MG ENERGY

Hybrid Solar Inverter

User Manual

Preface

Attention

The purchased products, services should be restrained by commercial contracts of the Company and their terms. Some of the products, services described in this document may not be within the range of procurement. Unless the contract specifies otherwise, the Company does not make any representation or warranty, expressed or implied regarding the contents of this document.

Proper keeping of the Manual

The manual is an important part of product, and you may print the electronic document of manual into a paper document as required, and properly keep the paper and electronic document for subsequent reference. All shall operate the equipment in accordance with the requirements in the manual at anytime.

Copyright statement

The current version was last updated on , 2025.

Overview

Prior to installation, operation, and maintenance,please read the Manual carefully.The Manual contains important safety and installation instructions that must be followed during installation and maintenance of theequipment.

Range of application

The Manual describes the installation, electrical connection, commissioning, maintenance and troubleshooting of TCI X5.0 Ⅲ inverter.

Readers

The Manual is intended for professional electrical technicians being responsible for the installation and commissioning of inverters in the photovoltaic power generation system.

Symbols used in the Manual

In order to ensure the safety of the users and their property in the process of using grid-connected PV inverters, and ensure the efficient use of this product, the relevant safety operation information are provided in the Manual and highlighted with the corresponding symbols. Please fully understand and absolutely comply with the highlighted information, so as to avoid personal injury and property loss. The symbols used in the Manual are listed below:

"Danger" indicates a high potential hazard, which could result in injury or death if it is not avoided.

"Warning" indicates a medium potential hazard, which could result in injury or death if it is not avoided.

"Caution" indicates a minor potential hazard, which could result in moderate or minor injury if it is not avoided.

"Attention" indicates a potential risk, which could make the equipment unable to run or result in property loss if it is not avoided.

"Prompt" refers to the additional information in the Manual, highlighting and supplementing the contents, and it can also provide tips or tricks on how to optimize the use of the product, thus helping the users to resolve a problem or save the time.

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1. Basic Safety Information

Please carefully read the safety warning in the Manual, to avoid potential personal injury and death.

 Prompt	If you have any queries while reading the following information, please contact distributor.

1.1 Necessary conditions for the installation and maintenance of the inverter

The installation of the TCI X5.0 III energy-storage PV inverter must be in full compliance with the national and local grid standards and regulations.

Please read and understand all the instructions in the Manual, get familiar with the relevant safety symbols and initiate installation and commissioning.

In accordance with national and prefecture/provincial regulations, it can be connected to the grid only upon approval by the electricity authority, and this operation may only be conducted by qualified electrical engineers.

In terms of any maintenance or repair, please contact the local authorized maintenance center. For understanding the related information of the local authorized center, please contact franchiser. Do not perform self-maintenance, for which may result in personal injury or property loss.

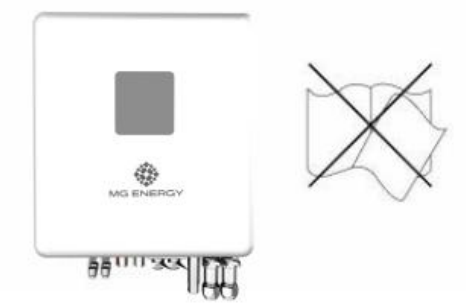
Prior to installation and maintenance of the equipment, the high-voltage DC power shall be disconnected by a DC switch; otherwise, the high voltage generated could cause serious injury.

1.1.1 Requirements for the installation and maintenance personnel

During the running of the inverter, some parts may be electrically charged, and some may be heated. Improper use, incorrect installation or operation may result in serious personal injury or property loss. The transportation, loading/unloading, installation, start-up and maintenance must be performed by qualified electrical engineers (All effective accident prevention measures in the country of the user must be observed!). The Supplier shall not be liable for any personal or property injury caused by any incorrect use.

1.1.2 Assembling conditions

TCI X5.0 III energy-storage PV inverter shall be assembled in accordance with the detailed instructions in the following sections. The inverter shall be placed on an object with suitable loading capacity, and it shall be vertically placed. The equipment shall be installed in an appropriate place, and ensure sufficient fire escape space, for convenient maintenance in case of failure. The ventilation conditions shall be fulfilled, to ensure adequate circulating air for cooling. The air humidity during assembly should be no more than 90%.



1.1.3 Transportation

The inverter shall be in the best electrical and mechanical state upon delivery. The inverter must be transported in the original package or any other suitable package, to ensure the safety of the equipment during transportation. Any damage caused to the equipment during transportation shall be charged by the transportation company. During taking delivery, please thoroughly inspect the inverter. In the case of any packaging problem that may cause any damage to the inverter, or any visible damage to the inverter,

please inform the transportation company immediately.

1. Basic Safety Information

1.1.4 Equipment label

The label must not be covered by any object and extraneous part (rag, carton, and equipment, etc); it must be wiped regularly, to make it visible.

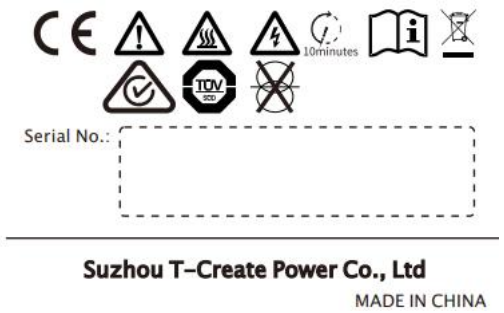
Model	TCI X5.0 III
Dimensions(WDH)	535*485*198.5 mm
Weight	29 KG
Ambient Temperature Range	-20°C - +60°C
OverVoltage Category	DC II / AC III
Ingress Protection	IP65
Protective Class	Class I
Inverter Topology	Non-Isolated
Standard	IEC61000, EN62109, EN62477, AS4777

Max. PV Input Power	8 KW
Max. Input Voltage	600 V.d.c.
MPPT Voltage Range	120-550 V.d.c.
Max. PV Input Current	13 Ad.c. x2
Isc PV	20 Ad.c. x2

Battery Type	Lithium-ion
Battery Voltage Range	40-60 V.d.c.
Max. Charging & Discharging Current	100 Ad.c.

Nominal Output Power	5 KVA
Nominal Input & Output Voltage	230 Va.c.
Max. Input & Output Current	40 / 25 Aa.c.
AC Output/Input Rated Current	21.7 A
Rated/Max. Apparent Power	5 KVA
Nominal Grid Frequency	50/60 Hz
Power Factor	0.8 leading to 0.8 lagging

Max. AC Apparent Output Power	5 KVA
Max. AC Apparent Output Current	25 A
AC Output Rated Current	21.7 A
AC Output Rated Power	5 KVA
Back-up Frequency	50/60 Hz
Back-up Voltage	230 Va.c.



1.1.5 Precautions for electrical connection

When handling the energized inverter, please observe all the current national regulations regarding the prevention of electrical accidents.

 Danger	Prior to electrical connection, be sure to cover the PV panel with opaque materials or disconnect the DC side circuit breaker, for the exposure to sunlight will make the PV array generate dangerous voltages. When it is necessary to install the battery, please identify the positive and negative terminals, and switch off the battery.
 Warning	The installation must be completed by a professional electrical engineer, who must have been trained, and have fully read the Manual and understood the related safety items.
 Attention	The inverter can only be connected to the grid with the permission of the local electricity authority and upon electrical connection by a professional electrical engineer.

1.1.6 Precautions for operation

 Danger	The touching of the grid or equipment terminal may result in death due to electric shock or fire! Do not touch any terminal or conductor connected to the grid circuit. Pay attention to any instructions or safety documents related to electrical connection.
 Attention	In the process of running, some internal components may be heated, please wear protective gloves.

1.1.7 Precautions for maintenance and repair

 Danger	Prior to any maintenance or repair, please firstly disconnect the inverter from the grid, and then disconnect the electrical connection at the DC side. Wait for at least 10 minutes, and only when all internal components are discharged, can the maintenance or repair be started.
 Attention	Any fault affecting the safety of the inverter must be resolved before starting the inverter again. If any repair is required, please contact the local authorized service center. No unauthorized disassembly and assembly of internal components of the inverter are allowed.

1.1.8 Inverter EMC/noise level

Electromagnetic compatibility (EMC) refers to the capacity of an electrical equipment to fulfill its functions in the specified electromagnetic environment without faults and errors, and without causing any unacceptable effects on the environment. Therefore, EMC represents the quality characteristics of electrical equipment, the inherent noise immunity, the immunity to internal electrical noise, the immunity to external noise, the immunity to electromagnetic noise from external systems, the noise emission level, and the impact of electromagnetic emission on the environment.

 Danger	High-voltage circuits in the inverter may endanger the lives! Only professional electrical engineers can operate this product: No minors, disabled or mental patients are allowed to use the product; and it shall be installed out of the reach of children.

1.2 Description of safety information symbols

 Danger	High-voltage circuits in the inverter may endanger the lives! Only professional electrical engineers can operate this product: No minors, disabled or mental patients are allowed to use the product; and it shall be installed out of the reach of children.
 Caution	In view of the high temperature of the inverter housing during running, please watch out for burns! During running of the inverter, the user may only touch the display and buttons of the inverter.
 Attention	The frame and support of the PV array must be safely earthed, and meet the earthing requirements of the local electricity authority!
 Warning	Be sure that the maximum output voltage of PV array (open-circuit voltage after low-temperature correction) shall not exceed the maximum input voltage of the inverter, and for the resulting damage to the inverter or other losses.

1. Basic Safety Information

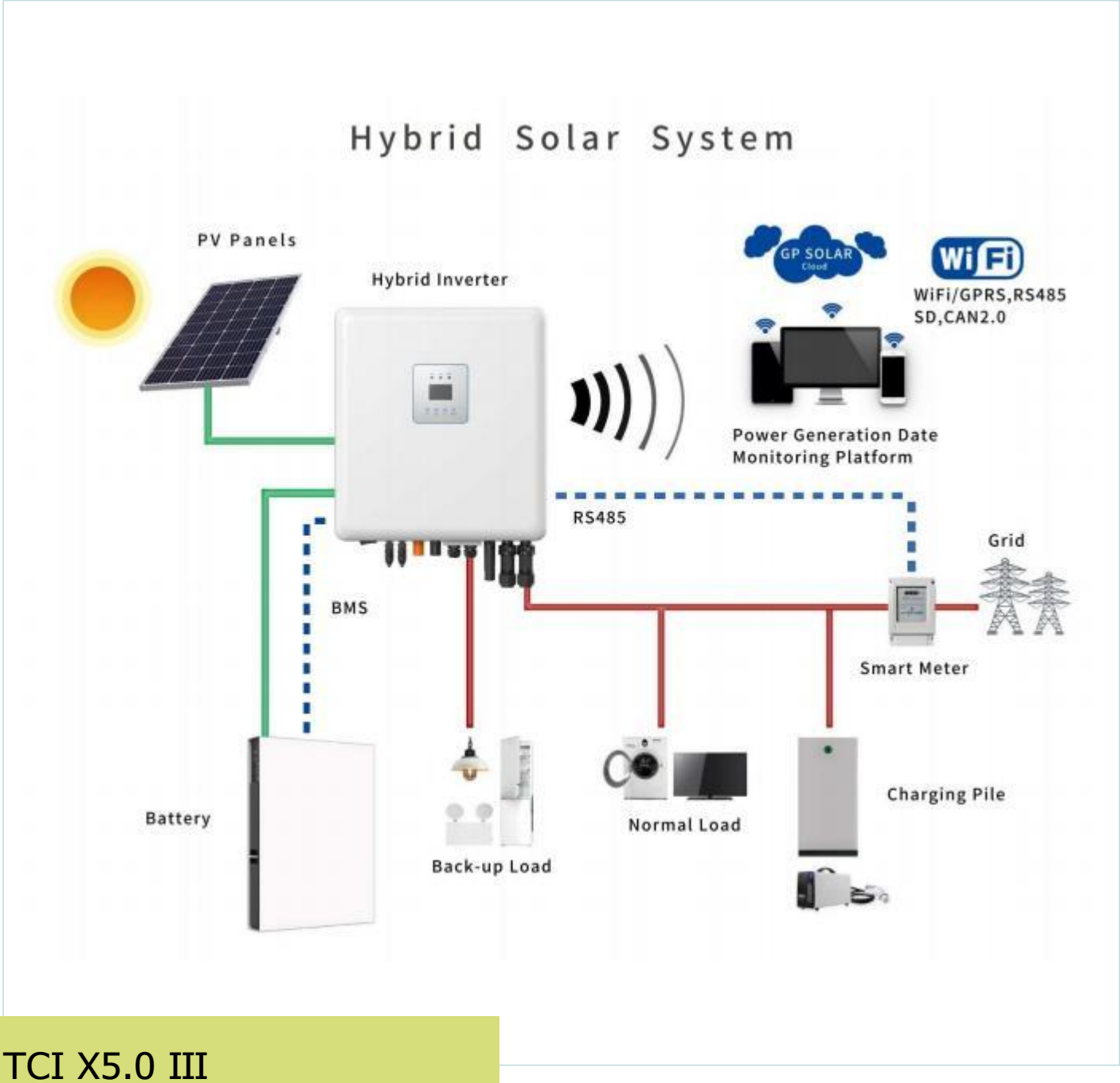
1.2.1 Symbols on the inverter

There are some safety-related labels on inverter. Please be sure to carefully read and fully understand the contents on these labels before installation.

Symbol	Description	Meaning
	There is a risk of residual voltage in the inverter!	For a period of time after disconnecting DC side of the inverter, the internal capacitor may still be charged; it is necessary to wait 10 minutes for the capacitor to fully discharge prior to maintenance.
	Beware of hot surface.	The housing of the inverter is hot during running, and please do not touch it.
	Conforming to EU standard (CE) authentication.	This product complies with the CE authentication standard.
	Read the manual	Please read the Manual prior to installation of the inverter.
	RCM identification.	The product meets the requirements of the applicable Australian Standard.
	Transformerless Inverter	The inverter does not have a transformer.
	WEEE Symbol	Do not dispose of the inverter together with household waste.
	TÜV SÜD Certification Mark	The product meets all essential health, safety, and environmental requirements of the European Union (EU) directives (e.g., Machinery Directive, EMC Directive). TÜV SÜD acts as a Notified Body (No. xxxx) to verify compliance.
	Warning Sign	Disconnect the inverter from all the external power source before maintenance!

2. Product Description

2.1 Product Information



TCI X5.0 III

TCI X5.0 III inverter is a single-phase energy-storage PV inverter integrating the PV grid-connected inverter and battery storage.
Inverter is installed with multiple working modes, to suit the diverse needs of use.
In the period with increased costs of oil and coal, and decreased oil and coal for the grid-connected PV system, inverter can provide a complete solution for mountainous areas or base stations without access to the grid in the case of the need of uninterrupted power supply or emergency power supply.

