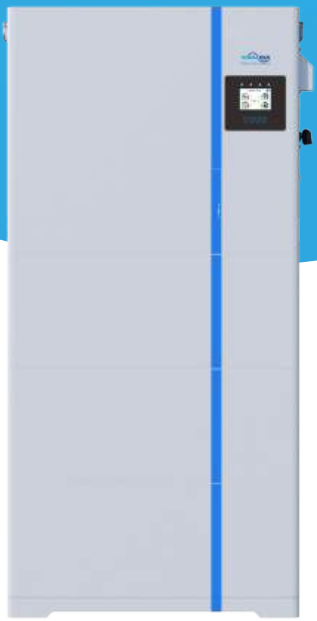
TOMMATECH GmbH
GERMAN-based company

TOMMATECH TRIO HYBRID S SERIES THREE PHASE LV AIO HYBRID INVERTER



- Trio Hybrid S 5K LV AIO
- Trio Hybrid S 6K LV AIO
- Trio Hybrid S 8K LV AIO
- Trio Hybrid S 10K LV AIO
- Trio Hybrid S 12K LV AIO

USER MANUAL

Contents

	Model
Inverter	Trio Hybrid S 5/6/8/10/12K LV AIO
Battery System	Hightech Power S 5.1kWh LV AIO

About This Manual

The manual mainly describes the product information, guidelines for installation, operation and maintenance. The manual cannot include complete information about the photovoltaic (PV) system.

How to Use This Manual

Read the manual and other related documents before performing any operation on the inverter. Documents must be stored carefully and be available at all times.

Contents may be periodically updated or revised due to product development. The information in this manual is subject to change without notice.

1. Safety Introductions

Labels description

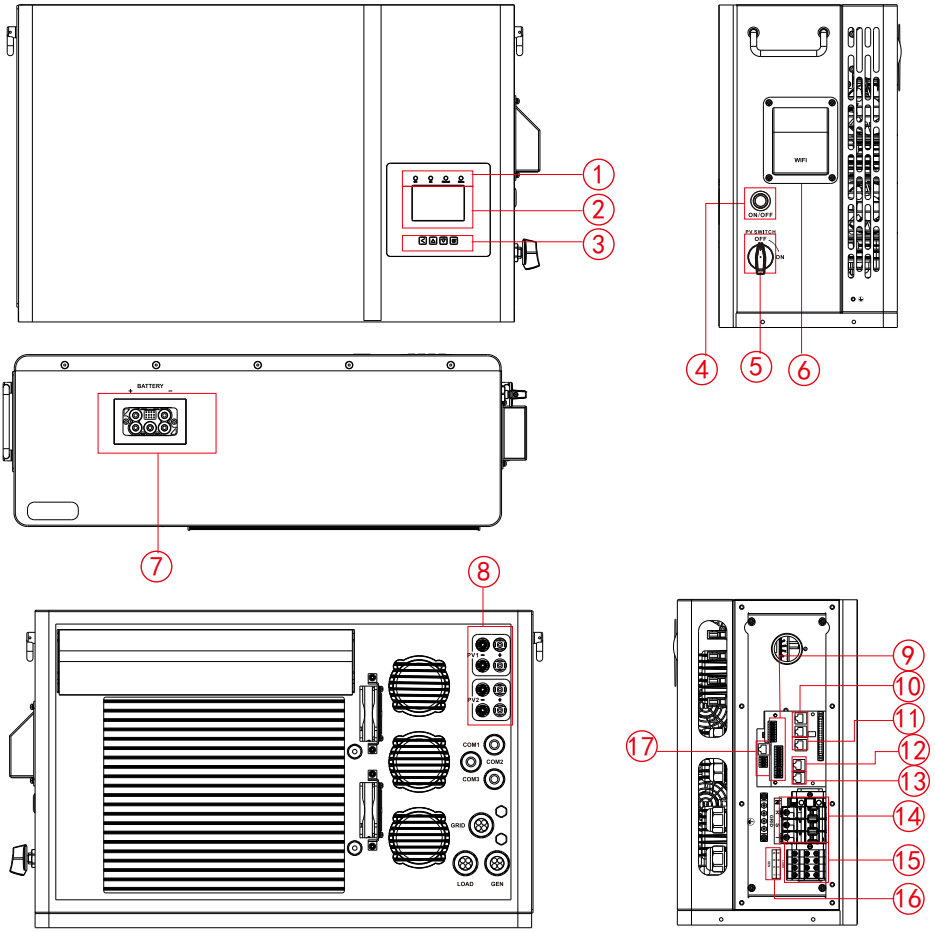
Label	Description
	Caution, risk of electric shock symbol indicates important safety instructions, which if not correctly followed, could result in electric shock.
	The DC input terminals of the inverter must not be grounded.
	Surface high temperature, Please do not touch the inverter case.
	The AC and DC circuits must be disconnected separately, and the maintenance personnel must wait for 5 minutes before they are completely powered off before they can start working.
	CE mark of conformity
	Please read the instructions carefully before use.
	Symbol for the marking of electrical and electronics devices according to Directive 2002/96/EC. Indicates that the device, accessories and the packaging must not be disposed as unsorted municipal waste and must be collected separately at the end of the usage. Please follow Local Ordinances or Regulations for disposal or contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.

· This chapter contains important safety and operating instructions. Read and keep this manual for future reference.
· Before using the inverter, please read the instructions and warning signs of the battery and corresponding sections in the instruction manual.
· Do not disassemble the inverter. If you need maintenance or repair, take it to a professional service center.
· Improper reassembly may result in electric shock or fire.
· To reduce risk of electric shock, disconnect all wires before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
· Caution: Only qualified personnel can install this device with battery.
· Battery needs to be recharged within 48 hours after fully discharged.
· Never charge a frozen battery.
· For optimum operation of this inverter, please follow required specification to select appropriate cable size. It is very important to correctly operate this inverter.
· Be very cautious when working with metal tools on or around batteries. Dropping a tool may cause a spark or short circuit in batteries or other electrical parts, even cause an explosion.
· 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.
· Grounding instructions - this inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
· Never cause AC output and DC input short circuited. Do not connect to the mains when DC input short circuits.

2. Product Introductions

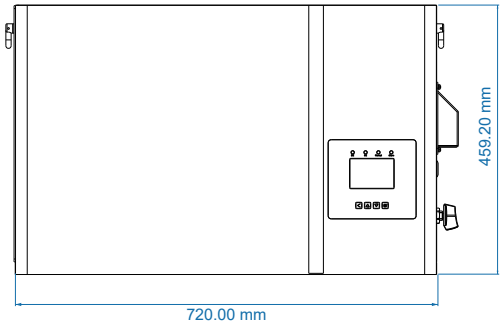
This is an All-in-one energy storage system, integrated 5kW~12kW hybrid inverters and energy storage batteries. Modular stacked design, easy installation, easy expansion, capacity range of 5kWh to 30kWh. Lithium iron phosphate battery, safe and reliable.
This is a multifunctional inverter, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user configurable and easy accessible button operation such as battery charging, AC/solar charging, and acceptable input voltage based on different applications.

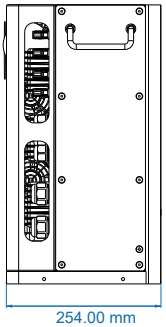
2.1 Product Overview



1: Inverter indicators
2: LCD display
3: Function buttons
4: Power on/off button
5: DC switch
6: WiFi Interface
7: Battery input connectors
8: PV input with two MPPT
9: Function port
10: Parallel port
11: Meter-485 port
12: Modbus port
13: BMS port
14: Grid port
15: Load port
16: Generator port
17: DRMs and DI Ports

2.2 Product Size





Inverter Size

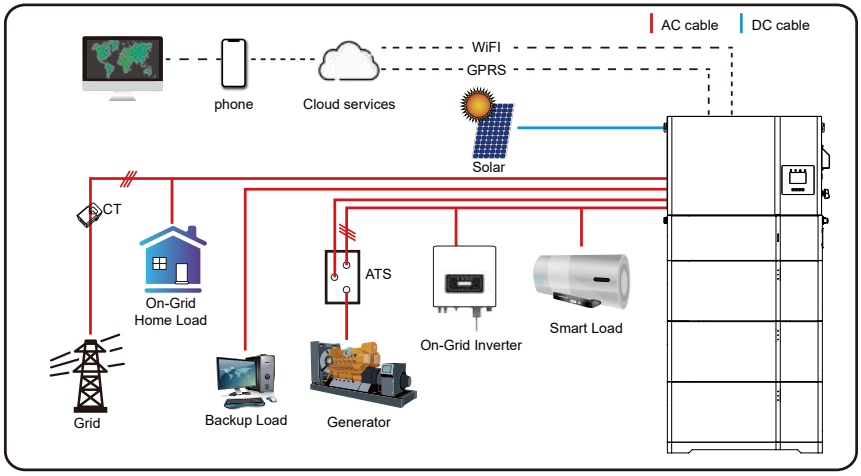
2.3 Product Features

- 230V/400V Three phase Pure sine wave inverter.
- Self-consumption and feed-in to the grid.
- Auto restart while AC is recovering.
- Programmable supply priority for battery or grid.
- Programmable multiple operation modes: On grid, off grid and UPS.
- Configurable battery charging current/voltage based on applications by LCD setting.
- Configurable AC/Solar/Generator Charger priority by LCD setting.
- Compatible with mains voltage or generator power.
- Overload/over temperature/short circuit protection.
- Smart battery charger design for optimized battery performance
- With limit function, prevent excess power overflow to the grid.
- Supporting WIFI monitoring and build-in 2 strings of MPP trackers..
- Smart settable three stages MPPT charging for optimized battery performance.
- Time of use function.
- Smart Load Function.

2.4 Basic System Architecture

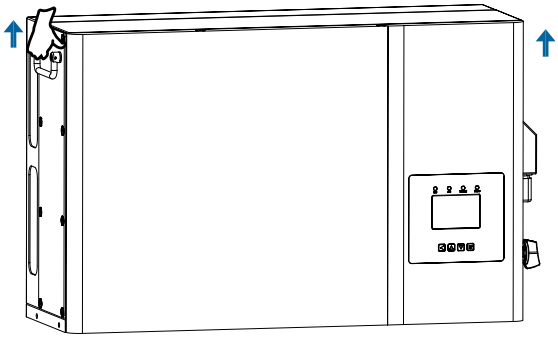
The following illustration shows basic application of this inverter.
It also includes following devices to have a Complete running system.
- Generator or Utility
- PV modules

Consult with your system integrator for other possible system architectures depending on your requirements.
This inverter can power all kinds of appliances in home or office environment, including motor type appliances such as refrigerator and air conditioner.



2.5 Product handling requirements

Lift the inverter out of the packaging box and transport it to the designated installation location.



CAUTION:

Improper handling may cause personal injury!

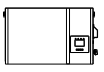
- Arrange an appropriate number of personnel to carry the inverter according to its weight, and installation personnel should wear protective equipment such as anti-impact shoes and gloves.
- Placing the inverter directly on a hard ground may cause damage to its metal enclosure. Protective materials such as sponge pad or foam cushion should be placed underneath the inverter.
- Move the inverter by one or two people or by using a proper transport tool.
- Move the inverter by holding the handles on it. Do not move the inverter by holding the terminals.

3. Installation

3.1 Parts List

Check the equipment before installation. Please make sure nothing is damaged in the package. You should have received the items in the following package:

Inverter package


Hybrid inverter x1


L-type Hexagon wrench x1

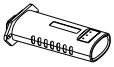

Battery temperature sensor x1


Parallel communication cable x1

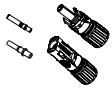

Stainless steel mounting screws M4*12 x2

User manual x1


Sensor Clamp x 3


Data logger(optional) x1


Meter(optional) x 1

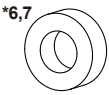

DC+/DC- Plug connectors including metal terminal xN


Solar Photovoltaic Connector Special Spanner x1

Magnetic ring for Meter communication cable x1

Magnetic ring for external temperature sensor x1

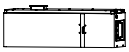
Magnetic ring x3



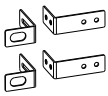
magnetic rings for GEN and Load ports x2

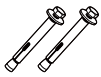
DRM connector x 1

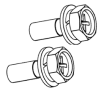
System Power Distribute Unit packaging box


PDU3 x1


Ground wire 2m x1

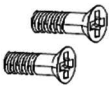

Wall fixing plate x2 sets

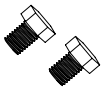

Expansion screws M6*100 x2

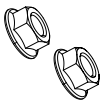

Wall fixing plate mounting screws M4*12 x9

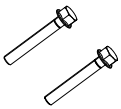

Base x1


Retractable Rack x2

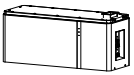

Upper and lower fixing screws M4*6 x4

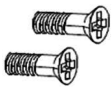

M10*20 bolt x4


M8*Flange nut x4

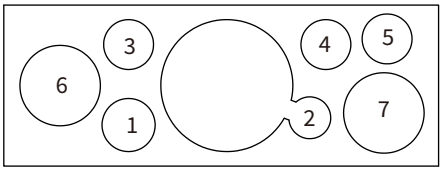

M8*70 bolt x4

Li-ion Battery Pack packaging box


Battery pack x1


Upper and lower fixing screws M4*6 x4

Packing box of magnetic ring



*1: 33×23×15 mm
*2: 25.9×28×13 mm
*3,4,5: 31×29×19 mm
*6,7: 55.5×33×23 mm

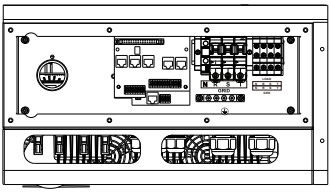
3.2 Mounting instructions

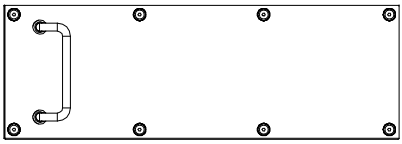
Installation Precaution

This Hybrid inverter is designed for outdoor use(IP65), Please make sure the installation site meets below conditions:

· Not in direct sunlight
· Not in areas where highly flammable materials are stored.
· Not in potential explosive areas.
· Not in the cool air directly.
· Not near the television Antenna or antenna cable.
· Not higher than altitude of about 2000 meters above sea level.
· Not in environment of precipitation or humidity(>95%),Not near the sea.

Please AVOID direct sunlight, rain exposure, snow laying up during installation and operation. Before connecting all wires, please take off the metal cover by removing screws as shown below:

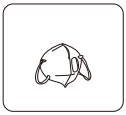


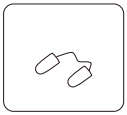


Installations Tools

Installation tools can refer to the following recommended ones. Also, use other auxiliary tools on site.

