EN

RESIDENTIAL THREE PHASE HYBRID INVERTER

N3 Plus Series

User Manual

VT0

- N3-14.9K
- N3-15K
- N3-19.9K
- N3-20K
- N3-25K
- N3-29.9K
- N3-30K

RENAC

更新日志

版本	更新记录	更新日期	更新人
VT0	初版	2024.10.14	隆烨洪

Content

Notice

This manual contains important safety instructions, installation, electrical connections, commissioning, maintenance, and troubleshooting of the equipment.

Save the manual!

This manual must be stored carefully and be available at all times.

Copyright Declaration

1. About this manual

1.1 Applicability

Please read the product manual carefully before installation, operation or maintenance of the inverter. This manual contains important safety instructions and installation instructions that must be followed during installation and maintenance of the equipment.

1.2 Target group

This manual is intended for technical professionals for installation, commissioning and maintenance of the hybrid inverter. The technical personnel has to be familiar with the product, local standards, and electric systems.

1.3 Symbols used

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

 'Danger' indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.
 'Warning' indicates a hazard with a medium level of risk that, if not avoided, will result in death or serious injury.
 'Caution' indicates a hazard with a low level of risk that, if not avoided, could result in minor or moderate injury.
 'Notice' indicates a situation that, if not avoided, could result in equipment or property damage or provides tips that are valuable for the optimal operation of your product.

1.4 Acronyms and abbreviations

AFCI	Arc fault circuit interrupter
BAT	Battery
BMC	Battery Master Controller
BMS	Battery Master System
DRM	Demand response modes
DRED	Demand response enabling device
EMI	Electromagnetic interference
EPS	Emergency power supply
LED	Light emitting diode
MPP	Maximum power point
MPPT	Maximum power point tracking
PV	Photovoltaic
RCD	Residual Current Operated Protective Device
RSD	Rapid shutdown
THDi	Total Harmonic Distortion of Current
THDv	Total Harmonic Distortion of Voltage

2. Safety

2.1 General Safety

The hybrid inverter has been designed and tested strictly in according with international safety regulations. Read all safety instructions carefully prior to any work and observe them at all times when working on or with the hybrid inverter. Incorrect operation or work may cause:

◆ Injury or death to the operator or a third party;

◆ Damage to the inverter or other properties.

2.2 Important safety instructions

DANGER

- PV strings will produce electrical power when exposed to sunlight and can cause lethal voltage and electric shock.
- Only qualified personnel should work on PV panels.
- Do not open lid when the inverter is operating. Unauthorized opening will void warranty and warranty claims and in most cases terminate the operating license.
- When the enclosure lid is removed, live components could be touched which can result in death or serious injury due to electric shock.
- Operating damaged inverter can lead to hazardous situations that can result in death or serious injuries due to electric shock.
- Batteries store large amount of electrical power, short circuiting or incorrect installation may lead to burns or serious injuries.
- Lethal voltages are present at battery terminals and cables connecting to the inverter. Serious injuries or death may occur if the cables and terminals are touched.
- PV negative (PV-) and battery negative (BAT-) on inverter side are not grounded intentionally. Connecting PV- or BAT- to EARTH is strictly forbidden.

WARNING

Do not disconnect PV, AC and/or battery plugs and cables while the inverter is operating. Before working on the system power down on all supplies and wait for 5 minutes to discharge. Verify that there is no voltage or current before disconnecting any plugs or cables.

Use personal protective equipment, including rubber gloves and protective boots during installation or maintenance

CAUTION

Do not touch any hot parts (such as the heat sink) during operation, temperature of inverter surface may exceed 60℃ during operation.

NOTICE

Electrical installation and maintenance must only be carried out by trained and qualified electrician, following all local regulations.
Do not open inverter lid or change components without RENAC Power's authorization. Unauthorized work will invalidate warranty.
Operate inverter as explained in this manual, failure will damage equipment and invalidate warranty.
Installation and maintenance must be carried out by competent electricians following all local regulations.
With an integrated universal current-sensitive residual current monitoring unit included the inverter will disconnect immediately from the mains power once a fault current with a value exceeding the limit is detected. However, if an external residual current device (RCD) is mandatory, the switch must be triggered at a residual current of 300 mA (recommended), or it can be set to other values according to local regulations. For example, in Australia, the inverter can use an additional 100 mA (Type A) RCD in installations.

When installing, operating, and maintaining the product, comply with local laws and regulations. The safety instructions in this manual are only supplements and cannot cover all the precautions.
Renac will not be held liable for any damage caused by violating general safety operation requirements, general safety standards, or any safety instruction in this manual.

Anti-Islanding Effect

Islanding is a condition when grid connected PV / batteries back feed power into the Grid when Grid is turned off for maintenance work, putting maintenance personal at serious risk. N3 Plus inverters prevent islanding through Active Frequency Drift (AFD).

2.3 Explanation of symbols

Symbols on the type label:

Symbol	Explanation
CE	CE mark. The inverter complies with requirements of applicable CE guide-lines.
	Beware of hot surface. The inverter can be hot during operation. Avoid touching during operation.
	Danger of high voltage. Danger to life due to high voltage in the inverter!
	Danger. Risk of electric shock!

Symbol	Explanation
	Inverter should not be disposed of with the household waste. Disposal information can be found in this manual.
	Don't work on this inverter until it is isolated from battery, mains supply and on-site PV modules.
	Danger to life due to high voltage. Inverter holds stored power, wait for 5 minutes to discharge before opening lid.
	Please read this manual before installation.
	RCM (Regulatory Compliance Mark) The product meets the requirements of the applicable Australian standards.

3. Introduction

3.1 Block diagram

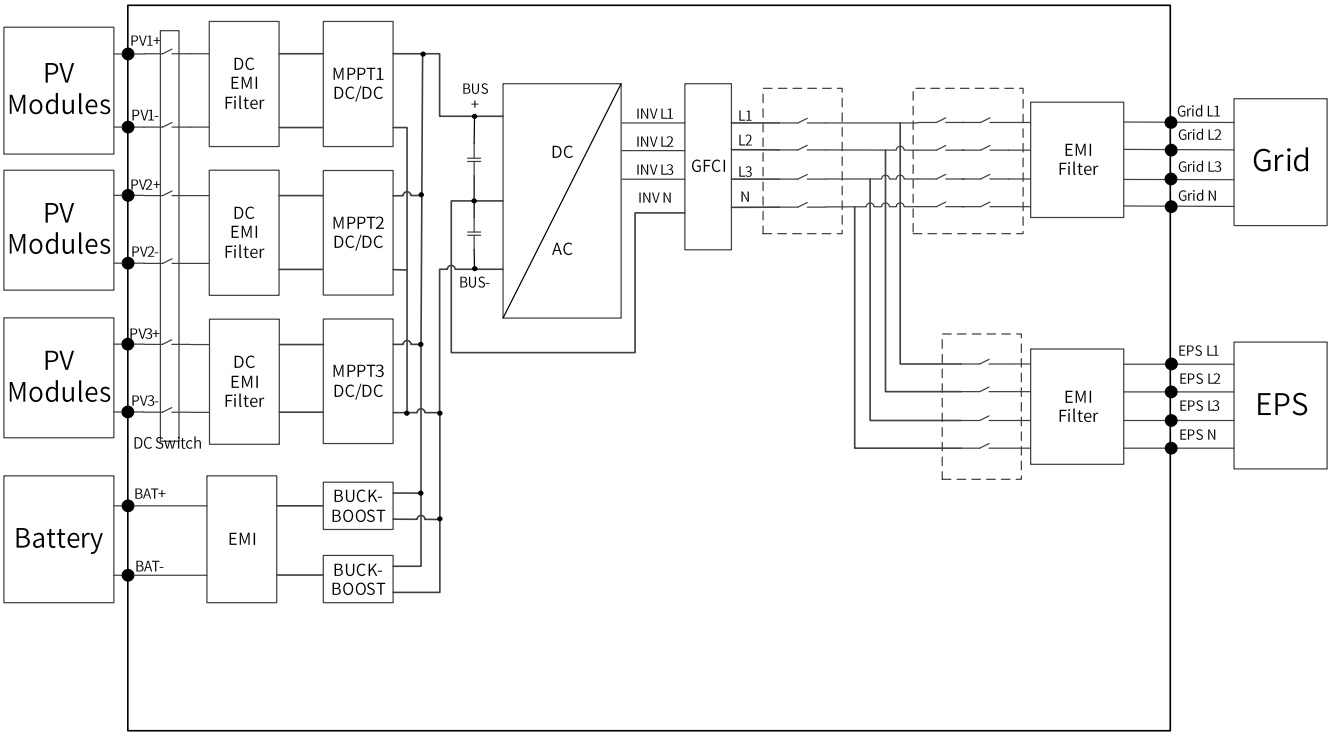

Figure 3-1 Block diagram of the N3 Plus

3.2 Product overview

The N3 Plus hybrid inverters are designed to work with PV modules, battery, grid power and electrical loads. Hybrid inverter helps to optimize on-site consumption, charge battery with surplus PV power and supply power from battery to meet load. When PV and battery power are insufficient, grid power will be used to support loads.

Model name: N3-15K

- Power class: 14.9K, 15K, 19.9K, 20K, 25K, 29.9K, 30K
- Three phase hybrid inverter

3.3 Dimensions

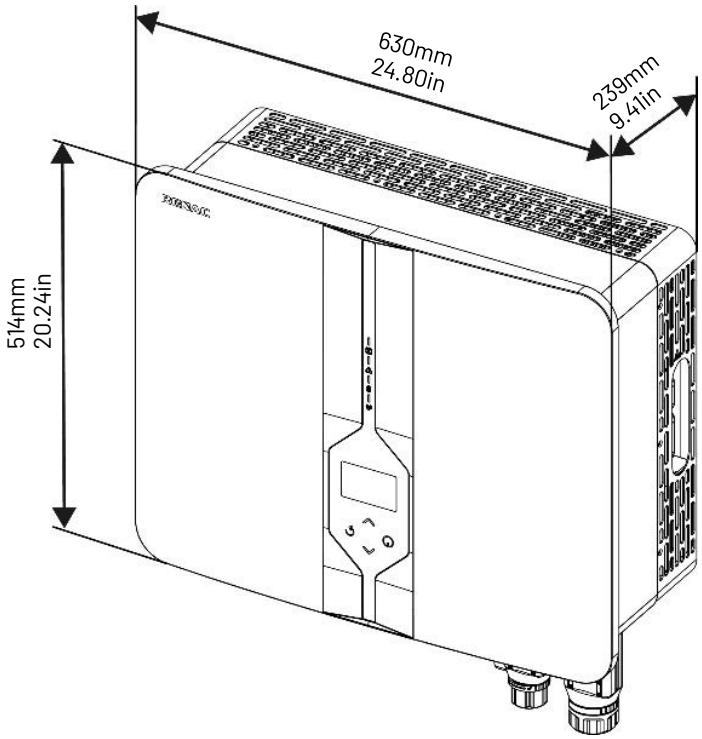

Figure 3-2 Dimensions of N3 Plus

3.4 Application Scenarios

1. On-grid Solution:

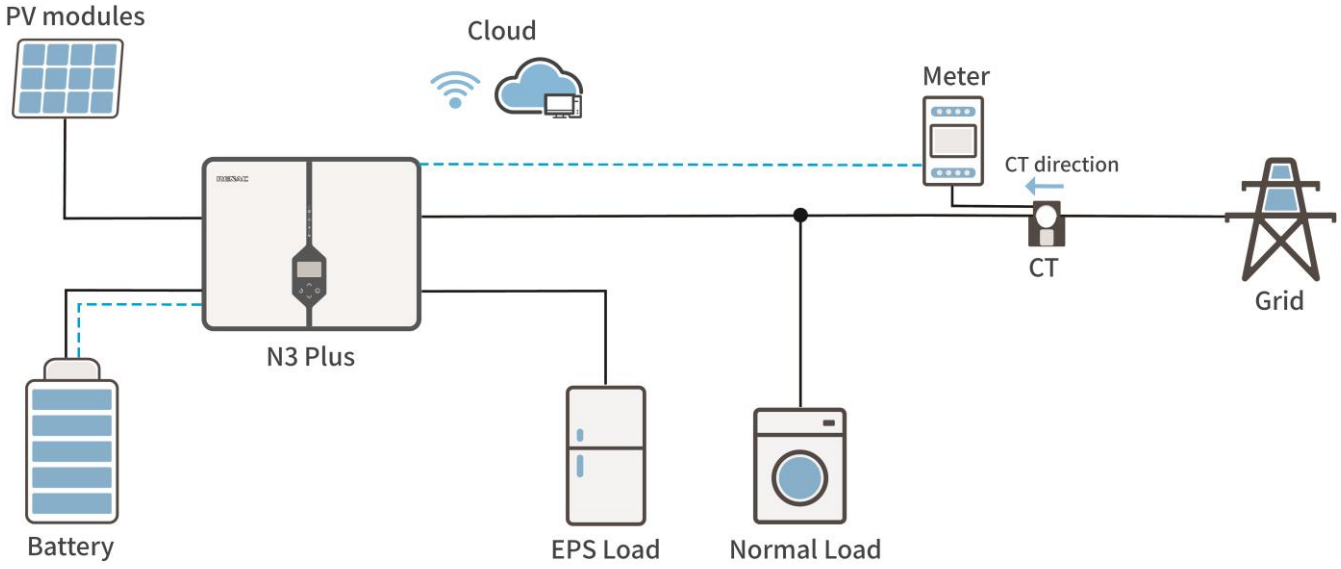

Figure 3-3 On-grid solution

2. AC Retrofit Solution:

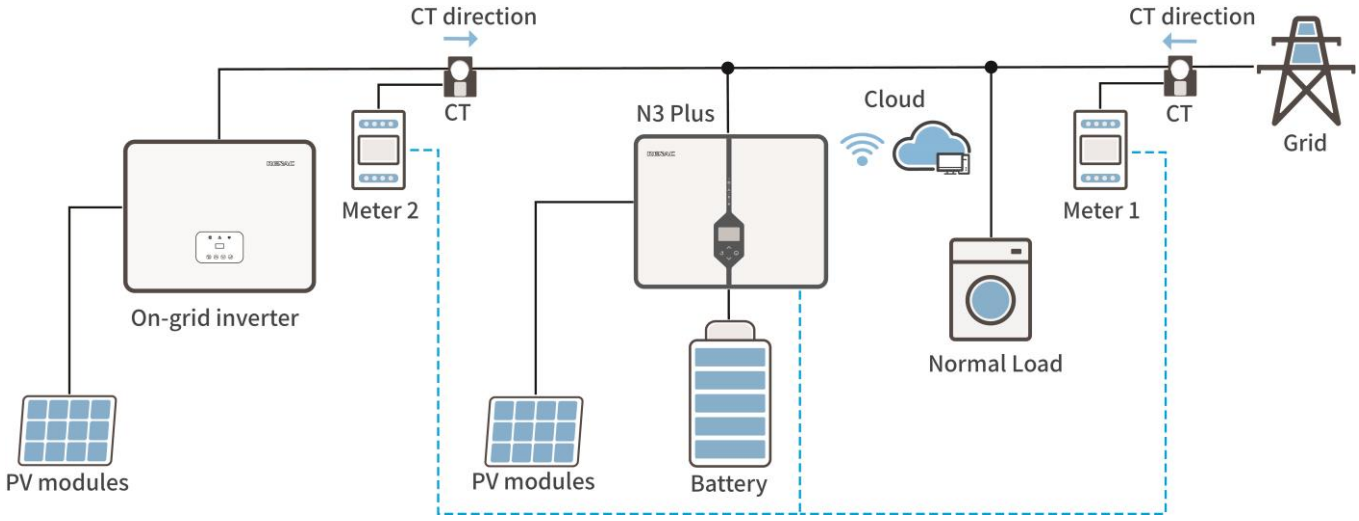

Figure 3-4 AC retrofit solution

3.5 Work mode

The N3 Plus Series hybrid inverter has the following work mode based on the configuration and connected equipment.

Work mode: Self Use

This mode is applies to areas with low subsidies and high electricity prices. Self-consumption of PV renewable power is the highest priority. Excess PV power is used to charge batteries, and then feed in the grid.

a. When the PV power is sufficient, PV power will supply the following sequence:

Consumption priority: Load -> Battery -> Grid

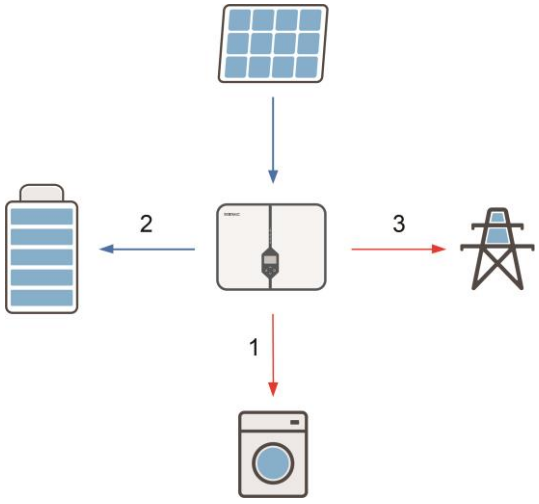

Figure 3-5

b. When the PV power is insufficient, the battery will discharge to supply loads, and the grid will be insufficient.

Supply priority: PV power -> Battery -> Grid

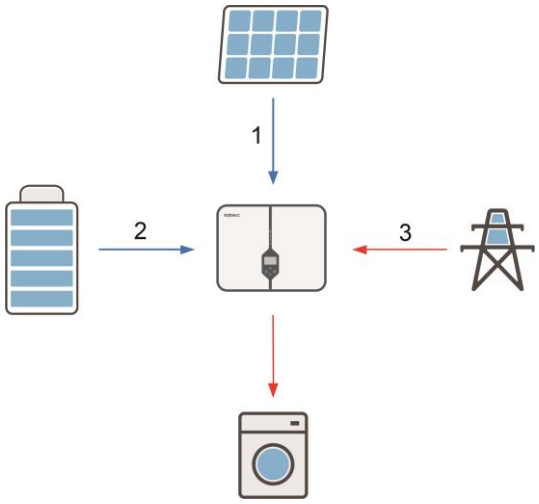

Figure 3-6

Work mode: Backup Use

This mode is applies to areas with frequent power outages. When the grid is off, the battery is used as backup power to supply load. This mode ensures that the battery has sufficient power to supply loads during a grid outage. PV power and battery power could support the backup load in the event of a blackout.

a. When grid is on, the battery is in a state of charge until it is full and keep standby status.

Consumption priority: Battery -> Load

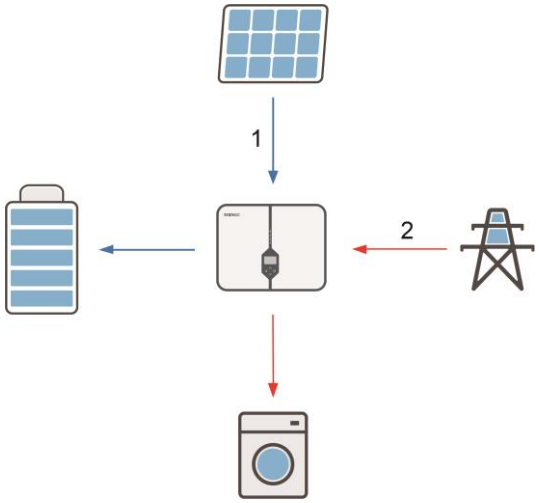

Figure 3-7

b. When grid is off, the battery will be discharged to supply load. The inverter will connect grid automatically when grid goes back on.

Supply priority: PV power -> Battery

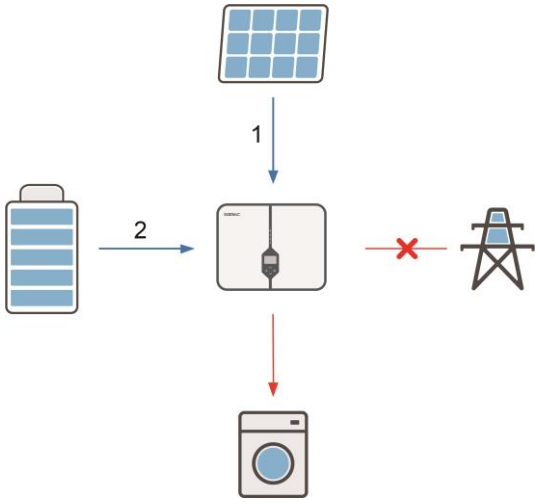

Figure 3-8

Work mode: Feed in Use

This mode applies to areas that has high feed-in tariff and export control. This model prioritizes grid feeds with sufficient PV power to maximize the tariff subsidy earned.

a. When the PV power is sufficient, the PV power will supply load first, then feed into grid, and the excess power will charge the battery last.

Consumption priority: Load -> Grid -> Battery

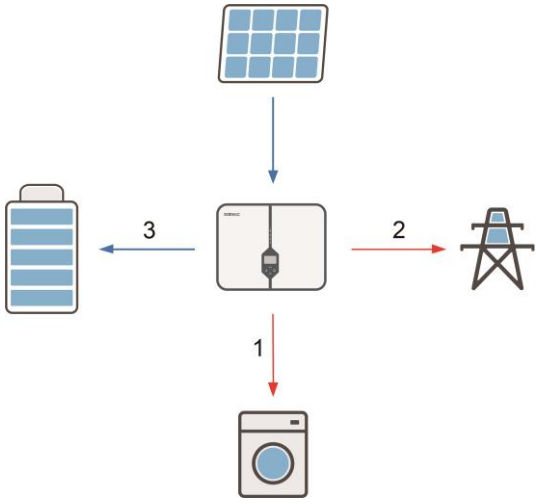

Figure 3-9

b. When the PV power is insufficient, using the power from PV and battery to supply loads and the insufficient power will be supplied by the grid.

Supply priority: PV power -> Battery -> Grid

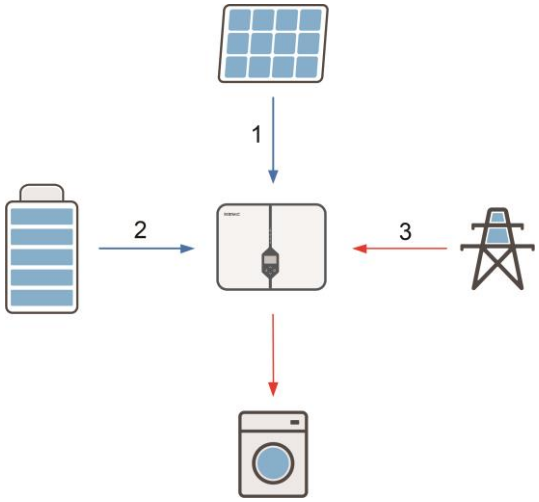

Figure 3-10

Work mode: Peak Shaving

This mode applies to the area where the grid system needs to balance the load. In this mode, the hybrid inverter ensures that the battery is charged during the valley period and discharged during the peak period.

PeakLimit: The consumption limits power from the grid side. 0 W by default, the settable range: 0 ~ 41500 W.

Reserved SOC: The lower limit of battery SOC required for later peak shaving period. 50% by default, the settable range is 10~100%.

During peak shaving period:

a. When grid consumption power < PeakLimit, the load will draw power from the PV and the grid, and the battery will be in standby state.

Supply priority: PV power -> Grid

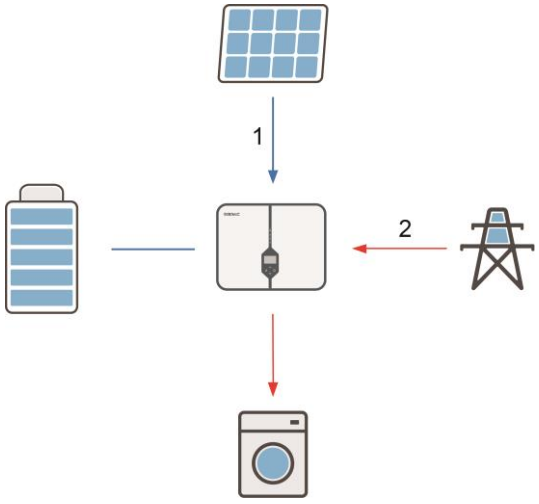

Figure 3-11

b. When grid consumption power > PeakLimit, the battery will discharge power for loads and thus reduce the amount of power from the grid.

Supply priority: PV power -> Battery -> Grid

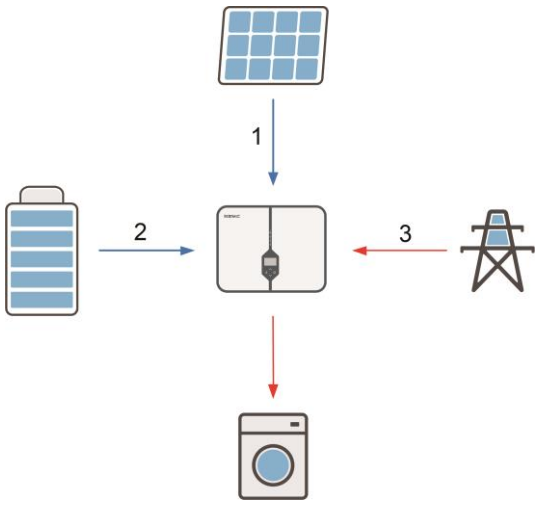

Figure 3-12

Outside peak shaving period:

The battery does not discharge power. The PV charges the battery up to the Reserved SOC before supplying power to the loads.

3.6 Functions

(1) Charge period mode:

This function applies the areas with large gaps between peak and valley electricity prices. Users can set time-based schedules to charge the battery using the APP or inverter display.

During charging period inverter will use the power from PV or grid to charge the battery.

Users can set two charge periods, each requiring settings for whether power needs to be drawn from the grid, start time, end time, maximum SOC, and power limit.

Max. SOC: 10 ~ 100%; Power limit: 0 ~ 30000W

Consumption priority: Battery -> Load

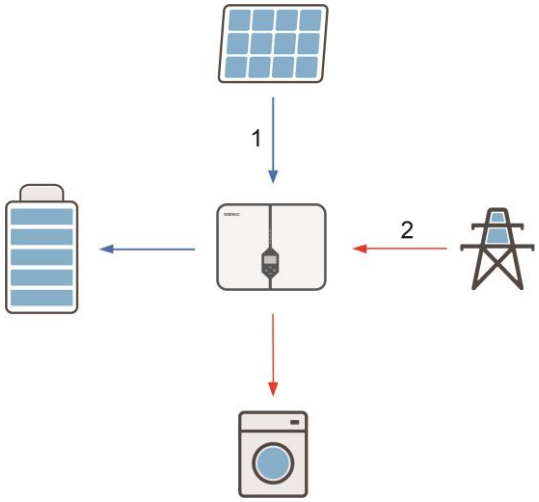

Figure 3-13

As long as the charging start time and charging end time are the same, this feature is off by default. Outside the charge period, the inverter will work in another work mode, which users are already set in the work mode of the inverter interface or APP.

(2) EPS mode:

When grid is off, during daytime PV generation will supply load, excess power is stored in the battery. At nighttime inverter will discharge battery to supply load.

In this mode, you have to make sure that the EPS load power is within the EPS's output power rating. Otherwise, the inverter will report an EPS Over Load warning.

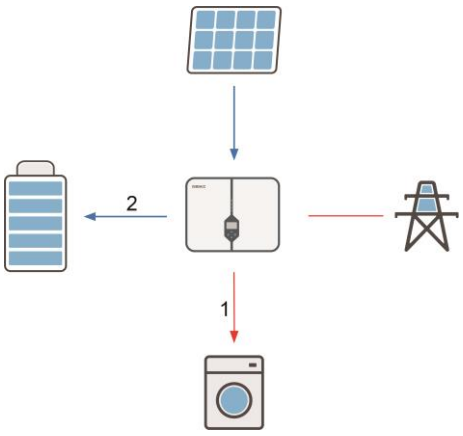

Figure 3-14

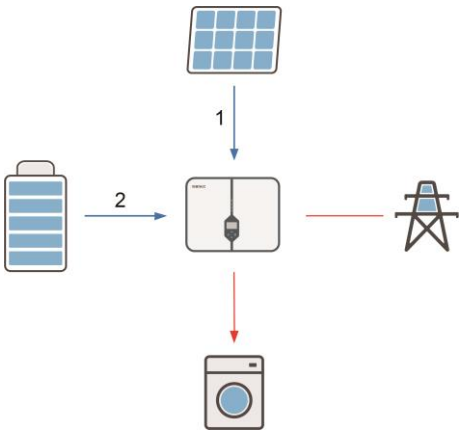

Figure 3-15

When EPS Over Load warning appears, reduce load to be with in power rating of the EPS's output power rating and the inverter will return to normal after ESC button on the LCD screen pressed.

For inductive load such as fridge, air conditioner, washing machine, etc. ensure that the start power does not exceed the EPS peak power.

Model	N3-14.9K / 15K	N3-19.9K / 20K	N3-25K	N3-29.9K / 30K
Peak Apparent Power, Duration (VA, s)	22500, 10	30000, 10	37500, 10	45000, 10

(3) Export Control:

Export control is a limit on the amount of power your solar system that can export into the grid. Users can limit the power export to the grid according to site conditions.

