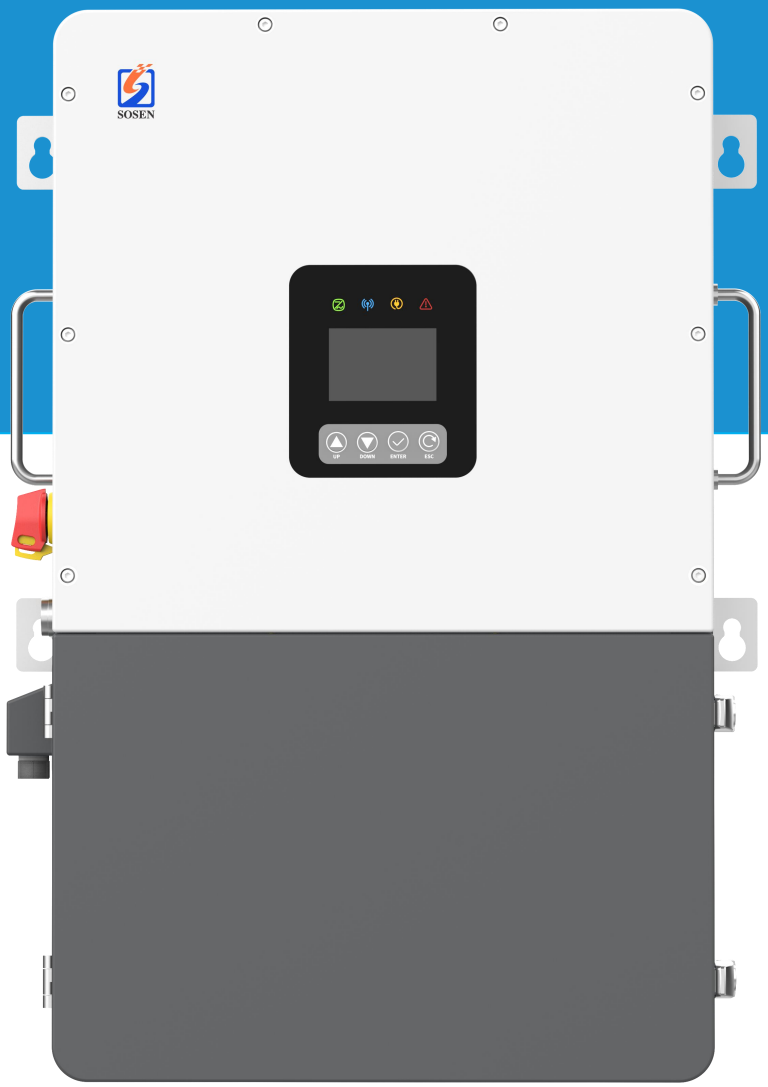
User Manual

Hybrid Inverter
SSE-HL8-15K-P2SA-S
Series



SSE-HL8K-P2SA-S
SSE-HL10K-P2SA-S
SSE-HL12K-P2SA-S
SSE-HL15K-P2SA-S

Please read this manual before use and follow its guidance.
Keep this manual for future reference.

Content

READ THE INSTRUCTIONS COMPLETELY BEFORE OPERATING THE EQUIPMENT

Check the utility voltage before turning ON the unit.

Verify the inviter's programmed grid type before connecting to the utility.

The unit will be programmed in 120/240V Split-Phase at 60Hz by default.

Disregarding these instructions could result in permanent damages to the unit

DISCLAIMER

UNLESS SPECIFICALLY AGREED TO IN WRITING:

We assumes no responsibility or liability for any damages, property loss, personal injury, or any adverse consequences resulting from improper use and installation of the product or the failure to adhere to the guidelines provided in this document. Users are expressly advised to follow the instructions and guidelines outlined in the documentation accompanying the product. We shall not be liable for any damages or losses incurred due to deviations from recommended usage, installation, or maintenance procedures. By using the product, users acknowledge their understanding of these disclaimers and agree to use the product at their own risk. We reserves the right to update or modify product information, specifications, and guidelines without prior notice.

We retains the right to final interpretation of this document and all related materials pertaining to this product. This document is subject to modifications, updates, revisions, or termination without prior notice. For the latest product information, please visit https://www.soseninverter.com/.

1.About This Manual

This manual describes the product information, installation, electrical connection, commissioning, troubleshooting, and maintenance. Read through this manual before installing and operating the product. All the installers and users have to be familiar with the product features, functions, and safety precautions. This manual is subject to update without notice. For more product details and latest documents, visit **https://www.soseninverter.com/**.

1.1 Applicable Model

Model	Nominal Output Power	Nominal Output Voltage
SSE-HL8K-P2SA-S	8kW	120Vac / 240Vac（Split phase）; 208Vac（2/3 phase） 2L/N/PE
SSE-HL10K-P2SA-S	10kW	
SSE-HL12K-P2SA-S	12kW	
SSE-HL15K-P2SA-S	15kW	

1.2 Target Group

This manual is intended for qualified and knowledgeable electrical technical personnel who are responsible for hybrid inverter installation and commissioning in the energy storage system and electric system.

1.3 Symbol Definition

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

DANGER	WARNING	CAUTION	NOTICE
“Danger” indicates a hazardous situation with a high level of risk that, if not avoided, will result in death or serious injury.	“Warning” indicates a hazardous situation with a medium level of risk that, if not avoided, could result in death or serious injury.	“Caution” indicates a hazardous situation with a low level of risk that, if not avoided, could result in minor or moderate injury.	“Notice” provides some tips and methods to solve product-related problems to save time.

1.4 Updates

The latest document contains all the updates made in earlier issues.

V1.0 2025-9-1 • First Issue

V1.1 2026-3-23 • Second Issue

2. Safety Precaution

Please strictly follow these safety instructions in the user manual during the operation.

2.1 General Safety

NOTICE

• The information in this user manual is subject to change due to product updates or other reasons. This guide cannot replace the product labels or the safety precautions in the user manual unless otherwise specified. All descriptions here are for guidance only.
• Before installations, read through the quick installation guide. For additional information, please see the user manual.
• All installations should be performed by trained and knowledgeable technicians who are familiar with local standards and safety regulations.
• Use insulating tools and wear personal protective equipment when operating the equipment to ensure personal safety. Wear anti-static gloves, cloths, and wrist strips when touching electron devices to protect the inverter from damage.
• Strictly follow the installation, operation, and configuration instructions in this manual. The manufacturer shall not be liable for equipment damage or personal injury if you do not follow the instructions. For more warranty details, please visit **https://www.soseninverter.com/**.

2.2 PV String Safety

DANGER

Connect the DC cables using the delivered PV connectors. The manufacturer shall not be liable for the equipment damage if other connectors or terminals are used.

WARNING

- Ensure the component frames and the bracket system are securely grounded.
- Ensure the DC cables are connected tightly, securely, and correctly.
- Measure the DC cables with a multimeter to avoid reverse polarity connection. Also, the voltage should be under the permissible range.
- Do not connect one PV string to more than one inverter at the same time. Otherwise, it may cause damage to the inverter.
- The PV modules used with the inverter must have an IEC61730 class A rating.
- When the photovoltaic array is exposed to light, it supplies a d.c. voltage to the inverter.

2.3 Inverter Safety

WARNING

- The voltage and frequency at the connecting point should meet the on-grid requirements.
- Additional protective devices like circuit breakers or fuses are recommended on the AC side. Specification of the protective device should be at least 1.25 times the AC rated output current.
- Make sure that all the groundings are tightly connected. When there are multiple inverters, make sure that all the grounding points on the enclosures are equip Potential bonding.
- Off-grid function is not recommended if the PV system is not configured with batteries. Otherwise, the risk in system power usage is beyond the equipment manufacturer's warranty scope.
- It should be taken into account the characteristics of photovoltaic power instability, if the battery is not connected, there is no EPS function.
- DO NOT connect the grid to the “LOAD” output terminal.

DANGER

- All labels and warning marks should be visible after the installation. Do not cover, scrawl, or damage any label on the equipment.
- Warning labels on the inverter are as follows:

	DANGER High voltage hazard. Disconnect all incoming power and turn off the product before working on it.		Delayed discharge. Wait 5 minutes after power off until the components are completely discharged.
	Read through the user manual before working on this device.		Potential risks exist. Wear proper PPE before any operations.
	High-temperature hazard. Do not touch the product under operation to avoid being burnt.		Grounding point.
	With CE mark & the inverter fulfills the basic requirements of the guideline governing Low-Voltage and electron-magnetic compatibility.		Do not dispose of the inverter as household waste. Discard the product in compliance with local laws and regulations, or send it back to the manufacturer.
	RCM marking		

2.4 Battery Safety

WARNING

• The battery used with the inverter shall be approved by the inverter manufacturer. The approved battery list can be obtained through the official website.
• Before installations, read through the corresponding battery's User Manual to learn about the product and the precautions. Strictly follow its requirements.
• If the battery discharged completely, please charge it in strict accordance with the corresponding model's User Manual.
• Factors such as: temperature, humidity, weather conditions, etc. may limit the battery's current and affect its load.
• Contact after-sale service immediately if the battery is not able to be started. Otherwise, the battery might be damaged permanently.
• Use the multimeter to measure the DC cable to avoid reverse polarity connection. Also, the voltage should be under the permissible range.
• Do not connect one battery group to several inverters at the same time. Otherwise, it may cause damage to the inverter.
• Lead-acid battery types—including but not limited to Flooded Lead Acid (FLA), Gel, and Absorbent Glass Mat (AGM) batteries—typically require specific charging methods and may perform optimally only under certain operating conditions. The inverter may not fully support these requirements by default, and adjustments to its charging and discharging parameters may be necessary.
• If you intend to use any of these battery types, it is strongly recommended to consult the battery manufacturer for guidance on best practices, compatibility, and overall system sizing specific to your application.

2.5 Personal Requirements

NOTICE

• Personnel who install or maintain the equipment must be strictly trained, learn about safety precautions and correct operations.
• Only qualified professionals or trained personnel are allowed to install, operate, maintain, and replace the equipment or parts.

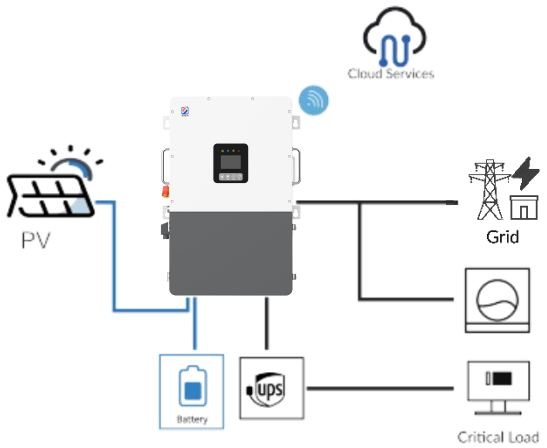
3. Product Introduction

3.1 Product Features

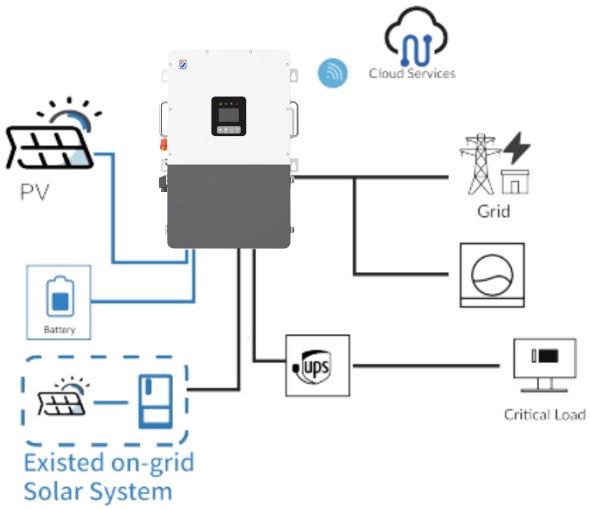
Intended usage
This is a multifunctional inverter, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. The inverter is equipped with a powerful APP. Users can view the operating status of the inverter in real time through the APP, including but not limited to battery information, photovoltaic power generation information, alarm information, etc. The brief operation interface makes it easier to set the appropriate working mode in different application scenarios to meet the diversified needs of users.

This unit and its associated system are suitable for the following applications:

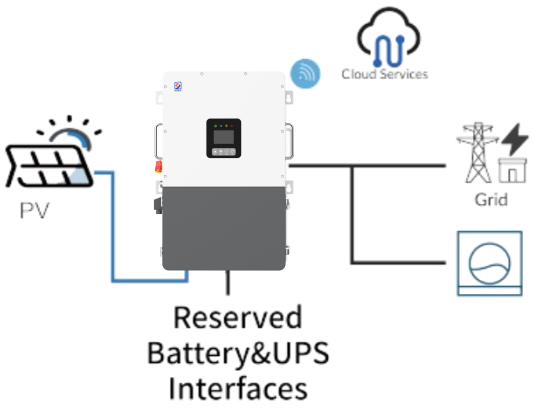
A:Solar and battery storage system



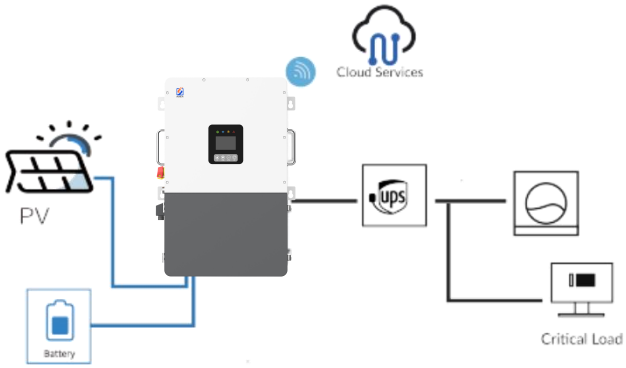
B: AC Coupling with existed solar system



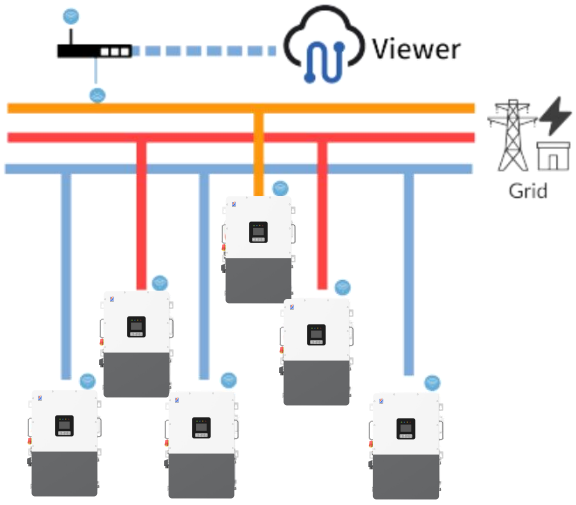
C:On-grid solar system without battery
(Support EPS even without battery)



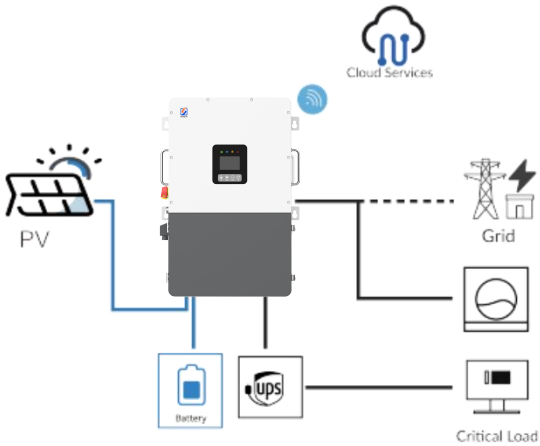
D:off-grid and back-up applications



E: Single and three phase paralleling system



F: Energy storage system with peak shaving Function

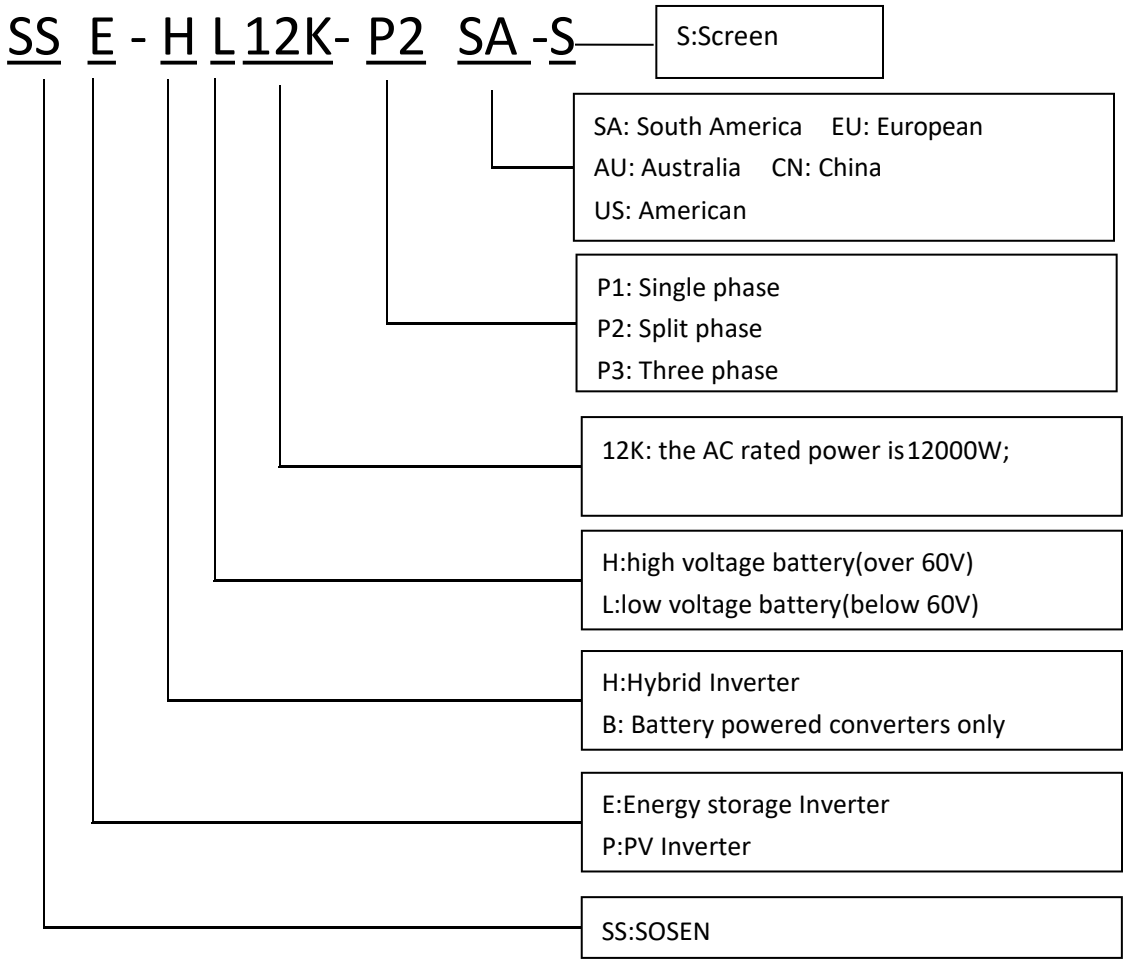


Model

This manual applies to the listed inverters below:

SSE-HL8K-P2SA-S SSE-HL10K-P2SA-S SSE-HL12K-P2SA-S SSE-HL15K-P2SA-S

Model description



Series Code:

SN: SXXXXXXXX2401100001

Series Code description

No.	Referring to	Code	Description
1	Brand name	S	SOSEN
2	Product category	XXXXXXXX	Inverter model ID
3	Production date	24	The year of production
4	Production date	01	The month of production
5	Production date	11	The day of production
6	Production serial number	00001	

3.2 Working Mode

The SSE-HL8-15K-P2SA-S Series hybrid inverter has the following work modes based on your configuration and layout conditions.

Work modes	Description
Self Use (with PV Power)	Priority: load>battery>grid The energy produced by the PV system is used to optimize self-consumption. The excess energy is used to charge the batteries, then exported to gird.
Self Use (without PV Power)	Priority: load>battery When no PV supplied, battery will discharge for local loads firstly, and grid will supply power when the battery capacity is not enough.
TOU[1] Eco	This mode can be used to meet users' demand for peak cutting and valley filling and achieve maximum economic benefit in areas with large difference of peak and valley electricity price. **Peak price:**The battery is discharged at full power to sells electricity to the grid at a high price **Flat price:**Run spontaneous self-use mode. **Valley price:** Buy electricity from the grid at a low price to charge the battery at full power
Back up only	Priority: load>battery When entering this mode, the system will start to charge the battery until it is fully charged and remains fully charged, waiting for the power grid to fail. When the grid is off, system will supply emergency power from PV or battery to supply the home loads .
Grid Priority	Priority: load>grid When the system works in this mode, the electricity generated by the photovoltaic will be preferentially connected to the grid. Users can send requests to the grid at peak times, and in this mode, users can set the end of the battery SOC point.

1.TOU means time of use.

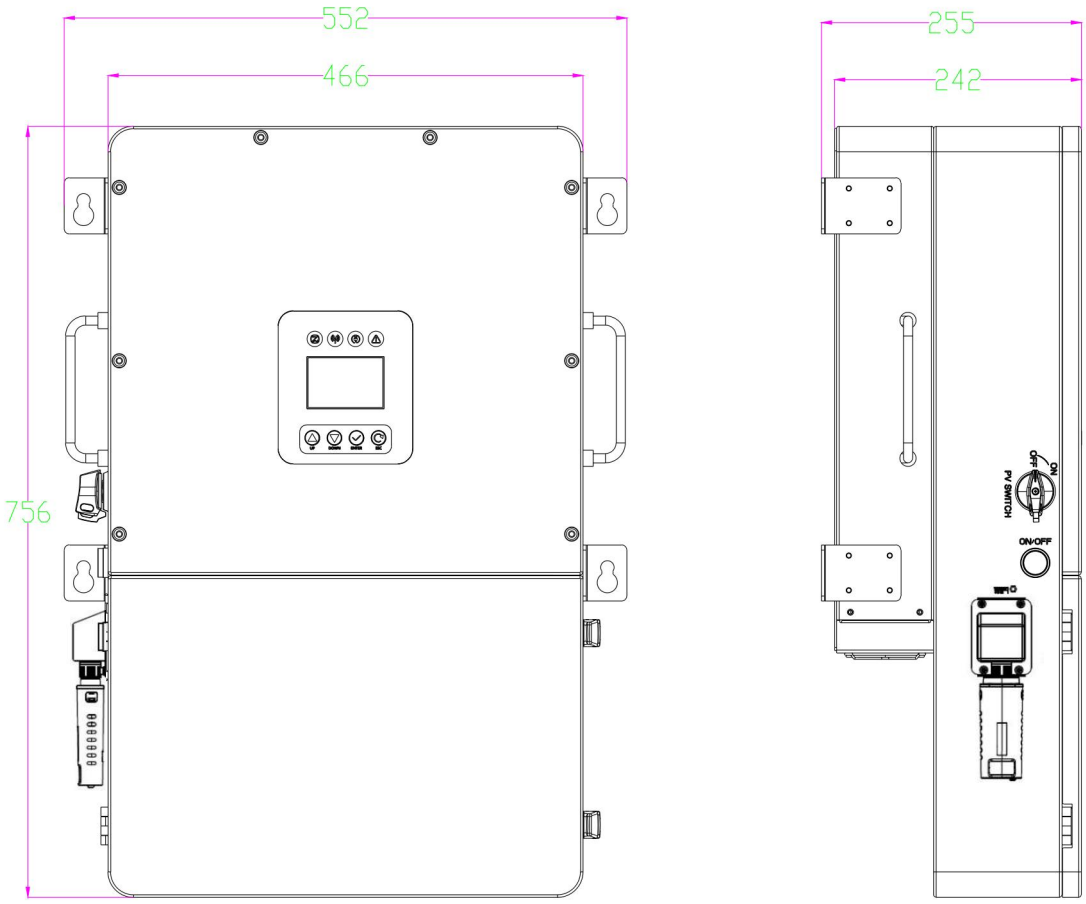
DANGER

Make sure the load powering rating in within the EPS's output rating. Or the inverter will shut down with an 'over load' warning.When an “over load” is appeared, adjust the load power make sure it is with the range of the EPS output, and turn the inverter on.For the nonlinear load, please pay attention to the inrush power make sure it is within the range of the EPS output.

3.3 Appearance

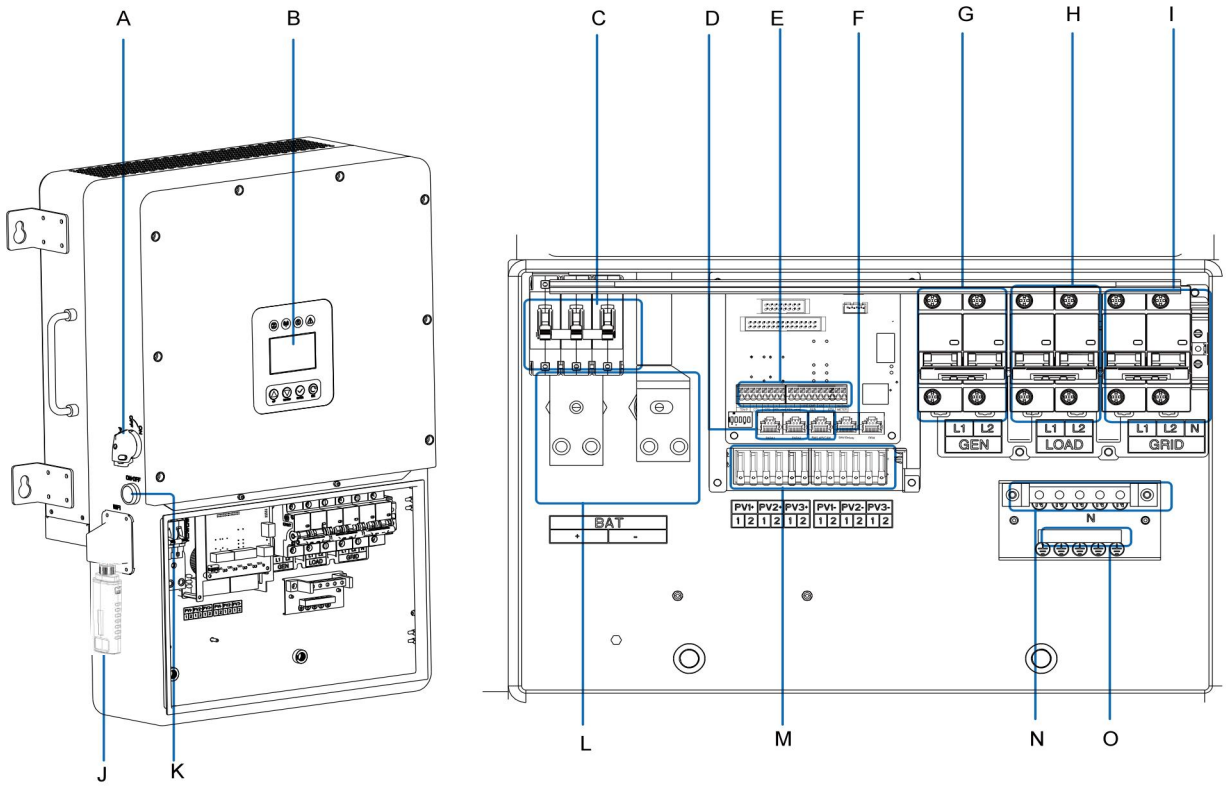
3.3.1 Dimensions

Considering the dimensions of the inverter, find a suitable location for the system. The upper, lower and left and right sides of the inverter must leave a suitable distance to ensure heat dissipation.



PROTECT THE LCD SCREEN from direct exposure to UV light.
The SSE-HL8-15K-P2SA-S is a IP66 enclosure that is rated for outdoor installation but can also be installed indoors.

3.3.2 General Description



Component	Name	Component	Name
A	PV DC disconnect	J	Wi-Fi
B	LCD Screen	K	ON/OFF Button
C	BAT Breaker	L	Battery terminals
D	Parallel RJ45 ports	M	3*PV Inputs
E	Input pinouts for sensors & accessories	N	Neutral busbar
F	BMS RJ45 ports（RS485/CAN)	O	Ground busbar
G	Generator Terminals		
H	Load Terminals		
I	Grid Terminals		

3.3.3 Nameplate

The nameplate is for reference only.

