



NANUK SE 12/15/20/25/30 KHB
Energy Storage Hybrid Inverter
Installation Manual Ver 1.0

For the latest Nanuk SE installation documents in all supported languages, visit:

<https://iglutech.eu/en/>

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

This manual contains important instructions for the Nanuk SE hybrid inverter that must be followed during installation and maintenance of the system.

Installation and service require knowledge of high voltage electricity and should only be performed by IGLU TECH Certified Installers. IGLU TECH assumes no liability for injury or property damage due to repairs attempted by unqualified individuals or a failure to properly follow these instructions. These warnings and cautions must be followed when using Nanuk SE energy storage hybrid inverter.

PRODUCT SPECIFICATIONS

All specifications and descriptions contained in this document are verified to be accurate at the time of printing. However, because continuous improvement is a goal at IGLU TECH, we reserve the right to make product modifications at any time.

The images provided in this document are for demonstration purposes only. Depending on the product version and market region, details may appear slightly different.

ERRORS OR OMISSIONS

To communicate any inaccuracies or omissions in this manual, please send an email to:

info@iglutech.eu



ELECTRONIC DEVICE: DO NOT THROW AWAY

Proper disposal of inverter is required. Refer to your local regulations for disposal requirements.

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ABOUT THIS MANUAL

This manual describes the installation, electrical connection, commissioning and maintenance of the NANUK SE three-phase energy storage hybrid inverter. Please first read the manual and related documents carefully before using the product and store it in a place where installation, operation and maintenance personnel can access it at any time. The illustration in this user manual is for reference only. This user manual is subject to change without prior notice. (Specific please in kind prevail.)

TARGET GROUP

Nanuk Se three-phase energy storage hybrid inverters must be installed by professional electrical engineers who have obtained relevant qualifications.

SCOPE

This manual is applicable to the following inverters:

- Nanuk SE 12KHB-D3
- Nanuk SE 15KHB-D3
- Nanuk SE 20KHB-D3
- Nanuk SE 25KHB-T3
- Nanuk SE 30KHB-T3

CONVENTIONS

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



DANGER: Indicates an imminently hazardous situation which, if not correctly followed, will result in serious injury or death.



WARNING: Indicates a potentially hazardous situation which, if not correctly followed, will result in serious injury or death.



CAUTION: Indicates a potentially hazardous situation which, if not correctly followed, could result in moderate or minor injury.



NOTICE: Indicates a potentially hazardous situation which, if not correctly followed, could result in equipment failure to run, or property damage.



NOTE: Call attention to important information, best practices and tips: supplement additional safety instructions for your better use of the three-phase ESS inverter to reduce the waste of your resources.

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1. Safety

Warning

Before using the Nanuk SE hybrid inverter, please read all instructions and cautionary markings on the unit and manual. Put the instructions where you can take them easily. The three-phase Nanuk SE inverter of IGLU TECH strictly conforms to related safety rules in design and test. Local safety regulations shall be followed during installation, operation and maintenance. Incorrect operation work may cause injury or death to the operator or a third party and damage to the inverter and other properties belonging to the operator or a third party.

1.1 Symbols Used



DANGER OF HIGH VOLTAGE: Only qualified personnel may perform work on the inverter.



CAUTION, RISK OF ELECTRIC SHOCK, ENERGY STORAGE TIMED DISCHARGE: Residual voltage exists after the inverter is powered off. It takes 10 minutes for system to discharge to a safe voltage.



DANGER OF HOT SURFACE



DO NOT DISCONNECT UNDER LOAD, otherwise there will be a danger of fire.



ENVIRONMENTAL PROTECTION USE PERIOD



REFER TO OPERATING INSTRUCTIONS: Indicates that users should refer to operating or installation instructions before proceeding.



ELECTRONIC DEVICE: DO NOT THROW AWAY: Don't dispose of the inverter with the household waste



GROUNDING TERMINAL

1.2 Safety Precaution

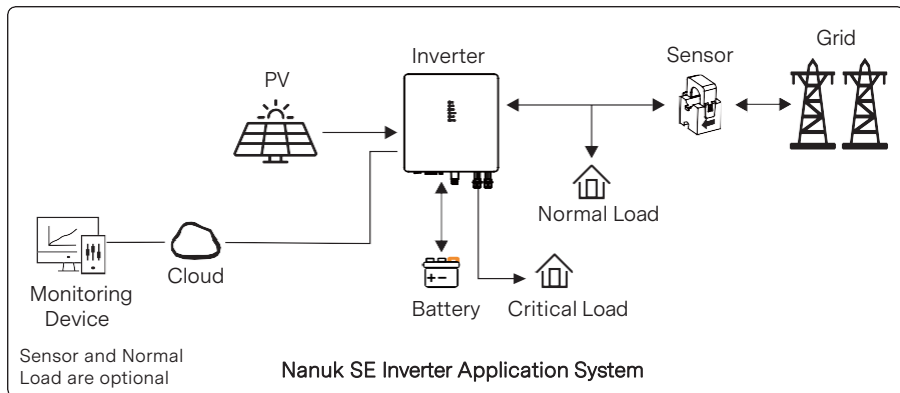
IGLU TECH products are designed with full consideration of safety. However, all electrical appliances can be dangerous if used inappropriately. This can cause a fire or electric shock that leads to severe injury or death. For your protection, please read these safety precautions thoroughly.

-  **WARNING:** Installation, maintenance and connection of inverters must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and requirements of local power authorities and/or companies.
-  **WARNING:** To avoid electric shock, DC input and AC output of the inverter must be terminated at least 10 minutes before performing any installation or maintenance.
-  **WARNING:** The temperature of some parts of the inverter may exceed 60°C during operation. Do not touch the inverter during operation to avoid being burnt.
-  **WARNING:** Ensure children are kept away from inverters.
-  **WARNING:** Don't open the front cover of the inverter. Apart from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.
-  **WARNING:** Static electricity may damage electronic components. Appropriate methods must be adopted to prevent such damage to the inverter; otherwise, the inverter may be damaged and the warranty annulled.
-  **WARNING:** Ensure the output voltage of the proposed PV array is lower than the maximum rated input voltage of the inverter; otherwise, the inverter may be damaged and the warranty annulled.
-  **WARNING:** 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.
-  **WARNING:** PV modules should have an IEC61730 class A rating.
-  **WARNING:** If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
-  **WARNING:** Completely isolate the inverter before maintaining. Completely isolate the inverter should: turn off the PV switch and disconnect the PV terminal, battery terminal, and AC terminal.
-  **WARNING:** After the inverter is powered off, the remaining electricity and heat may still cause electric shock and body burns. Do not touch parts of inverter for 10 minutes after disconnecting from the power sources.
-  **WARNING:** Prohibit inserting or pulling the AC and DC terminals when the inverter is running.
-  **WARNING:** Don't connect NANUK SE inverter in the following ways: The BACKUP Port should not be connected to the grid; More than two inverters share a single PV panel string.
-  **WARNING:** Never touch BACK-UP port when the inverter is powered on since there is AC output. Power off the inverter first if maintenance is required for the loads connected with BACK-UP ports. Otherwise, electric shock may occur.

2. Product Introduction

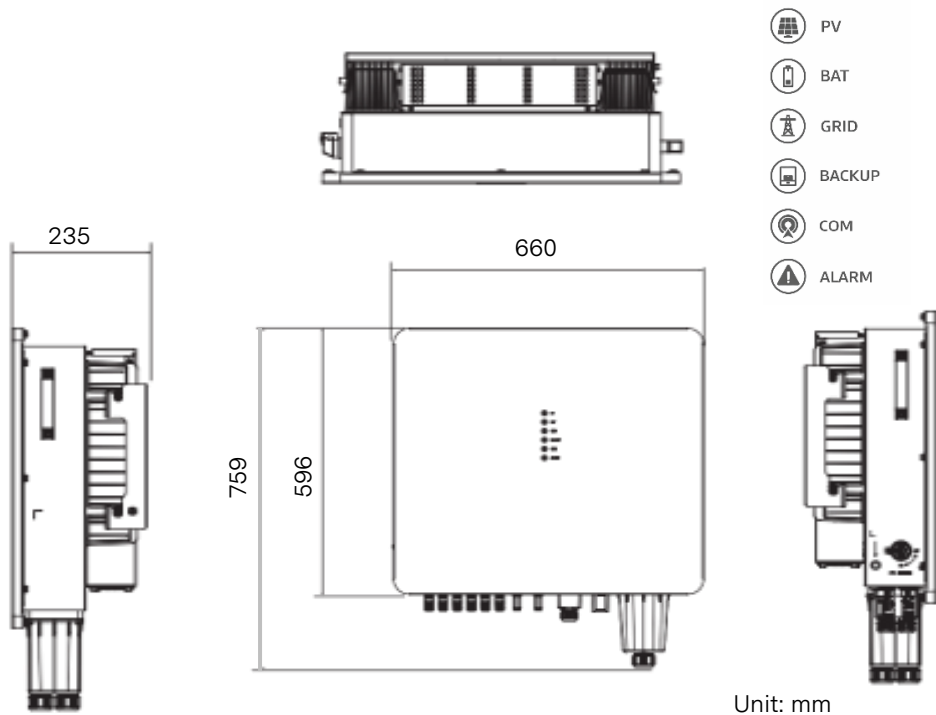
2.1 Overview

NANUK SE Hybrid Inverter optimizes self-consumption, stores excess PV energy in a battery, or feeds it into the public grid. It also provides emergency backup power during grid outages. Its working mode depends on PV energy and user's preference.

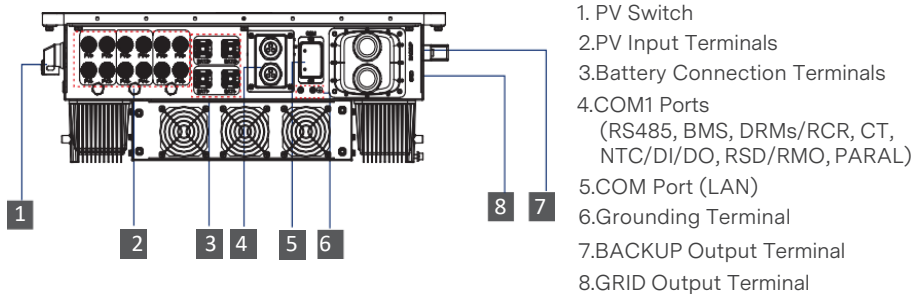


2.2. Product Appearance

The External View of Nanuk SE 12/15/20/25/30KHB Hybrid Inverter



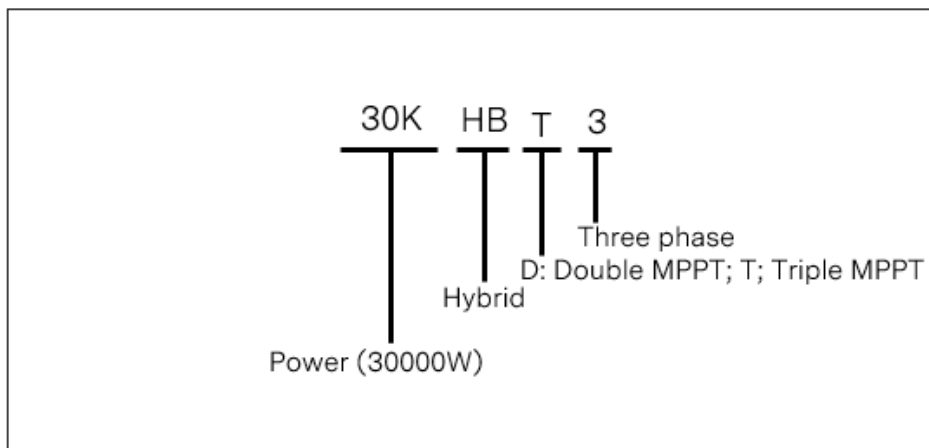
Width (mm)	Height (mm)	Depth (mm)
660.0	596.0	235.0



The bottom view of Nanuk SE inverter

2.3 Model Definition

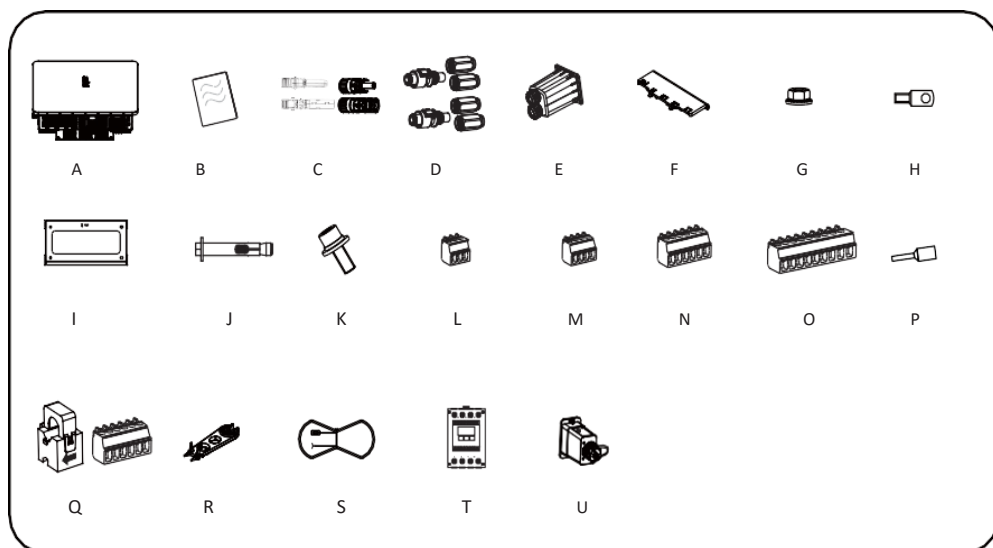
The letters in the product model indicate the power of the inverter.



3. Installation

3.1 Packing List

After unpacking, please check the following packing list carefully for any damage or missing parts. If any damage or missing parts occur, contact your supplier or IGLU TECH for support.

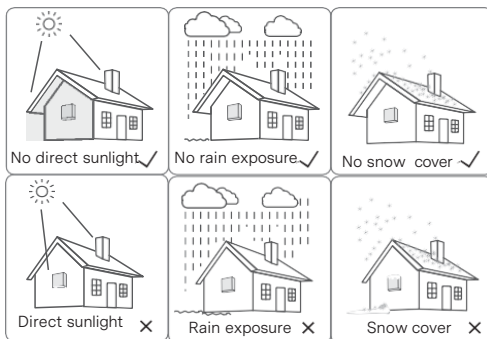


Number	Quantity	Description
A	1	Inverter
B	1	File package
C	4/6	PV connector group (female + male connector of PV input wire)
D	1/2	Battery connector group (positive + negative terminal of battery cable)
E	1	AC waterproof cover
F	1	Insulation board for AC terminal
G	11	M5 Screw cap (for AC cable locking)
H	11	OT terminal
I	1	Mounting bracket
J	4	M10 Expansion bolt
K	1	M6 Security screw
L	1	3-Pin terminal
M	3	4-Pin terminal
N	1	6-Pin terminal
O	1	9-Pin terminal
P	25	Pin terminal
Q	1	CT pack (3 pcs CT + 1 pc 6-pin terminal)
R	1	Tightening/Removal tool for PV connector
S	1	Battery temperature sensor (NTC optional)
T	1	Meter (Optional)
U	1	LAN module (optional)

3.2 Selecting the Mounting Location

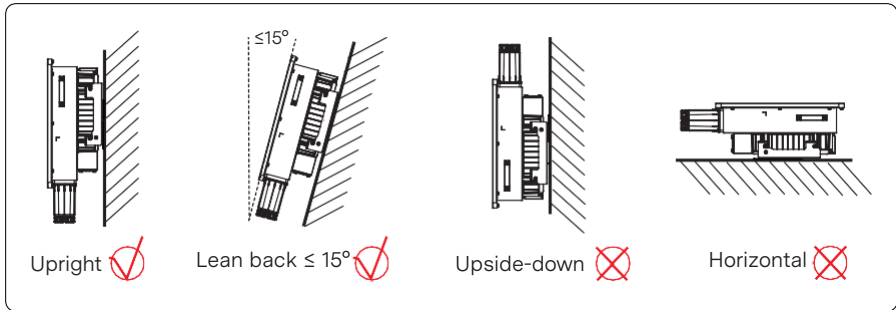
3.2.1 Installation Environment Requirements

- The storage inverter protection class is IP66 and can be mounted indoors or outdoors.
- To ensure optimum operation and long service life, the ambient temperature should be -25°C to 60°C.
- Do not install the inverter in a rest area since it will cause noise during operation.
- The inverter carrier must be fire-proof. Do not mount the inverter on flammable building materials.
- Ensure that the wall meets the requirements of the inverter installation.
- Product label and warning symbols shall be clear to read after installation.
- The installation height should be reasonable and make sure it is easy to operate and view the display.
- Please avoid direct sunlight, rain exposure, snow cover.



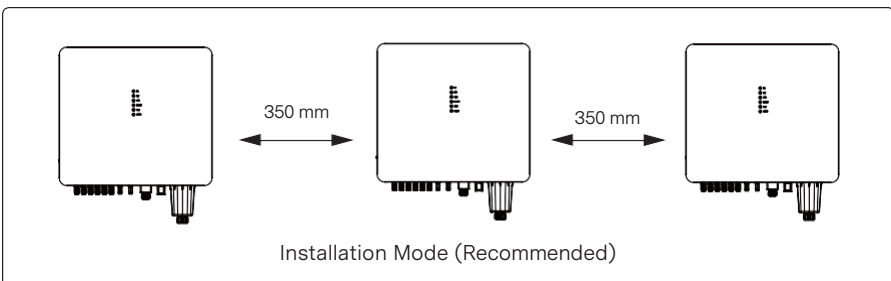
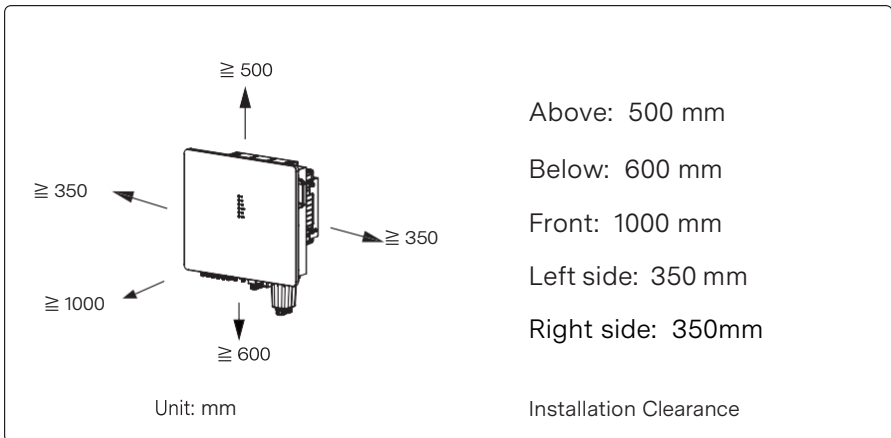
3.2.2 Mounting Requirements

Mount the inverter vertically or tilted backward by max 15°. Never install the inverter in the wrong way. Always make the connection area downward.



3.2.3 Installation Space Requirement

Follow the installation space requirements shown in the figures below to ensure the inverter can run normally and easily operate



3.3 Mounting

Before mounting the inverter, you must prepare the expansion screws and security screw.



