

**ZBENY**



# RAPID SHUTDOWN SAFETY SOLUTION

**ZHEJIANG BENYI NEW ENERGY CO.,LTD.**

Address : Changjiang Rd, Wenzhou Daqiao Industry Park,  
Beibaixiang Town, Yueqing, Wenzhou City, Zhejiang Province, China, 325600  
TEL : +86-577-5717 7008 Email : benyi@zjbeny.com  
VERSION : 20221212

For the latest version of specification, please refer to [www.beny.com](http://www.beny.com) or contact to [benyi@zjbeny.com](mailto:benyi@zjbeny.com)  
We reserve the right to explain the terms of specification.



[WWW.BENY.COM](http://WWW.BENY.COM)





# COMPANY INTRODUCTION

---

BENY new energy offers a reliable and robust electric fast charger with an attractive design that is easy to own and operate, with high quality power electronic components. It is a powerful charging station that can deliver up to 262 kW, with CCS1/CCS2/CHAdemo/AC charging outlets.

We are a leading brand in annually producing hundreds of thousands of quality DC protection products and EV charging stations for complete and reliable solar photovoltaic, battery energy storage, and EV charging system. Certified by UL, SAA, CB, CE, TUV, UKCA, ISO, and RoHS, we have the first listed patented DC switch and produce creative solutions like the AFCI solution for rooftop fire protection, dynamic load balancing, and PEN fault detection EV charger.

# CONTENTS

---

Solar Module Level Rapid Shutdown Safety Solution	01
SunSpec Solar Module Level Rapid Shutdown Safety Solution	13
Fire Fighter Safety Switch for Solar Building	20



# Solar Module Level Rapid Shutdown Safety Solution

BFS Series



- Module Level Rapid Shutdown
- Manual Shutdown by button switch
- Automatic Shutdown on AC Power Loss
- Over temperature Automatic Shutdown
- Compatible with most string inverters and panels
- No cross-talk with inverter or WIFI

## Application

BFS-11/BFS-12/BFS-11B/BFS-12B is a module level rapid shutdown device offers fire safety for solar rooftop and building, remains the rapid shutdown function period the solar PV system whole working life.

Emergency button switch/Rapid Shutdown Monitoring Device is required to initiate the rapid shutdown operating, as a trigger placed on the ground and easier to reach.

The communication cable on the rapid shutdown device should be connected in series and wire to the button switch/Rapid Shutdown Monitoring Device. So the button switch/Rapid Shutdown Monitoring Device can control the BFS rapid shutdown devices.

A communication without cross-talk with the inverter or WIFI source.

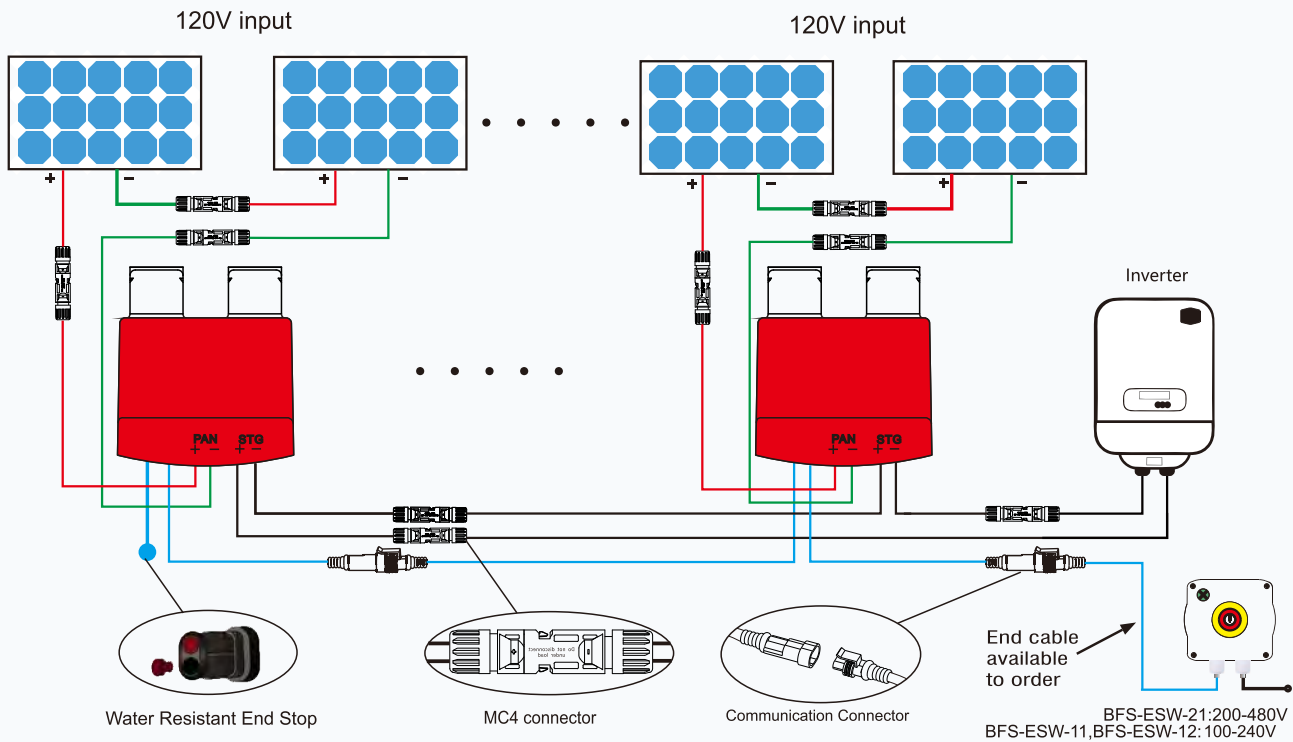


BFS-11 RSD Specifications

Model	BFS-11	
Maximum Input Voltage	120V Single Panel (Voc) or 60V Two Panels (Voc) (Two Panels In Series)	
Maximum Input Current	18A(Isc)	20A(Isc)
Maximum Power	2160W in total	2400W in total
PV Input and Output Cables	4.0mm²(12AWG) Cables + MC4 Connectors	
PV Input Cables Length	180mm	
PV Output Cables Length	1800mm	
IP Protection	IP68	
Operating Temperature	-40°C to +85°C	
Ambient Operating Temperature	-40°C to +55°C	
Standard Compliance	EN 62109-1:2010, EN 61058-1:2018	
PV Connectors	Staubli MC4 (Standard) Jinko connectors for option	

DC Power Supply for each RSD

Voltage Range	14V ~ 28V
Maximum Current	8mA
Maximum Power	0.15W
Power Supply Cables (Signal Cables)	2x0.823mm² (18AWG) Signal Cables + Signal Connectors
Power Supply Cables Length	1800mm

