SOLARMG 100k 125k Three Phase Grid Tied PV String Inverter User Manual

THREE PHASE GRID-TIED
PV STRING INVERTER
100K/110K/125K
(UserManual)
REV.1-Preliminary
S.MG-OM:SG 100-125T

Contents

About This Manual

This manual describes the installation, electrical connection, commissioning and maintenance, APP operation of Three-phase Grid-tied PV String Inverter. Please first read the manual and related documents carefully before using the product and store it in a place where installation, operation and maintenance personnel can access it at any time. The illustration in this user manual is for reference only. This user manual is subject to change without prior notice. (pecific please in kind prevail.)

Target Group
Three phase hybrid inverters must be installed by professional electrical engineers who have obtained relevant qualitications.
Scope
This manual is applicable to following inverters:

- 100K/110K/125K

Conventions

The following safety instructions and general information are used within this user manual.

DANGER	Indicates an imminently hazardous situation which, if not correctly followed, will result in seri ous injury or death.
WARNIN G	Indicates a potentially hazardous situation which, if not correctly fnlInvenri, will result in serio us injury or death.
CAUTION	Indicates a potentially hazardous situation which, if not correctly followed, could result in mo derate or minor injury.
NOTICE	Indicates a potentially hazardous situation which, if not correctly followed, could result in equipment failure to run, or property damage.
NOTE	Call attention to important information, best practices and tips: supplement additional safety instructions for your better use of the Three phase hybrid inverter to reduce the waste of you resource.

Safety

Before using the inverter, please read all instructions and cautionary markings on the unit and manual. Put the instructions where you can take them easily. The Three-phase Grid-tied IV String Inverter of ours strictly conforms to related safety rules in design and test. Local safety regulation shall be followed during installation, operation and maintenance. Incorrect operation work may cause injury or death and damage to the inverter and other properties belonging to the operator or a third party.

1.1 Safety Instructions

	Risk of electric shock The device contains high voltages, Eath alternating and direct, and high leakage currents m ay be generated during operation. To avoid risk of electric shock during maintenance or inst allation, make sure that all DC and AC connection terminals are disconnected. First connect t he grounding wire to grounding and disconnect it for maintenance. Check proper phase and neutral connection. If the unit is used without following the specifications of the manufacture, the protection provided by the equipment may be impaired. Disconnect the inverter from the grid and fram the photovalraic generator hefare cleaning photovoltaic strings. An unexpected capacitive current from the surface of the strings may surprise operator and cause them to fa ll from the roof.
	Hanging the PV inverter The PVinverter 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 discannected the PV inve rter from the grid and the PV generator, an electric charge may remain in the bulk capacitor. Please wait at least 10 minutes after disconnecting from the grid before handing,
	Exclusively for the grid The PV inverter is designed for the sole purpase of converting from PV strings and injecting it into the grid. This inverter is not designed to be powered by saurces of primary energy other than PV strings or to be connected to different loads other than the public grid.
	Hot surfaces Although it has been designsd in accordance with international safsty standards, the PV inve rter may become hut during operation.

1.2 Safety Precaution

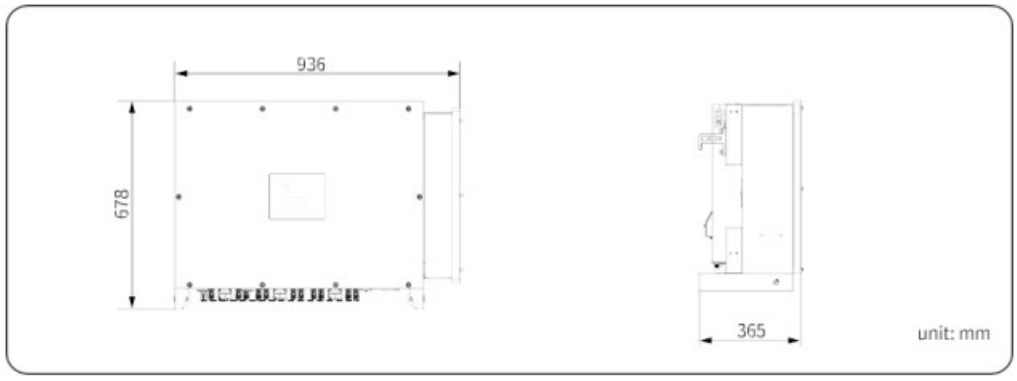
- Installation,maintenance and connection of inverters must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and requirements of local power authorities and/or companies(for example: AS 4777 and AS/NZS 3000 IN Australia).
- To avoid electric shock, DC input and AC output of the inverter must be terminated at least 5 minutes before performing any installation or maintenance.
- The temperature of some parts of the inverter may exceed 60°C during operation. Do not touch the inverter during operation to avoid being burnt and let it cool before touching it.
- Ensure children are kept away from inverters.

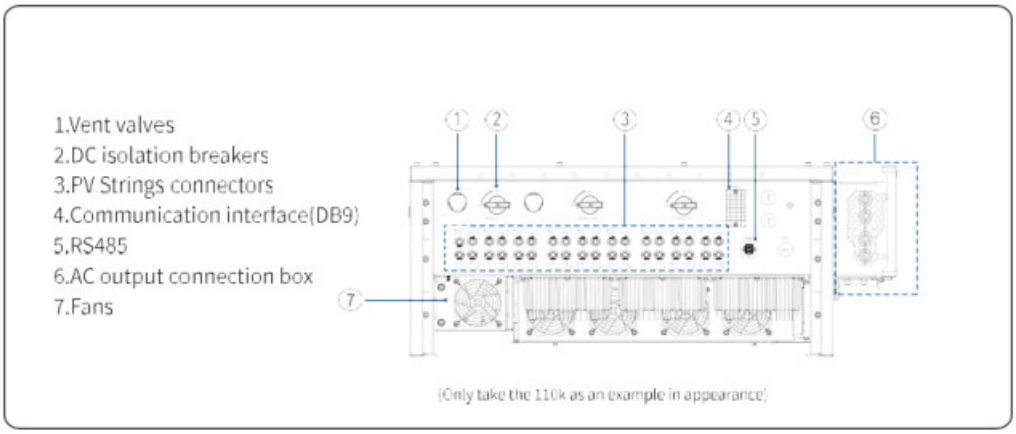
  • Don’ t open the front cover of the inverter. A part from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.
- Static electricity may damage electronic components. Appropriate method must be adopted to prevent such damage to the inverter; otherwise the inverter may be damaged and the warranty annulled.
- Ensure the output voltage of the proposed PV array is lower than the maximum rated input voltage of the inverter; otherwise the inverter may be damaged and the warranty annulled.

