

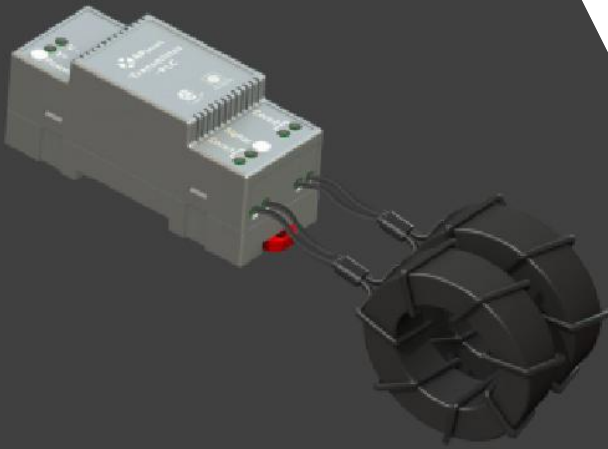


# Installation /User Manual

## APsmart Rapid Shutdown Device & Transmitter

Rev1.2 2021/3/27

RSD-D  
TRANSMITTER-PLC  
TRANSMITTER-PLC OUTDOOR KIT



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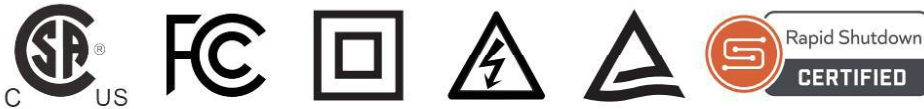
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# IMPORTANT SAFETY INSTRUCTIONS

This manual contains important instructions to be followed during installation and maintenance of the APsmart RSD-D and Transmitter. To reduce the risk of electrical shock and ensure the safe installation and operation of the APsmart RSD-D 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-D without first disconnecting the AC power.
- Only qualified professionals should install and/or replace the APsmart RSD-D.
- Perform all electrical installations in accordance with local codes.
- Before installing or using the RSD-D, please read all instructions and cautionary markings in the technical documents.
- Be aware that the body of the operating RSD-D is a heat sink and can reach high temperature. To reduce risk of burns, do not touch the body of the RSD-D.
- Do NOT attempt to repair the RSD-D. If it fails, contact APsmart Customer Support to obtain an RMA number and start the replacement process. Damaging or opening the RSD-D will void the warranty.

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

**This device complies with part 15 of the FCC Rules, Operation is subject to the following two conditions:**

(1) This device may not cause harmful interference, and (2) this device must accept any interference receiver, including interference that may cause undesired operation.

### 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, electrical systems and EMC and is authorized to energize, ground, and tag equipment, systems, and circuits in accordance with established safety procedures. The inverter and balance of system may only be commissioned and operated by qualified personnel.

# RSD PRODUCTS

## RSD-D



- Meets NEC 2017 & 2020 (690.12) requirements
- Executes rapid shutdown of system when Transmitter-PLC signal is absent
- Meets SunSpec requirements
- Dual-input channel

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

# TRANSMITTER PRODUCTS

## Transmitter-PLC



- Meets NEC 2017&2020 (690.12) requirements
- Switching off Transmitter-PLC results in rapid shutdown of 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&2020 (690.12) requirements
- Switching off Transmitter-PLC results in rapid shutdown of the output of PV modules
- Meets SunSpec requirements
- Equipped with single/dual core
- Optional 85-264VAC power supply
- Optional 180-550VAC power supply

