall and a kit to mount pyranometers at an adjustable angle.

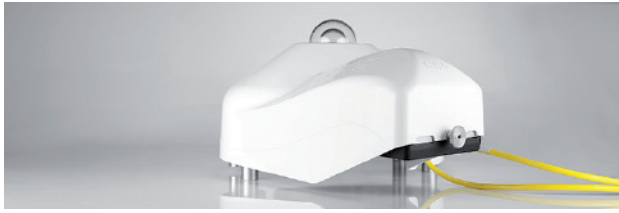
### Glare Screen

For some types of radiometers, when used facing downwards, it is advisable to fit a glare screen to prevent the instrument seeing radiation from below the horizon of the detector.

### Instrument Cables and Plugs

For instruments with connectors, high quality cables in a range of lengths are available, pre-wired with a waterproof plug. Plugs are also available separately for the user to fit their own cable.

# CVF4 Ventilation Unit



CVF4 is a low power, low maintenance ventilation unit. The only part that needs maintenance is the removable air inlet filter, which should be checked at regular intervals and cleaned or replaced when necessary. The cover is easily removed without tools to check the radiometer desiccant.

Ventilation of radiometers improves the reliability and accuracy of the measurement by reducing dust, raindrops and dew on the dome. With thermopile-based instruments ventilation stabilises the temperature of the radiometer and suppresses thermal offsets.

The integrated heater can be used to disperse precipitation and melt frost, or even melt snow and ice in cold climates. The heater power must be switched externally.

The flow that the CVF4 creates is unique. At the top of the pyranometer dome the flow is very high and it swirls to improve the air distribution over the dome. The position of the heaters and the new cover material ensures that only half the heating power is needed to melt frost and snow compared to older ventilation units.

A pulse output allows the fan speed to be monitored and there is a waterproof connector for the cable. The accessory CVP2 universal AC-DC power adaptor can operate up to three CVF4 ventilation units with the heaters on.

Specifications	
Air temperature rise caused by CVF4	< 0.25 K with ventilator fan only < 1 K with fan and heater
Tacho output	5 V, 2 pulses per revolution 8800 pulses per minute (nominal)
Supply voltage	8 to 13.5 VDC
Power consumption ventilator	5 W continuously
Power consumption heater	5.5 W (to be externally switched)
Cable voltage drop	0.075 V/m (with heater)
Operational temperature range	-40 °C to +70 °C
Storage temperature range	-40 °C to +70 °C
Humidity range	0 to 100 % non-condensing
Ingress Protection (IP) rating	55

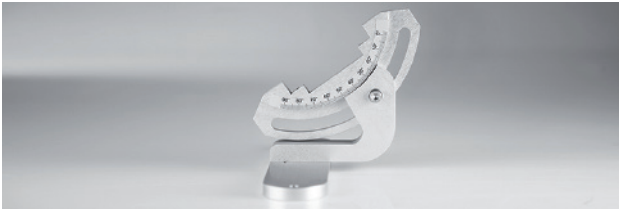
Part number	Instrument
0378910-002	CVF4 Ventilation Unit • 10 m cable
0378910-000	CVF4 Ventilation Unit • no plug, no cable

Note: Cable length is limited to 50m because of voltage drop on the power supply wires

Part number	Accessories
2682916	Spare Filters pack of 5 fan inlet filters
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
0369701	CMB1 Mounting Bracket In combination with mounting rod for easy attachment to a pole or a wall
0349401	CVP2 Power Supply 115 / 230V AC Power adaptor with 12 VDC output

Note: CVP2 is not suitable for unprotected outdoor use

# Adjustable Tilt Radiometer Mounting Kit



## Adjustable Tilt Radiometer Mounting Kit

In solar energy applications it is often desirable to measure the 'tilted' global solar radiation at the angle of non-tracking (fixed) photovoltaic panels, in addition to the horizontal global radiation.

