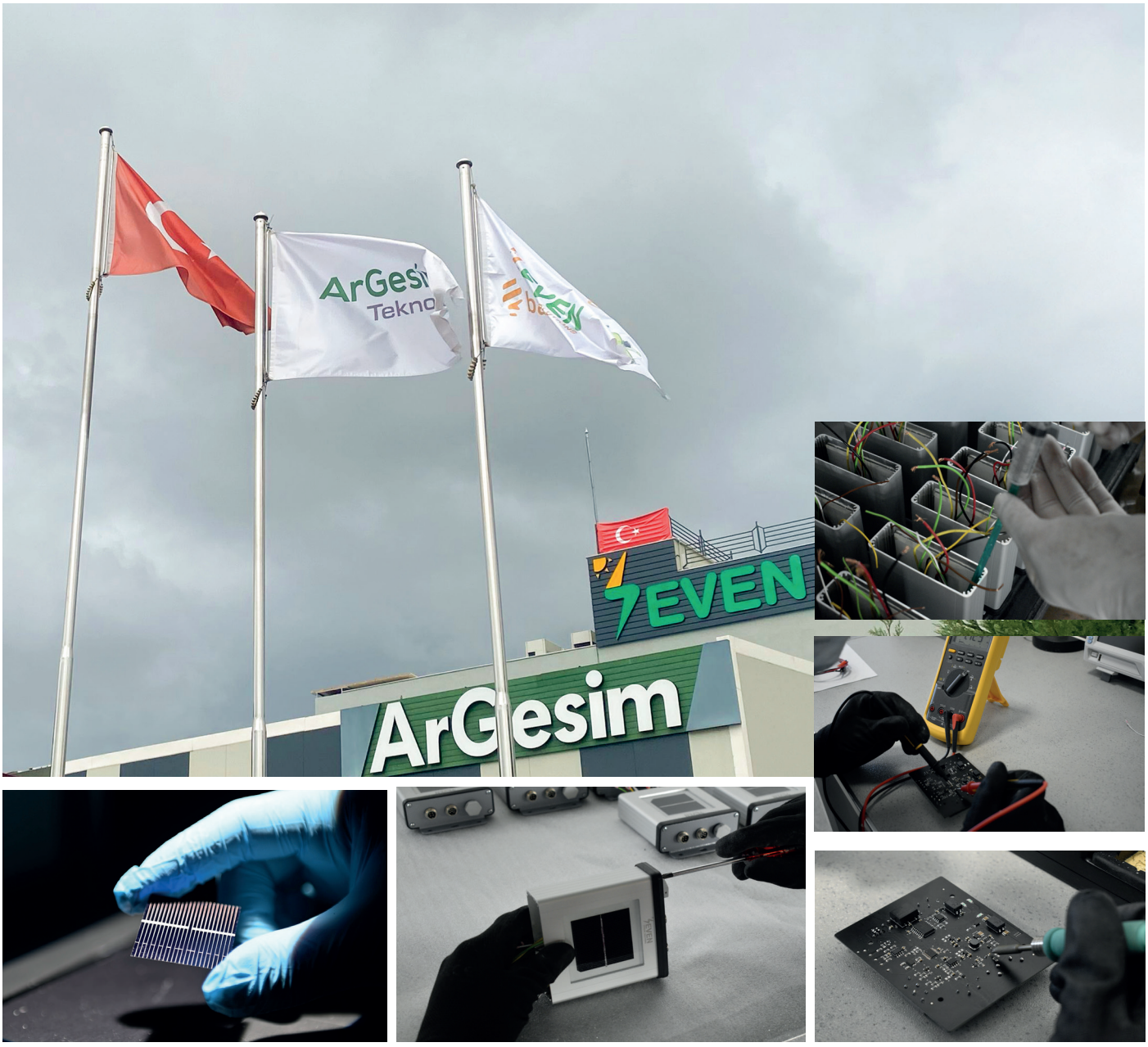
SOLAR SENSOR SOLUTIONS

SENSOR SOLUTIONS

TABLE OF CONTENTS



ABOUT US

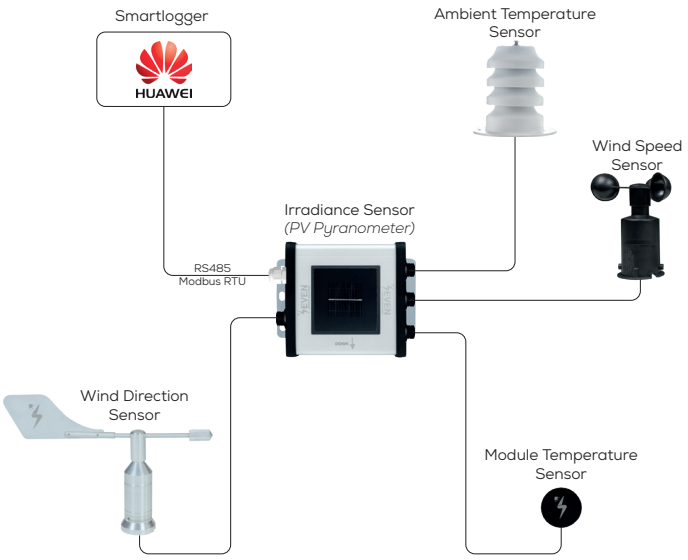
SEVEN Sensor Solutions is a trade mark of ArGesim Teknoloji, located in the Industrial Area of Corum in Türkiye. It is specialized in producing, installing and commissioning high-quality meteorological sensors used for monitoring solar PV plants. SEVEN weather stations are compatible with many well known datalogger brands.

In 2018, the company moved to Corum Technopark and focused more on R&D activities. These activities were fruitful and resulted in international patents for ArGesim.

SEVEN Sensor products are used in more than 85 countries all over the world, from Japan to USA. High quality, Fast delivery and on time after sales service are the basics of our good reputation in the market.

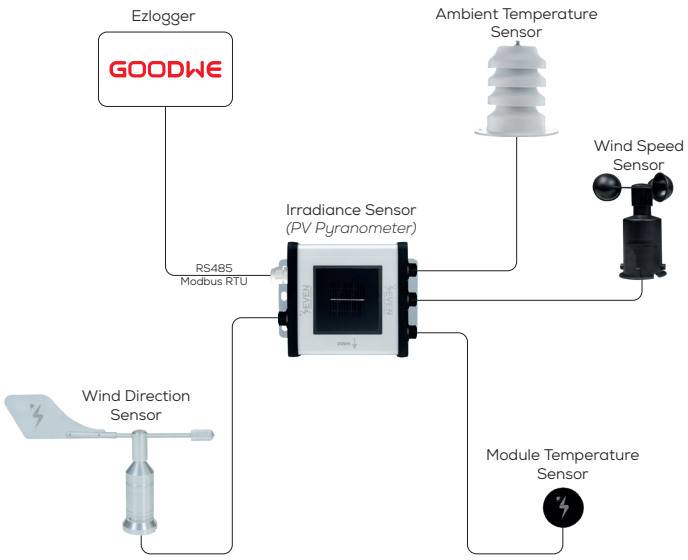
ArGesim carries out R&D activities with young engineers and continue to work in line with this mission by serving the industrialization goals of our country in the field of high technology.

WEATHER STATIONS



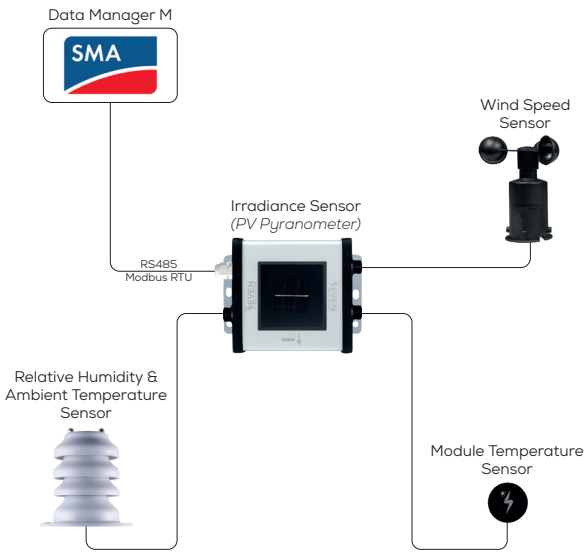
Huawei

Weather Station.



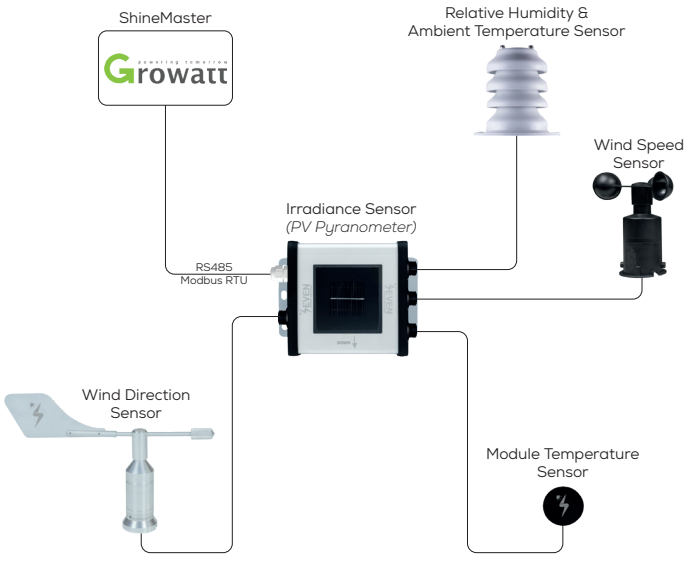
Goodwe

Weather Station.



SMA

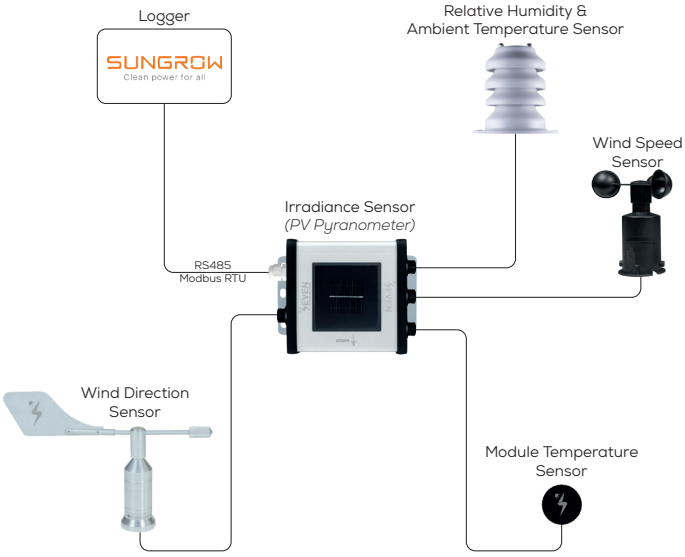
Weather Station.