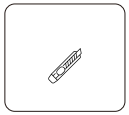

Protective goggles

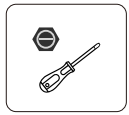

Anti-dust mask


Earplugs

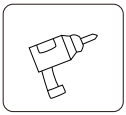

Work gloves


Work shoes


Utlity Knife

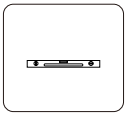

Slotted screwdriver


Cross screwdriver

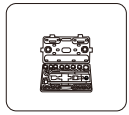

Percussion drill


Pliers

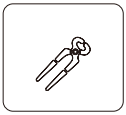

Marker

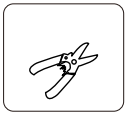

Level

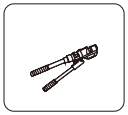

Rubber hammer

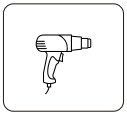

socket wrenches set

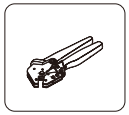

Anti-static wrist strap

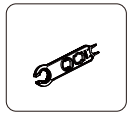

Wire cutter


Wire stripper

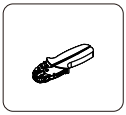

Hydraulic pliers


Heat gun

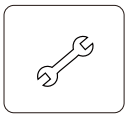

Crimping tool4-6mm²


Solar connector wrench

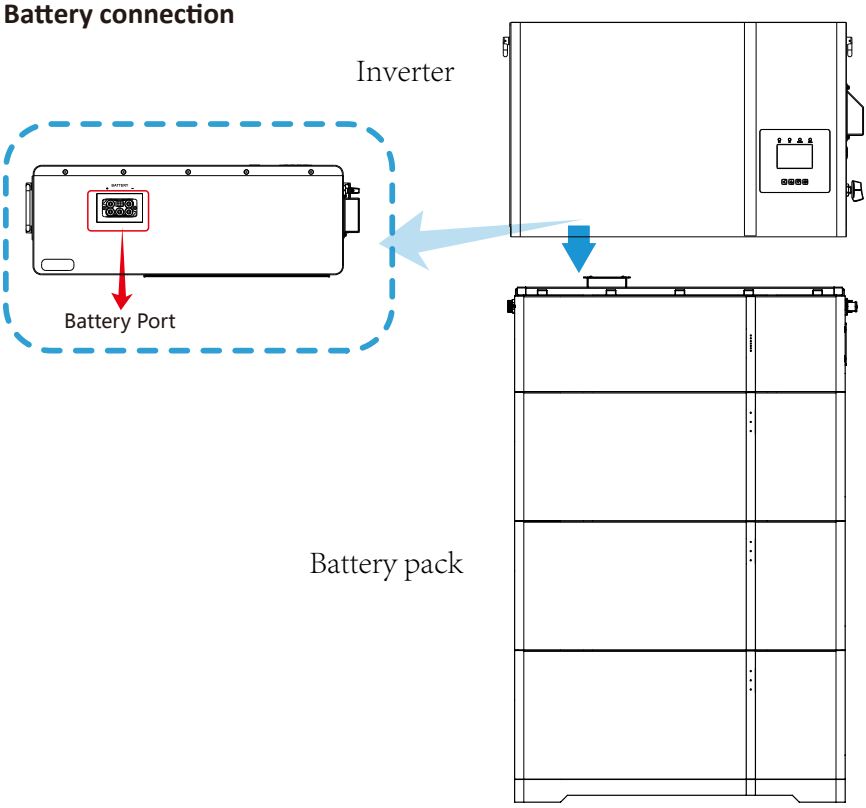

Multimeter ⩾1100 Vdc


RJ45 crimping plier


Cleaner


Spanner

3.3 Battery connection

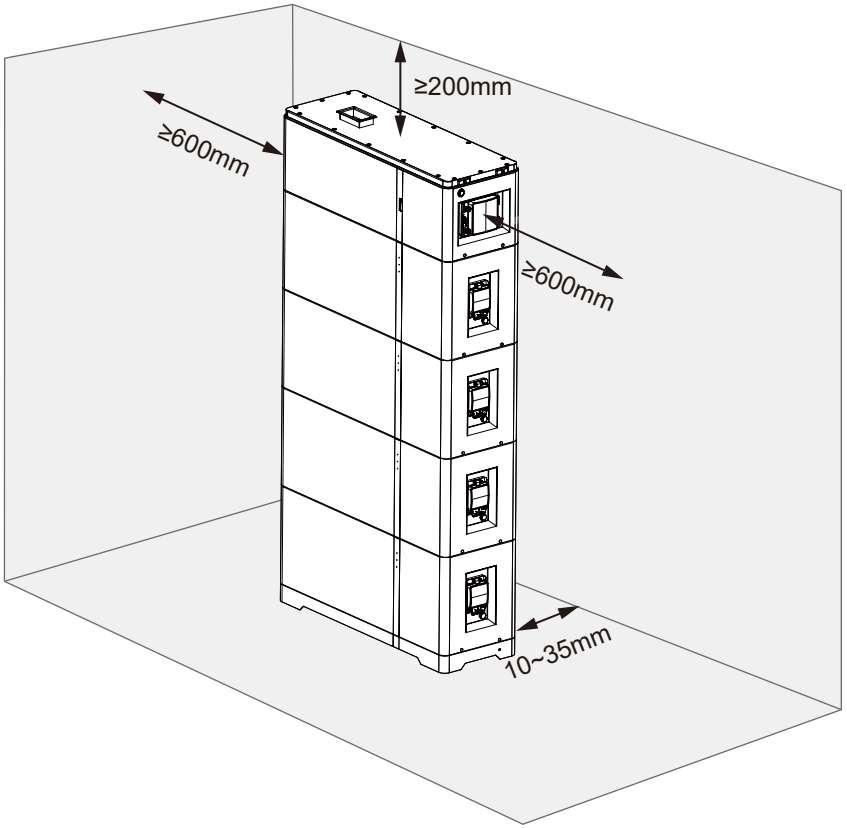


3.3.1 Install the Battery

CAUTION:
Remember that this battery is heavy! Please be careful when lilting out from the package.
The battery module must be installed by at least two persons using movable handles.

3.3.1.1 Selection of installation sites

It is necessary to choose the appropriate installation location site according to the requirements. Batteries should be installed in a clean flat place with no direct sunlight, away from water and fire sources, and at a suitable temperature. The installation location is recommended to meet the size requirements of the figure below:

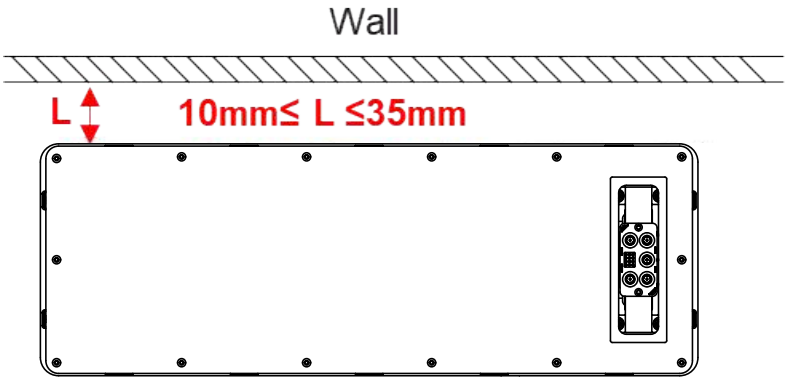


3.3.1.2 Unpacking order

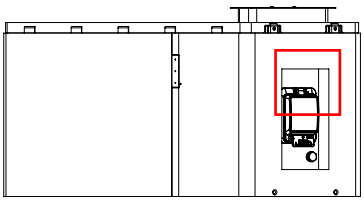
First open the box of System Power Distribute Unit, take out the base and handle. The handle is used to carry the battery module, without the handle the battery module will be difficult to remove from the battery box.

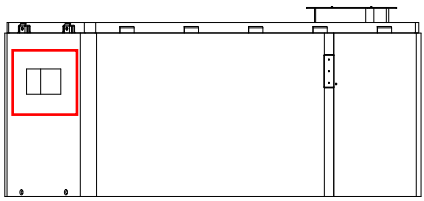
3.3.1.3 Installation order

i. Put the installed base along the wall, and keep the distance of 10~35 mm between the wall and the base.

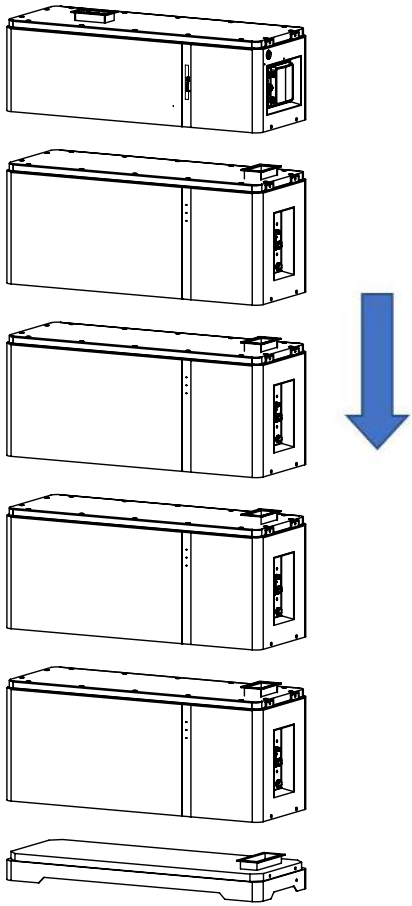


ii. Open the battery box, take a battery module out. Hold the handle of both batteries with your hands easy for lifting. Put one battery module on the base. Insert the plug on the base into the port on the battery. Pay attention to the direction of the module to make sure that the blind-mating connectors of the module and the base are at the same side.

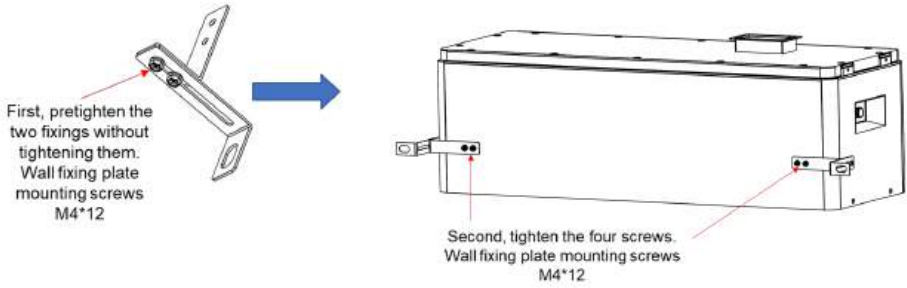




iii. Plug the upper battery module connector into the lower battery connector. Repeat the operations for other battery modules.

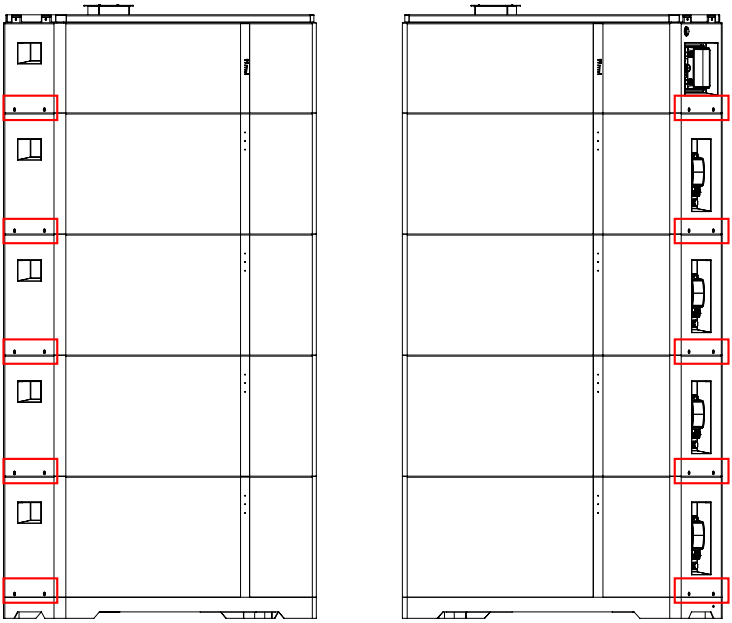


iv. Install the wall fixing plate (PDU part) to the PDU. To do this, follow the instructions below to install and tighten them on the back side of PDU (torque: 2 Nm).

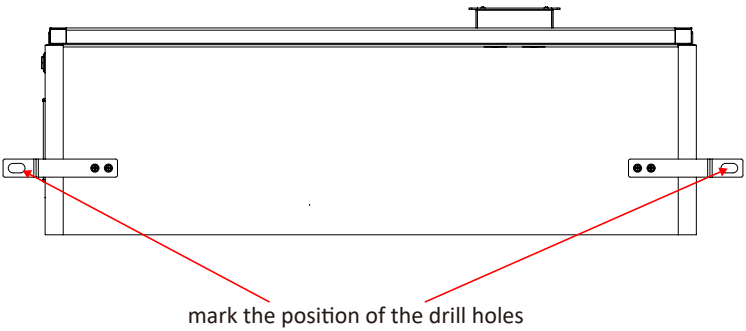


v. After all battery modules are stacked, put the PDU on top of the battery modules.

vi. Fix the connection between the battery module and the base, between battery modules, and between PDU and battery module with screws (M4*6). To do this, use a Phillips screwdriver to tighten the screws through the holes on them.

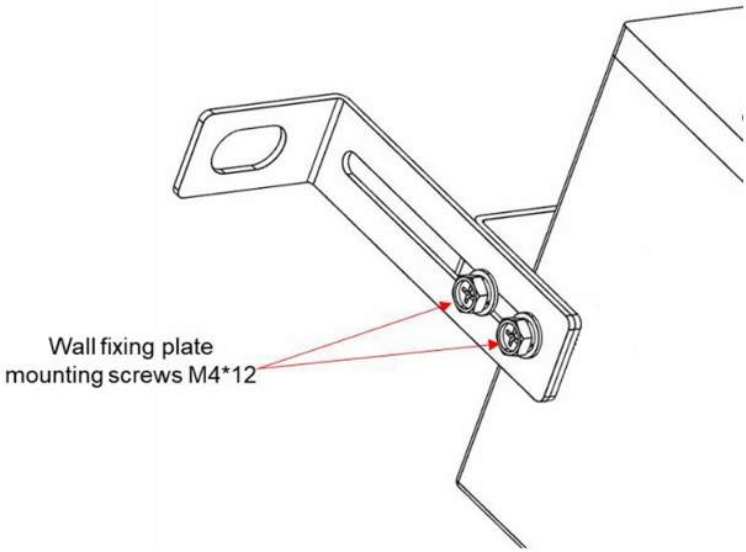


vii. Hold the wall fixing plate (wall part) where it intends to be mounted on the wall and mark the position of the drill holes. Please pay attention that there may be power cables or other supply lines (e.g., gas or water) routed inside of the wall. Ensure that no lines are laid in the wall, which could be damaged when drilling holes.



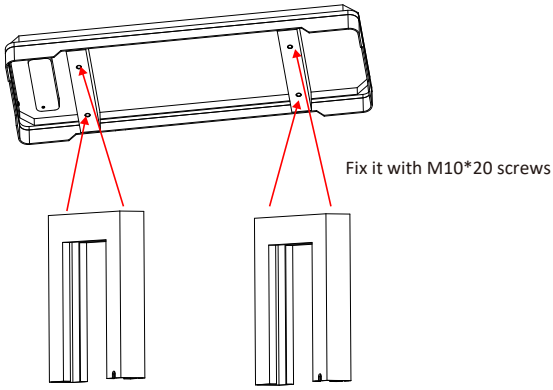
viii. Set the wall fixing plate (wall part) aside and drill the marked holes. Choose the recommend drill head (10mm) to drill 2 holes on the wall, 100mm-110mm deep. Put the wall fixing plate (wall part) in front of the holes, then insert the expansion screw of M6*100 and tighten.

ix. Fix the two hangers (wall part and PDU part) with M4X12 screws, using a cylinder screwdriver (10 mm) to tighten it (torque: 2 Nm).

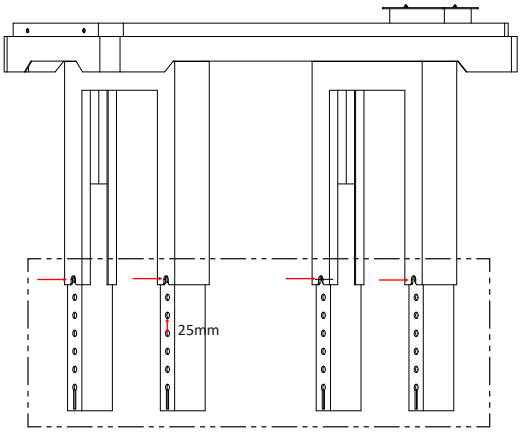


3.3.1.4 Floor-mounted method 2

Step 1
First, fix the support and base with screws(M10*20).

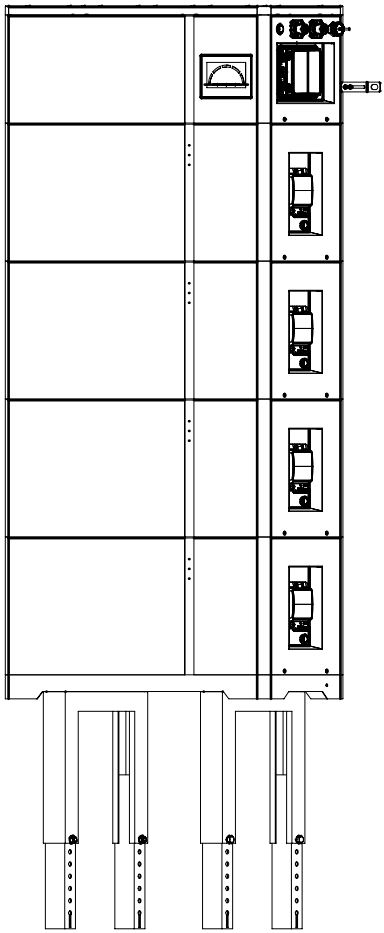


Step 2
Fix the height of the expansion frame with screws(M8*70).

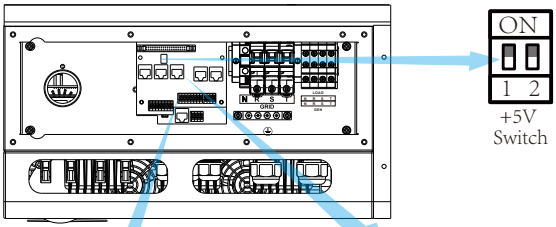


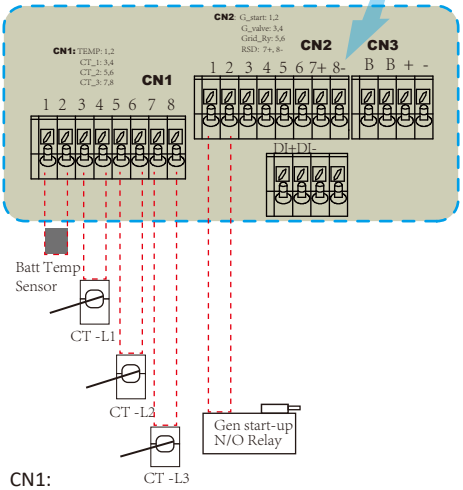
The distance between the holes of the retractable support is 25mm.
The maximum length of the retractable bracket is 485mm and the minimum length is 335mm.
Retractable legs (dashed frame) are optional and can be added according to demand.

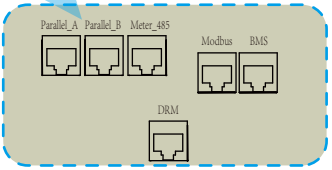
Step 3
Stack battery packs to complete the installation
And make sure the wall fixing plate is attached to the wall.