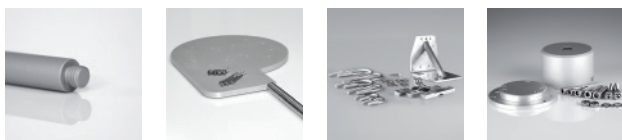
Adjustable Tilt Radiometer Mounting Kit is designed to be installed on a horizontal surface and allows a CMP, SMP, CGR or CUV series instrument to be mounted at zenith angles from 0° to 90°, using a graduated scale.

The kit can also be installed using a CMF4 Mounting Fixture and CMB1 Mounting Bracket.

It is not possible to use a ventilation unit with the kit.

Part number	Article
0367718	Adjustable Tilt Radiometer Mounting Kit for mounting a tilted global radiometer at a zenith angle from 0° to 90°

# Mounting Accessories



A range of mounting accessories enables the attachment of Kipp & Zonen radiometers to poles, masts or walls.

## Mounting Rod

For the SP Lite2, PQS1, CMP3, SMP3 and CGR3 a mounting rod is available, which screws into the instrument housing.

Rod diameter 12 mm, length 300 mm.

## CMF1 Mounting Fixture

For the CMP, SMP, CGR and CUV series of instruments without ventilation units. It can take one upwards and/or one downwards facing radiometers.

Plate diameter 88 mm. Rod diameter 16 mm, length 350 mm.

## CMF4 Mounting Fixture

For the CMP, SMP, CGR and CUV series of instruments with or without ventilation units. CMF4 can also be used to mount the UVS ultraviolet radiometer series. It can take one upwards and/or one downwards facing radiometer.

Plate length 375 mm, width 280 mm. Rod diameter 20 mm, length 350 mm

## CMB1 Mounting Bracket

For attaching mounting rods of 12 to 20 mm diameter, or the CSD3 to poles, masts or walls. The radiometer can be levelled by rotating and tilting the rod. The bracket includes u-bolts for fixing to poles and masts from 22 to 60 mm diameter.

## CLF4 Levelling Fixture

For the CM4 high temperature pyranometer. Baseplate for CM4 with three adjustable height screws and removable cap with bubble level.

Part number	Article
0338720	Mounting Rod For SP Lite2, PQS1, CMP3, SMP3 and CGR3
0356700	CLF4 Levelling Fixture For CM4 high temperature pyranometer
0362700	CMF1 Mounting Fixture For 1 or 2 unventilated radiometers
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
0369701	CMB1 Mounting Bracket

# CVP1 and CVP2



**CVP1** is a weatherproof heavy duty power supply with wide-range AC input and a fully protected 12 VDC output at up to 3.5 A. It is suitable for powering ventilation units and other equipment, such as data loggers, and is supplied pre-wired with 5 m AC cable.

**CVP1 LAS MkII** is a special version for use with Kipp & Zonen Large Aperture Scintillometer (LAS). It is pre-wired with 10 m cable fitted with the waterproof connector for the LAS MkII transmitter or receiver.

**CVP2** is a universal AC power adaptor with 12 VDC output. It operates from 115 or 230 VAC and can power up to four CVF4 ventilation units with heating. It can also be used to power the UVS series of UV radiometers.

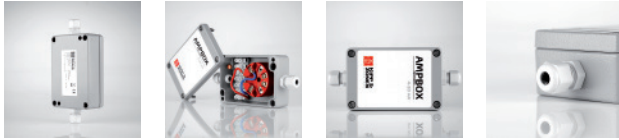
Please note that CVP2 is not suitable for unprotected outdoor use.

