3S-SMS-MB

Automatic Soiling Sensor

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The Automatic Soiling Sensor is a device designed to measure energy losses caused by dirt and dust accumulating on the surfaces of photovoltaic (PV) panels due to environmental conditions. This sensor detects the amount of dust accumulating on the panels and helps determine the need for regular maintenance and cleaning of commercial and industrial facilities. If the soiling rate obtained from the sensor is 10%, this indicates a 10% energy loss in the facility. Thus, users can take necessary precautions based on the soiling level to improve energy efficiency.

The Automatic Soiling Sensor includes two irradiance sensors, one defined as 'clean' and the other as 'soiled', a water tank with a pump that performs the cleaning process, and an electronic panel housing the sensor's electronic components.

According to the sensor's measurement principle, the soiled irradiance sensor is left to accumulate dust under the same conditions as the solar panels in the field, while the clean irradiance sensor is cleaned daily by an automatic cleaning system. The sensor, utilizing its specialized software, filters and compares data received from the soiled and clean irradiance sensors to calculate a soiling ratio in compliance with the IEC 61724-1:2021 standard. According to this standard, the soiling ratio should be calculated as a single daily average value within the time range of ±2 hours from local noon, excluding low irradiance values and unstable weather conditions. Additionally, the Automatic Soiling Sensor stores the collected data for one year, allowing the user to get the backup of this data at any time.

Benefits and Features

- Data Recording and Downloading
- Quick & Easy Installation
- Automatic Cleaning System
- Free Software Update
- SunSpec Complicant
- SEVEN Remote Setup Service
- SEVEN Customer Support
- 2 Years Warranty

Models

3S-SMS-MB & 3S-SMS-MB-24V

The 3S-SMS-MB model operates on 100–240 V AC, while the 3S-SMS-MB-24V model operates on 24 V DC. The only difference between these two models is the power supply method; all other features are the same. Users who choose the 3S-SMS-MB model can connect the sensor directly to the mains supply. Users who choose the 3S-SMS-MB-24V model must use a 24 V DC, 5 A power supply to operate the sensor.

Automatic Soiling Sensors can be integrated with systems such as dataloggers, SCADA, and PLCs that use the Modbus protocol. For applications where such systems are not available on site, or where a dedicated monitoring solution is required, SEVEN Sensor has developed its own monitoring system. To use the SEVEN Sensor monitoring system, a Gateway device supplied by SEVEN Sensor must be purchased. The Gateway transfers the data received from the sensor to the SEVEN Sensor monitoring system, allowing users to monitor data remotely over the internet. For Automatic Soiling Sensors, the Gateway is delivered to the customer pre-wired inside an electrical control panel, with all connections completed and the necessary configuration already set. For SEVEN Sensor Monitoring System options and more detailed information, please contact the SEVEN Sales Team.

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Accessory

Sunshade Structure

The Sunshade Structure is specially designed to meet the installation requirements of Automatic Soiling Sensors, especially in rooftop applications. It is manufactured from 1 mm thick formed ST37 steel sheet and weighs 15,7 kg. The Sunshade Structure is not included in the standard scope of supply of the Automatic Soiling Sensor. Please contact the SEVEN Sales Team for availability.

Technical Specifications

Item Codes	3S-SMS-MB & 3S-SMS-GW-24V
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	-20°C ... +85°C
Operating Humidity Range	0% - 100% RH
Power Supply	110-240V AC or 24V 5A DC
Power Consumption	Pump Passive: Max. 20 – 50 mA @ 24V DC
	Pump Active: Max. 3 A @ 24V DC
Communication Cable	3 m 3x2x0.22 mm^2, 24 AWG LI2YC11Y-TP PUR Cable (UV and Weather Resistant)
Galvanic Isolation	1000 V between power supply and RS485 bus
Water Tank Capacity	18 Liters or 40 Liters
Water Consumption	Refilling required twice a year
Washing Liquid	Pure Water: 100% (Should be used when the ambient temperature is above 0°C)
	Pure Water: 65% + Antifreeze: 35% (Should be used when the ambient temperature is below 0°C)
Water Hose Length	5 m (on request up to 20m)
Max. Water Line Height	5 m
Protection Class	IP54 (Optional IP66)*
Weight	10,5 kg
Standard	IEC61724-1: 2021 (Annex C)
Origin	TÜRKİYE

