

Rapid Shutdown USER MANUAL

HRSD-1C
HT10
HT10-Kit

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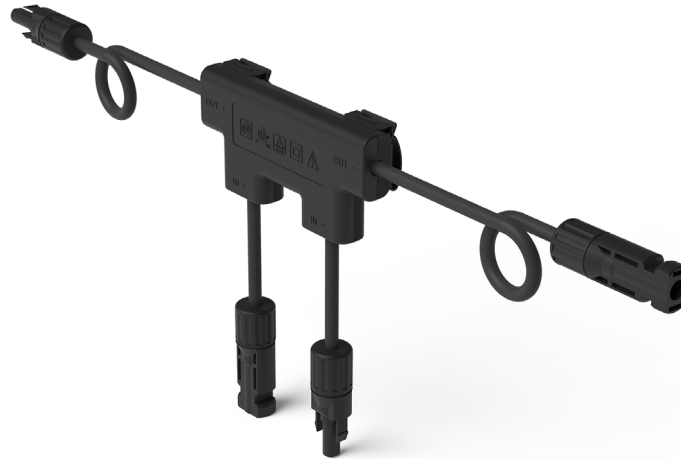
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SAVE THESE INSTRUCTIONS

- This manual contains important instructions for installation and maintenance of the Hoymiles product models HRSD-1C and the Transmitter.
- Risk of electric shock, do not remove the cover, disassemble, or repair, no user-serviceable parts inside. If it fails, contact Hoymiles Customer Support. Damaging or opening the product will void the warranty.
- Before installing or using the Hoymiles HRSD-1C System, please read all instructions and warning markings on the Hoymiles products, relevant sections of your inverter manual, photovoltaic (PV) module installation manual, and other available safety guides.
- Failure to adhere to these instructions may result in injury or death, damage to the system or invalidating the factory warranty.
- Perform all electrical installations in accordance with local codes.
- Do NOT disconnect the PV module from the HRSD-1C without first disconnecting the AC power.
- Installation must be performed by trained professionals only. Hoymiles does not assume liability for loss or damage resulting from improper handling, installation, or misuse of products
- Do not attempt to install in inclement weather.
- Be aware that the body of the running HRSD-1C is the heat sink and can reach high temperatures. To reduce the risk of burns, do not touch the body of the HRSD-1C.
- Do not operate the HRSD-1C if they have been physically damaged. Check existing cables and connectors and ensure they are in good condition and appropriate in rating. Do not operate HRSD-1C with damaged or substandard wiring or connectors.
- Do not connect or disconnect under load. Turning off the Inverter and/or the HRSD-1C products may not reduce this risk. Internal capacitors within the inverter can remain charged for several minutes after disconnecting all power sources. Verify capacitors have discharged by measuring a voltage across inverter terminals before disconnecting wiring if service is required. Wait 30 seconds after rapid shutdown activation before disconnecting DC cables or turning off DC disconnect.
- The transmitter control power supply **MUST** be on the same AC branch circuit as the inverter to meet rapid shutdown requirements.

1. Product

1.1 HRSD-1C



Features	• Meets NEC2017&NEC2020 690.12 requirements
	• Meets Sunspec RSD requirements
	• PLC communication, realize rapid shutdown with Transmitter
	• Plug & play, no configuration required
	• Lower power consumption and wider operating voltage range
	• Much lower than arc noise. No risk of triggering AFCI

As part of Hoymiles rapid shutdown solution for PV system, HRSD-1C can be connected with one module. It meets NEC2017, NEC 2020, UL 1741 and Sunspec Rapid Shutdown requirements, guaranteeing PV system safety.

When installed with and receiving a “permission to operate” signal from Hoymiles Transmitter, HRSD starts proper operation of PV system. In case of emergency, PV system would enter module-level rapid shutdown mode by simply disconnecting the AC power of Transmitter or using an external initiator.

1.2 HT10



Features	• Meets NEC2017&NEC2020 690.12 requirements
	• Meets SunSpec RSD requirements
	• Equipped with single/dual core
	• Realize rapid shutdown by simply powering off the transmitter or using an external initiator

The Transmitter HT10 is part of Hoymiles Rapid Shutdown solution. When paired with Hoymiles rapid shutdown HRSD and powered on, HT10 sends a “permission to operate” signal to HRSD, to make PV modules connected in series and then connect to string inverter, thus producing power.

In case of emergency, PV system would enter module-level rapid shutdown mode by simply disconnecting the AC power of Transmitter or using an external initiator.

1.3 HT10-Kit



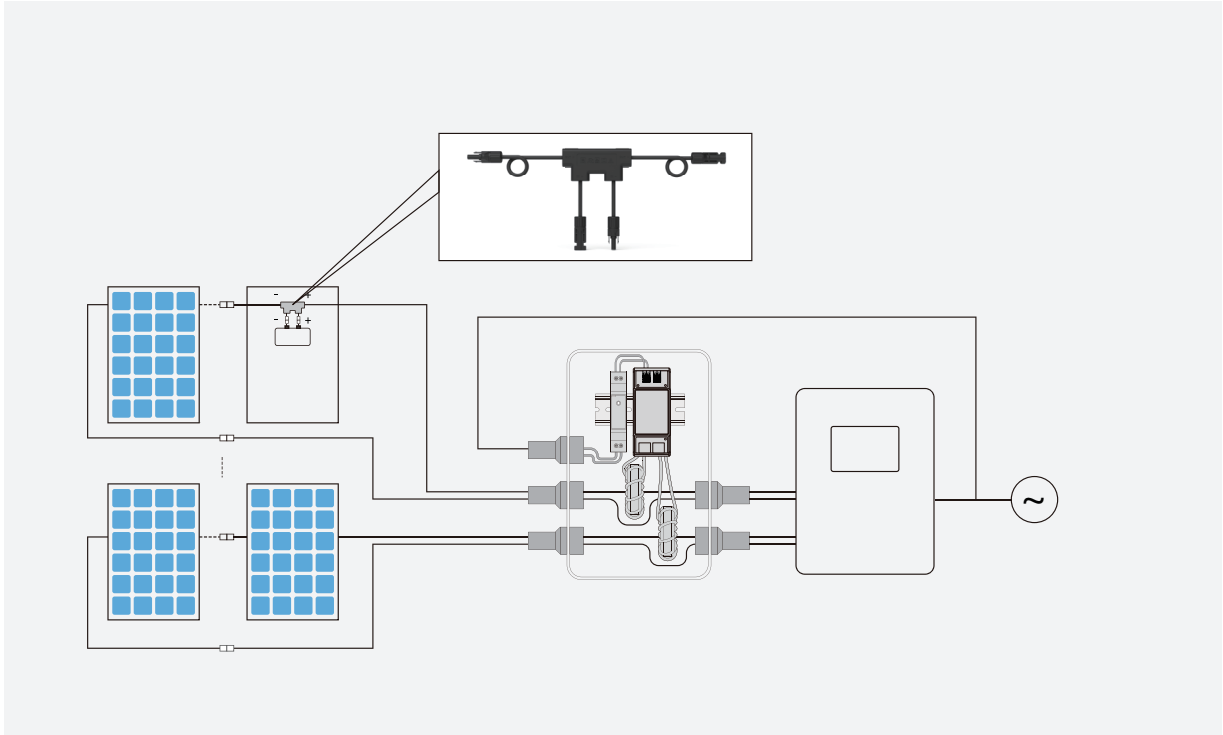
Features	• Meets NEC2017&NEC2020 (690.12) and Sunspec RSD requirements
	• Module-level rapid shutdown with Hoymiles HRSD
	• Equipped with single/dual core
	• Realize rapid shutdown by simply powering off the transmitter or using an external initiator
	• Weatherproof outdoor enclosure
	• Includes power supply

Hoymiles Transmitter HT10-Kit is part of a rapid shutdown solution when paired with Hoymiles rapid shutdown HRSD. While powered on, HT10-Kit sends a “permission to operate” signal to HRSD to keep the PV modules connected in series to the string inverter and producing power.

