



## Quick Installation guide

Three-phase Grid-tied PV String Inverter:  
**RS 20.0 T / 25.0 T / 30.0 T**

This PV inverters series is equipped with **integrated Wi-Fi**



For installation and configuration settings use the dedicated APP **RS Connect**

For inverter energy production monitoring use APP **RS Connect** or register to the cloud portal **Riello RS Monitoring** [www.riello-rsmonitoring.com](http://www.riello-rsmonitoring.com).  
Please refer to relative APP and Cloud portal user manuals for details.



**RS Connect**



Complete user manual is available for download from:  
[www.riello-solartech.com](http://www.riello-solartech.com)

## Safety Instructions



### Risk of electric shock

The device contains high voltages, both alternating and direct, and high leakage currents may be generated during operation. To avoid risk of electric shock during maintenance or installation, make sure that all DC and AC connection terminals are disconnected. First connect the grounding wire to grounding and disconnect it last for maintenance. Check proper phase and neutral connection. If the unit is used without following the specifications of the manufacturer, the protection provided by the equipment may be impaired. Disconnect the inverter from the grid and from the photovoltaic generator before cleaning photovoltaic modules: an unexpected capacitive current from the surface of the modules may surprise operators and cause them to fall from the roof.



### Handling the photovoltaic inverter

The photovoltaic inverter must only be handled by qualified service personnel. When the photovoltaic generator is exposed to sufficient light intensity, it generates a DC voltage and, when connected to the device, it charges the bulk capacitor. After having disconnected the photovoltaic inverter from the grid and the photovoltaic generator, an electric charge may remain in the bulk capacitor. Please wait at least 10 minutes after disconnecting from the grid before handling.



### Exclusively for the grid

The PV inverter is designed for the sole purpose of converting energy from PV modules and injecting it into the grid. This inverter is not designed to be powered by sources of primary energy other than PV modules or to be connected to different loads other than the public grid.



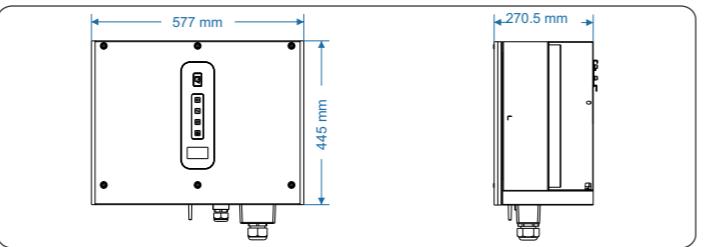
### Hot surfaces

Although it has been designed in accordance with international safety standards, the photovoltaic inverter may become hot during operation.

## Guarantee

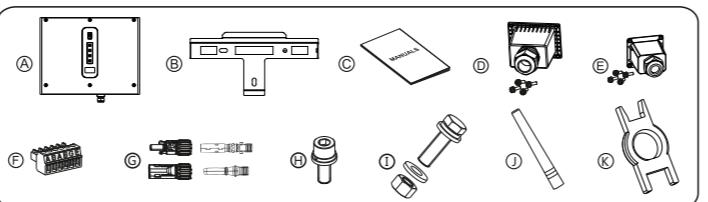
Guarantee conditions are available on the website: [www.riello-solartech.com](http://www.riello-solartech.com)

## Outline and Dimensions



## Installation

### Package contents



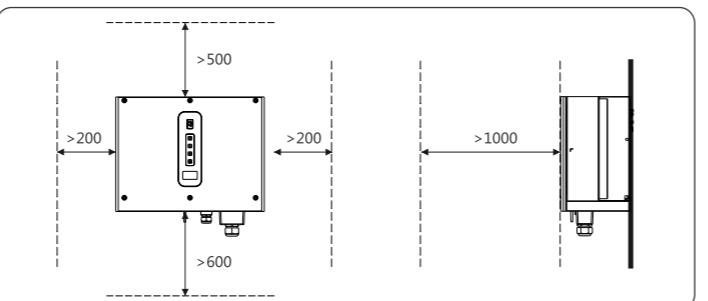
ITEM	DESCRIPTION
A	PV Inverter
B	Rear panel
C	Manuals
D	AC waterproof cover
E	COM2 waterproof cover
F	Signal terminals (4pin+6pin)
G	DC terminal connector group
H	Screws
I	Bolt group (including screw, nut)*3 (reserved for tightening the support and rear panel)
J	Wi-fi Antenna
K	Removal tool for DC connectors

### Determining the Installation Position

The inverter must be installed on the place where is free from direct exposure to sunlight, rain, and snow to extend its service life.

