MIDDLETON SOLAR
16 WILSON AVENUE BRUNSWICK VICTORIA 3056 AUSTRALIA

SD4 Sunshine Duration Sensor

Contrast Detector for measurement of Direct Sunlight Duration

Four identical omni-directional sensors under a hemispherical shading canopy.

Embedded microcontroller executes a sophisticated contrast-evaluation algorithm to accurately discriminate direct sunshine from diffuse sunlight.

Performance Specification	WMO recommended[1]	SD4
sunshine duration uncertainity	± 0.1 hour	< ± 0.1 hour
sunshine duration resolution	0.1 hour	0.02hr (0.01hr option)
sunshine threshold[2] (direct solar irradiance)	120 $W.m^{-2}$ ± 20%	120 $W.m^{-2}$ ± 15%
unobstructed view of sun above horizon[3]	> 3°	> 3°

EASY TO USE, RELIABLE, ACCURATE, FULLY ELECTRONIC

Excellent performance even in difficult bright-cloud conditions.

Fully sealed, with a glass dome to protect the sensors.

Simple high/low output is used to indicate sunshine/no sunshine.

Operates at any latitude & longitude, and does not require alignment.

Marine-grade aluminium, hard anodised, for corrosion resistance.

Compact size and light weight.

The SD4 replaces the Middleton Solar RS-4 and RS-6 Sunshine Duration Sensors.

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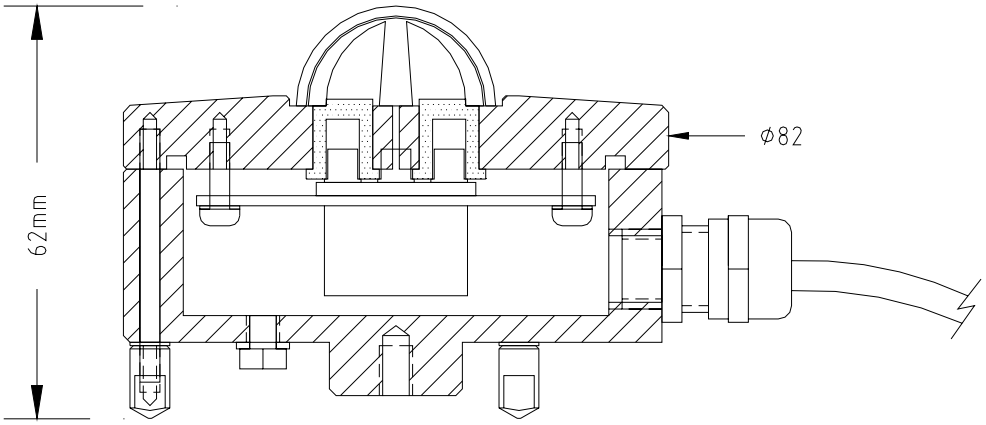
[1] WMO Guide to Meteorological Instruments and Methods of Observation, 6th ed., 1996.

[2] WMO threshold tolerance of ±20% implies daily uncertainty of ±0.3hr in some scattered cloud conditions.

[3] Direct sunshine below 3° elevation is ignored.

Middleton Solar SD4 Sunshine Duration Sensor - Detailed Specification



Conforms with the World Meteorological Organization definition for sunshine duration.
Embedded microcontroller samples four omni-directional sensors every second.
Algorithm evaluates magnitude, difference, and rate of change, to determine sun status.
Output state updated every 60 seconds (or optional 30s).
Permanently sealed construction with internal desiccant.
Low power consumption.
No moving parts, no routine maintenance required.
TTL output signal interfaces to simple Elapsed Time Meter, or to Datalogger.
Reduced output voltages available using external resistor.
Supplied with comprehensive User's Guide.

General Specification

field of view	2π steradians
irradiance	0 - 1500 $W.m^{-2}$
spectral range	300 - 1150nm
spectral selectivity	-5 to +10%
operating latitude	-90° to 90°
non-stability	< 0.5% per year
temperature response	< 2%
operating temperature	-30 to +60°C
operating humidity	0-100% RH
digital output signal (TTL)	sunshine = +5V nominal (inbuilt pullup resistor = 1KΩ) no sunshine = 0V (contact-closure to ground option available)
response time	< 1 sec, per sample
sampling period	60 sec. (30s option on request)
power supply requirement	5.5 to 14.5VDC, 20mA max.
detectors	silicon photodiode, with cosine diffuser
desiccant	orange silica gel (non-toxic)
lead	6m; 4-core
mounting	central M5 hole provided
construction	anodised marine-grade aluminium, stainless steel, permanently sealed to IP65
shipping size & weight; net weight	150 x 150 x 150mm, 0.8Kg; 0.5Kg

Available from:

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