

Off Grid Solar Solutions

2022



POWERED BY
PROME

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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.

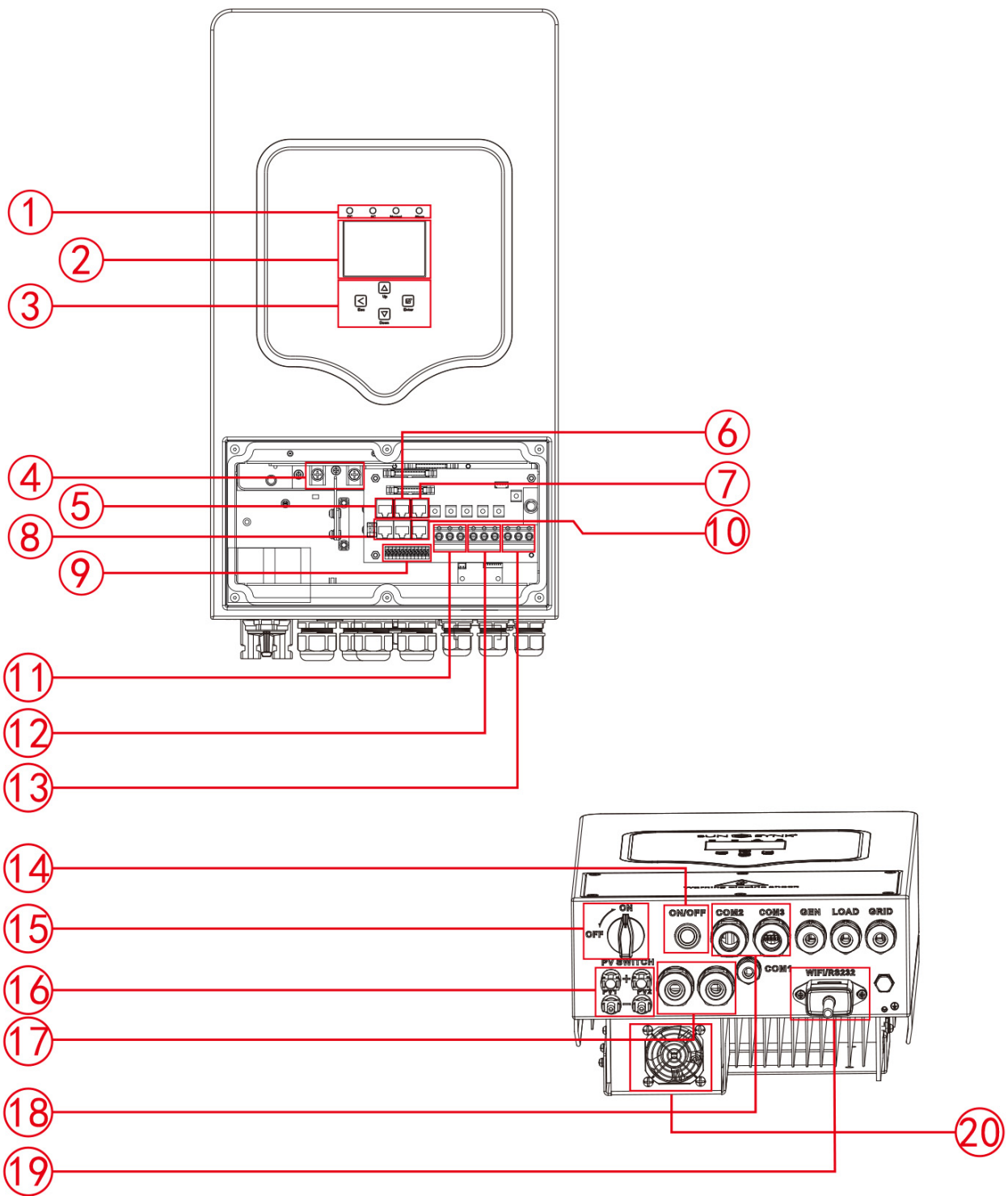
1. Safety Introductions

- 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.
- 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 Introduction

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: Battery input connectors

5: BMS 485 Port

6: BMS CAN Port

7: DRMs Port

8: Parallel port

9: Function Port

10: RS 485 Port

11: Generator input

12: Load

13: Grid

14: Power on/off button

15: DC Switch

16: PV input with two MPPT

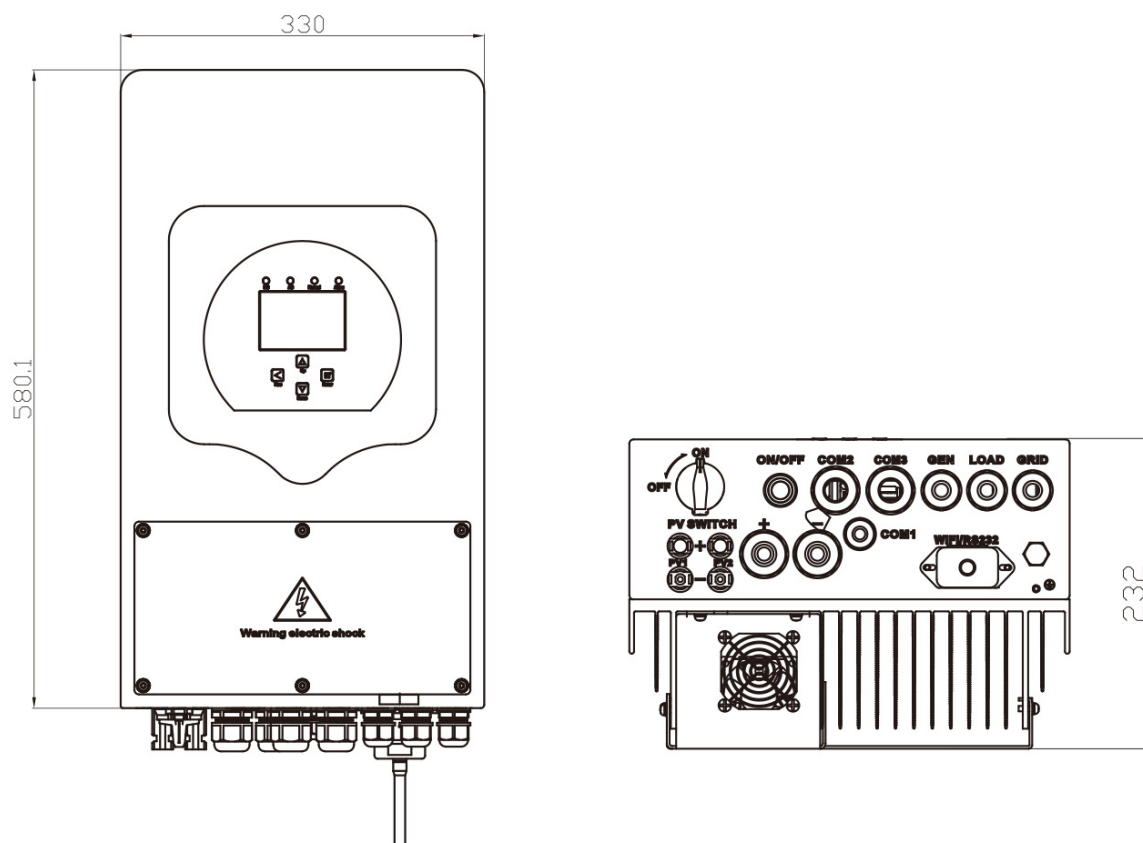
17: Battery

18: Temperature sensor

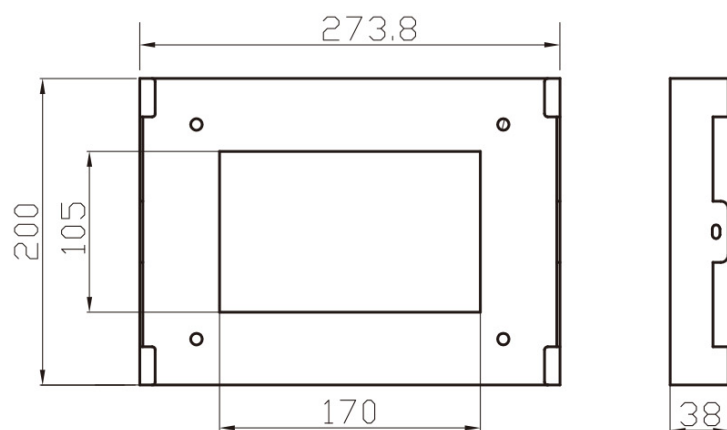
19: WiFi Interface

20: fan (*Note: For some hardware version, it doesn't have this fan)

2.2 Product Size



Inverter Size



Mounting bracket

2.3 Product Features

- 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.

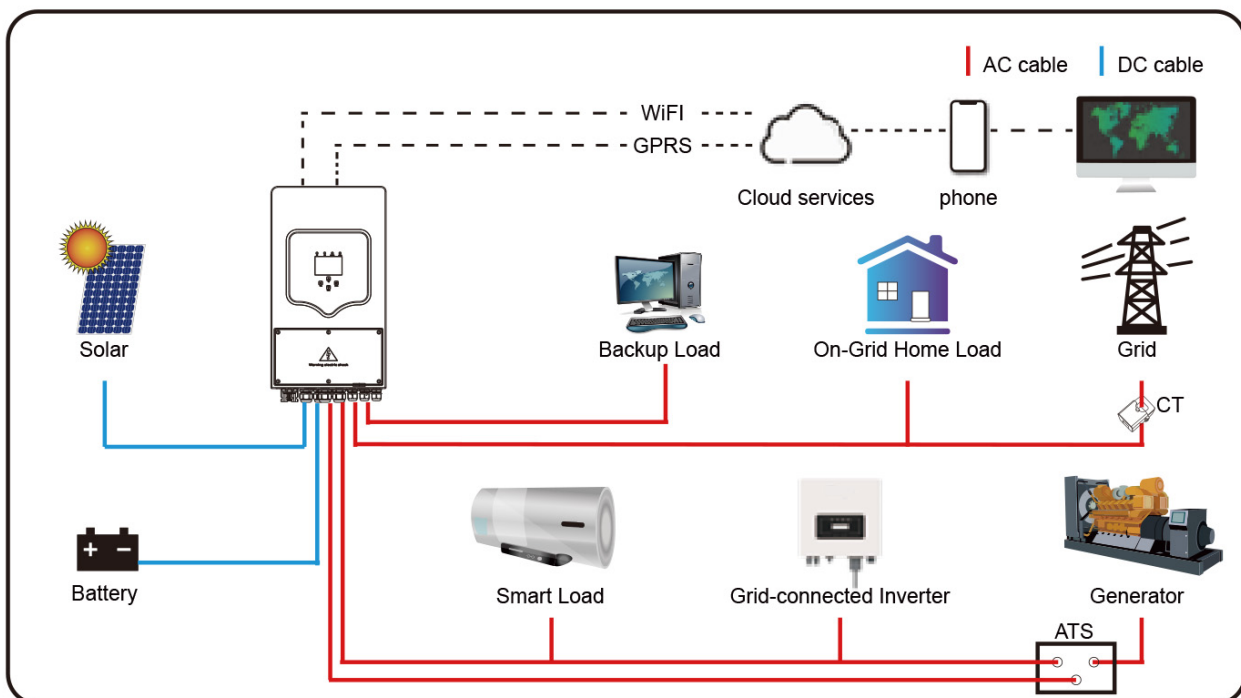
2.4 Basic System Architecture

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.

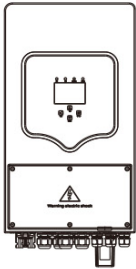
This inverter can power all kinds of appliances in home or office environment, including motor type appliances such as refrigerator and air conditioner.



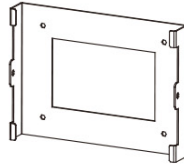
3. Installation

3.1 Parts List

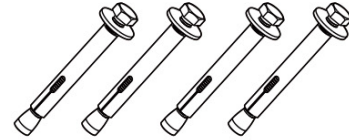
Check the equipment before installation. Please make sure nothing is damaged in the package. You should have received the items in the following package:



