xStorage Hybrid system

xStorage Hybrid Three Phase Inverter



Powering Business Worldwide

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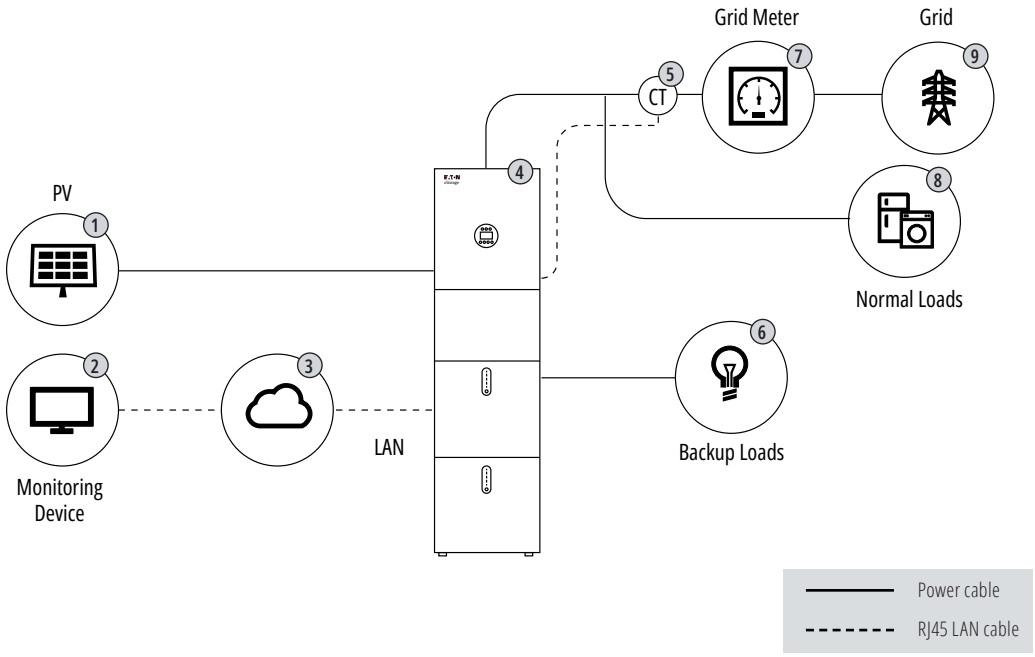
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1. Introduction

1.1 System Introduction

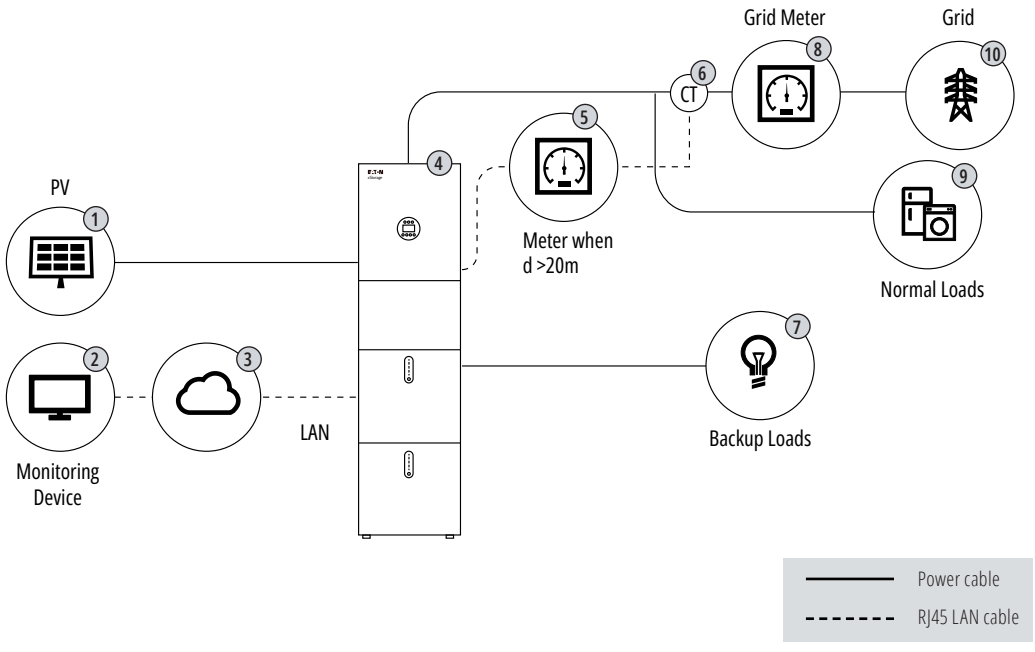
XSTHS3P-8K / 10K / 10KBE, 12K can be applied in DC- coupled systems (mostly new installation), AC-coupled systems (mostly retrofit) and Hybrid-coupled systems (mostly retrofit, and PV capacity-increase), as the following schemes show:

Figure 1a. Diagram of the xStorage system coupled with direct current Diagram when the cable length between the main panel and the inverter is less than or equal to 20 m (d < 20 m).



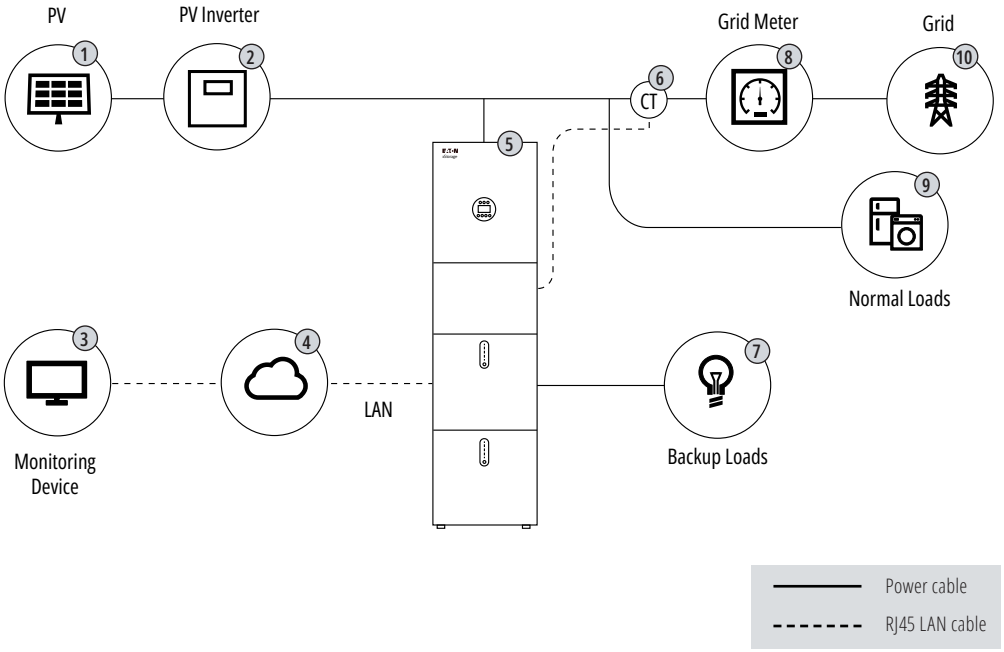
Tag	Description
1	Solar panels that converts sunlight into electricity
2	Monitoring device that performs various functions including tracking system performance, ensuring safety, and prolonging the lifespan of the system
3	Local Area Network (LAN) is used for data communication to monitor and control the system's components.
4	xStorage system with 3 phase inverter
5	Current transformer that is used to measure the alternating current (AC)
6	Backup loads (lights, refrigerator)
7	Grid meter that measures the energy flow to and from the grid
8	Normal loads (home appliances TV, washing machine)
9	Utility grid that supplies power when power from the solar panels and battery is not sufficient

Figure 1b. Diagram of the xStorage system coupled with direct current Diagram when the cable length between the main panel and the inverter is greater than 20 m (d > 20 m).



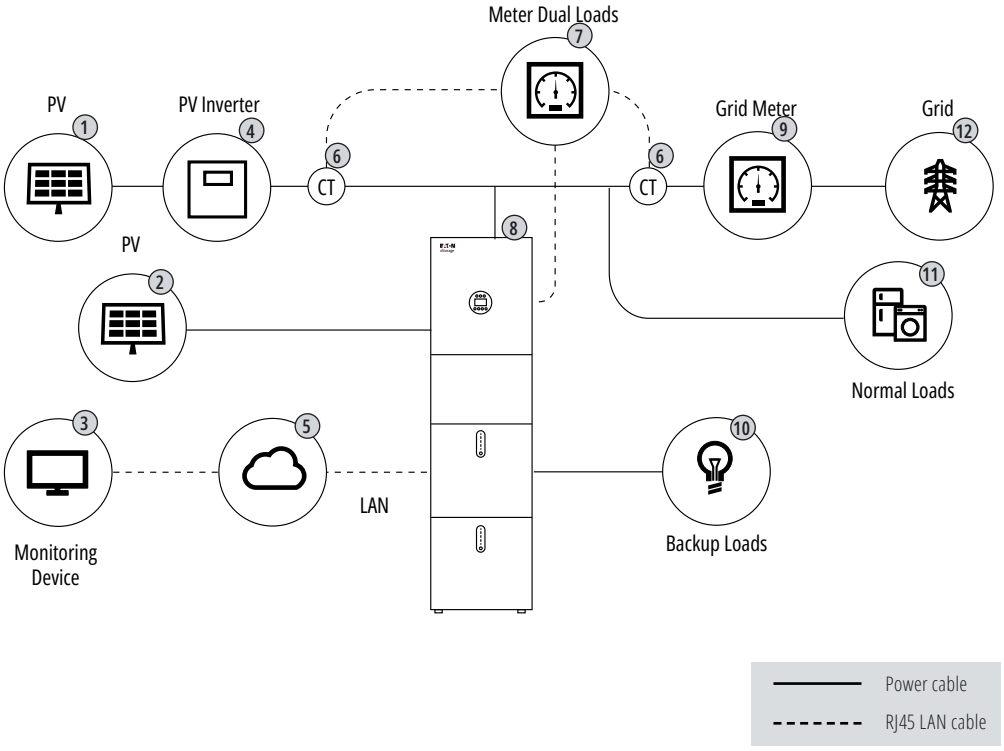
Tag	Description
1	Solar panels that converts sunlight into electricity
2	Monitoring device that performs various functions including tracking system performance, ensuring safety, and prolonging the lifespan of the system
3	Local Area Network (LAN) is used for data communication to monitor and control the system's components.
4	xStorage system with 3 phase inverter
5	Meter when the cable length between the main panel and inverter is greater than 20 meters
6	Current transformer that is used to measure the alternating current (AC)
7	Backup loads (lights, refrigerator)
8	Grid meter that measures the energy flow to and from the grid
9	Normal loads (home appliances TV, washing machine)
10	Utility grid that supplies power when power from the solar panels and battery is not sufficient

Figure 2. AC-coupled storage system-scheme



Tag	Description
1	Solar panels that converts sunlight into electricity
2	PV inverter that converts the DC electricity from solar panels into usable AC electricity for homes and businesses
3	Monitoring device that performs various functions including tracking system performance, ensuring safety, and prolonging the lifespan of the system
4	Local Area Network (LAN) is used for data communication to monitor and control the system's components
5	xStorage system with 3 phase inverter
6	Current transformer that is used to measure the alternating current (AC)
7	Backup loads (lights, refrigerator)
8	Grid meter that measures the energy flow to and from the grid
9	Normal loads (home appliances TV, washing machine)
10	Utility grid that supplies power when power from the solar panels and battery is not sufficient

Figure 3. Hybrid-coupled storage system-scheme



Tag	Description
1	Solar panels that converts sunlight into electricity
2	Private consumer solar panels that converts sunlight into electricity
3	Monitoring device that performs various functions including tracking system performance, ensuring safety, and prolonging the lifespan of the system
4	PV inverter that converts the DC electricity from solar panels into usable AC electricity for homes and businesses
5	Local Area Network (LAN) is used for data communication to monitor and control the system's components
6	Current transformers that are used to measure the alternating current (AC)
7	Dual loads meter that measures both the energy consumed from the grid and the energy fed back into the grid
8	xStorage system with 3 phase inverter
9	Grid meter that measures the energy flow to and from the grid
10	Backup loads (lights, refrigerator)
11	Normal loads (home appliances TV, washing machine)
12	Utility grid that supplies power when power from the solar panels and battery is not sufficient

1.2 Operation Modes

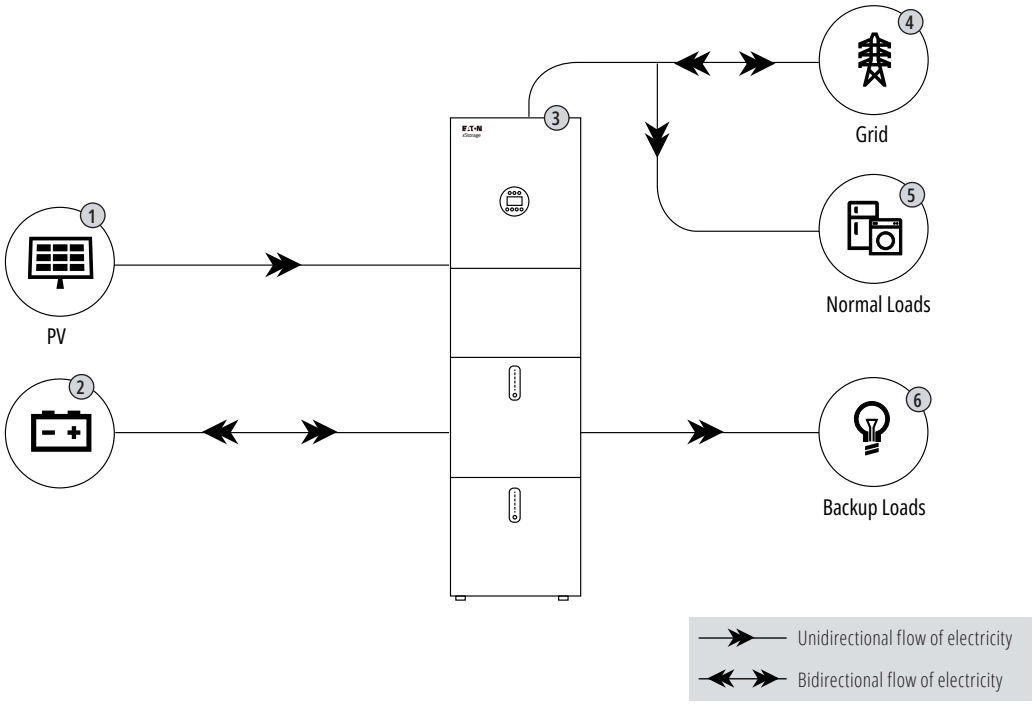
There are three basic modes that end users can choose via inverter screen/APP.

SELF CONSUME: The energy generated by the solar panels will be used in the following order: Feed the home loads; Charge the battery and then, feed into the grid.

When the sun is off, the load is supported by battery to enhance self-consumption.

If the power supply from the batteries is not sufficient, the grid will support the load demand.

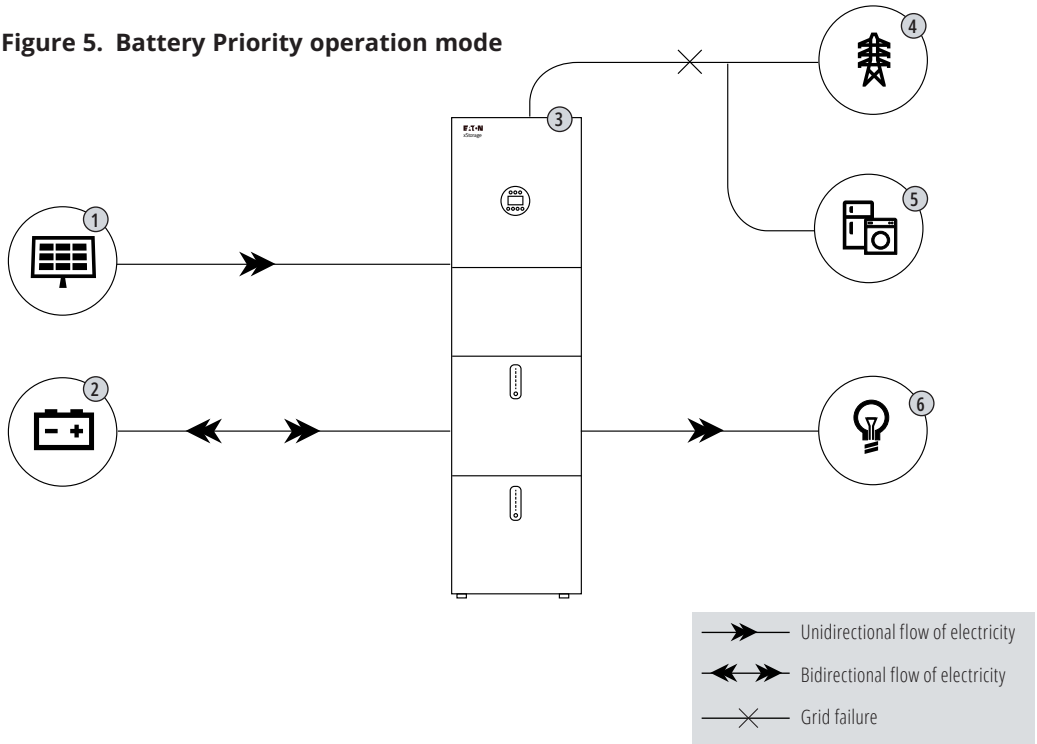
Figure 4. Self-Consumption operation mode



Tag	Description
1	Solar panels that converts sunlight into electricity
2	Battery that stores energy
3	xStorage system with 3 phase inverter
4	Utility grid that supplies power when power from the solar panels and battery is not sufficient
5	Normal loads (home appliances TV, washing machine)
6	Backup loads (lights, refrigerator)

BAT PRIORITY: Under this mode, the battery is only used as a backup power supply when the grid fails and as long as the grid works, the batteries are not used to power the load. The battery will get charged with the power generated by the PV system or from the grid.

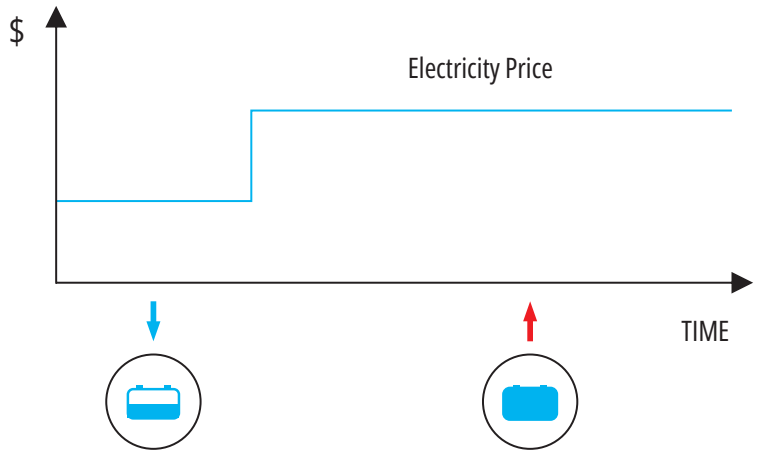
Figure 5. Battery Priority operation mode



Tag	Description
1	Solar panels that converts sunlight into electricity
2	Battery that stores energy
3	xStorage system with 3 phase inverter
4	Utility grid that supplies power when power from the solar panels and battery is not sufficient
5	Normal loads (home appliances TV, washing machine)
6	Backup loads (lights, refrigerator)

PEAK SHIFT: In PEAK SHIFT mode, you can determine the charging and discharging time of the battery yourself. You can set the time through the integrated EMS. For more information, see the WORK MODE subsection under SYS SETTING. You can also set the maximum and minimum power drawn from the grid. When this feature is enabled, the inverter will continuously draw power from the grid.

Figure 6. Peak Shift operation mode



1.3 Safety Introduction

1.3.1 Manual Keeping

This manual contains important information about operating the system. Before operating, please read it very carefully. The system should be operated in strict accordance with the instructions in the manual, otherwise it can cause damages or loss to equipment, personnel and property. This manual should be kept carefully for maintenance and reparation.

1.3.2 Operator Requirements

The operators require professional qualification or proper training.

The operators must be familiar with the whole storage system, including compositions and working principles of the system.

The operators must be familiar with the Product Instruction.

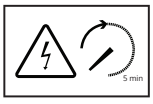
While maintaining, the maintainer is not allowed to operate any equipment until all the equipment has been turned off and fully discharged.

1.3.3 Protection of Warning Sign

The warning signs contain important information for the system to operate safely, and it is strictly prohibited to torn or damage them. Ensure that the warning signs are always well-functioned and correct placed. The signs must be replaced immediately when damaged.



This sign indicates a hazardous situation which, if not avoided, could result in death or serious injury!



The XSTHS3P-8K / 10K / 10KBE/ 12K must not be touched or put into service until 5 minutes after it has been switched off or disconnected to prevent an electric shock or injury.



This sign shows danger of hot surface!



Refer to the operating instructions.

1.3.4 Setting of Warning Sign for Safety

During instruction, maintenance, and repair, follow the instructions below to prevent non-specialist personnel from causing misuse or accident:

- Obvious signs should be placed at front switch and rear-level switch to prevent accidents caused by false switching.
- Warning signs or tapes should be set near operating areas.
- The system must be reinstalled after maintenance or operation.

1.3.5 Measuring Equipment

To ensure the electrical parameters to match requirements, related measuring equipment are required when the system is being connected or tested. Ensure that the connection and use matched specification to prevent electric arcs or shocks.

1.3.6 Moisture Protection

It is very likely that moisture may cause damages to the system. Repair or maintaining activities in wet weather should be avoided or limited.

1.3.7 Operation after Power Failure

The battery system is part of the energy storage system which stores life-threatening high voltage even when the DC side is switched off. Touching the battery outlets is strictly prohibited. The inverter can keep a life-threatening voltage even after disconnecting it from the DC and / or AC side. Therefore, for safety reasons, it must be tested with a properly calibrated voltage tester before an installer works on the equipment.

1.3.8 Information on environmental conservation and recycling



This symbol indicates that the marked device must not be disposed of as normal household waste. It must be disposed of at a collection center for the recycling of electric and electronic equipment.

1.4 Safety Introduction

1.4.1 Hazard Information

Classification of the hazardous chemical

Exempt from classification according to Australian WHS regulations.

Other hazards

This product is a Lithium Iron Phosphate Battery with certified compliance under the UN Recommendations on Transport of Dangerous Goods, Manual of Tests and Criteria, Part III, subsection 38.3. For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage. However, if the product is exposed to afire, added mechanical shocks, decomposed, added electric stress by misuse, the gas release vent will be operated. The battery cell case will be breached at the extreme. Hazardous materials may be released. Moreover, if heated strongly by the surrounding fire, acrid or harmful fume may be emitted.

1.4.2 Safety Datasheet

For detailed information please refer to the provided battery safety datasheet.

1.5 General Precautions



DANGER

Danger to life due to high voltages of the PV array, battery and electric shock. When exposed to sunlight, the PV array generates dangerous DC voltage which will be present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks. If you disconnect the DC connectors from the system under load, an electric arc may occur leading to electric shock and burns.

- Do not touch uninsulated cable ends. Do not touch the DC
- Do not open the inverter and battery.
- Do not wipe the system with damp cloth.
- Have the system installed and commissioned by qualified people with the appropriate skills only.
- Prior to performing any work on the inverter or the battery pack, disconnect the inverter from all voltage sources as described in this document.



WARNING

Risk of chemical burns from electrolyte or toxic gases. During standard operation, no electrolyte shall leak from the battery pack and no toxic gases shall form. Despite careful construction, if the Battery Pack is damaged or a fault occurs, it is possible that electrolyte may be leaked or toxic gases formed.

- Do not install the system in any environment of temperature below -10°C or over 50°C and in which humidity is over 95%.
- Do not touch the system with wet hands.
- Do not put any heavy objects on top of the system.
- Do not damage the system with sharp objects.
- Do not install or operate the system in potentially explosive atmospheres or areas of high humidity.
- Do not mount the inverter and the battery pack in areas containing highly flammable materials or gases.
- If moisture has penetrated the system (e.g. due to a damaged enclosure), do not install or operate the system.
- Do not move the system when it is already connected with battery modules. Secure the system to prevent tipping with restraining straps in your vehicle.
- The transportation of XSTHSBP-5.1 must be made by the manufacturer or
- An instructed personal. These instructions shall be recorded and repeated.
- A certified ABC fire extinguisher with minimum capacity of 2kg must be carried along when transporting.
- It is totally prohibited to smoke in the vehicle as well as close to the vehicle when loading and unloading.
- For the exchange of a battery module, please request for new hazardous goods packaging if needed, pack it and let it be picked up by the suppliers.
- In case of contact with electrolyte, rinse the affected areas immediately with water and consult a doctor without delay.



CAUTION

Risk of injury through lifting or dropping the system. The inverter and battery are heavy. There is risk of injury if the inverter or battery is lifted incorrectly or dropped during transport or when attaching to or removing from the wall.

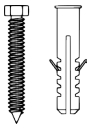
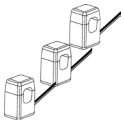
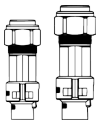
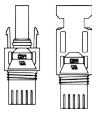
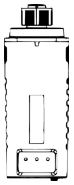
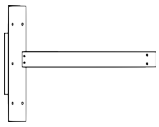
- Lifting and transporting the inverter and battery must be carried out by more than 2 people.

1.6 Parts List

Check the following parts list to ensure it is complete.

Delivers a total system separately on site to client, this consists of:

Figure 7. Parts list included in XSTHS3P-8K/10K/12K Packaging

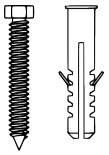
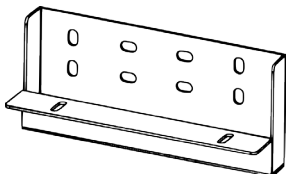
						
6x M5*12	5x ST6.3*50 5x D10*50	2x CT Connector	3x CT and com cable	2x AC Connector	1x DRM Connector	5x M6 Gasket
						
4x MC4	1x Stick Logger	1x Mounting Panel	1x COM Connector	1x User Manual	1x Parallel connector (Optional)	

Accessory - Cable (XSTHS3P010CK2BP for a capacity of 10.24kWh)

Battery Pack Components

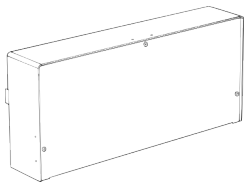
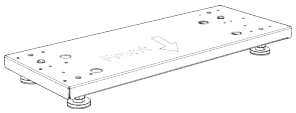
A minimum of two battery packs are necessary for an XSTHS3P-8K/10K/12K energy storage system. A battery pack delivery includes the following.

Figure 8. Battery Pack Components

		
2x M5*12	4x ST6.3*50 4x D10*50	4x M6 Gasket
		
1x Mounting Kit		

You must order a bottom support [XSTHSBPBSV1W] for installation. For an XSTHS3P-8K/10K/12K energy storage system with four, six, or eight battery packs, battery top covers [XSTHSBPCOV1W] are necessary. The quantity of battery top covers and floor stand supports is determined by the number of battery packs.

Figure 9. Mounting and Battery Accessories Components

	
Battery Top Cover (XSTHSBPCOV1W)	Floor Stand Support [XSTHSBPBSV1W]

Cables

Here are the cables necessary for connections. The specifications and quantity of cables depends on the number of battery packs ordered.