PV system equipped with HRSD and HT10-Kit enters module-level rapid shutdown by simply disconnecting the AC power of the Transmitter during emergencies.

Hoymiles Transmitter Outdoor Kit includes one Transmitter, one or two cores, 85~264V power supply and outdoor enclosure.

2. System Overview



The HRSD-1C requires a Transmitter or inverter with built-in transmitter for operation.

The Transmitter is installed in line with a solar PV inverter.

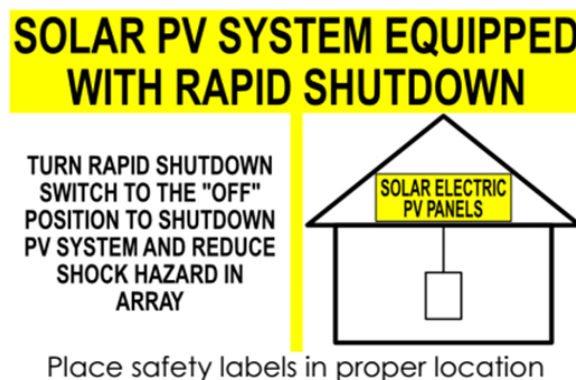
The HRSD-1C starts in the **OFF** position and measures 1V at the output. When power is supplied to the Transmitter, the HRSD-1C turns **ON** and allows full PV module voltage. The HRSD-1C constantly receives a “permission to operate” signal from the Transmitter.

When power to the Transmitter is cut, this “permission to operate” signal ceases, sending every HRSD-1C into shutdown mode with output reduced to 1V.

In this way, PV array enters rapid shutdown in event of AC grid loss.

3. Installation Notes

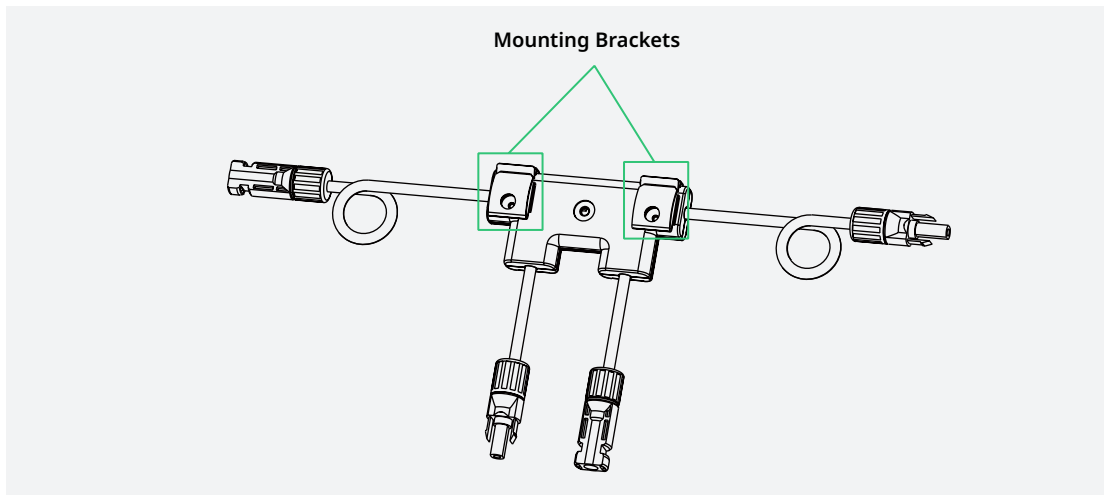
- Installation **MUST** comply with local regulations and technical rules.
- Perform all electrical installations in accordance with local codes.
- Be aware that only qualified professionals should install and/or replace the HRSD-1C.
- Before installing or using an HRSD-1C, please read all instructions and warnings in the technical documents and on the inverter system itself as well as on the PV array.
- Be sure to verify the voltage and current specifications of your PV module match with those of the HRSD-1C.
- Never apply an external voltage source to a module or string equipped with HRSD-1C.
- HRSD-1C is shipped in the **OFF** position and will measure 1V at the output when the “permission to operate” signal is not present.
- Failing to follow the sequence of installation steps may result in HRSD-1C damage not covered under warranty.
- Connect HRSD-1C to its respective modules before connecting its outputs in series.
- Install HRSD-1C before powering on the Transmitter.
- If parallel string connections are needed, first connect the HRSD-1C to the PV modules, then connect all outputs of HRSD-1C in series, and finally pass one side (+ or -) of the string through the transmitter to turn the system **ON**.
- Do not touch any live parts in the system, including the PV array, when the system has been connected to the electrical grid.
- Place rapid shutdown system label no more than 1m (3ft) from initiator (AC disconnect) or service panel containing means of disconnection if not at same location.



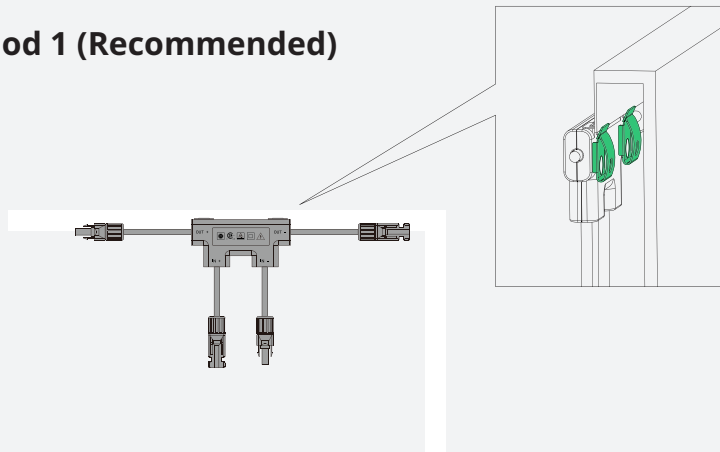
4. Installation

4.1 HRSD-1C Installation

A). Buckle HRSD-1C on the PV module frame. HRSD-1C can be installed anywhere on the PV module frame.

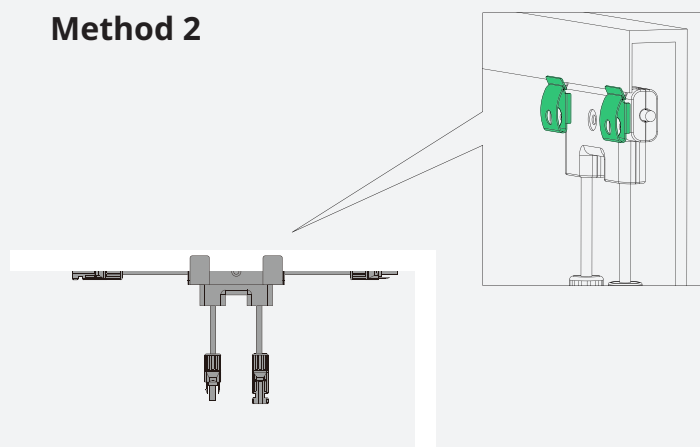


Method 1 (Recommended)



