N1-HV
Series

User Manual

N1-HV-3.0
N1-HV-3.68
N1-HV-5.0
N1-HV-6.0

RENAC

Content

Notice

This manual contains important safety instructions that must be followed during installation and maintenance of the equipment.

Save the manual!

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

Copyright Declaration

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1 About this manual

1.1 Applicability

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

N1-HV-3.0   **N1-HV-3.68**   **N1-HV-5.0**   **N1-HV-6.0**

1.2 Target group

This manual is intended for qualified electrical engineers / technicians responsible for installation and commissioning of the hybrid inverter.

1.3 Symbols used

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

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

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 energy, 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	**CAUTION!** ◆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.
👉	**NOTE!** ◆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.

2.3 Explanation of symbols

Symbols on the Type Label:

Symbol	Explanation
TÜV Rheinland CERTIFIED (Type Approved Safety Regular Production Surveillance, www.tuv.com ID 2000000000)	TÜV mark
CE	CE mark. The inverter complies with requirements of applicable CE guide-lines.
(hot surface warning triangle)	Beware of hot surface. The inverter can be hot during operation. Avoid touching during operation.
(high voltage warning triangle)	Danger of high voltage. Danger to life due to high voltage in the inverter!
(general warning triangle)	Danger. Risk of electric shock!
(crossed-out wheelie bin)	Inverter should not be disposed of with the household waste. Disposal information can be found in this manual.
(no entry / do not touch)	Don't work on this inverter until it is isolated from battery, mains supply and on-site PV modules.
(high voltage / 5 min)	Danger to life due to high voltage. Inverter holds stored energy, wait for 5 minutes to discharge before opening lid.
(read manual)	Please read this manual before installation.
(RCM mark)	RCM (Regulatory Compliance Mark) The product meets the requirements of the applicable Australian standards.

3. Introduction

3.1 Electrical system design
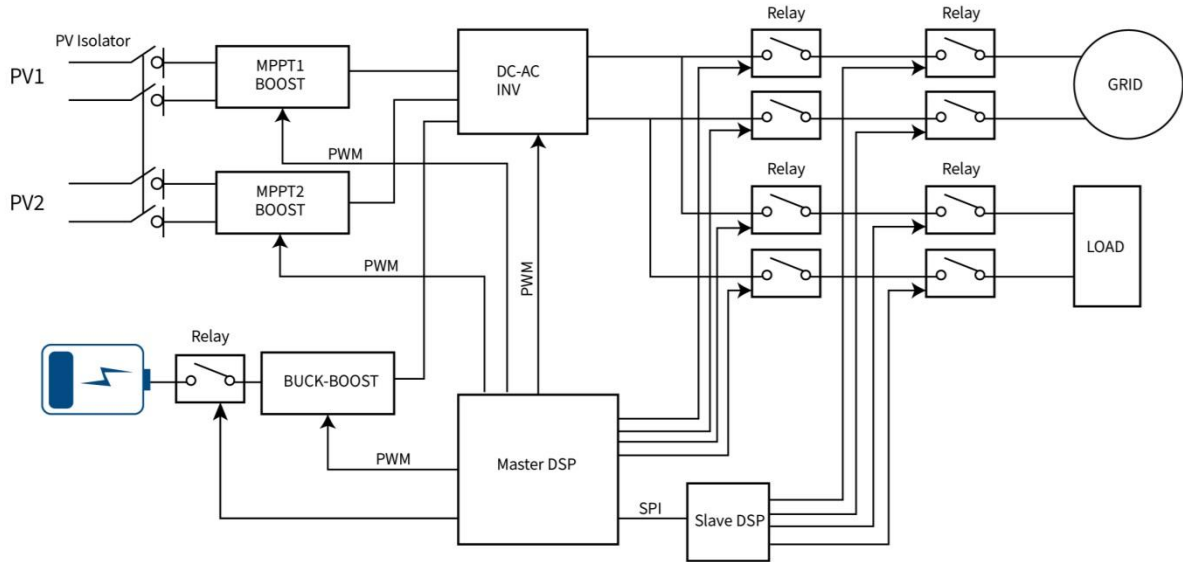
Figure 3-1 Wiring diagram of the hybrid inverter system

3.2 Basic features

The N1-HV series hybrid inverters are developed for PV energy storage system with PV module, battery, loads and grid.

Energy produced by PV system shall be used to optimize self-consumption (on site consumption), surplus production will charge battery and the rest power would be fed to the grid. Battery shall be discharged to support loads when PV power is insufficient to meet self-consumption. If both PV power and battery power is insufficient, the system will take power from grid to support loads.
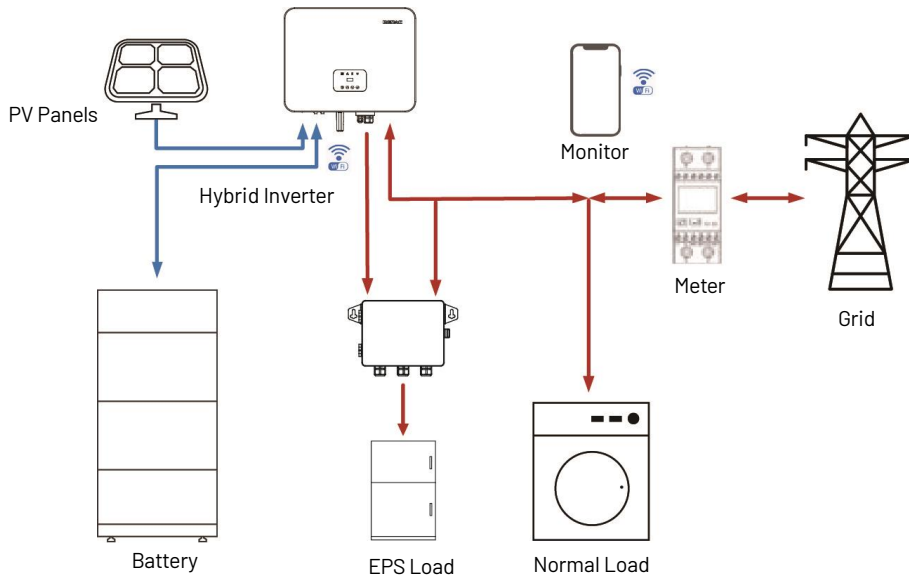
Figure 3-2 Use of Hybrid Inverters

3.3 Work modes

The N1-HV Series hybrid inverter has the following work modes based on the configuration and connected equipment.

Work mode: Self Use

This mode is applicable to areas with low subsidies and high electricity prices. Self-consumption of PV renewable energy is the highest priority. Excess PV generation is used to charge batteries, and then feed back into the grid.

a. When the PV power is sufficient, PV power will supply the following sequence:
Priority: Load -> Battery -> Grid

b. When the PV power is insufficient, the battery will discharge to supply loads, and the grid will join in if the battery power is not enough.
Priority: PV power -> Battery -> Grid
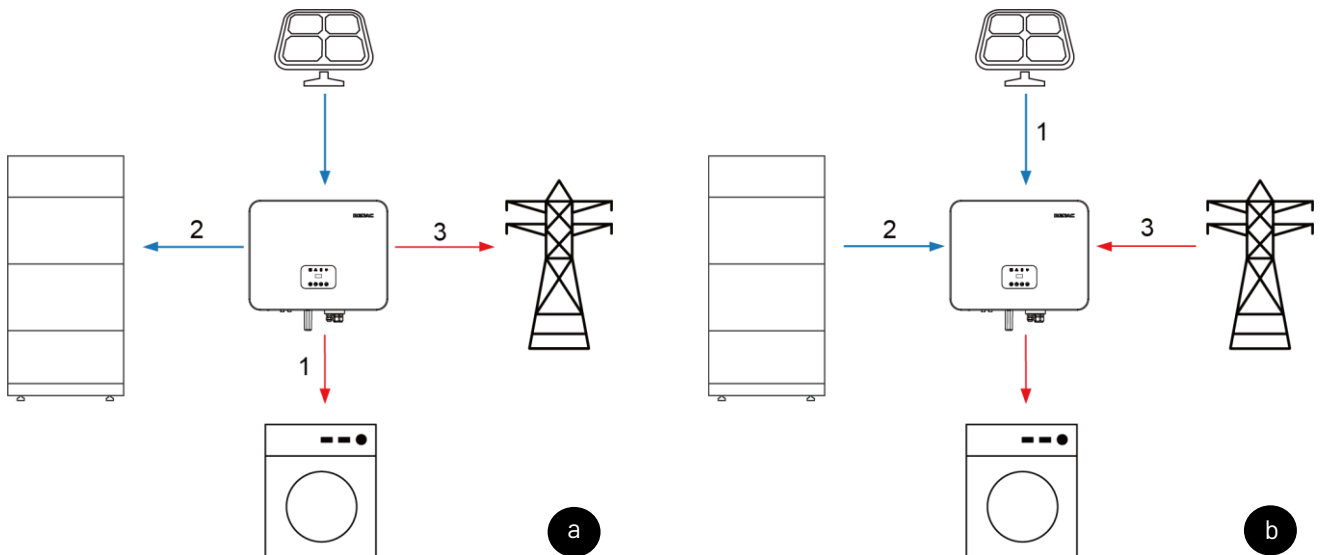
Figure 3-3 Self Use Mode

Work mode: Time of Use

Applicable to the areas with large gaps between peak and valley electricity prices. Users can set time-based schedules to charge the battery by App or inverter display.

a. During charging time period inverter will use the power from PV or grid to charge the battery.
Priority: Battery -> Load

b. Outside the charging time period inverter will work in self use mode. Using the power from PV and battery to supply loads and the insufficient part will be supplied by the grid.
Priority: PV power -> Battery -> Grid
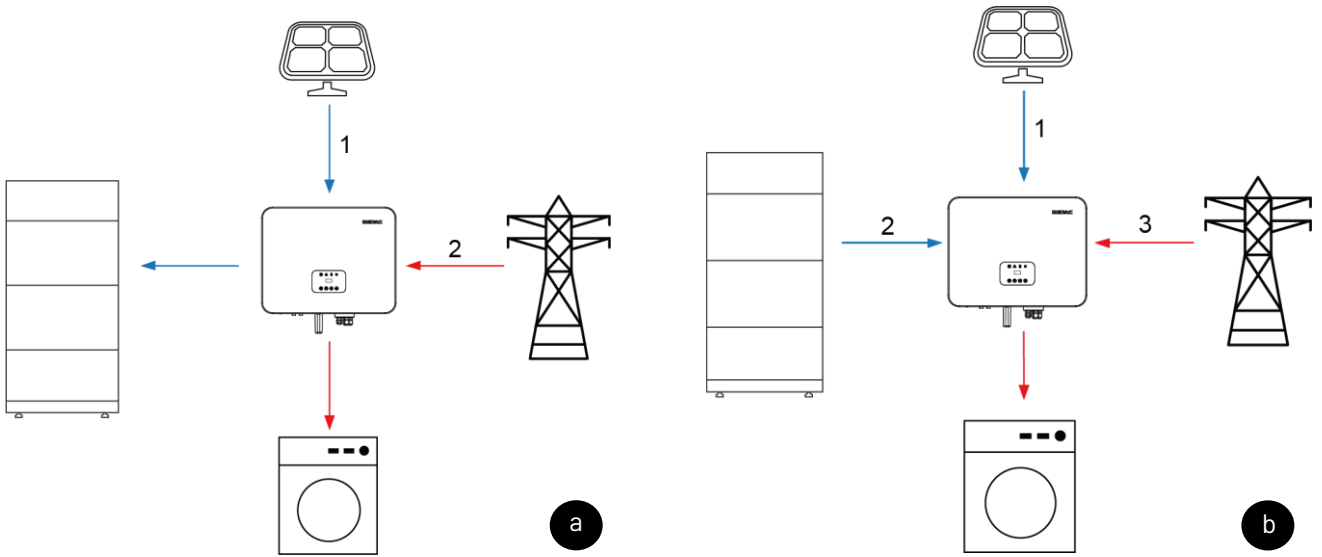
Figure 3-4 Time of Use Mode

Work mode: Backup Use

It is suitable for the 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 will have enough energy to supply loads during a grid outage. PV and battery could support the backup load in the event of a blackout.

a. When grid is on, the battery will be in charging state and will not be discharged.

