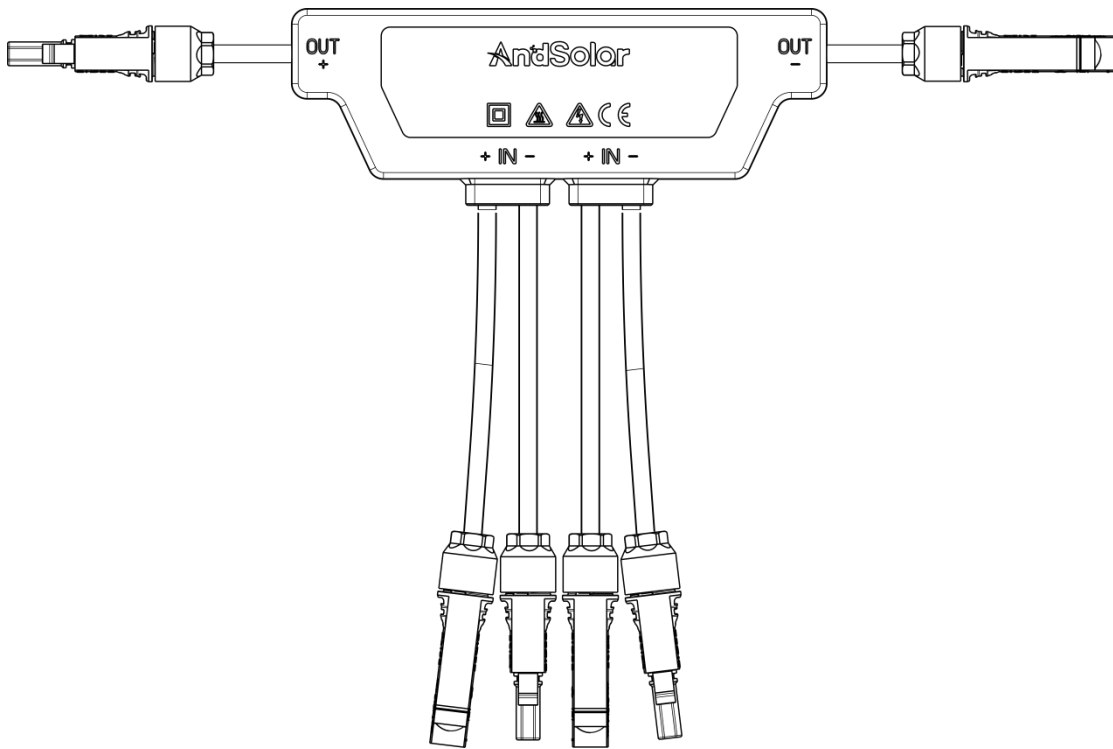




# User Manual

Module Level Rapid Shutdown System



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## 1. Precautions

### 1.1. Marking Definitions

#### **⚠ Danger**

Indicates that it may trigger high-voltage electric shock or discharge accidents, which may cause serious harm to the human body and property, such as causing personal injury or death or fire accident.

#### **⚠ Warning**

Indicates that it may trigger a high-voltage electric shock or discharge accident, which is moderately harmful to the human body and property, such as causing a brief electric shock to a person or partially damaging asset.

#### **⚠ Notice**

Indicates practice that might damage the RSD product, or products that are electrically connected to the RSD.

#### **Attention**

Indicates important information about the product. Failure to comply may result in rework or failure to fully function properly.

### 1.2. Unboxing and Inspection

#### **⚠ Warning**

Check all safety signs and product labels to ensure they are clearly visible and not obscured.

After unpacking, check whether the Andsolar smart RSD product (AMCL) is damaged and whether it is the product model ordered. If you find the above problems, do not proceed with the installation and contact customer service immediately.

### 1.3. Product Installation

### **⚠ Danger**

Please perform all electrical installation in accordance with local electrical codes.

Make sure there are no electrical connections prior to installing the product.  
Do not attempt installation in unfavorable weather.

### **Attention**

Indicates important information about the product. Failure to comply may result in rework or failure to fully function properly.

## 1.4. AMCL Electrical Connection Precautions

- (1) Please do not short-circuit the AMCL output port, otherwise AMCL will be damaged;
- (2) When installing AMCL, please first connect the PV modules to the AMCL input port, and then connect the output ports of two adjacent AMCLs in series. Please do not use the AMCL input or output port incorrectly, such as connecting PV modules to the output of AMCL or connecting the input port of AMCL to the string DC line;
- (3) If you need to disconnect AMCL, please disconnect the adjacent AMCL output port first, and then disconnect the input port which connect AMCL to PV module;
- (4) If you need to connect AMCL to a single PV module, you need to connect the PV module to the input 1 (PV 1) port of AMCL-B2, and plug the positive and negative connector of the other input port (PV 2) directly into each other. ;
- (5) Do not use AMCL with different types of DC terminals, otherwise it may cause damage to AMCL and this damage is not covered by the warranty;
- (6) Before disconnecting the AMCL wiring, please use a current clamp meter to confirm that AMCL is in a no-current state.

## 1.5. Operation

### **⚠ Danger**

When the product is working, it is prohibited to plug or unplug any connectors on the product.

When the product is running, please do not disassemble any parts, as there is a risk of electric shock.

### **⚠ Warning**

Please do not touch the product's surface when it is working to prevent burns.

## 1.6. Maintenance and Replacement

- (1) Do not disconnect the PV module from AMCL before disconnecting the AC power supply.
- (2) If the AMCL surface is physically damaged, do not operate it directly. Check that existing cables and connectors are functioning properly. Do not operate with damaged wiring or connectors.
- (3) There is a risk of electric shock. Do not remove the casing, disassemble or repair. This product has no user-serviceable parts. In case of failure, please contact Andsolar after-sales service. Disassembly or damage to this product will void the warranty

## 1.7. Product Handling

- (1) This manual contains important instructions for the installation and maintenance of the AMCL Smart RSD products and ADCU Data Central Unit Kit. Please read all instructions and warning signs before installing or using the AMCL system. Failure to follow the instructions or warnings in this manual may result in personal injury or death, system damage, and voiding of the warranty.
- (2) Please perform all electrical installations in accordance with local electrical codes.
- (3) Installation must be performed by trained professionals. Andsolar is not

responsible for product malfunction or damage caused by incorrect operation, installation or improper use.

- (4) Do not attempt installation in unfavorable weather.
- (5) Please do not touch the surface of AMCL when working to prevent burns.
- (6) Do not disconnect the PV module from AMCL before disconnecting the AC power supply.
- (7) Do not operate if the AMCL surface is physically damaged. Check that existing cables and connectors are functioning properly. Do not operate with damaged wiring or connectors.