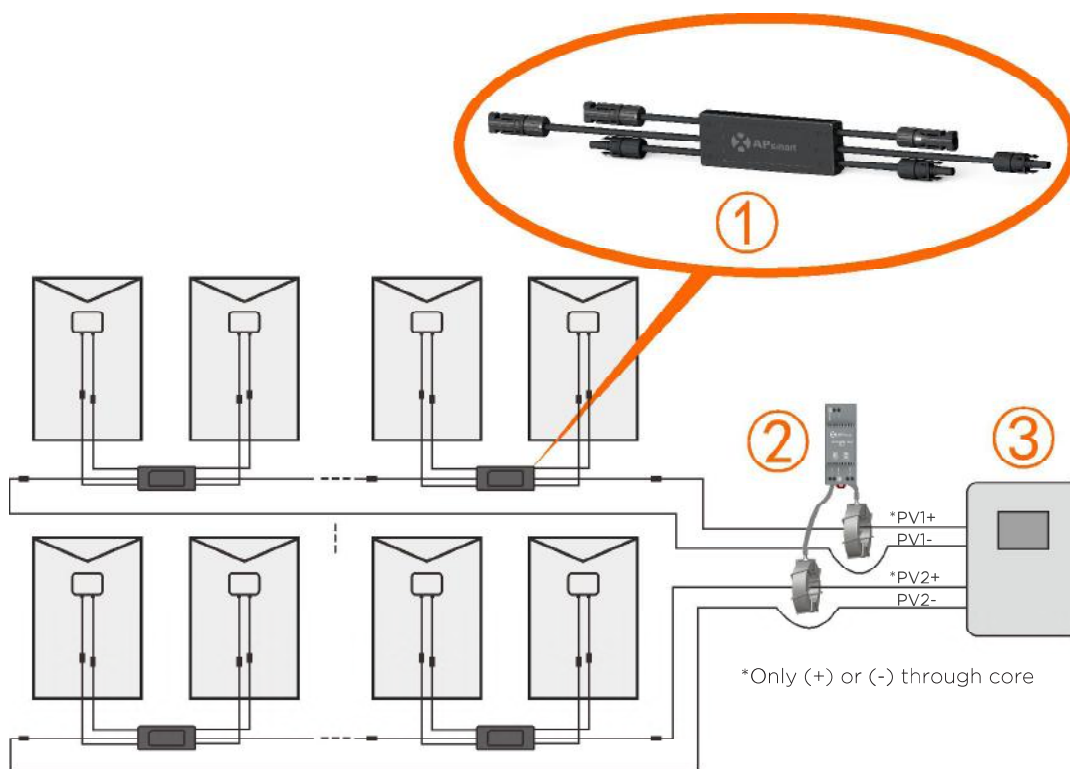
# SYSTEM WIRING DIAGRAM

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

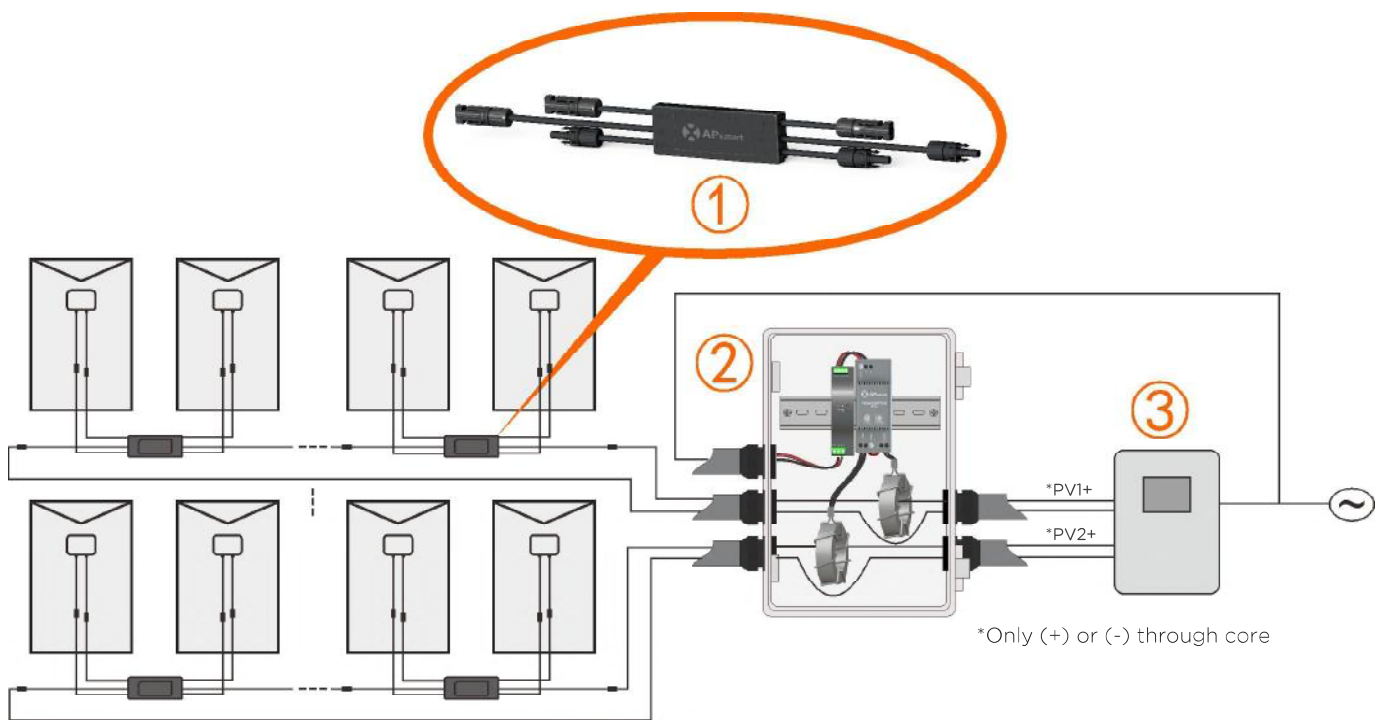
RSD-D units automatically enter rapid shutdown mode when the Transmitter-PLC is switched off and resume energy production when power is restored to the Transmitter-PLC. This solution complies with NEC 690.12 specifications for 2017 & 2020 and supports the SunSpec signaling for rapid shutdown.