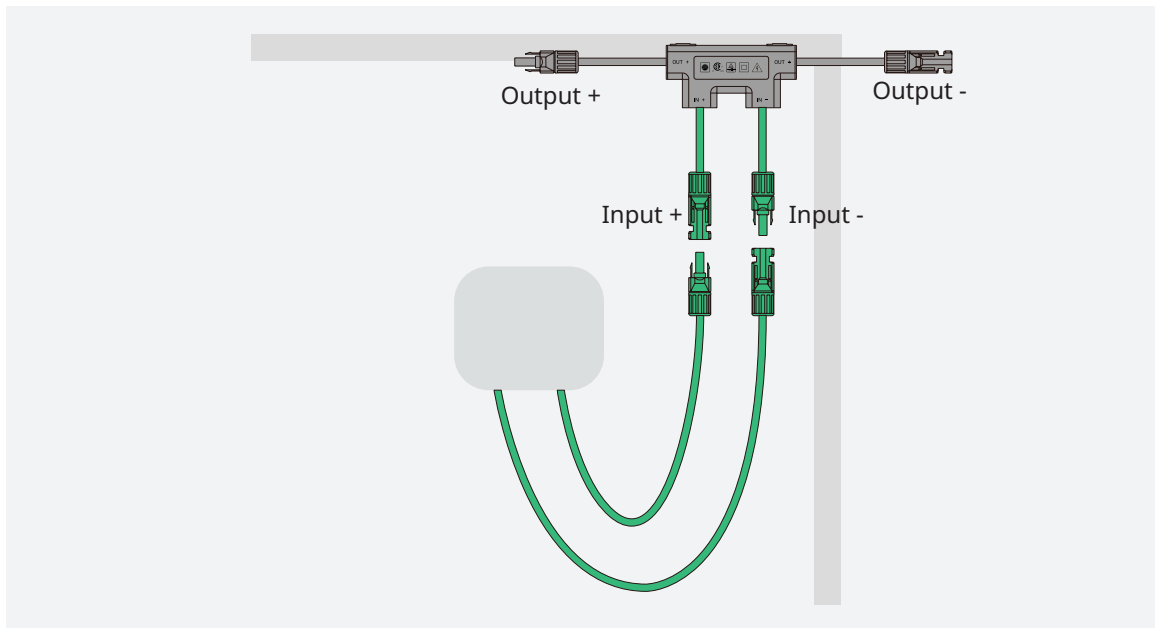
Allow a minimum of 1.5 cm of space between the roof and the HRSD-1C enclosure to ensure ventilation and heat dissipation

Method 2

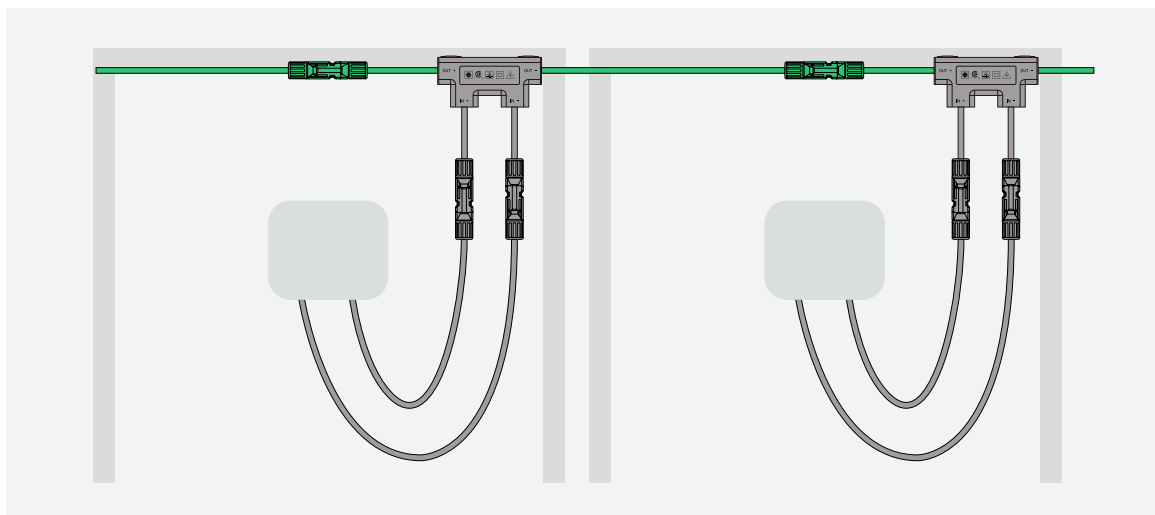


Allow a minimum of 1.5 cm of space between the roof and the HRSD-1C enclosure to ensure ventilation and heat dissipation

B). Connect modules to inputs of HRSD-1C. Each HRSD-1C must have a PV module connected to its inputs.



C). Connect the outputs of HRSD-1C in series.



Note:

When installing HRSD-1C, connect the input cables to the PV module before connecting the HRSD-1C output cables in series.

If disconnecting HRSD-1C, disconnect the HRSD-1C output cables from the string before disconnecting the input cables from the PV module.

Connectors from different manufacturers cannot be mated with each other.

Transmitter must be powered off during HRSD-1C installation.

HRSD-1C output Voltage is 0.9V to 1.1V when Transmitter "permission to operate" signal is not present.

