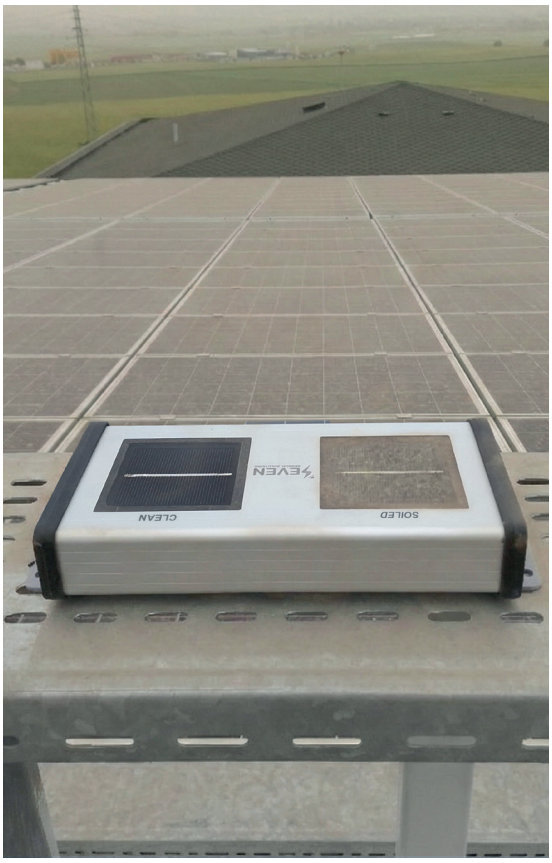
3S-SMS-MB-M

Manual Soiling Sensor



Manual Soiling Sensor

The Manual Soiling Sensor is designed to measure the energy losses caused by dirt and dust that accumulate on the surfaces of photovoltaic (PV) panels in commercial and industrial plants due to environmental conditions. By monitoring the soiling level of the panels, it helps determine when regular maintenance and cleaning are needed. If the sensor reports a soiling ratio of 10%, the plant is experiencing a 10% energy loss. This allows users to take the necessary measures based on the soiling level and improve energy efficiency.

The Manual Soiling Sensor has two cells: one defined as clean and the other as soiled. According to the sensor's measurement principle, the soiled cell is left exposed to the same conditions as the PV panels in the field and allowed to accumulate dirt, while the clean cell is cleaned manually by the user.

Using its dedicated software, the sensor filters and compares the data from the soiled and clean cells to calculate a soiling ratio in accordance with the IEC 61724-1:2021 standard. According to this standard, the soiling ratio must be calculated as a single daily average value within a ±2-hour window around local noon, excluding low irradiance values and unstable weather conditions. In addition, the Manual Soiling Sensor stores the collected data on its internal electronic board for one year, and the user can download this data at any time.

Benefits and Features

- Economical Solution
- Data Logging and Downloading
- Fast & Easy Installation
- Free Remote Software Updates
- SunSpec Compatible (for Modbus RTU)
- SEVEN Remote Installation Service
- SEVEN Customer Support
- 2 Year Warranty

Optional Monitoring Solutions

The Manual Soiling Sensor can be integrated into data acquisition and monitoring systems that support the Modbus RTU communication protocol, such as data loggers, SCADA systems and PLCs. If there is no suitable system on site for monitoring and recording the sensor data, SEVEN Sensor offers the following alternative solutions.

HMI Operator Panel

For local monitoring and data logging, the Manual Soiling Sensor can be used with an HMI operator panel supplied by SEVEN Sensor. The soiling ratio data received from the sensor via Modbus RTU can be displayed and recorded on the HMI panel in real time, and the recorded data can be accessed and exported from the panel when needed. This solution is intended for local monitoring and data logging only and does not offer remote monitoring over the internet.

Gateway Device

For applications where the sensor data needs to be monitored remotely and continuously over the internet, without visiting the site, SEVEN Sensor has developed a dedicated remote monitoring system. To use this system, a Gateway device supplied by SEVEN Sensor is required. The Gateway device transfers the measurement data received from the sensor to the SEVEN Monitoring System over the internet, allowing users to access the data and track the measurement results remotely.

The HMI Operator Panel and the Gateway device are not included as standard in the Manual Soiling Sensor package. If required, please contact the SEVEN Sales Team.