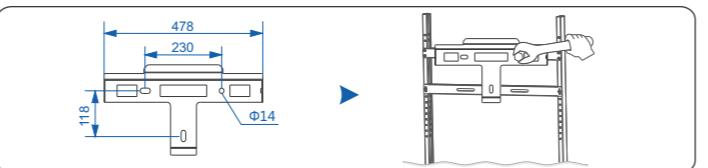
### Installation Space Requirements

Reserve enough clearance around the inverter to ensure sufficient space for installation and heat dissipation, as shown in below Figure. When installing multiple inverters, ensure 200mm distance between inverters' lateral sides, 500mm-600mm between inverters' top and/or bottom sides, and 1000mm clearance between inverters' front sides.

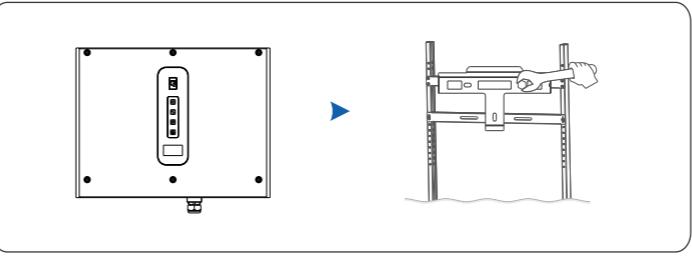


### Inverter fixation

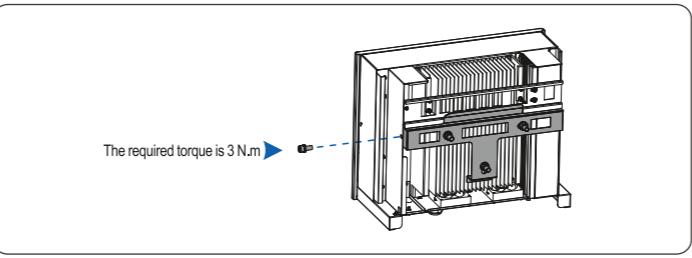
Step 1 Support-mounting the inverter is recommended. Tighten the support and rear panel using M12 bolt and the required torque is 42N·m.



Step 2 Mount the inverter on the rear panel and keep them aligned with each other.



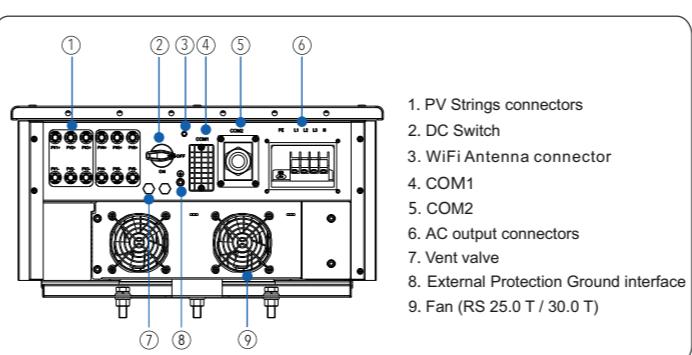
Step 3 Tighten the retaining screw on the rear panel to fasten the inverter.



### Installation Self-check

1. Ensure that the supporting points (on the rear side of the inverter) align with the holes of the support.
2. Ensure that the inverter is well fixed.
3. Ensure that the inverter is locked on the support.

### Preparation before wiring



### Wi-Fi antenna installation

Fasten Wi-Fi antenna ① (included in the box) to the inverter, screwing it to the relative connector ③ .

