



Installation / User Manual

APsmart rapid shutdown system Rev1.6 2020/08/26

RSD-S-PLC
TRANSMITTER-PLC
TRANSMITTER-PLC OUTDOOR KIT

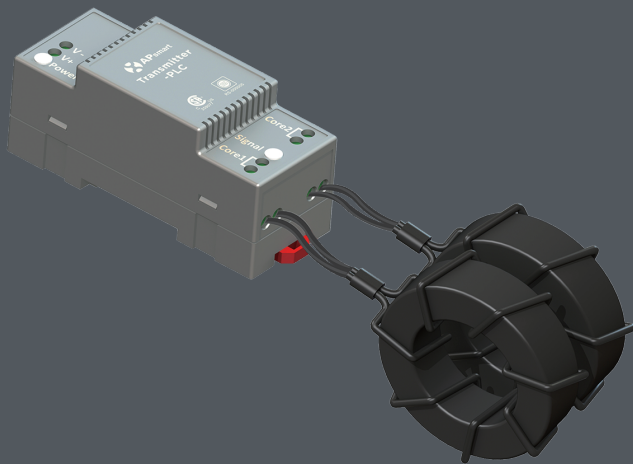


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IMPORTANT SAFETY INSTRUCTIONS

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

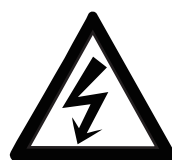
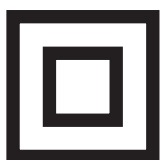
- Do NOT disconnect the PV module from the RSD-S-PLC without first disconnecting the AC power.
- Only qualified professionals should install and/or replace the APsmart RSD-S-PLC.
- Perform all electrical installations in accordance with local codes.
- Before installing or using the RSD-S-PLC, please 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

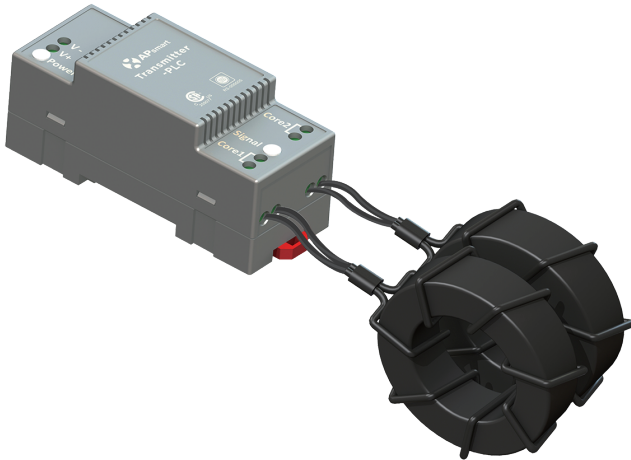


- Meets NEC 2017 (690.12) requirements
- Executes rapid shutdown of system when Transmitter-PLC signal is absent
- Meets SunSpec requirements

