



Installation / User Manual

APsmart rapid shutdown system Rev1.0 2020/03/18

RSD-S-PLC
TRANSMITTER-PLC/TRANSMITTER-PLC-PCBA/
TRANSMITTER-PLC OUTDOOR KIT

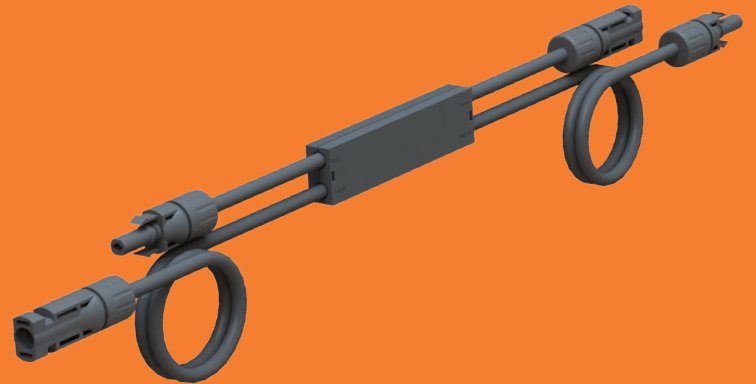
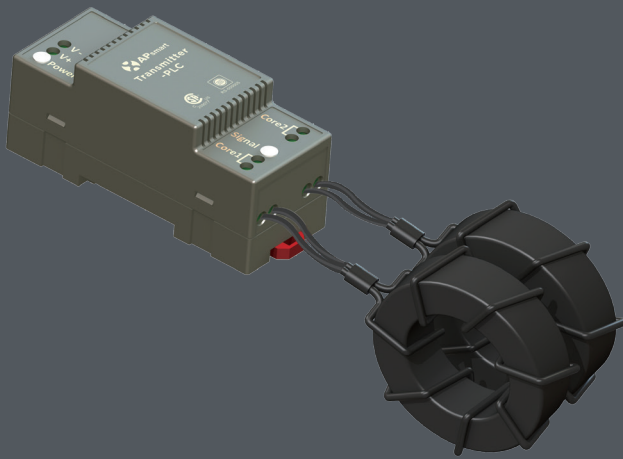


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IMPORTANT SAFETY INSTRUCTIONS

This manual contains important instructions to be followed during installation and maintenance of the APsmart RSD and Transmitter. To reduce the risk of electrical shock and ensure the safe installation and operation of the APsmart RSD and Transmitter, the following symbols appear throughout this document to indicate dangerous conditions and important safety instructions.

Safety Instructions

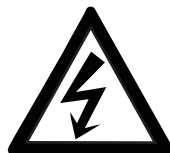
- Do NOT disconnect the PV module from the RSD-S-PLC without first disconnecting the AC power.
- Only qualified professionals should install and/or replace the APsmart RSD-S-PLC.
- Perform all electrical installations in accordance with local codes.
- Before installing or using the RSD-S-PLC, please read all instructions and cautionary markings in the technical documents.
- Be aware that the body of the running RSD-S-PLC is the heat sink and can reach high temperatures. To reduce risk of burns, do not touch the body of the RSD-S-PLC.
- Do NOT attempt to repair the RSD-S-PLC. If it fails, contact APmart Customer Support to obtain an RMA number and start the replacement process. Damaging or opening the RSD-S-PLC will void the warranty.

The Transmitter-PLC control power supply MUST be on the same AC branch circuit as the inverter to meet rapid shutdown requirements.

Symbols replace words on the equipment, on a display, or in manuals

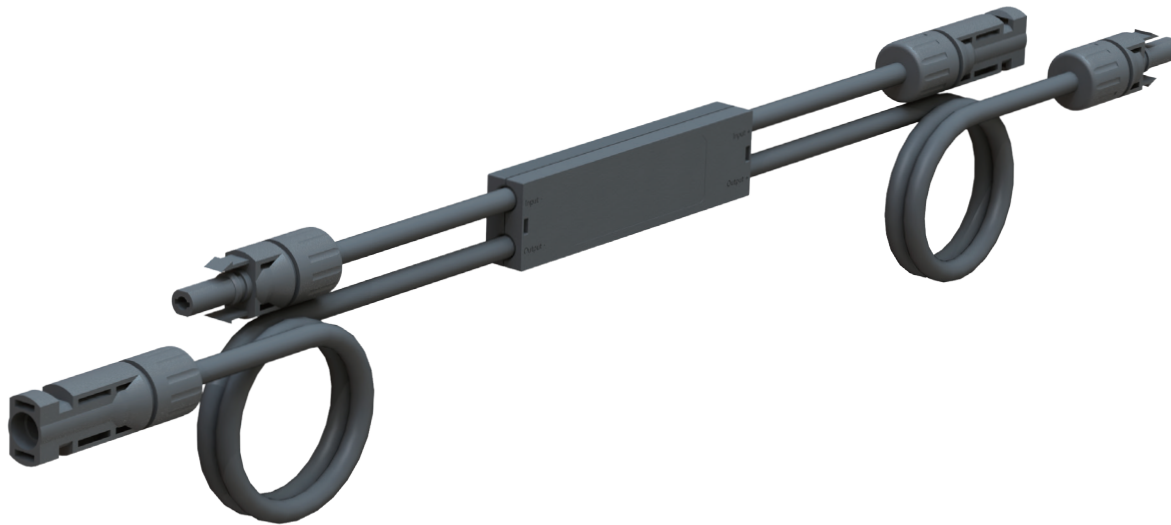
Qualified personnel:

Person adequately advised or supervised by an electrically skilled person to enable him or her to perceive risks and to avoid hazards which electricity can create. For the purpose of the safety information of this manual, a "qualified person" is someone who is familiar with requirements for safety, refrigeration system and EMC and is authorized to energize, ground, and tag equipment, systems, and circuits in accordance with established safety procedures. The inverter and endues system may only be commissioned and operated by qualified personnel.



RSD PRODUCTS

RSD-S-PLC

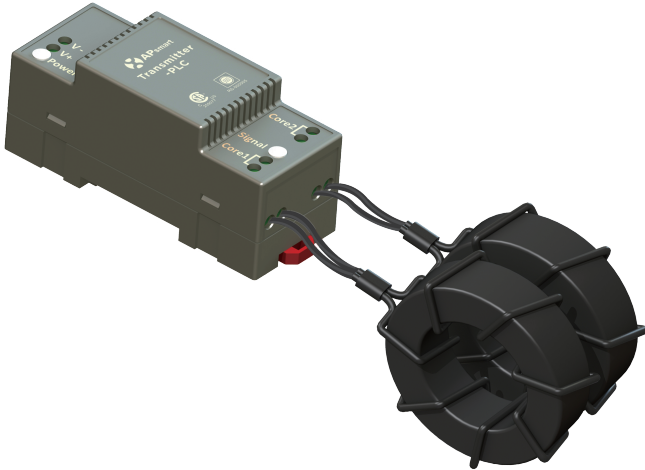


- Meets NEC 2017 (690.12) requirements
- Executes rapid shutdown of system when Transmitter-PLC signal is absent
- Meets SunSpec requirements

RSD-S-PLC meets SunSpec requirements, maintaining normal function by continually receiving a heart-beat signal from the APsmart Transmitter. The RSD executes rapid system shutdown when Transmitter signal is absent. Users can manually execute rapid shutdown using Transmitter breaker switch.

