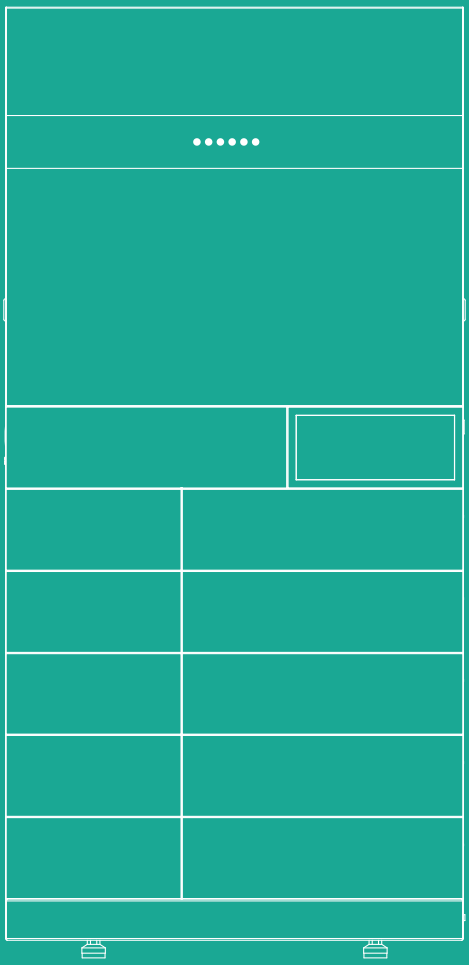
STRONG ENERGY

Three-phase Powerall
ALFRED

User Manual



We Make Green Energy Strong

Revision History

Version	Issued	Description
V1.0	28th Jun 2024	First Release

Preface

ABOUT THIS MANUAL

This manual describes the installation, electrical connection, commissioning and maintenance, APP operation of the Three-phase Powerall product. 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

Three phase Powerall must be installed by professional electrical engineers who have obtained relevant qualifications.

SCOPE

This manual is applicable to the following Powerall products:

8K

10K

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 ESS inverter to reduce the waste of you resource.

Table of Contents

1. Safety

Before using the Powerall product, please read all instructions and cautionary markings on the unit and manual. Put the instructions where you can take them easily.

The three phase Powerall product of our 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

Safety Symbol	Description
	Danger of high voltage! Only qualified personnel may perform work on the inverter.
	Residual voltage exists after the inverter is powered off. It takes 5 minutes for system to discharge to a safe voltage.
	Danger of hot surface.
	Do not disconnect under load! Otherwise there will be a danger of fire.
	Environmental Protection Use Period.
	Refer to the operating instructions.
	Don't dispose of the inverter with the household waste.
	Grounding terminal.

1.2 SAFETY PRECAUTION

Installation, maintenance and connection of Powerall product must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and requirements of local power authorities and/or companies.

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

Static electricity may damage electronic components. Appropriate methods must be adopted to prevent such damage to the inverter, otherwise the inverter may be damaged and the warranty annulled.

Ensure the output voltage of the proposed PV array is lower than the maximum rated input voltage of the Powerall product, otherwise the inverter may be damaged and the warranty annulled.

PV modules should have an IEC61730 class A rating.

After the Powerall product is powered off, the remaining electricity and heat may still cause electric shock and body burns. Do not touch parts of Powerall product for 10 minutes after disconnection from the power sources.

Prohibit inserting or pulling the AC and DC terminals when the Powerall product is running.

Ensure children are kept away from inverters.

The temperature of some parts of the Powerall product may exceed 60°C during operation. Do not touch the inverter during operation to avoid being burnt.

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.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Completely isolate the Powerall product before maintaining. Completely isolate the Powerall product, should turn off the PV switch and disconnect the PV terminal, battery terminal, and AC terminal.

In Australia, the Powerall product internal switching does not maintain the neutral neutral continuity. And neutral integrity must be addressed by external connection arrangements.

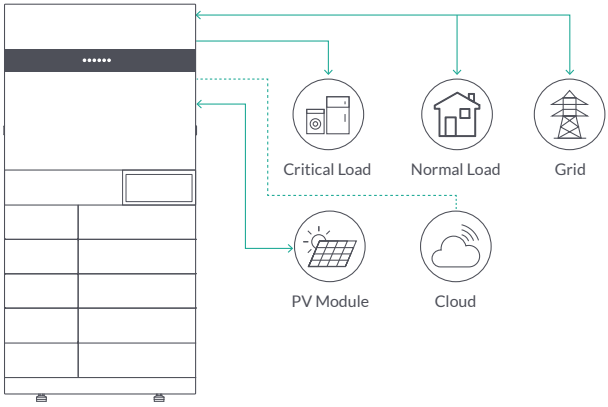
Don't connect Powerall product in the following ways:
The BACKUP Port should not be connected to the grid;
A single PV panel string should not be connected to two or more Powerall products.

2. Product Introduction

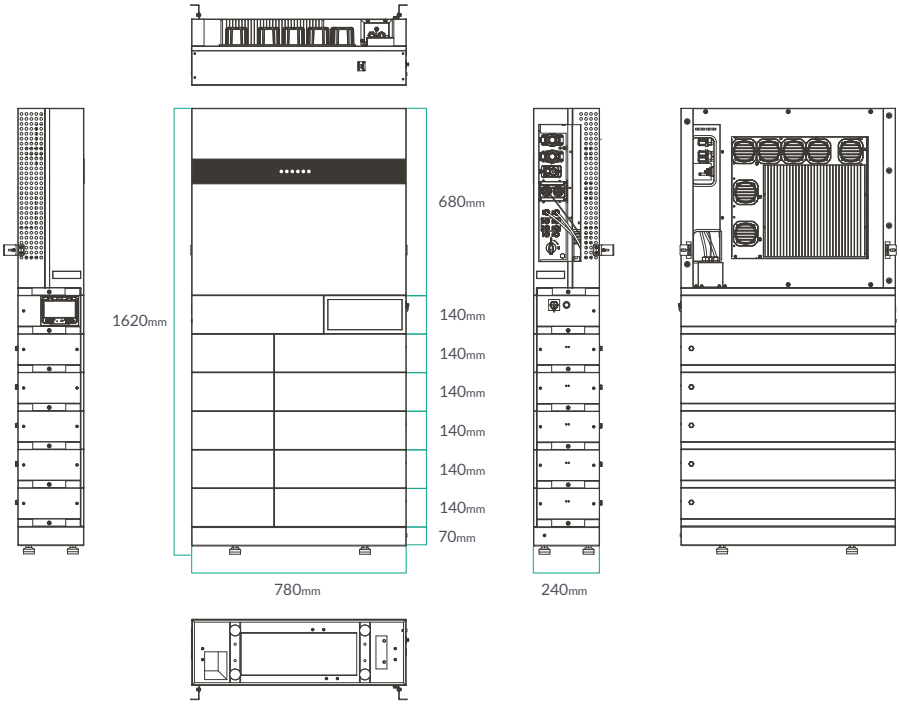
2.1 OVERVIEW
Three-phase Powerall Product
The Powerall products are high-quality products which can convert solar energy to AC energy and store energy into battery.

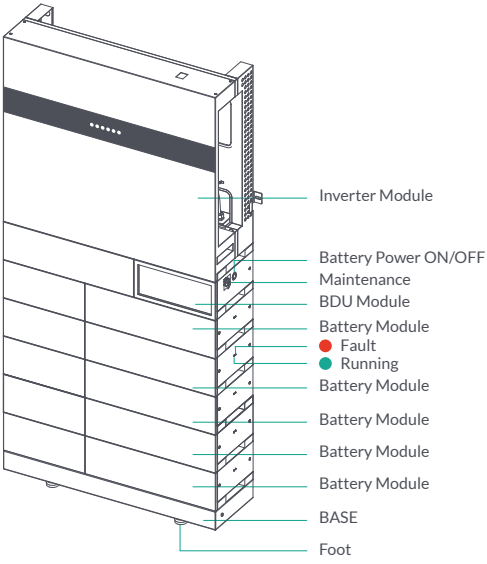
The Powerall product can be used to optimize self consumption, store in the battery for future use or feed into public grid. Work mode depends on PV energy and user's preference. It can provide power for emergency use during the grid lost by using the energy from battery and inverter (generated from PV).

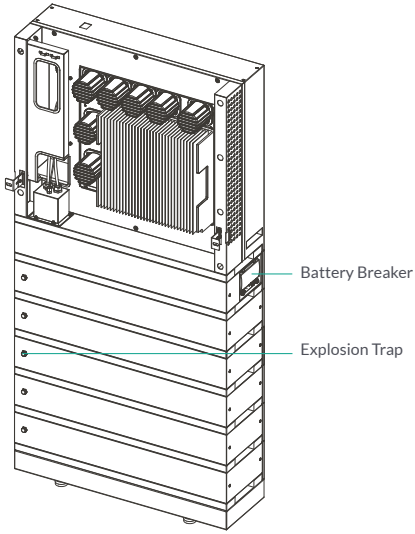
Powerall Application System



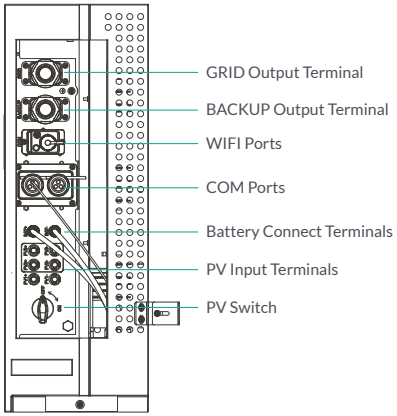
2.2 PRODUCT APPEARANCE





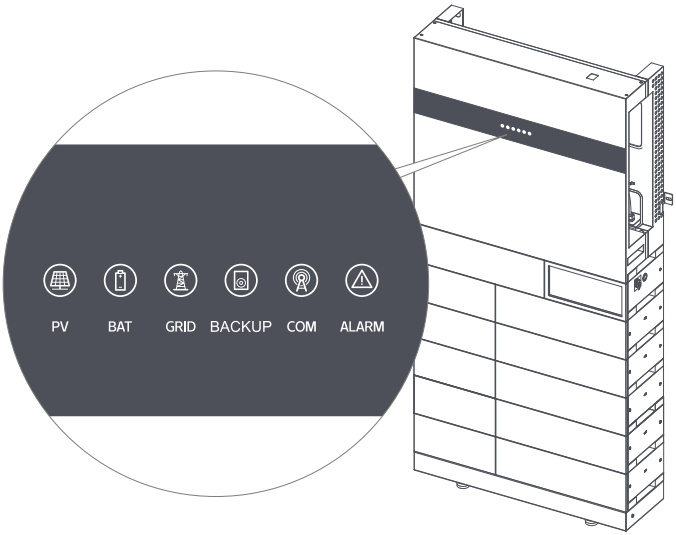


Inverter Module Interfaces



2.2.1 LED Indicators

- PV
- BAT
- GRID
- BACKUP
- COM
- ALARM



2.3 MODEL DEFINITION

The letters in the product model have the specific information.

Take 8K as an example.

Power (8000W)

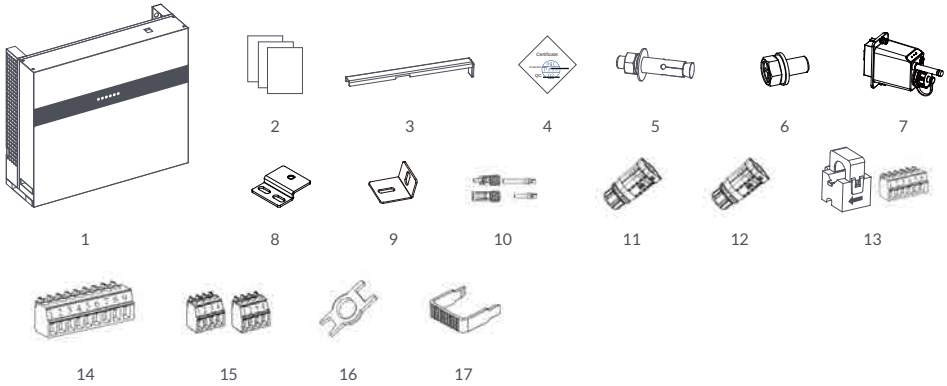
8K

3. Installation

3.1 PACKING LIST

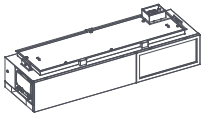
After unpacking, please check the following packing list carefully for any damage or missing parts. If you find any part damage or missing, please contact the supplier for help.

Inverter Packaging List



Serial Number	Items	Quantity (PCS)
1	Inverter	1
2	Packaging List	1
3	Removal Tool for Grid/BACKUP Connector Shell	1
4	Certificate Card	1
5	M8 Expansion Screws	2
6	Screws M5*10	6
7	Smart WiFi Communicator	1
8	Bracket A	2
9	Bracket B	2
10	PV Terminal Connector Group	3
11	Grid Connector	1
12	BACKUP Connector	1
13	CT Pack	1
14	9-Pin Terminal	1
15	4-Pin Terminal	2
16	Removal Tool for 1 PV/BAT Connector	1
17	Removal Tool for Grid/BACKUP Connector	1

BDU Packaging List


18

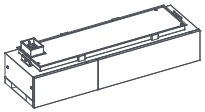

19


20


21

Serial Number	Items	Quantity (PCS)
18	BDU Module	1
19	Packaging List	1
20	Certificate Card	1
21	Screws M5*10	2

Battery Packaging List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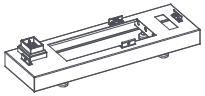
24


25

Serial Number	Items	Quantity (PCS)
22	Battery Module	1
23	Packaging List	1
24	Certificate Card	1
25	Screws M5*10	2

BASE Packaging List (For 5-6 Battery Modules)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27

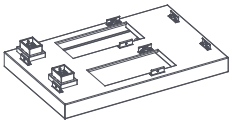

28


29


30

Serial Number	Items	Quantity (PCS)
26	BASE	1
27	Packaging List	1
28	Certificate Card	1
29	Ground Cable	1
30	Screws M5*12	1

BASE Packaging List (For 7-10 Battery Modules)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33


34


35

Serial Number	Items	Quantity (PCS)
31	BASE	1
32	Packaging List	1
33	Certificate Card	1
34	Ground Cable	1
35	Screws M5*12	1

BOX Packaging List (For 7-10 Battery Modules)


36


37


38


39

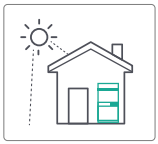

40

Serial Number	Items	Quantity (PCS)
36	BOX	1
37	Packaging List	1
38	Certificate Card	1
39	Screws M5*10	4
40	Bracket	2

3.2 SELECTING THE MOUNTING LOCATION

3.2.1 Installation Environment Requirements

a. The Powerall product protection class is IP65 and can be mounted indoors or outdoors.
b. To ensure optimum operation and long service life, the ambient temperature must be below 50°C.
c. Do not install the inverter in a rest area since it will cause noise during operation.
d. The inverter carrier must be fire-proof. Do not mount the inverter on flammable building materials.
e. Ensure that the wall meets the requirements of the inverter installation.
f. Product label and warning symbols shall be clear to read after installation.
g. The installation height should be reasonable and make sure it is easy to operate and view the display.
h. Please avoid direct sunlight, rain exposure, snow cover.



✓ No direct sunlight

✗ Direct sunlight

✓ No rain exposure

✗ Rain exposure

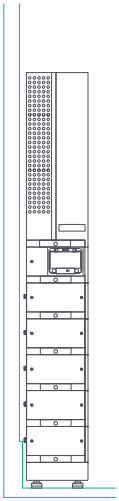
✓ No snow cover

✗ Snow cover

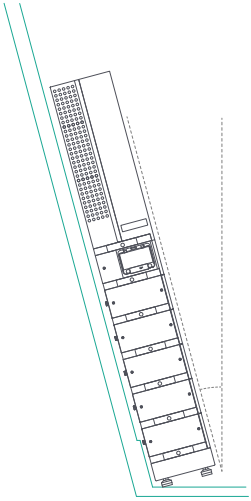
3.2.2 Mounting Requirements

Mount the inverter vertically. The device can not be installed with a wrong mode and the connection area must point downward.

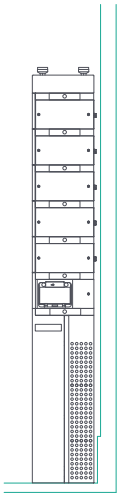
✓ Upright



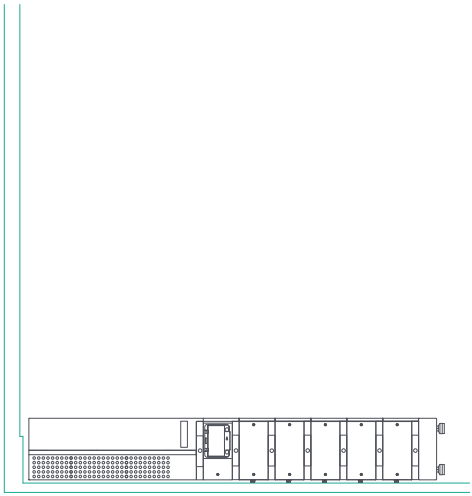
✗ Lean back



⊗ Upside-down

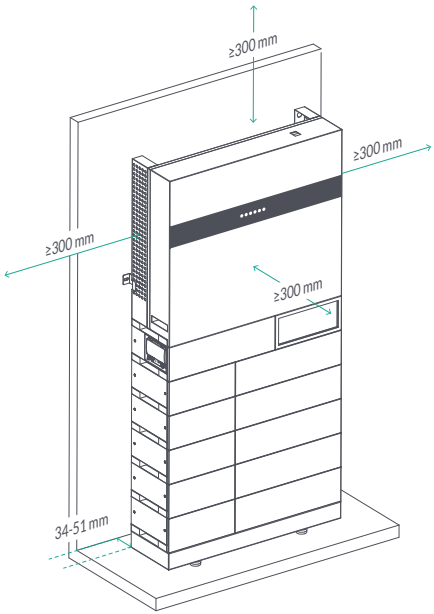


⊗ Horizontally



3.2.3 Installation Space Requirements

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



⚠ WARNING

The equipment must be installed away from exposure to direct sunlight, rain and snow.

Keep at least 300mm clean area around the equipment.

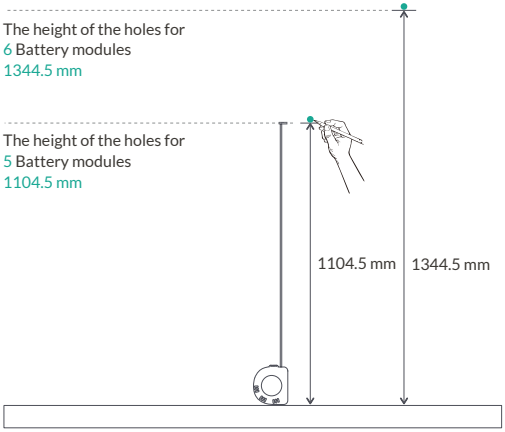
3.3 MOUNTING

Before mounting the Powerwall product, you have to prepare expansion screws and a security screw.

3.3.1 Mounting Method (For 5-6 Battery Modules)

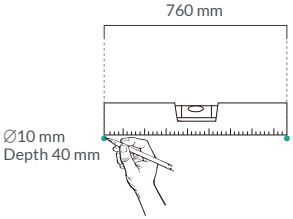
Step 1.
Installation dimension drawing

1. Measure the height of the holes according to the number of battery modules and mark the positions of brackets with a marker pen.



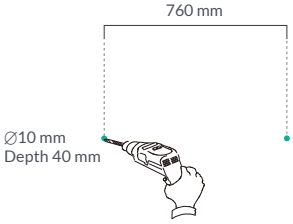
2. Use a spriti level ruler to measure the distance between the 2 holes and mark the position of the other hole on the wall.