Priority: Battery -> Load

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

Priority: PV power -> Battery
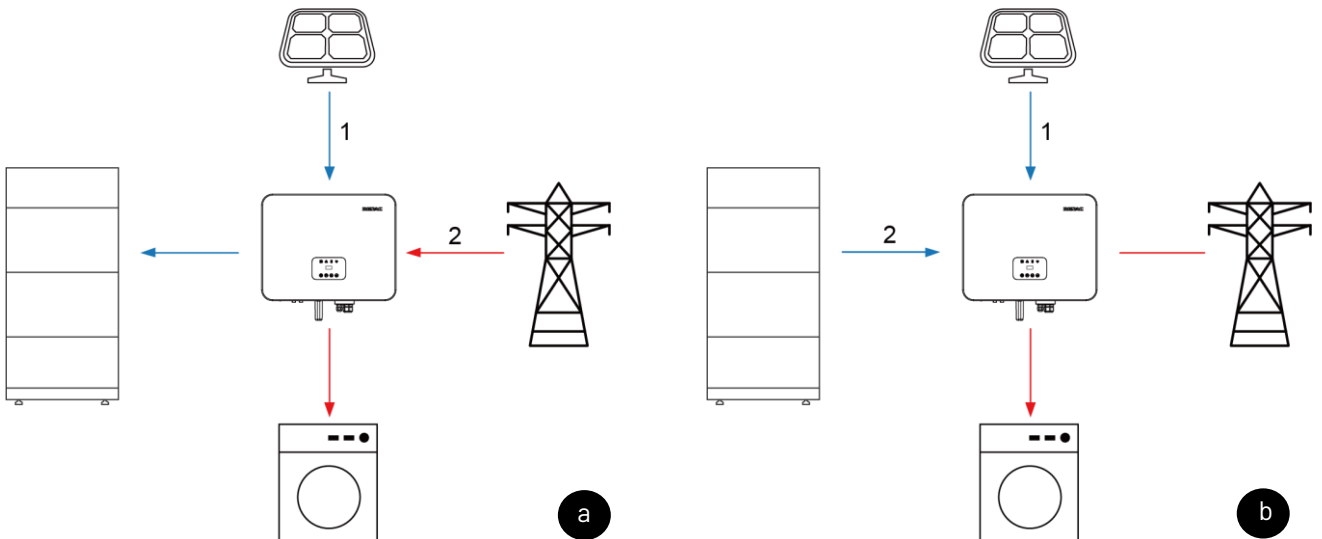
Figure 3-5 Backup Mode

Work mode: Feed in Use

This mode applies to the area 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 generation will supply load first, then feed into grid, and the excess power will charge the battery last.

Priority: Load -> Grid -> Battery

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

Priority: PV power -> Battery -> Grid
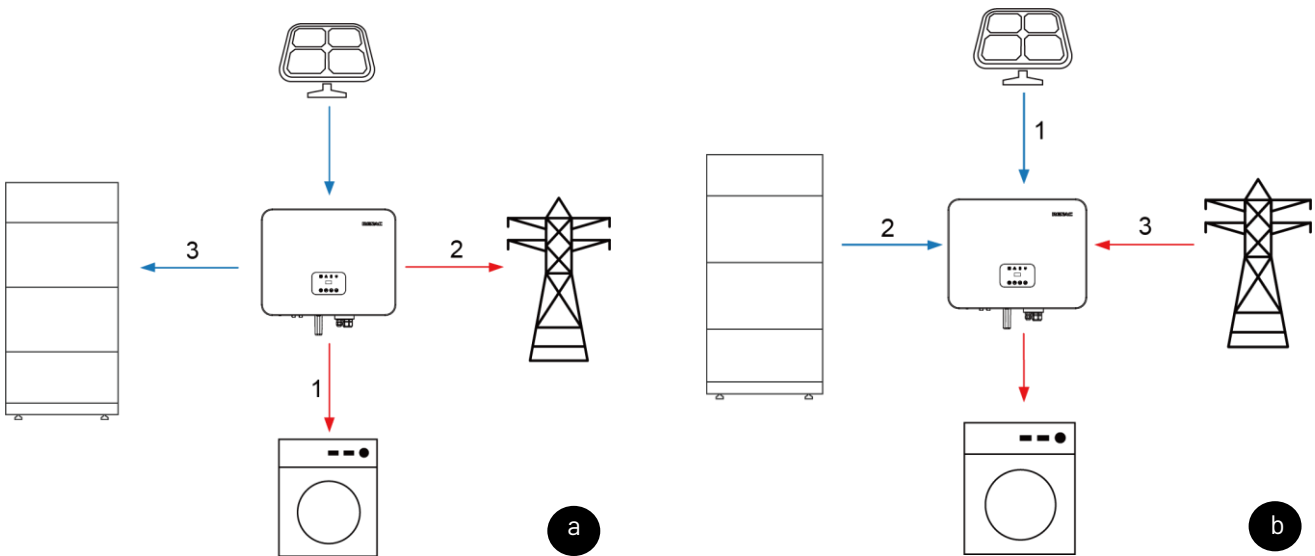
Figure 3-6 Feed in Use Mode

	WARNING!
	Make sure that the total load power is within the EPS's output power rating. Otherwise the inverter will shut down with an 'over load' warning.
	When an 'over load' warning appears, reduce load to be with in power rating of the EPS and restart inverter.
	For non-linear load, please pay attention to the inrush power to make sure that it is within the range of the EPS output.

3.3 Terminals

The N1-HV series hybrid inverters are designed to work with PV energy storage system with PV module, battery, loads and grid. Energy produced by PV system shall be used to optimize self-consumption, excess power used to charge battery and surplus power could be fed into the grid. Battery shall be discharged to support loads when PV power is insufficient to meet self-consumption. If both PV power and battery power are insufficient, the system will take power from grid to support loads.
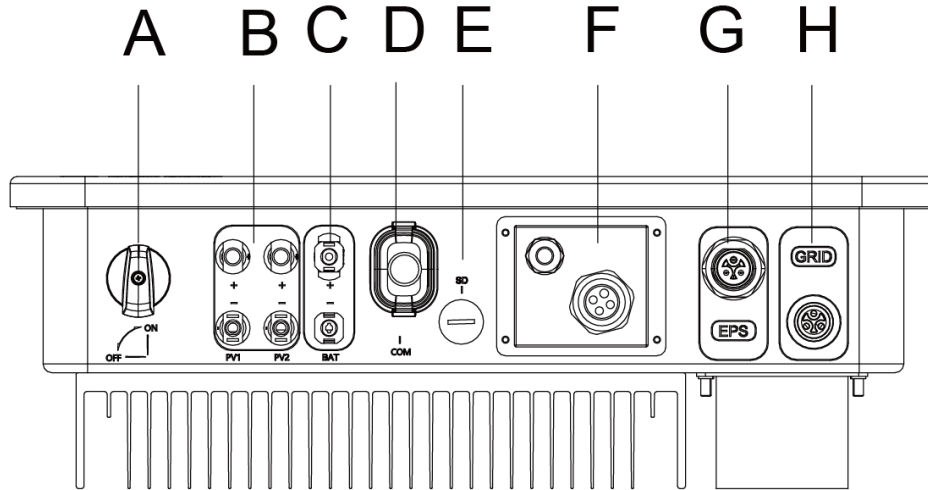
Figure 3-7 Terminals of the inverter

Object	Description	Object	Description
A	DC switch	E	SD port
B	PV connector	F	Communication port
C	Battery connector	G	EPS port
D	WIFI or 4G or Ethernet port	H	AC port

Note: The DC switch is used to isolate PV strings.

3.4 Dimensions
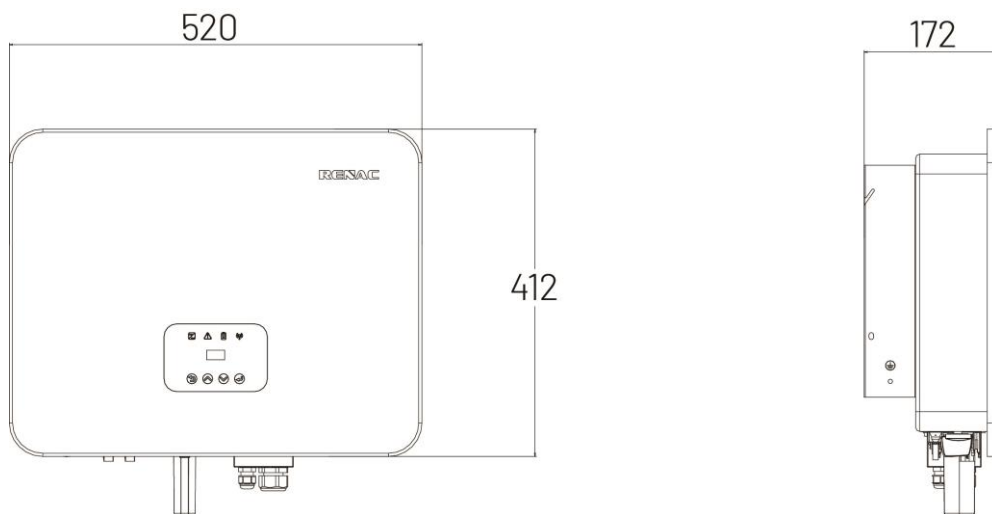
Figure 3-8 Product Size

4. Technical data

Model	N1-HV-3.0	N1-HV-3.68	N1-HV-5.0	N1-HV-6.0
PV Input Data				
Max. Recommended PV Power (W)	4500	5500	7500	9000
Max. DC Input Voltage (V)	600			
MPPT Voltage Range (V)	120 ~ 550			
Rated DC input voltage (V)	360			
Start-up Voltage	150			
No. of MPP Trackers	2			
No. of Input Strings per Tracker	1			
Max. DC Input Current (A)	13.5 / 13.5			
Max. short circuit current (A)	17 / 17			
Backfeed Current to array (A)	0			
DC Switch	Integrated			
AC Output Data (on-grid)				
Rated AC Power (W)	3000	3680	5000[1]	6000
Rated Apparent Power (VA)	3000	3680	5000[1]	6000
Rated.AC Current (A)	13	16	21.7[1]	26.1
Max.AC Current (A)	13	16	21.7[1]	26.1
Rated AC Voltage/Range (V)	220 / 230 / 240; 160 – 290			
Grid Frequency/Range (Hz)	50 / 60; $\pm$5			
Adjustable Power Factor[cos ϕ]	0.8leading ~ 0.8lagging			
Output THDi (@Rated Output) (%)	< 2			
AC Inrush Current(A)	35			
AC Maximum Output Fault Current (A)	80			
Output DC (Battery)				
Battery Type	Lithium			
Battery Voltage Range (V)	80 – 450			
Normal Battery Voltage (V)	384			
Max. Charging / Discharging Current (A)	25			
Max. Charging / Discharging Power (W)	4500 / 3000	5500 / 3680	6000 / 5000	6000 / 6000
Communication Interface	CAN			
EPS Output (With Battery)				
EPS Rated Power (W)	3000	3680	5000	6000
EPS Rated Voltage (V)	220 / 230			
EPS Rated Frequency (Hz)	50 / 60			
EPS Rated current (A)	13	16	21.7	26.1
Output THDi (@Rated Output) (%)	< 3			
Automatic Switch Time (s)	< 0.5			
Peak Apparent Power, Duration [VA, s]	3600, 600	4416, 600	6000, 600	7200, 600

Model	N1-HV-3.0	N1-HV-3.68	N1-HV-5.0	N1-HV-6.0
Efficiency				
Max. Efficiency (%)	97.42	97.45	97.50	97.50
Euro Efficiency (%)	97.15	97.17	97.20	97.20
MPPT Efficiency (%)	99.90	99.90	99.90	99.90
Max. Battery Discharge Efficiency (%)	97.15	97.17	97.20	97.20
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 III)			
AC Surge Protection	Integrated(Type III)			
General Data				
Size (Width*Height*Depth mm)	520 * 412 * 172			
Weight (kg)	20			
User Interface	LED + OLED			
Communication	RS485 and USB (Standard), WIFI or 4G or Ethernet (Optional)			
Operating Temperature Range (℃)	-30 ~ 60			
Relative Humidity (%)	0 ~ 100			
Operating Altitude (m)	⩽ 2000			
Standby Self Consumption (W)	< 15			
Topology	Transformerless			
Cooling	Natural			
Enclosure	IP65			
Protective Class	I			
Overvoltage Category	III(Mains) II(DC)			
Warranty	5 / 7 / 10 years			
Certifications & Standards				
Grid Regulation	AS 4777, EN 50549-1, EN 50549-PL, EN 50549-GR, IEC 61727, CEI 0-21, IEC 62116, C10/C11, VDE0126, ORDINANCE 140			
Safety Regulation	IEC 62109-1, IEC 62109-2			
EMC	EN/IEC 61000-6-1, EN/IEC 61000-6-3			

*1: The AC output power for VDE-AR-N 4105, VDE0126 and NRS097-2-1 are limited to 4600VA for AS/NZS 4777.2 is limited to 4999VA & 21.7A.

