

Version: US -UM-4.0.0



USER MANUAL

Elios Inversa1510



HISTORY

VERSION	ISSUED	COMMENTS
1.0.0	03-Feb23	First release
2.0.0	05-Sept23	Updated the appearance of Inversa1510 Inverter Added 4.2 GRID/BACKUP/GEN Connection. Added 4.3 PV Connection. Added 4.4 Battery Connection.
3.0.0	07-Dec23	Added the general guidelines for space in 3.2.3 Installation Space Requirements. Added 5.1.4 Forced Charge/Discharge Function. Updated 7 User Interface. Added Appendix.
3.1.0	02-Feb24	Updated battery information in 3 Installation . Added three-phase connection in 4 Electrical Connection . Updated 7 User Interface .
3.1.1	01-Mar24	Updated the APP guide for three-phase connection in 4 Electrical Connection.
3.1.2	23-Mar24	Updated the bottom view of Inversa1510 Inverter. Updated installation steps in 3.3 Mounting .
4.0.0	29-Apr24	Updated 9 Technical Specifications. Updated the wire box of Inversa1510 Inverter.



Preface

About This Manual

This manual describes the installation, connection, APP setting, commissioning and maintenance etc. of Inversa1510 Inverter. Please first read the manual and related documents carefully before using the product and store it in a place where installation, operation and maintenance personnel can reach it at any time. The illustrations in this user manual are for reference only. This user manual is subject to change without prior notice. (Specific please in kind prevail.)

Target Group

Inverters must be installed by professional electrical engineers who have obtained relevant qualifications.

Scope

This manual is applicable to the Elios Inversa1510 Inverter model:

10K UL

For battery models and other detailed information, please refer to the Appendix.

Conventions

The following safety instructions and general information are used within this user manual.

DANGER Indicates an imminently hazardous situation which, if not co followed, will result in serious injury or death.	
WARNING Indicates a potentially hazardous situation which, if not correct followed, will result in serious injury or death.	
CAUTION Indicates a potentially hazardous situation which, if not correctly followed, could result in moderate or minor injury.	
NOTICE NOTICE	Indicates a potentially hazardous situation which, if not correctly followed, could result in equipment failure to run, or property damage.
NOTE	Call attention to important information, best practices and tips: supplement additional safety instructions for your better use of the Three phase hybrid inverter to reduce the waste of you resource.



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Appendix



1 Safety

Before using the Elios Inversal510 Inverter, please read all instructions and cautionary markings on the unit and in this manual. Put this manual to a place where you can take it easily.

Our inverter strictly conforms to related safety rules in design and test. Please follow the local laws and regulations during installation, operation and maintenance. Incorrect operation may cause injury or death to the operator or a third party, and damage to the inverter and other properties belonging to the operator or a third party.

1.1 Symbols Used

Safety Symbol	Description
A	Danger of high voltage and electric shock! Only qualified personnel may perform work on the inverter.
A Simins	Residual voltage exists after the inverter is powered off. It takes 5 minutes for system to discharge to a safe voltage.
	Danger of hot surface
20	Environmental Protection Use Period
Ţ <u>i</u>	Refer to the operating instructions
	Product should not be disposed as household waste.
	Grounding terminal



1.2 Safety Precaution

- Installation, maintenance and connection of inverters must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and requirements of local power authorities and/or companies.
- The temperature of some parts of the inverter may exceed 60°C during operation. Do not touch the inverter during operation to avoid being burnt.
- Ensure children are kept away from inverters.
- Don't open the front cover of the inverter. Apart from performing work at the wiring terminal (as
 instructed in this manual), touching or changing components without authorization may cause injury
 to people, damage to inverters and annulment of the warranty.
- Static electricity may damage electronic components. Appropriate methods must be adopted to prevent such damage to the inverter; otherwise the inverter may be damaged and the warranty annulled.
- Ensure the output voltage of the proposed PV array is lower than the maximum rated input voltage of the inverter; otherwise the inverter may be damaged and the warranty annulled.
- When exposed to sunlight, the PV array generates dangerous high DC voltage. Please operate according
 to our instructions, or it will result in danger to life.
- PV modules should have an IEC61730 class A rating.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the
 equipment may be impaired.
- Completely isolate the inverter before maintaining. Completely isolate the inverter should: turn off the PV switch and disconnect the PV terminal, battery terminal, and AC terminal
- After the inverter is powered off, the remaining electricity and heat may still cause electric shock and body burns. Do not touch parts of inverter for 10 minutes after disconnection from the power sources.
- Prohibit inserting or pulling the AC and DC terminals when the inverter is running.
- In Australia, the inverter internal switching does not maintain the neutral neutral continuity. And neutral
 integrity must be addressed by external connection arrangements.
- Don't connect inverter in the following ways:
 The BACKUP Port should not be connected to the grid;
 A single PV panel string should not be connected to two or more inverters.



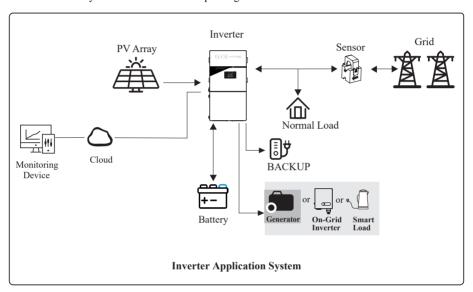
Product Introduction

2 Product Introduction

2.1 Overview

Elios Inversa1510

Typically, an ESS Energy storage system consists of PV array, inverter, battery, loads and electricity sensor. The inverter is a high-quality component which can convert solar energy to AC energy and store energy into battery. The energy generated by inverter can be preferentially supplied to its self consumption, stored in the battery for future use or fed into public grid.

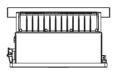


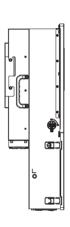


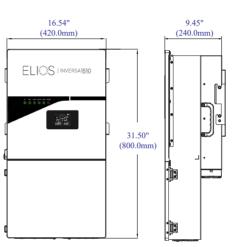
2.2 Product Appearance

2.2.1 Inverter Appearance

• The External View of Inverter







Inverter dimensions:

Width	Height	Depth
16.54"	31.50"	9.45"
(420.0mm)	(800.0mm)	(240.0mm)

LED Details:



🖺 ват

T GRID

BACKUP

(сом

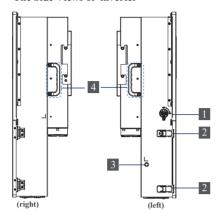
(A) ALARM

Icon	Description
(a)	PV
0	BAT
1	GRID
a	BACKUP
®	COM
(A)	ALARM



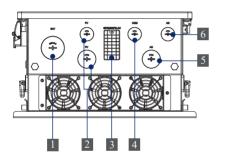
Product Introduction

• The Side Views of inverter



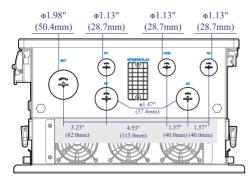
No.	Description
1	PV switch
2	Toggle latch (for opening/closing the wire box cover)
3	ON/OFF Button
4	Handle Areas

• The Bottom View of inverter



No.	Description
1	Battery connection port
2	PV connection ports
3	COM Port (GPRS/WIFI/LAN)
4	Communication connection ports
	(RS485, BMS, DRM, CT, DRY, RSD, PARA)
5	GRID/BACKUP/PE connection port
6	GEN connection port

• The Dimensions of Waterproof Holes



2.2.2 Battery Appearance

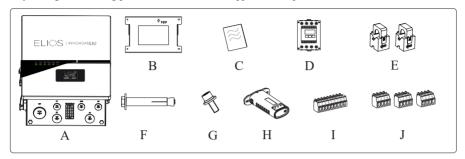
For detailed information about battery, please refer to the Appendix.



3 Installation

3.1 Packing List

After unpacking, please check the following packing list carefully for any damages or missing parts. If any damages or missing parts occurs, contact the supplier for help.



Number	Quantity	Description
A	1	Inverter
В	1	Mounting bracket
С	1	File package
D	1	Meter (Optional)
Е	2	CT
F	4	M6 Expansion screws
G	1	M6 Security screw
Н	1	WIFI module
I	1	9-Pin terminal
J	3	4-Pin terminal

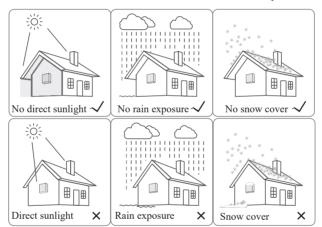


Installation

3.2 Selecting the Mounting Location

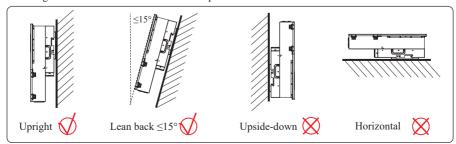
3.2.1 Installation Environment Requirements

- a. With an IP65 protection rating, the inverter can be mounted indoors or outdoors.
- b. The inverter is suitable for use in residential non-habitable spaces.
- c. The mounting location must be inaccessible to unrelated personnel since the enclosure and heat sinks are extremely hot during operation.
- d. Do not install the inverter in areas containing highly flammable materials or gases.
- e. To ensure optimum operation and long service life, the ambient temperature must be below 50°C.
- f. The inverter must be mounted in a well-ventilated environment to ensure good heat dissipation.
- g. Identify the inverter location on a stub frame, a brick wall or a concrete wall. Ensure the carrier, where the inverter is mounted, can support the weight of the inverter.
- h. Do not install the inverter in a rest area since it will cause noise during operation.
- i. The installation height should be reasonable, and please make sure it is easy to operate and view the display.
- j. Product label and warning symbols shall be clear to read after installation.
- k. To ensure long service life, the inverter must not be exposed to direct solar irradiation, rain, or snow. It is recommended that the inverter be mounted in a sheltered place.



3.2.2 Mounting Requirements

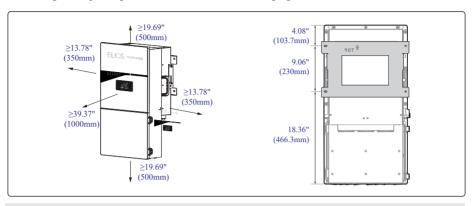
Mount the inverter vertically or at a maximum back tilt of 15°. The device can not be installed in a wrong mode and the connection area must point downward.





3.2.3 Installation Space Requirements

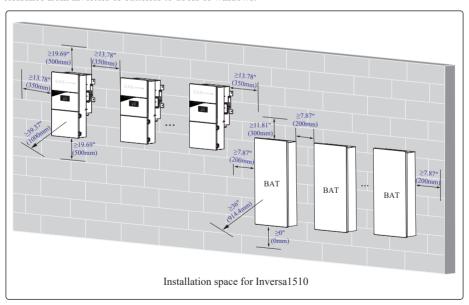
To ensure the inverter is normal and easy to operate, there are requirements on available spaces of the inverter, e.g. to keep enough clearance. Refer to the following figures.



Note:

Make sure to comply with all local compliance and regulation standards.

The details below are the general guidelines for space. There should be at least 36in.(1000mm) of clearance from inverters or batteries to doors or windows.

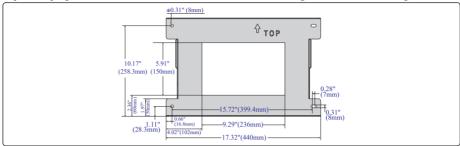




Installation

3.3 Mounting

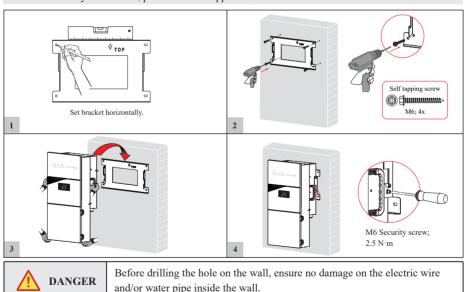
Before mounting the inverter, you have to prepare an electric screwdriver and a marker. You may need expansion plugs or anchors for concrete. The dimension of mounting bracket is shown as figure below.



