3S-C2

WORKING PRINCIPLES

SEVEN Sensor Box is an UV protected aluminum box, including an electronic card where 6 different sensors can be connected and has an RS485 port output to transfer data in Modbus RTU protocol to the datalogger or Scada system. SEVEN provides Sunspec options for needed devices, also.

CONSTRUCTION FEATURES

Sensor Box:

The solar cell, all the input connectors and the output connector and ventilation port located on an UV protected aluminum box, is called Sensor Box. The sensor box has two opening access for and the mounting holes on its sides are for easy site installation. There are three option for IP Class; IP68, IP65 and IP54. For ventilation purpose there are 1mm holes at bottom side of the box or a ventilation plug on its side.

Connectors:

The Sensor Box has max. 6 inputs and 1 output connectors. Each plastic connector has a different pin number which prevents any connection confusion during site installation. The connection cables are delivered as 1.5m or 3m lengths. SEVEN Sensor Box is designed as Plug & Run device and end user friendly operation.

Ventilation Port:

This port is made of a plastic material and allows air circulation and moisture releasing in the box which is required for long run life time of the electronic card. The same function can be provided through the 1 mm holes drilled in the bottom of the box, when ventilation plug is not used.

Configuration Tool:

SEVEN firmware is downloadable directly from SEVEN website
https://www.sevensensor.com/software
Download the program and run it. The Modbus parameter can be set and the connected sensors data can be monitored via this configuration tool.

DATALOGGER COMMUNICATION

SEVEN Sensor Boxes communicate by Modbus RTU protocol through RS485. SEVEN sensor is compatible with many well-known datalogger brands. However, the purchaser should get the confirmation from SEVEN whether his datalogger is compatible with SEVEN sensor or not.

WARRANTY

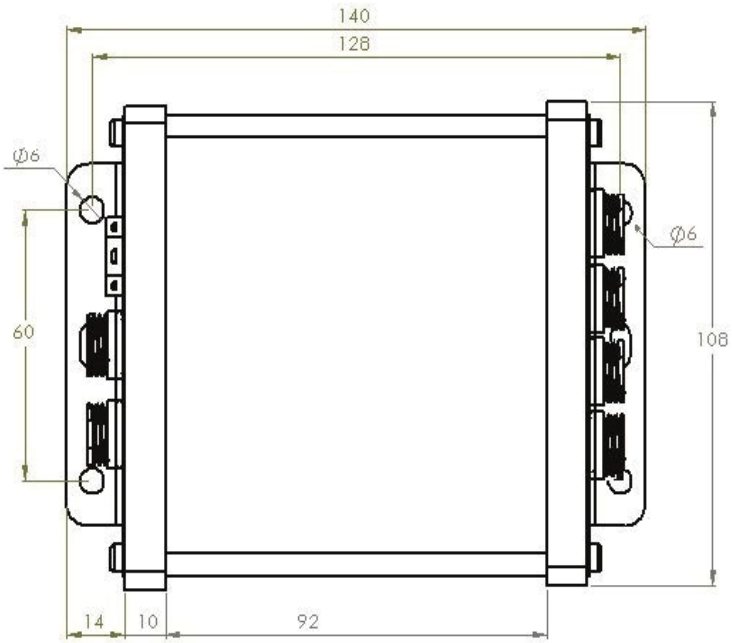
SEVEN provides 5-year warranty certificate against manufacturer defects for each sensor box. The certificate will be delivered with products. This certificate does not cover loss or damages due to incorrect usage of the sensor box.
SEVEN Sensor Box should not be opened, the fact that will cause the termination of the warranty conditions.

