User Manual

S-Box Plus

In order to prevent improper operation before use, please carefully read this manual.

1. Introduction

In most photovoltaic systems, the DC isolator is integrated into the DC/AC power inverter. After switching off the DC isolator, the cables between the DC solar modules and DC/AC power inverter running through the building are still subject to up to 1000 Vdc. In the event of a fire, firefighters are exposed to a very serious source of potential danger. The S-Box Plus provides the solution to this problem. It directly disconnects the DC current in close proximity to the solar modules and creates a safer situation for firefighters.

Basic Features:

- AC power shut down=automatic DC power shut down
- Auto reset when AC power is back=DC power is back
- Easy to install

2. System Advantages

2.1 Easy installation

S-Box Plus can be installed without disassembling the shell.

2.2 Gain valuable time in case of a fire

S-Box Plus works according to standard international firefighter routines, resulting in valuable time lost in AC power is shut down, S-Box Plus will automatically switch off and isolate DC cables running between the PV modules and the inverter. Firefighters only have to follow their regular routine and do not have to waste valuable time eliminating the risk of DC power still present at these cables. In case the AC power is not shut down and the temperature reaches 70°C at the S-Box Plus unit it will automatically shut down the DC power as extra safety system.

2.3 Completely isolate PV modules

S-Box Plus is powered by a motorized X-type switch and can therefore be located directly at the PV modules. This minimizes the amount of cabling with dangerous high voltage and leads to a completely powerless situation in the house, maximizing safety when needed.

2.4 Auto reset

A power down situation can occur at any time and for many reasons. S-Box Plus has an auto reset function. S-Box Plus automatically switches off if the regular AC power is down for more than 6 sec and automatically switches on when the regular AC power is on again. No manual reset is necessary every time the power has been down! After check of the safety situation and when the AC main power is reconnected automatically the S-Box Plus will switch on the DC power.

2.5 For use in industrial and residential photovoltaic installations

By using this standard concept unit for either 1 or 2 strings it is possible to combine unlimited number of units to fix every size of installation. As option it is possible to connect all units to the same AC source in order to create a separate DC on-off operation by switching this specific AC source on-off that will operate all units at the same time. Again, reset is done automatically AC on = DC on, AC off = DC off. These units can be easily retrofitted to existing or new installations.

2.6 Indication of DC switch status

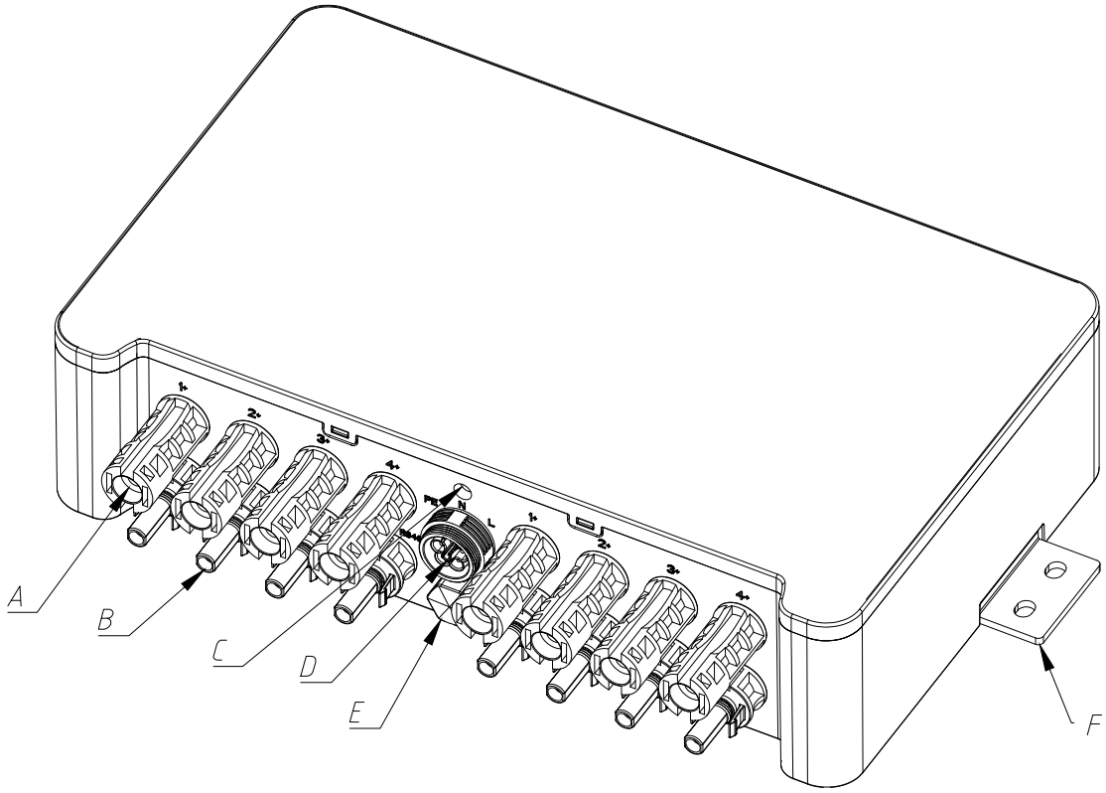
S-Box Plus integrated with status indicator for customers to confirm the switch status.

