NEOVOLTA

NV12KAC & NV16KAC
Hybrid Inverter

User Manual

V1.12152025

DECLARATION

NeoVolta. (hereinafter referred to as "NeoVolta") reserves the right to modify the frame dimensions, functionality, technical data, parameters, standards without prior notice.

The contents of this manual have been checked for accordance with its described hardware and software. However, the contents of this manual may be subject to appropriate modification as a result of product upgrade, specification change and update of the manual, we cannot guarantee full accordance all the time. But the data in this manual are reviewed regularly and any necessary corrections are included in subsequent editions. Suggestions for improvement from readers are appreciated.

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PREFACE

Thank you for choosing this hybrid inverter (hereinafter referred to as "inverter").

This user manual presents a detailed description of with respect to product features, structural characteristics, functions, installation, parameter settings, troubleshooting, commissioning and daily maintenance, etc. Be sure to carefully read through the safety precautions before use and keep it properly at a place for easy access.

🔲 **IMPORTANT NOTES**

- Please assure the intactness of the product enclosure and all safety covers before installation. Operation must conform to the requirements of this manual and local industrial safety regulations and/or electrical codes.
- In the event of damage or loss of user manual, users can download a new copy online at NeoVolta.com.
- Contents of this manual may be subject to appropriate modification as a result of product upgrade, specification change and update of the manual.
- If any item as stated in this manual is not clear, please contact our technical service department. 800.364.5464
- If any anomaly occurs after power up or during the operation, it is essential to stop the machine and identify the fault or seek technical services as soon as possible.

It will be referred to as "inverter" hereinafter unless otherwise specified.

The inverter must only be installed by professional technicians. The professional technician is required to meet requirements as follows:

- Know electronic, electrical wiring and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Be familiar with local standards and relevant safety regulations for electrical systems.
- Have received professional training related to the electrical equipment installation and commissioning.
- Be able to quickly respond to hazards or emergencies that occur during installation and commissioning.

TECHNICAL SUPPORT

Before installation, wiring, operation, and repair to the inverter, please read carefully and strictly comply with all its safety precautions in this manual.

Please ensure all the warning marks on the inverter are clear and distinct. Replace or add missed warning marks.

If you have any question, or anything that it is not clear for you during installation, wiring, and/or operation, you are suggested to contact us at 800.364.5464.

For support scan here

CONTENT

1 Notes on This Manual

1.1 Scope of Validity

This manual is an integral part of the hybrid inverter, and it describes the assembly, installation, commissioning, maintenance, and troubleshooting of the product.

Please read it carefully before operating.

The NV12KAC & NV16KAC series consist of the following inverter models:

(1) Inverter terminals with circuit breakers.

• NV12KAC	• NV16KAC

Naming rules, For example: NV16KAC.

NV = NeoVolta

16K = Output Power in kW

AC = Alternating Current

Store this manual where it will be always accessible.

1.2 Target Group

This manual is for qualified installers. The tasks described in this manual only can be performed by qualified electricians.

1.3 Symbols Used

The following types of safety instructions and general information appear in this document as described below:

DANGER

- "Danger" indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

- "Warning" indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

- "Caution" indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

- "Note" provides tips that are valuable for the optimal operation of our equipment.

2 Safety

2.1 Important Safety instructions

DANGER

- Danger to life due to high voltages in the inverter!
- All work must be carried out by a qualified electrician.
- The equipment is not to be used by unauthorized personnel, unless they have been given supervision or instruction.
- Children should be supervised to ensure that they do not play with the equipment.

CAUTION

- Danger of burn injuries due to hot enclosure parts!
- During operation, the upper lid of the enclosure and the enclosure body may become hot.
- Only touch the lower enclosure lid during operation.

CAUTION

- Possible damage to health as a result of the effects of radiation!
- Do not stay closer than 20 cm (8") to the inverter for any length of time.

- Grounding the PV generator.
- Comply with the local requirements for grounding the PV modules and the PV generator. They recommend connecting the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction and ground in order to have optimal protection of system and persons.

WARNING

- Ensure input DC voltage ≤Max. DC voltage. Over voltage may cause damage.
- Permanent damage to inverter or other losses, which will not be included in the warranty!

WARNING

- Authorized service personnel must disconnect both AC and DC power from inverter before attempting any maintenance, cleaning or working on any circuits connected to inverter.
- Do not operate the inverter when the device is running.
- Risk of electric shock!

- Please store the user manual properly. When operating equipment, in addition to following the general precautions in this document, follow the specific safety instructions. We will not be liable for any consequences caused by the violation of the safety operation regulations and design, production, and usage standards.
- Only accessories shipped with the inverter are recommended for use, Otherwise, it may result in a risk of fire, electric shock, or injury to person.

- Make sure the existing wiring is in good condition and the wire is not undersized. Do not disassemble any parts of the inverter which are not mentioned in the installation guide. It contains no user-serviceable parts. See warranty for instructions on obtaining service. Attempting to service the inverter yourself may result in a risk of electric shock or fire and will void your warranty.

- Keep away from flammable, explosive materials to avoid fire disasters.

- The installation location should be away from humid or corrosive substance.

- Authorized service personnel must use insulated tools when installing or working with this equipment.

- Never touch either the positive or negative pole of the PV connecting device. It's strictly prohibited touching both at the same time.

- The unit contains capacitors that remain charged to a potentially lethal voltage after the MAINS, battery and PV supply have been disconnected.

- Hazardous voltage will present for up to 5 minutes after disconnection from power supply.

- CAUTION-RISK of electric shock from energy stored in capacitor, never operate on the inverter couplers, the MAINS cables, Battery cables, PV cables or the PV generator when power is applied. After switching off the PV, battery, and Mains, always wait for 5 minutes to let the intermediate circuit capacitors discharge before unplugging DC, battery in plug and MAINS couplers.

- When accessing the internal circuit of the inverter, it is very important to wait 5 minutes before operating the power circuit or demounting the electrolyte capacitors inside the device. Do not open the device beforehand since the capacitors require time to sufficiently discharge!

- Surge protection devices (SPDs) for PV installation.

WARNING

- Over-voltage protection with surge arresters should be provided when the PV power system is installed.

- The grid connected inverter is not fitted with SPDs in both PV input side and MAINS side.

- Lightning will cause damage either from a direct strike or from surges due to a nearby strike.

- Induced surges are the most likely cause of lightning damage in the majority of installations, especially in rural areas where electricity is usually provided by long overhead lines. Surges may be included on both the PV array conduction and the AC cables leading to the building.

- Specialists in lightning protection should be consulted during the end use application. Using appropriate external lightning protection, the effect of a direct lightning strike into a building can be mitigated in a controlled way, and the lightning current can be discharged into the ground.

- Installation of SPDs to protect the inverter against mechanical damage and excessive stress include a surge arrester in case of a building with external lightning protection system (LPS) when separation distance is kept.

- To protect the DC system, surge suppression device (SPD type2) should be fitted at the inverter end of the DC cabling and at the array located between the inverter and the PV generator, if the voltage protection level (VP) of the surge arresters is greater than 1100V, an additional SPD type3 is required for surge protection for electrical devices.

- To protect the AC system, surge suppression devices (SPD type2) should be fitted at the main incoming point of AC supply (at the consumers cutout), located between the inverter and the meter/distribution system.

- All DC cables should be installed to provide as short a run as possible, and positive and negative cables of the string or main DC supply should be bundled together. Avoiding the creation of loops in the system.

- Spark gap devices are not suitable to be used in DC circuits once conducting, they won't stop conducting until the voltage across their terminals is typically more than 30 volts.

Anti-islanding Effect

- Islanding effect is a special phenomenon where a grid-connected PV system will still supply power to the nearby grid when the voltage loss has happened in the power system. It is dangerous for maintenance personnel and the public.

- Hybrid series inverters provide active frequency drift (AFD) to prevent the islanding effect.

PE Connection and Leakage Current

- The end-use application shall monitor the protective conductor by the residual current operated protective device (RCD) with rated fault current lfn ≤240mA which automatically disconnects the device in case of a fault.

- The device is intended to connect to a PV generator with a capacitance limit of approximately 700nf.

- Incorrect grounding can cause physical injury, death or equipment malfunction and increase electromagnetic.

WARNING

- High leakage current!
- Ground connection essential before connecting supply.

Battery Safety Instructions

- Hybrid series inverters should be used with low voltage batteries, for the specific parameters such as battery type, nominal voltage and nominal capacity etc, please refer to chapter 13.

- As accumulator batteries may contain potential electric shock and short-circuit current danger, to avoid accidents that might be thus resulted, the following warnings should be observed during battery replacement:

  1. Do not wear watches, rings or similar metallic items.
  2. Use insulated tools.
  3. Put on rubber shoes and gloves.

4. Do not place metallic tools and similar metallic parts on the batteries.

5. Switch off the loads connected to the batteries before dismantling the battery connection terminals.

6. Only personnel with proper expertise can carry out the maintenance of accumulator batteries.

2.2 Explanation of Symbols

This section gives an explanation for all the symbols shown on the inverter and on the type label.

Table 2-1   Symbols on the type label

Symbols	Symbols on the type label
SGS	UL certified.
5mins	This symbol indicates that you should wait at least 5mins after disconnecting the inverter from the utility grid and from the PV panel before touching any inner live parts.
	Keep dry! The package/product must be protected from excessive humidity and must be stored under cover.
	Refer to the operating instructions.
	Fragile - The package/product should be handled carefully and never be tipped over or slung.
	Products should not be disposed as household waste.
6	No more than six (6) identical packages being stacked on each other.
	Components of the product can be recycled.
	Danger of hot surface!
	Danger of high voltage and electric shock!
	Caution! Failure to observe a warning indicated in this manual may result in injury.

3 Introduction

3.1 Basic Features

The hybrid series are high-quality inverters that can convert solar energy to AC energy and store energy into battery.

The inverter can be used to optimize energy consumption by storing energy in the battery for future use. The work mode depends on the user's preference, utility company's policies, and PV energy. It can provide power for emergency use, if the grid power goes down, by using stored battery power generated from the inverter's PV.

3.2 Electrical Connection

Figure 3-1   Electrical Connection Diagram
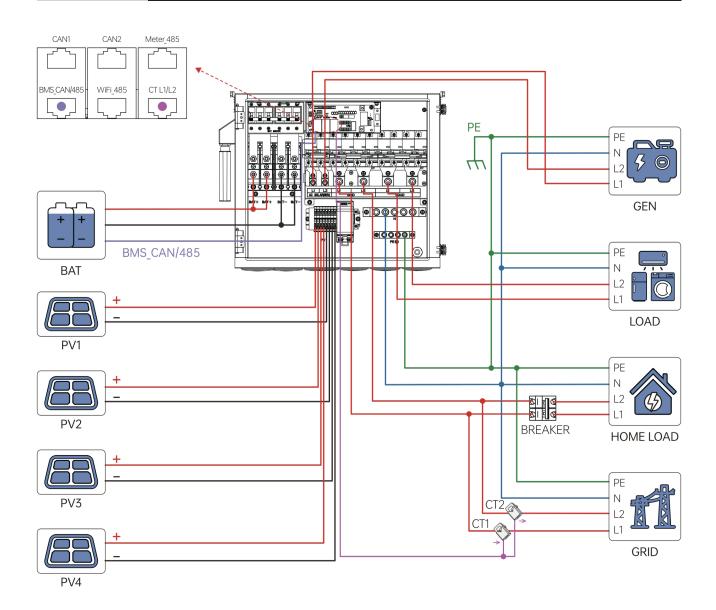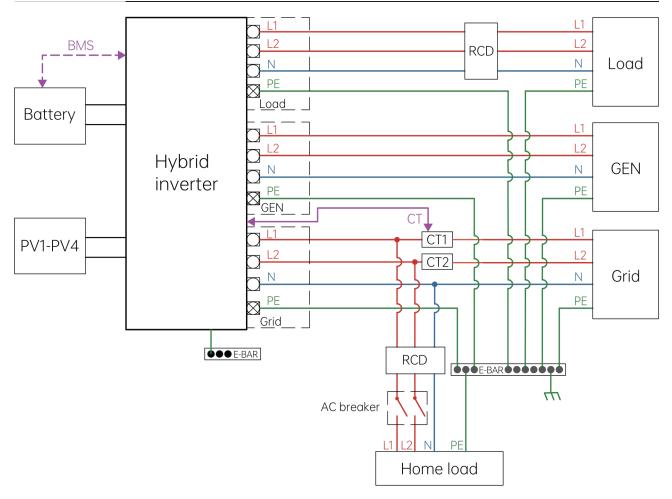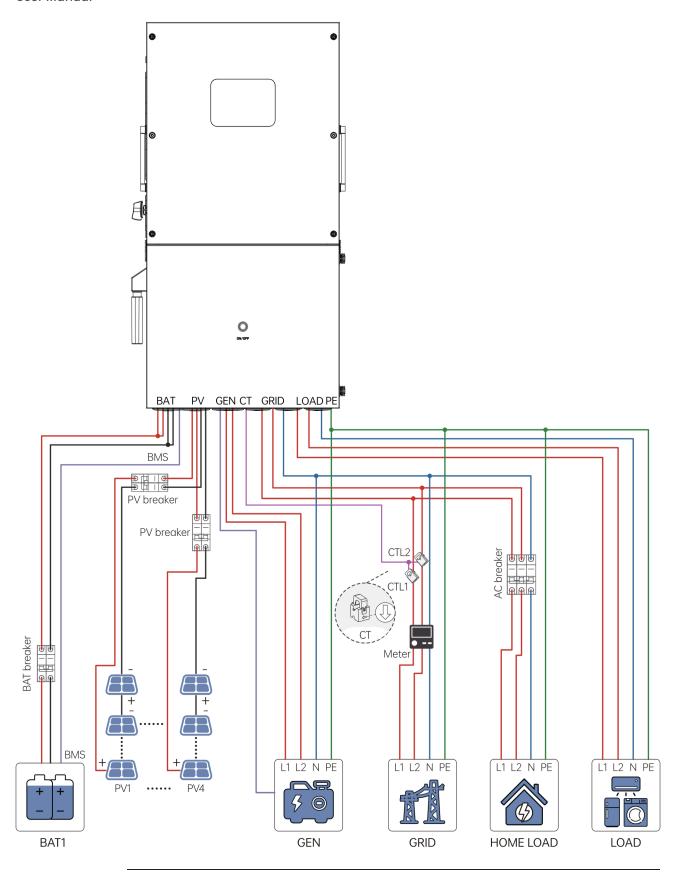
Figure 3-2   System Basic Wiring Diagram

All switches and RCD devices in the figure are for reference only, and the specific installation shall be subject to local regulations.

- Please control the home loads, and make sure it's within the "BACK-UP output rating" under BACK-UP mode, otherwise the inverter will shut down with an "overload fault" warning.

- Please confirm with the mains grid operator whether there are any special regulations for grid connection.

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BAT   PV   GEN CT   GRID   LOAD PE

BMS

PV breaker

PV breaker

CTL2

CTL1

CT

Meter

AC breaker

BAT breaker

BMS

| L1 L2 N PE | | L1 L2 N PE | | L1 L2 N PE | | L1 L2 N PE |

PV1   ······   PV4

BAT1   GEN   GRID   HOME LOAD   LOAD

- The arrow on the CT points to the power grid, as shown.
- If the CT connector is improperly connected, the inverter cannot read the data correctly, and will not function as intended.

NEOVOLTA
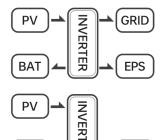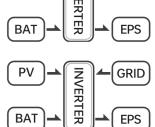
3.3 Work Modes

Inverter provides multiple work modes based on different requirements.

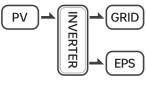### Work Mode: Self-Use

1. When PV, Grid, Battery is Available:

A. Solar Energy provides power to the loads as first priority. If sun power is sufficient to power all connected loads, excess energy will be stored in the battery, and excess power will feed to the grid.
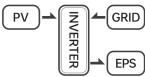
B. Solar energy provides power to the loads as first priority, if solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time.

C. Solar energy provides power to the loads as first priority, if solar energy and battery are not sufficient to power all connected loads, utility energy (Main grid) will supply power to the loads with solar energy at the same time.

2. When PV, Grid is Available (without battery):
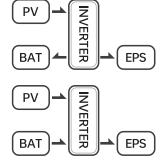
A. Solar energy provides power to the loads as first priority, if solar energy is sufficient, the excess power will be fed to grid.

B. Solar energy provides power to the loads as first priority, if solar energy is not sufficient to power all connected loads, Grid energy will supply power to the loads at the same time.

3. When PV, Battery is Available (Grid is disconnected):
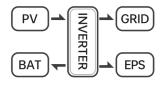
A. Solar energy provides power to the loads as first priority, if solar energy is sufficient to power all connected loads, solar energy will charge the battery.