## 2. Product Introduction

### 2.1. Module Level Smart RSD AMCL



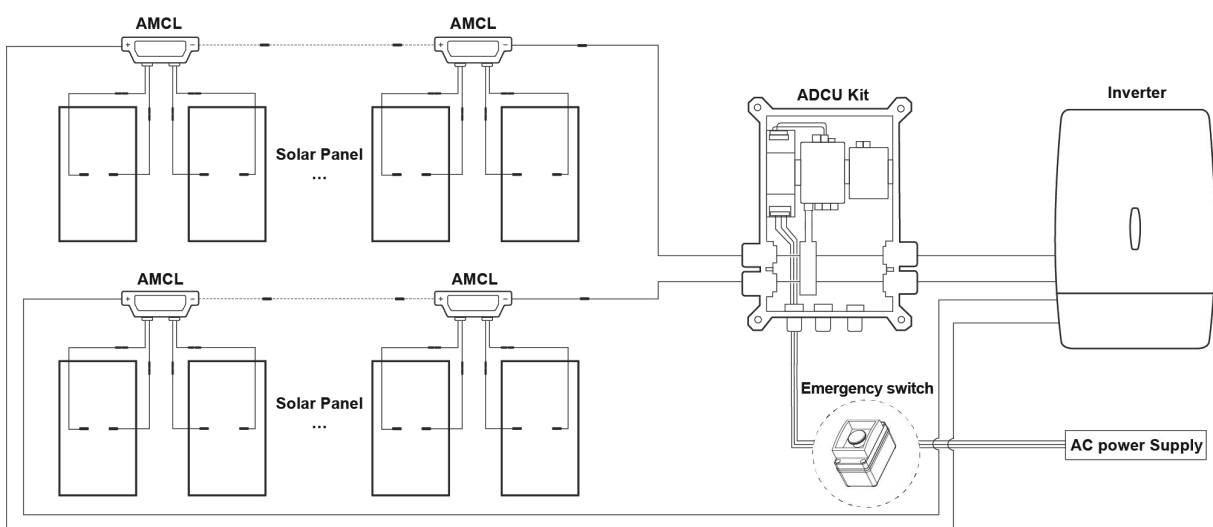
- (1) Compliance with NEC 2017 & 2020 (690.12) requirements;
- (2) Rapid Shutdown Method : emergency switch manual shutdown, App remote shutdown, high temperature automatic shutdown;
- (3) Module-level data monitoring: module voltage, current, power, equipment temperature, etc.;
- (4) Two-way PLC for high-speed communication.

### 2.2. ADCU Outdoor Kit



- (1) Data Central Unit (ADCU) is part of rapid shutdown solution to be paired with AMCL Smart RSD units, a PV module-level RSD unit;
- (2) While powered on, ADCU sends the power and signals to AMCL units to keep their PV modules connected and supply the energy. When switched off, ADCU will turn off, and AMCL units will automatically disconnect the connection between PV modules and DC system. When the power is restored to ADCU, AMCL will resume the PV module operation;
- (3) This solution complies with NEC 2017&2020(690.12) specifications.

### 3. System Topology Diagram



### 4. Unboxing and Inspection

### ⚠ Warning

Check all safety signs and product labels to ensure they are clearly visible and not obscured.

After unboxing, check whether the AMCL is damaged and whether it is the product model ordered. If you find the above problems, do not proceed with the installation and contact customer service immediately.

## 5. Module Level Smart RSD AMCL Installation

### ⚠ Warning

Please ensure that there are no electrical connections before installing the product.

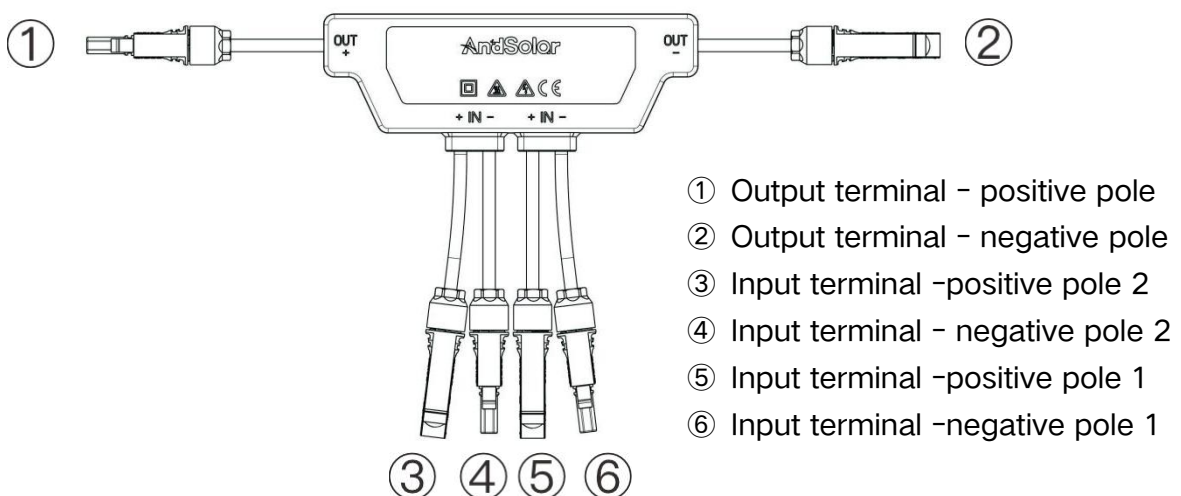
Do not attempt installation in unfavorable weather.

### Attention

Before installing the product, confirm that the installation tools used are available and within the maintenance cycle.

Installation, operation and maintenance must be performed by trained professionals. Andsolar is not responsible for product malfunction or damage caused by improper operation, installation, maintenance or improper use.