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

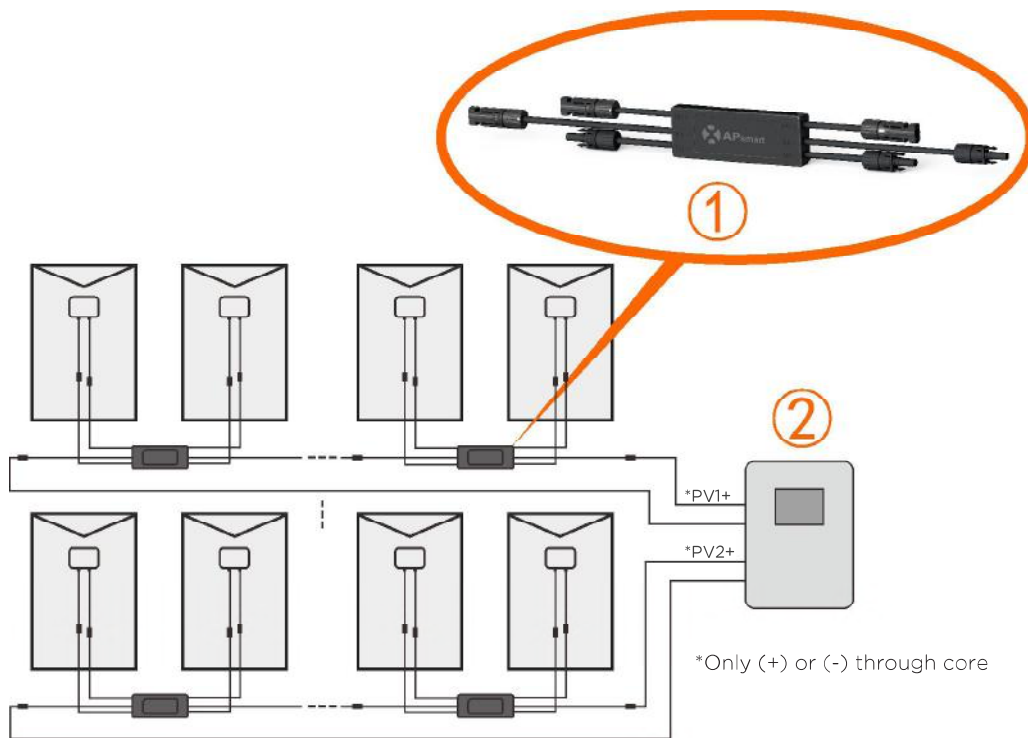
The Transmitter-PLC Outdoor Kit includes a Transmitter-PLC with one or two cores, outdoor enclosure, 85-264VAC or 180V-550VAC power supply. It could be used in a residential or commercial project.



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



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



- ① RSD-D
- ② Inverter\*

\*Inverter in diagram includes an integrated SunSpec-certified Rapid Shutdown Transmitter.

# RSD-D 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-D.
- ③ Before installing or using an RSD-D, 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 PV module and inverter have been disconnected before installing an RSD-D.

- ① Be sure to verify the voltage and current specifications of your PV module match with those of the RSD-D.
- ② The maximum open circuit voltage of the PV module must not exceed the specified maximum input voltage of the APsmart RSD-D.