TRANSMITTER PRODUCTS

Transmitter-PLC:



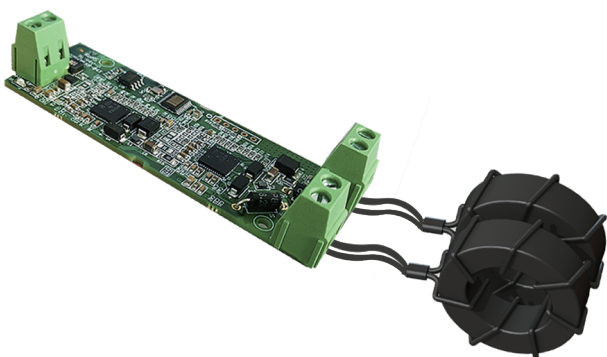
- Meets NEC 2017 (690.12) requirements
- Switch off Transmitter, rapid shutdown the output of PV modules
- Meets SunSpec requirements
- Equipped with single/dual core
- Optional 85-264VAC power supply
- Optional 180-550VAC power supply

Transmitter-PLC-Outdoor Kit:



- Meets NEC 2017 (690.12) requirements
- Switch off Transmitter, rapid shutdown the output of PV modules
- Meets SunSpec requirements
- Equipped with single/dual core
- Optional 85-264VAC power supply
- Optional 180-550VAC power supply

Transmitter-PLC-PCBA:



- Meets NEC 2017 (690.12) requirements
- Switch off Transmitter, rapid shutdown the output of PV modules
- Meets SunSpec requirements
- Equipped with single/dual core
- Optional 85-264VAC power supply
- Optional 180-550VAC power supply

SYSTEM WIRING DIAGRAM

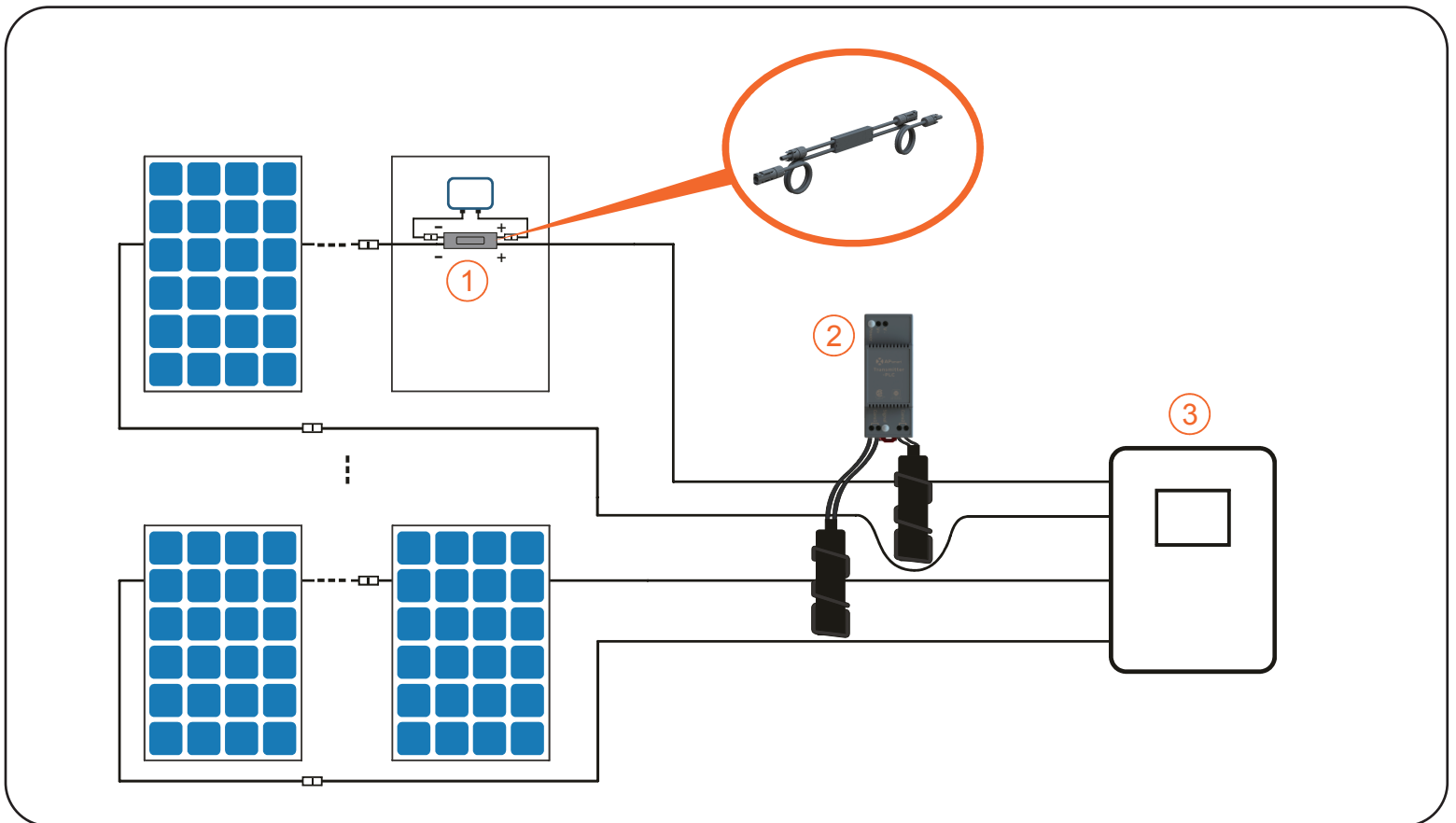
The APsmart Rapid Shutdown System Transmitter-PLC is part of a rapid shutdown solution when paired with APsmart RSD-S-PLC, a PV module rapid shutdown unit. While powered on, the Transmitter-PLC sends a signal to the RSD-S-PLC units to keep their PV modules connected and supplying energy.

RSD-S-PLC units automatically enter rapid shutdown mode when the Transmitter-PLC is switched off and resume energy production when power is restored to the Transmitter-PLC. This solution complies with NEC 690.12 specifications for 2017 and supports the SunSpec signaling for rapid shutdown.

