SUNGROW
Clean power for all

User Manual

PV Rapid Shutdown Equipment

SR20D-M

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About This Manual

This manual gives an introduction to the PV rapid shutdown equipment as well as instructions on its installation, operation, and maintenance, yet not all-encompassing regarding the information about the PV system. You may visit **www.sungrowpower.com** or the website of the device manufacturer for more information.

Validity

This manual applies to the following product:

- SR20D-M

It is referred to as "RSD" hereinafter unless otherwise specified.

Target Group

This manual is intended for qualified technical persons who are responsible for the RSD installation, operation, and maintenance and users who need to check its parameters.

The installation must only be performed by qualified technical persons. Qualified technical persons must:

- Have certain electrical wiring, electronic, and mechanical expertise, and be familiar with electrical and mechanical schematics;
- Have received professional training in the installation and commissioning of electrical equipment;
- Be able to respond quickly and effectively to dangers or emergencies that may occur during the process of installation and commissioning;
- Be familiar with applicable local standards and relevant safety regulations on electrical systems;
- Read through this manual carefully and have a good understanding of the relevant safety instructions.

How to Use This Manual

Read through this manual carefully before using the product, and keep it properly in an easy-to-reach place.

The manual may be updated and revised from time to time, however, there still might be slight deviation from the real product or errors. In such cases, the actual product you have purchased should take precedence. You can find the latest version of the manual at **https://support.sungrowpower.com** or reach your sales for it.

Security Declaration

For details on the product's network security vulnerability response process and vulnerability disclosure, please visit the following website: https://en.sungrowpower.com/security-vulnerability-management.

For more information on network security, please refer to the user manual of the communication module or the Data Logger that comes with the product.

Symbols in the Manual

To ensure the safety of life and property for users when using the product and to improve the efficiency of product use, the manual provides relevant information, which are highlighted by the following symbols.

Symbols used in this manual are listed below. Please review carefully for better use of this manual.

⚠ DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a moderately hazardous situation which, if not avoided, will result in death or serious injury.

⚠ CAUTION

Indicates a slightly hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Indicates a potential hazard which, if not avoided, will result in device malfunction or property damage.

“NOTE” indicates supplementary information, emphasis on specific points, or tips related to the use of the product that might help to solve your problems or save your time.

Contents

1 Safety Instructions

When installing, commissioning, operating, and maintaining the device, strictly observe relevant safety instructions. Incorrect operation or work may cause:

- Injury or death to the operator or a third party.
- Damage to the device and other properties.

Strictly follow the safety instructions stated in the manual to avoid the hazards mentioned above.

- The safety instructions in this manual are only supplements and cannot cover all the precautions that should be followed. Perform operations considering actual on-site conditions.
- SUNGROW shall not be held liable for any damage caused by violation of general safety operation requirements, general safety standards, or any safety instruction in this manual.
- When installing, operating, and maintaining the device, comply with local laws and regulations. The safety precautions in this manual are only supplements to local laws and regulations.

1.1 Unpacking and Inspection

⚠ WARNING

Check all safety signs, warning labels, and nameplates on products.
The safety signs, warning labels and nameplates must be clearly visible and cannot be removed or covered before the product is decommissioned.

NOTICE

After receiving the product, check whether the appearance and structural parts of the device are damaged, and check whether the product received is consistent with the order. If there are problems with the above inspection items, do not install the device and contact SUNGROW in time.

1.2 Installation Safety

⚠ DANGER

Make sure there is no electrical connection before installation.

NOTICE

Before operating the product, please check and ensure that tools to be used have been maintained regularly.

1.3 Electrical Connection Safety

⚠ DANGER

Before electrical connections, make sure that the RSD is not damaged. Otherwise, it may lead to dangers!
Before electrical connections, make sure that all switches connected to the RSD are set to "OFF". Otherwise, it may lead to electric shocks!
The RSD does not support hot swapping. Do not add or remove an RSD with power on, otherwise, the RSD may get damaged!

⚠ DANGER

Hazardous voltages on the PV string when it is exposed to sunlight!

- **Operators must wear proper personal protective equipment during electrical connections.**
- **Check and confirm that the DC cables are voltage-free using a measuring instrument before touching them.**
- **Observe all the safety instructions listed in the documents for the PV string and other relevant documents.**

⚠ DANGER

- **Be sure to use specialized insulated tools during wiring.**
- **Observe the warning signs on the RSD, and perform operations by strictly following the corresponding safety instructions.**
- **Observe all the safety instructions listed in this manual and other relevant documents for the product.**

⚠ WARNING

Improper wiring may damage the product, and such damage will not be covered by the warranty.

- **Electrical connections must only be performed by qualified technical persons.**
- **The specification of cables used in the PV system should meet the relevant requirements. The cables should be well-insulated and firmly connected.**

⚠ WARNING

Check the positive and negative terminals of the PV module cables first. Connect the PV module cables to the DC terminals on the product only after confirming that the polarity is correct.
During the installation and operation of the RSD, ensure that the positive or negative of the PV string is not short-circuited to the ground. Otherwise, the product may be damaged, and such damage will not be covered by warranty.

NOTICE

Wiring must be done in compliance with the applicable local grid regulations and relevant safety instructions specified for the PV string.

1.4 Operation Safety

⚠ DANGER

- **Do not plug or pull out any connector on the RSD when it is running.**
- **Do not disassemble the RSD or remove any of its parts or components when it is running. Otherwise, it may lead to electric shocks.**
- **Do not touch the RSD when it is running. Otherwise, it may cause burns.**
- **Do not take other actions, such as setting parameters, during the process of firmware update, to avoid update failure.**

1.5 Maintenance Safety

⚠ DANGER

Risk of personal injury or device damage due to improper servicing!

- **Be sure to use specialized insulated tools when performing high-voltage operations.**
- **Before maintenance, power off the input and output sides first, then test the voltage and current using the specialized measuring instrument. Maintenance can be carried out by qualified persons who wear proper protective equipment only after confirming that no voltage or current is present.**
- **Danger of burns due to a hot surface still exists even if the product has stopped running. Perform operations on the product wearing protective gloves after it cools down.**

⚠ WARNING

In case of a fault in the product during its operation, before powering on again, make sure the fault has been removed. Otherwise, it may cause the influence of the fault to spread or device damages.

⚠ CAUTION

To prevent irrelevant personnel from operating the product by mistake or other accidents, please set up highly visible warning signages around the product or fence off a warning zone.

NOTICE

To minimize the risk of electric shocks, do not perform maintenance operations that are not specified in this manual. If necessary, contact SUNGROW for maintenance. Losses arising from failure to observe this instruction will not be covered by warranty.

1.6 Disposal Safety

⚠ WARNING

Please scrap the product in accordance with relevant local regulations and standards to avoid property losses or casualties.

2 Product Description

2.1 System Introduction

The PV Rapid Shutdown Equipment (hereinafter referred to as "RSD") is a device that can quickly cut off the PV modules. It can break the connections of PV modules in case of an emergency, thus eliminating the high DC voltage in the PV array, to ensure the safety of the whole PV system.

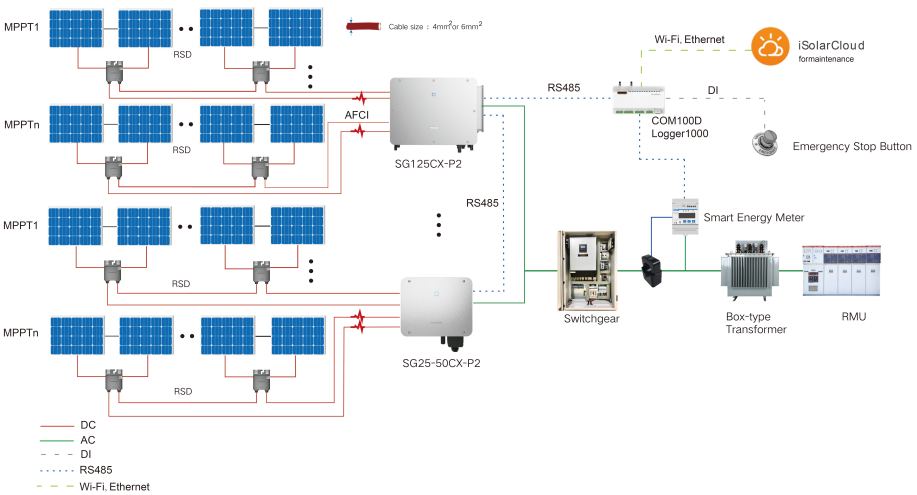


Figure 2-1 Application of RSDs in Commercial and Industrial System

NOTICE

- **The SR20D-M RSD is not compatible with third-party inverters.**
- **The SR20D-M must be used with SUNGROW communication devices and the iSolarCloud software.**

Wiring Instructions for System with RSD Control Box (Optional)

NOTICE

The following systems that require RSD control boxes do not support operations such as RSD logical and physical layout configuration, or functions such as module data monitoring.

The wiring scheme for the system with an RSD control box is shown below.

Shutdown method 1:Rapid shutdown is triggered when the emergency stop button is pressed or the AC power supply is disconnected. (Connect the internal normally open (NO) contact of the emergency stop button to the RSD control box.).

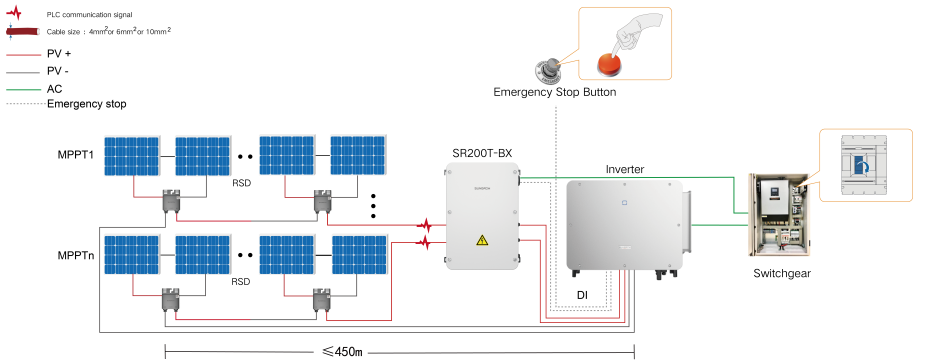


Figure 2-2 Shutdown method 1

Shutdown method 2:

Rapid shutdown is triggered within 30 seconds after an AC disconnect cuts off AC power to the inverter and the RSD control box, ceasing the transmission of a keep-alive signal.