Growatt

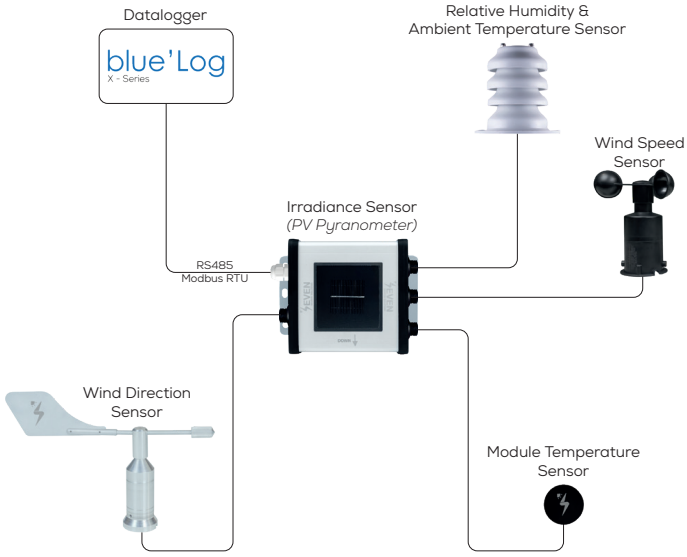
Weather Station.

WEATHER STATIONS



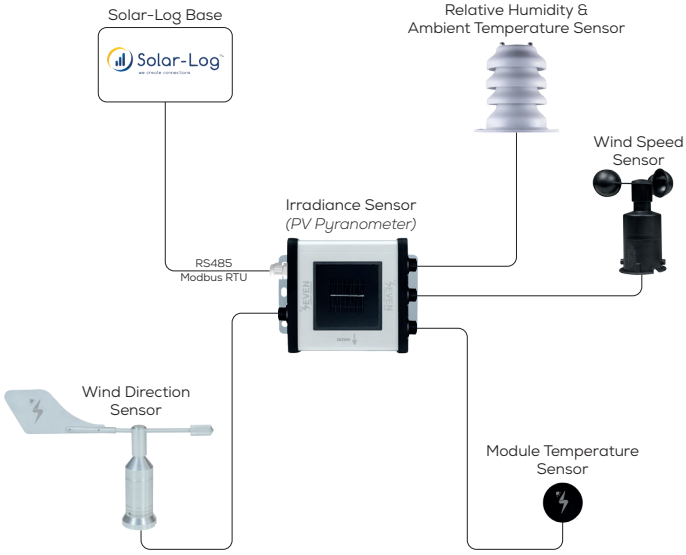
Sungrow

Weather Station.



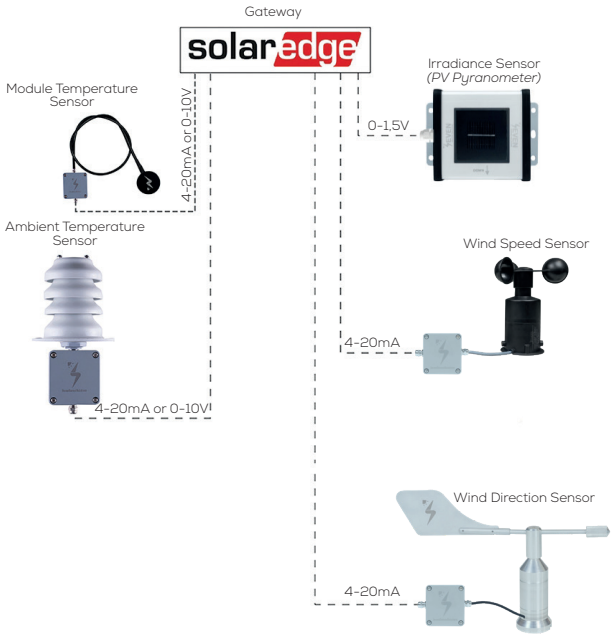
Bluelog

Weather Station.



Solar-Log

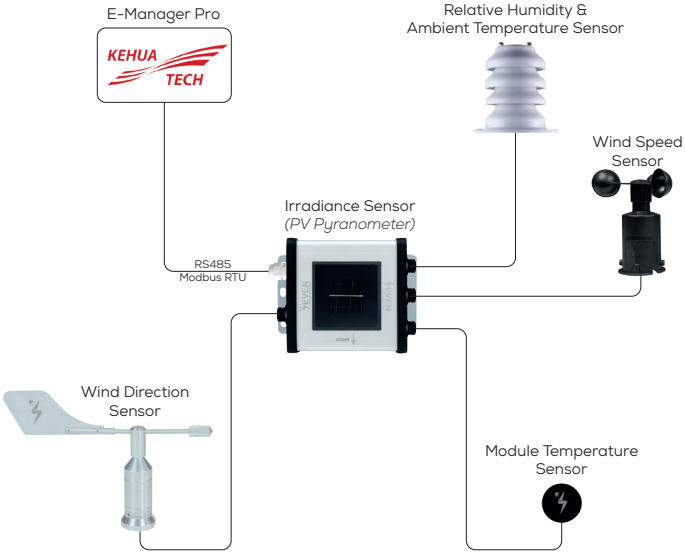
Weather Station.



SolarEdge

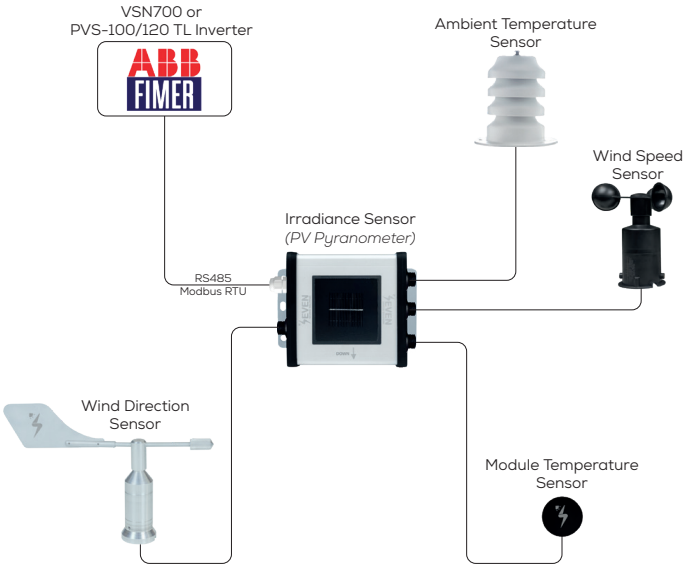
Weather Station.

WEATHER STATIONS



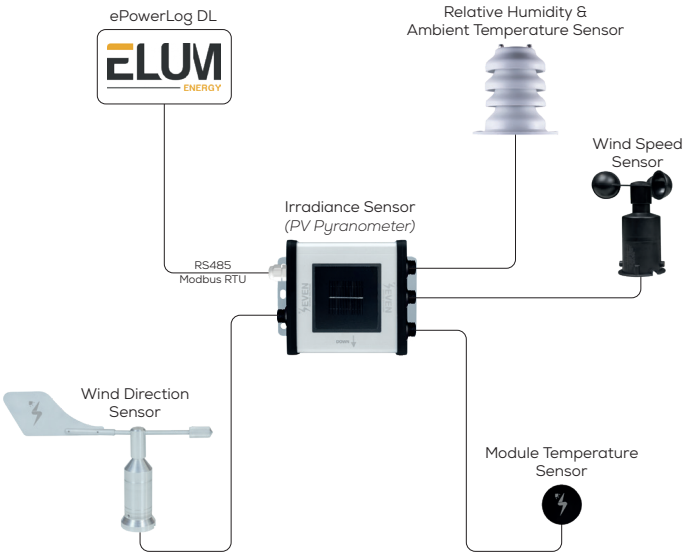
Kehua Tech

Weather Station.



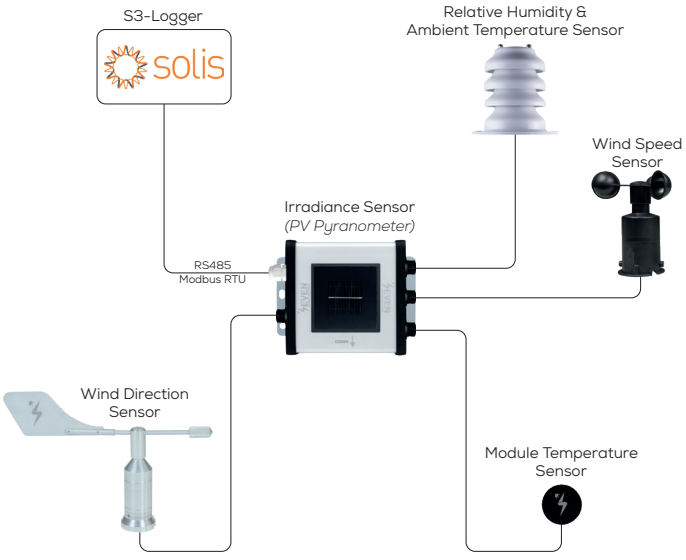
ABB/FIMER

Weather Station.



Elum

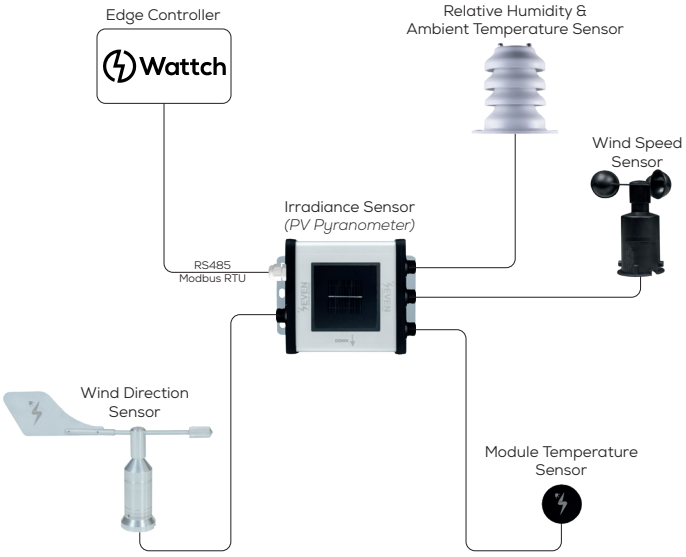
Weather Station.