- When exposed to sunlight, the PV array generates dangerous high DC voltage. Please operate according to our instructions, or it will result in danger to life.
- PV modules should have an IEC61730 class A rating.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Completely isolate the inverter before maintaining. Completely isolate the inverter should: Switch off the PV switch, disconnect the PV terminal, disconnect the battery terminal, and disconnect the AC terminal.
- Don’ t insert or pull the AC and DC terminals when the inverter is running.
- In Australia, the inverter internal switching does not maintain the neutral integrity, neutral integrity must be addressed by external connection arrangements.
- In Australia the output of backup side in switchbox should be labeled main switch UPS supply, the output or nbrmai ioaa side ins witcnioox snow De tame° mains switcn inverter suppiy.

Product Introduction

2.1 Outline and Dimensions





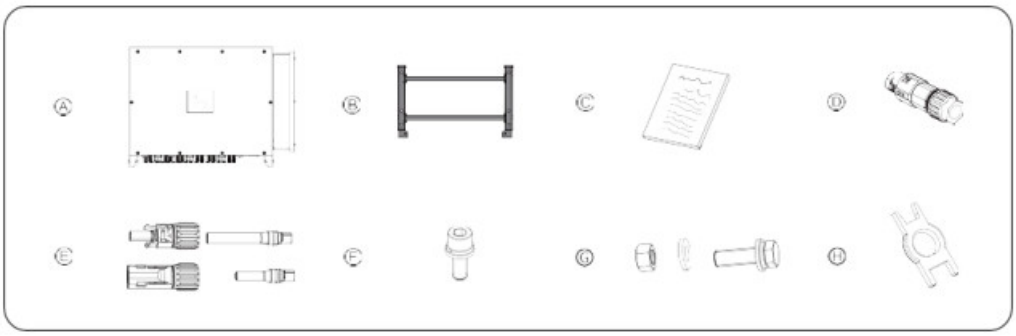
2.2 Route connection for PV strings installation

Route connecting for the installation of PV strings per inverter model is shown in below table:
100k totally 16 routes; 110k/125k totally 18 routes.

Model MPPT1 MPPT2	MPPT3	MPPT4	MPPT5 MPPT6		MPPT7	MPPT8 MPPT9	
100k 2routes 2routes	2routes	2routes	2routes 2routes		2routes	2routes	
110k/125k 2routes 2routes	2routes	2routes	2routes	12routes	2routes	2routes	2routes

Unpack and Storage

3.1 Packing list



Items	Deliverables
A	The inverter
B	Rear panel
C	File package
D	RS485 connector
E	DC terminal connector group
F	M8 screws
G	M12 Bolt group (including screw, nut) *4 (reserved for tightening the support and rear panel)
H	Removal tool for DC connectors

3.2 Selecting the Mounting Location

Installation Environment Requirements

a The PVinverter protection class is IPG6 and can he monnted indoors ar autdoors

b. The mounting location must be inaccessible to unrelated personnel since the bracket and heat sinks are extremely hot during operation.

c. Do not install the PV inverter in areas containing highly flammable materials or gases.

d. To ensure optimum operation and long operation life, the ambient temperature must be below 50°C.

e. The PV inverter must be mounted in a well-ventilated environment to ensure good heat dissipation.

f. To ensure long operation life, the storage of the inverter must not be exposed to direct sunlight, rain, or snow. It is recommended that the inverter be mounted in a sheltered place.

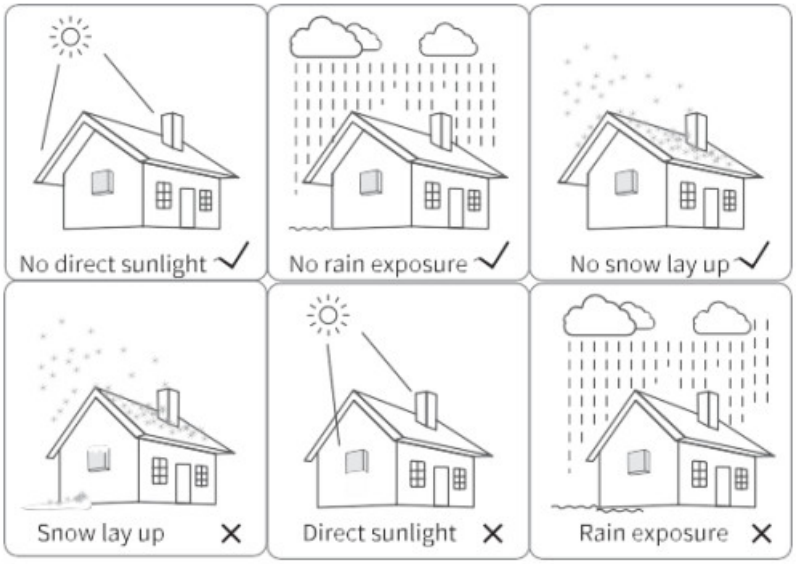
g. The carrier where the inverter is mounted must be fire-proof. Do not mount the inverter on flammable building materials.

h. Do not install the inverter in a rest area since it will cause noise during operation.

i. The installation height should be reasonable and make sure it is easy to operate and view the display.

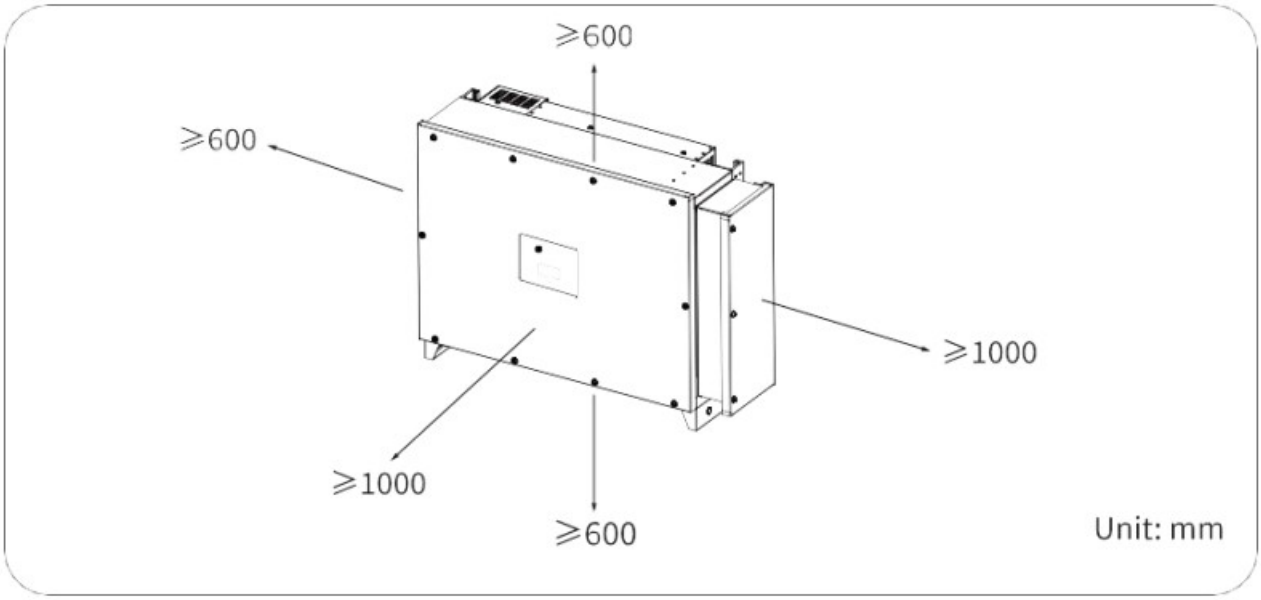
J. Product label and warning symbols shall be clear to read after installation.

k. Please avoid direct sunlight, rain exposure, snow lay up.



