



Irradiance Sensor

The Irradiance Sensor is part of the SEVEN meteorological sensor range, which includes professional, smart measurement sensors featuring a digital or analog interface for environmental and industrial applications such as photovoltaic plants. Also referred to as a PV pyranometer with a photovoltaic reference cell, the Irradiance Sensor provides the user with irradiance data in W/m^2 for calculating the performance ratio of PV plants.

Irradiance Sensors are offered with different output options such as digital (Modbus RTU) or analog (4–20 mA, 0–1,5 V, 0–10 V), and the measured data can be transferred to data loggers or monitoring units according to the requirements of the system.

SEVEN products use reliable, high-quality components to provide accurate meteorological information in environmental and industrial applications. The Irradiance Sensor is specially designed for the requirements of PV plant monitoring systems based on standards such as IEC 61724-1 and IEC 60904. All irradiance sensors use the cell temperature value for the compensated irradiance data. For stable operation of the Modbus RS-485 line in multi-sensor installations, the termination resistor can be easily enabled or disabled via the GUI, so daisy-chain connections can be configured quickly without requiring additional hardware.

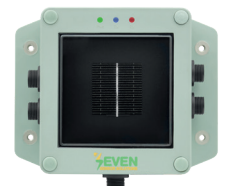
Benefits and Features

- Class A Compliance
- Fast and Easy Installation
- Structure Similar to PV Panels
- Free Software Update
- Configurable Termination Resistor via GUI
- SEVEN Remote Installation and After-Sales Support
- SunSpec Compatible (for Modbus RTU)
- 5 Year Warranty

Models

3S-IS+

The 3S-IS+ Advanced Modbus Irradiance Sensor is the main sensor unit designed to perform professional-level irradiance measurement at industrial, commercial and large-scale photovoltaic power plants. Thanks to its modular structure, it allows external sensors such as module temperature, ambient temperature, wind speed, wind direction, humidity and pressure to be connected directly. All measured meteorological data is transmitted securely to data loggers and receiving units via the Modbus RTU protocol over a shielded twisted-pair cable. The status LEDs on the device allow the power connection and Modbus communication status to be monitored in real time.



3S-IS

The 3S-IS, with its aluminum housing, has similar features to the 3S-IS+. It is designed for professional use at industrial, commercial and large-scale photovoltaic power plants. Thanks to its modular structure, it allows external sensors such as module temperature, ambient temperature, wind speed, wind direction, and humidity to be connected directly. All measured meteorological data is transmitted to data loggers and receiving units via the Modbus RTU protocol over a shielded twisted-pair cable. Unlike the 3S-IS+, it does not have status LEDs.



3S-IS-T-I

The 3S-IS-T-I is an irradiance sensor with an aluminum housing and an industrial-standard 4-20 mA analog output. It measures irradiance and cell temperature data and provides the measured irradiance value with temperature compensation applied. The 4-20 mA output signal can be connected directly to the appropriate analog inputs of industrial data loggers and other receiving units, providing easy integration into systems that do not require the Modbus protocol. This model is designed for irradiance measurement only and does not support external sensor connection.



3S-IS-T-1,5V

Irradiance sensors with an analog 0-1,5 V output measure irradiance and cell temperature data. The measured irradiance value is a temperature compensated irradiance value. The 0-1,5 V Irradiance Sensor is connected to the appropriate analog inputs of data loggers or other receiving units.



3S-IS-T-10V

Irradiance sensors with an analog 0-10 V output measure irradiance and cell temperature data. The measured irradiance value is a temperature compensated irradiance value. The 0-10 V Irradiance Sensor is connected to the appropriate analog inputs of data loggers or other receiving units.



Technical Specifications

	3S-IS+	3S-IS	3S-IS-T-I	3S-IS-T-1,5V	3S-IS-T-10V
Sensor Type	Silicon Reference Cell (31 mm x 31 mm)				
Measurable Data	Irradiance, Cell & Module & Ambient Temperature, Wind Speed & Direction, Relative Humidity and Pressure*		Irradiance and Cell Temperature		
Irradiance Range	0 - 1600 W/m²		0 - 1500 W/m²		
Uncertainty	≤ 1% (Class A according to IEC 61724-1)				
Resolution	0,1 W/m² (less than 1 W/m²; Class A according to IEC 61724-1)				
Response Time	1 S (less than 3 s; Class A according to IEC 61724-1)				
Long-Term Drift	<0,3% / year				
Field of View	170° (more than 160°; Class A according to IEC 61724-1)				
Tilt-Azimuth Angle	0° - 0° (less than 1°; Class A according to IEC 61724-1)				
Output Rate	1/s		-	-	-
Data Output	RS485 from 4800 to 38400 Baud		Analog 4-20 mA	Analog 0-1,5 V	Analog 0-10 V
Communication Protocol	Modbus RTU		-	-	-
Power Supply	12 to 30 V DC (Recommended 24 V DC)				
Power Consumption	Typically 21 mA @ 24 V DC @ 25°C, Maximum 30 mA @ 24 V DC @ 25°C**		50 mA max. @24 V DC	15 mA max. @24 V DC	15 mA max. @24 V DC
Cable Length and Specifications	3 m 3x2x0,14 mm² 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		-	-	-
Cell Temperature Sensor Type	Class A PT1000 according to EN 60751				
Operating Temperature Range	-40°C ... +85°C				
Operating Humidity Range	0 ... 100% RH				
Box Dimensions	105 x 135 x 51 mm (W x L x H)		110 x 140 x 42 mm (W x L x H)		
IP Rating	IP 54**** (Optional IP 68)				
Housing Material	ASA		Aluminum		
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 measured data varies according to the model. For more information, see the model selection table on page 4.