Table 1. Cables for XSTHSBP-5.1-16S-100A-F

Cable		Quantity			
		2 x	4 x	6 x	8 x
		PACK 5.1	PACK 5.1	PACK 5.1	PACK 5.1
PE	520 mm	1	2	3	5
	1000 mm	1	1	1	1
	2000 mm	0	1	2	2
COM	585 mm	1	2	3	5
	600 mm	1	1	1	1
	2600 mm	0	1	2	2
BAT(black)	260 mm	1	1	1	1
	490 mm	0	2	2	4
	850 mm	1	0	1	1
	1600 mm	0	1	0	0
	2600 mm	0	0	2	2
BAT. (red)	260 mm	1	0	0	0
	490 mm	0	2	2	4
	850 mm	1	0	0	0
	1100 mm	0	1	0	0
	1600 mm	0	0	1	0
	2600 mm	0	1	3	2
	3500 mm	0	0	0	2

Table 2. Accessories table

Accessories	Quantity			
	2 x	4 x	6 x	8 x
	PACK 5.1			
Bottom Support	1	2	3	3
Battery Cover	0	1	2	3

Figure 10. Preparation tools and instruments

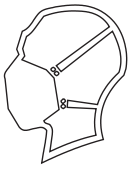
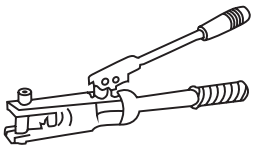
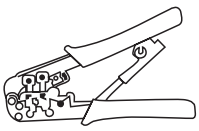
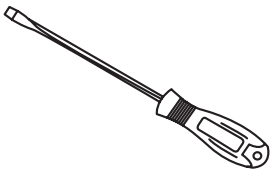
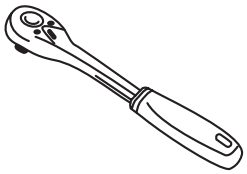
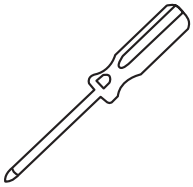
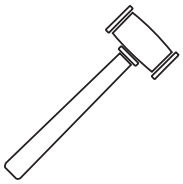
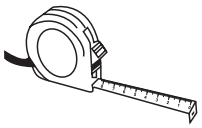
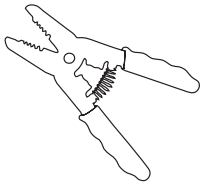
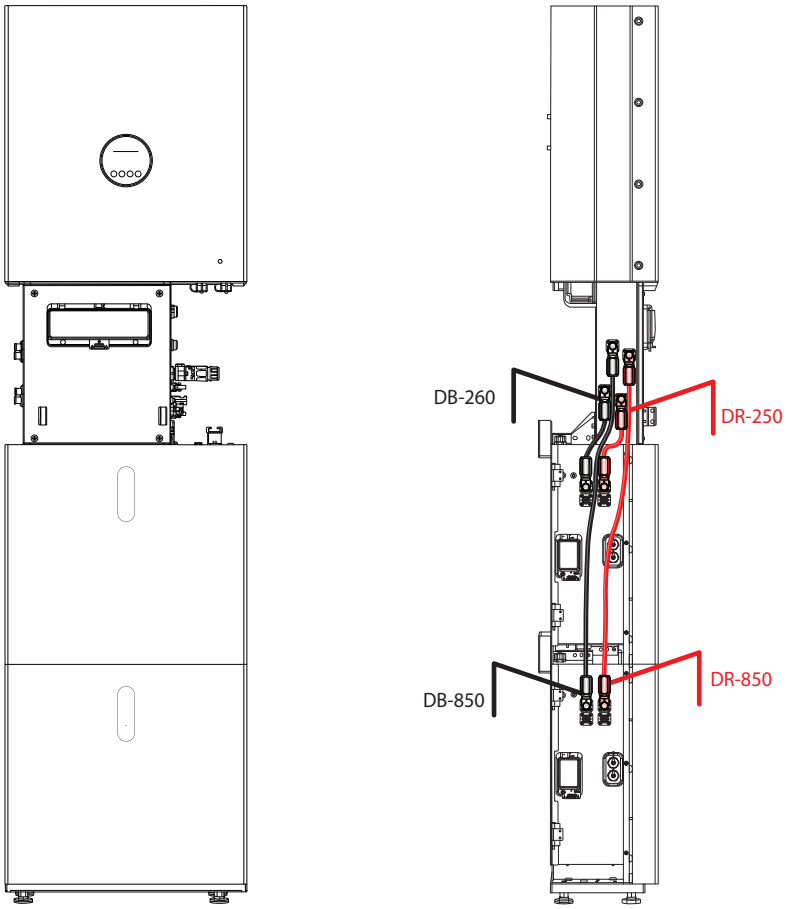
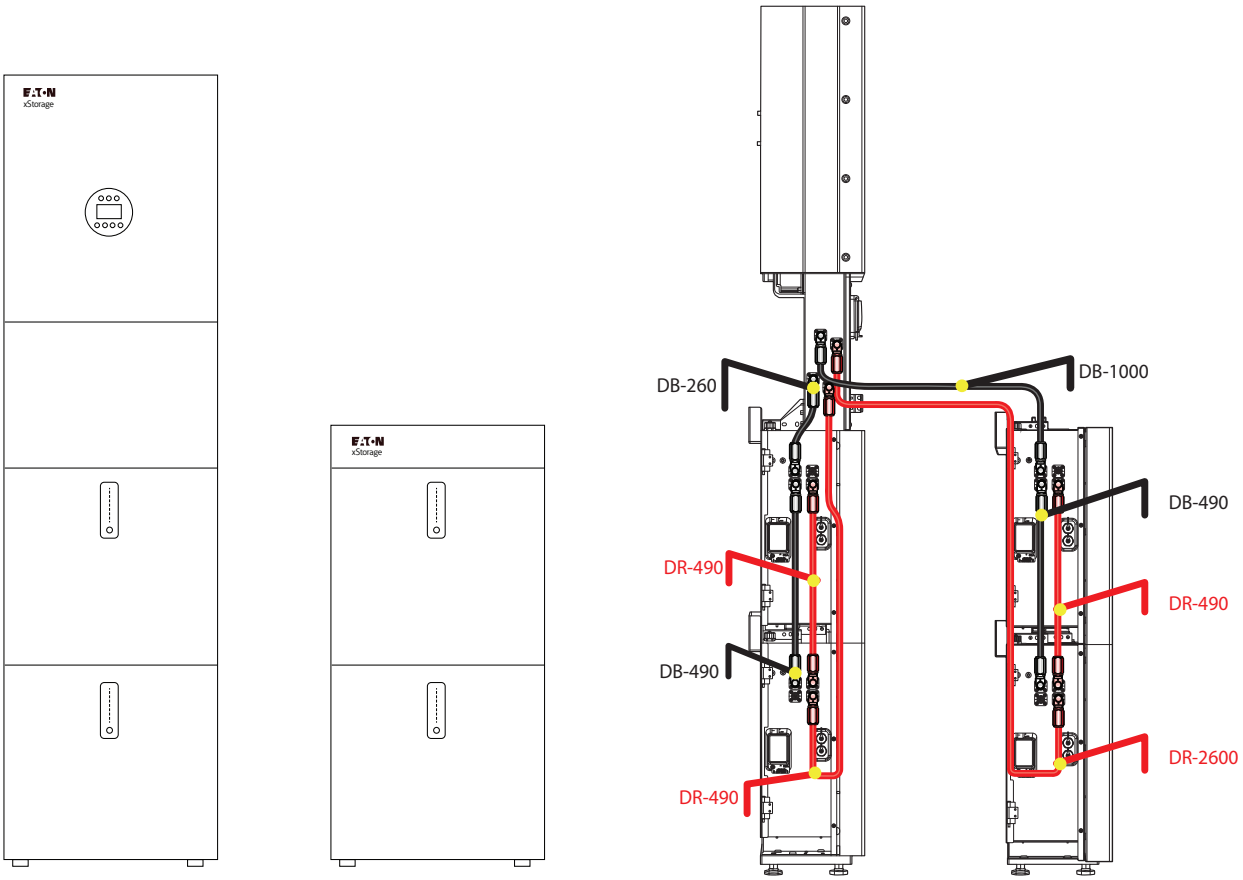
 Protective Goggles	 Protective Gloves	 Protective Mask
 Protective Shoes	 Wire Clamp	 Cable Crimper
 ϕ10mm Power Drill	 Flat-head Screwdriver	 Torque Wrench
 Cross Screwdriver	 Multi-meter	 Rubber Mallet
 Leveling Instrument	 Tape Measure	 Marker Pen
 Wire Stripper	 ON GRID Wire (10 AWG or 6 mm^2)	 BACKUP Wire (12 AWG or 4 mm^2,)
 PV Wire (12 AWG or 4 mm^2, max. Voltage 1,000 V)		

Figure 11. Accessory - Cable kit XSTHS3P010CK2BP



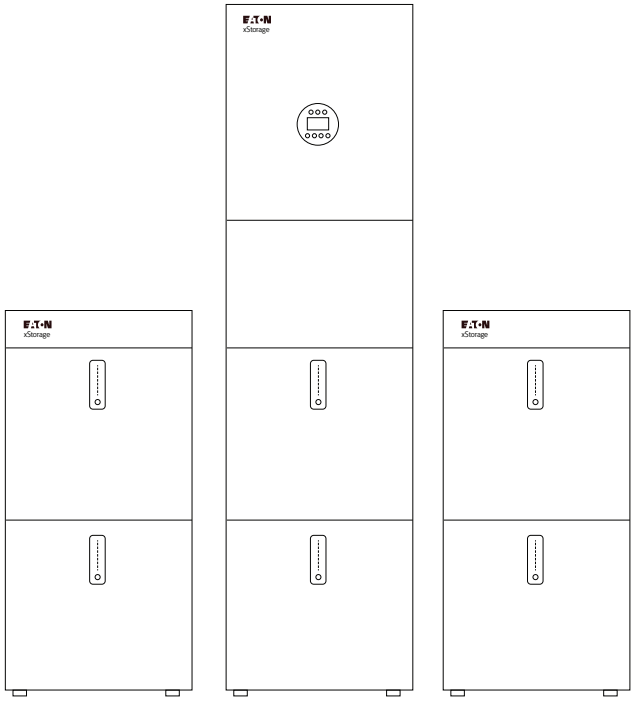
Accessory - Cable kit for Battery Pack 20.4 kWh

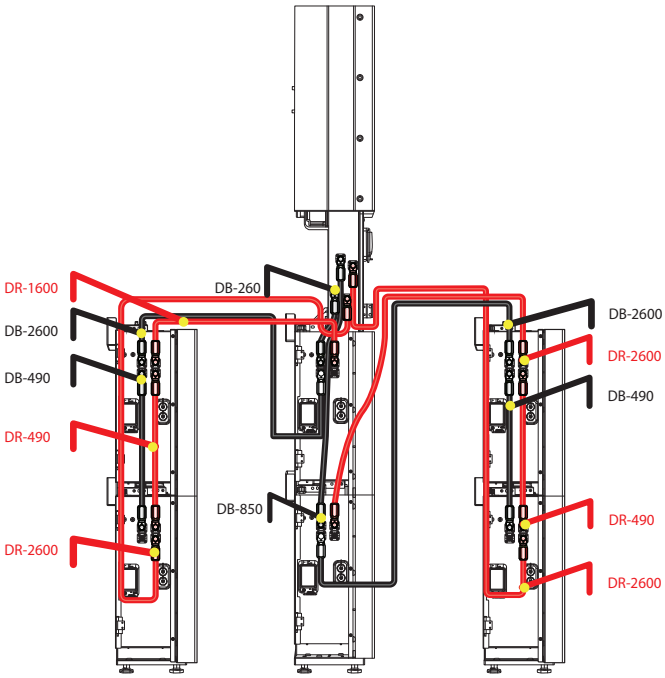
Figure 12. Accessory - Cable kit XSTHS3P010CK4BP



Accessory - Cable kit for Battery Pack 30.6kWh

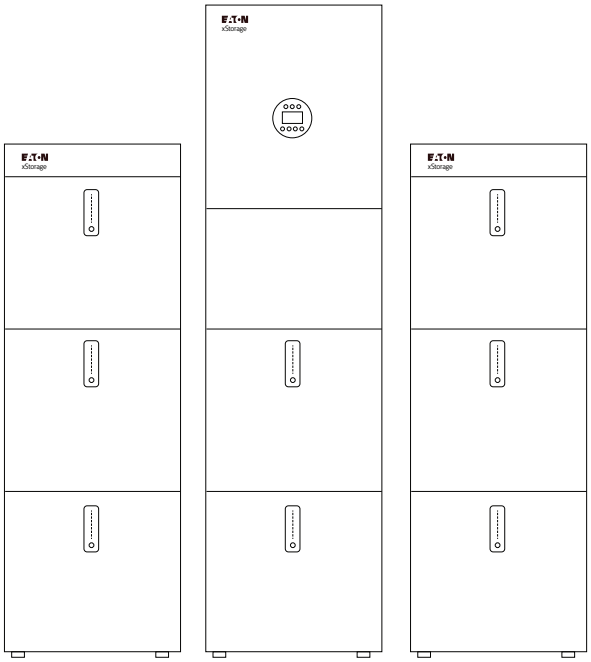
Figure 13. Accessory - Cable kit XSTHS3P010CK6BP

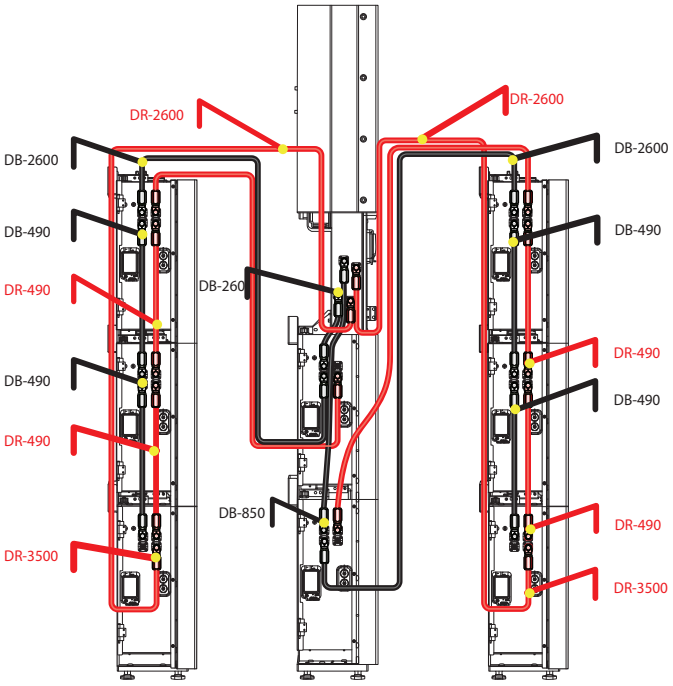




Accessory - Cable kit for Battery Pack 40.8kWh

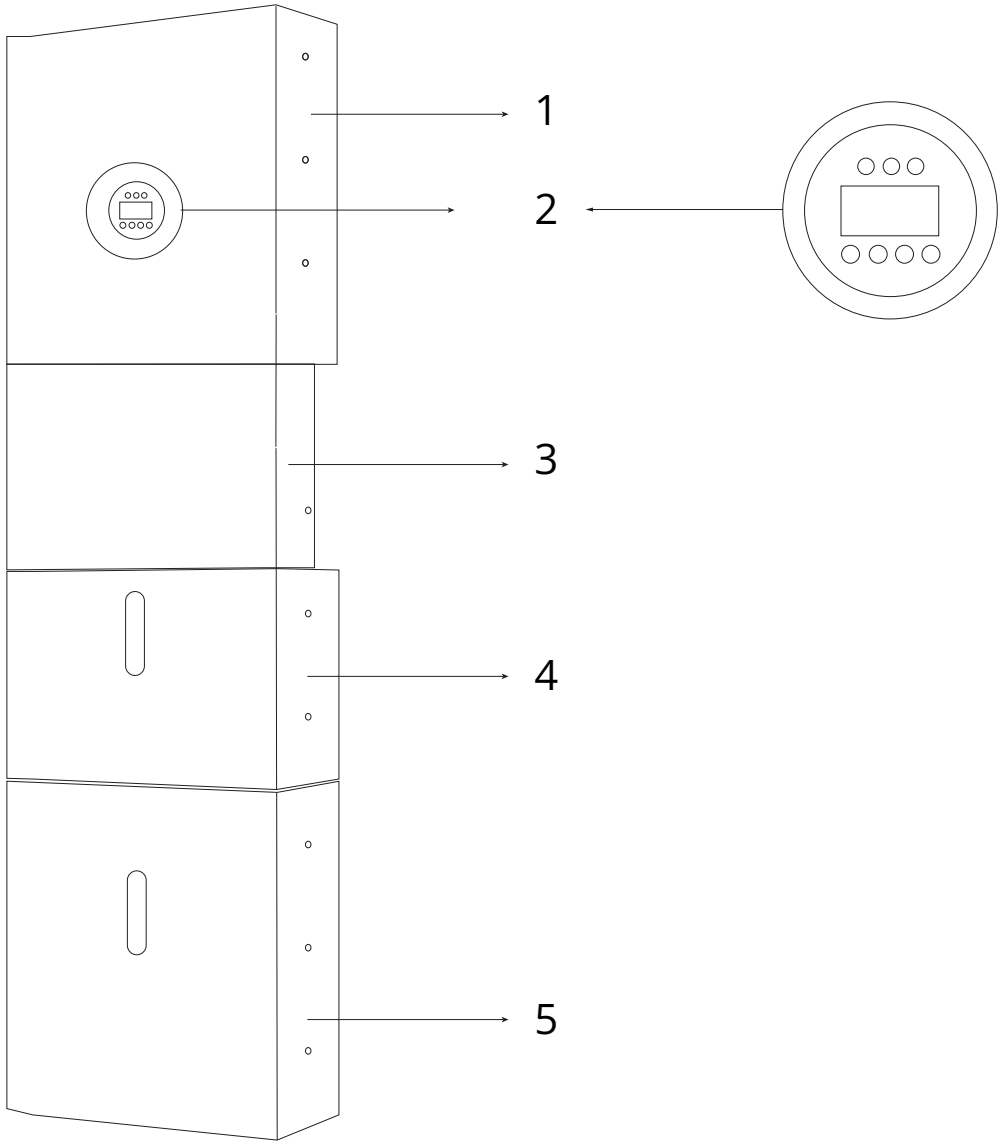
Figure 14. Accessory - Cable kit XSTHS3P010CK8BP





1.7 System Appearance

Figure 15. XSTHS3P- XK Delivery Scope



Object	Description
1	Hybrid Inverter
2	EMS Display Screen
3	Cable Box (connected to Inverter)
4	PACK5.1 (Battery 1)
5	PACK5.1 (Battery 2)

1.7.1 Cable Box Part

Figure 16. Inverter without Cable Box Covers - Front View

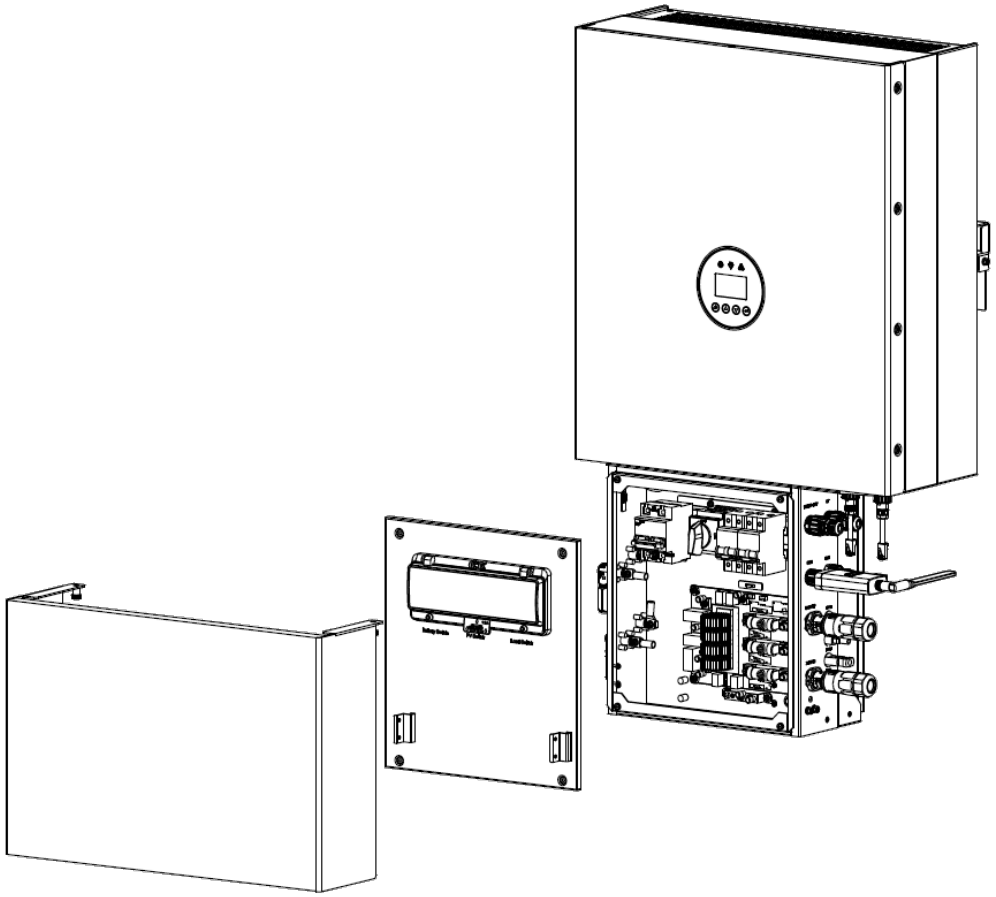
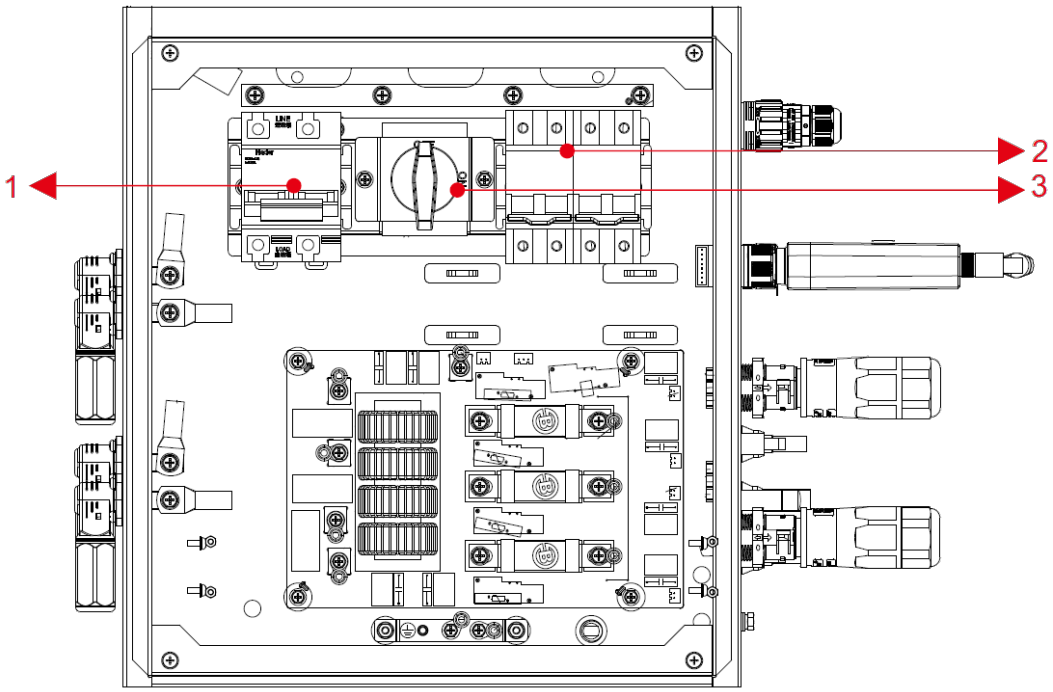
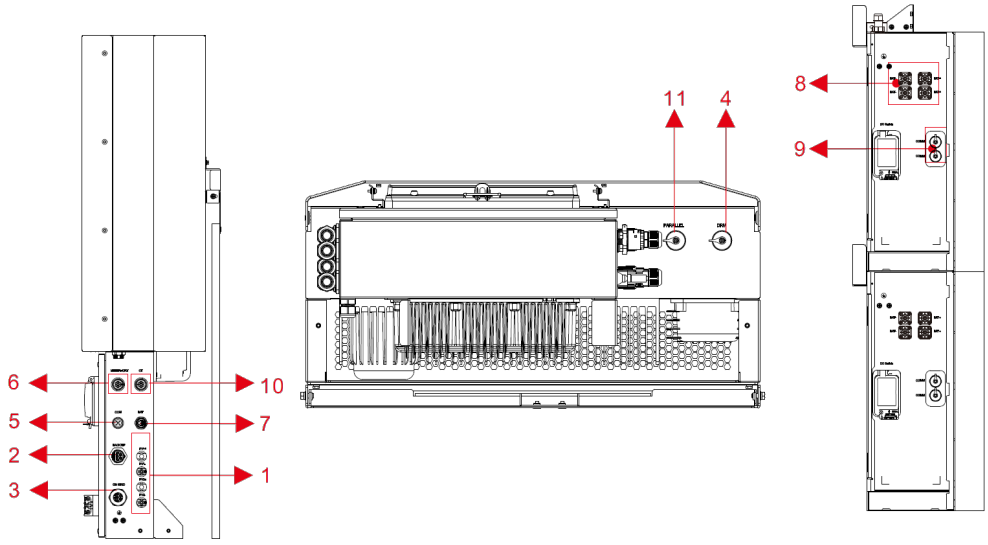


Figure 17. Cable Box Part without Covers - Front View



Object	Description
1	Battery circuit breaker
2	Output terminal block BACK UP
3	DC isolation switch

Figure 18. Cable Box Part without Covers



Object	Description	DVC class	Object	Description	DVC class
1	PV1, PV2	DVC C	2	BACKUP	DVC C
3	ON GRID	DVC C	4	DRM OR PARALLEL2	DVC A
5	COM	DVC A	6	METER+DRY	DVC A
7	BAT	DVC A	8	BAT+,BAT-	DVC A
9	COMM	DVC A	10	CT	DVC A
11	PARALLEL1	DVC A			

The DVC indicates the minimum required level of protection for the circuit.

Table 3. Limits of working voltage.

Decisive voltage Classification (DVC)	Limits of working voltage (V)		
	a.c. voltage r.m.s. U_{ACL}	a.c. voltage peak U_{ACPL}	d.c. voltage mean U_{DCL}
A*	≤25 (16)	≤35.4 (22.6)	≤60 (35)
B	50 (33)	71 (46.7)	120 (70)
C	>50 (>33)	>50 (>46.7)	>120 (>70)
The table values in parentheses are to be used for PCE or portions of PCEs rated for installation in wet locations as addressed in 6.1 for environmental categories and minimum environmental conditions. *DVC-A circuits are allowed under fault conditions to have voltages up to the DVC- B limits, for maximum 0.2 s.			

1.8 Liability Limitation

Any product damage or property loss caused by the following conditions, does not assume any direct or indirect liability.

- Product modified, design changed, or parts replaced without authorization;
- Changes, repair attempts and erasing of series number or seals by non-company technician;
- System design and installation are not in compliance with standards and regulations;
- Fail to comply with the local safety regulations (VDE for DE, SAA for AU);
- Transport damage (including painting scratch caused by rubbing inside packaging during shipping). A claim should be made directly to shipping or insurance company in this case as soon as the container/packaging is unloaded, and such damage is identified;
- Fail to follow any/all of the user manual, the installation guide and the maintenance regulations;
- Improper use or misuse of the device; Insufficient ventilation of the device;
- The maintenance procedures relating to the product have not been followed to an acceptable standard;
- Force majeure (violent or stormy weather, lightning, overvoltage, fire etc.); Damages caused by any external factors.

2. Installation

This Manual introduces the basic steps to install and set up.



Please be cautious unpacking the battery, otherwise components could be damaged.

2.1 Installation Site and Environment

2.1.1 General

This XSTHS3P-8K/10K/10KBE/12K energy storage system is outdoor version and can be installed in an outdoor or an indoor location.

When xStorage Hybrid systems are installed in a room, it must not be hampered by the structure of the building, the furnishings and equipment of the room.

The xStorage XSTHS3P Hybrid Inverter is naturally ventilated. The location should therefore be clean, dry and adequately ventilated. The mounting location must allow free access to the unit for installation and maintenance purposes, and the system panels must not be blocked.

The following locations are not allowed for installation:

- Habitable rooms;
- Ceiling cavities or wall cavities; on roofs that are not specifically considered suitable; access / exit areas or under stairs / access walkways;
- Where the freezing point can be reached, such as garages, carports or other places as well as wet rooms (environmental category 2);
- Locations with humidity and condensation over 95%;
- Places where salty and humid air can penetrate;
- Seismic areas - additional security measures are required;
- Sites with altitude over 2000m;
- Places with an explosive atmosphere;
- Locations with direct sunlight or a large change in the ambient temperature;
- Places with flammable materials or gases or an explosive atmosphere.

2.1.2 Restricted Locations

The XSTHS3P-8K/10K/10KBE/12K shall not be installed:

(a) In restricted locations as defined for panels in certain countries;

(b) Within 600mm of any heat source, such as hot water unit, gas heater, air conditioning unit or any other appliance.

(c) Within 600mm of any exit;

(d) Within 600mm of any window or ventilation opening;

(e) Within 600mm of side of other device.

A XSTHS3P-8K/10K/10KBE/12K installed in any corridor, hallway, lobby or the like and leading to an emergency exit shall ensure sufficient clearance for safe egress of at least 1 meter.

2.1.3 Barrier to Habitable Rooms

To protect against the spread of fire in living spaces where the xStorage XSTHS3P hybrid inverter is mounted or on surfaces of a wall or structure in living spaces with a xStorage Hybrid system on the other side, the wall or structure shall have a suitable non-combustible barrier. If the mounting surface itself is not made of a suitable non-combustible material, a non-combustible barrier can be placed between the XSTHS3P and the surface of a wall or structure.