SOSEN

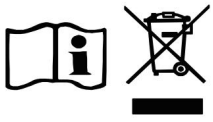
Hybrid Inverter

Model	SSE-HL15K-P2SA-S
Max PV input voltage	550V d.c
PV input operating voltage range	120-520V d.c
Max operating PV input current	26A d.c*3
Isc PV	39A d.c*3
Grid rated voltage	120V/240V,208V a.c, 2L+N+PE
Grid rated frequency	60Hz
Grid rated input/output current	62.5A a.c
Grid rated input/output apparent power	15000VA
Power Factor	0.8Leading-0.8Lagging
EPS rated output voltage	120V/240V,208V a.c, 2L+N+PE
EPS rated output frequency	60Hz
EPS rated output current	62.5A a.c
EPS rated output apparent power	15000VA
Battery operation voltage range	40-60V d.c
Max.charge and discharge current	275A d.c
Battery type	Li-ion/Lead-acid
Ingress protection degree	IP66
Inverter topology	Non-isolated
Operating temperature range	-25℃~+60℃(>45℃derating)

Manufacturer: Shenzhen SOSEN Innovation Technology Co.,Ltd

Address: Room 601,Pengzhanhui No 1 Building, Zhongxin Road No 233, Xinqiao Community,Xinqiao Street, Baoan District, Shenzhen, China

SN:



FC

This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Made in China

3.3.4 Specification

Model	SSE-HL8K-P2SA-S	SSE-HL10K-P2SA-S	SSE-HL12K-P2SA-S	SSE-HL15K-P2SA-S
Product Type	Hybrid Inverter			
Battery				
Battery type	Li-ion/Lead-acid			
Battery voltage range	40-60V d.c			
Rated battery voltage	51.2V d.c			
Max.charge/discharge Power	8 kW	10 kW	12 kW	15 kW
Rated charge/discharge current	167A d.c.	210A d.c.	250A d.c.	275A d.c.
Max. charge/discharge current	167A d.c.	210A d.c.	250A d.c.	275A d.c.
Reverse Connect Protection	Yes			
Communication interface	CAN/RS485			
Input (PV)				
Recommended Max. PV array power for each input	12 kW	15 kW	18 kW	22.5 kW
Max. operating PV input current (PV 1 /PV 2 / PV3)	26A d.c+26A d.c+26A d.c			
Max. Isc PV (PV 1 /PV 2 / PV3)	39A d.c+39A d.c+39A d.c			
Vmax PV (Max. PV input voltage)	550V d.c			
MPPT Voltage Range	120-480V dc			
Full power MPPT voltage range	120-480V d.c	125-480V d.c	145-480V d.c	195-480V d.c
Start-up Voltage	120V dc			
Number of MPP Trackers	3			
Strings per MPP Tracker	2			
Number of PV input	6			
Grid AC input and AC output				
Grid rated voltage	120V a.c / 240V a.c（Split phase），208V a.c（2/3phase）			
Grid rated frequency	50/60Hz			
Grid rated input active power	8 kW	10 kW	12 kW	15 kW
Grid rated input apparent power	8 kVA	10 kVA	12 kVA	15 kVA
Grid max. input active power	15 kW	15 kW	15 kW	19.2 kW
Grid max. input apparent power	15 kVA	15 kVA	15 kVA	19.2 kVA
Grid rated output active power	8 kW	10 kW	12 kW	15 kW
Grid rated output apparent power	8 kVA	10 kVA	12 kVA	15 kVA
Grid max. output active power	8 kW	10 kW	12 kW	15 kW
Grid max. output apparent power	8 kVA	10 kVA	12 kVA	15 kVA
Grid rated input current	33.4A a.c	41.7A a.c	50A a.c	62.5A a.c
Grid max. input current	62.5A a.c	62.5A a.c	62.5A a.c	80A a.c
Grid rated output current	33.4A a.c	41.7A a.c	50A a.c	62.5A a.c
Grid max. output current	33.4A ac	41.7A a.c	50A a.c	62.5A a.c
Grid power factor	0.8 leading to 0.8 laggings			
Grid input and output Inrush current	250A a.c @ 3μs			
Max. Grid output fault current	67A a.c @0.2μs	84A a.c @0.2μs	100A a.c @0.2μs	125 A a.c @0.2μs
Max. Grid output overcurrent protection	240V a.c /80 A a.c			
Grid input Icc (Rated conditional short-circuit current)	250A a.c			
Grid input Icw (Rated short-time withstand current)	250A a.c			
Total Harmonic Distortion(THDi, rated power)	<3%			

EPS output	SSE-HL8K-P2SA-S	SSE-HL10K-P2SA-S	SSE-HL12K-P2SA-S	SSE-HL15K-P2SA-S
EPS rated output Voltage	120V a.c / 240V a.c(Split phase)，208V a.c(2/3phase)			
EPS rated output frequency	50/60Hz			
EPS rated output active power	8 kW	10 kW	12 kW	15 kW
EPS rated output apparent power	8 kVA	10 kVA	12 kVA	15 kVA
EPS max. output active power	8 kW	10 kW	12 kW	15 kW
EPS Max. output apparent power	8 kVA	10 kVA	12 kVA	15 kVA
EPS rate output current	33.4 A a.c	41.7 A a.c	50 A a.c	62.5 A a.c
EPS output power factor	0.8 leading to 0.8 lagging			
EPS output peak power	200% overload(<10s)			
EPS output Inrush current	200A a.c @ 10ms			
EPS max. output fault current	200A a.c @ 10ms			
Switch Time	<10ms			
Total Harmonic Distortion(THDv, linear Load)	<3%			
Compatible with the Generator	Optional			
Efficiency				
MPPT Efficiency	99 .50%			
California-efficiency	96.50%			
Max.efficiency	97.50%			
Standard				
Safety	UL1741 IEC62116 IEC61683			
EMC	FCC Part15 Class B			
General Parameter				
Degree of ingress protection	IP66			
Protection class	I			
Environment category	Indoor&Outdoor			
Wet location classification	Yes			
Pollution degree	PD3			
Operating altitude	4000 m(>2000 Derating)			
Operating ambient temperature	-25 - +60 °C (linely derating to 60% when exceed +45 to +60 °C)			
Operating relative Humidity	0-100% (non-condensing)			
Storage Temperature	-25- +60 °C			
Storage relative Humidity	0-100% (non-condensing)			
Noise Emission(typical)	<45 db			
Over voltage Category	AC: III, PV: II			
Electrical supply system	TN, TT			
Dimension (WxHxD)	466*756*242mm			
Net Weight	45kg			
Cooling Mode	Intelligent Air Cooling			
Topology	Non-isolated			
Active anti-islanding method	Active frequency drift			
Communication	RS485/Wifi/Bluetooth/LAN/CAN/DRM/Meter Yes/ Yes/ Opt/Opt/ Yes/ Yes/ Opt			
LED indicator	LCD+LED+APP			
Warranty	5 years			

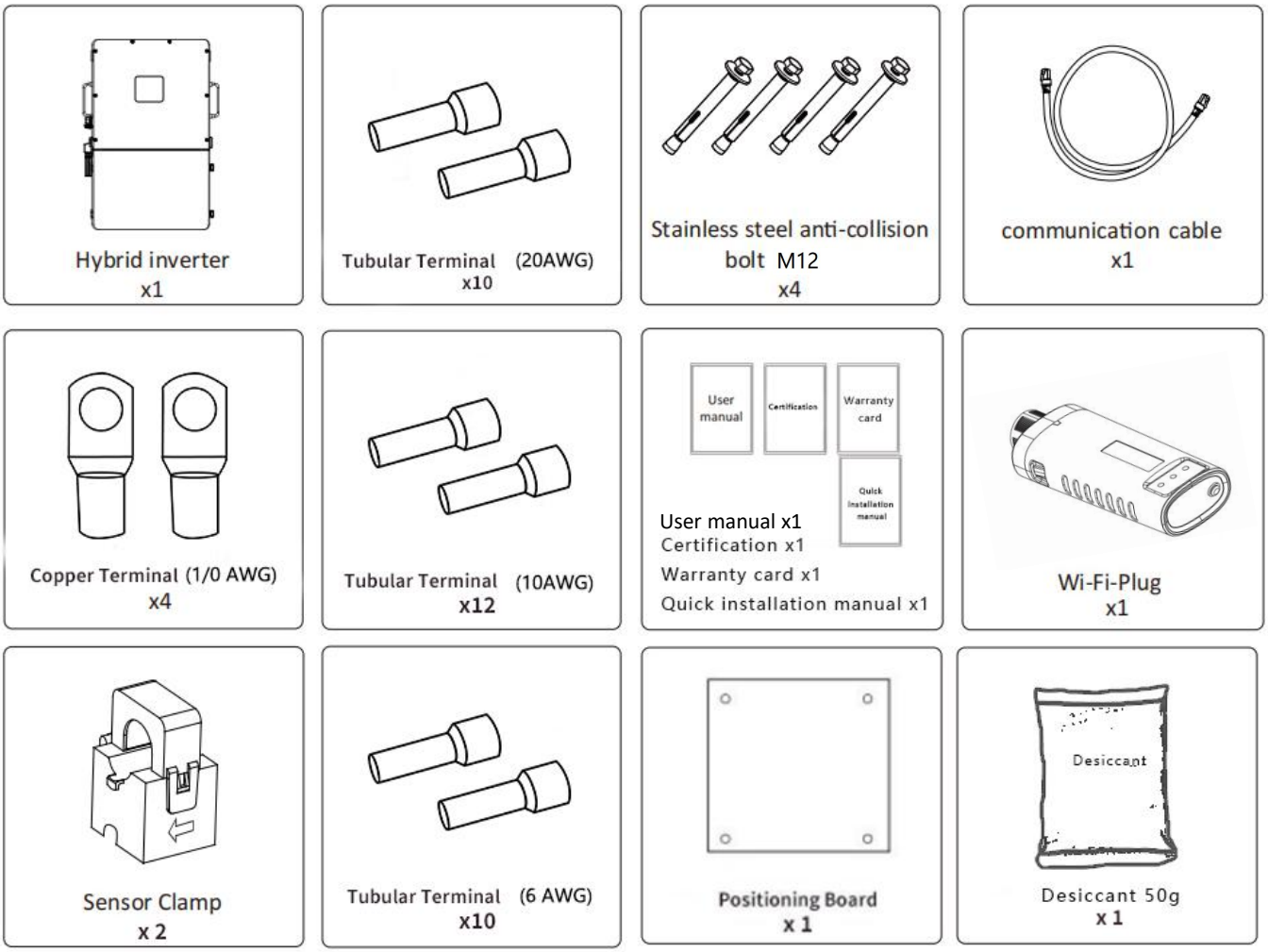
4. Check and Storage

4.1 Check Before Receiving

Check the following items before receiving the product.

1. Check the outer packing box for damage, such as holes, cracks, deformation, and others signs of equipment damage. Do not unpack the package and contact the supplier as soon as possible if any damage is found.
2. Check the inverter model. If the inverter model is not what you requested, do not unpack the product and contact the supplier.
3. Check the deliverable for correct model, complete contents, and intact appearance. Contact the supplier as soon as possible if any damage is found.

4.2 What's in the box?

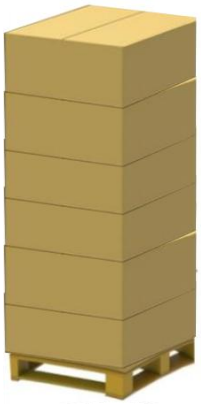


4.3 Storage

If the equipment is not to be installed or used immediately, please ensure that the storage environment meets the following requirements:

1. Do not unpack the outer package or throw the desiccant away.
2. Store the equipment in a clean place. Make sure the temperature and humidity are appropriate and no condensation.
3. The height and direction of the stacking inverters should follow the instructions on the packing box.

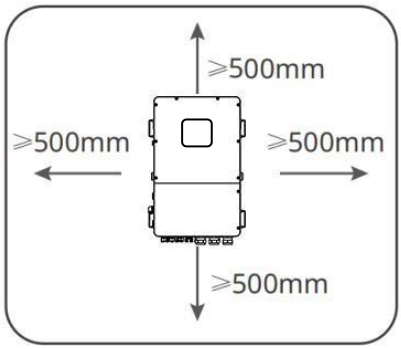
4. The inverters must be stacked with caution to prevent them from falling.
5. If the inverter has been long term stored, it should be checked by professionals before being put into use.
6. The storage temperature range is: -25℃~60℃, and the storage humidity is 0~100%.
7.The box should be suitable for loads more than250kg.



5. Installation

5.1 Installation Requirements

Installation Environment Requirements
1. Do not install the equipment in a place near flammable, explosive, or corrosive materials.
2. Do not install the equipment in a place that is easy to touch, especially within children's reach. High temperature exists when the equipment is working. Do not touch the surface to avoid burning.
3. Avoid the water pipes and cables buried in the wall when drilling holes.
4. Install the equipment in a sheltered place to avoid direct sunlight, rain, and snow. Build a sunshade if it is needed.
5. The place to install the equipment shall be well-ventilated for heat radiation and large enough for operations.
6. The equipment with a high ingress protection rating can be installed indoors or outdoors. The temperature and humidity at the installation site should be within the appropriate range.
7. Install the equipment at a height that is convenient for operation and maintenance, electrical connections, and checking indicators and labels.
8. The altitude to install the inverter shall be lower than the maximum working altitude 4000m.
9. The PV modules used with the inverter must have an IEC61730 class A rating.
10. There should be provided an over current protection (such as a breaker rated 250V a.c /80 A a.c) before AC input and after LOAD output, and make sure that the installation position shall not prevent access to the disconnection means.
11. Please ensure that there is adequate ventilation space for the inverter after installation, refer to the installation diagram below.
12. This inverter does not provide an internal isolated transformer between PV input and Battery / AC output circuits, But a basic insulation is provided between PV input / Battery / AC output circuits and metal enclosure / earth, and reinforced / double insulation between PV input / Battery / AC output and communication circuits (DRM / Meter / WiFi/ RS485)
13. The PV input ratings please refer to the specification table of subclause 3.3.5, and please make sure that PV array should not be grounded.
14. Install the equipment away from electromagnetic interference. If there are radio stations or wireless communication equipment below 30 MHz near the installation location, please install the equipment as follows:
• Add a multi-turn winding ferrite core at the DC input line or AC output line of the inverter,
or add a low-pass EMI filter.
• The distance between the inverter and the wireless EMI equipment is more than 30m.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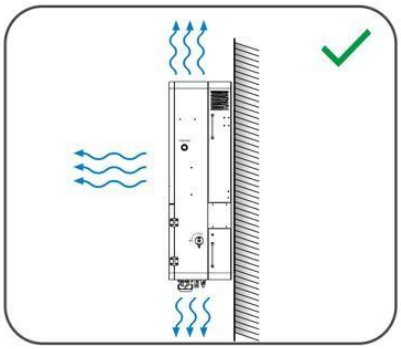
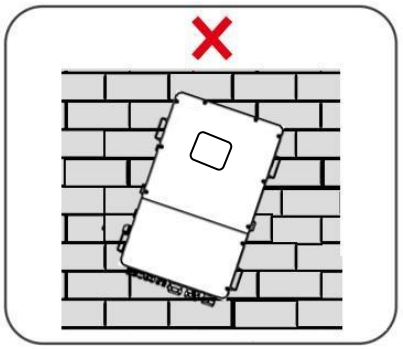
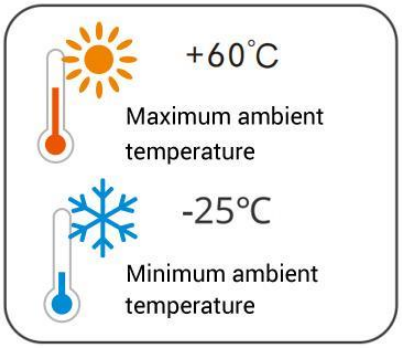
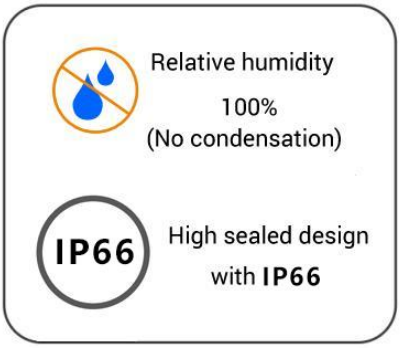
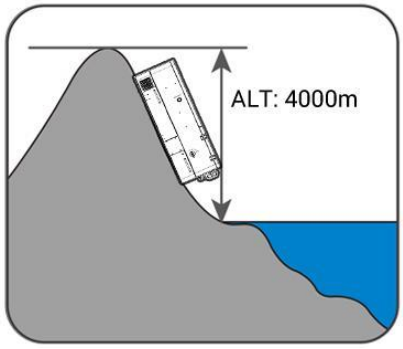
≥500mm
≥500mm
≥500mm



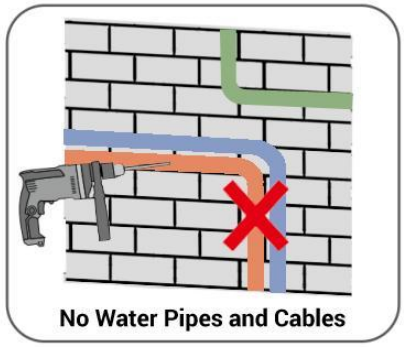


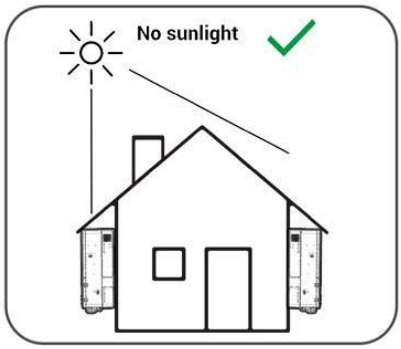

+60°C
Maximum ambient temperature
-25°C
Minimum ambient temperature

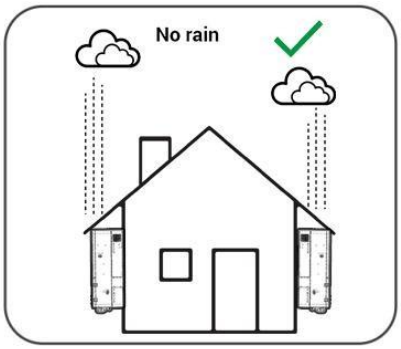

Relative humidity
100%
(No condensation)
IP66
High sealed design with IP66

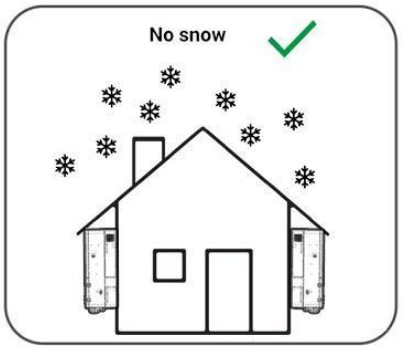

ALT: 4000m

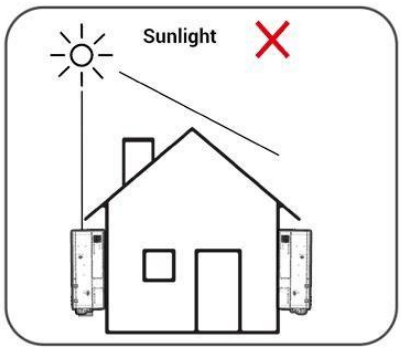

Children No Reach

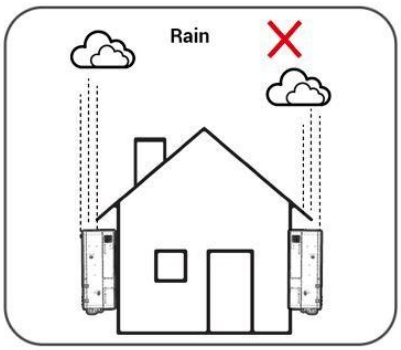

No Water Pipes and Cables

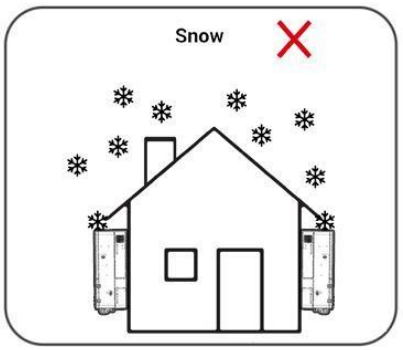

No sunlight


No rain


No snow

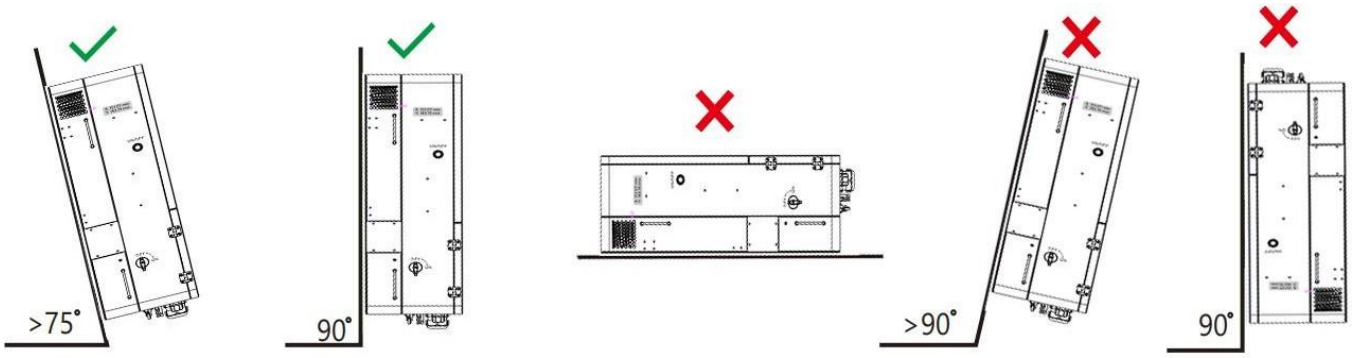

Sunlight


Rain


Snow

Installation Angle Requirements

- Install the inverter vertically or at a maximum back tilt of 15 degrees.
- Do not install the inverter upside down, forward tilt, back forward tilt, or horizontally.



Installation Tool Requirements

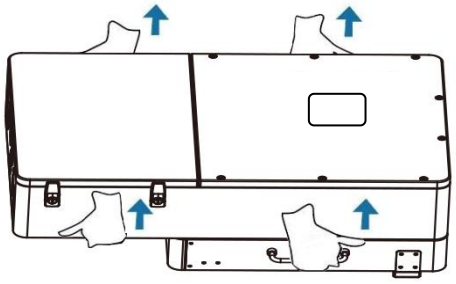
The following tools are recommended when installing the equipment. Use other auxiliary tools on site if necessary.

5.2 Inverter Installation

5.2.1 Moving the Inverter

CAUTION

•The unit is heavy. Do not lift it alone During lifting procedures ensure that the unit is firmly secured to avoid the risk of accidental tipping or dropping. Parts serving for support or immobilization of unit shall be designed and manufactured so as to minimize the risk of physical injuries and of accidental loosening of fixing. Ensure that the method of lifting will not allow the unit to slip from chains and slings or turn-over or slide from lifting devices.



transport

•Transportation must be carried by specialized person (truck operators. Hook-up personal), equipped with the necessary protection equipment(overalls, safe shoes, protective gloves, helmets, goggles)

•Do not walk or stand beneath or in the proximity of the load. Avoid sudden movements and jolts when unloading and positioning the unit, Internal handling procedures must be conducted with care.

•Do not exert leverage on the components of the machine. If the unit is not balanced apply ballast, Any protruding parts should not be supported by hand. The inverter should be installed so that the operating panel shall be easily accessible- easy access to the electrical power connection point.

•Accessible for maintenance and repair work. Parts serving for support or immobilization of unit shall be designed and manufactured so as to minimize the risk of physical injuries and accidental loosening of fixings.

•Loading capacity and hardness of the supporting surface, load rating of mounting bracket should be at least four times the weight of the devices according to lEC62109-1. And supporting characteristics will be impaired by wear, corrosion, material fatigue or ageing, This should be calculated by inspection of the design data of supporting material and consulting construction engineer.

5.2.2 Installing Steps

NOTICE

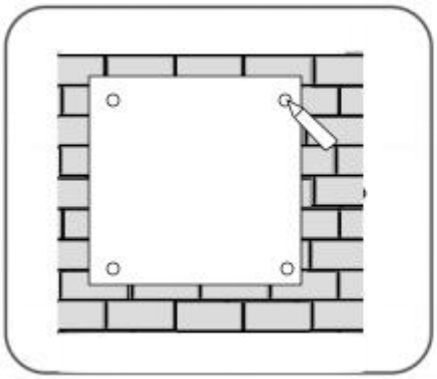
•Use screws or anchors suitable for the support surface and capable of supporting the weight of the inverter.

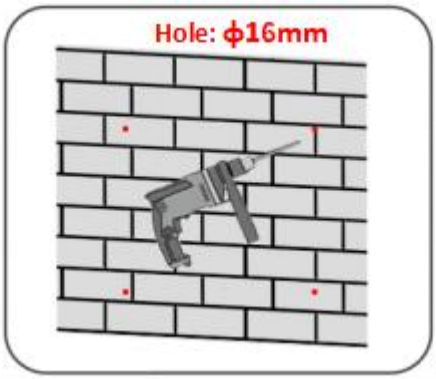
•Avoid the water pipes and cables buried in the wall when drilling holes.

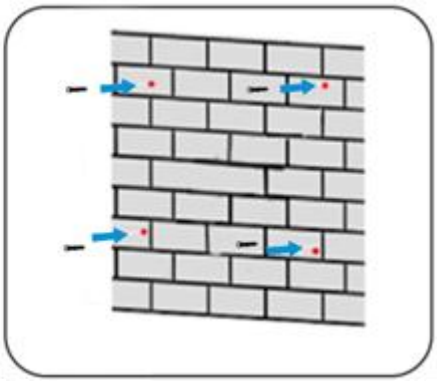
•Wear goggles and a dust mask to prevent the dust from being inhaled or contacting eyes when drilling holes.

•Make sure the inverter is firmly installed in case of falling down.

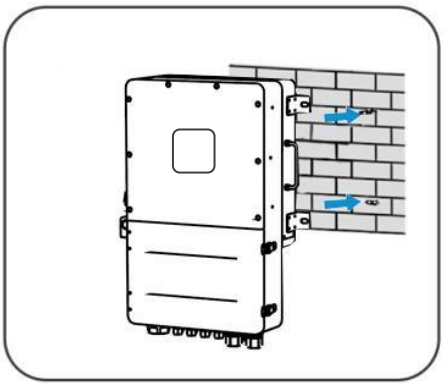
Step 1 : Attach the positioning paper to the wall.
Step 2 : Drill holes according to the marked positions on the positioning paper.
Step 3 : Install the expansion bolts.
Step 4 : Hang the inverter onto the expansion bolts.
Step 5: Install the nuts.

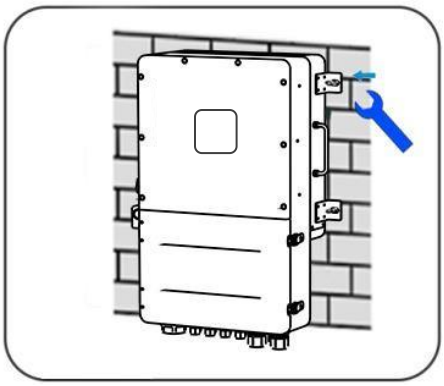






Step 1 Step 2 Step 3





Step 4 Step 5

6. Electrical Connection

6.1 Safety Precaution

DANGER

•All operations, cables and parts specification during the electrical connection shall be in compliance with local laws and regulations.

•Disconnect the DC switch and the AC output switch of the inverter to power off the inverter at lest 5 minutes for the capacitor to be electrically discharged before any electrical connections. Do not work with power on. Otherwise, an electric shock may occur.

•Tie the same type cables together, and place them separately from cables of different types. Do not place the cables entangled or crossed.

•If the cable bears too much tension, the connection may be poor. Reserve a certain length of the cable before connecting it to the inverter cable port.

•When crimping the terminals, ensure that the conductor part of the cable is in full contact with the terminals. Do not crimp the cable jacket with the terminal. Otherwise the inverter may not operate, or its terminal block getting damaged due to heating and other phenomenon because of unreliable connection after operation.

NOTICE

•Wear personal protective equipment like safety shoes, safety gloves, and insulating gloves during electrical connections.

•All electrical connections should be performed by qualified professionals.

•Cable colors in this document are for reference only. The cable specifications shall meet local laws and regulations.