2.7 RS485

The RS485 interface on the S-Box Plus can provide grid voltage temperature, switching status and other information via external communication.

3. About Product

3.1 Overview



Item	Description
A	PV+
B	PV-
C	LED light
D	Terminal
E	Water proof vent valve
F	Fixed block

A&B. PV+&PV-

C. LED light

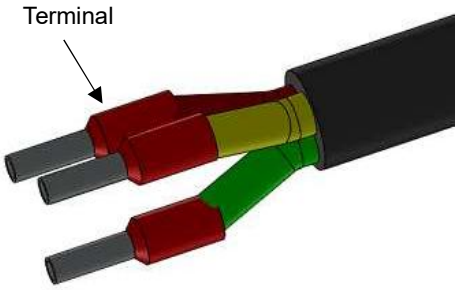
Visual feedback of the switch position: LED will go off when the DC switch goes off; LED will on when the DC switch is on.

D. Terminal

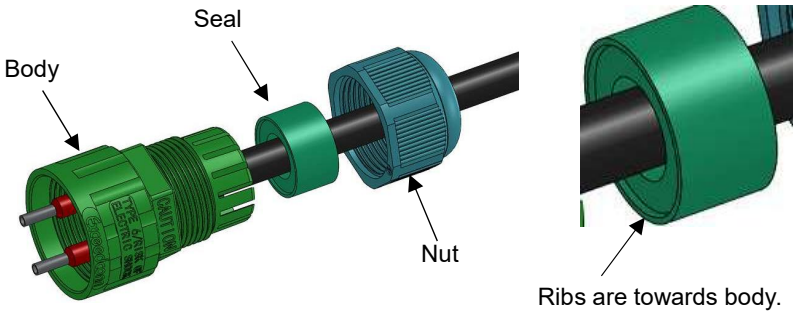
Contains AC input and RS485:

- AC input: Signal input and power supply of the S-Box Plus.
- RS485: RS485 communication consists of interface RS485: A and RS485: B.

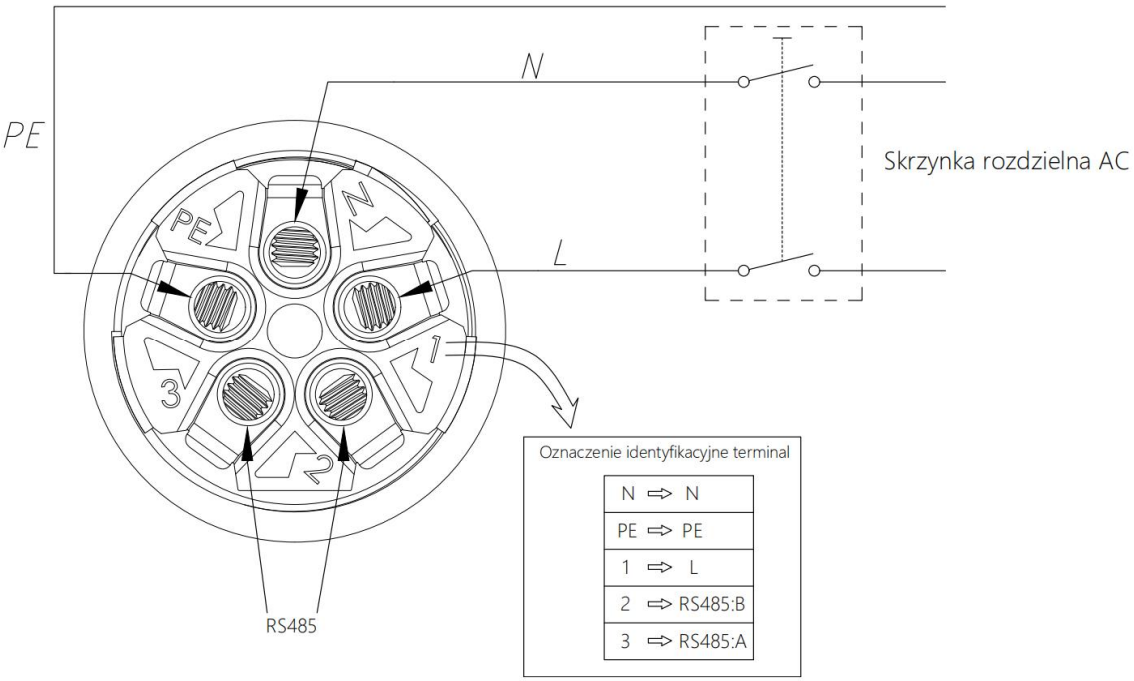
Step 1: Trim the wires and rivet terminal.



