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VERSION : 20240815

RAPID SHUTDOWN SAFETY SOLUTION

WWW.BENY.COM

COMPANY INTRODUCTION

Experience innovation with our leading brand. We produce cutting-edge DC protection products, rapid shutdown safety solution, EV charging stations, and more. Our products ensure reliability and performance for solar photovoltaic, battery energy storage, and EV charging systems. We hold certifications from renowned organizations such as UL, SAA, CB, CE, TUV, UKCA, ISO, and RoHS. Our patented DC switch is an industry first.

Explore our groundbreaking solutions, including AFCI for rooftop fire protection, dynamic load balancing, and PEN fault detection EV charger. Join us at the forefront of energy technology and discover limitless possibilities.

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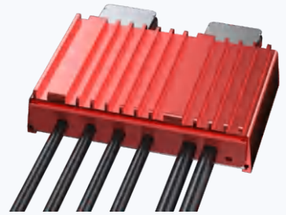
Module Level Rapid Shutdown

BFS-A1/A2 Basic Version

- Module Level Rapid Shutdown
- Aluminum Enclosure With Higher Safety Level and Better Heat Dissipation Function
- 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

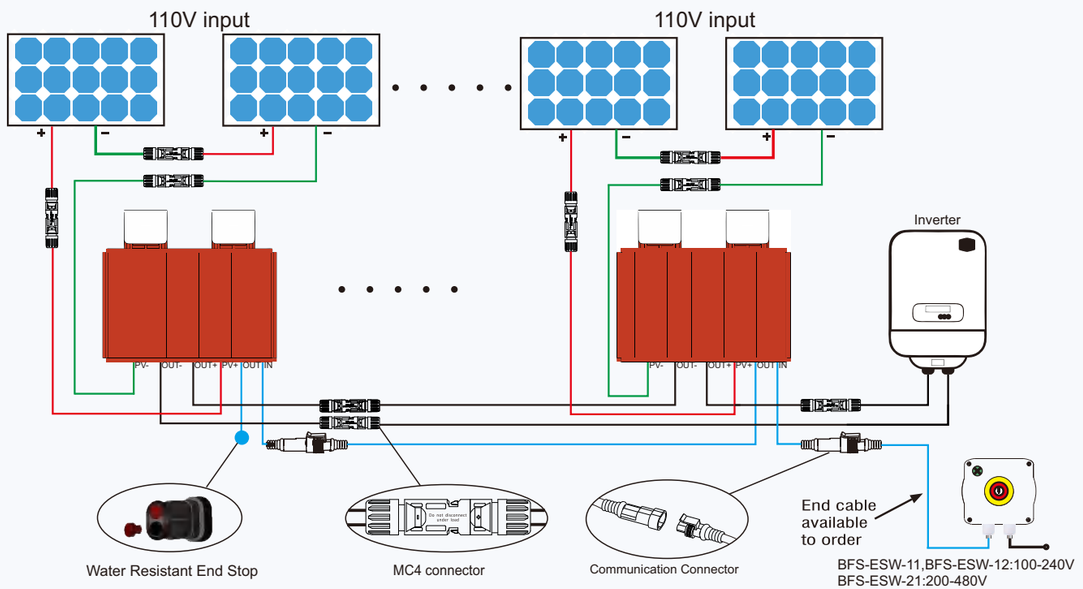
BFS-A1/A2 is a module-level rapid shutdown device designed to ensure safety for roofs and buildings equipped with photovoltaic (PV) systems, preserving rapid shutdown capabilities throughout the system's entire lifespan.

The product incorporates a novel metal casing and a heat dissipation structure, improving the maximum operating temperature, thereby enabling safer and more stable functionality even in extreme environmental conditions. It has industry-leading temperature adaptability, ranging from -40℃ to 85℃.

An emergency button switch is required to initiate the rapid shutdown operation, and the switch can be placed on the ground for easier operation.