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

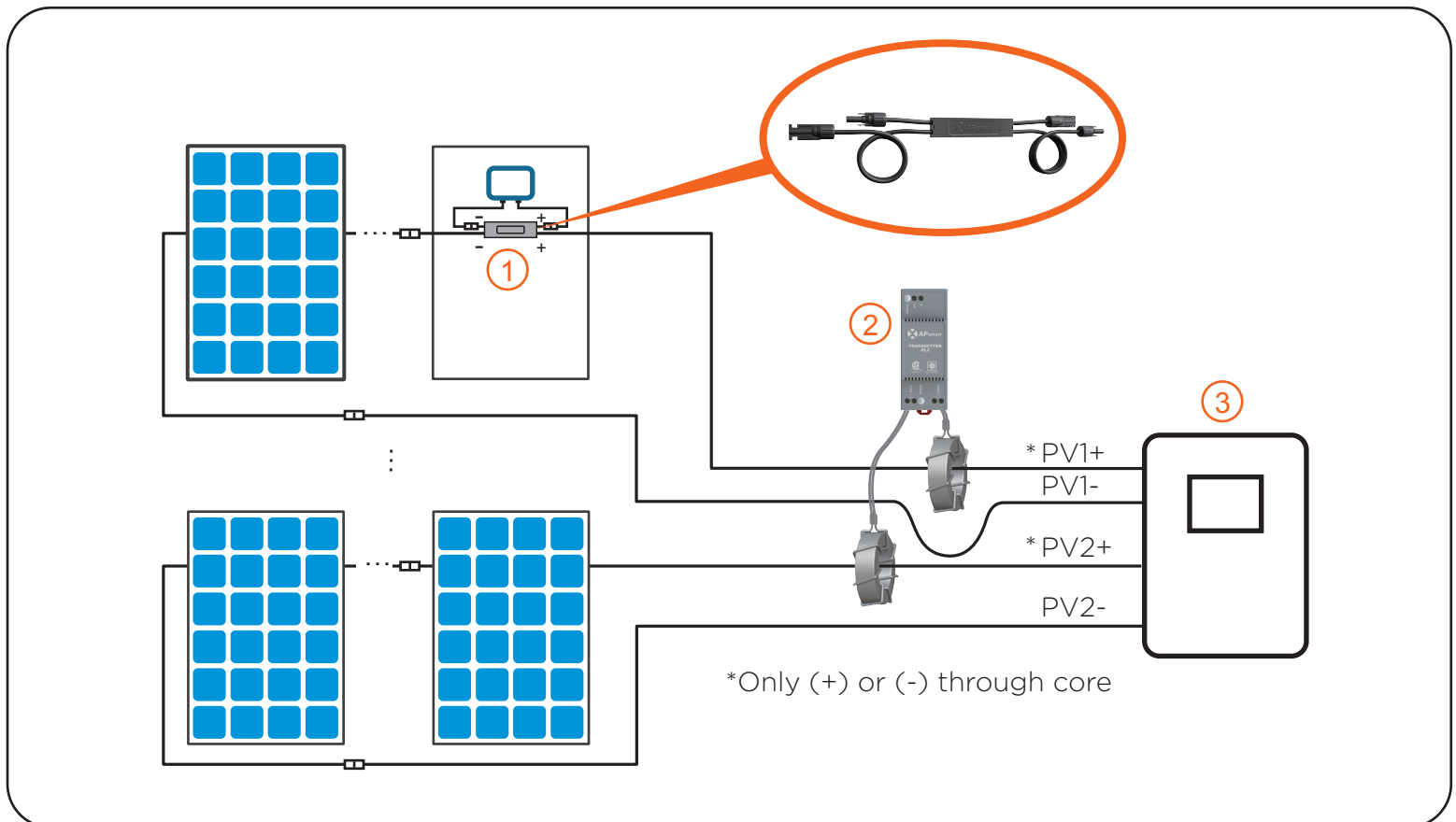
SYSTEM WIRING DIAGRAM

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.

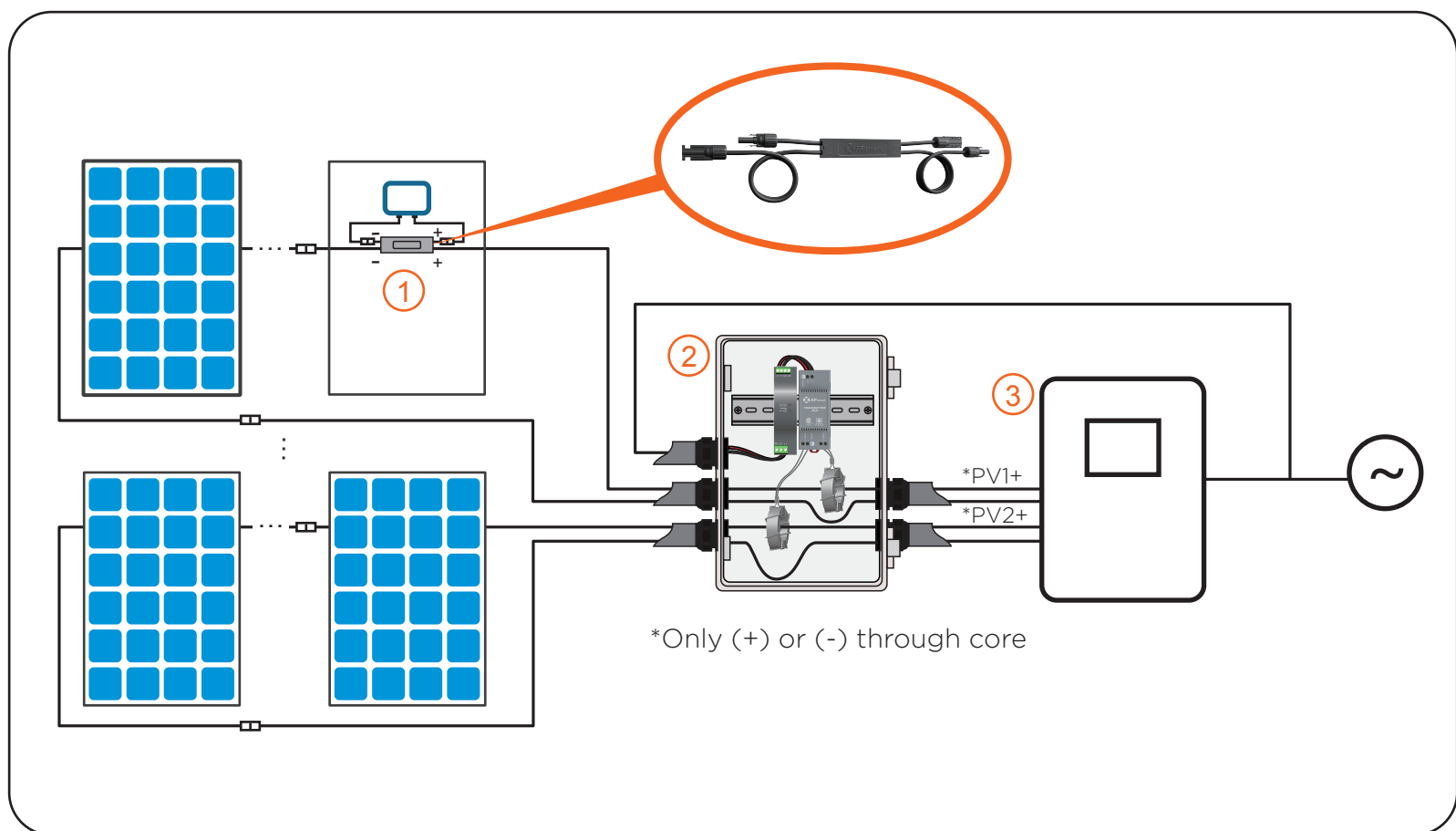
RSD-S-PLC units automatically enter rapid shutdown mode when the Transmitter-PLC is switched off and resume energy production when power is restored to the Transmitter-PLC. This solution complies with NEC 690.12 specifications for 2017 and supports the SunSpec signaling for rapid shut-down.

