

# ENSERVER 50KWH

## USER MANUAL



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# SAFETY INSTRUCTIONS

## SAFETY GUIDELINES

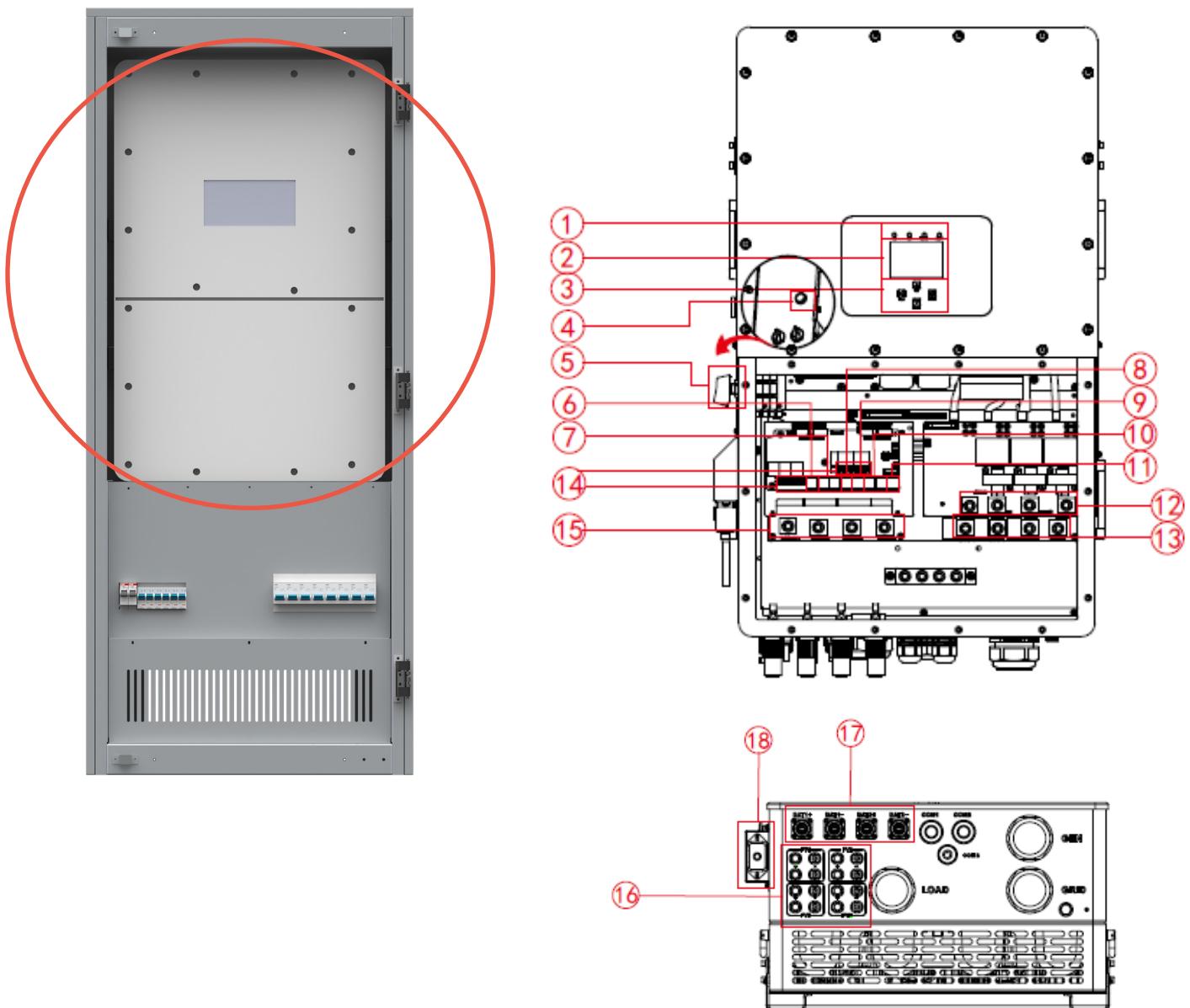
- This chapter contains important safety and operating instructions. Read and keep this manual for future reference.
- Before using the Enserver, please read the instructions and warning signs of the battery and corresponding sections in the instruction manual.
- Do not disassemble the Enserver. If you 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.
- Never charge a frozen battery.
- For optimum operation of this Enserver, please follow required specification to select appropriate cable size. It is very important to correctly operate this Enserver.
- 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 Enserver should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this Enserver.
- Never cause AC output and DC input short circuited. Do not connect to the mains when DC input short circuits.

# ENSERVER

## 2.1 INTRODUCTION

This is a multi-functional Enserver, combining functions of Enserver, solar charger and battery charger to offer uninterrupted 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.

## 2.2 OVERVIEW



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1: Enserver indicators

7: Parallel port

13: Grid

2: LCD display

8: CAN port

15: Load

3: Function buttons

9: DRM port

14: Function port

5: DC switch

10: BMS port

16: PV input

4: Power on/off button

11: RS485 port

17: Battery input

6: Meter port

12: Generator input

18: WiFi Interface

### 2.3 PRODUCT FEATURES

- 230V/400V Three phase pure sine wave Enserver.
- 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 for 1 MPPT tracker, 1 string for 1 MPPT tracker.
- Smart settable three stages MPPT charging for optimized battery performance.
- Time of use function.
- Smart Load Function.

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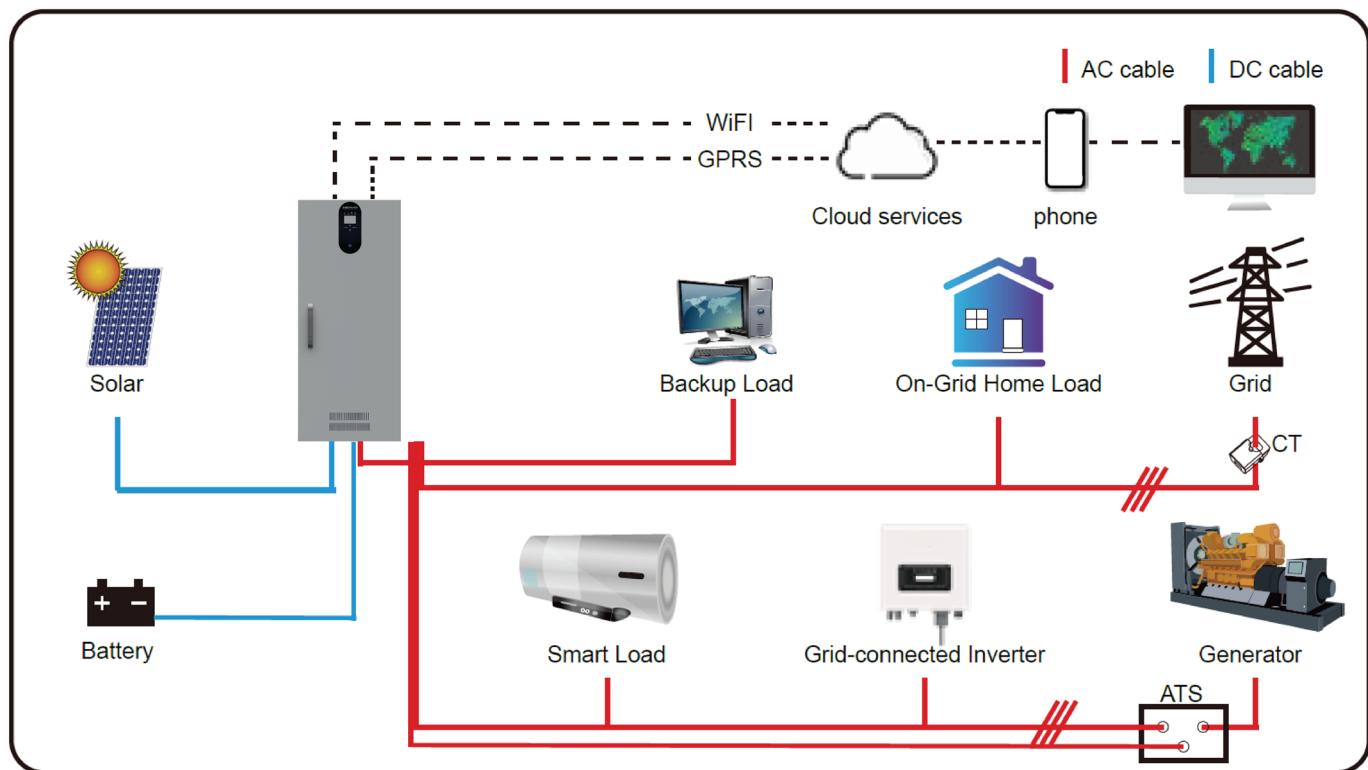
### 2.4 BASIC SYSTEM ARCHITECTURE

The following illustration shows basic application of the Enserver.

It also includes following devices to have a complete running system.

- Generator or Utility
- PV modules

This Enserver can power all kinds of appliances in home or office environment, including motor type appliances such as refrigerator and air conditioner.



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## INSTALLATION

### 3.1 INSTALLATION PRECAUTION

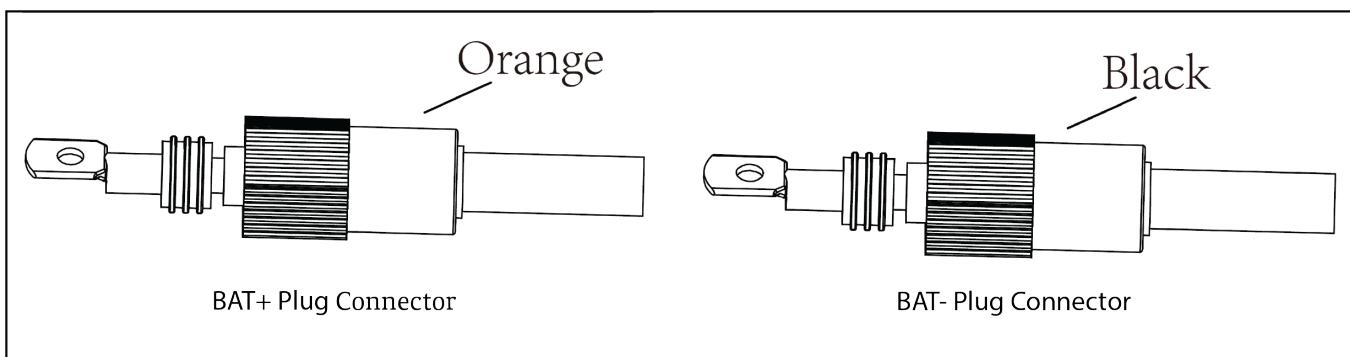
The Enserver is designed for outdoor use(IP65), Please make sure the installation site meets below conditions:

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:

- 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%).

### 3.2 BATTERY CONNECTION

For safe operation and compliance, a separate DC over-current protector or disconnect device is required between the battery and the Enserver. In some applications, switching devices may not be required but over-current protectors are still required. Refer to the typical amperage in the table below for the required fuse or circuit breaker size.



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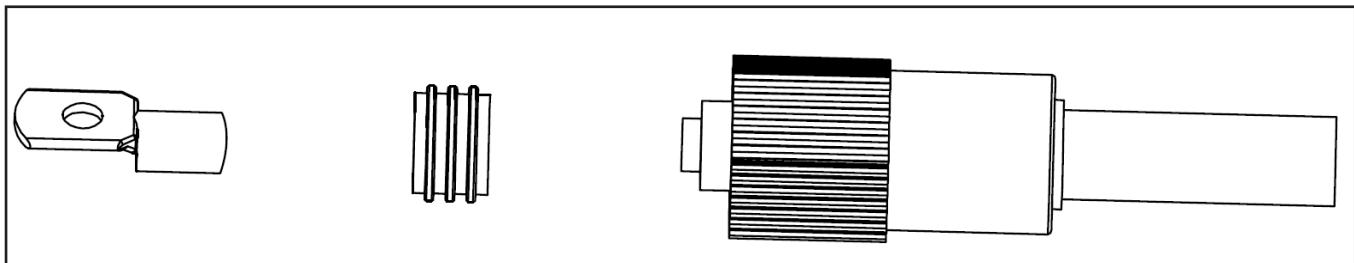
### *Safety Hint:*

Please use approved DC cable for battery system.

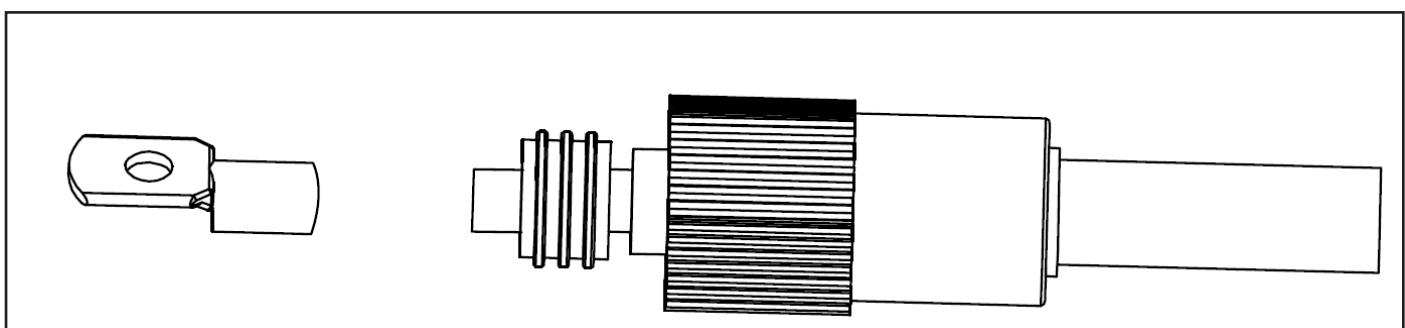
<i>Model</i>	<i>Cross section (mm<sup>2</sup>)</i>	
	<i>Range</i>	<i>Recommended value</i>
25/30/40/50KW	16.0~25.0 (6~4AWG)	16.0(6AWG)

The steps to assemble the battery plug connectors are listed as follows:

- Pass the cable through the terminal.



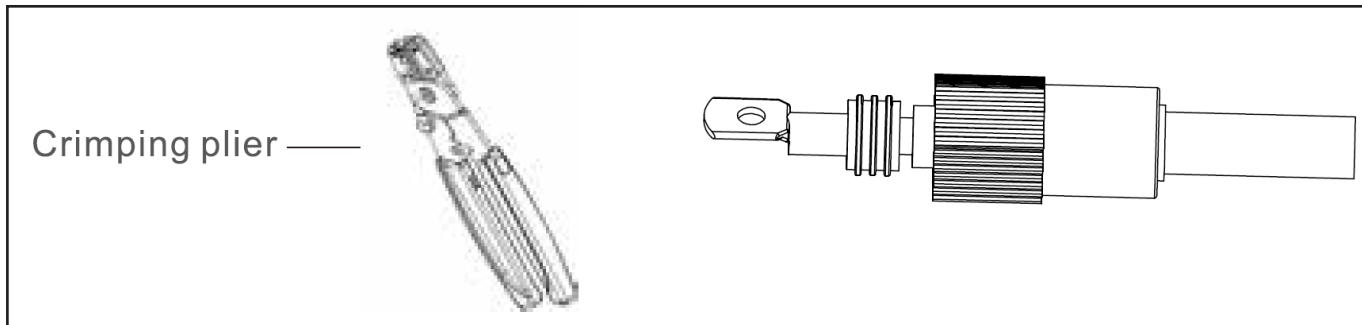
- Put on the rubber ring.