Installation Space Requirements

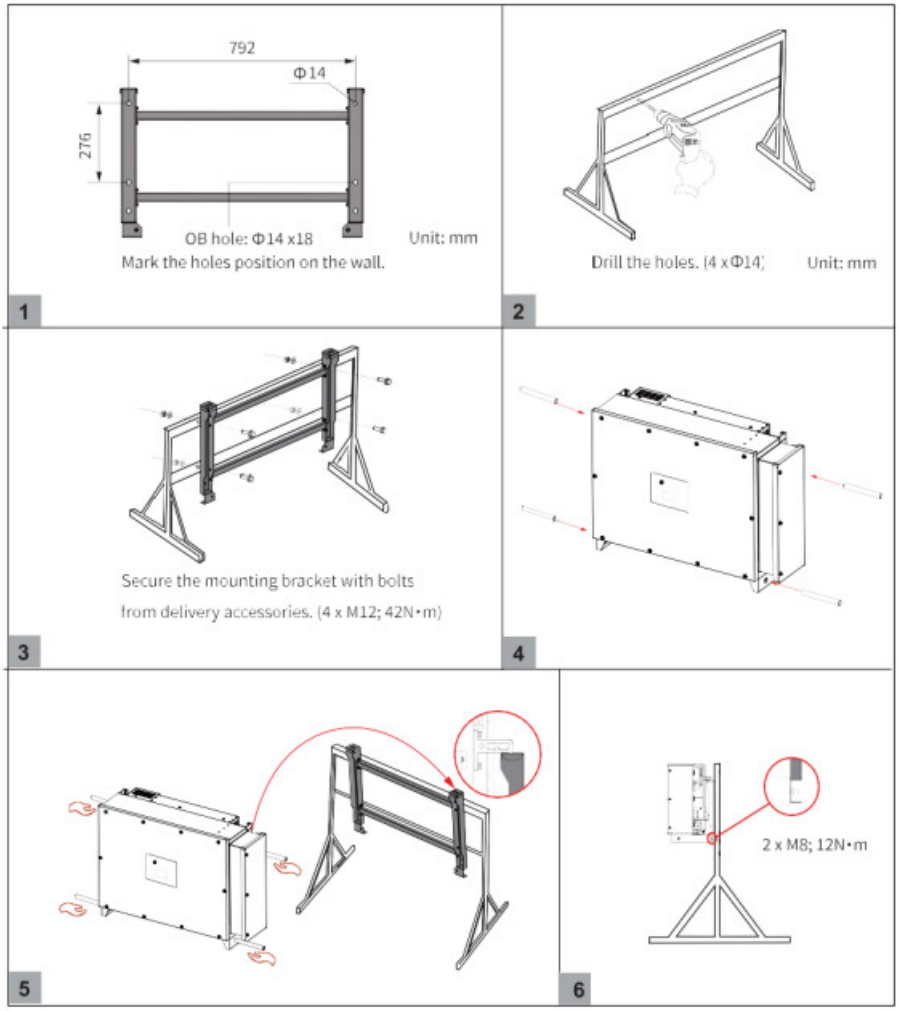
Reserve enough clearance around the inverter to ensure sufficient space for installation and heat dissipation, as shown in below image.



Support-mounting Inverter

DANGER	1.The walls must be fire-proot and non-flammable materials, otherwise there is atire risk 2.Before drilling holes, check whether there arz electrical pipes or other pipes buried in the w alls to avoid risks,

Inverteris installed on the wall or support by means of mounting bracket. The following, steps are illustrated with only support-mounted installation. The load-bearing capacity of the wall must be greater than LOKN/mi, M12 x 60mm stainless steel pressure- burst expansion bolts are recommended in wall- mounted installation.



Installation Self-check

1. Ensure that the inverter is well fixed.
2. Ensure that the inverter is locked on the support with an anti-theft lock installed.

Electrical Connection

4.1 Safety Caution

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 generated from AC and DC cables.

CAUTION Grounding the PV strings needs below prerequisites.
Anisolation 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 ane PV inverter: do not install a single isolation transformer for multiple inverters. Otherwise, circulating current generated by the inverters will lead to operation failure.

4.2 Electrical Connections

Connecting Extern PGND Cables

Items	Remark
Screw	M8; 7N·m
Yellow green lines	$S_r \geq S/2$

NOTE

S: cross-sectional area of AC cable
Su: cross-sectional area of PE cable
The S, value is valid only when the PE cable and the AC cable are of the same material

