HANCHU ESS

HYBRID INVERTER

CESS-HY-25/30/36/40/50K
CESS-HY-40/50K-P

User Manual

ENGLISH VERSION


HANCHU ESS

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1 About This Manual

This manual is an integral part of HANCHU ESS CESS-HY-25~50K series three-phase high-voltage hybrid inverters (hereinafter referred to as the inverter). It mainly introduces the assembly, installation, electrical connection, debugging, maintenance and trouble-shooting of the products.

The products, services or features purchased are subject to the commercial contracts and terms of Jiangsu Hanchu Energy Technology Co., Ltd or part of the products, services or features described in this document may not be within the scope of purchase. This document serves only as a guide to use, and all statements, information and recommendations in this document do not constitute any express or implied guarantee.

1.1 How To Use This Manual

Before installing and using inverters, please read this manual carefully, understand the safety information and be familiar with the functions and characteristics of inverters.

The manual content of subsequent versions of the inverter may be subject to change. The latest manual can be found at www. hanchuess.com.

1.2 Target Groups

This manual is applicable to electrical installers with professional qualifications and end-users, who should have the following skills:

① Training for installation and commissioning of the electrical system, as well as dealing with hazards.

② Knowledge of the manual and other related documents.

③ Knowledge of the local regulations and directives.

1.3 Symbols

Important instructions contained in this manual should be followed during installation, operation and maintenance of the inverter. They will be highlighted by the following symbols.

DANGER	Indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium level of risk that, if not avoided, could result in death or serious injury.

CAUTION	Indicates a hazard with a low level of risk that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a situation that, if not avoided, could result in equipment or property damage, data loss, equipment performance degradation.
NOTE	Indicates additional information, emphasized contents or tips that may be helpful, e.g., to help you solve problems or save time.

2 Safety Instructions

2.1 Safety Notes

① Before installation, please read this manual carefully and follow the instructions in this manual strictly.

② Installers need to undergo professional training or obtain electrical related professional qualification certificates.

③ When installing, do not open the front cover of the inverter. Apart from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.

④ All electrical installations must conform to local electrical safety standards.

⑤ If the inverter needs maintenance, please contact the local designated personnel for system installation and maintenance.

⑥ To use this inverter for power generation needs the permission of the local power supply authority.

⑦ The temperature of some parts of the inverter may exceed 60° C during operation. To avoid being burnt do not touch the inverter during operation. Let it cool before touching it.

⑧ When exposed to sunlight, the PV array generates dangerous high DC voltage. Please operate according to our instructions, or it will result in danger to life.

⑨ When wiring the lithium battery terminals, please disconnect the breaker or switch of the lithium battery in case of a physical injury caused by the high voltage.

2.2 Statement

Jiangsu Hanchu Energy Technology Co., Ltd has the right not to undertake quality assurance in any of the following circumstances:

① Damages caused by improper transportation.

② Damages caused by incorrect storage, installation or use.

③ Damages caused by installation and use of equipment by non-professionals or untrained personnel.

④ Damages caused by failure to comply with the instructions and safety warnings in this document.

⑤ Damages of running in an environment that does not meet the requirements stated in this document.

⑥ Damages caused by operation beyond the parameters specified in applicable technical specifications.

⑦ Damages caused by unauthorized disassembly, alteration of products or modification of software codes.

⑧ Damages caused by abnormal natural environment (force majeure, such as lightning, earthquake, fire, storm, etc.).

⑨ Any damages caused by the process of installation and operation which don't follow the local standards and regulations.

⑩ Products beyond the warranty period.

3 Product Description

3.1 System Introduction

The hybrid solar system is usually composed of the PV array, hybrid inverter, lithium battery, loads and power grid.

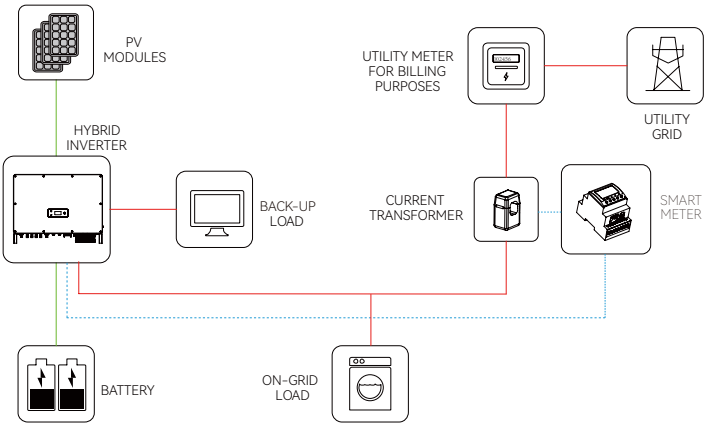


Figure 3-1 Schematic diagram of hybrid system

NOTICE

The system is not suitable for supplying life-sustaining medical devices. It cannot guarantee backup power in all circumstances.

The applicable grid types for the HANCHU ESS CESS-HY-25~50K series are TN-S, TN-C, TN-C-S and TT. When applied to the TT grid, the voltage of N to PE suggests less than 30V.

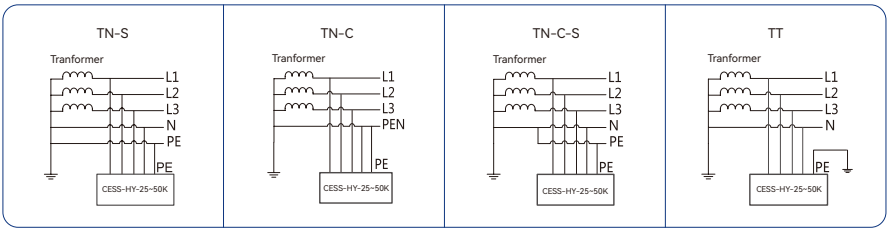


Figure 3-2 Applicable grid types

3.2 Product Introduction

The HANCHU ESS CESS-HY-25~50K series inverter is also known as hybrid inverter or storage inverter, which is mainly used to combine the PV array, lithium battery, loads and power grid to realize intelligent power management and dispatching.

▼ 3.2.1 Models

The CESS-HY-25~50K series hybrid inverter includes 7 models which are listed below: CESS-HY-25K, CESS-HY-30K, CESS-HY-36K, CESS-HY-40K, CESS-HY-50K, CESS-HY-40K-P, CESS-HY-50K-P

▼ 3.2.2 Appearance

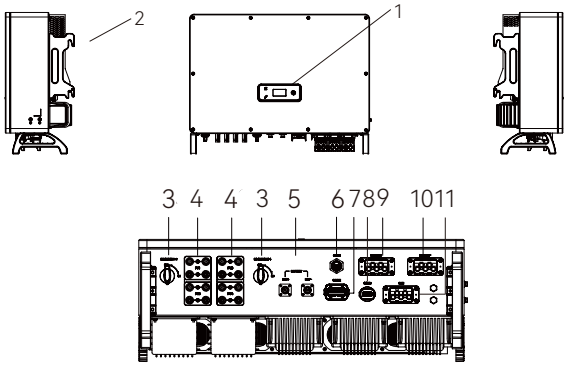


Figure 3-3 Inverter Appearance

Wiring terminals are at the bottom of the inverter, as shown in the table below.

Item	Terminal	Note
1	Display and LED panel	Display the operation information and working states of the inverter.
2	Hanger	Used to hang the inverter on the wall-mounting bracket.
3	DC switch	Used to safely disconnect the DC circuit.
4	DC input terminal	PV connector(CESS-HY-25~50K 8 pairs / CESS-HY-40~50K-P 6 pairs)
5	Battery input terminal	Battery connector
6	COM1 port	WiFi/LAN/4G module connector
7	COM2 port	Meter/BMS/RS485/DRED/DO Connector
8	COM3 port	DO/0-10V AO/4-20mA AO Connector
9	On-grid output terminal	Used for On-grid output cable connection
10	Back-up output terminal	Used for Back-up output cable connection
11	Generator input terminal	Generator connector(This function is temporarily unavailable. Please contact HANCHU ESS if necessary)

3.2.3 Indicator

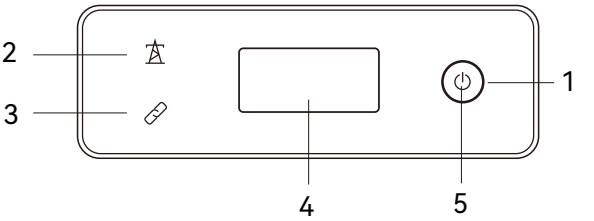


Figure 3-4 Inverter display interface

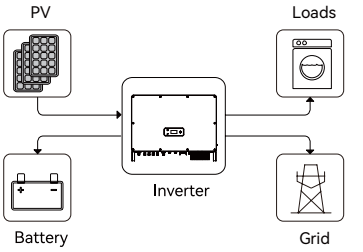
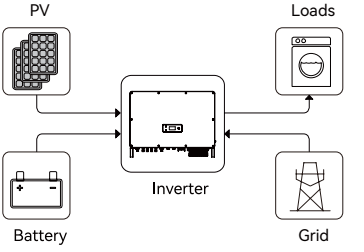
Item	Indicator	Status		Description
1	Power and Alarm Indicator	Off		No power.
		Green	Quick flashing	Inverter entered self-test status.
			Slow flashing	Inverter entered waiting status.
			Breathe flashing	Inverter works normal.
		Orange	Breathe flashing	Low battery warning, the battery power is about to reach the SOC protection value.
		Red	Always on	An alarm or fault is detected, view the fault info on the display.
2	Grid Indicator	Off	Grid lost.	
		Slow flashing	Inverter detected grid but not running in on-grid mode.	
		Always on	Inverter works in on-grid mode.	
3	Communication Indicator	Green	Always on	The inverter communication is running normally.
		Green	Flashing	The inverter communicates with EMS or Master inverter through RS485 or CAN.
		Orange	Always on	The inverter isn't communicating with HANCHU ESS smart meter.
		Red	Always on	The inverter isn't communicating with the BMS.
4	Display	Display off to save power, press the button to wake up the display.		
5	Button	Switch display information and set parameters by short press or long press.		

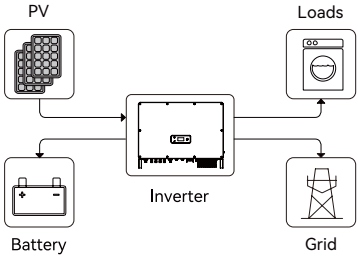
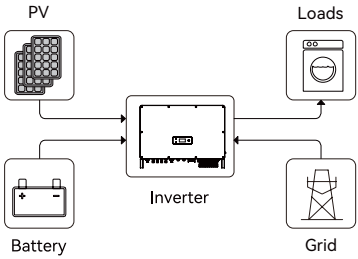
3.3 Symbols On the Inverter

Symbol	Description
	To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end-users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.
	Please read the instructions carefully before installation.
	Do not touch any internal parts of the inverter within 10 minutes of disconnecting the power,battery and PV input.
	CE mark, the inverter complies with the requirements of the applicable CE guidelines.
	Danger. Risk of electric shock!
	The surface is hot during operation and do not touch.
	Additional grounding point.
	TÜV mark of conformity.

3.4 Operation Modes

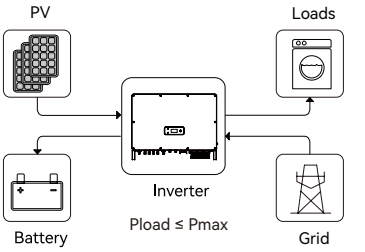
HANCHU ESS CESS-HY Hybrid inverter has the following basic operation modes and you can configure the operation mode as per your preference in the App.

Self-Consume Mode	
In this working mode, when the power from the PV array is sufficient, PV power will supply the loads, battery, and grid in the order of loads first, battery second, and grid last. (You can set the power to the grid to 0W when the local grid doesn't allow inverter power to feed to the grid).	
When the PV power is insufficient, the battery will discharge to supply loads, and the grid will join in if the battery is not enough to supply loads.	

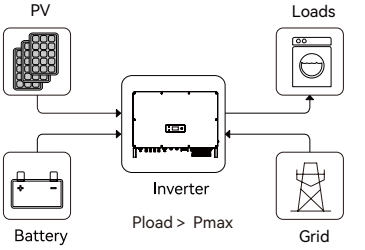
Priority Grid Mode	
When the PV power is sufficient, it will be dispatched in the following sequence: loads first, the grid second, and the battery last. PV→Loads→Grid→Battery	
When the PV power is insufficient, the PV and the battery will supply loads together. when the battery power is insufficient(or the battery reaches the End SOC), the grid will join together to supply loads. PV+Battery(+Grid)→Loads	

Peak load Shifting (Load Shifting)

Set the maximum power Pmax (kVA) contracted with the grid.
When the load consumption is less than the Pmax, the PV will charge the battery first, and the grid supplies the load. When the battery is full, PV will supply the load together with the grid, but the battery doesn't.



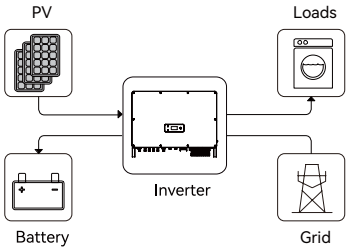
When the load consumption exceeds the Pmax, the inverter will take power from the battery and PV to supply power to the load to compensate for the power that exceeds the Pmax.



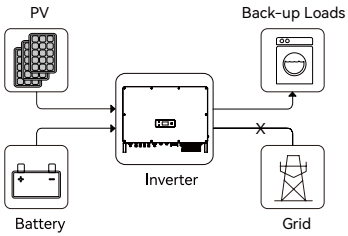
*To realize the "Peak load Shifting" function, the load power that exceeded Pmax has to be within the inverter max output power, otherwise, the inverter will only output the max power which allowed.

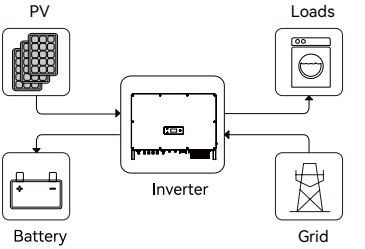
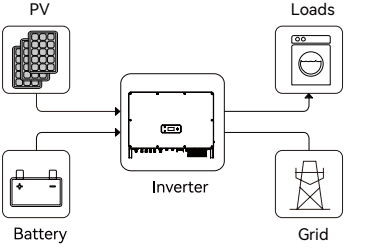
Back-Up Mode

In this working mode, the inverter will use the power from PV or grid to charge the battery until it is fully charged, and as long as the grid is there, the battery won't discharge.



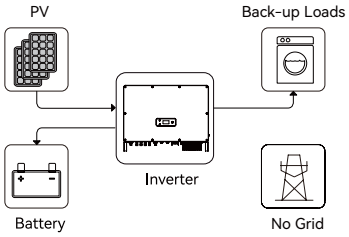
When the grid fails, power from PV and battery will supply loads connected on the back-up side (UPS).



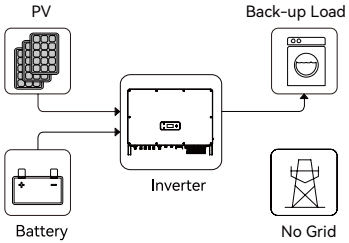
User-Defined Mode	
In this working mode, you can set charge/discharge power and time in the App, inverter will use the power from PV or grid (whether to use can be set in the App) to charge the battery in the predetermined period.	
Inverter will use power from PV and battery to supply loads in the predetermined period and the insufficient part will be supplied by the grid.	

Off-grid Mode

In the purely off-grid mode, power from PV will supply the back-up loads first and then charge the battery if there's surplus power.



When the power from PV isn't enough, the battery will discharge to supply back-up loads together with PV.



3.5 Back-Up and Off-Grid Output

Normally, the Back-Up switching time is less than 20ms. However, some external factors may cause the system to fail on switching to Back-up Power Supply Mode. Therefore, the conditions for using the Back-Up function smoothly are as follows for your awareness.

① Do not connect loads that are dependent on a stable energy supply for a reliable operation.

② Do not connect the loads whose total capacity is greater than the maximum Back-Up capacity.

③ Do not connect the loads that may cause very high start-up current surges, such as non-frequency conversion air conditioning, vacuum cleaner or half-wave loads such as hair dryer, heat gun, hammer drill.

④ Due to the condition of the battery itself, battery current might be limited by some factors, including but not limited to the temperature and weather.

The inverter will restart in case of overload protection. The time required for restarting will increase (5 min at most) if overload protection repeats. Try to reduce Back-Up load power within maximum limitation or remove the loads which may cause very high start-up current surges.

3.6 Unpacking and Storage

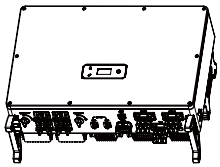
The device is thoroughly tested and strictly inspected before delivery. Nonetheless, damage may still occur during shipping. For this reason, please conduct a thorough inspection after receiving the device.

Contact HANCHU ESS or the transport company in case of any damage or incompleteness, and provide photos to facilitate services.

▼ 3.6.1 Packing List

The package of the inverter includes the following accessories. Please check whether the accessories in the packing box are complete when receiving the goods.

A



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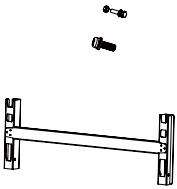

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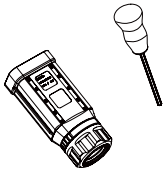

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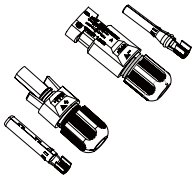

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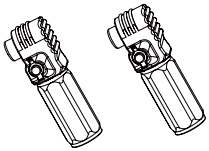

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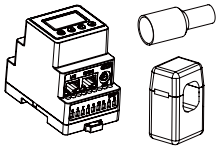

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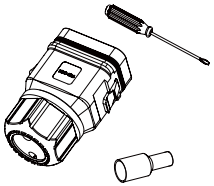

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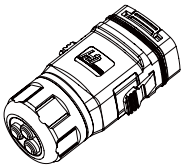

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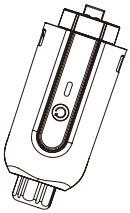


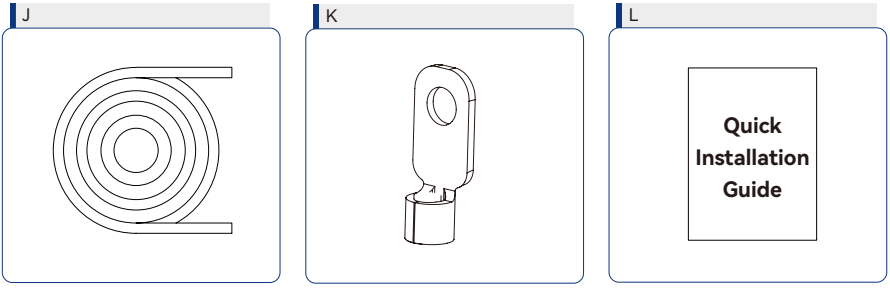


Figure 3-5 Packing list

Item	Name and Quantity
A	Inverter (1pcs)
B	Inverter bracket (1pcs), Bolt assembly (4pcs), M6 screws (2pcs)
C	AC connector set (3 pcs)
D	PV terminal (CESS-HY-25~50K 8 pairs)
E	Battery terminal (1 pairs)
F	Meter with 3 CTs (1pcs)
G	COM2 connector set (1pcs)
H	COM3 connector set (1pcs)
I	Monitoring device (1pcs)
J	10m meter communication cable (1pcs), 3m battery communication cable (1pcs)
K	PE terminal(1pcs)
L	Quick Installation Guide

▼ 3.6.2 Inverter Storage

① Do not dispose of the original packing case. It is recommended to store the device in the original packing case when the device is decommissioned.

② The storage temperature and humidity should be in the range of -30℃ and+ 60℃, and less than 90%, respectively.

③ If a batch of inverters needs to be stored, the height of each pile should be no more than 4 levels.

4 Installation

4.1 Location

The HANCHU ESS CESS-HY-25~50K series inverters are designed with IP65 protection enclosure for indoor and outdoor installations. When selecting an inverter installation location, the following factors should be considered:

① The wall on which the inverters mounted must be able to withstand the weight of the inverter.

② The inverter needs to be installed in a well-ventilated environment.