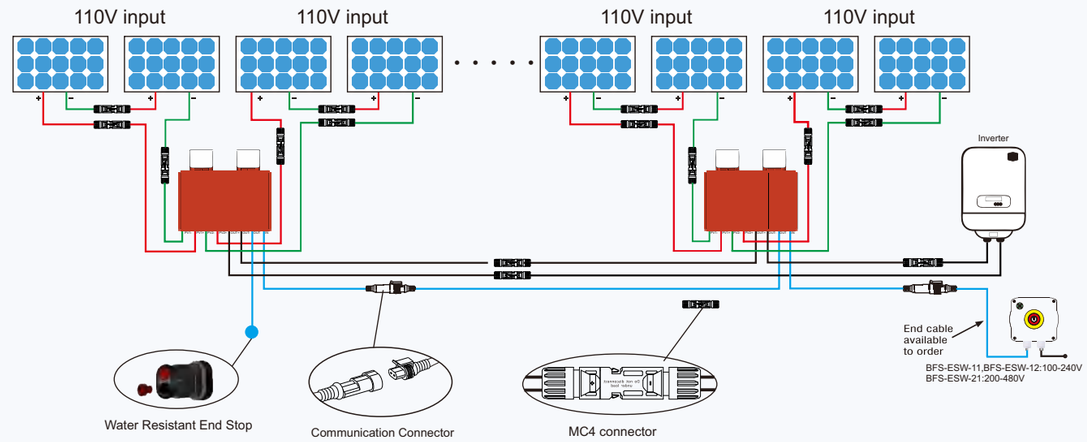
BFS-A1 RSD Basic Version

Model	BFS-A1	
Maximum Input Voltage	110V	70V
Maximum Input Current	20A	25A
Maximum Power	2200W	1750W
PV Input and Output Cables	4.0mm^2 (12AWG) Cables + MC4 Connectors	
PV Input Cables Length	180mm	
PV Output Cables Length	1800mm	
IP Protection	IP68	
Operating Temperature	-40˚C to +85˚C	
Storage Temperature	-40˚C to +85˚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)	2*0.823mm^2 (18AWG) Signal Cables + Signal Connectors	
Power Supply Cables Length	1800mm	
Mechanical		
Enclosure Material	Aluminum	
Dimension	118mm*107mm*42.8mm	



BFS-A2 RSD Basic Version

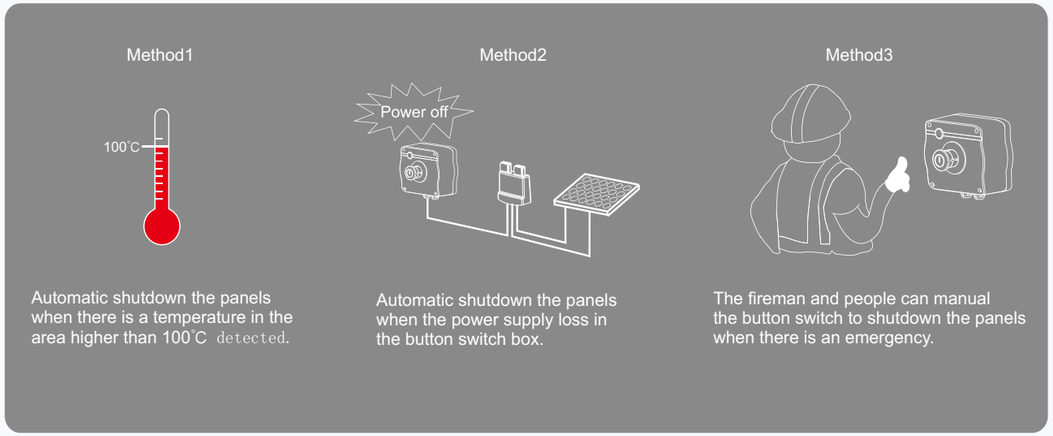
Model	BFS-A2	
Maximum Input Voltage	110V*2	70V*2
Maximum Input Current	20A	25A
Maximum Power(Input1+Input2)	2200W*2	1750W*2
PV Input and Output Cables	4.0mm^2 (12AWG) Cables + MC4 Connectors	
PV Input 1 Cables Length	180mm	
PV Input 2 Cables Length	300mm	
PV Output Cables Length	1800mm	
IP Protection	IP68	
Operating Temperature	-40˚C to +85˚C	
Storage Temperature	-40˚C to +85˚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)	2*0.823mm^2 (18AWG) Signal Cables + Signal Connectors	
Power Supply Cables Length	1800mm	
Mechanical		
Enclosure Material	Aluminum	
Dimension	136mm*116mm*42.8mm	



Each BFS-A1/BFS-A2 device can hold solar modules output max: 1500V total, the modules connect in series as solar string goes to inverter as PV system designing. The connection of BFS-A1/BFS-A2 RSD and button switch is via communication cable.