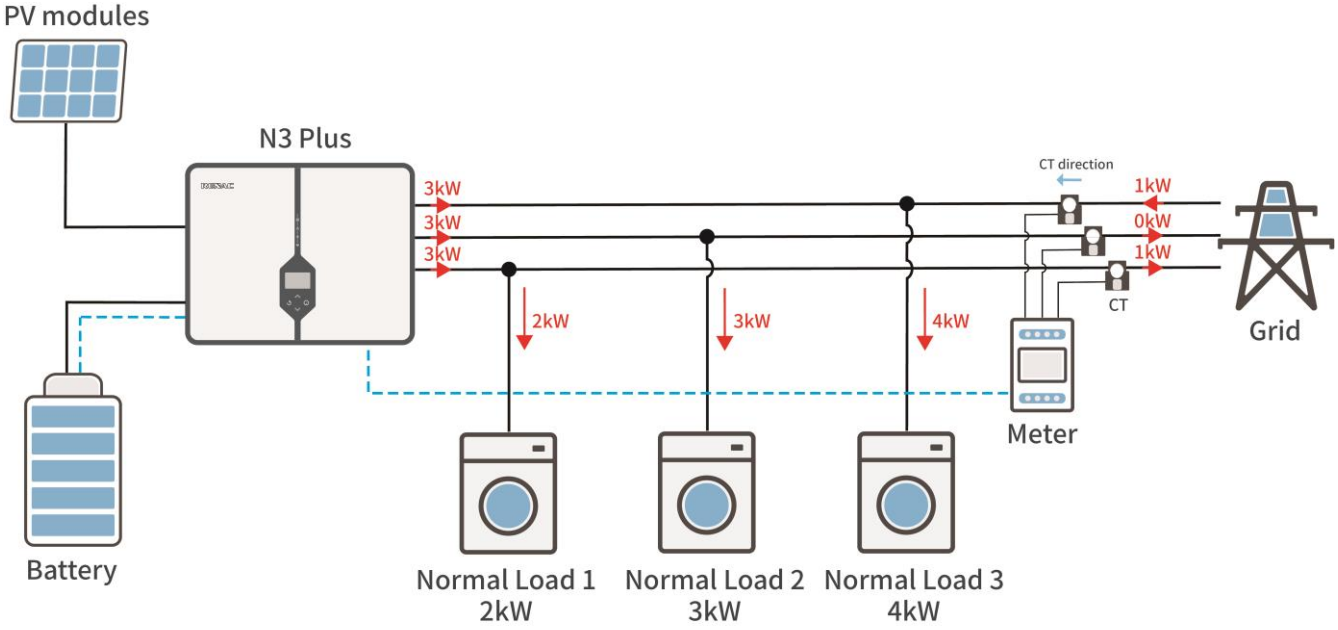

Figure 3-16 Zero export control with phase balance

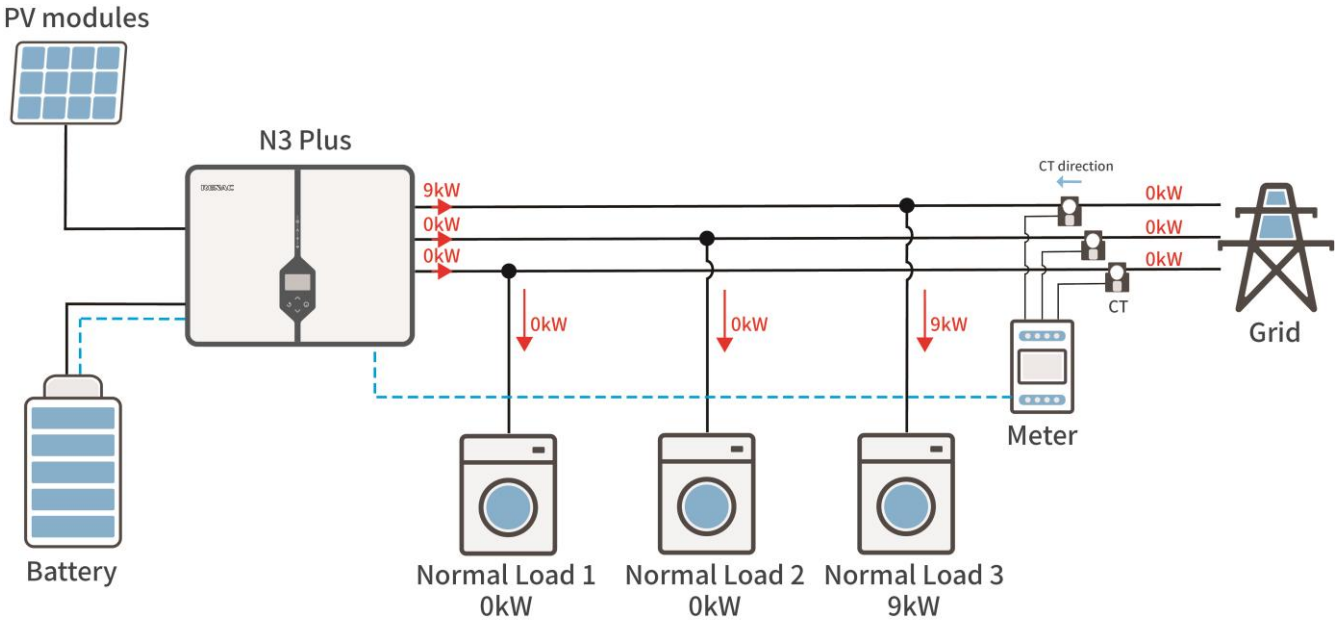

Figure 3-17 Zero export control with phase unbalance

Note: When setting the power to limit the power export to the grid, the CT or meter is enabled first.

3.7 Technical data

Model	N3-14.9K	N3-15K	N3-19.9K	N3-20K	N3-25K	N3-29.9K	N3-30K
PV Input							
Max. Recommended PV Power (Wp)	22500	22500	30000	30000	37500	45000	45000
Max. PV Power for Single MPPT (Wp)	15000						
Max. PV Input Voltage (V)	1000						
MPPT Voltage Range (V)	180 ~ 960						
Rated PV input voltage (V)	700						
Start-up Voltage (V)	200						
No. of MPP Trackers	3						
No. of Input Strings per Tracker	2 / 2 / 2						
Max. PV Input Current (A)	36 / 36 / 36						
Max. short-circuit Current (A)	46 / 46 / 46						
Max. Backfeed Current to array (A)	0						
AC Output							
Rated AC Output Apparent Power (VA)	14900	16500	19900	22000	27500	29900	33000
Rated AC Output Power (W)	14900	15000	19900	20000	25000	29900	30000
Max.AC Output Current (A)	22.6	25	30.2	33.4	41.7	45.4	50
Rated.AC Output Current (A)	22.6	22.8	30.2	30.3	37.9	45.4	45.5
Rated AC Voltage/Range (V)	3 / N / PE, 220 / 380, 230 / 400; ± 20%						
Grid Frequency/Range (Hz)	50 / 60; ±5						
Adjustable Power Factor[cos Φ]	0.8leading ~ 0.8lagging						
Output THDi (@Rated Output)	< 3%						
Inrush current (A)	69						
Maximum output fault current (A)	127						
AC Input							
Max. AC Input Power (VA)	30000	30000	40000	40000	41500	41500	41500
Max. AC Input Current (A)	45.5	45.5	60.6	60.6	63	63	63
Rated AC Voltage / Range (V)	3 / N / PE, 220 / 380, 230 / 400; ± 20%						
Grid Frequency / Range (Hz)	50 / 60; ±5						
Battery							
Battery Type	Lithium						

Model	N3-14.9K	N3-15K	N3-19.9K	N3-20K	N3-25K	N3-29.9K	N3-30K
Battery Voltage Range (V)	180 ~ 800						
Max. Charging / Discharging Current (A)	50 / 50						
Max. Charging / Discharging Power (W)	30000 / 14900	30000 / 15000	30000 / 19900	30000 / 20000	30000 / 25000	30000 / 29900	30000 / 30000
Communication Interface	CAN						
Backup Output (With Battery)							
Rated Output Power (W)	14900	15000	19900	20000	25000	29900	30000
Rated Output Voltage (V)	3 / N / PE, 220 / 380, 230 / 400						
Rated Frequency (Hz)	50 / 60						
Rated Output Current (A)	22.6	22.8	30.2	30.3	37.9	45.4	45.5
Output THDv (@Linear Load)	< 3%						
Automatic Switch Time (ms)	< 10						
Peak Apparent Power, Duration (VA, s)	22500, 10	22500, 10	30000, 10	30000, 10	37500, 10	45000, 10	45000, 10
Efficiency							
Max. Efficiency	98.1%	98.1%	98.1%	98.1%	98.1%	98.1%	98.1%
Euro Efficiency	97.7%	97.7%	97.7%	97.7%	97.7%	97.7%	97.7%
Max. Battery Discharge Efficiency (%)	97.6%	97.6%	97.6%	97.6%	97.6%	97.6%	97.6%
Protection							
DC Insulation Monitoring	Integrated						
Input Reverse Polarity Protection	Integrated						
Anti-island Protection	Integrated						
Residual Current Monitoring	Integrated						
Over-heat Protection	Integrated						
AC Overcurrent Protection	Integrated						
AC Short-circuit Protection	Integrated						
AC Overvoltage Protection	Integrated						
DC Surge Protection	Integrated(Type II)						
AC Surge Protection	Integrated(Type II)						
RSD	Optional						
AFCI Protection	Optional						
DC Switch	Integrated						
General Data							
Dimensions (W*H*D) (mm)	630 * 514 * 239						
Weight (kg)	48						
Display	LED + LCD						
Communication	RS485, USB update, 4 * DI, 2 * DO, Optional: WiFi or 4G or Ethernet						
Ambient Temperature Range (℃)	-30 ~ +60						

Model	N3-14.9K	N3-15K	N3-19.9K	N3-20K	N3-25K	N3-29.9K	N3-30K
Relative Humidity	0 ~ 100%						
Operating Altitude (m)	≤ 2000						
Standby Self-consumption (W)	< 15						
Topology	Transformerless						
Cooling	Natural				Fan		
Ingress Protection	IP66						
Protective Class	I						
Overvoltage Category	III(Mains), II(DC)						
Certifications & Standards							
Grid Regulation	IEC61727 / IEC62116, EN50549-1 / EN50549-10, EN50549-PL, EN50549-CZ, CEI 0-21						
Safety Regulation	IEC 62109-1, IEC 62109-2, EN 62109-1, EN 62109-2						
EMC	EN / IEC 61000-6-1, EN / IEC 61000-6-2, EN / IEC 61000-6-3, EN / IEC 61000-6-4						

3.8 Components Introduction

N3 Plus 14.9-20K View:

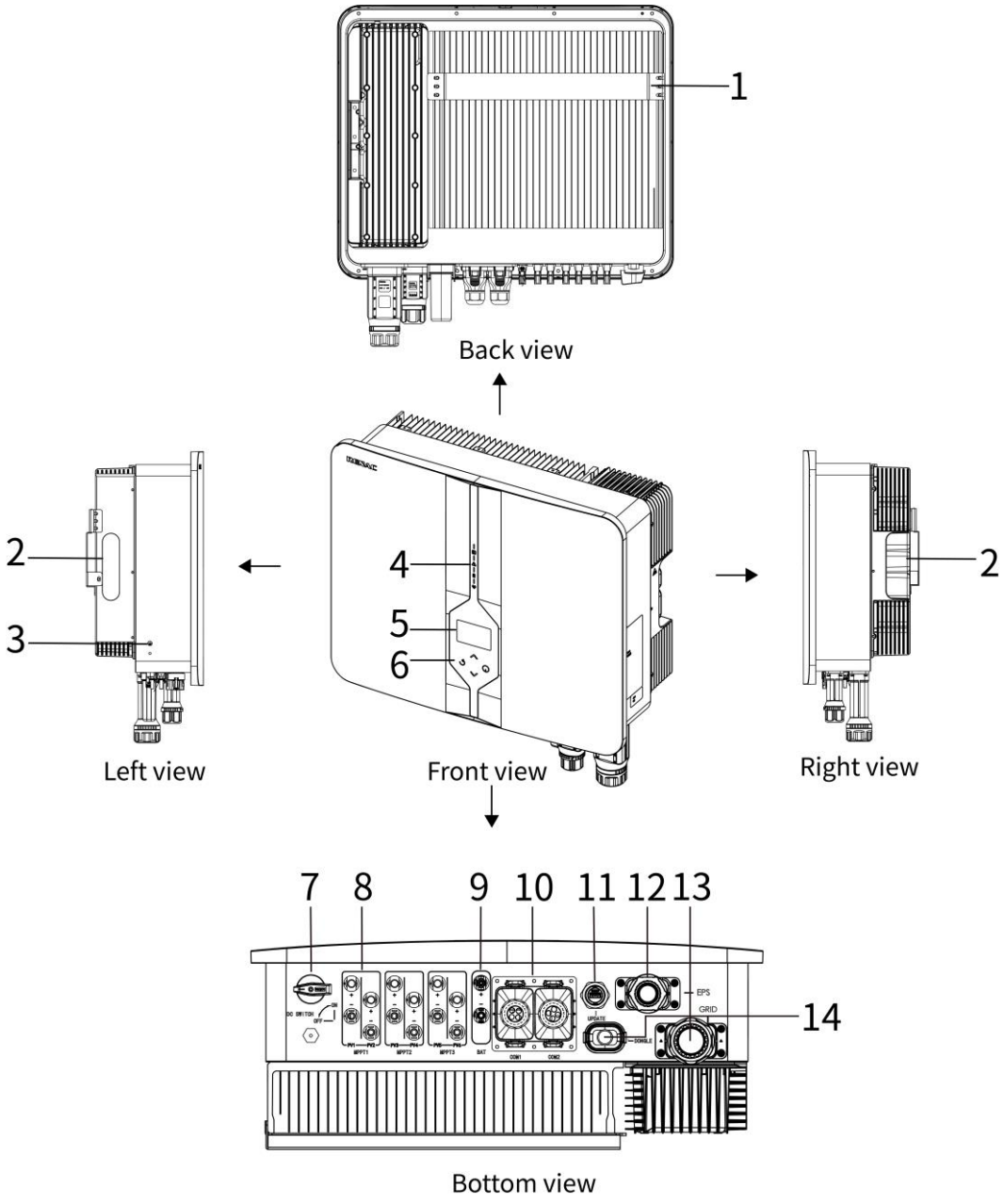

Figure 3-18 Components of the N3 Plus 14.9-20K

No.	Name
1	Mounting bracket: Used to hang the inverter on the wall.
2	Handle: Used to manual hang the inverter on the wall-mounting bracket.
3	Grounding terminal: For reliable grounding.
4	LED indicator: Indicate the working state of the inverter.
5	LCD panel: Display the operation information.
6	Touch button: Used to perform the parameter setting.
7	DC switch: Used to disconnect the DC circuit when necessary.

No.	Name
8	PV input terminal: Connectors for the PV input.
9	Battery terminal: Connectors for the battery power cables.
10	Communication port: Connectors for Meter/BMS-CAN/DRM/Parallel/DI/DO.
11	Update: For local firmware update.
12	EPS terminal: AC terminal reserved for EPS loads.
13	Grid terminal: AC terminal for connection to the utility grid.
14	Smart dongle port: Connector for WIFI / 4G / LAN dongle.

N3 Plus 25-30K View:

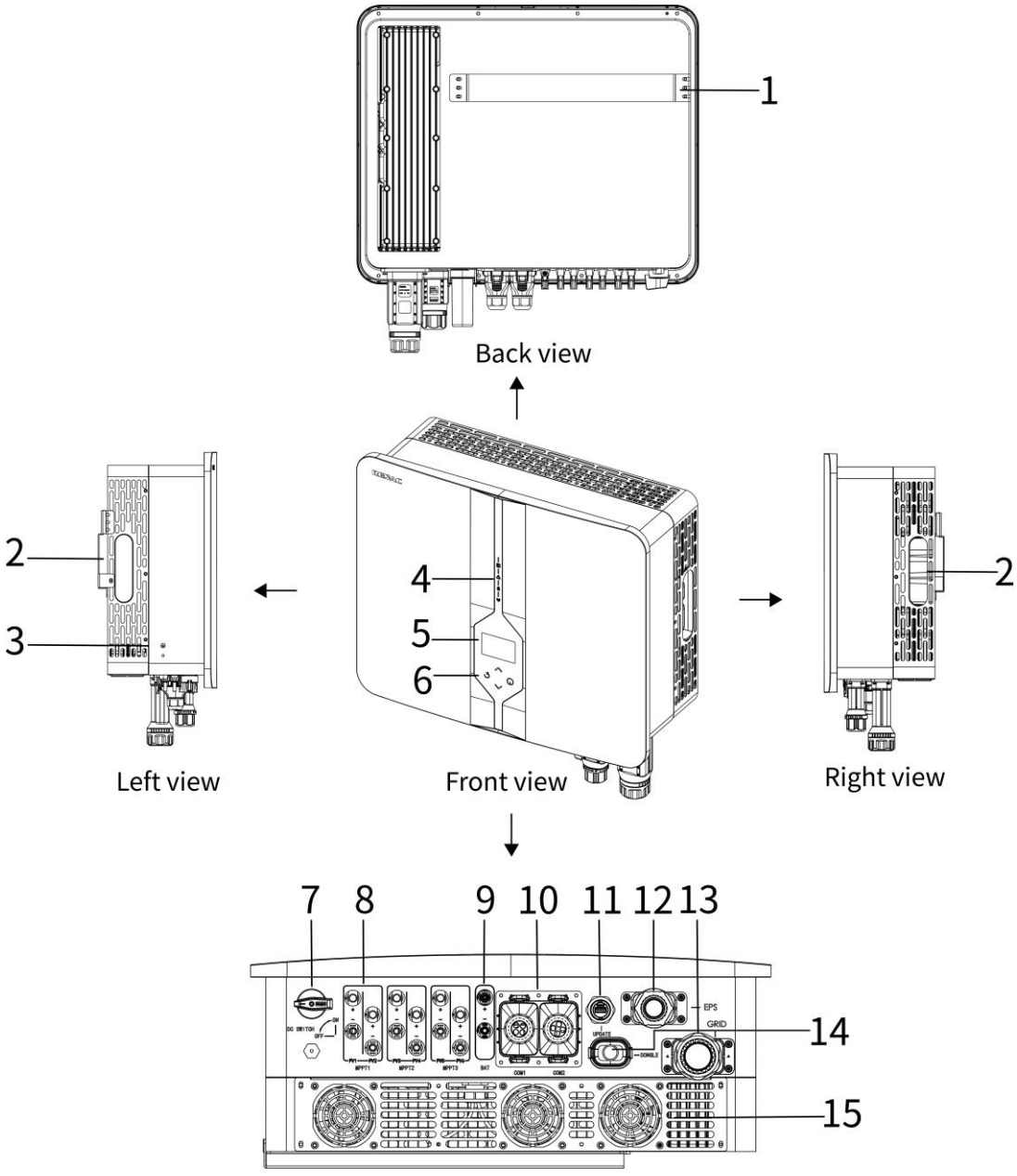

Figure 3-19 Components of the N3 Plus 25-30K

No.	Name
1	Mounting bracket: Used to hang the inverter on the wall.
2	Handle: Used to manual hang the inverter on the wall-mounting bracket.
3	Grounding terminal: For reliable grounding.
4	LED indicator: Indicate the working state of the inverter.
5	LCD panel: Display the operation information.
6	Touch button: Used to perform the parameter setting.
7	DC switch: Used to disconnect the DC circuit when necessary.
8	PV input terminal: Connectors for the PV input.
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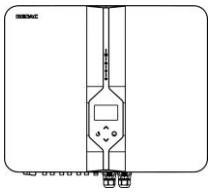
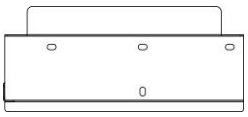
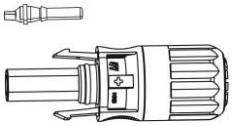
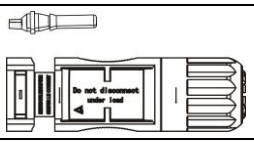
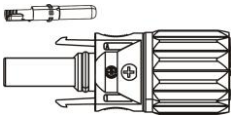
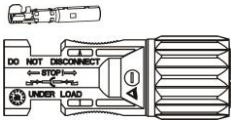
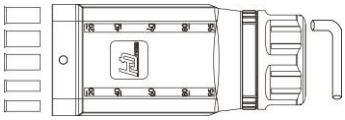
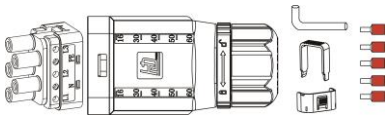
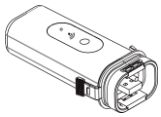
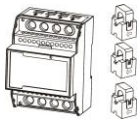
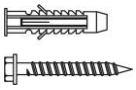
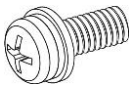
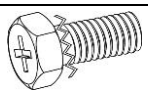
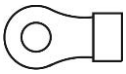
10	Communication port: Connectors for Meter/BMS-CAN/DRM/Parallel/DI/DO.
11	Update: For local firmware update.
12	EPS terminal: AC terminal reserved for EPS loads.
13	Grid terminal: AC terminal for connection to the utility grid.
14	Smart dongle port: Connector for WIFI / 4G / LAN dongle.
15	Fan: For heat dissipation.

4. Installation

4.1 Unpacking

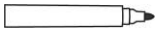
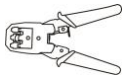
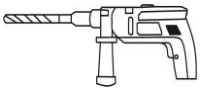
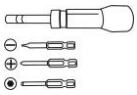
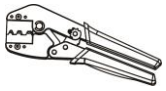
Before opening the package, please check whether the packing box is complete and whether there is any damage, soaked in water; if the package is incomplete or obviously damaged, please contact the supplier. If the package is complete, please open the box to check whether the contents are complete against the material list or as shown in the figure below; if there is any omission or damage, please contact the supplier.

No.	Shape	Model	Quantity
1		N3 Plus inverter	1
2		Mounting bracket	1
3		Battery power cable terminal(+) with a corrugated pipe	1
4		Battery power cable terminal(-) with a corrugated pipe	1

No.	Shape	Model	Quantity
5		PV cable terminal(+) with a corrugated pipe	6
6		PV cable terminal(-) with a corrugated pipe	6
7		GRID terminal & related accessories	1
8		EPS terminal & related accessories	1
9		WIFI or 4G or Ethernet Dongle (Optional)	1
10		Three phase smart meter & three CTs	1
11		RJ45 connector for COM cable	5
12		Expansion tube M6 & screw M6*55 for mounting bracket	4
13		Fastening screw M4*12	1
14		Ground screw M5*12	1
15		Ground OT terminal	1
16		Quality Certificate	1
17		User Manual	1

4.2 Preparation for installation

4.2.1 Installation tools

No.	Tool	Model	No.	Tool	Model
1		Spirit level	7		Knife
2		Wire stripper	8		Marker
3		Crimping tool	9		Rubber hammer
4		Heat gun	10		RJ45 crimping tool
5		Hammer drill	11		Torque screwdriver
6		PV terminals crimping tool	12		Multimeter

4.2.2 Protective tools

No.	Tool	Model	No.	Tool	Model
1		Dust mask	4		Insulated shoes
2		Goggles	5		Safety helmet
3		Insulated gloves			

4.2.3 Required cables

No.	Tool	Model	Cross-section
1		PV cable	4 mm^2
2		Grounding cable	6 ~ 10 mm^2
3		Grid / EPS cable	16 mm^2 / 10 mm^2
4		Network cable	Standard network cable
5		Signal cable	0.25 ~ 0.3 mm^2

4.3 Installation precaution

WARNING

Loading capacity and hardness of the supporting surface, load rating of mounting bracket should be at least four times the weight of the devices according to IEC62109-1. And supporting characteristics will be impaired by wear, corrosion, and material fatigue or ageing, this should be calculated by inspection of the design data of supporting material and consulting construction engineer.

The N3 Plus inverter is designed for outdoor installation (IP66).

- Do not install inverter in direct sunlight.
- Do not mount inverter on flammable material.
- Do not install inverter in areas where flammable materials are stored.
- Do not install inverter in potentially explosive areas.
- Do not install inverter during rain or high humidity (>95%).
- Provide adequate ventilation when using batteries, and also read the warning label on the bottom of the inverter.
- Install inverter where air temperature would be below 40°C. Children should not have access to inverter.
- The inverter emits a slight noise when operating, this is normal and will not affect performance.
- Mounting should not tilt more than 5 degrees.
- The inverter is heavy, ensure the mounting is strong enough to hold the weight of the inverter.
- If installed in a cabinet, closet or other small enclosed areas, sufficient air circulation must be ensured in order to dissipate heat generated by the unit.
- Please select a concrete wall with load-bearing capacity and non-flammable surface for installation.

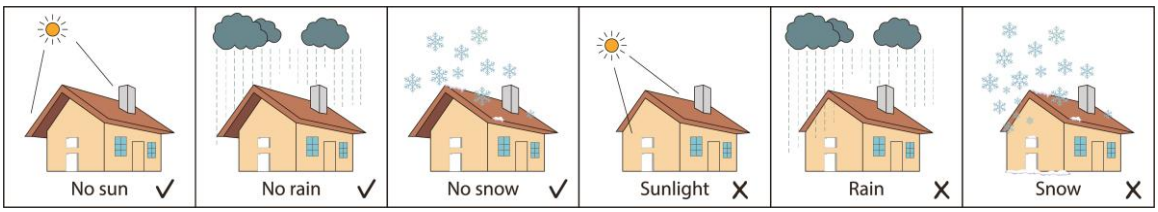


Figure 4-1 Installation environment

4.4 Space requirement

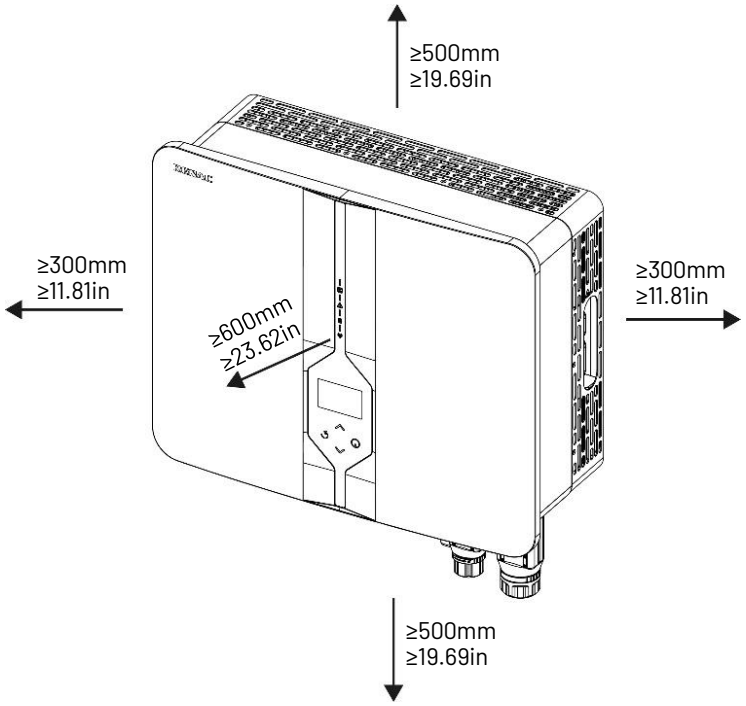


Figure 4-2 Installation space

4.5 Installation steps

CAUTION

- Due to the heavy weight of the inverter, at least 2-3 people should work during manual handling and installation to avoid falling accidents or injuries.
- Do not walk or stand beneath or in the proximity of the load.

1. Use the mounting bracket as a template to mark the position of the 4 holes, and use a level to make sure it is parallel to the ground.

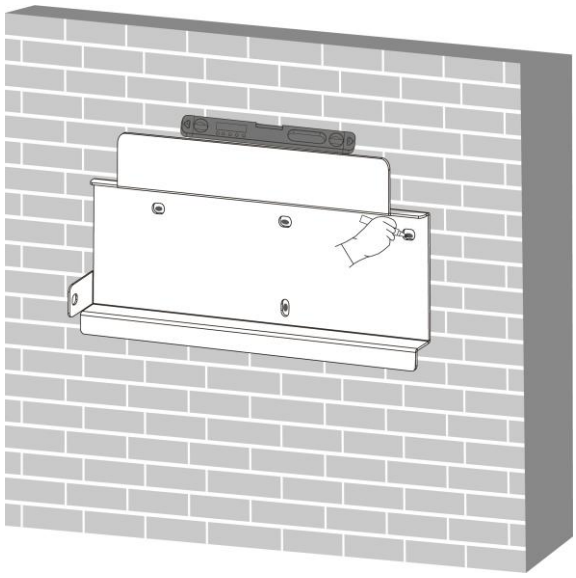


Figure 4-3

2. Drill 4 holes ⩾50mm deep in the wall with a Φ10mm drill. The mounting bracket is then secured to the wall with expansion screws.

