

## Thermopile Pyranometer

The SEVEN Thermopile Pyranometer is a product of the SEVEN meteorological sensor series, which consists of professional and intelligent measurement sensors with digital interfaces for environmental and photovoltaic system.

The SEVEN pyranometer 3S-TP-MB-A is designed to meet the “**ISO 9060:2018, fast-response, spectrally flat and Class A**” and “**IEC 61724-1:2021 Class A**” standards. Equipped with cutting-edge thermopile detector and diffuser technology, this high-precision device features **low zero-offset** behavior and the **lowest non-stability** characteristics. Falling into the **fast-response and spectrally flat** sub-categories, the SEVEN pyranometer offers low-zero-offset behavior, maximizing measurement accuracy. This advanced technology device is ideal for meeting the highest standards in solar energy system performance monitoring.

The SEVEN pyranometer also includes a humidity sensor and two temperature sensors. These additional features ensure multi-parameter environmental monitoring, allowing for precise adjustments and accurate readings under varying conditions. The integrated sensors contribute to the device's overall reliability and performance, making it a robust solution for solar energy system, meteorology and to be used in different applications assessments.

Measured irradiance, humidity and temperature data are transmitted to data loggers and other receiving units via serial RS485 interface with Modbus RTU protocol.

## Benefits and Features

- ISO 9060:2018 Class A (Secondary Standard)
- IEC 61724-1:2021 Class A Monitoring
- Advanced Detection
- Fast-Response
- Spectrally Flat
- Low Zero-Offset Behavior
- Exceptional Stability
- Multi-Parameter Monitoring
- Fast & Simple to Install
- Free Software Update
- SunSpec Compliant
- SEVEN Remote Setup Service
- SEVEN Customer Support
- 5 Years Warranty

## Technical Specifications

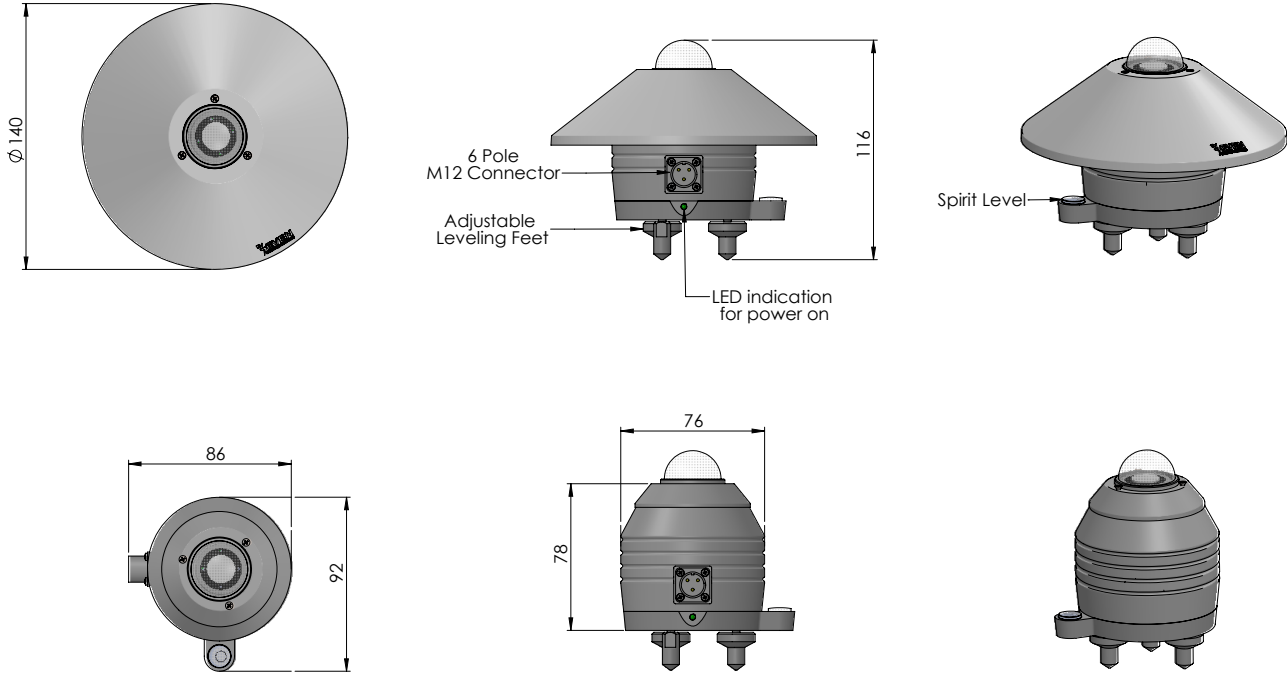
3S-TP-MB-A	
Measured Data	Global Horizontal (GHI) or POA Irradiance, Internal and Housing Temperature and Internal Humidity
Sensor Type	Thermopile
Spectral range (50% points)	280 to 3000 nm
Irradiance Range	0 - 4000 W/m <sup>2</sup>
Response time (95%)	0.5s (less than 10s; as per ISO9060:2018 standard Class A)
Zero offset A - Thermal Radiation (200W/m <sup>2</sup> )	± 1W/m <sup>2</sup> (± 7W/m <sup>2</sup> ; as per ISO9060:2018 standard Class A)
Zero offset B - Temperature change (5K/hr)	± 1.5 W/m <sup>2</sup> (± 2W/m <sup>2</sup> ; as per ISO9060:2018 standard Class A)
Total zero off C - Total zero off-set	± 3W/m <sup>2</sup> (± 10W/m <sup>2</sup> ; as per ISO9060:2018 standard Class A)
Non-stability (change/year)	< 0.5% (± 0.8%; as per ISO9060:2018 standard Class A)
Non-linearity (100 to 1000 W/m <sup>2</sup> )	± 0.2% (± 0.5%; as per ISO9060:2018 standard Class A)
Directional response (at 1000W/m <sup>2</sup>   0 to 80°)	± 10W/m <sup>2</sup> (± 10W/m <sup>2</sup> ; as per ISO9060:2018 standard Class A)

