AlpSolar
A LIGOO BRAND

USER MANUAL

PULSE S3 4-6kW

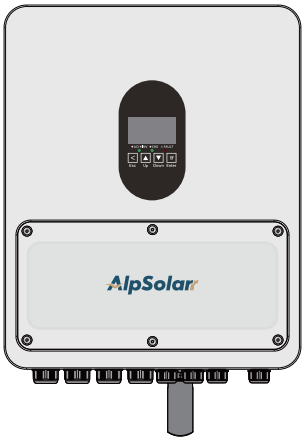


Table of Contents

1. Foreword

This document mainly introduces the product information, installation and wiring, configuration and testing, troubleshooting and maintenance of the inverter. Please read this manual carefully to understand the product safety information and familiarize yourself with the product's functions and features before installing and using the product. This document may be updated irregularly, please download the latest version of the document and find more product information on the official website (https://www.alpsolarr.com)

1.1 Applicable Products

Disclaimer clause

Dear users, first of all, thank you for purchasing this product. Before you open the package and officially use this product, in order to do our best responsibility, we kindly ask you to read the following statement first:

Any user should read this statement carefully before using this product, and once used, is deemed to recognize and accept the entire contents of this statement. Please strictly follow the manual to install and use the product. In view of the fact that the company has no control over the user's future specific use, re-installation, re-modification, and other possible misuse, etc., our company will not be liable for corresponding losses or compensation for any damages or damages caused by the above reasons.

Copyright statement

The current version was last updated on March 31th, 2025.

This document applies to the following models of AlpSolarr inverters:

PS3004K1P01	4.0kW
PS3006K1P01	6.0kW

1.2 Applicable Personnel

This manual applies to professional electrical technicians responsible for the installation and commissioning of inverters for mixed photovoltaic and battery systems. Professional electrical technicians should be familiar with local codes, standards and electrical systems, and be trained and knowledgeable about this product before operating the equipment.

1.3 Symbol Definition

For better use of this manual, the following symbols have been used to highlight important information, so please read the symbols and descriptions carefully.

Symbolization	Definition	Description
DANGER	Danger	Indicates a situation with a high potential hazard that could result in death or serious injury if not avoided.
WARNING	Warning	Indicates a situation with a moderate potential hazard that could result in death or serious injury if not avoided.
CAUTION	Caution	Indicates a situation with a low potential hazard that could result in moderate or minor injury to personnel if not avoided
ATTENTION	Attention	Highlighting and supplementing content may also provide tips or tricks to optimize the use of a product, help you solve a problem, or save you time.

2. Safety Precautions

The safety precautionary information contained in this document must always be observed when operating the equipment.

ATTENTION

The inverter has been designed and tested in accordance with strict safety regulations. However, as electrical equipment, it is important to follow the relevant safety instructions before carrying out any operation on the equipment, as improper operation may result in serious injury or property damage.

2.1 Generic Safety

ATTENTION

- The content of this document may be updated from time to time due to product version upgrades or other reasons, and does not replace the safety precautions on the product label or in the user's manual, unless otherwise agreed. All descriptions in this document are intended as a guide to use only.
- Please read this document carefully to understand the product and precautions before installing the equipment.
- All operations of the equipment must be carried out by professional, qualified electrical technicians who are familiar with the relevant standards and safety codes of the project site.
- When operating the inverter, use insulated tools and wear personal protective equipment to ensure personal safety. Wear electrostatic gloves, electrostatic bracelets, and anti-static clothing to protect the inverter from electrostatic damage.
- Damage to equipment or injury to personnel caused by failure to install, use, or configure the inverter in accordance with the document is not the responsibility of the equipment manufacturer.

2.2 PV String Safety

⚠ DANGER

PV wiring must have a disconnect device, which is required to be disconnected before connecting to the inverter.

⚠ WARNING

- Ensure that the module bezel and support system are well grounded.
- After connecting the DC cables, make sure that the cable connections are tight and not loose.
- Use a multimeter to measure the positive and negative terminals of the DC cables to ensure that the positive and negative terminals are correct and not reversed; and that the voltage is within the allowable range.
- Do not connect the same PV string to more than one inverter as this may cause damage to the inverter.
- PV modules used in conjunction with the inverter must comply with IEC61730 Class A.

2.3 Inverter Safety

⚠ WARNING

- It is recommended to add protection devices such as breakers or fuses on the AC side of the inverter, and the specification of the protection devices should be greater than 1.25 times of the rated current of the AC output of the inverter.
- It is recommended to add protection devices such as breakers or fuses on the PV side of the inverter, and the specification of the protection devices should be greater than 1.25 times of the rated current of the PV input of the inverter.
- It is recommended to install DC switch for isolation on the PV side of the inverter, The rated insulation voltage of the isolating switch shall not be lower than the maximum open-circuit voltage of the PV string, and the rated operating current shall not be less than 1.25 times of maximum operating current of the PV input of inverter.
- The protective ground of the inverter must be firmly connected, and in the case of multiple inverters, make sure that the protective ground points of all inverter chassis enclosures are equipotential connected.
- It is not recommended to use a LOAD port to connect the BACK-UP load if PV systems are not configured with batteries. The resulting risk of system power usage will be beyond the equipment manufacturer's warranty.

⚠ DANGER

- After the inverter is installed, the labels and warning signs on the case must be clearly visible, and obscuring, altering, or damaging them is prohibited. -
- The markings on the inverter case are as follows:

	High voltage hazard. The inverter operates at a high voltage, so make sure the inverter is disconnected from the power supply when operating the inverter.
	Delayed discharge. Once the equipment is powered down, wait 5 minutes until the equipment is fully discharged.
	Before operating the equipment, read the product manual carefully.
	The equipment is potentially hazardous when operated. Please take protective measures during operation.
	The surface of the inverter is hot and should not be touched during operation as this may cause burns.
	Do not dispose of the equipment as household garbage. Dispose of the equipment according to local laws and regulations, or send it back to the equipment manufacturer.
	CE marking
	Protective ground wire connection point.

2.4 Battery Safety

WARNING

- Batteries used with the inverter need to be approved by the inverter manufacturer, and a list of approved batteries is available through the official website.
- Before installing the equipment, please read the corresponding user's manual of the battery carefully to understand the product and precautions, and please operate strictly according to the requirements of the user's manual of the battery.
- If the battery has been fully discharged, please charge the battery in strict accordance with the user's manual for the corresponding model.
- Battery current may be affected by a number of factors, such as: temperature, humidity, weather conditions, etc., which may result in current limitation and affect the load carrying capacity.
- If the battery cannot start, contact an after-sales service center as soon as possible. Otherwise, the battery may be permanently damaged.
- Use a multimeter to measure the positive and negative terminals of the DC cable to ensure that the positive and negative terminals are correct; and that the voltage is within the allowable range.
- An externally mounted breaker is required when the battery is connected to the inverter. (Circuit breakers need to meet IEC 60947-1 and IEC 60947-2 certification)

2.5 Personnel Requirements

ATTENTION

- Personnel responsible for installing and maintaining the equipment must first undergo rigorous training to understand the various safety precautions and master the correct operating methods.
- Installation, operation, maintenance, and replacement of equipment or parts are permitted only by qualified professionals or trained personnel.

2.6 EU Conformity Declaration

Devices that can be marketed in Europe that do not have wireless communication capabilities meet the requirements of the following directives:

- Electromagnetic compatibility Directive 2014/30/EU (EMC)
- Electrical Apparatus Low Voltage Directive 2014/35/EU (LVD)

More EU declarations of conformity are available from the official website: https://www.alpsolarr.com

3. Profile of Product

3.1 Product Introduction

Functional overview:

The Eco-Hybrid inverters developed by Shenzhen Ligoo New Energy Technologies Co., Ltd. use advanced control algorithms to implement an integrated energy management system in the photovoltaic and energy storage systems to control and optimize the energy flow. During the day, the power generated in the PV system is used by the loads, with excess energy stored in the batteries. At night, when there is no solar energy, the energy stored in the batteries can be discharged to the loads. The Eco-Hybrid inverter has both HMI and LED local monitoring and EMS system remote scheduling functions, with excellent load adaptability and grid adaptability. Meanwhile, the good hardware design makes it effective to deal with a variety of complex application environments, and the system operation is safer, more reliable, more economical, and more adaptable to the environment.

3.2 Functional Features

S3 series low-voltage single-phase Eco-Hybrid inverters are suitable for residential and small commercial and industrial PV energy storage systems, with the following main product features:

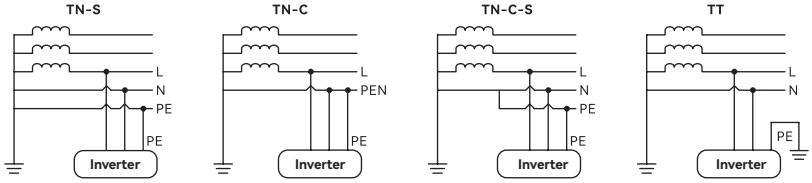
- Pure sine wave inverter
- MPPT ranges 60V~450V, 500Voc
- Support 70V PV voltage startup, 2 times PV access power and 1.7 times the maximum MPPT
- High frequency inverter with small size and light weight
- Compatible to utility mains or generator power
- Supports lead acid battery and li-ion battery connections
- WIFI remote monitoring
- Communication:RS232/Dry-Contact/CAN/RS485
- Work with or without battery
- Parallel operation up to 6 units
- Dual AC outputs, for intelligent of management load
- AC/PV can activate lithium batteries
- Cold start function
- Auto restart while AC is recovering
- 90-280VAC wide grid voltage
- MAX 40A grid input current
- Configurable input voltage ranges for home appliances and personal computers via LCD control panel
- Smart battery charger design for optimized battery performance
- All-round protection with complete short circuit protection, overload protection, over current protection, over under voltage protection, over temperature protection, etc.
- Supports three different voltage levels of 220\230\240Vac

- Combined with solar energy, AC power and battery power, it provides users with an uninterruptible power supply experience
- LCD large screen dynamic flow diagram design, easy to understand the system data and operation status
- 3000m altitude
- IP66 protection rating
- 5-year warranty/10-year warranty

Support grid forms:

It is categorized by the neutral point grounding mode of power transformers and the grounding mode of the shell or conductive part of the electrical equipment, and this inverter product supports the following grid forms including TN-S, TN-C, TN-C-S, TT, etc.

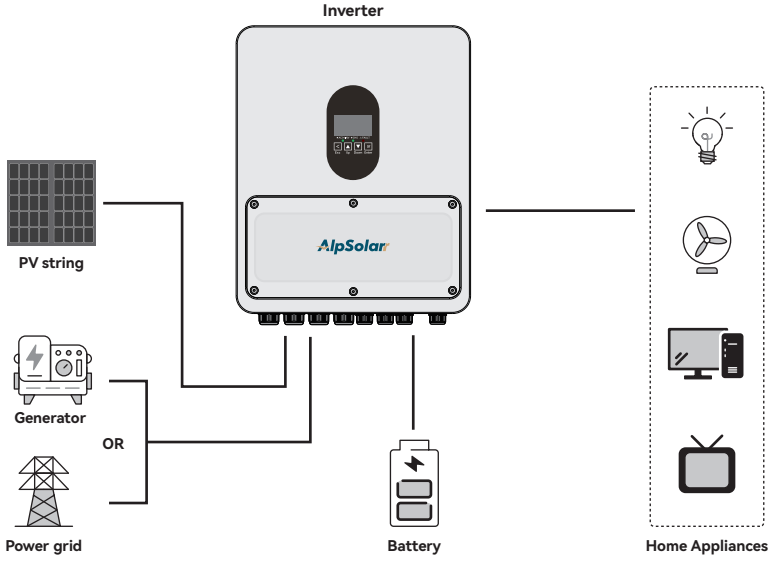
For grid forms with N wires, the N-to-ground (PE) voltage needs to be less than 10 V.



3.3 Application Scenarios（Basic System Architecture）

The following illustration shows basic application for this unit.It also required the following devices to have a complete running system:

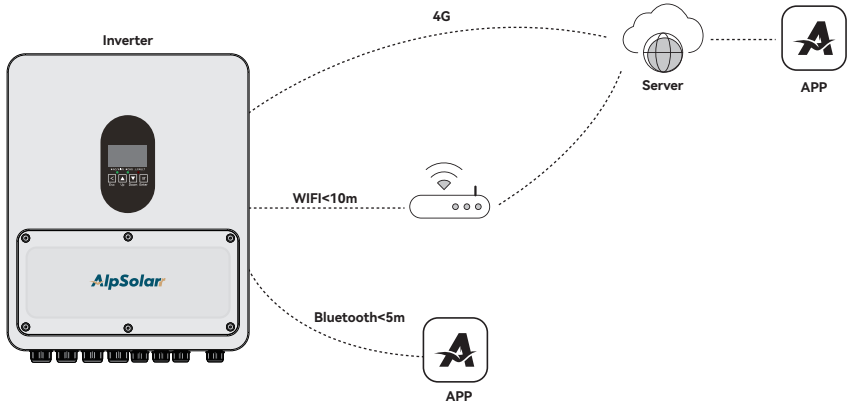
- Generator or Utility mains.
- PV modules



3.4 Communication

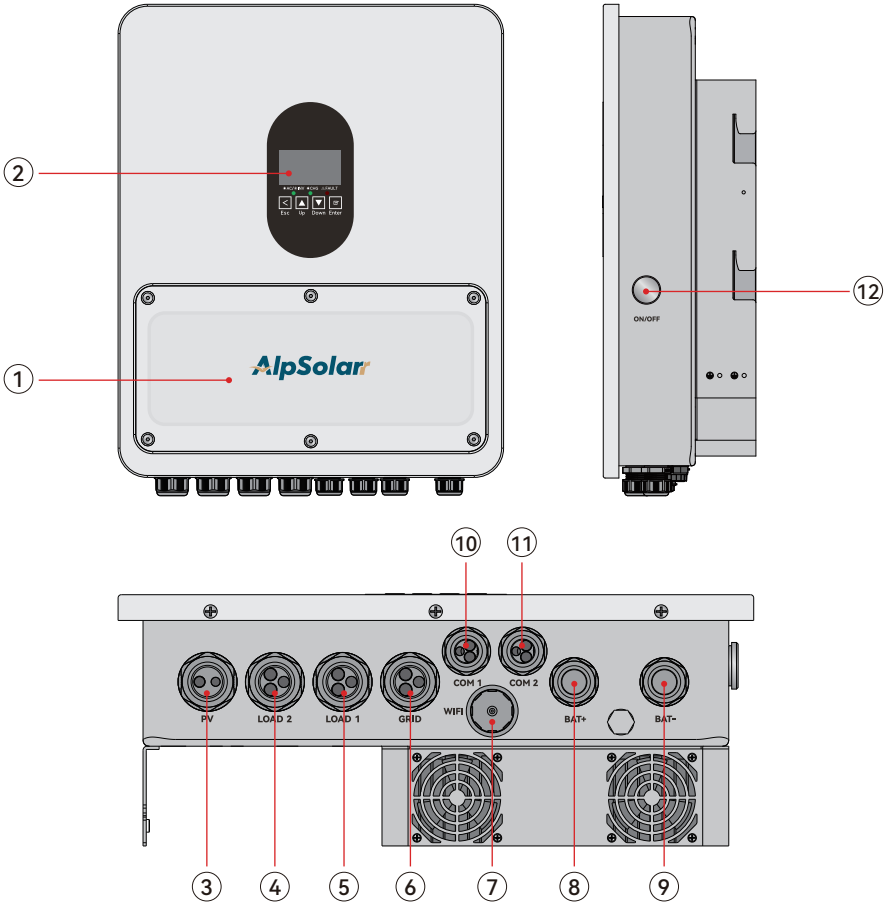
The inverter supports to be set up locally via WiFi, it can be connected to the cloud via WiFi to monitor the operating status of the inverter and the operation of the power plant.