Hybrid inverter
x1



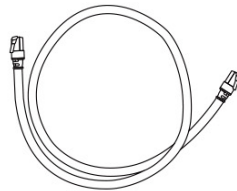
Wall mounting bracket x1



Stainless steel anti-collision
bolt M6*60x4



Stainless steel mounting
screws M4*12x2



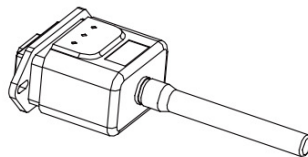
Parallel communication
cable x1



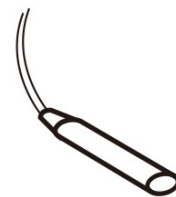
L-type Hexagon wrench
x1



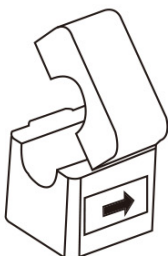
User manual x1



Wi-Fi-Plug (optional) x1



Battery temperature sensor
x1



Sensor Clamp
x 1

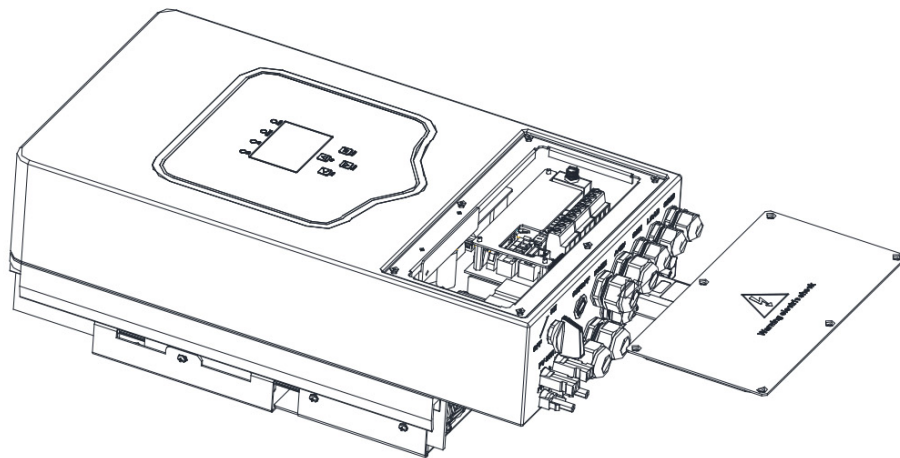
3.2 Mounting instructions

Installation Precaution

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

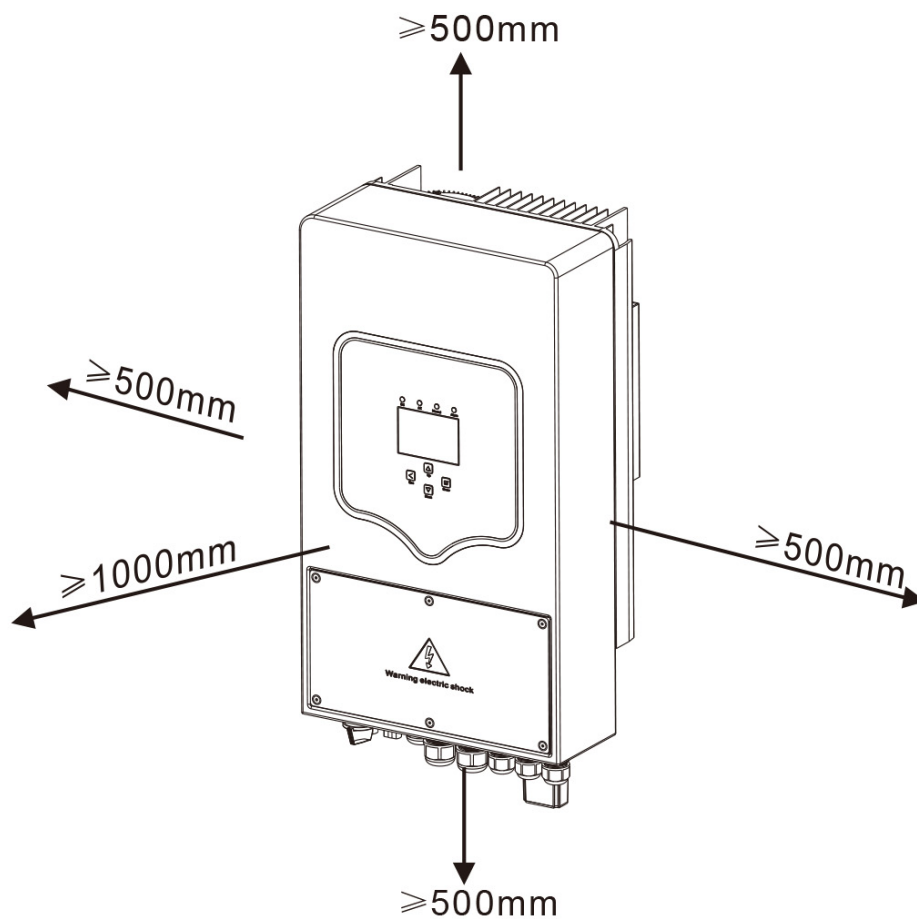
- Not in direct sunlight
- Not in areas where highly flammable materials are stored.
- Not in potential explosive areas.
- Not in the cool air directly.
- Not near the television Antenna or antenna cable.
- Not higher than altitude of about 2000 meters above sea level.
- Not in environment of precipitation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

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:



Considering the following points before selecting where to install:

- Please select a vertical wall with load-bearing capacity for installation, suitable for installation on concrete or other non-flammable surfaces, installation is shown below.
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between -25°C ~ 60°C to ensure optimal operation.
- Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and have enough space for removing wires.

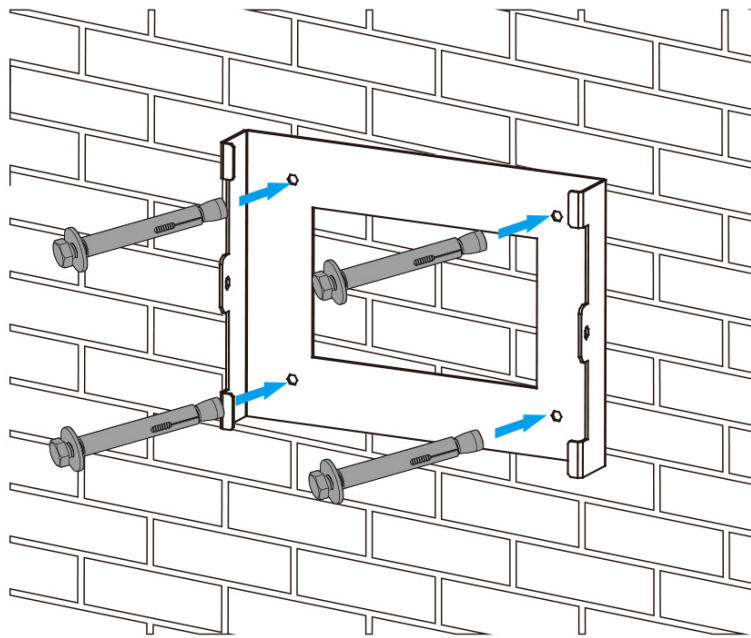


For proper air circulation to dissipate heat, allow a clearance of approx. 50cm to the side and approx. 50cm above and below the unit. And 100cm to the front.

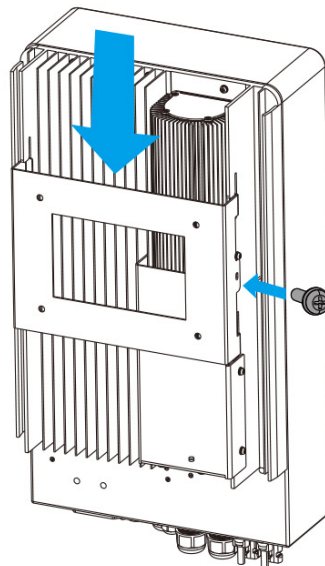
Mounting the inverter

Remember that this inverter is heavy! Please be careful when lifting out from the package. Choose the recommend drill head(as shown in below pic) to drill 4 holes on the wall, 52-60mm deep.

1. Use a proper hammer to fit the expansion bolt into the holes.
2. Carry the inverter and holding it, make sure the hanger aim at the expansion bolt,fix the inverter on the wall.
3. Fasten the screw head of the expansion bolt to finish the mounting.



Inverter hanging plate installation



3.3 Battery connection

For safe operation and compliance, a separate DC over-current protector or disconnect device is required between the battery and the inverter. 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.

| <i>Model</i> | <i>Wire Size</i> | <i>Cable(mm²)</i> | <i>Torque value(max)</i> |
|--------------|------------------|-------------------------------|--------------------------|
| 3.6/5Kw | 3AWG | 25 | 5.2Nm |

Chart 3-2 Cable size



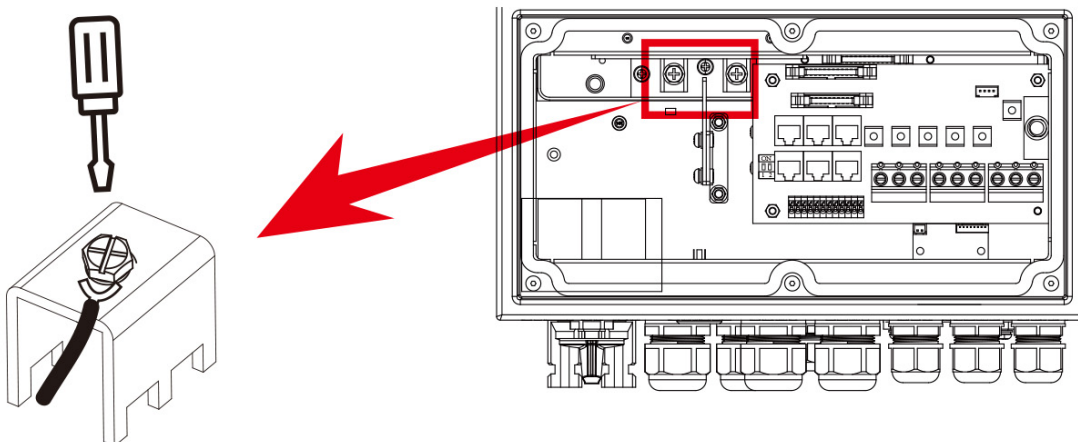
All wiring must be performed by a professional person.



Connecting the battery with a suitable cable is important for safe and efficient operation of the system. To reduce the risk of injury, refer to Chart 3-2 for recommended cables.

Please follow below steps to implement battery connection:

1. Please choose a suitable battery cable with correct connector which can well fit into the battery terminals.
2. Use a suitable screwdriver to unscrew the bolts and fit the battery connectors in, then fasten the bolt by the screwdriver, make sure the bolts are tightened with torque of 5.2 N.M in clockwise direction.
3. Make sure polarity at both the battery and inverter is correctly connected.



For 3.6KW/5KW model, battery connector screw size: M6

4. In case of children touch or insects go into the inverter, Please make sure the inverter connector is fasten to waterproof position by twist it clockwise.

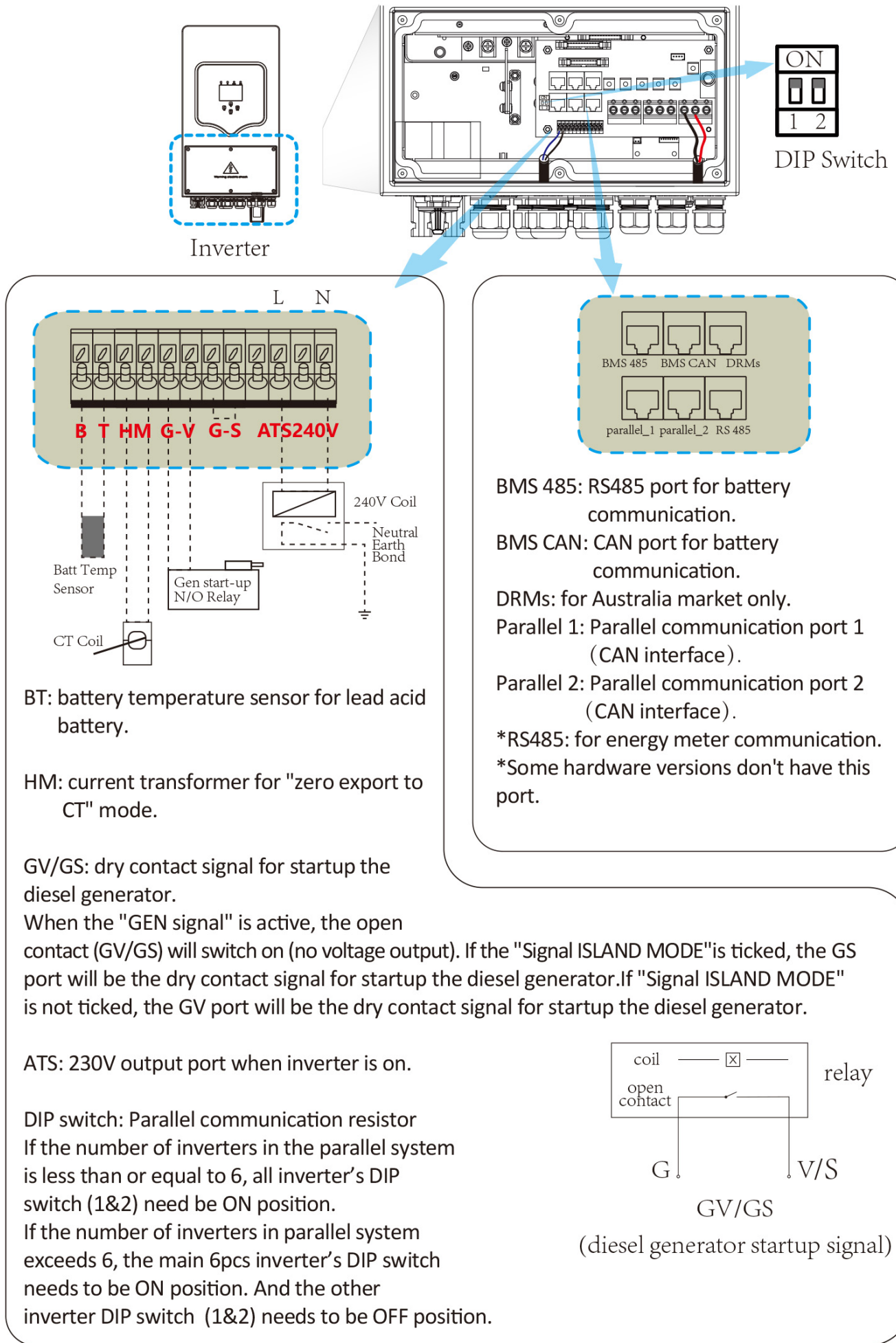


Installation must be performed with care.