Danger

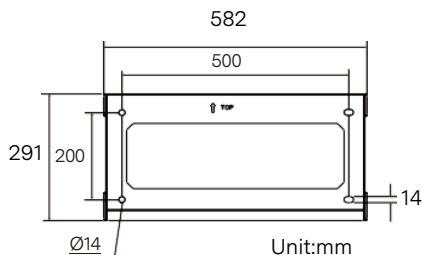
Before drilling holes, check whether there are electric power pipes or other pipes buried in the walls to avoid risks.



Caution

To prevent potential damages and injuries from inverter falling down, please well-mounted the inverter on the mounting bracket.

3.3.1 Mounting Bracket

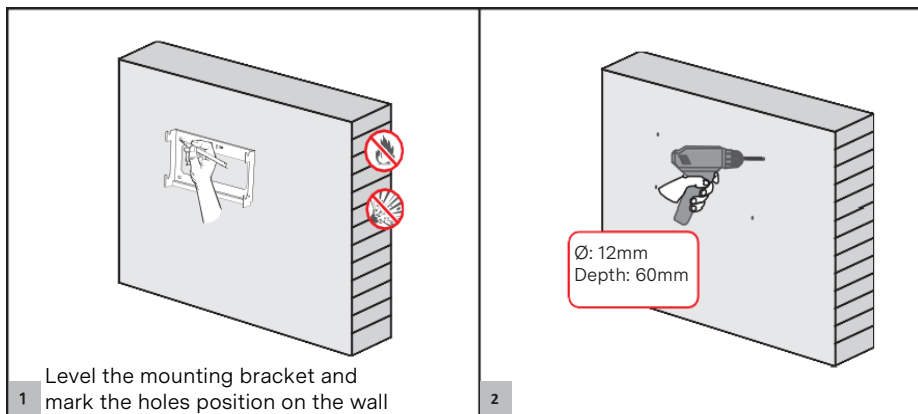


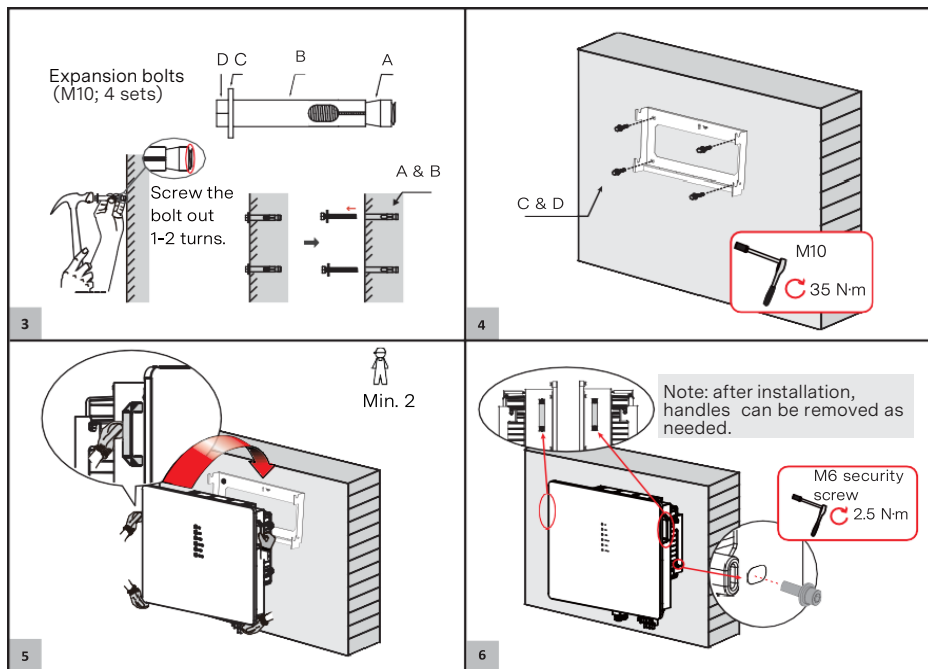
3.3.2 Wall-mounted Installation



Caution

The inverter is heavy! To avoid device damage and personnel injury, at least two people are recommended to move the inverter and handle with care.





4. Electrical Connection

This chapter shows the detailed electrical connection of the three-phase Nanuk SE inverter. The following illustrations are for reference only.

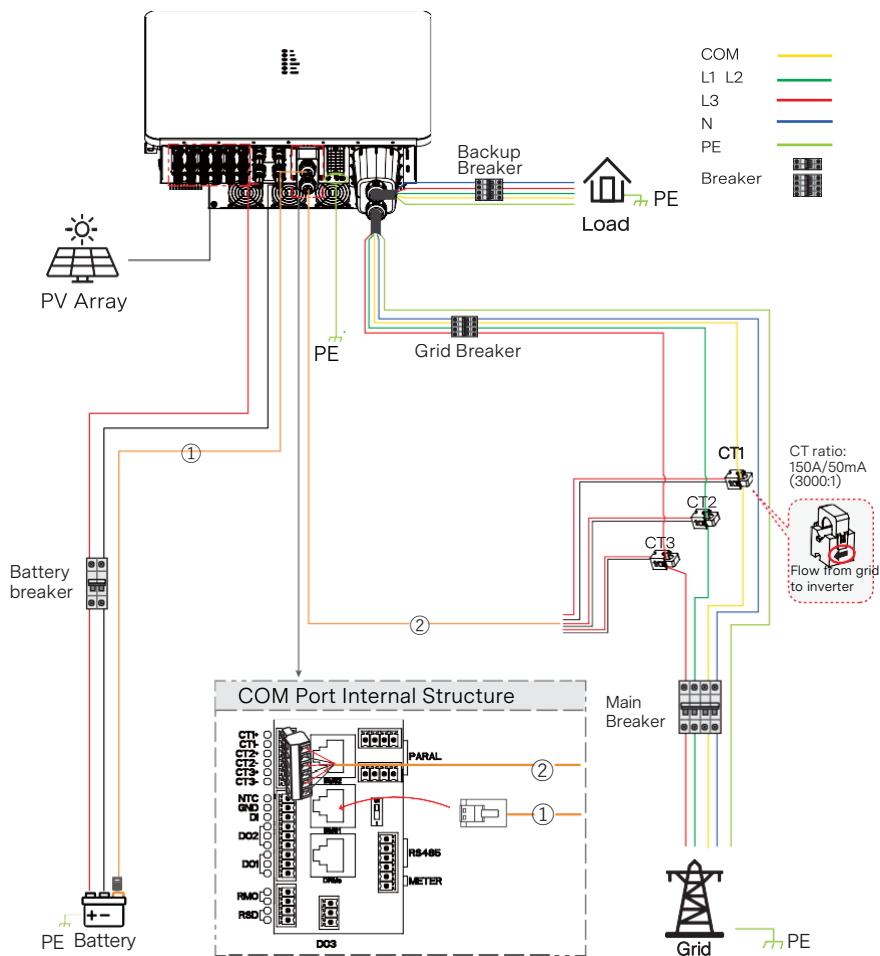


Danger

Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, high voltage may result in fatal injury.

Inverter system connection diagram:

Connection mode for whole-house load:



1. BMS communication cable
2. CT communication cable

NOTE:

1. BMS communication connection is only for lithium battery.
2. The external DC/AC breakers are not supplied with the inverter and must be purchased separately. For other breakers, please refer to the table below.

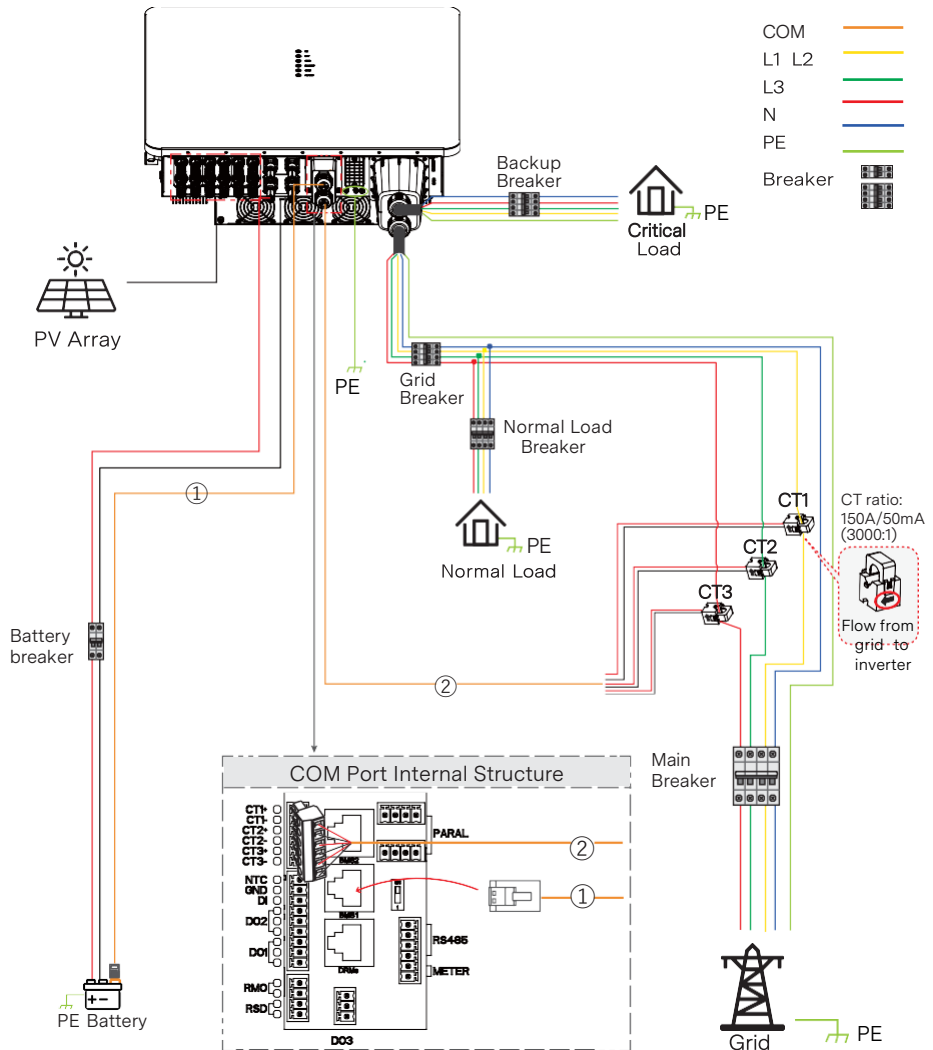
Breakers recommendation:

Inverter	Battery Breaker	Backup Breaker	Grid Breaker	Normal Load Breaker	Main Breaker
12K	≥ 80A	≥63 A	≥63 A	Depends on household loads	Depends on household loads
15K		≥63 A	≥63 A		
20K		≥63 A	≥63 A		
25K	≥ 160 A * 1 (Single battery connected to both BAT1 and BAT2);	≥80 A	≥80 A		
30K	≥ 80 A * 2 (Battery systems connected to BAT1 and BAT2 respectively).	≥80 A	≥80 A		

Non-parallel connection mode

Danger

Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, high voltage may result in fatal injury.



1. BMS communication cable
2. CT communication cable

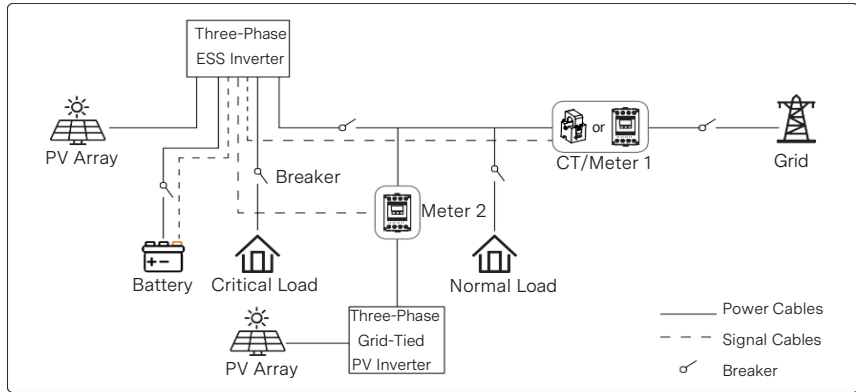
NOTE:

1. BMS communication connection is only for lithium battery.
2. The external DC/AC breakers are not supplied with the inverter and must be purchased separately. The specifications of main breaker and normal load breaker depend on household loads. For other breakers, please refer to the table below.

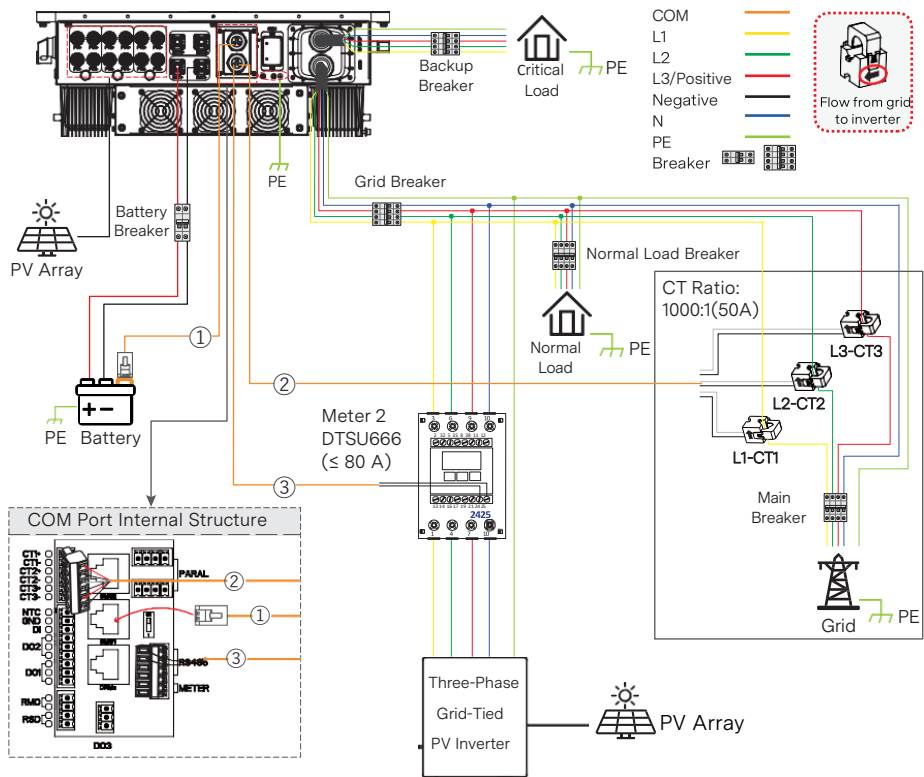
Breakers recommendation:

Inverter	Battery Breaker	Backup Breaker	Grid Breaker	Normal Load Breaker	Main Breaker
12K	≥ 80A	≥63 A	≥63 A	Depends on household loads	Depends on household loads
15K		≥63 A	≥63 A		
20K		≥63 A	≥63 A		
25K	≥ 160 A * 1 (Single battery connected to both BAT1 and BAT2);	≥80 A	≥80 A		
30K	≥ 80 A * 2 (Battery systems connected to BAT1 and BAT2 respectively).	≥80 A	≥80 A		

AC Coupling Connection Wiring Overview



AC Coupling Connection Wiring Diagram-Scheme 1 (CT+Meter)



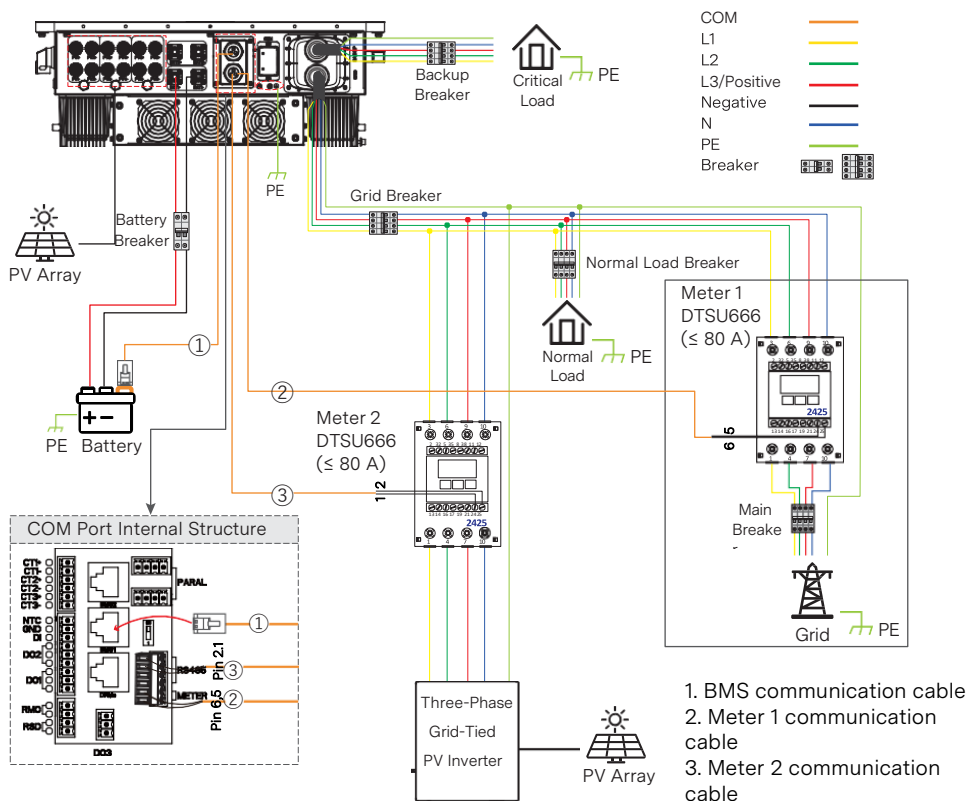
1. BMS communication cable
2. CT communication cable
3. Meter 2 communication cable

AC Coupling Connection Wiring Diagram-Scheme 2 (Meter 1 + Meter 2)



Danger

Ensure that inverter and all cables to be installed are completely powered off during whole installation and connection. Otherwise, high voltage may result in fatal injury.