Note: If your market requires NEC2017/NEC2020 requirement, we recommend one RSD BFS-A1 connects 1 panel(≥40V) or 2 panels(<40V); BFS-A2 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 live on).

Emergency Button Switch Specifications

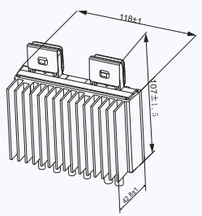
Model	BFS-ESW11(-K)	BFS-ESW12(-K)	BFS-ESW21(-K)
Input Voltage Range	100~240VAC		200V~480VAC
Maximum Working Current	0.5A	0.88A	0.7A
Input Frequency Range	47~63Hz		
Rated Output Voltage	24VDC		
Maximum Output Current	315mA	750mA	1250mA
Maximum Output Power	7.06W	18W	30W
Power Supply Cables	0.823mm² / 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
BFS-11/BFS-A1	40 Units	90 Units	90 Units
BFS-12/BFS-A2	20 Units	45 Units	45 Units
Maximum Distance (First RSD to the Emergency Button Switch)	150m		

Ordering Information

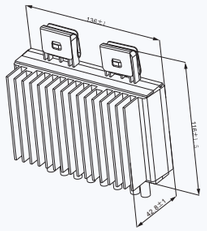
Model Number	Description
BFS-A1	Rapid Shutdowm Unit for solar panel(s)
BFS-A2	Rapid Shutdowm Unit for solar panel(s)
BFS-ESW11	Emergency Button Switch for BFS-A1/BFS-A2.(100-240V AC power input).
BFS-ESW12	Emergency Button Switch for BFS-A1/BFS-A2.(100-240V AC power input).
BFS-ESW11-K	Emergency Button Switch with Key Lock for BFS-A1/BFS-A2. (100-240V AC power input).
BFS-ESW12-K	Emergency Button Switch with Key Lock for BFS-A1/BFS-A2. (100-240V AC power input).
BFS-ESW21	Emergency Button Switch for BFS-A1/BFS-A2.(200V-480V AC power input).
BFS-ESW21-K	Emergency Button Switch with Key Lock for BFS-A1/BFS-A2. (200V-480V 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

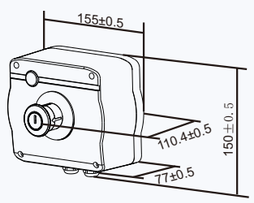
Unit: (mm)



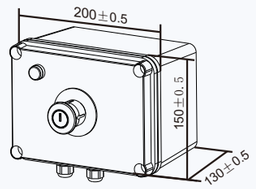
BFS-A1



BFS-A2



BFS-ESW11-(K)/BFS-ESW12-(K)



BFS-ESW21-(K)