3.3.2 Function port definition

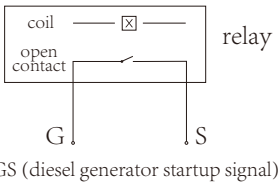




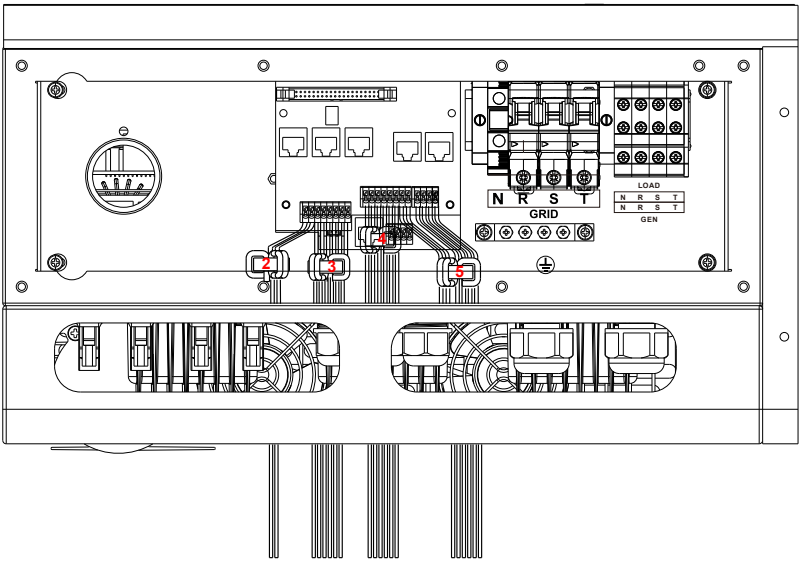


Parallel A: Parallel communication port 1 (CAN interface).
Parallel B: Parallel communication port 2 (CAN interface).
Meter_485: for energy meter communication.
Modbus: Reserved.
BMS: BMS port for batterycommunication (CAN/RS485).
DRM: It is used to accept the external input signal(Digital input).More details please refer to the P56.
+5V Switch: For turning ON/OFF the 5V DC output of pin 3 of the meter port.

CN1:
TEMP (1,2): battery temperature sensor for lead acid battery.(Not applicable to AI All in one Series).
CT-L1 (3,4): current transformer (CT1) for“zero export to CT”mode clamps on L1 when in three phase system.
CT-L2 (5,6): current transformer (CT2) for“zero export to CT”mode clamps on L2 when in three phase system.
CT-L3 (7,8): current transformer (CT3) for“zero export to CT”mode clamps on L3 when in three phase system.
CN2:
G-start (1,2): dry contact signal for startup the diesel generator.When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).
G-valve (3,4): When the inverter is in off-grid mode and the 'Signal island mode ' is checked. The G-valve contact will close after the 'GEN signal' take effect or 'GEN force' is enabled.
Grid_Ry (5,6): reserved.
CN3:
RSD (7,8): When battery is connected and the inverter is in "ON" status, it will provide 12Vdc.
RSD_input (B,B,+,-): when the terminal “B” & “B” is short-circuited with additional wire connection, or there’s 12Vdc input at the terminal “+ & - “, then the 12Vdc of RSD+ & RSD- will disappear immediately, and the inverter will shutdown immediately.



DI+,DI-: According to "Article 14a of the German Energy Industry Act (EnWG)" (2024) The Energy Industry Act, The digital interface DI of the hybrid inverters can receive an external control signal to reduce the charging power from the grid to less than 4.2kW. When the signal disappears, the inverter can return to its previous operating state. Note: This newly developed interface may not have in older hardware versions of inverters.



No.	Function Port	Installation Instructions
2	TEMP (1,2)	Wrap the wires three laps around the magnetic ring, then thread the end of wires through the magnetic ring.
3	CT_1 (3,4) CT_2 (5,6) CT_3 (7,8)	Wrap the wires three laps around the magnetic ring, then thread the end of wires through the magnetic ring.
4	G_start (1,2) G_valve (3,4) Grid_Ry (5,6)	Wrap the wires three laps around the magnetic ring, then thread the end of wires through the magnetic ring.
5	RSD (7,8) RSD_input (B,B,+,-)	Wrap the wires three laps around the magnetic ring, then thread the end of wires through the magnetic ring.

3.4 Grid connection and backup load connection

· Before connecting to the grid, a separate AC breaker must be installed between the inverter and the grid, and also between the backup load and the inverter. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current. The recommended of AC breaker for the load port is 63A for 5/6/8/10/12kW. The recommended of AC breaker for the grid port is 63A for 5/6/8/10/12kW.

· There are three terminal blocks with "Grid" "Load"and "GEN" markings. Please do not misconnect input and output connectors.

Note:
When the inverter is in the off-grid state, the N line needs to be connected to the earth.

Note:
In final installation,breaker certified according to IEC 60947-1 and IEC 60947-2 shall be installed with the equipment.
All wiring must be performed by a qualified personnel.It is very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable as below.

Grid connection and backup load connection (Copper wires) (bypass)

Model	*Wire Size*	*Cable(mm²)*	*Torque value(max)*	*Phase*
Trio Hybrid S 5/6/8/10/12K LV AIO	6AWG	10	4Nm	3L+N

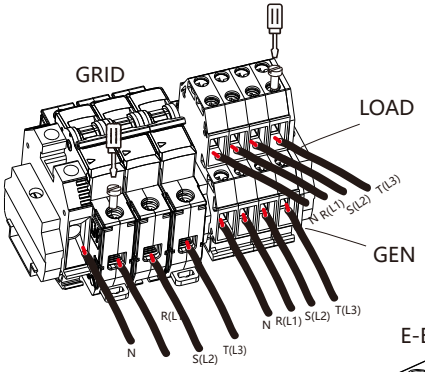
Grid connection and backup load connection (Copper wires)

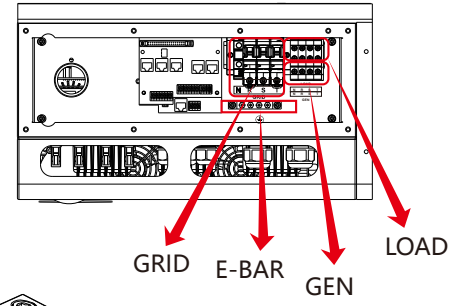
Model	*Wire Size*	*Cable(mm²)*	*Torque value(max)*	*Phase*
Trio Hybrid S 5K LV AIO	12AWG	2.5	4Nm	3L+N
Trio Hybrid S 6K LV AIO	12AWG	2.5	4Nm	3L+N
Trio Hybrid S 8K LV AIO	10AWG	4.0	4Nm	3L+N
Trio Hybrid S 10K LV AIO	8AWG	6.0	4Nm	3L+N
Trio Hybrid S 12K LV AIO	8AWG	6.0	4Nm	3L+N

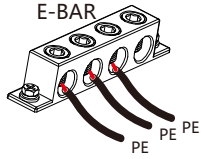
Chart 3-3 Recommended Size for AC wires

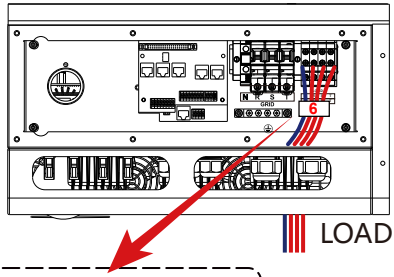
Please follow below steps to implement Grid, load and Gen port connection:

1. Before making Grid, load and Gen port connection, be sure to turn off AC breaker or disconnector first.
2. Remove insulation sleeve 10mm length, unscrew the bolts. For GRID and GEN ports, just insert the wires into the terminals according to polarities indicated on the terminal block. For load port, thread the wires through the magnetic ring firstly, then insert the wires into the terminals according to polarities indicated on the terminal block.
   Tighten the terminal screws and make sure the wires are completely and safely connected.

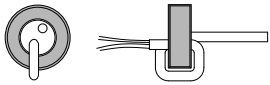




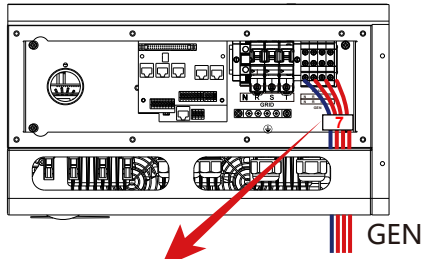




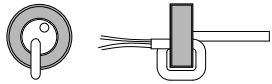
6



Wrap the wires of Load port one laps around the magnetic ring, then thread the end of wires through the magnetic ring,as the diagram above, peform this operation again on the other three wires.



7



Wrap the wires of GEN port one laps around the magnetic ring, then thread the end of wires through the magnetic ring,as the diagram above, peform this operation again on the other three wires.

Be sure that AC power source is disconnected before attempting to wire it to the unit.

3. Then, insert AC output wires according to polarities indicated on the terminal block and tighten terminal. Be sure to connect corresponding N wires and PE wires to related terminals as well.
4. Make sure the wires are securely connected.
5. Appliances such as air conditioner are required at least 2-3 minutes to restart because it is required to have enough time to balance refrigerant gas inside of circuit. If a power shortage occurs and recovers in short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it is equipped with time-delay function before installation. Otherwise, this inverter will trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner

3.5 PV Connection

Before connecting to PV modules, please install a separately DC circuit breaker between inverter and PV modules. It is 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*	*Cable(mm²)*
Trio Hybrid S 5/6/8/10/12K LV AIO	12AWG	2.5

Chart 3-4 Cable size

To avoid any malfunction, do not connect any PV modules with possible current leakage to the inverter. For example, grounded PV modules will cause current leakage to the inverter. When using PV modules, please ensure the PV+ & PV- of solar panel is not connected to the system ground bar.

It is requested to use PV junction box with surge protection. Otherwise, it will cause damage on inverter when lightning occurs on PV modules.

3.5.1 PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:
1) Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2) Open circuit Voltage (Voc) of PV modules should be higher than min. start voltage.
3) The PV modules used to connected to this inverter shall be Class A rating certified according to IEC 61730.

Inverter Model	*Trio Hybrid S 5K LV AIO*	*Trio Hybrid S 6K LV AIO*	*Trio Hybrid S 8K LV AIO*	*Trio Hybrid S 10K LV AIO*	*Trio Hybrid S 12K LV AIO*
PV Input Voltage	550V (160V-800V)				
PV Array MPPT Voltage Range	200V-650V				
No. of MPP Trackers	2				
No. of Strings MPP Tracker	1+1	1+1	1+1	2+2	2+2

Chart 3-5

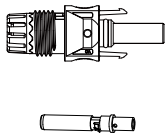
3.5.2 PV Module Wire Connection:

1. Switch the Grid Supply Main Switch(AC)OFF.
2. Switch the DC Isolator OFF.
3. Assemble PV input connector to the inverter.

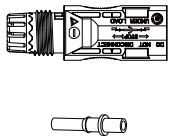
Safety Hint:
When using PV modules, please ensure the PV+ & PV- of solar panel is not connected to the system ground bar.

Safety Hint:
Before connection, please make sure the polarity of the output voltage of PV array matches the “DC+” and “DC-” symbols.

Safety Hint:
Before connecting inverter, please make sure the PV array open circuit voltage is within the 800V of the inverter.



Pic 5.1 DC+ male connector



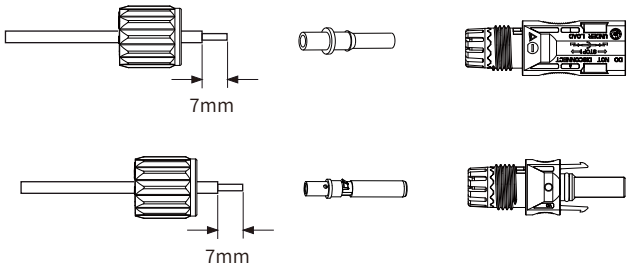
Pic 5.2 DC- female connector

Safety Hint:
Please use approved DC cable for PV system.

Cable type	*Cross section* (mm²)	
	Range	*Recommended value*
Industry generic PV cable (model: PV1-F)	2.5-4 (12-10AWG)	2.5(12AWG)

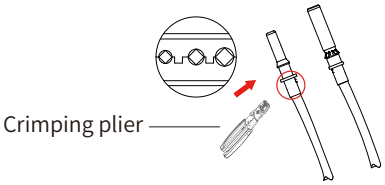
Chart 3-6

The steps to assemble the DC connectors are listed as follows:
a) Strip off the DC wire about 7mm, disassemble the connector cap nut (see picture 5.3).



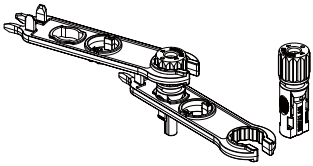
Pic 5.3 Disassemble the connector cap nut

b) Crimping metal terminals with crimping pliers as shown in picture 5.4.



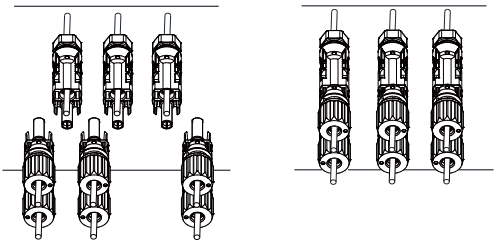
Pic 5.4 Crimp the contact pin to the wire

c) Insert the contact pin to the top part of the connector and screw up the cap nut to the top part of the connector. (as shown in picture 5.5).



Pic 5.5 connector with cap nut screwed on

d) Finally insert the DC connector into the positive and negative input of the inverter, shown as picture 5.6

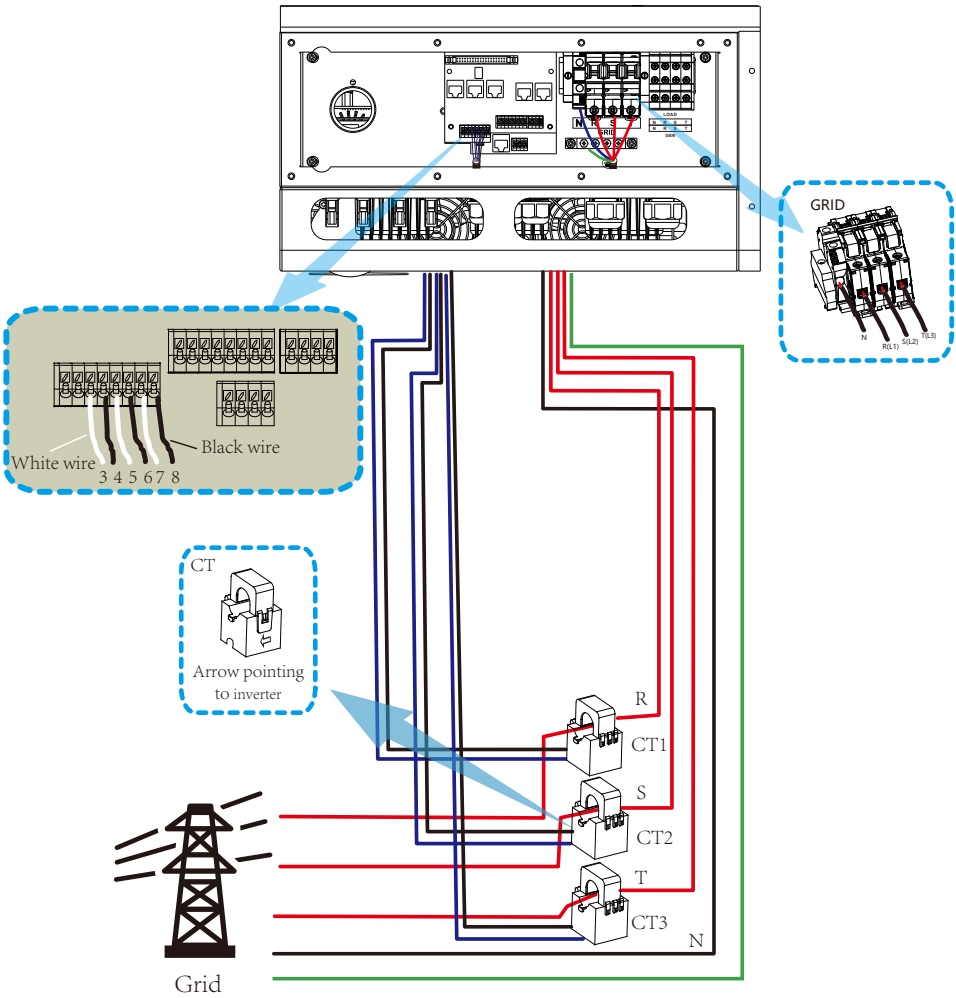


Pic 5.6 DC input connection

Warning:
Sunlight shines on the panel will generate voltage, high voltage in series may cause danger to life. Therefore, before connecting the DC input line, the solar panel needs to be blocked by the opaque material and the DC switch should be 'OFF', otherwise, the high voltage of the inverter may lead to life-threatening conditions.

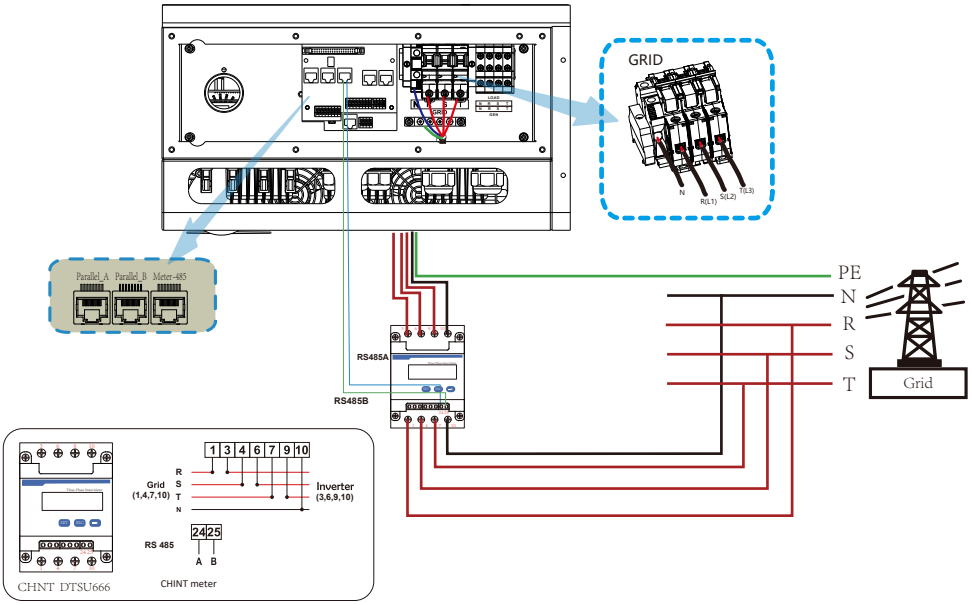
Warning:
Please use its own DC power connector from the inverter accessories. Do not interconnect the connectors of different manufacturers.Max. DC input current should be 20A.