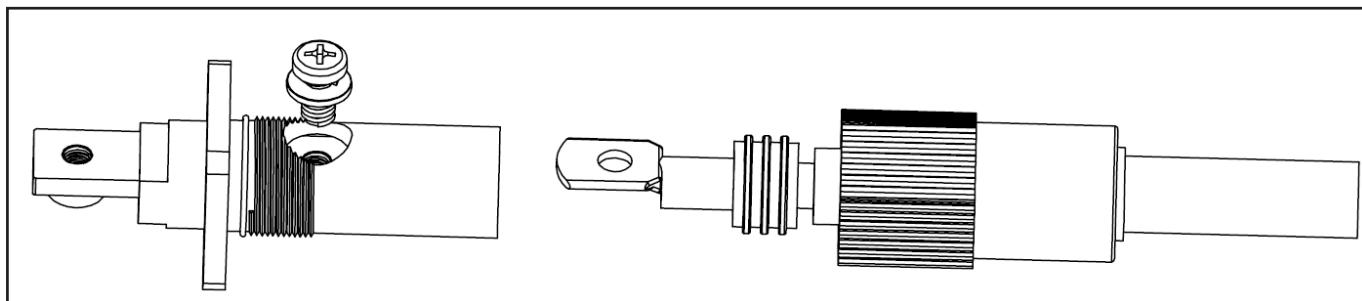
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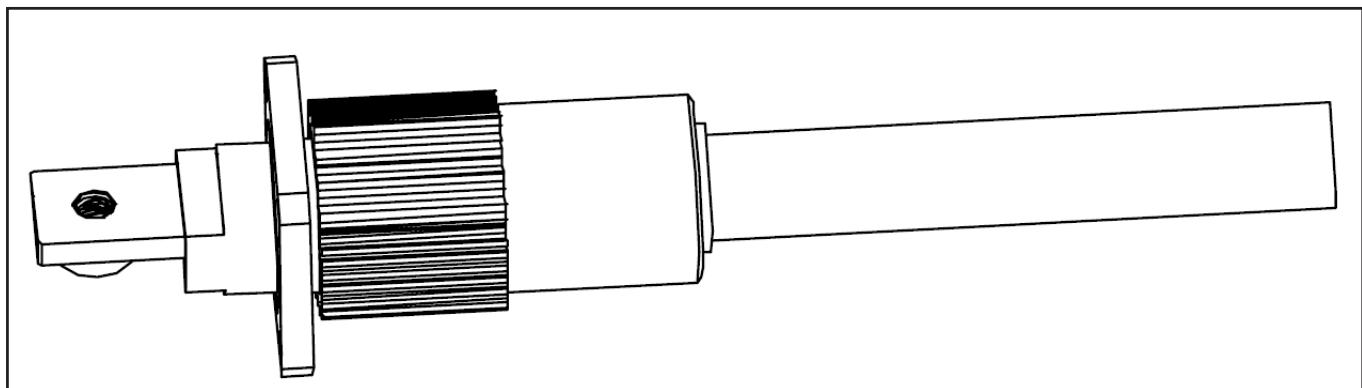
c) crimp terminals.



d) Fasten terminal with a bolt.



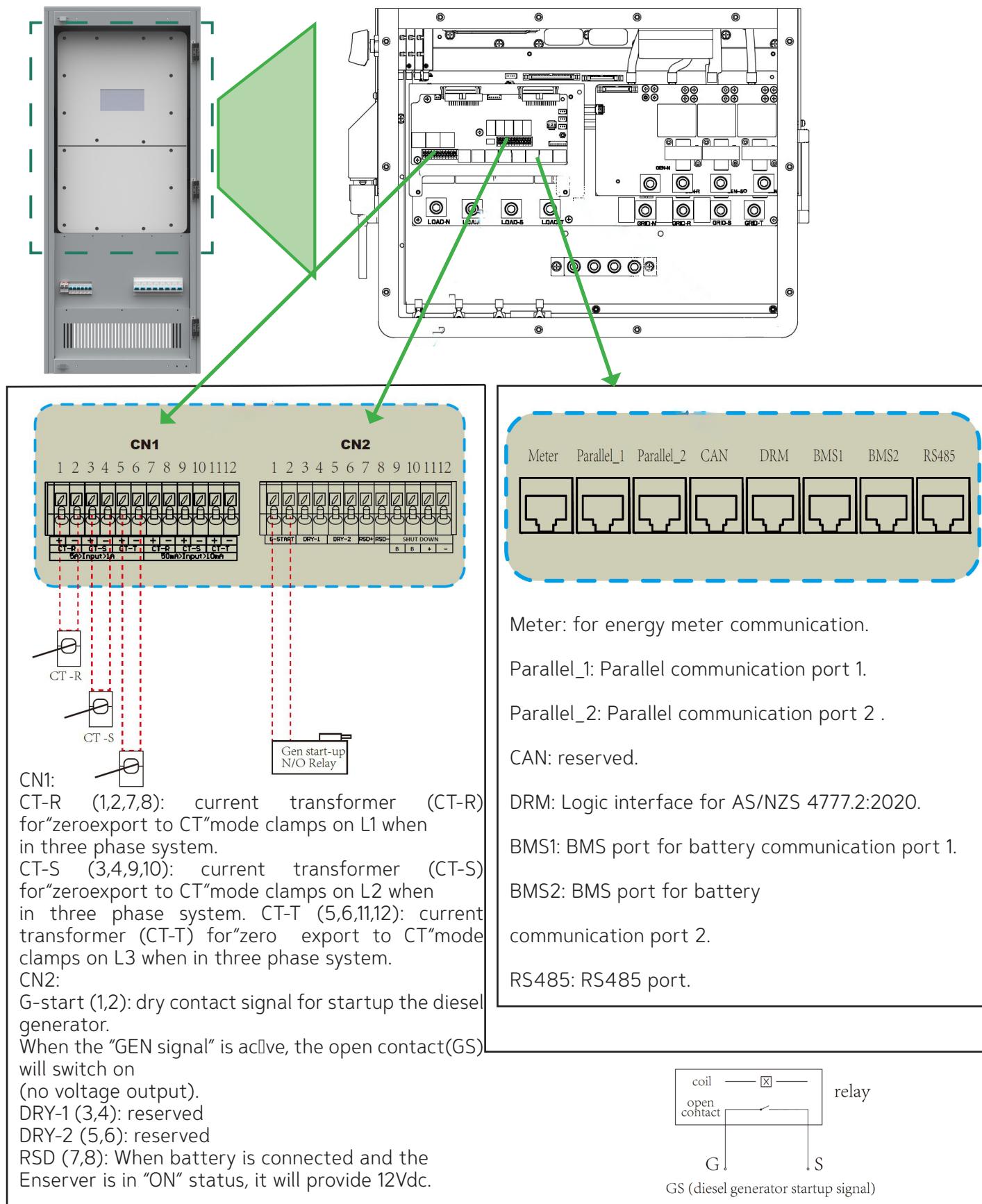
e) Fasten the terminal with outer cover.



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### 3.2 FUNCTION PORT DEFINITION



CN1:  
CT-R (1,2,7,8): current transformer (CT-R) for "zeroexport to CT" mode clamps on L1 when in three phase system.

CT-S (3,4,9,10): current transformer (CT-S) for "zeroexport to CT" mode clamps on L2 when in three phase system. CT-T (5,6,11,12): current transformer (CT-T) 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).

DRY-1 (3,4): reserved

DRY-2 (5,6): reserved

RSD (7,8): When battery is connected and the Enserver is in "ON" status, it will provide 12Vdc.

Meter: for energy meter communication.

Parallel\_1: Parallel communication port 1.

Parallel\_2: Parallel communication port 2 .

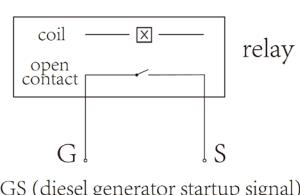
CAN: reserved.

DRM: Logic interface for AS/NZS 4777.2:2020.

BMS1: BMS port for battery communication port 1.

BMS2: BMS port for battery communication port 2.

RS485: RS485 port.



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### 3.3 GRID CONNECTION AND BACKUP LOAD CONNECTION

Before connecting to grid, please install a separate AC breaker between Enserver and grid. Also, it is recommended that installs an AC breaker between backup load and Enserver. This will ensure the Enserver can be securely disconnected during maintenance and fully protected from over current. For the 25/30/40/50KW model, the recommended AC breaker for backup load is 180A. For the 25/30/40/50KW model, the recommended AC breaker for grid is 180A.

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



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.

#### backup load connection

<b>Model</b>	<b>Cross section (mm<sup>2</sup>)</b>	
	<b>Range</b>	<b>Recommended value</b>
25/30/40/50KW	70~95 (2/0~3/0AWG)	70(2/0AWG)

#### Grid connection

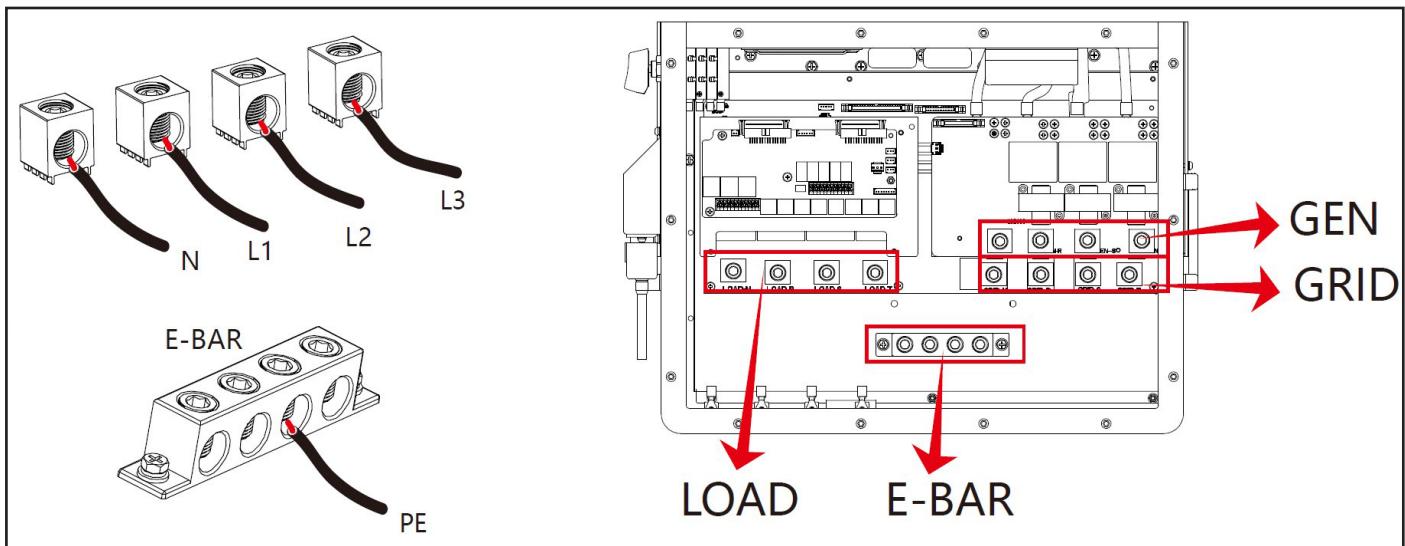
<b>Model</b>	<b>Cross section (mm<sup>2</sup>)</b>	
	<b>Range</b>	<b>Recommended value</b>
25/30/40/50KW	70~95 (2/0~3/0AWG)	70(2/0AWG)

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, insert the wires according to polarities indicated on the terminal block. Make sure the connection is complete.

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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 Enserver will trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

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### 3.4 PV CONNECTION

Before connecting to PV modules, please install a separate DC circuit breaker between Enserver and PV modules. It is very important for system safety and efficient operation to use appropriate cable for PV module connection.



To avoid any malfunction, do not connect any PV modules with possible leakage current to the inverter. For example, grounded PV modules will cause leakage current 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.

#### 3.4.1 PV MODULE SELECTION:

When selecting proper PV modules, please be sure to consider below parameters:

- 1) Open circuit Voltage (Voc) of PV modules can not exceed max. PV array open circuit voltage of Enserver.
- 2) Open circuit Voltage (Voc) of PV modules should be higher than min. start voltage.
- 3) The PV modules used to connect to this Enserver shall be Class A rating certified according to IEC 61730.

<b>Inverter Model</b>	<b>25KW</b>	<b>30KW</b>	<b>40KW</b>	<b>50KW</b>
PV Input Voltage	600V (180V~1000V)			
PV Array MPPT Voltage Range	150V-850V			
No. of MPP Trackers	2	3	4	
No. of Strings per MPP Tracker	2+2	2+2+2	2+2+2+2	

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### 3.4.2 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 Enserver.



#### *Safety Hint:*

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



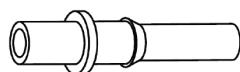
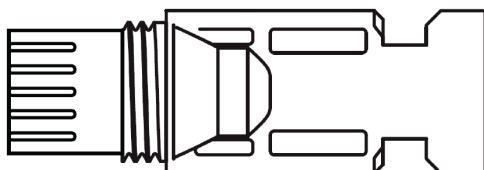
#### *Safety Hint:*

Before connection, please make sure the polarity of PV array matches the "DC+" and "DC-" symbols.

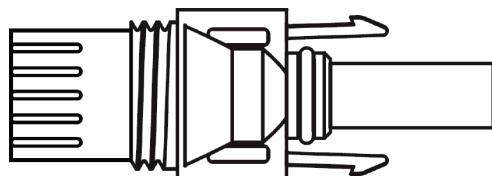


#### *Safety Hint:*

Before connecting inverter, please make sure the PV array open circuit voltage is within the 1000V of the inverter.



**DC+ Male Connector**



**DC- Female Connector**



#### *Safety Hint:*

Please use approved DC cable for PV system.