Specifications CVP 1	
Supply voltage	100 to 240 VAC, 50/60 Hz
Power consumption	120 to 170 W
Output voltage	12 VDC
Output current	3.5 A
Line regulation	±0.2% maximum
Load regulation	±1% maximum
Operational temperature range	-20 °C to +50 °C
Storage temperature range	-20 °C to +50 °C
Humidity range	0 to 100% non-condensing
Ingress Protection (IP) rating	65

Specifications CVP2	
Supply voltage	100 to 240 VAC, 50/60 Hz
Output voltage	12 VDC
Output current	2.5 A
Plug type	European, UK, USA and Australian plug adapters
Operational temperature range	0 °C to +40 °C
Storage temperature range	0 °C to +40 °C
Humidity range	0 to 100% non-condensing
Ingress Protection (IP) rating	For indoor use only

Part number	Article
0357700	CVP 1 power supply 12 VDC output
0371701	CVP1 LAS MkII power supply 12 VDC output
0349401	CVP2 power supply 12 VDC output

# AMPBOX



**AMPBOX** is a digital amplifier perfectly suited to combine with our instruments. Most Kipp & Zonen solar radiation radiometers are passive instruments that do not require any power to operate. The output signal is generated by the thermopile or photo-diode detector. However, the output is a very low voltage, typically in the region of 10 mV on a bright sunny day.

AMPBOX can be used to provide a 4 to 20 mA current loop signal for applications where longer cables are required, or the low signal outputs cannot be handled. AMPBOX is fully waterproof and can be installed outdoors close to the radiometer and connected by several hundred metres of cable to the data acquisition system. The amplifier is 'current-sink' (powered by the current loop). The power for the loop must be supplied from the data acquisition system.

AMPBOX is a programmable digital amplifier and the input and output are isolated to minimize feedback and to protect the data collection equipment. As standard the amplifier is delivered with an input signal of 2 mV producing an output of 1 mA, so that 4 to 20 mA represents 0 to 32 mV.

AMPBOX can be adjusted to suit the sensitivity of a particular radiometer to provide a defined radiation output range, for instance 4 to 20 mA represents 0 to 1600 W/m<sup>2</sup> of radiation. For radiometers that can produce a negative output the zero point is offset.

Specifications	
Input impedance	10 MΩ
Output range	4 to 20 mA
Supply voltage	35 VDC maximum
Voltage drop to power amplifier	7.2 VDC
Input range	-12 to +150 mV
Standard gain	2 mV / mA
Gain range	0.1 to 4 mA / mV
Zero adjustment	Up to 12 mA
Operational temperature range	-40 °C to +85 °C
Storage temperature range	-40 °C to +85 °C
Humidity range	0 to 100 % non-condensing
Ingress Protection (IP) rating	66

Part number	Article
0365900	AMPBOX signal amplifier standard gain setting
0365901	AMPBOX signal amplifier gain adjusted
0365903	AMPBOX signal amplifier gain adjusted for pygeometers

Note: For an existing radiometer please specify the model, serial number and sensitivity when ordering

# CM121B/C Shadow Ring



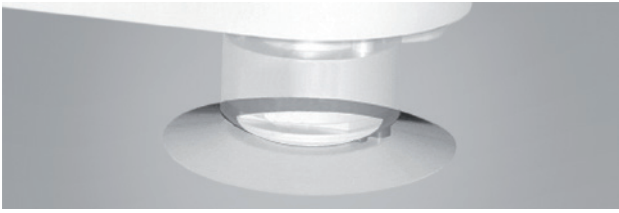
**CM121** is a shadow ring that does not require power and can be used with all the Kipp & Zonen CMP, SMP, CGR and CUV series of instruments. It is used for measurements of the diffuse sky radiation or to shade a pyrgometer from the direct solar radiation. CM121B is for unventilated radiometers and CM121C is for ventilated instruments.

The radiometer is installed on the mounting pedestal and after levelling and correct adjustment for the location and the sun declination the ring makes a shadow on the radiometer dome throughout the day. To maintain the shading accuracy it is necessary to adjust the position of the ring every few days to compensate for changes in the solar arc.

The ring has a width / diameter ratio of 0.185 and has a view of  $10.6^\circ$  seen from the radiometer. Because the ring intersects a part of the diffuse sky, a table is supplied to compensate the measured values.