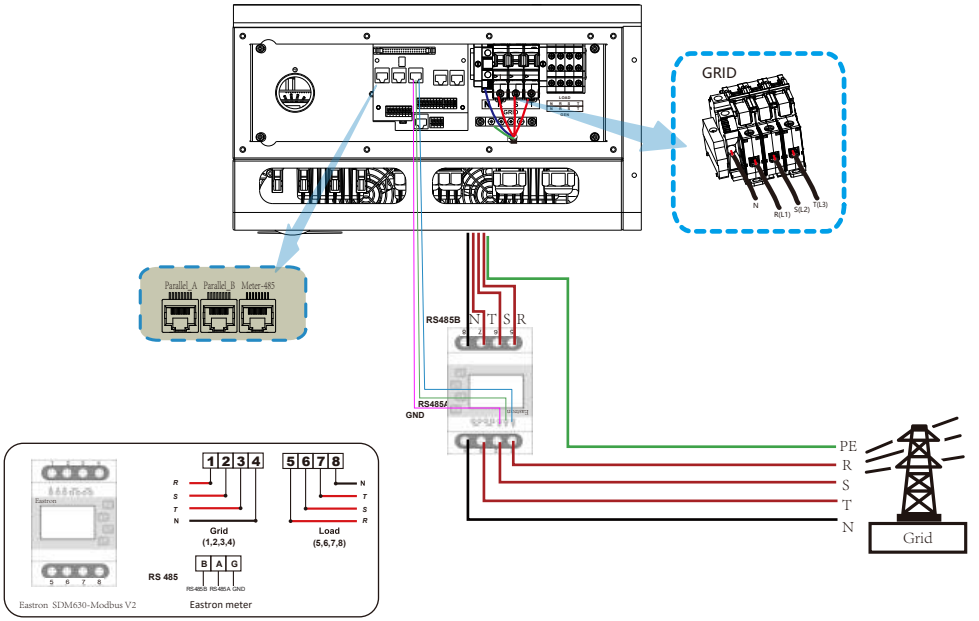
3.6 CT Connection



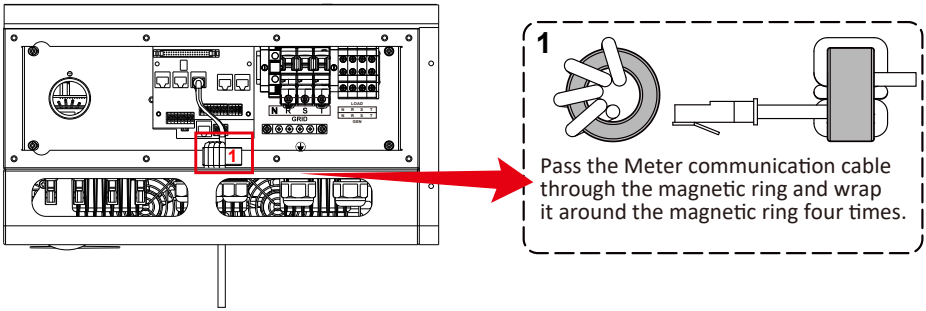
***Note: when the reading of the load power on the LCD is not correct, please reverse the CT arrow.**

3.6.1 Meter Connection



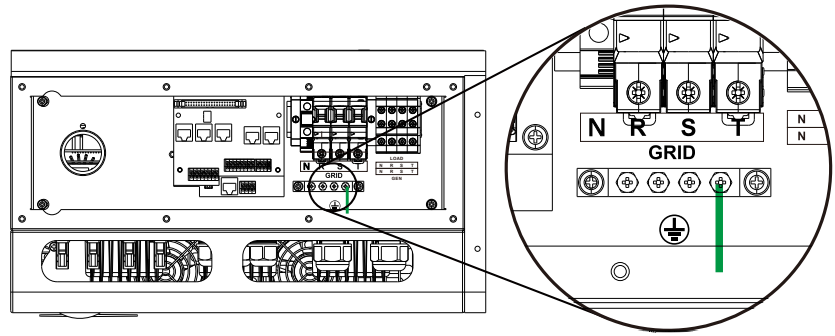


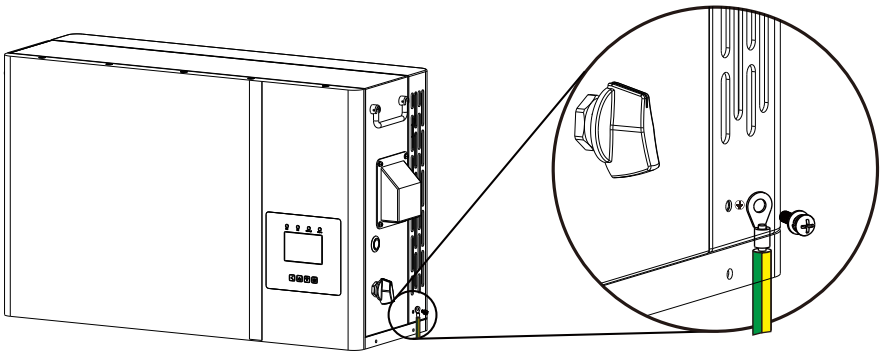
Meter connection



3.7 Earth Connection(mandatory)

Ground cable shall be connected to ground plate on grid side this prevents electric shock if the original protective conductor fails.





Earth Connection (Copper wires) (bypass)

Model	*Wire Size*	*Cable(mm²)*	*Torque value(max)*	*Phase*
Trio Hybrid S 5/6/8/10/12K LV AIO	6AWG	10	4Nm	3L+N

Earth Connection (Copper wires)

Model	*Wire Size*	*Cable(mm²)*	*Torque value(max)*	*Phase*
Trio Hybrid S 5K LV AIO	12AWG	2.5	4Nm	3L+N
Trio Hybrid S 6K LV AIO	12AWG	2.5	4Nm	3L+N
Trio Hybrid S 8K LV AIO	10AWG	4.0	4Nm	3L+N
Trio Hybrid S 10K LV AIO	8AWG	6.0	4Nm	3L+N
Trio Hybrid S 12K LV AIO	8AWG	6.0	4Nm	3L+N

The conductor should be made of the same metal as the phase conductors.

Warning:
Inverter has built-in leakage current detection circuit,The type A RCD can be connected to the inverter for protection according to the local laws and regulations.If an external leakage current protection device is connected, its operating current must be equal to 300 mA or higher, otherwise inverter may not work properly.

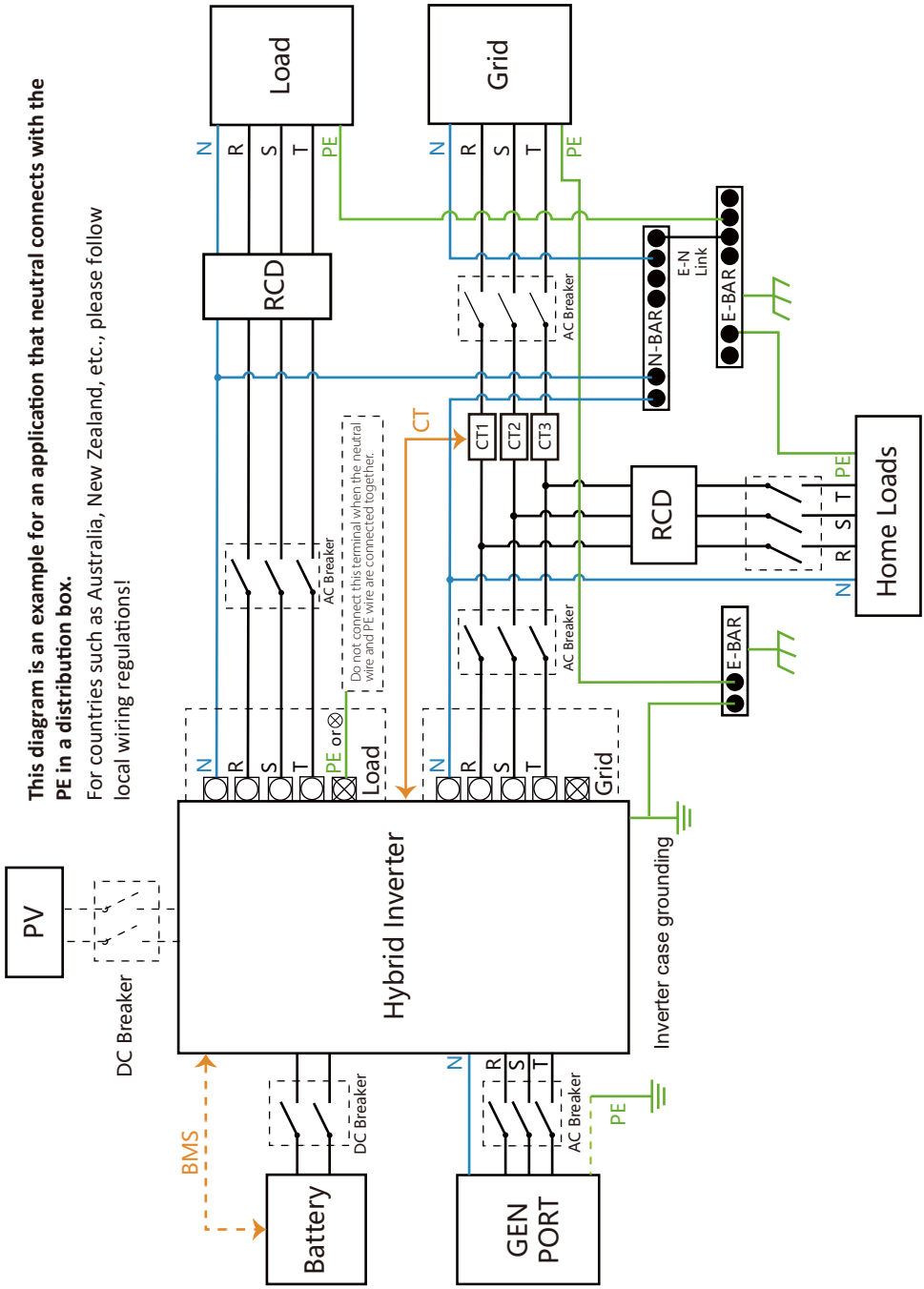
3.8 WIFI Connection

For the configuration of Wi-Fi Plug, please refer to illustrations of the Wi-Fi Plug. The Wi-Fi Plug is not a standard configuration, it's optional.

3.9 Wiring System for Inverter

This diagram is an example for an application that neutral connects with the PE in a distribution box.

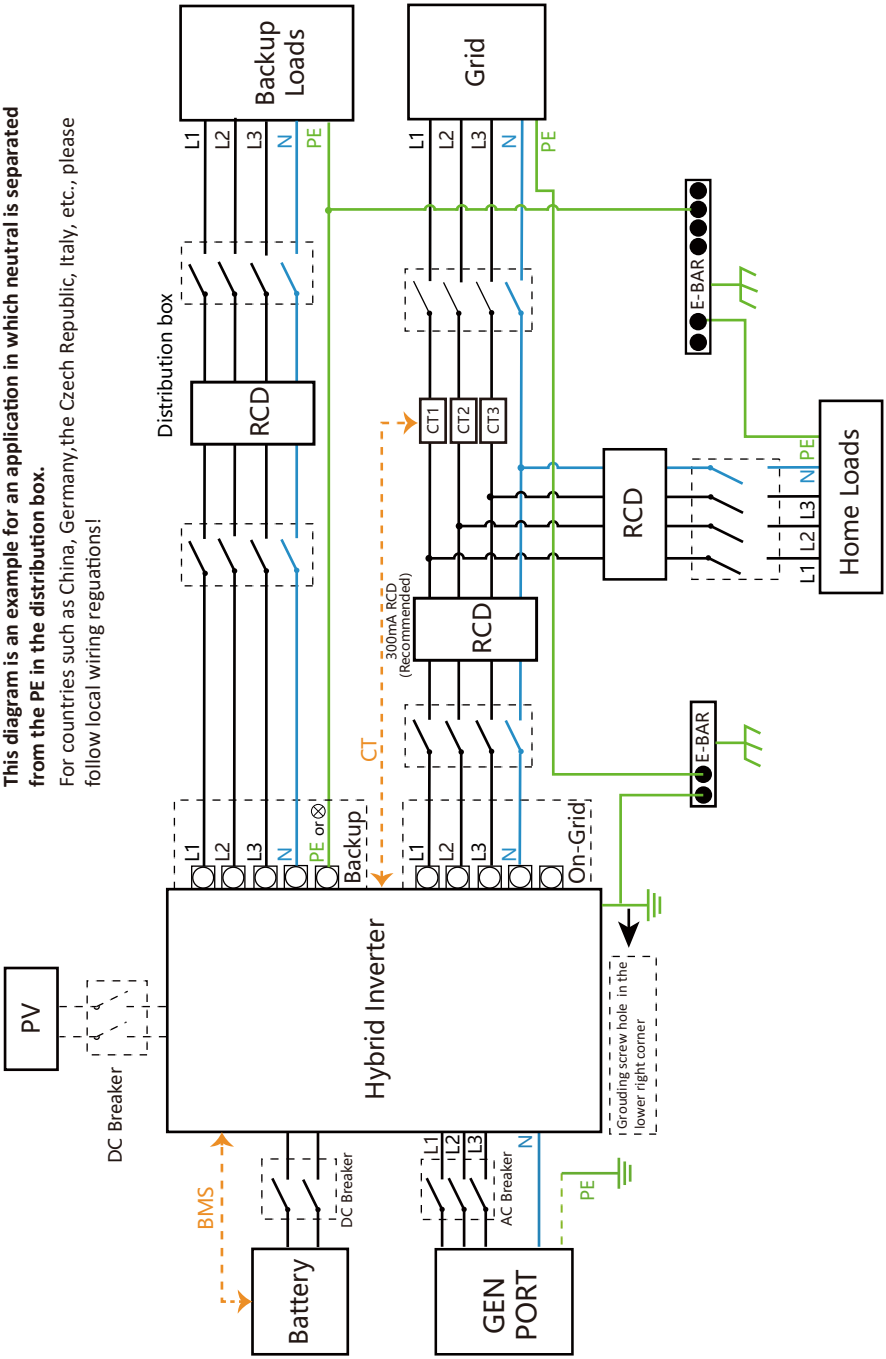
For countries such as Australia, New Zealand, etc., please follow local wiring regulations!

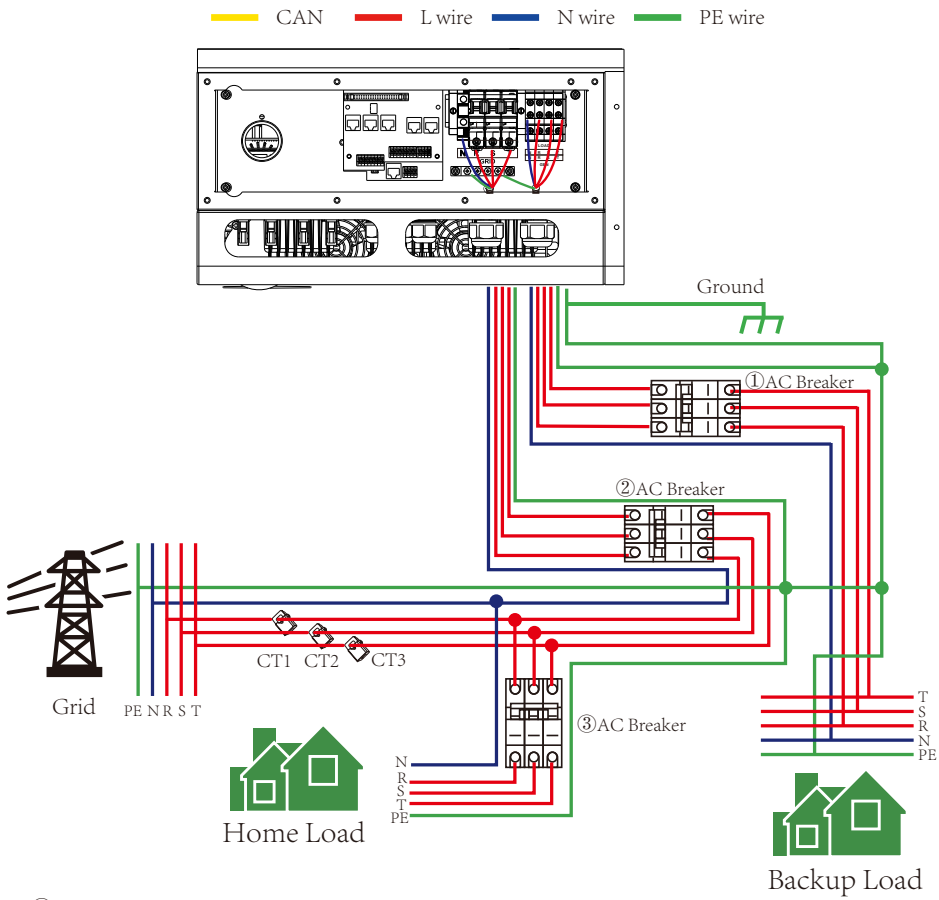


3.10 Wiring diagram

This diagram is an example for an application in which neutral is separated from the PE in the distribution box.

For countries such as China, Germany,the Czech Republic, Italy, etc., please follow local wiring regulations!