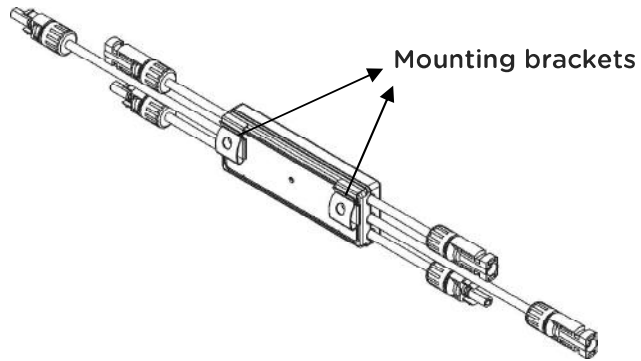
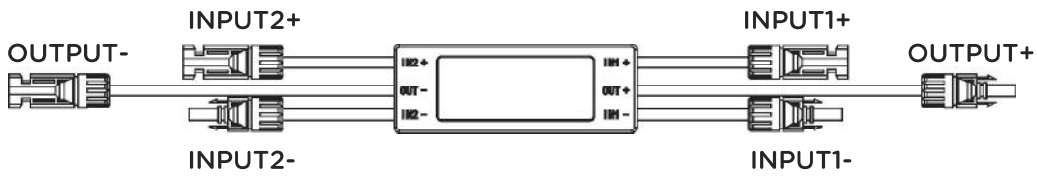
## Additional installation components from APsmart

- DC extension cable (sold separately)

## Required parts and tools to complete the installation

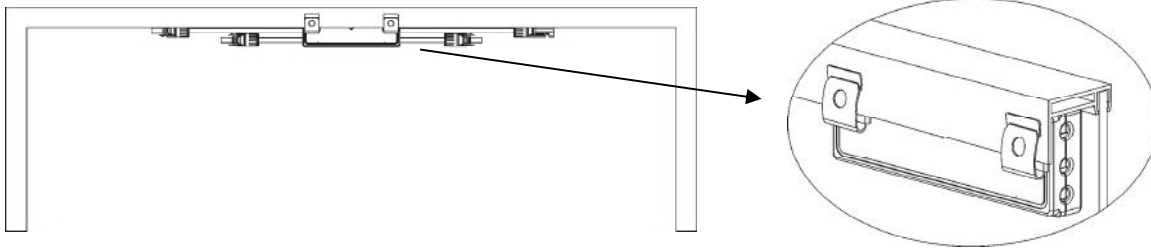
In addition to your PV array and its associated hardware, you will need a torque wrench and a Phillips screwdriver.

## Step 1: Install the RSD-D.

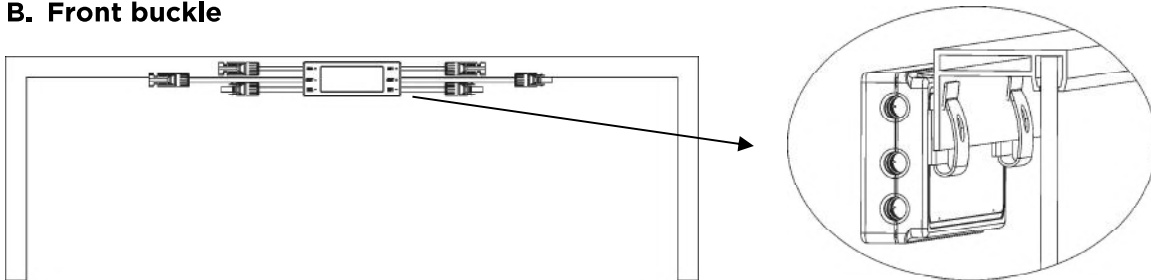


Buckle RSD-D onto the PV module frame.