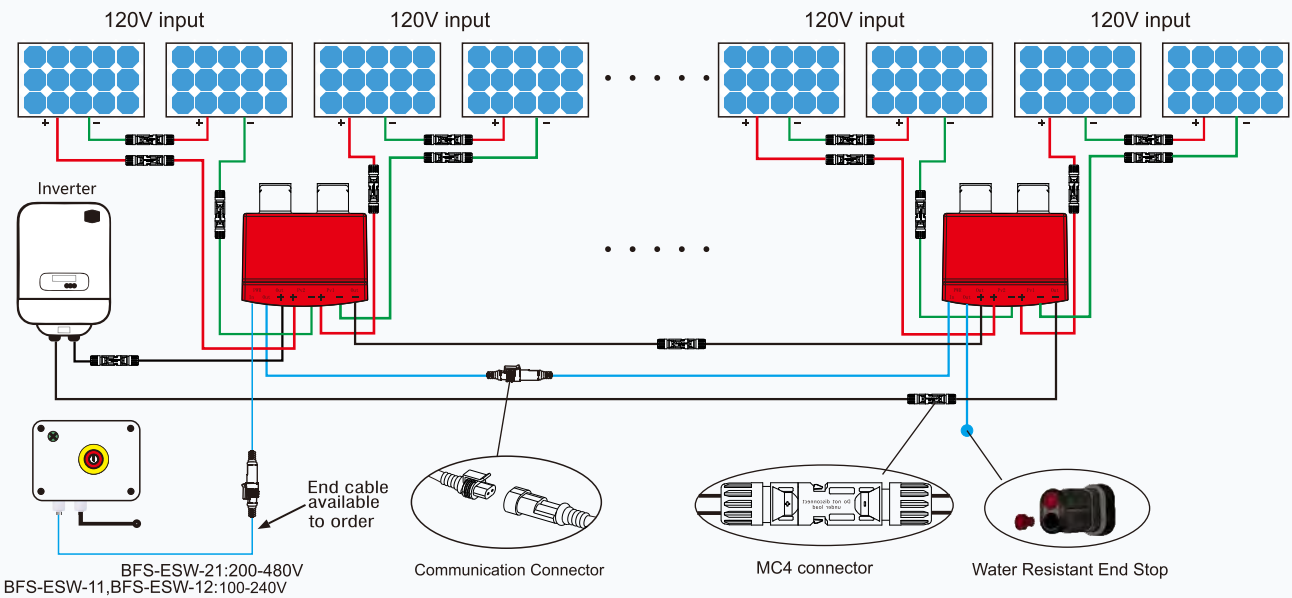


BFS-12 RSD Specifications

Model	BFS-12	
Maximum Input Voltage	240V in total (Input 1 + Input 2)	
Maximum Voltage each Input	120V Single Panel (Voc) or 60V Two Panels (Voc) (Two Panels In Series)	
Maximum Input Current	18A(Isc)	20A(Isc)
Maximum Power	4320W in total (Input 1 + Input 2)	4800W in total(Input 1+ Input 2)
PV Input and Output Cables	4.0mm²(12AWG) Cables + MC4 Connectors	
PV Input 1 Cables Length	180mm	
PV Input 2 Cables Length	300mm	
PV Output Cables Length	1800mm	
IP Protection	IP68	
Operating Temperature	-40°C to +85°C	
Ambient Operating Temperature	-40°C to +55°C	
Standard Compliance	EN 62109-1:2010, EN 61058-1:2018	
PV Connectors	Staubli MC4 (Standard) Jinko connectors for option	

DC Power Supply for each RSD

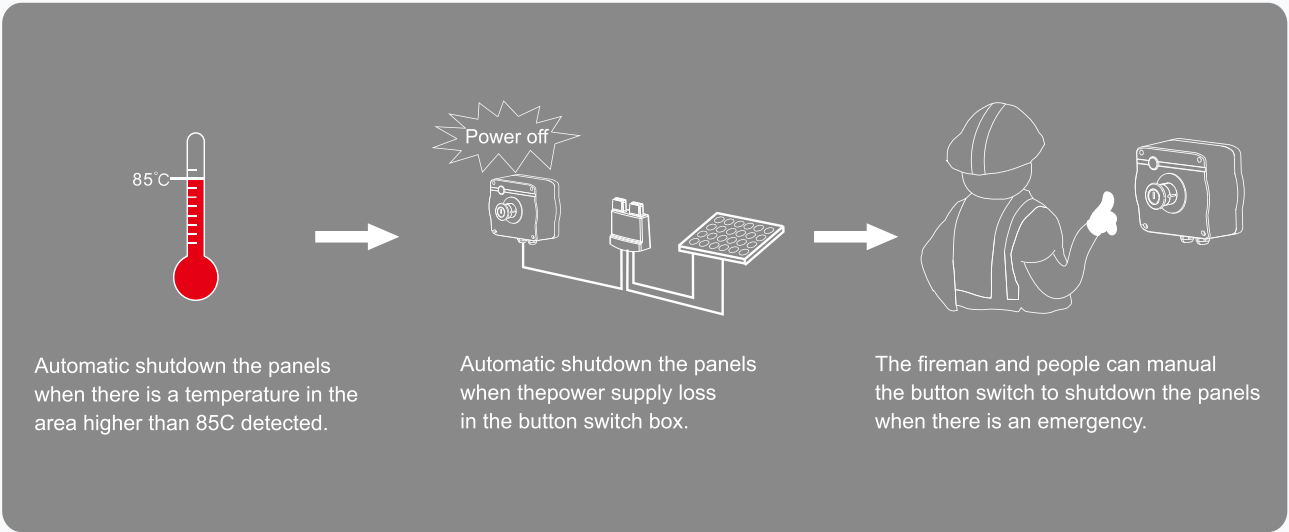
Voltage Range	14V ~ 28V
Maximum Current	12mA
Maximum Power	0.2W
Power Supply Cables (Signal Cables)	2x0.823mm²(18AWG) Signal Cables + Signal Connectors
Power Supply Cables Length	1800mm



Each BFS-11/BFS-12 device can hold solar modules output max: 1200V total, the modules connect in series as solar string goes to inverter as PV system designing. The connection of BFS-11/BFS-12 RSD and button switch is via communication cable.

**Note:** If your market requires NEC2017/NEC2020 requirement, we recommend one RSD BFS-11 connects 1 panel(≥40V) or 2 panels(<40V); BFS-12 connects 2 panels(≥40V) or 4 panels(<40V).

A Complete RSD Solution



Emergency Shutdown Switch



The Emergency Switch offers the manual shutdown of solar panels on the rooftop by pushing the button. AC power from grid or AC side at solar inverter both could be the power source for the emergency switch.

And when the AC power loss, automatically shuts down the DC panels at the meantime. (The green light is ON only indicates the AC power supply is on).