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.



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



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

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 APsmart RSD-S-PLC.

Additional installation components from APsmart

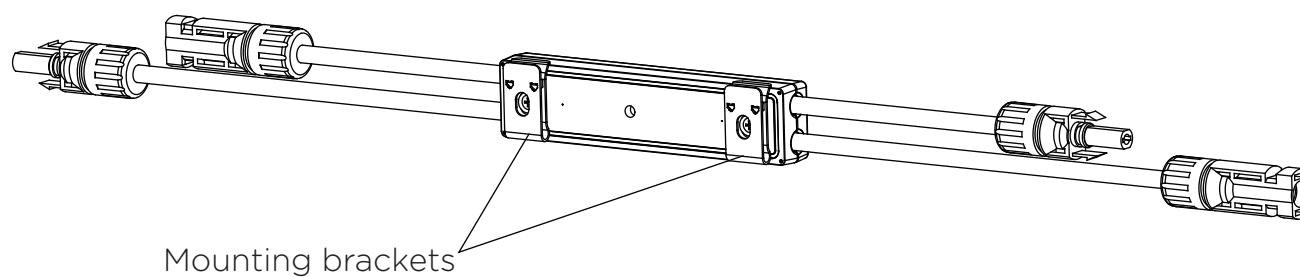
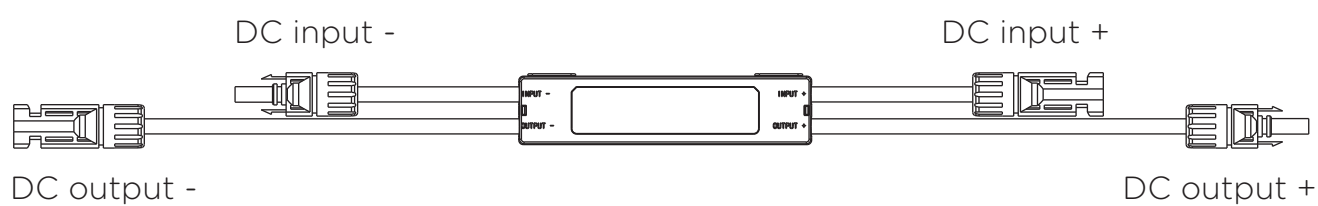
- DC extension cable (sold separately)