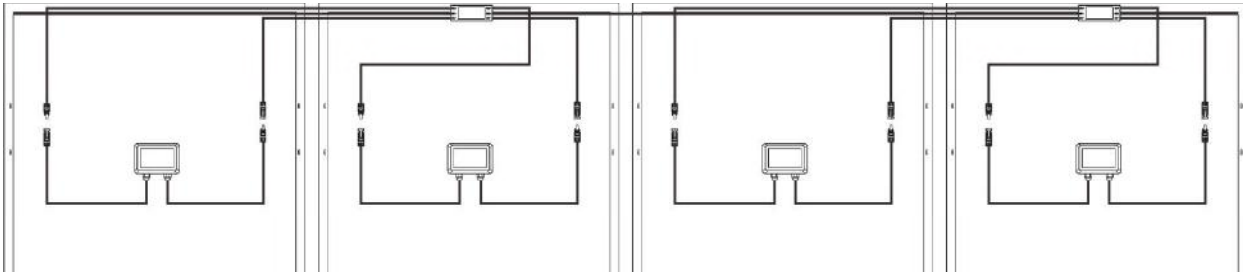
### A. Back buckle



### B. Front buckle



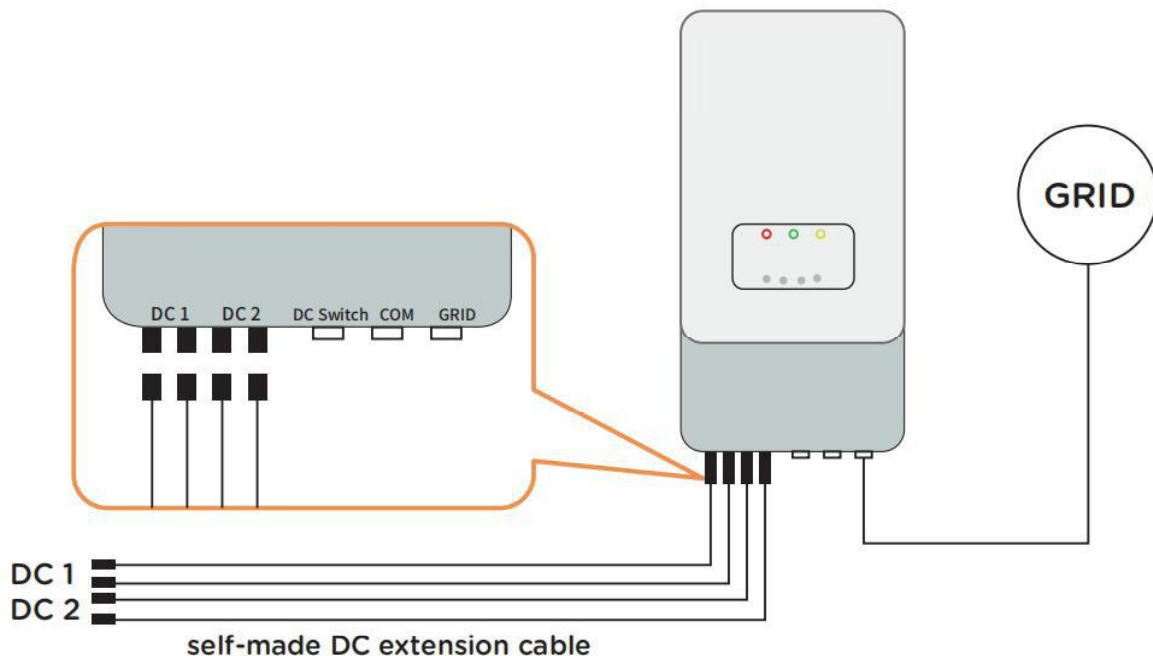
**Step 2. Connect the input 1 port of the RSD-D to the PV module junction box, and connect the input 2 port of RSD-D to the other PV module junction box.**