*** Note:** Sensors with an IP54 protection rating may pose a sealing risk when used in tracker systems. This is because the range of movement and tilt angles of tracker systems during operation can affect sealing performance. In systems that move with small tilt angles, the use of IP54 may not cause issues; however, in systems with large tilt angles, the risk of water or dust ingress may increase. For this reason, the selection of the protection rating should be evaluated by the user based on the application conditions and site requirements, and the appropriate IP rating should be chosen accordingly. **Please communicate your preferred protection rating to the SEVEN Sales Team at the time of order.**

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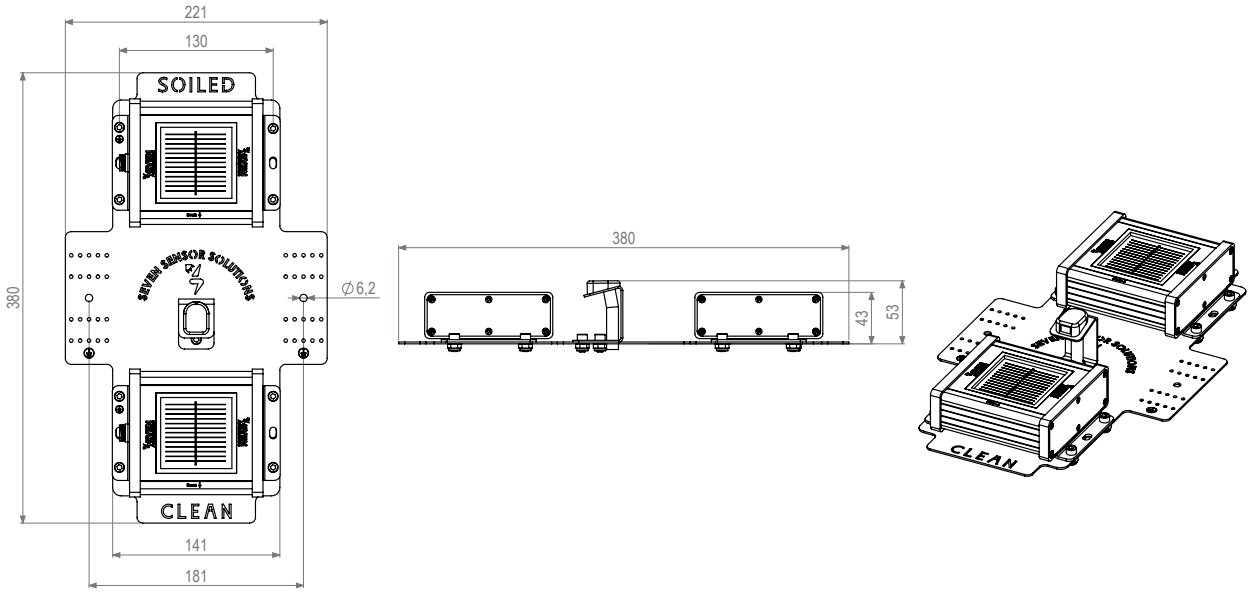
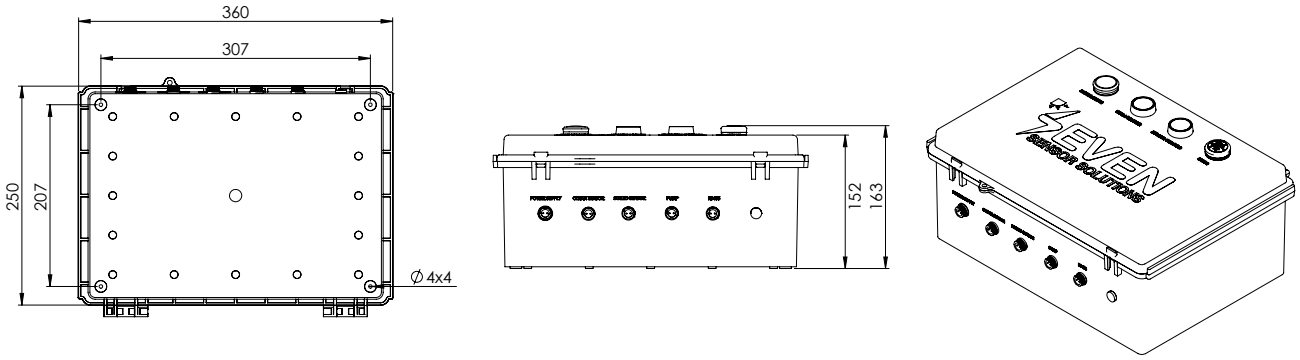
Technical Drawings