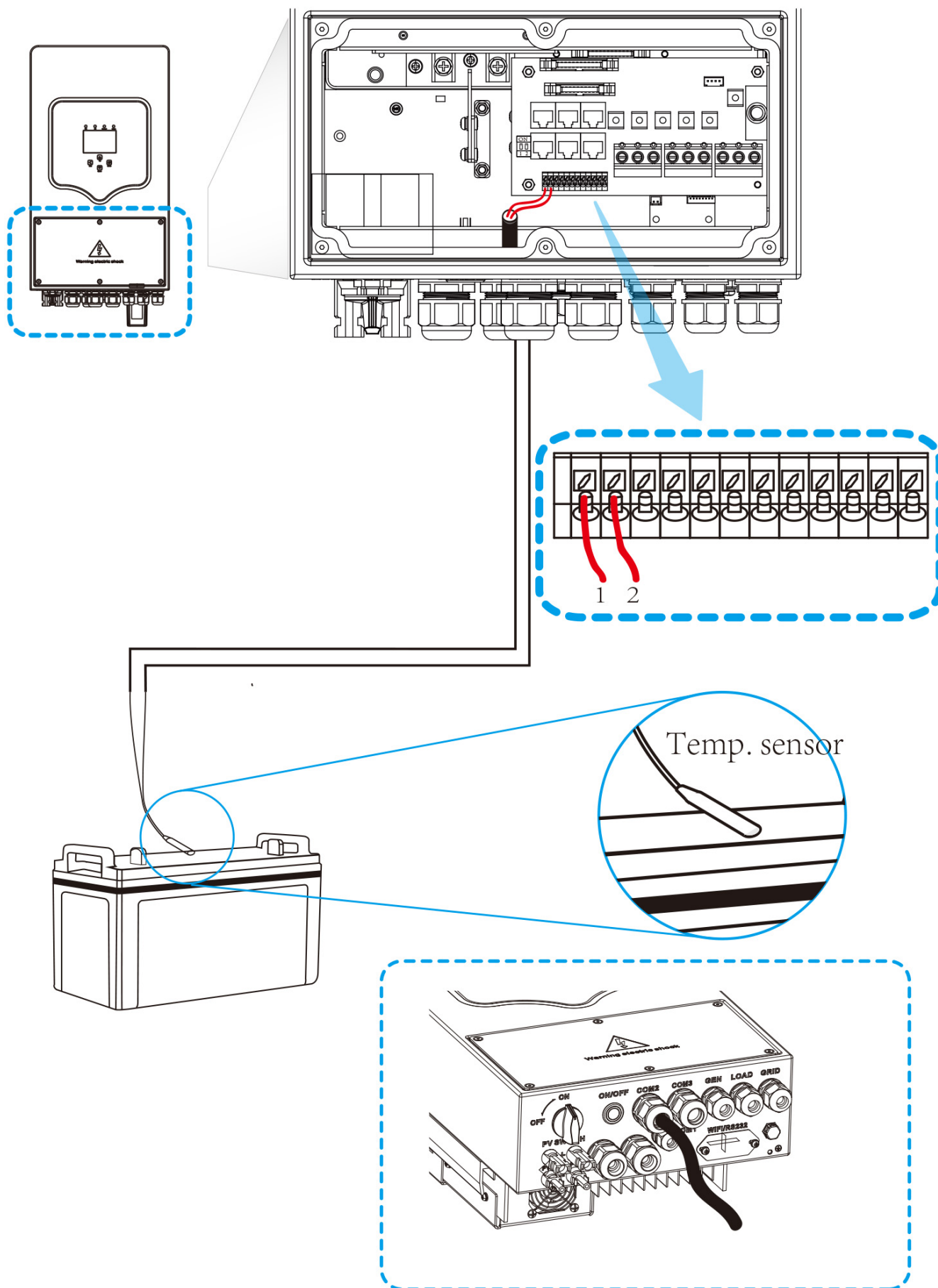


Before making the final DC connection or closing DC breaker/disconnect, be sure positive(+) must be connect to positive(+) and negative(-) must be connected to negative(-). Reverse polarity connection on battery will damage the inverter.

3.3.2 Function port definition



3.3.3 Temperature sensor connection for lead-acid battery



3.4 Grid connection and backup load connection

- Before connecting to grid, please install a separate AC breaker between inverter and grid. Also, it is recommended that installs an AC breaker between backup load and inverter. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current. For the 3.6/5KW model, the recommended AC breaker for backup load is 32A/40A. For the 3.6/5KW model, the recommended AC breaker for grid is 40A.
- There are three terminal blocks with "Grid" "Load" and "GEN" markings. Please do not misconnect input and output connectors.



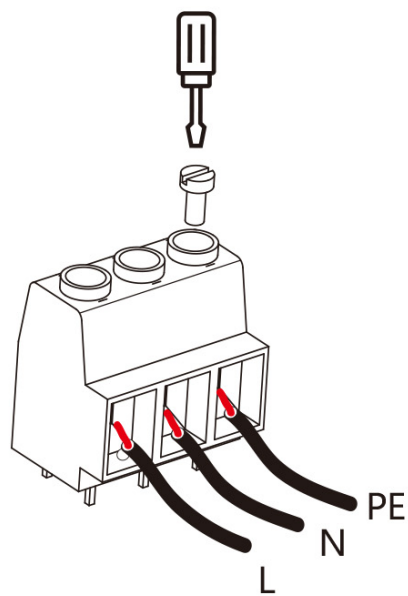
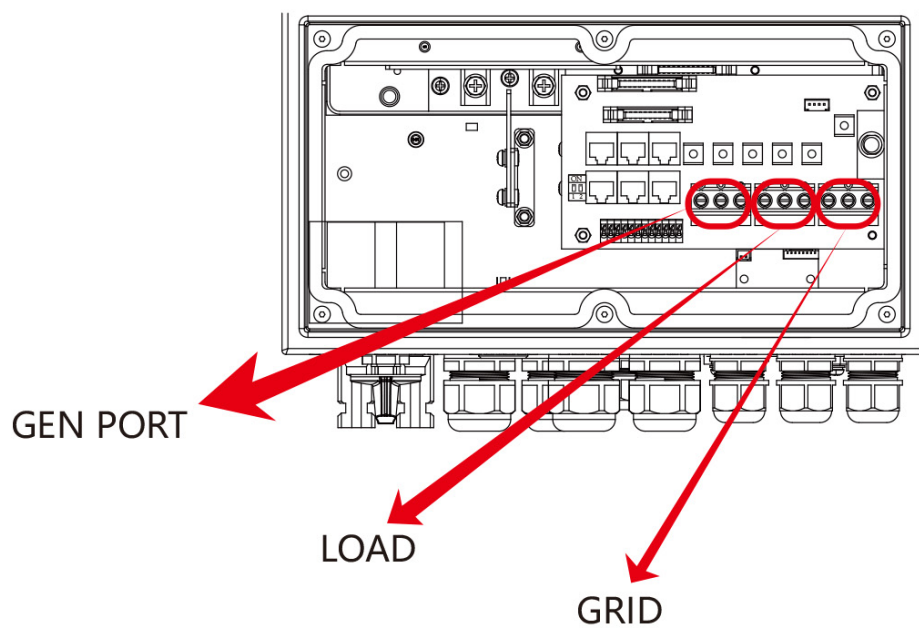
All wiring must be performed by a qualified personnel. It is very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable as below.

| <i>Model</i> | <i>Wire Size</i> | <i>Cable(mm²)</i> | <i>Torque value(max)</i> |
|--------------|------------------|------------------------------|--------------------------|
| 3.6Kw | 12AWG | 4 | 1.2Nm |
| 5Kw | 10AWG | 6 | 1.2Nm |

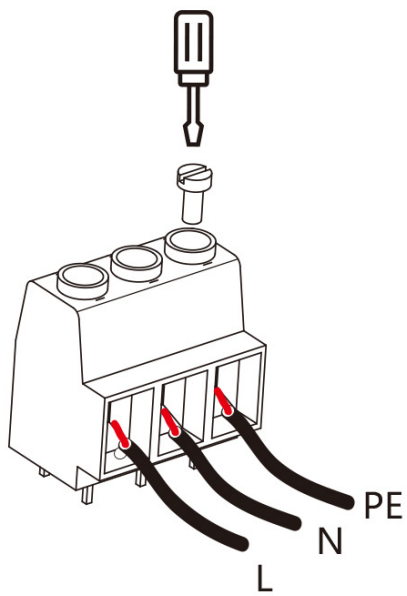
Chart 3-3 Recommended Size for AC wires

Please follow below steps to implement AC input/output connection:

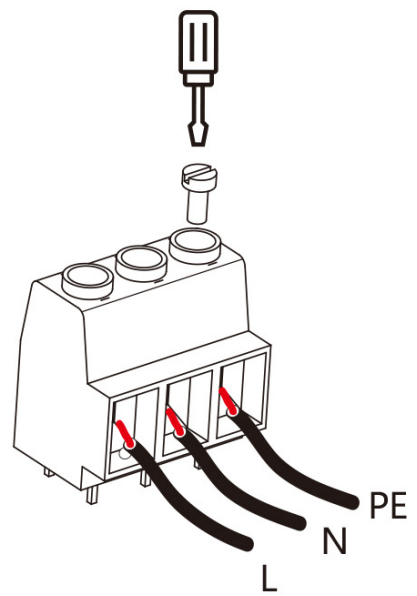
1. Before making Grid, load and Gen port connection, be sure to turn off AC breaker or disconnect first.
2. Remove insulation sleeve 10mm length, unscrew the bolts, insert the wires according to polarities indicated on the terminal block and tighten the terminal screws. Make sure the connection is complete.



GEN PORT



LOAD



GRID



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.

| <i>Model</i> | <i>Wire Size</i> | <i>Cable(mm²)</i> |
|--------------|------------------|------------------------------|
| 3.6/5Kw | 12AWG | 4 |

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 be sure PV+ don't ground and PV- don't ground.



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:

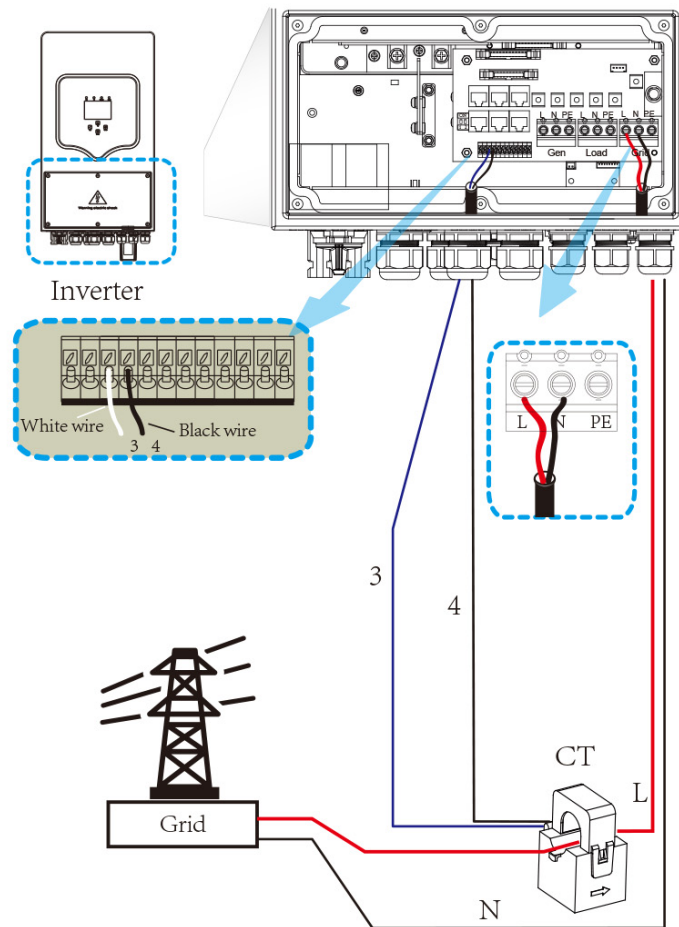
When selecting proper PV modules, please be sure to consider below parameters:

- 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.

| <i>Inverter Model</i> | <i>3.6KW</i> | <i>5KW</i> |
|--------------------------------|---------------------|-------------------|
| PV Input Voltage | 370V (100V~500V) | |
| PV Array MPPT Voltage Range | 125V-425V | |
| No. of MPP Trackers | 2 | |
| No. of Strings per MPP Tracker | 1+1 | |

Chart 3-5

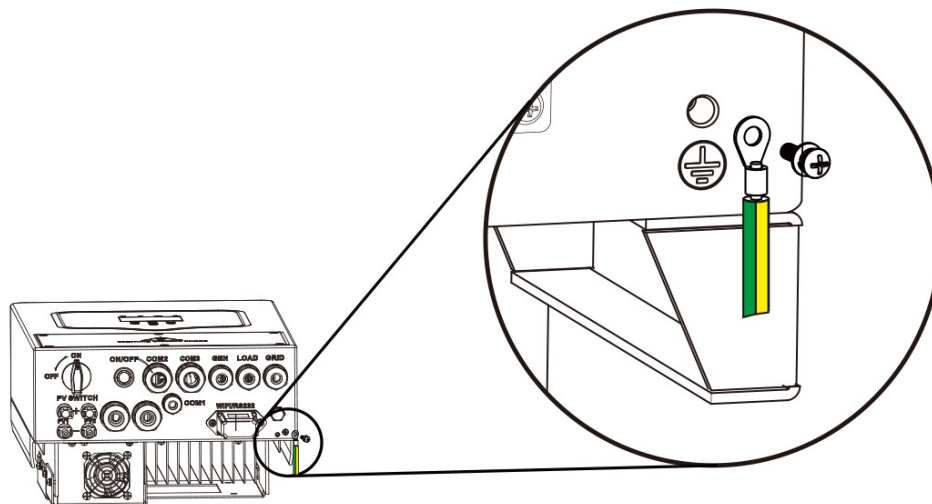
3.6 CT Connection



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

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.