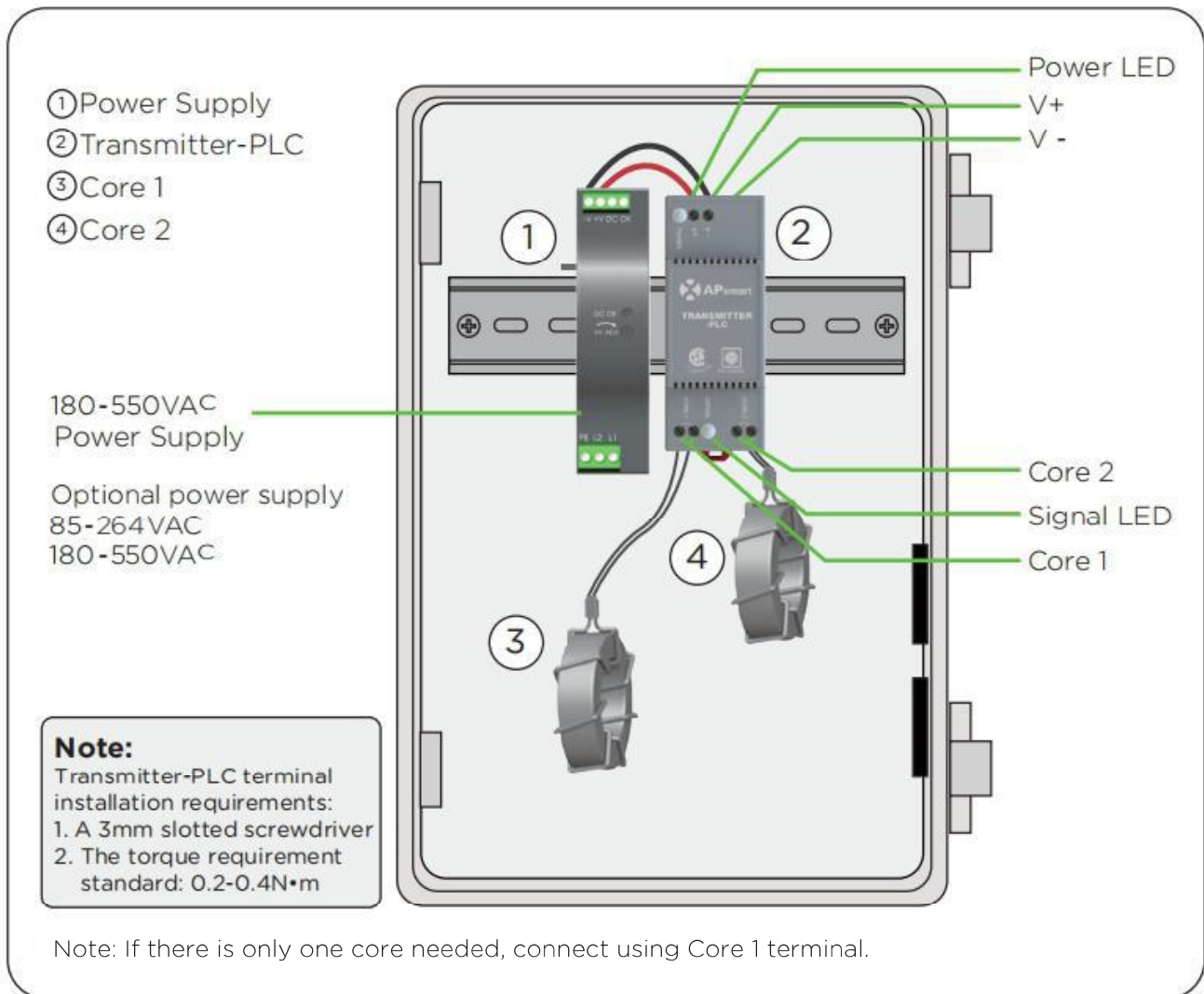
**WARNING: When connecting the RSD-D to only one PV module, use INPUT1 port ONLY, then connect a DC extension cable to both terminals of INPUT2 to short the unused side, otherwise the RSD-D may be damaged.**

**WARNING: Do not short-circuit the RSD ( RSD string ) output cable.**

**Step 3: Connect the output ports of two adjacent RSD-Ds in series and then connect to the inverter with a self-made DC extension cable.**



# TRANSMITTER-PLC INSTALLATION



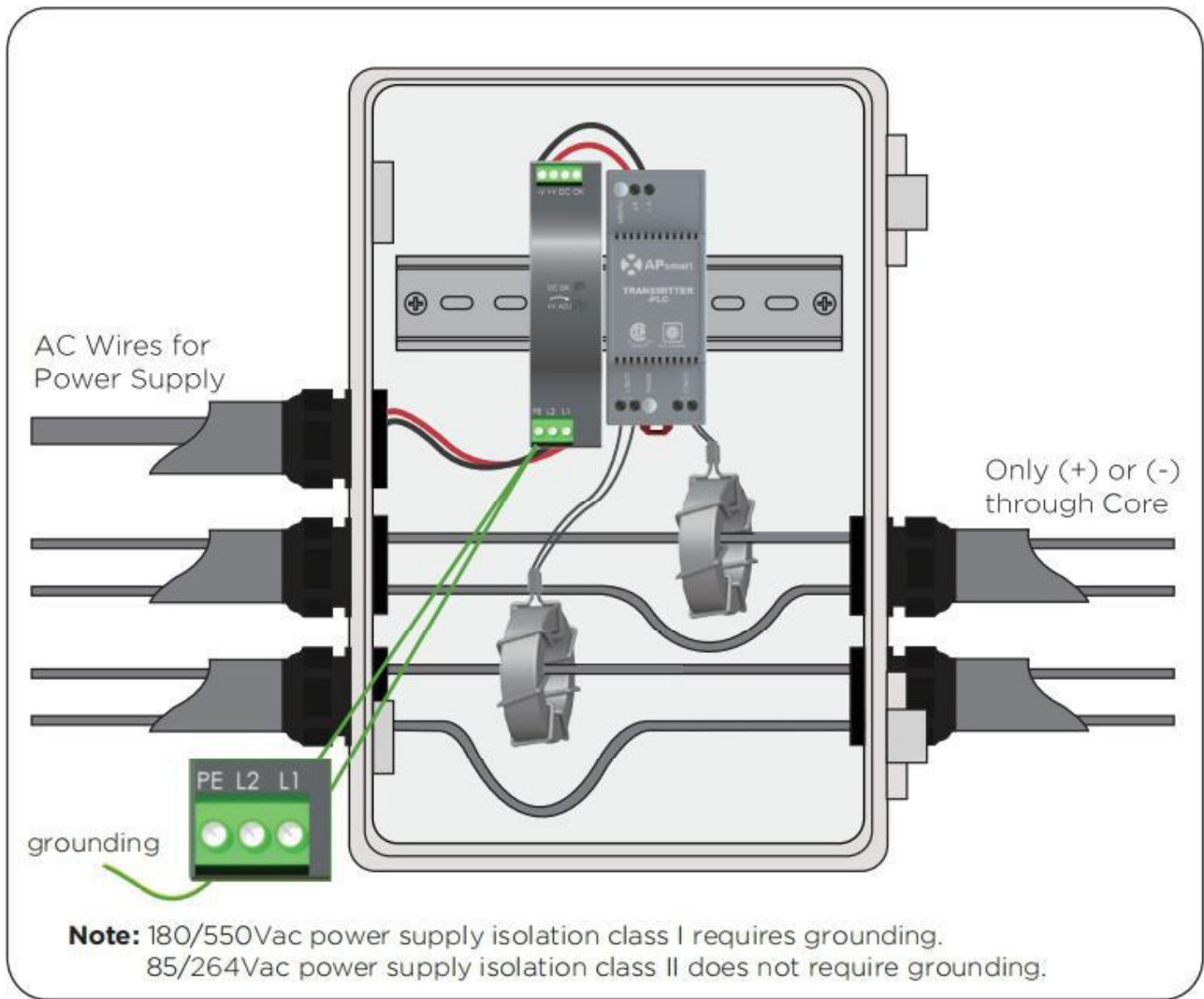
Transmitter-PLC power supply must be on same AC branch circuit as inverter to meet rapid shutdown requirements.