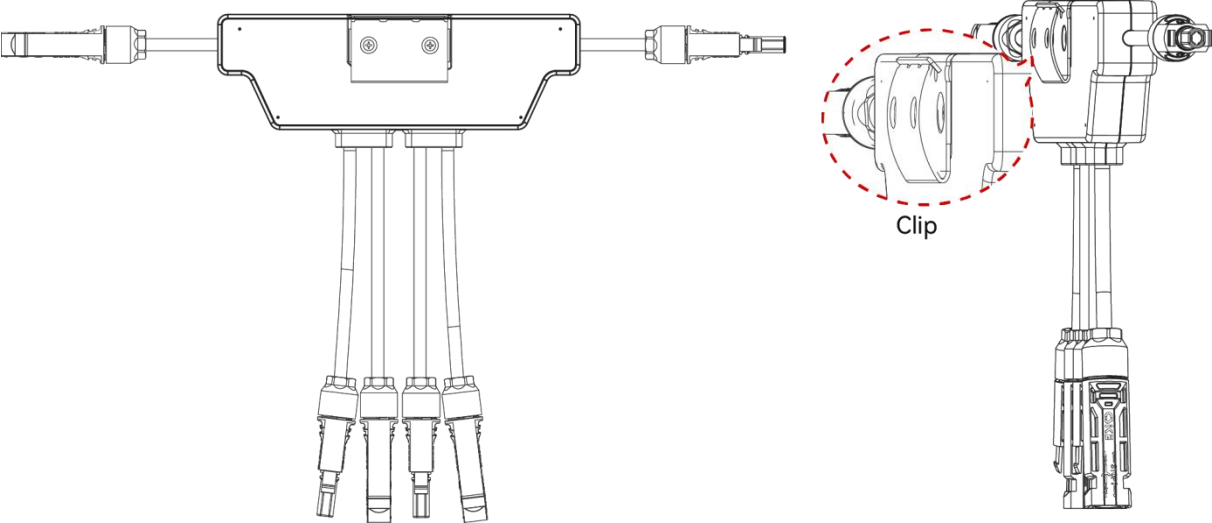
### 5.1. Product introduction



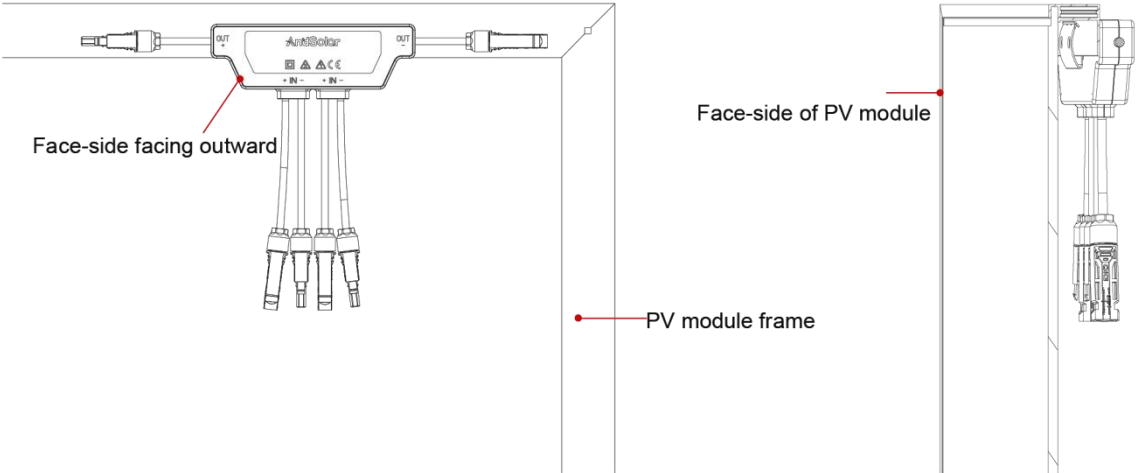
### 5.2. Installation method



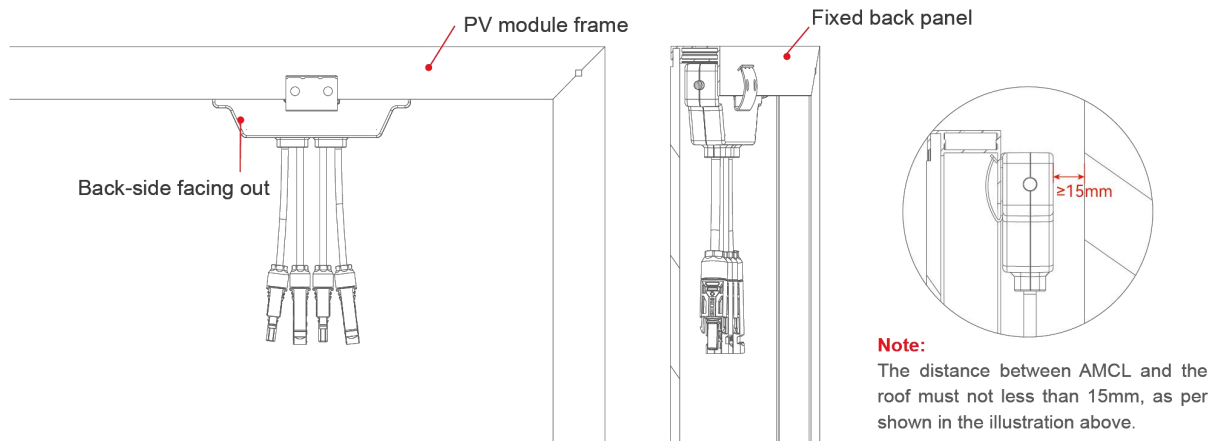
5.2.1. Clip installation



Method 1 (recommended): Install AMCL on the PV module frame with the AMCL facing outward



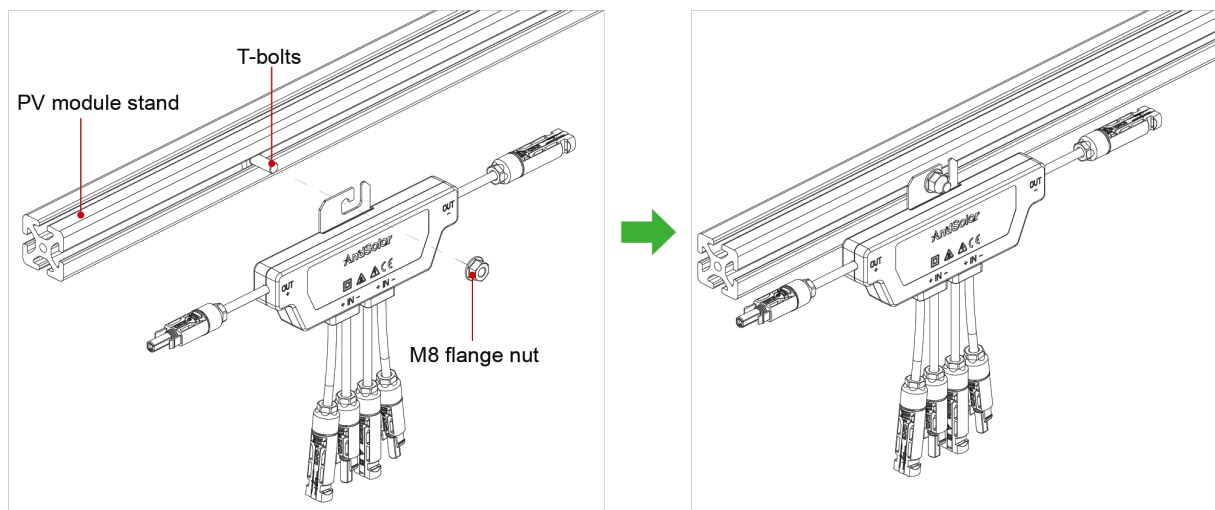
Method 2: Install AMCL on the PV module frame with the AMCL facing inwards.



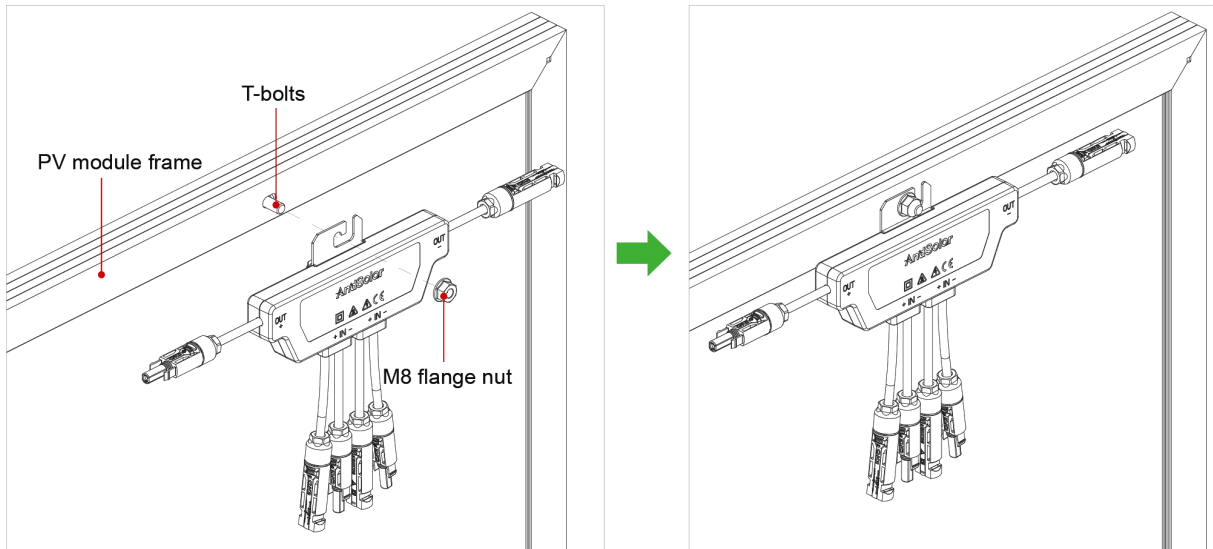
Note: The distance between AMCL and the roof must not less than 15mm, as per shown in the illustration above.