③ Do not expose the inverter directly to strong sunlight to prevent excessive temperature operation. The inverter should be installed in a place with shelter to prevent direct exposure to sunlight and rain.

④ Install the inverter at eye level for easy inspection of screen data and further maintenance.

⑤ The ambient temperature of the inverter installation location should be between -30℃ and 60℃.

⑥ The surface temperature of the inverter may reach up to 75℃. To avoid risk of burns, do not touch the inverter while it's operating and inverter must be installed out of reaching of children.

▼ 4.1.1 Installation location

Select an optimal mounting location for safe operation, long service life and expected performance.

① The inverter with protection rating IP65 can be installed both indoors and outdoors.

② Install the inverter at a place convenient for electrical connection, operation, and maintenance.

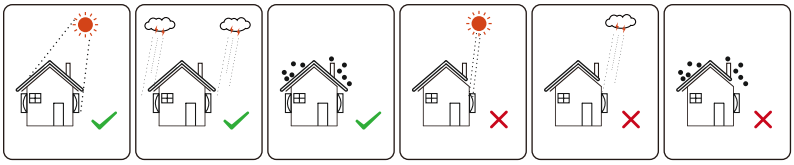


Figure 4-1 Recommended installation location

WARNING

Do not put flammable and explosive articles around the inverter.

4.1.2 Installation Spacing

Reserve enough clearance around the inverter to ensure sufficient space for heat dissipation.

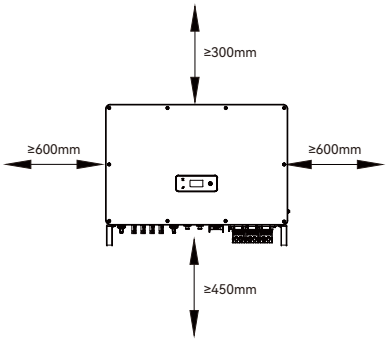


Figure 4-2A Spacing for installing an inverter

In case of multiple inverters, reserve specific clearance between the inverters.

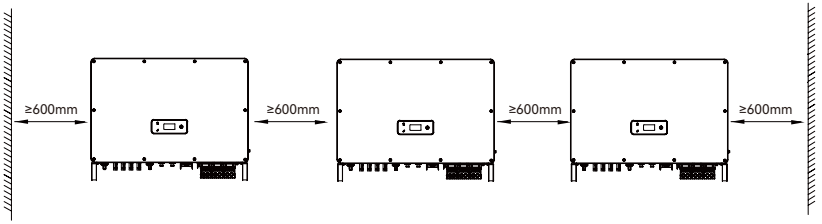


Figure 4-2B Spacing for installing multiple inverters

When installing inverters back-to-back, the distance between every two inverters should be at least 600 mm.

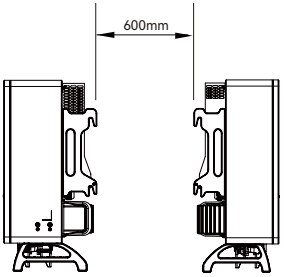


Figure 4-2C Spacing for Back to Back Installation

▼ 4.1.3 Installation Angle

Install the inverter vertically. Never install the inverter horizontally, or at forward/backward tilted, or upside down.

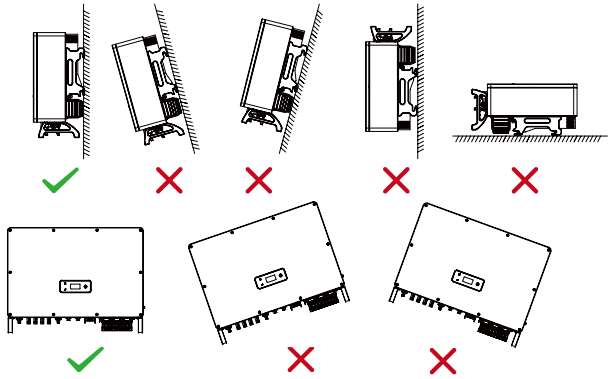


Figure 4-3 Permitted and prohibited mounting positions

4.2 Mounting the Inverter

▼ 4.2.1 Bracket Installation

Dimensions of wall bracket (mm)

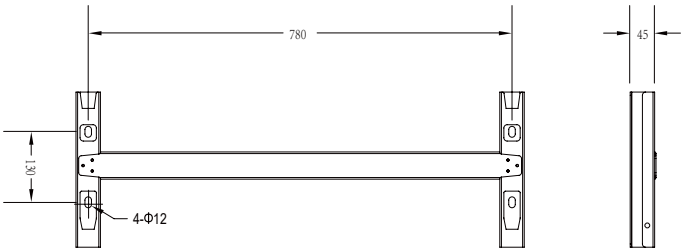


Figure 4-4 Dimensions of bracket

① Level the assembled inverter-bracket by using the level, and mark the positions for drilling holes on the mounting bracket. Drill the holes by using a hammer drill.

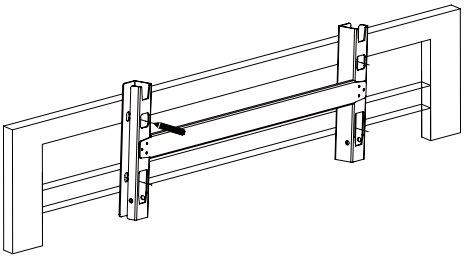


Figure 4-5 Marking hole position using installation bracket

② Secure the inverter-bracket with bolts.

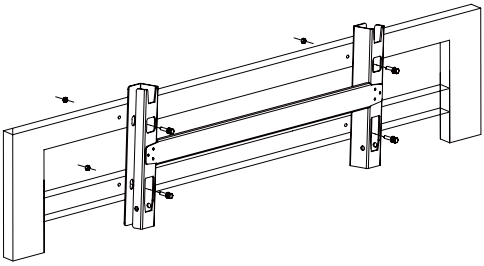


Figure 4-6 Fixing the bracket

▼ 4.2.2 Mounting the Inverter

Lift the inverter, hang the back rail on the fixed bracket carefully. Secure the inverter with M6 screws(two sides).

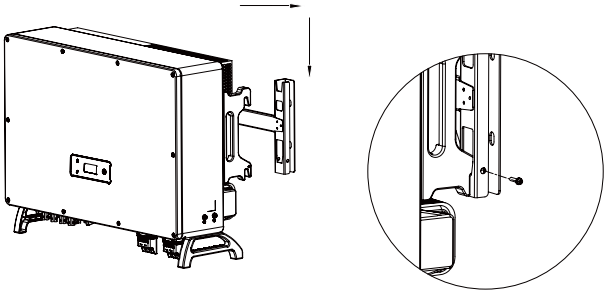


Figure 4-7 Mounting the inverter

4.2.3 External Ground Connection

Connect the inverter and ground bar through PE wire to achieve the purpose of grounding protection. Please always remember wiring the PE wire before wiring other wires.

DANGER

Do not connect the N-wire as a protective ground wire to the inverter casing. Otherwise, it may cause electric shock.

NOTICE

Reliable grounding is good for resisting surge voltage shock and improving EMI performance.
Inverters must be well-grounded.
For a system with only one inverter, just ground the PE cable.
For a multi-inverter system, all inverters PE wire need to be connected to the same grounding copper bar to ensure equipotential bonding.

Ground terminal connection steps:

① The external grounding terminal is located at the lower right side of the inverter.

② Fix the grounding terminal to the PE wire with a proper tool and lock the grounding terminal to the grounding hole in the lower right side of the inverter.

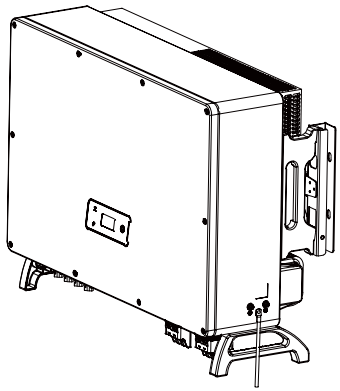


Figure 4-8 Grounding terminal connection

5 Electrical Connection

DANGER	A high voltage in the conductive part of the inverter may cause an electric shock. When installing the inverter, make sure that the AC and DC sides of the inverter are completely de-energized.
DANGER	Do not connect the N-wire as a protective ground wire to the inverter casing. Otherwise, it may cause electric shock.
WARNING	Do not ground the positive or negative pole of the PV string, otherwise it will cause serious damage to the inverter.
WARNING	Static may cause damage to the electronic components of the inverter. Anti- static measures should be taken during installation and maintenance.
NOTICE	Do not use other brands or other types of terminals other than the terminals in the accessory package. HANCHU ESS has the right to refuse all damages caused by the mixed-use of terminals.
NOTICE	Moisture and dust can damage the inverter, ensure the cable gland is securely tightened during installation. The warranty claim will be invalidated if the inverter is damaged as a result of a poorly connected cable connector.

5.1 Electrical Wiring Diagram

This diagram shows HANCHU ESS CESS-HY-25~50K series hybrid inverter wiring structure and composition, concerning the real project, the installation and wiring have to be in line with the local standards.

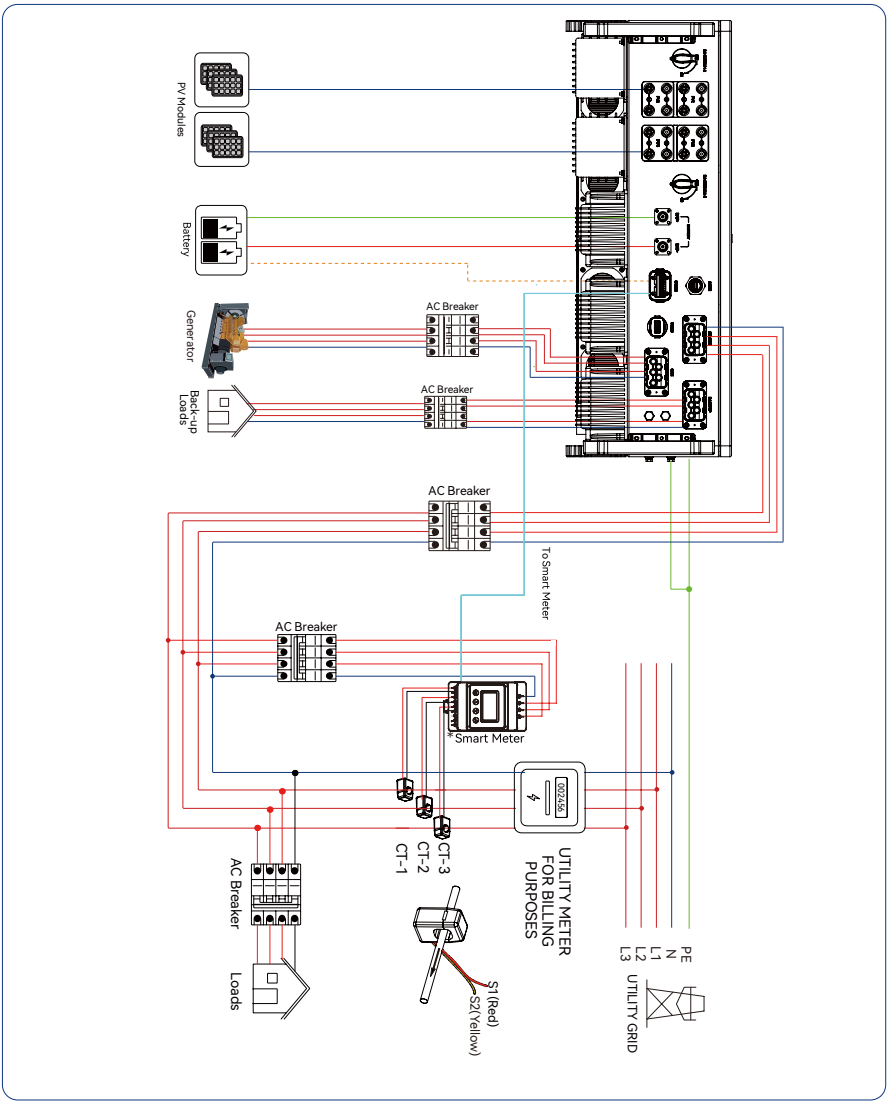


Figure 5-1 Electrical wiring diagram

Single inverter wiring diagram

This diagram is an example without special requirement on electrical wiring connection. Neutral line of AC supply can be isolated or switched.

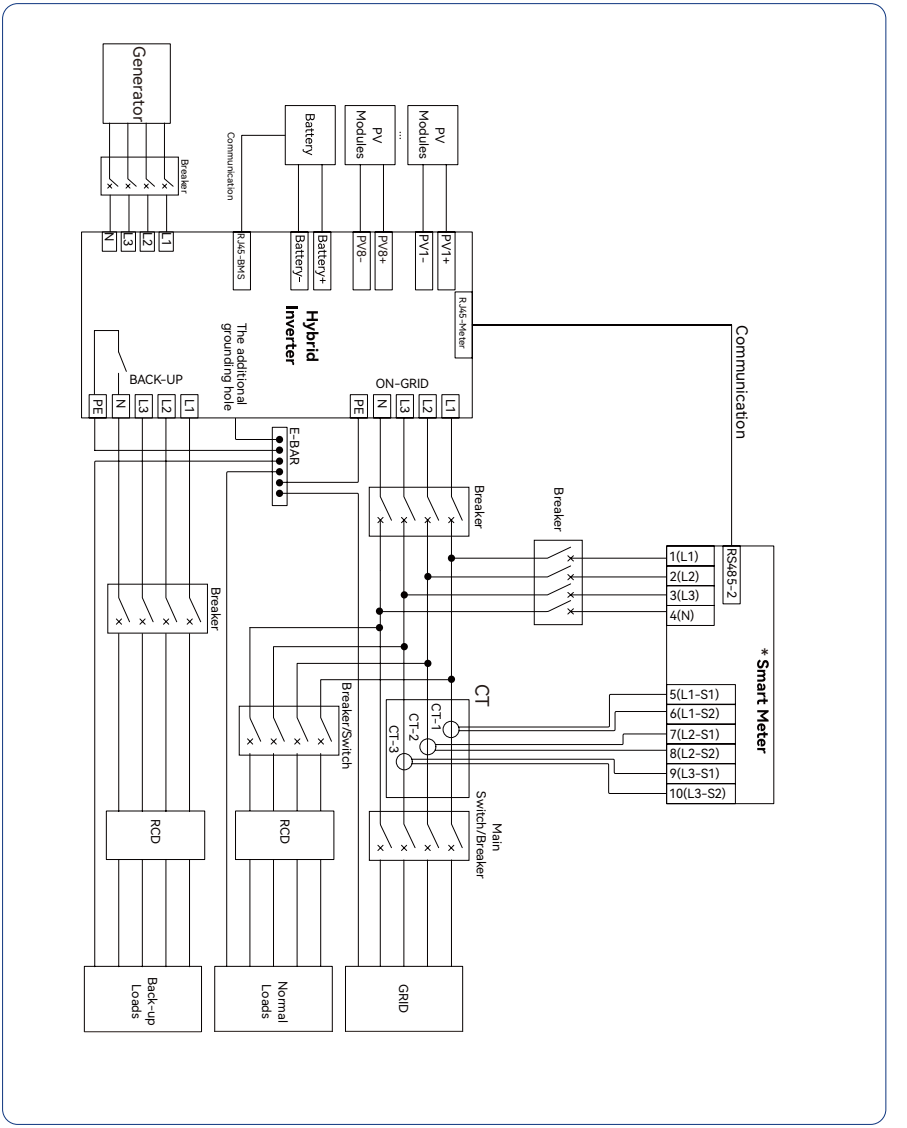


Figure 5-2 Standard wiring diagram

This diagram is an example for Australia and New Zealand. Neutral line of AC supply must not be isolated or switched, and the neutral line of GRID side and BACK-UP side must be connected together according to the wiring rules AS/NZS_3000. Otherwise, BACK-UP function will not work.

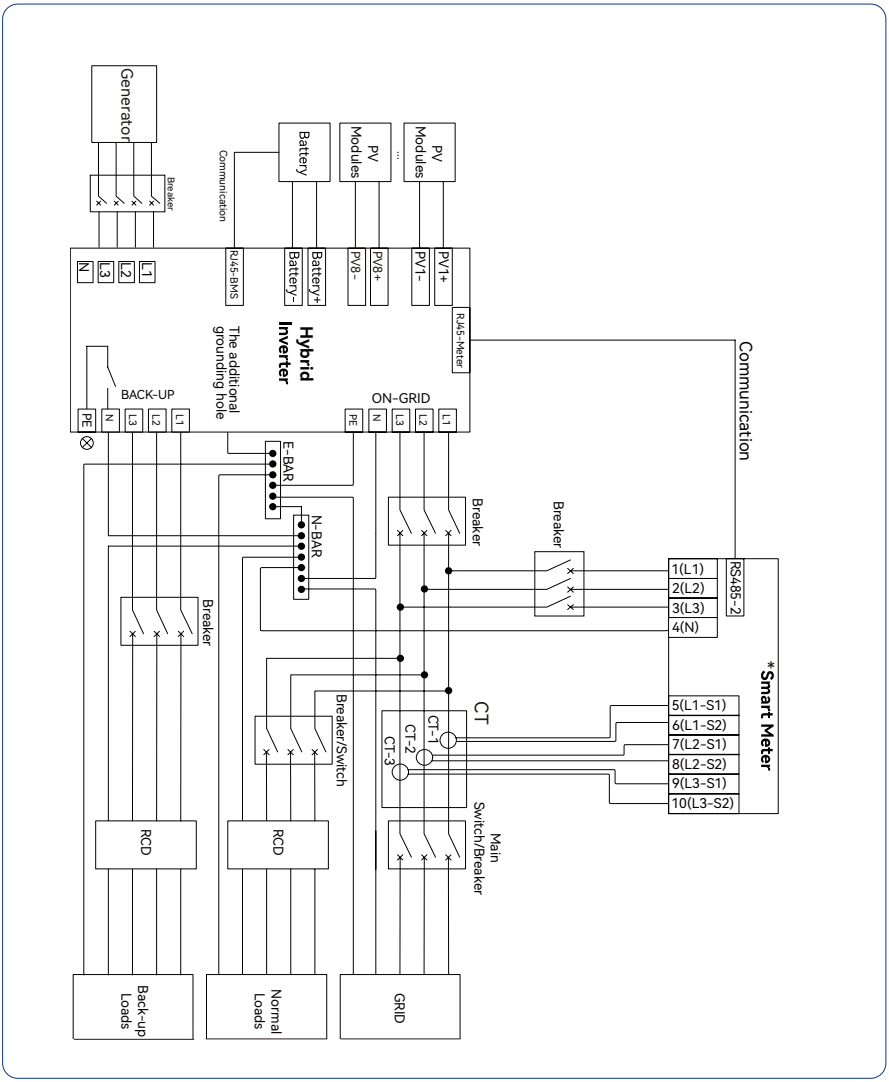


Figure 5-3 Australia wiring diagram

5.2 AC Connection

▼ 5.2.1 AC Side Requirements

NOTICE

① An independent AC breaker is required in both on-grid and back-up output side, and any loads cannot be connected with inverter directly.

② Before making the connection of AC cable, please confirm all DC & AC power source are disconnected from the inverter.

③ The HANCHU ESS CESS-HY-25~50K series three-phase high voltage hybrid inverter applies to the three-phase power grid with a voltage of 230/400V and a frequency of 50/60Hz.

④ Connect the inverter to the grid only after getting an approval from the local electric power company.

A three-phase AC breaker needs to be installed on the AC side of the CESS-HY-25~50K. To ensure that the CESS-HY-25~50K can safely disconnect itself from the power grid when an exception occurs, select a proper overcurrent protection device in compliance with local power distribution regulations and Max. input (output) current of CESS-HY-25~50K AC side.

The allowable AC cable of wire diameter and cross-sectional area for HANCHU ESS CESS-HY-25~50K are as shown in the following:

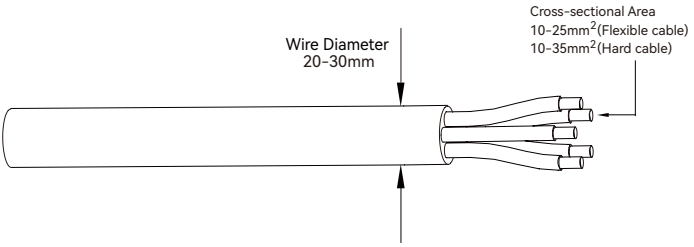


Figure 5-4

NOTICE

Determine whether an AC circuit breaker with greater overcurrent capacity is required based on actual conditions.