B. Solar energy provides power to the loads as first priority, if solar energy is not sufficient to power all connected loads, battery energy and solar energy will supply power to the loads at the same time.
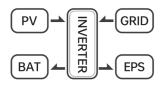
Work Mode: Peak Shift

1. When PV, Grid, Battery is Available:
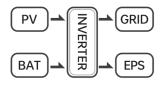
A. Solar energy will charge the battery as first priority. The excess energy will supply power to the loads. If solar energy is sufficient to supply loads and charge the battery, and if there's still some extra energy, then the excess power will feed the power to grid.

PV → INVERTER ← GRID
BAT ← INVERTER → EPS

B. Solar energy will charge the battery as priority, then the excess solar energy will supply the power to the loads. If solar energy is not sufficient to charge the battery and supply the loads, the grid will power all the connected loads.

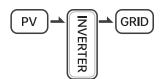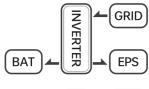PV → INVERTER → GRID
BAT → INVERTER → EPS

C. Solar energy provides power to the loads as first priority, if solar energy is sufficient to supply loads, and if there's still some extra energy from solar energy, then the excess power and battery will deliver the power to the grid at the same time.

PV → INVERTER → GRID
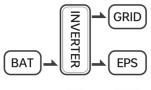
D. In the period of no charge or discharge, the solar power supplies loads as a priority, then excess energy to the grid.

2. When Grid, Battery is Available (PV is disconnected):

INVERTER ← GRID
BAT ← INVERTER → EPS
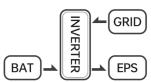
A. Grid energy will charge the battery and supply power to the connected loads at the same time.

INVERTER → GRID
BAT → INVERTER → EPS
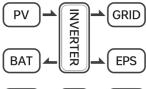
B. If load power is less than battery power, the battery will supply power to the loads as a priority. Excess power will be sent to the grid.

INVERTER ← GRID
BAT → INVERTER → EPS
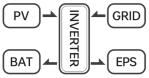
C. If the required load power is more than battery power, battery and grid will supply power to the loads at the same time.

Work Modes: Bat Priority

1. When PV, Grid, Battery is Available:
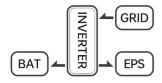
PV → INVERTER → GRID
BAT ← INVERTER → EPS

A. Solar energy will charge the battery as first priority, if solar energy is in excess, the excess power will supply the loads. If there's still some extra energy, then the excess power will be used to power the grid.

PV → INVERTER ← GRID
BAT ← INVERTER → EPS

B. Solar energy will charge the battery as first priority, if solar energy is in excess, the excess power will supply the loads. If solar energy is not sufficient to charge the battery and supply loads, grid will supply power to loads.

2. When Grid, Battery is Available (PV is disconnected):

INVERTER ← GRID
BAT ← INVERTER → EPS

The grid will supply power to loads and charge battery at the same time.
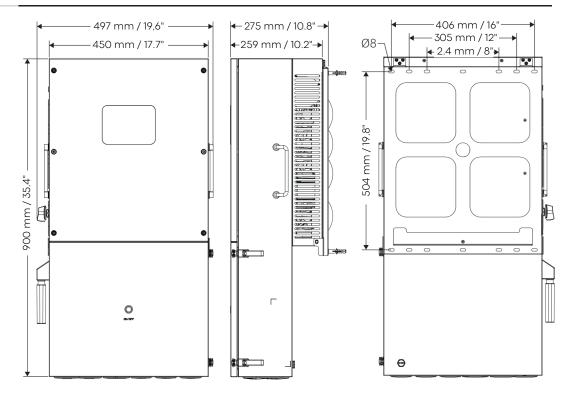
> • If set anti-reverse function is allowable, once set to the work mode of self-use, peak shift, battery priority, the system will not feed power to the grid.

In addition to the above three basic modes, there is also an "Advanced Mode." Please refer to chapter 10 for details.

3.4 Dimensions

Figure 3-3   Product Size
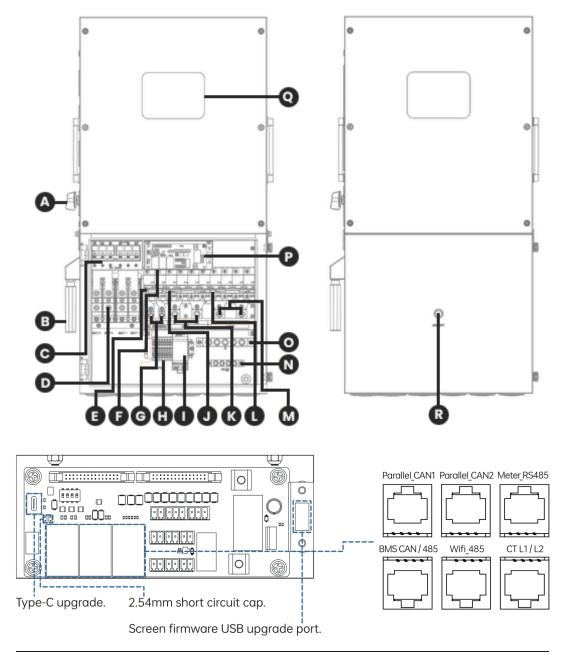
3.5 Terminals of PV Inverter

Object	Description
A	DC switch
B	Wi-Fi
C	Battery circuit breaker
D	BAT input
E	AC SOLAR / Generator / Multifunction circuit breaker
F	CAN1 / CAN2 / Meter_RS485 / BMS_CAN / 485 / CTL1L2 / Type-C upgrade
G	AC SOLAR / Generator / Multifunction Input
H	PV1~PV4 input
I	Rapid shutdown system transmitter
J	Grid circuit breaker

Object	Description
K	Grid output
L	EPS load circuit breaker
M	EPS load output
N	PE terminal
O	N terminal
P	Screen firmware USB upgrade port
Q	Touch panel
R	On / Off Button

Type-C upgrade.

2.54mm short circuit cap.

Screen firmware USB upgrade port.

Parallel_CAN1 Parallel_CAN2 Meter_RS485

BMS CAN / 485 Wifi_485 CT L1 / L2
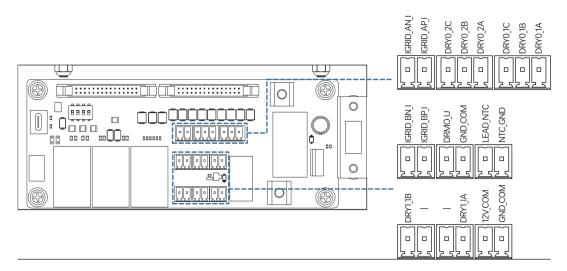
Port Function

- CAN1 / CAN2: Communication interface for connecting inverters.
- Meter_RS485: Read the inverter data and send it to the screen.

- Meter_RS485: Read the inverter data and send it to the screen.
- BMS-485 / BMS-CAN: BMS communication for lithium batteries.
- Wi-Fi_485: Standby crystal port for the Wi-Fi module.
- CT L1 / L2: For external grid side CT to detect current size.
- TYPE-C UPDATE: Update inverter software locally on PC via USB-A port.
- 2.54mm short circuit cap: To use the battery software remote upgrade function, you need to insert two "2.54 mm short circuit caps". If the battery does not use this function, do not insert the "2.54 mm short circuit cap". Otherwise, "BMS communication exception" will occur.
- Screen firmware USB upgrade port: Upgrade the screen firmware using the USB port.

- DRY1_1B / DRY1_1: Used to start the inverter driver.
- DRY0_2A (common): Reserved dry contact port.
- DRY0_2B (normally open): Reserved dry contact port.
- DRY0_2C (normally closed): Reserved dry contact port.
- DRY0_1A (common): Together with the other two contacts, the switch function is formed.
- DRY0_1B (normally open): In the generator automatic mode, the contact is closed when starting.
- DRY0_1C (normally closed): In the generator automatic mode, the contact is disconnected when starting.
- +12V_COM / GND COM: Used to connect Rapid Solar Shutdown (RSS).
- IGRID_BN_I / IGRID_BP_I: CT standby cable port.
- IGRID_AN_I / IGRID_AP_I: CT standby cable port.
- LEAD_NTC / LEAD_GND: Lead-acid battery temperature sampling input interface.
- DRMO_U / GND_COM: Reserved dry contact port.

⚠ **WARNING**

- Qualified electrician will be required for the installation.
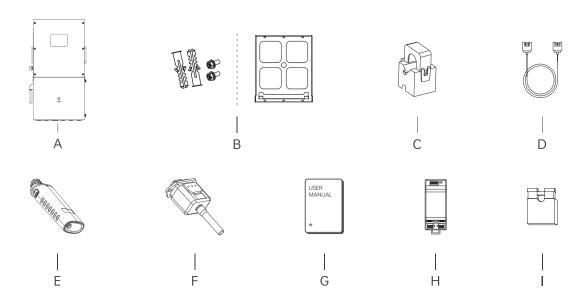
4 Installation

4.1 Check for Physical Damage

Make sure the inverter is intact. If there is any visible damage, such as cracks, please contact your dealer immediately.

4.2 Packing List

First, unpack all pieces of the product and confirm that you have all parts and accessories.
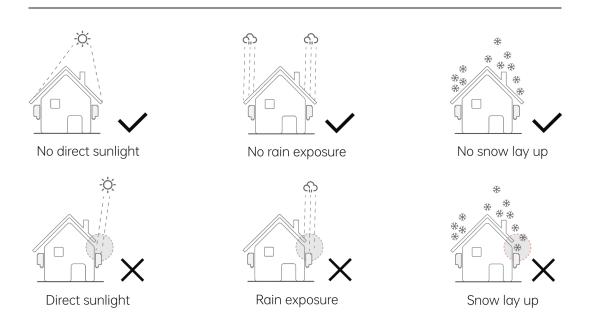
Object	Description
A	Hybrid Inverter.
B	Expansion screws, Hanger Screws and mounting Brackets.
C	CT (CTSA035-200A-100mA, innerradius 35mm).
D	6ft Ethernet Cable for parallel connection.
E	Wi-Fi logger.
F	GPRS module (optional).
G	User manual.
H	Rapid shutdown system transmitter (optional).
I	2.54 mm short circuit cap.
J	Installer Checklist.
K	Certificate of Approval.

4.3 Mounting

Installation Precaution:
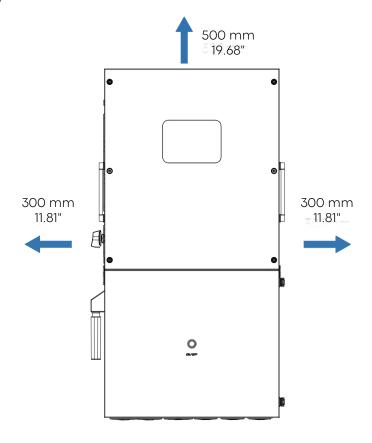
The inverter is designed for outdoor installation (IP65). Make sure the installation site meets the following conditions:

- Not in direct sunlight
- Not in areas where highly flammable or explosive materials are stored
- The site has no rain or snow exposure
- Not near the television antenna or antenna cable
- Not higher than altitude of about 2000m above sea level
- Under good ventilation
- Maintains ambient temperature in the range of -20° to +60° Celsius, -4° to +140° Fahrenheit.
  - Installers must calculate VOC based on the coldest temperature at the installation site
- The slope of the wall should be within ± 5°
- The wall where the inverter is installed should be solid brick or concrete. If the wall isn't strong enough, the inverter must be supported or reinforced.

No direct sunlight

No rain exposure

No snow lay up

Direct sunlight

Rain exposure

Snow lay up

Space Requirements

500 mm
19.68"

300 mm
11.81"

300 mm
11.81"

ON/OFF

Position	Min. size
Left	300mm (11.8in)
Right	300mm (11.8in)
Top	500mm (19.7in)
Front	1000mm (39.4in)

Mounting

Tools required for installation are as follows:

Crimping pliers for binding post and RJ45, a screwdriver, a hex key wrench, a manual wrench etc.
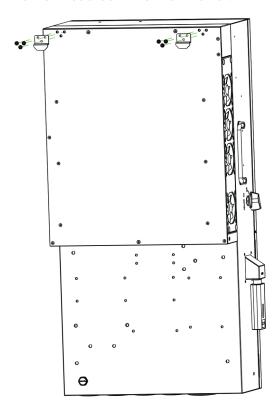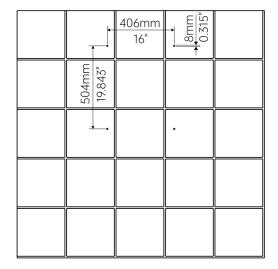
Step 1: Mounting the hanging rack on the inverter.
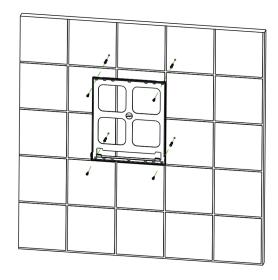
    1. Place the hanging rack on the back of the inverter.

    2. Then install the Hex head bolt into the inverter.

Step 2: Mounting the hanging rack on the wall.
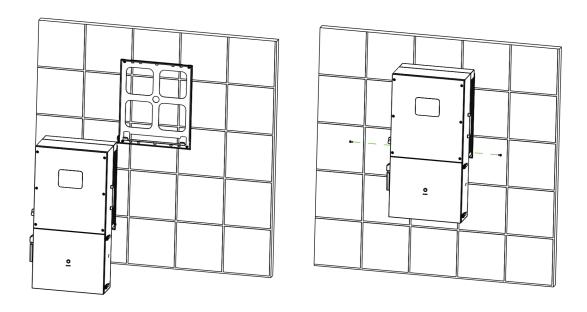
    1. Place the bracket on the wall, marking the positions of the four holes (hole positions, refer to the figure below), then remove it.

    2. Drill holes, making sure they are deep enough (55mm (2.2") < depth < 65mm (2.6")) to support the inverter.

    3. Install the expansion pipes into the hole and fix the hanging rack with self-tapping screws. The torque is 5Nm.
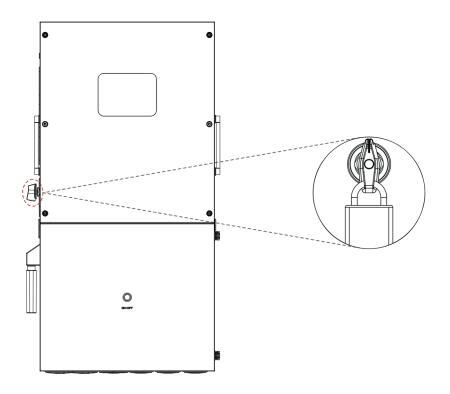
Step 3: Secure the inverter to the wall.

1. Align the expansion bolts with the holes on the inverter and secure the inverter to the wall.

2. Tighten the fixing screws on the right side of the inverter.
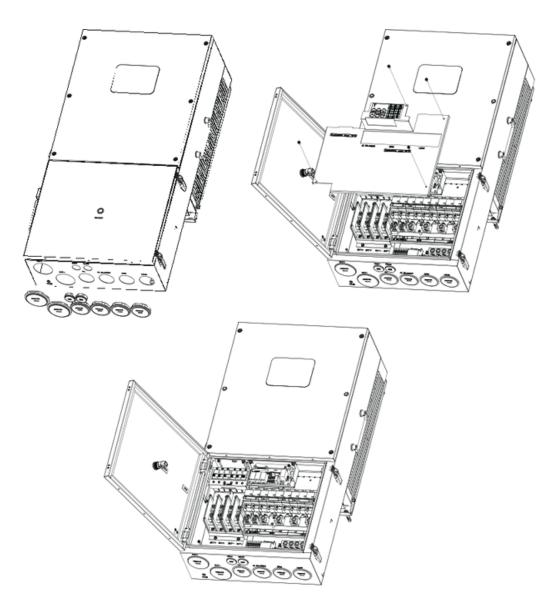
Step 4: Tighten the nut of the expansion bolt and install an anti-theft lock on DC switch of the inverter.

Step 5: Disassembly of the inverter's waterproof components.

1. The two latches on the lower right of the inverter open upward to open the waterproof cover.

2. Use a Phillips screwdriver to remove the protective plastic plate designed to protect the inverter's internal parts.

3. Remove the waterproof plug at the bottom of the inverter.

Step 6: Use the appropriate conduit to connect to the wiring hole at the bottom of the inverter.

Step 7: After installation, to ensure that the machine does not fall off, please verify that the machine is fixed to the rack.

⚠ WARNING

- Nothing should be stored on or placed against the inverter.

5 Electrical Connection

5.1 PV Connection

For the 12kw and 16kw inverter models, you can connect up to four strings of solar panels. Ensure you use certified solar panels that meet industry standards. When you wire panels in series, their voltages add up. The total open circuit voltage of each series string must be below the inverter's maximum DC input voltage rating. Installers must calculate VOC based on the coldest temperature at the installation site.