- WiFi: support 2.4G band, need to set the router to 2.4G.
- WiFi signal strength is supported to be viewed via AlpsCloud APP. When the signal strength is less than -60dBm, it is recommended to move the router closer to the equipment or move away from the signal blocker to improve the signal strength.
- Support dry contact communication
- Support RS232 contact communication for host computer
- BMS communication supports CAN/RS485 communication



3.5 Product Overview

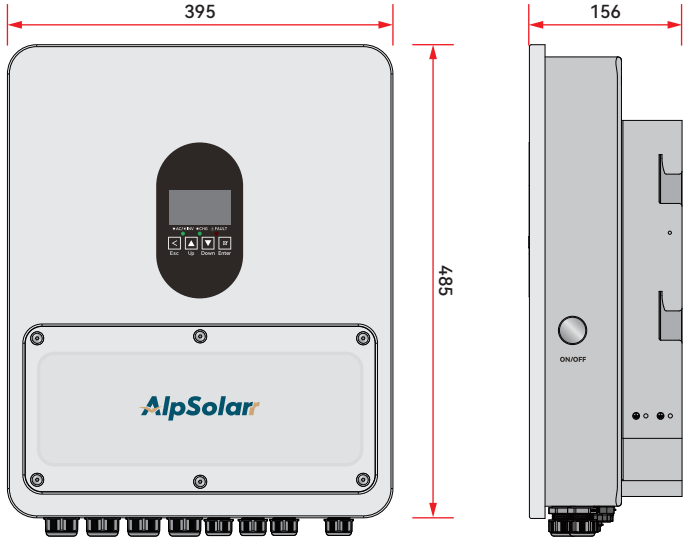
3.5.1 Appearance Description



① Terminal cover
② LCD display
③ PV
④ LOAD 2
⑤ LOAD 1
⑥ GRID
⑦ WIFI Port
⑧ Battery (+)
⑨ Battery (-)
⑩ COM 1 Port(Dry Contact,CT,BMS Port)
⑪ COM 2 Port(Parallel Port)
⑫ Power ON/OFF switch

3.5.2 Dimension

Product size(W*H*D): 395*485*156(mm)



4. Equipment Inspection and Storage

4.1 Check Before Signing

Before signing for the product, please check the following in detail:

1. Check the outer packaging for damage, such as deformation, openings, cracks or other signs that may cause damage to the equipment inside the box, and if there is any damage, do not open the packaging and contact your dealer.

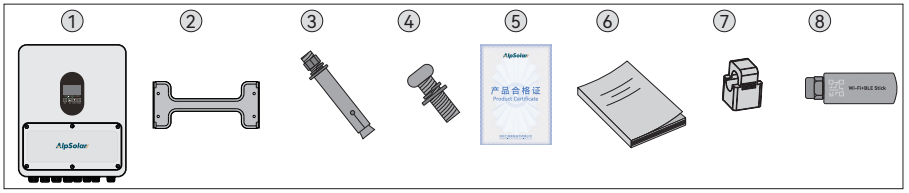
2. Check that the inverter model number is correct. If there is any discrepancy, do not open the packaging and contact your dealer.

3. Check whether the delivery type and quantity are correct, and whether there is any damage to the appearance. If there is any damage, please contact your dealer.

4.2 Deliverables

WARNING

When making electrical connections, use the wiring terminals shipped with the box . Damage to the equipment caused by the use of incompatible connectors is not covered by the warranty.



1	Eco-Hybrid Inverter *1PC	5	Product Certificate*1PC
2	Wall-mounted Backplate Support *1PC	6	User manual*1PC
3	Expansion Bolt M6*60mm *4PC	7	Current Transformer*1PC[1]
4	Cross Pan Head Three-in-One Combination Screw M4*8mm *2PC	8	WiFi Module*1PC[2]

[1] Some batches/models of this product may come with a Current Transformer, please check the list of accessories in the package after receiving the goods.

[2] Some batches/models of this product may come with a WiFi module, please check the list of accessories in the package after receiving the goods.

4.3 Equipment Storage

If the inverter is not to be put into service immediately, store it according to the following requirements:

1. Ensure that the outer carton has not been removed and that the desiccant in the carton has not been lost.

2. Ensure that the storage environment is clean, has an appropriate temperature and humidity range, and is free of condensation.

3. Ensure that the inverters are stacked at a height and in an orientation that is in accordance with the labeling instructions on the cases.

4. Ensure that there is no risk of dumping of inverters after stacking.

5. After long-term storage, the inverter should be inspected and confirmed by professional personnel before further use.

5. Installation

5.1 Installation Requirements

● Installation Environmental Requirements

1. The equipment must not be installed in flammable, explosive or corrosive environments.

2. Installation position should be out of the reach of children and avoid installing in a location that is easy to touch. High temperatures may exist on the surface of the equipment during operation to prevent burns.

3. Please avoid water pipes and cables in the wall at the installation location to avoid danger when drilling.

4. The installation space should meet the requirements of equipment ventilation and heat dissipation and operation space.

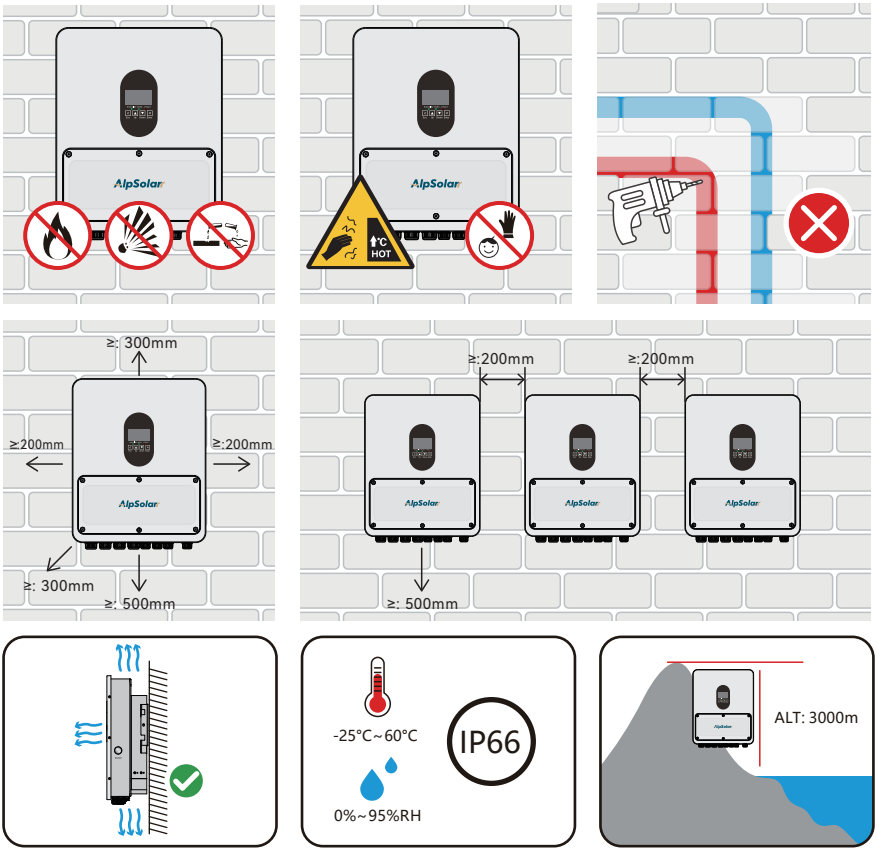
5. The protection level of the equipment meets the indoor installation, and the temperature and humidity of the installation environment should be within the suitable range.

6. The equipment should be installed at a height that facilitates operation and maintenance, ensuring that the equipment indicator lights and all labels are easy to see and the terminals are easy to operate.

7. The inverter should be installed at an altitude lower than the maximum working altitude of 3000 m.

8. Keep away from strong magnetic field environment to avoid electromagnetic interference. If there is a radio station or wireless communication equipment below 30 MHz near the installation location, install the equipment according to the following requirements:

- Add ferrite cores with multi-turn windings at the DC/AC input/ output lines of the inverter, or add low-pass EMI filters.
- The distance between the inverter and the wireless electromagnetic interference equipment should be more than 30 m.



● Installation carrier requirements

• The installation carrier must not be flammable and must be fire resistant.

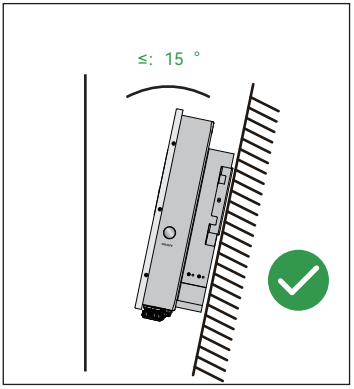
• Make sure that the installation carrier is sturdy and reliable to carry the weight of the inverter.

• The equipment will vibrate during operation, so do not install it on a poorly insulated carrier to prevent the noise from the equipment from disturbing residents in the living area.

● Installation angle requirements

• Recommended inverter installation angle: vertical or tilted back ≤ 15° .

• Do not install the inverter upside down, tilted forward, tilted backward beyond the angle, or horizontally.


≤: 15 °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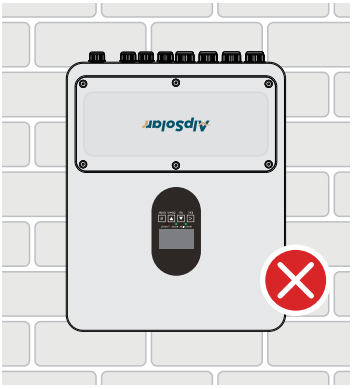
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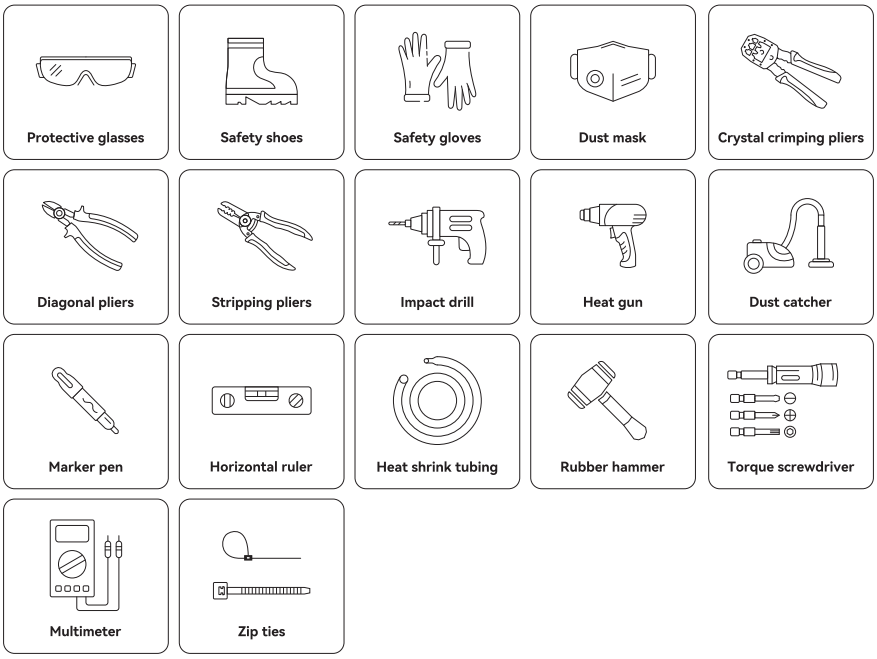
● Installation tool requirements

• For installation, the following installation tools are recommended. Other aids may be used on site if necessary.



5.2 Inverter Installation

5.2.1 Handling of Inverter

CAUTION

● During transportation, turnover, installation and other operations, it shall meet the requirements of laws and regulations and relevant standards of the country or region where it is located.

● Before installation, it is necessary to handle the inverter to the installation location. To avoid personnel injury or equipment damage during the handling process, please pay attention to the following matters:

1. Please assign personnel according to the weight of the equipment so that the equipment does not exceed the weight range that can be handled by personnels and injure them.

2. Wear safety gloves to avoid injury.

3. Make sure that the equipment is balanced during handling to avoid dropping.

5.2.2 Inverter Installation

ATTENTION

When drilling, make sure that its location avoids water pipes, cables, etc.When drilling, please wear goggles and dust masks to avoid dust inhalation into the respiratory tract or falling into the eyes.Make sure the inverter is firmly installed to prevent it from falling and injuring people.