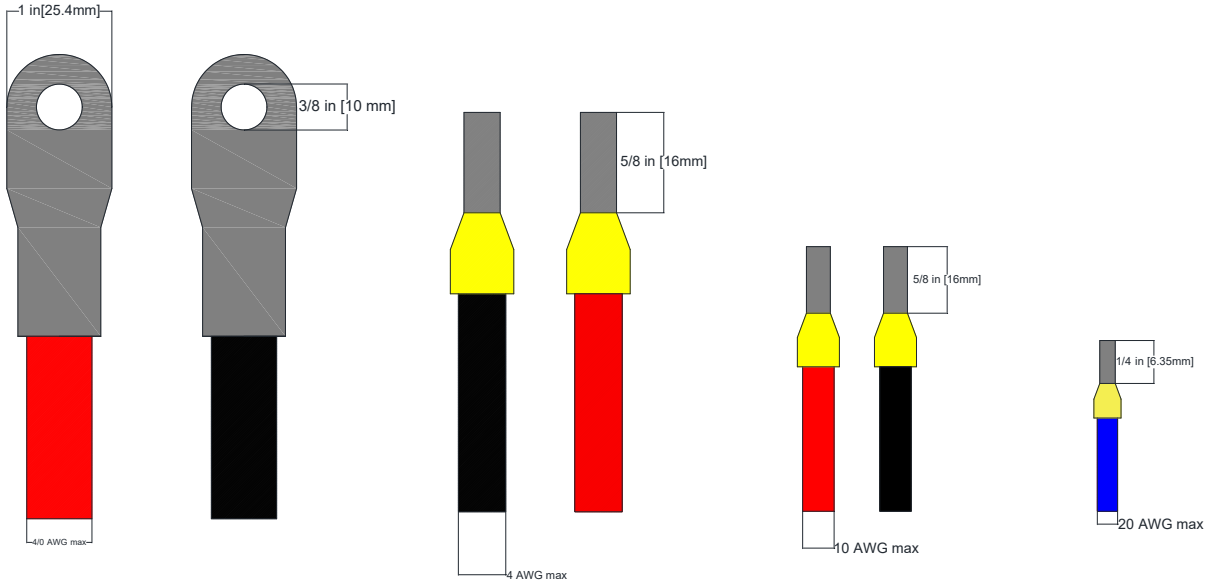
6.2 Connection Requirements

6.2.1 AC / DC Connection Requirements

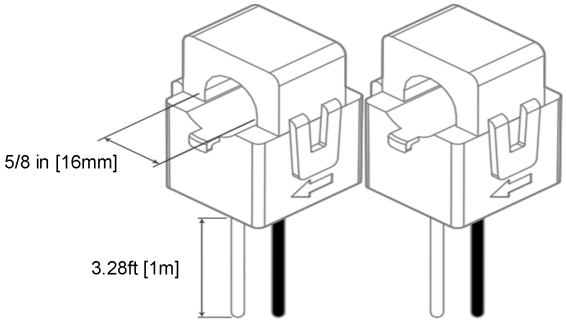
Port	Terminal / Breaker Rating	Terminal Wire Size Range (min-max)
GRID	100A AC(15kW)	4 AWG
LOAD	100A AC(15kW)	4 AWG
GEN	90A AC	6 – 4 AWG
MPPT	27A DC	12 – 10 AWG
Battery Port	150A DC×2	2/0 – 4/0 AWG

6.2.2 Sensors and Communications Requirements

Component	Wire Size Range	Max Distance
CT Sensor	16-20 AWG	0’ – 13’ [4 m]: 16 AWG included 13’ – 20’ [6 m]: CAT6 extendable
Communications	24 – 23 AWG	0’ – 100’ [30 m]: 24 AWG 100’ – 400’ [120 m]: 23 AWG
RJ45 Parallel Communication	CAT 5E or better	0’ – 7’ [2.1 m]: Included 7’ – 20’ [6m]: Extendable

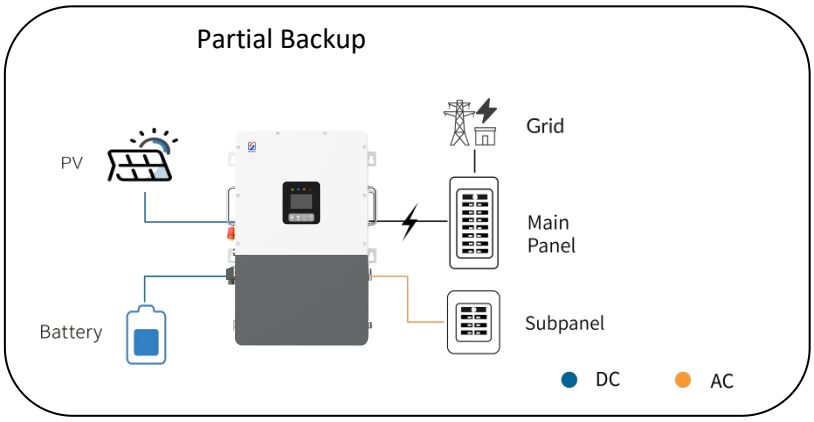


CT Sensors (Included)



6.3 System Integration

The system connection diagram is as follows (SA. version):



Single System Installation Guide

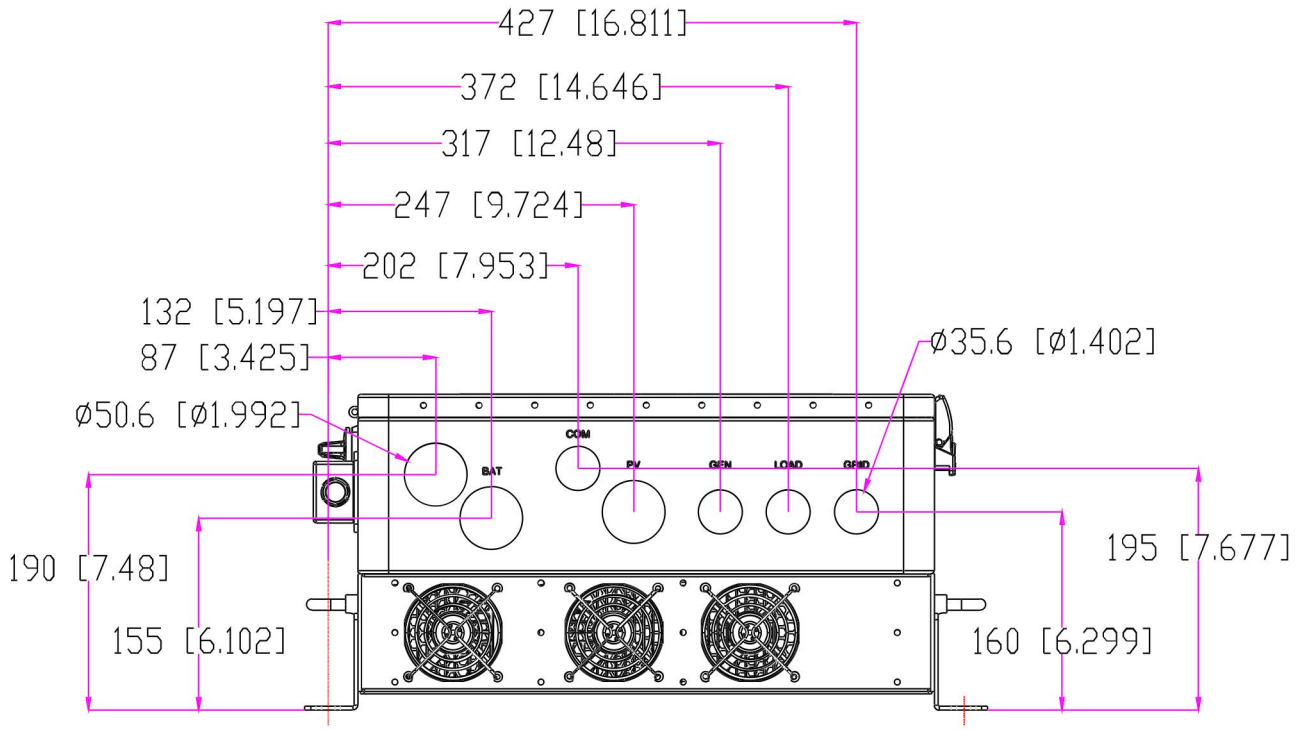
For Partial Backup (Essential Loads Only):

Connect the output of the back-feed breaker or line-side tap (depending on your interconnection method) to the “GRID” terminal of the inverter.

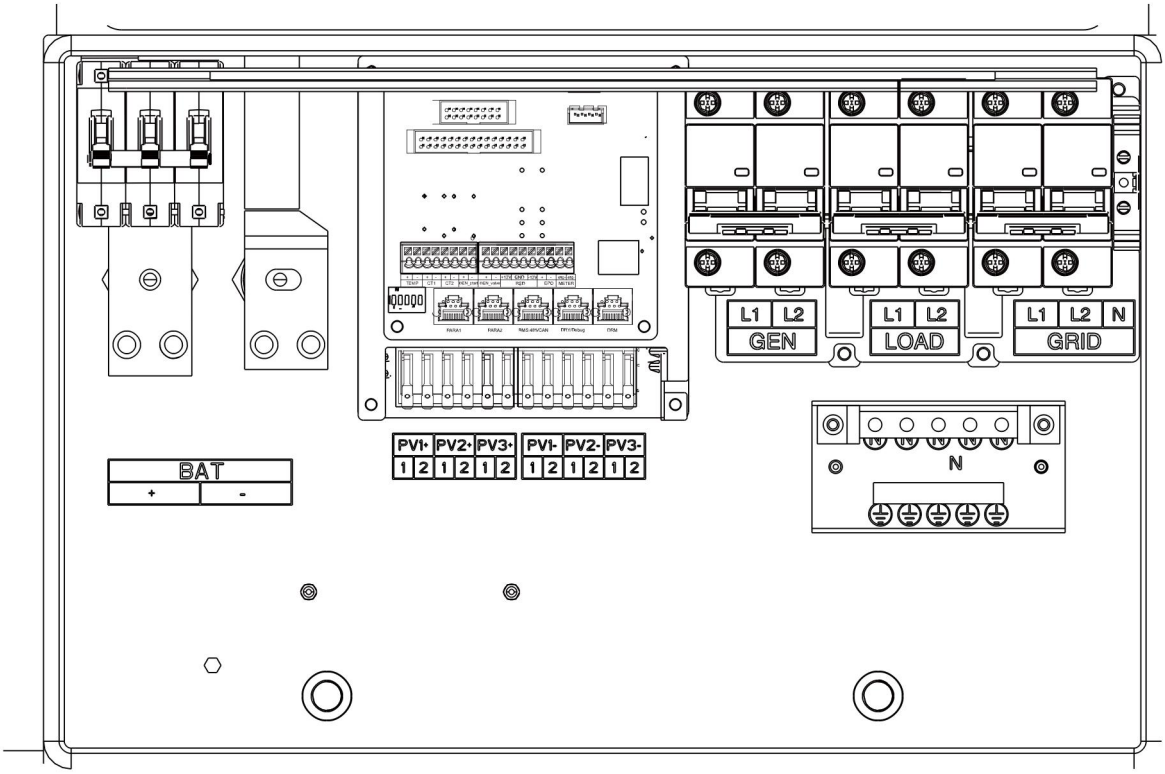
Install an external disconnect switch between the point of interconnection and the inverter. The disconnect must be properly sized according to local electrical code.

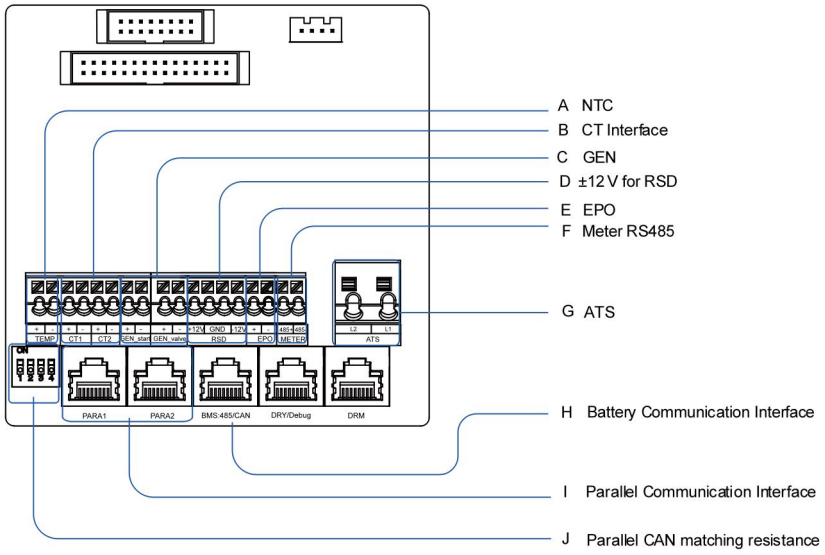
Connect the “LOAD” terminal of the inverter to the Essential Loads Panel. Select the appropriate wire gauge in compliance with electrical code.

Bottom View of Cable Box Knockouts



Overview of Cable Box





A. NTC：Connection for temperature sensor of Lead acid battery.

B. CT Interface：please check Chapter 6.7.4 for Pin definition.

C. GEN(NO): Connection for generator auto-start function. dry contact signal for startup the diesel generator. When the "GEN signal" is active, the open contact (GS) will switch on (no voltage output).

D. ±12V for RSD : Power supply for RSD PLC transmitter(Max current 500mA).

E. EPO : Reserved for external EPO.

F. Meter RS485 :for meter communication.

G. ATS: 240V output port when inverter is on.

H. Battery Communication port（CAN&485）： please check Chapter 6.6.2 for Pin definition.

I. Parallel Communication port（CAN&485）： please check Chapter 6.9.1 for Pin definition.

J. Parallel CAN matching resistance：Set DIP Switch when use inverters in Parallel.

6.4 PE Cable Connection

WARNING

• The PE cable connected to the enclosure of the inverter cannot replace the PE cable connected to the AC output port. Both of the two PE cables must be securely connected

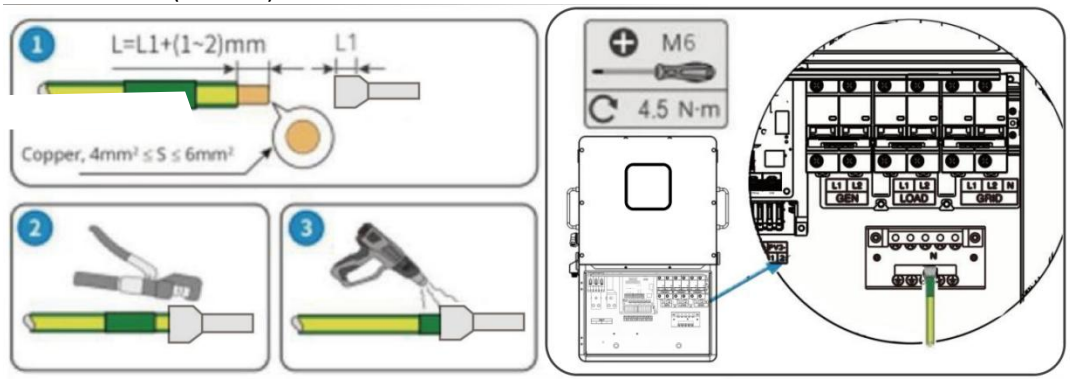
• Make sure that all the grounding points on the enclosures are equipotential connected when there are multiple inverters.

• To improve the corrosion resistance of the terminal, it is recommended to apply silica gel or paint on the ground terminal after installing the PE cable.

• Prepare PE cables with the recommended specification:

• Type: Outdoor single-core copper wire

• Cross-sectional area: 6mm^2(10AWG)



6.5 PV Connection

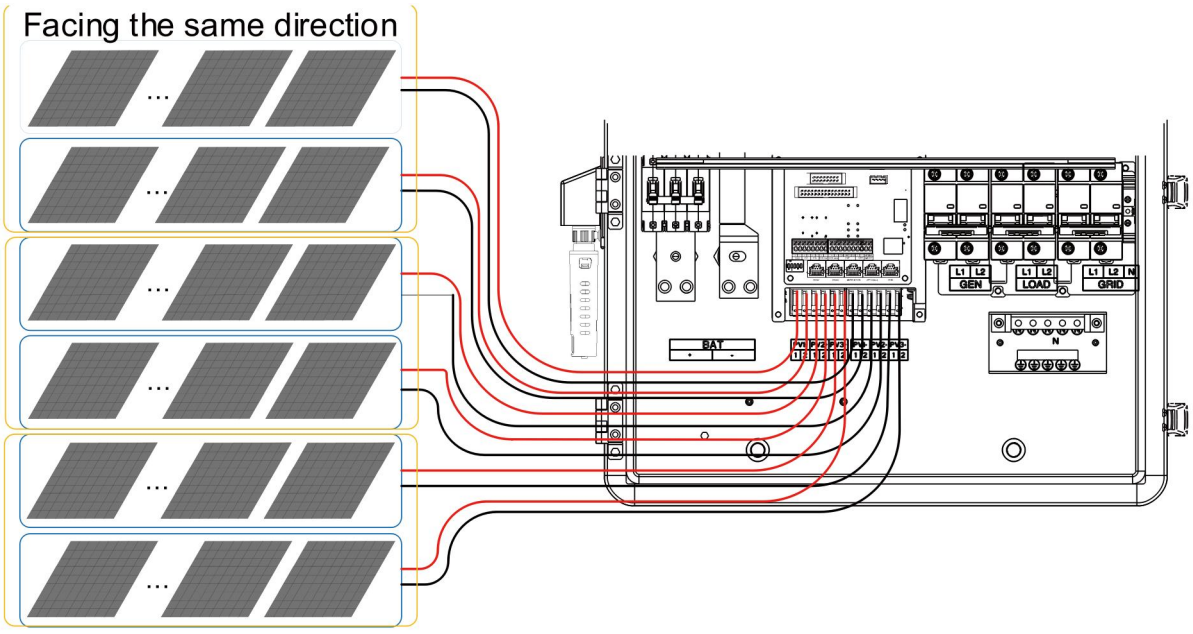
The photovoltaic connection of this hybrid inverter is the same as that of a traditional grid-tied solar inverter (string inverter).

WARNING

Please double-check the minimum ambient temperature at the installation location. The thermal Voc on the solar panel nameplate is measured at 25°C. As the ambient temperature decreases, the solar panel Voc increases. Ensure that the maximum solar string voltage, corrected for the lowest temperature, does not exceed the inverter's maximum input voltage of 525V.

NOTICE

- The inverter has three MPPTs. For each MPPT, the user can connect two strings of solar panels.
- When the user connects two strings to the same MPPT, ensure that the number of solar panels in each string is the same, and that the installation location and orientation are as consistent as possible. The inverter will automatically limit the total input current of each MPPT to 26A.
- The inverter limits the maximum solar input power to 22.5kW.
- Strings in parallel on the same MPPT must have the same designed open-circuit voltage (Voc), otherwise the system will be limited to the lowest string voltage.
- If the solar panels are oriented in different directions and connected in the same MPPT, there will be a loss in PV efficiency.
- For ground mounted arrays, We recommends installing an auxiliary grounding electrode placed near the array to ensure optimal earth-to-ground resistance of the grounding system. This auxiliary electrode would need to follow the Standard specification.
- Connect the solar panel string using the following configuration:



PV Connection Steps

a. Strip 1/4-5/16 inch (6-8mm) of insulation from the positive and negative conductors of the PV string.

b. If the PV string wires are stranded, use wire ferrules.

c. Insert the conduit connector into the PV connection port.

d. Pass the photovoltaic conductors through the conduit fittings and insert them into the inverter.

e. Confirm that the cable connections are correct and secure. Then take appropriate measures to ensure that the conduit and conduit fittings are properly tightened and sealed into the cable hole

6.6 Battery Connection

Battery Connection Guidelines for SSE-HL8-15K-P2SA-S
Important: Ensure theSSE-HL8-15K-P2SA-S inverter is turned OFF before connecting any batteries.

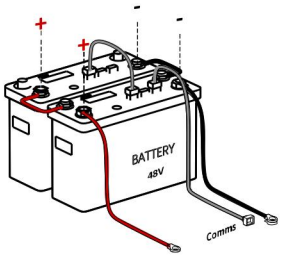
Connect your battery bank according to the appropriate configuration based on the battery voltage (see wiring diagrams b elow if applicable).

Battery breakers must be OFF during wiring.
If your battery bank does not have built in breakers, take all necessary safety precautions when handling exposed terminals or cables.

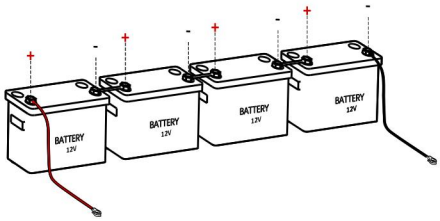
The maximum battery charge/discharge current is 275A when both sets of battery terminals are used.
If you are using only one set of battery terminals, the charge/discharge current will be limited accordingly.

This inverter is designed for a 48VDC nominal system.
❌ DO NOT connect it to battery configurations outside the 40–60VDC range.
❌ If you are using 12V batteries, you must not exceed 4 batteries in series (i.e., max 48V nominal).

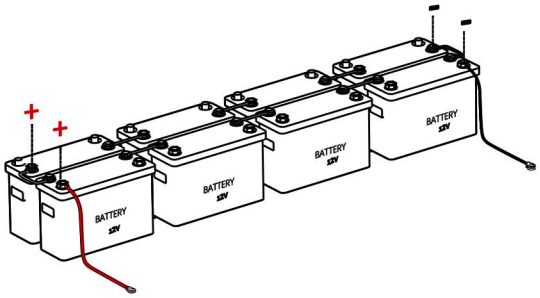
The inverter supports various battery chemistries, provided the voltage remains within 40VDC to 60VDC.Depending on the battery voltage, wire up the battery bank in the possible configurations shown below.



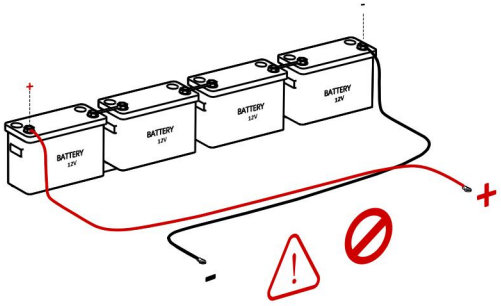
48V batteries in parallel connection



12V batteries in series connection



Series and parallel connections for complete 48V battery bank



DO NOT reverse polarity.The system will be damaged, and warranty voided!

6.6.1 Battery Power Cable Connection

Procedure for connecting battery terminals：

Step 1: Strip 1/4 ~ 5/16 inch (6 ~ 8mm) of insulation from the cable ends and crimp the OT rings.

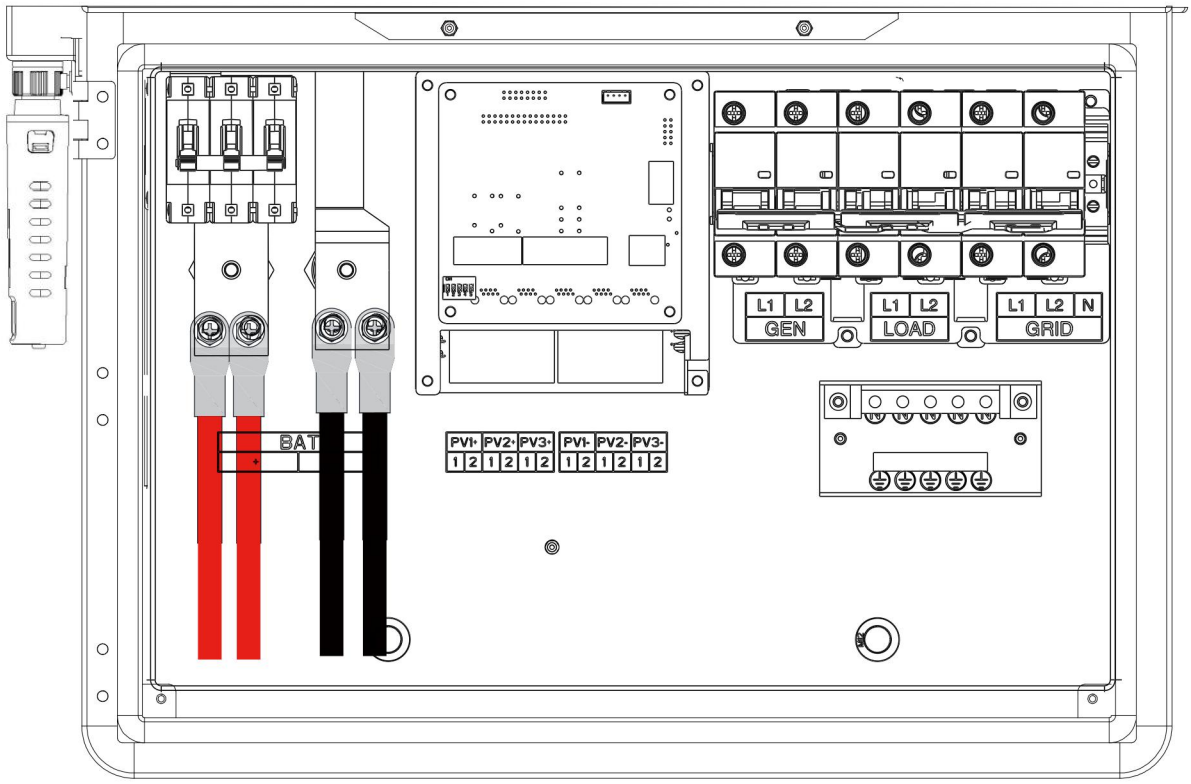
Step 2: Lay the battery power cables, connecting the positive terminal to BAT+ and the negative terminal to BAT-.

Step 3: Use the reverse nut to secure the conduit fittings to the enclosure.

Step 4: Secure the OT rings of the battery positive and negative cables onto the terminal block according to the markings.

Multi-Terminal Installation

The two battery input terminals of the SSE-HL8-15K-P2SA-Swill parallel batteries internally to ensure a common connection between battery banks and simplify battery installations. If a charge / discharge rate of 275A is needed, the batteries must be connected to both input terminals. If you use 3 or more batteries, use external busbars for (+) and (-) connections.



WARNING

Multiple inverters in parallel system

Follow all battery manufacturer-specified values to ensure proper charging and discharging.

BATTERY CHARGING SETPOINT EXAMPLES (48V NOMINAL)

Battery Type	Absorption	Float	Equalize (Every 30 days)
AGM	57.6V	53.6V	57.6V
Gel	56.4V	54.0V	
Lithium	54.6V	54.3V	-

CALCULATING BATTERY BANK AMP-HOURS EXAMPLES (AGM)

# of batteries	Voltage per Battery	Ah per battery	Ah @48V(Chain of 4 batteries of 12V in series)	Max Charge / Discharge (A)
4	12V	230Ah	230Ah	100A
8	12V	230Ah	460Ah	200A
12	12V	230Ah	690Ah	275A
16	12V	230Ah	920Ah	275A

Please refer to Chapter **9.7 Battery Settings Menu** for the operation method of the screen.

WARNING

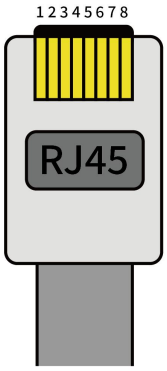
Reverse polarity will damage the inverter!

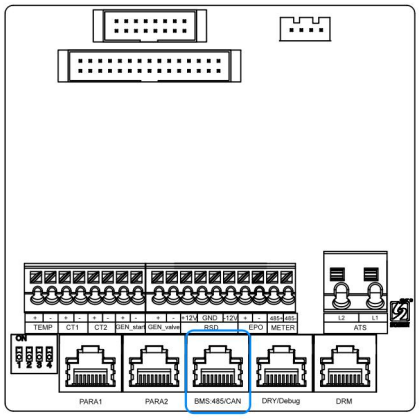
Before connecting or disconnecting the battery, ensure that the built-in battery circuit breaker is in the "off"

6.6.2 Battery Communication Cable Connection

When the user selects the lithium-ion battery type, the correct battery communication cable must be used to connect the battery to the inverter. If the lithium battery cannot communicate with the inverter, please select the "lead-acid" type. The inverter's battery communication port is an RJ45 socket, and the pins of the RJ45 connector are as follows. Create the communication cable according to the correct pins of the inverter and the battery communication port. The inverter supports both CAN and RS485 communication.