If the XSTHS3P is mounted at a wall or at a distance of 300mm from the wall or the structure separating it from the habitable space, the distances to other structures or objects must be increased. The following distances must remain free:

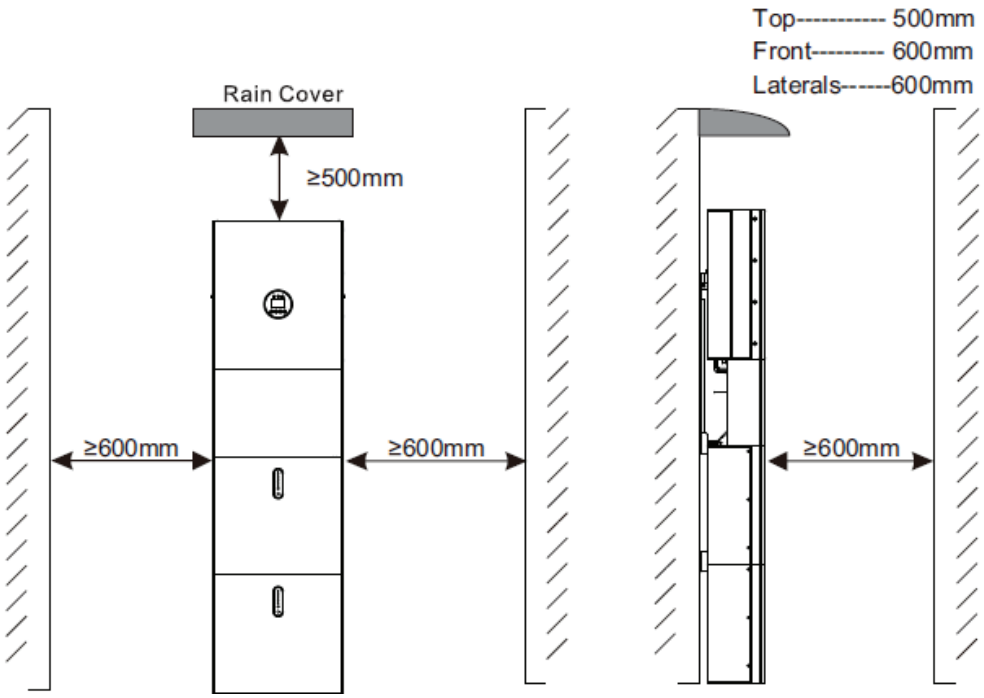
600 mm beside the XSTHS3P; 500 mm above the XSTHS3P; 600 mm before the XSTHS3P.

If the distance between the XSTHS3P and the ceiling or any object above the system is less than 500mm, the ceiling or structural surface above the system must be made of noncombustible material within a radius of 600mm around the system.

The XSTHS3P must be mounted to ensure the highest point is not more than 2.2m above the ground or the platform.

A shelter must be installed above the Energy Storage System.

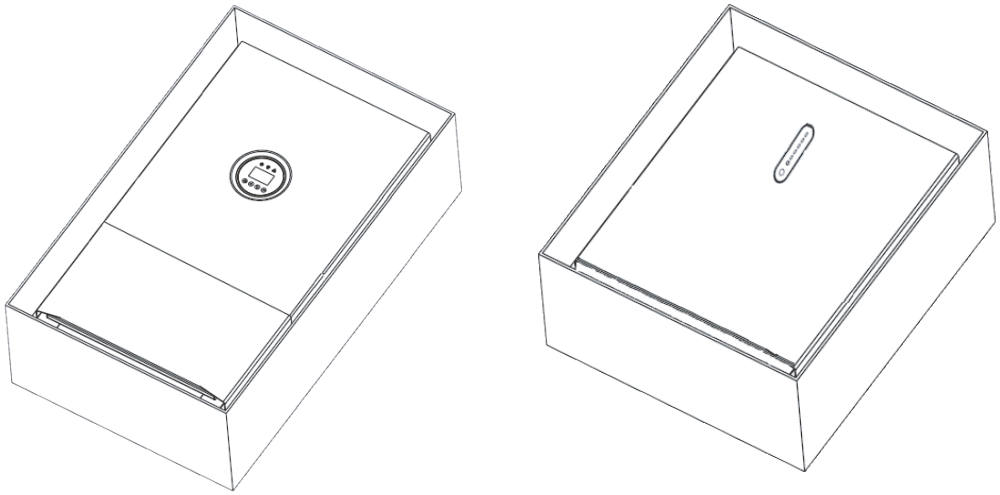
Figure 19. Limited Distance of Installation to Neighboring Objects



2.2 Installation

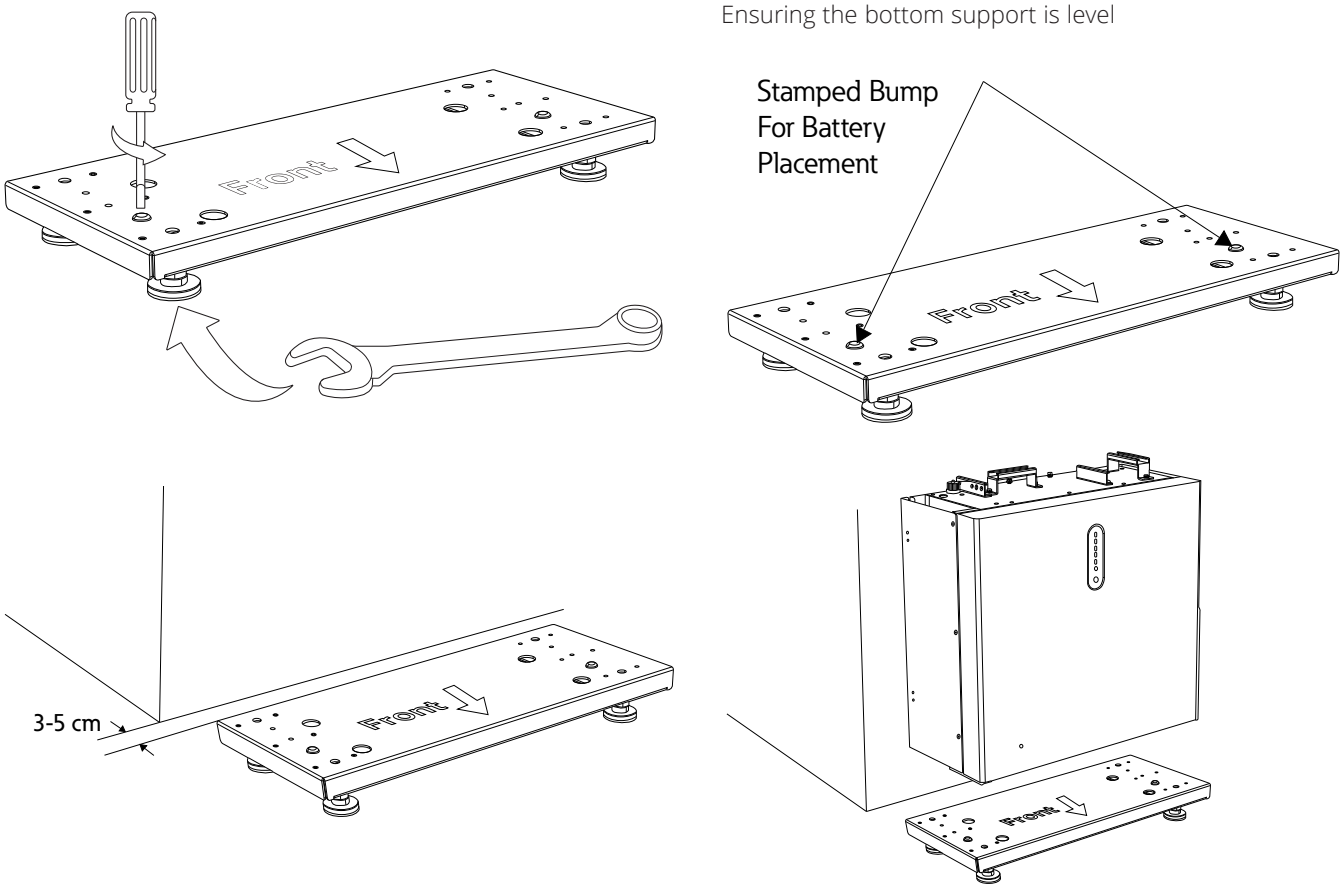
Step 1. Remove the battery and inverter from the packaging box.

Figure 20. Unpacking the inverter and battery



Step 2. A bottom support is required to install the batteries (never place the batteries directly on the ground; if there is a risk of flooding, raise the stand). Use a flathead screwdriver and wrench to attach the pads to the stand. Place the stand in the direction marked "Forward". Use a spirit level to ensure it is level.

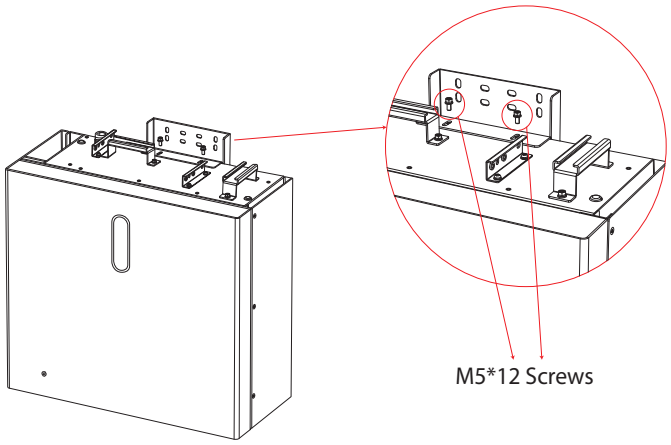
Figure 21. Bottom support installation



2.2.1 Battery Installation

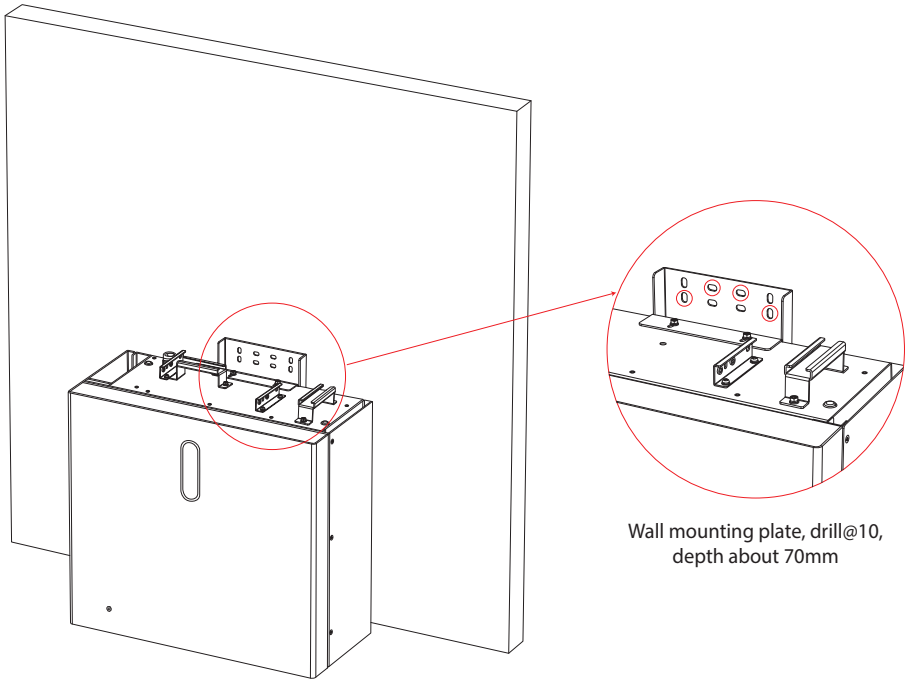
Step 5. Assemble the battery mounting panel on the battery.

Figure 22. Assemble Battery Mounting Panel



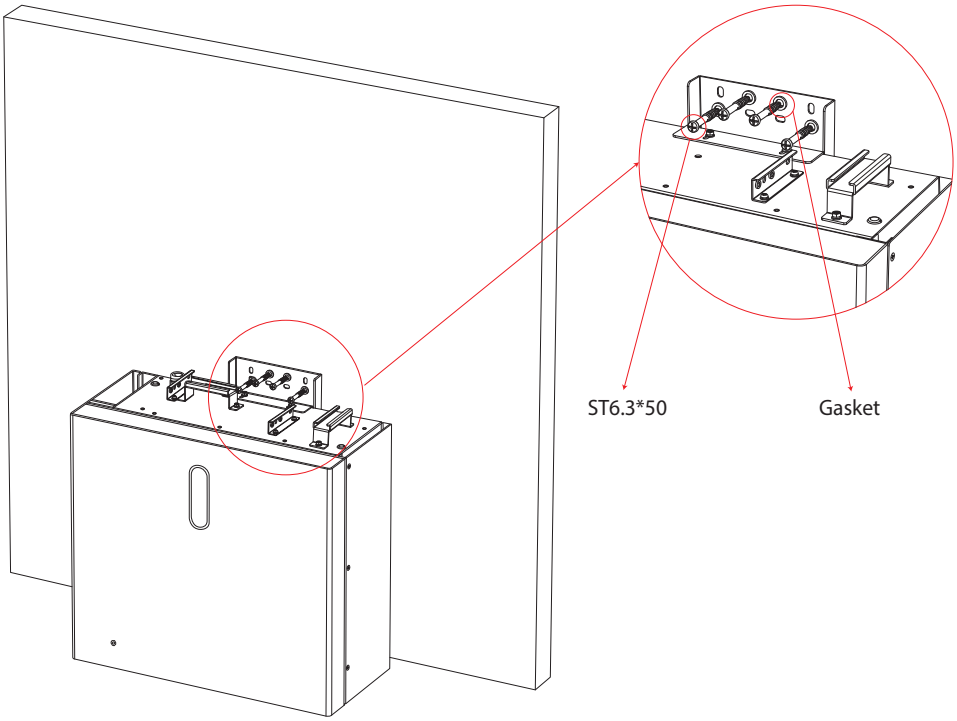
Step 3. Position the battery parallel to the wall and use a Φ10mm drill to drill holes at a depth of about 70mm in the wall for subsequent fix action of the mounting plates.

Figure 23. Battery Installation - Drill Holes



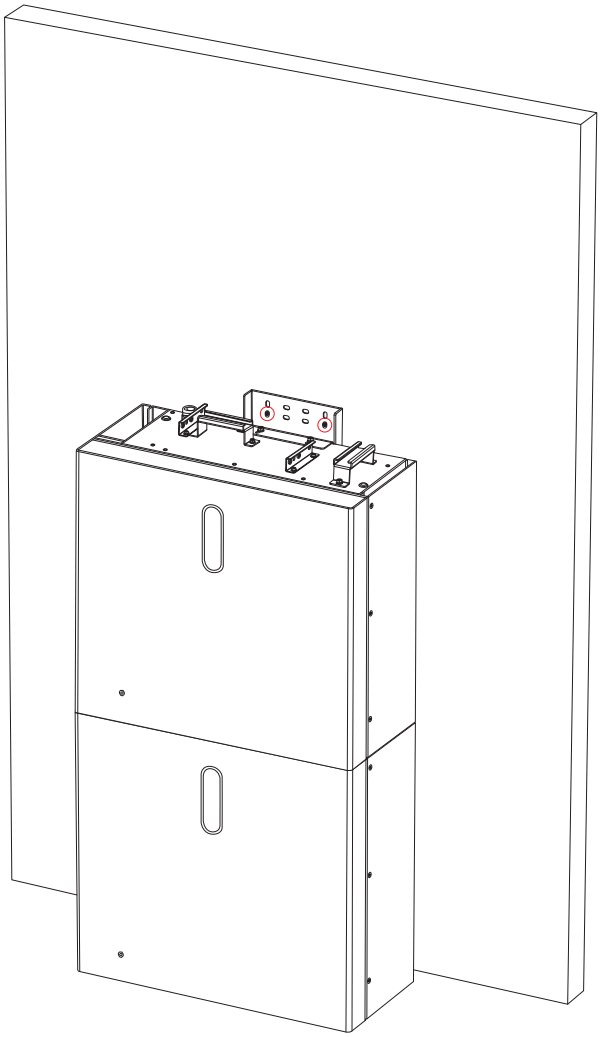
Step 4. Remove the debris baffle and secure the battery to the wall with screws and gaskets.

Figure 24. Battery Installation-Mounting on the Wall



Step 6. To assemble the second (and all other) battery, repeat step 6 and 7, respectively.

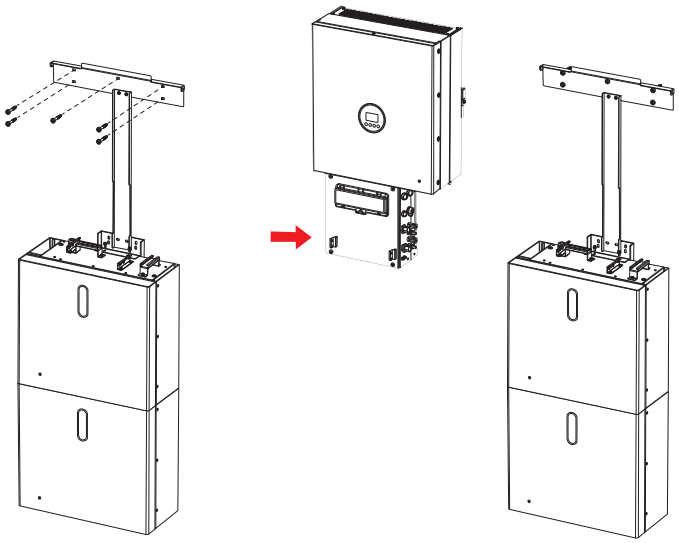
Figure 25. Battery Installation Second Battery Installation



2.2.2 Inverter Installation

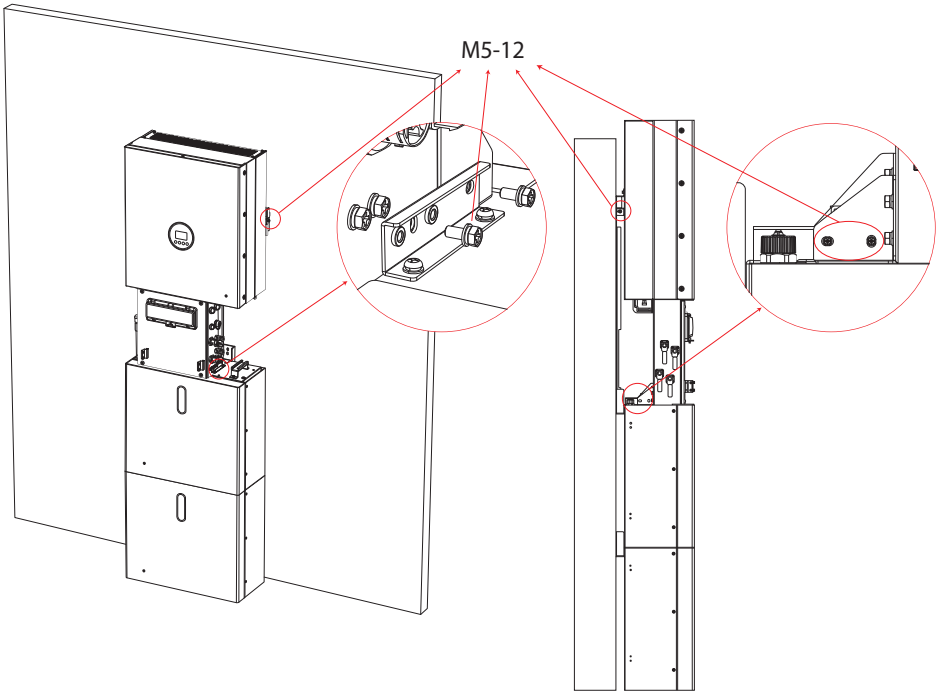
Step 7. Inverter Installation.

Figure 26. Inverter Installation



Step 8. Hang the inverter onto the mounting panels, adjust the entire system and ensure that the battery and the inverter have been securely hung onto the panels and brackets.

Figure 27. Inverter Installation on the Wall



Step 9. Run out the AC cables on site.

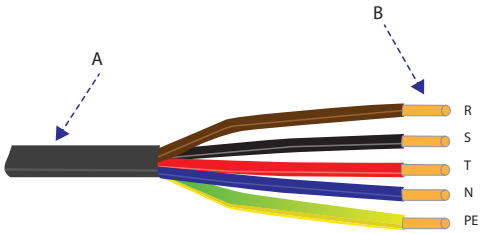
Step 8-1. Follow the AC cable requirements below.

- For backup connection, 12AWG or 4mm² cable is required to be used.
- For grid connection, 10AWG or 6mm² cable is required to be used.

Make sure the resistance of cable is lower than 1 ohm. If the wire is longer than 20m, it's recommended to use 10AWG or 6mm²cable for backup and 8AWG or 8mm²cable for grid

There are"1,2,3,N,⏚" symbols marked inside the connector, the Line wire of grid must be connected to "1,2,3" terminal; the Neutral wire of grid must be connected to "N" terminal; the Earth of grid must be connected to "⏚" .

Figure 28. Cable connections



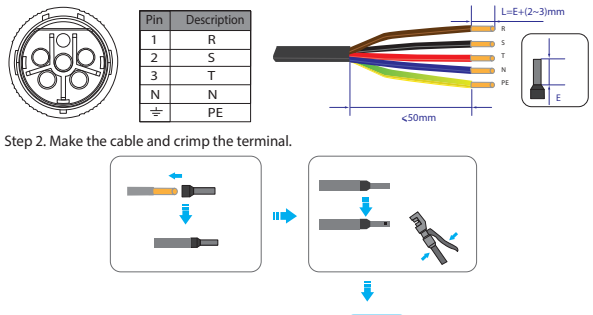
Object	Description	Value
A	External diameter	10mm
B	Copper conductor cross-section	6mm²

Label	Color	Proper name (IEC)	Description
R	Brown	Phase L1 (Line 1)	First live conductor of the three phase system
S	Black	Phase L2 (Line 2)	Second live conductor
T	Red (or Grey*)	Phase L3 (Line 3)	Third live conductor
N	Blue	Neutral (N)	Current return conductor for unbalanced loads
PE	Green / Yellow	Protective Earth (PE)	Safety grounding conductor

1. Insert the conductor into the suitable ferrule acc. to DIN 46228-4 and crimp the contact.

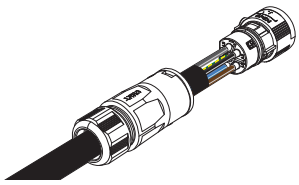
Figure 29. AC cable

AC cable



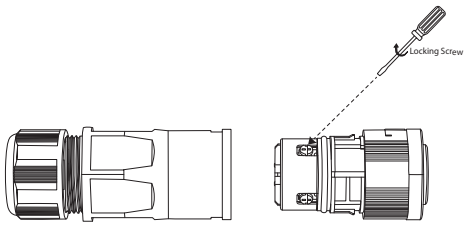
2. Unscrew the swivel nut from the threaded sleeve and thread the swivel nut and threaded sleeve over the AC cable.

Figure 30. AC connector



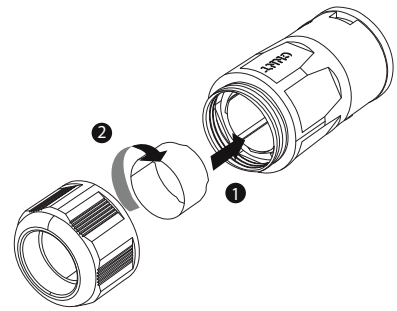
3. Insert the crimped conductors L1, L2, L3, N and PE into the corresponding terminals and tighten the screw with a hex key wrench screwdriver (size: 2.5, 1.2~2.0 N.M). Ensure that all conductors are securely in place in the screw terminals on the bush insert.

Figure 31. Inserting conductors



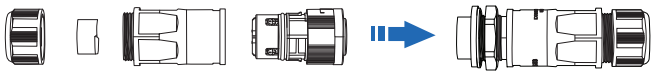
4. Screw the swivel nut onto the threaded sleeve. This seals the AC connector and provides strain relief for the AC cable. When doing so, hold the bush insert firmly by the locking cap. This ensures that the swivel nut can be screwed firmly onto the threaded sleeve.

Figure 32. AC connector mounting part 1



5. Assemble the plug shell ,adapter as shown below. Push the adapter and shell by hand until a click is heard or felt.

Figure 33. AC connector mounting part 2



6. Plug the AC connector into the jack for the AC connection by hand until a click is heard or felt.

7. Use tool to clamp the AC wiring terminal and wire rod; screw the nut, but do not tighten it. Make sure that the cable is free to pass through the waperproof components. Once the terminal is connected to the right site of the inverter, tighten the nut.

Figure 34a. Common instructions for earthing and grounding the inverter and batteries

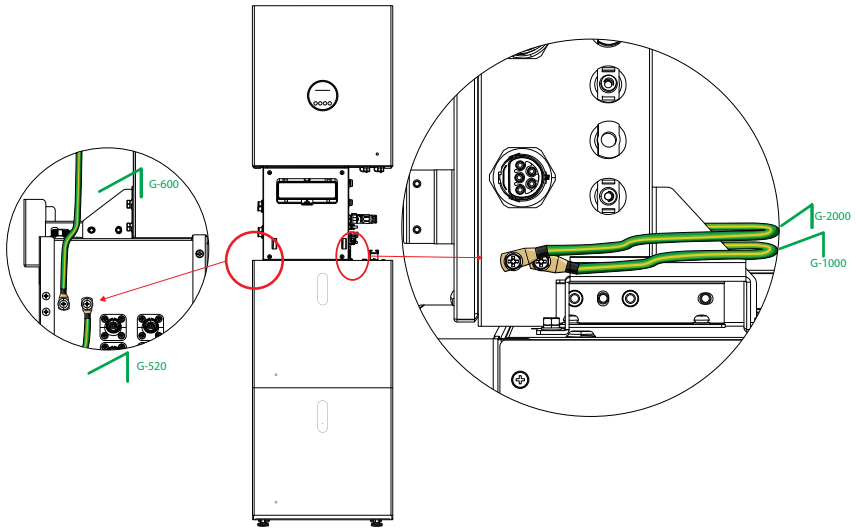
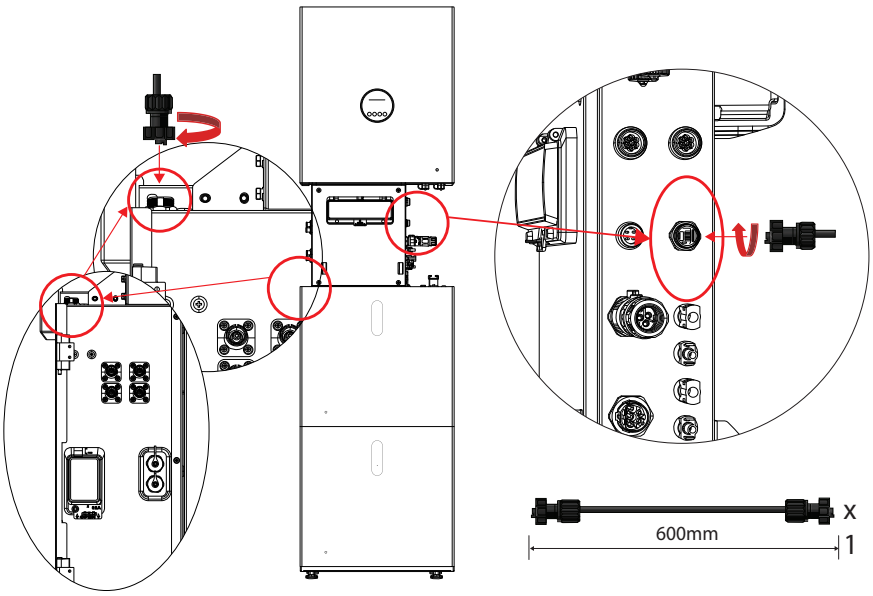


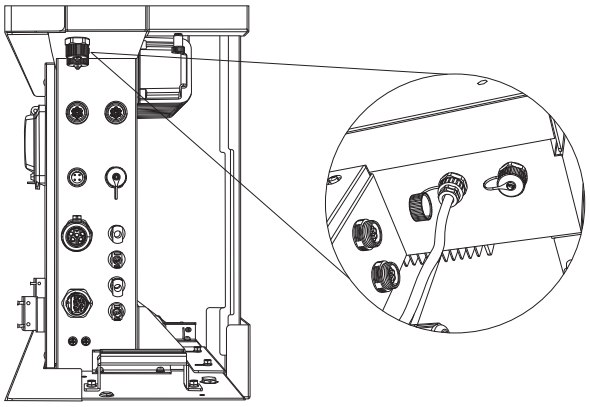
Figure 34b. Common instructions for communication between the inverter and the first battery



8. Connect the AC wiring terminal to the corresponding hole site of the inverter and lock it with a screwdriver or electric screwdriver (suggestion: stem diameters and torsion of screwdriver or electric screwdriver should be 4mm and 8~12kg-f.cm respectively)
9. Tighten the nut.
10. Circuit breaker parameters are recommended:
    - Back-up 25A/400Vac 6KA|
    - On-grid 32A/400Vac 6KA

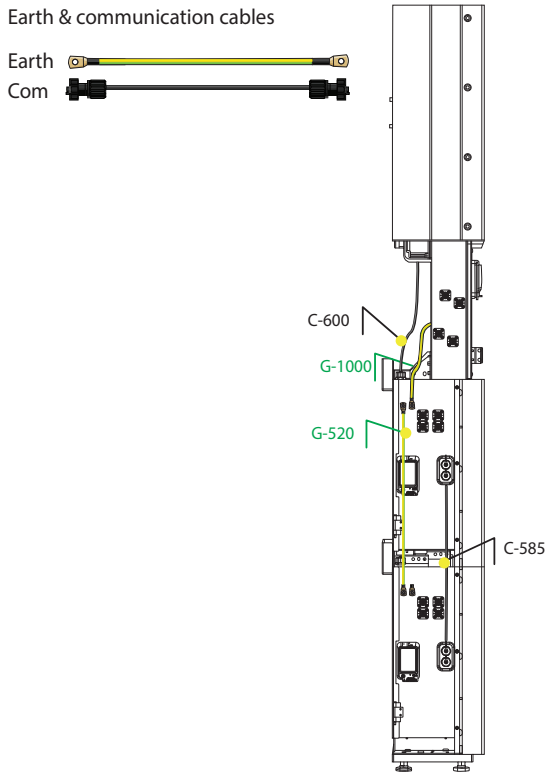
Step 8-2. Connect the Backup and Grid cables in advance according to the connector mode, and connect them to the Backup and Grid board connectors in turn.