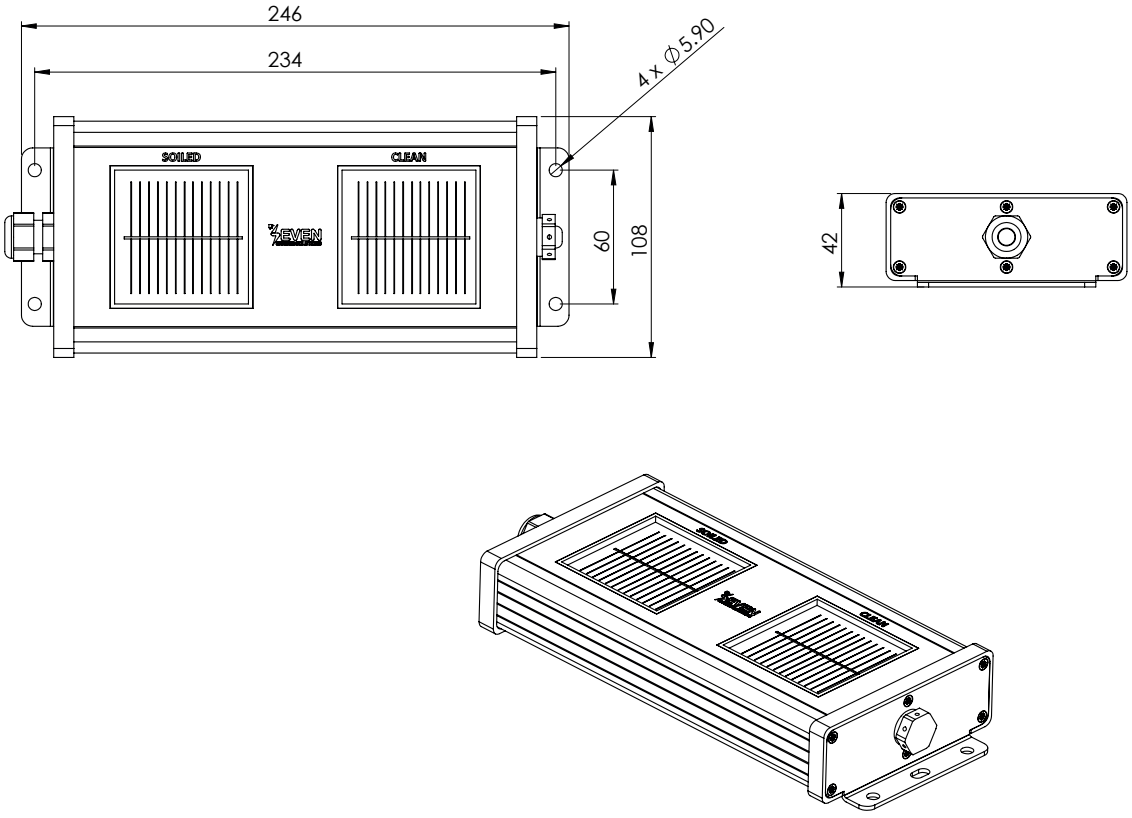
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Technical Specifications

	3S-SMS-MB-M
Soiling Ratio	0% ... 100%
Resolution	0.1%
Uncertainty	≤ 1%
Data Output	RS485 up to 38400 Baud
Communication Protocol	Modbus RTU
Output Rate	1/s
Operating Temperature Range	-40 °C ... +85 °C
Operating Humidity Range	0 ... 100% RH
Supply Voltage	12 ... 30 V DC
Current Consumption	Typ. 20 mA (24 V DC, 25 °C)
Cable Length and Specifications	3 m, 3×2×0.22 mm², 24 AWG LI2YC11Y-TP PUR cable, UV and weather resistant
Galvanic Isolation	1000 V galvanic isolation between the RS485 bus and the power supply
IP Rating	IP68
Dimensions	246 × 108 × 42 mm (W × L × H)
Weight	750 g
Standard	IEC 61724-1:2021 (Annex C)
Origin	Türkiye

Technical Drawings



Note: All dimensions are in mm.

*SEVEN reserves the right to make changes to this document without prior notice.

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