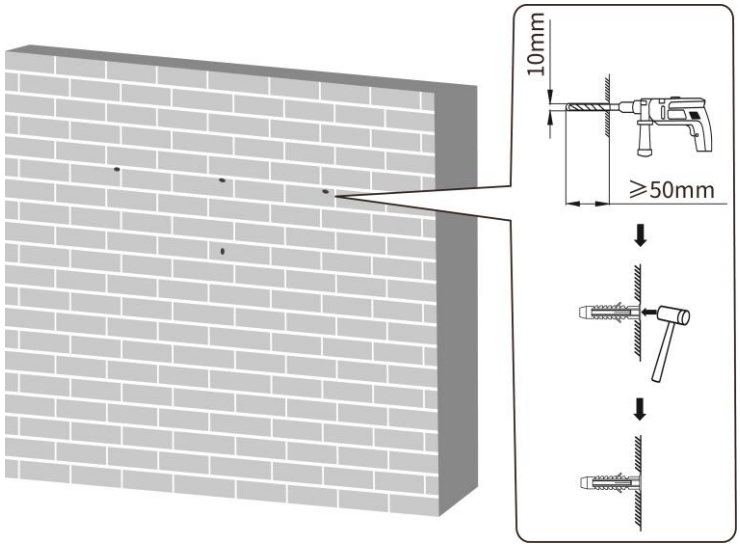


Figure 4-4

3. The mounting bracket is then secured to the wall with expansion screws.

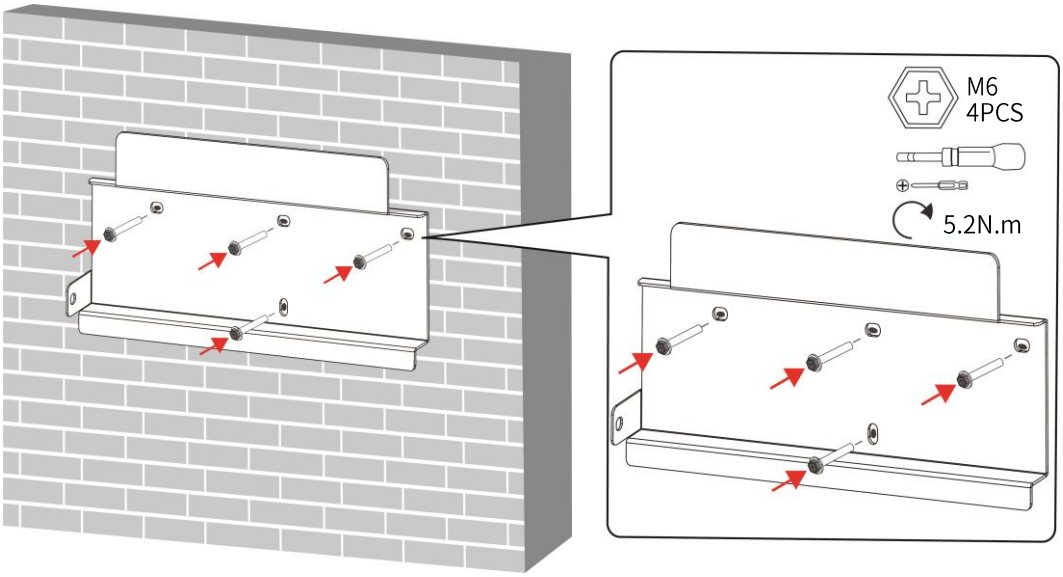


Figure 4-5

4. Hang the inverter on the mounting bracket, and make sure the unit hangs on the hanging bracket.

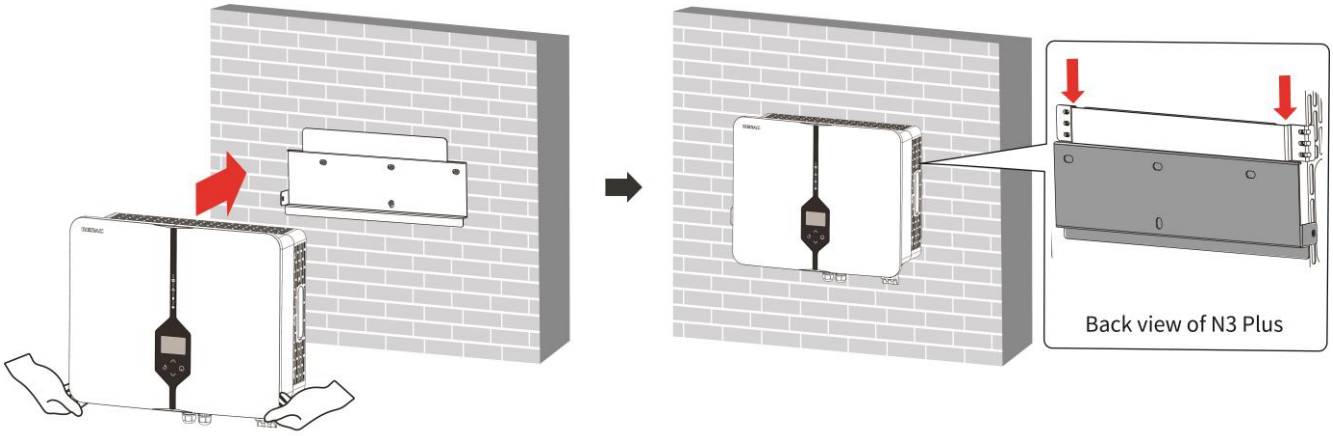


Figure 4-6

5. Secure the mounting bracket to the inverter with fastening screw M4 * 12.

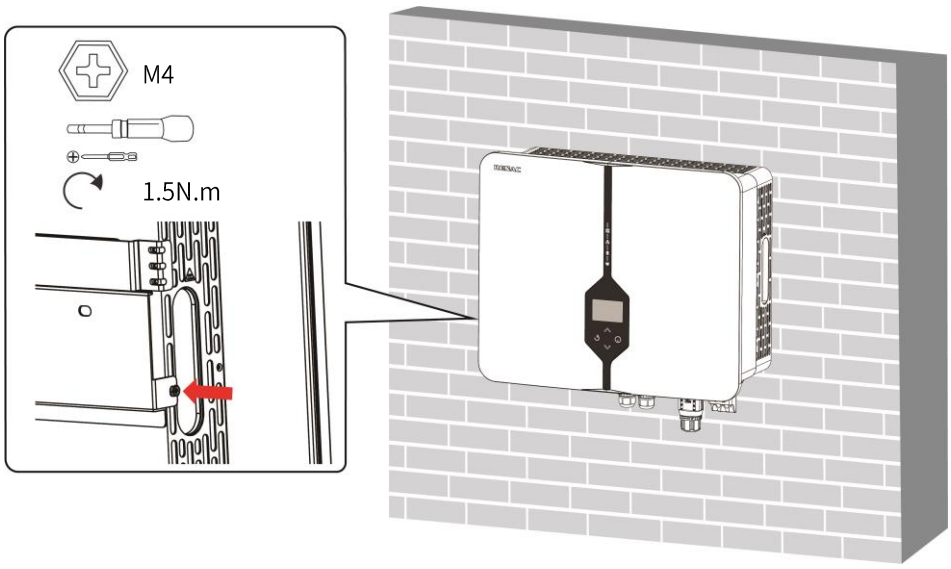


Figure 4-7

5. Electrical wiring connection

5.1 Grounding connection

1. Connect the grounding cable before connecting other cables. Users need to prepare their own grounding cable with a recommended cross-sectional area of 6-10mm^2.

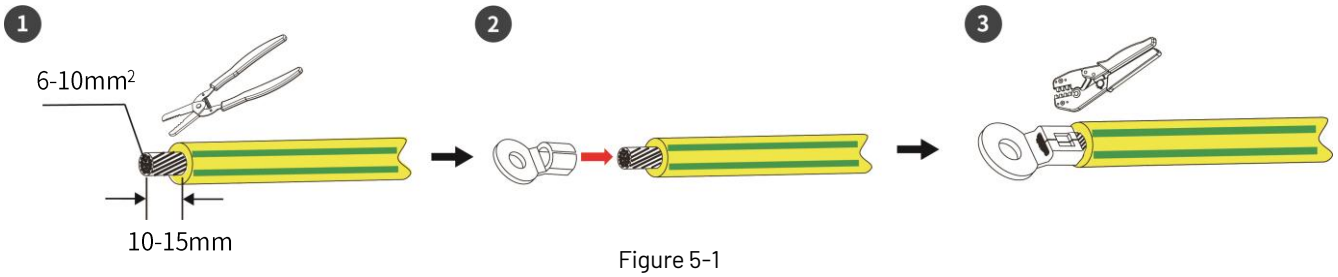


Figure 5-1

2. Connect the grounding cable at the inverter end.

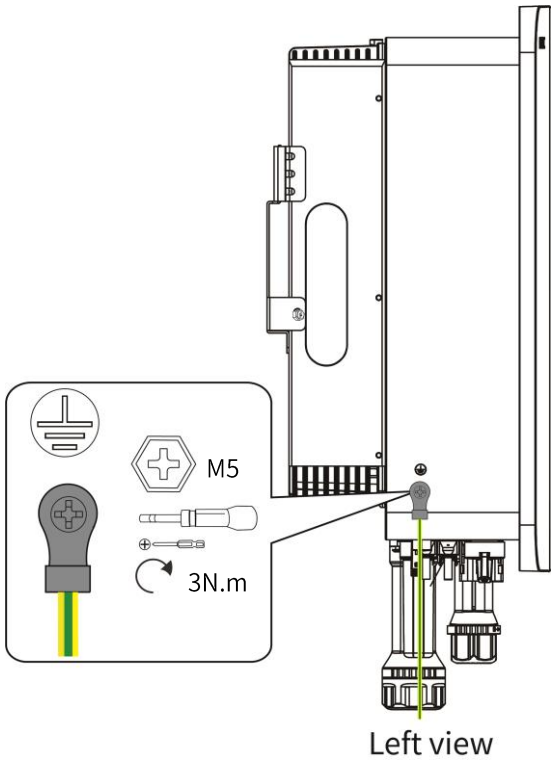


Figure 5-2

5.2 PV connection

CAUTION

Before connecting PV strings to N3 Plus hybrid inverter, ensure the following:

- The total short- circuit current of PV string must not exceed inverter's maximum DC current.
- Make sure that open circuit voltage of PV string is less than 1000V.
- PV strings are not connected to earth/grounding conductor.
- Use the right PV plugs from accessory box, Battery plugs look similar to PV plugs, do confirm before using.
- Ensure that the DC switch is in the off state.

WARNING

- The inverter must only be operated with PV strings with class II protection in accordance with IEC 61730, application class A. It is not allowed for the positive pole or the negative pole of the PV strings to be grounded.
- Verify that the Positive and Negative PV connectors are connected correctly. Otherwise, it may lead to system failure or even personal injury or death.

1. Strip about 7mm of the cable insulation with a wire stripper.

Figure 5-3

2. Unscrew the swivel nut and thread the PV cable through the swivel nut.

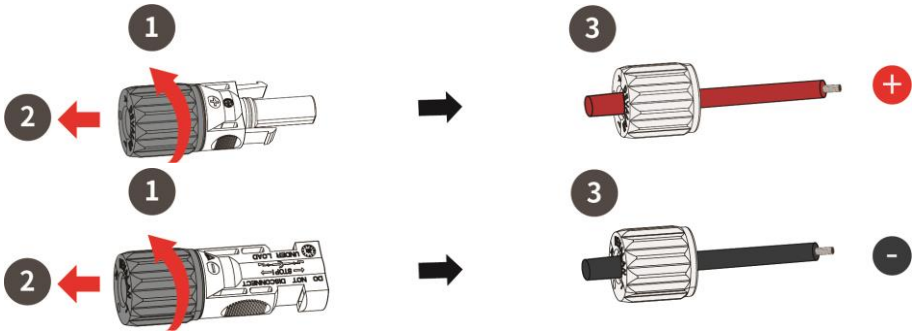


Figure 5-4

3. Insert the cable into the PV cable terminal until a "Click" is heard Tighten the swivel nut clockwise.

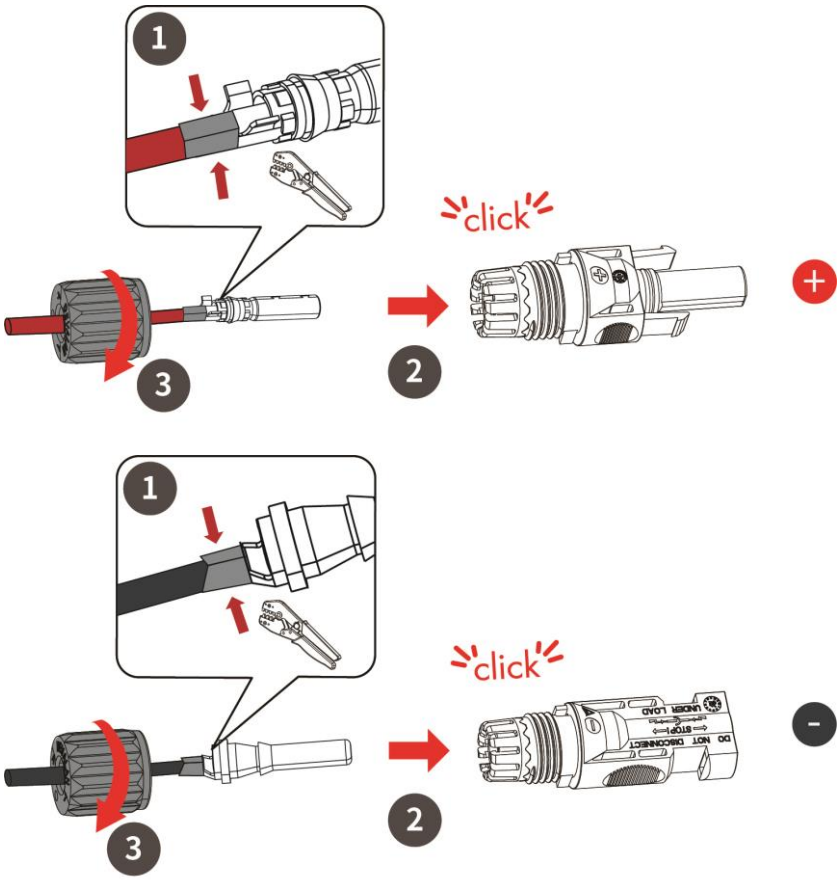


Figure 5-5

4. Use a multimeter to measure the positive and negative voltages at the PV cable terminal. Ensure that the open circuit voltage does not exceed the 1000V input limit.

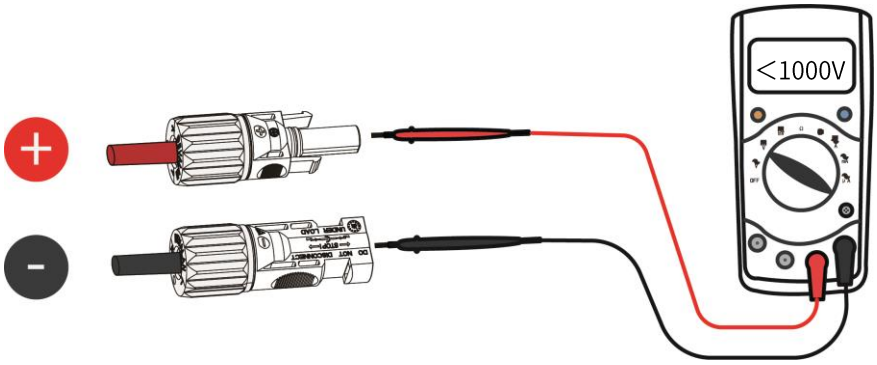


Figure 5-6

5. Remove the PV terminal caps of the hybrid inverter and connect the PV cable terminal to corresponding terminals until there is a "Click".

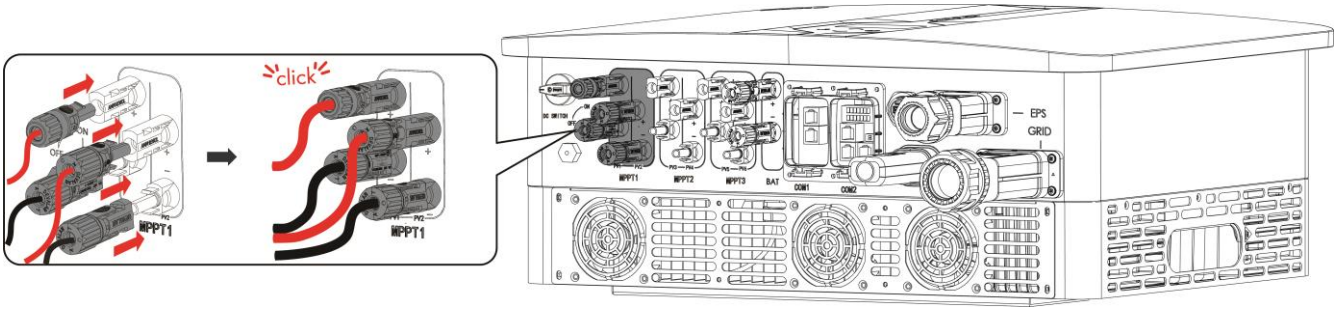


Figure 5-7

5.3 Battery power connection

The N3 Plus series hybrid inverter is equipped with one independent battery terminal. This hybrid inverter is compatible with the battery models Turbo H4 (10kWh ~ 30kWh) and Turbo H5 (30kWh ~ 60kWh). For details of Turbo H4 and Turbo H5, please refer to the corresponding user manuals. Turbo H4 and Turbo H5 are wired in a similar way, using Turbo H4 as an example, as shown in Figure 5-8.

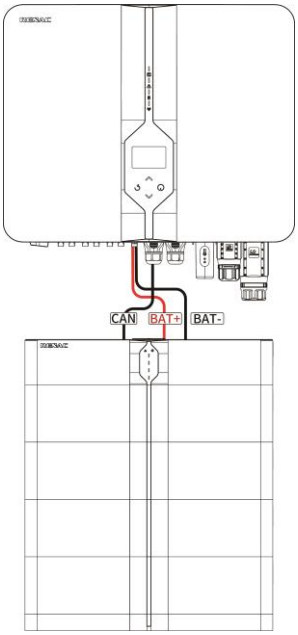
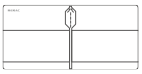
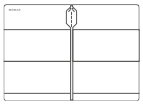
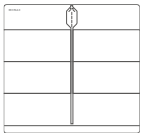
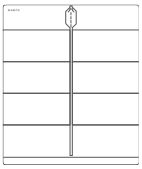
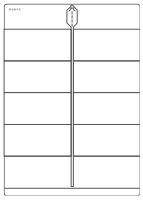
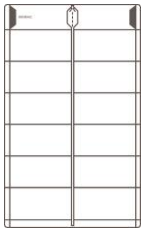
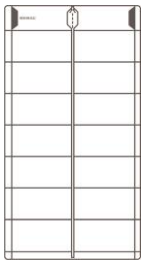
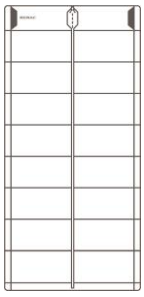
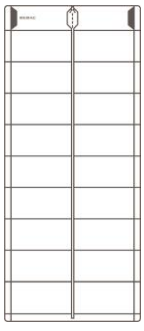
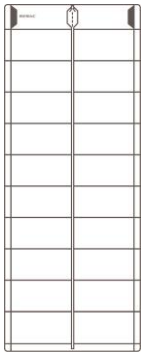
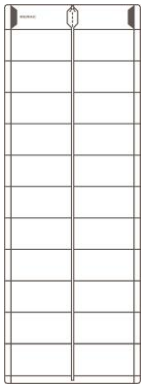
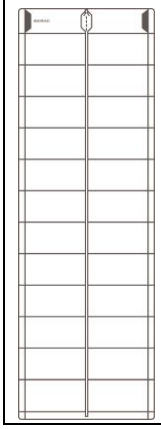


Figure 5-8

N3 Plus series hybrid inverter is matched to the batteries of RENAC in the table below:

Model	N3-14.9K	N3-15K	N3-19.9K	N3-20K	N3-25K	N3-29.9K	N3-30K
TB-H4-5 	×	×	×	×	×	×	×
TB-H4-10 	√	√	√	√	√	√	√
TB-H4-15 	√	√	√	√	√	√	√
TB-H4-20 	√	√	√	√	√	√	√
TB-H4-25 	√	√	√	√	√	√	√
TB-H4-30 	√	√	√	√	√	√	√

Model	N3-14.9K	N3-15K	N3-19.9K	N3-20K	N3-25K	N3-29.9K	N3-30K
TB-H5-30 	√	√	√	√	√	√	√
TB-H5-35 	√	√	√	√	√	√	√
TB-H5-40 	√	√	√	√	√	√	√
TB-H5-45 	√	√	√	√	√	√	√

Model	N3-14.9K	N3-15K	N3-19.9K	N3-20K	N3-25K	N3-29.9K	N3-30K
TB-H5-50 	√	√	√	√	√	√	√
TB-H5-55 	√	√	√	√	√	√	√
TB-H5-60 	√	√	√	√	√	√	√

WARNING

Make sure to select cables of the right specification. Failure could cause fire and result in death or serious injury.

1. Strip about 15mm of the cable insulation with a wire stripper.

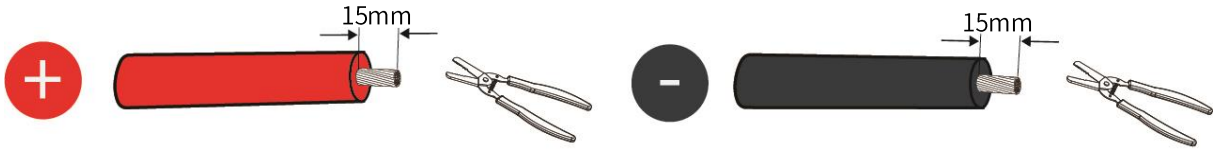


Figure 5-9

2. Unscrew the swivel nut and thread the battery cable through the swivel nut.

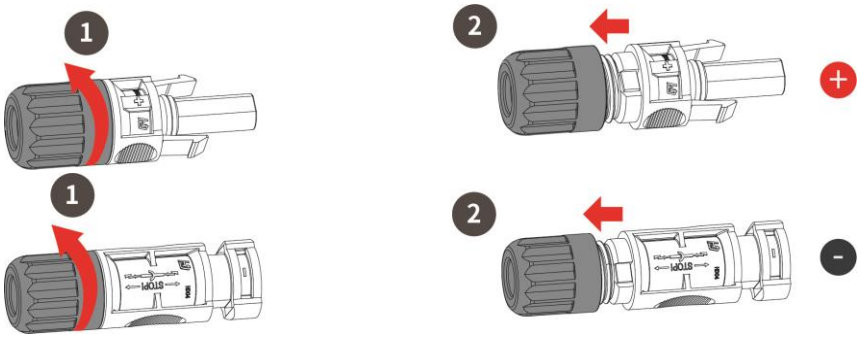


Figure 5-10

3. Insert the cable into the battery power cable terminal until a "Click" is heard Tighten the swivel nut clockwise.

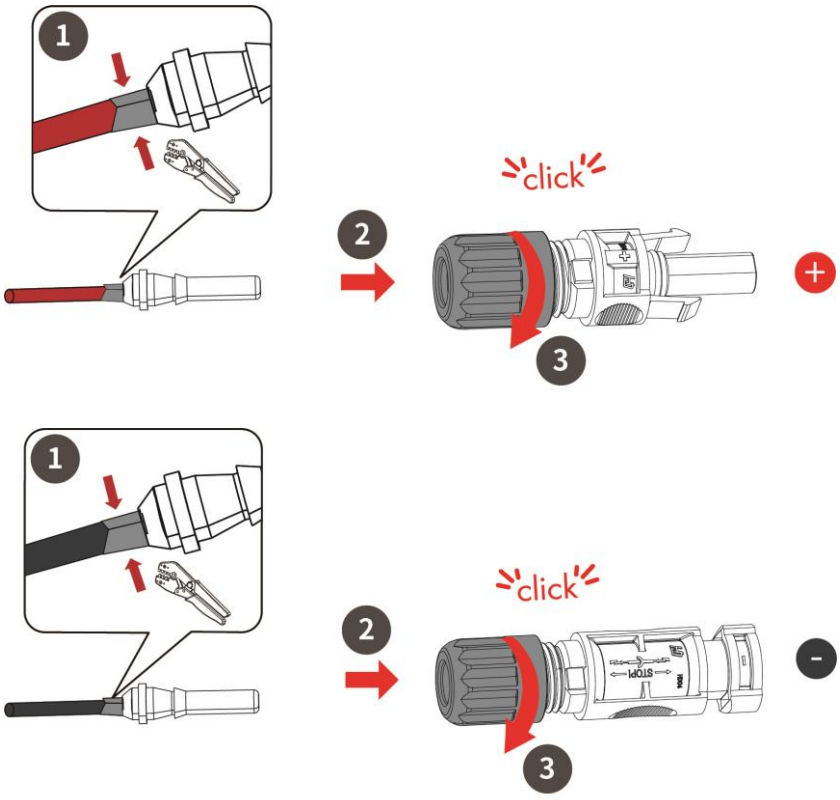


Figure 5-11

4. Use a multimeter to measure the positive and negative voltages at the BAT cable terminal. Ensure that the open circuit voltage does not exceed the 180 ~ 800V input limit.

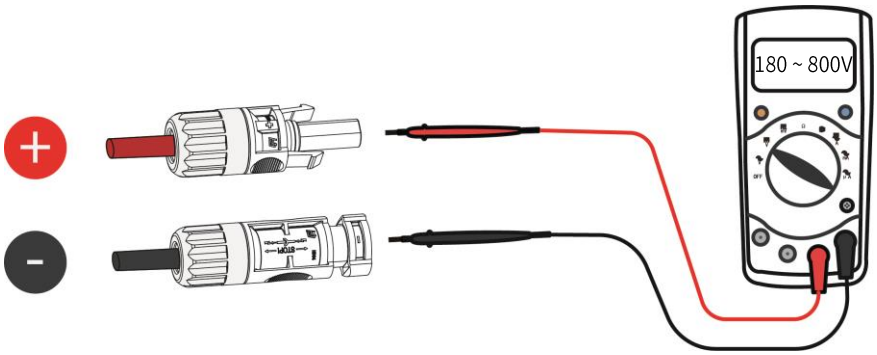


Figure 5-12

5. Remove the battery terminal caps of the hybrid inverter and connect the battery power cable terminal to corresponding terminals until there is a "Click".

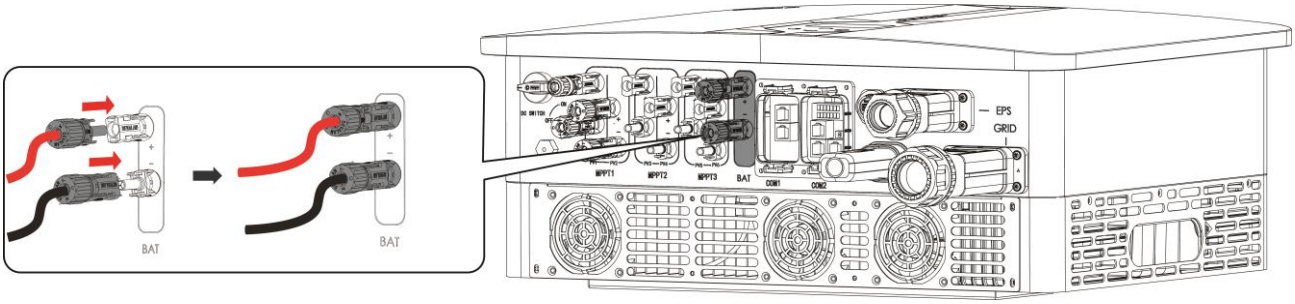


Figure 5-13

5.4 AC connection

N3 Plus inverters have already integrated RCMU (residual current monitoring unit) inside, however if an external RCD is required by local regulations, a 300 mA Type-A RCD is recommended.

An AC breaker must be used to connect the inverter output and the power grid. Each inverter must be equipped with an independent breaker or other load disconnection unit to ensure the safe disconnection from the grid. The AC cable and micro-breaker/external fuse specification for AC side of N3 Plus inverter as below.

Model	N3-14.9K / 15K	N3-19.9K / 20K	N3-25K	N3-29.9K / 30K
Grid Cable (Cu)	14mm^2	14mm^2	14mm^2	14mm^2
Grid-breaker	50A	63A	63A	63A
EPS Cable (Cu)	10mm^2	10mm^2	10mm^2	10mm^2
EPS-breaker	40A	50A	63A	100A

WARNING

- Select cables of the correct specifications.
- Failure could result in in fire and lead to death or serious injury.
- Don't connect the line/phase cable to 'PE' terminal, failure will result in improper operation of the inverter.

5.4.1 Grid connection

1. Strip about 15mm of the cable insulation with a wire stripper.

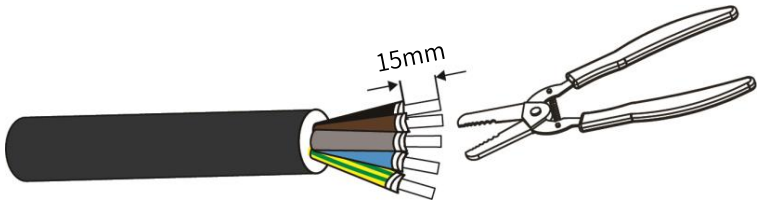


Figure 5-14

2. Install the stripped AC cables to the crimp terminals.

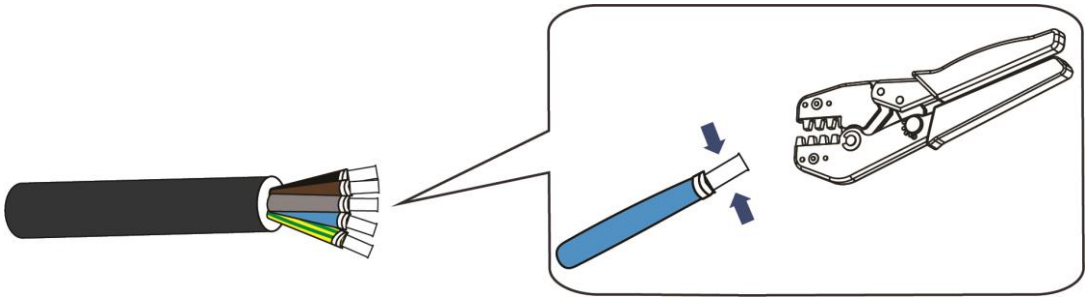


Figure 5-15

3. Lead the AC cable through the GRID terminal.

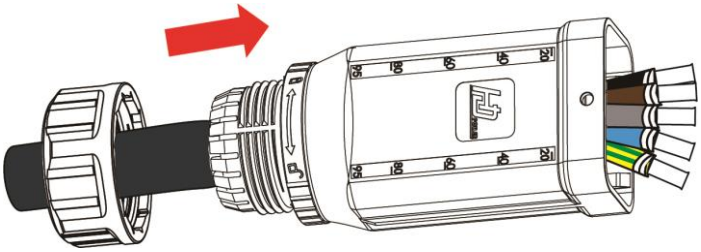


Figure 5-16

4. Fully insert the conductors into the corresponding terminal and tighten the screws with a matching hexagonal screwdriver. Then, plug the GRID terminal into the hybrid inverter until a "Click" is heard. Then, tighten the swivel nut.

