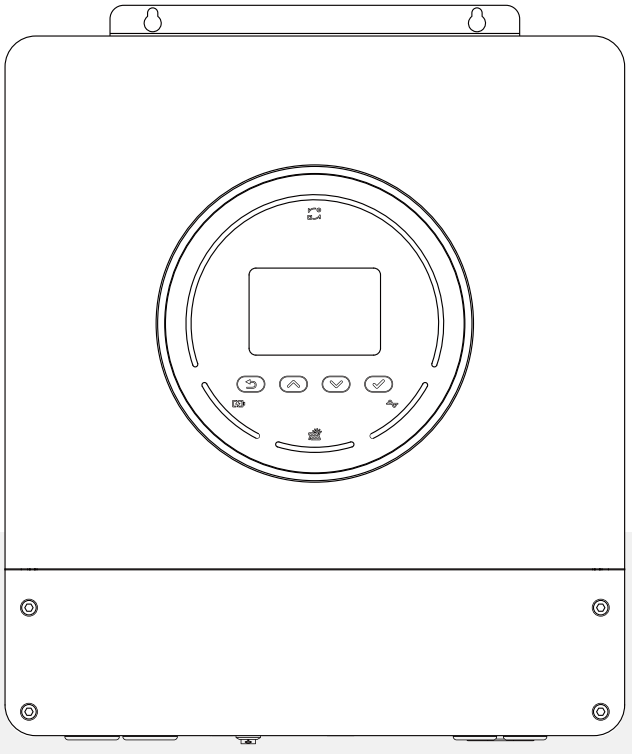
User Manual

Hybrid Inverter TG6200-48



Version: 1.0

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Information on this Manual

Validity

This manual is valid for the following devices:

- TG 6200-48

Scope

This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations.

Target Group

This document is intended for qualified persons and end users. Tasks that do not require any particular qualification can also be performed by end users. Qualified persons must have the following skills:

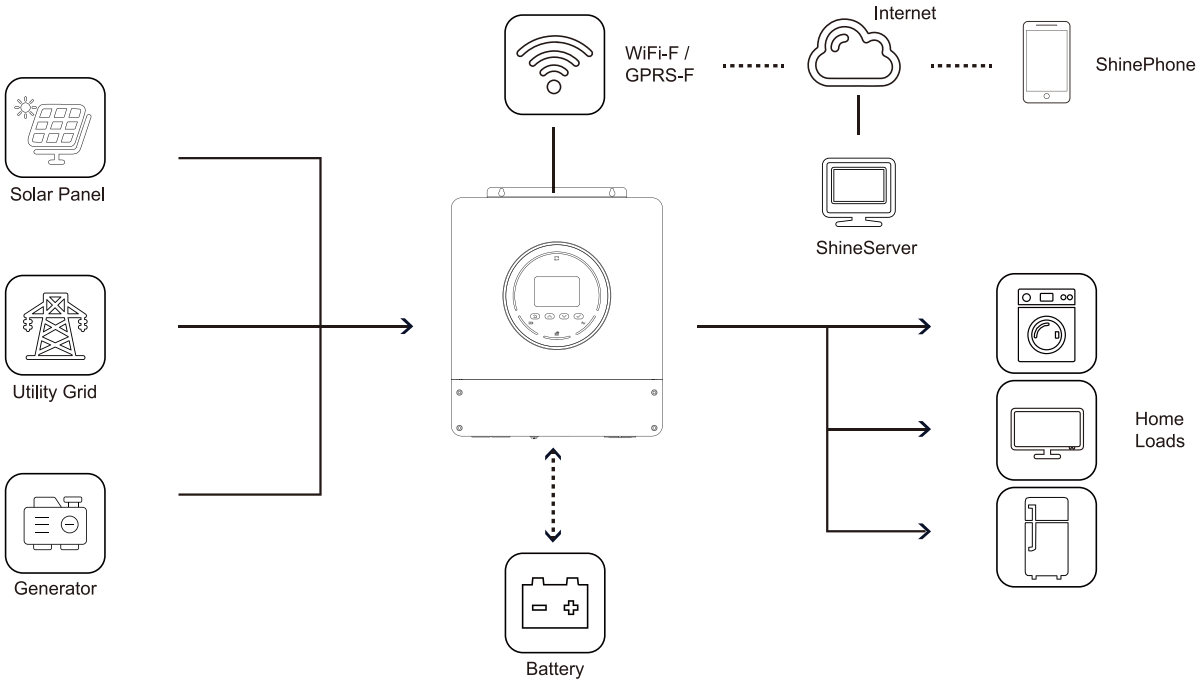
- Knowledge of how an inverter works and is operated
- Training in how to deal with the dangers and risks associated with installing and using electrical devices and installations
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of the applicable standards and directives
- Knowledge of and compliance with this document and all safety information

Safety Instructions

⚠ **WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.**

1. Please be clear which kind of battery system you want, lithium battery system or lead-acid battery system, if you choose the wrong system, energy storage system can't work normally.
2. Before using the unit, read all instructions and cautionary marking on the unit, the batteries and all appropriate sections of this manual. The company has the right not to quality assurance, if not according to the instructions of this manual for installation and cause equipment damage.
3. All the operation and connection please professional electrical or mechanical engineer.
4. All the electrical installation must comply with the local electrical safety standards.
5. When installing PV modules in the daytime, installer should cover the PV modules by opaque materials, otherwise it will be dangerous as high terminal voltage of modules in the sunshine.
6. **CAUTION-**To reduce risk of injury, charge only deep-cycle lead-acid type rechargeable batteries and lithium batteries. Other types of batteries may burst, causing personal injury and damage.
7. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
8. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
9. **NEVER** charge a frozen battery.
10. For optimum operation of this inverter, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter.
11. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
12. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.
13. GROUNDING INSTRUCTIONS -This inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulations to install this inverter.
14. **NEVER** cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
15. Make sure the inverter is completely assembled, before the operation.

Introduction



Hybrid Power System

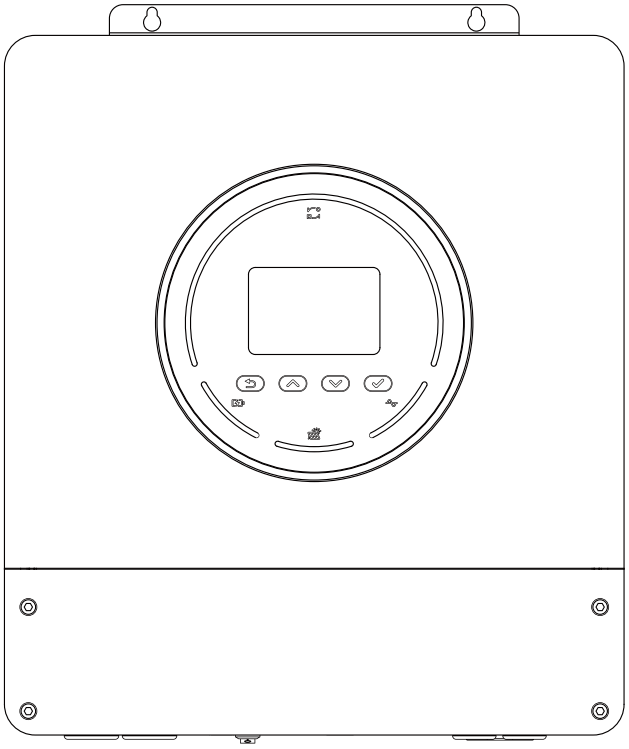
This is a multifunctional hybrid solar inverter, integrated with a MPPT solar charge controller, a high frequency pure sine wave inverter and a UPS function module in one machine, which is perfect for off grid backup power and self-consumption applications. This inverter can work with or without batteries.

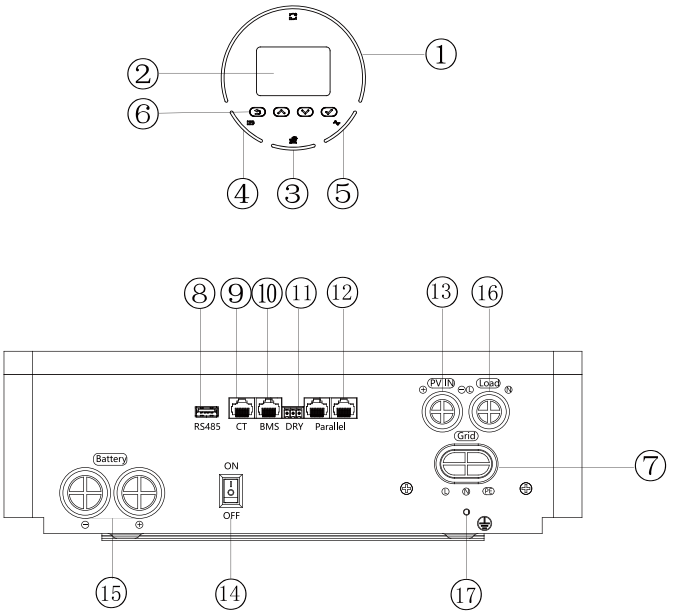
The whole system also need other devices to achieve complete running such as PV modules, generator, or utility grid. Please consult with your system integrator about other possible system architectures depending on your requirements. The Wi-Fi / GPRS module is a plug-and-play monitoring device to be installed on the inverter. With this device, users can monitor the status of the PV system from the mobile phone or from the website anytime anywhere.

Features

- Rated power 6.2KW, power factor 1
- MPPT ranges 85V~450V, 500Voc
- High frequency inverter with small size and light weight
- Pure sine wave AC output
- Solar and grid can power loads at the same time With
- RS485 for BMS communication
- With the ability to work without battery
- Parallel operation up to 10 units (only with battery connected)
- WIFI/ GPRS remote monitoring (optional)

Product Overview





1. Working mode indicator
2. LCD display
3. PV status indicator
4. Battery status indicator
5. Grid status indicator
6. Function buttons
7. Grid input
8. Wi-Fi/GPRS communication port
9. CT communication port
10. BMS communication port (support RS485 protocol)
11. Dry contact
12. Parallel communication ports
13. PV input
14. Power on/off switch
15. Battery input
16. Load
17. PE protective conductor

Installation

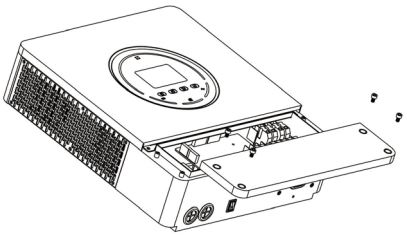
Unpacking and Inspection

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items in the package:

- The unit x 1
- User manual x 1

Preparation

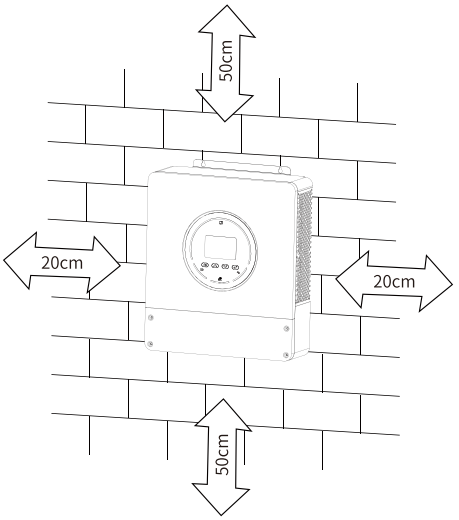
Before connecting all wiring, please take off bottom cover by removing four screws as shown below.



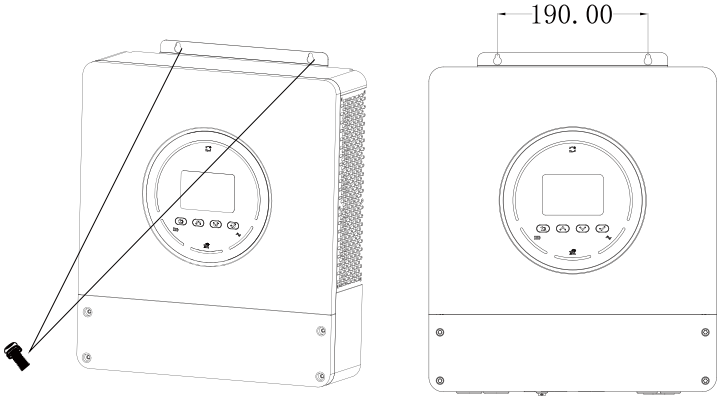
Mounting the Unit

Consider the following points before selecting where to install:

- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- Install this inverter at eye level to allow the LCD display to be always read.
- The ambient temperature should be between 0°C and 55°C to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the right diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.



SUITABLE FOR MOUNTING ON CONCRETE OR OTHER NON-COMBUSTIBLE SURFACE ONLY.



Install the unit by screwing two screws.

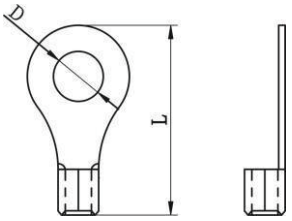
Battery Connection

Lead-acid Battery Connection

Users can choose proper capacity lead acid battery with a nominal voltage at 48V. Also, you need to choose battery type as "AGM (default) or FLD"

CAUTION: For safety operation and regulation compliance, it's requested to install a separate DC over-current protector or disconnect device between battery and inverter. It may not be requested to have a disconnect device in some applications, however, it's still requested to have over-current protection installed. Please refer to typical amperage in below table as required fuse or breaker size.

Ring terminal:



WARNING! All wiring must be performed by a qualified person.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below.