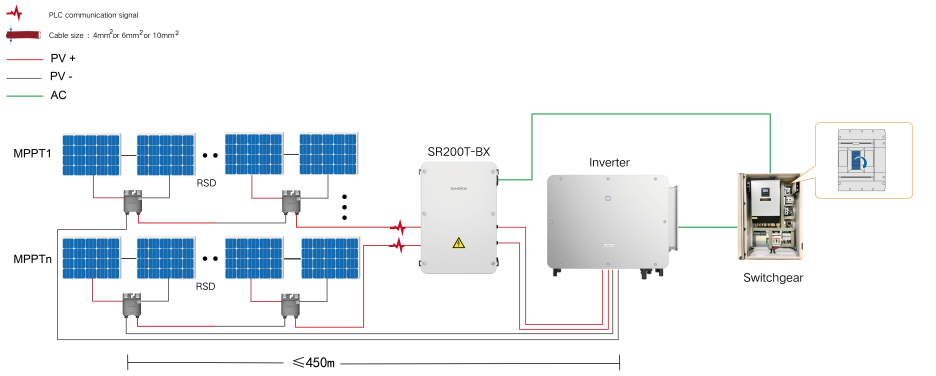


Figure 2-3 Shutdown method 2

NOTICE

- **Install the trigger device of the rapid shutdown system in a location that is easily accessible.**
- **RSD control boxes connected to the same AC power are considered to form an independent rapid shutdown system.**
- **A maximum of five SR200T-BX devices is allowed per independent rapid shutdown system (The system can only perform a global shutdown and does not support partial shutdown.) For more than five devices, please contact SUNGROW.**
- **The RSD control box and the inverter must be connected to the same AC power to ensure proper rapid shutdown and stop functionality.**
- **The maximum total length of cables from the inverter input (+) to input (-) is 900 m.**

2.2 RSD Introduction

Product Model

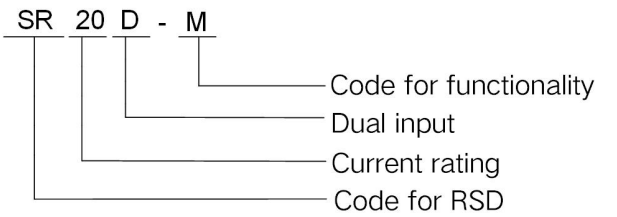
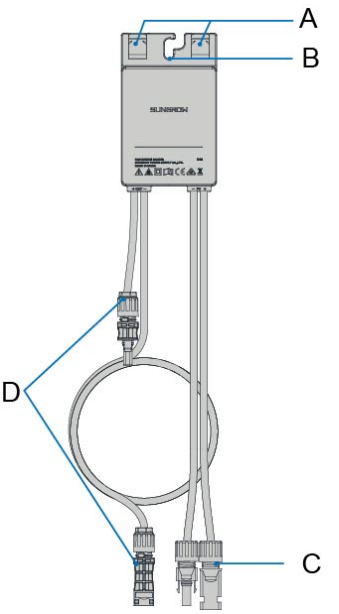


Figure 2-4 Product Model

External Design

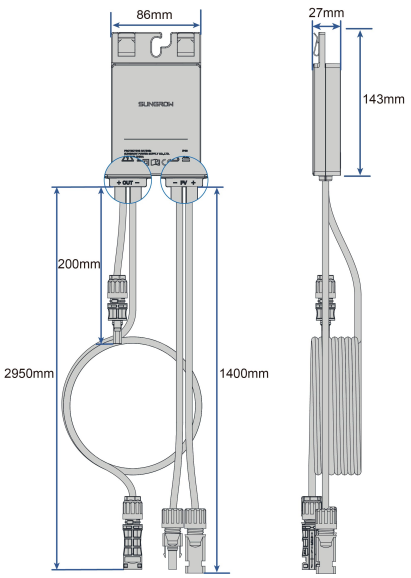


(A) Clips	(B) Hanger	(C) Input connectors (Stäubli)	(D) Output connectors (Jinko)

Figure 2-5 External Design

- The figure here is for illustration only and the real product may differ.
- The SR20D-M is available with two types of output connector. The installation and wiring diagrams below use this version as an example; the actual product received shall take precedence.

Dimensions



The RSD is available in a variant featuring 2950 mm long positive and negative output cables. The actual product you have received shall take precedence.

2.3 Signs on the Product

Sign	Description
	Do not dispose of the RSD as household waste.
	Read the manual before performing any operation on the RSD.
	CE compliance mark. EU/EEA imports.
	RCM compliance mark.
	Burn hazard due to the hot surface that may exceed 60℃.
	Beware of electric shocks.

Sign	Description
	Equipment protected by double insulation or reinforced insulation.

2.4 Configuration Principles

Number of RSDs supported by communication device

The WiNet-S2 supports the use of up to 400 RSDs, while the Logger1000A and the Logger1000B support up to 4900 RSDs.

Requirements for PV module connection

- Up to 15 RSDs can be installed in each PV string.
- The number of PV modules connected to RSDs in each PV string must not exceed the maximum number of modules allowed in one string by the inverter.
- The maximum open-circuit voltage of each PV string must not exceed 1100V.

2.5 Application Scenario

Full-coverage Deployment

Full-coverage deployment refers to the scenario where the PV modules attached to the inverter are all connected to RSDs.

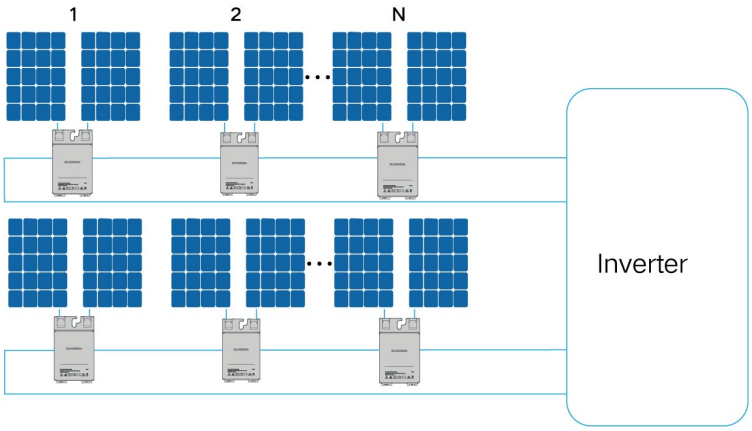


Figure 2-6 Full-coverage Deployment

The RSD supports full-coverage deployment only. Partial-coverage deployment is not supported.

3 Unpacking and Storage

3.1 Unpacking and Inspection

The device is thoroughly tested and strictly inspected before delivery. Nonetheless, damage may still occur during shipping. For this reason, please conduct a thorough inspection after receiving the device.

- Check the packing case for any visible damage.
- Check the inner contents for damage after unpacking.

Contact SUNGROW or the transport company in case of any damage or incompleteness, and provide photos to facilitate services.

Do not dispose of the original packing case. It is recommended to store the device in the original packing case when the product is decommissioned.

NOTICE

After receiving the product, check whether the appearance and structural parts of the device are damaged, and check whether the packing list is consistent with the actual order. If there are problems with the above inspection items, do not install the device and contact SUNGROW in time.
If any tool is used for unpacking, be careful not to damage the product.

3.2 RSD Storage

If the RSD is not to be put into use immediately, store it properly by following the below requirements.

- Repack it using the original packing crate.
- The temperature for RSD storage is -40℃ to 85℃ and the humidity is 0% to 95%.
- If the RSD crates are stacked, the number of layers in a stack should not exceed the maximum layers of stack indicated on the crate.
- The packing crate cannot be tilted or turned upside down.
- Do not store the RSD in places prone to direct sunlight, rain, or strong electric field.
- Do not store the RSD in places with items that may affect or damage it.
- The RSD should be kept in a clean, dry, and ventilated place and protected from the intrusion of dust and moisture.
- Do not store the RSD in places with corrosive chemicals or prone to damages by rodents or pests.

- Carry out routine inspections. Inspection should be conducted at least once every six months. Re-pack the RSD in time if any damage caused by pests or animals is found.
- If the RSD has been stored for more than a year, ask qualified personnel to inspect and test it before putting it into use again.

NOTICE

Store the RSD according to the storage requirements. Device damage arising from failure to observe the storage requirements will not be covered by warranty.

4 Mechanical Mounting

⚠ WARNING

Respect all local standards and requirements during mechanical installation.

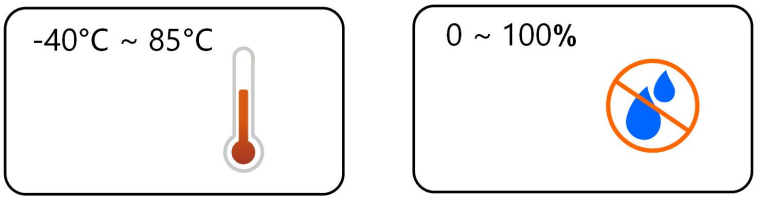
4.1 Installation Site Selection

A good location is critical to the safe operation, long service life, and good performance of the RSD.

- The RSD is IP68 rated.
- It should be installed at a position convenient for electrical connection, operation, and maintenance.