Technical Data	
MPPT voltage range (without battery) (V)	120 - 500
MPPT voltage range (with battery) (V)	120 - 430
MAX.DC input voltage (V)	500

⚠️ WARNING

- PV module voltage is very high, which already achieves a dangerous voltage range, please comply with electric safety rules when connecting.
- Please do not make PV positive or negative ground!
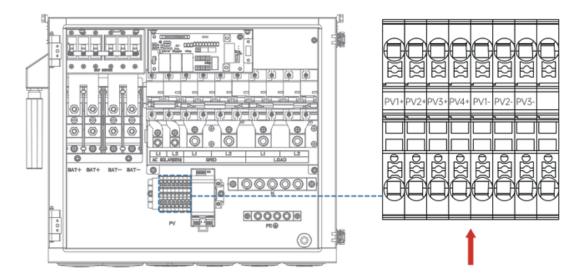
- The following requirements for PV modules need to be applied for each input area.
- Please do not make PV positive or negative ground!
- In order to save cable and reduce the DC loss, we suggest installing the inverter near the PV modules.

Step 1: Wiring.

1. Choose the 12AWG wire to connect with the cold-pressed terminal.

2. Remove 18 mm (0.7") of insulation from the end of wire.

12AWG

18mm

Step 2: Cross the PV cables through the PV port, Connect PV cables to PV terminals.

5.2 Grid Connection (GEN / Multifunction Connection)

Step 1: Check the grid voltage.

1. Check the grid voltage and ensure it is within a safe range for the voltage.

2. Ensure all conductors that feed the inverter are de-energized to avoid electrocution

Step 2: Grid cables selection.

Please use the cables corresponding to the inverter type and specifications in the attached table.

Model	NV12KAC	NV16KAC
Cable	1/0 AWG	1/0 AWG

Step 3: GEN cables selection.
Please use the cables corresponding to the inverter type and specifications in the attached table.

Model	NV12KAC	NV16KAC
Cable	6AWG	5AWG
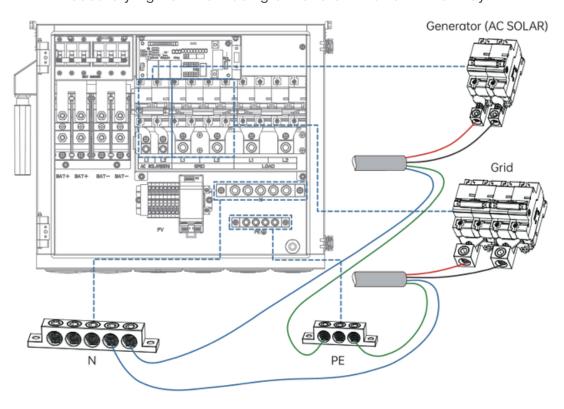
Step 4: Remove 18 mm (0.7") of insulation from the end of the wire.

18mm

Step 5: The terminal hole diameter for grid connection is 16 mm (0.6"); for diesel generator connection is 12 mm (0.5"); and for the N-line copper busbar is 16 mm (0.6").

Step 6: Route the diesel generator power cable and grid cable through the corresponding outlet ports at the inverter base, connecting them to their designated terminals in the bottom junction box, and securely tighten them using either a 6mm or 8mm hex key.
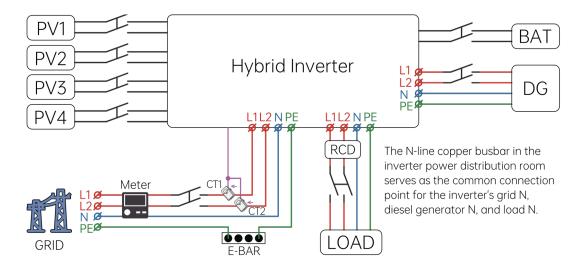
5.3 Back-Up: Load Connection

The inverter has on and off grid functions, so the inverter will deliver output power through the AC port when the grid is on, and it will deliver output power through a back-up port when the grid is off.

Load Port: Important Load.

1. For the inverter, the standard PV installation typically consists of connecting the inverter to both panels and batteries. In the event that batteries aren't connected into the system, it's strongly advised not to use the system as a backup. If the system is used as a back-up without a connected battery, the inverter is at risk of sustaining damages that fall outside of standard warranty coverage.

2. Hybrid inverters are able to supply overload output as back-up. For details, please refer to the technical parameters of the inverter. The inverter has self-protection derating at high ambient temperatures.

3. For complicated application, or special loads, please contact the after-sales team.

The N-line copper busbar in the inverter power distribution room serves as the common connection point for the inverter's grid N, diesel generator N, and load N.

- If your local electrical mode requires wiring that is different from what this manual states, do not guess or follow this manual blindly. Please contact the after sales team for support before installation.

Back-up: Load Connection
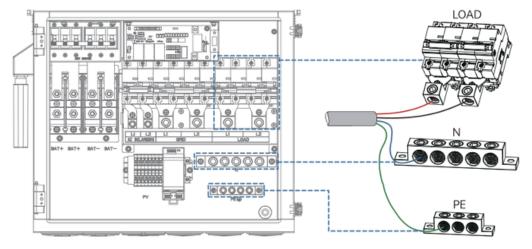
Step 1: Make BACK-UP wires.

Model	NV12KAC	NV16KAC
Cable	1/0 AWG	1/0 AWG

Step 2: Remove 18mm (0.7") of insulation from the end of the wire.

18mm

Step 3: The terminal diameter for the load circuit breaker is 15.2mm (0.6") ; the terminal hole diameter for the N-line copper busbar is 15.2mm (0.6"); and the terminal diameter for the PE-line copper busbar is 10.2mm (0.4") .

Step 4: Connect the load cable to the inverter's load terminal (LOAD port), then securely tighten it using an 8 mm (0.3") hex key wrench. For the N-line busbar and P-lineE busbar, use 8 mm (0.3") and 6 mm (0.2") hex key wrenches respectively.

Requirements for BACK-UP Load

WARNING
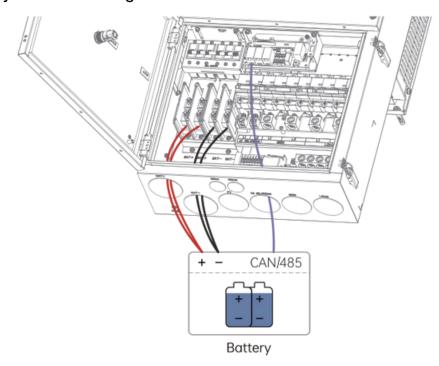
- Make sure the BACK-UP load power rating is within the BACK-UP output rating, otherwise the inverter will shut down with an "over load" warning.

- When an "over load" warning appears, adjust the load power to make sure it is within the BACK-UP output power range, then turn the inverter back on.

- For the nonlinear loads, please make sure the inrush power is within the BACK- UP output power range.

5.4 Battery Connection

The charging & discharging system of the hybrid series inverter is designed for a 48V lithium battery.

Before choosing a battery, please note the maximum voltage of the battery, it can't exceed 58V and the battery communication should be compatible with the hybrid inverter. Note: Always use POS and NEG battery terminals.
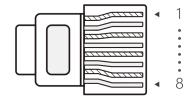
Battery Connection Diagram

BMS PIN Definition
Communication interface between inverter and battery is RS485 or CAN with a RJ45 connector.
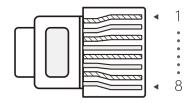
Step 1: Definition of the BMS interface when the 2.54 mm (0.1") short circuit cap is not inserted.

PIN	1	2	3	4	5	6	7	8
CAN Definition	X	X	X	BMS_CANH	BMS_CANL	X	X	X
RS485 Definition	X	X	X	X	X	GND	BMS_485A	BMS_485B

Step 2: Definition of the BMS interface when a 2.54mm short circuit cap is inserted.

PIN	1	2	3	4	5	6	7	8
CAN Definition	RS485_WIFIA	RS485_WIFIB	X	BMS_CANL	BMS_CANL	X	X	X
RS485 Definition	RS485_WIFIA	RS485_WIFIB	X	X	X	GND	BMS_485A	BMS_485A

- The battery communication can only work when the battery BMS is compatible with the inverter.
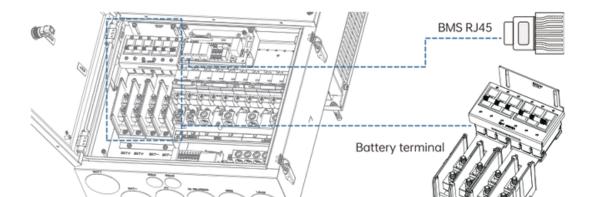
Power Connection Battery

Step 1: Select four battery cables and strip 18mm (0.7") of insulation. The battery terminal features four connection ports, with two for the positive pole and two for the negative pole. Select 4 O-terminals with an aperture of M8. Insert the wire into the O-terminal and clamp it with crimping pliers. Fasten with heat shrinkable sleeve to ensure insulation reliability.

Step 2: Thread the battery cable through the battery terminal block located on the inverter, then connect the battery cable to the appropriate battery terminals, and use a 13mm hexagonal socket wrench to tighten the nut to ensure a secure connection.

BMS RJ45

Battery terminal
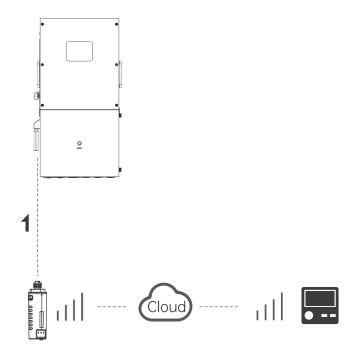
> • Positive and negative wires are not allowed to be reversed.

5.5 WiFi Connection (Optional)

The inverter provides a WiFi port which can collect data from the inverter and transmit it to monitoring website by WiFi.

Purchase the product from a supplier if needed.

1

Cloud

WIFI connection steps

Step 1: Assemble the WIFI logger to the COM port on the left side of the inverter.

Step 2: Establish the connection between the inverter and the router.

Step 3: Create a user account online. (Please check the "WIFI logger user manual" for more details).

5.6 CT Installation Instructions
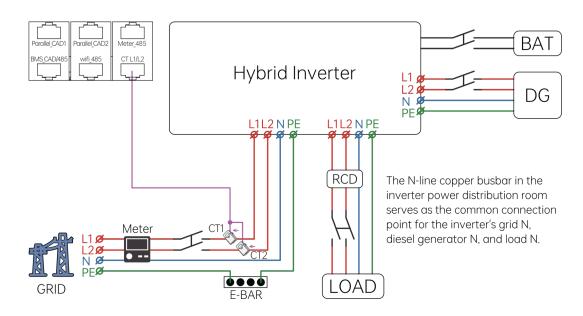
Current transformation, abbreviated to CT, is used to detect the current of the power grid.

The attached CT has two CTSA035-200A-100mA connected to one network port.

When connecting for split phase power, clip two CTS, CT-L1, clip the L1 phase of the power grid, and CT-L2 clip the L2 phase of the power grid. The CT arrow direction points to the power grid.

- If CT is not installed or installed reversely, the functions of "Anti-reflux", "Self-use", "Peak-shift"... will not be realized.

- The direction of the arrow on the CT, points from this inverter to the GRID!

The N-line copper busbar in the inverter power distribution room serves as the common connection point for the inverter's grid N, diesel generator N, and load N.
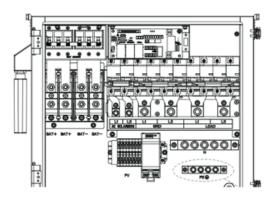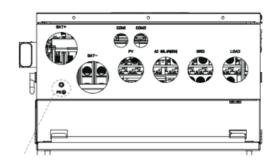
5.7 Ground Connection

For safety purposes, the inverter's grounding point must always be connected to the grounding cable of the power distribution box to prevent ground conductor failure.

Please connect the grounding wire of the distribution box to the grounding screw at the bottom of the inverter or the PE copper bar inside. When installing the grounding wire, multi-point grounding is prohibited.

5.8 RSD (ON / OFF) Installation
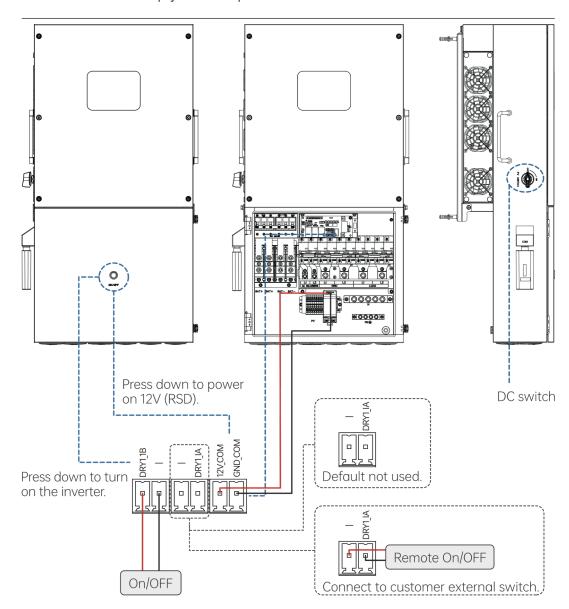
RSD Button and ON/OFF Button
These are the same button on the inverter.

For the ON/OFF function, the button connects to two dry contact terminals labeled DRY1_1B and DRY1_1A. When these two terminals are shorted together, the inverter turns on. The inverter also includes remote power-off terminals, which are already shorted before delivery. If needed, an external switch can be connected to these terminals to control the inverter's ON and OFF states.

RSD stands for rapid shutdown, which is a required safety feature for PV systems installed on or in buildings. Its purpose is to quickly reduce voltage during emergencies to protect responders. Releasing the button disables the 12V (12VCOM) power supply that powers the RSD transmitter. When the transmitter turns off, all PV modules are de-energized.

The DC switch is simply the PV input switch.

Press down to power on 12V (RSD).

DC switch

Press down to turn on the inverter.

DRY1_1B

DRY1_1A

12V_COM

GND_COM

DRY1_IA

Default not used.

On/OFF

DRY1_IA

Remote On/OFF

Connect to customer external switch.

6 LCD Operation

Figure 6-1   LCD touch screen operation flow chart

```
LCD touch screen ─┬─ Hybrid inverter
                  ├─ PV
                  ├─ Grid
                  ├─ Battery
                  ├─ Load
                  ├─ Generator
                  ├─ Setting ─┬─ System setting ─┬─ Work mode
                  │           │                  ├─ Advanced mode
                  │           │                  ├─ Backup enable
                  │           │                  ├─ Sell enable
                  │           │                  ├─ Grid power limit
                  │           │                  ├─ Advanced settings
                  │           │                  ├─ PV types
                  │           │                  ├─ Peak shift time
                  │           │                  ├─ Date and time settings
                  │           │                  └─ AC couple setting
                  │           ├─ Parallel settings
                  │           ├─ Battery settings
                  │           ├─ Grid setting
                  │           ├─ Generator setting
                  │           └─ Inverter information ─┬─ Information
                  │                                    ├─ Screen setting
                  │                                    └─ Factory reset
                  └─ Maintenance setting ─┬─ Custom grid set
                                          ├─ Grid parameters
                                          ├─ Grid reconnect parameter
                                          ├─ Grid function
                                          └─ Reactive power parameter
```

CT please ensure that the connection is correct. Enable the battery no-alarm function. If you want to sell electricity, set Grid sell to YES, otherwise NO.

battery connect? — NO

YES

battery type?

Lithium → ① Battery setting: BAT TYPE: Lithium. BAT-COMM: CAN. CHARG-CURR:XXA. BMSID:0

LEAD-ACID → ② Battery setting: BAT TYPE: LEAD-ACID. CHARG-CURR: XX A.
Float chg V: XX V. Absorption V: XX V. BAT cutoff V: XX V.(40~51V)
Over V: XX V.(50~59.5V) Grid dischg V: XX V. Hyst V: X V.
BAT CAP AH: XXX AH.(charge/discharge curr: XXX AH*0.2=XX A)

Gird setting

③ GRID STD: America.

GRID SET: 120/240 split. American standard: Choose according to local regulations.

connet to grid?

NO → **Off-grid** → PV supplies power to the load, and excess energy charges the battery. → No other settings required.

YES

① **Self consumption (basic mode)** → PV supplies power to the load, and excess energy charges the battery and sells electricity to the grid (LOAD>BAT>GRID). The grid will not charge the battery. Grid sell: Yes/No. (Whether the inverter is allowed to output excess photovoltaic energy to the power grid.)