Emergency Button Switch Specifications

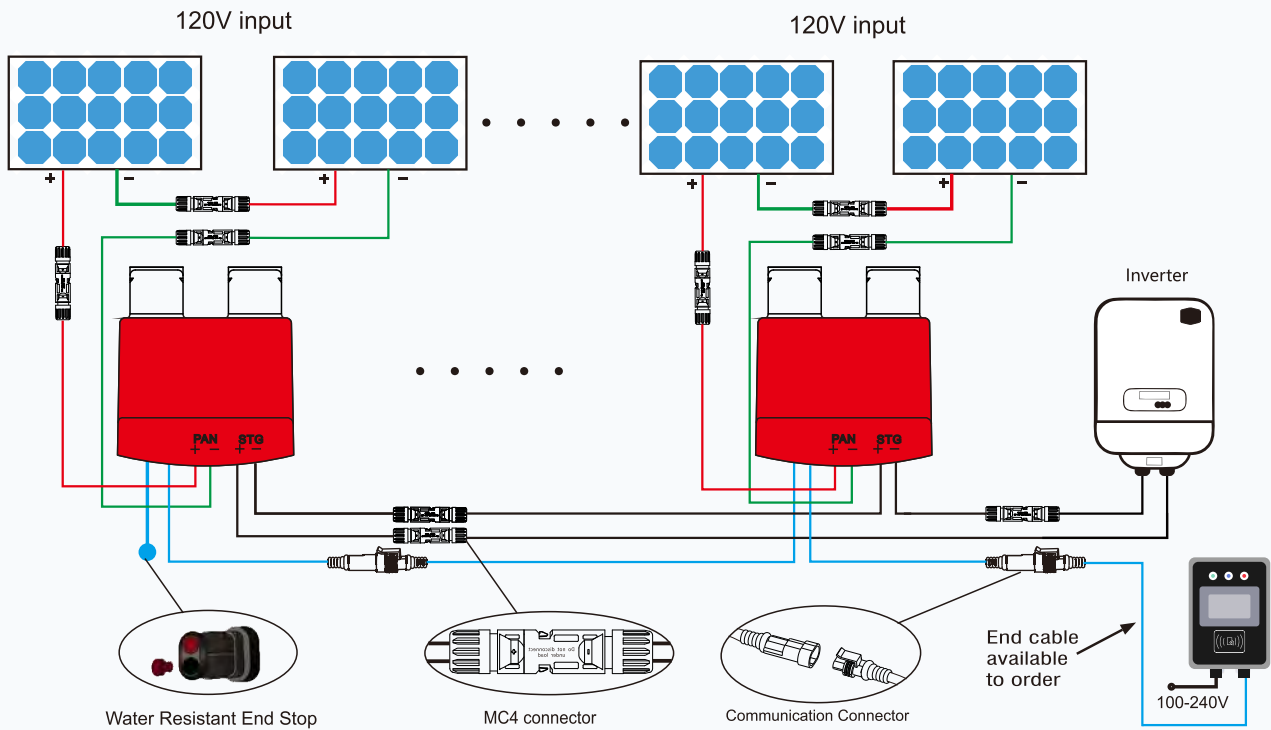
Model	BFS-ESW11(-K)	BFS-ESW12(-K)	BFS-ESW21(-K)
Input Voltage Range	100~240VAC		200V~480VAC
Maximum Working Current	0.5A	0.88A	0.7A
Input Frequency Range	47~63Hz		
Rated Output Voltage	24VDC		
Maximum Output Current	315mA	750mA	1250mA
Maximum Output Power	7.06W	18W	30W
Power Supply Cables	0.823mm² / 18AWG		
Cables Torque	0.5 NM/4.5lbin		
DIN Terminal Connector Wiring	0.5-4mm²/26AWG–10(Note:BFS-11/ BFS-12 uses communication connector 2x0.823mm²)		
DIN Terminal Torque	0.5-0.8Nm/4.5-7lbin		
Ambient Operating Temperature	-30°C to +70°C		-30°C to +85°C
Maximum BFS-11 Units	40 Units	90 Units	90 Units
Maximum BFS-12 Units	20 Units	45 Units	45 Units
Maximum Distance ( First RSD to the Emergency Button Switch )	150m		

BFS-11B RSD With Monitoring

Model	BFS-11B	
Maximum Input Voltage	120V Single Panel (Voc) or 60V Two Panels (Voc) (Two Panels In Series)	
Maximum Input Current	18A(Isc)	20A(Isc)
Maximum Power	2160W in total	2400W in total
PV Input and Output Cables	4.0mm²(12AWG) Cables + MC4 Connectors	
PV Input Cables Length	180mm	
PV Output Cables Length	1800mm	
IP Protection	IP68	
Operating Temperature	-40°C to +85°C	
Ambient Operating Temperature	-40°C to +55°C	
Standard Compliance	EN 62109-1:2010, EN 61058-1:2018	
PV Connectors	Staubli MC4 (Standard) Jinko connectors for option	

DC Power Supply for each RSD

Voltage Range	14V ~ 28V
Maximum Current	15mA
Maximum Power	0.2W
Power Supply Cables (Signal Cables)	2x0.823mm² (18AWG) Signal Cables + Signal Connectors
Power Supply Cables Length	1800mm