Residual Current Monitoring device

With an integrated universal residual current monitoring device, the inverter will disconnect immediately from the mains once a fault current with a value exceeding the limit is detected.

However if an external residual current device (RCD) (type A is recommended) is mandatory, the switch must be triggered at the residual current. RCD of other specifications can also be used according to local standard. The recommended residual current is as follows.

Inverter	Recommended residual current
CESS-HY-25K	300mA
CESS-HY-30K	
CESS-HY-36K	360mA
CESS-HY-40K	400mA
CESS-HY-40K-P	
CESS-HY-50K	500mA
CESS-HY-50K-P	

▼ 5.2.2 Installing the AC Connector

DANGER

High voltage may be present in inverter!
Ensure all cables are voltage-free before electrical connection.
Do not connect the AC circuit breaker until all inverter electrical connections are completed.

The AC terminal block is on the bottom side of the inverter.

① Seal accessory option.

The recommended outer diameter of the cable is 20-24 mm and 24.5~30mm.

If the outer diameter of the cable is greater than 24mm, remove part 1.

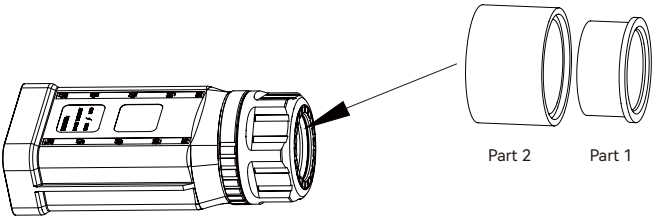


Figure 5-5

② According to the figure 5-4, select an appropriate cable, peel the insulation sleeve of AC cable off for 95-100mm, and peel off the end of 3L /PE / N wires for 15mm.

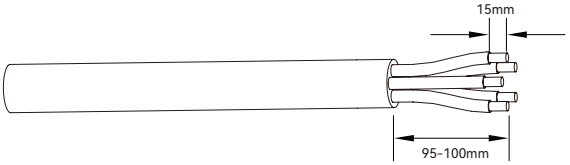


Figure 5-6

③ Thread the stripped wire into the lock nut and the main body in turn (the multi-core multi-strand copper wire cable needs to be riveted to the cord end terminal).

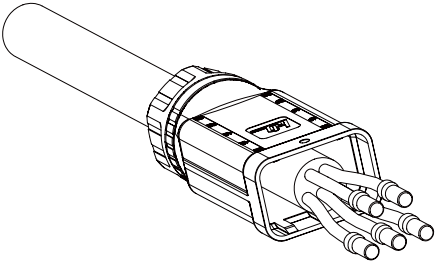


Figure 5-7

④ Insert the cable into the rubber core according to the line sequence,observe the perspective hole, the cable is in place, and the torque of the crimping screwdriver is 5 ± 0.1N.m.

WARNING

The cord end terminals must be locked tightly, and make sure it won't be loose after a long period of use.

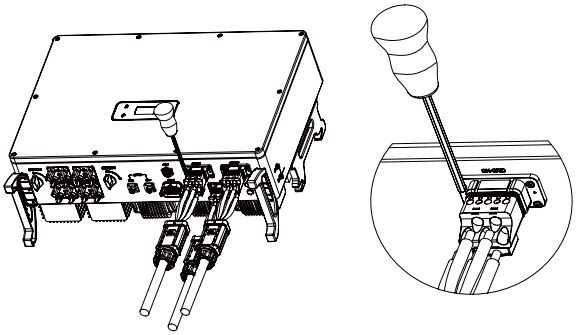


Figure 5-8A

⑤ Insert the main body into the rubber core and hear the "click" sound, then tighten the nut with an open-ended wrench (torque 10.0±0.1N·m) and complete the installation with a "click, click, click".

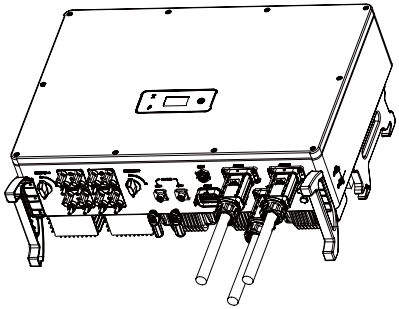


Figure 5-8B

▼ 5.2.3 Removal the AC Connector

① Hold the unlocking buckle with one hand and rotate it in the marked direction, and rotate the nut in the opposite direction with the other hand.

② Use a screwdriver to align the unlocking position, press and hold the main body and pull back to complete the removal.

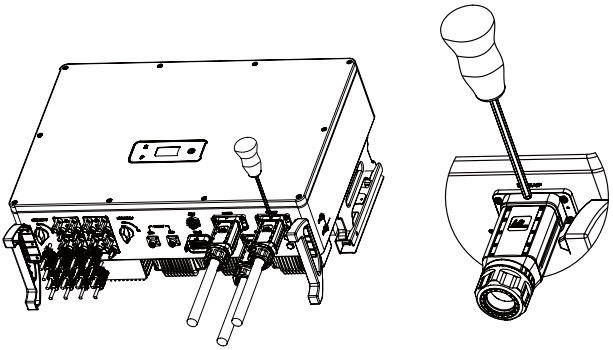


Figure 5-9

CAUTION

Please distinguish the on-grid and back-up port, and don't mix up the on-grid port and back-up port when making the connection.

5.3 Monitoring Device Installation

INV-Logger A210(Monitoring device) supports both WiFi and LAN connection.

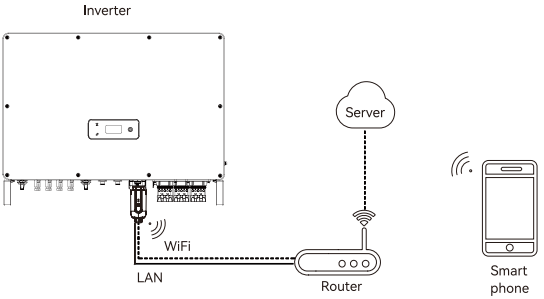


Figure 5-10

If you select WiFi connection, the operation method is described in "9.APP Guide".
If you select LAN connection, see the following contents and steps.
Tips: When WiFi and LAN are connected at the same time, the communication method will be prioritized to LAN.

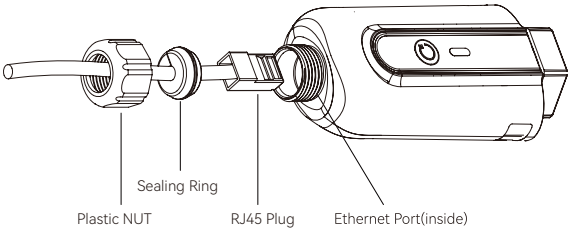


Figure 5-11

Step1: Remove the "Plastic Nut" and "Sealing Ring" in turn.
Step2: Pass the network cable plug through the"Plastic Nut" and "Sealing Ring" (with opening) in thedirection as shown in the figure 2-1.
Step3: Fully embed the "Sealing Ring" into the"Plastic Nut".
Step4: Connect the "RJ45 Plug" to the Ethernet Port(inside) and tighten the "Plastic Nut" for better waterproofing.
Step5: Connect the "INV-Logger A210" to the "COM1" as shown in the figure 5-12.

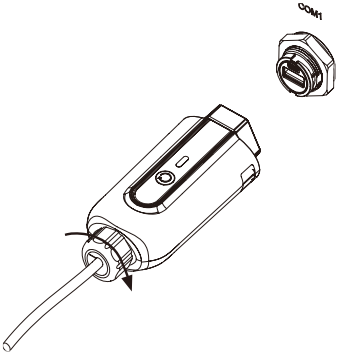


Figure 5-12

NOTE

Due to limited space, only RJ45 plug without protective cap can be used.

The network cable is required to be circular or oval, and the diameter of the networkcable needs to be greater more than 5.5mm and less than 6.5mm in order to beproperly sealed.

If you want to remove the network cable, unscrew the plastic case and seal-ing ring, and usea one-piece screwdriver to press in the way shown below, then pull out the cable.

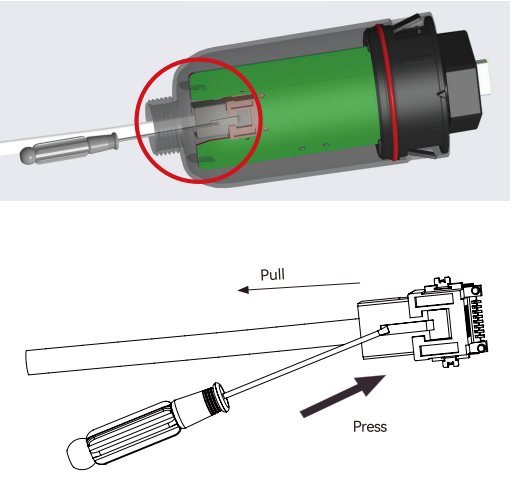


Figure 5-13

5.4 Meter and CT Connection

The current Transformer, also called CT, is usually installed on the L wires between the house loads and the power grid.

The Meter can be installed in the AC combiner box or other places that are unable to be touched by children. CT cable with length of 2m, it's fixed and can't be extended.

The CTs have been connected to the Smart Meter when you received them, and you just need to follow the wiring diagram in the Meter to connect CT.

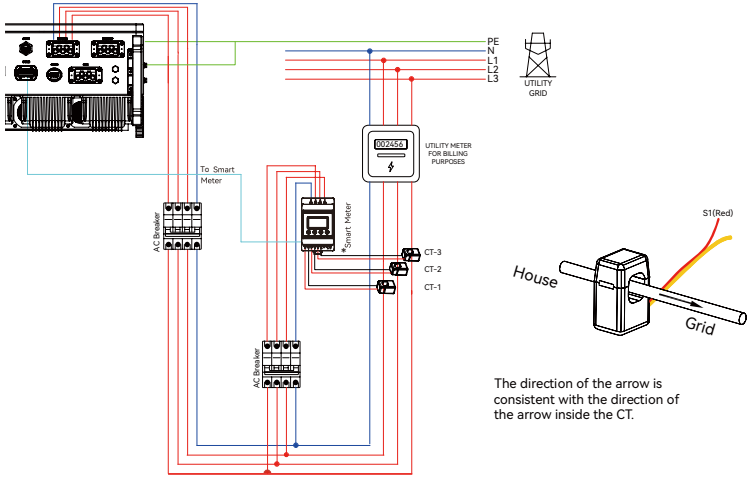


Figure 5-11

NOTICE

CT installation direction should strictly follow the instruction in the user manual, otherwise, the inverter may not be working normally.

The CT has to be corresponding with the port in the meter, and the connection between CT and Meter needs to be reliable, otherwise, the CT measurement accuracy may be affected.

NOTE

Please choose the appropriate CT size according to your needs.

Meter terminals definition as shown in table below:

No.	Definition	Function
	SM	
1	L1	L1/L2/L3/N connect to grid to detect power grid voltage
2	L2	
3	L3	
4	N	
5	L1-S1	To detect the CT current and direction
6	L1-S2	
7	L2-S1	
8	L2-S2	
9	L3-S1	
10	L3-S2	
11	PE	Ground connection
RS485	Reserve	
	RS485-2	Communicate with hybrid inverter
ANT	Reserve	
LAN	Reserve	
Type-C	Type-C	Specified Debug Interface. Do not use it by non-professionals

5.5 Communication Connection

All communication ports are in the multifunction communication Port at the bottom of inverter which including Meter port, CAN port, BMS port, EMS port, DRED port. DO port, 0-10V AO port, 4-20mA AO port.

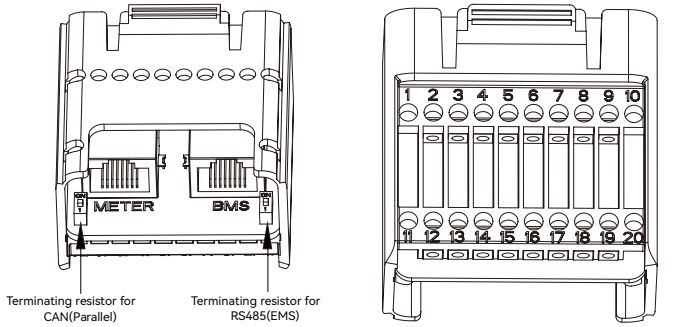


Figure 5-12A COM2 port

Pin	Definition	Function
METER（RJ45-1）	RS 485	Communicate with Meter
BMS（RJ45-1）	CAN	Communicate with BMS
1	COM	DO-1(Multifunction Relay)
2	NO (Normally Open)	Load control (eg.SG ready heat pump)
3	/	Reserved
4	/	Reserved
5	DRM4/8	DRED For Australia and New Zealand RCR For Germany and some other European countries Grid/diesel generator DI signal
6	DRM3/7	
7	DRM2/6	
8	DRM1/5	
15	COM D/0	
16	REF D/0	
11	Emergency stop +	Emergency stop
12	Emergency stop -	
13	485 B1	EMS
14	485 A1	
17	CANL_P	CAN for parallel connection of inverters
18	CANH_P	
19	/	Reserved
20	/	Reserved

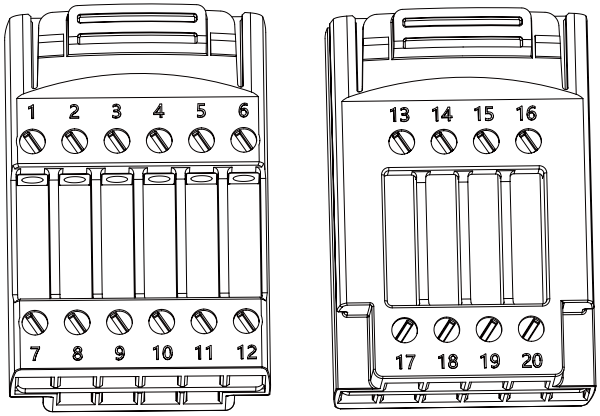
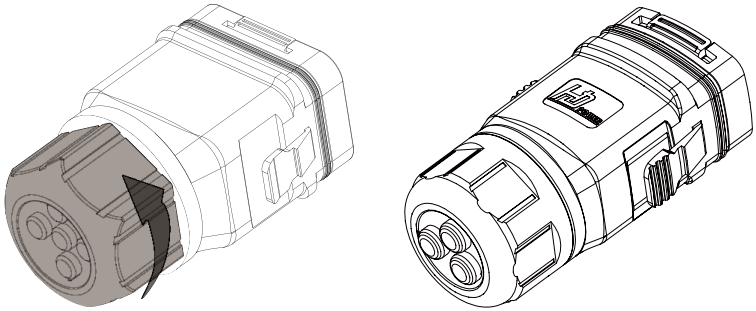


Figure 5-12B COM3 port

Pin	Definition	Function
1-6	/	Reserved
7	COM	DO-2(Multifunction Relay) Connected with diesel generator
8	NO	
9-10	/	Reserved
11	COM	DO-3(Multifunction Relay) Connected with backup box
12	NC	
13-16	/	Reserved
17	4-20mA_OUT	4-20mA analog output
18	GND	
19	GND	0-10V analog output
20	0-10V_OUT	

▼ 5.5.1 Assembling the Multi-com Connector

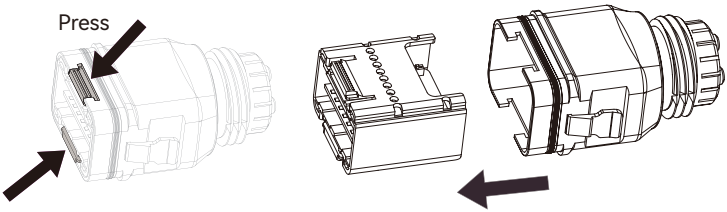
① Unscrew the swivel nut from the connector.



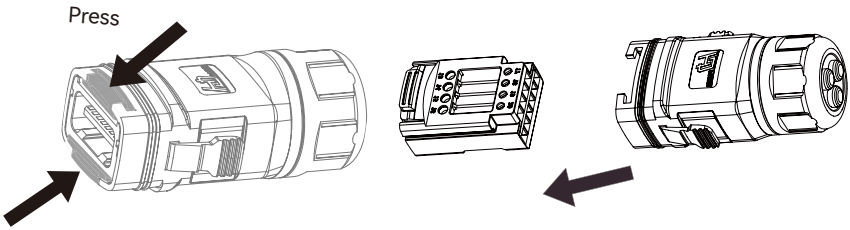
COM2 COM3

Figure 5-13

② Take out the terminal block.



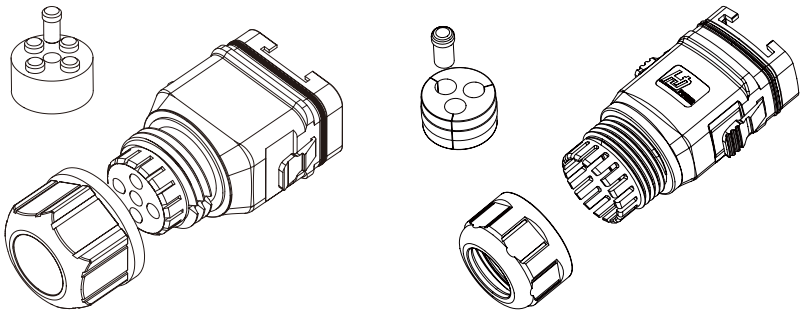
COM2



COM3

Figure 5-14

③ Remove the seal and lead the cable through the cable gland.



COM2 COM3

Figure 5-15

▼ 5.5.2 Connect the Meter and BMS Communication Cables

NOTE	The communication between meter/BMS and inverter is RJ45 interface cable.

① Thread the RJ45 plug of appropriate length through the swivel nut, and insert it into the open side of the rubber gasket.

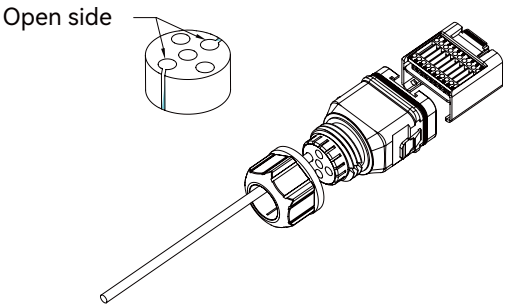


Figure 5-16

② Insert one side of the RJ45 plug into the RJ45 port of terminal block.

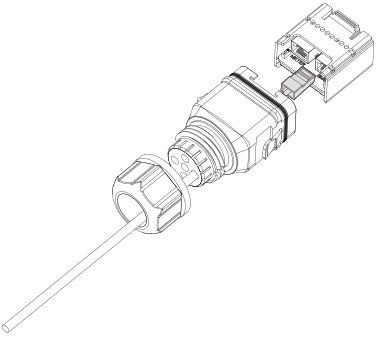
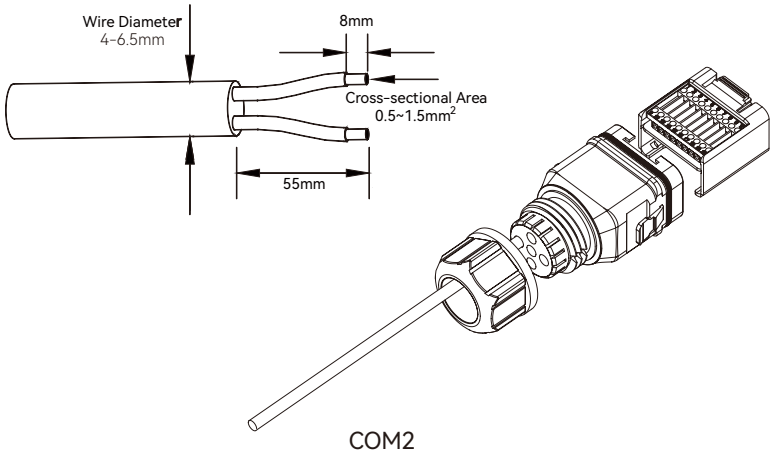


Figure 5-17

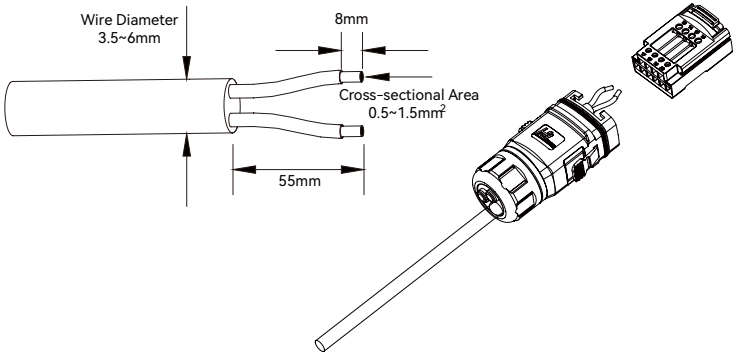
③ Insert another side of the communication cable into the meter RS485 port or BMS CAN port.