Set bracket level
Mark the holes position on the wall



3. Drill 2 holes in total. Make sure the drilling depth of holes is at least 40mm when you drill holes with the driller.

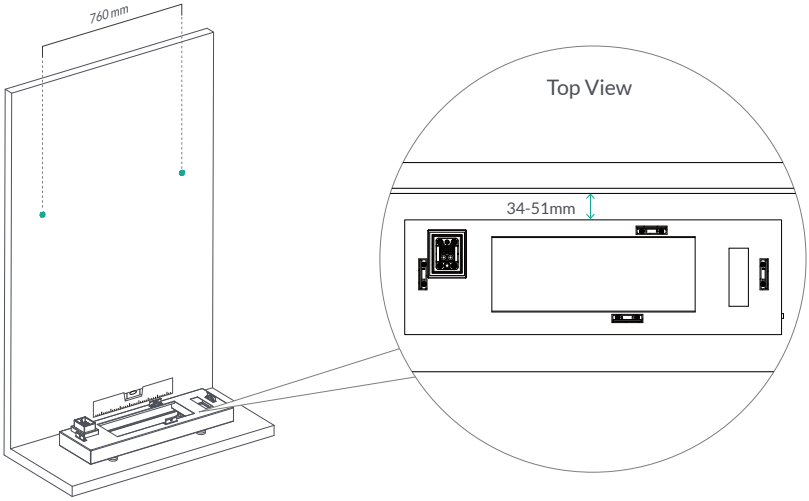
Drill the holes
Ø10 mm
Depth 40 mm



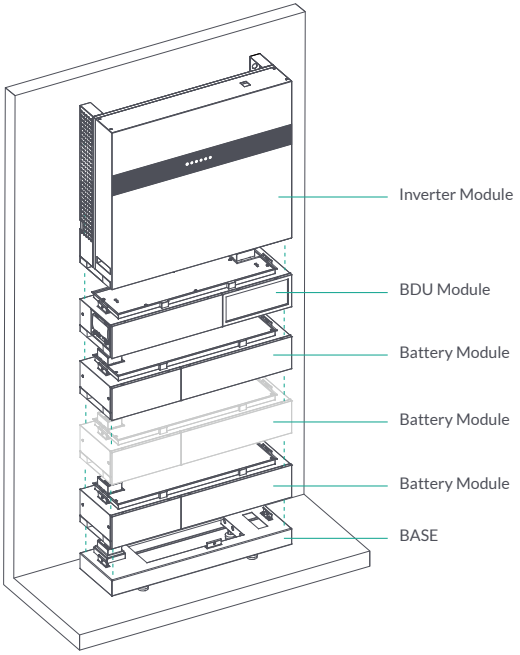
⚠ DANGER
Before drilling the hole on the wall, ensure no damage on the electric wire and/or water pipe inside the wall.

Step 2.
Pedestal Installation (Using 5 battery modules as an example)

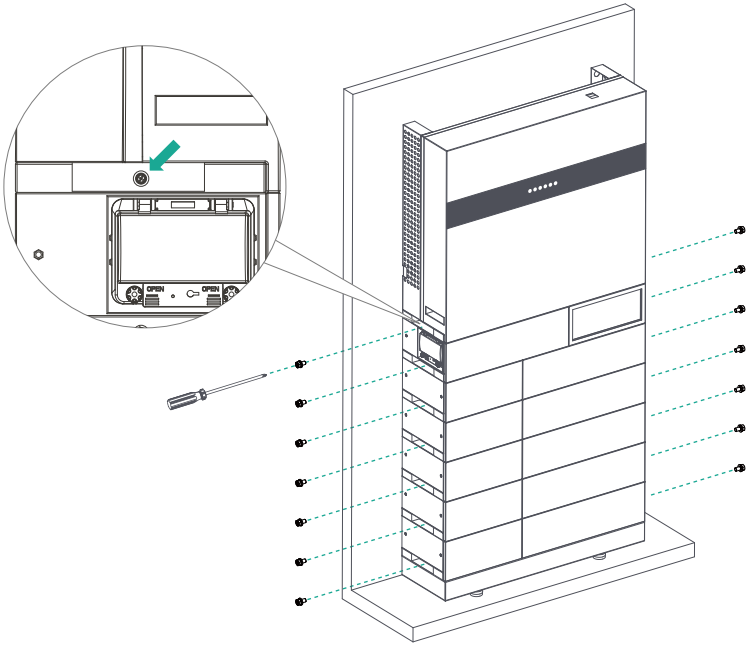
1. Use spirit level to position the BASE (Serial No.26) so that to make sure it is aligned with the ground. Measure the distance between the BASE and the wall, to keep the BASE in right distance from the wall.

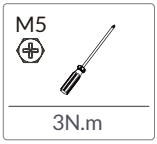


2. Stack Battery modules (Serial No.22), BDU Module (Serial No.18) and Inverter Module (Serial No.1) in order on the BASE. Mount the battery modules to the BASE on the ground. Mount the BDU module to the top of battery modules. Mount the inverter module to the top of BDU module.

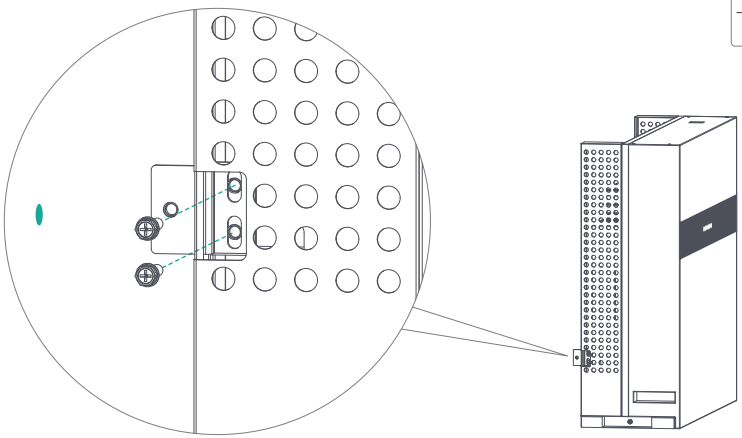


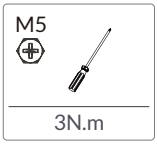
3. Install the Screws M5 (Serial No.6, 21, 25) on both sides of the inverter module, BDU module and each battery modules.



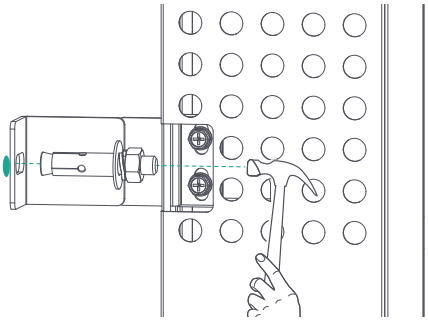


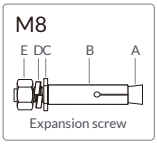
4. Install the Support Rack, install Bracket A (Serial No.8) with Screws M5 (Serial No.6) on both side of the inverter module.



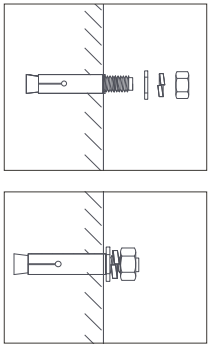


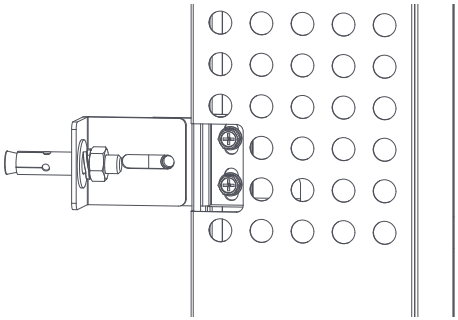
5. Place the Bracket B (Serial No.9) on the wall. Knock the M8 Expansion Screw (Serial No.5) into the hole with a hammer. Note: Do not remove the nut unit in this step.

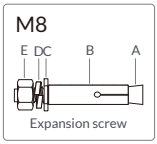




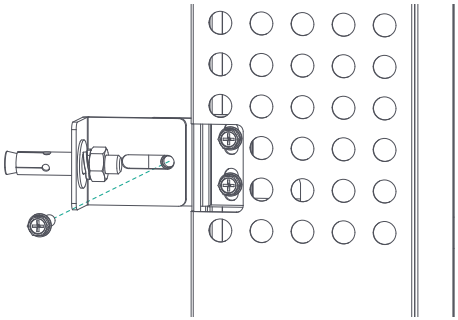
6. After tightening 2 buckles, the expansion bolts are tight and not loose, and then unscrew the bolts, spring washer, gasket. (Part C, D, E)

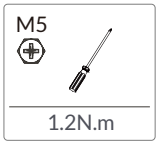




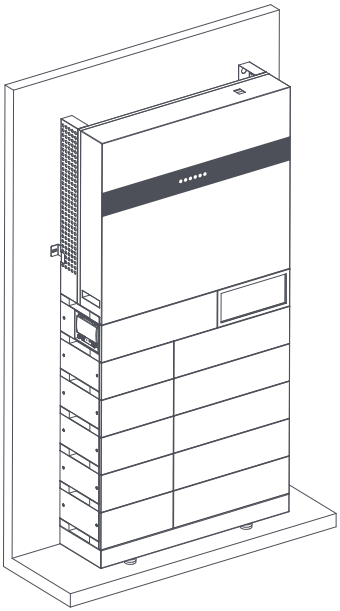


7. Then lock the inverter with bracket A to bracket B using the M5 screws. .





8. After the above steps, check if it is firmly and stable fixed to the wall.



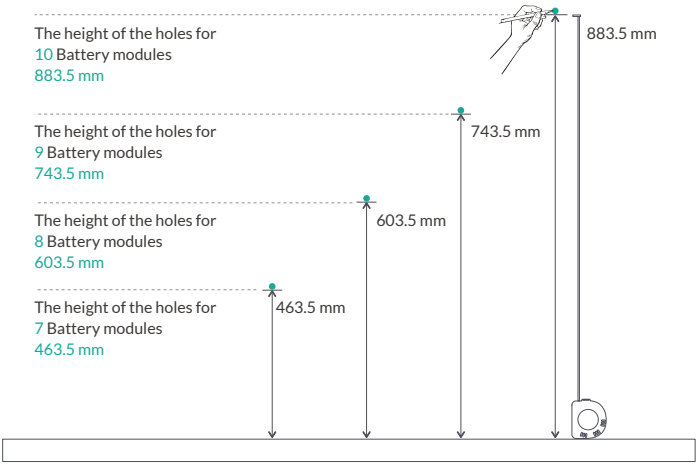
DANGER
Before frilling the hole on the wall, ensure no damage on the electric wire and/or water pipe inside the wall.

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

3.3.2 Mounting Method (For 7-10 Battery Modules)

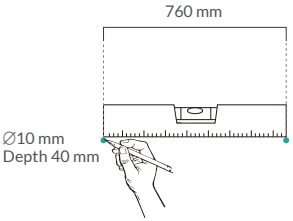
Step 1.
Installation dimension drawing

1. Measure the height of the holes according to the number of battery modules and mark the positions of brackets with a marker pen.



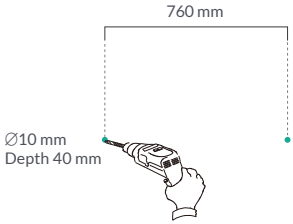
2. Use a spriti level ruler to measure the distance between the 2 holes and mark the position of the other hole on the wall.

Set bracket level
Mark the holes position on the wall



3. Drill 2 holes in total. Make sure the drilling depth of holes is at least 40mm when you drill holes with the driller.

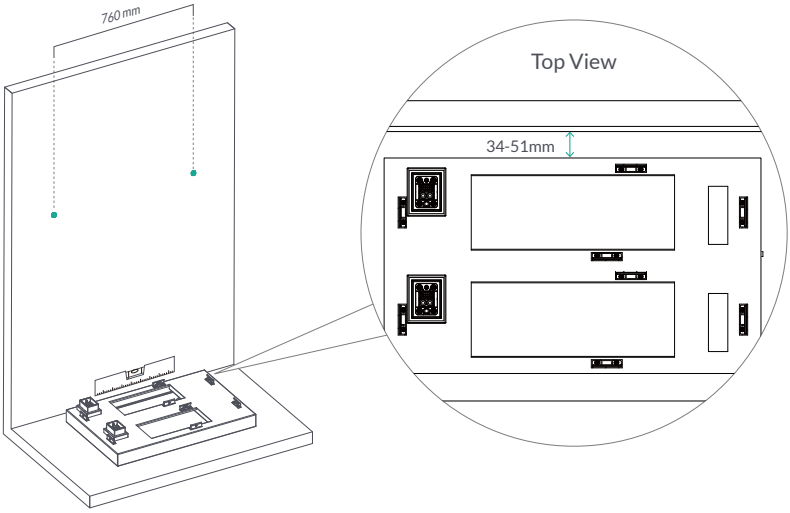
Drill the holes
Ø10 mm
Depth 40 mm



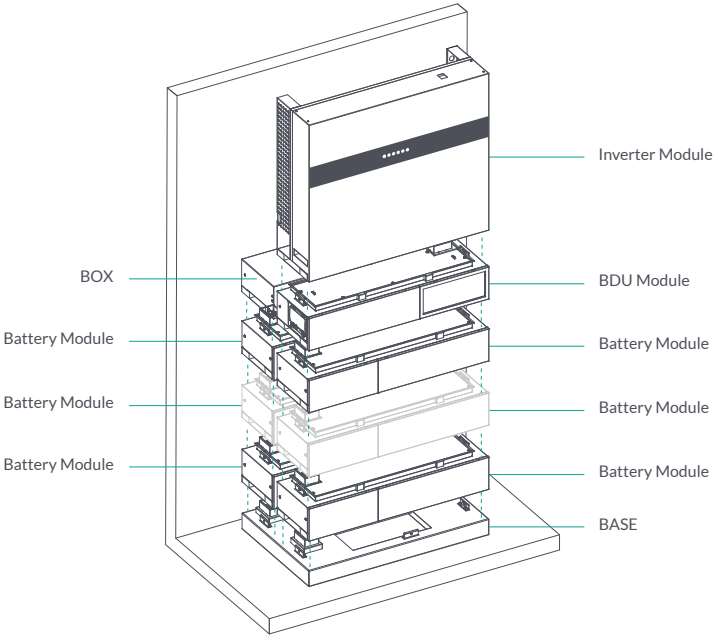
⚠ DANGER
Before drilling the hole on the wall, ensure no damage on the electric wire and/or water pipe inside the wall.

Step 2.
Pedestal Installation (Using 10 battery modules as an example)

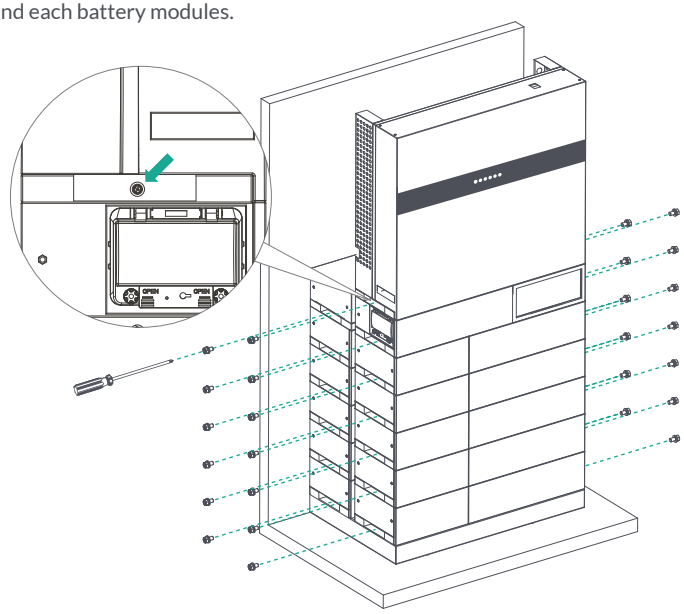
1. Use spirit level to position the BASE (Serial No.31) so that to make sure it is aligned with the ground. Measure the distance between the BASE and the wall, to keep the BASE in right distance from the wall.

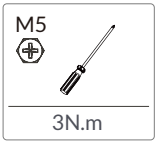


2. Stack the Battery Modules (Serial No.22), BOX (Serial No.36) in order on the back row of the BASE. Then stack the Battery Modules (Serial No.22), BDU Module (Serial No.18) and Inverter Module (Serial No.1) in order on the front row of the BASE.

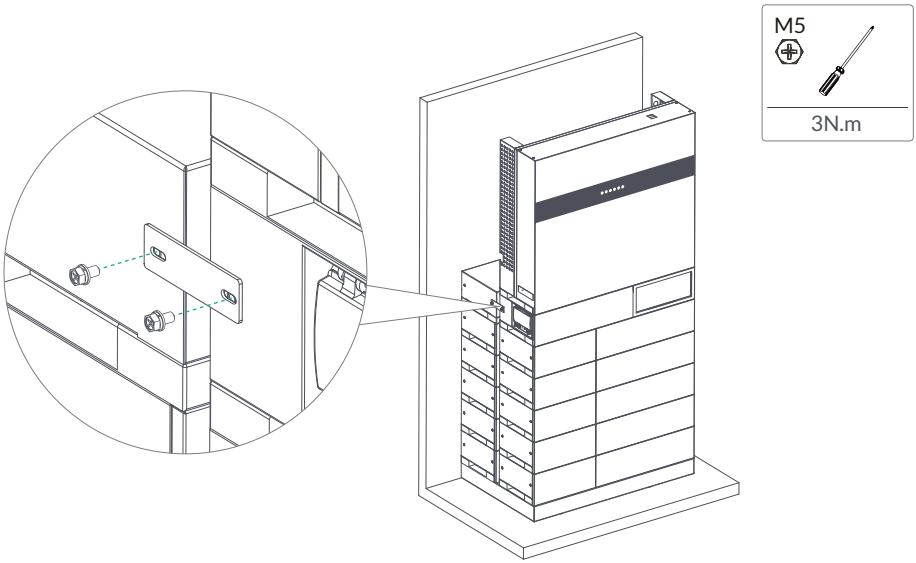


3. Install the Screws M5 (Serial No.6, 21, 25, 39) on both sides of the inverter module, BDU module, BOX and each battery modules.



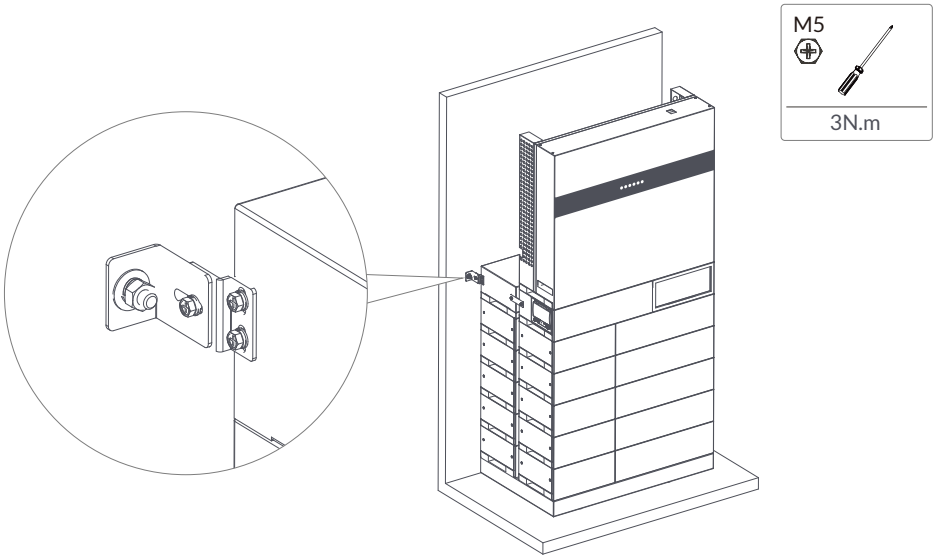


2. Install the Screws M5 (Serial No.39) to the Bracket (Serial No.40) on both sides of the BDU module and BOX.

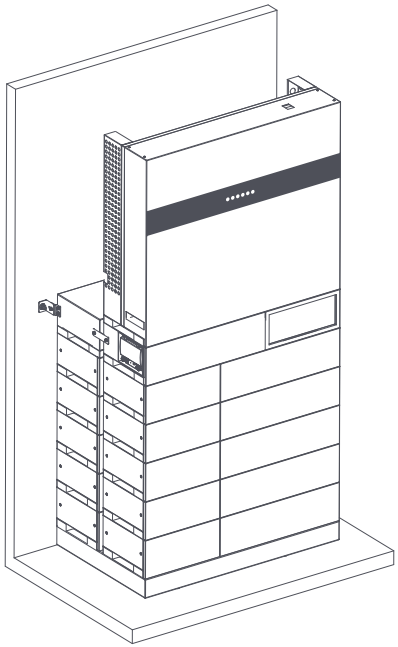


3. Install the Support Rack, install the Bracket A (Serial No.8) and Bracket B (Serial No.9) with Screws M5 (Serial No.6) on both side of the BOX.

Installation details of the support rack can refer back to Page 16, 17 Step 4-7.



4. After the above steps, check if it is firmly and stable fixed to the wall.



DANGER
Before frilling the hole on the wall, ensure no damage on the electric wire and/or water pipe inside the wall.