Installation Environment Requirements

- Do not install the device in an environment with flammables, explosives, or smoke.
- Do not install the device in a place prone to water leak, e.g., under the air-conditioner vent, the air vent, or the cable outlet window of the machine room, so as to prevent device damage or short circuit caused by intrusion of water.
- Do no install the device in a place with corrosives such as corrosive gas and organic solvent, etc.
- Do not install the device in an environment contaminated with chemicals such as halogen and sulfide.
- Do not install the device in an environment with vibration and strong electromagnetic field. Strong-magnetic-field environments refer to places where magnetic field strength measures over 30A/m.
- The device must be out of reach of children.
- Protect the device from direct sunlight, rain, or snow to prolong its service life. A place with shelter is recommended for installing the device.
- Good heat dissipation is very important to the device. Please install it in a ventilated environment.
- The average temperature approximately 1 m around the device should be taken as its operating temperature. The temperature and humidity should meet the requirements below:

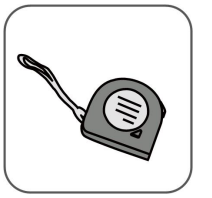


4.2 Installation Tools

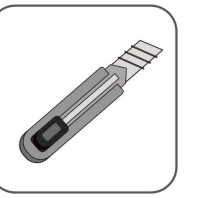
Installation tools include but are not limited to the following recommended ones. Use other auxiliary tools on site as needed.

Protective gloves

Insulated shoes



Tape

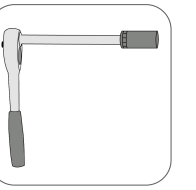


Utility knife

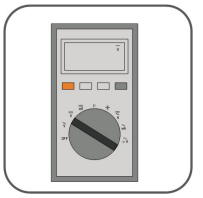
Wire cutter

Wire strippers

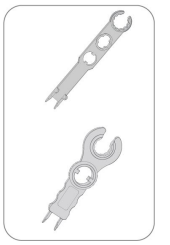
Crimping tool



Socket wrench (M8)



Multimeter



Open-end wrench kit

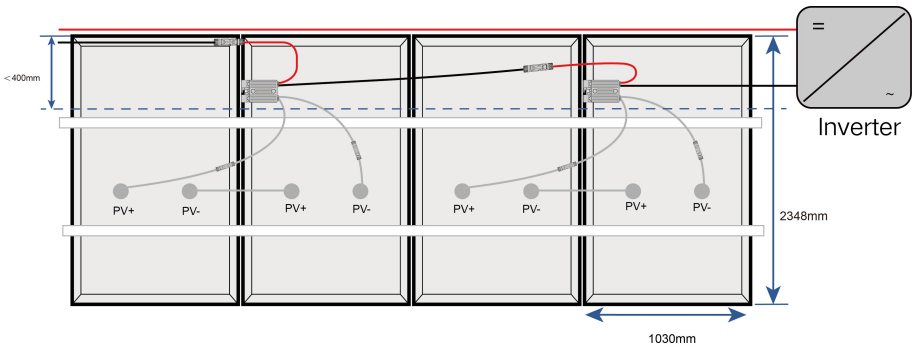
4.3 RSD Mounting

Prerequisite

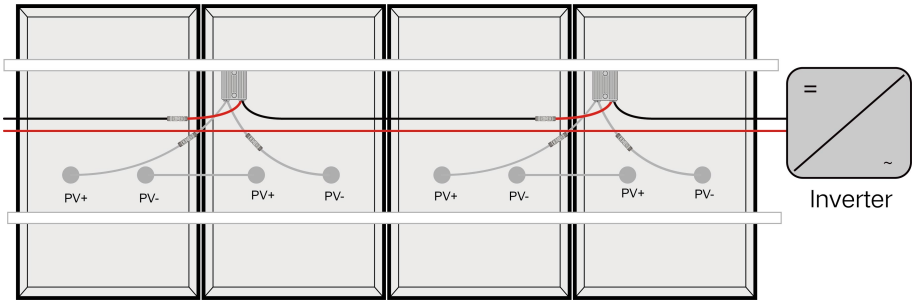
The RSD supports clip-on mounting and bolt mounting. Please choose a mounting method based on the on-site conditions.

4.3.1 Installation Scenarios

Clip-on mounting



Bracket mounting



NOTICE

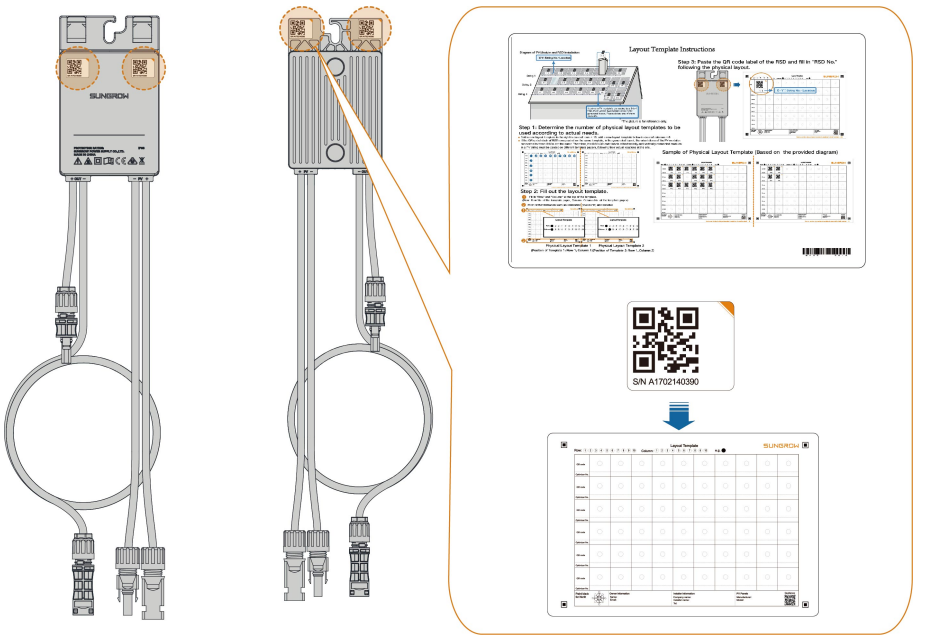
- **Before installation, select the appropriate RSD variant and decide the installation and arrangement schemes based on the actual situation, to ensure that the RSD can be connected to PV modules and adjacent RSDs normally.**
- **The mounting and wiring should be performed in compliance with local laws, regulations, safety standards, and installation specifications. If the cable is too long, do not let it hang down to the ground. You can secure it nearby to the bracket or the edge of the module.**

4.3.2 Preparation Before Mounting

Choose a mounting method based on actual needs

Decide the installation position of the RSD properly, to ensure that the RSD can be connected to PV modules and adjacent RSDs normally.

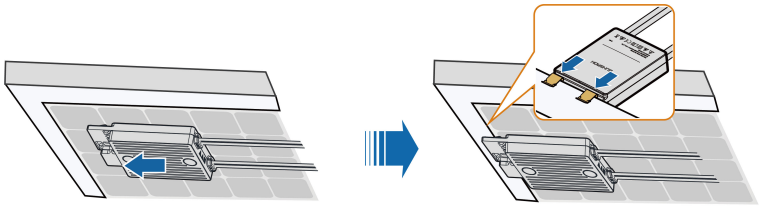
Decide on an appropriate position to mount the RSD. Remove the QR code label from the RSD, and attach the label to the template paper by referring to the instructions for "**Physical Layout Template**".



- Read through the instructions provided on the back of the layout template carefully before operation.
- Remove the QR code label from the RSD, and attach it to the layout template.
- Stick the RSD QR code label in the corresponding position on the template paper based on the actual position of the RSD at the site. Keep the QR code label flat and even, and make sure it does not go outside the cell border.

4.3.3 Mounted on PV Module (Clip-on)

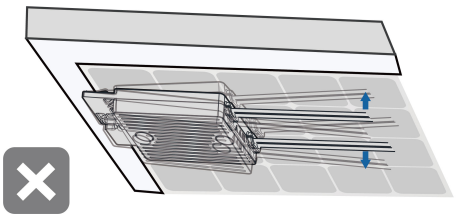
Step 1 Clip the RSD into the back of the PV module, as shown in the figure below. Keep the RSD parallel to the PV module when clipping it on.



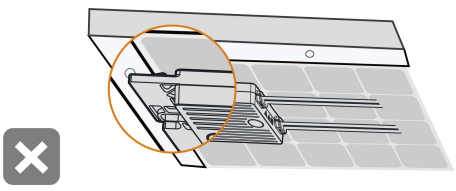
NOTICE

- **Ensure that the RSD is installed facing the back of the module. Otherwise, the clips may get damaged.**

- **Do not apply force to the RSD in a direction vertical to its clips when clipping it onto the module. Otherwise, the clips may get damaged.**



- **Do not clip the RSD into holes in the module frame during installation. Otherwise, you may not be able to remove the RSD again and its clips may get damaged.**

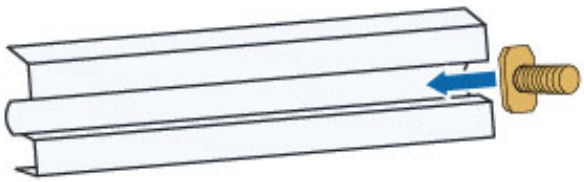


- **It is recommended to install RSDs on the same side of modules.**
- **Do not clip and remove the RSD repeatedly. Otherwise, the clips may become loose and thus cannot function properly.**

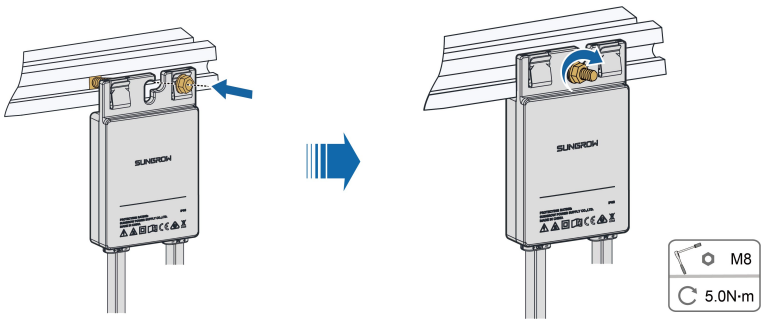
--End

4.3.4 Mounted on Aluminum Guide Rail

Step 1 It is recommended to use M8×25 T-head bolt (not included in the scope of delivery). Slide the T-head bolt into the groove in the aluminum guide rail.