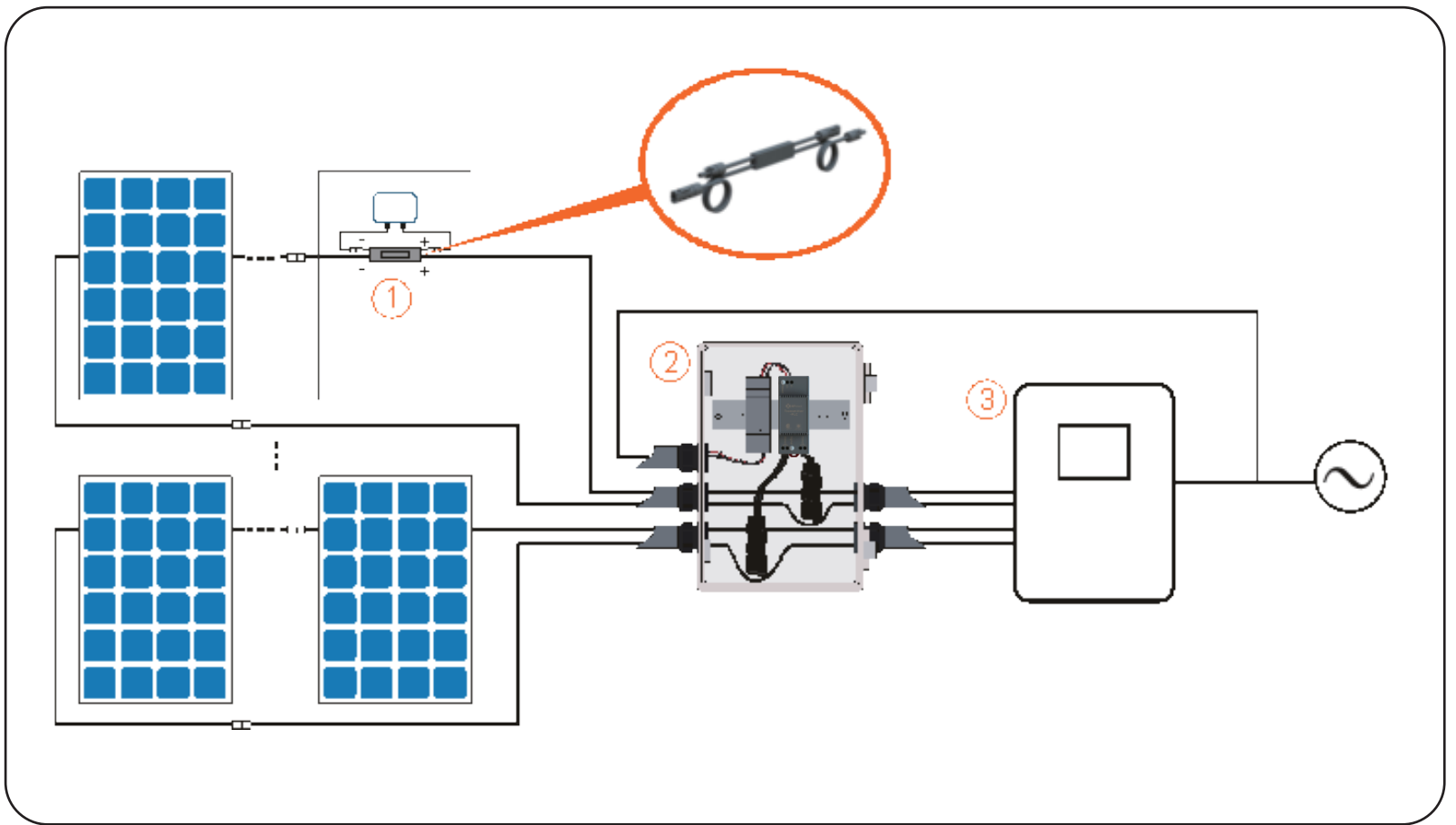
The Transmitter-PLC includes one or two cores and an optional power supply: 85-264VAC for residential, 180-550VAC for commercial.

Transmitter-PLC Outdoor Kit includes a Transmitter-PLC with one or two Cores, outdoor enclosure, 85-264VAC or 180V-550VAC power supply. It could be used in residential or commercial project.

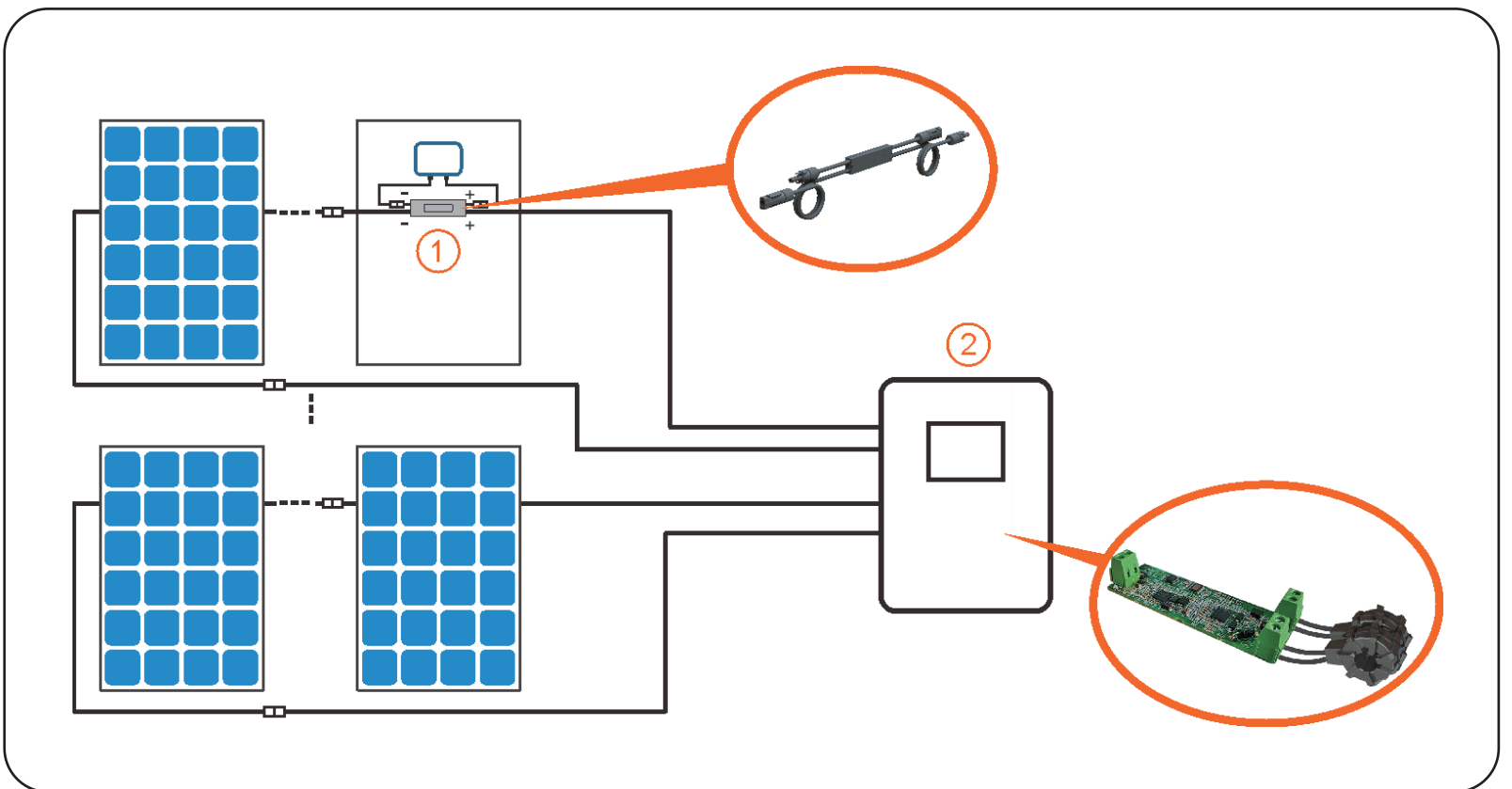
The Transmitter-PLC-PCBA includes one or two cores and an optional power supply: 85-264VAC for residential, 180-550VAC for commercial.



- ① RSD-S-PLC
- ② Transmitter-PLC
- ③ Inverter



- ① RSD-S-PLC
- ② Transmitter-PLC-Outdoor Kit
- ③ Inverter



- ① RSD-S-PLC
- ② Inverter with Transmitter-PLC-PCBA

RSD-S-PLC INSTALLATION

INSTALLATION NOTES

Installation **MUST** comply with local regulations and technical rules:

- ① Perform all electrical installations in accordance with local codes.
- ② Be aware that only qualified professionals should install and/or replace the RSD-S-PLC.
- ③ Before installing or using an RSD-S-PLC, please read all instructions and warnings in the technical documents and on the inverter system itself as well as on the PV array.
- ④ Be aware that installation of this equipment includes the risk of electric shock.
- ⑤ Do not touch any live parts in the system, including the PV array, when the system has been connected to the electrical grid.
- ⑥ Ensure the solar module and inverter has been disconnected before installing an RSD-S-PLC.

- ① Be sure to verify the voltage and current specifications of your PV module match with those of the RSD-S-PLC.
- ② You must match the DC operating voltage range of the PV module with the allowable input voltage range of the RSD-S-PLC.
- ③ The maximum open circuit voltage of the PV module must not exceed the specified maximum input voltage of the APsystem RSD-S-PLC.