5.5.3 Connect Other Cables

① Thread the cable of appropriate length through the swivel nut and the housing. Remove the cable jacket and strip the wire insulation.



COM2



COM3

Figure 5-18

② (Optional) When using a multi-core multi-strand copper wire cable, connect the AC wire head to the cord end terminal (hand-tight). In case of single-strand copper wire, skip this step.

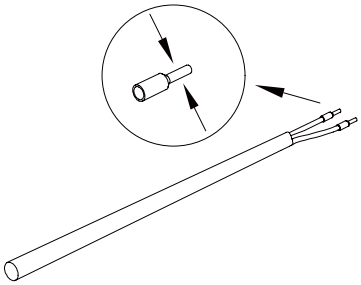


Figure 5-19

③ Fix all the wires to the terminal plug according to the assignment and tighten to a torque of 1.2+/-0.1N·m with a screwdriver.

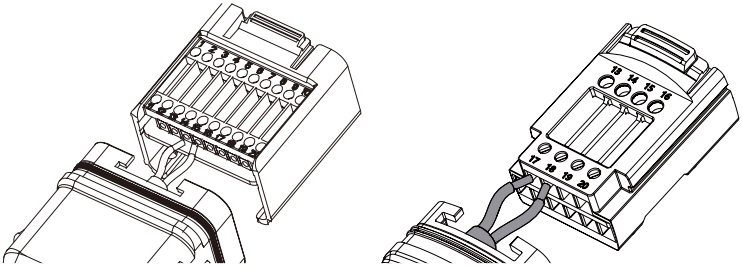


Figure 5-20

④ Pull the wires outward to check whether they are firmly installed.
Insert the terminal block into the connector until it snaps into place with an audible click.

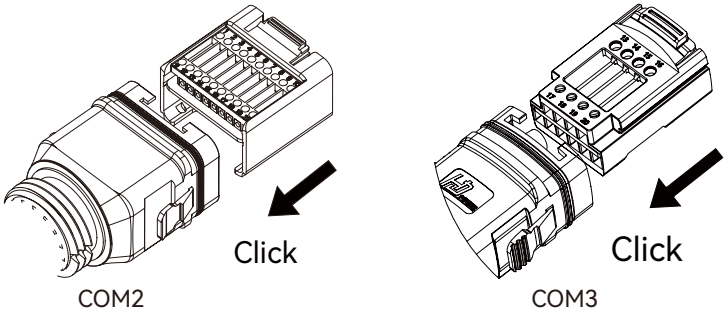


Figure 5-21

⑤ Fasten the swivel nut.

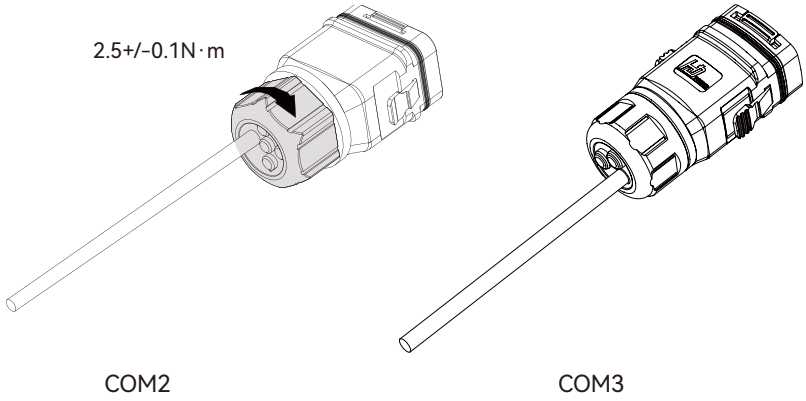


Figure 5-22

▼ 5.5.4 Installing the COM Connector

① Remove the waterproof lid from the COM terminal.

② Insert the COM connector into COM terminal on the bottom of the inverter until there is an audible click.

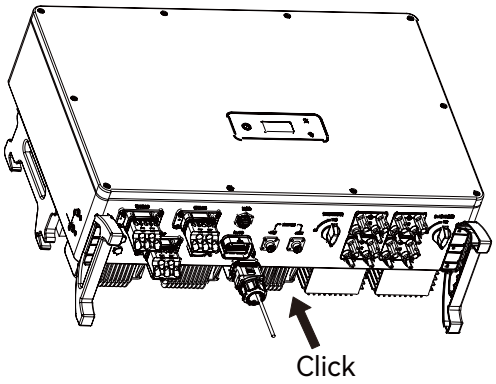


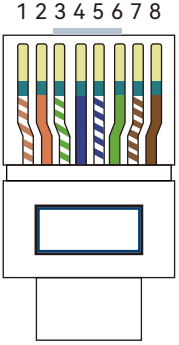
Figure 5-23

▼ 5.5.5 Meter and BMS Communication

NOTE

Before purchasing the battery, you need to make sure the battery you selected is in the battery approval list of HANCHU ESS, otherwise, the system may not work properly. Please contact your installer or HANCHU ESS service team for confirmation if you're not sure about it.

RJ45 terminal connection sequence and definition as below.



No.	Color	Meter Side	Battery Side
1	Orange & White	/	RS485_A3
2	Orange	/	RS485_B3
3	Green & White	RS485_B2	/
4	Blue	/	CANH_B
5	Blue & White	/	CANL_B
6	Green	RS485_A2	/
7	Brown & White	RS485_B2	/
8	Brown	RS485_A2	/

Figure 5-24 RJ45 terminal connection sequence and definition

▼ 5.5.6 EMS Communication

An EMS communication cable needs to be connected when to control the operation of a hybrid inverter through the EMS, and communication between EMS and inverter is RS485.

▼ 5.5.7 DI Control

Inverter supports DRM(DRED), RCR and ATS signal input via DI port.
When the inverter is connected to DRED, RCR and ATS cannot be connected.
RCR and ATS can connect to the inverter simultaneously.

COM2 Pin	Definition	DRM(DRED)	RCR	ATS
5	DRM4/8	√	√	
6	DRM3/7	√	√	
7	DRM2/6	√	√	
8	DRM1/5	√	√	
15	COM D/0	√		√
16	REF D/0	√	√	√

DRM

DRED (Demand Response Enabling Device) interface is special reserved for Australia and New Zealand according to their safety regulation, and HANCHU ESS doesn't provide the DRED device for the customer.The inverter supports the demand response modes as specified in the standard AS/NZS 4777. The inverter has integrated a terminal block for connecting to a DRED. DRED wiring diagram (hybrid inverter) as below:

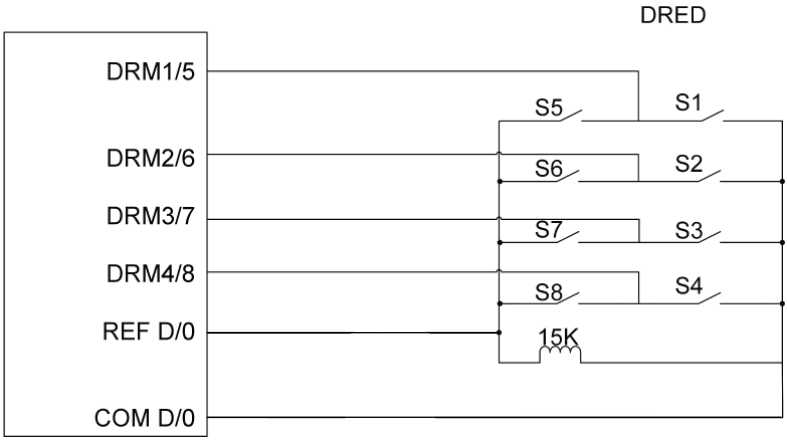


Figure 5-25

DRED mode as shown in table below:

Mode	Function
DRM 0	Operate the disconnection device
DRM 1	Do not consume power
DRM 2	Do not consume at more than 50% of rated power
DRM 3	Do not consume at more than 75% of rated power and source reactive power if capable
DRM 4	Increase power consumption (subject to constraints from other active DRMs)
DRM 5	Do not generate power
DRM 6	Do not generate at more than 50% of rated power
DRM 7	Do not generate at more than 75% of rated power and sink reactive power if capable.
DRM 8	Increase power generation (subject to constraints from other active DRMs
Priority	DRM1 > DRM2 > DRM3 > DRM4
	DRM5 > DRM6 > DRM7 > DRM8

NOTE

There is a resistor between15(COM D/0) and 16(REF D/0), do not move the resistor while wiring.

RCR

RCR (Ripple Control Receiver) interface is special reserved for Germany and some other European country according to their safety regulation, and HANCHU ESS doesn't provide the RCR device for the customer.

In Germany and some European areas, a ripple control receiver is used to convert a power grid dispatching signal to a dry contact signal. The dry contact is required for receiving the power grid dispatching signal.

RCR wiring diagram (hybrid inverter) as below:

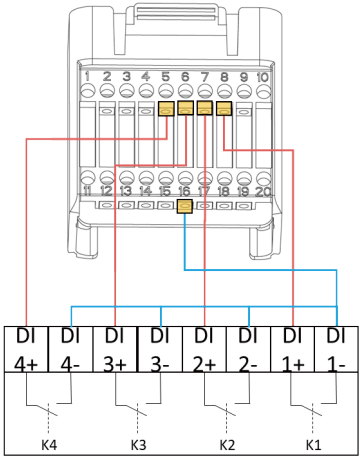


Figure 5-26

RCR operation mode as shown in table below:

Switch mode (External RCR device)	Feed-in output power (in % of the Rated AC output power)
K1 turn on	100%
K2 turn on	60%
K3 turn on	30%
K4 turn on	0%
RCR priority: K1<K2<K3<K4	

▼ 5.5.8 Multifunction Relay

The inverter is equipped with a multifunction dry contact relay, which helps turn the loads on or off when an extra contactor is connected, or startup the diesel generator when the diesel generator startup signal is connected.

NOTICE	Maximum voltage and current at DO dry contact port:30VDC 1A.

NOTE	For more installation and setup information, please contact HANCHU ESS.

SG Ready heat pump control

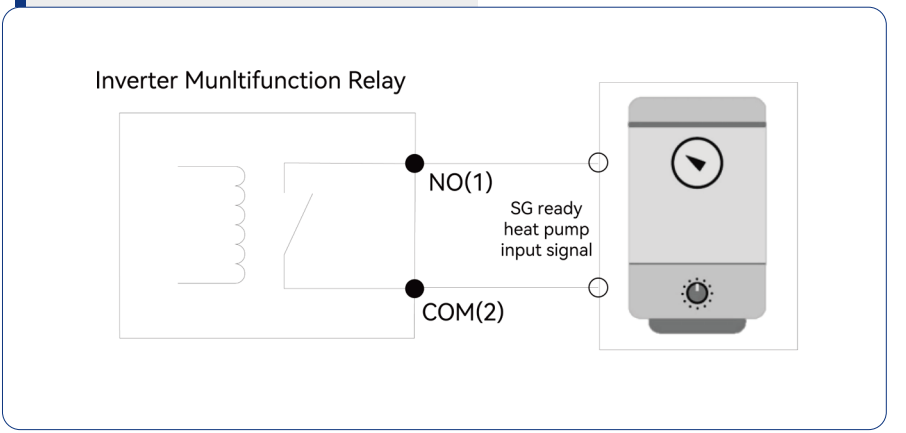


Figure 5-26 SG Ready heat pump controll connection diagram

Hybrid Inverter is matched with a SG-ready heat pump with dry contact port, which can realize heat pump integrated energy system management.

Most heat pumps today have a digital control input, such as SG ready, allowing external signals to influence the working of the heat pump. Please refer to the heat pump manufacturer's manual for more information on the specific control input of the heat pump

Mode	State	SG ready recommendation	Validity	DO-1 state
1	OFF	HP switched off	/	/
2	Normal	HP operates in normal energy efficient mode.	Yes	0
3	Recommended ON	HP is operating in an enhanced heating mode.	Yes	1
4	Forced ON	HP has to switch on.	/	/

NOTICE

Hybrid Inverter only supports Mode 2 and Mode 3 of SG ready.Inverter switches between mode 2 and mode 3.

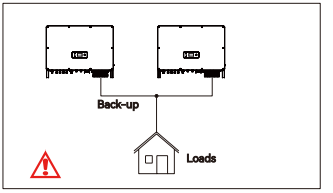
Load Management

Hybrid Inverter has three work modes to control smart loads (such as SG ready heat pump).

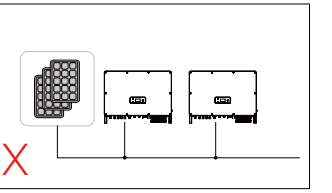
Work mode		Application description
Disable		Disable means not using the load management function.
Smart Mode	Feed-in Power Control	Set the feed-in power threshold for triggering the heat pump entering Mode3 or turn on smart load. When the meter detects the feed-in power equal to or greater than the set value, inverter relay will close and heat pump will enter heating mode or smart loads start working. This control mode is suggested to use in the system without power export limitation.
	Battery SOC Control	Set the battery SOC threshold for triggering the heat pump entering Mode3 or turn on smart load. When inverter detects the battery SOC value equal to or greater than the set value, inverter relay will close and heat pump will enter heating mode or smart loads start working. This control mode is suggested to use in the system with power export limitation.
	Time Control	Set the operation periods for heat pump mode three or smart load according to user habits or preferences. Up to 3 periods can be set. When this mode is enabled, a higher priority than other modes within the period. Outside the period, the heat pump or smart load operates according to the parameters set by the smart mode. If this mode is not enabled or no period is set, it operates according to the parameters set by the smart mode throughout the day.
Manual Mode		Manually control the heat pump entering Mode3 or start the smart load.

More configuration items for heat pumps or other smart loads are available on the APP or platform.

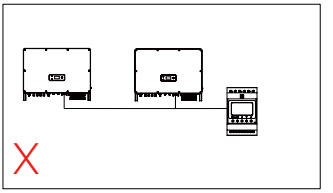
5.5.9 Parallel System



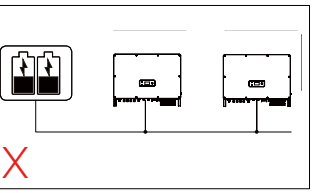
For the general version, back-up cannot connect in parallel. For advanced applications, please contact our after-sales department.



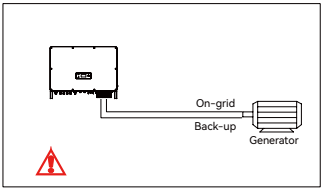
Single PV string cannot connect to multiple inverters.



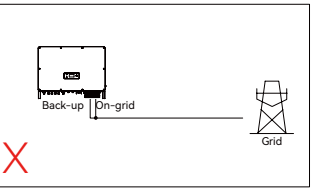
One meter cannot be connected to multiple inverters. Different CTs cannot connect to the same line cable.



One battery bank cannot be connected to multiple inverters.



The on-grid and back-up side cannot be connected to and generator directly.
For advanced applications, please contact our after-sales department.



The back-up side cannot be connected on-grid side or grid.

Figure 5-27

NOTE

For more installation and setup information about parallel system, please contact HANCHU ESS.

5.5.10 Emergency stop

HANCHU ESS CESS-HY-25~50K hybrid inverter comes standard with Emergency stop function, and you can use this function by connecting an external switch into the Emergency stop interface if it requires in the installation place. The external switch doesn't include in our accessory box.

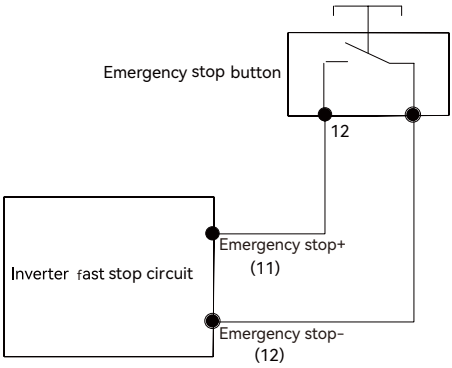


Figure 5-28 Emergency stop connection diagram

5.6 PV String Connection

DANGER

High voltage may be present in the inverter!
Ensure all cables are voltage-free before performing electrical operations.
Do not connect the DC switch and AC circuit breaker before finishing electrical connection.

NOTICE

For best practice, ensure PV modules of the same model and specifications are connected in each string.

WARNING

PV Max. Input voltage is 850V, otherwise inverter will be waiting.

▼ 5.6.1 PV Side Requirements

System Layout of Units with external DC Switch

① Local standards or codes may require PV systems that fit with an external DC switch on the DC side. The DC switch must be able to safely disconnect the open-circuit voltage of the PV array plus a safety reserve of 20%. Install a DC switch to each PV string to isolate the DC side of the inverter.

② The DC switch has to be certified by AS 60947.3:2018 and AS/NZS IEC 60947.1:2020 in Australia and New Zealand market. The Max. current of the DC switch matching with CESS-HY-25~50K inverter is no less than 40A. We recommend the following electrical connection.

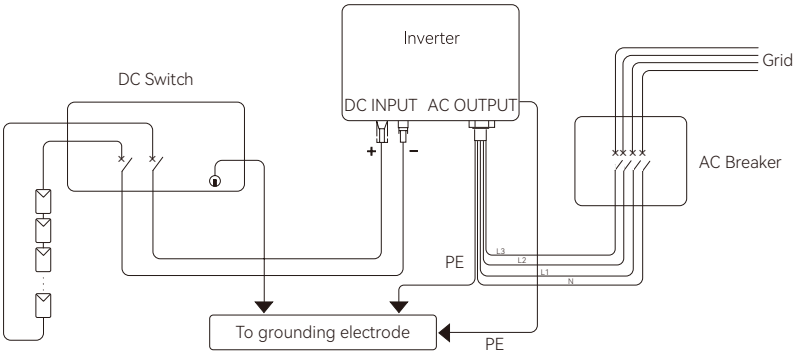


Figure 5-29

Select the appropriate photovoltaic cable

Cable requirements		Cable stripping length
Outside diameter	Conductor core section	
5.9-8.8 mm	4 mm^2	7 mm

▼ 5.6.2 Assembling the PV Connector

WARNING

Before assembling the DC connector, make sure that the cable polarity is correct.

① Peel off the DC cable insulation sleeve for 7 mm.

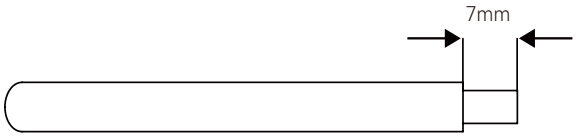


Figure 5-30

② Disassemble the connector in the accessory bag.

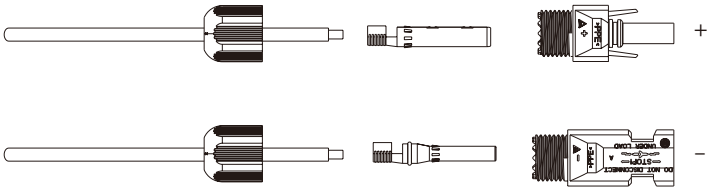


Figure 5-31

③ Insert the DC cable through the DC connector nut into the metal terminal and press the terminal with a professional crimping plier (pull back the cable with some power to check if the terminal is well connected to the cable).