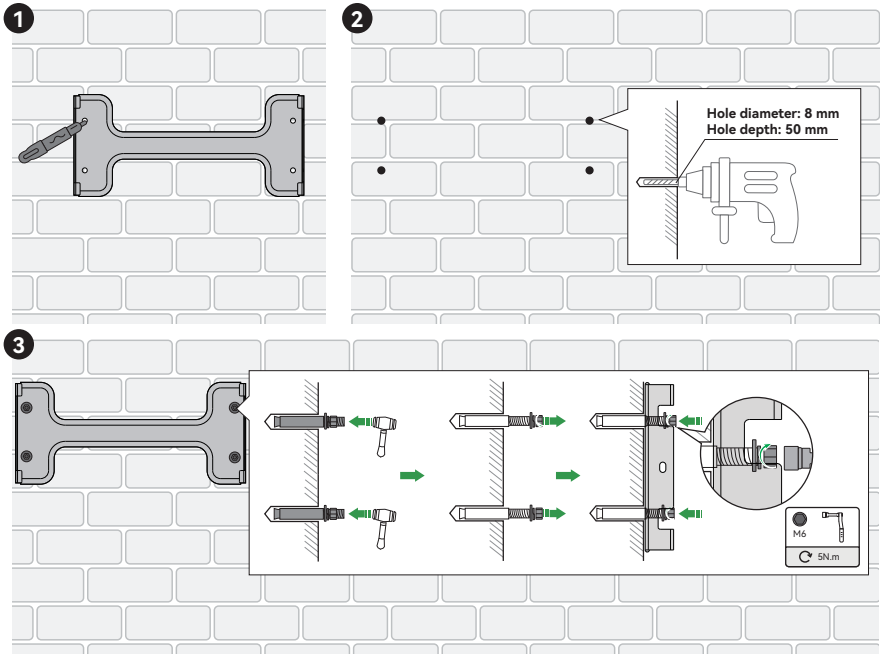
1. Refer to the following drawing to mark the location of the wall mounting holes.

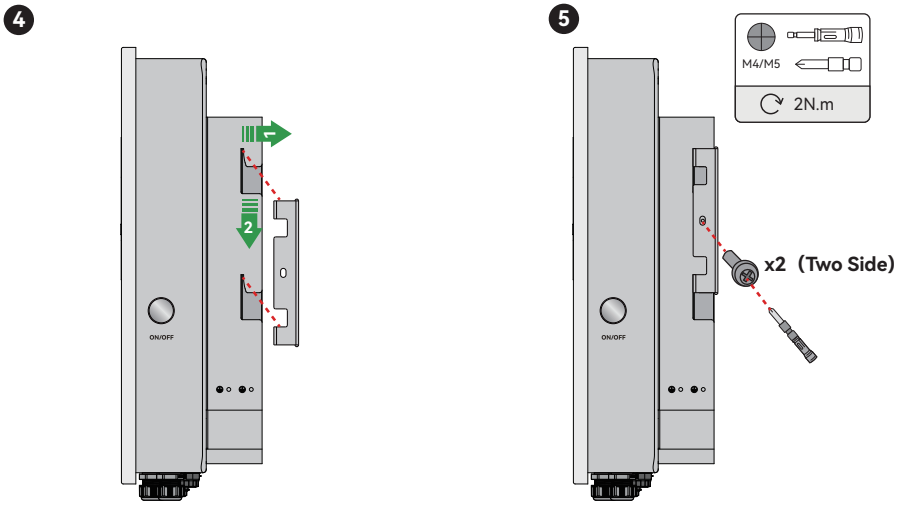
2. Use an impact drill with a drill bit of 8 mm (0.315 inches) in diameter to drill 4 holes, ensuring that the hole depth is about 50mm.

3. Use two M6 * 60 expansion screws to hang the Eco-Hybrid inverter on the wall with the recommended torque (30 kgf.cm); at the same time, plug the plastic expansion screw tube into the two holes below.

4. Remove the terminal cover of the Eco-Hybrid inverter.

5. Use two M5 * 40 self-tapping screws to fix the machine to the wall from the bottom of the machine.


1
2
Hole diameter: 8 mm
Hole depth: 50 mm
3
M6
5N.m


4
1
2
ON/OFF
5
M4/M5
2N.m
x2 (Two Side)
ON/OFF

6. Electrical Connection

6.1 System Wiring Block Diagram

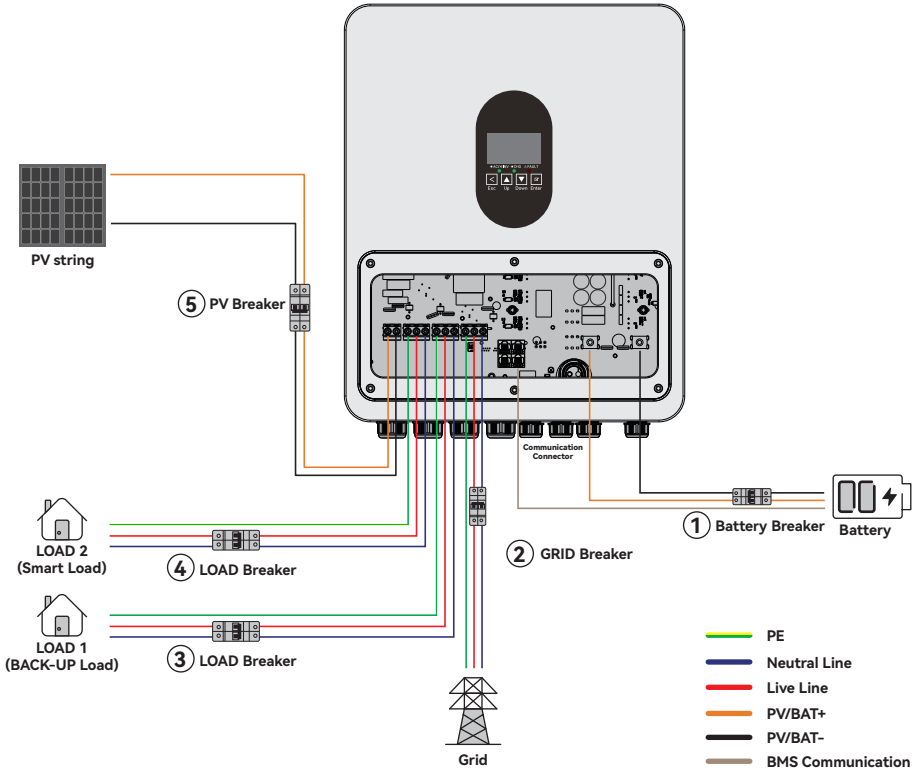
ATTENTION

1. The N and PE wiring of the inverter GRID and LOAD ports are different according to the regulatory requirements of different regions, depending on the local regulatory requirements.

2. When the inverter is powered up, the LOAD port is energized. If you need to perform maintenance on the BACK-UP loads, power down the inverter or electric shock may occur.

ATTENTION

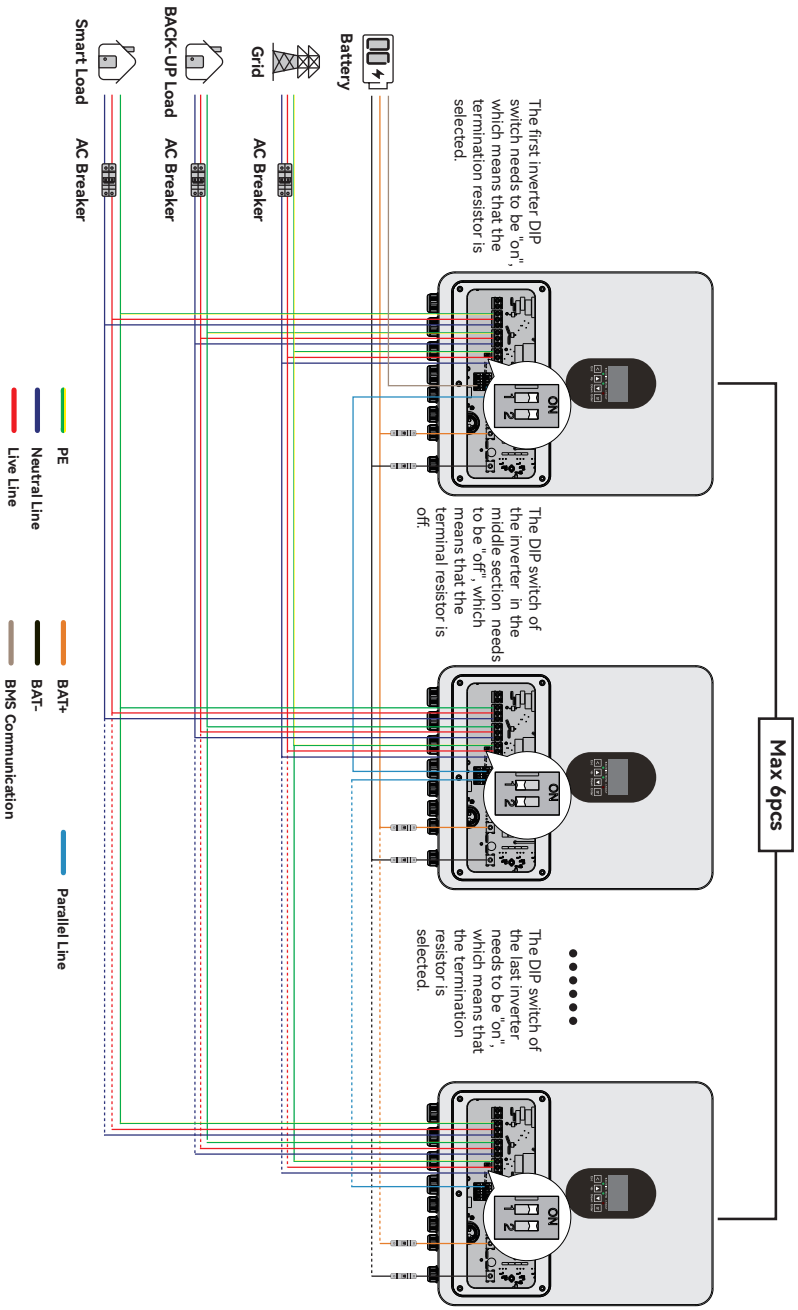
- Electrical wiring diagram for stand-alone applications:



Recommended breaker specifications:

Serial No.	Inverter Model	Battery DC Breaker	Grid AC Breaker	Backup AC Breaker	Smart AC Breaker	PV Breaker
1	4K	63V/125A	250V/32A	250V/32A	250V/32A	35A
2	6K	63V/160A	250V/50A	250V/50A	250V/50A	35A

6.2 Electrical Wiring Diagram In Parallel（Single phase）

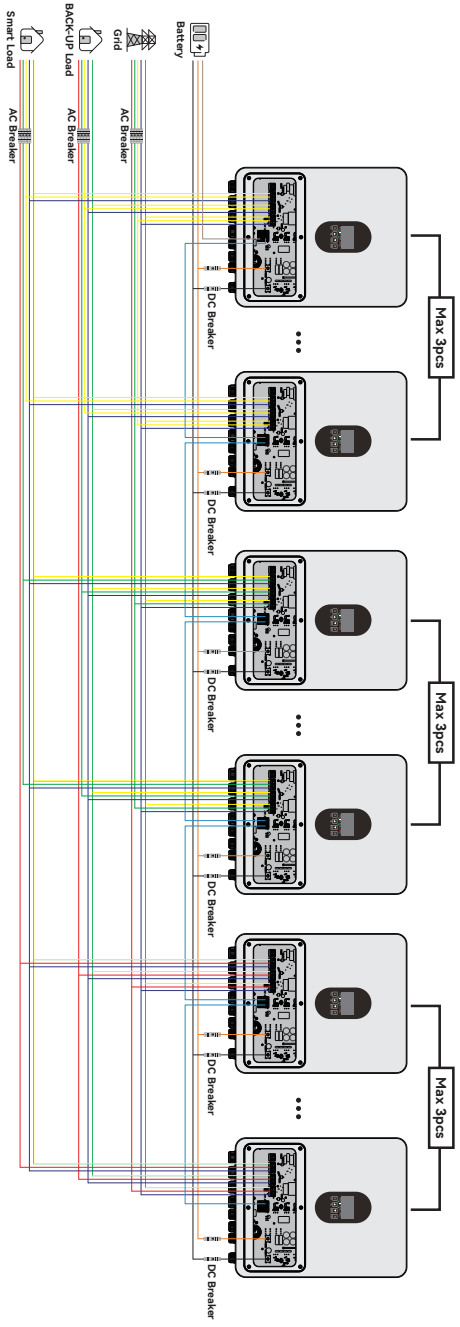


Note：

1）Supports a maximum of 6 inverters in parallel operation.

2）The communication cable length for parallel operation is less than 1.5 meters.

6.3 Electrical Wiring Diagram In Parallel（Three phase）



Note:
The DIP switch of the terminal resistor also needs to be set, with the setting logic consistent with that of the single-phase parallel system shown in the figure 6.2. The first and the last inverter DIP switch needs to be "on","The DIP switch of the inverter in the middle section needs to be "off".

6.4 Safety Precautions

⚠ DANGER

1. All operations, cables and components used in the electrical connection process must comply with local laws and regulations.

2. Before making electrical connections, disconnect the inverter's DC breaker, AC breaker, and make sure the equipment is powered off.

3. Strictly prohibit operation with electricity, otherwise electric shock and other dangers may occur.

4. Similar types of cables should be tied together and arranged separately from different types of cables, and mutual entanglement or cross-layout is prohibited

5. If the cable is subjected to too much tension, it may lead to poor wiring. When wiring, please reserve a certain length of the cable before connecting it to the inverter's wiring port.

6. When crimping the terminals, make sure that the conductor part of the cable is in full contact with the terminals, and do not crimp the insulating skin of the cable together with the terminals. Otherwise, the equipment may not be able to operate, or the inverter terminal block may be damaged due to the heat generated after operation because of unreliable connection.

ATTENTION

1. When making electrical connections, wear personal protective equipment such as safety shoes, protective gloves, and insulated gloves as required.

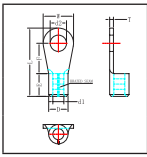
2. Allow only specialized personnel to perform operations related to electrical connections.

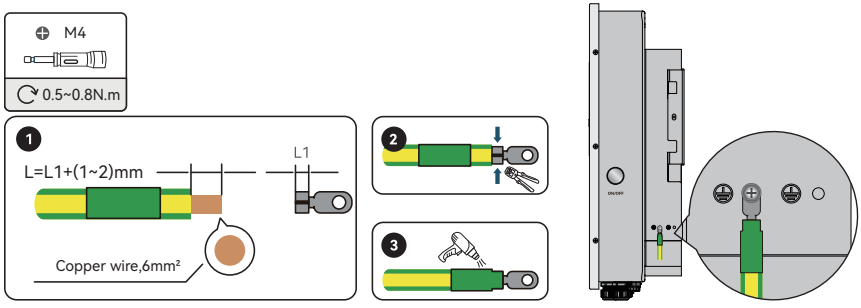
3. The wire colors shown in this graphic are for reference only, and specific wire specifications are subject to local code requirements.