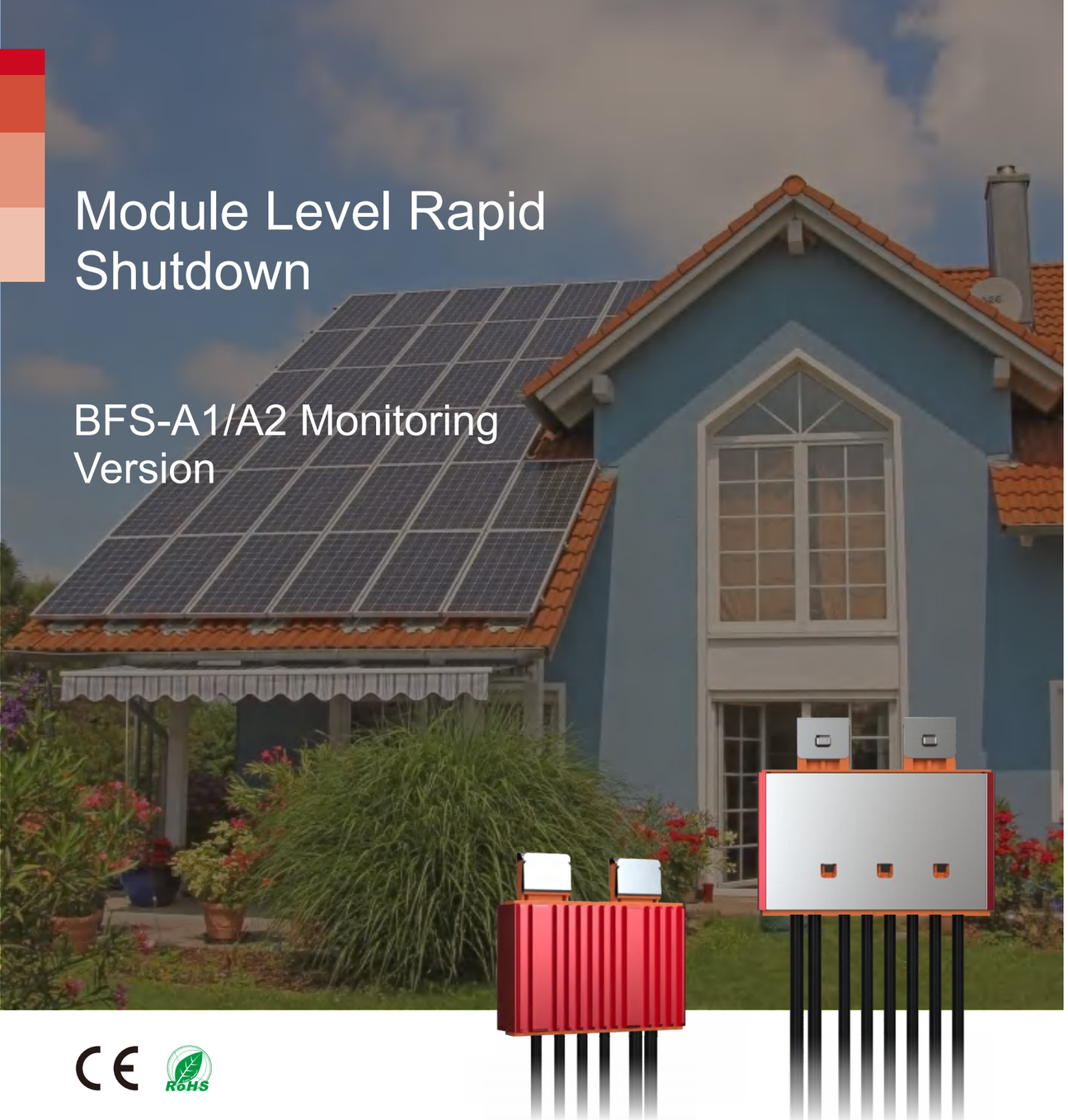
ZBENY

CASE STUDY: Philippines with 1.2MW solar installation.

CASE STUDY: Pampanga, Philippines 1.3MW.

Module Level Rapid Shutdown

BFS-A1/A2 Monitoring Version



CE RoHS

- Module Level Rapid Shutdown With Monitoring Fuction
- Aluminum Enclosure With Higher Safety Level and Better Heat Dissipation Function
- Manual Shutdown by emergency button
- 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