## Technical Specifications

3S-TP-MB-A	
<b>Spectral Error</b>	$\pm 0.2\%$ ( $\pm 0.5\%$ ; as per ISO9060:2018 standard Class A)
<b>Temperature response (-20°C to 50°C)</b>	$\pm 0.4\%$ ( $\pm 1\%$ ; as per ISO9060:2018 standard Class A)
<b>Irradiance Resolution</b>	0.1 W/m <sup>2</sup>
<b>Internal Humidity</b> Range Accuracy Resolution	0% to 100% $\pm 1\%$ RH (20...70%) @ 25°C 1%
<b>Internal Temperature</b> Range Accuracy Resolution	-40°C to +85°C $\pm 0.1^\circ\text{C}$ (5...60°C) @ 20...80% RH 0.1°C
<b>Housing Temperature</b> Range Accuracy Resolution	-40°C to +85°C $\pm 0.2^\circ\text{C}$ 0.1°C
<b>Accuracy of Bubble Level</b>	$\pm 0.1^\circ$
<b>Viewing angle</b>	2 $\pi$ sr
<b>Data Output</b>	RS485 up to 38400 Baud
<b>Communication Protocol</b>	Modbus RTU (Optional Modbus TCP/IP)
<b>Output Rate</b>	1/s
<b>Operating Temperature Range</b>	-40 to 85°C
<b>Supply voltage</b>	12 to 30 V DC
<b>Power Consumption</b>	20 mA @ 24 V DC
<b>Cable Features</b>	3x2x0,14 mm <sup>2</sup> Cable - LI2(ST)C11Y- PUR, UV and weather resistant
<b>Cable Length</b>	3 meter standard length (Custom length available)
<b>Galvanic Isolation</b>	1000 V between power supply and RS485 Bus
<b>IP Rating</b>	IP 68
<b>Dimensions</b>	Ø 140 mm x 116 mm
<b>Sensor Housing Material</b>	Alloy Aluminum
<b>Shade Disk Material</b>	ABS
<b>Weight</b>	0,98 kg
<b>Standards</b>	ISO 9060:2018, Fast Response Spectrally Flat Class A (Secondary Standard), IEC 61724-1:2021, Class A, ISO/TR 9901:1990 ISO 9847
<b>Origin</b>	TÜRKİYE

## Technical Drawings

### Technical Drawings of Thermopile Pyranometer



**Note:** All dimensions are in mm.

\*\*\*SEVEN has the right to make modifications on this documentation without notice.