Recommended battery cable and terminal size:

Model	Wire Size	Torque value
TG6200-48	1 * 2 AWG	2-3 Nm

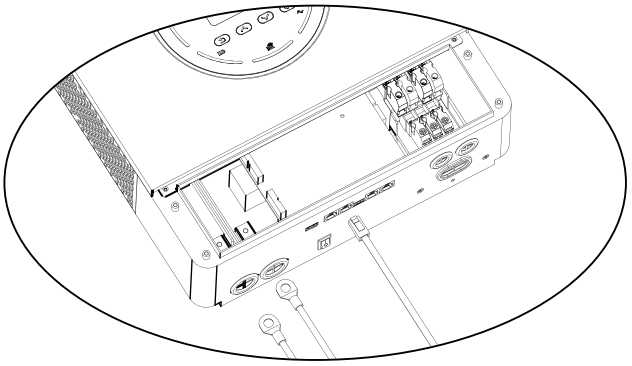
Note: For lead acid battery, the recommended charge current is 0.2C(C→battery capacity)

Please follow the steps below to implement battery connection:

Assemble battery ring terminal based on recommended battery cable and terminal size.

Connect all battery packs as units require. It's suggested to connect at least 200Ah capacity battery for TG6200-48.

Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the bolts are tightened with torque of 2Nm. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.



⚠ **WARNING: Shock Hazard**
Installation must be performed with care due to high battery voltage in series.

⚠ **CAUTION!!** Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur.
CAUTION!! Do not apply antioxidant substance on the terminals before terminals are connected tightly.
CAUTION!! Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

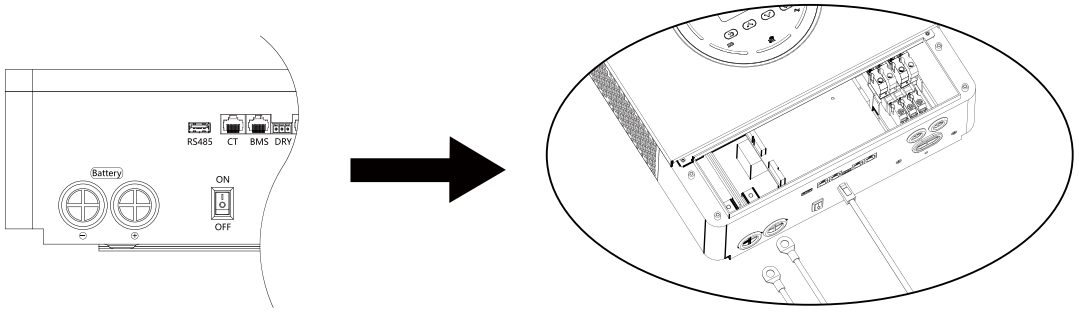
Lithium Battery Connection

If choosing lithium battery for TG6200-48, you are allowed to use the lithium battery only which we have configured. There're two connectors on the lithium battery, RJ45 port of BMS and power cable.

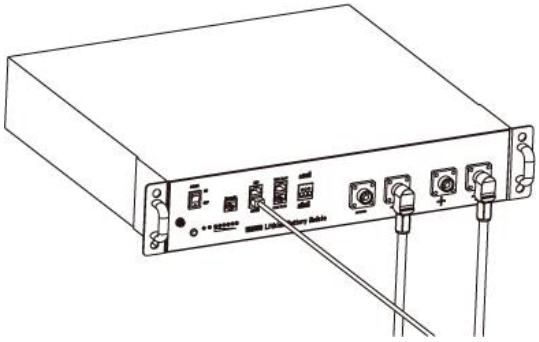
Please follow the steps below to implement lithium battery connection:
1. Assemble battery ring terminal based on recommended battery cable and terminal size (same as Lead acid, see section Lead-acid Battery connection for details).

2. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the bolts are tightened with torque of 2-3Nm. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.

3. Connect the end of RJ45 of battery to BMS communication port (RS485) of inverter.



4. The other end of RJ45 is inserted to battery communication port (RS485).

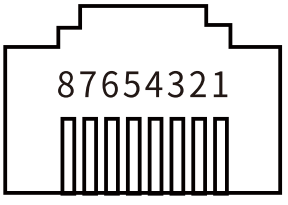


Note: If choosing lithium battery, make sure to connect the BMS communication cable between the battery and the inverter. You need to choose battery type as "lithium battery".

Lithium battery communication and setting

To communicate with battery BMS, you should set the battery type to "Lib" in program 00. Then switch to Program 01, which is to set the protocol type. Connect the end of RJ45 of battery to BMS communication port of inverter. Make sure the lithium battery BMS port connects to the inverter is Pin to Pin, the inverter BMS port pin and RS485 port pin assignment shown below:

Pin number	BMS port
1	RS485B
2	RS485A
3	--
4	--
5	--
6	--
7	RS485A
8	RS485B



LCD setting

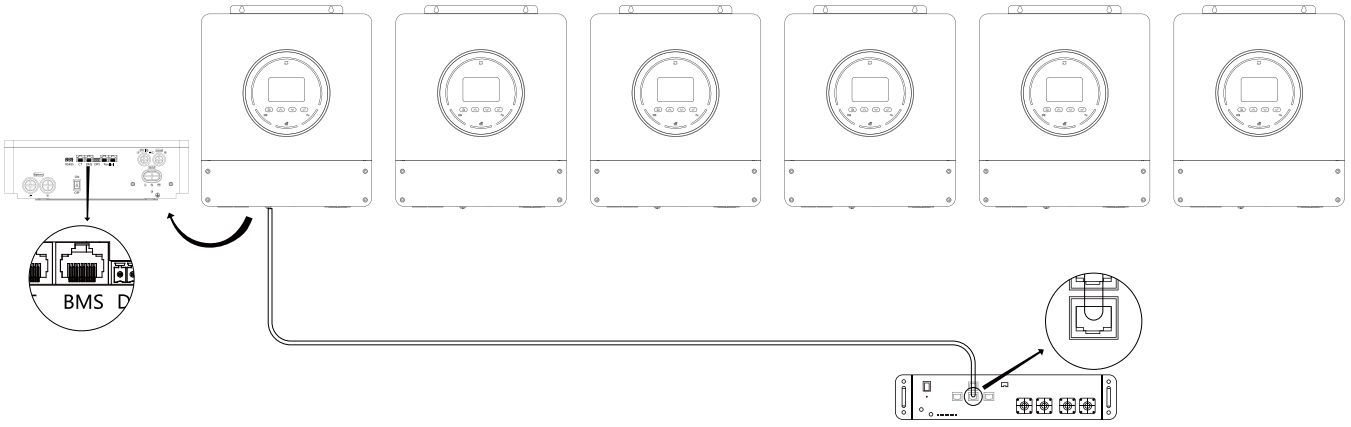
To connect battery BMS, need to set the battery type as "Lib" in Program 0.
After set "Lib" in Program 0, it will switch to Program 1 to choose communication protocol.

<table>
<tr><td rowspan="5">00</td><td rowspan="5">Battery Type</td><td>AGM (default)
  </td></tr>
<tr><td>No battery
 
If inverter doesn't need to connect battery, you could choose this option.</td></tr>
<tr><td>Flooded
  </td></tr>
<tr><td>User-Defined
  </td></tr>
<tr><td>Lithium
 
If "Lib" is selected, inverter can charge lithium battery when the lithium battery needs to be activated. Please make sure Lithium battery is connected before you start up inverter</td></tr>
<tr><td rowspan="2">01</td><td rowspan="2">BMS Type</td><td>Pylon low voltage BMS protocol (Rs485, Default)
  </td></tr>
<tr><td>Tsolar BMS protocol (Rs485)
  </td></tr>
</table>

Note: When the battery type set as "Lib", the maximum charge current can't be modified by the user.

Communicating with battery BMS in parallel system

If need to use communicate with BMS in a parallel system, you should make sure to connect the BMS communication cable between the battery and one inverter of the parallel system.



Grid input/Load Connection

CAUTION!! Before connecting to Grid input power source, please install a **separate** AC breaker between inverter and Grid input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of Grid input. The recommended spec of AC breaker is 50A for TG6200-48.

CAUTION!! There are two terminal blocks with "Grid" and "Load" markings. Please do NOT misconnect "Grid " and "Load" connectors.

WARNING! All wiring must be performed by a qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for Grid input connection. To reduce risk of injury, please use the proper recommended cable size as below.

Suggested cable requirement for AC wires

Model	Gauge	Torque Value
TG6200-48	1 * 8 AWG	1.2-1.6 Nm

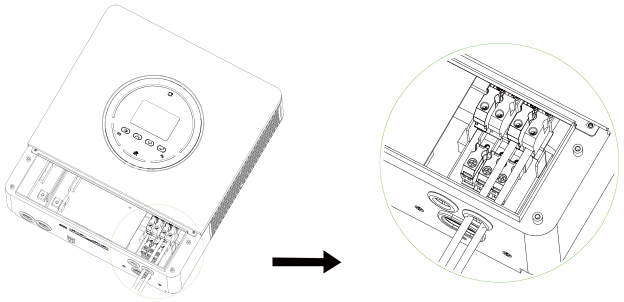
Please follow the steps below to implement Grid input/Load connection:

1. Before making Grid input/Load connection, be sure to open DC protector or disconnector first.
2. Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.
3. Insert Grid input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect with the PE protective conductor ⏚ first.

   ⏚ **→Ground (yellow-green)**

   L→LINE (brown or black)

   N→Neutral (blue)

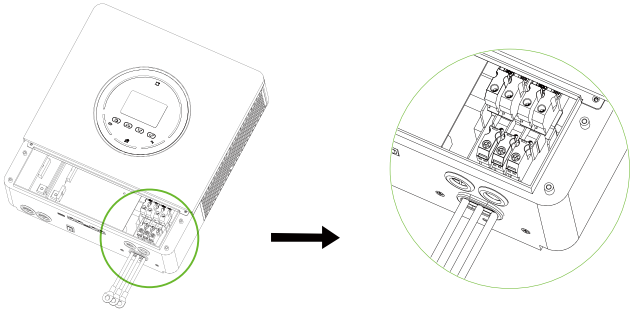


⚠	**WARNING:** Be sure that AC power source is disconnected before attempting to hardwire it to the unit.

4. Then, insert load wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor ⏚ first.

   L→LINE (brown or black)

   N→Neutral (blue)



5. Make sure the wires are securely connected.

   CAUTION: Important

   Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check with manufacturer of air conditioner that if it's equipped with time-delay function before installation. Otherwise, this hybrid solar inverter will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

PV Connection

CAUTION: Before connecting to PV modules, please install **separately** a DC circuit breaker between inverter and PV modules.

WARNING! All wiring must be performed by a qualified personnel.
WARNING! It' very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

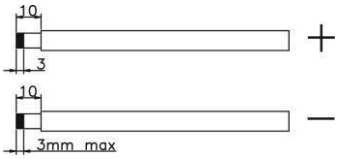
Model	Wire Size	Torque value
TG6200-48	1 * 12 AWG	1.2-1.6 Nm

PV Module Selection:

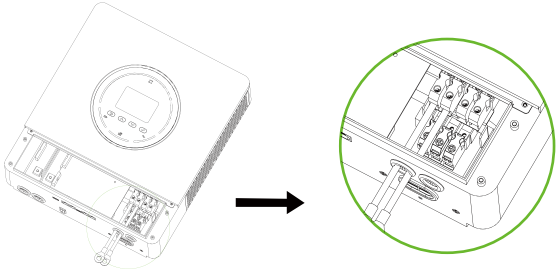
When selecting proper PV modules, please be sure to consider the parameters below:
1. Open circuit Voltage (Voc) of PV modules do not exceed max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

INVERTER MODEL	TG6200-48
Max. PV Array Open Circuit Voltage	500Vdc
Start-up Voltage	80Vdc
PV Array MPPT Voltage Range	85Vdc~450Vdc

Please follow the steps below to implement PV module connection:
1. Remove insulation sleeve 10 mm for positive and negative conductors.



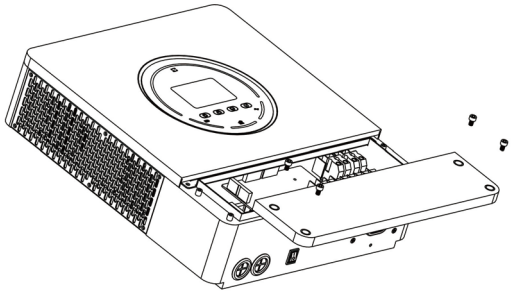
2. Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.



3. Make sure the wires are securely connected.

Final Assembly

After connecting all wiring, please put bottom cover back by screwing two screws as shown below.

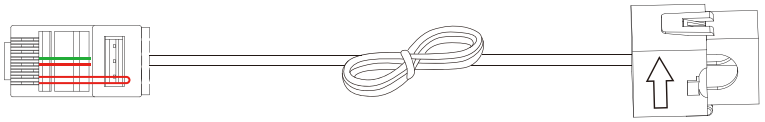


Communication Connection

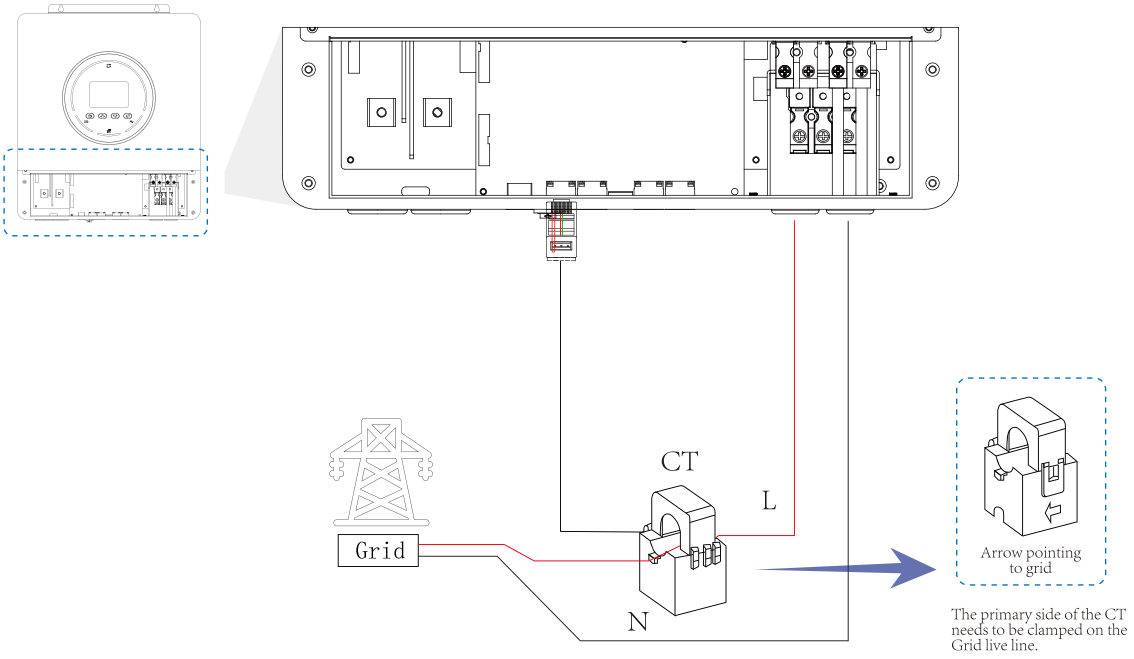
You can plug the included data logger into the inverter's RS485 port. With a simple one-time configuration, you will be able to remotely monitor the inverter's operational data and adjust its settings anytime and anywhere. For detailed instructions, please refer to the corresponding user manual.