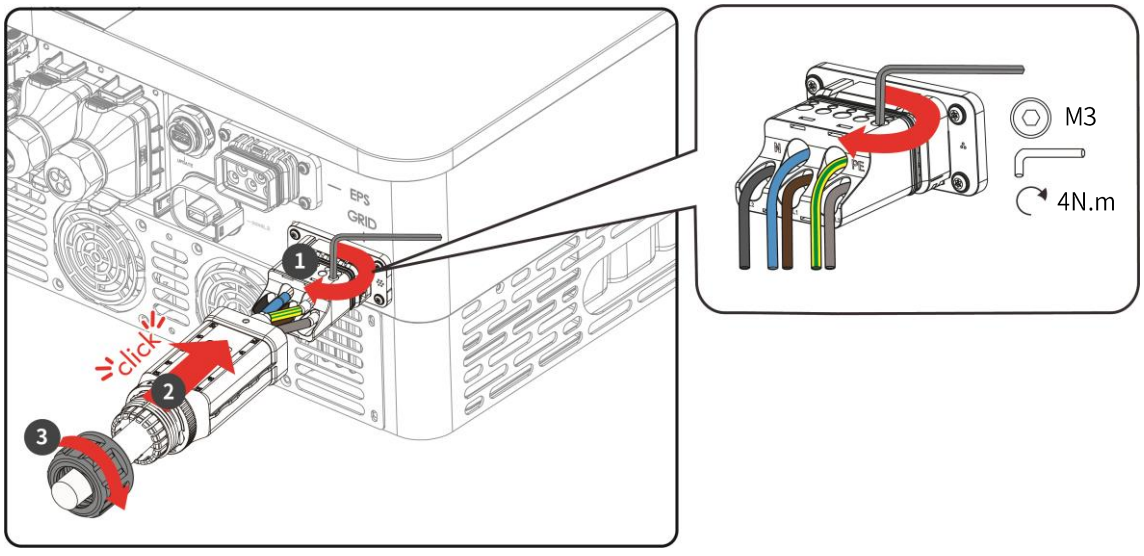


Figure 5-17

Unlocking steps:

1. Unscrew the swivel nut.

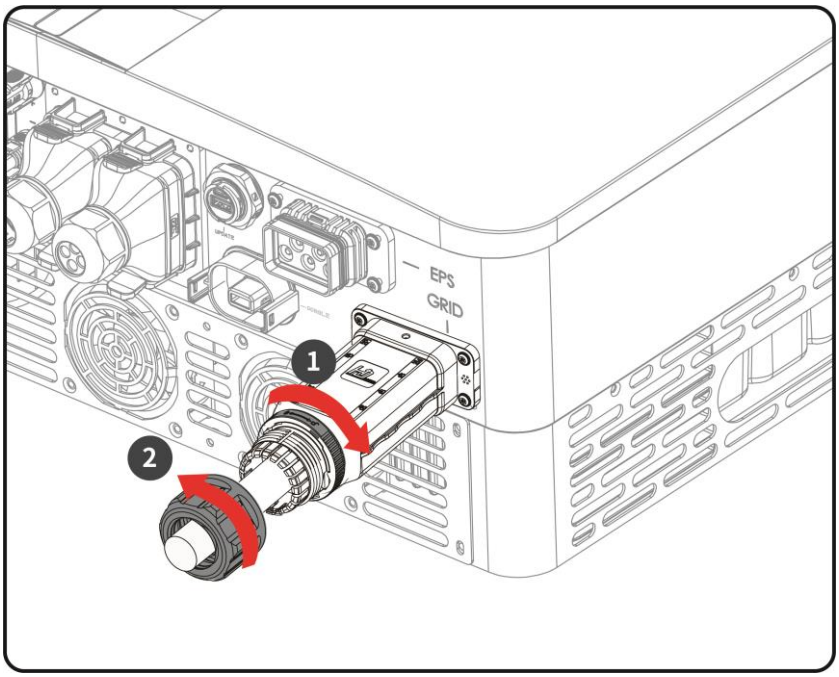


Figure 5-18

2. Remove the GRID terminal from the hybrid inverter using the matching hexagonal screwdriver.

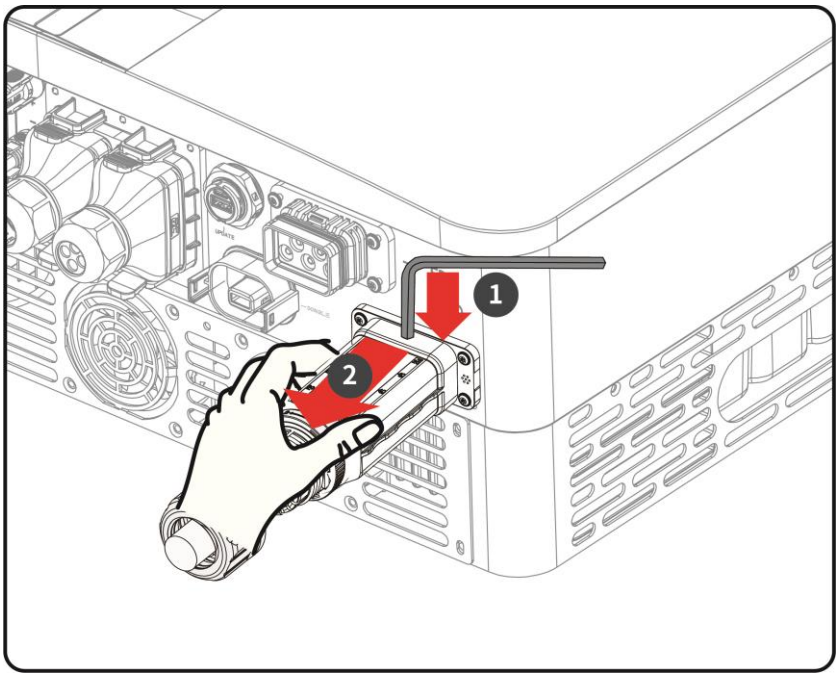


Figure 5-19

3. Loosen the AC cables with a matching hexagonal screwdriver.

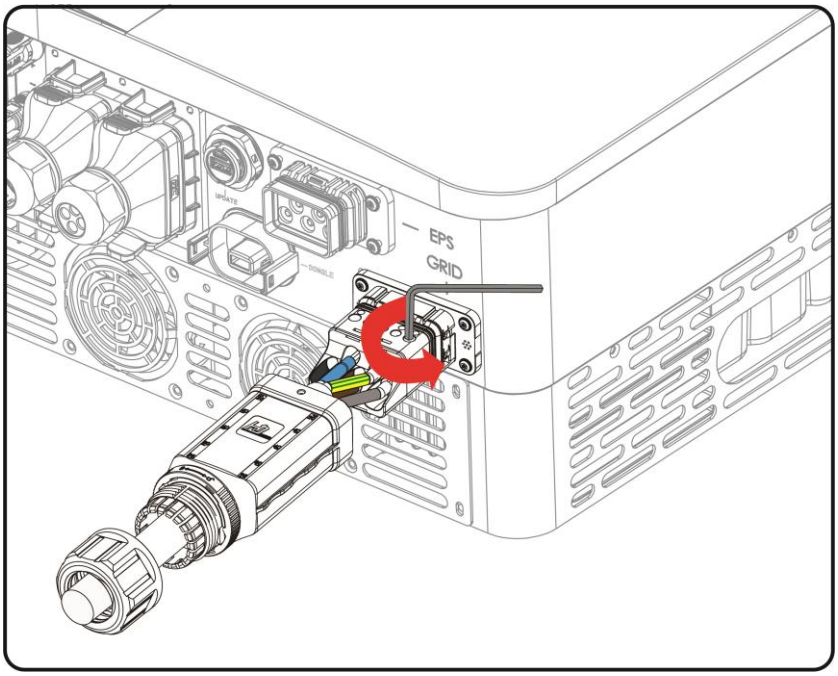


Figure 5-20

5.4.2 EPS output connection

1. Strip about 15mm of the cable insulation with a wire stripper.

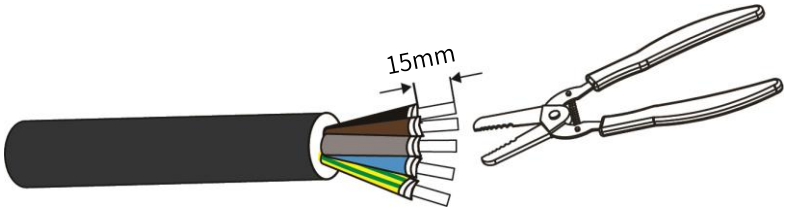


Figure 5-21

2. Install the stripped EPS cables to the crimp terminals.

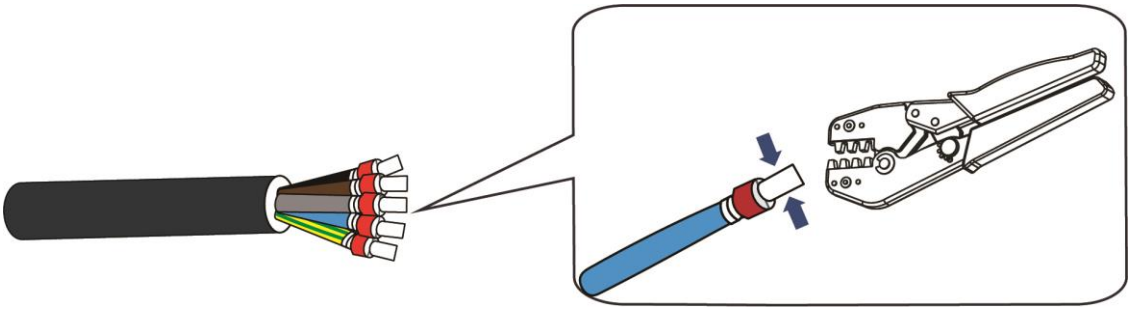


Figure 5-22

3. Lead the EPS cables through the housing.

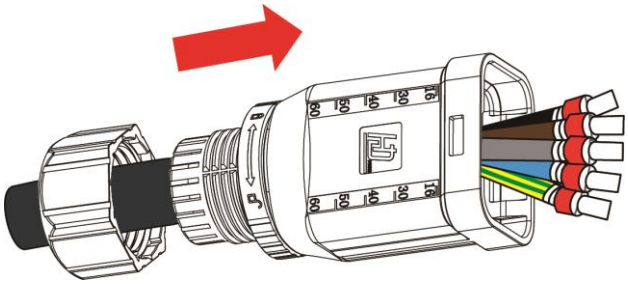


Figure 5-23

4. Fully insert the conductors into the corresponding terminal and tighten the screws with a matching hexagonal screwdriver.

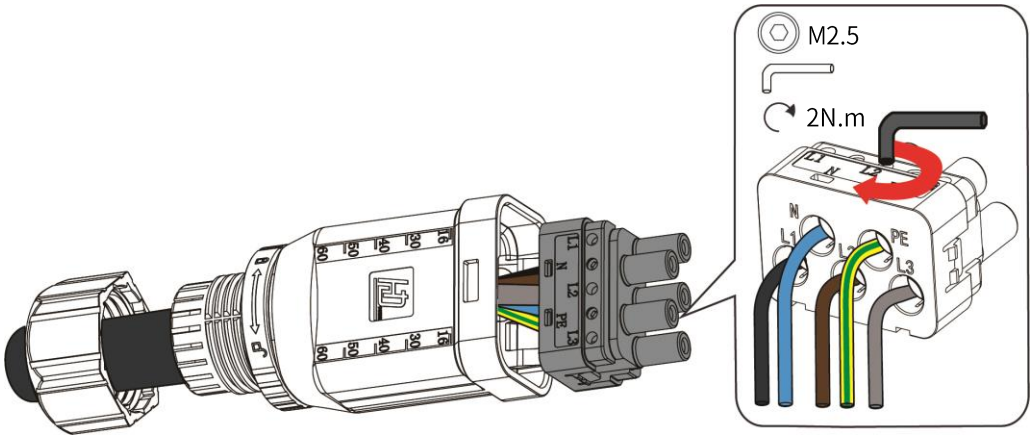


Figure 5-24

5. Push the terminal block into the housing, and make sure that the rib of the terminal block and the groove on the housing engage perfectly until a "Click" is heard. Then tighten the swivel nut.

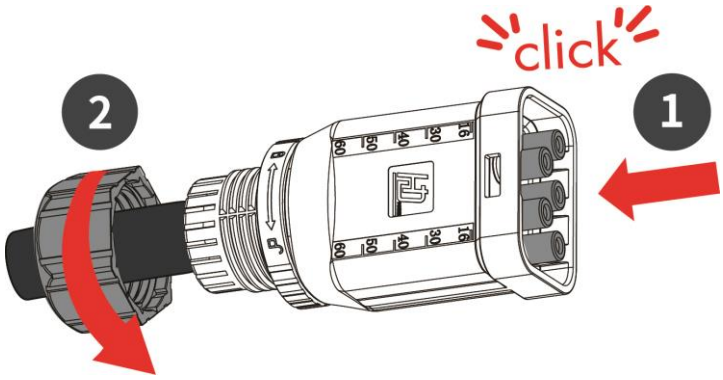


Figure 5-25

6. Plug the EPS terminal into the hybrid inverter until a "Click" is heard.

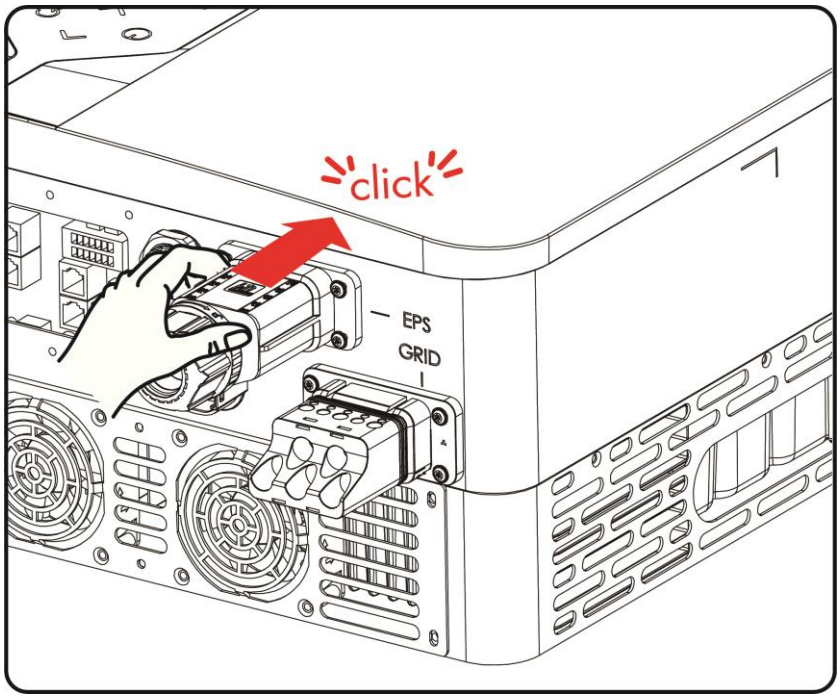


Figure 5-26

Unlocking steps:

1. Remove the EPS terminal from the hybrid inverter using the appropriate removal tool.

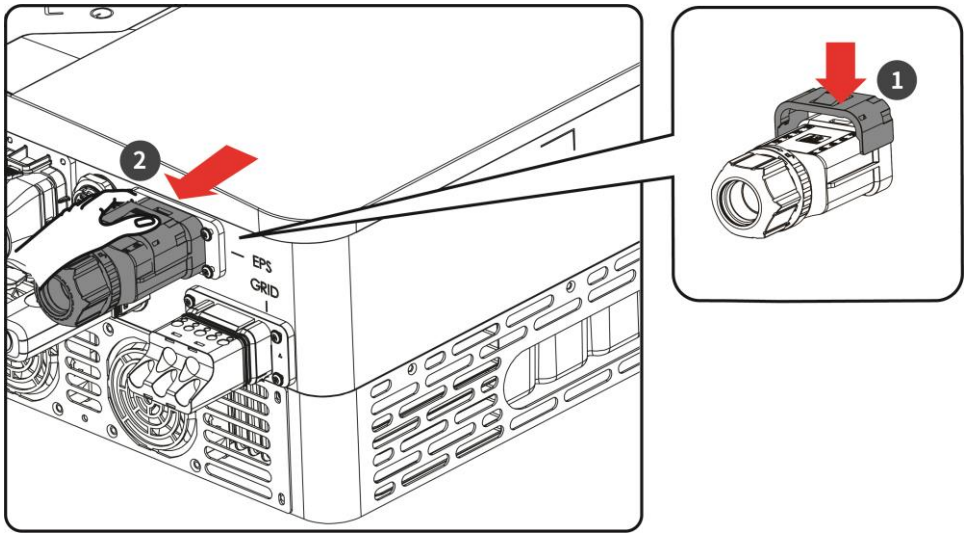


Figure 5-27

2. Turn the knob in the direction of unlocking and then unscrew the swivel nut.

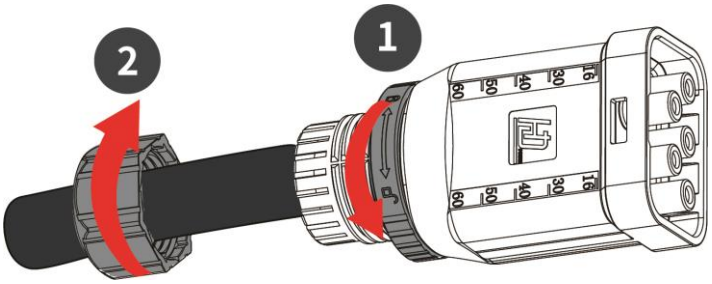


Figure 5-28

3. Remove the terminal block with the core removal tool and press down with the core removal tool while pushing the wire end up. Then, remove the EPS cables.

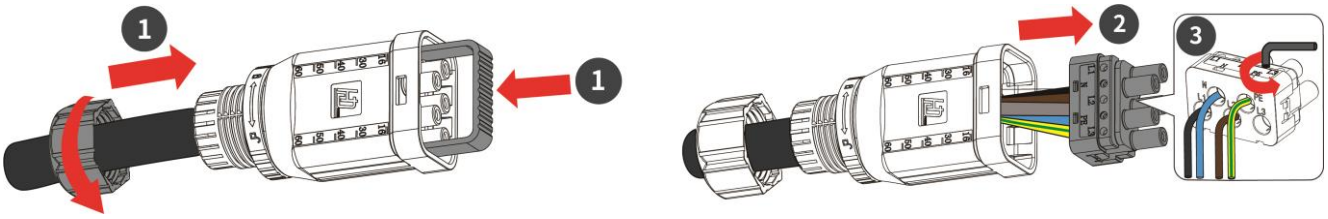


Figure 5-29

5.5 Communication connection

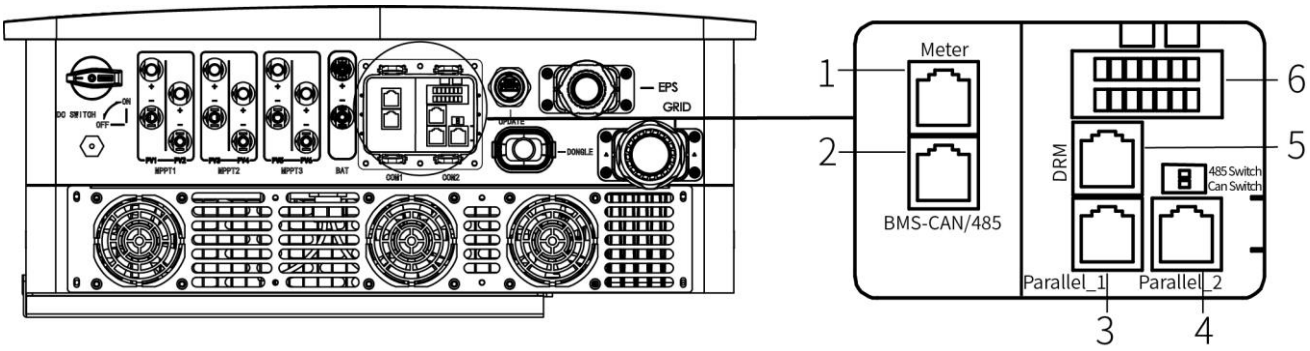


Figure 5-30 Communication port without waterproof cover

No.	Port definition	Description
1	Meter port	For communication between inverter and meter.
2	BMS-CAN / 485 port	For communication between inverter and battery.
3	Parallel_1 port (Reserve)	For parallel connection of inverters.
4	Parallel_2 port (Reserve)	For parallel connection of inverters.
5	DRM port	The inverter satisfies the Australian DRED certification and offers DRED signal controlling ports.
6	I / O port (Reserve)	Expanding the communication interface.

Note: Ports 1~5 are all standard network ports and the network cables used are all standard network cables, as shown in the figure below.

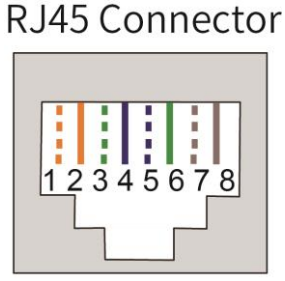


Figure 5-31

No.	Color	No.	Color
1	White- Orange	5	White- Blue
2	Orange	6	Green
3	White-Green	7	White-Brown
4	Blue	8	Brown

(1) Meter port

Pins definition:

Pin	1	2	3	4	5	6	7	8
Function	METER-485A	METER-485B	NC	NC	NC	NC	NC	NC

(2) BMS-CAN / 485 port

Pins definition:

Pin	1	2	3	4	5	6	7	8
Function	NC	NC	NC	CANH	CANL	NC	NC	NC

(3) & (4) Parallel port (Reserve)

Pins definition:

Pin	1	2	3	4	5	6	7	8
Function	RS485A	RS485B	VCC	CANH	CANL	GND	SYNA	SYNB

Note: Only 4 and 5 PIN pins are used.

(5) DRM port

Pins definition:

Pin	1	2	3	4	5	6	7	8
Function	DRM1/5	DRM2/6	DRM3/7	DRM4/8	+3.3V	COM/DRM0	GND	GND

In Australian grid code, requirements for connection call for compatibility with Demand Response Enabling Devices (DRED).

The DRED is controlled by a local network operator and allows to put the inverter in one of the Demand Response Modes (DRMs) defined by the standard:

- DRM 0 Operate the disconnection device.
- DRM 1 Do not consume power.
- DRM 2 Do not consume at more than 50% of rated power.
- DRM 3 Do not consume at more than 75% of rated power and source reactive power if capable.
- DRM 4 Increase power consumption (subject to constraints from other active DRMs).
- DRM 5 Do not generate power.
- DRM 6 Do not generate at more than 50% of rated power.
- DRM 7 Do not generate at more than 75% of rated power and sink reactive power if capable.
- DRM 8 Increase power generation (subject to constraints from other active DRMs).

Note: Only DRM0 is currently supported.

(6) I / O port (Reserve)

Pins definition:

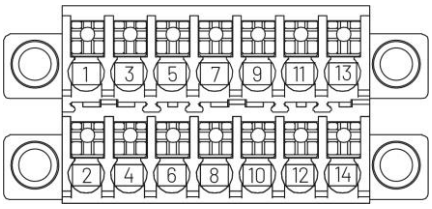


Figure 5-32

Pin	1	3	5	7	9	11	13
Function	GND_COM	RE_485B	RE_485A	DOB	DOA	GENB	GENA
Pin	2	4	6	8	10	12	14
Function	+5V_COM	+5V_COM	SHUTDOWN	RF_485A	RF_485B	GND_COM	EPSBOX_RELAY_VCC

485 communication: RE_485A & RE_485B——Pin3 & Pin5

Shut down the hybrid inverter: +5V & SHUTDOWN——Pin4 & Pin6

Relay contact output for generator: GENA & GENB——Pin11 & Pin13

Relay contact output for EPS BOX: EPSBOX_RELAY_VCC & GND_COM——Pin12 & Pin14

Connection steps:

1. Loosen the swivel nut on the communication waterproof cover and remove the waterproof plugs. Remove as many communication wires as are connected.

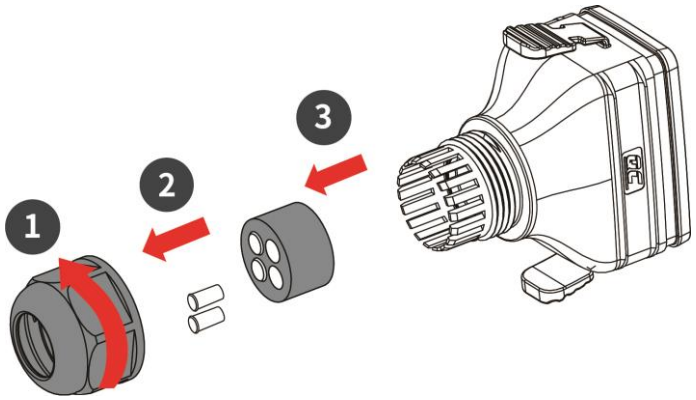


Figure 5-33

2. Thread the network cable through the swivel nut, waterproof plug, and housing in sequence. Then crimp the crystal head with a RJ45 crimping tool.

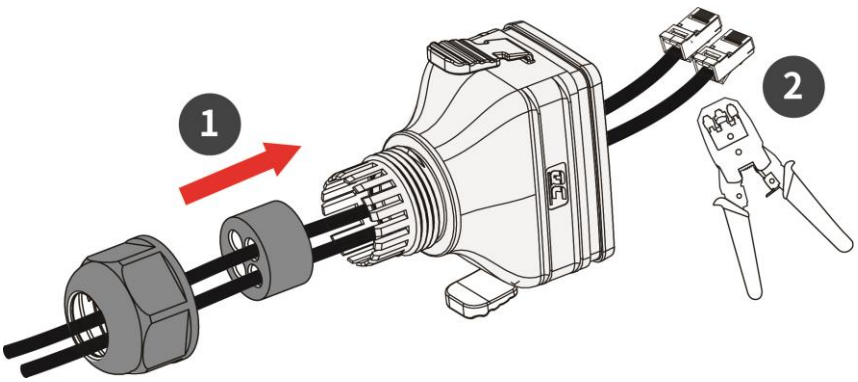


Figure 5-34

3. Insert the network cable into the corresponding network port, then put the communication waterproof cover and tighten the swivel nut. Ensure the cable fixture tongue is well inserted into the terminal slot until a "Click" is heard.

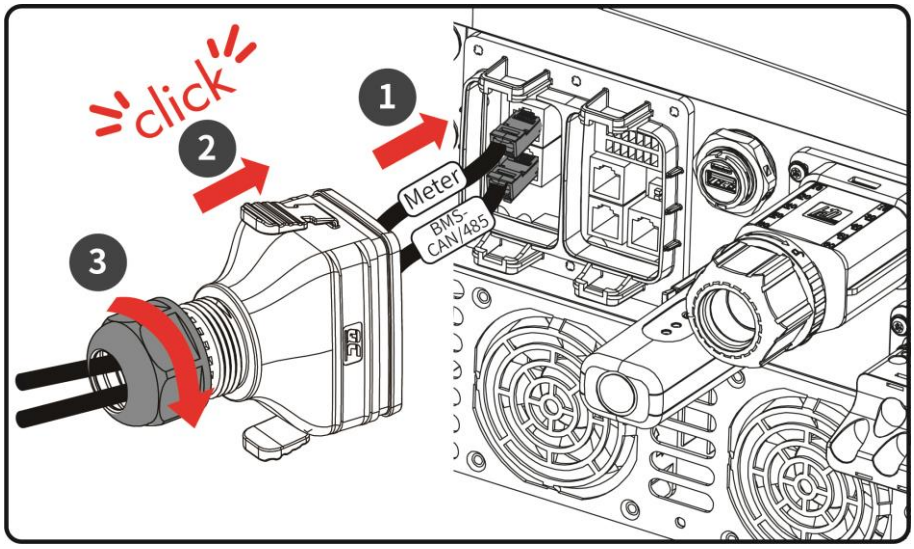


Figure 5-35

5.6 Scenario Wiring Diagram

> **NOTICE**
>
> The battery in the following wiring diagrams is based on the Turbo H4 as an example, the N3 Plus can also connect to the Turbo H5 with the same connections as shown.