Solis

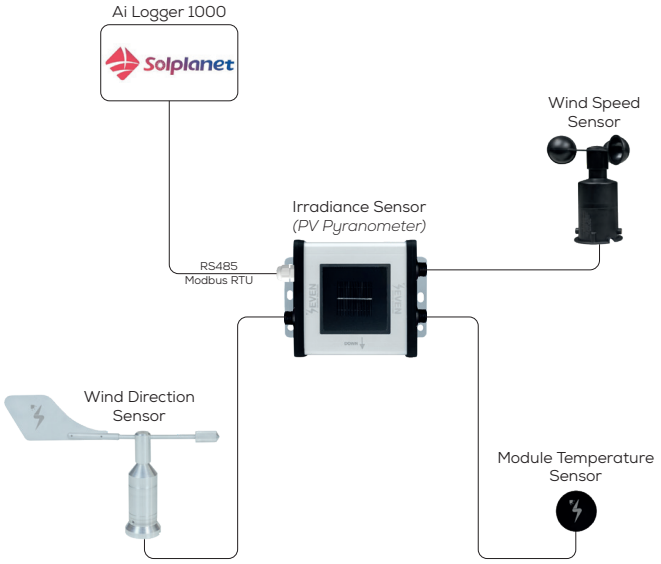
Weather Station.

WEATHER STATIONS



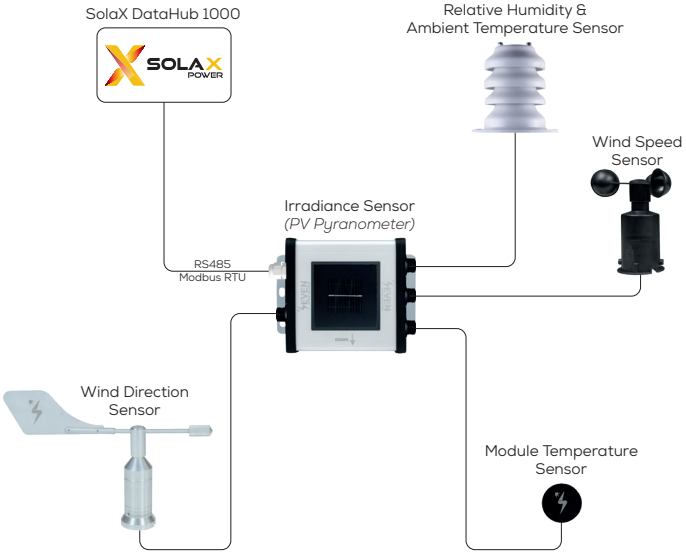
Wattch

Weather Station.



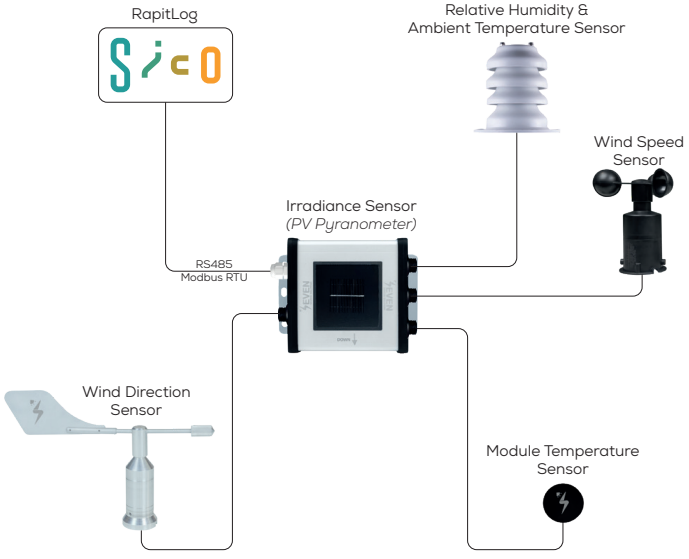
Solplanet

Weather Station.



SolaX Power

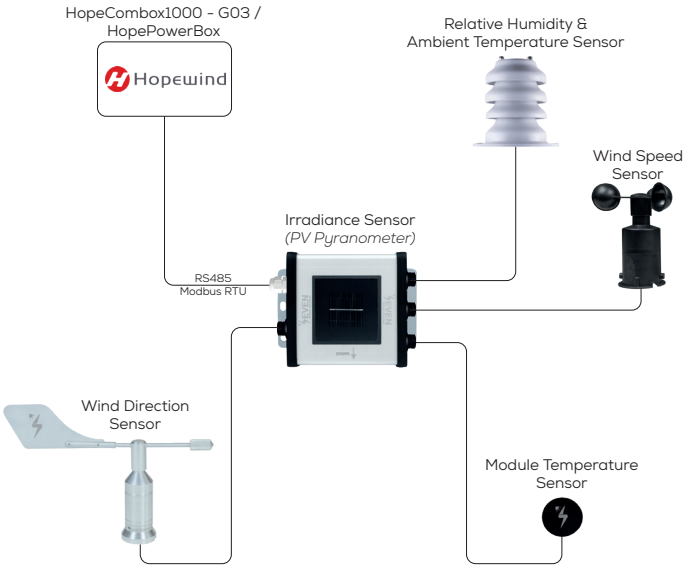
Weather Station.



Sico

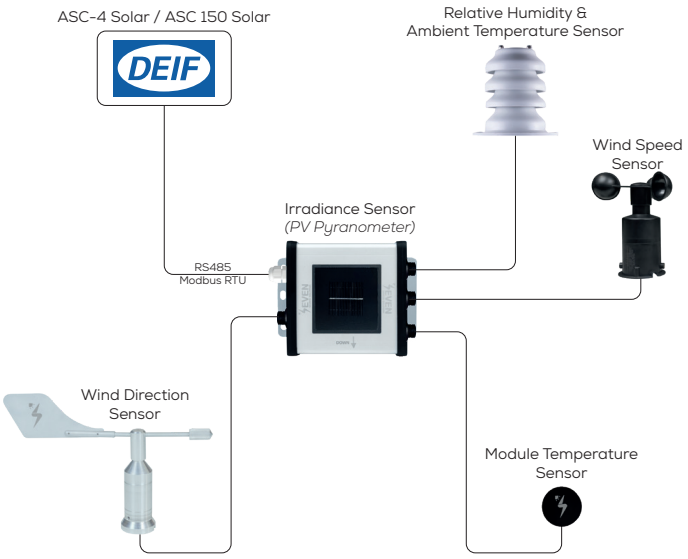
Weather Station.

WEATHER STATIONS



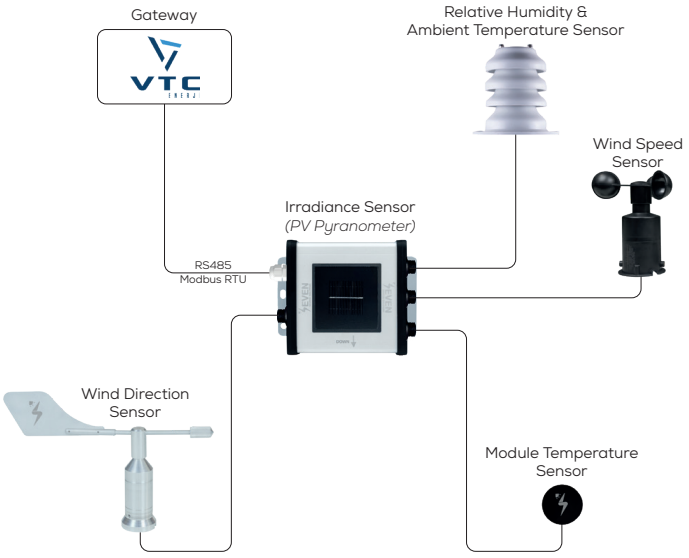
Hopewind

Weather Station.



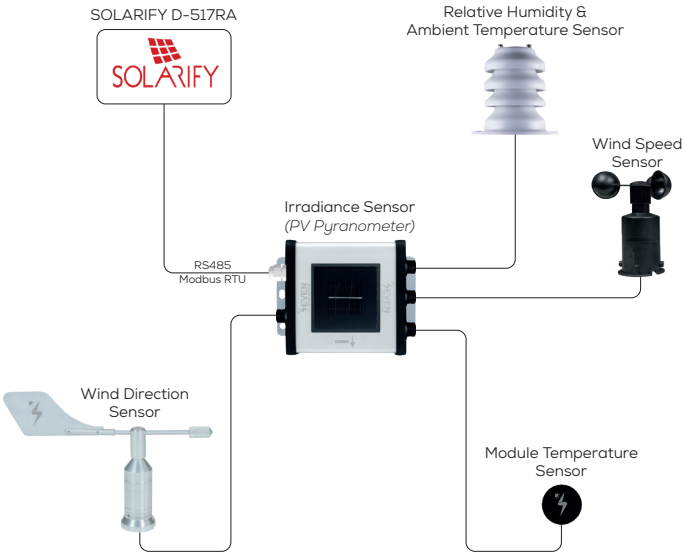
DEIF

Weather Station.



VTC

Weather Station.



Solarify

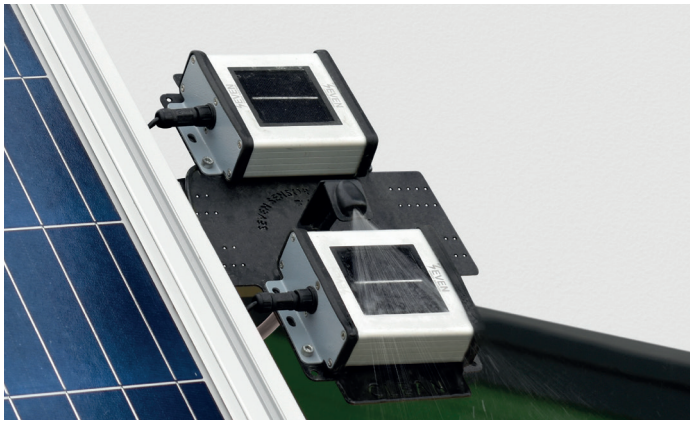
Weather Station.

COMPACT WEATHER STATION

TECHNICAL DATA

	3S-CWS
Measured Data	Plane of Array Irradiance, Module & Ambient Temperature, Wind Speed & Direction, Relative Humidity, Air Pressure and Precipitation.
Standards	Compliant to IEC 61724-1:2021
Digital Outputs	RS485 up to 38400 Baud
Communication Protocol	Modbus RTU (Optional Modbus TCP/IP)
Output Rate	1/s
Operating Temperature Range	-40°C to +85°C
Operating Humidity Range	0 to 100 %RH
Mounting Structure	Aluminum & Stainless Steel
Dimensions	720 x 1370 x 855 mm (W x L x H) (Height can be changed as per request)
Weight	4.8 kg
IP Rating	IP 54 (Optional IP 67)
Power Supply	12 to 30 V DC
Power Consumption	25 mA @ 24 V DC
Cable Length & Features	3 m LIYYC11Y PUR Cable, UV and weather resistant
Connection Box Material	ABS
Galvanic Isolation	1000 V between power supply and RS485 Bus

SOILING SENSOR



TECHNICAL DATA

Item Codes	3S-SMS-MB, 3S-SMS-GW, 3S-SMS-MB-24V, 3S-SMS-GW-24V	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	-20°C - 85°C	-40°C - 85°C
Operating Humidity Range	0% - 100% RH	
Power Supply	110-240V AC or 24V 5A DC	12 to 30 V DC
Power Consumption	Pump Passive: Max. 20 mA @ 24V DC	-
	Pump Active: Max. 3 A @ 24V DC	-
Communication Cable	3 m LI2Y(st)C11Y PUR Cable (UV and weather-resistant)	
Galvanic Isolation	1000 V between power supply and RS485 bus	
Water Tank Capacity	18 Liters	-
Water Consumption	36 Liters/year (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 IP65)	IP65 (Optional IP68)
Weight	10.5 kg	0.5 kg
Standard	IEC61724-1 (Annex C)	

IRRADIANCE SENSOR

(PV Pyranometer)

TECHNICAL DATA

	3S-IS	3S-IS-T-I	3S-IS-T-V
Sensor Type	Silicon Reference Cell (31 mm x 31 mm)		
Meassured Data	Irradiance, Cell & Module & Ambient Temperature, Wind Speed & Direction, and Relative Humidity	Irradiance and Cell Temp.	Irradiance and Cell Temp.
Irradiance Range	0 - 1600 W/m²		
Uncertainty	≤1,2% (Less than 2%; as per IEC 61724-1 standard Class A)		
Resolution	0.1 W/m² (Less than 1W/m²; as per IEC 61724-1 standard Class A)		
Response Time	1 sec. (Less than 3 sec; as per IEC 61724-1 standard Class A)		
Drift	<0.3% / year		
Field of View	170° (Larger than 160° as per IEC 61724-1 standard Class A)		
Tilt-Azimuthal Angle	0°- 0° (≤1°; as per IEC 61724-1 standard Class A)		
Output Rate	1/s	-	-
Data Output	RS485 up to 38400 Baud	Analog 4-20 mA	Analog 0-1,5 V
Communication Protocol	Modbus RTU	-	-
Power Supply	12 to 30 V DC		
Power Consumption	30 mA max @24 VDC	50 mA max @24 VDC	15 mA max @24 VDC
Cable Length & Features	3 m, LIYYC11Y PUR Cable, UV and Weather Resistant		
Galvanic Isolation	1000 V between power supply and RS485 bus	-	-
Cell Temperature Sensor Type	PT1000 Class A as per EN 60751		
Operating Temperature Range	-40°C to +85°C		
Operating Humidity Range	0 to 100 % RH		
Box Dimensions	110 mm x 140 mm x 42 mm (W x L x H)		
Weight	0.3 kg		
IP Rating	IP 54 (Optional IP 65, IP 68)		
Sensor Housing Material	ASA GF10		
Compliant Standard	IEC 61724-1:2021 and IEC 60904		
Calibration	Each sensor is calibrated under Class AAA Sun Simulator as per IEC 60904-2 and IEC 60904-4 by using a reference cell calibrated by ISFH-Germany		

ALBEDOMETER

TECHNICAL DATA

	3S- ALBEDO	3S- ALBEDO-2T
Sensor Type	Silicon Reference Cell (31 x 31 mm)	
Measured Data	POA Irradiance, Reflected Irradiance and Solar Albedo	POA Irradiance, Reflected Irradiance and two module temperatures
Irradiance Range	0 - 1600 W/m²	
Uncertainty	≤1.2 % (less than 2%; as per IEC 61724-1 standard Class A)	
Resolution	0.1 W/m² (less than 1 W/m²; as per IEC 61724-1 standard Class A)	
Response Time	1 sec (less than 3 sec; as per IEC 61724-1 standard Class A)	
Field of View	170° (Larger than 160° as per IEC 61724-1 standard Class A)	
Tilt-Azimuthal Angle	0°- 0° (≤1°; as per IEC 61724-1 standard Class A)	
Output Rate	1/sec	
Data Output	RS485 up to 38400 Baud	
Communication Protocol	Modbus RTU	
Power Supply	12 to 30 V DC	
Power Consumption	20 mA max @24 VDC	22 mA max @24 VDC
Cable Length & Features	3 m LIYYC11Y PUR Cable, UV and Weather Resistant	
Galvanic Isolation	1000 V between power supply and RS485 bus	
Operating Temperature Range	-40°C to + 85°C	
Operating Humidity Range	0 to 100 %	
Box Dimensions	108 mm x 112 mm x 38 mm (W x L x H)	
Weight	0.52 kg	0.86 kg
IP Rating	IP54 (Optional IP 65, IP 68)	
Sensor Housing Material	Aluminum	
Standard	IEC 61724-1:2021 and IEC 60904	
Calibration	Each sensor is calibrated under Class AAA Sun Simulator as per IEC 60904-2 and IEC 60904-4 by using a reference cell calibrated by ISFH-Germany	

LOW-COST IRRADIANCE SENSOR

TECHNICAL DATA

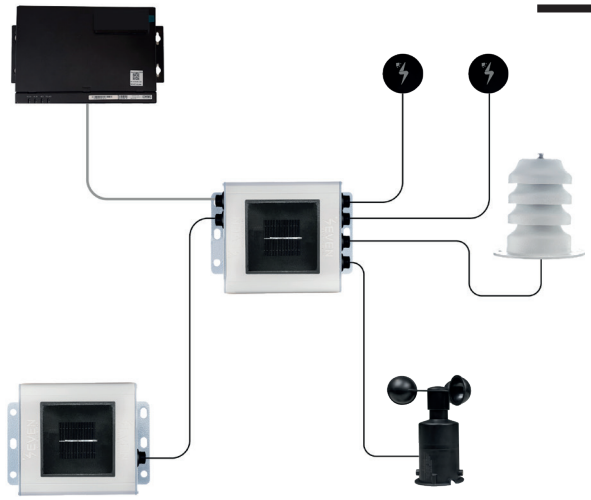
	3S-IS-LR	3S-IS-LR-T
Measured Data	Plane of Array Irradiance	Plane of Array Irradiance and 1 External Temperature
Sensor Type	Silicon Reference Cell (31 x 31 mm)	
Measuring Range	0 ... 1600 W/m²	
Uncertainty	≤ 3 %	
Resolution	0.1 W/m²	
Response Time	1 s	
Drift	<0.3% / year	
Field of View	170°	
Tilt-Azimuthal Angle	0°- 0°	
Output Rate	1/s	
Data Output	RS485 up to 38400 Baud	
Communication Protocol	Modbus RTU	
Power Supply	12 to 30 V DC	
Power Consumption	10 mA max @ 24 V DC	15 mA max @ 24 V DC
Cable Length & Features	3 m LIYYC11Y PUR Cable, UV and Weather Resistant	
Galvanic Isolation	1000 V Between Power Supply and RS485 Bus	
Operating Temperature Range	-40°C to +85°C	
Operating Humidity Range	0 to 100 % RH	
Box Dimensions	84 mm x 118 mm x 55 mm (W x L x H)	
Weight	0.2 kg	
IP Rating	IP 67	
Sensor Housing Material	ABS	

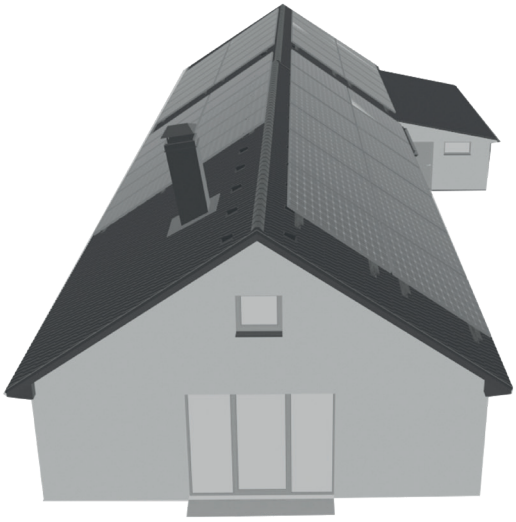
THERMOPILE
PYRANOMETER

TECHNICAL DATA

	3S-TP-MB-A	3S-TP-MB-B	3S-TP-MB-C
Measured Data	Global Horizontal (GHI) or POA Irradiance, Internal and Housing Temperature and Internal Humidity		
Sensor Type	Thermopile		
Spectral range (50% points)	280 to 2800 nm		
Irradiance Range	0 - 4000 W/m²		0 - 2000 W/m²
Response time (95%)	0.5s (less than 10s; as per ISO9060:2018 standard Class A)		
Zero offset A - Thermal Radiation (200W/m²)	± 1W/m² (± 7W/m²; as per ISO9060:2018 standard Class A)		
Zero offset B - Temperature change (5K/hr)	± 1.5 W/m² (± 2W/m²; as per ISO9060:2018 standard Class A)	± 4 W/m² (± 4W/m²; as per ISO9060:2018 standard, Class B)	± 5 W/m² (± 8W/m²; as per ISO9060:2018 standard, Class C)
Total zero off C - Total zero off-set	± 3W/m² (± 10W/m²; 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/m²)	± 0.2% (± 0.5%; as per ISO9060:2018 standard Class A)	± 1% (±1%; as per ISO9060:2018 standard, Class B)	± 3% (±3%; as per ISO9060:2018 standard, Class C)
Directional response (at 1000W/m² I 0 to 80°)	± 10W/m² (± 10W/m²; as per ISO9060:2018 standard Class A)		
Spectral Error	± 0.2% (± 0.5%; as per ISO9060:2018 standard Class A)		
Temperature response (-20°C to 50°C)	± 0.4% (± 1%; as per ISO9060:2018 standard Class A)		
Irradiance Resolution	0.1 W/m²		
Internal Humidity Range Accuracy Resolution	0% to 100% ± 1 % RH (20…70 %) @ 25 °C 1%		
Internal Temperature Range Accuracy Resolution	-40°C to +85°C ± 0.1 °C (5…60 °C) @ 20…80 % RH 0.1°C		
Housing Temperature Range Accuracy Resolution	-40°C to +85°C ± 0.2 °C 0.1°C		
Viewing angle	2π sr		
Data Output	RS485 up to 38400 Baud		
Communication Protocol	Modbus RTU (Optional Modbus TCP/IP)		
Output Rate	1/s		
Operating Temperature Range	-40 to 85°C		
Supply voltage	12 to 30 V DC		
Power Consumption	20 mA @ 24 V DC		
Cable Features	3x2x0,14 mm² Cable - LI2(ST)C11Y- PUR, UV and weather resistant		
Cable Length	3 meter standard length (Custom length available)		
Galvanic Isolation	1000 V between power supply and RS485 Bus		
IP Rating	IP 67		
Dimensions	Ø 140 mm x 116 mm		
Sensor Housing Material	Alloy Aluminum		
Shade Disk Material	ABS		
Weight	0,98 kg		
Standards	ISO 9060:2018, Fast Response Spectrally Flat Class A (Secondary Standard), IEC 61724-1:2021, Class A, ISO/TR 9901:1990 ISO 9847	ISO 9060:2018 Spectrally Flat Class B (First Class), IEC 61724-1:2021 Class B, ISO/TR 9901:1990 ISO 9847	ISO 9060:2018 Spectrally Flat Class C (Second Class), IEC 61724-1:2021 Class B, ISO/TR 9901:1990 ISO 9847

DUAL ORIENTATIONS IRRADIANCE SENSOR (3S-2IS)

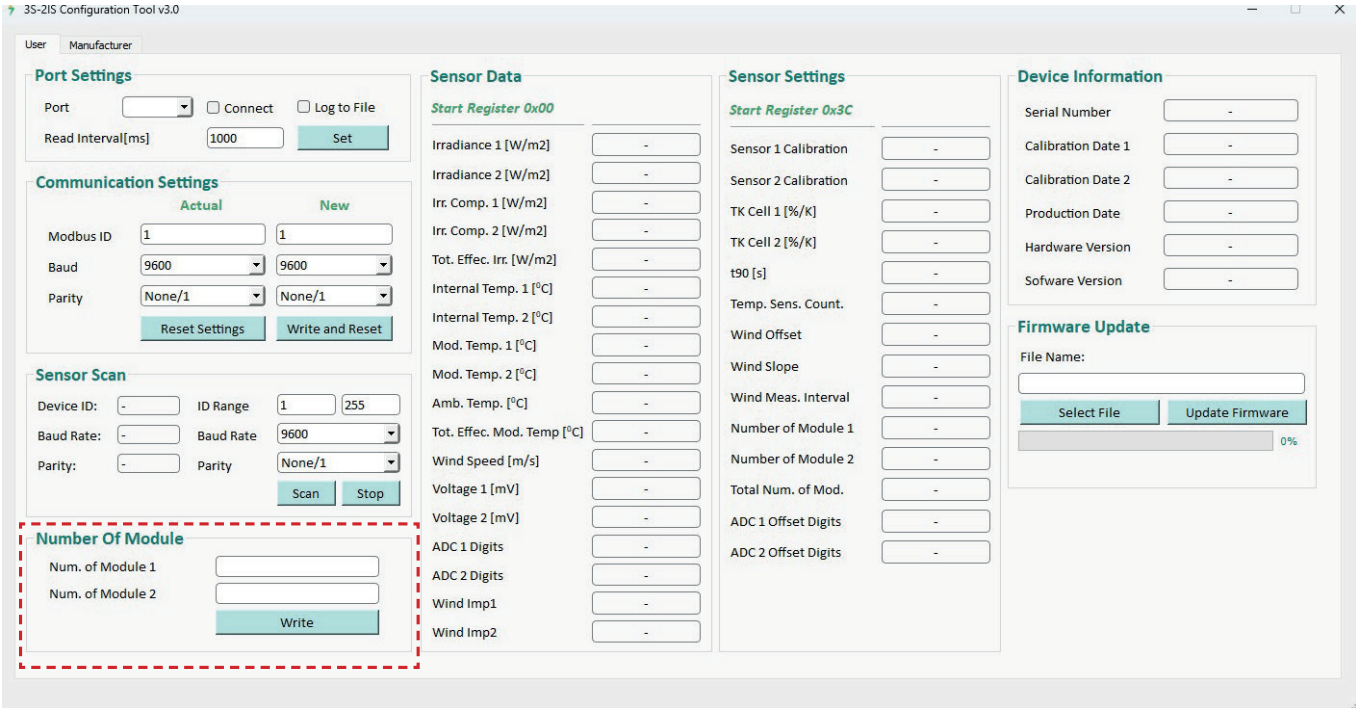




Special Solution for dual orientation plants:

3S-2IS model is specially developed to calculate the Performance Ratio (PR) for the dual orientation PV plants, as it calculates the average irradiance value as per the number of panels in each direction. Installation directions of panels in PV power plants and the number of panels in these directions may be different. The user will be able to set the number of panels in each orientation for the correct calculations. 3S-2IS special design allows simultaneous connection of two Irradiance Sensors, two Module Temperature Sensors, Ambient Temperature Sensor and Wind Speed Sensor.

The number of panels in both directions, to which the sensors are connected to, is entered into the electronic card via 3S-2IS Configuration Interface. The total effective irradiance and total effective module temperature can be calculated and communicated to the datalogger via Modbus RTU protocol. By using these values, the accurate Performance Ratio can be calculated in the monitoring systems.



MULTI-ORIENTATION IRRADIANCE SENSOR (3S-4IS) / (3S-3IS)

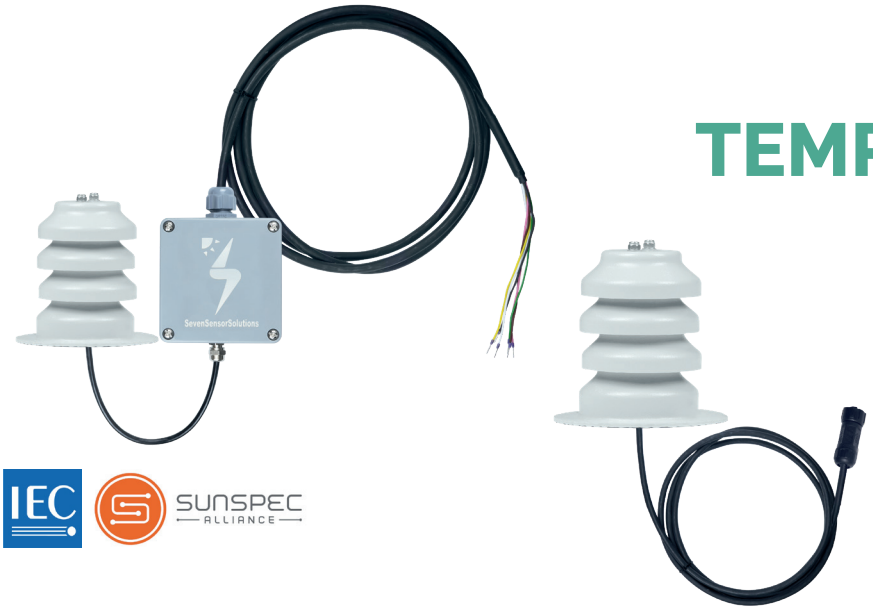
TECHNICAL DATA

	3S-4IS / 3S-3IS
Measured Data	Total Effective Irradiance, Total Effective Module Temperature, 4 nos. POA Irradiance, 4 nos. Cell Temperature, 4 nos. Module Temperature, Ambient Temperature, Wind Speed, and Wind Direction
Output Rate	1/s
Data Output	RS485 up to 38400 Baud
Communication Protocol	Modbus RTU
Power Supply	12 to 30 V DC
Power Consumption	40 mA max @ 24 V DC
Electrical Connection	3 m LIYYC11Y PUR Cable, UV and Weather Resistant
Galvanic Isolation	1000 V between power supply and RS485 bus
Operating Temperature Range	-40°C to +85°C
Operating Humidity Range	0 to 100 %RH
Dimensions (Connection Box / Sensor)	211 mm x 123 mm x 60 mm / 140 mm x 110 mm x 42 mm (W x L x H)
Weight (Connection Box / Sensor)	0.5 kg / 0.3 kg
IP Rating (Connection Box / Sensor)	IP 67 / IP 54 (Optional IP 65, IP 68)
Material (Connection Box / Sensor)	ABS / Aluminum
Standard	IEC 61724-1:2021 and IEC 60904
Calibration	Each sensor is calibrated under a Class AAA Sun Simulator according to IEC 60904-2 and IEC 60904-4 standards using a reference cell calibrated by the ISFH Institute in Germany.Germany.

MODULE TEMPERATURE SENSOR

TECHNICAL DATA

	3S-MT-PT1000	3S-MT-PT1000-MB	3S-MT-PT1000-I	3S-MT-PT1000-U
Sensor Type	PT1000			
Measuring Range	-40°C to +85°C			
Accuracy	±0.1°C			
Resolution	0.1°C			
Data Output	PT1000	RS485 up to 38400 Baud	Analog 4-20 mA	Analog 0-10 V
Communication Protocol	-	Modbus RTU	-	-
Power Supply	-	12 to 30 V DC		
Power Consumption	-	15 mA @ 24 V DC	30 mA @ 24 V DC	15 mA @24 V DC
Electrical Connection	3 m 2x2x0,22 mm² 24 AWG LI2YC11Y-TP PUR Cable, UV and Weather Resistant	1 m 2x2x0,22 24 AWG LI2YC11Y-TP PUR Cable, and 2 m 2x2x0,22 mm² LIY2Y(SE)GRP PUR Cable, UV and Weather Resistant		
Operating Temperature Range	-40°C to +85°C			
Box Dimensions	-	82 x 80 x 55 mm (W x L x H)		115 x 65 x 55 (WxLxH)
Sensor Cover Dimensions	Ø 35 x 3 mm			
Weight	167 gr	280 gr	257 gr	267 gr
IP Rating	IP 67			
Box Material	-	ABS		
Sensor Cover	Laminated Backsheet (EVA - Tedlar)			
Mounting Method	3M® Sticker to Back of Module			
Standard	Class A according to IEC 60751:2022			



AMBIENT TEMPERATURE SENSOR

TECHNICAL DATA

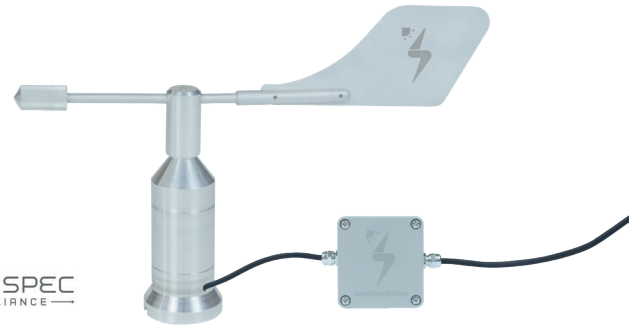
	3S-AT-PT1000	3S-AT-PT1000-MB	3S-AT-PT1000-I	3S-AT-PT1000-U
Sensor Type	PT1000			
Measuring Range	-40°C to +85°C			
Accuracy	±0.1°C			
Resolution	0.1°C			
Data Output	PT1000	RS485 up to 38400 Baud	Analog 4-20 mA	Analog 0-10 V
Communication Protocol	-	Modbus RTU	-	-
Power Supply	-	12 to 30 V DC		
Power Consumption	-	15 mA @ 24 V DC	30 mA @ 24 V DC	15 mA @ 24 V DC
Cable's Length & Features	1.5 m 2x2x0,22 24 AWG LI2YC11Y PUR Cable, UV and Weather Resistant	0.5 m 2x2x0,22 24 AWG LI2YC11Y-TP PUR Cable, and 2.5 m 3x2x0.22 mm² LI2Y(SE)GRP PUR Cable, UV and Weather Resistant		
Operating Temperature Range	-40°C to +85°C			
Box Dimensions	-	80 mm x 82 mm x 55 mm (W x L x H)		65 mm x 115 mm x 55 mm (WxLxH)
Shield Dimensions	Ø 105 x 100 mm			
Weight	127 gr	467 gr		347 gr
IP Rating	IP 67			
Box Material	-	ABS		
Sensor Housing Material	Stainless Steel Tube			
Shield Material	ABS			
Mounting Method	Ground Mounting			
Standard	Class A according to IEC 60751:2022			

