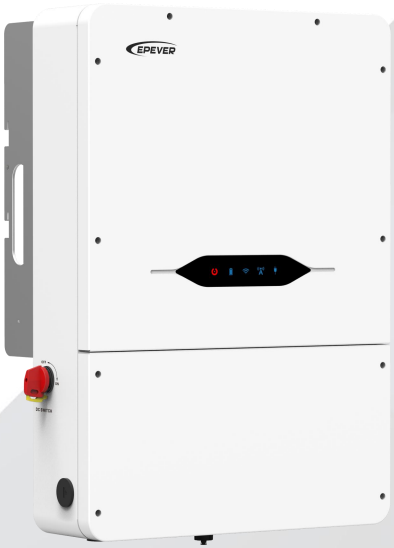
USER MANUAL



On-Grid Hybrid Inverter

(Grid Support Utility-interactive Inverter)

EHD6K, EHD8K, EHD10K, EHD12K

EN

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Preface

1. Attention

The products, services or features you purchase are subject to the company's commercial contracts and terms. All or part of the products and service features described in this document may not be within the scope of your purchase. Unless otherwise agreed in the contract, the company does not make any express or implied statements or warranties regarding the contents of this document.

As an important part of the device, you can print the electronic user manual into paper as needed, and keep the paper and electronic documents properly for future reference. Anyone operating the device at any time must operate in accordance with the requirements of this manual.

2. Copyright declaration

3. Overview

Please read the user manual carefully before installation, operation and maintenance. This manual contains important safety and installation instructions, which must be followed during equipment installation and maintenance.

4. Applicable products

This user manual describes the installation, electrical connection, commissioning, maintenance and troubleshooting of the EHD series on-grid hybrid inverter (hereinafter referred to as "inverter"). The EHD series includes the following product models:

EHD6K, EHD8K, EHD10K, EHD12K

5. Intended audience

This manual is only intended for professionals who are familiar with local regulations, standards and electrical systems, have received professional training, and know the product well.

6. Symbols in this manual

To ensure the user's personal and property safety during operation, as well as the efficient use of this product, relevant safety instructions are provided in the manual and highlighted with the corresponding symbols. To prevent personal injury and property damage, please fully understand and strictly follow these highlighted information. The symbols used in this manual are as follows.

DANGER

Indicates a high-level hazard that, if not avoided, will result in serious injury or death.

WARNING

Indicates a medium-level hazard that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a low-level hazard that, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates an important reminder during the operation which, if ignored, may result in an equipment error alarm.

Tip	Indicates recommendation for reference.
	Read through the user manual before any operations.

Disclaimers

The warranty does not apply to the following conditions:

- Damage caused by improper use or inappropriate environments (It is strictly forbidden to install the inverter in the flammable, explosive, dust accumulative or other harsh environments).
- The actual current/voltage/power exceeds the limit value of the inverter.
- Damage caused by working temperature exceeding the rated temperature range.
- Electric arc, fire, explosion and other accidents caused by failure to follow the inverter labels or manual instructions.
- Unauthorized disassembly and maintenance of the inverter.
- Damage caused by force majeure such as lightning strikes, rainstorms, mountain torrents and grid failures, etc.
- Damage occurred during transportation or loading/unloading the inverter.

Important Safety Instructions

Please keep this manual for future reference.

This manual contains instructions on safety, installation, and operation for EHD series on-grid hybrid inverter.

1. General safety instructions

⚠ DANGER

- The high voltage circuits in the inverter can endanger lives!
- Only professional electrical engineers can operate this product, minors and people with disability/mental illness cannot use this product. Do not install the inverter at a place within children's reach.

⚠ WARNING

- Ensure that the maximum AC input voltage and maximum photovoltaic (PV) output voltage (namely, the PV open circuit voltage after low temperature correction) does not exceed the maximum input voltage of the inverter. Failure to do so may result in inverter damage or other losses, for which EPEVER reserves the right to exclude warranty and shall not bear any joint liability.
- Due to the high temperature of the case when the inverter is running, be careful of being burned.
- When the inverter is running, only the display and buttons of the inverter can be touched.

NOTICE

The PV frame and bracket should be safely grounded in accordance with the local power department's grounding requirements!

2. Requirements for inverter installation

- Inverter must be installed in full compliance with national and local grid standards and regulations.
- Before proceeding with the installation and commissioning, read and understand all instructions contained in this manual, familiarize yourself with relevant safety symbols.
- In accordance with national and state/provincial regulations, access to the power grid is only permitted after obtaining authorization from the power department, and the operation must be performed by a qualified electrical engineer.
- Before installing and maintaining the inverter, cut off the DC power from the PV array and

battery pack by the DC switch, as well as the AC power from the grid and generators by the AC switch. Failure to do so may result in high voltage causing serious injury.

3. Requirements for professional and technical personnel

Installation, operation, maintenance, and replacement of devices or components are permitted only for qualified professionals or trained personnel. Personnel responsible for the installation and maintenance of device must undergo rigorous training, understand various safety precautions, and master correct operating procedures.

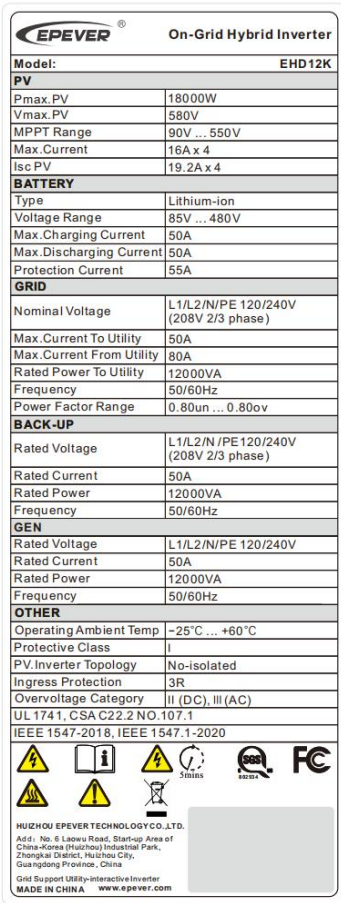
4. Transportation precautions

Upon leaving the factory, the inverter is already in its optimal electrical and mechanical condition. During transporting, it is imperative to use the inverter's original packaging or appropriate packaging to ensure the safety. Damage to the inverter caused during transportation is the responsibility of the shipping company. Upon pickup, please conduct a thorough inspection of the inverter. If any packaging issues are found that may cause damage to the inverter, or if any visible damage is found to the inverter, please immediately notify the responsible shipping company. If necessary, you can seek assistance from your PV system installer or EPEVER.

5. Assembly precautions

Assemble the inverter according to the details in the following sections of this manual. Place the inverter on an object (such as a wall or component bracket) with appropriate load-bearing capacity, ensuring it is placed vertically. Choose a suitable location for the installation of electrical equipment, ensuring sufficient space for fire escape routes to facilitate maintenance in case of failure. Maintain appropriate ventilation conditions to ensure adequate air circulation for cooling, with air humidity less than 95% during assembly.

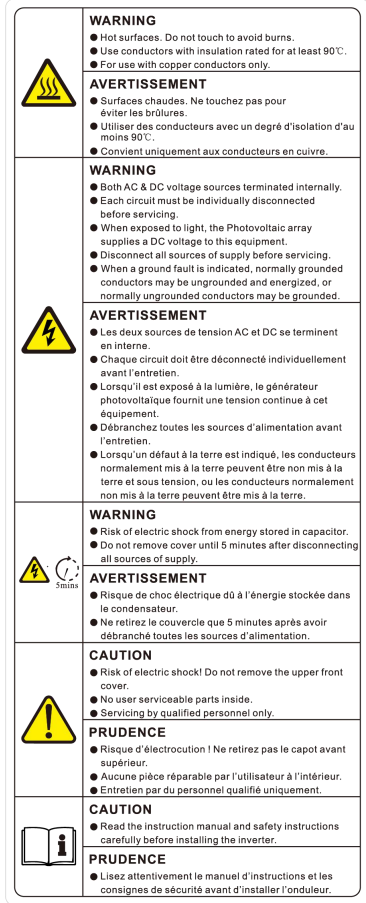
6. Inverter label



EPEVER	On-Grid Hybrid Inverter
Model:	**EHD12K**
PV	
Pmax.PV	18000W
Vmax.PV	580V
MPPT Range	90V ... 550V
Max.Current	16A x 4
Isc PV	19.2A x 4
BATTERY	
Type	Lithium-ion
Voltage Range	85V ... 480V
Max.Charging Current	50A
Max.Discharging Current	50A
Protection Current	55A
GRID	
Nominal Voltage	L1/L2/N/PE 120/240V (208V 2/3 phase)
Max.Current To Utility	50A
Max.Current From Utility	80A
Rated Power To Utility	12000VA
Frequency	50/60Hz
Power Factor Range	0.80un ... 0.80ov
BACK-UP	
Rated Voltage	L1/L2/N /PE120/240V (208V 2/3 phase)
Rated Current	50A
Rated Power	12000VA
Frequency	50/60Hz
GEN	
Rated Voltage	L1/L2/N/PE 120/240V
Rated Current	50A
Rated Power	12000VA
Frequency	50/60Hz
OTHER	
Operating Ambient Temp	-25°C ... +60°C
Protective Class	I
PV.Inverter Topology	No-isolated
Ingress Protection	3R
Overvoltage Category	II (DC), III (AC)
UL 1741, CSA C22.2 NO.107.1	
IEEE 1547-2018, IEEE 1547.1-2020	

5mins

HUIZHOU EPEVER TECHNOLOGY CO.,LTD.
Add: No. 6 Laowu Road, Start-up Area of China-Korea (Huizhou) Industrial Park, Zhongkai District, Huizhou City, Guangdong Province, China
Grid Support Utility-interactive Inverter
MADE IN CHINA www.epever.com



WARNING
- Hot surfaces. Do not touch to avoid burns.
- Use conductors with insulation rated for at least 90℃.
- For use with copper conductors only.

AVERTISSEMENT
- Surfaces chaudes. Ne touchez pas pour éviter les brûlures.
- Utiliser des conducteurs avec un degré d'isolation d'au moins 90℃.
- Convient uniquement aux conducteurs en cuivre.

WARNING
- Both AC & DC voltage sources terminated internally.
- Each circuit must be individually disconnected before servicing.
- When exposed to light, the Photovoltaic array supplies a DC voltage to this equipment.
- Disconnect all sources of supply before servicing.
- When a ground fault is indicated, normally grounded conductors may be ungrounded and energized, or normally ungrounded conductors may be grounded.

AVERTISSEMENT
- Les deux sources de tension AC et DC se terminent en interne.
- Chaque circuit doit être déconnecté individuellement avant l'entretien.
- Lorsqu'il est exposé à la lumière, le générateur photovoltaïque fournit une tension continue à cet équipement.
- Débranchez toutes les sources d'alimentation avant l'entretien.
- Lorsqu'un défaut à la terre est indiqué, les conducteurs normalement mis à la terre peuvent être non mis à la terre et sous tension, ou les conducteurs normalement non mis à la terre peuvent être mis à la terre.

5mins

WARNING
- Risk of electric shock from energy stored in capacitor.
- Do not remove cover until 5 minutes after disconnecting all sources of supply.

AVERTISSEMENT
- Risque de choc électrique dû à l'énergie stockée dans le condensateur.
- Ne retirez le couvercle que 5 minutes après avoir débranché toutes les sources d'alimentation.

CAUTION
- Risk of electric shock! Do not remove the upper front cover.
- No user serviceable parts inside.
- Servicing by qualified personnel only.

PRUDENCE
- Risque d'électrocution ! Ne retirez pas le capot avant supérieur.
- Aucune pièce réparable par l'utilisateur à l'intérieur.
- Entretien par du personnel qualifié uniquement.

CAUTION
- Read the instruction manual and safety instructions carefully before installing the inverter.

PRUDENCE
- Lisez attentivement le manuel d'instructions et les consignes de sécurité avant d'installer l'onduleur.

Labels must not be covered by unrelated objects (such as rags, cardboard boxes, equipment, etc.). Regular wiping is necessary to keep them visible at all times.

7. Explanations of symbols

The EHD series on-grid hybrid inverters come with some safety related labels. Ensure you carefully read and fully understand the labels before installing.

Symbol	Definition
	**Residual Power Discharge** Delayed discharge. Wait 5 minutes after power off until the components are completely discharged.
	**Electric Shock Hazard** The inverter contains fatal DC and AC power. All work on the inverter must be carried out by qualified personnel only.
	**Beware of Hot Surface** High-temperature hazard. Do not touch the product under operation to avoid being burnt.
	**Caution** Potential risks exist. Wear proper Personal Protective Equipment before any operations.
	**FCC Mark** The inverter complies with the requirements of the applicable FCC guidelines.
	**Grounding Terminal** Connect the inverter with grounding terminal to achieve grounding protection.
	Read through the user manual before any operations.
	**Electrical Polarity Mark** Pay attention to the polarity of the electrical connection.
	**Temperature Mark** Indicates the operating temperature range.
	**Up Mark** The inverter must always be transported, handled, and stored in such a way that the arrows always point upwards.

8. Electrical connection precautions

When handling energized inverters, comply with all current state regulations related to the prevention of electrical accidents.

⚠ DANGER

- All installation operations must be carried out by professional electrical engineers who have received training, thoroughly read this manual, and fully understood the relevant safety considerations.
- Ensure that the PV arrays are covered with opaque materials or the DC circuit breaker is disconnected before electrical connections. Exposure to sunlight will cause the PV array to generate dangerous voltages.
- When installing batteries, confirm the positive and negative terminals of the battery and ensure the battery is turned off.
- When connecting to the AC power, ensure that the breaker is disconnected.

NOTICE

The inverter can only be connected to the grid after obtaining permission from the local power department and ensuring all electrical connections are completed by a professional electrical engineer.

9. Operating precautions

⚠ DANGER

- Touching the terminals of the power grid or PV array, etc., may cause death from electric shock or fire!
- Do not touch terminals or conductors connected to the grid and PV circuit.

⚠ WARNING

Please wear protective gloves when operating the inverter as some internal components will heat up.

NOTICE

Pay attention to any instructions or safety documentation related to grid connections.

10. Maintenance precautions

⚠ DANGER

Before any maintenance, the electrical connection between the inverter and the grid should be disconnected first, followed by the disconnection of the DC side. Wait for at least 5 minutes until the internal components are fully discharged.

NOTICE

- The inverter can be restarted after removing the faults, which affects the safety performance. If any maintenance is required, please contact the local authorized service center.
- Unauthorized disassembly or alteration of components within the inverter is prohibited. Any losses caused by this will not be covered by the warranty or joint liability of EPEVER.