Required parts and tools to complete the installation

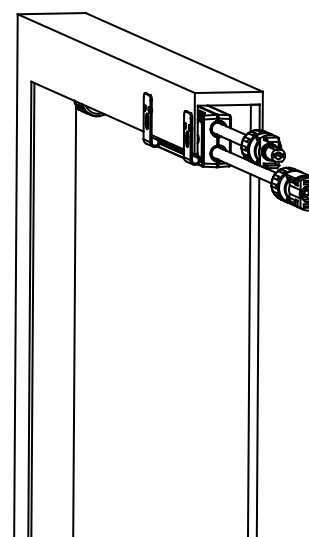
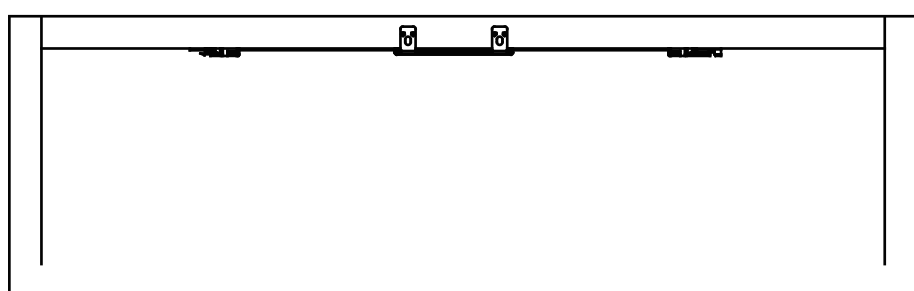
In addition to your PV array and its associated hardware, you will need the following items:

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

Step 1: Install the RSD-S-PLC.

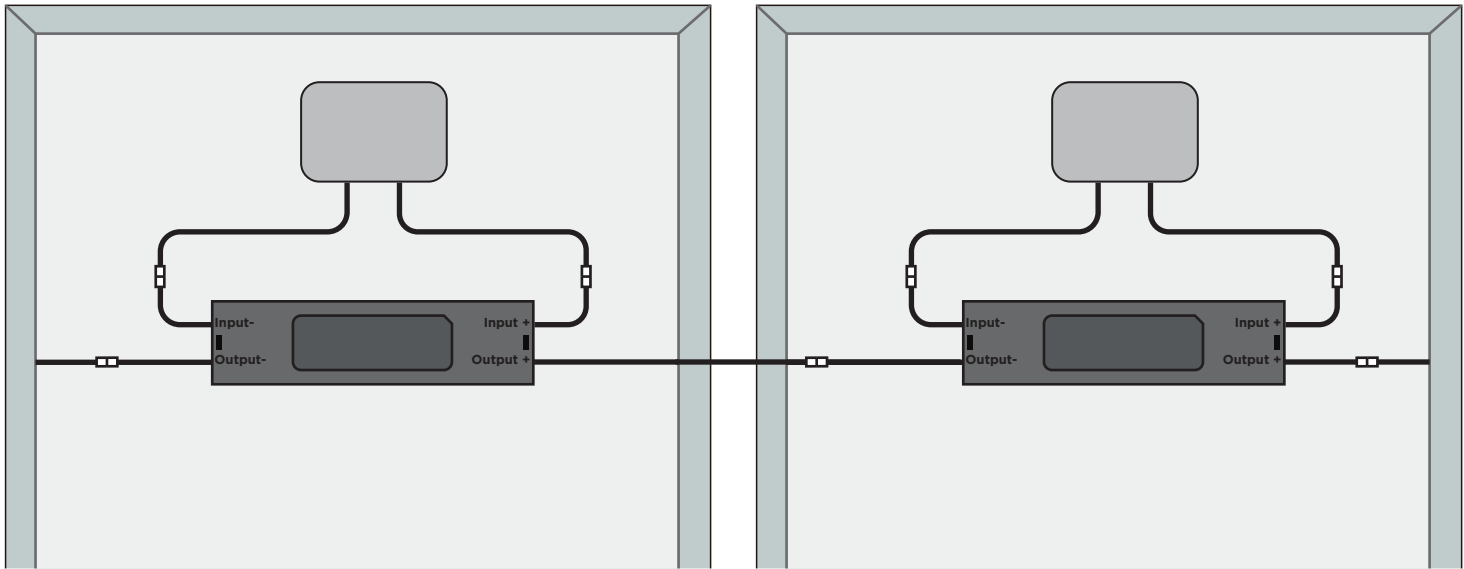


Buckle RSD-S-PLC on the PV module frame.