Figure 35. Cable Box Bottom View, Wiring Connectors



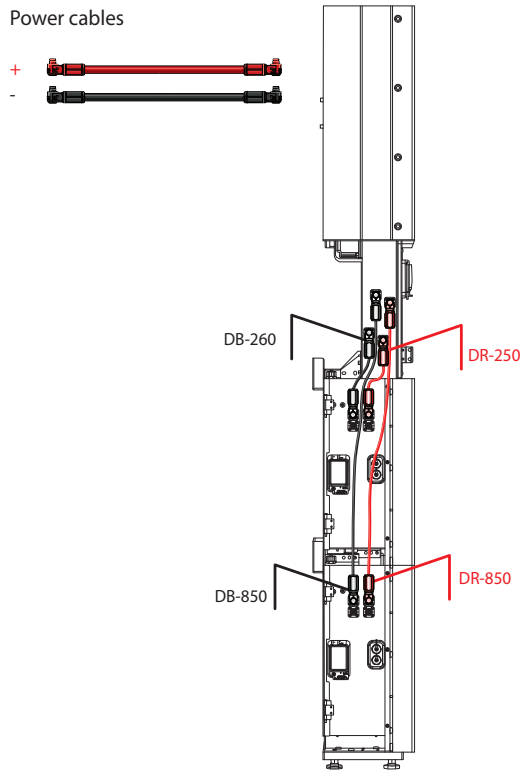
Step 10. Connect the BAT communication cable of the cable box from Step 13 to the topmost battery at the right side. Then use the communication cable supplied with the batteries to connect the batteries to each other via the respective connectors on the left side. After you have connected all the modules together, close all covers (if you want to connect further battery modules, you must mount them before closing).

Figure 36. Wiring the Communication Cable



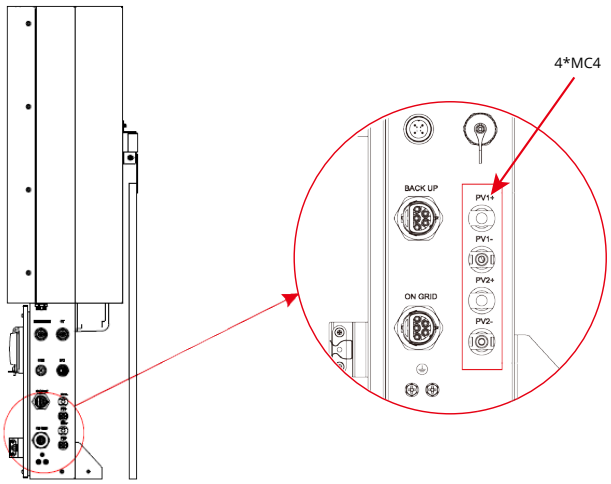
Step 11. Connect the power cables of the bottom battery from Step 4 to the side terminals of the top battery. Make sure that red connects to red and black connects to black.

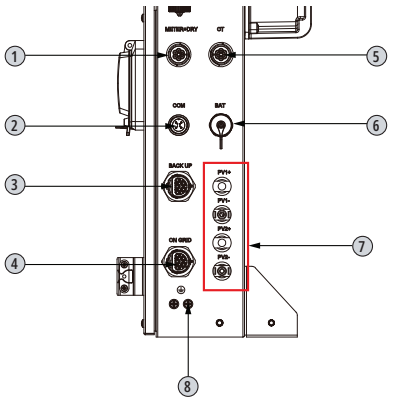
Figure 37. Wiring the Battery Power Cable



Step 12. Close the battery covers and connect the PV-MC4 connectors to the system (connection on both sides). Also, connect all AC cables, the meter communications cable METER, and the Ethernet cable LAN. Then close the cable box cover. The installation is now complete.

Figure 38. PV Wiring

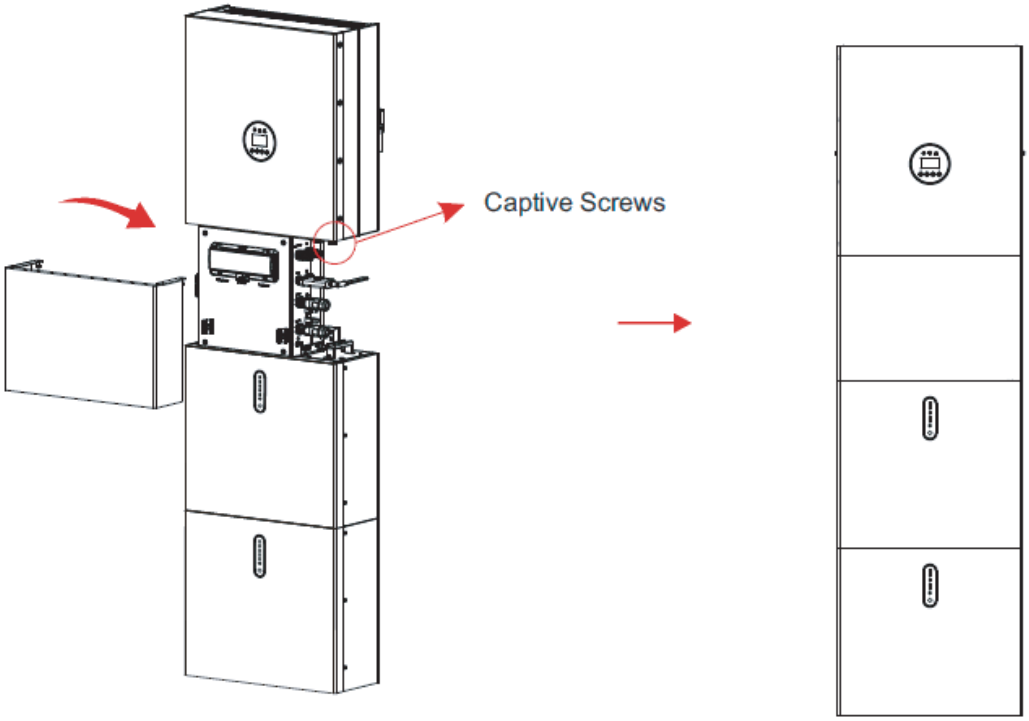




Object	Description
1	METER + DRY (DVC A)
2	COM (DVC A)
3	BACK UP (DVC C)
4	ON GRID (DVC C)
5	CT (DVC A)
6	BAT (DVC A)
7	PV1, PV2 (DVC C)
8	PE (DVC A)

Step 13. Close the lid and tighten the screw.

Figure 39. Three-phase finishes



Step 14. Step 13: Commissioning of the energy storage system.
After the installation of the energy storage system completed, in order to ensure the normal operation of the system, it is necessary to check the battery, PV and grid input parameters according to the following steps.

a. Manually press the reset button of the battery pack touch screen for 3-5S, then turn on the battery switch of both the battery pack and the hybrid inverter after the green light of the capacity indicator on the battery pack touch screen is on and there is no red light alarm indication, and check the screen Battery and Battery Parameter interfaces after the inverter LCD screen is on for 5-10S, and check whether the temperature, voltage and capacity are normal (the temperature determination is roughly based on the current ambient temperature of the system, the voltage determination is in the range of 50V ± 3V, and the capacity determination is 100AH for a single battery pack, when multiple battery packs are connected in parallel, the capacity is the number of battery packs multiplied by 100AH).

b. After PV input connected and PV switch of the hybrid inverter closed, check whether the voltage display on the PV input display interface is normal.

c. After connecting to the grid, check whether the voltage display on the Grid-connected output interface is normal

The method of anti-islanding protection is power variation.

2.3 External CT Connection

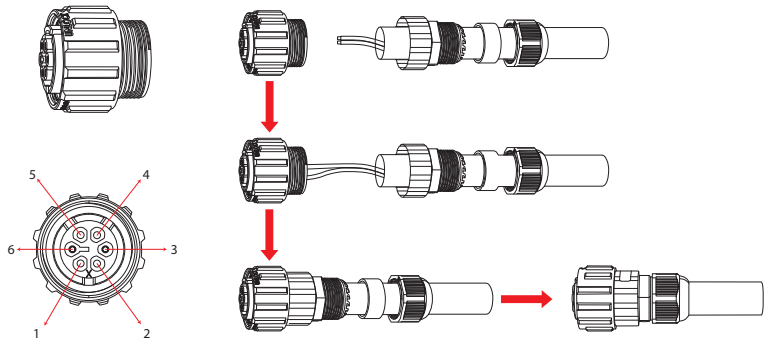
The electricity meter should be mounted and connected at the grid transition point (feed-in point) so that it can measure the grid reference and feed-in power.

1. Loosen the nut and untangle the single-aperture sealing ring.

Table 4. External connection pins

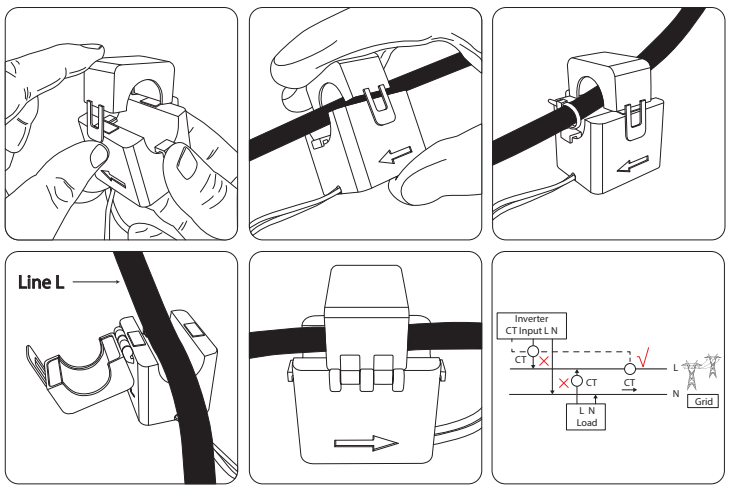
Object	Description	Object	Description
1	R phase CT positive electrode(White)	2	R phase CT negative pole(Black)
3	S phase CT positive electrode(White)	4	S phase CT negative pole(Black)
5	T phase CT positive electrode(White)	6	T phase CT negative pole(Black)

Figure 40. CT connector mounting and wiring



2. Install the waterproof component and screw on the waterproof sheath nut.
3. Open the external CT wiring port, the arrow points to the direction of the power grid, put the wire into the external CT card slot, and buckle the buckle.

Figure 41. CT split-core mounting



External CT should be placed near the power grid.
If CT test pass but inverter still can't achieve export power (power is not controllable or always 0 power output). Please check installation location of the CT.

2.4 DRED Port Connections (optional, only for DRM function)

Demand Response Enable Device (DRED) are inverters compliant with the AS/NZS 4777.2:2015 and support demand response mode (DRM). Inverter is fully comply with all DRM. A 8P terminal is used for DRM connection.

Table 5. Optional DRED/RRCR ports

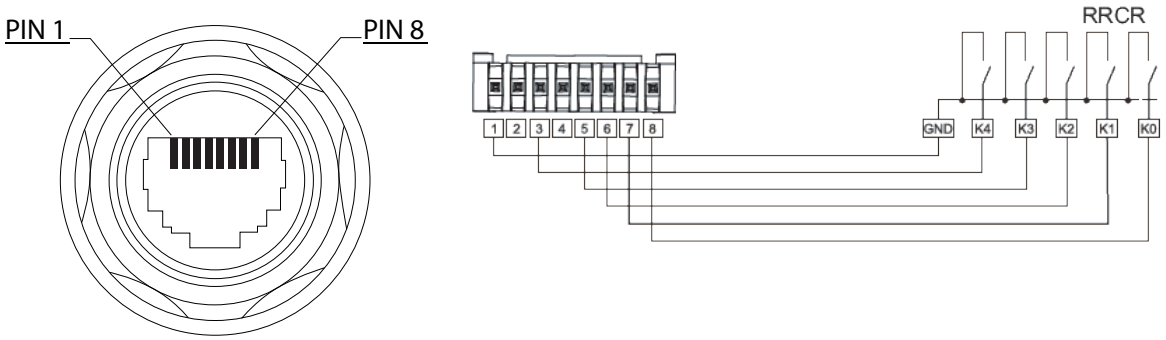
The inverter is preconfigured to the following RRCR power level. "0" indicates that corresponding relay closed.

PIN	PIN Name	Description	Connected to RRCR
1	G	GND	Not connected
2	V	5VDC Voltage Supply	Relays common node
3	DRM4/8	Relay contact 4 input	K4-Relay 4 output
4	V	5VDC Voltage Supply	Relays common node
5	DRM3/7	Relay contact 3 input	K3-Relay 3 output
6	DRM2/6	Relay contact 2 input	K2-Relay 2 output
7	DRM1/5	Relay contact 1 input	K1-Relay 1 output
8	DRM0	Relay contact 0 input	K0-Relay 0 output

DRM0	DRM1/5	DRM2/6	DRM3/7	DRM4/8	Active Power	Cos(Q)
1	0	1	1	1	0%	1
1	1	0	1	1	30%	1
1	1	1	0	1	60%	1
1	1	1	1	0	100%	1
1	1	1	1	1	100%	1
0	X	X	X	X	Standby	1

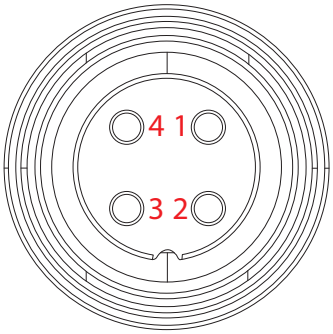
Please follow below figure to assemble DRM connector.

Figure 42. DRM connector



2.5 COMM Port Connections

Figure 43. COMM connector identification



PIN	Description
1	+5V
2	GND
3	RS485-A
4	RS485-B

2.6 METER+DRY Port Connections

1. The Smart Meter with CT is already configured; please do not change any settings on the Smart Meter.
2. One Smart Meter can be used with only one inverter.
3. three CTs must be used for one Smart Meter and must be connected on the same phase with the Smart Meter power cable.
Smart Meter & CT connection diagram
Please refer to the manual of meter for detailed wiring connection at the meter end.

Figure 44. Meter DRY port connector identification

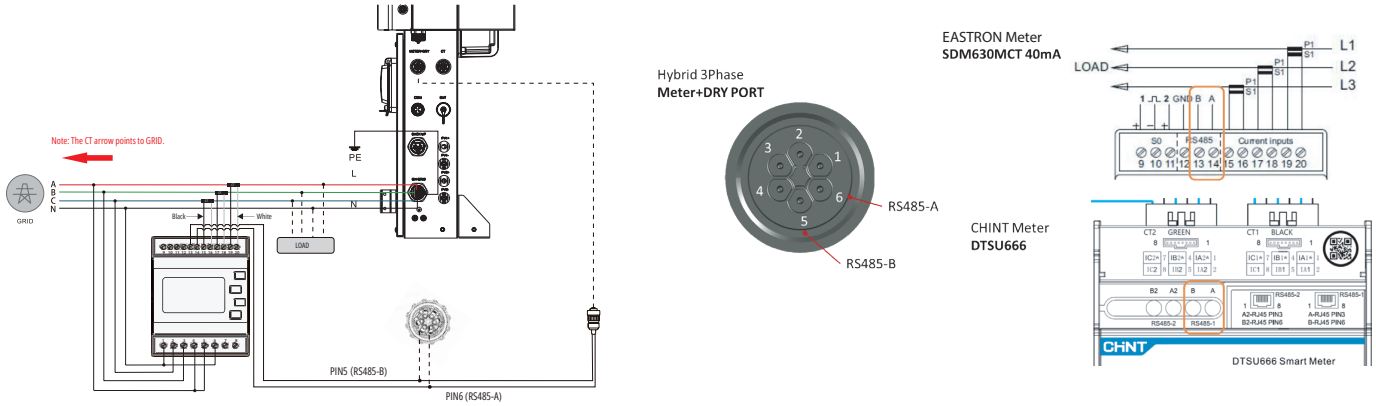
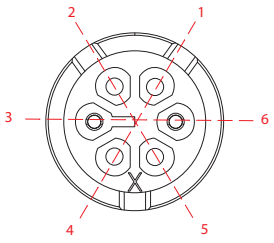


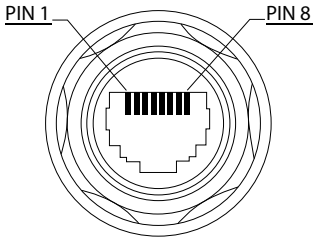
Figure 45. Meter DRY port connector identification



Object	Description
1	DRY contact
2	DRY contact
3	GND
4	I/O
5	RS485-B
6	RS485-A

2.7 Parallel port connections

Figure 46. DRM connector



PIN	Description	PIN	Description
1	CAN_H	5	MASTER_SYN_BC
2	CAN_L	6	GND
3	INV_STATUS_BC	7	
4	BPSIDE_HOLD_BC	8	

Figure 47. DC coupled

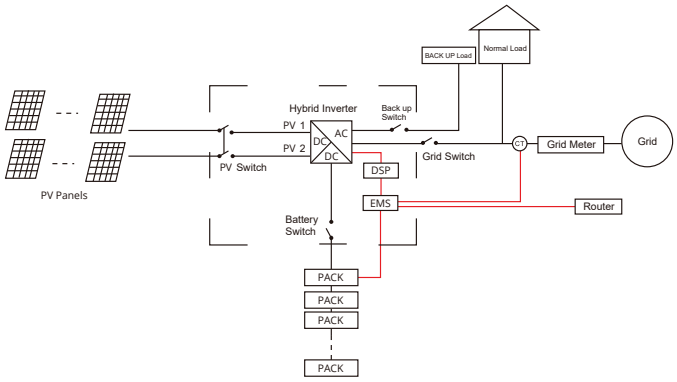


Figure 48. AC coupled

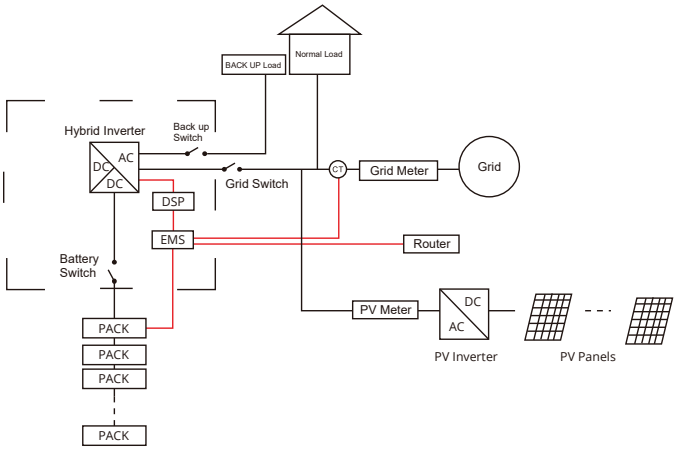


Figure 49. DC and AC coupled

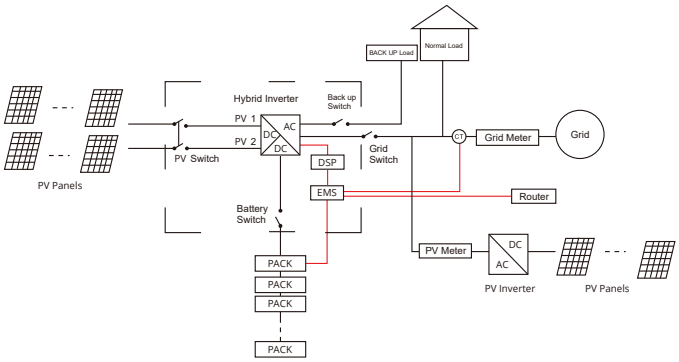


Figure 50. Wiring example 1

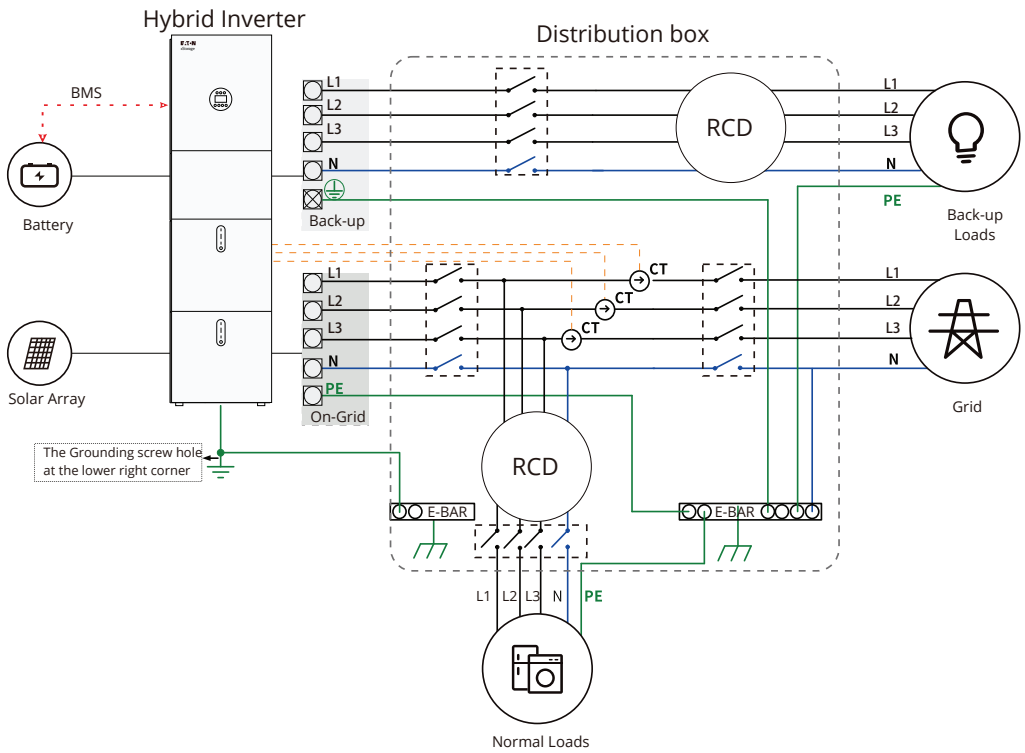
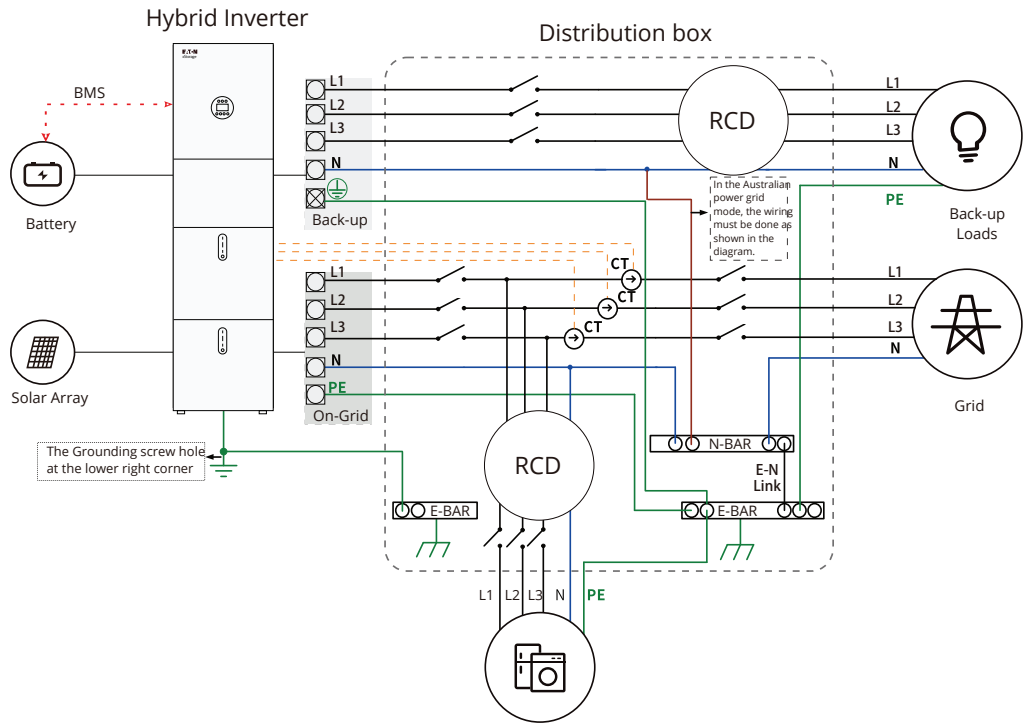


Figure 51. Wiring example 2



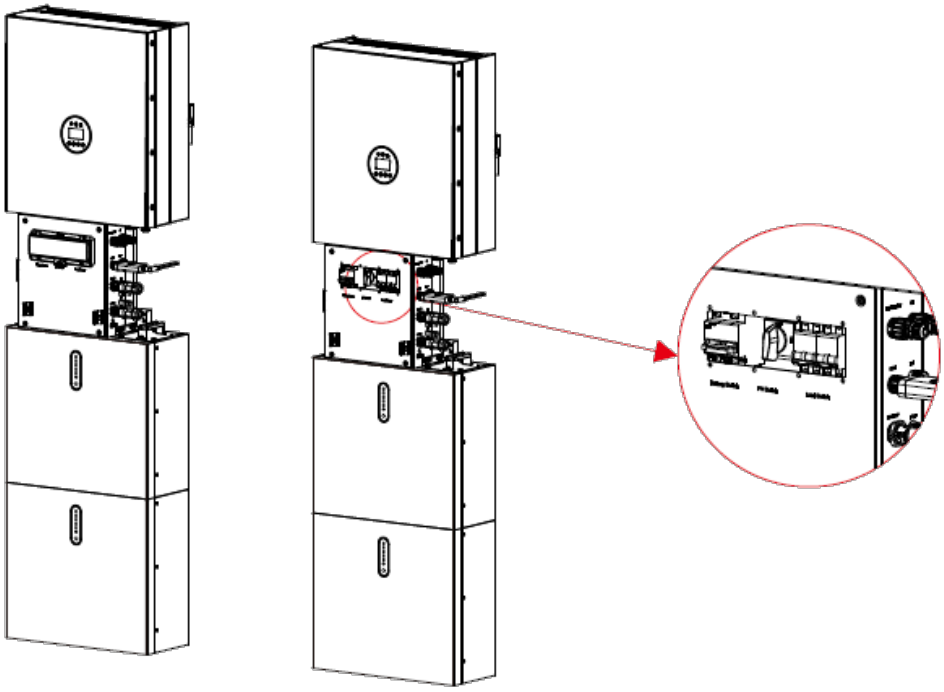
3. System Operation

3.1 Switch On

When turning on the system, it is very important to follow the steps below to prevent damage to the system.

Please check the installation again before turning on the system.

Figure 52. Turning on the system



Step 1. Open the outer shell of the cable box.
Step 2. Turn on the external grid switch.
Step 3. Turn on the PV switch.
Step 4. Press power button on all the batteries until the indicator lights turn on.
Step 5. Open the battery switch cover and turn on the battery switch.
Step 6. Turn on the battery switch on the cable box
Step 7. If backup load is applied, turn on the Backup switch.
Step 8. Close the battery switch cover and the outer shell of the cable box

The Backup switch is only used when a backup load is applied.

If PV=0V under sunshine, please check whether PV is connected reversely or whether the circuit is normal.