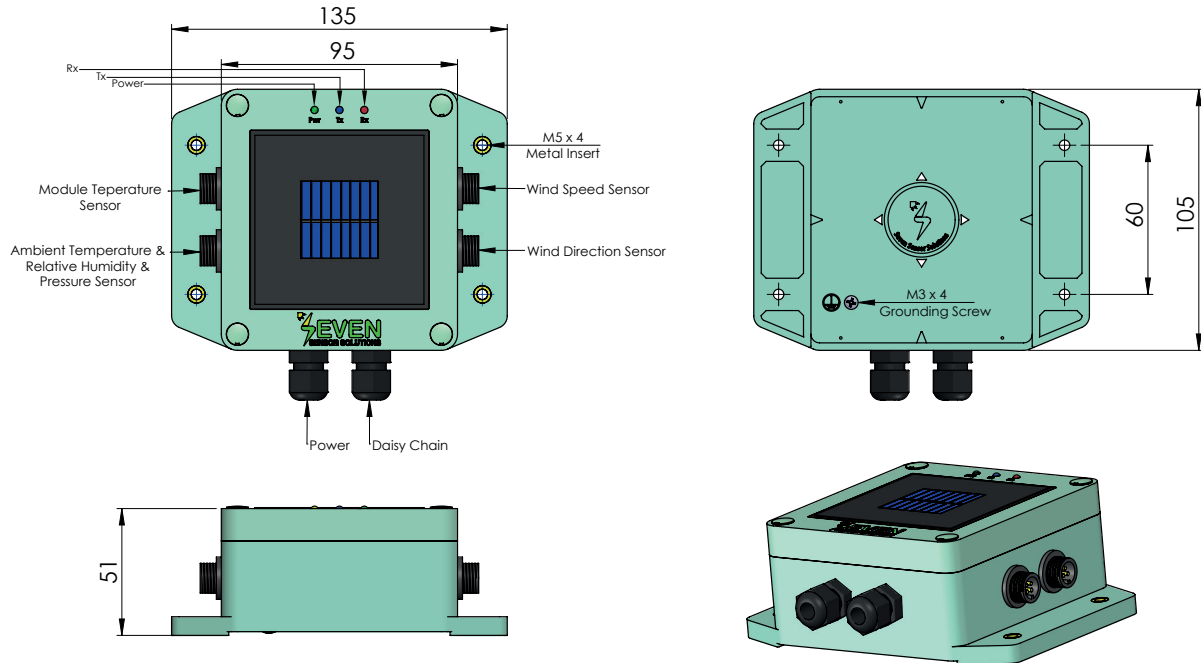
** The typical power consumption value may vary depending on the model configuration. For systems that require precise power budget calculations, contact the SEVEN technical team.