② **BAT priority (basic mode)** → Photovoltaic power prioritizes charging the battery. The excess energy supplies power to the LOAD and sells the excess electricity to the power grid (BAT>LOAD>GRID). When the photovoltaic energy is insufficient, the power grid can charge the battery. The battery will be fully charged to 100% first. When the photovoltaic energy is insufficient, the power grid can charge the battery. Grid sell: Yes/No. (Whether the inverter is allowed to output excess photovoltaic energy to the power grid.)

Enable the advanced mode and the basic mode will be automatically disabled.

scenario

③ **Sell first mode (Advance mode)** → Grid sell is auto enabled. The excess photovoltaic power generation is sold to the power grid. When the TOU time period control is enabled, the battery energy can be sold to the power grid. TOU is enabled: Within the set time period, the battery can be controlled to sell electricity to the power grid or the power grid can charge the battery.

④ **Limited consumption (Advance mode)** → Grid sell is auto enabled. The excess photovoltaic power generation is sold to the power grid. Batteries do not supply electricity to the power grid. TOU is enabled: During the set time period, the power grid charges the battery.

⑤ **Zero export (Advance mode)** → Grid sell is auto disabled. The energy of photovoltaic power and batteries will never be sold to the power grid. TOU is enabled: During the set time period, the power grid charges the battery.

Abbreviated Noun Interpretation

Abbreviation	Full Name		
RSD	Rapid shutdown	TOU	Time-of-use
CV	Constant voltage	Aux load SOC	Aux load SOC
EPS	EMERGENCY POWER SYSTEM	GRID HYST	GRID hysteresis
ZeroExportP	Zero export power		
BAT COM	Battery communication		
DOD	Depth of discharge		
E-TODAY	Energy-today		

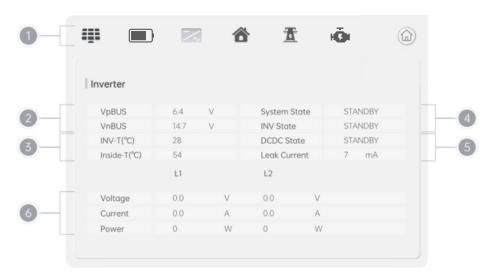## 6.1 Control Panel

Code	Name	Explanation
1	Hybrid inverter	Click hybrid inverter to enter the working status interface of the hybrid inverter.
2	PV	Display the real-time PV power. Click PV to enter the working status interface of PV.
3	Grid	Display the real-time grid power. Click grid to enter the working status interface of grid.

4	Battery	Display the real-time battery power and percentage of battery surplus capacity from the BMS. Click battery to enter the working status interface of battery.
5	Load	Display the real-time load power. Click load to enter the working status interface of load.
6	Generator	Display the real-timegenerator power. Click generator to enter the working status interface of generator.
7	Setting	Users can click setting to enter the settings interface.
8	Data/Time	Date and time of the inverter.
9	Alarm Information	The alarm information of the current inverter is displayed. For details, see the alarm information table in the appendix.

6.2 Working Status

6.2.1 Hybrid Inverter

Data panel of hybrid inverter

1. Users can click the icon above to switch between different types of device's status information such as PV, Battery, the Hybrid Inverter, Load, Grid, and BUS. Users can also use the same icon to go back to the home page.

2. **VpBUS**: This is the positive DC bus line inside the inverter.
    VnBUS: This is the negative DC bus line inside the inverter.

3. Temperature:
    INV-T (in Celsius or Fahrenheit) = temperature of the inverter's working hardware
    Inside-T (in Celsius or Fahrenheit) = temperature of the air inside the inverter housing.

4. The display provides several types of status information, including the overall system status, the inverter status, and the DCDC status. The system status shows the full operating condition of the inverter, such as INIT (initializing), STANDBY (ready but not operating), PV GRID (running on solar while connected to the grid), BAT GRID (running on battery while connected to the grid), BYP (bypass mode), AC BAT CHG (charging the battery from the grid), and HYBRID POW (operating in hybrid mode with multiple power sources).

The inverter status shows how the inverter itself is operating. It may show STANDBY, OFF GRID (operating without the utility grid), GRID (connected to the utility grid), OFF GRID PL (transitioning from off-grid to grid-connected operation), or INV TO PFC (the inverter is shifting into grid-connected power-flow control mode).

When the display shows GRID, it means the system is connected to the utility grid. When it shows OFF-GRID, it means the system is operating independently from the grid. OFF GRID PL represents the transition back toward grid-connected operation, and INV TO PFC indicates the inverter is preparing to operate in grid-connected mode.

The DCDC status shows whether the DC-DC converter is idle, charging the battery, or discharging it. The possible states are STANDBY, CHARGE, and DISCHARGE.
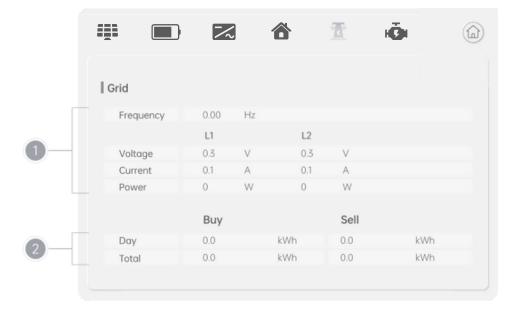
5. **Leak current: This refers to the real-time leakage current measured by the inverter. It shows how much unintended current is flowing to ground during operation**

6. Displays the real-time voltage, current, and power of the device.

Data Panel of PV

1. Displays the working parameters of the four channels - PV1, PV2, PV3, and PV 4 including real-time voltage, current, and power.

2. Displays the cumulative charging capacity of the PV, including daily and total accumulated energy.
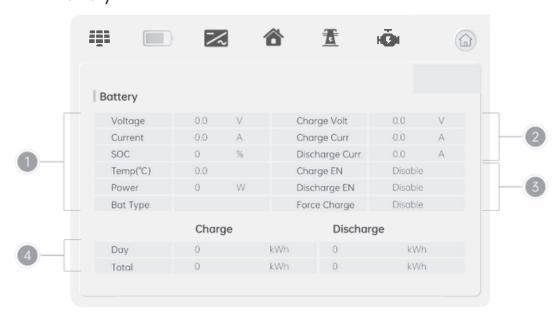
6.2.3 Grid

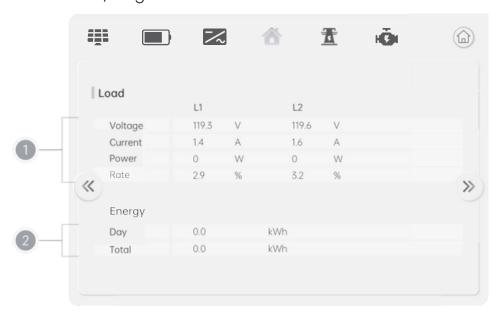| Data Panel of Grid	
1	Displays the working parameters on the grid, including frequency, real-time voltage, real-time current, and real-time power.
2	Displays the accumulated energy from the power grid to the inverter and accumulated energy from the inverter to the power grid, including daily and total accumulated energy.

6.2.4 Battery

Data Panel of Battery
1. Displays the working parameters of the battery, including real-time voltage, real-time current, battery surplus capacity, battery temperature, battery power, and battery type.
2. Displays battery charging voltage, charging current, and discharge current.
3. Displays the three working states of the battery, including charging, discharging, and forced charging.   **Charge EN:** Allows the inverter to charge the battery.   **Discharge EN:** Allows the inverter to discharge the battery.
4. Displays accumulated discharge and charging capacity of the battery, including daily and total accumulated energy.

6.2.5 Load

6.2.5.1 Load / Page One
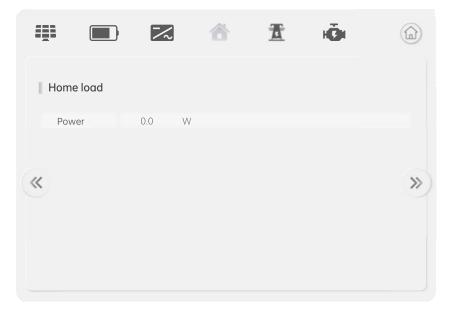
User can click « to return to the previous page, and click » to enter the next page. (not to be repeated later)

Load / Page One
1. Displays the working parameters of the load, including real-time voltage, current, power, and load rate.
2. Displays accumulated usage of load, including daily and total accumulated energy.
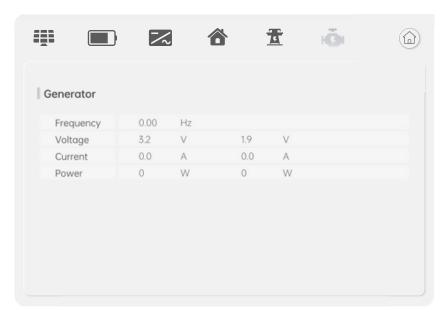
6.2.5.2 Load / Page Two

When "Home Load EN" is set to ENABLE, the device will measure and display the power consumption of any load connected to the mains output port.

6.2.6 Generator
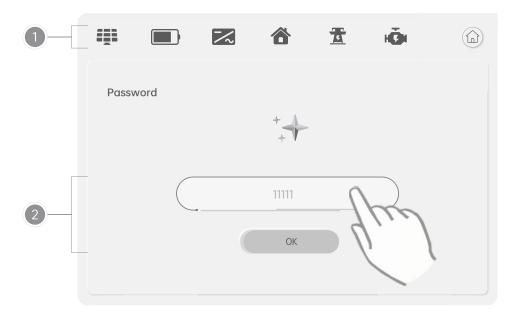
Displays the working parameters of the generator, including real-time voltage, current, and power.

6.3 Setting

6.3.1 Enter Setting
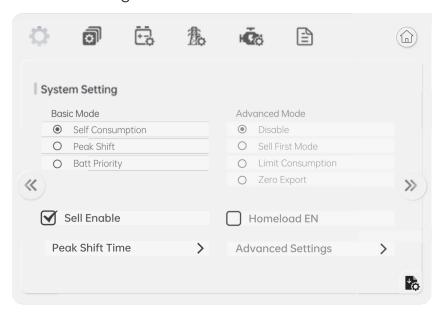
6.3.1.1 Input Password

Input password
1. Users can click on the icon above to enter device status data (PV, Battery, Hybrid inverter, Load, Grid, Generator) and return to the home page.
2. To enter the settings, a password is required. The default password is 11111. Click OK to enter the settings interface.

6.3.1.2 Enter the Settings Interface

Users can click on the icon above to switch between setting options, machine related information, and return to the home page.
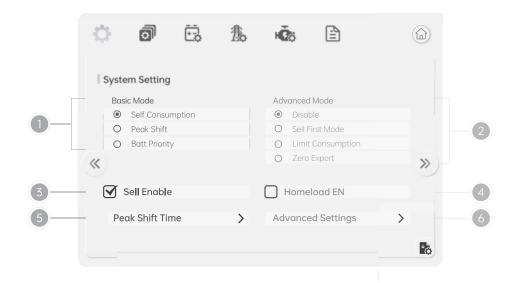
⚙️ System setting	🗂️ Parallel setting	🔋 Battery
🏗️ Grid setting	⚙️ Generator setting	📄 Machine

📥 After modifying the parameters, theuser needs to click on this icon to confirm themodification.

6.3.2 Setting Option

6.3.2.1 System Setting / Page One

Input Password

1. **Basic mode** includes three settings - Self consumption, Peak Shift, and Battery Priority.

2. In **Advanced Mode** there are four options - Disable, Sell First Mode, Limited Consumption Mode and Zero Export Mode. For full descriptions and configuration instructions, refer to Chapter 10.
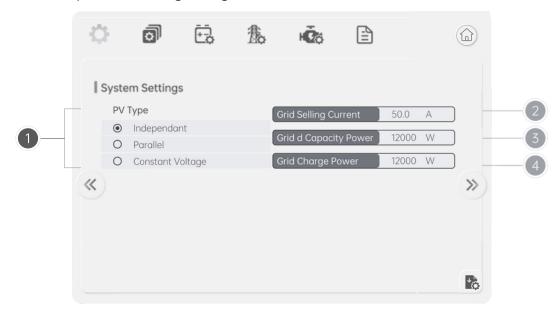
3. **Sell-First Mode** controls grid export capability. When enabled, the inverter is allowed to generate and deliver excess power to the utility grid. When disabled, grid export is not permitted.

4. **Homeload EN** allows the inverter to track home load usage, making the displayed home load power values more accurate.

5. **Limited Consumption Mode** limits how much power the system can draw from the grid. When enabled, the inverter uses PV or battery power to keep grid import below the set limit, helping reduce electricity costs and avoid exceeding contracted grid power.

6. **Zero Export Mode** ensures that no power is fed back into the utility grid. When this mode is enabled, the inverter adjusts PV and battery output so that generation only supplies local loads and does not export any excess energy. This is required in areas where grid feed-in is not allowed.

7. **Peak shift time** gives the user the option to enter the configuration interface for setting the time periods used in peak-shift mode.

8. Go to **Advanced Settings** to configure advanced operating modes. This section includes options such as enabling grid charging, PV-only charging, battery-charge priority, and Time-of-Use control with six programmable time periods. For more details, see Chapter 10.
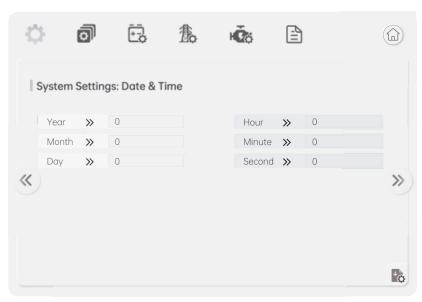
6.3.2.2 System Setting / Page Two

System Setting	
1.	Users can set PV types, including independent, Parallel and constant voltage.
2.	Default parameters vary by inverter model, which can be set for the inverter to sell current to the power grid.
2.	The inverter compares Grid Export Limit and Grid Selling Current and applies the lower of the two values as the actual export limit.
3.	Displays the maximum power drawn by the battery and load from the grid.
4.	Displays the limiting threshold for battery charging power drawn from the grid. When the battery is in charging mode, it cannot charge faster or draw more power than this specified limit.
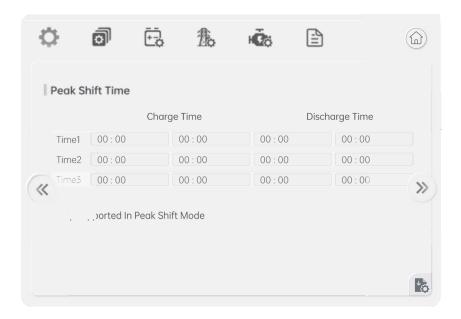
6.3.2.3 System Setting / Page Three

Date and time settings: Users can manually enter the year, month, day, hour, minutes and seconds. The year input range should be between 2000 and 2099.

6.3.2.4 Peak Shift Time

Peak shift time charging and discharging.

When the system is operating in peak-shift mode, the user must define when the battery should charge and when it should discharge. The user must manually type in:

- the start time for charging
- the end time for charging
- the start time for discharging
- the end time for discharging

Users must set the schedule for peak shift time charging and discharging.
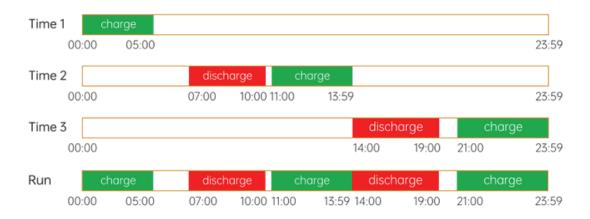
WORK TIME:
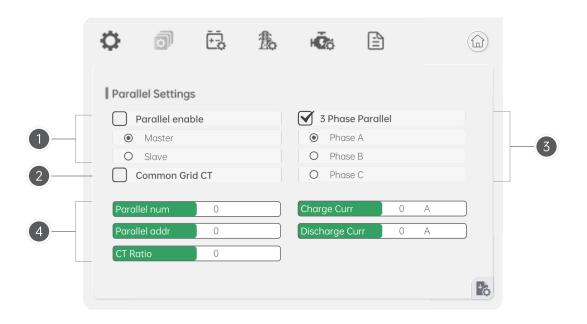
1. Up to 24 hours (one full day) can be scheduled, with six charge/discharge periods available (Time1, Time2, Time3, each with charge and discharge settings). The inverter repeats this schedule every day.

Set time range
00:00   23:59

2. The inverter follows the schedule you set for Time1, Time2, and Time3 in chronological order (from earliest time to latest). Each of these time periods must be separate, meaning they cannot overlap—one period must end before the next one begins.

3. If you want to set a continuous charging time from the first night to the next morning, divide this time period into two shorter time periods (21:00~23:59, 00:00~05:00); select two charging time periods from Time1, Time2 or Time3.