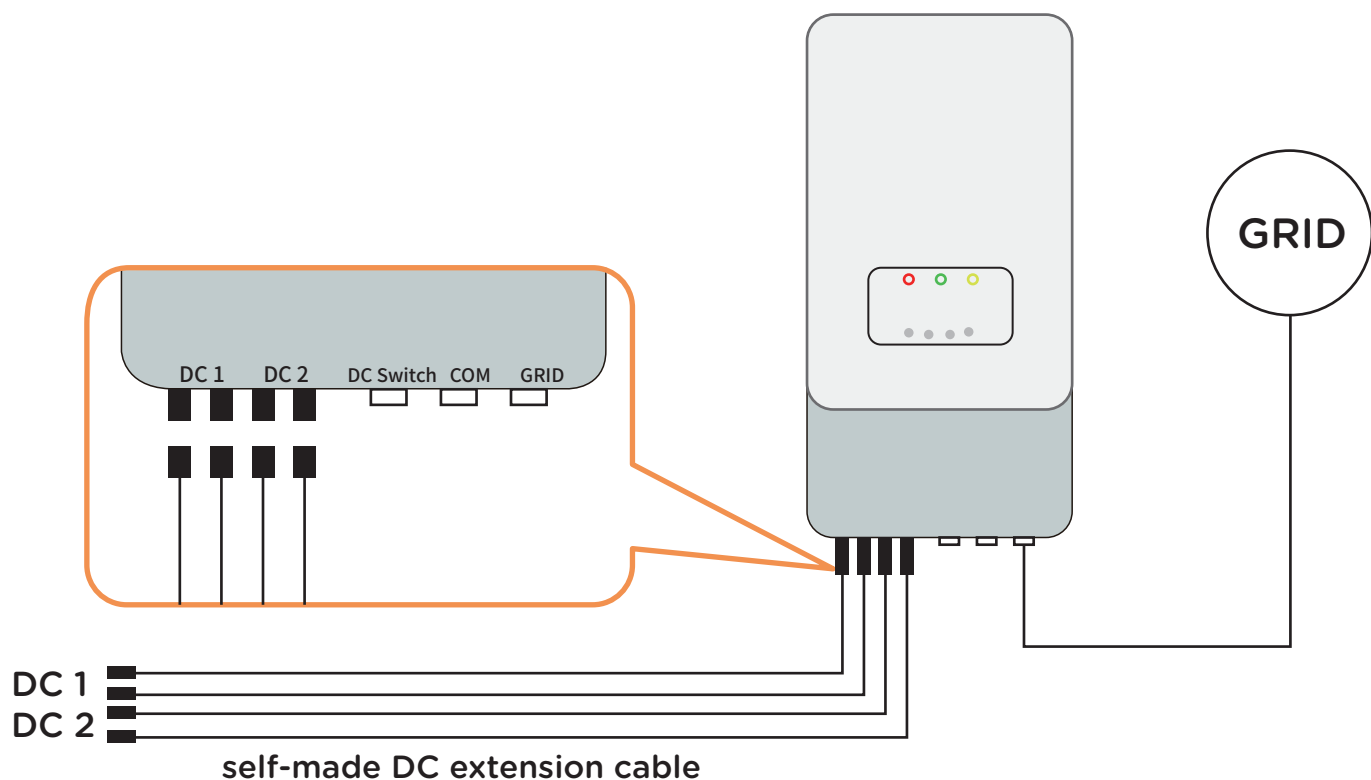


Note: RSD-S-PLC can be installed anywhere on the PV module frame.

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

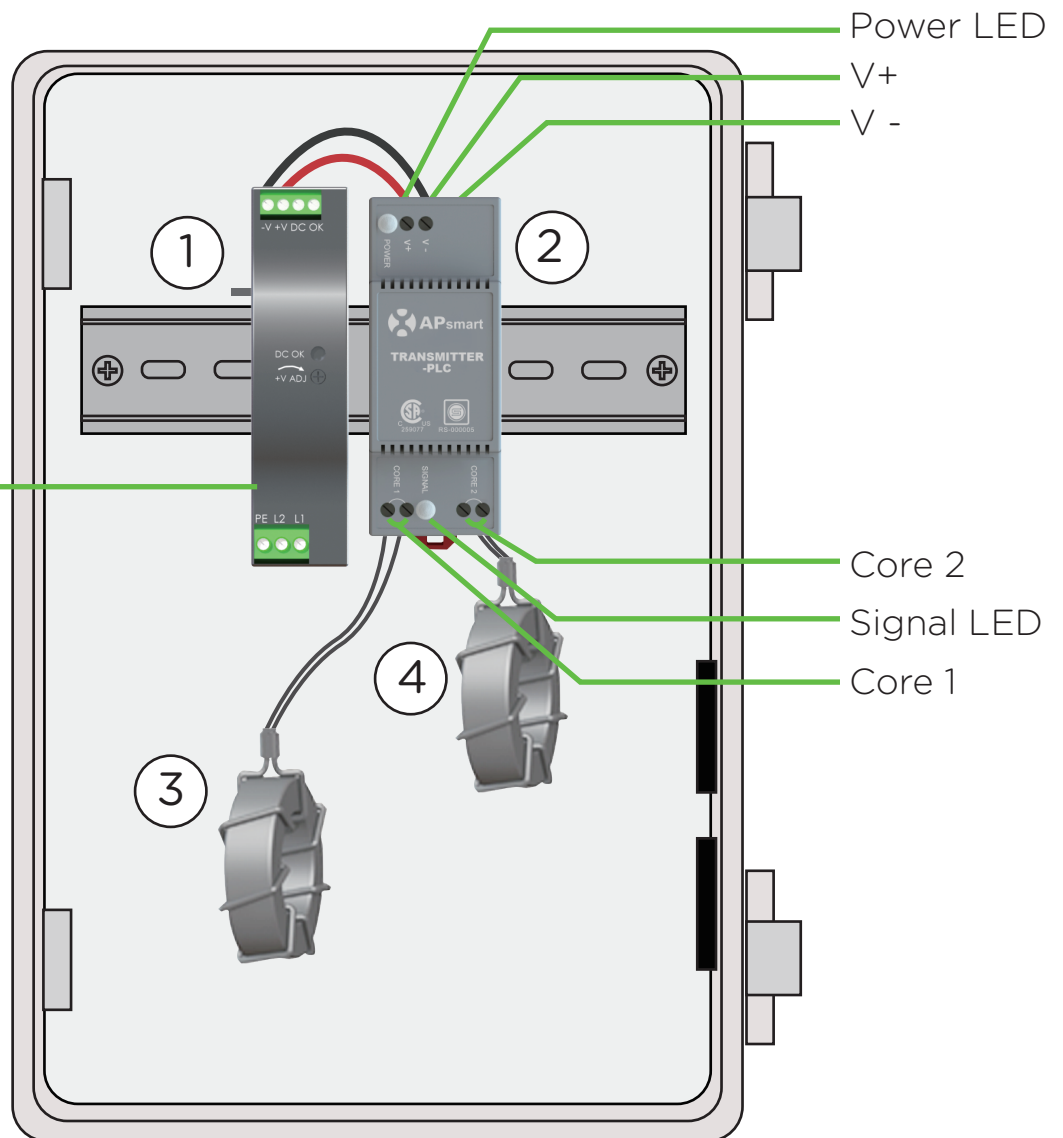
- ① Power Supply
- ② Transmitter-PLC
- ③ Core 1
- ④ Core 2