### Electrical Connections

**DANGER** Before performing any electrical connections, ensure that both DC and AC Switches are OFF. Otherwise, fatal injury can occur due to the high voltage caused from AC and DC cables.

**CAUTION** Grounding the PV Strings needs below prerequisites: If an isolation transformer must be installed on the AC side of each inverter, ensure that the neutral wire of the isolation transformer must be disconnected from the PGND cable.

One isolation transformer is with one PV inverter: do not install a single isolation transformer for multiple inverters; otherwise, circulating current generated by the inverters will lead to operation failure.

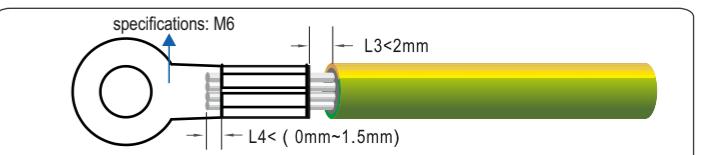
## Cable specifications (recommended)

Cable	Cable type	Cross-sectional Area (mm <sup>2</sup> )		Cable Outer Diameter (mm)
		Range	Recommended Value	
AC cable	multi-core outdoor cable	6~16 (20.0 T)	10 (20.0 T)	24~32
		10~25 (25.0~30.0 T)	16 (25.0~30.0 T)	
DC cable	common PV cables in the industry (model: PV1-F)	4~6	4	5~8
External PGND cable	outdoor cable	16~25	16	NA

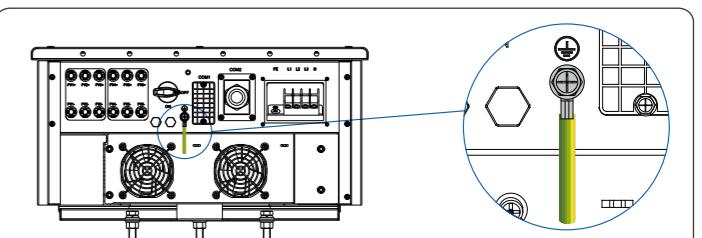
### Connecting External PGND Cables

Step 1 Remove an appropriate length of the insulation layer from the PGND cable using a wire stripper; the length is a little bit longer than that of OT terminal's crimping end by 2mm~3mm.

Step 2 Insert the exposed core wires into the crimping area of the OT terminal and crimp them using hydraulic pliers.



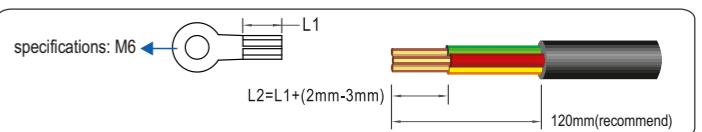
Step 3 Secure the PGND cable using the ground screw and tighten the screw to a torque of 3 N·m.



Connecting External Protection Ground (PGND) cables cannot substitute the PE of connecting the AC power cables. Ensure that both connections are grounding well; otherwise, warranty or liability will be void if damage is caused by electrical connection faults.

### Connecting AC Output Cables

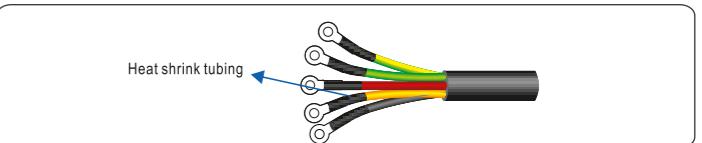
Step 1 Remove an appropriate length of the jacket and insulation layer from the AC output cable.



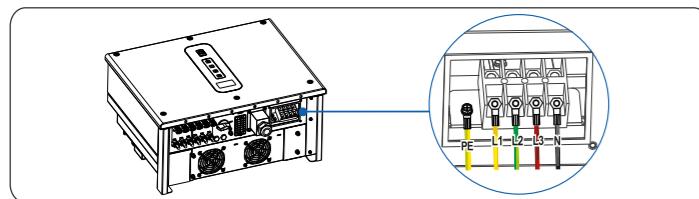
Step 2 Insert the exposed core wires into the crimp area of the OT terminal and crimp them using hydraulic pliers. Wrap the wire crimp area with heat shrink tubing or PVC insulation tape (only for non-insulated OT terminals).



