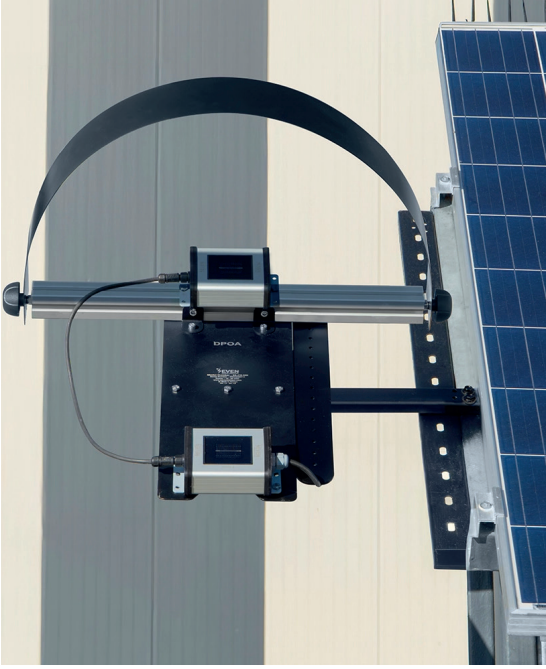


Cloud Sensor



The SEVEN Cloud Sensor is a dedicated sensor developed to measure the cloud ratio covering the sky at commercial and industrial photovoltaic (PV) installations. This measured data is used to determine the optimum positioning of panels in tracker systems, and to monitor the cloud ratio and assess system performance in fixed systems. Users can thereby improve energy efficiency by taking the necessary measures according to the cloud ratio.

The SEVEN Cloud Sensor consists of two irradiance sensors, a shade band, a mounting plate and a mounting profile. One irradiance sensor is positioned to remain permanently shaded and the other permanently exposed.

As part of the sensor's operating principle, one irradiance sensor is kept permanently shaded by the shade band to measure diffuse irradiance in accordance with the IEC 61724 standard, while the other irradiance sensor is mounted so that it is never shaded, measuring the plane of array irradiance (POA). By taking the ratio of the irradiance values obtained from these two measurements, the cloud ratio is calculated, which represents the proportion of the sky covered by clouds.

The measured irradiance and cloud ratio data are transmitted to data loggers and other receiving units via serial RS485 interface with Modbus RTU protocol.

Definition of Measured Data:

1) Total Plane of Array Irradiance (POA): The sum of the direct, diffuse and reflected irradiance reaching the plane of the photovoltaic panels. This value is measured by the uncovered (open) irradiance sensor.

2) Diffuse Plane of Array Irradiance (DPOA): The irradiance formed when solar rays scattered in the atmosphere by clouds, aerosols and similar factors reach the photovoltaic panel surface indirectly rather than directly. This value is measured by the irradiance sensor shaded with a shade band.

3) Direct Plane of Array Irradiance (BeamPOA): The irradiance component that reaches the plane of the photovoltaic panels directly. This value is calculated from the difference between the total plane of array irradiance (POA) and the diffuse plane of array irradiance (DPOA).

4) Cloud Ratio in the Sky: The ratio of diffuse irradiance to the total plane of array irradiance. Within this scope, instantaneous and daily average cloud ratios are calculated.

Benefits and Features

- Percentage Cloud Ratio Calculation
- Okta Cloud Ratio Calculation
- Innovative Technology
- Unique Sensor Design
- Class A Compliant
- Fast & Simple to Install
- SunSpec Compliant
- Free Software Update
- SEVEN Remote Setup Service
- SEVEN Customer Support
- 2 Year Warranty

Technical Specifications

	3S-CS-MB
Measured Data	Total Plane of Array Irradiance (POA), Diffuse Plane of Array Irradiance (DPOA), Direct Plane of Array Irradiance (BeamPOA), Cloud Ratio
Cloud Ratio	0 ... 100% 0 ... 8 Okta
Cloud Ratio Resolution	5% 1 okta
Uncertainty*	≤1% (less than 2%; Class A as per IEC 61724-1 standard)
Output Rate	1/s
Data Output	RS485 from 4800 to 38400 Baud
Communication Protocol	Modbus RTU
Power Supply	12...30 V DC
Power Consumption	25 mA max. @ 24 V DC
Cable Length and Features**	3 m 3x2x0,14 mm ² , 26 AWG*** LI2YC11Y-TP PUR cable, UV and weather resistant, cable bending radius 35 mm
Galvanic Isolation	1000 V between power supply and RS485 Bus
Operating Temperature Range	-40°C...+85°C
Operating Humidity Range	0...100% RH
Dimensions	616 x 500 x 328 mm (W x L x H)
Weight	4,2 kg
IP Rating****	IP54 (optional IP65, IP68)
Housing Material	Aluminum
Shade Band Material	FBE Epoxy Coated Steel
Standard	IEC 61724-1:2021 and IEC 60904
Calibration	Each sensor is calibrated under a Class AAA sun simulator in accordance with the IEC 60904-2 and IEC 60904-4 standards, using a reference cell calibrated by the ISFH Institute in Germany.
Origin	TÜRKİYE