- Step 1. Position the mounting bracket against the mounting surface, level it, and mark the mounting hole locations.
- **Step 2.** Drive the screws through the mounting bracket into the mounting surface. Ensure the bracket is firmly attached.
- Step 3. Hang the inverter onto the mounting bracket.
- Step 4. Lock the inverter using the security screw.



- 1. Two or three persons are recommended to install the inverter.
- 2. For battery installation, please refer to Appendix.





To prevent potential damages and injuries from inverter falling down, please hang the inverter on the bracket, do not loosen grip unless confirm that the inverter is well-mounted.



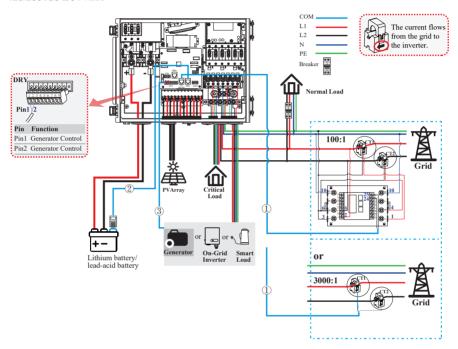
This chapter shows the detailed electrical connections of Elios Inversa1510 inverter.

4.1 Wiring Diagram

Standard Non-parallel Wiring Diagram

Diagram 01

120/240Vac Split Phase **120/208Vac** 2/3 Phase



Note:

- ① CT/Meter communication connection (meter is optional)
- 2 BMS communication connection (only for lithium battery)
- (3) DRY communication connection



Ensure that the inverter and all cables to be installed have been completely powered off during the whole process of installation and connection. Otherwise, fatal injury could be caused by the high voltage.



Split Phase Parallel Connection Mode-Scheme A (N=2) Diagram 02 COM PARA L1 The current flows from the grid to L2 Turn this switch the inverter. N to "ON". PE Breaker No.2 Inverter No.1 Inverter GEN Lithium battery/ Generator/ On-Grid Inverter lead-acid battery $P \Delta R \Delta$ Pin Function 1 GND S Turn this switch to "ON". PARA_SYNO CAN_L CAN_H L1 N (1) Parallel communication connection PE (2) CT/Meter communication connection

* CT/Meter and BMS communication cables can be connected to any inverter, but they must be inserted into the same inverter and we call this inverter No. 1 inverter.

(3) BMS communication connection



Note:

- 1. BMS communication connection is only for lithium battery.
- 2. It is necessary to turn the matched resistance switch of No. 1 inverter and No. 2 inverter to "ON" in parallel connection mode.
- 3. With parallel connection mode, it is necessary to connect APP to one of the inverters and then go to Console > Hybrid Setting> Other > Parallel mode to enable parallel mode on APP.
- 4. Under parallel connection mode, the smart load should only be connected independently.
- 5. The external DC/AC breakers are not supplied with the inverter and must be purchased separately.

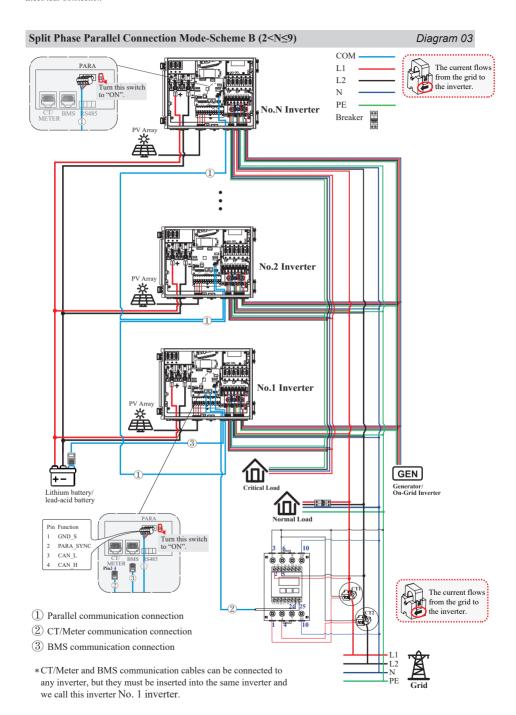
 Breaker recommendation:

DC Breaker (Battery side): 300A/80VAC Breaker (GEN side): $\ge 60A/250V$ AC Breaker (Grid side): $\ge 60A/250V$ AC Breaker (Backup side): $\ge 60A/250V$



Ensure that the inverter and all cables to be installed have been completely powered off during the whole process of installation and connection. Otherwise, fatal injury could be caused by the high voltage.







Note:

- 1. BMS communication connection is only for lithium battery.
- 2. It is necessary to additionally purchase suitable CT and meter according to the specific requirements in parallel connection mode-Scheme B. Meter+CT Ratio is 100:1(optional).
- 3. It is necessary to turn the matched resistance switch of No. 1 inverter and No. N inverter to "ON" in parallel connection mode.
- 4. With parallel connection mode, it is necessary to connect APP to one of the inverters and then go to Console > Hybrid Setting> Other > Parallel mode to enable parallel mode on APP.
- 5. Under parallel connection mode, the smart load should only be connected independently.
- 6. The external DC/AC breakers are not supplied with the inverter and must be purchased separately.

Breaker recommendation:

DC Breaker (Battery side): 300A/80V AC Breaker (GEN side): ≥60A/250V AC Breaker (Grid side): ≥60A/250V AC Breaker (Backup side): ≥60A/250V



DANGER

Ensure that the inverter and all cables to be installed have been completely powered off during the whole process of installation and connection. Otherwise, fatal injury could be caused by the high voltage.

Inverter N1

Common

Meter(DTSU666)

CT(HY94C5-500)



(AC) L1 (DC) PV+ (DC) BAT+

(AC) L2 (DC) PV-(DC) BAT -

NEUTRAL

GROUND

COM

BREAKER RECOMMENDATION

WIRE GAUGE GUIDE (COPPER)

TABLE 2

: Ø Ė

1

Generator

LABEL

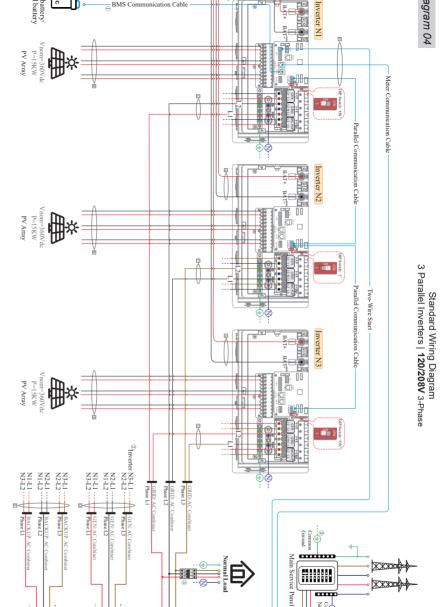
CONDUCTOR

0 AWG

TABLE 1

lead-acid battery 48Vdc

BMS Communication Cable



(a) (b) These symbols represent a common neutral/ground connection.	On the arrow indicates the current in CT flows from the grid to the inverter.	 in 'N-1-11', 'N' represents inverter serral mamber; 'L' represents the phase of live wire in CRILD/GLY/BACK/UP connection. ii) The external D/CAC brackers are not suspicified with the inverter and must be purchased separately. Refer or JABLE 1. 	② The wiring method of GEN/critical load is as the same as that of the grid.	(1) BMS is only for Lithium battery. When am lying standalone lithium battery connection, each inverter should be connected to BMS COM cable.
Backup side(AC)	Grid side(AC)	GEN side(AC)	Battery side(DC)	LOCATION
≥60A/250V	≥60A/250V	≥60A/250V	300A/80V	SPECIFICATION

Normal load side(AC) Depends on required passifiroug

Backup side(AC)

≥60A/250V

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24-23 AWG CAT6

4-2AWG 4-2 AWG 10-8 AWG 6-4 AWG



Note:

- 1. Before three-phase connection, please make sure all inverters in parallel have the same firmware version by verifying the 'DSP', 'CSB', and 'DC-DC converter' version numbers on App, as shown in *Figure 4-1*. It is recommended to restore the firmware before the three-phase connection to ensure the same parameter for each inverter, as shown in *Figure 4-2*.
 - Verify version number: (Admin account) Console > Maintenance > Basic information
 - Restore the firmware: (Admin account) Console > Maintenance > Maintaining (Factory data reset)





Figure 4-1 Basic information

Figure 4-2 Maintaining

- 2. Detailed connection steps of each port have been illustrated in the following sections of this chapter, please read carefully.
- 3. BMS connection is only applicable to lithium battery.
- For shared lithium battery connection, please refer to diagram 04 to connect the BMS communication cable.
- For standalone lithium battery connection, the BMS communication cable needs to be connected to each inverter.

App setting guide for three-phase connection

Under three-phase connection mode, it is necessary to connect the APP to each inverter and set related parameters by following the steps below.

- 1. Login as an administrator: Console > Access Management > Change User > Login as administrator.
- 2. Go to Console > Hybrid Setting > Other to enable parallel mode, select the correct battery connection type, and set the phase position accordingly, as shown in *Figure 4-3--4-5*. Notice that all three inverters should be set in this step.
- 3. Go to Quick setup to set the basic parameters of the inverter. Detailed setting process can be found in Quick setting at Chapter 7.2.3.
- 4. Set power control: Go to Console > Power Limit > Power control > Digital Power Meter. (Figure 4-6)
- 5. Set power derating control mode: Go to Console > Power Limit > Power derating control mode > Independent phase power. (Figure 4-7)



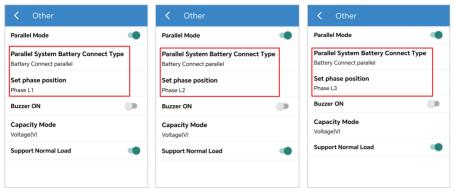


Figure 4-3 Inverter N1-Phase L1

Figure 4-4 Inverter N2-Phase L2

Figure 4-5 Inverter N3-Phase L3



Figure 4-6 Power control



Figure 4-7 Power derating control mode

Meter Communication Cable

Parallel Communication Cable

Inverter N1

Inverter N2



(AC)L2 (DC)PV-(DC)BAT-

NEUTRAL

GROUND

COM

LOCATION

SPECIFICATION

LABEL

CONDUCTOR

300A/80V

BREAKER RECOMMENDATION

WIRE GAUGE GUIDE (COPPER)

PV Array

Vnom=360Vdc P=15KW

Lithium battery/ lead-acid battery 48Vdc +

Vnom=360Vdc P=15KW PV Array

BMS Communication Cable



























Normal load side(AC) | Depends on required passthrough

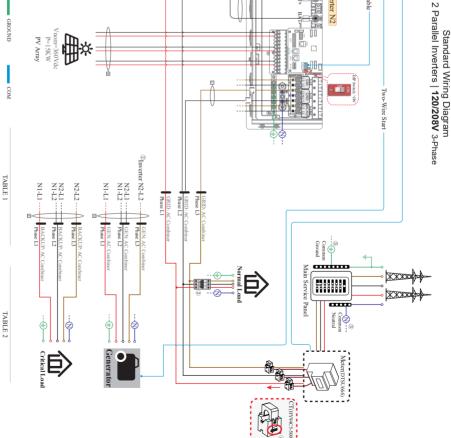
Backup side(AC) GEN side(AC) Battery side(DC) Grid side(AC)

≥60A/250V ≥60A/250V ≥60A/250V

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24-23 AWG CAT6

4-2AWG 6-4 AWG 4-2 AWG 10-8 AWG 0 AWG





Note:

- 1. Before three-phase connection, please make sure all inverters in parallel have the same firmware version by verifying the 'DSP', 'CSB', and 'DC-DC converter' version numbers on App, as shown in *Figure 4-1*. It is recommended to restore the firmware before three-phase connection to ensure the same parameter for each inverter, as shown in *Figure 4-2*.
 - Verify version number: (Admin account) Console > Maintenance > Basic information.
 - Restore the firmware: (Admin account) Console > Maintenance > Maintaining (Factory data reset).
- 2. Detailed connection steps of each port have been illustrated in the following sections of this chapter, please read carefully.
- 3. BMS connection is only applicable to lithium battery.
- For shared lithium battery connection, please refer to diagram 05 to connect the BMS communication cable.
- For standalone lithium battery connection, the BMS communication cable needs to be connected to each inverter.