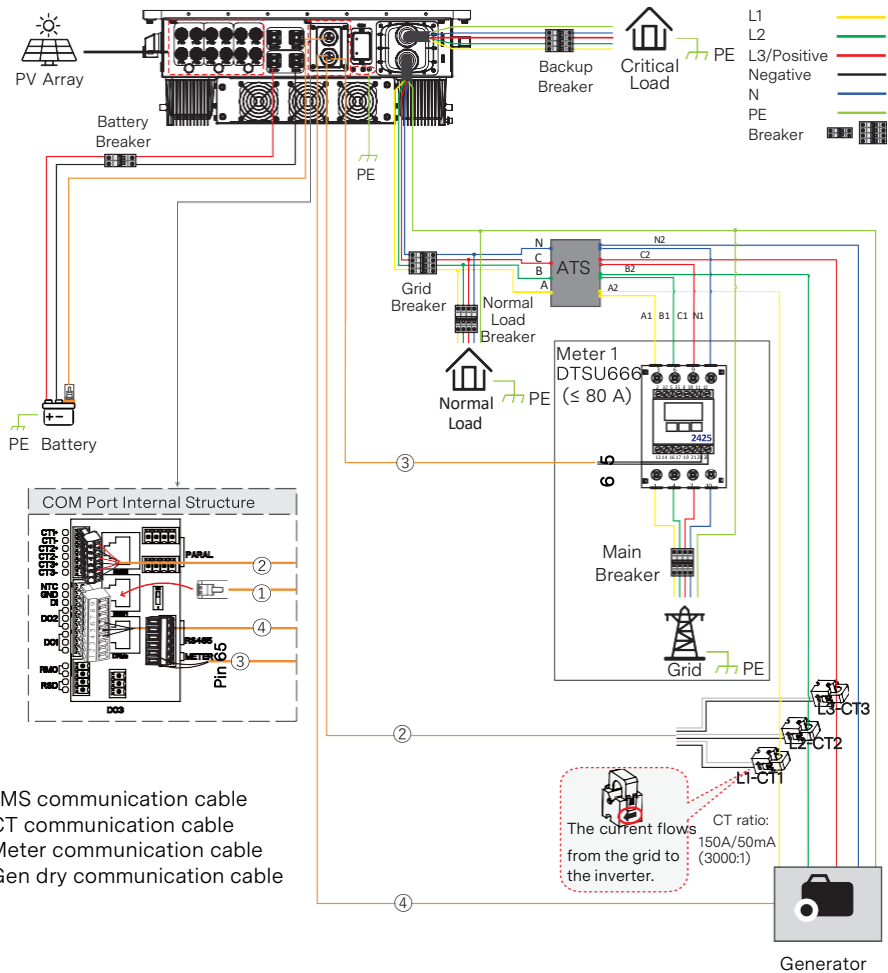


Note for Scheme 1 and Scheme 2:

1. BMS communication connection is only for lithium battery.
2. About breakers: DC breaker on battery side ≥ 80 A; AC breaker on critical load side ≥ 40 A; AC breaker on inverter side ≥ 40 A. The specifications of main breaker and normal load breaker depend on household loads.
3. Ensure that the Grid phase sequence of the Nanuk SE inverter and the Grid-Tied PV inverter are consistent, and the grid phases between the inverters must be connected correctly.
4. When connecting the meter, the phase of the meter must be consistent with that of the Nanuk Se inverter and Grid-Tied PV inverter.
5. Ensure that meter 1 and meter 2 are wired properly and correctly, otherwise unpredictable problems may occur.

6. When the current through the meter is excessive (≥ 80 A), pair the meter with a CT.
7. AC coupling function needs to be activated via APP. Go to **Console > Hybrid Setting > Other > AC coupling function**. For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”

Generator Connection Wiring Diagram



Note:

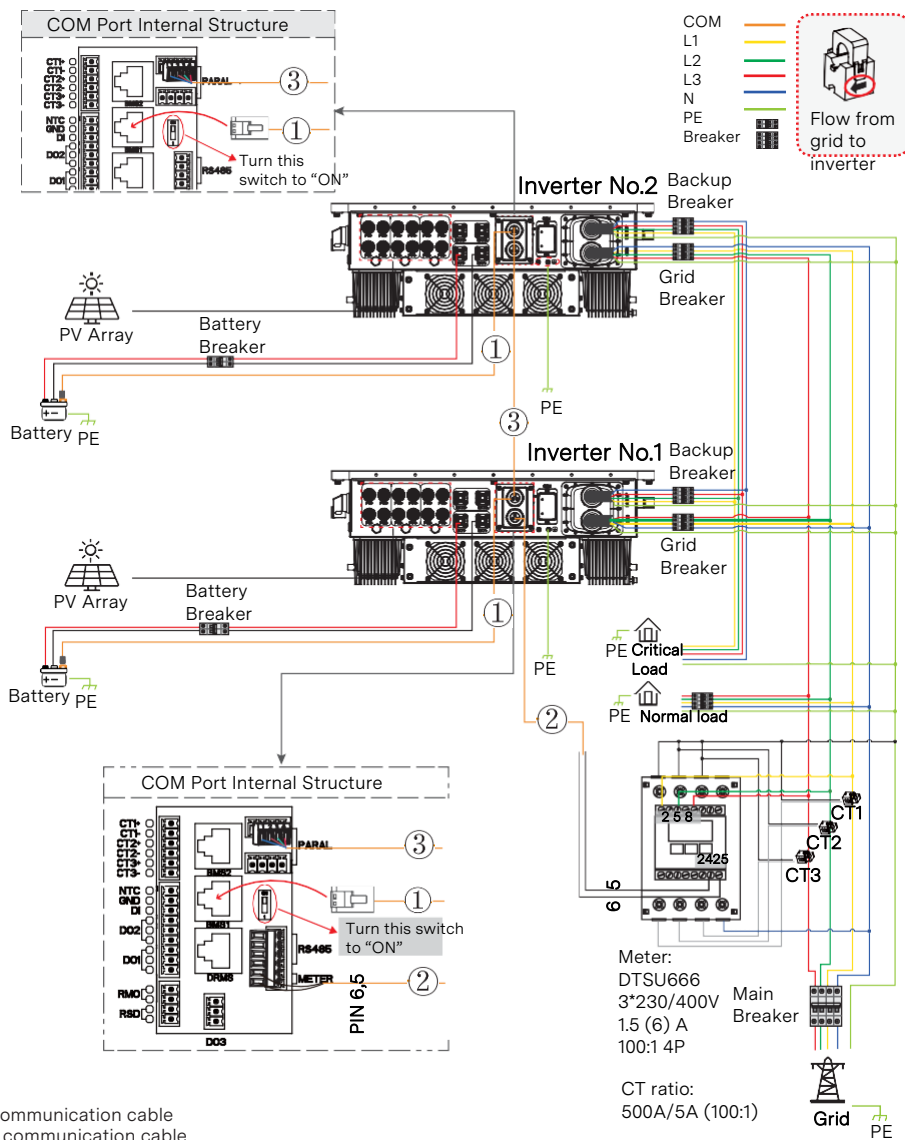
1. BMS communication connection is only for lithium battery.
2. About breakers: DC breaker on battery side ≥ 80 A; AC breaker on critical load side ≥ 40 A; AC breaker on inverter side ≥ 40 A. The specifications of main breaker and normal load breaker depend on household loads.
3. Connect the meter to the grid side and the CT to the generator side.
4. Ensure that meter and CT are wired properly and correctly, otherwise unpredictable problems may occur.
5. In GEN mode, generator energy will be the first consumed by load, the excess energy can be used to charge the battery when necessary. PV can only charge the battery, neither the battery nor the PV supplies power to the loads.
6. When switching the power source by ATS, the transfer time must be greater than 100 ms to prevent the risk of inverter damage.
7. GEN mode needs to be activated via APP. Go to *Console > Hybrid Setting > Gen (Grid)* page and then enable **Generator at Grid Port**. For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”

Parallel Connection Mode-Scheme A (N=2)



Danger

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



1.BMS communication cable

2.Meter communication cable

3.Parallel communication cable

*Meter communication cable can be connected to any inverter of the parallel system and this inverter will be inverter No.1.

Note:

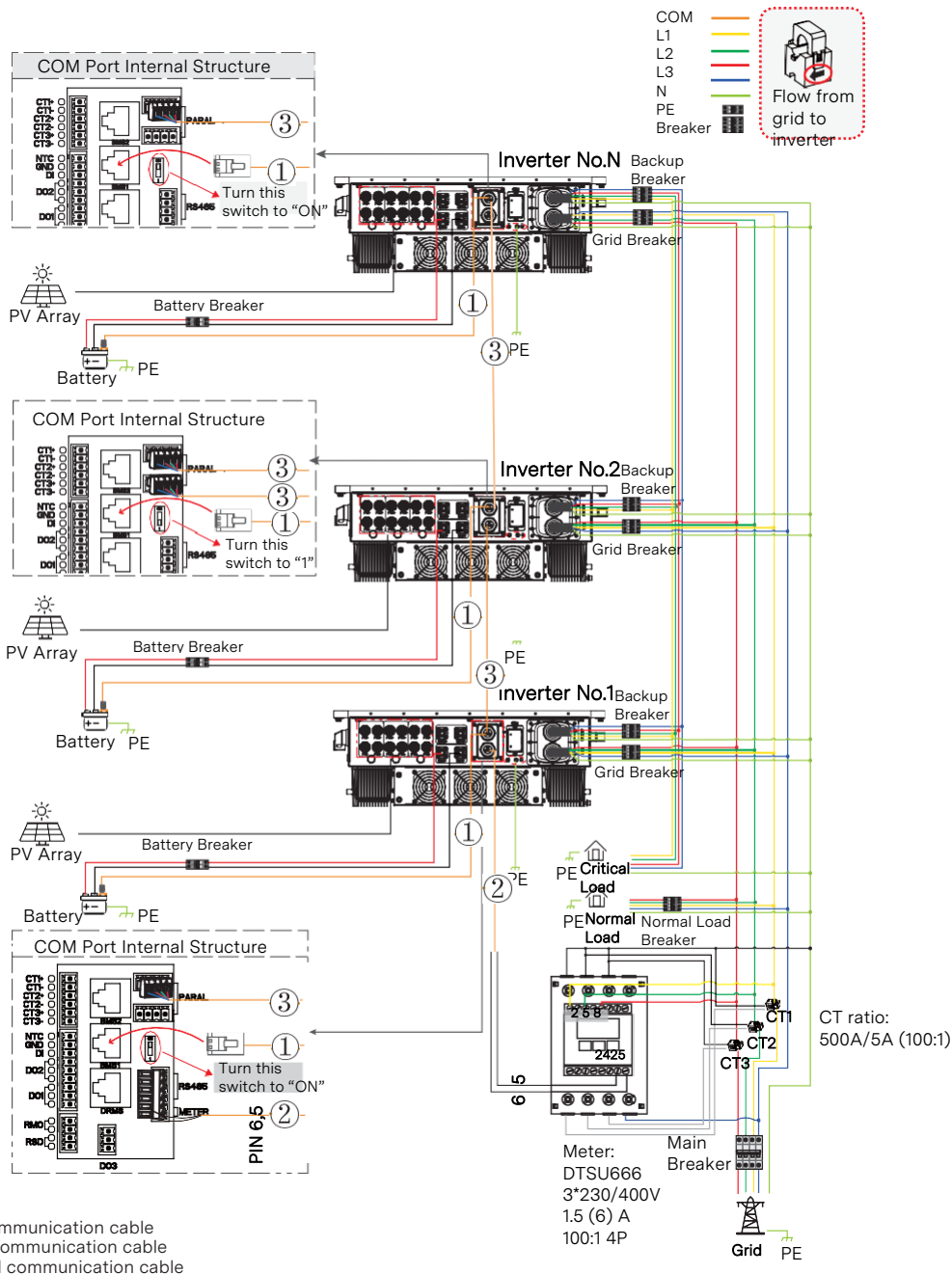
1.BMS communication connection is only for lithium battery.

2.The external DC/AC breakers are not supplied with the inverter and must be purchased separately. The specifications of main breaker and normal load breaker depend on household loads. For other breakers, please refer to the table below.

Breakers recommendation:

Inverter	Battery Breaker	Backup Breaker	Grid Breaker	Normal Load Breaker	Main Breaker
12K	≥ 80A	≥63 A	≥63 A	Depends on household loads	Depends on household loads
15K		≥63 A	≥63 A		
20K		≥63 A	≥63 A		
25K	≥ 160 A * 1 (Single battery connected to both BAT1 and BAT2);	≥80 A	≥80 A		
30K	≥ 80 A * 2 (Battery systems connected to BAT1 and BAT2 respectively).	≥80 A	≥80 A		

Parallel connection mode - Scheme B ($3 \leq N \leq 10$)



* Meter communication cable can be connected to any inverter of the parallel system and this inverter will be inverter No.1.

Danger

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

Note:

1. BMS communication connection is only for lithium battery.
2. It is necessary to turn the matched resistance switch of No. 1 inverter and No. N inverter to "ON" and turn others to "1" in parallel connection mode. (Only for Scheme B)
3. With parallel connection mode, it is necessary to connect APP to one of inverters and then go to **Console > Hybrid Setting > Other > Parallel mode** page to enable **Parallel mode** on APP. For more information, please refer to manual "Nanuk SE Energy Storage Hybrid Inverter Application Guide"
4. The external DC/AC breakers are not supplied with the inverter and must be purchased separately. The specifications of main breaker and normal load breaker depend on household loads. For other breakers, please refer to the table below.

Breakers recommendation:

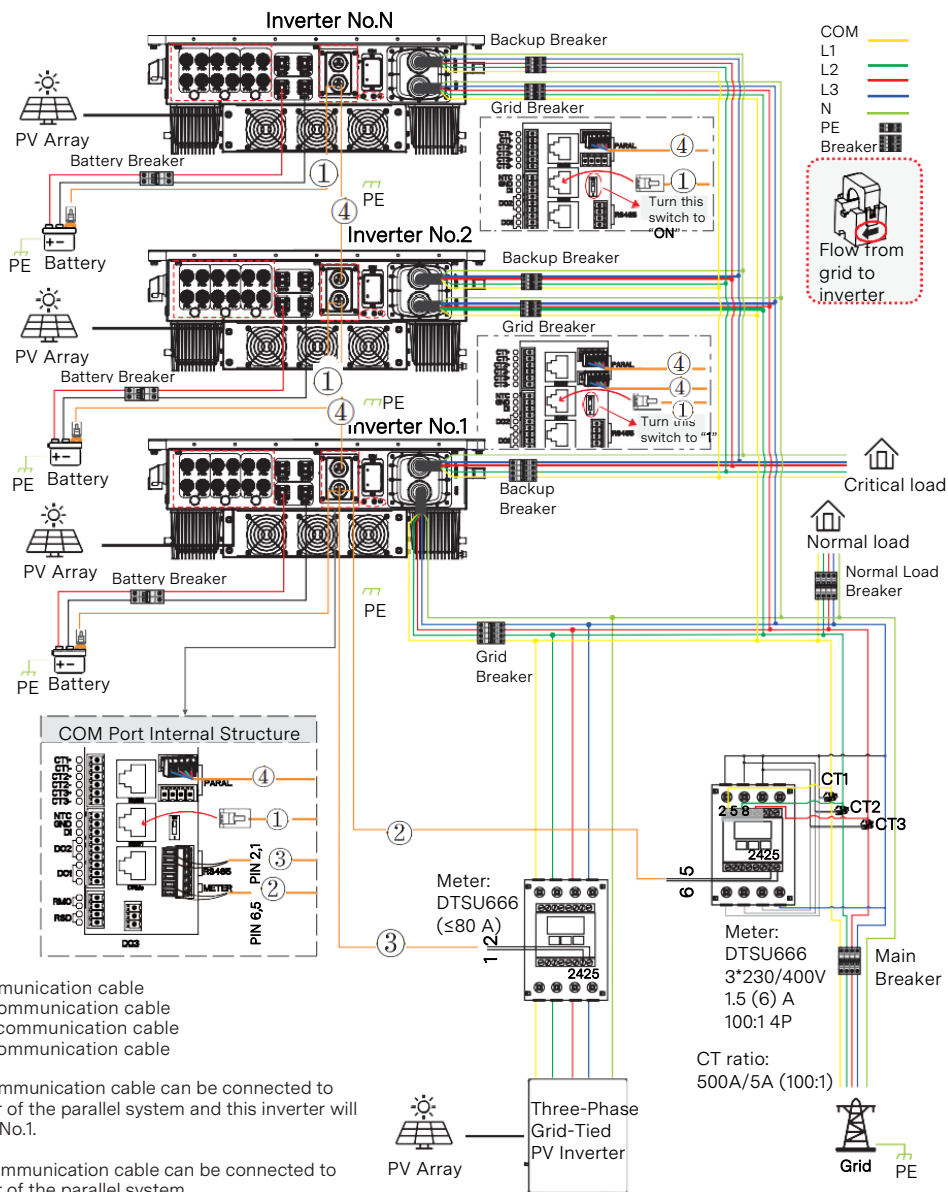
Inverter	Battery Breaker	Backup Breaker	Grid Breaker	Normal Load Breaker	Main Breaker
12K	≥ 80A	≥63 A	≥63 A	Depends on household loads	Depends on household loads
15K		≥63 A	≥63 A		
20K		≥63 A	≥63 A		
25K	≥ 160 A * 1 (Single battery connected to both BAT1 and BAT2);	≥80 A	≥80 A		
30K	≥ 80 A * 2 (Battery systems connected to BAT1 and BAT2 respectively).	≥80 A	≥80 A		

AC Coupling Connection Wiring Diagram in Parallel System ($3 \leq N \leq 10$)



Danger

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



* Meter1 communication cable can be connected to any inverter of the parallel system and this inverter will be inverter No.1.

* Meter2 communication cable can be connected to any inverter of the parallel system

Note:

- 1.Ensure that the Grid phase sequence of the ESS inverter and the Grid-Tied PV inverter are consistent, and the grid phases between inverters must be connected correctly.
- 2.When connecting the meter, the phase of the meter must be consistent with that of the ESS/PV inverter.
- 3.Ensure that meter 1 and meter 2 are wired properly and correctly, otherwise unpredictable problems may occur.
- 4.When the current through the meter is excessive (≥ 80 A), pair the meter with a CT.
- 5.AC coupling function needs to be activated via APP. Go to **Console > Hybrid Setting > Other > AC coupling function**. For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”

4.1 Grounding

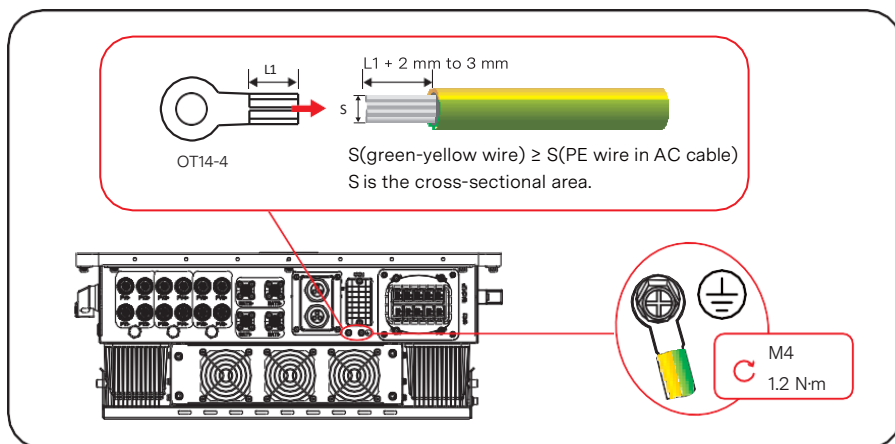
A protective earth (PE) terminal is equipped at the side of the inverter. Please be sure to connect this PE terminal to the PE bar for reliable grounding.

Warning

- The inverter must be grounded; otherwise, there may be electric shock risk.
- The PE cable connected to the enclosure of the inverter cannot replace the PE cable connected to the AC output port. Please make sure that both of the two PE cables are securely connected.

Caution

If the positive pole or negative pole of the PV array is required to be grounded, then the inverter output (to AC grid) must be isolated by transformer in accordance with IEC62109-1, -2 standards.