During operation, the Power LED should be lit and the Signal LED should be blinking. If the Transmitter-PLC 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 the RSD-D before powering on the Transmitter-PLC.

- 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-PLC or AC disconnect if not at same location.



Note: Install the RSD-D before powering on the Transmitter-PLC.

- Pass either positive or negative cables through cores (either both positive cables or both negative cables. Do not use one positive and one negative cable.)
- Connect wires to AC side of power supply

Max number Of Strings Per Core :

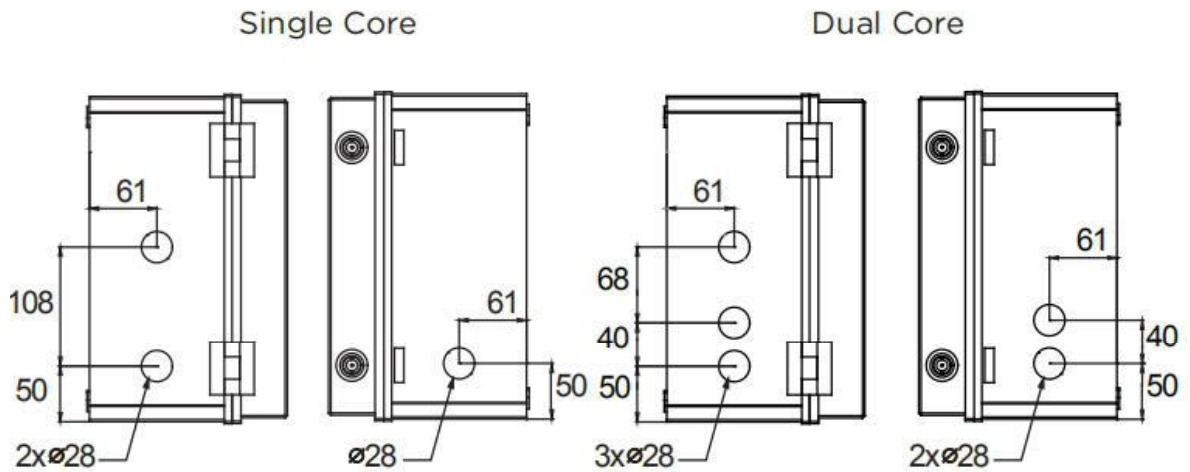
DC cable Diameter	Φ 5.9mm	Φ 6.35mm	Φ 7mm	Φ 8.6mm
Number Of Strings Per Core (without connector)	≤15	≤15	≤14	≤10