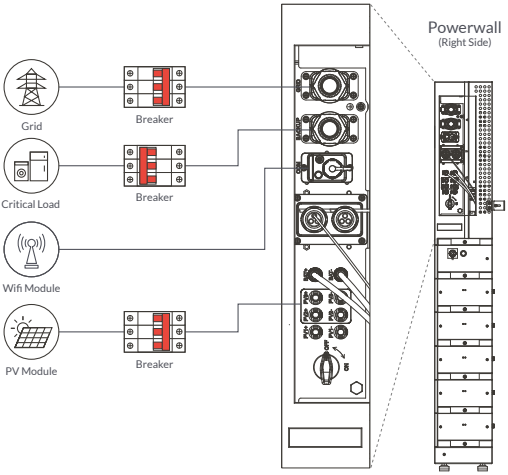
CAUTION
To prevent potential damages and injuries from inverter falling down, please hang the inverter on the bracket, do not loosen grip unless confirm the inverter is well mounted.

4. Electrical Connection

This chapter shows the details connection of Three-phase Powerall product. The following illustration only uses the ESS inverters as an example.

Three phase Powerall system connection diagram:

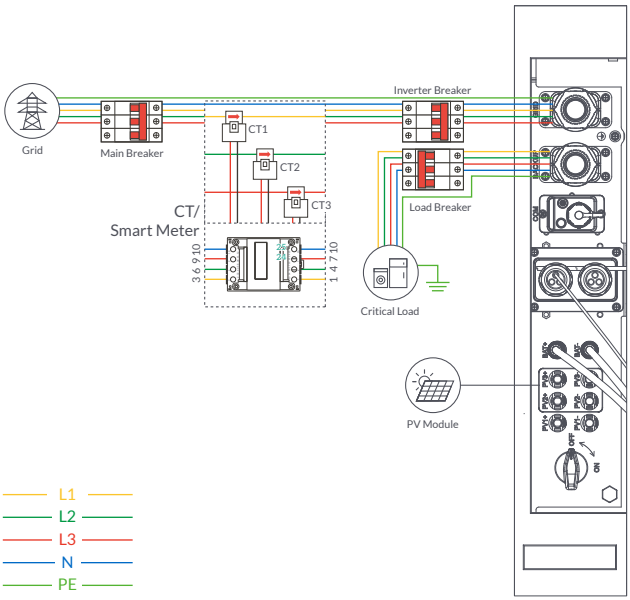
Connection mode for whole-house load



DANGER
Ensure that the Powerall and all cables to be installed are completely powered off during whole installation and connection. Otherwise, fatal injury can occur due to the high voltage.

NOTE
1. Meter is optional.
2. About breakers:
AC breaker on load side ≥40A
AC breaker on Grid side ≥40A

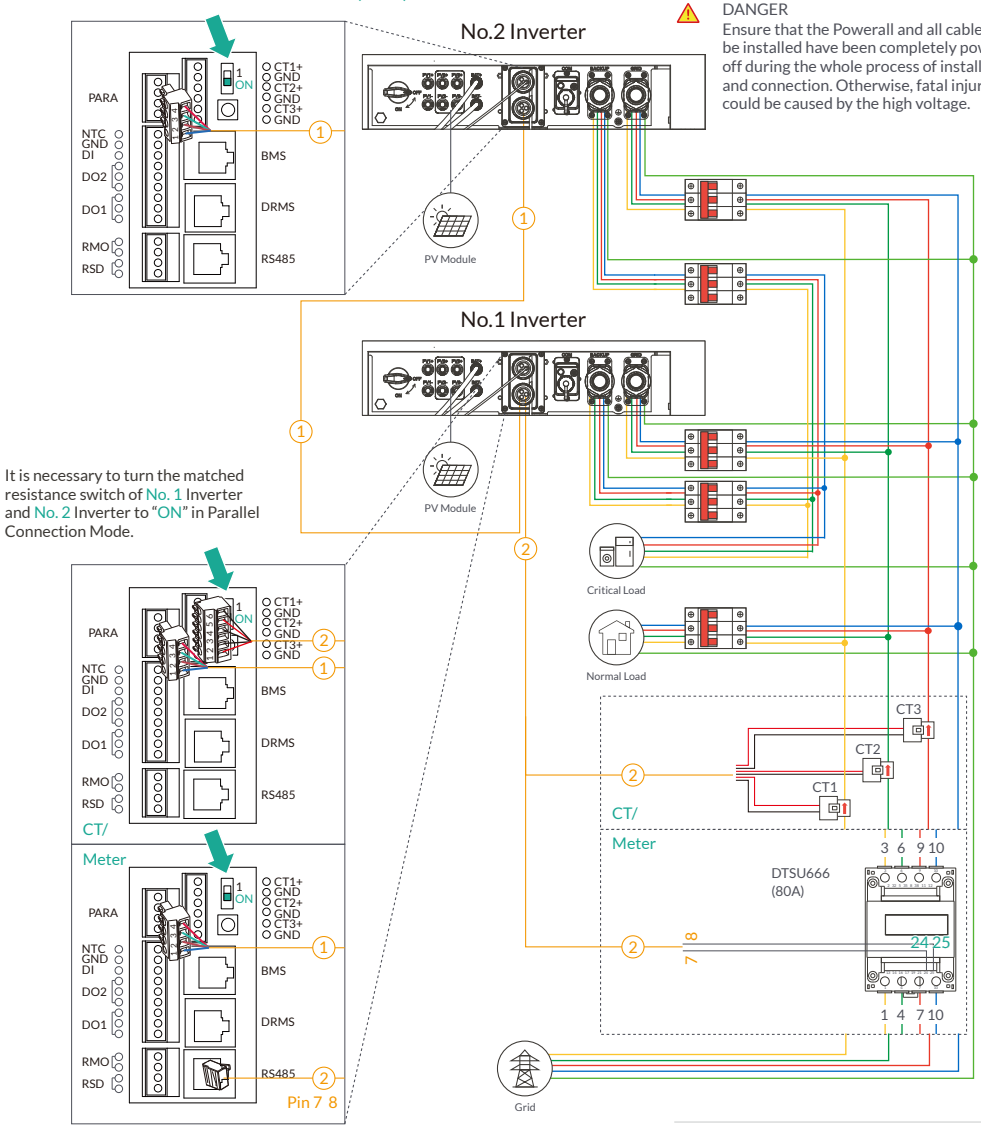
Connection mode for whole-house load



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

NOTE
1. BMS communication connection is only for lithium battery.
2. Meter is optional.
3. About breakers:
DC breaker on BATTERY side ≥80A
AC breaker on critical load side ≥40A
AC breaker on Inverter side ≥40A

Parallel Connection Mode - Scheme A (N=2)



It is necessary to turn the matched resistance switch of No. 1 Inverter and No. 2 Inverter to "ON" in Parallel Connection Mode.

DANGER

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

Electrical Connection

COM
L1
L2
L3
N
PE

① Parallel communication connection

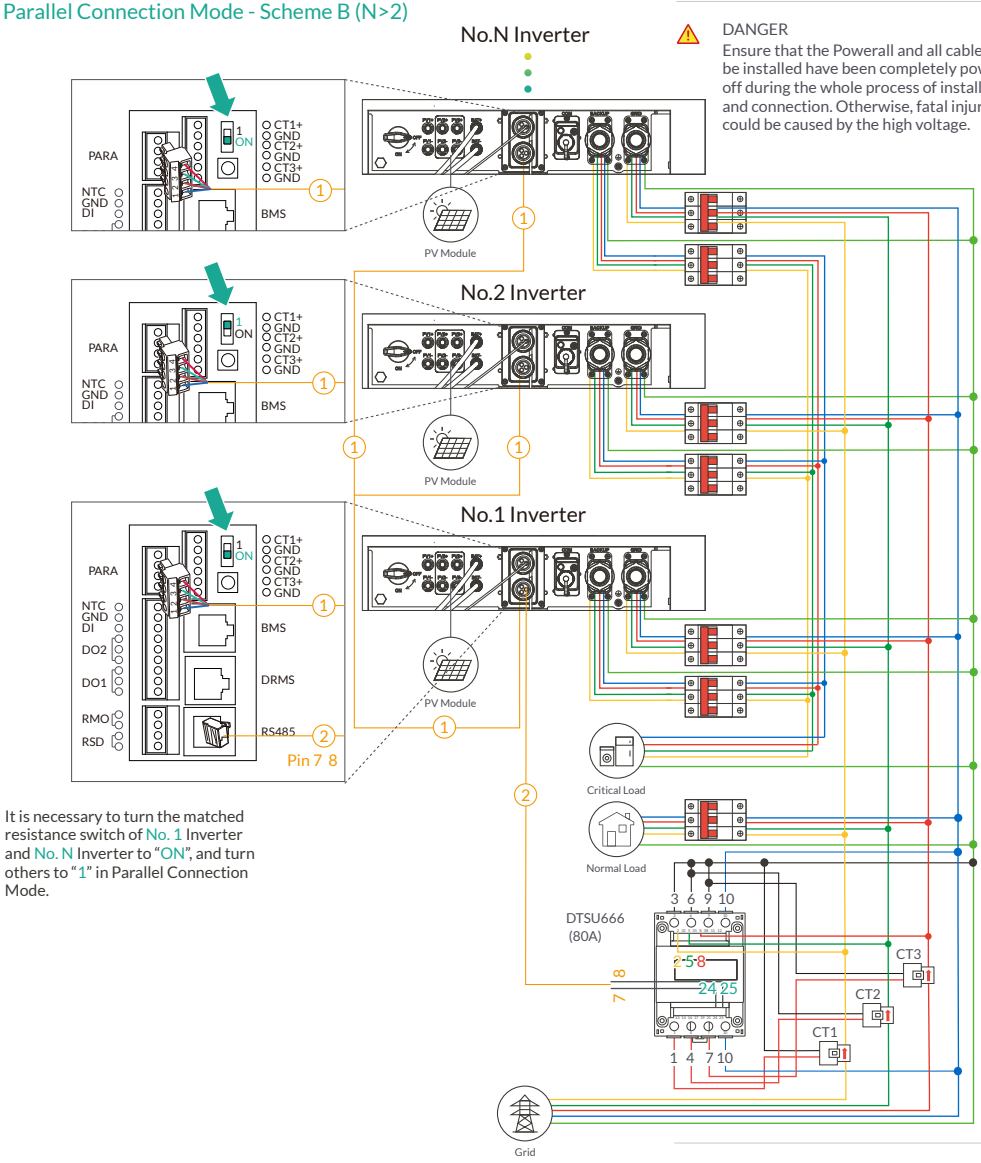
② CT/Meter communication connection

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

NOTE

1. BMS communication connection is only for lithium battery.
2. With parallel connection mode, it is necessary to connect APP to one of inverters and then go to Console > Other Setting page to enable Parallel mode on APP. Please refer to section 7.2.3.
3. About breakers:
DC breaker on BATTERY side ≥80A
AC breaker on critical load side ≥40A
AC breaker on Inverter side ≥40A

Parallel Connection Mode - Scheme B (N>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.

DANGER

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

Electrical Connection

COM
L1
L2
L3
N
PE

① Parallel communication connection

② Meter communication connection

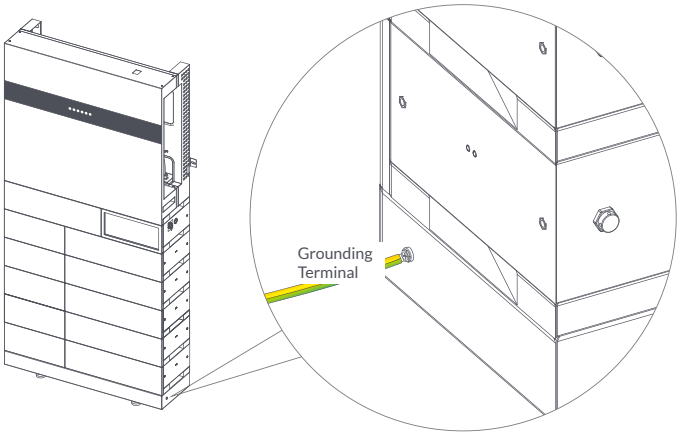
*These communication cables can be connected to any Powerwall, but they must be inserted into the same Powerwall and we call this inverter No. 1 Powerwall.

NOTE

1. BMS communication connection is only for lithium battery.
2. With parallel connection mode, it is necessary to connect APP to one of inverters and then go to Console > Other Setting page to enable Parallel mode on APP. Please refer to section 7.2.3.
3. About breakers:
DC breaker on BATTERY side ≥80A
AC breaker on critical load side ≥40A
AC breaker on Inverter side ≥40A

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. AWG 10 yellow green wire are recommended. The ground cable is packed with the BASE.



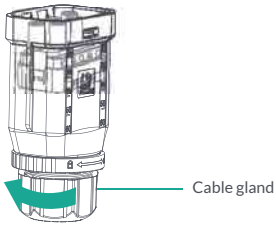
⚠ WARNING
The Powerall product must be grounded; otherwise, there may be electric shock risk.

⚠ 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

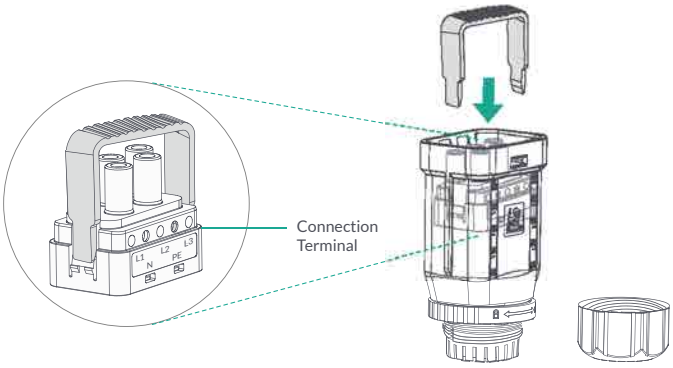
If necessary, please refer to below to disassemble the GRID/BACKUP terminal.

1. Loosen the cable gland from the Grid/Backup Connector (Serial No.11/No.12).



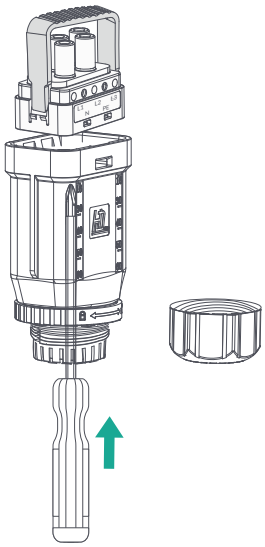

Grid/Backup Connector

2. Plug the Removal Tool (Serial no.17) on the connection terminal.




Removal Tool

3. Use the screwdriver to poke out the connection terminal and pull the removal tool.

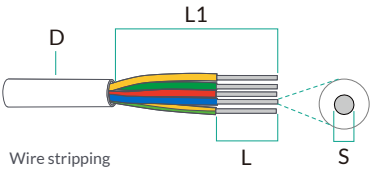


DANGER
Before connecting the GRID/BACKUP terminal, ensure that both the AC terminal and the DC terminal are powered OFF and the PV switch is OFF. Otherwise there is a risk of high voltage shock.

GRID/BACKUP Connection please refer to below.

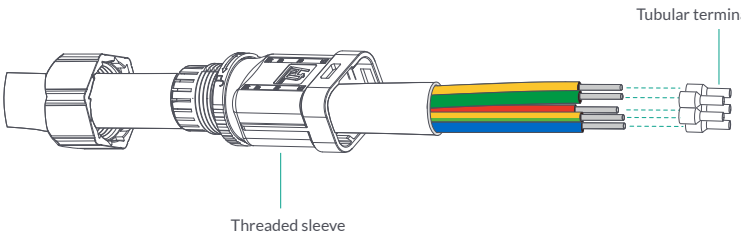
Step 1.
Assemble the AC connector.

1. It is recommended to use outdoor dedicated cables with multiple copper cores.



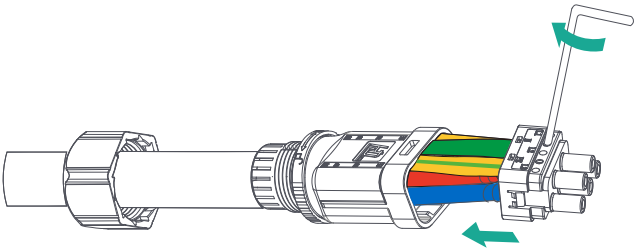
D (Diameter)	18 - 24mm
S (Cross sectional area)	≥5 mm²
L (Length)	16 ± 1mm
L1	60 ± 2mm

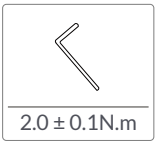
2. Lead the cable throught cable grand and threaded sleeve. Put the tubular terminals on end of the copper cores. Use a standard four-sided tubular terminal crimping pliers to crimp the tubular terminals. The recommended crimping pliers brands are as follows: GeeLii, ELECALL, SATA.



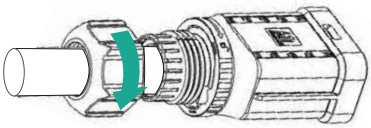
3. Put the connection terminal on the copper cores.

4. Tighten five screws with the L-shape screwdriver. Plug the connection terminal back to the threaded sleeve. A "Click" sound should be heard.

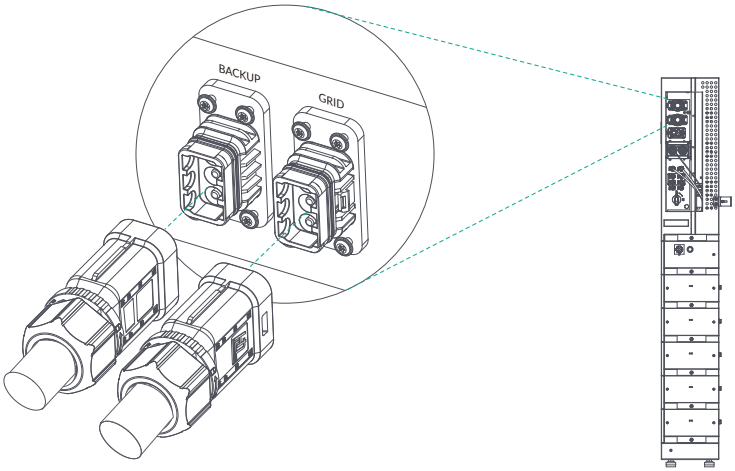




5. Tighten the cable grand to avoid loosening. A "Click" sound should be heard.



6. Insert the terminal into the GRID/BACKUP port. A "Click" sound should be heard.



Step 2.
Connect the AC connector.
An AC breaker（≥40A）should be installed between Powerall and the GRID/BACKUP.

1. Before connecting the AC cable from Powerall to AC breaker, you should confirm the AC breaker is working normally. Turn off the AC breaker and keep the status.

2. Connect the PE conductor to grounding electrode, and connect the N and L conductors to AC breaker.

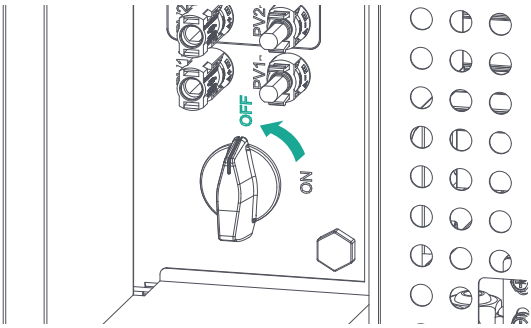
3. Connect the AC breakers to the GRID/BACKUP.

⚠ NOTICE
Multiple Poweralls are not allowed to share a circuit breaker.

Load is not allowed to connect between the grid and the AC breaker.

4.3 PV CONNECTION

Ensure that the PV switch is OFF before any action. PV connection please refer to below.



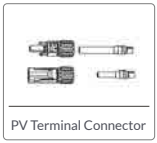
⚠ NOTICE
Before connection the PV panels, make sure the plug connector have the correct polarity. Incorrect polarity could permanently damage the inverter.

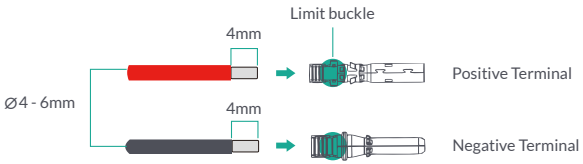
PV array shouldn't be connected to the grounding conductor.

The minimum insulation resistance to ground of the PV panels must exceed 33.3k Ω, there is a risk of shock hazard if the requirement of minimum resistance is not met.

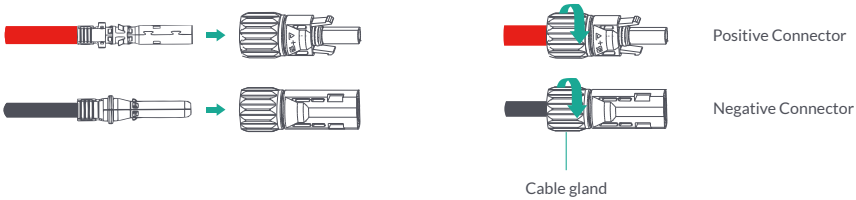
1. Insert the battery cable to the corresponding PV Terminal (Serial No.10). Using crimping tool to stitch the terminal. Limit buckle can't be crimped. Pay attention to the difference between the battery terminal and the PV terminal to avoid confusion.