11. Inverter EMC Disclaimer

This equipment is designed to comply with Electromagnetic Compatibility (EMC) standards. However, electromagnetic interference (EMI) may still occur during operation due to factors such as installation environment, external devices, or other external conditions. The user is required to install and operate the device strictly in accordance with the provided instructions and to implement necessary measures to mitigate potential interference. The manufacturer shall not be liable for any interference issues resulting from improper installation, operation, or external environmental factors. For further assistance, please contact technical support.

1 Product Introduction

1.1 Overview

The EHD series is a split-phase high-voltage on-grid hybrid inverter that integrates an on-grid PV inverter and a battery, featuring a 3R protection rating. With various built-in working modes to meet users' diverse needs, it supports grid charging, oil generator charging, solar charging, bypass output and AC independent output with parallel scalability. Additionally, it supports parallel operation of multiple split-phase inverters for application expansion.

The inverter optimizes the solar output power to achieve self-consumption, feeding excess energy into the grid or storing it in batteries to reduce reliance on the grid and provides backup power during outages. The uninterrupted power supply (UPS) mode supports inductive loads such as air conditioners or refrigerators, with an automatic UPS level switch time of less than 10 milliseconds (ms).

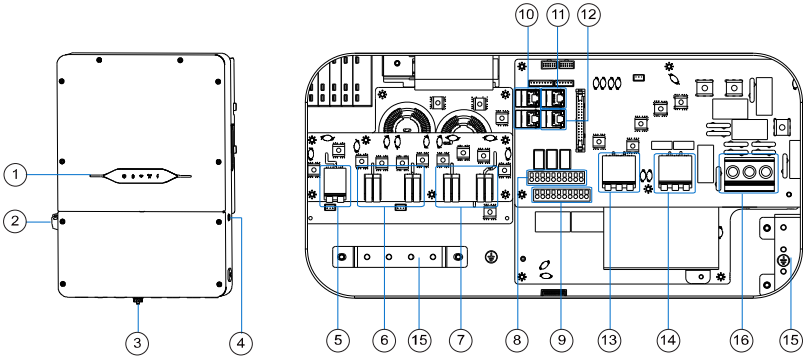
The EHD series inverter is applied to on-grid and off-grid solar power systems, integrating on-grid PV inverter and battery charging/discharging capabilities, offering a flexible solution for household electricity needs.

Features

- Integrated heat dissipation technology without fans, 3R rated dustproof and waterproof
- User-friendly APP operation through the WiFi module
- UPS level switching within 10ms
- PV maximum input power up to 18,000W, support oversizing up to 1.5 times the rated power
- PV input voltage range from 90V to 580V
- PV maximum working current 16A plus 4 channels
- High standard protection on the DC side, including standard surge level II protection and optional AFCI function
- Supports the connection of high-voltage batteries and anti-reverse-connection protection, with voltage range 85V to 480V
- Comprehensive anti-reverse current function
- Multiple AC parallel function for more flexible system solutions
- Optional RS485/WiFi/GPRS modules for smart monitoring
- RSD rapid shutdown to reduce device damage and prevent personnel injury
- The off-grid load can support 100% unbalanced load
- Supports two-wire control for generator start/stop functionality

- Supports generator connection to the grid port, enabling simulated grid functionality
- Independent generator port for energy storage, smart load, and AC coupling management

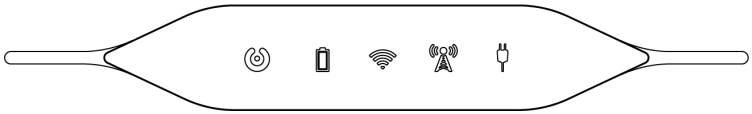
1.2 Appearance



1	LED indicator	9	COM1 port
2	DC switch	10	Parallel port 1/2
3	WiFi/GPRS com. port	11	DER_RS485 and wired monitoring com. port
4	ON/OFF button	12	BMS com. port
5	Battery input terminals	13	Load connection port (From left to right: L2, N and L1)
6	PV1/2 input terminals	14	Generator connection port (From left to right: L2, N and L1)
7	PV3/4 input terminals	15	PE copper terminals
8	COM2 port	16	Grid connection port (From left to right: L1, N and L2)

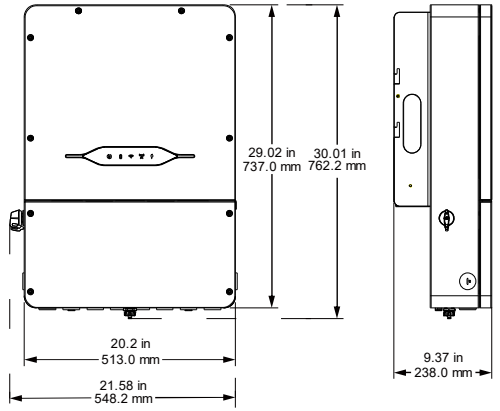
For the introduction of Ports ③, ④, ⑧, ⑨, ⑩, ⑪, and ⑫, please refer to Subsection 3.7 Connecting the COM cable.

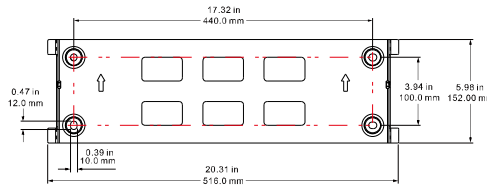
1.3 Indicator

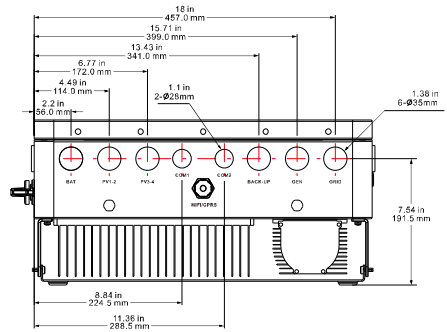


No.	Indicator	Symbol	Status	Description
1	Operating		Flashing blue (2s on 2s off)	Standby
			Flashing blue (1s on 1s off)	Self-test
			Solid blue	The inverter is running normally.
			Flashing red (1s on 1s off)	Recoverable faults
			Solid red	Unrecoverable faults
2	Battery		Solid ON	Battery is online.
			OFF	Battery dropout
3	IoT		Solid ON	Data sending in Software/IoT.
			OFF	No data sending in Software/IoT.
4	Grid		Solid ON	Normal grid.
			OFF	Abnormal grid
5	Load		Solid ON	Normal AC output
			OFF	Abnormal AC output
6	Upgrade		Pink	Upgrade successful.
			Solid red	Upgrade failed.
			Flashing	Upgrading.

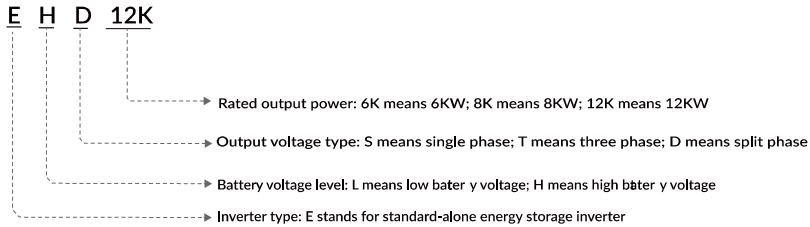
1.4 Dimensions





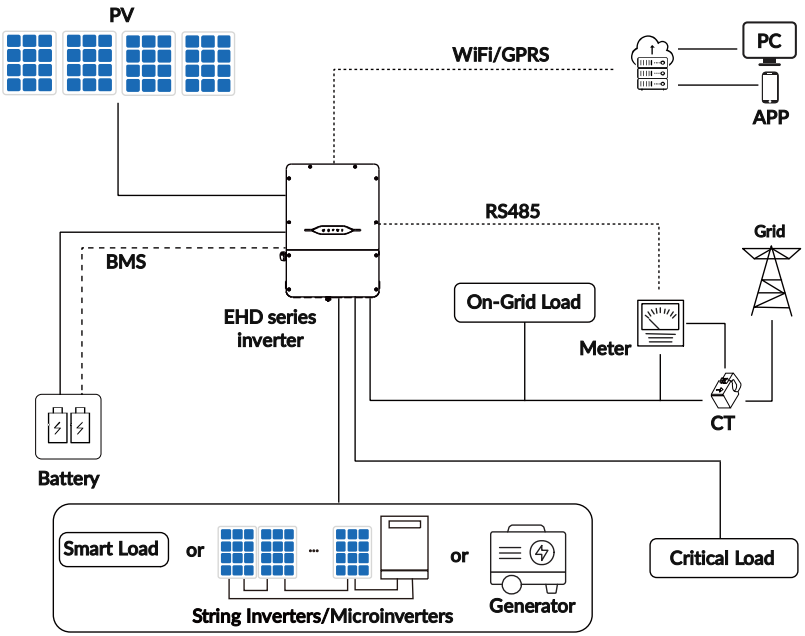


1.5 Naming rules

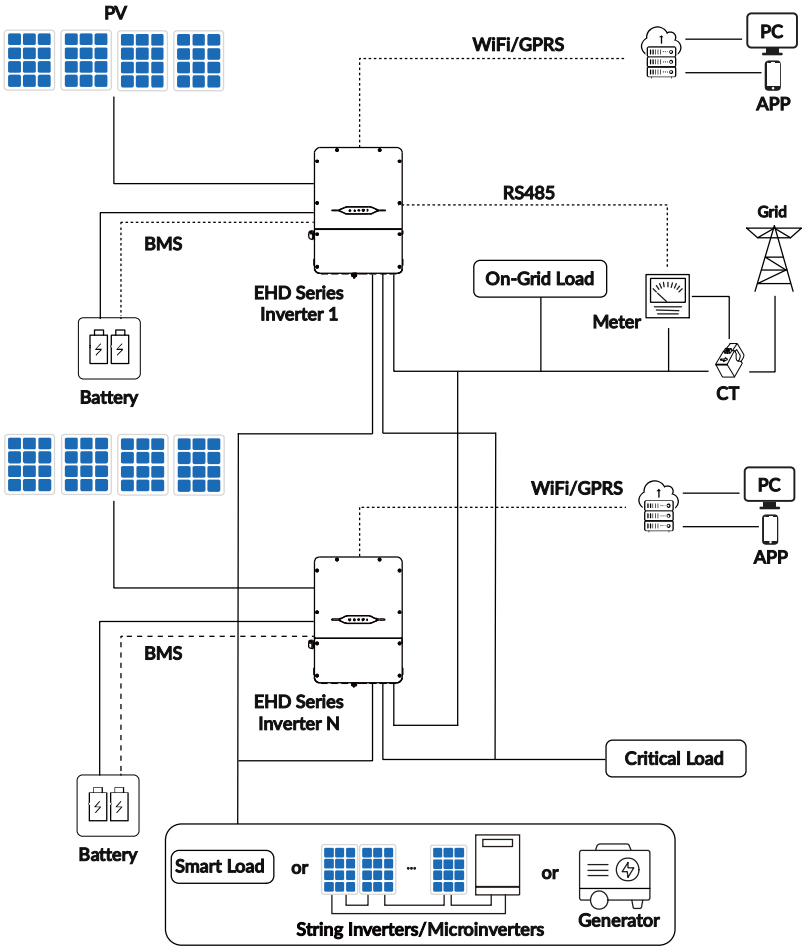


1.6 Application scenarios

- Schematic diagram of single inverter connection

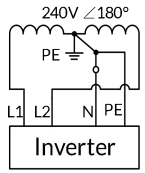


- Schematic diagram of multiple inverters connection

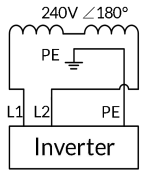


1.7 Supported grid types

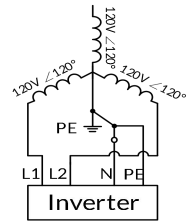
The EHD series supports the following grid configurations: 120/240V split-phase (120VAC between L1-N and L2-N with a 180° phase difference), 240V single-phase (240VAC between L1-L2 with no neutral output), and 120/208V two-phase derived from a three-phase system (120VAC between L1-N and L2-N with a 120° phase difference).



120/240V Split Phase



240V Single Phase



120/208V 2 Phase of 3

NOTICE

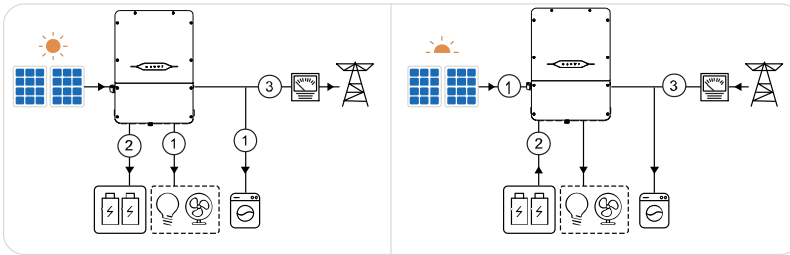
- The Grid PE-N Bonding Detection function is enabled by default. To disable this function, configure it via the APP. For details, refer to the "EHD Series APP Instructions Manual".
- In North American split-phase power system areas, the inverter's PE and the grid's N line must be externally bonded in the distribution cabinet, and the Grid PE-N Bonding Detection function must be enabled in the APP. Failure to do so will prevent the inverter from operating in on-grid mode.
- In split-phase power system areas where bonding the inverter's PE and the grid's N line is not required, the Grid PE-N Bonding Detection function must be disabled in the APP. Otherwise, the inverter will not operate in on-grid mode.

1.8 Working modes

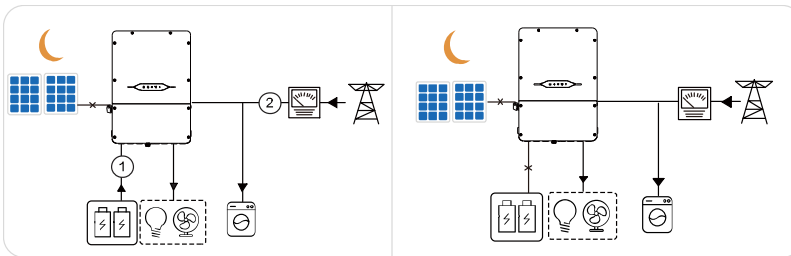
1.8.1 Self consumption mode

Day time: When the power generated in the PV system is sufficient, it will supply the loads in priority. And the excess power will charge the batteries first. The remaining power will be sold to the grid.

When the power generated in the PV system is insufficient or no power is generated, the battery will supply the loads in priority. If the battery power is insufficient, then the load will be powered by the grid.