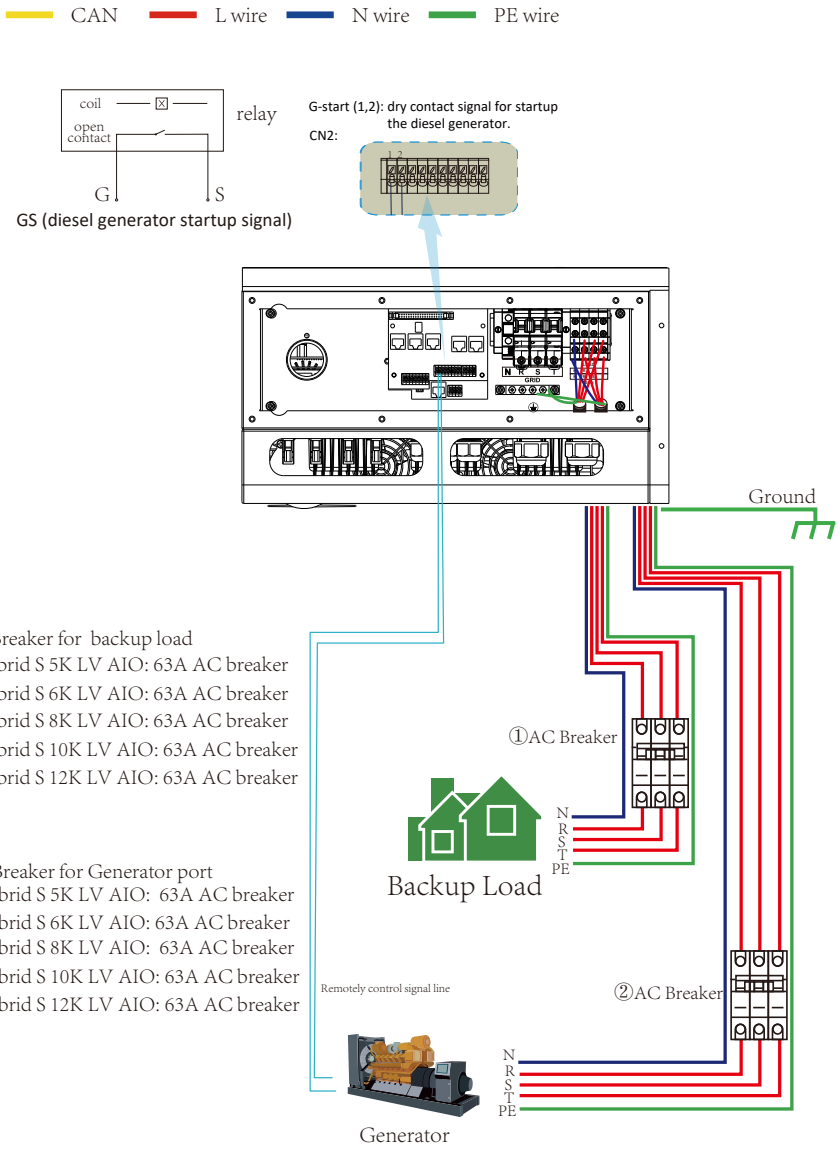


① AC Breaker for backup load
Trio Hybrid S 5K LV AIO: 63A AC breaker
Trio Hybrid S 6K LV AIO: 63A AC breaker
Trio Hybrid S 8K LV AIO: 63A AC breaker
Trio Hybrid S 10K LV AIO: 63A AC breaker
Trio Hybrid S 12K LV AIO: 63A AC breaker

② AC Breaker for grid
Trio Hybrid S 5K LV AIO: 63A AC breaker
Trio Hybrid S 6K LV AIO: 63A AC breaker
Trio Hybrid S 8K LV AIO: 63A AC breaker
Trio Hybrid S 10K LV AIO: 63A AC breaker
Trio Hybrid S 12K LV AIO: 63A AC breaker

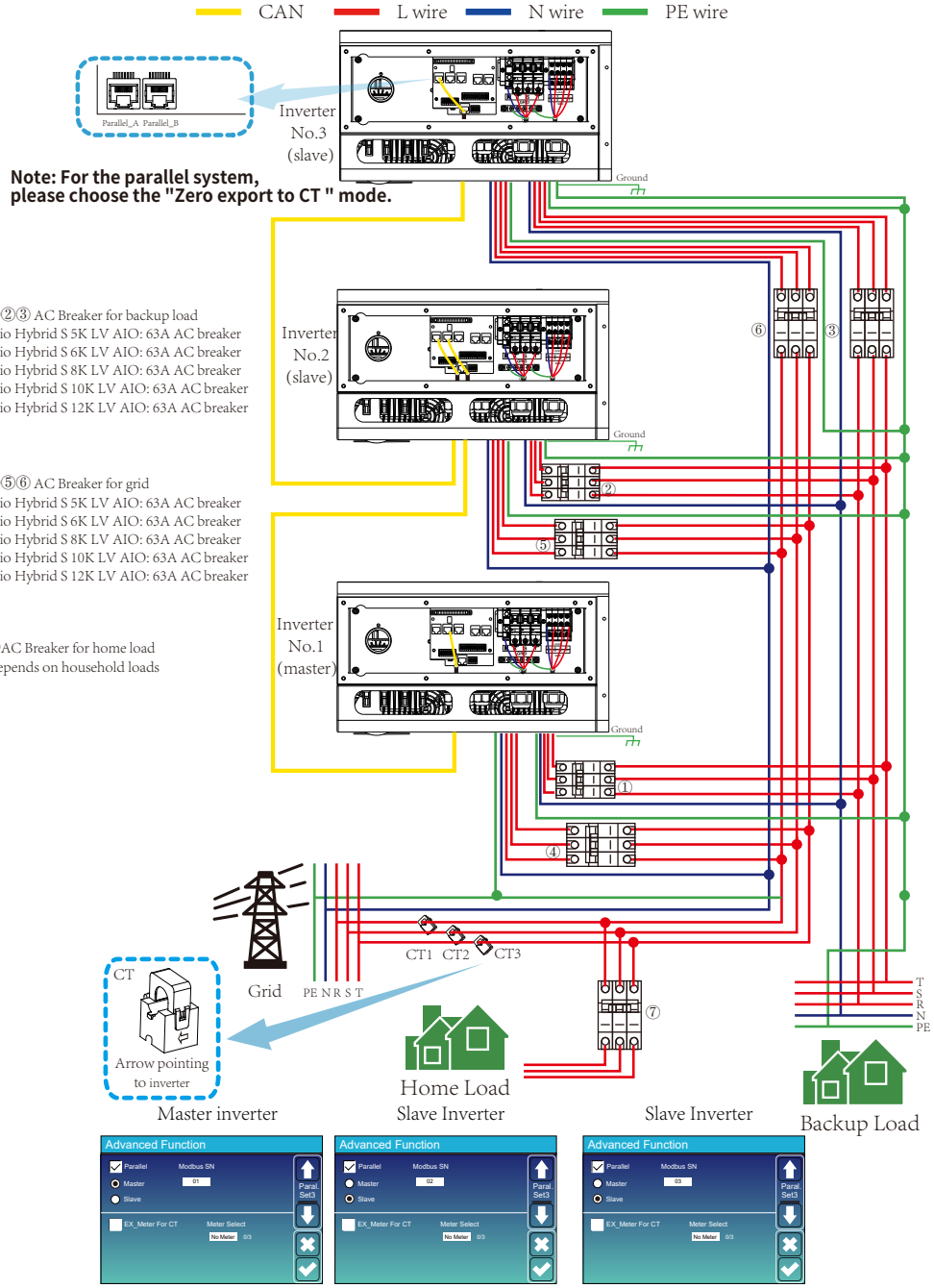
③AC Breaker for home load
Depends on household loads

3.11 Typical application diagram of diesel generator



3.12 Three phase parallel connection diagram

Max. 10pcs parallel for on-grid and off-grid operation.



4. OPERATION

4.1 Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press On/Off button(located on the left side of the case) to turn on the unit. When system without battery connected, but connect with either PV or grid, and ON/OFF button is switched off, LCD will still light up(Display will show OFF), In this condition, when switch on ON/OFF button and select NO battery,system can still working.

4.2 Operation and Display Panel

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

LED Indicator		*Messages*
DC	Green led solid light	PV Connection normal
AC	Green led solid light	Grid Connection normal
Normal	Green led solid light	Inverter operating normal
Alarm	Red led solid light	Malfunction or warning

Chart 4-1 LED indicators

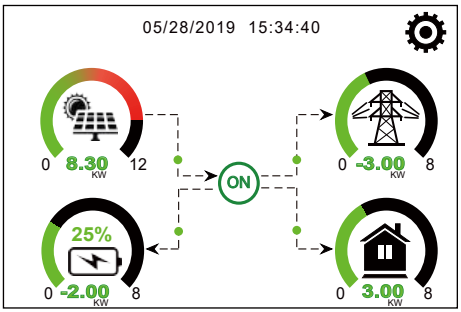
Function Key	*Description*
Esc	To exit setting mode
Up	To go to previous selection
Down	To go to next selection
Enter	To confirm the selection

Chart 4-2 Function Buttons

5. LCD Display Icons

5.1 Main Screen

The LCD is touchscreen, below screen shows the overall information of the inverter.



1.The icon in the center of the home screen indicates that the system is Normal operation. If it turns into "comm./F01~F64" , it means the inverter has communication errors or other errors, the error message will display under this icon(F01-F64 errors, detail error info can be viewed in the System Alarms menu).

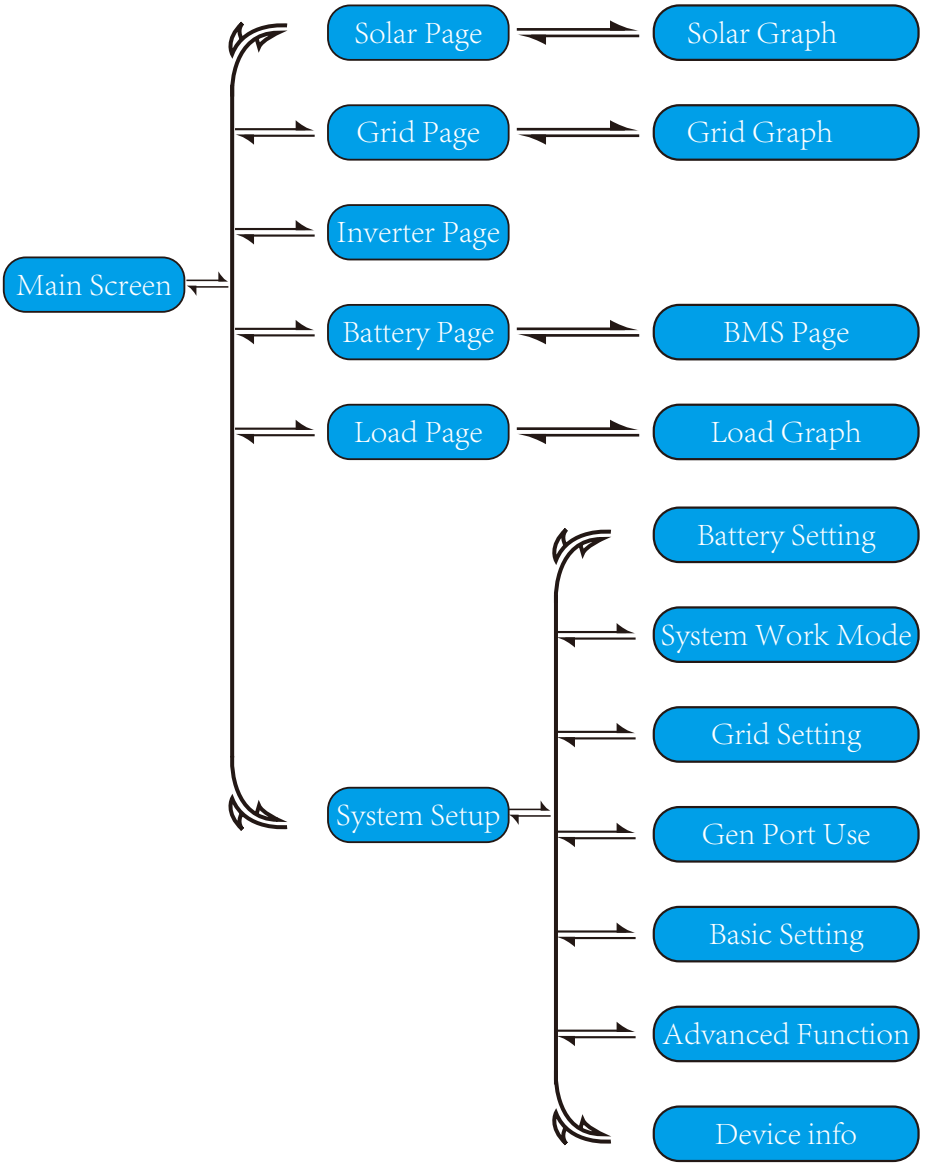
2.At the top of the screen is the time.

3.System Setup Icon, Press this set button,you can enter into the system setup screen which including Basic Setup, Battery Setup, Grid Setup, System Work Mode, Generator port use, Advanced function and Li-Batt info.

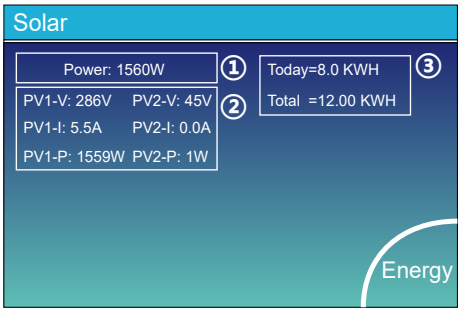
4.The main screen showing the info including Solar, Grid, Load and Battery. Its also displaying the energy flow direction by arrow. When the power is approximate to high level, the color on the panels will changing from green to red so system info showing vividly on the main screen.

· PV power and Load power always keep positive.
· Grid power negative means sell to grid, positive means get from grid.
· Battery power negative means charge, positive means discharge.

5.1.1 LCD operation flow chart



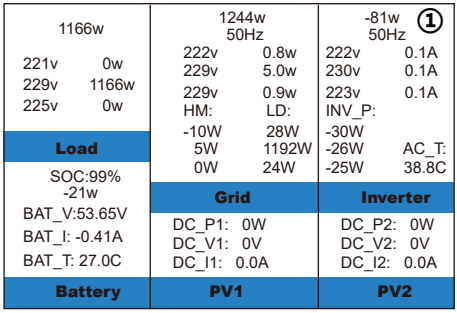
5.2 Solar Power Curve



This is Solar Panel detail page.

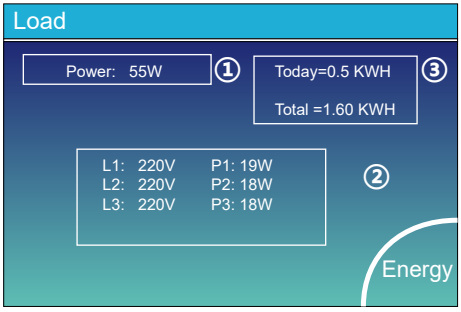
① Solar Panel Generation.
② Voltage, Current, Power for each MPPT.
③ Solar Panel energy for Day and Total.

Press the “Energy “button will enter into the power curve page.



This is Inverter detail page.

① Inverter Generation.
Voltage, Current, Power for each Phase.
AC-T: mean Heat-sink temperature.

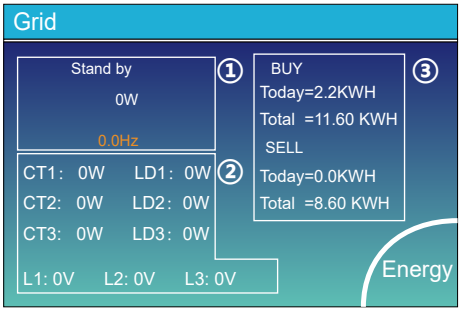


This is Load detail page.

① Load Power.
② Voltage, Power for each Phase.
③ Daily and total Load consumption .

When you check “Selling First” or “Zero export to Load” on system work mode page, the information on this page is about backup load which connect on Load port of hybrid inverter.
When you check “Zero export to CT”on system work mode page, the information on this page is including backup load and home load.

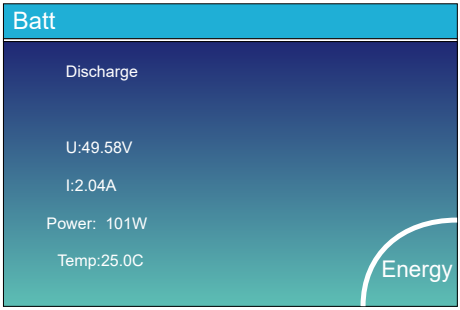
Press the “Energy “ button will enter into the power curve page.



This is Grid detail page.

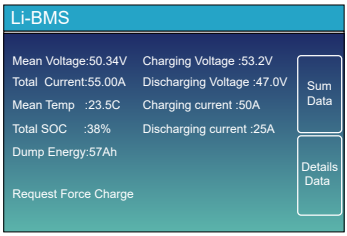
① Status, Power, Frequency.
② L: Voltage for each Phase
CT: Power detected by the external current sensors
LD: Power detected using internal sensors on AC grid in/out breaker
③ BUY: Energy from Grid to Inverter,
SELL: Energy from Inverter to grid.

Press the “Energy “ button will enter into the power curve page.

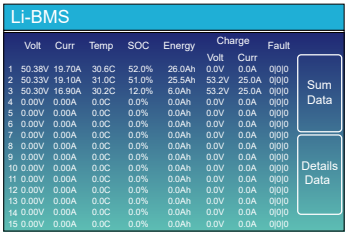


This is Battery detail page.

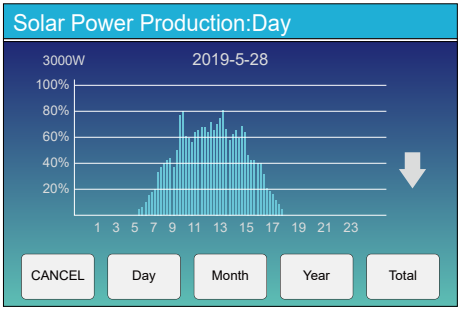
if you use Lithium Battery, you can enter BMS page.

