

Photovoltaic Rapid Shutdown Instruction manual



Catalog

About this brochure	3~4
1. Safety instructions	4
2. Product description	4
2.1.1 External shutoffs	4~4
2.1.2 Connectors for external shutoffs	5
2.1.3 External shut-off disassembly	6
2.1.4 External shut-off gluing	6
2.1.5 Precautions	7
2.1.6 List of chemical substances to which direct contact is to be avoided	8
2.2 Composition of photovoltaic system	9~10
3. Installation and wiring instructions	10
3.1 Installation step-by-step instructions	10~11
3.2 Shut-off installation and wiring	11~13
3.3 Control box installation and wiring	13~14
3.4 gateway installation and wiring	14~15
3.5 Controller installation and wiring	15~16
4. Inspection and replacement	16
4.1 Check	16~17
4.2 Replacement	17
5. Appendix	18
5.1 Product Specification	18~19
5.2 Control box specification	20
5.3 Gateway Specification	221
5.4 Gateway Specification	222
5.5. Contact information.....	22

About this brochure

This manual is mainly for the external PV shut-offs developed and produced by Foshan Sunpv Technology Co., Ltd

> Purpose

The purpose of this manual is to provide the reader with detailed information about the product and instructions for installation, operation and maintenance.

> For readers

This manual is for technical professionals and users who need to install, operate and maintain external shut-offs.

> Manual use

Please read this manual carefully before using the product and keep it in a place where it can be easily found by operation and maintenance personnel. > Use of symbols

The following is a list of symbols that may be used in this manual. Please read it carefully to make better use of this manual.

"Hazardous"

Indicates a high potential hazard that, if not avoided, would result in death or serious injury.

A "warning"

Indicates a moderate potential hazard that could result in death or serious injury if not avoided.

"Caution"

Indicates a low potential hazard that could result in moderate or minor injury to personnel if not avoided.

"Caution"

Indicates a potential risk that if not avoided may result in the equipment not operating properly or causing property damage Situation.

1. Safety instructions

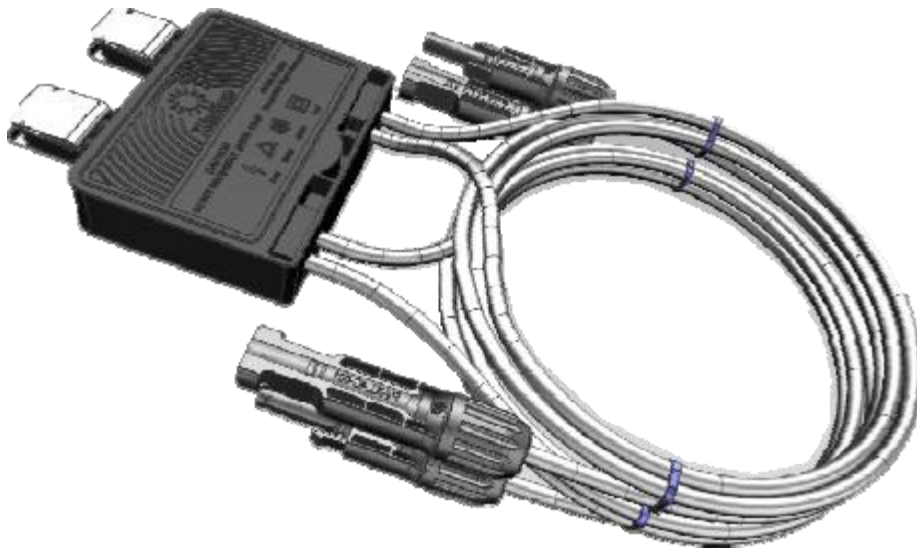
In order to ensure safe installation and operation of the shut-offs, reduce the risk of electric shock and reduce equipment damage, the operation and maintenance process requires Strictly follow the following safety precautions.

2. Product description

2.1.1 External shut-offs

The Sunpv module-level PV shutdown device has a module-level fast shutdown function. After the fast shutdown mechanism is activated, the voltage between any two points of the system will not exceed 80V within 30s, meeting the NEC 2017 690.12 standard, and the solution is based on power line carrier communication and meets the SunSpec standard.