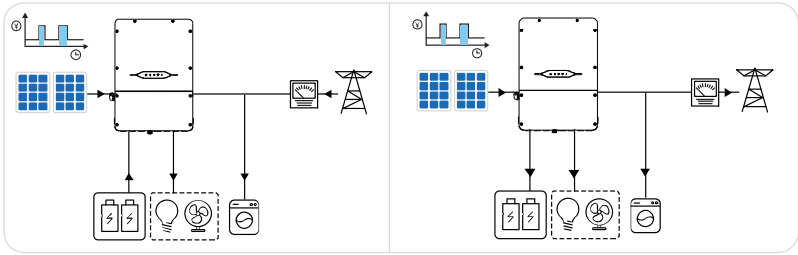
Night: If the battery power is sufficient, the load will be powered by the battery. If the battery power is not enough, the load will be powered by the grid.

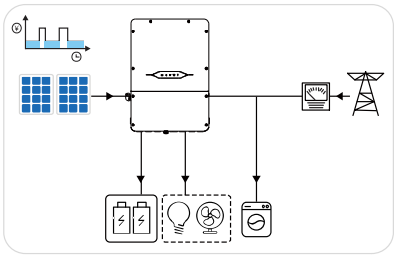


Scenario recommendation: It is suitable for areas with high electricity prices and little or no solar power generation subsidies.

1.8.2 Economic mode

Users can set the charging power based on their own electricity demand and price, enabling battery charging during periods of low electricity demand and switching to a self-consumption mode during high electricity demand periods. The stages of high and low electricity demand are divided by season, week, and time of day, with summer and winter primarily determining high and low demand, weekdays and weekends primarily determining electricity usage, and day and night primarily determining electricity demand.

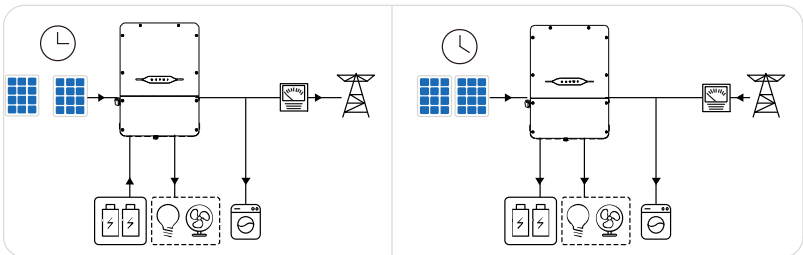




Scenario recommendation: Users with distinct high and low electricity demand, such as less electricity during weekdays and more on weekends, can set up battery charging at night on weekends. For example, if local summer PV generation significantly differs from winter, battery charging can be scheduled at night during winter.

1.8.3 Time-of-use mode

The system performs the charging and discharging according to the set charging/discharging period and power.

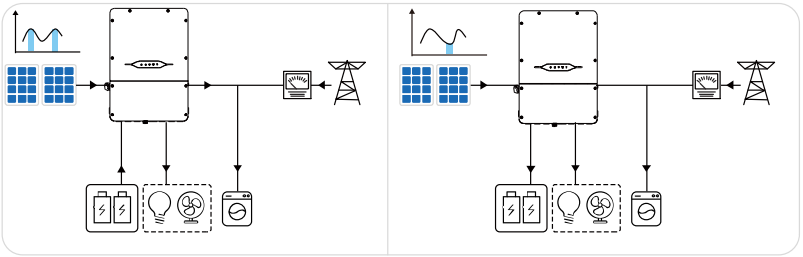


Scenario recommendation: It is suitable for scenarios when the peak-valley electricity price varies a lot, and it can only be used when local laws and regulations are met, such as whether the battery is allowed to discharge and sell to the power grid. When the electricity price is at its valley, set the time for the grid to charge the battery. When the electricity price is at its peak, the battery will power the load first, and the remaining power can be sold to the grid. Thereby earning the

corresponding profit from the grid price difference.

1.8.4 Peak shaving mode

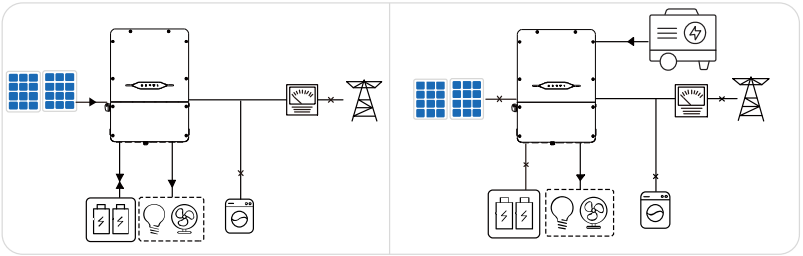
Users can set the peak shaving power according to the actual need. During peak hours, the inverter limits the power supplied by the grid. The insufficient power is provided by PV and battery, reducing the local electricity consumption. During off-peak hours, the grid charges the battery, and supplies power to the load simultaneously.



Scenario recommendation: Recommended for use in areas with high electricity consumption.

1.8.5 Emergency power supply mode

When the power grid is cut off, PV will supply the loads in priority; if the PV power generation cannot meet the load usage, the battery discharges to supplement. If the PV power generation exceeds the load demand, the surplus power charges the battery. When the battery runs out of energy, the system can switch to a diesel generator mode, and then the generator supplies power to the load.



Scenario recommendation: Recommended for use in areas with unstable power grid.

2 Installation

2.1 Precautions

DANGER

- Do not install the inverter in a place near flammable, explosive, or corrosive materials.
- Do not install the inverter in a place that is easy to touch, especially within children's reach.

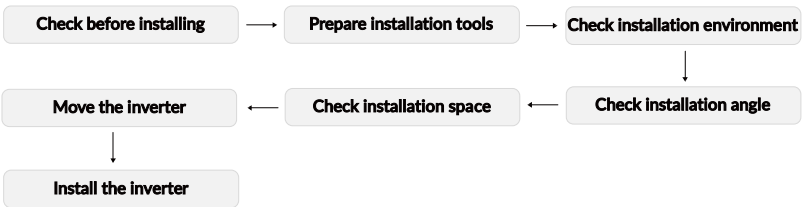
WARNING

High temperature exists when the inverter is working. Do not touch the surface to avoid burning.

CAUTION

When transporting and moving inverters, the weight of the equipment should be considered. Determine the installation position. At least two persons are required to install the inverter.

2.2 Installation flow



2.3 Checking before installation

Tip Please carefully check the product packaging and accessories list before installation.

2.3.1 Check packing

Packaging materials and components may be damaged during transportation. Therefore, before installing the inverter, please inspect its packaging materials. Check the packaging for any damage, such as holes, cracks, etc. If any damage is found on the inverter, do not open the package and contact your dealer as soon as possible. It is recommended to inspect the packaging materials within 24 hours before installing the inverter.

2.3.2 Check accessories list

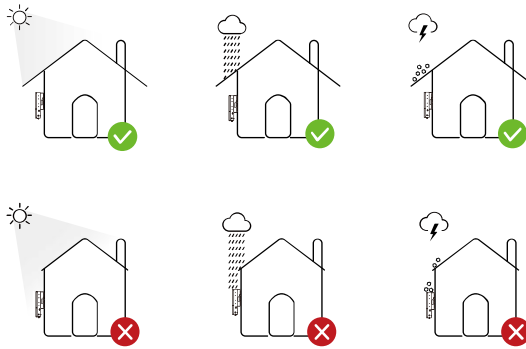
After unpacking the inverter, inspect the product and its accessories to ensure they are complete and undamaged. If any parts are missing or damaged, please contact the dealer.

2.4 Installation tools

Prepare the following tools to install and connect the inverter.

2.5 Installation environments

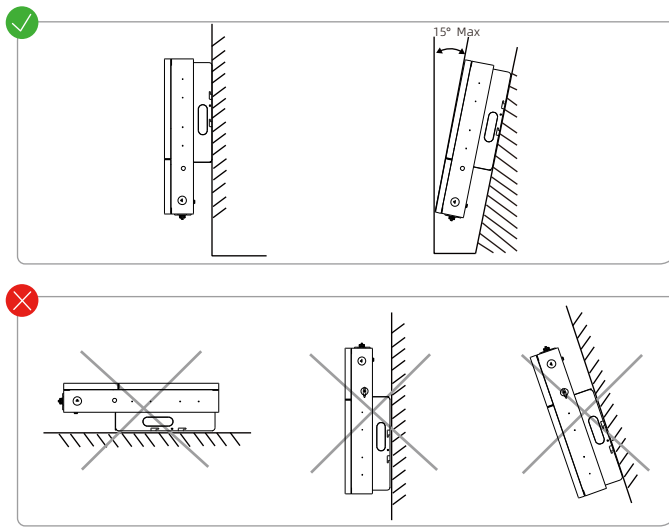
- The place to install the inverter shall be well-ventilated for heat radiation.
- Installation environment temperature range: -25℃ to 60℃ (> 45℃ derating), relative humidity: 5% to 95% (non-condensing).
- Install the inverter in a sheltered place to avoid direct sunlight, as increased temperature may lead to reduced power output.
- It is recommended to choose a shaded installation site or construct a sunshade.
- Do not install the inverter in a place near flammable and explosive materials.
- The installation carrier must be fireproof; do not install the inverter on flammable materials.
- Ensure the installation surface is sturdy and meets the load-bearing requirements for the inverter.
- Do not install the inverter on the support with poor sound insulation to avoid the noise generated by the working product, which may annoy the residents nearby.
- The altitude to install the inverter must not exceed 4,000 meters.



2.6 Installation angle

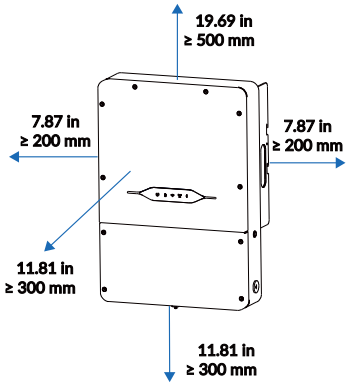
Inverter supports wall mounting and bracket mounting. Installation angle requirements are as follows:

- Install the inverter vertically or at a maximum back tilt of 15 degrees.
- Do not install the inverter in a tilted, horizontal, upside down, excessively backward-leaning, or sideways-tilted position.

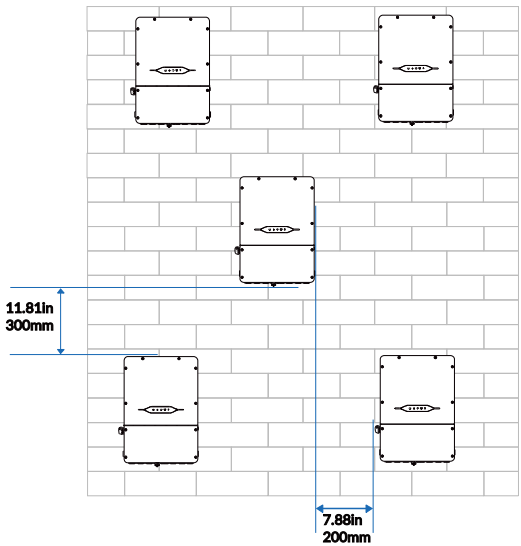


2.7 Installation space

When installing the inverter, a certain amount of space should be reserved to ensure that there is enough space for installation and heat dissipation.



In scenarios with multiple inverters, a linear installation is recommended when space is sufficient; when space is limited, the following Triangle installation is recommended. It is not recommended to install multiple inverters in a stacked configuration.



2.8 Moving the inverter

Open the packing box, and two operators place their hands under the inverter's heat sink, lifting the inverter out of the packing box. Then, move the inverter horizontally to the designated site.

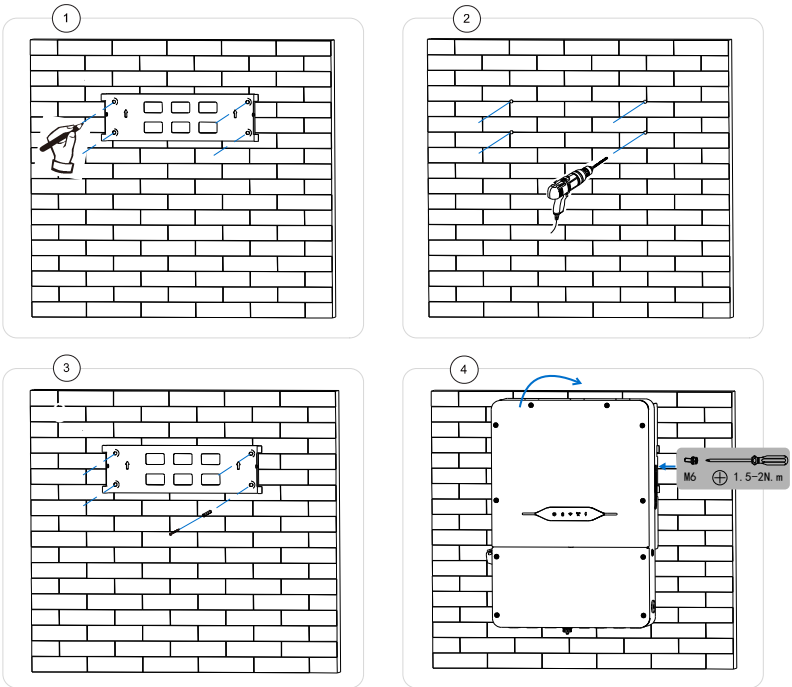
⚠ CAUTION

- Please maintain balance when moving the inverter to avoid dropping and injuring the operator.
- The power line and signal line ports at the bottom of the inverter cannot bear weight; do not let the terminal connectors directly touch the ground; place the inverter horizontally.

NOTICE

When placing the inverter on the ground, use foam or cardboard underneath to prevent damage to the casing.

2.9 Installing the inverter



Step 1: Select a proper wall which meets the installation requirements. Put the mounting plate on the wall horizontally and mark positions for drilling holes. Then use an impact drill to drill holes in the wall (hole diameter 10mm). When drilling, keep the impact drill vertical to the wall, and the drilling depth slightly greater than the length of the expansion tube. After drilling, verify the hole positions with the mounting plate; if the deviation is too large, reposition and drill again.

Step 2: Slowly tap the expansion screw tube into the drilled hole with a hammer.

Step 3: Align the mounting plate with the holes, put shrapnel and flat pads, and fix the mounting plate with hexagonal nuts.

Step 4: Hang the inverter on the mounting plate and lock them with M6 Allen socket screws.

3 Electrical Connection

3.1 Safety cautions

Ensure that both AC and DC sides are not energized before installation and maintenance. Since the capacitor is still live for a period of time after the DC side of the inverter is disconnected, it is necessary to wait 5 minutes to ensure that the capacitor is discharged completely. The EHD series on-grid hybrid inverters are used in the PV energy storage systems. Improper use may damage the inverter.

⚠ DANGER

Before carrying out the electrical connections at the DC side, ensure that the PV panels are covered with opaque material or disconnect the circuit breaker at the DC side. If the PV panels are exposed to sunlight, the PV array will generate hazardous voltages.