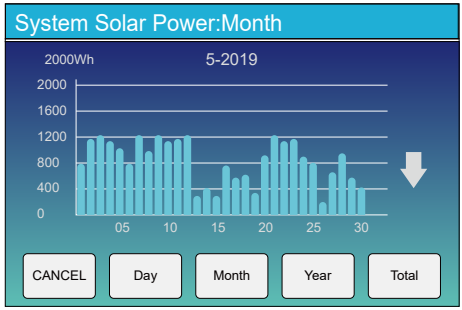


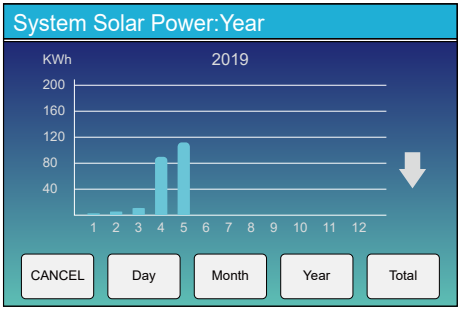
Request Force Charge: It indicates the BMS requests hybrid inverter to charge the battery actively.

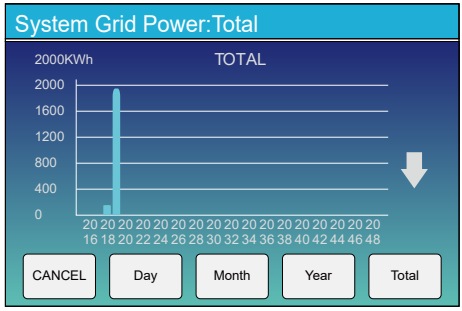


5.3 Curve Page-Solar & Load & Grid



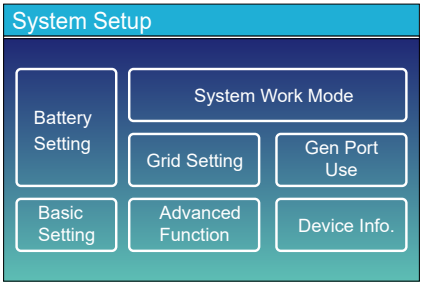






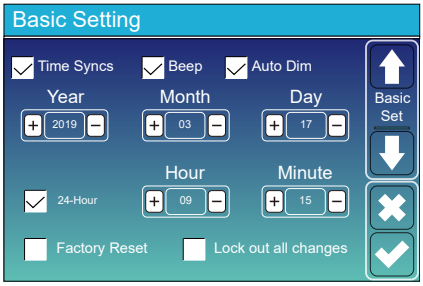
Solar power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more accuracy power generation, pls check on the monitoring system. Click the up and down arrow to check power curve of different period.

5.4 System Setup Menu

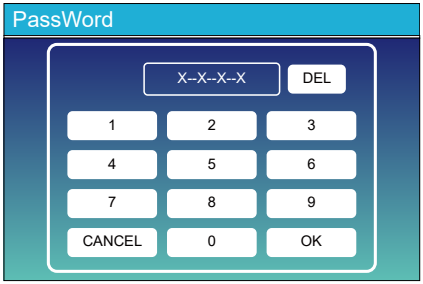


This is System Setup page.

5.5 Basic Setup Menu



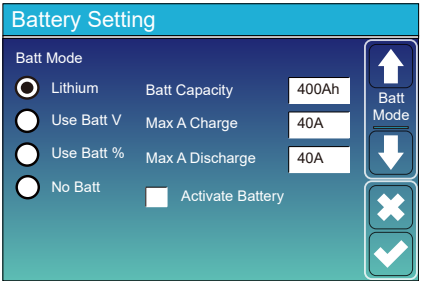
Factory Reset: Reset all parameters of the inverter.
Lock out all changes: Enable this menu for setting parameters that require locking and cannot be set up. Before performing a successful factory reset and locking the systems, to keep all changes you need to type in a password to enable the setting.
The password for factory settings is 9999 and for lock out is 7777.



Factory Reset Password: 9999

Lock out all changes Password: 7777

5.6 Battery Setup Menu



Battery capacity: it tells hybrid inverter to know your battery bank size.

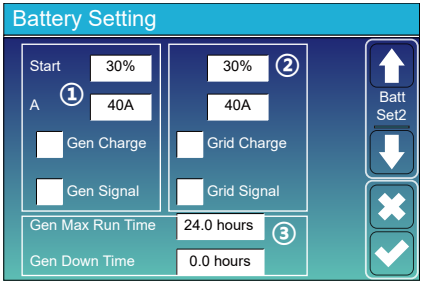
Use Batt V: Use Battery Voltage for all the settings (V).

Use Batt %: Use Battery SOC for all the settings (%).

Max. A charge/discharge: Max battery charge/discharge current(0-120A for 5kW model,0-130A for 6kW model, 0-190A for 8kW model, 0-210A for 10kW model, 0-240A for 12kW model).
For AGM and Flooded, we recommend Ah battery size x 20%= Charge/Discharge amps.
. For Lithium, we recommend Ah battery size x 50% = Charge/Discharge amps.
. For Gel, follow manufacturer' s instructions.

No Batt: tick this item if no battery is connected to the system.

Active battery: This feature will help recover a battery that is over discharged by slowly charging from the solar array or grid.



This is Battery Setup page. ①③

Start =30%: Percent S.O.C at 30% system will AutoStart a connected generator to charge the battery bank.

A = 40A: Charge rate of 40A from the attached generator in Amps.

Gen Charge: uses the gen input of the system to charge battery bank from an attached generator.

Gen Signal: Normally open relay that closes when the Gen Start signal state is active.

Gen Max Run Time: It indicates the longest time Generator can run in one day, when time is up, the Generator will be turned off. 24H means that it does not shut down all the time.

Gen Down Time: It indicates the delay time of the Generator to shut down after it has reached the running time.

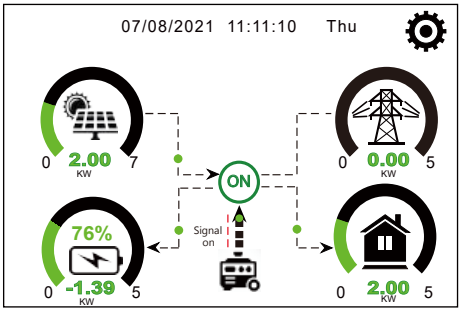
This is Grid Charge, you need select. ②

Start =30%: No use， Just for customization.

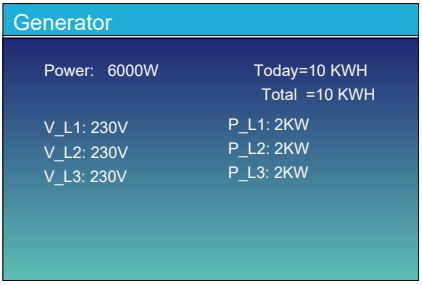
A = 40A: It indicates the Current that the Grid charges the Battery.

Grid Charge: It indicates that the grid charges the battery.

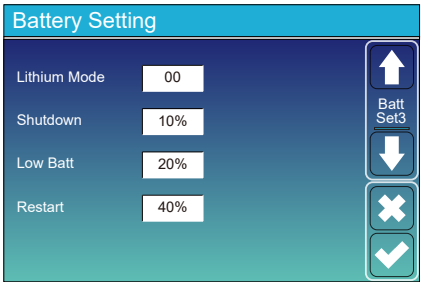
Grid Signal: Disable.



This page tells the PV and diesel generator power the load and battery.



This page tells generator output voltage, frequency, power. And, how much energy is used from generator.

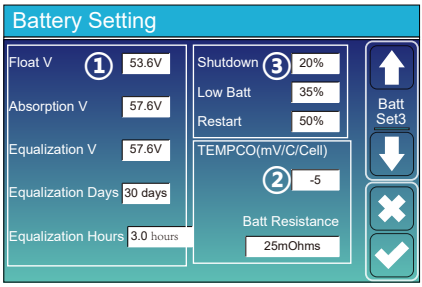


Lithium Mode: This is BMS protocol.Please reference the document(Approved Battery).

Shutdown 10%: It indicates the inverter will shutdown if the SOC below this value.

Low Batt 20%: It indicates the inverter will alarm if the SOC below this value.

Restart 40%: Battery voltage at 40% AC output will resume.



There are 3 stages of charging the Battery . ①

This is for professional installers, you can keep it if you do not know. ②

Shutdown 20%: The inverter will shutdown if the SOC below this value.

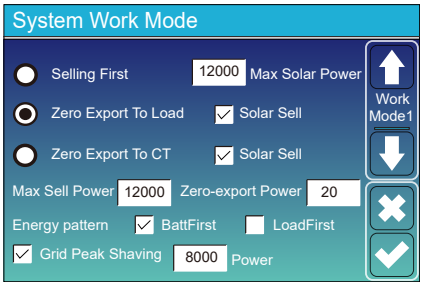
Low Batt 35%: The inverter will alarm if the SOC below this value. ③

Restart 50%: Battery SOC at 50% AC output will resume.

Recommended battery settings

Battery Type	*Absorption Stage*	*Float Stage*	*Equalization Voltage (every 30 days 3hr)*
AGM (or PCC)	14.2V (57.6V)	13.4V (53.6V)	14.2V (57.6V)
Gel	14.1V (56.4V)	13.5V (54.0V)	
Wet	14.7V (59.0V)	13.7V (55.0V)	14.7V (59.0V)
Lithium	Follow its BMS voltage parameters		

5.7 System Work Mode Setup Menu



Work Mode

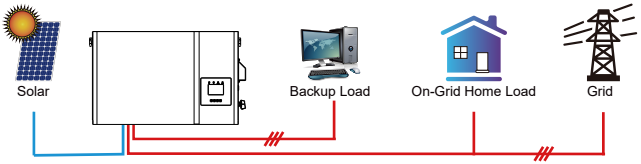
Selling First: This Mode allows hybrid inverter to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid.

The PV energy will be used to power the load and charge the battery and then excess energy will flow to grid.

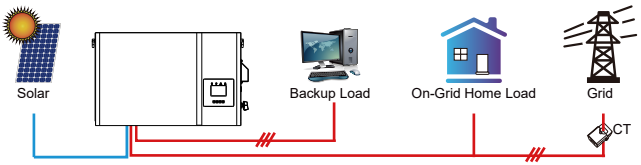
Power source priority for the load is as follows:

1. Solar Panels.
2. Grid.
3. Batteries (until programable % discharge is reached).

Zero Export To 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 local load and charge the battery.



Zero Export To 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 is insufficient, it will take grid energy as supplement. The hybrid inverter will not sell power to grid. In this mode, a CT is needed. The installation method of the CT please refer to chapter 3.6 CT Connection. The external CT will detect power flowing back to the grid and will reduce the power of the inverter only to supply the local load, charge battery and home load.



Solar Sell: "Solar sell" is for Zero export to load or Zero export to CT: when this item is active, the surplus energy can be sold back to grid. When it is active, PV Power source priority usage is as follows: load consumption and charge battery and feed into grid.

Max. sell power: Allowed the maximum output power to flow to grid.

Zero-export Power: for zero-export mode, it tells the grid output power. Recommend to set it as 20-100W to ensure the hybrid inverter won' t feed power to grid.

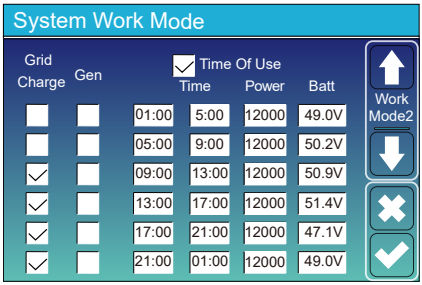
Energy Pattern: PV Power source priority.

Batt First: PV power is firstly used to charge the battery and then used to power the load. If PV power is insufficient, grid will make supplement for battery and load simultaneously.

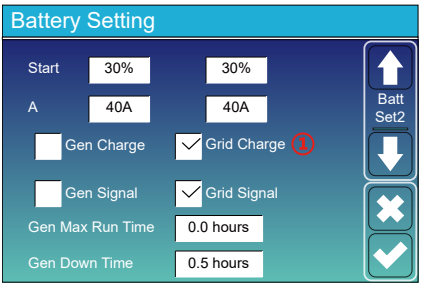
Load First: PV power is firstly used to power the load and then used to charge the battery. If PV power is insufficient, Grid will provide power to load.

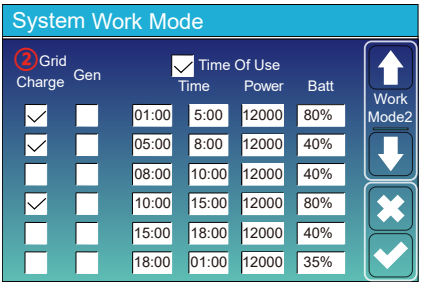
Max Solar Power: allowed the maximum DC input power.

Grid Peak-shaving: when it is active, grid output power will be limited within the set value. If the load power exceeds the allowed value, it will take PV energy and battery as supplement. If still can't meet the load requirement, grid power will increase to meet the load needs.

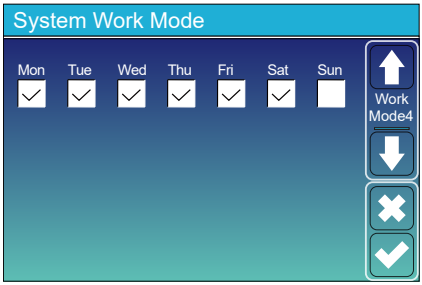


Time of use: it is used to program when to use grid or generator to charge the battery, and when to discharge the battery to power the load. Only tick "Time Of Use" then the follow items (Grid, charge, time, power etc.) will take effect.
Note: when in selling first mode and click time of use, the battery power can be sold into grid.
Grid charge: utilize grid to charge the battery in a time period.
Gen charge: utilize diesel generator to charge the battery in a time period.
Time: real time, range of 01:00-24:00.
Note: when the grid is present, only the “time of use” is ticked, then the battery will discharge. Otherwise, the battery won’t discharge even the battery SOC is full. But in the off-grid mode (when grid is not available, inverter will work in the off-grid mode automatically).
Power: Max. discharge power of battery allowed.
Batt(V or SOC %): battery SOC % or voltage at when the action is to happen.



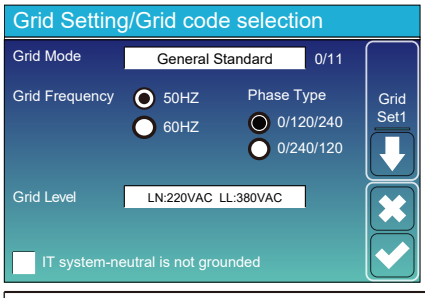


For example
During 01:00-05:00,
if battery SOC is lower than 80%, it will use grid to charge the battery until battery SOC reaches 80%.
During 05:00-08:00,
if battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%. At the same time,
if battery SOC is lower than 40%, then grid will charge the battery SOC to 40%.
During 08:00-10:00,
if battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%.
During 10:00-15:00,
when battery SOC is higher than 80%, hybrid inverter will discharge the battery until the SOC reaches 80%.
During 15:00-18:00,
when battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%.
During 18:00-01:00,
when battery SOC is higher than 35%, hybrid inverter will discharge the battery until the SOC reaches 35%.

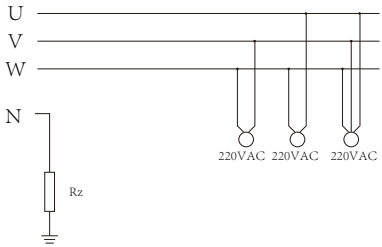


It allows users to choose which day to execute the setting of “Time of Use”.
For example, the inverter will execute the time of use page on Mon/Tue/Wed/Thu/Fri/Sat only.

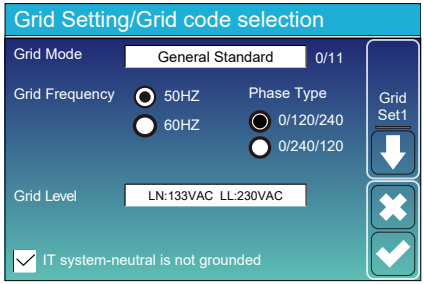
5.8 Grid Setup Menu

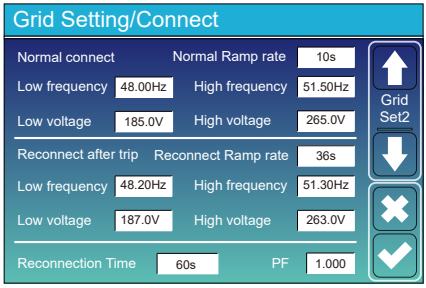


Grid Mode: General Standard、UL1741 & IEEE1547、CPUC RULE21、SRD-UL-1741、CEI 0-21、Australia A、Australia B、Australia C、EN50549_CZ-PPDS(>16A)、NewZealand、VDE4105、OVE-Directive R25.
Please follow the local grid code and then choose the corresponding grid standard.
Grid level: there're several voltage levels for the inverter output voltage when it is in off-grid mode.
LN:230VAC LL:400VAC,LN:240VAC LL:420VAC,
LN:120VAC LL:208VAC, LN:133VAC LL:230VAC.
IT system: If the grid system is IT system, then please enable this option. For example, the IT grid system voltage is 230Vac (the Line voltage between any two live lines in a three-phase circuit is 230Vac, and the diagram is as follow) then please enable "IT system" and tick the "Grid level" as LN:133VAC LL:230VAC as below picture shows.



