DAH Solar

## Hybrid Inverter Series

# USER MANUAL

DHN-LVEH3P8/10/12K-EU-G1



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## ABOUT THIS MANUAL

This manual provides essential instructions for the DHN-LVEH3P8/10/12K-EU-G1 and other hybrid inverters. It is crucial that users read the entire manual carefully before beginning installation or commissioning.
For safety and proper operation, only qualified technicians should install or maintain this system. These technicians must possess appropriate certifications, receive relevant training, have the necessary technical skills, and strictly adhere to all guidelines outlined in this document.

## ADDITIONAL INFORMATION

Product specifications and information are subject to change without prior notice. This user manual is updated regularly to reflect the latest product developments. For the most current version, please visit the official DAH Solar website at www.dahsolar.com.

# 1 - IMPORTANT NOTES

## 1.1 Safety Instructions

The DAH Solar DHN-LVEH3P8/10/12K-EU-G1 hybrid inverter is designed and tested in accordance with international safety standards. However, compliance with all applicable safety regulations during installation and operation remains essential.
Installers must read this user manual thoroughly, fully understand its contents, and strictly adhere to all instructions, precautions, and safety warnings provided.

## 1.2 Precautions

• All wiring, installation, and commissioning must be carried out by qualified professionals with appropriate training and certification.
• Please read this manual carefully before operating the device. The company assumes no liability for malfunctions or damages resulting from improper use or operation.
• Before performing any installation or maintenance, ensure that all AC, DC, and battery connections are fully disconnected. Wait at least 5 minutes to allow residual voltage to dissipate and reduce the risk of electric shock.
• During inverter operation, the chassis may become hot. Avoid touching it to prevent the risk of burns.
• All electrical installations must comply with local electrical standards. The inverter must only be connected to the grid by qualified personnel after obtaining permission from the local power supply authority.
• Use insulated tools and wear appropriate personal protective equipment (PPE) during installation to ensure safety. When handling electronic components, always wear anti-static gloves, wrist straps, and protective clothing to prevent electrostatic damage to the inverter.
• Install the inverter in a location that is out of reach of children to prevent accidental contact or injury.
• Do not insert or remove AC and DC terminals while the inverter is operating to avoid the risk of electrical shock or equipment damage.
• Ensure the DC input voltage does not exceed the maximum allowable limit specified by the inverter to prevent damage or malfunction.
• Choose a compatible battery system and configure the correct battery type. Using mismatched batteries and hybrid inverters may result in system failure or reduced performance.
• Obtain the necessary permissions before connecting the hybrid energy storage system to the grid to comply with local regulations and safety standards.
• When installing solar PV panels during daylight with strong sunlight, ensure the PV switch is turned off to avoid the risk of electrical shock from live circuits.
• Do not connect the same PV string to multiple inverters, as this can cause damage to the inverters or system failure.
• The emergency load port is not suitable for devices that require a continuous, stable power supply, such as life-sustaining medical equipment.

## 1.3 Explanation of Symbols

| SYMBOL | USE |
|---|---|
|  | **Notice**<br>Potential hazards exist during equipment operation. Ensure proper protective measures are taken when handling the device. |
|  | **Risk of High Temperature**<br>Failure to follow these safety instructions may cause burns. |
|  | **Notice**<br>There is a risk of electric shock when the product is converting energy. Do not perform any operation before the residual voltage is released.<br>The hybrid inverter is working, no one is allowed to enter within 20 cm. |
|  | **Please read the manual first**<br>User manual before installing, operating and maintaining the hybrid inverter . |

| SYMBOL | USE |
|---|---|
| CE | **CE Marking**<br>The battery complies with the EU Low Voltage Directive. |
| | **Disposal**<br>In order to comply with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and other electronic equipment disposal regulations implemented as national laws, electrical equipment that has reached the end of its useful life must be collected separately and sent to approved recycling plants. If the hybrid inverter is in a waste state, it must be returned to an authorized dealer or an approved recycling plant. |
| 5min | **Notice**<br>Discharge Delay ,Wait at least 5 minutes after shutdown for full discharge. |

# 2- PRODUCT INTRODUCTION

## 2.1 Product Description

This next-generation hybrid inverter seamlessly integrates solar energy storage, grid charging, and pure sine wave AC output. Featuring a multifunctional LCD display, it offers flexible configuration options for a variety of applications. It supports efficient battery charge management, AC/solar dual-mode charging switching, and adjustable input voltage range settings—ensuring optimal energy management and stable power output.

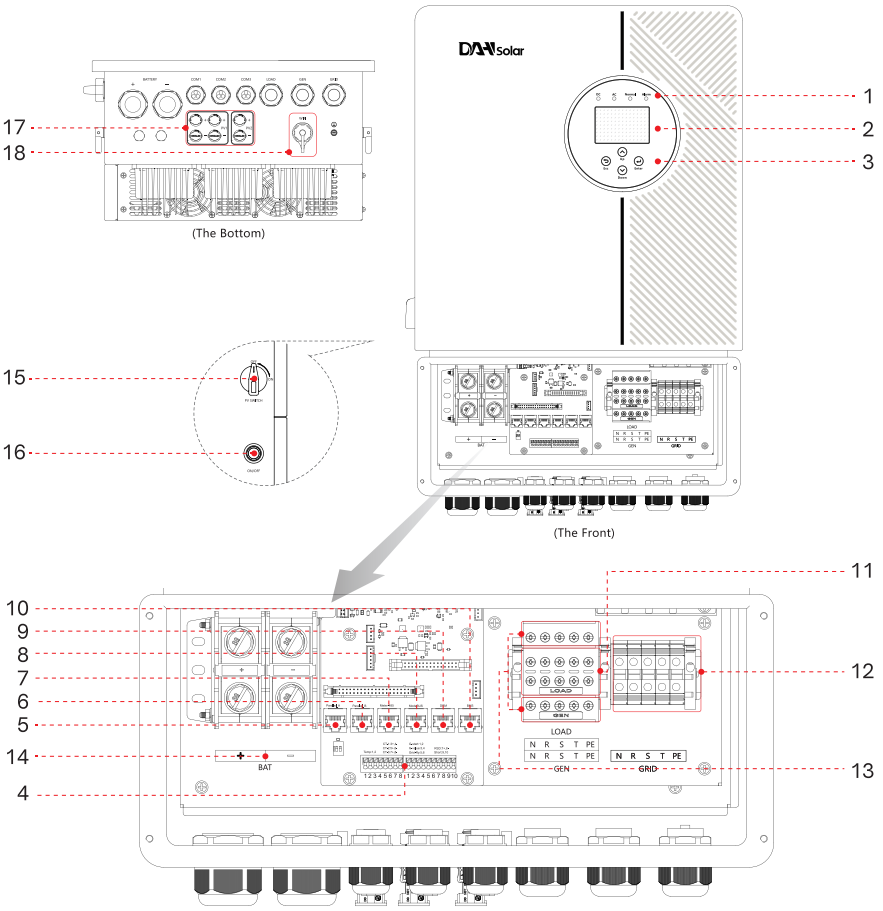
## 2.2 Features

| | |
|---|---|
| **Safety** | • Intelligent AI-powered DC Arc Fault Protection<br>• Supports 2x Short-Time Overload Capacity(10S)<br>• IP65 Rated for Enhanced Protection. |
| **Flexible** | • Compatible with Diesel Generators<br>• AC Coupling for Retrofitting Existing Solar Systems<br>• Supports Parallel Battery Connections for Increased Storage Capacity |
| **Smart** | • 4ms backup power switching.<br>• Colored LCD touchscreen for intuitive setup and real-time monitoring.<br>• Supports the setting of 6 time periods for battery charging/discharging. |
| **High Efficiency** | • Supports 1.6 times DC overloading<br>• 240A charge and discharge current<br>• 97.6% maximum conversion efficiency and 95% maximum charging efficiency |

## 2.3 Dimensions

| Model | |
|---|---|
| DHN-LVEH3P8/10/12K-G1 |  |

## 2.4 Interface Definition




| Serial number | Interface Name | Serial number | Interface Name |
|---|---|---|---|
| 1 | Indicator light | 10 | BMS port |
| 2 | LCD display | 11 | Load |
| 3 | Function buttons | 12 | Grid |
| 4 | Function port | 13 | Generator input |
| 5 | Parallel port A | 14 | Battery input connectors |
| 6 | Parallel port B | 15 | PV switch |
| 7 | Meter-485 port | 16 | ON/OFF |
| 8 | Modbus port | 17 | PV Input with two MPPT |
| 9 | DRM port | 18 | WiFi Interface |

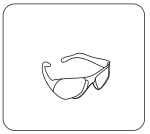
# 3 - PRODUCT INSTALLATION AND CONFIGURATION

## 3.1 Prepare tools

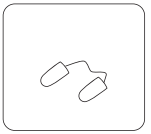
### 3.1.1 Preparation for Installation of Protective Equipment

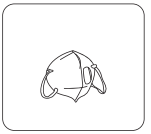
When installing the hybrid inverter , you must wear the following protective gear:


Insulating gloves


Safety goggles


Safety shoes


Earplugs


Anti-Dust Mask

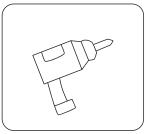
### 3.1.2 Installation Tool Preparation

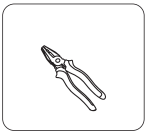
Tools and Instruments Reference:

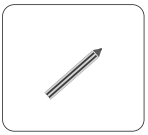

Utility Knife


Slotted screwdriver


Cross screwdriver

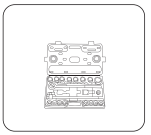

Percussion drill

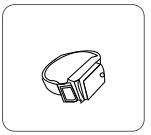

Pliers

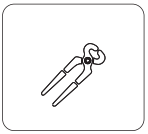

Marker

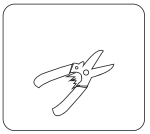

Level

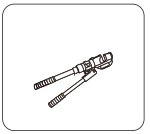

Rubber hammer

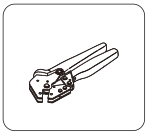

Socket wrenches set


Anti-static wrist strap


Wire cutter


Wire stripper


Hydraulic pliers


Crimping tool 4-6mm²


Multimeter ≥1100 Vdc

## 3.2 Unpacking and Inspection

The inverter undergoes thorough testing and strict inspection before shipment. However, damage may occur during transit.

### Before unboxing:

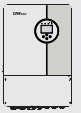
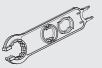
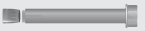
Carefully verify that the product information on the packaging matches your order details, and ensure the packaging is intact. If any damage is detected, immediately contact the carrier or supplier and provide photographic evidence of the damage.

### Storage:

When the inverter is not in use, store it in the original packaging to protect it from moisture and dust.

After unpacking, check the following items:
- Confirm that the main body of the inverter is intact and undamaged.
- Verify that the quantity of products and accessories in the packaging matches the packing list.
- Ensure there is no damage or missing items in the delivered contents.
- Check that the product information on the nameplate of the inverter matches the details on your order.

**The packing list is as follows:**

| Name | Specification | Quantity | Schematic diagram |
|---|---|---|---|
| Hybrid Inverter | DHN-LVEH3P8/10/12K-EU-G1 | 1 |  |
| Wall mounted bracket | 418*362*50mm | 1 |  |
| Communication cable | Black/L2000mm / Double RJ45 plug | 1 |  |
| Battery temperature sensor | MT103F3950P/3B3000 | 1 |  |
| CT | CTK160402-100A/50mA | 3 |  |
| Magnet ring | 80*50*20mm | 1 |  |
| PV + connector | VP-D4B-CHSF4 | 2/3 |  |
| PV - connector | VP-D4B-CHSM4 | 2/3 |  |
| D4 install tool | DW51040001013 | 1 |  |
| Expansion bolt | M8×80mm | 4 |  |
| Combination Screw | M5×12mm | 4 |  |
| L-shaped plum blossom wrench | T25 | 1 |  |
| Packing list | / | 1 |  |
| User Manual | / | 1 |  |
| Meter (optional) | DTSU666-Q 3*230/ 400V5(80A) 4p | 1 |  |
| Data acquisition stick (optional) | LSW-5B3153 | 1 |  |

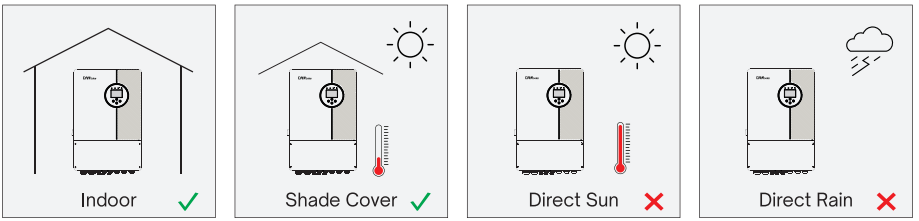
## 3.3 Installation Requirements

### 3.3.1 Installation Environment Requirements

• Installation Environment: The inverter can be installed both indoors and outdoors.
• Heat Precautions: During operation, the inverter chassis and heat sink may become hot. Avoid installing the inverter in easily accessible areas.
• Avoid Hazardous Areas: Do not install the inverter in locations containing flammable or explosive materials.
• Safe Installation Location: Choose an installation site that is free from concealed pipes or wiring to avoid potential hazards during drilling.
• Ventilation: Ensure the inverter is installed in a well-ventilated area to allow for adequate heat dissipation.
• Shading and Protection: It is recommended to select a shaded location or build a sun shelter to protect the inverter from direct sunlight.
• Grounding: The installation site must provide reliable grounding, using grounding conductors made from the same metal material as the inverter's grounding terminal.
• Electromagnetic Interference: Keep the inverter away from strong magnetic fields to prevent electromagnetic interference. If the installation site is near radio stations or wireless communication devices operating below 30 MHz, follow these guidelines:

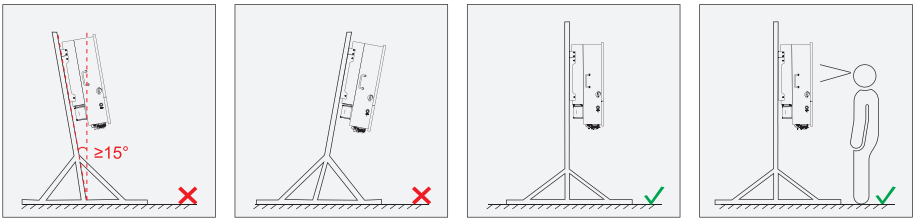
1. Add ferrite cores with multiple turns to the DC input or AC output cables
2. Install a low-pass EMI filter
3. Maintain a minimum distance of 30 meters between the inverter and any interfering wireless equipment



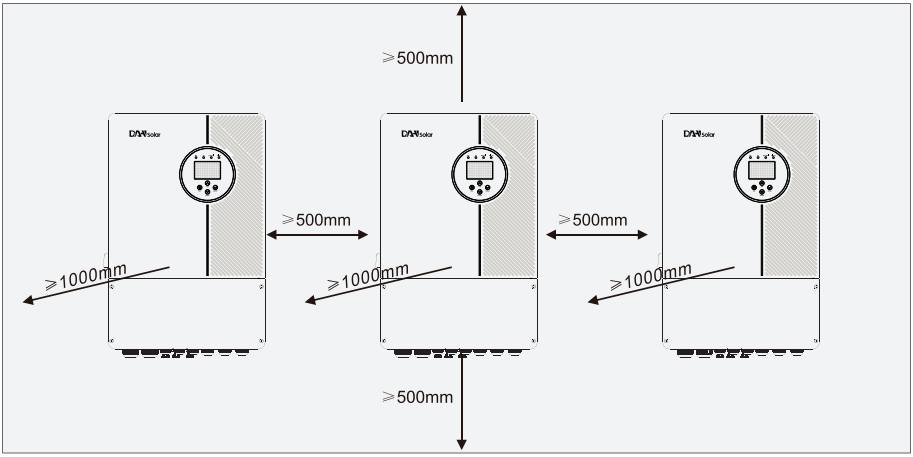



### 3.3.2 Installation Space Requirements

• Mounting Height: Ensure the mounting height allows the LCD display to be at eye level for easy status monitoring.
• Clearance for Maintenance: The installation location must provide sufficient clearance around the inverter to allow for easy maintenance access and proper air circulation.
• Installation Angle: The installation surface should be perpendicular to the ground. Install the inverter vertically or with a backward tilt of ⩽15 ° to facilitate optimal heat dissipation. Do not install the inverter with a forward tilt, horizontally, upside-down, excessive backward tilt, or sideways.