⚠ WARNING

- The installation and maintenance of inverters must be carried out by professional electrical engineers. When working on high-voltage/high-current systems (such as inverters and battery systems), rubber gloves and protective clothing (including protective glasses and boots) should be worn.
- As a on-grid hybrid inverter without a transformer, the EHD series requires that both the positive and the negative pole of the PV array can not be grounded. Grounding either pole will result in inverter malfunction. In a PV power generation system, all non-current-carrying metal components (such as the mounting frame, combiner box/distribution cabinet enclosures, and inverter enclosures) should be properly grounded to ensure safety.

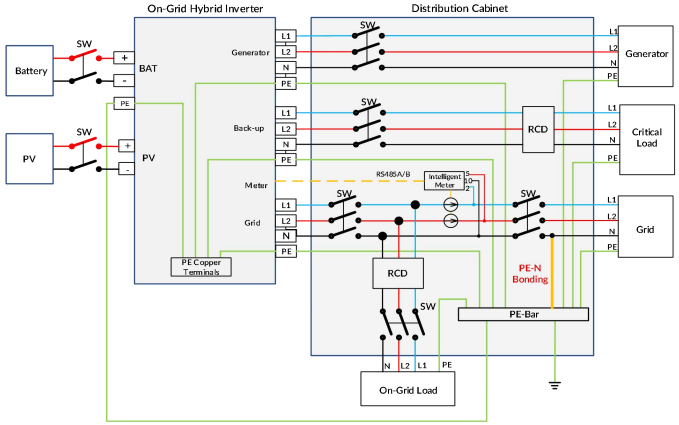
3.2 Circuit diagram

NOTICE

The following is the circuit diagram of EHD series on-grid hybrid inverters based on the regulation requirements of different countries/regions. Refer to the specific requirements of local regulations.

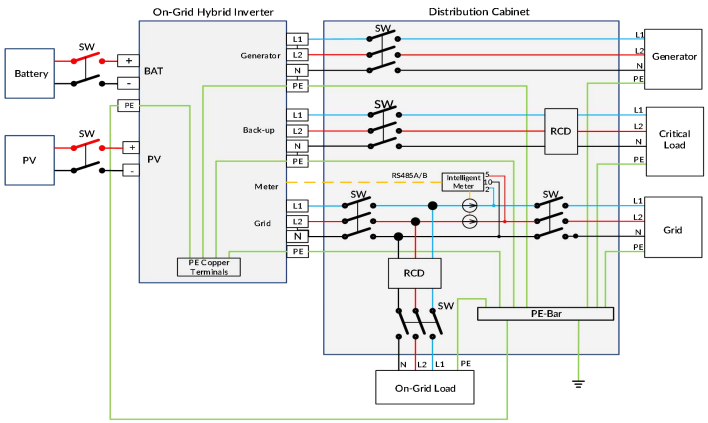
Scenario 1: N and PE wires are bonded together in the distribution cabinet (applicable to the North American split-phase power system areas.)

Ensure that the grid's N and PE wires are bonded in the distribution cabinet, and the Grid PE-N Bonding Detection function has been enabled in the APP. Additionally, for the electricity meter, the voltage sampling signal: PIN2 is connected to L1, PIN5 is connected to L2, PIN10 is connected to N, and the current sampling is connected to two channels CT1-1 and CT1-2.



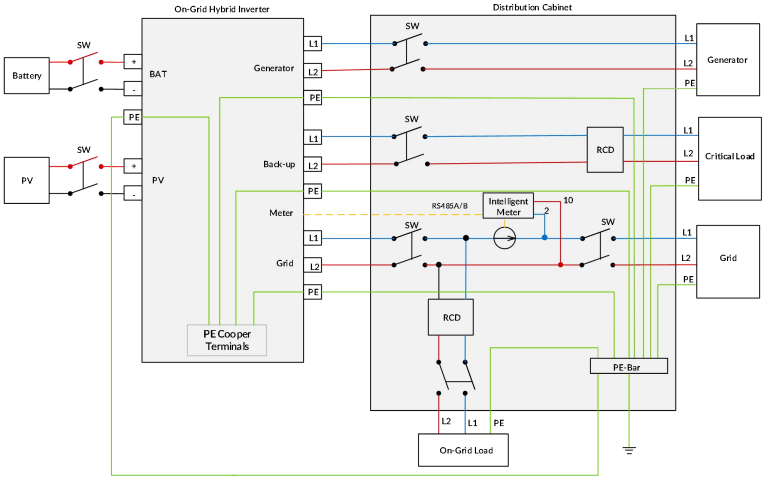
Scenario 2: N and PE wires are not bonded together in the distribution cabinet (applicable to other split-phase power system areas.)

Ensure that the grid's N and PE wires are disconnected in the distribution cabinet, and the Grid PE-N Bonding Detection function has been disabled in the APP. Also, for the electricity meter, the voltage sampling signal: PIN2 is connected to L1, PIN5 is connected to L2, PIN10 is connected to N, and the current sampling is connected to two channels CT1-1 and CT1-2.

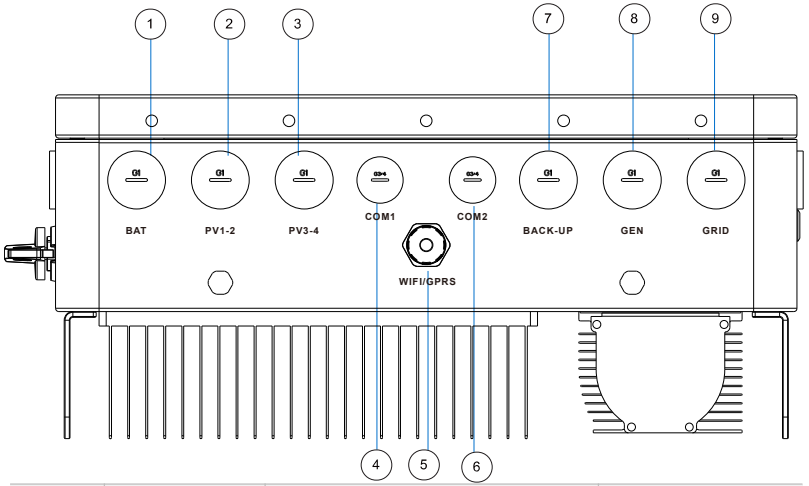


Scenario 3: L1 - L2 dual live wires 240VAC output

Ensure that the rated output voltage of L1-L2 for the grid, Back-up, and generator is 240VAC. Otherwise, it may cause malfunctions in the inverter. For the electricity meter, the voltage sampling signal: PIN2 is connected to L1, PIN10 is connected to L2, and only one-channel CT1-1 is needed for the current sampling.

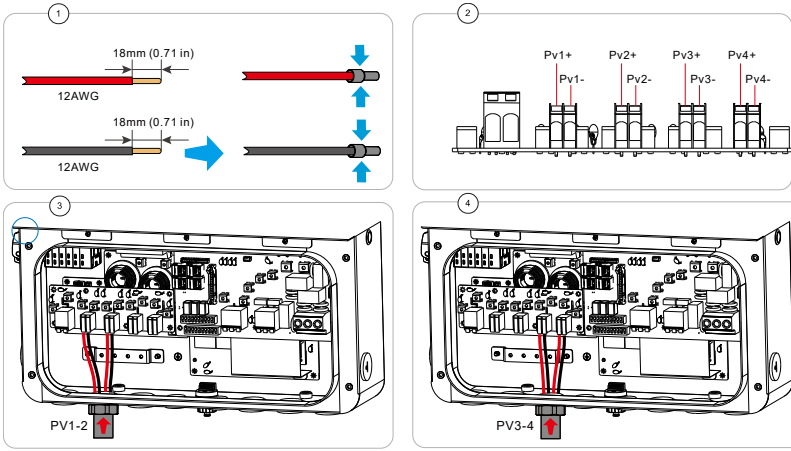


3.3 Port cable description



Port	Definition	Cable type	Recommended cable specification
1	BAT	Outdoor multi-core copper cable	6AWG
2	PV1-2		12AWG
3	PV3-4		12AWG
4	COM1	--	--
5	WIFI/GPRS	--	--
6	COM2	--	--
7	BACK-UP	Outdoor multi-core copper cable	6AWG
8	GEN		
9	GRID		

3.4 Connecting the PV cable



⚠ WARNING

- Ensure the "DC SWITCH" has been rotated to "OFF" before removing the PV connectors.
- Each PV array's total short-circuit current must not exceed the "Maximum Short-Circuit Current per String" (see Chapter 7) and reverse connection time must be less than 5 minutes. Avoid frequent miswiring to prevent inverter damage.
- For EHD series on-grid hybrid inverters, PV module open-circuit voltage must not exceed 580V, and current per input must not exceed 16A. Exceeding the limits may cause inverter failure.
- PV inputs must be connected to a 650VDC-rated DC circuit breaker with arc-extinguishing capability before connecting to the inverter. In case of PV reverse polarity, disconnect the DC breaker first, then the inverter PV terminals to avoid arcing and potential damage.

Step 1: Select the appropriate cable type and specification according to Section 3.3 Port cable description. It is recommended to differentiate the positive and negative terminals with different colors.

Step 2: Use wire strippers to strip the insulation layer of the PV cable to a suitable length (as shown in Figure ①).

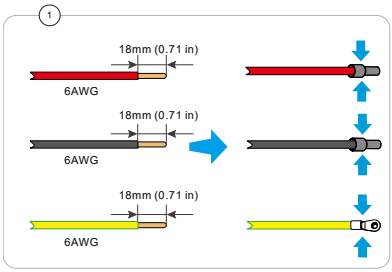
Step 3: Insert the stripped cables into their respective positive and negative metal terminals. Use wire crimper to firmly press the cables, ensuring a secure connection between the cables and the metal terminals.

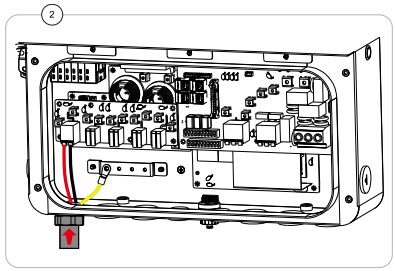
Step 4: Thread the crimped PV cables through the locking nuts, then insert them into its respective plastic housings until the orange snap is pressed in a horizontal position, indicating that the metal cores are securely seated.

Step 5: Use a multimeter to check the positive and negative poles of PV cables, and then, connect them to the PV terminals of the inverter accordingly.

If it is necessary to remove the PV connectors from the inverter, gently lift the orange clip on the terminal upwards to carefully remove the PV connectors. If the PV system is configured in parallel mode, all MPPT strings must be connected.

3.5 Connecting the battery cable (BAT)





Step 1: Use wire strippers to strip the insulation layer of the battery cable to a suitable length (as shown in Figure ①).

Step2: Insert the stripped cables into their respective positive and negative metal terminals. Use a wire crimper to firmly press the cables, ensuring a secure connection between the cables and the metal terminals.

Step 3: Thread the crimped PV cables through the locking nuts, then insert them into their respective plastic housings until the orange snap is pressed in a horizontal position, indicating that the metal cores are securely seated.

Step 4: Insert the stripped yellow-green ground wire into the conductor crimping area of the OT terminal and crimp it firmly using a crimping tool (as shown in Figure ①). Recommended OT terminal model: OT-M5, and the recommended ground wire gauge is ≥ 6 AWG.

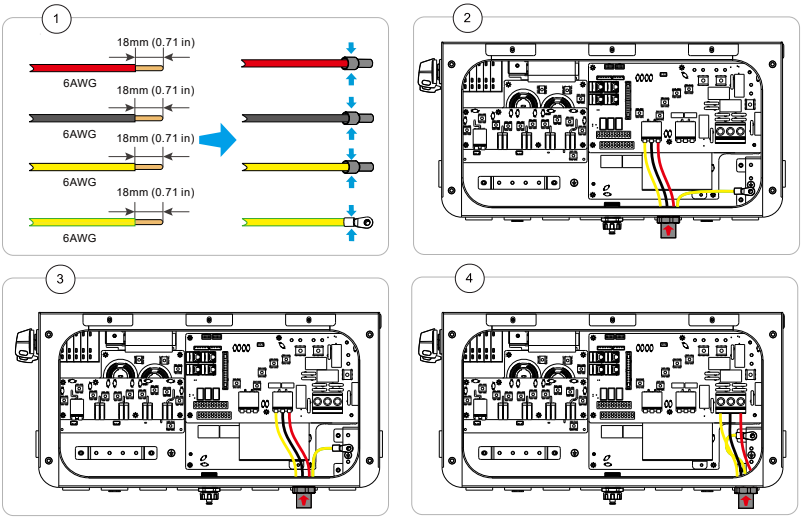
Step 5: Secure the OT terminal to the grounding PE copper busbar using M5 screws, as shown in Figure ②. The recommended tightening torque is 2 N·m.

Step 6: Use a multimeter to check the correct connection of the battery positive and negative poles and PE cables, and then finished.

3.6 Connecting the Backup load, Grid and GEN cable

The residual current monitoring unit (RCMU) is integrated into the inverter. When the inverter detects the leakage current is higher than 240mA, it can disconnect from the grid quickly. When the external AC switch has a leakage protection function, its rated leakage protection current is required to be ≥ 300mA.

Note: For the Backup load cable port and the GEN cable port, the terminals from left to right are arranged as L2, N, L1. For the Grid AC cable port, the terminals from left to right are arranged as L1, N, L2.



Step 1: Select the appropriate cable type and specification according to Section 3.3 Port cable description. And use wire strippers to strip the insulation layer of the specified cable to a suitable length (as shown in Figure ①).

Step 2: Insert the stripped cables into their respective positive and negative metal terminals. Use a wire crimper to firmly press the cables, ensuring a secure connection between the cables and the metal terminals.

Step 3: Insert the crimped L1, L2, and N cables into their respective terminal holes. Ensure the orange snap on the terminal is pressed into a horizontal position, indicating that the metal cores are securely seated (as shown in Figure ② and ③).

Step 4: First loosen the terminal screws, then insert the L1, L2, and N cables into their respective terminal holes. Use a Phillips screwdriver to tighten the screws (as shown in Figure④).

Step 5: Insert the stripped yellow-green ground wire into the conductor crimping area of the OT terminal and crimp it firmly using a crimping tool (as shown in Figure ①). Recommended OT terminal model: OT-M5, and the recommended ground wire gauge is ≥ 6 AWG.

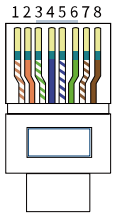
Step 6: Secure the OT terminal to the grounding PE copper busbar using M5 screws, as shown in Figure ②③④. The recommended tightening torque is 2 N·m.