Max string length : **30 modules**

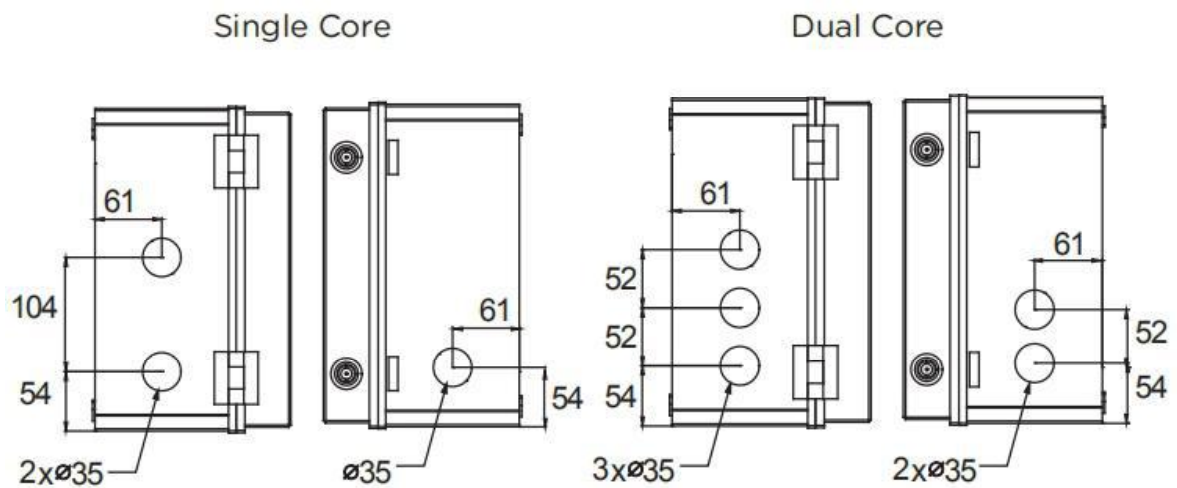
Max current per core : **150A**

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

## Drilling Guide for .75" Conduit



## Drilling Guide for 1" Conduit



# TECHNICAL DATA—RSD-D

## Model

RSD-D

### Input Data (DC)

Input Operating Voltage Range	8-80V Per Channel
Maximum Cont. Input Current (Imax)	15A Per Channel

### Output Data (DC)

Output Operating Voltage Range	16-160V
Maximum Output Current	15A
Maximum System Voltage	1000V/1500V

### Mechanical Data

Operating Ambient Temperature Range	-40 °F to +167 °F (-40 °C to + 75 °C)
Dimensions (without cable & connectors)	5.5" x 2" x 0.8"(140 mm x 50.6 mm x 20 mm)
Cable Length	Input 500mm/Output 2200mm
Cable Cross Section Size	TUV:4mm <sup>2</sup> /UL:12AWG
Connector	MC4 or Customize
Enclosure Rating	NEMA Type 6P/IP68
Over Temperature Protection	Yes

### Features & Compliance

Communication	PLC
Safety Compliance	NEC 2017 & 2020 (690.12); UL1741; CSA C22.2 No. 330-17; IEC/EN62109-1
EMC Compliance	FCC Part15; ICES-003

# TECHNICAL DATA—TRANSMITTER-PLC

## Model

## Transmitter-PLC

### Main electrical data

Input Voltage	12VDC
Input Current	0.8A
Communication	PLC

### Power Supply

Residential ( optional )	85-264VAC 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

	29mm Core	11mm Core
Max. Current	150A Per core	75A Per core
Max. System Voltage	1500VDC	
Internal Opening for Wires/Outside Dimensions	-29mm/65mm	-11mm/35mm
Max. Supported PV Modules per String	30 modules	

### 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	≤2

### Environmental

Temperature	-40°C ~ +100°C
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### 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 & 2020 (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 )	85-264VAC 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	150A Per core
Max. System Voltage	1500VDC
Internal Opening for Wires/Outside Dimensions	~29mm/65mm
Max. Supported PV Modules per String	30 modules

### Number Of Strings Per Core

DC Cable Diameter(without connector)	Φ5.9mm	Φ6.35mm	Φ7mm	Φ8.6mm
29mm Core	≤15	≤15	≤14	≤10

### Environmental

Temperature	-40°C ~ +60°C
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### Structure data

Dimensions (W x H x D)	198.5 mm x 298 mm x 179 mm
Enclosure Environmental Rating	IP30

### Features & Compliance

Safety Compliance	NEC 2017 & 2020 (690.12); UL1741; CSA C22.2 No. 330-17
EMC Compliance	FCC Part15; ICES-003