• Spacing Between Inverters: When installing multiple inverters, maintain a minimum spacing of 500 mm between each unit. Ensure adequate clearance above and below the inverters to allow for effective heat dissipation.




### 3.3.3 Requirements for Installation Carrier

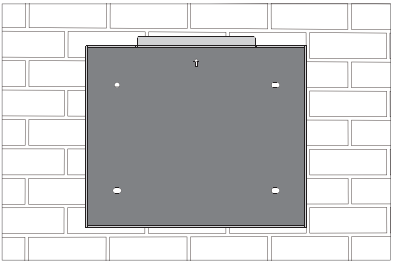
• Fire Resistance: The installation surface must be made of non-flammable, fire-resistant materials.
• Structural Stability: Ensure the installation surface is robust and capable of securely supporting the weight of the inverter and associated equipment.

## 3.4 Hybrid Inverter Installation

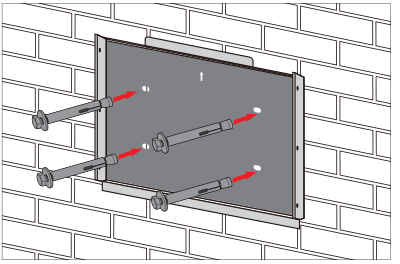
Before installation, the equipment must be transported to the installation site. To prevent personal injury and equipment damage during transportation, please follow these guidelines:
1. Proper Handling: Assign an adequate number of personnel based on the weight of the equipment to prevent overloading and reduce the risk of injury.
2. Wear Protective Gear: Always wear safety gloves to protect your hands from injury during transportation.
3. Maintain Balance: Ensure the equipment is kept balanced throughout the transportation process to prevent it from tipping or falling.
4. Qualified Personnel: Installation should only be performed by trained professionals with adequate knowledge of power systems. During installation, ensure compliance with all relevant safety regulations and local safety standards.

### 3.4.1 Installation Steps

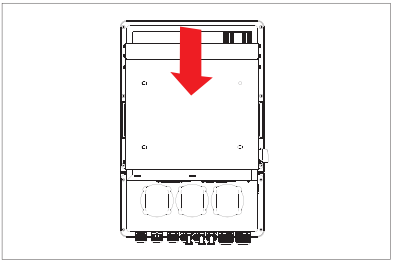
I. Position the wall-mounted bracket horizontally on the wall surface. Ensure the wall thickness is greater than 60 mm. Use a marking pen to accurately mark the positions of the four mounting holes to be drilled.



II. Using the marked positions, drill holes in the wall with a 12 mm diameter and a depth of more than 90 mm using an impact drill.
III. Fix the casing of the M8 expansion bolt in the hole on the wall, and use the M8 bolt to fix the hanging plate on the wall, with the control torque being 8 N.m.

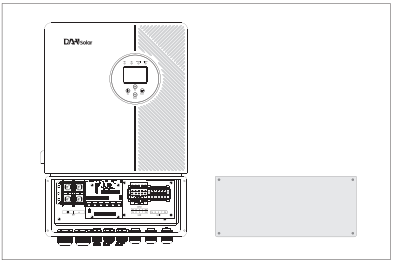


IV. Align the mounting notch on the back of the inverter with the wall-mounted bracket, then snap it into place. Gently push the inverter downward to ensure it is securely fastened. Make sure the groove on the inverter's heat sink fits precisely with the bracket for a stable and secure installation.
V. Secure the inverter by tightening the side screws using a screwdriver.



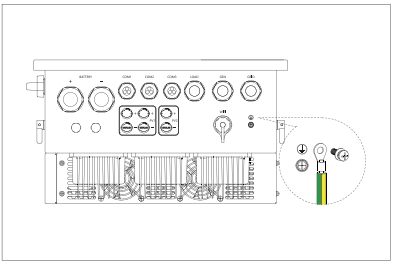
## 3.5 System Wiring

Before wiring the system, use an L-shaped hex (spline) wrench to remove the port protective cover.



### 3.5.1 Ground Connection (Mandatory)

Connect one end of the grounding cable to the grounding terminal on the hybrid inverter's casing and secure it using an M5 screw. Tighten the screw to a torque of 3N·m to ensure a reliable connection and good electrical conductivity.
Connect the other end of the cable to the grid's grounding point, ensuring compliance with electrical safety standards and connection stability. This guarantees the integrity and effectiveness of the grounding for the entire electrical system.



To ensure the safety and effectiveness of system grounding, it is essential to use properly rated cables. To minimize potential risks, please refer to the recommended cable specifications below.

Ground Connection (Copper wires)

| Model | Wire Size | Cable(mm²) | Torque value(max) |
|---|---|---|---|
| DHN-LVEH3P8/10K-G1 | 12AWG | 4mm² | 3N·m |
| DHN-LVEH3P12K-G1 | 10AWG | 6mm² | 3N·m |

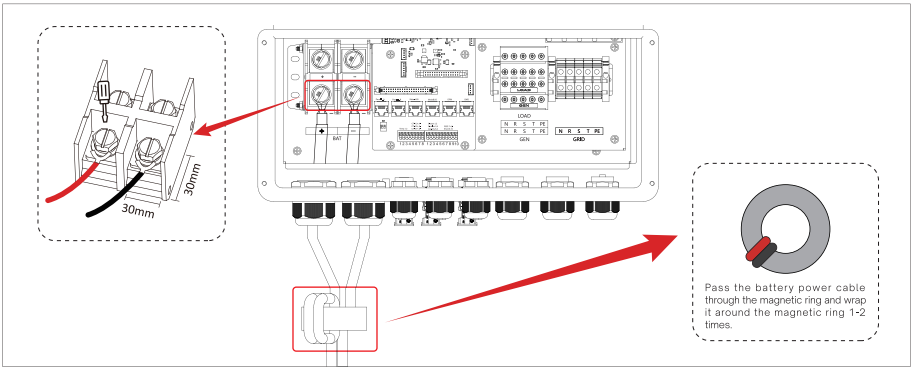
Note: The inverter is equipped with a built-in leakage current detection circuit. A Type A RCD can be connected to the inverter for protection in accordance with local laws and regulations. If an external leakage current protection device is used, its operating current must be 300 mA or higher; otherwise, the inverter may not function properly.

### 3.5.2 Battery Connection

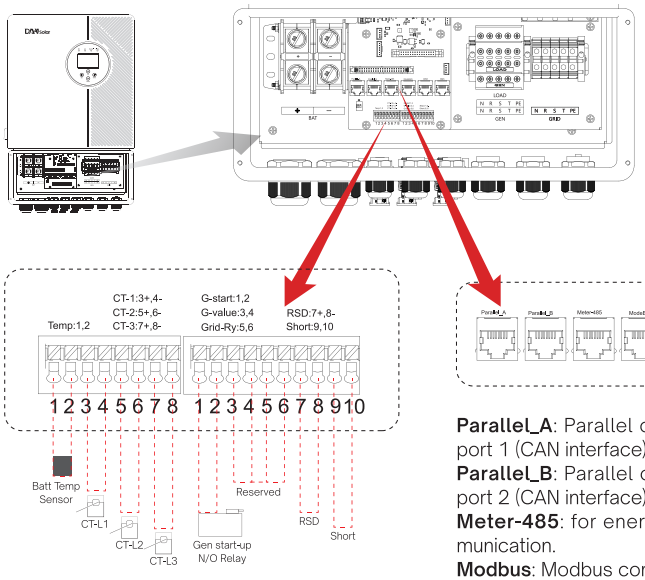
For safe operation and compliance, a separate DC over-current protector or disconnect device is required between the battery and the inverter.In some applications, switching devices may not be required but over-current protectors are still required.
Recommended DC circuit breaker specifications: 250A for 8kW, and 300A for both 10kW and 12kW.
Recommended cable sizes are as follows:

| Model | Wire Size | Cable(mm²) | Torque value(max) |
|---|---|---|---|
| DHN-LVEH3P8K-G1 | 2AWG | 35mm² | 24.5N·m |
| DHN-LVEH3P10K-G1 | 0AWG | 50mm² | 24.5N·m |
| DHN-LVEH3P12K-G1 | 2/0AWG | 70mm² | 24.5N·m |

Follow these steps to properly connect the battery:
I. Loosen the cable fixing heads corresponding to the battery interface on the hybrid inverter and the BMS communication port. Pierce the black sealing rubber at the end of the compression ring on the cable fixing head.
II. Select the appropriate battery-to-inverter connection cable and pass it through the corresponding cable fixing heads for both the battery interface and the inverter.
III. Using a suitable screwdriver, loosen the bolts, connect the cables, and then tighten the bolts securely. Ensure the bolts are tightened clockwise with a torque of 24.5 N·m.
IV. Double-check that the polarity connections at both the battery and inverter ends are correct.
V. After passing the communication cable through the cable fixing head for the BMS communication port, connect the RJ45 connector to the BMS port on the hybrid inverter.
VI. Attach a magnetic ring to the battery-to-inverter connection cable, as shown in the diagram below.
VII. Finally, tighten the cable fixing head to secure the connection.

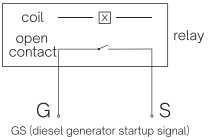


### 3.5.3 Function port definition




**TEMP 1,2**: Battery temperature sensor for lead acid battery.
**CT-1 3+,4-**:Current transformer (CT1) clamps on L1 when in three phase system.
**CT-2 5+,6-**:Current transformer (CT1) clamps on L2 when in three phase system.
**CT-3 7+,8-**:Current transformer (CT1) clamps on L3 when in three phase system.

**G-start 1,2**: Start the dry node of the generator.
When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).

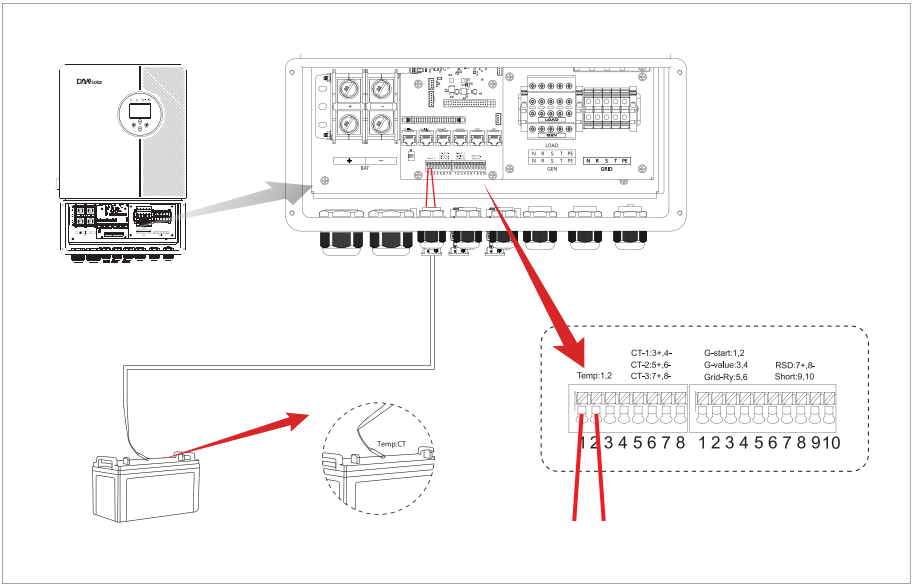



**G-valve 3,4**: Reserved.
**Grid_Ry 5,6**: Reserved.
**RSD 7+,8-**: Output 12V voltage externally. When the key switch is in the OFF position, the 12V power is immediately cut off.
**Short 9,10**: Factory short, can also be used as an external remote switch interface.

**Parallel_A**: Parallel communication port 1 (CAN interface).
**Parallel_B**: Parallel communication port 2 (CAN interface).
**Meter-485**: for energy meter communication.
**Modbus**: Modbus communication.
**DRM**: It is used to accept the external input signal(Digital input).
**BMS**: BMS port for battery communication.

### 3.5.4 Temperature Sensor Connection for Lead-Acid Battery

Ⅰ. Loosen the cable fixing head corresponding to the lower part of the functional port on the hybrid inverter. Carefully pierce the black sealing rubber at the end of the compression ring of the cable fixing head.
Ⅱ. Pass the NTC wire through the cable fixing head and connect it to the Temp1/2 terminals on the functional port of the hybrid inverter.
Ⅲ. Finally, tighten the cable fixing head securely to ensure a stable connection.




### 3.5.5 Grid Connection and Load Connection

Before connecting the inverter to the grid, it is essential to install a separate AC breaker between the inverter and the grid, as well as between the inverter and the backup load. This ensures the inverter can be safely disconnected during maintenance and offers full protection from overcurrent.
Recommended AC Breaker Specifications:
For the Load Port:
• 63A for 8kW • 63A for 10kW • 63A for 12kW
For the Grid Port:
• 63A for 8kW • 63A for 10kW • 63A for 12kW

Note:
1. Terminal Blocks: There are three terminal blocks labeled "Grid," "Load," and "GEN." Ensure that input and output connectors are correctly connected to avoid miswiring.
2. Breaker Installation: In the final installation, a breaker certified according to IEC 60947-1 and IEC 60947-2 must be installed with the equipment for safety compliance.
3. Qualified Personnel: All wiring must be performed by qualified personnel. For system safety and optimal performance, it is crucial to use the correct cable for the AC input connection. To minimize the risk of injury, always use the recommended cable as outlined below.

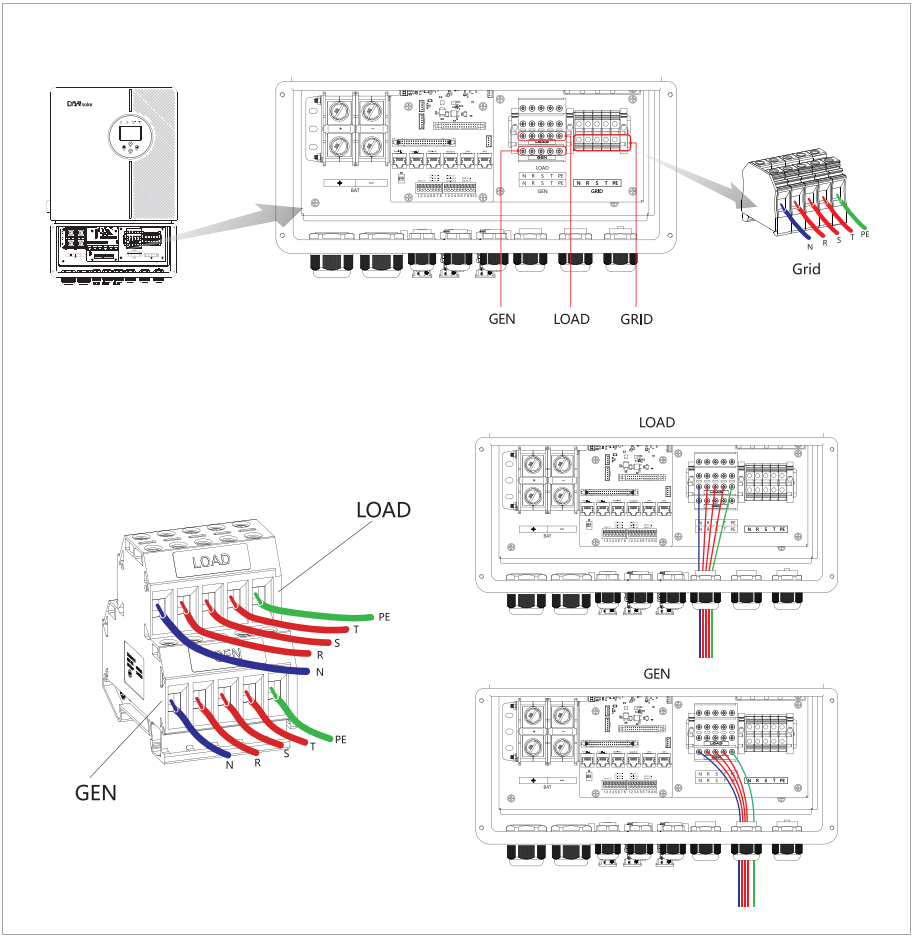
**Grid Connection and Backup Load Connection (Copper wires)**

| Model | Wire Size | Cable($mm^2$) | Torque value(max) |
|---|---|---|---|
| DHN-LVEH3P8/10K-G1 | 10AWG | $6mm^2$ | 2.0N·m(Load)/1.6N·m(Grid) |
| DHN-LVEH3P12K-G1 | 8AWG | $10mm^2$ | 2.0N·m(Load)/1.6N·m(Grid) |

Note： This wire gauge is suitable for operation at the rated power. If the power exceeds the rated value, the inverter's overload protection will be triggered in pure off-grid mode.