Step 7: Use a multimeter to check the correct connection of the cables and then finished.

3.7 Connecting the COM cable

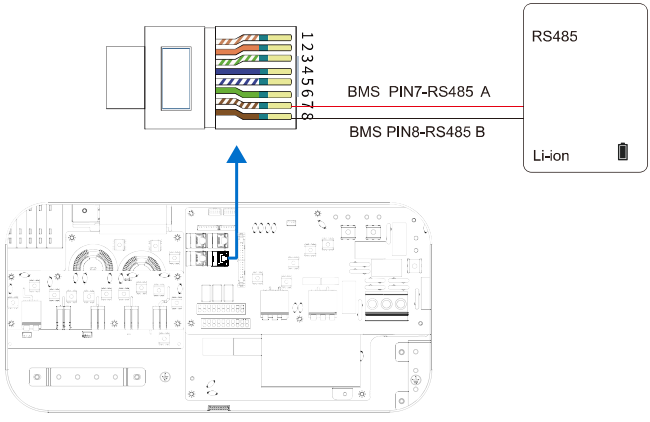
3.7.1 BMS

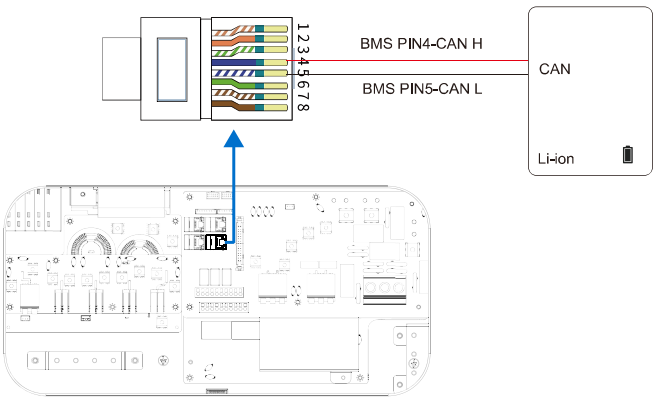
The BMS communication port is used for the communication between the inverter and the lithium battery. The pins of the BMS port (RJ45) are defined as follows:

Picture	Pin	Name	Description
	1	Idle	-
	2	Idle	-
	3	GND	GND
	4	BAT-CANH	Lithium battery CAN high-level data
	5	BAT-CANL	Lithium battery CAN low-level data
	6	Idle	-
	7	BAT-485A	Lithium battery RS485 differential signal +
	8	BAT-485B	Lithium battery RS485 differential signal -

Note: For specific details on the battery usage, please refer to the EHD Series Battery Instructions on the EPEVER official website: https://www.epever.com/products/.

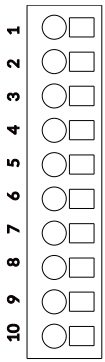
- Schematic diagram of RS485 and CAN communication connections for lithium batteries



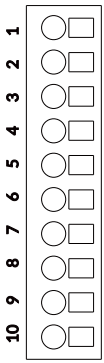


3.7.2 COM1/COM2

The pins of the COM1 port (DG236-5.0-10P) are defined as follows:

Picture	Pin	Name	Description
	1	CT1+	Current transformer 1 output positive pole (White line)
	2	CT1-	Current transformer 1 output negative pole (Black line)
	3	CT2+	Current transformer 2 output positive pole (White line)
	4	CT2-	Current transformer 2 output negative pole (Black line)
	5	Meter-RS485A	Meter 485 communication
	6	Meter-RS485B	
	7	Idle	-
	8	+12V	Auxiliary supply +12V
	9	GNDS	GNDS
	10	GNDS	GNDS

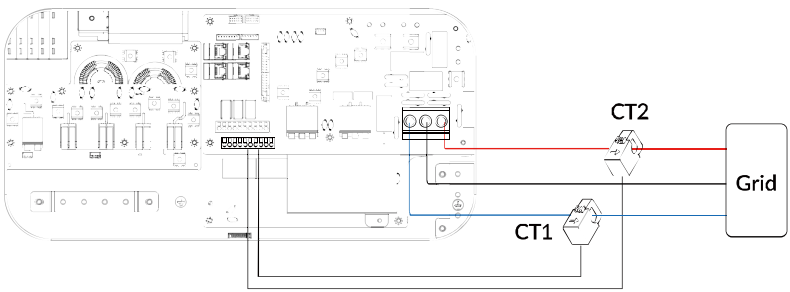
The pins of the COM2 port (DG236-5.0-10P) are defined as follows:

Picture	Pin	Name	Description
	1	Idle	-
	2	GNDS	GNDS
	3	GEN_ON1	Generator back-up dry contact
	4	GEN_ON2	
	5	GEN_ST1	Generator start/stop dry contact
	6	GEN_ST2	
	7	RSD_IN1	RSD switch input 1
	8	RSD_IN2	RSD switch input2
	9	RSD_+12V	RSD supply port +
	10	RSD_GND	RSD supply port -

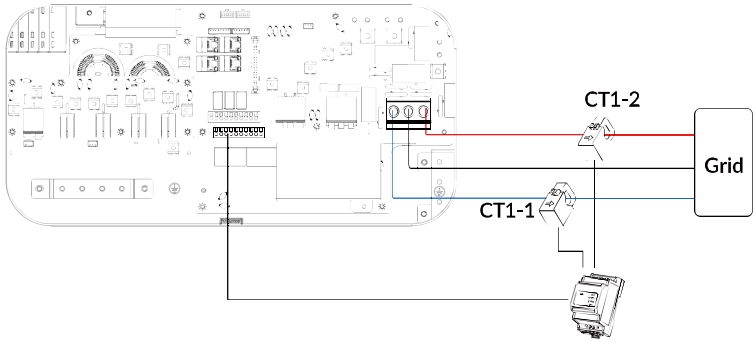
Differences exist in the use of CT/Meter between single-inverter systems and multi-inverter parallel systems. In a single-inverter system, the CT/Meter is applied to measure the anti-reverse current and the on-grid load. In a multi-inverter parallel system, the CT/Meter is used to monitor the load power rating.

- For a single-inverter system without on-grid load, the following three options are used to achieve the anti-reverse current function: CT, Meter, or neither CT nor Meter. See schematic diagrams below for details.

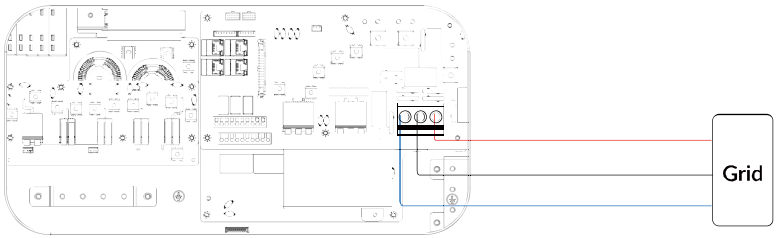
① Without On-Grid Load + Anti-reverse Current + CT



② Without On-Grid Load + Anti-reverse Current + Meter

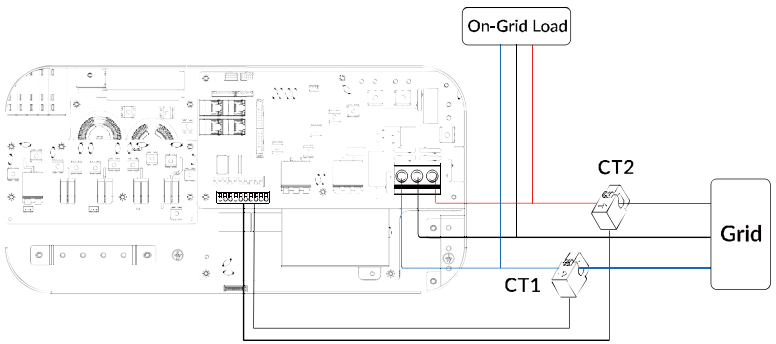


③ Without On-Grid Load + Anti-reverse Current + No CT/ Meter

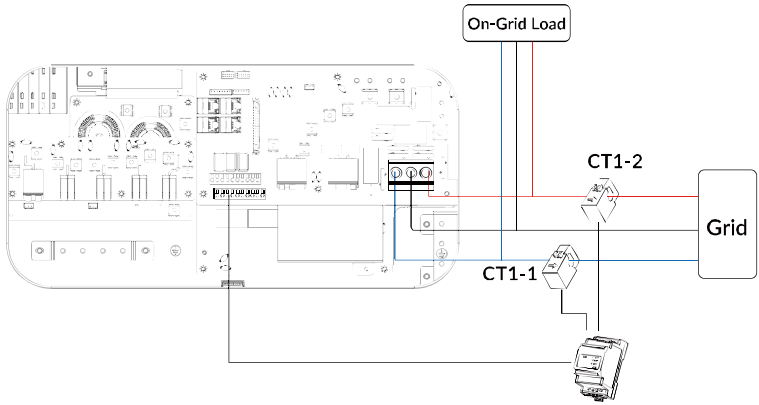


- For a single-inverter system with on-grid load, the following two options are used to achieve the anti-reverse current function: CT and Meter. See schematic diagrams below for details.

① With On-Grid Load + Anti-reverse Current + CT

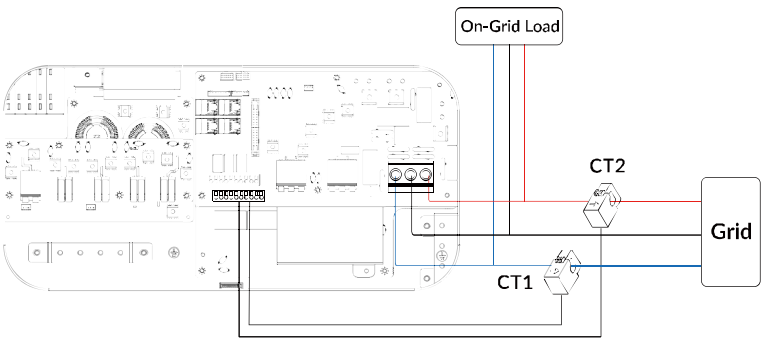


② With On-Grid Load + Anti-reverse Current + Meter

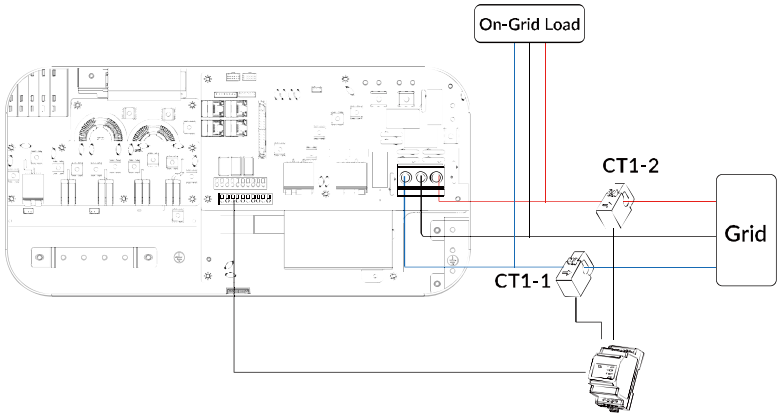


- For a single-inverter system with on-grid load, three options are available when there is no anti-reverse current function: CT, Meter, or neither CT nor Meter. See schematic diagrams below for details.

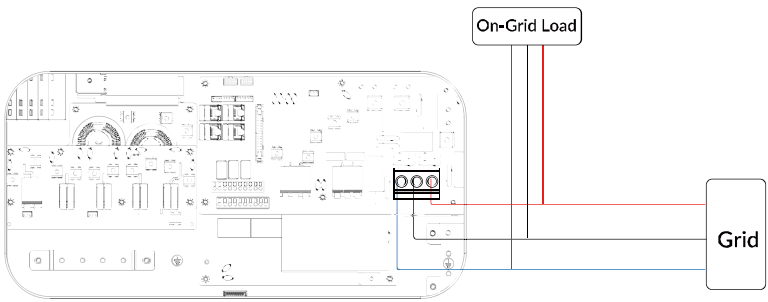
① With On-Grid Load + No Anti-reverse Current + CT



② With On-Grid Load + No Anti-reverse Current + Meter

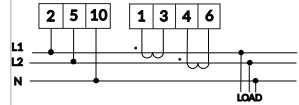


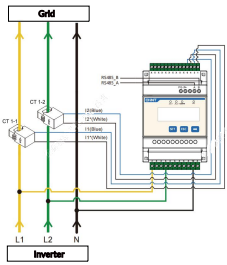
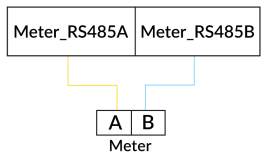
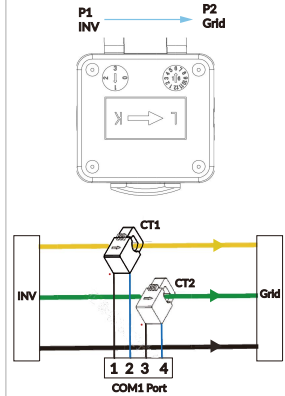
③ Without On-Grid Load + No Anti-reverse Current + No CT/ Meter



- **Connecting the Meter/CT port (meter is an optional accessory)**

The dry contacts of the COM1 communication port can be connected to CT1, CT2, and the electricity meter signals. This connection is used for communication between the inverter and the electricity meter, as well as for collecting the current signals flowing through CT.

<table>
<tr>
<td> 
Meter for single inverter
2 CTs with a CT current ratio of 100A/40mA</td>
<td> 
Meter for parallel-connected inverters
2 CTs with a CT current ratio of 600A/40mA</td>
<td> 

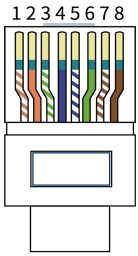
Meter Connection Schematic Diagram</td>
</tr>
<tr>
<td>①</td>
<td>②</td>
<td>③</td>
</tr>
<tr>
<td> 
</td>
<td>Meter communication port
 
</td>
<td> 

CT1/CT2 for inverter</td>
</tr>
<tr>
<td>④</td>
<td>⑤</td>
<td>⑥</td>
</tr>
</table>

- PIN 5 and PIN 6 of the COM1 port on the inverter are used for meter communication. The appearances of Meters are shown as Figure ①②. PIN 5 and PIN 6 of the COM1 port correspond to A and B of the meter, shown as Figure ⑤.
- Connection of the Meters is shown as Figure ③. PIN 2/5/10 of the meter are connected to the voltage signal L1, L2 and N respectively. PIN 1/3 and PIN 4/6 of the meter are connected to CT1-1 and CT1-2, respectively. The installation direction of the electricity meter CT is as shown in Figure ④. The arrow on the electricity meter CT should point towards the grid.
- The installation direction and wiring method of CT1/2 is shown in Figure ⑥, along with the port definitions for the COM1port type. The CT arrows point toward the grid.

