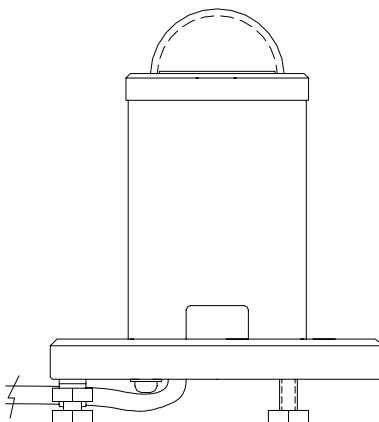




**MIDDLETON SOLAR  
SK01-D2 PYRANOMETER  
USER'S INSTRUCTIONS**

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 (or white) to +ve                      clear (or 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  $1\text{mV/W.m}^{-2}$  (so  $1000\text{W.m}^{-2}$  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	$2\pi$ steradians
spectral range (nominal)	300-1150nm
irradiance	$2000 \text{ W.m}^{-2}$
sensitivity	$1\text{mV/W.m}^{-2}$
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