### 5.2.2. Bolt installation

Method 1: Install on the PV module stand using T-bolts.

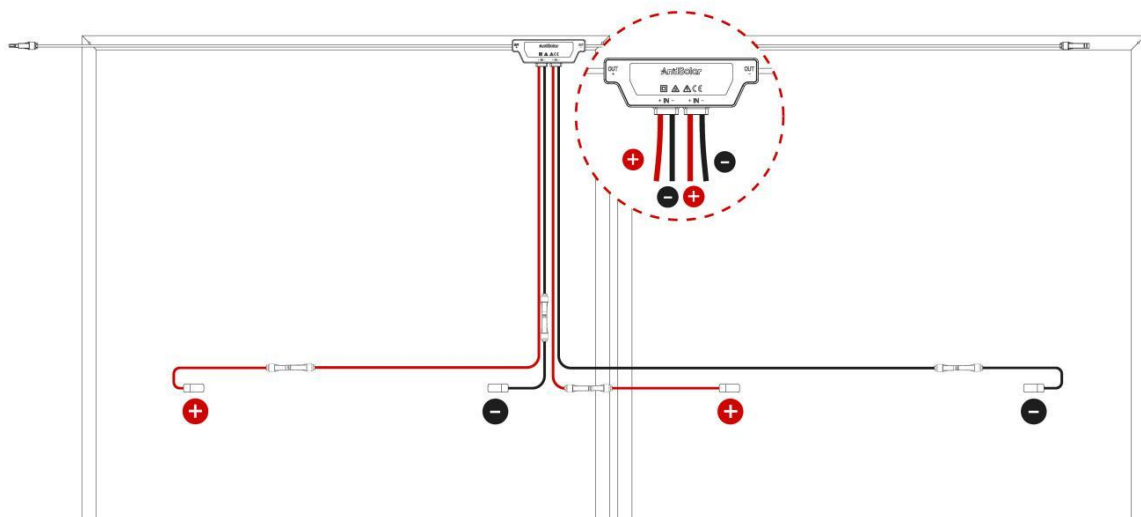


Method 2: Install on the PV module frame.



## 5.3. Cable installation

### 5.3.1. Connect AMCL and photovoltaic module cables



#### ⚠ Danger

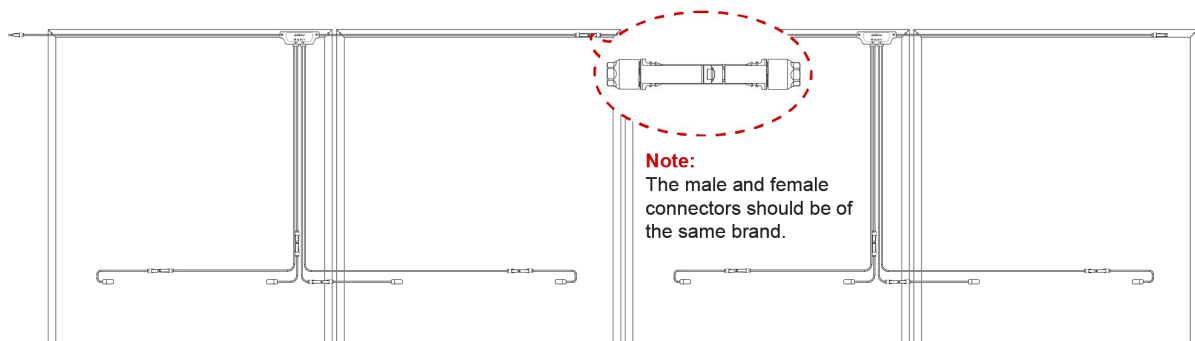
Please ensure the inverter and components are disconnected before connecting cables, otherwise it may cause electric shock.

#### ⚠ Notice

The positive and negative poles of a single PV module must be connected to the positive and negative poles of input PV 1 or the positive and negative poles of input PV 2 of the RSD respectively. For example, it is not allowed to connect the positive and negative poles of the PV panel to RSD' s input PV1+ and

PV2- or to input PV2+ and PV1-, otherwise the product may be damaged. Do not connect PV module to the output terminal of the RSD, otherwise the product may be damaged as well.

### 5.3.2. Connect two adjacent AMCL output ports in series



#### ⚠ Warning

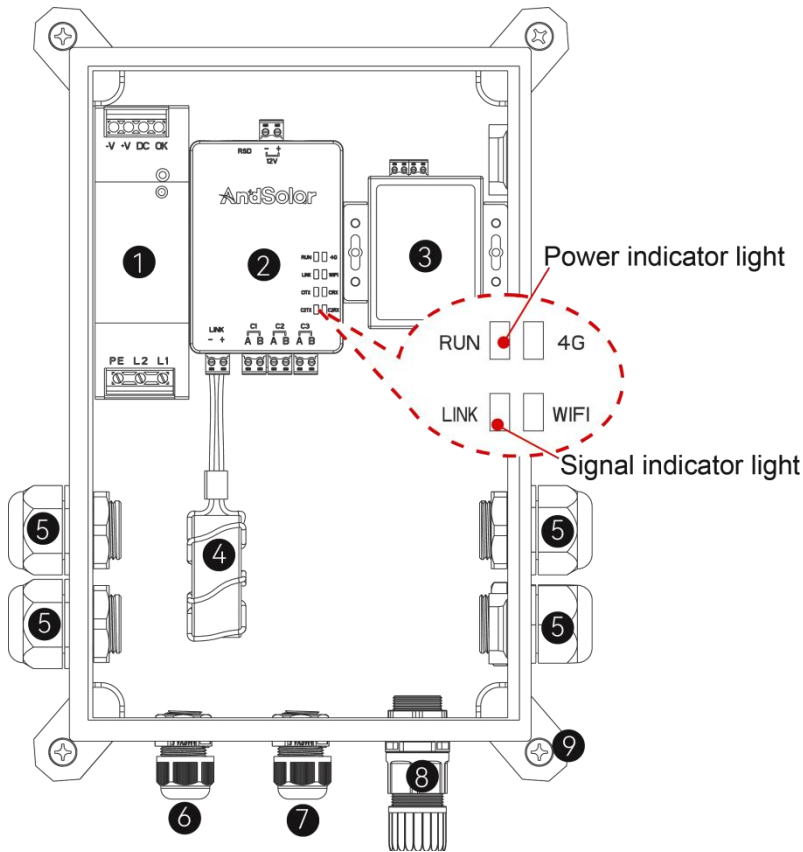
Please ensure to connect the input of the circuit breaker first, and then connect the output of the circuit breaker, otherwise it may cause an electric shock accident.

## 6. ADCU Outdoor Kit Installation

#### ⚠ Danger

When installing the ADCU, please ensure that the AC power input is disconnected from the power grid, otherwise you may get an electric shock.