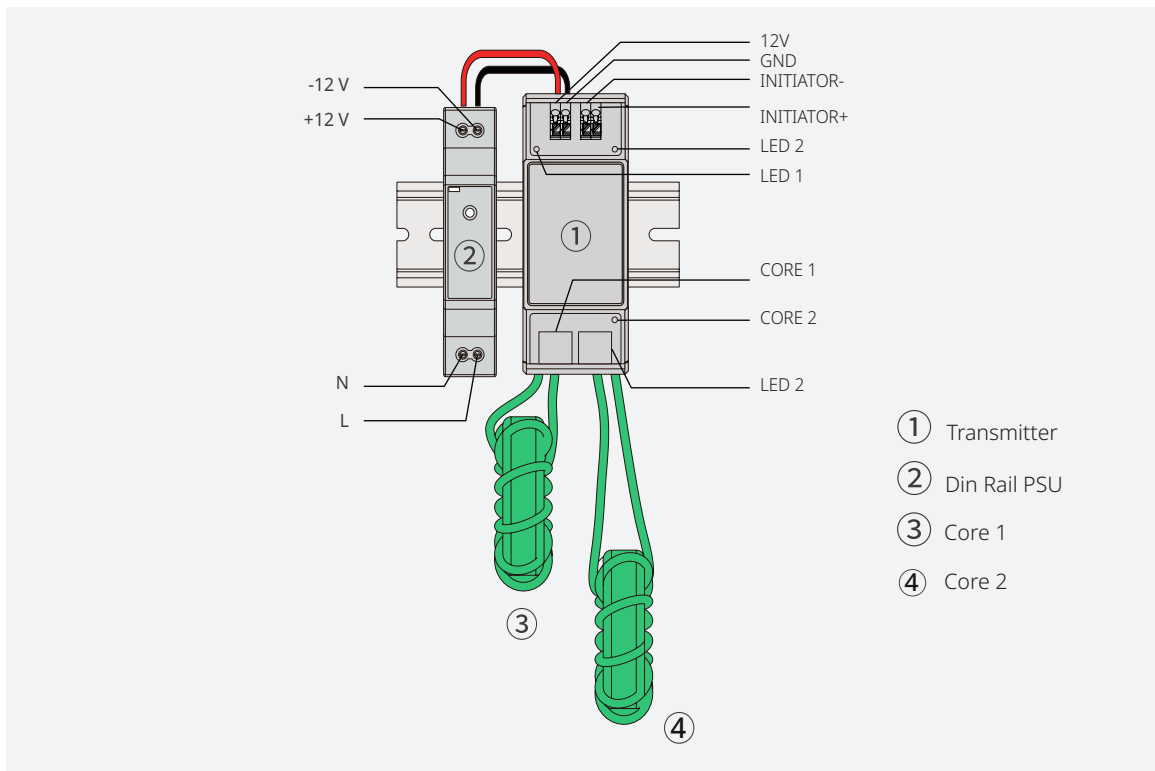
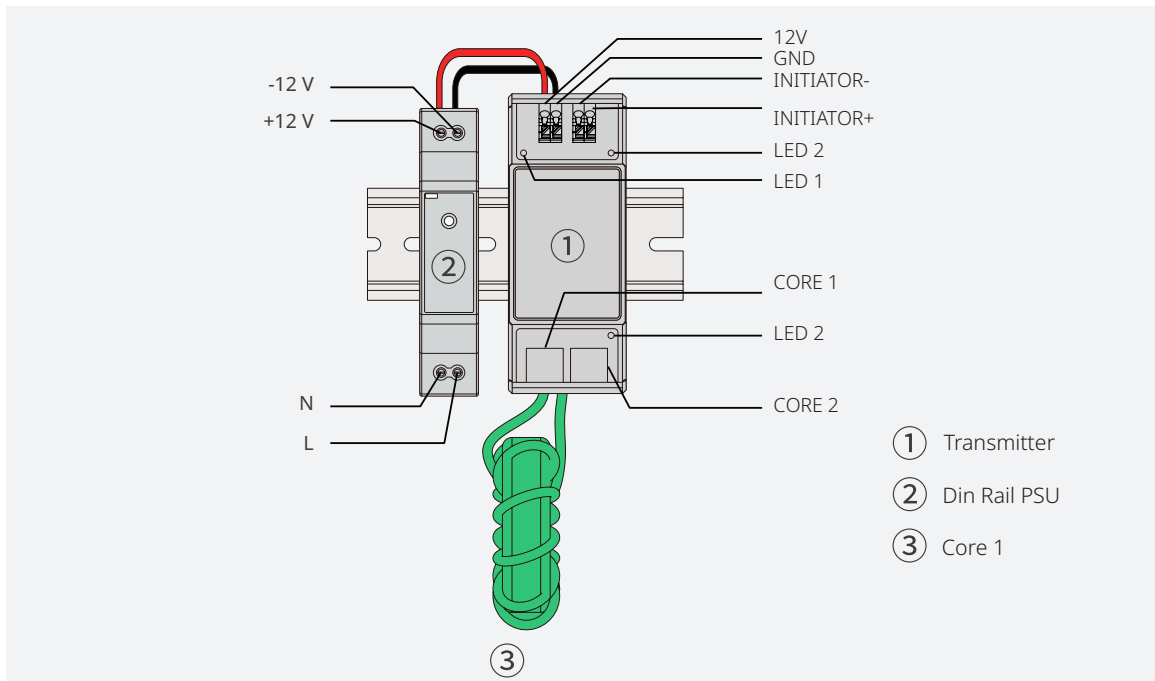
Max. string length: 30 modules

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

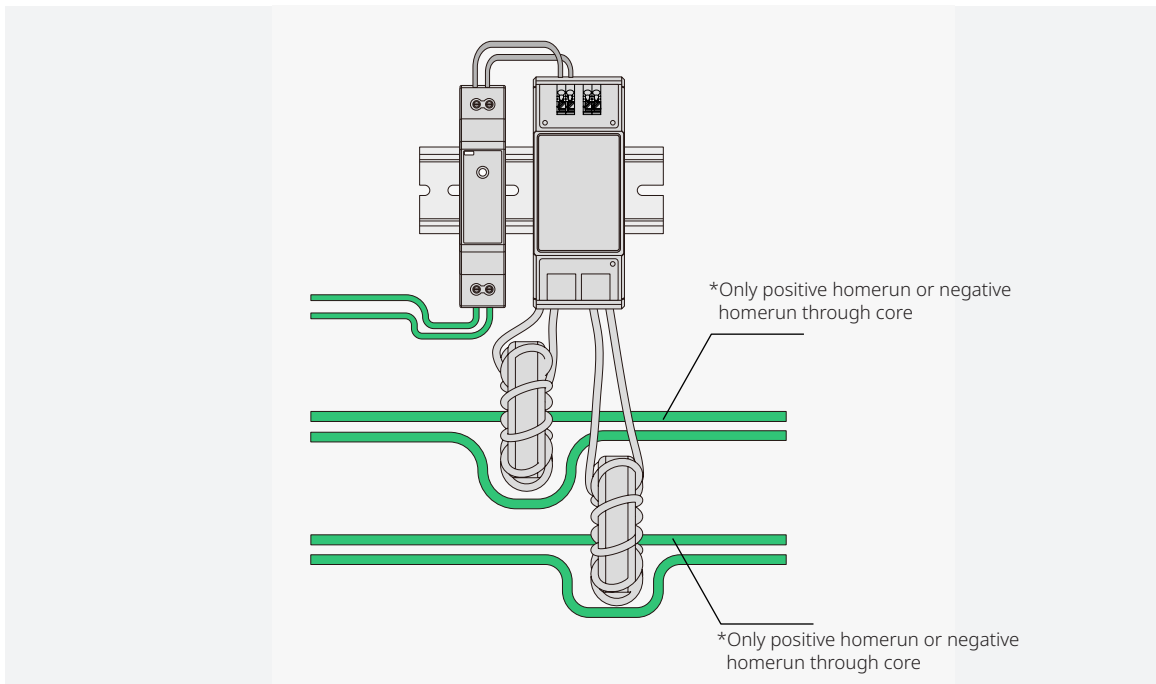
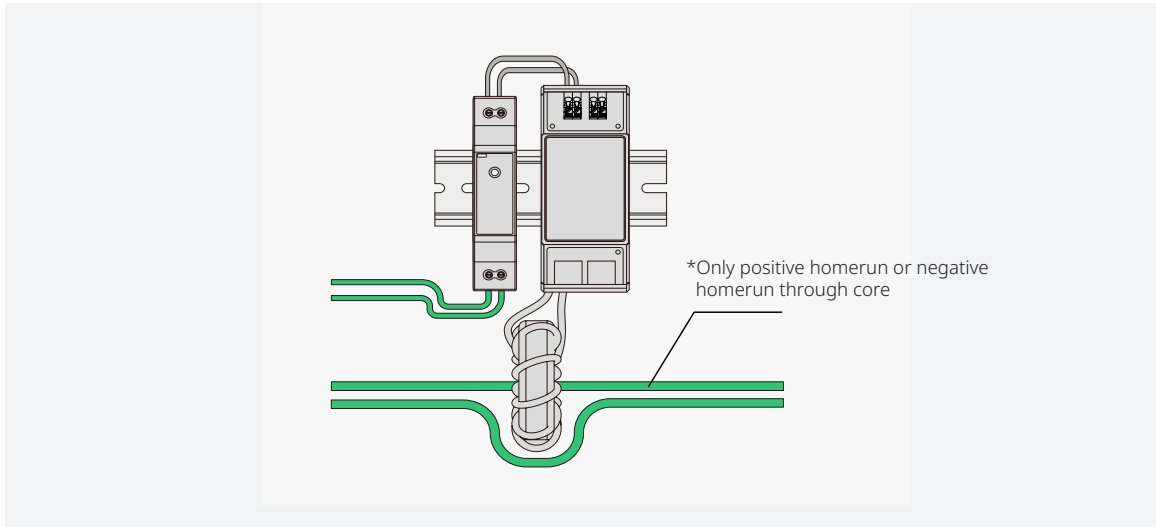
4.2 HT10 Installation

A). - Mount Transmitter HT10 and power supply on DIN rail.