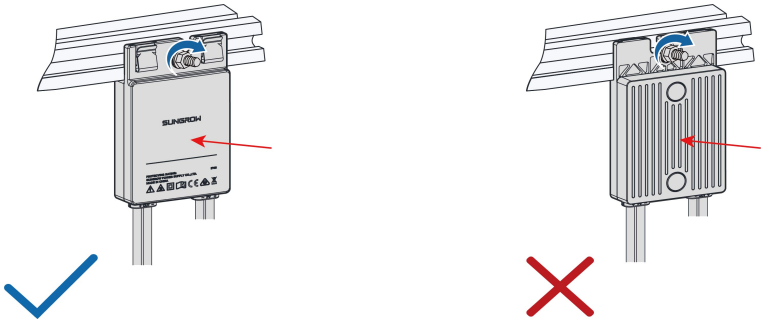


Step 2 Hang the RSD to the T-head bolt by its hanger, then fit the nut onto the bolt using a socket wrench, to secure the RSD to the aluminum guide rail. They are connected together in the order of nut, hanger, and then T-head bolt.



⚠ WARNING

- **During installation, make sure the metal clips do not get in contact with the bracket.**
- **Install the RSD with its back tightly against the bracket. Installing it from the opposite direction may damage the RSD and such damage will not be covered by warranty.**

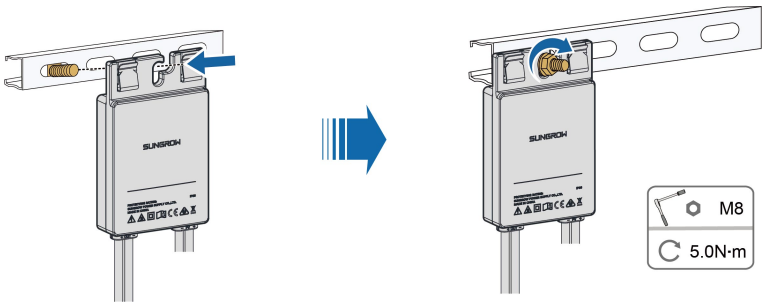


--End

4.3.5 Mounted on Steel Guide Rail (T-head bolt)

Step 1 It is recommended to use M8×25 T-head bolt (not included in the scope of delivery). Insert the T-head bolt into the guide rail, and turn it 90°.

Step 2 Hang the RSD to the T-head bolt by its hanger, then fit the nut onto the bolt using a socket wrench, to secure the RSD to the steel guide rail. They are connected together in the order of nut, hanger, and then T-head bolt.



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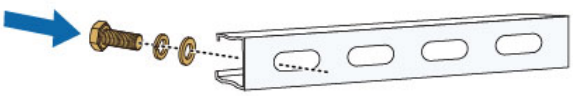
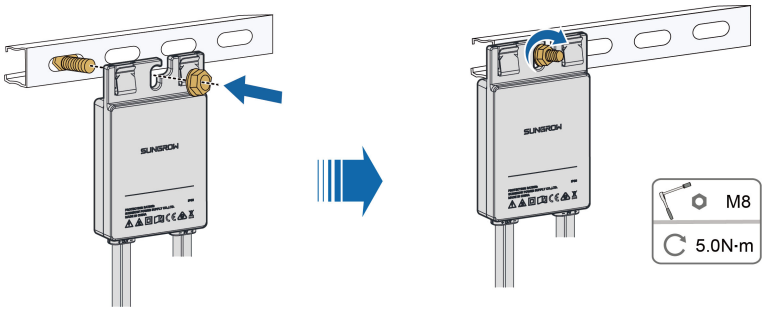
4.3.6 Mounted on Steel Guide Rail (Bolt Assembly)

Step 1 It is recommended to use the M8×25 bolt assembly (not included in the scope of delivery). Insert the bolt through the flat washer and spring washer into the guide rail.



Step 2 Hang the RSD to the bolt by its hanger, then fit the nut onto the bolt using a socket wrench, to secure the RSD to the steel guide rail. They are connected together in the order of nut, hanger, spring washer, flat washer, and then bolt.



--End

5 Electrical Connection

5.1 Safety Instructions

⚠ DANGER

Hazardous voltages on the PV string when it is exposed to sunlight!

- **Operators must wear proper personal protective equipment during electrical connections.**
- **Check and confirm that the DC cables are voltage-free using a measuring instrument before touching them.**
- **Observe all the safety instructions listed in the documents for the PV string and other relevant documents.**

⚠ DANGER

- **Before electrical connections, make sure that the RSD is not damaged. Otherwise, it may lead to dangers!**
- **Before electrical connections, make sure that all switches connected to the RSD are set to "OFF". Otherwise, it may lead to electric shocks!**
- **The RSD does not support hot swapping. Do not add or remove an RSD with power on, otherwise, the RSD may get damaged!**
- **Check that the input and output cables of the RSDs are all connected correctly (that is, the PV module should not be connected to the output side of the RSD, while the input side of the RSD should not be connected to the inverter side or other RSDs in the system); if the connection is wrong, correct it in time. Add and activate the RSDs in the software only after confirming that the connections are all correct. Otherwise, the improperly wired RSD may get damaged, and such damage will not be covered by warranty.**

⚠ WARNING

Improper wiring may damage the product, and such damage will not be covered by the warranty.

- **Electrical connection must only be performed by qualified technical persons.**
- **Operators must wear proper personal protective equipment during electrical connections.**
- **The specification of cables used in the PV system should meet the relevant requirements. The cables should be well-insulated and firmly connected.**

NOTICE

All electrical connections must be done in compliance with the applicable local and national/regional electrical standards.

- **Cables used by the user should comply with the requirements of local laws and regulations.**

NOTICE

Wiring must be done in compliance with the applicable local grid regulations and relevant safety instructions specified for the PV string.

The wire colors in the figures in this manual are for reference only. Please select cables according to local cable codes.

5.2 Terminal Description

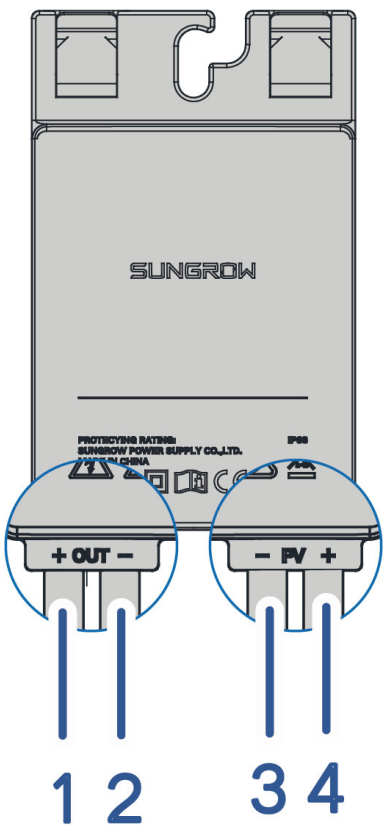


Figure 5-1 Internal Terminals

No.	Mark	Description
1	OUT+	Positive output.
2	OUT-	Negative output.
3	PV-	Negative input.
4	PV+	Positive input.

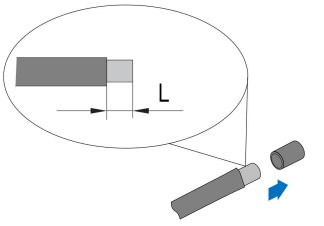
5.3 Cable Preparation

In the process of RSD wiring, if the main cable falls short and the connectors cannot reach each other, an extension cable is needed.

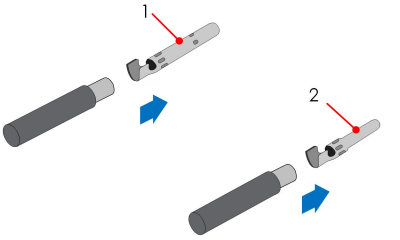
NOTICE

- **When preparing an extension cable, pay attention to the selection of DC connectors at the two ends of the cable. Do not mix them up.**
- **Make sure the DC connectors of the cable are identical to or compatible with the connectors on the product. Otherwise, it may lead to damage and such damage will not be covered by the warranty.**

Step 1 Strip the insulation layer of the DC cable by a length (L) of about 7–8 mm.



Step 2 Crimp the terminal onto the cable.

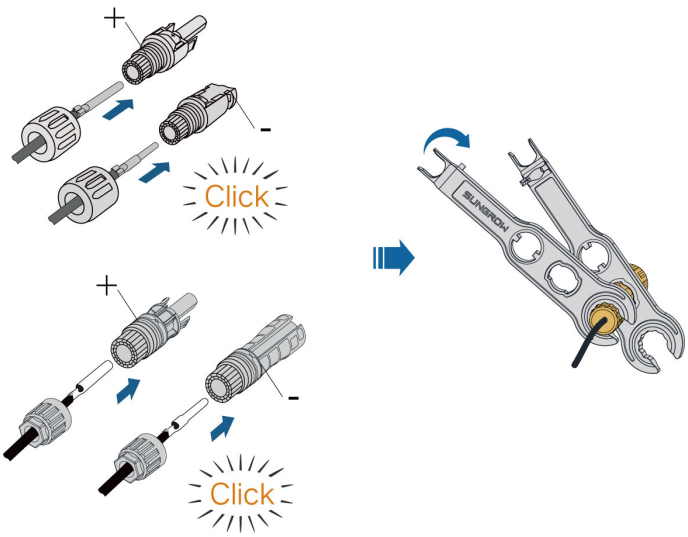


(1) Cold-pressed terminal, positive (2) Cold-pressed terminal, negative

NOTICE

When making an extension cable, ensure that the cold-pressed terminals are of the same model as the DC connector, otherwise, the connection may be unreliable and the DC connector may be burned.

Step 3 Lead the cable through the cable gland, and insert the cold-pressed terminal into the insulator until it snaps into place. Pull gently the cable backward to make sure the connection is secure. Then, tighten the cable gland and the insulator at a torque of 2.5–3 N.m.



Step 4 Insert the positive DC connector into the corresponding negative DC connector, until there is an audible "click".