3.8 WIFI Connection

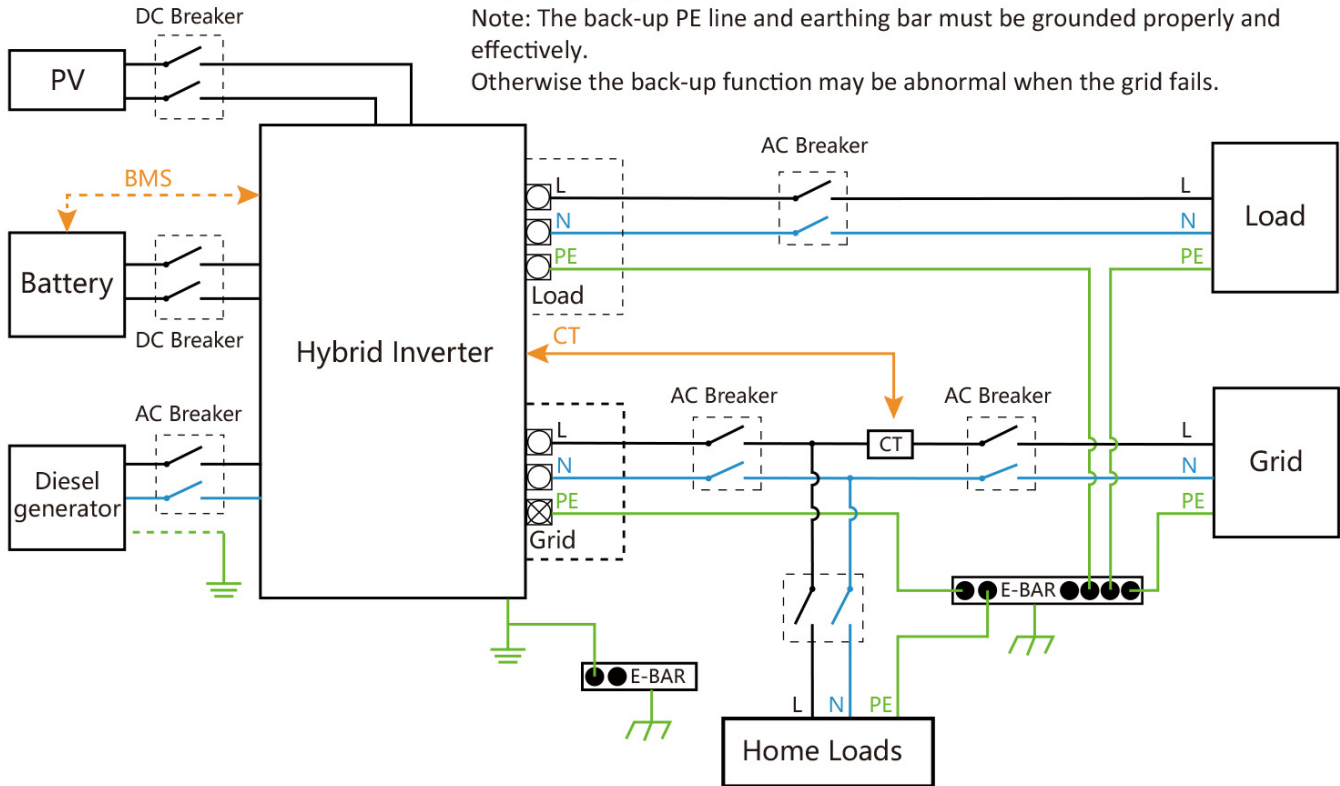
For the configuration of Wi-Fi Plug, please refer to illustrations of the Wi-Fi Plug.

3.9 Wiring System for Inverter

This diagram is an example for grid systems without special requirements on electrical wiring connection.

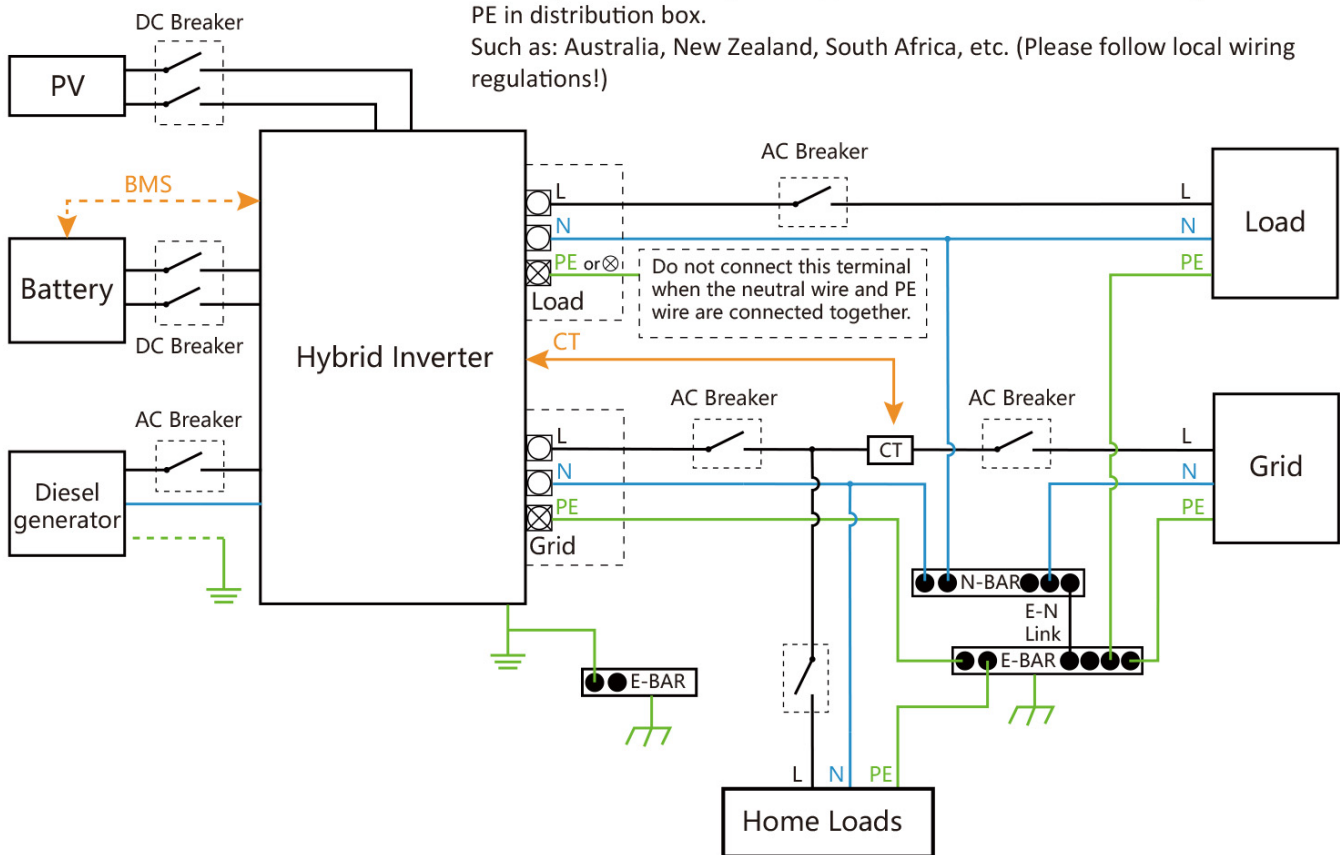
Note: The back-up PE line and earthing bar must be grounded properly and effectively.

Otherwise the back-up function may be abnormal when the grid fails.



This diagram is an example for application that Neutral connects together with PE in distribution box.

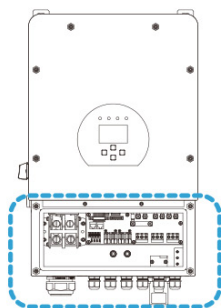
Such as: Australia, New Zealand, South Africa, etc. (Please follow local wiring regulations!)



3.10 Typical application diagram of diesel generator

(Region:EU)

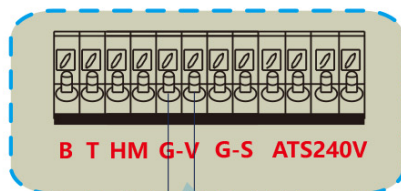
— CAN — L wire — N wire — PE wire



Inverter

① DC Breaker for battery
SUN 3.6K-SG: 120A DC breaker
SUN 5K-SG: 150A DC breaker

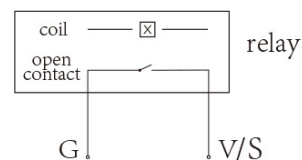
②③ AC Breaker for grid port
SUN 3.6K-SG: 40A AC breaker
SUN 5K-SG: 40A AC breaker



Inverter

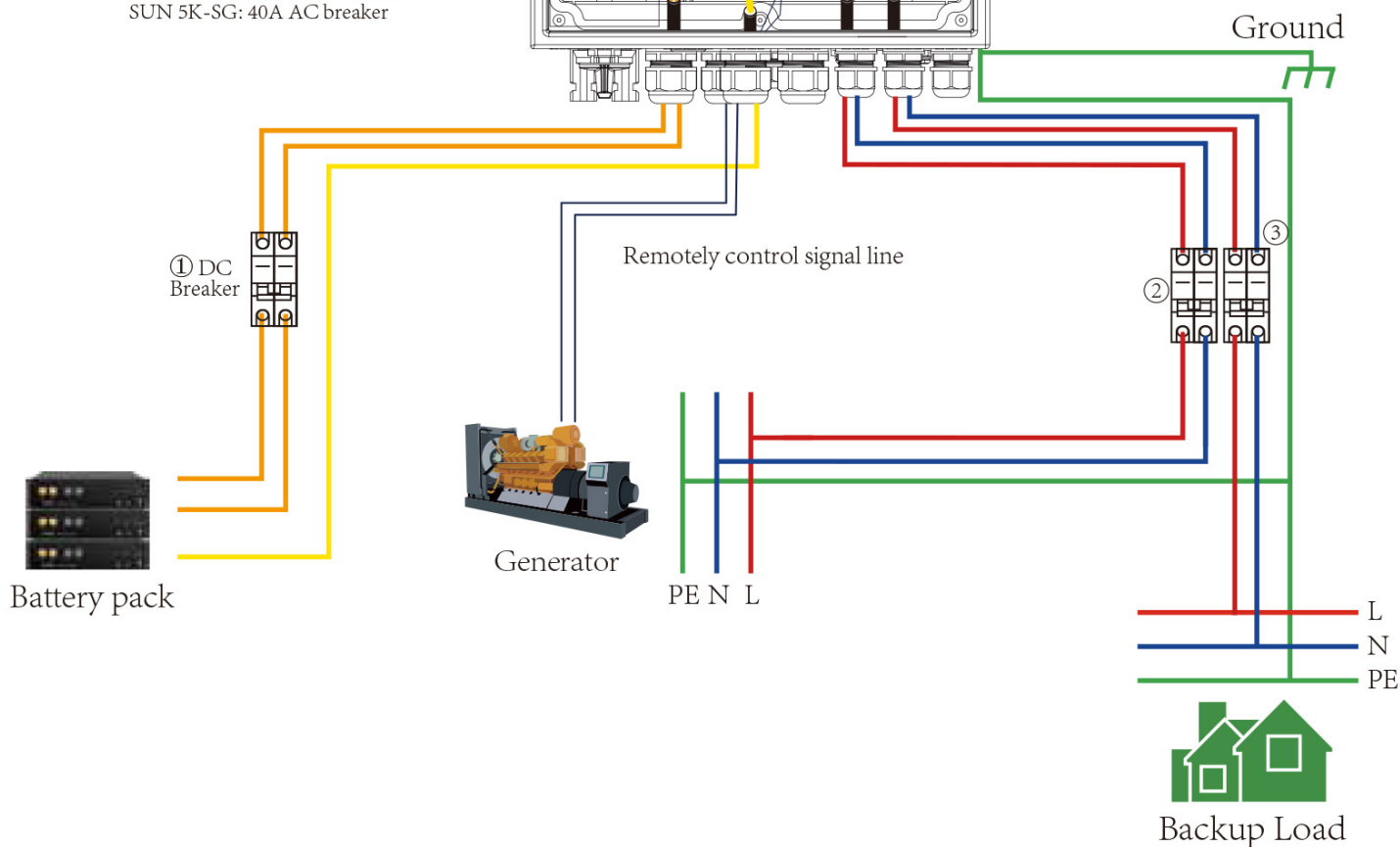
GV/GS: dry contact signal for startup the diesel generator.

When the "GEN signal" is active, the open contact (GV/GS) will switch on (no voltage output). If the "Signal ISLAND MODE" is ticked, the GS port will be the dry contact signal for startup the diesel generator. If "Signal ISLAND MODE" is not ticked, the GV port will be the dry contact signal for startup the diesel generator.