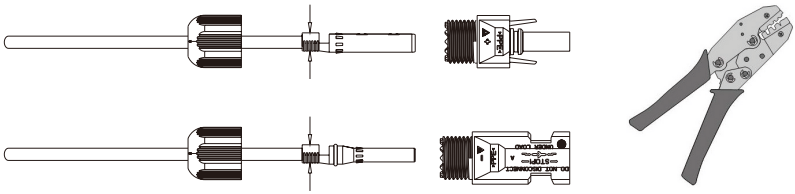


Figure 5-32

④ Insert the positive and negative cables into the corresponding positive and negative connectors, pull back the DC cable to ensure that the terminal is tightly attached in the connector.

⑤ Use an open-end wrench to screw the nut to the end to ensure that the terminal is well sealed.

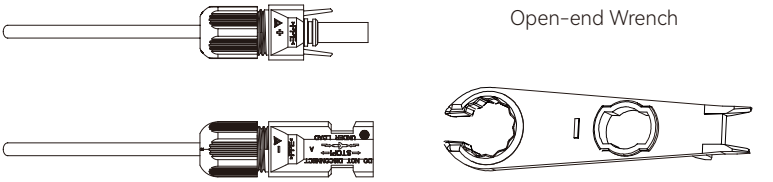


Figure 5-33

5.6.3 Installing the PV Connector

① Rotate the DC switch to “OFF” position.

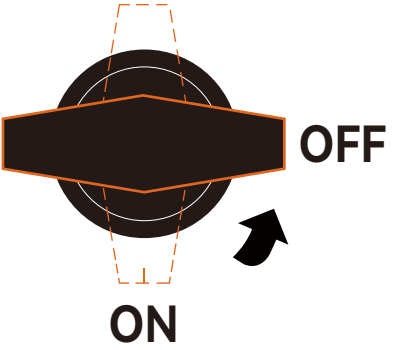


Figure 5-34

② Check the cable connection of the PV string for polarity correctness and ensure that the open circuit voltage in any case does not exceed the inverter input limit of 1,000V, PV Max. Input voltage is 850V, otherwise inverter will be waiting.

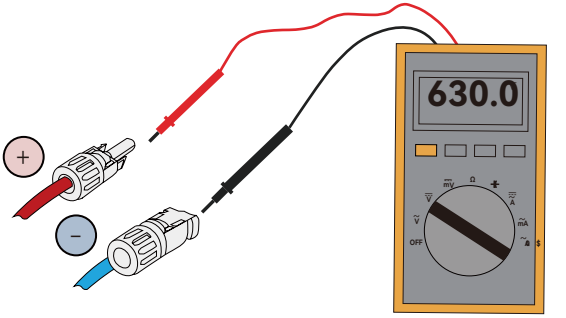


Figure 5-35

③ Insert the positive and negative connectors into the inverter DC input terminals respectively, a click sound should be heard if the terminals are well connected.

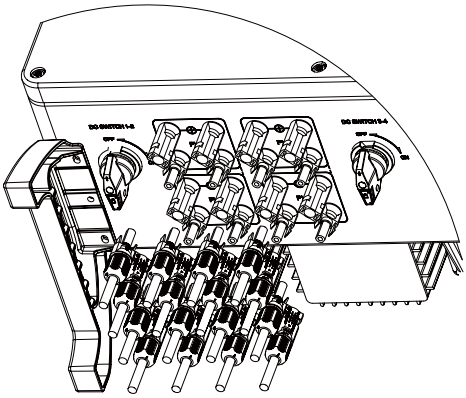


Figure 5-36

④ Seal the unused PV terminals with the terminal caps.

5.7 Power Cable of the Battery Connection

NOTE

Please contact your battery supplier for detailed battery installation information.

▼ 5.7.1 The following principles must be considered when making battery connection:

① Disconnect the AC breaker on the grid side.
② Disconnect the breaker on the battery side.
③ Turn the inverter DC switch to the “OFF” position.
④ Make sure the maximum input voltage of battery is within the inverter limitation.

Select an appropriate DC cable

Cable requirements		Cable stripping length
Outside diameter	Conductor core section	
9.8±0.2 mm	25 mm^2	20 mm

CAUTION

If the conductor core of the battery cable is too small, which may cause poor contact between the terminal and the cable, please use the cable specified in the above table, or contact HANCHU ESS to purchase terminals of other specifications.

① Peel off the battery cable insulation sleeve for 20 mm.

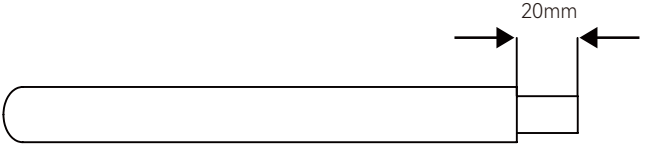


Figure 5-37

② Disassemble the connector in the accessory bag, Thread the cable into end cap, grommet, and cable gland in turn.

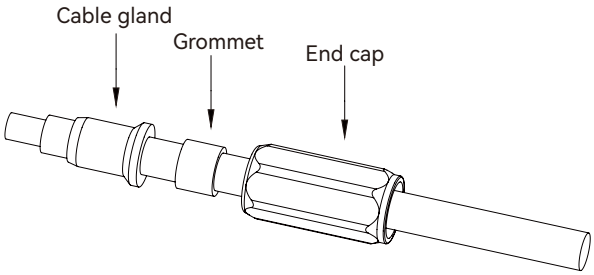


Figure 5-38

③ Insert the battery cable through into the metal terminal and press the terminal with a professional crimping plier (pull back the cable with some power to check if the terminal is well connected to the cable).

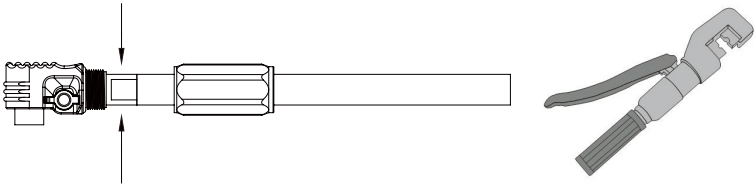


Figure 5-39

④ After the crimping is completed, push the cable gland, grommet and end cap at the plug end into place, and tighten the end cover with the thread of the plug unit.

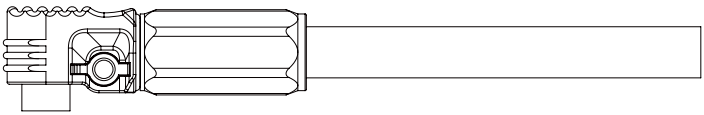


Figure 5-40

WARNING

① Before making the battery connector, please make sure the polarity of the cable is correct.

② Use a multimeter to measure the voltage of the battery pack and make sure the voltage is within the inverter limitation and the polarity is correct.

⑤ Insert the positive and negative connector into the inverter battery terminals respectively, and a “click” sound represents the assembly in place.

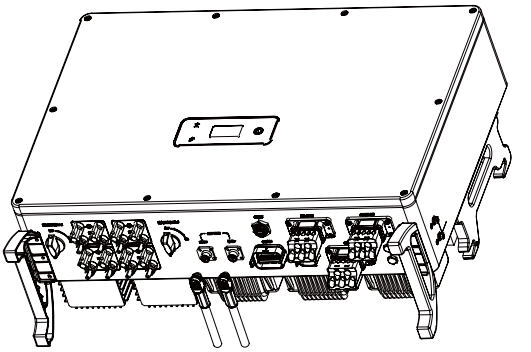


Figure 5-41

⑥ When pulling out the plug, you need to press the switch button first, and then pull the plug out.

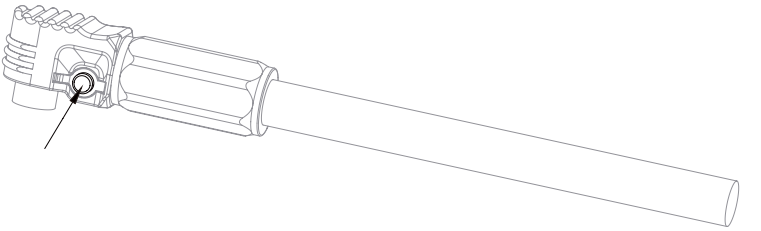


Figure 5-42

6 Commissioning

6.1 spection Before Commissioning

Check the following items before starting the inverter:

① All equipment has been reliably installed.

② DC switch and AC circuit breaker are in the "OFF" position.

③ The ground cable is properly and reliably connected.

④ The AC cable is properly and reliably connected.

⑤ The DC cable is properly and reliably connected.

⑥ The communication cable is properly and reliably connected.

⑦ The vacant terminals are sealed.

⑧ No foreign items, such as tools, are left on the top of the machine or in the junction box (if there is).

⑨ The AC circuit breaker is selected in accordance with the requirements of this manual and local standards.

⑩ All warning signs & labels are intact and legible.

6.2 Commissioning Procedure

If all of the items mentioned above meet the requirements, proceed as follows to start up the inverter for the first time.

① Turn on the AC breaker.

② Turn on the lithium battery switch. Power on the battery pack manually if a battery is equipped.

③ Turn on the DC switch, the DC switch may be integrated in the inverter or installed by the customer.

④ The inverter will work properly after turning on the DC and AC breakers on the condition the weather and grid meet requirements. The time for entering the operating mode may vary according to the chosen safety code.

⑤ Observe the LED indicator to ensure that the inverter operates normally.

⑥ After the inverter is started, please refer to the [Quick Installation Guide] which is attached to the access to configure the inverter.

NOTE

If the inverter does not work properly, check the country code and battery ID Settings.

① Select the safety code suitable for the country (region) where the inverter is installed at.

② Select the battery ID suitable for the battery is installed.

NOTE

CT AUTO TEST FUNCTION

CESS-HY hybrid inverter has the function of detecting the installation direction and phase sequence of CT. The system is installed, this function can be enabled on the APP for detection.

NOTICE

SOC RESET FUNCTION

When the inverter is turned on for the first time, the battery will be automatically charged to calibrate the battery SOC. After the battery is charged, this function will be turned off automatically (If you confirm that it is not necessary, you can manually turn off the function. We recommend to enable this function.)

If you need to calibrate the SOC during system use, you can manually enable the function to calibrate the battery SOC on app or inverter screen. After the battery is fully charged, the function is automatically disabled again.

6.3 Stop the Inverter

When turning off the inverter, please follow the steps below:

① Shut down the inverter through the APP or the button on the display first.

② Disconnect the breakers on the grid and load side.

③ Turn off the battery switch, and disconnect the DC breaker on the battery side (if any).

④ Wait 30 seconds and then turn the inverter DC switch to the “OFF” position. At this time, there is remaining power in the inverter capacitor. Wait for 10 minutes until the inverter is completely de-energized before operating.

⑤ Disconnect the AC and DC cables.

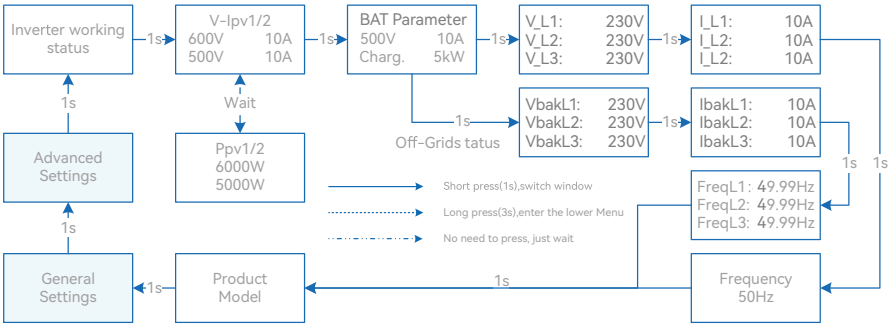
7 Operation

When the inverter is turned on, the following interfaces will be displayed on the OLED display, and the OLED display allows the user to check various operation information and to modify the settings of the inverter.

NOTE

If the parameter is a number short press to change the number, long press to confirm the number and jump to the next number.
Please wait for 10 seconds and the inverter will automatically save your settings or modifications.

7.1 Main Window

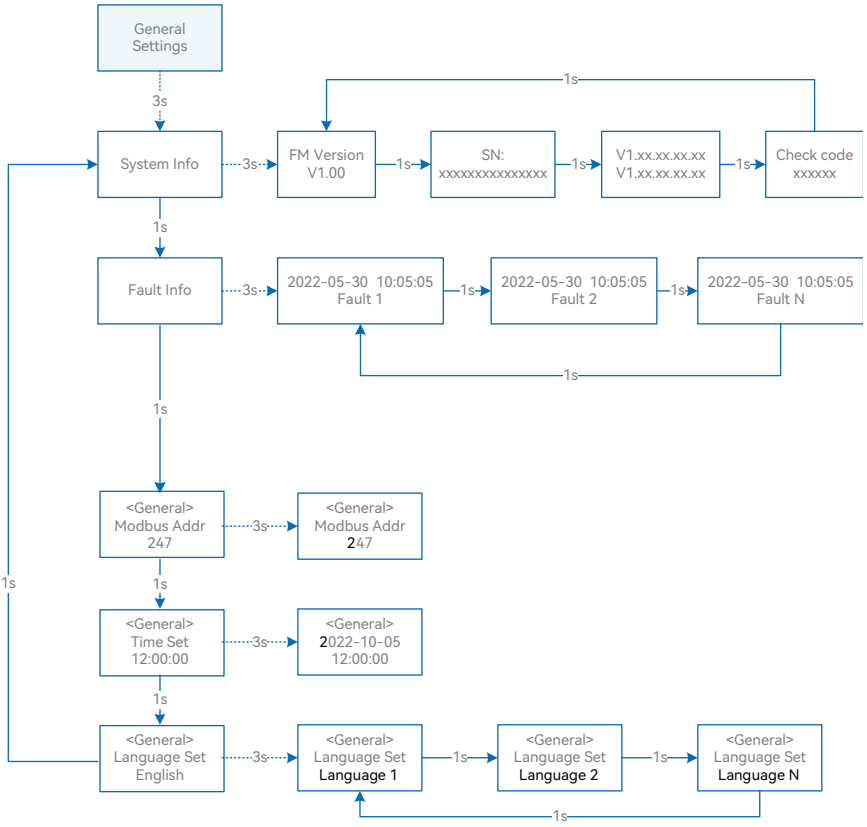


Inverter working status
Waiting/Checking/On-Grid/Off-Grid/Fault Info/FW Updating

Inverter Display Abbreviation and Complete Name Reference Table

Abbreviation	Complete Name
V-Ipv1/2	PV input voltage and current of each MPPT
Ppv1/2	PV input power of each MPPT
BAT Parameter	Battery Parameter
Charg.	Charge
Dischg.	Discharge
V_L1: / V_L2: / V_L3:	Three-phase AC voltage (On-Grid status)
VbakL1: / VbakL2: / VbakL3:	Three-phase AC voltage (Off-Grid status)
I_L1: / I_L2: / I_L3:	Inverter output current (On-Grid status)
IbakL1: / IbakL2: / IbakL3:	Inverter output current (Off-Grid status)
FreqL1: / FreqL2: / FreqL3:	Inverter output Frequency (Off-Grid status)
FW Updating	Firmware Updating

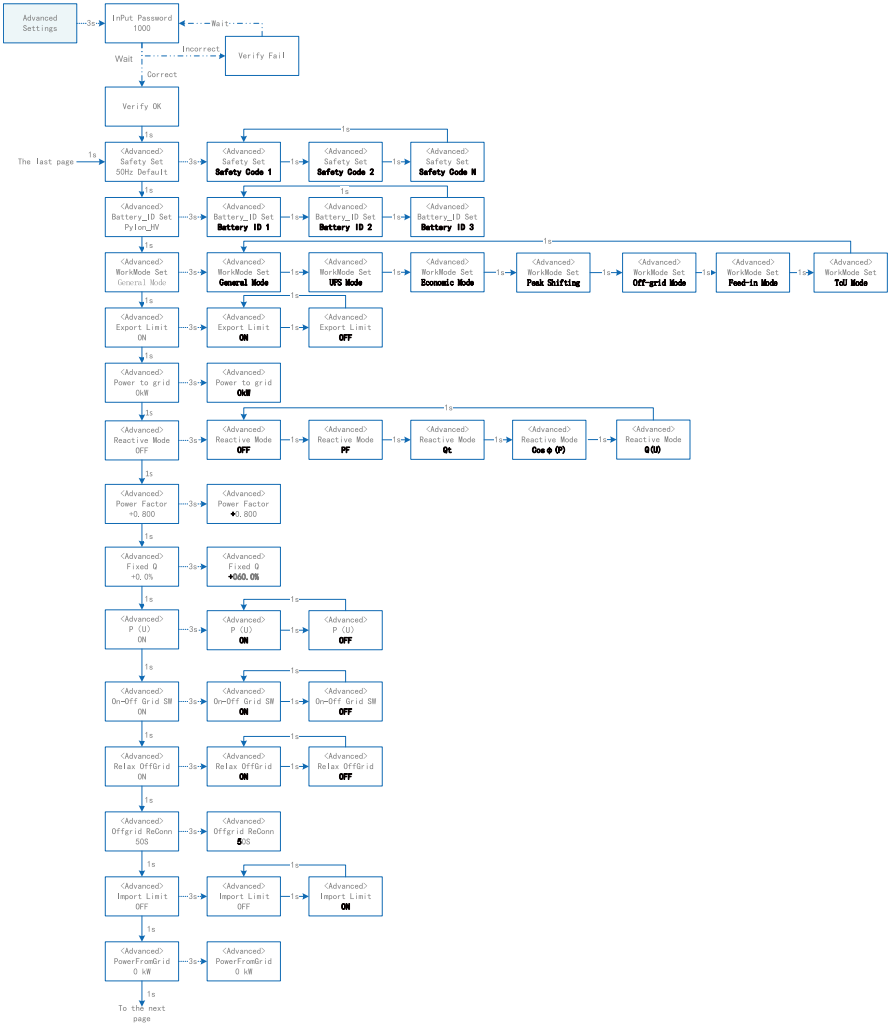
7.2 General Setting



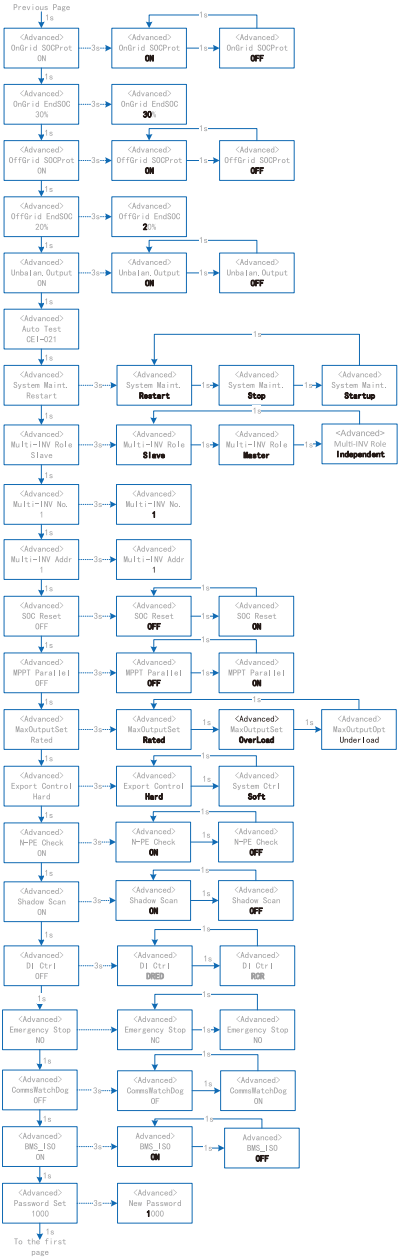
Inverter Display Abbreviation and Complete Name Reference Table

Abbreviation	Complete Name
System Info	System information
FM Version	Firmware version
DNS Addr	If DHCP is turned off, set the domain name server address
Modbus Addr	Modbus address

7.3 Advanced Setting



*Please contact HANCHU ESS service team for password.



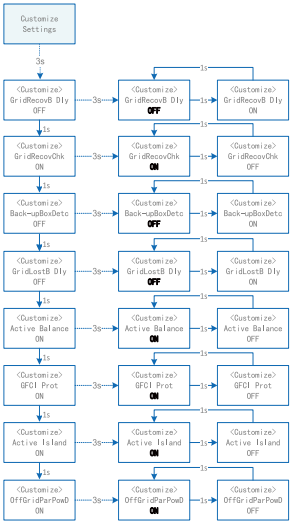
*Please contact HANCHU ESS service team for password.