DC cable should be dedicated PV cable
4 - 6mm² PV1-F cable (recommended)

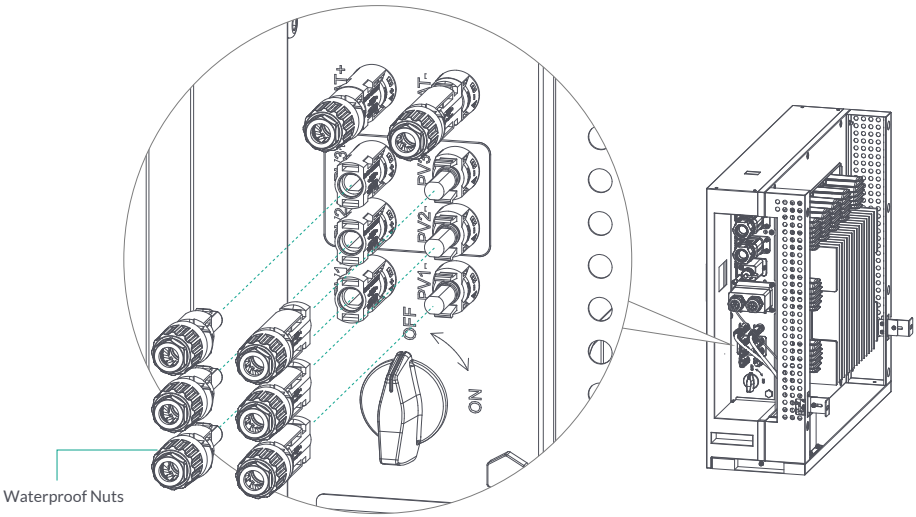

PV Terminal Connector



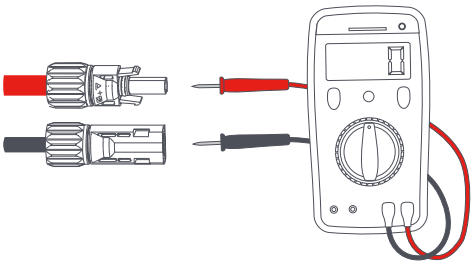
2. Insert the terminal to the correct connector. A "Click" sound should be heard. Tighten the cable gland.



3. Insert the positive PV connector to PV+ and negative PV onnector to PV-. A "Click" sound should be heard. Tighten the waterproof nuts on each connector to avoid loosening.



4. Test string voltage and confirm string polarity.



⚠ 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!

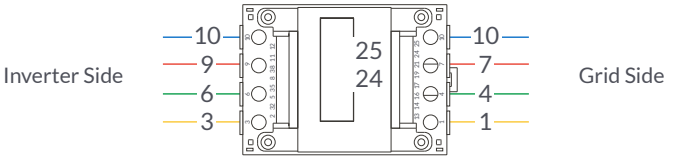
Only then disconnect the PV plugs and correct the polarity before reconnecting.

4.4 METER/CT CONNECTION (DIRECT CONNECT)

You can monitor usage with a meter or a CT.

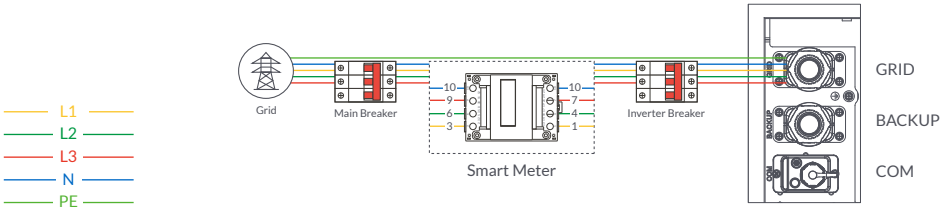
4.4.1 Meter Connection

This section is applicable to Non-parallel Connection Mode only.
Three phase Powerall product supports the meter CHINT-DTSU666 meter by default. The meter is optional.



Before connecting to Grid, please install a separate AC breaker (≥40A; not equipped) between meter and Grid. This ensure the inverter can be security disconnected during maintenance.

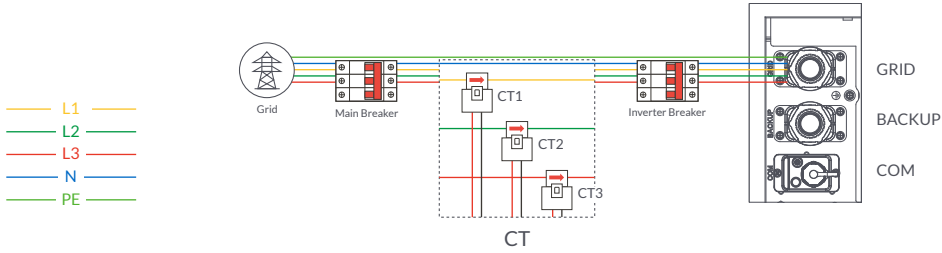
The connection diagram of power cable of meter is as shown in the figure below. Please refer to the meter instruction manual for details.



4.4.2 CT Connection

Before connecting to Grid, please install a separate AC breaker (≥40A; not equipped) between CT and Grid. This ensure the Powerall can be security disconnected during maintenance.

The connection diagram of power cable of CT is as shown in the figure below. Please attention to the Current interchanger (CT) connection. The arrow on the CT indicates the current flow from grid to Powerall. And lead the live line through the detection hole of CT.

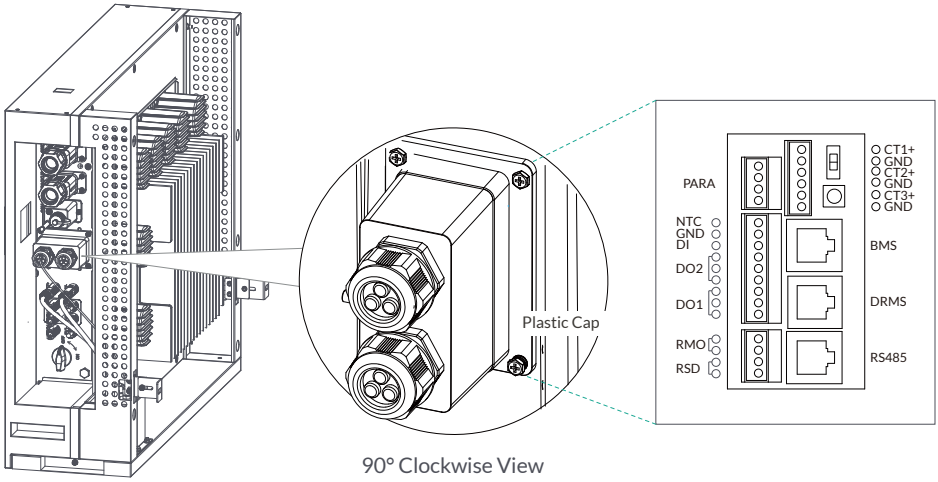


NOTE
The current direction from grid to Powerall is defined as positive and current direction from Powerall to grid is defined as negative.

4.5 COMMUNICATION CONNECTION

There are communication interfaces in the communication port on the bottom of the Powerall as show below. The following installation instructions will be presented in 90° clockwise.

Interface for connecting DRMs, RJ45, CT cable,4-Pins Terminal and 9-Pins Terminal is located on the right side of inverter module, protected by plastic cap.



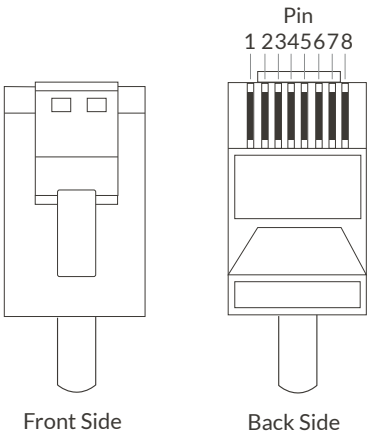
90° Clockwise View

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

4.5.1 DRMs Connection

DRMs is a shortened form for “Inverter demand response modes”. It is a compulsory requirements for inverters.

RJ45 Terminal Configuration of DRMs

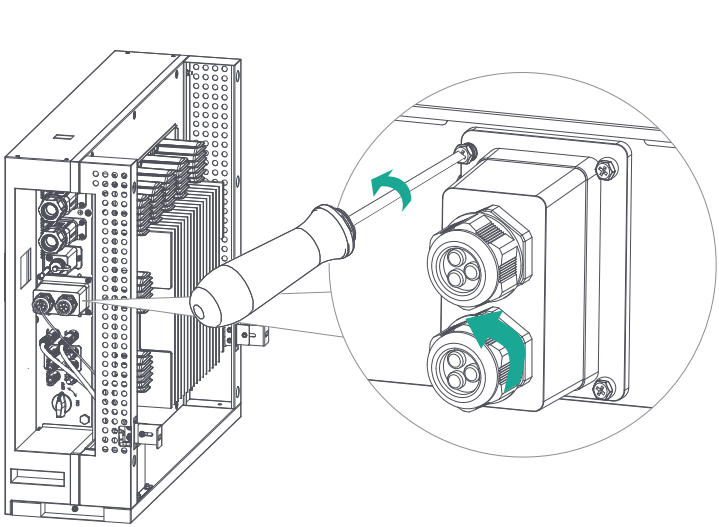


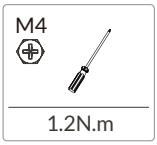
Pin	Function Description
1	DRMs1/5
2	DRMs2/6
3	DRMs3/7
4	DRMs4/8
5	REF
6	GND
7	-
8	-

NOTE
With DRMs connection, it is necessary to connect APP to Powerall.

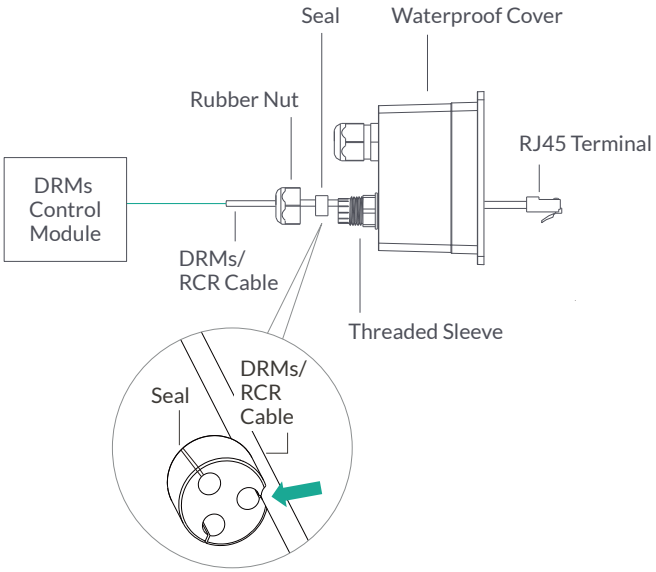
Connecting DRMs

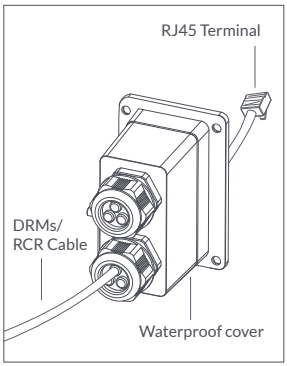
1. Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.





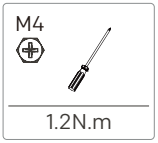
2. Make the RJ45 terminal according to above function description of each Pin definition.
Lead the DRMs/RCR cable through the rubber nut, seal and waterproof cover in turn.
Press the DRMs cable in the seal via the side incisions.

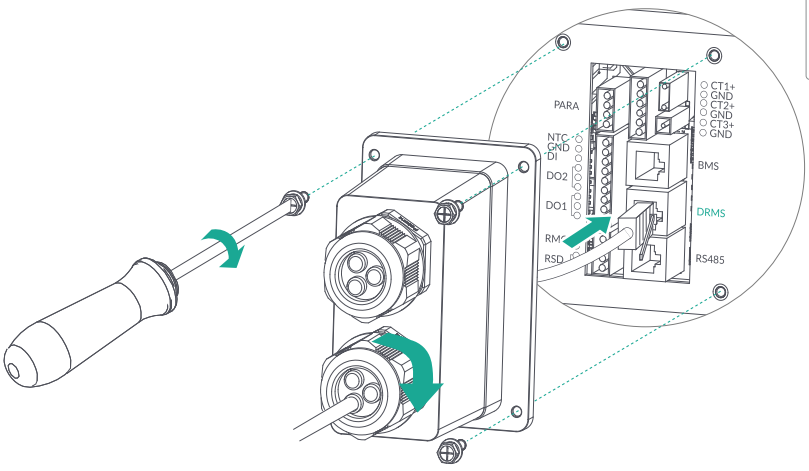




⚠ NOTICE
Don't cut off any Communication Cables.

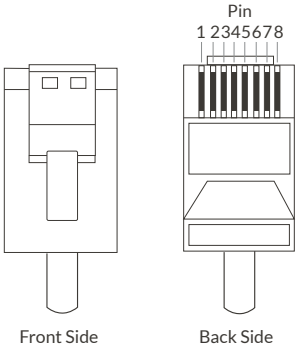
3. Insert RJ45 Terminal into corresponding port. Screw the waterproof cover back to inverter firmly with 4 x M4 screws (1.2N.m). Install the seal into the threaded sleeve, fasten the rubber nut.





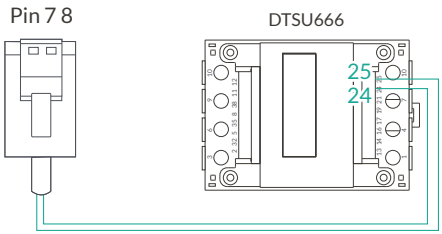
4.5.2 Monitoring/Meter Connection

RJ45 Terminal Configuration of Monitoring/Meter Communication



Pin	Function Description
1	RS485_A
2	RS485_B
3	-
4	-
5	-
6	-
7	RS485_A
8	RS485_B

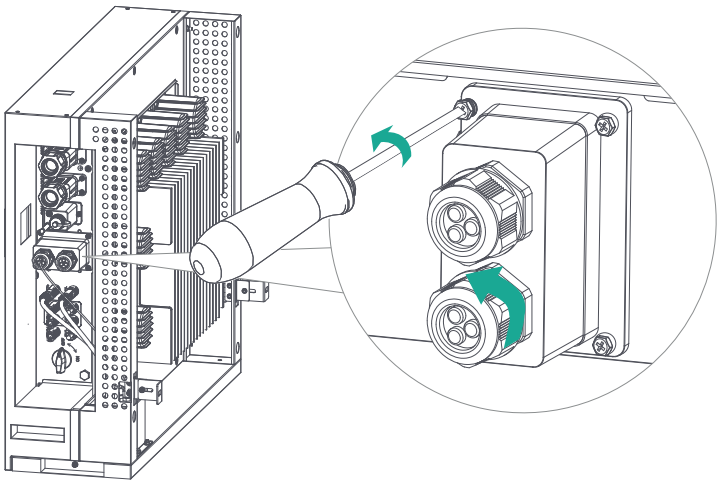
Meter cable connection overview

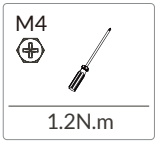


Inverter	Meter
Pin7 (RS485_A)	Pin 24
Pin8 (RS485_B)	Pin 25

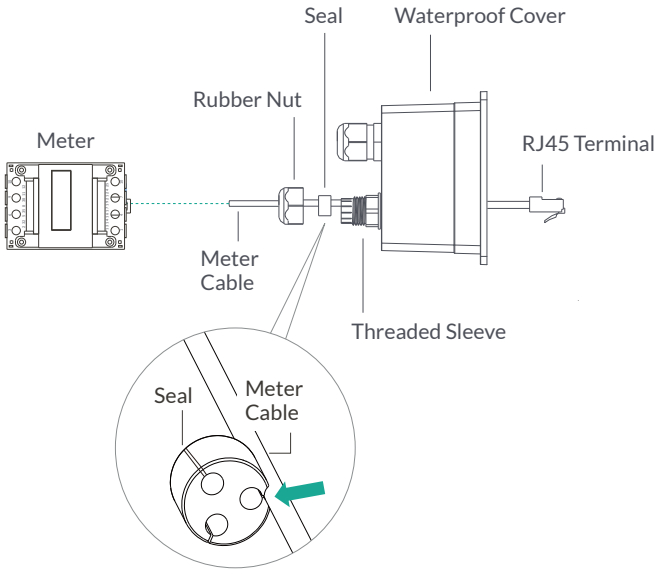
Connecting Meter

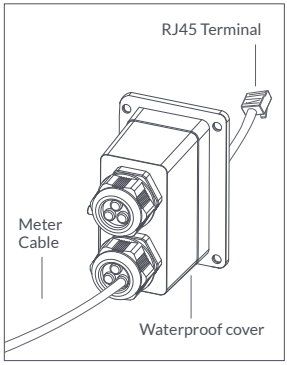
1. Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.





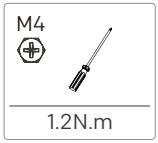
2. Make the RJ45 terminal according to above function description of each Pin definition.
Lead the meter communication cable through the rubber nut, seal and waterproof cover in turn.
Press the meter cable in the seal via the side incisions.

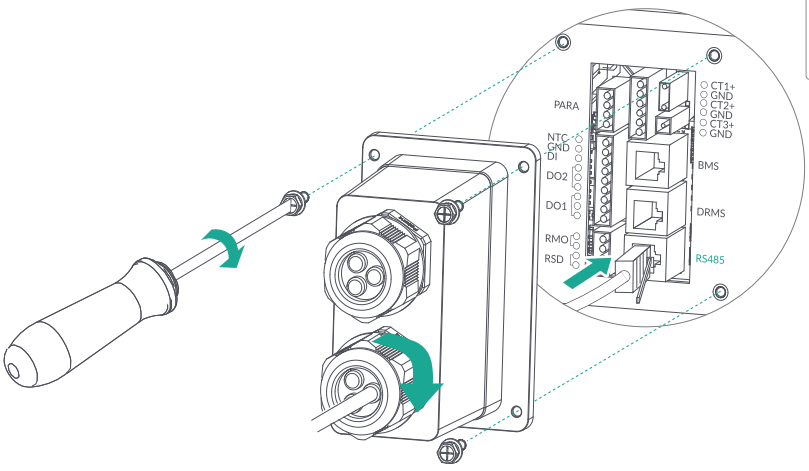




⚠ NOTICE
Don't cut off any Communication Cables.

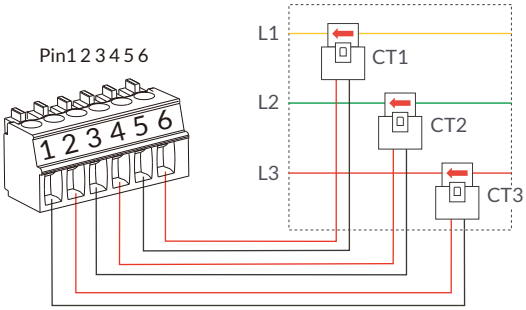
3. Insert RJ45 Terminal into corresponding port. Screw the waterproof cover back to inverter firmly with 4 x M4 screws (1.2N.m). Install the seal into the threaded sleeve, fasten the rubber nut.





4.5.3 CT Connection

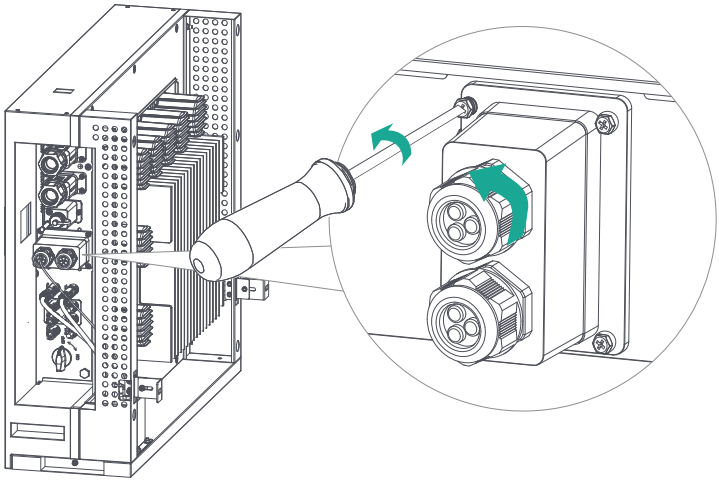
CT cable connection overview (Serial No.13)

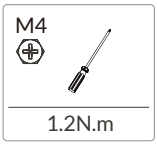


	Inverter	CT
L1	Pin1 (GND)	Black
	Pin2 (CT3+)	White
L2	Pin3 (GND)	Black
	Pin4 (CT2+)	White
L3	Pin5 (GND)	Black
	Pin6 (CT1+)	White

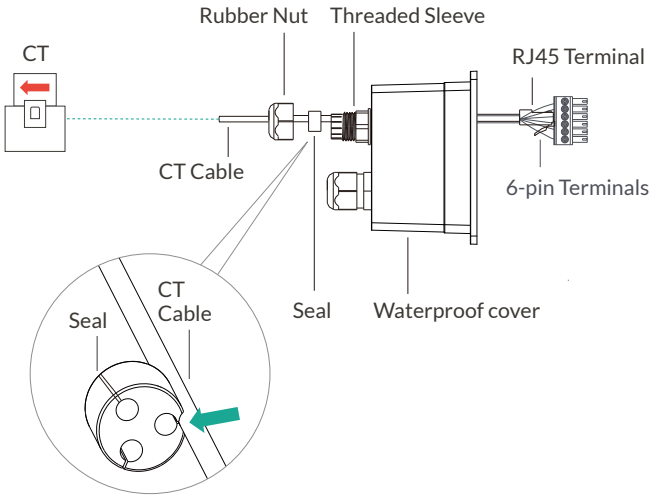
Connecting CT

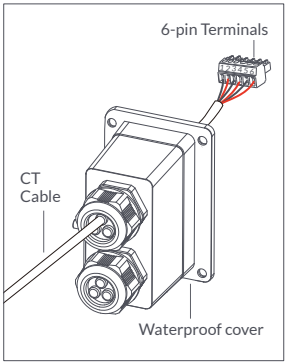
1. Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.