App setting guide for three-phase connection

Under three-phase connection mode, it is necessary to connect the APP to each inverter and set related parameters by following the steps below.

- 1. Login as an administrator: Console > Access Management > Change User > Login as administrator.
- 2. Go to Console > Hybrid Setting > Other to enable parallel mode, select the correct battery connection type, and set the phase position accordingly, as shown in *Figure 4-8&4-9*. Notice that all three inverters should be set in this step.
- 3. Go to Quick setup to set the basic parameters of the inverter. Detailed setting process can be found in Quick setting at Chapter 7.2.3.
- 4. Set power control: Go to Console > Power Limit > Power control > Digital Power Meter. (Figure 4-6)
- 5. Set power derating control mode: Go to Console > Power Limit > Power derating control mode > Independent phase power. (Figure 4-7)



Figure 4-8 Inverter N1-Phase L1



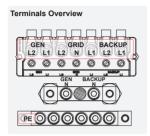
Figure 4-9 Inverter N2-Phase L2

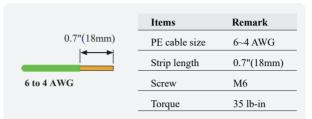


4.2 Grounding

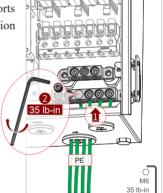
A protective earth (PE) terminal is equipped inside of the inverter's wire box. Please be sure to connect the PE cable to the ground bus bar for reliable grounding.

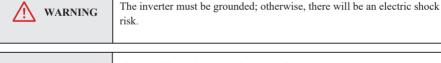
AWG 6 or 4 green or green-yellow wires are recommended.





- a. Thread the wires into wire box through AC connection ports which refer to Grounding/GRID/BACKUP/GEN connection ports.
- b. As shown in the figures, connect PE to the terminals as labeled, and tighten terminal screws.
- c. Make sure that all wires are securely in place.





If the positive pole or negative pole of the PV array is required to be grounded, the inverter output (to AC grid) must be isolated by



4.3 GRID/BACKUP/GEN Connection

This section explains the requirements and procedures of PV connection. Read carefully before connecting.



Before connecting the GRID/BACKUP/GEN terminal, ensure that both the AC terminal and the DC terminal are powered off and the PV switch is OFF.

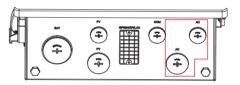
Otherwise there is a risk of high voltage shock.

Step1. Prepare the proper cable we recommended as table below, and strip an appropriate length of the cable insulation.

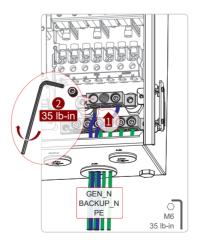
It is recommended to use outdoor dedicated cables.

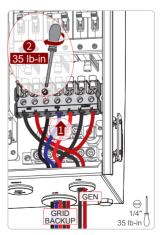


Step2. Thread the wires into wire box through AC ports.



Step3. As shown in figure below, according to the label on terminal blocks, fit the wire in and tighten terminal screws. Finally, make sure that all wires are securely in place.







4.4 PV Connection

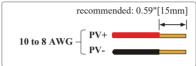
This section explains the requirements and procedures of PV connection. Read carefully before connecting.



1.Photovoltaic arrays exposed to sunlight will generate dangerous voltages!
2.Before connecting the PV terminal, ensure that both the AC terminal and the DC terminal are powered off and the PV switch is OFF. Otherwise there is a risk of high voltage shock.

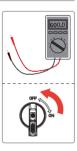
Step1. Prepare the proper cable we recommended, and strip approx. 15 mm of the cable insulation.

It is recommended to use dedicated PV cable.

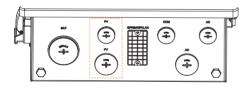


Step2. Inspection before connection.

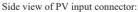
- Check correct polarity of wire connection from PV modules and PV input connectors.
- The test voltage cannot exceed 600V.
- Ensure that the PV switch is OFF.

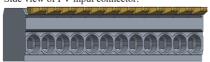


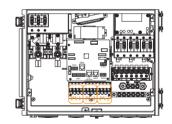
Step3. Thread the wires into wire box through PV connection ports.

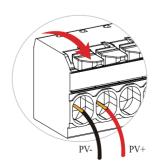


Step4. Open the switches of PV input connector. Insert the stripped cable into the PV input connector. When doing so, ensure that the stripped cable and the PV input connector are of the same polarity. Finally, close switches and ensure the wires are tightly fixed.











4.5 Battery Connection

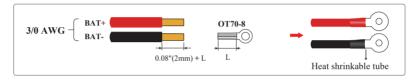
This section explains the requirements and procedures of battery connection. Read carefully before connecting.



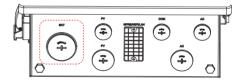
Before connecting the battery terminal, ensure that both the AC terminal and the DC terminal are powered off and the PV switch is OFF. Otherwise there is a risk of high voltage shock.

Step1. Prepare the proper cable we recommended, and strip an appropriate length of the cable insulation.

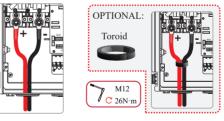
It is recommended that the battery cable be less than or equal to 3m.



Step2. Thread the wires into wire box through BAT connection port.



Step3. Insert the wires into battery terminals. A toroid is optional for our inverter to avoid interference.



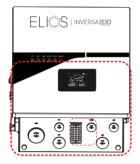


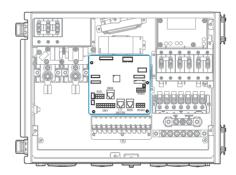
Reverse polarity will damage the inverter!



4.6 Communication Connection

There are communication interfaces in the communication port on the bottom of the inverter as show below:





Interface		Descriptions
PARA		4-Pin interface for parallel communication
		A matched resistance switch for parallel communication
RS485		4-Pin interface for RS485 communication
DRM		Demand response mode for Australia application
CT/ME	ETER	For CT/Meter communication or Grid current sense
BMS		Lithium battery communication interface
	GEN	Generator control
9-Pin	NTC	Temperature sensor terminal of lead-acid battery
	RMO	Remote off control
DRY		DI/DO control
RSD		RSD control interface
GPRS/WIFI/LAN		For GPRS/WIFI/LAN communication

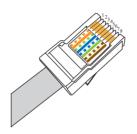


4.6.1 BMS Connection (Only for Lithium Battery)



This manual ONLY illustrates the pinout sequence of BMS at INVERTER SIDE. For details about the pinout sequence at battery side, see the user manual of the battery you use, and the following pinout diagram of battery side is only for illustration.

• Standard RJ45 Pinout





RJ45 Pin Configuration		
Pin	Color	
1	White-Orange	
2	Orange	
3	White-Green	
4	Blue	
5	White-Blue	
6	Green	
7	White-Brown	
8	Brown	

Always face the flat side of the terminal, and count the pin slots from left to right from 1 to 8. Read the pin definitions of both the battery and inverter carefully.

• Pin definition of terminal

INVERTER:

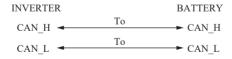
Inverter		
Pin	Definition	
1	RS485_A	
2	RS485_B	
3	NC	
4	CAN_H	
5	CAN_L	
6	NC	
7	NC	
8	NC	

BATTERY:

Taking one battery's pin configuration as an example.

Ba	Battery Example		
Pin	Definition		
1	NC		
2	NC		
3	NC		
4	CAN H		
5	CAN_L		
6	GND		
7	NC		
8	NC		

• CAN BUS connection principle

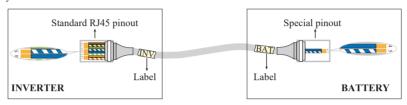




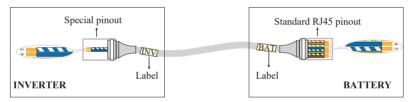
• BMS communication cable preparation:

- ① Prepare RJ45 terminals and strip appropriate length of COM cables.
- ② According to pin definitions and cable order, assemble the RJ45 terminals and crimp communication wires. There are two methods to assemble the RJ45 terminals.
- ③ Then label the RJ45 terminals (BAT or INV) to avoid confusion.
- 4 After finishing wire-making, use a multimeter or other specific tool to check if your cable is good, bad, or wired incorrectly.

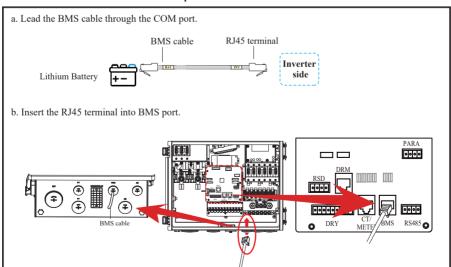
Method 1: Use the INVERTER RJ45 pinout as the standard pinout to crimp wires, then the battery side will be a non-standard one (special pinout). Cut off the other no-used wires (1/2/3/6/7/8) for the battery RJ45 terminal.



Method 2: Use the BATTERY RJ45 pinout as the standard pinout to crimp wires, then the inverter side will be a non-standard one (special pinout). Cut off the other no-used wires (1/2/3/6/7/8) for the inverter RJ45 terminal.



• BMS communication cable connection steps:





4.6.2 CT/Meter Connection

A CT/Meter is applied to monitor electricity usage of all loads.

• RJ45 Terminal Configuration for CT and Meter Communication

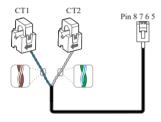
PIN	1	2	3	4	5	6	7	8
Function Description	/	/	RS485_ A	RS485_B	CT2-	CT2+	CT1+	CT1-



Note: The Standard RJ45 Pinout Color in BMS Connection section is also applicable to this part .

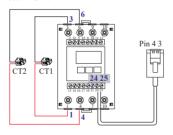
• Cable connection overview

CT:



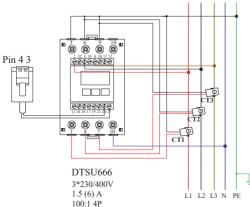
RJ45	RJ45 Pinout Color	CT Cable Color	
Pin5(CT2-)	White-Blue	White	
Pin6(CT2+)	Green	wnite	
Pin7(CT1+)	White-Brown	DI.	
Pin8(CT1-)	Brown	Blue	

Meter+CT:



RJ45	Meter
Pin3(RS485_A)	Pin24
Pin4(RS485_B)	Pin25

Meter+CT (for 3-phase connection only):

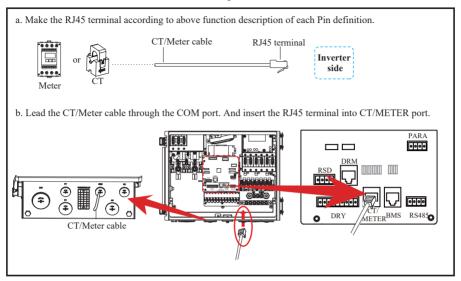


RJ45	Meter
Pin3(RS485_A)	Pin24
Pin4(RS485_B)	Pin25

Meter	CT	Other Wiring
Pin1	CT1+	/
Pin3	CT1 -	PE
Pin4	CT2+	/
Pin6	CT2 -	PE
Pin7	CT3+	/
Pin9	CT3 -	PE
Pin2	/	L1
Pin5	/	L2
Pin8	/	L3
Pin10	/	N



• CT/Meter communication cable connection steps:





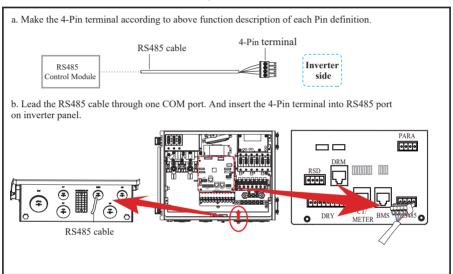
4.6.3 RS485 Connection

• 4-Pin Terminal Configuration of RS485 Communication



PIN	1	2	3	4
Function Description	RS485_A	RS485_B	PE	PE

• RS485 communication cable connection steps:





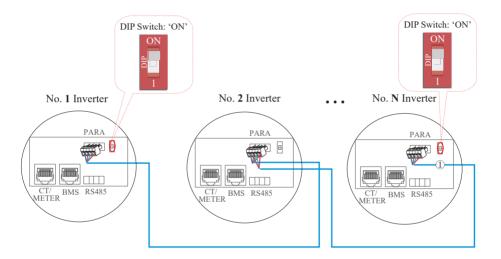
4.6.4 Parallel Communication Connection

• 4-Pin Terminal Configuration of parallel Communication



PIN	1	2	3	4
Function Description	GND_S	PARA_SYNC	CAN_L	CAN_H

• Parallel communication cable connection overview

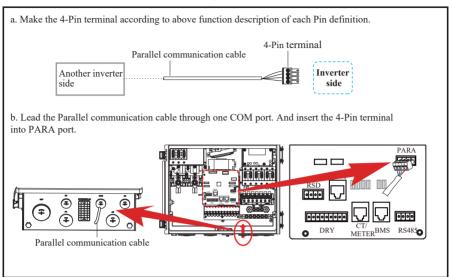


It is necessary to turn the matched resistance switch of No. 1 inverter and No. N inverter to "ON" in parallel connection mode.