6.5 Connecting Protective Ground Wires

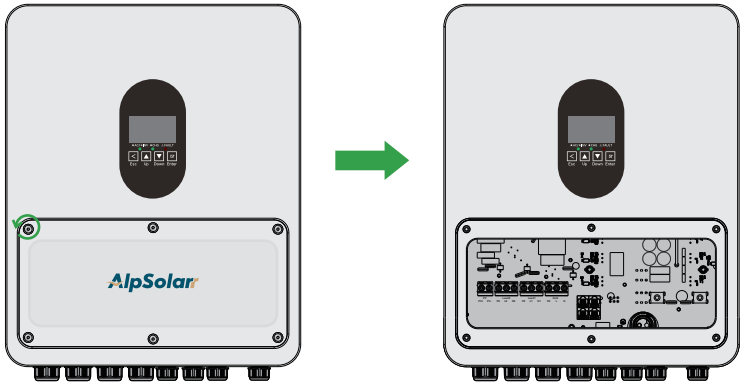
WARNING

- The protective ground of the chassis enclosure cannot replace the protective ground of the AC terminal, and when wiring, ensure that the two protective grounds are reliably connected.
- In the case of multiple inverters, ensure that the protective ground points of all inverters' chassis enclosures are equipotentially bonded.
- To improve the corrosion resistance of the terminals, it is recommended to protect the outside of the ground terminal by applying silicone or paint after the protective ground connection has been installed.
- Please provide your own protective grounds with recommended specifications:
  - Type: outdoor multi-core copper cable.
  - Cross-sectional area of conductor: 6 mm²

	Recommended terminal size							
	Dimension(mm)							
	$d2^{+0.4}_{-0}$	W±0.2	L±1.0	F±1.0	E±0.6	D±0.5	d1±0.3	T±0.05
	5.3	8.8	23.5	10.5	8.5	7.2	4.5	1.2



6.6 Uninstall Terminal Cover



6.7 Connecting AC Cables

WARNING

1. It is prohibited to connect a load between the inverter and the AC breaker, directly connected to the inverter.

2. When the inverter is powered up, the AC output port is energized. If you need to perform maintenance on the AC output loads, power down the inverter or electric shock may occur.

3. Choose whether or not to install RCD equipment in accordance with local laws and regulations.This product can cause current with a d.c. component. Where a residual current operated protective (RCD) or monitoring (RCM) device is used for protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed on the supply side of this product.

Inverter Model	AC GRID	AC BACKUP
PS3004K1P01	30mA	30mA
PS3006K1P01		

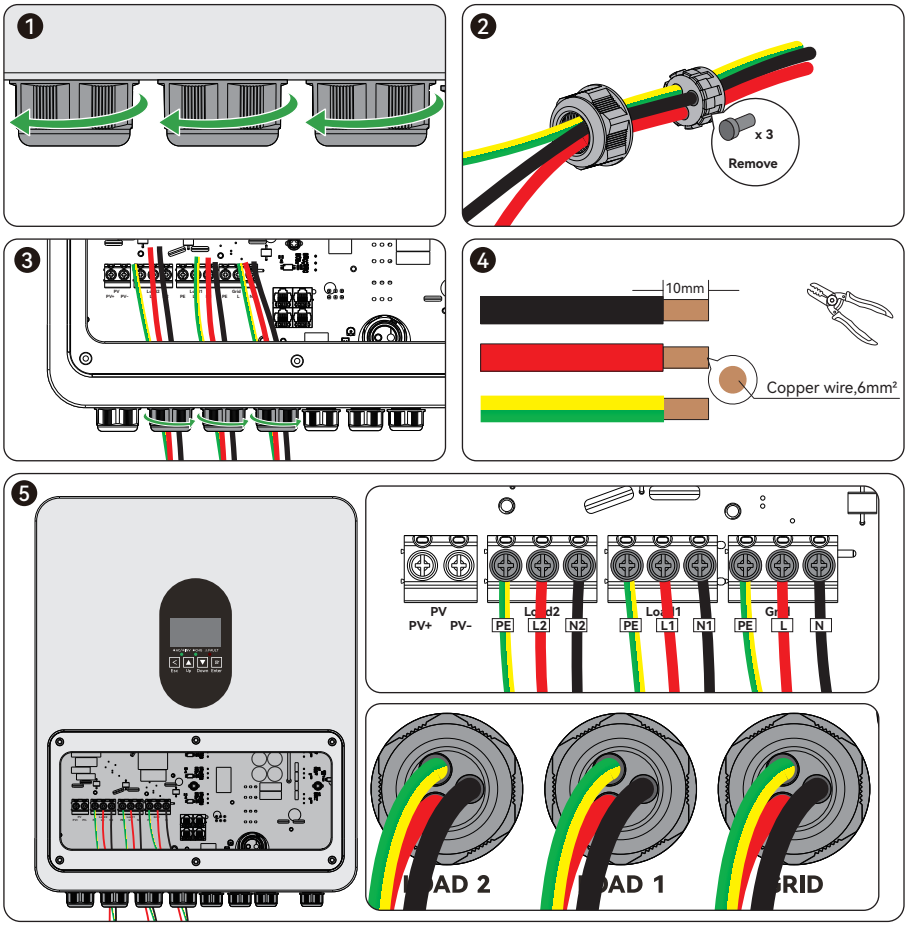
1. When wiring, the AC cable matches the “L”, “N” and “PE” ports of the AC terminal exactly, if the cable is connected incorrectly, it will lead to the damage of the equipment.

2. Make sure that the cable core is fully inserted into the terminal lugs and is not exposed.

3. Ensure that the cables are connected tightly, otherwise the equipment may be damaged by overheating of the terminals during operation.

Suggested cable requirement for AC wires:

Serial No.	Inverter Model	L/N/PE (Grid-Tied)	L1/N1/PE (BACK-UP)	L2/N2/PE (Smart-Load)	Torque value
1	4K	6 mm^2/8 AWG	6 mm^2/8 AWG	6 mm^2/8 AWG	1~1.2N·m
2	6K	6 mm^2/8 AWG	6 mm^2/8 AWG	6 mm^2/8 AWG	1~1.2N·m


1
2
x 3
Remove
3
4
10mm
Copper wire,6mm²
5
PV
PV+ PV-
PE L2 N2
PE L1 N1
PE L N
AD 2
AD 1
RID

6.8 Connect DC Input Cable (PV)

1. Do not connect the same PV string to more than one inverter as this may cause damage to the inverter.

2. Before connecting the PV string to the inverter, please confirm the following information, otherwise it may cause permanent damage to the inverter, and in serious cases, it may cause a fire resulting in loss of life and propefiy:

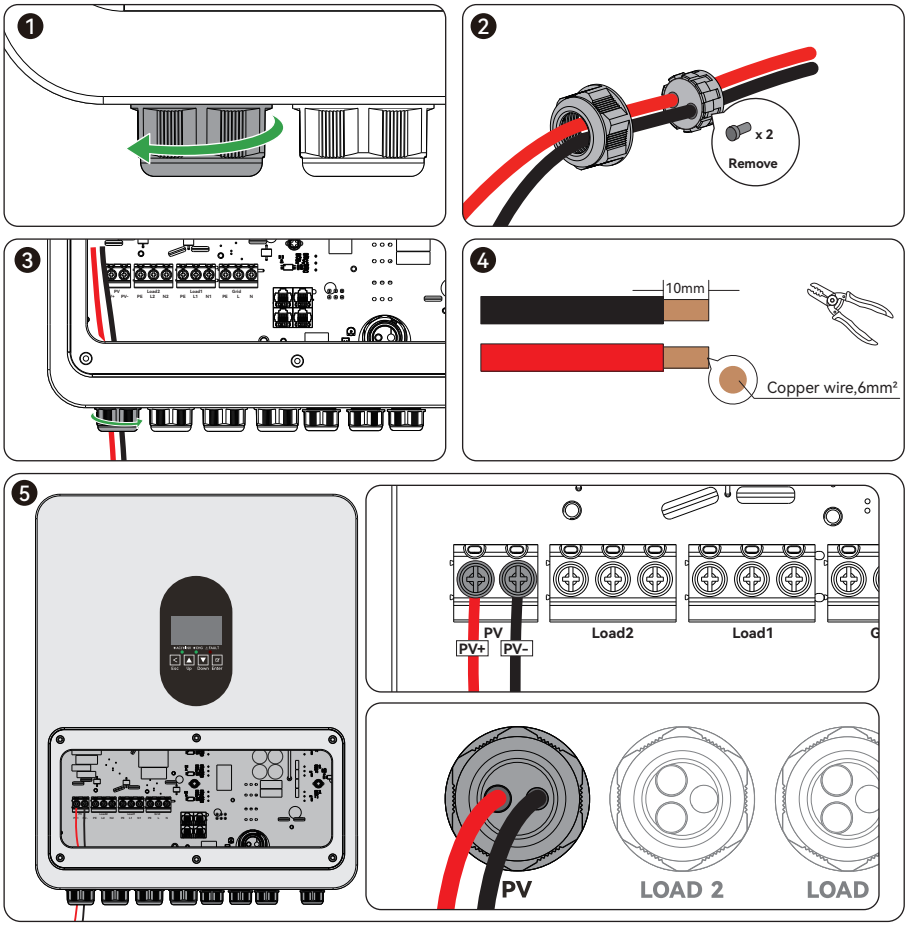
- Make sure that the maximum short-circuit current and maximum input voltage of each MPPT are within the allowable range of the inverter.

- Make sure that the positive terminal of the PV string is connected to PV+ of the inverter and the negative terminal of the PV string is connected to PV- of the inverter.

- Since the output of the PV string connected to the inverter cannot be grounded, ensure that the PV module output is well insulated to ground.

- An DC breaker should be installed on the PV side of the inverter. To ensure that the inverter can safely disconnect itself from the PV strings when an exception occurs, before connecting the DC input power cables, ensure that the DC voltage is within the safe range (lower than 60 V DC) and that the DC breaker is OFF. Failing to do so may result in electric shocks.

Serial No.	Inverter Model	Wire Size	Torque value
1	4K	2.5 mm^2/12 AWG	1~1.2N·m
2	6K	2.5 mm^2/12 AWG	1~1.2N·m


1
2
x 2
Remove
3
4
10mm
Copper wire,6mm²
5
PV
PV+
PV-
Load2
Load1
PV
LOAD 2
LOAD

6.9 Connecting Battery Cables

DANGER

1. Batteries used with the inverter need to be approved by the inverter manufacturer, and a list of approved batteries is available through the official website.

2. A short-circuited battery may cause personal injury, and the instantaneous high current caused by a short-circuit can release a large amount of energy that may cause a fire.

3. Before connecting battery cables, make sure that the inverter and batteries are disconnected from the power supply and that both the front and rear switches of the equipment are disconnected.

4. Connecting and disconnecting the battery cables is prohibited when the inverter is running, and violations may result in a risk of electric shock.

5. Do not connect the same battery pack to more than one inverter as this may cause damage to the inverter.

6. It is prohibited to connect a load between the inverter and the batteries.

7. Use insulated tools when connecting battery cables to prevent accidental electric shock or short-circuiting of the battery.

8. Make sure that the battery open circuit voltage is within the permissible range of the inverter.

9. A DC breaker is required between the inverter and the battery.

10. When the battery port has short circuits or other abnormal conditions, the battery side BMS and the inverter will provide protection and alarm for the user at the same time.

11. After connecting the battery cables, ensure that the battery terminal covers are installed. DO NOT operate the battery terminals and covers when power is live.

Recommended battery cable and terminal size:

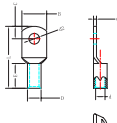
Serial No.	inverter Model	Wire Size	Torque value
1	4K	16 mm^2/4AWG	2~3Nm
2	6K	25 mm^2/2AWG	2~3Nm

WARNING

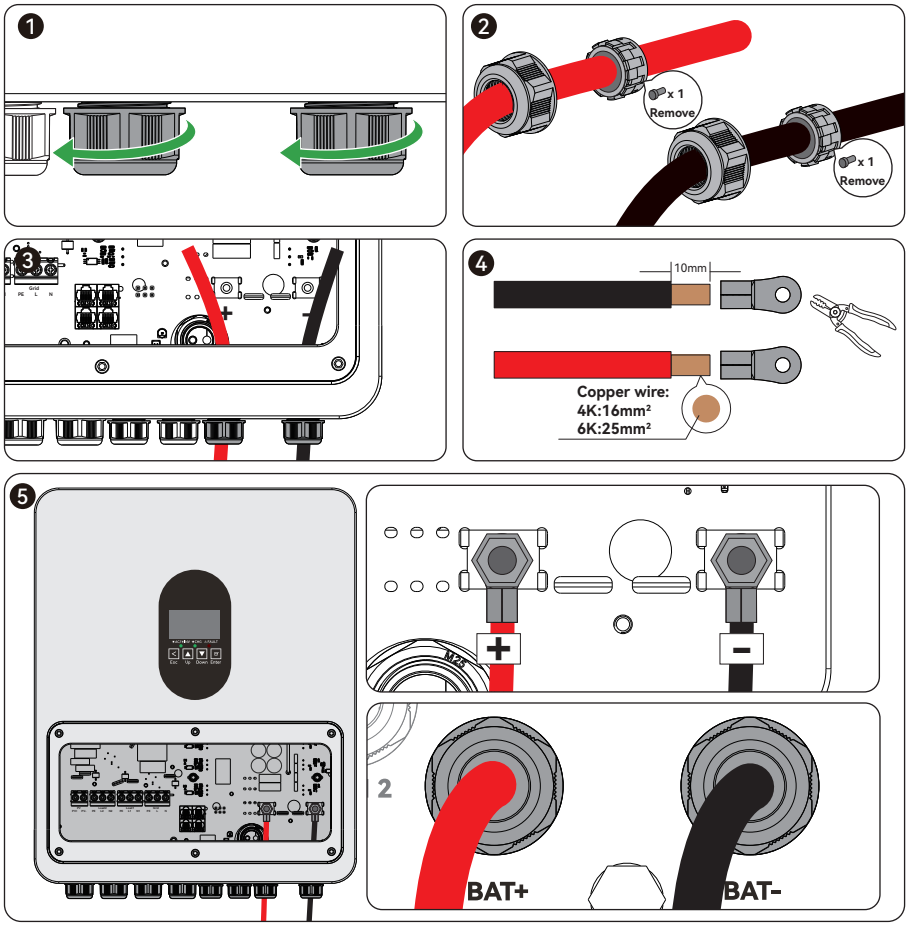
1. When wiring, the battery cables should match the “POS+”, “NEG-”, and ground ports of the battery terminals exactly, if the cables are connected incorrectly, the equipment will be damaged.