Rz: Large resistance ground resistor. Or the system doesn't have Neutral line

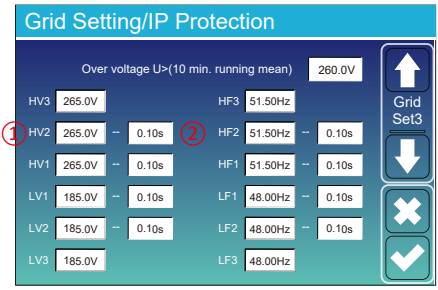




Normal connect: The allowed grid voltage/frequency range when the inverter first time connect to the grid.
Normal Ramp rate: It is the startup power ramp.

Reconnect after trip: The allowed grid voltage /frequency range for the inverter connects the grid after the inverter trip from the grid.
Reconnect Ramp rate:It is the reconnection power ramp.

Reconnection time: The waiting time period for the inverter connects the grid again.
PF: Power factor which is used to adjust inverter reactive power.

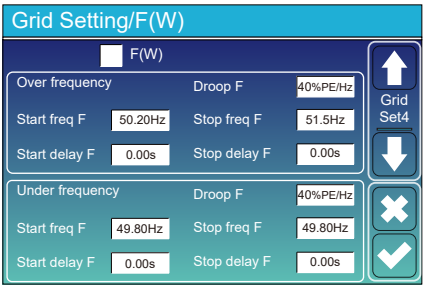


HV1: Level 1 overvoltage protection point;
① **HV2:** Level 2 overvoltage protection point; ② 0.10s—Trip time.
HV3: Level 3 overvoltage protection point.

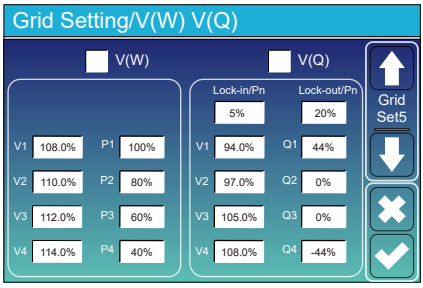
LV1: Level 1 undervoltage protection point;
LV2: Level 2 undervoltage protection point;
LV3: Level 3 undervoltage protection point.

HF1: Level 1 over frequency protection point;
HF2: Level 2 over frequency protection point;
HF3: Level 3 over frequency protection point.

LF1: Level 1 under frequency protection point;
LF2: Level 2 under frequency protection point;
LF3: Level 3 under frequency protection point.



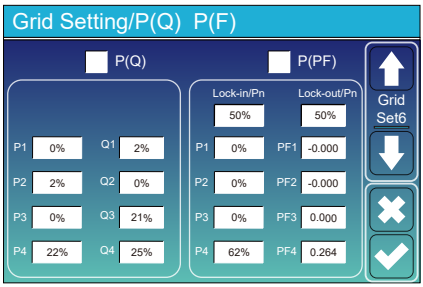
FW: this series inverter is able to adjust inverter output power according to grid frequency.
Droop F: percentage of nominal power per Hz
For example, "Start freq F＞50.2Hz, Stop freq F＜51.5, Droop F=40%PE/Hz" when the grid frequency reaches 50.2Hz, the inverter will decrease its active power at Droop F of 40%. And then when grid system frequency is less than 50.1Hz, the inverter will stop decreasing output power.
For the detailed setup values, please follow the local grid code.



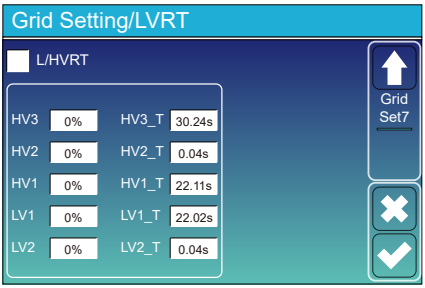
V(W): It is used to adjust the inverter active power according to the set grid voltage.
V(Q): It is used to adjust the inverter reactive power according to the set grid voltage.
This function is used to adjust inverter output power (active power and reactive power) when grid voltage changes.

Lock-in/Pn 5%: When the inverter active power is less than 5% rated power, the VQ mode will not take effect.
Lock-out/Pn 20%: If the inverter active power is increasing from 5% to 20% rated power, the VQ mode will take effect again.

For example: V2=110%, P2=80%. When the grid voltage reaches the 110% times of rated grid voltage, inverter output power will reduce its active output power to 80% rated power.
For example: V1=94%, Q1=44%. When the grid voltage reaches the 94% times of rated grid voltage, inverter output power will output 44% reactive output power.
For the detailed setup values, please follow the local grid code.

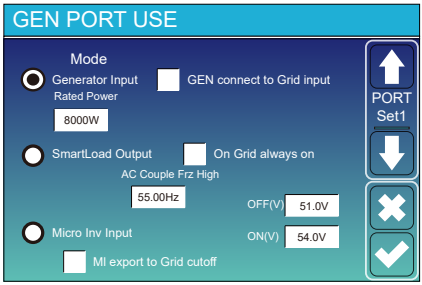


P(Q): It is used to adjust the inverter reactive power according to the set active power.
P(PF): It is used to adjust the inverter PF according to the set active power.
For the detailed setup values, please follow the local grid code.
Lock-in/Pn 50%: When the inverter output active power is less then 50% rated power, it won't enter the P(PF) mode.
Lock-out/Pn 50%: When the inverter output active power is higher then 50% rated power, it will enter the P(PF) mode.
Note : only when the grid voltage is equal to or higher than 1.05times of rated grid voltage, then the P(PF) mode will take effect.



Reserved: This function is reserved.It is not recommended.

5.9 Generator Port Use Setup Menu

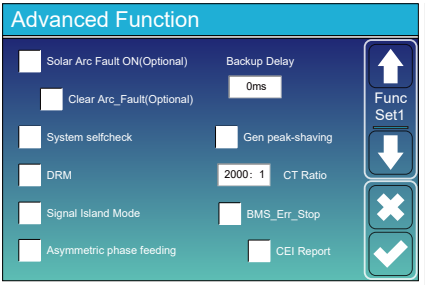


Generator input rated power: allowed Max. power from diesel generator.
GEN connect to grid input: connect the diesel generator to the grid input port.
Smart Load Output: This mode utilizes the Gen input connection as an output which only receives power when the battery SOC is above a user programmable threshold.
e.g. ON: 100%, OFF=95%: When the battery bank SOC reaches 100%, Smart Load Port will switch on automatically and power the load connected. When the battery bank SOC < 95% , the Smart Load Port will switch off automatically.

Smart Load OFF Batt
• Battery SOC at which the Smart load will switch off.
Smart Load ON Batt
• Battery SOC at which the Smart load will switch on. simultaneously and then the Smart load will switch on.
On Grid always on: When click "on Grid always on" the smart load will switch on when the grid is present.
Micro Inv Input: To use the Generator input port as a micro-inverter on grid inverter input (AC coupled), this feature will also work with "Grid-Tied" inverters.
* **Micro Inv Input ON**: When the hybrid inverter operates in off-grid mode and the SOC or voltage of battery drops to this set value, the relays on GEN port of hybrid inverter will turn to normally closed(ON), then the Grid-Tied inverter will generate solar power and feed into hybrid inverter. When the hybrid inverter operates in on-grid mode, this parameter will be invalid, the relays on GEN port of hybrid inverter will always be normally colsed(ON), Grid-Tied inverter can operate normally.
AC Couple Frz High: If choosing"Micro Inv input", as the battery SOC reaches gradually setting value (OFF), During the process, the microinverter output power will decrease linear. When the battery SOC equals to the setting value (OFF), the system frequency will become the setting value (AC couple Frz high) and the Microinverter will stop working.
MI export to grid cutsoff: Stop exporting power produced by the microinverter to the grid.

* **Note**: Micro Inv Input OFF and On is valid for some certain FW version only.

5.10 Advanced Function Setup Menu

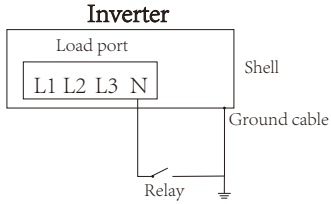


Solar Arc Fault ON(Optional): This feature is optional. After enabling this function, the inverter will detect whether there is a arcing fault on the PV side. If arcing occurs, the inverter will report a fault and stop outputting power.
Clear Arc_Fault(Optional): After the arc fault on the PV side is eliminated, enabling this function can eliminate the arc fault alarm of the inverter and restore normal operation of the inverter.
System selfcheck: Disable. this is only for factory.
Gen Peak-shaving: Enable When the power of the generator exceeds the rated value of it, the inverter will provide the redundant part to ensure that the generator will not overload.
DRM: For AS4777 standard.
Backup Delay: When the grid cuts off, the inverter will give output power after the setting time.
For example, backup delay: 3ms. the inverter will give output power after 3ms when the grid cuts off.
Note: for some old FW version, the function is not available.

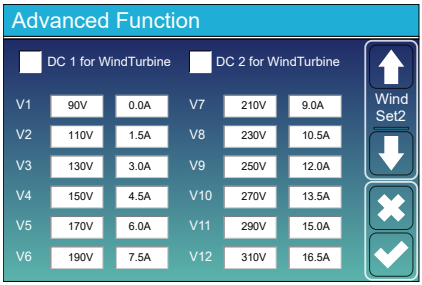
BMS_Err_Stop: When it is active, if the battery BMS failed to communicate with inverter, the inverter will stop working and report fault.

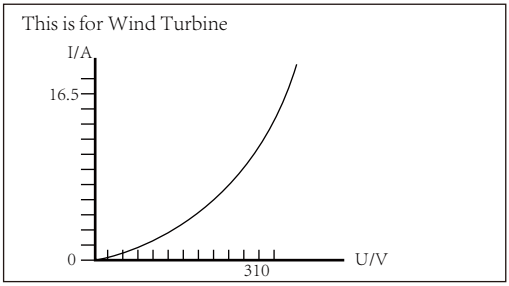
***Signal island mode:** If "Signal island mode" is checked and When inverter is in off-grid mode, the relay on the Neutral line (load port N line) will switch ON then the N line (load port N line) will bind to inverter ground.

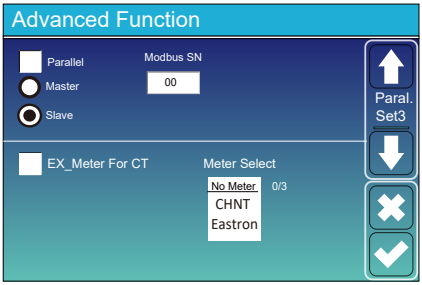
***If this item was selected, please ensure that the shell of the inverter is grounded, otherwise there will be electric shock if you touch the shell.**



Asymmetric phase feeding: If it was checked, the inverter will take power from the grid balance of on each phase (L1/L2/L3) when needed.

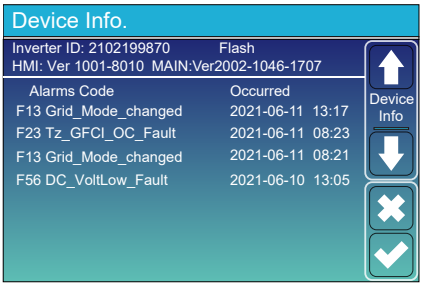






Ex_Meter For CT: when using zero-export to CT mode, the hybrid inverter can select EX_Meter For CT function and use the different meters.e.g.CHNT and Eastron.

5.11 Device Info Setup Menu



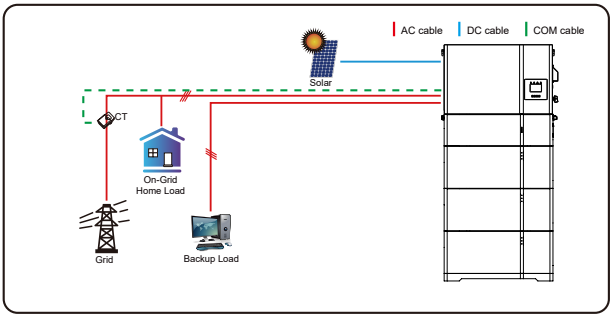
This page show Inverter ID, Inverter version and alarm codes.

HMI: LCD version

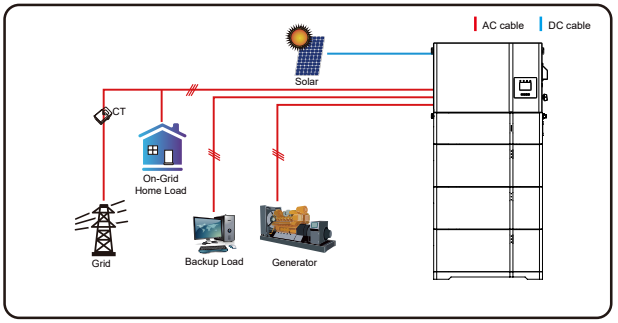
MAIN: Control board FW version

6. Mode

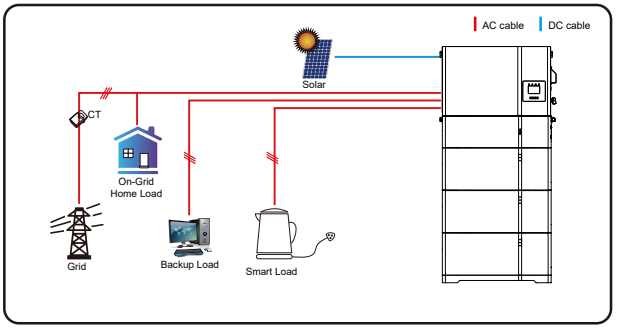
Mode I:Basic



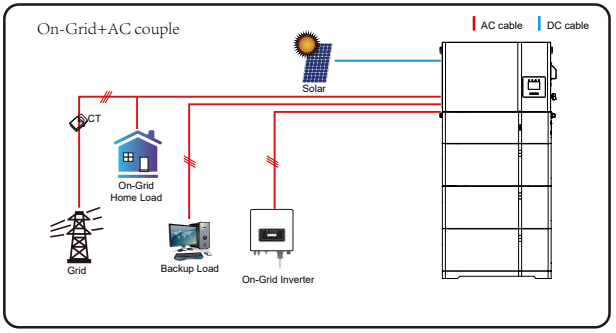
Mode II: With Generator



Mode III: With Smart-Load



Mode IV: AC Couple



The 1st priority power of the system is always the PV power, then 2nd and 3rd priority power will be the battery bank or grid according to the settings. The last power backup will be the Generator if it is available.

7. Limitation of Liability

In addition to the product warranty described above, the state and local laws and regulations provide financial compensation for the product's power connection (including violation of implied terms and warranties). The company hereby declares that the terms and conditions of the product and the policy cannot and can only legally exclude all liability within a limited scope.

Error code	Description	Solutions
F01	DC input polarity reverse fault	1，Check the PV input polarity 2，Seek help from us, if can not go back to normal state.
F07	DC_START_Failure	1，The BUS voltage can't be built from PV or battery. 2，Restart the inverter, If the fault still exists, please contact us for help
F13	working mode change	1. When the grid type and frequency changed it will report F13; 2. When the battery mode was changed to "No battery" mode,it will report F13; 3. For some old FW version, it will report F13 when the system work mode changed; 4, Generally, it will disappear automatically when shows F13; 5. If still same, and turn off the DC switch and AC switch and wait for one minute and then turn on the DC/AC switch; 6. Seek help from us, if can not go back to normal state.
F15	AC over current fault of software	AC side over current fault 1. Please check whether the backup load power and common load power are within the range; 2. Restart and check whether it is in normal; 3. Seek help from us, if can not go back to normal state.
F16	AC leakage current fault	Leakage current fault 1, Check the PV side cable ground connection 2, Restart the system 2-3 times 3, if the fault still existing, please contact us for help.
F18	AC over current fault of hardware	AC side over current fault 1. Please check whether the backup load power and commonload power are within the range; 2. Restart and check whether it is in normal; 3. Seek help from us, if cannot go back to normal state.
F20	DC over current fault ofthe hardware	DC side over current fault 1. Check PV module connect and battery connect; 2. When in the off-grid mode, the inverter startup with big power load, it may report F20. Please reduce the load power connected; 3. Turn off the DC switch and AC switch and then wait one minute, then turn on the DC/AC switch again; 4. Seek help from us, if can not go back to normal state.

Error code	Description	Solutions
F21	Tz_HV_Overcurr_fault	BUS over current. 1, Check the PV input current and battery current setting 2. Restart the system 2~3 times. 3. If the fault still exists, please contact us for help.
F22	Tz_EmergStop_Fault	Remotely shutdown 1, it tells the inverter is remotely controlled.
F23	Tz_GFCI_OC_ current is transient over current	Leakage current fault 1. Check PV side cable ground connection. 2. Restart the system 2~3 times. 3. If the fault still exists, please contact us for help.
F24	DC insulation failure	PV isolation resistance is too low 1. Check the connection of PV panels and inverter is firmly and correctly; 2. Check whether the PE cable of inverter is connected to ground; 3. Seek help from us, if can not go back to normal state.
F26	The DC busbar isunbalanced	1. Please wait for a while and check whether it is normal; 2. When the load power of 3 phases is big different, it will report the F26. 3 .When there’ s DC leakage current, it will report F26 4. Restart the system 2~3 times. 5. Seek help from us, if can not go back to normal state.
F29	Parallel CAN Bus fault	1. When in parallel mode, check the parallel communication cable connection and hybrid inverter communication address setting; 2. During the parallel system startup period, inverters will report F29.But when all inverters are in ON status, it will disappear automatically; 3. If the fault still exists, please contact us for help.
F34	AC Overcurrent fault	1, Check the backup load connected, make sure it is in allowed power range 2, If the fault still exists, please contact us for help
F41	Parallel system stop	1, Check the hybrid inverter work status. If there’s 1pcs hybrid inverter shutdown, all hybrid inverters will report F41 fault. 2, If the fault still exists, please contact us for help
F42	AC line low voltage	Grid voltage fault 1. Check the AC voltage is in the range of standard voltage inspecification; 2. Check whether grid AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.