Pin	Description
1	BAT RS485 A
2	BAT RS485 B
3	NC
4	BAT CAN H
5	BAT CAN L
6	NC
7	BAT RS485 B
8	BAT RS485 A





WARNING

- After the battery socket and communication socket are connected, you need to enter the advanced settings in the inverter's app to change the battery type and brand. After selecting the appropriate battery protocol, communication will be established within 1-2 minutes.
- Any damage caused by the improper use of the communication protocols (CANBUS or MODBUS) will not be covered by warranty. Modbus map is available upon request for “READ” operations only. Contact technical support to obtain the MODBUS map.

6.7 Grid& EPS Load Connection

6.7.1 Grid Type and Regulation Selection

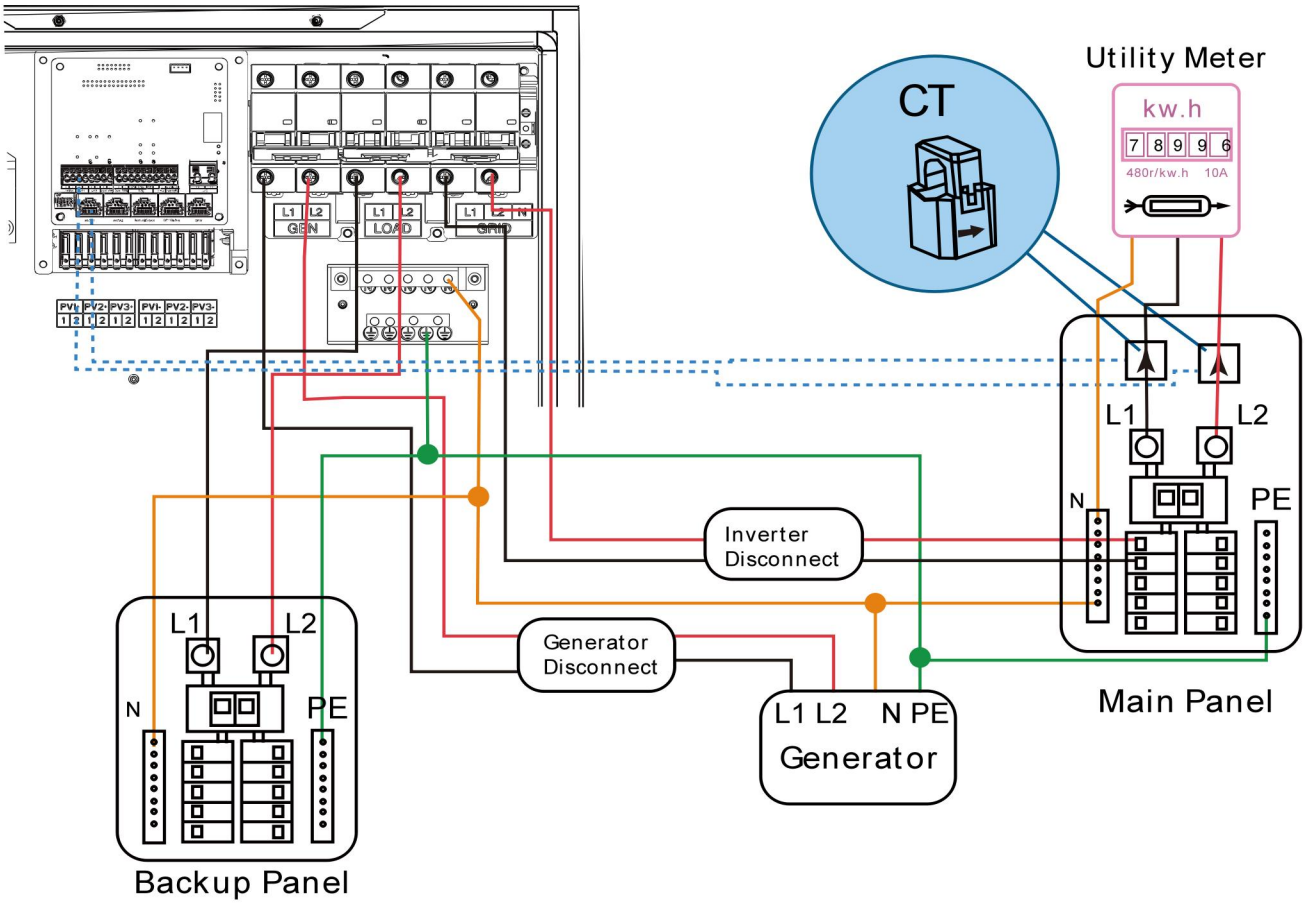
This inverter can be used with 120/240V split-phase or 120/208V 2/3 phase systems. If connecting to the grid, ensure that the grid settings are configured correctly. The user can select different grid types and regulations in the advanced settings of the app.

6.7.2 Split-phase Grid and EPS Load Connection

The wiring diagram for 120/240V is shown below: The wiring diagram for the 120/208V 2/3 phase service is largely the same, except it does not support a generator.

When the main panel bus rating meets the NEC705.12(B)(3) requirements, the inverter can be connected to the load side of the service disconnecting device. Otherwise, a line-side connection can be made to avoid the costly upgrade of the main panel.

Grid and EPS Load Connection



6.7.3 AC Cable Connection

Strip 5/16-3/8 inch (8-10mm) of insulation from the cable.

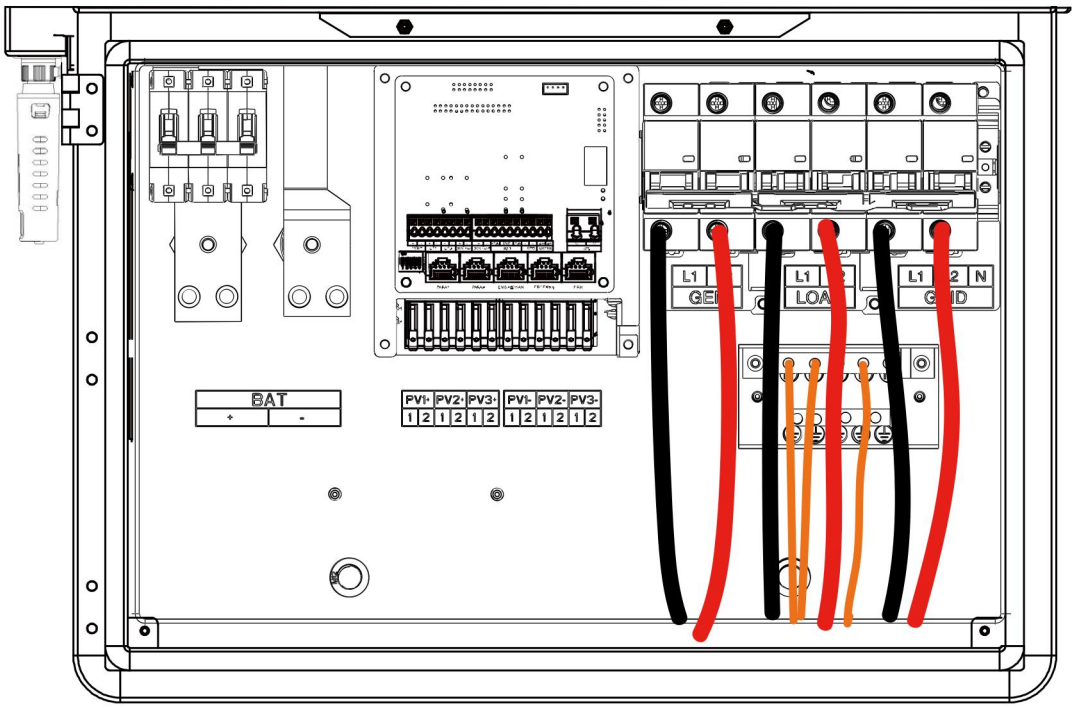
a. If the cable is stranded, use a cable sheath.

b. Secure the conduit fitting to the enclosure using the top nut of the fitting.

c. Secure the grid line and EPS load line onto the terminal block according to the markings.

d. Fix the conduit onto the conduit fitting.

e. Check that the cable connections are correct and secure. Take appropriate measures to ensure that the conduit and conduit fittings are properly tightened and sealed into the cable entry hole.



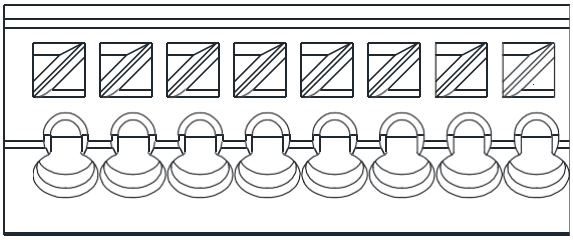
WARNING

Before supplying power to the EPS load, ensure that the built-in load circuit breaker is in the "ON" position.

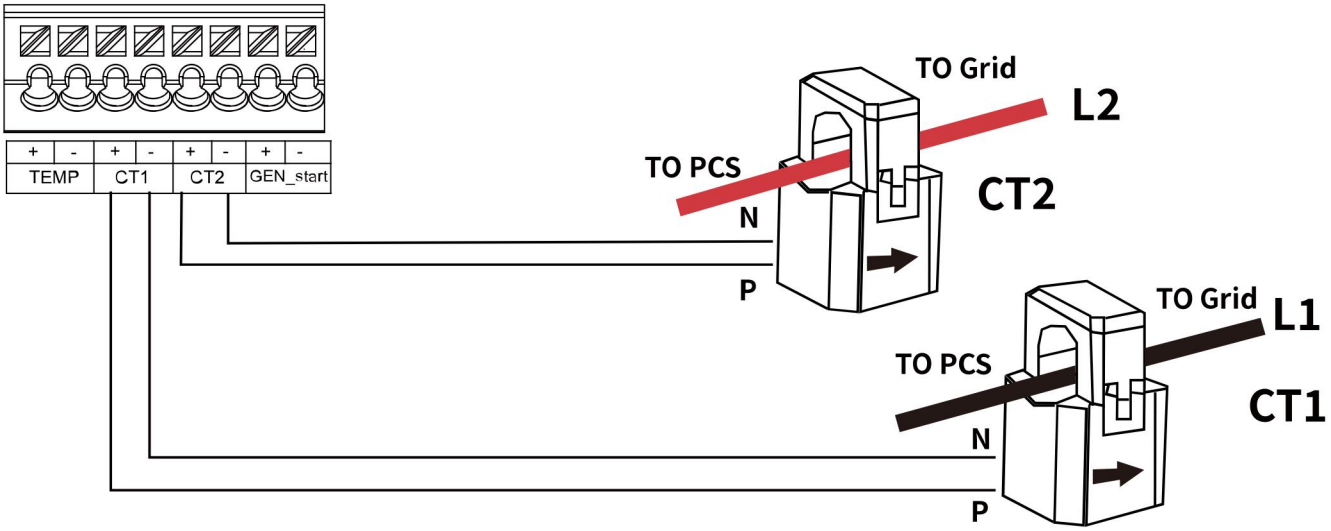
6.7.4 CT / Energy Meter Connection

To measure the input and output grid power, a pair of CTs or a three-phase meter must be installed at the service entrance point, either inside or near the main service panel. We standardly supply 2 CTs for one inverter.

CT Interface Pin Definition



+	-	+	-	+	-	+	-
TEMP		CT1		CT2		GEN_start	



Please refer to the wiring diagram to determine the correct placement of the CTs. Attach the two CTs to the L1 and L2 lines at the service entrance point of the main service panel.

- **CT1** (labeled L1) should be placed on **L1**.
- **CT2** (labeled L2) should be placed on **L2**.

⚠ WARNING

- Install sensors on incoming electrical service wires (L1, L2, and L3 if the system is 3Φ).
- Embossed arrows on the sensors must point toward the grid.
- If the system is 3Φ, the arrows must point toward the inverter(s).

(**Incorrect installation of the CTs may result in incorrect readings on the display and may prevent the inverter from functioning properly.**) If the CT is installed in the wrong direction, there is an option to reverse the direction in the inverter settings: **CT Direction Reversal** (only applicable if the CT1 or CT2 is not installed correctly). This can be done in the **Advanced Settings** tab. However, you should not need to change this if the CTs are installed correctly.

CT Clamping Ratio

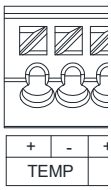
CT (Current Transformer) Compatibility and Configuration

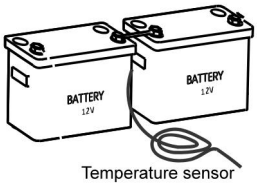
The CT included in the accessory package has a 1000:1 ratio and is pre-calibrated for use with the system.

If using a third-party CT, ensure that its ratio is either 1000:1, or2000:1.

⚠ **Be sure to set the correct CT ratio in the inverter's monitoring interface or LCD display, depending on the CT used.Incorrect CT ratio settings may result in inaccurate power measurements or system misbehavior.**

Temperature Sensor



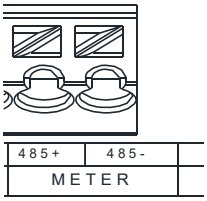


Temperature sensor

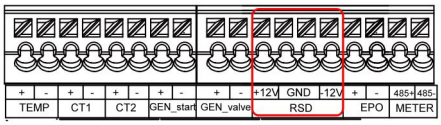
- This temperature sensor terminal is required when using lead-acid batteries.
- Place the sensor between two batteries as shown.
- Secure with tape and place away from the battery terminals to prevent overheating.
- This sensor has no polarity. The temperature sensor helps perform voltage charging adjustments and capacity calculations due to changes in temperature.
- Lithium Batteries DO NOT require our external temperature sensor.

Energy Meter Connection

If you need to use an energy meter for import/export monitoring instead of using CTs, it should be connected to the **485A** and **485B** terminals on the inverter for communication. These terminals support RS485



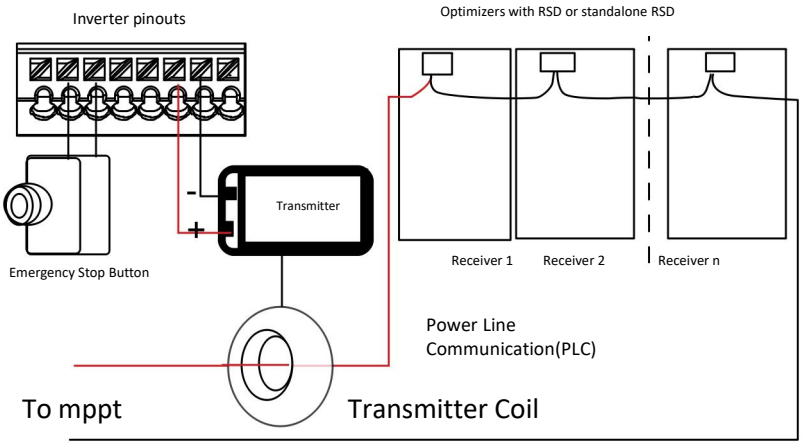
6.7.5 Emergency Stop and Rapid Shutdown Connection



Emergency Stop (E-Stop) & RSD Connection Guidelines
The Emergency Stop (E-Stop) button must be connected to the designated control pins on the inverter.
The Rapid Shutdown (RSD) transmitter should be connected to the corresponding RSD terminal, which supplies 12/24V DC powe r.
The maximum current output from the RSD terminal is 500mA.
Ensure that the connected RSD transmitter or device does not exceed this limit.

The emergency stop (E-Stop) pins on the SSE-HL8-15K-P2SA-S are a normally open (NO) contact. When the circuit is closed, it will trigger the Rapid Shutdown (RSD) function.
The SSE-HL8-15K-P2SA-S provides two power terminals for RSD (Rapid Shutdown) transmitter connection:+12V – 12V
For 12V RSD Transmitters:
Connect the transmitter to: +12V and GND
For 24V RSD Transmitters：
connect the transmitter to:+12V and – 12V
⚠ Make sure the RSD transmitter's current consumption does not exceed 500mA, which is the maximum output supported by the inverter's RSD terminal.

There is a way to set the transmitter to achieve fast shutdown, taking care to avoid the transmitter exceeding the current provided by the RSD terminal, the wiring diagram is provided below for user reference.



NOTICE

The Built-in 12Vdc power supply of the SSE-HL8-15K-P2SA-S is rated for 500mA . Do not exceed!
If you are unsure of the current (A) rating of the transmitter, contact the manufacturer before connecting.

6.8 Use a Generator

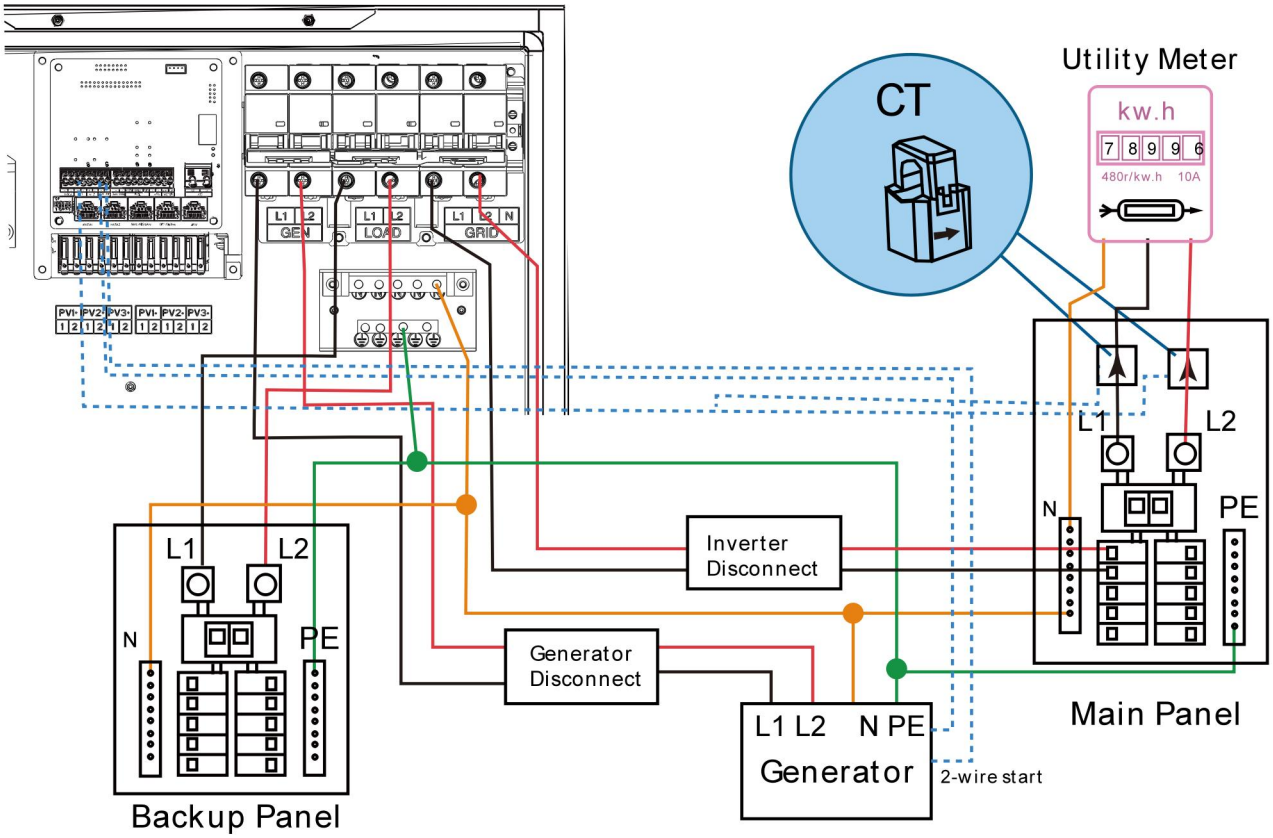
6.8.1 Generator System Connection

This hybrid inverter can be used with a generator. The inverter has a **Gen** port for connecting the generator.

Stator Requirements:

- The generator should use a **neutral-grounding connection** and provide both **240V/120V output**. The generator's capacity may be greater than the current system capacity.
- A THD (Total Harmonic Distortion) of less than 15% is preferred.
- Make sure the generator is correctly connected and meets the voltage and capacity requirements to ensure proper operation with the inverter. Always follow the manufacturer's guidelines for installation and connection.
- DO NOT use “Grid Sell” in Off-Grid systems. Potential to damage the generator.

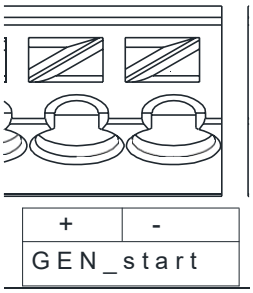
Generator Connection-Partial Home Backup



When the generator starts, all loads connected to the EPS will be powered by the generator, and the battery will be charged simultaneously.

The AC circuit breaker on the **Gen** port is rated for 63A. When the generator is running, ensure that the total load and charging current do not exceed 63A.

If the user requires remote starting of the generator, the generator start signal should be connected to the **GEN_start** port on the I3 board.



6.8.2 Generator Start and Stop Settings

These conditions depend on the **Battery (Bat) Operation Mode** settings. The system uses the **battery's State of Charge (SOC)** or **battery voltage** to determine whether the generator needs to start or stop.

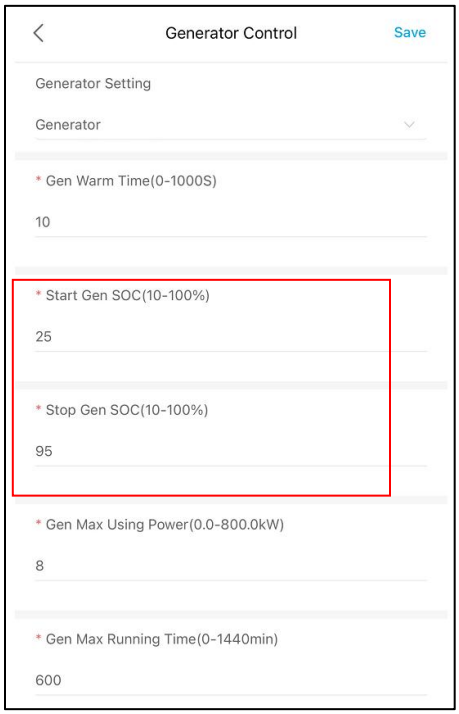
Generator Start Conditions:

The generator will start under the following circumstances:
Power failure: When there is a loss of grid power or other power sources.
Battery discharge cutoff: When the battery discharges to the cutoff voltage or SOC setting.
Forced charging requirement: If there is a need for forced charging of the battery.
Battery voltage or SOC below the generator start threshold: If the battery voltage or SOC falls below the set **generator charging start voltage/SOC.**

Generator Stop Conditions:

The generator will stop under the following conditions:
When the **battery voltage** or **SOC** is higher than the **charging endpoint voltage/SOC** setting, meaning the battery is sufficiently charged and the generator is no longer needed. By using these settings, the system ensures the generator only operates when necessary, optimizing battery performance and reducing unnecessary generator run time.
Please refer to Chapter 9.9 **Generator Port Settings Menu** for the operation method of the screen.

APP Setting:



6.8.3 AC Coupling Installation and Connection

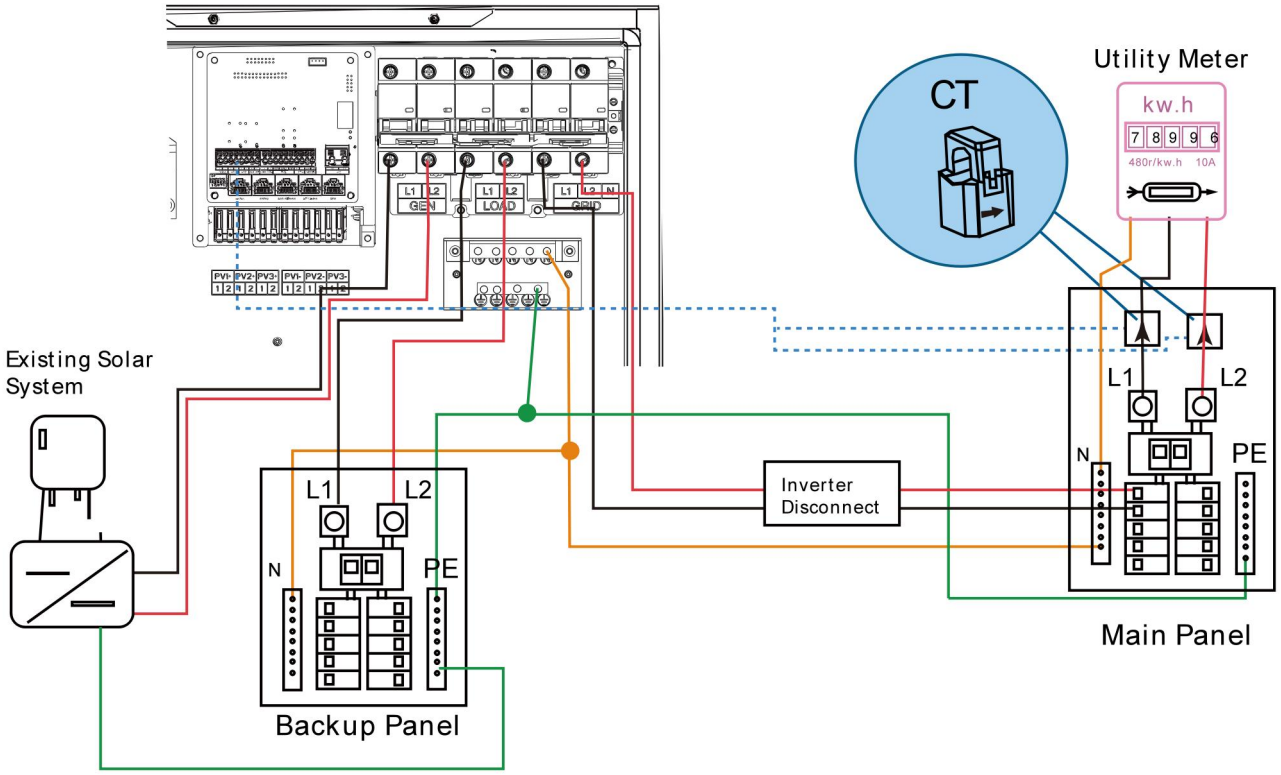
The SSE-HL8-15K-P2SA-S is a system that supports the addition of AC coupled solar panels. The max solar input power can be expanded by coupling micro or string inverters into the “GEN” or “LOAD” terminals. A full AC coupled solar system is not recommended as power control and monitoring is limited. Having DC coupled modules or a combination of DC coupled and AC coupled solar panels is always preferred.

Inverters that can be used for AC coupling should meet relevant industry specifications. This certification confirms the inverters’ ability to disconnect from the grid based on frequency and ensures that the SSE-HL8-15K-P2SA-S will safely be able to frequency shift to control the AC coupled production.

AC coupling to "GEN" or "LOAD"

- Can produce solar power during grid outages.
- Can produce solar power for Off-Grid systems.
- Can monitor solar production.
- The "GEN" input cannot be used when AC is coupled to "LOAD". In addition, the backup power conversion time is extended.

Connection for AC coupled solar system



When the **"Grid"** is in the **ON** state, the **GEN** terminal connects to the internal **"Grid"** terminal of the inverter. In this case, the hybrid inverter will bypass the interactive inverter grid and EPS (Emergency Power Supply) system.

When the grid is disconnected, the **GEN** terminal connects to the inverter's internal **EPS** terminal. In this situation, the loads will be powered first by solar energy. If the solar power generated exceeds the load consumption, the excess energy will be stored in the battery.

When the solar power exceeds the sum of load power and the battery's maximum charging power (for example, when the battery is close to full), the inverter will signal the interactive inverter to reduce its power output using a **frequency shifting power reduction mechanism**. This helps maintain the balance between power generation and consumption within the microgrid system, ensuring that the system operates efficiently while preventing overproduction.

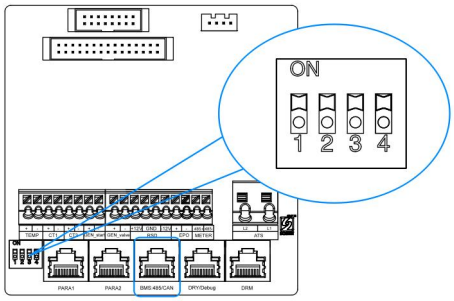
6.9 System Parallel Operation

6.9.1 Parallel System Connection

NOTICE

- The hybrid inverter supports parallel operation, allowing for scalable power and energy capacity to meet various usage scenarios. A total of up to 6 units can be connected in parallel, achieving a capacity of up to 90kW.
- Make sure all units in parallel have the same software version by verifying the “MCU” numbers on System Setup.
- Parallel systems REQUIRE a joint battery bank.
- All INPUTS/OUTPUTS must be shared among ALL parallel inverters, except for DC solar inputs.