2. Make sure that the cable core is fully inserted into the terminal lugs and is not exposed.

3. Ensure that the cables are connected tightly, otherwise the equipment may be damaged by overheating of the terminals during operation.



Recommended terminal size							
Dimension(mm)							
d2±0.4	E±0.5	L±0.4	C±0.2	D±0.5	d±0.3	B±0.5	C1±0.3
6.5	19.5	48.5	2.8	14.5	11.5	21	10.2

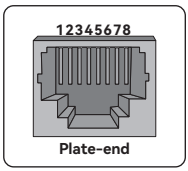


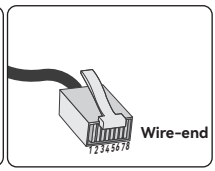
6.10 Communication

ATTENTION

When connecting communication cables, please make sure that the definition of the terminal port matches the device exactly, and the cable routing path should avoid interference sources, power lines, etc., so as not to affect the signal reception.

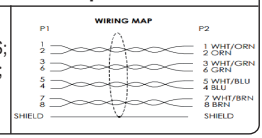
RJ45 Terminal:



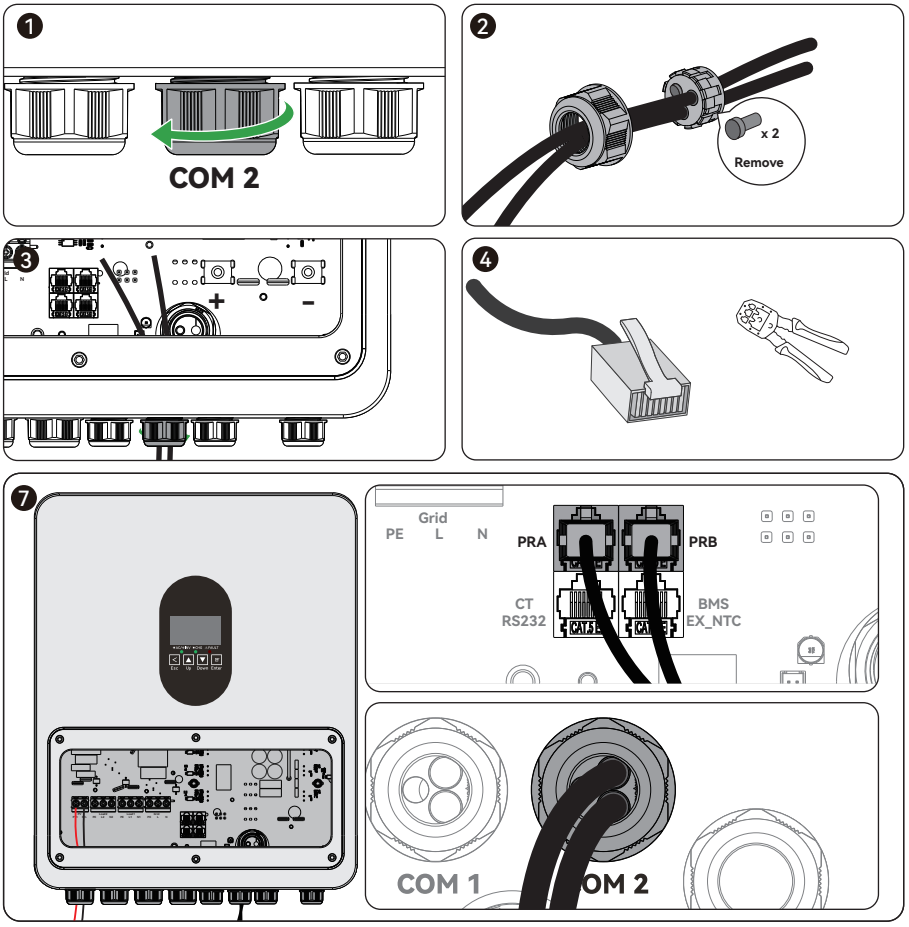


Recommended Ethernet Cable Specifications

CAT 6a SHIELDED CABLE;
4 TWISTED PAIR, 26AWG CONDUCTORS;
ALUMINIZED POLYESTER SHIELD WITH;
TINNED COPPER DRAIN WIRE;
PVC JACKET;

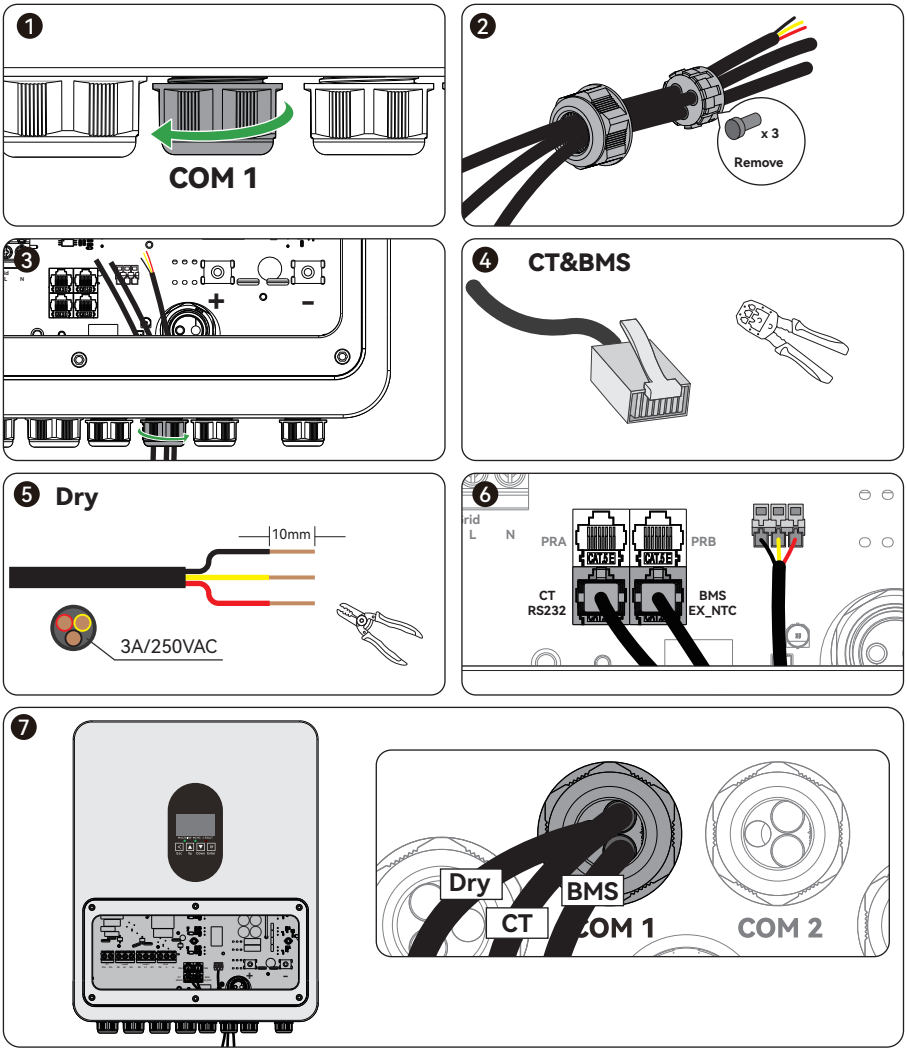


6.10.1 Communication Port 2 (Parallel Terminal)



Wire number	Definition	Functions	Description
1	SYN_GND3	Synchronization signal	Synchronization signals between parallel machines, and transmission of synchronization signals.
2	SYN3		
3	SYN_GND2		
4	SYN2		
5	SYN_GND1		
6	SYN1		
7	PR_CAN_L	CAN Communication	For CAN communication between parallel inverters, set the DIP switches of the first and last inverters to ON and the DIP switches of other inverters to OFF.
8	PR_CAN_H		

6.10.2 Communication Port 1 (CT/BMS/Dry)



● CT

Wire number	Definition	Functions	Description
1	ICR+	External CT input	The External CT usage prevents backflow. The white wire of C T is connected to "ICR+", and the black wire of CT is connected to "ICR-".
2	ICR-	External CT input	
3	GND	RS232 GND	RS-232 communication to PC
4	RS232_TX	RS232 TX	
5	RS232_RX	RS232 RX	
6	GND	RS232 GND	
7	--	--	--
8	--	--	--

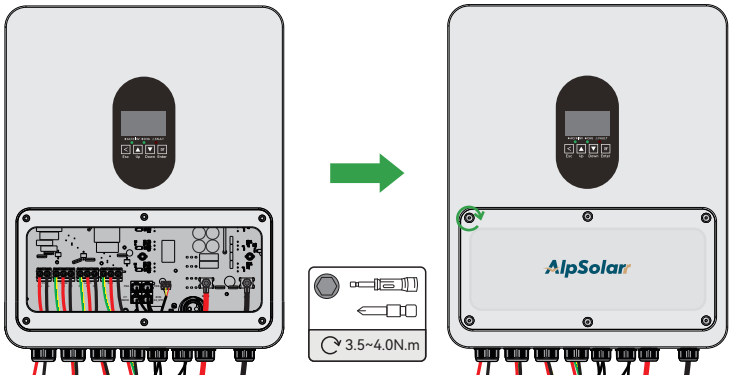
● BMS

Wire number	Definition	Functions	Description
1	BMS_485_B	BMS_485_B	Supports RS485 communication with BMS
2	BMS_485_A	BMS_485_A	
3	--	--	--
4	BMS_CAN_H	BMS_CAN_H	Supports CAN communication with BMS
5	BMS_CAN_L	BMS_CAN_L	
6	--	--	--
7	EX_NTC+	External NTC input	allows external NTC input when detecting lead acid battery temperature
8	EX_NTC-	External NTC input	

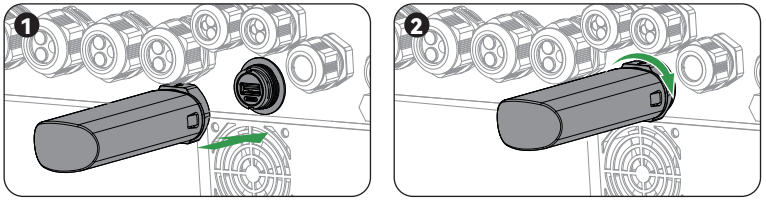
● DRY

Unit Status	Condition		Dry contact port: 	
			NC & C	NO & C
Power Off	Unit is off and no output is powered.		Close	Open
Power On	Output is powered from Utility		Close	Open
	Output is powered from Battery power or Solar energy.	Battery voltage(SOC) < Low DC warning voltage(SOC)	Open	Close
		Battery voltage(SOC) > Setting value or battery charging reaches floating stage	Close	Open

6.11 Installation Terminal Cover

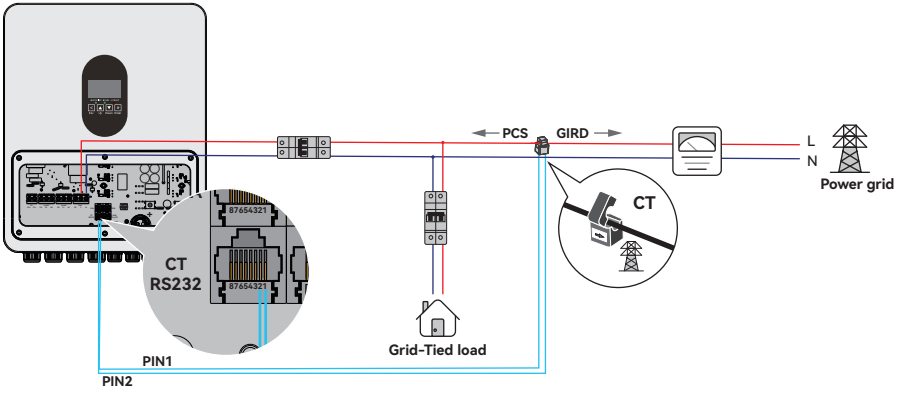


6.12 WIFI Port



6.13 CT Circuit Connection

When the CT is selected, the power direction of the CT is shown in the figure below:



CT Technical Parameter	
Ipn (N1 primary side rated effective current)	120A
Iout (N2 output current)	40.0mA
ϕ (Phase Error)	1.50° Max
F(I) (Amplitude Error)	0.50%Max
D.C.R. (direct current resistance)	255Ω +15%
Hi-Pot (insulation and voltage resistance)	2.00mA Max

7. Equipment Test Run

7.1 Check Before Power-up

1	The inverter is firmly installed, the installation position is convenient for operation and maintenance, the installation space is convenient for ventilation and heat dissipation, and the installation environment is clean and tidy.
2	Protective ground, DC input, AC output, and communication lines are connected correctly and securely.
3	Cable ties meet alignment requirements, are well distributed, and are not damaged.
4	Ensure that a waterproof cover is installed for unused wire holes.
5	Ensure that used crossing holes are sealed.
6	The voltage and frequency of the inverter's on-grid access point meets the on-grid requirements.
7	PV+/PV- wires are securely connected, correctly polarized, and the voltage is in line with the accessible range.
8	BAT+/BAT wires are securely connected, correctly polarized, and the voltage is within the accessible range.

7.2 Equipment Power-up

Close the inverter LOAD AC breaker;

Close the inverter DC breaker between batteries;

Close the PV DC breaker of the inverter;

Close the inverter GRID AC breaker;

NOTE: If the inverter needs to be turned on without utility power, the inverter GRID AC breaker needs to be disconnected before turning on the inverter.