Step 2: Insert the parts into the cable.

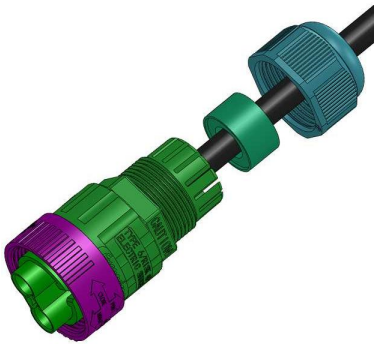


Step 3: Tighten wires as shown in the figure below. Tightening torque 0.6±0.1N·m, then insert cable respectively to pin hole.



Step 4: Screw body to housing, tightening torque 1.2±0.2N·m.

Step 5: Insert seal into body, then tighten the nut, torque 1.5±0.3N·m. The maximum spacing between the nut and the body after tightening is 1.5mm.



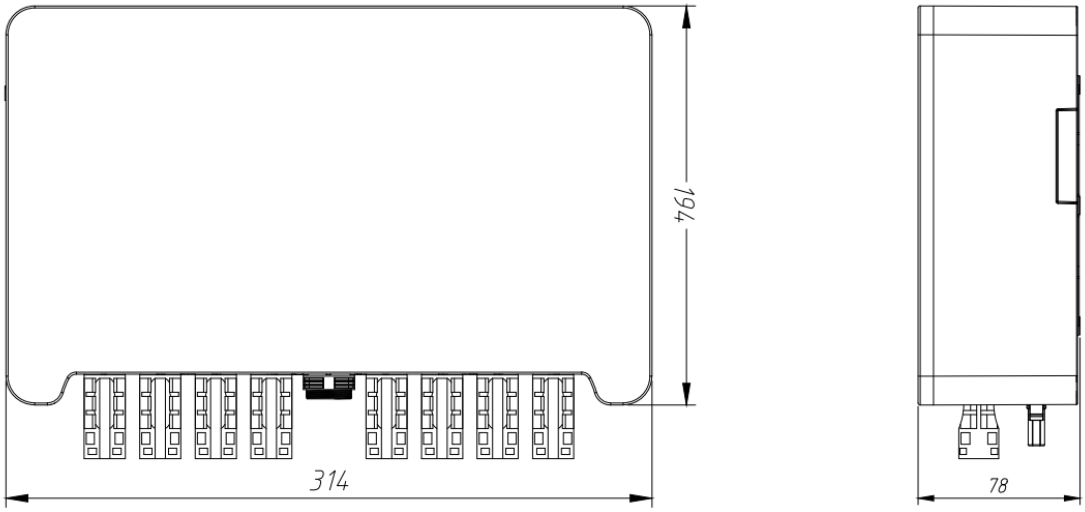
E. Water proof vent valve

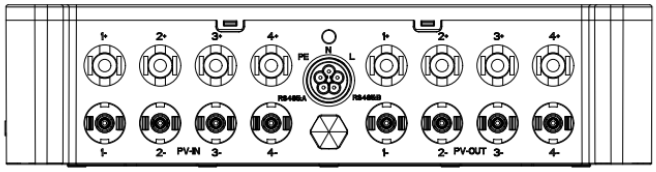
- Prevent condensation and fog, improve the service life.
- Heat dissipation and balance pressure difference, improve product integrity.
- Chemical resistance, high and low temperature resistance, aging resistance. These performances can improve the reliability of products in harsh environment.