5. Installation

5.1 Unpacking

Check the delivery for completeness. Contact your dealer at once if anything is missing.

Figure 5-1 Packaging

Object	Quantity	Description
A	1	N1-HV inverter
B	1	Mounting Bracket
C	2	Battery Connectors (1* positive, 1*negative)
D	8	PV Connectors (2* positive, 2*negative) & PV Pin contact (2* positive, 2*negative)
E	1	AC Terminal
F	1	EPS Terminal
G	1	8P Pluggable Terminal Block
H	6	Tubular terminal
I	1	WIFI or 4G or Ethernet Module(Optional)
J	3	Ethernet RJ45 Connector
K	2	M5 Screw
L	1	Earth Terminal
M	4	Expansion tubes & Expansion screws
N	1	Energy Meter(Meter)
O	1	User Manual
P	1	Quality Certificate

Open the package and pick the product, check that if there is any distortion or impaired during the transportation. Meanwhile check that If the relating accessories and the materials are here, you can see the accessories list in the table.

The instruction manual is an integral part of the unit end should therefore be needed and kept carefully.

It is recommended that the packaging should not be removed until the unit is located in the installation site.

5.2 Checking for transport damage

Check if the N1-HV series inverter has any visible external damage such as cracks in the housing or display, if any damage is found, please contact with your Dealer immediately.

5.3 Installation precaution

The N1-HV inverter is designed for outdoor installation (IP65)

- Make sure that the installation does not fall into one of the following:
- Do not install inverter in direct sunlight.
- Do not install inverter on flammable construction material.
- Do not install inverter in areas where highly flammable materials are stored.
- Do not install inverter in potentially explosive areas.
- Do not install inverter during rain or high humidity (>95%); Moisture trapped within the inverter may cause corrosion and damage electric components.
- Provide adequate ventilation when using batteries, also read the warning label at the bottom of the inverter.
- Install inverter in a location that maintains ambient air temperature less than 40°C. This is to maintain safe internal component temperature; inverter would reduce power if ambient air temperature exceeds 40°C.
- The inverter should only be installed in locations that are not accessible to children.
- The inverter emits a slight vibration noise when operating, this is normal and will not affect performance.
- Tilt of mounting surface should be within $+5^{\circ}$.
- Please select a concrete wall with load-bearing capacity and a non-flammable surface for installation.
- Inverter is heavy, ensure the mounting surface is strong enough to take weight of the inverter.
- If inverter is installed in a cabinet, closet or other small enclosed areas, sufficient air circulation must be provided in order to dissipate heat generated by the unit.
- Please select a concrete wall with load-bearing capacity and non-flammable surface for installation.
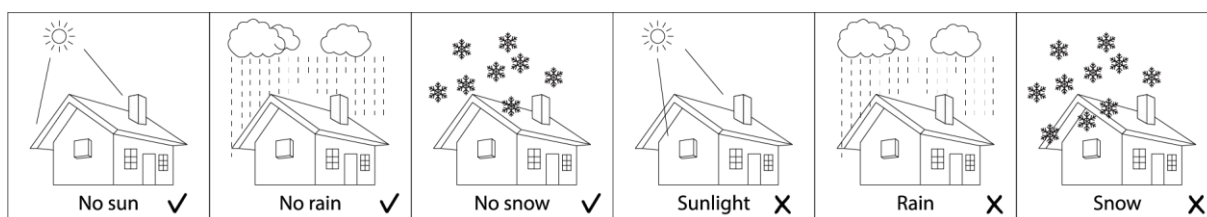
Figure 5-2 Recommended Installation Locations

5.4 Space requirement
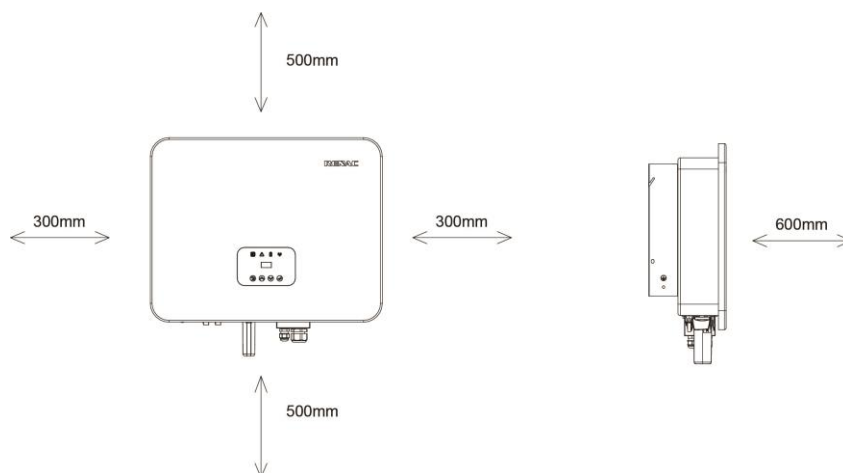
Figure 5-3 Minimum clearance required

5.5 Preparation

NO.	Tool	Model	Function
1		Sprit level	To ensure proper install
2		Two-Speed Hammer Drill	To drill holes on the wall
3		Hammer	Hanging the bracket
4		Impact Wrench Set	Hanging the bracket
5		PV-AZM-410	Stripping plier for PV cable
6		PV-CZM-22100	Crimping plier for PV cable
7		Screwdriver	Wiring

8		RJ45 Crimping Tool	Crimping tool for RJ45 terminal
9		Crimping plier	Crimping Tool For Insulated Electrical Connectors

Lifting and Handling

The unit is heavy. Do not lift it alone.

- During lifting procedures ensure that the unit is firmly secured to avoid the risk of accidental tipping or dropping.
- Parts serving for support or immobilization of unit shall be designed and manufactured so as to minimize the risk of physical injuries and of accidental loosening of fixing.
- Ensure that the method used for lifting would not allow the unit to slip from chains and slings or turn-over or slide from lifting devices.
- Transportation must be carried by qualified persons wearing necessary personal protection equipment.
- Avoid sudden movements and jolts when unloading and positioning the unit. Handling procedures must be conducted with care. Do not exert leverage on the components of the machine.
- If the unit is not balanced properly, use ballast.
- The inverter should be installed so that the operating panel is easily accessible and also ensure easy access to the electrical connection points.
- 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.

5.6 Installation steps

Step 1: Fix mounting bracket on suitable wall.

- Use the wall bracket as a template to mark the position of the 4 holes.
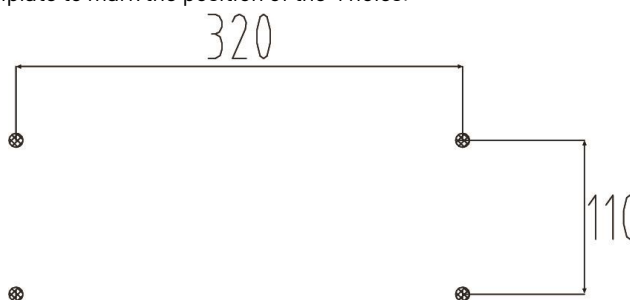
Figure 5-4 Inverter Wall Mounting

- Dill holes with φ10 drill carefully, make sure that holes are deep enough (at least 45mm) for installing grips.
- Install grips in the holes, and tighten. Install the wall bracket using the expansion screws provided in screw package.

Step2: Hang the N1-HV Inverter on the wall bracket.

- Lifting inverter needs at least 2 people, use handles provided at the sides of the inverter for lifting.
- To hang the inverter over the bracket, move the inverter close to the bracket, carefully lower the unit on to the bracket making sure the 4 mounting bars on the back of the inverter are fixed well with the 4 grooves on the bracket.
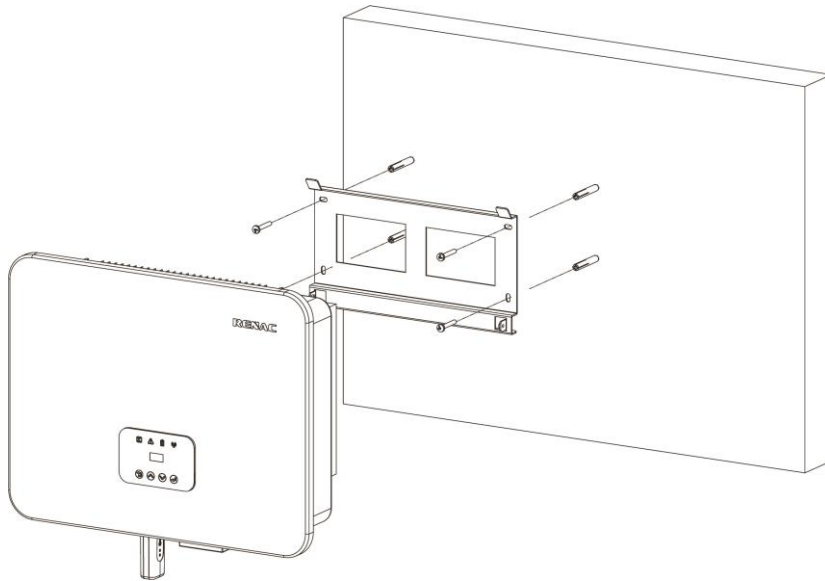
Figure 5-5 Wall Mount Bracket

5.7 Electrical Wiring Connection

For an overview of the connection terminals of inverter please refer to Fiqure3-7, and for wiring connections please refer to Figure 3-1 PV energy storage system wiring diagram in chapter 3.1.

System Connections Diagrams

Note: This diagram is an example for Australian, South Africa and New Zealand grid system where neutral line should not be switched.
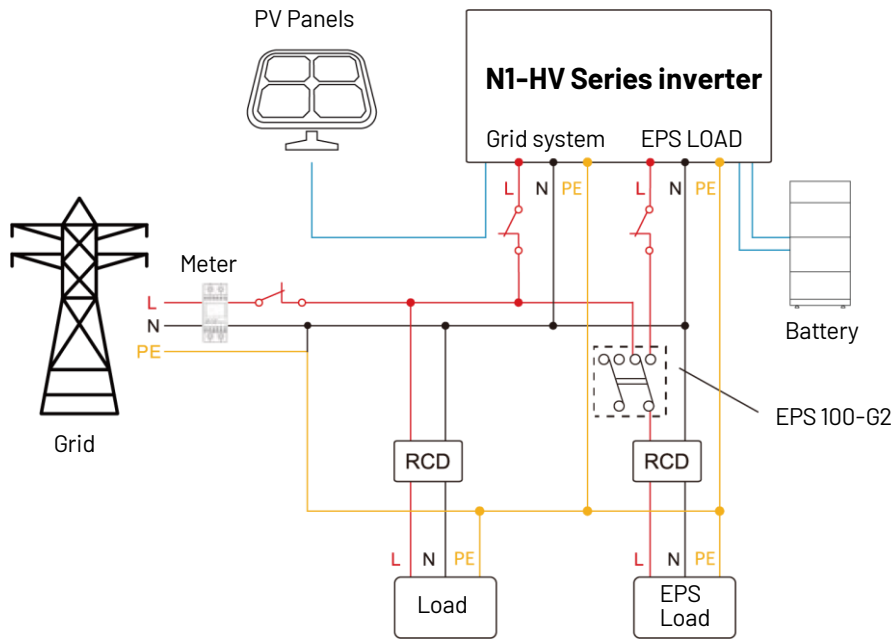
Figure 5-6

Note: This diagram is an example for grid system without special requirement on electrical wiring connection.
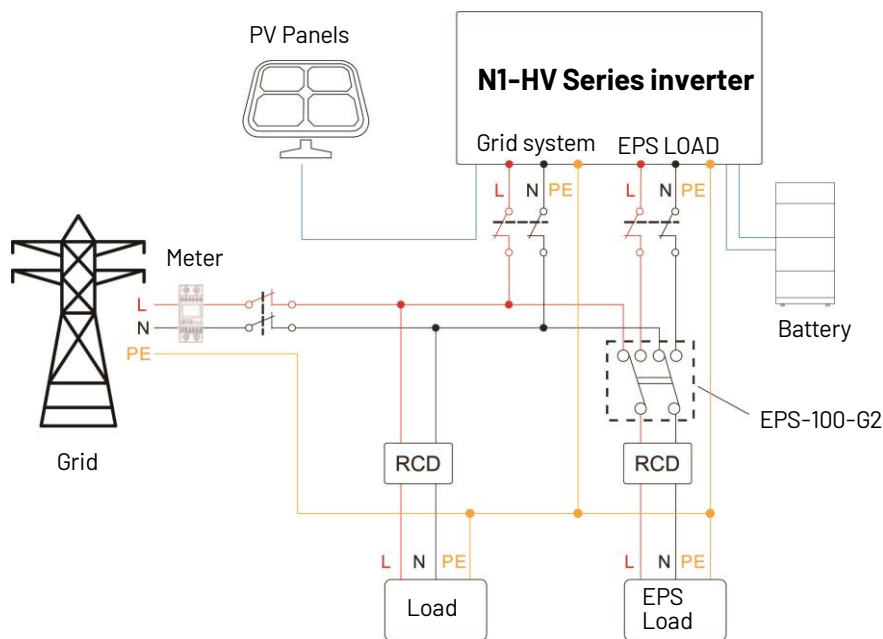
Figure 5-7

NOTICE	NOTICE! •The EPS Box is not included as part of the inverter. •Inverters have not been tested to AS/NZS 4777.2:2020 for multiple phase combinations.