- > Meets NEC 2017 690.12 standards
- > Meet SunSpec standard
- > Easy and convenient installation and operation
- > 20 years design life, matched to PV modules



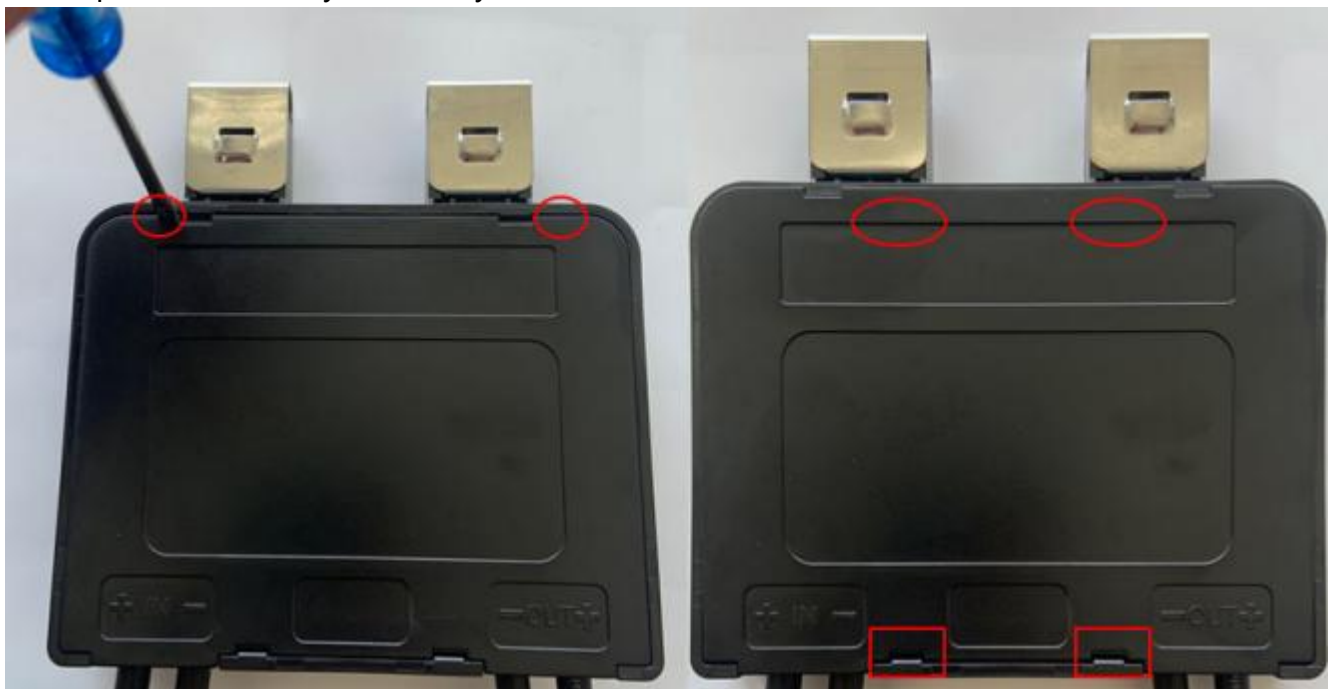
2.1.2 Connectors for external shutoffs

The role of Sunpv external optimizer (for PV system) connectors is reflected in all aspects of the PV connection, mainly in the PV module end junction box above, at the same time, the PV inverter, PV converter box, and the electrical connection of the PV power plant array. Xinlian photovoltaic connection. The connector is derived from the MC4 connector to form Xinlian's "PV-XL4C-001" and "PV-XL4C-002" connectors for PV systems.



2.1.3 External shut-off disassembly 1. Insert a screwdriver into the gap along the side of the snap position (at the red circle), pry open the front bright snap position, take out the cover.

2. When you put in, first put in the back end snap position, the front end near the snap position (red circle), press down with your hand, you will hear the "bar" sound.



2.1.4 External shut-offs glued

Put the product into the glue filling equipment, set the glue filling volume, the intelligent shut-off glue filling volume 105g.



2.1.5 Precautions

- > Prohibit alkane substances from contacting connectors, such as gasoline, cleaning lubricants, electronic resurrection agents and other solvents containing alkane substances.
- > Pay attention to the handling and transportation process of the product, do not be subject to external pressure, so as not to cause damage.
- > To install the junction box and connector, first make sure that the battery component is not in working condition, and the human body should not touch the positive and negative terminals at the same time.

to avoid electrocution and electrostatic breakdown diodes of the human body.

- > Under no circumstances should the positive and negative plugs of the same set of junction box connectors be inserted together to prevent shorting and burning of the positive and negative terminals of the battery board.

Damage.