F. Fixed block

It is used to install the S-Box Plus.

3.2 Dimensions





4. Technical Parameters

Type S-Box Plus	Number of Strings	Number of Poles	Specs.
S-Box Plus	4	8	Unit pre-wired with 16 * MC4 connectors and 1 * M23 quick connection for AC

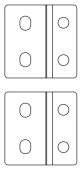
Ratings according to IEC: EN 60947-3:2009/A1:2012/C1:2013/A2:2015 Cat PV-1 based on switching both the + and the - pole:						
VDC	300	600	800	1000	1200	1500
A	25	25	25	25	25	16

Technical Parameter	
String voltages	300~1500 Vdc
String current	25 / 25 / 25 / 25 A
Number of strings	4
Switch wiring	8
Operating voltage	100~270 Vac
Nominal voltage	230 Vac
Nominal current	30 mA
Start up (loading) current	average 100 mA
Switch on action current	max 300 mA
Communication	RS485
Recommended operating temperature range	-20 - +50 °C
Max. operating temperature before automatic switch off	+70 °C
Storage temperature range	-40 - +85 °C
Protection degree	IP66
Protection level	Class II
DC switch disconnect according to	CE
Certification	EN 60947-1&3
Number of mechanical operations	10000 times

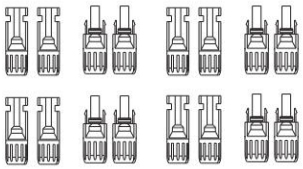
5. Mounting

5.1 Packing List

A



B



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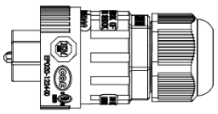


D

E

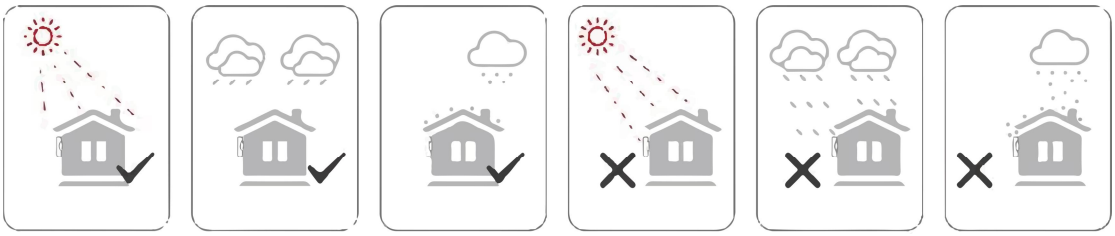
F

G

Object	Quantity	Description	Object	Quantity	Description
A	1	S-Box Plus	E	8	Expansion screws
B	2	Fixed blocks	F	4	Expansion tubes
C	16	PV connectors (8*positive, 8*negative)	G	1	User manual
D	1	Waterproof terminal block			

5.2 Preparation

- Please refer to the Technical Data to make sure the environmental conditions fit the requirements (degree of protection, temperature, etc.).
- Please avoid direct sunlight, rain exposure and snow build-up during installation and operation.
- To avoid overheating, always make sure the air flow around the box is not blocked.
- Do not install in places where gas or flammable substances may be present.
- Avoid electromagnetic interference that can compromise the correct operation of electronic equipment.
- The slope of the wall should be within ±5°.
- The S-Box Plus needs to be placed as close to the solar panels as possible.

