



# AT

## INNOVATIVE SOLUTIONS FOR SOLAR ENERGY MONITORING

### ***SPN1 Sunshine Pyranometer***

The SPN1 provides accurate measurement of direct and diffuse solar radiation and sunshine duration

- **Direct and Diffuse radiation**
- **No moving parts or adjustments**
- **DNI Calculations**
- **Sunshine status**

The SPN1 enables test engineers to monitor the efficiency of solar photovoltaic installations. It is particularly useful for selecting CPV sites, as its unique design enables the measurement of direct and diffuse radiation without complex adjustments, shade rings or other moving parts.



*The SPN1 can be connected to a data logger such as the GP1 - or directly to a PC via RS232*



Output from an SPN1 Sunshine Pyranometer enables calculation of DNI (Direct-Normal Irradiance) for sun tracking, horizontal and tilted installations.



# AT

## DELTA-T DEVICES PROVEN APPLICATIONS IN METEOROLOGY SOLAR ENERGY AND PV MONITORING

### Direct and diffuse radiation

#### Applications

The SPN1 is essential equipment for monitoring solar radiation and sunshine duration within the following markets:

#### Solar Energy

Dependable solar radiation data is vital for the development, siting and monitoring of solar energy installations. The SPN1's high quality, versatility and simplicity make it an excellent and affordable choice for these measurements. It is particularly suited to the site selection, testing and evaluation of concentrator photovoltaic (CPV) and thermal systems which collect energy from the direct solar beam.

#### Meteorology

The SPN1 derives sunshine status using an advanced algorithm that closely matches the standard WMO threshold of 120W.m<sup>-2</sup> in the direct beam. The straightforward Total and Diffuse analogue outputs (1mV = 1W.m<sup>-2</sup>) and sunshine status can be easily recorded as part of long-term climate and environmental studies with greatly reduced maintenance and labour overheads compared to traditional instruments.

#### Advantages

The SPN1's unique combination of features makes it an excellent choice for meteorology and solar energy monitoring:

#### Innovative design

The patented design\* comprises an array of 7 miniature thermopile sensors and a unique shading pattern. See shadow mask illustration in right hand column.

#### No moving parts

Once the SPN1 is installed, no adjustments are necessary. The SPN1 has no moving parts, unlike shadow-band or rotating-ring pyranometers and pyrheliometers.

#### Multiple outputs

The SPN1 provides Total and Diffuse analogue outputs, and sunshine status. Direct Normal Irradiance (DNI) and sunshine duration can both be calculated from stored data.

#### Research grade sensor

The machined aluminium and glass construction features industrial grade connectors, and the internal heater keeps the dome clear of dew, ice and snow at temperatures as low as -20°C (still conditions).

\* The SPN1 Sunshine Pyranometer is protected by patents EP1012633 and US6417500.

#### Brief specifications

##### Total and Diffuse radiation

- Daily integral: ± 5%
- Hourly mean: ± 5% ±10W.m<sup>-2</sup>

##### Sunshine status

- Threshold: 120W.m<sup>-2</sup> equivalent
- Sun hours: ± 10%

##### General

- Range: 0 to >2000W.m<sup>-2</sup>
- Spectral response: ± 10% from 400 to 2700nm
- Cosine response: ± 2%
- Temperature range: -40 to +70°C

Ordering information	
<b>SPN1</b>	Sunshine Pyranometer with 5m logger cable to bare wire, 1.5m comms cable, spare desiccant, Quick Start Guide and calibration certificate.
Accessories and spares	
<b>SPN1/BP</b>	Levelling baseplate
<b>SPN1/ARM</b>	Support arm (1m)
<b>SPN1-SD</b>	Spare desiccant unit
Cable options	
<b>EXT/8W-05</b>	5m extension cable, M12 connector to M12 connector
<b>EXT/8W-10</b>	10m extension cable
<b>EXT/8W-25</b>	25m extension cable



Computer-generated shadow mask within the SPN1 ensures that one of the 7 thermopiles is always exposed to the full solar beam and one is in full shade regardless of the sun's position.

#### DNI (Direct-Normal Irradiance)

Direct-Normal Irradiance (DNI) is the amount of solar radiation in unit time at the Earth's surface on a unit area perpendicular to the direction to the Sun. It is a common practice to compare solar panel efficiency to DNI, particularly in field trials. Output from an SPN1 allows calculation of DNI for sun tracking, horizontal and tilted installations.