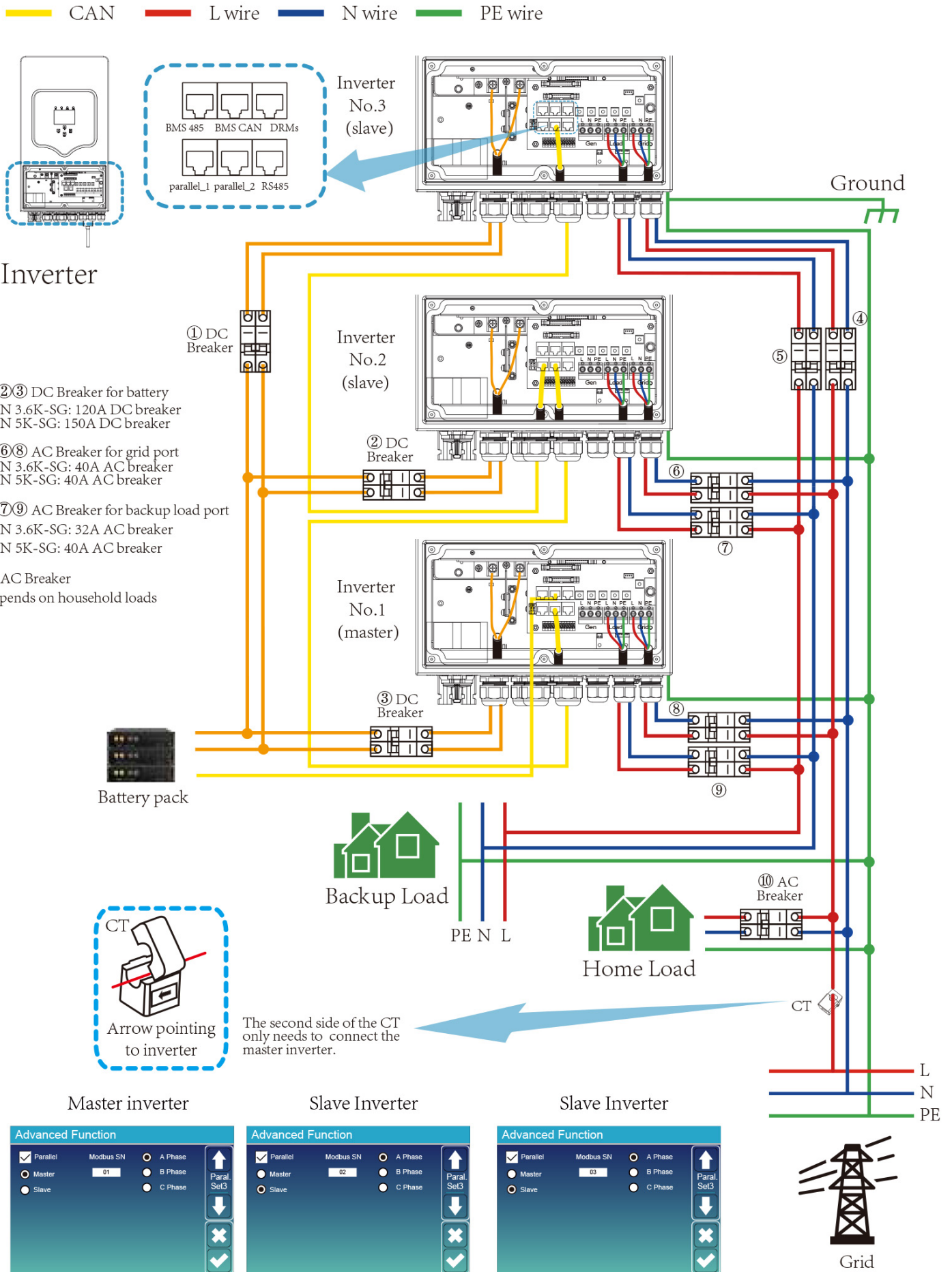


GV/GS

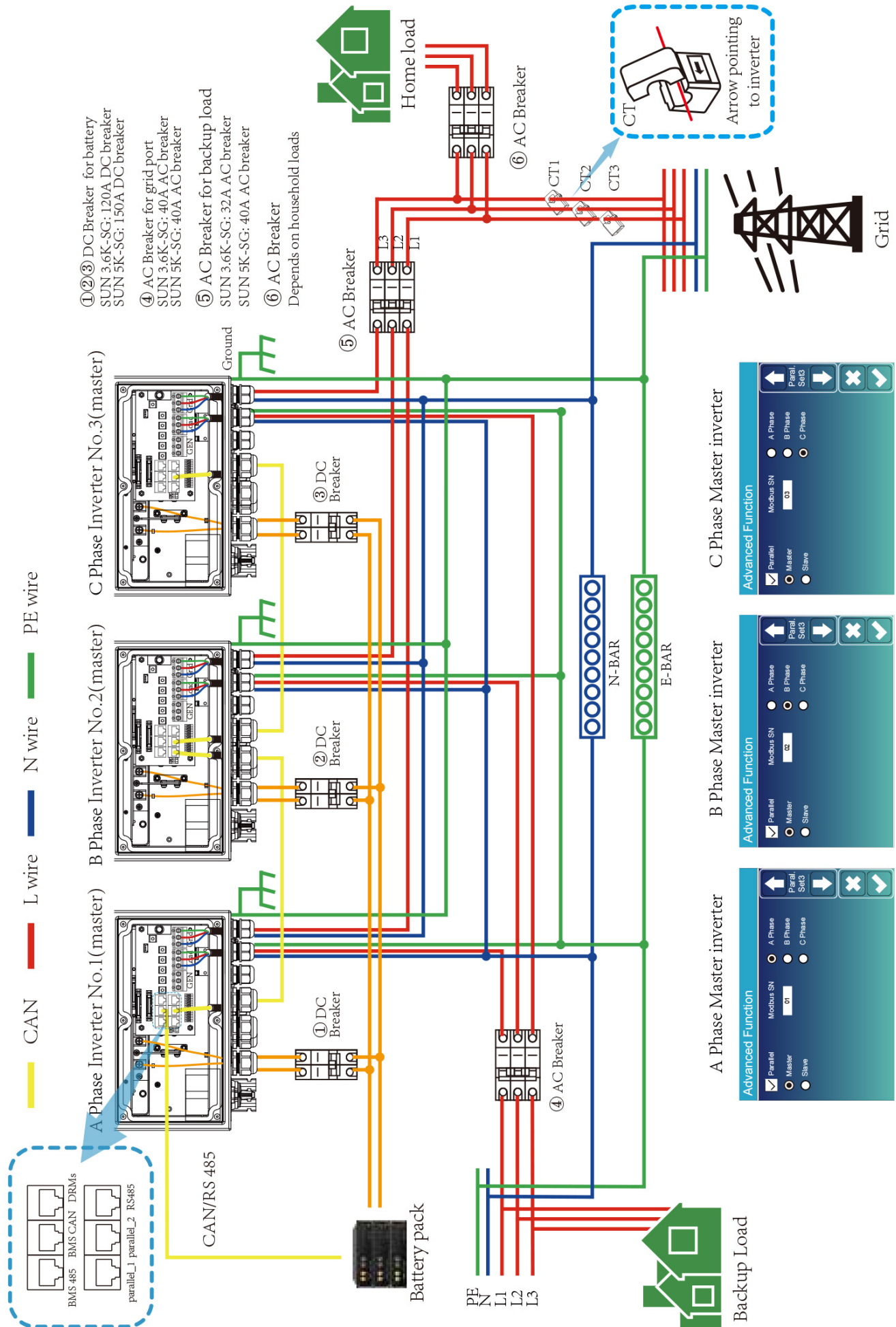
(diesel generator startup signal)



3.11 Single phase parallel connection diagram



3.12 Three phase Parallel Inverter



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 work.

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.

| <i>LED Indicator</i> | | <i>Messages</i> |
|----------------------|-----------------------|---------------------------|
| 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

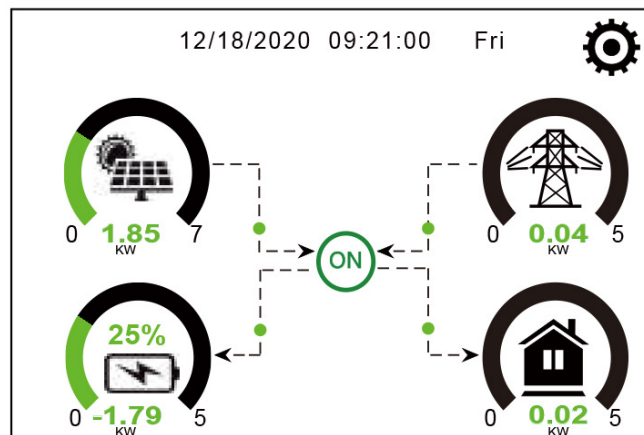
| <i>Function Key</i> | <i>Description</i> |
|---------------------|-----------------------------|
| Esc | To exit setting mode |
| Up | To go to previous selection |
| Down | To go to next selection |
| Enter | To confirm the selection |

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./FXX" , it means the inverter has communication errors or other errors, the error message will display under this icon(FXX errors, detail error info can be viewed in the System Alarms menu).

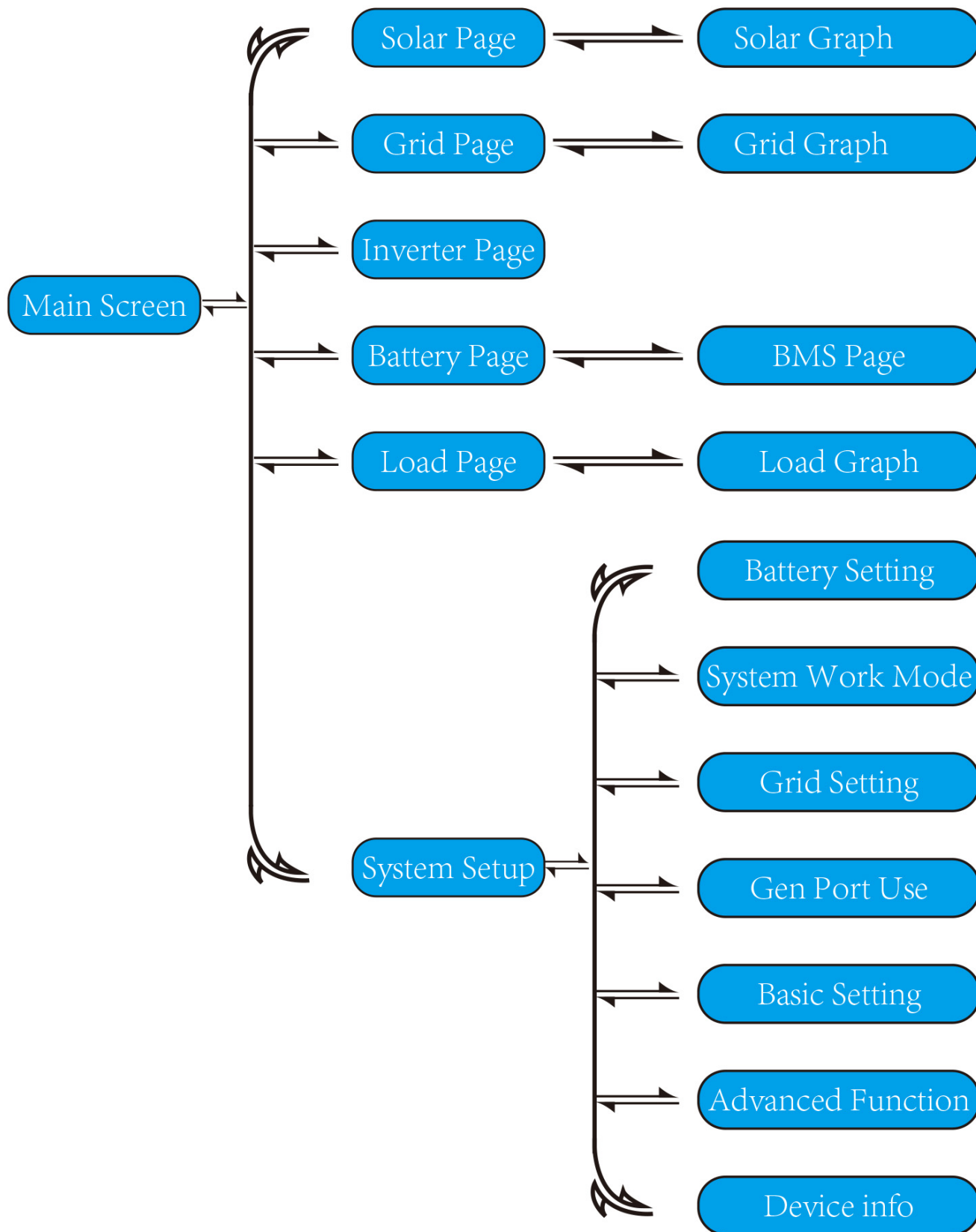
2.At the top of the screen is the time.

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.

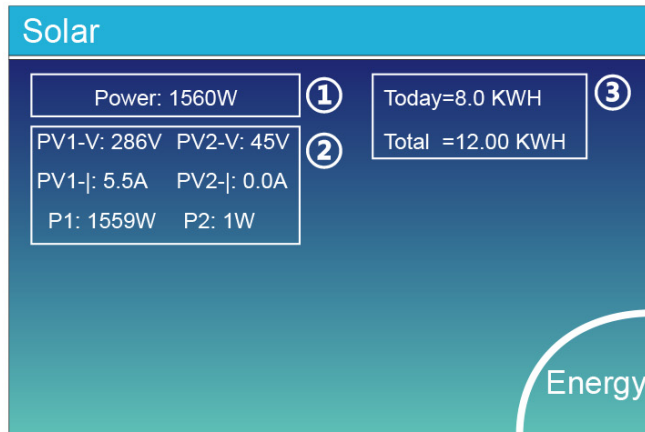
4.The main screen showing the info including Solar, Grid, Load and Battery. Its also displaying the energy flow direction by arrow. When the power is approximate to high level, the color on the panels will changing from green to red so system info showing vividly on the main screen.

- 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



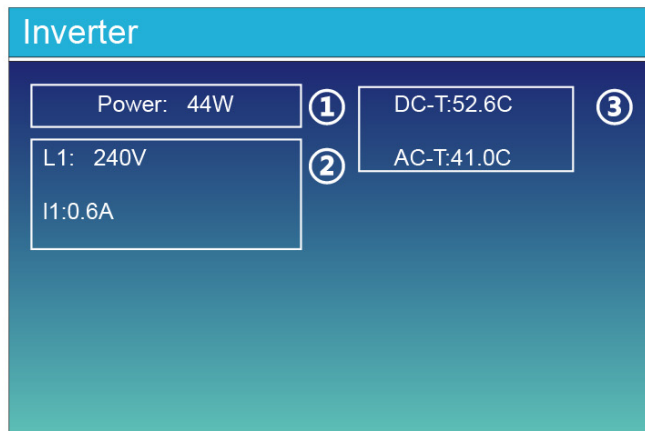
5.2 Solar Power Curve



This is Solar Panel detail page.

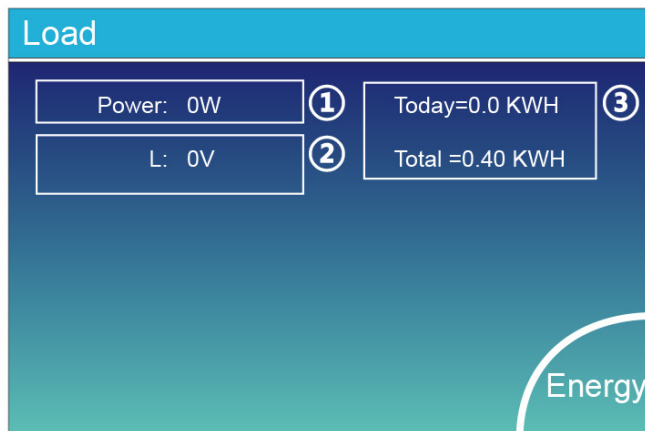
- ① Solar Panel Generation.
- ② Voltage, Current, Power for each MPPT.
- ③ Solar Panel energy for Day and Total.