The main steps to connect the N1-HV series system

• PV string connection
• AC output connection
• Battery connection
  • Battery power connection
  • Battery communication connection
• EPS connection
• Earth connection
• Communication connection

5.7.1 PV Wiring Connection

Before connecting PV strings to N1-HV series hybrid inverter, please make sure requirements are followed as bellow:

• The total short- circuit current of PV string must not exceed inverter's max DC current .
• Make sure open circuit voltage of PV string is less than 600V.
• PV strings could not connect to earth/grounding conductor.
• Use the right PV plugs in the accessory box. BAT plugs are similar with PV plugs, please confirm before use it.

Connection Steps:

1. Turn off the Dc switch.
2. Prepare 2.5-4mm^2 PV cable and PV plugs as below.

3. Strip 7mrn of the conductor with stripping plier. Use a suitable stripping tool for this (e.g."PY-AZM-410").

4. Insert striped cable into pin contact and ensure all conductor strands are captured in the pin contact.
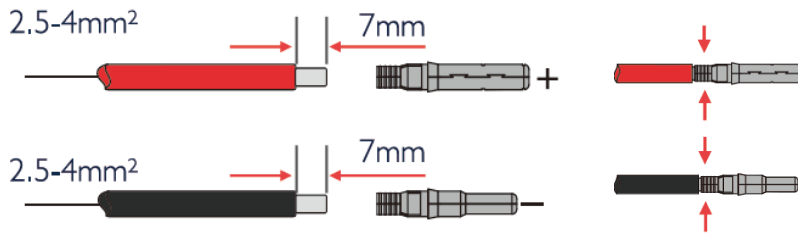
Figure 5-8

5. Crimp pin contact by using a crimping pliers (PV-CZM-22100). Place the pin contact with striped cable into the corresponding crimping pliers and crimp the contact.

6. Insert pin contact through the cable nut to assemble into back of the male or female plug. When one feels or hear a 'click sound the pin contact assembly is attached correctly.

7. To tightening the DC connector.

a. Slide the cable nut towards the back shell.

b. Rotate the cable nut to secure the cable.
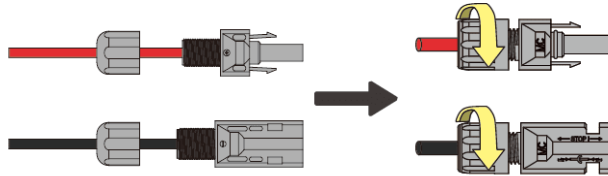
Figure 5-9

8. After securing the cable tightly, align the two half connectors and attach them together by hand until a 'click is felt or heard.

9. Separate the DC connectors.

a. Use the specified wrench tool.

b. When separating the DC+ connector, push tool down from upper side.

c. When separating the DC- connector, push tool down from the bottom rear side.

d. Separate the connectors by hands.

5.7.2 Battery Connection

When one wants to build a self-use storage system, the Power Box HV battery is a necessary part. The N1-HV Series inverter provides the necessary parts of the interface to connect the battery.

⚠	**WARNING!** Make sure to select cables of the correct specification for installation. Failure to do so could overheat or burn cable resulting in death or serious injury.

1. Battery Power Cable Connection

1) Select the tin-plated cables with a conductor cross section of 4 to 6 mm^2 (AWG 10).

2) Strip 15mm insulation off the conductor. Use a suitable stripping tool for this (example "Knipex Solar 121211").

3) Open the spring in the plug using a screwdriver (Figure 5-10)
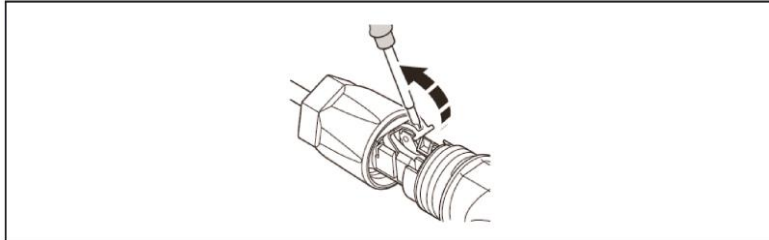
Figure 5-10

4) Carefully insert the stripped litz wires all the way in (Figure 5-11, A). The litz wire ends have to be visible in the spring.

5) Close the spring making sure that the spring is snapped in (Figure 5-11, B).
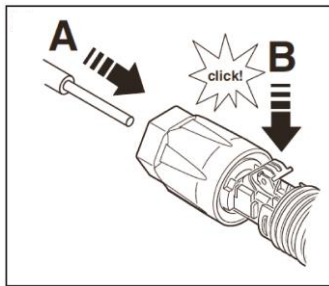
Figure 5-11

6. Push the insert into the sleeve (Figure 5-12, C).

7. Tighten the cable gland to 2 Nm (Figure 5-12, D). Use a suitable and calibrated torque wrench, size 15. Use an open-jaw wrench, size 16, to hold the connector in place.
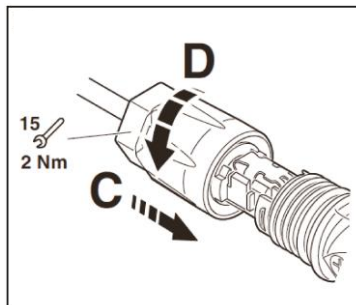
Figure 5-12

8. Fit the two connectors together until the connection audibly locks into place.

9. Check to make sure the connection is securely locked.

10. Separating connectors.

1) Insert the screwdriver into one of the four openings (Figure 5-13, A).

2) Leave the screwdriver in the opening. Pull the two connectors apart (Figure 5-13, B).
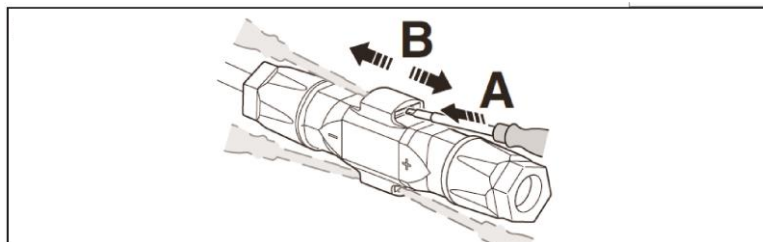
Figure 5-13

NOTE:

If resistance to earth of each conductor of the PV array and battery system is lower than, the inverter will report Earth Fault Alarm. Inverter complies with IEC 62109-2 clause 13.9 for earth fault alarm monitoring. If an Earth Fault Alarm occurs, the red light will be ON and ISO Check fault will be displayed on the LCD screen, and the fault can be found in the fault history. For Inverter with WIFI / GPRS, the alarm information can be seen on the corresponding monitoring website, and can also be received by the APP on the mobile phone.

```
===Error Logs===
01: ISO Check Fault
```
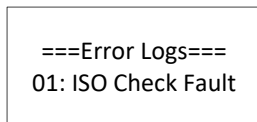
Figure 5-14

2. Battery Communication Connection

The communication interface between battery and inverter is CAN with a RJ45 connector. Pins definition is as below.
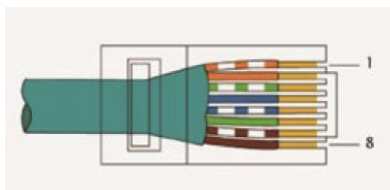
Figure 5-15

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

Overview for all battery connections
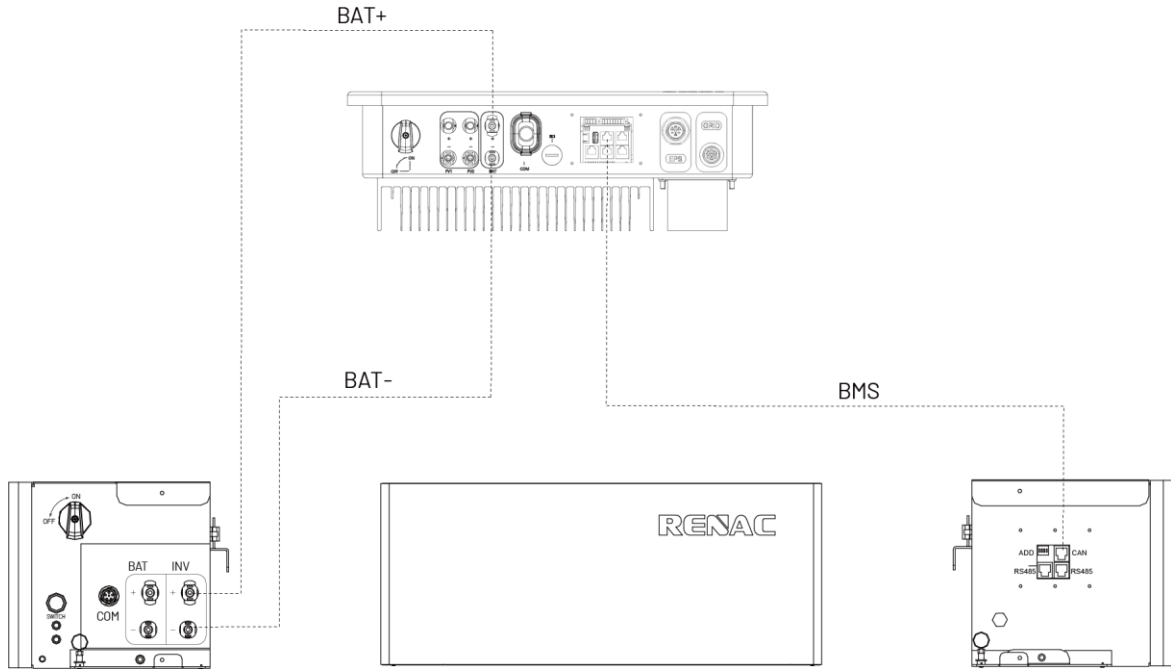
Figure 5-16

5.7.3 AC Output Connection

N1-HV series inverters have integrated RCMU (residual current monitoring unit) built inside the unit, however if an external RCD is required, a type A RCD with rated residual current of 100mA or higher is recommended.

There are two AC terminals and the assembly steps for both are identical, need to ensure that one is for 'Grid and the other for' EPS. The AC cable and micro-breaker specification for AC side of N1-HV series inverter as below.

Model	N1-HV-3.0	N1-HV-3.68	N1-HV-5.0	N1-HV-6.0
Cable (Cu)	4mm²	4mm²	6mm²	6mm²
Micro-Breaker	25A	25A	32A	32A

⚠️	**WARNING!**
	Make sure to select cables of correct specification cables for installation.
	Failure could over heat or burn cables resulting in death or serious injury.
	Do not connect the line (phase) to 'PE terminal'. Failure will result in incorrect operation

Connection Step:

1. Remove the cable jacket by 40 mm, and strip the wire insulation by about 10mm.
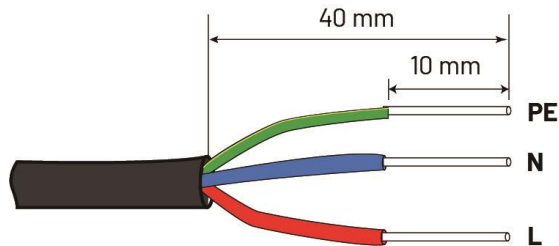
Figure 5-17

2. Lead the AC cable through the cable gland and the housing.
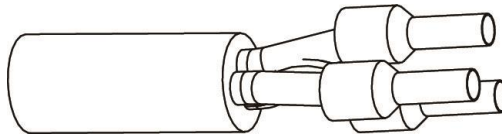
Figure 5-18

3. Fully insert the conductors to the corresponding terminal and tighten the screws with the torque 0.8 Nm. Pull cables outward to check whether they are firmly installed.

Figure 5-19

4. Assemble the housing, the terminal block and cable gland (torque 4 Nm-5 Nm). Make sure that the rib of the terminal block and the groove on the housing engage perfectly until a Click' is heard or felt.