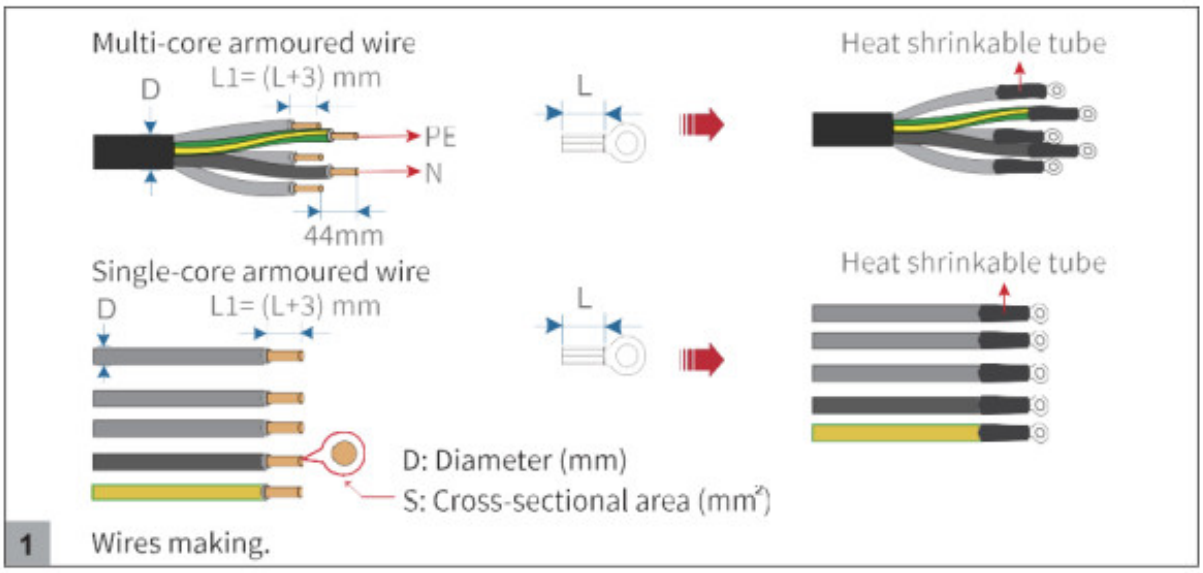
NOTICE

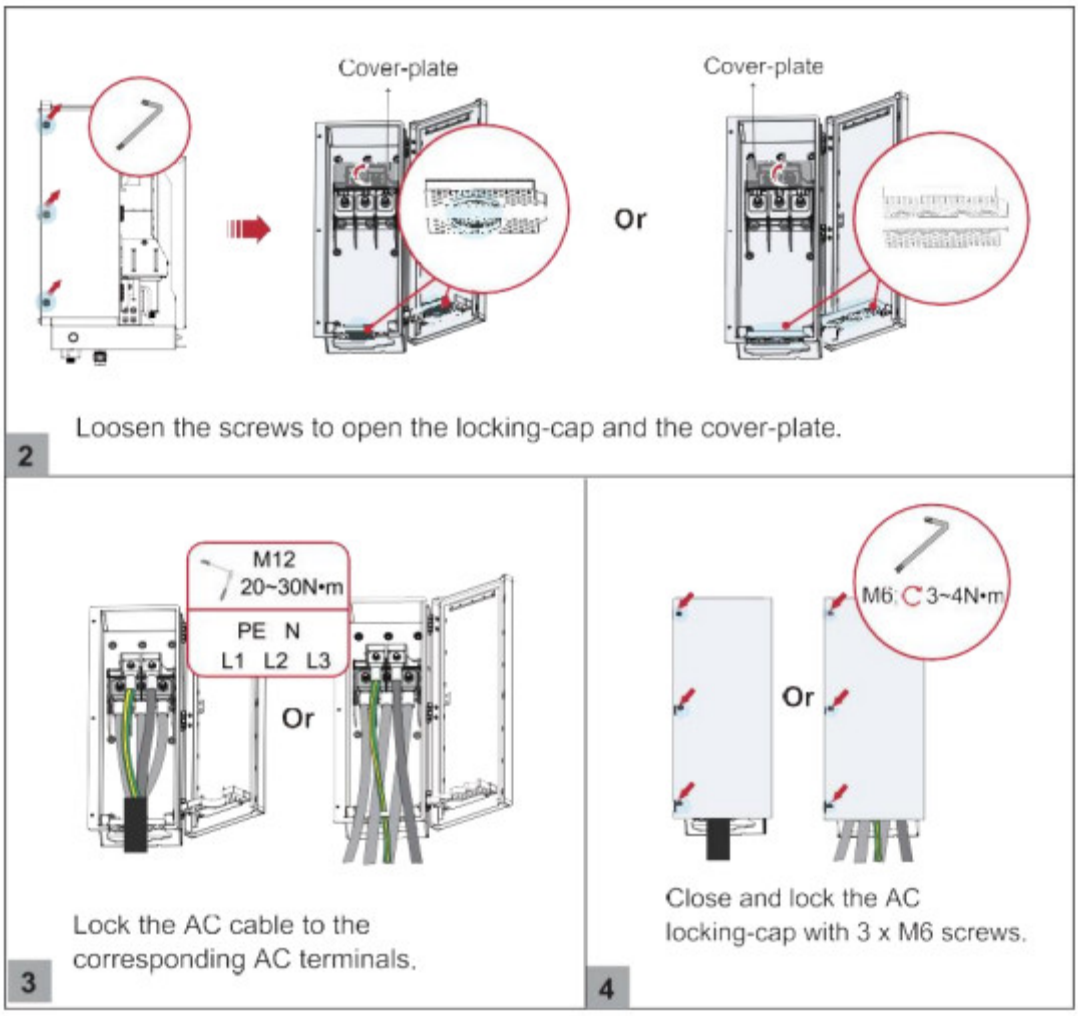
Connecting External Protection Ground (PNGD) Cables can not substitute the PE of connecting the AC power cables. Ensure that both connecting are grounding well. Otherwise, warranty will be void if damage is caused by electrical connection faults.
AC circuit breaker
Connect the inverter with the power grid through installing one AC circuit breaker whose rated current is no less than 250A. Residual current protection function of square matrixes internally installed in the inverter and you can set leakage current protection value no less than the corresponding value in below table, if local utility department require leakage current protection function for AC circuit breaker. That set can save the inverter from its performance failure

Inverter Model	Residual current
100k	≥110mA
210k	≥ 1230mA
125k	≥ 1330mA

Connecting AC Output Cables
AC Cable Requirements:

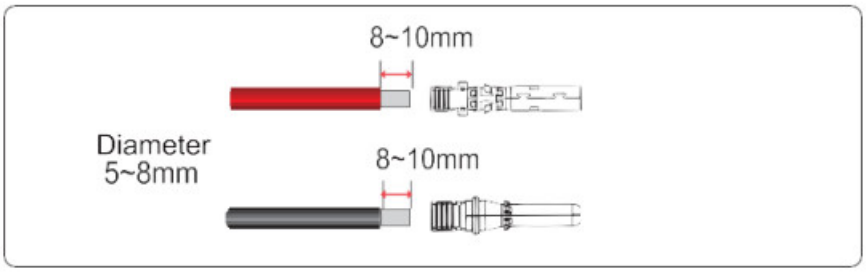
NOTICE For your operation and safety sake, please prepare multi-stranded wire, crimping terminals and a proper crimping tool before AC wiring.