Error code	Description	Solutions
F46	backup battery fault	1，Please check each battery status, such as voltage/ SOC and parameters etc., and make sure all the parameters are same. 2，If the fault still exists, please contact us for help
F47	AC over frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F48	AC lower frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F55	DC busbar voltage is too high	BUS voltage is too high 1. Check whether battery voltage is too high; 2. check the PV input voltage, make sure it is within the allowed range; 3. Seek help from us, if can not go back to normal state.
F56	DC busbar voltage is too low	Battery voltage low 1. Check whether battery voltage is too low; 2. If the battery voltage is too low, using PV or grid to charge thebattery; 3. Seek help from us, if can not go back to normal state.
F58	BMS communication fault	1, it tells the communication between hybrid inverter and battery BMS disconnected when “BMS_Err-Stop” is active” 2, if don’ t want to see this happen, you can disable “BMS_Err-Stop” item on the LCD. 3, If the fault still exists, please contact us for help
F62	DRMs0_stop	1, the DRM function is for Australia market only. 2, Check the DRM function is active or not 3, Seek help from us, if can not go back to normal state after restart the system
F63	ARC fault	1. ARC fault detection is only for US market; 2. Check PV module cable connection and clear the fault; 3. Seek help from us, if can not go back to normal state
F64	Heat sink high temperaturefailure	Heat sink temperature is too high 1. Check whether the work environment temperature is too high; 2. Turn off the inverter for 10mins and restart; 3. Seek help from us, if can not go back to normal state.

Chart 7-1 Fault information

Under the guidance of our company, customers return our products so that our company can provide service of maintenance or replacement of products of the same value. Customers need to pay the necessary freight and other related costs. Any replacement or repair of the product will cover the remaining warranty period of the product. If any part of the product or product is replaced by the company itself during the warranty period, all rights and interests of the replacement product or component belong to the company.

Factory warranty does not include damage due to the following reasons:

· Damage during transportation of equipment;
· Damage caused by incorrect installation or commissioning;
· Damage caused by failure to comply with operation instructions, installation instructions or maintenance instructions;
· Damage caused by attempts to modify, alter or repair products;
· Damage caused by incorrect use or operation;
· Damage caused by insufficient ventilation of equipment;
· Damage caused by failure to comply with applicable safety standards or regulations;
· Damage caused by natural disasters or force majeure (e.g. floods, lightning, overvoltage, storms, fires, etc.)

In addition, normal wear or any other failure will not affect the basic operation of the product. Any external scratches, stains or natural mechanical wear does not represent a defect in the product.

8. Datasheet

Model		Hightech Power S 5.1kWh LV AIO				
Main Parameter						
Battery Chemistry		$LiFePO_4$				
Battery Module Energy (kWh)		5.12				
Battery Module Voltage (V)		51.2				
Battery Module Capacity (Ah)		100				
Battery Module Quantity		1	2	3	4	5
Nominal Voltage (V)		51.2				
Operating Voltage(V)		44.8-57.6				
Energy(kWh)		5.12	10.24	15.36	20.48	25.6
Usable Energy(kWh)[1]		4.6	9.2	13.8	18.4	23.0
Charge/Discharge Current (A)	Recommend[2]	50	100	150	200	250
	Max.[2]	100	200	250	250	250
	Peak(10s,25℃)	150	270	360	360	360
Other Parameter						
Recommend Depth of Discharge		90%				
System Dimension (W/D/H, mm)		720*255*569	720*255*869	720*255*1169	720*255*1469	720*255*1769
System Weight (kg)		76.5	131.5	186.5	241.5	296.5
Master LED Indicator		Battery module: 3LED(working, alarming, protecting)				
		PDU module: 5LED(SOC:20% to 100%)&3LED(working, alarming, protecting)				
IP Rating of Enclosure		IP65(after stacking)				
Operating Temperature[3]		Charge/Discharge:-20°C to 55°C				
Operating Temperature[4]		Charge/Discharge:-20°C to 55°C(heating film being activated)				
		Charge: 0°C to 55°C/Discharge:-20°C to 55°C(heating film being deactivated)				
Operating Temperature		Charge: 0°C to 55°C /-20°C to 55°C (Battery heating film activated)/Discharge: -20°C to 55°C				
Storage Temperature		0°C to 35°C				
Humidity		5% to 95%				
Altitude		⩽2000m				
Installation		Floor-Mounted				
Communication Port		CAN2.0, RS485				
Cycle Life		⩾6000(25°C±2°C,0.5C/0.5C,90%DOD,70%EOL)				
Certification		UN+IEC6100+IEC62619+VDE4105				
Energy Throughput		16 MWh (Battery Module @70%EOL)				
Battery Module Weight(kg)		55				
Battery Module Dimension(W/D/H, mm)		720*255*300 (without terminal parts)				

[1] DC Usable Energy , test conditions: 90% DOD, 0.5C charge & discharge at 25°C. System usable energy may vary due to system configuration parameters.
[2] The current is affected by temperature and SOC.
[3] Only apply to cells rated for low operating temperature.
[4] Only apply to batteries cells with heating film.

Model	Trio Hybrid S 5K LV AIO	Trio Hybrid S 6K LV AIO	Trio Hybrid S 8K LV AIO	Trio Hybrid S 10K LV AIO	Trio Hybrid S 12K LV AIO
Battery Input Data					
Battery Type	Lithium-ion				
Battery Voltage Range(V)	40-60				
Max. Charging Current(A)	120	130	190	210	240
Max. Discharging Current(A)	120	130	190	210	240
Charging Strategy for Li-Ion Battery	Self-adaption to BMS				
Number of Battery Input	1				
PV String Input Data					
Max. PV access power(W)	10000	12000	16000	20000	24000
Max. PV Input Power(W)	8000	9600	12800	16000	19200
Max. PV Input Voltage(V)	800				
Start-up Voltage(V)	160				
PV Input Voltage Range(V)	160-800				
MPPT Voltage Range(V)	200-650				
Full Load MPPT Voltage Range(V)	350-650				
Rated PV Input Voltage(V)	550				
Max. Operating PV Input Current(A)	20+20			36+20	
Max. Input Short-Circuit Current(A)	30+30			54+30	
No.of MPPT Trackers/No.of String MPPT Tracker	2/1+1			2/2+2	
Max. Inverter Backfeed Current to The Array	0				
AC Input/Output Data					
Rated AC Input/Output Active Power(W)	5000	6000	8000	10000	12000
Max. AC Input/Output Apparent Power(VA)	5500	6600	8800	11000	13200
Peak Power (off-grid)(W)	2 times of rated power, 10s				
Rated AC Input/Output Current(A)	7.6/7.2	9.1/8.7	12.1/11.6	15.2/14.5	18.2/17.4
Max. AC Input/Output Current(A)	8.4/8	10/9.6	13.4/12.8	16.7/15.9	20/19.1
Max. Continuous AC Passthrough (grid to load)(A)	45				
Max. Output Fault Current(A)	16.8	20	26.8	33.4	40
Max. Output Overcurrent Protection(A)	70				
Rated Input/Output Voltage/Range(V)	220/380V,230/400V 0.85Un-1.1Un				
Grid Connection Form	3L+N+PE				
Rated Input/Output Grid Frequency/Range	50Hz/45Hz-55Hz 60Hz/55Hz-65Hz				
Power Factor Adjustment Range	0.8 leading-0.8 lagging				
Total Current Harmonic Distortion THDi	<3% (of nominal power)				
DC Injection Current	<0.5%In				
Efficiency					
Max. Efficiency	97.6%				
Euro Efficiency	97.0%				
MPPT Efficiency	>99%				
Equipment Protection					
DC reverse polarity protection	Yes				
AC Output Overcurrent Protection	Yes				
AC Output Overvoltage Protection	Yes				
AC Output Short Circuit Protection	Yes				
Thermal Protection	Yes				
Insulation Impedance detection	Yes				
DC Component Monitoring	Yes				

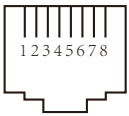
Arc fault circuit interrupter (AFCI)	Optional
Anti-islanding protection	Yes
DC Switch	Yes
Residual Current Detection	Yes
Surge Protection Level	TYPE II(DC), TYPE II(AC)
Interface	
Display	LCD+LED
Communication Interface	RS232, RS485, CAN
Monitor Mode	GPRS/WIFI/Bluetooth/4G/LAN (optional)
General Data	
Operating Temperature Range	-40 to +60℃, >45℃ Derating
Permissible Ambient Humidity	0-100%
Permissible Altitude	3000m
Noise	≤ 55 dB
Ingress Protection(IP) Rating	IP 65
Inverter Topology	Non-Isolated
Over Voltage Category	OVC II(DC), OVC III(AC)
Cabinet size(W*H*D) [mm]	720W×460.5H×254D (Excluding connectors and brackets)
Weight(kg)	43.75
Installation Style	Floor-Mounted
Warranty	10 Years
Type of Cooling	Intelligent Air Cooling
Grid Regulation	IEC 61727,IEC 62116,VDE-AR-N 4105, EN50549-1 Europe
Safety EMC/Standard	IEC/EN 61000-6-1/2/3/4, IEC/EN 62109-1, IEC/EN 62109-2

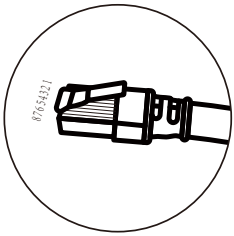
9. Appendix I

Definition of RJ45 Port Pin for BMS

No.	RS485 Pin
1	485_B
2	485_A
3	--
4	CAN-H
5	CAN-L
6	GND_485
7	485_A
8	485_B

BMS Port

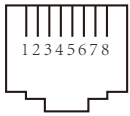


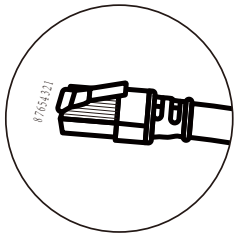


Definition of RJ45 Port Pin for Meter-485

No.	Meter-485 Pin
1	METER-485-B
2	METER-485-A
3	COM-5V
4	METER-485-B
5	METER-485-A
6	COM-GND
7	METER-485-A
8	METER-485-B

Meter-485 Port



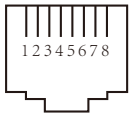


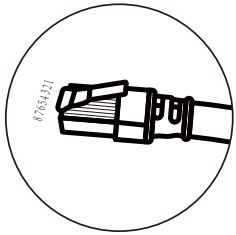
Definition of RJ45 Port Pin of "Modbus port" for remotely monitoring

No.	Modbus port
1	485_B
2	485_A
3	GND_485
4	--
5	--
6	GND_485
7	485_A
8	485_B

Note : for some hardware versions, this port is useless.

Modbus port

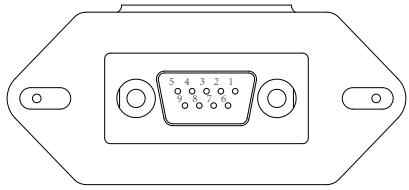




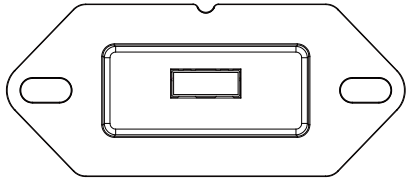
This model of inverter has two types of logger interfaces, DB9 and USB. Please refer to the actual inverter received for the actual interface type.

RS232

No.	RS232
1	
2	TX
3	RX
4	
5	D-GND
6	
7	
8	
9	12Vdc



DB9 (RS232)

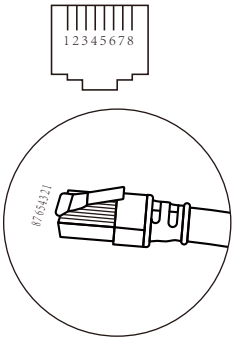


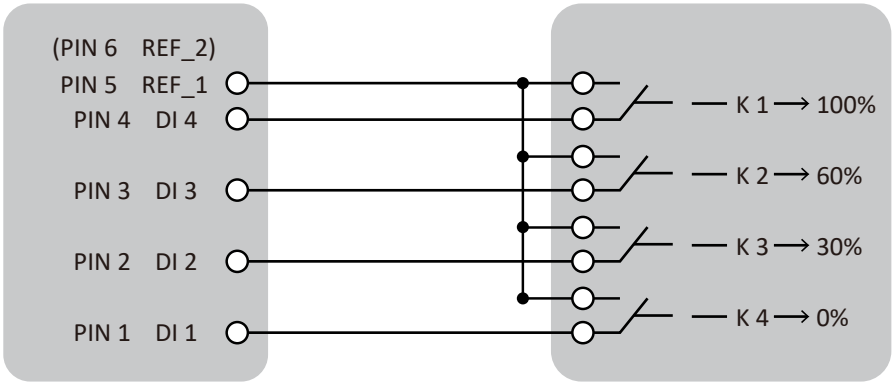
USB

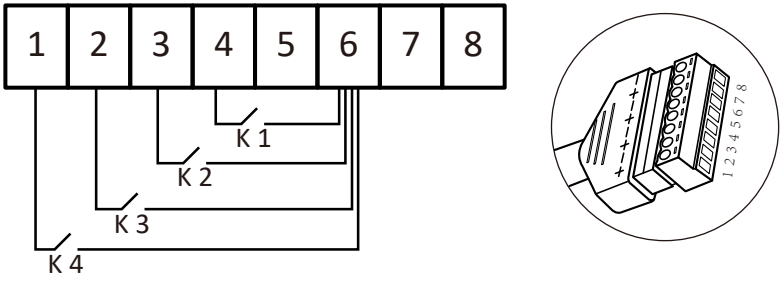
DRM： It is used to accept the external control command.

Definition of RJ45 Port Pin for DRM

No.	DRM
1	DI 1
2	DI 2
3	DI 3
4	DI 4
5	REF
6	GND
7	Reserved
8	Reserved

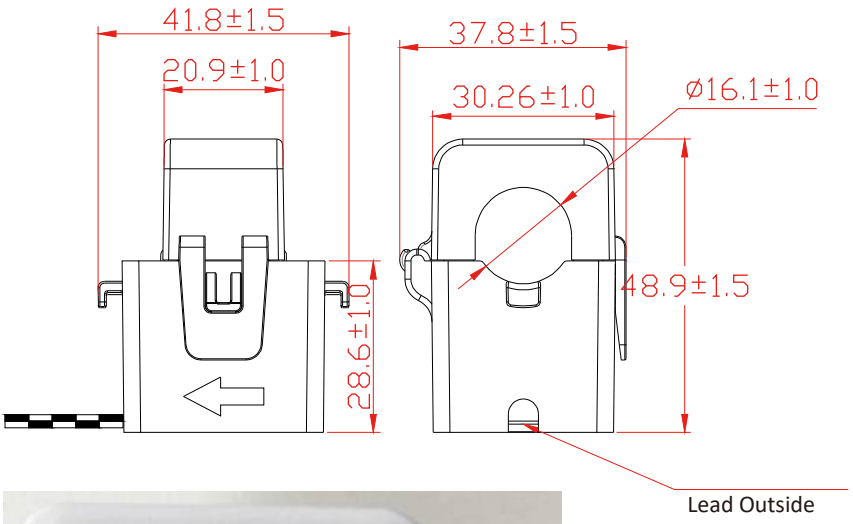






10. Appendix II

1. Split Core Current Transformer (CT) dimension: (mm)
2. Secondary output cable length is 4m.



Ver: 1.1.0, 2025-12-09

Hybrid-Wechselrichter WLAN-Verbindungsanleitung

Schritt 1: Laden Sie die Apps **TommaTech Connect** und **TommaTech Cloud** aus dem **Google Play Store** oder **App Store** herunter. Alternativ können Sie die Apps auch direkt aufrufen, indem Sie die untenstehenden QR-Codes scannen.

Hybrid Inverter Wi-Fi Connection Guide

Step 1: Download the **TommaTech Connect** and **TommaTech Cloud** applications from the **Google Play Store** or **App Store**. Alternatively, you can scan the **QR codes** below to access the applications directly.

Hibrit Inverter Wi-Fi Bağlantı Rehberi

1.Adım: Google Play Store veya **App Store** üzerinden **TommaTech Connect** ve **TommaTech Cloud** uygulamalarını indiriniz. Alternatif olarak aşağıda yer alan **QR** kodlarını taratarak uygulamalara doğrudan erişim sağlayabilirsiniz.

TOMMATECH GmbH
GERMAN-based company
CONNECT

TommaTech Connect

TOMMATECH GmbH
GERMAN-based company
CLOUD

TommaTech Cloud

Schritt 2: Scannen Sie den untenstehenden **QR-Code** der **Hybrid-Verbindungsanleitung**. Klicken Sie in der Liste nacheinander auf die Anleitungen TommaTech Connect und TommaTech Cloud.

Schritt 3: Schließen Sie den Registrierungsvorgang der Anwendung ab, indem Sie die in den Anleitungen beschriebenen Verbindungsschritte befolgen.

Step 2: Scan the QR code of the Hybrid Connection Guide below.
From the list, click on the TommaTech Connect and TommaTech Cloud guides in order.

Step 3: Complete the application registration process by following the connection steps provided in the guides.

2.Adım: Aşağıda bulunan **Hibrit Bağlantı Kılavuzu** ''**QR**' kodunu taratınız. Listeden sırasıyla TommaTech Connect ve Tommatech Cloud kılavuzlarına tıklayınız.

3.Adım: Kılavuzlardaki bağlantı adımlarını takip ederek uygulamaya kayıt işlemini tamamlayınız.

TommaTech Hybrid-Verbindungsanleitung

TommaTech Hybrid Connection Guide

TommaTech Hibrit Bağlantı Kılavuzu

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