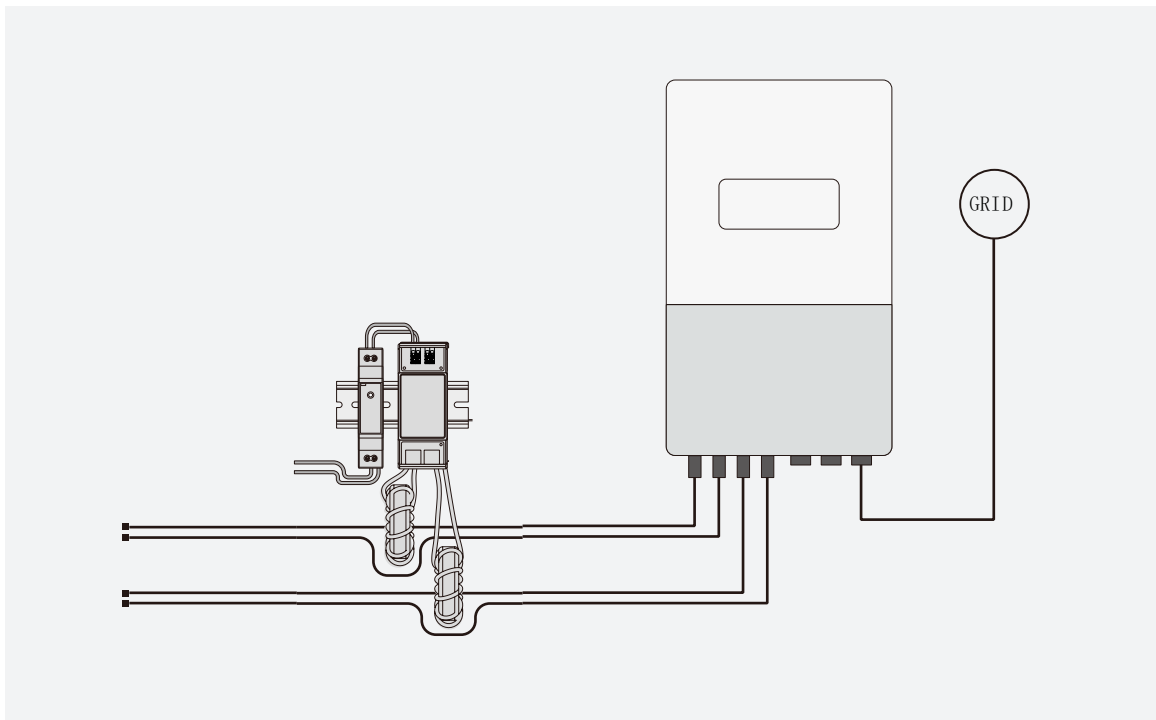
- Connect DC leads from power supply to Transmitter.
- Connect Core to Transmitter HT10.
- If there is only one core that needs to be connected, please connect Core 1 first.



- B).** - Pass either positive homerun or negative homerun through cores.
- Connect wires to AC side of power supply.



- C).** - Connect the serially connected outputs of HRSD-1C to the inverter with a DC cable.
- Turn on AC power to Transmitter HT10 power supply to activate the “permission to operate” signal.



Note:

Install HRSD-1C before powering on Transmitter HT10-Kit.

Transmitter HT10-Kit power supply must be on the same AC branch circuit as the inverter to meet rapid shutdown requirements.

When the PV system is operating, the Power LED1 should be lit and the Signal LED2 should be blinking.

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

Note:

Max. number of strings per Core* : 5 (75A core) or 15 (150A core)

Max. current per Core: 75A or 150A

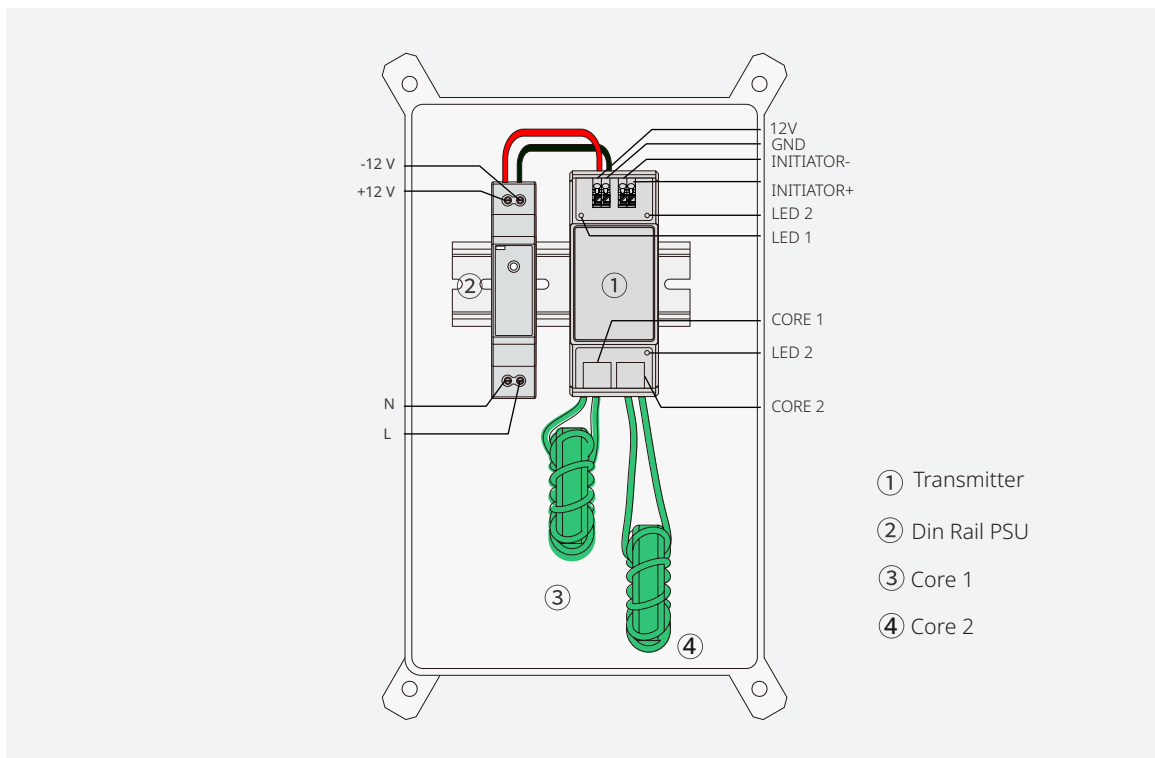
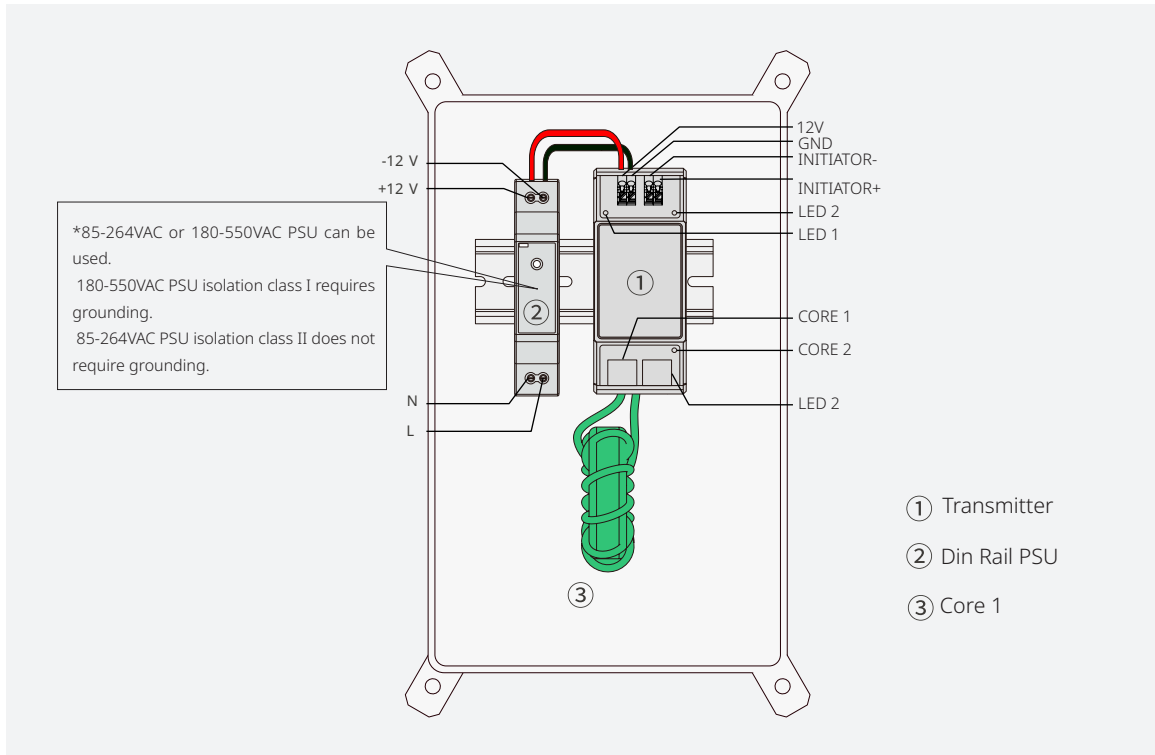
Max. cable length from inverter (+) to inverter (-): 1000ft (300m)