(1) On-grid solution wiring:

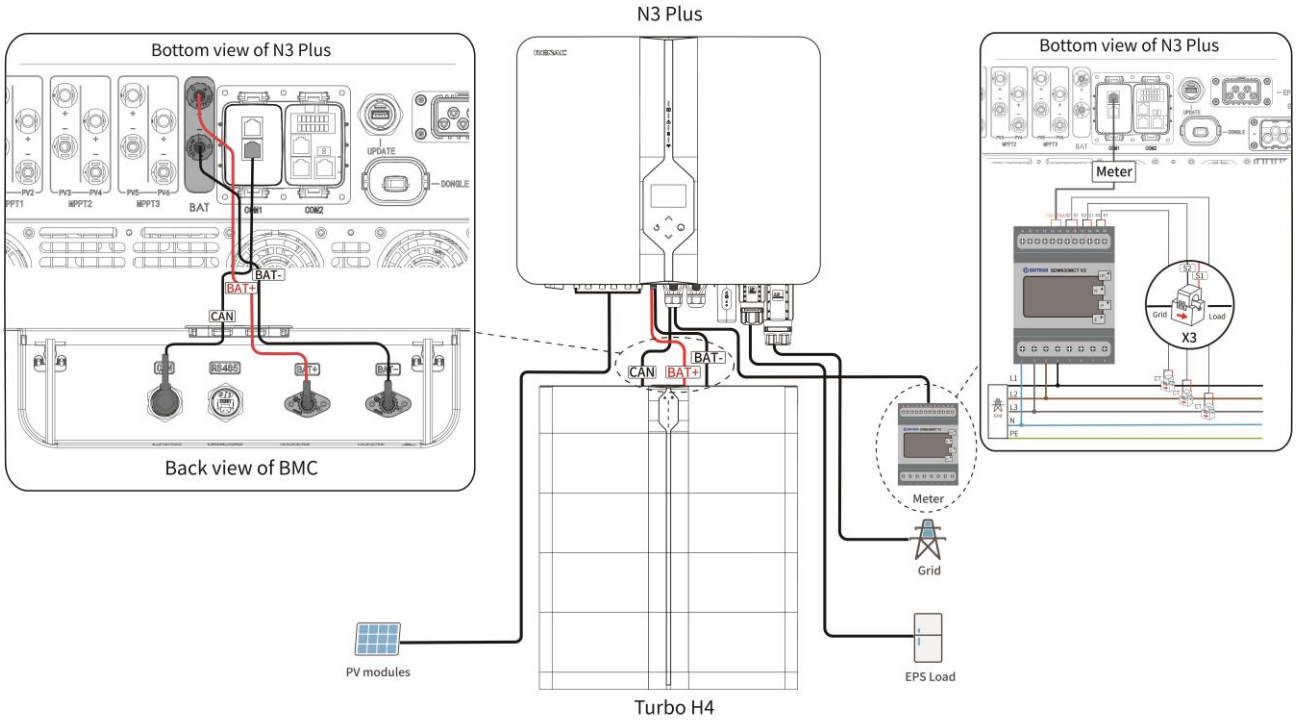


Figure 5-36 On-grid solution wiring

(2) AC retrofit solution wiring:

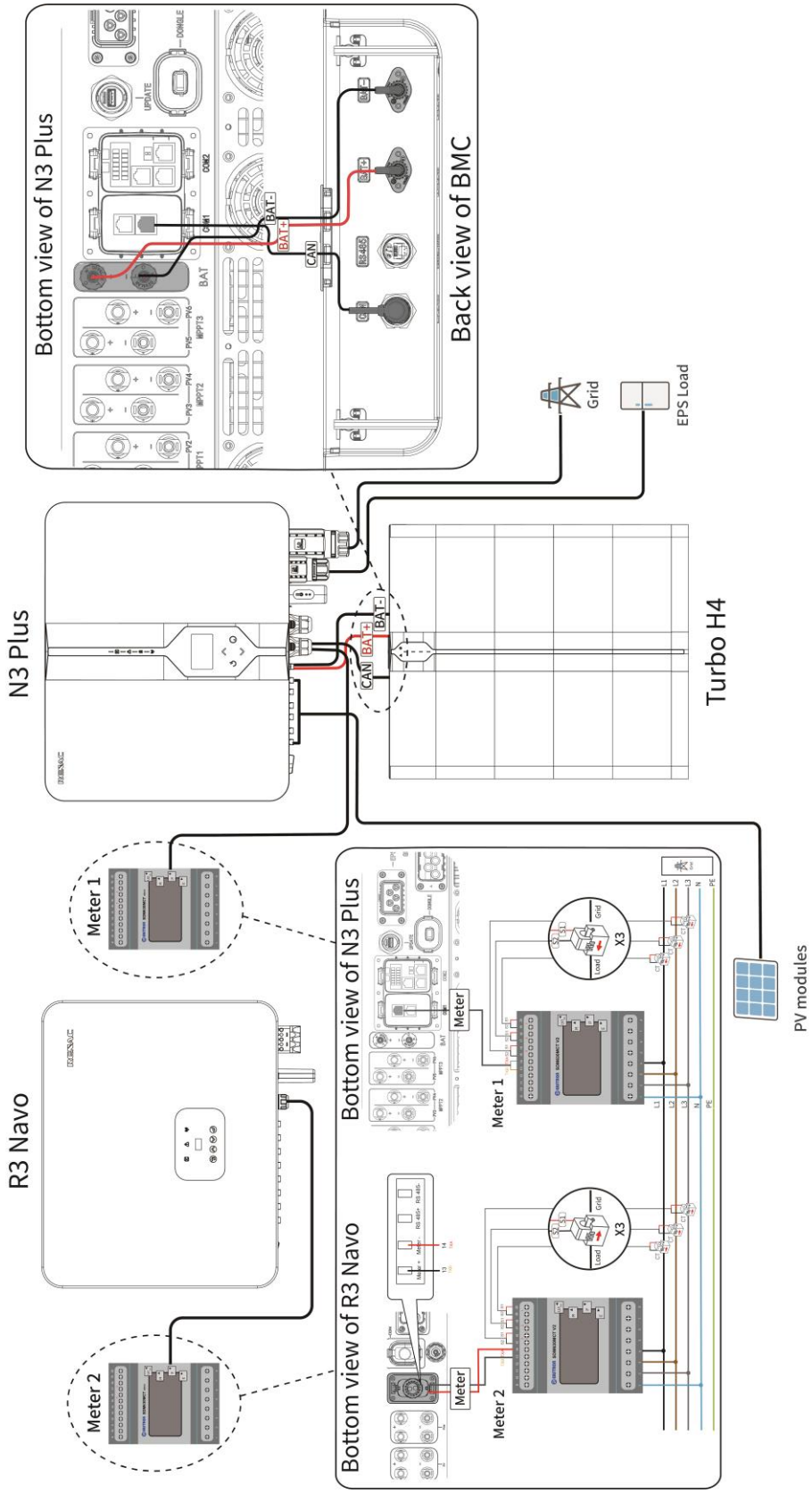


Figure 5-37 AC retrofit solution wiring

6. LED indicator status and operation button

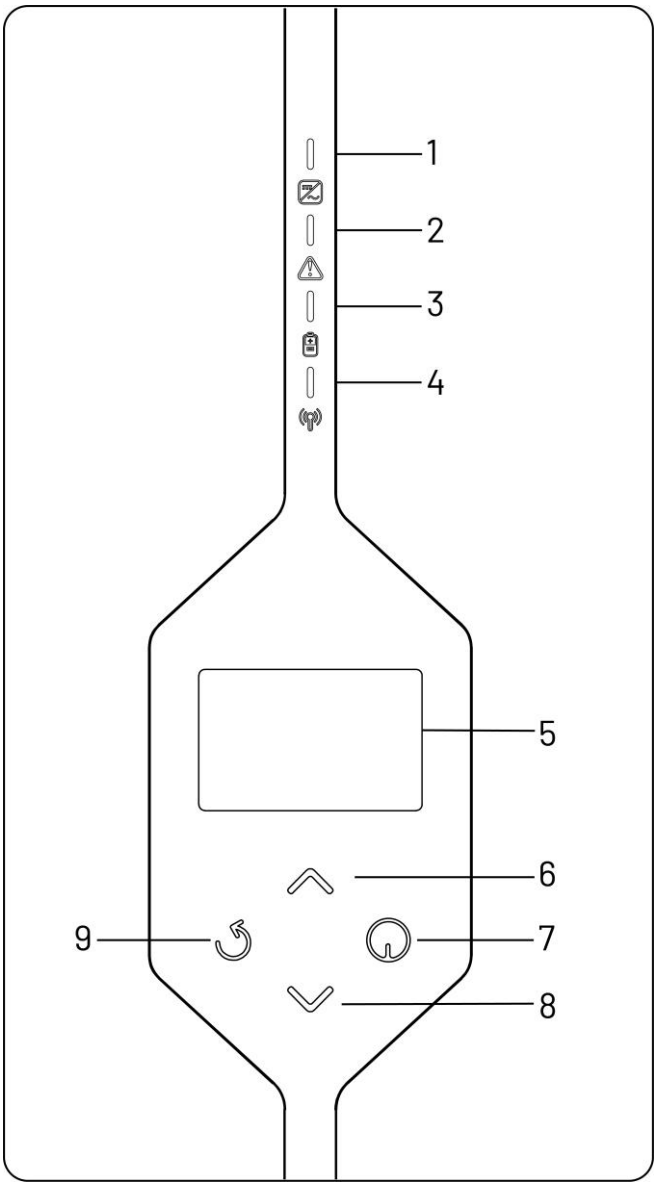


Figure 6-1

No.	Name	Description	
1	Green indicator	On	The inverter is in on-grid or off-grid operating state.
		Blinking	The inverter is in waiting, checking, or idle state.
		Off	This inverter has a communication fault.
2	Red indicator	On	The inverter has a fault.
		Blinking	The inverter has no fault, but the battery has a fault.
		Off	The inverter has no fault.
3	Blue indicator	On	Communication between the inverter and the battery is normal.
		Off	Communication between the inverter and the battery is abnormal.
4	Yellow indicator	On	Communication between the inverter and the monitoring dongle is normal.
		Blinking	Monitoring dongle failed to connect to the server.
		Off	Communication between the inverter and the monitoring dongle is abnormal.
5	LCD Screen	Display the information of the inverter.	
6	Up button	Move cursor to upside or increase value.	
7	OK button	Press the button to confirm the selection.	
8	Down button	Move cursor to downside or decrease value.	
9	ESC button	Leave from current interface or function.	

7. Commissioning

7.1 Check before powering on

Before powering on the N3 Plus, please make sure that the product has been installed following the specifications, and carry out a comprehensive and detailed inspection of the system to ensure that all indicators are in line with the requirements before powering on the system.

(1) Installation check:

Installed correctly and securely.

(2) Electrical connection check:

The PE, DC input, AC output, and communication cables are connected correctly and securely.

(3) Switch check:

Ensure that the DC switches on the inverter and battery are off.

(3) Breaker check:

Ensure that all AC breakers are off.

(4) Other check:

Unused terminals and ports are locked by waterproof caps.

All the screws are tightened.

7.2 Power on

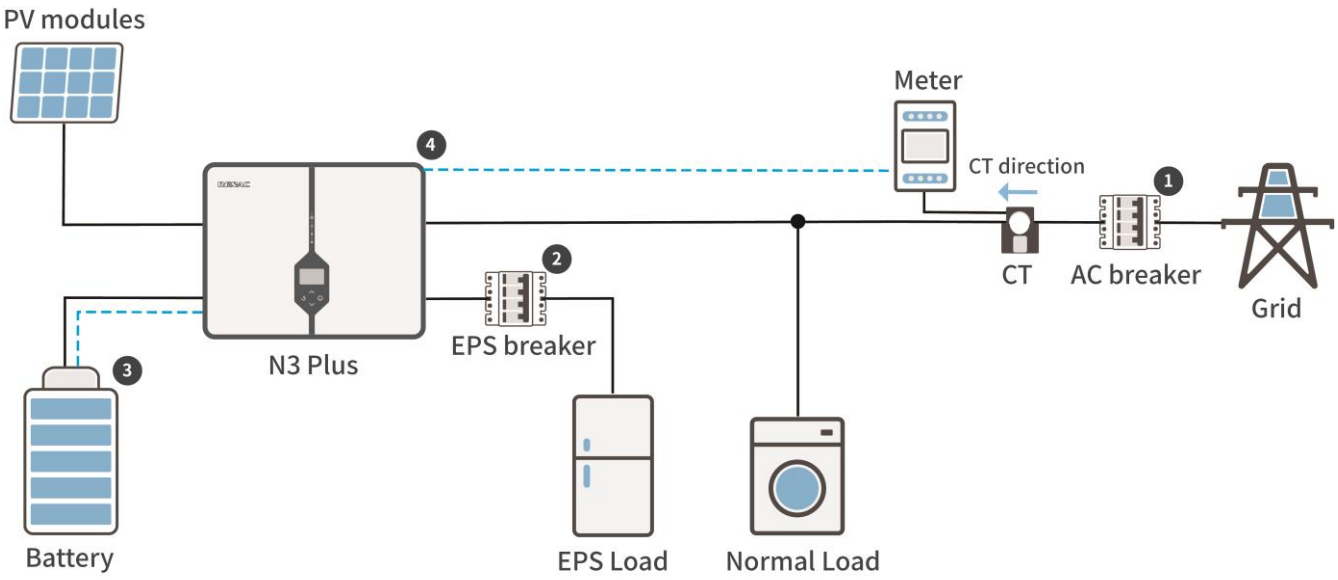


Figure 7-1 On-grid solution power on steps

1. Turn on the external AC breaker of the grid side, and the green indicator of hybrid inverter is blinking.

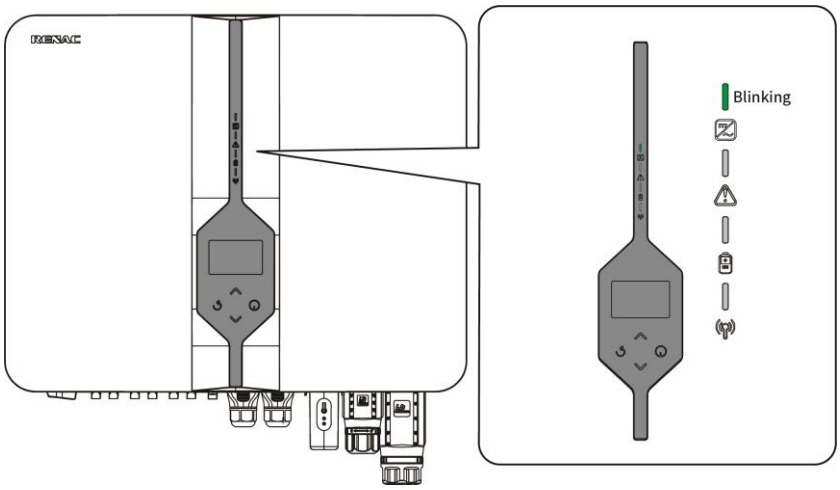


Figure 7-2

2. Turn on the external EPS breaker.

3. Turn on the DC switch and the SWITCH button of the battery, and check the status of LED indicator, first, the power indicator and green indicator of the battery should be on and the blue light of the hybrid inverter should be on. If the battery cables are reversed, the inverter will not query the battery voltage when the battery is switched on.

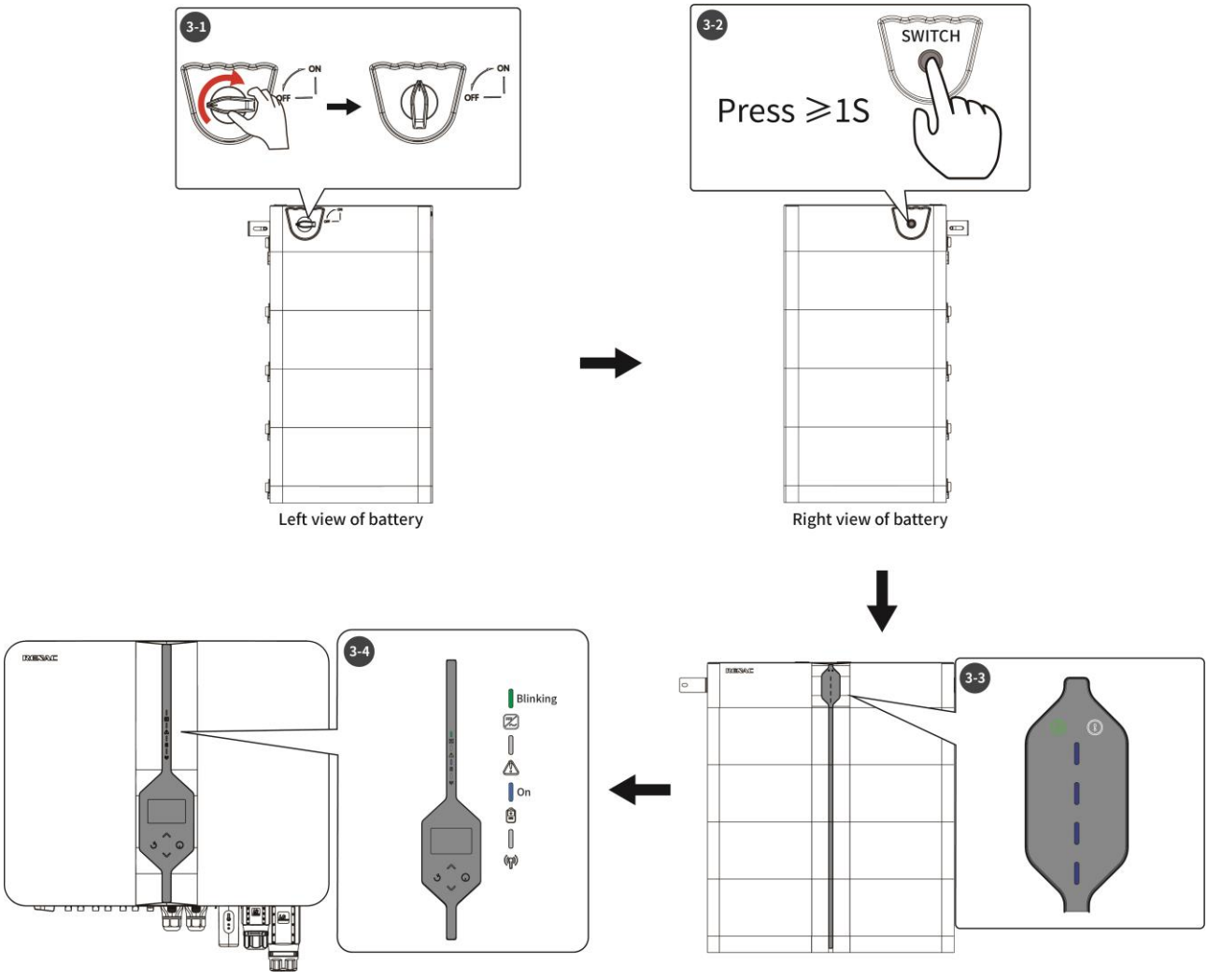


Figure 7-3

4. Turn on the DC switch of the hybrid inverter.

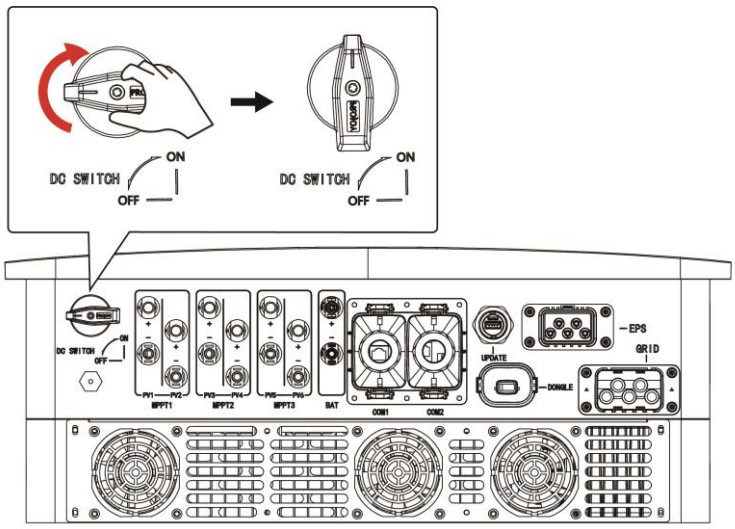


Figure 7-4

5. Set the language, time, grid code, work mode, and meter setting on the screen of the hybrid inverter. Among them, meter 1 is enabled by default in the meter setting, and users only need to confirm that meter 1 is enabled. Finally, turn on the system switch. (For details, please refer to Section 8.5.)

6. Check the status of LED indicator and LCD screen. Firstly, the green indicator should be on and the LCD screen should display the main interface.

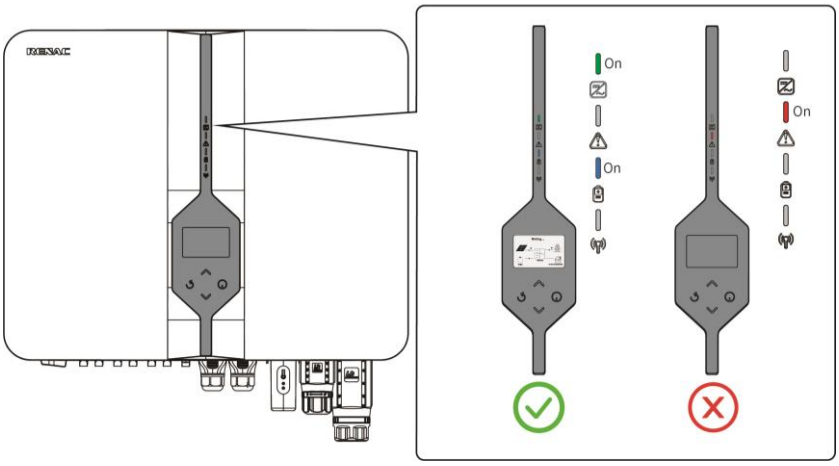


Figure 7-5

If the green indicator is not on, please check the below:

- All the connections are right.
- All the external disconnect switches are turned on.
- The DC switch of the hybrid inverter is in the 'ON' position.

7.3 Power off

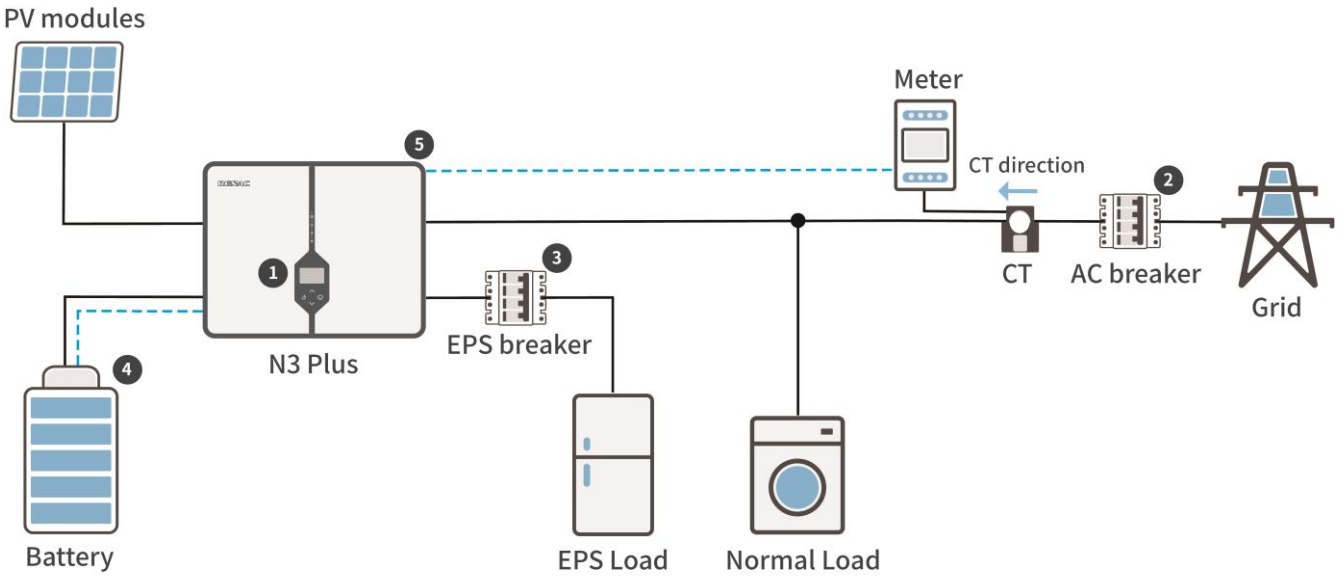


Figure 7-6

1. Turn off the system switch on the screen of the hybrid inverter. (For details, please refer to Section 8.5.)

2. Turn off the external AC breaker of the grid side, and check the status of LED indicator and LCD screen. Firstly, the green indicator should be blinking and the LCD screen should be off.

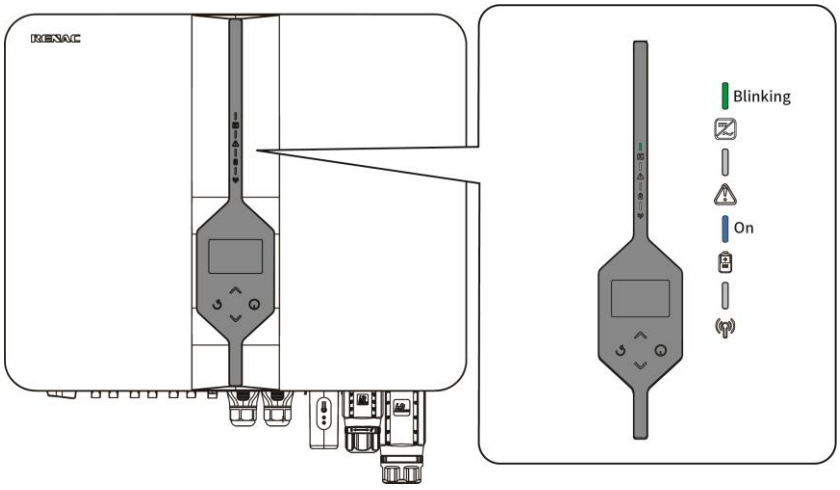


Figure 7-7

3. Turn off the external EPS breaker.

4. Turn off the power button and the DC switch of the battery, and check the status of LED indicator, first, the power indicator and green indicator of the battery should be off and the blue light of the hybrid inverter should be off.