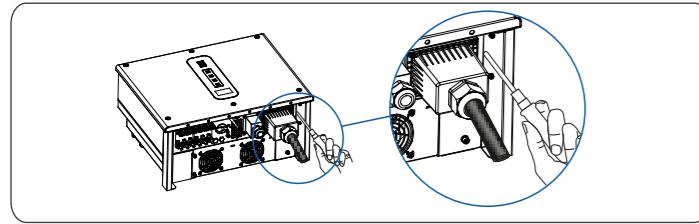
If heat shrink tubing is used, put it through the power cable and then crimp the OT terminal.



Step 3 Insert the prepared AC output cable through AC waterproof cover, and connect L1, L2, L3, N and PE wires to the terminal block, use a screw driver to tighten screws to a torque of 3N·m.

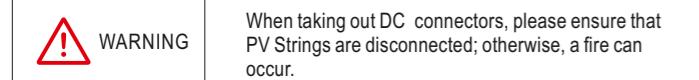
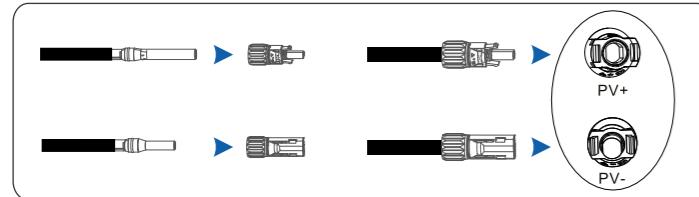


Step 4 Fasten the AC waterproof cover with the hexagon screws supplied and then tighten the waterproof gland.

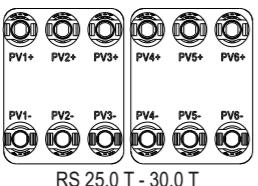
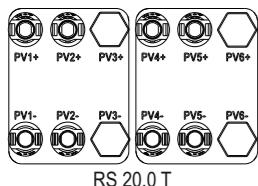


#### Connecting the PV Strings

- Step 1 Remove an appropriate length of the insulation layer from the positive and negative power cables using a wire stripper.  
 Step 2 Insert the exposed areas of the positive and negative power cables into the metal terminals of the positive and negative connectors respectively, crimp them, and tighten the locking nuts on the positive and negative connectors using a specific wrench (not included).  
 Step 3 Take out the protective plug from the DC terminals of the inverter, insert the positive and negative connectors into the corresponding connector terminals of the inverter until a "click" sound is heard.



The number of DC input terminals at the bottom of inverter varies according to the model (see below figure): RS 20.0 T is equipped with 4 inputs, RS 25.0-30.0 T is equipped with 6 inputs. If the quantity of available PV strings is less than number of inputs on inverter, refer to below table for the configuration of the connections.

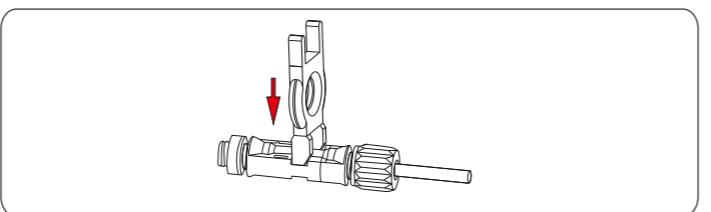


PV strings	Inverter Input connection	Inverter model
1	Connected to any input	RS 20.0-30.0 T
2	Connected to inputs 1 and 4	
3	Connected to inputs 1, 2 and 4	
4	Connected to inputs 1, 2, 4 and 5	
5	Connected to inputs 1, 2, 3, 4 and 5	RS 25.0-30.0 T
6	Connected to inputs 1, 2, 3, 4, 5 and 6	

#### Inverter Uninstall

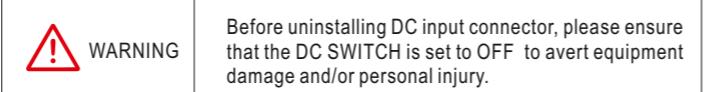
Inverter uninstall requires below procedure:

- Step 1 Disconnect all electric connections including the communications cables, DC input cables, AC output cables and the PGND cables.