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

1. Power Off First:
• Before beginning any connections, ensure that the AC breaker or disconnector is turned off to guarantee safety during installation.
2. Prepare Cable Fixing Heads:
• Loosen the cable fixing heads located at the lower sections of the Grid, Load, and Gen ports.
• Carefully pierce the black sealing rubber at the end of each compression ring on the cable fixing heads.
3. Strip and Insert Cables:
• Strip approximately 10 mm of insulation from each cable.
• Feed the stripped cable through the corresponding cable fixing head.
• Loosen the terminal bolts and insert the cable fully into the terminal, matching the marked polarity (+/-).
• Tighten the terminal screws securely to ensure a safe and stable connection.



4. Then, connect the AC output terminals to the corresponding interfaces in the power distribution cabinet, and tighten the terminals. Make sure to also connect the corresponding neutral wire and ground wire to the relevant terminals. (Before making the wiring connections, ensure that the AC power supply has been disconnected.)
5. Tighten the cable fixing head.

Note: Appliances such as air conditioners require at least 2–3 minutes before restarting, to allow sufficient time for the refrigerant gas to stabilize within the system. If a power outage occurs and power is restored too quickly, it can damage connected appliances.
To prevent this, check with the air conditioner manufacturer to confirm whether the unit includes a built-in time-delay function before installation. If not, the inverter may trigger an overload fault and shut off the output to protect the appliance—but internal damage to the air conditioner may still occur.

### 3.5.6 PV Connection

Before connecting the inverter to the PV modules, install a dedicated DC circuit breaker between them. This step is crucial to ensure system safety and optimal performance.
Furthermore, it is essential to use appropriate cables for the PV module connections. To reduce the risk of injury and prevent system malfunctions, always use the recommended cable size specified below.

| Model | Wire Size | Cable($mm^2$) |
|---|---|---|
| DHN-LVEH3P8/10/12K-G1 | 12AWG | $4mm^2$ |

Note: To prevent malfunctions, do not connect any PV modules that may have current leakage to the inverter. For example, grounded PV modules can cause leakage current and damage the inverter. When connecting PV modules, ensure that the PV+ and PV- terminals of the solar panel are not connected to the system ground bar.

#### 3.5.6.1 PV Module Selection

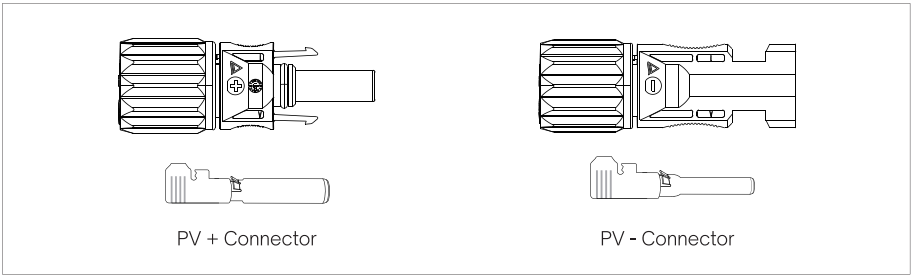
When selecting appropriate PV modules, please consider the following parameters:
• The open-circuit voltage (Voc) of the PV modules must not exceed the inverter's maximum PV array open-circuit voltage (800V).
• The open-circuit voltage (Voc) should be higher than the inverter's minimum start-up voltage (150V).
• The PV modules connected to this inverter must be Class A certified in accordance with IEC 61730 standards.

| | DHN-LVEH3P8K-G1 | DHN-LVEH3P10K-G1 | DHN-LVEH3P12K-G1 |
|---|---|---|---|
| PV Input Voltage | 550V (150V-800V) | | |
| PV Array MPPT Voltage Range | 200V-650V | | |
| No. of MPP Trackers | 2 | | |
| No. of Strings per MPP Tracker | 1+1 | 2+1 | 2+1 |

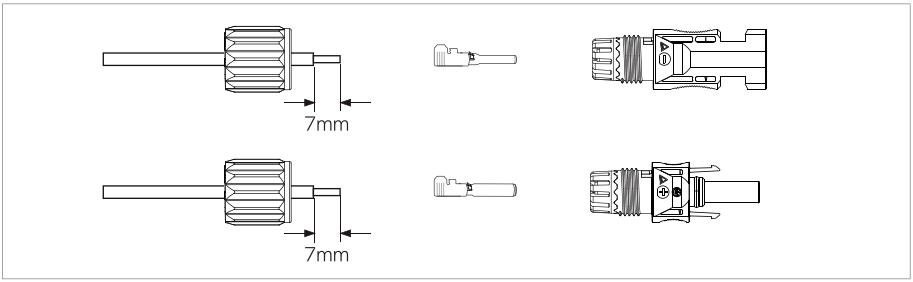
#### 3.5.6.2 PV Module Wire Connection

• Turn OFF the Grid Supply Main Switch (AC).
• Turn OFF the DC Isolator.
• Connect the PV input connector to the inverter.

Note:
1. When connecting the PV modules, ensure that PV+ and PV- are not connected to the system grounding busbar.
2. Before connecting the inverter, measure the open-circuit voltage (Voc) of the PV modules and confirm that it does not exceed the inverter's maximum allowable input voltage.
3. Before connecting the PV modules, ensure that the polarity of their output voltage is consistent with the markings of the inverter input terminals.
4. Connect the PV+ of the PV module to the PV+ terminal of the inverter.
5. Connect the PV- of the PV module to the PV- terminal of the inverter.
6. Please use certified DC cables for the PV system.

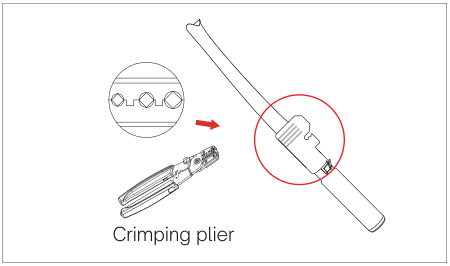



The steps to assemble the DC connectors are listed as follows:
a) Strip off the DC wire about 7mm, disassemble the connector cap nut.

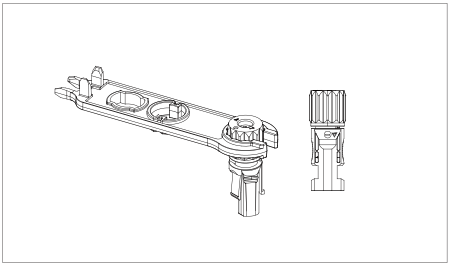



(a)

b) Crimping metal terminals with crimping pliers.
c) Insert the contact pin into the upper part of the connector, then securely tighten the cap nut onto the connector.

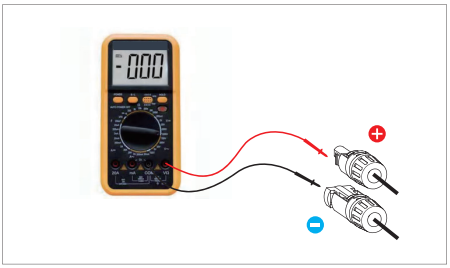



(b)

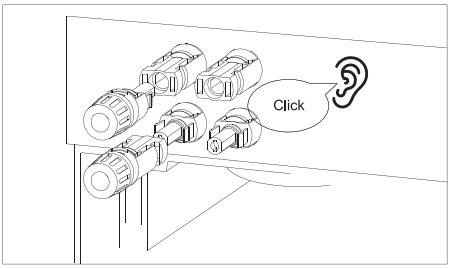


(c)

d) Use a multimeter to verify that the positive and negative terminals are not reversed and that the voltage is within the inverter's specified operating range.
e) Finally, insert the DC connector into the positive and negative input of the inverter.



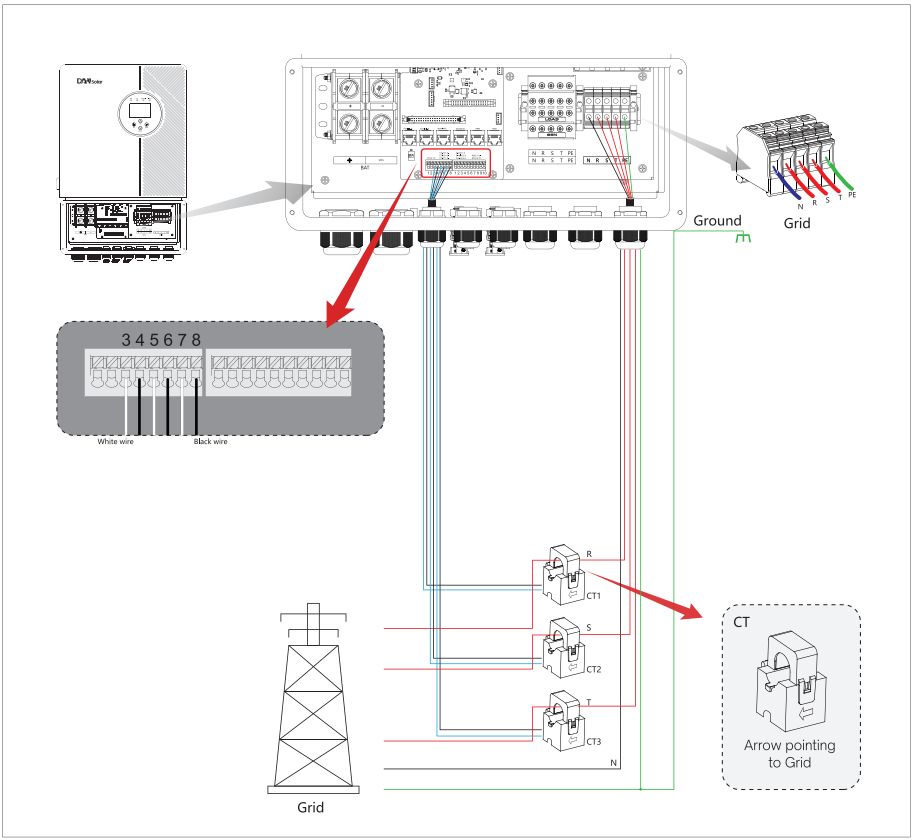
(d)




(e)

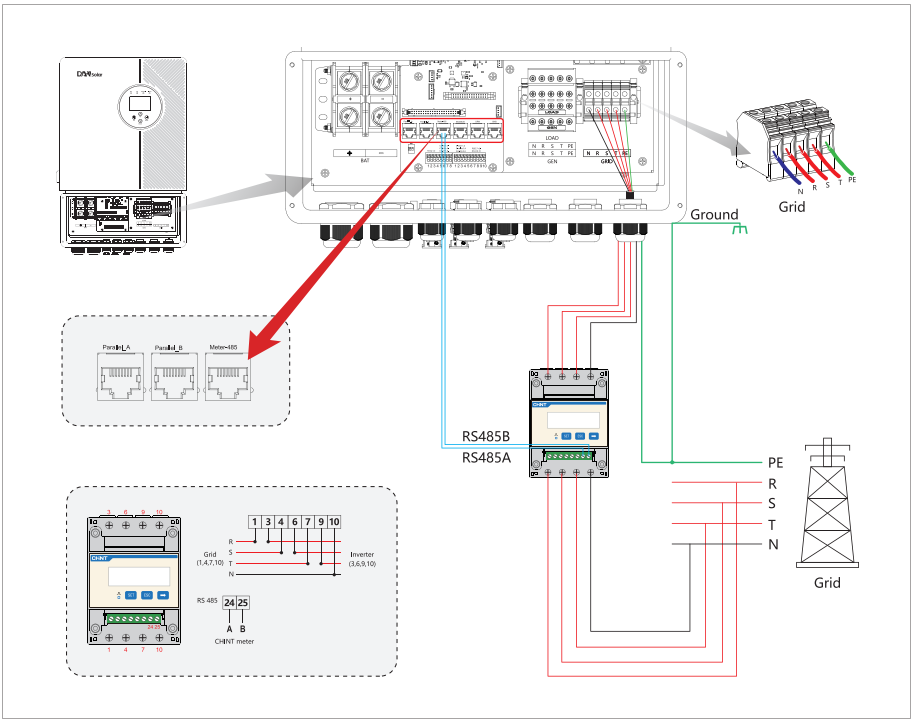
Note:
1. Warning: When exposed to sunlight, solar panels generate high voltage, especially when connected in series, which can pose a serious risk of electric shock or life-threatening injury. Before connecting the DC input cables, ensure that the solar panels are covered with opaque material and the DC switch is turned OFF. Failure to do so may expose the inverter to high voltage and create hazardous conditions.
2. Important: Only use the dedicated DC power connectors provided with the inverter. Do not interconnect connectors from different manufacturers.

### 3.5.6.3 CT Connection




Note:
1. Ensure that the arrow on the CT (Current Transformer) points toward the grid.
2. If the load power reading on the LCD screen appears abnormal, first check whether the CT is installed in the correct direction.

### 3.5.6.4 Meter Connection

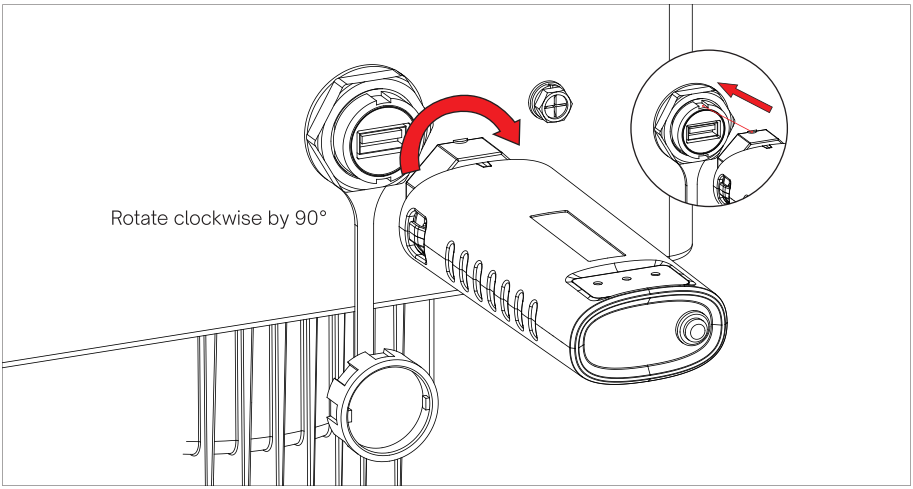



### 3.5.6.5 WIFI Connection

WIFI capture stick and inverter are fixed via USB, please refer to the following installation steps:

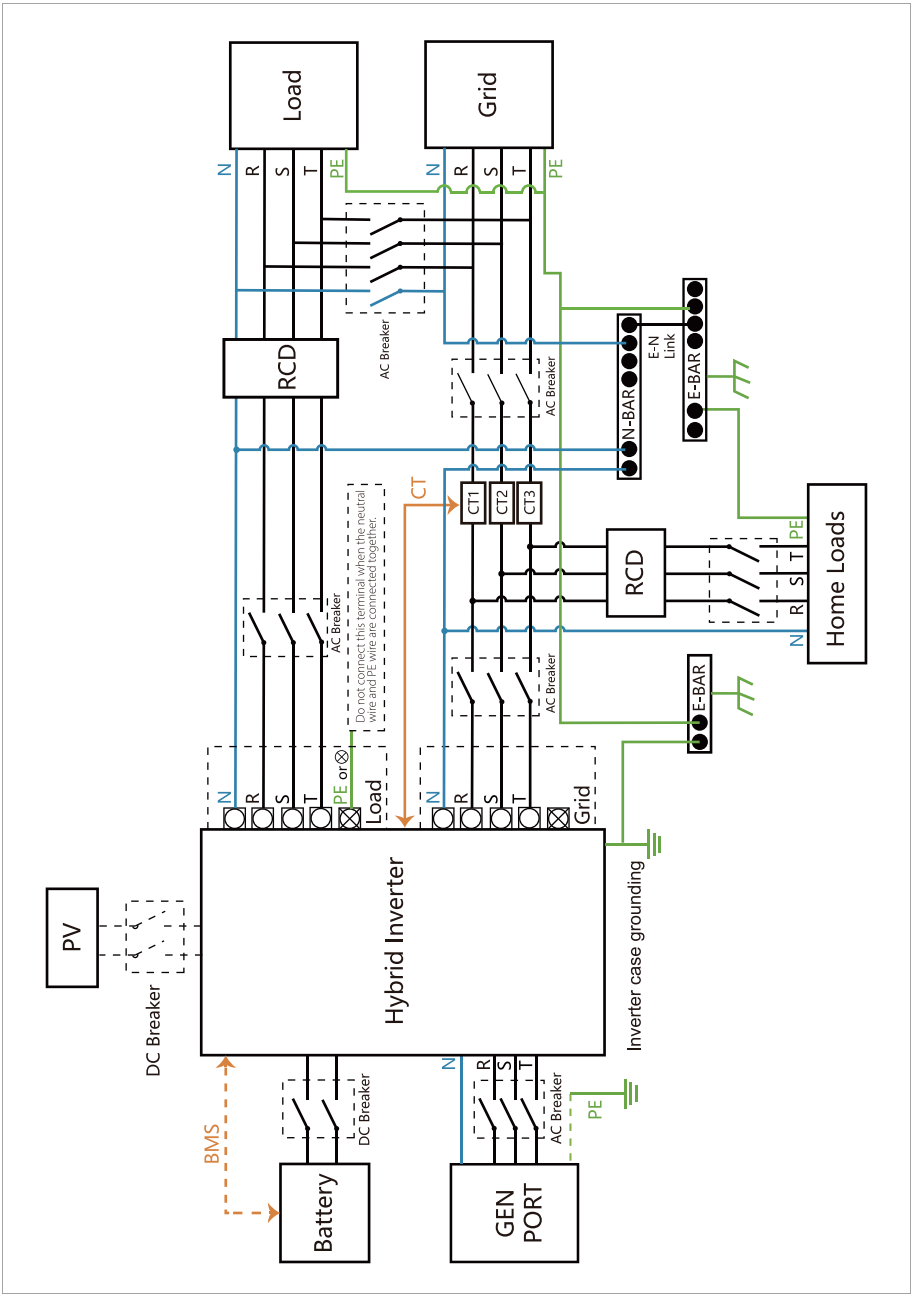
1. Insert the data acquisition stick along the connector guide slot.
2. Tighten the fastening cap clockwise.

Refer to the figure below.



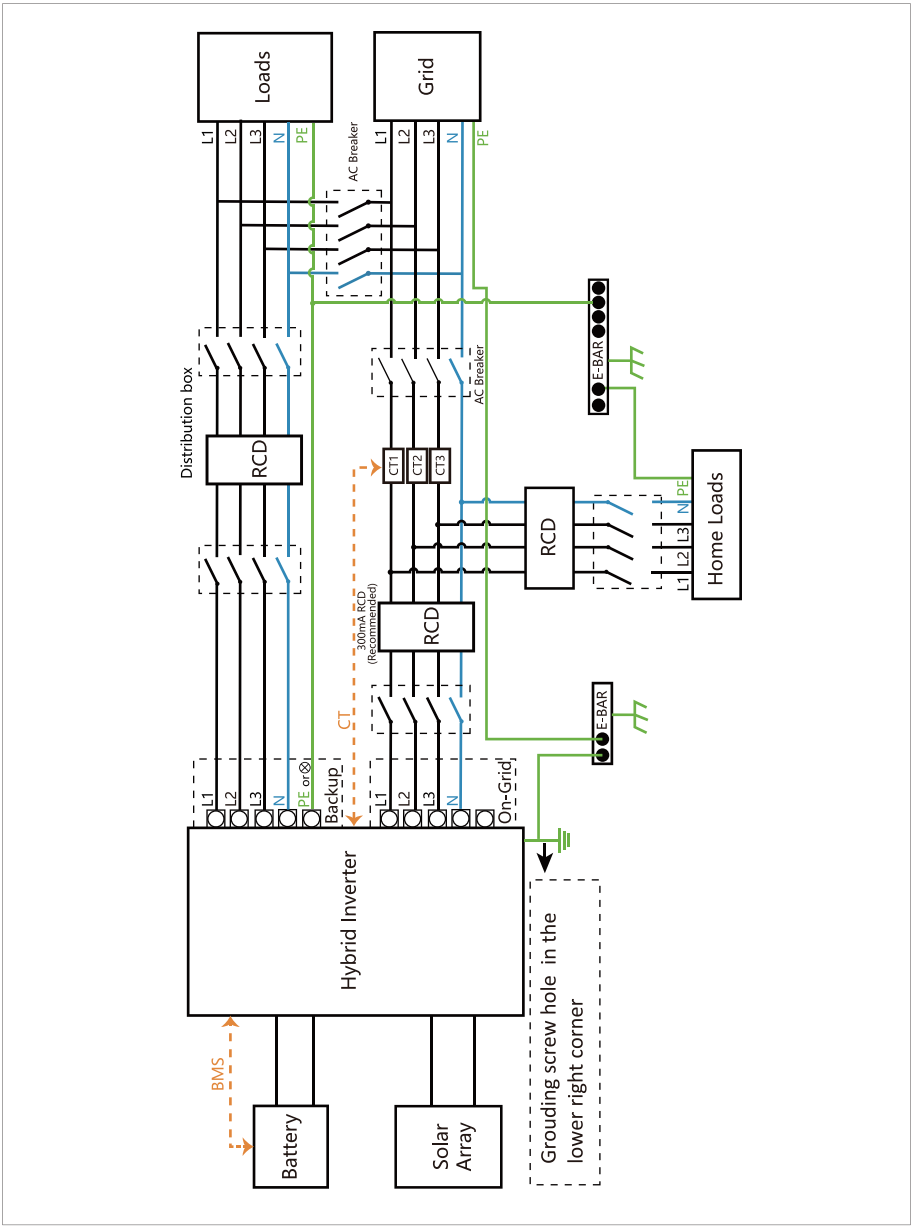
### 3.5.6.6 Wiring System for Inverter

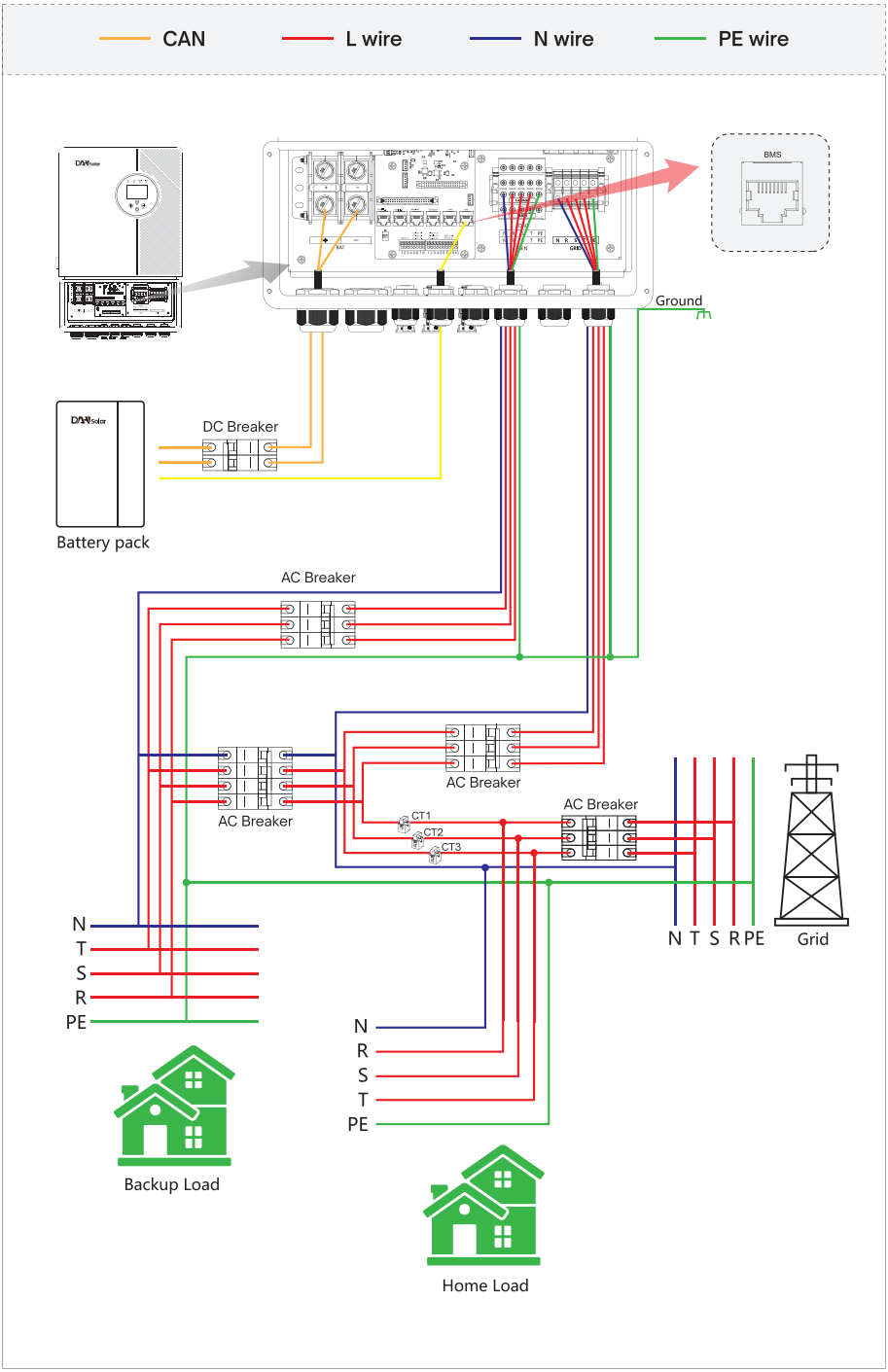
The following figure illustrates a scenario where the Neutral wire (N) is connected to the Protective Earth (PE) within the distribution box.
For countries such as Australia and New Zealand, please ensure that all wiring complies with local electrical codes and regulations!



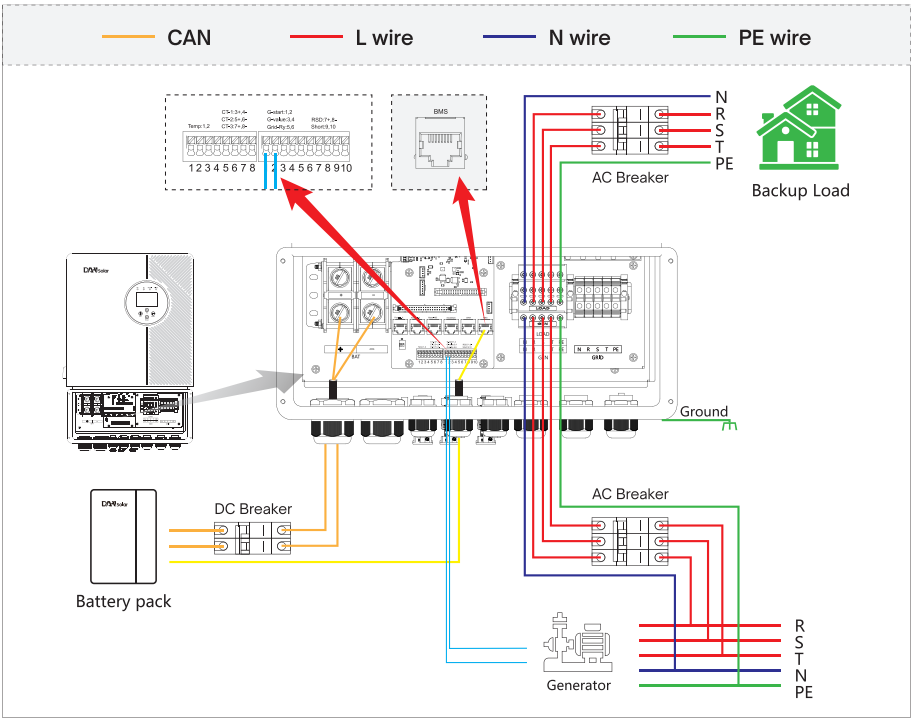
The following figure demonstrates the proper separation of the neutral wire (N) from the protective earth wire (PE) in the distribution box.
For countries such as China, Germany, the Czech Republic, and Italy, please ensure compliance with local electrical wiring regulations.

Note:
The backup function is optional in the German market. If the inverter does not include the backup function, leave the backup side unconnected.

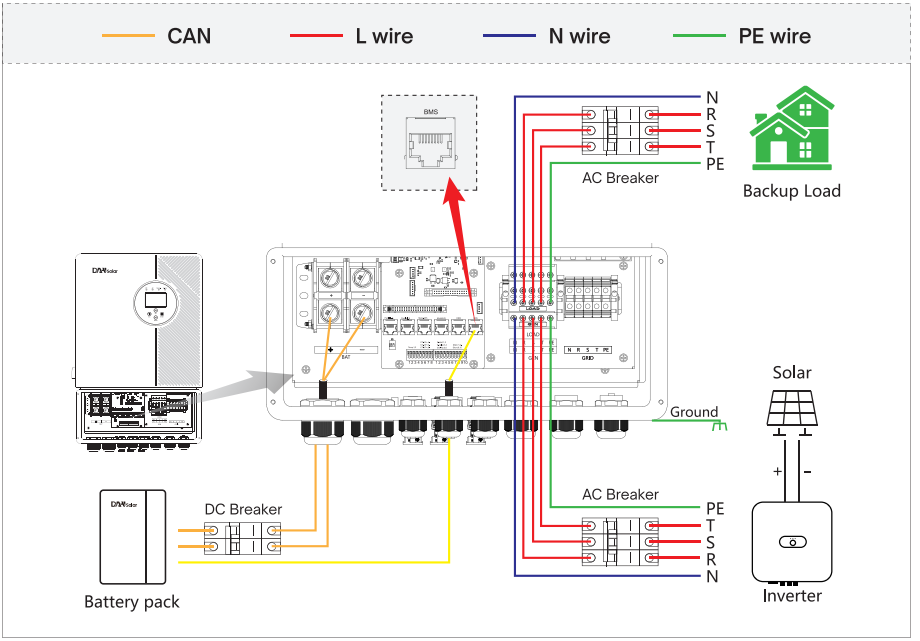



CAN
L wire
N wire
PE wire
BMS
Ground
DC Breaker
Battery pack
AC Breaker
AC Breaker
AC Breaker
AC Breaker
CT1
CT2
CT3
N
T
S
R
PE
N T S R PE
Grid
N
R
S
T
PE
Backup Load
Home Load

Typical Application Diagram of Diesel Generator:

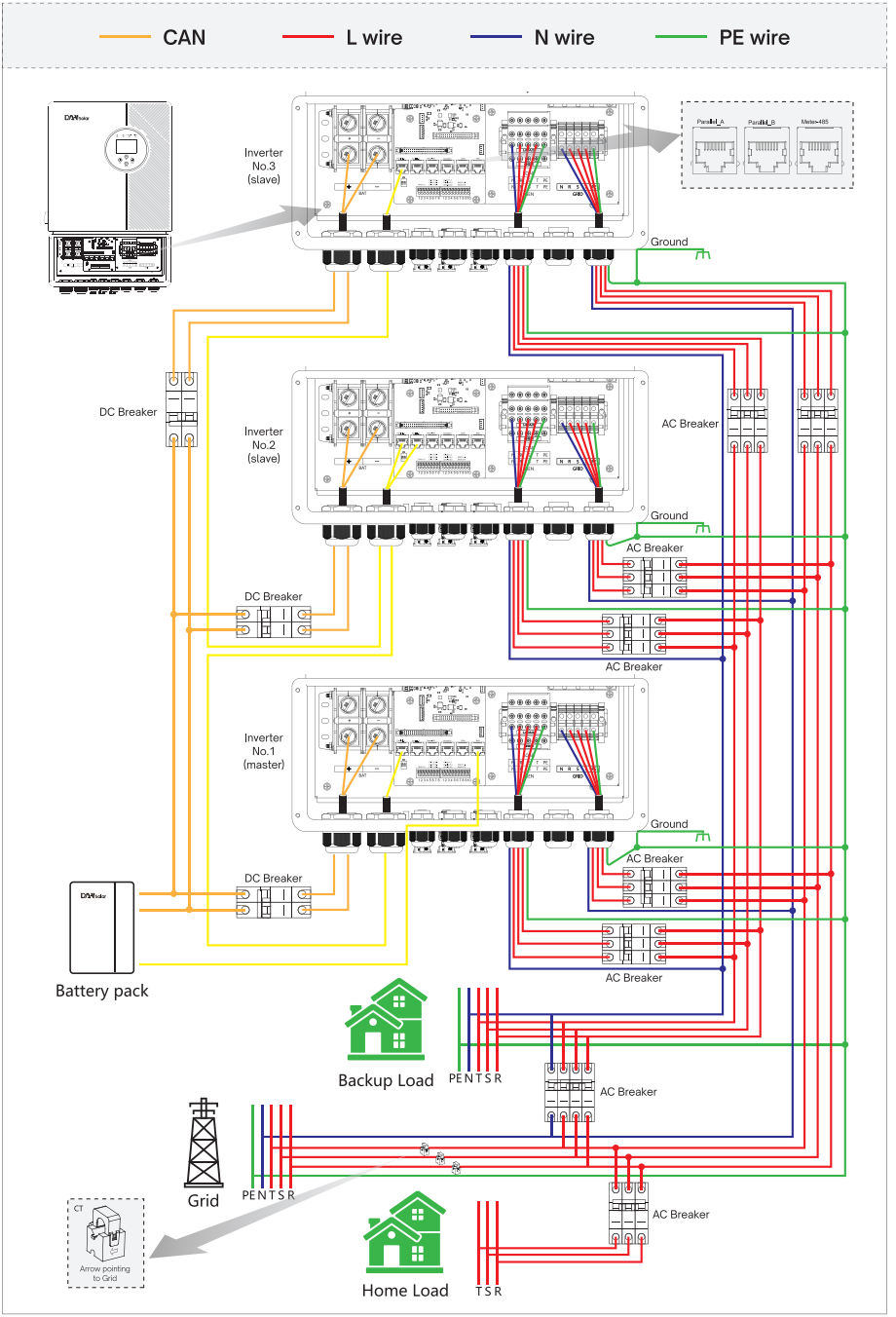



Typical Application Diagram of AC Coupling:



**Three phase parallel connection diagram**:

It can support a maximum of 10 units to operate in parallel (both grid-connected and off-grid modes are available).



## 3.6 System Operation

### 3.6.1 Power On / Power Off

With the device properly installed and the battery securely connected, you can power on the system by pressing the ON/OFF button located on the left side of the chassis.
Note: When the input from any source—such as the PV, battery, generator, or grid—is within the allowable range, the LCD screen will light up and display the "OFF" state, even if the ON/OFF button has not been pressed. However, the system will only enter normal operation mode once the ON/OFF button is pressed.

### 3.6.2 Operation and Display Panel

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

**Indicator light status**

| Indicator light status | | Description |
|---|---|---|
| DC | Green LED stays on | PV connection normal |
| AC | Green LED stays on | Grid connection normal |
| Normal | Green LED stays on | Inverter operating normally |
| Alarm | Red LED stays on | Fault or Warning |

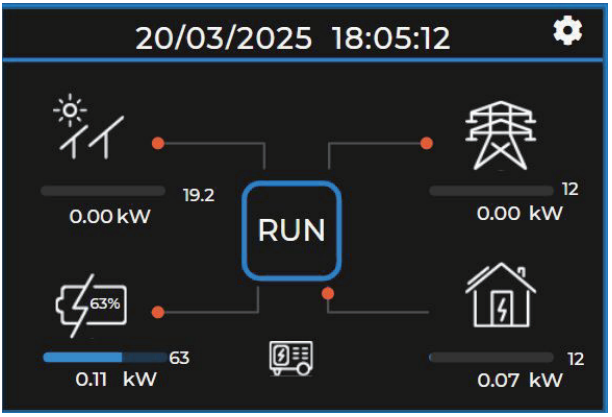
**Function Buttons**

| Function Buttons | Description |
|---|---|
| Esc | Back to last option |
| Up | Increase the input value and Table page break |
| Down | Decrease the input value and Table page break |
| Enter | Proceed to next selection |

### 3.6.3 LCD Display

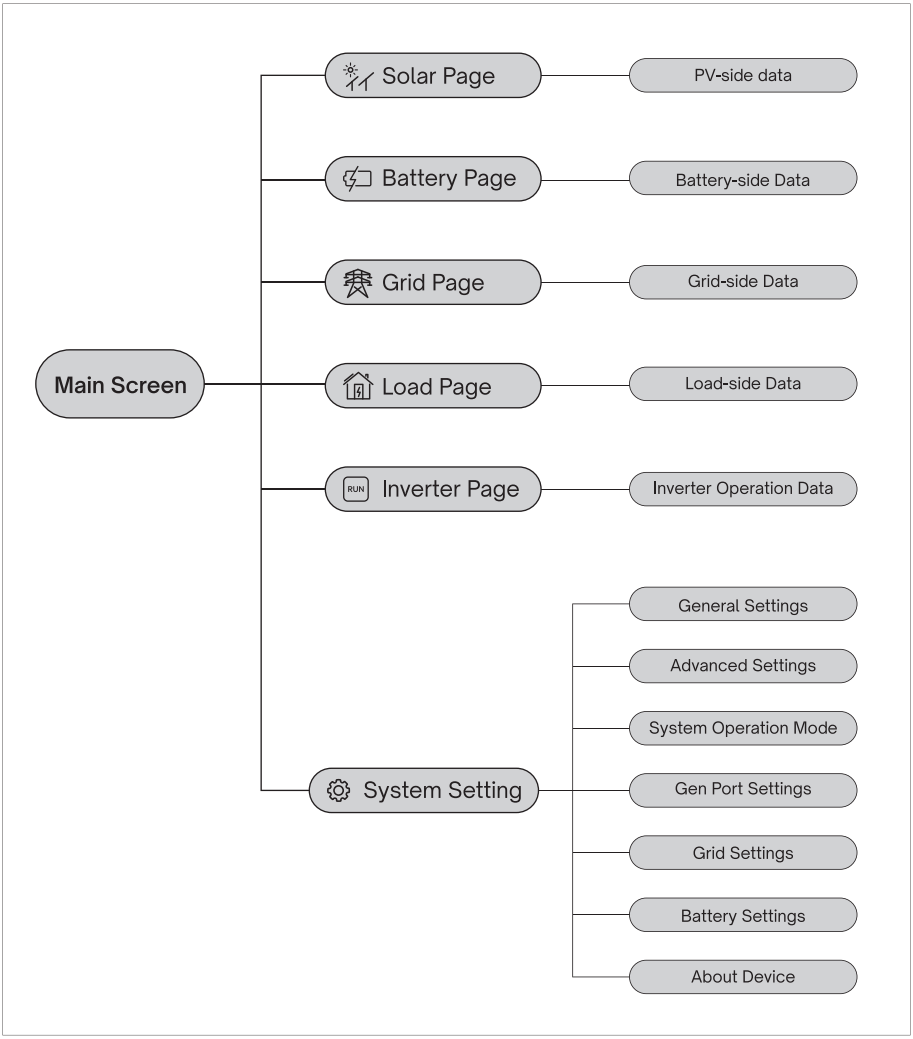
#### 3.6.3.1 Main Screen

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



1. System status icon: The icon in the centre of the main screen displays 'RUN' to indicate that the system is operating normally. If the icon changes to 'ERROR', it indicates a communication error or other problem, and the specific error message will be displayed in the form of E001~E192.
2. Time Display: The current time is shown at the top of the screen.
3. System Setup Icon: Press this icon to access the System Setup screen, where you can configure settings such as Basic Setup, Battery Setup, Grid Setup, System Work Mode, Generator Port Settings, Advanced Functions, and Li-Batt Info.
4. Main Screen Information: The main screen displays key information, including data for Solar, Grid, Load, and Battery. It also shows the energy flow direction using arrows:
• PV power and Load power are always displayed as positive.
• Grid power: A negative value indicates energy sold to the grid, while a positive value indicates energy drawn from the grid.
• Battery power: A negative value indicates charging, while a positive value indicates discharging.

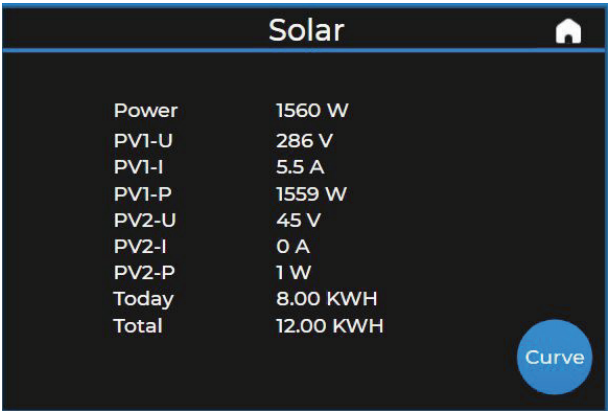
### 3.6.3.2 LCD Operation Flow Chart



### 3.6.3.3 Operation Steps

**Solar Icon Operation Procedure**

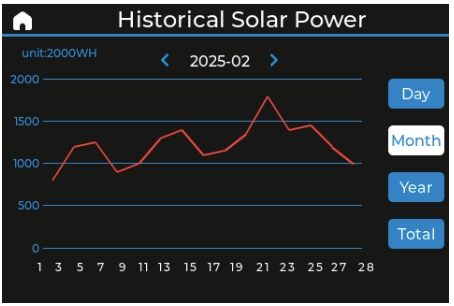
Click the PV icon on the main page to access the PV-side data interface.




On the interface, you can view the following information:

| Name | Instructions |
|---|---|
| Power | The current total output power on the PV side |
| PV1-U | The current PV voltage of the first channel MPPT |
| PV1-I | The current PV current of the first channel MPPT |
| PV1-P | The current PV output power of the first channel MPPT |
| PV2-U | The current PV voltage of the Second channel MPPT |
| PV2-I | The current PV current of the Second channel MPPT |
| PV2-P | The current PV output power of the Second channel MPPT |
| Today | Today's energy yield from the solar panels |
| Total | total energy generation from the solar panels |

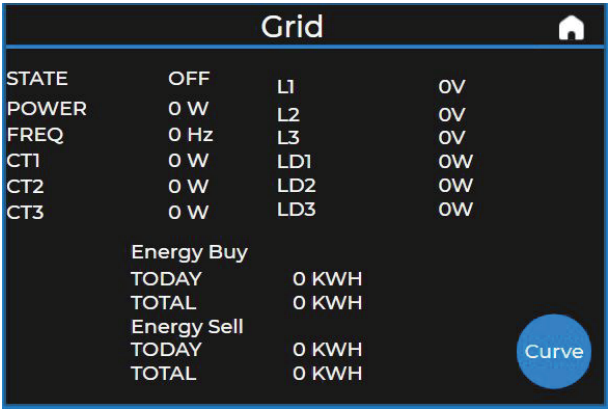
You can enter the power curve interface by clicking the "Curve" button in the bottom - right corner.




On the interface, you can view the historical power generation on the PV side on a daily, monthly, or yearly basis.

**Grid Icon Operation Procedure**

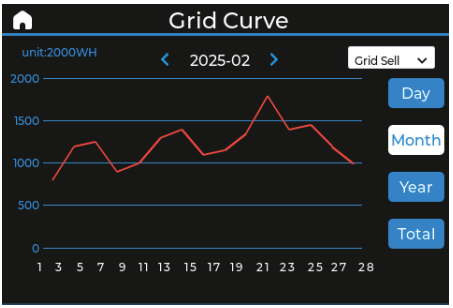
Click the Grid icon on the main page to access the Grid-side data interface.




On the interface, you can view the following information:

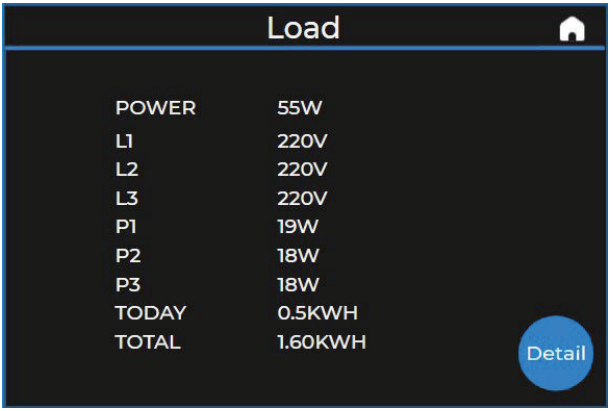
| Name | Instructions |
|---|---|
| Power | The current total output power on the Grid side |
| Freq | The current grid frequency |
| CT1/2/3 | The current power detected by the external current sensor (CT1/2/3) |
| L1/2/3 | The current voltage of each phase of the Grid (L1, L2, L3) |
| LD1/2/3 | The current power of the Grid input/output circuit breaker detected by the internal sensor (LD1/2/3) |
| Energy Buy | Today/Total energy input from the Grid to the inverter (i.e., the electricity purchased from the Grid) |
| Energy Sell | Today/Total energy output from the inverter to the Grid (i.e., the electricity sold to the Grid) |

Click the "Curve" button in the bottom-right corner to enter the power curve interface.




On the interface, you can view the historical power generation on the Grid side on a daily, monthly, or yearly basis.

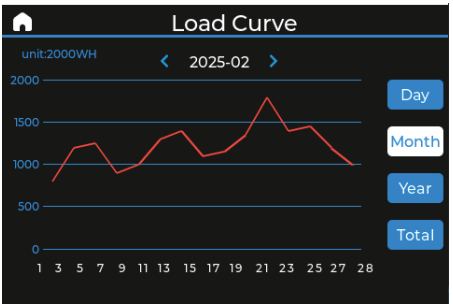
Load Icon Operation Procedure




Click the Load icon on the main page to enter the operation data interface of the Load side. You can view the following information:

| Name | Instructions |
|---|---|
| Power | The current total power of the Load |
| L1/2/3 | The current voltage on the load side of each phase |
| P1/2/3 | The current power on the load side of each phase |
| Today | The daily electricity consumption of the Load |
| Total | The total electricity consumption of the Load |

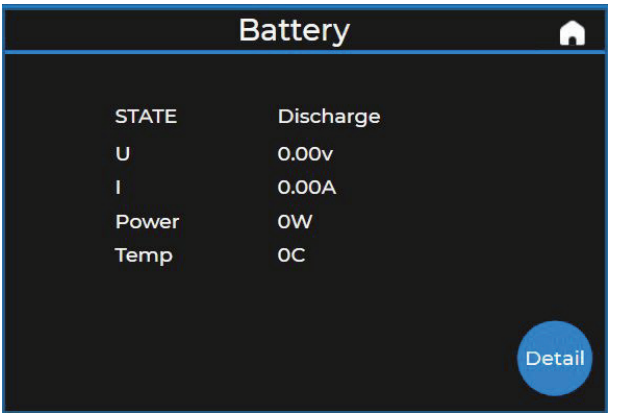
Click the "detail" button to enter the power curve page.




On the interface, you can view the electricity consumption of the Load on a daily, monthly or yearly basis.