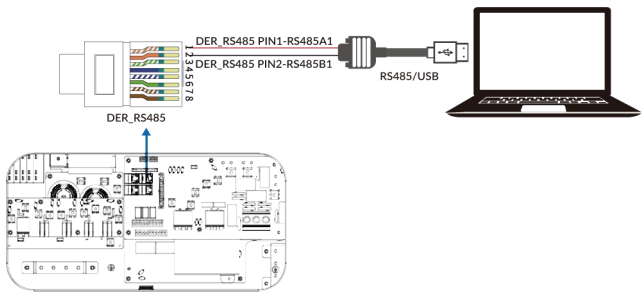
3.7.3 DER grid dispatch and wired monitoring com. port

The pins of the DER grid dispatch and wired monitoring com. port (RJ45) are defined as follows:

Picture	Pin	Definition	Description
	1	RS485-A1	Wired monitoring RS485A (+)
	2	RS485-B1	Wired monitoringRS485B (-)
	3	Idle	-
	4	Idle	-
	5	Idle	-
	6	Idle	-
	7	RS485-A2	Grid dispatch com. RS485A (+)
	8	RS485-B2	Grid dispatch com. RS485B (-)

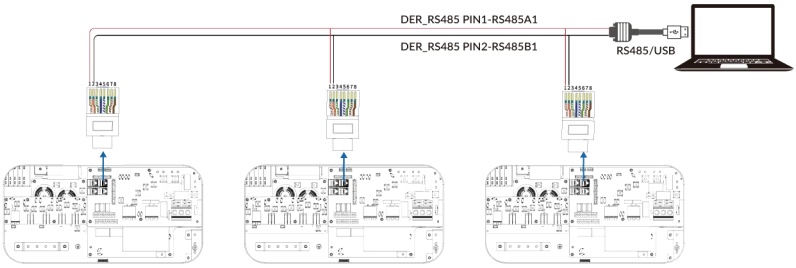
- **RS485 (monitoring via cable)**

As shown in the figure, connect the RS485-A1 and RS485-B1 of the inverter to the TX+ and TX- of the RS485 to USB adapter, and then connect the adapter's USB port to the computer. Note that it is recommended to use double-shielded Cat5e anti-interference network cable as the communication cable between the energy storage inverter and the RS485-to-USB adapter.



- **RS485 (inverter cascade monitoring)**

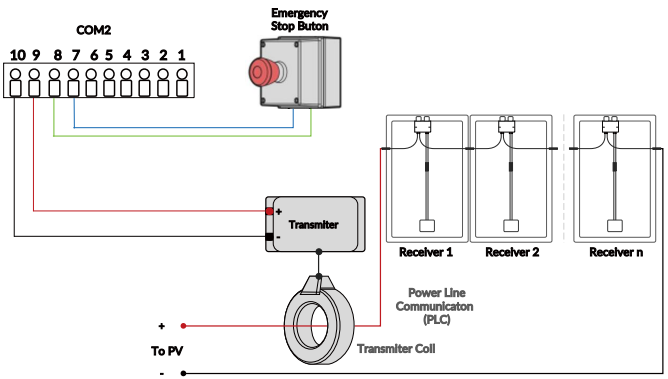
Multiple inverters are connected in parallel through RS485 communication cables. When multiple inverters are connected via RS485 communication cables, different communication addresses must be set to distinguish the inverters.



- **RSD rapid shutdown and emergency power off**

The emergency shutdown pins (PIN7, PIN8) of COM2 port are normally open contacts, which can trigger a rapid shutdown when closed. The RSD will cut off all power, including the inverter internal power, and stop all AC and DC outputs. The internal power supply (PIN9, PIN10) of the inverter will disconnect the power supply to the RSD transmitter. After pressing the emergency stop button, the RSD transmitter will cut off all input circuits of the solar panels.

- The emergency power off button (normally open) is connected to the PIN7 and PIN8 of COM2 port.
- The RSD transmitter is connected to PIN9 (+) and PIN10 (-) (12VDC power supply).
- Configured the RSD transmitter in the on-grid hybrid inverter may cause interference in the user area.



NOTICE

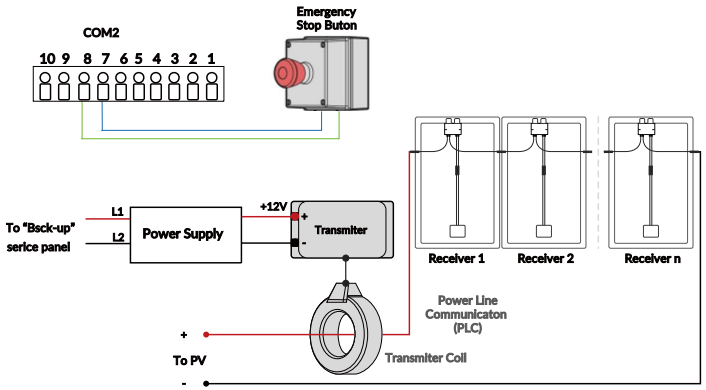
- The rated current of the built-in 12V DC power supply is 100mA (1.2W). Overloading is strictly prohibited.
- If the rated current of the RSD transmitter exceeds 100mA, please contact the manufacturer before installation.
- After the danger is cleared, restore the emergency stop switch button to its normally open state before restarting the inverter. Otherwise, it won't return to normal operation.

When the rated current of the RSD transmitter exceeds 100mA, an external power converter is needed to power the RSD transmitter. The input of the power converter is connected to the Back-up port of the distribution box. Once the emergency stop button is pressed, all outputs including power to the Back-up port will be shut down. And then, the RSD transmitter will be immediately turned off.

Recommended RSD transmitter model: APsmart Transmitter-PLC 406001;

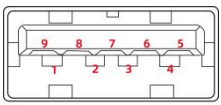
Recommended PV rapid shutdown (receiver) model: RSD-S-PLC

Note: Please select the PV rapid shutdown switch (receiver) based on the actual PV panel model used.

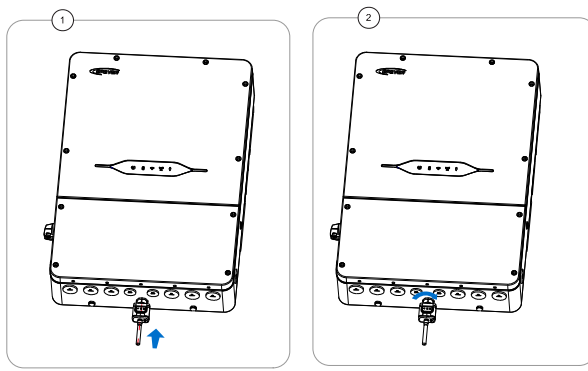


3.7.4 WiFi/GPRS com. port

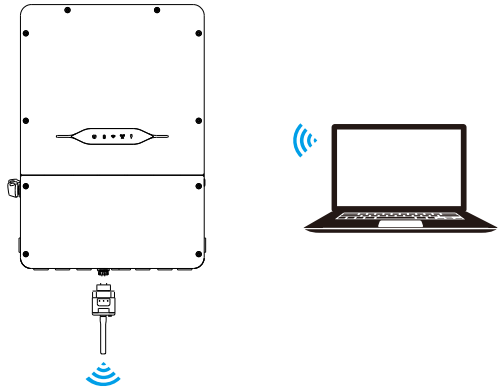
Connect a USB drive to the WiFi/GPRS com. port for inverter firmware upgrades, or connect a WiFi/GPRS module for inverter remote monitoring. The pins of the WiFi/GPRS com. port (USB-A 3.0) are defined as follows:

Picture	PIN	USB-A 3.0	Description
	1	+5V	+5V
	2	D-	Data interface
	3	D+	
	4	GND	Power ground
	5	RS485-A	RS485 communication
	6	RS485-B	
	7	Idle	-
	8	Idle	-
	9	Idle	-

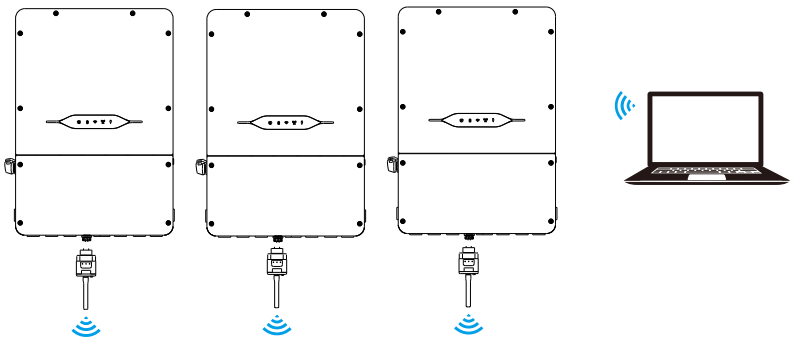
- **Connecting the WiFi/GPRS com. port**



Installing a WiFi/GPRS module for single inverter

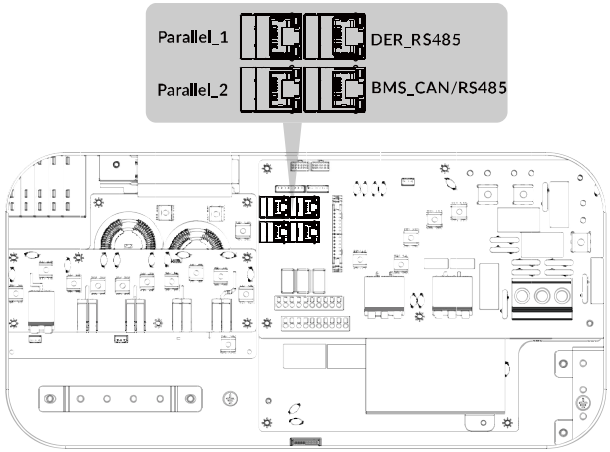


Installing WiFi/GPRS modules for multiple inverters



The inverter's operational information (such as power generation, alarms, and operational status) can be uploaded to the server via communication modules like WiFi/GPRS. Users view this information via a WEB interface or an APP, as needed. An account for the WEB or APP is required, and users need to bind the inverter with the serial number of the WiFi/GPRS communication module. The WiFi/GPRS serial number is stuck on both the packaging box and the module itself.

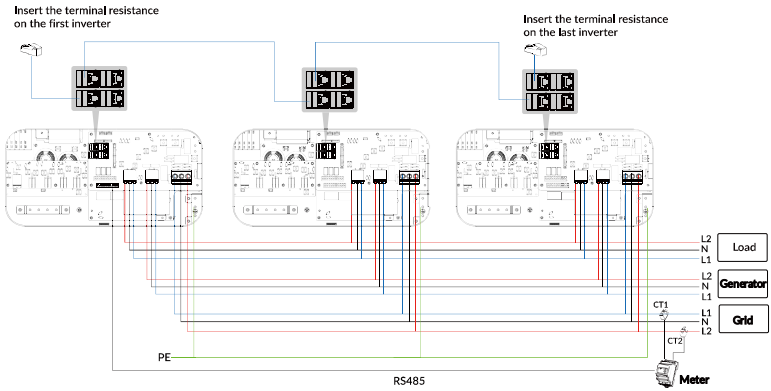
3.7.5 Parallel connection port



In the parallel system, one of the inverters is set as the master and the others as slaves through APP or monitoring software.

For the scenario where critical load is also connected in parallel under parallel system:

- Connect 8-pin connectors with the Parallel_1 and Parallel_2 on the first and last inverters.
- The cable length and specification from the load devices to the AC LOAD terminal of each inverter should be the same to ensure the same loop impedance, thereby ensuring that the load current shunts to each inverter are nearly equal.
- When the load power is greater than the maximum AC LOAD power of the parallel system, the load needs to be connected to the AC GRID terminal (not the AC LOAD terminal). For example, the maximum AC LOAD power of one inverter is 12kVA, and the maximum AC LOAD power of six inverters is 72kVA.



Note: A dedicated meter for parallel operation is required (Chint DTSU666 split-phase rail-mounted meter, equipped with 2 CTs). For detailed instructions on parallel operation, please refer to the "EHD Series Parallel Operation Guide" on the EPEVER official website: https://www.epever.com/products/.

3.7.6 AFCI setup

Causes for arc generation:

- Damage to connectors in PV or battery systems.
- Improper cable connection or breakage.
- Aging of connectors and cables.

Methods for detecting arcs:

- The inverter integrates AFCI function and complies with UL1699B.
- When the inverter detects an arc, the user can view the APP to find the arc fault history.
- The inverter will shut down for protection until the AFCI fault is removed. After the AFCI fault is removed, the inverter can automatically reconnect to the grid.
    - Automatic re-connection: If the fault is triggered less than 5 times within 24 hours, the inverter will automatically remove the fault within 5 minutes.
    - Manual re-connection: When the fifth arc fault occurs within 24 hours, the inverter will shut down. Users can remove the faults through the APP, or restart the system after powering off. After the inverter removes the fault, it will reconnect to the grid and operate.

By default, the AFCI function is disabled and can be enabled through the APP.

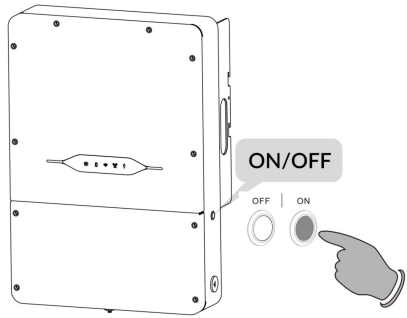
AFCI operation steps:

Step 1: Open the parameter setting of the APP and find the AFCI module setting.

Step 2: Read the AFCI parameter values.

Step 3: Enable the AFCI module.

3.7.7 ON/OFF shutdown button



The ON/OFF button is designed on the right side of the inverter casing. Press the button will trigger an immediate shutdown of the inverter to cut off power from the battery and PV systems while only grid bypass to supply the load. The button stays recessed when the inverter is in shutdown mode and pops back out when in its default state.

NOTICE

- The ON/OFF power button is only allowed to be pressed when the inverter requires a shutdown.
- Restore the ON/OFF button to its default (popped-out) position before restarting the inverter. Failure to do so will result in the inverter not functioning until the button is reset.