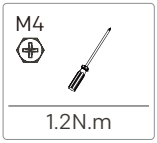
2. Make the 6-pin terminal according to above function description of each Pin definition.
Lead the CT cable through the rubber nut, seal and waterproof cover in turn.
Press the CT cable in the seal via the side incisions.

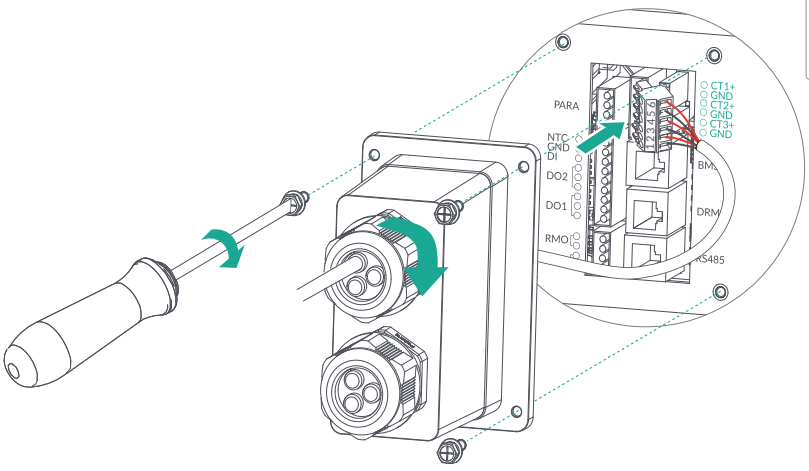




⚠ NOTICE
Don't cut off any Communication Cables.

3. Insert RJ45 Terminal into corresponding port. Screw the waterproof cover back to inverter firmly with 4 x M4 screws (1.2N.m). Install the seal into the threaded sleeve, fasten the rubber nut.

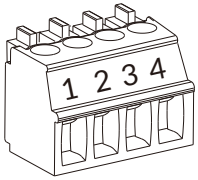




4.5.4 Parallel Communication Connection

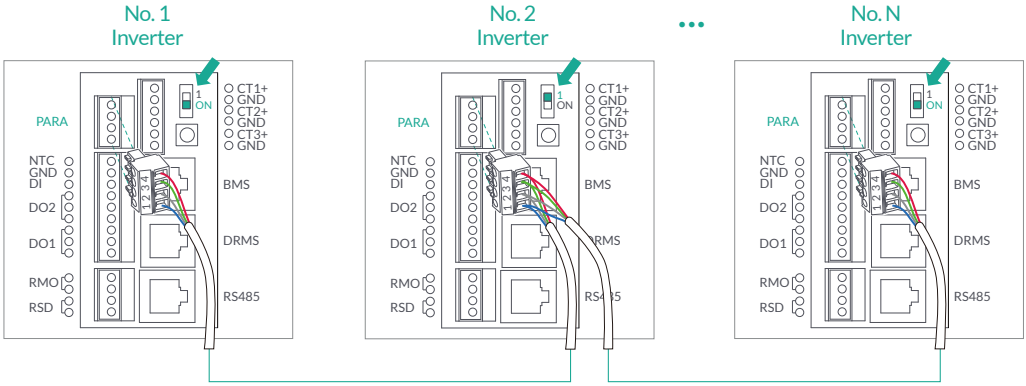
4-Pins Terminal Configuration of Parallel Communication (Serial No.15)

4-Pins Terminal



Pin	Function Description
1	GND_S
2	PARA_SYNC
3	CAN_L
4	CAN_H

Parallel communication cable connection overview

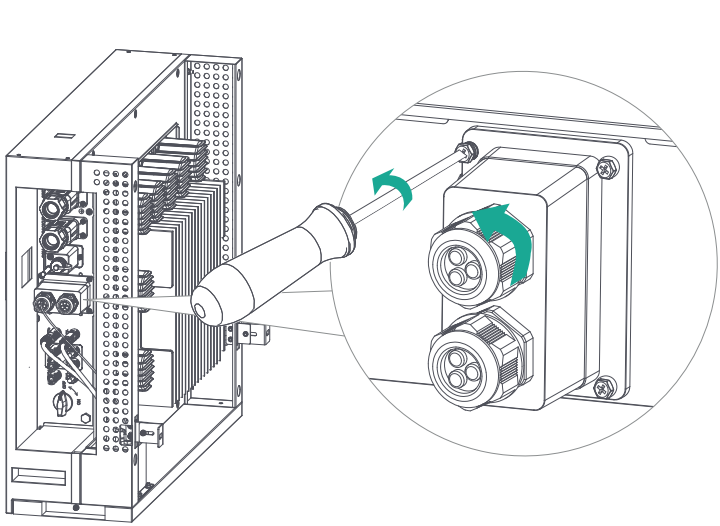


No. 1 Inverter	No. 2 Inverter	...	No. N Inverter
Pin4 (CAN_H)	Pin4 (CAN H)		Pin4 (CAN_H)
Pin3 (CAN_L)	Pin3 (CAN L)		Pin3 (CAN_L)
Pin2 (PARA_SYNC)	Pin2 (PARA_SYNC)		Pin2 (PARA_SYNC)
Pin1 (GND_S)	Pin1 (GND_S)		Pin1 (GND_S)

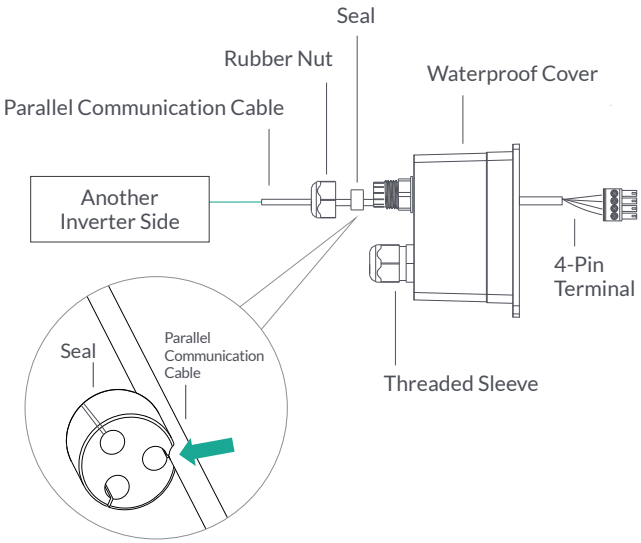
NOTE
It is necessary to turn the matched resistance switch of No. 1 inverter and No. N inverter to "ON" and turn the matched resistance switch of others to "1" in parallel connection mode.

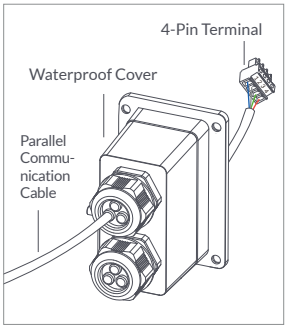
Connecting Parallel Communication

1. Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.



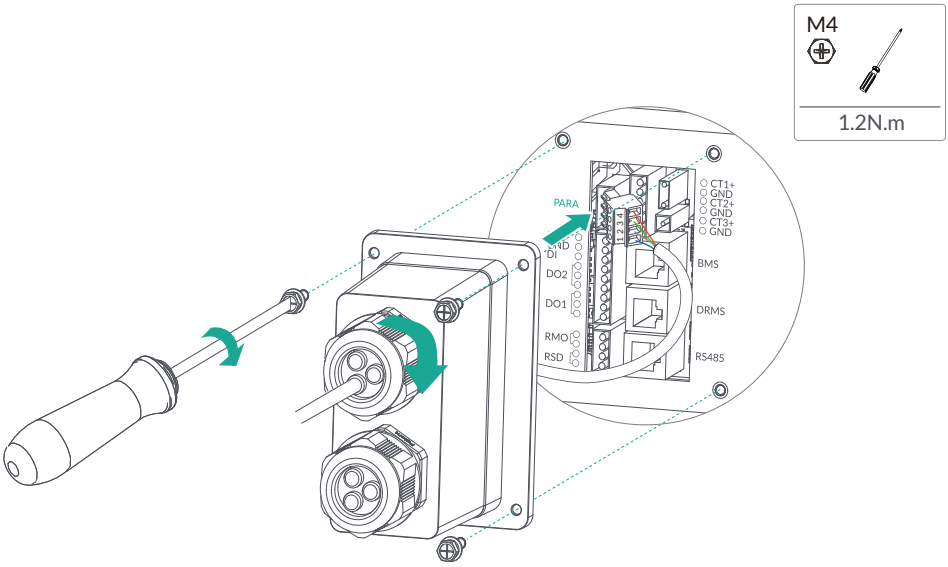
2. Make the 4-pin terminal according to above function description of each Pin definition.
Lead the Parallel cable through the rubber nut, seal and waterproof cover in turn.
Press the Parallel cable in the seal via the side incisions.





⚠ NOTICE
Don't cut off any Communication Cables.

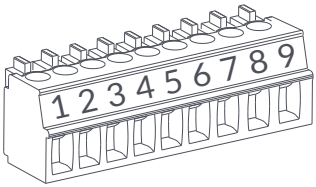
3. Insert 4-Pin Terminal into corresponding port. Screw the waterproof cover back to inverter firmly with 4 x M4 screws (1.2N.m). Install the seal into the threaded sleeve, fasten the rubber nut.



4.5.5 NTC/DI/DO Connection(s)

9-Pins Terminal Configuration of Auxiliary Communication (Serial No.14)

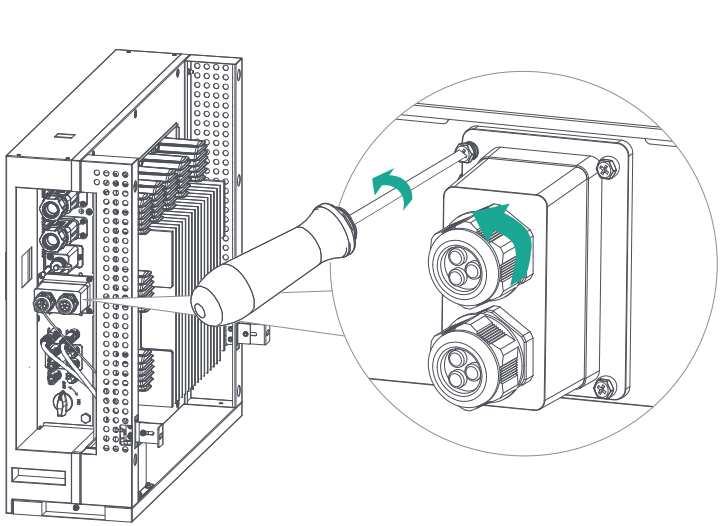
9-Pins Terminal



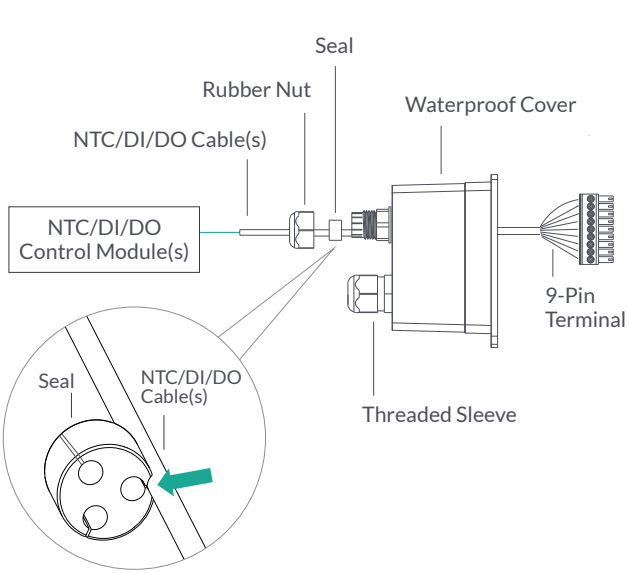
Pin	Function Description	Function
1	NO (Normal Open)	DO1
2	COM	
3	NC (Normal Close)	
4	NO (Normal Open)	DO2
5	COM	
6	NC (Normal Close)	
7	DI	DI
8	GND S	GND
9	NTC BAT+	NTC

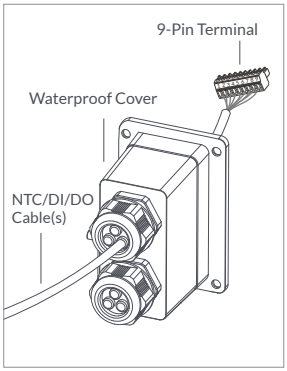
Connecting NTC/DI/DO

1. Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.



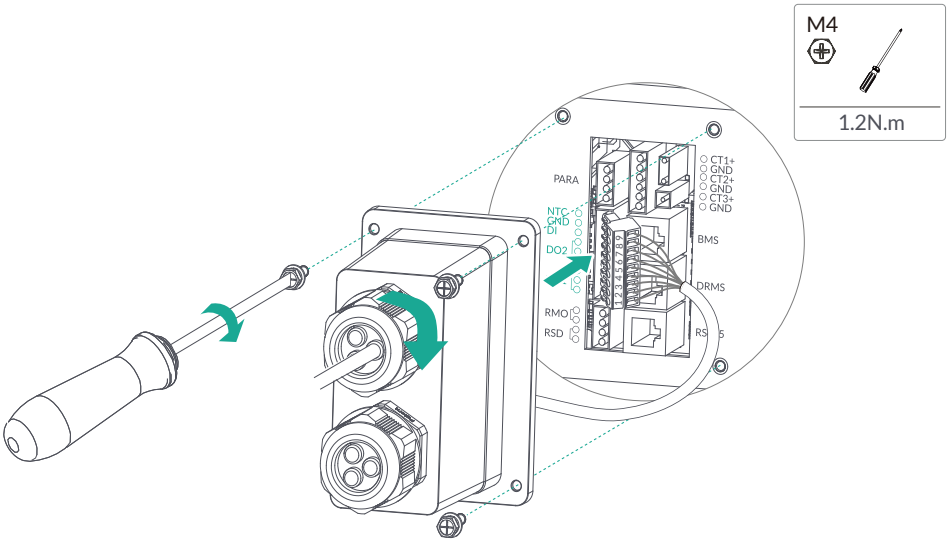
2. Make the 9-pin terminal according to above function description of each Pin definition for the auxiliary port you want to use. Lead the NTC/DI/DO cable(s) through the rubber nut, seal and waterproof cover in turn. Press the NTC/DI/DO cable(s) in the seal via the side incisions.





⚠ NOTICE
Don't cut off any Communication Cables.

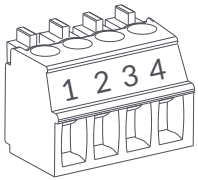
3. Insert its 9-Pin terminal into the corresponding NTC/DI/DO port on the Three phase ESS inverter. Install the seal into the threaded sleeve, fasten the rubber nut and screw the waterproof cover back to inverter firmly with 4 x M4 screws (1.2N.m).



4.5.6 RSD/RMO Connection(s)

4-Pins Terminal Configuration of RSD/RMO Communication (Serial No.15)

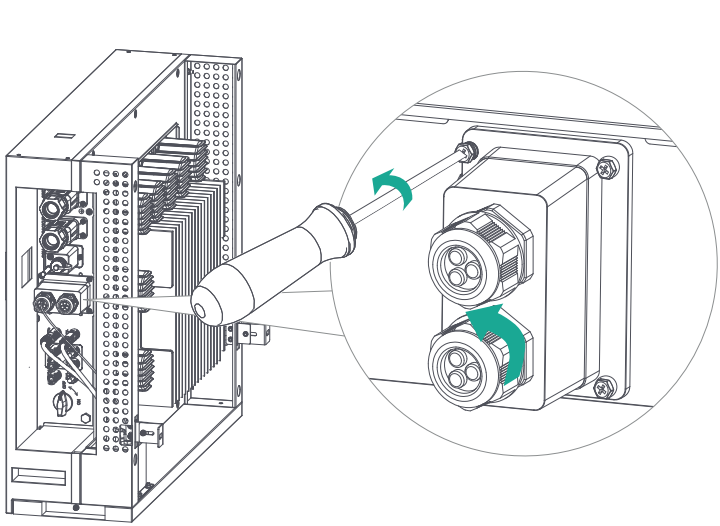
4-Pins Terminal



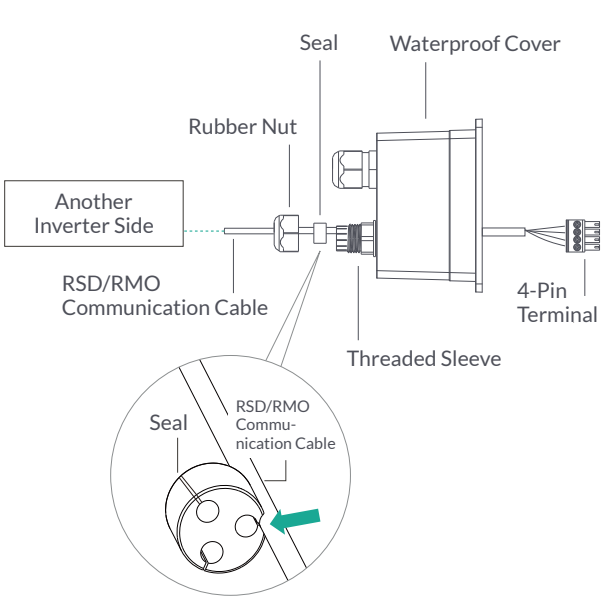
Pin	Function Description
1	+12V
2	GND
3	GND
4	REMOTE OFF

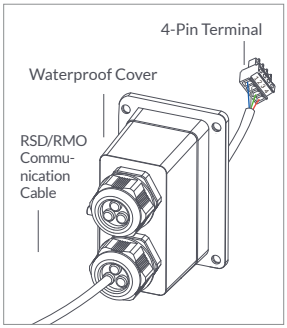
Connecting RSD/RMO

1. Unscrew the waterproof cover and loosen the rubber nut on waterproof cover.



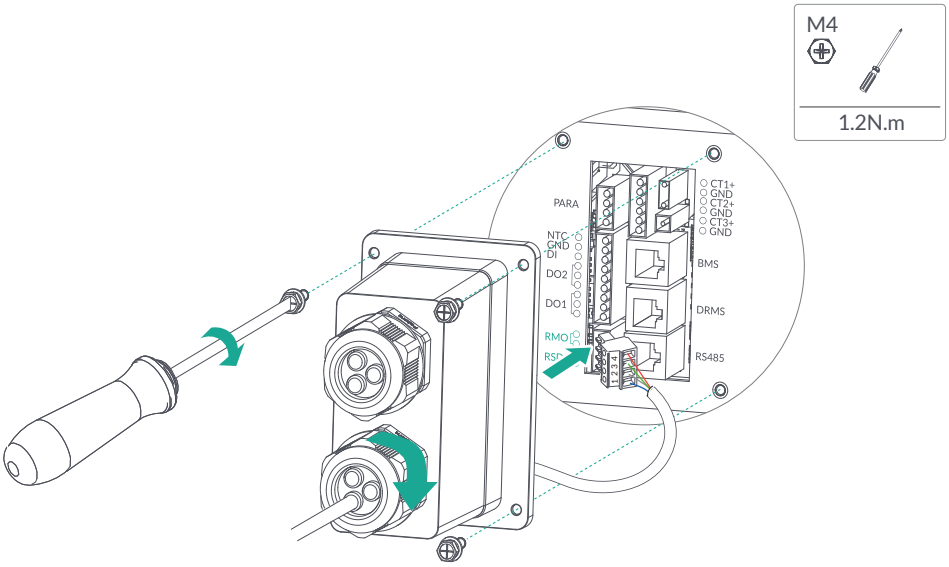
2. Make the 4-Pin terminal according to above function description of each Pin definition. Lead the RSD/RMO cable through the rubber nut, seal and waterproof cover in turn. Press the RSD/RMO communication cable in the seal via the side incisions.