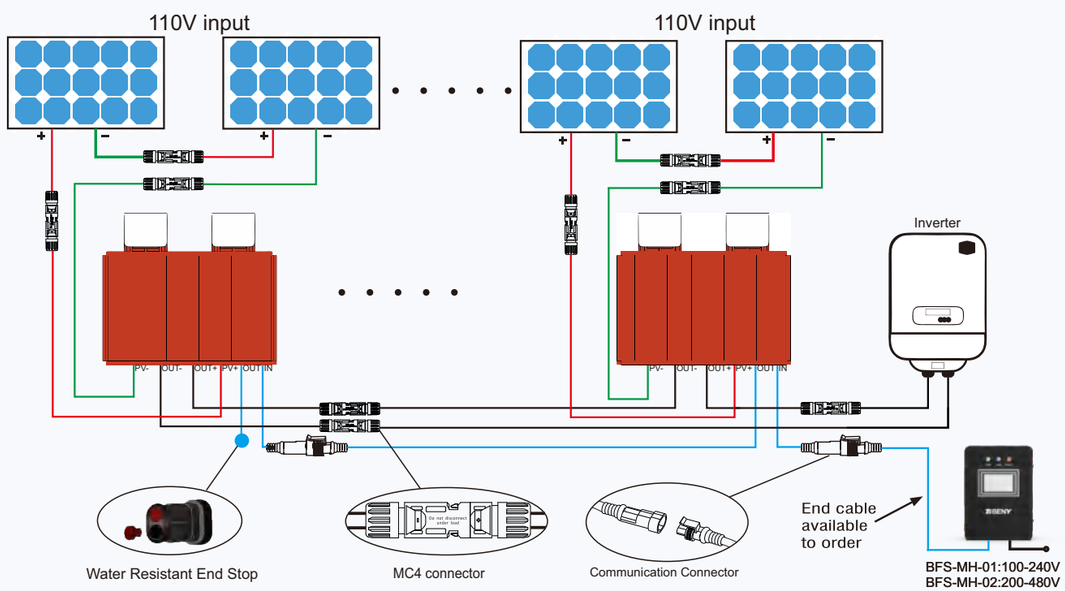
The BFS-A1/A2 Monitor version is a module-level rapid shutdown device designed to enhance fire safety for solar rooftops and buildings. It maintains rapid shutdown functionality throughout the entire lifespan of the solar PV system.

Utilizing a unique POWERBUS communication method, it continuously monitors the temperature, voltage, current, and other data of the Rapid Shutdown Device (RSD) in real-time. This enables immediate observation of RSD status and early detection of issues, facilitating replacement and maintenance, thereby enhancing the safety of the PV power generation system.

The accompanying RSD monitoring equipment is required to utilize monitoring functions. Additionally, the monitoring equipment is equipped with emergency stop functionality alongside its monitoring capabilities.

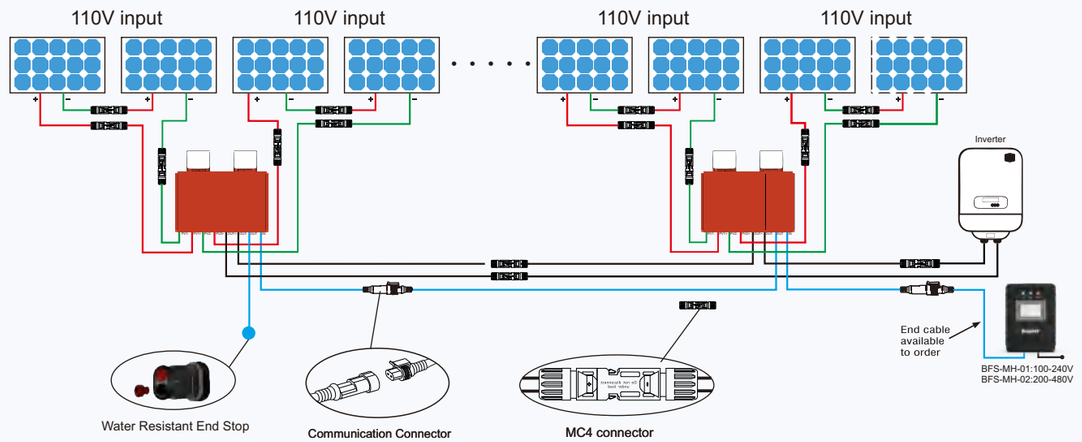
BFS-A1 RSD Monitoring Version

Model	BFS-A1	
Maximum Input Voltage	110V	70V
Maximum Input Current	20A	25A
Maximum Power	2200W	1750W
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	
Storage Temperature	-40˚C to +85˚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)	2 *0.823mm² (18AWG) Signal Cable + Signal	
Power Supply Cables Length	1800mm	
Mechanical		
Enclosure Material	Aluminum	
Dimension	118mm*107mm*42.8mm	



BFS-A2 RSD Monitoring Version

Model	BFS-A2	
Maximum Input Voltage	110V*2	70V*2
Maximum Input Current	20A	25A
Maximum Power(Input1+Input2)	2200W*2	1750W*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	
Storage Temperature	-40˚C to +85˚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)	2 *0.823mm² (18AWG) Signal Cable + Signal Connectors	
Power Supply Cables Length	1800mm	
Mechanical		
Enclosure Material	Aluminum	
Dimension	136mm*116mm*42.8mm	

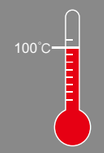


Each BFS-A1/BFS-A2 device can accommodate solar modules with a total max output of 1500V. The modules connect in series as the solar string links to the inverter as will be stated in the PV design. The BFS-A1/BFS-A2 and Rapid Shutdown Monitoring Device are connected via communication cable.