Figure 5-20

5.7.4 Earth Connection

One can additionally earth the inverter enclosure of a second earthing or equipotential bonding is required under local regulations. This prevents touch current if the original protective conductor fails.
Cable size: 12AWG

Connection step:

*   Strip the earthing cable insulation.
*   Insert the stripped cable into the ring terminal.
*   Clamp the end of the ring terminal.
*   Unscrew the screw of the earthing connector.
*   Insert the ring terminal on the earthing connector .
*   Fix gasket on the earthing connector.
*   Tighten the screw of the earthing connector.
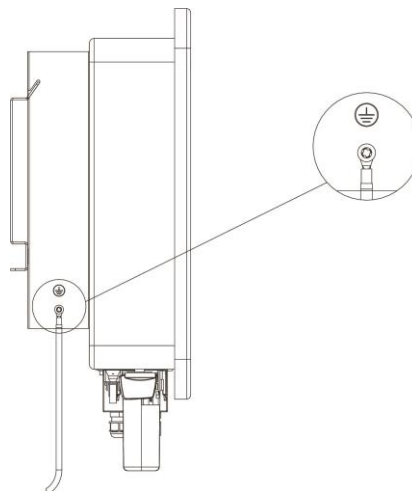
Figure 5-21

5.7.5 Communication connection

Communication interface

This product has a series communication interfaces besides WIFI or 4G or Ethernet (optional). Dry contact and extend port and for human and machine communication, etc., can be sent to a PC or other monitoring equipment via these interfaces.
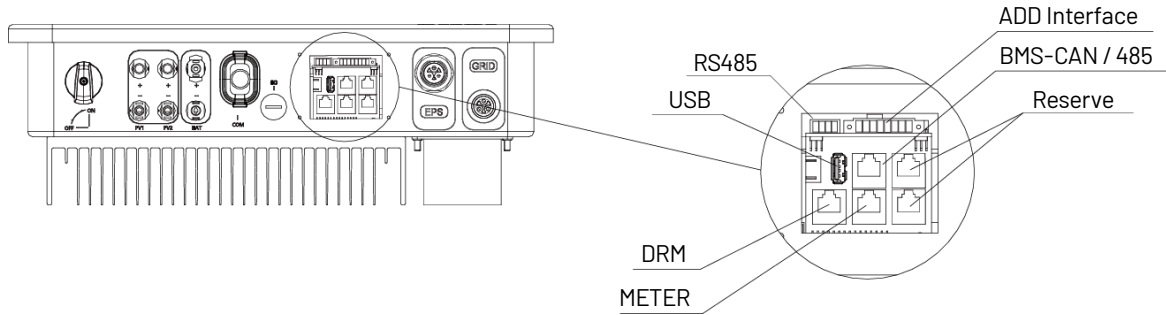
Figure 5-22

1. WIFI or 4G or Ethernet

For details please refer to the WIFI or 4G or Ethernet module user manual.

2. RS485 Interface

RS485 interface PINS definition:
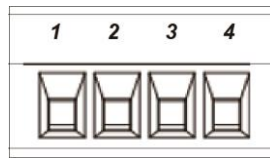
Figure 5-23

Pin	1	2	3	4
Function	+5V	GND	485A	485B

3. ADD Interface

ADD interface PINS definition:
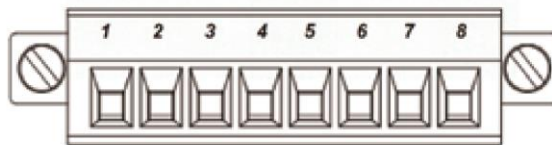
Figure 5-24

Pin	1	2	3	4	5	6	7	8
Function	METER-485A	METER-485B	GENA	GENB	+5V	SHUTDOWN	Temp	GND

Meter communication: METER_485A & METER_485B——pin1 & pin2

Relay contact output for generator: GENA & GENB——pin3 & pin4

Shut down the hybrid inverter: +5V & SHUTDOWN——pin5 & pin6

Temperature of Lead-acid battery Temp & GND——pin7 & pin8

4. METER port

Meter port PINS definition:
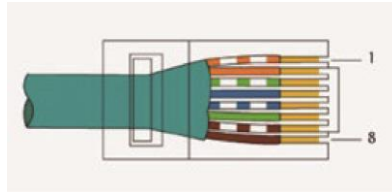
Figure 5-25

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

The function of meter port is the same as pins 1 & 2 of ADD interface.

4.1 Meter wiring diagram for Typical Energy Storage System
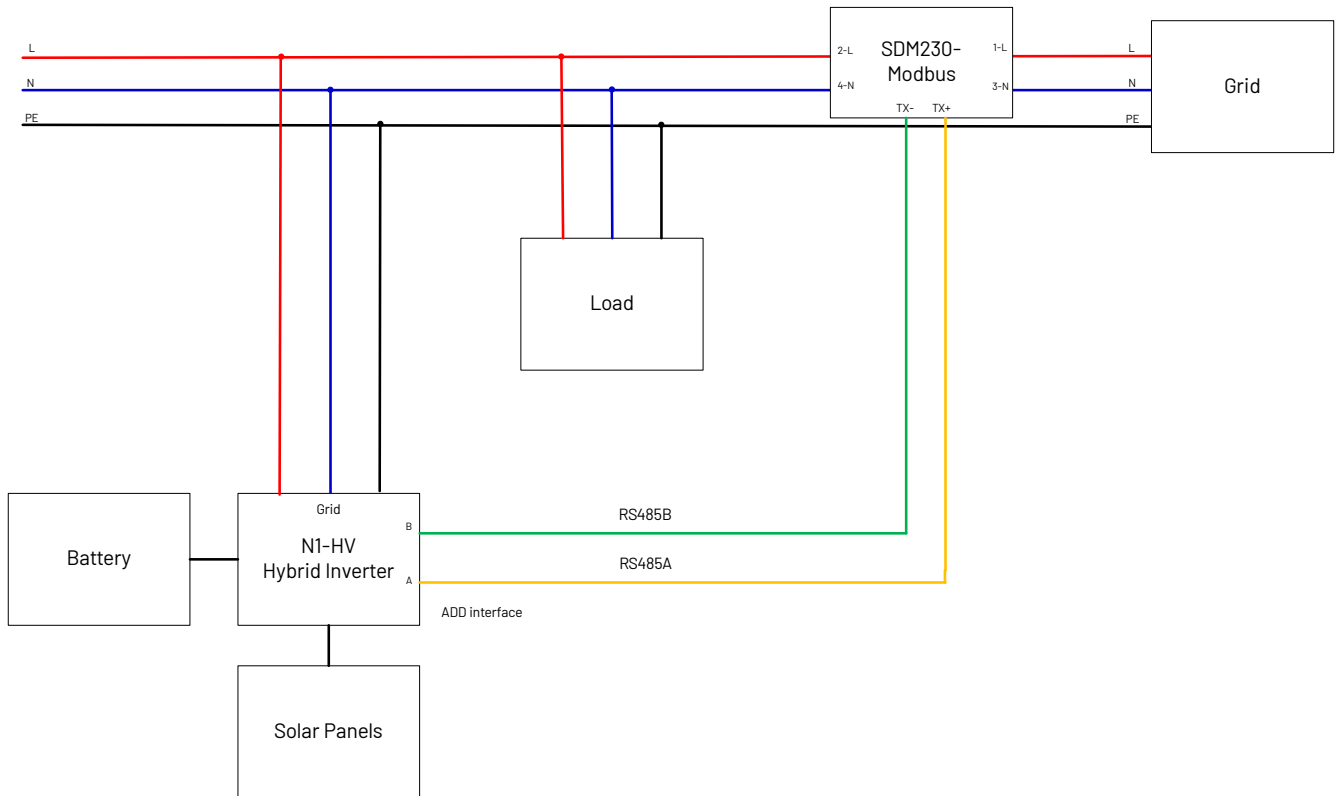
Figure 5-26

The N1-HV series energy storage inverter adopts EASTRON SDM230-Modbus smart meter. The connect steps are as follows:

• Before connecting the smart meter to the system, please read the signs on the meter carefully. Please connect the PIN1 and PIN3 of the meter to the grid, and connect the PIN2 and PIN4 of the meter to the inverter and load.

• Connect the smart meter PIN5, PIN6 to the ADD interface of inverter (meter PIN5 to inverter RS485 A, meter PIN6 to inverter RS485 B).

Note:

The local address and the meter address need to be set as "001" on the inverter screen. The address of the smart meter itself needs to be set to "001".

<table>
<tr><td>

⚠️
</td><td>

WARNING!

If one chooses a flexible wire, ensure the cord section is pressed on the crimping terminal before connecting it to the meter as below.

</td></tr>
</table>
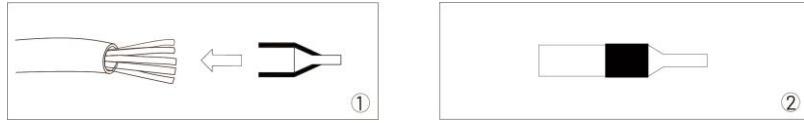
4.2 Meter wiring diagram for AC Retrofit System

Renac Hybrid inverters can be used in the following situations also. If the site already has a grid tied PV system and want to increase module capacity or provide back-up power. Additional meter between the grid-connected inverters and N1-HV hybrid inverter is required. One N1-HV Hybrid inverter can be connected maximum two On-Grid single-phase inverters, and in the system, the smart meter must be the EASTRON SDM230-Modbus.
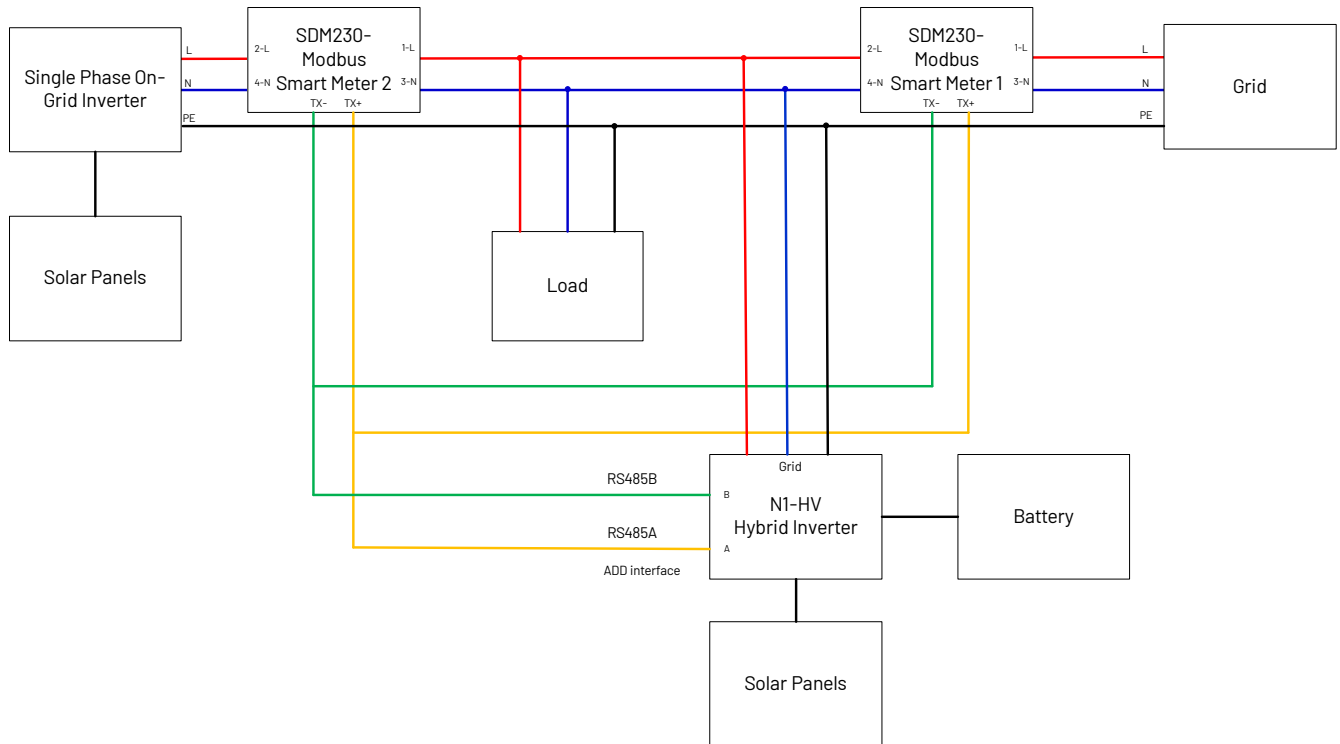
Figure 5-27

Note:

The local address needs to be set as "001" on the inverter screen, and meter1 address set as "001", meter2 address set as "004". The address of the smart meter1 itself needs to be set to "001", and the smart meter2 needs to be set as "004".