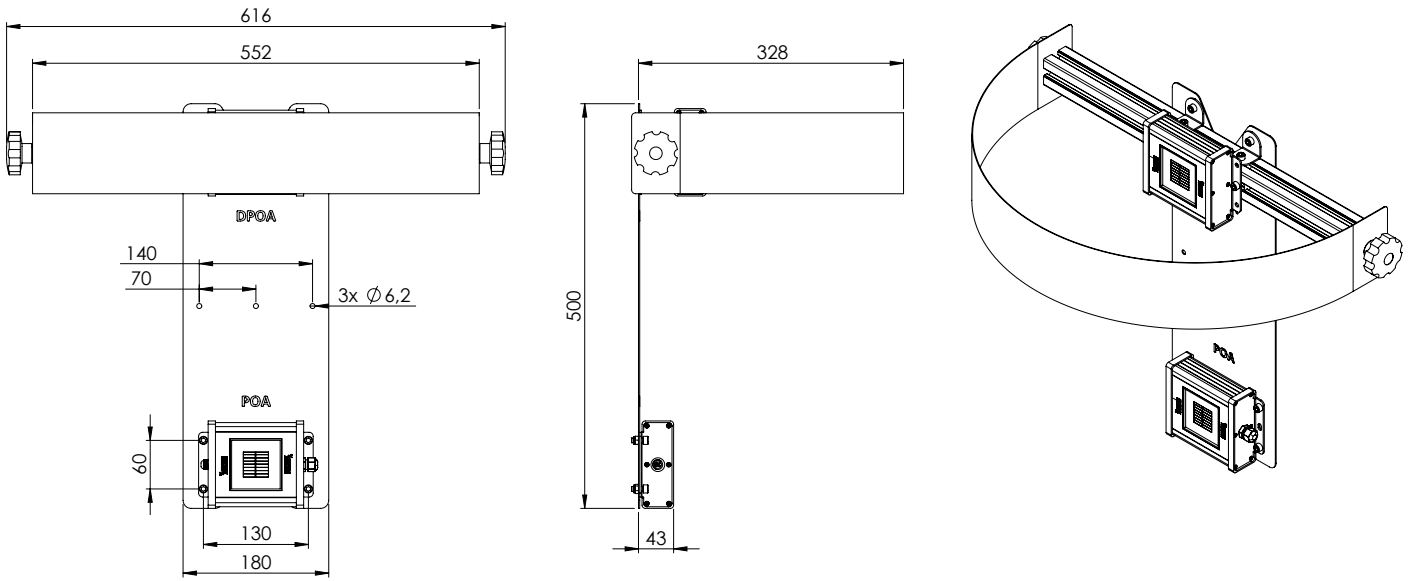
* The stated uncertainty value applies to the irradiance sensor.

** In line with RS485 connection requirements, splicing the communication cable is not recommended. The communication cable should be used as a single, continuous run. The required cable length can be supplied by SEVEN Sensor.

*** Recommended conductor size for the 3 x 2 cable: 26 AWG up to 10 m, 24 AWG up to 100 m, and 22 AWG up to 1000 m.

**** Using sensors with an IP54 protection rating in tracker systems may pose a sealing risk. This is because the range of movement angles that tracker systems perform during operation can affect sealing performance. Using IP54 may not cause problems in systems that move through small angles; however, in systems that move through large angles the risk of leakage may increase. Therefore, the choice of protection rating should be evaluated by the user in line with the application conditions and site requirements, and the IP rating decided accordingly. Please communicate your protection-rating preference to the SEVEN Sales Team when placing your order.

Cloud Sensor Technical Drawings



Note: All dimensions are in mm.

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