Additional installation components from APsystems

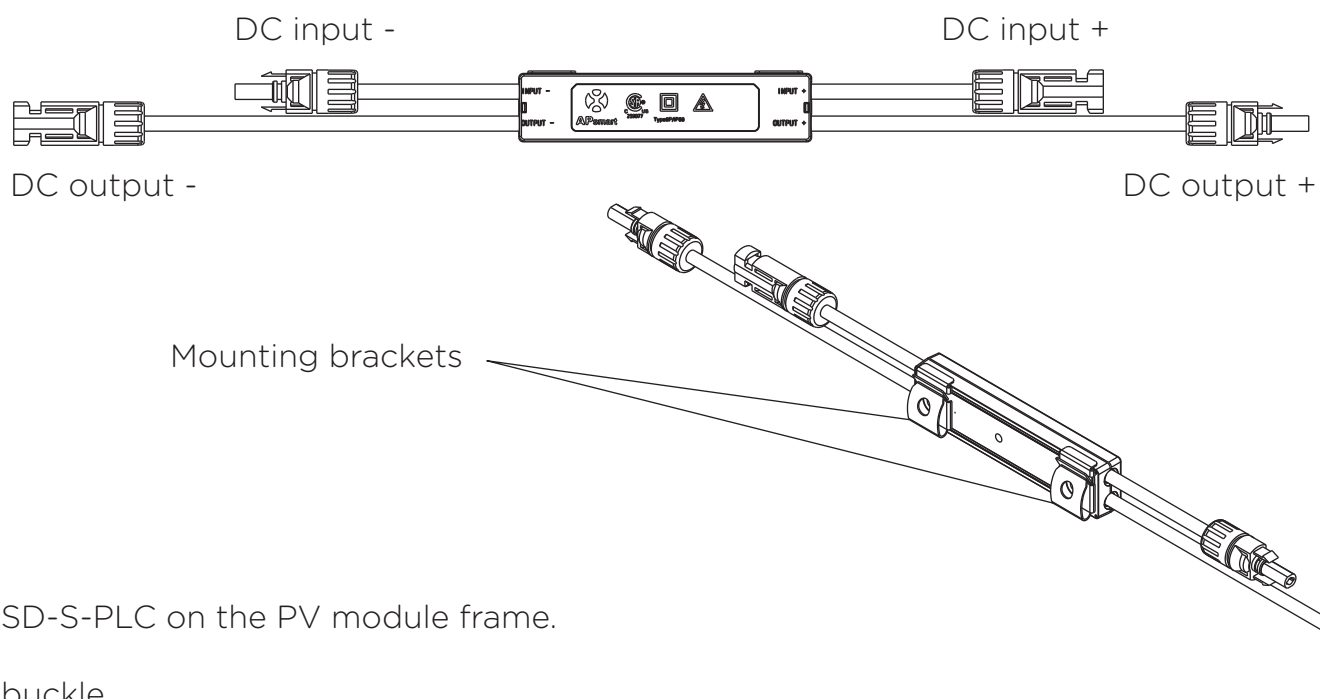
- DC extension cable (sold separately)

Required parts and tools to complete the installation

In addition to your PV array and its associated hardware, you will need the following items:

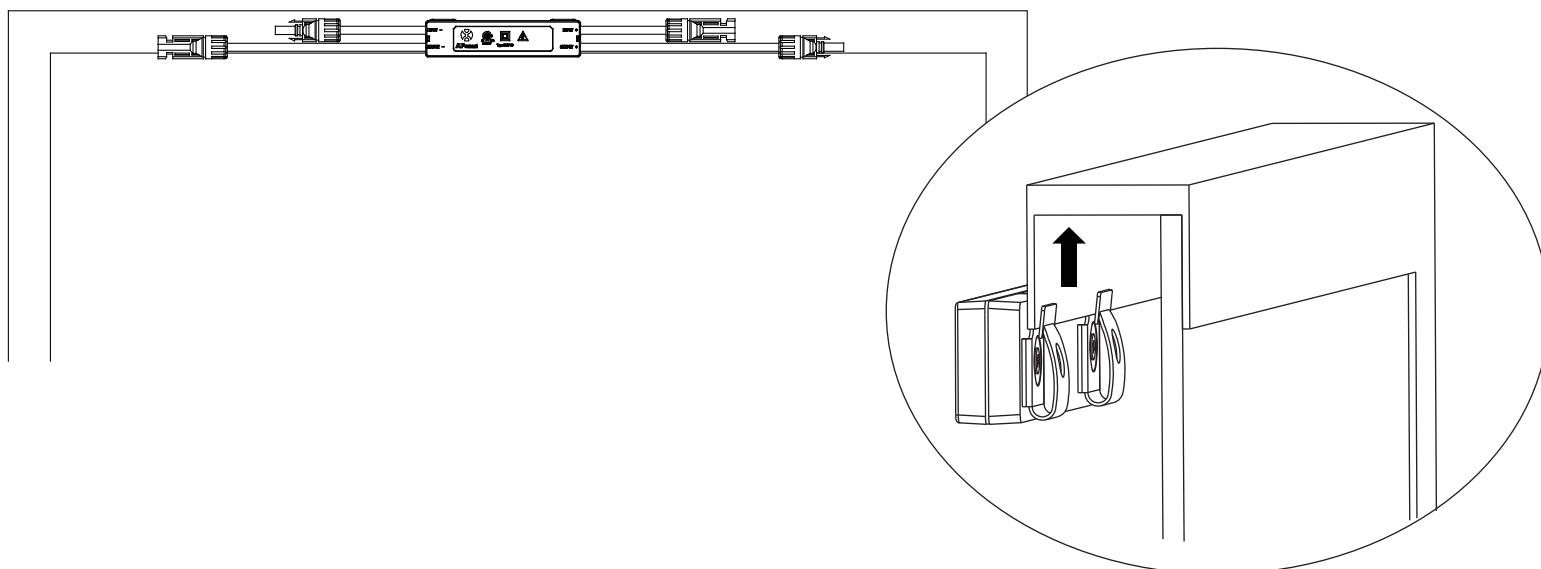
- Rapid shutdown device installation kit (screw, nut)
- A torque wrench and a Phillips screwdriver

Step 1: Install the RSD-S-PLC.