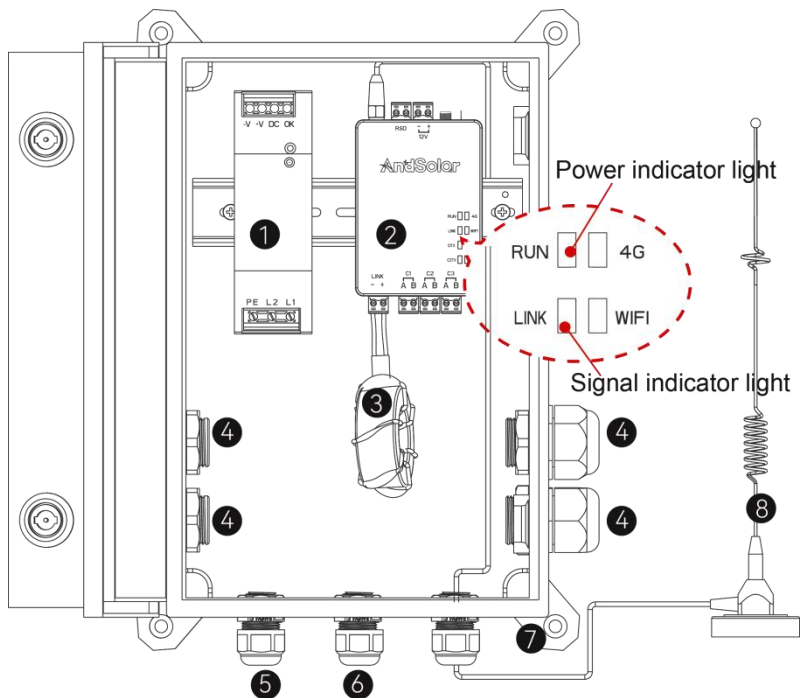
### 6.1. Product introduction



**Components:**

- ① 12V Power Supply
- ② ADCU
- ③ TAS-LAN-475
- ④ Magnetic Ring
- ⑤ Waterproof Port 1
- ⑥ Waterproof Port 2
- ⑦ Waterproof Port 3
- ⑧ RJ45 waterproof port
- ⑨ Mounting part

**ADCU (LAN)**



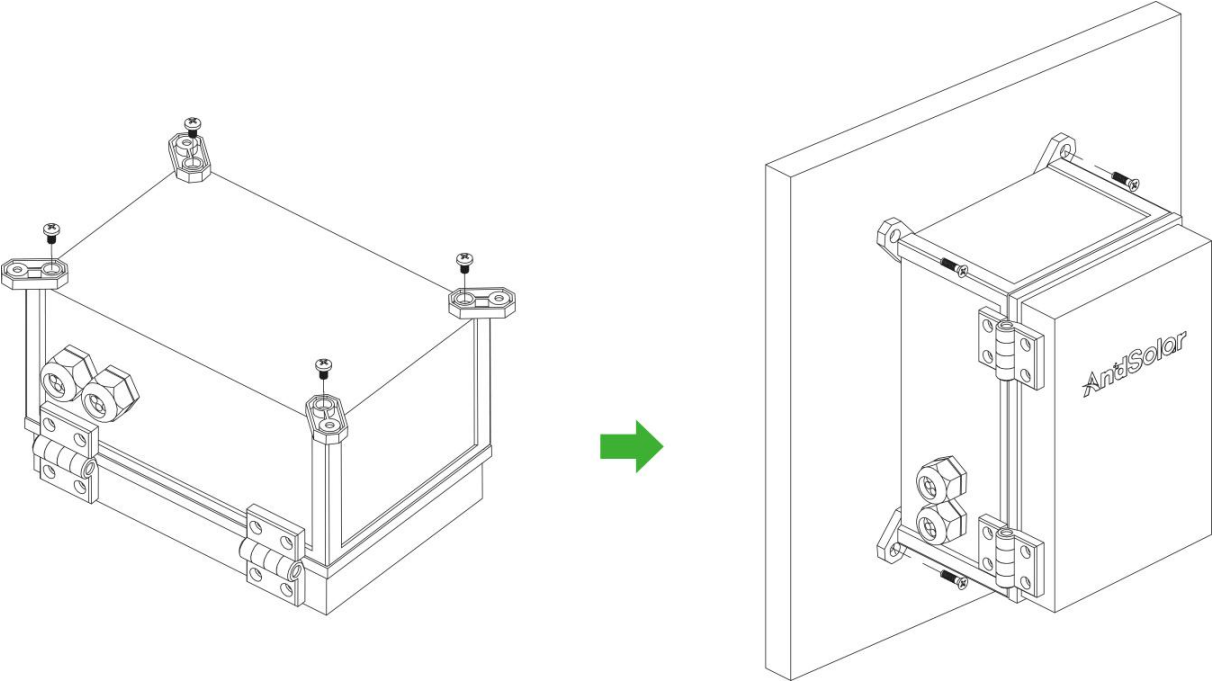
**Components:**

- ① 12V Power Supply
- ② ADCU
- ③ Magnetic Ring
- ④ Waterproof Port 1
- ⑤ Waterproof Port 2
- ⑥ Waterproof Port 3
- ⑦ Mounting part
- ⑧ 4G Antenna

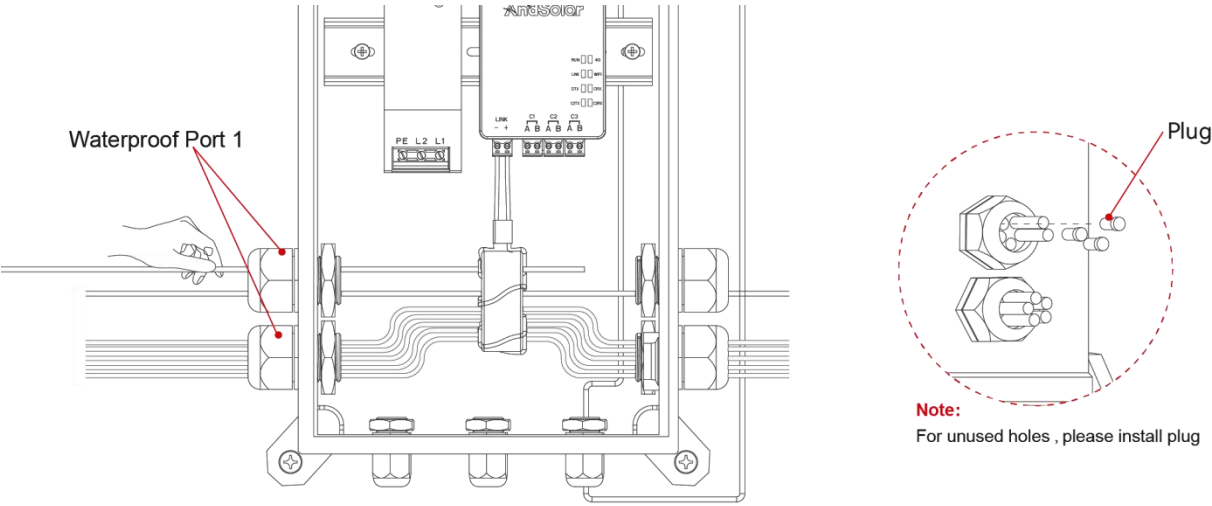
**ADCU (4G)**

**6.2. Installation Procedure**

Step1 : Fixed the mounting part on the four corner of the back of ADCU and install it to the wall or install it on the bracket



Step 2: Pass the negative DC cable through the waterproof port 1 and through the magnetic ring then connect it to the inverter, Connect the positive DC cable directly to the inverter



**Attention**

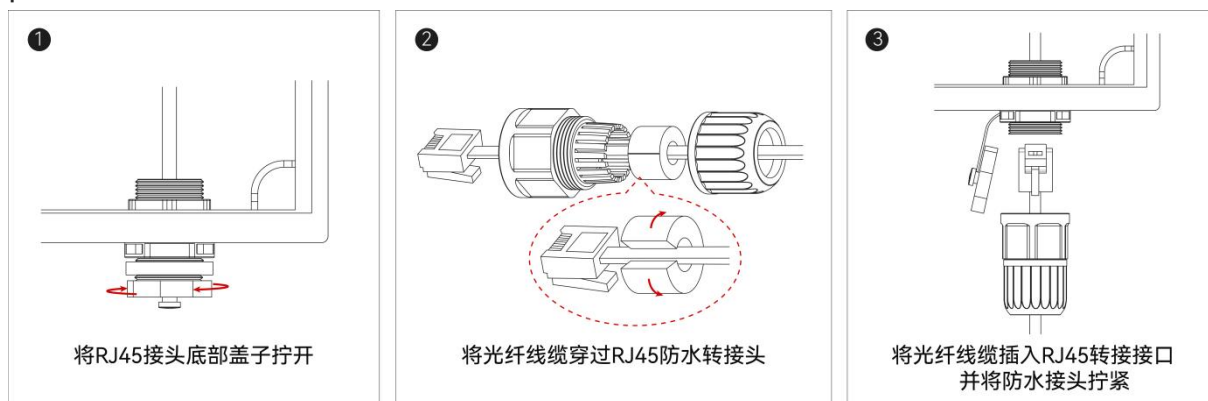
Do not pass the positive pole of the RSD through the magnetic ring, otherwise it will affect the HPLC communication function of the product and may further cause the PV panel to be unable to generate electricity.