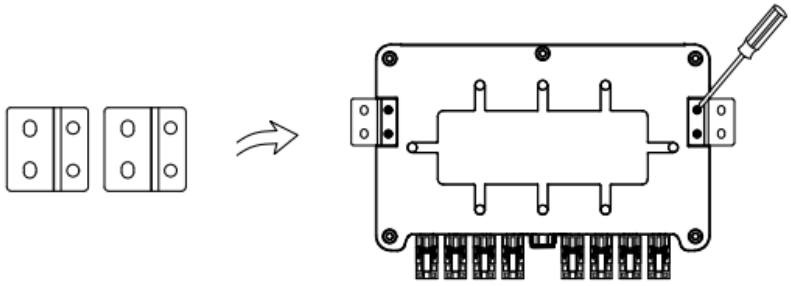


5.3 Tools Required

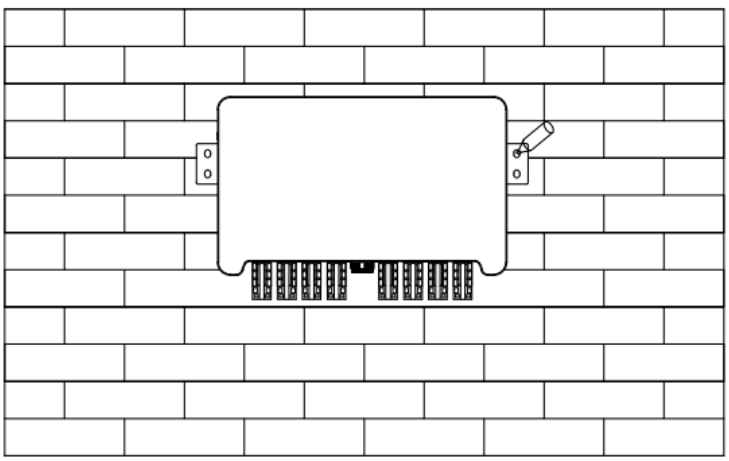
- Manual wrench;
- Electric drill (drill bit set 8mm);
- Crimping pliers;
- Stripping pliers;
- Screwdriver.

5.4 Installation Steps

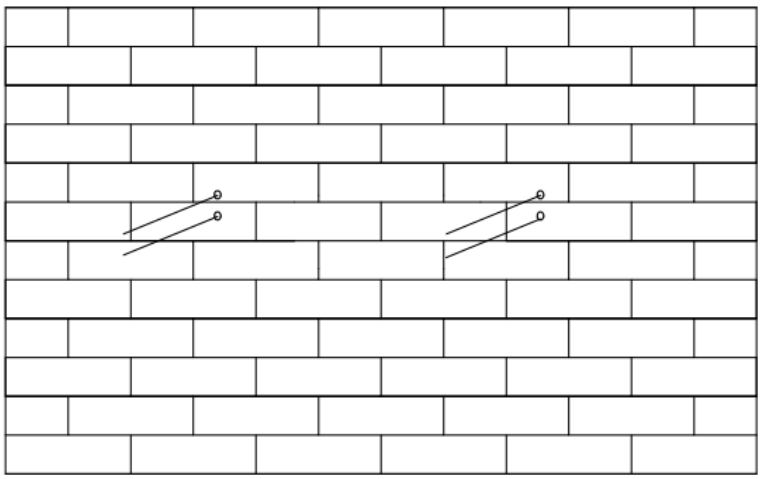
- Prepare two fixed blocks. The two fixing blocks are locked on the box body with M5 self-tapping screw.



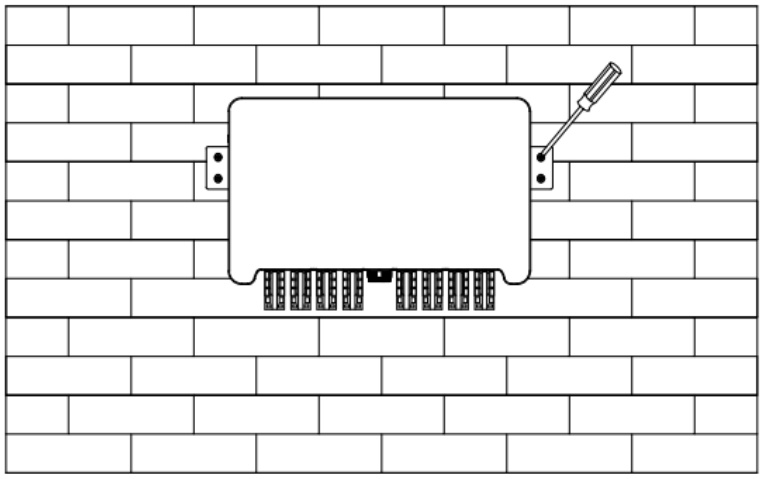
- Choose the place you want to install the S-Box Plus. Place the S-Box Plus on the wall and mark the position of the 4 holes from fixing blocks.



· Drill holes with electric drill, make sure the holes are at least 50mm deep, and then tighten the expansion tubes.



· Insert expansion tubes into the holes and tighten them. Install the fixing blocks with expansion screws.



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