Parallel Setup Menu

1. Parallel enable mode allows you to turn the parallel operation feature on or off, which lets multiple inverters work together. The "Master/Slave" setting is used when parallel mode is active and lets you specify whether the inverter will function as the master, which controls and coordinates the system, or as a slave, which follows the master's commands.

2. A common grid CT is a single current transformer installed at the main grid connection that measures total grid current and shares this information with all inverters so they can operate consistently and coordinate functions like export limiting and load tracking.

3. Phase Parallel A/B/C: This interface is used to select the output phase of the device when three phases are used.

4. "Parallel num" sets how many inverters are connected in parallel.

   "Parallel addr" assigns each inverter a unique address; the master is set to 1 by default, the first slave to 2, and additional slaves to 3 and so on, with no two inverters sharing the same address.
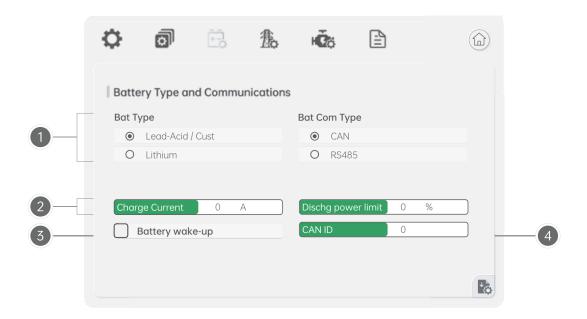
   The CT ratio is set to 2000:1 by default.

   "Charge curr" specifies the total charging current for parallel operation, and "Discharge curr" specifies the total discharging current for parallel operation.

6.3.4 Battery Settings

6.3.4.1 Battery Type and Communications

Battery Setup Menu

1. This setting allows you to choose the battery type and communication method. You can select either a lead-acid or lithium battery and choose CAN or RS-485 communication, with CAN set as the default.

2. Users can manually input the value of charging current and discharge power limit.

3. Battery wake-up: When the battery is extremely low and its internal relay has disconnected, this function allows the inverter to send a command through the BMS to force the relay to close so the battery can begin charging again. The feature is disabled by default and is only supported by certain battery models. If you need to use it, check with your dealer to confirm that your battery brand supports this function and use it only when the battery is severely low. After the battery has successfully woken up, be sure to turn this function off to avoid affecting normal inverter operation.

4. CAN ID: The default is 0, and this function is only used for lithium batteries with specific communication protocols. If required, please contact the supplier.

6.3.4.2 Battery Setting

Settings for Lead-Acid Batteries

Float Chg volt:
Sets the floating charge voltage, where the battery is charged at a constant voltage with a small current. The value can be set from 40 to 59.5 V and must be lower than the absorption (constant charge) voltage.

Absorption Volt:
Sets the absorption charging voltage, where the battery is charged at a constant current.

Bat Cutoff Volt:
Sets the battery discharge cut-off voltage (40–51 V), as recommended by the battery manufacturer. The inverter stops discharging below this level to protect the battery.

Over voltage:
Sets the battery over-voltage protection level during charging (50–59.5 V), based on the manufacturer's recommendations.

Grid dischg en:
Sets the discharge cut-off voltage for lead-acid batteries when the inverter is operating with the grid.

Hyst volt:
Sets the voltage level used to clear a low-voltage alarm. When battery voltage rises above "cut-off voltage + hysteresis voltage," the alarm clears and discharging can resume.

Battery cap AH:
Sets the battery's capacity (50–2000 Ah). This affects the maximum charging current. For example, if capacity is set to 100 Ah, the maximum charging current will be 20 A (20% of capacity).
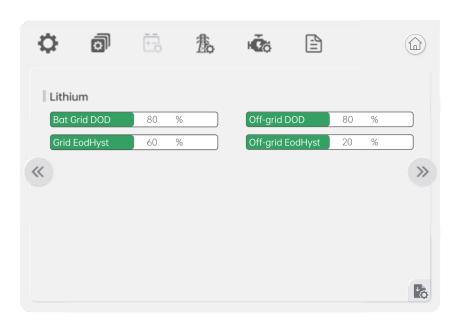
Settings for Lead-Acid Batteries

Bat grid DOD / off-grid DOD:
These settings define the depth of discharge limit for the battery. If the battery discharges beyond this limit, the inverter triggers a low-voltage alarm. Separate values can be set for grid-connected and off-grid operation.
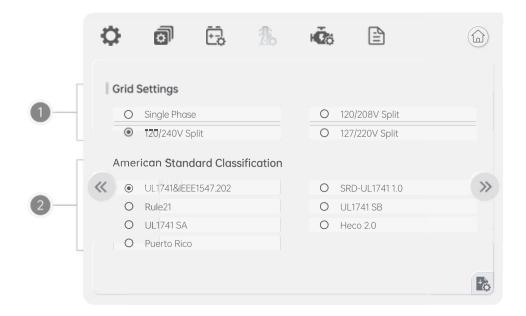
Grid eod hyst / off-grid eod hyst:
These settings control how the low-voltage alarm is cleared. Once an alarm occurs, it will reset only after the battery charges above the specified hysteresis value. The minimum default hysteresis is 5%.

6.3.5 Grid Setting
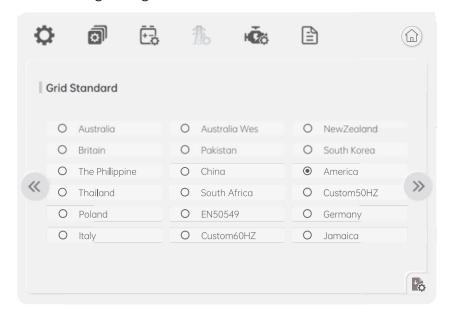
6.3.5.1 Grid Setting / Page One

Grid Setting / Page One
1   **Grid settings:** Inverter default option is 120/240V split phase.
2   American standard classification for multiple regions of America is provided. When grid standard = America, the system provides a classification that covers multiple regions within the Americas (possibly North America, Central America, South America, etc.)
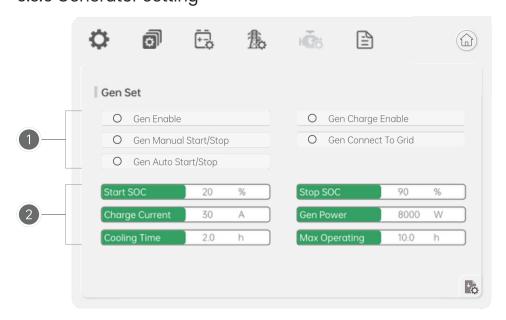
6.3.5.2 Grid Setting / Page Two

This interface is used to set the grid standard. Users can set and switch grid standards according to their needs.

Custom50Hz/60Hz: Customize grid settings.

6.3.6 Generator Setting

Generator Setting (Lithium Battery)

1. **Gen Enable**
   Activates the generator control function.

   Gen Charge Enable
   Allows the generator to charge the battery bank.

   Gen Auto Start/Stop
   Enables automatic generator start and stop through the dry-contact control.

   Gen Manual Start/Stop
   Allows the user to manually start or stop the generator.

   Gen Connect to Grid
   Indicates that the diesel generator is connected to the system's grid input port.

2. **Diesel Generator Parameter Settings**

   Start SOC
   When the battery State of Charge (SOC) falls below this value, the generator dry contact closes and the generator starts.

   Stop SOC
   When the battery SOC rises above this value, the generator dry contact opens and the generator stops. (Start SOC must be lower than Stop SOC.)

   Charge Current
   Sets the maximum current the inverter can use to charge the batteries from the generator.

   Gen Power
   Sets the rated output power of the generator.

   Cooling Time
   Defines the wait time before the generator is allowed to restart after completing a run cycle. (Unit: 0.1 hours)

   Max Operating Time
   Specifies the maximum total time the generator is allowed to run within one day. A value of **240** (24.0 hours) means there is **no daily run-time limit** and the generator will not be shut down by this setting. (Unit: 0.1 hours)

The generator's input voltage and frequency are monitored and controlled according to the protection settings on this page.

Gen Low Voltage
Defines the minimum acceptable generator input voltage. If the generator voltage falls below this value, the system will treat it as an under-voltage condition and may disconnect the input.

Gen High Voltage
Defines the maximum acceptable generator input voltage. If the generator voltage exceeds this value, the system will treat it as an over-voltage condition and may disconnect the input.

Gen Low Frequency
Sets the minimum allowable generator input frequency. Values below this threshold are treated as under-frequency conditions.
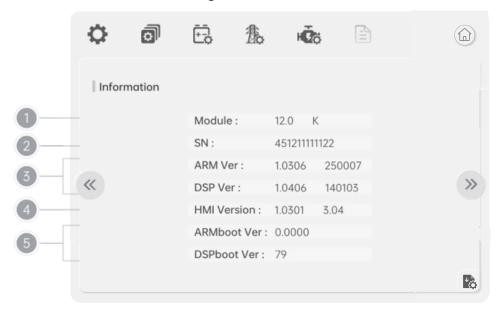
Gen High Frequency
Sets the maximum allowable generator input frequency. Values above this threshold are treated as over-frequency conditions.

6.3.7 Inverter Information 6.3.7.1

Inverter Information / Page One
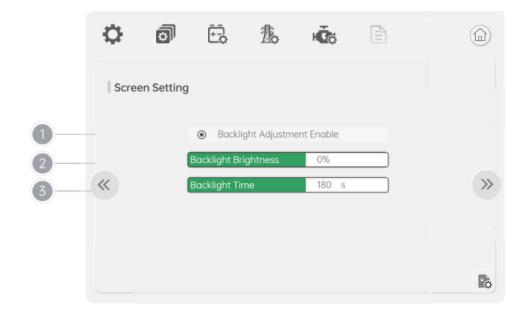
Inverter Information / Page One
1   Shows inverter module.
2   Shows hybrid inverter serial number.
3   Shows inverter software version.
4   Displays firmware version.
5   Displays inverter bootloader version.
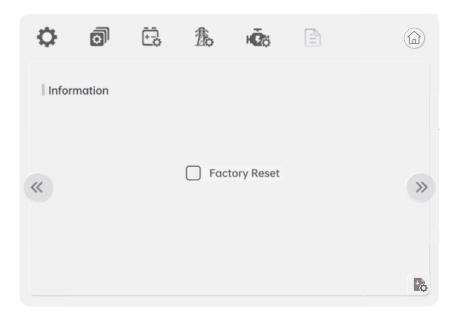
6.3.7.2 Inverter Information / Page Two

Inverter Information / Page Two
1   Use these options to adjust how the screen backlight operates. If none of the options are enabled, the screen will automatically turn off after 3 minutes by default.
2   Allows users to adjust screen brightness; this value ranges from 0 to 100%.
3   Specifies how long the display stays on before turning off automatically. The adjustable range is 5 to 250 seconds.

6.3.7.3 Inverter Information / Page Three
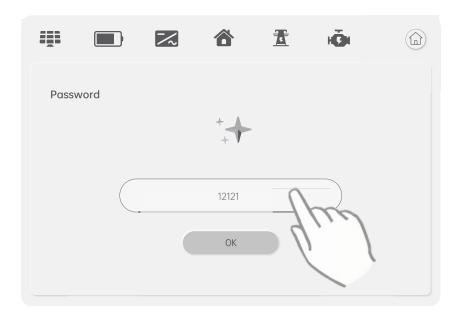
When the inverter is restored to factory settings, the parameters will be reset to the default values. This function takes effect only when the inverter is in standby mode.

6.4 Maintenance Setting

6.4.1 Enter maintenance Setting 64.1.1

Input Password
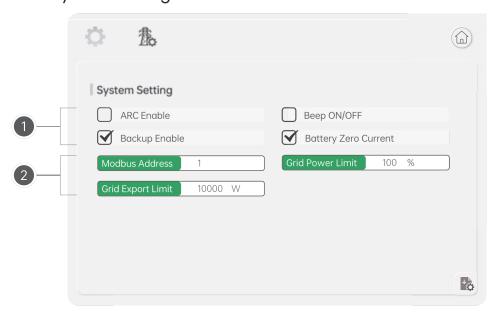
To enter the maintenance settings, a password is required. The default password is 12121. Click OK to enter the settings interface.

> ⚠ • Under normal circumstances, customers are not allowed to modify the parameters of this interface. To make changes, please contact the dealer.

6.4.2 System Settings

System Settings

1. **ARC enable:** ARC detection function.
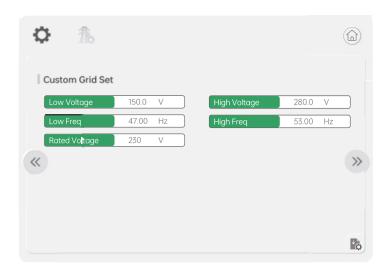
   Beep ON/OFF: Screen alarm switch. Set enabled, the buzzer will sound when the inverter alarms.

   Backup enable: When the grid and PV are powered off, Enable the battery to supply power to the load, default option is enabled. Modbus address: The default value is 1 and you do not need to change it.

2. **Battery zero current (Activated solely under sell first mode configuration):**
   When the inverter is in a no-charge/no-discharge state (both Grid Charge and Sell First are disabled):
   - If battery zero current is selected: Grid-supplied power directly feeds the load, isolating battery discharge path.
   - If battery zero current is deselected: Battery priority supply maintains load operation.

3. **Modbus Address:** In most cases, you should leave this setting unchanged. **Grid Power Limit:** Allows you to set the maximum power the inverter is allowed to output. Tap the field to enter a value. The default is 100% (full power).

   Grid Export Limit: Controls how much power the inverter is allowed to send back to the grid. The default value depends on the specific model.

6.4.3 Custom Grid Set

These settings apply only when the grid standard is set to "Custom."

Low Voltage
Sets the minimum grid voltage. If the grid drops below this value, the inverter reports a Grid Under-Voltage fault.

High Voltage
Sets the maximum grid voltage. If the grid rises above this value, the inverter reports a Grid Over-Voltage alarm.

Low Frequency
Sets the minimum grid frequency. If the frequency falls below this value, the inverter reports a Grid Under-Frequency alarm.

High Frequency
Sets the maximum grid frequency. If the frequency exceeds this value, the inverter reports a Grid Over-Frequency alarm.
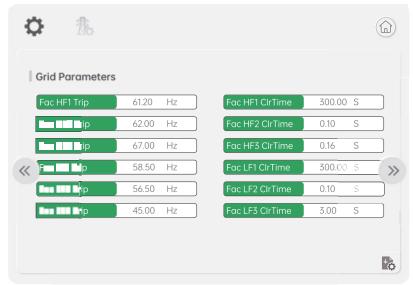
Rated Voltage
Defines the inverter's rated output voltage in custom grid mode. This value only takes effect when the grid standard is set to Custom.

6.4.4 Grid Parameters

Grid Parameters

Vac HV1 Trip	264.0	V	Vac HV1 ClrTime	13.00	S
▓▓▓ Trip	288.0	V	Vac HV2 ClrTime	0.10	S
▓▓▓ Trip	312.0	V	Vac HV3 ClrTime	0.10	S
V▓▓ ip	211.2	V	Vac LV1 ClrTime	20.00	S
▓▓▓ ip	192.0	V	Vac LV2 ClrTime	2.00	S
▓▓▓ Trip	120.0	V	Vac LV3 ClrTime	0.10	S

Grid Parameters

Fac HF1 Trip	61.20	Hz	Fac HF1 ClrTime	300.00	S
▓▓▓ ip	62.00	Hz	Fac HF2 ClrTime	0.10	S
▓▓▓ ip	67.00	Hz	Fac HF3 ClrTime	0.16	S
F▓▓ p	58.50	Hz	Fac LF1 ClrTime	300.00	S
▓▓▓ ip	56.50	Hz	Fac LF2 ClrTime	0.10	S
▓▓▓ ip	45.00	Hz	Fac LF3 ClrTime	3.00	S

Grid Protection Parameters

These settings are defined by your country's grid standard. If you need to adjust over-voltage or under-voltage protection levels, please contact your supplier.

HV – High-voltage trip protection

LV – Low-voltage trip protection

HF – High-frequency trip protection

LF – Low-frequency trip protection

6.4.5 Grid Reconnect Parameter

Grid Reconnection Parameters

Grid Voltage Low/High
Sets the lower and upper voltage limits the grid must meet before
the inverter reconnects.
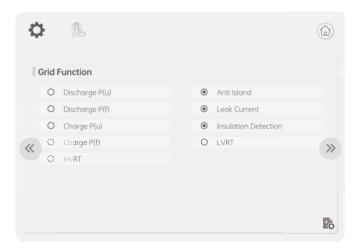
Grid Frequency Low/High
Sets the lower and upper frequency limits the grid must meet before
the inverter reconnects.

Grid Reconnection Time
Sets how long the inverter must wait before reconnecting to the grid.
The minimum allowable setting is 31 seconds.