No. 1 Inverter	No. 2 Inverter	•••	No. N Inverter
Pin4(CAN_H)	Pin4(CAN_H)		Pin4(CAN_H)
Pin3(CAN_L)	Pin3(CAN_L)		Pin3(CAN_L)
Pin2(PARA_SYNC)	Pin2(PARA_SYNC)		Pin2(PARA_SYNC)
Pin1(GND_S)	Pin1(GND_S)		Pin1(GND_S)



• Parallel communication cable connection steps:





4.6.5 NTC/RMO/DRY Connection(s)

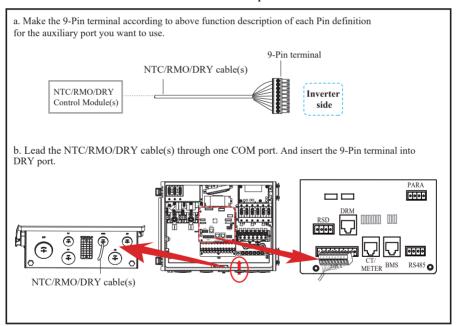
• 9-Pin Terminal Configuration of Auxiliary Communication

Pin 123456789



PIN	Function Description	
1	GEN Control	
2	GEN Control	
3	NC1 (Normal Close)	
4	NO2 (Normal Open)	
5	N2	
6	NC2 (Normal Close)	
7	REMO OFF	
8	GND S (NTC BAT)	
9	NTC BAT+	

• NTC/RMO/DRY communication cable connection steps:





Electrical Connection

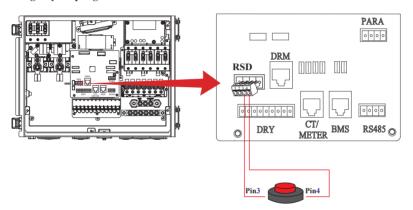
4.6.6 RSD Connection(s)

• 4-Pin Terminal Configuration of RSD



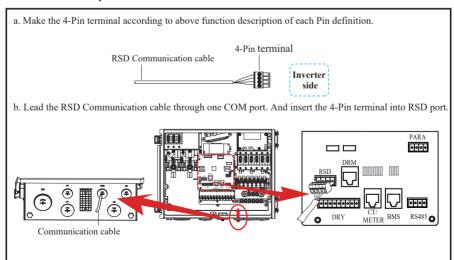
PIN	3	4
Function Description	Emergency S	top Signal Button

• Emergency Stop Signal:



Normally Open Rapid Shutdown Signal Button

• RSD connection steps:

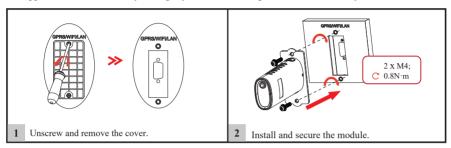




4.6.7 WIFI Module Connection

For details, please refer to the corresponding Module Installation Guide in the packing.

The appearance of module may be slightly different. The figure shown here is only for illustration.





System Operation

5 System Operation

5.1 Inverter Working Mode

The inverter supports several different working modes.

5.1.1 Self-consumption Mode

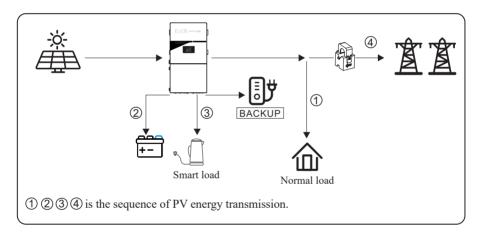
Go to the "Hybrid Setting" menu, and select the "Self-consumption mode".

Under Self-consumption mode, the priority of PV energy consumption will be Load > Battery > Grid, that means the energy produced by PV gives priority to powering local loads, the excess energy is used to charge the battery and the remaining energy is fed into the grid.

This is the default mode to increase self-consumption rate. There are several situations of self-consumption working mode based on PV energy.

a) Wealthy PV Energy

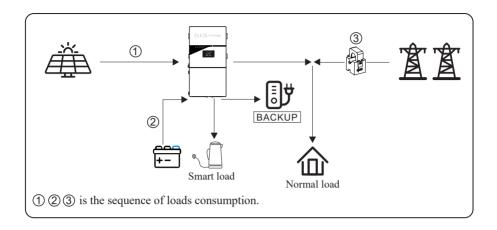
When PV energy is wealthy, the PV energy will be first consumed by loads, the excess energy will be used to charge the battery and then the remaining energy will be fed into the grid.



b) Limited PV Energy

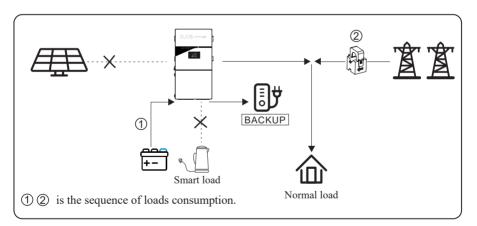
When the PV energy is not enough to cover all consumption, the PV energy will be entirely used by loads, and the insufficient part will be supplied by battery. Then still insufficient parts will be supplied by grid.





c) No PV Input

The inverter will first discharge the battery energy for home load consuming when no PV input(such as in the evening or some cloudy or rainy days). If the demand is not met, the loads will consume grid energy.



5.1.2 Feed-in Priority Mode

Go to the "Hybrid Setting" menu, and select the "Feed-in priority mode".

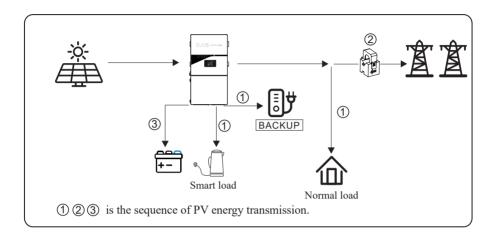
Under this mode, the priority of PV energy consumption will be Load > Grid > Battery, that means the energy produced by PV gives priority to powering local loads, the excess energy is fed into the grid, and the remaining energy is used to charge the battery.



System Operation

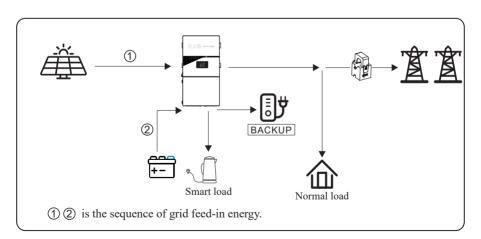
a) Wealthy PV Energy

When PV energy is wealthy, the PV energy will be first consumed by loads. If there is excess PV power, the power will be fed into grid. If there is still PV energy left after load consuming and grid feeding, then the remaining PV power will be used to charge the battery.



b) Limited PV Energy

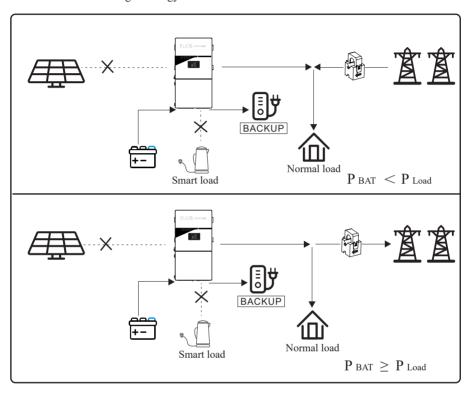
When PV energy is limited and can not meet the feed-in grid power, the battery will discharge to meet it.





c) No PV Input

The inverter will first discharge the battery energy for home load consuming when no PV input (such as in the evening or some cloudy or rainy days). If the demand is not met, the loads will consume the grid energy.





System Operation

5.1.3 Back-up Mode

Go to the "Hybrid Setting" menu, and select the "Back-up Mode".

Under this mode, the priority of PV energy consumption will be Battery > Load > Grid.

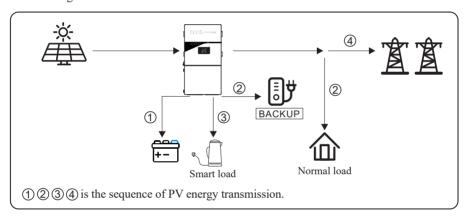
This mode aims at charging the battery quickly, and at the same time, you can choose whether to allow AC to charge the battery.

Forbid AC charging

In this mode, the battery can be charged only with PV power, and the charging power varies with PV power.

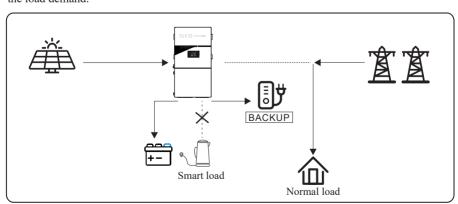
a) Wealthy PV power

When PV energy is wealthy, PV charges the battery first, then meets the load, and the rest is fed into the grid.



b) Limited PV power

When PV energy is limited, PV gives priority to charging the battery, and the grid directly meets the load demand.



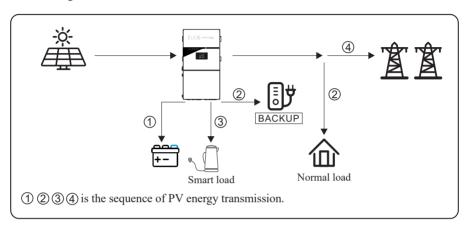


Allow AC charging

In this situation, the battery can be charged both with PV and AC.

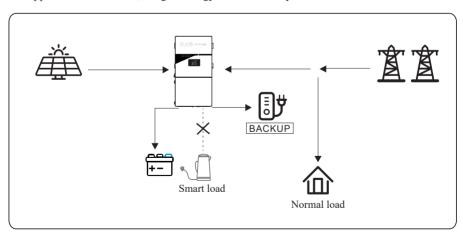
a) Wealthy PV power

When PV energy is wealthy, PV charges the battery first, then meets the loads, and the rest is fed into the grid.



b) Limited PV power

When the PV energy is not enough to charge the battery, the grid energy will charge the battery as supplement. Meanwhile, the grid energy is consumed by loads.





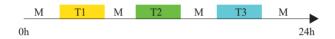
System Operation

5.1.4 Forced Charge/Discharge Function

According to the demands of application, the user can set the inverter to work on forced charge/discharge the battery in any working mode.

There are three time periods in which you can set this function. Outside of the set periods, the inverter returns to its original working mode. The forced charge/discharge function has the highest priority.

The relationship between the forced charge/discharge function and working mode shown as below.



M: Self-consumption Mode/Feed-in Priority Mode/Back-up Mode

T1: Time period 1 for forced charge/discharge parameter setting

T2: Time period 2 for forced charge/discharge parameter setting

T3: Time period 3 for forced charge/discharge parameter setting

T1, T2, and T3 priority to M.

For the detail settings, please go to Console > Hybrid Setting to enable Time-based Control on APP.