Note: If your market requires NEC2017/NEC2020 requirement, we recommend one RSD BFS-A1 connects 1 panel (≥40V) or 2 panels (<40V); BFS-A2 connects 2 panels (≥40V) or 4 panels (<40V).

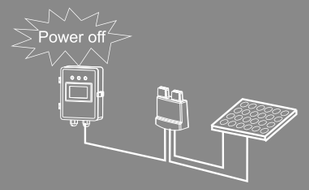
A Complete RSD Solution

Method1



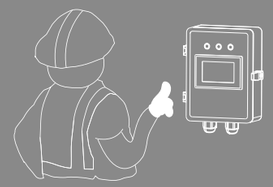
Automatically shuts down the panels when the temperature in the area exceeds 100°C.

Method 2



Automatically shuts down the panels when there is a loss of power in the Rapid Shutdown Monitoring Device.

Method 3



In the case of an emergency, the firefighters can manually shut down the panels via the screen or by pushing the Rapid Shutdown Monitoring Device on the outer box.

Rapid Shutdown Monitoring Device

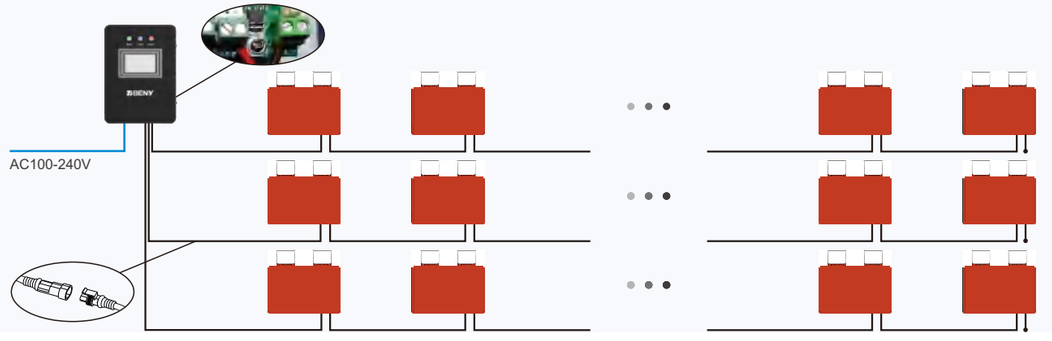
Rapid Shutdown Monitoring Device can simultaneously monitor the failure and communication status of multiple Rapid Shutdown Devices.

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

When there is a loss of AC power, the DC panels will be automatically shutdown.

Rapid Shutdown Monitoring Device Specifications

Product Model	BFS-MH-01	BFS-MH-02
Rated Working Voltage	100V-240VAC	200V-480VAC
Interactive Mode	Touch screen and indicator light	
Maximum Power consumption	180W	
Operating Temperature	-25℃~55℃	
Storage Temperature	-30℃~80℃	
IP Class Protection	IP65	
Overvoltage Category	II	
Maximum Altitude	2000m	
Mechanical		
Dimension	W360*D260*H152.5mm	
Weight	8.2kg	9.1kg
Communication Mode	POWERBUS	
The Maximum Distance: （From the First RSD to the Monitoring Device)	150m	
The Maximum Number of Circuit	3	
The Maximum Number of Strings Per Circuit	4	
The Maximum On-load Per String	BFS-A1:40	
	BFS-A2:20	
Total maximum number of standby	BFS-A1:3*4*40=480	
	BFS-A2:3*4*20=240	
Polling Speed	4 times per second is for each channel, and 12 times per second can be achieved when three channels work simultaneously	