6.4.6 Grid Function

Discharge P(U) – Generation Voltage Response When the grid voltage goes
outside the normal range, the inverter will limit its discharge (active power
output). This function is only activated if required by the national grid standard.

Discharge p(f): Generation frequency response

Grid Response and Protection Functions

Active Power Frequency Response
When the grid frequency becomes abnormal, the inverter automatically reduces its active power output. This function is enabled only if required by the local grid standard.

Charge P(U) – Charge Voltage Response
If the grid voltage goes outside the normal range, the inverter will limit its charging power. This feature is enabled only when required by national grid regulations.

Charge P(F) – Charge Frequency Response
If the grid frequency becomes abnormal, the inverter will limit its charging power. This function is enabled only when required by national grid standards.

HVRT / LVRT (High / Low Voltage Ride-Through)
Enables the inverter to remain connected during short periods of high or low grid voltage, as required by certain grid codes.

Anti-Islanding (Default: Enabled)
If the grid fails, the inverter quickly detects the outage and disconnects from the grid within milliseconds. This prevents energy from being fed into a downed or unsafe power line.

Leakage Current Detection (Default: Enabled)
Monitors for abnormal leakage current and provides protection if detected.

Insulation Detection (Default: Enabled)
Checks the system's insulation status.

- When enabled in grid-connected mode, the inverter performs one insulation test per day when PV power is available. During the test, the inverter switches to bypass mode.

- In off-grid mode, the inverter disconnects its output during the test, and the load will temporarily stop operating.

6.4.7 Reactive Power Parameter

Reactive Power Parameters

These settings control how the inverter manages reactive power. They are used only if required by the local grid standard.

Power Factor

Sets the inverter's power factor. The value must be between **L0.80–L0.99** or **C0.80–C1.00.**

Reactive Power

Controls the amount of reactive power the inverter provides. The setting can range from **–60% to +60%**, depending on the applicable standard.

QU Curve

Defines the relationship between grid voltage and reactive power.

QP Curve

Defines the relationship between active power and reactive power.
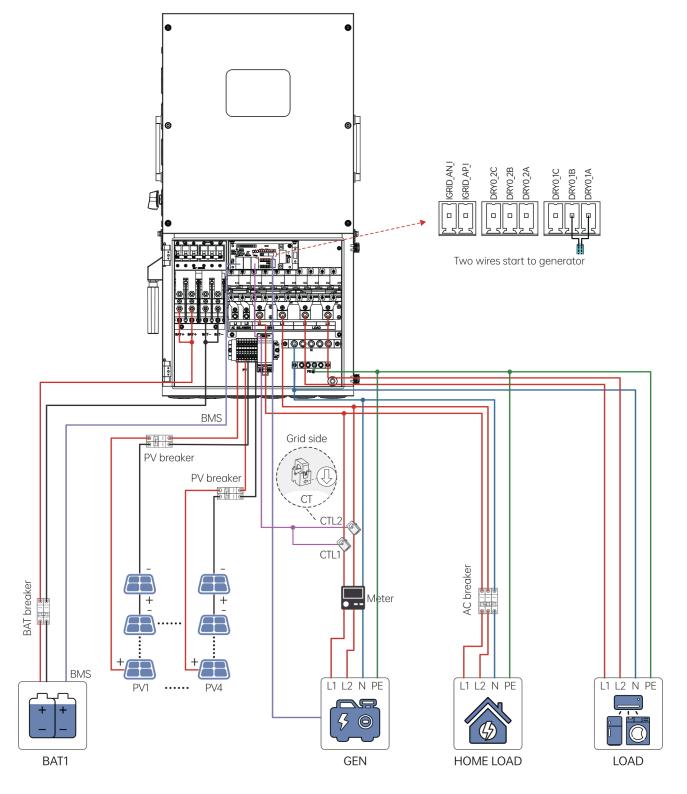
(These two functions are not available through the screen. Contact your distributor if you need them.)

7 Generator Use Operation Guide
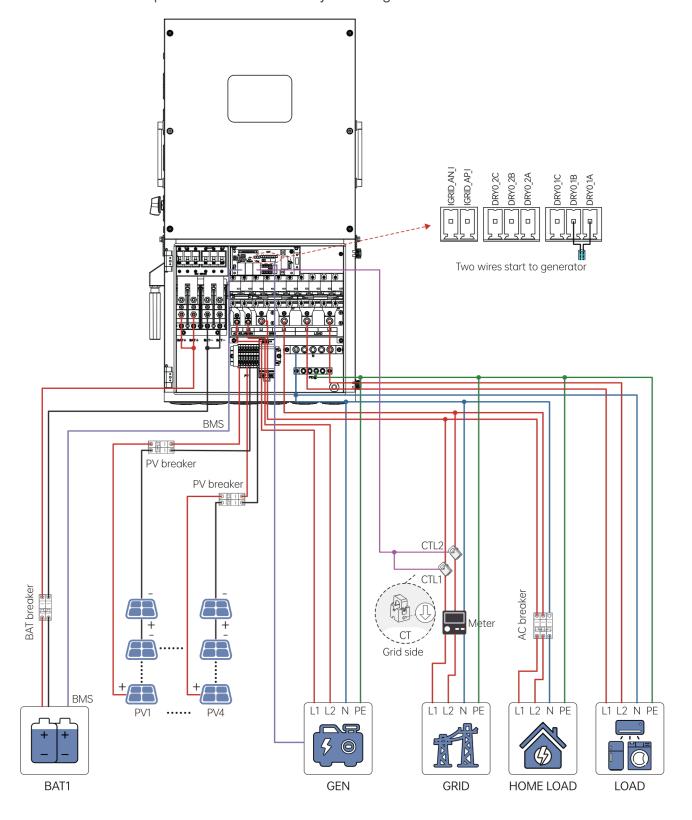
7.1 Generator Use Diagram

The generator provides two wiring methods for connection

- The first method is one where the generator is connected to the grid port of the inverter. The connecting cable is covered with CT and can be used in some off-grid situations. The system diagram is as follows:

Two wires start to generator

- The second method is that the generator is normally connected to the generator multifunction port. The connecting cable between the generator and the inverter does not need to be covered with a CT. The connection line of the power grid port must use a CT. The system diagram is as follows:

Two wires start to generator

BMS

PV breaker

PV breaker

BAT breaker

BMS

CTL2

CTL1

CT
Grid side

Meter

AC breaker

BAT1

PV1 ...... PV4

GEN

GRID

HOME LOAD

LOAD

7.2 Generator Operation Notes

1. Double-check the wiring.
   Make sure all cables and connections are installed correctly before using the system.

2. Choose only one generator control mode.
   The generator supports automatic or manual control. Select one mode—do not enable both at the same time.

3. Select "Connect to Grid Port" if using the generator on the inverter's grid input.
   When the generator is connected to the inverter's grid port, make sure this option is enabled in the settings.

4. Match generator voltage and frequency to the inverter's grid standards.
   The generator's output must fall within the inverter's accepted voltage and frequency limits.

5. Use DRYO_1A and DRYO_1B wires for automatic start/stop.
   These two dry-contact wires provide the signal that starts and stops the generator automatically.

6. For parallel inverter systems, only connect start/stop wires to the master unit.
   - Connect the generator's two start-signal wires only to the master inverter.
   - Enable the generator function on both master and slave inverters.
   - Make sure all inverters use identical generator settings.

7. Generator restart behavior in automatic mode.
   If the generator shuts down unexpectedly before the battery reaches the Stop SOC value, it will not restart on its own.
   To start it again, you must reset the Start SOC value.
   The same behavior applies if voltage-based control is used.
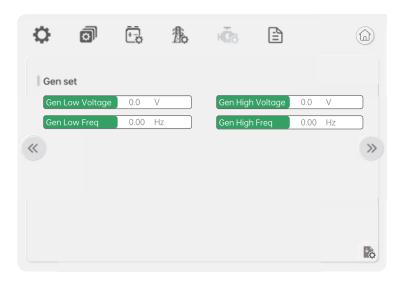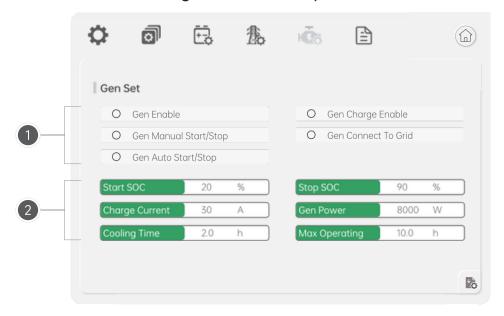
8. Generator input protection is controlled by this page's settings.
   The inverter monitors the generator's voltage and frequency using the protection parameters here. If they go out of range, the inverter will take protective action.

7.3 Generator Setting

7.3.1 Generator Setting (Lithium Battery)

Generator Setting (Lithium Battery)

Diesel Generator Enable Settings

Gen enable
This simply turns on the generator-control feature of the system.
If this is OFF, the inverter/EMS will ignore the generator entirely.

Gen charge enable
Allows the generator to charge your batteries when it is running.
If OFF, the generator can run but won't be used for battery charging.

Gen auto start/stop
If enabled, the system will automatically start or stop the generator using a dry contact (a simple relay signal).
The system might auto-start the generator when the battery is low, load is high, or grid is unavailable—depending on your configuration.

Gen manual start/stop
Lets you control the generator yourself.
You choose when to start or stop it using the system interface, rather than letting the system do it automatically.

Gen connect to grid
This option tells the system that the generator is connected to the *grid input port* of the inverter (not the AC load/output port).
This is important because it determines how the inverter synchronizes and how the power will flow when the generator is running.

Diesel Generator Settings

Start SOC means the battery percentage at which the system will automatically start the generator. If the battery drops below this level, the generator will be turned on.

Stop SOC means the battery percentage at which the system will stop the generator. If the battery rises above this level, the generator will be turned off.
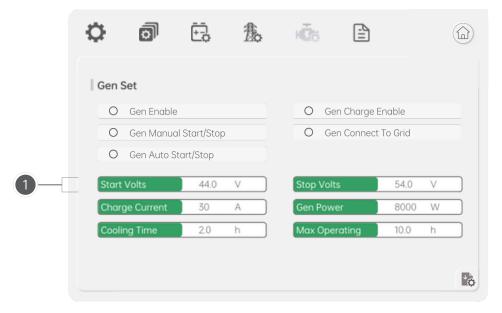
Charge current is the maximum amount of current the inverter is allowed to send to the battery when the generator is running.
Gen power is the normal rated power of the generator. The system uses this to manage charging and load.

Cooling time is how long the generator must rest before it can restart after running for its allowed time. The time is set in units of 0.1 hour, which is 6 minutes.

Max operating is the maximum number of hours the generator can run in one day. This is also set in units of 0.1 hour. A value of 240 means 24 hours, which allows the generator to run continuously without shutting off.
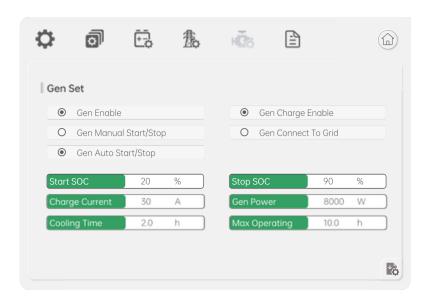
7.3.2 Generator Setting (Lead-Acid Battery)

1. **Start Volts:** In automatic mode, if the battery voltage drops below the level you set, the system will turn on the dry contact and start the generator.

   Stop Volts: In automatic mode, if the battery voltage rises above the level you set, the system will turn off the dry contact and stop the generator.
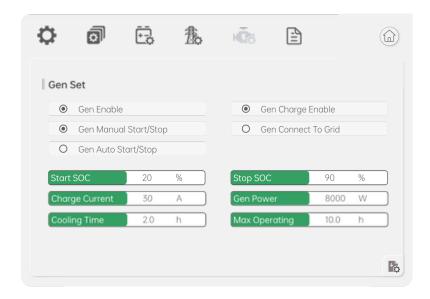
7.3.3 Generator Automatic Mode Setting

Turn on the generator features by selecting Gen Enable, Gen Auto, and Gen Charge Enable. Then set your generator's start and stop values (SOC or voltage), charging current, generator power, cooling time, and maximum running time.

NEOVOLTA™

7.3.4 Generator Manual Mode Setting

Turn on the generator functions by selecting Gen enable, Gen manual, and Gen charge enable. Then set the charging current, generator power, cooling time, and maximum running time.

8 Inverter Parallel Guide

8.1 Parallel System Diagram

8.1.1 Split Phase (120/240Vac) Parallel Connection Diagram

AC breaker
Depends on household loads

GRID standard: US
GRID set: 120V/240V

Parallel set:
Master set:
parallel num: 3   parallel adr: 1
Master/slave: Master   Common CT: Yes
Parallel en: Enable
Charge curr: xxA   Discharge curr: xxA
Phase set: A   3Phase en: disable

Slave 1 set:
parallel num: 3   parallel adr: 2
Master/slave: Slave   Common CT: Yes
Parallel en: Enable
Charge curr: \ A   Discharge curr: \ A
Phase set: A   3Phase en: disable

Slave 2 set:
parallel num: 3   parallel adr: 3
Master/slave: Slave   Common CT: Yes
Parallel en: Enable
Charge curr: \ A   Discharge curr: \ A
Phase set: A   3Phase en: disable

DRY0_1C   DRY0_1B   DRY0_1A

Two wires start to generator

GEN set:
Start SOC: xx%   Stop SOC: xx%
Charge curr: xx A   MAX run time: xx hour
Cooldown: xx hour

Manual mode contrl:
GEN en: enable   Gen charge: enable
Auto start: disable   Manual start: enable
Connect to grid: disable

Auto mode contrl:
GEN en: enable   Gen charge: enable
Auto start: enable   Manual start: disable
Connect to grid: disable

Note: Set the master and slave at same time.

The CT arrow points in the directions of the grid.

CAN1   CAN2   Meter_485

BMS_CAN/485   WiFi_485   CT L1/L2

3#

2#

1#

CAN

CAN

BMS_CAN/485

Breaker

CT1   CT2

PE

CT

L1 L2 N PE   L1 L2 N PE   L1 L2 N PE   L1 L2 N PE

BAT   GEN   HOME LOAD   GRID   LOAD

8.1.2 Parallel Connection for 120/208 Three Phase (American Standard)

AC breaker
Depends on household loads

GRID standard: US
GRID set: 120V/208V

Parallel set:
Master set:
parallel num: 3   parallel adr: 1
Master/slave: Master   Common CT: Yes
Parallel en: Enable
Charge curr: xxA   Discharge: xxA
Phase set:A   3Phase en: enable

Slave 1 set:
parallel num: 3   parallel adr: 2
Master/slave: Slave   Common CT: Yes
Parallel en: Enable
Charge curr: \ A   Discharge curr: \ A
Phase set: B   3Phase en: enable

Slave 2 set:
parallel num: 3   parallel adr: 3
Master/slave: Slave   Common CT: Yes
Charge curr: \ A   Discharge: \ A
Phase set: C   3Phase en: enable

Two wires start to generator

GEN set:
Start SOC: xx%   Stop SOC: xx%
Charge curr: xx A   MAX run time: xx hour
Cooldown: xx hour

Manual mode contrl:
GEN en: enable   Gen charge: enable
Auto start: disable   Manual start: enable
Connect to grid: disable

Auto mode contrl:
GEN en: enable   Gen charge: enable
Auto start: enable   Manual start: disable
Connect to grid: disable

Note: Set the master and slave at same time.

The CT arrow points in the directions of the grid.

Each inverter in the system has a fixed role based on its label:

- Units labeled "1#" are always the master inverter (the main controller of the system).
- Units labeled "2#" are always slave inverter 1 (they follow the master).
- Units labeled "3#" are always slave inverter 2 (they also follow the master).

You can connect several inverters together to increase the total power. When the AC load is running, all the inverters share the load. The wiring diagram for this setup is shown in section 8.1.1.
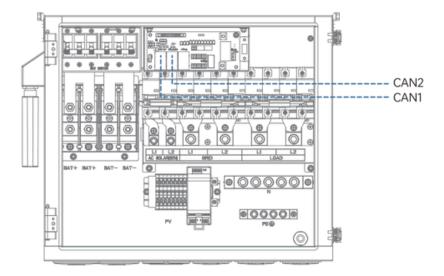
When using inverters in parallel, you can choose to share a CT (current transformer) or use separate CTs.
- If you do not share the CT, then each inverter needs its own CT, wired the same way as a single-inverter system.
- If you want to use external loads, you must use the COMMON CT wiring method and turn on COMMON CT ENABLE.

The inverters are set up to use batteries in parallel by default.

If you have multiple batteries, connect them according to the battery manufacturer's instructions, and make sure the battery communication cable is connected to the master inverter.