* With Φ 6 mm DC cable diameter (without DC connector)

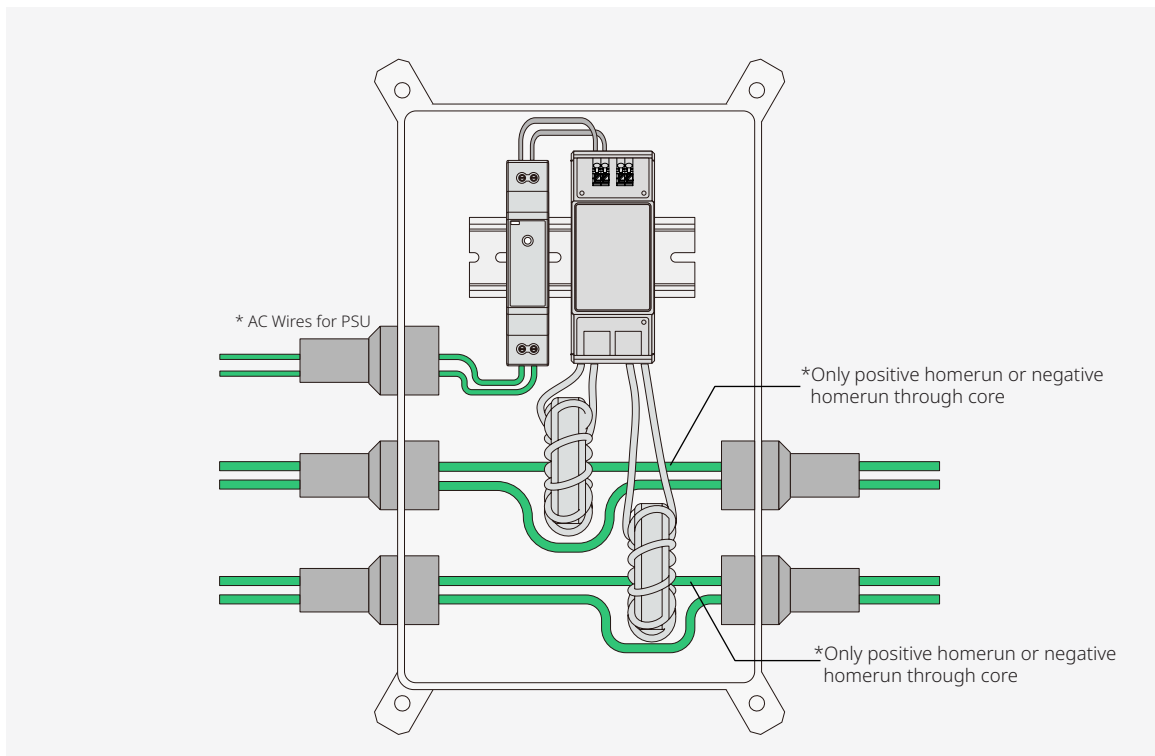
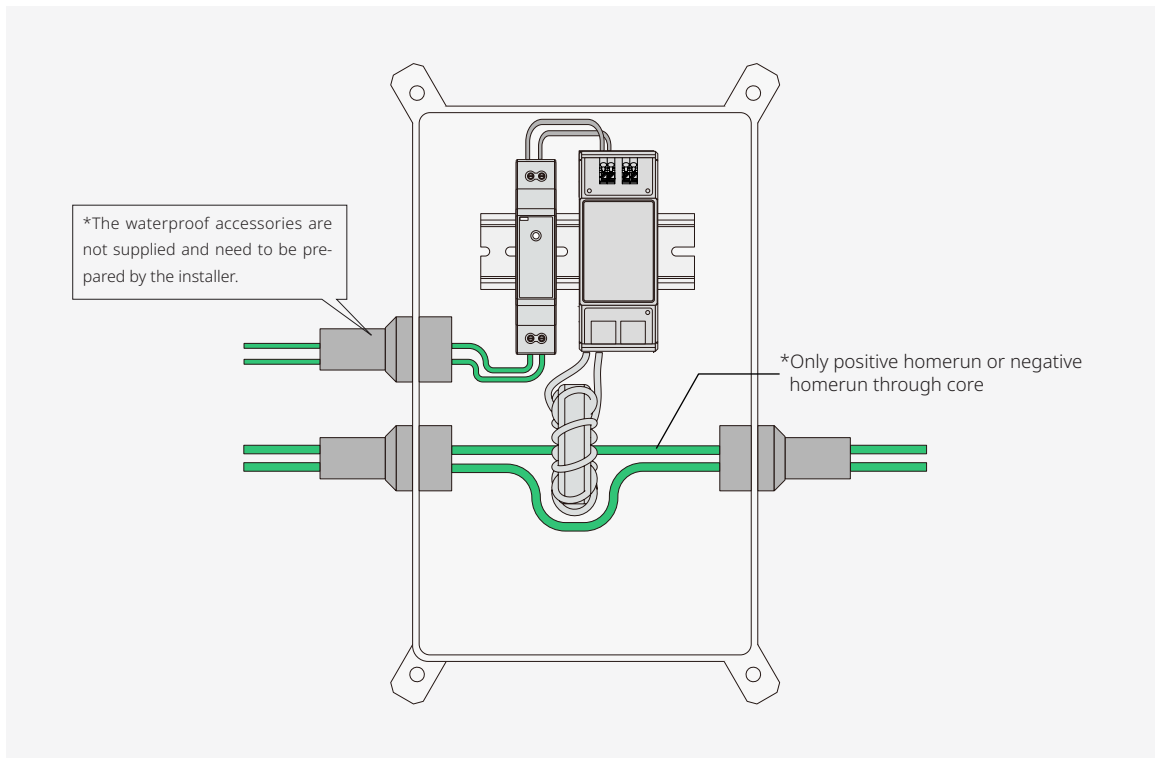
4.3 HT10-Kit Installation

A). - Mount Transmitter HT10-Kit and power supply on DIN rail.

- Connect DC leads from power supply to Transmitter HT10-Kit.
- Connect Core to Transmitter HT10-Kit. If there is only one core that needs to be connected, please connect Core 1 first.



