

SD4 Sunshine Duration Sensor

Contrast Detector for measurement of Direct Sunshine Duration



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

Microcontroller contrast-evaluation to discriminate direct sunshine from diffuse sunlight.

| Performance Specification | WMO recommended ¹ | SD4 |
|---|------------------------------|-----------------------------|
| sunshine duration uncertainty | ± 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% |
| accuracy (monthly sunshine hours) | - | > 90% |
| 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.

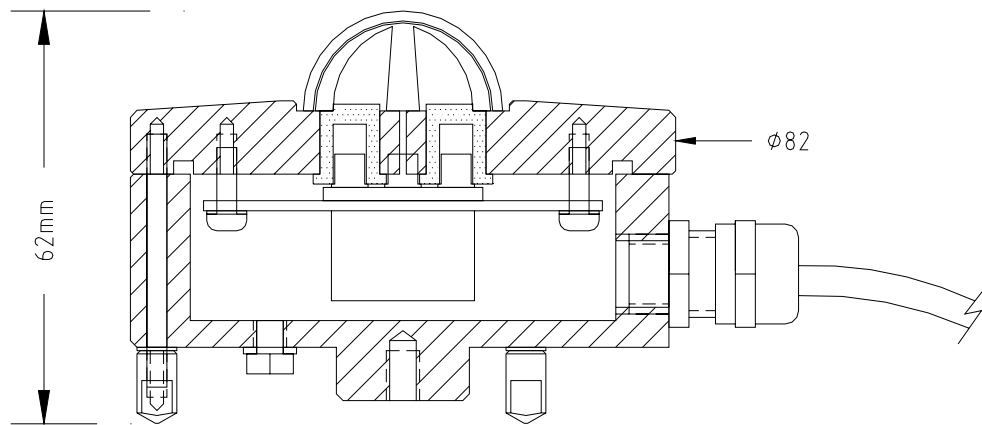
Compact size and light weight.

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



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|---|
| 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 = 1K Ω) 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 | 5m; 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: