SOLAR SENSOR SOLUTIONS

SENSOR SOLUTIONS

ABOUT US

Seven Sensor Solutions is a trade mark of ArGesim Makina, 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 75 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.

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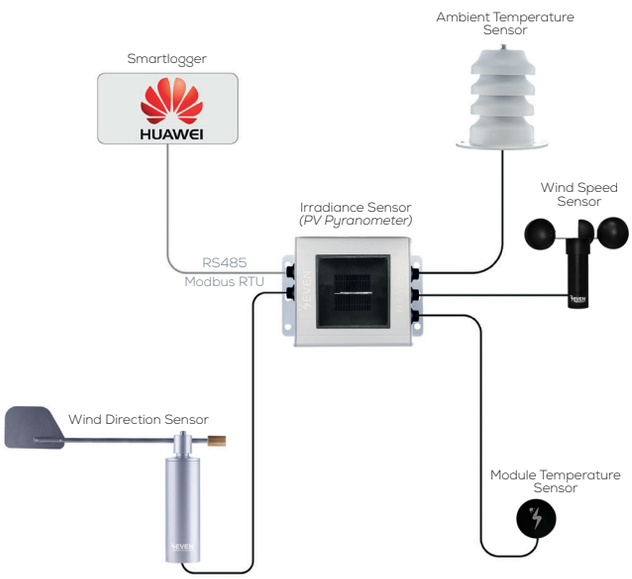
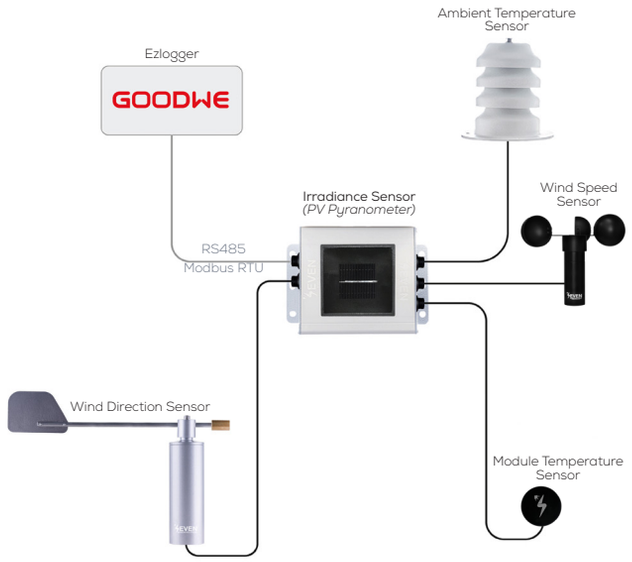


Huawei

Weather Station.



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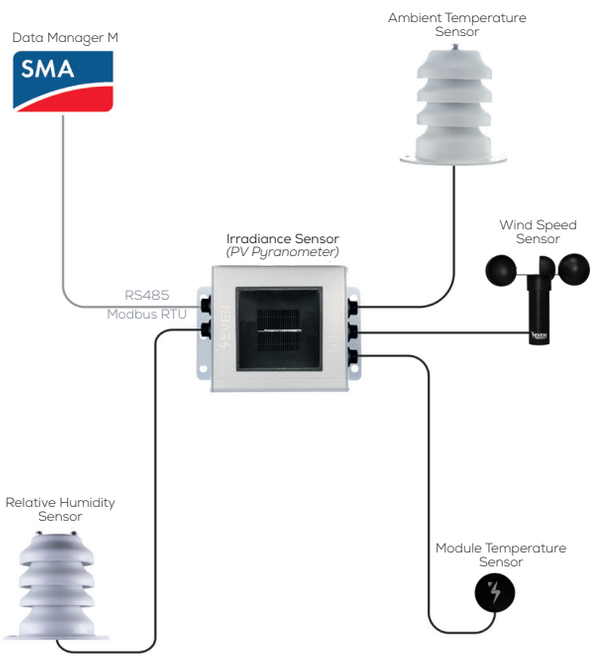

SMA

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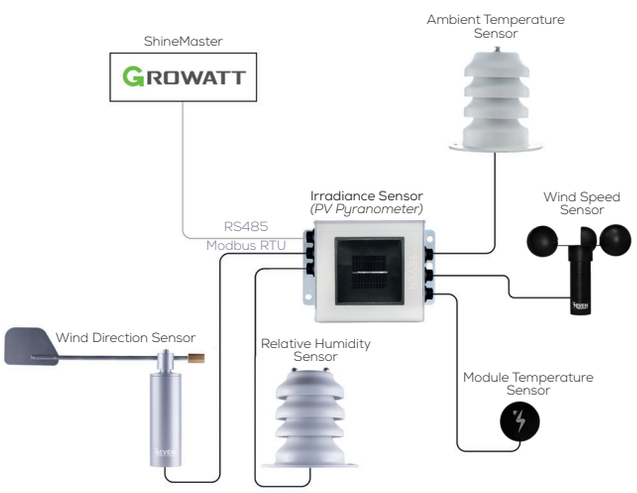

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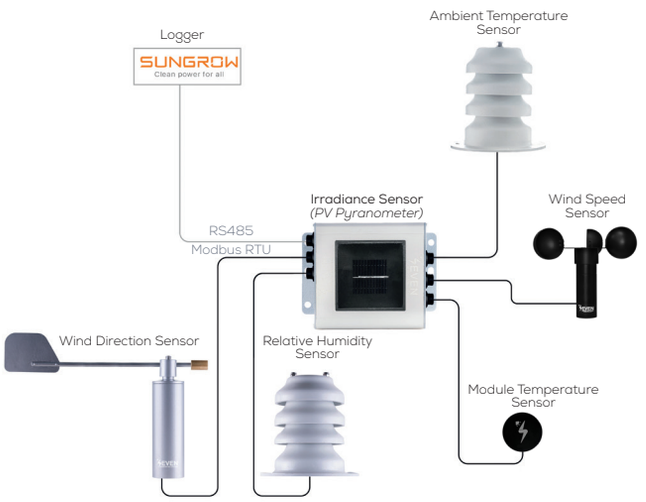
Weather Station.

WEATHER STATIONS



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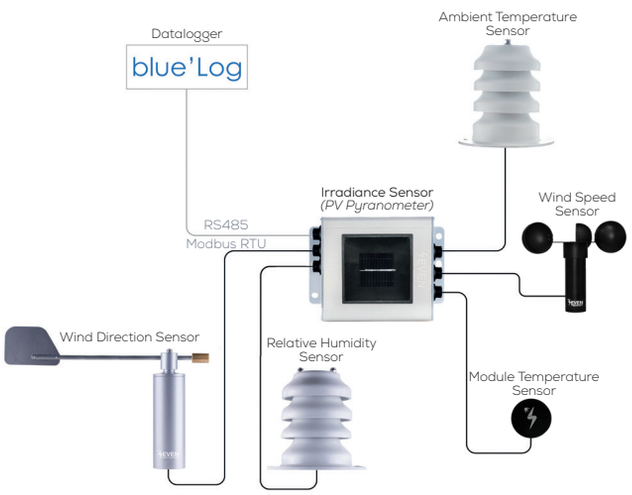

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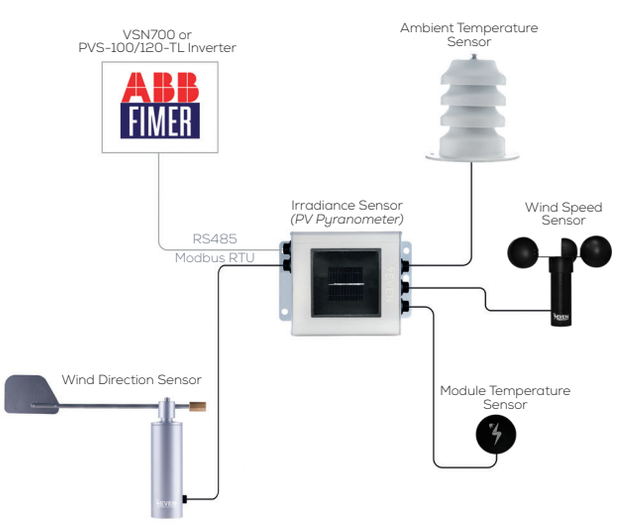
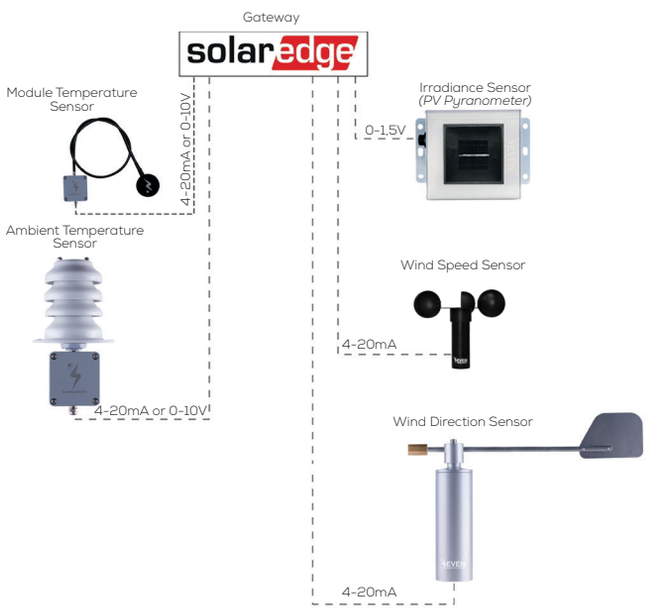


ABB/FIMER

Weather Station.



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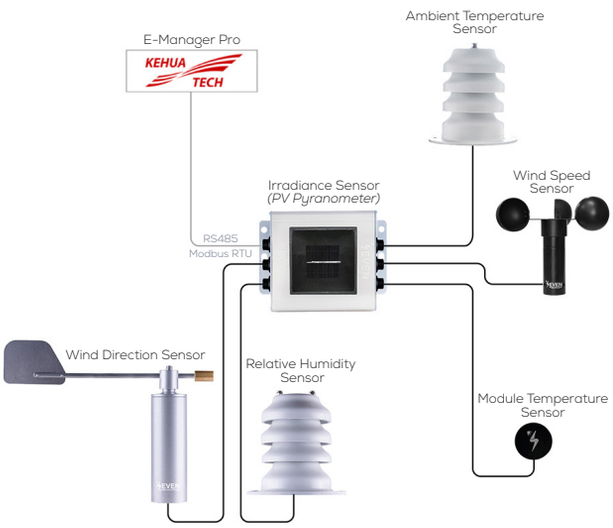

Kehua Tech

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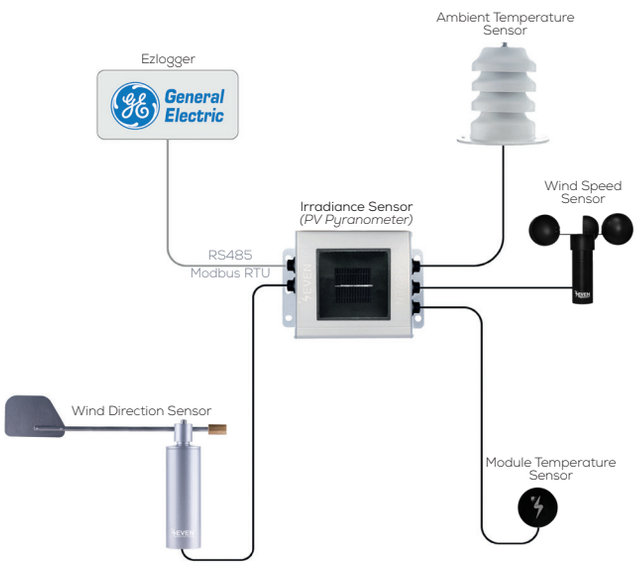
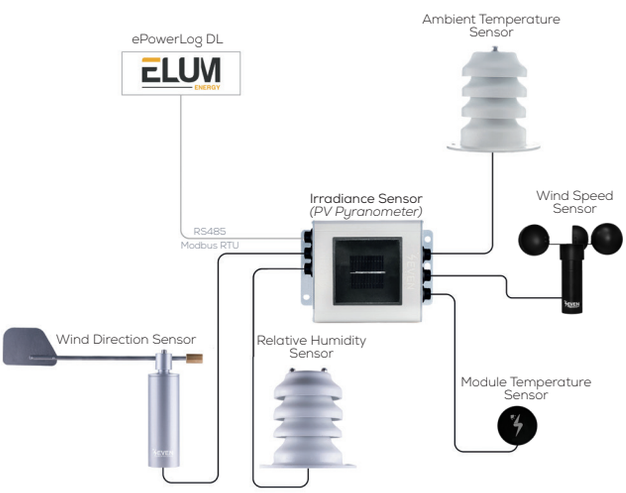


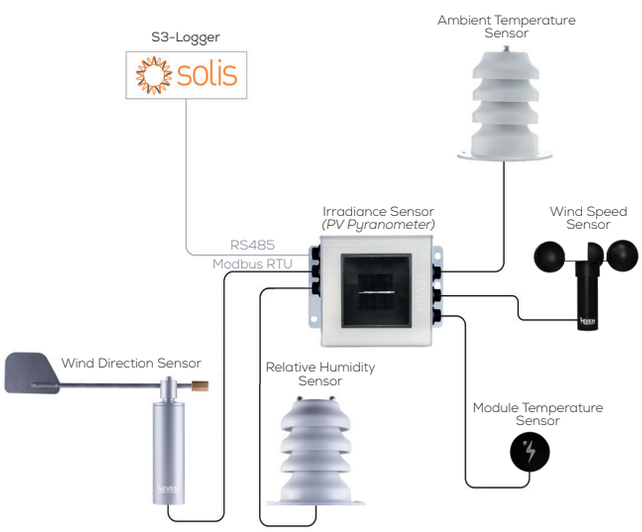
General Electric

Weather Station.



Elum

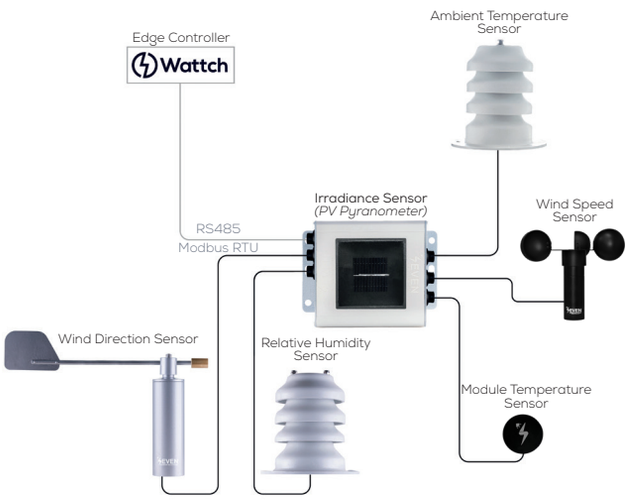
Weather Station.



Solis

Weather Station.

WEATHER STATIONS



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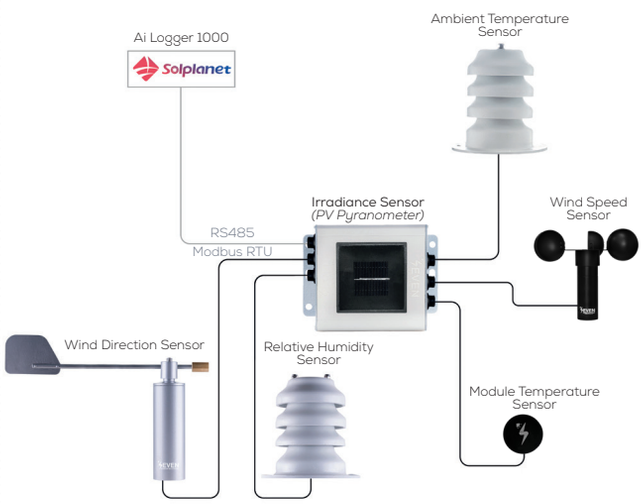
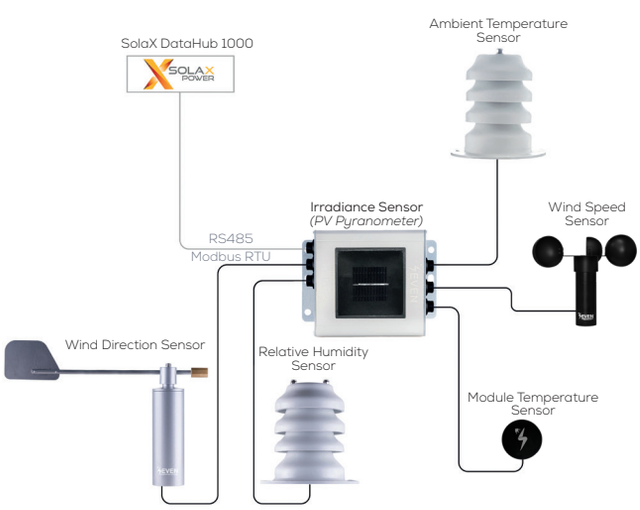


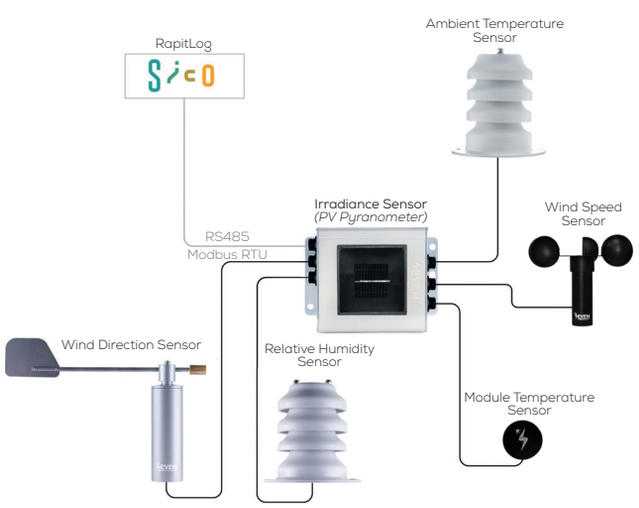
Solplanet

Weather Station.



SolaX Power

Weather Station.



Sico

Weather Station.

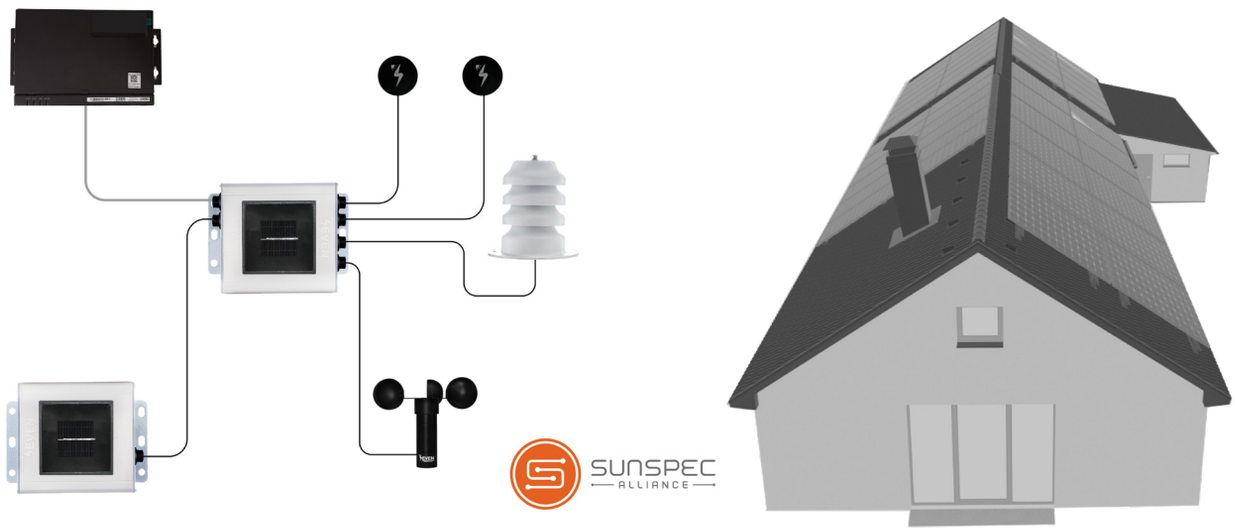
IRRADIANCE SENSOR

(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 Tempature, Wind Speed & Direction and Relative Humidity	Irradiance and Cell Temp.	Irradiance and Cell Temp.
Irradiance Range	0 - 1600 W/m²	0 - 1500 W/m²	
Uncertainty	≤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
Electrical Connection	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	140 mm x 110 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	Aluminum		
Compliant 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.		
Test	Each sensor is tested in natural sunlight using a reference cell calibrated by the Fraunhofer ISE Institute in Germany.		

DUAL ORIENTATIONS IRRADIANCE SENSOR (3S-2IS)

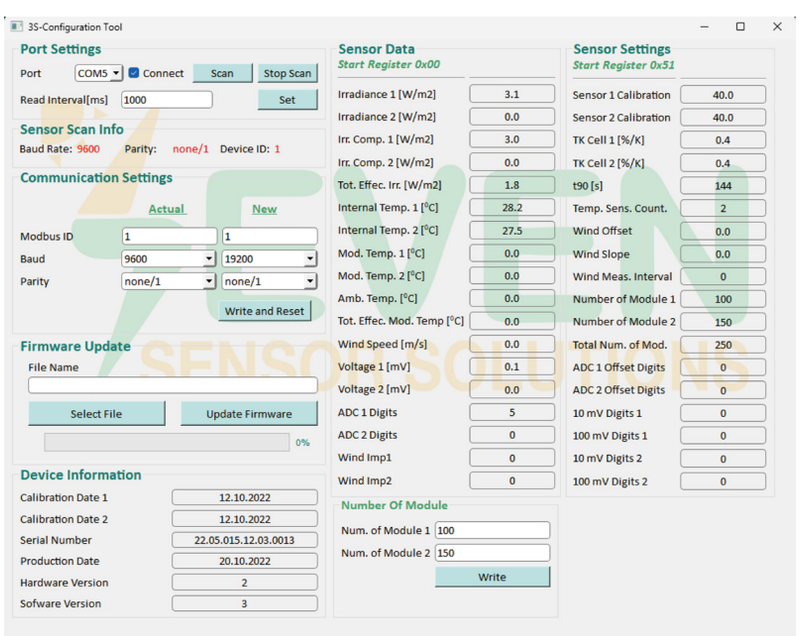


Special Solution for dual orientation plants:

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.

SEVEN offers a special model for projects with three and four orientations as well.



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.
Test	Each sensor is tested in natural sunlight using a reference cell calibrated by the Fraunhofer ISE Institute in Germany.

ALBEDOMETER

SUNSPEC ALLIANCE

TECHNICAL DATA

3S- ALBEDOMETER	
Sensor Type	Silicon Reference Cell (31 x 31 mm)
Measured Data	Horizontal Irradiance, Reflected Irradiance and Solar Albedo
Irradiance Range	0 - 1600 W/m²
Uncertainty	≤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
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 %
Box Dimensions	210 mm x 155 mm x 85 mm (L x W x H)
Weight	0.67 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
Test	The test is carried under natural sunlight by using a calibrated reference cell from Fraunhofer ISE, Germany

THERMOPILE PYRANOMETER

TECHNICAL DATA

	3S-TP-MB	3S-TP-MB-B	3S-TP-MB-C
Sensor Type	Thermopile		
Classification as per ISO 9060:2018	Spectrally Flat Class A	Spectrally Flat Class B	Spectrally Flat Class C
Measuring Range	0 - 2000 W/m2		
Spectral range (50%)	283 - 2800 nm		300 - 2800 nm
Response time (95%)	< 5 s	< 10 s	< 20 s
Zero offsets: **a) Thermal radiation (at 200 W/m²)** **b) Temperature change (5 K/h)**	< l±7l W/m2 < l±2l W/m2	< l±10l W/m2 < l±4l W/m2	< l±15l W/m2 < l±4l W/m2
Non-stability (change/year)	< l±0,5l %	< l±1l %	
Non-linearity	< l±0,2l %	< l±1l %	< l±1,5l %
Response according to the cosine law	< l±10l W/m2	< l±18l W/m2	< l±20l W/m2
Spectral error	< l±0,2l %	< l±0,5l %	< l±2l %
Temperature response (-10…+40 °C)	< 1 %	< 1,5 %	< 3 %
Tilt response	< l±0,2l %	< l±2l %	
Accuracy of levelling device	< 0.1°		< 0.2°
Output	Digital RS485-Modbus RTU (Analog options available)		
Power Supply	5 to 30 VDC		
Electrical Connection	3 m LIYYC11Y PUR Cable, UV and weather resistant		
Operating Temperature Range	-40°C to +80°C		
Dimensions	Ø 165 x 104 mm		Ø 73 x 83 mm
IP Rating	IP 67		
Shade Disk	Included		On Request

MODULE TEMPERATURE SENSOR

TECHNICAL DATA

	3S-MT-PT1000	3S-MT-PT1000-MB	3S-MT-PT1000-I
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
Communication Protocol	-	Modbus RTU	-
Power Supply	-	12 to 30 V DC	
Power Consumption	-	15 mA @ 24 V DC	30 mA @ 24 V DC
Electrical Connection	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)	
Sensor Cover Dimensions	Ø 35 x 3 mm		
Weight	77 gr	156 gr	
IP Rating	IP 67		
Box Material	-	ABS	
Sensor Cover	Laminated Backsheet (EVA - Tedlar)		
Mounting Method	3M® Sticker to Back of Panel		
Standard	Class A according to IEC 60751:2022		

AMBIENT TEMPERATURE SENSOR

SUNSPEC ALLIANCE

TECHNICAL DATA

	3S-AT-PT1000	3S-AT-PT1000-MB	3S-AT-PT1000-I
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
Communication Protocol	-	Modbus RTU	-
Power Supply	-	12 to 30 V DC	
Power Consumption	-	15 mA @ 24 V DC	30 mA @ 24 V DC
Electrical Connection	1,5 m LIYYC11Y PUR Cable, UV and Weather Resistant	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	127 gr	206 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

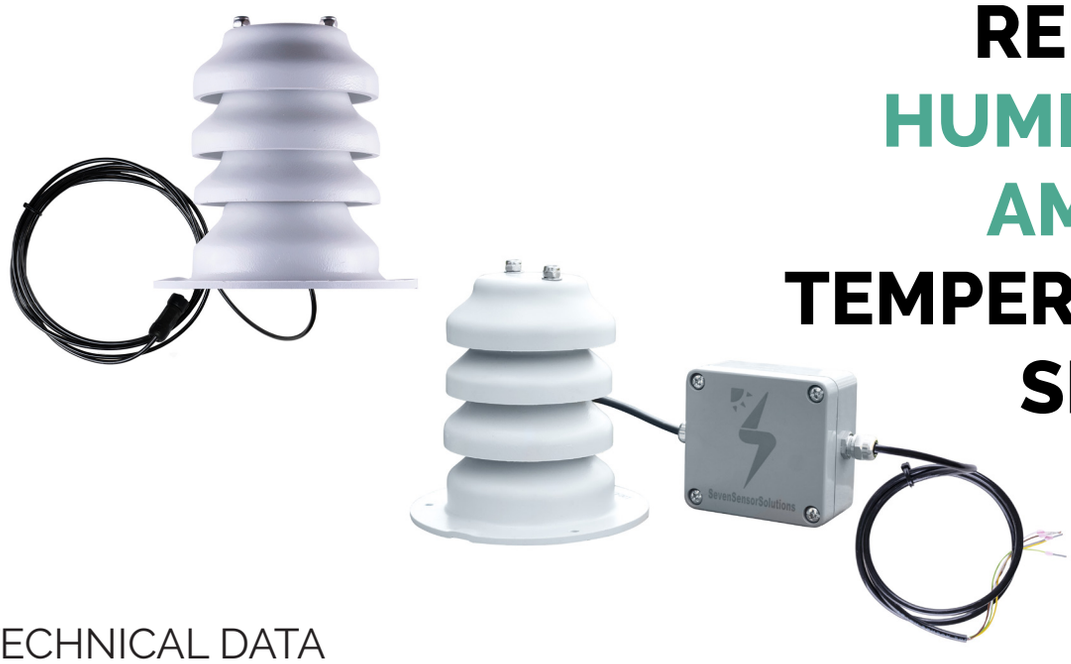
TECHNICAL DATA

	3S-WS-PLS	3S-WS-MB	3S-WS-I	3S-WS-I-H
Sensor Type	Cup Star Anemometer (Reed Switch)			
Measuring Range	0,9 to 40 m/s	0,9 to 50 m/s		
Accuracy	± 0,3 m/s or ± 3% of Measuring Value	± 0,1 m/s or ± 1% of Measuring Value		
Resolution	0,1 m/s			
Threshold	0,9 m/s			
Survival Speed	60 m/s	80 m/s		
Data Output	Read Relay	RS485 up to 38400 Baud	Analog 4-20 mA	
Communication Protocol	-	Modbus RTU	-	
Power Supply	-	12 to 30 V DC		
Heating	-	-	-	Available
Electrical Connection	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)			-40°C to +85°C
Dimensions	Ø 180 x 145 mm	Ø 180 x 235 mm		
Weight	0,2 kg	0,6 kg		
IP Rating	IP 54 (Optional IP 65)			
Housing Material	Anodized Aluminum			
Cup Material	ABS			
Mounting Method	Pipe or Ground Mounting			
Standard	Compliant to IEC 61724-1:2021			

WIND DIRECTION SENSOR

TECHNICAL DATA

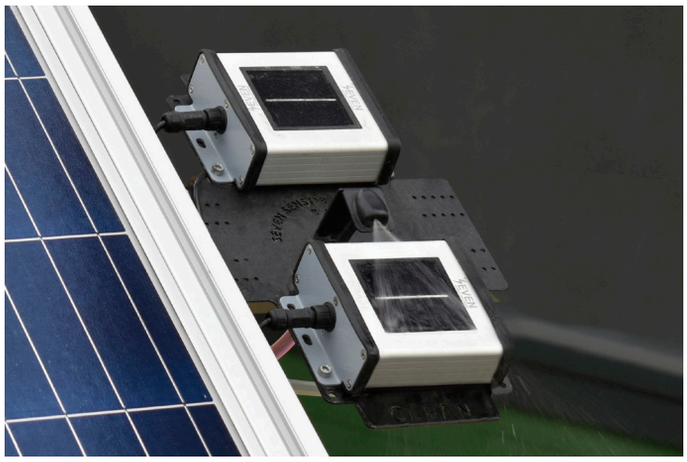
	3S-WD	3S-WD-MB	3S-WD-I
Sensor Type	Wind Vane (Potentiometer)		
Measuring Range	0 to 359°		
Accuracy	± 3°		
Resolution	1°		
Threshold	1 m/s		
Survival Speed	60 m/s		
Data Output	Potentiometer	RS485 up to 38400 Baud	Analog 4-20 mA
Communication Protocol	-	Modbus RTU	-
Power Supply	-	12 to 30 V DC	
Power Consumption	-	20 mA @ 24 V DC	30 mA @ 24 V DC
Electrical Connection	3 m LI9YC11Y Cable, UV and Weather Resistant	3 m LIYYC11Y PUR Cable, UV and Weather Resistant	
Operating Temperature Range	-40°C to +85°C (Ice Free)		
Dimensions	410 x 220 mm	410 x 260 mm	
Weight	580 gr	0,6 kg	620 gr
IP Rating	IP 54 (Optional IP 65)		
Housing Material	Polyamide		
Vane Material	Aluminum		
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-MB	3S-RH-I
Sensor Type	Capacitive		
RH Range	0% to -100%		
RH Accuracy	± 1% RH (20...70%) @ 25 °C		
RH Resolution	1%		
T Range	-40°C to +85°C		-
T Accuracy	± 0.3 °C (5...60 °C) @ 20...80% RH		-
T Resolution	0.1°C		-
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
Electrical Connection	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		



SOILING SENSOR

TECHNICAL DATA

	3S-SMS-MB
Soiling Ratio	%0 - %100
Resolution	%0.1
Uncertainty	≤1%
Followed Standard	IEC61724-1 (Annex C)
Interface	RS485 up to 38400 Baud
Communication Protocol	The sensor is connected via a 2-wire RS485 bus with open vendor-independent Modbus RTU Protocol, Sunspec compliant
Protection	IP65
Power Supply	100-240 V AC or 24 V DC 5 A
Irradiance	0…1600 w/m²
Calibration	Each sensor is calibrated under Class AAA Sun Similator as per IEC 60904-2 by using a reference cell calibrated by ISFH-Germany.
Test	Each sensor is tested under natural sunlight by using a calibrated reference cell from Fraunhofer ISE, Germany.
Operating Temperature	-20°C / +85°C
Water Tank Capacity	18 Liter
Water Consumption	36lt./year (2 times filling per year)
Cleaning Fluid	Pur Water
Antifreeze Ratio	%65 Pur Water + %35 Antifreeze (Weather conditions ≤ 0°)
***Max. Water Line Length**	2,5 Meter
***Max. Water Line Height**	2,5 Meter

SEVEN also offers Manually Cleaned Soil Monitoring System when the cost of the system matters. It has the same features like automatic one. The difference is cleaning of the sensor which is manually.

LOW-COST IRRADIANCE SENSOR

TECHNICAL DATA

	3S-IS-LR
Reference Cell	Monocrystalline Silicon (31 mm x 31 mm)
Irradiance Range	0 to 1600 W/m²
Uncertainty	≤5%
Resolution	0.1 W/m²
Drift	Very small drift of <0.3%/ year
Output Rate	1/s
Data Output	RS485 up to 38400 Baud
Communication Protocol	Modbus RTU
Dimensions	118 mm x 84 mm x 55 mm
Power Supply	12 to 30 VDC
Power Consumption	10 mA max @24 VDC
Electrical Connection	3 m LIYC11Y PUR Cable, UV and Weather Resistant
Galvanic Isolation	1000 V between power supply and RS485 bus
Weight	300 gr
IP Rating	IP 67
Sensor Housing Material	ABS
Test	Each sensor is tested under natural sunlight by using a calibrated reference cell from Fraunhofer ISE, Germany

RAIN GAUGE

TECHNICAL DATA

	3S-RG-MB	3S-RG-PLS
Sensor Type	Tipping Bucket Rain Gauge	
Measuring Range	600 mm/h	
Accuracy	± 2%	
Resolution	0.1mm	
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	-
Electrical Connection	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 280 mm	
Weight	1,5 kg	
IP Rating	IP 65	
Housing Material	Anodized Aluminum	

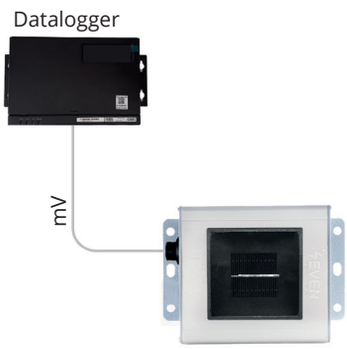
COMPACT WEATHER STATION

TECHNICAL DATA

	3S-CWS
Measured Data	Global & 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	630 x 860 x 1285 mm (W x L x H) (Height can be changed as per request)
Weight	5.8 kg
IP Rating	IP 54 (Optional IP 67)
Power Supply	12 to 30 V DC
Power Consumption	25 mA @ 24 V DC
Electrical Connection	3 m LIYYC11Y PUR Cable, UV and weather resistant
Galvanic Isolation	1000 V between power supply and RS485 Bus

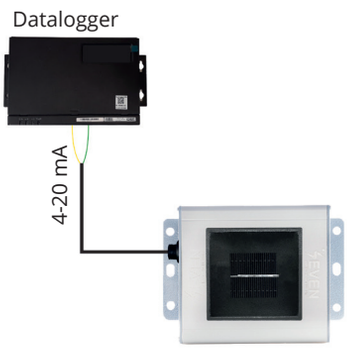
IRRADIANCE SENSOR BOX

Model: 3S-IS-mV



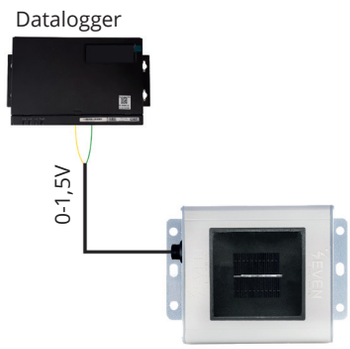
Irradiance Sensor with mV output

Model: 3S-IS-T-I



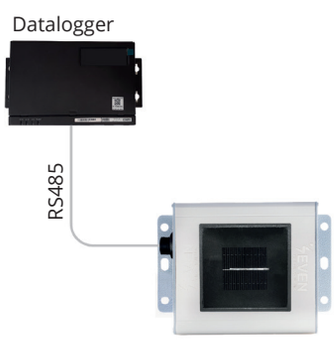
4-20 mA analog output for Irradiance Value

Model: 3S-IS-T-V



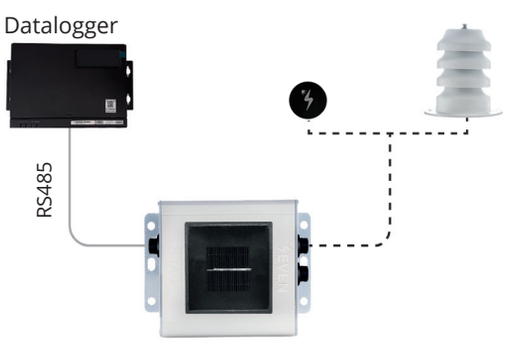
0-1,5 V analog output for Irradiance Value

Model: 3S-IS



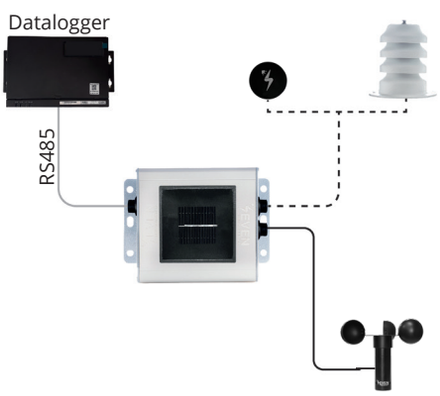
Modbus RTU output for Irradiance Value Cell Temperature Sensor Included

Model: 3S-IS-1



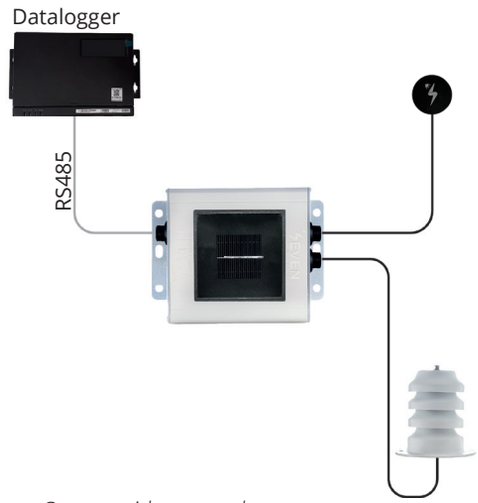
Irradiance Sensor with an external temperature sensor (Module Temperature Sensor or Ambient Temperature Sensor)

Model: 3S-IS-2



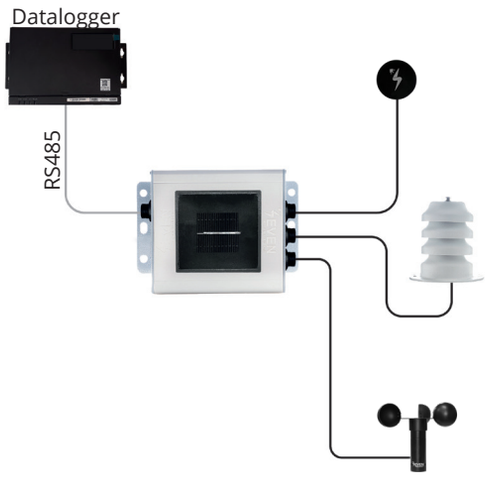
Irradiance Sensor with an external Temperature Sensor (Module Temperature Sensor or Ambient Temperature Sensor), and Wind Speed Sensor

Model: 3S-IS-2T



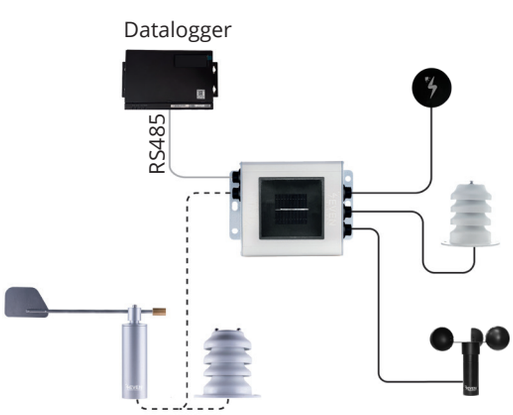
Irradiance Sensor with external two temperature sensors; Module Temperature Sensor, and Ambient Temperature Sensor

Model: 3S-IS-3



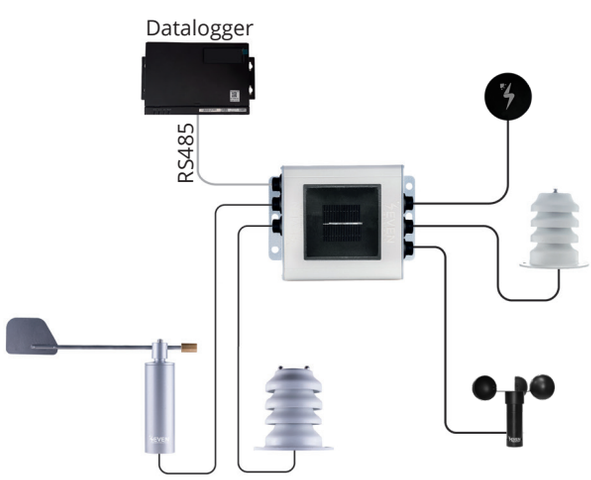
Sensors can be connected to Irradiance Sensor; Module Temperature Sensor, Ambient Temperature Sensor, and Wind Speed Sensor

Model: 3S-IS-4



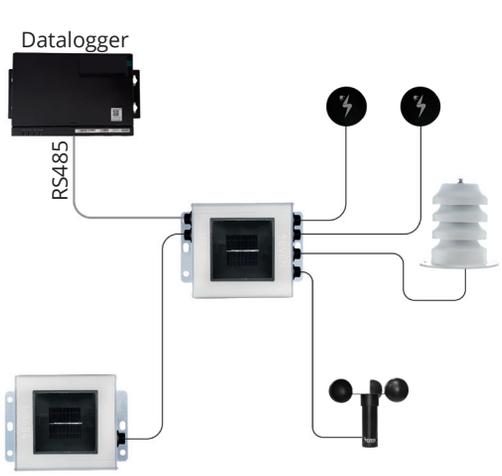
Following sensors can be connected to Irradiance Sensor; Module Temperature Sensor, Ambient Temperature Sensor, Wind Speed Sensor, and Wind Direction Sensor or Relative Humidity Sensor

Model: 3S-IS-5



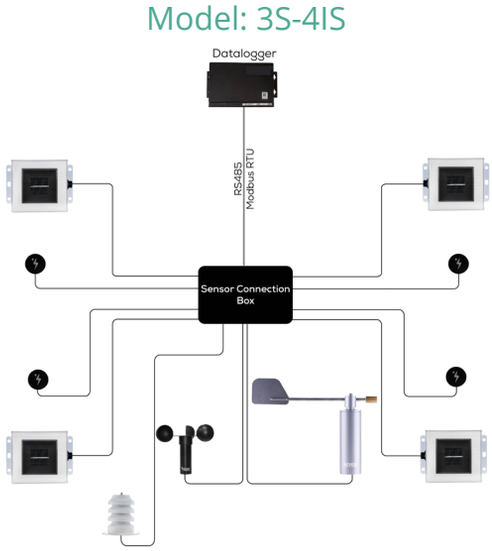
Following sensors can be connected to Irradiance Sensor; Module Temperature Sensor, Ambient Temperature Sensor, Wind Speed Sensor, Wind Direction Sensor, and Relative Humidity Sensor

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.

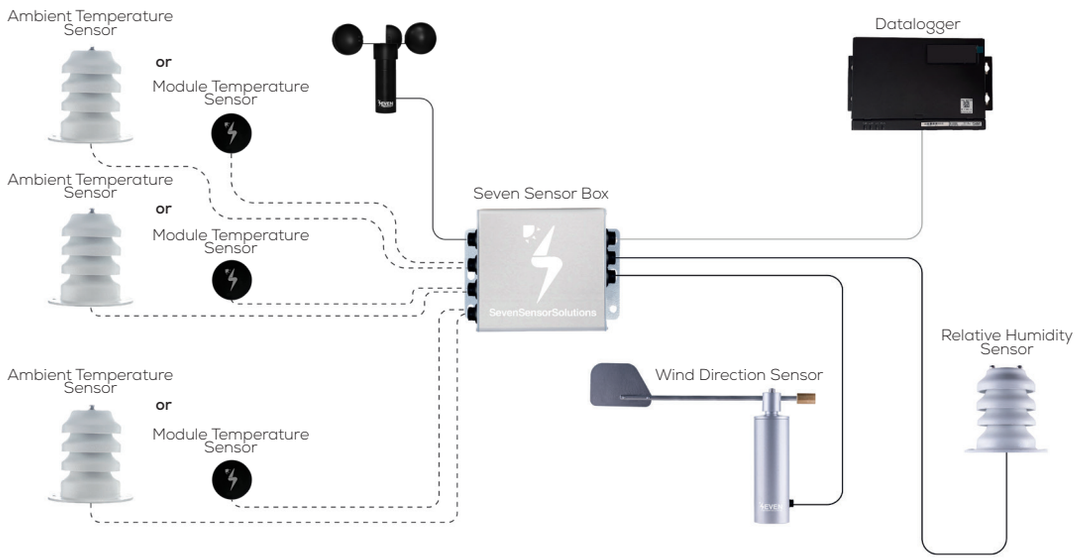
Model: 3S-4IS



4 Irradiance Sensors, 4 Module Temperature Sensors, Ambient Temperature Sensor, Wind Direction Sensor ve Wind Speed Sensor bağlanabilir.

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

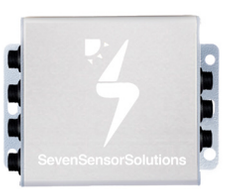
Model: 3S-C2-4

Sensor Box with four sensor connections

Model: 3S-C2-5

Sensor Box with five sensor connections

Model: 3S-C2-6



Sensor Box with six sensor connections

Modbus RTU Specifications

Supported Bus Protocol
BaudRate: 4800, 9600, 19200, 38400
Parity: None**,** Even, Odd
Stop Bit: 1, 2 (only at none parity)
Factory Default: 9600 Baud, 8N1, address: 1
Transmission mode: MODBUS RTU
Supported function codes: 0x04: Read Input Register

Register Map:
The following Modbus data can be read individually or in blocks:

ID-Dec.	ID-Hex	Value
3	0x03	Wind speed in 1/100 m/s 0...6000
5	0x05	Temperature compensated Irradiance value 0...16000 in 0.1 W/m²
10	0x0A	(SHT21 Temperature) Ext. temp 3 as 'sign value' -400 ...+900 [range -40 ...+90°C] in 0.1°C
15	0x0F	Cell temperature as 'sign value' -400 ... +900 [range -40 ... +90°C] in 0.1°C
16	0x10	Ext. temp. 1 as 'sign value' -400 ... +900 [range -40 ... +90°C] in 0.1°C
17	0x11	Ext. temp. 2 as 'sign value' -400 ... +900 [range -40 ... +90°C] in 0.1°C
18	0x12	External relative humidity 0...100 [%], 1%
19	0x13	Wind direction 0...359 in 1°