External CT Connection(optional)

In install kit, you will find the following items in the package:



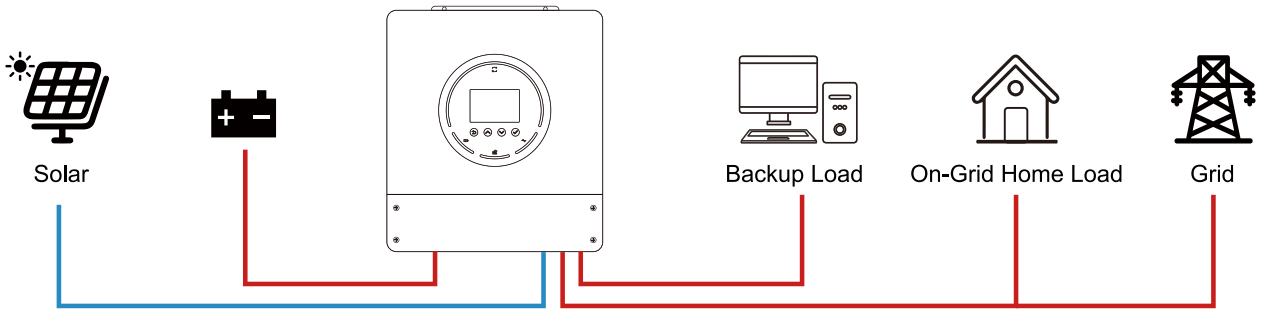
Clamp the CT around the L line plugged into the mains power input of the inverter, and insert the RJ45 connector of the CT cable into the inverter's "CT" port as shown in the wiring diagram below. Once the CT is installed, the inverter's LCD screen will display the "CT" icon (About "CT" icon, you can check "LCD Display Icons" section for detailed information).



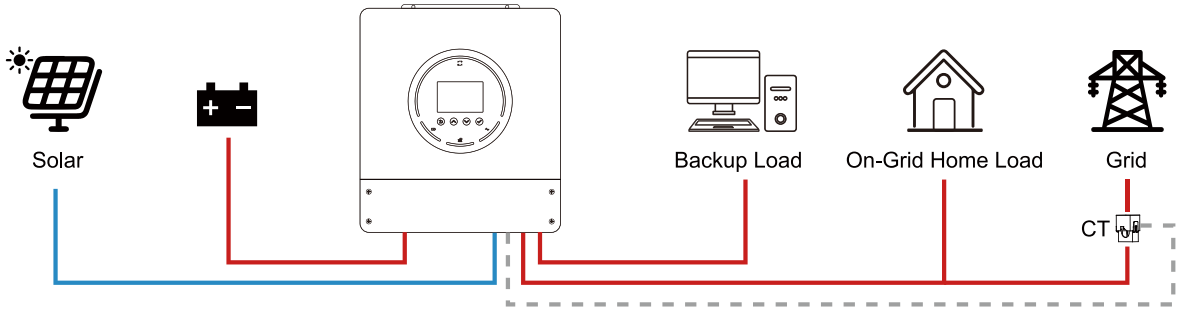
CAUTION: Important

The Function of External CT

Zero Export To Backup Load: Hybrid inverter will only provide power to the backup load connected. The hybrid inverter will neither provide power to the home load nor sell power to grid. The built-in CT will detect power flowing back to the grid and will reduce the power of the inverter only to supply the backup load and charge the battery.



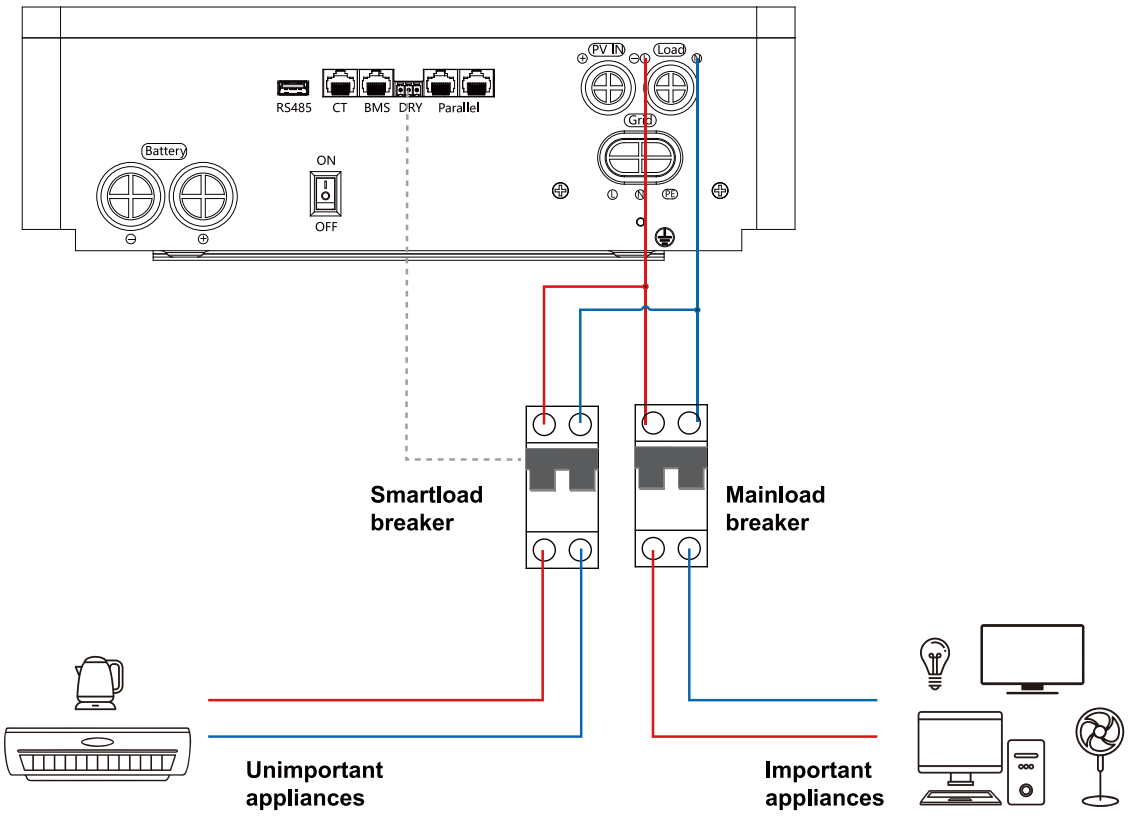
Zero Export To External CT: Hybrid inverter will not only provide power to the backup load connected but also give power to the home load connected. If PV power and battery power are insufficient, it will take grid energy as supplement. The hybrid inverter will not sell power to grid. In this mode, an external CT is needed. The external CT will detect power flowing back to the grid and will reduce the power of the inverter only to supply the backup load, charge battery and home load.



Note1: If the CT arrow is not pointing toward the grid, the LCD will display incorrect values. You can go to the LCD settings and enable setting item 35, "External CT Direction Reverse," or use the app to enable this setting.

Dry Contact Signal

There is one dry contact(3A/250VAC) available on the rear panel. It could be used to deliver signals to external devices when battery voltage reaches warning level. TG6200-48 only has one inverter output interface. However, it can achieve dual output function by controlling external Contactor through dry contact.

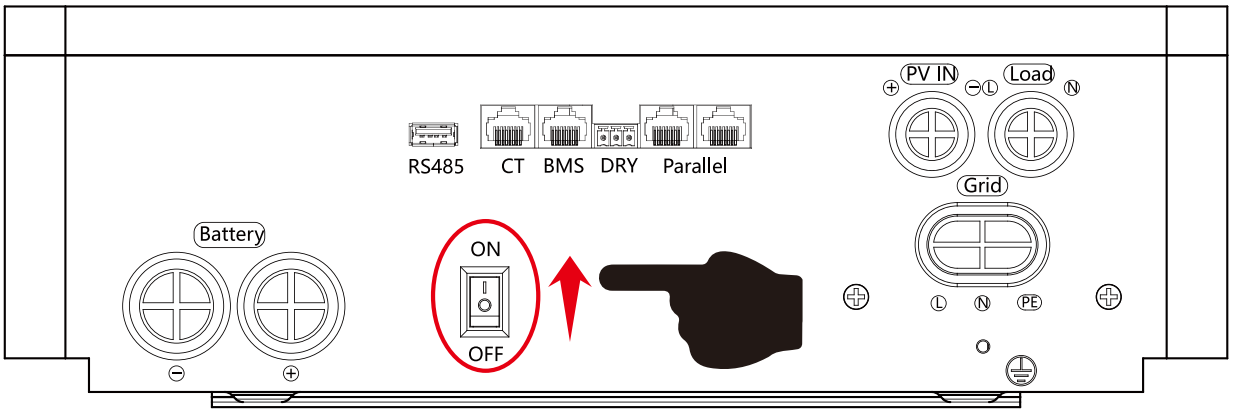


Dry contact signal reference table

Unit Status	Scenarios	SOC Conditions	Dry contact port: 		Generator	Smart load
			NO-C	NC-C		
POWER OFF			Open	Close	off	off
POWER ON	Battery only	>setting 8/9	Open	Close	off	on
		<setting 6/7	Close	Open	on	off
	Grid supply	>setting 8/9	Open	Close	off	on
		<setting 6/7	Open	Close	off	on
	PV≥3KW	>setting 8/9	Open	Close	off	on
		<setting 6/7	Open	Close	off	on
	Battery+PV<3KW	>setting 9/9	Open	Close	off	on
		<setting 6/7	Close	Open	on	off

Operation

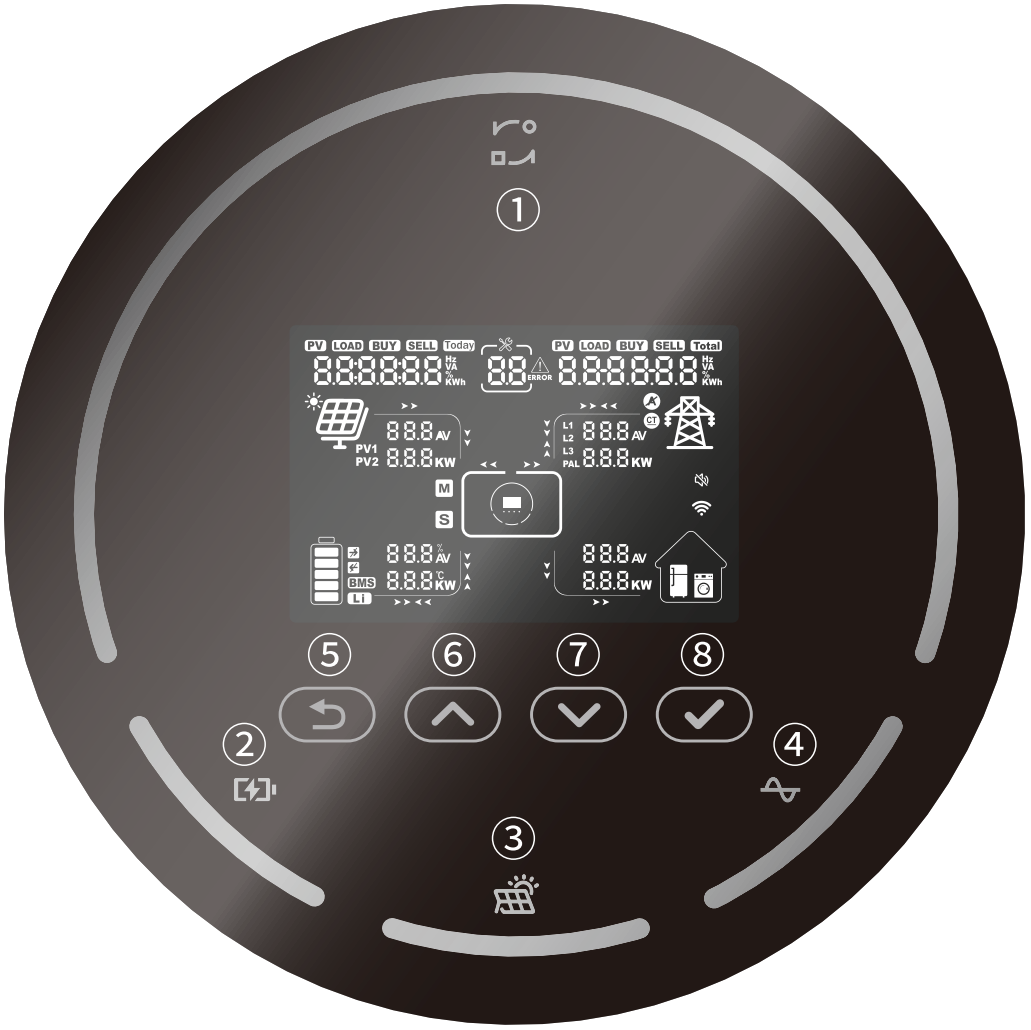
Power ON/OFF



Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the button of the case) to turn on the unit.