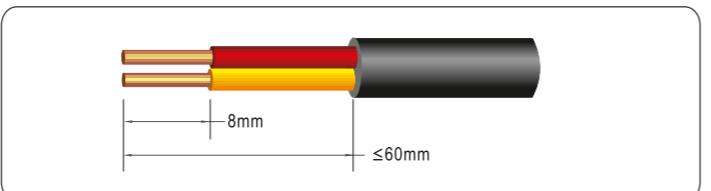
When uninstalling DC input connectors, insert removal tool into the bayonet as shown in Figure, press the tool down, and take out the connector.

- Step 2 Remove the inverter from its rear panel.



#### Installing RS485 communications cable procedure

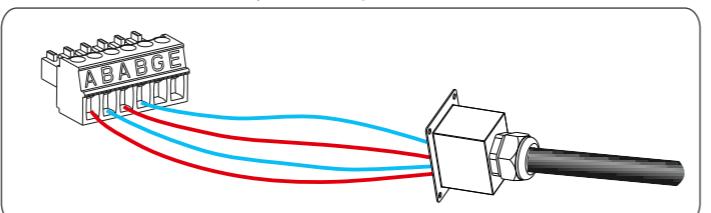
- Step 1 Remove an appropriate length of the insulation layer from cable using a wire stripper.



- Step 2 Remove the cover of COM2.

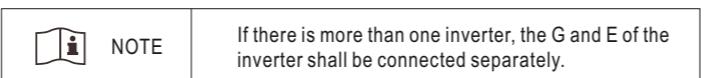
- Step 3 Take COM2 cover and the 6-pole male connector out of the accessory kit. Release the two cable gland and thread the cables through the cable gland.

- Step 4 Connect the differential positive and negative wires of the first RS485 cable signal from datalogger (or from another inverter) to one pair of A and B terminals of the 6-poles male connector supplied, connect the other RS485 cable (if needed, to connect another inverter) to the other pair of A and B terminals.



- Step 5 Connect 6-pole male terminal to its female terminal. Lock the case to the inverter with two hexagonal screws and tighten the cable gland.

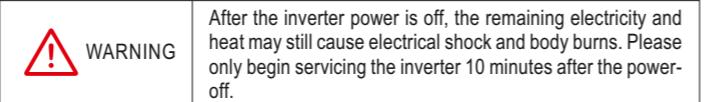
- Step 6 Set the RS485 termination resistor of the last inverter of the RS485 bus, via the App RS Connect (for more information, refer to the related manual).



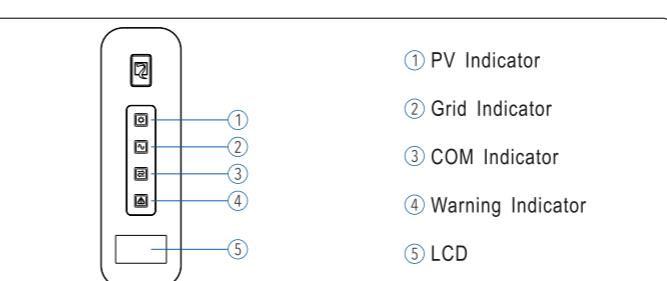
#### System Operation

Switch ON the AC circuit breaker and set the DC SWITCH of the inverter to ON. Check statuses of grid-connecting lights on the inverter, and if the lights indicate that the inverter has entered grid connecting, it means the inverter is operating properly.