- > Do not open, close or plug the connection system frequently for reasons other than maintenance, as this will reduce the watertightness and service life

2.1.6 List of chemical substances to which direct contact is to be avoided

Matter	Impact
Gasoline	Avoid direct contact or enclosed in confined spaces, which may lead to slight skinning of the junction box surface
White Flower Oil	Avoid direct contact or enclosed in confined spaces, which may lead to cracking or splitting of the junction box
Revitalizing oil	Avoid direct contact or enclosed in confined spaces, which may lead to cracking or splitting of the junction box
Acetone	Avoid direct contact or enclosed in confined spaces, which may lead to cracking or splitting of the junction box
Windex	Avoid direct contact or enclosed in confined spaces, which may lead to cracking or splitting of the junction box
Orthopedic water	Avoid direct contact or enclosed in confined spaces, which may lead to cracking or splitting of the junction box
Tiana water	Avoid direct contact or enclosed in confined spaces, which may lead to cracking or splitting of the junction box
Mold release agents (e.g. Pelicoat, etc.)	Avoid direct contact or enclosed in confined spaces, which may lead to cracking or splitting of the junction box
Adhesives or sealers that produce oxime gas (e.g. KE-200, KE-400, etc.) CX-200, Chemlok, etc.)	Avoid direct contact or enclosed in confined spaces, which may lead to cracking or splitting of the junction box
TBP(Plasticizer)	Avoid direct contact, which may lead to cracks or crazing of the junction box
Motor oil (e.g. KV46, etc.)	Avoid direct contact, which may lead to cracks in the junction box
Mold temperature oil	Avoid direct contact, which may lead to cracks in the junction box
Alcohol	Avoid direct contact, which may lead to slight skinning of the junction box surface
Oils and fats (e.g. Molykote, etc.)	Avoid direct contact, which may lead to cracks or crazing of the junction box
Cleaning agent	Avoid direct contact, which may lead to cracks or crazing of the junction box

2.2 System Solution

Depending on the actual application scenario, there are two typical system solutions.

The controller has three input and output ports, one for taking power from the AC side, and the other two ports are pre-installed with PV cables and connectors (one male and one female), which can be strung into the PV string.

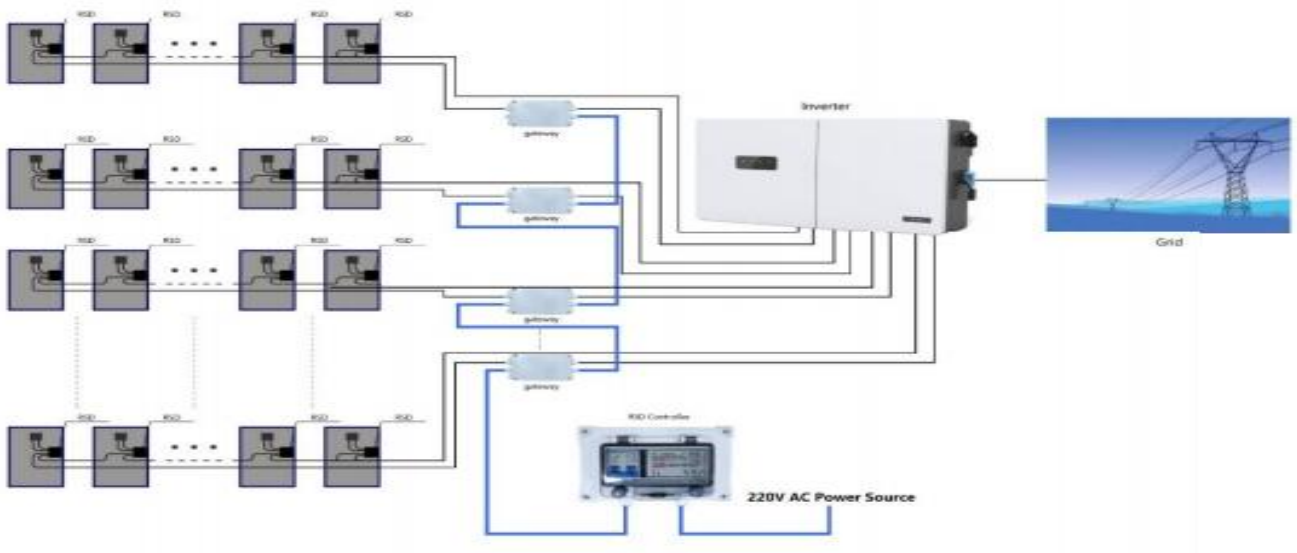
Component level shutdown can be achieved when the AC power is lost at the grid-connected side of the inverter, or by actively disconnecting the vacs in the controller

● 应用场景一：关断器外挂+关断控制器：



When there are multiple strings in the system, the system of "Application Scenario 2" is applied, one shutdown device is installed in each component, one gateway in each string, two pre-installed photovoltaic wires and connectors (one male and one female) of the gateway are strung into the string, the power ports of the gateway are connected in series with two-core wires, and finally strung into the control box. The control box has two ports, one port is connected to the gateway to supply power to the gateway, and one port takes power from the AC side.