3.7.8 Generator functionality

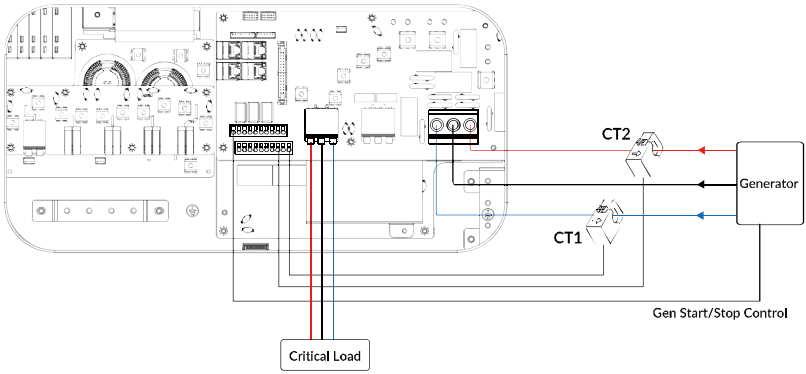
The GEN interface offers four operation modes: Standby Mode, Generator Recharge Mode, Smart Load Mode, and AC Coupling Mode. When connecting a generator to the GEN port, the max power from the generator to the inverter is 12KW (Refer to the "EHD Series APP Instructions Manual" for details of the generator overload protection limit setting). Only 120/240VAC split-phase generators are supported.

Connecting a generator to the Grid port enables grid simulation function. It supports 120/240V split-phase generators. Select "Simulated Grid Mode" in the APP's generator settings and adjust grid over/under-frequency protection limits according to the specifications of the generator; otherwise, inverter faults may occur.

Four types of generator usage are provided as follows according to the operation modes. Besides, the inverter features a 2-wire start/stop control for generators.

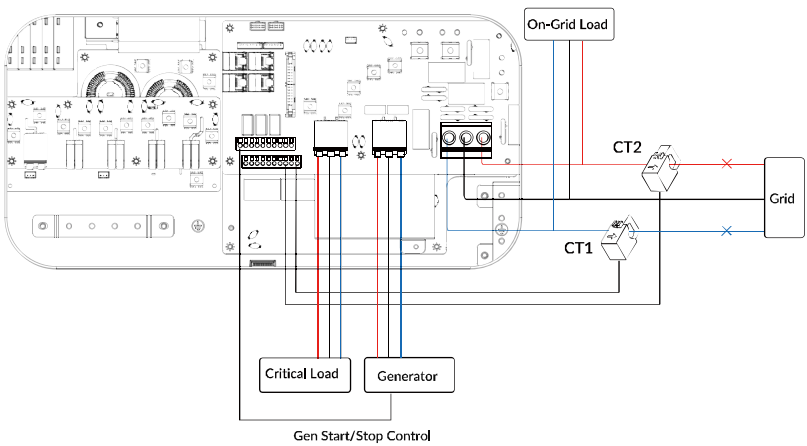
- The wirings for single-inverter system are shown below:

① Generator + Critical Load –– Simulated Grid Mode



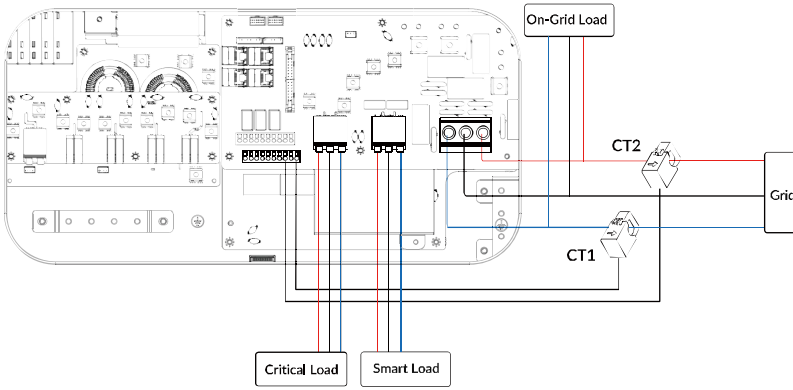
In this mode, the generator replaces the grid and is connected to the Grid port. It can supply power to the critical load directly and charge the battery simultaneously. However, the system cannot feed power back to the generator. Therefore, the Simulated Grid Mode is primarily suitable for self-consumption and peak shaving modes application.

② Generator + Critical Load + On-Grid Load + Grid –– Generator Recharge Mode



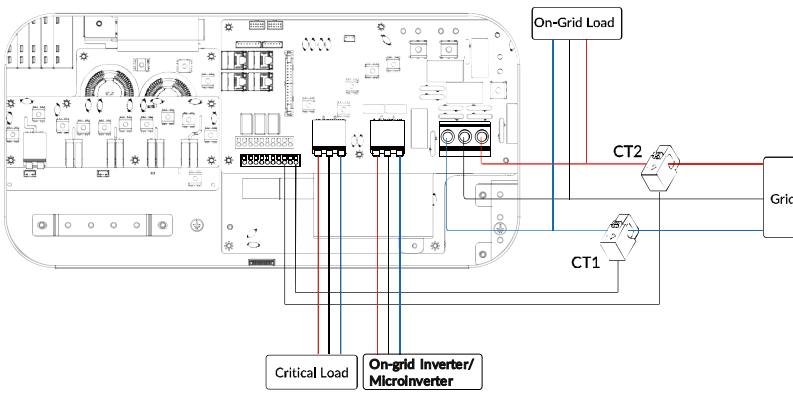
This mode is activated when the grid fails and the battery capacity drops to the discharge lower limit. The generator is started to recharge the battery and supply power to the critical loads.

③ Smart Load + Critical Load + On-Grid Load + Grid –– Smart Load Mode



This mode is specifically designed for applications involving smart loads, which are connected to the GEN port. The smart load operates on a priority basis, ensuring that critical loads are powered first. Subsequently, the system determines whether to supply power to the smart load based on the available energy reserves and power distribution capabilities.

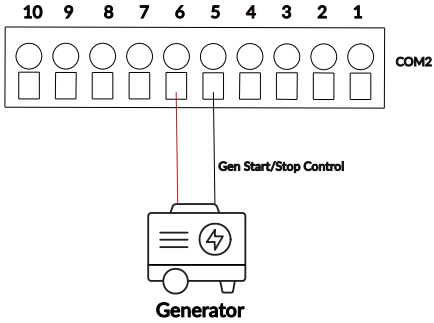
④On-Grid Inverter/Microinverter + Critical Load + On-Grid Load + Grid: AC Coupling Mode



This mode is compatible with grid-tie inverters or microinverters to achieve efficient energy utilization. The grid-tie inverter or microinverter's grid port needs to be connected to the GEN port, with the AC coupling mode selected.

- Two-wire Generator Start/Stop Control Function

The inverter features a built-in circuit for controlling the generator's start and stop. For wiring, connect the two generator start/stop control signals to pins 5 and 6 of the COM2 terminal on the inverter respectively. After configuring the generator parameters via the APP, the inverter can automatically start and stop the generator. The detailed wiring diagram is shown below:



4 Commissioning

4.1 Check before powering on

Please check the following items again before powering on.

- The inverter is securely fixed to the mounting plate.
- The PV cables are securely connected, correctly polarized, and the PV input is within the acceptable voltage range of the inverter.
- The Battery cables are securely connected, correctly polarized, and the battery input is within the acceptable voltage range of the inverter.
- The DC switch is correctly connected between the battery and the inverter, and the DC switch is in the off state.
- The grid and load cables are securely and correctly connected.
- The AC circuit breaker is correctly connected between the inverter grid port and the power grid, and the circuit breaker is disconnected.
- The AC circuit breaker is correctly connected between the inverter load port and the critical load, and the circuit breaker is disconnected.
- For lithium batteries, ensure that the communication cables are properly connected.

4.2 Initial power on (Important)

Please follow the steps below to turn on the inverter:

Step 1: Ensure that no power generation occurs on the phase connected to the inverter.

Step 2: Turn on the DC switch.

Step 3: Turn on the battery (i.e., turn on the DC switch between the battery and the inverter).

Step 4: Connect the AC circuit breaker between the inverter grid port and the power grid.

Step 5: Connect the AC circuit breaker between the inverter load port and the critical load.

Step 6: Complete the inverter power-on.

Step 7: Set inverter parameters via the APP to ensure it is working normally. Refer to the “EHD Series APP Instructions Manual” for specific configurations.

(1) Select **Safety Code**.

(2) Select **Grid Type.**

(3) Select PV **Input Mode** ("Independent" mode by default).

(4) Select **Operation Mode** ("Self Consumption" by default).

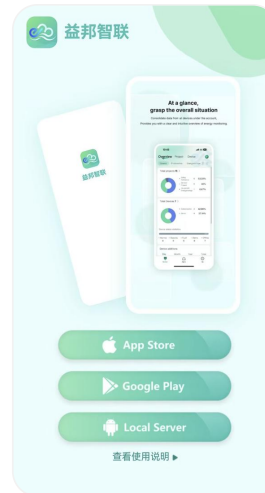
(5) Select **Battery Model** and set battery parameters on the Battery Configuration interface.

(6) Select **Remote Switching** as **ON** after completing the above four parameters settings. To power on the inverters remotely for grid connecting.

4.3 APP settings

Add the WiFi adapter and the connected device to the cloud server by website (https://hncloud.epsolarpv.com) or APP. Then you will be able to monitor the device and set parameters by PC or APP.

Note: For the details of APP setting, please refer to the "EHD Series APP Instructions Manual" on the EPEVER official website: https://www.epever.com/products/.



5 Troubleshooting and Maintenance

5.1 Inverter powering off

Please follow the steps below to power off the inverter:

Step 1: Disconnect the inverter grid AC breaker.

Step 2: Disconnect the inverter back-up AC breaker.

Step 3: Disconnect the DC breaker between the inverter and the battery.

Step 4: Turn off the DC switch of the inverter.

5.2 Inverter dismantling

Please follow the steps below to dismantle the inverter:

Step 1: Disconnect all electrical connections of the inverter, including: DC lines, AC lines, communication lines, communication modules, and protective ground lines.

Step 2: Remove the inverter from the mounting plate.

Step 3: Dismantle the mounting plate.

Step 4: Properly store the inverter. If the inverter is to be reused in the future, ensure that storage conditions meet the requirements.

5.3 Troubleshooting

Verify the fault cause by checking the status of the inverter indicators (refer to Subsection 1.3 Indicator for fault cause identification); or access the alarm information within the APP. On the APP's main screen, select "Site > Device List", click on a device to access its relevant information page, and then click "Alarm Messages" to view the fault details. Then, refer to the error information and solutions provided in the table below to try to resolve the fault.

If the inverter LED or APP does not display any error information, please refer to the following to see if the current installation status meets the requirements for the inverter to work properly. If not, make the right adjustments and then check if the fault has been solved.

- Check whether the inverter is installed in a clean, dry and well-ventilated location. Dampness and poor ventilation may cause adverse effects on the operation of the device.
- Check whether the DC switch is disconnected. If it is disconnected, it may affect the normal start-up and operation of the device.
- Check whether the cross-section and length of the cable meet the requirements. Inappropriate cable specifications may lead to abnormal current transmission and thus trigger faults.
- Check whether the input, output connections and wiring are in good condition to ensure that

there are no loose connections, short circuits, etc., and to guarantee stable and reliable circuit connections.

- For specific installations by users, confirm whether the configuration settings are correct. Incorrect configurations may prevent the inverter from operating as expected.
- Check whether the display panel and communication cable are correctly connected and undamaged. If the connection is improper or the cable is damaged, it may result in the inability to display or transmit information normally.

If you still need assistance after above operations, please contact the after-sales service center.

The error information and solutions are as follows:

ID	Failure	Solution
1	GridOVP (Grid Overvoltage)	If it occurs occasionally, it may be occasional abnormalities in the power grid. After the power grid returns to normal, the inverter will automatically resume working.
2	GridUVP (Grid Undervoltage)	If it occurs frequently, check whether the grid voltage/frequency is within the specified range of the inverter. - If the grid voltage/frequency is within the specified range of the inverter, check the inverter's AC circuit breaker and AC wiring. - If the grid voltage/frequency is not within specified range and the AC wiring is correct, but there are still multiple alarms, contact technical support to adjust the grid over/under-voltage and over/under-frequency protection values.
3	VGridLineFault (Grid Line Voltage Error)	
4	GridOFP (Grid Over Frequency)	
5	GridUFP (Grid Under Frequency)	
6	OVRT (Overvoltage Ride Through Error)	This is an internal fault of the inverter. Please turn off the inverter, and then turn it back on after waiting for 5 minutes to check if the fault disappears. If the issue remains unresolved, please contact our technical support.
7	LVRT (Low Voltage Ride Through Error)	
8	IslandFault (Island Fault)	
11	Wire Sequence Error	When multiple inverters operate in parallel, check whether the wire sequence of the grid or generator interface (L1/L2/N) between the master and slave units is reversed.

17	GEN_OVP (Generator Overvoltage)	Check whether the generator is working normally.
18	GEN_UVP (Generator Undervoltage)	
19	GEN_OFP (Generator Over Frequency)	
20	GEN_UFP (Generator Under Frequency)	
21	GEN_OverLoad (Generator Overload)	
22	GEN_RefluxOverLoad (Generator Anti-reflux Overload)	
23	Overload1	This is an internal fault of the inverter. Please turn off the inverter, and then turn it back on after waiting for 5 minutes to check if the fault disappears. When multiple inverters operate in parallel and report faults 26, 27, and 30, check whether the wire sequence of the load port (L1/L2/N) between the master and slave units is reversed. If the issue remains unresolved, please contact our technical support.
24	Overload2	
26	InvVoltFault (Inverter Voltage Fault)	
27	SwInvInstantOVP (Inverter Peak Overvoltage)	
28	SwAcRmsOCP (Inverter RMS Over Current)	
29	SwAcOCPInstant (Inverter Peak Over Current)	
30	HwAcOCP (Inverter Hardware Over Current)	
32	DciOCP (Inverter DC Component Over Current)	
33	HwADFaultVAC (AC Side Voltage Reference Error)	
34	HwADFaultIAC (AC Side Current Reference Error)	This is an internal fault of the inverter. Please turn off the inverter, and then turn it back on after waiting

36	HwADFaultDCV (Inverter Voltage DC Component Reference Error)	for 5 minutes to check if the fault disappears. If the issue remains unresolved, please contact our technical support.
37	HwADFaultDCI (Inverter Current DC Component Reference Error)	
38	HwADFaultVGrid_Slave (Slave Chip Grid Voltage Reference Error)	
39	GFCIDeviceFault_Slave (Slave Chip Leakage Current Sampling Error)	
40	ConsistentFault_Vgrid (Grid Voltage Inconsistency)	
41	ConsistentFault_DCI (Inverter Current DC Component Inconsistency)	
42	ConsistentFault_GFCI (Leakage Current Inconsistency)	
43	GFCIDeviceFault (Leakage Current Sampling Error)	
44	GFCI (Leakage Current Fault)	
45	CTDisconnect (CT Current Error)	Check whether the CT connection is correct.
46	SwGridRmsOCP (Grid RMS Over Current)	This is an internal fault of the inverter. Please turn off the inverter, and then turn it back on after waiting for 5 minutes to check if the fault disappears. If the issue remains unresolved, please contact our technical support.
47	RefluxOverLoad (Anti-backfeeding Overload)	
49	SwBusOVP (Bus Average Overvoltage)	