180-550VAC
Power Supply

Optional power supply
85-264VAC
180-550VAC

Note:

Transmitter-PLC terminal
installation requirements:
1. A 3mm slotted screwdriver
2. The torque requirement
standard: 0.2-0.4N•m



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

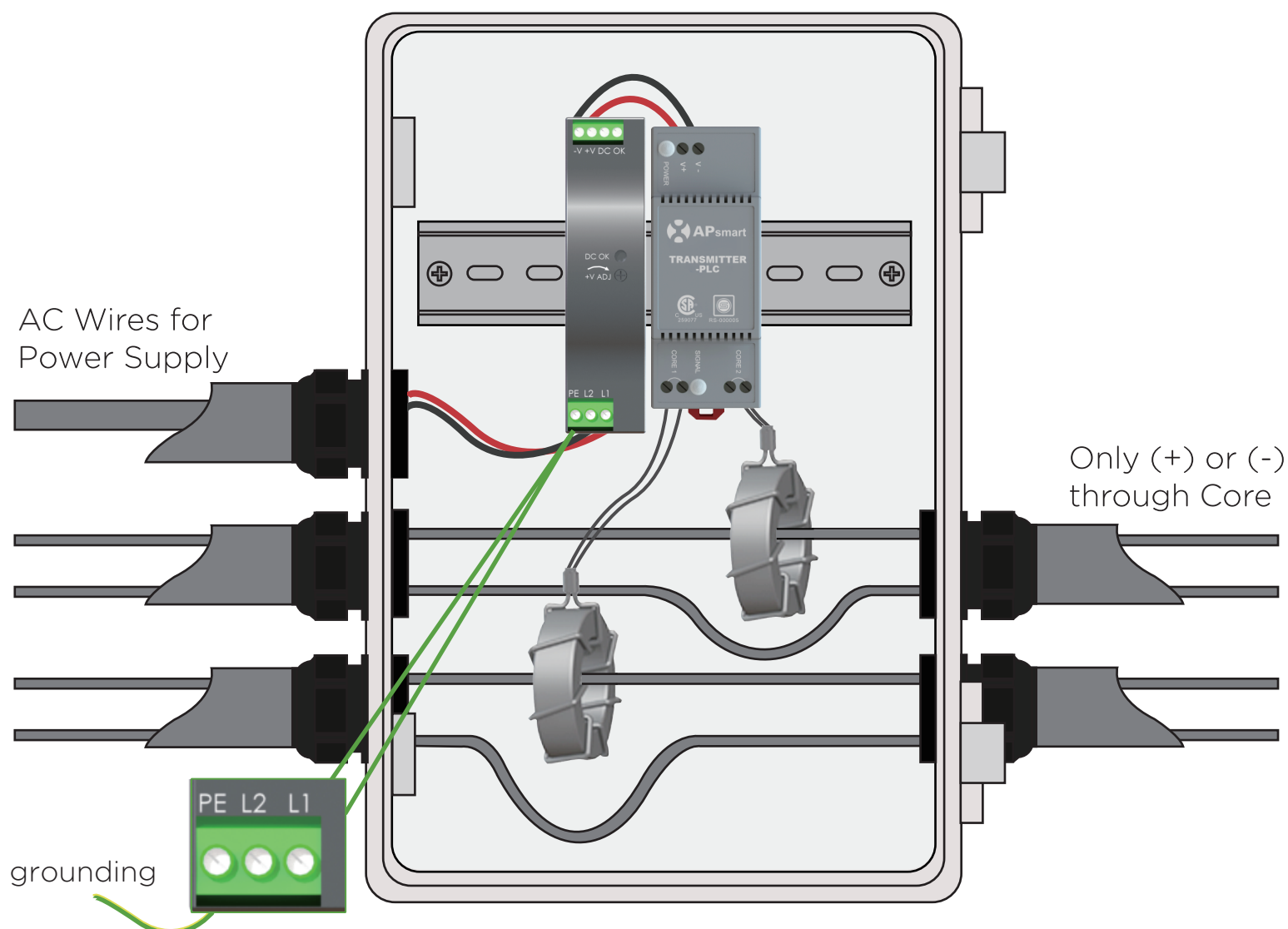
Transmitter power supply must be on same AC branch circuit as inverter to meet rapid shutdown requirements.

