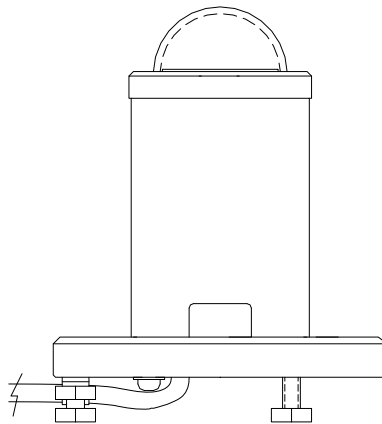




MIDDLETON SOLAR SK01-D2 PYRANOMETER USER'S INSTRUCTIONS

CE 2005



The SK01-D2 pyranometer is for measuring solar global radiation. It uses a silicon photodiode detector shielded by a cosine corrected diffuser and has a glass dome to keep debris off the diffuser. It is sealed and fully weatherproof. The detector signal is boosted by a low noise amplifier that is drift stabilised.

Mounting. Select a site that has an unobstructed view of the sun from sunrise to sunset. Place the instrument on a flat horizontal platform and adjust the feet with a 7mm A.F. spanner until the circular level is centered. Secure the instrument to the platform with a 5mm holding screw in the centre of the base; the screw should be brass or stainless steel.

Power up the instrument by connecting the lead to the terminals of a 5.5-14.5V DC supply (a fresh 9V PP3 alkaline battery will power the instrument for up to 200 hours).

red to +ve blue to -ve.

Measure the output signal by connecting the lead to a voltmeter, data-logger, chart recorder, or similar instrument.

yellow to +ve green to -ve.

Note: the instrument has a low current drain and a 50ms settling time; it is suitable for unattended installation with a battery operated datalogger periodically powering it up.

Calibration. The SK01-D2 is calibrated for use in unobstructed daylight. The calibration is by outdoors comparison to a reference pyranometer. It is recommended that the calibration be checked annually.

The output signal is factory set to 1mV/W.m^{-2} (so 1000W.m^{-2} of sunshine = 1 volt).

Photodiode detectors do not have a flat spectral response and are therefore not recommended for use in indirect or artificial light. In daylight the spectral selectivity can cause small deviations from ideal response: global irradiance will tend to be overestimated by up to 2% in bright cloud conditions, and underestimated by up to 6% in heavy overcast conditions. The cumulative solar energy error from spectral selectivity is small.

Maintenance. Keep the dome of the SK01-D2 clean and free from debris otherwise the directional response will be compromised. Damaged or faulty units should be returned to the manufacturer for repair.

Technical Specification

parameter	specification
viewing angle	2π steradians
spectral range (nominal)	300-1150nm
irradiance	2000 W.m^{-2}
sensitivity	1mV/W.m^{-2}
response time (to 95%)	30ms
temperature response	$< \pm 0.15\%$ per °C
non-stability (per year)	$< \pm 2\%$
non-linearity	$< 1\%$
directional response (30°-80° zenith)	$\pm 30 \text{ W.m}^{-2}$ (ISO9060 second class)
spectral response (w.r.t clear sun)	-6% (heavy overcast) to +2% (bright cloud)
tilt response	no tilt error
operating temperature	-35°C to +60°C
calibration accuracy	$\pm 3\%$
sensor type	silicon photodiode
lead	3m
mounting	central M5 hole; two adjustable feet
construction	aluminium, hard anodized for corrosion resistance. Stainless steel fasteners
IP rating	sealed to IP66

Signal Amplifier	
type	chopper stabilised (for zero amplifier drift)
voltage & current	5.5V to 14.5V, 3mA
dark offset	$< +0.5\text{mV}$
output characteristic	external load $> 3\text{K}\Omega$; max. output current: +2mA source, -5mA sink
overvoltage & polarity reversal protection	$> 15\text{V}$; $> 0.2\text{A}$
settling time after power on	50ms