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



This is Inverter detail page.

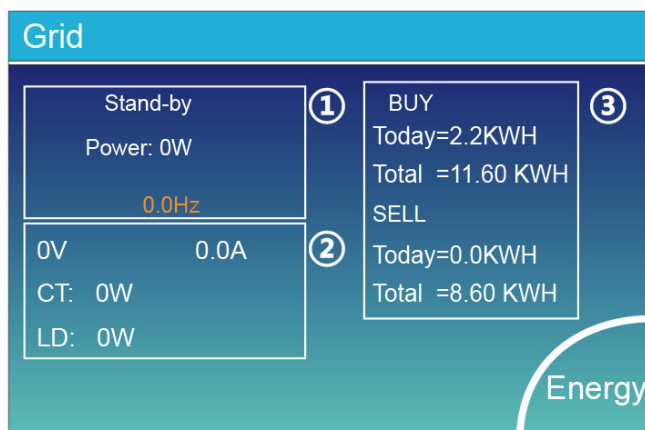
- ① Inverter Generation.
- ② Voltage, Current, Power for each Phase.
- ③ *DC-T: mean DC-DC temperature,
AC-T: mean Heat-sink temperature.
*Note: this part info is not available for some LCD FW.



This is Back-up Load detail page.

- ① Back-up Power.
- ② Voltage, Power for each Phase.
- ③ Back-up consumption for Day and Total.

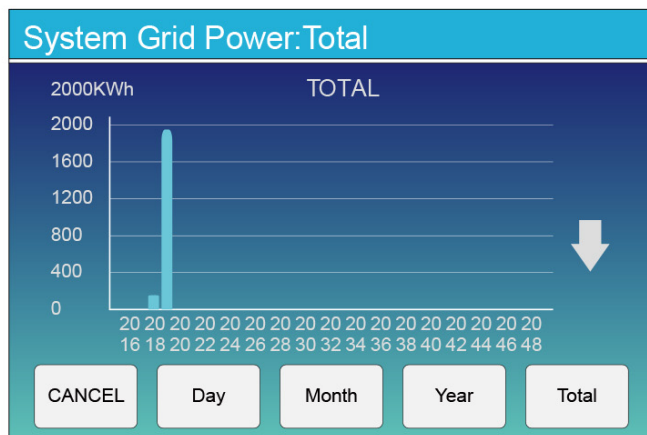
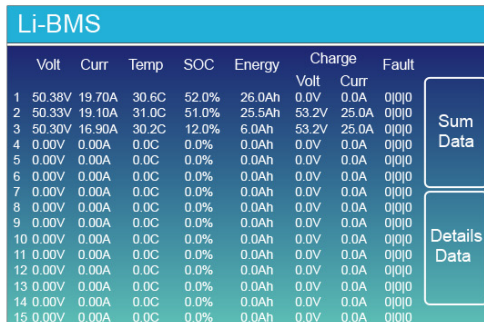
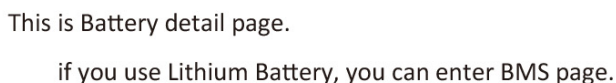
Press the “Energy “ button will enter into the power curve page.



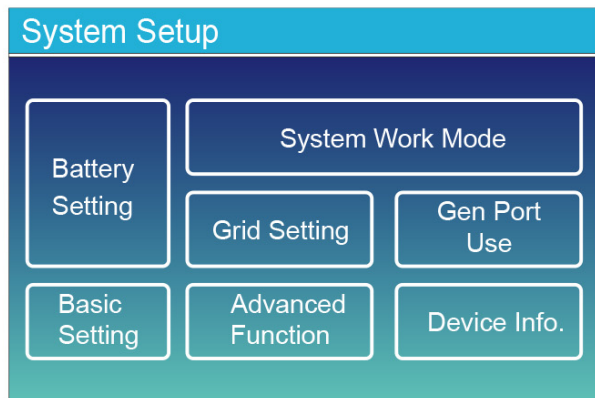
This is Grid detail page.

- 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.

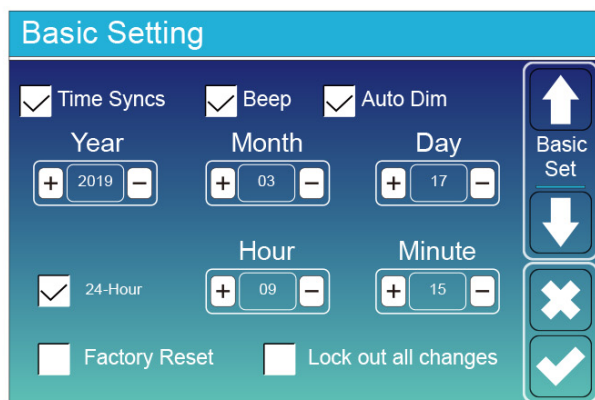


5.4 System Setup Menu

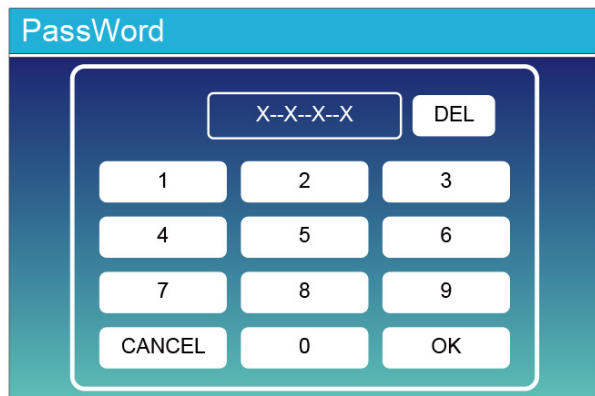


This is System Setup page.

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

System selfchek: After ticking this item, it needs input the password. The default password is 1234

5.6 Battery Setup Menu

Battery Setting

Batt Mode

☒ Lithium
 ☐ Use Batt V
 ☐ Use Batt %
 ☐ No Batt

Batt Capacity

400Ah

Max A Charge

40A

Max A Discharge

40A

☐ Activate Battery

↑

Batt Mode

↓

✕

✓

Battery capacity: it tells Deye 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(0-115A for 5KW model, 0-90A for 3.6KW 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%

A 40A

☐ Gen Charge

☐ Gen Signal

Gen Max Run Time 0.0 hours

Gen Down Time 0.5 hours

30% ②

40A

☐ Grid Charge

☐ Grid Signal

0.0 hours ③

↑

Batt Set2

↓

✕

✓

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 = 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.

Battery Setting

Lithium Mode 00

Shutdown 10%

Low Batt 20%

Restart 40%

↑

Batt Set3

↓

✕

✓

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 53.6V

Absorption V 57.6V

Equalization V 57.6V

Equalization Days 30 days

Equalization Hours 3.0 hours

Shutdown ③ 20%

Low Batt 35%

Restart 50%

TEMPCO(mV/C/Cell) ② -5

Batt Resistance 25mOhms

↑

Batt Set3

↓

✕

✓

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

| <i>Battery Type</i> | <i>Absorption Stage</i> | <i>Float Stage</i> | <i>Torque value (every 30 days 3hr)</i> |
|---------------------|-----------------------------------|--------------------|--|
| 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

System Work Mode

☐

Selling First

5000

Max Solar Power

☒

Zero Export To Load

☒

Solar Sell

☐

Zero Export To CT

☒

Solar Sell

Max Sell Power

5000

Zero-export Power

20

Energy pattern

☒

BattFirst

☐

LoadFirst

☒

Grid Peak Shaving

5000

Power

↑

Work Mode1

↓

✕

✓

Work Mode

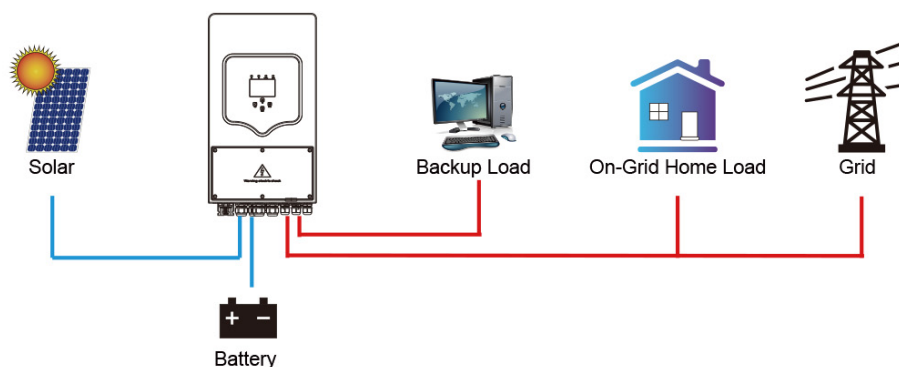
Selling First: This Mode allows hybrid inverter to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid.

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

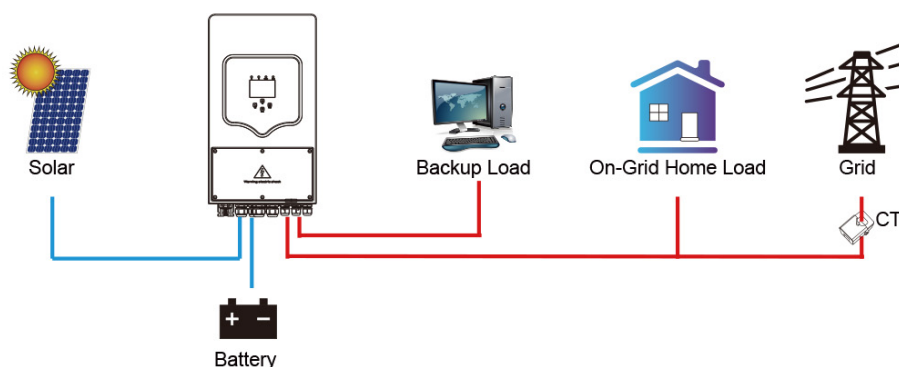
Power source priority for the load is as follows:

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 make supplement for battery and load simultaneously.

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.

| System Work Mode | | | | | | |
|-------------------------------------|--------------------------|-------------|-------|-------|-------|--|
| Grid Charge | Gen | Time Of Use | | Power | Batt | |
| | | Time | | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | 01:00 | 5:00 | 5000 | 49.0V | <div>↑ Work Mode2</div> <div>↓</div> <div>✕</div> <div>✓</div> |
| <input type="checkbox"/> | <input type="checkbox"/> | 05:00 | 9:00 | 5000 | 50.2V | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 09:00 | 13:00 | 5000 | 50.9V | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 13:00 | 17:00 | 5000 | 51.4V | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 17:00 | 21:00 | 5000 | 47.1V | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 21:00 | 01:00 | 5000 | 49.0V | |

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.

Power: Max. discharge power of battery allowed.

Batt(V or SOC %): battery SOC % or voltage at when the action is to happen.

| System Work Mode | | | | | | |
|-------------------------------------|--------------------------|-------------|-------|-------|------|--|
| Grid Charge | Gen | Time Of Use | | Power | Batt | |
| | | Time | | | | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | 01:00 | 5:00 | 5000 | 80% | <div>↑ Work Mode2</div> <div>↓</div> <div>✕</div> <div>✓</div> |
| <input type="checkbox"/> | <input type="checkbox"/> | 05:00 | 8:00 | 5000 | 40% | |
| <input type="checkbox"/> | <input type="checkbox"/> | 08:00 | 10:00 | 5000 | 40% | |
| <input type="checkbox"/> | <input type="checkbox"/> | 10:00 | 15:00 | 5000 | 80% | |
| <input type="checkbox"/> | <input type="checkbox"/> | 15:00 | 18:00 | 5000 | 40% | |
| <input type="checkbox"/> | <input type="checkbox"/> | 18:00 | 01:00 | 5000 | 35% | |

For example:

During 01:00-05:00, when battery SOC is lower than 80%, it will use grid to charge the battery until battery SOC reaches 80%.

During 05:00-08:00 and 08:00-10:00, when 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%.

5.8 Grid Setup Menu

Grid Setting

Grid Mode

☒ General Standard
☐ UL1741 & IEEE1547
☐ CPUC RULE21
☐ SRD-UL-1741

Grid Type

☒ 220V Single Phase
☐ 120/240V Split Phase
☐ 120/208V 3 Phase
☐ 120V Single Phase

Grid Set1

Grid Set2

Grid Set3

Grid Set4

Please select the correct Grid Mode in your local area.
If you are not sure, please choose General Standard.

Please select the correct Grid Type in your local area,
otherwise the machine will not work or be damaged.

Grid Setting

Grid Frequency

☒ 50HZ
☐ 60HZ

Reconnection Time

60S

PF

1.000

Grid HZ High

53.0Hz

Grid Vol High

265.0V

Grid HZ Low

49.0Hz

Grid Vol Low

185.0V

Grid Set2

Grid Set3

Grid Set4

Grid Set5

UL1741&IEEE1547, CPUC RULE21, SRD-UL-1741

No need to set the function of this interface.

General Standard

Please select the correct Grid Frequency in your local
area.

You can hold this in default value.

Grid Setting

Q(V)

FW

VW

V1:0.0V

Q1:0.00

Fstart:0.00Hz

Vstart:0.0V

V2:0.0V

Q2:0.00

Fstop:0.00Hz

Vstop:0.0V

V3:0.0V

Q3:0.00

Normal Ramp rate

0.0%/s

V4:0.0V

Q4:0.00

Soft Start Ramp rate

0.0%/s

Grid Set3

Grid Set4

Grid Set5

Grid Set6

For California only.