5. DRED

This application meets the requirements of local Australian grid code (AS/NZS 4777.2 which among specific requirements for connection, calls for compatibility with Demand Response Enabling Devices (DRED). The DRED is under control of 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 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 more than 50% of rated power.
- DRM 7 Do not generate more than 75% of rated power and sink reactive power if capable.
- DRM 8 Increase power generation (subject to constraints from other active DRMs).

Currently, it is mandatory to respond to DRM0, which allows the network manager to remotely decouple the installation from the distribution network.

DRM PINS definition:
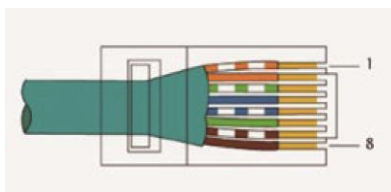
Figure 5-28

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

5.8 Inverter configuration

Start inverter after checking all the following.

- Check that the device is installed well on the wall.
- Make sure that all the PV and AC cables are connected.
- Make sure that Energy meter are connected properly.
- Make sure that battery is connected correctly.
- Turn ON external AC, and DC switches.
- Turn ON built in DC switch.
- Set Sysswitch on the screen of the inverter to 'Turn on'.

Starting up inverter:

- Inverter will start automatically when the PV panel generate enough energy or the battery is charged.
- Check the status of LED and LCD screen, first LED should be green and the LCD screen should display the main interface.
- If first LED is not green please check the following:
    -All the connections are made right.
    -All the external isolation switches are ON.
    -DC switch of the inverter is in ' ON ' position.
- Enter the setting interface.
- Set the safety standard as in page 34; Set the system time as in page 33;PV connection mode as page 33; Set the work mode as in page 33; Set the communication address as in page 33; Set the EPS as in page 32; Set WIFI according to the WIFI manual.

	NOTE!
	Please configure the inverter if operating first time.
	Above steps are for regular start-up of the inverter. If the inverter is turned on for the first time, set the language, time, and safety regulations in turn according to the boot guidance.

Shutting down inverter:

	CAUTION!
⚠	Danger of burns! Even if the inverter is shut down, it may still be hot and cause burns. Wear protective gloves before working on the inverter.

For maintenance or other service, the inverter must be switched off.

Proceed as follows to disconnect the inverter from the AC and DC power sources. Failure may result in injuries and damage the inverter.

- Disconnect the external AC circuit breaker and secure it against reconnection.
- Turn DC switch to 'OFF' position for disconnecting all of the PV string inputs.
- Wait about 10 minutes until the capacitors inside the inverter discharge completely.
- Ensure that the DC cable is current-free using a Current Clamp meter.

6. Operation

6.1 Control panel
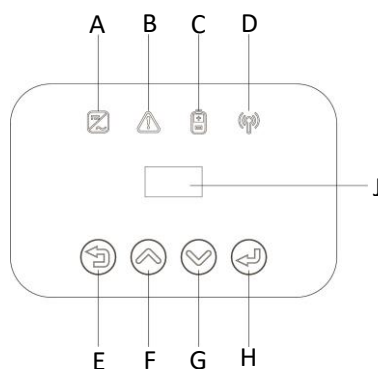
Figure 6-1

Object	Name	Description
A	Indicator LED	Green: Normal working Status.
B		Red: Fault.
C		Blue: Battery communication status
D		Yellow: RS485 communication status.
E	Function Button	ESC button: Leave from current interface or function.
F		Up button: Move cursor to upside or increase value.
G		Down button: Move cursor to downside or decrease value
H		OK button: Confirm the selection.
J	LCD Screen	Display the information of the inverter

6.2 LCD function

Menu structure:

```
┌─────────────────┐
│     Normal      │
│ Power:      W   │
│ Battery:    %   │
│ XX-XX XX:XX:XX  │
└─────────────────┘

┌─────────────────┐
│     Normal      │
│ Ppv:        W   │
│ Pbat:       W   │
└─────────────────┘

┌─────────────────┐
│     Normal      │
│ Pac:        W   │
│ Pfeed:      W   │
│ Pload:      W   │
└─────────────────┘

┌─────────────────┐
│     Normal      │
│ WorkMode:       │
│     Self Use    │
└─────────────────┘

┌─────────────────┐
│     Normal      │
│ Battery Status: │
│       XXX       │
└─────────────────┘
```

Menu (>Status / History / Setting)

=====Solar=====	=====Solar=====	=====Solar=====
Vpv1: V	Ipv1: A	Ppv1: W
Vpv2: V	Ipv2: A	Ppv2: W
		PV Conf:Multi

=====BMS=====	=====BMS=====	=====EPS=====
Vpv1: V	Vdis: V	Veps: V
Vpv2: V	Ichr: A	Iepr: A
	Idis: A	Peps: W

=====Grid=====	=====Grid=====	=====Charger=====
Vac: V	Fac: Hz	Vbat: V
Iac: A		Ibat: A
Pac: W		Pbat: W

=====EPS=====	=====TEMP=====	=====TEMP=====
Feps: Hz	Inner: ℃	Boost: ℃
	Charger: ℃	
	Inverter: ℃	

Menu (Status / >History / Setting)

====History====
>Yield Logs
Error Logs

===Error Logs===
01: xx-xx-xx
xx:xx:xx
XXX   Fault

===Yield Logs===	===Yield Logs===	===Yield Logs===
>Output Total	>Input Total	>Batchr Total
kWh	kWh	kWh

===Yield Logs===	===Yield Logs===	===Yield Logs===
>Batdischr Total	>Solar Total	>EPS Total
kWh	kWh	kWh

Menu (Status / History / >Setting)

=====Settings=====	====Language====
>Language	>English
Date&Time	
Work Mode	OK

=====Settings=====	===Date&Time===
Language	Date:xx-xx-xx
>Date&Time	Time:xx:xx:xx
Work Mode	OK

=====Settings=====	===Work Mode===	===Work Mode===	===Work Mode===	===Work Mode===
Language	>Self Use	>Time of Use	>Backup Use	>Feedin Use
Date&Time				
>Work Mode	OK	OK	OK	OK

=====Settings=====	=PV Connection=	=PV Connection=
Date&Time	>Multi	>Comm
Work Mode		
>PV Config	OK	OK

=====Settings=====	===Comm Addr===	===Local Addr===
Work	>Local Addr	>001
PV config	Meter Addr	
>Comm Addr		OK

	===Comm Addr===	===Meter Addr===
	Local Addr	>001
	>Meter Addr	
		OK

=====Settings=====	===Key Mute===
Comm Addr	>Enable
>Key Mute	OK
Advanced	

TO 'Advanced'

Menu (History / Setting / >SysSwitch)

====SysSwitch====
>Turn On
OK

Menu (Setting / SysSwitch / >About)

=====About=====	=====About=====	=====About=====	=====About=====
Model:	InverSN:	M Ver: Vx.xx	BMS M Ver: Vx.xx
N1-HV-6.0	123456789abcdefg	S Ver: Vx.xx	BMS S Ver: Vx.xx
		H Ver: Vx.xx	

Menu tree flow chart:

=====Settings=====
PV Config
Comm Addr
>Advanced*

==User Verify==
0 0 0 0
OK

===Advanced*===
>On-Grid
Battery
Bat Model

====On-Grid====
>Safety
Grid
Export Control

====Safety====
>Australia A
OK

====On-Grid====
Safety
>Grid
Export Control

=====Grid=====
>Volt Protect
Freq Protect

==Volt Protect==
>Vac Upper Slow
260.0V
OK

==Volt Protect==
>Vac Upper Fast
265.0V
OK

==Volt Protect==
>Vac 10M Avg
255.0V
OK

==Volt Protect==
>Vac Lower Slow
180.0V
OK

==Volt Protect==
>Vac Lower Fast
000.0V
OK

=====Grid=====
Volt Protect
>Freq Protect

==Freq Protect==
>Fac Lower Slow
47.00Hz
OK

==Freq Protect==
>Fac Lower Fast
47.00Hz
OK

==Freq Protect==
>Fac Upper Slow
52.00Hz
OK

==Freq Protect==
>Fac Upper Fast
52.00Hz
OK

====On-Grid====
Safety
Grid
>Export Control

=Export Control=
>User Value
10000W
OK

===Advanced*===
On-Grid
>Battery
Bat Model

====Battery====
>Min Capacity
010%
OK

====Battery====
>Min On-Grid SOC
000%
OK

====Battery====
>Chr Max Curr
25.0A
OK

====Battery====
>Dischr Max Curr
25.0A
OK

====Battery====
>Battery Awaken
NO
OK

====Battery====
>Eps BT Low Rec
Disable
OK

====Battery====
>Eps OL Rec SOC
100%
OK

===Advanced*===
On-Grid
Battery
>Bat Model

====Bat Model===
>RENAC-TURBO
OK

===Advanced*===
Battery
Bat Model
>Feature

=====Feature=====
>Remote Control
DRM0
Meter Setting

=Remote Control=
>Disable
OK

=====Feature=====
Remote Control
>DRM0
Meter Setting

=====DRM0=====
>Disable
OK

=====Feature=====
Remote Control
DRM0
>Meter Setting

=Meter Setting=
>Disable
OK

===Advanced*===
Bat Model
Feature
>New Password

==New Password==
Enter Password
0 0 0 0
OK

===Advanced*===
Feature
New Password
>Reset

=====Reset=====
>Reset Energy
Reset Errlogs
Factory Reset

==Reset Energy==
>ESC< ENT

=====Reset=====
Reset Energy
>Reset Errlogs
Factory Reset

==Reset Errlogs==
>ESC< ENT

=====Reset=====
Reset Energy
Reset Errlogs
>Factory Reset

=Factory Reset=
>ESC< ENT

===Advanced*===
New Password
Reset
>USB

=====USB=====
>Upgrade

====Upgrade====
>DSPM Upgrade
DSPS Upgrade
ARMC Upgrade

==DSPM Upgrade==
>No< Yes

====Upgrade====
DSPM Upgrade
>DSPS Upgrade
ARMC Upgrade

==DSPS Upgrade==
>No< Yes

====Upgrade====
DSPM Upgrade
DSPS Upgrade
>ARMC Upgrade

==ARMC Upgrade==
>No< Yes

====Upgrade====
DSPS Upgrade
>ARMC Upgrade
BATM Upgrade

==BATM Upgrade==
>No< Yes

====Upgrade====
ARMC Upgrade
BATM Upgrade
>BATS Upgrade

==BATS Upgrade==
>No< Yes

6.3 LCD operation

6.3.1. Main screen

The main screen as below. Press up or down for more information.

Normal		Normal		Normal		Normal		Normal	
Power:	W	Ppv:	W	Pac:	W	WorkMode:		Battery Status:	
Battery:	%	Pbat:	W	Pfeed:	W		Self Use		XXX
XX-XX XX:XX:XX				Pload:	W				

6.3.2. Status

Press 'OK' to enter the menu, check grid, solar, battery, EPS and temperature of the inverter.

Press up and down to select, press 'ESC' to return to the Menu.

```
                  =====Solar=====        =====Solar=====        =====Solar=====        =====Grid=====
                  Vpv1:        V         Ipv1:        A         Ppv1:        W         Vac:        V
 =====Menu=====   Vpv2:        V         Ipv2:        A         Ppv2:        W         Iac:        A
>Status                                                         PV Conf:Multi          Pac:        W
 History
 Setting          =====Grid=====         =====Charger=====      =====BMS=====          =====BMS=====
                  Fac:        Hz         Vbat:        V         Vbat:        V         Vdis:        V
                                         Ibat:        A         Ibat:        A         Ichr:        A
                                         Pbat:        W         Vchr:        V         Idis:        A

                  =====EPS=====          =====EPS=====          =====TEMP=====         =====TEMP=====
                  Veps:        V         Feps:        Hz        Inner:        ℃        Boost:        ℃
                  Ieps:        A                                Charger:      ℃
                  Peps:        W                                Inverter:     ℃
```

A) 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. Press 'ESC' to return to status.

```
=====Solar=====        =====Solar=====        =====Solar=====
Vpv1:        V         Ipv1:        V         Ppv1:        W
Vpv2:        V         Ipv2:        V         Ppv2:        W
                                              PV Conf: Multi
```

B) Grid

This status shows the real time grid parameters such as voltage, current, output power and frequency. Pac measures the output of the inverter.