● 应用场景二：关断器外挂+关断GATEWAY+控制箱：



3. Installation and wiring instructions

3.1 Description of installation steps

Read all instructions and warnings in this manual and the warning signs on the inverter and component arrays before installation.

Shut down the inverter and disconnect it from the module array before installation.

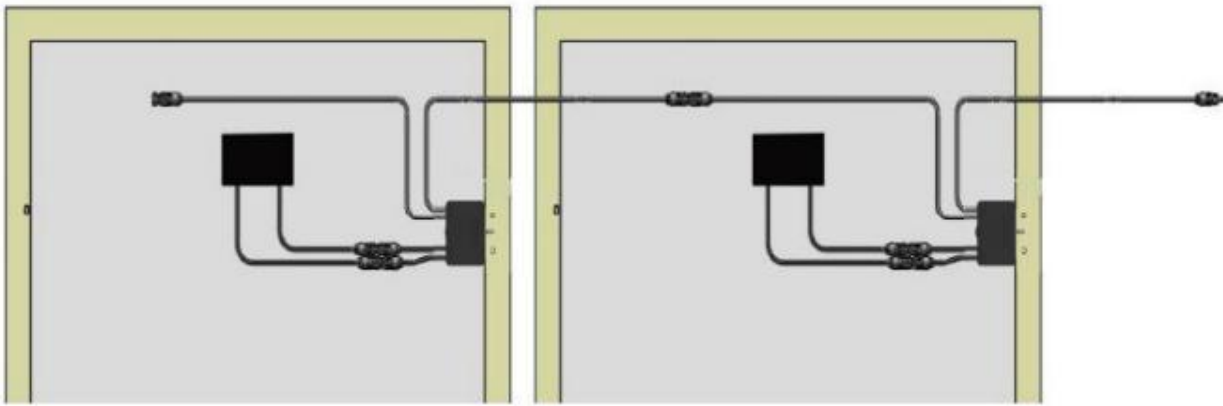
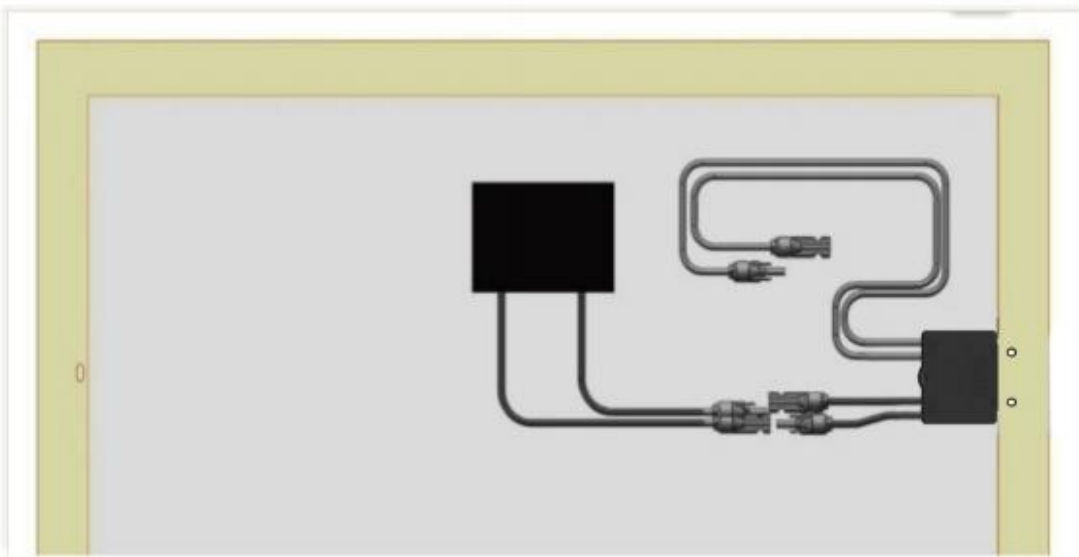
3.2 Shut-off installation and wiring

Step 1. Shutoffs are mounted to the component bezel

Place the external shut-off in the assembly in the direction show component bezel , snap the snap directly into place.