Inverter Display Abbreviation and Complete Name Reference Table

Abbreviation	Complete Name
Safety Set	Select the code that meet local regulatory requirements
Battery_ID Set	Select the battery model
Work Mode	Current work mode / work mode setting
Export Limit	On-grid export limit function switch
Power to grid	Set the power that is allowed to feed to the grid(under the condition of Export Limit is on)
Reactive Modes	Reactive Power Mode
PF	"Under ""Reactive Mode" "The reactive power can be regulated by the parameter PF (Power Factor)."
Qt	"Under ""Reactive Mode" "The reactive power can be regulated by the parameter Q-Var limits (in %)."
Cosφ(P)	"Under ""Reactive Mode" "The PF changes with the output power of the inverter."
Q(U)	"Under ""Reactive Mode" "The reactive power changes with the grid voltage"
Fixed Q	The reactive power ratio when the "Reactive Mode" is Qt.
P(U)	Active power mode Switch. The active power changes with the grid voltage.
On-Off Grid SW	Off-grid function switch (If turn it on, the inverter will automatically switch to off-grid mode to ensure the back-up side power supply when the gird is abnormal or off, otherwise, there is no output on the back-up side)
Relax OffGrid	Reduce the switching sensitivity of the On/Off-grid (applied to the places where the grid is unstable or inverter always entered off-grid mode for some reasons)
Offgrid ReConn.	When inverter is operating without grid, it will stop backup output after overload protection, and restart within the set time.
Import Limit	On-grid import limit function switch
Power From Grid	Set max allowed power from grid (under the condition of Import Limit is on)
OnGrid SocProt.	On-grid battery SOC (State of Charge) Protection
OnGrid EndSOC	End-of-discharge SOC of on-grid
OffGrid SocProt.	Off-grid SOC Protection
OffGrid EndSOC	End-of-discharge SOC of off-grid
Unbalan. Output	3-Phase Unbalanced Output Switch when inverter work on On-grid state
System Maint.	System maintenance, includes inverter stop and run, system restart

Abbreviation	Complete Name
Multi-INV Role	In the multi-inverter parallel system, set the role of one inverter as the master and the other inverter as the slave.
*Multi-INV No	This menu is displayed only when the inverter is Master.Set the number of master-slave parallel. Range:1~10.
**Multi-INV Addr	This menu is displayed only when the inverter is Slave.Set the address of slave inverter. Range:1~9.The address will be "Auto" when "Multi-INV NO." is "1".
SOC Reset	If turned it on, the battery will be automatically charged to calibrate the battery SOC. After the battery is charged, this function will be turned off automatically
MPPT Parallel	If MPPT is connected in parallel, enable this function.
MaxOutputSet	Select the maximum AC output power. Rated, Max. output power= Rated output power on the datasheet Overload, Max. output power= Max. output power on the datasheet Underload, Max. output power < Rated output power on the datasheet
Export Control	In the power export limit on mode, when the communication between the inverter and meter or the inverter and datalogger is interrupted, select the inverter operation mode from one of the follows: Hard, inverter stops Soft, inverter generates power as the “Feed in Grid” value set on the screen
N-PE Check	The N and PE shorting function on the BACK-UP side in the off-grid operation status.
Shadow Scan	Shadow Scan function switch
DI Ctrl	DI Ctrl enable "DRM" or "RCR" function
DRM	Demand Response Modes
RCR	Ripple Control Receiver
Emergency Stop	Emergency stop switch device
NO	Normally open:Emergency Switch Normally Open, when switch closed, inverter stop.
NC	Normally closed: Emergency Switch Normally Closed, when switch open, inverter stop.
CommsWatchDog	When the function is turned on, the inverter stops working when communication with the master is lost.

7.4 Customize Set



Item	Full name	Description	Application scenarios
GridRecovB Dly	Grid recover back-up output delay function	When the inverter is switched from the off-grid state to the grid-connected state, the back-up side selects normal output or delayed output. OFF(default): Normal output (within 10ms) ON: Delay output (delay 500ms)	When the customer connects to an ATS that cannot self-recover between grid side and back-up side, the customer selects the delay mode and the output is delayed by 500 ms on back-up side, so that the ATS can be switched from back-up side to grid side.
GridRecov Chk	Grid recover self-check function	The inverter is self-test when it is switched from the off-grid state to the grid-connected state. ON(default):Self-test OFF:No self-test Notice:If turn this function off, it may not meet local grid connection regulations	In areas where utility grid is unstable, if utility grid is cut off again during the self-test process, the output on the back-up side will be interrupted.
Back-upBoxDetc	Back-up box detection function	Turn on this function, and the inverter will detect whether the backup box is operating normally OFF(default):Not detected ON:Perform tests Notice:In off-grid parallel system, this function is enabled by default	The function is automatically turned on in off-grid paralleled system. When backup box connected with single inverter, please manually turn on this function.

Item	Full name	Description	Application scenarios
GridLostB Dly	Grid lost back-up output delay function	When inverter is switched from Grid-connected state and off-grid state, the back-up side is normal output or delayed output. OFF(default): Normal output ON: Delay output	When the system is connected to the shock load, the inverter may not be switched and work normally when grid-connection state switched to off-grid state.and turning on the function can improve the probability of system restart.
GridLostB Dly	Grid lost back-up output delay function	When inverter is switched from Grid-connected state and off-grid state, the back-up side is normal output or delayed output. OFF(default): Normal output ON: Delay output	When the system is connected to the shock load, the inverter may not be switched and work normally when grid-connection state switched to off-grid state.and turning on the function can improve the probability of system restart.
Active Balance	Grid active balancing function	When there is no PV and no battery, whether the machine actively turns on the three-phase unbalance function to balance the power of the grid port. ON(default):turn on this function OFF:turn off this function	Turn the function on or off according to the grid requirements and needs
GFCI Prot	GFCI protection function	The leakage current protection function is turned on or off. ON(default):turn on this protection OFF:turn off this protection	When there is abnormal leakage current in the system, which causes the system to fail to operate normally, the function can be disabled. Notice: Before disabling this function, need to confirm that there are no security risks.
Active Island	Active islanding disturbance function	Active islanding disturbance function is turned on or off. ON(default):turn on this function OFF:turn off this function Notice:Active islanding disturbance function is turned off, and the passive islanding protection function is still available.	In some test scenarios, need to disable this function, but no operation is required for normal condition .
OffGrid ParPowD	Off-grid parallel power distribution function	When multiple inverters are off-grid paralleled, the master schedules and distributes the power of the slaves. ON(default):turn on this function OFF:turn off this functionActive islanding disturbance function is turned on or off. ON(default):turn on this function OFF:turn off this function Notice:Active islanding disturbance function is turned off, and the passive islanding protection function is still available.	If the off-grid side of the parallel power station is together, the function needs to be turned on; If the off-grid side of the parallel power station is not combined, the function needs to be turned off Under normal circumstances, the switch does not need to be operated, only the project is connected to the grid, and the standby side needs to be turned off when the load is connected independently.

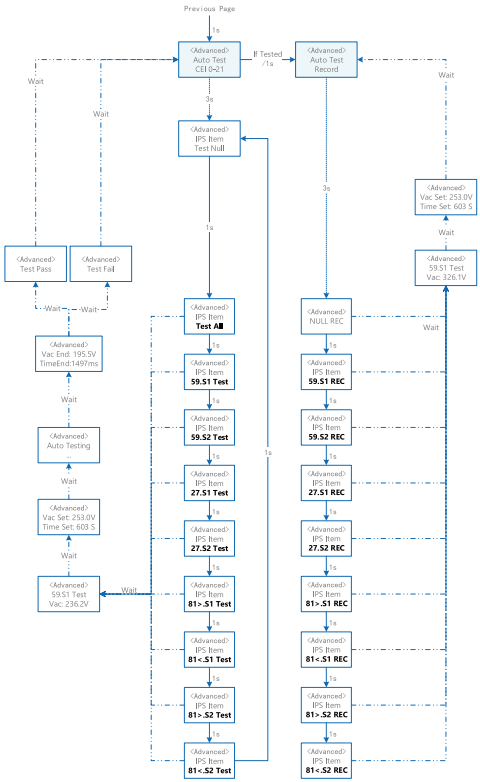
7.5 Country Code (Safety Code) Setting

Please set "Country code (Safety code)" under the menu "Safety Set" in " Advanced Settings ". Refer to “7.3 Advanced Setting” for more information.

7.6 Auto-Test

This function is disabled by default, and will be only functional in the safety code of Italy. Short press the button several times until "Auto Test CEI 0-21" displays on the screen, press and hold the button 3 seconds to activate “Auto Test". After the auto test is finished, short press the button several times until the screen displays "Auto Test Record", and hold the button 3 seconds to check the test results.

The auto test will start when the correct test item is selected, and the test result will be displayed on the screen when it finished. If the test was successful, it will display "Test Pass", otherwise will display "Test Fail”. After each item tested, the inverter will reconnect to the grid and automatically start the next test according to the requirements of CEI 0-21. Connect the AC cable, auto test will start after the inverter connected to the grid, see the operation steps below:



7.7 Reactive Power

The inverter provides a reactive power regulation function.

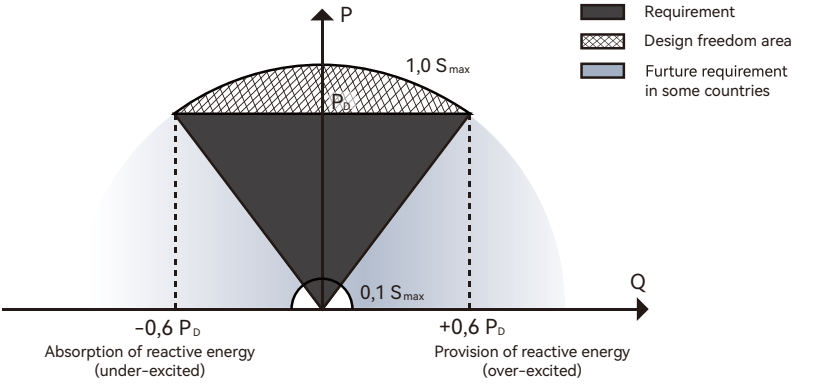


Figure 7-1 Capabilities

This mode can be enabled via configuration software. It is enabled by default in some regions, such as AU, DE market. For information on how to change default setpoints please contact HANCHU ESS Technical Support at service@hanchuess.com.

Descriptions of reactive power regulation mode:

Mode	Descriptions
Off	The PF is fixed at +1.000.
PF	The reactive power can be regulated by the parameter PF (Power Factor).
Qt	The reactive power can be regulated by the parameter fixed Q(in Pn%).
Cosφ(P)	The PF changes with the output power of the inverter.
Q(U)	The reactive power changes with the grid voltage.

▼ 7.7.1 “Off” Modes

The reactive power regulation function is disabled. The PF is limited to +1.000.

▼ 7.7.2 “PF” Mode

The power factor is fixed and reactive power setpoint is calculated according to the current power. The PF ranges from 0.8 leading to 0.8 lagging.

Leading: the inverter is sourcing reactive power to the grid.

Lagging: the inverter is injecting reactive power into the grid.

▼ 7.7.3 “Qt” Mode

In the Qt mode, system rated reactive power is fixed, and the system injects reactive power according to the delivered reactive power ratio.
The setting range of the reactive power ratio is -60%~60%, corresponding to the ranges of inductive and capacitive reactive power regulation respectively.

▼ 7.7.4 “Cosφ(P)” Mode

The PF of the inverter output varies in response to the output power of the inverter.
“Cosφ(P)” Mode Parameter Descriptions:

Parameter	Explanation	Range
Cosφ(P)_P1(Point A)	Output power at P1 on the Cosφ(P) mode curve (in percentage)	10% ~ 100%
Cosφ(P)_P2(Point B)	Output power at P2 on the Cosφ(P) mode curve (in percentage)	20% ~ 100%
Cosφ(P)_P3(Point C)	Output power at P3 on the Cosφ(P) mode curve (in percentage)	20% ~ 100%
Cosφ(P)_K1(Point A)	Power factor at P1 on the Cosφ(P) mode curve	0.8 ~1
Cosφ(P)_K2(Point B)	Power factor at P2 on the Cosφ(P) mode curve	
Cosφ(P)_K3(Point C)	Power factor at P3 on the Cosφ(P) mode curve	
Cosφ(P)_Enter-Voltage	Voltage percentage for Cosφ(P) function activation	100% ~ 110%
Cosφ(P)_Exit-Voltage	Voltage percentage for Cosφ(P) function deactivation	90% ~ 100%

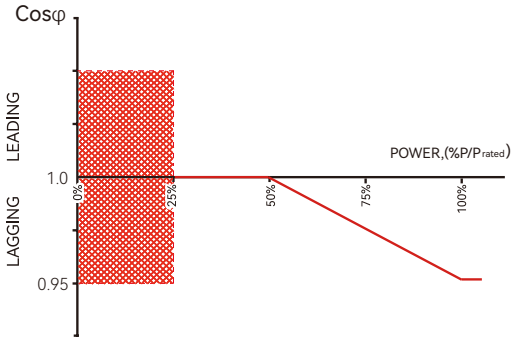


Figure 7-2 Cosφ(P) Curve

▼ 7.7.5 “Q(U)” Mode

The reactive power output of the inverter will vary in response to the grid voltage.

“Q(U)” Mode Parameter Descriptions:

Parameter	Explanation	Range
QU_V1	Grid voltage limit at P1 on the Q(U) mode curve	80% ~ 100%
QU_Q1	Value of Q/Sn at P1 on the Q (U) mode curve	0 ~ 60%
QU_V2	Grid voltage limit at P2 on the Q(U) mode curve	80% ~ 100%
QU_Q2	Value of Q/Sn at P2 on the Q (U) mode curve	-60% ~ 60%
QU_V3	Grid voltage limit at P3 on the Q(U) mode curve	100% ~120%
QU_Q3	Value of Q/Sn at P3 on the Q (U) mode curve	-60% ~ 60%
QU_V4	Grid voltage limit at P4 on the Q(U) mode curve	100% ~120%
QU_Q4	Value of Q/Sn at P4 on the Q(U) mode curve	0 ~ -60%
QU_Enter-Power	Active power for Q(U) function activation	20% ~ 100%
QU_Exit-Power	Active power for Q(U) function deactivation	1% ~ 20%

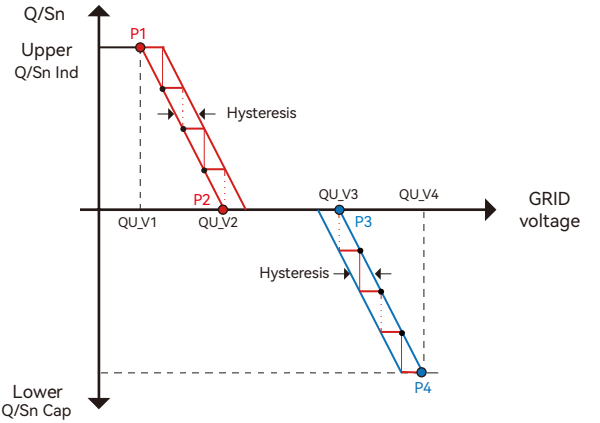


Figure7-3 Q(U) Curve

8 Monitoring

8.1 Monitoring device display interface

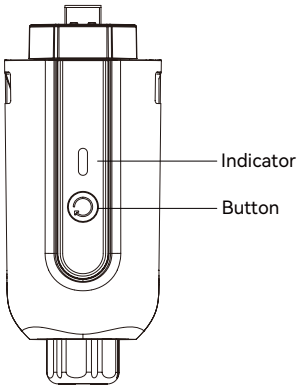


Figure 8-1Monitoring device display interface display interface

Indicator Status	Description
Off	Connection abnormal
Always On	The monitoring device is normal working.
Slow flashing	The monitoring device is not connected to the router.
Quick flashing	The monitoring device is connected to the router but not connected to the server.

Button	Description
Press 2 seconds	Restart device

NOTE

The WiFi module needs to be configured to the router for the first installation. If the router name or password are changed, the WiFi devices will need to be reconfigured. For details, please refer to the [Quick Installation Guide] which is attached to the accessory bag.

9 APP Guide

9.1 App Download

You can scan the QR code or visit the website to download the HanchuEss App: **https://iess.hanchuess.com.**
You can also download the HanchuEss App from the App store or Google play.

Android APP

IOS APP

9.2 Device binding

▼ 9.2.1 Registering and login

• If you have already registered, you can log in directly . Then you can turn to **"9.2.2 Bind decives".**If you don't have an account yet, tap**"Sign up"** to register as shown in Fig. 1.

• In order to provide you with the basic functionality of our products / services, you are required to authorise your consent to the **"Privacy Policy"** and **"Terms & Conditions".** We promise to keep users' information strictly confidential and will not disclose users' private information to outside parties unless authorised by the user or required by law.

• Fill in the account information

After filling in the information for registration, tap **"Get Verification Code"** as shown in Fig. 2. We will send the verification code to your email.Fill in the code, and click on **"Confirm"** to log in, as shown in Fig. 3.

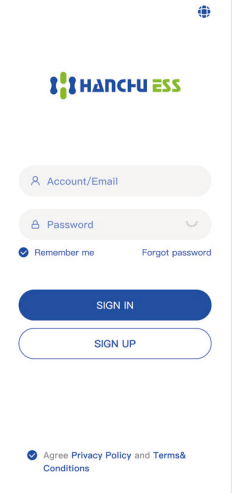


Fig. 1

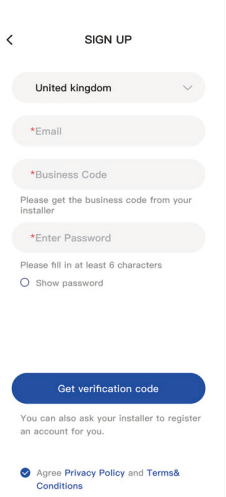


Fig. 2

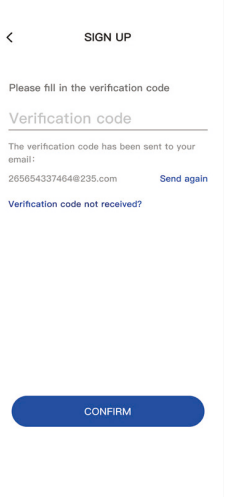


Fig. 3

▼ 9.2.2 Bind devices

You can jump to the relevant section referring to what you want to do:

• Now you have a station, but need to setting the network for devices or add new devices to your station?

- Please tap the "Add Device" button , as shown in Fig. 4. Then you can directly turn to **b.Network configuration.**

• Now you don't have a station yet?

- Tap **"Add station"** on the page, as shown in Fig. 5.

a. Fill in the new station information

You will need to fill in some information for the station, as shown in Fig. 6.

• Address (optional): Your detailed address, we will only use it for after-sales service.

• Electricity price setting (optional): After filled, you will be able to view the income and expenditure of your devices.

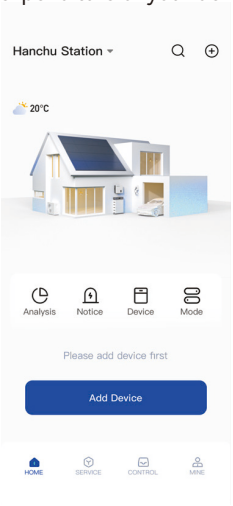


Fig. 4

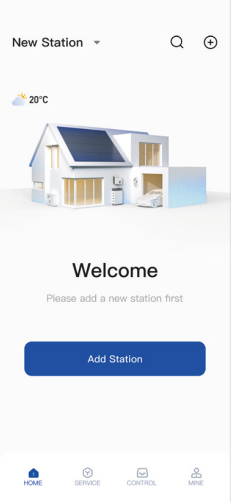


Fig. 5

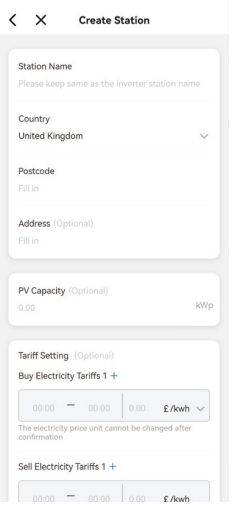


Fig. 6

b. Network configuration

Select the home Wi-Fi network you want to connect to (not 5GWiFi) and enter your WiFi password, as shown in Fig. 7.

c. Bluetooth search

Turn on your phone's Bluetooth, then select the devices you want to bind.