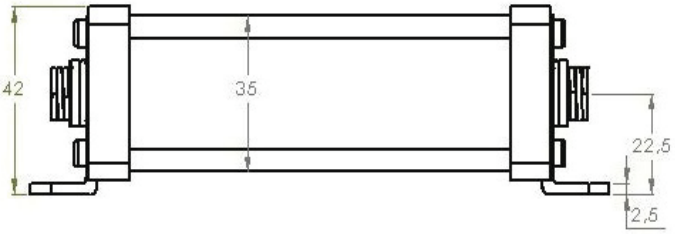
TECHNICAL DATA

General Information	
Operating Temperature	*-40 °C to +90 °C*
Cable Kind	*3 m LIYYC11Y PUR Cable , UV and weather resistant*
Power Supply	*12 to 30 VDC (30 mA typically at 20 VDC)*
Interface / Communication	*RS485 up to 19200 Baud*
Protocol	*The sensor box is connected via a 2-wire RS485 bus with open vendor-independent Modbus RTU Protocol, Sunspec compliant*
Galvanic Isolation	*1000 V between power supply and RS485 bus*
Sensor Box	*Advanced weatherproof junction box made of UV resistant material*
Dimensions , Weight	*108 mm x 140 mm x 42 mm, approx 300 g*
Protection	*IP54 (IP65, IP68 options)*
Electrical Connections	
Brown	*Power (+)*
White	*Power (-)*
Green	*RS485 A / Data (+)*
Yellow	*RS485 B / Data (-)*
Input 1	*Ambient or Module Temperature Sensor (PT1000), 4 pin connector*
Input 2	*Ambient or Module Temperature Sensor (PT1000), 5 pin connector*
Input 3	*Ambient or Module Temperature Sensor (PT1000), 4 or 5 pin connector*
Input 4	*3S-WS-PLS, Wind speed Sensor, 2 pin connector*
Input 5	*3S-WD, Wind Direction Sensor, 3 pin connector*
Input 6	*3S-RH&AT, Relative Humidity&Ambient Temperature Sensor, 7 pin connector.*
Output	*Power and Communication, 6 pin connector*
Others	
Warranty	*5 years Limited warranty against manufacturer defects. Opening of the sensor box by the user or installation staff is not accepted. Opening of the sensor box is one of the reason of terminating the warranty conditions.*
Modbus Spesification	
Baud Rate	*4800 , 9600 , 19200 , 38400*
Parite	*None , even , odd*
Stop Bit	*1, 2 (only none porite)*
Factory Defaults	*9600 Baud , 8N1 , Address : 1*

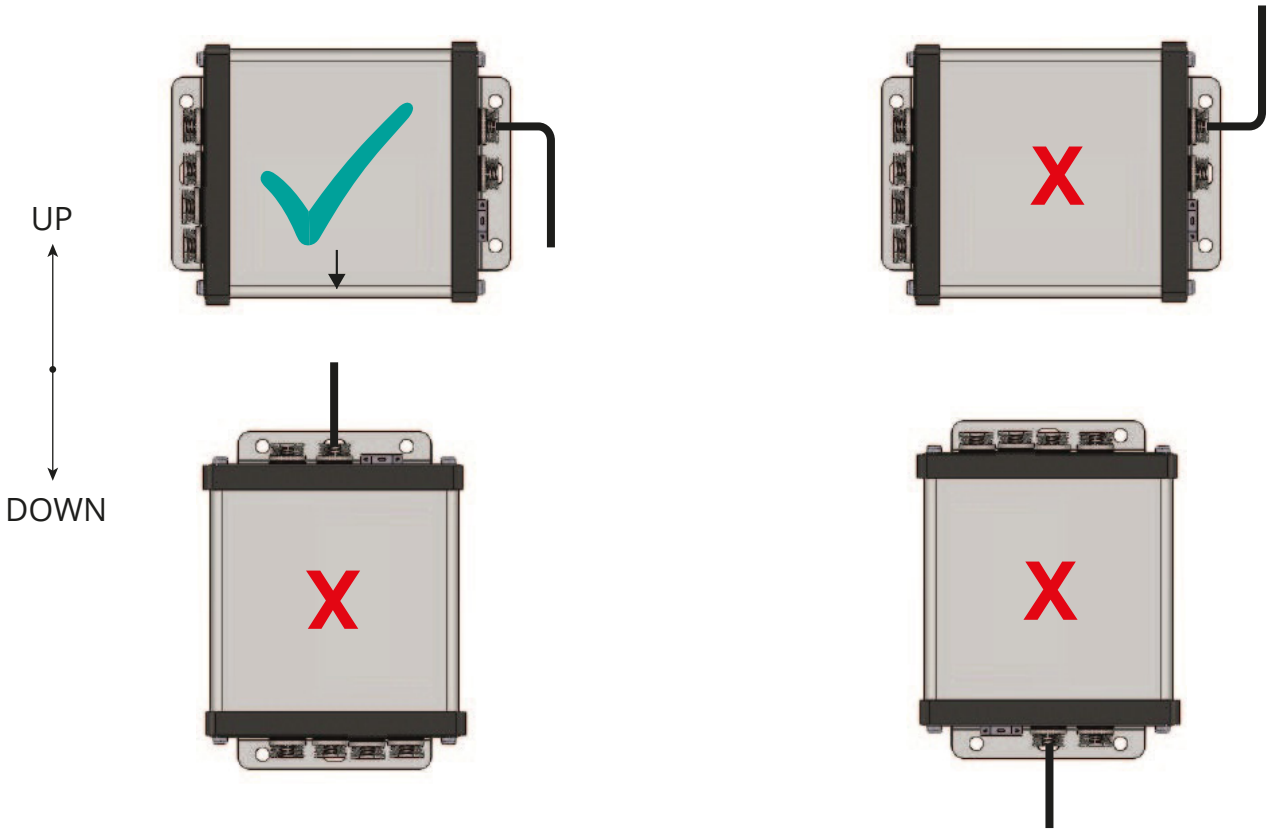
NOTE! The temperature sensor ports are suitable for both module and ambient temperature sensors. So for example, 3 Module Temperature Sensors can be connected in case the Ambient Temperature is not needed .