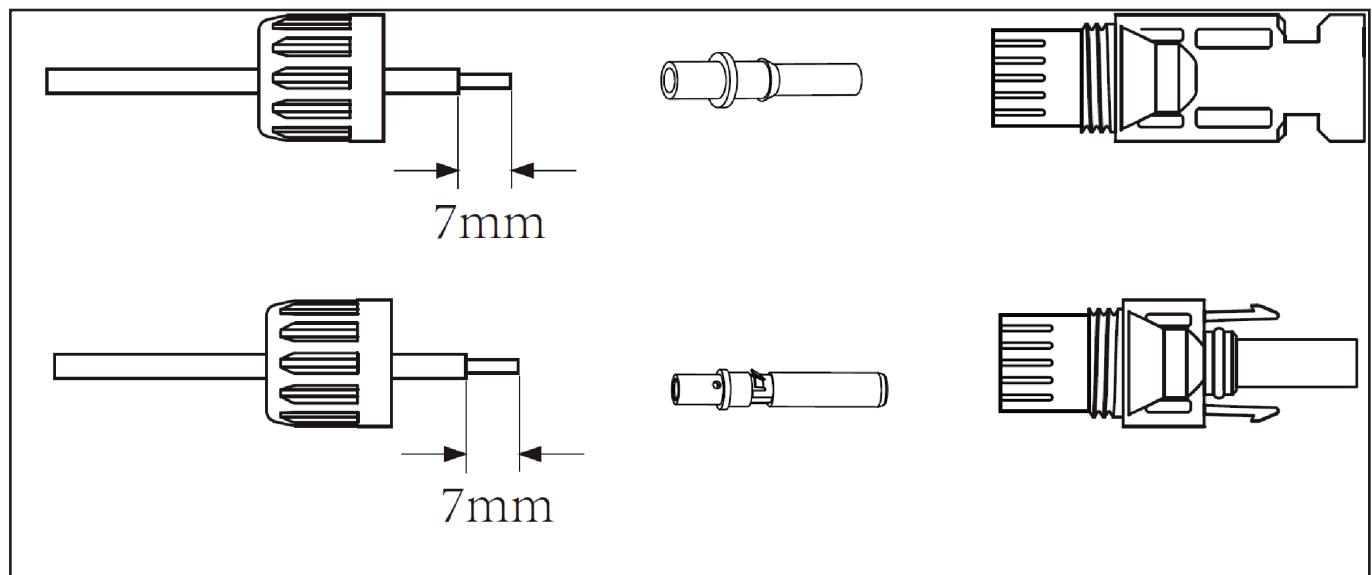
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<b>Cable type</b>	<b>Cross section (mm<sup>2</sup>)</b>	
	<b>Range</b>	<b>Recommended value</b>
Industry generic PV cable (model: PV1-F)	2.5~4 (12~10AWG)	2.5(12AWG)

The steps to assemble the DC connectors are listed as follows:

- Strip off the DC wire about 7mm, disassemble the connector cap nut.



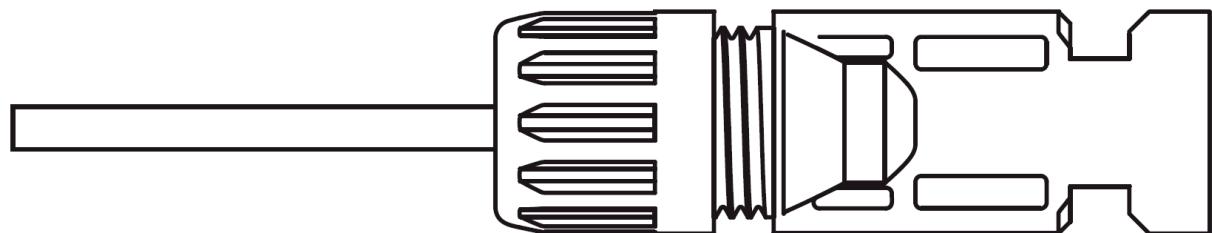
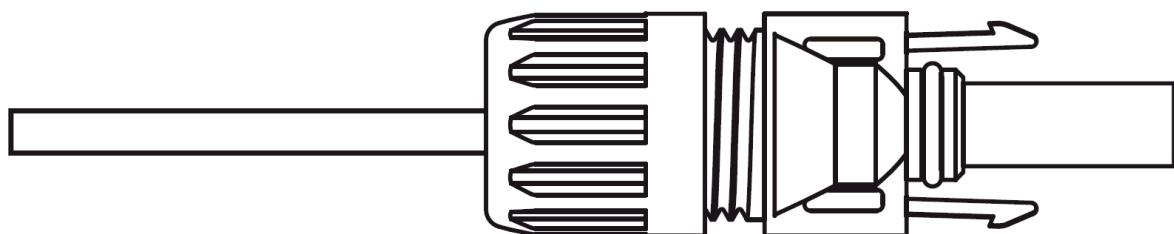
- Crimping metal terminals with crimping pliers.



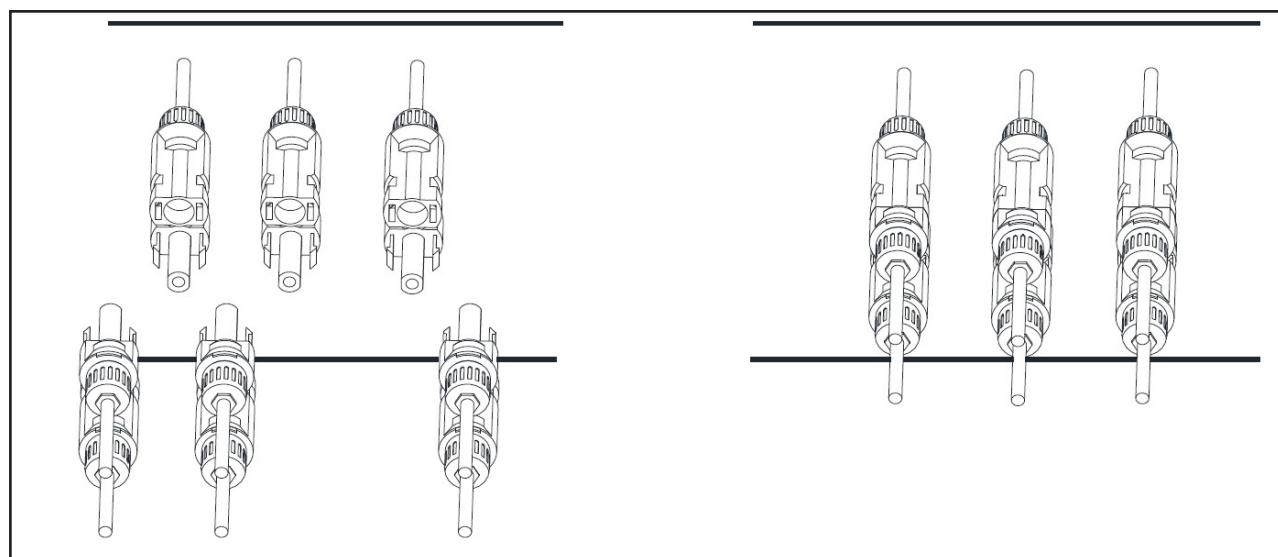
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c) Insert the contact pin to the top part of the connector and screw up the cap nut to the top part of the connector.



d) Finally insert the DC connector into the positive and negative input of the Enserver.



*Figure: DC Input Connection*

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### *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. Please do not switch off DC isolator when the DC current when there is high voltage or current. Technicians need to wait until night to keep safety.



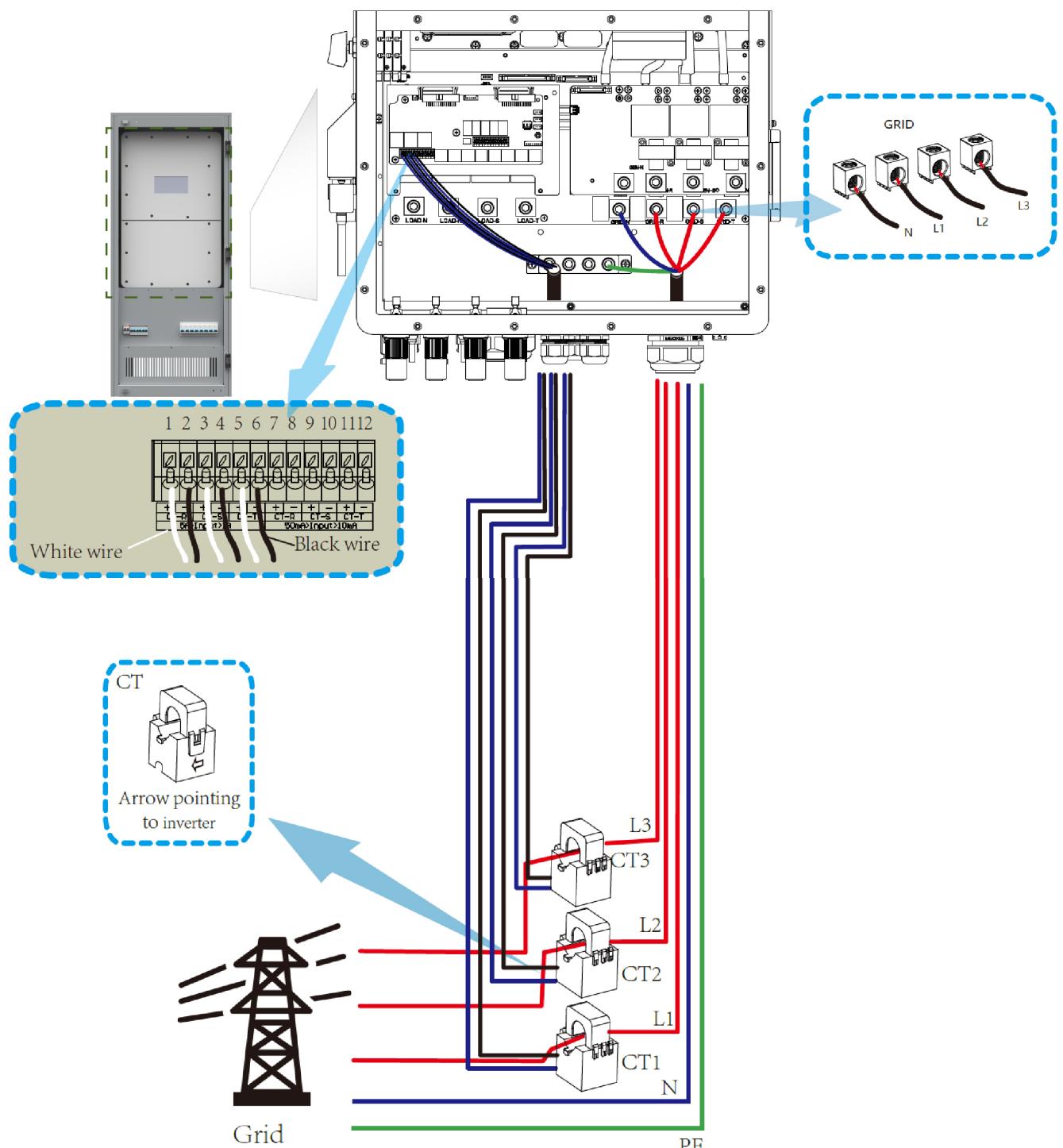
### *Warning:*

Use the DC power connector of the accessories. Do not interconnect the connectors of different manufacturers.

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### 3.5 CT CONNECTION

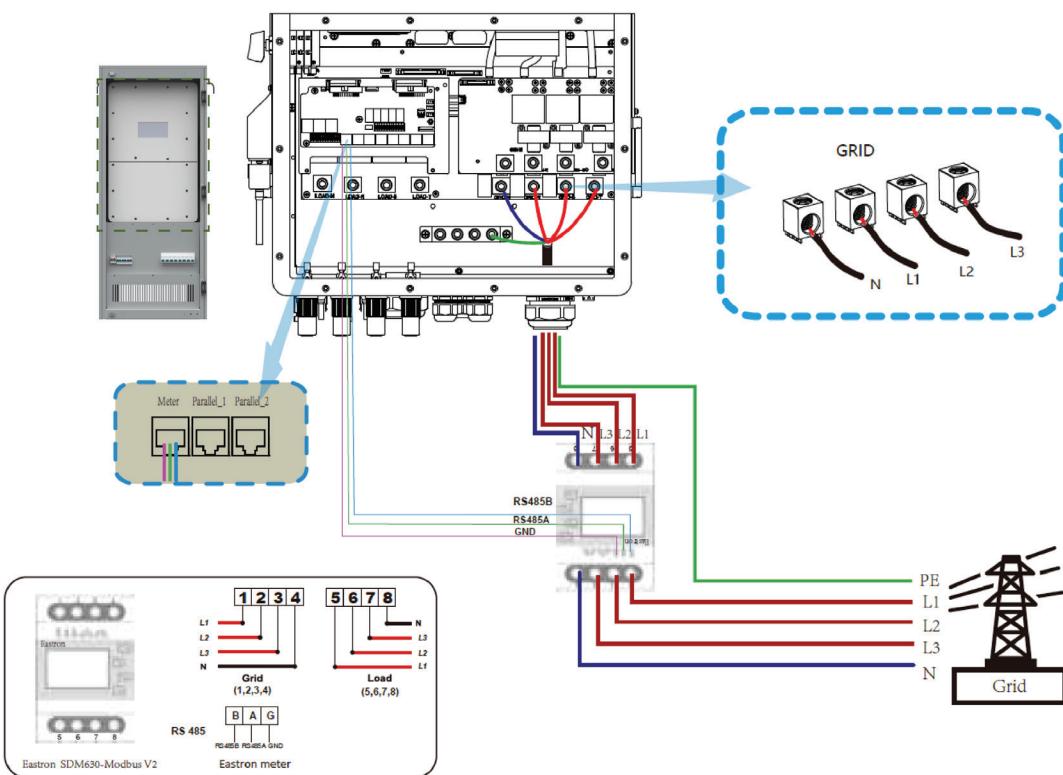
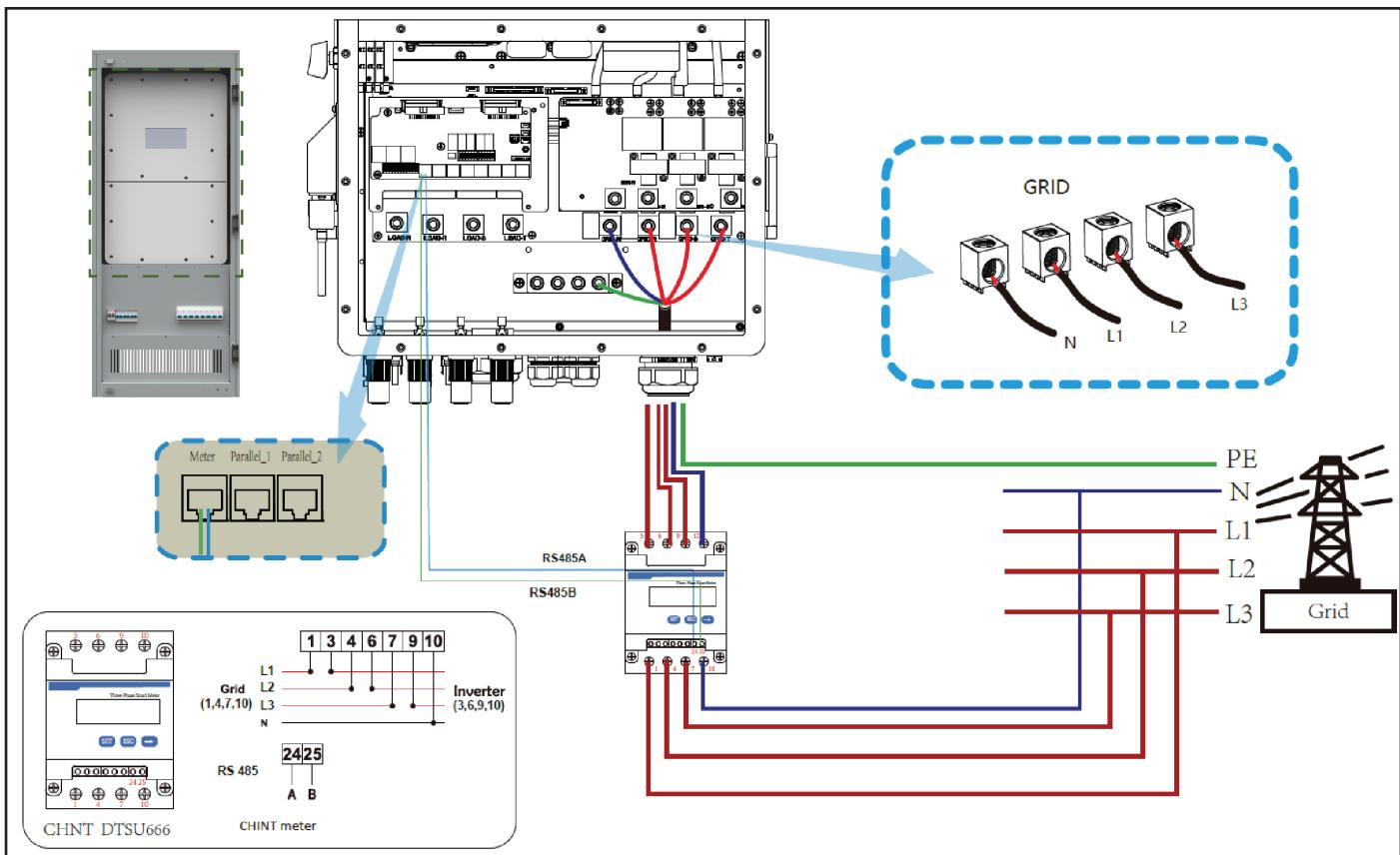