Different branches of the same MPPT of the inverter should be connected to

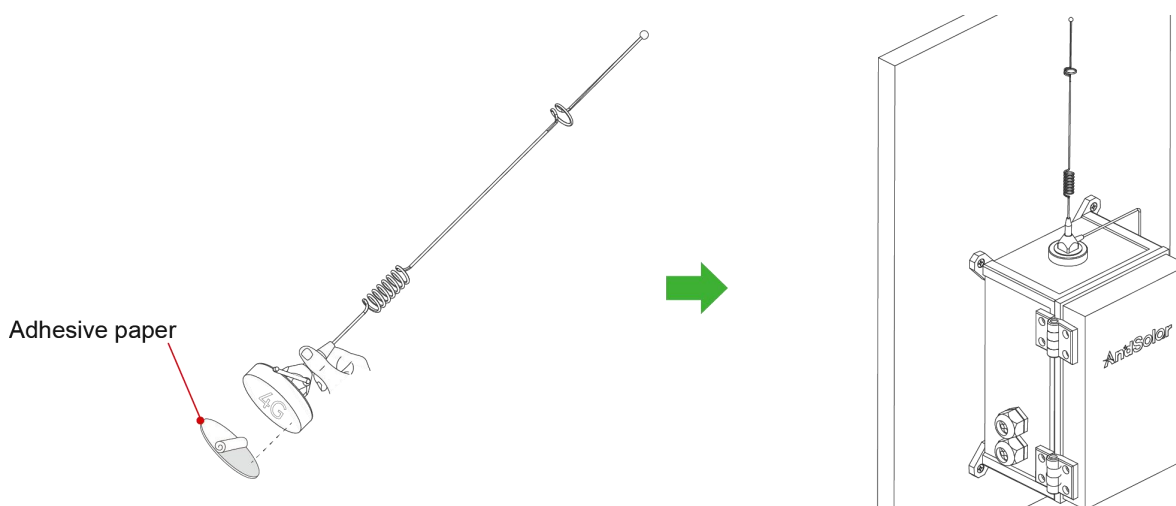
the same ADCU.

### Step 3 Communication installation

(1) LAN: connect the internet cable to the device through the RJ45 waterproof port



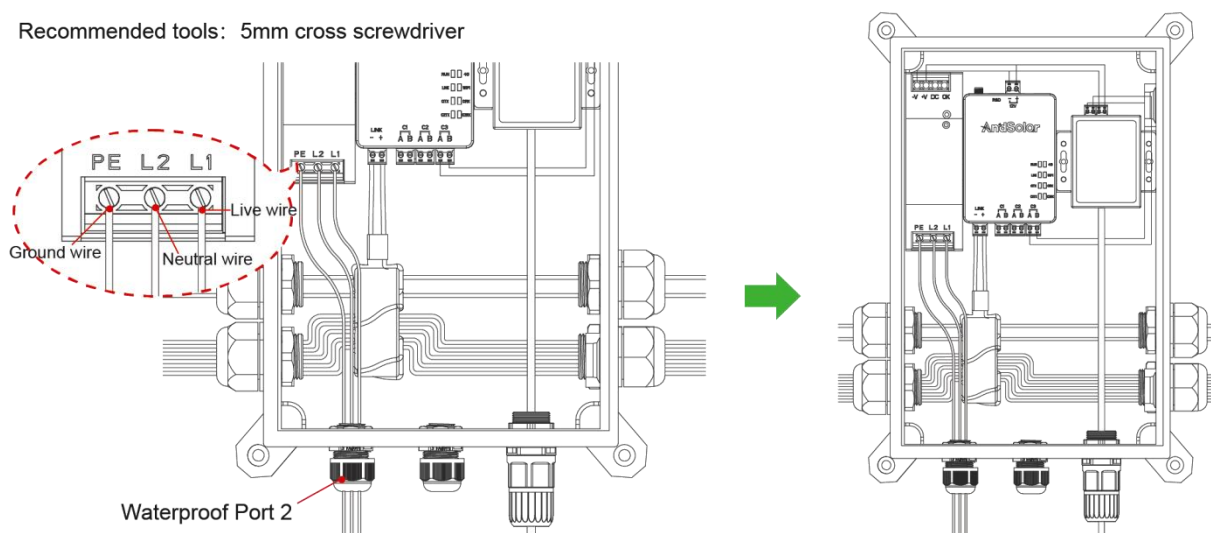
(2) 4G: Tear the adhesive paper, attach the paper to the 4G antenna base, and then secure the 4G antenna to the top of the ADCU Outdoor Kit



Step 4: Pass the AC power cable through the waterproof port 2 and connect it to the input port of the 12V power supply switch

(Recommended tools: 5mm cross screwdriver)

Recommended tools: 5mm cross screwdriver



Note:

- (1) Please install the AMCL first, before supplying power to ADCU;
- (2) When the system is running normally, the power indicator light is always on, and the signal indicator light is flashing. If the ADCU malfunctioning, the signal indicator light will be turned off. If the power indicator light is turned off, please check whether the power supply is malfunctioning;
- (3) Maximum no. of strings input to single magnetic ring: 5/10 (cable diameter 6.35mm);
- (4) Single magnetic ring maximum current: 150A;
- (5) The maximum communication distance between AMCL and ADCU : 800M;
- (6) Recommended ADCU power supply cable: 1.5 mm<sup>2</sup> cable;
- (7) PV Strings connected to one MPPT of an inverter should be connected to the same ADCU.