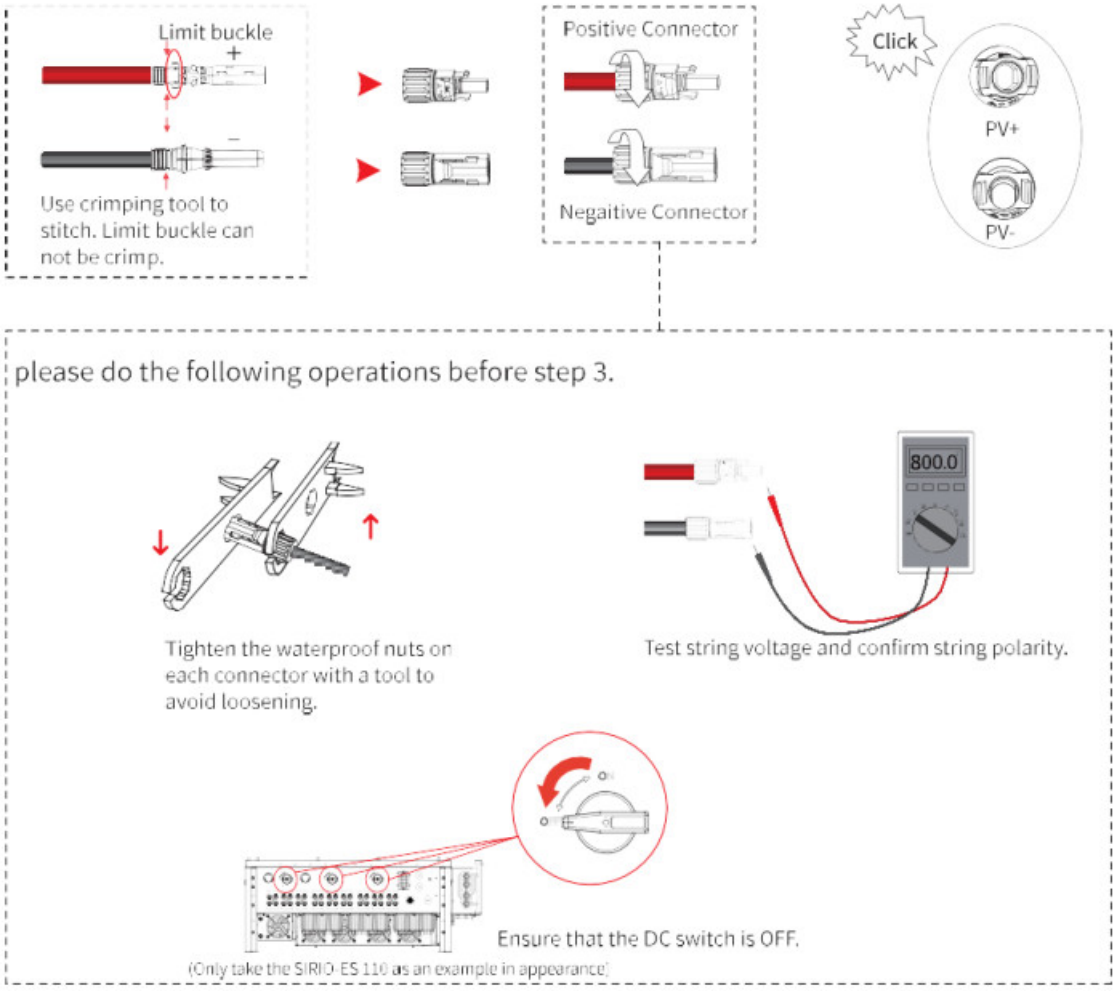


Connecting the PV Strings

Stept Remove an appropriate length of the insulation layer from the positive and negative power cables using a wire stripper, as shown in below Figure:

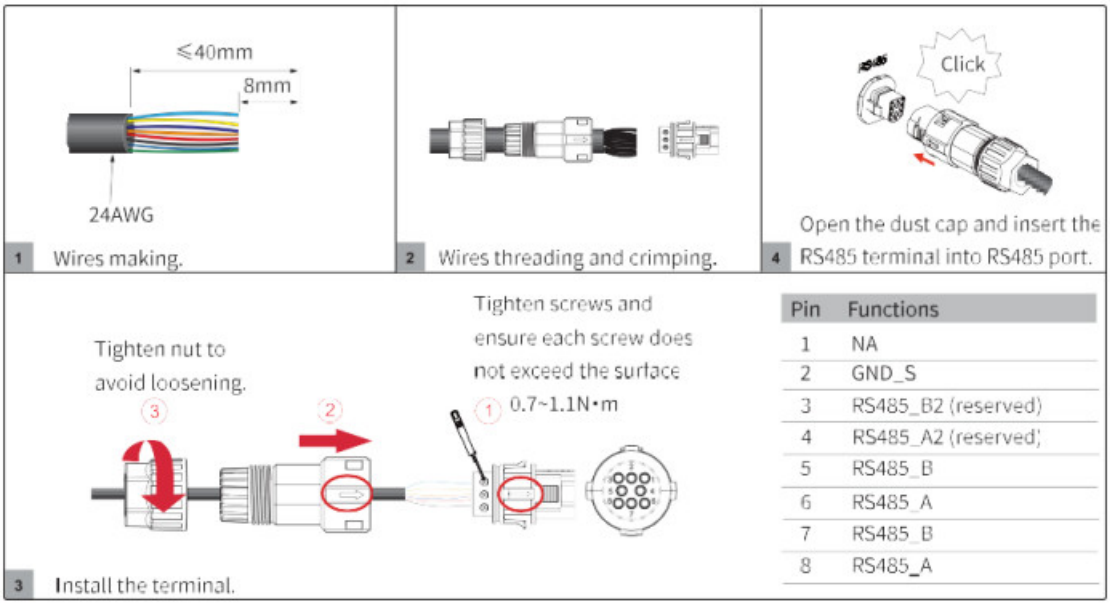


Step 2 Insert the exposed areas of the positive and negative cables into the metal terminals of the positive and negative connectors respectively and crimp them using a them using a crimping tool. Then insert the crimped positive and negative cables into the corresponding corresponding positive and negative connectors.
Step3 Insert the positive and negative connectors into the PV+/PV-port until a “click” sound is heard.

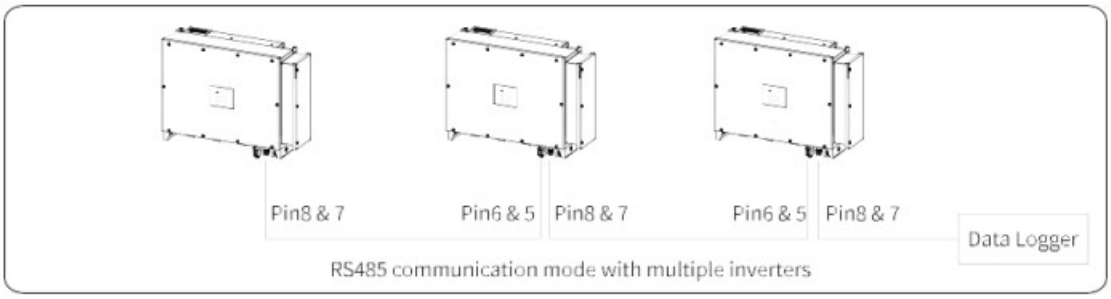


WARNING
When taking out DC connectors, please ensure that PV Strings aredisconnected. Otherwise, a fire can occur.