SunSpec and Modbus

Serial/ General
Baud Rate: 9600
Parity: None
Stop Bits: 1

RS-485
Interface Mode: 2-Wire Half Duplex

Modbus
Device ID: 60

Register Map:

Start	End	#	Name	Type	Units	Scale Factor	Contents	Description
0001	0002	2	C_SunSpec_ID	uint32	N/A	N/A	"SunS"	Well-known value. Uniquely identifies this as a SunSpec Modbus Map
0003	0003	1	C_SunSpec_DID	uint16	N/A	N/A	0x0001	Well-known value. Uniquely identifies this as a SunSpec Common Model block
0004	0004	1	C_SunSpec_Length	uint16	registers	N/A	65	Length of common model block
0005	0020	16	C-Manufacturer	String(32)	N/A	N/A	"SEVEN"	Well-known value
0021	0036	16	C-Model	String(32)	N/A	N/A	"3S-IS"	Manuf specific value
0037	0044	8	C-Options	String(16)	N/A	N/A	"0"	Manuf specific value
0045	0052	8	C-Version	String(16)	N/A	N/A	"1"	Manuf specific value
0053	0068	16	C_Serial Number	String(32)	N/A	N/A	"Serial"	Manuf specific value
0069	0069	1	C_DeviceAddress	unint16	N/A	N/A	60	Modbus Id
0070	0070	1	C_SunSpec_DID	int16	N/A	N/A	307	Start of next Device
0071	0071	1	C_SunSpec_Length	int16	N/A	N/A	11	Device Model Block Size
0072	0072	1	E_BaseMet_Air Temperature	int16	°C	-1	Measured	Ambient Air Temperature
0073	0073	1	E_BaseMet_Relative	int16	%	0	Measured	Relative Humidity
0075	0075	1	E_BaseMet_Wind _Speed	int16	m/s	0	Measured	Wind Speed
0076	0076	1	E_BaseMet_Wind	int16	Degrees	0	Measured	Wind Direction
0083	0083	1	C_SunSpec_DID	int16	N/A	0	302	Well-known value. Uniquely identifies this as a SunSpec Irradiance Model
0084	0084	1	C_Sunspec_Length	int16	N/A	0	5	Variable length model block =(5*n), where n=number of sensors blocks
0086	0086	1	E_Irradiance _Plane-of-Array_1	uint16	W/m²	0	Measured	Plane-of-Array Irradiance
0090	0090	1	C_SunSpec_DID	int16	N/A	0	303	Well-known value. Uniquely identifies this as a SunSpec Back of Module Temperature Model
0091	0091	1	C_Sunspec_Length	int16	N/A	0	2	Variable length model block =(5*n), where n=number of sensors blocks
0092	0092	1	E_BOM_Temp_1	int16	°C	-1	Measured	Back of module temperature
0094	0094	1	EndOfSunspecBlock	uint16	N/A	N/A	0xFFFF	End of SunSpec Block
0095	0095	1	C_Sunspec_Length	uint16	N/A	0	0	Terminate length, zero
0200	0200	1	Modbus Id - Write Register	int16	N/A	N/A	60	Modbus device address, write register
0205	0205	1	Baud Rate	uint16	N/A	N/A	9600	Baud Rate, write register

MODEL SELECTION TABLE

Sensor Box Model	Irradiance Sensor	Cell Temperature Sensor	Connections: The following external sensors can be connected to the sensor box	Communication / Protocol
3S-IS-T-V	✓	✓	NA	0-1,5V
3S-IS-T-I	✓	✓	NA	4-20 mA
3S-IS-LR	✓	×	NA	RS485 - Modbus RTU
3S-IS	✓	✓	NA	RS485 - Modbus RTU
3S-IS-1	✓	✓	Module Temperature Sensor (3S-MT-PT1000) **or** Ambient Temperature Sensor (3S-AT-PT1000)	RS485 - Modbus RTU
3S-IS-2	✓	✓	Module Temperature Sensor (3S-MT-PT1000) **or** Ambient Temperature Sensor(3S-AT-PT1000) **+** Wind Speed Sensor (3S-WS-PLS)	RS485 - Modbus RTU
3S-IS-2T	✓	✓	Module Temperature Sensor (3S-MT-PT1000) **+** Ambient Temperature Sensor (3S-AT-PT1000)	RS485 - Modbus RTU
3S-IS-3	✓	✓	Module Temperature Sensor (3S-MT-PT1000) **+** Ambient Temperature Sensor (3S-AT-PT1000) **+** Wind Speed Sensor (3S-WS-PLS)	RS485 - Modbus RTU
3S-IS-4	✓	✓	Module Temperature Sensor (3S-MT-PT1000) **+** Ambient Temperature Sensor (3S-AT-PT1000) **+** Wind Speed Sensor (3S-WS-PLS) **+** Wind Direction Sensor (3S-WD) **or** Relative Humidity & Ambient Temperature Sensor (3S-RH & AT)	RS485 - Modbus RTU
3S-IS-5	✓	✓	Module Temperature Sensors (3S-MT-PT1000) **+** Ambient Temperature Sensor (3S-AT-PT1000) **+** Wind Speed Sensor (3S-WS-PLS) **+** Wind Direction Sensor (3S-WD) **+** Relative Humidity & Ambient Temperature Sensor (3S-RH & AT)	RS485 - Modbus RTU
3S-2IS	✓	✓	Irradiance Sensor (3S-IS-mV) **+** 2 pcs. Module Temperature Sensor (3S-MT-PT1000) **+** Ambient Temperature Sensor (3S-AT-PT1000) **+** Wind Speed Sensor (3S-WS-PLS)	RS485 - Modbus RTU
3S-4IS	✓	✓	4 pcs. Module Temperature Sensor (3S-MT-PT1000) **+** Ambient Temperature Sensor (3S-AT-PT1000) **+** Wind Direction Sensor (3S-WD) **+** Wind Speed Sensor (3S-WS-PLS)	RS485 - Modbus RTU
3S-CWS	✓	✓	Irradiance Sensor (3S-IS-mV) Module Temperature Sensor (3S-MT-PT1000) Relative Humidity & Ambient Temperature Sensor (3S-RH & AT) Wind Speed Sensor (3S-WS-PLS) Wind Direction Sensor(3S-WD) Rain Gauge (3S-RG-PLS) Air Pressure Sensor	RS485 - Modbus RTU
3S-C2-2	×	×	2 Sensors can be connected	RS485 - Modbus RTU
3S-C2-3	×	×	3 Sensors can be connected	RS485 - Modbus RTU
3S-C2-4	×	×	4 Sensors can be connected	RS485 - Modbus RTU
3S-C2-5	×	×	5 Sensors can be connected	RS485 - Modbus RTU
3S-C2-6	×	×	6 Sensors can be connected	RS485 - Modbus RTU

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