--End

5.4 RSD Wiring

Prerequisite

DANGER

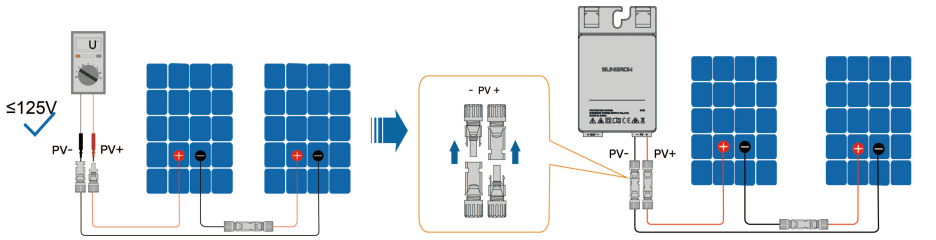
Danger of electric shocks!
Pay attention! PV arrays carry hazardous high voltages when exposed to sunlight. Ensure all cables are voltage-free before performing electrical operations.

WARNING

- **Ensure that the PV array is well insulated from the ground before connecting a PV module to an RSD.**

Shorten the distance between the positive and negative cables of the RSD according to on-site conditions to reduce electromagnetic interference.

Step 1 Connect the PV+ and PV- cables of the RSD respectively to the positive and negative terminals in the junction box of the PV module.



NOTICE

- **Before connecting the PV module to the RSD's input terminals, use a multimeter to test the module's output voltage and ensure it is below 125V. Excessive module output voltage may damage the PV module or the RSD, and such damage will not be covered by the warranty.**
- **Do not connect the PV module to the OUT+ and OUT- of the RSD. Otherwise, the RSD or PV module will be damaged, and such damage will not be covered by warranty.**

Step 2 Connect the positive probe of a multimeter to the OUT+ of the RSD, and negative probe to OUT-, to check whether there is a fault in the RSD. If the typical value of the output voltage (U) is 1V, the RSD has no fault.

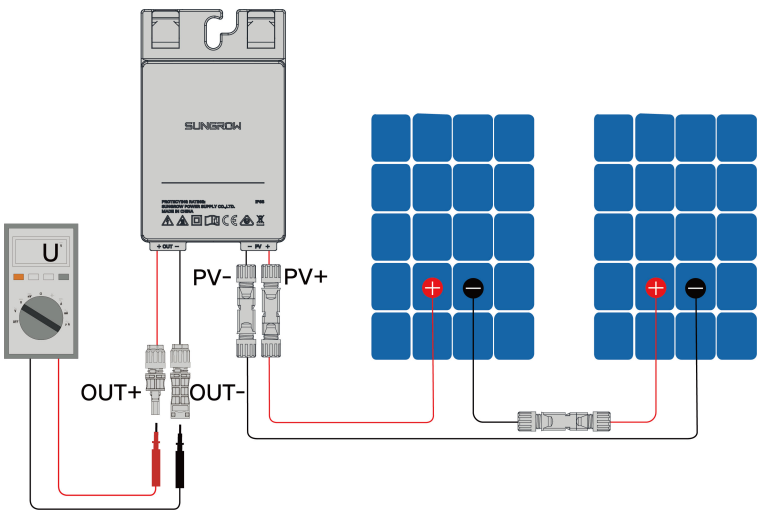


Table 5-1 Output Voltage

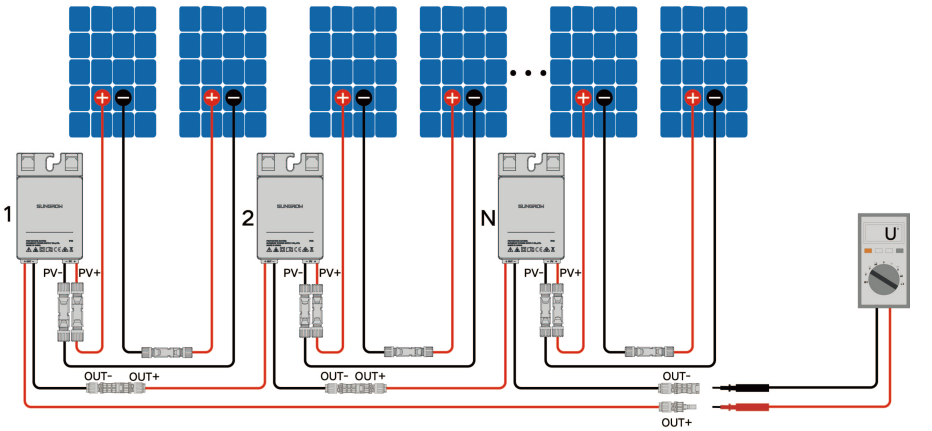
Voltage	Possible Cause	Suggestions
0.9 V≤U≤1.1 V	Nothing abnormal with the RSD.	/
U<0.9 V	1. Poor sunlight. 2. No PV module is connected to the input side of the RSD. 3. The wiring of the RSD is wrong. 4. There is a fault in the RSD.	1. Measure the voltage when there is sufficient sunlight. 2. Connect the PV module to the input side of the RSD. 3. Re-connect the RSD cables correctly. Make sure the input side of the RSD is connected to the output side of the PV module. 4. Replace the RSD.
U>1.1 V	There is a fault in the RSD.	Replace the RSD.

NOTICE

Complete the RSD wiring and measure the output voltage by following the steps below.

- **After completing the wiring of an RSD, use a multimeter to measure its output voltage. Ensure that the output voltage of each RSD is within the normal range.**
- **After confirming that the output voltages of all RSDs are normal, use a multimeter to measure the output voltages of RSDs in the same string.**
- **If you do not check the RSD output voltages and confirm the string has been wired properly in this step, in case of something abnormal, you may have to check the whole wiring again, where rework is required.**

Step 3 Where multiple RSDs are used, connect the OUT- of the first RSD to the OUT+ of the second one, and so on. Use a multimeter to test the positive and negative terminals of the RSDs. If the typical value of the output voltage is 1 V*N (N = number of RSDs), the system is fault-free.



NOTICE

In the actual wiring, the connection of the negative/positive terminal of the first RSD to that of the second one (whether connecting OUT1+ to OUT2-, or OUT1- to OUT2+) should be decided considering the negative and positive terminals of the inverter.

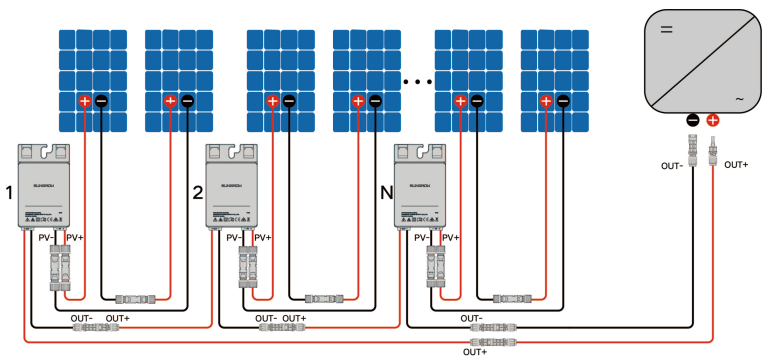
Table 5-2 Output Voltage

Voltage	Possible Cause	Suggestions
U=1*N	Nothing abnormal with the RSD.	/
U=0	1. The PV string is open-circuited. 2. The cables are not connected to the same string.	1. Check whether the string is open-circuited. 2. Identify the string cables correctly.
U<0	1. The probes are connected reversely. 2. The cable labels are incorrect.	1. Reconnect the positive and negative probes correctly. 2. Prepare cable labels correctly.
U<0.9*N	1. The input cables of some RSDs are not connected. 2. The output cables of some RSDs are not connected. 3. The output cables of some RSDs are connected reversely.	Check whether the cables of modules and strings are properly connected.

Voltage	Possible Cause	Suggestions
U>1.1*N	1. The actual number of RSDs in the string is greater than expected. 2. The PV module is connected to the string directly, not connected to any RSD.	1. Check whether the number of RSDs in the string is correct. 2. Check whether the cables of modules and strings are properly connected.

Step 4 (Optional) If an RSD control box is required in the system, complete the installation and DC cable routing according to the SR200T-BX Quick Installation Guide before proceeding to the next step.

Step 5 Connect the OUT+ of the first RSD and the OUT- of the last one to the DC input terminals of the inverter.



⚠ WARNING

- **If all modules in a string go offline or show no current during plant creation on iSolarCloud, first check whether the string output voltage is within the normal range as instructed in Step 3. If the voltage is normal, inspect the wiring for reverse polarity or disconnection.**
- **The total power of PV modules in a PV string should not exceed the maximum input power of a single input of the inverter.**

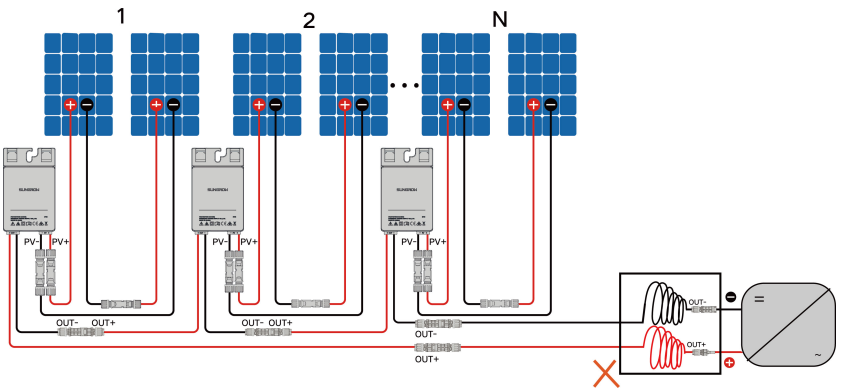
NOTICE

- **The RSD supports full-coverage deployment only.**
- **To deploy the RSD, the use of Y-type connectors on the input side of the inverter is not supported, as the RSD is not compatible with such connectors.**

--End

5.5 Wiring Notices

Do not coil the RSD's cable when wiring, given that the communication quality may decline if the extension cable is too long.