50	SwBusInstantOVP (Bus Peak Overvoltage)	
51	HwBusOVP (Bus Hardware Overvoltage)	
54	VbusRmsUnbalance (Bus RMS Voltage Unbalance)	
55	VbusInstantUnbalance (Bus Instantaneous Voltage Unbalance)	
57	SwSplitOCPInstant (Software Split Instantaneous Overcurrent Protection)	
58	HwSplitNOCP (Hardware Split Overcurrent Protection)	
65	BatOVP (Battery Overvoltage)	Check whether the battery voltage is too high.
66	BatLowVoltage (Battery Low Voltage)	Check whether the battery voltage is too low.
67	SwBatOCP (Battery Over Current)	Check whether the inverter is working overload.
69	SwBuckBoostOCP (BuckBoost Peak Over Current)	This is an internal fault of the inverter. Please turn off the inverter, and then turn it back on after waiting for 5 minutes to check if the fault disappears. If the issue remains unresolved, please contact our technical support.
70	HwBuckBoostOCP (BuckBoost Hardware Over Current)	
73	PvOVP (PV Overvoltage)	
74	SwPvOCPInstant (PV Peak Over Current)	
75	HwPVOCP (PV Hardware Over Current)	

76	IpvUnbalance (PV Current Unbalance)	
77	PVConfigError (PV Mode Settings Error)	Check the setting of the PV input mode (parallel/single mode). Modify the settings if it is not corresponding to the actual PV input method.
81	IsoFault (Insulation Resistance)	Check the insulation resistance between the PV array and ground (earth). If a short circuit occurs, repair the fault in time.
82	PEConnectFault (Grounding Error)	When the Grid PEN Bond Detect is enabled in the APP, check whether the grid-side N and PE lines are bonded in the distribution box.
83	AFCIFault (AFCI Fault)	Check the PV input wiring for any loose connections or arcing.
84	AFCIDeviceFault (AFCI Module Fault)	This is an internal fault of the inverter. Please turn off the inverter, and then turn it back on after waiting for 5 minutes to check if the fault disappears. If the issue remains unresolved, please contact our technical support.
89	SpiCommFault_DC (SPI Communication Error (DC))	
90	SpiCommFault (Master-Slave SPI Communication Error)	
91	SChip_Fault (Slave Chip Error)	
92	MChip_Fault (Master Chip Error)	
93	SciCommLose (SCI Communication Error)	
94	MeterCommLose (Electric Meter Communication Fault)	Check whether the communication cable of the electric meter is properly connected.
95	AFCICommFault (AFCI Communication Fault)	This is an internal fault of the inverter. Please turn off the inverter, and then turn it back on after waiting for 5 minutes to check if the fault disappears. If the issue remains unresolved, please contact our technical support.

96	ParallelFault (Parallel Error)	Check whether the parallel connection cable is in good contact.
97	FanFault 1 (Fan 1 Fault)	Check whether the fan 1 of the inverter is working normally.
98	TempFault_Env1 (Ambient Temperature Over Temperature 1)	Ensure the inverter is installed in a cool, well-ventilated area (do not install the inverter in direct sunlight).
103	FanFault 2 (Fan 2 Fault)	Check whether the fan 2 of the inverter is working normally. (near the capacitor side of the busbar)
104	NTCSampleFault (NTC Sample Abnormality)	In the event of an internal inverter fault, please power down the inverter and allow a 5-minute interval before restarting it. Verify whether the issue has been resolved. If the issue remains unresolved, please contact our technical support.
106	TempFault_HeatSink1 (Heat Sink 1 Over Temperature)	Ensure the inverter is installed in a cool, well-ventilated area (do not install the inverter in direct sunlight).
107	TempFault_HeatSink2 (Heat Sink 2 Over Temperature)	
113	VoltDerating (Voltage Derating)	Ensure the grid voltage and frequency are within the specified range of the inverter.
114	VoltLoading (Voltage Loading)	
115	FreqDerating (Frequency Derating)	
116	FreqLoading (Frequency Loading)	
117	OverTempDerating (Over Temperature Derating)	Ensure the inverter is installed in a cool, well-ventilated area (do not install the inverter in direct sunlight).
118	BatLowVoltageAlarm (Battery Low Voltage Alarm)	Check whether the battery voltage is too low.

119	ReversalConnection (PV Input Reverse Connection Alarm)	Check whether the positive and negative poles of the PV input cable are reversed.
120	EStop Warn (Emergency Stop Alarm)	Check whether the ON/OFF switch is pressed down.
121	GenSeltTestAbnormal (Generator Self-test Abnormality)	Check whether the generator is operating normally.
130	unrecoverPVOCPInstant (PV Over Current Permanent Fault)	This is an internal fault of the inverter. Please turn off the inverter, and then turn it back on after waiting for 5 minutes to check if the fault disappears. If the issue remains unresolved, please contact our technical support.
132	unrecoverRelayFail (Grid Relay Permanent Fault)	
134	unrecoverOverLoad (Overload Permanent Fault)	
138	unrecoverBusOVP (Bus Overvoltage Permanent Fault)	
140	unrecoverIpvUnbalance (PV Current Unbalance Permanent Fault)	
141	unrecoverEPSBatOCP (EPS Battery Over Current Permanent Fault)	
142	unrecoverAcOCPInstant (Inverter Peak Over Current Permanent Fault)	
144	unrecoverAFCIFault (AFCI Permanent Fault)	
145	BMS OVP (BMS Overvoltage Alarm)	This is an internal fault of the lithium battery. Please turn off the inverter and lithium battery, and then

146	BMS UVP (BMS Undervoltage Alarm)	turn them back on after waiting for 5 minutes to check if the fault disappears. If the issue remains unresolved, please contact our technical support.
147	BMS OTP (BMS High Temperature Alarm)	
148	BMS UTP (BMS Low Temperature Alarm)	
149	BMS OCP (BMS Charging/Discharging Over Current)	
150	BMS Short (BMS Short Circuit Alarm)	
161	ARM update Fail (ARM Update Failed)	If the upgrade fails, make multiple times of plugging and unplugging or perform a re-upgrade after powering on. If the issue remains unresolved, please contact our technical support.
162	DSP-M update Fail (Master DSP Update Failed)	
163	DSP-S update Fail (Slave DSP Update Failed)	
164	BMSLink update Fail (BMSLink Update Failed)	
171	Drms0Shutdown (Drms0 Shutdown)	The inverter is shut down via Drms0.
177	USBFault (USB Fault)	Check the inverter USB port.
178	WifiFault (WiFi Fault)	Check the WiFi connection of the inverter.
179	BluetoothFault (Bluetooth Fault)	Check the Bluetooth connection of the inverter.
180	RTCFault (RTC Fault)	This is an internal fault of the inverter. Please turn off the inverter, and then turn it back on after waiting for 5 minutes to check if the fault disappears. If the issue remains unresolved, please contact our technical support.
181	EEPROMFault (EEPROM Error)	
182	FlashFault (FLASH Error)	

184	SafetyVerFault (Safety Version Error)	
185	SCILose(DC) (SCI Communication Error (DC))	
186	SCILose(AC) (SCI Communication Error (AC))	
189	BMSCommFault (Battery Communication Fault)	Ensure that the batteries you use are compatible with the inverter. CAN communication is recommended. Check for any faults in the communication cables or ports between the battery and inverter.
190	RsdFault (RSD Fault)	Check whether fast shutdown occurs.

5.4 Routine maintenance

Inverters generally require no maintenance or calibration, but it is important to ensure that the heat sinks are not covered by dust, dirt, or other debris.

- Clean inverter

Please clean the inverter using an electric compressed air blower, a dry soft cloth, or a soft-bristled brush. Do not use water, corrosive chemicals, cleaning agents, or strong detergents to clean the inverter.

- Clean heat sink

To ensure the normal function and long-term use of the inverter, it is crucial to maintain sufficient airflow space around the heat sink. No obstructions to airflow, such as dust or snow, should be present around the heat sink and must be removed. Clean the heat sink using compressed air, a soft cloth, or a soft brush. Do not use water, corrosive chemicals, detergents, or strong cleaning agents to clean the heat sink.

5.5 Inverter disposal

When the inverter can no longer be used and needs to be discarded, please dispose of the inverter in accordance with the electrical waste disposal requirements specified by the current country/region. The inverter should not be treated as household waste.

6 Protections

No.	Protections	Description
1	PV limit current/power	When the PV output current/power exceeds the PV maximum input current/power of the on-grid hybrid inverter, the inverter will obtain energy from the PV array at its maximum input current/power. When the input voltage of the PV array is 90V ≤ Vin < (Pmax per string/16A)V, the PV input power of the on-grid hybrid inverter decreases as the input voltage decreases. When the input voltage of the PV array is (Pmax per string/16A)V ≤ Vin < 520V, the inverter supports a maximum PV input power of up to 1.5 times the rated power. When the input voltage of the PV array is 520V ≤ Vin < 580V, the PV input power of the inverter decreases as the input voltage increases. **Note:** Pmax per string is calculated by dividing the maximum PV input power by the number of corresponding MPPTs.
2	PV short circuit	When the PV is not charging, a short circuit in the PV array will not damage the inverter.
3	PV reverse polarity	In case of PV reverse polarity, the inverter will not be damaged and will resume operation after correcting the wiring error.
4	Grid input overvoltage	When the grid voltage exceeds the set value of the grid overvoltage disconnect voltage, the grid relay will disconnect, and bypass output will stop.
5	Grid input undervoltage	When the grid voltage is lower than the set value of the grid undervoltage disconnect voltage, the grid relay will disconnect, and bypass output will stop.
6	Battery reverse polarity	In case of battery reverse polarity, the inverter will not be damaged and will resume operation after correcting the wiring error.
7	Battery overvoltage	When the battery voltage goes higher than the overvoltage disconnect voltage, the PV and grid will automatically stop charging the battery to prevent overcharging damage.

<table>
<tr><td>8</td><td>Battery over discharge</td><td>When the battery voltage goes lower than the undervoltage disconnect voltage, the battery will stop discharging to protect the battery from being over-discharged.</td></tr>
<tr><td>9</td><td>Output short circuit (off-grid)</td><td>In the event of a short circuit at the off-grid output port, the inverter will trigger short-circuit protection and automatically restore output after a delay (5 seconds after fault detection).
Promptly address any faults, as prolonged short circuits may cause permanent damage to the inverter.</td></tr>
<tr><td>10</td><td>Device overheating</td><td>When the internal environment or heatsink temperature of the inverter exceeds safe limits, the inverter may reduce power output or shut down. Once the temperature returns to normal, the inverter will resume operation.</td></tr>
<tr><td>11</td><td>Inverter overload (off-grid)</td><td><table><tr><td>0W ≤ P < 12KW</td><td>12KW ≤ P < 15KW</td><td>15KW ≤ P < 18KW</td><td>P ≥ 18KW</td></tr><tr><td>Normal operating</td><td>Protect after 300s</td><td>Protect after 60s</td><td>Protect immediately</td></tr></table>Note: The output is recovered automatically after a delay time of 120s. The inverter stops working after the 4th protection and can resume working after resetting or restarting.</td></tr>
</table>

7 Technical Specifications

Parameters	EHD6K	EHD8K	EHD10K	EHD12K
Battery Input				
Battery Type	Lithium battery			
Voltage Range (V)	85–480			
Rated Voltage (V)	310			
Charging Rule	BMS command			
Maximum Charging and Discharge Current (A)	25	33.3	41.7	50
Protection Current (A)	55			
PV Input				
Maximum Input Power (W)	9,000	12,000	15,000	18,000
Maximum Input Voltage(1) (V)	580			
MPPT Voltage Range (V)	90–550			
Start-up Voltage (V)	100			
Rated Input Voltage (V)	360			
Maximum Input Current (A)	16			
Maximum Short Circuit Current (A)	19.2			
Number of MPPTs	3	3	4	4
Number of Strings per MPPT	1			
AC Output (On-grid)				
Maximum Output Power (VA)	6,000	8,000	10,000	12,000
Rated Output Voltage (V)	L1/L2/N/PE 120/240 (208V 2/3 phase)			
Rated Output Frequency (Hz)	50/60			
Maximum Output Current (A)	25	33.3	41.7	50
Maximum Input Current (A)	50	66.6	80	80

Load Power Factor	0.99 (±0.8)			
THDi (Total Harmonic Current Distortion) @ Rated Output Power	< 3%			
AC Output (Off-grid)				
Rated Output Power (VA)	6,000	8,000	10,000	12,000
Peak Power (VA), Time (s)	1.5* Rated Power, 60s			
Overload Power (VA), Time (s)	1.25* Rated Power, 300s			
Switch Time (ms)	10			
Rated Output Current (A)	25	33.3	41.7	50
Rated Output Voltage (V)	L1/L2/N/PE 120/240 (208V 2/3 phase)			
Rated Output Frequency (Hz)	50/60			
THDu (Total Harmonic Voltage Distortion) @Linear loads	< 3%			
Generator Input				
Rated Input Power (VA)	6,000	8,000	10,000	12,000
Rated Input Voltage (V)	L1/L2/N/PE 120/240			
Rated Input Current (A)	25	33.3	41.7	50
Rated Input Frequency (Hz)	50/60			
Efficiency				
Maximum Efficiency	97.56%	97.66%	97.72%	97.75%
European Efficiency	96.7%	96.9%	96.9%	97.0%
Maximum Discharge Efficiency	97.0%	96.9%	96.9%	97.1%
MPPT Efficiency	99.9%			
General Info				

Protections	PV reverse polarity/insulation resistance/ overcurrent/overvoltage/over temperature/ anti-islanding/leakage current protection
DC Switch	Included
AFCI	Optional
SPD Protections	DC Type II/AC Type III
RSD Rapid Shutdown	Optional
Generator Auto Start-up	2 Wire Start - integrated
Working Temperature Range	-25℃ to +60℃ (> 45℃ derating)
Relative Humidity	5% to 95% (N.C.)
Maximum Working Altitude	4,000 meters (> 2,000 meters derating)
Cooling Method	Natural
User Interface	LED & APP
Communication with BMS	RS485/CAN
Communication with Meter	RS485
Monitoring Method	WiFi/Bluetooth (External)
Net Weight (kg)	45
Dimension W × H × D (mm)	513 × 737 × 238
Noise Emission (dB)	< 35
Topology	Non-Isolation
Standby Losses (W)	< 20
Ingress Protection Rating	3R
Mounting Method	Wall Mounted

(1) The maximum input voltage refers to the voltage at an ambient temperature of -30℃.

Any changes without prior notice! Version number: V1.0

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