WIND SPEED SENSOR

TECHNICAL DATA

	3S-WS-PLS-A	3S-WS-PLS-P	3S-WS-MB-A	3S-WS-MB-P	3S-WS-I-A	3S-WS-I-P
Sensor Type	Cup Star Anemometer (Reed Switch)					
Measuring Range	0,9 to 60 m/s				0,9 to 50 m/s	
Accuracy	Below 5m/s 0.5 m/s and 10% of reading above 5m/s					
Resolution	0,1 m/s					
Threshold	0,9 m/s					
Survival Speed	60 m/s				50 m/s	
Data Output	Reed Relay		Modbus RTU - RS485		Analog (4-20 mA)	
Communication Protocol	-		Modbus RTU		-	
Power Supply	-		12 to 30 V DC			
Cable Length & Features	3 m LIYY Cable, UV and Weather Resistant		3m LIYYC11Y PUR Cable, UV and Weather Resistant			
Operating Temperature Range	-40°C … +85°C (Ice Free)					
Dimensions	180 x 145 mm	136 x 151 mm	180 x 145 mm	136 x 151 mm	180 x 145 mm	136 x 151 mm
Box Dimensions	-		82 x 80 x 55 mm (L x W x H)			
Weight	0,34 kg	0,20 kg	0,34 kg	0,20 kg	0,34 kg	0,20 kg
Box Weight	-		0,16 kg			
Housing Material	Anodized Aluminum	ASA	Anodized Aluminum	ASA	Anodized Aluminum	ASA
Cup Material	ABS	ASA	ABS	ASA	ABS	ASA
Mounting Method	Pipe or Ground Mounting					
Standard	Compliant to IEC 61724-1:2021					

WIND DIRECTION SENSOR



TECHNICAL DATA

	3S-WD	3S-WD-MB	3S-WD-I
Sensor Type	Vane-Driven Hall Effect Position Sensor		
Measuring Range	0-359°		
Accuracy	±1% of Measuring Value		
Resolution	0.1°	1°	
Start Speed	1 m/s		
Data Output	Analog (0 V – 3.3 V)	Modbus RTU - RS485	Analog 4-20 mA
Communication Protocol	-	Modbus RTU	-
Power Supply	-	12 to 30 V DC	
Power Consumption	-	20 mA typically at 24 VDC	30 mA typically at 24 VDC
Cable Length & Features	3 m LIYY Cable, UV and Weather Resistant	3m LIYYC11Y PUR Cable, UV and Weather Resistant	
Operating Temperature Range	-40°C to +85°C (Ice Free)		
Dimensions	Ø: 290x195 mm		
Box Dimensions	-	L x W x H : 55x80x82 mm	
Weight	0,25 kg		
Box Weight	-	0,25 kg	
IP Rating	IP 54 (IP67 Optional)		
Housing Material	Aluminum/ASA GF10 (Plastic)		
Vane Material	Aluminum/ASA GF10 (Plastic)		
Box Material	-	ABS	
Mounting Method	Pipe or Ground Mounting		
Standard	Compliant to IEC 61724-1:2021		

RELATIVE HUMIDITY & AMBIENT TEMPERATURE SENSOR

TECHNICAL DATA

	3S-RH&AT	3S-RH&AT&PS	3S-RH&AT-MB	3S-RH&AT&PS-MB	3S-RH-I
Measured Data	Relative Humidity and Ambient Temperature	Relative Humidity, Ambient Temperature and Pressure	Relative Humidity and Ambient Temperature	Relative Humidity, Ambient Temperature and Pressure	Relative Humidity
Sensor Type	Capacitive				
RH Range	0% to 100%				
RH Accuracy	±1% RH (20 ... 70%) at 25 °C				
RH Resolution	0.1%				
T Range	-40°C to +85°C				-
T Accuracy	±0.1% °C at (5 ... 60 °C)				-
T Resolution	0.1°C				-
Pressure Range	-	260 to 1260 hPa	-	260 to 1260 hPa	-
Pressure Accuracy	-	0.5 hPa	-	0.5 hPa	-
Pressure Resolution	-	0.1 hPa	-	0.1 hPa	-
Data Output	I²C		RS485 up to 38400 Baud		Analog 4-20 mA
Communication Protocol	-		Modbus RTU		-
Power Supply	3 V DC		12 to 30 V DC		
Power Consumption	-		20 mA max @ 24 VDC		30 mA @ 24 V DC
Cable Length & Features	3 m LIYYC11Y PUR Cable, UV and Weather Resistant				
Operating Temperature Range	-40°C to +85°C				
Box Dimensions	-		64 x 68 x 35 mm (W x L x H)		
Shield Dimensions	Ø 105 x 100 mm				
Weight	0,2 kg		0,5 kg		
IP Rating	IP 65				
Box Material	-		ABS		
Sensor Housing Material	Stainless Steel Tube - Membran Filter				
Shield Material	ABS				
Standard	Class A according to IEC 60751:2022 (Temperature) Class A according to IEC 61724-1:2021 (Relative Humidity)				

RAIN GAUGE

TECHNICAL DATA

	3S-RG-MB	3S-RG-PLS
Sensor Type	Tipping Bucket Rain Gauge	
Measuring Range	600 mm/h	
Accuracy	±%1 (0 mm/h - 30mm/h) ±%2 (30mm/h - 100mm/h) ±%5 (100mm/h-600mm/h)	
Resolution	0.2 mm	
Collecting Area	200 cm²	
Data Output	RS485 up to 38400 Baud	Reed Relay
Communication Protocol	Modbus RTU	-
Power Supply	12 to 30 V DC	-
Power Consumption	35 mA @ 24 V DC	-
Cable Length & Features	3 m LIYYC11Y Cable, UV and Weather Resistant	3 m LIYY Cable, UV and Weather Resistant
Operating Temperature Range	0°C to +85°C	
Dimensions	Ø 160 x 257 mm	
Connection Box Dimensions	70.2 mm x 82 mm x 55 mm (W x L x H)	-
Weight	1.4 kg	1,2 kg
IP Rating	IP 65	
Housing Material	Plexiglass	
Connection Box Material	ABS	-

Mounting Systems

SEVEN produces custom designed mounting systems for easy sensor installation in site, especially for Rooftop projects. It is a tower combining different sensors as per the installation requirements.

SEVEN Mounting System is a custom product designed as per the site conditions and the sensors to be mounted. It is made of Chrome as it is strong and has a high resistance against the Weather conditions.

TECHNICAL DATA

	3S-MS
Material	Coated Steel
Length	1123 mm
Width	635 mm
Height	1048 mm (it can be changed as per request)

PORTABLE SOILING SENSOR

TECHNICAL DATA

	3S-SMS-P
Soiling Ratio	0% - 100%
Resolution	0.1%
Uncertainty	≤ 2%
Data Output	RS485
Operating Temperature Range	-10°C to +50°C
Operating Humidity Range	0 ... 90 % RH
Power Supply	12 V 24 Ah Lithium Battery
Working Time	3 hours
Battery Charging Time	3 hours
Portable Soiling Sensor Dimensions	Ø 280 mm x 180 mm
Portable Soiling Sensor Weight	4 kg
Battery Box Dimensions	220 mm x 232 mm x137 mm (W x L x H)
Battery Box Weight	3.6 kg

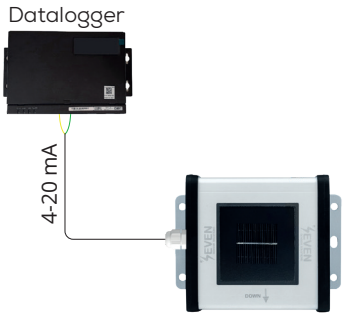
SNOW SENSOR

TECHNICAL DATA

	3S-SS-MB
Snow Ratio	0% - 100%
Snow Ratio's Resolution	5%
Irradiance Sensor's Uncertainty	≤ 1.2 %
Irradiance Range	0…1600 W/m²
Data Output	RS485 up to 38400 Baud
Communication Protocol	Modbus RTU
Output Rate	1/s
Operating Temperature Range	-40°C to +85°C
Operating Humidity Range	0 to 100 %RH
Power Supply	22 to 30 V DC
Power Consumption	0.82 A max @ 24VDC (While heating off 0.02 A max @24 VDC)
Cable's Length & Features	3m LIYYC11Y PUR Cable, UV and weather resistant
Galvanic Isolation	1000 V Between Power Supply and RS485 Bus
IP Rating	IP 65
Dimensions	200 mm x 412 mm x 44 mm (W x L x H)
Weight	1845 g
Calibration	Each sensor is calibrated and normalized under Class AAA Sun Similator as per IEC 60904-2 by Using a reference cell calibrated by ISFH-Germany

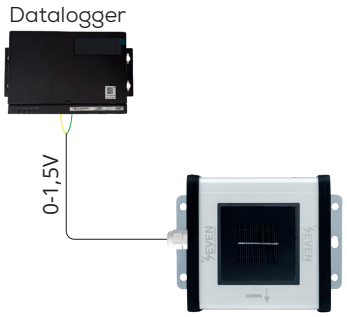
IRRADIANCE SENSOR BOX

Model: 3S-IS-T-I



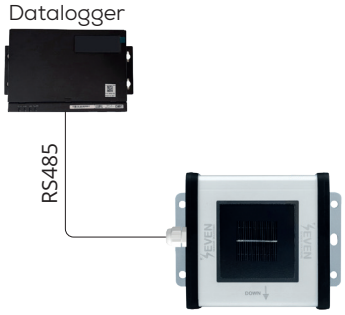
4-20 mA analog output for Irradiance Value

Model: 3S-IS-T-V



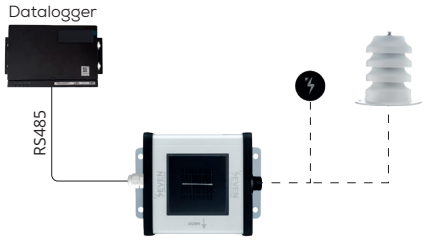
0-1,5 V analog output for Irradiance Value

Model: 3S-IS



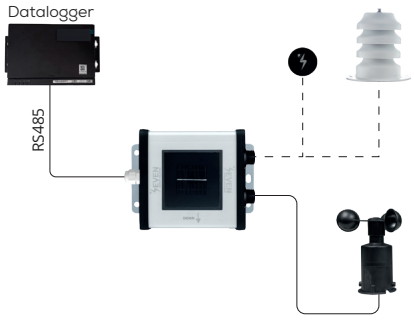
Modbus RTU output for Irradiance Value Cell Temperature Sensor Included