2.2 Dimensions

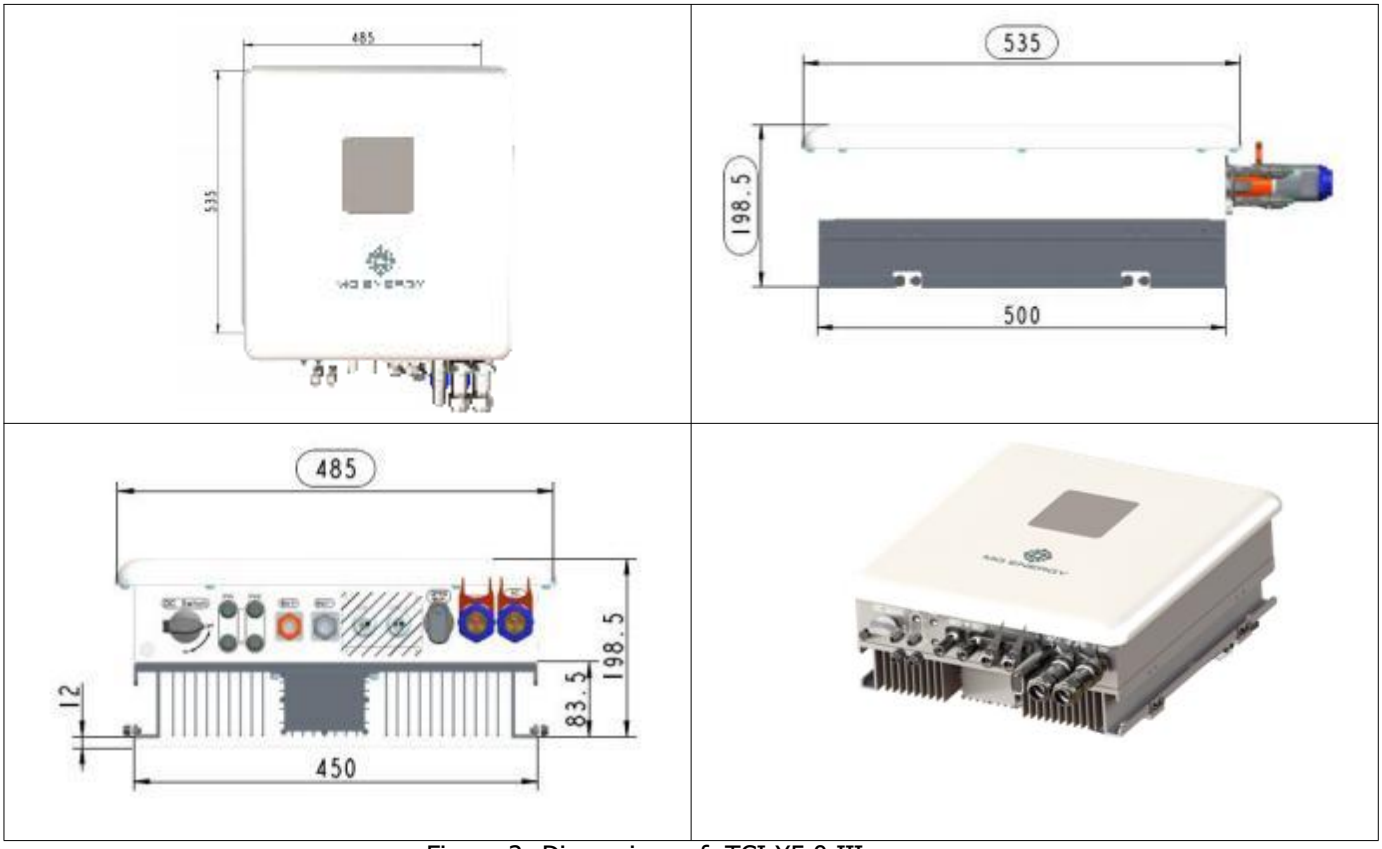


Figure 2: Dimensions of TCI X5.0 III

2.3 Functional features

This energy-storage PV inverter allows up to 10% overload, to achieve maximum power output; the UPS mode can support inductive load for air conditioners or refrigerators, with the automatic switching time of 10 ms.The inverter does not require an external residual current device,as it has integrated with a RCMU.If local regulations require the application of external residual current device,either type A or type B RCD is compatible with the inverter.The action current of external residual current device should be 300mA.

- With two channels of MPPT input, it can support 1.5 times of DC overload.
- It can flexibly switch the grid-connected mode and energy storage mode.
- The maximum charge/discharge efficiency of battery is 94.6%.
- Input of 1 battery string, with the maximum charge/discharge current of 100A.
- Battery voltage range (40-60V).
- Multiple AC parallel connections make the system solutions more flexible.
- Intelligent monitoring, RS485/WiFi/Bluetooth/GPRS (optional).
- Linear load and nonlinear load (PF: -0.8~0.8).

2.4 Electrical block diagram

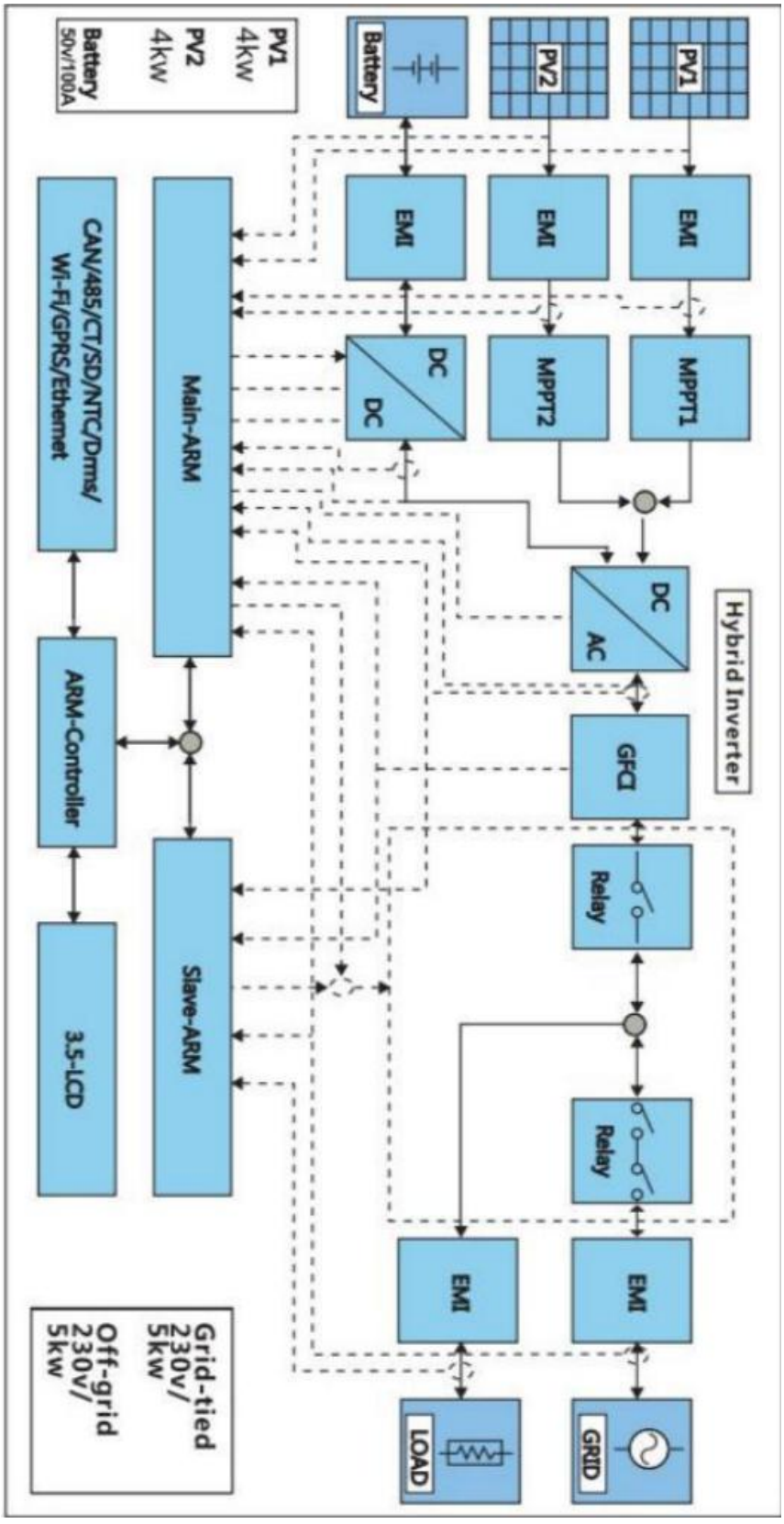


Figure 3: Electrical block diagram of TCI X5.0 III

3.Product installation

3.1 Precautions

Symbol	Symbol Name	Symbol Meaning
	**Danger**	Do not install inverter on inflammable materials. Do not install inverter in the areas storing flammable and explosive materials.
	Caution	The housing and cooling fin are quite hot during running of the inverter, so do not install inverter in a place where you may inadvertently touch it.
	Attention	For transportation and moving of the inverter, the weight of the inverter shall be considered. The proper installation position and surface shall be selected. The inverter shall be installed by at least two persons.

3.2 Installation process

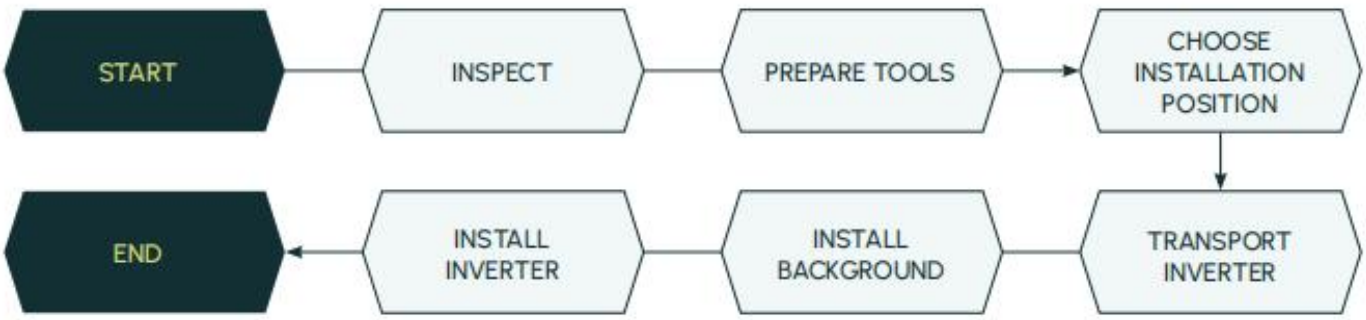


Figure 4: Diagram of the installation process

3.3 Inspect before installation

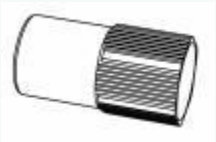
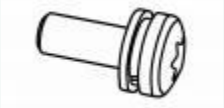
3.3.1 Inspect the outer packaging materials

Packaging materials and components may be damaged during transportation. Therefore, please inspect the outer packaging materials before installing the inverter. Inspect the outer packaging materials for damage, e.g. holes and cracks. In the case of any damage to the inverter, please do not open the package, and contact the dealer as soon as possible. You are recommended to remove the packaging materials within 24 hours prior to installation of the inverter.

3.3.2 Check the Delivery List

Upon unboxing of the inverter, check the integrity of the deliverable. In the case of any damage or loss of components, please contact the dealer.

3. Product installation

S/N	Item	Description	Quantity
1		Inverter	1 pcs
2		Install the backboard	1 pcs
3		PV+ Input terminal plastic shell	2 pcs
4		PV- Input terminal plastic shell	2 pcs
5		PV+ Input terminal metal core	2 pcs
6		PV- Input terminal metal core	2 pcs
7		BAT- Input terminal plastic shell	1 pcs
8		BAT+ Input terminal plastic shell	1 pcs
9		M6 inner hexagon screw	6 pcs
10		M8*50 Self-tapping screw	4 pcs
11		Screw fixing seat	4 pcs

3. Product installation

S/N	Item	Description	Quantity
12		AC wiring terminal	1 pcs
13		Load wiring terminal	1 pcs
14		Current transformer (CT)	1 pcs
15		Single-phase electronic rail mounted meter	1pcs(optimal)
16		WIFI/GPRS Data Collector	1 pcs
17		User Manual	1 pcs
18		Warranty Card	1 pcs
19		Certificate	1 pcs
20		Parallel communication connector	1 pcs

Table 1: Deliverable components and mechanical parts

3.4 Product appearance

TCI X5.0 III inverter shall be strictly inspected before packaging and delivery. This inverter is not allowed to be inverted during manufacturing.

 Attention	Please carefully check the packaging and accessories before installation.

3. Product installation

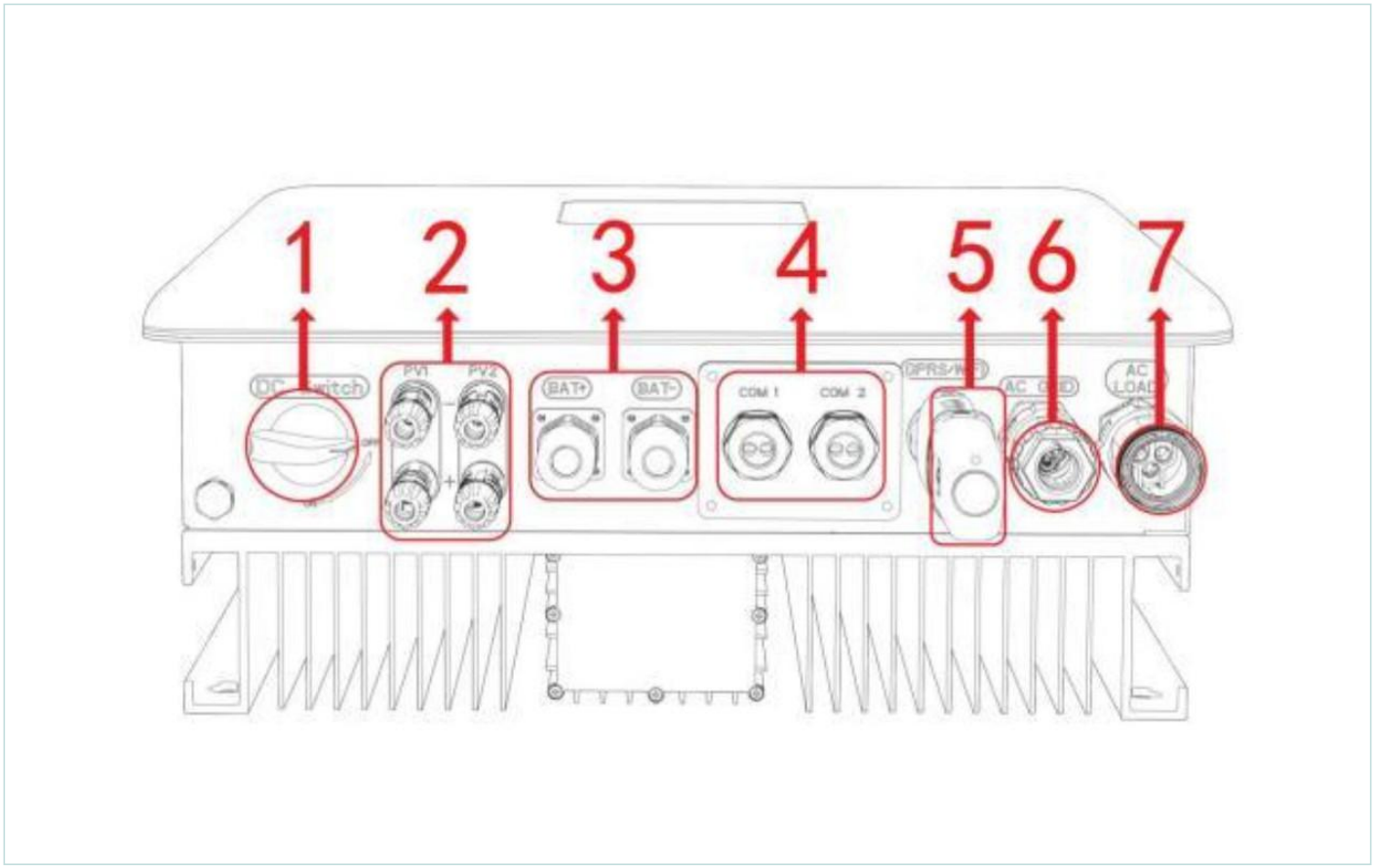


Figure 5: Appearance of TCI X5.0 III

S/N	Description
1	DC switch
2	PV input terminal
3	Battery input terminal
4	COM (communication connection port)
5	CPRS/WIFI
6	Grid connection port
7	Load connection port

Table 2: Appearance of TCI X5.0 III

3. Product installation

3.5 Tools

Prepare the tools for installation and electrical connection.