Tap **"Add"** to add the devices to your station, as shown in Fig. 8.

The SN on this page is the same as the SN on the logger.

! Tips: Please be sure to turn on the Bluetooth of the mobile phone, otherwise the binding function will not be available.

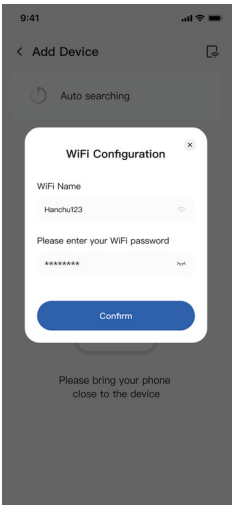


Fig. 7

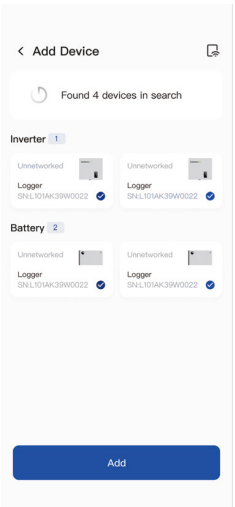


Fig. 8

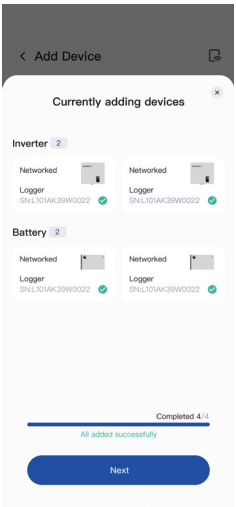


Fig. 9

d. Binding completed

After the devices are connected to the network and bound successfully, you will see the page shown in Fig. 9.

Please tap **"Next ".**

e. Choose the inverter:

Choose one inverter to Setting.

f. Local Setting:

Then enter the local Setting page, as shown in Fig. 10. Click **"Complete"** to complete the Setting

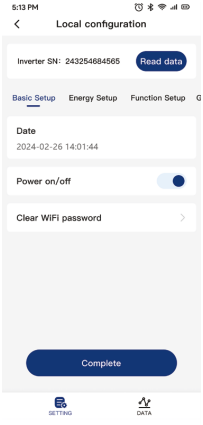


Fig. 10

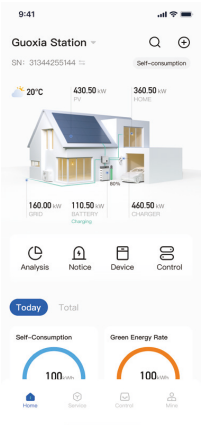


Fig. 11

! Tips:

• If you want to set more inverter configuration items, please contact your installer.

• If you want to set up the inverter remotely, enter the "Home" page, select the device you want to control, and click "Control" to operate the device remotely. As the following fig. 11.

Congratulations! You have done the basic setting. Now you can view your device data on APP.

You can also view your device data by logging into **https://iess.hanchuess.com**, the website login password is the same as the APP account password.

▼ 9.2.3 Account and service information

Tap **"PERSONAL"** to view account information and app settings.

• Have any device malfunction or have technical problems?

Tap **"After Sales"**, and you will see how to contact the service.

• Have any questions or suggestions about the APP?

You can leave us a message in the **"Suggestions feedback"** or contact us at **service@hanchuess.com**. We will deal with it for you as soon as we know.

• How do I view the device manual in the app?

Click "Data Center" on the "SERVICE" page to view the corresponding device information.

10 Troubleshooting

10.1 Error Message

HANCHU ESS CESS-HY-25~50K series hybrid inverter is designed in accordance with grid operation standards, and conform to the requirements of safety and EMC. The inverter had passed a series of rigorous tests to ensure it runs sustainably and reliably before shipment. When a fault occurs, the corresponding error message will be shown on the OLED display, and in this case, the inverter might stop feeding into grid. The fault messages and their corresponding troubleshooting methods are listed below:

Error Message	Description	Solution
Mains Lost	Grid power outage, AC switch or circuit is disconnected.	1. Check whether the mains supply is lost. 2. Check whether the AC breaker and terminal are well connected.
Grid Voltage Fault	Inverter detects that the gird voltage exceeds the limit of selected safety set range.	1. Check whether the safety code is correct. 2. Check whether the AC cable wiring is correct. 3. Check whether the voltage increased cause by large AC cable impedance. In this case we could replce with a thicker AC cable. 4. Extend the voltage protection limit with the permission of the Electricity Authority.
Grid Frequency Fault	Grid over frequency or underfrequency, the grid frequency is higher or lower than the set protection value.	1. Check whether the AC cable is correct and well connected. 2. Change to another country with wider protection range if it's allowed by the local electricity company.
DCI Fault	Inverter detects that the the direct current injection value exceeds the range.	1. Restart the inverter. 2. Seek for help from the installer or manufacture.

Error Message	Description	Solution
ISO Over Limitation	Inverter detects that DC side's insulation impedance to the ground is too low.	1. Check whether PV panels, cables, and connectors are waterlogged or damaged. 2. Use a megger to measure ground resistance on the DC sidel, and the measured value should not be less than 500 KΩ. 3. Seek help from the installer or manufacture.
GFCI Fault	The inverter detects that the ground leakage current exceeds the limitation.	1. Restart the inverter. 2. Check whether the PV panels, cables, and connectors are waterlogged or damaged. 3. Seek help from the installer or manufacture.
PV Over Voltage	PV input voltage exceeds the upper limit.	Reduce the number of PV panels to make sure that the open-circuit voltage of each string is lower than the inverter maximum allowed input voltage.
Bus Voltage Fault	The voltage of bus circuit is too high	1. Check whether the input voltage exceeds the limit. 2. Restart the inverter. 3. Seek help from the installer or manufacture.
Inverter Over Temperature	The inverter detects its high internal temperature	1.Check whether the inverter installation location is well ventilated. 2.Try to turn it off for a while, and then power it back on when it cools down. 3.Seek help from the installer or manufacture.
N-PE Check Fault	The ground cable is losse or in poor connection	Check whether the ground cable wiring is correct.
SPI Fault	Internal communication got failed. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek help from the installer or manufacture.

Error Message	Description	Solution
E2 Fault	Internal storage got abnomal. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek help from the installer or manufacture.
GFCI Device Fault	GFCI device got abnormal	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
AC Transducer Fault	AC transducer got abnomal	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
Relay Check Fail	Self-checking of internal relay got failed. Neutral & ground cable are in poor connection on AC side.	1. Use multimeter to measure the voltage between N&PE cable on AC side. If the voltage is higher than 10V, which means the neutral or ground connection is abnormal. 2. restart the inverter. 3. Seek help from the installer or manufacture.
Internal Fan Fault	Inverter's internal fan got failed	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
External Fan Fault	Inverter's external fan got failed	1. Check whether the fan is blocked by foreign matters, clean them if necessary.
Bat OV	Battery protection got triggered	1. Check working status of battery. 2. Check if battery is alarming.

Error Message	Description	Solution
Backup OV	Abnormal voltage exists on the back-up side	Turn off inverter and remove the back-up connector. Use a multimeter to measure whether there is voltage existing on the back-up connector.
Bus Volt Low	Abnormal power schedduling	Check whether the battery voltage or PV input voltage is normal
Hard Fault	Hardware protection got triggered	1. Restart the inverter. 2. Seek help from the installer or manufacture.
Backup OP	Output power over limitation on back-up side	Check whether the load power on back-up side exceeds the maximum output power of inverter.
Inverter OV	The load power exceeds the range of its limit of inverter in off-gird mode	1. Check whether there is an impact load on the back-up side and whether the load power is too high. 2. Check whether back-up side is short circuit.
Inverter OF	The load power exceeds the range of its limit of inverter in off-gird mode	1. Check whether there is an impact load on the back-up side and whether the load power is too high. 2. Check whether back-up side is short circuit.
Inverter OC	The load power exceeds the range of its limit of inverter in off-gird mode	1. Check whether there is an impact load on the back-up side and whether the load power is too high. 2. Check whether back-up side is short circuit.

Error Message	Description	Solution
SCI Fault	Internal communication got failed. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
FLASH Fault	Internal storage anomaly. Caused by a strong external magnetic field etc.	1. Restart the inverter. 2. Seek for help from the installer or manufacture.
Meter Comm Fault	Abnormal communication between meter and inverter.	1. Check whether the communication connection between inverter and meter is reliable 2. Comfirm whether the meter model is compatible
BMS Comm Fault	Abnormal communication between inverter and battery BMS.	1. Check whether the battery ID selection is correct. 2. Check whether the communication connection between inverter and BMS is reliable 3. Check the working status of battery.

10.2 Inverter Maintenance

DANGER

Incorrect operation do cause the risk of inverter damage or personal injury.

Please strictly follow the steps below.

① select 'stop' option on inverter screen or monitoring app to shut down inverter.

② Turn off the AC breaker on utility grid side.

③ Turn off inverter DC switch.

④ Turn off the battery switch, and disconnect the DC breaker on the battery side (if any).

⑤ Wait for 10 minutes to ensure the energy of capacitor is fully dissipated.

⑥ Confirm all the indicator lights are off.

CAUTION

Keep unprofessional person away.

A temporary alarm sign or barrier must be posted to keep unprofessional person away while performing electrical connection and maintenance.

NOTICE

Any Arbitrary replacement of internal components is forbidden.

Please seek help from HANCHU ESS for maintenance support. Otherwise, we will not take any responsibility.

NOTE

Please remember not to do the self-maintenance before being familiar with the proper instruction of the whole process.

Items	Methods	Period
System clean	Check dust or foreign matter on the heat-sink, air inlet and outlet.	Once 6-12 months
Electrical connection	Check whether the cables are in good connection.	Once 6-12 months
Sealing	Check whether all the terminals and ports are properly sealed. Reseal the cable hole if it is aging or not sealed.	Once a year

10.3 Battery Maintenance

Installation and maintenance of batteries should be performed or supervised with professional knowledge about batteries.

Please contact your battery supplier for detailed installation and maintenance information.

CAUTION	Do not dispose battery in fire, or it may explode. Do not dismantle or break the battery. The electrolyte inside would be harmful to your body.

CAUTION	The battery has risk of electrical shock, the following scenario should be noticed during the operation. a) Remove metal items from your body. b) Use insulated tools. c) Remove metal items from battery. d) Turn off the DC breaker of the battery before assembling or disassembling battery terminals. f) There is a risk of electrical shock if battery is unexpectedly grounded. Remove the grounding cable to avoid the electrical shock.

11 Appendix

11.1 Technical Parameters

Model	CESS-HY-25K	CESS-HY-30K
PV Input		
Start-up voltage (V)	135	135
Max. DC input voltage (V)*	1000*	1000*
Rated DC input voltage (V)	620	620
MPPT voltage range (V)*	200-850*	200-850*
No. of MPP trackers	4	4
No. of DC inputs per MPPT	2	2
Max. input current (A)	30*4	30*4
Max. short-circuit current (A)	40*4	40*4
Backfeed current to the array (A)	0	0
Battery Side		
Battery type	Lithium Battery (with BMS)	
Battery communication mode	CAN	CAN
Battery voltage range (V)	135-750	135-750
Maximum charging current (A)	100	100
Maximum discharge current (A)	100	100
Grid Side		
Rated output power (kW)	25.0	30.0
Max. output power (kW)	27.5	33.0/30.0 ①
Rated output apparent power (kVA)	25.0	30.0
Max. output apparent power (kVA)	27.5	33.0/30.0 ②
Max. input apparent power (kVA)	30.0	36.0
Max. charging power of battery (kW)	25.0	30.0
Rated AC voltage (V)	3L/N/PE, 220/380V; 230/400V; 240/415V	
Rated AC frequency (Hz)	50/60	50/60
Rated output current (A)	38.0	43.5

Model	CESS-HY-25K	CESS-HY-30K
Grid Side		
Max. output current (A)	42.0	50.0/43.5 ③
Max. input current (A)	43.5	52.2
Power factor	0.8 leading …0.8 lagging	
Max. total harmonic distortion	<3% @Rated output power	
DCI	<0.5%In	<0.5%In
Back-up Side		
Rated output power (kW)	25.0	30.0
Max. output power (kW)	27.5	33.0
Rated output apparent power (kVA)	25.0	30.0
Max. output apparent power (kVA)	27.5	33.0
Rated output current (A)	38.0	43.5
Max. output current (A)	42.0	50.0
UPS switching time	<20ms	<20ms
Rated output voltage (V)	3/N/PE, 220/380V; 230/400V; 240/415V	
Rated output frequency (Hz)	50/60	50/60
Peak output apparent power (kVA)	30, 60s	36, 60s
Voltage harmonic distortion	<3% @Linear load	
Generator Side		
Max. input apparent power (kVA)	30.0	36.0
Max. charging power of battery (kW)	25.0	30.0
Rated AC voltage (V)	3L/N/PE, 220/380V; 230/400V; 240/415V	
Rated AC frequency (Hz)	50/60	50/60
Max. input current (A)	43.5	52.2
Efficiency		
Max. efficiency	98.8%	98.8%
European efficiency	98.3%	98.3%
Protection		
DC reverse polarity protection	Integrated	

Model	CESS-HY-25K	CESS-HY-30K
Protection		
Battery input reverse connection protection	Integrated	
Insulation resistance protection	Integrated	
Surge protection	Integrated	
Over-temperature protection	Integrated	
Residual current protection	Integrated	
Islanding protection	Integrated (Frequency shift)	
AC over-voltage protection	Integrated	
Overload protection	Integrated	
AC short-circuit protection	Integrated	
General Data		
Over voltage category	PV: II ; Main: III	
Dimensions (mm)	800*620*300 (W*H*D)	
Weight (KG)	72	72
Protection degree	IP65	IP65
Standby self-consumption (W)	<15	<15
Topology	Transformerless	
Operating Temperature Range (℃)	-30~60	-30~60
Relative Humidity (%)	0~100	0~100
Operating Altitude (m)	3000 (>3000m derating)	
Cooling	Smart fan	
Noise Level (dB)	<50	<50
Display	OLED & LED	
Communication	CAN, RS485, WiFi/LAN (Optional)	

Model	CESS-HY-36K	CESS-HY-40K
PV Input		
Start-up voltage (V)	135	135
Max. DC input voltage (V)*	1000*	1000*
Rated DC input voltage (V)	620	620
MPPT voltage range (V)*	200-850*	200-850*
No. of MPP trackers	4	4
No. of DC inputs per MPPT	2	2
Max. input current (A)	30*4	30*4
Max. short-circuit current (A)	40*4	40*4
Backfeed current to the array (A)	0	0
Battery Side		
Battery type	Lithium Battery (with BMS)	
Battery communication mode	CAN	CAN
Battery voltage range (V)	135-750	135-750
Maximum charging current (A)	100	100
Maximum discharge current (A)	100	100
Grid Side		
Rated output power (kW)	36.0	40.0
Max. output power (kW)	39.6	44.0
Rated output apparent power (kVA)	36.0	40.0
Max. output apparent power (kVA)	39.6	44.0
Max. input apparent power (kVA)	43.5	48.0
Max. charging power of battery (kW)	36.0	40.0
Rated AC voltage (V)	3L/N/PE, 220/380V; 230/400V; 240/415V	
Rated AC frequency (Hz)	50/60	50/60
Rated output current (A)	52.0	60.0
Max. output current (A)	60.0	66.0
Max. input current (A)	63.0	69.6
Power factor	0.8 leading …0.8 lagging	

Model	CESS-HY-36K	CESS-HY-40K
Grid Side		
Max. total harmonic distortion	<3% @Rated output power	
DCI	<0.5%In	<0.5%In
Back-up Side		
Rated output power (kW)	36.0	40.0
Max. output power (kW)	39.6	44.0
Rated output apparent power (kVA)	36.0	40.0
Max. output apparent power (kVA)	39.6	44.0
Rated output current (A)	52.0	60.0
Max. output current (A)	60.0	66.0
UPS switching time	<20ms	<20ms
Rated output voltage (V)	3/N/PE, 220/380V; 230/400V; 240/415V	
Rated output frequency (Hz)	50/60	50/60
Peak output apparent power (kVA)	43.5, 60s	48, 60s
Voltage harmonic distortion	<3% @Linear load	
Generator Side		
Max. input apparent power (kVA)	43.5	48.0
Max. charging power of battery (kW)	36.0	40.0
Rated AC voltage (V)	3L/N/PE, 220/380V; 230/400V; 240/415V	
Rated AC frequency (Hz)	50/60	50/60
Max. input current (A)	63.0	69.6
Efficiency		
Max. efficiency	98.8%	98.8%
European efficiency	98.3%	98.3%
Protection		
DC reverse polarity protection	Integrated	
Battery input reverse connection protection	Integrated	
Insulation resistance protection	Integrated	
Surge protection	Integrated	

Model	CESS-HY-36K	CESS-HY-40K
Protection		
Over-temperature protection	Integrated	
Residual current protection	Integrated	
Islanding protection	Integrated (Frequency shift)	
AC over-voltage protection	Integrated	
Overload protection	Integrated	
AC short-circuit protection	Integrated	
General Data		
Over voltage category	PV: II ; Main: III	
Dimensions (mm)	800*620*300 (W*H*D)	
Weight (KG)	72	72
Protection degree	IP65	IP65
Standby self-consumption (W)	<15	<15
Topology	Transformerless	
Operating Temperature Range (℃)	-30~60	-30~60
Relative Humidity (%)	0~100	0~100
Operating Altitude (m)	3000 (>3000m derating)	
Cooling	Smart fan	
Noise Level (dB)	<50	<50
Display	OLED & LED	

Model	CESS-HY-50K	CESS-HY-40K-P	CESS-HY-50K-P
PV Input			
Start-up voltage (V)	135	135	135
Max. DC input voltage (V)*	1000*	1000*	1000*
Rated DC input voltage (V)	620	620	620
MPPT voltage range (V)*	200-850*	200-850*	200-850*
No. of MPP trackers	4	2	2
No. of DC inputs per MPPT	2	3	3
Max. input current (A)	30*4	60*2	60*2
Max. short-circuit current (A)	40*4	80*2	80*2
Backfeed current to the array (A)	0	0	**0**
Battery Side			
Battery type	Lithium Battery (with BMS)		
Battery communication mode	CAN	CAN	CAN
Battery voltage range (V)	135-750	135-750	135-750
Maximum charging current (A)	100	100	100
Maximum discharge current (A)	100	100	100
Grid Side			
Rated output power (kW)	50.0	40.0	50.0
Max. output power (kW)	55.0	44.0	55.0
Rated output apparent power (kVA)	50.0	40.0	50.0
Max. output apparent power (kVA)	55.0	44.0	55.0
Max. input apparent power (kVA)	60.0	48.0	60.0
Max. charging power of battery (kW)	50.0	40.0	50.0
Rated AC voltage (V)	3L/N/PE, 220/380V; 230/400V; 240/415V		
Rated AC frequency (Hz)	50/60	50/60	50/60
Rated output current (A)	75.0	60.0	75.0
Max. output current (A)	83.0	66.0	83.0
Max. input current (A)	87.0	69.6	87.0
Power factor	0.8 leading …0.8 lagging		

Model	CESS-HY-50K	CESS-HY-40K-P	CESS-HY-50K-P
Grid Side			
Max. total harmonic distortion	<3% @Rated output power		
DCI	<0.5%In	<0.5%In	<0.5%In
Back-up Side			
Rated output power (kW)	50.0	40.0	50.0
Max. output power (kW)	55.0	44.0	55.0
Rated output apparent power (kVA)	50.0	40.0	50.0
Max. output apparent power (kVA)	55.0	44.0	55.0
Rated output current (A)	75.0	60.0	75.0
Max. output current (A)	83.0	66.0	83.0
UPS switching time	<20ms	<20ms	<20ms
Rated output voltage (V)	3/N/PE, 220/380V; 230/400V; 240/415V		
Rated output frequency (Hz)	50/60	50/60	50/60
Peak output apparent power (kVA)	60, 60s	48, 60s	60, 60s
Voltage harmonic distortion	<3% @Linear load		
Generator Side			
Max. input apparent power (kVA)	60.0	48.0	60.0
Max. charging power of battery (kW)	50.0	40.0	50.0
Rated AC voltage (V)	3L/N/PE, 220/380V; 230/400V; 240/415V		
Rated AC frequency (Hz)	50/60	50/60	50/60
Max. input current (A)	87.0	69.6	87.0
Efficiency			
Max. efficiency	98.8%	98.8%	98.8%
European efficiency	98.3%	98.3%	98.3%
Protection			
DC reverse polarity protection	Integrated		
Battery input reverse connection protection	Integrated		
Insulation resistance protection	Integrated		
Surge protection	Integrated		

Model	CESS-HY-50K	CESS-HY-40K-P	CESS-HY-50K-P
Protection			
Over-temperature protection	Integrated		
Residual current protection	Integrated		
Islanding protection	Integrated (Frequency shift)		
AC over-voltage protection	Integrated		
Overload protection	Integrated		
AC short-circuit protection	Integrated		
General Data			
Over voltage category	PV: II; Main: III		
Dimensions (mm)	800*620*300 (W*H*D)		
Weight (KG)	72	72	72
Protection degree	IP65	IP65	IP65
Standby self-consumption (W)	<15	<15	<15
Topology	Transformerless		
Operating Temperature Range (℃)	-30~60	-30~60	-30~60
Relative Humidity (%)	0~100	0~100	0~100
Operating Altitude (m)	3000 (>3000m derating)		
Cooling	Smart fan		
Noise Level (dB)	<50	<50	<50
Display	OLED & LED		
Communication	CAN, RS485, WiFi/LAN (Optional)		

① AS 4777.2&VDE-AR-N 4105: 30.0kW
② AS 4777.2&VDE-AR-N 4105: 30.0kVA
③ AS 4777.2&VDE-AR-N 4105: 43.5A
*PV Max. Input voltage is 850V, otherwise inverter will be waiting.