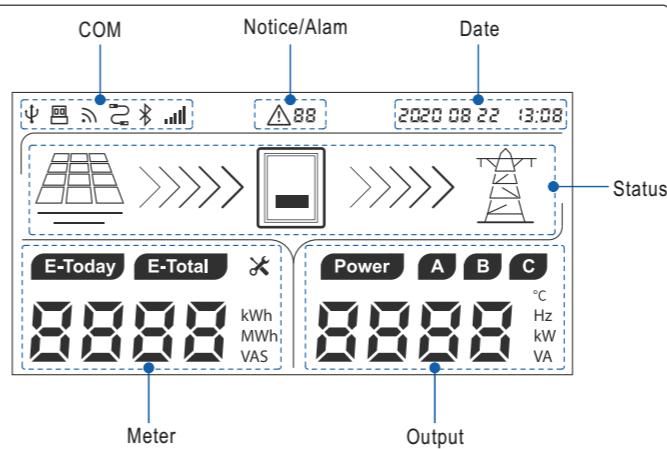
To power OFF the Inverter, switch off the AC circuit breaker and set the DC SWITCH to OFF.



#### Interface



#### LCD Screen



#### LED/LCD Status and Warning code

	LCD Display	PV indicator	Grid indicator	COM indicator	Warning indicator
Normal status (with Wi-Fi internet connection OK)	○	●	●	●	○
Starting up (inverter tries to connect to grid)	Countdown for grid connection	●	★F	○	○
Wi-Fi connection Router OK - Internet OK	○	○	○	●	○
Wi-Fi connection Router OK - Internet Fail	○	○	○	★S	○
Wi-Fi connection Router Fail - Internet Fail	○	○	○	○	○
WIFI/RS485 communication during data transmission	○	○	○	★F	○
PV normal	○	●	○	○	○
PV absent	○	○	○	○	○
Grid normal (inverter connected to grid)	○	●	●	○	○
Grid normal (not connected to grid) except starting up phase	○	○	★VS	○	○
Grid absent	R2	○	○	○	○
Grid over voltage	R0				
Grid under voltage	R1				
Grid over frequency	R3		★S	○	○
Grid under frequency	R4				
Grid unbalance	R6	○	★S	○	○
PV over voltage	b0	★S	○	○	○
PV under voltage	b4	★S	○	○	○

Strings abnormal	b3	●	○	○	★S
Inverter over temperature	c5	●	○	○	
Fan abnormal	c8	●			
Insulation resistance abnormal	b1				
Leakage current abnormal	b2				
Strings reverse	b7				
Control power abnormal	c0				
DC bias current abnormal	c2				
Inverter relay abnormal	c3				
Leakage current HCT abnormal	c6				
System fault	c7				
DC link voltage unbalance	c9				
DC link over voltage	c8				
Internal Communications Fault	cb				
Software version incompatibility	cc				
EEPROM fault	cd				
Sampling inconsistency	ce				
Invert circuit abnormal	cf				
Boost circuit abnormal	cg				
Firmware update in progress	off	●	●	●	●

Note: ● light on ○ light off ○ keep original status

★VS light blinks very slow (every 5s) ★S light blinks slow (every 2s)

★F light blinks fast (every 0.5s)

#### Maintenance

The inverter is equipped with heat sink (fins on the back side), the RS 25.0-30.0 T are also equipped with external fans for forced cooling, check periodically the heat sink and the inlet/outlet of external fans, ensure that they are free from dust and blockage. If needed, clean periodically the heat sink and the fans to ensure a good heat dissipation.

If any anomaly occurs to the fans, please contact your local service centre.

#### The Inverter Troubleshooting

If any abnormal phenomena occur, refer to below table for trouble shooting. If failed, call your dealer for help.

Issue	Solution
No display	1.Check DC switch of inverter is on or off. 2.If there is PV combiner box, check fuse, terminal, wires.
No generation	1.Check AC breaker is on or off. 2.Wait stronger sunshine. 3.Check the number of PV panel. 4.To operate according to inverter's manual.
Inverter abnormal	1.Disconnect both AC and DC breakers. 2.Wait as less 10 minutes and switch on AC and DC breaker. 3.Check whether inverter run normally or not.
Power generation is less than expected	1.Ensure that inverter is free from direct sun exposure and good ventilation. 2.Check that inverter isn't dust clogging, fans run normally. 3.Ensure enough installation distance between inverters.