5.1.5 Off Grid Mode

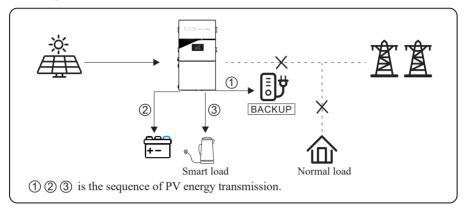
When the power grid is cut off, the system automatically switches to Off Grid mode. Under off-grid mode, only critical loads are supplied to ensure that important loads continue to work without power failure.

Under this mode, the inverter can't work without the battery.



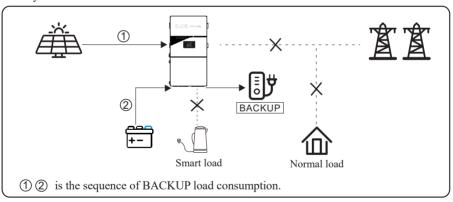
a) Wealthy PV power

When PV energy is wealthy, the PV power will be first consumed by critical load, then charge the battery.



b) Limited PV power

When PV energy is limited, BACKUP loads are first powered by PV and then supplemented by battery.





- Under this mode, please complete the output voltage and frequency settings.
- It is better to choose the battery capacity greater than 100Ah to ensure BACKUP function works normally.
- If BACKUP output loads are inductive or capacitive loads, to make sure the stability and reliability of system, it is recommended to configure the power of these loads to be within 50% of BACKUP output power range.



System Operation

5.2 Startup/Shutdown Procedure

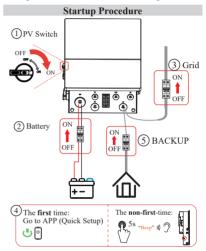
5.2.1 Startup Procedure

Before starting up, check whether the installation is secure and strong enough, and whether the system has been well grounded. Then make sure the connections of AC, battery, PV etc. are correct, and confirm the parameters and configurations conform to relevant requirements.

AC Frequency 50/60H	z PV Voltage	70~540V
Battery Voltage 40~64V	Grid AC Voltag	e 120/240V(Split phase) /208V(2/3 phase)

Make sure all the above aspects are right, then follow the procedures below to start up the inverter.

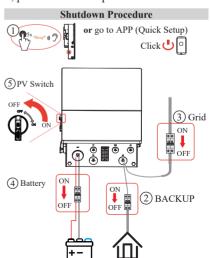
- 1) Power on the PV Switch.
- 2) Power on the DC breaker at BATTERY side.
- 3) Power on the AC breaker at GRID side.
- 4) Connect the cell phone App via Bluetooth. And click the Power ON in the App for the first time. Refer to Section 7.2 for details. Or you can hold the ON/OFF button on the side of the inverter for 5s in this step when performing subsequent startup.
- 5) Power on the AC breaker at BACKUP side.



5.2.2 Shutdown Procedure

When it is necessary to shut down the running system, please follow the procedures below:

- 1) Connect the cell phone App via Bluetooth. And click the Power OFF on the App.
 Refer to Section 7.2 for details. Or you can hold the ON/OFF button on the side of the inverter for 5 seconds in this step when performing subsequent shutdown.
- 3) Power off the AC breaker at BACKUP side.
- 4) Power off the AC breaker at GRID side.
- 5) Power off the DC breaker at BATTERY side.
- 6) Power off the PV Switch.
- 7) To disconnect the inverter cables, please wait at least 5 minutes before touching them.





6 Commissioning

Full commissioning of the inverter system is required as this can essentially protect the system from fire, electric shock or other damages or injuries.

6.1 Inspection

Before commissioning, the operator or installer (qualified personnel) must inspect the system carefully and make sure:

- 1) The system is firmly and correctly installed according to this Manual, and there is an enough space for operation, maintenance and ventilation.
- 2) All the terminals and cables are in good conditions, free of any damages.
- 3) No items are left on the inverter or in the required gap.
- 4) The PV, battery pack can working normally, and grid is normal.

6.2 Commissioning Procedure

After inspection and making sure status is right, then start the commissioning of the system.

- 1) Power on the system by referring to the Startup section 5.2.1.
- 2) Setting the parameters on the App as needed.
- 3) Finish the commissioning.



7 User Interface

7.1 LED/LCD

7.1.1 LED Introduction	Pv	SU CONTROL CON
	BAT	##CUP*
This section describes LED indicators, which include PV, BAT,	(I) GRID	<u>~</u>
GRID, BACKUP, COM, ALARM indicators.	BACKUP	ALARM
The table below explains the status and description of all indicators.	© сом	
Please read it carefully.	ALARM	
	LED	LED+LCD

		EED+ECD
LED Indicator	Status	Description
	On	PV input is normal.
PV	Blink	PV input is abnormal.
	Off	PV is unavailable.
	On	Battery is charging.
BAT	Blink	Battery is discharging.
	2	Battery is abnormal.
	Off	Battery is unavailable.
	On	GRID is available and normal.
GRID	Blink	GRID is available and abnormal.
	Off	GRID is unavailable.
2016	Blink	Data are communicating.
COM	Off	No data transmission.
	On	BACKUP power is available.
BACKUP	Blink	BACKUP output is abnormal.
	Off	BACKUP power is unavailable.
	On	Fault has occurred and inverter shuts down.
ALARM	Blink	Alarms have occurred but inverter doesn't shut down.
	Off	No fault.



Details	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
PV normal		•	0	0	0	0	0
No PV		0	0	0	0	0	0
PV over voltage	В0						
PV under voltage	В4						
PV irradiation weak	В5	*	0	0	0	0	\circ
PV string reverse	В7		O	Ü	O	O	O
PV string abnormal	В3						
On grid Bypass output		0	•	0	0	0	0
Grid absent	A2	0	\circ	0	0	0	\circ
Grid over voltage	A0						
Grid under voltage	A1						
Grid over frequency	A3						
Grid under frequency	A4	0	*	0	0	0	0
Grid abnormal	A6						
Grid over mean voltage	A7						
Neutral live wire reversed	A8						
Battery in charge		0	0	•	0	0	0
Battery unavailable							
Battery absent	D1	0	0	0	0	0	0
Battery in discharge		0	0	**	0	\bigcirc	0
Battery under voltage	D3						
Battery over voltage	D2						
Battery discharge over current	D4	0	0	*	0	0	0
Battery over temperature	D5						
Battery under temperature	D6						
Communication loss (Inverter - BMS) BACKUP output active	D8	0	0	0	_	(i)	0
1		0	0	0	0	0	0
BACKUP output inactive BACKUP short circuit	DB	9	\odot	9	O	\odot	Θ
BACKUP snort circuit BACKUP over load	DB						
BACKUP over dc-bias voltage BACKUP over dc-bias voltage	D7 CP	0	0	0	*	0	0



Details	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
RS485/DB9/BLE/USB		0	0	0	0	*	0
Inverter over temperature	C5						
Fan abnormal	C8						
Inverter in power limit state	CL						
Data logger lost	CH	0	0	0	0	0	*
Meter lost	CJ						
Remote off	CN						
PV insulation abnormal	B1						
Leakage current abnormal	B2						
Internal power supply abnormal	C0						
Inverter over dc-bias current	C2						
Inverter relay abnormal	C3						
GFCI abnormal	C6						
System type error	C7						
Unbalance Dc-link voltage	C9						
Dc-link over voltage	CA	0	0	0	0	\bigcirc	
Internal communication error	CB						
Internal communication loss(E-M)	D9						
Internal communication loss(M-D)	DA						
Software incompatibility	CC						
Internal storage error	CD						
Data inconsistency	CE						
Inverter abnormal	CF						
Boost abnormal	CG						
Dc-dc abnormal	CU						

Remark:

◆ Light on

C Light off

© Keep original status

★ Blink 1s and off 1s

★ Blink 2s and off 2s



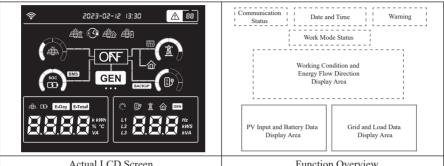
7.1.2 LCD Introduction

An LCD screen is optional for this series of inverters. If you choose the LCD screen, the following introduction will help you understand the function of each icon displayed.

Note

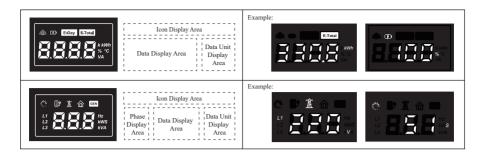
The LCD screen will be automatically turned off if there is no operation within 10 mins (which cannot be changed by default). You can tap the ON/OFF button on the side of inverter to wake up the LCD screen.

Menu Structure Overview



Actua	ıl LCD Screen	Function Overview
Icon Introduction	-1	
	This icon indicates WIFI conne	ection status.
2023-02-12 13:30	The date and time display infor The ':' between hour and minute	rmation about year, month, day, and hour. e flashes once a second.
▲ 88		s when an error occurs. For the specific warning of the chapter Inverter Troubleshooting.
	These four icons show different Working Mode for a detailed int	t operating statuses. Please refer to Chapter Inverter croduction.
	Feed-in Priority Mode Time-based Control Fun	Self-used Mode action Back-up Charging Mode
	Time sused control in	Back up charging Mode
(A) TON TON		onditions and energy flow directions. Description for a detailed introduction to each icon
	The Energy Bars indicate the de Each bar lights up one by one, the this cycle again.	irection of energy flow. hen turns off when all bars light and repeats
	The Energy Ring indicates the Each Energy Ring definition is a	battery SOC or the current power percentage. as follows.
	PV Input Power	On-Grid Mode: Grid Output Power Non On-Grid Mode: Bypass load consumption power + Backup consumption power
	Battery SOC	Backup
	Grid undervoltage	Grid overvoltage





Icon Introduction-2

icon introduction	~
	The PV icon represents the power of PV.
3	The Battery icon represents the current battery charge percentage or the voltage of battery.
E-Day	The E-Today icon represents the electricity energy generated today.
E-Total	The E-Total icon represents the electricity energy generated in total.
S. S.	When the Loading icon is on, it indicates that the device is starting, and the start timer countdown is displayed. The icon lights up a cluster of lights every second until all lights are on, and then it repeats the whole process again.
	The Back-Up icon represents the relevant power, frequency or voltage of Back-Up.
<u>\$</u>	The Grid icon represents the relevant power, frequency or voltage of the Grid.
命	The Smart Load icon represents the power consumption.
GEN	The GEN icon represents the voltage or power of generator.
L1 L2 L3	The L1 icon represents L1 phase of Grid/Backup/Generator. The L2 icon represents L2 phase of Grid/Backup/Generator. The L3 icon represents L3 phase of Grid/Backup/Generator.
8888	These two areas will display corresponding data of each lit icon mentioned above.



Table: Icon Status Description

	Icon Status Description					
Icon	Name	Light	Description			
_ - %_	PV PV	ON	Any PV voltage exists (it should be higher than the Min. PV Startup Voltage).			
	PV	OFF	PV Voltage is lower than the Min. PV Startup Voltage.			
יאפי	Cit	ON	Grid Voltage and frequency are normal.			
A	Grid	OFF	Grid overvoltage / undervoltage / overfrequency / underfrequency occurs.			
soc	Dottowy	ON	Bat. Voltage is higher than the Rated Min. Bat Voltage.			
(3)	Battery	OFF	Bat. Voltage is lower than the Rated Min. Bat Voltage.			
€	Back-Up	ON	Backup relay is on.			
ره	Load	OFF	Backup relay is off.			
		ON	Battery is set to BMS Type and its communication is normal.			
	BMS	Blink	BMS communication is abnormal.(The icon indicator on for one second, off for one second)			
BMS	DIVIS	OFF	Battery is not set to BMS Type.			
		OFF	2. Battery voltage is lower than Rated Min. Voltage			
BACKUP	BACKUP	ON/OFF	Lights up with Back-Up Load icon simultaneously			
		ON	Power Limit is set to CT or Meter in APP, and the CT/Meter communication is normal, the Grid side is running well.			
	Meter/CT	Blink	When Meter/CT communication is lost, Meter/CT icon on for one second, off for one second)			
		OFF	1. Power Limit is not set to CT or Meter.			
			The voltage or frequency of grid side is abnormal.			
命	Load	ON/OFF	Lights up with Grid icon simultaneously.			
	OM		1. Backup relay is on.			
ON	ON	ON	2. The inverter works under On-Grid mode.			
			The inverter works under Off-Grid mode.			
OFF	OFF	OFF	Non-on working mode.			
GEN	Generator / Smart Load /	From left to	right, when the three dots light up, each represents a different meaning.			
•••	Inverter	When GEN	communication is lost, GEN icon will go off.			
GEN	GEN	ON	Generator relay is on.			
	GLIV	OFF	Generator replay is off.			
GEN	Generator	ON	In APP, the "Gen port" parameters are set to "Generator Input" and the generator relay is powered on.			
	dot	OFF	APP parameter is set to Non 'Generator Input'.			
GEN	Smart Load	ON	In APP, the "Gen port" parameters are set to "Smart Load Output" and the generator relay is powered on.			
•	dot	OFF	APP parameter is set to Non 'Smart Load Output'.			
GEN	Inverter dot	ON	In APP, the "Gen port" parameters are set to "Inverter Input" and the generator relay is powered on.			
•		OFF	APP parameter is set to Non 'Inverter Input'.			
			*			



7.2 App Setting Guide

7.2.1 Download App for Local Setting

- Scan the QR code on the inverter to download the App SolarHope.
- Download the APP from the App Store or Google Play.