11.2 Single inverter with diesel generator system

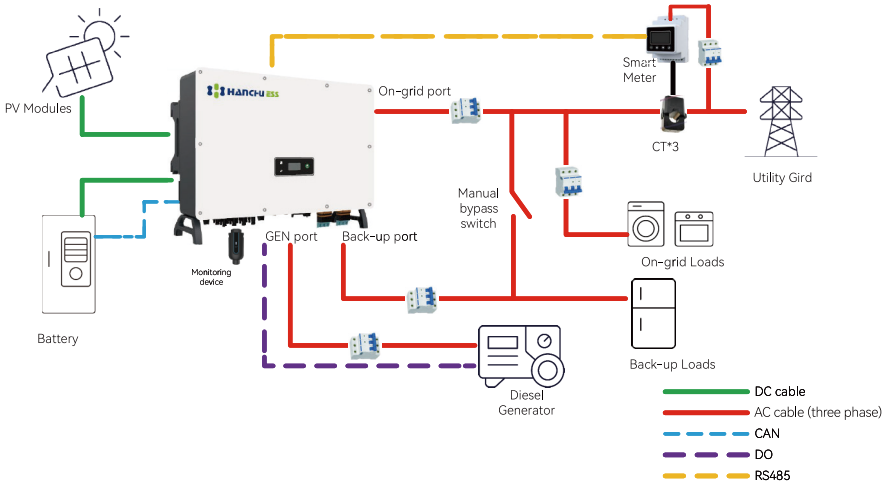


Figure 11-1 System diagram

Notice:

① This solution is suitable for single inverter and is not suitable for parallel systems. Dieselpowered is directly connected to the inverter Gen port.

② Diesel generator need to support the start&stop via the controls the start&stop of the DG via inverter COM3-7/8pin DO2 port.

③ Users can access manual bypass switch. In the event of an inverter failure, close the switch manually to power back-up loads.

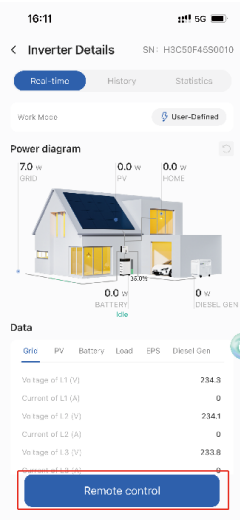
④ Do not close the manual bypass switch and the on-grid&back-up side breaker at the same time. Disconnect the on-grid&back-up side circuit breaker before closing the manual bypass switch. Close the on-grid&back-up side circuit breaker and disconnect the manual bypass switch first.

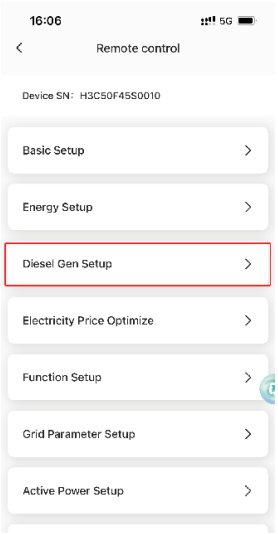
Operation step:

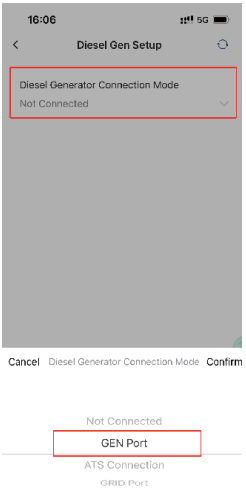
① Referring to the diagram above, complete the wiring.

② Create a power station and add equipment through the APP.

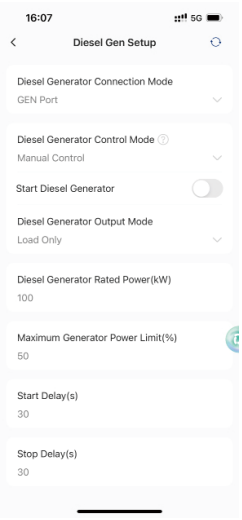
③ Enter the <Inverter Detail> interface. Click <Remote control>. Click < Diesel Gen Setup >. Select <GEN port > in <Diesel Generator Connection Mode > menu.

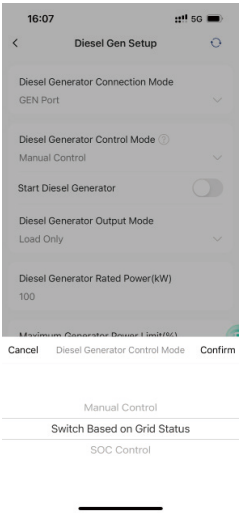


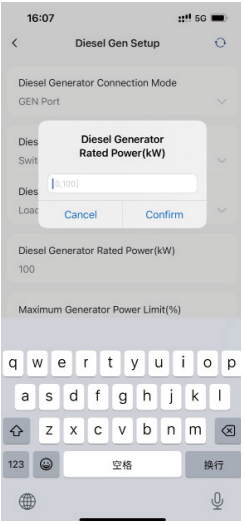




④ Enter< Diesel Gen Setup > interface to set <Diesel Generator Control Mode> and other parameters.







11.3 On-grid side parallel system

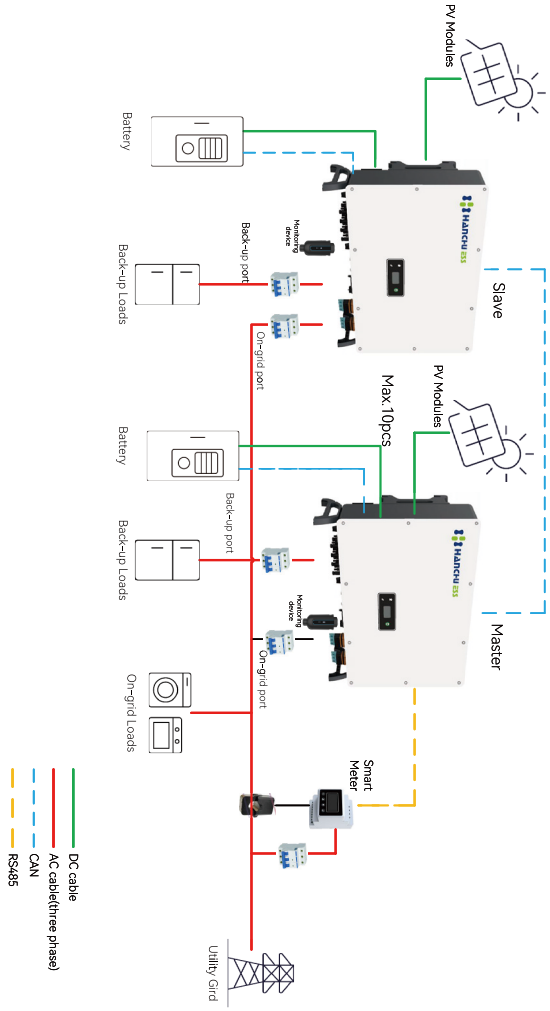


Figure 11-2 System diagram

WARNING

In the case of on-grid parallel connection, it is forbidden to connect the backup ports in parallel, otherwise the equipment failure caused by this is not covered by the warranty.

Notice:

① Up to 10 inverters on-grid side parallel is supported; The 25-50K series inverter can only be paralleled with the same model (the same rated power), and cannot be paralleled with different model(different rated power).

② It is recommended that PV and battery capacity connected with each inverter must be the same or close.

③ Parallel system is master and slave parallel. User need to set one of the inverters as the master and the other inverters as slaves through the screen or monitoring platform.

④ The master needs to communicate with the meter via RS485. Master and slave inverters communicate with each other via CAN. The communication port is COM2-pin17&18 (CANL_P&CANH_P).

⑤ Each inverter needs to be connected to a communication module.

⑥ In the parallel system, circuit breakers need to be installed on the on-grid/back-up AC output side and on-grid/back-up load side of the inverter.

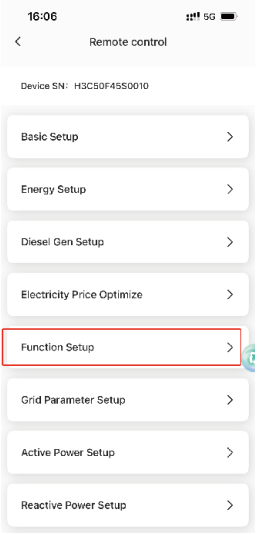
⑦ In the parallel system, the DIP switch of the parallel CAN termination resistor of the first and last inverters needs to be turned to "ON".

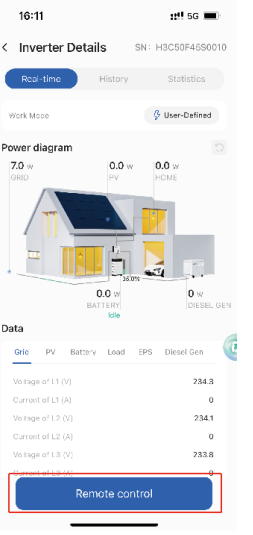
Operation step:

① Referring to the diagram above, complete the wiring.

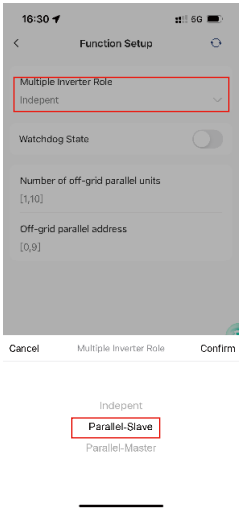
② Create a power station and add all inverters into power station through the APP.

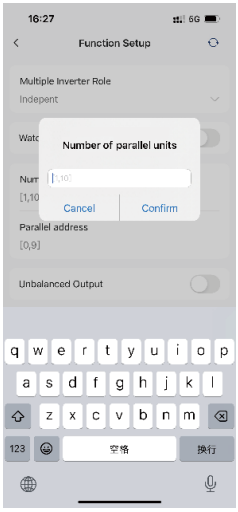
③ Designate an inverter as the master. Enter the <Inverter Detail> interface of the master. Click <Remote control>. Click <Function Setup >.

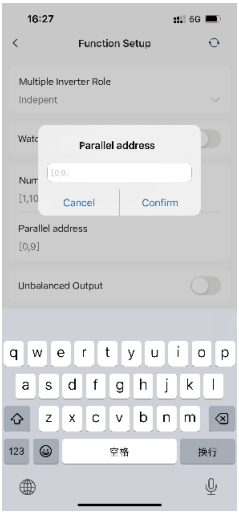




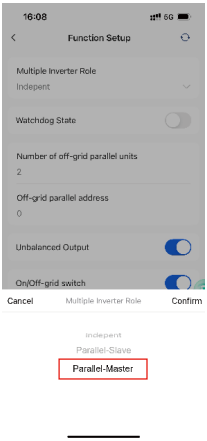
④ Select <Parallel-Master > under <Multi Inverter Role > menu. Set the number of parallel units by <Number of parallel units> (range: 1~10). Set parallel address to 0 by<Parallel address>

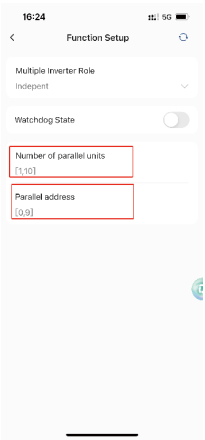






⑤ The rest of the inverters are slaves. Select <Parallel-Slave> under < Multi Inverter Role > menu. Set the number of parallel units by <Number of parallel units> (range: 1~10). Set the slave address (range:1~9) in <Parallel address> . Starting from 1 in order (1, 2, 3...) settings, do not skip the number setting, and do not set duplicate addresses.





11.4 Off-grid side parallel with diesel generator system

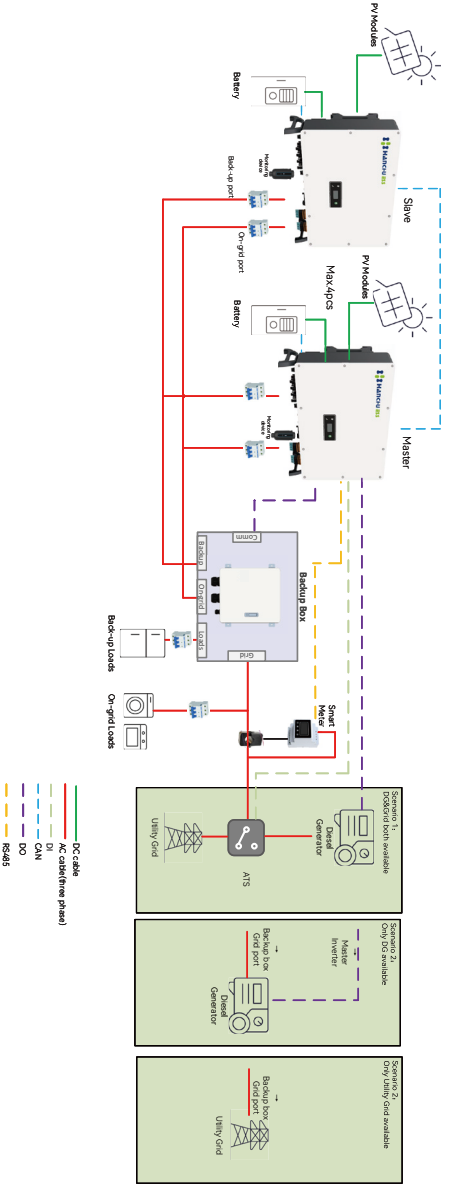


Figure 11-3 System diagram

Scenario 1: Utility grid&DG both available; connect DG via ATS
Scenario 2: Only DG available;DG connects grid port of backup box
Scenario 3: Only utility grid available.

NOTICE	The inverter software version must be higher than the following to support off-grid paralleling: ARM: 5.22, DSP: 5.45, INV-Logger-A210: 1.3.1 Please check the inverter software version before parallel operation.

Notice:

① Up to 4 inverters off-grid side parallel is supported; The 25-50K series inverter can only be paralleled with the same model (the same rated power), and cannot be paralleled with different model(different rated power).

② It is recommended that PV and battery capacity connected with each inverter must be the same or close.

③ Parallel system is master and slave parallel. User need to set one of the inverters as the master and the other inverters as slaves through the screen or monitoring platform.

④ The master needs to communicate with the meter via RS485. Master and slave inverters communicate with each other via CAN. The communication port is COM2-pin17&18 (CANL_P&CANH_P).

⑤ Each inverter needs to be connected to a communication module.

⑥ In the parallel system, circuit breakers need to be installed on the on-grid/back-up AC output side and on-grid/back-up load side of the inverter.

⑦ In the parallel system, the DIP switch of the parallel CAN termination resistor of the first and last inverters needs to be turned to "ON".

⑧ Diesel generator need to support the start&stop via the dry contact signal. DG communicates with the inverter through the inverter COM3-7/8pin DO2 port. The Grid Comm inverter controls the start&stop of the DG

⑨ Off-grid parallel requires access to the backup box . Backup box communicates with the inverter via the master COM3-11/12pin DO3 port. Please refer to the manual for the model selection and installation guidance of the backup box.

⑩ The external ATS shall have a normally open (NO) output signal circuit of backup power supply (diesel generator) auxiliary contact, which communicates with the inverter through the master COM2-15/16pin DI port.

Operation step:

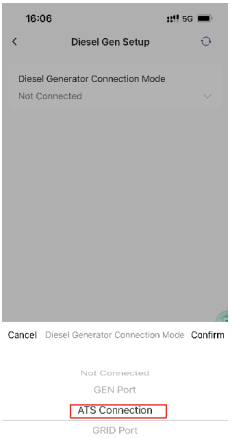
① Referring to the diagram above, complete the wiring.

② Create a power station and add all inverters into power station through the APP.

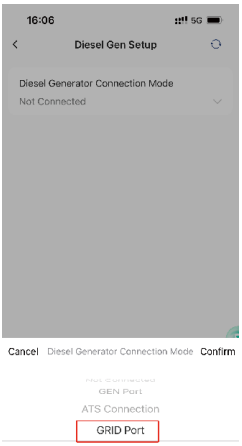
③ The configuration mode of master and slave is the same as that of the grid-connected side. Please refer to the "On-grid side parallel" section above.

④ Set the diesel generator access mode:

Scenario 1: Enter the <Inverter detail> page. Click <Remote control>. Click < the Diesel Gen Setup>. Select <ATS connection > under <Diesel Generator Connection Mode> menu .Please notice that set value of < Number of parallel units>should not exceed 4.

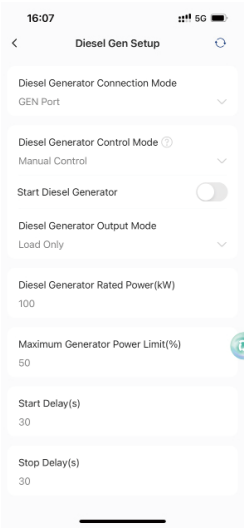


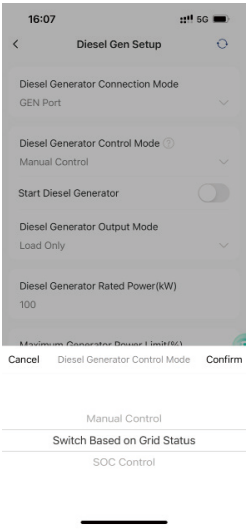
Scenario 2: Select <Grid port > under <Diesel Generator Connection Mode> menu.

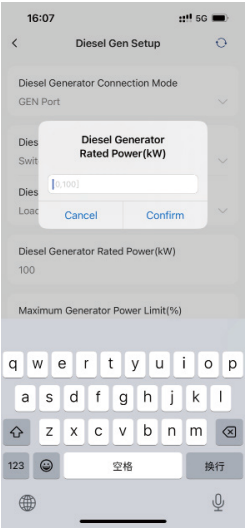


Scenario 3: No setup is required.

⑤ Enter< Diesel Gen Setup > interface to set <Diesel Generator Control Mode> and other parameters.







11.4 Contact Information

Should you have any question about this product, please contact us.

We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device
- Date of the device
- Fault code/name
- Brief description of the problem

China (HQ)

Jiangsu Hanchu Energy Technology Co., Ltd

Address: No.9,Huicheng Road,Huishan District ,Wuxi City,Jiangsu Province,China

Website: www.hanchuess.com

Service Mail: service@hanchuess.com

HANCHU ESS

www.hanchuess.com

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