Step 2. Input and output cable connections the output line is connected to

The output lines of the box are connected in series in turn and then incorporated into the rear stage. Photovoltaic shutter output line replacement module wiring



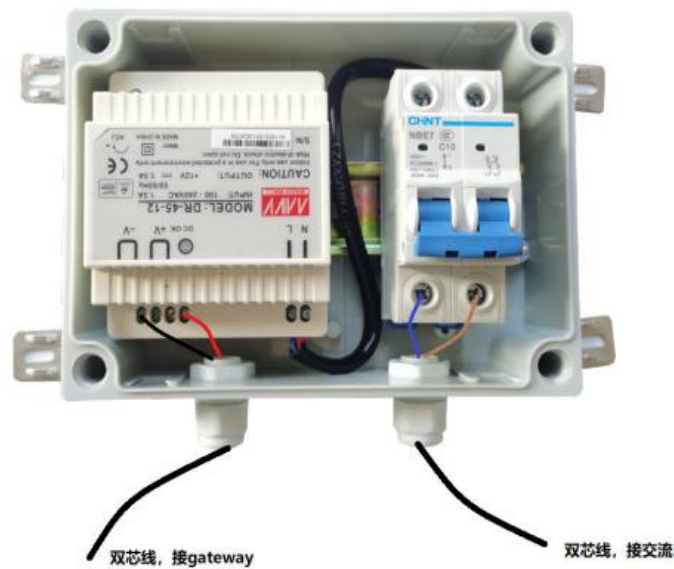
**When installing, be sure to connect the input line of the optimizer first, then the output line.
When removing, be sure to disconnect the output wire first, then the input wire.**

3.3 Control box installation and wiring



The control box is used in conjunction with the gateway to power the gateway for systems with multiple strings.

The control box has 2 ports, one for the AC side and one for the gateway, which supplies power to the gateway.



The internal connection scheme of the control box is shown in the diagram above. The AC two-core wire is connected to the lower side of the internal switch; the DC two-core wire connected to the gateway is connected to V+ and V- of the internal power supply.

3.4 gateway installation and wiring



A gateway is used in conjunction with a control box, which can power multiple gateways simultaneously, one gateway in each string.

The pre-installed PV cables and connectors can be strung into the string, and the other two terminals are used to connect the DC power provided by the control box in series, with two-core wire in accordance with The internal wiring is shown in the following diagram.

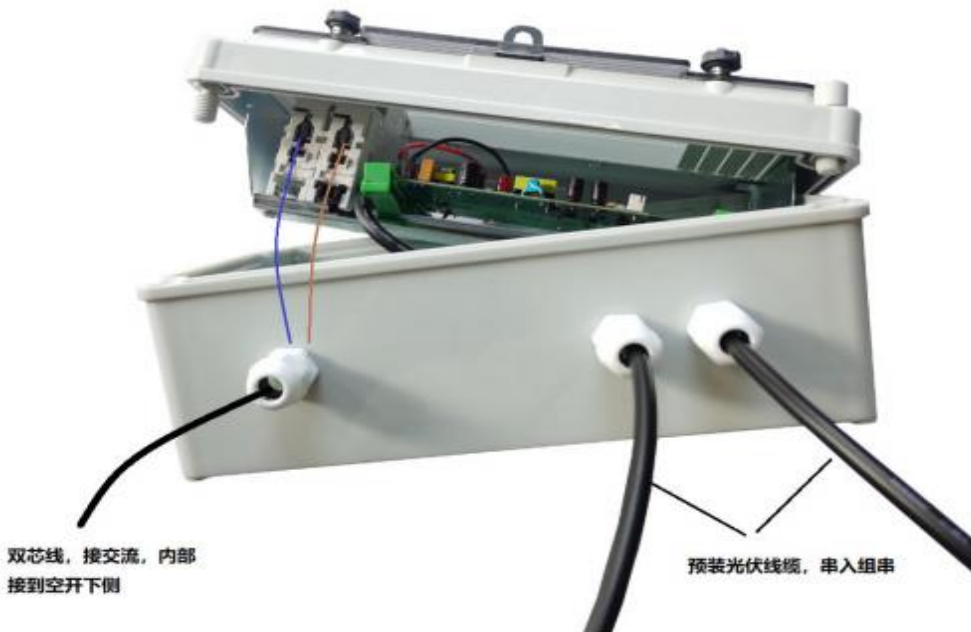
There is no difference between the left and right sides, which are directly shorted, but the order of the position of 12V and GND on the left and right sides is different.