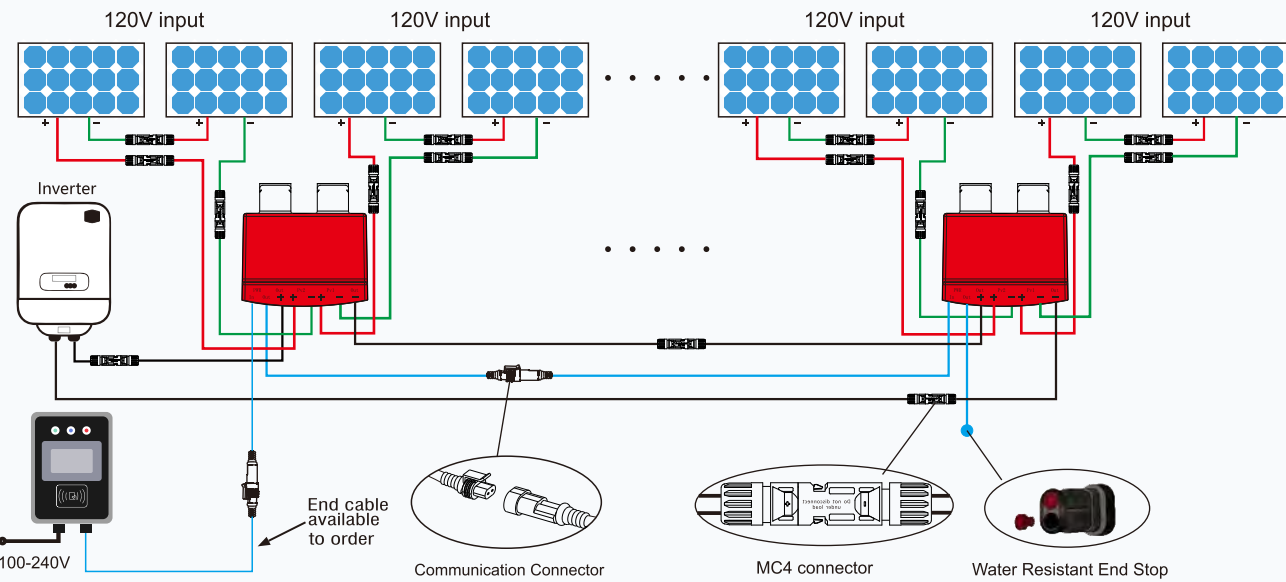


BFS-12B RSD With Monitoring

Model	BFS-12B	
Maximum Input Voltage	240V in total (Input 1 + Input 2)	
Maximum Voltage each Input	120V Single Panel (Voc) or 60V Two Panels (Voc) (Two Panels In Series)	
Maximum Input Current	18A(Isc)	20A(Isc)
Maximum Power	4320W in total (Input 1 + Input 2)	4800W in total (Input 1 + Input 2)
PV Input and Output Cables	4.0mm²(12AWG) Cables + MC4 Connectors	
PV Input 1 Cables Length	180mm	
PV Input 2 Cables Length	300mm	
PV Output Cables Length	1800mm	
IP Protection	IP68	
Operating Temperature	-40°C to +85°C	
Ambient Operating Temperature	-40°C to +55°C	
Standard Compliance	EN 62109-1:2010, EN 61058-1:2018	
PV Connectors	Staubli MC4 (Standard) Jinko connectors for option	

DC Power Supply for each RSD

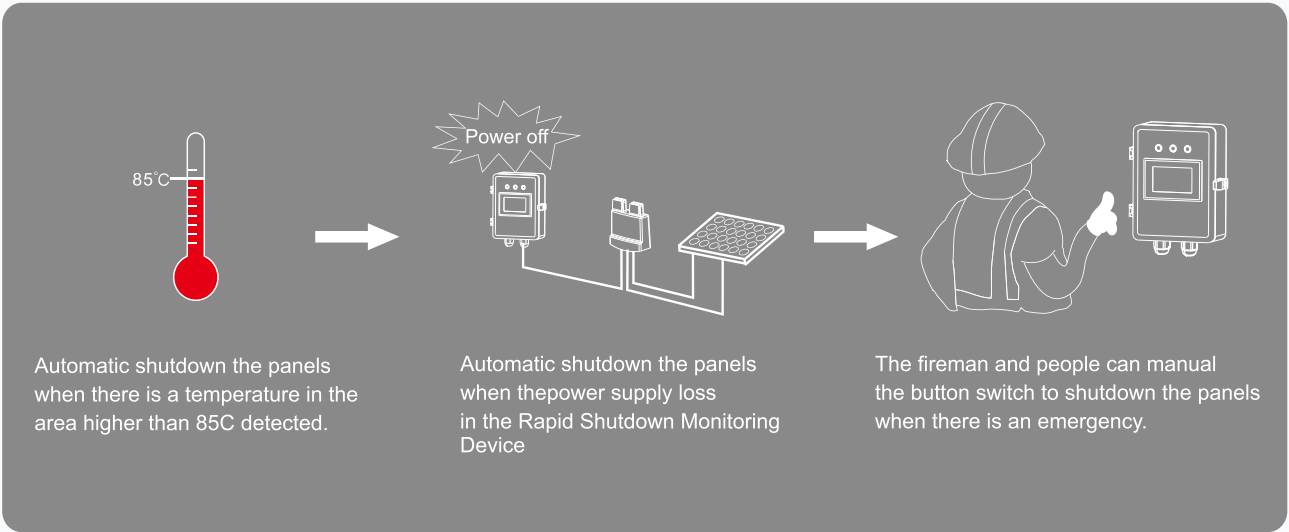
Voltage Range	14V ~ 28V
Maximum Current	20mA
Maximum Power	0.3W
Power Supply Cables (Signal Cables)	2x0.823mm²(18AWG) Signal Cables + Signal Connectors
Power Supply Cables Length	1800mm



Each BFS-11B/BFS-12B device can hold solar modules output max: 1200V total, the modules connect in series as solar string goes to inverter as PV system designing. The connection of BFS-11B/BFS-12B RSD and Rapid Shutdown Monitoring Device is via communication cable.

**Note:** If your market requires NEC2017/NEC2020 requirement, we recommend one RSD BFS-11B connects 1 panel(≥40V) or 2 panels(<40V); BFS-12B connects 2 panels(≥40V) or 4 panels(<40V).

A Complete RSD Solution



Rapid Shutdown Monitoring Device



Rapid Shutdown Monitoring Device can simultaneously monitor the failure and communication status of multiple Rapid Shutdown Devices.

AC power from grid or AC side at solar inverter both could be the power source for the Rapid Shutdown Monitoring Device.

And when the AC power loss, automatically shuts down the DC panels at the meantime.

Rapid Shutdown Monitoring Device Specifications

Product Model	BFS-MH-01
Rated Working Voltage	100V-240VAC
Communication Mode	POWERBUS
The Maximum Number of Loops	3
The Maximum Number of Strings Per Loop	4
The Maximum On-load Per String	45
The Maximum Communication Distance	1000 meter
Polling Speed	4 times per second is for each channel, and 12 times per second can be achieved when three channels work simultaneously.
Display Mode	LCD screen and indicator light
Interactive Mode	Touch screen
Total maximum number of standby	540