*** Use 26 AWG up to 10 meters, 24 AWG up to 100 meters, and 22 AWG up to 1000 meters (3x2 cable).

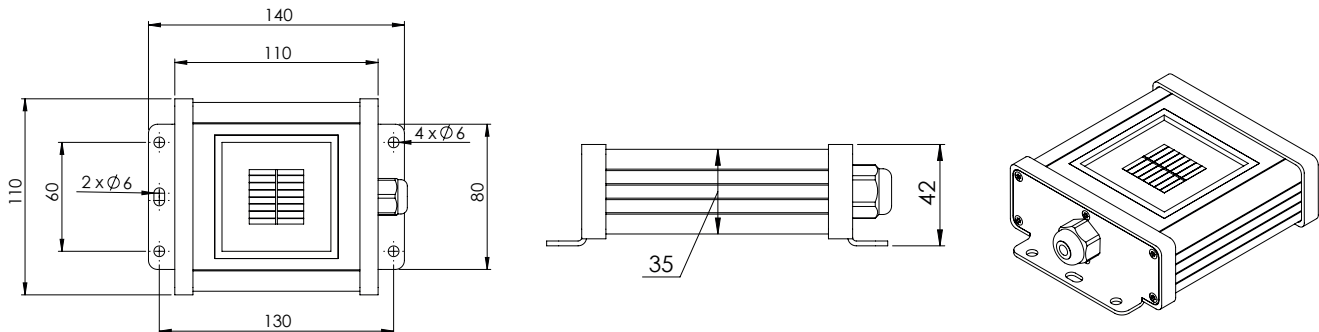
**** Using sensors with an IP54 protection rating as "Rear Side Irradiance" and in tracker systems may pose a risk in terms of sealing. This is because the range of motion angles that tracker systems perform during operation can affect the sealing performance. Using IP54 may not be a problem in systems that move at small angles; however, the sealing risk may increase in systems that move at large angles. For this reason, the choice of protection rating should be evaluated by the user in line with the application conditions and site requirements, and the IP class should be decided accordingly. **You must state your protection-rating preference to the SEVEN Sales Team in your order.**

Technical Drawings

3S-IS+ Technical Drawings



3S-IS / 3S-IS-T-I / 3S-IS-T-1,5V / 3S-IS-T-10V Technical Drawings



Note: All dimensions are in mm.

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

Model Selection Table

				Connectable Sensors					
Sensor Model		Irradiance	Internal Cell Temperature	Module Temperature 3S-MT-PT1000	Ambient Temperature 3S-AT-PT1000	Wind Speed 3S-WS-PLS	Wind Direction 3S-WD	Relative Humidity & Ambient Temperature 3S-RH&AT	Relative Humidity & Ambient Temperature & Pressure 3S-RH &AT&PS
3S-IS-T-I		1	1						
3S-IS-T-1,5V		1	1						
3S-IS-T-10V		1	1						
3S-IS / 3S-IS+		1	1						
3S-IS-1 / 3S-IS-1+	3S-IS-1-MT / 3S-IS-1-MT+	1	1	1					
	3S-IS-1-AT / 3S-IS-1-AT+	1	1		1				
3S-IS-2 / 3S-IS-2 +	3S-IS-2-MT / 3S-IS-2-MT+	1	1	1		1			
	3S-IS-2-AT / 3S-IS-2-AT+	1	1		1	1			
3S-IS-2T / 3S-IS-2T+		1	1	1	1				
3S-IS-3 / 3S-IS-3+			1	1	1	1			
3S-IS-4 / 3S-IS-4+	3S-IS-4-WD / 3S-IS-4-WD+	1	1	1	1	1	1		
	3S-IS-4-WD/AT-MT / 3S-IS-4-WD/AT-MT+	1	1	1	1		1		
	3S-IS-4-WD/MT-WS / 3S-IS-4-WD/MT-WS+	1	1	1		1	1		
	3S-IS-4-WD/AT-WS / 3S-IS-4-WD/AT-WS+	1	1		1	1	1		
	3S-IS-4-WD/WS / 3S-IS-4-WD/WS+	1	1			1	1		
	3S-IS-4-WD/MT / 3S-IS-4-WD/MT+	1	1	1			1		
	3S-IS-4-WD/AT / 3S-IS-4-WD/AT+	1	1		1		1		
	3S-IS-4-WD/ / 3S-IS-4-WD/+	1	1				1		
	3S-IS-4-RH / 3S-IS-4-RH+	1	1	1		1		1	
	3S-IS-4-RH/WS / 3S-IS-4-RH/WS+	1	1			1		1	
	3S-IS-4-RH/MT / 3S-IS-4-RH/MT+	1	1	1				1	
	3S-IS-4-RH/ / 3S-IS-4-RH/MT+	1	1					1	
3S-IS-5 / 3S-IS-5+	3S-IS-5 / 3S-IS-5+	1	1	1		1	1	1	
	3S-IS-5/RH-WD / 3S-IS-5/RH-WD+	1	1				1	1	
	3S-IS-5/WS / 3S-IS-5/WS+	1	1			1	1	1	
	3S-IS-5/MT / 3S-IS-5/MT+	1	1	1			1	1	
3S-IS-6+	3S-IS-6+	1	1						1
	3S-IS-6/MT+	1	1	1					1
	3S-IS-6/WS+	1	1			1			1
	3S-IS-6/WD+	1	1				1		1
	3S-IS-6/MT-WS+	1	1	1		1			1
	3S-IS-6/MT-WD+	1	1	1			1		1
	3S-IS-6/WS-WD+	1	1			1	1		1
	3S-IS-6/+	1	1						1
3S-2IS		2	2	2	1	1			
3S-3IS		3	3	3	1	1	1		
3S-4IS		4	4	4	1	1	1		