Press up and down button to review the parameter, Press 'ESC' to return to status.

```
=====Grid=====        =====Grid=====
Vac:        V         Fac:        Hz
Iac:        A
Pac:        W
```

C) charger

This status shows the charger situation of the system. Includes battery voltage, charge or discharge current. Charge or discharge power. –'Means charging; '–' means discharging. Press up and down button to review the parameter. Press 'ESC' to return to Status.

```
=====Charger=====
Vbat:        V
Ibat:        A
Pbat:        W
```
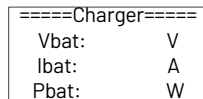
D) BMS

This status shows the battery situation of the system. Includes battery voltage and current, charge and discharge voltage, charge and discharge current. '–' means charging.'–' means discharging Press up and down button to review the parameter. Press 'ESC' to return to Status.

```
=====BMS=====         =====BMS=====
Vbat:        V        Vdis:        V
Ibat:        A        Ichr:        A
Vchr:        V        Idis:        A
```
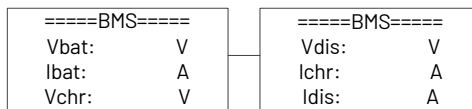
E) EPS

EPS will only have data when the inverter is working in EPS mode it will show the real tire data of the EPS output such as voltage current, power, and frequency. Press up and dawn button to review the parameter. Press 'ESC' to return to Status.

```
=====EPS=====         =====EPS=====
Veps:        V        Feps:        Hz
Ieps:        A
Peps:        W
```
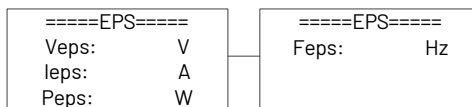
6.3.3. History

The history function contains three aspects of the information: inverter yield, battery yield and error log.

Press up and down to select, and review the data of system, press 'ESC' to return to the Menu.

```
=====Menu=====        ====History====        ===Yield Logs===      ===Yield Logs===      ===Yield Logs===
  Status              >Yield Logs            >Output Total         >Input Total          >Batchr Total
 >History              Error Logs                        kWh                   kWh                    kWh
  Setting

                      ===Error Logs===       ===Yield Logs===      ===Yield Logs===      ===Yield Logs===
                      01: xx-xx-xx           >Batdischr Total      >Solar Total          >EPS Total
                          xx:xx:xx                       kWh                   kWh                    kWh
                      XXX    Fault
```
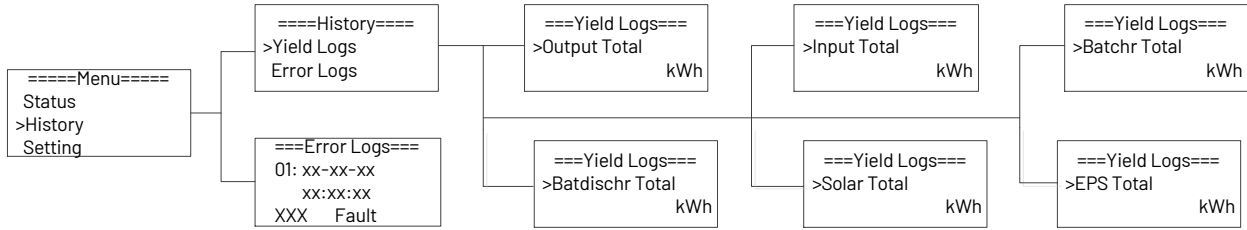
6.3.4. Settings

Setting function is used for set the inverter for language, date and time, work mode, PV configuration communication address, advanced and so on.

A) Language

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

```
=====Settings=====      ====Language====
>Language               >English
 Data&Time
 Work Mode                 OK
```
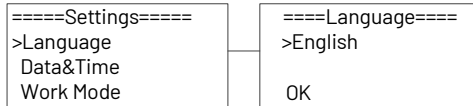
B) Date Time

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

```
=====Settings=====      ====Data&Time====
 Language               Data:xx-xx-xx
>Data&Time              Time:xx:xx:xx
 Work Mode              OK
```
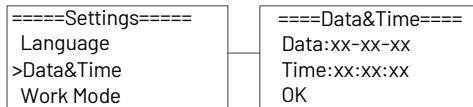
C) Work Mode

Press up or down button to select different work modes. Press 'OK' to confirm.

```
=====Settings=====    ===Work Mode===    ===Work Mode===    ===Work Mode===    ===Work Mode===
 Language             >Self Use          >Time of Use       >Backup Use        >Feedin Use
 Date&Time
>Work Mode              OK                 OK                 OK                 OK
```
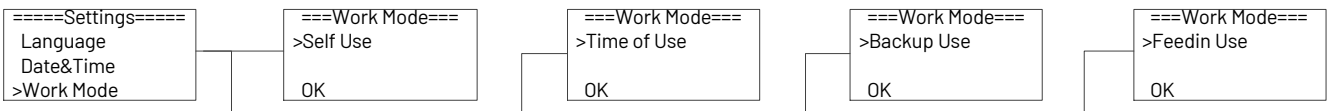
D) PV Connection

This function can set the ode of PV input. There are two modes for selection: Comm and Multi. The 'Comm' mode means single MPP tracking, 2 MPPT working together; 'Multi' means multi-MPP tracking, 2 MPPT work independently. Press up or down button to select and press 'OK' to confirm.

```
=====Settings=====      =PV Connection=       =PV Connection=
 Date&Time              >Multi                >Comm
 Work Mode
>PV Config                OK                    OK
```
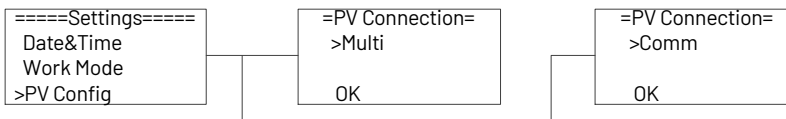
E) Communication Address

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

```
                        ===Comm Addr===       ===Local Addr===
                        >Local Addr           >001
                         Meter Addr
=====Settings=====                            OK
 Work
 PV Config
>Comm Addr              ===Comm Addr===       ===Meter Addr===
                         Local Addr           >001
                        >Meter Addr
                                              OK
```
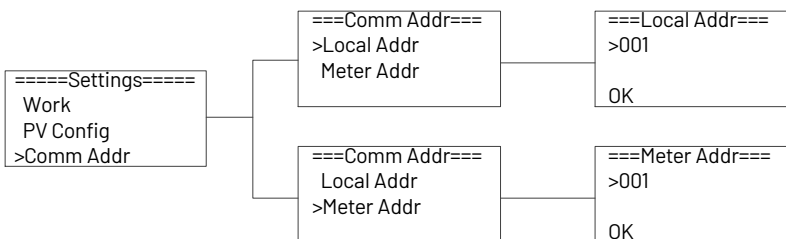
Advanced settings require the original password '0000, Press 'OK' to confirm.

```
=====Settings=====        ==User Verify==
 PV Config
 Comm Addr                    0  0  0  0
>Advanced*                 OK
```
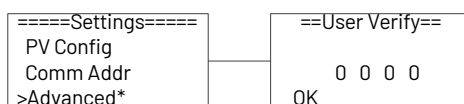
F) Safety

User can set safety standard according to different countries and local standards.

Press up or down button to change the grid code. Press 'OK' to confirm.

```
====On-Grid====          ====Safety====
>Safety                   >Australia A
 Grid
 Export Control            OK
```
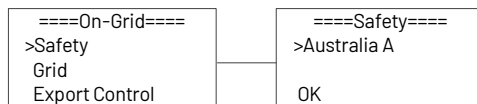
Note:

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.

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	For large interconnected power systems. e. g. all Australian networks other than Australia B/C and New Zealand.
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, meet Grid standards "EN50438".
8	C10/11	Belgium power Grid.
9	G99	UK power Grid.
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 "CEI 0-16".
16	G98	UK power Grid.
17	Greece Island	Greece Island power Grid.
18	EN50549-CZ	Czech Republic power Grid, meet Grid standards "EN50438Y2007-CZ
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: 160-290V
23	China-H	Grid frequency range: 47-53HZ.
24	IEC61727-IN-W	China power Grid, meet standards" CQC".

NO.	National/Regional Grid Code	Description
25	Brazil	India power Grid, meet Grid standards "IEC61727".
26	IEC61727-SL	Sri Lanka power Grid, meet Grid standards "IEC61727".
27	Mexico	Mexico power Grid, meet Grid standards "IEC61727 60HZ".
28	New Zealand	All systems in New Zealand.
29	Philippines	Philippines power Grid, meet Grid standards "IEC61727 60HZ spec
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
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
41	Chile	Chile Power Grid
42	Brazil-W	Brazil power Grid, meet Grid standards "NBT 16150".
43	EN50549-PL-W	Poland power Grid.
44	Brazil-180s-W	Brazil power Grid, meet Grid standards "NBT 16150".
45	UNE217002-ES	Spain power Grid.
46	G98-NI	G98 for Northern Ireland
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	Australia B	For small interconnected power systems. e.g. Western Power
52	Australia C	For isolated or remote power systems. e.g. Horizon Power and TasNetworks

G) Grid

Normally, the end user do not need to set the grid parameters, all default value has set on factory according to safety standards of different countries.

If need to reset please refer to the requirement of local grid to do changes. Press up or down button to change the value of grid voltage and grid frequency protect. Press 'OK' to confirm.

```
                                            ==Volt Protect==
                                            >Vac Upper Slow
                                            260.0V
                                            OK
                                                              ==Volt Protect==
   ====On-Grid====        =====Grid=====    ==Volt Protect==   >Vac Lower Slow
   Safety                 >Volt Protect     >Vac Upper Fast    180.0V
   >Grid                  Freq Protect      265.0V             OK
   Export Control                           OK
                                                              ==Volt Protect==
                                            ==Volt Protect==   >Vac Lower Fast
                                            >Vac 10M Avg       000.0V
                                            255.0V             OK
                                            OK


                                            ==Freq Protect==   ==Freq Protect==
                                            >Fac Lower Slow    >Fac Upper Slow
                                            47.00Hz            52.00Hz
                          =====Grid=====    OK                 OK
                          Volt Protect
                          >Freq Protect     ==Freq Protect==   ==Freq Protect==
                                            >Fac Lower Fast    >Fac Upper Fast
                                            47.00Hz            52.00Hz
                                            OK                 OK
```

H) Export control

With this function the inverter can control the energy export to the grid. Press up or down button to change the export power. Press 'OK' to confirm.

```
   ====On-Grid====        =Export Control=
   Safety                 >User Value
   Grid                   10000W
   >Export Control        OK
```
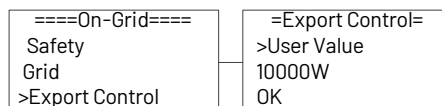
I) Battery

Press 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 Re SOC" means EPS overload due to low capacity for battery, if recovered, min soc. Press "Ok to confirm. Users need to set the battery model before using, press 'OK' to confirm.

```
                      ====Battery====    ====Battery====    ====Battery====    ====Battery====
                      >Min Capacity      >Min On-Grid SOC   >Chr Max Curr      >Dischr Max Curr
                      010%               000%               25.0A              25.0A
   ===Advanced*===    OK                 OK                 OK                 OK
   On-Grid
   >Battery           ====Battery====    ====Battery====    ====Battery====
   Bat Model          >Battery Awaken    >Eps BT Low Rec    >Eps OL Rec SOC
                      NO                 Disable            100%
                      OK                 OK                 OK
```
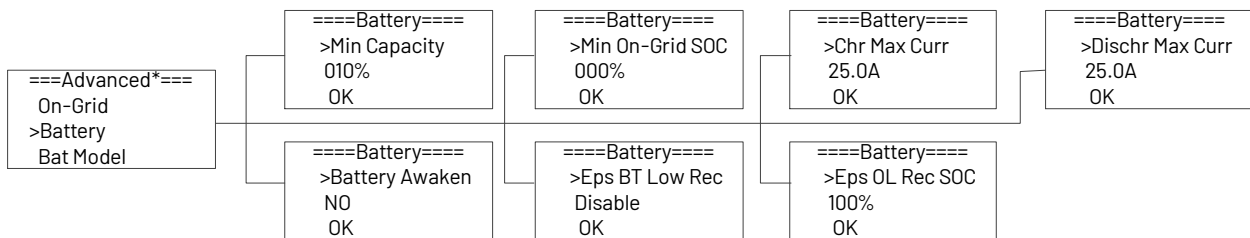
J) Bat Model

Press up or down button to set the model of battery. Press 'OK' to confirm.

```
   ===Advanced*===        ===Bat Model===
   On-Grid                >RENAC-TURBO
   Battery
   >Bat Model             OK
```
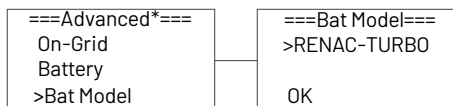
K) Feature