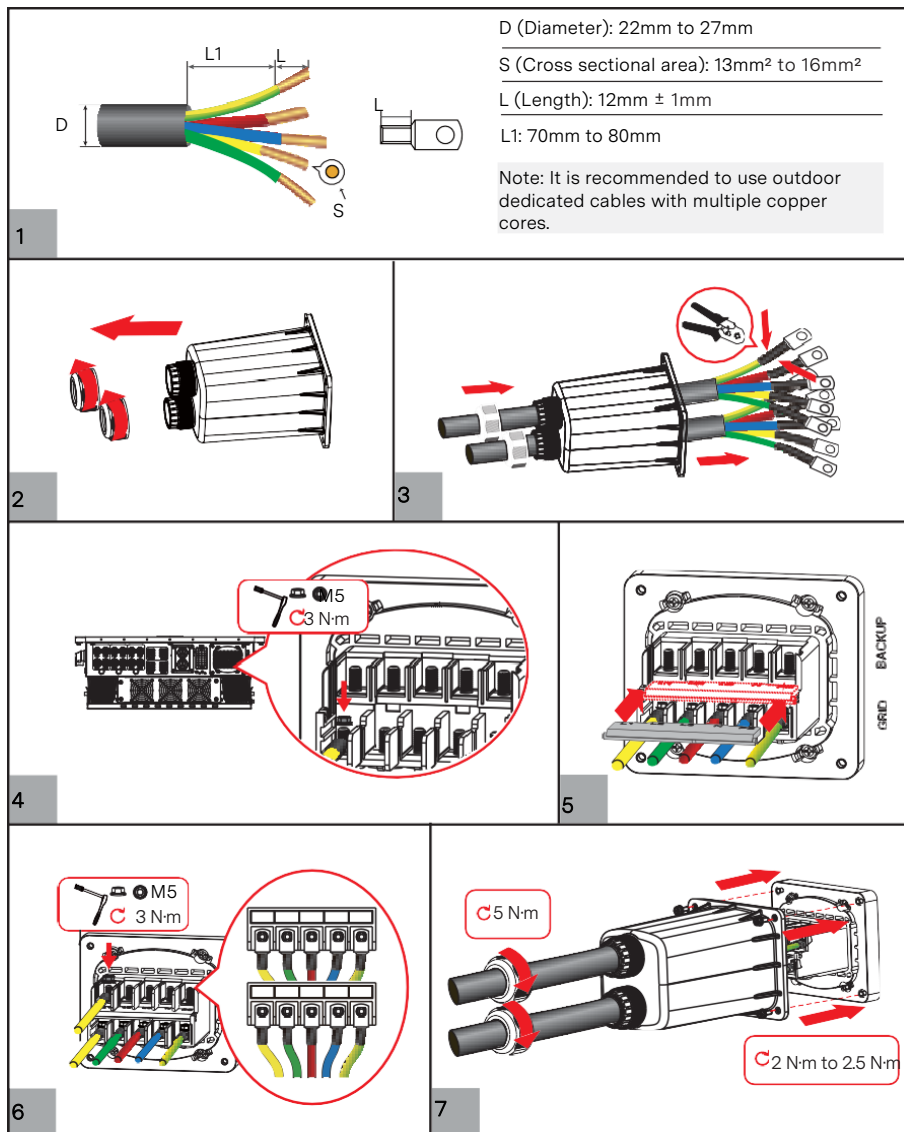
4.2 Grid/Backup Connection

Warning

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

For GRID/BACKUP connection, please perform the following steps:

Step 1: Assemble the AC connector and then insert AC connector into GRID/BACKUP port



Step 2: Install the AC circuit breaker. For safety, an appropriate AC breaker (≥ 63 A or ≥ 80 A) must be installed between inverter and the GRID/BACKUP for safety:

- Before installing the AC circuit breaker, verify that it is functioning properly. Turn off the breaker and keep it in the "off" position.
- Connect the PE conductor to grounding electrode, and connect the N and L conductors to AC breaker.
- Connect the AC breakers to the utility GRID/BACKUP load.

Warning

- Connect the AC cables to the corresponding terminals correctly. Otherwise it will damage the inverter.
- Install a dedicated AC circuit breaker for each inverter. Sharing a circuit breaker among multiple inverters is prohibited.
- No load shall be connected between the grid and the AC circuit breaker.
- Never touch backup port when the inverter is powered on as there is an AC output. If maintenance is required for loads connected to the BACK-UP port, power off the inverter first; otherwise, electric shock may occur.

4.3 Battery Connection

Warning

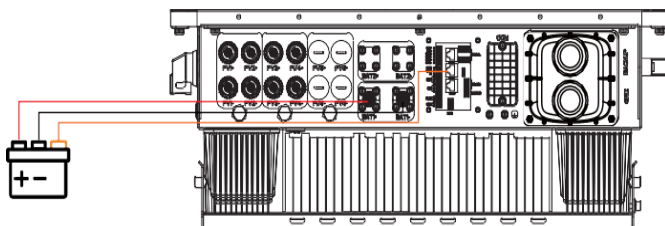
- Reverse polarity will damage the inverter!
- Be careful of electric shock and chemical hazards!
- To reduce risk of injury, please use the suitable recommended cable size.
- Install a DC breaker between the inverter and battery.

This part in this manual only describes the battery connection on inverter side. If you need more detailed connection information about the battery side, please refer to the manual of the battery you are using.

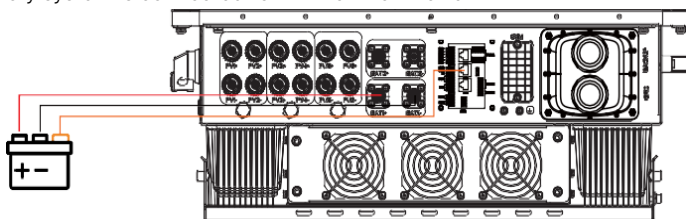
Nanuk SE Three-phase inverter now only supports the lithium / lead-acid battery. The recommended lithium battery brands are as follows: IGLU TECH, Weco, Pylon tech, UZ energy series.

Before connecting to battery, please install a separate DC breaker between inverter and battery. This ensures the inverter can be securely disconnected during maintenance.

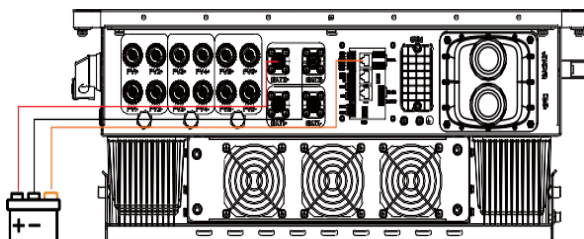
12K/15K/20K can be connected to only one battery system. The battery cable must be connected to BAT 1, as shown below.



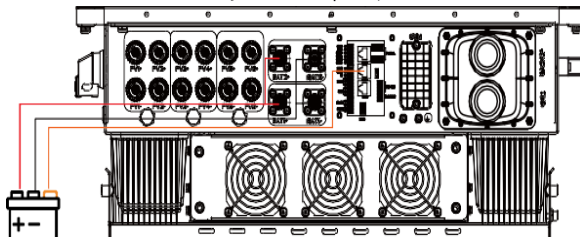
25K/30K can be connected to one or two battery systems, as shown below.
Single battery system is connected to BAT1 of the inverter



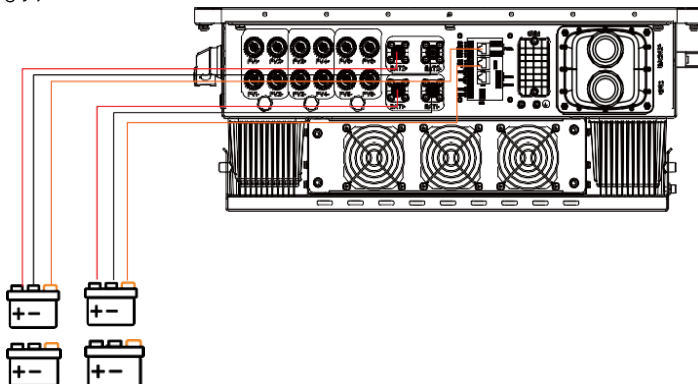
Single battery system is connected to BAT2 of the inverter

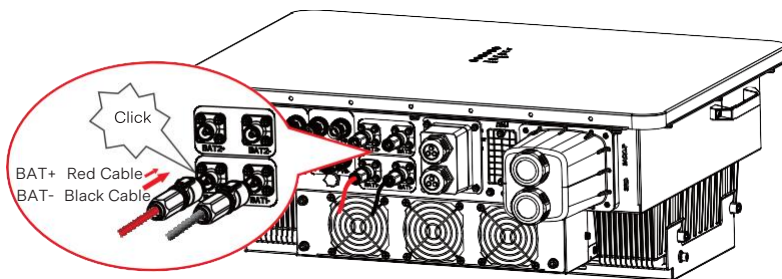


Single battery system is connected to both BAT1 and BAT2 of the inverter. (In this mode, the battery communication cable can be connected only to BMS1 port.)



Battery systems are connected to the inverter's BAT1 and BAT2 respectively. (In this mode, connect the BAT1 communication cable to BMS1 and the BAT2 communication cable to BMS2 port accordingly.)

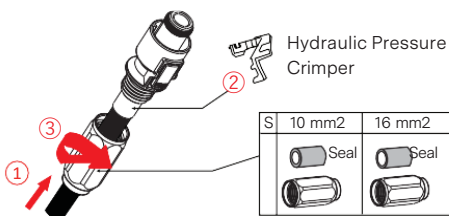




BAT Cable Item (recommendation)	Spec 1	Spec 2
Diameter (D)	6.5 mm to 7.5 mm	8.0 mm to 9.0 mm
Cross section (S)	10 mm ²	16 mm ²
Strip length (L)	~10 mm	
Cable total length	≤ 3 m	

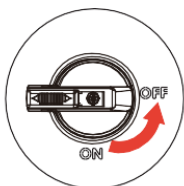
Note: the 10 mm² BAT cable is applicable to model 12K/15K/20K, while the 16 mm² BAT cable is applicable to all inverter models.

1



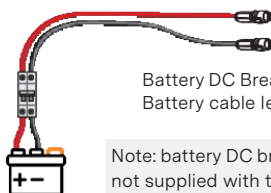
Note: choose the proper connector parts according to the BAT cable cross section (S).

2



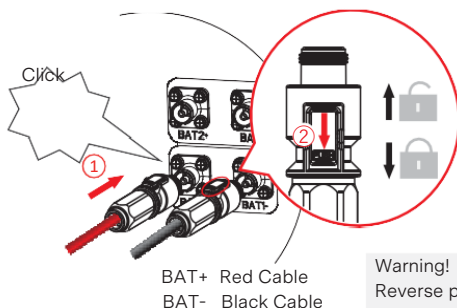
Ensure that the PV switch is OFF.

3



Note: battery DC breakers are not supplied with the inverter.

4



BAT+ Red Cable
BAT- Black Cable

Warning!
Reverse polarity will damage the inverter!

5

Battery Communication Connection

If the battery type is a lithium type which requires communication between the inverter and the battery management system (BMS), this connection must be made. Please refer to section 4.6.1 for details.

For 25K/30K, since there are two sets of battery connection terminals, you must set the battery connection type in the APP and verify that the connection methods for both the power port and BMS port are correct according to the table below before powering on the inverter.

Battery connection type	Description	Power port		BMS port	
		BAT1+/-	BAT2+/-	BMS1	BMS2
Single Battery (BAT1)	Single battery system connected to BAT1 only	✓		✓	
Single Battery (BAT2)	Single battery system connected to BAT2 only		✓		✓
Two Separate Batteries (BAT1, BAT2)	Battery system connected to BAT1 and BAT2 respectively	✓	✓	✓	✓
Single Battery (BAT1+BAT2)	Single battery system connected to both BAT1 and BAT2	✓	✓	✓	

4.4 PV Connection



Warning

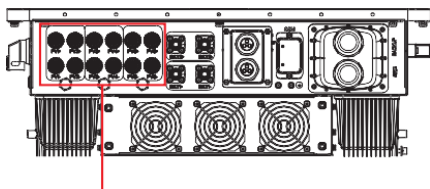
Please check polarity of PV connectors! If polarity reversed, do not try to disconnect any PV connector until the irradiance declines and the DC currents fall below 0.5A! Only then disconnect the PV plugs and correct the polarity before reconnecting.

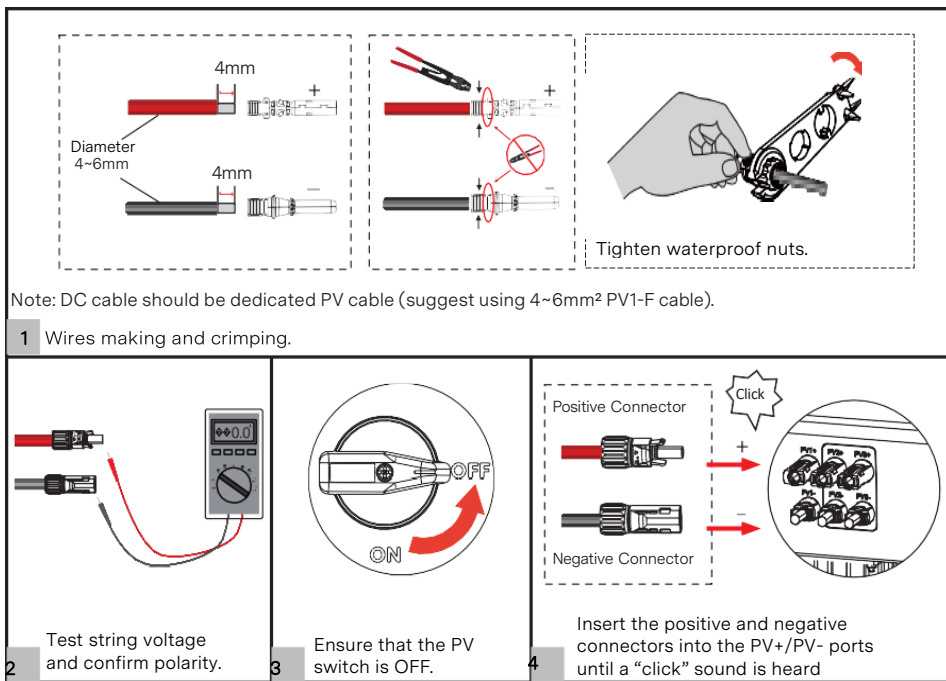


Notice

- Before connecting the PV panels, make sure the plug connector have the correct polarity. Incorrect polarity could permanently damage the inverter.
- PV array shouldn't be connected to the grounding conductor.
- The minimum insulation resistance to ground of the PV panels must exceed 33.3kΩ, there is a risk of shock hazard if the requirement of minimum resistance is not met.

For PV connection, please refer to the following figures:





4.5 CT Connection (Direct connect)

You can monitor usage with a CT (Current transformer).

Before Grid connection, install a dedicated AC circuit breaker (≥ 100 A, user-supplied) between the CT and the grid to enable safe disconnection of the inverter during maintenance.

When making CT connection, pay attention to the current flow direction and pass the live wire through the detection hole of CT.

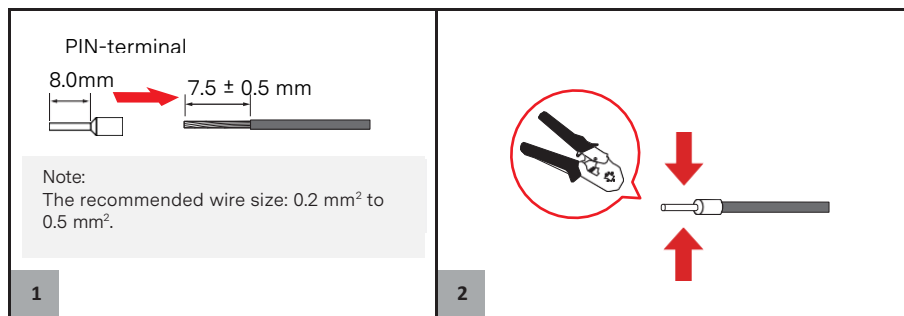
NOTE:

- The arrow on the CT indicates current flow from the grid to the inverter. Current direction from grid to inverter is defined as positive, and from inverter to grid as negative.
- L1, L2, and L3 can only pass through the detection holes of CT1, CT2, and CT3 respectively.

Interface		Descriptions
BMS		Lithium battery communication interface
RS485		RS485 communication (Monitoring/Meter)
CT		6-pin terminal for grid/load current transformer
9-Pin	NTC	Temperature sensor terminal of lead-acid battery
	DRY	DI/DO control
DO3		DO control
DRMs		Demand response mode for Australia application
RSD/RMO		RSD control power and remote off
PARA		4-pin terminal for parallel communication
		A matched resistance switch for parallel communication
COM		For WIFI/LAN communication.

PIN Terminal Crimping

Crimp communication cables before threading



4.6.1 BMS Connection (Only for Lithium Battery)



Caution

- For 12K/15K/20K, please connect the cable to BMS1 port. Otherwise, BMS communication may fail.
- For 25K/30K, when a single battery system is connected to both BAT1 and BAT2, the cable must be connected to the BMS1 port to enable BMS communication. Failure to do so may result in BMS communication failure.
- For 25K/30K, When battery systems are connected to the inverter's BAT1 and BAT2 respectively, the BAT1 communication cable must be connected to BMS1, and the BAT2 communication cable to BMS2 port accordingly to enable BMS communication. Failure to do so may result in BMS communication failure

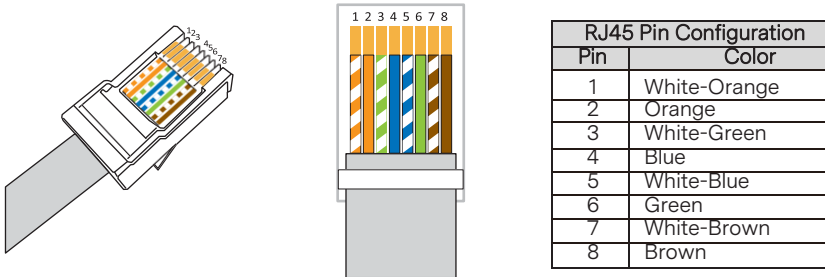


NOTE:

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

RJ45 Terminal Configuration of Battery Communication at Inverter Side

Standard RJ45 Pinout



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

Pin definition of terminal

INVERTER:

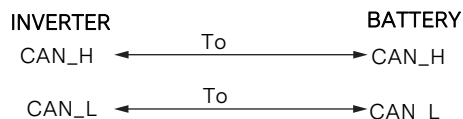
Inverter	
Pin	Definition
1	RS485_ A
2	RS485_ B
3	GND
4	CAN_ H
5	CAN_ L
6	NC
7	NC
8	NC

BATTERY:

An example of the battery's pin configuration is as follows:

Battery (example)	
Pin	Definition
1	NC
2	NC
3	GND_ S
4	CAN_ H
5	CAN_ L
6	GND_ S
7	NC
8	NC

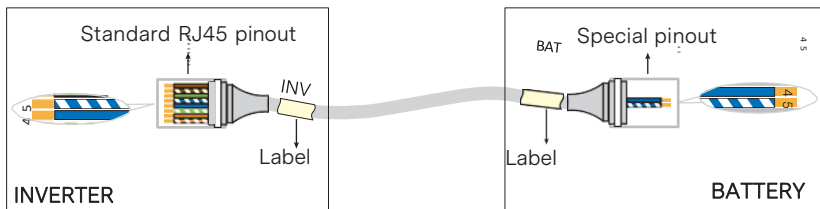
CAN BUS connection principle:



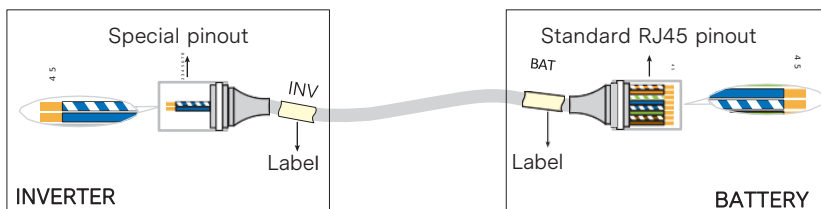
BMS communication cable prepare

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

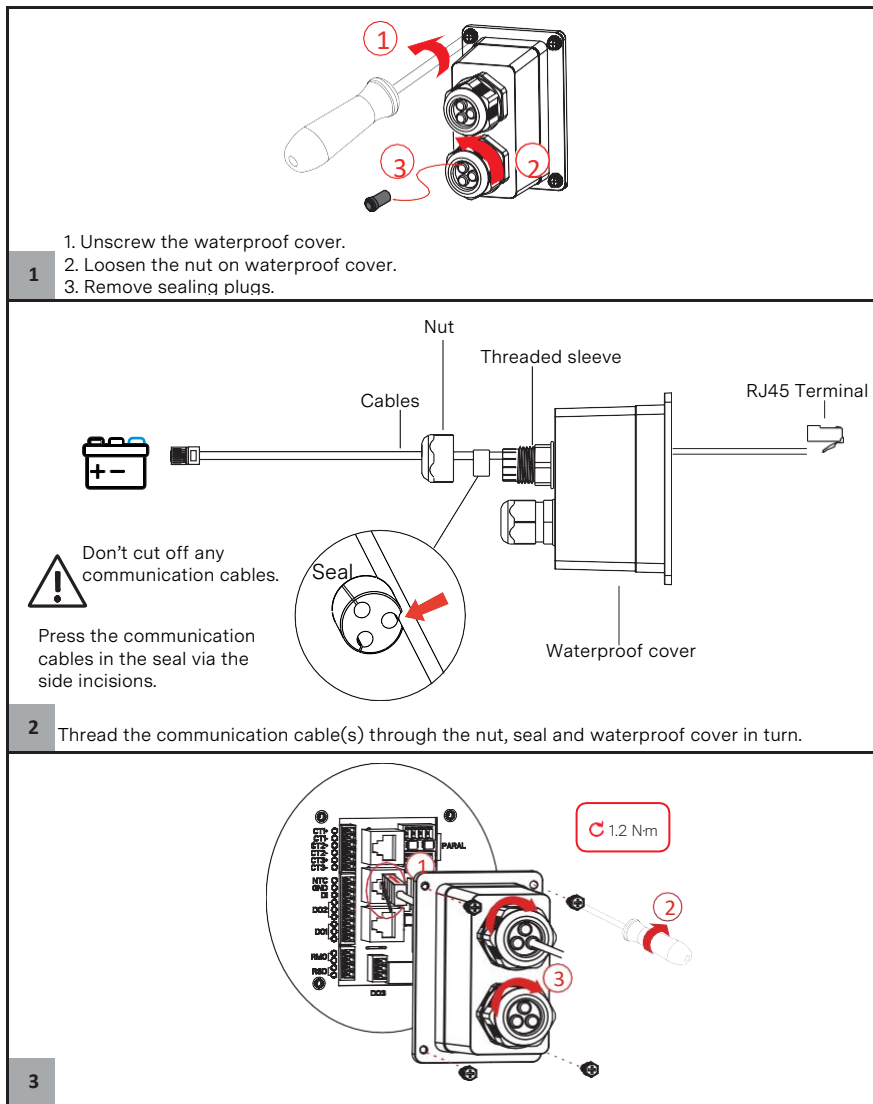
Method 1: Use the INVERTER RJ45 pinout as the standard pinout to crimp wires, then the battery side will be a non-standard one (special pinout). Cut off the other no-used wires (1/2/3/6/7/8) for the battery RJ45 terminal.



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



For BMS communication connection, please refer to the following steps:



4.6.2 RS485 Connection (Monitoring/Meter)

6-Pin Terminal Configuration of Monitoring/Meter Connection

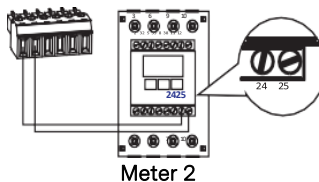
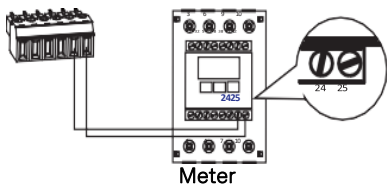


PIN	Functional Description
1	RS485 A1 (for Meter2)
2	RS485 B1 (for Meter2)
3	RS485 A1 (for Monitoring)
4	RS485 B1 (for Monitoring)
5	RS485 A2 (for Meter)
6	RS485 B2 (for Meter)

Inverter	Monitoring
Pin3	RS485 A
Pin4	RS485 B

Inverter	Monitoring
Pin1/Pin5	Pin24
Pin2/Pin6	Pin 25

Meter Cable Connection Overview



For RS485 connection, please perform the following steps:

1. Unscrew the waterproof cover.
2. Loosen the nut on waterproof cover.
3. Remove sealing plugs.

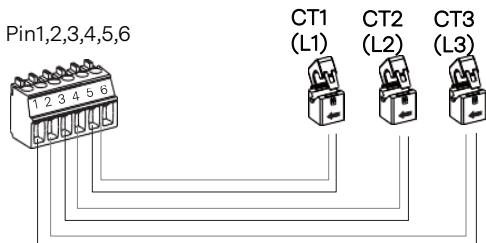
3. Thread the communication cable(s) through the nut, seal and waterproof cover in turn.

2. Thread the communication cable(s) through the nut, seal and waterproof cover in turn.

Don't cut off any communication cables.

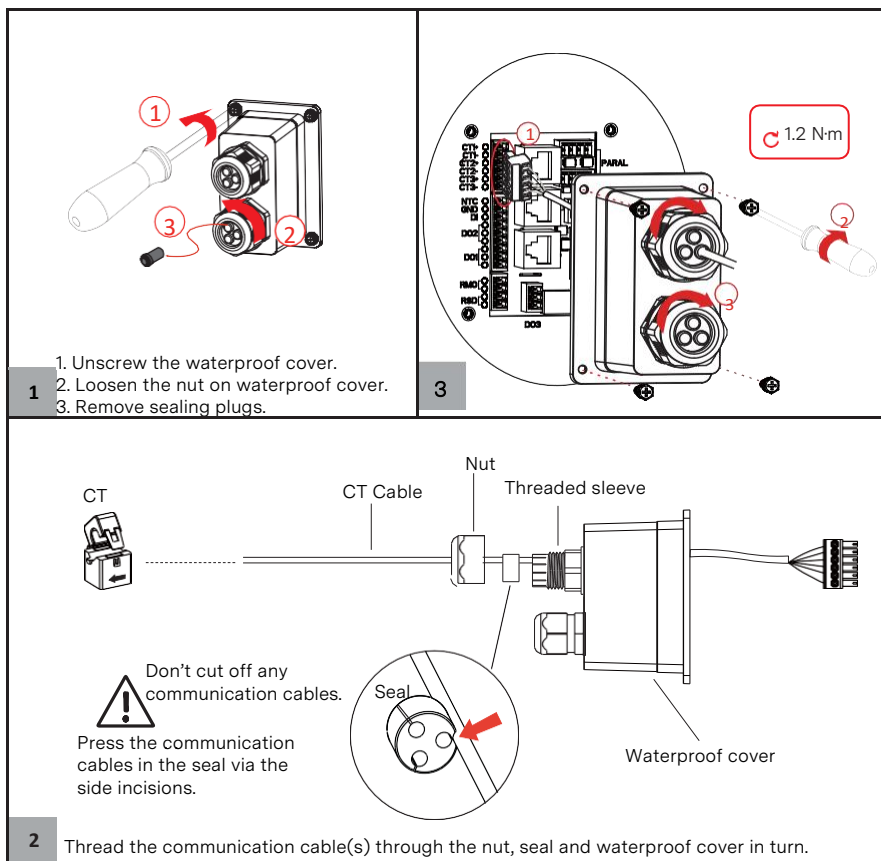
4.6.3 CT Connection

CT cable connection overview



Inverter	CT	Phase Line
Pin1 (CT3-)	Black	L3
Pin2 (CT3+)	/	
Pin3 (CT2-)	Black	L2
Pin4 (CT2+)	/	
Pin5 (CT1-)	Black	L1
Pin6 (CT1+)	/	

For CT connection, please perform the following steps:

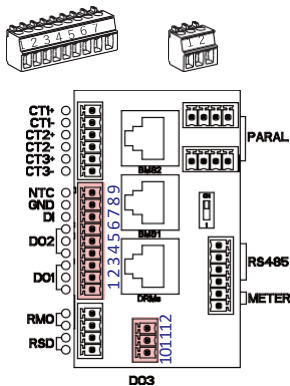


4.6.4 DI/DO Connection(s)

A dry contact controlling port is reserved in the inverter to facilitate the addition of more contactors

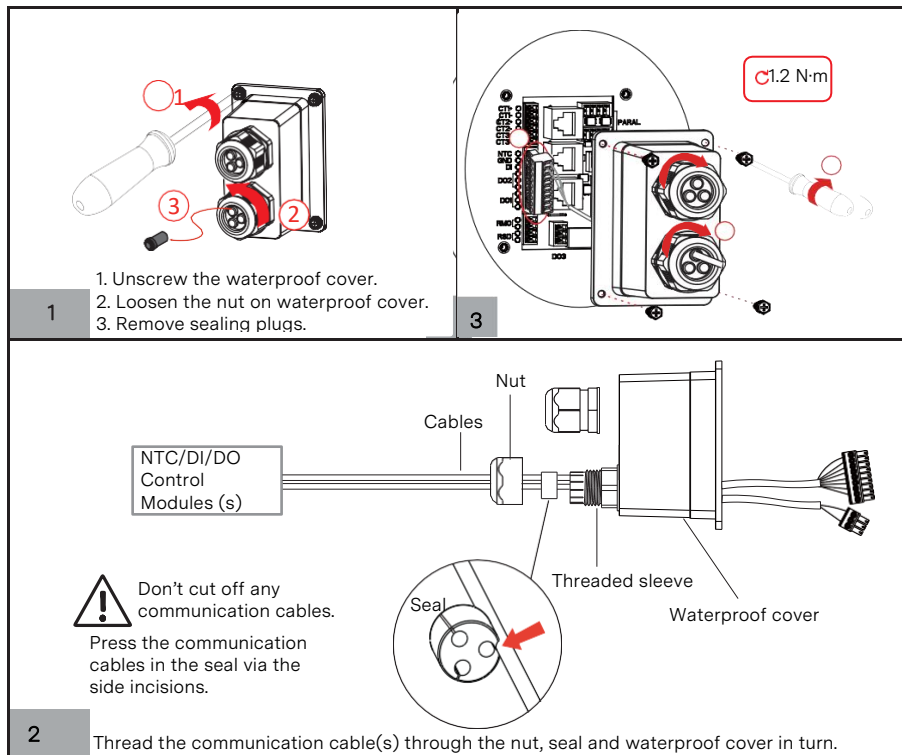
to manage the activation and deactivation of the load.

To enable the dry contact function, please go to the APP via **Console > Other setting > Dry contact**. For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”



PIN	Pin Definition	Function
1	NO1 (Normal Open)	Dry contact control supports manual control mode and time mode
2	COM1 (Common Pole)	
3	NC1 (Normal Close)	
4	NO2 (Generator control)	Generator connection: start-up signal
5	COM2 (Generator control)	
6	NC2 (Normal Close)	
7	DI	Signal testing: pin7/8 can be used for CEI 0-21 SPI external signal testing.
8	GND	
9	NTC BAT+	
10	DO3+	Dry contact control: supports smart load mode
11	/	
12	DO3-	

For DI/DO connection, please perform the following steps:



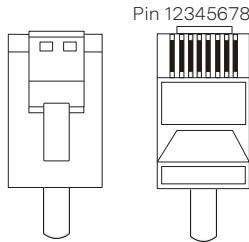
4.6.5 DRMs/ RCR Connection

DRMs Connection

DRMs is a shortened form for “inverter demand response modes”. It is a compulsory requirement for inverters in Australia.

Note: With DRMs connection, it is necessary to connect APP to inverter and then go to *Console > Other Setting* page to enable *DRM function* on APP. For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”

RJ45 Terminal Configuration of DRMs



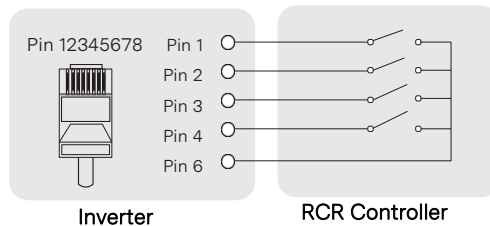
DRMs

PIN	1	2	3	4	5	6	7	8
Function Description	DRMs 1/5	DRMs 2/6	DRMs 3/7	DRMs 4/8	REF	GND	/	/

RCR Connection

RCR (Ripple Control Receiver): In Germany and some other European regions, grid companies use Ripple Control Receiver to convert grid dispatching signals into dry contact mode for transferring. And the power station receives grid dispatching signals through dry contact communication mode.

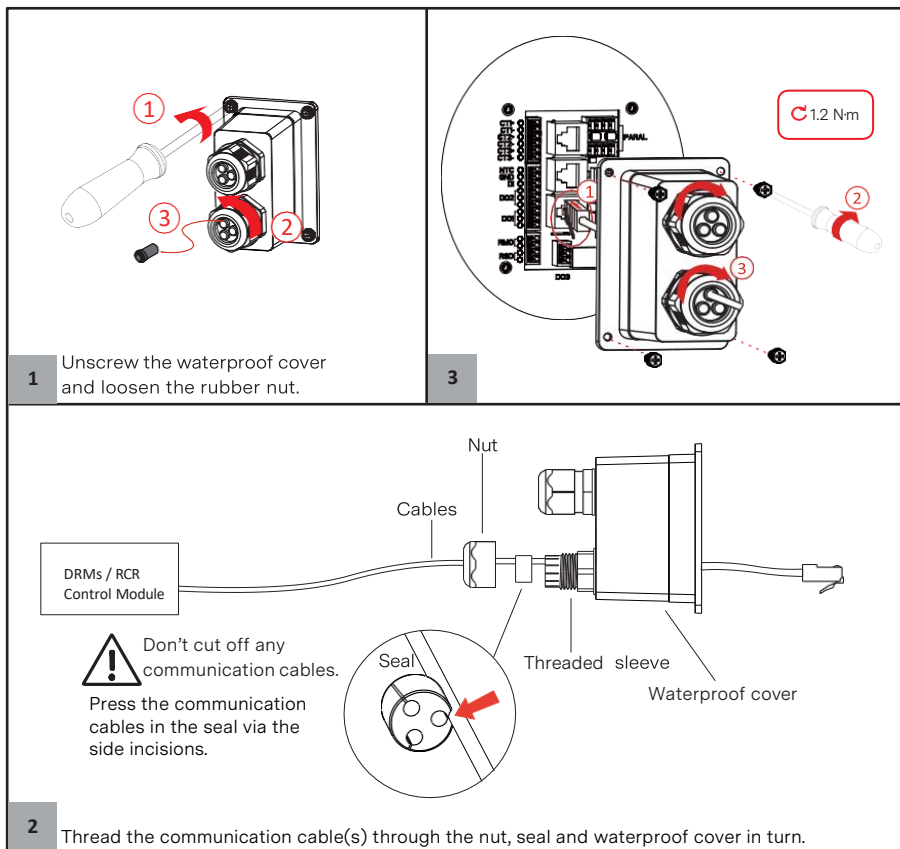
RJ45 Terminal Configuration of RCR Controller



To enable the RCR control function, please go to *Console > RCR control* via APP.

For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”

For DRMSs/RCR Connection, please perform the following steps:



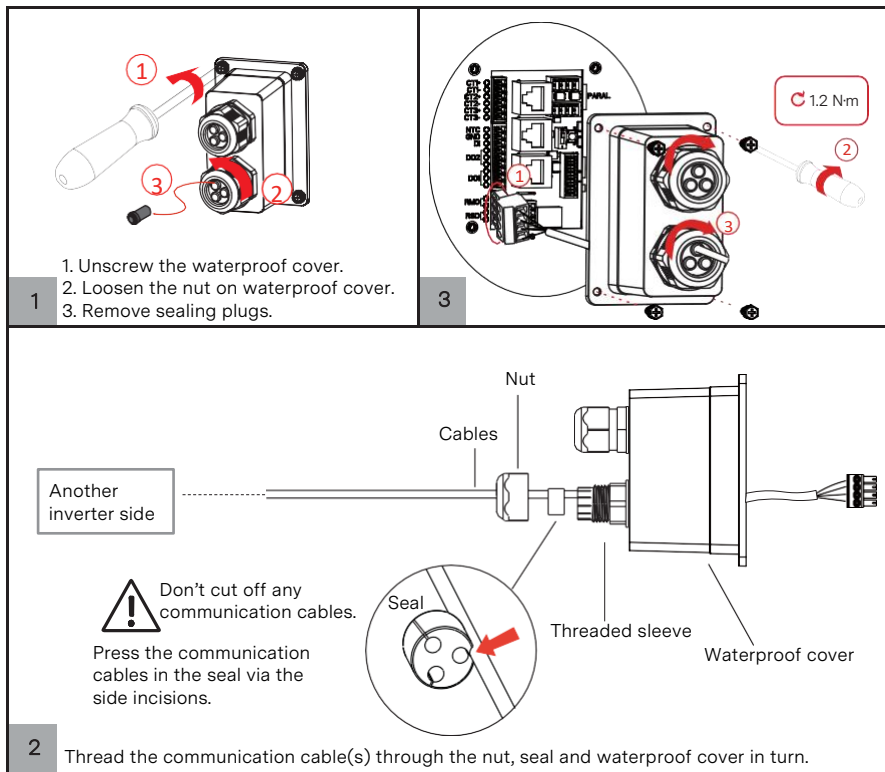
4.6.6 RSD/RMO Connection(s)

4-Pin Terminal Configuration of RSD/RMO Communication



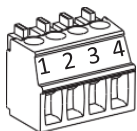
PIN	1	2	3	4
Function Description	+12V	GND	GND	REMO-OFF

For RSD/RMO connection, please perform the following steps:



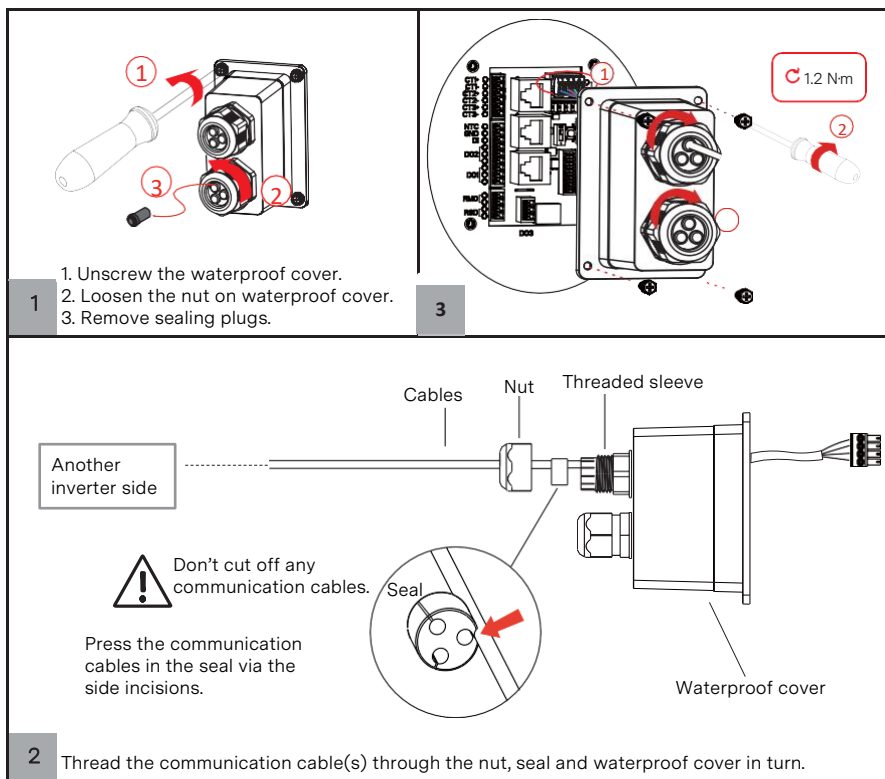
4.6.7 Parallel Communication Connection

4-Pin Terminal Configuration of parallel Communication

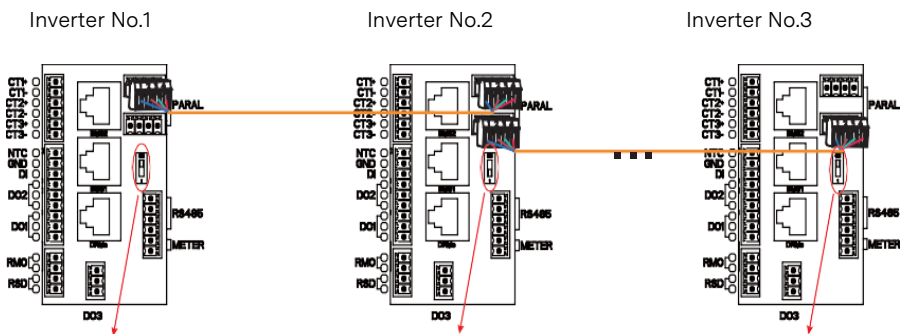


PIN	1	2	3	4
Function Description	GND_S	PARA_SYNC	CAN_L	CAN_H

For parallel communication connection, please perform the following steps:



Parallel communication cable connection overview

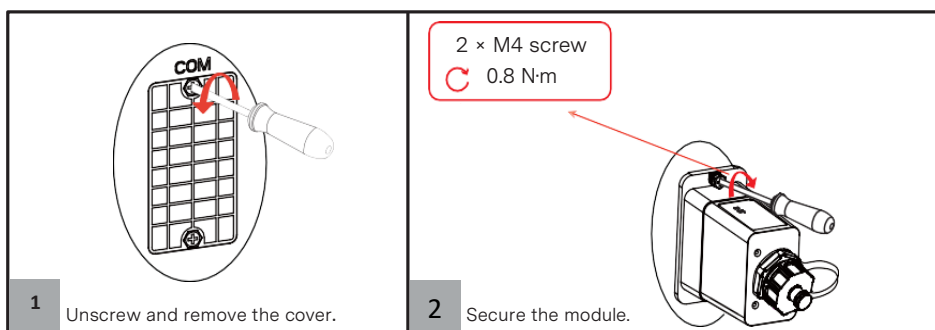


It is necessary to turn the matched resistance switch of inverter No.1 and inverter No.N to "ON" and turn the matched resistance switch of others to "1" in parallel connection mode.

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

4.6.8 LAN Module Connection (Optional)

For details, please refer to the corresponding Module Installation Guide in the packing. Module appearances may vary slightly. The figure below is for illustration only.



5. System Operation

5.1 Inverter Working Mode

The Nanuk SE hybrid inverter supports several different working modes.

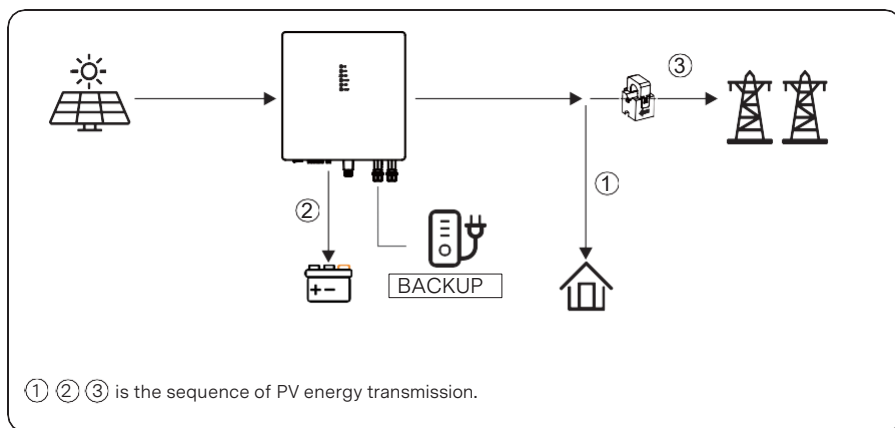
5.1.1 Self-consumption Mode

Go to *Console > Hybrid Setting > Work mode* page, and select *Self-consumption mode*. For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”

Under Self-consumption mode, the priority of PV energy consumption will be Load > Battery > Grid, that means the energy produced by PV gives priority to powering local loads, the excess energy is used to charge the battery and the remaining energy is fed into the grid. This is the default mode to increase self-consumption rate. There are several situations of Self-consumption working mode based on PV energy.

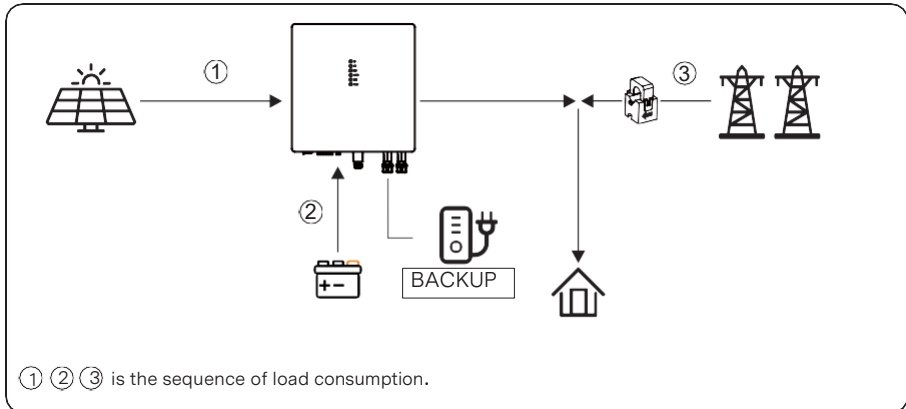
a) Abundant PV Energy

When PV energy is abundant, it will give priority to local loads, the excess energy charges the battery first, then the remaining power will be fed into the grid.



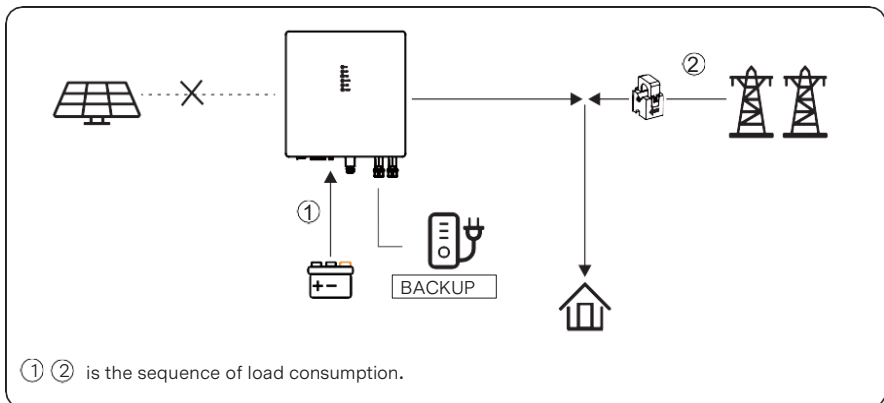
b) Limited PV power

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



c) No PV Input

The inverter will first discharge the battery energy for home load consuming when no PV input (such as in the evening or some cloudy or rainy days). If the battery power is not enough, the load will be supplied by the grid.



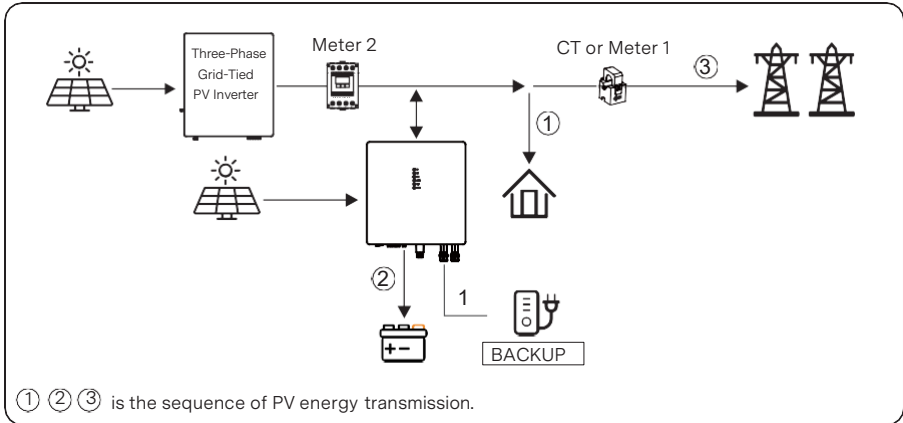
AC Coupling Connection

With AC coupling connection, PV energy generated by grid-tied PV inverters should be used to optimize self-consumption first, excess energy will be used to charge the batteries. If the battery is already full,

excess energy could be fed into the grid. Loads are supported in priority by the grid-tied system, then by the battery power, then by the grid. The following illustrates the general distribution of PV energy.

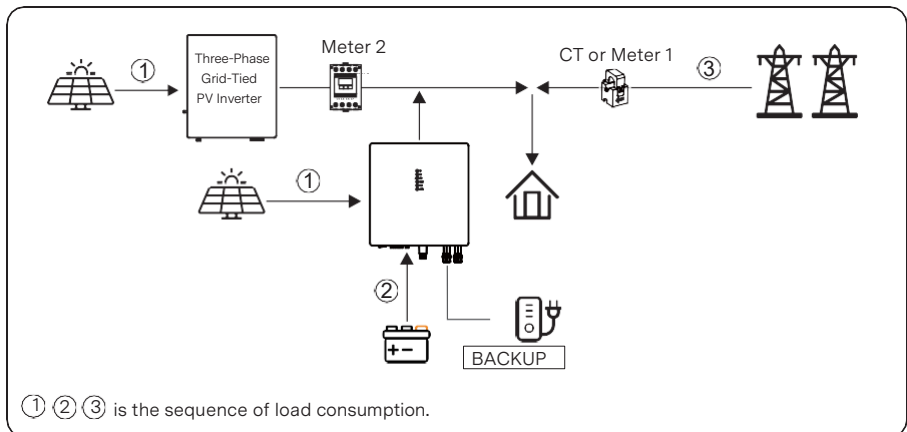
a) Abundant PV Energy

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



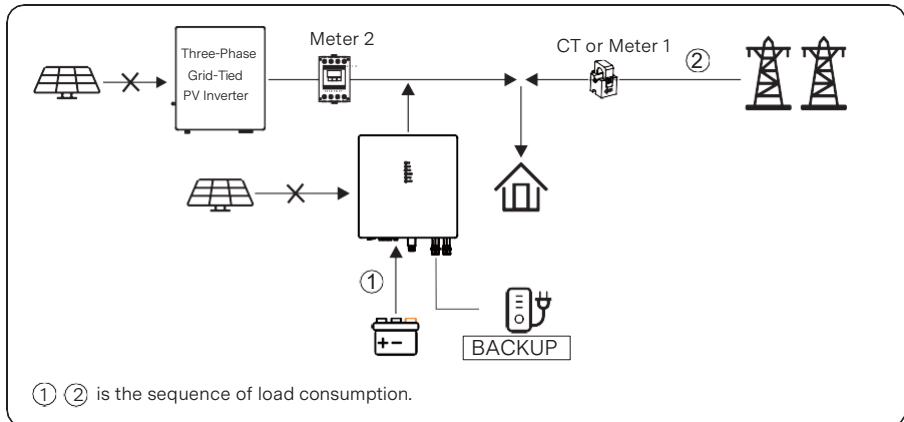
b) Limited PV Energy

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



c) No PV Input

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

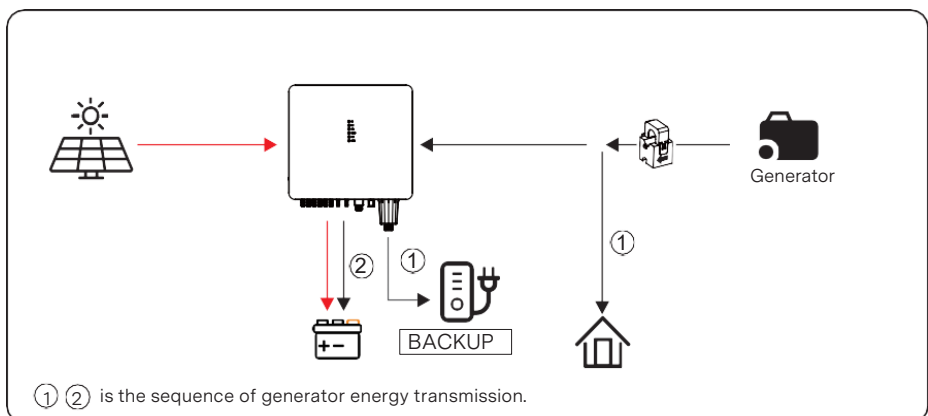


GEN Mode

In GEN mode, the PV can only charge the battery, neither the battery nor the PV supplies power to the loads. The following illustrates the general distribution of generator energy.

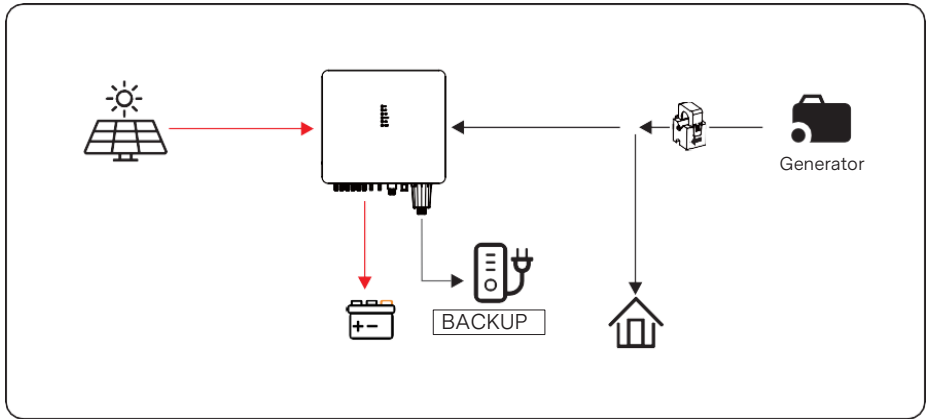
a) Abundant Generator Energy

When generator energy is abundant, the generator energy will be first consumed by loads, the excess energy can be used to charge the battery when necessary.



b) Limited Generator Energy

The generator energy will be entirely used by the loads.



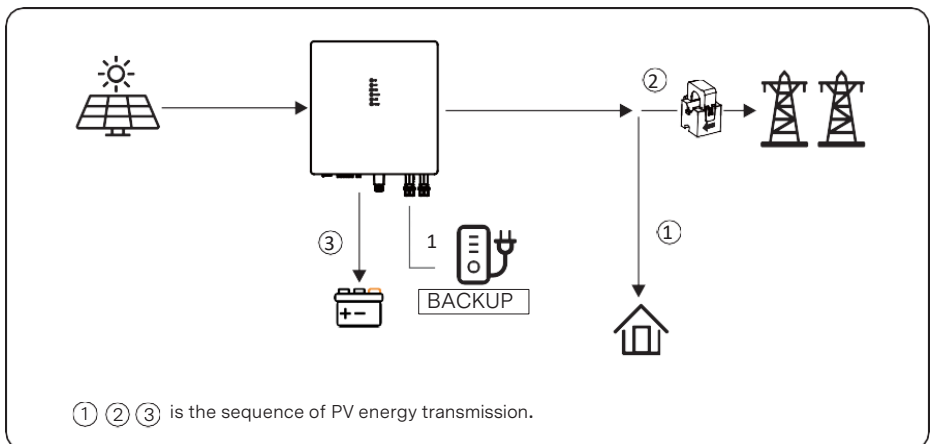
5.1.2 Feed-in Priority Mode

Go to *Console > Hybrid Setting > Work mode* page and select *Feed-in priority mode*. For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”

In this mode, the supply priority of PV power will be Load > Grid > Battery, that means the power generated by PV system gives priority to local loads, the excess power will be fed into the grid first, then the remaining power charges the battery

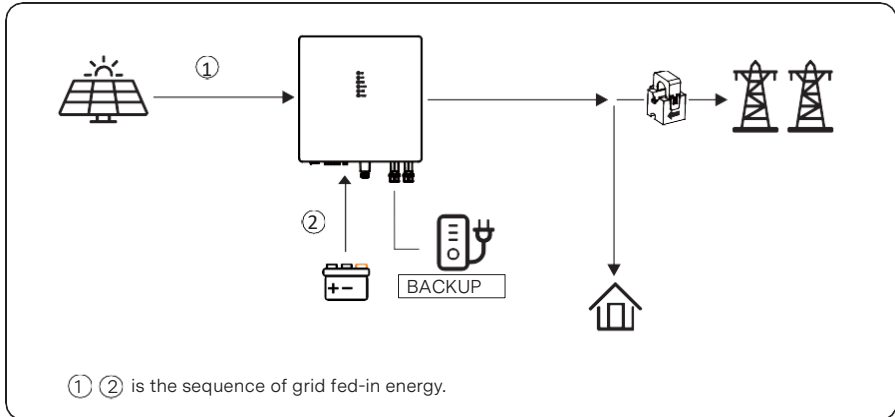
a) Abundant PV Energy

When PV energy is abundant, it will give priority to local loads, the excess power will be fed into the grid first, then the remaining power charges the battery.



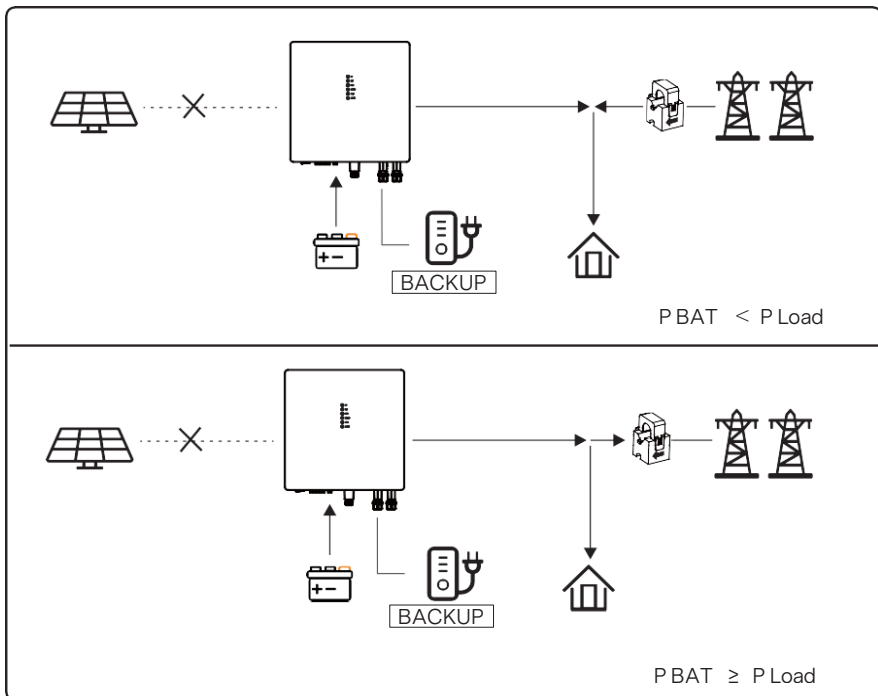
b) Limited PV Energy

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



c) No PV Input

The inverter will first discharge the battery energy for home load consuming when no PV input (such as in the evening or some cloudy or rainy days). If the battery power is not enough, the load will be supplied by the grid.