Operation and Display Panel

The operation and display panel, shown in the chart below, is on the front panel of the inverter. It includes three indicators, four function keys and an LCD display, indicating the operating status and input/output power information.



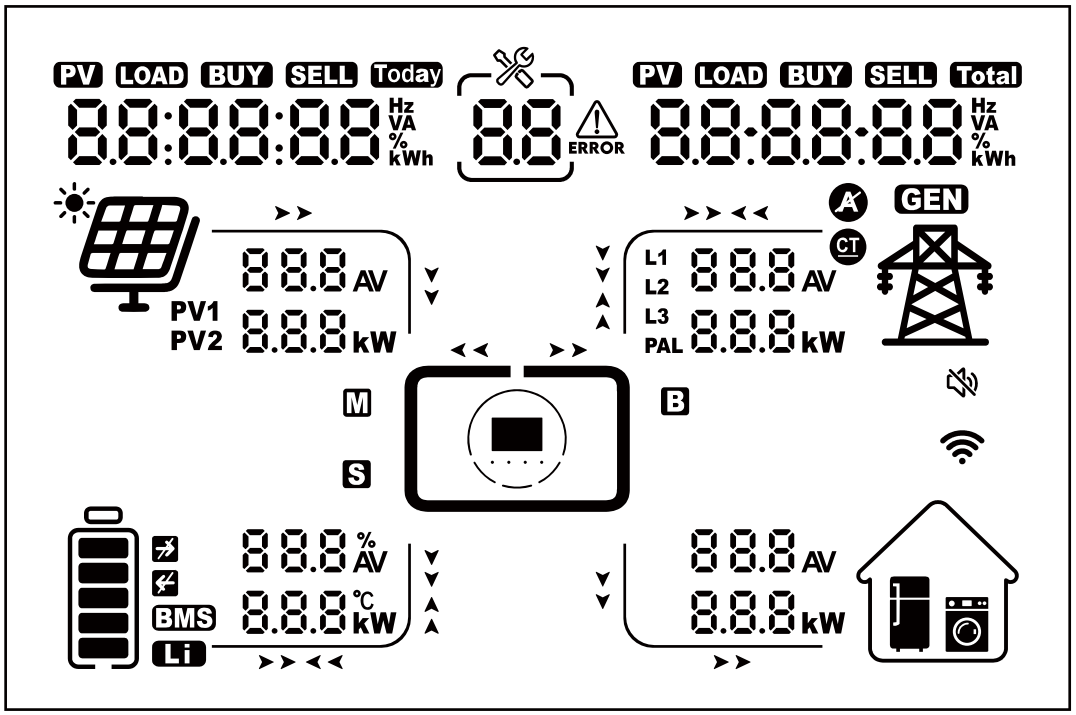
LED Indicator

LED Indicator				Messages
①	Inverter Working Mode	Green	Flash	Inverter is in line mode/bypass mode.
		Blue	Flash	Inverter is in battery mode.
		White	Flash	Inverter is in standby mode.
		Red	Solid On	Inverter is in fault mode and fault occurs
			Flashing	Inverter is in fault mode and only alarm occurs
②	Battery State	White	Solid On	Battery is charging or discharging
			Flashing	Battery is in standby
			Off	Not connected
③	PV State	White	Solid On	PV is working.
			Flashing	PV is in standby mode.
			Off	Not connected
④	Grid State	White	Solid On	The inverter is feeding power to grid or drawing power from the grid.
			Flashing	Grid is in standby mode.
			Off	Not connected

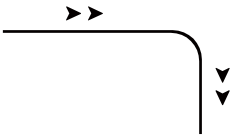
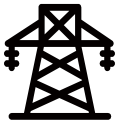
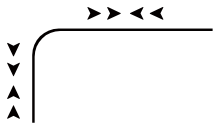
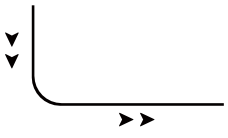
Function Buttons

Button		Description
⑤	ESC	To exit
⑥	UP	To go to previous selection
⑦	DOWN	To go to next selection
⑧	ENTER	To confirm the selection in setting mode or enter pages

LCD Display Icons



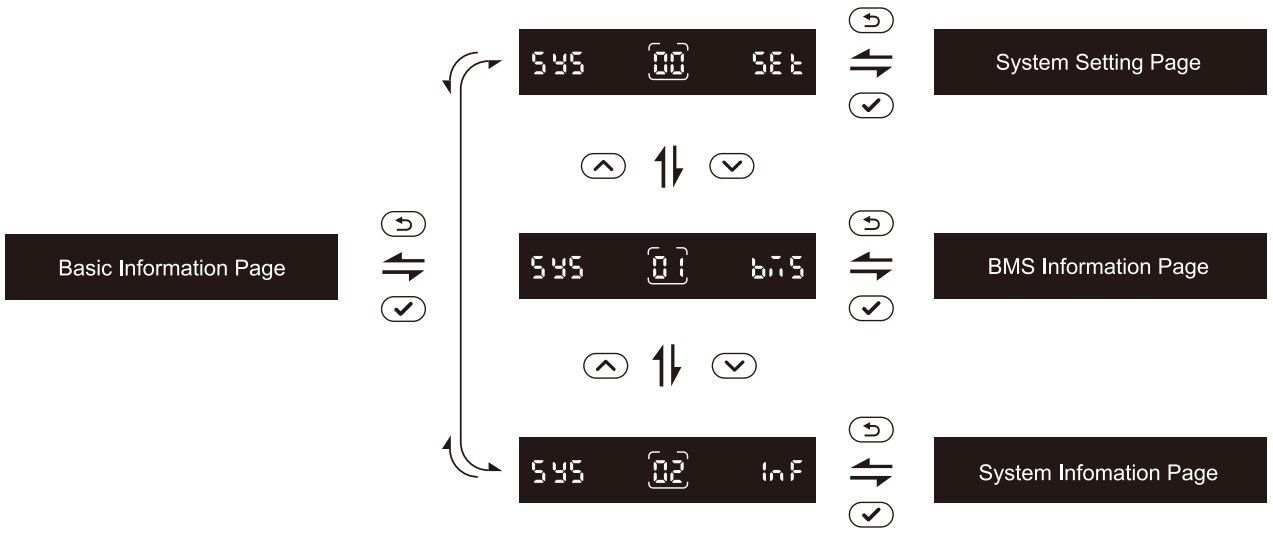
Icon	Description
Top Bar Information	
	Indicates when in setting page
ERROR	Indicates When a fault or alarm occurs on the inverter. Only if only a fault occurs on the inverter, "ERROR" icon will be on.
	Indicates Page number and fault/alarm code
PV LOAD BUY SELL Today Hz VA % kWh	Indicates daily energy information :PV Generation、 Load Consumption、 Grid Consumption、 Grid Feed-in Energy 、time. For further details, please check "LCD Setting" and "Display information" sections.
PV LOAD BUY SELL Today Hz VA % kWh	Indicates total energy information :PV Generation、 Load Consumption、 Grid Consumption、 Grid Feed-in Energy and time. For further details, please check "LCD Setting" and "Display information" sections.
PV Input Information	
	PV input icon
AV	Indicate PV voltage, PV current
kW	Indicate PV power

	If the arrows are on, it means PV is working.
Grid Information	
	Grid icon
GEN	Indicates when the Grid input port function (Program 36) is set to generator mode
	Indicates when feeding power to grid (Program 18) is disabled
	Indicates when external CT is installed
88.8 AV	Indicate grid voltage, grid current
8.8.8 kW	Indicates Grid power
L1 L2 L3 PAL	Indicates the output mode (Program 12) configured for single-phase or three-phase paralleling
	If the arrow points from the grid to the inverter, it indicates that the inverter is buying electricity; conversely, it is selling electricity.
Load Information	
	Load icon
88.8 AV	Indicate load voltage
8.8.8 kW	Indicate load power
	If the arrows are on, it means the inverter is powering the loads.
Battery Information	
	Indicate battery level (0-24%,25-49%,50-74% and 75-100%) when battery discharge and charge status.
	BMS discharge disabled symbol
	BMS charge disabled symbol
BMS	BMS communication success symbol, only on when battery type (Program 0) is set to lithium battery

Li	Lithium battery symbol
88.8 % AV	Indicates battery current 、battery voltage、battery soc
	If the arrow points from the battery to the inverter, it indicates that the battery is discharging; conversely, it means the battery is charging.
Other Information	
	Indicate the alarm is disabled.
	Indicate Wi-Fi data logger network connection is normal.
M	Indicate the inverter acts as the master in output mode.
S	Indicate the inverter acts as the slave in output mode.
B	Indicate the inverter is currently in bypass mode.
	When the left arrows are on, it indicates that the inverted energy is being used for charging; when the right arrows are on, it indicates that the inverted energy is being used for discharging

LCD operation flow chart

On base information page, pressing and holding "ENTER" key for 2 sec, the unit will enter System management page. Short press "UP" or "DOWN" key to switch the selection and short press "ENTER" key to enter selected page. Press "ESC" key to back to previous page.

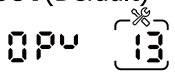
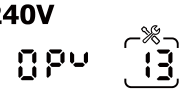
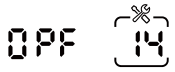
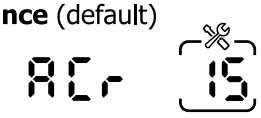
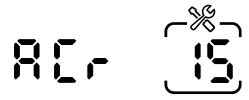
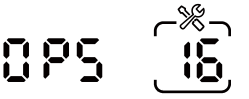


LCD Setting

Press "Up" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or Esc button to exit, keep pressing UP or DOWN button after 2 seconds, it will increase or decrease setting value fastly.

Program	Description	Setting Option
00	Battery Type	**No battery**  If inverter doesn't need to connect battery, you could choose this option.
		AGM (default) 
		Flooded 
		User-Defined 
		Lithium  If "Lib" is selected, inverter can charge lithium battery when the lithium battery needs to be activated. Please make sure Lithium battery is connected before you start up inverter
01	BMS Type	**Pylon low voltage BMS protocol** (Rs485, Default) 
		Tsolar BMS protocol (Rs485) 
02	C.V. Charge Voltage	 Valid when battery type is Lithium or User-Defined Default 56.4V, 48.0V~60.0V Settable
03	Floating Charge Voltage	 Valid when battery type is Lithium or User-Defined Default 54.0V, 48.0V~60.0V Settable

04	Battery Discharge Voltage Limit	 If self-defined is selected in program 0, this program can be set up. Default 42.0V, 40.0V~48.0V Settable	
05	Battery Discharge Soc Limit	 If self-defined is selected in program 0, this program can be set up. Default 10%, 10%~90% Settable	
06	Battery Low to Charge Voltage	 Only valid when program 16 is set to "SBU" priority Default 46.0V, 44.0V~54.0V Settable	
07	Battery Low to Charge Soc	 Only valid when program 16 is set to "SBU" priority and program 0 is set to lithium battery. Default 20%, 10%~90% Settable	
08	Battery Back to Discharge Voltage	 Only valid when program 16 is set to "SBU" priority Default 48.0V, 48.0V~60.0V Settable	
09	Battery Back to Discharge Soc	 Only valid when program 16 is set to "SBU" priority and program 0 is set to lithium battery. Default 70%, 10%~90% Settable	
10	Battery Max Charge Current	 It is only valid when the BMS is not communicating. Default 60A, 1A~120A Settable	
11	Max AC Charge Current	 It is only valid when the BMS is not communicating. Default 30A, 1A~120A Settable	
12	Output Mode	**Single** (Default) 	**Parallel** 
		L1 Phase 	**L2 Phase** 

		L3 Phase  When the units are used in parallel with single phase, please select "PAL" in program 12. It requires 3 inverters to support three-phase equipment, 1 inverter in each phase. Please select "3P1" in program 12 for the inverters connected to L1 phase, "3P2" in program 12 for the inverters connected to L2 phase and "3P3" in program 12 for the inverters connected to L3 phase.
13	Output Voltage	**230V**(Default)  **240V**  **220V** 
14	Output Frequency	**50Hz**(Default)  **60Hz** 
15	Grid input Range	**Appliance** (default)  **UPS** 
16	Output Priority	**USB**(Default, Utility >> PV >>Battery)  Utility provides power to the loads first. PV and battery will provide power to loads only when utility is not available. **SUB(PV >> Utility >> Battery)**  PV provides power to the loads first. If PV is not sufficient, utility will supply power to the loads at the same time. Battery will provide power to loads only when utility is not available. **SBU** (PV >> Battery >>Utility)  PV provides power to the loads first. If PV is not sufficient, battery will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to the setting point in program 6.