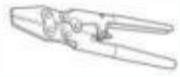
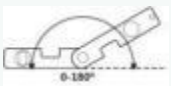
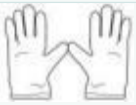
S/N	Tools	Description	Function
1		Impact drill 6mm drill bit is recommended	For drilling on the wall
2		Slot type screwdriver	For removing, installing screws and wiring
3		4mm cross screwdriver	For removing and installing AC terminal screws
4		Removal tool	For removing PV terminals
5		Wire stripper	For stripping the wire
6		Wire crimper	For crimping cables connected to the grid and those at the critical load terminal, as well as CT extension cord.
7		Multimeter	Check whether the cable wiring, positive and negative battery terminals are correct, and whether the earthing is reliable
8		Wrench with the opening ≥ 32 mm	For fastening the expansion bolts
9		Marking pen	For marking the holes
10		Tape measure	For measuring the distance
11		Leveling instrument	For ensuring the leveling of the backboard
12		Protective gloves	Wearing when installing the equipment
13		Safety goggles	Wearing when drilling holes
14		Mask	Wearing when drilling holes

Table 3: Tools for installation and electrical connection

3.6 Installation environment

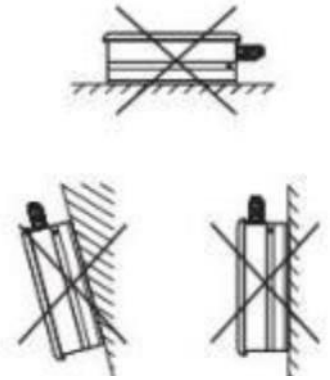
- Select a dry and clean place, for easy installation.
- Range of ambient temperature: -20℃~60℃ .
- Relative humidity: 0%～95% RH.
- TCI X5.0 III inverter shall be installed in a well-ventilated area.
- TCI X5.0 III frequency converter shall be away from flammable and explosive materials.
- AC over voltage category of the inverter shall be Class III.
- Maximum working altitude: 3000m derating.

3. Product installation

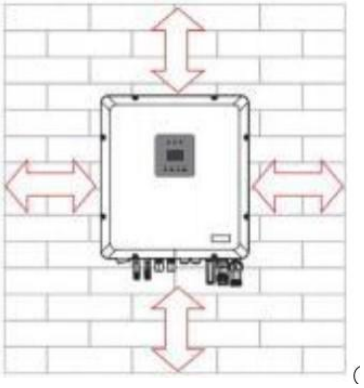
3.7 Installation position

Please determine the appropriate location for installing the inverter. When determining the installation position, the following requirements must be met. The clearances required around inverters is 60cm.
Remark: The inverter is suitable for outdoor installation. It must be installed under a roof or awning to protect it from direct sunlight and rain.

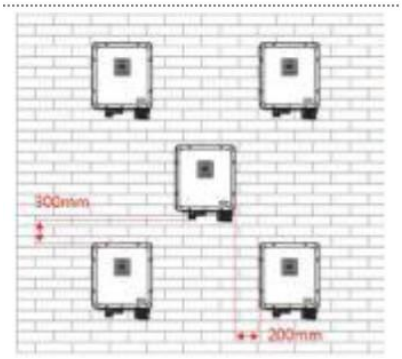
Figure 6: Installation position



Such installation is prohibited.



Installation gap 60cm



Suggested installation methods

Suggested installation methods

3.8 Transport

Take the inverter out of the outer package, and horizontally carry it to the designated installation position. After opening the packaging box, two operators shall reach under the inverter's radiator, to take the inverter out of the box, and move to the designated installation position.

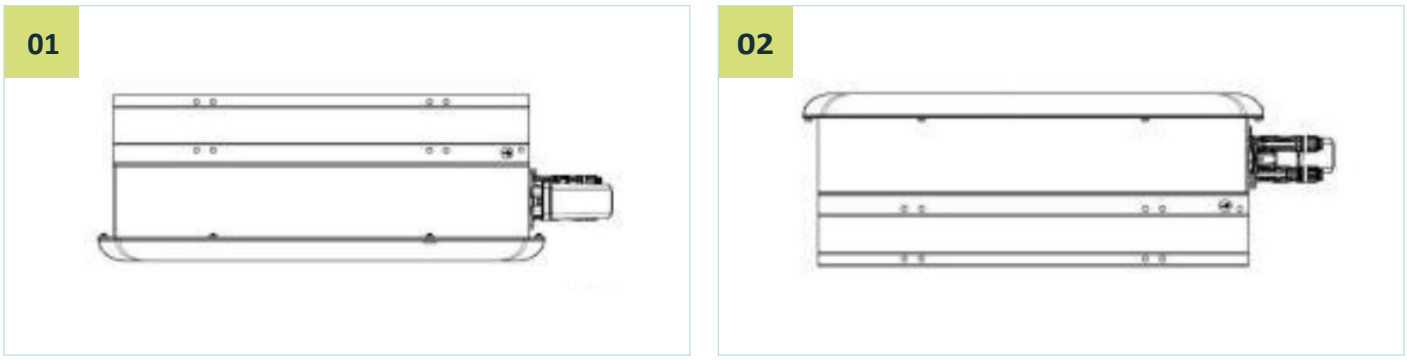


Figure 7: Handling of the inverter

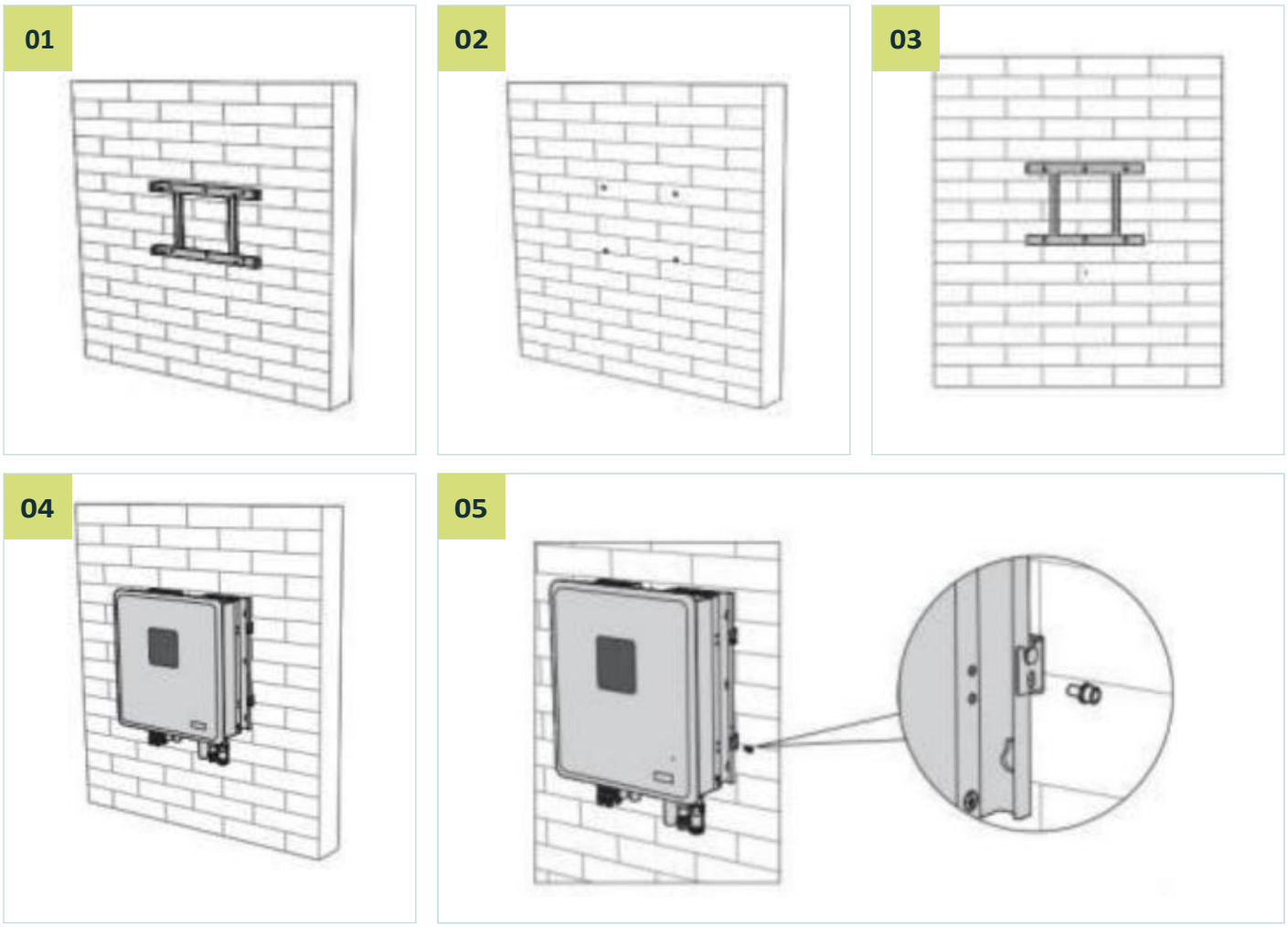
Attention: The inverter is heavy, please keep balance during handling, to protect the operators from being injured by equipment falling.

The power and signal cable ports at the bottom of the inverter cannot bear any weight, so please do not place the wiring terminal directly on the ground. Please place the inverter horizontally.

When the inverter is placed on the ground, there shall be foam or cardboard underneath, to avoid damage to the housing.

3.9 Installation

- **Step 1:** Select a wall with sufficient load capacity, place the backboard horizontally against the wall, and mark the positions for drilling to fix the backboard with a marker. Then drill holes on the wall with an impact drill (diameter: 10mm). When drilling the holes, please keep the impact drill perpendicular to the wall, and drill holes slightly deeper than the length of the screw holder. After drilling, please check the hole position with the backboard, and if the deviation is too large, please reposition the holes.
- **Step 2:** Slowly tap the screw holders into the drilled holes with a hammer.
- **Step 3:** Align the backboard with the holes, screw in the M8 self-tapping screws with a tool, to fix the backboard bracket.
- **Step 4:** Hang the inverter on the backboard, and tighten the inverter and backboard with M6 threaded pins.



- **Step 5**: Screws need to be installed on the side. Torque :30kgf·cm

Figure 8: Installation of TCI X5.0

4. Electrical Connection

Prior to installation and maintenance, the AC or DC sides shall be de-energized. For a period of time after disconnecting DC side of the inverter, the capacitor may still be charged, it is necessary to wait 10 minutes for the capacitor to fully discharge.
This inverter can be used for battery storage PV system. If it is not used as intended, the equipment may be damaged.

Symbol	Name	Meaning
	Attention	The inverter must be installed and maintained by a professional electrical engineer. As for high voltage/high current systems (such as inverter and battery system), the operators shall wear rubber gloves and protective clothing (safety goggles and protective boots).
	**Danger**	Prior to electrical connection at the DC terminal, be sure to cover the PV panel with opaque materials or disconnect the DC side circuit breaker. The exposure to sunlight will make the PV array generate dangerous voltages.
	**Prompt**	The open circuit voltage of the PV module connected to inverter shall not be greater than 580V.

The connected PV components must have the rate of IEC61730A.

Model	IscPV (absolute maximum)	Maximum output overcurrent protection
TCI X5.0 III	20A/20A	25

Table 4: Current parameters

Port	DVC
PV input port	DVCC
Grid connection port	DVCC
Battery input port	DVCC
Load connection port	DVCC
USB/WiFi port	DVCA
COM port	DVCA
Link Port 0 & Link Port 1	DVCA

Prompt:
DVC refers to the voltage level of any two live parts of a circuit under nominal operating conditions.

Table 5: DVC

Prompt: DVC refers to the voltage level of any two live parts of a circuit under nominal operating conditions.

4. Electrical Connection

4.1 Instructions to wiring of external ports

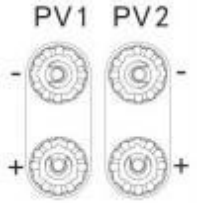
Port	Definition		Cable type	Cable specification
	+: Connect to the positive terminal of the lithium battery		Outdoor multi-core copper cable	Wire size: 4~6AWG
	-: Connect to the negative terminal of the lithium battery			
	+: Connect to the positive terminal of the PV battery		Outdoor multi-core copper cable	Wire size: 12AWG
	-: Connect to the negative terminal of the PV battery			
	Load	L	Outdoor multi-core copper cable	Wire size: 8~10AWG
		N		
		PE		
	AC	L	Outdoor multi-core copper cable	Wire size: 8~10AWG
		N		
		PE		

Table 6: Cable description

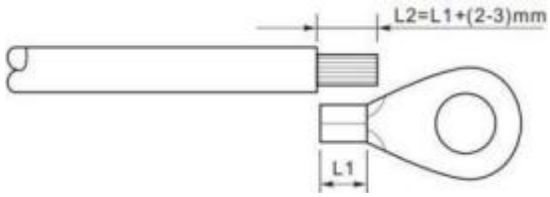
4.2 Protection earthing (PE)

Attention	Since the inverter does not contain a transformer, the positive and negative terminals of the PV array shall not be earthed, otherwise, the inverter will fail. In the PV power generation system, all non-current-carrying metal parts (such as the bracket, busbar/distribution box enclosure, inverter enclosure) shall be earthed.

Note: Prepare an earthing cable (it is recommended to use the yellow-green outdoor power cable with the size of ≥5mm).

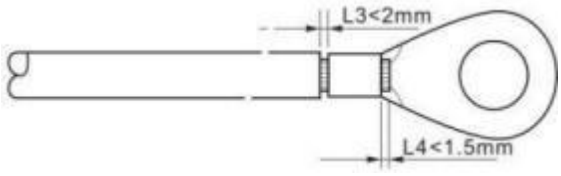
- **Step 1:** Strip the insulation layer of an appropriate length of the earthing cable with the wire stripper (Figure 9 ①).
- **Step 2:** Thread the stripped wire core into the conductor crimp area of the OT terminal, and crimp it with a crimper (Figure 9 ②). It is recommended to use the OT terminal: OTM6, the diameter of the recommended earthing wire is ⩾6mm^2.
- **Step 3:** Fix the OT terminal with M5 screws in the position shown in Figure 9 ③, with the recommended locking torque of 2N.m.
- **Note 1:** L3 is the distance between the insulated terminal face of the cable and the rear section of the terminal conductor crimp area; L4 is the length of the cable conductor protruding from the terminal
conductor crimp area.
- **Note 2:** The cavity formed by crimping the conductor crimp sheet shall completely enclose the
cable conductor, and the conductor shall be tightly bonded to the terminal.

01



Prompt: L2 is 3mm longer than L1

02



03

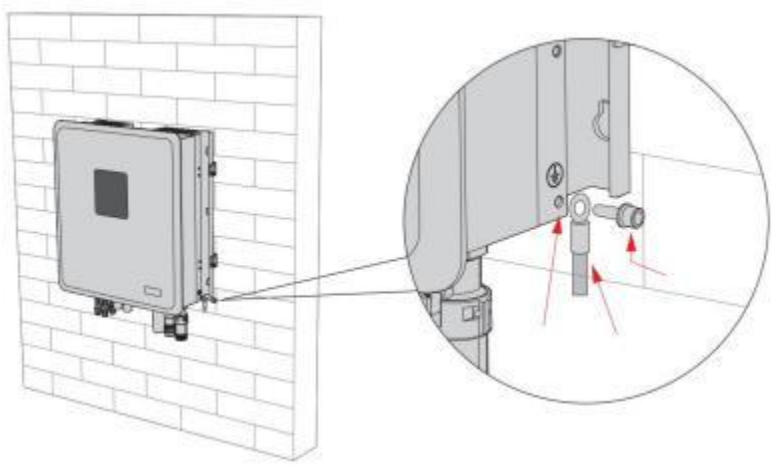


Figure 9: Diagram of connection of the earthing wire

The inverter has the system of earth fault alarm. When a ground fault occurs, the user will receive below alarm message.

There is an alarm light on the inverter that will flash and a buzzer will sound. Fault alarm information will be displayed on the solar man APP.

If the fault is not cleared, the alarm light will keep flashing, the buzzer will keep sounding the alarm, and the alarm of the APP will continue. The alarm will be eliminated after the power is restored.