## 7. Product Specifications

### 7.1. Module Level Smart RSD AMCL

Model	AMCL-A2	AMCL-B2	AMCL-C2
<b>Input Parameters</b>			
Voltage Range	8-80V Single-channel, 120V Dual-channel		
Maximum Input Current	15A	20A	25A
Maximum Short-Circuit Current	30A		
<b>Output Parameters</b>			
Voltage Range	8-120V		
Maximum System Voltage	600/1000/1500V		
Maximum Output Current	15A	20A	25A
Maximum Voltage in Disconnect State	1V		
<b>Structure Parameters</b>			
Dimensions (W*D*H)	180*23*70mm		
Input/Output Connectors	MC4/Compatible with MC4/Customizable		
Input Cable Length	0.6m/Customizable		
Output Cable Length	1.4m/Customizable		
Ingress Protection Rating	Type 6P/IP68		
<b>Environment Parameters</b>			
Temperature Range	-40~+85°C		
Relative Humidity Range	0~100%		
<b>Other Parameters</b>			
Communication Method	HPLC		
User Interface	WEB+APP		
<b>Certification</b>			
Safety	NEC 2017&2020(690.12), UL1741, UL 3741, IEC 62109-1		
EMC	FCC Part15, IEC/EN 61000-6-1/-2/-3/-4		

### 7.2. ADCU Outdoor Kit

Model	ADCU
<b>ADCU</b>	
Input Voltage	12Vdc

AMCL Communication	HPLC
Cloud Communication	4G/LAN/Wi-Fi
Max. No. of Modules in Series	30
Maximum MPPT String Voltage	1500V
Safety	NEC2017&2020 ( 690.12 ) , UL1741, UL3741
EMC	FCC Part15 , IEC/EN 61000-6-1/-2/-3/-4
<b>Power Supply</b>	
Input Voltage	180~550Vac
<b>Magnetic Ring</b>	
Specification	38mm
Inner Dimension/Outer Dimension	38mm/63mm
Maximum Current of Single Magnetic Ring	250A
Max. Input Strings of Single Magnetic Ring	10
Max. PV module of Single Magnetic Ring	200
<b>Outdoor Box Specifications</b>	
Temperature	-40°C~+85°C
Dimensions (W*D*H)	200*180*300mm
Ingress Protection Level	IP65

## 8. Frequently Asked Questions (FAQ)

Q1: The clip installation method is difficult to install. How to solve the problem?

A1: When installing, the product can be tilted 30°. First, snap one side into place, and then snap the other side into place, which will require less effort.

Q2: When an RSD is connected to two PV panels, how to distinguish PV 1 and PV 2?

A2: The two input ports PV 1 and PV 2 are marked on AMCL products. If the identification cannot be confirmed, you can judge based on the AMCL structure. The port next to the negative pole of the AMCL output is connected to PV 1, and the port next to the positive pole of the AMCL output is connected to PV 2. Connecting mistake or recording errors will affect the precise physical location of the component, but will not affect normal power generation and shutdown functions.

Q3: How to ensure on-site construction efficiency?

A3: Recommended installation steps:

- (1) After getting the PV panel wiring drawing, mark the place where the switch needs to be installed in advance, print it out and bring it to the site.
- (2) After unboxing the RSD, place each RSD according to the position marked on the drawing.
- (3) Remove the binding band (if any) on the RSD.
- (4) Tear off the QR code on each RSD label as required and stick it on the “Physical Positioning Template” printed in advance.
- (5) When connecting the input terminals, when connecting the output terminals in series, pay attention to start from the first RSD on the positive pole of a string, leaving the positive output of the switch floating, and serially connecting to the last one. Ensure that the positive and negative poles of the entire string are accurate and will not be reworked.

Q4: After the RSD is connected in series, why is the measured string voltage 0V?

A4: Regulations require that the RSD is in the off state by default. The ADCU needs to be installed and powered. The ADCU will transmit a HPLC signal

through the negative cable of the string to the RSD. After receiving the signal, the RSD will switch to the conducting state, and the string voltage can be measured normally at this time.

Q5: Can the AC power supply of the ADCU be taken from the AC side of the inverter nearby?

A5: It is first recommended to use grid electricity or draw power from the grid-connected box. When meeting relevant national and regional requirements or design standards, power can also be taken from the nearest inverter, but a suitable circuit breaker needs to be connected in series with the live wire to ensure that it will not be burned when the circuit fails or is short-circuited.

Q6: Can the RSD be placed on the ground?

A6: The RSD needs to be hung on the PV panel in strict accordance with the requirements, or installed on the bracket with screws.

Q7: Can the one-to-two AMCL product be connected to only one PV module to work? How to connect?

A7: Yes. If you want to connect AMCL to a single PV module, you need to connect the PV module to the input 1 (PV 1) port of AMCL, and plug the positive and negative terminal of the other input port (PV 2) directly into each other.

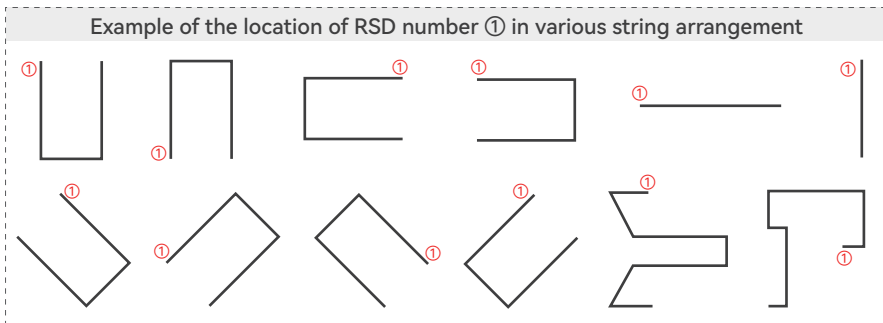
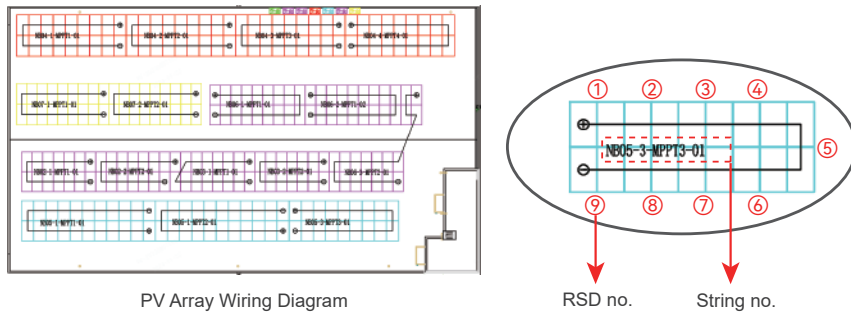
Q8: Does the inverter need to correspond to the ADCU? What should I do if the number of PV strings supported by the inverter is inconsistent with the number of PV strings supported by the ADCU?

A8: PV strings connected to different inverters and different MPPTs can be connected to the same ADCU. It should be noted that different branches of the same MPPT of the inverter should be connected to the same ADCU.

## Physical Layout Template Usage Guide

1. Prepare the PV array wiring diagram. The diagram must include the string number and the corresponding PV position of each string, as per shown in the figure below. The QR codes from RSD label should be pasted to the physical layout diagram according to the order of string wiring, with each PV string correspond to only one physical layout template.

At both ends of each string, appoint the RSD at the upper end of the string wiring diagram as number ① (if the two ends are on the same level, appoint the RSD at the left end as number ①), and then number them in sequence according to the direction of the string line, as shown in the figure below.



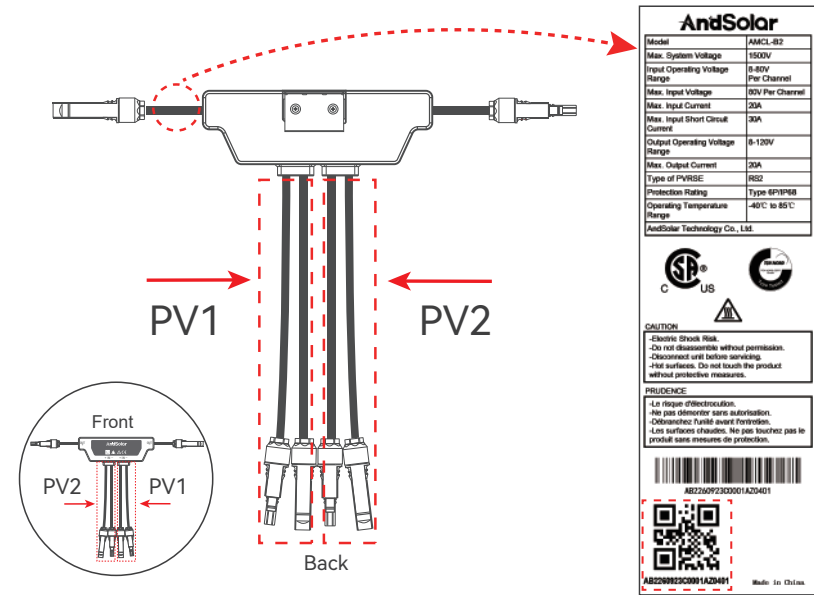
2. Stick the QR code of the ADCU to the corresponding position on the Physical Layout Template; copy the string number on the PV Array Wiring Diagram to the corresponding position on the Physical Layout Template.