Model: 3S-IS-1



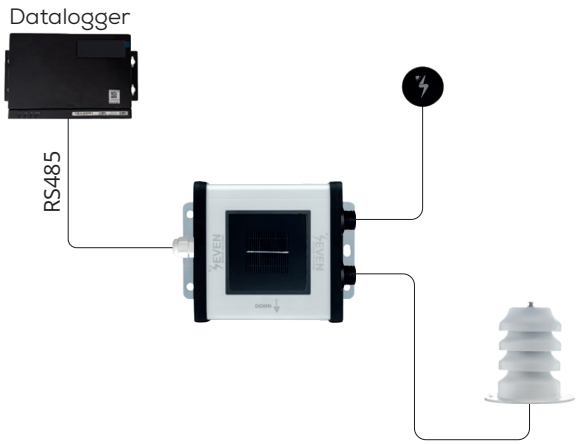
Irradiance Sensor with an external temperature sensor (Module Temperature Sensor or Ambient Temperature Sensor)

Model: 3S-IS-2



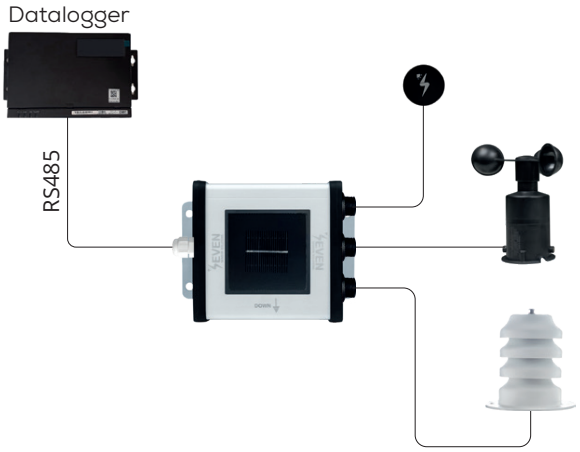
Irradiance Sensor with an external Temperature Sensor (Module Temperature Sensor or Ambient Temperature Sensor), and Wind Speed Sensor

Model: 3S-IS-2T



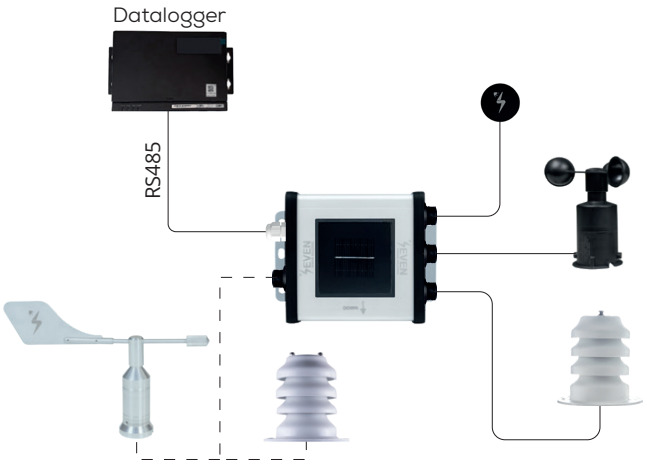
Irradiance Sensor with external two temperature sensors; Module Temperature Sensor, and Ambient Temperature Sensor

Model: 3S-IS-3



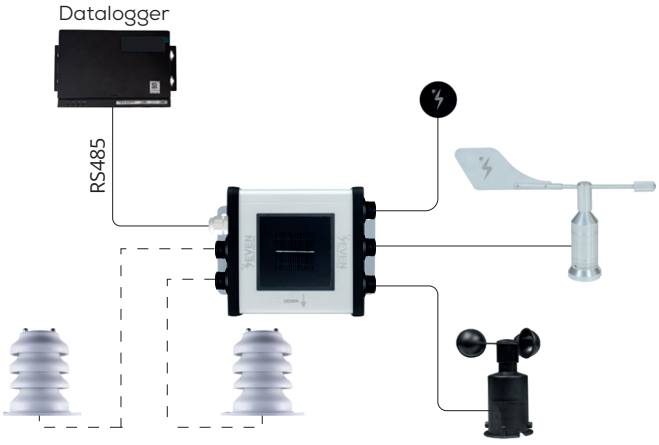
Sensors can be connected to Irradiance Sensor; Module Temperature Sensor, Ambient Temperature Sensor, and Wind Speed Sensor

Model: 3S-IS-4



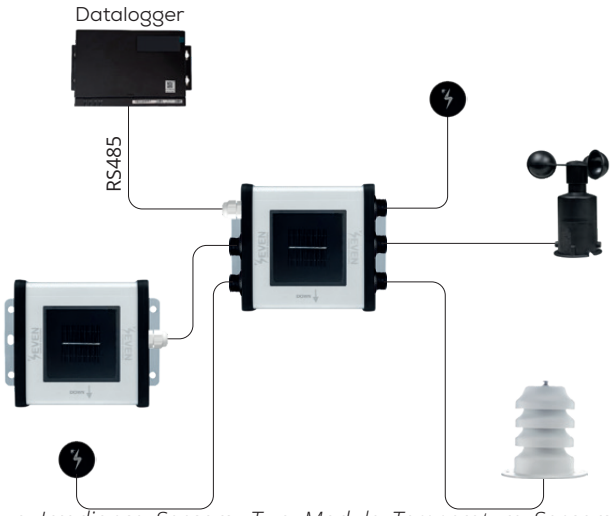
Following sensors can be connected to Irradiance Sensor; Module Temperature Sensor, Ambient Temperature Sensor, Wind Speed Sensor, and Wind Direction Sensor or Relative Humidity Sensor

Model: 3S-IS-5



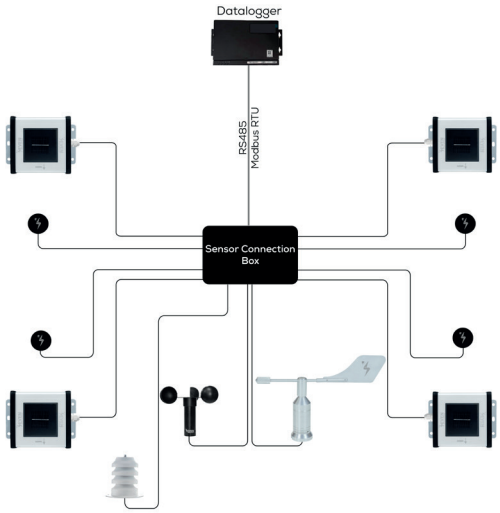
Following sensors can be connected to Irradiance Sensor; Module Temperature Sensor, Ambient Temperature Sensor, Wind Speed Sensor, Wind Direction Sensor, and Relative Humidity Sensor

Model: 3S-2IS



Two Irradiance Sensors, Two Module Temperature Sensors, Ambient Temperature Sensor, and Wind Speed Sensor can be connected. Special Solution when it's a dual orientation plant.

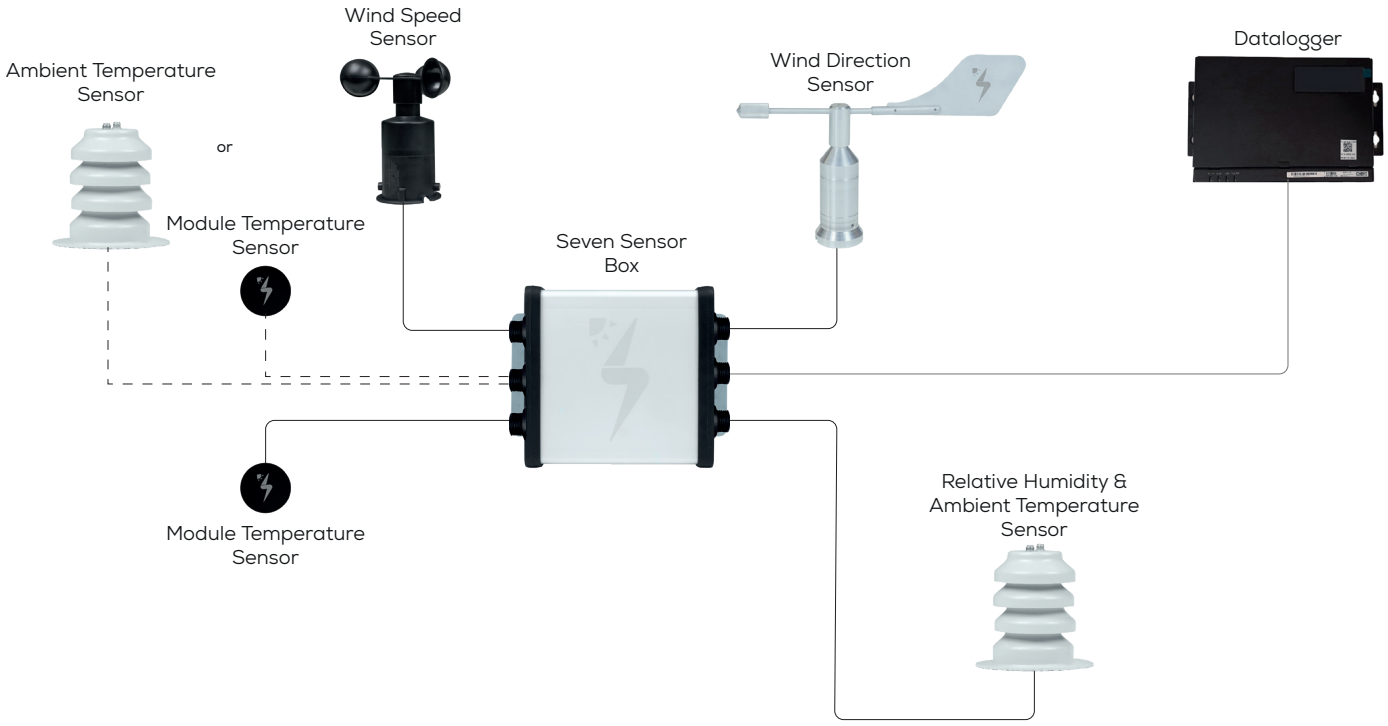
Model: 3S-4IS



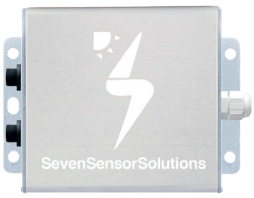
4 Irradiance Sensors, 4 Module Temperature Sensors, Ambient Temperature Sensor, Wind Direction Sensor, and Wind Speed Sensor can be connected.

3S-C2

SELECTION OF SENSOR BOX



Model: 3S-C2-2

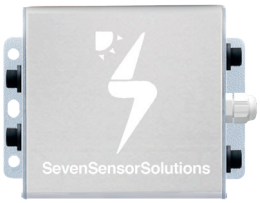


Sensor Box with two sensor connections

Model: 3S-C2-3

Sensor Box with three sensor connections

Model: 3S-C2-4



Sensor Box with four sensor connections

Model: 3S-C2-5

Sensor Box with five sensor connections

Technical Specifications
Modbus RTU

Common Modbus Register Map

SEVEN Modbus devices can be configured to operate in different communication parameters. The table that follows describes each supported bus protocol.