Press up or down button to enable or disable remote control, DRMO, and Meter. Press 'OK' to confirm.

```
===Advanced*===        ====Feature====        =Remote Control=
  Battery              >Remote Control        >Disable
  Bat Model              DRMO
 >Feature                Meter Setting          OK
```

```
                       ====Feature====        =====DRMO=====
                         Remote Control        >Disable
                        >DRMO
                         Meter Setting           OK
```

```
                       ====Feature====        =Meter Setting=
                         Remote Control        >Disable
                         DRMO
                        >Meter Setting           OK
```
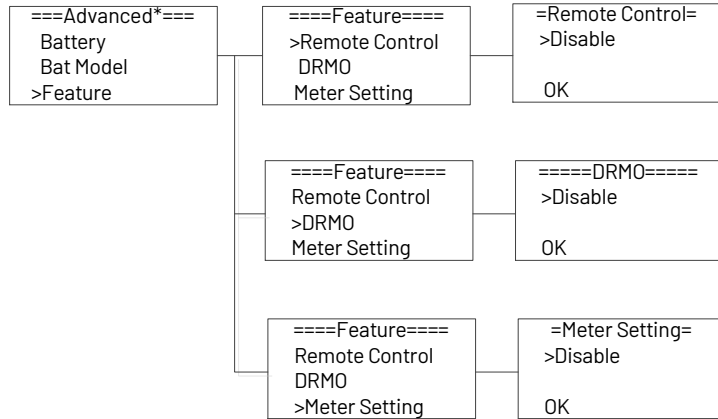
L) New Password

Press up or down button to set new password. Press 'OK' for more than 3 seconds to confirm.

```
===Advanced*===        ==New Password==
 >New Password          Enter Password
  Reset                   0  0  0  0
  USB                   OK
```

M) Reset

Press up or down button to reset energy, reset errors or factory reset. Press 'OK' to confirm.

```
===Advanced*===        =====Reset=====        ==Reset Energy==
  New Password         >Reset Energy
 >Reset                 Reset Errlogs
  USB                   Factory Reset           >ESC<   ENT
```

```
                       =====Reset=====        ==Reset Errlogs==
                         Reset Energy
                        >Reset Errlogs
                         Factory Reset          >ESC<   ENT
```

```
                       =====Reset=====        =Factory Reset=
                         Reset Energy
                         Reset Errlogs
                        >Factory Reset          >ESC<   ENT
```
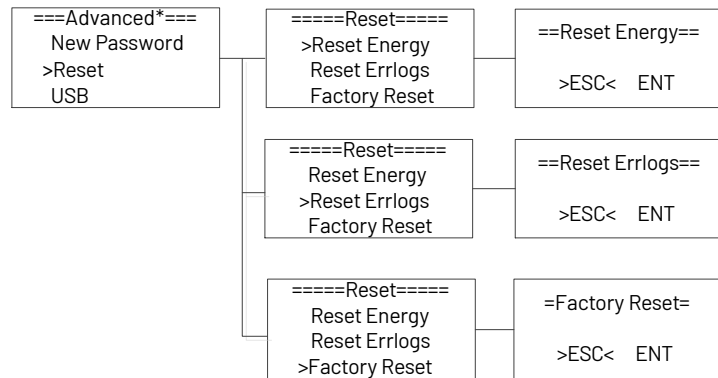
N) USB

Press up or down button to upgrade DSPM, DSPS, ARMC, BATM or BATS. Press 'OK' to confirm.

```
===Advanced*===          =====USB=====          ====Upgrade====          ==DSPM Upgrade==
 New Password             >Upgrade                >DSPM Upgrade
 Reset                                             DSPS  Upgrade            >No<   Yes
 >USB                                              ARMC  Upgrade

                                                  ====Upgrade====          ==DSPS Upgrade==
                                                   DSPM  Upgrade
                                                   >DSPS Upgrade            >No<   Yes
                                                   ARMC  Upgrade

                                                  ====Upgrade====          ==ARMC Upgrade==
                                                   DSPM  Upgrade
                                                   DSPS  Upgrade            >No<   Yes
                                                   >ARMC Upgrade

                                                  ====Upgrade====          ==BATM Upgrade==
                                                   DSPS  Upgrade
                                                   >ARMC Upgrade            >No<   Yes
                                                   BATM  Upgrade

                                                  ====Upgrade====          ==BATS Upgrade==
                                                   ARMC  Upgrade
                                                   BATM  Upgrade            >No<   Yes
                                                   >BATS Upgrade
```
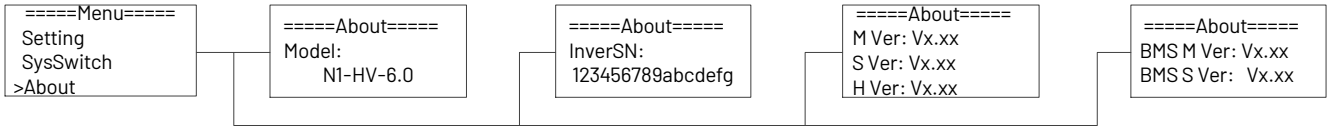
6.3.5. System Switch

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

```
=====Menu=====          ====SysSwitch====
 History                 >Turn On
 Setting
 >SysSwitch              OK
```
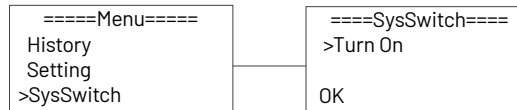
6.3.6. About

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

```
=====Menu=====      =====About=====      =====About=====      =====About=====      =====About=====
 Setting             Model:               InverSN:             M Ver: Vx.xx         BMS M Ver: Vx.xx
 SysSwitch            N1-HV-6.0            123456789abcdefg     S Ver: Vx.xx         BMS S Ver:  Vx.xx
 >About                                                        H Ver: Vx.xx
```
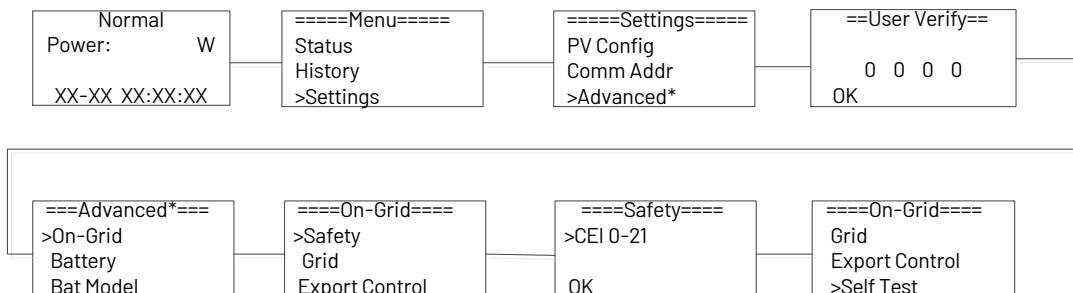
6.3.7. Self-Test in accordance with CEI 0-21 (Applies to Italy only)

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 CEI 0-21. During the self-test the inverter will consecutively check the protection reaction times and values for over voltage, under voltage, over frequency and under frequency. 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 CEI 0-2 before testing.
Auto-Test from screen:

```
   Normal              =====Menu=====      =====Settings=====      ==User Verify==
 Power:        W        Status              PV Config
                        History             Comm Addr               0  0  0  0
 XX-XX  XX:XX:XX        >Settings           >Advanced*              OK


 ===Advanced*===      ====On-Grid====      ====Safety====      ====On-Grid====
 >On-Grid             >Safety              >CEI 0-21            Grid
 Battery              Grid                                      Export Control
 Bat Model            Export Control       OK                   >Self Test
```

7. Troubleshooting

7.1 Troubleshooting

This section contains information and procedures for salving possible problems with the N1-HV series inverters, and provides you with trouble shooting tips to identify and solve most problems that could occur with the N1-HV series 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 message is displayed, record it before doing anything further.
- Attempt the solution indicated in below table.

Fault	Cause	Solutions
HW Protect Fault	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.
Grid Lost Fault	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.
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.
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.
PV Volt 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.
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.
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.

Vgrid 10M Fault	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.
DCI OCP Fault	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.
DCV OVP Fault	DC component is out of limit in output voltage.	
SW OCP Fault	Output current high detected by software.	
RC OCP Fault	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.
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.
Temp Over 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.
BatConDir Fault	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.
AD Sample Fault	The sampling value between the main and slave DSP is inconsistent.	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.
EPS Over Load	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.
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.

PV Cnf Fault	PV connection setting is wrong.	Reset the PV connection.
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.
M/S DspCommFault	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.
BMS Lost	The communication between BMS and Inverter is interrupted.	Check if the communication cable between BMS and inverter is connected correctly.
Dsp Lost 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.
Inter Fan Fault	Internal fan Device failure.	
AC HCT Fault	AD sampling failure.	
Inv EEPROM Fault	DSP EEPROM failure.	
GFCI HW Fault	The residual current circuit is fault.	1. Please check if the insulation of the electric wires is damaged. 2. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 3. Contact the dealer or the after-sales service if the problem persists.
ByPassRelay Fault	1. The relay is abnormal or short-circuited.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later.
EPS Relay Fault	2. The control circuit is abnormal.	
Grid Relay Fault	3. The AC cable connection is abnormal, like a virtual connection or short circuit.	2. Contact the dealer or the after-sales service if the problem persists.
Other Dev Fault	Other device 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.
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.
Meter1 Lost 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.
Meter2 Lost Fault	The communication between smart meter2 and Inverter is interrupted.	
Dsp Lost 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.
BMS AD_AFE Fault	The difference between the total voltage of battery AD and AFE is too large.	
BMS Tepr Fault	Battery temperature sensor fault.	
BMS InCom Fault	Battery internal communication fault.	

BMS Other Fault	Other battery fault.
BMS PreChg Fault	Battery pre charge fault.
BMS Relay Fault	The battery relay is fault.
BMS Cell Fault	Battery cell error.
BMS Protect OV	Battery over voltage protection.
BMS Protect LV	Battery under voltage protection.
BMS Prot ChgOC	Battery over current charging protection.
BMS Prot DsgOC	Battery over current discharging protection.
BMS Prot TemHigh	Battery temperature is high.
BMS Prot TemLow	Battery temperature is low.
BMS Volt Fault	Battery voltage sensor fault.
BMS OutCom Fault	BMS internal communication fault.
BMS ISO Fault	Battery insulation test failed.
BMS Check Fault	Battery self-test failed.
BMS Prot TemDiff	The difference in battery cell temperature is too large.
BMS Prot AD_AFE	The difference between the total voltage of battery AD and AFE is too large, triggering protection.
BMS Prot Hard OC	Battery hardware overcurrent protection.

Remark

If your inverter's information panel is not displaying a Fault light. Check the following list to make sure that the present state of the installation allows proper operation of the unit.

• Is the inverter located in a clean, dry, and adequately ventilated place?

• Have the DC input breakers been opened?

• Are the cables adequately sized and short enough?

• Are the input and output connections and wiring in good condition?

• Are the configurations settings correct for your particular installation?

• Are the display panel and the communications cable properly connected and undamaged?

Contact Renac Power Customer Service for further assistance, please be prepared to describe details of your system installation and provide the model and serial number of the unit.

7.2 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.

During the process of using the inverter, the manage person shall examine and maintain the machine regularly. The concrete operations are follow.

1: Check that if the cooling fins on the rear of house are covered by dirt, and the machine should be cleaned and absorbed dust when necessary. This work shall be check time to time.

2: Check that if the indicators of the inverter are in normal state, check if the keys of the inverter are in normal state, check the display of the inverter is normal. This check should be performed at least every 6 months.

3: Check that if the input and output wires are damaged or aged. This check should be performed at least every 6 months.

4: You should keep the inverter panels clean and their security checked at least every 6 months.

• Inverter cleaning

Please clean the inverter with an air blower, a dry & soft cloth or a soft bristle brush. Do NOT clean the inverter with water, chemicals, detergent, etc.

• Heat sink cleaning

For the long-term proper operation of inverters, ensure there is enough space around the heat sink for ventilation, check the heat sink for blockage (dust, snow, etc.) and clean them if they exist. Please clean the heat sink with an air blower, a dry & soft cloth or a soft bristle brush. Do NOT clean the heat sink with water, corrosive chemicals, detergent, etc.

8. Decommissioning

8.1 Dismantling inverter

•   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.

8.2 Packaging

If possible, please pack the inverter with 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 25kg.
•   With handle.
•   Can be fully closed.

8.3 Storage

Store the inverter in dry place where ambient temperatures are always between -20 $^{\circ}$C ~ +60 $^{\circ}$C.

8.4 Disposal

When the inverter or other related components need to be disposed. Have it carried out according to local waste handling regulations. Please be sure to deliver wasted inverters and packing materials to certain site, where can assist relevant department to dispose and recycle.

SMART ENERGY FOR BETTER LIFE

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