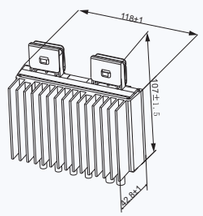


Ordering Information

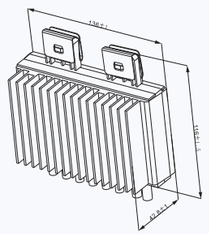
Model Number	Description
BFS-A1	Rapid Shutdowm Unit with Monitoring for solar panel(s).
BFS-A2	Rapid Shutdowm Unit with Monitoring for solar panel(s).
BFS-MH-01	Rapid Shutdown Monitoring Device for BFS-A1/BFS-A2.（100-240V AC input)
BFS-MH-02	Rapid Shutdown Monitoring Device for BFS-A1/BFS-A2.（200-480V AC 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

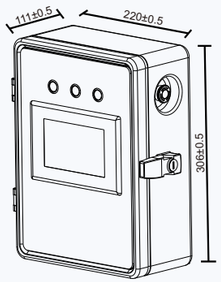
Unit: (mm)



BFS-A1



BFS-A2



BFS-MH-01/02

CASE STUDY: Festival Supermall Alabang Solar Rooftop, 2.8Mw

CASE STUDY: 2MW Commercial Rooftop Project in Malaysia

Fire Fighter Safety Switch for Solar Building

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

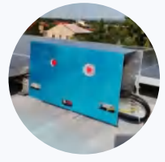
IP66

IEC DC switch built-in

TÜVRheinland

Genuine MC4 Plug and Play

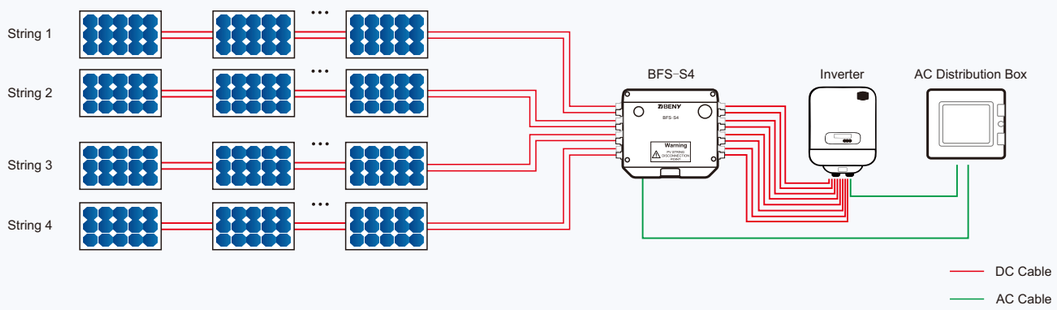
Protection cover for rooftop installation is available



Specifications

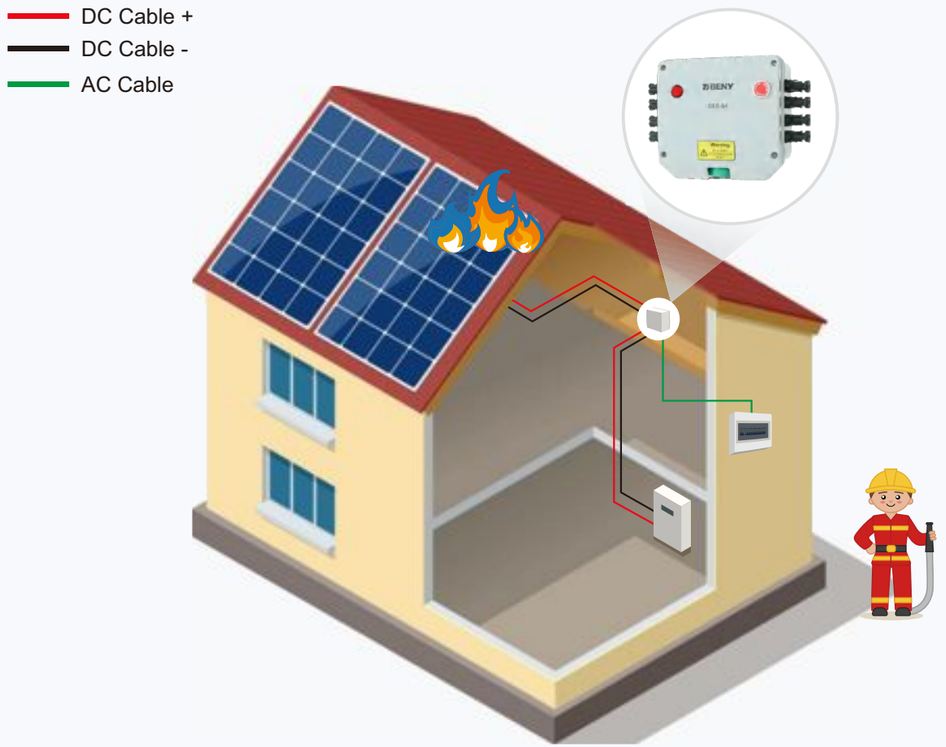
Models	BFS-S			
Models	BFS-S1	BFS-S2	BFS-S3	BFS-S4
Number of Strings	1 string	2 strings	3 strings	4 strings
				