⚠ NOTICE
Don't cut off any Communication Cables.

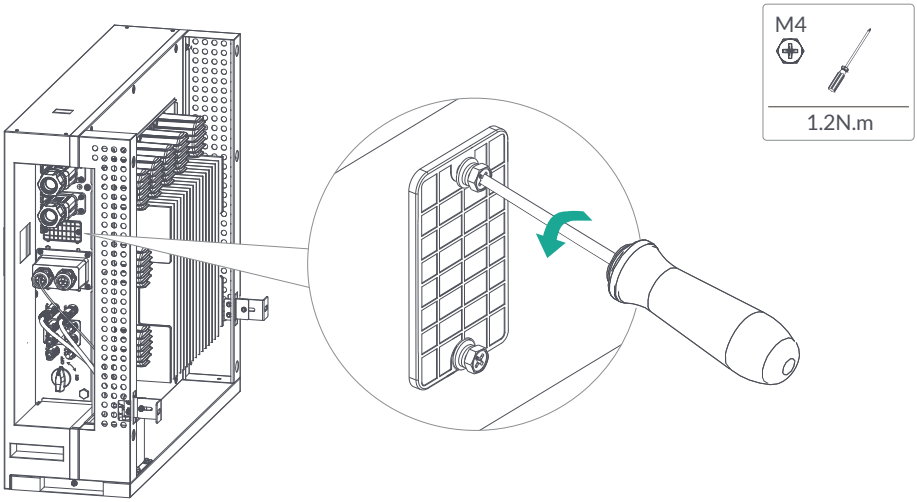
3. Insert 4-Pin Terminal into corresponding port. Screw the waterproof cover back to inverter firmly with 4 x M4 screws (1.2N.m). Install the seal into the threaded sleeve, fasten the rubber nut.



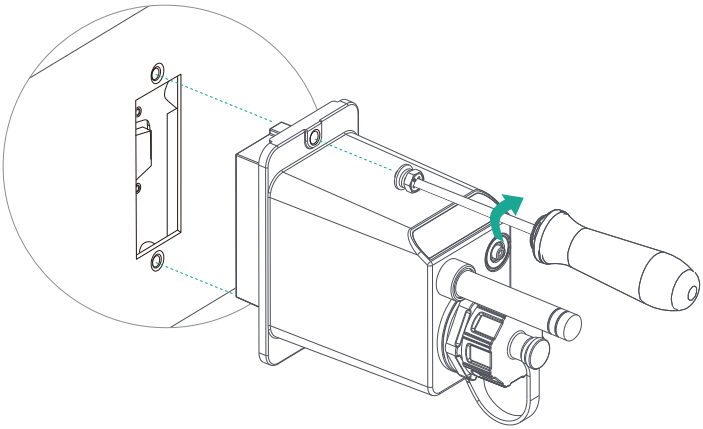
4.5.7 WiFi/LAN Module Connection (Optional)

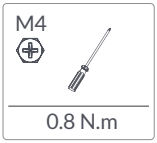
For details, please refer to the corresponding Module Installation Guide in the packing. The appearance of modules may be slightly different. The figure shown here is only for illustration.

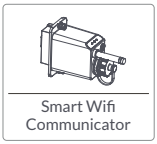
1. Loosen two screws and remove the cover.



2. Insert the Smart Wifi Communicator (Serial No.7) into WIFI/LAN port , and ensure that it does not fall off. Tighten the screws back.







5. System Operation

5.1 POWERALL WORKING MODE

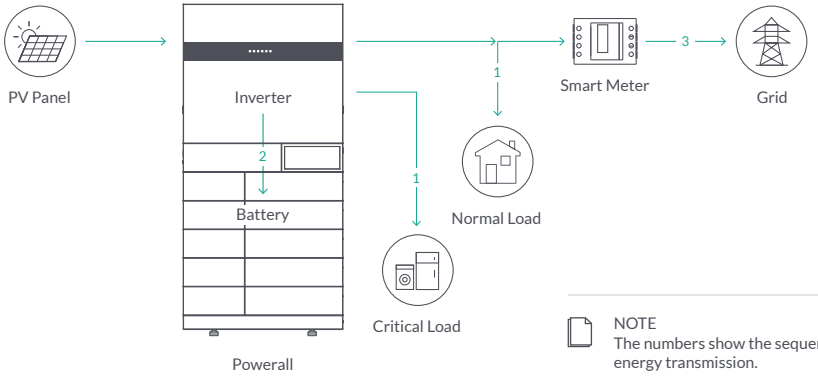
The Powerall product supports several different working modes.

5.1.1 Self Used Mode

Go to the **Hybrid Work Mode** menu, and select the **Self Used Mode**.
Under Self Used 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-used working mode based on PV energy.

A. Wealthy PV Energy

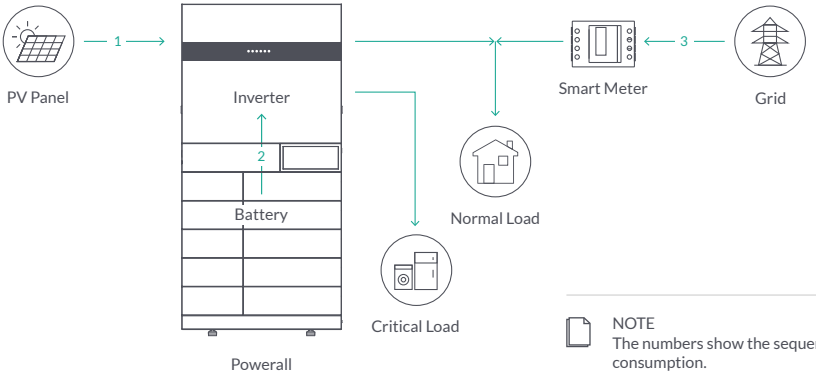
When PV energy is wealthy, the PV energy will be first consumed by loads, the excess energy will be used to charge the battery and then the remaining energy will be fed into the grid.



NOTE
The numbers show the sequence of PV energy transmission.

B. Limited PV Power

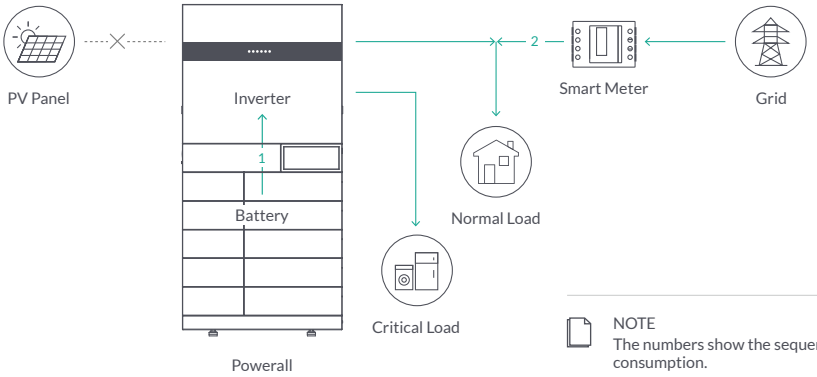
When the PV energy is not enough to cover all consumption, the PV energy will be entirely used by loads, and the insufficient part will be supplied by battery. Then still insufficient parts will be supplied by grid.



NOTE
The numbers show the sequence of load consumption.

C. No PV Input

The Powerall 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.



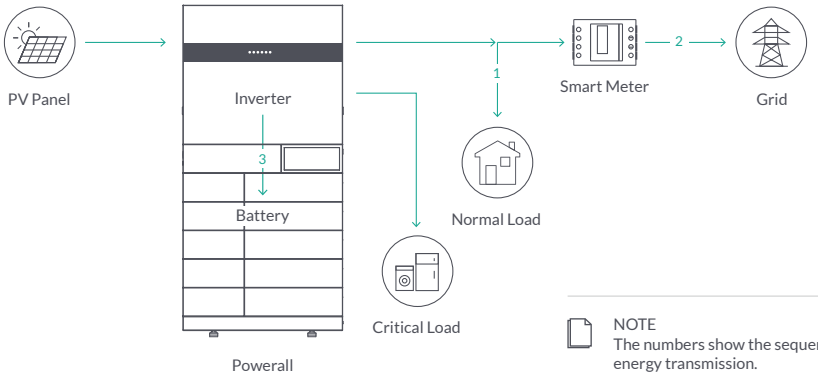
NOTE
The numbers show the sequence of load consumption.

5.1.2 Feed-in Priority Mode

Go to the **Hybrid Work Mode** menu, and select the F**eed-in Priority Mode**.
Under this mode, the priority of PV energy consumption will be Load > Grid > Battery, that means the energy produced by PV gives priority to powering local loads, the excess energy is fed into the grid, and the remaining energy is used to charge the battery.

A. Wealthy PV Energy

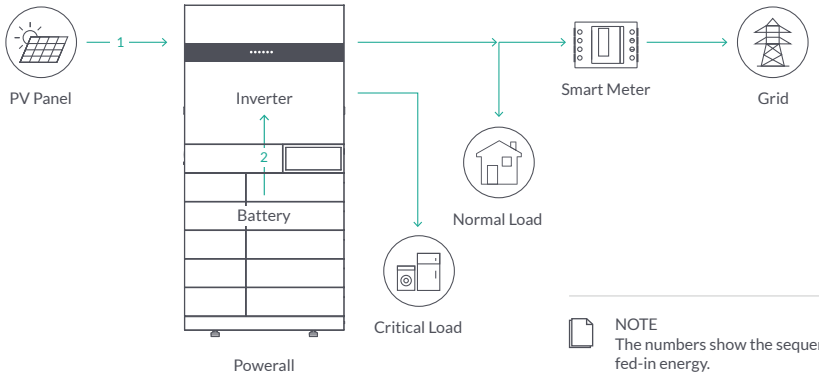
When PV energy is wealthy, the PV energy will be first consumed by loads. If there is excess PV power, the power will be fed into grid. If there is still PV energy left after load consuming and grid feeding, then the remaining PV power will be used to charge the battery.



NOTE
The numbers show the sequence of PV energy transmission.

B. Limited PV Energy

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

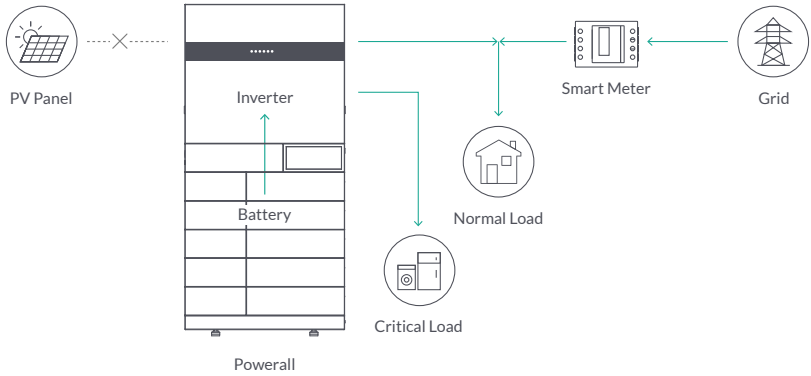


NOTE
The numbers show the sequence of grid fed-in energy.

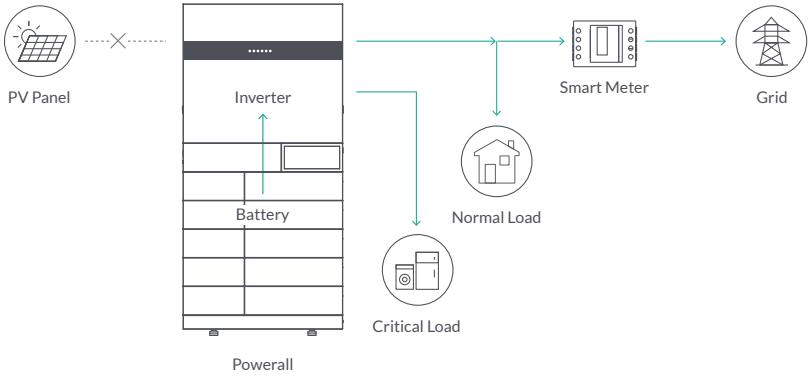
C. No PV Input

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

$P_{BAT} < P_{Load}$



$P_{BAT} \geq P_{Load}$



5.1.3 Back-up Mode

Go to the **Hybrid Work Mode** menu, and select the **Back-up Mode**.

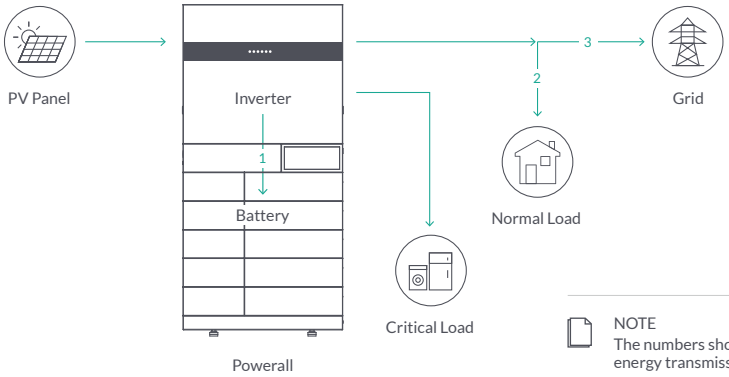
Under this mode, the priority of PV energy consumption will be Battery > Load > Grid. This mode aims at charging the battery quickly, and at the same time, you can choose whether to allow AC to charge the battery.

Forbid AC Charging

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

A. Wealthy PV Power

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

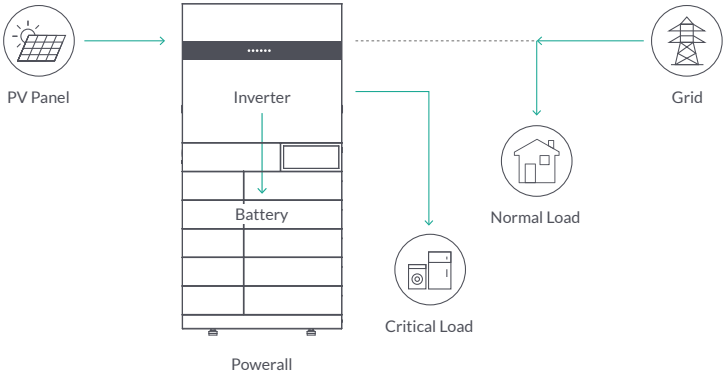


NOTE

The numbers show the sequence of PV energy transmission.

B. Limited PV Power

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

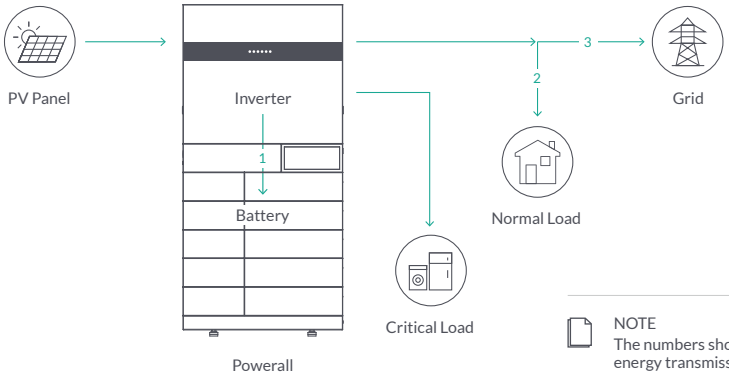


Allow AC Charging

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

A. Wealthy PV Power

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

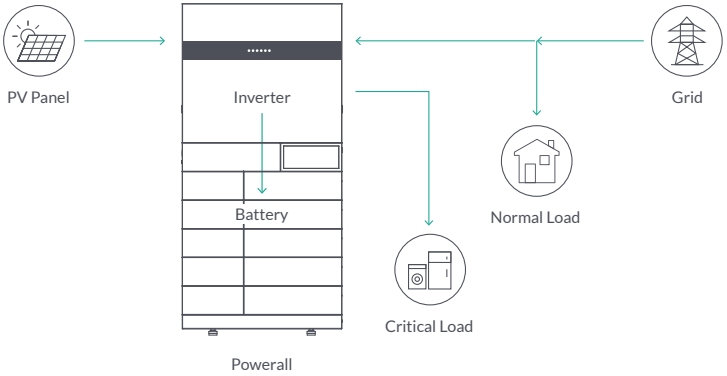


NOTE

The numbers show the sequence of PV energy transmission.

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.

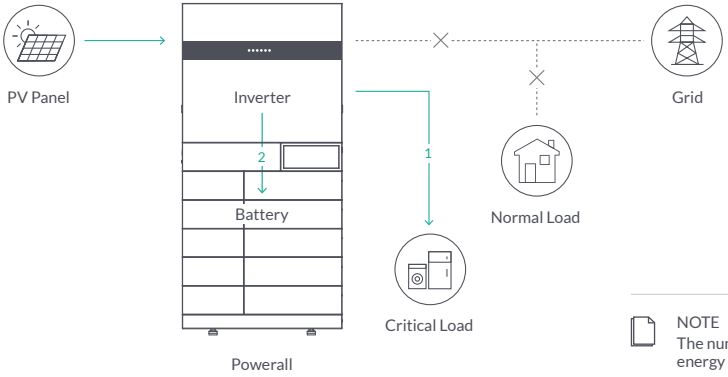


5.1.4 Off Grid Mode

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

A. Wealthy PV Energy

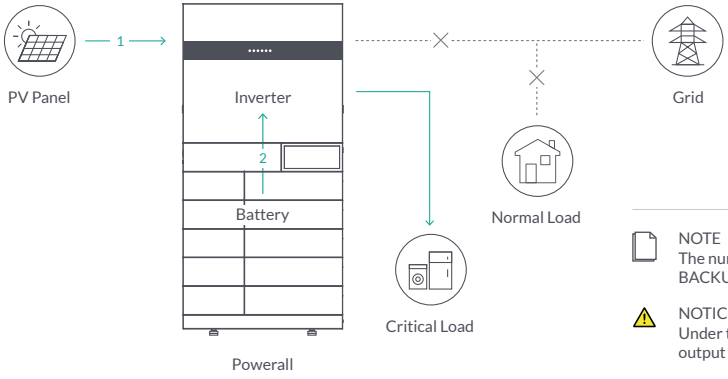
When PV energy is wealthy, the PV power will be first consumed by critical load, then charge the battery.



NOTE
The numbers show the sequence of PV energy transmission.

B. Limited PV Power

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



NOTE
The numbers show the sequence of BACKUP load consumption.

NOTICE
Under this mode, please complete the output voltage and frequency settings.

It is better to choose the battery capacity larger than 100Ah to ensure BACKUP function work normally.

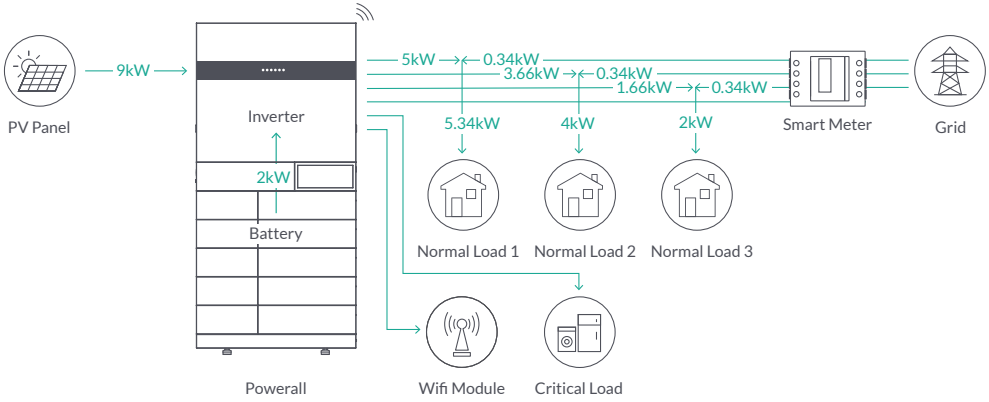
If BACKUP output loads are inductive or capacitive loads, to make sure the stability and reliability of system, it is recommended to configure the power of these loads to be within 50% BACKUP output power range.