- B).** - Pass either positive homerun or negative homerun through cores.
- Connect wires to AC side of power supply.

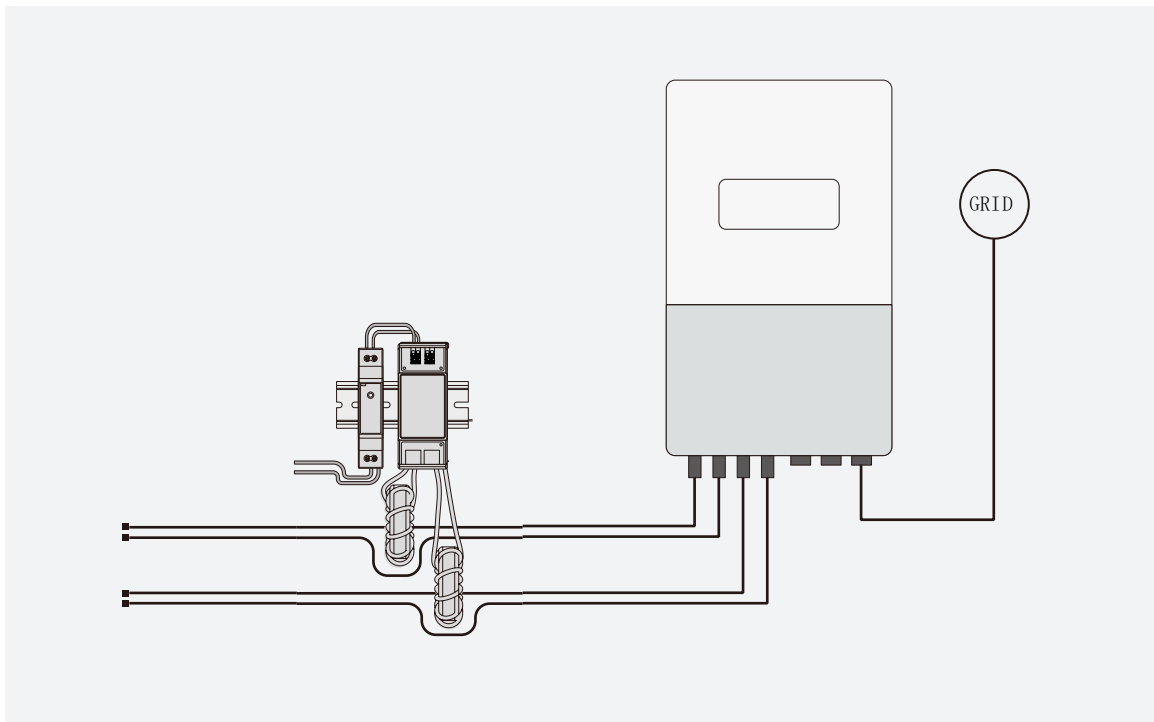


C). - Connect ground wires.

- Ground all conduit connections.
- The nonmetallic enclosure does not provide bonding between conduit connections.
- Use grounding-type bushings and jumper wires.

D). - Connect the serially connected outputs of HRSD-1C to the inverter with a DC cable.

- Turn on AC power to Transmitter HT10-Kit power supply to activate the “permission to operate” signal.



Note:

Install HRSD-1C before powering on Transmitter HT10-Kit.

Transmitter HT10-Kit power supply must be on the same AC branch circuit as the inverter to meet rapid shutdown requirements.

When the PV system is operating, the Power LED1 should be lit and the Signal LED2 should be blinking.

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

Note:

Max. number of strings per Core* : 5 (75A core) or 15 (150A core)

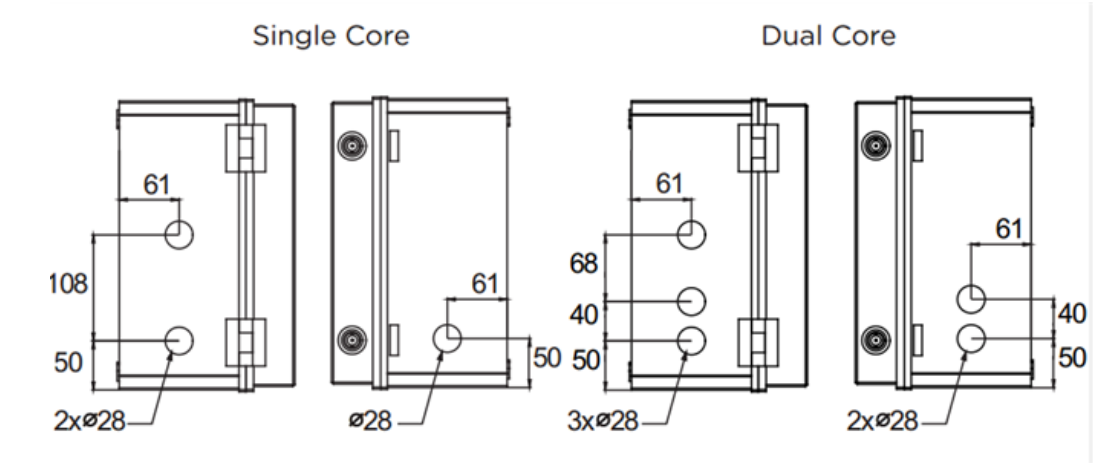
Max. current per Core: 75A or 150A

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

* With Φ 6 mm DC cable diameter (without DC connector)