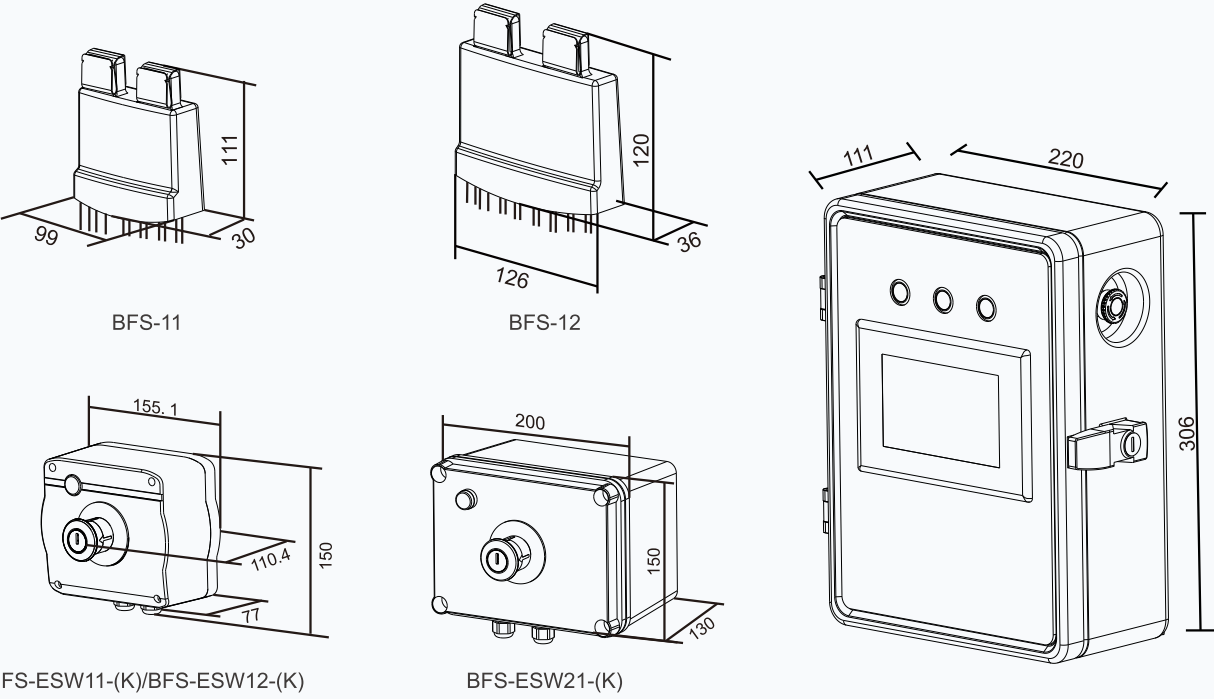


Ordering Information

Model Number	Description
BFS-11	Rapid Shutdown Unit for solar panel(s) 120V input
BFS-12	Rapid Shutdown Unit for solar panel(s) 2 x 120V input
BFS-11B	Rapid Shutdown Unit for solar panel(s) 120V input
BFS-12B	Rapid Shutdown Unit for solar panel(s) 2 x 120V input
BFS-ESW11	Emergency Button Switch for BFS-11/ BFS-12. (100-240V AC power input).
BFS-ESW12	Emergency Button Switch for BFS-11/ BFS-12. (100-240V AC power input).
BFS-ESW11-K	Emergency Button Switch with Key Lock for BFS-11 / BFS-12. (100-240V AC power input).
BFS-ESW12-K	Emergency Button Switch with Key Lock for BFS-11 / BFS-12. (100-240V AC power input).
BFS-ESW21	Emergency Button Switch for BFS-11 / BFS-12. (200V-480V AC power input).
BFS-ESW21-K	Emergency Button Switch with Key Lock for BFS-11 / BFS-12. (200V-480V AC power input).
BFS-MH-01	Rapid Shutdown Monitoring Device for BFS-11B/BFS-12B (100-240V AC power input)
BFS-CCABLE	20m signal cable with female connector for end of string.
BFS-CCABLES	2m signal cable with male and female connectors for between strings or panels.

Install Dimension

Unit: (mm)



CASE STUDY: Philippines with 1.2MW solar installation.



CASE STUDY: Pampanga, Philippines 1.3MW.



# SunSpec Solar Module Level Rapid Shutdown Safety Solution



## Application

The BFS-21 is designed and developed as the most reliable module level rapid shutdown device for solar building fire safety and meeting the NEC requirements. Operates SINGLE standard PV module ( $\geq 40V$ ) or Two modules ( $<40V$ ).

The BFS-21 complies with NEC 2017&2020 690.12 rapid shutdown requirements when work with the SunSpec signal transmitter BFT-01 or an inverter with built-in transmitter, in non-interference with the inverter AFCI.



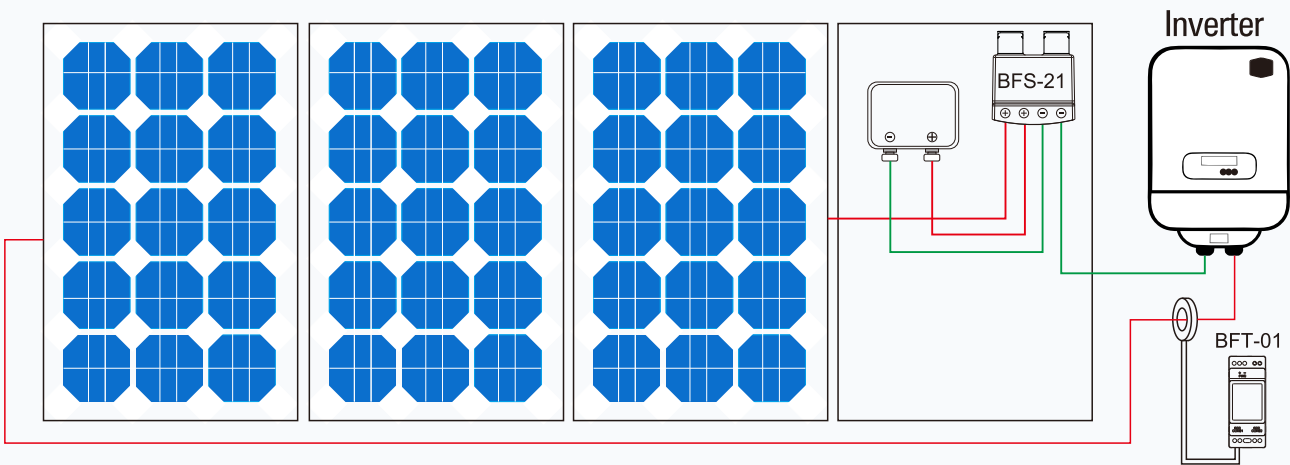
## BFS-21 Specifications

Electrical	
Range of Operatong Voltage:	120V input
Max operating current (A dc):	18A
Max. input power(W):	2160W total
Max. array short circuit current (A dc):	18A
Output DC Voltage(V dc):	120V
Rated Max. output current (A dc):	18A
Communication:	PLC(DC Power Line),SunSpec certicate Microsecond response RSD
Mechanical	
UL 50 E Enclosure Type Rating:	4X
Connectors:	MC4(standard),Jinko connectors for option
Input Cable Length:	180mm
Output Cable Length:	1800mm
Weight:	600g
Environmental	
Operating Temperature:	-40°C to +80°C
Ambient Operating Temperature:	-40°C to +55°C
Over Temperature Protection:	85°C
Certicate and Standards:	UL 1741 PVRSS and PVRSE listed , NEC 2014/2017/2020 690.12