(Note : each ADCU will have 10 QR Code Stickers)

ADCU QR code spot

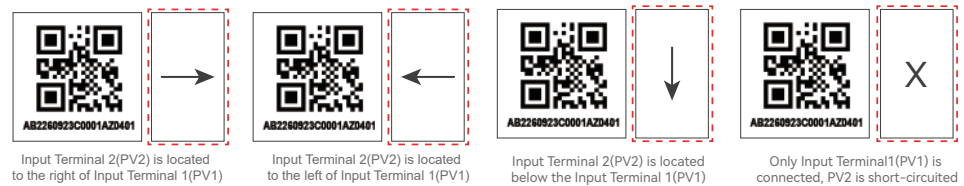
String no. \_\_\_\_\_

4. If the PV module is connected to the Input Terminal 1(PV1) of the RSD, please peel off the QR code from the RSD label and stick it into the corresponding square of the Physical Layout Template.



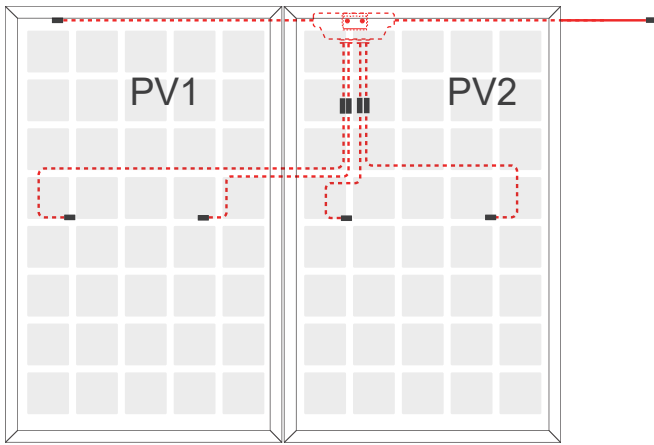
5. If the PV module is connected to the Input Terminal 2 (PV2) of the RSD, draw an arrow in the corresponding square. The arrow indicates the direction of the PV module connected to the PV2 input relative to the PV module connected to the PV1 input; If there is only one PV module, the Input terminal 1(PV1) input of the RSD must be connected to RSD, Input Terminal 2(PV2) must be short-circuited(connect positive and negative pole), and an "x" must be drawn in the blank square after it, as shown in the figure below.

(Note: Based on the front perspective view of the PV module)

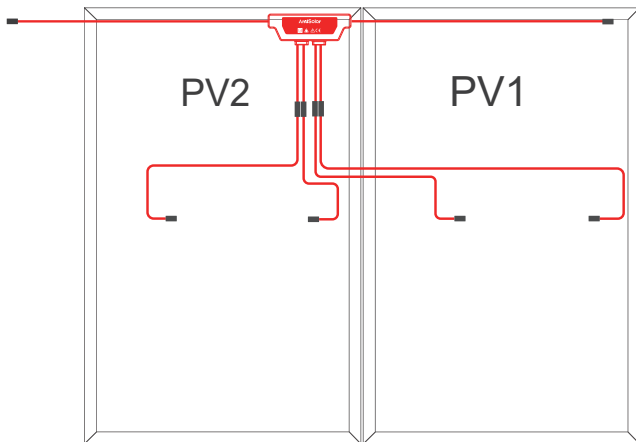


6. Upload the finished Physical Layout Template and corresponding PV Array Wiring Diagram to the AndSolar Cloud Platform APP.

## Completed RSD Installation Drawing



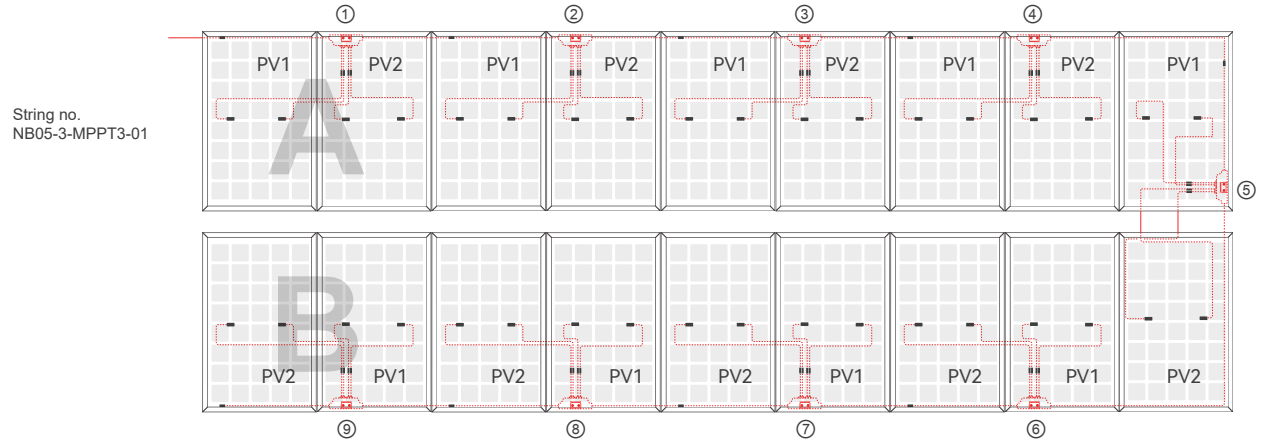
Front view



Back view

## PV String Arrangement Sample

At both ends of the string, A and B, appoint the RSD at the upper end of the string wiring diagram as number ① (if the two ends are on the same level, appoint the RSD at the left end as number ①)



## Physical Layout Template Usage Examples

ADCU QR  
code spot

String no. NB05-3-MPPT3-01

User: XXXXXXXXXX

①	②	③	④	⑤	⑥
 <small>AB2269823C0001AZB401</small>	→ <small>AB2269823C0001AZB401</small>	→ <small>AB2269823C0001AZB401</small>	→ <small>AB2269823C0001AZB401</small>	→ <small>AB2269823C0001AZB401</small>	↓ <small>AB2269823C0001AZB401</small> ←
⑦	⑧	⑨	⑩	⑪	⑫
 <small>AB2269823C0001AZB401</small>	← <small>AB2269823C0001AZB401</small>	← <small>AB2269823C0001AZB401</small>	←		
⑬	⑭	⑮	⑯	⑰	⑱

Note: Paste the QR code of the corresponding numbered RSD into the corresponding numbered square.

ADCU QR  
code spot

String no. \_\_\_\_\_

User: \_\_\_\_\_

①		②		③		④		⑤		⑥	

⑦		⑧		⑨		⑩		⑪		⑫	

⑬		⑭		⑮		⑯		⑰		⑱	

**Note: Paste the QR code of the corresponding numbered RSD into the corresponding numbered square.**