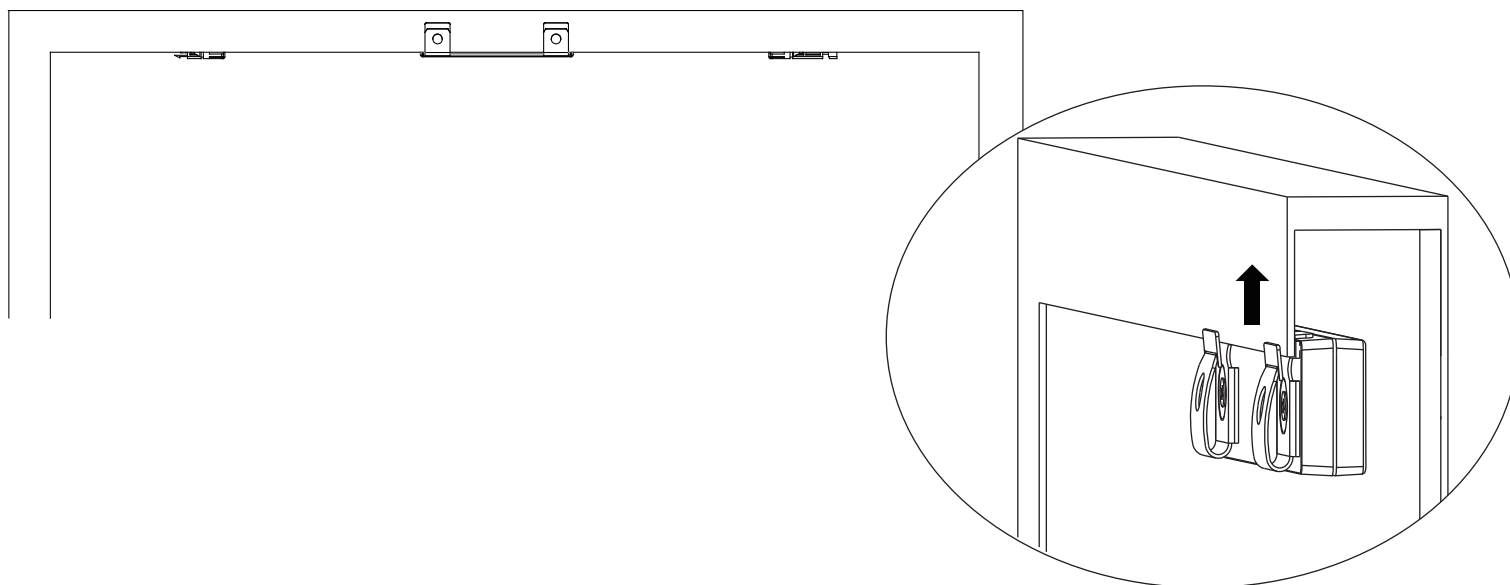


Buckle RSD-S-PLC on the PV module frame.

A. Front buckle

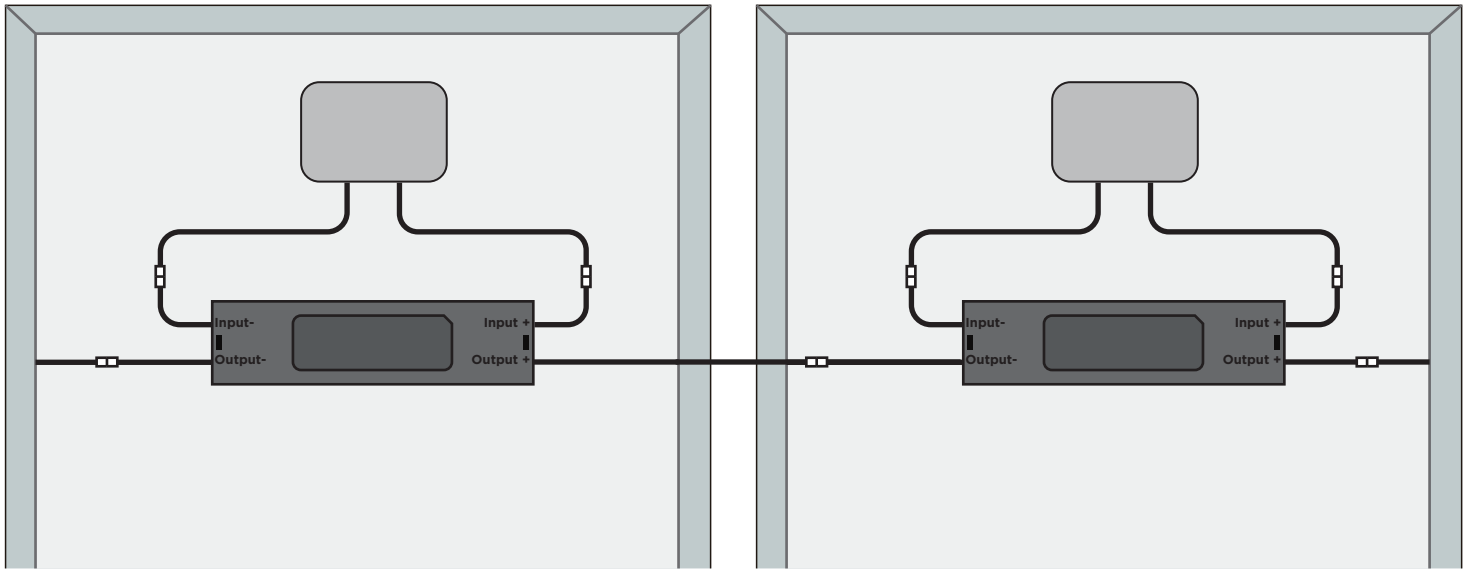


B. Back buckle

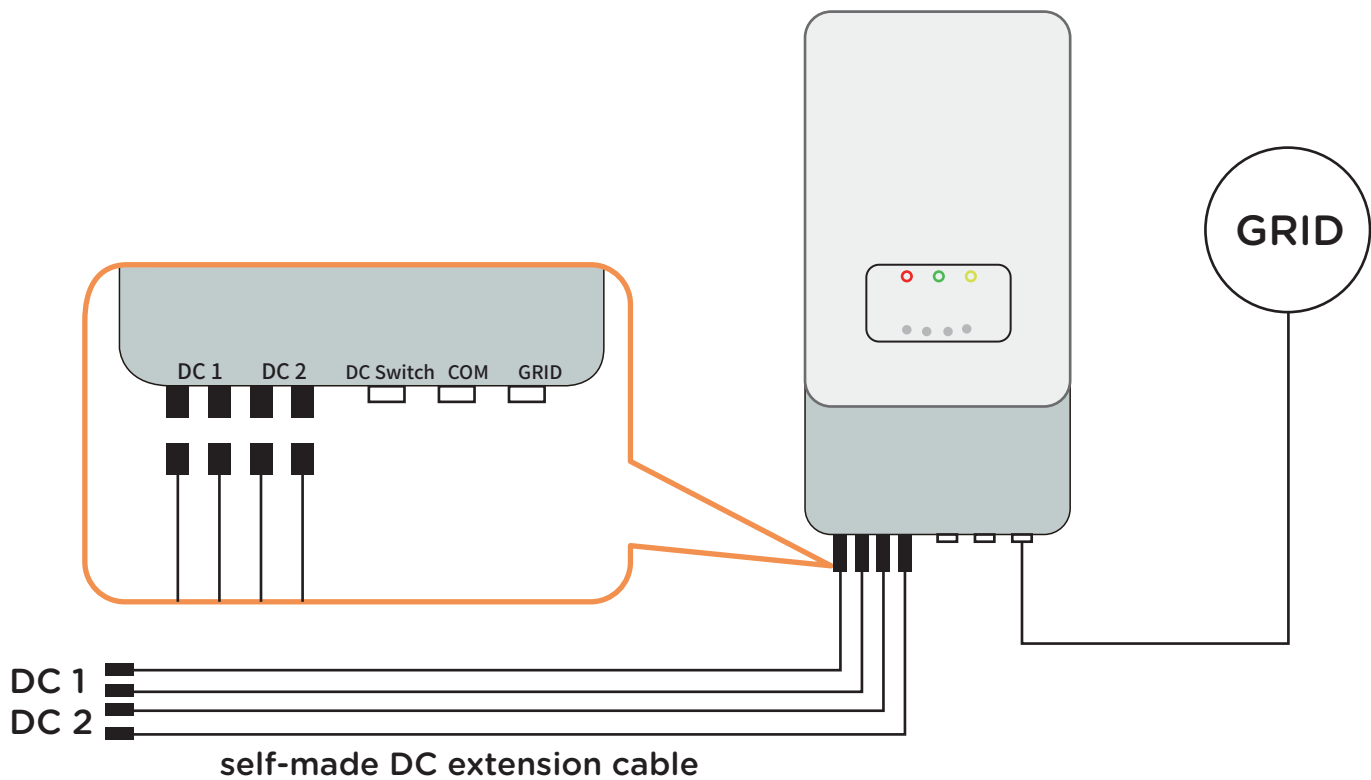


Note: Both installations can be installed anywhere on the PV module frame.