5.1.3 Back-up Mode

Go to **Console > Hybrid Setting > Work mode** page and select **Back-up mode**. For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”

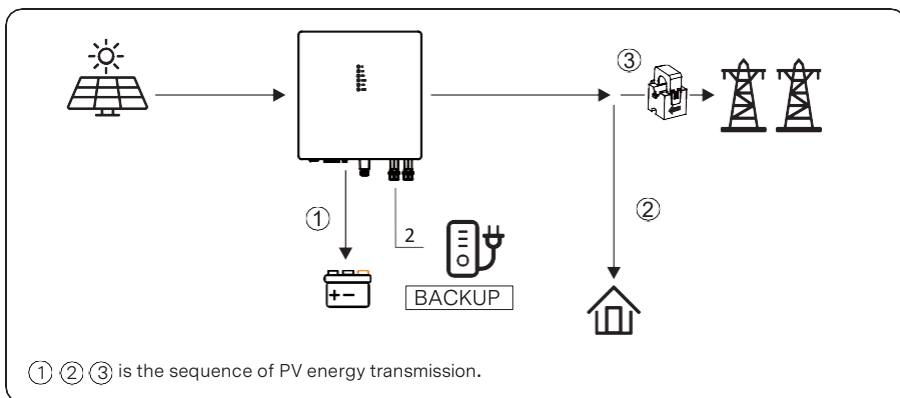
In this mode, the supply priority of PV energy will be Battery > Load > Grid. This mode aims at fast battery charging. You can set whether to allow AC charging or not.

Forbid AC charging

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

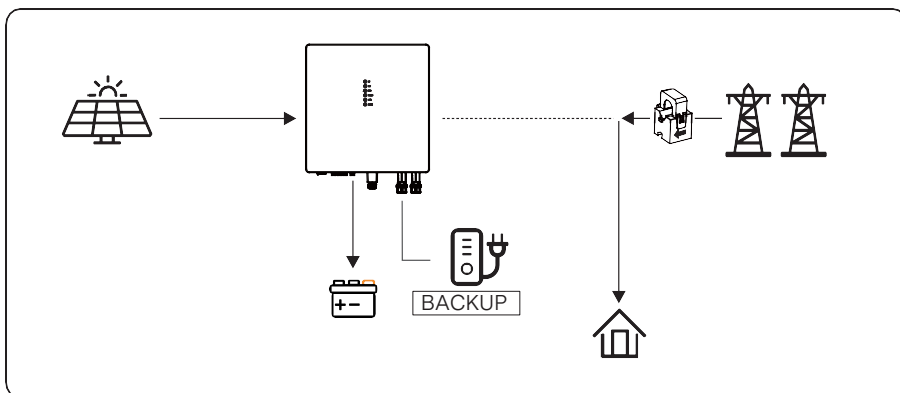
a) Abundant PV power

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



b) Limited PV power

When PV energy is limited, PV charges the battery, and the grid meet the load demand, including normal load and backup load.

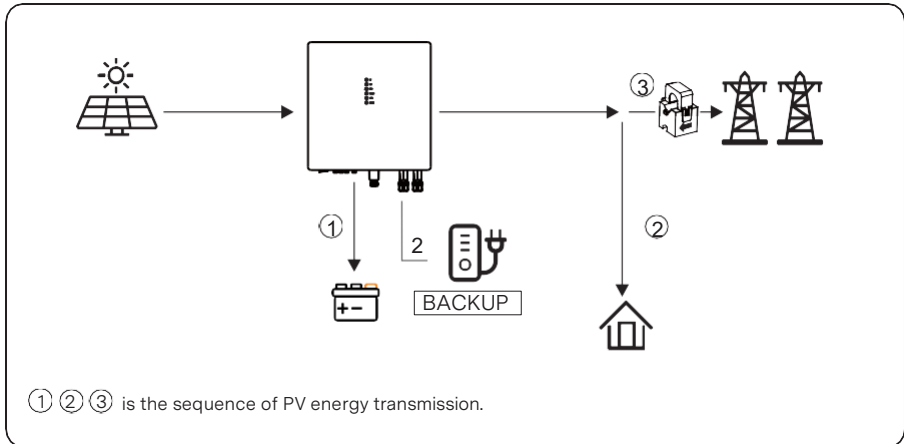


Allow AC charging

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

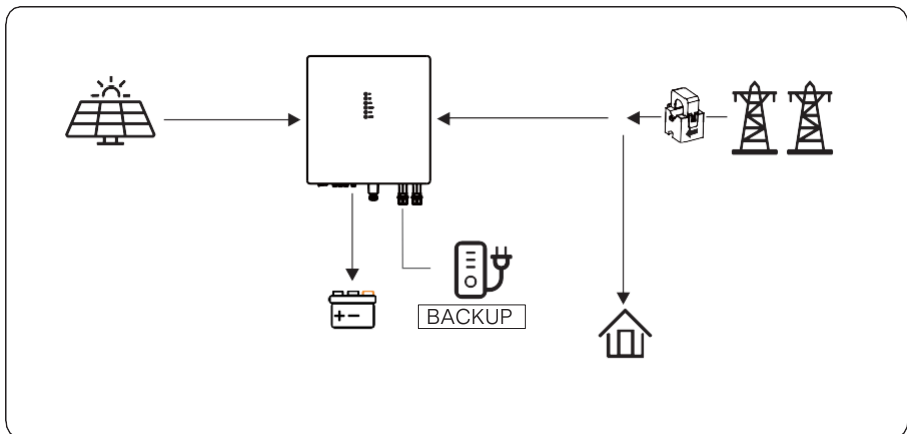
a) Abundant PV Power

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



b) Limited PV power

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



5.1.4 Forced Charge/Discharge Function

According to the demands of application, the user can set the inverter to work on forced charge/discharge the battery in any working mode. Please go to **Console > Hybrid Setting > Work mode** to enable **Time-based Control** on APP. For more information, please refer to manual “Nanuk SE Energy Storage Hybrid Inverter Application Guide”

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

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



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

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

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

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

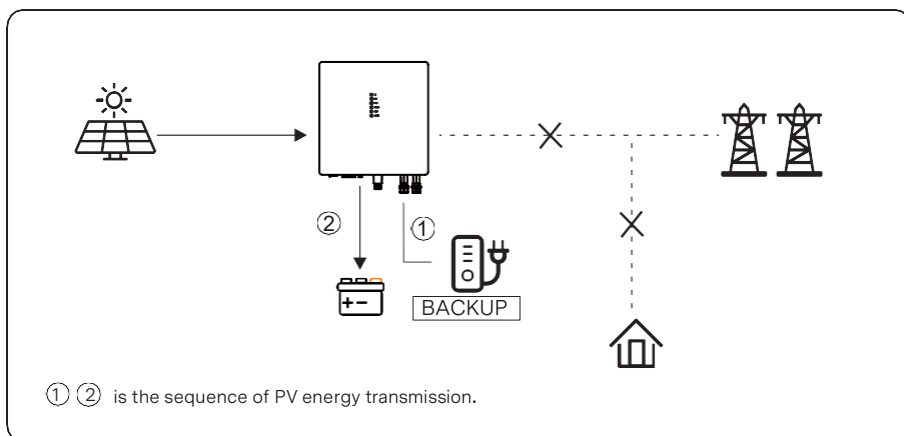
T1, T2, and T3 priority to M.

5.1.5 Off Grid Mode

When the power grid is cut off, the system automatically switches to Off Grid mode. In off-grid mode, only critical loads are supplied to ensure that important loads continue to work without power failure. In this mode, the inverter cannot work without the battery

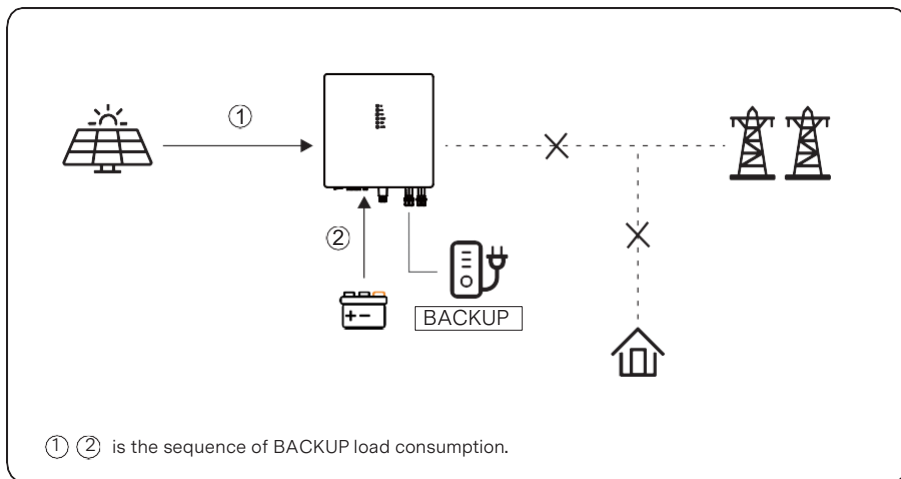
a) Abundant PV power

When PV energy is abundant, the PV energy will be first consumed by critical load, then will be used to charge the battery.



b) Limited PV Power

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



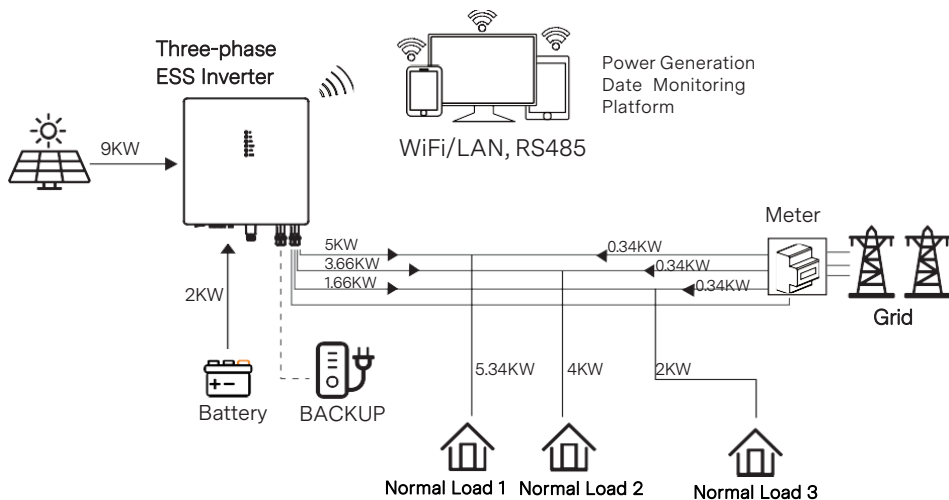
Notice

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

5.1.6 On-grid Unbalanced Output

- 1) The normal load is single phase.
 - 2) The three phases of normal load are the same or unbalanced.
- This is the best scheme to meet your needs.

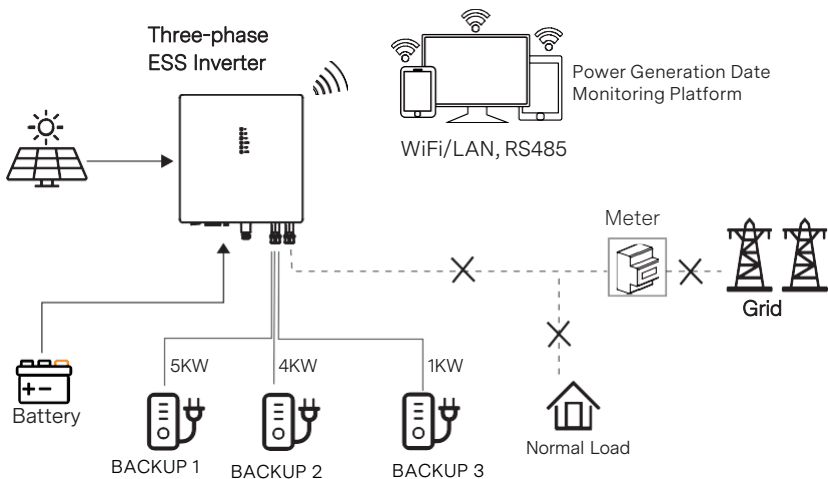
On-Grid Unbalanced Output



5.1.7 Back-up Unbalanced Output

- 1) The critical load is single phase.
 - 2) The three phases of critical load are different or unbalanced.
- This is the best scheme to meet your needs.

Back-up Unbalanced Output



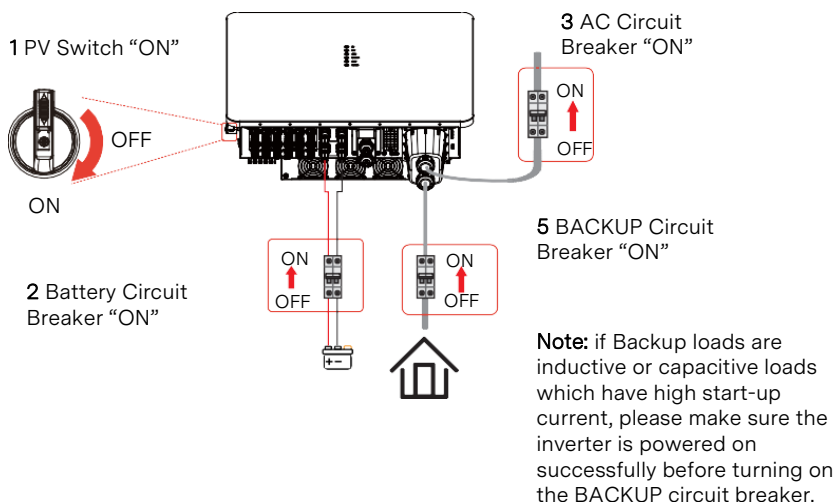
5.2 Startup/Shutdown Procedure

5.2.1 Startup Procedure

Check and confirm the installation is secured and that the system is well-grounded. Ensure that all connections (AC, battery, PV etc.) are correct, parameters and configurations conform to relevant requirements.

AC Frequency 50/60Hz	PV Voltage 160~950V
Battery Voltage 120~600V	Grid AC Voltage 180~270V(311~467V)

Startup Procedure



4 Go to APP, finish Quick Setup, and start the inverter  

*To startup the inverter for the first-time with the APP, For more information, please refer to manual "Nanuk SE Energy Storage Hybrid Inverter Application Guide"

*To perform the non-first-time startup, press and hold down the button on the left side of the inverter for about 5 seconds, until you hear the "beep" sound.

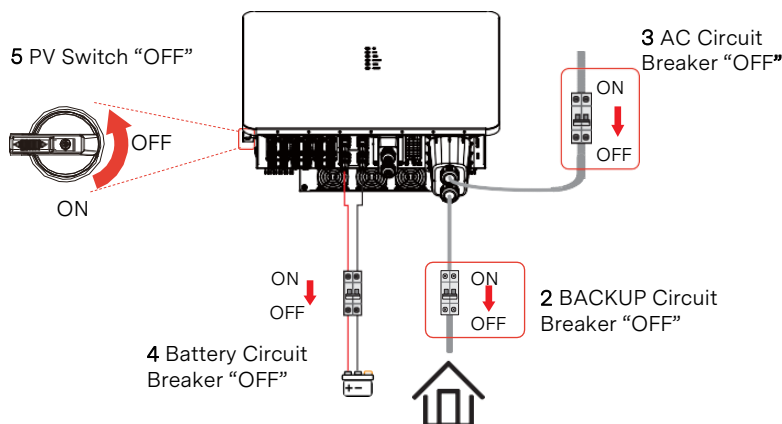


Shutdown Procedure



Danger

After the inverter is powered off, the remaining electricity and heat may still cause electric shock and body burns. If you need to disconnect the inverter cables, please wait at least 10 minutes before touching the inverter.



1 Go to APP, enter Quick Setup, and shutdown the inverter 

6. Commissioning

It is necessary to fully commission the inverter system for it is essential to protect the system from fire, electric shock, other damages, and personal injury.

6.1 Inspection

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

- 1) The system is firmly installed correctly following the contents and notifications of this manual, and there are enough spaces for operation, maintenance and ventilation.
- 2) All the terminals and cables are in good status without any damages.
- 3) No items are left on the inverter or within the required clearances section.
- 4) The PV, battery pack is working normally, and grid is normal.

6.2 Commissioning Procedure

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

- 1) Power on the system by referring to the **Startup Procedure** section 5.2.1.
- 2) Setting the parameters on the App according to user's requirement. For more information, please refer to manual "Nanuk SE Energy Storage Hybrid Inverter Application Guide"
- 3) Finish commissioning.

7. User Interface

7.1 LED

This section describes the LED panel. LED indicators include PV, BAT, GRID, BACKUP, COM, ALARM indicators. It includes the explanation of indicator states and summary of indicator states under the running state of the inverter.



LED Indicator	Status	Description
PV	On	PV input is normal.
	Blink	PV input is abnormal.
	Off	PV is unavailable.
BAT	On	Battery is charging.
	Blink	Battery is discharging (light on 2s and off 2s). Battery is abnormal (light on 1s and off 1s).
	Off	Battery is unavailable.
GRID	On	GRID is available and normal.
	Blink	GRID is abnormal.
	Off	GRID is unavailable.
BACKUP	On	BACKUP power is available.
	Blink	BACKUP output is abnormal.
	Off	BACKUP power is unavailable.
COM	Blink	Data are communicating.
	Off	No data transmission
ALARM	On	Fault has occurred and inverter shuts down.
	Blink	Alarms has occurred but inverter doesn't shut down.
	Off	No fault.