DIP Switch Configuration for Parallel Systems



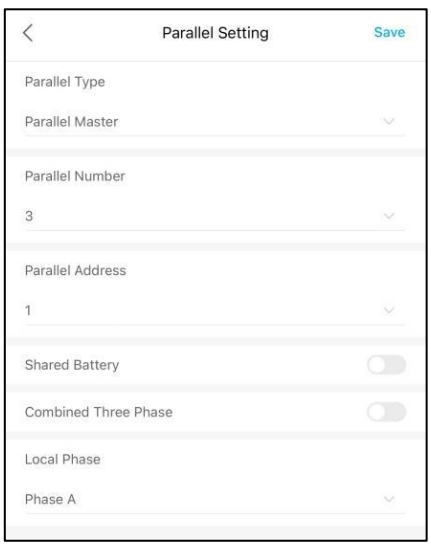
Please refer to **Chapter 9.10 Advanced Settings Menu** for the operation method of the screen.

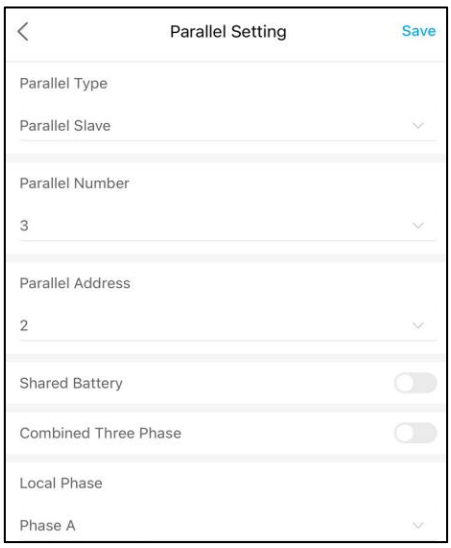
The switch status in the table below refers to the switch status of DIP Switch 2, 3, 4. If Inverter 3 is ON, then switches2, 3, and 4 should be set to the ON position. DIP Switch 1 should be set based on whether a lithium battery is present, indicating the BMS connection status.

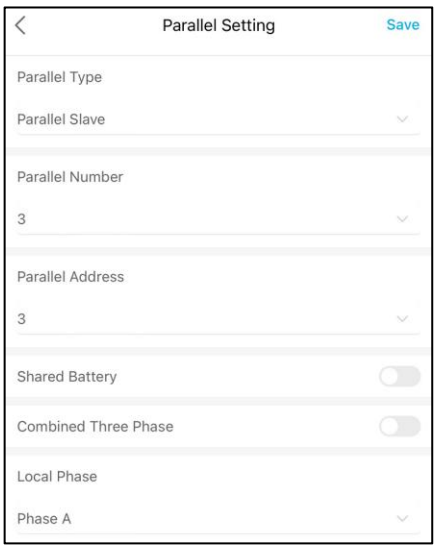
Inverter1(Master)	Inverter2	Inverter3	Inverter4	Inverter5	Inverter6
OFF					
ON	ON				
ON	OFF	ON			
ON	OFF	OFF	ON		
ON	OFF	OFF	OFF	ON	
ON	OFF	OFF	OFF	OFF	ON

Parallel Systems in APP Setting

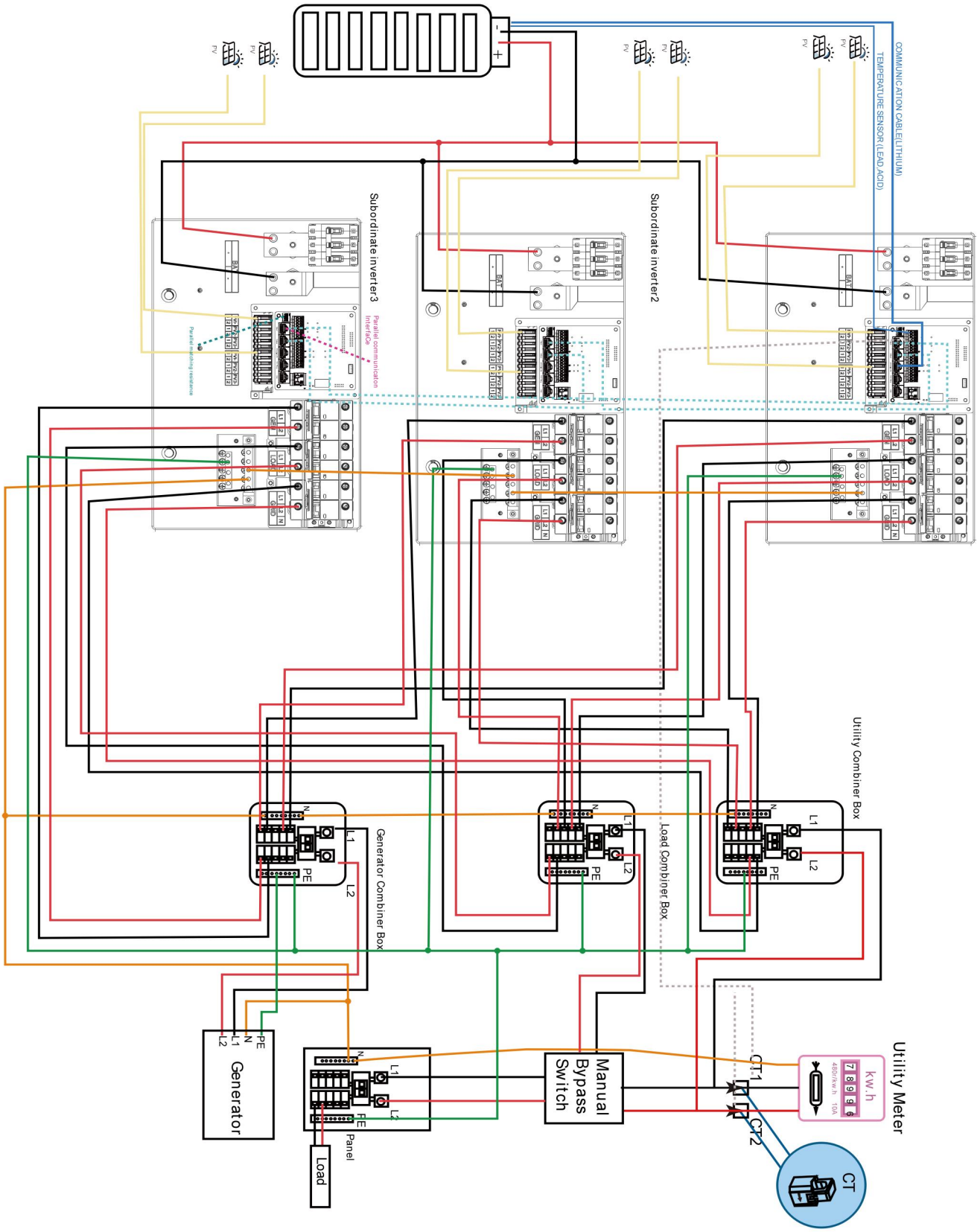
Master **Slave 1** **Slave 2**







The wiring diagram for parallel connection is provided below.



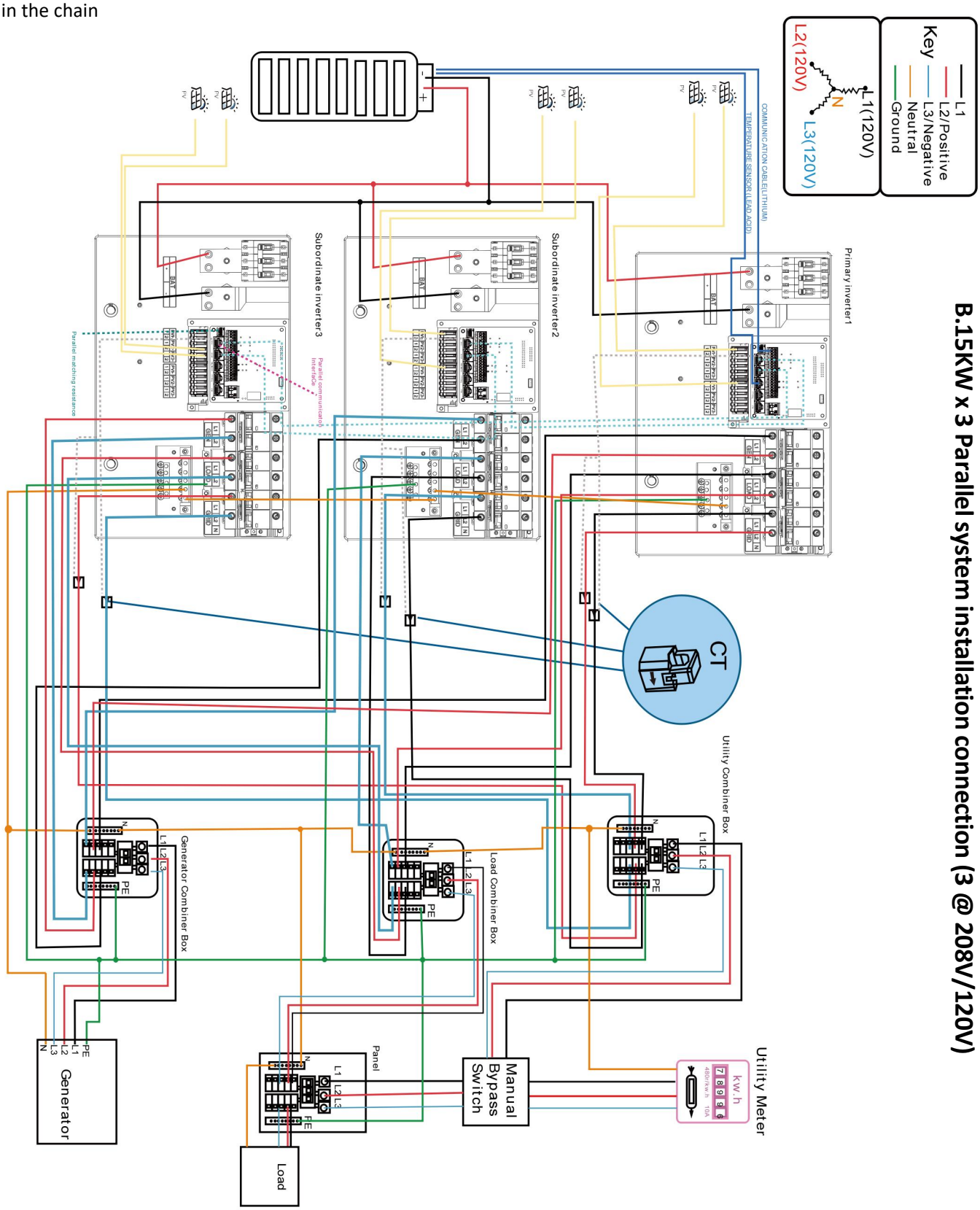
For the **daisy chain** circuit,ensure that the **2-position CAN termination resistors** on the **first** and **last** inverters in the chain are set to the **ON** position.

Steps:

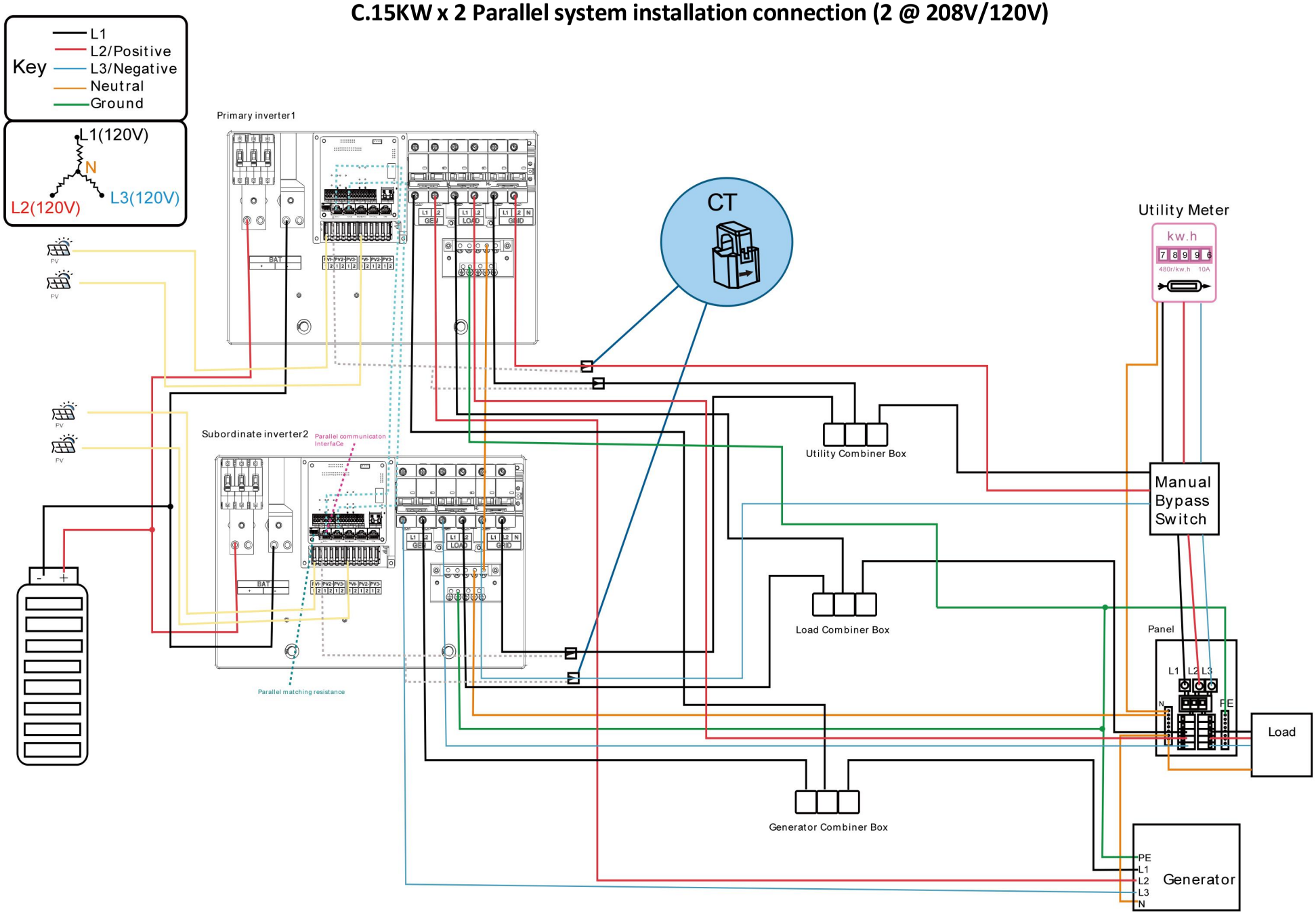
1.**First Inverter**: Set the CAN termination resistor switch to **ON**.

2.**Last Inverter**: Set the CAN termination resistor switch to **ON** as well.

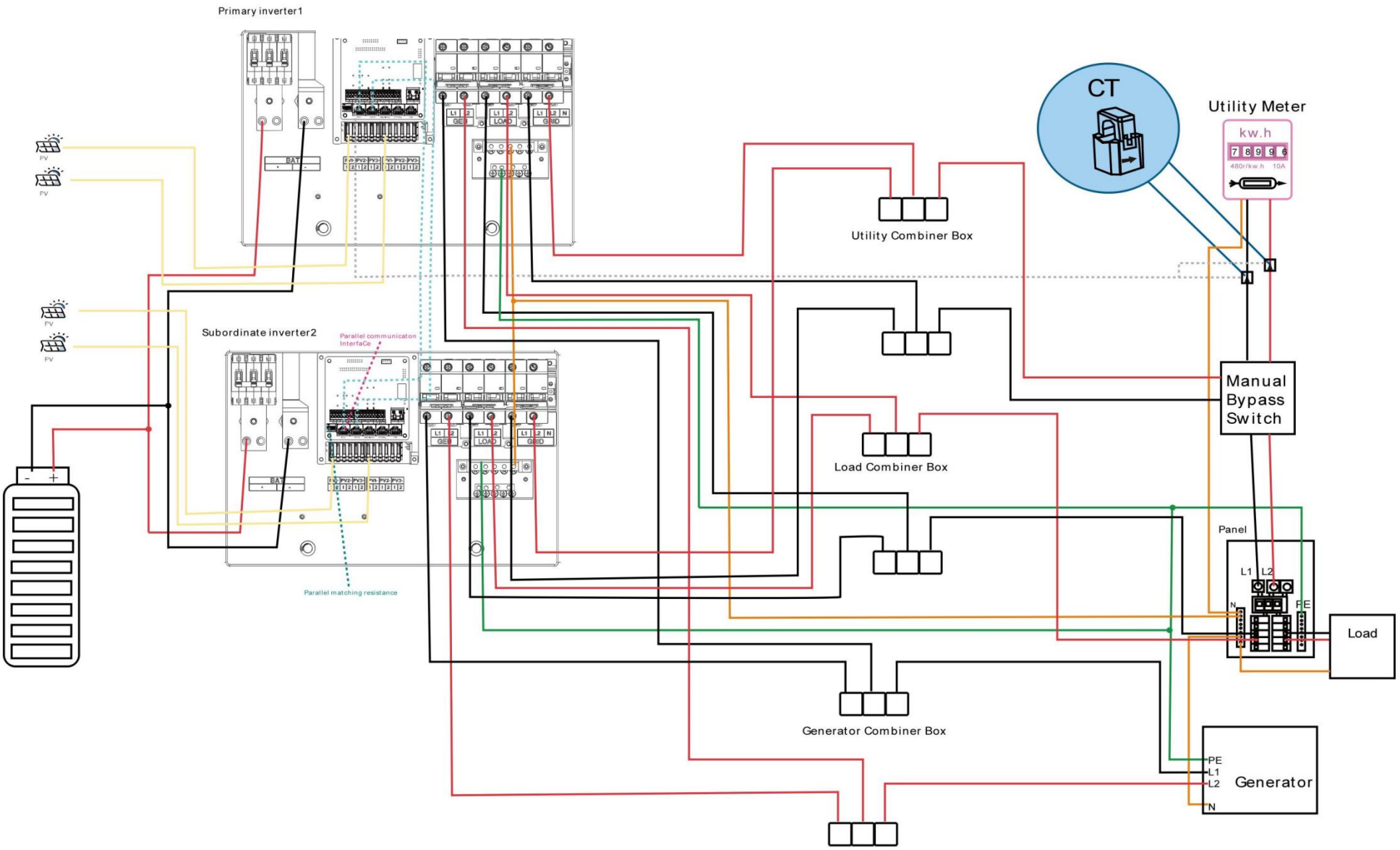
3.**Intermediate Inverters**: Leave the termination resistors in the **OFF** position for all inverters between the first and last units in the chain



C.15KW x 2 Parallel system installation connection (2 @ 208V/120V)



D,15KW x2 Parallel system installation connection (2 @ 240V/120V)



To properly configure the CAN communication for a daisy chain setup, follow these steps:

First Inverter:

Set the CAN communication pins to the ON position for the first inverter in the chain. This will enable communication and establish the starting point of the CAN bus.

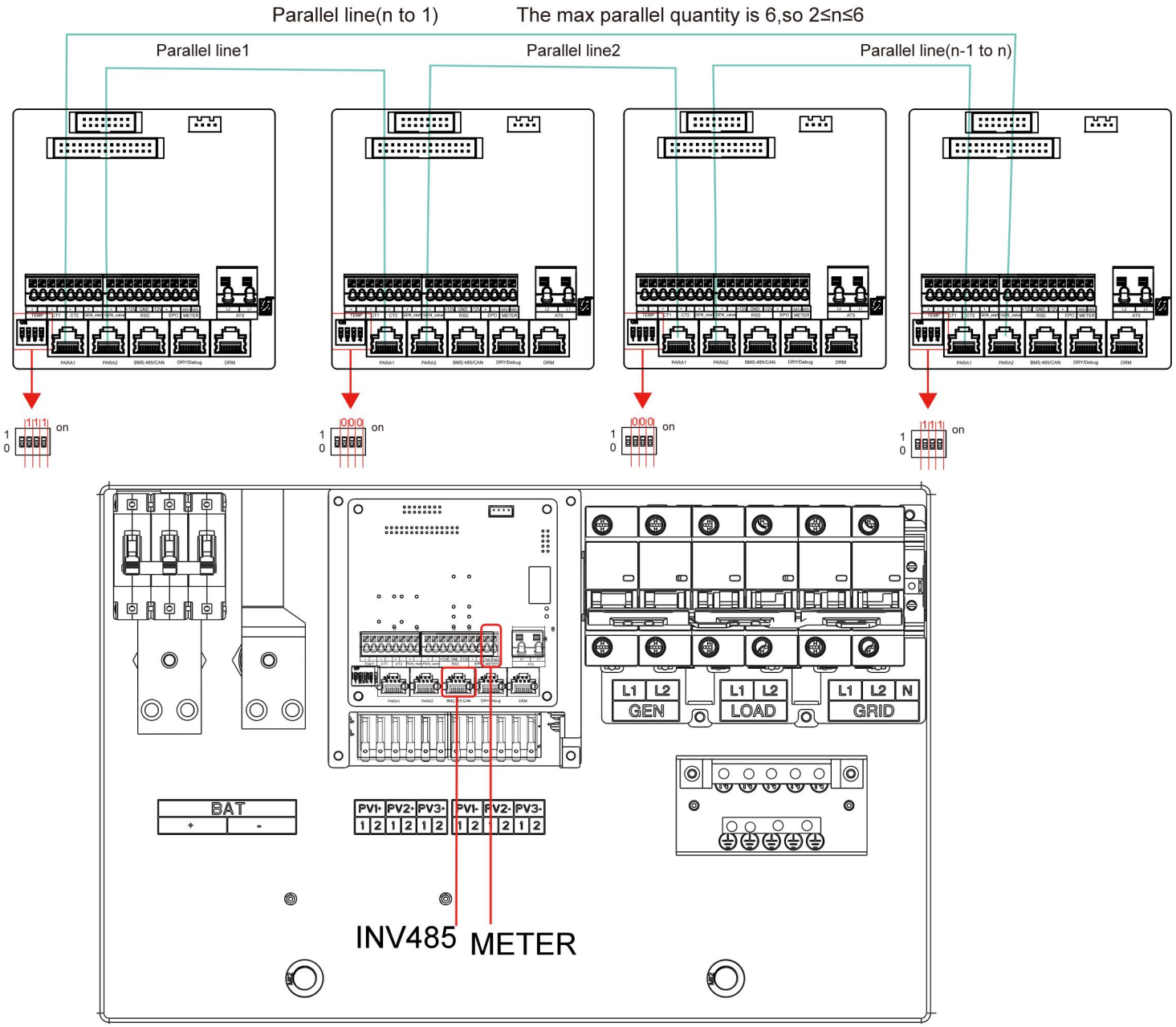
Last Inverter:

Set the CAN communication pins to the ON position for the last inverter in the chain. This ensures the communication line is properly terminated at the end of the bus.

Intermediate Inverters:

For the inverters in between, the CAN communication pins should be left in the OFF position, as they act as repeaters but do not need to have the termination enabled.

If the **parallel cables** are not long enough or unavailable, you can create a **direct pin-to-pin cable** to extend the connections between the inverters.



7.Operating Modes and Functions

7.1 Operate the inverter and conduct a test

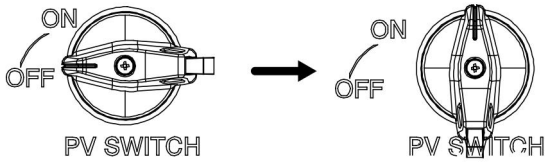
At least one energy source must be available to run this inverter: Battery, PV, or Grid.

7.1.1 Check the voltage of the battery bank

- Voltage of the battery must be between 40VDC - 60VDC.
- If applicable, turn ON internal switches of the batteries. Measure individual voltages.
- Verify that the voltage of the battery bank at the SSE-HL8-15K-P2SA-S terminals is adequate.
- DO NOT reverse polarity. DO NOT turn OFF battery disconnect if any current is flowing in or out of the battery.

7.1.2 Check the voltage of each PV input circuit

- Input voltage must not exceed 550VDC.
- Input voltage must be above the startup voltage of 120VDC.
- Do not ground PV+ or PV-.
- Verify polarity in each PV string. Backward polarity will measure 0Vdc by the SSE-HL8-15K-P2SA-S and will cause long term damage.
- PV alone turns LCD screen only. Inverter requires grid and/or batteries to operate.
- PV DC disconnect switch on the side of the inverter will turn the PV ON or OFF.

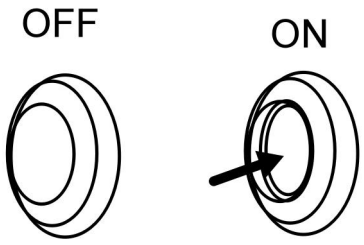


7.1.3 Check GRID input voltage

- Use the “GRID” terminals to measure AC voltage with a multimeter.
- Measure line (L) to neutral (N) voltages on “GRID” terminals. Ensure 120VAC on all phases.
- Measure line (L1) to line (L2) voltages on “GRID” terminals. Ensure 240VAC. (If voltage reading is close to 220V or 210V, verify if grid is single-phase or three-phase instead).
- Verify that voltage between Neutral and Ground is 0VAC.
- Verify that voltage between “GRID” L1 and “LOAD” L1 is 0V. Do the same for L2

7.1.4 Power ON SSE-HL8-15K-P2SA-S

- Turn ON the battery breaker(s).
- PRESS down the power button to the ON position. Wait for the LED indicator to turn on. This may take a few minutes.
- Turn ON the PV DC disconnect switch.
- Turn ON the external “GRID” disconnect.
- Turn ON the internal “LOAD” and external “GEN” breakers.



7.1.5 Power Cycle Sequence

1. TURN OFF all AC breakers / disconnects (“GRID”, “GEN” and “LOAD”).
2. TURN OFF the built-in PV DC disconnect switch on the side of the inverter.
3. PRESS the power button, making sure it is in the OFF position. An “OFF” message will appear after the LED turns off.
4. TURN OFF the battery breakers.
5. Wait a moment (~1 min) to ensure the inverter is completely de-energized.
6. Make sure that the SSE-HL8-15K-P2SA-S is properly connected to the batteries, solar panels, “GRID”, “GEN”, and “LOAD”.
7. Reverse the steps to turn ON the SSE-HL8-15K-P2SA-S.

7.2 Operating Modes and Functions

This inverter offers different operating modes and functions to meet a variety of customer needs. The operating modes and their functions are as follows:

7.2.1 Self-Use Mode (Default)

In **Self-Use Mode**, the system prioritizes energy flow as follows:

For powering loads: **Solar → Battery → Grid**

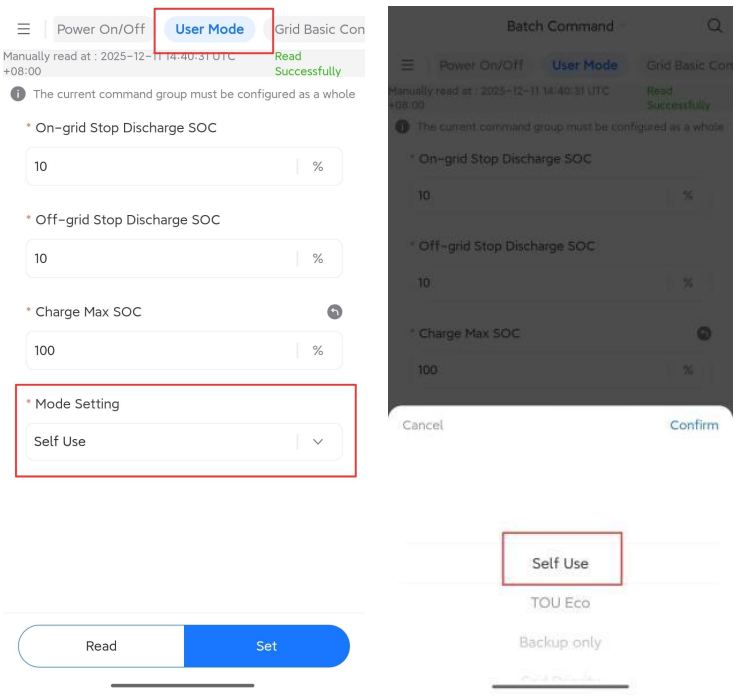
For using solar energy: **Load → Battery → Grid**

When solar power is available, it is first used to power local loads. Excess solar energy is stored in the battery, and any remaining surplus is exported to the grid. When solar power is insufficient, the system uses battery energy to support the loads. Only when both solar and battery are insufficient does the system draw power from the grid. This mode is set as the default operating mode. It is designed to **maximize self-consumption of solar energy**, thereby reducing reliance on the grid and lowering electricity costs.