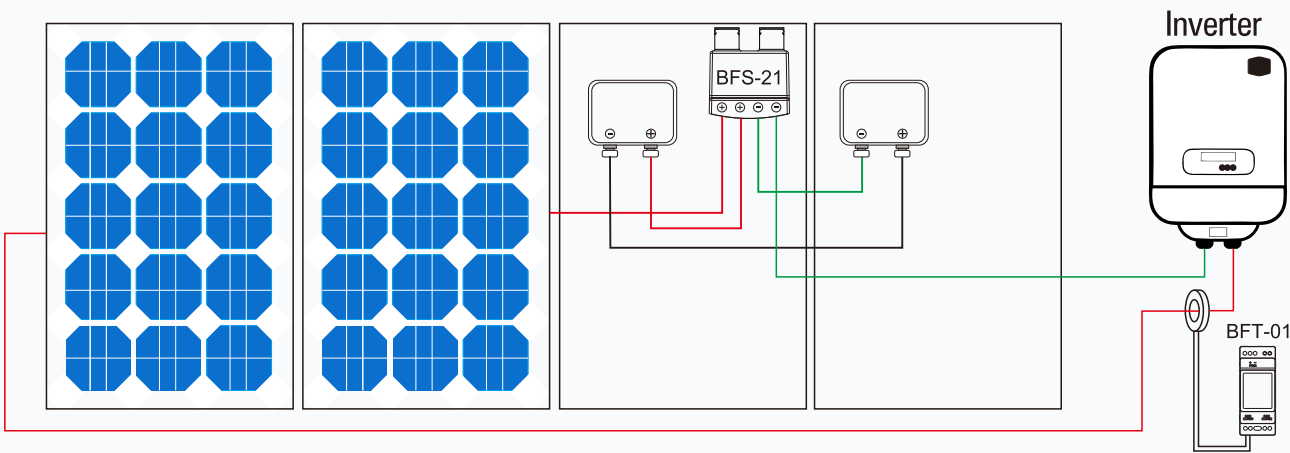
Rapid Shutdown initiate of BFS-21 requires RSD transmitter as a complete solution.

**How to intall the RSD:**

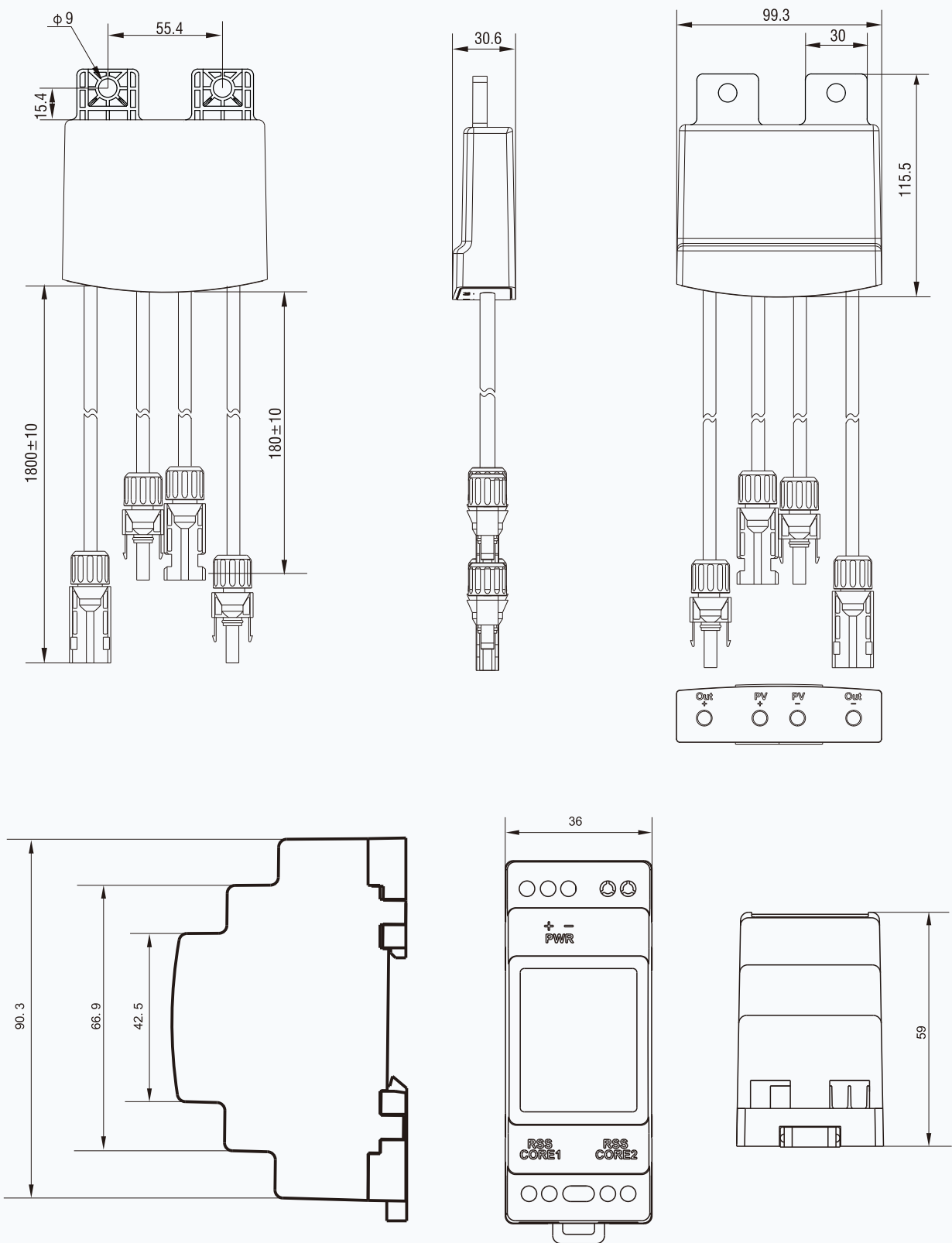
Panel Voltage≥40V



Panel Voltage<40V



**Dimension**







Application

The BFS-22 is designed and developed as the most reliable module level rapid shutdown device for solar building fire safety and meeting the NEC requirements. Operates TWO standard PV module ( $\geq 40V$ ) or FOUR modules ( $< 40V$ ).

The BFS-22 complies with NEC 2017&2020 690.12 rapid shutdown requirements when work with the SunSpec signal transmitter BFT-01 on an inverter with built-in transmitter, in non-interference with the inverter AFCI.



BFS-22 Specications

Electrical

Range of Operatong Voltage:	120V per input(total 2 inputs)
Max operating current (A dc):	18A
Max. input power(W):	2160W per input (total 2 inputs)
Max. array short circuit current (A dc):	18A
Output DC Voltage(V dc):	240V
Rated Max. output current (A dc):	18A
Communication:	PLC(DC Power Line),SunSpec certicate Microsecond response RSD

Mechanical

UL 50 E Enclosure Type Rating:	4X
Connectors:	MC4(standard),Jinko connectors for option
Input Cable Length:	PV1:180mm; PV2:160mm
Output Cable Length:	1800mm
Weight:	715g