17	Battery Charge Priority	**Solar first** (Default)  PV will charge battery first. Utility will charge battery only when PV is unavailable.
		Solar and Utility  PV and utility will charge battery together.
		Only Solar  Only PV can charge the battery.
18	Grid Feed-in Function	**Grid Feed-in Function disable**(Default)  If program 36 is set to "Gen", it won't be valid. If disabled, the inverter won't feed power to grid
		Grid Feed-in Function enable  If program 36 is set to "Gen", it won't be valid. If enabled, the inverter will feed power to grid when there is excess PV energy.
19	Maximum Grid Feed-in Power Ratio	 Default 0. Setting range is from 0-100. Set the maximum ratio of exported power to the inverter rated power.
20	Overload Bypass	**Enable** (Default) 
		Disable 
21	Overload Restart	**Enable** (Default) 
		Disable 
22	Overheat Restart	**Enable** (Default) 

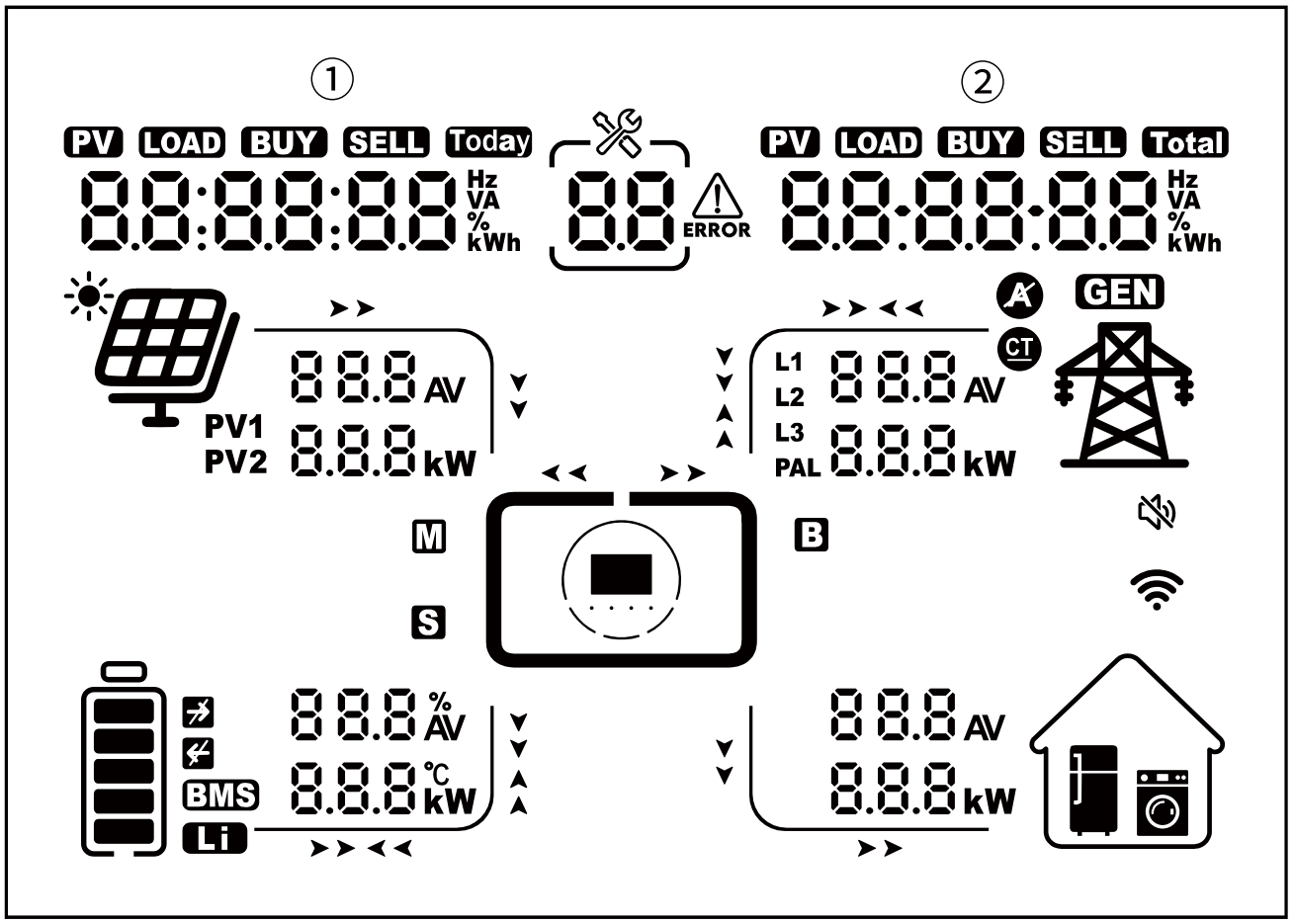
		Disable 
23	LCD On Time	 Default 5 minutes. Setting range is from 5 to 999 minutes. The screen will automatically turn off when the screen-on time reaches the setting value.
24	Auto Back To Main Page	**Disable**(Default) 
		Enable 
25	Buzzer Alarm	**Enable**(Default)  Buzzer priority order: Fault indication>>Alarm indication>> Keypress feedback. When alarm is enabled, in the event of an inverter fault, the buzzer will sound continuously. In the event of an alarm, the buzzer will sound at regular intervals. For a more detailed description, please refer to the sections on " Fault Reference Code" and " Warning Indicator".
		Disable  With alarms disabled, the buzzer functions solely to indicate a keypress.
26	Restore Default Setting	**Disable**(Default) 
		Enable  If you select Enable, settings of the inverter will be reset to default setting value
27	Fan Work Mode	**Performance Mode**  In performance mode, the inverter will perform at its highest performance.
		Balanced Mode  Balanced mode, applicable to the condition of 80% output power and 90A charge current limitation, to reduce additional noise greatly.

		Silent Mode  Silent mode, applicable to the condition of 60% output power and 70A charge current limitation, to reduce additional noise extremely.
28	Real time setting---Year	 Default 25 Setting range is from 25 to 99
29	Real time setting---Month	 Default 1 Setting range is from 1 to 12
30	Real time setting---Date	 Default 1 Setting range is from 1 to 31
31	Real time setting---Hour	 Default 0 Setting range is from 0 to 23
32	Real time setting---Minute	 Default 0 Setting range is from 0 to 59
33	Real time setting---Second	 Default 0 Setting range is from 0 to 59
34	Clear Running Data	**Disable**(Default) 
		Enable  If you select Enable, running data of the inverter will be cleared.
35	External CT Direction Reverse	**Disabled**(Default)  If disabled, the inverter will use the direction detected by the CT as the reference.

		Enable  If enabled, the inverter will use the direction opposite that detected by the CT as the reference.
36	Grid input port function	**Grid** (Default)  When selected, input port is used for grid input.
		Generator  When selected, AC input port is used for generator input.

Display Information

The LCD display information will be switched automatically. The selectable information is switched as below order: PV Generation, Load Consumption, Grid Consumption, Grid Feed-in Energy, time. If BMS communication is built, battery part will show battery SOC and battery temperature information.



Base Information	LCD display
①Today PV Generation ②Total PV Generation	PV Today 0003.1 kWh PV Today 0045.3 kWh
①Today Load Consumption ②Total Load Consumption	LOAD Today 0003.7 kWh LOAD Today 0028.6 kWh
①Today's Grid Consumption ②Total Grid Consumption	BUY Today 0800.0 kWh BUY Today 0007.1 kWh

①Today's Grid Feed-in Energy ②Total Grid Feed-in Energy	
Time (2025/1/1 00:28:36)	

When you enter System management page -BMS Info page, the selectable information is switched Manually as below order.

Index	BMS Information	LCD display
0	①Bat number ②SOH	
1	①Max cell voltage ②Max cell voltage ID	
2	①Min cell voltage ②Max cell voltage ID	
3	①Max cell temperature ②Max cell temperature ID	
4	①Min cell temperature ②Min cell temperature ID	

5	①Cell average temperature ②Mosfet average temperature	
6	①Max charging current ②Max discharging current	
7	①BMS charging volt limit ②BMS discharging volt limit	

When you enter System management page -System Info page, the selectable information is switched Manually as below order.

Index	Sys Information	LCD display
0	①MCU2 Version ②MCU1 Version	

Operating Mode Description

Operation mode	Description	Led display
Standby mode **Note:** *Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output.	No output is supplied by the unit, but it still can charge batteries.	The LED of working mode will flash white.
Fault mode Note: *Fault mode: Errors are caused by inside circuit or external reasons such as over temperature, output short circuited and so on.	The inverter won't output and charge battery.	If fault occurs, the LED of working mode will be red which is always on. If alarm occurs, the LED of working mode will flash red.
Line Mode	The unit will provide output power from the mains. It can also charge the battery at line mode.	The LED of working mode will flash green.
Battery Mode	The unit will provide output power from battery and PV power.	The LED of working mode will flash blue.

Parallel Installation Guide

Introduction

This inverter can be used in parallel with two different operation modes.

1. Parallel operation in single phase with up to 10 units.
2. Maximum 10 units work together to support 3-phase equipment. Four units support one phase maximum.

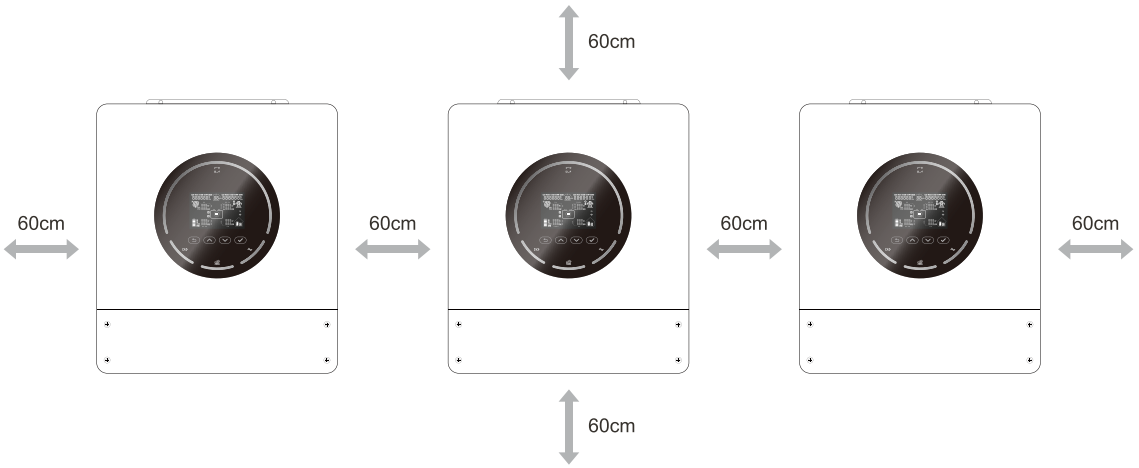
Note 1: Under parallel operation modes, battery must be connected with inverters.

Note 2: Before starting up inverters, please connect all positive (+) and negative (-) wires of battery together.

Mounting the Unit

When installing multiple units, please follow the chart below.

Note: For proper air circulation to dissipate heat, allow a clearance of approx. 60cm to the side and approx. 60 cm above and below the unit. Be sure to install each unit at the same level.



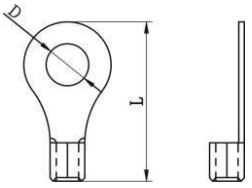
Wiring Connection

The cable size of each inverter is shown as below

Recommended battery cable and terminal size for each inverter:

Model	Wire Size	Torque value
TG6200	1 * 2 AWG	2-3 Nm

Ring terminal:



WARNING: Be sure the length of all battery cables is the same. Otherwise, there will be voltage difference between inverter and battery to cause parallel inverters not working.

You need to connect the cables of each inverter together. Take the battery cables for example: You need to use a connector or bus-bar as a joint to connect the battery cables together, and then connect to the battery terminal. The cable size used from joint to battery should be X times cable size in the tables above. "X" indicates the number of inverters connected in parallel.

In a parallel system, regardless of whether it is a single-phase or three-phase configuration, only one CT is required for each phase. The installation position and orientation of the CT should follow the instructions described in the "CT Installation" section. When there are two or more units per phase, multiple RJ45 T-connectors can be used to connect the CT cables to the inverters.

Regarding Grid input and output, please also follow the same principle.

Recommended Grid input and output cable size for each inverter:

Model	Gauge	Torque Value
TG6200-48	1 * 8 AWG	1.2-1.6 Nm

CAUTION!! Please install the breaker at the battery and Grid input side. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of battery or Grid input.

Recommended breaker specification of battery for each inverter:

Model	1 unit*
TG6200-48	150A / 60VDC

*If you want to use only one breaker at the battery side for the whole system, the rating of the breaker should be X times current of 1 unit. "X" indicates the number of inverters connected in parallel.

Recommended breaker specification of Grid input with single phase:

Model	2 units	3 units	4 units	5 units	6 units
TG6200-48	100A/230VAC	150A/230VAC	200A/230VAC	250A/230VAC	300A/230VAC

Note1: You can use 50A breaker for TG6200-48 for only 1 unit, and each inverter has a breaker at its Grid input.

Note2: Regarding three phase system, you can use 4 poles breaker, the rating is up to the current of the phase which has the maximum units. Or you can follow the suggestion of note 1.

Recommended battery capacity

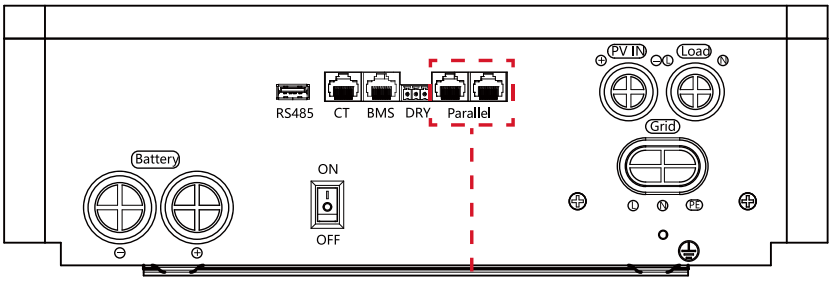
Inverter parallel numbers	2	3	4	5	6
Battery Capacity	400AH	600AH	800AH	1000AH	1200AH

WARNING! Be sure that all inverters will share the same battery bank. Otherwise, the inverters will transfer to fault mode.