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: 180/550Vac power supply isolation class I requires grounding.
85/264Vac power supply isolation class II does not require grounding.

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

- Pass either positive or negative homerun through Cores
- Connect wires to AC side of Power supply

Max number Of Strings Per Core :

DC cable Diameter	Φ5.9mm	Φ6.35mm	Φ7mm	Φ8.6mm
Number Of Strings Per Core (without connector)	≤15	≤15	≤14	≤10

Max string length: **30 modules**

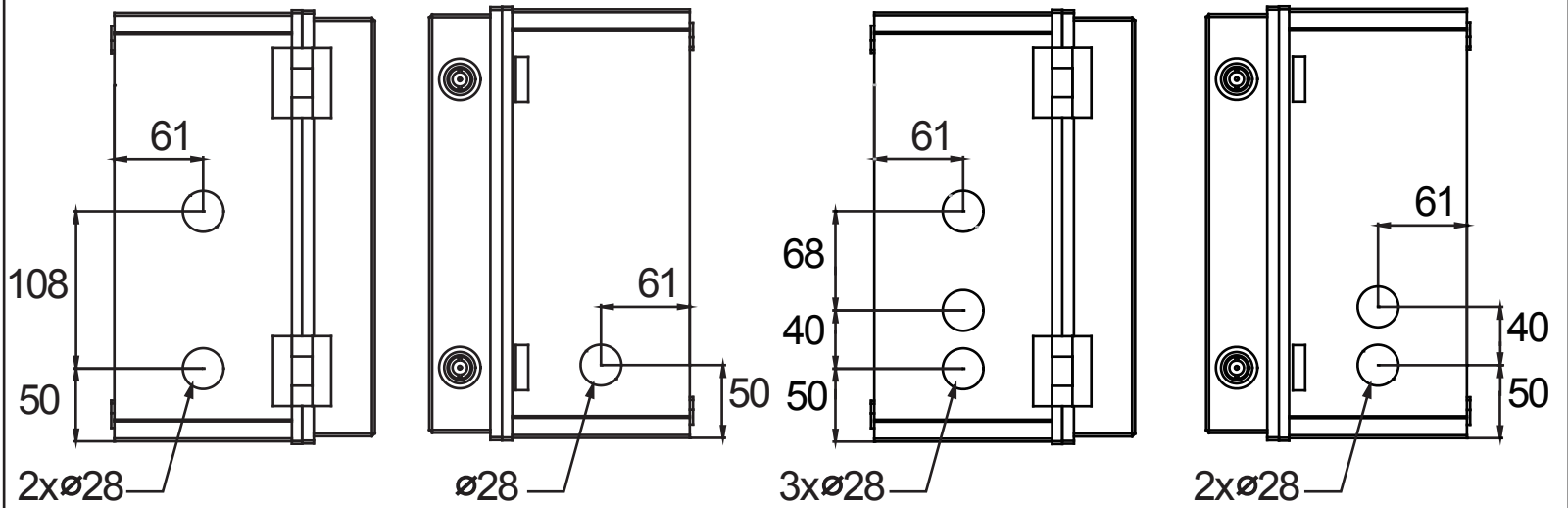
Max current per Core: **150A**

Max cable length from inverter (+) to inverter (-): **1000ft (300m)**

Drilling Guide for .75" Conduit

Single Core

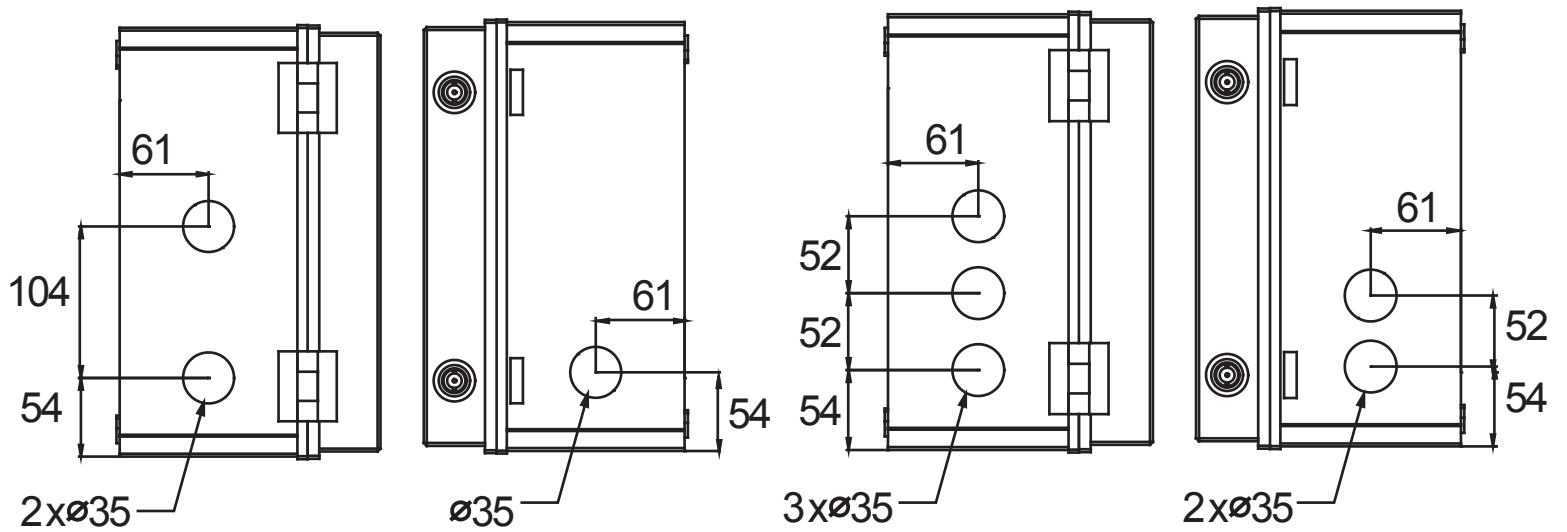
Dual Core



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 (Imax)

15A

Output Data (DC)

Output Operating Voltage Range

8-80V

Maximum System Voltage

1000V/1500V

Mechanical Data

Operating Ambient Temperature Range

-40 °F to + 185°F(-40°C to + 85°C)

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

Over Temperature Protection

Yes

Features & Compliance

Communication

PLC

Safety Compliance

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

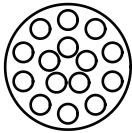
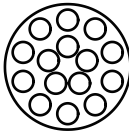
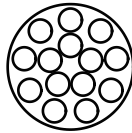
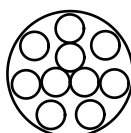
EMC Compliance

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

TECHNICAL DATA—TRANSMITTER-PLC

Model	Transmitter-PLC			
Main Electrical Data				
Input Voltage	12VDC			
Input Current	0.8A			
Communication	P L C			
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	29mm Core		11mm Core	
Max. Current	300A (150AX2)		75A (75AX2)	
Max. System Voltage	1500VDC		1500VDC	
Internal Opening for Wires/Outside Dimensions	~29mm/65mm		~11mm/35mm	
Max. Supported PV Modules per String	30 modules		30 modules	
Max. Number Of Strings per core				
DC Cable Diameter(without connector)	Φ5.9mm	Φ6.35mm	Φ7mm	Φ8.6mm
29mm Core	≤15	≤15	≤14	≤10
11mm Core	≤6	≤5	≤4	≤12
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	12VDC			
Input Current	0.8A			
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			
Internal Opening for Wires/Outside Dimensions	~29mm/65mm			
Max. Supported PV Modules Per String	30 modules			
Max. Number Of Strings				
Inner Hole Size Of Core				
DC Cable Diameter	Φ5.9mm	Φ6.35mm	Φ7mm	Φ8.6mm
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			

ORDERING INFORMATION

Transmitter

406000	29mm Dual Core Transmitter-PLC (no power supply)
406001	29mm Single Core Transmitter-PLC (no power supply)
406002	11mm Dual Core Transmitter-PLC (no power supply)
406003	11mm Single 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

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