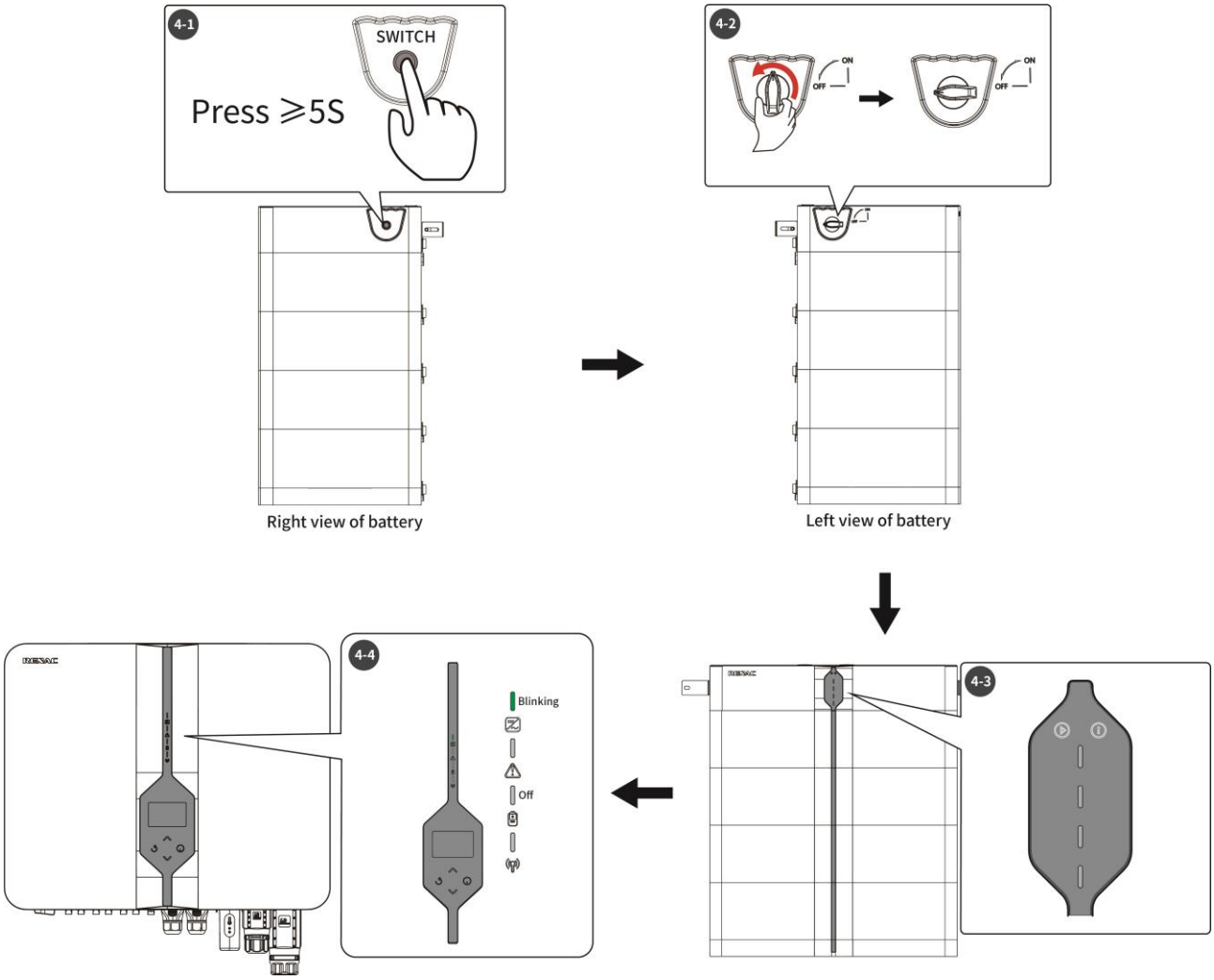


Figure 7-8

5. Turn off the DC switch of the hybrid inverter, and the green indicator should be off.

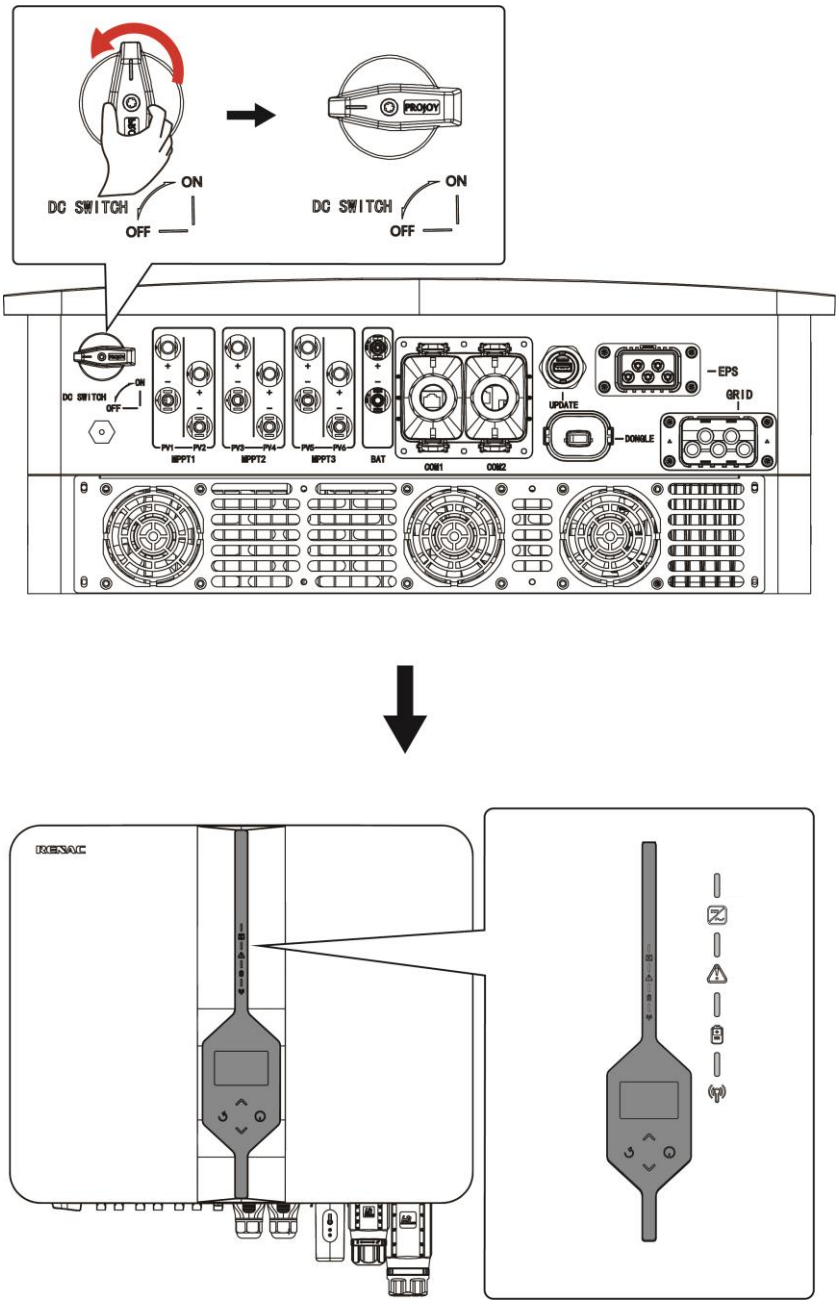
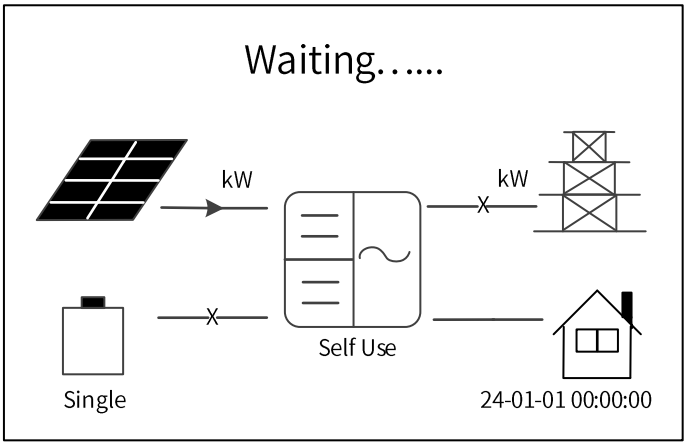


Figure 7-9

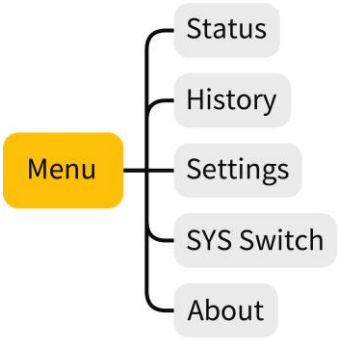
8. Operation and Handling

8.1 Introduction of Menu Interface

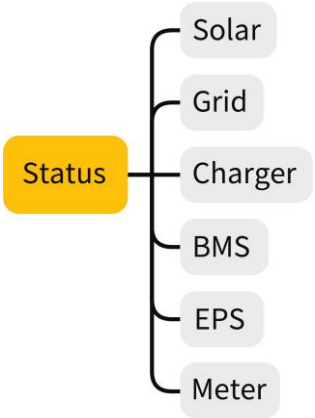


This is the first page of the interface. When the inverter is just powered up, you can see 'Waiting,' and when the power-up is completed, you can see the power flow of the PV, the grid, the battery, and the load.

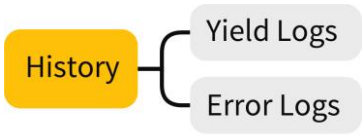
There are five submenus in the menu that can be selected for relevant setting operations.



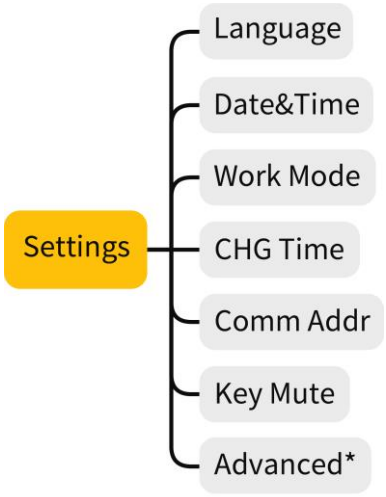
(1) Status: Display the real-time value of solar, grid, charger, BMS, EPS, and meter.



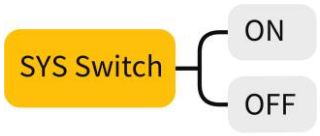
(2) History: Display the history data of yield logs and error logs.



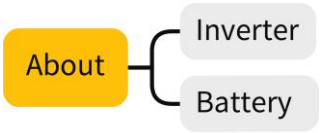
(3) Settings: Set the parameters of inverter, including language, date & time, work mode, charge time, communication address, key mute and advanced* setting.



(4) SYS Switch: Turn on and off the inverter.

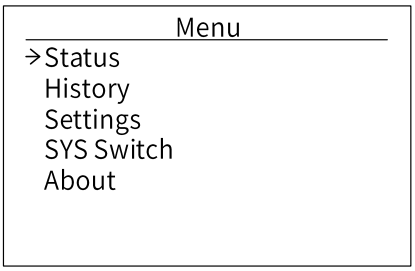


(5) About: Display the information about inverter and battery.



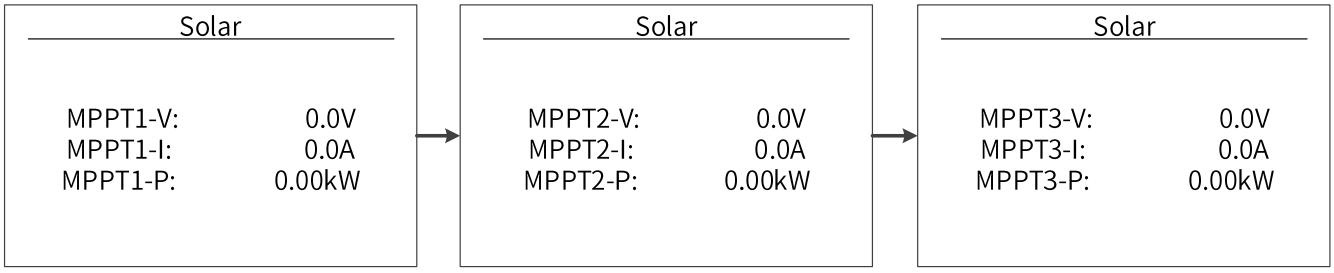
8.2 Status

Press the OK button to enter the status interface and check the real-time value of solar, grid, charger, BMS, EPS, and meter. Press up and down to select, and press the ESC button to return.



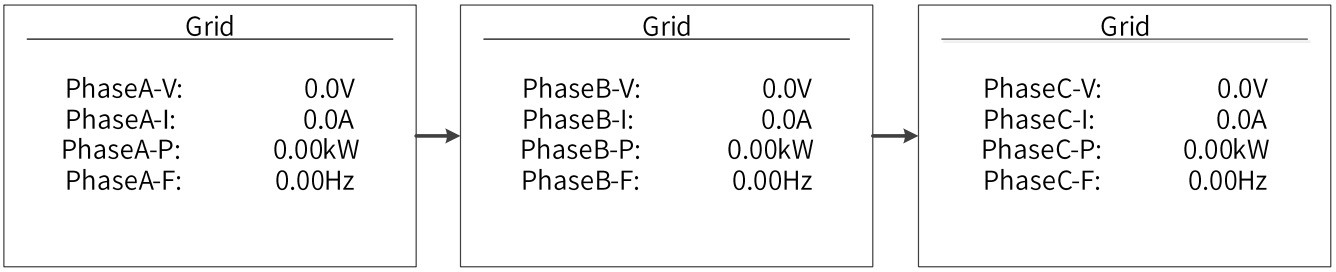
8.2.1 Solar

This status shows the real-time PV parameters of the system. The input voltage, current and power of each PV input. Press up and down button to review the parameter.



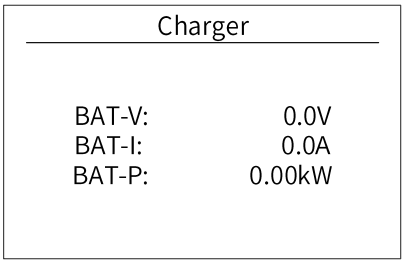
8.2.2 Grid

This status shows the real-time grid parameters such as voltage, current, output power and frequency. Press up and down button to review the parameter.



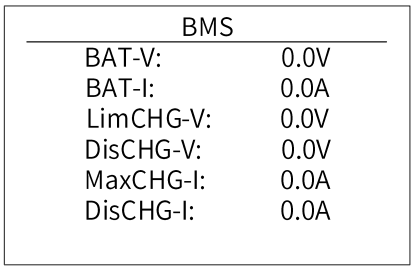
8.2.3 Charger

This status shows the charger situation of the system. Include the battery including the voltage, current, and power. Press up and down button to review the parameter.



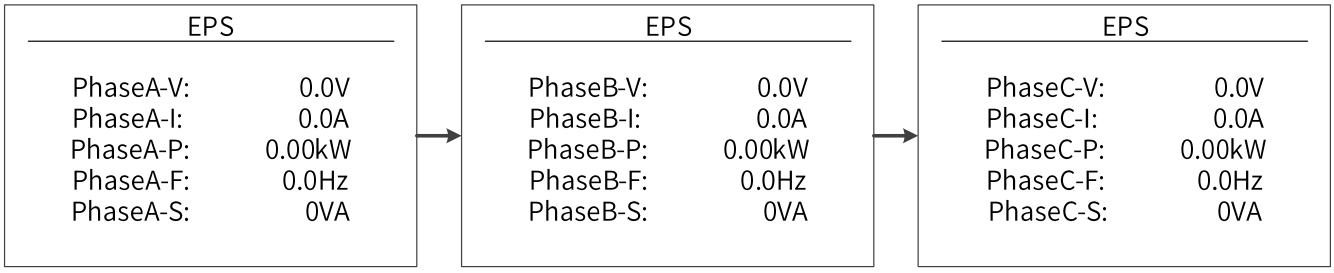
8.2.4 BMS

This status shows the battery situation of the system. Include the battery voltage and current, charge and discharge voltage, charge and discharge current. '+' means in charging; '-' means in discharging. Press up and down button to review the parameter.



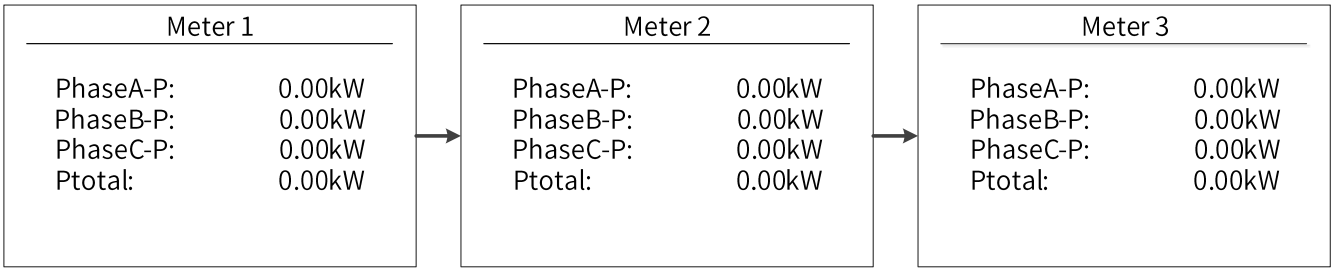
8.2.5 EPS

This status will only have data when the inverter is working in EPS mode, it will show the real-time data of the EPS output, as voltage, current, power, frequency. Press up and down button to review the parameter.



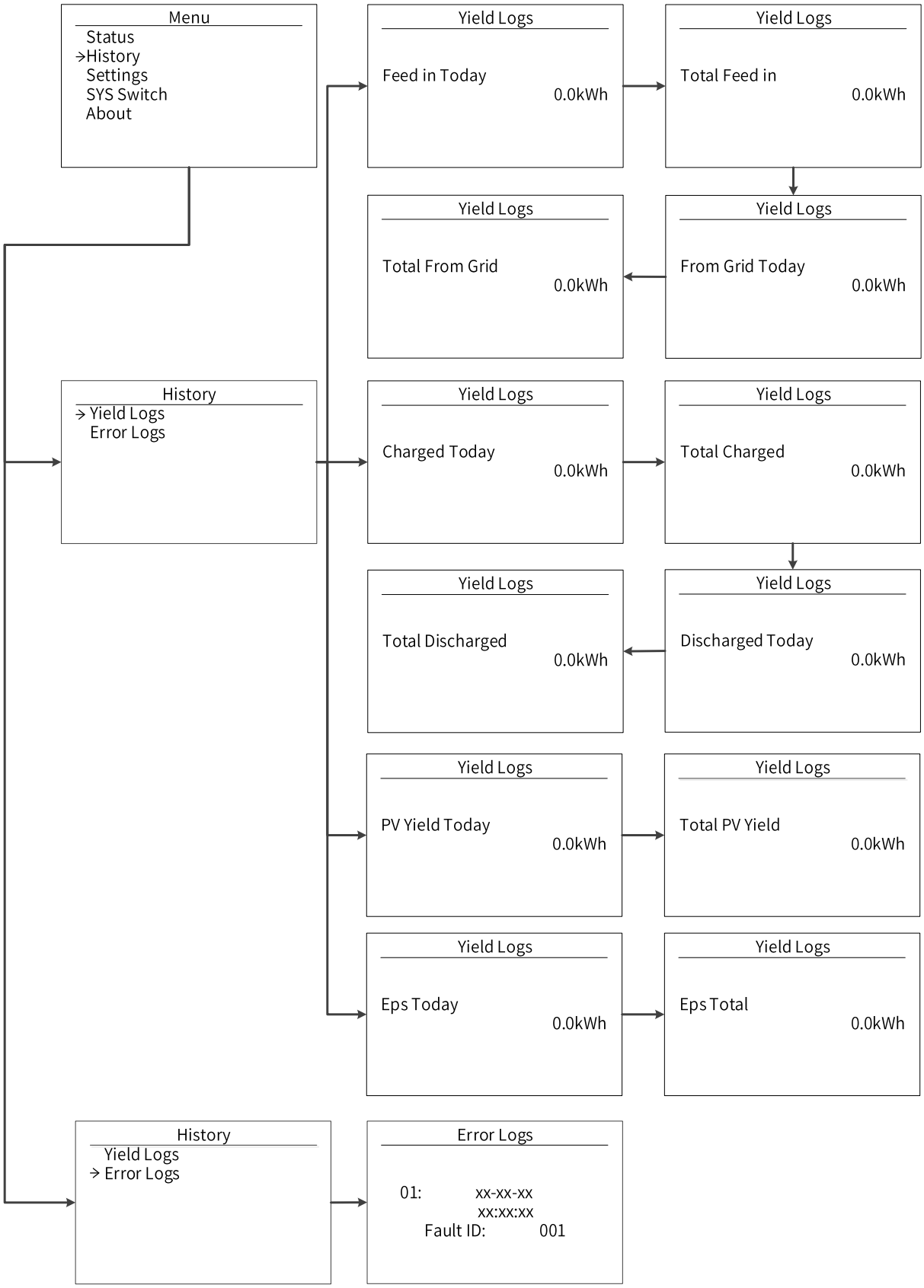
8.2.6 Meter

This status shows the meter situation of the system. Include the smart meter A, B, and C phase power and total power. Press up and down button to review the parameter.



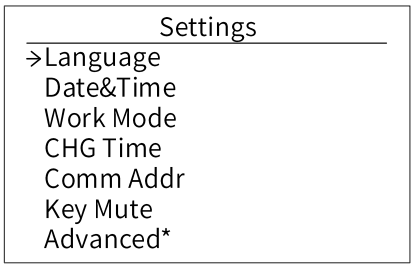
8.3 History

The history function contains three aspects of the information: inverter yield, battery yield and error logs. Press up and down to select, and review the data of system, press ESC button to return.

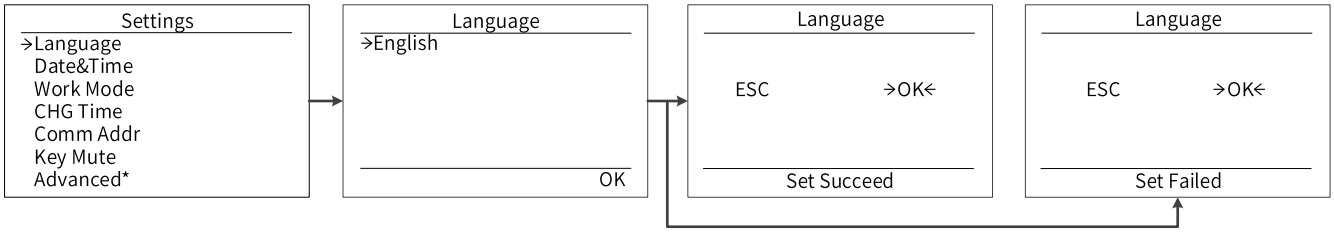


8.4 Settings

The setting function includes user settings and advanced* settings. The user settings include language, date & time, work mode, charge period, EPS mode, communication address, and key mute. The advanced* settings include on-grid, battery, bat model, feature, parallel set, relay function, new password, reset, and USB.

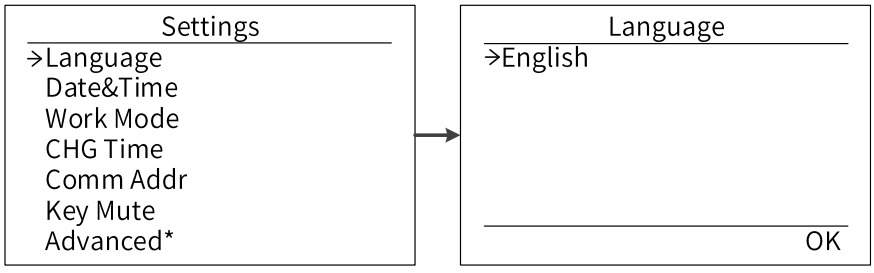


In the setting function, press the OK button to enter the second confirmation interface; users need to select 'ENT' to confirm formally. If the setting is successful, 'Set Succeed' will be displayed below, and the page will automatically return to the previous page in a while; if the setting fails, 'Set Failed' will be displayed below, and the page will be fixed, and the user will need to press the Back button to return to the previous page. Take setting the language as an example.



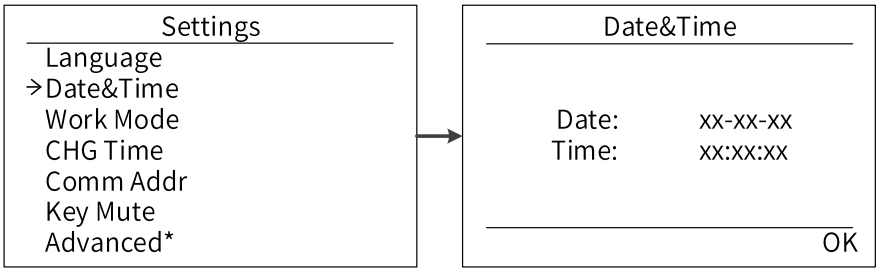
8.4.1 Language

Press the up or down button to change language. Press the OK button to confirm.



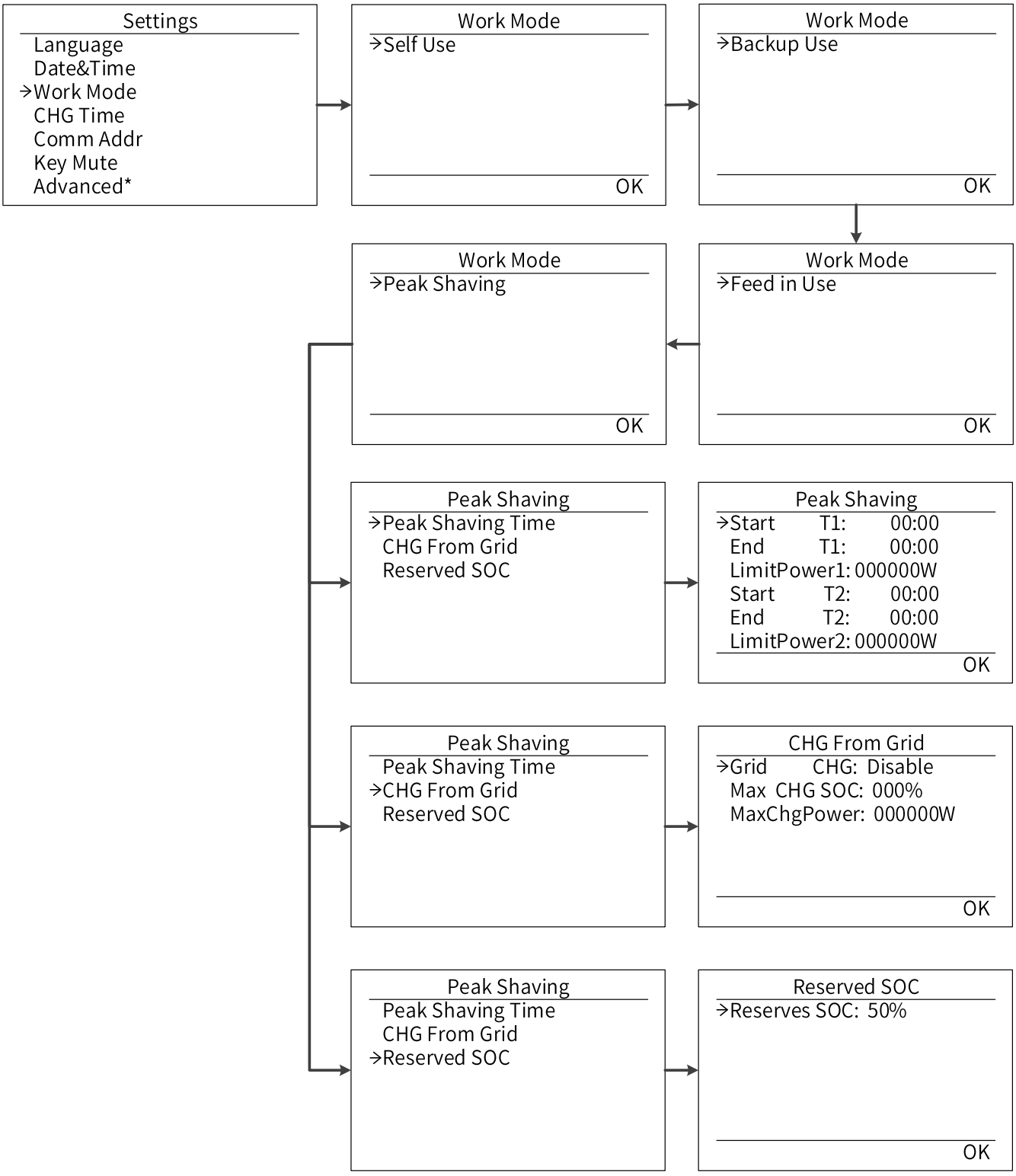
8.4.2 Date & Time

Press the up or down button to change date and time. Press the OK button to confirm.



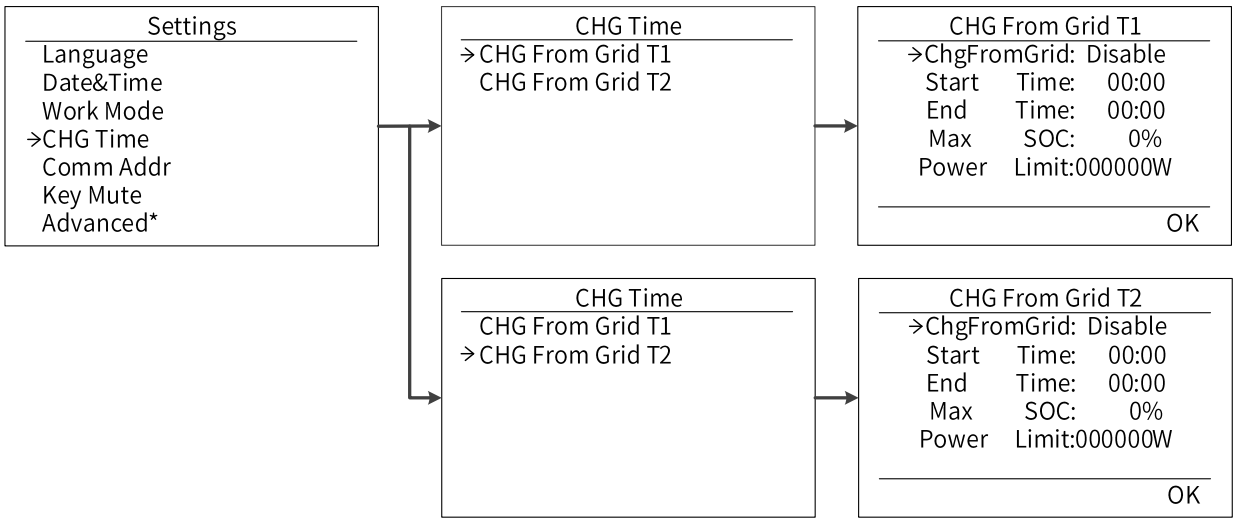
8.4.3 Work Mode

Press the up or down button to select different work modes. Press the OK button to confirm. If you choose Peak Shaving mode, further settings are required.



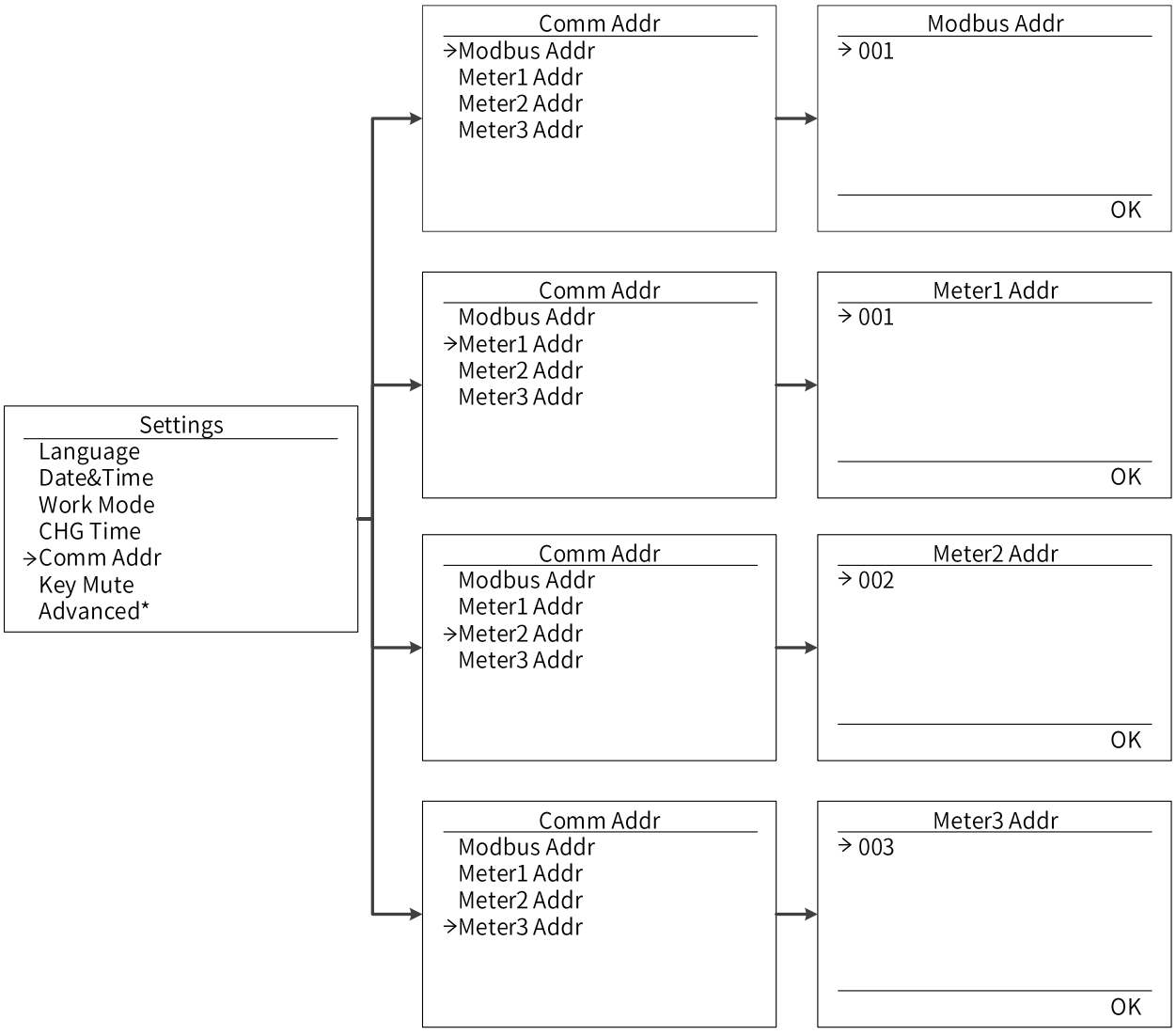
8.4.4 CHG Time

Press the up or down button to set whether power needs to be drawn from the grid, start time, end time, maximum SOC, and power limit. Press the OK button to confirm.