Wiring Connection

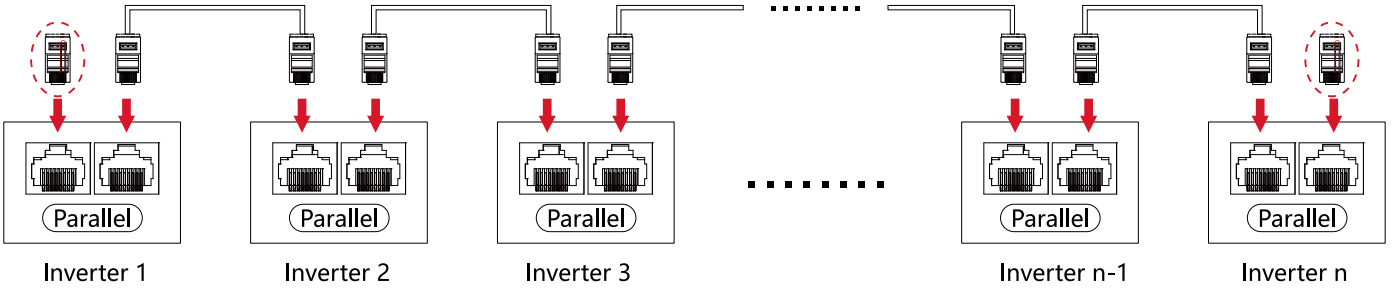
WARNING! All inverters must be connected to the same batteries and ensure each group of cables from the inverters to the batteries in the same length. Before starting up inverters, please connect all Positive (+) and negative (-) wires of battery together

Communication Connection

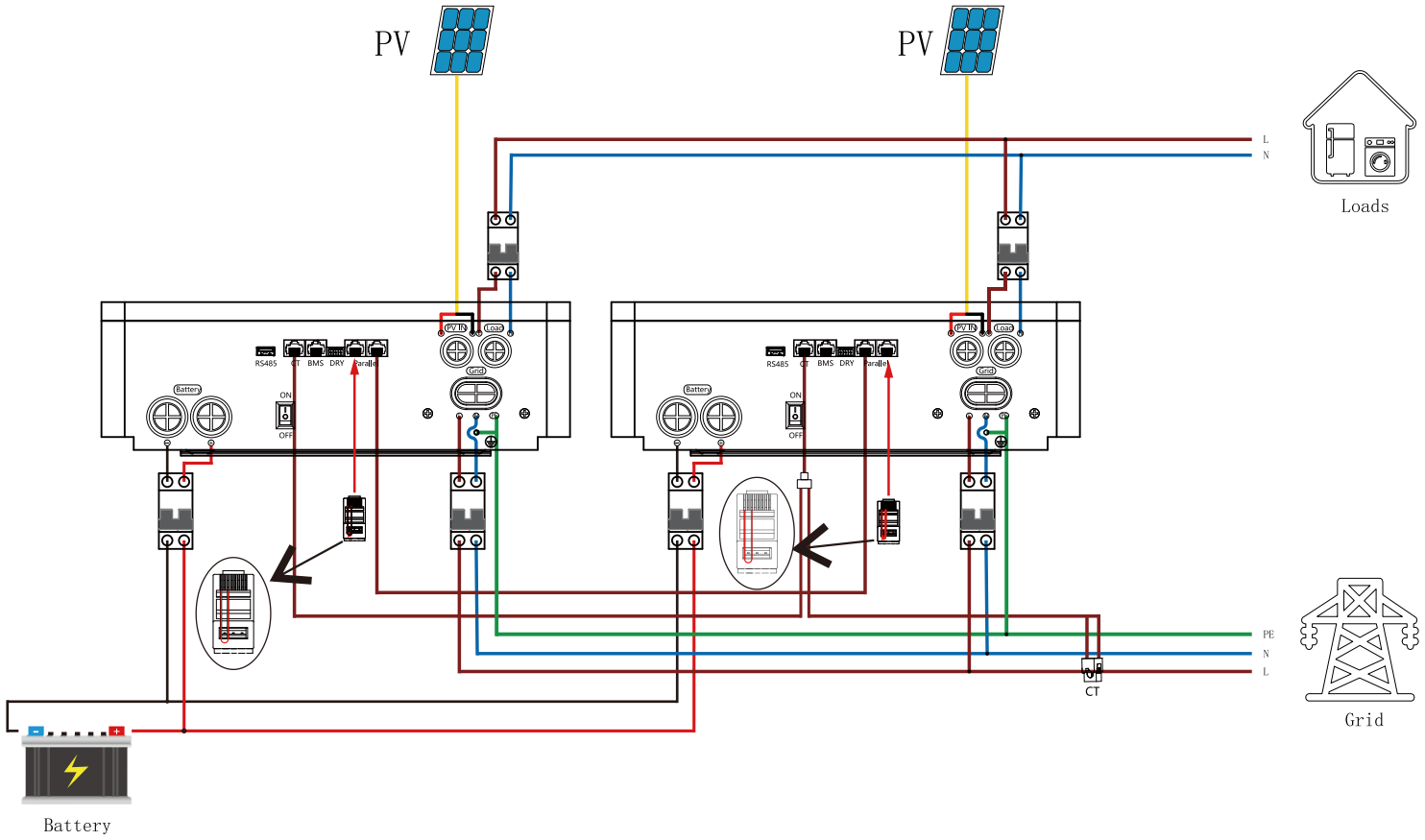


Connect parallel communication connector to the first one and the last one

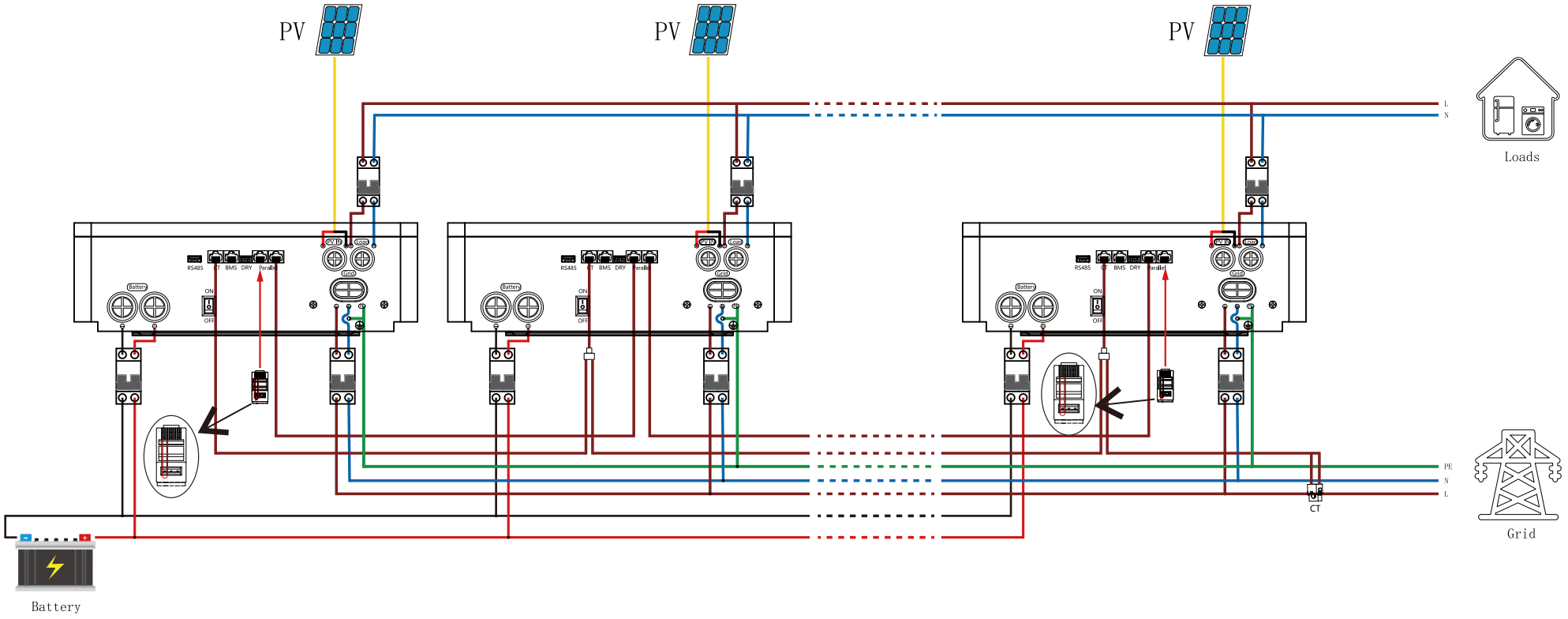
Connect parallel communication cable one by one



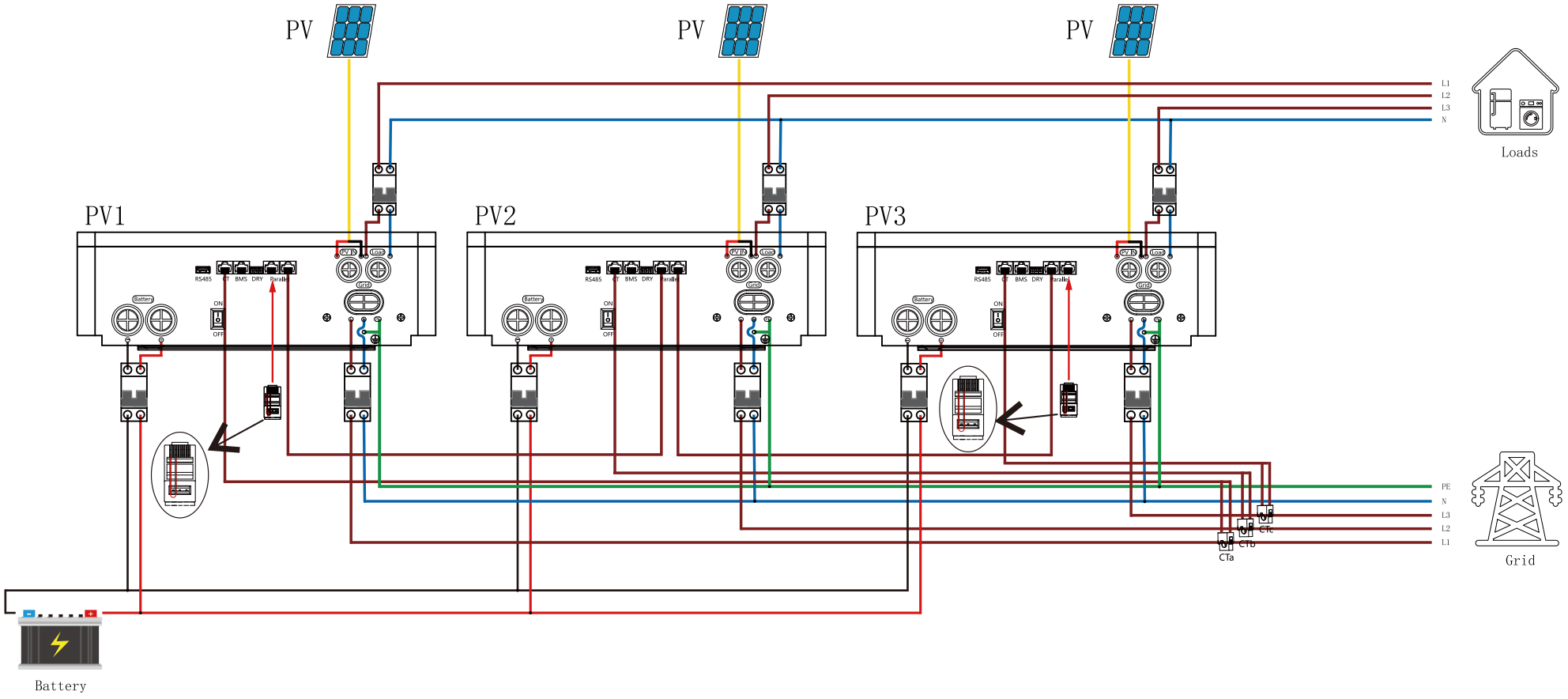
Single Phase Parallel connection diagram for two inverters in parallel



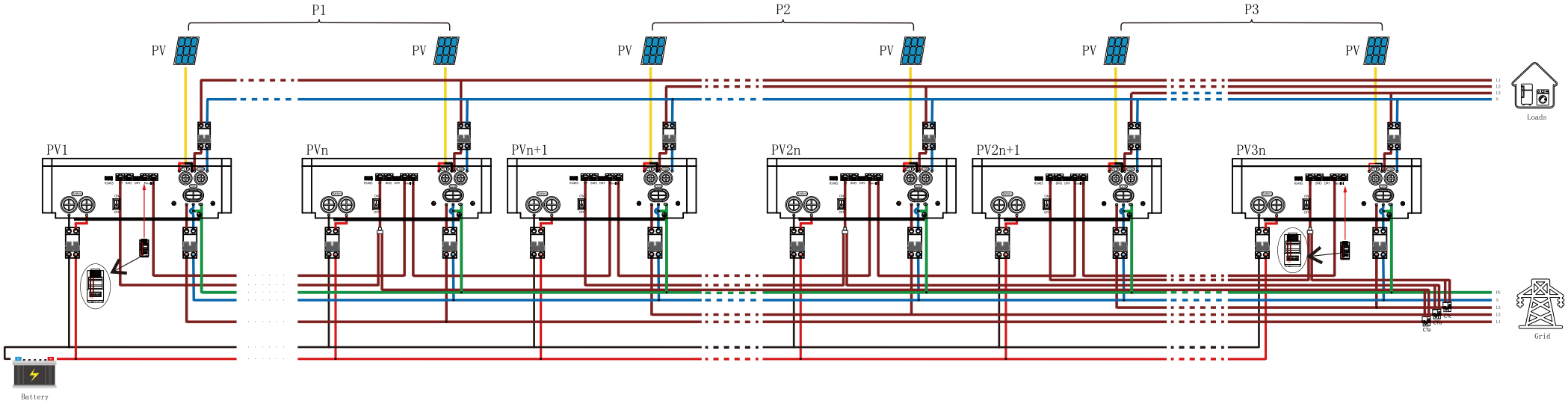
Single Phase Parallel connection diagram for 3-10 inverters in parallel



Three Phase Parallel connection diagram for three inverters in parallel



Three Phase Parallel connection diagram for 4-10 inverters in parallel



PV Connection

Please refer to user manual of single unit for PV Connection.

CAUTION: Each inverter should connect to PV modules separately.