**Battery Icon Operation Procedure**

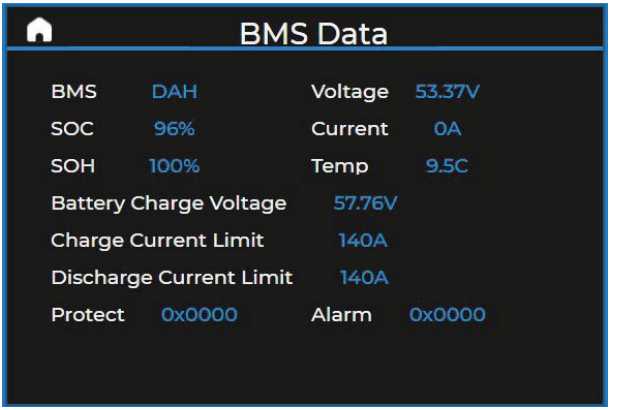
Click the battery icon on the main page to enter the battery data interface.




On the interface, you can view the following information:

| Name | Instructions |
|---|---|
| State | The current status of the battery |
| U | The current voltage of the battery |
| I | The present current of the battery(Charge or Discharge) |
| Power | The current Power of the battery |
| Temp | The current temperature of the battery |
| SOC | The current remaining battery capacity |

If you are using a lithium battery, Click the "detail" button will take you to the BMS page.

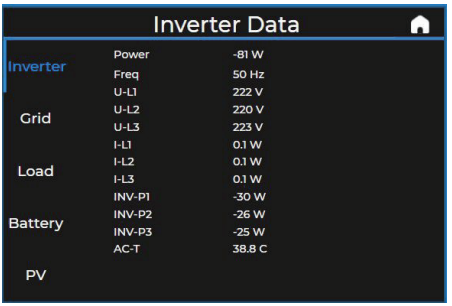


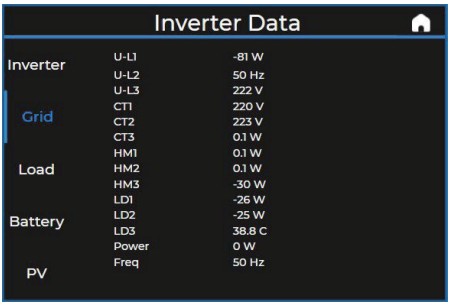

On the interface, you can view the following information:

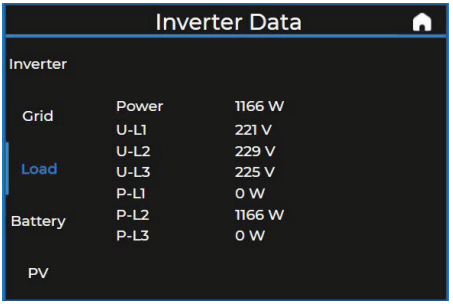
| Name | Instructions |
|---|---|
| BMS | BMS model |
| Voltage | The current voltage of the battery |
| SOC | The current remaining battery capacity |
| Current | The present current of the battery(Charge or Discharge) |
| SOH | The current health status of the battery |
| Temp | The current temperature of the battery |
| Battery Charge Voltage | Recommend charging voltage |
| Charge Current Limit | Maximum charging current |
| Discharge Current Limit | Maximum discharging current |
| Protect | The current protection status of BMS |
| Alarm | The current alarm status of BMS |

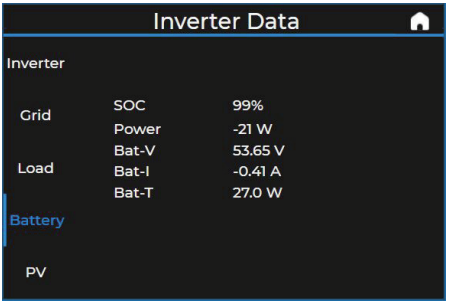
**Inverter Operating Status Icon Operation Procedure**

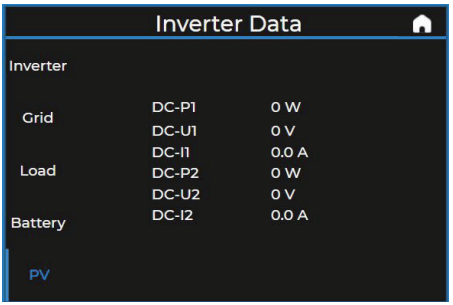
Click the "Operating Status" icon on the main page to enter the interface of the system's real-time operating status.



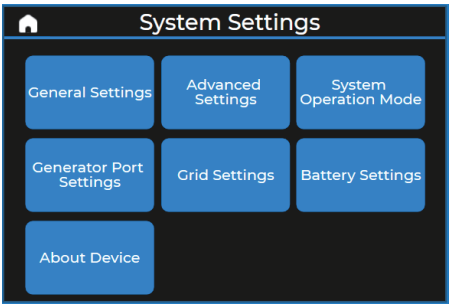




On the interface, you can view the following information:
a. Real-time operating data of the inverter
b. Real-time information on the Grid side
c. Real-time information on the Load side
d. Real-time information on the battery side
e. Real-time information on the PV side

**System Setting Icon Operation Procedure**

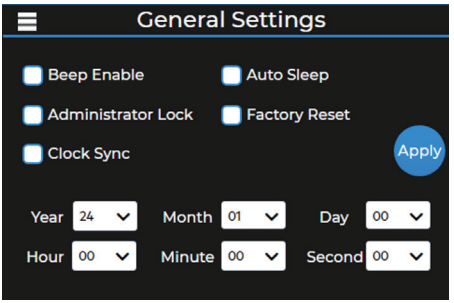
1. Click the settings icon on the main page to enter the system settings interface.




On the interface, you can make the following settings:

A. General Settings
B. Advanced Settings
C. System Operation Mode
D. Gen Port Settings
E. Grid Settings
F. Battery Settings
G. About Device

A.Click the "General Settings" button to enter the basic settings interface.

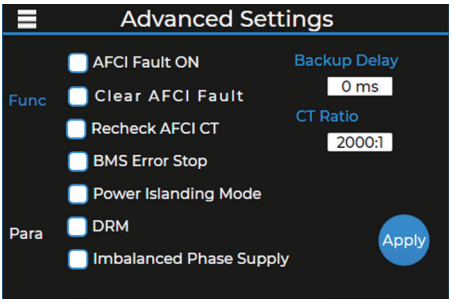


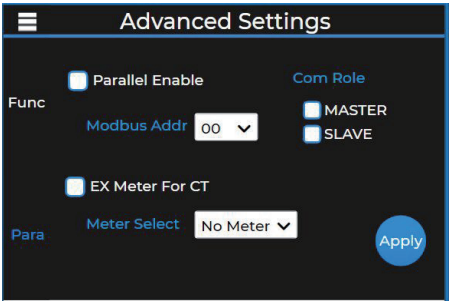

On the interface, you can make the following General Settings for the inverter by checking the checkboxes:

| Setting Items | Instructions |
|---|---|
| Beep Enable | Enable the buzzer prompt sound (After it is turned on, there will be an alarm prompt sound when the inverter malfunctions.) |
| Auto Sleep | The LCD screen will automatically go into sleep mode if there is no operation within 30 seconds after it is turned on. |
| Administrator Lock | Enable this menu for seting 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 seting.The password is 861291. |
| Factory Reset | Reset all parameters of the inverter.you need to type in a password to enable the seting.The password is 861291. |
| Clock Sync | When it is turned on, it means that it is synchronized with the cloud time. |

Click the "apply" button to save the settings and apply them to the inverter.

B. Click the "Advanced Settings" button to enter the Advanced Settings interface.



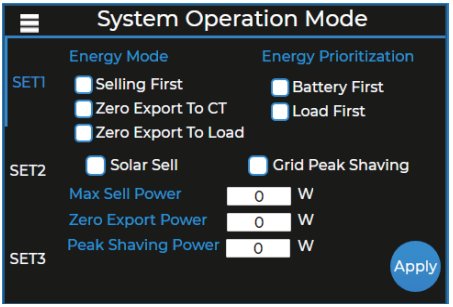



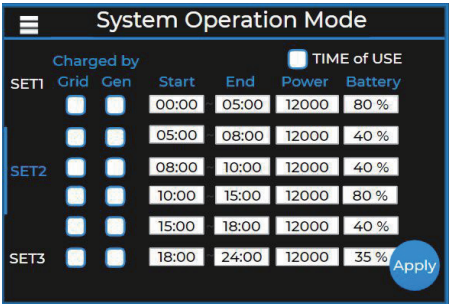

On the interface, you can make the following Advanced Settings for the inverter by checking the checkboxes:

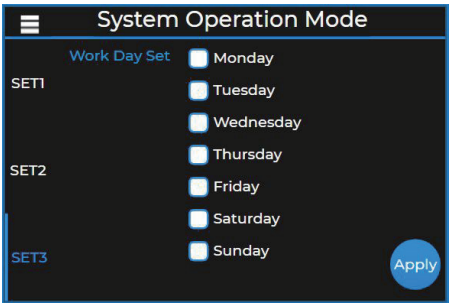
| Setting Items | | Instructions |
|---|---|---|
| Func | AFCI Fault ON | Enable solar arc fault detection. |
| | Clear AFCI Fault | When the number of arc fault records exceeds 5 times, it needs to be manually cleared. |
| | Recheck AFCI CT | If the AFCI self-check fails, manually check it and then conduct the self-check again. |
| | BMS Error Stop | When turned on, the system will stop when a fault occurs in the BMS. |
| | Power Islanding Mode | When turned on, the inverter will be in the off-grid mode, and the relay on the neutral wire (N wire of the Load port) will be switched to the ON state, binding the N wire to the grounding of the inverter. |
| | DRM | Enable the dynamic response mode (in compliance with the AS4777 standard). |
| | Imbalanced Phase Supply | When turned on, the inverter will obtain electrical energy from the phase balance of the Grid as needed. |
| Para | Parallel Enable | It needs to be turned on when multiple inverters are operating in parallel. |
| | Modbus Addr | Communication address and role selection. |
| | EX Meter For CT | The system defaults to CT mode, hiding the meter selection screen. For external meters, deselect the CT option to reveal the meter selection interface, then choose the correct meter model. |
| | Com Role | Communication configuration selection (master or slave). |

Click the "apply" button to save the settings and apply them to the inverter.

C. Click the "System Operation Mode" button to enter the System Operation Mode interface.It is divided into three steps.



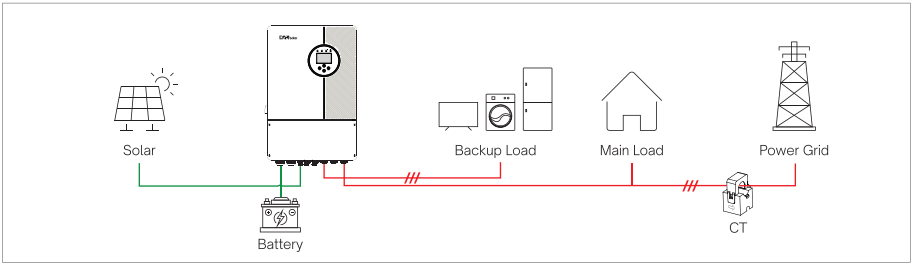



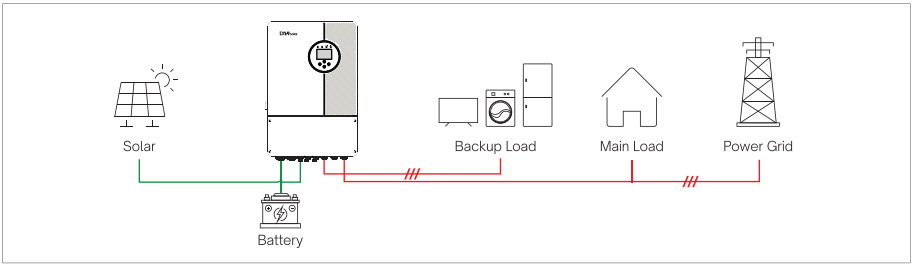

| Setting Items | | | Instructions |
|---|---|---|---|
| SET1 | Energy Mode | Selling First | This Mode allows hybrid inverter to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid. |
| | | Zero Export To CT | Hybrid 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 3.5.6.3 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.Refer to Figure a below. |
| | | 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.Refer to Figure b below. |

| Setting Items | | | Instructions |
|---|---|---|---|
| SET1 | Energy Mode | 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. |
| | Energy Prioritization | Battery 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. |
| | Grid Peak Shaving | | Once enabled, the system will prioritize PV power supply and restrict grid power purchase below the configured limit. |
| | 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. |
| | Peak Shaving Power | | If Grid Peak Shaving is enabled, a fixed value needs to be set. |

Click the "apply" button to save the settings and apply them to the inverter.




Zero Export To CT(Figure a)

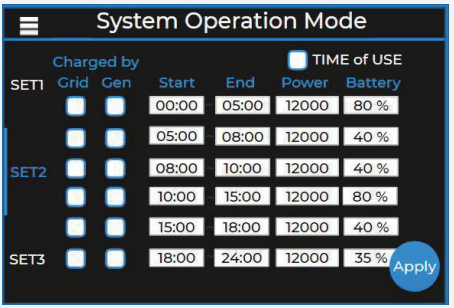



Zero Export To Load(Figure b)

| Setting Items | | Instructions |
|---|---|---|
| SET2 | 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.<br>Note: When the grid is available, the battery will only discharge if the "Time of Use" option is selected. Otherwise, even with a full SOC, the battery will not discharge. However, in off-grid mode (which the inverter automatically switches to when grid power is unavailable), battery discharge primarily responds to real-time load demand, and the "Time of Use" function typically does not take effect.<br>Please refer to the following example for details. |

Click the "apply" button to save the settings and apply them to the inverter.

**For example:**

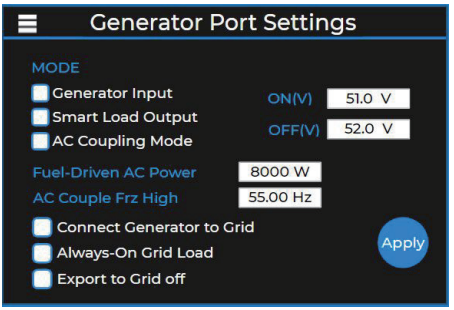



① During 00:00-05:00, if battery SOC is lower than 80%, it will use grid to charge the battery until battery SOC reaches 80%.
② During 05:00-08:00, if battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%. At the same time, if battery SOC is lower than 40%, then grid will charge the battery SOC to 40%.

| Setting Items | | Instructions |
|---|---|---|
| SET3 | Work Day Set | It allows users to choose which day to execute the setting of “Time of Use”.<br>For example, the inverter will execute the time of use page on Mon/Tue/Wed/Thu/Fri/Sat only. |

Click the "apply" button to save the settings and apply them to the inverter.

D. Click the "Generator Port Settings" button to enter the Generator Port Settings interface

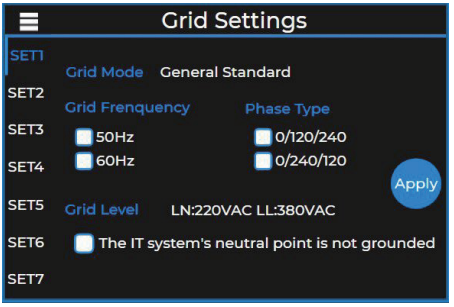



Select the Desired Modes by Checking the Appropriate Checkboxes:

| Setting Items | | Instructions |
|---|---|---|
| Mode | Generator Input | If the Gen input interface is selected to be used as an output terminal, this output terminal will supply power only when the battery charge level is higher than the user-set threshold. |
| | Fuel-Driven AC Power | Maximum allowed power from diesel generator. |
| | Smart Load Output | This mode utilizes the Gen input connection as an output which only receives power when the battery SOC is above a user programmable threshold.<br>e.g. ON: 100%, OFF=95%: When the battery bank SOC reaches 100%, Smart Load Port will switch on automatically and power the load connected. When the battery bank SOC < 95% , the Smart Load Port will switch off automatically. |
| | AC Coupling Mode | Use the Gen input port as the input (AC coupling) for a micro-inverter or a grid-connected inverter. |
| | AC Couple Frz High | In AC Coupling mode,When the battery charge gradually reaches the set value (OFF), the microinverter's output power will decrease linearly during this process.Once the battery charge equals the set value (OFF), the system frequency will adjust to the preset value, at which point the microinverter(s) will cease operation. |
| | Connect Generator to Grid | Connect the diesel generator to the grid input port. |
| | Always-On Grid Load | When click "Always-On Grid Load" the smart load will switch on when the grid is present. |
| | Export to Grid Off | This feature is under development. |

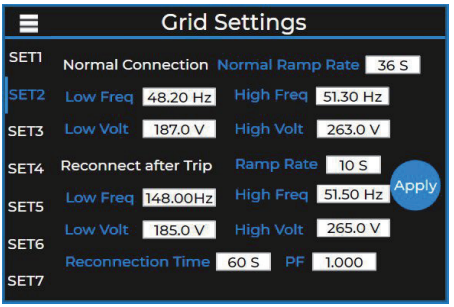
Click the "apply" button to save the settings and apply them to the inverter.