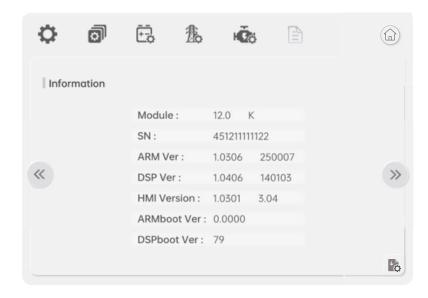## 8.2 Parallel Communication Cable Connection

To connect multiple inverters in parallel, you need CAT-5 communication cables. The inverters must be connected one to the next in a chain.

If all inverters share the same battery bank, the BMS communication cable must be connected to the master inverter. The master then sends the battery information to the other inverters through the parallel communication cables.
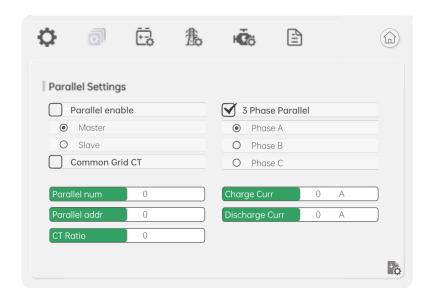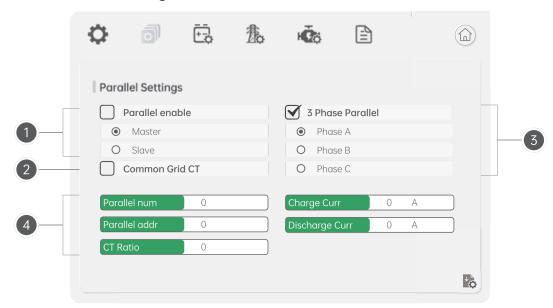
8.3 Parallel Operation Notes

1. Ensure that all inverters in the parallel system are using the same software version. Using different software versions may cause the parallelsystem to run abnormally.

2. Double-check all wiring. Most parallel-system problems are caused by incorrect connections.

3. Make sure the AC output cables from each inverter are the same length. This keeps the wiring resistance equal so that each inverter shares the load properly.

4. Follow the wiring diagram for the correct parallel settings. Incorrect settings are one of the most common causes of issues.

5. In a parallel system, multiple batteries are normally connected in parallel. Only the battery's BMS communication cable needs to be connected to the master inverter. Be sure the batteries are wired correctly and that the battery's communication protocol is compatible with the inverter.

6. If you are using a generator in a parallel system, connect and configure all inverters at the same time. This ensures all units operate consistently.

7. You can choose to use common CT (one CT shared by all inverters, with the master sending current data to the slaves) or separate CTs (each inverter has its own CT).
    If you are using household loads, you must use the common CT option.

8. The inverters communicate through parallel communication cables. These cables transfer data between the master and slave inverters. Each inverter has two communication ports (CAN1 and CAN2), and the order you use them does not matter.

9. If the parallel system still does not work correctly, contact after sales support for help.

8.4 Parallel System Setting

The parallel setting page can be visited in the following steps in the screen:

Password -> Parallel settings

8.4.1 Parallel settings

Parallel Setup Menu

Parallel enable
Turns the parallel function on or off.

Master / Slave
Choose whether this inverter will act as the master or a slave in the parallel system.

Common Grid CT
Turn CT sharing on or off.

Phase Parallel
Turn three-phase operation on or off.

Phase A / B / C
Select which phase this inverter uses in a three-phase system. (This feature is reserved and may not be active.)

Parallel num
Set how many inverters are connected in parallel.

Parallel addr
Set each inverter's address.
- The master is always address 1.
- If there is one slave, it must be address 2.
- If there are two slaves, they must be address 2 and address 3.

Each inverter must have a different address.

CT ratio
Set the CT ratio. The default is 2000:1.

Charge curr
Set the total charging current allowed for all inverters together. The system will split this current evenly between the units.
(Only the master sets this.)

Discharge curr
Set the total discharge current allowed for all inverters together. This is also shared evenly. (Only the master sets this.)

If you need to assemble the split phase into three phases, use the following settings:
1. 3PHASE EN;
2. PARALLEL EN;
3. PHASE selection;
4. Grid standard (United states);
5. Power grid settings(US 208V);
6. Master/slave selection;
7. Number of parallel machines.
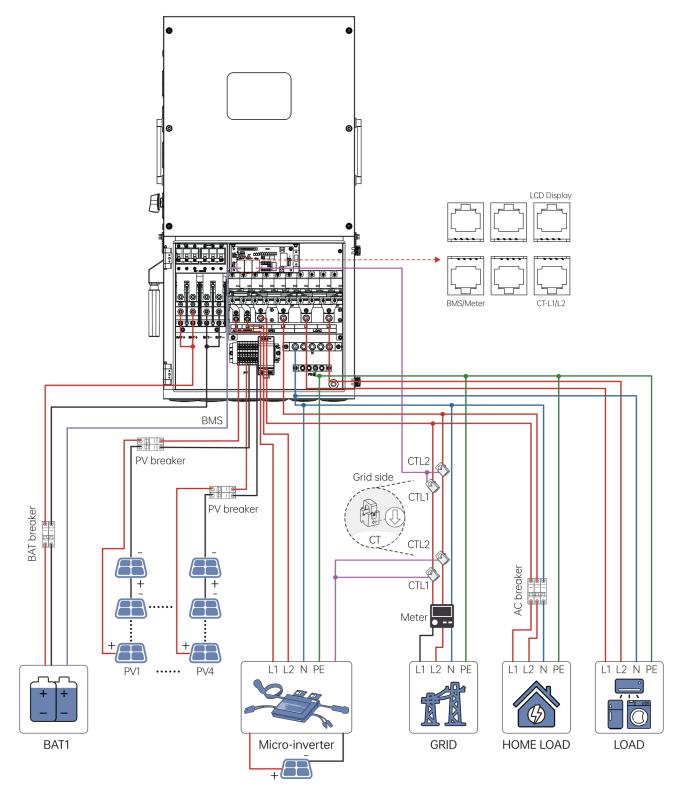
9 AC Coupled (Micro-Inverter)

Guide 9.1 AC Coupled Connection

9.1.1 Connect to Multifunction Port
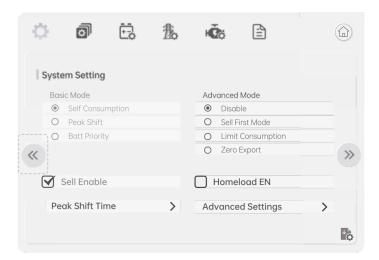
If you are not using a generator, we recommend still connecting something to the generator input terminal. This allows the hybrid inverter's internal sensor to measure the power coming from PV inverters or micro-inverters.
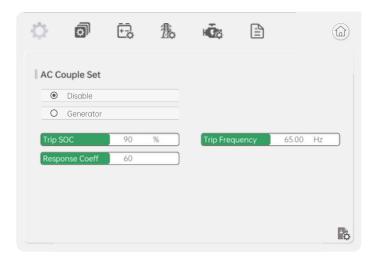
9.2 AC Coupled Function Setting

You can access the AC Couple settings page by following these steps:

Password -> System settings

Click the arrow on the next page of the settings interface to find the AC couple settings interface.

AC couple set
If you are using AC-coupled solar (like PV inverters or micro-inverters connected to the AC side), choose the generator option in this menu.

Trip SOC
If the battery's state of charge (SOC) goes above the value you set, the hybrid inverter will shut off the PV inverter or micro-inverters. This only works during a grid outage. If the grid is still on, this setting does nothing.

In off-grid mode
If the battery SOC drops to 10% below the value you set, the AC-coupled solar system will turn back on. (AC-coupled charging only works when you are using a lithium battery.)

Trip frequency
This feature is reserved. In the United States, the default frequency is 64.5 Hz

Response Coeff

This setting controls how quickly the inverter changes its frequency between the normal operating frequency and the trip frequency.
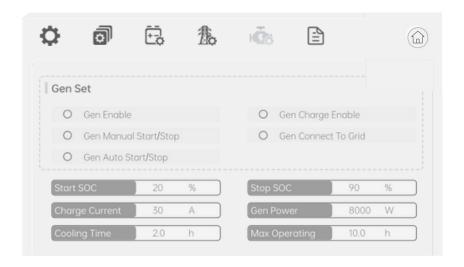
If this value is too high, the frequency may change too quickly, causing the AC-coupled PV inverter or micro-inverter to disconnect more often than it should.

If you notice that your AC-coupled system keeps disconnecting after it turns on, lowering this value will slow down the frequency change and make the connection more stable.

Gen enable: As shown in the figure, if you are using an AC couple, you need to manually turn off all functions on the gen enable interface.

When the grid is turned on, the hybrid inverter will no longer control the power output of the photovoltaic (PV) inverter by adjusting the frequency. If you want the PV inverter to continue operating as a grid-tie inverter, you must install a pair of CT clamps on the grid connection, as shown in figure 9.1.1, and make sure the CT arrow direction follows the PV inverter's instructions.

When a generator is used, the hybrid inverter will automatically turn off any AC-coupled PV inverters. The AC-coupling function will only work if the PV inverter is compatible with the hybrid inverter. In other words, the PV inverter must support frequency-response power control, which the hybrid inverter uses when it is operating off-grid.

10 Advanced Mode Operation Guide

10.1 Advanced Mode Introduction

The hybrid inverter can be programmed to control how and when to use grid power. The advanced mode allows management of flexible loads and time-of-use billing.

There are three advanced modes available: Sell First Mode, Limited Consumption Mode, and Zero Export Mode.

Table 10-1   **Advanced Work Mode**
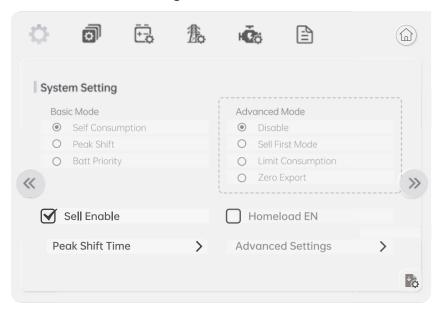
	Selling first	Limited consumption	Zero export
Grid sell disable/ enable	This will be enabled automatically.	For those regions with feed-in-tariff, enable this mode.	This will be disabled automatically.
Mode description	**Features:** Battery storage power can be sold to the grid under TOU control.	**Features:** Uses some grid power first, then uses battery storage power under TOU control.	**Features:** Never sells power to the grid.
	When TOU is enabled: During designated time slots: Charge or discharge to the grid at scheduled time and specific power without caring for consumption. When outside of the time slots: The grid cannot charge the battery, only allow the PV to charge the battery.	**When TOU is enabled:** Day time: PV power load and charge battery first, surplus power feedback to grid (grid sell enable) or limit the PV yield (grid sell disable). The grid charge can be scheduled When outside of the time slots: The grid cannot charge the battery, only allow the PV to charge the battery.	**When TOU is enabled:** Day time: PV power load and charge battery first, surplus power will be limited automatically. The grid charge can be scheduled. When outside of the time slots: The grid cannot charge the battery, only allow the PV to charge the battery.
	When TOU is disabled: Always charge the battery first whatever from PV or grid. The battery doesn't discharge on grid mode.	**When TOU is enabled:** Night time: discharge battery to power the load if the battery capacity is available. For those regions with tiered electricity prices, users can set CT limit power to use some grid power first. The grid charge can be scheduled	**When TOU is enabled:** Night time: discharge battery to power the load if the battery capacity is available. The grid charge can be scheduled.
		When TOU is disabled: Always charge the battery first whatever from PV or grid. The battery doesn't discharge on grid mode.	**When TOU is disabled:** Always charge the battery first from PV or grid power. The battery doesn't discharge on grid mode.

There are also some attributes of these mode: Global grid charge enable, PV charge only, Battery first, Time-of-use enable and 6 time-of-use slots. The time slots parameters are shown in as below:

Start time	Endtime	Bat power	Grid charge	Bat SOC
00:00	05:00	8000 W	✓	50 %
05:00	08:00	8000 W		50 %
08:00	10:00	8000 W	✓	50 %
10:00	16:00	8000 W		50 %
16:00	19:00	8000 W	✓	50 %
19:00	23:59	8000 W	✓	50 %

10.1.1 Advanced Mode Setting

Advanced mode has four options: **Disable, Sell First, Limited Consumption**, and **Zero Export**.

When **Disable** is selected, the inverter uses the normal operating modes such as Self-Consumption, Peak-Shift, or Battery-Priority. If you select any of the other three options (Sell First, Limited Consumption, or Zero Export), those basic modes will no longer apply.
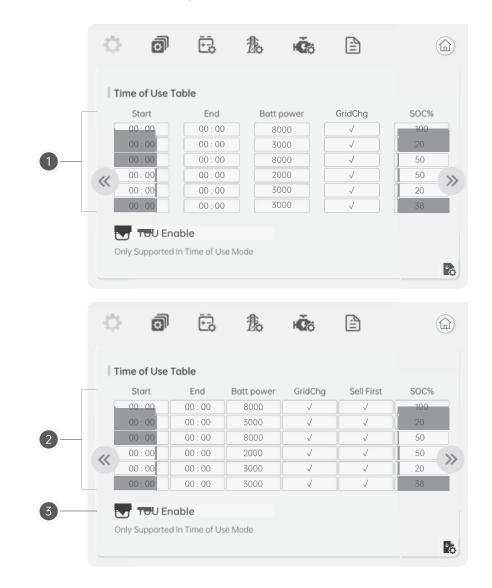
Sell First means the system tries to sell power to the grid before anything else. Selling to the grid is automatically turned on in this mode. Extra PV power is sent to the grid, and if Time-of-Use is enabled, extra battery power can also be sent to the grid.

Limited Consumption uses CT sensors to monitor the power flow to and from the grid. The inverter can be set either to sell or not sell to the grid based on CT readings. A "CT limit power" value is available in this mode. When discharge is needed, the grid supplies the amount you set, and the battery provides the rest. This mode works similarly to Self-Consumption, except that extra PV power can be sold to the grid according to the CT limit.

Zero Export requires CT sensors installed at the inverter's grid input. In this mode, the inverter will not allow any power to flow back into the grid. A "zero export power" setting is used to ensure no excess PV or battery power is exported.

You can click "Advanced settings" to enter the detailed configuration menu. These modes also include additional options such as: Global Grid Charge Enable, PV-Only Charging, Battery-Charge Priority, Time-of-Use Enable, and six customizable Time-of-Use periods.

Time of Use Table

Start	End	Batt power	GridChg	SOC%
00 : 00	00 : 00	8000	√	100
00 : 00	00 : 00	3000	√	20
00 : 00	00 : 00	8000	√	50
00 : 00	00 : 00	2000	√	50
00 : 00	00 : 00	3000	√	20
00 : 00	00 : 00	3000	√	38

① TOU Enable

Only Supported In Time of Use Mode

Time of Use Table

Start	End	Batt power	GridChg	Sell First	SOC%
00 : 00	00 : 00	8000	√	√	100
00 : 00	00 : 00	3000	√	√	20
00 : 00	00 : 00	8000	√	√	50
00 : 00	00 : 00	2000	√	√	50
00 : 00	00 : 00	3000	√	√	20
00 : 00	00 : 00	3000	√	√	38

② ③ TOU Enable
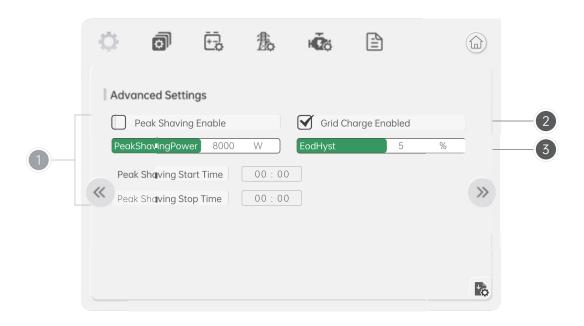
Only Supported In Time of Use Mode

Advanced Settings / First Page

1   Time-of-use enable: There are 6 slots which can be programmed. If grid charge is enabled, the grid is used to power the load and charge the battery to target SOC at a specific battery power attribute value. If selling electricity to the grid enable, the battery will discharge to target SOC at specific battery power attribute value.

Time period configuration restriction: The initial time segment parameters cannot be set just to zero values. Failure to configure valid time intervals will result in malfunction of the time-based scheduling function.

1   Batt Power: The power that the grid charges and discharges to the battery.

Grid Chg: Grid is ticked, indicating that in the effective interval of the current interface period, if the set SOC is greater than the actual SOC of the battery, the power grid will charge the battery (if not ticked, the power grid will not charge the battery); if the set SOC is less than the actual SOC of the battery, the battery can be discharged.

2   Sell first: This function is only displayed in the Sell First Mode, only after enabling can the battery sell to the grid, otherwise the battery will not sell to the grid. Other modes do not have this feature.