Max String Voltage(Vdc)	300V-1500V			
Max String Current(A)	50A			
Operating Voltage	90Vac-260Vac			
Nominal Voltage	230Vac			
Nominal Current	30mA			
Start up Current	Average 100mA			
Switch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

Diagram



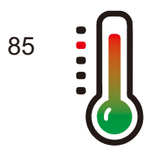
ZBENY

How the solution works?



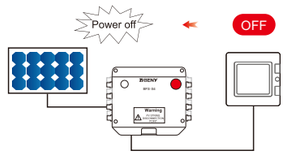
Shutdown Mode

Automatic Shutdown
When Over Temperature



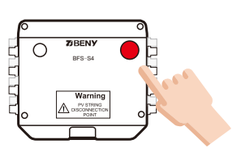
Automatically OFF the DC Power, when temperature inside of BFS-S enclosure ⩾ 85°C.
Once temperature drop to ≤ 75°C, DC power will be back automatically.

Automatic Shutdown
When AC Power Loss



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

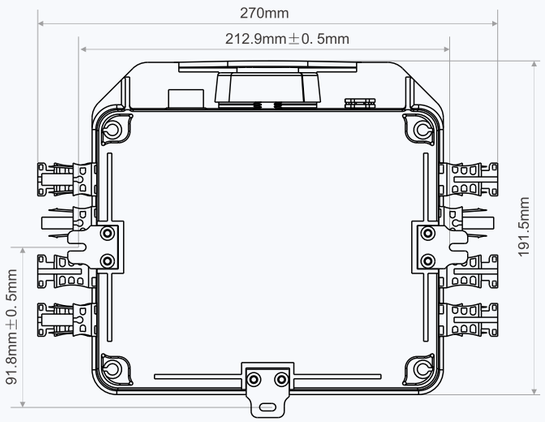
100% Shutdown
By Emergency Button

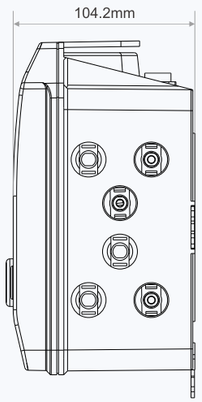


Press the emergency button to keep DC Power 100% OFF even when AC Power is back, so to keep a total safety zone for firefighters.

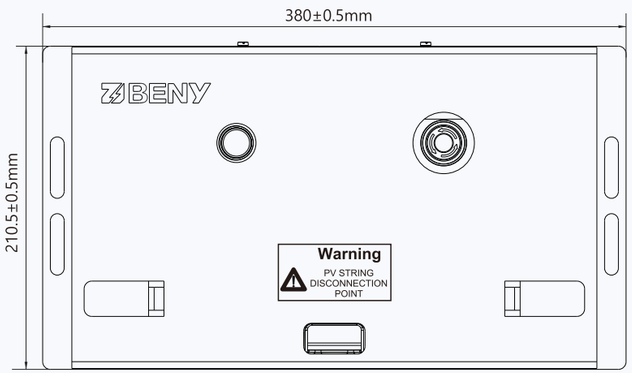
Fire Fighter Safety Switch for Solar Building

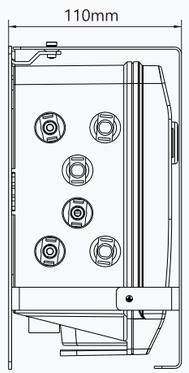
Dimensions





BFS-S1/S2/S3/S4





BFS-S1/S2/S3/S4 With Protection Cover

ZBENY

CASE STUDY: 6kW Grid-tied System in the Philippines

CASE STUDY: 5kW Grid-tied System in Asia