**\*Note: When the reading of the load power on the LCD is not correct, please reverse the CT arrow.**

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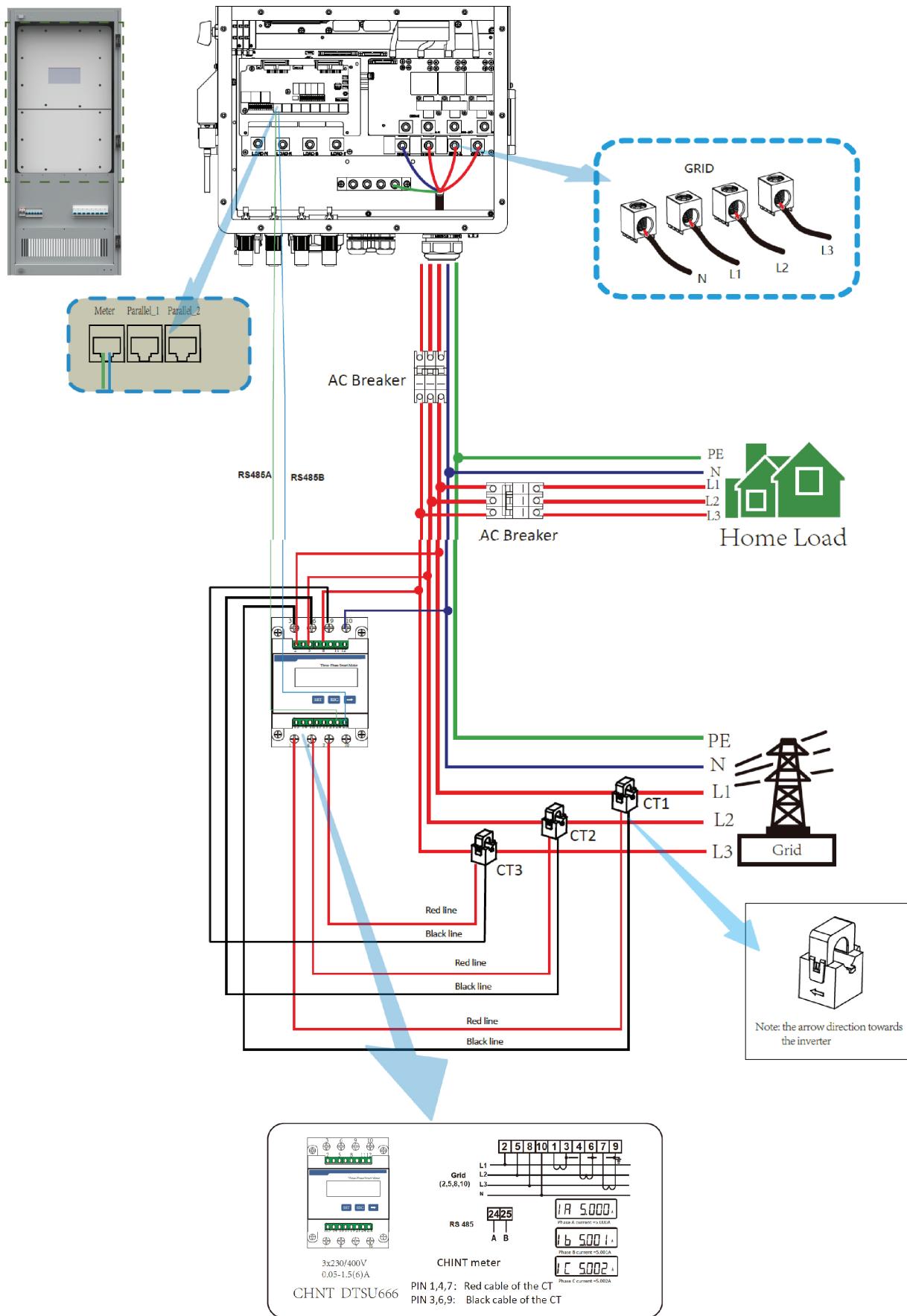
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### 3.5.1 METER CONNECTION



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**Note:**

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

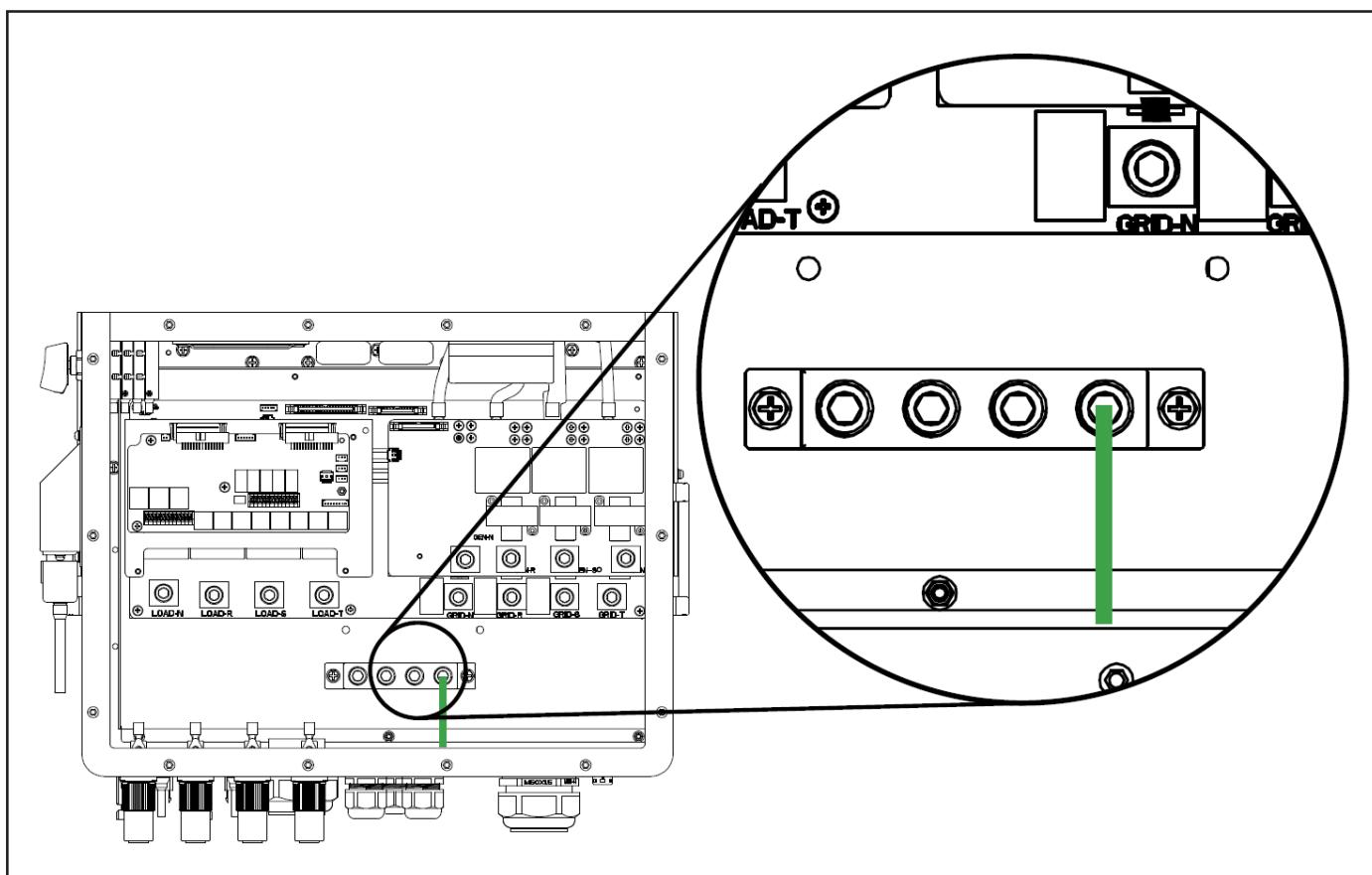


**Note:**

In final installation, breaker certified according to IEC 60947-1 and IEC 60947-2 shall be installed with the equipment.

### 3.6 EARTH CONNECTION (MANDATORY)

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



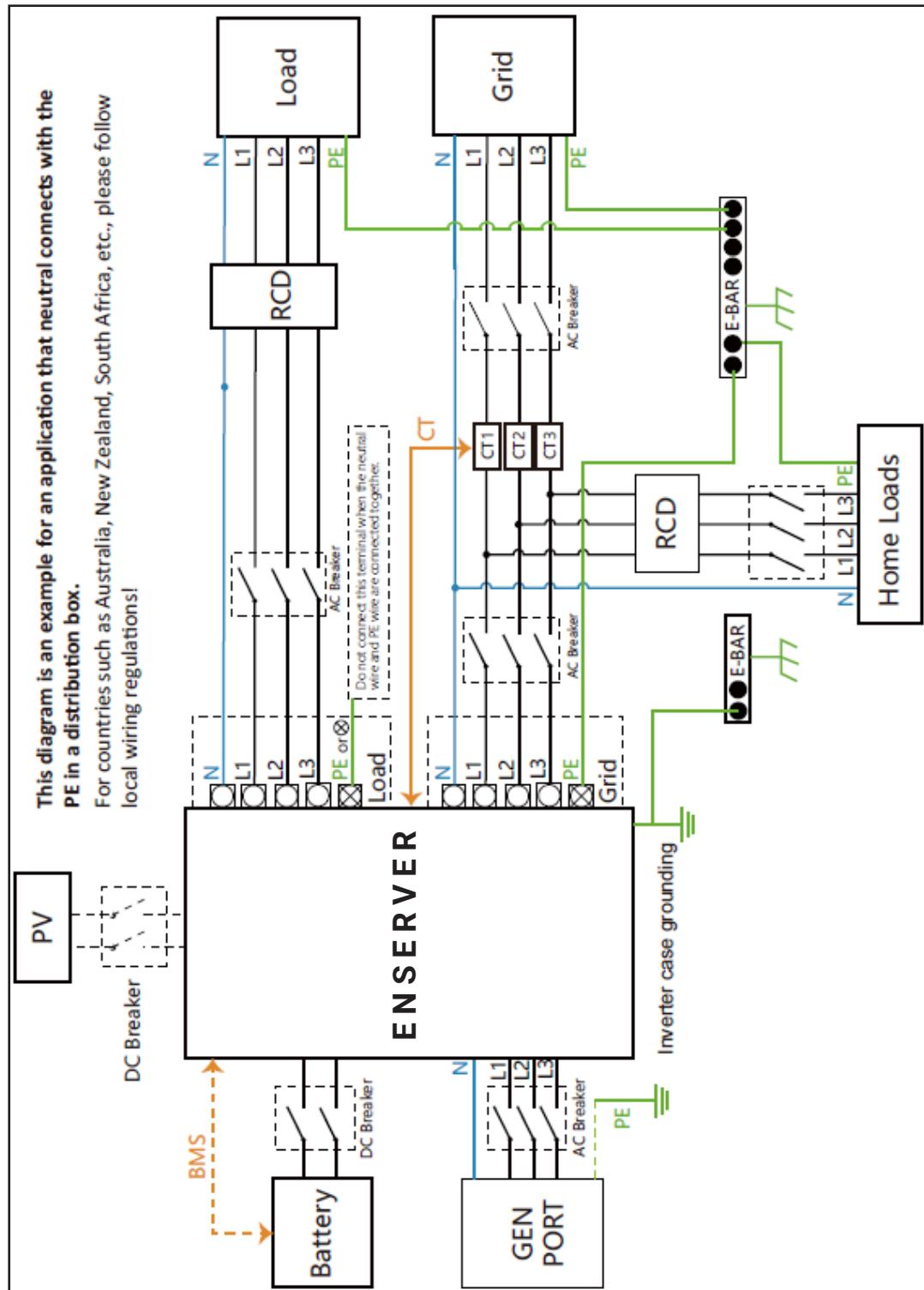
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### 3.7 WIFI CONNECTION

For the configuration of Wi-Fi Plug, please refer to illustrations of the Wi-Fi Plug.