4.3 Connecting RS485 Communication Cables
RS485 Terminal Installation

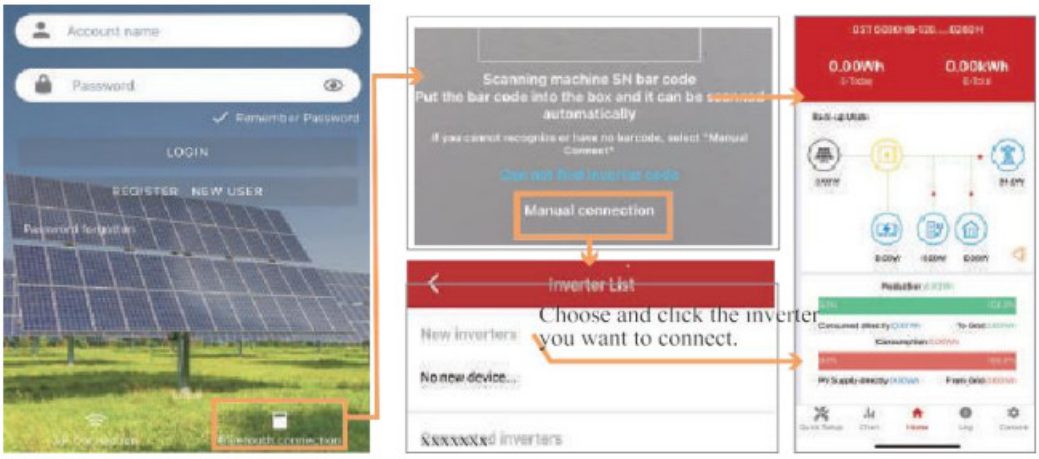


RS485 communication mode with multiple inverters
Connect the differential positive and negative signal wires of the first RS485 cable from the data logger to Ping and PinT of the 8-Pin terminal respectively. If there is more than one inverter, connect Pin6 and Pin5 to Ping and PinT of another inverter.

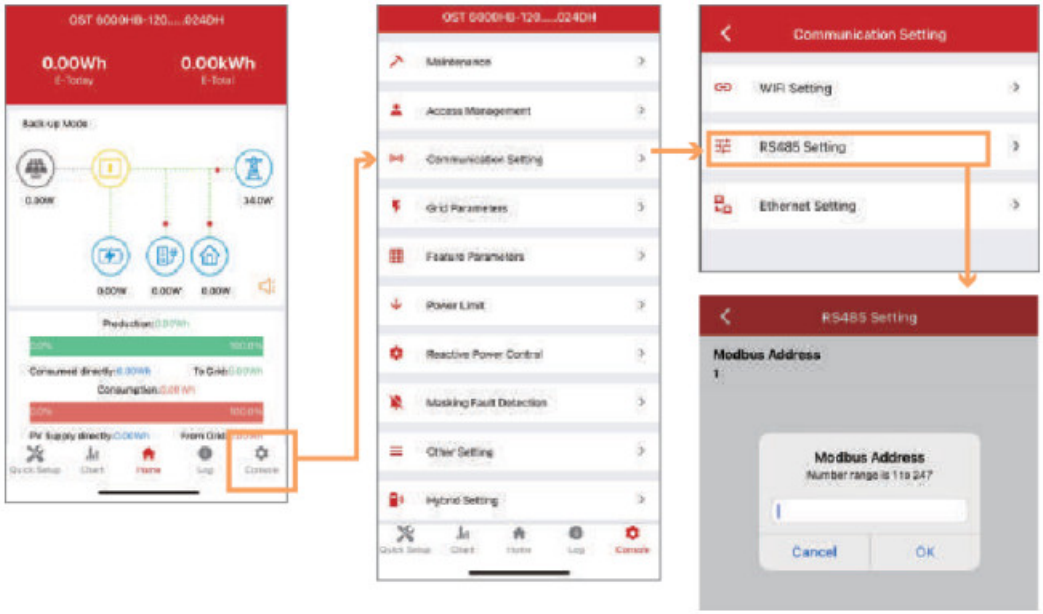


RS485 communication address setting.

1. Download the APP in either of the following ways
   • Scan the QR code on the inverter to download the APP
   • Download the APP from the App Store or Google Play.
   Note: APP should access some permissions such as inverter' s location. You need to allow all permissions to be granted in all pop-up windows when installing the APP or in your own phone setting.
2. Power on the inverter.
3. Connect the Inverter. Open the Bluetooth on your own phone, then open the APP.
   Then follow the instructions below.