8. HMI Interface Description

8.1 Power ON /OFF

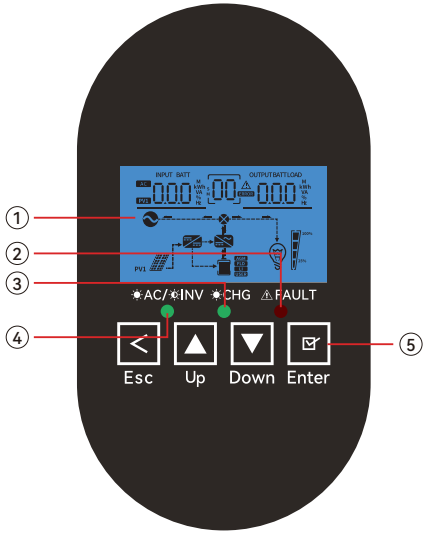
Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the button of the case) to turn on the unit.

8.2 Inverter Turn-on

After this inverter is turned on, the LCD screen will light up and display all device icons for initialization. After initialization, the screen displays the actual connection status of the device (PV, Grid, Battery, Load). For more information, please refer to the LCD instructions.

8.3 Display Panel

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



1	LCD display	4	Status indicator
2	Fault indicator	5	Function buttons
3	Charging indicator		

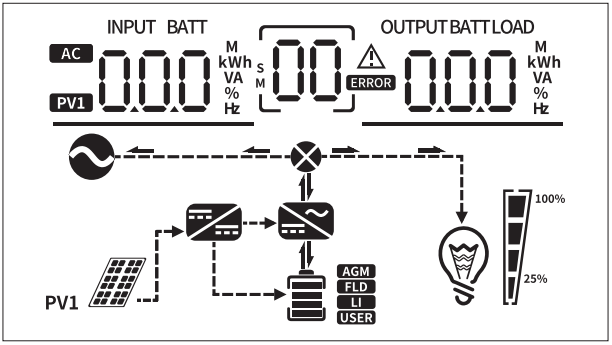
8.3.1 Description of LED function

Name	Color	State	Instruction
AC/INV	Green	Steady On	AC supplying power to load
		Flashing	Battery/PV supplying power to load
CHG	Green	Steady On	Battery in float charge state and SOC near 100%
		Flashing	Battery charging
FAULT	Red	Steady On	Fault detected
		Flashing	Warning detected
The two green lights flash alternately and slowly			Firmware loading
Two green lights flash alternately and quickly			Firmware upgrade
Two green lights flash quickly at the same time			the inverter starts self-checking.

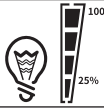
8.3.2 Description of the key function

Name	Action	Description
ESC	Press	1.Return to the display mode home page 2.Return to the Settings Mode home page 3.Exit setup mode
UP	Press	1.previous page
	Press and hold	2.Continuous page flipping with a 100ms interval 3.The set parameters are continuously increased
DOWN	Press	1.Next page
	Press and hold	2.Continuous page flipping with a 100ms interval 3.The setting parameters are constantly decreasing
ENTER	Press	1.Confirm setting
	Press and hold	2.Long press to enter setting mode (3s)
Each key can wake up the screen		

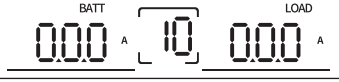
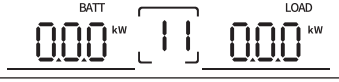
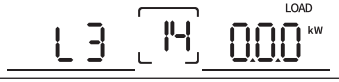
8.3.3 HMI Icons Display



8.3.4 Description of LCD Icon

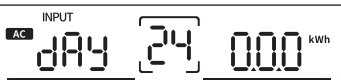
	The icon will show when the PV is connected and has sunlight.
	The power grid is working normally
	Battery type: AGM/FLD/USER
	Percentage of output power to rated power: 0~25%, 25~50%, 50~75%, 75~100%
OVER LOAD	Displayed when the load side power is greater than the rated power.
	PV module working
	Inverter module working
AC	Displays AC input side data
PV1	PV1 data display
INPUT	AC, PV input data display
OUTPUT	Inverter output data
BATT	Battery data
LOAD	Load data
	The inverter has an alarm
ERROR	The inverter has an fault
	1.Display page number. 2."M" indicates the parallel master, "S" indicates the parallel slave.
M kWh VA % Hz	Each character can be displayed individually. Includes:W、kW、kWh、MWh、V、A、Ah、%、Hz。

8.3.5 Basic data display interface

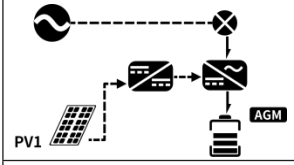
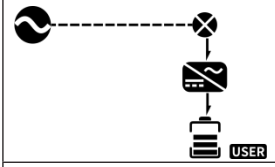
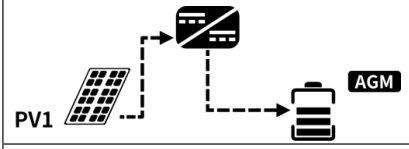
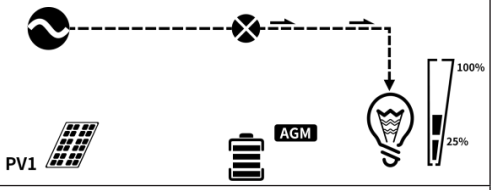
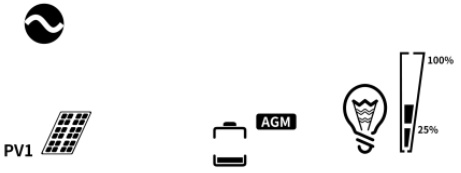
Page	UI	Description
0		Home Page: Left: Total PV Power Right: Load Power
1		Left: PV1Voltage Right: Load Voltage
2		Left: PV1 Current Right: Load Current
3		Left: PV1 Power Right: Load Power
4		Left: Input frequency Right: Load frequency
5		Left: Input Voltage Right: Load Voltage
6		Left: Input Current Right: Load Current
7		Left: Input Power Right: Load Power
8		Battery SOC
9		Left: Battery Voltage Right: Load Voltage
10		Left: Battery Current Right: Load Current
11		Left: Battery Power Right: Load Power
12		Critical Load Power
13		Smart Load Power
14		Home Load Power
DC		Total parallel power (DC): Left: PV, Right: Battery. Supported only by parallel master. Press the "UP" button on the home page

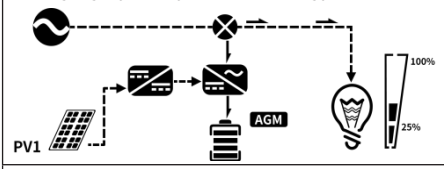
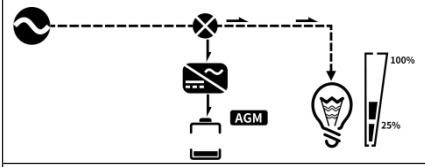
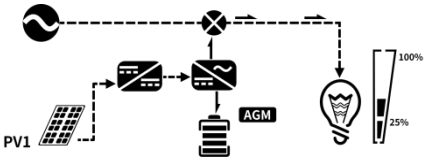
AC		Total parallel power (AC): Left: AC, Right: Load. Supported only by parallel master. Press the "UP" button on the home page

8.3.6 Electricity statistics

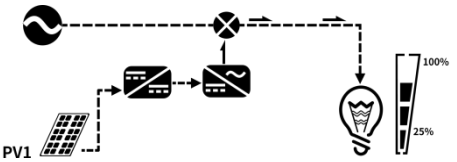
20-23		PV power generation - today
		PV power generation - current month
		PV power generation - current year
		PV power generation - total
24-27		AC side purchase electricity - day, month, year, total
28-31		AC side electricity sales - daily, monthly, annual, total
32-35		Load side power consumption - daily, monthly, annual, total
36-39		Battery charge capacity - day, month, year, total
40-43		Battery side discharge amount - day, month, year, total

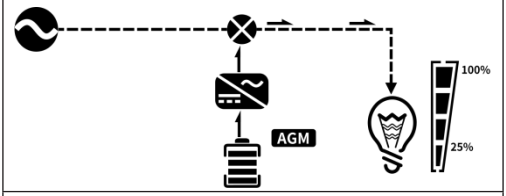
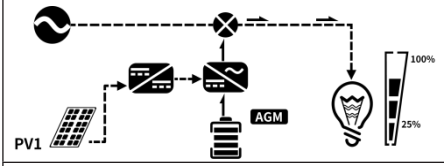
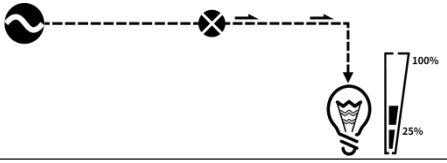
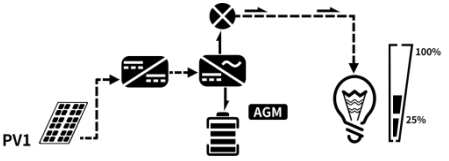
8.3.7 Operating Mode Description

Operation mode	Description	LCD display
Standby mode Note: *Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output.	No output is supplied by the unit but it still can charge batteries.	Charging by utility and PV energy. 
		Charging by utility. 
		Charging by PV energy. 
		No charging. 
Fault mode Note: *Fault mode: Errors are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.	No charging at all no matter if grid or PV power is available.	Bypass 
		Standby 

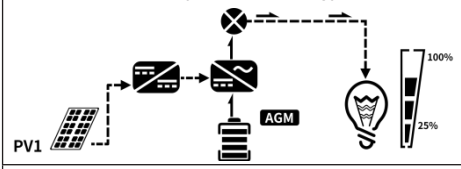
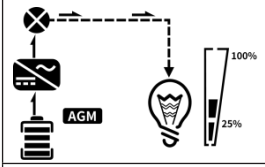
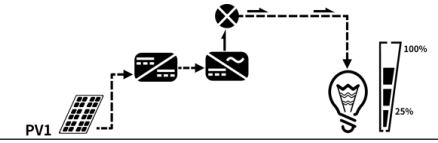
<table>
<tr>
<td rowspan="3">Line Mode
(Charging and Power Supply)</td>
<td rowspan="3">The unit will provide output power from the mains. It will also charge the battery at line mode.</td>
<td>Charging by utility and PV energy.
 
</td>
</tr>
<tr>
<td>Charging by utility.
 
</td>
</tr>
<tr>
<td>Charging by Solar.
 

Note:
If “SUB” (solar first) is selected as output source priority and solar energy is not sufficient to provide the load, solar energy and the utility will provide the loads and charge the battery at the same time.</td>
</tr>
</table>

<table>
<tr><td rowspan="4">Line Mode
(Power Supply)</td><td rowspan="4">The unit will provide output power from the mains. It will also charge the battery at line mode.</td><td>Power from solar and utility.
 

Note:
If either “SUB” (solar first) or “SBU” is selected as output source priority and battery is not connected, solar energy and the utility will provide the loads.</td></tr>
<tr><td>Power from battery and utility.
 
</td></tr>
<tr><td>Power from solar、battery and utility.
 
</td></tr>
<tr><td>Power from utility.
 
</td></tr>
<tr><td>Battery Mode
(Charging and Power Supply)</td><td>The unit will provide output power from battery and/or PV power.</td><td>Power from PV energy
 

PV energy will supply power to the loads and charge battery at the same time. No utility is available.</td></tr>
</table>

Battery Mode (Power Supply)	The unit will provide output power from battery and/or PV power.	Power from battery and PV energy. 
		Power from battery only. 
		Power from PV energy only. 

8.3.8 Real-time fault alarm

Page	UI	Description
43	 	Left: Total number of faults + alarms Center: FA stands for Fault Alarm Right: Display fault ID in a loop A+number: alarm ID; F+number: fault ID

8.3.9 Version display

Page	UI	Description
H1		Hardware version
S1		Software version -MARM
S2		Software version -DSP
S3		Software version -SARM

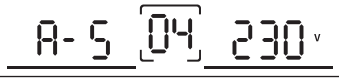
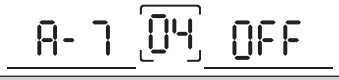
8.4 LCD Settings

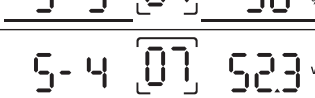
Page	Name	UI	Description
Home			
00	Settings Page		Press and hold the Enter button for 3 seconds to enter the setup mode. Press the Up/Down button to start setup.
I-1	Energy mode		USB: Utility priority, Solar second, Battery last
			SUB: Solar priority, Utility second, Battery last. (default)
			SBU: Solar priority, Battery second, Utility last
			INT: Intelligent mode. When the grid is present and the battery's SOC is less than or equal to the set value (B-0 backup SOC/voltage), the battery stops discharging.
I-2	Battery charging mode		CSO: solar first
			SNU: solar and utility (default)
			OSO: only solar
I-3	Automatic power on		OFF/ON(default)
I-4	Meter settings		None (default)
			Meter
			CT
I-5	Zero ground volt fault detection		OFF (default) / ON
I-6	Leakage current detection		OFF (default) / ON

PV Settings（02）			
P-3	PV connection mode		1P: single PV connection (default)
			2P: 2 PV parallel connection
Battery Settings（03）			
B-0	Intelligent backup SOC/ Voltage (I-1 Intelligent mode)		When the battery type is Lithium (B-1 is LI), the intelligent backup SOC setting is displayed
			When the battery type is Lead Acid (B-1 is L-A), the intelligent backup voltage setting is displayed
B-1	Battery type selection		DC: DC source
			L-A: Lead Acid battery (default)
			LI: Lithium battery
B-2	Max battery charging current		S3: 4KW 0-80A; 6KW 0-125A (default value depends on the battery type) 5A per level, support long press
B-3	Max battery discharge current		S3: 4KW 0-100A; 6KW 0-125A (default value depends on the battery type) 5A per level, support long press
B-4	Battery stops charging SOC		0-100% (default 80%) 5% per level, support long press
B-5	Battery stops discharging SOC		0-100% (default 20%) 5% per level, support long press

B-6	Battery charging stop voltage (high voltage cut-off point)		40-60V (default value depends on the battery type) 0.1V per level, support long press
B-7	Battery discharge stop voltage (low voltage cut-off point)		40-60V (default value depends on the battery type) 0.1V per level, support long press
B-8	Battery capacity (lead acid)		50-500Ah (default value depends on the battery type) 10Ah per level, supports long press
B-9	Equalized charging voltage		40-60V (default value depends on the battery type) 0.1V per level, support long press
B10	Float charge voltage		40-60V (default value depends on the battery type) 0.1V per level, support long press
B11	Lithium battery manufacturers		00: Alpsolarr 01: SVOLT 02: UZENERGY 03: DYNESS 04: PYLON (default,General) 05: GROWATT 06: ACM/48100
B12	Lead-Acid battery type		Ur : custom
			AGM (default) : Absorbent Glass Mat Lead-Acid battery
			GEL: Gel Electrolyte Lead-Acid battery
			FLD (WET): Flooded Lead-Acid battery