### 3.8 WIRING SYSTEM FOR ENSERVER



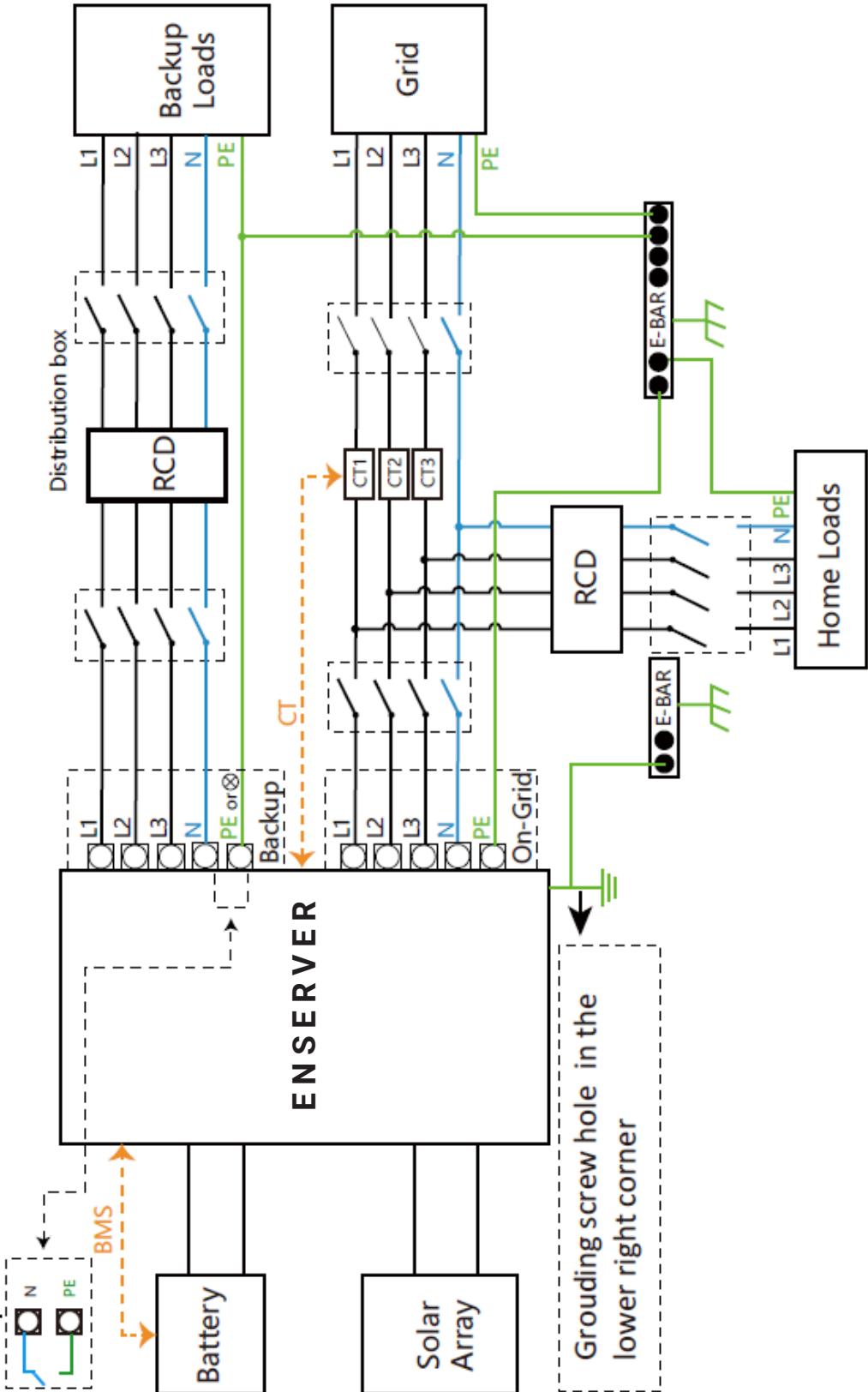
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### 3.9 WIRING DIAGRAM

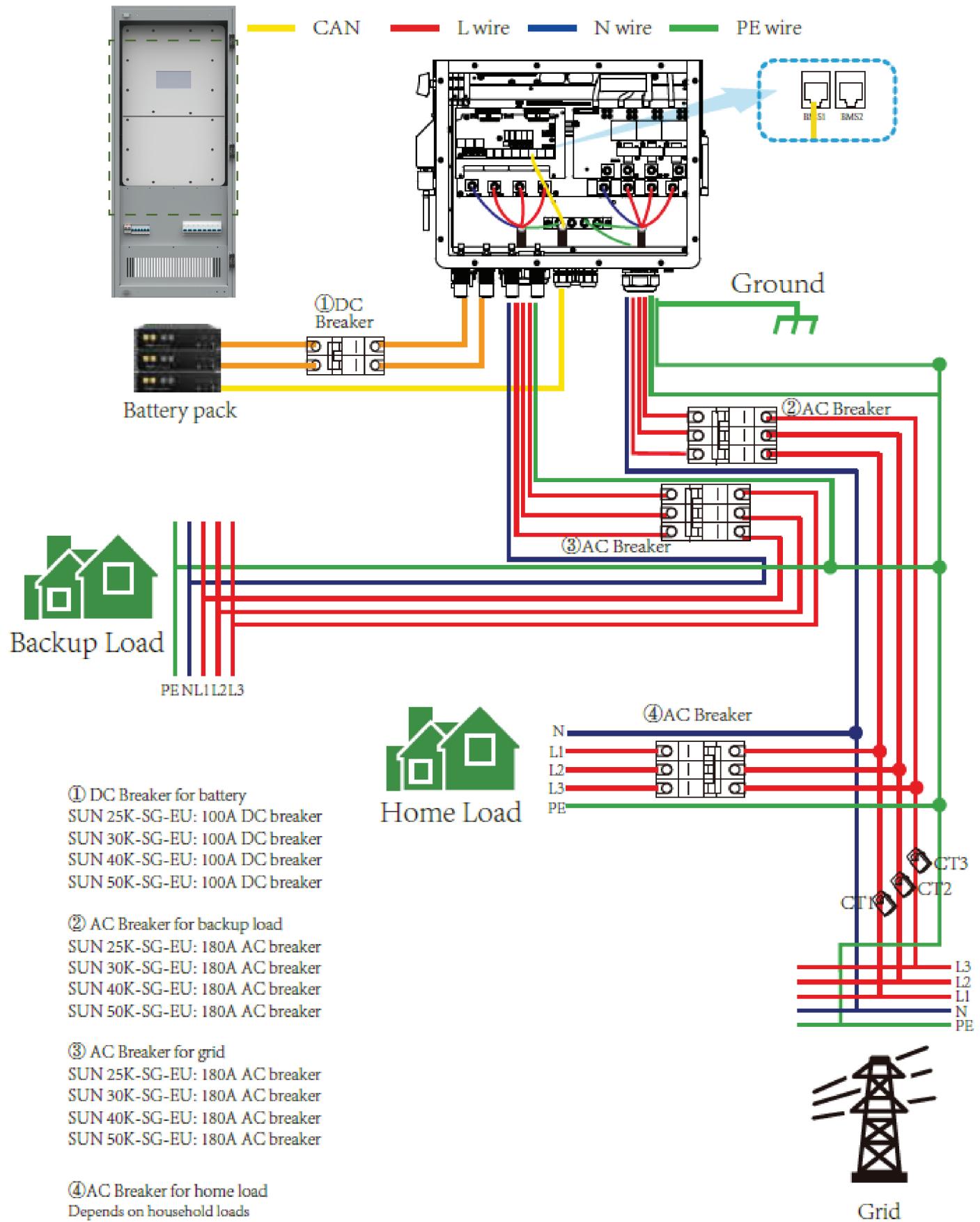
This diagram is an example for an application in which neutral is separated from the PE in the distribution box. For countries such as China, Germany, the Czech Republic, Italy, etc, please follow local wiring regulations!  
Note: Backup function is optional in German market, please leave backup side empty if backup function is not available in the inverter.

When the inverter is working in backup mode, neutral and PE on the backup side are connected via the internal relay. Also, this internal relay will be open when the inverter is working in grid tied mode.



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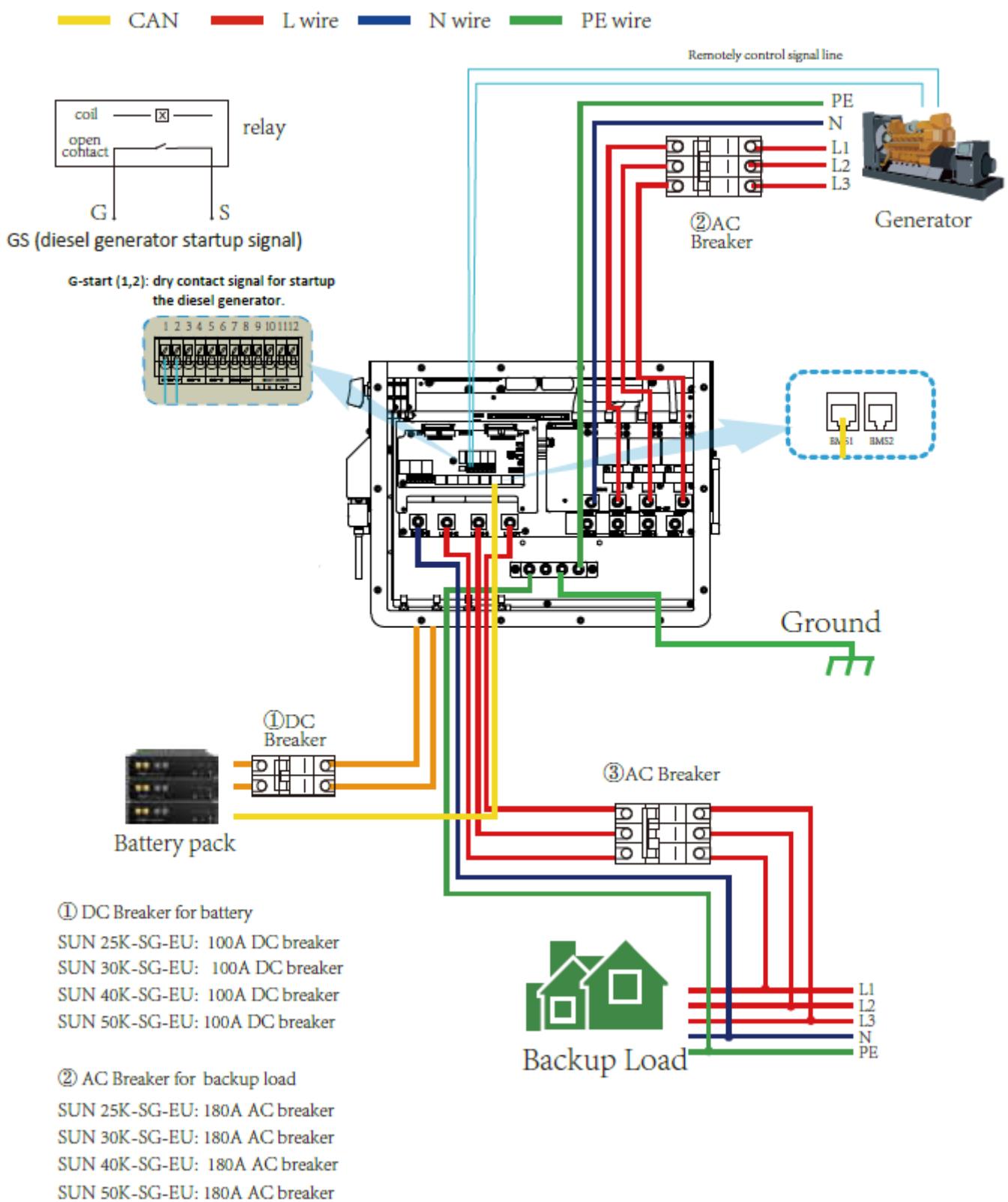
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### 3.10 TYPICAL APPLICATION DIAGRAM OF DIESEL GENERATOR



# 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 Enserver.

It includes four indicators, four function keys and a LCD display, indicating the operating status and input/output power information.

<b><i>LED Indicator</i></b>		<b><i>Messages</i></b>
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

<b><i>Function Key</i></b>	<b><i>Description</i></b>
Esc	To exit setting mode
Up	To go to previous selection
Down	To go to next selection
Enter	To confirm the selection

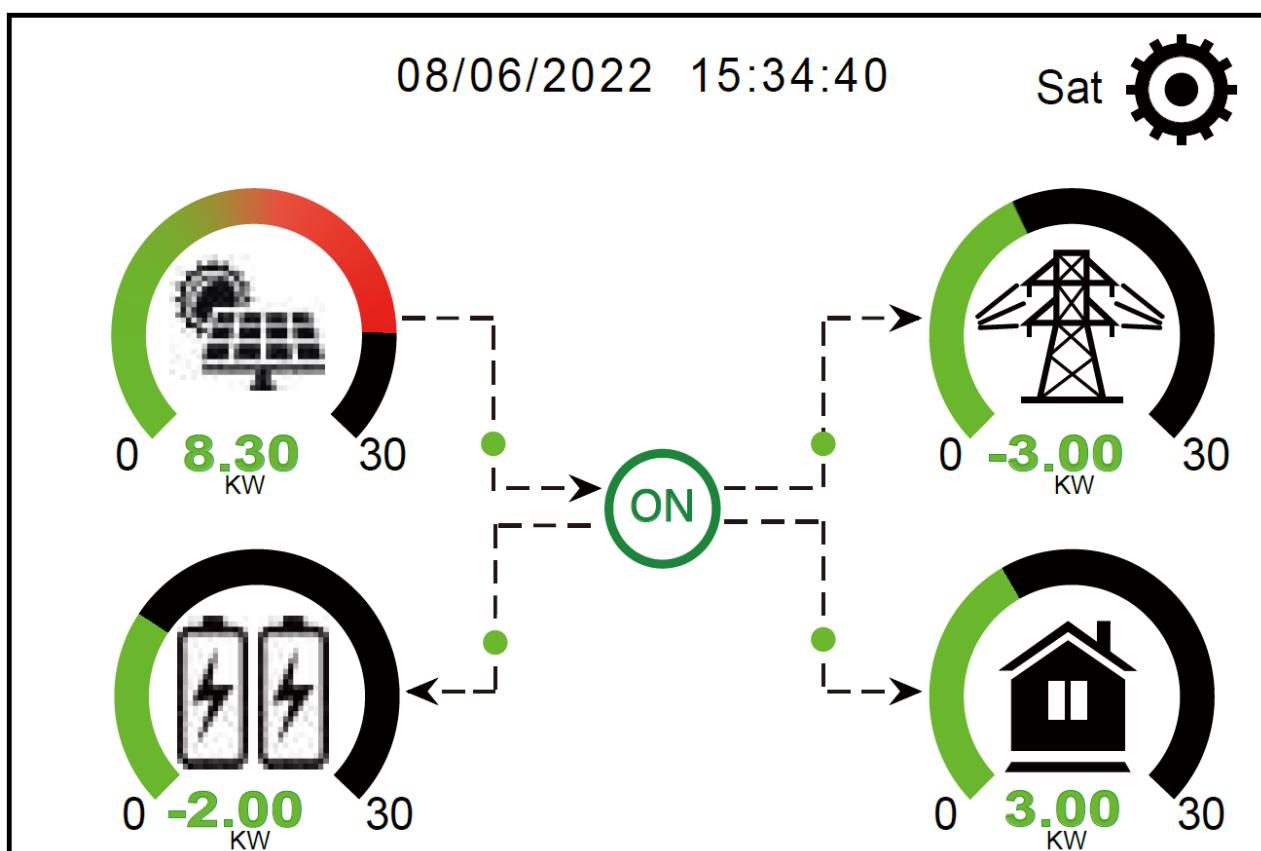
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### LCD Display Icons

#### 5.1 MAIN SCREEN

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



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 Enserver 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-Bat 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.