Grid Setting

L/HVRT

L/HFRT

HV2:0.0V

0.16S

HF2:0.00HZ

0.16S

HV1:0.0V

0.16S

HF1:0.00HZ

0.16S

LV1:0.0V

0.16S

LF1:0.00HZ

0.16S

LV2:0.0V

0.16S

LF2:0.00HZ

0.16S

LV3:0.0V

0.16S

LF2:0.00HZ

0.16S

Grid Set4

Grid Set5

Grid Set6

Grid Set7

For California only.

5.9 The method of CEI-021 Standard Self-Check

Grid Setting

Grid Mode

- ☐ General Standard
- ☐ UL1741 & IEEE1547
- ☐ CPUC RULE21
- ☐ SRD-UL-1741
- ☒ CEI-0-21

Grid Type

- ☒ 220V Single Phase
- ☐ 120/240V Split Phase
- ☐ 120/208V 3 Phase

Grid Set1

Grid Set1

Firstly, tick the “CEI-021” and “220V single phase/50Hz” on the grid setting menu.

Grid Warning

Grid Mode: CEI 0-21

Grid Type: 50Hz
220V Single Phase

CANCEL OK

Advanced Function

☐ Solar Arc Fault ON

☐ Clear Arc_Fault

☒ System selfcheck

☐ DRM

☐ Signal ISLAND MODE

☐ BMS_Err_Stop

Backup Delay

0S

Gen peak-shaving

CT Ratio

2000: 1

CEI 0-21 Report

Func Set1

Func Set1

Secondly, tick “System selfchek” , then it will ask you input the password, and the default password is 1234.

Note: please don’t tick “CEI-021 Report” .

This “System selfcheck” program is valid only after choosing grid type as "CEI-021".

PassWord

X--X--X--X DEL

1 2 3

4 5 6

7 8 9

CANCEL 0 OK

The default password is 1234
After input the password and then tick "OK"

| Inverter ID : 2012041234 | | | |
|--------------------------|------------|-----|--|
| Self-Test OK | | 8/8 | |
| Testing 59.S1... | Test 59.S1 | OK! | |
| Testing 59.S2... | Test 59.S2 | OK! | |
| Testing 27.S1... | Test 27.S1 | OK! | |
| Testing 27.S2... | Test 27.S2 | OK! | |
| Testing 81>S1... | Test 81>S1 | OK! | |
| Testing 81>S2... | Test 81>S2 | OK! | |
| Testing 81<S1... | Test 81<S1 | OK! | |
| Testing 81<S2... | Test 81<S2 | OK! | |

During the self-test process, all the indicators will be on and the alarm keeps on.
When all the test items shows OK, which means the self-test is completed successfully.

Advanced Function

☐ Solar Arc Fault ON
 ☐ Clear Arc_Fault
 ☐ System selfcheck
 ☐ DRM
 ☐ Signal ISLAND MODE
 ☐ BMS_Err_Stop

Backup Delay: 0S
 Gen peak-shaving
 CT Ratio: 2000: 1
☒ CEI 0-21 Report

↑ Func Set1
 ↓
 ✕
 ✓

then press "esc" button to quit from this page.
Tick "system selfcheck" on the Advanced function menu and tick "CEI-021 Report".

PassWord

X--X--X--X

| | | |
|--------|---|----|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |
| CANCEL | 0 | OK |

System selfchek: After ticking this item, it needs input the password.
The default password is 1234.
After input the password and then tick "OK"

| Inverter ID : 2012041234 | | | |
|--------------------------|--------------|----------------|-------|
| Self-Test Report | | | |
| 59.S1 threshold | 253V 900ms | 59.S1: 228V | 902ms |
| 59.S2 threshold | 264.5V 200ms | 59.S2: 229V | 204ms |
| 27.S1 threshold | 195.5V 150ms | 27.S1: 228V | 158ms |
| 27.S2 threshold | 34.5V 200ms | 27.S2: 227V | 205ms |
| 81>.S1 threshold | 50Hz 100ms | 81>.S1: 49.9Hz | 103ms |
| 81>.S2 threshold | 51.5Hz 100ms | 81>.S2: 49.9Hz | 107ms |
| 81<.S1 threshold | 49.5Hz 100ms | 81<.S1: 50.0Hz | 95ms |
| 81<.S2 threshold | 47.5Hz 100ms | 81<.S2: 50.1Hz | 97ms |

This page will shows the test result of "CEI-021 self-check".

5.10 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. Power=500W, 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% or PV power < 500w, 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. Also, the PV input power should exceed the setting value (Power) 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 OFF: when the battery SOC exceeds setting value, Microinverter or grid-tied inverter will shut down.

* Micro Inv Input ON: when the battery SOC is lower than setting value, Microinverter or grid-tied inverter 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 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 Fre high) and the Microinverter will stop working.

MI export to grid cutoff: 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.

5.11 Advanced Function Setup Menu

Advanced Function

☐ Solar Arc Fault ON

☐ Clear Arc_Fault

☐ System selfcheck

☐ DRM

☐ Signal ISLAND MODE

☐ BMS_Err_Stop

Backup Delay
 0S

☐ Gen peak-shaving

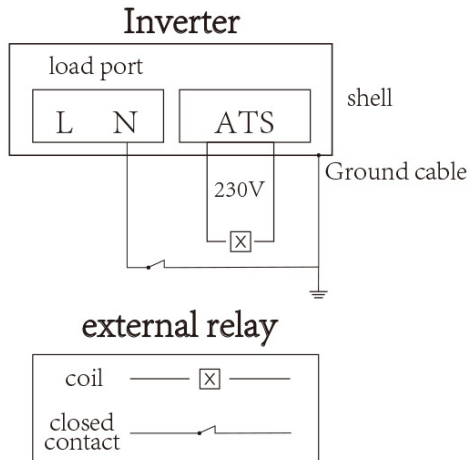
CT Ratio
 2000: 1

↑
 Func
 Set1

↓

✕

✓



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

DRM: For AS4777 standard

Backup Delay: (0-300)S adjustable

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: when the inverter connects grid, the ATS port will output 230Vac and it is used to cuts off Earth-Neutral(load port N line) bond via connect external relay. When the inverter disconnects from the grid, ATS port voltage will be 0 and the Earth-Neutral bond keeps on. More details, please refer to left picture.

Advanced Function

☐ Parallel

☒ Master

☒ Slave

Modbus SN
 00

☒ A Phase

☐ B Phase

☐ C Phase

☐ Ex_Meter For CT

☐ A Phase

☐ B Phase

☐ C Phase

↑
 Paral.
 Set3

↓

✕

✓

Ex_Meter For CT: when in Three phase system with CHNT Three phase energy meter (DTSU666), click corresponding phase where hybrid inverter is connected. e.g. when the hybrid inverter output connects to A phase, please click A Phase.

5.12 Device Info Setup Menu

Device Info.

| | | |
|-----------------------------|---------------|-------|
| Inverter ID: 1601012001 | | Flash |
| HMI: Ver0302 | MAIN: Ver2138 | |
| Alarms Code | Occurred | |
| F64 Heatsink_HighTemp_Fault | 2019-03-11 | 15:56 |
| F64 Heatsink_HighTemp_Fault | 2019-03-08 | 10:46 |
| F64 Heatsink_HighTemp_Fault | 2019-03-08 | 10:45 |

↑

Device Info

↓

✕

✓

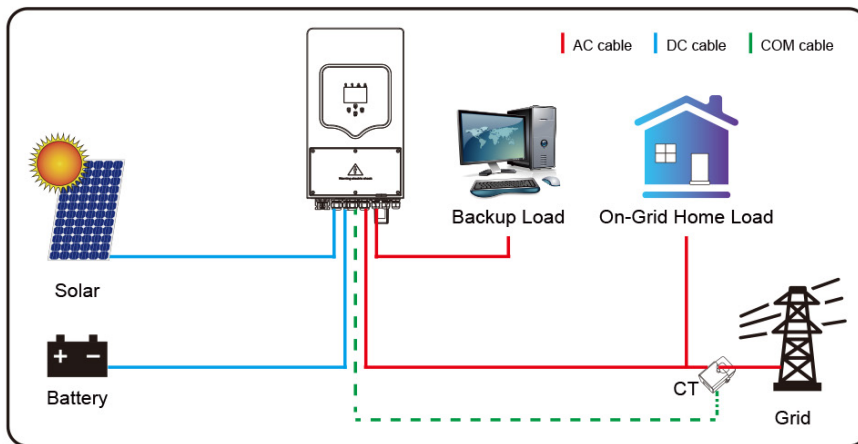
This page show Inverter ID, Inverter version and alarm codes.

HMI: LCD version

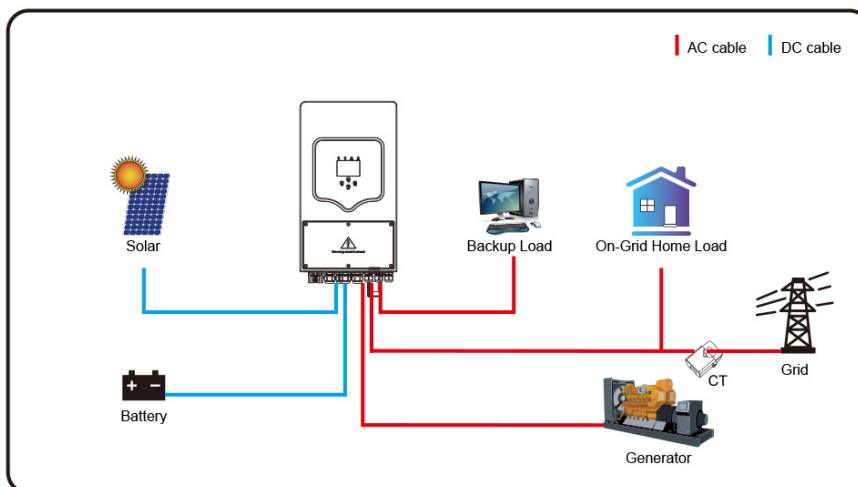
MAIN: Control board FW version

6. Mode

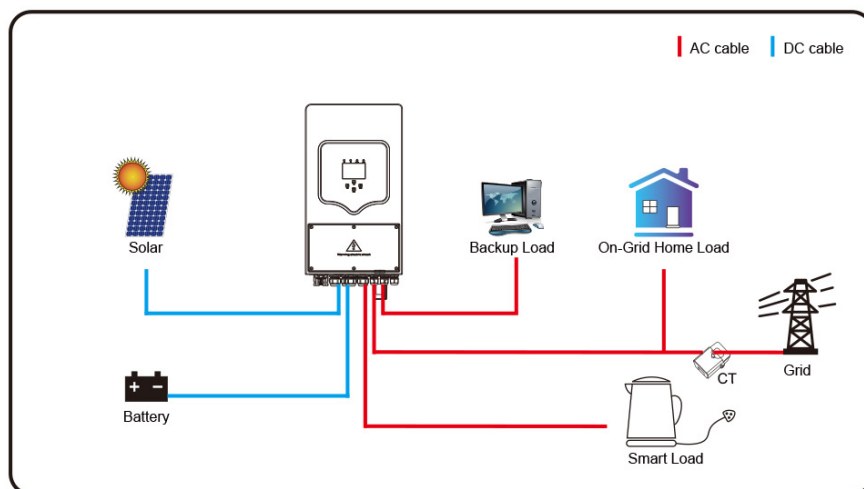
Mode I: Basic



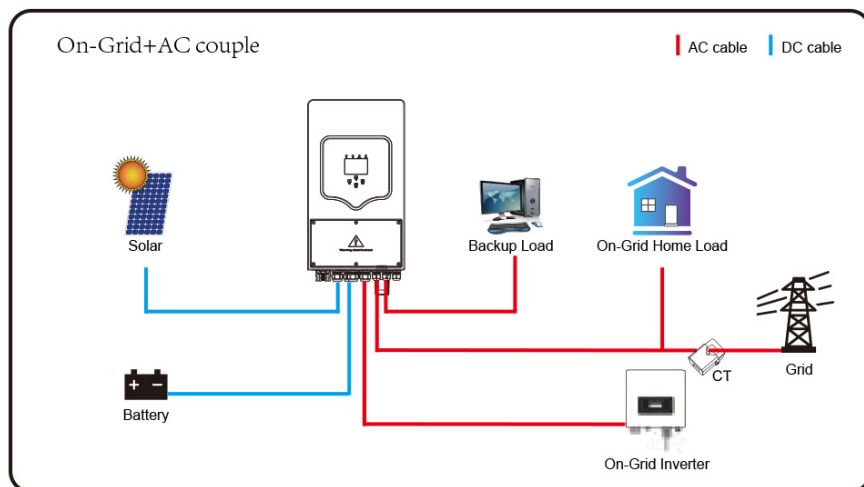
Mode II: With Generator



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. Fault information and processing

The energy storage inverter is designed according to the grid-connected operation standard and meets the safety requirements and electromagnetic compatibility requirements. Before leaving the factory, the inverter undergoes several rigorous tests to ensure that the inverter can operate reliably.



If any of the fault messages listed in Table 7-1 appear on your inverter and the fault has not been removed after restarting, please contact your local dealer or service center. You need to have the following information ready.