Step 2: According to the component arrangement, connect the output port of the RSD-S-PLC and connect the input port to the junction box.

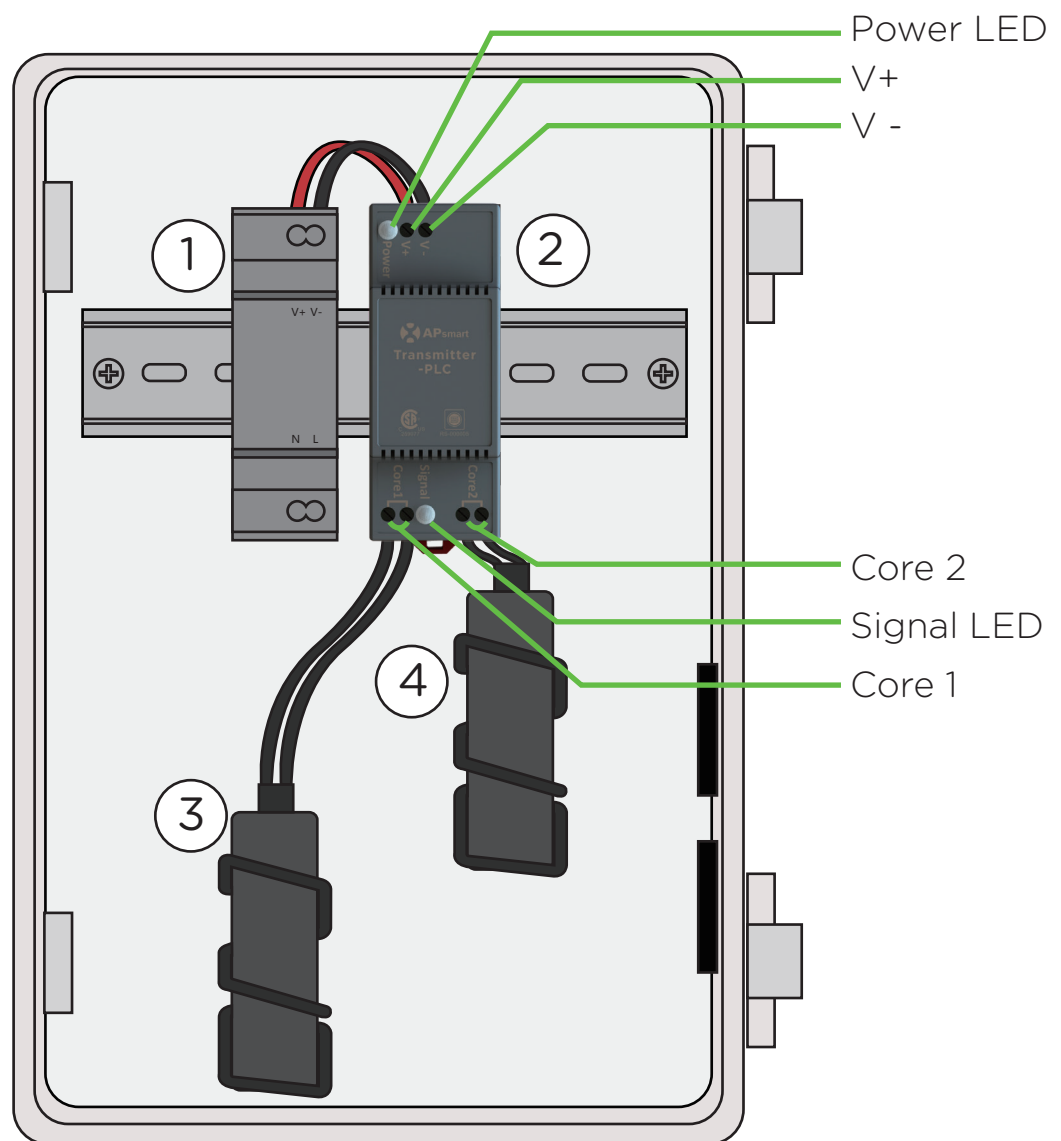


Step 3: Connect the RSD-S-PLC serially connected output to the inverter with a self-made DC extension cable.



TRANSMITTER-PLC INSTALLATION

Optional power supply
85-264VAC
180-550VAC



- ① Power Supply
- ② Transmitter-PLC
- ③ Core 1
- ④ Core 2

Note: If there is only one core need to connect, please connect Core 1 first.

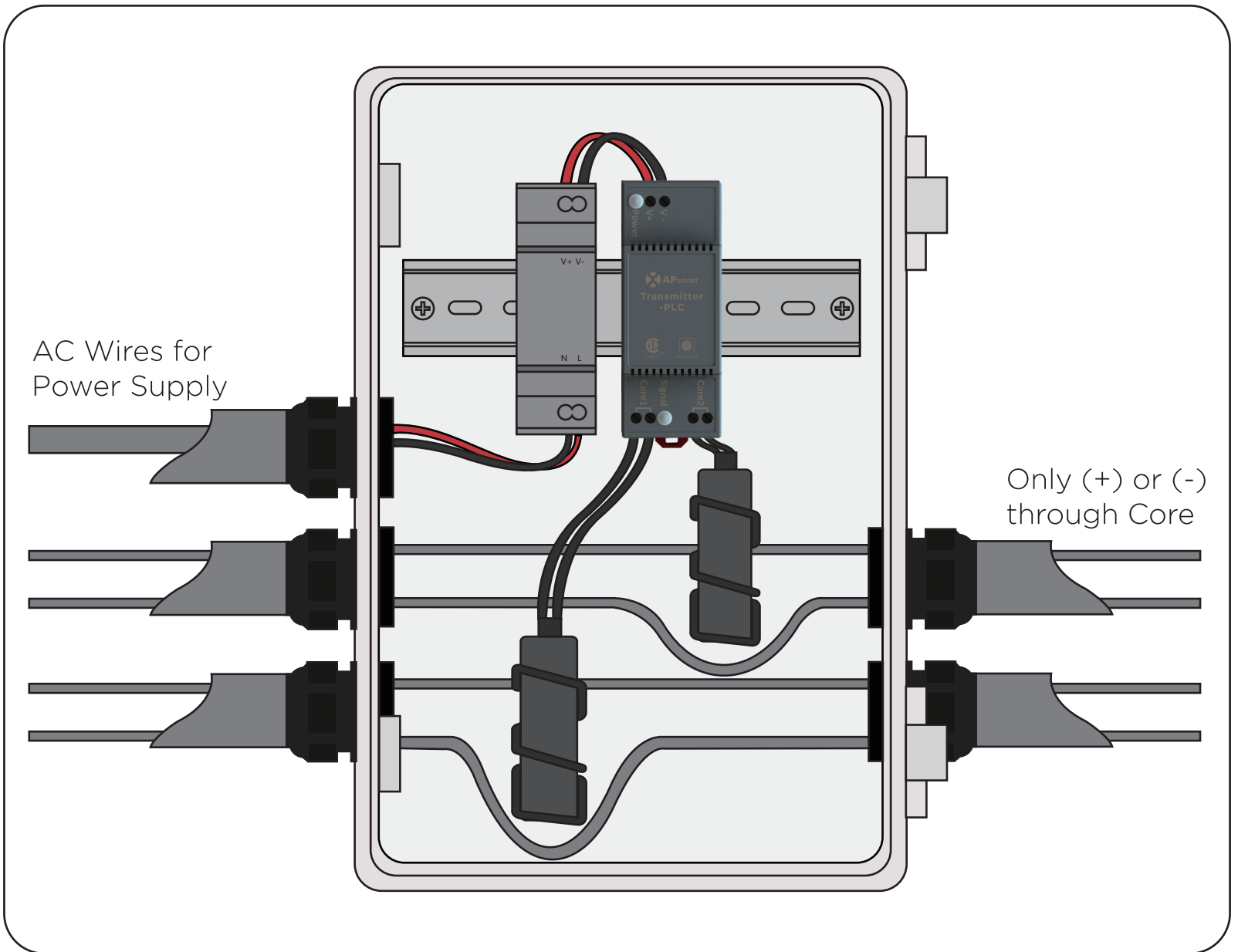
Transmitter power supply must be on same AC branch circuit as inverter to meet rapid shutdown requirements.