B13	Battery automatic activation		OFF/ ON (default ON)
B14	Battery activation voltage		40-60V (default 43.2V)
B15	Battery activation time		10-600s (default 60s)
B16	Auto force charge		OFF/ON(default)
B17	AC charge battery current		0-125A (default 30A) 5A per level, support long press
Utility AC Settings (04)			
A-1	AC Mode		APL (default): ① The grid voltage range is between 90~280V. If it exceeds this range, it will be overvoltage. ② The grid port of APL mode is compatible with generator input and has low frequency sensitivity.
			UPS: The grid voltage range is between 170~280V. If it exceeds this range, it will be overvoltage.
			ONG: on-grid, The grid voltage range is between 185~265V. If it exceeds this range, it will be overvoltage.
A-2	Solar Sell Enable		OFF (default) / ON
A-3	System work mode		limit to critical load (default)
			limit to home load
A-4	Solar Sell Power Limit		Max power allowed to feed into the grid 0.1kW per level, support long press (default value depends on the device rated)

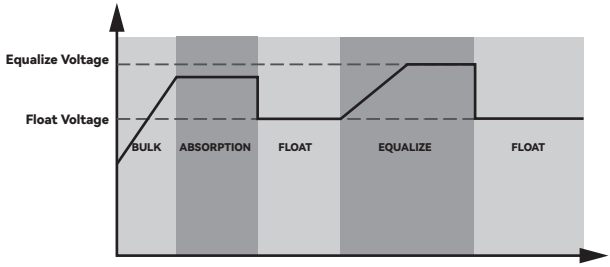
A-5	AC rated voltage		220V / 230V (default) / 240V
A-6	AC rated frequency		50Hz (default) / 60Hz
A-7	AC coupling enable		OFF (default) / ON
Generator Settings（05）			
G-0	Generator input port		OFF: Disable (default)
			G: Grid
			S: Smart Load
G-1	Generator mode		OFF: Disable (default)
			M: Manual
			A: Automatic
G-2	Generator start enable		OFF (default) / ON
G-3	AC input priority		GRI: Grid priority (Requires smart load input port)
			GEN: Generator priority (Requires smart load input port)
G-4	Max generator charging power		Max generator charging power (default rated power)
G-5	Generator startup SOC		0-100% (default 20%) (Requires smart load input port and automatic mode)
G-6	Generator shutdown SOC		0-100% (default 80%) (Requires smart load input port and automatic mode)
G-7	Dry contact mode		01: Short circuit effective 02: Open circuit effective

Parallel Settings（06）			
P-0	Parallel mode		1PH: single phase (default)
			3PH: three phases mode
P-1	Parallel enable		OFF: Disable (default)
			MAS: Master
			SLA: Slave
P-2	Number of parallel devices		Number of parallel devices (Slave device cannot set)
P-3	Slave address		Slave address. (Master device cannot set)
P-4	Battery sharing enable		OFF (default) / ON (Slave device cannot set)
P-5	Configure three functions		3P1: Three-phase R phase (default)
			3P2: Three-phase S phase
			3P3: Three-phase T phase
P-6	Parallel generator charing enable		OFF(default)/NO (Slave device cannot set)
Smart Load Settings（07）			
S-1	Smart Load Enable		OFF(default) / ON.
S-2	Smart Load Start SOC		0-100% (default 40%) 5% per level, support long press
S-3	Smart Load Stop SOC		0-100% (default 20%) 5% per level, support long press
S-4	Smart Load Start Voltage		40V-60V (default 46V)
S-5	Smart Load Duration		0-990 (default 0) 5 min increments, support long press

S-6	Smart Load Automatic Start Time		0-24 (default 0)
S-7	Smart Load Automatic Stop Time		0-24 (default 0)
S-8	Smart Load Stop Voltage		40V-60V (default 42V)
Clock Settings（08）			
Year			Year (25 means 2025)
Month			Month
Day			Day
Hour			Hour
Minute			Minute
Second			Second
LCD Settings（09）			
L-1	Automatic screen off time		60s (default)、120s、180s
L-3	Warning fault led flashing enable		OFF/ON (default)

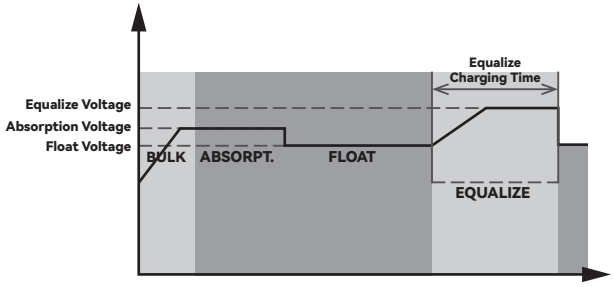
8.5 Battery Equalization Description

Battery equalization function is built into the charge controller. It reverses the buildup of negative chemical effects such as stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalization also helps to remove sulfate crystals that may have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize the battery periodically.

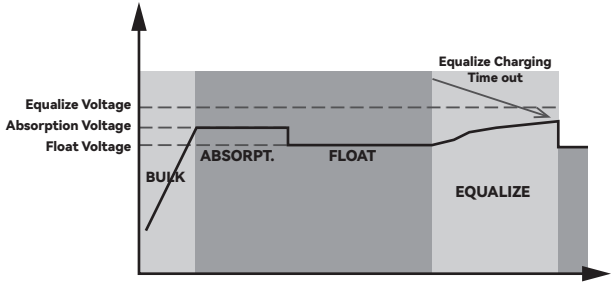


Equalize Charging and Timeout

In Equalize Mode, the controller will supply power to charge battery as much as possible until battery voltage reach the equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the equalization level. The battery will remain in the Equalize Mode until the equalization timer runs out.



However, in Equalize Mode, if the battery equalization timer runs out and the battery voltage doesn't recover to the battery equalization voltage point, the charge controller will extend the battery equalized time until battery voltage achieves equalization voltage. If the battery voltage is still lower than equalization voltage when the extension runs out, the charge controller will stop equalization and return to the floating charging stage.



8.6 Smart Load Operation

Connect the smart load to the dedicated **Smart Load Port (LOAD2)** on the inverter, system wiring block diagram see **Section 6.1**. Verify the load specifications are compatible with the LOAD2 terminal parameters before connection.And make sure LCD setting page "S-1" is set to "ON".

1.Recovery /Shutdown Logic Description

- When the **grid is normal**: Users can set the on/off schedule of smart loads through the **timer.**

- When the **grid is abnormal/absent**: In addition to timer control, the smart load's operation depends on **battery voltage** (for lead-acid battery), **battery SOC** (for lithium battery), **and off-grid discharge time.**

- Shutdown condition: The smart load will immediately turn off if any shutdown condition is triggered.

- Recovery condition: The smart load will only turn back on when all shutdown conditions are resolved.

- **Examples**: If you want to turn on the smart load mode, you need to turn to the smart load area (07) in the LCD setting mode, and then perform the following operations:

a.**Battery SOC** (Lithium) : Verify the battery SOC is higher than the "S-2" setting value .

b.**Battery Voltage** (Lead-Acid) : Verify the battery voltage exceeds the "S-4" setting value.

c.**Delayed Shutdown Duration**: Defines the delayed shutdown duration (in minutes) for the Smart Load port after grid failure/disconnection. Default: 0 (disabled). Adjust only if necessary.

d.**Timer Control**: The Smart Load port will activate only when the system time falls between the configured start "S-6" and stop "S-7" times. Note: Supports overnight scheduling (e.g., 22:00–06:00).

2. Recovery /Shutdown Conditions

1) Battery Voltage (Lead-Acid Battery)

- Recovery condition: Battery voltage ≥ Set Smart Load Start voltage (default: 46.0V).

- Shutdown condition condition: Battery voltage ≤ Set Smart Load Stop voltage (default: 42.0V).

- Adjustment: Press ▲/▼ to change by ±0.1V per step (LCD Settings Page “S-4” and “S-8”).

2) Battery SOC (Lithium Battery)

- Recovery condition: SOC ≥ Set Smart Load Start SOC (default: 40%).

- Shutdown condition condition: SOC ≤ Set Smart Load Stop SOC (default: 20%).

- Adjustment: Press ▲/▼ to change by ±5% per step (LCD Settings Page “S-2” and “S-3”).

3) Discharge Duration

- Shutdown condition: If the actual discharge time exceeds the allowed limit after voltage/SOC reaches the shutdown threshold, the load will turn off.

- Recovery condition: Any of the following must be met: Set to 0 (disabled), grid power returns to normal, or battery is in charging state.

- Adjustable range: 0~990 minutes (default: 0, meaning this feature is disabled).

- Adjustment: Press ▲/▼ to change by ±5 minutes per step (LCD Settings Page “S-5”).

4) Timer Control

- Shutdown condition: The system time is outside the set "Start Time" and "Stop Time" range.

- Recovery condition: The system time is within the set time range (supports overnight settings).

- Examples:

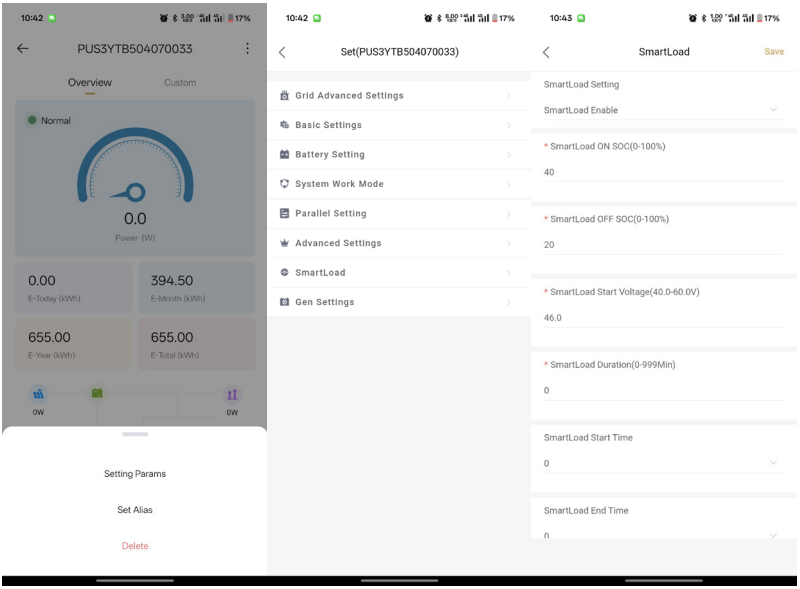
Start Time: 00, Stop Time: 08 → Smart Load stays on from 00:00-08:00, off otherwise.

Start Time: 22, Stop Time: 06 → Smart Load stays on from 22:00-06:00 (next day), off otherwise.

- Special rule: If Start Time = Stop Time, the load remains on as long as conditions (1)(2)(3) are met.

- Adjustment: Press ▲/▼ to change by ±1 hour (LCD Settings Page “S-6” and “S-7”).

The above introduction is to use the LCD to set, and the following are the steps for the AlpsCloud APP.



9. App Download and System Setup

Please scan the QR code to enter the App download interface.

10. System Maintenance

When operating or maintaining the inverter, operating the equipment with electricity may result in damage to the inverter or a risk of electric shock, please disconnect the inverter from the power supply as the following steps.

After the inverter is disconnected, it takes some time for the internal components to discharge, please wait until the equipment is fully discharged according to the required labeling time.

1. Disconnect the inverter GRID AC breaker.
2. Disconnect the inverter LOAD AC breaker.
3. Disconnect the DC breaker between the inverter and the battery.
4. Disconnect the PV DC breaker of the inverter.

10.1 Removal of Inverter

⚠ DANGER

- Ensure that the AC and DC sides of the inverter are not charged before removal. Since the capacitor is still charged for a period of time after the DC side of the inverter is disconnected, wait for 5 minutes to ensure that the capacitor is discharged.
- Wear personal protective equipment when operating the inverter.

1. Disconnect all electrical connections to the inverter, including: DC wires, AC wires, communication wires, communication module, and protective ground.

2. Remove the inverter from the expansion screws.

3. Store the inverter properly and ensure that storage conditions are met if subsequent inverters are to be put into service.

10.2 Scrapping of Inverter

If the inverter can no longer be used and needs to be scrapped, dispose of the inverter in accordance with the electrical waste disposal requirements of the regulations of the country where the inverter is located, and do not dispose of the inverter as household waste.

10.3 Fault Removal

Please perform common troubleshooting according to the following methods, if the troubleshooting methods cannot help you, please contact the after-sales service center. When contacting the after-sales service center, please collect the following information to facilitate a quick solution to the problem.

1. Inverter information, such as: serial number, software version, equipment installation time, fault occurrence time, fault frequency, etc.

2. Equipment installation environment, such as: weather conditions, whether the component is obscured, there are shadows, etc., installation environment recommendations can provide photos, videos and other documents to help analyze the problem.

3. Grid conditions, such as overvoltage, undervoltage, overfrequency, underfrequency, etc. of the grid.

Alarm			
ID	Description	Cause	Measures
00	Grid abnormal	1. Grid not detected. 2. Grid voltage/frequency out of tolerance.	Verify inverter grid settings (voltage / frequency) match local grid specifications.
02	Battery abnormal	1. Battery under-voltage protection activated 2. Battery over-voltage protection activated 3. Discharge current zero in off-grid mode with load	1. Validate battery charge/discharge voltage thresholds in inverter settings 2. Measure actual battery bank voltage 3. Condition will auto-clear within 10 seconds when: - PV generation resumes - Grid connection is restored - Discharge current becomes non-zero 4. For persistent faults, contact certified service technician
04	PV abnormal	Excessive voltage deviation between parallel PV strings	Inspect PV arrays for shading or mismatched configurations
06	Generator abnormal	1.Generator voltage / frequency instability. 2. Incompatible generator type.	Ensure generator operates within inverter's input specifications
08	Inverter abnormal	Inverter output current exceeds rated limit.	Reduce connected load to match inverter capacity.
10	Disruptive risk	DC bus voltage exceeds safety threshold.	1.Verify that the battery voltage is within specification. 2. If the problem persists, it may be a hardware issue, contact a technician.
12	Device abnormal	1. Overheating 2. Fan malfunction.	Ensure ventilation is unobstructed. If fan fails, service is required.
14	Relay abnormal	Grid/Load relay fault.	Restart the device. If unresolved, contact installer.
16	Main control abnormal	1. Master-slave chip communication loss. 2. Firmware upgrade interruption.	Restart the device. If unresolved, contact installer.
18	Storage abnormal	Internal memory error.	Restart the device. If unresolved, contact installer.
20	Logic abnormal	1. Grid voltage <180V or >280V. 2. Phase synchronization failure. 3. Overheat-induced load reduction.	Restart the device. If unresolved, contact installer.
22	Parallel abnormal	Poor parallel communication signal quality.	There is signal interference in the on-site environment, but it can be used normally.
24	Safety abnormal	Non-compliant local safety standards.	Adhere to regional electrical regulations.
32	PV1 abnormal	1. PV1 input exceeds limits. 2. PV1 string reverse polarity.	Verify PV1 wiring and ensure power is within inverter's PV input range.
40	Slave control abnormal	Battery voltage spike/drop.	Allow 30s for auto-recovery. If persistent, contact installer.