Part number	Article
0346900	CM121B Shadow Ring for unventilated radiometers
0346901	CM121C Shadow Ring for ventilated radiometers

# Glare Screen Kit



## Glare Screen Kit

A downward facing radiometer should not see any radiation coming from the hemisphere above or from the first 5° below the horizon. Our albedometers and net radiometers have this feature integrated into the design.

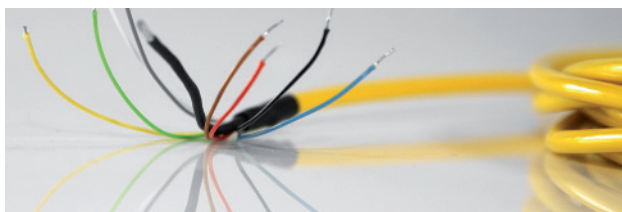
An accessory glare screen kit is available for use with the CMP, SMP, CGR and CUV series of instruments (except the CMP3, SMP3 and CGR3).

Please note that the CVF4 ventilation unit cannot be fitted if the glare screen kit is used.

Part number	Article
0305722	Glare Screen Kit for downwards facing radiometers



# Instrument Cables and Plugs



Many instruments are fitted with a socket in the housing. The matching plug is supplied pre-wired to a high quality, wide temperature range, UV-resistant yellow cable. The connectors allow easy installation and exchange of instruments during recalibration.

The plugs have metal housings to protect the signals from interference, are waterproof, and have gold-plated pins for reliability. Pre-wired cables are available in a range of lengths and plugs are available separately for the user to fit their own cable.

Instruments with heaters or temperature control systems have restrictions on the maximum cable length due to voltage drop in the wires that could prevent correct operation. This is noted below where applicable.

Part number	For CMP3, CMP6, CMP10, CMP11, CUV5
2523144	Waterproof 2-pin plug only
0362601	10 m cable • pre-wired with waterproof 2-pin plug
0362603	25 m cable • pre-wired with waterproof 2-pin plug
0362604	50 m cable • pre-wired with waterproof 2-pin plug
0362605	100 m cable • pre-wired with waterproof 2-pin plug

Part number	For CMP21 (10 K), CMP22 (10 K), CGR3 (10 K), CGR4 (10 K) CMA6, CMA11, CVF4*, CNF4*
2523145	Waterproof 4-pin plug only
0362611	10 m cable • pre-wired with waterproof 4-pin plug
0362613	25 m cable • pre-wired with waterproof 4-pin plug
0362614	50 m cable • pre-wired with waterproof 4-pin plug
0362615	100 m cable • pre-wired with waterproof 4-pin plug

\*Note: 4-wire cable length for CVF4 and CNF4 is limited to 25 m of this type of cable because of voltage drop power supply wires

Part number	For SMP3, SMP6, SMP10, SMP11, SMP21, SMP22, CMP21 (Pt:100), CMP22 (Pt:100), CGR3 (Pt:100), SGR3, CGR4 (Pt:100), SGR4, CHP1, SHP1, CNR4, CNF4 <sup>(1)</sup> , SUV5, UVS <sup>(2)</sup> , CSD3 <sup>(2)</sup> , CVF4 <sup>(3)</sup>
2523146	Waterproof 8-pin plug only
0362621	10 m cable • pre-wired with waterproof 8-pin plug
0362623	25 m cable • pre-wired with waterproof 8-pin plug
0362624	50 m cable • pre-wired with waterproof 8-pin plug
0362625	100 m cable • pre-wired with waterproof 8-pin plug

<sup>(1)</sup>Note: Cable length for UVS is limited to 25 m of this type of cable because of voltage drop on the temperature control power supply wires

<sup>(2)</sup>Note: Cable length for CSD3 is limited to 25 m of this type of cable because of voltage drop on the heater power supply wires

<sup>(3)</sup>Note: Cable length for CNF4 and CVF4 is limited to 50 m of this type of cable because of voltage drop on the heater power supply wires