During operation, the Power LED should be lit and the Signal LED should be blinking. When Transmitter fails to work, the Signal LED will not be blinking. If the Power LED is also not lit, check the power supply first.

Note: Install RSD-S-PLC before powering on Transmitter.

- Mount Transmitter-PLC and power supply on DIN rail
- Connect DC leads from power supply to Transmitter-PLC
- Connect single/dual core(Core 1 and Core 2) to Transmitter-PLC

Place rapid shutdown system label no more than 1m (3ft) from Transmitter or AC disconnect if not at same location.



Note: Install RSD-S-PLC before powering on Transmitter.

- Pass either positive or negative homerun through Cores (Max 10 strings per core)
- Connect wires to AC side of Power supply

Max.Number Of Strings Per Core :

DC cable size	2.5mm ²	4mm ²	6mm ²	10mm ²
Number Of Strings Per Core(with connector)	≤12	≤10	≤7	≤5
Number Of Strings Per Core(without connector)	≤15	≤15	≤14	≤10

Max string length: **30 modules**

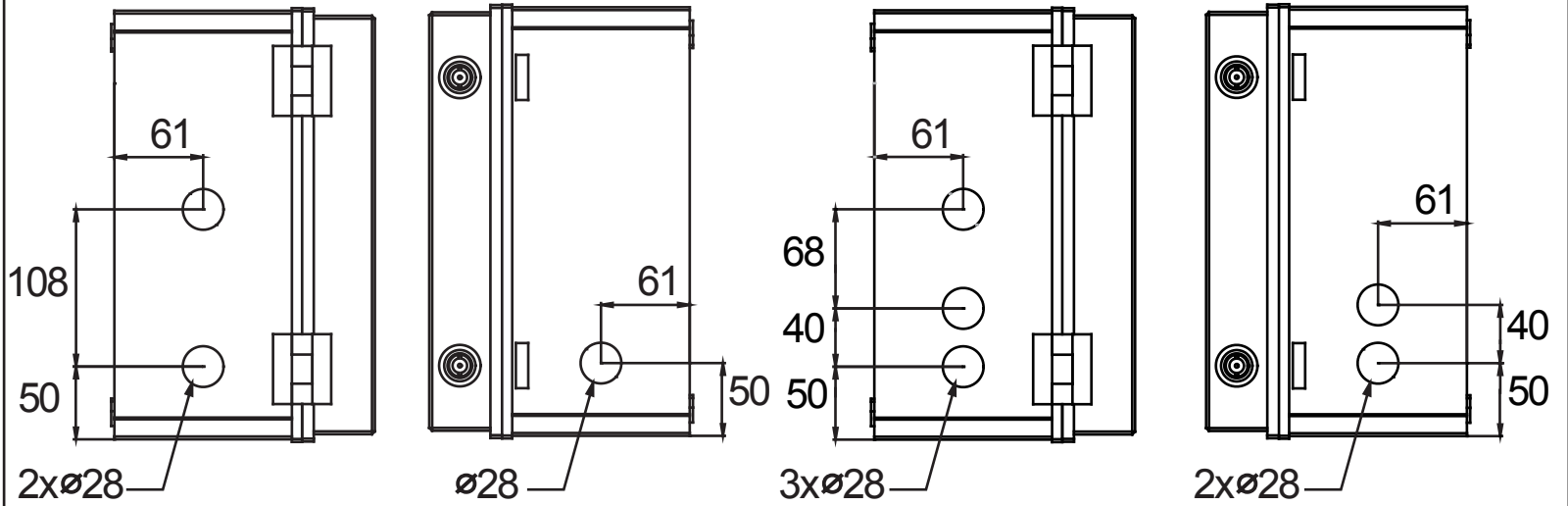
Max current per Core: **150A**

Max cable length from inverter (+) to inverter (-): **3300ft (1000m)**

Drilling Guide for .75" Conduit

Single Core

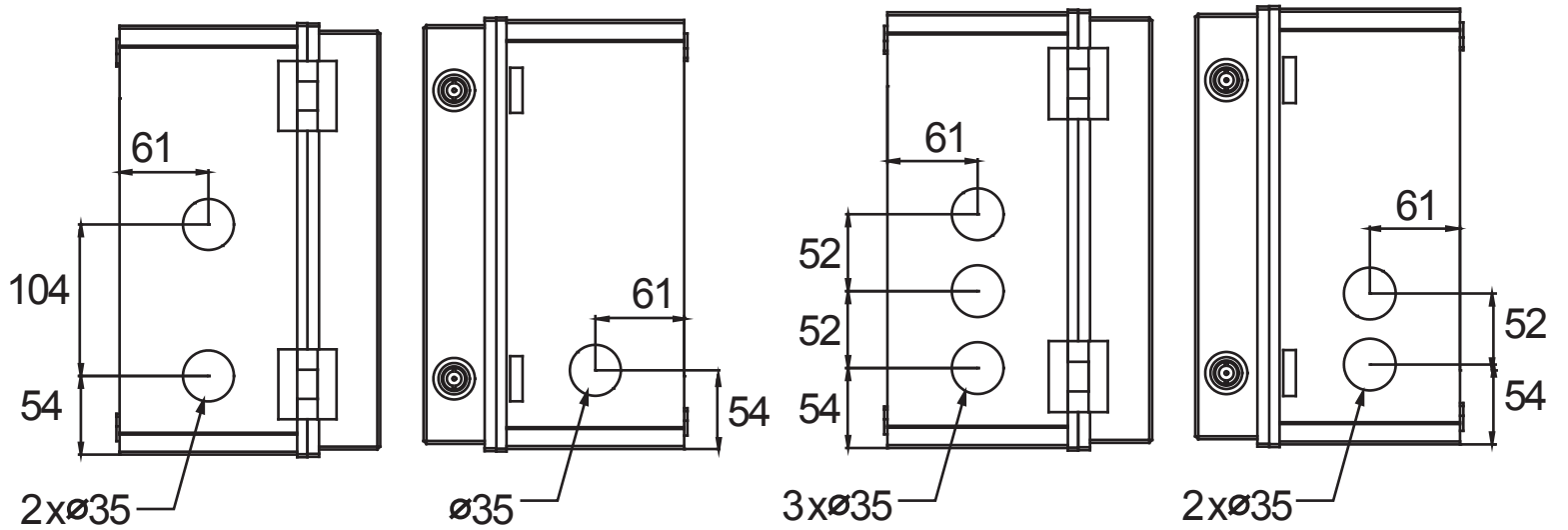
Dual Core



Drilling Guide for 1" Conduit

Single Core

Dual Core



TECHNICAL DATA—RSD-S-PLC

Model

RSD-S-PLC

Input Data (DC)

Input Operating Voltage Range

8-80V

Maximum Cont. Input Current (I_{max})

15A

Maximum Input Power

800W

Output Data (DC)

Output Operating Voltage Range

8-80V

Output Power Range

0-800W

Maximum System Voltage

1000V/1500V

Mechanical Data

Operating Ambient Temperature Range

-40 °C to + 85 °C (-40 °F to +185 °F)