LCD Setting and Display

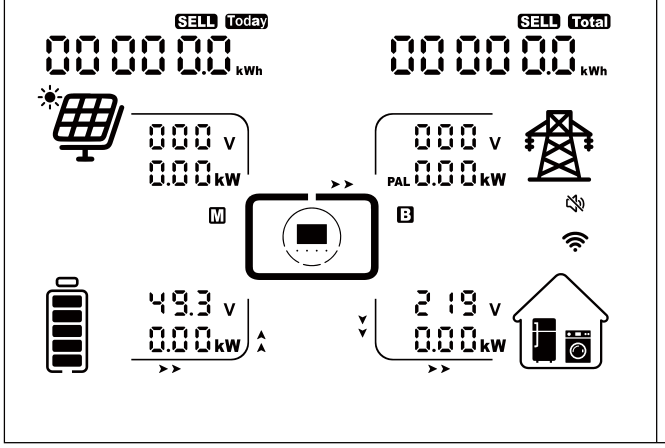
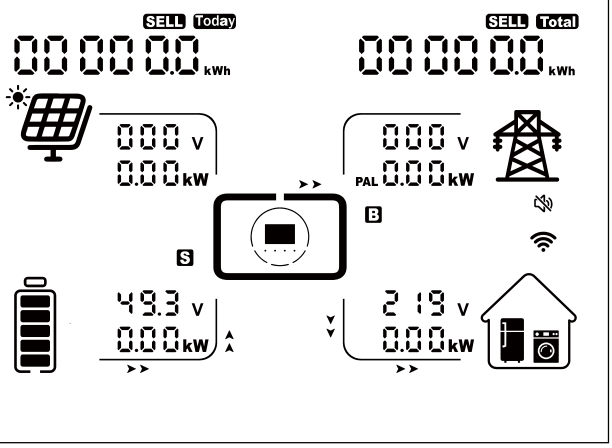
Refer to Program 23.

Parallel in Single Phase

Step 1: Check the following requirements before commissioning:

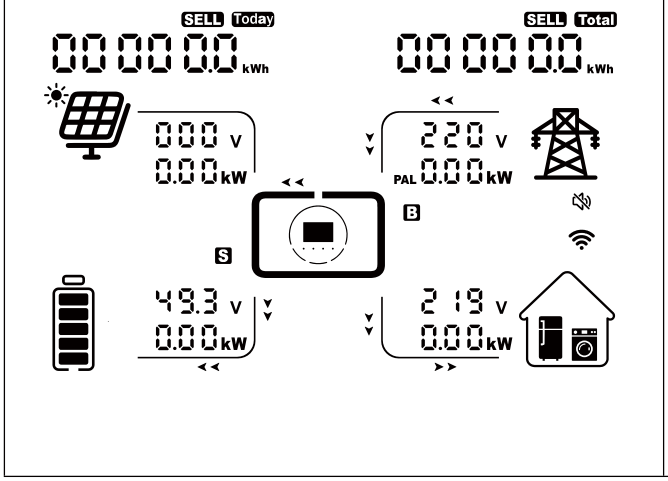
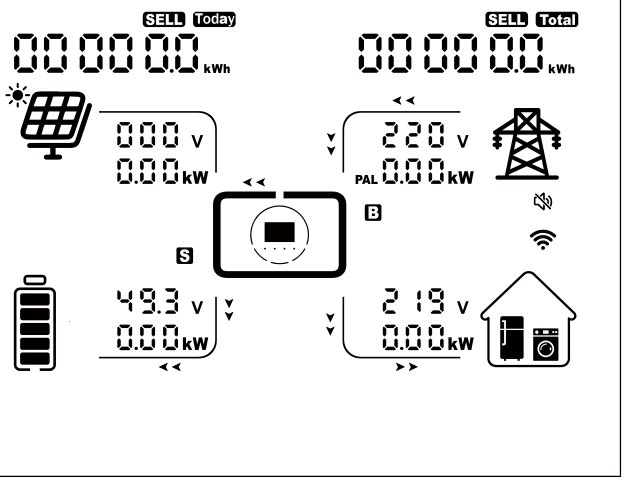
- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step 2: Turn on each unit and set "PAL" in LCD setting program 23 of each unit. And then shut down all units.
Note: It's necessary to turn off switch when setting LCD program. Otherwise, the setting cannot be programmed.
Step 3: Turn on each unit.

LCD display in Master unit	LCD display in Slave unit
	

Note: Master and slave units are randomly defined.

Step 4: Switch on all AC breakers of Line wires in Grid input. It's better to have all inverters connect to utility at the same time. If not, it will display fault 53/54.

LCD display in Master unit	LCD display in Slave unit
	

Step 5: If there is no more fault alarm, the parallel system is completely installed.
Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

Parallel in Three Phase

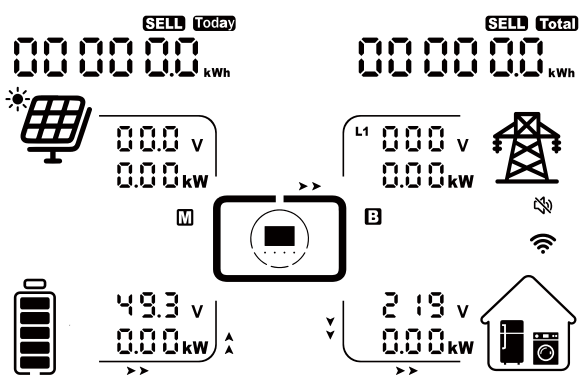
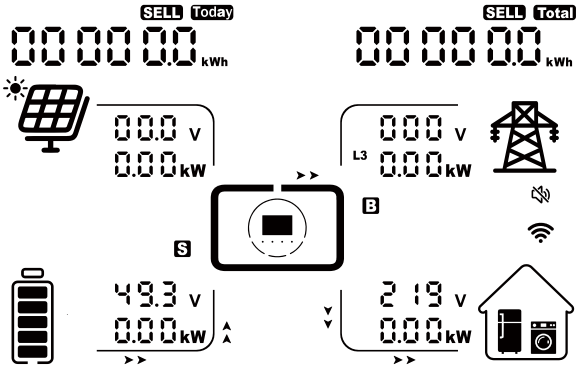
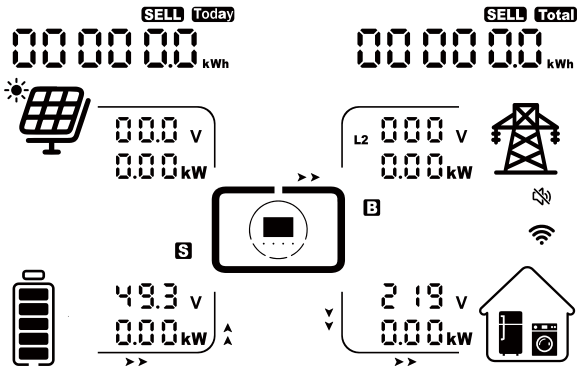
Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

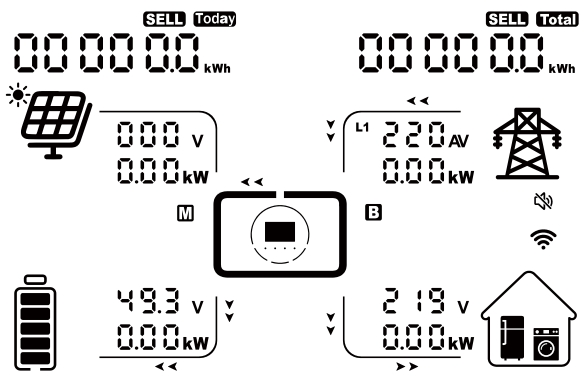
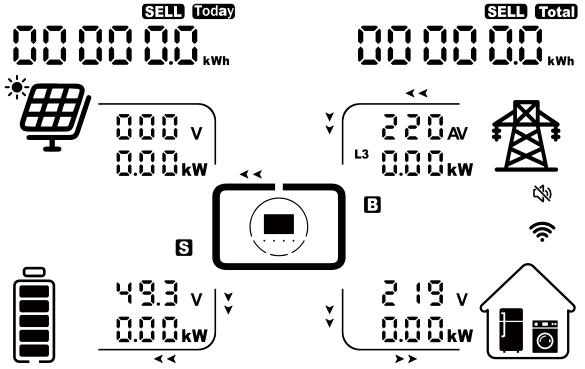
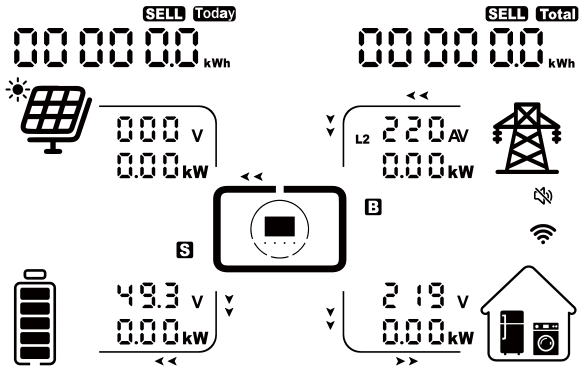
Step 2: Turn on all units and configure LCD program 23 as P1, P2 and P3 sequentially. Then shut down all units.

Note: It's necessary to turn off switch when setting LCD program for safety.

Step 3: Turn on all units sequentially.

LCD display in L1-phase unit	LCD display in L3-phase unit
	
LCD display in L2-phase unit	
	

Step 4: Switch on all AC breakers of Line wires in Grid input. If AC connection is detected and three phases are matched with unit setting, they will work normally. Otherwise, they will display fault 53/54 and will not work in the line mode.

LCD display in L1-phase unit	LCD display in L3-phase unit
	
LCD display in L2-phase unit	
	

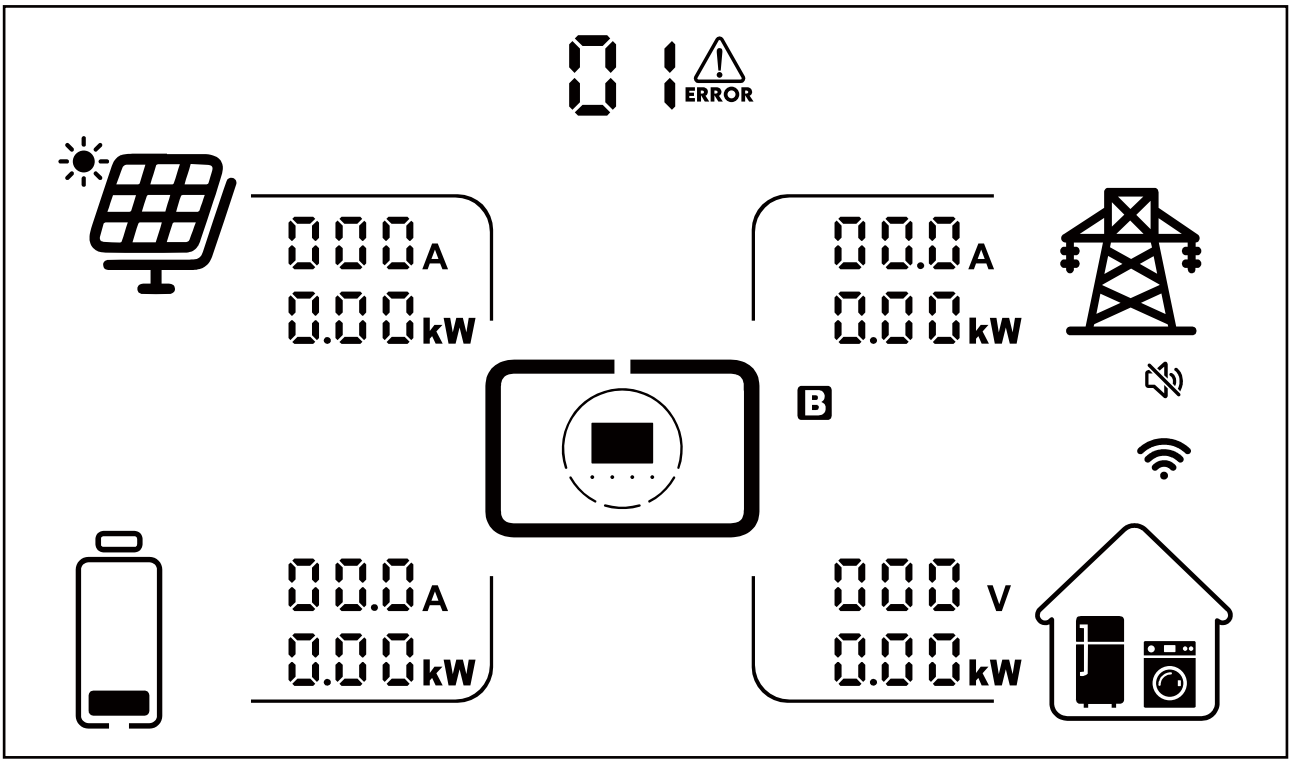
Step 5: If there is no more fault alarm, the system to support 3-phase equipment is completely installed.
Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

Note 1: To avoid overload occurring, before turning on breakers in load side, it's better to have whole system in operation first.
Note 2: Transfer time for this operation exists. Power interruption may happen to critical devices, which cannot bear transfer time.

Fault Reference Code

When the inverter experiences a fault event, the inverter LCD will display as shown in the figure below.

For detailed fault code information, please refer to the table below.