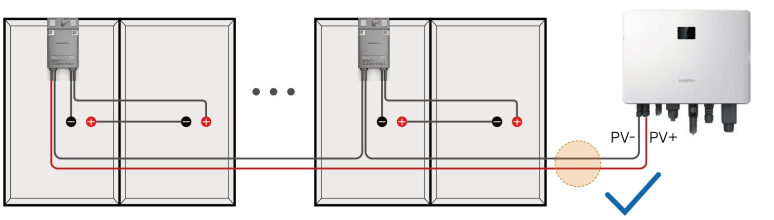


The maximum total length of cables from the inverter input (+) to input (-) is 900 m. If the distance exceeds 900 m, consult SUNGROW first.

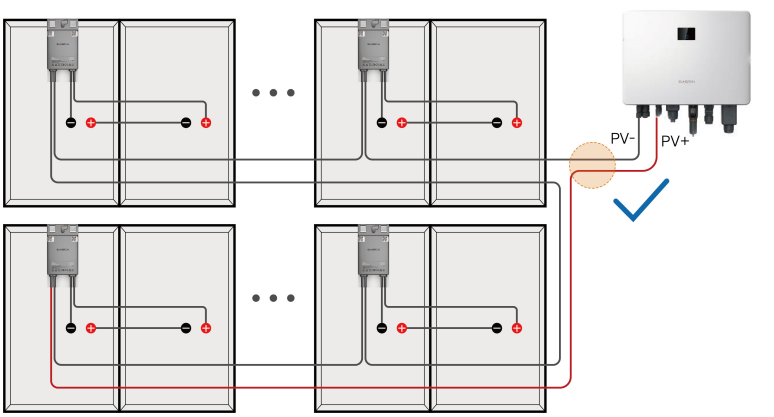
⚠ WARNING

DC Wiring Requirements: The positive and negative DC cables of the same PV string should be kept parallel and close to each other. The correct wiring is shown below.

Scenario 1:

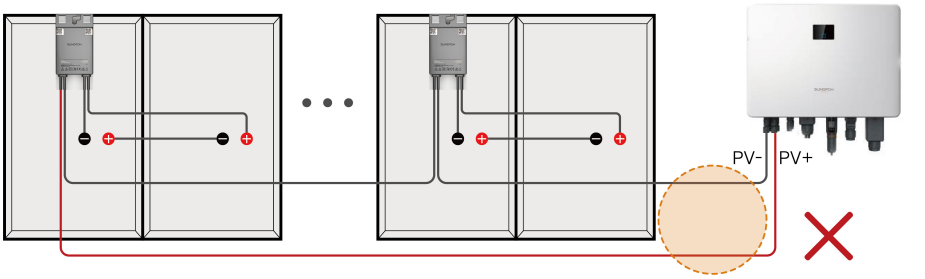


Scenario 2:



⚠ WARNING

The positive and negative DC cables of the same PV string are not allowed to be laid apart, as shown in the figure below.



6 Commissioning

6.1 Inspection Before Commissioning

Perform inspections as follows before starting the RSD for the first time, and make sure the requirements below are all met.

- All devices are properly installed.
- All cables are connected properly in the correct polarity.
- Check that the input and output cables of all RSDs are connected correctly.
- The RSD QR code labels are attached to the corresponding cells on the physical layout template correctly.
- Ensure the data logging device (WiNet-S2 or Logger1000) properly communicates with the inverter and other devices. For specific instructions, see theiSolarCloud App User Manual (Overseas)or Logger1000 User Manual.
- All warning signs and labels are intact and legible.
- V2.1.6.20250225 or later versions of iSolarCloud App is used.

6.2 Set RSD Physical & Logical Layouts

The physical layout provides a visual representation of the installation locations and orientations of plant components, along with their corresponding RSD units. The logical layout clearly illustrates the electrical connection topology between the RSDs and the inverters. Proper configuration of both layouts is fundamental to ensuring stable plant operation and enabling efficient O&M.

Before configuring the physical and logical layouts of the RSDs, create the PV plant via the iSolarCloud App or Web platform (https://www.isolarcloud.com). For detailed procedures, refer to the corresponding user manuals.

- iSolarCloud App□iSolarCloud App User Manual
- iSolarCloud □iSolarCloud WEB 3.0 User Manual

Import Excel Layout File

For a C&I PV plant, it is recommended to complete the layout setup by importing an Excel layout file. For detailed steps, refer to the **Layout Setup for C&I PV Plant** section in the iSolarCloud WEB 3.0 User Manual.

For large-scale C&I PV plants above 20 kW, the full commissioning typically takes 2–3 days. Using the automatic search function to complete the logical layout can significantly

shorten commissioning time and enable faster power generation. For detailed procedures, refer to Auto Optimizer/RSD Search.

- The automatic search function can only be used to configure the logical layout of the RSDs. You must still set the physical layout by importing the Excel layout file to ensure efficient future O&M for the plant.
- Use the automatic search function only under good solar irradiance conditions.
- The iSolarCloud platform supports simultaneous automatic search for a maximum of three inverters. If the plant contains four or more inverters, repeat the automatic search operation to complete the logical layout setup for RSDs connected to the remaining inverters.
- Some earlier RSD models do not support the automatic search function. If the operation fails, contact SUNGROW.

6.2.1 RSD Layout Settiing (iSolarCloud)

For distributed PV plants, it is recommended to complete the layout settings by importing an Excel layout template. For detailed instructions, refer to Section **4.3.8 Layout Settings** in the iSolarCloud WEB 3.0 User Manual. The user manual can be accessed by visiting the website or scanning the QR code below.

In the scenario of connection without network, the O&M personnel need to upload a configuration file containing the physical layout information of the inverter and other devices on the Web of the Logger1000 to create a plant. For detals, see **10.5 Uploading Physical Layout** in Logger1000 User Manual.

6.3 PLC Communication Setup

By default, communication between the inverter and the RSD is disabled. After the RSD is connected to the inverter, enable communication manually to establish the communication link.

Prerequisite

A plant is created via the iSolarCloud App, and the inverter and RSD are added to the plant.

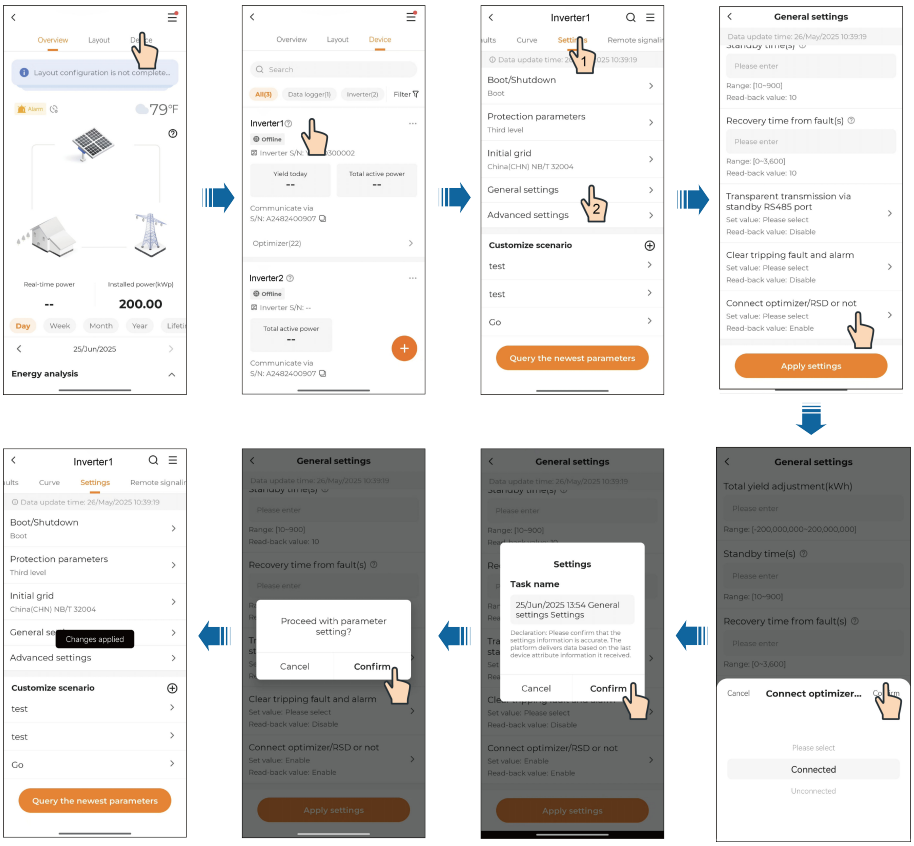
Step 1 Tap the plant name to open its overview.

Step 2 Tap **Device**, then select the inverter.

Step 3 Choose **Settings** from the top tabs.

Step 4 Tap **General settings**. Choose **Connect optimizer/RSD or not**, select **Connected**, then tap **Apply settings**.

Step 5 Tap **Confirm**. The App will display "**Changes applied**" once the setup is successful.



--End

6.4 View RSD Layout

6.4.1 Check RSD Status

RSD Running Status

You can tell the status of the RSD based on the color of the corresponding PV module in the layout. The table below shows the relation between the PV module color and the RSD status.

Layout	Status	Cause	Suggestions
	The RSD is operating normally.	/	/
	There is a fault in the RSD	1. There is a hardware fault in the RSD. 2. The PV voltage exceeds the preset voltage protection threshold.	See 8.1 Troubleshooting for troubleshooting methods.
	There is an alarm in the RSD.	RSD software update has failed.	1. Software update may take more than 20 minutes for a large-scale system with a large number of RSDs. Please check the light condition, and perform software update under good light conditions. 2. If the fault persists, please contact SUNGROW Customer Service.
	The RSD is offline.	1. The RSD input connectors are in poor contact. 2. There is a fault in the module attached to the RSD. 3. The modules attached to the RSD are shaded. 4. There is a fault in the RSD. 5. The PV string may be connected with reverse polarity.	1. Check if the RSD input cables are properly connected. 2. After powering off*, check whether the voltage of the module is in normal range using a multimeter. 3. Check if the modules are shaded. 4. After powering off, check whether the voltage of the RSD is in normal range using a multimeter. 5. After powering off, check whether the

Layout	Status	Cause	Suggestions
			string voltage is in normal range using a multimeter. If the voltage is negative, check whether the PV cables are connected with reverse polarity.