Baud Rate	4800, 9600, 19200, 38400
Parity	None, Even, Odd
Stop Bit	1, 2 (only at None parity)
Factory Default	9600 Baud, 8N1, address: 1

The following Modbus data can be read individually or in blocks:
Read carefully the notes at the bottom of the table about the parameters.
You can find which parameter is included in which sensors in the matching matrix after the table.

COMMON MODBUS REGISTER MAP				
ID-Dec	**ID-Hex**	**Parameter**	**Range**	**Resolution**
30000	0x00	Irradiance [1] / Irradiance 1 [2]	0-1600 W/m²	0.1 W/m²
30001	0x01	Irradiance 2	0 - 1600 W/m²	0.1 W/m²
30002	0x02	Irradiance 3	0 - 1600 W/m²	0.1 W/m²
30003	0x03	Irradiance 4	0 - 1600 W/m²	0.1 W/m²
30006	0x06	Temperature Compensated Irradiance [3] / Temperature Compensated Irradiance 1 [2]	0 - 1600 W/m²	0.1 W/m²
30007	0x07	Temperature Compensated Irradiance 2	0-1600 W/m²	0.1 W/m²
30008	0x08	Temperature Compensated Irradiance 3	0 - 1600 W/m²	0.1 W/m²
30009	0x09	Temperature Compensated Irradiance 4	0 - 1600 W/m²	0.1 W/m²
30012	0x0C	Irradiance [4] / Temperature Compensated Irradiance [3] / Total Effective Temperature Compansated Irradiance [5]	0 - 1600 W/m²	0.1 W/m²
30014	0x0E	Albedo	0-1	0.01
30015	0x0F	Internal Temperature [3] / Internal Temperature 1 [2]	(-40) - (+85)°C	0.1°C
30016	0x10	Internal Temperature 2	(-40) - (+85) °C	0.1°C
30017	0x11	Internal Temperature 3	(-40) - (+85) °C	0.1°C
30018	0x12	Internal Temperature 4	(-40) - (+85) °	0.1°C
30021	0x15	Total Effective Module Temperature [5]	-40) - (+85) °C	0.1°C

COMMON MODBUS REGISTER MAP				
ID-Dec	**ID-Hex**	**Parameter**	**Range**	**Resolution**
30022	0x16	Module Temperature [3]	(-40) - (+85) °C	0.1°C
		Module Temperature 1 [5]		
		External Temperature 1 [7]		
30023	0x17	Module Temperature 2 [5]	(-40) - (+85) °C	0.1°C
		External Temperature 2 [7]		
30024	0x18	Module Temperature 3 [5]	(-40) - (+85)°C	0.1°C
		External Temperature 3 [7]		
30025	0x19	Module Temperature 4 [5]	(-40) - (+85) °C	0.1°C
		External Temperature 4 [7]		
30026	0x1A	External Temperature 5	(-40) - (+85) °C	0.1°C
30027	0x1B	External Temperature 6	(-40) - (+85) °C	0.1°C
30028	0x1C	External Temperature 7	(-40) - (+85) °C	0.1°C
30029	0x1D	Ambient Temperature [8]	(-40) - (+85) °C	0.1°C
		External Temperature 8 [7]		
30032	0x20	Ambient Temperature (SHT)	(-40) - (+85) °C	0.1°C
30033	0x21	Relative Humidity (SHT)	0 - 100 %	0.1 %
30035	0x23	Air Pressure	260 - 1260 hPa	0.1 hPa
30036	0x24	Rainfall Intensity (Hour)	0 - 900 mm/hr	mm/hr
30037	0x25	Rainfall Intensity (Minute)	0 - 15 mm/min	mm/min
30038	0x26	Rainfall Intensity (Second)	0 - 0.25 mm/sec	mm/sec

30042	0x2A	Instant Soiling Ratio	0 - 1	0.01
30043	0x2B	Daily Average Soiling Ratio	0 - 1	0.01
30044	0x2C	Instant Soiling Level	0 - 1	0.01
30045	0x2D	Daily Average Soiling Level	0 - 1	0.01
30046	0x2E	Instant Soiling Level Percentage	0 - 100 %	0.1 %
30047	0x2F	Daily Average Soiling Level Percentage	0 - 100 %	0.1 %
30048	0x30	Soiling Rate	(-100) - (+100) %	0.1 %
30050	0x32	Wash Tank Status	0 - 1	-
30052	0x34	Wind Direction	0 - 359°	1°
				0.1°
30053	0x35	Wind Speed (m/s)	0 - 40 m/s	0.1 m/s
			0 - 60 m/s	0.01 m/s
30054	0x36	Wind Speed (knots)	0 - 120 knots	0.01 knots
30055	0x37	Wind Speed (knots)	0 - 216 km/h	0.01 km/h

SunSpec Technical Specifications

Modbus Holding Registers Map

SEVEN Modbus devices can be configured to operate in different communication parameters. The table that follows describes each supported bus protocol.

Baud Rate	4800, 9600, 19200, 38400
Parity	None, Even, Odd
Stop Bit	1, 2 (only at None parity)
Factory Default	9600 Baud, 8N1, address: 1

The following Modbus data can be read individually or in blocks.
Seven Sensor Modbus Holding Register Map is created based on SunSpec modbus Register map:

Start	End	Value	Type	Units	Scale Factor	Constant
40000	40001	SunSpec ID	uint32	N/A	N/A	"SunS"
40002	40002	SunSpec Device ID	uint16	N/A	N/A	0x0001
40003	40003	SunSpec Length	uint16	Registers	N/A	65
40004	40019	Manufacturer	String (32)	N/A	N/A	"SevenSensor"
40020	40035	Model	String (32)	N/A	N/A	"3S-2IS"
40036	40043	Hardware Version	String (16)	N/A	N/A	"4.0"
40044	40051	Software Version	String (16)	N/A	N/A	"6.0"
40052	40067	Serial Number	String (32)	N/A	N/A	"24.12.345.65.0013"
40068	40068	Device ID	uint16	N/A	N/A	1
Sunspec Device Model Measurement Registers						
40069	40069	Block ID	uint16	N/A	N/A	307
40070	40070	Length	uint16	Registers	N/A	11
40071	40071	Air Temperature	int16	°C	0.1	Measured
40072	40072	Relative Humidity	int16	%	0	N/A
40073	40073	Barometric Pressure	int16	hPa	0	N/A
40074	40074	Wind Speed	int16	m/s	0.1	Measured
40075	40075	Wind Direction	int16	°	0	N/A
40076	40076	Rain Gauge (Hour)	int16	mm/hour	0	N/A
40077	40077	Snow	int16	inches	0	N/A
40078	40078	PPT Type	int16	inches	N/A	N/A
40079	40079	Electric Field	int16	V/m	0	N/A
40080	40080	Surface Wetness	int16	KOhms	0	N/A
40081	40081	Soil Moisture	int16	%	0	N/A

Irradiance Model Registers						
Start	**End**	**Value**	**Type**	**Units**	**Scale Factor**	**Constant**
40082	40082	Block ID	uint16	N/A	0	302
40083	40083	Length	uint16	Registers	0	5
40084	40084	Global Horizontal	uint16	W/m²	0.1	Measured
40085	40085	Plane of Array	uint16	W/m²	0.1	Measured
40086	40086	Diffuse Irradiance	uint16	W/m²	0	N/A
40087	40087	Direct Irradiance	uint16	W/m²	0	N/A
40088	40088	Total Effective Irradiance	uint16	W/m²	0	N/A
Back of Module Temperature Registes						
40089	40089	Block ID	int16	N/A	N/A	303
40090	40090	Length	int16	Registers	N/A	9
40091	40091	Total Effective Modul Tempe-rature	int16	°C	0.1	Measured
40092	40092	Modul Temp 1	int16	°C	0.1	Measured
40093	40093	Modul Temp 2	int16	°C	0.1	Measured
40094	40094	Modul Temp 3	int16	°C	0.1	Measured
40095	40095	Modul Temp 4	int16	°C	0.1	Measured
40096	40096	Modul Temp 5	int16	°C	0.1	Measured
40097	40097	Modul Temp 6	int16	°C	0.1	Measured
40098	40098	Modul Temp 7	int16	°C	0.1	Measured
40099	40099	Ambient Temp (SHT)	int16	°C	0.1	Measured
Device Model Measurement Registers						
40100	40100	Block ID	uint16	N/A	N/A	308
40101	40101	Length	uint16	Registers	N/A	5
40102	40102	Total Effective Irradiance	uint16	W/m²	0.1	Measured
40103	40103	Modul Temp1	int16	°C	0.1	Measured
40104	40104	Modul Temp2	int16	°C	0.1	Measured
40105	40105	Wind Speed	int16	m/s	0.1	Measured
40106	40106	Air Temperature	int16	°C	0.1	Measured

MODEL SELECTION TABLE

Sensor Model		Irradiance	Internal Cell Temperature	Connectable Sensors				
				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
3S-IS-LR		1						
3S-IS-LR-T		1		1				
3S-IS-LR-T		1			1			
3S-IS-T-I		1	1					
3S-IS-T-V		1	1					
3S-IS		1	1					
3S-IS-1	3S-IS-1-MT	1	1	1				
	3S-IS-1-AT	1	1		1			
3S-IS-2	3S-IS-2-MT	1	1	1		1		
	3S-IS-2-AT	1	1		1	1		
3S-IS-2T		1	1	1	1			
3S-IS-3		1	1	1	1	1		
3S-IS-4	3S-IS-4-WD	1	1	1	1	1	1	
	3S-IS-4-WD/AT-MT	1	1	1	1		1	
	3S-IS-4-WD/MT-WS	1	1	1		1	1	
	3S-IS-4-WD/AT-WS	1	1		1	1	1	
	3S-IS-4-WD/WS	1	1			1	1	
	3S-IS-4-WD/MT	1	1	1			1	
	3S-IS-4-WD/AT	1	1		1		1	
	3S-IS-4-WD/	1	1				1	
	3S-IS-4-RH	1	1	1		1		1
	3S-IS-4-RH/WS	1	1			1		1
	3S-IS-4-RH/MT	1	1	1				1
	3S-IS-4-RH/	1	1					1
3S-IS-5	3S-IS-5	1	1	1		1	1	1
	3S-IS-5/RH-WD	1	1				1	1
	3S-IS-5/WS	1	1			1	1	1
	3S-IS-5/MT	1	1	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	

www.sevensensor.com
sales@sevensensor.com
+90 (0364) 230 12 33
Argesim Teknoloji A.S.
Address: Pinarcay OSB Mah. Organize San. 11. Cad. No: 35 , Merkez, Corum.Türkiye