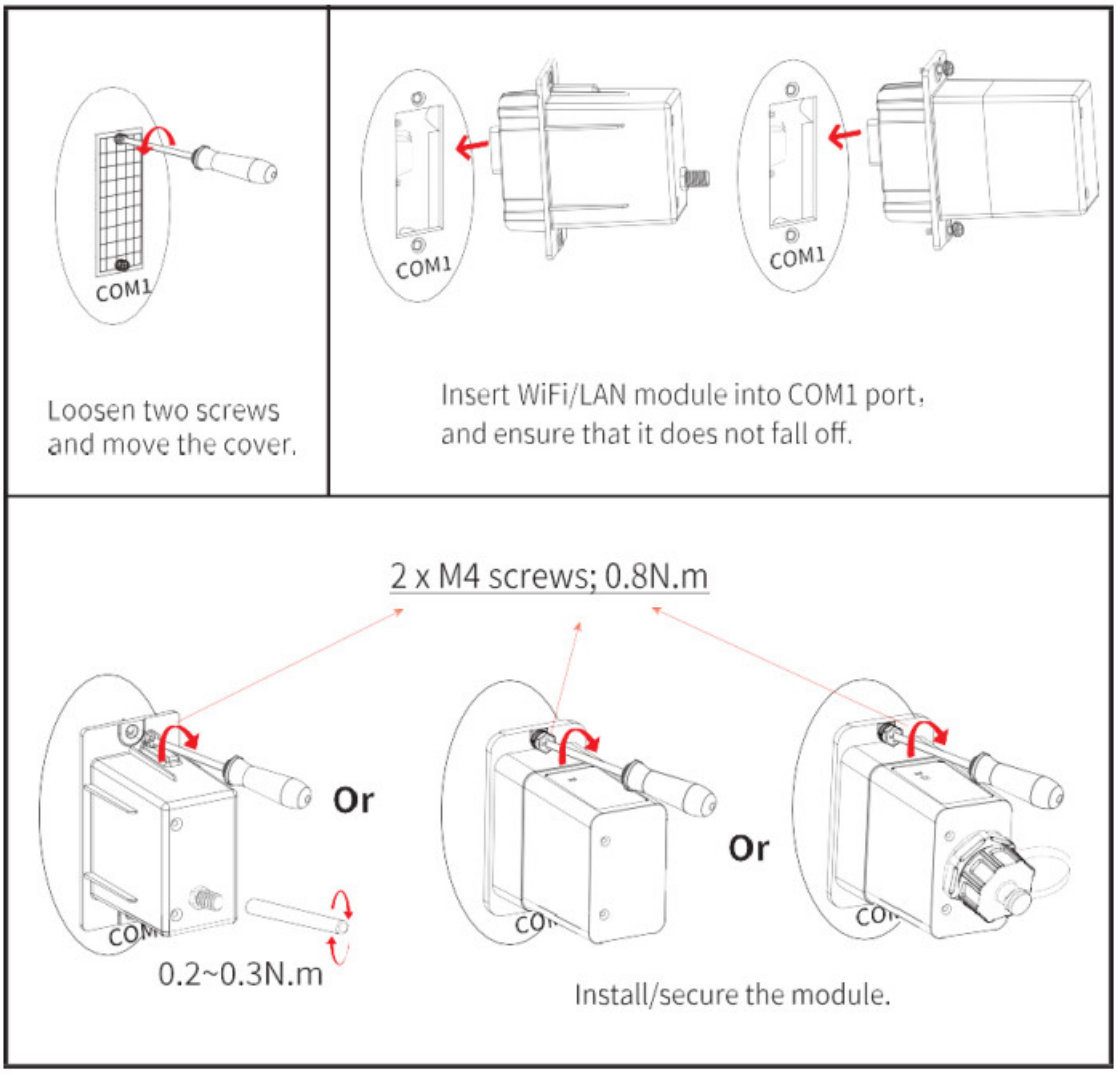


4. Go to Console > Communication Setting > RS485 Setting > Modbus Page, check the Modbus address (the default value is 1), and click to modify the address as required if necessary.



WITI/ LAN MODULE INSTALLATION (OPTIONAL)

For details, please refer to the corresponding Module Installation Guide in the packing.The appearance of modules may be slightly different. The figure shown here is only for illustration.



System Operation

5.1 System Operation

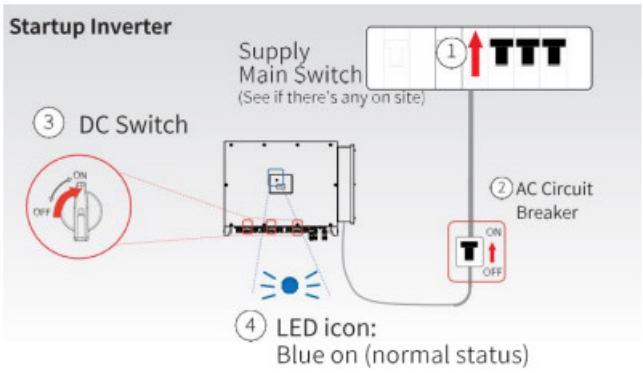
Switch ON the AC circuit breaker and set the DC SWITCH of the inverter to ON, Observe .Slatuses of gr\'d—conne(.tmg light o.n th? \'r\vsrlerfor.a while. \.Fthe \igh.ts display that the inverter has entered grid-connecting, it means the inverter is operating well. Any query during operating the PV inverter, call your dealer.
To power OFF the Inverter, switch off the circuit breaker at AC terminal, and set the DC SWITCH to OFF.

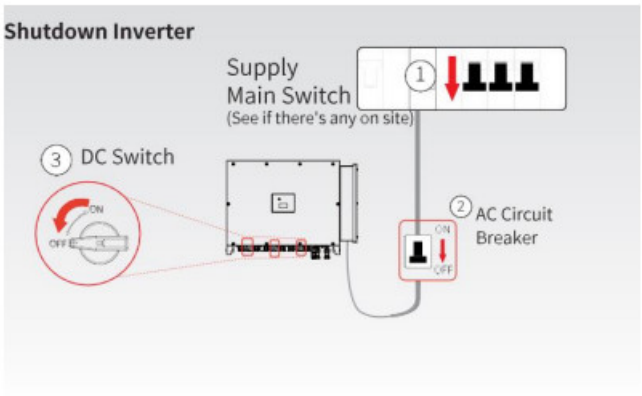
⚠ **WARNING** After the inverter power is off, the remaining electricity and heat may still cause eletrical shock and burns. Please only begin servicing the inverter 10 minutes after the poweralff,

5.2 Startup/Shutdown the System
Inspection

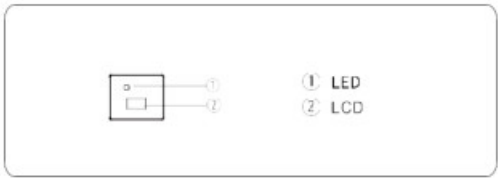
No.	Items
1	Theinverteris firmly installed
2	Thereisenough heat dissipation space, no external objects or parts left on the invertar
3	Itis convenient for operation and maintenance
4	The wiring of the system is correct and firm
5	Check whether the DC and AC connections are correct with amultimeter, and whether there is a shart circuit, break, or wrong conngction,
6	Check whether the waterproof nuts of eac part are tightened
7	The vacant port has been sealed
8	All safety labels and warning labels on the inverter are complete and without occlusion or al teration

⚠ After the inverter is powered off, the remaining electricity and hest may still cause electrical shock and body burns. If need to disconnect the inverter cables, please wait at least 10 minutes before touching these parts of inverter.





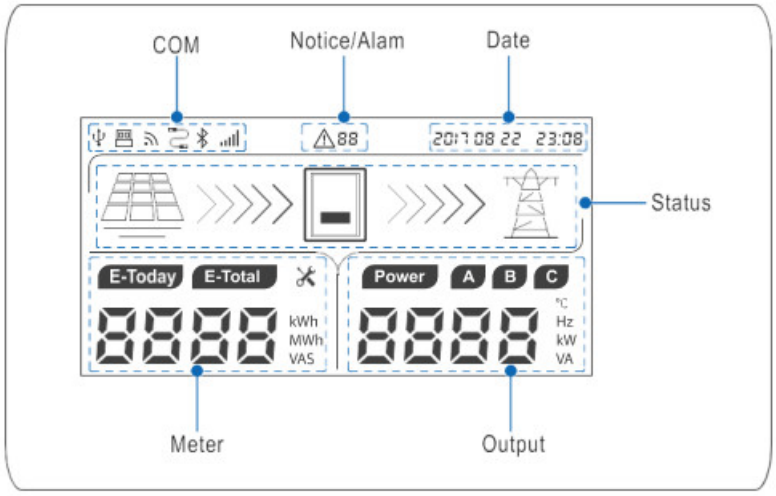
5.3 Interface



LED Indicator

LED Indicator	status	descriptions
PV Indicator	on	Voltage of PV strings meets the requirements for inverter grid-connecting to generate power.
	blink	Voltage of PV strings can not meet the requirements for inverter grid-connecting to generate power.
Grid Indicator	blink	Grid abnormal, can not meet the requirements for inverter grid-connecting to generate power.
	off	The inverter is connecting to the grid.
	on	The inverter has connected to the grid. The inverter is generating power.
COM Indicator	blink	Communications data transmission is underway.
	off	No external communications are connected or no communications data transmission.
Waring Indicator	on/blink	Refer LED status in warning table.
	off	No warning.