3.5 Controller installation and wirin



The controller is the equivalent of a control box and gateway integrated into a single string system. The controller has three ports, two of which are pre-installed with photovoltaic cables and connectors (one male and one female), and can be connected in series to a group string.

Another port with a two-core wire to AC, connected to the lower side of the internal open (for the convenience of wiring, you can remove the rail, connected to the line and then solid (Set on).



4. Inspection and replacement

4.1 Inspection

Check if the shut-off is abnormal, you can follow the steps below.

(1) To check whether the external shutdown device is working properly, use a clamp current meter to measure the input current of the shutdown device, the input current means the shutdown device is working properly, if the input current is 0, it means the shutdown device or component is abnormal.

(2) If the input current is 0, check the component for obvious damage or severe blocking. If there is obvious damage, replace the component.

There is a serious obstruction , remove the obstruction.

(3) If the component is not abnormal, check whether the connection cable is disconnected, you can switch off the disconnecter input line (the output line has been disconnected first), use a multimeter to measure the component output line positive and negative connector voltage. If the voltage is normal, the line connection is normal, if no voltage, further check the line connection to confirm the disconnection point.

1) If the components and wiring connections are normal, consider replacing the shutoff.

4.2 Replacement

(4) If the shutoff needs to be replaced, proceed as follows.

(5) The inverter is shut down and disconnected from the corresponding string.

(6) Disconnect the output connection of the shut-off.

(7) Disconnect this shutoff input connection.

(8) Remove the original shut-off device and install the new shut-off device.

(9) Connect the input cable.

(10) Connect the output cable.

(11) The corresponding string is connected to the rear inverter.

(12) Restart the inverter.

(13) Use a clamp current meter to test the input current of the shutdown device after replacement (at this time the shutdown device corresponding to the control box and gateway has been started), to confirm that it is fixed

5 Appendix

5.1 Product Specification

Component-level Shutdown (Photovoltaic Rapid Shutdown)

(PV-XL1B-003)



Nomenclature (Naming Principle)

PV - XL 1B - 003

Product Type (Product Type)	Product Line (Product Category)	Serial number (Running number)
PV (Connections for photovoltaic systems ware)	1B (Single box junction box)	

**Product Name : Component-level Smart Shutdown
(Photovoltaic Rapid Shutdown)**

Technical Data (Technical Data)

DC input	Maximum input voltage	60V
	Maximum continuous input current	15A
	Anti-reverse connection protection	There are
	Night time standby power loss	0
DC Output	Maximum system voltage	1500V
Conformity to standards	TUV Certificate	CN2151BR 001
	CSA Certificate	CoFC_80073219
	RoHs	There are
Installation specifications	Size	106*105*22(MM)
	Cable	4m m 2
	Connector	pv-xlc4-001 pv-xlc4-002
	Operating temperature	40°C ~ +85°C
	Protection level	IP65 I P 6 8

5.2 Control box specification

Model	Control box	Unit
Power supply parameters		
Input	AC input: 90~264	Vac
Output	12	Vdc
Installation specifications		
DC Output		
Length*width*height	200*150*75	Mm
Protection level	IP65	
Operating temperature range	-20~+60	°C
Installation form	Hanging wall or holding column	
Waterproof terminal	PG9	

5.3 Gateway datasheet

Model	Gateway	Unit
Operating Voltage	12	Vdc
Photovoltaic system voltage	1500	Vdc
Conformity to standards		
Electromagnetic compatibility (EMC)	IEC61000-6-2, IEC61000-6-3, IEC61000-3-11, IEC61000-3-12 FCC Part 15 ClassB	/
Safety Standards	IEC-62109-1/2	/
RoHS	Yes	/
Installation specifications		
Length×width×height	150*100*44	mm
Protection level	IP65	/
Operating temperature range	-40 +85	°C
Installation form	Hanging wall and holding column	/
Waterproof terminal	PG9	

5.4 Gateway datasheet

Model	Controller	Unit
Power supply parameters		
Input	AC input:90 264	Vac
Installation specifications		
Length×width×height	250 x 150x 100	mm
Protection level	IP65	/
Operating temperature range	-20 +60	°C
Installation form	Hanging wall or holding column	/
Waterproof terminal	PG9	

5.5 Contact Information

If you have any questions or suggestions about this product, please contact us. The contact information is as follows.

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