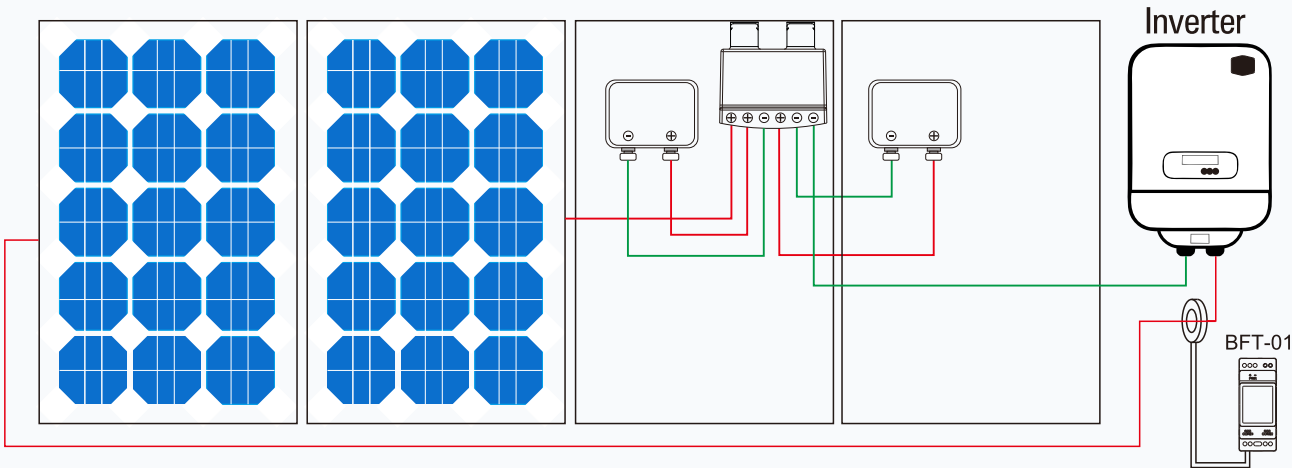
Environmental

Operating Temperature:	-40°C to +80°C
Ambient Operating Temperature:	-40°C to +55°C
Over Temperature Protection:	85°C
Certicate and Standards:	UL 1741 PVRSS and PVRSE listed , NEC 2014/2017/2020 690.12

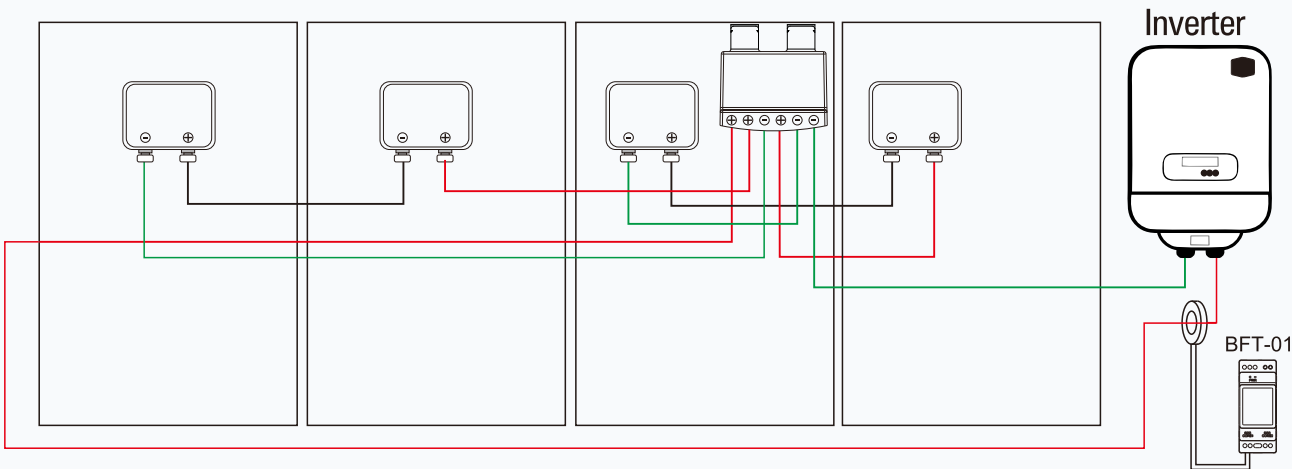
Rapid Shutdown initiate of BFS-22 requires RSD transmitter as a complete solution.

How to intall the RSD:

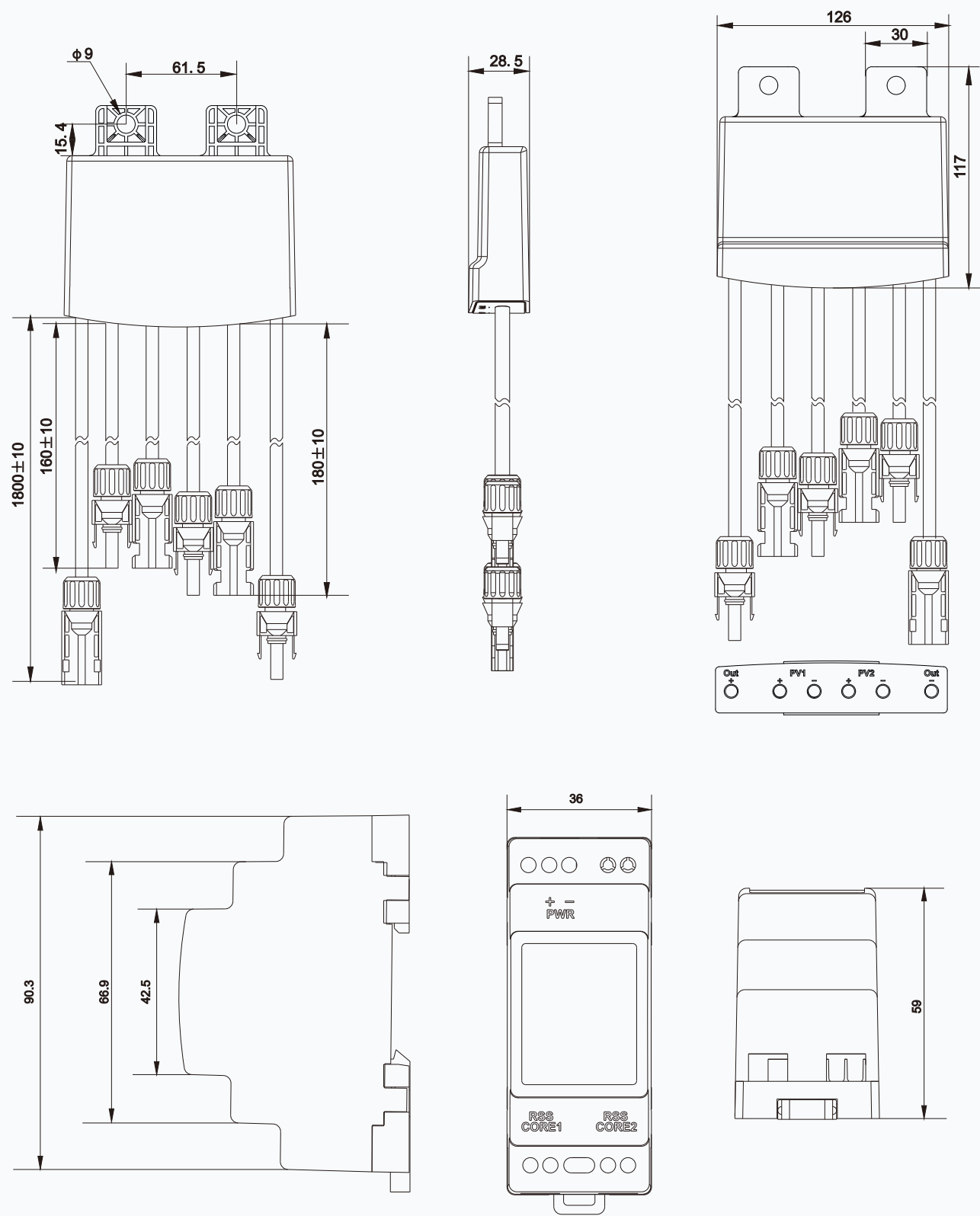
Panel Voltage $\geq 40V$





Panel Voltage $< 40V$



Dimension



# Fire Fighter Safety Switch for Solar Building

-  Automatic DC Power Shutdown
-  AC Power Manual Shutdown






Application

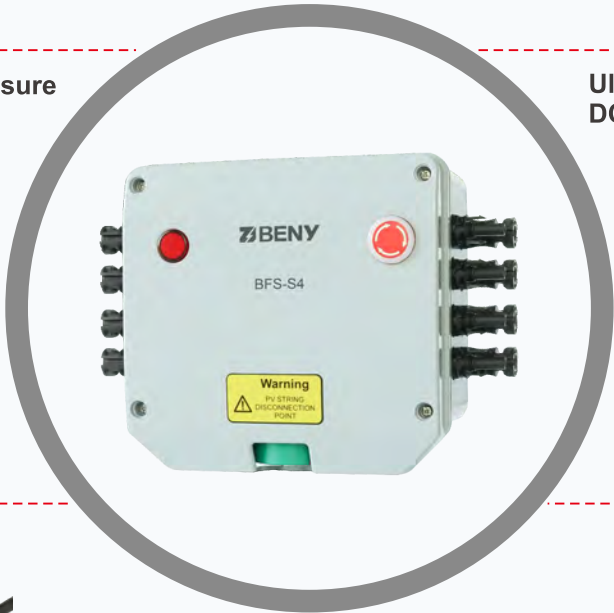
**ZBENY** The BFS-S Series Firefighter Safety Switch is a DC Isolation Solution for solar rooftop fire safety, providing DC power mechanical and complete isolation in the event of a fault. Make a safe area and operating space to protect the firefighter from DC electric shock. As the firefighter cut off the AC power in the house, the safety switch will disconnect the DC power at the sametime.

- String Level Rapid Shutdown
- Up to 1500VDC, 50A per string
- Plug and Play for easy installation
- No cross-talk with inverter or Wifi
- Compatible with most string inverters and panels




Features

IP66 Aluminum enclosure with breathing valve






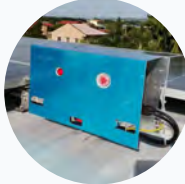
UI508i listed and IEC PV2 DC switch built-in







Genuine MC4 Plug and Play



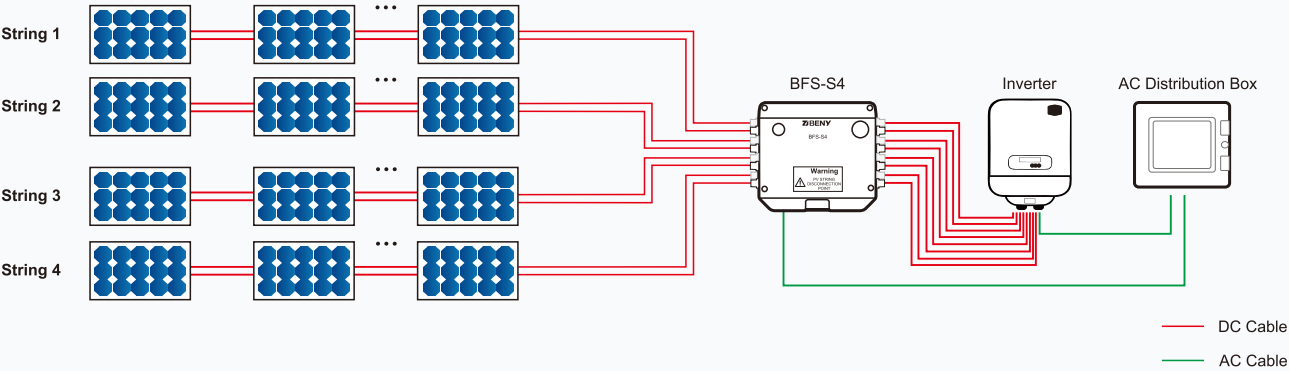
Protection cover for rooftop installation is available



Specifications

Models	BFS-S			
Models	BFS-S1	BFS-S2	BFS-S3	BFS-S4
Number of Strings	1 string	2 strings	3 strings	4 strings
				
Max String Voltage(Vdc)	300V-1500V			
Max String Current(A)	50A			
Operating Voltage	90Vac-260Vac			
Nominal Voltage	230Vac			
Nominal Current	30mA			
Start up Current	Average 100mA			
Switch on Action Current	Max 300mA			
Standard Compliance	IEC / EN 60947-3			
Protection Degree	IP66			
Storage Temperature Allowed Between	-40℃~+85℃			
Operating Temperature Range	-20℃~+50℃			
Maximum Operating Temperature Before Automatic Switch OFF	+85℃			
Protection Level	Class II			
Mechanical Endurance	9700			
Electrical Endurance	300			

Diagram



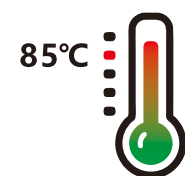
## How the solution works?

- DC Cable +
- DC Cable -
- AC Cable



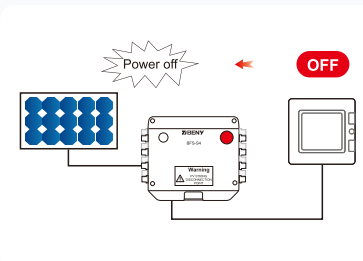
## Shutdown Mode

### Automatic Shutdown When Over Temperature



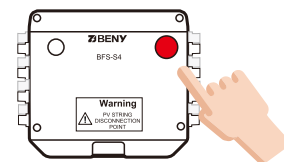
Automatically OFF the DC Power, when temperature inside of BFS-S enclosure  $\geq 85^{\circ}\text{C}$ .  
Once temperature drop to  $\leq 75^{\circ}\text{C}$ , DC power will be back automatically.

### Automatic Shutdown When AC Power Loss



Automatically OFF the DC Power, when AC Power is loss accidentally or manually turn off by firefighter, so to make safety zone for firefighters.  
Once AC Power is back, DC Power will be back automatically.

### 100% Shutdown By Emergency Button



Press the emergency button to keep DC Power 100% OFF even when AC Power is back, so to keep a total safety zone for firefighters.

## Dimensions