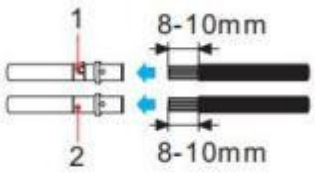
4.3 Connection of PV cable

- Step 1: Select the appropriate cable type and specification according to Table 4-3. Remove the cable connectors from the positive and negative connectors. (It is recommended to use different colors to distinguish the positive and negative connectors);
- Step 2: Strip the insulation layer of an appropriate length of the positive and negative cables with the wire stripper, and the specific stripping length is shown in Figure 10 ①;
- Step 3: Insert the stripped positive and negative cables into the positive and negative metal terminals respectively; crimp the cable and metal core of the terminal with a crimping plier; it is necessary to ensure that the cable is firmly crimped with the metal core;
- Step 4: Insert the crimped positive and negative cables through the locking nuts, and into the corresponding plastic enclosures, until a click sound is heard, indicating that the metal core is in place, and then tighten the locking nuts;
- Step 5: Check the positive and negative terminals with a multimeter, and after confirming their correctness, they can be accordingly inserted into the PV input of the inverter.

If it is necessary to remove the positive and negative PV connectors from the inverter, the operator may insert a dismantling spanner to the fixing slot as shown in the figure, and press it with force, to carefully remove the DC connector, as shown in Figure 10 ⑦.

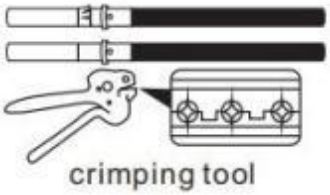
 Caution	Before removing the positive and negative connectors, please be sure that the "DC SWITCH" is turned "OFF".

4. Electrical Connection

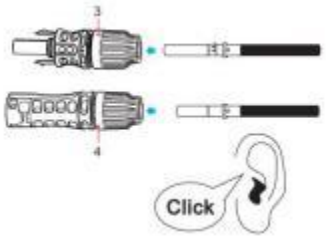


1: Positive metal core
2: Negative metal core

①

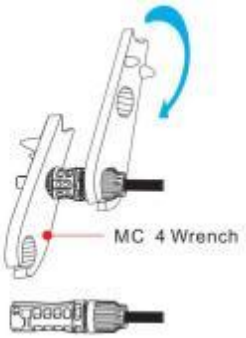


②



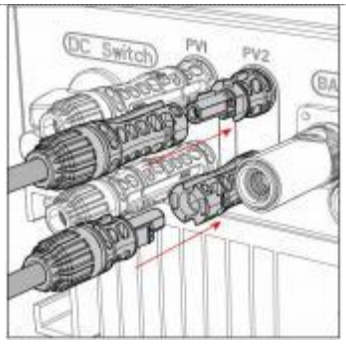
3： Positive terminal
4: Negative terminal

③

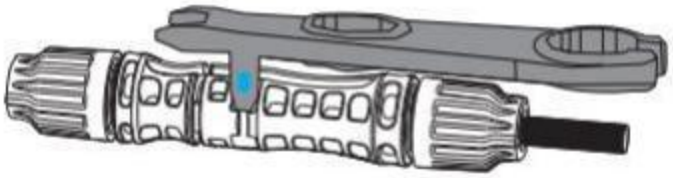


④

⑤



⑥



Remove the PV terminal ⑦

Figure 10: Connection ofPV cable

4.4 Connection of battery cable (BAT)

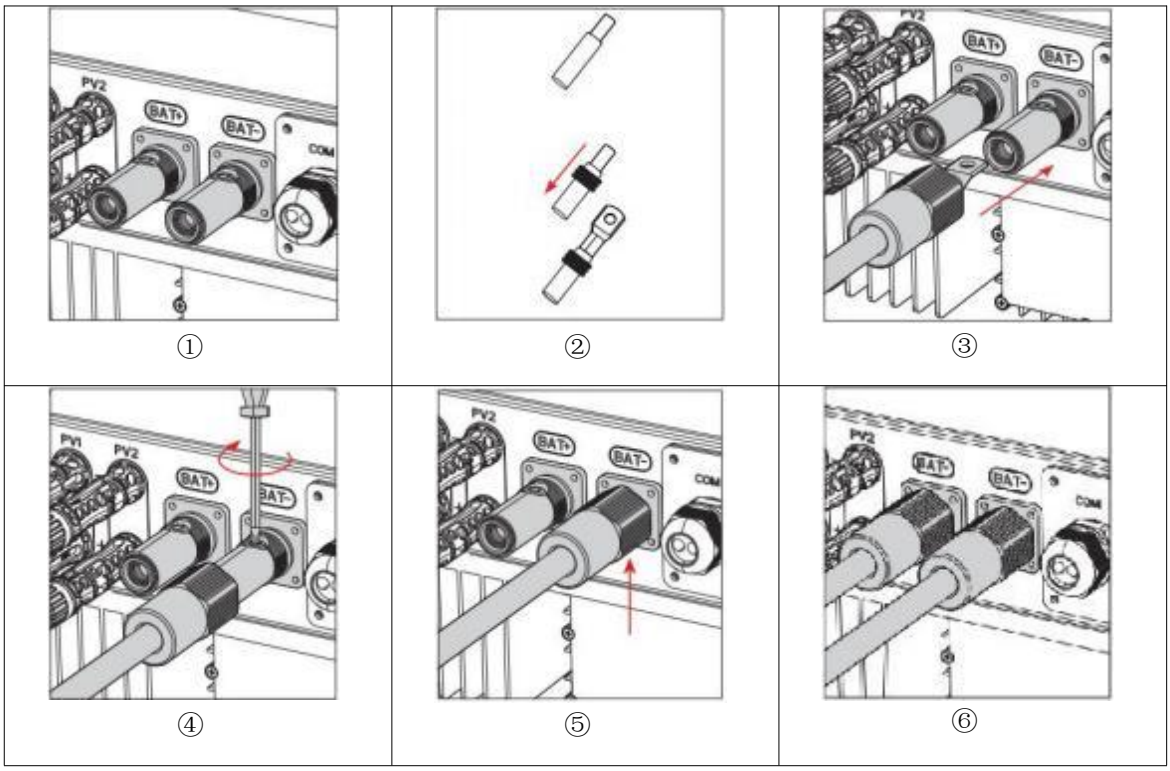


Figure 11: Connection of battery cable

The tighten torque for battery connector connection: 4.5±0.5kgf/cm.

4.5 Connection of load cable (LOAD)

- Step 1: Select the appropriate type and specification of cable according to Table 4-3, and then strip the cable; the specific stripping length shall refer to Figure 12 ①; A: 30~50mm B: 3~5mm
- Step 2: Disassemble the AC terminal as shown in Figure 12 ②, and pass the stripped cable through the waterproof locking nut;
- Step 3: Lock the cable into the locking hole on the terminal as indicated, and fastened with a hexagon socket screwdriver, as shown in Figure 12 ③④;
- Step 4: Insert the output terminal, and when the "click" sound is heard, tighten the waterproof nut clockwise, as shown in Figure 12 ⑤⑥, to ensure that the cable is securely connected;
- Step 5: Connect the connected AC output terminal to the inverter output terminal, push it forward, until there is a "click" sound, and the terminal is locked in place.
- If it is required to remove the terminal from the equipment, it can be pulled out by a tool inserted in the direction as indicated by the arrow. The same tool can be used to remove the terminal, as shown in Figure 12 ⑩⑧ .

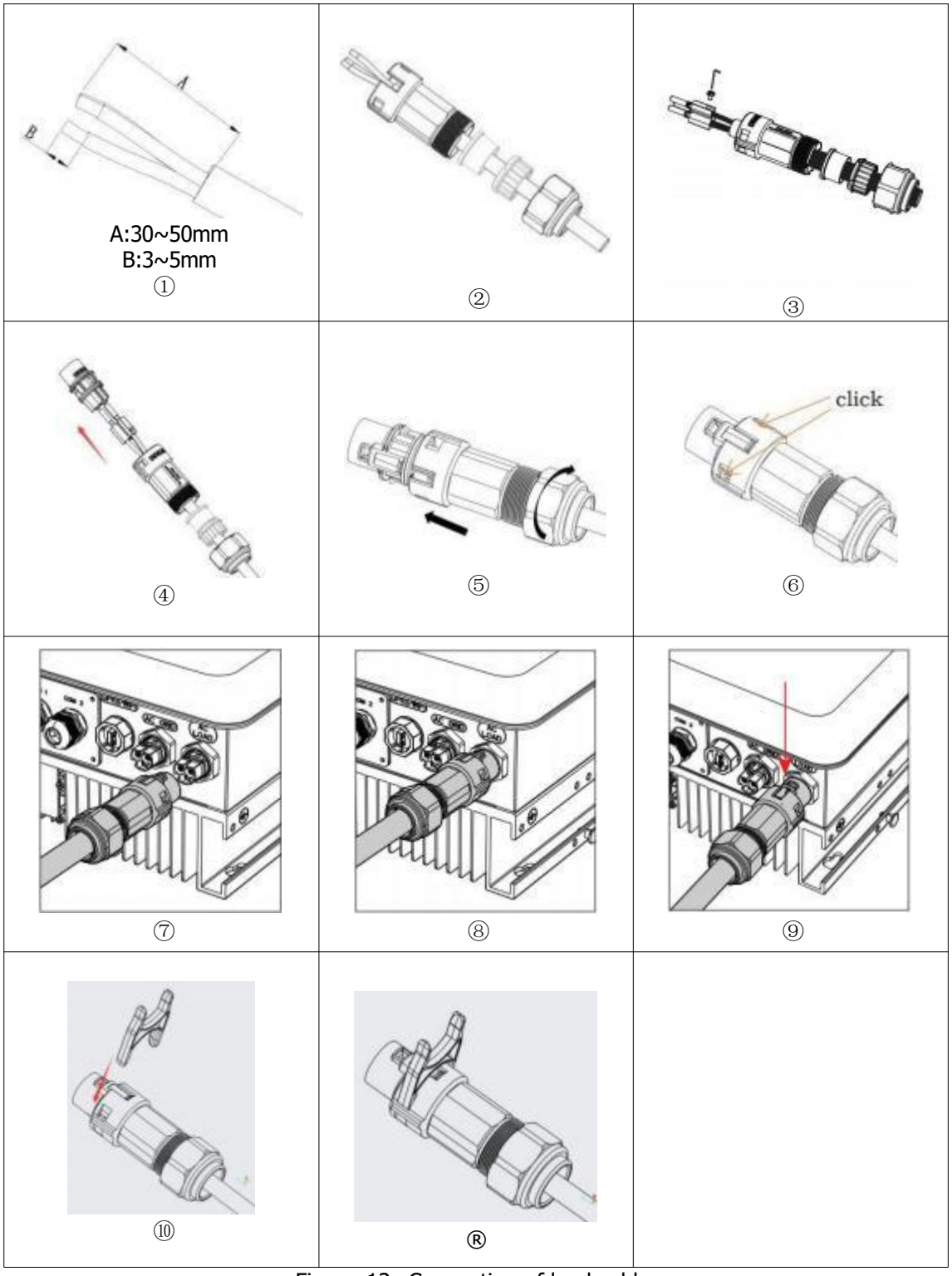


Figure 12: Connection of load cable

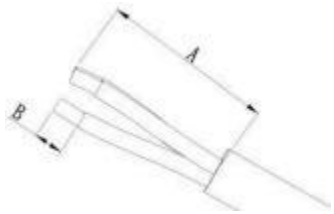
The tighten torque to fix the cable to the AC load connector and grid connector: 4.5±0.5kgf/cm.

4.6 Connection of the AC output cable (GRID)

The inverter is equipped with an integrated leakage current monitoring unit. When the inverter detects a leakage current exceeding 300mA, it will immediately disconnect from the grid for protection. When the external AC switch has the function of leakage protection, the rated leakage action current shall be ⩾ 300mA.

- Step 1: Select the appropriate type and specification of cable according to Table 4-3, and then strip the cable; the specific stripping length shall refer to Figure 13 ①; A: 30~50mm B: 3~5mm
- Step 2: Disassemble the AC terminal as shown in Figure 13 ②, and pass the stripped cable through the waterproof locking nut;
- Step 3: Lock the cable into the locking hole on the terminal as indicated, and fastened with a hexagon socket screwdriver, as shown in Figure 13 ③④;
- Step 4: Insert the output terminal, and when the "click" sound is heard, tighten the waterproof nut clockwise, as shown in Figure 13 ⑤⑥, to ensure that the cable is securely connected;
- Step 5: Connect the connected AC output terminal to the inverter output terminal, push it forward, until there is a "click" sound, and the terminal is locked in place.

If it is required to remove the terminal from the equipment, it can be pulled out by a tool inserted in the direction as indicated by the arrow. The same tool can be used to remove the terminal, as shown in Figure 13 ⑩⑪.

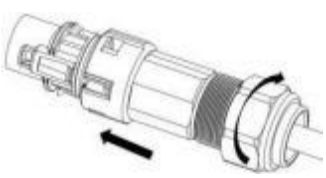


A:30~50mm
B:3~5mm
①

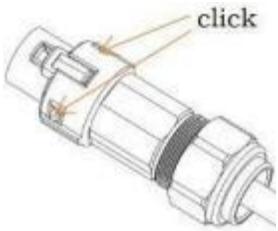
②

③

④



⑤



⑥

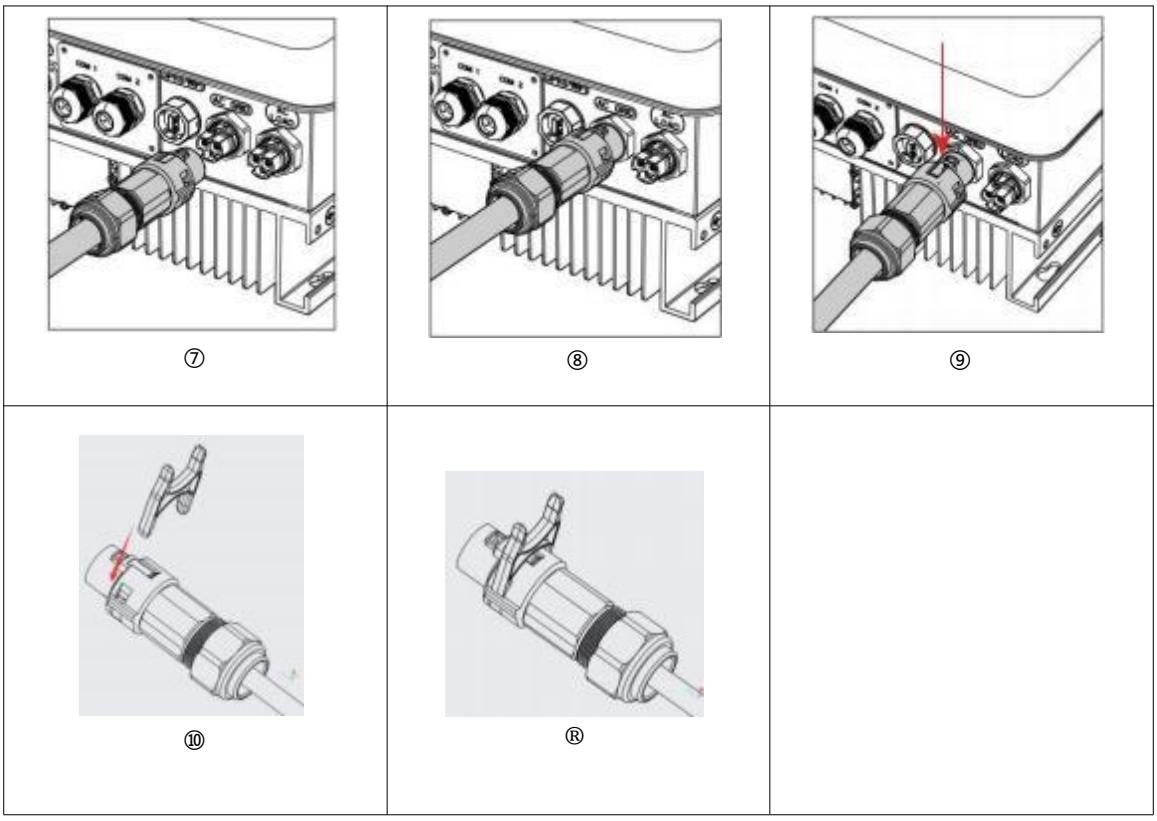


Figure 13: Connection of AC output cable

4.7 Other external interfaces

4.7.1 USB/WIFI communication interface

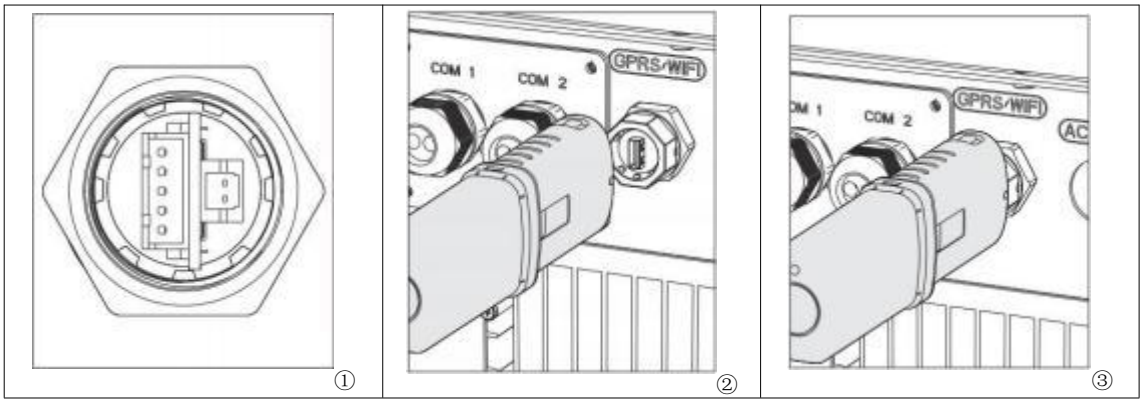


Figure 14: USB/WIFI interface

USB communication interface	USB: USB Flash Drive Access	For inverter firmware upgrade and wave recording
	WIFI/GPRS: WIFI/GPRS Data Collector Access	For remote monitoring and control

Table 7: Interface description

Note: Please refer to the following contents for the use of the collector.