Fault Code	Fault Event	Trouble Shooting
1	Fan Lock	1.Check whether all fans are working properly. 2.Replace the fan.
3	Battery Over Voltage	Restart the unit, if the error happens again, please return to repair center.
5	Output Short Circuit	Check if spec and quantity of batteries meet requirements.
6	Output Voltage High	Check if wiring is connected well and remove abnormal load.
7	Overload	Reduce the connected load by switching off some equipment.
8	Bus Over Voltage	1. If you connect to a lithium battery without communication, check whether the voltage points of the program 2 and 3 are too high for the lithium battery. 2. Restart the unit, if the error happens again, please return to repair center.
9	Bus Soft Start Fail	Restart the unit, if the error happens again, please return to repair center.
10	Bus Under Voltage	
11	Inversion Soft Start Fail	
12	Inversion Soft Start Over Current	
13	Inversion Hardware Over Current	
14	Inversion Voltage Low	

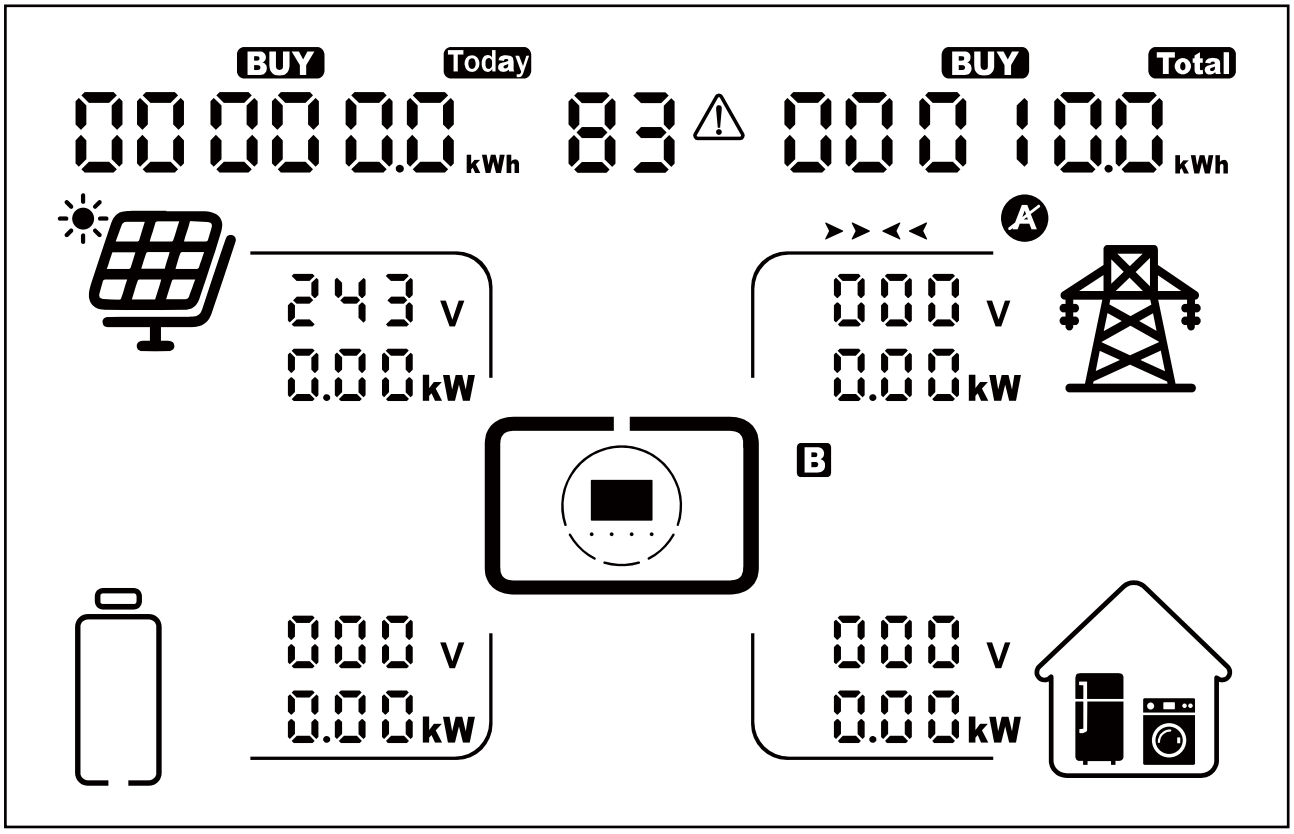
16	Output CT Senser Fault	
18	Input Output Reverse	
19	Output Relay Abnormal	
21	DC-DC Over Current	
22	DC-DC CT Senser Fault	
23	DC-DC Avg CT Senser Fault	
24	DC-DC Soft Start Time Out	
25	DC-DC Hardware Over Current	
26	LLC Over Current	
27	LLC Transformer Fault	
31	PV Circuit Over Temperature	1. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high. 2.Check whether the thermistor plug is loose.
32	Inversion Circuit Over Temperature	
33	ConvertL Circuit Over Temperature	
34	ConvertH Circuit Over Temperature	
35	LLC Over Temperature	
36	Inversion CT Senser Abnormal	Restart the unit, if the error happens again, please return to repair center.
37	Inversion Negative Power	1. Check whether the AC output is connected to the grid input. 2. Check whether Program 13 settings are the same for all parallel inverters 3. Check whether all neutral wires of all parallel units are connected. If problem still exists, contact repair center.
41	PV Over Voltage	Reduce the number of PV modules in series.
42	PV Short Circuit	Check if wiring is connected well.
43	Solar Power Abnormal	Restart the unit, if the error happens again, please return to repair center.
44	Solar Input Over Current	
46	MCU Communication Loss	
47	Register Fault	Contact repair center to active.
50	Can Communication Fail	1. Check whether the parallel communication cables are connected well. 2. Check whether Program 12 settings are right for the parallel system. 3. If problem still exists, contact repair center
51	Parallel HOST Line Loss	

52	Parallel Sync Line Loss	
53	Parallel Output Setting Different	1.Make sure the parallel settings are the same system (single or parallel; 3P1,3P2,3P3). 2.Make sure all phases inverters are powered on.
54	Single Phase Parallel Install Fault	Check if Grid input wires of all inverters are connected well.
		Change the input phase S and T wiring.
55	Parallel Version Different	Contact repair center

Note1: If the inverter is in fault mode (for example, due to an overload) and does not automatically recover within 5 minutes, please turn off the inverter switch for 15 seconds, then turn it back on. The inverter will attempt to recover automatically. If it still does not operate normally, please contact professional after-sales service for assistance.

Warning Indicator

When the inverter is currently experiencing only alarm events, the top information bar of the inverter's LCD will display as shown in the figure below.



For detailed alarm code information, please refer to the table below.

Warning Code	Warning Event	Audible Alarm	Trouble Shooting
1	Battery Low	Beep once every 5 second	Re-charge battery.
2	Battery Weak	Beep once every 5 second	Replace battery.
3	Battery Open	Beep once every 5 second	Check if battery wires are connected well.
4	Battery Under	Beep once every 5 second	Re-charge battery.
5	Overload	Beep once every second	Reduce the connected load by switching off some equipment.
6	Remote Off	No beep	Contact repair center
9	Output Disconnect	Beep once every 3 second	1. Please check if single unit is installed to parallel system. 2. If this error happens during parallel installation, please check wires connection. If they are connected correctly, please finish parallel installation first, and then restart inverters. 3. If the problem remains, please contact your installer

10	Right Fan Lock	Beep once every 3 second	1.Check whether all fans are working properly. 2.Replace the fan.
11	Left Fan Lock	Beep once every 3 second	
17	Inversion Over Temperature	Beep once every second	1.Check whether the air flow of the unit is blocked or whether the ambient temperature is too high. 2.Check whether the thermistor plug is loose.
18	Inversion Temperature Sensor Abnormal	Beep once every second	Check whether the thermistor plug is loose.
19	Solar Boost Over Temperature	Beep once every second	1.Check whether the air flow of the unit is blocked or whether the ambient temperature is too high. 2.Check whether the thermistor plug is loose.
20	Solar Boost Temperature Sensor Abnormal	Beep once every second	Check whether the thermistor plug is loose.
21	LLC_TXT Over Temperature	Beep once every second	1.Check whether the air flow of the unit is blocked or whether the ambient temperature is too high. 2.Check whether the thermistor plug is loose.
22	LLC_TXT Temperature Sensor Abnormal	Beep once every second	Check whether the thermistor plug is loose.
23	ConvertL Over Temperature	Beep once every second	1.Check whether the air flow of the unit is blocked or whether the ambient temperature is too high. 2.Check whether the thermistor plug is loose.
24	ConvertL Temperature Sensor Abnormal	Beep once every second	Check whether the thermistor plug is loose.
25	ConvertH Over Temperature	Beep once every second	1.Check whether the air flow of the unit is blocked or whether the ambient temperature is too high. 2.Check whether the thermistor plug is loose.
26	ConvertH Temperature Sensor Abnormal	Beep once every second	Check whether the thermistor plug is loose.

Note: To restart the inverter, all power sources need to be disconnected. After the LCD screen light is off, only use the battery to boot.

Specifications

Table 1 Line Mode Specifications

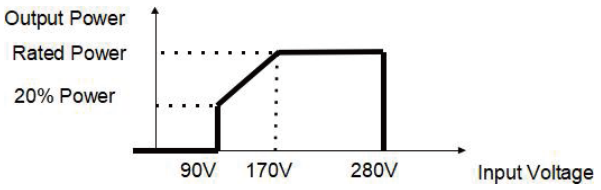
INVERTER MODEL	**TG6200-48**
Input Voltage Waveform	Sinusoidal (utility or generator)
Nominal Input Voltage	230Vac
Low Loss Voltage	170Vac±3V (UPS); 90Vac±3V (Appliances)
Low Loss Return Voltage	180Vac±3V (UPS); 100Vac±3V (Appliances)
High Loss Voltage	280Vac±3V
High Loss Return Voltage	270Vac±3V
Max Grid input Voltage	280Vac±3V
Nominal Input Frequency	50Hz / 60Hz (Auto detection)
Low Loss Frequency	40±1Hz
Low Loss Return Frequency	42±1Hz
High Loss Frequency	65±1Hz
High Loss Return Frequency	63±1Hz
Output Short Circuit Protection	Line mode: Circuit Breaker Battery mode: Electronic Circuits
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)
Transfer Time	10ms typical, 20ms Max@ Single <30ms @ Parallel
Output power derating: When Grid input voltage drops to 170V, the output power will be derated.	

Table 2 Inverter Mode Specifications

INVERTER MODEL	TG6200-48
Rated Output Power	6.2KVA/6.2KW
Output Voltage Waveform	Pure Sine Wave
Output Voltage Regulation	230Vac±5%
Output Frequency	50Hz
Nominal Output Current	27.5A
Max. Output Fault Current/ Duration	80A/ 300μs
Max. Output Overcurrent Protection	40A
Peak Efficiency	93%
Overload Protection	5s@≥150% load; 10s@110%~150% load
Surge Capacity	2* rated power for 10 seconds
Nominal DC Input Voltage	48Vdc
Cold Start Voltage (Lead-Acid Mode)	46.0Vdc
Cold Start SOC (Li Mode)	Default 20%, Battery Discharge Soc Limit +10%
Low DC Warning Voltage (Lead-Acid Mode)	44.0Vdc @ load < 20% 42.8Vdc @ 20% ≤ load < 50% 40.4Vdc @ load ≥ 50%
Low DC Warning Return Voltage (Lead-Acid Mode)	46.0Vdc @ load < 20% 44.8Vdc @ 20% ≤ load < 50% 42.4Vdc @ load ≥ 50%
Low DC Cut-off Voltage (Lead-Acid Mode)	42.0Vdc @ load < 20% 40.8Vdc @ 20% ≤ load < 50% 38.4Vdc @ load ≥ 50%
Low DC Cut-off Voltage (Li Mode)	42.0Vdc
Low DC Warning SOC (Li Mode)	Battery Discharge Soc Limit +5%
Low DC Warning Return SOC (Li Mode)	Battery Discharge Soc Limit +10%
Low DC Cut-off SOC (Li Mode)	Default 10%, 10%~90% settable
High DC Recovery Voltage	60Vdc
High DC Cut-off Voltage	62Vdc
No Load Power Consumption	<60W

Table 3 Charge Mode Specifications

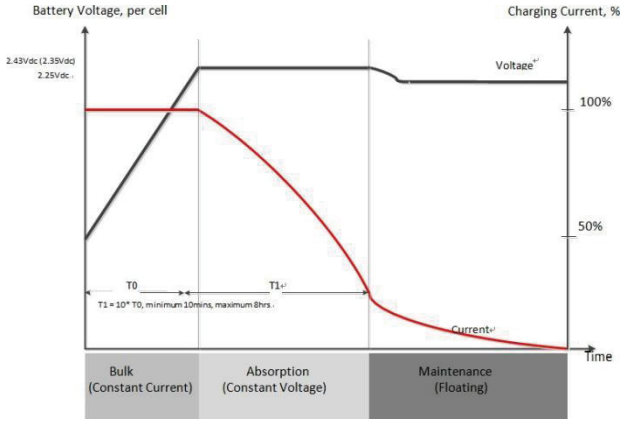
Utility Charging Mode		
INVERTER MODEL		**TG6200-48**
Charging Algorithm		3-Step
Max. AC Charging Current		120Amp(@$V_{I/P}$=230Vac)
Bulk Charging Voltage	**Flooded Battery**	58.4Vdc
	AGM / Gel Battery	56.4Vdc
Floating Charging Voltage		54Vdc
Charging Curve		
MPPT Solar Charging Mode		
Max. PV Array Power		9000W
No. of MPP Trackers		1
Max. PV Input Current		27A
Max. Input Short-Circuit Current (A)		35A
Start-up Voltage		80Vdc±10Vdc
PV Array MPPT Voltage Range		85Vdc~450Vdc
Max. PV Array Open Circuit Voltage		500Vdc
Max. Inverter Back Feed Current To The Array		0A
Max. PV Charging Current		120A
Max. Charging Current (AC Charger Plus Solar Charger)		120A
Protection		DC Polarity Reverse Connection Protection, AC Output Overcurrent Protection, Thermal Protection, AC Output Overvoltage Protection, AC Output Short Circuit Protection, Grid Monitoring, Island Protection Monitoring,
Surge protection level		TYPE II(DC), TYPE II(AC)

Table 4 General Specifications

INVERTER MODEL	**TG6200-48**
Safety Certification	CE
Operating Temperature Range	-10℃ to 55℃
Storage temperature	-15℃~ 60℃
Humidity	5% to 95% Relative Humidity (Non-condensing)
Altitude	<2000m
Dimension(D*W*H), mm	428 x 363 x 120
Net Weight, kg	14
Ingress Protection(IP) Rating	IP 54
Safety / EMC Standard	IEC/EN 61000-6-1/2/3/4, IEC/EN 62109-1, IEC/EN 62109-2
Permissible Altitude	2000m