E. Click the "Grid Settings" button to enter the Grid Settings interface. It is divided into seven steps.



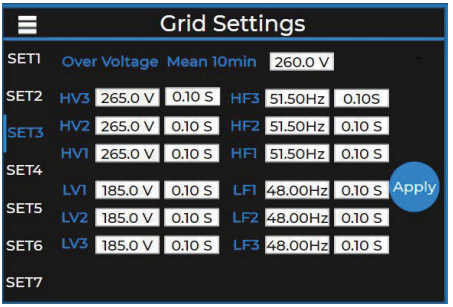

| Setting Items | | Instructions |
|---|---|---|
| SET1 | Grid Mode | General Standard, UL1741 & IEEE1547, CPUC RULE21, SRD-UL-1741, CEI 0-21, Australia A, Australia B, Australia C,EN50549_CZ-PPDS(>16A), NewZealand, VDE4105, OVE-Directive R25. Please follow the local grid code and then choose the corresponding grid standard.<br>After selecting the corresponding standard, the system will usually automatically load the default grid parameters corresponding to that standard. If there are special requirements, custom configuration and adjustment can also be carried out. |
| | Grid Level | there're several voltage levels for the inverter output voltage when it is in off-grid mode.<br>LN:230VAC LL:400VAC,LN:240VAC LL:420VAC,<br>LN:120VAC LL:208VAC*, LN:133VAC LL:230VAC*.<br>*This feature is under development. |
| | IT system-neutral is not grounded | If the grid system is IT system, then please enable this option. |

Click the "apply" button to save the settings and apply them to the inverter.



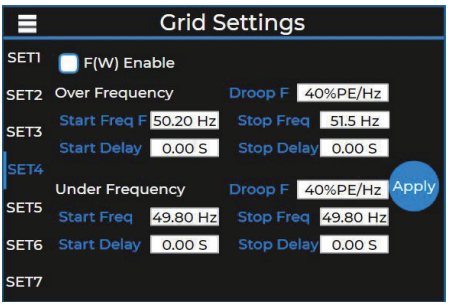

| Setting Items | | Instructions |
|---|---|---|
| SET2 | Normal Connection | The allowed grid voltage/frequency range when the inverter first time connect to the grid. |
| | Reconnect after Trip | The allowed grid voltage/frequency range for the inverter connects the grid after the inverter trip from the grid. |

Click the "apply" button to save the settings and apply them to the inverter.



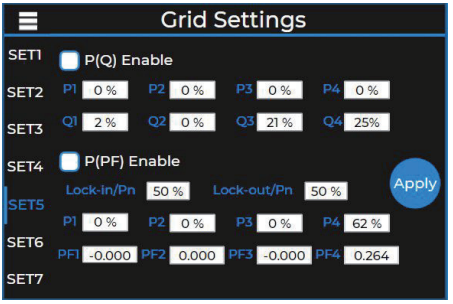

| Setting Items | | Instructions |
|---|---|---|
| SET3 | Over Voltage Mean 10min | Within a continuous period of 10 minutes, if the grid voltage reaches the set average value, the system will trigger the protection mechanism and disconnect the connection within the corresponding time period. |
| | HV1~HV3<br>LV1~LV3 | Customize the overvoltage/undervoltage thresholds and protection times for Level 1, Level 2, and Level 3. The system will trigger the protection mechanism and disconnect the connection within the corresponding time periods. |
| | HF1~HF3<br>LF1~LF3 | Customize the over-frequency/under-frequency thresholds and protection times for Level 1, Level 2, and Level 3. The system will trigger the protection mechanism and disconnect the connection within the corresponding time periods. |

Click the "apply" button to save the settings and apply them to the inverter.



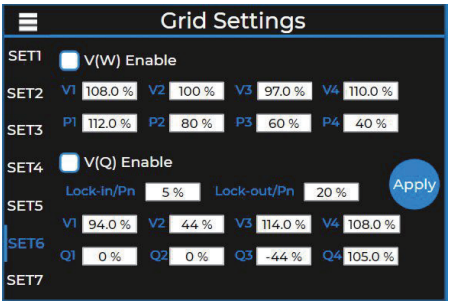

| Setting Items | | Instructions |
|---|---|---|
| SET4 | F(W) Enable | this series inverter is able to adjust inverter output power according to grid frequency. |
| | Reconnect after Trip | Percentage of nominal power per Hz<br>For example, "Start freq F>50.2Hz, Stop freq F<51.5, Droop F=40%PE/Hz" when the grid frequency reaches 50.2Hz, the inverter will decrease its active power at droop F of 40%. And then when grid system frequency is less than 50.1Hz, the inverter will stop decreasing output power. For the detailed setup values, please follow the local grid code. |

Click the "apply" button to save the settings and apply them to the inverter.



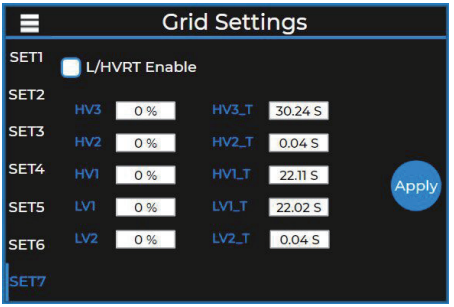

| Setting Items | | Instructions |
|---|---|---|
| SET5 | P(Q) Enable | It is used to adjust the inverter reactive power according to the set active power. |
| | P(PF) Enable | It is used to adjust the inverter PF according to the set active power. For the detailed setup values, please follow the local grid code. |
| | Lock-int/Pn 50% | When the inverter output active power is less then 50% rated power, it won't enter the P(PF) mode. |
| | Lock-out/Pn 50% | When the inverter output active power is higher then 50% rated power, it will enter the P(PF) mode. |
| Note:only when the grid voltage is equal to or higher than 1.05times of rated grid voltage, then the P(PF) mode will take effect. | | |

Click the "apply" button to save the settings and apply them to the inverter.



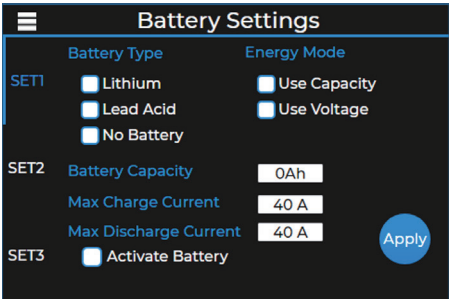

| Setting Items | | Instructions |
|---|---|---|
| SET6 | V(W) Enable | It is used to adjust the inverter active power according to the set grid voltage. |
| | V(Q) Enable | It is used to adjust the inverter reactive power according to the set grid voltage.<br>This function is used to adjust inverter 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.<br>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.<br>For the detailed setup values, please follow the local grid code.<br>Note: This function is used to adjust the output power of the inverter when the Grid voltage changes | | |

Click the "apply" button to save the settings and apply them to the inverter.



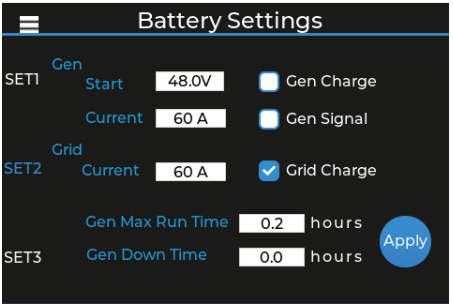

SET7: Set the high-voltage ride-through and low-voltage ride-through values of the grid voltage and their related time parameters. After selecting the corresponding grid standard in the Grid Settings step, the corresponding parameters will be automatically generated. It is not recommended to modify them casually.

F. Click the "Battery Settings" button to enter the Battery Settings interface.It is divided into three steps.




| Setting Items | | Instructions |
|---|---|---|
| SET1 | Battery Type | Select the type of the connected battery.When the battery type is set to lithium battery, the State of Charge (SOC) percentage is used as the main display parameter. When the battery type is set to lead-acid battery, the real-time terminal voltage (V) is used as the main display parameter. |
| | Energy Mode | When lithium batteries are selected, the system automatically sets the energy mode to "Use Capacity".<br>When lead-acid batteries are selected, the system automatically sets the energy mode to "Use Voltage". |
| | Battery Capacity | Set the rated capacity corresponding to the connected battery. |
| | Max Charge Current | Set the maximum charging current corresponding to the connected battery. |
| | Max Discharge Current | Set the maximum discharging current corresponding to the connected battery. |
| | Activate Battery | When turned on, the excessively discharged battery can be slowly charged through the solar array or the Grid to restore it. |

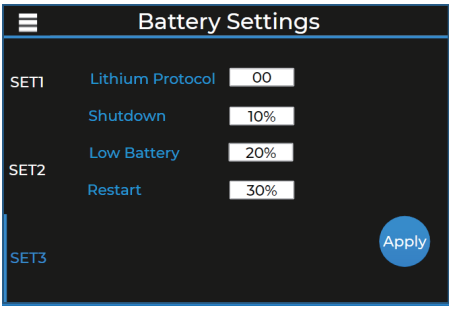
Click the "apply" button to save the settings and apply them to the inverter.




| Setting Items | | Instructions |
|---|---|---|
| SET2 | Gen Charge | If you choose to use a generator (Gen) to charge the battery, you can configure the system to automatically start the generator when the battery's State of Charge (SOC) falls below a specified percentage. Additionally, you can set a fixed charging current to control the charging rate.<br>To further automate operation, you may define a specific runtime for the generator. Once the set duration is reached, the system will automatically shut off the generator. |
| | Gen Signal | Generator Enable |
| | Grid Charge | If you choose to use the grid to charge the battery, you can set a fixed charging current. |

Click the "apply" button to save the settings and apply them to the inverter.

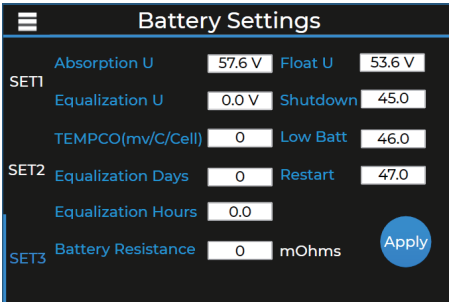
If the battery type is selected as lithium battery, then the third step should be set according to the following page.




| Setting Items | | Instructions |
|---|---|---|
| SET3 | Lithium Protocol | Set the lithium battery protocol |
| | Shutdown | When the SOC falls below this set value, the battery will stop discharging actively (the inverter may shut down in off-grid mode). |
| | Low Battery | If the SOC drops below this set value, the battery can still discharge actively, but an alarm will be triggered. |
| | Restart | Battery voltage at X% AC output will resume. |

Click the "apply" button to save the settings and apply them to the inverter.

If the battery type is selected as lead-acid battery, then the third step should be set according to the following page.

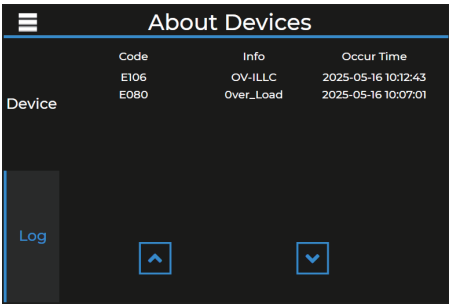



| Setting Items | | Instructions |
|---|---|---|
| SET3 | Absorption U | The set voltage value of the battery during the constant voltage charging stage. |
| | Float U | This setting maintains the battery's voltage after a full charge. If the voltage drops below this value, the system will initiate recharging to prevent over-discharge. |
| | Equalization U | Through periodic high-voltage charging, the voltage differences among individual cells within the battery pack are eliminated. |
| | Equalization Days | Days of equalization charging interval. |
| | Equalization Hours | Duration of a single equalization charge. |
| | TEMPCO(mv/C/Cell) | The temperature compensation coefficient is used to dynamically adjust the charging voltage to compensate for temperature changes. |
| | Battery Resistance | Battery internal resistance. |
| | Shutdown | Low-voltage shutdown threshold of the system. |
| | Restart | The voltage will be automatically restored after shutdown. |
| | Low Batt | Low-pressure warning threshold (triggered alarm but not shut down). |

Click the "apply" button to save the settings and apply them to the inverter.

G. Click the "About Device" button to enter the Inverter information interface.




| Setting Items | Instructions |
|---|---|
| Device | It shows the product name, inventer SN and version number of the inverter. |
| Log | It shows the fault code information of the inverter. |

# 4 - TROUBLESHOOTING

## 4.1 Error Codes & Solutions

| Error code | Description | Solutions |
|---|---|---|
| E007 | OV-F (Over Frequency) | 1.If it occurs by chance, it may be a short time anomaly in the power grid, the hybrid inverter will resume normal operation after detecting a normal power grid without manual intervention.<br>2.If it occurs frequently, check that the grid frequency is within the permissible range.<br>2.1. If the grid frequency is outside the permitted range, contact the local power operator.<br>2.2. If the grid frequency is within the permissible range, it is necessary to modify the inverter grid overfrequency protection point or disable the grid overfrequency protection function with the consent of the local power operator.<br>3. Seek help from us, if can not go back to normal state. |
| E008 | UN-F (Under Frequency) | |
| E012 | P-Seq-F (Phase Sequence Fault) | 1.Confirm whether the power grid is abnormal and whether the AC cable is connected correctly.<br>2.in the LCD interface, select the grid settings, select to change the grid type.<br>3.restart the system, check whether the fault still exists.<br>4.Seek help from us, if can not go back to normal state. |
| E019 | PV Rer-CON (PV Reverse Connection) | 1.Check the PV input polarity<br>2.Seek help from us, if can not go back to normal state. |
| E023 | UNB-BUS(DC Bus Voltage Unbalance) | 1.Disconnect the AC output side switch and DC input side switch, and close the AC output side switch and DC input side switch after 5 minutes.<br>2.Seek help from us, if can not go back to normal state. |
| E030 | BST OV-I(Boost Circuit Overcurrent) | 1.Check whether the DC wiring is correct, no loose.<br>2.Restart the system 2-3 times.<br>3.Seek help from us, if can not go back to normal state. |
| E031 | Grid Track(Grid Current Tracking Error) | 1. Confirm whether the power grid system is abnormal<br>2. Confirm that the AC cable link is correct.<br>3.Seek help from us, if can not go back to normal state. |

| Error code | Description | Solutions |
|---|---|---|
| E032 | G-RMS OV-U (Grid RMS Transient Overvoltage) | 1.If it occurs by chance, it may be a short time anomaly in the power grid, the hybrid inverter will resume normal operation after detecting a normal power grid without manual intervention.<br>2.If it occurs frequently, check that the grid voltage is within the permissible range.<br>2.1. If the grid voltage is outside the permitted range, contact the local power operator.<br>2.2. If the grid voltage is within the permissible range, it is necessary to modify the inverter grid overvoltage protection point or disable the grid overvoltage protection function with the consent of the local power operator.<br>3. Seek help from us, if can not go back to normal state. |
| E038 | Int OV-I(Inverter Overcurrent) | 1. Please check whether the backup load power and common load power are within the range.<br>2. Restart and check whether it is in normal;<br>3. Seek help from us, if can not go back to normal state. |
| E055 | PV ISO N (Negative Busbar Insulation Fault) | 1. Check the connection of PV panels and inverter is firmly and correctly.<br>2. Check whether the PE cable of inverter is connected to ground.<br>3. Seek help from us, if can not go back to normal state. |
| E056 | PV ISO P (Positive Busbar Insulation Fault) | |
| E058 | ILeak-Pro01 (Leakage Current Exceed 30mA) | 1. If it occurs occasionally, it may be caused by accidental abnormality of external wiring, and it will resume normal operation after the fault is cleared without manual intervention.<br>2. If it occurs frequently, check the PV side cable ground connection.<br>3. Restart the system 2-3 times<br>4.If the fault still existing, please contact us for help. |
| E059 | ILeak-Pro02 (Leakage Current Exceed 60mA) | |
| E060 | ILeak-Pro03 (Leakage Current Exceed 150mA) | |
| E061 | ILeak-Pro04 (Leakage Current Exceed 300mA) | |
| E062 | ILeak-Check (Leakage Current Sensor Fault) | 1.Disconnect the AC output side switch and DC input side switch, and close the AC output side switch and DC input side switch after 5 minutes.<br>2.Seek help from us, if can not go back to normal state. |
| E067 | Met Com Fault (Meter Communication Faul) | 1.Check if the meter communication line is connected correctly.<br>2.Seek help from us, if can not go back to normal state. |
| E075 | NO-Battery (Battery Connection Fault) | 1.Check whether the battery voltage is within the standard range.<br>2.Test the battery voltage at the wiring.<br>3. Seek help from us, if can not go back to normal state. |
| E162 | BMS COM Fault (BMS Communication Fault) | 1.Check the physical connection between the CAN communication cable and the corresponding CAN ports of the inverter and the battery management system (BMS) to ensure that there is no looseness, oxidation or poor contact on the interface.<br>2.Confirm that the communication cables used meet the requirements of the technical specifications of the equipment, and some energy storage batteries need to be matched with special CAN cables exclusive to the battery manufacturers due to customized communication protocols or electrical parameters.<br>3.Seek help from us, if can not go back to normal state. |
| E169 | ARC Fault | 1. Check PV module cable connection and clear the fault;<br>2. Seek help from us, if can not go back to normal state. |

# 5 - MAINTENANCE

## 5.1 Regular maintenance of the inverter

In order to maintain the best long-term working performance, it is recommended to carry out the following inspection items twice a year.