4. Electrical Connection

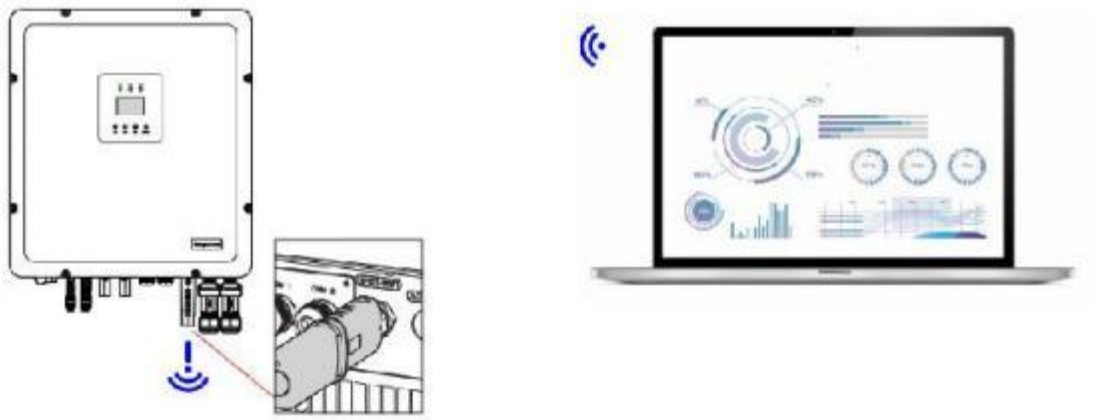


Figure 15:

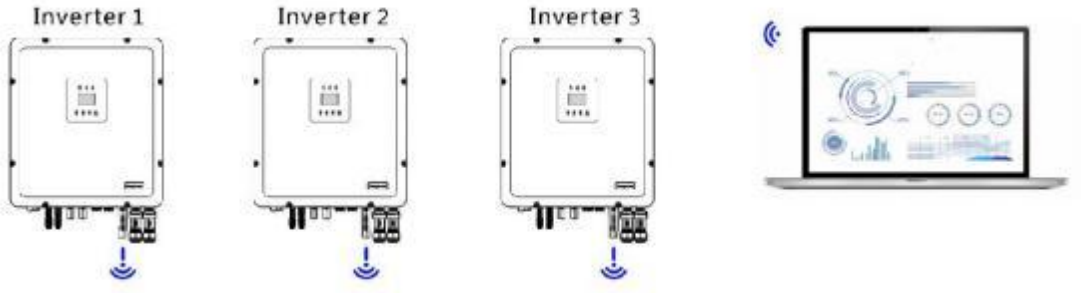


Figure 16:

Running information of the inverter (generating capacity, alarm, running status) can be uploaded to the server via WiFi/GPRS. The user can monitor and view the information with web or APP as required. The user needs to register an account and bind the equipment to WiFi/GPRS serial number. The serial number of WiFi/GPRS shall be attached to the packing box and WiFi/GPRS.

The data monitoring of the inverter is accomplished by the inverter monitoring system. Running information of the inverter(generating capacity,alarm,running status)can be uploaded to the server via WiFi/GPRS.The user can monitor and view the information with web or APP as required.The user needs to register an account and bind the equipment to WiFi/GPRS serial number.The serial number of WiFi/GPRS shall be attached to the packing box and WiFi/GPRS.

Web: https://home.solarmanpv.com(it is recommended to use Chrome58, Firefox49and IE9 or above).

APP: Android customers may search"SOLARMAN"in the App Store.

IOS customers may also search"SOLARMAN"in the App Store,

For specific manual at APP and the website, please visit https://www.solarman.cn.

4.7.2 COM-Multi-functional Communication Interface

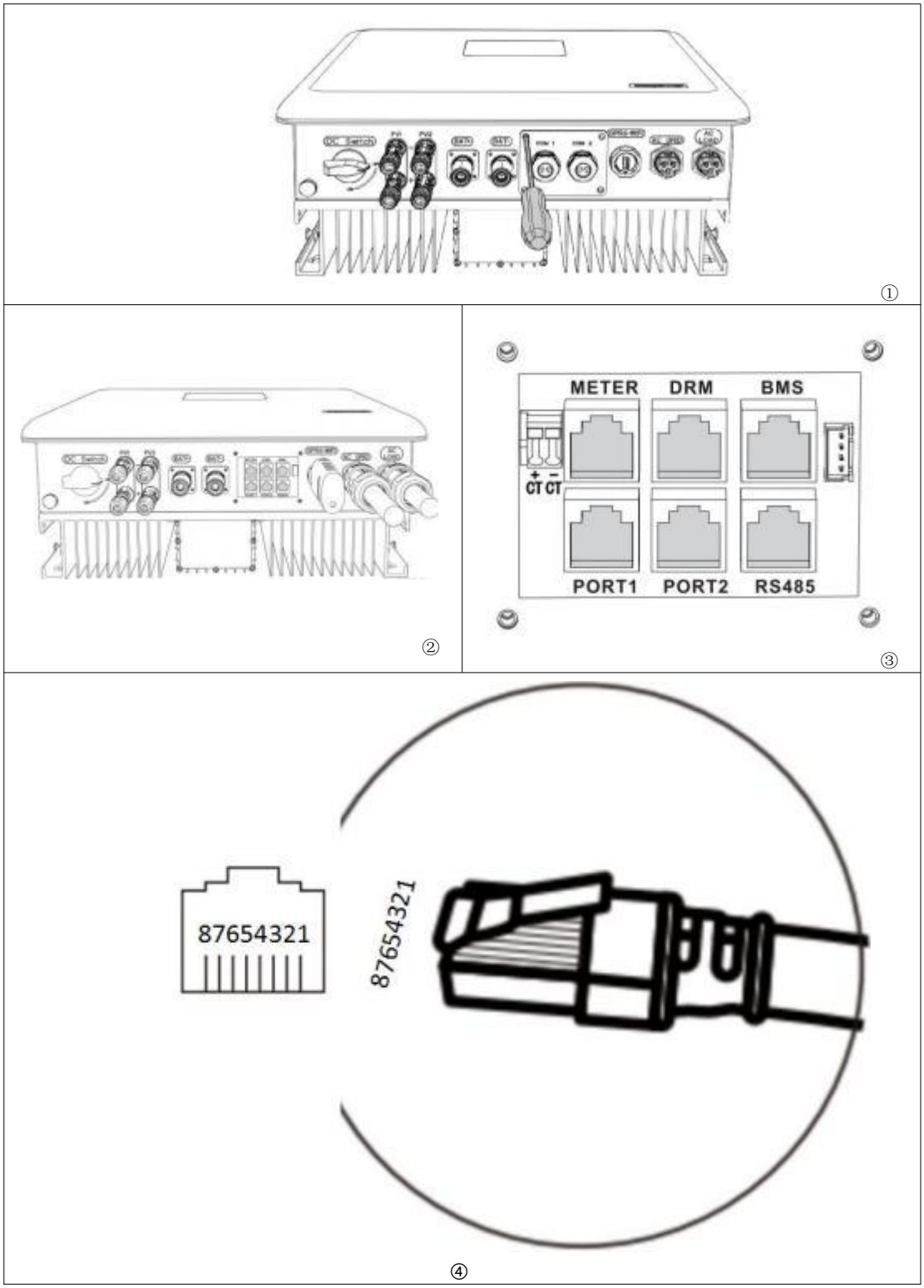


Figure 17: COM Interface

Note: *In the figure17④,the tag on the left represents the pin tag in the crystal slot of the inverter, and the digital tag on the right represents the pin tag on the RJ45 Registered jack inserted into this end of the inverter.*

4. Electrical Connection

No.	METER-PIN
1	METER_485A
2	METER_485B
3	
4	
5	
6	
7	CT1.V
8	CT1_GND1

No.	DRM-PIN
1	DRM1/5
2	DRM2/6
3	DRM3/7
4	DRM4/8
5	REF GEN/0
6	COM LOAD/0
7	V+
8	V-

No.	BMS-PIN
1	CANAL
2	CANAH
3	
4	
5	
6	
7	BMS_485A
8	BMS_485B

No.	PORT1-PIN
1	CANAL_SYNC
2	CANAH_SYNC
3	COM_GND
4	INV_SYNC-
5	INV_SYNC+
6	CARRER_SYNC-
7	CARRER_SYNC+
8	

No.	PORT2-PIN
1	CANAL_SYNC
2	CANAH_SYNC
3	COM_GND
4	INV_SYNC-
5	INV_SYNC+
6	CARRER_SYNC-
7	CARRER_SYNC+
8	

No.	RS485-PIN
1	D_485A1
2	D-485B1
3	
4	
5	
6	
7	
8	

Table 8: Description of PIN for crystal slots

- **METER crystal slot: meter/CT (the meter is optional)**

METER crystal slot interface is used for meter communication, and the meter is shown in Figure18. ①. PIN1 and PIN2 correspond to 24 and 25, as shown in Figure18. ③. The connection mode is shown in Figure18.②, and 1 and 2 of the electric meter are connected to the inverter's L and N respectively, 3 and 4 of the electric meter are connected to the grid's L and N respectively.The connection and use of smart meters not only require electrical connections, but also the input of communication addresses on the screen(The specific operations on the screen please refer to 6.3.1>5.Zero Export to Grid>Meter Address).

If the user needs to use the CT alone, please connect the CT to METER PIN7 and PIN8 via the RJ45 crystal header.Alternatively, connect the white wire of CT to CT+and the black wire of CT to CT - through dry contacts (see Figure 17 ③).

Note: The inverter must be connected to CT or meter to enable anti-reflux function. Otherwise, the feed
power cannot be controlled.

Note: *The direction of the current transformer is shown in Fig. ④, arrow pointing from inverter to power grid.*

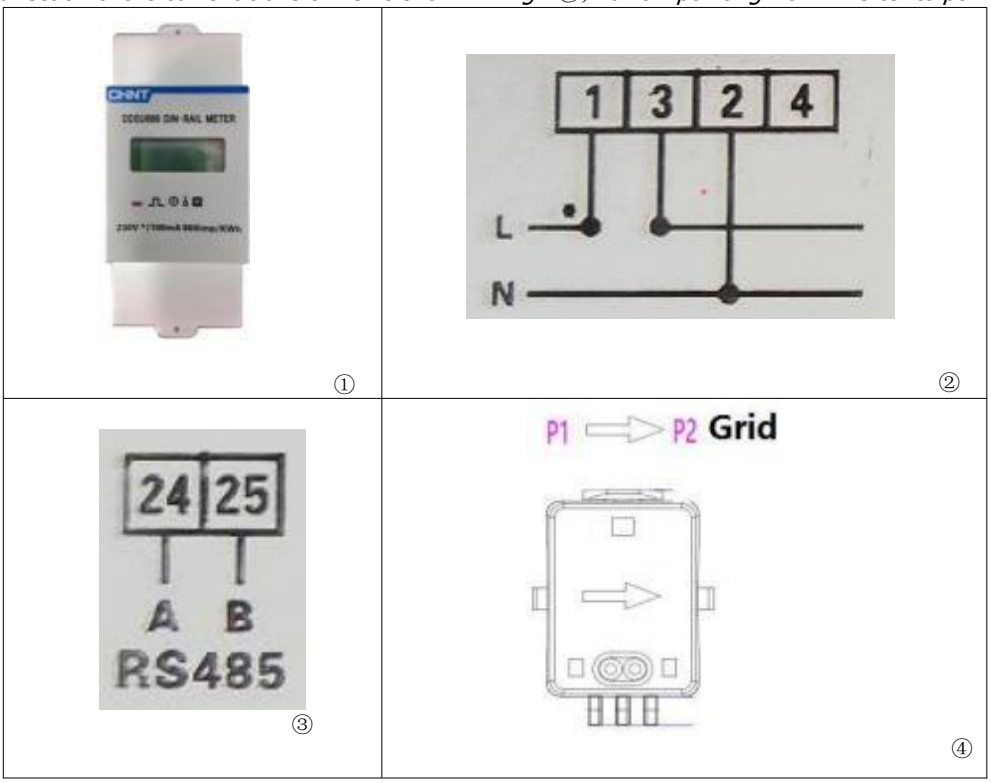


Figure 18 : Electric meter

There are two ways to obtain current information of the grid: Mode A: CT; Mode B: Electric meter +CT.