NOTE

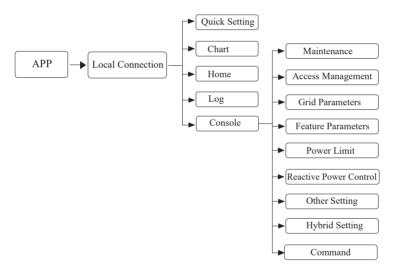
1. The App SolarHope is only for local settings.

Detailed information about remote monitoring, please refer to corresponding WIFI User Manual.

2. The App should access some permissions such as the device's location. You need to grant all access rights in all pop-up windows when installing the App or setting your phone.

7.2.2 App Architecture

The App can read data from the inverter through the local Bluetooth connection, allowing you to check real-time data and customize the inverter within the App.





7.2.3 Local Setting

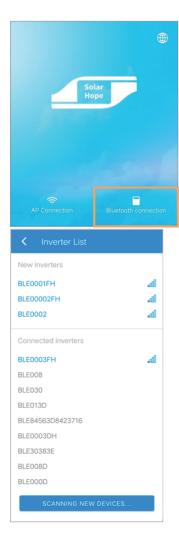
■ Access Permission

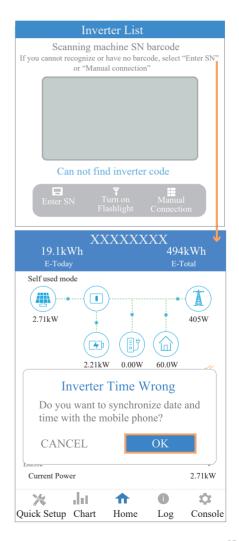
Before using the local setting, the APP should access some permissions. (You can allow them when you install the APP or grant permissions in your own phone setting.) When the APP asks for permission, please click Allow.

■ Connect Inverter

Firstly, open the Bluetooth on your own phone, then open the APP.

Click Bluetooth Connection to enter scanning interface. This page will list the inverters which you can connect or you have connected. (As shown below) click the inverter's name to connect it.







• Quick Setting

➤ Go to Quick Setup page.

Step 1 Set parameters for the inverter to connect to the power limit. Click each item to enter the information, then click Next.

Step 2 Set parameters for the inverter to connect to the workmode. Click each item to enter the information, then click Next. You can click Previous to go back to the previous page.

Step 3 Click the button below to turn on the inverter. You can click Previous to go back to the previous page.







APP Power Chart

The power chart is showed by Day, Month and Year in our APP. Data curves in the following figures are only for illustration.

> Day Chart



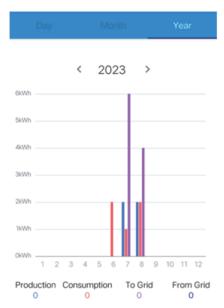


> Month Chart





> Year Chart

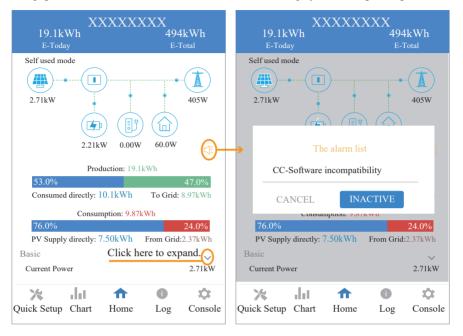






Local Setting Homepage

This page shows the basic information of inverter. Click to display the warning message.



• History Log Click Log at the bottom and then go to the history log page (as shown below). It contains all the logs for the inverter. No history data Consumed directly: 10.1kWh To Grid: 8.97kWh Consumption: 9.87kWh PV Supply directly: 7.50kWh From Grid:2.37kWh 2.71kW Current Power 101 × dat 0 Quick Setup Chart Home Log Console da 1 :Ö:

Quick Setup Chart

Home

Log

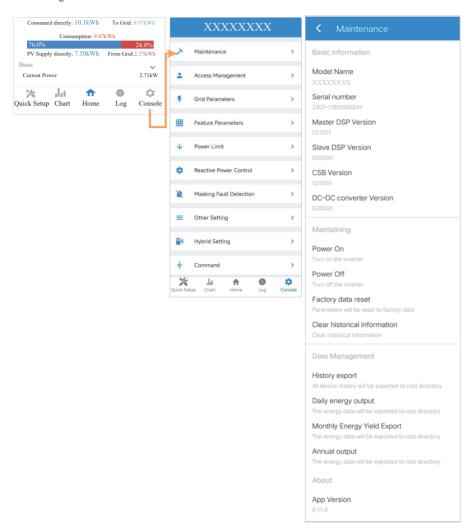
Console



Console

> Maintenance

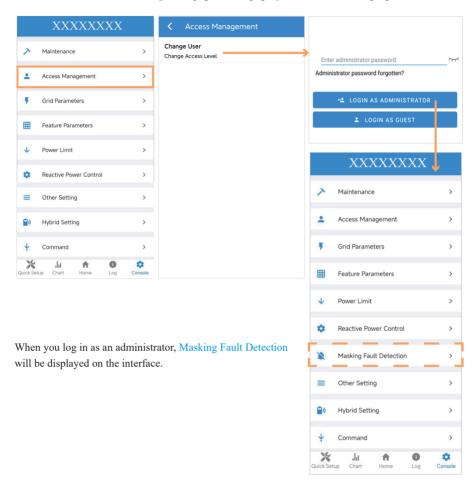
Go to Console page and click Maintenance. In this page, you can view the basic information including version information, do some maintaining operations like turn off/on the inverter and manage data.





> Access Management

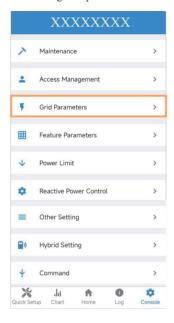
Go to Console > Access Management page. In this page, you can switch the login permission.





> Grid Parameters

Go to Console > Grid Parameters page. In this page, you can set or change the parameters of Grid side, as shown in the figure.





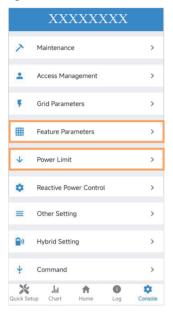


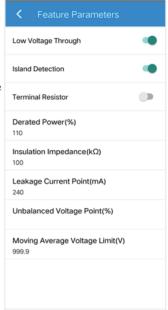
> Feature Parameters

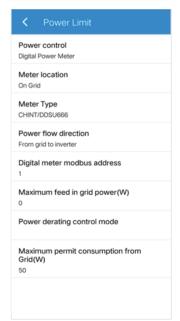
Go to Console > Feature Parameters page. In this page, you can set or change the feature parameters, as shown in the figure.

> Power Limit

Go to Console > Power Limit page. In this page, you can set or change the parameters of power limit, as shown in the figure.







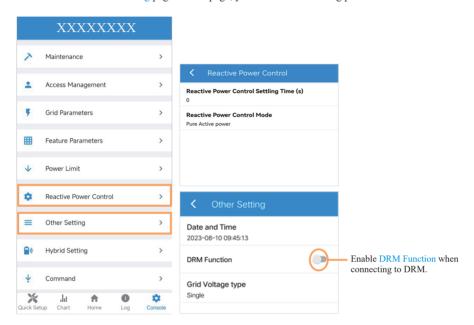


> Reactive Power Control

Go to Console > Reactive Power Control page. In this page, you can set or change the Reactive Power Control parameters.

> Other Setting

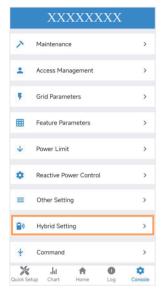
Go to Console > Other Setting page. In this page, you can set other setting parameters.





> Hybrid Setting

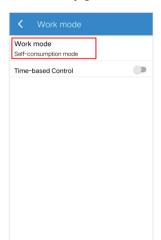
Go to Console > Hybrid Setting page. In this page, you can set contents about work mode, battery, backup Load, generator and other. The setting interfaces are listed one by one.

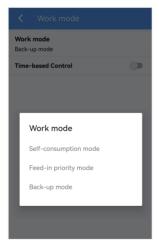




1 Work mode

In Work mode page, there are four work modes are available.



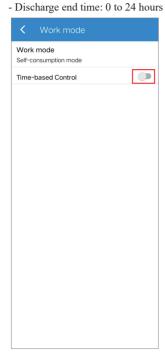


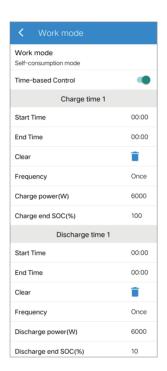


In Work mode page, you can also find "Time-based Control" function. This function is designed to control the time setting of charging and discharging the inverter. You can set the following parameters based on your requirements:

- Charge and discharge frequency: one time or daily

- Charging start time: 0 to 24 hours - Charging end time: 0 to 24 hours - Discharge start time: 0 to 24 hours

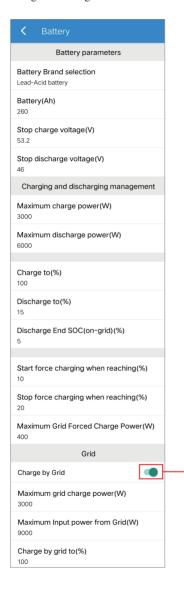








In Battery page, information including battery parameters, charging and discharging management and grid will be listed. Enter corresponding information if necessary.



Choose whether to allow the grid to charge the battery, which is prohibited by default. When the battery capacity or voltage reaches the set value, the grid will stop charging the battery.



3 Backup Load

In Backup Load page, if enabling Backup Output, you can set parameters including the range of backup output voltage and Min. initiation/startup battery capacity when off-grid.







To activate functions about generator of the inverter, you should first standby the inverter to connect the App, then set parameters below to enable the functions that you need, and finally power on the inverter to start.

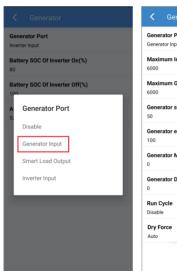
> Generator Input Mode

• Generator Input Mode: In this mode, while the generator is off the grid, the GEN port functions as an input port from the generator. The backup load or battery charging can be supplied by the generator input. The generator can be started and stopped in two ways: via the inverter's dry contact and manually. For the former, the inverter has total control over the generator's start and stop operations. In the latter case, you can apply manual control to start and stop the generator.

Note

The nominal power of generator should be 1.3 times larger than that of the hybrid inverter.

 Go to Hybrid Setting > Generator > Generator Port page and choose Generator Input as below.







All parameters have been set by default.

Maximum Input power from Generator (W)

Forbid the generator power larger than the setting value (W).

Maximum GEN charger power (W)

Maximum battery charge power from generator.

Generator start SOC (%)

Battery SOC below which the generator starts to charge the battery. Meanwhile, the generator's running time should not exceed the maximum runtime setting value (Min).