DIMENSIONS OF THE SENSOR BOX

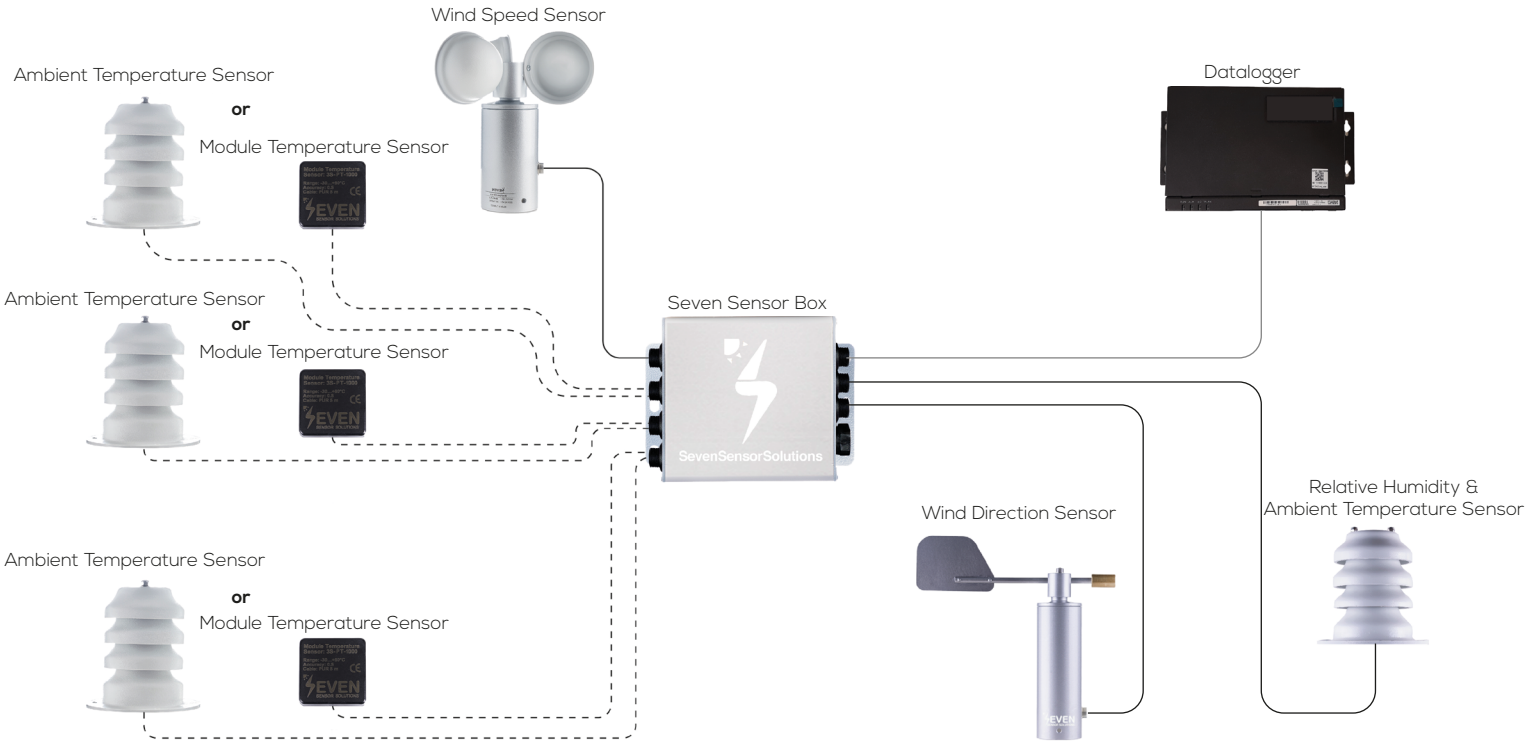




MOUNTING INSTRUCTIONS



SELECTION OF SENSORS

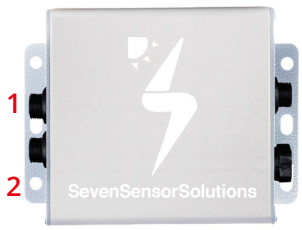


RELATED PRODUCTS

3S-WS-PLS	Wind Speed Sensor, reed contact, pulse; pin connection 2
3S-WD	Wind Direction Sensor, Potentiometer output, pin connection 3
3S-MT-PT1000	Module Temperature Sensor, PT1000, pin connection 4
3S-AT-PT1000	Ambient Temperature Sensor, PT1000, pin connection 5
3S-RH&AT	Relative Humidity & Ambient Temperature Sensor, Digital output, pin connection 7

