RENAC

N1 HL Series

ESC3000-DS / ESC3680-DS / ESC5000-DS

Renac Power Technology Co.,Ltd.

Contents

1. Noted on this manual

1.1 Scope of validity

This manual is an integral part of inverter, and it describes the assembly, installation, commissioning, maintenance and failure search of below inverters. Please read it carefully before operating.

ESC3000-DS	ESC3680-DS	ESC5000-DS

Store the manual where it will be accessible at all times.

1.2 Target group

This manual is qualified electricians. The tasks described in this manual only can be performed by qualified electricians.

1.3 Symbols used

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

	**DANGER!** “Danger” indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	**WARNING!** “Warning” indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	**CAUTION!** “Caution” indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	**NOTE!** “Note” provides tips that are valuable for the optimal operation of your product.

2. Safety

2.1 Important safety instructions

	**DANGER TO LIFE DUE TO HIGH VOLTAGES IN THE INVERTER!** • All work on the inverter must be carried out by qualified electrician. • The appliance is not to be used by children or persons with reduced physical sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction. • Children should be supervised to ensure that they do not play with the appliance.

	**DANGER OF BURN INJURIES DUE TO HOT ENCLOSURE PARTS!** • During operation, the upper lid of the enclosure and the enclosure body may become hot. • Only touch the lower enclosure lid during operation.
	**POSSIBLE DAMAGE TO HEALTH AS A RESULT OF THE EFFECTS OF RADIATION!** • Do not stay closer than 20 cm to the inverter for any length of time.
	**NOTE!** Grounding the PV generator. • Comply with the local requirements for grounding the PV modules and the PV generator. Renac Power recommends connecting the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction and ground these in order to have optimal protection of the system and persons.

	**WARNING!** • Ensure input DC voltage ≤Max. DC voltage .Over voltage may cause permanent damage to inverter or other losses, which will not be included in warranty! • Authorized service personnel must disconnect both AC and DC power from inverter before attempting any maintenance or cleaning or working on any circuits connected to inverter. • Do not operate the inverter when the device is running. • Risk of electric shock!

- Prior to the application, please read this section carefully to ensure correct and safe application. Please keep the user manual properly.
- Accesories only together with the inverter shipment are recommanded here. Otherwise may result in a risk of fire, electric shock, or injury to person.
- Make sure that existing wiring is in good condition and that wire is not undersized.
- Do not disassemble any parts of inverter which are not mentioned in installation guide. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the inverter yourself may result in a risk of electric shock or fire and will void your warranty.
- Keep away from flammable, explosive materials to avoid fire disaster.
- The installation place should be away from humid or corrosive substance.
- Authorized service personnel must use insulated tools when installing or working with this equipment.
- PV modules shall have an IEC 61730 class A rating.
- Never touch either the positive or negative pole of PV connecting device. Strictly prohibit

touching both of them at the same time.

- The unit contains capacitors that remain charged to a potentially lethal voltage after the MAINS , battery and PV supply has been disconnected. Hazardous voltage will present for up to 5 minutes after disconnection from power supply.
- CAUTION-RISK of electric shock from energy stored in capacitor, Never operate on the inverter couplers, the MAINS cables, Battery cables, PV cables or the PV generator when power is applied. After switching off the PV , battery and Mains, always wait for 5minutes to let the intermediate circuit capacitors discharge before unpluging DC ,battery inplug and MAINS couplers.
- When accessing the internal circuit of inverter, it is very important to wait 5 minutes before operating the power circuit or demounting the electrolyte capacitors inside the device. Do not open the device before hand since the capacitors require time to sufficiently discharge!
- Measure the voltage between terminals UDC+ and UDC- with a multi-meter (impedance at least 1Mohm) to ensure that the device is discharged before beginning work (35VDC) inside the device.

2.2 Explanation of symbols

This section gives an explanation of all the symbols shown on the type label.