Generator Max Runtime (Min)

When the generator's running time reaches to the setting value, the inverter will disconnect the input from generator. But the generator will keep working for a while defined by "Generator down time(Min)".

Generator end SOC (%)

Battery SOC above which the generator stops charging the battery.

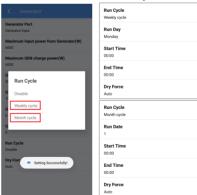
Generator Down time (Min)

When the inverter disconnects the input from generator, the generator will keep working for a while by the down time setting value (Min).

- For generator that switch on and off by dry contact, it will stop working automatically when the generator working time reaches to the down time setting value (Min).
- For generator that are manually switched on and off, it will stop working by manual regardless of the down time setting value (Min).

Run Cycle

Generator Cycle run mode. You can set as Weekly or Month cycle.



Dry force

When the Grid power is abnormal, the generator is forced to be turned on.

Generator start Bat. Volt(V)

Battery voltage below which the generator starts to charge the battery.

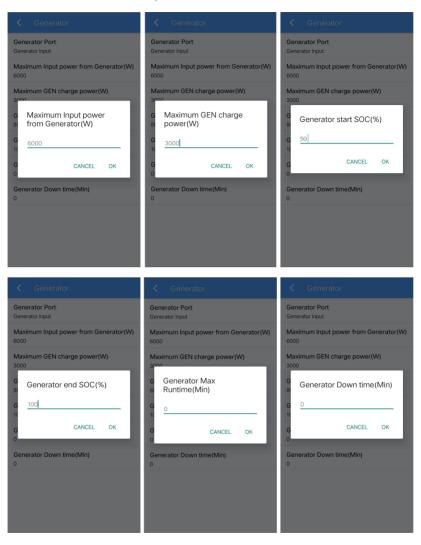
Meanwhile, the generator running time should not exceed the maximum runtime setting value (Min).

Generator end Bat. Volt(V)

Battery voltage above which the generator stops charging the battery.



The default values of Generator Input are as below:



Note:

- 1. If 'Generator Max Runtime (Min)' sets to 0, it means the generator can run all the time.
- 2. The default value of Generator start Bat. Volt(V) is 48V.
- 3. The default value of Generator end Bat. Volt(V) is 65V.



- If the values are set as described above, and Capacity Mode is set to SOC (%), the situations are as follows:
 - In off-grid mode, the Generator Input function being ON or OFF depends on the set values of the battery SOC and the Generator Max Runtime.
 - When the value of battery SOC is lower than 50% and the runtime is less than the set value of Generator Max Runtime (Min), the GEN Port function will be enabled and the Generator Input will be turned on.
 - When the battery SOC is ≥ 100% or the run time is longer than the set Generator Max Runtime (Min), the GEN port function will be disabled and the Generator Input will be turned to OFF.
 - In on-grid mode, the GEN Port function will be disabled and the Generator Input will be turned off.

Note:

- 1. The total generator running time is equal to "Generator Max Runtime (Min)" plus "Generator down time (Min)".
- 2. Go to Hybrid setting > Other > Capacity Mode, you can switch Capacity Mode to voltage (V),

as shown in below figure, so that parameter settings about **Generator start SOC** (%) will be changed to **Generator start Bat. Volt(V)**. Also, parameter settings about **Generator end SOC** (%) will be changed to **Generator start Bat. Volt(V)**. Yet, under this mode the Generator Input function still follows the running logic you set above.

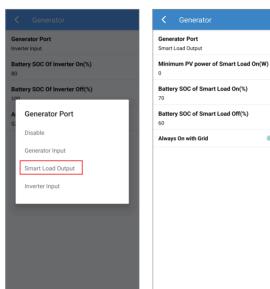


If the generator and the grid run normally, the load and battery charging will be powered by the grid in priority.



> Smart Load Output Mode Introduction

- Smart Load Output Mode: In this mode, the GEN Port works as an output port for the Smart Load connected to the GEN terminal.
- Go to Hybrid Setting > Generator > Generator Port page and choose Smart Load Output as below.



• All parameters have been set by default.

Minimum PV power of Smart Load On (W) & Battery SOC of Smart Load On (%)

If the PV input power is higher than the setting value(Power), and the battery SOC exceeds the setting value simultaneously, the Smart Load will be switched on.

Battery SOC of Smart Load Off (%)

If the battery SOC is lower than the setting value, the Smart Load will be switched off. Always On with Grid

When the grid is present, click "Always On with Grid", and the Smart Load will be switched on.

Battery voltage of Smart Load On (V)

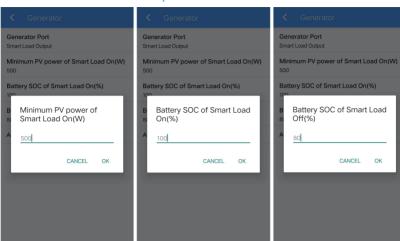
If the battery voltage is higher than the setting value, and the PV input power exceeds the setting

power simultaneously, the Smart Load will be switched on.

Battery voltage of Smart Load Off (V)

If the battery voltage is lower than the setting value, the Smart Load will switch off.





The default values of Smart Load Output are as below:

Note:

1. Go to Hybrid setting > other > Capacity Mode, when you set Capacity Mode to Voltage (V), parameter settings about Battery SOC of Smart Load On (%) will be changed to Battery voltage of Smart Load On (V). Also, parameter settings about Battery SOC of Smart Load Off (%) will be changed to Battery voltage of Smart Load Off (V). Yet, under this mode the Smart Load Output function still follows the running logic you set.

- 2. The default value of **Battery Voltage of Smart Load On(V)** is 60V;
- 3. The default value of Battery Voltage of Smart Load Off(V) is 40V.
- If the values are set as described above, and Capacity Mode is set to SOC (%), the situations are as follows:
 - When Always On with Grid is turned to ON:
 If the grid is present, the Smart Load Output will be on all the time without effect from the change of parameters mentioned above. If the grid is absent, the Smart Load Output being ON or OFF depends on the PV power and the battery SOC.
 - If the PV power is \geq 500W and the battery SOC \geq 100%, the Smart Load Output will be on. If the battery SOC is <80%, the Smart Load Output will be off. If the PV power is <500W or the battery SOC <80%, the Smart Load Output will be off.
 - When Always On with Grid is turned to OFF:
 If the PV power is ≥ 500W and the battery SOC ≥ 100%, the GEN Port function will be enabled and the Smart Load Output will be ON. In the state of the state

function will be enabled and the Smart Load Output will be ON. In the state of Smart Load ON, if the battery SOC is < 80%, the Smart Load will be OFF.

If the PV power is < 500W or the battery SOC < 80%, the GEN Port function will be disabled and the Smart Load will be OFF.



> Inverter Input Mode Introduction

• Inverter Input Mode: Under this mode, the GEN Port works as an input port from other grid-tied inverter whose rated power should be less than the hybrid inverter. The grid-tied inverter should also support derating output power according to the output frequency.

Note:

The capacity of grid-tied inverter should be less than that of hybrid inverter.

• Go to Hybrid Setting > Generator > Generator Port page and choose Inverter Input.







All parameters have been set by default.

Battery SOC of Inverter On (%)

If the battery SOC is lower than the default value, the inverter powers on and starts to charge the battery.

Battery SOC of Inverter Off (%)

If the battery SOC is higher than the default value, the inverter powers off and stops charging the battery.

AC couple Frequency high (Hz)

This parameter is used to limit the output power of grid-tied inverter when the hybrid inverter works under off-grid mode. As the battery SOC gradually reaches to the setting value (Off), during the process, the grid-tied inverter output power will decrease linear. When the battery SOC equal to the setting value (Off), the system frequency will become the setting value (AC Couple Frequency high) and the grid-tied inverter will stop working.

Battery Voltage of Inverter On (V)

If battery voltage lower than the setting value, the inverter powers on and starts charging the battery.

Battery Voltage of Inverter Off (V)

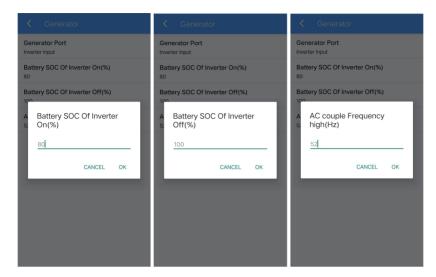
If battery voltage higher than the setting value, the inverter powers off and stops charging the battery.

ſ	$^{\sim}$	
		Mata
- 1		Note:

Go to Hybrid setting > Other > Capacity Mode, when you set Capacity Mode to voltage (V), parameter settings about Battery SOC of Inverter On (%) will be changed to Battery voltage of Inverter On (V). Also, parameter settings about Battery SOC of Inverter Off (%) will be changed to Battery voltage of Inverter Off (V). Yet, under this mode the Inverter Input function still follows the running logic you set.



The default values of Inverter Input are as below:



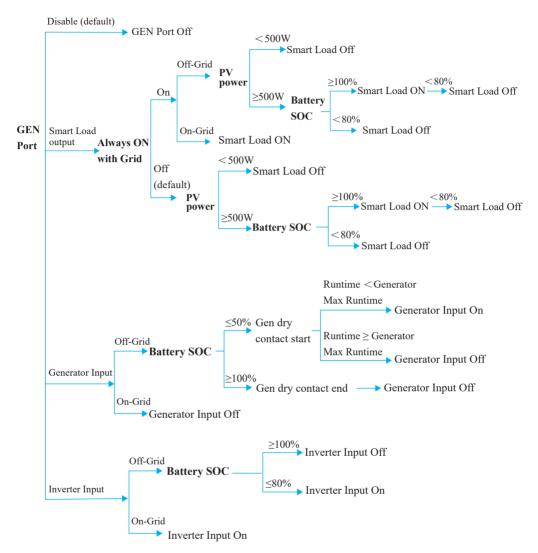
Note:

The default value of **Battery Voltage of Inverter On(V)** is 40V; The default value of **Battery Voltage of Inverter Off(V)** is 60V.

- If the values are set as described above, and Capacity Mode is set to SOC (%), the situations are as follows:
 - In off-grid mode, the Inverter Input being on or off depends on the battery SOC.
 When the Battery SOC ≤ 80%, the GEN port function will be enabled and Inverter Input will be ON.
 - When the battery charge power lower than the grid-tied inverter output power, the hybrid inverter will increase the output frequency to maximum 52Hz. Then the grid-tied inverter will work in limited power mode.
 - When the Battery SOC \geq 100%, the GEN port function will be disabled and Inverter Input will be OFF.
 - Under on-grid mode, the grid-tied inverter works as normal regardless of battery capacity.



Logic Diagram of Enable/Disable GEN Port Function



Note:

When the Capacity Mode was set to voltage, the Gen Port still follows the above logic.



5 Other

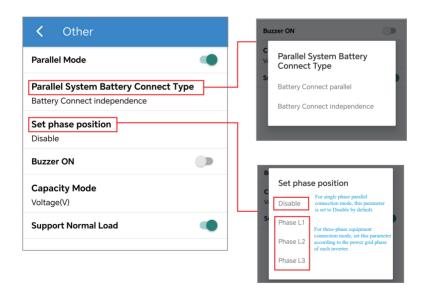
In Other page, options including Parallel mode, Buzzer ON, Support Normal Load are listed. Enable them when necessary.



> Parallel mode

In Other page, if enabling Parallel Mode, you can set the following parameters:

- Parallel System Battery Connect Type
- Set phase position (for more details, please refer to Chapter 4.)







CAUTION

Before maintaining and commissioning inverter and its peripheral distribution unit, switch off all the charged terminals of the inverter and wait at least 10 minutes after the inverter is powered off.

8.1 Routine Maintenance

Items	Check Content	Maintain Content	Maintenance Interval
Inverter output status	Statistically maintain the status of electrical yield, and remotely monitor its abnormal status.	N/A	Weekly
Inverter cleaning	Check periodically that the heat sink is free from dust and blockage.	Clean periodically the heat sink.	Yearly
Inverter running status	Check that the inverter is not damaged or deformed. Check for normal sound emitted during inverter operation. Check and ensure that all inverter communications are running well.	If there is any abnormal phenomenon, replace the relevant parts.	Monthly
Inverter electrical connections	Check that all AC, DC and communication cables are securely connected; Check that PGND cables are securely connected; Check that all cables are intact and free from aging.	If there is any abnormal phenomenon, replace the cable or re-connect it.	Semiannually



8.2 Inverter Troubleshooting

When the inverter has an exception, its basic common warning and handling methods are shown below.