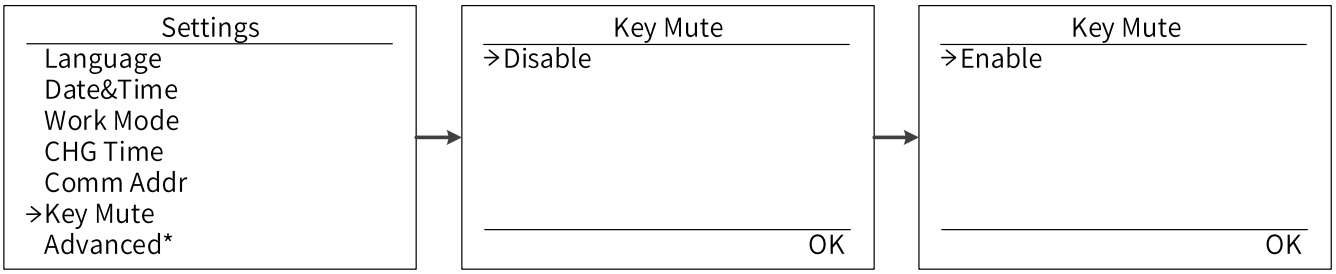
8.4.5 Communication Address

Press the up or down button to change address of local and meter. Press the OK button to confirm.

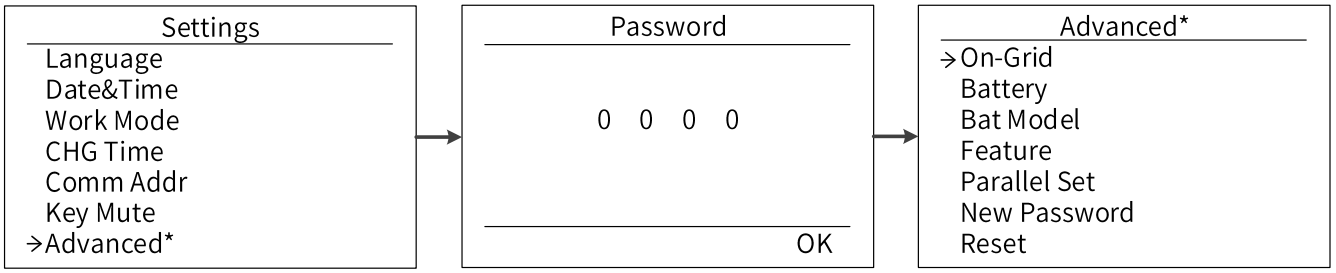


8.4.6 Key Mute

Press the up or down button to select whether to enable the key mute. Press the OK button to confirm.



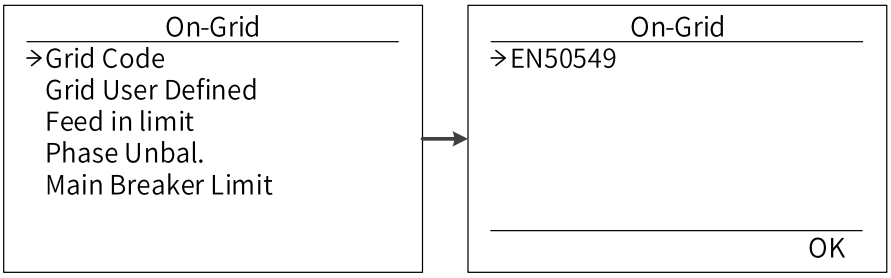
8.4.7 On-Grid



First of all, if the user wants to enter the Advanced* setting interface, verify the user identity and enter the default password '0000' to enter the setting interface.

The on-grid function includes safety, grid, export control, and phase unbalanced.

(1) Grid Code: Press the up or down button to set the grid code. Press the OK button to confirm.



Grid codes:

No.	National/Regional Grid Code	Description
0	VDE4105-DE	Germany power Grid, meet Grid standards "VDE-AR-N-4105".
1	CEI0-21	Italy power Grid.
2	Australia A	Australia A power Grid.
3	RD1699	Spain power Grid.
4	EN50549	Default EN50549 Grid setting.
5	EN50549-DK-W	West Denmark power Grid.
6	Greece	Greece power Grid.
7	EN50549-NL	Netherland power Grid.
8	C10/11	Belgium power Grid.
9	G99	UK power Grid.

No.	National/Regional Grid Code	Description
10	China	China power Grid, meet Grid standards "CN-NBT".
11	VDE0126-FR	France power Grid, meet Grid standards "VDE 0126".
12	EN50549-PL	Poland power Grid.
13	Brazil-180s	Brazil power Grid, connect/reconnect time 180s.
14	VDE0126-DE	Germany power Grid, meet Grid standards "VDE 0126".
15	CEI0-16	Italy power Grid, meet Grid standards "CEI0-16".
16	G98	UK power Grid.
17	Greece Island	Greece Island power Grid.
18	EN50549-CZ	Czech Republic power Grid.
19	IEC61727-IN	India power Grid.
20	Korea	Korea power Grid.
21	EN50549-SW	Sweden power Grid.
22	China-W	China power Grid, Grid voltage range: 160-264.5V. Grid frequency range: 47-52Hz.
23	China-H	China power Grid. Grid voltage range: 160-280V.
24	IEC61727-IN-W	India power Grid. Grid voltage range: 195.5-280V.
25	Brazil	Brazil power Grid, meet Grid standards "NBT 16150".
26	IEC61727-SL	Sri Lanka power Grid, meet Grid standards "IEC61727".
27	Mexico	Mexico power Grid, meet Grid standards "IEC61727 60Hz".
28	New Zealand	New Zealand power Grid.
29	Philippines	Philippines power Grid, meet Grid standards "IEC61727 60Hz".
30	IEC61727-SL-W	Sri Lanka power Grid, Grid voltage range: 160-280V. Grid frequency range: 47-52Hz.
31	PEA	Thailand power Grid.
32	PEA-W	Thailand power Grid. Grid voltage range: 160-280V. Grid frequency range: 47-52Hz.
33	IEC61627-VN	Vietnam power Grid.
34	IEC61627-VN-W	Vietnam power Grid. Grid voltage range: 160-280V. Grid frequency range: 47-52Hz.
35	Tunisia	Tunisia.
36	MEA	Thailand power Grid.
37	MEA-W	Thailand power Grid. Grid voltage range: 160-280V. Grid frequency range: 47-52Hz.
38	Brazil-LV	120V 60Hz voltage of grid L to N (R3-10-15K-LV only, others reserved).
39	EN50549-DK-E	East Denmark power Grid.
40	Tunisia-W	Tunisia wide range. Grid voltage range: 160-290V.
41	Chile	Chile Power Grid.
42	Brazil-W	Brazil power Grid. Grid voltage range: 160-290V.
43	EN50549-PL-W	Poland power Grid. Grid voltage range: 160-290V.
44	Brazil-180s-W	Brazil power Grid. Grid voltage range: 160-290V.
45	UNE217002-ES	Spain power Grid.
46	G98-NI	G98 for Northern Ireland.

No.	National/Regional Grid Code	Description
47	G99-NI	G99 for Northern Ireland.
48	EN50549-NW	Norway-400VLine
49	EN50549-NW-LV	Norway-230VLine-R3-10-15K-LV only, others reserved.
50	IEC61727-LV	133V 50Hz, low voltage power grid.
51	EN50549-IR*/	Ireland power Grid.
52	Austria	Austria power Grid.
53	Australia B	Australia B power Grid.
54	Australia C	Australia C power Grid.
55	EN50549-SIST	Slovenia Grid.
56	EN50549-HUN	Hungary Grid.
57	Pakistan	Pakistan Grid.

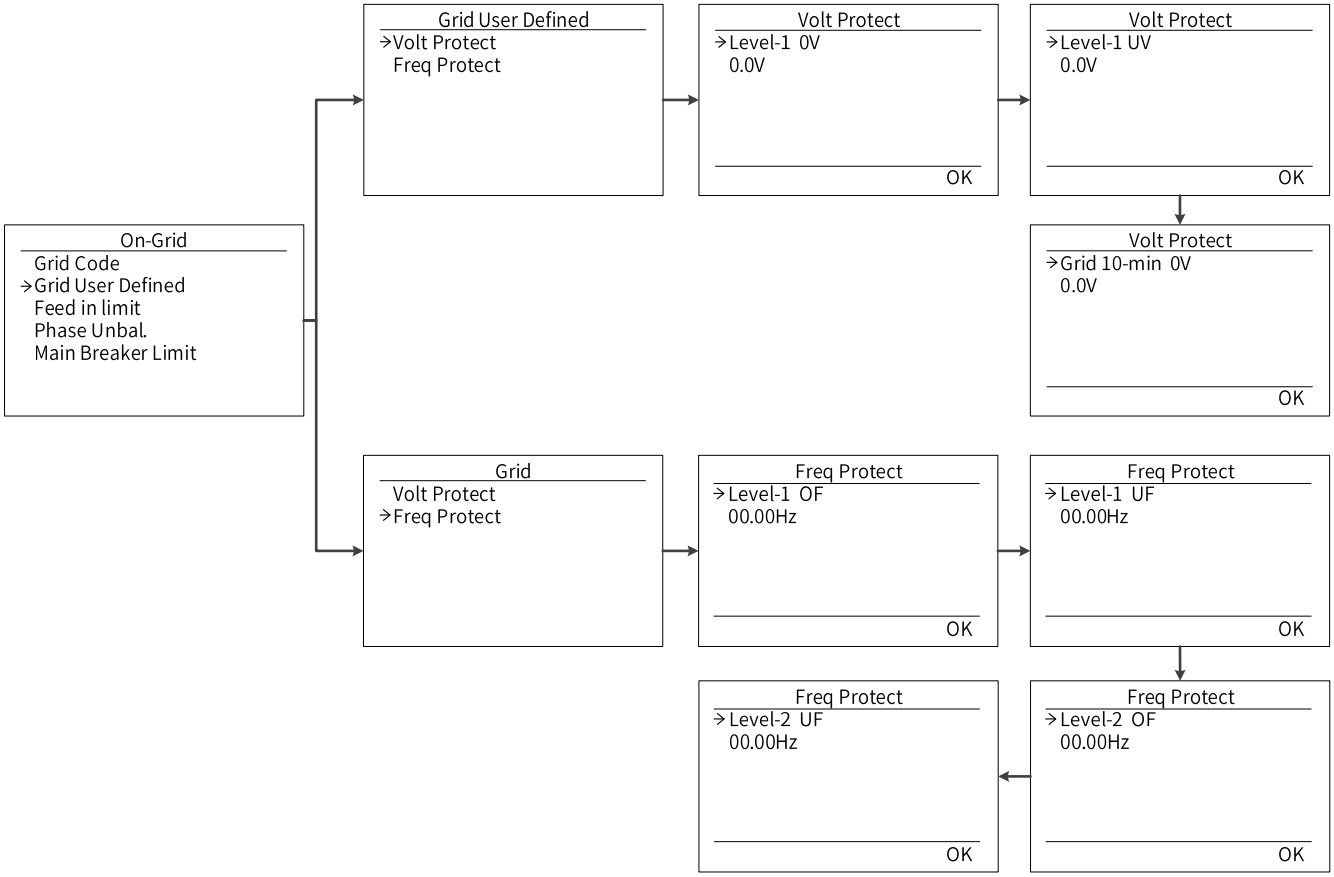
Note:

For compliance with AS/NZS 4777.2:2020, please select from Australia A/B/C/ or New Zealand.

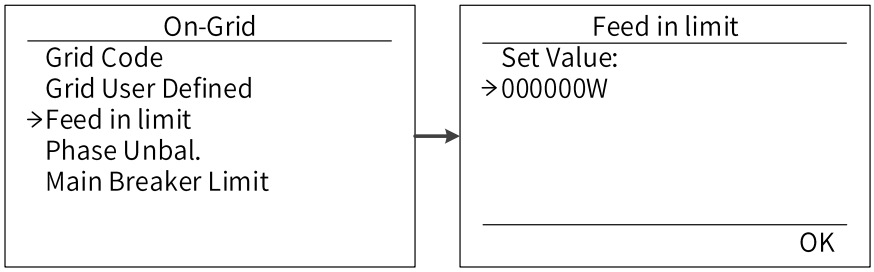
Please contact your local grid operator to select the region according to the grid code list.

The grid codes are subject to change. The listed codes are updated without notice.

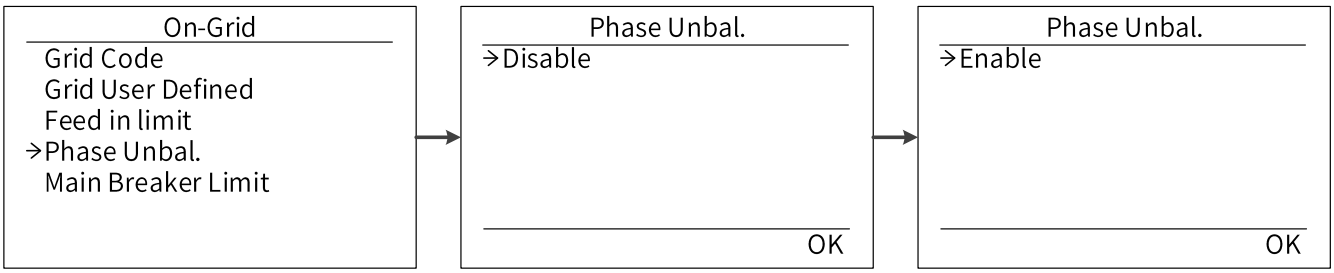
(2) Grid User Defined: Press the up or down button to change the value of grid voltage and grid frequency protect. Press the OK button to confirm.



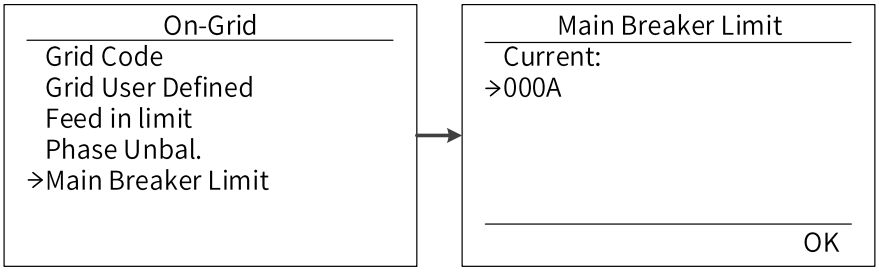
(3) Feed in limit: With this function the inverter can control the power export to the grid. Press the up or down button to change the export power. Press the OK button to confirm.



(4) Phase unbal.: When the system is connected with three-phase unbalanced load or single-phase load, customers can enable the phase unbalance function, the inverter can detect and identify the three-phase current unbalance in the system through the meter and output unbalanced power to different phase.

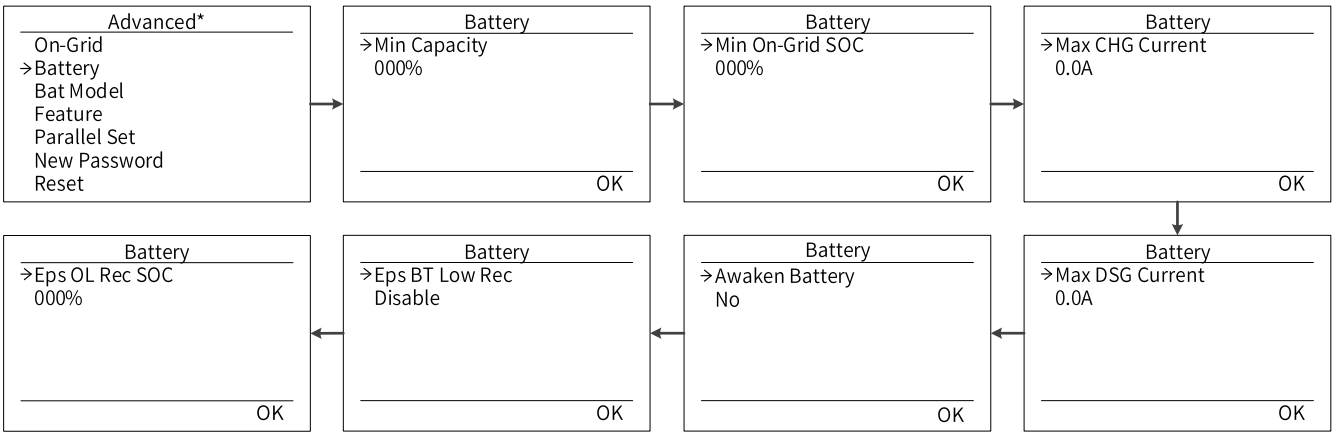


(5) Main Breaker Limit: Due to the power limit, the current of Meter or CT must be abide by the utility's requirements. Users can set the corresponding amperage according to the utility's requirements. Failure to set the current may cause a circuit breaker fault of the main switchboard, thus affecting the charging and discharging of the battery. The default value is 100 A, range: 10-250 A.



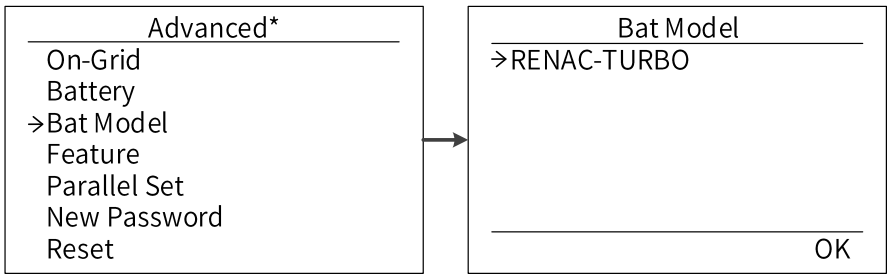
8.4.8 Battery

Press the up or down button to set the parameters of battery. 'Eps BT Low Rec' means recovery enable switch when battery low capacity in EPS mode, 'Eps OL Rec SOC' means EPS overload due to low capacity for battery, if recovered, min soc. Press the OK button to confirm.



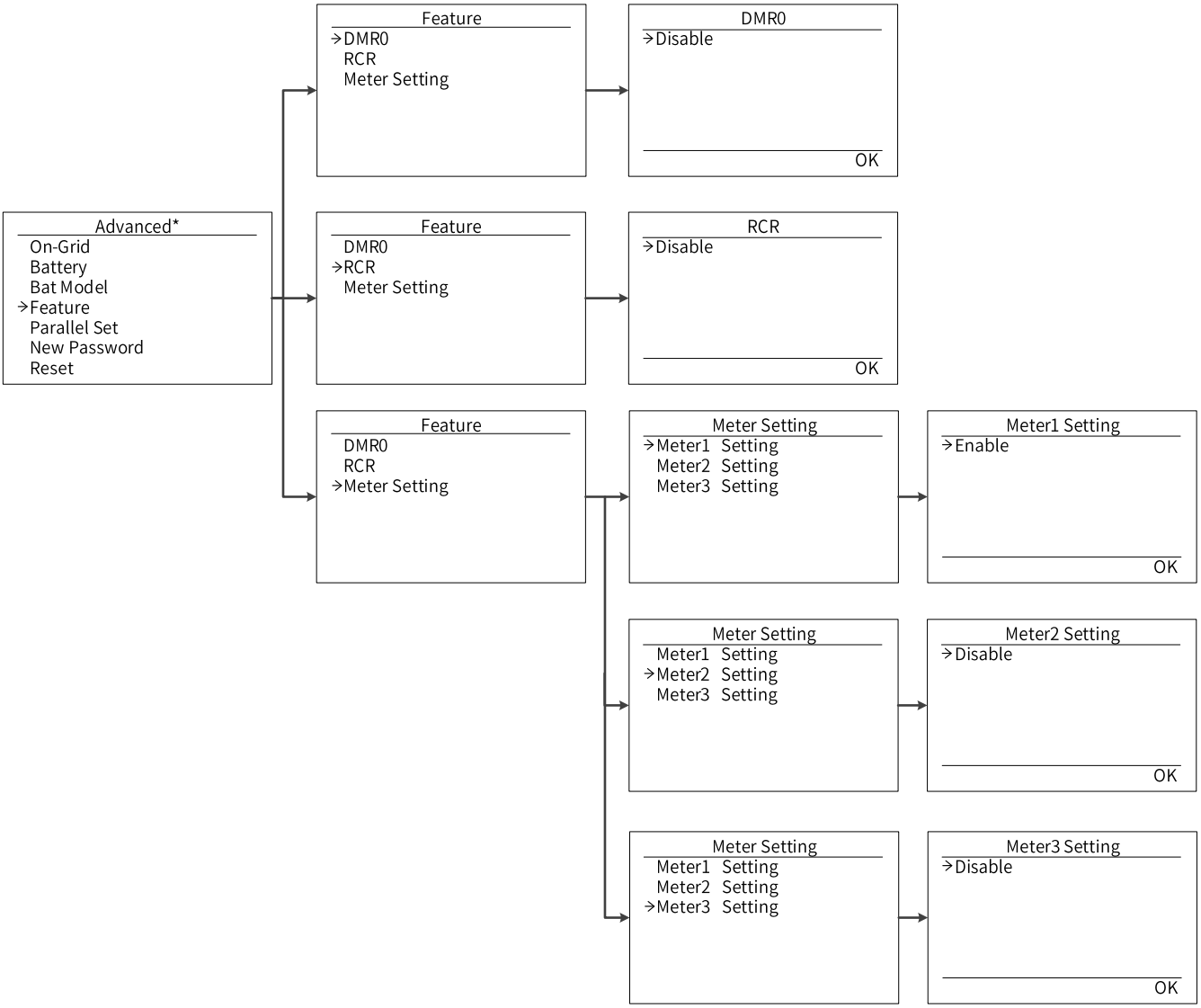
8.4.9 Bat Model

Press the up or down button to set the model of battery. Press the OK button to confirm. If the battery is not connected, select 'No Battery'.



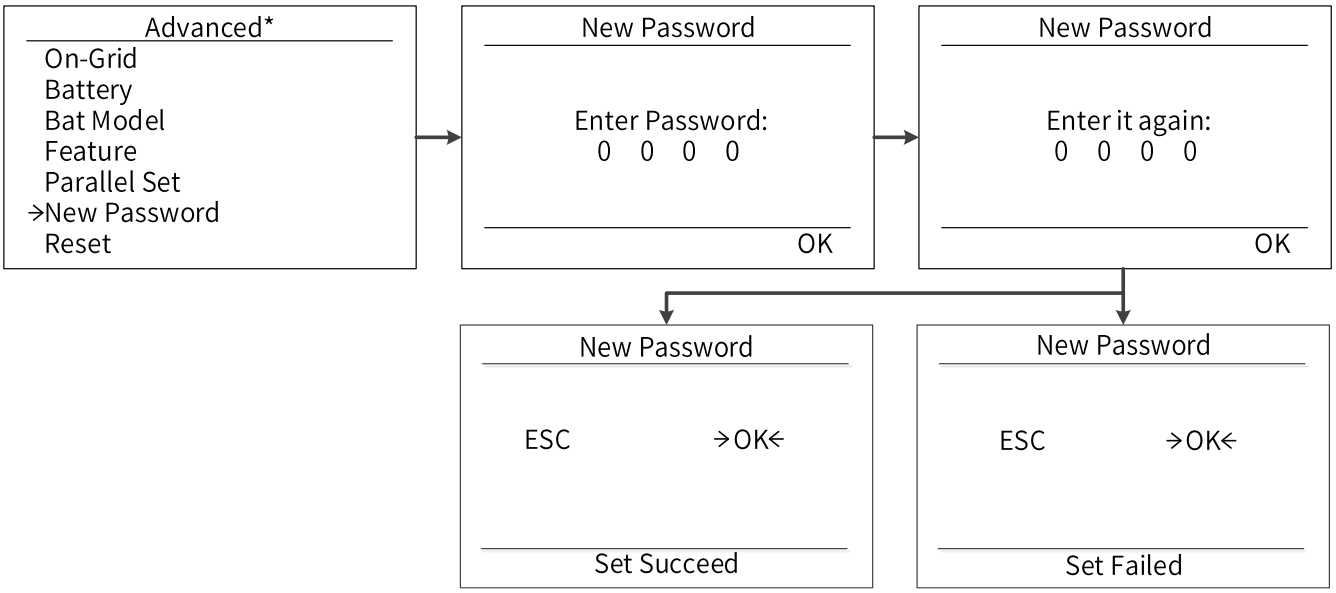
8.4.10 Feature

Press the up or down button to enable or disable DRM0, RCR, and Meter Setting. Press the OK button to confirm.



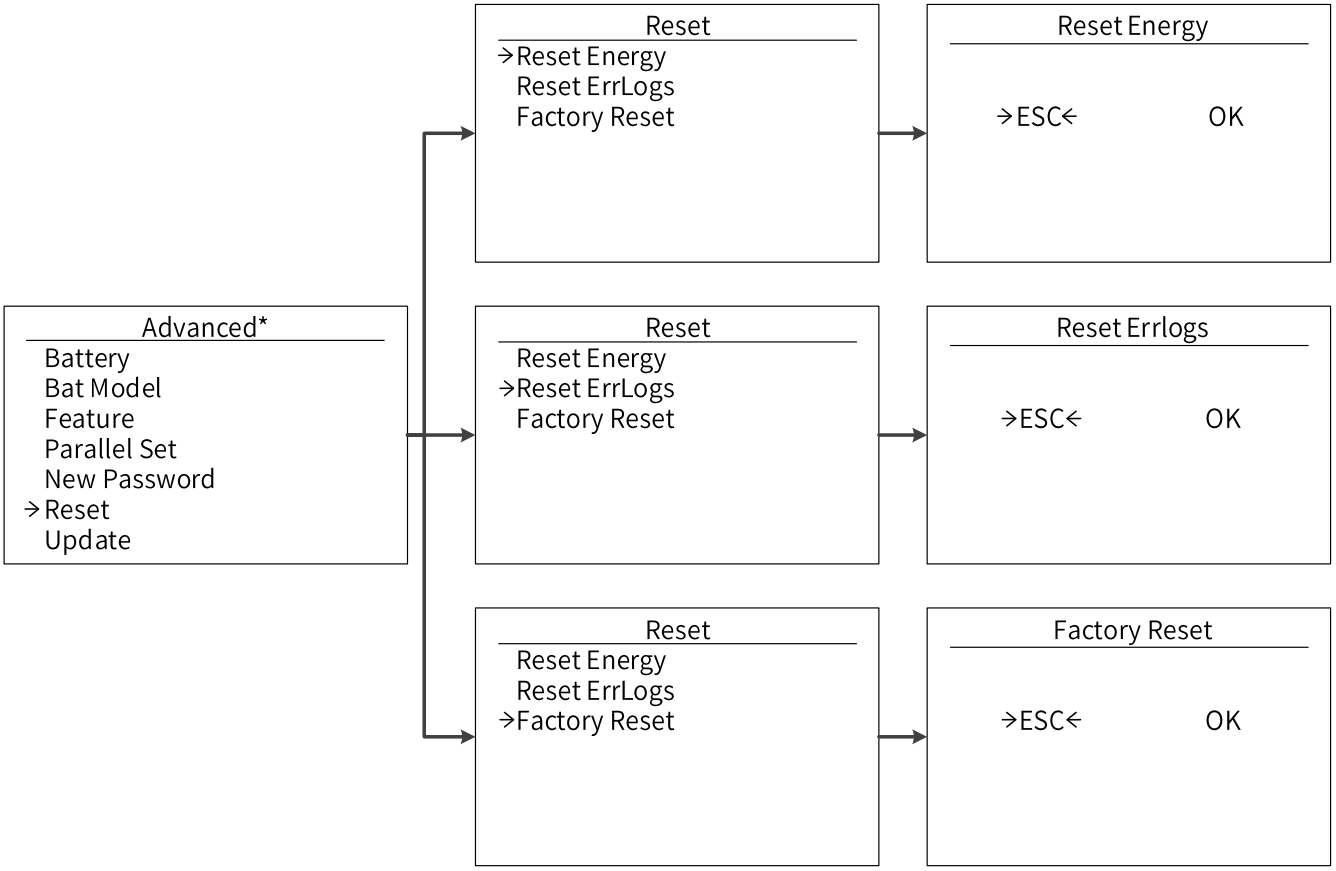
8.4.11 New Password

Press the up or down button to set new password. Press the OK button to confirm.