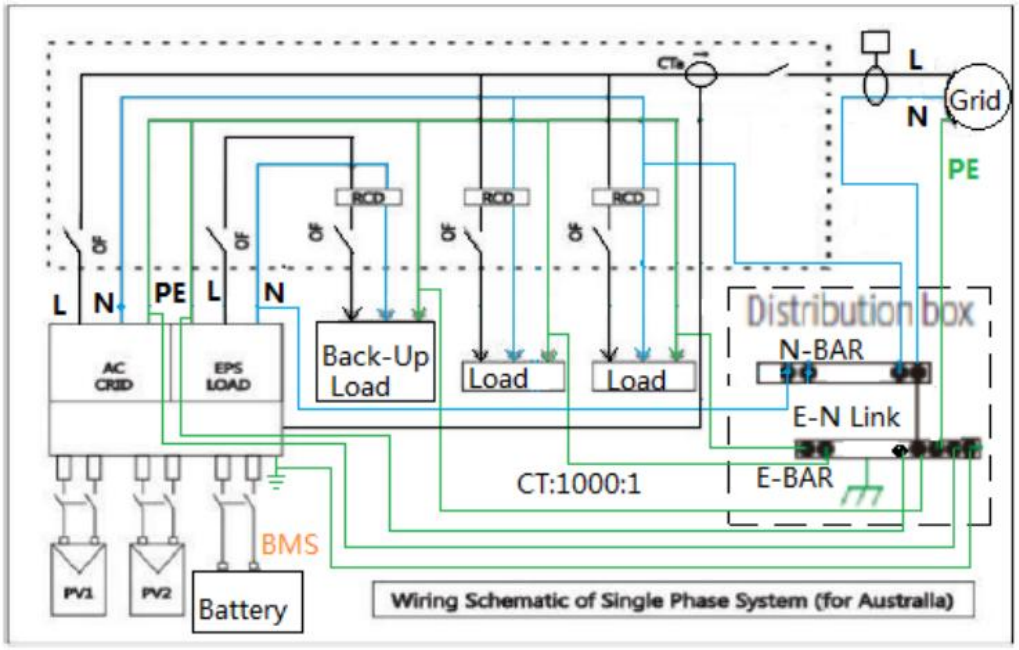


Figure 19: Electrical connection mode (Mode A:CT)

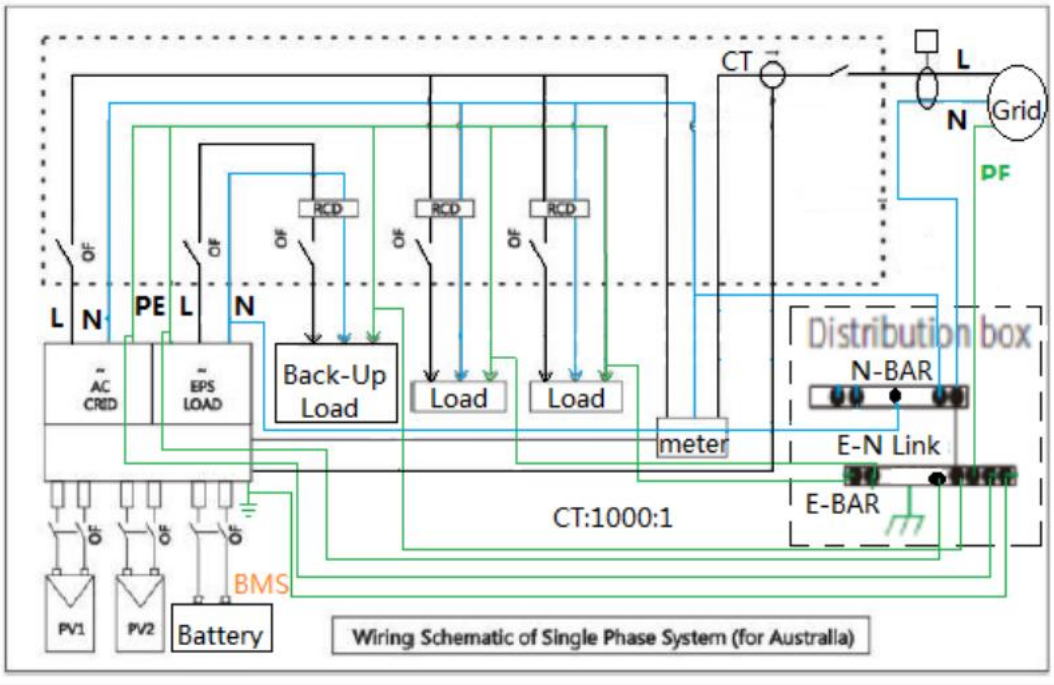


Figure 20: Electrical connection mode (Mode B: Electric meter +CT)

BMS crystal slot: Battery communication interface

Our inverter has two methods communicate with the battery: CAN and RS485.

If you want to select the RS485 communication method, please connect the corresponding RS485 pin in the BMS crystal slot on the inverter and the RS485 pin in the RS485 crystal slot on the battery pack for communication with the inverter through the RJ45 Registered jack and the communication line.The CAN

communication method is the same, just connect the communication pins in the corresponding communication crystal slot together.

Note: *Please refer to the battery manual of the battery pack you purchased for the definition of the communication crystal slot pin on the battery pack.*

Note: *The inverter must be connected to CT or meter to enable anti-reflux function. Otherwise, the feed power cannot be controlled.*

- **RS485 crystal slot: Wired monitoring or inverter cascade monitoring**

As shown in the figure, D_485A1 and D-485B1 of RS485 crystal slot of the inverter can be connected to TX+ and TX- of RS485→ USB adapter with the RJ45 crystal head, which can also connect USB port of the adapter to the computer. (Note: The length of RS485 communication cable is recommended to be less than 3m).

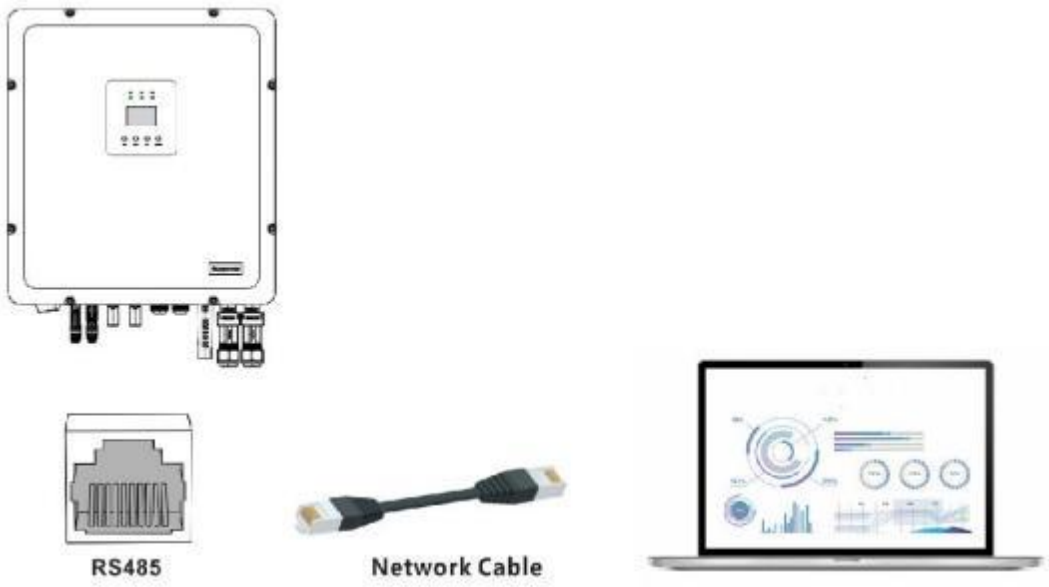


Figure 22

The RS485 lines are connected in parallel between the inverters, (Note: when multiple inverters are connected via RS485 lines, the communication address can be set to distinguish between different inverters, please refer to 6.3.1 System setting> 5.Configuration of communication parameters>1.Communication address> in the Manual).

4. Electrical Connection

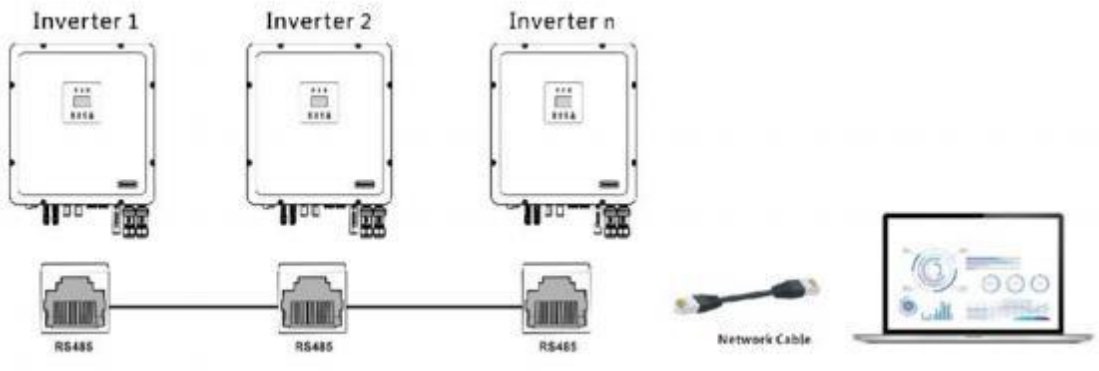


Figure 23: RS485 connection (cascade monitoring between inverters)

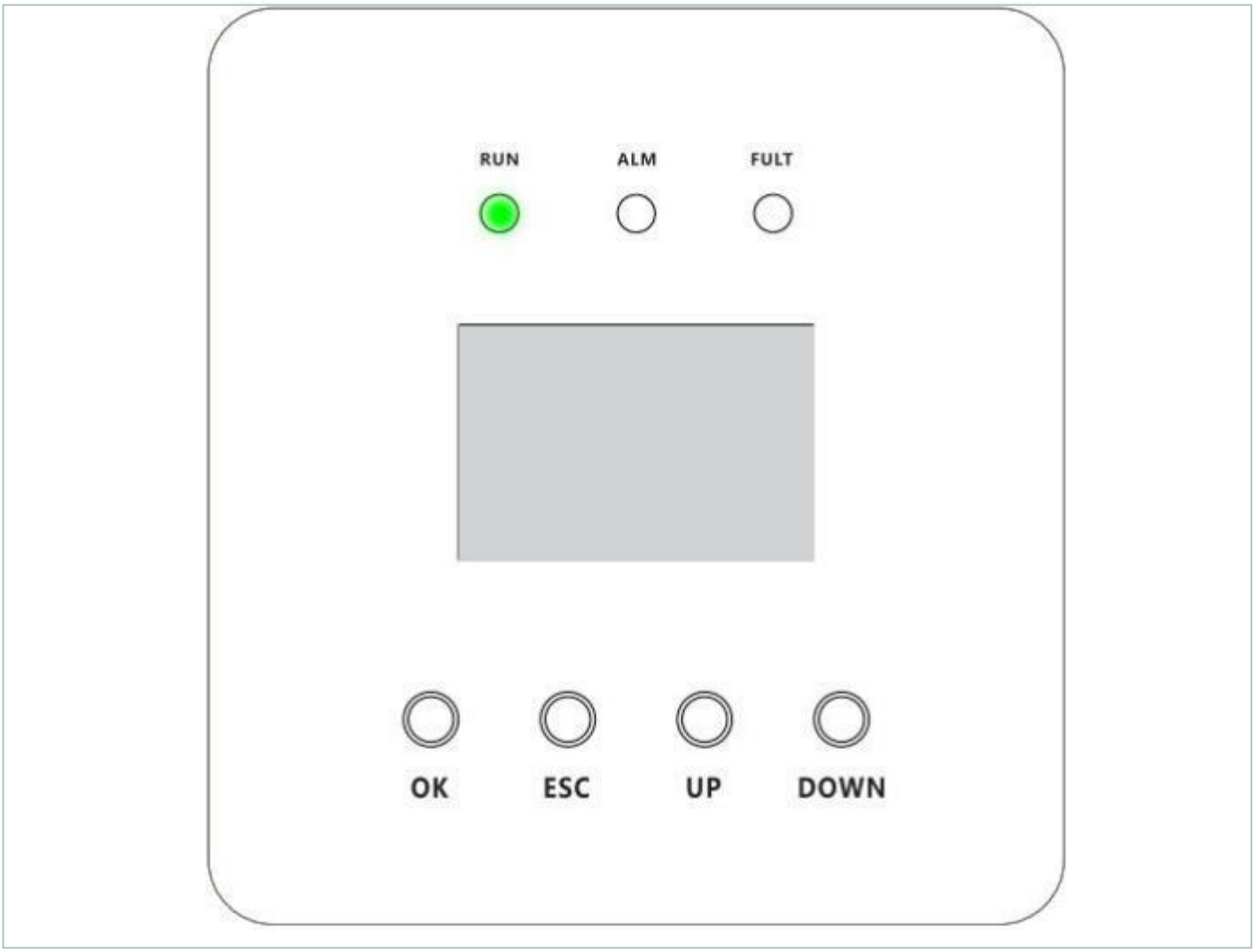


Figure 24: Keys and Indicator lights

5.Keys and indicator lights

5.1 Keys

- Press **"Esc"** to return to the previous menu.
- Press **"Up"** to return to the menu on the previous page or digit +1.
- Press **"Down"** to the menu on the next page or digit -1.
- Press **"OK"** to select the current menu option or switch to the next digit

5.2 Indicator lights and their status

Status	**RUN** **Green Light**	**ALM** **Yellow Light**	FULT Red Light
Normal Run	Always On		
Alarm		Always On	
Fault			Always On

6. Trial operation

6.1 Recheck

The following should be rechecked before operation.

- The inverter is securely bracket mounted on the wall.
- PV+/PV- lines are firmly connected, with correct polarity and the voltage within the accessible range.
- The BAT+/BAT lines are firmly connected, with correct polarity and voltage within the accessible range.
- A DC switch in the disconnected state is correctly connected between the battery and the inverter.
- The power grid/load cable is firmly/correctly connected.
- An AC circuit breaker in a disconnected state is correctly connected between the power grid port of inverter and the power grid.
- An AC circuit breaker in a disconnected state is correctly connected between the load port of inverter and the emergency load.
- Ensure that the communication cable is properly connected for the lithium battery.

6.2 Initial power on (important)

Important note: turn on the inverter by following the steps below.

- Ensure that the phase connected to the inverter does not generate electricity.
- Turn on the DC switch.
- Turn on the battery, and the DC switch between the battery and the inverter.
- Turn on the AC circuit breaker between the power grid port of inverter and the power grid.
- Turn on the AC circuit breaker between the load port of inverter and the emergency load.
- The inverter now starts working.

6.Trial operation

It is required to set the following parameters before starting the inverter.

Parameters	Remarks
1. Selection of menu language	English by default.
2. Setting and confirmation of system time	The time should have been calibrated to local time as long as the upper computer such as the collector or mobile APP has been connected.
3. Import of safety regulation parameters	You are required to locate the safety regulation parameters file (named after the corresponding safety regulations) on the website, enter the inverter regulation parameters setting interface and set it by yourself.
4. Set PV Mode	Select PV mode based on the connection method: 1. A set of photovoltaic panel outputs are connected to the inverter in two ways, and the parallel mode is selected. 2.Two sets of photovoltaic panel outputs are connected to the inverter to select independent mode.
5. Set Battery type	1. Using a battery with communication protocol, select Idx1 Idx2 or ... 2. Using lead-acid or no communication protocol, select Custom Remark: lead-acid setting is not applicable to Australia market. (see 6.3. 1>3.Battery Parameters>1.Battery Type)
6. Setting completed	

Figure 25: Parameters and Remarks

6.3 Menu

Main interface

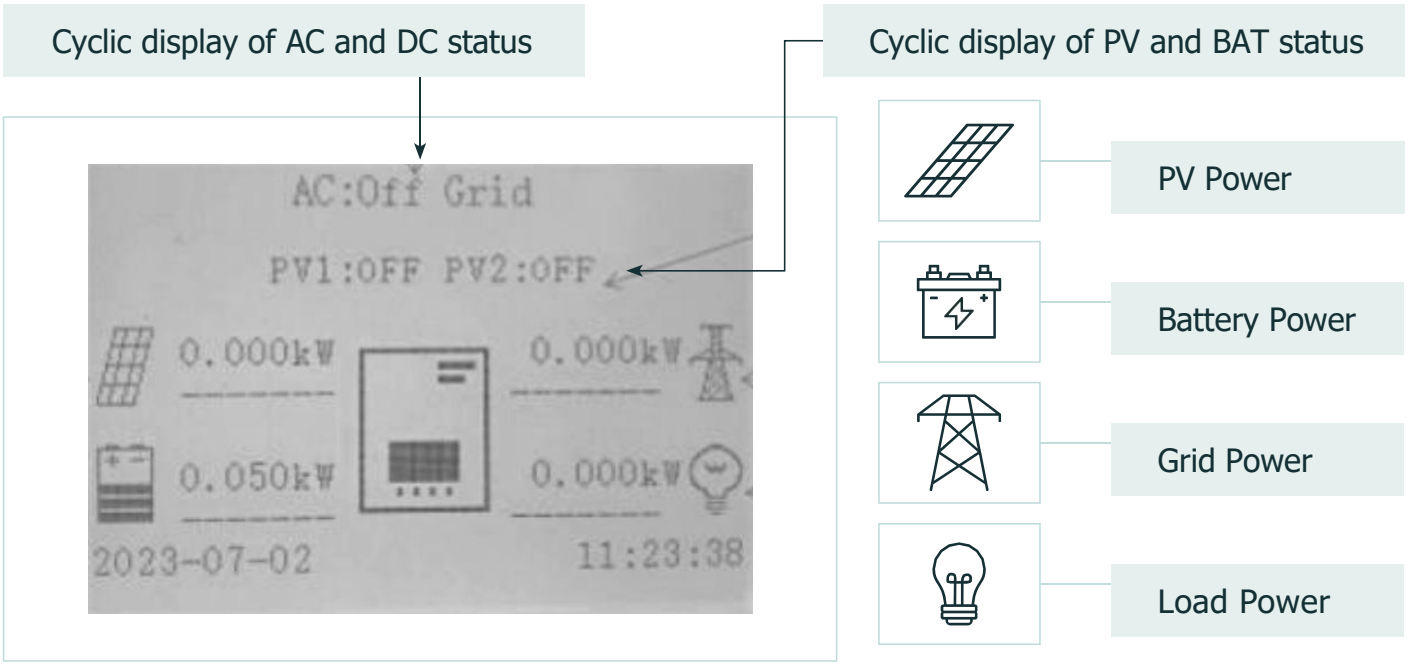


Figure 26: Main interface

Press the button " Down" (↓) on the main interface to enter the power grid/battery parameter page.