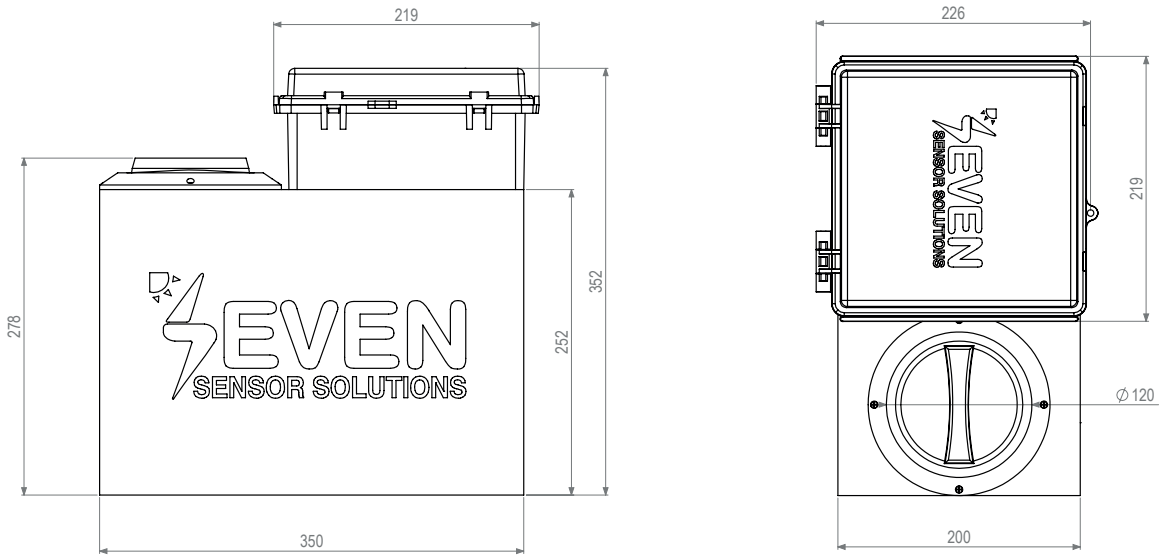
Irradiance Sensors



Electronic Panel



Water Tank



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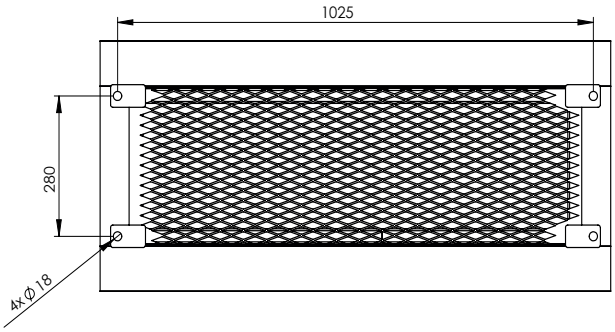
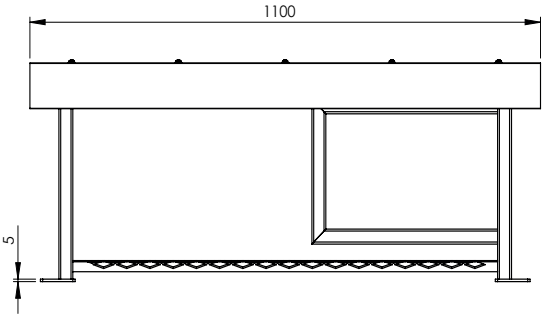
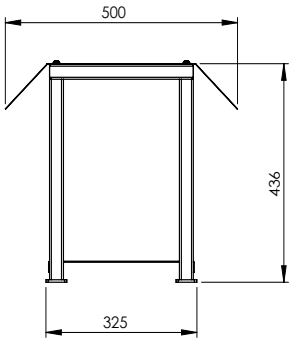
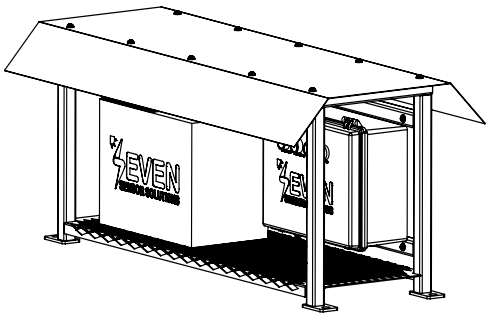
Sunshade Structure









Note: All dimensions are in mm.

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

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