SEVEN SENSOR BOX MODELS

Model: 3S-C2-2 *Sensor Box with two sensors connections*



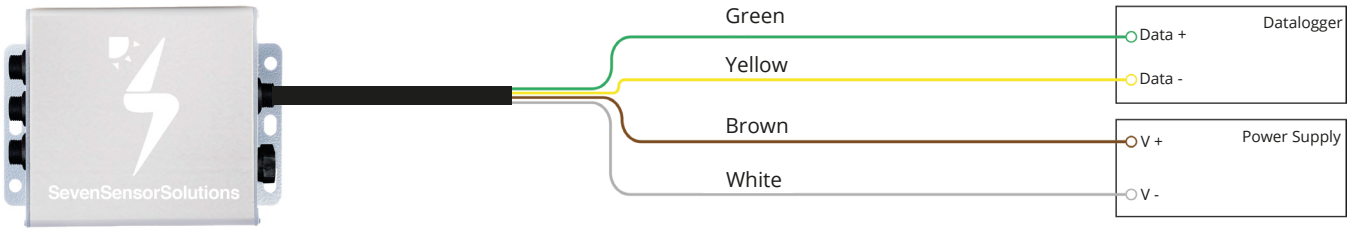
Model: 3S-C2-3 *Sensor Box with three sensors connections*

Model: 3S-C2-4 *Sensor Box with four sensors connections*

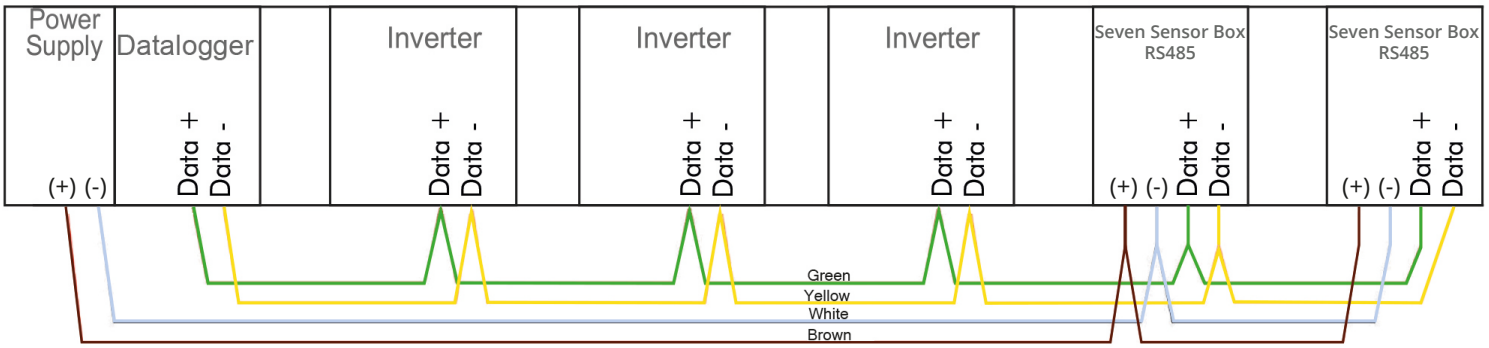
Model: 3S-C2-5 *Sensor Box With five sensors connections*

Model: 3S-C2-6 *Sensor Box with six sensors connections*

SENSOR BOX DATALOGGER CONNECTION



BUS TOPOLOGY



INSTALLATION

SEVEN Sensor Boxes are designed with Plug & Run principle. The Sensor Box has waterproof pin connectors. Each sensor has different pin configuration, so wrong connection is not possible. Follow SEVEN instructions for cable connection to dataloggers.

SEVEN provides mounting features or mounting brackets for all the products. End user will be responsible for just providing and fastening the screws for brackets.
The sensor cables should be always laid separated from AC/DC cables. The minimum bending radius at cables is 5mm.
The installation and assembly of SEVEN sensors should be carried out by a qualified electrician.

Modbus RTU Specifications

Supported Bus Protocol
BaudRate:4800,9600,19200,3800
Parity: None, Even, Odd
Stop Bit: 1, 2
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
10	0x0A	(SHT21 Temperature) Temp. 4 as 'sign value' -400...+900 (range -40°C ...+90°C) in 0,1°C
15	0x0F	Temp. 1 as 'sign value' -400...+900 (range -40...+90°C) in 0.1°C
16	0x10	Temp. 2 as 'sign value' -400 ... +900 [range -40 ... +90°C] in 0.1°C
17	0x11	Temp. 3 as 'sign value' -400 ... +900 [range -40 ... +90°C] in 0.1°C
18	0x12	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-C2"	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
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