Application Scenario

Self-Use Mode is ideal for residential or commercial users who want to reduce energy bills and improve energy independence by making full use of on-site solar generation.
Please refer to Chapter 9.6 **Work Mode Settings Menu** for the operation method of the screen.

APP Setting:



*On -grid Battery Reserve SOC (10-100%):When the battery is connected to the grid, it maintains its charge.
When the battery is low on soc, the battery will be charged and discharging is not allowed .
*Off - grid Battery Reserve SOC (10-100%):The battery maintains its charge when off-grid, and will charge when the soc is low, and discharging is not allowed .

7.2.2 TOU ECO Mode

TOU Economy Mode is designed to optimize economic returns by adjusting energy usage and storage behavior according to time-of-use (TOU) electricity pricing.

During peak price periods, the system prioritizes: Load → Grid → Battery
Maximize revenue by selling solar energy to the grid at high prices.

During flat price periods, the system prioritizes: Load → Battery → Grid
Use solar power primarily for self-consumption and store excess in the battery.

During valley price periods, the system prioritizes: Battery → Load → Grid
Charge the battery from the grid when electricity prices are low, and use stored energy during expensive periods.

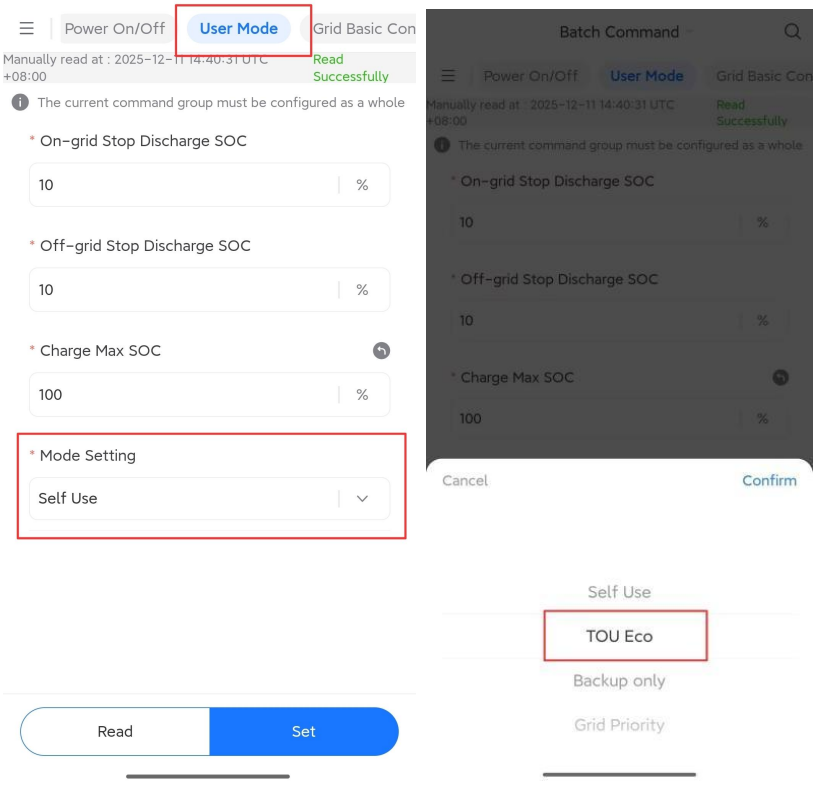
Users can define the peak, flat, and valley time periods according to local electricity rates and their own usage patterns via the system settings or monitoring platform.

Application Scenario

TOU Eco Mode is suitable for users in regions with significant differences in electricity prices across time periods. It helps reduce electricity costs and maximize profits by charging when electricity is cheap and discharging or selling when it is expensive.

Please refer to Chapter 9.6 **Work Mode Settings Menu** for the operation method of the screen.

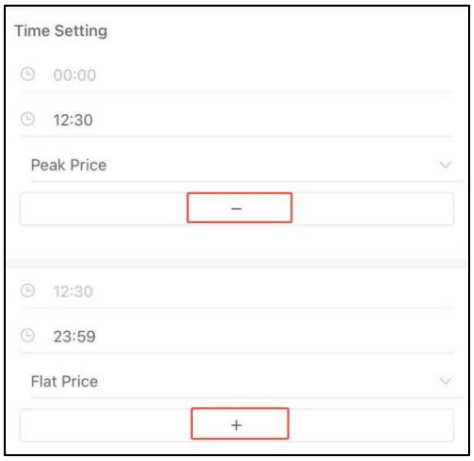
APP Setting:



Time Setting

Set the time period for peak and valley electricity prices.

“+” is to add time period “-” is to delete time period



7.2.3 Backup Only Mode

Backup Only Mode is designed to maximize battery charging and reserve energy specifically for backup use during grid outages or instability. In this mode, the system prioritizes storing solar energy in the battery rather than supplying it to loads or exporting to the grid during normal operation. The battery will **only discharge when the grid fails or becomes unavailable**.

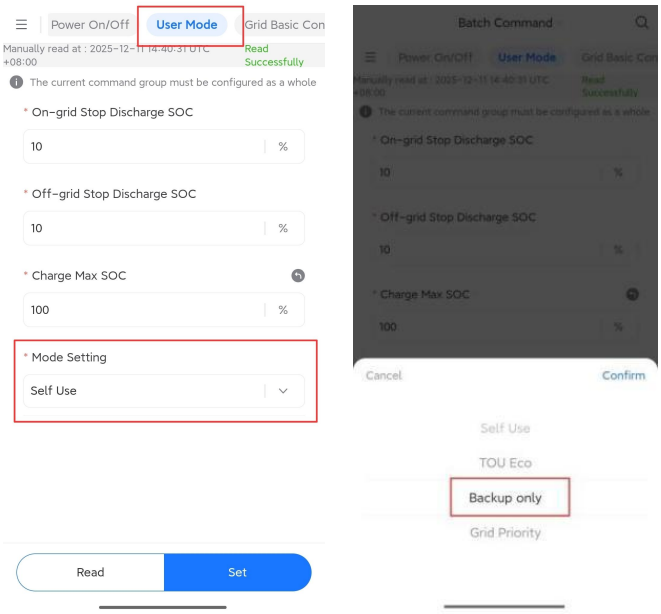
PV power priority: **Battery → Load → Grid**

Application Scenario

Backup Only Mode is ideal for users in areas with frequent power outages, unstable grid conditions, or where critical loads (such as medical equipment, servers, or refrigeration) must be kept running at all times. It prioritizes energy availability and system reliability over cost savings or feed-in profits.

Please refer to Chapter 9.6 **Work Mode Settings Menu** for the operation method of the screen.

APP Setting:



7.2.4 Grid priority Mode

Grid Priority Mode is designed to prioritize exporting electricity to the grid when sufficient power is available, in order to maximize feed-in profits.

In this mode, the system supplies power in the following order:

Power Supply Priority: Load → Grid → Battery

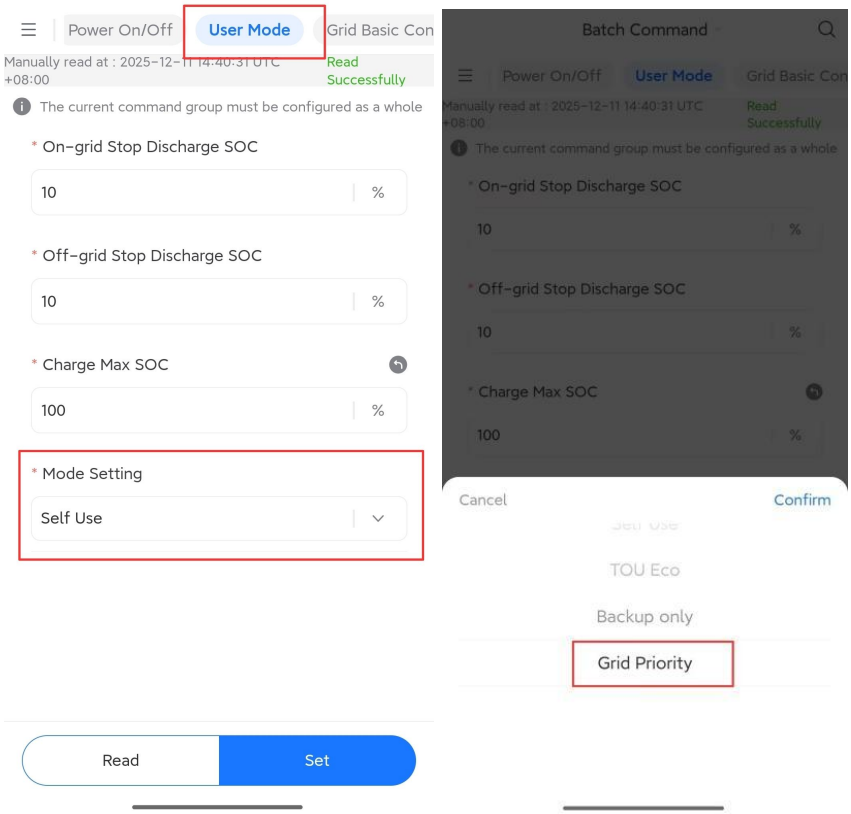
When solar energy is generated, it is first used to meet local load demand. Any excess energy is then exported to the grid for revenue. The battery will only be charged if there is additional surplus after meeting both load and grid feed-in needs**.**

Application Scenario

Grid Priority Mode is suitable for regions with **favorable feed-in tariffs (FiTs)** or net metering policies. It is ideal for users who aim to **maximize income from solar generation**, rather than prioritize local energy consumption or backup capacity.

Please refer to Chapter 9.6 **Work Mode Settings Menu** for the operation method of the screen.

APP Setting:



7.3 Generator Function

The **Generator**&**Smart Load** function allows the power input connection point to act as a load connection point. When enabled, the inverter will supply power to the connected load when the **battery state of charge (SOC)** exceed the user-defined thresholds. **Please refer to Chapter 9.9 Generator Port Settings Menu for the operation method of the screen.**

Function Description:

Gen Warm Time: Generator warm-up time. After the inverter sends the start signal, it waits for this duration before accepting generator input.

Start SOC / Stop SOC: Battery SOC thresholds for starting and stopping the generator automatically.

Gen Rated Power: Maximum power output of the generator.

Max Run Time: Maximum continuous run time for the generator. Applies when the inverter is automatically controlling the generator.

Cooling Time: Generator cool down period after stopping. Applies to inverter-controlled generator operation.

Gen Force: Force Start Generator function. Should be enabled during the first-time connection of a generator to ensure recognition and activation.

For example:

- **Generator Start SOC = 20%**
- **Generator Stop SOC = 90%**

Operation:

- When the **battery SOC reaches 20%**, the Generator Port automatically turns on and supplies power to the connected load.
- When the **battery SOC falls below 90%**, the Generator Port will automatically shut off.

Application Scenario:

- This function is useful when you want to prioritize powering non-critical loads with solar energy when both the battery is sufficiently charged and solar power generation is above a certain level, ensuring that only excess power is used for loads.

Important Note:

- **Do not connect a generator** when enabling the Smart Load function, as this can **damage the equipment**.

Please refer to Chapter 9.6 **Work Mode Settings Menu** for the operation method of the screen.

7.4 Smart Load Function

The **Smart Load** function allows the power input connection point to act as a load connection point. When enabled, the inverter will supply power to the connected load when the **battery state of charge (SOC)** exceed the user-defined thresholds. **Please refer to Chapter 9.9 Generator Port Settings Menu for the operation method of the screen.**

Function Description:

Stop Output SOC: When the battery SOC drops to this threshold, the smart load output will automatically disconnect.
Stop Output Volt: If voltage-based control is selected, the smart load output will disconnect when the battery voltage reaches this value.
Control Start Time: Start of the time window during which the SOC or voltage control conditions are valid.
Control End Time: End of the time window during which the SOC or voltage control conditions are valid.
Note:
Outside the defined time window, the smart load output is not restricted by SOC or voltage conditions, and will follow the same discharge behavior as the EPS output.

For example:

- **Smart Load Start SOC = 90%**
- **Smart Load Stop SOC = 50%**

Operation:

- When the **battery SOC reaches 90%**, the Smart Load Port automatically turns on and supplies power to the connected load.
- When the **battery SOC falls below 50%**, the Smart Load Port will automatically shut off.

Application Scenario:

- This function is useful when you want to prioritize powering non-critical loads with solar energy when both the battery is sufficiently charged and solar power generation is above a certain level, ensuring that only excess power is used for loads.

7.5 Off-Grid Installation Tips

- **Limit sensors (CTs)** are **not required** for completely off-grid installations, **unless**:

  "Grid Priority" is enabled using a generator connected to the **GRID** terminal.

- A **transfer switch is not required** in off-grid systems. The **LOAD** output can be connected directly to the main panel.

- **Do not use "Grid Sell" mode** in off-grid installations.

- When using a **generator in an off-grid scenario**, it is recommended to set the **Grid Mode** to **"General Standard"**.

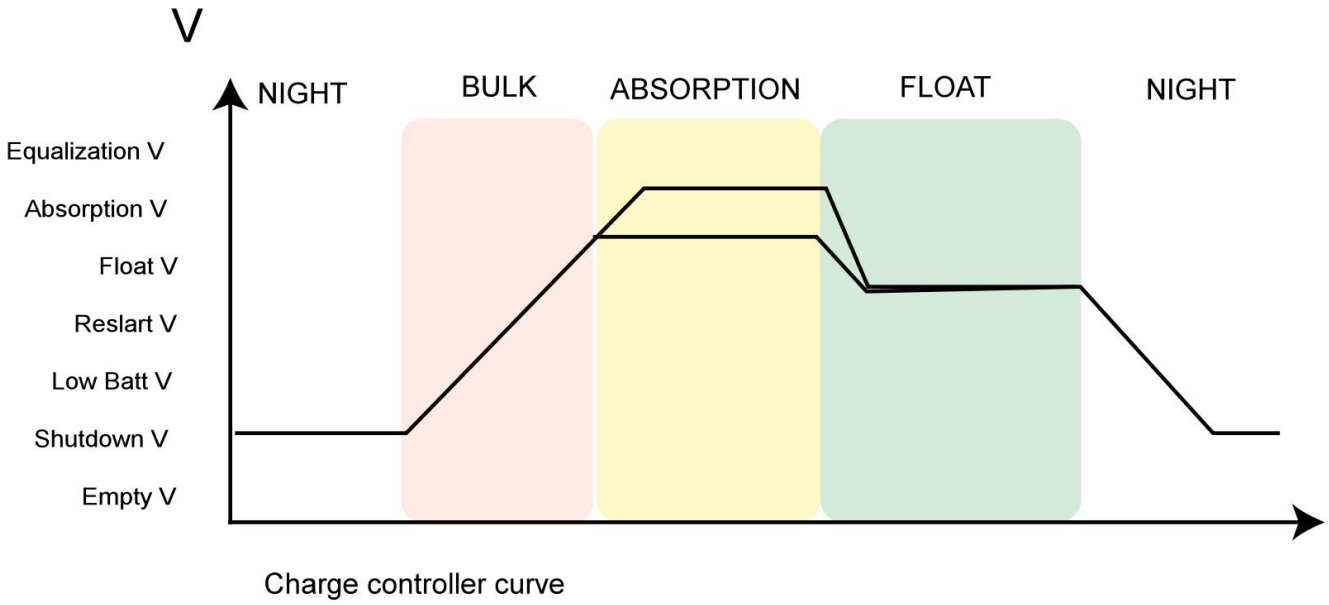
- The **Auto Generator Start (AGS)** function activates when the battery voltage or state of charge drops below the user-defined **"Start Voltage / SOC"** threshold.

- Ensure that the **battery capacity** is correctly configured and that charge/discharge current limits are set within safe operating ranges.

7.6 Battery Charge Controller

4-Stage Charging

The Inverter has a 4-stage battery charging algorithm for rapid, efficient, and safe battery charging. The next figure shows the stage sequence.



Charge controller curve

Bulk Charge Stage

In the Bulk Charge stage, the battery is not at a 100% state of charge and has not yet reached the Absorption voltage setpoint. The controller will deliver 100% of available solar power to recharge the battery.

Absorption Stage

When the battery has reached the absorption voltage setpoint, the inverter uses constant-voltage regulation to maintain battery voltage at the absorption setpoint, preventing overheating and excessive battery gassing. The battery is allowed to come to a full state of charge at the absorption voltage setpoint. Absorption lasts until the battery charge amperage (A) rate reaches 2% of the programmed capacity (Ah).

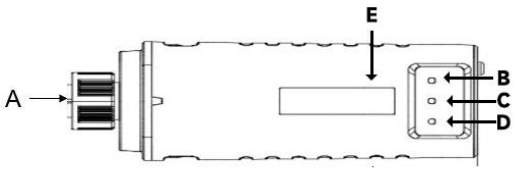
Float Stage

After the Absorption stage charges the battery fully, the MPPT reduces the battery voltage to the float voltage setpoint. If the batteries have 100% charge, there can be no more chemical reactions, and all the charging current turns into heat and gassing. The Float stage provides a minimum rate of maintenance charging while reducing the heating and gassing of a fully charged battery. The purpose of the Float stage is to protect the battery from long-term overcharge

8. Wi-Fi&BLE stick installation

8.1 Indication

A:Circular Connector Interface, Connect to inverter and communication
B:Green LED, Inverter communication indication
C:Green LED, Network communication indication
D:Green LED, Show WIFI data logger operating status
E:Label, Show SN and password of WiFi data logger



1.LED glow only when the Wi-Fi&BLE stick is powered on.

2.When the Wi-Fi&BLE stick is powered on, the green LED glows for 3S as a power on indication.

3.The more detail LED indication please refer chapter 8.5 “LED indication and trouble shooting”.

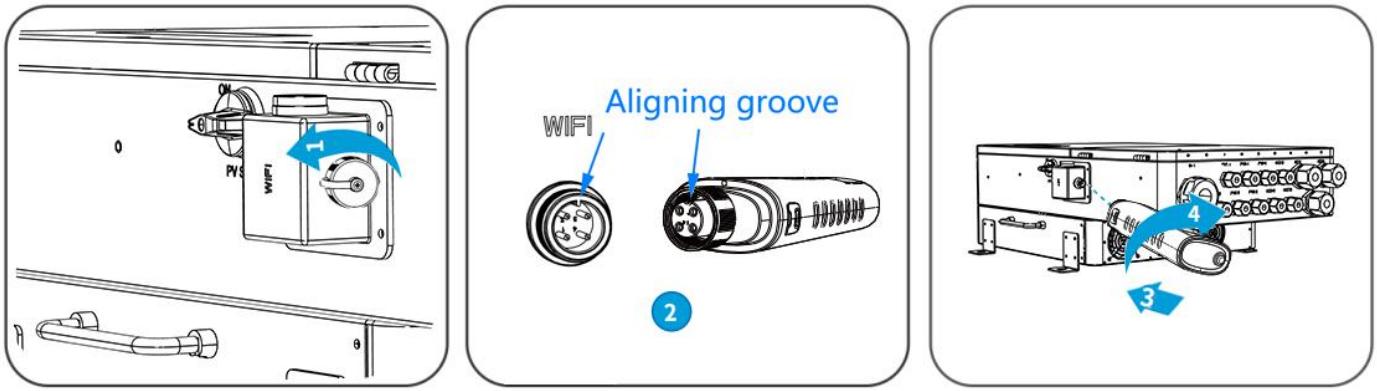
NOTICE

Router and ONT should not be connected to the load terminals of the inverter, as this may interfere with remote software updates. These devices can be connected to the Grid side to ensure uninterrupted network service.

8.2 Install the Wi-Fi&BLE stick

Follow the installation steps!

1.Remove the waterproof cover.	2.Aligning groove.
3.Plug in WiFi module.	4.Revolve to lock the WiFi module.



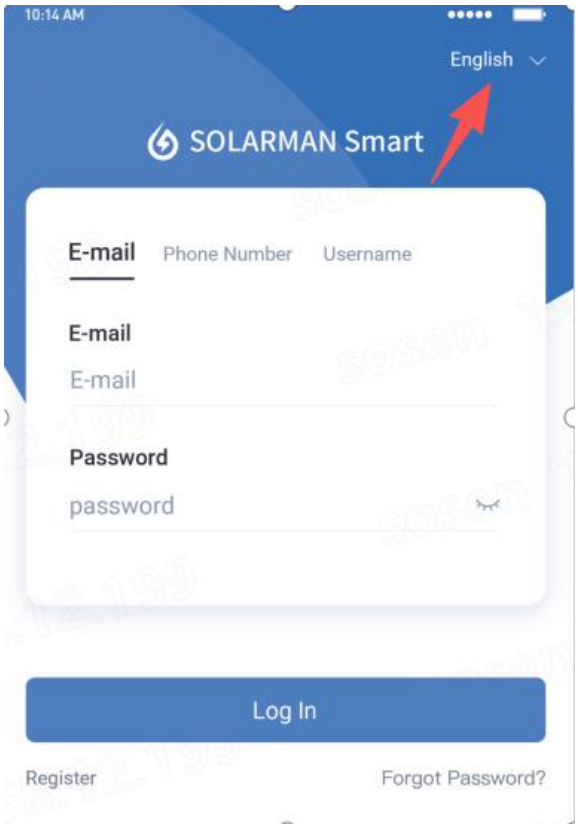
8.3 Web/APP

If you are an household user, please scan QR code below to download SOLARMAN Smart APP. Or you can log in to https://home.solarmanpv.com

SOLARMAN Smart

8.4 Wi-Fi Connection

8.4.1Log in to your account

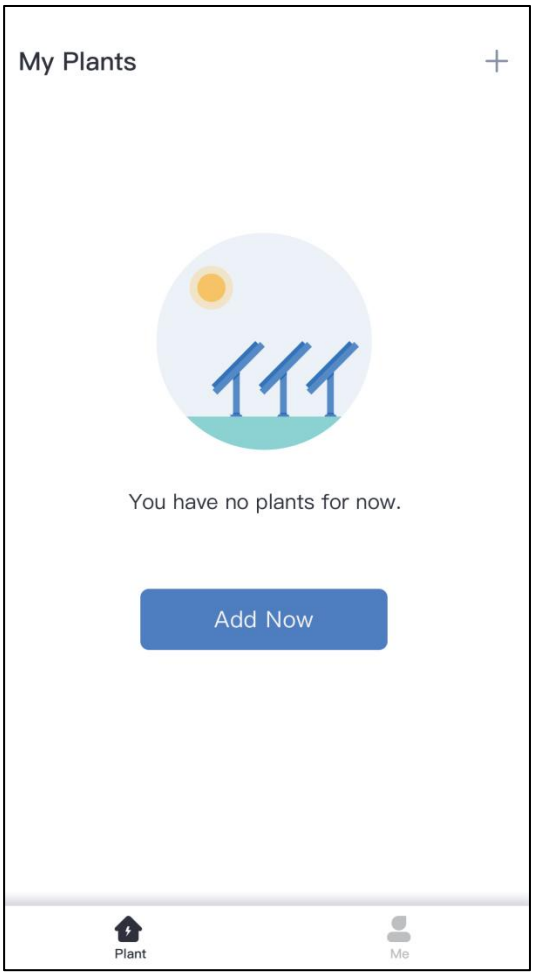


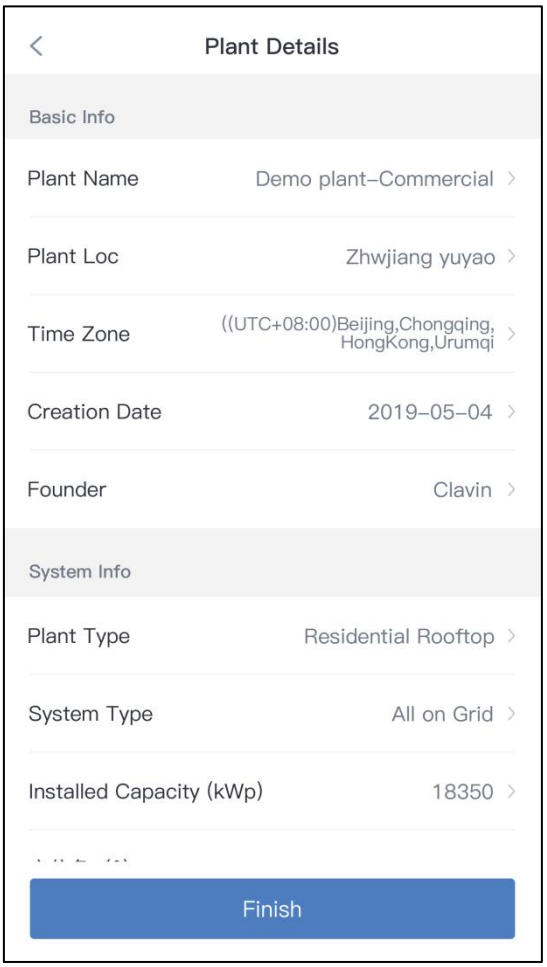
Step 1: Select language

Step 2: Create an account

Step 3: Enter your account and password to log in

8.4.2 Create a plant

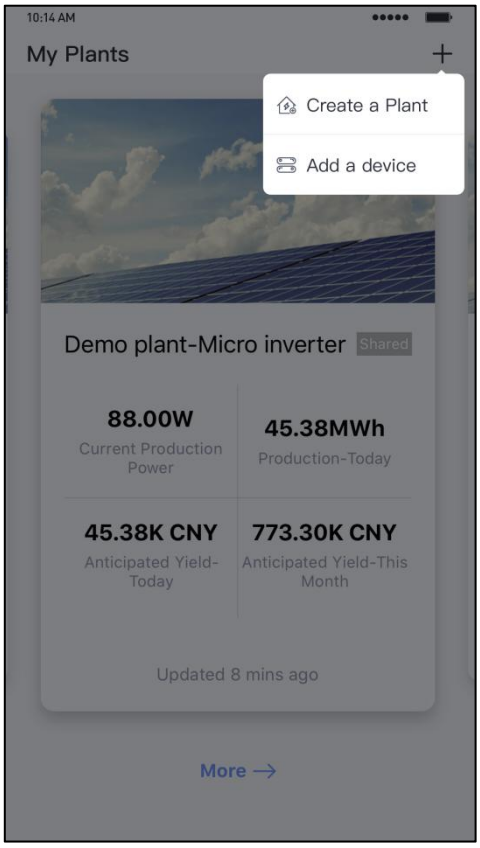




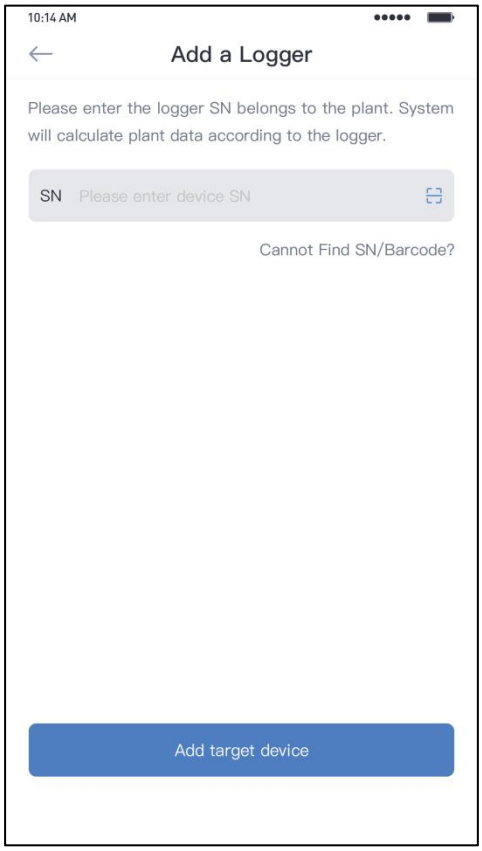
Step 1: Click "Add Now" to create your plant

Step 2: Fill in plant basic information and other information here. Then click “Finish” option

8.4.3 Add a Logger



Step 1: Click the “+” icon in the upper-right corner, then click "Add a device"

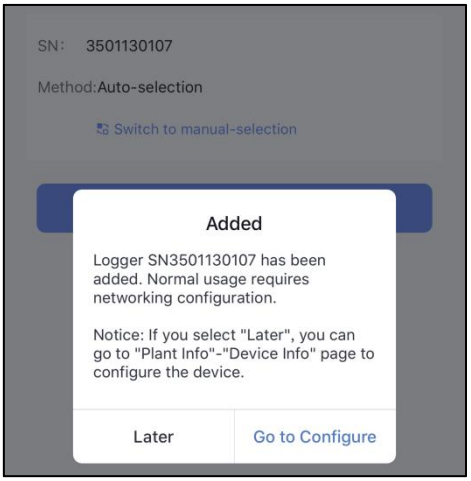


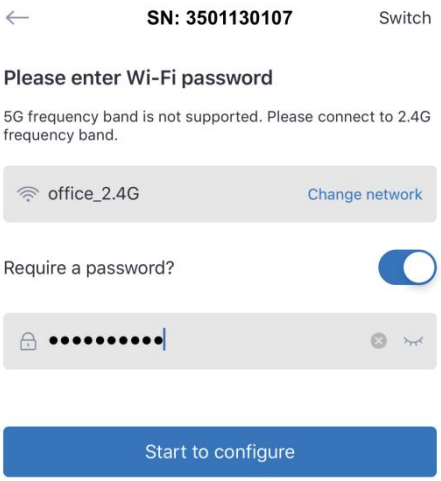
Method 1: Enter logger SN manually

Method 2: Click the icon in the right and scan to enter logger SN

NOTE: You can find logger SN in the external packaging or on the logger body.