Main interface	**Press 'Down' (↓)**	**Grid Information**
		Grid Voltage---------- ***.*V
		Grid Current---------- **.*A
		Grid Frequency---------- **.**Hz

Grid Information	**Press 'Down' (↓)**	**Battery Information**
		BAT Voltage---------- ***.*V
		BAT Current----------**.*A
		BAT Power----------**.***kW
		BAT Temperature---------- ***.* °C
		BATSOC----------**%

Battery Information	**Press 'Down' (↓)**	**Load Information**
		Load Voltage ---------- ***.*V
		Load Current---------- **.*A
		Load Power ---------- **.***kW
		Load Apparent Power ---------- *.***kVA
		Load Percentage ---------- %

Enter the PV parameter page by pressing the " Up" button on the main interface.

Main interface	**Press 'Up' (↑)**	**PV Information**
		PV1 Voltage---------- ***.*V
		PV1 Current---------- A
		PV1 input power ---------- kW
		PV2 voltage ---------- V
		PV2 current---------- A
		PV2 input power ----------kW

PV information	**Press 'Up' (↑)**	**Heat-Sink Temperature**
		AC Heat-Sink Temperature 1----------***.*°C
		AC Heat-Sink Temperature 2 ----------***.*°C
		DC Heat-Sink Temperature 1----------***.*°C
		DC Heat-Sink Temperature 2 ----------***.*°C

Press the "OK" button on the main interface to enter the main menu page that includes the following 6 options.

Main interface	**Press 'OK'**	1.System settings
		2. Advanced Settings
		3. Energy statistics
		4. System Information
		5. Event List
		6. USB Update

6.3.1 System setting

System setting	**OK**	1. Language
		2. ESS Mode
		3. Battery Parameters
		4. Regulation Parameters
		5. Zero Export to Grid
		6. System Time

Statement: Australia grid code cannot be set under Regulation parameters.

Language

1.Language	**OK**	1.中文
		2.English
		……

ESS mode

2. ESS mode	**Press 'OK'**	1. Feed-In Priority
		2. Self Use mode
		3. Back-Up mode
		4. Off-Grid mode
		5. Economic mode

1.Feed-In Priority mode

PV energy is prioritized for power grid, the excess energy is used to charge the battery, and if any remaining energy is available, maximum power point tracking (MPPT) is not implemented for PV. PV and battery energy is always the preferred energy for loads, followed by the grid energy.

2.Self Use mode

PV energy is prioritized for loads, the excess energy is used to charge the battery, and the remaining is reserved for the power grid. PV and battery energy is always the preferred energy for loads, followed by the grid energy.

3.Back-Up mode

PV energy is prioritized for loads, and if no loads, PV and grid energy are prioritized for battery charging. No power is supplied to the grid before the battery is fully charged.

4.Off-Grid mode

Do not support grid-connected mode in Off-Grid state

5.Economic mode

5. Economic mode	**Press 'OK'**	CHG Start----------00h00m
		CHG End----------00h00m
		DSG Start----------00h00m
		DSG End----------00h00m

Back-Up mode and Feed-In Priority mode are enabled during charging and discharging respectively, and Self Use mode lies between the two modes.

- **Battery Parameters**

3.Battery parameters	**Press 'OK'**	1. Battery Type
		2. C.V. Charging Volt
		3. Floating Charging Volt
		4. Max. Charging Curr

		5. Max. Discharging Curr
		6. Depth of Discharging
		7. EPS Depth of Discharging
		8. EPS Depth of Recovery

NOTE:
1. In the on grid state, if the battery's SOC is less than or equal to (1-DOD) ,it will no longer discharge.
2. In the off grid state, the DOD does not have any effect, the battery can discharge to 0%.
3. In the off grid state, if the battery SOC is less than (1-EPS DOD), connected to the grid, the inverter will prioritize charging the battery to EPS DOR. After that enter the previously set ESS mode again.
4. In the off grid state, if the battery SOC is greater than (1-EPS DOD), connected to the grid, the inverter will directly enter the previously set ESS mode.
The setting needs to follow the following logic: EPS DOD>EPS DOR>DOD.

1. Battery Type	**Press 'OK'**	**Custom**
		Idx1
		Idx2

- **Regulation Parameters**

4. Regulation Parameters	**Press 'OK'**	EN50549
		Custom

Custom	**Press 'OK'**	Frequency ----------**Hz
		OVP1----------***.*V
		OVP2----------***.*V
		UVP1----------***.*V
		UVP2----------***.*V
		OFP1----------**.**Hz
		OFP2----------**.**Hz

		UFP1----------**.**Hz
		UFP2----------**.**Hz
		OVP10mins----------***.*V

- **Zero Export to Grid**

5. Zero Export to Grid	Press 'OK'	Zero Export Ctrl	Enable
		Zero Export Power	6000W
		Zero Export Mode	
		Meter Address	
		CT Calibration	
Zero Export Mode	**Press 'OK'**	1. CT	
		2. Meter	
Meter Address	**Press 'OK'**	Meter Address	
		00 00 00 00 00 00	
CT Calibration	**Press 'OK'**	1. CT Current Samp.	0.0A
		2. Calibration Para.	32
		+ -	

Zero Export Ctrl option Enable

Zero Export Power represents the maximum power allowed for on-grid.

Please select meter for Zero Export Mode to connect to the electricity meter.

There are 6 two-digit numbers（exp：22 09 23 34 34 65） under the barcode on the side of the meter. Please input these 6 two-digit numbers from left to right in sequence onto the display screen（exp：22 09 23 34 34 65).

Please clamp the clamp current meter onto the L-line connected to the power grid and continuously adjust the Calibration Para parameters(This value has no units or meaning, just to show that the click is
recognized) using the+- button until the CT Current Samp value matches the clamp current meter

value. The calibration is completed and the save is exited.

- **System Time**

6. System time	**Press 'OK'**	**System time**
		2023-05-20 13:14:20

6.3.2 Advanced settings

2. Advanced settings	**Press 'OK'**	**Please input password**
		0 0 0 0

Enter password 1000, press OK to start password entry, select numbers with Up and Down, and then press OK to switch to the next digit. In case of a wrong selection, press Esc to exit and press OK again to start configuring the password from the first digit. You will be redirected to the Advanced Settings page after entering a correct password.

2. Advanced settings	**Press 'OK'**	**1.ON/OFF Ctrl**
		2.PV Mode
		3.Lithium BAT Activate
		4.Anti-Islanding Ctrl
		5.Bypass Mode
		6.Parallel Settings
		7.Clear Energy Generation Record
		8.Clear Event Log
1. ON/OFF Ctrl	**Press 'OK'**	1. OFF
2. PV Mode	**Press 'OK'**	1. Independent Mode
		2. Parallel Mode
3.Lithium BAT Activate	**Press 'OK'**	1. Confirm
		2. Cancel
4.Anti-Islanding Ctrl	**Press 'OK'**	1. Enable
		2. Disable
5.Bypass Mode	**Press 'OK'**	1. Enable

		2. Disable
6.Parallel Settings	**Press 'OK'**	1.Parallel Mode
		2.Parallel Address
7.Clear Energy Generation Record	**Press 'OK'**	1. Confirm
		2. Cancel
8.Clear Event Log	**Press 'OK'**	1. Confirm
		2. Cancel

6.Parallel Settings

1.Parallel Mode	**Press 'OK'**	1.Single Machine
		2.Parallel Operation
		3.Three-phase P1
		4.Three-phase P2
		5.Three-phase P3

When the inverter are used in parallel with single phase. Please select " Parallel Operation" .It is required to have maximum 6 inverters to support single phase equipment.

When the inverter are used in parallel with three-phase.It is required to have at least 3 inverters or maximum 6 inverters to support three-phase equipment.It's required to have at least 1 inverter in each phase or it's up to 4 inverters in one phase.

Please select "Three-phase P1" for the inverters connected to L1 phase;

Please select "Three-phase P2" for the inverters connected to L2 phase;

Please select "Three-phase P3" for the inverters connected to L3 phase.

Statement：Parallel setting is not used for Australia market. Inverter has not been tested to AS/NZS 4777.2:2020 for multiple inverter combinations and/or multiple phase inverter combinations.

2.Parallel Address	**Press 'OK'**	Address 1
		Address 2
		Address 3
		Address 4

		Address 5

Please set inverters connected to the same parallel system to different parallel addresses. The default address 1 is the master, while others are the slaves.
Before starting up inverters, please connect all N wires of AC output together.

6.3.3 Energy statistics

3. Energy statistics	**Press 'OK'**	Daily
		Energy Generation
		Sales
		Purchase
		Load Consumption

Daily	Press **'Down'**	Monthly
		Energy Generation
		Sales
		Purchase
		Load Consumption

Monthly	Press **'Down'**	Yearly
		Energy Generation
		Sales
		Purchase
		Load Consumption

Yearly	Press **'Down'**	Total
		Energy Generation

		Sales
		Purchase
		Load Consumption

6.3.4 System Information

4. System information	**Press 'OK'**	1. Inverter information

1. Inverter information	Press **'Down'**	S/N
		PMUS/W VER
		MCU1 S/W VER
		MCU2 S/W VER
		Regulation
		Rated Power

6.3.5 Event List

Fault message can be displayed on the Event List Query interface once the inverter fails. The event list shows the a record of currently generated evens, including the events, and the specific name and time of each event. Users may view detailed information of real-time event record after entering the event list interface via the main interface. Events are listed by their occurrence time, with the most recent ones listed first.

5. Event list	**Press 'OK'**	1. Current fault message
		2. Historical fault message

1. Current fault message	**Press 'OK'**	Fault info	Time of occurrence
2. Historical fault message	Press 'OK'	Fault info	Time of occurrence

6.3.6 USB Update

6.Trial operation

Software can be upgraded through a USB flash drive for inverter to maximize inverter performance and avoid abnormal operation due to software bugs.

The folder name of upgrade file is firmware , including three upgrade files: AM. bin, DM.bin, PM.bin.

- Step 1: Insert the USB flash drive into the computer.
- Step 2: We will send the upgraded firmware to the users in need. After receiving the files, users may unzip and save it on a USB flash drive.
- Step 3: The inverter interface only displays the first four BIN files in the USB flash drive at most.
- Step 4: Insert the USB flash drive into the USB/WiFi interface of the machine.
- Step 5: Turn on the DC switch.
- Step 6: Select the BIN software to update.

6. Software upgrade	**Press 'OK'**	602AM117.bin
		602DM117.bin
		602PM117.bin
		...

- Step 7: Select the BIN software to update.

602AM117.bin	**Press 'OK'**	Upgrade Module: MCU 1
		Upgrade Status: Receiving/Loading
		Total Packages:
		Current Package:
602DM117.bin	**Press 'OK'**	Upgrade Module: MCU 2
		Upgrade Status: Receiving/Loading
		Total Packages:
		Current Package:
602PM117.bin	**Press 'OK'**	Upgrade Module:
		Upgrade Status: Receiving/Loading
		Total Packages:
		Current Package:

- Step 8: Upon the completion of upgrading, turn off the DC switch to wait for the LCD screen off, then restore WiFi connection, and turn on the DC and AC switches again. The inverter will start running. Users can view the current software version in System Information>>Inverter Information.

6.3.7 Other settings

Selecting Australia Region A/B/C for grid protection settings and power quality response modes settings. These settings are protected by password and unauthorized person cannot change the setpoints.

- Step 1: Press OK button to enter the system interface.
- Step 2: Enter into the system setting.
- Step 3:Choose safety parameters.
- Step 4: Enter the administrator password.
- Step 5: Select the AS/NZS.

Adjusting grid protection settings and power quality response mode setpoints. Since this setting needs to be operated through the host computer, these settings are protected and unauthorized person cannot change the setpoints.

- Step 1: Connect to the host computer. （Only administrator can proceed this proceed.）
- Step 2: Switch to the protection setting parameters and power quality response mode parameters pages.
- Step 3: Click to read.
- Step 4: Modify the protection parameters and power quality response setting values.
- Step 5: Click to write.

6.3.8 Viewing inverter settings

Statements: Unauthorized people can only read below setpoints.

Country Grid Code/Region settings

- Step 1: Press OK button to enter the system interface.
- Step 2: Enter into the system information.
- Step 3: Read the Country Grid Code/Region settings.

Power quality response modes settings

- Step 1: Connect to the host computer. （Only administrator can proceed this step. If you need to know/read this information, please contact your dealer to obtain it.）
- Step 2: Switch to the interface for setting parameters and power quality response mode parameters.
- Step 3: Click to read.

6.Trial operation

Grid Protection settings

- Step 1: Connect to the host computer. （Only administrator can proceed this step. If you need to know/read this information, please contact your dealer to obtain it.）
- Step 2: Switch to the parameter configuration interface.
- Step 3: Read the AC protection parameters.

Inverter firmware version

- Step 1: Press OK button to enter the system interface.
- Step 2: Press the DOWN key to select system information.
- Step 3: Press the OK button to enter the system information interface.
- Step 4: Click to read firmware version information.

7. Troubleshooting and Maintenance

7.1 Troubleshooting

- This section helps users identify the causes of possible faults. Please read the following troubleshooting steps carefully:

View the warning or error messages and error codes on the display screen, and record all error messages.

If no error prompt is available on the inverter's display screen, confirm whether the current installation status meets the requirements for correct inverter operation through the following steps:

- ✓ Is the inverter installed in a clean, dry, and well ventilated location?
- ✓ Is the DC switch disconnected?
- ✓ Does the cable's cross-section and length meet the requirements?
- ✓ Are the input and output connections and wiring in good condition?
- ✓ Are the configuration settings correct for users' specific installation ?
- ✓ Is the display panel and communication cable properly connected without damage?

- Viewing the recorded fault message according to the steps below: By pressing " Esc" on the main interface, enter the main menu, select the " Event List" and then press "OK" .

- Grounding fault alarm

The inverter complies with the monitoring of grounding fault alarm in clause 13.9 of IEC 62109-2.

In case of a grounding fault alarm, the fault will be displayed on the LCD screen with red light illuminated, and the fault can be found in the fault history. If a machine with WiFi/GPRS data collector is installed,
alarm message can be viewed on the corresponding monitoring website or received through the APP on the phone.

- List of Fault Message(red light)

ID No.	Name of Events	Solution
1	Load Volt Samp. Err	Internal failure of the inverter, turn off the inverter, wait for 10 minutes, and then turn on the inverter. Check if the problem has been resolved. If not, please contact technical support.
2	Grid Curr Samp. Err	
3	Leak Curr Samp. Err	

4	Grid Curr DCC Samp. Err	
5	Isolation Err	
6	On Grid Curr DCCOC Prot.	
7	AC BUS Peak OV	
8	Inv CHG Peak OC	
9	Over Load Level 1 Prot.	Please check if the inverter is operating in an overload state. If so, please reduce the load power and restart it.
10	Over Load Level 2 Prot.	
11	Over Load Level 3 Prot.	
12	AC BUS RMS OV	Internal failure of the inverter, turn off the inverter, wait for 10 minutes, and then turn on the inverter. Check if the problem has been resolved. If not, please contact technical support.
13	Off Grid Volt DCCOV Prot.	
14	Leak Curr Fault	
15	AC Heat-Sink 1 Over Temp.	Please ensure that the inverter is installed in a place without direct sunlight, and ensure that the inverter is installed in a cool and well ventilated place. Ensure that the inverter is installed vertically and the ambient temperature is less than the upper limit of the inverter's temperature.
16	AC Heat-Sink 2 Over Temp.	
17	AC Comm. Fault with PMU	
18	AC Comm. Fault with DC	Internal failure of the inverter, turn off the inverter, wait for 10 minutes, and then turn on the inverter. Check if the problem has been resolved. If not, please contact technical support.
19	AC BUS Hardware OV	
20	Soft Start Fault	
21	Inv Volt UV	
22	Inv Volt OV	
23	AC BUS RMS UV	
24	Short Circuit Prot.	Check if there is a short circuit between the output cable and the load. If not, please contact the seller to apply for technical support.