NOTICE

"Power off": Switch off the external AC circuit breaker of the inverter, and then set the DC switch to "OFF". After that, wait 5–15 minutes, depending on the specific inverter model, until the capacitors inside the inverter are fully discharged.

The PV module is blue if the RSD is operating properly. The color shade of a module reflects its power generation efficiency. Darker blue indicates a higher power ratio and greater power generation efficiency.

Color Shade	Actual Power/PV Module Peak Power*100%
	80–100%
	60–80%
	40–60%
	20–40%
	0–20%
	Default

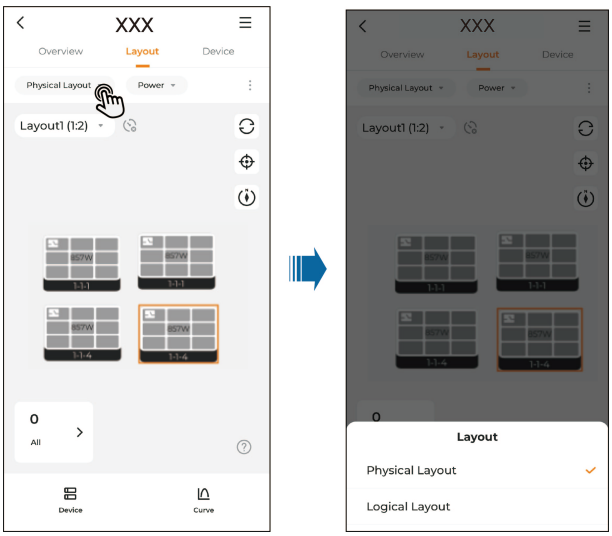
6.4.2 View Layout

Physical layout: The actual arrangement of the PV modules at the site.

Logical layout: The arrangement of PV modules in each string.

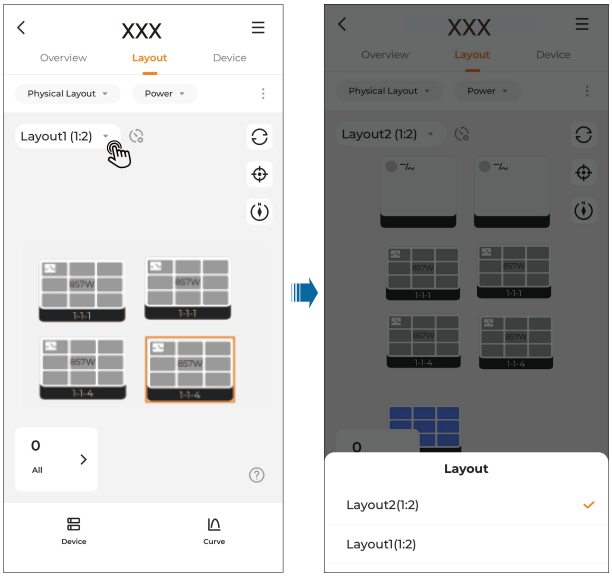
Switch between physical layout and logical layout

Tap **Layout** at the top of the screen. You may then choose to view the **Physical Layout** or **Logical Layout**.



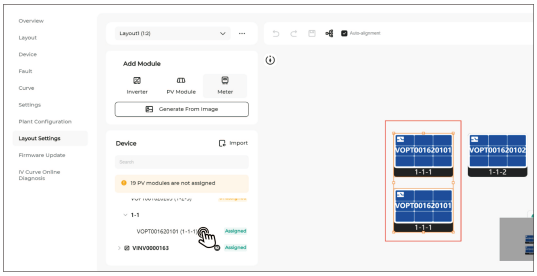
Switch between physical layouts

Tap **Layout1 (1:2)**. You may then switch between physical layouts with different device-to-module ratios.



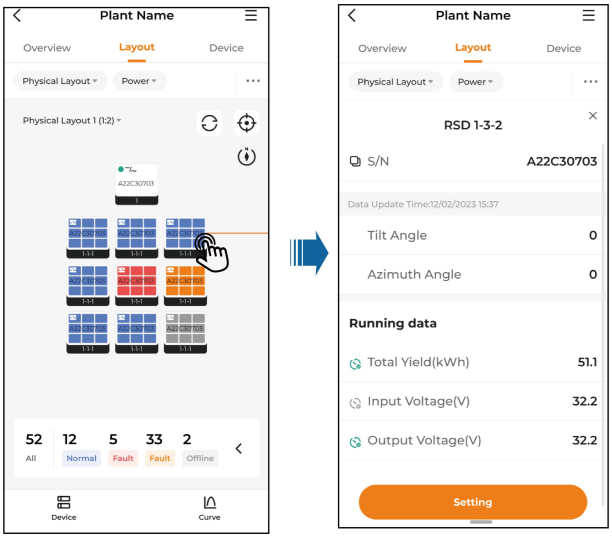
Quickly locate PV modules (for iSolarCloud only)

Double-click a device in the layout. The module associated with this device will also be selected.

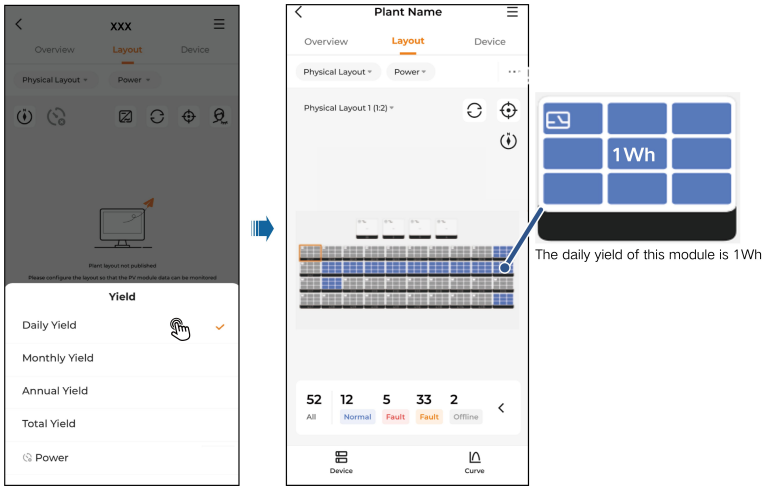


6.4.3 View Module Information

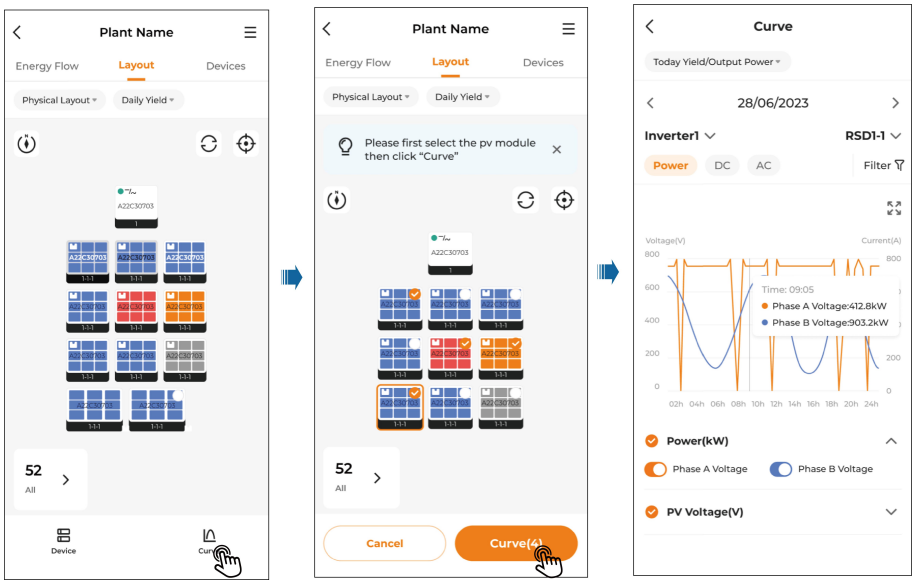
Step 1 Tap a module in the layout to view the device information and running data of the RSD.



Step 2 Tap **Daily Yield**. You can then choose to check the data on **Daily Yield**, **Monthly Yield**, **Annual Yield**, **Total Yield**, or **Power**. After an option is selected, the corresponding data will be shown on the modules. You can also select **Power** to get the data refreshed at intervals of seconds.



Step 3 To see how the data of a module changes over time, tap  in the lower right corner, select the target module, and tap **Curve**. The data curve of this module will then be shown.



--End

7 RSD Decommissioning, Dismantling, and Disposal

7.1 RSD Decommissioning

Prerequisite

⚠ CAUTION

Danger of burns!
Even if the RSD has stopped running, it may still be hot and cause burns. Perform operations on the RSD wearing protective gloves after it cools down.

Step 1 The inverter that is connected to the RSD has been powered off.

Step 2 Test the DC cables using a current clamp and confirm that they are current-free.

--End

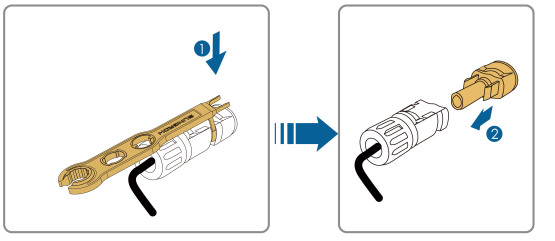
7.2 RSD Dismantling

Prerequisite

⚠ CAUTION

Danger of burns and electric shocks!
After the upstream and downstream devices of the RSD have been powered off, test the voltage and current using proper measuring instruments. Operations on the RSD can be performed by qualified persons who wear proper protective equipment after confirming that no voltage or current is present.

Step 1 Disconnect all electrical connections of the RSD by completing in reverse order the procedure described in 5.4 RSD Wiring. To disconnect the DC connector, use a specialized wrench to release the locking element first. Then, fit the waterproof stopper plug.