8.4.4.Network Configuration

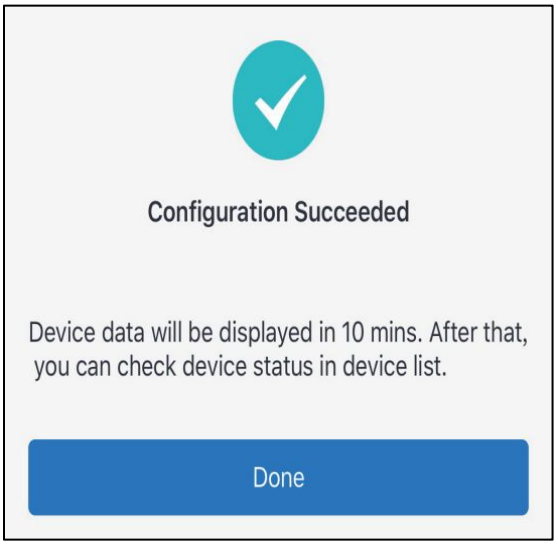




Step 1: Click“Go to Configure”to set the network

(Please make sure Bluetooth and WiFi are ON.)

Step 2: Choose WiFi network and enter password to log in

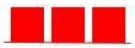
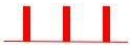


Step 3: Please wait for a few minute. Then click "Done" and view plant data.

NOTICE

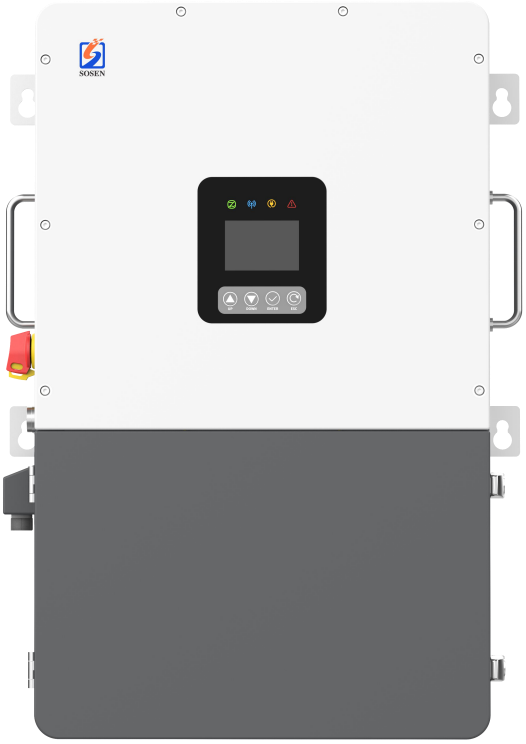
Notice:
5G WiFi is not supported .

8.5 LED indication and trouble shooting

LED	State	Indication
	Red LED:Inverter communication indication	 Green LED:Network communication indication
	Cycle for 2S: flash once quickly, then glowing	Cycle for 2S: flash once quickly, then glowing
	Not glow more than 20S	The power supply to the Wi-Fi&BLE stick is abnormal or damaged： 1. Check whether the power supply of the Aerial Plug Interface on the inverter is normal 2. Wi-Fi&BLE stick abnormal, contact the dealer
	Cycle for 2S: flash once quickly, then off	Communication failure： Check whether the connection between the Wi-Fi&BLE stick and inverter is loose or poor contact
	When powered on, continuously glows 3S, and then off	Power on indication
	Glow more than 5S	Communication is normal
	During the long glowing, flash occasionally	Network transmit data
	Cycle for 20S: flash once quickly, then off	The route is not connected: 1. Check whether the password is right 2. Check the strength of the router
	Cycle for 20S: flash 3 times continuously, then off	Connect to the route, but can't connect to the cloud server： 1. Check whether the router has Internet access permission 2. Check the firewall setting
	Cycle for 20S: flash 4 times continuously, then off	Wi-Fi&BLE stick information error: Please contact the dealer

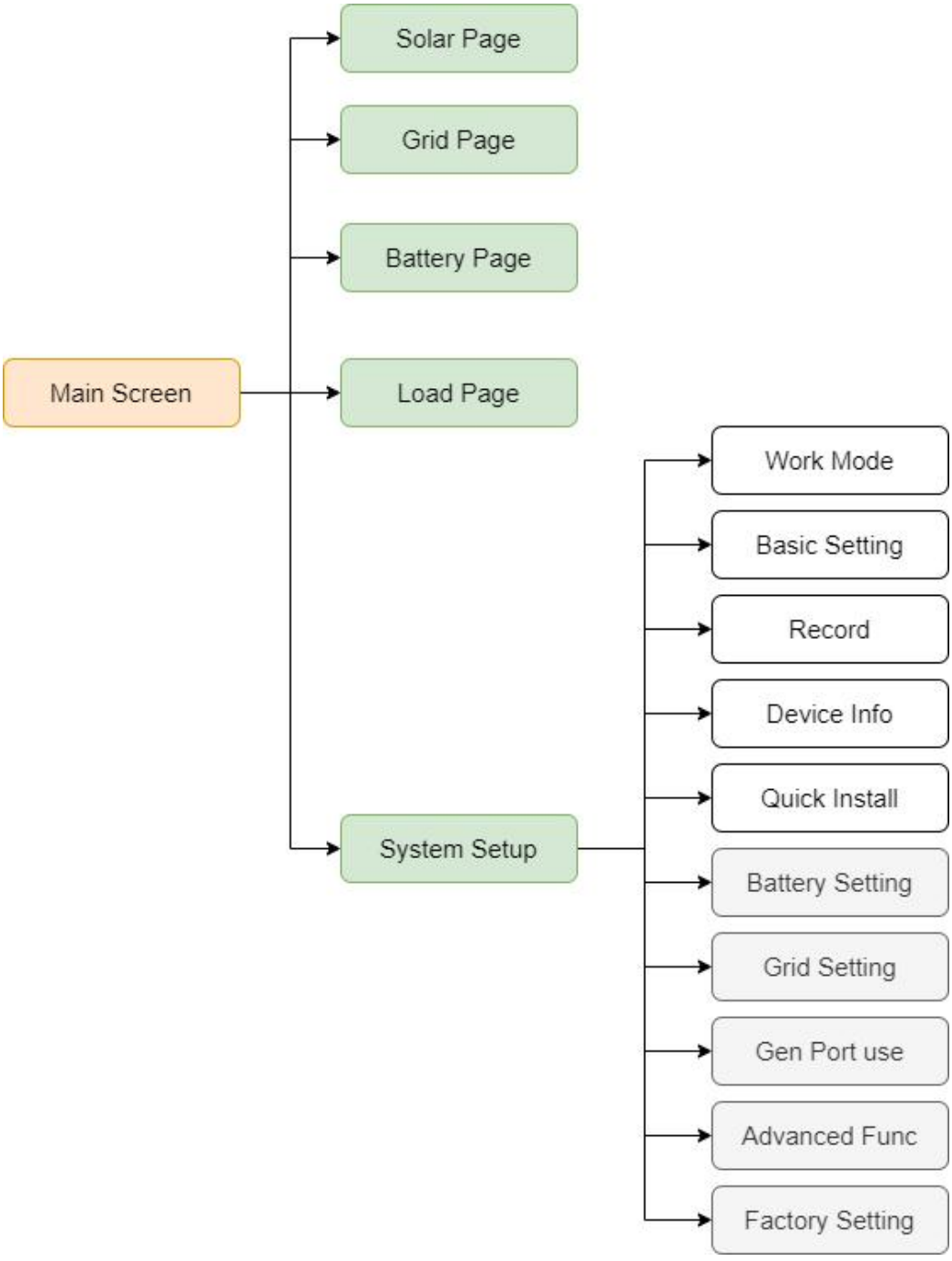
9.Operation

9.1 Indicator panel



Name	Object	Function
Indicator LED	A	Green : ON, The inverter is running ; Flash is Standby.
	B	Blue : ON, Communication with BMS normal.
	C	Yellow : ON, The inverter is in EPS mode.
	D	Red : The inverter is in fault mode.
	E	UP:To go to previous selection
	F	DOWN:To go to next selection
	G	ENTER:To confirm the selection
	H	ESC:To exit setting mode

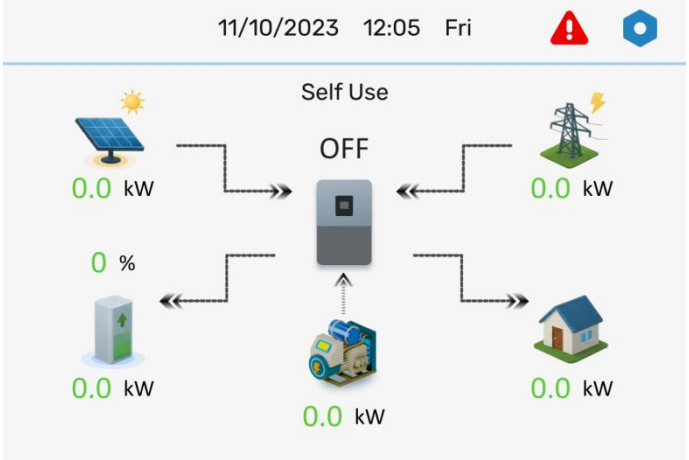
9.2 LCD operation flow chart



9.3 LCD Display Icons

9.3.1 Main Screen

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



1.System Information Display

1.1 Date and Time
At the top of the screen displays the current system date and time.

1.2 Warning Icon ('!')
A red '!' mark indicates a system fault or abnormal condition.
Clicking the icon opens the fault detail page,where users can check the alarm messages and fault codes.
Follow the on-screen guidance or troubleshooting manual to resolve issues.

1.3 Settings Icon (Gear)
Click to access the system settings menu.
Includes configuration options such as operation mode,battery parameters,grid settings,etc.

2.Inverter Status and Operating Mode

2.1 Inverter Power Status
The icon in the center represents the inverter unit.
Its power status is clearly shown as ON or OFF.

2.2 Current Operating Mode Display
The active system mode is shown above the inverter icon.
Possible modes include:TOU ECO,Self-Use,Backup,etc.
This helps users understand how the system is currently operating.

3.Real-Time Energy Device Overview
The four blue icons visually represent the status and power of key energy components.Each icon is interactive:
3.1 Top Left--PV
Displays real-time solar generation power.
Click to view detailed PV status.

3.2 Top Right--Grid
Shows grid import power.
Click to view grid connection information.

3.3 Bottom Left--Battery
Displays current battery state of charge and charge/discharge power.
Click to view battery details.

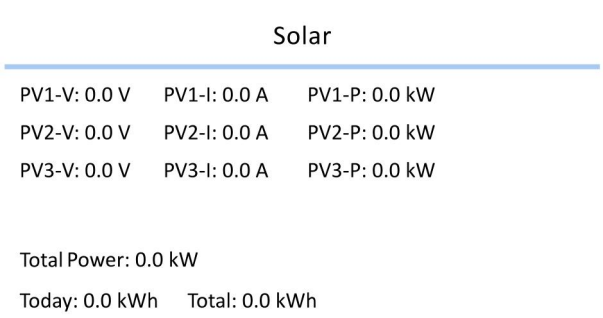
3.4 Bottom Right--Load
Shows real-time load consumption.
Click to access detailed load information.

4.Energy Flow and Connection Indicators

4.1 Arrow Indicators
Arrows illustrate real-time energy flow paths.
The direction indicates the power flow direction (e.g.,from PV to Load).

4.2 Red“X"Icons
Indicate that a path or device is not connected or inactive.
Examples include:battery not installed,grid offline,etc.
-PV power and Load power always keep positive.
-Grid power negative means get from grid,positive means sell to grid.
-Battery power negative means charge,positive means discharge.

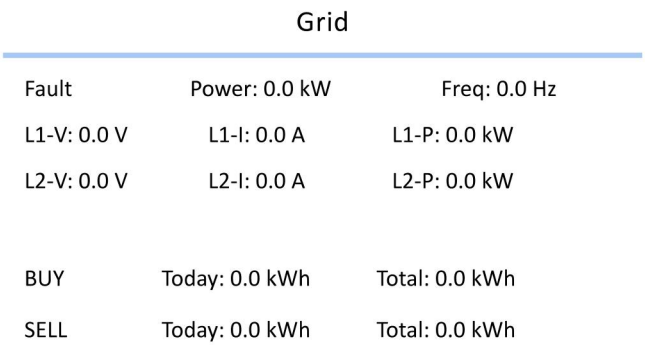
9.3.2 PV Information Page Overview



(Subject to variation depending on project configuration) When the PV icon on the main interface is clicked, the system navigates to the PV information page. Here, PV1 to PV3 display the voltage, current, and power data for each of the three PV input channels.

Below these readings, users can view the total current PV power, the energy generated today, and the historical cumulative generation. Page navigation arrows on the side of the screen allow users to scroll through additional data pages.

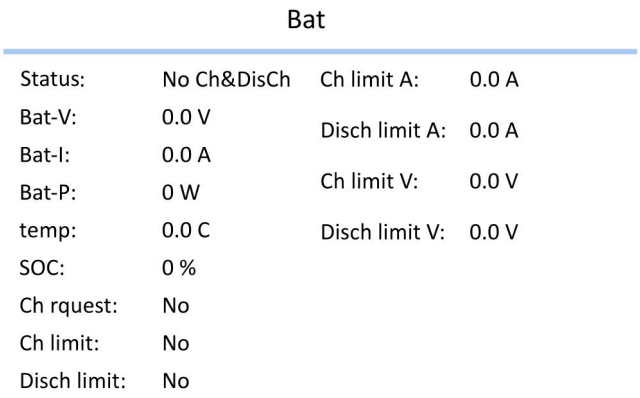
9.3.3 Grid Information Page Overview



(Subject to variation depending on project configuration)
The Power field displays the total grid power.
Freq refers to the present grid frequency.
L-V represent the single phase voltage, each showing their respective voltage, current, and power values.

At the bottom of the page, the energy purchased from the grid is displayed, including both the daily purchased energy and cumulative purchased energy. (Note: These fields may vary depending on the specific project configuration.)

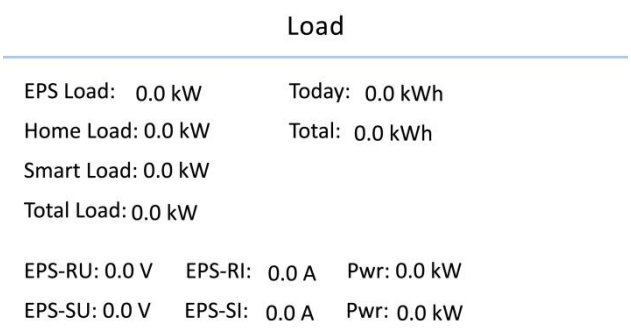
9.3.4 Battery Information Page Overview



This page displays the operating information of Battery 1 (subject to variation depending on the project configuration).

Key parameters include the current battery status, voltage, current, power, temperature, and State of Charge (SOC).

9.3.5 Load Information Page Overview



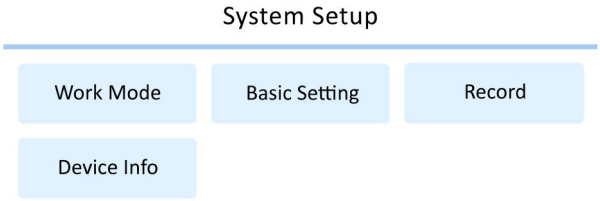
(Subject to variation depending on the project configuration)
This page includes readings for EPS load power, household load power, i load power, and the total load power.

Below these values, the page also displays the voltage, current, and power for the split AC phases: L1, and L2.

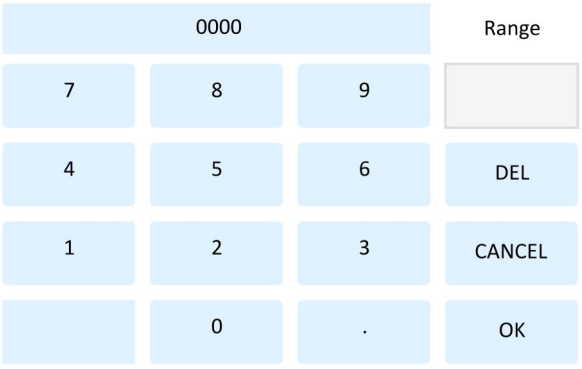
9.4 System Setup Menu

System Settings Page (Standard User Access)

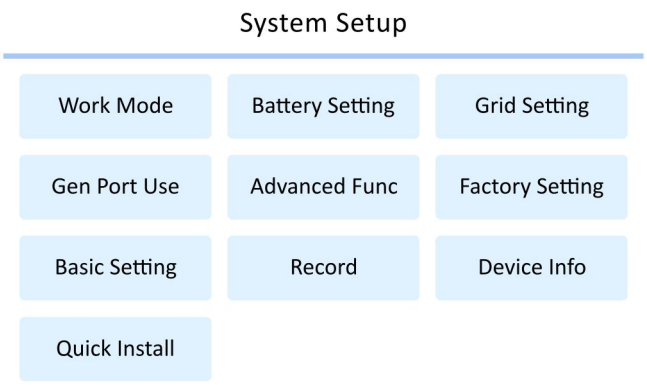
This is the settings page available under standard user permissions.



To enter basic settings mode, click the icon  in the upper-left corner and enter the password **0000**.

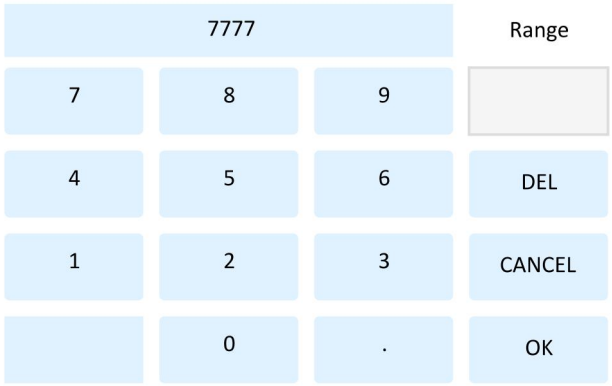


Advanced User Access

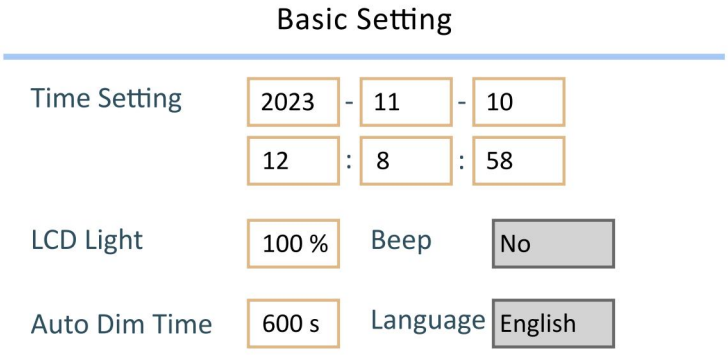


To enter advanced settings mode, click the icon in the upper-left corner and enter the password 7777.

Once verified, the system will open the Advanced Settings Page, where users can access additional configuration options not available under standard permissions.



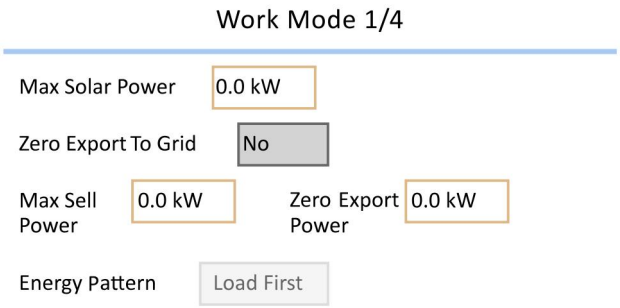
9.5 Basic Settings Menu



-Time Setting:
Set the system's date and time, including year, month, day, hour, and minute.
-LCD Light:
Adjust the screen brightness level.
-Beep:
Enable or disable the buzzer.
Enabled by default; the buzzer will sound upon touch or key press.
-Auto Dim Time:
Set the duration before the screen automatically dims or turns off.
-Language:
Select the system display language.

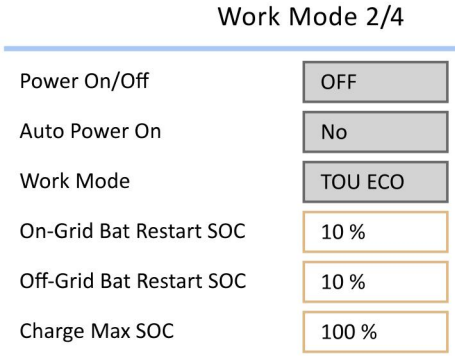
9.6 Work Mode Settings Menu

Work Mode Settings-Page 1



-Max Solar Power:
Sets the maximum PV input power.
Zero Export To Grid:
When enabled,the inverter limits the amount of power exported to the grid.
The actual export limit is defined by the Zero-export Power setting.
-Zero Export Power:
Specifies the inverter's export power limit to the grid.
This setting takes effect only when Zero Export to Grid is enabled.
-Max Sell Power:
Sets the maximum power that can be exported to the grid.
-Energy Pattern:
Defines the system's energy priority strategy.Currently,only **Load First** mode is supported.
-Load First:
PV power is used first to supply the load.
Any surplus PV energy is then used to charge the battery.
If PV is insufficient,the grid will supply the load.

Work Mode Settings-Page 2



-Power On/Off:
Manually switches the inverter ON or OFF.

-Auto Power On:
Enables automatic startup and shutdown.
When enabled,the inverter will power on automatically.

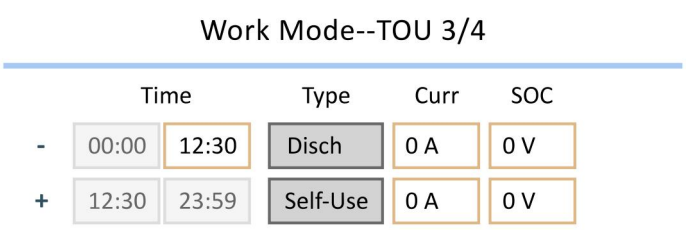
-Work Mode:
Sets the system's working mode.Available options include:
Self-USE,TOU ECO,Backup Power,and Grid Priority.

-On-Grid Bat Restart SOC:
When the inverter is connected to the grid:
Battery is allowed to discharge if SOC 10%.
If battery SOC drops below(Restart SOC-3),the inverter will trigger forced charging to
raise SOC back to 10%.

-Off-Grid Bat Restart SOC:
When the inverter is off-grid (not connected to the utility):
Battery is allowed to discharge if SOC 10%.

-Charge Max SOC:
Sets the maximum battery SOC for charging.
Once this limit is reached,charging will stop automatically.

Work Mode Settings-Page 3(TOU Mode Settings)



To enable TOU scheduling, the Work Mode on Work Mode Settings – Page 2 must be set to **TOU ECO**.

Only then will the time-based configuration become effective.

-Time:Defines the time slots used for energy management.

The full 24-hour day must be divided into continuous,non-overlapping periods.Each time slot includes a start time and an end time.Up to 6 time slots can be added by clicking the "+"icon.

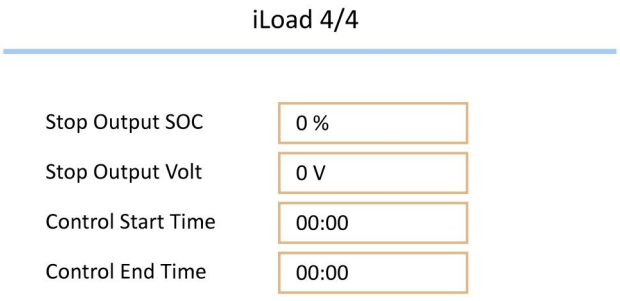
-Type:Defines the behavior of the system during the time slot:

-Discharge:Battery discharges according to the specified parameters.

Example Schedule:

Time Period	Priority Type	Zero Export Disabled	Zero Export Enabled
00:00 – 12:30	Discharge	- Battery discharges if SOC > 20% (up to 50A limit) - Excess PV is exported to the grid	- Same discharge behavior - Excess PV charges battery to avoid waste
12:30 – 16:30	Self Use	- Battery discharges if SOC > 40% when PV cannot meet load - Battery charges if SOC < 36% using PV or grid - Remaining PV is exported	- Same behavior - No export allowed: Excess PV not used for load or charging is curtailed
16:30 – 23:59	Charge	- Battery charges if SOC < 90% using PV + grid (up to 30A) - Excess PV is exported	- Same charging behavior - No export allowed: Any excess PV after charging is curtailed

Work Mode Settings-Page 4(iLoad Mode Settings)



iLoad: The port is used as a dedicated load output, with user-defined working conditions for iLoad control.

Stop Output SOC:
When the battery SOC drops to this threshold, the i load output will automatically disconnect.

Stop Output Volt:
If voltage-based control is selected, the i load output will disconnect when the battery voltage reaches this value.

Control Start Time:
Start of the time window during which the SOC or voltage control conditions are valid.

Control End Time:
End of the time window during which the SOC or voltage control conditions are valid.

9.7 Battery Settings Menu

Battery1 Setting1 – Page 1

Bat Setting1 1/2

Max A Charge	0 A	Bat 1 Type	No_Bat
Max A Disch	0 A	Activate Bat	No
Max Ch Power	0 kW	Comm Type	1-CAN
Max Disch Power	0 kW	Company	
Grid Charge	No	BYD_HV	
Parallel Bat1&Bat2	No	Disch To Grid	No

1.-Max A Charge / Max A Disch:
Set the **maximum battery charging current** and **maximum battery discharging current**, respectively.

-Max Ch Power / Max Disch Power:
Set the **maximum charging power** and **maximum discharging power** for the battery.

-Grid Charge:
Enables or disables battery charging from the utility grid.

2.-Parallel Bat1 & Bat2:
For inverter models with two battery ports, enabling this function allows a single battery to be connected to both **Battery Port 1** and **Battery Port 2** simultaneously.
In this case, the battery communication cable should be connected to the inverter's **BMS1 port**.

-Bat1 Type:
Select the battery type. Available options include: **Lithium**, **Lead-acid**, **DC Source**, and **No Battery**.

-Activate Bat:
Manually triggers battery activation or wake-up.

3.-Comm Type:
Select the battery communication protocol: **CAN** or **RS485**

-Company:
Select the battery manufacturer. The system will automatically match the correct communication protocol based on the selected brand.

Battery1 Setting2 – Page 2

Bat Setting2 2/2

Float V	0.0 V	Ch Ratio	0.00
Equalization V	0.0 V	TEMPCO(mV/C/Cell)	0
Shutdown	0.0 V	Parallel Num	0
High Bat	0.0 V	Bat Capacity	0 Ah
Low Bat	0.0 V		

Float V:
Sets the **battery float charging voltage**

Equalization V:
Sets the **equalization charging voltage**

Shutdown:
Sets the **battery discharge cutoff voltage** for protection

High Bat / Low Bat:
Define the **battery port over-voltage** and **under-voltage protection thresholds**, respectively

The following settings is **only applicable to lead-acid batteries:**

Ch Ratio:
Sets the **charging C-rate** (charging ratio)

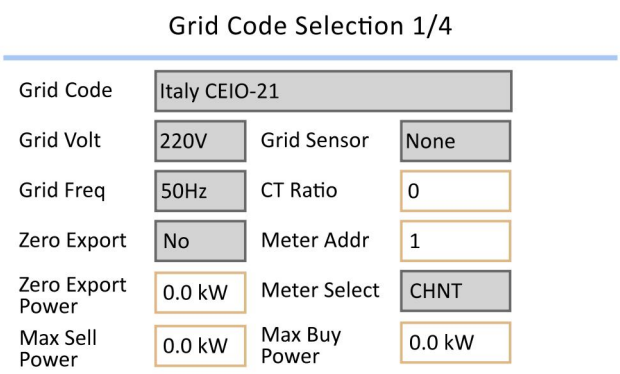
TEMPCO:
Battery **temperature compensation coefficient**

Parallel Num:
Sets the number of parallel-connected battery groups, when used in multiple parallel clusters

Bat Capacity:
Set the battery capacity

9.8 Grid Settings Menu

Grid Settings – Page 1



Grid Code: Select the national grid standard according to the installation region (e.g.,Italy-CEl0-21,Spain UNE217002).