3   Only when TOU enable is selected, the timetable in the figure can be effective.

Advanced Settings / Second Page

Peak Shaving Enable

When Peak Shaving is turned on, the inverter will follow the Peak Shaving Power limit during the set start and stop times.
(For example, from 5 pm to 9 pm.)

Peak Shaving Power
This is the maximum power the inverter is allowed to draw from the grid.
During Battery Charging
- The inverter will not pull more than the set limit from the grid.
- If your home load suddenly increases, the inverter will reduce battery-charging power so the total grid draw (home load + charging) stays below the limit.

During Battery Discharging
- The home load is supplied by the battery first.
- If the load is higher than what the battery can provide (or is allowed to provide), the extra power will come from the grid—but never more than the Peak Shaving Power limit.

Global Grid Charge Enable
This controls whether the battery is allowed to charge from the grid.
- If Time of Use is OFF → This switch alone decides if grid charging is allowed.
- If Time of Use is ON → The battery can only charge from the grid during time periods where grid charging is enabled.

EodHyst (End-of-Discharge Hysteresis)
This prevents the battery from rapidly switching between charging and discharging near a set SOC level.
- When the battery hits the target SOC, it stops charging/discharging.
- If the actual SOC rises above target + EodHyst, battery is allowed to discharge again.
- If SOC falls below target – EodHyst, battery is allowed to charge again.
It basically creates a small "buffer zone" so the battery doesn't flip back and forth.

Time-of-Use & Operation Mode
If Time-of-Use is turned on but the inverter is outside the scheduled time slots, it automatically runs in Self-Consume mode.

Advanced Mode Requirement
Advanced Mode only works when:
- A battery is present, and
- The system is connected to the grid.
If either one is missing, advanced control settings won't have any effect.

11 APP Operation

11.1 Home Page

The home page contains options for setting up Wi-Fi, checking the data logger, switching to local control mode, restoring factory settings, changing the language (you can switch languages by clicking the icon in the upper-right corner), and changing the API settings.

When using the smart set app, the users can view the relevant status of the device in real time and control it wirelessly.

The APP provides the user with two different connectivity options, IoT remote mode (configured by the user according to the SOLARMAN smart APP's user manual) and local mode.

When you use the Smart Set app, you can check the device's status in real time and control it wirelessly.

The app offers two ways to connect:
- IoT remote mode, which lets you control the device from anywhere (set up through the SOLARMAN Smart App instructions).
- Local mode, which lets you connect directly to the device when you are nearby.

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11.2 Local Mode

11.2.1 Add a Logger

When you tap Local Mode, the app will open a scanner right away.
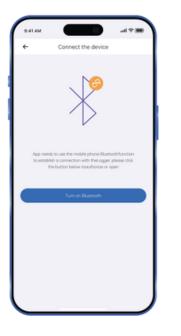You can then:

- Scan the logger's SN (serial number) using your phone's camera.
  (The SN is printed on the product box or on the logger itself.)
  OR
- Tap Enter SN to type in the serial number manually.
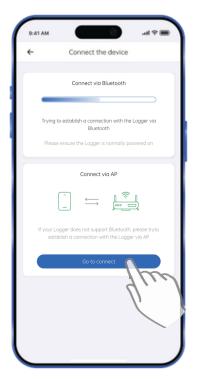

11.2.2 Bluetooth ON

Local mode supports bluetooth connection. You can turn on bluetooth in advance or add a logger firstly and then turn on bluetooth according to the page prompt. If the connection fails, users need to reconnect the logger.
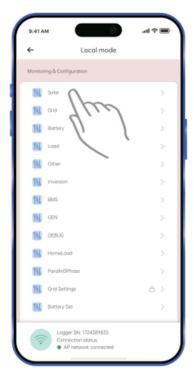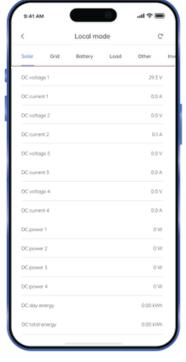
Or:

11.2.3 Enter the Local Mode Interface

Once the connection is complete, you can view the operating status of the device and the parameters set.

Click on the grouping to go to the detailed parameter page.
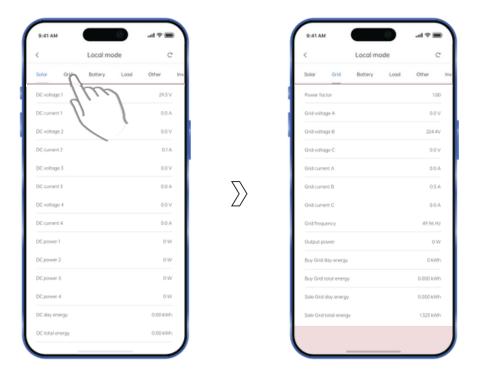
11.2.4 Working Status
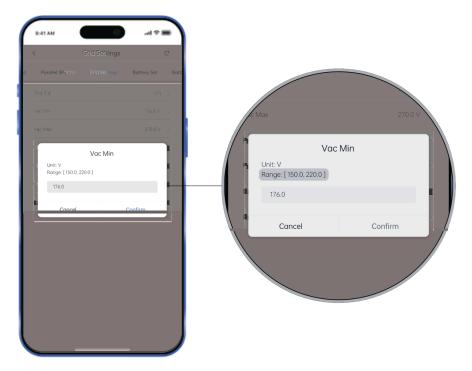
Click on the top groups to switch.

The monitoring & configuration page contains the following subgroups: Solar, Grid, Battery, Load, Other (Display software version SN code, fault information, working mode, device temperature, inverter temperature, etc.), Inversion, BMS, GEN, DEBUG, Home load, and Parallel 3Phase.

11.2.5 Set Parameters
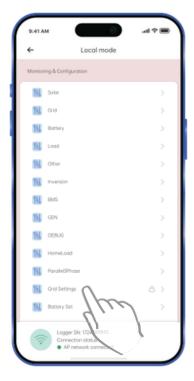
You can set the operating parameters of the device according to their needs. The parameters set by the user need to be within the specified range.
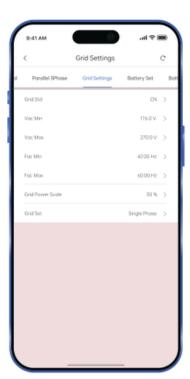
(1) Grid settings and grid protect set.

A password is required to access the grid settings. The default password is "00000".
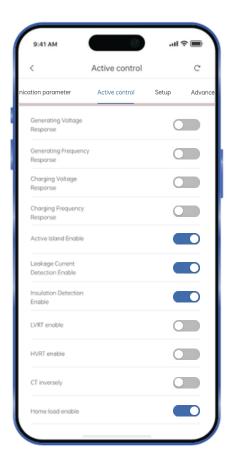
(2) Battery set, Battery management-custom model available and battery 485 communication parameter.
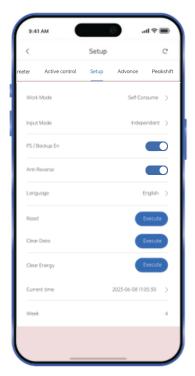
(3) Active control.

(4) Setup and advance.

Set work mode and PV input type, language, date/time, etc.
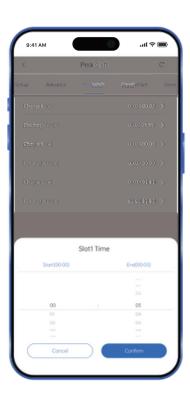
(5) Peak shift.

Set peak-shift charging and discharging time. When the operating mode is peak-shift, you need to enter this interface to set the charging and discharging time and manually enter the start charging/ discharging time and the end charging/ discharging time.

(6) Parallel set, Generator set, Advance work mode set, Custom function and AC couple.

12 Fault Diagnosis and Solutions

The inverter is easy to maintain. When you encounter the following problems, please refer to the solutions below, and contact the local distributor if the problem remains unsolved. The following table lists some of the basic problems that may occur during the actual operation as well as their corresponding basic solutions.

Fault Diagnosis Table

Table 12-1 Fault Diagnosis Table

| Content	Codes	Explanation	Solutions
Dischg over cur	01	Battery discharge over current. When the battery is loaded, the load is too large.	• No immediate action required, wait five minutes for the inverter to restart. • Check whether the load is in compliance with the specifications. • Cut off all the power and shut down all the inverters; disconnect the load and plug in to restart inverters, then check.
Over load	02	The load power is greater than other source power. (PV, BAT)	• Check whether the load is in compliance with the maximum power of the inverter. • Cut off all the power and shut down all the inverters; disconnect the load and plug in to restart inverters, then check whether the load is short circuited if the fault has been eliminated. • Contact customer service if error warning continues.
Bat disconnect	03	Battery disconnect. (Battery voltage not identified)	• Check whether the battery is connected. • Check if battery wiring port is open circuited. • Contact customer service if error warning continues.
Bat under volt	04	Battery voltage low that normal range.	• Checking system settings, If so, power off and restart. • Check if the grid power is down. If so, wait for the grid to power up, the inverter will automatically charge. • Contact customer service if error warning continues.
Bat low capacity	05	Bat low capacity.	• Battery Voltage is low. Normal range 40-58V. (SOC<100%-DOD)
Bat over volt	06	The battery voltage is greater than the inverter maximum voltage.	• Checking system settings, If so, power off and restart. • Contact customer service if error warning continues.
Gird low volt	07	Grid voltage is abnormal.	• Check if the grid is abnormal. • Restart the inverter and wait untilit functions normally.
Grid over volt	08		• Contact customerservice if errorwarning continues.

Content	Codes	Explanation	Solutions
Grid low freq	09	Grid frequency is abnormal.	• Check if the grid is abnormal. • Restart the inverter and wait until it functions normally. • Contact customer service if error warning continues.
Grid over freq	10		
Gfci over	11	Inverter GFCI exceeds standard.	• Check PV string for direct or indirect grounding phenomenon. • Check peripherals of inverter for current leakage. • Contact the local inverter customer service if fault remains unremoved.
Bus under volt	14	BUS voltage is lower than normal.	• Check the input mode setting is correct. • Restart the inverter and wait until it functions normally. • Contact customerservice if errorwarning continues.
Bus over volt	15	BUS voltage is over maximum value.	• Check the input mode setting is correct. • Restart the inverterand wait until it functions normally.
INV over cur	16	The inverter current exceeds the normal value.	• Restart the inverterand wait until it functions normally.
Cha over cur	17	Battery charge current over than the inverter maximum voltage.	• Restart the inverterand wait until it functions normally.
Meter comm fail	18	Meter comm fail.	• External meter alarm.
INV under volt	19	INV voltage is abnormal.	• Check if the INV voltage is abnormal. • Restart the inverter and wait until it functions normally. • Contact customerservice if errorwarning continues.
INV over volt	20		
INV freq abnor	21	INV frequency is abnormal.	• Check if the INV voltage is abnormal. • Restart the inverter and wait until it functions normally. • Contact customer service if error warning continues.
IGBT temp high	22	The inverter temperature is higher than the allowed value.	• Cut off all the power of the inverter and wait one hour, then turn on the power of the inverter.
Bat over temp	23	Battery temperature is higher than the allowed value.	• Disconnect the battery and reconnect it after an hour.
Bat under temp	25	Battery temperature is low than the allowed value.	• Check the ambient temperature near the battery to see if it meets the specifications.
Relay open circuit	26	Grid side relay open circuit detection.	• Used to detect whether the relay on the power grid side is disconnected due to a fault.

Content	Codes	Explanation	Solutions
BMS comm.fail	28	Communication between lithium battery and inverter is abnormal.	• Check the cable, crystal, Line sequence. • Checking the battery switch.
Fan fail	29	Fan fail.	• Check whether the inverter temperature is abnormal • Check whether the fan runs properly. (If you can see it)
Grid over load	30	Power of EPS load too large.	• Reduce the power of the EPS load, thereby reducing the power of the grid.
Grid phase err	31	The grid fault phase.	• Check power grid wiring.
Arc fault	32	PV arc fault.	• Check photovoltaic panels, PV wire • Contact customerservice if errorwarning continues
Bus soft fail	33	Hardware may be damaged and need to troubleshoot the cause.	• Restart the inverter and wait until it functions normally. • Contact customer service if error warning continues.
INV soft fail	34		
Bus short	35		
INV short	36		
Fan fault	37	Fan fault.	• Confirm that the inverter temperature is abnormal. • Confirm that the fan runs properly. (If you can see it)
PV iso low	38	PV iso low.	• Check if the PE line is connected to the inverter and is connected to the ground. • Contact customer service if the error warning continues.
Bus relay fault	39	The inverter may be damaged.	• Restart the inverter and wait until it functions normally. • Contact customer service if error warning continues.
Grid relay fault	40		
EPS rly fault	41		
Gfci fault Self	42		
test fail	45		
System fault	46		
Current DC over	47		
Voltage DC over	48		

⚠

• If an error occurs that is not listed in the table, Please contact customer service.

13 Technical Parameters

13.1 Inverter Specification

Table 13-1	Inverter specification

PV input Data

Technical data	NV12KAC	NV16KAC
Max. DC input power (kW)	18	24
No. of MPPT trackers	4	
MPPT voltage range (without battery) (V)	120 - 500	
MPPT voltage range (with battery) (V)	120 - 430	
Max. DC input voltage (V)	500	
Max. input current per MPPT (A)	16/16/16/16	20/20/20/20
Max. short current per MPPT (A)	22/22/22/22	25/25/25/25

Battery input Data

Technical data	NV12KAC	NV16KAC
Nominal voltage (V)	48	
Max. charging/discharging current (A)	250/260	260/280
Battery voltage range (V)	40-58	
Battery type	Lithium / Lead acid	
Charging controller	3-Stage with equalization	

AC Output Data (On-Grid)

Technical Data	NV12KAC	NV16KAC
Nominal output power output to grid (kW)	12	16
Max. apparent power output to grid (kVA)	13.2	17.6
Nominal AC voltage (L-N/L1-L2)	(110~120)/(220~240V) split phase, 240V single phase	
Nominal AC frequency (Hz)	60 (55 to 65)	
Nominal AC current (A)	50	66.7
Max. AC current (A)	55	73.3
Max. grid passthrough current (A)	200	
Output THDI	< 3%	

NEOVOLTA

AC Output Data (Back-Up)

Technical Data	NV12KAC	NV16KAC
Nominal. apparent power (kW) Max.	12	13
apparent power (No PV) (kVA) Max.	12	13.2
apparent power (With PV) (kVA)	13.2*	
Nominal output voltage (V) Nominal	120/240	
output frequency (Hz) Output power	60	
factor Output THDU	0.8leading~0.8lagging	
	< 2%	

Efficiency

Technical Data	NV12KAC	NV16KAC
MPPT efficiency Europe efficiency (PV)	99.9%	
Max. PV to grid efficiency (PV) Max.	96.2%	
battery to load efficiency Max. PV to	96.5%	
battery charing efficiency Max. GRID to	94.6%	
battery charing efficiency	95.8%	
	94.5%	

Protection

Technical Data	NV12KAC	NV16KAC
Grounding detection Arc fault	YES	
protection Island protection	YES	
Insulation resistor detection	YES	
Residual current monitoring unit	YES	
Output over current protection	YES	
Back-up output short protection	YES	
Output over voltage protection	YES	
Output under voltage protection	YES	
	YES	

General Data

Technical Data Operating	NV12KAC	NV16KAC
temperature range ( )	-25 ~ +60	

Technical Data	NV12KAC	NV16KAC
Relative humidity	0-95%	
Operating altitude	0~4000m (Derating above 2000m altitude)	
Ingress protection	IP65/NEMA 3R	
Weight (with breaker)(kg)	56	
Dimensions (width*height*depth)	495 * 900 * 260	
Cooling	FAN cooling	
Noise emission (approximately)	57dB*	
Display	Touch panel	
Communication with BMS/meter/EMS	RS485, CAN	
Supported communication interface	RS485, 4G (optional), Wi-Fi	
Self-consumption (W)	< 25	
Safety	UL1741, UL1741SA&SB all options, UL1699B, CSA -C22.2 NO.107.1-01, RSD (NEC690.5, 11, 12)	
EMC	FCC Part 15 Class B	
Grid connection standards	IEEE 1547, IEEE 2030.5, HECO Rule 14H, CA Rule 21 Phase I, II, III, CEC, CSIP, SRD2.0, SGIP, OGPe, NOM, California Prob65	

- 13.2*: During daylight hours, the NV16KAC inverter model delivers a maximum AC-side output power of 16kW, calculated as:

- Battery: 13.2kW + PV (photovoltaic): 2.8kW = 16kW.

- At night, the maximum AC-side output power is 13.2kW (attributed to the absence of PV generation at night).

- 57dB*: Test condition: Chamber back ground noise max <16dB.