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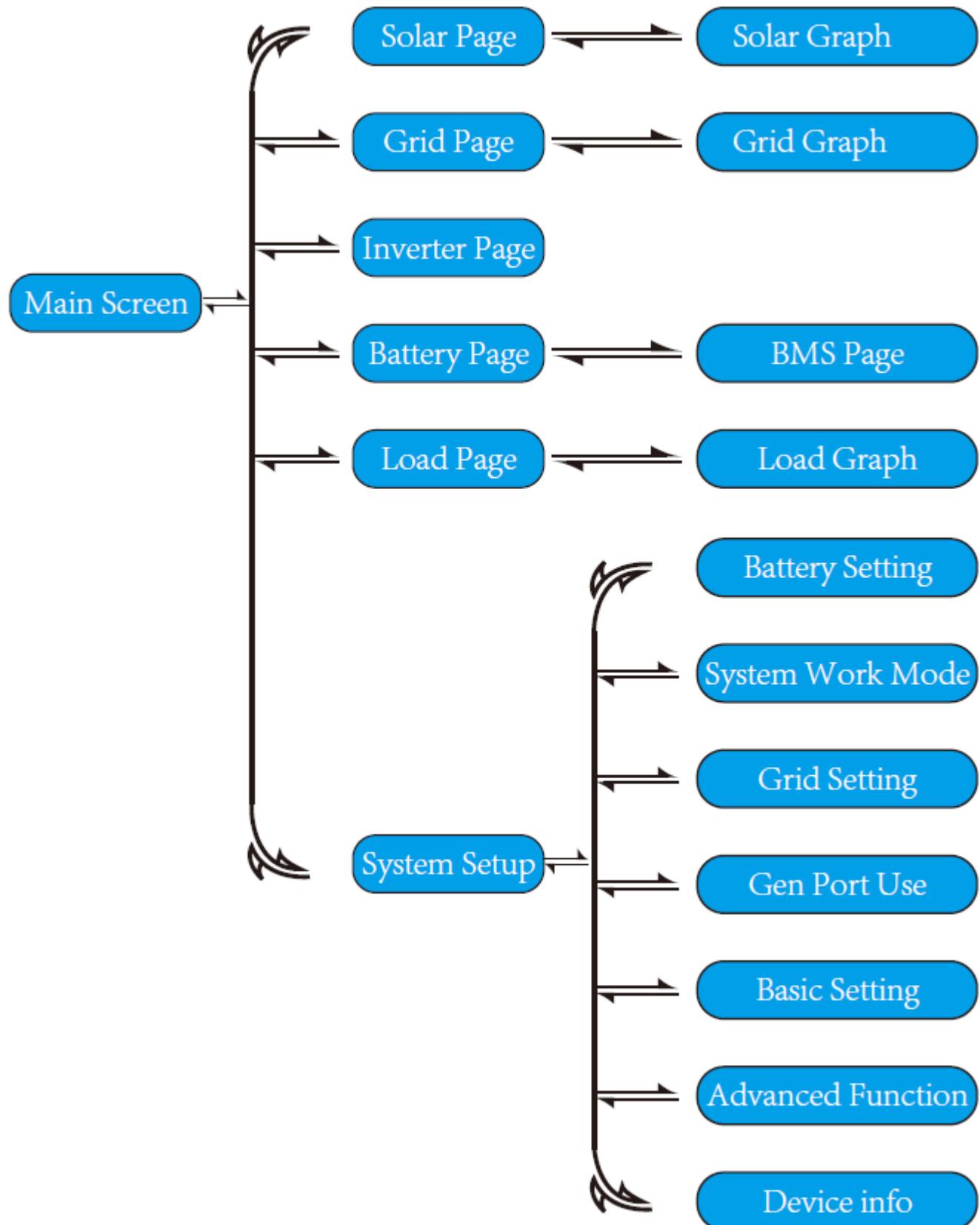
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- PV power and Load power always keep positive.
- Grid power negative means sell to grid, positive means get from grid.
- Battery power negative means charge, positive means discharge.

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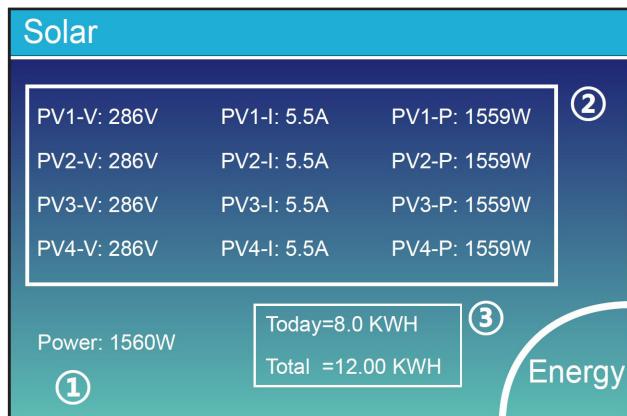
### 5.1.1 LCD OPERATION FLOW CHART



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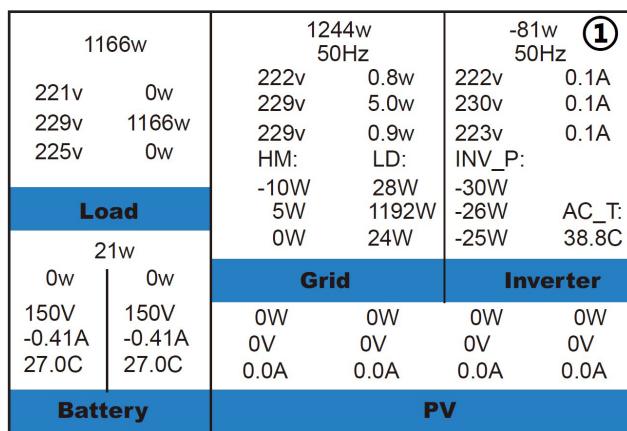
### 5.2 SOLAR POWER CURVE



This is Solar Panel detail page.

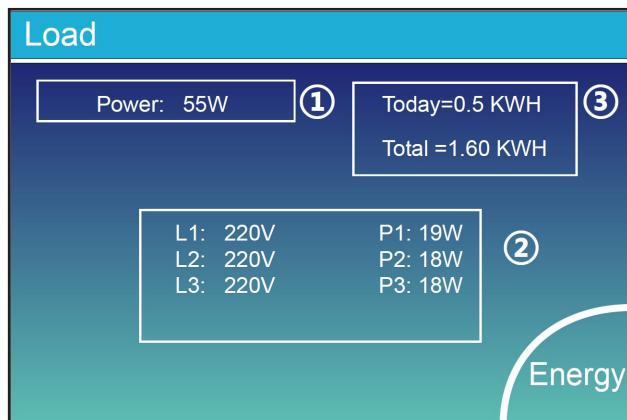
- ① Solar Panel Generation.
- ② Voltage, Current, Power for each MPPT.
- ③ Daily and total PV production.

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



This is Inverter detail page.

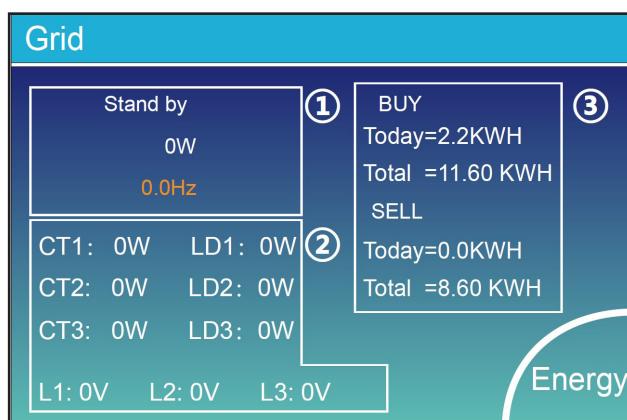
- ① Inverter Generation.
- Voltage, Current, Power for each Phase.
- AC-T: mean Heat-sink temperature.



This is Back-up Load detail page.

- ① Back-up Power.
- ② Voltage, Power for each Phase.
- ③ Daily and total backup consumption .

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.

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### Batt

Battery 1  
Stand by

U:170V

I:2.04A

Power: 101W

Temp:25.0C

Energy

This is Battery detail page.

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

### Li-BMS

Mean Voltage:170.0V Charging Voltage :180.0V  
Total Current:37.00A Discharging Voltage :160.0V  
Mean Temp :23.5C Charging current :30A  
Total SOC :38% Discharging current :25A  
Dump Energy:57Ah

Sum  
Data

Details  
Data

### Li-BMS

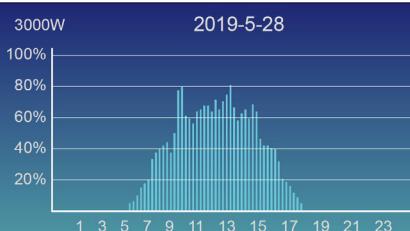
	Volt	Curr	Temp	SOC	Energy	Charge	Fault
1	150.3V	19.70A	30.8C	52.0%	26.0Ah	0.0V	0.0A
2	150.2V	19.10A	31.0C	51.0%	25.5Ah	153.2V	25.0A
3	150.1V	18.90A	30.2C	12.0%	6.0Ah	153.2V	25.0A
4	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
5	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
6	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
7	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
8	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
9	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
10	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
11	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
12	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
13	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
14	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A
15	0.00V	0.00A	0.0C	0.0%	0.0Ah	0.0V	0.0A

Sum  
Data

Details  
Data

### 5.3 CURVE PAGE-SOLAR & LOAD & GRID

#### Solar Power Production:Day



CANCEL

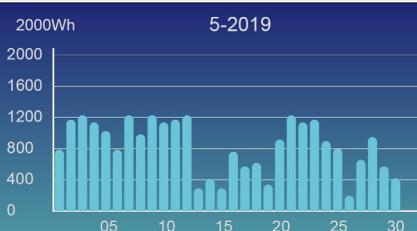
Day

Month

Year

Total

#### System Solar Power:Month



CANCEL

Day

Month

Year

Total

#### System Solar Power:Year



CANCEL

Day

Month

Year

Total

#### System Solar Power:Total



CANCEL

Day

Month

Year

Total

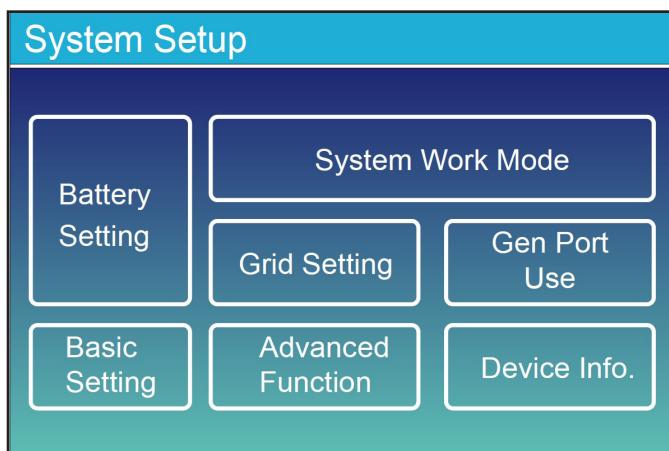
Solar power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more

accuracy power generation, pls check on the monitoring system. Click the up and down arrow to check power curve of different period.

# USER MANUAL

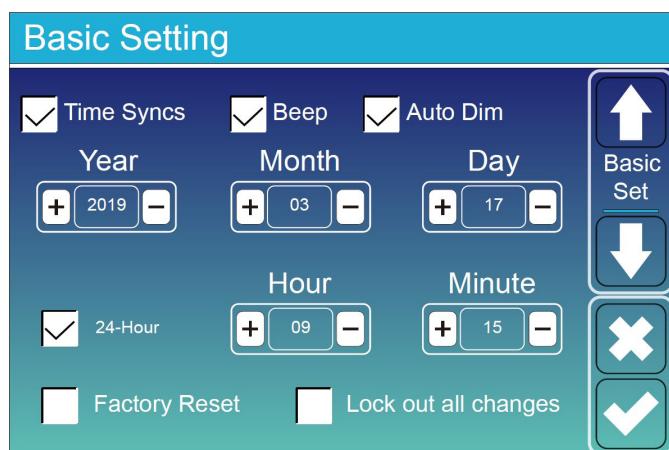
## ENSERVER 50kWh 48V

### 5.4 SYSTEM SETUP MENU

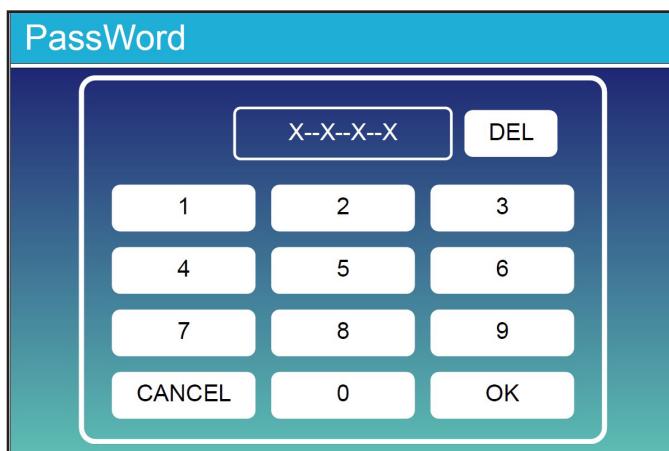


This is System Setup page.

### 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 PassWork:** 9999  
**Lock out all changes PassWork:** 7777

# USER MANUAL

## ENSERVER 50kWh

### 5.6 BATTERY SETUP MENU

#### Battery Setting

Batt Mode	Batt Capacity	0Ah	 Batt Mode
<input checked="" type="radio"/> Lithium	Max A Charge	0A	 
<input type="radio"/> Use Batt V	Max A Discharge	0A	
<input type="radio"/> Use Batt %			
<input type="radio"/> No Batt			
<input type="checkbox"/> Activate Battery1	<input type="checkbox"/> Parallel bat1&bat2		
<input type="checkbox"/> Activate Battery2			

**Battery capacity:** it shows your battery bank size to Deye hybrid inverter.

**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(0-50A for 25/30/40/50KW 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.

#### Battery Setting

Start	30%	 Batt Set2
A ①	50A	
<input type="checkbox"/> Gen Charge	30%	
<input type="checkbox"/> Gen Signal	50A	
<input type="checkbox"/> Gen Force	②	③
	Grid Charge	
	Grid Signal	

This is Grid Charge, you need select. ②

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

**A = 50A:** It indicates the Current that the Grid charges the Battery.

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

**Grid Signal:** Disable.

This is Battery Setup page. ① ③

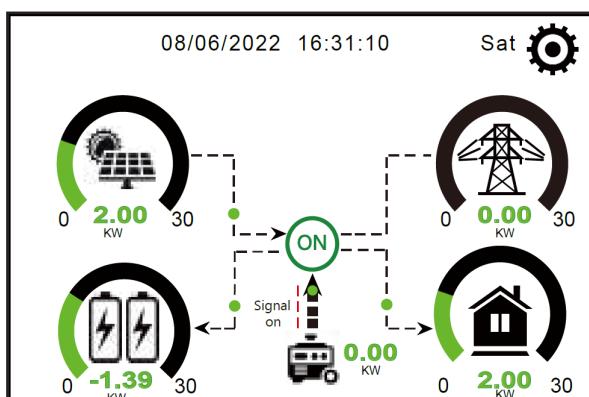
**Start =30%:** Percent S.O.C at 30% system will AutoStart a connected generator to charge the battery bank.

**A = 50A:** Charge rate of 50A 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 Force:** When the generator is connected, it is forced to start the generator without meeting other conditions.



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

# USER MANUAL

## ENSERVER 50kWh 48V

### Generator

Power: 6000W      Today=10 KWH  
Total =10 KWH  
  
V\_L1: 230V      P\_L1: 2KW  
V\_L2: 230V      P\_L2: 2KW  
V\_L3: 230V      P\_L3: 2KW

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

### Battery Setting

Float V	00	 Batt Set3
Shutdown	10%	
Low Batt	20%	
Restart	40%	

**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.

### Battery Setting

Float V	① 160V	Shutdown ③ 20%
Absorption V	160V	Low Batt 35%
Equalization V	160V	Restart 50%
Equalization Days	30 days	TEMPCO(mV/C/Cell) ② -5
Equalization Hours	3.0 hours	Batt Resistance 25mOhms

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 is below this value.