Note: Before performing the following operations, make sure that all power supplies of the inverter have been disconnected, and all the capacitance power has been discharged, and then carry out the corresponding inspection or operation!

1. Confirm that the airflow around the inverter is not obstructed, and remove any dust, dirt, or debris from the radiator.
2. Inspect all exposed wires for insulation damage caused by sun exposure, friction with nearby objects, dry rot, or damage from insects or rodents. Repair or replace any damaged wires as needed.
3. Verify that all indicators and display readings accurately reflect the equipment's operating status. Pay close attention to any fault or error messages and take corrective actions if necessary.
4. Check all wiring terminals for signs of corrosion, insulation degradation, overheating, or burn marks/-discoloration, and securely tighten all terminal screws.
5. Inspect for dirt accumulation, insect nests, or corrosion, and clean the inverter and surrounding area as needed.
6. If the lightning arrester is found to be faulty, replace it promptly to prevent potential damage to the inverter and other user equipment from lightning strikes.
7.Regularly inspect the air inlet and outlet for dust accumulation. If necessary, remove the inlet baffle for cleaning.
8.Check for any abnormal noise when the fan is operating.

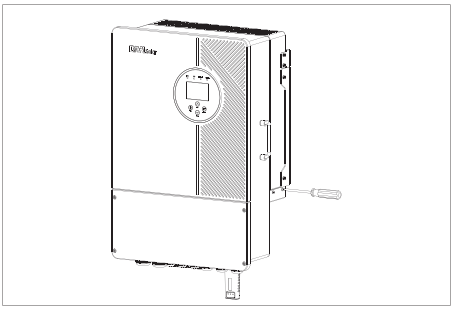
## 5.2 Power-off of the Inverter

1. Disconnect the ON-GRID AC circuit breaker of the inverter.
2. Disconnect the BACK-UP AC circuit breaker of the inverter.
3. Disconnect the energy storage circuit breaker between the inverter and the battery.

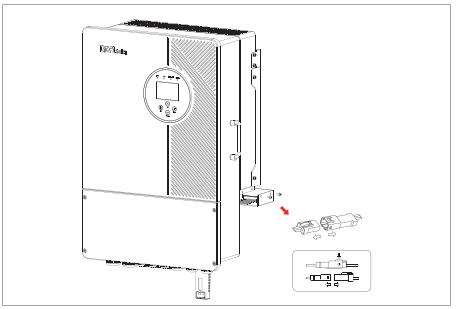
## 5.3 Fan Replacement

Note:
1.Prior to fan replacement, de-energize the inverter.
2.During fan replacement, insulated tools must be used, and Personal Protective Equipment (PPE) must be worn.
3.If resistance is encountered while extracting or inserting the fan assembly, slightly lift the fan frame.

**Step 1:** Remove the fastening screws on the left and right sides of the fan bracket/assembly and store them securely. (Figure a)
**Step 2:** Slide the fan bracket horizontally along its axis towards the right until the fan cable connector is accessible. (Figure b)
**Step 3:** Depress the connector latch and disengage the male and female terminals vertically. (Figure b)

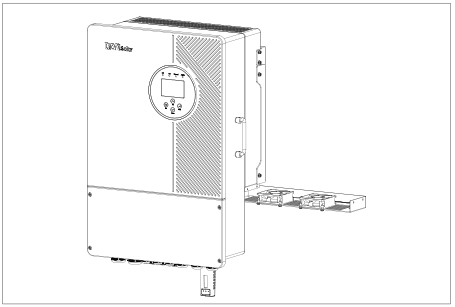


a

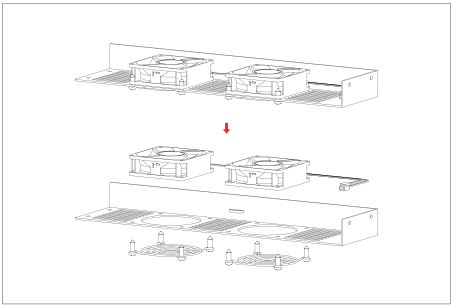


b

**Step 4:** Continue pulling the fan bracket horizontally to the right until it is fully extracted. (Figure c)
**Step 5:** Remove the faulty fan unit and inspect the mounting slot for any foreign objects or deformation. (Figure d)



c



d

**Step 6:** Install the replacement fan unit, ensuring correct airflow orientation.
**Step 7:** Slide the fan bracket back to the initial connector separation point and mate the connector (male-female pairing in any orientation is acceptable).
**Step 8:** Slide the fan bracket back to its original position and tighten the left and right fastening screws.

## 5.4 Removal of the Inverter

1. Disconnect all the electrical connections of the inverter, including: DC wires, AC wires, communication wires, communication modules and protective ground wires.
2. Remove the inverter from the back hanging plate.
3. Remove the back hanging plate.
4. Store the inverter properly. If the inverter needs to be put into use in the future, ensure that the storage conditions meet the requirements.

## 5.5 Disposal of the Inverter

When the inverter reaches the end of its service life and is no longer usable, it must be disposed of in accordance with local electrical and electronic waste disposal regulations.
Do not dispose of the inverter as household waste, as improper disposal may harm the environment or violate local laws.

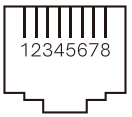
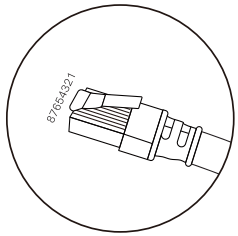
# 6 - DATASHEET

| Model | DHN-LVEH3P8K-EU-G1 | DHN-LVEH3P10K-EU-G1 | DHN-LVEH3P12K-EU-G1 |
|---|---|---|---|
| **Battery Input Data** | | | |
| Battery Type | Lead-acid/Li-ion | | |
| Battery Voltage Range (V) | 40-60 | | |
| Max. Charging Current (A) | 190 | 210 | 240 |
| Max. Discharging Current (A) | 190 | 210 | 240 |
| Charging Strategy for Li-ion Battery | Self-adaption to BMS | | |
| Number of Battery Input | 1 | | |
| **PV String Input Data** | | | |
| Max. PV Input Power (W) | 12800 | 16000 | 19200 |
| Max. PV Input Voltage (V) | 800 | | |
| Start-up Voltage (V) | 150 | | |
| MPPT Voltage Range (V) | 200-650 | | |
| Rated voltage (V) | 550 | | |
| Max. Operating PV Input Current (A) | 16+16 | 26+16 | 26+16 |
| Max. Input Short-Circuit Current (A) | 20+20 | 34+20 | 34+20 |
| No. of MPP Trackers/No. of Strings MPP Tracker | 2/1+1 | 2/2+1 | 2/2+1 |
| **AC Input/Output Data** | | | |
| Rated AC Input/Output Active Power (W) | 8000 | 10000 | 12000 |
| Max. AC Input/Output Apparent Power (VA)* | 8800 | 11000 | 13200 |
| Rated AC Input/Output Current (A) | 12.1/11.6 | 15.2/14.5 | 18.2/17.4 |
| Max. AC Input/Output Current (A)* | 13.3/12.8 | 16.7/15.9 | 20/19.1 |
| Peak Power (off-grid) (W) | 2 times of rated power for 10s | | |
| Power Factor Adjustment Range | 0.8 leading to 0.8 lagging | | |
| Rated Input/Output Voltage/Range (V) | 220/380, 230/400 0.85Un-1.1Un | | |
| Rated Input/Output Grid Frequency/Range(Hz) | 50/45-55, 60/55-65 | | |
| Grid Connection Form | 3L+N+PE | | |
| Total Current Harmonic Distortion THDi | <2% (of nominal power) | | |
| DC Injection Current | 0.5% In | | |
| **Efficiency** | | | |
| Max. Efficiency | 97.57% | | |
| Euro Efficiency | 96.85% | | |
| MPPT Efficiency | >99.99% | | |
| **Equipment Protection** | | | |
| Integrated | DC Polarity Reverse Connection Protection, AC Output Overcurrent Protection, Thermal Protection, AC Output Overvoltage Protection, AC Output Short Circuit Protection, DC Component Monitoring, Overvoltage Load Drop Protection, Ground Fault Current Monitoring, Arc Fault Circuit Interrupter (optional), Power Network Monitoring, Island Protection Monitoring, Earth Fault Detection, DC Input Switch, DC Terminal Insulation Impedance Monitoring, Residual Current (RCD) Detection, Surge protection leve | | |
| Surge Protection Level | TYPE II (DC), TYPE II (AC) | | |
| **Interface** | | | |
| Communication Interface | RS485/CAN | | |
| Monitor Mode | WIFI | | |
| **General Data** | | | |
| Operating Temperature Range (℃) | -40 to +60 | | |
| Permissible Ambient Humidity | 0-100% | | |
| Permissible Altitude (m) | 2000 | | |
| Ingress Protection(IP) Rating | IP 65 | | |
| Inverter Topology | Non-Isolated | | |
| Over Voltage Category | OVC II (DC), OVC III (AC) | | |
| Cabinet Size (WxHxD mm) | 450*677*255 | | |
| Weight (kg) | 36.2 | | |
| Type of Cooling | Intelligent Air Cooling | | |
| Warranty | 5 Years<br>the Warranty Period Depends the Final Installation Site of Inverter,<br>More Info Please Refer to Warranty Policy | | |
| Grid Regulation | Ordinance No.140 / Ordinance No.515 | | |
| Safety / EMC Standard | IEC/EN 61000-6-1:2019, IEC/EN 61000-6-3:2021, IEC/EN 62109-1:2010, IEC/EN 62109-2:2011, IEC 63027:2023 | | |

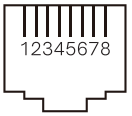
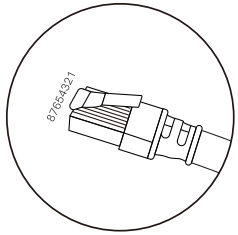
Note: *It is only implemented under specific safety regulations and working conditions.

# 7 - APPENDIX

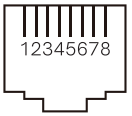
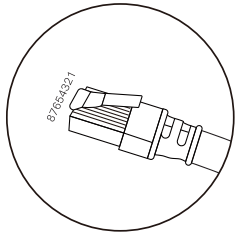
Appendix 1 - Definition of RJ45 Port Pin for 485

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

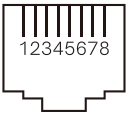
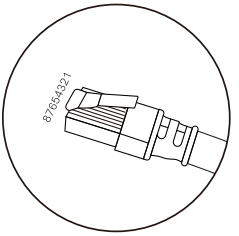
Appendix 2 - Definition of RJ45 Port Pin for “Modbus port” for remotely monitoring

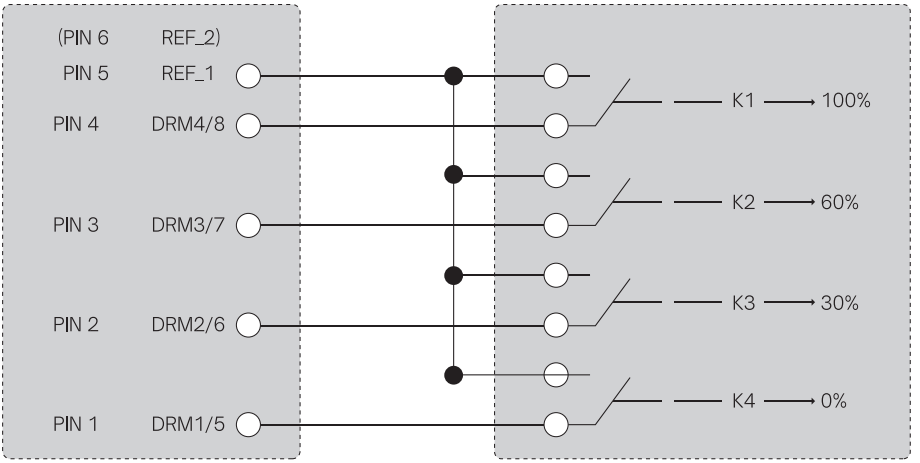
| No. | Modbus Port | Modbus Port | |
|---|---|---|---|
| 1 | SUNSPE-485_A |   |   |
| 2 | SUNSPE-485_A | | |
| 3 | GND_SUNSPE-485 | | |
| 4 | / | | |
| 5 | / | | |
| 6 | GND_SUNSPE-485 | | |
| 7 | SUNSPE-485_B | | |
| 8 | SUNSPE-485_B | | |

Appendix 3 - Definition of RJ45 Port Pin for BMS

| No. | RS485 Pin | BMS 485/CAN Port | |
|---|---|---|---|
| 1 | 485_B |   |   |
| 2 | 485_A | | |
| 3 | GND-485 | | |
| 4 | CAN-H | | |
| 5 | CAN-L | | |
| 6 | GND-485 | | |
| 7 | 485_A | | |
| 8 | 485_B | | |

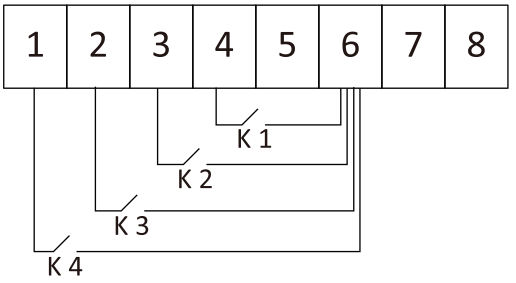
Appendix 4 - Definition of RJ45 Port Pin for DRM

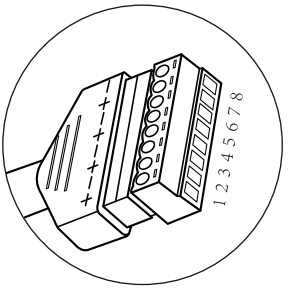
| No. | DRM | DRM Port |
|---|---|---|
| 1 | DRM1/5 |     |
| 2 | DRM2/6 | |
| 3 | DRM3/7 | |
| 4 | DRM4/8 | |
| 5 | REF | |
| 6 | GND | |
| 7 | Reserved | |
| 8 | Reserved | |









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