1. Inverter serial number;
2. Distributor or service center of the inverter ;
3. On-grid power generation date;
4. The problem description (including the fault code and indicator status displayed on the LCD) is as detailed as possible.
5. Your contact information. In order to give you a clearer understanding of the inverter's fault information, we will list all possible fault codes and their descriptions when the inverter is not working properly.

| Error code | Description | Solutions |
|------------|--|---|
| F08 | GFDI _Relay_Failure | <ol style="list-style-type: none"> 1. When inverter is in Split phase(120/240Vac) or three-phase system (120/208Vac) system, the backup load port N line needs to connect ground; 2. If the fault still exists, please contact us for help. |
| F13 | Working mode change | <ol style="list-style-type: none"> 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. |
| F18 | AC over current fault of hardware | <p>AC side over current fault</p> <ol style="list-style-type: none"> 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. |
| F20 | DC over current fault of the hardware | <p>DC side over current fault</p> <ol style="list-style-type: none"> 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. |
| F22 | Tz_EmergStop_Fault | Please contact your installer for help. |
| F23 | AC leakage current is transient over current | <p>Leakage current fault</p> <ol style="list-style-type: none"> 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 impedance failure | <p>PV isolation resistance is too low</p> <ol style="list-style-type: none"> 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 is unbalanced | <ol style="list-style-type: none"> 1. Please wait for a while and check whether it is normal; 2. When the hybrid in split phase mode, and the load of L1 and load of L2 is big different, it will report the F26. 3. Restart the system 2~3 times. 4. Seek help from us, if can not go back to normal state. |
| F29 | Parallel CANBus fault | <ol style="list-style-type: none"> 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. when all inverters are in ON status, it will disappear automatically; 3. If the fault still exists, please contact us for help. |

| Error code | Description | Solutions |
|-------------------|------------------------------------|--|
| F34 | AC Overcurrent fault | <ol style="list-style-type: none"> 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. |
| F35 | No AC grid | <p>No Utility</p> <ol style="list-style-type: none"> 1. Please confirm grid is lost or not; 2. Check the grid connection is good or not; 3. Check the switch between inverter and grid is on or not; 4. Seek help from us, if can not go back to normal state. |
| F41 | Parallel system stop | <ol style="list-style-type: none"> 1. Check the hybrid inverter working status. If there's 1 pcs hybrid inverter is in OFF status, the other hybrid inverters may report F41 fault in parallel system. 2. If the fault still exists, please contact us for help. |
| F42 | AC line low voltage | <p>Grid voltage fault</p> <ol style="list-style-type: none"> 1. Check the AC voltage is in the range of standard voltage in specification; 2. Check whether grid AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state. |
| F47 | AC over frequency | <p>Grid frequency out of range</p> <ol style="list-style-type: none"> 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 | <p>Grid frequency out of range</p> <ol style="list-style-type: none"> 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. |
| F56 | DC busbar voltage is too low | <p>Battery voltage low</p> <ol style="list-style-type: none"> 1. Check whether battery voltage is too low; 2. If the battery voltage is too low, using PV or grid to charge the battery; 3. Seek help from us, if can not go back to normal state. |
| F58 | BMS communication fault | <ol style="list-style-type: none"> 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. |
| F63 | ARC fault | <ol style="list-style-type: none"> 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 temperature failure | <p>Heat sink temperature is too high</p> <ol style="list-style-type: none"> 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.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.

9. Datasheet

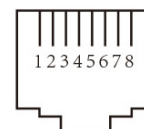
| Model | X-SUN-3.6K-KSG-EU | X-SUN-5.0K-KSG-EU |
|---|--|-------------------|
| Battery Input Data | | |
| Battery Type | Lead-acid or Li-Ion | |
| Battery Voltage Range(V) | 40-60V | |
| Max. Charging Current(A) | 90A | 120A |
| Max. Discharging Current(A) | 90A | 120A |
| Charging Curve | 3 Stages / Equalization | |
| External Temperature Sensor | yes | |
| Charging Strategy for Li-Ion Battery | Self-adaption to BMS | |
| PV String Input Data | | |
| Max. DC Input Power(W) | 4680W | 6500W |
| PV Input Voltage(V) | 370V (100V~500V) | |
| MPPT Range(V) | 125~425V | |
| Full Load DC Voltage Range | 240~425V | |
| Start-up Voltage(V) | 150V | |
| PV Input Current(A) | 13A+13A | |
| No. of MPPT Trackers | 2 | |
| No. of Strings Per MPPT Tracker | 1+1 | |
| AC Output Data | | |
| Rated AC Output and UPS Power(W) | 3600 | 5000 |
| Max. AC Output Power(W) | 3960 | 5500 |
| Peak Power(off grid) | 2 times of rated power, 10 S | |
| AC Output Rated Current(A) | 15.7A | 21.7A |
| Max. AC Current(A) | 18A | 25A |
| Max. Continuous AC Passthrough(A) | 35A | |
| Power Factor | 0.8 leading to 0.8 lagging | |
| Output Frequency and Voltage | 50/60Hz; 220/230 / 240Vac (single phase) | |
| Grid Type | Single Phase | |
| Current Harmonic Distortion | THD<3% (Linear load<1.5%) | |
| Efficiency | | |
| Max. Efficiency | 97.60% | |
| Euro Efficiency | 96.50% | |
| MPPT Efficiency | 99.90% | |
| Protection | | |
| PV Input Lightning Protection | Integrated | |
| Anti-islanding Protection | Integrated | |
| PV String Input Reverse Polarity Protection | Integrated | |
| Insulation Resistor Detection | Integrated | |
| Residual Current Monitoring Unit | Integrated | |
| Output Over Current Protection | Integrated | |
| Output Shorted Protection | Integrated | |
| Surge Protection | DC Type II / AC Type II | |

| Model | SUN-3.6K-SG01/03LP1-EU | SUN-5K-SG01/03LP1-EU |
|--------------------------------|--|----------------------|
| Certifications and Standards | | |
| Grid Regulation | VDE 0126, AS4777, NRS2017, G98, G99, IEC61683, IEC62116, IEC61727, RD1699: 2011, XP C15-712-3: 2019-05 | |
| Safety Regulation | IEC62109-1, IEC62109-2 | |
| EMC | EN61000-6-1, EN61000-6-3 | |
| General Data | | |
| Operating Temperature Range(℃) | -25~60℃, >45℃ Derating | |
| Cooling | Smart cooling | |
| Noise(dB) | <30 dB | |
| Communication with BMS | RS485; CAN | |
| Weight(kg) | 20.5 | |
| Size(mm) | 330W×580H×232D | |
| Protection Degree | IP65 | |
| Installation Style | Wall-mounted | |
| Warranty | 5 years | |

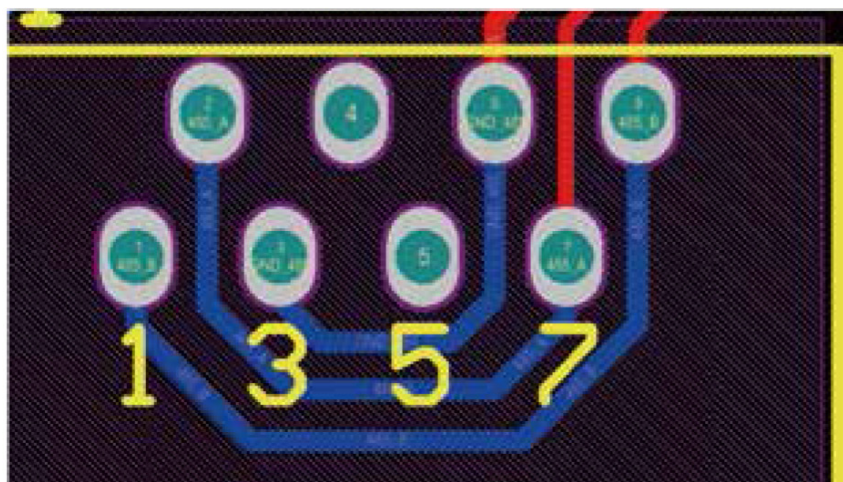
10. Appendix I

Definition of RJ45 Port Pin for BMS

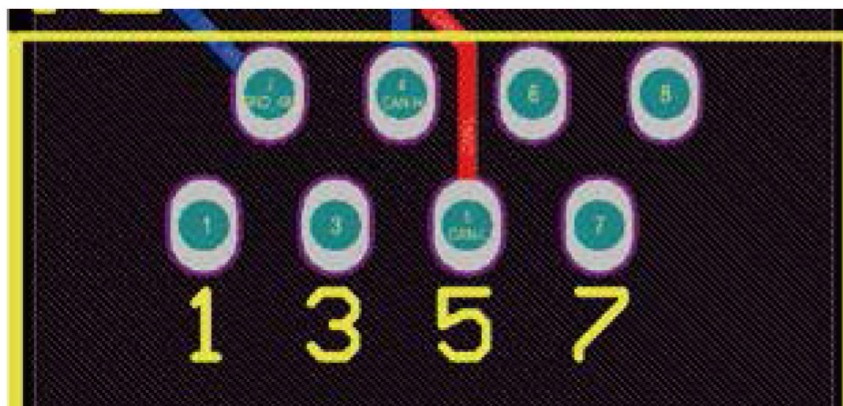
| No. | RS485 Pin | CAN Pin |
|-----|-----------|---------|
| 1 | RS485B | -- |
| 2 | RS485A | GND |
| 3 | GND | -- |
| 4 | | CANH |
| 5 | | CANL |
| 6 | GND | -- |
| 7 | RS485A | -- |
| 8 | RS485B | -- |



BMS 485 Port

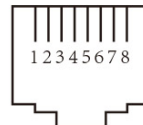


CAN Port

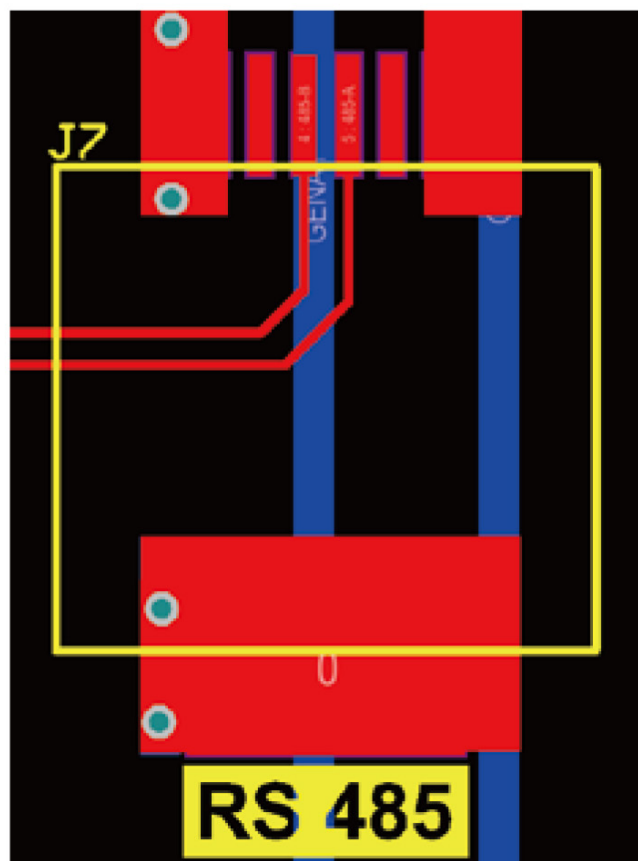


Definition of RJ45 Port Pin for RS485.
This port is used to communicate with energy meter

| No. | RS485 Pin |
|-----|-----------|
| 4 | RS485B |
| 5 | RS485A |

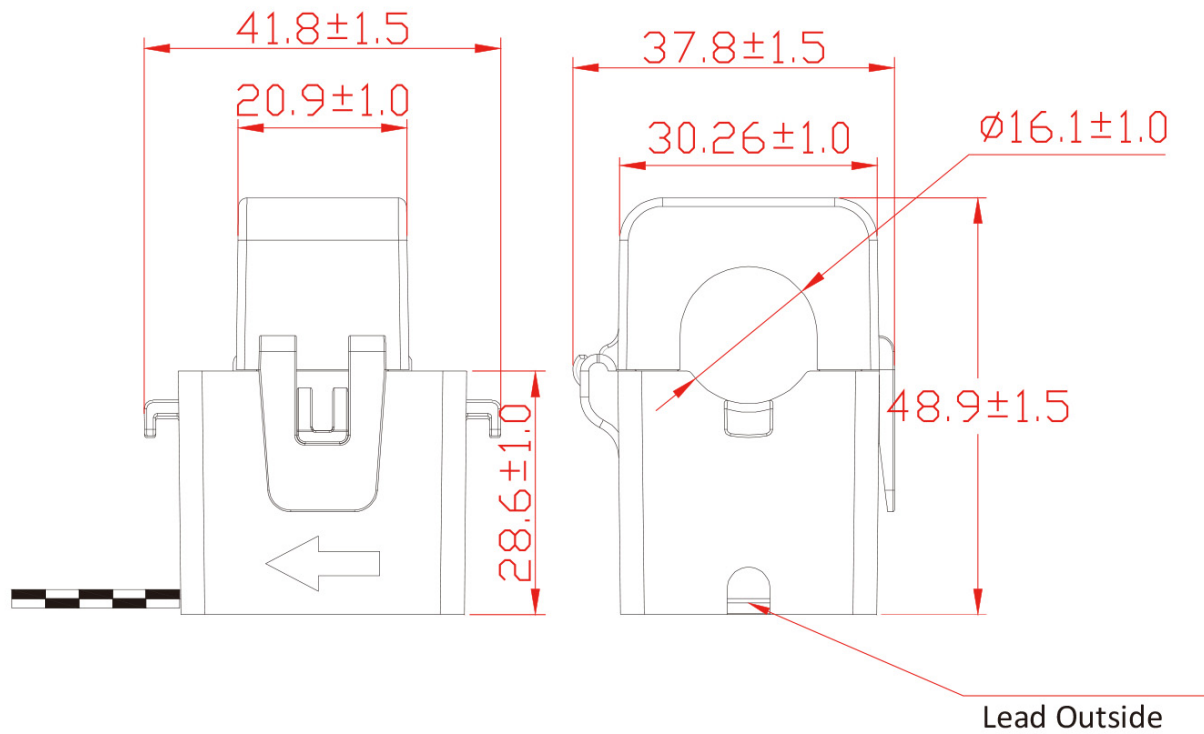


RS485 Port



11. Appendix II

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





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