③

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

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

# USER MANUAL

## ENSERVER 50kWh

Recommended battery settings

Battery Type	Absorption Stage	Float Stage	Torque value (every 30 days 3hr)
Lithium		Follow its BMS voltage parameters	

### 5.7 SYSTEM WORK MODE SETUP MENU

**System Work Mode**

Selling First      32000 Max Solar Power  
 Zero Export To Load       Solar Sell  
 Zero Export To CT       Solar Sell  
 Max Sell Power 32000      Zero-export Power 20  
 Energy pattern       BattFirst       LoadFirst  
 Grid Peak Shaving      28000 Power

**Work Mode**

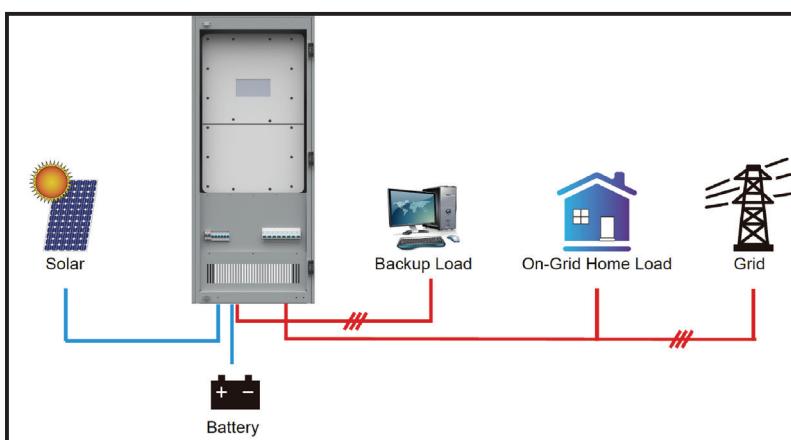
**Selling First:** This Mode allows hybrid Enserver to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid.

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 programmable % discharge is reached).

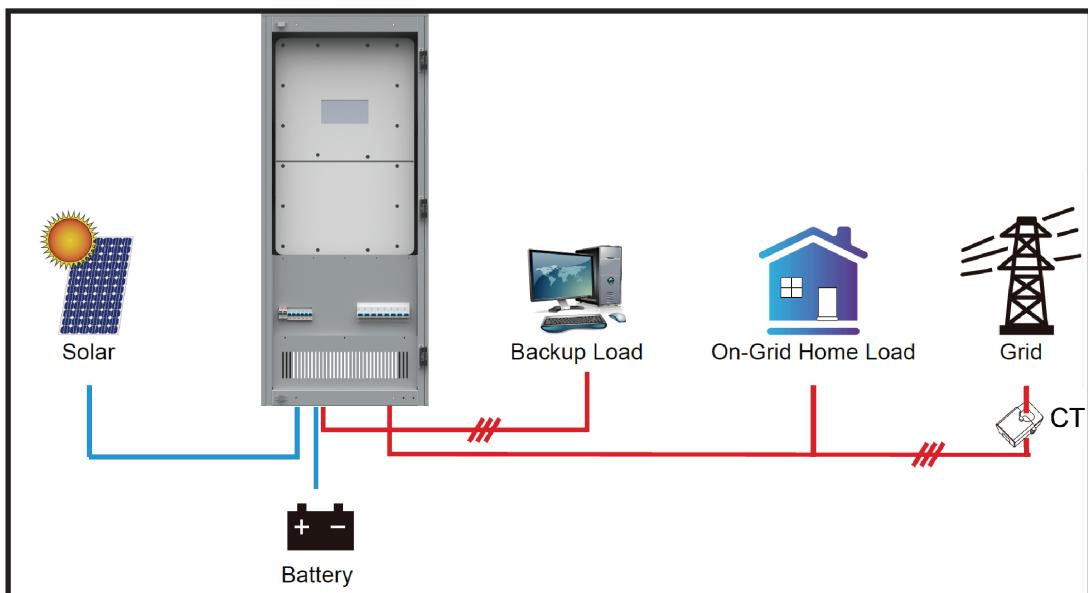
**Zero Export To Load:** Hybrid Enserver will only provide power to the backup load connected. The hybrid Enserver will neither provide power to the home load nor sell power to grid. The built-in CT will detect power flowing back to the grid and will reduce the power of the Enserver only to supply the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



# USER MANUAL

## ENSERVER 50kWh 48V

**Zero Export To CT:** Hybrid Enserver 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 Enserver 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 Enserver only to supply the local load, charge battery and home load.



# USER MANUAL

## ENSERVER 50kWh

**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 Enserver 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.

# USER MANUAL

## ENSERVER 50kWh 48V

### System Work Mode

Grid Charge	Gen	Time Of Use			
		Time	Power	Batt	
		01:00	5:00	32000	160V
		05:00	9:00	32000	160V
✓		09:00	13:00	32000	160V
✓		13:00	17:00	32000	160V
✓		17:00	21:00	32000	160V
✓		21:00	01:00	32000	160V

**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.

### Battery Setting

Start	30%	30%	
A	50A	50A	
<input type="checkbox"/> Gen Charge	<input checked="" type="checkbox"/> Grid Charge ①		
<input type="checkbox"/> Gen Signal	<input checked="" type="checkbox"/> Grid Signal		
Gen Max Run Time	0.0 hours		
Gen Down Time	0.5 hours		

**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, Enserver 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 Enserver 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 Enserver will discharge the battery until the SOC reaches 40%.

During 10:00-15:00, when battery SOC is higher than 80%, hybrid Enserver will discharge the battery until the SOC reaches 80%.

During 15:00-18:00, when battery SOC is higher than 40%, hybrid Enserver will discharge the battery until the SOC reaches 40%.

# USER MANUAL

## ENSERVER 50kWh

### 5.8 GRID SETUP MENU

**Grid Setting/Grid code selection**

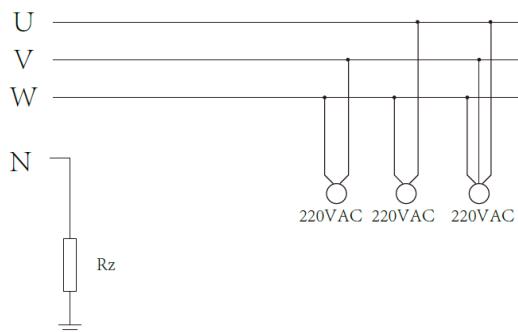
Grid Mode	General Standard	0/10	<input type="button" value="Grid Set1"/>
Grid Frequency	<input checked="" type="radio"/> 50HZ	Phase Type	<input type="radio"/> 0/120/240
	<input type="radio"/> 60HZ		<input type="radio"/> 0/240/120
Grid Level	LN:220V/LL:380V(AC)		<input type="button" value="X"/>
<input type="checkbox"/> IT system-neutral is not grounded			

**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:** For the IT grid system, the Line voltage

(between any two lines in a three-phase circuit) is 230Vac, and the diagram is as follow. If your grid system is IT system, please enable "IT system" and tick the "Grid level" as 133-3P as below picture shows.



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

**Grid Setting/Connect**

Normal connect	Normal Ramp rate	10s	<input type="button" value="Grid Set2"/>	
Low frequency	48.00Hz	High frequency	51.50Hz	
Low voltage	185.0V	High voltage	265.0V	
Reconnect after trip	Reconnect Ramp rate	36s	<input type="button" value="X"/>	
Low frequency	48.20Hz	High frequency	51.30Hz	
Low voltage	187.0V	High voltage	263.0V	
Reconnection Time	60s	PF	1.000	<input type="button" value=""/>

**Normal connect:** The allowed grid voltage/frequency range when the inverter first time connect to the grid.

**Reconnect after trip:** The allowed grid voltage /frequency range for the inverter connects the grid after the inverter trip from the grid.

**Reconnection time:** the waiting time period for the inverter connects the grid again

**PF:** power factor which is used to adjust inverter reactive power

**Grid Setting/IP Protection**

Over voltage U>(10 min. running mean)		260.0V	<input type="button" value="Grid Set3"/>
HV3	265.0V	HF3 51.50Hz	<input type="button" value=""/>
<span style="color: red;">①</span> HV2	265.0V	-- 0.10s	<span style="color: red;">②</span> HF2 51.50Hz -- 0.10s
HV1	265.0V	-- 0.10s	HF1 51.50Hz -- 0.10s
LV1	185.0V	-- 0.10s	LF1 48.00Hz -- 0.10s
LV2	185.0V	-- 0.10s	LF2 48.00Hz -- 0.10s
LV3	185.0V	--	LF3 48.00Hz

**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.

# USER MANUAL

## ENSERVER 50kWh 48V

### Grid Setting/F(W)

F(W)	
Over frequency	Droop F 40%P/Hz
Start freq F 50.20Hz	Stop freq F 51.5Hz
Start delay F 0.00s	Stop delay F 0.00s
Under frequency	
Start freq F 49.80Hz	Droop F 40%PE/Hz
Start delay F 0.00s	Stop freq F 49.80Hz
Stop delay F 0.00s	

Grid Set4

Grid Set4

Grid Set4

Grid Set4

**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%P/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.

### Grid Setting/V(W) V(Q)

V(W)		V(Q)	
V1 108.0%	P1 100%	Lock-in/Pn 0.3%	Lock-out/Pn 5.0%
V2 110.0%	P2 80%	V1 94.0%	Q1 44%
V3 112.0%	P3 60%	V2 97.0%	Q2 0%
V4 114.0%	P4 40%	V3 105.0%	Q3 0%
		V4 108.0%	Q4 -44%

Grid Set5

Grid Set5

Grid Set5

Grid Set5

**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.

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.

### Grid Setting/P(Q) P(PF)

P(Q)		P(PF)	
P1 0%	Q1 2%	Lock-in/Pn 0.3%	Lock-out/Pn 5.0%
P2 2%	Q2 0%	P1 0%	PF1 -0.000
P3 0%	Q3 21%	P2 0%	PF2 -0.000
P4 22%	Q4 25%	P3 0%	PF3 0.000
		P4 62%	PF4 0.264

Grid Set6

Grid Set6

Grid Set6

Grid Set6

**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.

### Grid Setting/LVRT

L/HVRT	
HV3 0%	HV3_T 30.24s
HV2 0%	HV2_T 0.04s
HV1 0%	HV1_T 22.11s
LV1 0%	LV1_T 22.02s
LV2 0%	LV2_T 0.04s

Grid Set7

Grid Set7

Grid Set7

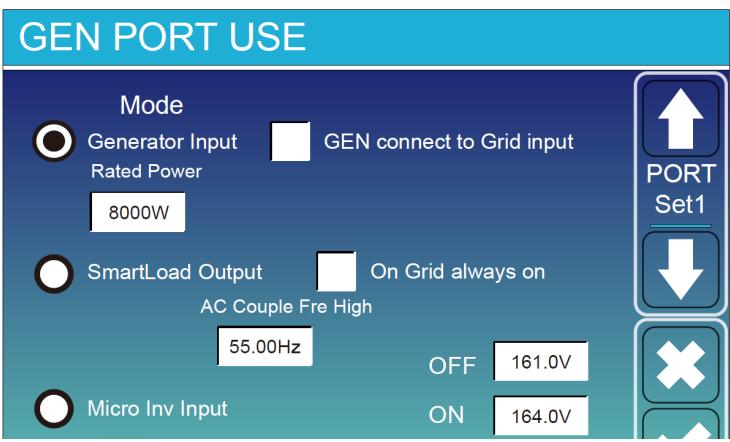
Grid Set7

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

# USER MANUAL

## ENSERVER 50kWh

### 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 and PV power is above a user programmable threshold.

**e.g. ON: 100%, OFF: 95%:** When the PV power exceeds 500W, and 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-Enserver on grid Enserver input (AC coupled), this feature will also work with "Grid-Tied" Enservers.

**Micro Inv Input OFF:** when the battery SOC exceeds setting value, Microinveter or grid-tied Enserver will shut down.

**Micro Inv Input ON:** when the battery SOC is lower than setting value, Microinveter or grid-tied Enserver will start to work.

**AC Couple Fre High:** If choosing "Micro Inv input", as the battery SOC reaches gradually setting value (OFF), during the process, the microEnserver 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 Fre high) and the MicroEnserver will stop working.

**MI export to grid cutoff:** Stop exporting power produced by the microEnserver to the grid.

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

# USER MANUAL

## ENSERVER 50kWh 48V

### 5.10 ADVANCED FUNCTION SETUP MENU

#### Advanced Function

<input type="checkbox"/> Solar Arc Fault ON	Backup Delay	 Func Set1
<input type="checkbox"/> Clear Arc_Fault	0s	
<input type="checkbox"/> System selfcheck	<input type="checkbox"/> Gen peak-shaving	
<input type="checkbox"/> DRM	2000: 1 CT Ratio	
<input type="checkbox"/> Signal Island Mode	<input type="checkbox"/> BMS_Err_Stop	
<input type="checkbox"/> Asymmetric phase feeding	<input type="checkbox"/> CEI Report	

**Solar Arc Fault ON:** This is only for US.

**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 Enserver will provide the redundant part to ensure that the generator will not overload.

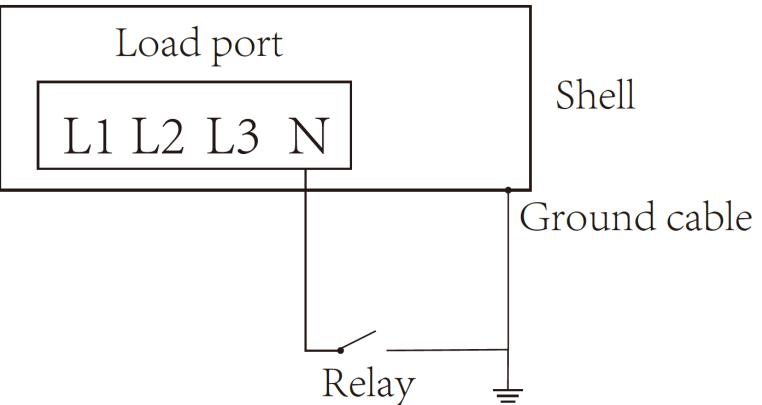
**DRM:** For AS4777 standard

**Backup Delay:** Reserved

**BMS\_Err\_Stop:** When it is active, if the battery BMS failed to communicate with Enserver, the Enserver will stop working and report fault.

**Signal island mode:** If "Signal island mode" is checked and When Enserver 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 Enserver ground.