Step 2 If the RSD will be used again in the future, store it properly by referring to 3.2 RSD Storage.

--End

7.3 RSD Disposal

Users shall bear the responsibility for RSD disposal.

⚠ WARNING

Please dispose of the product in accordance with applicable local regulations and standards, to avoid property damages or personal injuries.

NOTICE

Some parts or components of the RSD may contaminate the environment. Please dispose of them by following the applicable electronic waste disposal regulations in the place where the RSD is installed.

8 Troubleshooting and Maintenance

8.1 Troubleshooting

If a fault occurs in the RSD, the fault information will be shown on the iSolarCloud App.

Fault Code	Fault Name	Possible Cause	Corrective Method
4	Input overvoltage	The PV voltage is higher than the set protection threshold value.	Check whether the open-circuit voltage of the PV modules attached to the RSD exceeds the maximum allowable input voltage of the RSD.
512	Hardware fault	A hardware fault occurs to the RSD.	Please contact SUNGROW Customer Service.

8.2 Maintenance

8.2.1 Maintenance Notices

⚠ DANGER

Risk of personal injury or device damage due to improper servicing!

- **Be sure to use specialized insulated tools when performing high-voltage operations.**
- **Before maintenance, power off the input and output sides first, then test the voltage and current using the specialized measuring instrument. Maintenance can be carried out by qualified persons who wear proper protective equipment only after confirming that no voltage or current is present.**
- **Danger of burns due to a hot surface still exists even if the product has stopped running. Perform operations on the product wearing protective gloves after it cools down.**

⚠ WARNING

In case of a fault in the product during its operation, before powering on again, make sure the fault has been removed. Otherwise, it may cause the influence of the fault to spread or device damages.

⚠ CAUTION

To prevent irrelevant personnel from operating the product by mistake or other accidents, please set up highly visible warning signages around the product or fence off a warning zone.

NOTICE

The RSD contains no components or parts that can be maintained. Do not open its enclosure or replace any of its internal components.
To minimize the risk of electric shocks, do not perform maintenance operations that are not specified in this manual. If necessary, contact SUNGROW for maintenance. Losses arising from failure to observe this instruction will not be covered by warranty.

NOTICE

Touching the PCB or other static-sensitive components may lead to device damages.

- **Do not touch the circuit board unnecessarily.**
- **Observe the specifications for protection against electrostatic discharges and wear an anti-static wrist strap.**

8.2.2 Routine Maintenance

The maintenance item and period of the device are listed in the table below.

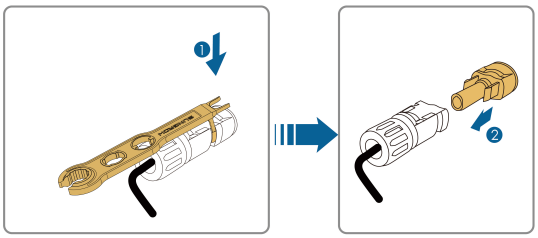
Check Item	Check Method	Maintenance Period
Running status	Check whether the device operates normally. Check whether there is abnormal noise or sound during operation.	Once every six months
Electrical connection	Check whether cables are loose or fall off. Check whether cables are damaged.	Once every six months to a year

8.2.3 Replace the RSD

Step 1 The inverter connected to the RSD has been powered off.

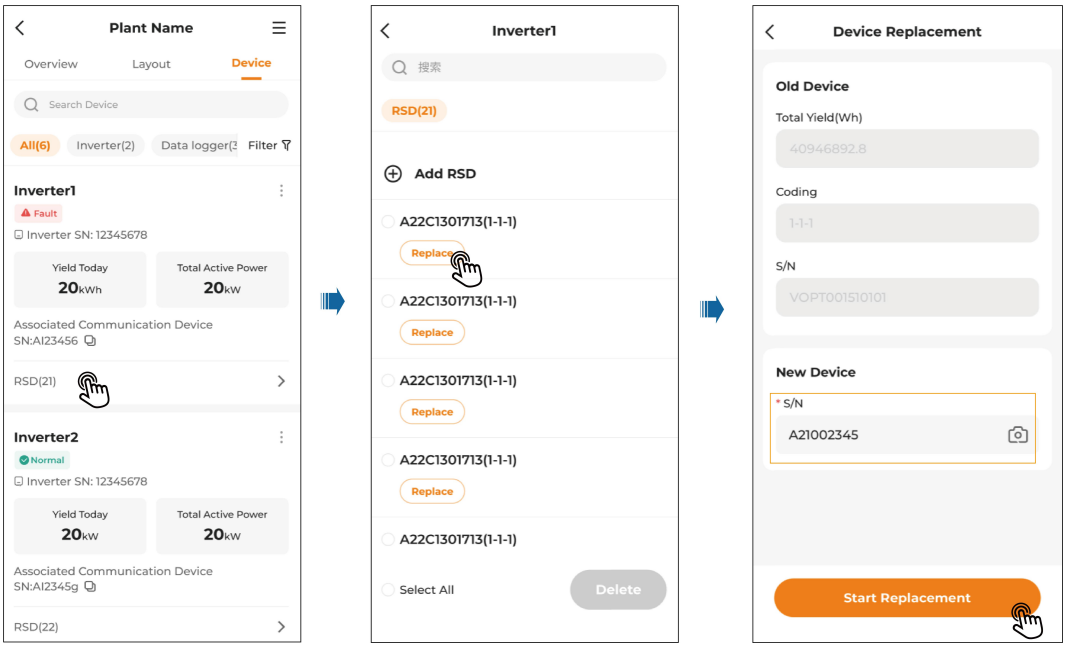
Step 2 Check and confirm that the DC cables are current-free using a current clamp.

Step 3 Disconnect all the electrical connections of the RSD. When disconnecting the DC connector, use an MC4 wrench to release the locking element first, and then fit the waterproof stopper plug.



Step 4 Replace the RSD. Mount the RSD and complete the wiring by referring to 5.4 RSD Wiring.

Step 5 Power on the inverter. Log in to the iSolarCloud App. Tap the plant name from the plant list on the **Monitoring** screen. Then, on the **Device** screen, choose “RSD” at the bottom of the inverter card. Find the S/N of the RSD to be replaced, and tap **Replace** below. Enter the S/N of the new RSD, or tap to scan the QR code on its enclosure. Then, tap **Start Replacement**.



After replacement, the new device will take the place of the old device in the layout automatically and thus does not need to be added again.

--End

9 Appendix

9.1 Technical Data

Parameter	SR20D-M
Electrical Data	
Input channels / Number of PV Modules	1 / 2
Input voltage range per channel	12V – 125V
Output voltage range	12V – 125V
Max.PV input current per channel	20 A
Max.DC short-circuit current per channel (Isc)	30 A
Max. system voltage	1100 V
Safety output voltage	1 V
Power consumption	< 1 W
Mechanical Data	
PV input / output connector	Stäubli MC4/MC4 compatible(Optional)
Mounting method	Snap-fit or bolt installation
PV input wire length	1.4 m (+ / -)
PV output wire length	0.2 m (+) / 2.95 m (-)
Dimensions (W * H * D)	86 mm * 143 mm * 27 mm
Weight (including cables)	0.9 kg
Environmental & Protection	
Operating ambient temperature range	-40℃ –85℃
Allowable relative humidity range (non-condensing)	0% – 100%
Degree of protection	IP68

Parameter	SR20D-M
Communication	PLC (≤ 450m)
Compliance	
Standard compliance	IEC/EN 62109-1 (class II safety), IEC/EN 61000-6-1/-2/-3/-4
Compatible products	SG25/30/33/36/40/50CX-P2 SG125CX-P2 SG150CX

Type designation	SR200T-BX
Input	
AC input power	15 W
AC voltage range	100 V - 276 V
Rated grid frequency	50Hz / 60Hz
Max. input DC cables	30
Overvoltage category	III
Output	
Max. number of DI	1
RSD Control signal	DI or AC Power Off
Core spec	
Number of Cores	3
Max. string voltage	1000 V
Max. current of single cores	200 A
Number of cables per cores	10 strings on 4 mm^2 or 6 mm^2 6 strings on 10 mm^2
General data	
Dimensions (W * H * D)	415 mm * 280 mm * 102 mm
Input / output DC ports diameter	35 mm * 3 / 35 mm * 3

Type designation	SR200T-BX
Weight	3 kg
Degree of protection	IP65
Allowable relative humidity range (non-condensing)	5 % - 95 %
Operating ambient temperature range	-30 °C - 50 °C
Max. operating altitude	4000 m
Mounting method	Wall-mounting bracket
Communication	PLC (≤ 450 m)
Standard compliance	IEC 61000-6-1 / -2 / -3 / -4, IEC 62109 -1 (Protective class I), IEC 60529

9.2 Quality Assurance

When product faults occur during the warranty period, SUNGROW will provide free service or replace the product with a new one.

Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, SUNGROW has the right to refuse to honor the quality guarantee.

Conditions

- After replacement, unqualified products shall be processed by SUNGROW.
- The customer shall give SUNGROW a reasonable period to repair the faulty device.

Exclusion of Liability

In the following circumstances, SUNGROW has the right to refuse to honor the quality guarantee:

- The free warranty period for the whole machine/components has expired.
- The device is damaged during transport.
- The device is incorrectly installed, refitted, or used.
- The device operates in harsh conditions beyond those described in this manual.
- The fault or damage is caused by installation, repairs, modification, or disassembly performed by a service provider or personnel not from SUNGROW.
- The fault or damage is caused by the use of non-standard or non-SUNGROW components or software.

- The installation and use range are beyond stipulations of relevant international standards.
- The damage is caused by unexpected natural factors.

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of SUNGROW.

Product data such as product dimensions are subject to change without prior notice. The latest documentation from SUNGROW should take precedence in case of any deviation.

9.3 Contact Information

In case of questions about this product, please contact us. We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device
- Fault code/name
- Brief description of the problem

For detailed contact information, please visit: **https://en.SUNGROWpower.com/contactUS**

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Sungrow Power Supply Co., Ltd.

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