Code	Alarm Information	Suggestions
A0	Grid over voltage	1. If the alarm occurs occasionally, possibly the power grid
A1	Grid under voltage	voltage is abnormal temporarily, and no action is required. 2. If the alarm occurs repeatedly, contact the local power station. After receiving approval of the local power bureau,
А3	Grid over frequency	revise the electrical protection parameter settings on the inverter through the App.
A4	Grid under frequency	If the alarm persists for along time, check whether the AC circuit breaker /AC terminals is disconnected, or if the grid has a power outage.
A2	Grid absent	Wait till power is restored.
ВО	PV over voltage	Check whether the maximum input voltage of a single PV string exceeds the MPPT working voltage. If yes, modify the number of PV module connection strings.
B1	PV insulation abnormal	1. Check the insulation resistance against the ground for the PV strings. If a short circuit has occurred, rectify the fault. 2. If the insulation resistance against the ground is less than the default value in a rainy environment, set insulation resistance protection on the App.
B2	Leakage current abnormal	If the alarm occurs occasionally, the inverter can be automatically recovered to the normal operating status after the fault is rectified. If the alarm occurs repeatedly, contact your dealer for technical support.
В4	PV under voltage	I. If the alarm occurs occasionally, possibly the external circuits are abnormal accidentally. The inverter automatically recovers to the normal operating status after the fault is rectified. If the alarm occurs repeatedly or last a long time, check whether the insulation resistance against the ground of PV strings is too low.
СО	Internal power supply abnormal	If the alarm occurs occasionally, the inverter can be automatically restored, and no action is required. If the alarm occurs repeatedly, please contact the customer service.



C2	Inverter over dc-bias current	I. If the alarm occurs occasionally, possibly the power grid voltage is abnormal temporarily, and no action is required. If the alarm occurs repeatedly, and the inverter fails to generate power, contact the customer service.
СЗ	Inverter relay abnormal	1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal temporarily, and no action is required. 2. If the alarm occurs repeatedly, pls. refer to the suggestions or measures of Grid over voltage. If the inverter fails to generate power, contact the customer service center. If there is no abnormality on the grid side, the machine fault can be determined. (If you open the cover and find traces of damage to the relay, it can be concluded that the machine is faulty.) And pls. contact the customer service.
CN	Remote off	Local manual shutdown is performed in APP. The monitor executed the remote shutdown instruction. Remove the communication module and confirm whether the alarm disappears. If yes, replace the communication module. Otherwise, please contact the customer service.
C5	Inverter over temperature	If the alarm occurs occasionally, the inverter can be automatically recovered. No action is required. If the alarm occurs repeatedly, please check whether the installation site has direct sunlight, bad ventilation, or high ambient temperature (such as installed on the parapet). Yet, if the ambient temperature is lower than 45° C and the heat dissipation and ventilation is good, please contact customer service.
C6	GFCI abnormal	If the alarm occurs occasionally, it could have been an occasional exception to the external wiring. The inverter can be automatically recovered. No action is required. If it occurs repeatedly or cannot be recovered for a long time, please contact customer service.
В7	PV string reverse	Check and modify the positive and negative polarity of the input string.
C8	Fan abnormal	If the alarm occurs occasionally, please restart the inverter. If it occurs repeatedly or cannot be recovered for a long time, check whether the external fan is blocked by other objects. Otherwise, Please contact customer service.
С9	Unbalance Dc-link voltage	I. If the alarm occurs occasionally, the inverter can be automatically recovered. No action is required.
CA	Dc-link over voltage	If the alarm occurs repeatedly, the inverter cannot work properly. Please contact customer service.



СВ	Internal communication error	1. If the alarm occurs occasionally, the inverter can be automatically
		recovered and no action is required.
		2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.
		contact the customer service center.
		1. If the alarm occurs occasionally, the inverter can be automatically
cc	Software incompatibility	recovered and no action is required.
((Software incompatibility	2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.
		contact the customer service center.
		1. If the alarm occurs occasionally, the inverter can be automatically
CD	Internal storage error	recovered and no action is required.
CD	internat storage error	2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.
		contact the customer service center.
		1. If the alarm occurs occasionally, the inverter can be automatically
CE	Data inconsistancy	recovered and no action is required.
CE	Data inconsistency	2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.
		contact the customer service center.
		1. If the alarm occurs occasionally, the inverter can be automatically
65	l	recovered and no action is required.
CF	Inverter abnormal	2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.
		contact the customer service center.
		1. If the alarm occurs occasionally, the inverter can be automatically
	D	recovered and no action is required.
CG	Boost abnormal	2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.
		contact the customer service center.
		1. Check the meter parameter Settings
		2. Local APP checks that the communication address of the inverter is
		consistent with that of the electricity meter
CJ	Meter lost	3. The communication line is connected incorrectly or in bad contact
		4. electricity meter failure.
		5. Exclude the above, if the alarm continues to occur, please contact the
		customer service center.
		It is Parallel ID Alarm. Pls. check the parallel communication cable, and
P1	Parallel ID warning	check whether any inverter joins or exits online. All inverters are powered
		off completely, check the line, and then power on the inverters again to
		ensure that the alarm is cleared.
	Darallol SVN signal	Parallel synchronization signal is abnormal. Check whether the parallel
P2	Parallel SYN signal warning	communication cable is properly connected.
	=	
	Develled DAT - b	The parallel battery is abnormal. Whether the battery of the inverter is
P3	Parallel BAT abnormal	reported low voltage or the battery is not connected.
		The asself of middle share most Wheels make mid of the inner to the
P4	Parallel GRID abnormal	The parallel grid is abnormal. Whether the grid of the inverter is
		abnormal.



P5	Phase Sequence abnormal	Ensure that Set phase position on APP is consistent with the power grid phase. There are two ways to clear this alarm: 1. Power off each inverter, change the phase sequence for each inverter and then power on inverter. 2. Standby each inverter, change the phase sequence for each inverter on APP, power off inverter, and then power on inverter. If exclude the above, the alarm continues to occur, please contact the customer service center.
D2	Battery over voltage	If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. Check that the battery overvoltage protection value is improperly set. The battery is abnormal. If exclude the above, the alarm continues to occur, please contact the customer service center.
D3	Battery under voltage	I. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. Check the communication line connection between BMS and inverter (lithium battery). The battery is empty or the battery voltage is lower than the SOC cutoff voltage. The battery undervoltage protection value is improperly set. The battery is abnormal. If exclude the above, the alarm continues to occur, please contact the customer service center.
D4	Battery discharger over current	1. Check whether the battery parameters are correctly set. 2. Battery undervoltage. 3. Check whether a separate battery is loaded and the discharge current exceeds the battery specifications. 4. The battery is abnormal. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.
D5	Battery over temperature	If the alarm occurs repeatedly, please check whether the installation site is in direct sunlight and whether the ambient temperature is too high (such as in a closed room).
D6	Battery under temperature	If the battery is abnormal, replace it with a new one. If exclude the above, the alarm continues to occur, please contact the customer service center.
D7	BACKUP output voltage abnormal	1. Check whether the BACKUP voltage and frequency Settings are within the specified range. 2. Check whether the BACKUP port is overloaded. 3. When not connected to the power grid, check whether BACKUP output is normal. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.



D8	Communication error (Inverter-BMS)	1. Check whether the battery is disconnected. 2. Check whether the battery is well connected with the inverter. 3. Confirm that the battery is compatible with the inverter. It is recommended to use CAN communication. 4. Check whether the communication cable or port between the battery and the inverter is faulty. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.
D9	Internal communication loss(E-M)	Check whether the communication cables between BACKUP, electricity meter and inverter are well connected and whether the wiring is correct Check whether the communication distance is within the specification range
DA	Internal communication loss(M-D)	3. Disconnect the external communication and restart the electricity meter and inverter. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
cu	Dcdc abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, please check: 1) Check whether the MC4 terminal on the PV side is securely connected. 2) Check whether the voltage at the PV side is open circuit, ground to ground, etc. If exclude the above, the alarm continues to occur, please contact the customer service center.
СР	BACKUP over dc-bias voltage	I. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
DB	BACKUP short circuit	Check whether the live line and null line of BACKUP output are short-circuited. If it is confirmed that the output is not short-circuited or an alarm, please contact customer service to report for repair. (After the troubleshooting of alarm problems, BACKUP switch needs to be manually turned on during normal use.)
DC	BACKUP over load	1.Disconnect the BACKUP load and check whether the alarm is cleared. 2.If the load is disconnected and the alarm is generated, please contact the customer service. (After the alarm is cleared, the BACKUP switch needs to be manually turned on for normal use.)



9 Technical Specification

Model	Inversa1510
Input (PV)	
Max. PV Configuration	200%
Max. PV Input Power	15,000W
Max. PV Voltage	600V
Start-up Voltage	90V
MPPT Operating Voltage Range	70V-540V
Max. Input Current per MPPT	30A/22A/22A
Max. Short Current per MPPT	40A/30A/30A
Nos. of MPPT	3
Input /Output(BAT)	
Compatible Battery Type	Lithium-ion/Lead-acid
Nominal Battery Voltage(Full load)	48V
Battery Voltage Range	40V-64V
Max. Charge/Discharge Current	210A/210A
Max. Charge/Discharge Power	10000W/10000W
Output (Grid)	
Nominal AC Output Power	10,000W
Max. AC Output	11,000VA
Apparent Power Max. AC Output Power (PF=1)	11000W
Nominal AC Output Current	41.7A
Max. AC Output Current	45.8A
Nominal Grid Voltage	120/240V(Split phase) / 208V(2/3 phase)V AC
Nominal Grid Frequency	50/60 Hz
Grid Frequency Range	45Hz-55Hz/55Hz-65Hz(Adjustable)
Power Factor	>0.99@rated power (Adjustable 0.8LD~0.8LG)
THDI	<3% (Rated Power)
Output (Back up)	
Nominal Output Power	10,000W
Max. AC Output Power (PF=1)	11,000W
Nominal Output Current	41.7A
Peak Power (1s)	20,000VA
Nominal Output Voltage	120/240V(Split phase) / 208V(2/3 phase)V AC
Nominal Output Frequency	50Hz/60Hz
Transfer Time	<10ms (typical)
THDV	<3% @100% R Load
Protection	
Protection Category	Class I
DC Switch	Yes
Anti-islanding Protection	Yes
AC Overcurrent Protection	Yes
DC/AC Overvoltage Protection	DC Type II, AC Type III
AC Short Circuit	Yes
Protection DC Reverse Protection	Yes
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Technical Specification

Model	Inversa1510
Protection	
Surge Arrester	DC Type II , AC Type II
Insulation Resistance Detection	Yes
Leakage Current Protection	Yes
AFCI	Yes
RSD	Yes
Generator	Yes
General	
Max. Operation Altitude	2000m
Ingress Protection Degree	IP65/NEMA 3R
Operating Temperature Range	-25~60°C (>45°C derating)
Relative Humidity	0~100%
Cooling Method	Fan Cooling
Mounting	Wall Bracket
Dimensions (W*H*D)	16.5*31.5*9.4 inch (420*800*240mm)
Weight	$40 \mathrm{Kg}/881 \mathrm{b}$
PV Connection Way	Terminals
HMI & COM	
Display	Wireless & APP + LED, LCD (optional)
Communication interface	RS485/CAN(for BMS), DRM/RS485(for meter), RS485, Optional:Wi-Fi/LAN
Certification	
Safety	UL 1741/CSA C22.2/UL 1699B
Grid	UL 1741SB, IEEE 1547:2018, HECO SRD 2.0
EMC	FCC Part 15 ClassB
Warranty	5 Years

Remarks:

- · The range of output voltage and frequency may vary depending on different grid codes.
- · Specifications are subject to change without advanced notice.