**ENSERVER**



**Asymmetric phase feeding:** The power that the Enserver of PV feeds into the grid will be balanced.

This technical data sheet may change without notice and at the sole discretion of Enercap Power Industries LLC

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# USER MANUAL

## ENSERVER 50kWh

### Advanced Function



**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



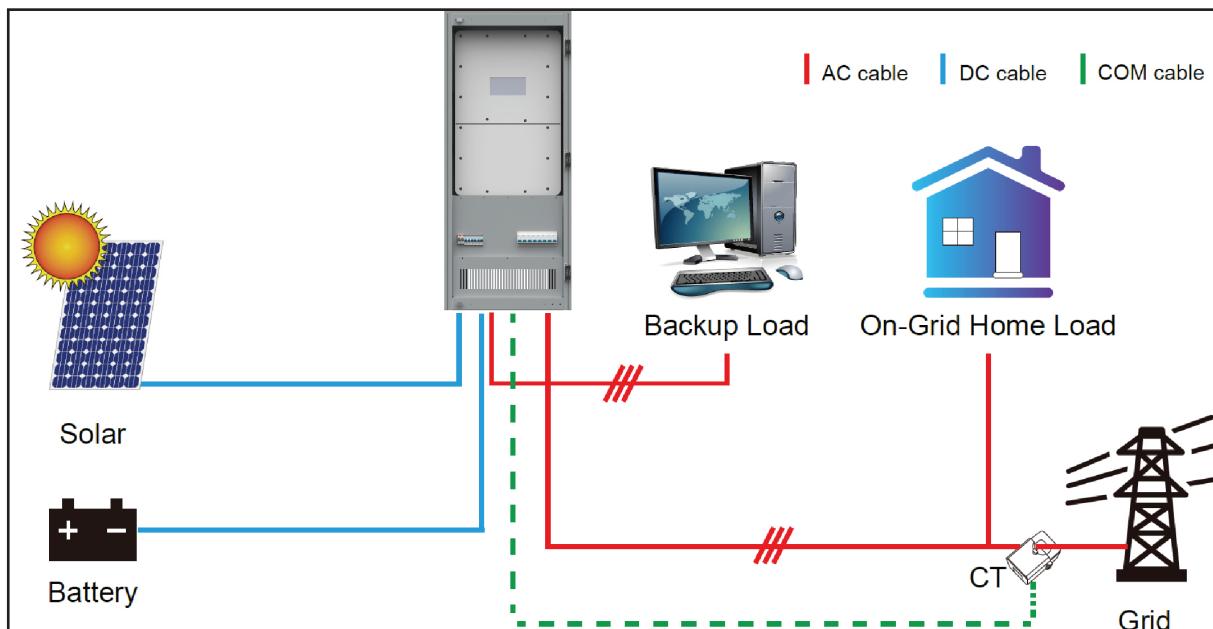
This page show Inverter ID, Inverter version and alarm codes.

**HMI:** LCD version

**MAIN:** Control board FW version

## 6. MODE

### MODE I: BASIC

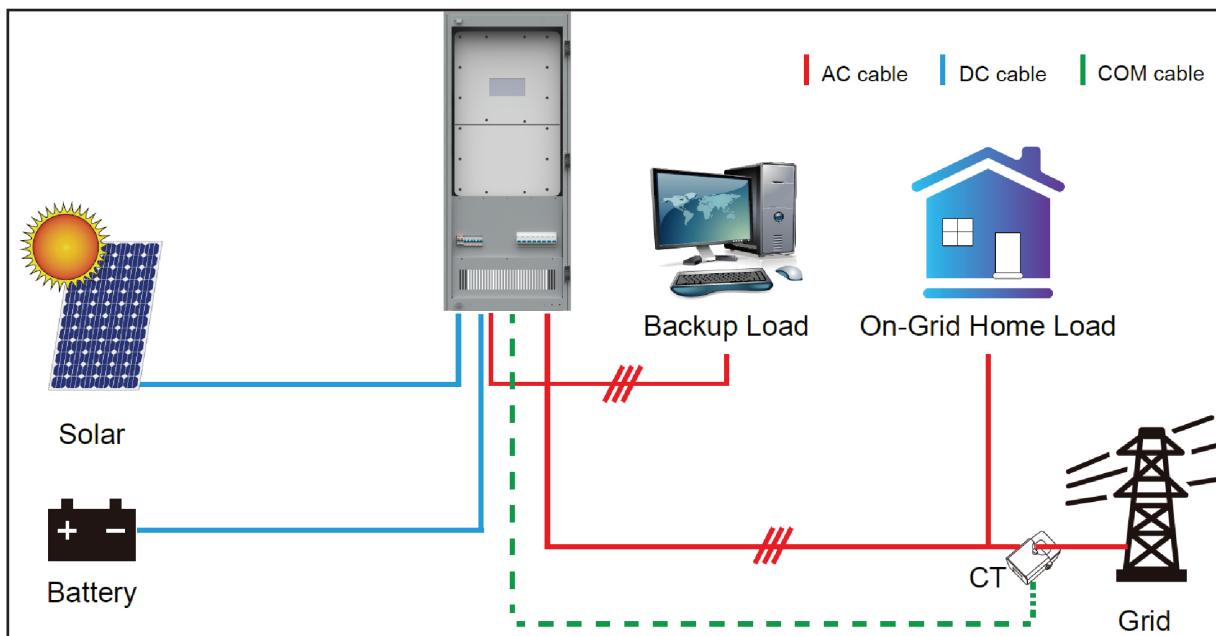


# USER MANUAL

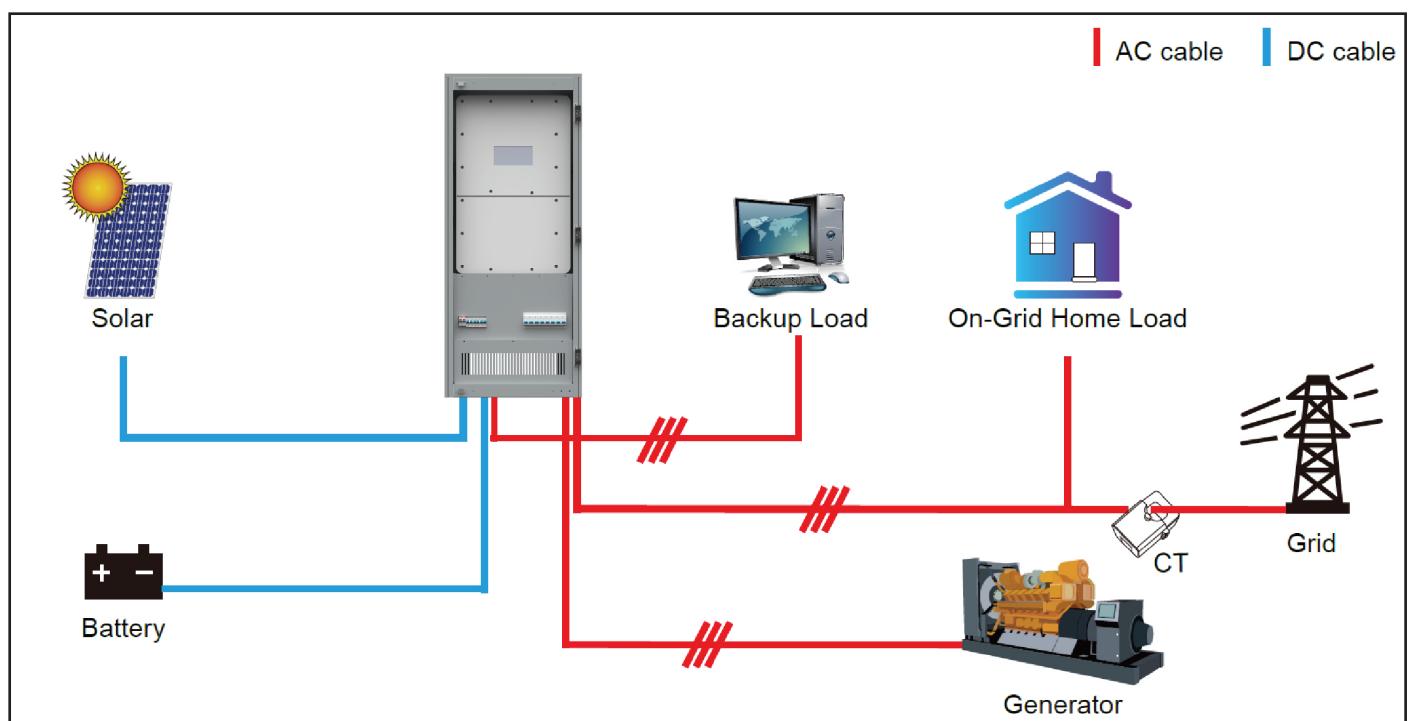
## ENSERVER 50kWh 48V

# M O D E

### MODE I: BASIC



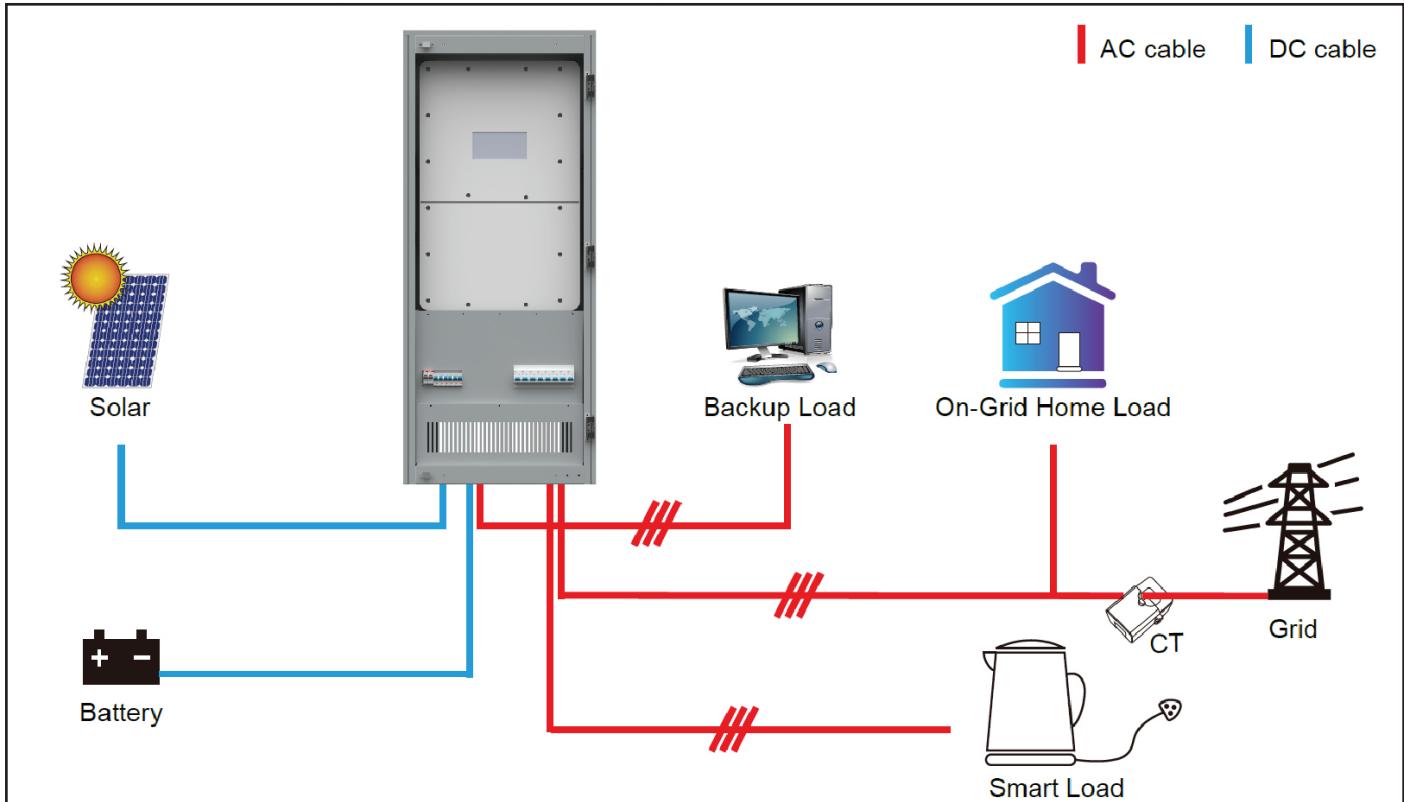
### MODE II: WITH GENERATOR



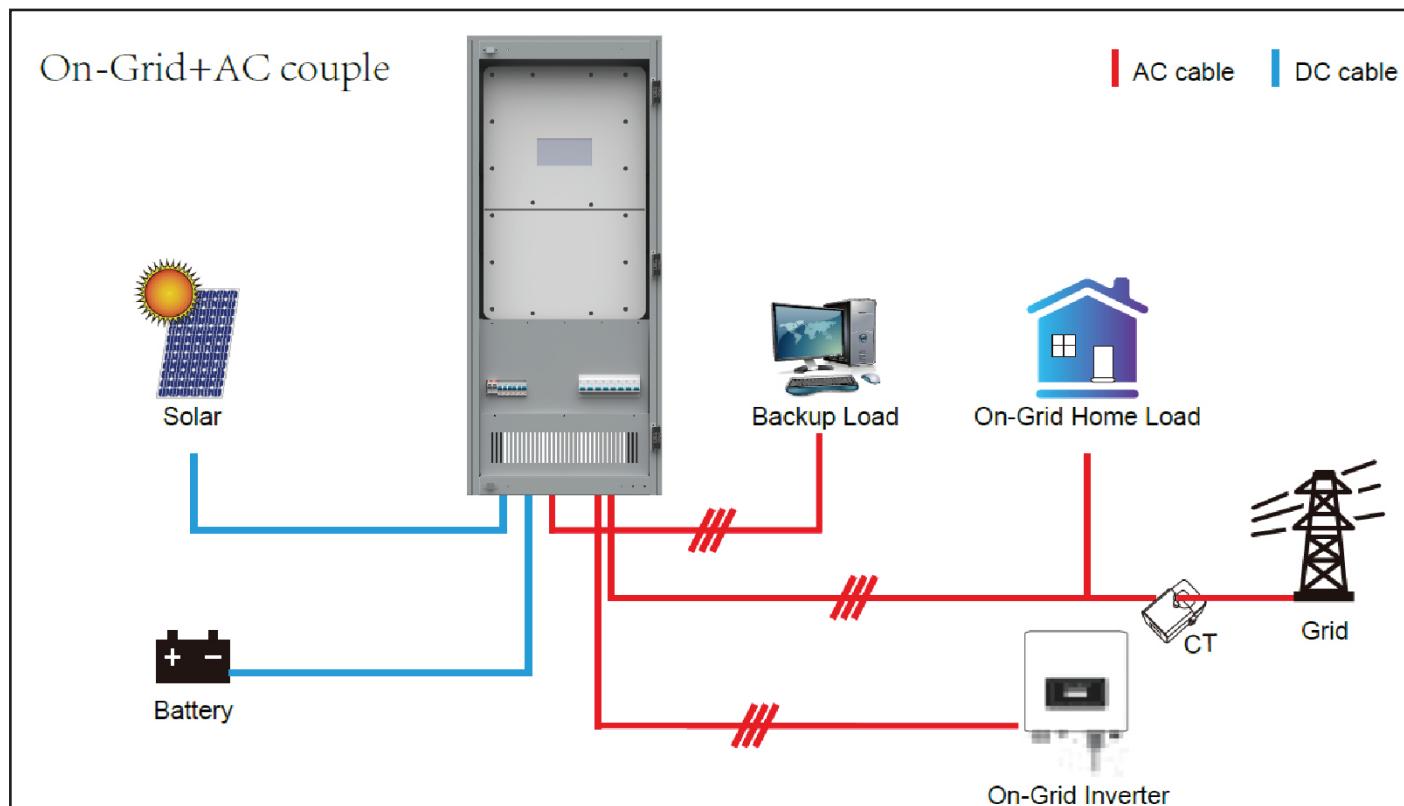
# USER MANUAL

## ENSERVER 50kWh

### MODE III: WITH SMART-LOAD



### MODE IV: AC COUPLE



# 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.

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.