Appliances such as air conditioner are required at least 2-3 minutes to restart because it is required to have enough time to balance refrigerant gas inside of circuit. If a power shortage occurs and recovers in short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it is equipped with time-delay function before installation. Otherwise, this inverter will trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

3.2 Switch Off

Step 1. If backup load is applied, turn off the backup switch.
Step 2. Turn off the external grid switch.
Step 3. Open cable box outer shell and turn off the battery switch.
Step 4. Open the battery switch cover and turn off the battery switch.
Step 5. Press the power button on all the batteries, till the lights turn off.
Step 6. Turn off the PV switch on the cable box.
Step 7. Close the battery switch cover and the outer shell of cable box.

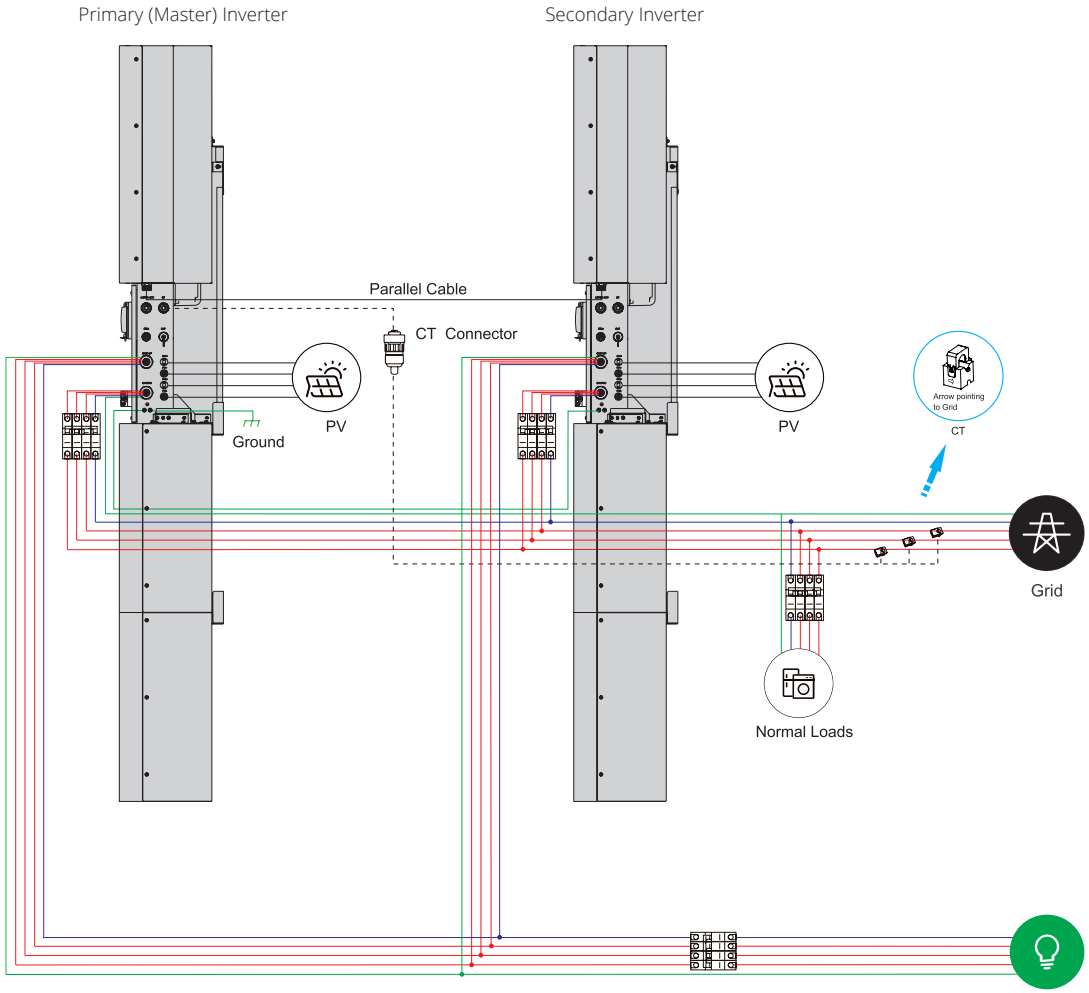
3.3 Parallel System instruction (Optional)

Some models are not supported. Please contact the manufacturer or authorized dealer for confirmation.

3.3.1 Installation

The installation of a system with two inverters connected in parallel is similar to the installation of a system with one inverter. The maximum number of parallel inverters is 4. The following diagram shows the installation and wiring connection of the parallel system.

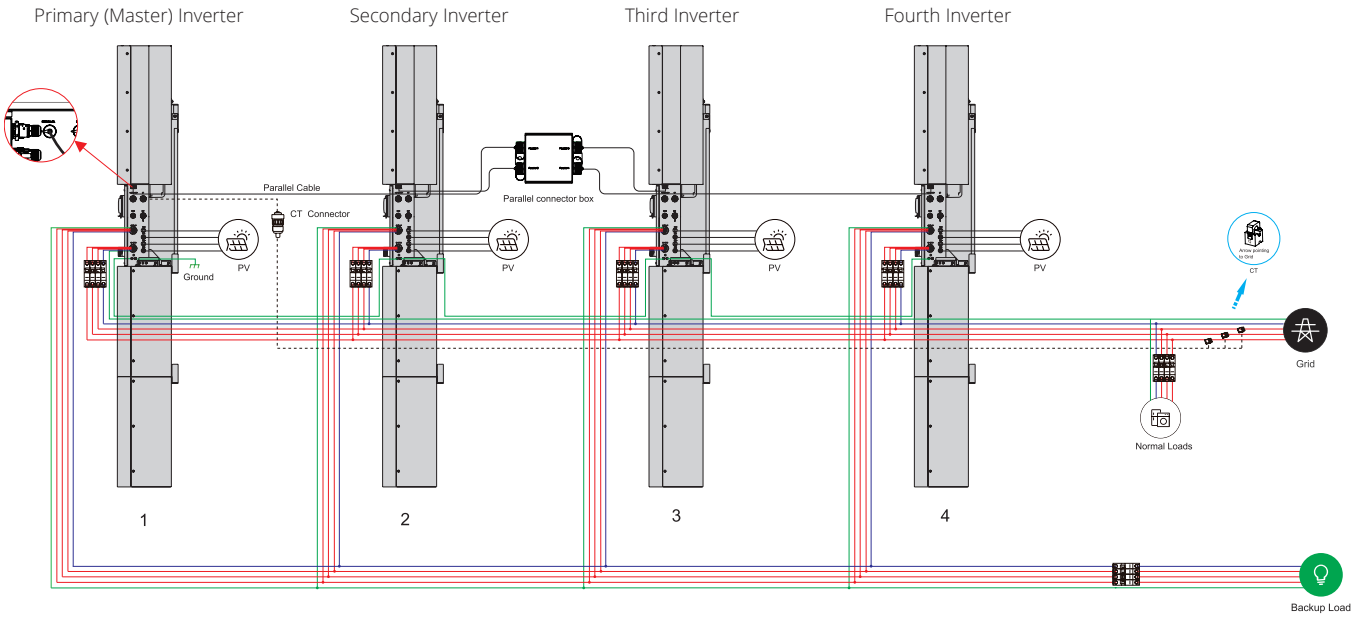
Figure 53. Parallel system scheme



The parameter settings of the primary (Master) and node inverters need to be consistent except for address.

To protect the inverter from burning, the L1, L2, L3, and N connection for the ON_GRID connection and the BACK UP connection must be correct.

Figure 54. Wiring of a parallel system with Four inverters



3.3.2 Installation Procedure

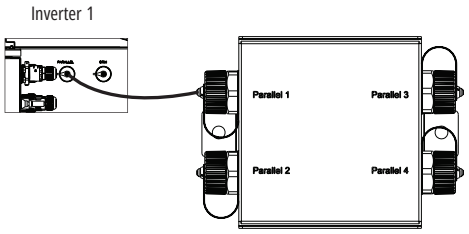
Step 1: Align the parallel connector box with the wall. Use a leveling instrument to make sure it is level.

Step 2: Drill two holes, use the rubber mallet to drive ST6.3×50 into the holes, and then use the gaskets and the D10×50 expansion screws to fix the connector box to the wall.

Step 3: On the PARALLEL port of an inverter, unscrew the parallel connector, thread one end of a cable into the connector and tighten it, and then screw the connector into the PARALLEL port.

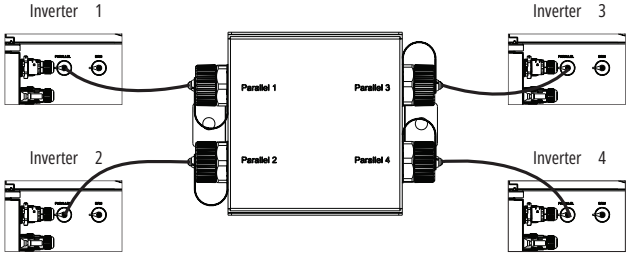
Step 4: If only two inverters are connected in parallel, repeat Step 3 on the other inverter. If three or four inverters are to be connected, unscrew the parallel connector from the Parallel 1 port of the parallel connector box, thread the other end of the first cable through the parallel port of the box, and tighten it.

Figure 55. Parallel connector box installation example



Step 5: If three or four inverters are connected, repeat Step 4 to connect all inverters through the Parallel 2, Parallel 3, and Parallel 4 ports of the parallel connector box.

Figure 56. Communication Wiring for 4 Inverters paralleled



Note: If parallel cable connection is completed incorrectly, an F22 error occurs. For more information about the error, see Error Codes of the System.

Step 6: Check the connections.



To protect the inverter from burning, the R, S, T, and N connection for the ON-GRID connection and the BACK UP connection must be completed correctly.

Step 7: Power on all the inverters of the parallel system. For more information, see Powering On.

Step 8: On the LCD screen of the primary inverter, enable the parallel feature and set the address to 1. For more information, see the PARALLEL subsection under SYS SETTING.

Step 9: On the LCD screens of the other inverters, enable the parallel feature and set the address to 2, 3, or 4. For more information, see the PARALLEL subsection under SYS SETTING.

Note: If the address setting is incorrect, an F22 error occurs. For more information about the error, see Error Codes of the System.

Step 10: If external CTs are connected to the primary inverter, disconnect all subordinate inverters and run a CT SELF-CHECK. For more information, see CT SELF CHK.

3.3.3 Setup

Step 1: Connect the cables according to the wiring of the parallel system, then turn on all inverters of the parallel system.

Step 2: Set address on the LCD. Each inverter in the parallel system must be set with parallel enable. Select one of the inverter as the primary (Master) and set its address to 1,and set the other secondary inverter's address to 2,3,4.Please refer to Section 4.3 for setting methods(Set up → System setting → Parallel).

Step 3: Perform CT self-check. Please cut off other secondary inverters before performing CT self- check. (Tips: CT self-check is not available when you connect meters).

Each inverter will have his datalogger connected to the router and to the Cloud

If you have more than two inverters connected, please contact Eaton support to have the data logger refresh interval in Solarman modified and reduced to 1 minute. Failure to make this request may result in incorrect values in the application.

This modification resolves this issue.

Data synchronization from 5 minutes to 1 minute.

3.3.4 Explanation

The following are some explanations about the operation of parallel system.

1. If the address setting is wrong or the parallel communication cable connection is wrong, the inverter will report F22.

2. The parallel system only need one set of CT (3 pcs) or one electricity meter, and it must to be connected to the primary (Master) inverter. If power meter is installed, the meter installation refers to section 2.6.

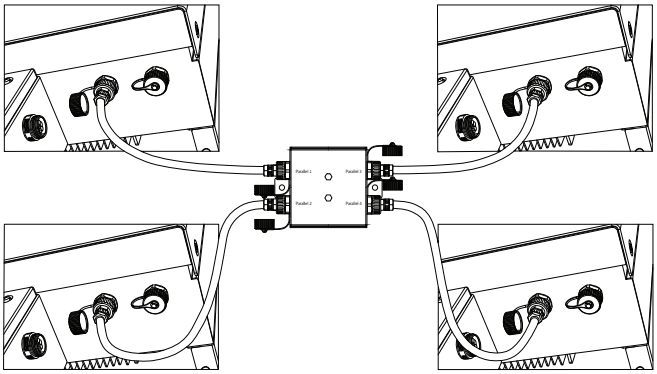
3. All inverters in a parallel system show the total grid power and the total normal load power of the whole system.

4. Three settings(work mode, zero export and time setting of peak shift mode) of the secondary inverters in the parallel system will be forced to synchronize with primary (Master) inverter, although the settings displayed on the inverter LCD are still their original settings, So you can only set these settings on the primary (Master) inverter.

3.3.5 Introduction to Parallel Box

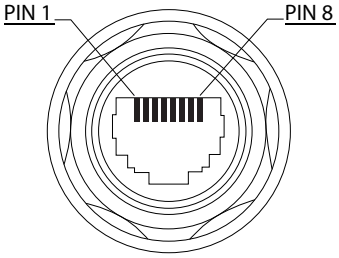
1. Due to the fact that there is only one parallel port on the inverter, when 3 or 4 inverters are used in parallel, this parallel box is required. By connecting the parallel port on the inverter to the port on this box, signal interconnection can be achieved.

Figure 57. Parallel box



2. Parallel port connection:

Figure 58. Parallel port connection



PIN	Description
1	CAN_H
2	CAN_L
3	INV_STATUS_BC
4	BPSIDE_HOLD_BC
5	MASTER_SYN_BC
6	GND
7	
8	

3. Specification

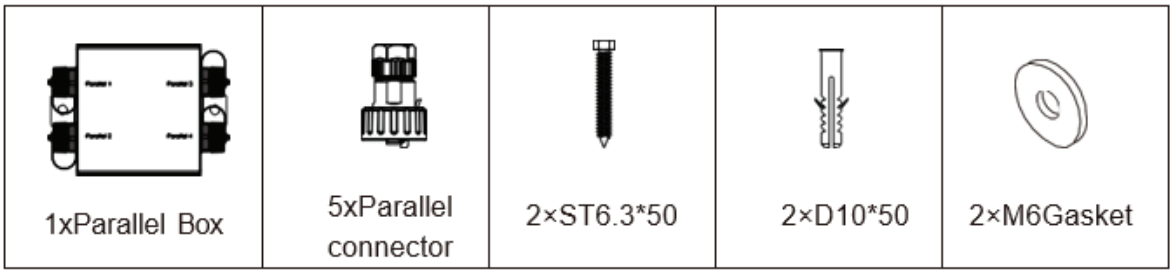
Table 6. Parallel specification table

Object	Description
Dimensions (W x H x D) mm	105 * 51.5 * 140.4
Weight (kg)	0.45
IP Protection	IP65

4. Part list

Check the following parts list to ensure it is complete.

Figure 59. Parallel Part List



5. When installing the parallel box, the diameter of the hole is 10mm and the depth is 70mm.

Inverter	Cable	Parallel Connector Box
2	1	0
3	3	1
4	4	1

3.4 Emergency Procedure

When the XSTHS3P energy storage system appears to be running abnormally, you can turn off the grid-connected main switch that directly feeding the BESS, and turn off all load switches within the BESS, turn off the battery switch at the same time. To prevent a potentially fatal personal injury, if you want to repair or open the machine after the power is switched off, please measure the voltage at the input terminals with a suitably calibrated voltage tester. Before working on this equipment, please confirm that there is no grid electric supply to the BESS!

The upper cover plate cannot be opened until the DC-link capacitance inside the battery modules discharges completely about 15 minutes later.

3.4.1 Emergency Handling Plan

1. Disconnect the AC breaker.
2. Check the control power supply. If it is OK, return the power supply to find out the reason.
3. Please record every detail related to the fault, so Company can analyses and solve the fault. Any operation of equipment during a fault is strictly forbidden, please contact Company as soon as possible.
4. As battery cells contain a little Oxygen inside and all cells have got explosion-proof valves, explosion hardly happens.
5. When the indicator light on the battery shows a red fault, check the fault type through the communication protocol, and contact our after-sales service personnel for advice.

3.4.2 Hazards

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below:

Inhalation: Evacuate the contaminated area and seek medical attention.

Eye contact: Rinse eyes with running water for 5 minutes and seek medical attention.

Contact with skin: Wash the affected area thoroughly with soap and water and seek medical attention.

Ingestion: Induce vomiting and seek medical attention.

3.4.3 Fire

If a fire breaks out in the place where the battery pack is installed, perform the following countermeasures:

Fire extinguishing media

During normal operation, no respirator is required. Burning batteries can't be extinguished with a regular fire extinguisher, this requires special fire extinguishers such as the Noves 1230, the FM-200 or a dioxin extinguisher. If the fire is not from a battery, normal ABC fire extinguishers can be used for extinguishing.

Fire -fighting instructions.

1. If fire occurs when charging batteries, if it is safe to do so, disconnect the battery pack circuit breaker to shut off the power to charge.
2. If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.
3. If the battery pack is on fire, do not try to extinguish but evacuate people immediately.



There may be a possible explosion when batteries are heated above 150°C. When the battery pack is burning, it leaks poisonous gases. Do not approach.

Effective ways to deal with accidents.

Battery in dry environment: Place damaged battery into a segregated place and call local fire department or service engineer.

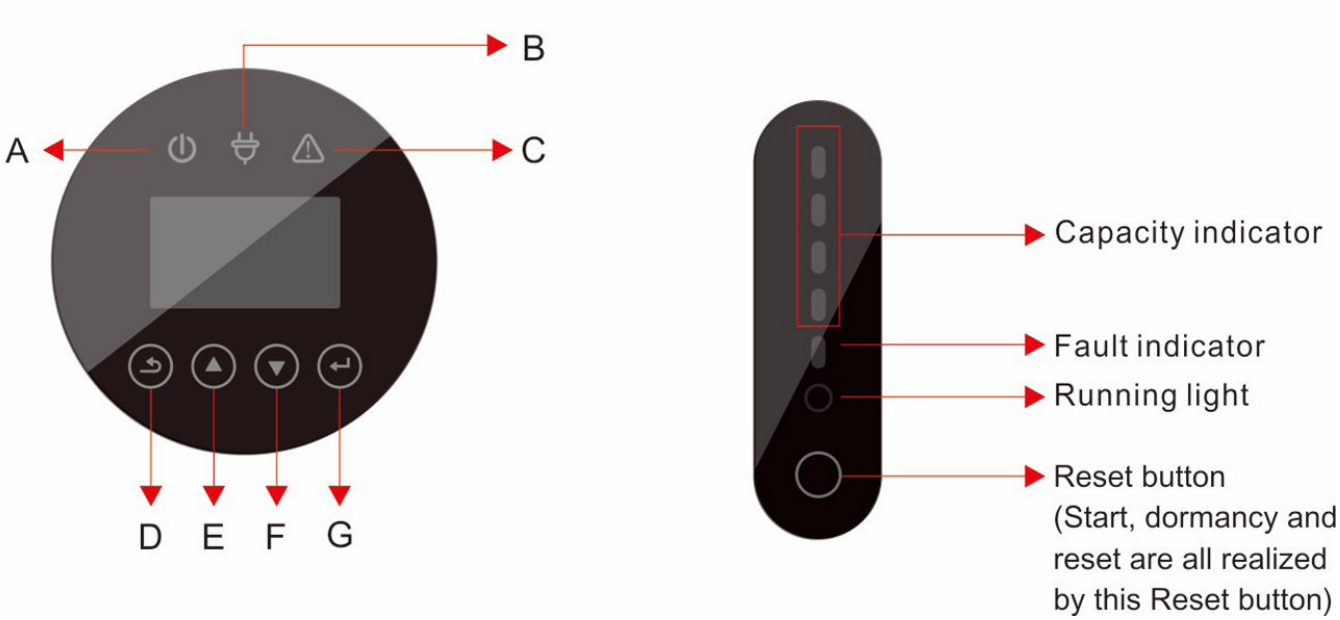
Battery in wet environment: Stay out of the water and don' t touch anything if any part of the battery, inverter, or wiring is submerged.

Do not use a submerged battery again and contact the service engineer.

4. EMS Introduction and Set Up

4.1 Function Description

Figure 60. XSTHS3P-8K, XSTHS3P-10K, XSTHS3P-10KBE, SXTHS3P-12K EMS and PACK Interfaces



Object	Description	Description
A	Indicator LED	Grid connection
B		Off-grid
C		Red: The inverter is in fault.
D	Button Function	Return Button: Escape from current interface or function. Enter the setting interface.
E		Up button: Move cursor to upside or increase value.
F		Down Button: Move cursor to downside or decrease value.
G		ENT Button: Confirm the selection.

Table 7. LED indicator description

Product status	Mode of operation	Operation	Fault	Battery Level Indicator LED				Description
				SOC Low ⟶ High				
								Physical Picture Of Lamp
OFF	Hibernation	Off	Off	Off	Off	Off	Off	All off
Normal	Idle	1	Off	Indicates battery SoC level				Idle state (Current = 0)
	Charge	On	Off	Indicates battery SoC level				Normal (Current > 0)
	Discharge	On	1	Indicates battery SoC level				Normal (Current < 0)
Low SoC	Idle	1	2	Indicates battery SoC level				Module low voltage alarm (SOC<5%) Only in Idle Mode
Alarm	Module over voltage	3	Off	On	On	On	On	0x340 BYTE 2,3 BIT2 (Vmodule > 57.6V)
	Module Under voltage	3	Off	Off	On	On	On	0x340 BYTE 2,3 BIT3 (Vmodule < 44.8V)
	Cell over voltage	3	Off	On	Off	On	On	0x340 BYTE 2,3 BIT0 (Vcell > 3.6V)
	Cell under voltage	3	Off	Off	Off	On	On	0x340 BYTE 2,3 BIT1 (Vcell < 2.8V)
	Charge MOS fault	3	Off	On	On	Off	On	0x340 BYTE 6,7 BIT0 (Still have charge current ,when charge MOS is turned off)
	Discharge MOS fault	3	Off	Off	On	Off	On	0x340 BYTE 6,7 BIT1 (Still have discharge current ,when discharge MOS is turned off)
	Cell over temperature	3	Off	On	Off	Off	On	0x340 BYTE 2,3 BIT8 and 9 (Tcell > 55°C)
	Cell under temperature	3	Off	Off	Off	Off	On	0x340 BYTE 2,3 BIT10 and 11 (Charge Tcell < 7°C Discharge Tvell < -18°C)
	Charging Over Current	3	Off	On	On	On	Off	0x340 BYTE 2,3 BIT4 (Current > 95A)
	Discharge Over Current	3	Off	Off	On	On	Off	0x340 BYTE 2,3 BIT5 (Current > 95A)
	Cell sampling fault	3	Off	On	Off	On	Off	0x340 BYTE 6,7 BIT3 (BMS Internal fault)
	Heating fault	3	Off	Off	Off	On	Off	0x340 BYTE 6,7 BIT6 OR 0x340 BYTE 4, 5 BIT15 (BMS Internal fault)
	Low SoC	3	Off	On	On	Off	Off	0x340 BYTE 2,3 BIT15 (SOC<5%) In Discharge and Idle Mode
	Temperature sensor malfunction	3	Off	Off	On	Off	Off	0x340 BYTE 6,7 BIT2 (BMS Internal fault)
	Battery Cell malfunction	3	Off	On	Off	Off	Off	0x340 BYTE 6,7 BIT4 (voltage difference between cells exceeds 1V)
	Communication failure	3	Off	Off	Off	Off	Off	0x340 BYTE 6,7 BIT5 (BMS Internal fault)

Protection	Short Circuit Protection	3	On	On	On	On	On	0x340 BYTE 4, 5 BIT6 (Current > 300A)
	Charge protection Module Over Voltage	3	On	Off	On	On	On	0x340 BYTE 4, 5 BIT7 (Vmodule > 57.6V,SOC = 100%)
	Protection Module Over current	3	On	On	Off	On	On	0x340 BYTE 4, 5 BIT4 and 5 (Current > 95A)
	Protection Module Over voltage	3	On	Off	Off	On	On	0x340 BYTE 4, 5 BIT2 (Vmodule > 57.6V)
	Protection Module Under voltage	3	On	On	On	Off	On	0x340 BYTE 4, 5 BIT3 (Vmodule < 40.8V)
	Protection Reverse Polarity	3	On	Off	On	Off	On	0x340 BYTE 6,7 BIT14 (The positive and negative are reversed) 0x340 BYTE 4, 5 BIT0 (Vcell > 3.6V)
	Cell Over voltage	3	On	On	Off	Off	On	0x340 BYTE 4, 5 BIT0 (Vcell > 3.6V)
	Cell Under voltage	3	On	Off	Off	Off	On	0x340 BYTE 4, 5 BIT1 (Vcell < 2.55V)
	Cell Over Temperature Charge/Discharge	3	On	On	On	On	Off	0x340 BYTE 4, 5 BIT8 and 9 (Tcell > 57°C)
	Cell Under Temperature Charge/Discharge	3	On	Off	On	On	Off	0x340 BYTE 4, 5 BIT10 and 11 (Charge Tcell < 5°C Discharge Tvell < -20°C)
	Ambient Over Temperature	3	On	On	Off	On	Off	0x340 BYTE 4, 5 BIT13 OR 0x340 BYTE 2,3 BIT12 (Tambient > 65°C)
	Ambient Under Temperature	3	On	Off	Off	On	Off	0x340 BYTE 4, 5 BIT14 OR 0x340 BYTE 2,3 BIT13 (Tambient < -15°C)
	Mosfet Over Temperature	3	On	On	On	Off	Off	0x340 BYTE 4, 5 BIT12 OR 0x340 BYTE 2,3 BIT14 (Tmosfet > 90°C)
	Locked	3	On	Off	Off	Off	Off	0x34F BYTE 4,5 [(Vcell>3.8V) 5S OR (Vcell<2.0V 5S) OR (Tcell>70°C 5min) OR (Tcell<-30°C 5min)]

Note: The threshold is for reference only and it is variable.

Table 8. LED blink description

Blink Sequence Number	Blink Mode	Blinking (Sec)	Off (Sec)
1	Blinks once every 4 seconds	0.25	3.75
2	Blinks twice every 2 seconds	2 times of 0.25/0.25	1s
3	Blinks three times every 3 seconds	3 times of 0.25/0.25	1.5S

Table 9. Battery level indication – when there is no fault or Alarms

Status		Charging				Discharge			
Battery level indicator		●	●	●	●	●	●	●	●
Battery level (%)	0–25%	Blinks twice	Off	Off	Off	Constantly On	Off	Off	Off
	26–50%	On	Blinks twice	Off	Off	On	On	Off	Off
	51–75%	On	On	Blinks twice	Off	On	On	On	Off
	76–100%	On	On	On	Blinks twice	On	On	On	On

4.2 Display and Setting

4.2.1 Viewing the Current System Information



Some parameter names shown on the integrated EMS page are abbreviated to fit the LCD display size. Information shown on the screen is for reference only. It may vary depending on the software version.

When the inverter is ON, the LCD screen on the inverter automatically shows these pages, one after another:

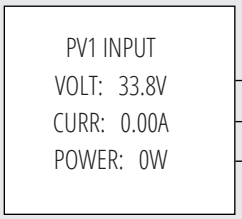
- DC VOLTAGE: Shows the bus voltage.
- BATTERY: Shows the voltage, current, and capacity of the battery.
- BMS PARAM: Shows the battery type, temperature, SOC, charge voltage, charging current, and discharge current.
- GRID VOLT, GRID CURR, GRID FREQ, INV VOLT, INV CURR, INV FREQ, BACKUP VOLT, and BACKUP CURR: Shows the voltage of the R, S, and T phases.
- POWER: Shows the power of the inverters, the grid, the normal loads, the PV, the backup loads, and the battery.
- TEMPERATURE: Shows the temperature of the inverter, the DC-DC converter (DC/DC) inside the inverter, the environment, the PV, and the LLC circuit module.
- STATE: Shows the state of the system, the inverter circuit inside the inverter, and the DC-DC converter.

Table 10. System State Description

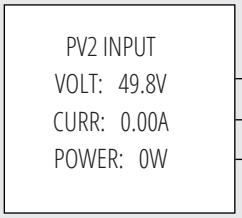
Parameter Name	Value	Description
SYS	INIT	Means the system is being initialized. This state occurs when the system is being powered on and the ARM chip is not communicating with the DSP chip.
	Standby	Means the main power circuit is not ON.
	Hybrid-G	Means the system is being connected to the grid.
	Off-grid	Means the system is off grid.
	G-charge	Means the system is charged by the power grid.
	P-charge	Means the system is charged by the PV panels.
	G-bypass	Means the power grid is being bypassed.
	Error	Means an error has occurred.
INV	Standby	Means the inverter circuit is on standby.
	Off-grid	Means the inverter circuit is off grid.
	Para	Means the inverter is being connected to the grid.
	Off to para	Means the inverter is in transition from off-grid to on-grid.
	Para to off	Means the inverter is in transition from on-grid to off-grid.
DCDC	Standby	Means the DC-DC converter is on standby.
	Soft start	Means the DC-DC converter is in soft-start.
	Charge	Means the DC-DC converter is in charging mode.
	Discharge	Means the DC-DC converter is in discharging mode.