LCD Screen



LED status and Warning code

	Warning code	PV Indicator	Grid Indicator	COM Indicator	Warning Indicator
Normal status		●	●/★	◎	○
Starting up		●	○	◎	○
WLAN/WIFI/RS485 communication		◎	◎	★	○
PV normal		●	◎	◎	○
Grid over voltage	A0	◎	★	◎	○
Grid under voltage	A1				
Grid absent	A2				
Grid over frequency	A3				
Grid under frequency	A4				
Grid unbalance	A6				
Grid high average voltage	A7				
Grid N abnormal	A8	◎	◎	◎	★
PV over voltage	B0	★	◎	◎	○
PV under voltage	B4				
Weak radiation	B5				
Strings abnormal	B3	◎	◎	◎	★
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	CA	○	●	★	●
Internal communications fault	CB	○	○	★	●
Software version incompatibility	CG	★	●	○	●
EEPROM fault	CD	★	○	●	●
Sampling inconsistency	CE	★	●	●	●
Inverter circuit abnormal	CF	●	●	●	●
Boost circuit abnormal	CG	★	○	○	●
Remote off	CN	●	○	◎	○

Note: ● light on ○ light off ★ light blink ◎ keep original status

Remote off

Maintenance

6.1 Maintenance

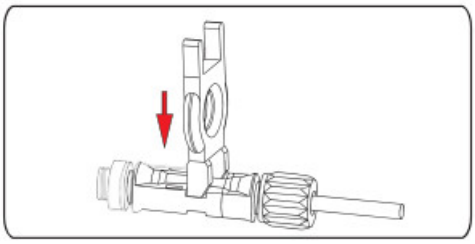
Check periodically heat sink and the inlet/outlet of external FAN, clean them, and ensure that they are free dust and blockage. If any abnormal with the FAN, please replace it.

Routine Maintenance

Items	Check Content	Maintain Content	Maintenance Interval
Inverter output status	Statistically maintain the status of electrical yield, and remotely monitor its abnormal status.	N/A	Weekly
PV inverter cleaning	Check periodically that the heat sink is free from dust and blockage.	Clean periodically the heat sink.	Yearly
PV inverter running status	Check that the inverter is not damaged or deformed. Check for normal sound emitted during inverter operation. Check and ensure that all inverter communications are running well.	If there is any abnormal phenomenon, replace the relevant parts.	Monthly
PV inverter electrical connections	Check that all AC, DC and communication cables are securely connected; Check that PGND cables are securely connected; Check that all cables are intact and free from aging.	If there is any abnormal phenomenon, replace the cable or re-connect it.	Semiannually

Inverter Uninstall

Inverter uninstall requires below procedure Step1 Disconnectall electric connections including these of communications cables, DC input cables, AC output cables and the PGND cables.



When uninstalling DC input connzctors, insert removal wrench into the bayonet shown in Figure, press the wrench down, and take out the connector.
Step2 Remove the inverter from its rear panel
Step3 Remove the rear panel

WARNWG Before uninstalling DC input connector, please ensure that the DC SWITCH is set to OFF lo avert equipment damage and/or personal injury.

The Inverter Troubleshonting

Ifany abnormal phenomena occur, refer to below table fortrouble 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 manua
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

Technical Specification

Model	SG-100KWT	SG-110KVVT	SG-125KVVT
Efficiency			
Max.efficiency	99.%	99.%	99.%
European Ettioency	98%	98.%	96.%
Input(PV)			
Max. Input Voltage	1100V		
Max. PV configuration	150%		
Rated Input Voltage	620V		
Max. Input Current	3'40A+5*32A	3.40A+6.32A	
Max.Short Circuit Current	3'50A+5'45A	3'50A+6*45A	
Start Input Voltage/ Min. Operating Voltage	250V/200V		
MPPT Operating Voltage Range	200V-1000V		
Max. Number of PV Strings	16(82)	18(92)	
No. of MPPTs Output (Grid)	8		
Rated AC Active Power	100,000W	110,000W	125,000W
Max. AC Apparent Power	110,000VA	121.000VA	137.500VA
Max. AC Active Power (PF=1)	110,000W	121,000W	137,500W
Max. AC Output Current	3968.8A	3'187A	3'167.3A
Rated AC Voltage	400V. 3W+N+PE		480V. 3W+PE
AC Voltage Range*	277V-520V (Adjustable)		300V-550V (Adjustable)

Rated Grid Frequency	50Hz / 60Hz
Grid Frequency Range-	45Hz-55Hz/55Hz-65Hz (Adjustable)
THDI	<3% (Rated Power)
DC Current Injection	<0.5%ln
Power Factor	> 0.99 Rated power (Adjustable 0.8 LD – 0.8 LG)
Protection	
DC switch	Support
Anti-islanding protection	Support
AC overcurrent protection	Support
AC short circuit protection	Support
DC reverse connection	Support
Surge Arrester	DC Type II/AC Type II
Insulation detection	Support
Leakage current protection	Support
AFC!	Optional
PID Recovery	Optional
PV String monitoring	Optional
Night load consumption monitorin g	Optional
General	
Topology	Transformerless
IP Rating	I P66
Night Self Consumption	<10W
Cooling	Fan cooling
Operating Temperature Range	-25t-sot
Relative Humidity Range	0-100%
Max. Operating Altitude	4000m
Noise	<75dB
Dimensions (WFI'D)	850mm'670mm •356mm
Weight	85Kg
HMI & COM	
Display	Wireless & APP+LED. LCD (Optional)
Communication	RS 485, Optional: WiFVGPRS/4G/LAN

Warranty	5 Years

Remarks:

- The range of output voltage and frequency may vary depending upon different grid codes
- Specifications are subject o change without advance notice.

Technical Assistance

SolarMG offers a technical assistance and consultancy service
To take advantage of this service, the following number is active: 055911077 Or by writing to the email: **support@solarmg.it**

Documents / Resources

	**SOLARMG 100k 125k Three Phase Grid Tied PV String Inverter** [pdf] User Manual 100k 125k Three Phase Grid Tied PV String Inverter, 100k 125k, Three Phase Grid Tied PV String Inverter, Tied PV String Inverter, String Inverter, Inverter