Dimensions (without cable & connectors)

5" x 1.2" x 0.6" (129 mm x 30 mm x 16 mm)

Cable Length

Input 250mm/ Output 1200mm or Customize

Module Connector

MC4 or MC4 Compatible

Enclosure Rating

Type 6P/ IP68

Overtemperature Protection

Yes

Features & Compliance

Communication

PLC

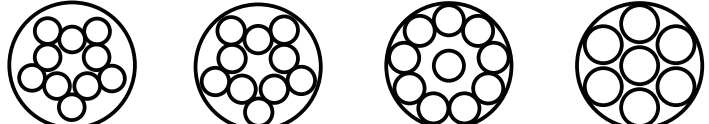
Safety Compliance

NEC 2017 (690.12); UL1741; CSA C22.2 No. 330-17;
IEC/EN62109-1; 2PFG2305

EMC Compliance

FCC Part15; ICES-003; IEC/EN62109-1/-2/-3/-4

TECHNICAL DATA—TRANSMITTER-PLC

Model	Transmitter-PLC				
Main Electrical Data					
Input Voltage	12 VDC				
Input Current	0.5A				
Communication	PLC				
Power Supply					
Residential (optional)	85-264 VAC Input, 12VDC Output, 90 mm x 17.5 mm x 58.4 mm				
Commercial (optional)	180-550 VAC Input, 12VDC Output, 125.2 mm x 32 mm x 102 mm				
Core Data					
Max. Current	300A (150AX2)				
Max. System Voltage	1500VDC				
Inner Diameter	29mm				
Max. Supported PV Modules per String	30 modules				
Max. Number Of Strings per core					
Inner Hole Size Of Core					
DC Cable Diameter	<table border="1"> <tr> <td>Φ5.94mm</td> <td>Φ6.35mm</td> <td>Φ6.97mm</td> <td>Φ8.57mm</td> </tr> </table>	Φ5.94mm	Φ6.35mm	Φ6.97mm	Φ8.57mm
Φ5.94mm	Φ6.35mm	Φ6.97mm	Φ8.57mm		
DC Cable Size	<table border="1"> <tr> <td>2.5mm²</td> <td>4mm²</td> <td>6mm²</td> <td>10mm²</td> </tr> </table>	2.5mm ²	4mm ²	6mm ²	10mm ²
2.5mm ²	4mm ²	6mm ²	10mm ²		
Number Of Strings Per Core(with connector)	<table border="1"> <tr> <td>≤12</td> <td>≤10</td> <td>≤7</td> <td>≤5</td> </tr> </table>	≤12	≤10	≤7	≤5
≤12	≤10	≤7	≤5		
Number Of Strings Per Core(without connector)	<table border="1"> <tr> <td>≤15</td> <td>≤15</td> <td>≤14</td> <td>≤10</td> </tr> </table>	≤15	≤15	≤14	≤10
≤15	≤15	≤14	≤10		
Environmental					
Temperature	-40°C~+100°C				
Structure Data					
Dimensions (W x H x D)	90 mm x 35 mm x 40 mm				
Enclosure Environmental Rating	IP30				
Features & Compliance					
Safety Compliance	NEC 2017 (690.12); UL1741; CSA C22.2 No. 330-17				
EMC Compliance	FCC Part15; ICES-003				

TECHNICAL DATA—TRANSMITTER-PLC OUTDOOR KIT

Model

Transmitter-PLC Outdoor Kit

Main Electrical Data

Input Voltage

12 VDC

Input Current

0.5A

Communication

PLC

Power Supply

Residential (optional)

85-264 VAC Input, 12VDC Output,
90 mm x 17.5 mm x 58.4 mm

Commercial (optional)

180-550VAC Input, 12VDC Output,
125.2 mm x 32 mm x 102 mm

Core Data

Max. Current

300A (150AX2)

Max. System Voltage

1500VDC

Inner Diameter

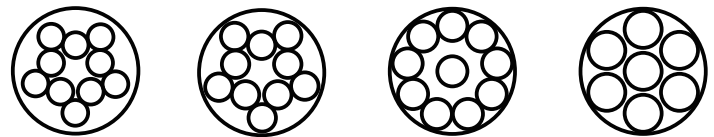
29mm

Max. Supported PV Modules Per String

30 modules

Max. Number Of Strings

Inner Hole Size Of Core



DC Cable Diameter

Φ5.94mm Φ6.35mm Φ6.97mm Φ8.57mm

DC Cable Size

2.5mm² 4mm² 6mm² 10mm²

Number Of Strings Per Core(with connector)

≤12 ≤10 ≤7 ≤5

Number Of Strings Per Core(without connector)

≤15 ≤15 ≤14 ≤10

Environmental

Temperature

-40°C~+100°C

Structure Data

Dimensions (W x H x D)

198.5 mm x 298 mm x 179 mm

Enclosure Environmental Rating

IP65

Features & Compliance

Safety Compliance

NEC 2017 (690.12); UL1741; CSA C22.2 No. 330-17

EMC Compliance

FCC Part15; ICES-003

TECHNICAL DATA—TRANSMITTER-PLC-PCBA

Model

Transmitter-PLC-PCBA

Main Electrical Data

Input Voltage

12 VDC

Input Current

0.5A

Communication

PLC

Power Supply

Residential (optional)

85-264 VAC Input, 12VDC Output,
90 mm x 17.5 mm x 58.4 mm

Commercial (optional)

180-550 VAC Input, 12VDC Output,
125.2 mm x 32 mm x 102 mm

Core Data

Max. Current

300A (150AX2)

Max. System Voltage

1500VDC

Inner Diameter

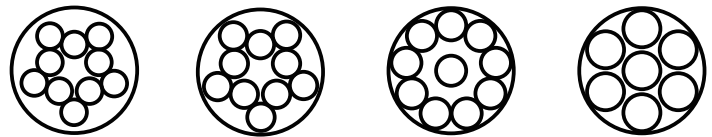
29mm

Max. Supported PV Modules Per String

30 modules

Max. Number Of Strings

Inner Hole Size Of Core



DC Cable Diameter

Φ5.94mm Φ6.35mm Φ6.97mm Φ8.57mm

DC Cable Size

2.5mm² 4mm² 6mm² 10mm²

Number Of Strings Per Core(with connector)

≤12 ≤10 ≤7 ≤5

Number Of Strings Per Core(without connector)

≤15 ≤15 ≤14 ≤10

Environmental

Temperature

-40°C~+100°C

Structure Data

Dimensions (W x H x D)

84 mm x 29 mm x 17.1 mm

Features & Compliance

Safety Compliance

NEC 2017 (690.12); UL1741; CSA C22.2 No. 330-17

EMC Compliance

FCC Part15; ICES-003

ORDERING INFORMATION

Transmitter

406001	Single Core Transmitter-PLC (no power supply)
406000	Dual Core Transmitter-PLC (no power supply)
408004	Single Core Transmitter-PLC Outdoor Kit, 180-550VAC Power Supply
408005	Dual Core Transmitter-PLC Outdoor Kit, 180-550VAC Power Supply
408006	Single Core Transmitter-PLC Outdoor Kit, 85-264VAC Power Supply
408007	Dual Core Transmitter-PLC Outdoor Kit, 85-264VAC Power Supply
409001	Single Core Transmitter-PLC-PCBA (no power supply)
409000	Dual Core Transmitter-PLC-PCBA (no power supply)

RSD-S-PLC

405002	1500V UL/1000V TUV, 1.2m cable, MC4
405001	1000V UL/TUV, 1.2m cable, MC4 compatible
405003	1500V UL/TUV, 1.2m cable, MC4-Evo2



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