- ERROR NO.: Shows the warning code and error code.
- SYSTEM: Shows the selected working mode, the selected grid standard, and the PV input mode.
- PV1 INPUT: Shows the input voltage, current, and power on the PV1 ports.
- PV2 INPUT: Shows the input voltage, current, and power on the PV2 ports.

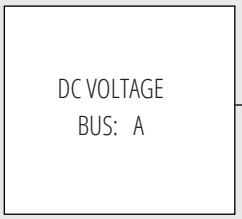
4.2.2 PV1 input display interface

Interface	Explanation
	PV1 input real-time voltage PV1 input real-time current PV1 input power

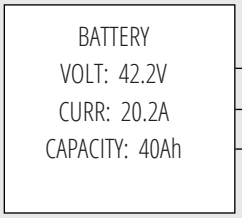
4.2.3 PV2 input display interface

Interface	Explanation
	PV2 input real-time voltage PV2 input real-time current PV2 input power

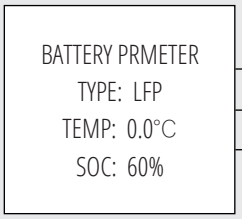
4.2.4 Bus voltage

Interface	Explanation
	Bus voltage of the system

4.2.5 Battery

Interface	Explanation
	Battery input voltage Battery current (+ means discharge, -means charge) Battery Capacity

4.2.6 Battery Parameter

Interface	Explanation
	Battery input voltage Battery current (+ means discharge, -means charge) Battery Capacity

4.2.7 BMS parameters

Interface	Explanation
BMS PARAM CHAR VOLT: 54.5V CHARGE: 25A DISCHARGE: 100A	Battery charging voltage Battery charging current: (select according to battery type) Battery discharging current

4.2.8 Grid-connected output

Interface	Explanation
GRID DATA VOLT: 0.0V CURR: 0.00A FREQ: 0.00Hz	Mains Real time voltage CT real-time current Grid-connected real-time frequency

4.2.9 Inverter output

Interface	Explanation
INV DATA VOLT: 0.0V CURR: 0.00A FREQ: 0.00Hz	Inverter real-time voltage Inverter real-time current Inverter real-time frequency

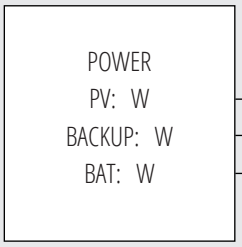
4.2.10 Load

Interface	Explanation
BACKUP DATA VOLT: 0.0V CURR: 0.00A	Emergency load (BACKUP) voltage Emergency load (BACKUP) current

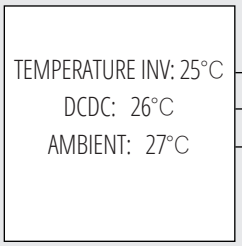
4.2.11 Power

Interface	Explanation
POWER INV: W GRID: W LOAD: W	Inverter real - time total power Grid real-time total power Load real-time total power

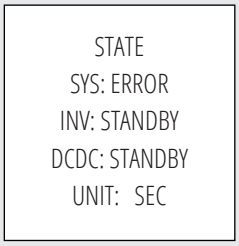
4.2.12 Power

Interface	Explanation
	PV real-time total power BACKUP real-time power Battery real-time power

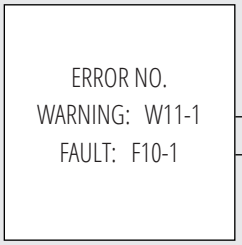
4.2.13 Temperature

Interface	Explanation
	Real-time temperature of inverter system radiator Real-time temperature of Bidirectional DCDC system radiator Internal ambient temperature

4.2.14 Status information

Interface	Explanation
	**System information:** Power-up mode, standby mode, hybrid grid-connection, off-grid operation, mains charging mode, PV charging mode, bypass mode, fault mode, DSP programming, ARM programming. **INV:** standby mode, off-grid inverter mode, grid-connected mode, and transition of grid-connection to off-grid, transition of off-grid to grid mode. **DCDC:** standby mode, soft start mode, charging mode, discharging mode.

4.2.15 Error information

Interface	Explanation
	Alarm code Error code

4.2.16 System setting.

Interface	Explanation
SYSTEM STATE: PEAK SHIFT GRID: CHN PV I/P: INDEPEN	**Status mode:** Self-generation and self-consumption, Peak load shifting, and Battery priority. **Grid-connection standards:** China, Germany, Australia, Italy, Spain, UK, Hungary, Belgium, Western Australia, Greece, France, Bangkok, Thailand, local and 60Hz. **PV input mode:** independent connection parallel connection constant voltage.

4.2.17 User setting

Interface	Explanation
USER 1:SETUP 2: INQUIRE 3: STATISTIC 4: FCTRY RESET	Press ESC on the Main Display Interface to enter the user interface. See chapter 8.2 for more setting details.

Enter the password before setting up the user.

Interface	Explanation
PASSWORD INPUT: XXXXX	After entering the setup interface, the system will prompt to input password. The default password is“00000”, which can be altered in Password setting menu. Press UP/DOWN button to increase or decrease the figure that is input. Press ENTER button to move the cursor backwards or confirm the setting. Press ESC button to move the cursor forward.



Restrict access to the inverter to only authorized people.

Avoid setting predictable passwords like 00000, 123456, 999999, etc.

It is recommended to change the PIN at frequent intervals.

Avoid using the same PIN for multiple inverter deployments.

To protect yourself from any cyberattack, Eaton strongly recommends that you change your password after completing commissioning

4.3 Setting

Interface	Explanation
--SETUP-- 1:SYS SETTING 2: BAT SETTING 3: GRID STD 4: RUN SETTING 5: 485 ADDRESS 6: BAUD RATE 7: LANGUAGE 8: BACKLIGHT 9: DATE/TIME 10: CLEAR REC 11: PASSWORD 12: MAINTENANCE 13: AUTO TEST	This interface is used for various information inquiry options. Press UP/DOWN button to move the corresponding options. Press ENTER to enter the selected menu. Press ESC button to return to the user interface. There are 13 options in total, including system mode, battery parameters, grid standard, operation parameters, 485 address, 485 baud rate, language display, LCD backlight, date/time, clear history, password setting and maintenance, and auto test.

4.3.1 System setting

Interface	Explanation
SYS SETTING 1:WORK MODE 2: PV INPUT 3: ZERO EXPORT 4: DRM ENABLE 5: EPS ENABLE 6: REMOTE CTRL 7: START DELAY 8: CEI SPI CTRL 9: GFCICHK ENB 10: DOD ENABLE 11: GENERATOR 12: CT OR METER 13: AC COUPLE 14: CT DIRECTIO 15: AFCI	This interface is used to access system information. Press UP/DOWN button to move corresponding options. Press ENTER to enter the selected menu. Press ESC button to return to the setting interface. There are 15 options in total, including working mode, PV input type, zero export enable, DRM enable , EPS enable, remote controlled enable , start delay.(see from 1 to 15)

1. Working mode

Interface	Explanation
WORK MODE 1: SELF CONSUME 2: PEAK SHIFT 3: BAT PRIORITY	This interface is used to opt for the working mode. After selecting the three modes, the restart interface will be entered. Press ESC button to return to setting interface.

SELF CONSUME: The energy generated is used in the following order: Feed the home loads; Charge the battery and then, feed into the grid.
BAT PRIORITY: the battery is only used as a backup power supply when the grid fails and as long as the grid works, the batteries won't be used to power the loads.

After completing the setup of peak load shifting mode, the time for charging and discharging also needs to be set.

Charging selection

Interface	Explanation
CHARGE FROM GRID 1: DISABLE 2:ENABLE	1.DISABLE 2.ENABLE After selecting self-consume mode, the setting of charge from grid can be disabled or enabled. If enabled, the charging time setting page will be displayed.

Charge time

Interface	Explanation
CHARGE TIME 00:00-23:59 MAX SOC:100%	1. Self-consumption mode disables grid charging: Battery pack can only be charged by PV. 2. Self-consumption mode enables grid charging: Grid charges battery pack until MAX SOC during set time.

Discharge time

Interface	Explanation
DISCHARGE TIME 00:00-23:59 MAX SOC:100%	1. Self-consumption mode disables grid discharging. 2. Self-consumption mode enables grid discharging: battery pack discharges into the grid until MAX SOC during set time.

Time setup 1

Interface	Explanation
CHA STAR1: 00:00 CHAR END1: 00:00 DIS START1: 00:00 DISC END1: 00:00	This interface is used to set the time-1 of peak load shifting. Press UP/DOWN button to change the value. Press ENTER to confirm. Press ESC button to return.

Time setup 2

Interface	Explanation
CHA STAR2: 00:00 CHAR END2: 00:00 DIS START2: 00:00 DISC END2: 00:00	This interface is used to set the time-2 of peak load shifting. Press UP/DOWN button to change the value. Press ENTER to confirm. Press ESC button to return.

2. Input mode

PV mode

Interface	Explanation
INPUT MODE 1:INDEPENDENT 2: PARALLEL 3: CV	Setup of PV Input mode. The factory setting by default is independent mode. When parallel input is set to be independent mode, PV power will be imbalanced.

3. ZERO EXPORT

Interface	Explanation
ZERO EXPORT 1: ENABLE 2:POWER	Limiting inverter power to be injected into the grid, disable by default.
ZERO EXPORT 1: DISABLE 2:ENABLE	

ZERO EXPORT: allows you to stop or limit the power exported to the grid. If set to Enabled, you can enter the power limit.

4. DRM enable

Interface	Explanation
DRM ENABLE 1:DISABLE 2: ENABLE	Only applicable in Australia and New Zealand. Default option is disabling.

5. EPS enable

Interface	Explanation
EPS ENABLE 1:DISABLE 2: ENABLE	It should be enabled if BACKUP load needs power supply after grid black out.

6. Remote Control enable

Interface	Explanation
REMOTE CTRL 1:DISABLE 2: ENABLE	The power switch of the machine can be realized through remote control. Default option is DISABLE.

7. START-UP delay

Interface	Explanation
START-UP DELAY INPUT: 30 UNIT: SEC	The power switch of the machine can be realized through remote control. Default option is enabling.

8. CEI SPI CTRL

Interface	Explanation
CEI SPI CTRL 1.DISABLE 2. ENABLE	CEI SPI CTRL: (1. Disable 2. Enable) When the DRM signal is enabled, this is used as a local signal. When the DRM signal is enabled, when the CEI SPI Ctrl is enabled, the frequency range is 50.2Hz ~ 49.8Hz. When the CEI SPI Ctrl is disabled, the frequency range is 51.5Hz ~ 49.8Hz

9. GFCICHK ENB

Interface	Explanation
GFCICHK ENB 1.DISABLE 2.ENABLE	GFCICHK ENB (1. Disable 2. Enable) PV leakage protection enable.

10. DOD ENABLE

Interface	Explanation
DISCHGDEPTH 1. DISABLE 2.ENABLE	Discharge depth (1. Disable 2. Enable). When the battery SOC reaches (100 minus the set discharge depth), the battery will stop discharging if it is enabled. If it is disabled, the battery will discharge to 0%. Enable by default.

11. GENERATOR

Interface	Explanation
GENERATOR 1.DISABLE 2. ENABLE	Generator mode enabling (1. Disable 2. Enable) when the generator needs to be connected for AC measurement, the enabling generator mode is prohibited, and the generator mode is prohibited in other times. In the mode of enabling generator, the frequency protection range measured by AC will be relaxed to + -10%, the frequency protection range at 50Hz is 45Hz-55Hz, and that of 60Hz is 54Hz-66Hz.

12. CT OR METER

Interface	Explanation
CT OR METER 1. CT 2. METER	CT or meter (1.CT 2.meter): the energy storage inverter supports the connection of three-phase ammeter.
METER-- 1.Eastron-3PH 2. Acrel 3. Rayleigh 4. YaDa 5. Eastron-1PH	Replace CT with three-phase ammeter to detect the utility power. When connecting three-phase ammeter, select “ammeter” option, and when connecting CT, select “CT” option.

13. AC COUPLE

Interface	Explanation
AC COUPLE 1. DISABLE 2.ENABLE	When ESS connects to other inverter by AC side, with other inverter charging PACK please enable AC couple.

14. CT DIRECTION

Interface	Explanation
CT DIRECTION 1.POSITIVE 2. NEGATIVE	If the CT connection is reversed, there is no need to change the direction actually but only set the direction on the interface by changing 1.POSITIVE to 2.NEGATIVE or 2.NEGATIVE to 1.POSITIVE, which is equivalent to changing the direction of the CT wiring. For example, when the battery is being charged and the grid power is positive “+” it means the CT connection is reversed. If the CT direction is 1. POSITIVE on the LCD, set it to 2. NEGATIVE, then the grid power will become negative “-”.

15. AFCI

Interface	Explanation
AFCI 1. DISABLE 2. ENABLE	Method to detect electric arcs The inverter has an integrated AFCI function. When the inverter detects an electric arc, users can find the time of the fault and the detailed phenomenon through the app. The alarm can be cleared automatically if the inverter triggers a fault for less than 5 times within 24 hours. The inverter locks for protection after the 5th electric arc fault. The inverter can operate normally after the fault is solved. Default Enable is Disabled If enabled options levels “1-9”.
Level INPUT: 9	

4.3.2 Battery parameters

Interface	Explanation
--BAT SETTING-- 1:BAT TYPE 2: DISC-DEPTH 3: OFF GRID DOD 4: CHG CURR 5: DISC POWER 6: CHG POWER 7: BAT END VOLT 8: BAT WAKE-UP 9: HEATING FLIM 10: BMS DOD 11: MAINTAIN SOC 12: FORCE WAKE	This interface is used to select battery parameters. Press UP/DOWN button to move corresponding options. Press ENTER button to enter the selected menu; Press ESC button to return to setting interface.

1. Battery type

Interface	Explanation
BAT TYPE 1: LEAD-ACID 2: LFP	This interface is used to select battery type. Press UP/DOWN button to move corresponding options. Press ENTER button to enter the selected menu; Select the LEAD-ACID enter button to enter the LEAD-ACID interface. Select the OTHER_Li enters button to enter the OTHER_Li interface;

Other Li battery parameters

Interface	Explanation
OTHER LI BAT 1:FLOAT VOLT 2: BAT END VOLT 3: BAT CAP 4: BAT OVP	This interface is used to select other Li battery parameters. Press UP/DOWN button to move corresponding options. Press ENTER button to enter the selected menu; Options include battery charge voltage, battery discharge end voltage and battery over voltage protection.

Lead-acid battery parameters

Interface	Explanation
LEAD-ACID 1: FLOAT VOLT 2: EQUALT VOLT 3: BAT CAP 4: BAT OVP	This interface is used to select other lead-acid battery parameters. Press UP/DOWN button to move corresponding options. Press ENTER button to enter the selected menu; Options include battery charge voltage, battery capacity, battery discharge end voltage, battery over voltage protection.

2. Discharge depth

Interface	Explanation
DISC DEPTH 1: INPUT: 60 2: UNIT: %	Grid connected discharge depth: the maximum allowable discharge depth of the machine with normal grid connection. If the grid connected discharge depth is set to 80%, when the SOC of the battery is lower than or equal to 20% with normal grid connection, the battery will stop discharging. Press UP/DOWN to increase or decrease the input figure. Press Enter to move cursor backward, confirm input and return to battery parameters interface. Press ESC to move cursor forward and return to battery parameters interface. The value ranges between 10% and 95%.

3. OFF GRID DOD

Interface	Explanation
OFF GRID DOD Input: 0~100% Default: 90%	Off grid discharge depth: the maximum allowable discharge depth of the machine in off-grid mode in case of grid power failure. The settable range is 0~100%. If the off-grid discharge depth is set to 90%, when the SOC of the battery is less than or equal to 10% with grid power failure, the battery will stop discharging. Relationship between off grid discharge depth and grid connected discharge depth. Grid connected discharge depth < off grid discharge depth. Off grid discharge depth - grid connected discharge depth = off grid standby SOC. For example, if the grid connected discharge depth is set to 80%, and the off-grid discharge depth is set to 90%, the battery will stop discharging if the SOC is equal to or lower than 20% with normal grid connection. When the grid power is off, the inverter will run in off-grid mode. At this time, 10% SOC of the battery can supply power to important loads.

4. Charge current

Interface	Explanation
CHARGE CURR INPUT: 25 UNIT: A	Press UP/DOWN button to increase or decrease the input figure; Press Enter to move cursor backward, confirm input and return to battery parameters interface; Press ESC button to move cursor forward and return to battery parameters interface.

5. Discharge Power

Interface	Explanation
DISC PERCENT INPUT: 080%	Press UP/DOWN button to increase or decrease the input figure. Press Enter button to move cursor backward, confirm input and return to battery parameters interface. Press ESC button to move cursor forward and return to battery parameters interface.

6. Charge Power

Interface	Explanation
CHAR PERCENT INPUT: 020%	Press UP/DOWN button to increase or decrease the input figure. Press Enter to move cursor backward, confirm input and return to battery parameters interface; Press ESC button to move cursor forward and return to battery parameters interface.

7. BAT END VOLT

Interface	Explanation
-- BAT END VOLT— INPUT: 43.2 UNIT: V	This function is used to set the discharge cut-off voltage. When select the battery type as LFP, the default value is 43.2 V, and the setting range is between 40.0 V to 48.0 V.

8. BAT WAKE-UP

Interface	Explanation
BAT WAKE-UP 1:ENABLE 2: TIME	Enter the option 1 to enable or disable the Function. Enter the option 2 to adjust the value of the time.

Battery wake up enable.

Interface	Explanation
WAKE-UP ENB 1: DISABLE 2: ENABLE	Battery wake-up enable setting. The default option is ENABLE.

Bat Wake Time

Interface	Explanation
WAKE-UP TIME INPUT: 060min	Press UP/DOWN button to increase or decrease the input figure. Press Enter button to move cursor backward, confirm input and return to battery parameters interface.

9. HEATING FILM

Interface	Explanation
HEATING FILM 1:AUTOMATIC 2: ON 3: OFF	This setting is only applicable for battery packs with heating film. 1. "Automatic" means that the system detects the external temperature and opens the heating film as required. 2. "On" means that the heating film will be turned on immediately after selecting "On". 3. "Off" means that the heating film will be turned off immediately after selecting "Off". It is Automatic by default.

10. BMS DOD

Interface	Explanation
BMS DOD 1:DISABLE 2: ENABLE	1. Disable BMS DOD: It will not close the discharge circuit when BMS discharging to the set SOC. 2. Enable BMS DOD: It will close the discharge circuit when BMS discharge to the set SOC. Note that don does not enable BMS DOD unless there's a special reason.

11. MAINTAIN SOC

Interface	Explanation
MAINTAIN SOC 1: DISABLE 2:ENABLE	1. Disable: The minimum SOC will not be maintained. 2. Enable: The minimum SOC 2% is maintained. When the battery SOC is less than 2%, the grid charges the battery pack to 5% through the inverter.

12. FORCE WAKE

Interface	Explanation
FORCE WAKE 1:DISABLE 2: ENABLE	1. Disable: Do not force to wake up battery packs. 2. Enable: Force to wake up the battery pack immediately if the battery is not connected.

4.3.3 Grid Code Setup

Interface	Explanation
GRID STD 1:China 2: Germany 3: Australia 4: Italy 5: Spain 6: U.K. ... 22: Local 23: 60Hz 24: Denmark	Press UP/DOWN button to move corresponding options. Here are 24 countries for selection, including China, Germany, Australia, Italy, Spain, and U.K. Press ENTER button to confirm the selection and enter restart interface. Press ESC button to cancel the selection and return to setting interface.

4.3.4 Operation parameters

Interface	Explanation
RUN SETTING 1: REACT MODE 2: GRID POWER 3: VOLT MAX 4: VOLT MIN 5: FREQ MAX 6: FREQ MIN 7: OVER VOLT 8: UNDER VOLT 9: OVER FREQ 10: UNDER FREQ 11: REACT RESP 12:VRT_ENABLE 13: POW SI RATE	Press UP/DOWN button to move corresponding options. Press Enter to enter the selected menu. Press ESC button to return to setting interface. Options include reactive power compensation mode, grid power, low/high grid voltage, low/high grid frequency, Grid over/under voltage derating and Grid over/under frequency derating, etc.

1. Reactive mode

Interface	Explanation
REACT MODE 1:POWER FACTOR 2: REACT POWER 3: QU CURVE 4: QP CURVE	Press UP/DOWN button to move corresponding options. Press Enter to confirm the input and enter power factor setting interface. (select 2, press Enter to confirm input and enter reactive power interface; Select 3, 4, the corresponding mode will be selected and return to the parameter setting interface.) Press ESC button to cancel the input and return to operation parameters interface.

Power factor setting

Interface	Explanation
POWER FACTOR INPUT: C1.00 Value range (L1.00~C1.00)	Press UP/DOWN to increase or decrease the input figure. Press ENTER button to confirm or ESC button to cancel the input and return to working interface; The input value should range between L0.80 and L1.00 or C0.80 and C1.00.

Reactive Power

Interface	Explanation
REACT POWER INPUT: +60% Value range (-60%~+60%)	Press UP/DOWN button to adjust the input figure; Press ENTER button to confirm or ESC button to cancel the input and return to working interface; The input value should range between -60% and +60%, which varies with the standard.

2. Grid Power

Interface	Explanation
GRID PERCENT INPUT: 100% Value range (0~100)	Press UP/DOWN button to adjust the input figure; Press ENTER button to confirm or ESC button to cancel the input and return to Press UP/DOWN button to adjust the input figure; Press ENTER button to confirm or ESC button to cancel the input and return to working interface; The input value should range between -60% and +60%, which varies with the standard. operation parameters interface. The input value should range between 0 and 100.

3. Volt Max

Interface	Explanation
VOLT MAX 1:INV MAX 2: GRID MAX	Enter option 1 to adjust the maximum volt of the INV. Enter option 2 to adjust the maximum volt of the grid.

High INV voltage

Interface	Explanation
VOLT MAX 1:INV MAX 2: GRID MAX	Enter option 1 to adjust the maximum volt of the INV. Enter option 2 to adjust the maximum volt of the grid.

Interface	Explanation
INV VOLT HIGH INPUT: V Value range (240~280V)	INV Over Voltage Protection Point Press UP/DOWN to adjust the input figure. Press Enter to confirm the input and enter restart interface. Press ESC to cancel the input and return to operation parameters interface. The value should range between 240V and 280V, which varies with different standards.

Grid Volt Max

Interface	Explanation
GRID MAX INPUT: 270V	GRID Over Voltage Protection Point Press UP/DOWN to adjust the input figure. Press Enter to confirm the input.

Volt Min

Interface	Explanation
VOLT MIN 1:INV-MIN 2: GRID MIN	Enter option 1 to adjust the minimum volt of the INV. Enter option 2 to adjust the minimum volt of the grid.

Low INV voltage

Interface	Explanation
I-INV VOLT LOW INPUT: V Value range (150~200V)	Enter option 1 to adjust the minimum volt of the INV. Enter option 2 to adjust the minimum volt of the grid.

Grid Volt Min

Interface	Explanation
GRID MIN INPUT: 170V	GRID Low Voltage Protection Point Press UP/DOWN to adjust the input figure; Press Enter to confirm the input.

Freq Max

Interface	Explanation
FREQ MAX 1:INV-MAX 2: GRID MAX	Enter option 1 to adjust the maximum frequency of the INV. Enter option 2 to adjust the maximum frequency of the grid.

High INV frequency

Interface	Explanation
INV FREQ HIGH INPUT: 52.0Hz Value range (50.5~55)	INV Over Frequency Protection Point Press UP/DOWN to adjust the input number. Press ENTER to confirm the input and enter restart interface. Press ESC to cancel the input and return to operational parameters interface. The value ranges between 50.5 and 55, which varies with different standards.

GRID Freq Max

Interface	Explanation
GRID MAX INPUT: 53.5Hz	GRID Over Frequency Protection Point Press UP/DOWN to adjust the input figure. Press Enter to confirm the input.

Freq Min

Interface	Explanation
FREQ MIN 1:INV-MIN 2: GRID MIN	Enter option 1 to adjust the minimum frequency of the INV. Enter option 2 to adjust the minimum frequency of the grid.

Low INV frequency

Interface	Explanation
INV FREQ LOW INPUT: Hz Value range (45~49.8)	INV Low Frequency Protection Point Press UP/DOWN to adjust the input figure. Press Enter to confirm the input and enter restart interface. Press ESC to cancel the input and return to operation parameters interface. The value ranges between 45 and 49.8, which varies with different standards.

GRID freq min

Interface	Explanation
GRID MIN INPUT: 50.5Hz	GRID Low Frequency Protection Point Press UP/DOWN to adjust the input figure. Press Enter to confirm the input.

Over volt

Interface	Explanation
OVER VOLT 1: ENABLE 2: VOLT	Enter the option 1 to enable or disable the function that the power of inverter derates when voltage is too high. Enter the option 2 to adjust the exact value of the voltage when power starts to derate.

Over volt enable

Interface	Explanation
OVER VOLT 1: DISABLE 2: ENABLE	Derate power when Voltage over. The default option is enabled.

Over volt start

Interface	Explanation
OVER VOLT INPUT: 264V	Press UP/DOWN to adjust the input figure. Press Enter to confirm the input.

Under volt

Interface	Explanation
OVER VOLT 1: ENABLE 2: VOLT	Enter the option 1 to enable or disable the function that the power of inverter derates when voltage is too low. Enter the option 2 to adjust the exact value of the voltage when power start to derate.

UNDER VOLT ENABLE

Interface	Explanation
OVER VOLT 1: DISABLE 2: ENABLE	Enable or disable the function that the power of inverter derates when voltage is too low.

UNDER VOLT START

Interface	Explanation
UNDER VOLT INPUT: 200V	Press UP/DOWN to adjust the input figure. Press Enter to confirm the input.

OVER FREQ

Interface	Explanation
OVER FREQ 1:ENABLE 2:FREQ	Enter the option 1 to enable or disable the function that the power of inverter derates when frequency is too high. Enter the option 2 to adjust the exact value of the frequency when power start to derate.

OVER FREQ ENABLE

Interface	Explanation
OVER FREQ 1: DISABLE 2: ENABLE	Derate power when Frequency over. The default option is “Enable”.

OVER FERQ START

Interface	Explanation
OVER FREQ INPUT: 50.50Hz	Press UP/DOWN to adjust the input figure. Press Enter to confirm the input.

UNDER FREQ

Interface	Explanation
UNDER FREQ 1: ENABLE 2: FREQ	Enter the option 1 to enable or disable the function that the power of inverter derates when frequency is too low. Enter the option 2 to adjust the exact value of the frequency when power start to derate.

UNDER FREQ ENABLE

Interface	Explanation
UNDER FREQ- 1: DISABLE 2: ENABLE	Derate power when frequency is too low. The default option is “Enable”.

UNDER FREQ START

Interface	Explanation
UNDER FREQ INPUT: 50.50Hz	The function that the power of inverter derates when frequency is too low. Press UP/DOWN to adjust the exact value of the frequency when power start to derate.

REACT RESP

Interface	Explanation
REACT RESP INPUT: 10s	The input value of Reactive response time. The value ranges from 6s to 60s and default value is 10s.
Value Range (6s ~ 60s)	

VRT_ENABLE

Interface	Explanation
VRT_ENABLE 1: DISABLE 2: ENABLE	Enable or disable the High/Low voltage ride through capability .

POW SI RATE

Interface	Explanation
POW SI RATE INPUT: 250%	The input value of power rising rate. Default value is 250%.

4.3.5 485 Address

Interface	Explanation
485 ADDRESS INPUT: 1 Value range (1~32)	Press UP/DOWN button to adjust the input figure; Press ENTER button to confirm or ESC button to cancel the input and return to setup interface; the input value should range between 1 and 32.

4.3.6 485 Baud rate

Interface	Explanation
SELECT 1:2400 bps 2:4800 bps 3:9600 bps	Press UP/DOWN button to move corresponding options; Press ENTER button to confirm or ESC button to cancel the selection and return to setup interface; there are three alternative options: 2400/4800/9600.

4.3.7 Language

Interface	Explanation
LANGUAGE 1: 中文 2: ENGLISH 3: Italia	Press UP/DOWN button to move corresponding options. Press ENTER button to confirm or ESC button to cancel the selection and return to setup interface.

4.3.8 LCD backlight

Interface	Explanation
LIGHTTIME INPUT: 20 UNIT: S (seconds)	Press UP/DOWN button to adjust the input figure; Press ENTER button to confirm or ESC button to cancel the input and return to setup interface. The input value should range between 20 and 120.

4.3.9 Date/time

Interface	Explanation
DATE/TIME DATE: 2020-07-19 TIME: 10:01:12 WEEK: Monday	Press UP/DOWN button to adjust the input figure; Press Enter button to move cursor backward, confirm input and return to setup interface; Press ESC button to move cursor forward and return to setup interface. The input value should range between 2000 and 2099.