5.1.5 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

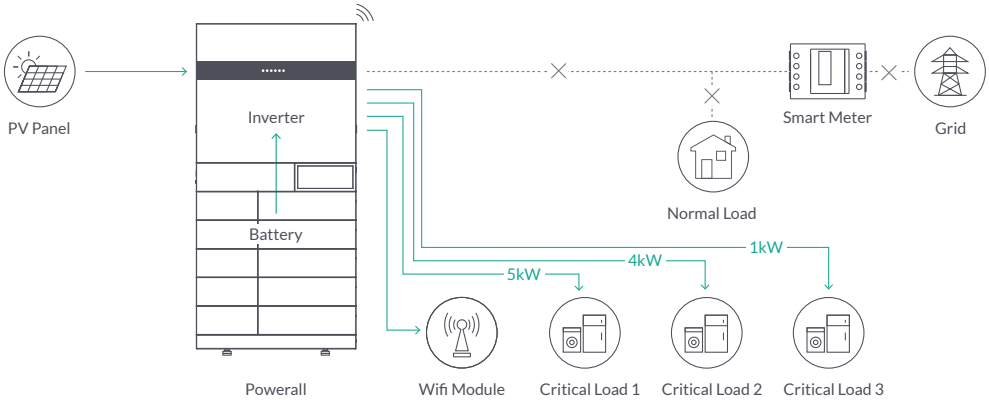


5.1.6 Back-up Unbalanced Output

1. The critical 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.

Back-up Unbalanced Output



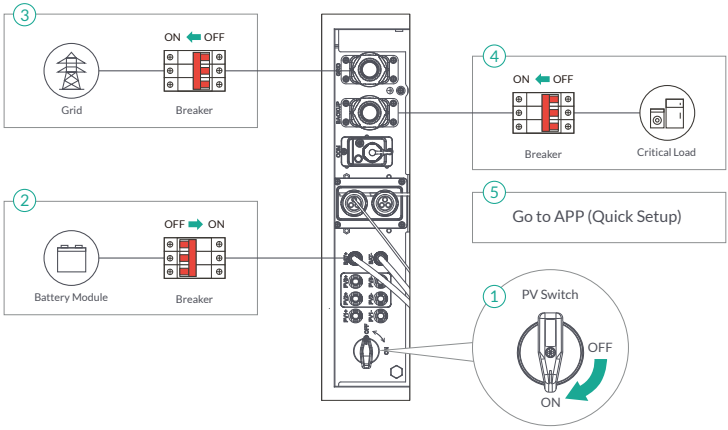
5.2 STARTUP/SHUTDOWN PROCEDURE

5.2.1 Startup Procedure

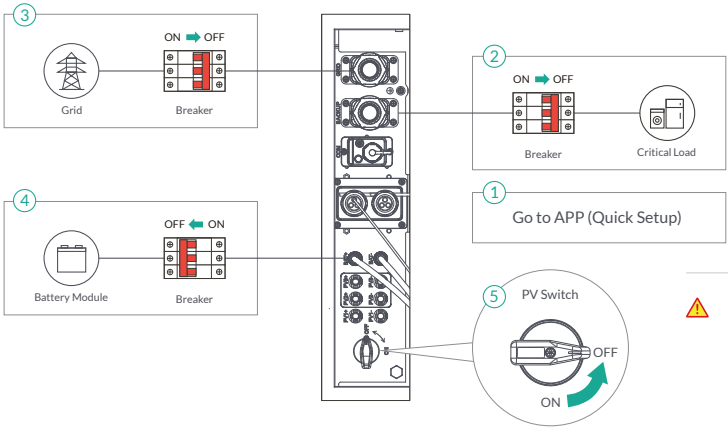
Check and confirm the installation is secure and strong enough and that the system grounding is OK. Then confirm the connections of AC, battery, PV etc. are correct. Confirm the **Parameters** and **Configurations** conform to relevant requirements.

AC Frequency	50/60Hz
Battery Voltage	150 - 600V
PV Voltage	160 - 950V
Grid AC Voltage	180 - 270V (311 - 467V)

Startup Procedure



Shutdown Procedure



⚠ DANGER
After the Powerall is powered off, the remaining electricity and heat may still cause electric shock and body burns. If need to disconnect the Powerall cables, please wait at least 10 minutes before touching these parts of Powerall.

6. Commissioning

It is necessary to make a complete commissioning of the Powerall system. This will essentially protect the system from fire, electric shock or other damages or injuries.

6.1 INSPECTION

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

1. The system is firmly 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 Powerall or within the required clearance 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.
3. Finish commissioning.

7. User Interface

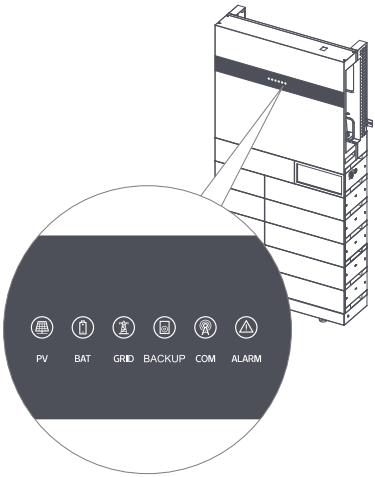
7.1 LED

This section describes the LED panel. On the inverter module there is a LED bar with 6 indicators including PV, BAT, GRID, BACKUP, COM, ALARM. It includes the explanation of indicator states and summary of indicator states under the running state of the machine.

LED Indicators

This table describes the status of the LED indicators. For detailed running status and error, please check from EnerConsole App.

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 / abnormal
	Off	Battery is unavailable
GRID	On	GRID is available and normal
	Blink	GRID is available and 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 the inverter has shut down
	Blink	An alarm has occurred but the inverter doesn't shut down
	Off	No fault



● Light On ● Light Off ○ Keep Original Status ★ Blink 1s and Off 1s ★★ Blink 2s and Off 1s

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 absent	D1	○	○	●	○	○	●
Battery in discharge		○	○	★★	○	○	●
Battery under voltage	D3	○	○	★	○	○	●
Battery over voltage	D2						
Battery discharge over current	D4						
Battery over temperature	D5						
Battery under temperature	D6						
Communication loss (Inverter -BMS)	D8						
BACKUP output active		○	○	○	●	○	○
BACKUP output inactive		○	○	○	●	○	○
BACKUP short circuit	DB	○	○	○	★	○	●
BACKUP over load	DC						
BACKUP output voltage abormal	D7						
BACKUP over DC-bias voltage	CP						
RS485 / DB9 / BLE / USB		○	○	○	○	★	○
Inverter over temperature	C5	○	○	○	○	○	★
Fan abnormal	C8						
Inverter in power limit state	CL						
Data logger lost	CH						
Meter lost	CJ						
Remote off	CN						
PV insulation abnormal	B1	○	○	○	○	○	●
Leakage current abnormal	B2						
Internal power supply abnormal	C0						
Inverter over DC-bias current	C2						
Inverter relay abnormal	C3						
GFCI abnormal	C6						
System type error	C7						
Unbalance DC-link voltage	C9						
DC-link over voltage	CA						
Internal communication error	CB						
Internal communication loss (E-M)	D9						
Internal communication loss (M-D)	DA						
Software incompatibility	CC						
Internal storage error	CD						
Data inconsistency	CE						
Inverter abnormal	CF						
Boost abnormal	CG						
DC-DC abnormal	CU						

7.2 APP SETTING GUIDE

7.2.1 Download App

Scan this QR code on the right to download the EnerConsole APP to manage your EBricks Energy Storage System.

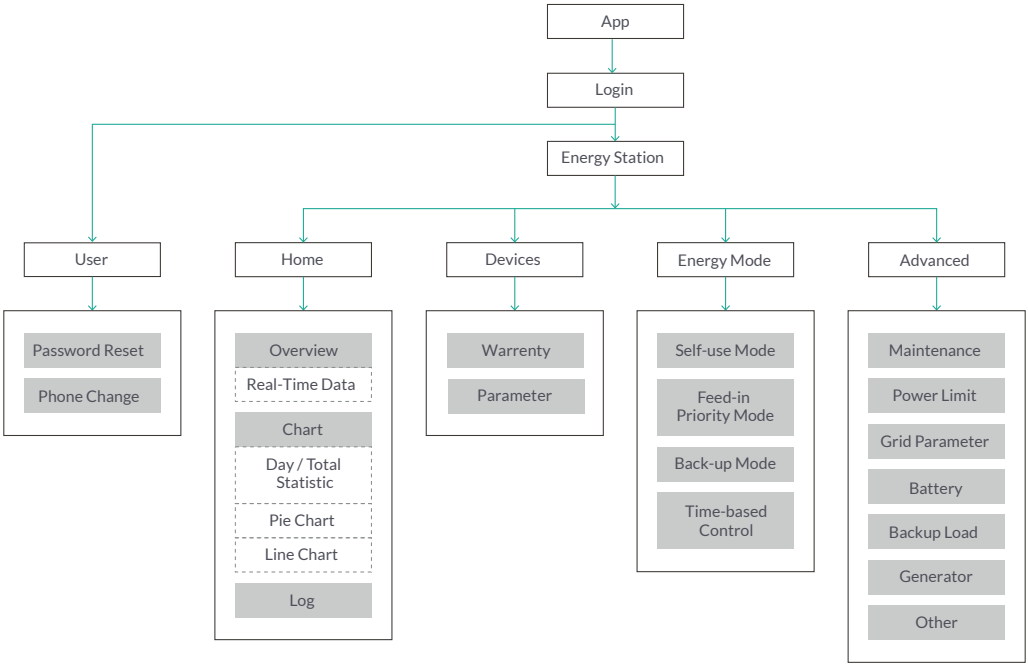
Scan Me

The same QR code can also be found on the left side of the inverter module. Or the EnerConsole APP is also available on App Store and Google Play for downloading.

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

7.2.2 App Architecture

APP read data from cloud server through API and display inverter parameter. You need to connect the inverter with Wi-Fi and thus control it remotely at any time.



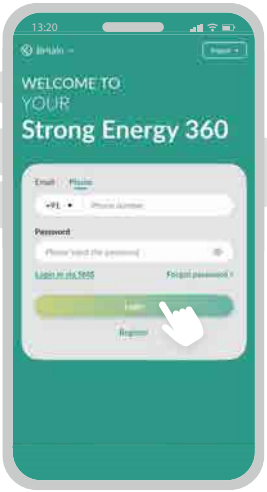
7.2.3 Basic Setting

Installation of App

Firstly, install the APP and enter. The APP may require some permissions from your phone, for example location, bluetooth, and notification. You need to grant all access rights in all pop-up windows when installing the APP or setting your phone. When the APP asks for permission, please click “Allow”.

Register and Login

1.

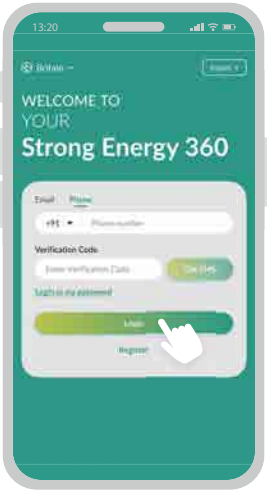


Register with your phone number.

2.

Input all needed information and click for Verfication Code.

3.

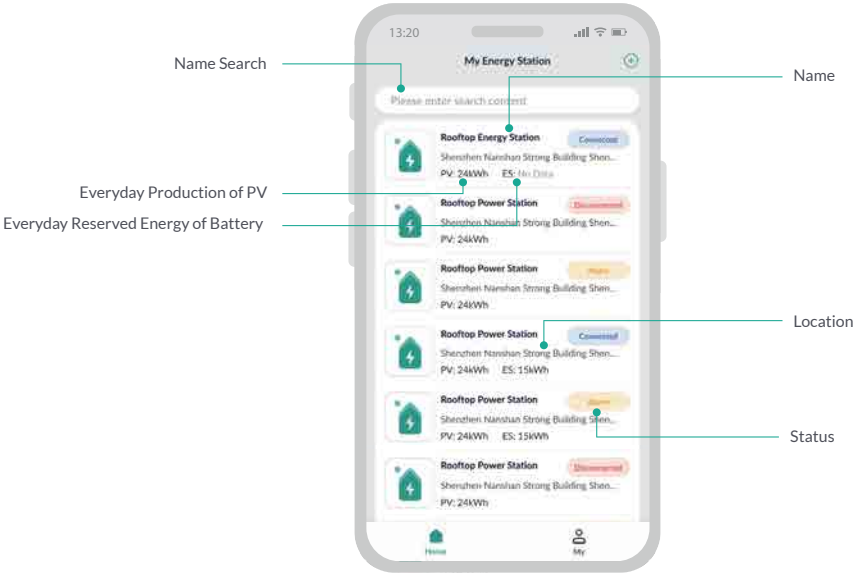


After registration, you can either login with password or one-time verification code each time.

⚠ NOTICE
You can only use verification code 5 times per Hour, 10 times per Day.

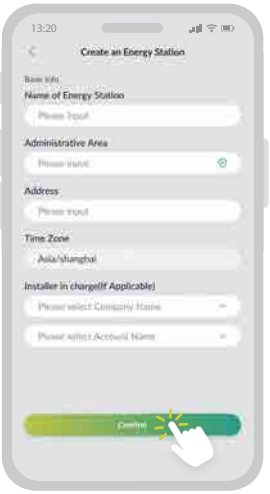
7.2.4 Energy Station

In Home page, you can view all your energy stations, including the Name, Location, Status, Everyday Production of PV, Everyday Reserved Energy of Battery. Name Search on the top is available.



Create an Energy Station

1.



Edit basic information of Energy Staion, including the name, location, detailed address and time zone.

2.

Scan the bar code of inverter.

3.

Connect Wi-Fi. It will scan and display the same Wi-Fi your phone is connected to.

4.

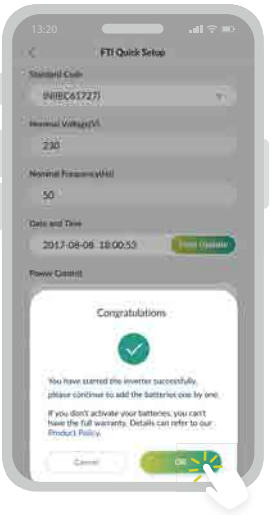
You need to make sure the Wi-Fi communicator is connected to the inverter and then follow the page instruction.

⚠ NOTICE
The Wi-Fi communicator only support 2.4G Wi-Fi right now.

5.

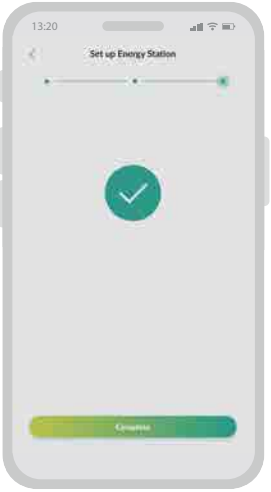
FTI(First Time Installation) Quick Setup. If the inverter never been activated before, you need to do the FTI quick setup. Confirm the parameter and change it if necessary so it can adapt to local laws.

6.



Scan to add batteries one by one.

7.



Completed.

7.2.5 My Energy Station

After creating the energy station, you can enter the detailed page of it.

Real-Time Data

Photovoltaic
When the inverter is connected to solar panels, you can check the real-time produce power of PV.

Grid
When the inverter is connected to grid, you can check the real-time grid power either flowing in or feeding back.

Critical Load
When the inverter is connected to critical load, you can check the real-time consuming power.

Energy Storage
When the inverter is connected to battery, you can check the SOC(State of Charge), the real-time power and the remaining time with the current load.

Inverter
You can check the real-time status of Wi-Fi signal strength, inverter status, current energy mode.

General Load
When the inverter is connected to general load, you can check the real-time consuming power.

Log

Alarm Log
When you see a Alarm banner, you can check the Alarm Log. It records the log of all time.

Operation Log
Operation Log records the user and the operation, including the status of that operation, date and time.

Chart

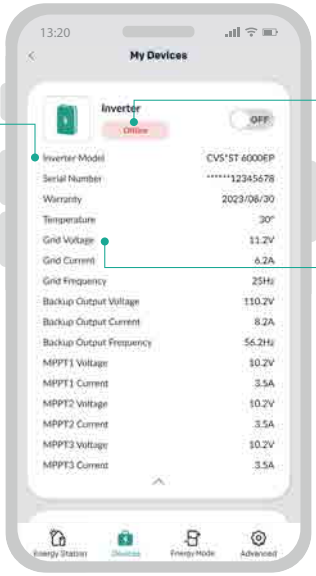
Day/Total Statistic
In this section, you can check the battery output energy, PV production energy and grid comsuption energy of everyday and inverter lifetime.

Pie Chart and Line Chart
In this section, you can check the household Power Consumption comparing the PV and Grid in pie chart, filtered by day/week/month/year.

Plus, you can check the PV Generation, Battery Output and household Power Consumption in line chart, filtered by day/week/month/year.

Devices

Inverter

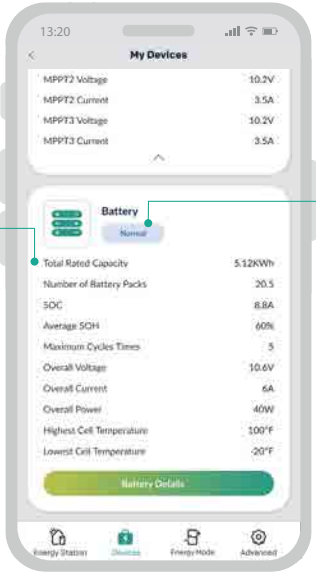


Basic Information
Here displays the inverter bound information, Inverter Model, Serial Number and Warranty.

Status
Inverter here show 5 statuses. Online/Offline, indicating if WiFi-Communicator is connected. Alarm means inverter working problem. ON/OFF indicates and allows the inverter working control.

Real-time Parameter
You can also check the real-time working parameter such as Grid Voltage, Grid Current, Grid Frequency, Backup Output Voltage, Backup Output Current, Backup Output Frequency, MPPT Voltage, MPPT Current and Inner Temperature.

Battery



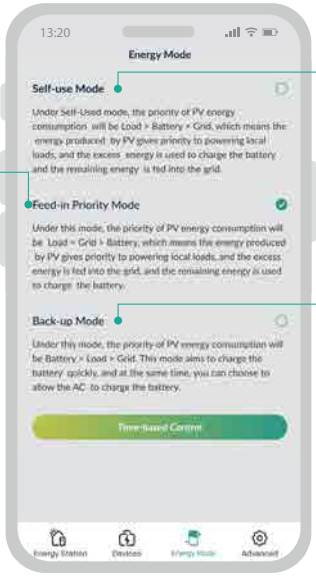
Real-time Parameter
You can also check the real-time working parameter such as Total Rated Capacity, Number of Battery Packs, SOC(State of Charge), Overall Voltage, Overall Current, Overall Power, Highest Cell Temperature, Lowest Cell Temperature.

Status
Battery here show 5 statuses. Normal/Disconnected, indicating if batteries are connected. Alarm means battery working problem. Charging/Discharging indicates the battery working status.

Energy Mode

Mode Selection

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



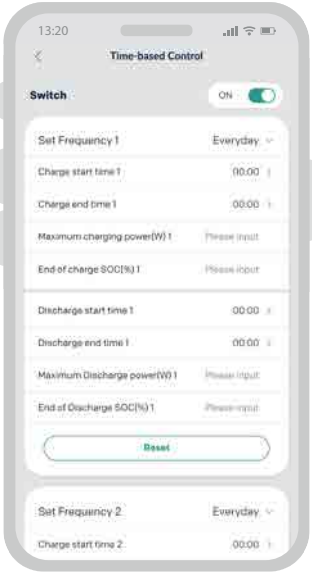
Self-use Mode
Under Self-Used mode, the priority of PV energy consumption will be Load > Battery > Grid, which means the energy produced by PV gives priority to powering local loads, and the excess energy is used to charge the battery and the remaining energy is fed into the grid.

Back-up Mode
Under this mode, the priority of PV energy consumption will be Battery > Load > Grid. This mode aims to charge the battery quickly, and at the same time, you can choose to allow the AC to charge the battery.

Time-based Control

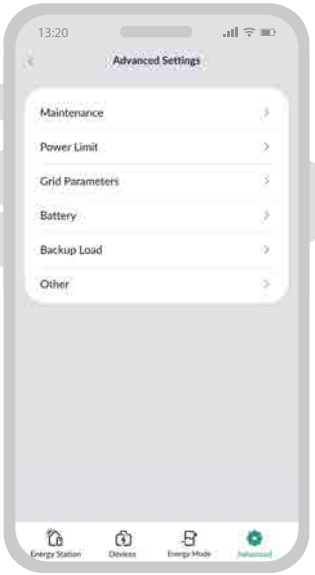
Besides the energy mode, you can also do specific setting to control the inverter through Time-based Control.