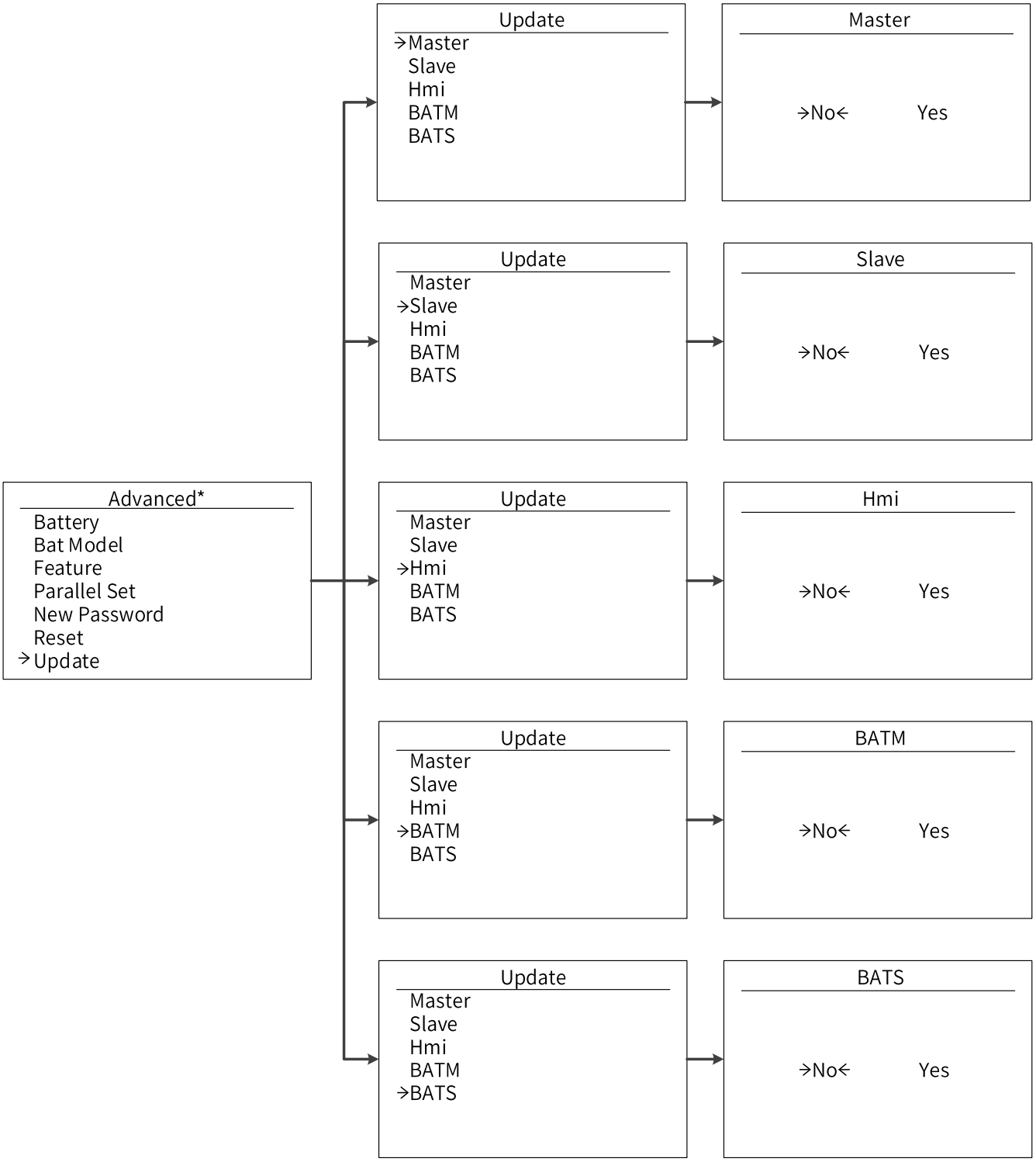
8.4.12 Reset

Press the up or down button to reset power, reset errors or factory reset. Press the OK button to confirm.



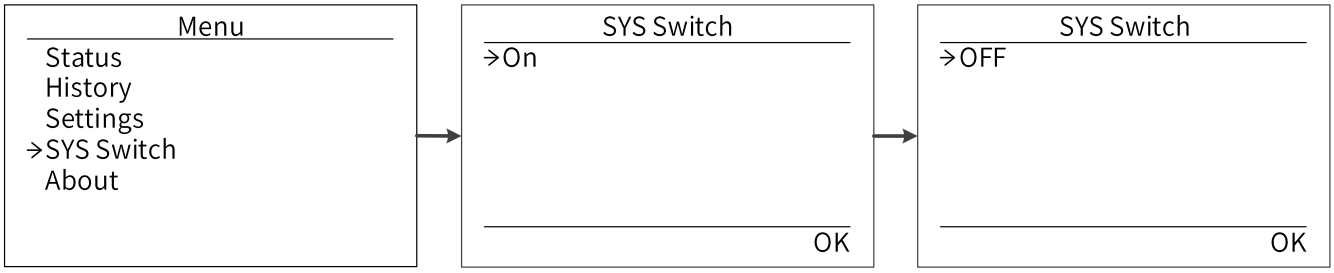
8.4.13 Update

Press the up or down button to update master inverter, slave inverter, Hmi, BATM or BATS. Press the OK button to confirm.



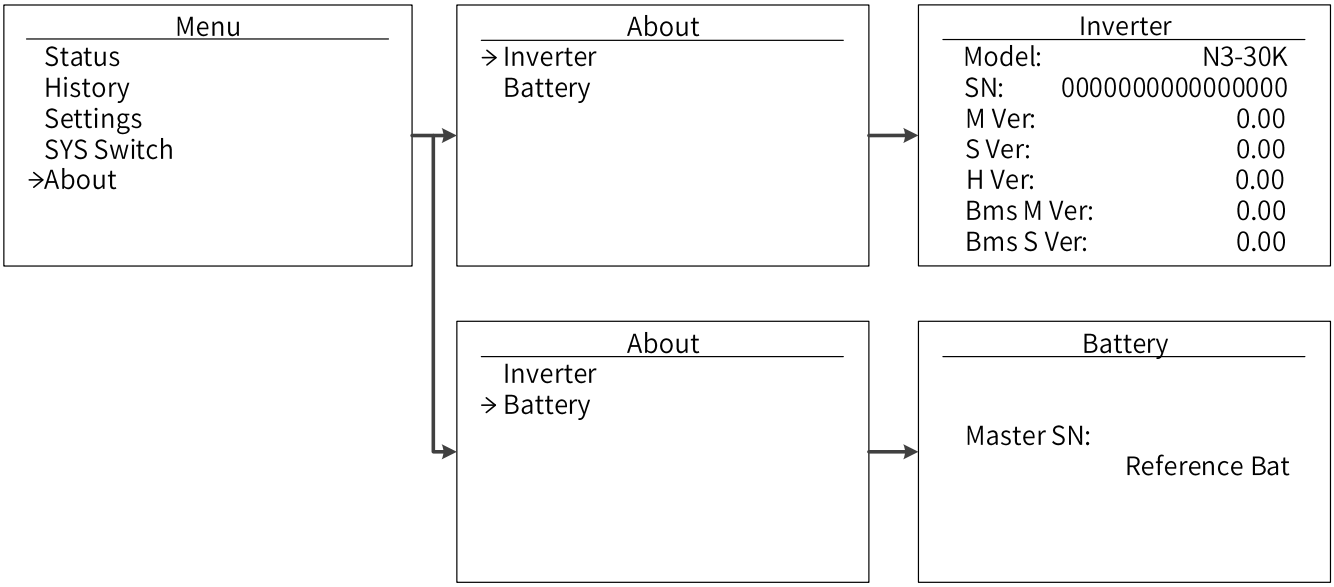
8.5 System Switch

Press the up or down button to turn on or turn off the inverter. Press the OK button to confirm.



8.6 About

This interface shows the information of the inverter, such as series number and software version.

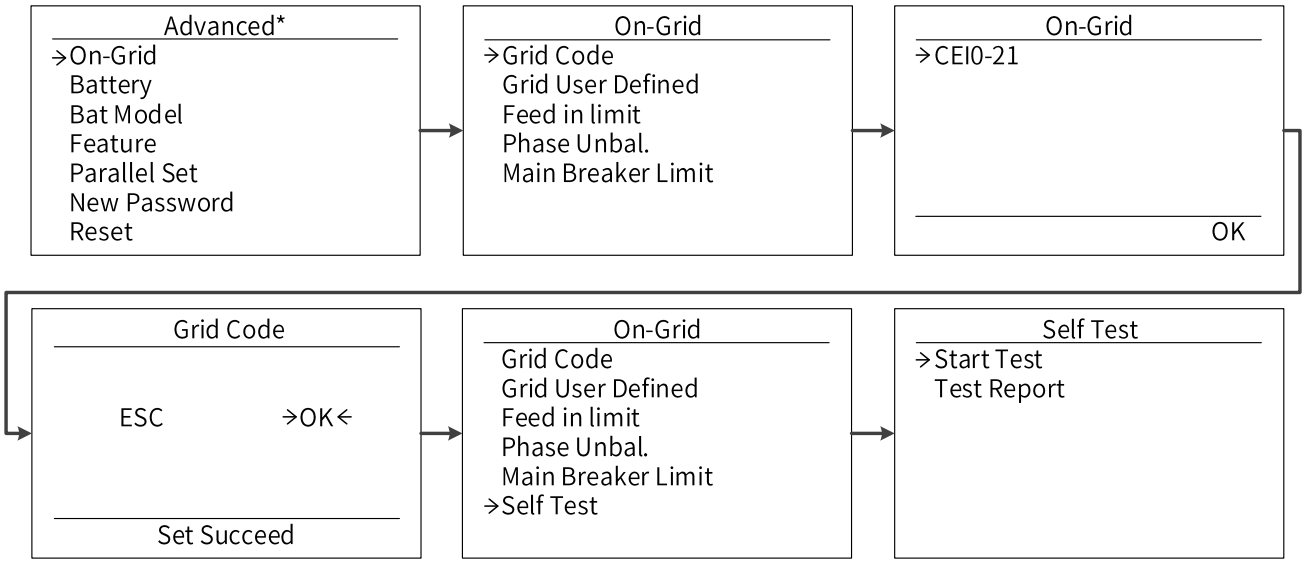


8.7 Self-Test in accordance with CEI0-21 (Applies to Italy only)

The self-test is only required for inverters, which are commissioned in Italy. The Italian standard requires that all inverters feeding into the utility grid are equipped with a self-test function in accordance with CEI0-21. Please note that there is a self-test option only when the inverter selects CEI0-21. During the self-test, the inverter will consecutively check the protection reaction times and values for overvoltage, under voltage, over frequency, and under frequency. The self-test function is available at any time. It also allows end user get test reports shown on LCD display.

Note: Users need to set the inverter country to CEI0-21 before testing.

Auto-Test from screen:



9. Troubleshooting and maintenance

9.1 Troubleshooting

This section contains information and procedures for solving possible problems with the N3 Plus inverters and provides you with troubleshooting tips to identify and solve most problems that could occur with the N3 Plus inverters.

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

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

Fault ID	Fault	Cause	Solutions
001	HW Protect	Inverter over-current, battery over-current, or PV over-current detected by hardware.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
002	Grid Failure	1. Utility grid power fails. 2. The AC cable is disconnected, or the AC breaker is off.	1. The alarm is automatically cleared after the grid power supply is restored. 2. Check whether the AC cable is connected and the AC breaker is on.
003	Grid Volt Fault	1. The grid voltage exceeds the permissible range, or the duration of high voltage exceeds the requirement of HVRT. 2. The grid voltage is lower than the permissible range, or the duration of low voltage exceeds the requirement of LVRT.	1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid voltage is within the permissible range.

Fault ID	Fault	Cause	Solutions
004	Grid Freq Fault	1. Utility grid exception. The actual grid frequency exceeds the requirement of the local grid standard. 2. Utility grid exception. The actual grid frequency is lower than the requirement of the local grid standard.	1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid frequency is within the permissible range.
005	PV-V Fault	PV voltage out of range.	Check the serial connection of the PV array. Make sure that the open circuit voltage of the PV string is not higher than the maximum operating voltage of the inverter.
006	Bus Volt Fault	Bus voltage out of range detected by hardware.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
007	Bat Volt Fault	Battery voltage fault.	Check if the battery input voltage is within the normal range, then restart the system and confirm whether the fault persists.
008	Grid 10-min OV	The grid voltage is out of range for the last 10 Minutes.	1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid voltage is within the allowed range. • Contact the local power company if the grid voltage exceeds the permissible range. • Modify the grid overvoltage rapid protection threshold after obtaining the consent of the local power company if the grid voltage is within the permissible range.
009	DCI OCP	DC component is out of limit in output current.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.

Fault ID	Fault	Cause	Solutions
012	RC OCP	The residual current is high.	1. If the problem occurs occasionally, it may be caused by a cable exception. The inverter will recover automatically after the problem is solved. 2. Check whether the impedance between the PV string and PE is too low if the problem occurs frequently or persists.
013	Iso Check Fault	1. The PV string is short-circuited to PE. 2. The PV system is in a moist environment and the cable is not well insulated to the ground.	1. Check whether the resistance of the PV string to PE exceeds 50kΩ. If no, check the short circuit point. 2. Check whether the PE cable is connected correctly.
014	Over TEMP Fault	The inverter temperature is high.	Check the ventilation and the ambient temperature at the installation point. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation.
015	BMS DC Reverse	The battery connection is reversed.	1. Check if the positive pole and negative pole of battery are correctly connected. 2. Contact the dealer or the after-sales service if the problem persists.
016	Sample Fault	The sampling value between the main and slave DSP is inconsistent.	
017	Eps Overload	EPS over load.	1. Check the EPS load to ensure it does not exceed the inverter EPS Rated Power. 2. Disconnect the AC output switch and DC input switch & battery switch, then connect them 5 minutes later.
018	Over Load Fault	Over load in on grid mode.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
019	PV ConnDir Fault	PV connection setting is wrong.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
020	Bat Low Fault	Battery SOC is too Low.	1. Wait the battery to be recharged. 2. Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.
023	Ground Fault	Inverter grounding issue.	1. Check whether the PE cable of the inverter is connected properly. 2. Check whether the L cable and N cable are connected reversely if output of the PV string is grounded.

Fault ID	Fault	Cause	Solutions
024	BMS COM Fault	The communication between BMS and Inverter is interrupted.	Check if the communication cable between BMS and inverter is connected correctly.
025	M/S COM Fault	The communication between master and slave is fault.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
026	EXT Fan Fault	External fan Device failure.	
027	HCT Dev Fault	AD sampling failure.	
028	Inv EEPROM Fault	DSP EEPROM failure.	
029	RCD Fault	Leakage current detection circuit fault.	
031	Grid Relay Fault	1. The relay is abnormal or short-circuited. 2. The control circuit is abnormal. 3. The AC cable connection is abnormal, like a virtual connection or short circuit.	
032	Other Dev Fault	Other device fault.	
033	Eps OCP Fault	EPS over current.	1. Check the EPS load to ensure it does not exceed the inverter EPS Rated current. 2. Disconnect the AC output switch and DC input switch & battery switch, then connect them 5 minutes later.
035	Inv OCP Fault	Invert cover-current fault.	1. Check whether the inverter grid is normal. 2. If the power grid is normal and the inverter still fails, restart the inverter. 3. Contact the dealer or the after-sales service if the problem persists.
036	PV OCP Fault	PV input cover-current fault.	1. Check whether the inverter PV connection is normal, and whether PV+, PV- is reversed. 2. If the PV connection is normal and the inverter still fails, restart the inverter. 3. Contact the dealer or the after-sales service if the problem persists.
037	Bat OCP Fault	Battery cover-current fault.	1. Check whether the power cable connection from the battery to the inverter is normal. 2. If the power cable connection is normal and the inverter still fails, restart the inverter. 3. Contact the dealer or the after-sales service if the problem persists.

Fault ID	Fault	Cause	Solutions
038	Inv Relay Fault	1. The relay is abnormal or short-circuited. 2. The control circuit is abnormal. 3. The AC cable connection is abnormal, like a virtual connection or short circuit.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
057	PLL Overtime	PLL Error.	
061	Parallel Fault	Inverter parallel connection fault.	1. Check if the parallel wiring is correct. 2. Check the inverter setting, ensure that only one inverter was set to "Master".
097	HMI EEPROM Fault	HMI eeprom failure.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
098	Meter1 COM Fault	The communication between smart meter1 and Inverter is interrupted.	1. Check if the communication cable between smart meter and Inverter is connected correctly. 2. Check if the smart meter is powered on.
099	H/M COM Fault	The communication is fail between ARM and master DSP.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
100	Meter2 COM Fault	The communication between smart meter2 and Inverter is interrupted.	1. Check if the communication cable between smart meter and Inverter is connected correctly. 2. Check if the smart meter is powered on.
101	Meter3 COM Fault	The communication between smart meter3 and Inverter is interrupted.	
114	BMS TEMP Fault	Battery temperature sensor fault.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
115	BMS InCom Fault	Battery internal communication fault.	Disconnect battery, check wiring between inverter and battery, battery internal wiring then reconnect.

Fault ID	Fault	Cause	Solutions
117	BMS PreChg Fault	Battery pre charge fault.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
118	BMS Relay Fault	The battery relay is fault.	
120	BMS CMU Adrress	Communication failure between battery modules.	1. Check if the connection between the battery master controller and rechargeable li-ion battery stack is abnormal, if abnormal try to reconnect it. 2. If the connection between the battery master controller and rechargeable li-ion battery stack is normal and the inverter still fails, restart the inverter. 3. Contact the dealer or the after-sales service if the problem persists.
121	BMS Volt Fault	Battery voltage sensor fault.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
122	BMS OutCOM Fault	BMS external communication fault.	
123	BMS ISO Fault	Battery insulation test failed.	
124	BMS Check Fault	Battery self-test failed.	
125	BMS AFE Fault	Internal battery sampling failure.	
126	CMU SW Ver. diff	Inconsistent software version failure between rechargeable li-ion battery stacks.	1. Check whether the software version of each rechargeable li-ion battery stack is the same, if not, update to the same software version. 2. If the software version is same, contact the dealer or the after-sales service if the problem persists.
129	BMS UV	Battery under voltage protection.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
130	BMS OV	Battery over voltage protection.	
133	BMS TEMP Low	Battery temperature is too low when charging.	
134	BMS TEMP High	Battery temperature is too high when charging.	
135	BMS TEMP Low	Battery temperature is too low when discharging.	
136	BMS TEMP High	Battery temperature is too high when discharging.	
137	BMS Charge OC	Battery over current charging protection.	
138	BMS Discharge OC	Battery over current discharging protection.	

Fault ID	Fault	Cause	Solutions
139	BMS Prot TemDiff	The difference in battery cell temperature is too large.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
140	BMS Prot AD-AFE	The difference between the total voltage of battery AD and AFE is too large, triggering protection.	
141	BMS Prot Hard OC	Battery hardware overcurrent protection.	
142	SOH degradation	Cell aging, prohibited to use.	
143	REPT PROT	Repeated protect within a short time.	

Remark

If you find the inverter has serious problems, including but not limited to the above content, please call Renac dealer or the after-sales service. Please provide the following information to www.renacpower.com for better service.

(1) Customer Name

(2) Contact Info

(3) Project Name and Location

(4) Project Scale

(5) Quantity of Faulty Inverters

(6) Problem Description

(7) Inverter Model

(8) Inverter SN

9.2 Maintenance

Item	LCD display	Period
System clean	Check the temperature and dust of the inverter. Clean the inverter enclosure if necessary. Check if the air inlet and outlet are normal, Clean the air inlet and outlet if necessary	Six months to a year (- depend on the dust contents in air.)
Cable entry	Check whether the cable entry is insufficiently sealed or the gap is excessively large, and reseal the entry when necessary!	Once a year
Electrical Connection	Check whether all cable are firmly in place. Check whether a cable is damaged, especially the part contacting the metal enclosure.	Six months to a year
Fans	Check whether there is an abnormal noise when the fan rotates. Clean or replace the fan if necessary (see the following sections)	Once a year

Maintenance Instruction

Cleaning Air Inlet and Outlet

A huge amount of heat is generated in the process of running the hybrid inverter. The inverter adapts a controlled forced-air cooling method. In order to maintain good ventilation, please check to make sure the air inlet and outlet are not blocked. Clean the air inlet and outlet with soft brush or vacuum cleaner if necessary.

The fans inside the hybrid inverter are used to cool the hybrid inverter during operation. If the fans do not operate properly, the hybrid inverter may not be able to cool, and the efficiency of the hybrid inverter may be reduced. Therefore, it is necessary to clean the dirty fans in time and replace the bad fans.

Remove the fans:

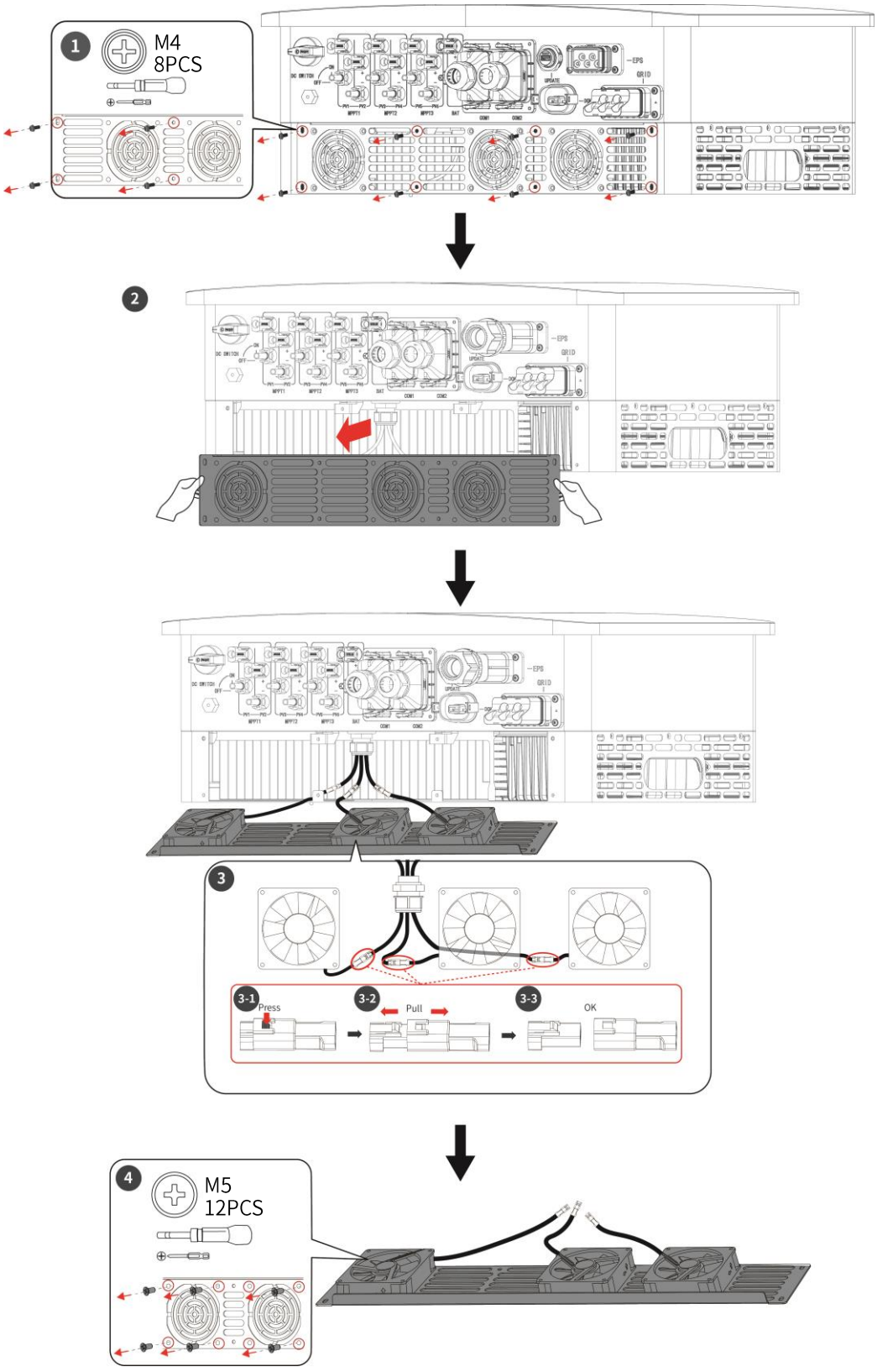


Figure 9-1 Remove the fans of N3 Plus (25K ~ 30K)

Install the fans:

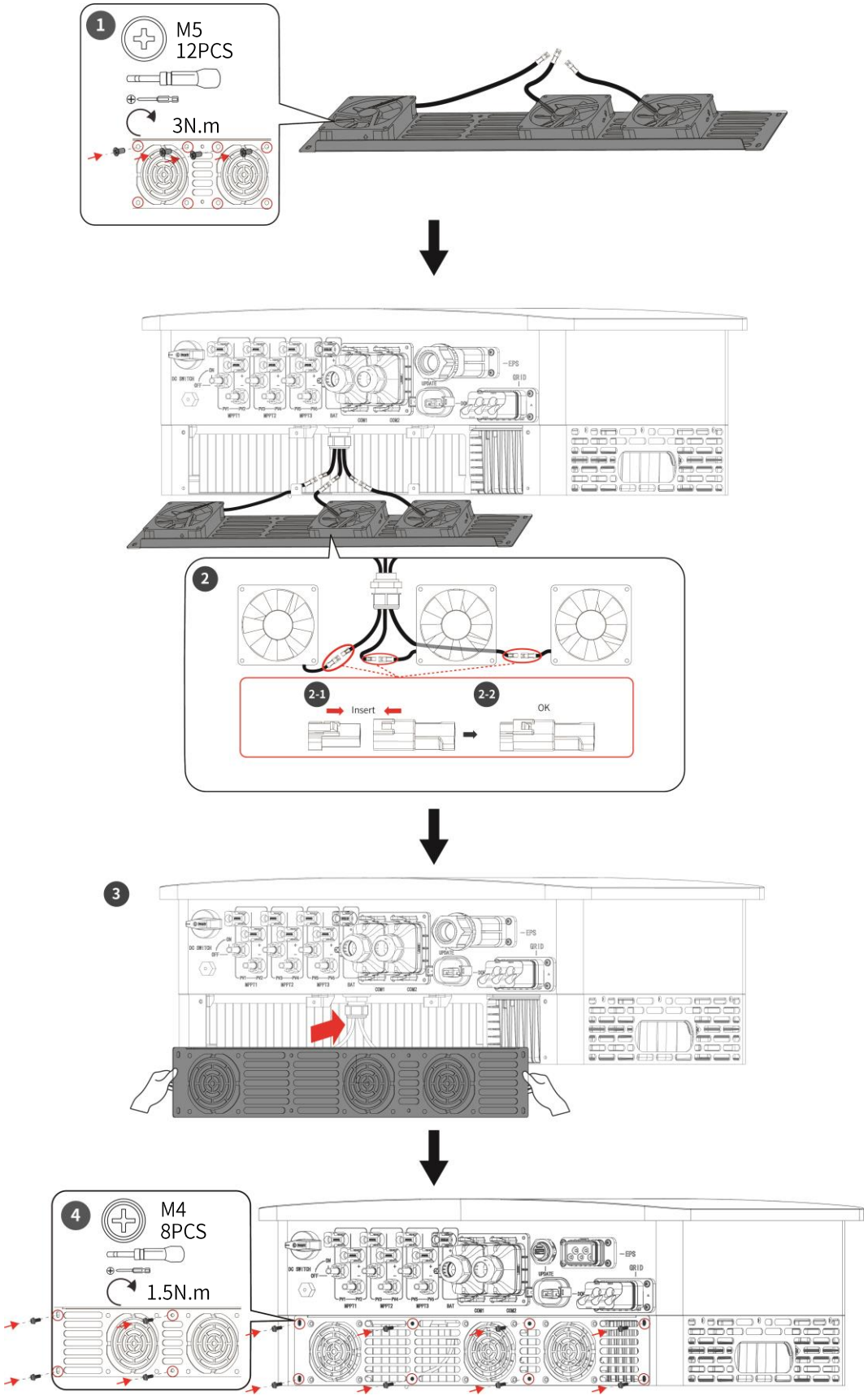


Figure 9-2 Install the fans of N3 Plus (25K ~ 30K)

10. Decommissioning

10.1 Dismantling

- Disconnect the inverter from DC input and AC output.
- Disconnect battery wiring.
- Wait for 5 minutes for de-energizing.
- Disconnect communication and optional connection wiring.
- Remove the inverter from the bracket.

10.2 Packing

If possible, please pack the inverter in the original packaging.

If it is no longer available, you can also use an equivalent carton that meets the following requirements.

- Suitable for loads more than 48kg.
- With handle.
- Can be fully closed.

10.3 Storage

Store the inverter in dry place where ambient temperatures are always between -20 °C - +60 °C.

10.4 Maintenance

Inverters generally do not need any daily or routine maintenance. Heat sink should not be blocked by dust, dirt or any other items. Before the cleaning, make sure that the DC SWITCH is turned OFF and the circuit breaker between inverter and electrical grid is turned OFF. Wait at least for 5 minutes before the Cleaning.

- Check that if the cooling fins on the rear are covered by dirt, if yes, fins should be cleaned. This shall be done at regular intervals.
- Check whether the indicators of the inverter are in normal state, check whether the keys of the inverter buttons are in normal state, check whether the display of the inverter is normal. These checks should be performed at least every 6 months.
- Check the input and output wires for damages or aging. This check should be performed at least every 6 months.
- You should keep the inverter panels clean and their security checked at least every 6 months.

10.5 Disposal

When the inverter or other related components need to be disposed, have it carried out according to local waste handling regulations. For safe disposal, take inverter to appropriate waste recycling center in your local area.

User Manual Download URL www.renacpower.com

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