64	COM chip abnormal	1. Internal chip communication error. 2. Peripheral (battery / meter) communication failure.	Check peripheral wiring. For internal faults, contact installer.
66	Battery low voltage/low battery	1. Battery voltage / SOC below alarm threshold. 2. Lead-acid battery overheating.	Adjust the low battery/low SOC alarm settings in the inverter parameters, If applicable.
68	BMS abnormal	Lithium battery abnormality.	Please check the lithium battery.

Alarm			
ID	Description	Cause	Measures
01	Grid abnormal	Grid voltage/frequency out of range.	Verify grid settings (voltage/frequency) match local standards.
03	Battery abnormal	1. Battery under-voltage protection activated 2. Battery over-voltage protection activated 3. Discharge current zero in off-grid mode with load	1. Validate battery charge/discharge voltage thresholds in inverter settings 2. Measure actual battery bank voltage 3. Condition will auto-clear within 10 seconds when: - PV generation resumes - Grid connection is restored - Discharge current becomes non-zero 4. For persistent faults, contact certified service technician
05	PV abnormal	Excessive voltage deviation in parallel PV strings.	Inspect PV strings for shading or mismatched configurations.
07	Generator abnormal	1. Generator voltage/frequency unstable. 2. Incompatible generator.	Ensure generator operates within inverter specifications.
09	Inverter abnormal	Inverter output current exceeds rated limit.	Reduce connected load to match inverter capacity.
11	Disruptive risk	1.Critical hardware damage detected.	Restart the device. If unresolved, contact installer.
13	Device abnormal	1. High internal temperature. 2. Fan failure.	Ensure proper ventilation. Replace fan if faulty.
15	Relay abnormal	Grid / load relay fault.	Restart the device. If unresolved, contact installer.
17	Main control abnormal	1. Master-slave communication loss. 2. Firmware upgrade interrupted.	Restart the device. If unresolved, contact installer.
19	Storage abnormal	Internal memory error.	Restart the device. If unresolved, contact installer.
21	Logic abnormal	1. Grid voltage <180V or >280V. 2. Phase synchronization failed. 3. Overheating-induced load reduction. 4. AC phase lock failure.	1.Check grid stability and cooling. 2. Restart the device. If unresolved, contact installer.

23	Parallel abnormal	1. Master-slave communication error. 2. Firmware version mismatch. 3. Incorrect slave phase sequence (3-phase).	Verify parallel wiring and firmware versions.
25	Safety abnormal	Local certification conflict.	Ensure compliance with regional safety standards.
33	PV1 abnormal	1. PV1 overvoltage / overcurrent. 2. PV1 reverse polarity.	Check PV1 wiring and input specifications.
41	Slave control abnormal	1. Battery voltage spike/drop. 2. Rapid voltage decline.	Allow 30s for auto-recovery. If persistent, contact installer.
65	COM chip abnormal	Communication failure between COM chip and control chip	Restart the device. If unresolved, contact installer.
67	Battery low voltage/low battery	1. Discharge endpoint reached. 2. Lead-acid battery overheated.	Recharge battery or halt operation for cooling.
69	BMS abnormal	Lithium battery abnormality.	Please check the lithium battery

10.4 Regular Maintenance

Ensure that the AC and DC sides are not charged before maintenance. Since the capacitor remains charged for a period of time after the DC side of the machine is disconnected from the DC side, wait 5 minutes to ensure that the capacitor is discharged.

Wear personal protective equipment when operating the inverter

Maintenance Content	Maintenance Method	Maintenance Cycle
/	/	/
Electrical connections	Check for loose electrical connections and for cable damage and copper leakage.	1 time/half a year~ 1 time/year

Note: Please regularly check to ensure the fan duct is not blocked or obstructed. to avoid affecting the air flow rate of the inverter, which may trigger an over-temperature protection fault affecting the use of the power supply and the service life of the inverter.

11. Technical Data

Table 11.1 Line Mode Specifications

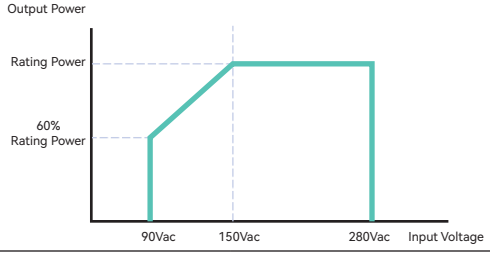
Model	4kW	6kW
Input Voltage Waveform	Sinusoidal (utility or generator)	
Nominal Input Voltage	220/230/240Vac	
Low Loss Voltage	170Vac±7V (UPS) 90Vac±7V (Appliances)	
Low Loss Return Voltage	180Vac±7V (UPS); 100Vac±7V (Appliances)	
High Loss Voltage	280Vac±7V	
High Loss Return Voltage	270Vac±7V	
Max AC Input Voltage	300Vac	
Max AC Input Current	26A	40A
Max Output Current	26A	40A
Nominal Input Frequency	50Hz / 60Hz (Auto detection)	
Low Loss Frequency	40±1Hz	
Low Loss Return Frequency	42±1Hz	
High Loss Frequency	65±1Hz	
High Loss Return Frequency	63±1Hz	
Output Short Circuit Protection	Line mode: External Breaker (50A) Battery mode: Electronic Circuits	
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)	
Transfer Time	10ms typical (UPS) 20ms typical (Appliances)	
Output power de-rating: When AC input voltage under 150V the output power will be de-rated.		

Table 11.2 Inverter Mode Specifications

Model	4kW	6kW
Rated Output Power	4000W/4000VA	6000W/6000VA
Output Voltage Waveform	Pure Sine Wave	
Output Voltage Regulation	220/230/240Vac±5% @ Nominal battery voltage	
Output Frequency	60Hz or 50Hz (±0.1Hz)	
Peak Efficiency	93%	
Overload Protection(BAT)	1min@100% ~ 110% load; 10s@110% ~ 150% load; 5s@150% ~ 200% load; 100ms@ > 200% load.	
Surge Capacity(PV+BAT)	2* rated power for 5 seconds	
High DC Cut-off Voltage	60Vdc±1Vdc	
Low DC Cut-off Voltage	44Vdc±1Vdc	
Nominal DC Input Voltage	48Vdc±1Vdc	
Cold Start Voltage	46.0Vdc±1Vdc	
Low DC Warning Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	46.0Vdc±1Vdc 42.8Vdc±1Vdc 40.4Vdc±1Vdc	
Low DC Warning Return Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	48.0Vdc±1Vdc 44.8Vdc±1Vdc 42.4Vdc±1Vdc	
Low DC Cut-off Voltage @ load < 20% @ 20% ≤ load < 50% @ load ≥ 50%	44.0Vdc±1Vdc 40.8Vdc±1Vdc 38.4Vdc±1Vdc	
DC Voltage Accuracy	+/-0.3V@ no load	
THDV	<3% for linear load, <10% for non-linear load @ nominal voltage	
Load detection error	±3% (Full load, rated output voltage)	
Power Limitation	When battery voltage is lower than 52Vdc, output power will be derated. If connected load is higher than this derated power, the AC output voltage will decrease until the output power reduces to this derated power. The minimum AC output voltage is output voltage setting − 20V.	

Table 11.3 Charge Mode Specifications

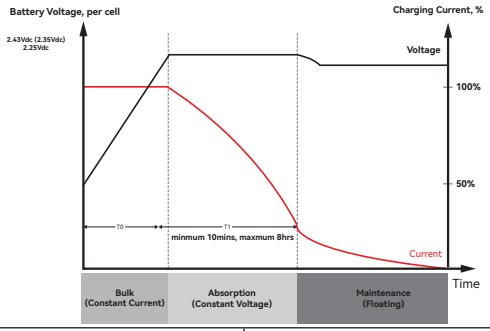
Model		4kW	6kW
Internal battery configuration			
Charging Current (UPS) @ Nominal Input Voltage		80A	125A
Bulk Charging Voltage	Flooded Battery	58.4Vdc	
	AGM / Gel Battery	56.4Vdc	
Floating Charging Voltage		54Vdc	
Overcharge Protection		60Vdc	
Charging Algorithm		3-Step	
Charging Curve			
Max. PV Access Power		8000W	12000W
Max. MPPT Input Power		6800W	10200W
Max. PV Array Open Circuit Voltage		500Vdc	
PV Array MPPT Voltage Range		60Vdc~450Vdc	
Max. Input Current		28A x 1(MAX 35A)	
Max. Charging Current		80A	125A
Start-up Voltage		70V +/- 5Vdc	
Electrical data			
Battery fuse protection		Yes	
Battery circuit breaker		No	

Table 11.4 General Specifications

Model	4kW	6kW
Operating Temperature Range	-40℃ ~+60℃（Above 45℃ De-rating）	
Storage temperature	-40℃ -70℃	
Humidity	0-100%	
Dimension	485*395*156 mm（H*W*D ）	
Net Weight	14.5kg	

Table 11.5 Parallel Specifications

Max parallel numbers	6
Circulation Current under No Load Condition	Max 2A
Power Unbalance Ratio	<5% @ 100% Load
Parallel communication	CAN
Transfer time in parallel mode	Max 20ms
Parallel Kit	YES

12. Maintenance and Warranty Contact Information

- **Company Name:** SHENZHEN LIGOO NEW ENERGY TECHNOLOGIES.Co., Ltd.
- **Department:** Customer Service
- **Address:** Room 301, Building B, Tongfang Information Harbor, No.11 Langshan Rd,
- Nanshan District, Shenzhen, Guangdong, CHINA
- **Phone Number:** +86 (0551)-66105555
- **Email Address:** sales@alpsolarr.com
- **Website:** www.alpsolarr.com
- **Operating Hours:**
  - Monday to Friday: 9:00 AM to 6:00 PM (UTC+8);
  - Saturday and Sunday: Closed

Our dedicated customer service team is available to assist you with any maintenance or warranty-related issues you may encounter. Please don't hesitate to reach out to us for prompt and efficient support.

13. Annex Warranty Terms (Overseas)

Shenzhen Ligoo New Energy Technologies Co., Ltd (hereinafter referred to as its brand name AlpSolarr) Product Warranty Terms

AlpSolarr offers standard factory warranty which is valid 5 years from the date of installation and no more than 5 and a half years from the delivery date from AlpSolarr.

1. Product Quality Standards and Warranty

- AlpSolarr inverters comply with local safety regulations related to the national grid and grid standards.
- The inverter warranty is decided by AlpSolarr and its distributor.
- Spare parts warranty is valid 3 months (beginning from the date of shipment), during the warranty period, AlpSolarr is responsible for the replacement.

Spare Parts	
NO.	Item
1	Enclosure
2	Parallel network cable
3	Fuse

- After the products leaving the factory, the appearance damage (scratches, rust, chemical damage) is beyond warranty.

2. Warranty Exceptions

- Damage or lose to inverter or accessory caused by logistics.
- Inverter failure caused by non-compliance with national utility grid standard which lead to eg. abnormal grid voltage, grid frequency etc.
- Inverter malfunction or damage caused by non-professional or non-qualified personnel.
- Failure to observe the user manual, the installation guide, and the maintenance regulations.
- Remove or damage warranty seal.
- Change or remove specification label, serial number (SN).
- Product malfunction or damage due to disobey to relevant laws and regulations or technical requirements in power plant design, construction or installation works.
- Solar panels' input parameters exceed the inverter's allowed range.
- Product malfunction or damage due to installation on movable device or in vibration occasions.
- Failure or damage caused by corrosion, lightning and other natural damage or force majeure.
- Unauthorized alteration or disassembly of the product.
- Damage or malfunction caused by other facilities eg. Surge damage caused by switching on/off high power generator.
- Low electricity generation because of inverter self-protection caused by environmental reasons (such as the installation environment, natural environment, grid environment, etc.) is not a quality problem.

3. Repair and Replacement

- When a failure occurs, the user should check and record from the screen display the error code, DC voltage, AC voltage data or phenomena ect., then contact your local dealer.
- When the dealer or AlpSolarr confirm that it is the product quality problem , the faulty product will be replaced.
- For the product has been replaced or repairedthe remaining warranty entitlement will be transferred to the replacement or repaired device.
- AlpSolarr is only responsible for the company's products troubleshooting, repair and replacement, but doesn't assume any other special damages, consequential damages, incidental damages (including loss of profits, loss of goodwill, loss of business reputation loss or delay, etc.).
- This warranty does not affect the customer's enjoyment of any other rights laws and regulations relating to sales of consumer goods provided for in the host country or region.

4. Service Contact

- Customers could contact local dealer or distributor to discuss how to proceed. Please visit www.alpsolarr.com for dealer/installer's contact details. Of course, customers may also contact AlpSolarr headquarter if they need help or advice.

5. Force Majeure

- Force majeure is not artificially unavoidable and insurmountable objective conditions. In addition, it is the loss that even if the use of methods of prevention and attention, cannot prevent. It includes the following:

a). earthquakes, floods, fires, storms and other natural disasters.

b). war, invasion, blockade and other hostile armed actors.

c). revolution, rebellions, riots.

d). strike.

e). collection, prohibition, and other provisions of the government's actions.

f). infectious diseases.

g). third-party negligence and wrongdoing which Manufacturers cannot control.

h). others.

AlpSolarr

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