25	AC BUS Peak UV	Check if the output load is too large and if the battery is in a low state.
26	Inv DSG Peak OC	
27	PV1 OV	Check if the PV string voltage (Voc) is higher than the maximum input voltage of the inverter. If so, adjust the number of PV modules in series to reduce the PV string voltage to adapt to the input voltage range of the inverter.
28	PV2 OV	
29	PV1 OC	
30	PV2 OC	
31	BUCK/BOOST1 Curr Samp. Err	
32	BUCK/BOOST2 Curr Samp. Err	
33	DC BUS Peak OV	Internal failure of the inverter, turn off the inverter, wait for 10 minutes, and then turn on the inverter. Check if the problem has been resolved. If not, please contact technical support.
34	DC BUS RMS OV	
35	DC BUS Hardware OV	
36	BUCK/BOOST1 S/WOC Prot.	
37	BUCK/BOOST2 S/WOC Prot.	
38	DC Comm. Fault with PMU	
39	DC Comm. Fault with AC	
40	BMS Comm. Fault	Check if the communication line is installed correctly. If it is installed correctly, it may be an internal fault of the inverter. Please contact the seller to apply for technical support.
41	DC Heat-Sink 1 Over Temp.	Please ensure that the inverter is installed in a place without direct sunlight, and ensure that the inverter is installed in a cool and well ventilated place. Ensure that the inverter is installed vertically and the ambient temperature is less than the upper limit of the inverter's temperature.
42	DC Heat-Sink 2 Over Temp.	
43	LLC 1 OV	
44	LLC 2 OV	
45	LLC 1 RMS OV	
46	LLC 2 RMS OV	

47	BAT Curr Samp. Err	Internal failure of the inverter, turn off the inverter, wait for 10 minutes, and then turn on the inverter. Check if the problem has been resolved. If not, please contact technical support.
48	BAT Volt OV (Quick Break)	
49	BAT CHGOC (Quick Break)	
50	BAT CHGOC Prot.	
51	BAT DSGOC Prot.	
52	BAT OV Prot.	
53	BAT UV Prot.	
54	EEPROM Fault	
55	PMU Comm. Fault with DC	
56	PMU Comm. Fault with AC	
57	Inconsistent S/W Version	
58	Inv CHG RMS OC	
59	Inv DSG RMS OC	
60	AC Relay Fault	
61	DC Relay Fault	

7. Troubleshooting and Maintenance

- List of ALM Message(yellow light)

ID No.	Name of Events	Solution
1	Meter Comm. Fault	Connecting the meter will clear the fault.
2	BAT UV Alarm	The fault will be cleared after charging the battery.
3	Inverter Shutdown	Shutdown signal.
4	RTC Clock Fault	Internal failure of the inverter, turn off the inverter, wait for 10 minutes, and then turn on the inverter. Check if the problem has been resolved. If not, please contact technical support.

- List of Other Important Fault Message

ID No.	Name of Events	Solution
1	Grid Peak OV	After the power grid is normal, the inverter will clear the fault.
2	Grid Over Frequency	
3	Grid Under Frequency	
4	Grid Over Volt	
5	Grid Under Volt	
6	Grid Disconnect	
7	Islanding Prot. Fault	
8	OT Load Reduction of rad	The fault will be cleared after the Heat-sink temperature drops
9	Grid Frequency Decrease Load	After the power grid is normal, the inverter will clear the fault.
10	Grid Frequency Increase Load	
11	Grid Volt Decrease Load	
12	Grid Volt Increase Load	
13	Grid OV Over 10 min	
14	Relay Ctrl Fault	The inverter will reclose on its own.

15	WIFI Fault	Check if WiFi is installed correctly.

Generally, inverters require no maintenance or calibration, but their fins should be protected against dust, dirt, etc.

- **Cleaning the inverter:**

An electric compressed hair dryer, dry soft cloth, or a soft bristled brush, instead of water, corrosive chemicals, cleaning agents, or strong detergents, should be used to clean the inverter.

- **Cleaning the fins:**

To ensure the normal function and long-term service life of the inverter, a sufficient airflow space must be provided around the radiator at the rear of the inverter. No articles that obstruct airflow around the fins, like dust or snow, are allowed and, if any, they must be removed. The fins should be cleaned by compressed air, a soft cloth, or a soft bristle brush, instead of water, corrosive chemicals, cleaning agents, or strong detergents.

- **Fan maintenance frequency:**

The internal turbulence fan needs to be maintained every two years.

- **Shutdown and maintenance procedure:**

The inverter can be shut down normally through steps 1 to step 5.

- Step 1: Click the OK button on the LCD screen to enter the system interface.
- Step 2: Select "Advanced Settings" on the main interface.
- Step 3: Press the OK key to select the password to enter. Press the UP or DOWN key to modify the password. After entering the password "1000", press the OK key to enter the Settings interface.
- Step 4: Select power on/off control, select power off, and click OK.
- Step 5: The inverter is shut down normally.

If you need to perform maintenance operations, you must continue to complete steps 6 to step 11 before carrying out the maintenance work. (Non-professional maintenance personnel are prohibited from disassembling the machine. Before maintenance, One must wait for 10 minutes after step 1-5 is completed.)

- Step 6: Turn off the external AC/DC breaker/switch (grid port, EPS port, PV port and battery port) before disconnecting the connector.
- Step 7: Disconnect the connector terminals of the mains power supply to ensure that the inverter is disconnected from the power grid.
- Step 8: Disconnect the PV terminal to ensure that the inverter and PV (solar panel) are disconnected. (Remarks: Measure the mains terminal and the PV terminal. There is no

voltage.)

- Step 9: Turn off the battery pack, disconnect the battery positive and negative terminal to ensure that the inverter and battery disconnect (press the buttons, check whether the LCD inverter is not bright).
- Step 10: Disconnect the load terminal to ensure that the machine and the load are not connected.
- Step 11: Remove the upper cover for maintenance work.

Remarks: The PV DC switch is a rotary switch. Before maintenance, the PV DC switch must be turned to the "Off" position following the steps 1-11 above. During maintenance operations, the switch is locked in the “Off ” state by the elastic force of the mechanical spring.

8.Technical parameters

8.1 Battery parameters

Model of inverter	TCI X5.0 III
Type of battery	LFP
Rated voltage (V)	48
Voltage range (V)	40-60
Maximum charging and discharging power (W)	5000
Maximum charging and discharging current (A)	100 (configurable)
Battery capacity (Ah)	≥100 (customized based on the needs)
Charging mode	According to BMS requirements (lithium battery)
Maximum charging voltage (V)	60 (configurable)
Battery temperature compensation	Integrated (lithium battery)
Battery voltage detection	Integrated

8.2 PV input parameters

Model of inverter	TCI X5.0 III
Maximum allowable access string power (W)	8,000
Maximum DC voltage(V)	600
MPPT voltage range (V)	120-550
Rated voltage (V)	380
Starting voltage (V)	150
Maximum DC current(A)	13/13
MPPT paths	2
MPPT strings per channel	1
Type of DC terminal	MC4

DC switch (photovoltaic)	PEDS150R-HM32R-3
Backfeed current for the PV port	0

8.3 AC output parameters (grid-connected)

Model of inverter	TCI X5.0 III
Rated grid-connected output apparent power (VA)	5,000
Maximum grid-connected output apparent power (VA)	5,000
Grid type	Single phase
Rated input frequency(Hz)	50/60
Voltage range (V)	176-264
Rated voltage (V)	230
Frequency range (Hz)	45-55(50)
	55-65(60)
Maximum grid-connected current (A)	25
Maximum input current (A)	40
Rated current (A)	21.7

8.4 AC output parameters (off-grid)

Model of inverter	TCI X5.0 III
Maximum AC power (W)	5,000
Rated frequency (Hz)	50/60 (optional)
Frequency accuracy	±2%
Voltage level (V)	200/208/220/230/240 (optional)

Maximum output current (A)	25A
Voltage stabilization accuracy	±1%
Voltage harmonics (full load)	THDV＜3% (Linear load)
Overload capacity	105%<load rate ≤ 125%, alarm and shutdown 10 minutes latter
	125%<load rate ≤ 150%, alarm and shutdown 1 minute latter
	Load rate>150%, alarm and shutdown 1s latter

8.5 Efficiency and protection

Model of inverter	TCI X5.0 III
Maximum efficiency	98.00%
European efficiency	97.10%
MPPT efficiency	99.90%
Maximum conversion efficiency of battery	94.00%
Residual current protection	Yes
Islanding protection	Yes
Overvoltage and undervoltage protection	Yes
Battery and photovoltaic reverse connection protection	Yes
Output overcurrent protection	Yes
Output short circuit	Yes
Over temperature protection	Yes
Insulation impedance detection	Yes

8.6 General parameters

Model of inverter	TCI X5.0 III

8.Technical parameters

Dimensions (l * w * h)	535*485*198.5（mm)
Weight (kg)	29
Installation method	Wall-mounted
Range of ambient temperature	-20～+60℃ (>45 ℃ load shedding or derating)
Relative humidity	0～95%
Maximum working altitude (m)	3,000m derating
Protection level	IP65
Topological structure	No transformer (grid side)
Standby power consumption (W)	<10
Cooling method	Natural convection
Noise index (db)	<25
Display method	LCD screen; APP
Communication mode	Wi-Fi; R485; CAN; GPRS
Warranty period (years)	10

8.7 Performance and safety regulation

Technical parameters	TCI X5.0 III
Display	LCD
Monitoring	Bluetooth / RS485 / WIFI / GPRS (optional) / CAN2.0
Parallel function	YES
Grid-connected	VDE-AR-N 4105, VDEV 0126-1-1, AS/NZS 4777, CEI 0-21, G98/G99,
standard	TR321,TR322, EN 50438/EN50549, UTEC15-712-1, NRS 097-2-1, UNE 206 007-1
Safety regulation standard	IEC 62109-1/2, IEC 62040-1, IEC 62116, IEC 61727, IEC 61683, IEC60068(1,2,14,30)
EMC	EN 61000-6-2, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3, EN 61000-3-11, EN 61000-3-12

9. Declare

The grid voltage and frequency range of the inverter, Class B inverter, are shown in the table below.

Grid voltage (at grid port)	Requirement
U<50%UN	The maximum opening time does not exceed 0.2s
50%UN≤U<85%UN	The maximum opening time does not exceed 2.0s
85%UN≤U<110%UN	Continuous operation
110%UN≤U<135%UN	The maximum opening time does not exceed 2.0s
135%UN≤U	The maximum opening time does not exceed 0.2s

Figure 27: Explanation of the voltage range of power grid

Note 1: *UN refers to the rated grid voltage at the grid-connected point.*
Note 2: *The maximum opening time refers to the period from the occurrence of an abnormal state to the cessation of power transmission to the power grid.*
Note 3: *The accuracy of grid voltage is 1%.*

Grid frequency	Requirement
f<47.5Hz	Shutdown within 0.2s, not grid-connected under shutdown state
47.5Hz≦f<48Hz	Shutdown within 0.2s, not grid-connected under shutdown state
48Hz≦f<49.5Hz	Normal operation, no grid-connected under shutdown state
49.5Hz≦f≦50.5Hz	Normal operation
f>50.5Hz	Shutdown within 0.2s, no grid-connected under shutdown state

Figure 28: Explanation of the frequency range of power grid

Note 1: *Accuracy of grid frequency ± 0.02H*

10. Warranty and Liability Clause

10.1 WARRANTY TERMS & CONDITIONS

Microgrid Energy Pty Ltd (Microgrid) gives the following limited standard warranty against defects as set out in these terms and conditions (Limited Warranty). This warranty is applicable only in Australia for Microgrid lithium battery energy storage systems (Battery TC B05 III) and hybrid inverters (Inverter TCI X5.0 III).

Microgrid's warranties are provided solely to the original purchaser of the Battery and/or Inverter (Purchaser), where the Purchaser is a distributor, solar retailer, accredited electrician (Installer), who on-supplies the Battery and/or Inverter to another party, that other- party (End- User). Microgrid warranties are not otherwise transferable.

10.2 Warranty

The Battery and/or Inverter must be used in accordance with the operating conditions set out in the specification and the installation manual provided by Microgrid. Subject to such compliance, Microgrid warrants that the Battery and/or Inverter will be free from defects in materials and workmanship for a period of ten (10) years from the first-time installation date (Warranty Commencement Date), at no cost to the customer.

10.3 10 Year Limited Performance Warranty

The performance warranty guarantees that the Battery maintains at least 80% of the initial Battery's capacity over the period of ten years from the Warranty Commencement Date.

For any Battery repaired or replaced under the Warranty, the remaining warranty period of the original Battery will be transferred to the replacement Battery. Microgrid will register the transfer of the warranty entitlement.

10.4 Exclusions

This Limited Warranty does not cover any defects arising from the following:

- use of inverters or converters that is incompatible with the Battery;
- failure to follow Microgrid's operating instructions, installation guide, or maintenance requirements;
- non-compliance with applicable safety standards in relation to the Battery and/or Inverter;
- incorrect installation or commissioning of the Battery and/or Inverter;
- any repair work carried out without Microgrid's authorization;
- misuse, improper use, or external factors beyond Microgrid's control (including but not limited

to accidents or lightning strikes or environmental factors);
- inadequate ventilation of the Battery and/or Inverter;
- damage during the transportation of the Battery and/or Inverter;
- a force majeure (e.g. war, crime, natural disasters, etc.); and
- flaws that do not adversely affect the proper functioning of the Battery and/or Inverter (e.g. cosmetic defects, and wear and tear).

10.5 Warranty Claim Process

In the event of a fault, the End User must first contact the Installer from whom the Battery system and/or Inverter was purchased to undertake initial troubleshooting and, if necessary, liaise with Microgrid. Where a fault is suspected, Microgrid may require the submission of a warranty claim outlining the reasons for the claim.

The End User or Installer (the " Claimant ") must notify Microgrid in writing to support@microgridenergy.com.au and provide the following:

a copy of the invoice, receipt, commissioning report, or other acceptable proof of purchase or installation date for the Battery and/or Inverter; and

current contact details for the Claimant.

Microgrid may reject a warranty claim if:

the Claimant fails to meet the above requirements;

the Battery and/or Inverter has been replaced without Microgrid's prior written consent; or

Microgrid is not satisfied that the defect arose from defective materials or workmanship.

Where Microgrid determines that the Battery and/or Inverter is free from defects in materials or workmanship, it may recover from the Claimant any costs incurred in relation to the assessment of the claim.

10.6 Limitations of Liability

To the maximum extent permitted by law: Our liability under this warranty is limited to the repair or replacement of the Battery and/or Inverter. We are not liable for any incidental or consequential damages, including lost profits or downtime.

10.7 Australian Consumer Law

This warranty is provided in addition to, and does not limit or replace, any statutory rights available to consumers. For customers in Australia, the goods supplied by Microgrid are subject to the guarantees that cannot be excluded under the Australian Consumer Law. Under these guarantees, you are entitled to a replacement or refund in the event of a major failure, as well as compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if they fail to meet the standard of acceptable quality and the failure does not constitute a major failure.

10.8 Manufacturer Details

Microgrid Energy Pty Ltd
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Tel: +61 3 8199 8129
Email: service@microgridenergy.com.au

Microgrid Energy Pty Ltd

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