4.3.10 Clear history

Interface	Explanation
DEL REC 1: CANCEL 2: CONFIRM	Clear all the previous history in Inquiry/Record menu. Press UP/DOWN button to move corresponding options. Press ENTER button to confirm or ESC button to cancel the selection and return to setup interface.

4.3.11 Password Setting

Interface	Explanation
PASSWORD OLD: XXXXX NEW: XXXXX CONFIRM: XXXXX	This interface will be used to change password for entry into the setup interface. Press UP/DOWN to adjust the input figure. Press Enter to move cursor backward, confirm input and return to setup interface. Press ESC to move cursor forward and return to setup interface.

4.3.12 Maintenance

Interface	Explanation
12: MAINTENANCE	Maintainer use only. Press Enter to enter the selected item.

4.3.13 Auto Test

Interface	Explanation
PASSWORD INPUT: XXXXX	The Auto test function works only in the Italy grid standard. After entering the Auto test interface, the system will prompt to input password. The password is“00000”.

Autotest countdown

Interface	Explanation
Auto test . . . 603 s	The self-test countdown interface. This interface will show up at the beginning of the self-test. The countdown will last for 603 seconds. You can press the ESC Key to exit the self-test.

Autotest parameters

Interface	Explanation
TEST LIST 1: VOLT MAX 2:VOLT MIN 3: FREQ MAX 4: FREQ MIN	After the countdown there is a test list interface which is used to select the parameter for Auto test. There are four kinds of test results including Volt Max , Volt Min ,Freq Max and Freq Min. After entering the submenu items, you can press the UP and Down key to scan the result.

VACMAX parameters

Interface	Explanation
VACMAX (S1) Set: 253.0V 30s Tes: 229.0V 30s Cur: 228.5V Pass! VACMAX (S2) Set: 264.5V 200ms Tes: 229.0V 193ms Cur: 228.3V Pass!	• Threshold setting value: The value set by upper computer software. • Threshold setting trip time: The trip time set by upper computer software. • Threshold auto test value: The value of threshold during coincidence between the threshold and current measured value. • Threshold auto test trip time: The time from the coincidence between the threshold and current to the trip signal of disconnection switch. • Current measured voltage or frequency value: The measurement value of grid voltage or frequency during the coincidence.

VACMIN parameters

Interface	Explanation
VACMIN (S1) Set: 195.5V 1.50s Tes: 228.4V 1.50s Cur: 228.7V Pass! VACMIN (S2) Set: 34.5V 0.2s Tes: 228.4V 0.19s Cur: 228.7V Pass!	• Threshold setting value: The value set by upper computer software. • Threshold setting trip time: The trip time set by upper computer software. • Threshold auto test value: The value of threshold during coincidence between the threshold and current measured value. • Threshold auto test trip time: The time from the coincidence between the threshold and current to the trip signal of disconnection switch. • Current measured voltage or frequency value: The measurement value of grid voltage or frequency during the coincidence.

FACMAX parameters

Interface	Explanation
FACMAX (S1) Set: 50.2Hz 100ms Tes: 50.0Hz 97ms Cur: 50.0Hz Pass! FACMAX (S2) Set: 51.5Hz 100ms Tes: 50.0Hz 94ms Cur: 50.0Hz Pass!	• Threshold setting value: The value set by upper computer software. • Threshold setting trip time: The trip time set by upper computer software. • Threshold auto test value: The value of threshold during coincidence between the threshold and current measured value. • Threshold auto test trip time: The time from the coincidence between the threshold and current to the trip signal of disconnection switch. Current measured voltage or frequency value: The measurement value of grid voltage or frequency during the coincidence.

FACMIN parameters

Interface	Explanation
FACMIN (S1) Set: 49.8Hz 100ms Tes: 50.0Hz 94ms Cur: 50.0Hz Pass! FACMIN (S2) Set: 47.5Hz 100ms Tes: 50.0Hz 98ms Cur: 50.0Hz Pass!	• Threshold setting value: The value set by upper computer software. • Threshold setting trip time: The trip time set by upper computer software. • Threshold auto test value: The value of threshold during coincidence between the threshold and current measured value. • Threshold auto test trip time: The time from the coincidence between the threshold and current to the trip signal of disconnection switch. • Current measured voltage or frequency value: The measurement value of grid voltage or frequency during the coincidence.

4.4 Inquiry

Interface	Explanation
INQUIRE 1:INV MODEL 2: MODEL SN 3: FIRMWARE 4: REGION 5: RUN SETTING 6: RECORD 7: BMS INFO 8: METER STATUS	Press UP/DOWN button to move corresponding options. Press Enter button to jump to the selected menu; Press ESC button to return to user interface; There are four alternative options: machine model, serial number, firmware version region, running setting, running records, BMS information and METER STATUS. (refer to 1 to 8).

1. Machine model

Interface	Explanation
INVERTER xxxxx	This interface displays machine model of the inverter. Press ESC button to return to inquiry interface.

2. Serial number

Interface	Explanation
SERIAL NUMBER- SN: 123456789532625	This interface displays serial number of the inverter. Press ESC button to return to inquiry interface.

3. Firmware Version

Interface	Explanation
FIRMWARE ARM VER: 1.0.0 DSP VER: 1.0.0	This interface displays firmware version for ARM and DSP of the inverter. Press ESC button to return to inquiry interface.

4. REGION

Interface	Explanation
REGION Aus-A	This interface displays the current selection of region. Press ESC button to return to inquiry interface.

5. RUN SETTING

Interface	Explanation
RUN SETTING INV VOLT MAX: 200 V INV VOLT MIN: 170 V INV FREQ HIGH: 52.0 Hz INV FREQ LOW: 48.0 Hz OVER VOLT: 264 V UNDER VOLT: 200 V OVER FREQ: 50.5 Hz UNDER FREQ: 49.5 Hz GRID POWER: 100%	This interface displays the current settings for grid protection and power quality response modes. Note that the parameters here are only available for view. Press ESC button to return to inquiry interface.

6. Running records

Interface	Explanation
REC (500) 1:F10-1 DATE: 2018 - 12-01 TIME: 00 :01 :02	SN of the fault: Fault warning codes (500 at utmost) (the latest fault or alarm marked as No.1) Time of the fault: Press UP/DOWN button to view the record; Press ENTER button to enter the description interface for corresponding records. Press ESC button to return to Inquiry interface.

7. BMS INFO

Interface	Explanation
PACK INFO 1:PACK 1 2: PACK 2 3: PACK 3 4: PACK 4 5: PACK 5	Battery information, warning records, fault records and protect information of the five battery packs can be queried in this interface.
PACK 1 1: INFO 2: WARN 3: FAULT 4: PROTECT	

8. METER STATUS

Interface	Explanation
METER STATUS COMMUNICATE OK	After connecting the meter, you can view the communication status of the meter here, success or fail. Press ESC button to return to Inquiry interface.

4.5 Statistics

Interface	Explanation
STAT 1:TIME STAT. 2:CONNE.TIMES 3: PEAK POWER 4: E-TODAY 5: E-MONTH 6: E-YEAR 7: E-TOTAL	This interface is used to select statistics items. Press UP/DOWN button to move corresponding options. Press Enter to enter the selected menu. Press ESC button to return to user interface. There are eight alternative options in total: time accounting, grid-connection frequency/ peak power/ power generation for the day / power generation for the month/ power generation for the year/gross power generation (refer to 1 to 7).

1. Time accounting

Interface	Explanation
Time RUN: 5 GRID: 0 UNIT: HOUR	Operation length of inverter (hours) Grid-connection length (hours) Press ESC button to return to statistics interface.

2. Grid-connection frequency

Interface	Explanation
CONNE.TIMES TIMES: 0	This interface displays grid-connection. frequency of the inverter. Press ESC button to return to statistics interface.

3. Grid-connection frequency

Interface	Explanation
PEAK POWER HISTORY: 5000 TODAY: 0 UNIT: W	This interface displays power peak in history and for the day. Press ESC button to return to statistics interface.

4. The day

Interface	Explanation
E-TODAY PV: 0.0KWH METER: 0.0KWH GRID: 0.0KWH LOAD: 0.0KWH CHARG: 0.0KWH DISCH: 0.0KWH	This interface displays power generation for the day (kWh). PV power generation. Electric energy selling to Grid. Electric energy buying from Grid; Power consumption of Load;

5. The month

Interface	Explanation
E-MONTH PV: 0.0KWH METER: 0.0KWH GRID: 0.0KWH LOAD: 0.0KWH	This interface displays power generation for the month (kWh); PV power generation; Electric energy selling to grid; Electric energy buying from grid; Power consumption of load;

6. The year

Interface	Explanation
E-YEAR PV: 0.0KWH METER: 0.0KWH GRID: 0.0KWH LOAD: 0.0KWH	This interface displays power generation for the year (kWh); PV power generation; Electric energy selling to grid; Electric energy buying from grid; Power consumption of load;

7. Gross generation

Interface	Explanation
E-TOTAL PV: 0.0KWH METER: 0.0KWH GRID: 0.0KWH LOAD: 0.0KWH CHARG: 0.0KWH DISCH: 0.0KWH	This interface displays gross power generation; PV power generation; Electric energy selling to grid; Electric energy buying from grid; Power consumption of load;

4.6 Factory default setting

Interface	Explanation
FACTORY RESET 1:CANCEL 2: CONFIRM	Press UP/DOWN button to move corresponding options; Press Enter to enter the selected item.

5. Battery storage and recharging

5.1 Battery storage requirements

1. Storage environment requirements:

• Ambient temperature: -10℃~45℃; recommended storage temperature: 20℃~30℃;

• Relative humidity: 0%RH~95%RH (No condensation);

• In a dry, ventilated and clean place;

• No contact with corrosive organic solvents, gases and other substances;

• No direct sunlight;

• Less than 2 meters from any heat source.

5.2 Storage expiration

In principle, it is not recommended to store the battery for a long time. Be sure to use it in time. The stored batteries should be disposed according to the following requirements.

Table 11. Stored lithium battery recharging interval

Required Storage Temperature	Actual Storage Temperature	Recharge Interval
-10°C～+45°C	-10°C≤T≤30°C	12 months
	30°C<T≤45°C	8 months

1. If a battery is deformed, broken, or leaking, discard it immediately regardless of its storage time.
2. The allowable maximum stored battery recharging period is 3 years and the allowable maximum stored battery recharging times is 3. For example, if recharging is performed once every 8 months, the allowable maximum recharging times is 3 times; if recharging is performed once every 12 months, the allowable maximum recharging times is 3 times; if the allowable maximum stored battery recharging period or times is exceeded, it is recommended to discard the battery.
3. A lithium battery will have its capacity decreasing after being stored for a long time, and typically will have its capacity irreversibly decreasing by 3%–10% after being stored at the recommended storage temperature for 12 months. If the customer conducts the discharge test and acceptance according to the specification, there is a risk that the battery with a capacity less than 100% after being stored will fail the test.

5.3 Inspection before battery recharging



Before charging the battery, check it for deformation, case damage, or leakage, and if you find any of these things, do not charge the battery.



If the SOC of a battery pack is not less than 50% after more than 12 months of storage, it is not necessary to recharge the battery.

5.4 Recharge Operation Steps

Step 1: Connect power cables to the battery charger correctly. The maximum number of battery PACK connected parallel is 5.

Step 2: Turn on the battery PACK DC breaker to ON; Press the battery “start key” for 3 second to start the battery PACK. Check the LED on the battery PACK is on.

Step 3: Turn on the battery charger.

Step 4: Set charging parameter on the battery charger.

Case #1, one battery PACK is charged. Set the charge limited voltage 56.5V; Set the charge limited current 50A;
Case #2, Two ~ Eight battery PACKs are charged. Set the charge limited voltage 56.5V; Set the charge limited current 100A;

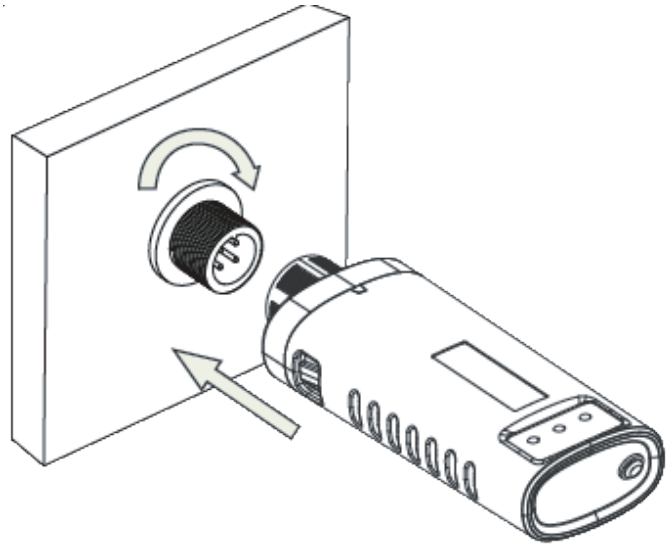
Step 5: after the battery is charged, switch off the battery charger and then the battery DC breaker. Disconnect the DC cables and then press the battery “start key” for 3 second to switch off the battery PACK.

6. Stick Logger Quick Guide

6.1 Stick Logger Installation

Step 1: Assemble logger to the inverter communication interface as shown in the diagram.

Figure 61. Installing stick logger



Please do not rotate the logger body while installing or removing the logger.



6.2 Logger Status

6.2.1 Check Indicator Light

Table 12. Indicator lights

Lights	Implication	Status Description (All lights are single green lights.) Interval
NET	Communicate with router	Light off: Fail to connect to the router. On 1s/Off 1s (Slow flash): Successful connection to the router. Light keeps on: Successful connection to the server. On 100ms/Off 100ms (Fast flash): Distributing network fast.
COM	Communicate with inverter	Light keeps on: Logger connected to the inverter. Light off: Fail to connect to the inverter. On 1s/Off 1s (Slow flash): Communicating with inverter.
READY	Logger running status	Light off: Running abnormally. On 1s/Off 1s (Slow flash): Running normally. On 100ms/Off 100ms (Fast flash): Restore factory settings.

The normal operation status of the stick logger, when router connected to the network normally:

1. Successful connection status with serve: NET light keeps on after the logger powered on.
2. Logger running normally: READY light Flashes.
3. Successful connection status with inverter: COM light keeps on.

6.3 Abnormal State Processing

Table 13. Abnormal state processing

NET	COM	READY	Fault Description	Fault Cause	Solution
Any state	OFF	Slow flash	Communicate with inverter abnormally	1. Connection between stick logger and inverter loosen. 2. Inverter does not match with stick logger's communication rate.	1. Check the connection between stick logger and inverter. Remove the stick logger and install again. 2. Check inverter's communication rate to see if it matches with stick loggers. 3. Long press Reset button for 5s, reboot stick logger.
OFF	ON	Slow flash	Connection between logger and router abnormal	1. Stick logger does not have a network. 2. Antenna abnormal 3.Router Wi-Fi signal strength weak.	1. Check if the wireless network configured. 2. Check the antenna if there is any damage or loose. 3. Enhance router Wi-Fi signal strength. Long press Reset button for 10s, reboot stick logger and networking again.
Slow flash	ON	Slow flash	Connection between logger and router normal, connection between logger and remote server abnormal.	1.Router networking abnormal. 2.The server point of logger is modified. 3.Network limitation, server cannot be connected.	1. Check if the router has access to the network. 2. Check the router's setting if the connection is limited.
OFF	OFF	OFF	Power supply abnormal	1. Connection between stick logger and inverter loosen or abnormal. 2. Inverter power in sufficient. 3. Stick Logger abnormal.	1. Connection between logger and router normal, connection between logger and remote server abnormal.
Fast flash	Any state	Any state	SMARTLINK networking status	Normal	1. Exit automatically after 5mins. 2. Long press Reset button for 5s, reboot stick logger. 3. Long press Reset button for 10s, restore factory settings.
Any state	Any state	Fast flash	Restore factory settings	Normal	1. Exit automatically after 1mins. 2. Long press Reset button for 5s, reboot stick logger. 3. Long press Reset button for 10s, restore factory settings.

6.4 Usage Methods and Notices for Reset Button

Table 14. Usage methods and notices for the reset button

	Keypress	Status Description	Light Status
	Short press 1s	SMARTLINK rapid networking status.	NET light flashes fast for 100ms.
	Long press 5s	Rebooting the stick logger.	All lights are extinguished immediately.
	Long press 10s	Resetting the stick logger.	1. All lights are extinguished after 4s. 2. READY light flashes fast for 100ms.



Do not remove waterproof plug.



7. SOLARMAN commissioning guide

7.1 Creating an account

7.1.1 App download

Please scan the QR code and download the APP.

Figure 62. QR codes to dowload Smart and Business APP



SOLARMAN Smart APP:

This app is remote monitoring and controlling platform for the end-users. The installer can help the end-user to create a account of SOLARMAN Smart in SOLARMAN Business.

SOLARMAN Business APP:

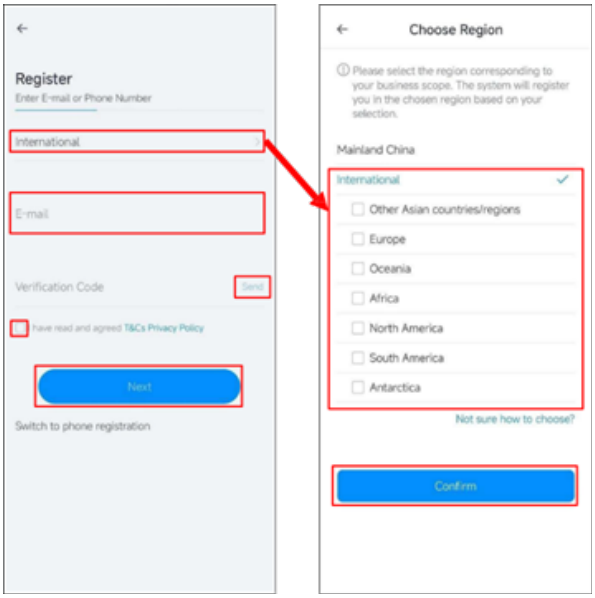
This app is remote monitoring and controlling platforms for distributors, dealers and installers.

7.1.2 Account registration

Step 1: Start registering

- Click “Register” to start account. You can use E-mail or Phone Number to register a new account, but using E-mail is recommended.
- Region Choose: there are two regions “Mainland China” and “International”, click here and choose “International” and the continent where you are, and the click “Confirm”.
- "E-mail": Input your own e-mail address.
- “Verification Code”: After filling out your email and click “Send”, then you will receive the “Verification Code” in your e-mail inbox, if you cannot find the verification e-mail in inbox, please check spam or trash box of your e-mail. And then input the verification code you received.
- Mark a check on “I have read and agreed T&Cs Privacy Policy”.
- Click “Next”.

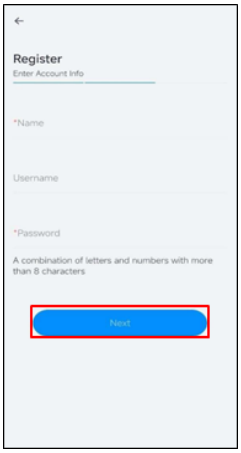
Figure 63. Account registration screen



Step 2: Start registering

- "**Name**": Input your name, you can input your own name or your company name as you want.
- "**Username**": it is not mandatory; it is optional.
- "**Password**": Set the password follow the request.
- Click "**Next**".

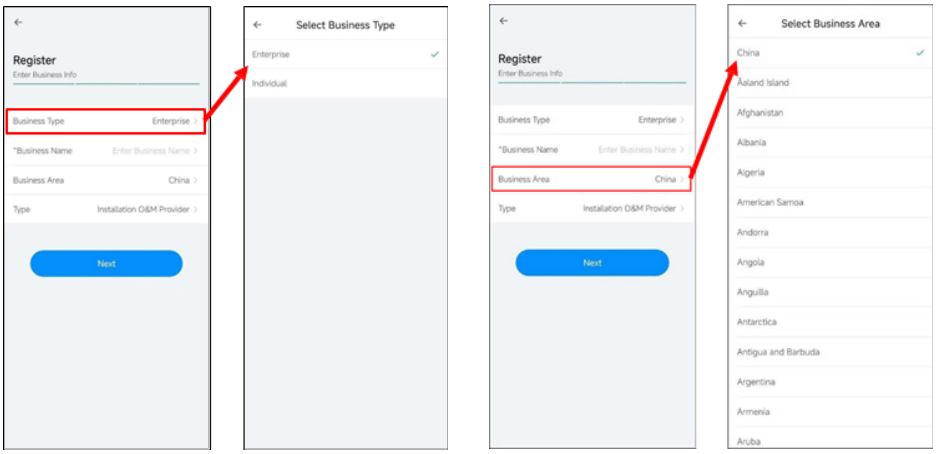
Figure 64. Account registration screen



Step 3: Input business information

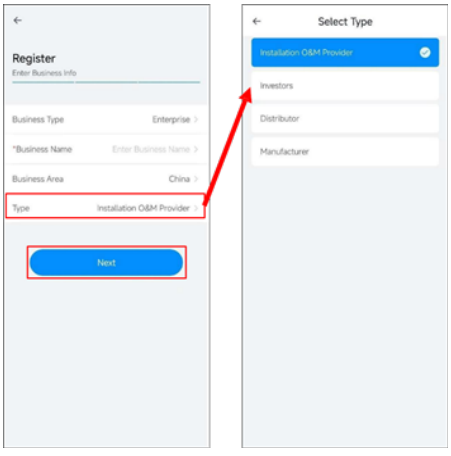
- Click "Business Type". Select the business type based on real situation.
- Click "Business Name". Edit your business name, the App supports 14 languages, you can edit your business name in your own language.
- Click "Save".
- Click "Business Area". Select your business area as real situation.

Figure 65. Business information screen



- Click "Type".
- Select the type based on real situation.
- Click "Next". It will show that you registered successfully.

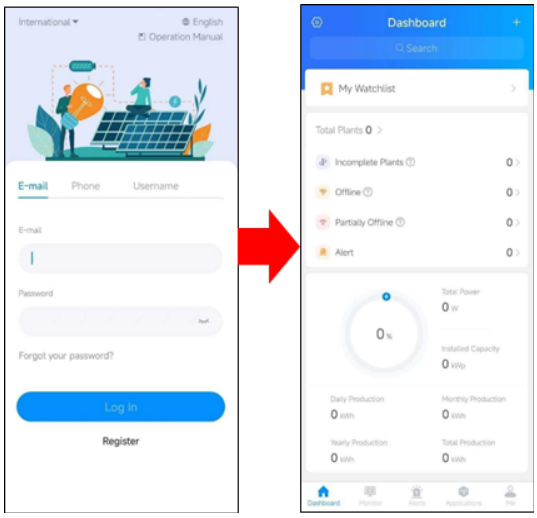
Figure 66. Business information screen



7.1.3 App login

• After successful account registration, you can login. You can login in three different ways, by E-mail is recommended. Input your email and password, and then click “Log In”. After logging in, you will enter the interface shown as in the picture.

Figure 67. Application login screen

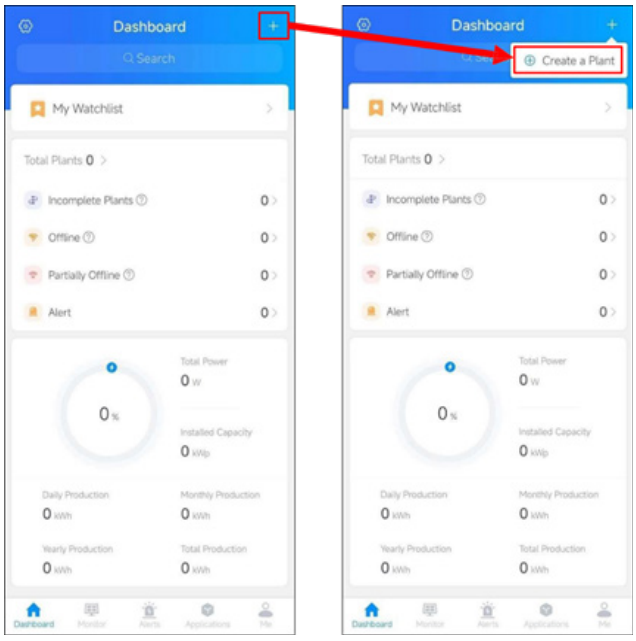


7.1.4 Adding power plant

After logging in, you can add your power plant to the app, you can create a power plant via two different ways.
Method one:

• Click the “+” at the top right corner of Dashboard, choose “Create a Plant”.

Figure 68. Adding a power plant

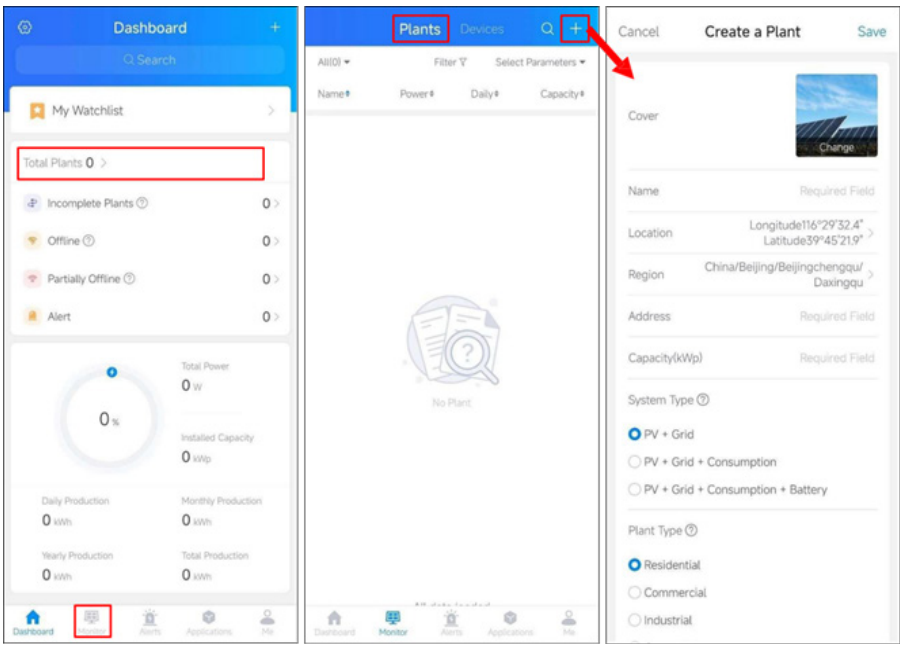


After login, you can add your power plant to the app, you can create a power plant through two ways:

• Click the “Total Plants” or “Monitor” icon go to the list of plants.

• Choose “Plants” and click the “+” at the top right of screen go to “Create a Plant” page.

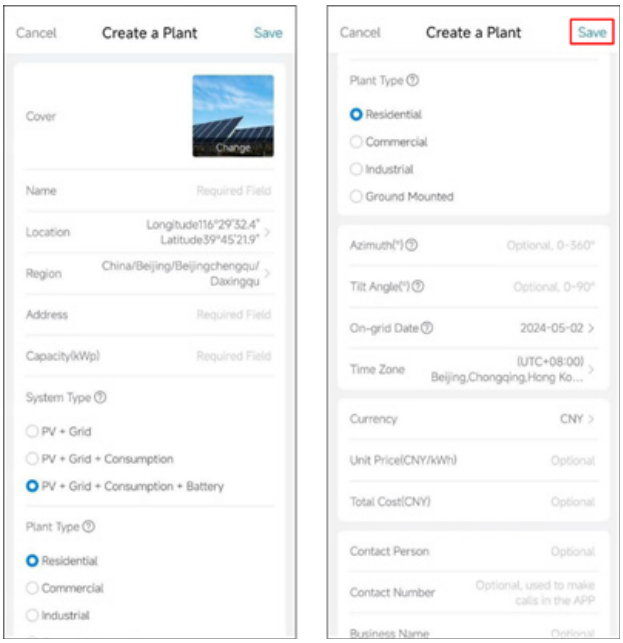
Figure 69. Create a Plant



At the “Create a Plant” page, you should input the information required as real situation.

- “Name”: Name your plant as you want.
- “Location”: Will be set automatically when you get GPS permission to this App.
- “Region”: Will be set automatically when you get GPS permission to this App.
- “Address”: Input detailed address of the power plant.
- “Capacity”: It means the total power capacity of PV system connected with inverter.
- “System Type”: always choose “PV + Grid + Consumption + Battery”.
- “Plant Type”: always choose “Residential”.
- Other items are not mandatory, click “Save”.