It allows you to set as follows
- Switch
- Set Frequency
- Charge Start Time
- Charge End Time
- Maximum Charging Power
- End of Charge SOC
- Discharge Start Time
- Discharge End Time
- Maximum Discharge Power
- End of Discharge SOC



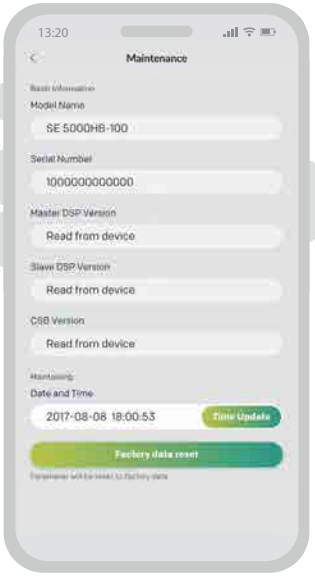
Advanced Setting

In Advanced, you can view more advanced setting. It allows you to have a more accurate control of your device.



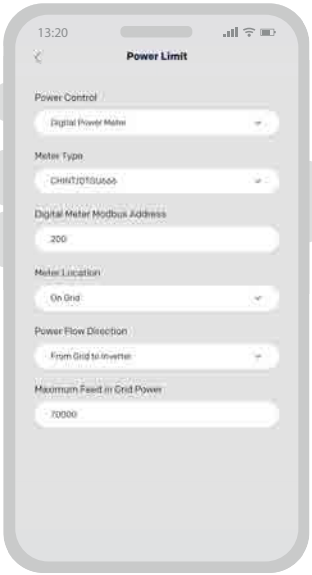
Maintenance

In Maintenance, you can check the Model Name, Serial Number. Meanwhile you can update the inverter Date and Time, Reset Factory Data and Clear Historical Information.



Power Limit

In Power Limit, you can set the Power Control meter, alongwith Meter Type, Meter Location, Power Flow Direction and Maximum Feed in Grid Power.



Grid Parameter

In Grid Parameter, you can change the Standard Code adapted to local law.

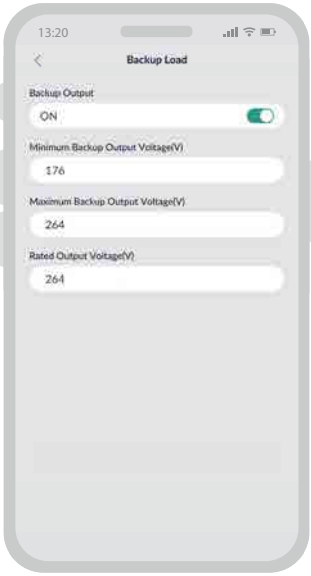
Battery

In Battery, you can control the battery work accurately by setting

- Maximum Charge Power
- Maximum Discharge Power
- Maximum Grid Forced Charge Power
- ON/OFF of Charge by Grid
- Maximum Grid Charge Power
- ON/OFF of Feed in Battery Power to Grid

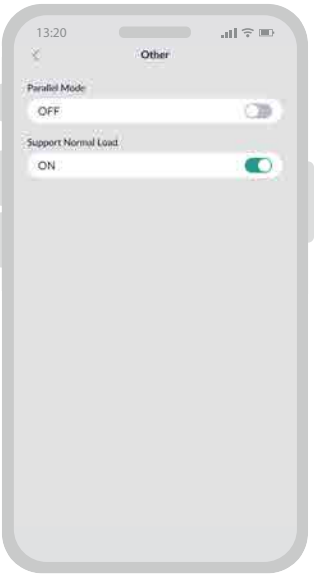
Backup Load

In Backup Load, you can choose whether to turn ON/OFF the Backup Load.



Other

In Other, you can choose whether to turn ON/OFF the Parallel Mode and Support Normal Load.



8. Maintenance

8.1 ROUTINE MAINTENANCE

Items	Check Content	Maintain Content	Maintenance Interval
Powerall Output Status	Statistically maintain the status of electrical yield, and remotely monitor its abnormal status.	N/A	Weekly
Powerall Cleaning	Check periodically that the heat sink is free from dust and blockage.	Clean periodically the heat sink.	Yearly
Powerall 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 is running well.	If there is any abnormal phenomenon, replace the relevant parts.	Monthly
Powerall 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

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

8.2 POWERALL TROUBLESHOOTING

When the equipment 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 bureau, revise the electrical protection parameters settings on the inverter through the App. 3. If the alarm persists for along time, check whether the AC circuit breaker /AC terminals is disconnected or not, or if the grid has a power outage.
A1	Grid under Voltage	
A3	Grid over Frequency	
A4	Grid under Frequency	
A2	Grid Absent	Wait till power is restored.
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 your dealer for technical 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.
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 the customer service center.
C2	Powerall 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 the customer service center.
C3	Powerall 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 the customer service center. If there is no abnormality on the grid side, the machine fault can be determined. (If you open the cover and find traces of damage to the relay, it can be concluded that the machine is faulty.) And pls. contact the customer service center.
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 the customer service center.
C5	Powerall 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 the customer service center.
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, pls. contact customer service to report repair.
B7	PV String Reverse	Check and modify the positive and negative polarity of the input of the circuit string.

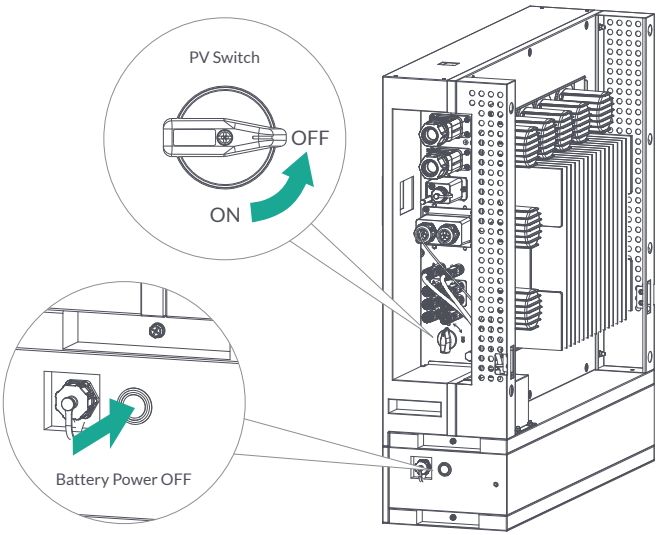
Code	Alarm Information	Suggestions
C8	Fan Abnormal	1. If the alarm occurs occasionally, please restart the inverter. 2. If it occurs repeatedly or cannot be recovered for a long time, check whether the external fan is blocked by foreign objects. Otherwise, contact customer service.
C9	Unbalance DC-link 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 the customer service center.
CA	DC-link over Voltage	
CB	Internal Communication Error	
CC	Software Incompatibility	
CD	Internal Storage Error	
CE	Data Inconsistency	
CF	Inverter Abnormal	
CG	Boost Abnormal	
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 the customer service center.
D2	Battery 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 the customer service center.
D3	Battery 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 cut-off 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 the customer service center.
D4	Battery Discharger over Current	1. Check whether the battery parameters are correctly set. 2. Battery undervoltage. 3. Check whether a separate battery is loaded and the discharge current exceeds the battery specifications. 4. The battery is abnormal. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.
D5	Battery over Temperature	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 the customer service center.
D6	Battery 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 BACKUP output is normal. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
D8	Communication Error (Inverter-BMS)	1. Check whether the battery is disconnected. 2. Check whether the battery is well connected with the inverter. 3. Confirm that the battery is compatible with the inverter. It is recommended to use CAN communication. 4. Check whether the communication cable or port between the battery and the inverter is faulty. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.

Code	Alarm Information	Suggestions
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. 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 the customer service center.
DA	Internal Communication Loss (M-D)	
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: i) Check whether the MC4 terminal on the PV side is securely connected. ii) Check whether the voltage at the PV side is open circuit, ground to ground, etc. If exclude the above, the alarm continues to occur, please contact the customer service center.
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 the customer service center.
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 EPS 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.)

8.3 UNINSTALLATION OF THE EQUIPMENT

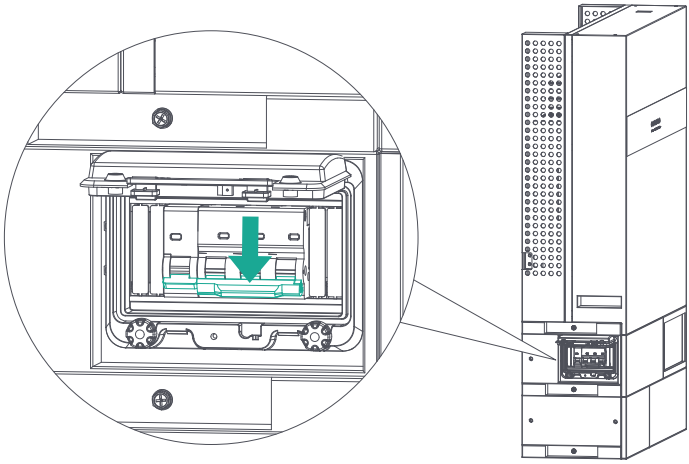
Perform the following procedures to remove the Powerall.

1. Before uninstalling the system, please switch off the system according the Chapter 5.2.1. Please make sure the inverter is turned to OFF in EnerConsole APP and switch off the PV Switch. Press and hold the Battery Power OFF button on top of the inverter module for 5 seconds, wait until the light is off.



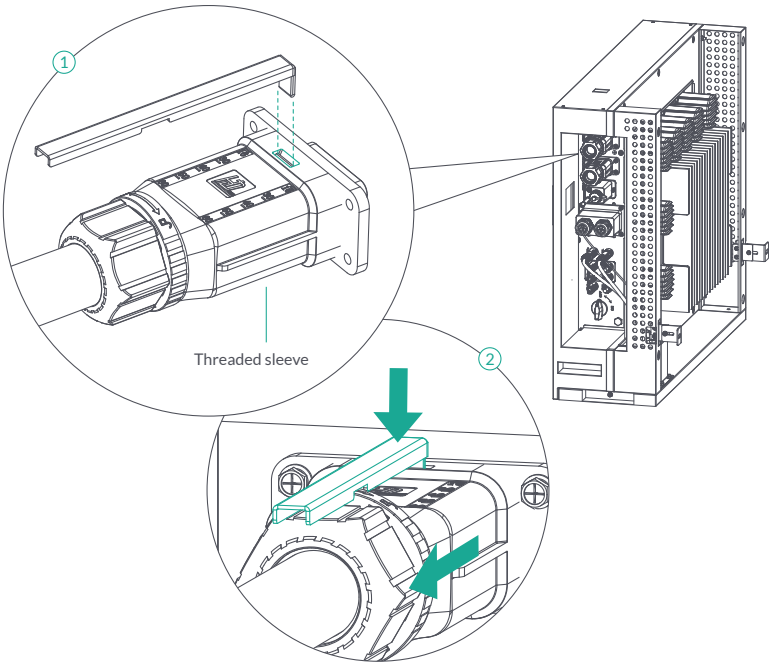
⚠ WARNING
Before removing DC input connector, double check DC input switch is turned to OFF to avoid inverter damage and personal injury.

2. Power off the Battery breaker.

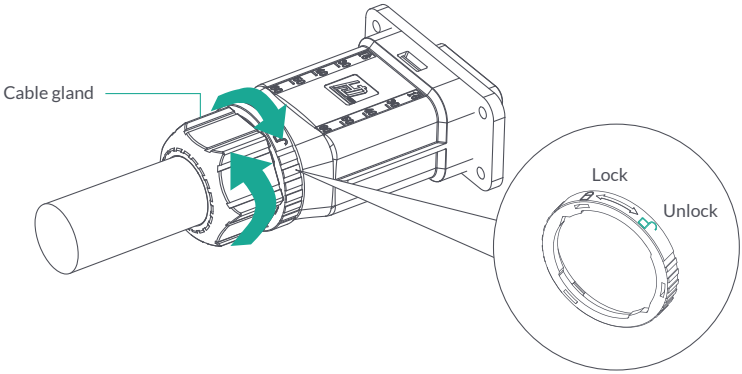


3. Disconnect all cables from the inverter, including GRID/BACKUP terminal. GRID/BACKUP connectors removing details are shown below.

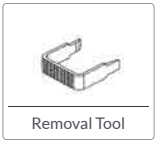
Align the protruding part of the Removal Tool (Serial No.3) with the small rectangular slot on the threaded sleeve. Firmly press the removal tool and pull out the threaded sleeve to disengage it at the same time.

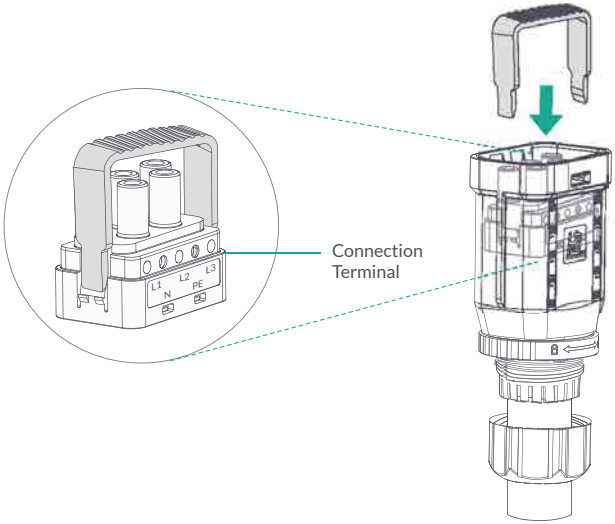


4. Hold the unlocking button with one hand and turn the cable gland in the Unlock direction with the other hand. Remove the cable gland.

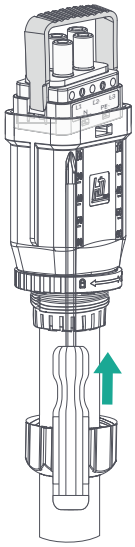


5. Plug the Removal Tool (Serial No.17) on the connection terminal.

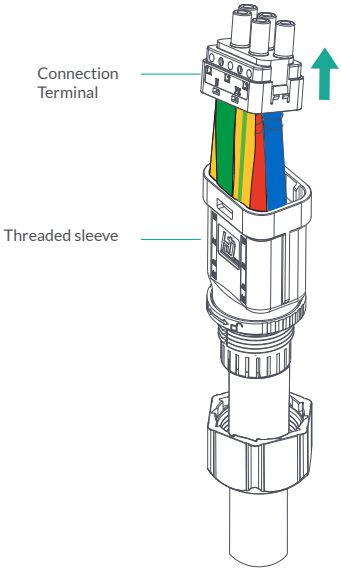

Removal Tool



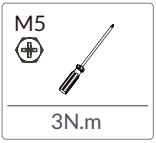
6. Use the screwdriver to poke out the connection terminal and pull the removal tool.

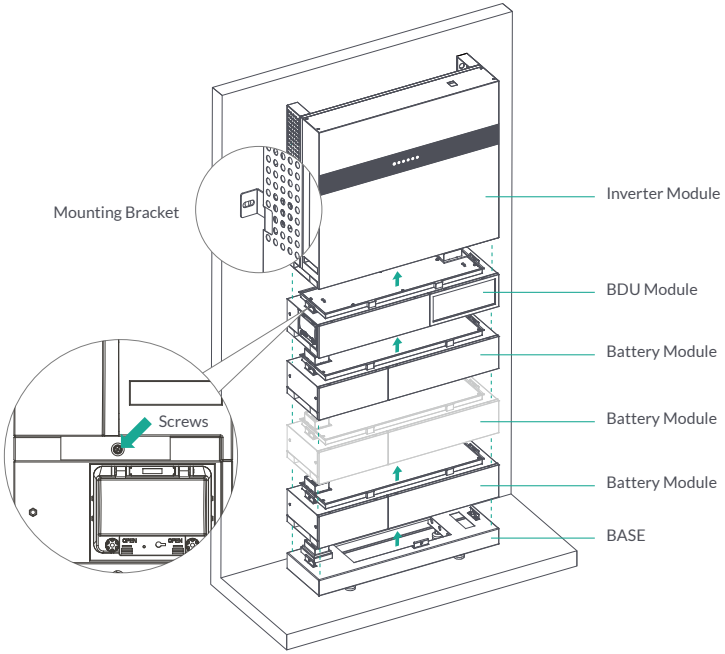


7. Pull out the connection terminal from the threaded sleeve.



8. Remove the Mounting Bracket and the Screws M5 on both sides of the inverter module, BDU module and each battery modules. Carefuly take the Inverter module off the BDU module, and then take the BDU module off the Battery module, and at last take all the Battery modules off the BASE.





9. Technical Specifications

*Not yet test **The range of output voltage and frequency may vary depending upon diffierent grid codes.
Specifications are subject to change without advance notice.

System Model	CRKAST-8K-24000Wh	CRHAST-10K-24000Wh
System Parameters		
Number of Batteries	4 - 10	5 - 10
Battery Total Energy	9.6-24 kWh	12-24 kWh
System Series Model	CRK4ST-8K-9600Wh	--
	CRK5ST-8K-12000Wh	CRH5ST-10K-12000Wh
	CRK6ST-8K-14400Wh	CRH6ST-10K-14400Wh
	CRK7ST-8K-16800Wh	CRH7ST-10K-16800Wh
	CRK8ST-8K-19200Wh	CRH8ST-10K-19200Wh
	CRK9ST-8K-21600Wh	CRH9ST-10K-21600Wh
	CRKAST-8K-24000Wh	CRHAST-10K-24000Wh
Degree of Protection	IP 65	
Operation Temperature Range	0°C ~ 50°C	
Allowable Relative Humidity Range	5% - 95%	
Max. Operating Altitude	4000 m	
Weight (Standard Package)	215.3 kg / 6 Batteries	
Dimension (W) x (H) x (D) (Standard Package)	780 x 1760 x 240mm /6 Batteries	

Inverter Model	CVG4ST-8kW3P	CVGJST-10kW3P
Input (PV)		
Max. Input Voltage	1000 V	
MPPT Operating Voltage Range	160 - 950V	
Max. Input Power	15000 W	
Max. Input Current	20A / 30A	
Max. Short Circuit Current	30A/ 40A	
Max. Number of PV Strings	3 (1/2)	
NO. of MPPTs	2	
Input (Battery)		
Compatible Battery Type	Lithium-ion	
Battery Voltage Range	150 - 600V	
Nominal Battery Voltage (Full Load)	250 - 600V	
Max. Charge/Discharge Current	50A / 50A	
Max. Charge/Discharge Power	15000W / 9100W	15000W / 11300W
Lithium Battery Charge Curve	Self-adaption to BMS	
Output (On Grid)		
Rated Grid Voltage	380V / 400V / 415V 3W+N+PE	
Rated Grid Frequency	50Hz / 60Hz	
Grid Frequency Range**	45Hz - 55Hz / 55Hz - 65Hz	
Nom. Power (Output)	8000 W	10000 W
Maximum Power (Output)	8800 W	11000 W
Apparent Power (Output)	8800 VA	11000 VA
Maximum Current (Output)	3*13.3A	3*16.7A
Maximum Current (Input)	3*25A	3*25A
THDI	<3% (Rated Power)	
DC Current Injection	<0.5% In	
Power Factor	>0.99 Rated Power (Adjustable 0.8 Leading - 0.8 Lagging)	

Inverter Model	CVG4ST-8kW3P	CVGJST-10kW3P
Output (Backup)		
Nom. power	8000 VA	10000 VA
Maximum Power (5mins)	9600 VA	12000 VA
Maximum Power (10s)	12000 VA	15000 VA
Rated Voltage	380V / 400V / 415V 3W+N+PE	
Backup Switch Time	10ms (Typical), 20ms (Max)	
THDV	<3% (R Load), 8% (RCD Load)	
Efficieney		
Max. Efficiency (PV to Grid)*	98.4 %	
European Efficiency (PV to Grid)*	97.9 %	
Max. Charge Efficiency (PV to Battery)*	98 %	
Max. Charge/Discharge Efficiency (Grid to Battery)*	98 %	
Protection		
DC Switch	Support	
Anti-islanding Protection	Support	
AC Overcurrent Protection	Support	
AC Short Circuit Protection	Support	
AC Over-voltage Protection	Support	
SPD	DC Type 2, AC Type 2	
GFCI	Support	
AFCI	Optional	
RSD	Optional (Tigo/APS)	
Insulation Detection	Support	
General		
Topology	Transformerless	
Cooling	Natural Cooling	
Noise	<30dB (Measured at 1m)	
Dimensions (W) x (H) x (D)	530 x 550 x 213mm	
Weight	32 kg	
HMI& COM		
Display	APP+LED	
Communication	WiFi/GPRS/4G/Ethernet(optional), BMS(CAN), DRM, 1*DI, 2*DO, METER (RS485), RS485	
Certification		
Safety	IEC 62109-1/2, IEC 62040, IEC 62477	
EMC	IEC/EN 61000-6-3, IEC 61000-3-11, IEC 61000-3-12, IEC/EN 61000-6-2	
Grid Code	IEC 61727, IEC 62116, EN 50549-1, VDE 4105, AS 4777, CEI 0-21, G98	

Please read carefully &
store in a safe place
for future reference.

EnerConsole

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