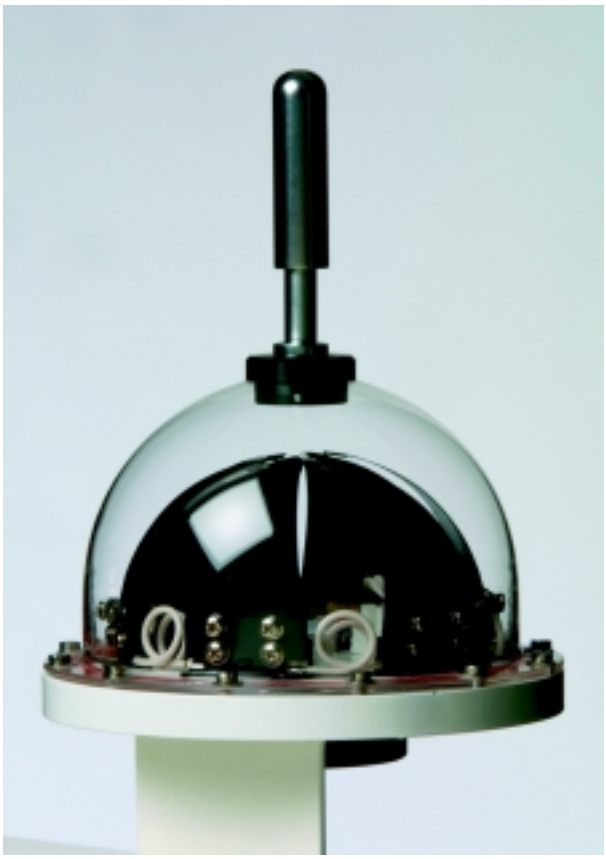
DSU12
Sunshine Duration Sensor

- **High Sensitivity**
- **Reliable Operation**
- **Snow-proof Chimney Vent**
- **Unaffected By Frost or Rain Drops**
- **Simple Interfacing to Data Loggers and Automated Weather Stations**
- **No Power Required**
- **Low Maintenance (Cleaning Only)**



The Vaisala model DSU12 Sunshine Duration sensor provides a contact closure in response to direct solar radiation above its set point flux level. The total sunshine duration for any day is thus the sum of the contact closure times and can be easily logged by a recorder or data logger. The sensitivity of the instrument can be set to match the well known Campbell-Stokes sunshine recorder.

DSU12 employs six blackened temperature sensitive bimetallic element pairs, arranged in a circle, which track each other thermally during overcast lighting conditions. When exposed to direct sunshine, the inner element is shaded whilst the outer element heats and bends to make a contact closure. In the absence of direct sunshine, the inner element receives diffuse radiation reflected from the white base and therefore the element pairs bend uniformly under varying temperature conditions thus preventing false contact closures.

The element pairs are protected within a clear acrylic dome fitted with a silicone O-ring seal and restricted ventilation chimney. Due to the difference in the bend radius of the inner and outer elements, the contacts close with a self-cleaning wiping motion.

Rain drops and frosting on the outer dome have negligible effect upon the performance of the DSU12 sensor. The solar heating of the dome via the blackened element pairs and the restricted ventilation combine to assist in quickly melting snow deposits and frost. Heavy snow falls may reduce the effectiveness of operation.

DSU12 can be used at latitudes between 0° and 65° in either hemisphere. The sensor is correctly installed when exposed to the sun, without shading, throughout the entire day. Due to the shape and geometry of the element pairs, DSU12 does not need any special alignment for the latitude of the site or the season of the year. The instrument is equipped with a shielded 2 core cable, two meters in length, which exits through the end of the threaded mounting spigot.

TECHNICAL DATA

PERFORMANCE

Spectral response	less than -3 dB between 350 and 1600 manometers
Sensitivity (Trip Point)	adjustable from 80 W/m², normally factory set for 120 W/m² at 15 °C
Response time	better than 20 to 40 seconds for all flux levels greater than the trip point
Trip Point	
Accuracy	± 20 % (insensitive to site latitude)
Stability	within 10 W/m² per year
Temperature Dependency	±2 W/m² / °C from trip point temperature
Azimuth error	less than ±7 % of trip point over 360 °
Level error	negligible within ±20° of level
Cosine correction	triangular element shape gives inherent cosine compensation

OPERATING CONDITIONS

Temperature	
Minimum	-20 °C (-4 °F)
Maximum	+50 °C (122 °F)
Latitude of site	
Minimum	0 ° (Equator)
Maximum	65 °

PHYSICAL

Number of elements	6 pairs
Contacts	6 pairs, solid Platinum rated at 6 VA (1 to 12 VDC, AC above 12 V)
Housing diameter	151 mm (5.9 inches)
Overall height	190 mm (7.5 inches)
Weight	800 grams (1.8 pounds)
Mounting method	fitted with 1 inch BSP externally threaded spigot (other threads to order)
Shipping weight	1200 grams (2.6 pounds)
Shipping dimensions	190 x 190 x 250 mm (7.5 x 7.5 x 90.8 inches)
Materials	
Base	Cast Aluminum, finished in white gloss polyurethane enamel
Dome	Acrylic (Polymethyl Methacrylate)
Elements	0.25 mm thermostatic bimetallic (Ni, Cr, Fe), one side painted matt black and mounted on machined black cast nylon 6
Screws	Stainless Steel (external), Nickel Plated Brass (internal)

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