Figure 70. Create a Plant

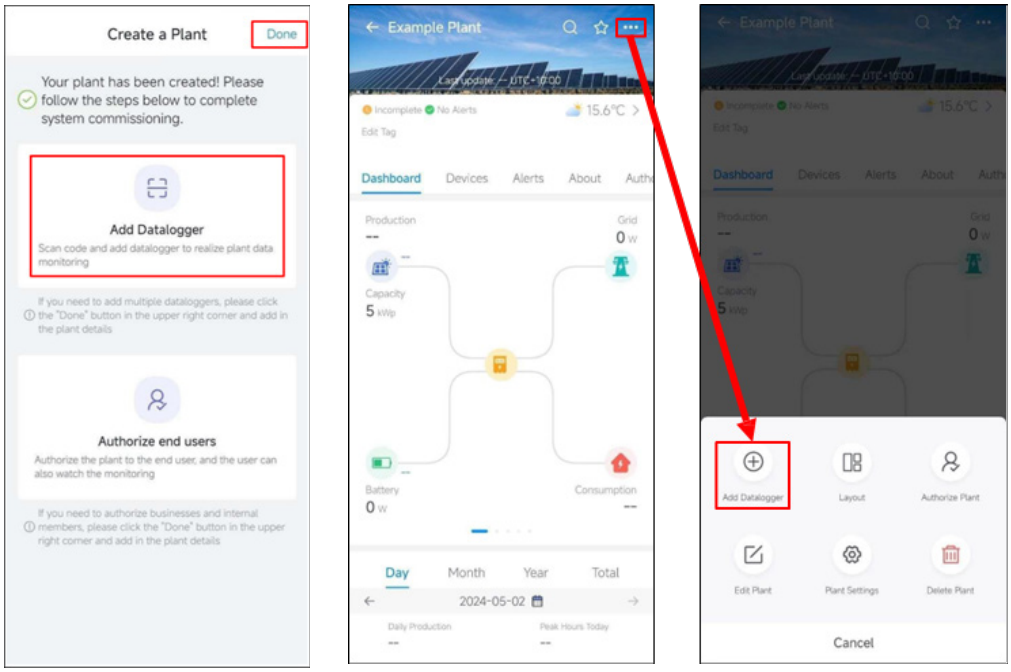


7.1.5 Adding a datalogger

After adding the power plants successfully, you will go to this page which shows that your plants have been created successfully.

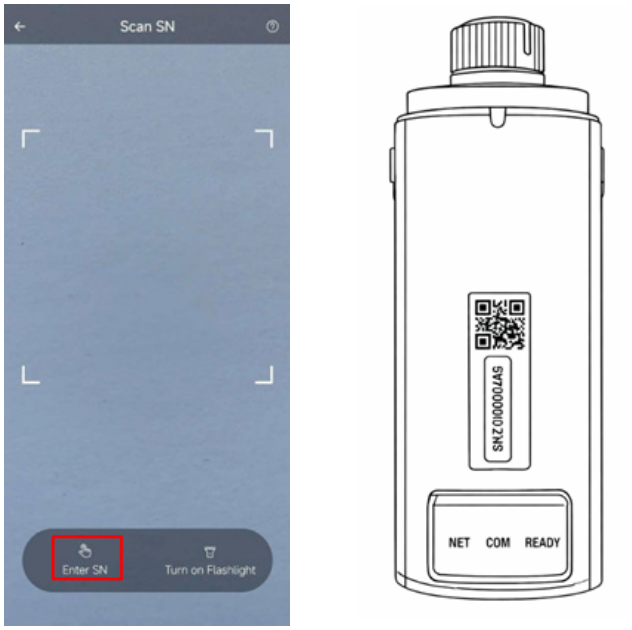
- Click “Done”, you will go back to plant page.
- Click “Add Datalogger”, you will start to add logger to this plant.
- Click “+” and then click “Add Datalogger”.

Figure 71. Adding datalogger



- After clicking “Add Datalogger”, you will be redirected to this page, where you can input the SN of Wi-Fi dongle, or scan the QR code on Wi-Fi dongle.
- After scanning the QR code or entering the SN successfully, click “Add”, and then it will go to next page.

Figure 72. Scan datalogger QR code

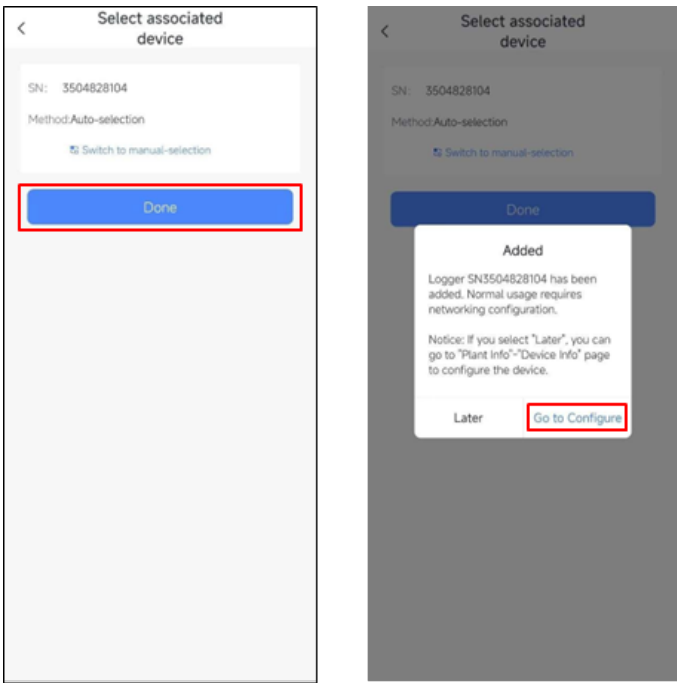


Configure Wi-Fi:

- Click “Done”.
- Click “Go to Configure”, it will go to next page to configure the internet.

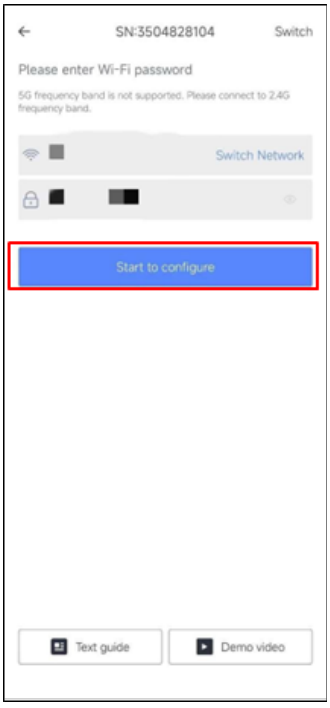
When you perform this step, please make sure your phone has connected to the Wi-Fi which you want the Wi-Fi dongle to connect to, and make sure the signal of Wi-Fi is good.

Figure 73. Configure datalogger screen



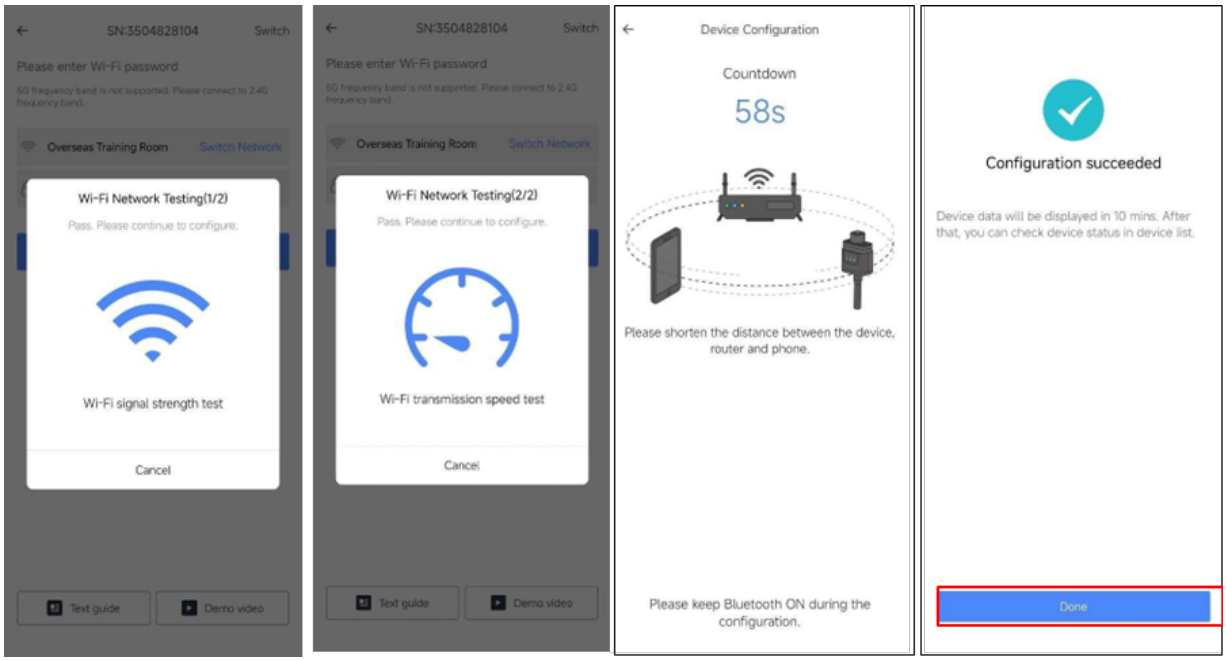
- Choose the Wi-Fi name you want the Wi-Fi dongle to connect to and make sure that your phone also has connected to this Wi-Fi at this time.
- Click **"Start to configure"**, it will configure the internet automatically as following steps.

Figure 74. Configure datalogger screen



- The internet will be configured as following the steps.
- After successfully, click "Done".

Figure 75. Wi-Fi network configuration



- If devices do not configure successfully, then follow the steps shown on the right. Check the connection between Wi-Fi dongle and WIFI interface on the PCS, the Wi-Fi signal.
- Click **"Return to modify"**, repeat the steps previous page.

Figure 76. Configuration fail screen



Light	Implication	Instruction
NET	Communication with base station	1. Light off: Connection to the router failed. 2. On 1s / Off 1s (Slow flash): Connection to the router succeeded. 3. Light on: Connection to the server succeeded. 4. On 100ms / Off 100ms (Fast flash): Fast networking.
COM	Communication with inverter	1. Light on: Logger connected to the inverter. 2. Light off: Connection to the inverter failed. 3. On 1s / Off 1s (Slow flash): Logger communicating with inverter.
READY	Logger Running Status	1. Light off: Logger runs abnormally. 2. On 1s / Off 1s (Slow flash): Logger runs normally. 3. On 100ms / Off 100ms (Fast flash): Restore factory settings.

7.1.6 Authorization level of end user accounts in SOLARMAN business app

Authorization levels:

1. View plant only: This role can only view the plant which is authorized by your business.

2. View + Edit plant: This role can view, edit the plant which authorized by your business, can control the devices (Depends on whether the manufacturer is authorized)

3. View +Edit +Delete plant: This role can view, edit the plant which authorized by your business, can control the devices (Depends on whether the manufacturer is authorized), can delete devices and subsystems in the plant.

Once you will create a plant on your business account, you can create and authorize the end user by following steps from below:

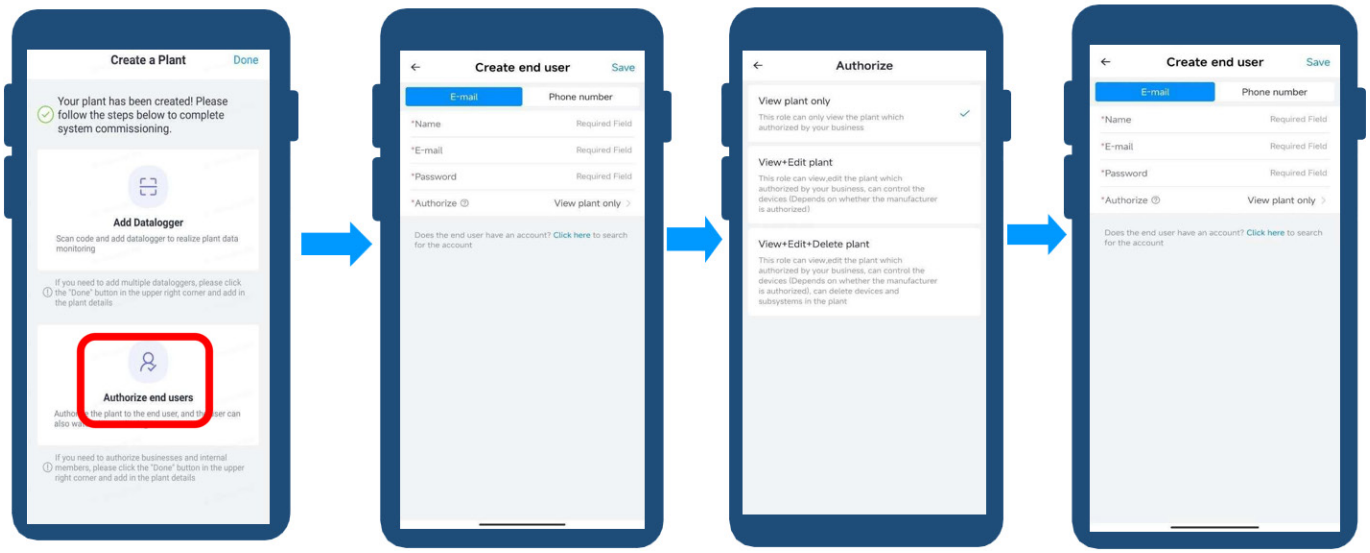
Step 1. Navigate to the “Create a plant” page.

Step 2. Add the relevant data of the end users in the fields.

Step 3. Select the level of authorization.

Step 4. Click “Save”.

Figure 77. Authorization of end user accounts



8. Alarm Code and Error Code

8.1 Alarm Code

Table 15. Alarm codes

Codes	English description
W00	Grid Volt Low
W01	Grid Volt High
W02	Grid Frequency Low
W03	Grid Frequency High
W04	Solar Loss
W05	Bat Loss
W06	Bat Under Volt
W07	Bat Volt Low
W08	Bat Volt High
W09	Over Load
W10	GFCI Over
W11	LN Reverse
W12	Fan Fault
W13	BAT Power Down
W14	BMS Discharge Over Current
W15	BMS charge Over Current
W16	BMS Over Volt
W17	BMS Over Temp
W18	BMS Discharge Low Temp
W19	BMS Volt Imbalance
W20	BMS Communicate Fault
W21	BMS Under Volt
W22	BMS Chg Temp Low
W23	BMS Severe Over Volt
W24	BMS Severe Over Temp
W25	BMS Updating
W26	BMS Program Version Err
W27	BMS Program Update Fail
W28	CT Reverse
W29	Grid Volt Lock Fail
W30	PV off
W31	System Reset

8.2 Error Code

Table 16. Error codes

Codes	English description
F00	Soft Time Out
F01	INV Volt Short
F02	GFCI Sensor Fault
F04	Bus Volt Low
F05	Bus Volt High
F06	Bus Short Circuit
F07	PV ISO Under Fault
F08	PV Input Short Circuit
F09	Bypass Relay Fault
F10	INV Curr Over
F11	INV DC Over
F12	Ambient Over Temp
F13	Sink Over Temp
F14	Grid Relay Fault
F15	DisChg Curr Over
F16	Chg Curr Over
F17	Current Sensor Fault
F18	INV Abnormal
F19	EPS Relay Fault
F20	Always Overload
F32	SCI Fault

9. Fault diagnosis and solutions

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

Table 17. Fault diagnosis

Types	Codes	Solutions
Soft Time Out	F00	(1)Restart the inverter and wait until it functions normally; (2) Contact customer service if error warning continues.
INV Volt Short	F01	(1) Cut off all the power and shut down all the machines; disconnect the load and plug in to restart machines, then check whether the load is short circuited if the fault has been eliminated; (2) Contact customer service if fault remains unremoved.
GFCI Sensor Fault	F02	(1) Cut off all the power, Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
Bus Volt Low	F04 F05	(1) Check the input mode setting is correct. (2) Restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
Bus Volt Short	F06	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
PV ISO Under Fault	F07	(1) Check for good ground connection; (2) Check if the earth resistance of PV+ and PV- is greater than 2MΩ; (3) If it is smaller than 2MΩ, check PV string for ground fault or poor ground insulation; if it is greater than 2MΩ, please contact the local inverter customer service once fault is not removed.
PV Input Short Circuit	F08	(1) Check the input mode setting is correct. (2) Disconnect the PV input, restart the inverter and wait until it functions normally. (3) Contact customer service if error warning continues.
Relay Fault	F09 F14 F19	(1) Disconnect the PV input, restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
INV Current Over	F10	(1) Wait five minutes for the inverter to automatically restart; (2) Check whether the load is in compliance with the specification; (3) Contact customer service if error warning continues.
INV DC Over	F11	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
NTC/Sink Temp Over	F12 F13	(1) Restart the inverter, restart the machine after a few minutes of cooling, and observe whether the machine can return to normal. (2) Check if the ambient temperature is outside the normal operating temperature range of the machine. (3) Contact customer service if error warning continues.
Dischg Curr Over	F15	(1) Wait one minute for the inverter to restart; (2) Check whether the load is in compliance with the specification; (3) Contact customer service if error warning continues.
CHG Current Over	F16	(1) Check if battery wiring port is short circuited; (2) Check if charging current is in compliance with presetting; (3) Contact customer service if error warning continues.
Current Sensor Fault	F17	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
INV Abnormal	F18	(1) Please contact the distributor.
EPS Relay Fault	F19	(1) The off-grid relay is faulty. (2) Contact customer service if error warning continues.
always Overload	F20	(1) The system load always exceeds the rated value. (2) Contact customer service if error warning continues.
Communication Fault	F32	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.

Types	Codes	Solutions
Grid Fault	W00 W01 W02 W03	(1) Check if the local voltage and frequency is in compliance with the machine specification; (2) If voltage and frequency are within the accepted range, then wait 2 minutes for the inverter to function normally; but if no recovery or fault repeats, please contact the local inverter customer service; (3) Contact the local power company if voltage and frequency are beyond range or unstable.
Solar Loss	W04	(1) PV is not connected; (2) Check grid connection; (3) Check PV availability.
Bat Loss	W05	(1) Battery is not connected; (2) Check if battery wiring port is short circuited; (3) Contact customer service if error warning continues.
Bat Volt Low	W06 W07	(1) Check the battery availability; (2) Contact customer service if error warning continues.
Bat Volt High	W08	(1) Check if the battery is in line with the presetting; (2) If so, power off and restart; (3) Contact customer service if error warning continues.
Overload Warning	W09	(1) Wait one minute for the inverter to restart; (2) Check whether the load is in compliance with the specification;
GFCI Over	W10	(1) Check PV string for direct or indirect grounding phenomenon; (2) Check peripherals of machine for current leakage; (3) Contact the local inverter customer service if fault remains unremoved.
LN Reverse	W11	(1) Check whether the installation follows the instructions; (2) Contact customer service if error warning continues.
Fan Fault	W12	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
BMS Fault	W14~W27	(1) Please contact the distributor.
CT Reverse	W28	(1) Perform CT self-check; (2) Contact customer service if error warning continues.
Clock Initiate Fail	W29	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
PV off	W30	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.
System Reset	W31	(1) Restart the inverter and wait until it functions normally. (2) Contact customer service if error warning continues.

10. Product Specifications

Table 18. Product specifications

Battery Specifications	XSTHSBP-5.1-16S-100A-F
Electrical	
Energy Capacity	10.24kWh (2 batteries in //)
Battery type	LFP (LiFePO4)
Depth of Discharge (DoD)	90%
Rated voltage	51.2V
Operating Voltage Range	44.8~56.5Vdc
Operation	
Maximum Charging Current	100A (0.5C)
Maximum Discharging Current	100A (0.8C)
Operating temperature range	-10°C~+50°C (built in heating film)
Storage temperature range	20°C~+50°C
Humidity	0~95% (No condensation)
BMS	
Modules Connection	Max.8 batteries in parallel
Monitoring Parameters	System voltage, current, cell voltage, PCBA temperature measurement
Communication	CAN and RS-485 compatible
Ventilation type	Passive Cooling
Physical	
Weight (Kg)	54
Dimension (W×H×D)mm	540* 530*240
IP Protection	IP65
Warranty	5 Year Product Warranty, 10 Year Performance
Certificate	
Safety(Cell)	IEC 62619, UL 1973, UN 38.3, VDE-AR-E 2510-50: 2017,IEC 62040-1:2017, IEC 62619:2017, IEC63056:2020

MODEL	XSTHS3P-8K	XSTH3P-10K / XSTHS3P-10KBE	XSTHS3P-12K
PV terminal			
Vmax. PV	1100Vd.c.		
Rated Voltage	720Vd.c.		
MPPT Voltage Range	140~1000Vd.c.		
MPPT Range (full load)	380~850Vd.c.	420~850Vd.c.	480~850Vd.c.
MPPT Tracker / Strings	2		
Max. continuous PV input current	15Ad.c.×2		
Isc PV	20Ad.c.×2		
Max. back feed current	0Ad.c.		
Max. continuous PV input power	16000W	20000W	20000W

MODEL	XSTHS3P-8K	XSTH3P-10K / XSTHS3P-10KBE	XSTHS3P-12K
PV terminal			
Vmax. PV	1100Vd.c.		
Rated Voltage	720Vd.c.		
MPPT Voltage Range	140~1000Vd.c.		
MPPT Range (full load)	380~850Vd.c.	420~850Vd.c.	480~850Vd.c.
MPPT Tracker / Strings	2		
Max. continuous PV input current	15Ad.c.×2		
Isc PV	20Ad.c.×2		
Max. back feed current	0Ad.c.		
Max. continuous PV input power	16000W	20000W	20000W
Battery terminal			
Battery type	Lithium		
Voltage range	44~58Vd.c.		
Rated voltage	51.2Vd.c.		
Maximum charge/discharge current	160Ad.c./160Ad.c.	160Ad.c./200Ad.c.	
Maximum charge/discharge power	8000W/8000W	8000W/10000W	
Grid terminal parameter			
Rated voltage	230/400Va.c.		
Rated frequency	50Hz/60Hz		
Maximum continuous input current	25Aa.c.		
Maximum continuous input power	16000W	17800W	17800W
Rated output Current	11.6Aa.c.	14.5Aa.c.	17.4Aa.c.
Maximum continuous output current	12.8Aa.c.	16Aa.c.	19.2Aa.c.
Power factor (Cos phi), adjustable	0.8 leading ~ 0.8 lagging (0.95 leading ~ 0.95 lagging for Germany)		
Maximum continuous output power	8800VA	11000VA / 10000VA (for BE)	13200VA
Max. output fault current	102Apeak		
Grid port inrush current	less than 22Apeak		
Grid port overcurrent protection	32A		
Backup load terminal parameter			
Rated voltage	230/400Vac		
Rated frequency	50/60Hz		
Rated output Current	10.7Aa.c.	13.3Aa.c.	13.3Aa.c.
Maximum continuous output current	11.6Aa.c.	14.5Aa.c.	14.5Aa.c.
Rated frequency	50/60Hz (Fluctuation range±0.2%)		
Rated continuous output power	7360W	9200W	9200W
Maximum output apparent power	8000VA	10000VA	10000VA
Max. output fault current	99Apeak		
Backup load overcurrent protection	25A		
General parameters			
Temperature	-25°C to +60°C, derating above 40 °C		
Protective class	Class I		
Overvoltage Category	II(DC side), III(AC side)		
Ingress protection	IP65		

MODEL	XSTHS3P-8K	XSTH3P-10K / XSTHS3P-10KBE	XSTHS3P-12K
Altitude	≤ 2000m		
Dimension (W×H×D)mm	540*980*240		
Weight (Kg)	47		
Relative Humidity	0~95% (No condensation)		
Topology	High Frequency Isolation		
Cooling	Natural Convection		
Display	LCD/APP		
Communication Interface	RS485/CAN2.0/WIFI		
Max. Conversion Efficiency (From Battery)	94.0%		
Max. Conversion Efficiency (From PV)	97.6%		
Euro Efficiency	97.0%		
MPPT Efficiency	99.5%		
Protection Function	Short Circuit Protection, AC Leakage Fault Protection, Grounding Fault Protection, Anti-islanding Protection, Overload Protection, Surge Protection, DC Polarity Protection		
Grid Regulation	EN 50549-1, VDE V 0124-100, VDE-AR-N4105, VDE0126-1-1, C10/11, NC Rfg, TOR Erzeuger Typ , G99,G98, G100		
Safety Regulation	IEC/EN 62109-1&2, IEC62040-1		
EMC	EN61000-6-1, EN61000-6-2, EN61000-6-3, EN61000-6-4,EN61000-4-16, EN61000-4-18, EN61000-4-29		

Table 19. Grid specification (three-phase)

Grid Specification	Output Voltage Range (Vac)	Output Frequency Range (Hz)	Boot wait time(S)
China	187-252	49.5-50.2	30
Germany	184-264	47.5-51.5	60
Australia-A	180-265	47-52	60
Australia-B	180-265	47-52	60
Australia-C	180-265	45-55	60
Italy (CEI0-21)	195-264	49.8-50.2	60
Italy (CEI0-21 ACEA)	195-264	49.8-50.2	60
Spain	196-253	48-50.5	180
U.K.	184-264	47-52	180
Hungary	196-253	49-51	300
Belgium	184-264	47.5-51.5	60
W-Australia	180-260	45-52	60
Greece	184-264	49.5-50.5	180
France	184-264	47.5-50.4	60
Bangkok	198-242	49-51	150
Thailand	198-242	47-52	60
S. Africa	180-260	47.0-52	60
50549	184-264	47.5-51.5	60
Brazil	184-264	59.5-60.5	60
0126	184-264	47.5-51.5	60
Ireland	184-264	47-52	180
Israel	195.5~253	47.0~51.5	60
Poland	195.5~253	49.00~50.05	60
Chile-BT	176.0~242	47.5~51.5	60
Chile-HD	198.0~242	49~51	300
Chile-LD	198.0~242	49~51	300
Local	150-280	45.0-55	30
60Hz	184-264	59.5-60.5	60

11. Routine Maintenance

11.1 Maintenance Plan

- Check if wire connections are loose.
- Check if cables are aged/damaged.
- Check if cable insulating ribbon drops.
- Check if cable terminal is loose, any overheat sign.
- Check if ground connection is good.

11.1.1 Operating Environment

(Every six months)

Carefully observe whether the battery system equipment is ineffective or damaged;

When the system is running, listen to any part of the system for abnormal noise;

Check whether the voltage, temperature and other parameters of the battery and other equipment parameters are normal during system operation;

11.1.2 Equipment Cleaning

(Every six months to one year, depending on the site environment and dust content, etc.) Ensure that the ground is clean and tidy, keep the maintenance access route unblocked, and ensure that the warning and guiding signs are clear and intact.

Monitor the temperature of the battery module and clean the battery module if necessary.

11.1.3 Cable, Terminal, and Equipment Inspection

(Every six months to one year)

- Check if the cable connections are loose. Check whether the cables are aged / damaged.
- Check whether the cable tie of the cable has fallen off.
- Check if the cable terminal screws are loose and the terminal position has any signs of overheating.
- Check whether the management system of the system equipment, monitoring system and other related equipment are invalid or damaged.
- Check that the grounding of the equipment is good, and the grounding resistance is less than 10 ohms.

11.2 Notes

After the equipment is out of operation, please pay attention to following notes while maintaining:

- Related safety standards and specifications should be followed in operation and maintenance.
- Disconnect all the electrical connections so that the equipment would not be powered on.
- Wait at least 5 minutes after disconnection, so that the residual voltage of the capacitors drops to a safe voltage. Use a multimeter to make sure that the equipment is completely discharged.
- The equipment should be repaired by professional staff only and it is strictly forbidden for maintenance staff to open equipment modules on their own.
- Appropriate protective measures should be taken while maintaining, such as insulated gloves, shoes, and anti-noise ear plugs.
- Life is priceless. Make sure no one would get hurt first.
- In case of a deep discharge, the battery must be charged to a SOC rate of 30% to 50%. If the entire system is static (i.e., the battery has not been charged for two weeks or more).

Please contact us in time if there are any conditions that could not be explained in the manual.

12. Quality Assurance

Please refer to the xStorage Hybrid warranty conditions documentation on the website www.eaton.com/xstoragehybrid

Cybersecurity

To protect and protect yourself from any cyberattack, Eaton strongly recommends that you change your password after completing commissioning.

Write down and store your password in a safe place hidden from everyone so you can find it if you need to change your settings.

Monitoring through applications

Note: At Eaton we do not currently have a Mobile or Web application capable of connecting to products. Customer can connect their own application such as a Home assistant to monitor their production, consumption and be notified of possible events appearing on its installation. Some apps such as Solarman app, BliQ app for (NL and BE) can be used.

xStorage Hybrid 3 phase inverter – Country-Specific QR Codes

Austria



Belgium (Dutch)



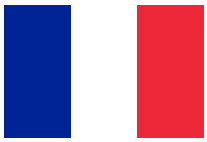
Belgium (French)



Czech Republic



France



Germany



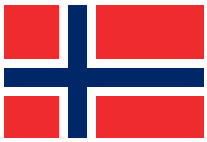
Italy



Netherlands



Norway



Poland



Slovakia



Switzerland



United Kingdom



For more information, please visit:
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