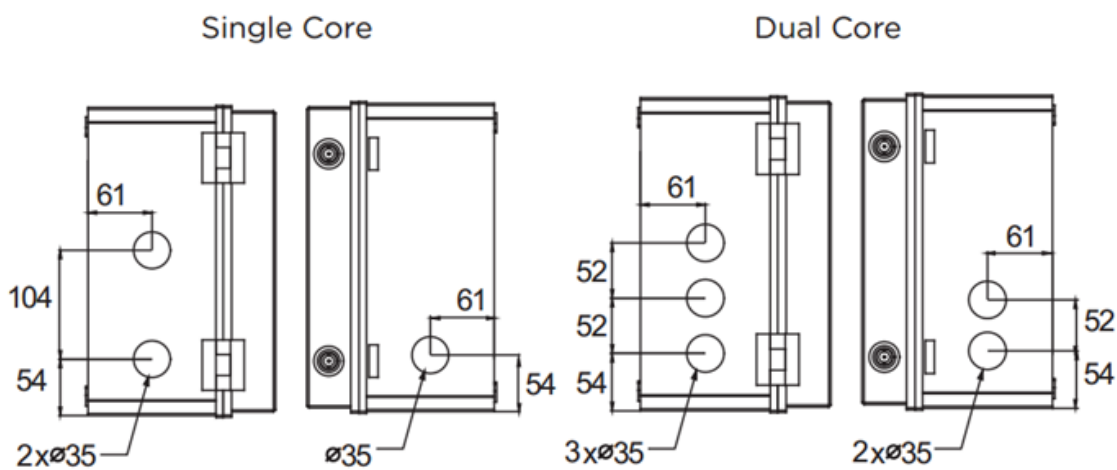
4.4 Conduit Drilling Guide

Enclosure Drilling Guide for .75" Conduit



Enclosure Drilling Guide for 1" Conduit

Drilling Guide for 1" Conduit

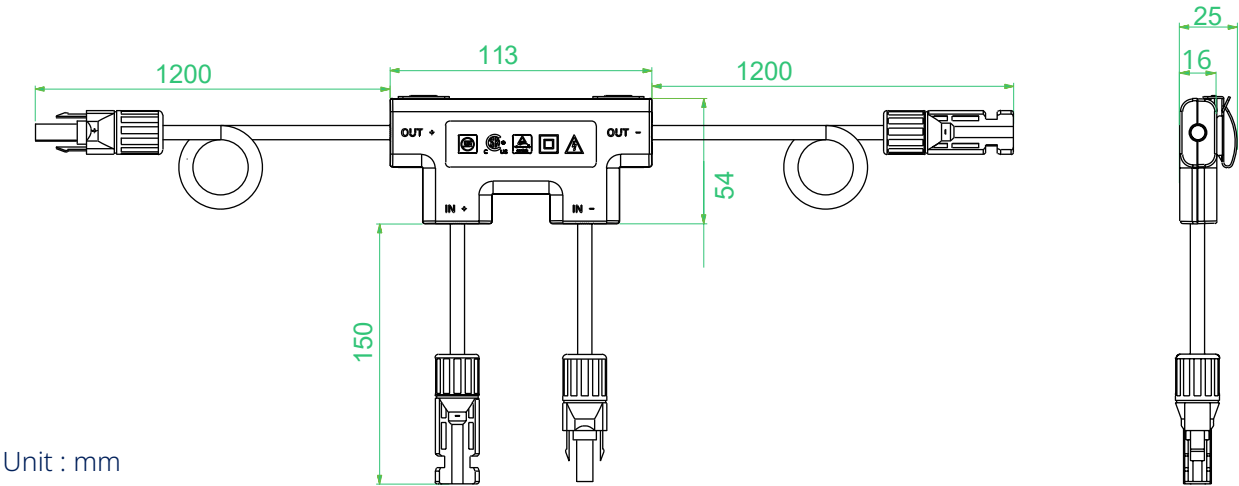


5. Technical Specifications

5.1 HRSD-1C

Electrical	
Input Voltage Range	8-80V
Maximum Current	15A (20A or 25A optional)
Maximum System Voltage	1000V (1500V optional)
Communication Type	Sunspec PLC
Shutdown Output Voltage	1V
Power Consumption	200mW
Mechanical	
Input Connectors	MC4 (standard)
Input Cable Length	0.15m
Output Connectors	MC4 (standard)
Output Cable Length	1.2m ¹
Dimensions	113 x 54 x 16mm
Environmental	
Operating Temperature Range	-40°C to +85°C (-40°F to +185°F)
Outdoor Rating	IP68/NEMA6P
Compliance	
Safety	UL1741, CSA C22.2 No. 330-17, IEC/EN 62109-1
EMC	FCC Part15 Class B, ICES-003, IEC/EN 61000-6-1/-2/-3/-4

*1: Fits PV module in landscape and portrait installation.



5.2 HT10

Electrical

Transmitter Input Voltage	12VDC (+/-2%)	
Transmitter Input Current	1A	
Communication Type	Sunspec PLC	

Core

Max. Number of Cores Connected	2	
Max. Current per Core	75A	150A
Max. String Voltage	1500VDC	
Max. Number of Strings per Core ¹	5	15

Mechanical

Dimensions	93 x 36.5 x 53 mm	
Mounting Type	DIN35 Rail	

Environmental

Operating Temperature Range	-40°C to +85°C (-40°F to +185°F)	
Outdoor Rating	IP30/NEMA1	

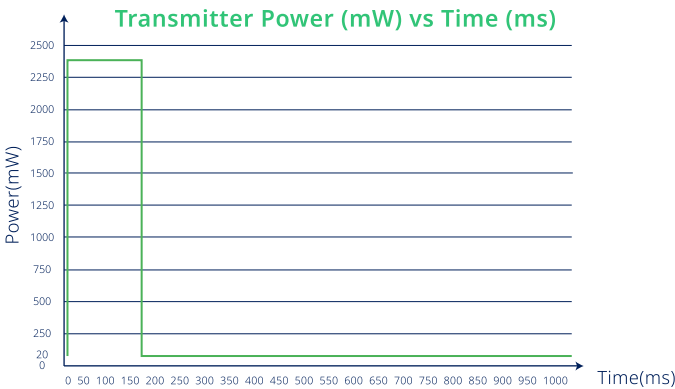
Compliance

Safety	UL1741, CSA C22.2 No. 330-17	
EMC	FCC Part15 Class B, ICES-003	

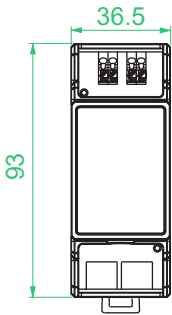
*1: Φ 6 mm DC cable diameter

When installed inside an inverter, HT1 needs to be powered with the following power curve at least.

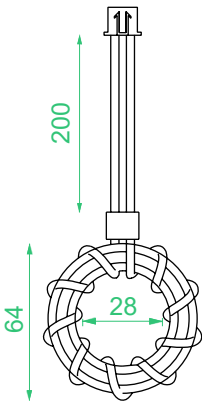
- Voltage: 12VDC (+/-2%)
- Power Standby: 0.2W
- Duty Cycle: 16%
- Max Power: 3W



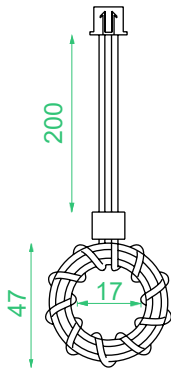
Unit : mm



Transmitter



Core-150A



Core-75A

5.3 HT10-Kit

Electrical

Power Supply Input Voltage	85-264VAC	
Transmitter Input Voltage	12VDC (+/-2%)	
Transmitter Input Current	1A	
Communication Type	SunSpec PLC	

Core

Max. Number of Configure Core	2	
Max. Current per Core	75A	150A
Max. String Voltage	1500VDC	
Max. Number of Strings per Core ¹	5	15

Mechanical

Dimensions	198.5 x 298 x 179 mm	
Mounting Type	Wall mounted	

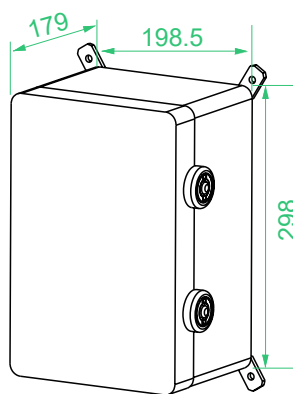
Environmental

Operating Temperature Range	-40°C to +85°C (-40°F to +185°F)	
Outdoor Rating	IP65/NEMA4	

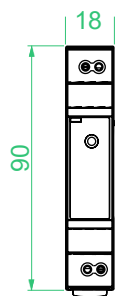
Compliance

Safety	UL1741, CSA C22.2 No. 330-17	
EMC	FCC Part15 Class B, ICES-003	

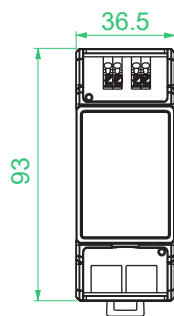
*1 According to the cable diameter Φ 6 mm, if cable diameter is more than Φ 6 mm, Strings Per Core will be reduced. Care should also be taken not to exceed the allowable current.



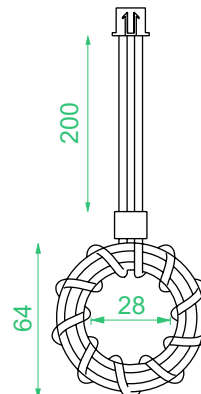
Unit : mm



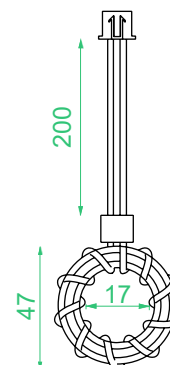
Power Supply
(optional)



Transmitter



Core-150A



Core-75A