Grid Sensor: Configuration of the grid-side current sampling method.

None:Inverter samples current internally at the grid port.

CT:External current transformer(CT)is used for sampling.

Meter:External smart meter connected via RS485 for grid data acquisition.

Grid Volt:Set the nominal grid voltage according to the country standard.

Grid Freq:Set the nominal grid frequency based on the local grid specification.

CT Ratio:Set the CT transformation ratio.

Zero Export:When enabled,the inverter will limit the power exported to the grid.

The limit is defined by the Zero-export Power setting.

Zero-export Power: Sets the maximum inverter export power.This is only effective when Zero Export is enabled.

Meter Addr: Set the RS485 address of the external energy meter.

Meter Select:Select the meter manufacturer.Please ensure the selected model matches the actual hardware.

Max Sell Power:Sets the maximum allowed output power exported to the grid.

Max Buy Power:Sets the maximum allowed input power drawn from the grid to the inverter

Grid Settings – Page 2

Grid Connect 2/4

10min Grid Volt	0%	L/HVRT Mode	No
Normal Ramp rate	0 s	L/HPRT Mode	No
Normal Connection Time	0 s	P-V Mode	No
Reconnect Ramp rate	0 s	P-Q Mode	No
Reconnection Time	0 s	Q-V Mode	No
PF	0.0	SPF Mode	No

Reserved:This function is reserved.It is not recommended.Please inform the manufacturer/installer before setting up

10min Grid Volt:

Set the voltage protection range within 10 minutes.

Normal Ramp Rate:

Sets the power ramp-up time after inverter startup.

Normal Connection Time:

Sets the time delay before the inverter injects active power to the grid after startup.

Reconnect Ramp Rate:

Sets the ramp-up time for active power after fault recovery.

Reconnection Time:

Sets the reconnection delay time after a fault is cleared.

Grid Settings-Page 3

Grid Protection1 3/4

High volt 1	0.0 %	Low volt 1	0.0 %
High volt 2	0.0 %	Low volt 2	0.0 %
		Low volt 3	0.0 %
High volt time 1	0.00 s	Low volt time 1	0.00 s
High volt time 2	0.00 s	Low volt time 2	0.00 s
		Low volt time 3	0.00 s
High volt recv	0.0 %	Low volt recv	0.0 %

Reserved:This function is reserved.It is not recommended. Please inform the manufacturer/installer before setting up

High Volt 1/High Volt 2:Level 1 and Level 2 overvoltage protection thresholds (as a percentage of nominal voltage).

High Volt Time 1/High Volt Time 2:Time delays for triggering Level 1 and Level 2 overvoltage protection.

High Volt Recv: Grid overvoltage recovery threshold.

Low Volt 1 Low Volt 2:Level1 and Level 2 undervoltage protection thresholds,also defined as percentages of the nominal voltage.

Example

To adjust the acceptable voltage range of the inverter for grid connection:

Simply configure High Volt 1 and Low Volt 1 values.

If the nominal voltage is 240V:

High Volt 1 at 120%-Overvoltage point 288V

Low Volt 1 at 80%-Undervoltage point 192V

Grid Settings-Page 4

Grid Protection2 4/4

High freq 1	0.0 Hz	Low freq 1	0.0 Hz
High freq 2	0.0 Hz	Low freq 2	0.0 Hz
High freq time 1	0.00 s	Low freq time 1	0.00 s
High freq time 2	0.00 s	Low freq time 2	0.00 s
High freq recv	0.0 Hz	Low freq recv	0.0 Hz

Reserved:This function is reserved.It is not recommended.
Please inform the manufacturer/installer before setting up

High Freq 1 and High Freq 2 refer to the first- and second-level over-frequency protection thresholds (in Hz). These values are typically based on the system's nominal frequency (e.g., 50Hz or 60Hz).

High Freq Time 1 and High Freq Time 2 define the delay time

before triggering protection actions when the grid frequency exceeds the corresponding threshold.

High freq recv: The recovery point frequency value of the power grid overfrequency protection. When the frequency recovers from too high to below this value, the system will allow reconnection to the grid or resume operation.

Low Freq 1 and Low Freq 2 represent the first- and second-level under-frequency protection thresholds. If the frequency falls below these values, protection will be triggered accordingly.

Low Freq Time 1 and Low Freq Time 2 set the delay durations before acti vating under-frequency protection once the frequency drops below the set limits.

Low Freq Recv: The recovery threshold for under-frequency protection. The system will reconnect or resume operation when the grid frequency rises above this value.

Example:
If the system nominal frequency is 50Hz, and the settings are as follows:

High Freq 1 = 52Hz, Low Freq 1 = 47Hz
The system will trigger first-level protection when the frequency goes above 52Hz or below 47Hz, based on the defined time delays.

High Freq 2 = 53Hz, Low Freq 2 = 46Hz
More severe deviations will activate second-level protection mechanisms.High Freq 1 and High Freq 2 refer to the first- and second-level over-frequency protection thresholds (in Hz). These values are typically based on the system's nominal frequency (e.g., 50Hz or 60Hz).

High Freq Time 1 and High Freq Time 2 define the delay time before trig gering protection actions when the grid frequency exceeds the correspo nding threshold.

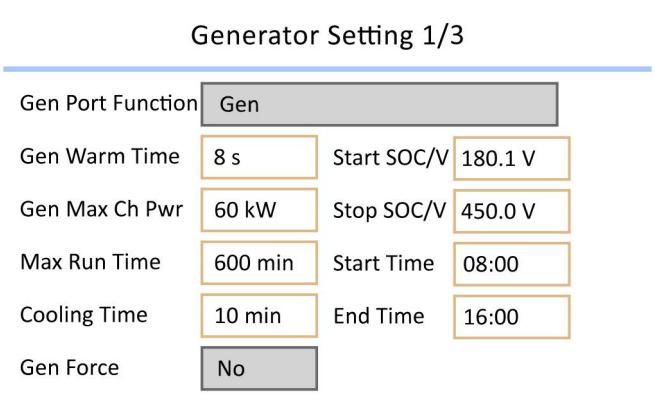
High Freq Recv is the recovery point. The inverter will reconnect to the grid or resume operation only after the frequency drops below this value.

Low Freq 1 and Low Freq 2 represent the first- and second-level under-frequency protection thresholds. If the frequency falls below these values, protection will be triggered accordingly.

9.9 Generator Port Settings Menu

Gen Port Function

Select the functional mode of the generator port. Available options:



Generator setting:The port is used as an input for generator power.Once the generator starts,its power is used to charge the battery.

Sets the Gen Port Function. Available options include: No, Gen, Smart Load, AC Coupling. Select the option to configure the corresponding parameters.

When Gen Port Function is set to Generator, the following parameters become effective:

Gen Warm Time:
Generator warm-up time. After the inverter sends the start signal, it waits for this duration before accepting generator input.

Start SOC / Stop SOC:
Battery SOC thresholds for starting and stopping the generator automatically.

Gen Rated Power:
Maximum power output of the generator.

Max Run Time:
Maximum continuous run time for the generator. Applies when the inverter is automatically controlling the generator.

Cooling Time:
Generator cooldown period after stopping. Applies to inverter-controlled generator operation.

Gen Force:
Force Start Generator function. Should be enabled during the first-time connection of a generator to ensure recognition and activation.

Smart Load Configuration

This configuration page becomes effective only when Gen Port Function is set to smart load.

Smart Load 2/3

Stop Output SOC	0 %
Stop Output Volt	0 V
Control Start Time	00:00
Control End Time	00:00

Smart load:The port is used as a dedicated load output,with user-defined working conditions for smart load control.

Stop Output SOC:
When the battery SOC drops to this threshold, the smart load output will automatically disconnect.

Stop Output Volt:
If voltage-based control is selected, the smart load output will disconnect when the battery voltage reaches this value.

Control Start Time:
Start of the time window during which the SOC or voltage control conditions are valid.

Control End Time:
End of the time window during which the SOC or voltage control conditions are valid.

Note:
Outside the defined time window, the smart load output is not restricted by SOC or voltage conditions, and will follow the same discharge behavior as the EPS output.

AC Coupling Function

AC Coupling 3/3

Start SOC/V	0 %
Stop SOC/V	0 V
Backlash SOC/V	0 %

The AC Coupling function allows the PV inverter connected to the generator port. When conditions are met, the power from the PV inverter can flow into the unit.

Start SOC/V: (used for lithium batteries)
The battery SOC or voltage threshold to activate AC Coupling.

Stop SOC/V: (used for non-lithium batteries)
The battery SOC or voltage threshold to deactivate AC Coupling.

Hysteresis SOC/V: The hysteresis value for the AC Coupling Start/Stop SOC or voltage thresholds.

Generator Details Page

Generator/AC Couple

L1-V: 0.0 V L2-V: 0.0 V
L1-I: 0.0 A L2-I: 0.0 A

Today: 0.0 kWh Total: 0.0 kWh

Total Power: 0.0 kW

(Subject to variation depending on the project configuration)

L1 / L2:
Displays the voltage, current, and power of each phase.

Additional Information:

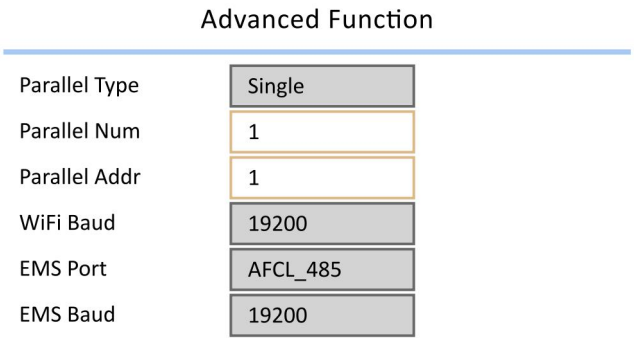
Today's Generated Energy

Total Historical Generation

Total Generator Power Output

9.10 Advanced Settings Menu

This page allows configuration of parallel settings, Wi-Fi baud rate, and EMS communication parameters.



1.Parallel Settings
Parallel Type:
Sets the parallel operation mode of the system.

Parallel Num:
Specifies the total number of inverters in the system (Master + Slaves).

Parallel Addr:
Sets the inverter address in the system.

The master inverter is always set to address 1.

Slave inverters follow in sequential order (2, 3, ...).

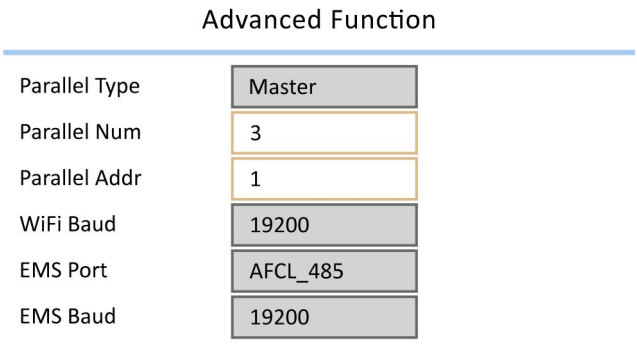
2.WiFi Baud:
Baud rate for communication between inverter and data logger.

EMS Port:
Designates the spare RS485 port on the inverter for EMS (Energy Management System) communication.
Default setting: AFCI_485 (can be changed based on actual use).

EMS Baud:
Sets the communication baud rate for the EMS Port.
Default value: 19200.

3. Parallel Configuration Screens – Example of 3-Inverter System
The following screenshots demonstrate how to configure a parallel system with one master inverter and two slave inverters. All settings must be consistent across devices, except for Parallel Addr, which should be unique per unit.

(1)Master Inverter Configuration



Parallel Type: Master

Parallel Num: 3 (total number of inverters)

Parallel Addr: 1

WiFi Baud: 19200

EMS Port: AFCI_485

EMS Baud: 19200

This inverter is designated as the master unit, responsible for synchronization and control across the entire system.

(2) Slave Inverter 1 Configuration

Advanced Function

Parallel Type	Slave
Parallel Num	3
Parallel Addr	2
WiFi Baud	19200
EMS Port	AFCL_485
EMS Baud	19200

Parallel Type: Slave

Parallel Num: 3

Parallel Addr: 2

WiFi Baud: 19200

EMS Port: AFCI_485

EMS Baud: 19200

This inverter operates as Slave 1, assigned address 2.

(3)Slave Inverter 2 Configuration

Advanced Function

Parallel Type	Slave
Parallel Num	3
Parallel Addr	3
WiFi Baud	19200
EMS Port	AFCL_485
EMS Baud	19200

Parallel Type: Slave

Parallel Num: 3

Parallel Addr: 3

WiFi Baud: 19200

EMS Port: AFCI_485

EMS Baud: 19200

This inverter operates as Slave 2, assigned address 3.
-Important Notes:

1.
All inverters must have the same WiFi Baud rate and EMS Baud rate.

2. Ensure proper wiring and grounding between all units.

3. Make sure firmware versions are consistent across all inverters.

4. Communication cables (e.g. RS485 or CAN) must be securely connected.

9.11 Record Menu

Records

Current Faults | History Faults | Operate Logs

History Fault

Occurred	Alarms Code
'11/15 05:38:58	F67 arm-dcdc comm lost
'11/15 05:38:58	F66 arm-inv comm lost
11/10 17:50:28	F67 arm-dcdc comm lost
11/10 17:50:28	F66 arm-inv comm lost
1/10 13:11:50 0	F68 wifi comm lost
0 13:10:50 23:	F67 arm-dcdc comm lost

1/184

Current Fault

Occurred	Alarms Code
23/11/10 12:03:26	F66-arm-inv comm lost
23/11/10 12:03:26	F67-arm-dcdc comm lost
23/11/10 12:04:16	F68-wifi comm lost

1/1

Operate Logs

Occurred	Description
23/11/01 14:19:54	INV power off
23/11/01 14:19:53	System start
23/11/01 14:19:26	INV power off
23/11/01 14:19:25	System start
23/11/01 14:18:55	INV power off
23/11/01 14:18:54	System start

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Fault and Operation Logs
Current Fault:
Displays the inverter's active faults and alarms.
It includes the timestamp, fault code, and fault description of the current issue.

History Fault:
Shows the inverter's fault and alarm history.
It records the start time, recovery time, and details of each fault event.

Operate Logs:
Contains logs of user operations such as changing inverter modes, powering the system on/off, or adjusting system settings.
These logs are useful for tracking system changes and user actions.

9.12 Device Info Setup Menu

Device Info

Device type:	
Rated Power:	
SN:	
Model:	
ARM:	L1.0S
INV:	
DCDC:	
Run Time:	00 : 00 : 01 : 56

This page displays basic information about the inverter, including:

Device Type:The category or class of the inverter.

Model Number:The specific model identifier.

Serial Number:The unique identifier assigned to each unit.

Software Version:The currently installed firmware/ software version.(ARM,INV,DCDC)

Run Time:Total runtime of the inverter since initial operation.

This page is useful for system diagnostics, firmware tracking, and technical support.

9.13 Factory Setting Menu

Reserved:This function is reserved.It is not recommended.
Please inform the manufacturer/installer before setting up

Factory Setting 1/3

DRM	No	Preventive PID	No
Factory Reset	No	Anti-Islanding	No
AFCI	No	BatTempCompen	No
Bat Warn	No	Bat Wake-up	No
GRID Warn	No	ISO	No
Ext-Control	No	Leakage Curr	No

Factory Setting 2/3

Device Reset	No	MPPT Ctrl Mode	CVT
Record Clear	No	MPPT Para Mode	Indepec
AFCI Alarm Clear	No	MPPT Num	3
Relay self-test	No	MPPT Power	0 kW
Device lock	No	MPPT Disturbed	0
Exec quick	No	CVT Volt	0 V

Factory Setting 3/3

Schedule Enable	No	
Schedule Power	Ch	0.0 kW

10.Trouble Shooting

This section contains information and procedures for solving possible problems with the AP-HL8-15K-P2 series inverters, and provides you with trouble shooting tips to identify and solve most problems that could occur with the SSE-HL8-15K-P2SA-S series inverters.

This section will help you narrow down the source of any problems you may encounter.Please read the following trouble' shooting steps.

Check the warning or fault messages on the System Control Panel or Fault codes on the inverter information panel.If a message is displayed, record it before doing anything further.Attempt the solution indicated in below table.

Error code	Description	Solutions
F01	inv over volt	The inverter is faulty. Turn off the PV, grid, and battery, and wait 5 minutes before turning on the inverter. Check whether the problem is resolved.Or seek help from us, if not go back to normal state.
F02	inv under volt	
F03	short circuit	
F04	inv over curr	
F05	over load	If the load power is too high or the device is downgraded, please reduce the power consumption. Or seek our help if you are unable to return to a normal state.
F07	inv bus over volt	The inverter is faulty. Turn off the PV, grid, a nd battery, and wait 5 minutes before turnin g on the inverter. Check whether the proble m is resolved.Or seek help from us, if not go back to normal state.
F08	inv bus under volt	
F09	bus unbalance	
F10	leakage self-test fail	
F11	leakage over limit	
F12	relay self-test fail	The inverter is faulty. Turn off the PV, grid, and battery, and wait 5 minutes before turning on the inverter. Check whether the problem is resolved.Or seek help from us, if not go back to normal state.
F13	inv locked	
F14	busbar buffer fail	
F15	inv over temp	
F17	parallel total count err	Check whether the parallel communication cable is properly connected.Or seek help from us, if not go back to normal state.
F18	parallel comm fail	
F19	parallel SW mismatch	
F20	parallel HW mismatch	
F21	parallel model mismatch	
F22	parallel para sync	
F23	master conflict	
F24	slave id conflict	
F25	parallel signal err	
F26	master no salve	
F33	inv flash fault	The internal communication and storage are abnormal. Turn off the PV, grid, and battery, and wait 5 minutes before turning on the inverter. Check whether the problem is resolved.Or seek help from us, if not go back to normal state.
F34	inv-dc comm fault	
F35	inv phase-locked	
F36	inner para match fail	

F38	inv master fault	The internal communication and storage are abnormal. Turn off the PV, grid, and battery, and wait 5 minutes before turning on the inverter. Check whether the problem is resolved.Or seek help from us, if not go back to normal state.
F39	inv parallel comm fail	
F40	inv parallel signal err	
F41	inv curr DC component high	
F42	inv parallel overload	
F43	inv load curr unbalance	
F44	inv parallel system fault	
F49	dc bus over volt	The inverter is faulty. Turn off the PV, grid, and battery, and wait 5 minutes before turning on the inverter. Check whether the problem is resolved.Or seek help from us, if not go back to normal state.
F50	dc bus under volt	
F51	midbus over volt	
F52	midbus under volt	
F53	dc bat disch OC	
F54	dc bat ch OC	
F55	LLC HW over curr	
F56	dc bat over volt	
F57	dc bat under volt	
F60	bat reverse connect	Check whether the positive and negative terminals of the battery power line are connected in reverse mode.
F63	dc over temp	Ensure that the inverter is installed in a place without direct sunlight. Make sure the inverter is installed in a cool/well-ventilated area. Ensure that the inverter is installed vertically and the ambient temperature is lower than the upper limit of the inverter temperature.
F64	Fan fault	Please first power off the inverter,check whether the software version is the latest one with us.If not,please upgrade firmware.
F65	meter comm lost	Check whether the meter communication line is normal.
F66	arm-inv comm lost	The internal communication and storage are abnormal. Turn off the PV, grid, and battery, and wait 5 minutes before turning on the inverter. Check whether the problem is resolved.Or seek help from us, if not go back to normal state.
F67	arm-dcdc comm lost	
F68	wifi comm lost	Please check wifi LED light status.Or seek help from us, if not go back to normal state.
F69	bms1-can comm lost	Make sure the battery you use is compatible with the inverter. Check whether the communication cables or ports between the battery and the inverter are properly connected
F70	dsp para match err	The internal communication and storage are abnormal. Turn off the PV, grid, and battery, and wait 5 minutes before turning on the inverter. Check whether the problem is resolved.Or seek help from us, if not go back to normal state.
F71	EPO	Seek help from us, if not go back to normal state.

F72	ambient temp high	Ensure that the inverter is installed in a place without direct sunlight. Make sure the inverter is installed in a cool/well-ventilated area. Ensure that the inverter is installed vertically and the ambient temperature is lower than the upper limit of the inverter temperature.
F73	bms1-485 comm lost	Make sure the battery you use is compatible with the inverter. Check whether the communication cables or ports between the battery and the inverter are properly connected
F74	arm flash error	The internal communication and storage are abnormal. Turn off the PV, grid, and battery, and wait 5 minutes before turning on the inverter. Check whether the problem is resolved.Or seek help from us, if not go back to normal state.
F75	NTC disconnect	
F76	dsp para set fail	
F81	dc-inv comm lost	
F82	dc flash fault	
F83	dc fault locked	
F86	PV1 over volt	The inverter is faulty. Turn off the PV, grid, and battery, and wait 5 minutes before turning on the inverter. Check whether the problem is resolved.Or seek help from us, if not go back to normal state.
F87	PV2 over volt	
F88	PV1 over curr	
F89	PV2 over curr	
F90	PV1 reverse connect	Check whether the PV cables are correctly connected.
F91	PV2 reverse connect	
F93	PV3 overvoltage protection	
F94	PV3 overcurrent protection	
F95	PV3 reverse connect protection	
F96	DC insulation fault	Seek help from us, if not go back to normal state.
Warning code	**Description**	**Solutions**
W01	Overload alarm	If the load power is too high or the device is downgraded, please reduce the power consumption. Or seek our help if you are unable to return to a normal state.
W02	INV overtemperature alarm	Ensure that the inverter is installed in a place without direct sunlight. Make sure the inverter is installed in a cool/well-ventilated area. Ensure that the inverter is installed vertically and the ambient temperature is lower than the upper limit of the inverter temperature.
W03	Grid over frequency alarm	If the power grid is abnormal, the inverter automatically returns to the normal working state after the power grid recovers.
W04	Grid under frequency alarm	
W05	Grid overvoltage alarm	

W06	Grid undervoltage alarm	Or seek help from us, if not go back to normal state. *GARDA(Power grid amplitude quick check alarm)
W07	Gen freq abnormal alarm	Measure the generator output voltage using a multimeter. Ensure the generator is operating within its rated voltage (typically 220/230V or 380/400V depending on the system). Check for loose or faulty wiring between the generator and inverter input.
W08	DC BAT overvoltage alarm	If the internal fault of the lithium battery occurs, Turn off the PV, grid, and battery, and wait 5 minutes to turn on the inverter and lithium battery. Check whether the problem is resolved. Or seek help from us, if not go back to normal state.
W09	DC BAT undervoltage alarm	
W10	BAT none-connected	
W11	DC over-temp alarm	
W12	grid phase rapid inspection	If the power grid is abnormal, the inverter automatically returns to the normal working state after the power grid recovers. Or seek help from us, if not go back to normal state.
W13	Grid fast inspection alarm	
W14	BAT Ch&Disch prohibited alarm	If the internal fault of the lithium battery occurs, Turn off the PV, grid, and battery, and wait 5 minutes to turn on the inverter and lithium battery. Check whether the problem is resolved. Or seek help from us, if not go back to normal state.
W19	Grid phase deficiency alarm	If the power grid is abnormal, the inverter automatically returns to the normal working state after the power grid recovers. Or seek help from us, if not go back to normal state. *GARDA(Power grid amplitude quick check alarm)
W20	Grid long time OV alarm	
W21	Grid phase abnormal alarm	
W22	Grid amplitude fast inspection alarm	
W23	Grid DC component fast detection	If the internal fault of the lithium battery occurs, Turn off the PV, grid, and battery, and wait 5 minutes to turn on the inverter and lithium battery. Check whether the problem is resolved. Or seek help from us, if not go back to normal state.
W24	Grid phase fast inspection alarm	Check the generator frequency output with a frequency meter.

		Make sure the generator engine speed is sta ble (RPM too high or low will affect frequenc y). Adjust the engine governor if needed. Avoid overloading the generator, which may cause frequency fluctuations.
W25	PV1 undervoltage alarm	If the internal fault of the lithium battery occurs, Turn off the PV, grid, and battery, and wait 5 minutes to turn on the inverter and lithium battery. Check whether the problem is resolved. Or seek help from us, if not go back to normal state.
W26	PV2 undervoltage alarm	
W27	PV3 undervoltage alarm	

NOTICE

If your inverters information panel is not displaying a Fault light, check the following list to make sure that the present state of the installation allows proper operation of the unit.

ls the inverter located in a clean, dry, and adequately ventilated place?

Have the DC input breakers been opened?

Are the cables adequately sized and short enough?

Are the input and output connections and wiring in good condition?

Are the configurations settings correct for your particular installation?

Are the display panel and the communications cable properly connected and undamaged?

Contact Customer Service for further assistance. Please be prepared to describe details of your system installation and provide the model and serial number of the unit.

11.Maintenance

11.1 Power ON the Inverter for first time

DANGER

Important: Please follow these steps to turn on the inverter.

Step 1: make the PV SWITCH to the ON position.

Step 2: Turn on the battery. Turn on the DC switch between battery and inverter.

Step 3: Turn on the AC circuit breaker between the inverter port and the power grid.

Step 4: Open the AC circuit breaker between the inverter load port and the emergency load.

Step 5: Manually send the startup command through the APP (for safety, it can be set to automatic startup after the initial power-on).

Step 6: The inverter should start running now.

11.2 Power Off the Inverter

DANGER

- Power off the inverter before operations and maintenance. Otherwise, the inverter may shocks or occur.
- Delayed discharge. Wait until the components are discharged after power off.

Step 1: Turn off the AC breaker on the ON-GRID side of the inverter.

Step 2: Turn off the AC breaker on the BACK-UP side of the inverter.

Step 3: Turn off the battery breaker between the inverter and the battery.

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

11.3 Removing the Inverter

WARNING

- Make sure that the inverter is powered off.
- Wear proper PPE before any operations.

Step 1: Disconnect all the cables, including DC cables, AC cables, communication cables, the communication module, and PE cables.

Step 2: Remove the inverter from the mounting plate.

Step 3: Remove the mounting plate.

Step 4: Store the inverter properly. If the inverter needs to be used later, ensure that the storage conditions meet the requirements.

11.4 Disposing of the Inverter

If the inverter cannot work anymore, dispose of it according to the local disposal requirements,
The inverter cannot be disposed of together with household waste.

WARNING

- Make sure that the inverter is powered off.
- Wear proper PPE before any operations.

12 Appendix

12.1 Routine Maintenance

Maintaining Item	Maintaining Method	Maintaining Period
System Clean	Check the heat sink, air intake, and air outlet for foreign matter or dust.	Once6-12 months
PV Switch	Turn the DC switch on and off ten consecutive times to make sure that it is working properly.	Once a year
Electrical Connection	Check whether the cables are securely connected. Check whether the cables are broken or whether there is any exposed copper core.	Once 6-12 months
Sealing	Check whether all the terminals and ports are properly sealed. Reseal the cable hole if it is not sealed or too big.	Once a year

12.2 Limited Warranty

The warranty does not apply to any Product or Product part that has been modified or damaged by the following:

- Installation or Removal (examples: wrong voltage batteries, connecting batteries backward, damage due to water/rain to electronics, preventable damage to solar wires.)
- Alteration or Disassembly.
- Normal Wear and Tear.
- Accident or Abuse.
- Unauthorized Firmware updates/software updates or alterations to the software code.
- Corrosion.
- Repair or service provided by an unauthorized repair facility.
- Operation or installation contrary to manufacturer product instructions.
- Fire, Floods, or Acts of Nature.
- Shipping or Transportation.
- Incidental or consequential damage caused by other components of the power system.
- Any product whose serial number has been altered, defaced, or removed.

WARNING

SOSEN expressly disclaims any responsibility for performance issues arising from improper installation. Installers and users are solely responsible for following proper installation procedures outlined in provided documentation. We disclaims any liability for changes in the installation that might result in electrical malfunctions or any other issues related to the our product.