Details	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
PV normal		●	⊙	⊙	⊙	⊙	○
No PV		○	⊙	⊙	⊙	⊙	○
PV over voltage	B0						
PV under voltage	B4						
PV irradiation weak	B5	★	⊙	⊙	⊙	⊙	○
PV string reverse	B7						
PV string abnormal	B3						
On grid		⊙	●	⊙	⊙	⊙	○
Bypass output							
Grid over voltage	A0	⊙	★	⊙	⊙	⊙	○
Grid under voltage	A1						
Grid absent	A2	⊙	○	⊙	⊙	⊙	○
Grid over frequency	A3						
Grid under frequency	A4						
Grid abnormal	A6	⊙	★	⊙	⊙	⊙	○
Grid over mean voltage	A7						
Neutral live wire reversed	A8						
Battery in charger		⊙	⊙	●	⊙	⊙	○
Battery in discharge		⊙	⊙	★★	⊙	⊙	○
Battery1 absent	D1	⊙	⊙	○	⊙	⊙	○
Battery2 absent	DE						
Battery1 over voltage	D2						
Battery2 over voltage	DF						
Battery1 under voltage	D3						
Battery2 under voltage	DG						
Battery1 discharge over current	D4	⊙	⊙	★	⊙	⊙	○
Battery2 discharge over current	DH						
Battery1 over temperature	D5						
Battery2 over temperature	DJ						
Battery1 under temperature	D6						
Battery2 under temperature	DL						

Details	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
Communication loss (Inverter - BMS1)	D8						
Communication loss (Inverter - BMS2)	DP	⊙	⊙	★	⊙	⊙	○
Battery1 reversed	Dn						
Battery2 reversed	Dq						
BACKUP output active		⊙	⊙	⊙	● ⊙		⊙
BACKUP output inactive		⊙	⊙	⊙	○ ⊙		⊙
BACKUP short circuit	DB						
BACKUP over load	DC	⊙	⊙	⊙	★	⊙	○
BACKUP output voltage abnormal	D7						
BACKUP over dc-bias voltage	CP						
RS485/DB9/BLE/USB		⊙	⊙	⊙	⊙	★	○
AFCI module lost	Bb						
Inverter over temperature	C5						
Fan abnormal	C8						
Data logger lost	CH						
Meter lost	CJ	⊙	⊙	⊙	⊙	⊙	★
Meter 2 lost or device communication lost	Do						
Remote off	CN						
PV insulation abnormal	B1						
Leakage current abnormal	B2						
Internal power supply abnormal	C0						
Arc fault detection	C1						
Inverter over dc-bias current	C2	⊙	⊙	⊙	⊙	⊙	●
Inverter relay abnormal	C3						
GFCI abnormal	C6						
System type error	C7						
Unbalance Dc-link voltage	C9						
Dc-link over voltage	CA						

Details	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
Internal communication loss(E-M)	D9						
Internal communication loss(M-D)	DA						
Software incompatibility	CC						
Internal storage error	CD	◎	◎	◎	◎	◎	●
Data inconsistency	CE						
Inverter abnormal	CF						
Boost abnormal	CG						
Inverter in power limit state	CL						
Dc-dc abnormal	CU						
Battery communication cable configuration error	DU	◎	◎	★	◎	◎	○
Battery power cable configuration error	DY						

Remark: ● Light on ○ Light off ◎ Keep original status

★ Light on 1s and off 1s ★★ Light on 2s and off 2s

8. Maintenance



Caution

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

8.1 Routine Maintenance

Items	Check Content	Maintain Content	Maintenance Interval
Inverter output status	Statistically maintain the status of electrical yield and remotely monitor its abnormal status.	N/A	Weekly
Inverter running status	Check that the inverter is not damaged or deformed. Check for normal sound emitted during inverter operation. Check and ensure that all inverter communications are running well.	If there is any abnormal phenomenon, replace the relevant parts.	Monthly

Inverter electrical connections	Check that all AC, DC and communication cables are securely connected. Check that PGND cables are securely connected; Check that all cables are intact and free from aging.	If there is any abnormal phenomenon, replace the cable or re-connect it.	Semiannually
Inverter cleaning	Check periodically that the heat sink is free from dust and blockage.	Clean periodically the heat sink.	Yearly

8.2 Inverter Troubleshooting

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

Code	Alarm Information	Suggestions
A0	Grid over voltage	1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal for a short time, and no action is required. 2. If the alarm occurs repeatedly, contact the local power station. After receiving approval of the local power station, revise the electrical protection parameters settings on the inverter through the App.
A1	Grid under voltage	
A3	Grid over frequency	
A4	Grid under frequency	3. If the alarm persists for a long time, check whether the AC circuit breaker /AC terminals is disconnected or not, or if the grid has a power outage.
A2	Grid absent	Wait till power is restored.
A7	Grid high average voltage	1. Check the actual working conditions of the power grid and the configuration of regulatory parameters. 2. Contact the IGLU TECH support.
B0	PV over voltage	Check whether the maximum voltage of a single string of input PV modules is greater than the allowable voltage. If the maximum voltage is higher than the standard voltage, modify the number of PV module connection strings.
B1	PV insulation abnormal	1. Check the insulation resistance against the ground for the PV strings. If a short circuit has occurred, rectify the fault. 2. If the insulation resistance against the ground is less than the default value in a rainy environment, set insulation resistance protection on the App.

B2	Leakage current abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered to the normal operating status after the fault is rectified. 2. If the alarm occurs repeatedly, contact IGLU TECH support
B4	PV under voltage	1. If the alarm occurs occasionally, possibly the external circuits are abnormal accidentally. The inverter automatically recovers to the normal operating status after the fault is rectified. 2. If the alarm occurs repeatedly or last a long time, check whether the insulation resistance against the ground of PV strings is too low.
B7	PV string reverse	Check and modify the positive and negative polarity of the input of the circuit string.
Bb	AFCI module lost	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly, please contact IGLU TECH support.
BC	Surge Protection Devices (SPD) defective	Contact IGLU TECH support.
C0	Internal power supply abnormal	1. If the alarm occurs occasionally, the inverter can be automatically restored, no action required. 2. If the alarm occurs repeatedly, please contact IGLU TECH support
C1	Arc fault detection	1. Check if there is any damage or poor contact in the PV line connections. 2. If the alarm occurs occasionally, the inverter can be automatically recovered and PV connect is normal, no action is required. 3. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact the customer service center.
C2	Inverter over dc-bias current	1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal for a short time, and no action is required. 2. If the alarm occurs repeatedly, and the inverter fails to generate power, contact IGLU TECH support
C3	Inverter relay abnormal	1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal for a short time, and no action is required.

		2.If the alarm occurs repeatedly, pls. refer to the suggestions or measures of Grid over voltage. and the inverter fails to generate power, contact IGLU TECH support. If there is no abnormality on the grid side, the machine fault can be determined. (If you open the cover and find traces of damage to the relay, it can be concluded that the machine is faulty.) And please contact IGLU TECH support
CN	Remote off	1. Local manual shutdown is performed in APP. 2. The monitor executed the remote shutdown instruction. 3. Remove the communication module and confirm whether the alarm disappears. If it does, replace the communication module. Otherwise, please contact IGLU TECH support
C5	Inverter over temperature	1. If the alarm occurs occasionally, the inverter can be automatically restored, no action required. 2. If the alarm occurs repeatedly, pls. check the installation site for direct sunlight, good ventilation, and high ambient temperature (Such as installed on the parapet). If the ambient temperature is lower than 45 ° C and the heat dissipation is good, contact IGLU TECH support.
C6	GFCI abnormal	1. If the alarm occurs occasionally, it could have been an occasional exception to the external wiring, the inverter can be automatically recovered, no action required. 2. If it occurs repeatedly or cannot be recovered for a long time, please contact IGLU TECH support to report repair.
C7	System type error	Contact the IGLU TECH support.
C8	Fan abnormal	1. If the alarm occurs occasionally, pls. restart the inverter. 2. If it occurs repeatedly or cannot be recovered for a long time, check whether the external fan is blocked by foreign objects. Otherwise, contact IGLU TECH support.
C9	Unbalance Dc-link voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact IGLU TECH support.
CA	Dc-link over voltage	

CB	Internal communication error	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact IGLU TECH support.
CC	Software incompatibility	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CD	Internal storage error	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact IGLU TECH support.
CE	Data inconsistency	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact IGLU TECH support.
CF	Inverter abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact IGLU TECH support.
CG	Boost abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact IGLU TECH support.
CL	Inverter in power limit state	1. Check the actual working conditions of the power grid and the configuration of regulatory parameters. 2. Contact IGLU TECH support.
CJ	Meter lost	1. Check the meter parameter Settings 2. Local APP checks that the communication address of the inverter is consistent with that of the electricity meter 3. The communication line is connected incorrectly or in bad contact 4. electricity meter failure. 5. Exclude the above, if the alarm continues to occur, Please contact IGLU TECH support.

D1	Battery1 absent	Connect the battery
DE	Battery2 absent	
D2	Battery1 over voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. Check that the battery overvoltage protection value is improperly set. 3. The battery is abnormal. 4. If exclude the above, the alarm continues to occur, Please contact IGLU TECH support.
DF	Battery2 over voltage	
D3	Battery1 under voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. Check the communication line connection between BMS and inverter (lithium battery). 3. The battery is empty or the battery voltage is lower than the SOC cutoff voltage. 4. The battery undervoltage protection value is improperly set. 5. The battery is abnormal. 6. If exclude the above, the alarm continues to occur, Please contact IGLU TECH support.
DG	Battery2 under voltage	
D4	Battery1 discharger over current	1. Check whether the battery parameters are correctly set. 2. Battery undervoltage. 3. Check whether a separate battery is loaded and the discharge current exceeds the battery specifications. 4. The battery is abnormal. 5. If exclude the above, the alarm continues to occur, Please contact IGLU TECH support.
DH	Battery2 discharge over current	
D5	Battery1 over temperature	1. If the alarm occurs repeatedly, please check whether the installation site is in direct sunlight and whether the ambient temperature is too high (such as in a closed room). 2. If the battery is abnormal, replace it with a new one. 3. If exclude the above, the alarm continues to occur, Please contact IGLU TECH support.
DJ	Battery1 over temperature	
D6	Battery1 under temperature	

DL	Battery2 under temperature	
D7	BACKUP output voltage abnormal	1. Check whether the BACKUP voltage and frequency Settings are within the specified range. 2. Check whether the BACKUP port is overloaded. 3. When not connected to the power grid, check whether output is normal. 4. If exclude the above, the alarm continues to occur, Please contact IGLU TECH support.
D8	Communication error (Inverter-BMS1)	1. Check whether the battery is disconnected. 2. Check whether the battery is well connected with the inverter.
DP	Communication error (Inverter-BMS2)	3. Confirm that the battery is compatible with the inverter. It is recommended to use CAN communication. 4. Check whether the communication cable or port between the battery and the inverter is faulty. 5. If exclude the above, the alarm continues to occur, Please contact IGLU TECH support.
Do	Meter 2 lost or device communication lost	1. Check the meter2 parameter Settings. 2. Local APP checks that the communication address of the inverter is consistent with that of the electricity meter. 3. The communication line is connected incorrectly or in bad contact. 4. Electricity meter failure. 5. Exclude the above, if the alarm continues to occur, please contact the customer service center.
D9	Internal communication loss(E-M)	1. Check whether the communication cables between BACKUP, electricity meter and inverter are well connected and whether the wiring is correct
DA	Internal communication loss(M-D)	2. Check whether the communication distance is within the specification range 3. Disconnect the external communication and restart the electricity meter and inverter. 4. If exclude the above, the alarm continues to occur, Please contact IGLU TECH support.
CU	Dcdc abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, please check:

		1) Check whether the MC4 terminal on the PV side is securely connected. 2) Check whether the voltage at the PV side is open circuit, ground to ground, etc. If exclude the above, the alarm continues to occur, Please contact IGLU TECH support.
CP	BACKUP over dc-bias voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact IGLU TECH support.
DB	BACKUP short circuit	1. Check whether the live line and null line of BACKUP output are short circuited. 2. If it is confirmed that the output is not short-circuited or an alarm, please contact customer service to report for repair. (After the troubleshooting of alarm problems, BACKUP switch needs to be manually turned on during normal use.)
DC	BACKUP over load	1. Disconnect the BACKUP load and check whether the alarm is cleared 2. If the load is disconnected and the alarm is generated, please contact the customer service. (After the alarm is cleared, the BACKUP switch needs to be manually turned on for normal use.)
Dn	Battery1 reversed	1.Check whether the battery power line (positive and negative) is reversed with the inverter. 2.Check whether the battery power line (positive and negative) is well connected with the inverter. 3.If exclude the above, the alarm continues to occur, please contact IGLU TECH support.
Dq	Battery2 reversed	
DU	Battery communication cable configuration error	1.Check the Battery connection type setting of APP is consistent with the current actual battery connection configuraion. 2.Check whether the battery1 and battery2 Communication interface is reversed with the inverter. 3.If exclude the above, the alarm continues to occur, please contact IGLU TECH support.
DY	Battery power cable configuration error	1.Check the Battery connection type setting of APP is consistent with the current actual battery connection configuraion.

		2. Check whether the battery1 and battery2 power line interface is reversed with the inverter. 3. If exclude the above, the alarm continues to occur, please contact IGLU TECH support.
P1	Parallel ID warning	1. Check the parallel cable connections. 2. Contact IGLU TECH support.
P2	Parallel SYN signal warning	1. Check the parallel cable connections. 2. Contact IGLU TECH support.
P3	Parallel BAT abnormal	Connect the battery.
P4	Parallel GRID abnormal	Connect the battery.
P5	Phase sequence abnormal	1. Check the phase sequence of grid. 2. Contact IGLU TECH support.

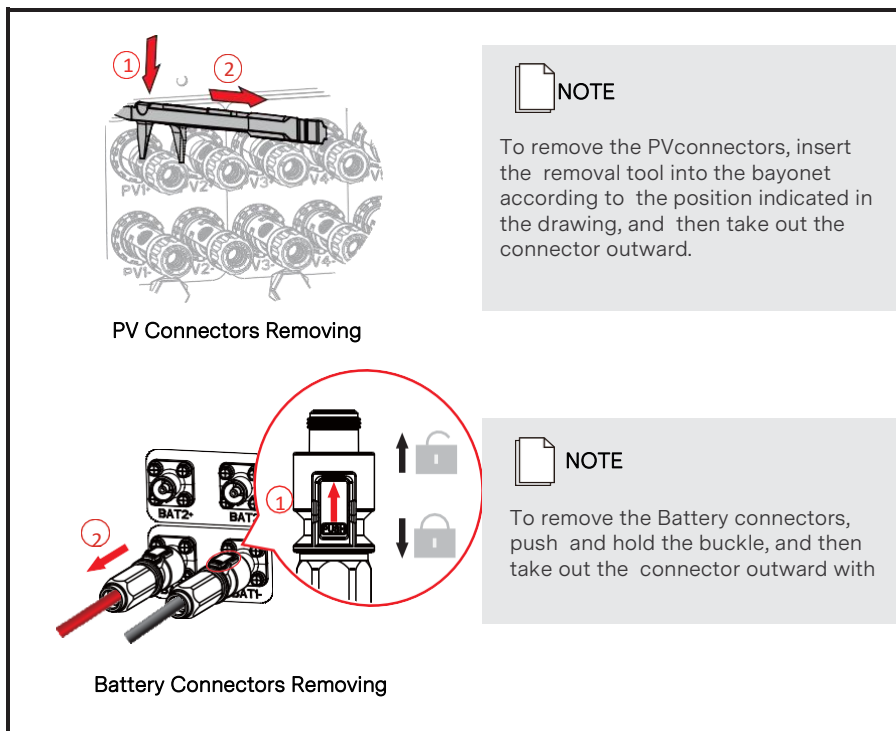
8.3 Removing the Inverter

Warning

Before removing DC input connector, double check DC input switch is turned to OFF to avoid inverter damage and personal injury.

Perform the following procedures to remove the inverter:

Step 1. Disconnect all cables from the inverter, including communications cables, DC input power cables, AC output power cables, and PGND cable, as shown below.



Step2. Remove the inverter from the mounting bracket.

Step 3. Remove the mounting bracket

9. Technical Specification

Model	NANUK SE 12KHB-D3	NANUK SE 15KHB-D3	NANUK SE 20KHB-D3	NANUK SE 25KHB-T3	NANUK SE 30KHB-T3
Input (PV)					
Max. PV Input Power	30,000W	30,000W	30,000W	45,000W	45,000W
Max. PV Voltage	1,000V				
Start-up Voltage	150V				
MPPT Operating Voltage Range	160V-950V				
MPPT Voltage Range at Rated Power	210V-800V	260V-800V	350V-800V	290V-800V	350V-800V
Max. Input Current per MPPT	32A/32A			32A/32A/32A	
Max. Short Circuit Current per MPPT	40A/40A			40A/40A/40A	
String per MPPT	4(2/2)			6(2/2/2)	
Nos. of MPPT	2			3	
Input / Output (Battery)					
Compatible battery type	Lithium-ion/Lead-acid				
Nominal Battery Voltage	512V				
Battery Voltage Range	120V-800V				
Battery Voltage Range at Rated Power	230V-800V	285V-800V	380V-800V	190V-800V	230V-800V
Max. Charge/Discharge Current	60A/60A			2*75A / 2*75A	
Max. Charge/Discharge power	30,000W /14,400W	30,000W /18,000W	30,000W/ 24,000W	45,000W/ 30,000W	45,000W/ 36,000W
Input / Output (Grid)					
Nominal AC Output Power	12,000W	15,000W	20,000W	25,000W	30,000W
Max. AC Output Apparent Power	13,200VA	16,500VA	27,500VA	27,500VA	33,000VA
Max. AC Output Power (PF=1)	13,200W	16,500W	22,000W	27,500W	33,000W
Max. AC Output Current	3*20A	3*25A	3*33.3A	3*41.7A	3*50A
Max. Single Phase power	10,000VA	10,000VA	10,000VA	11,000VA	11,000VA
Max. Input Power	36000VA	40,000VA	40,000VA	45,000VA	45,000VA
Max. Input current	3*54.5A	3*60.6A	3*60.6A	3*68.2A	3*68.2A
Nominal Grid Voltage	Three Phase 380V/400V/415V,3W+N+PE				
Grid Voltage Range *	277V-520V (Adjustable)				
Nominal Grid Frequency	50Hz/60Hz				
Grid Frequency Range *	45Hz-55Hz/55Hz-65Hz (Adjustable)				
Power Factor	> 0.99 @rated power (Adjustable 0.8 LG - 0.8 LD)				
THDI	<3% (Rated Power)				

Output (Backup)					
Nominal Output Power	12,000W	15,000W	20,000W	25,000W	30,000W
Nominal Output Current	3*18.2A	3*22.7A	3*30.3A	3*37.9A	3*45.5A
Max. Single Phase Power	10,000VA	10,000VA	10,000VA	11,000VA	11,000VA
Peak Output Apparent Power (5min)	14,400VA	18,000VA	24,000VA	30,000VA	36,000VA
Peak Output Apparent Power (10s)	18,000VA	22,500VA	30,000VA	37,500VA	45,000VA
Nominal Output Voltage	Three Phase 380V/400V/415V, 3W+N+PE				
Nominal Output Frequency	50Hz/60Hz				
Transfer Time	10ms(typical), 20ms(max)				
THDV	<3% @100% R Load				
Protection					
Protection Category	Class I				
DC Switch	Yes				
Anti-islanding Protection	Yes				
AC Overcurrent Protection	Yes				
DC/AC Overvoltage Protection	DC Type II, AC Type III				
AC Short Circuit Protection	Yes				
DC Reverse Protection	Yes				
Surge Arrester	DC Type II, AC Type II				
Insulation Resistance Detection	Yes				
Leakage Current Protection	Yes				
AFCI	Optional				
RSD	Optional				
General					
Max. Operation Altitude	4000m				
Ingress Protection Degree	IP66				
Operating Temperature Range	-25°C~60°C (>45°C derating)				
Relative Humidity	0~100%				
Cooling Method	Natural Cooling		Smart Fan Cooling		
Noise emission	Max. 35dB		Max. 45dB		Max. 60dB
Mounting	Wall bracket				
Dimensions (W*H*D)	660mm*596mm*235mm				
Weight	45Kg		55Kg		
AC Connection	Terminal block				
PV Connection	MC4/H4				
Battery Connection	dedicated connector				

HMI&COM	
Display	Bluetooth & APP + LED
Communication Interface	RS485/CAN (for BMS), RS485, DRM, RS485 (for Meter), 3*DO, 2*DI; Optional: LAN
Certification	
Safety	IEC 62109-1&2
EMC	IEC/EN 61000
Warranty	5 Years

Remarks: *The range of output voltage and frequency may vary depending upon different grid codes.
Specifications are subject to change without advance notice



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