Symbols on the Type Label

Symbol	Explanation
	CE mark. The inverter complies with the requirements of the applicable CE guidelines.
	RCM remark.
	SAA certification
	Beware of hot surface. The inverter can become hot during operation. Avoid contact during operation.
	Danger of high voltages. Danger to life due to high voltages in the inverter!
	Danger. Risk of electric shock!
	The inverter cannot be disposed of together with the household waste. Disposal information can be found in the enclosed documentation.
	Don’t work on this inverter until it is isolated from battery, mains and on-site PV generation suppliers.
	Danger to life due to high voltage. There is residual voltage in the inverter which needs 5 min to discharge. Wait 5 min before you open the upper lid or the DC lid.

3. Introduction

3.1 Basic features

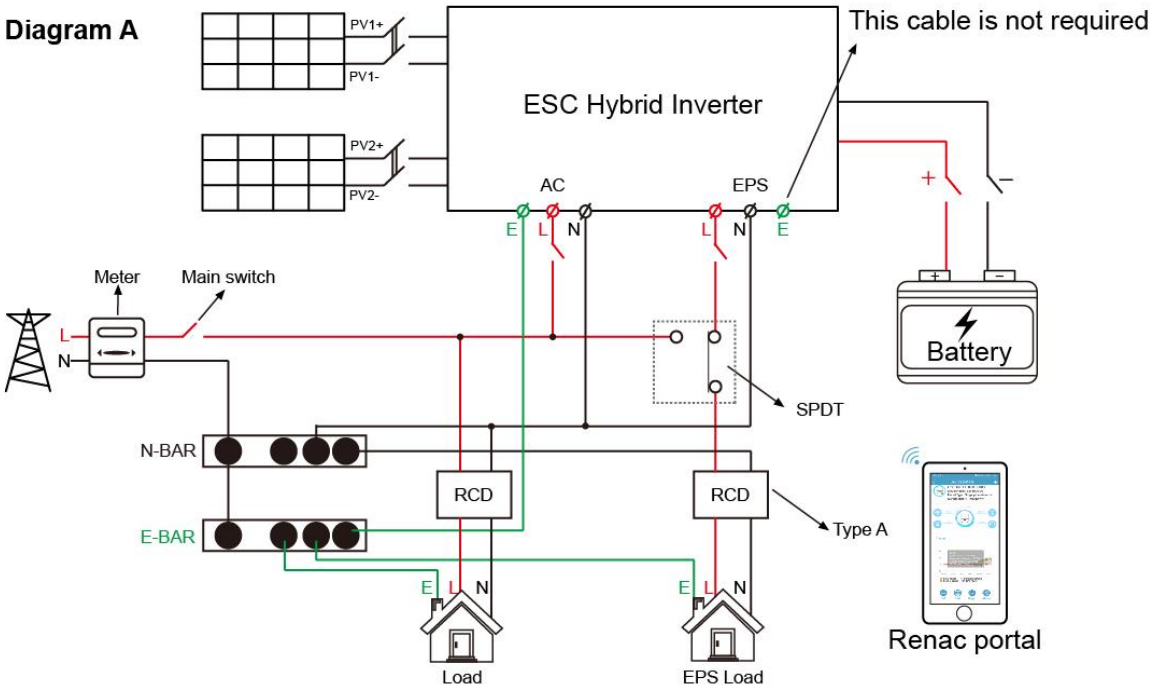
The ESC-hybrid inverter can store the energy in the battery for self-use and also can convert the DC current of the PV generator into AC current for on grid or off grid usage.

ESC-hybrid inverter with EPS can supply the energy from battery and PV generator when the grid is lost.

The below diagram are for reference based on different local wiring rules.

Diagram A : Neutral line of alternative supply must not be isolated or switched. applies to the wiring rules that requires Neutral line of alternative supply must NOT be isolated or switched (applies to wiring rules AS/NZS_3000:2012 for Australia and New Zealand).

Diagram B: Neutral line of alternative supply can be isolated or switched. applies to the wiring rules that requires the Live line and Neutral line of EPS must be disconnected with the Live line and Neutral line of grid. (applies to most countires)



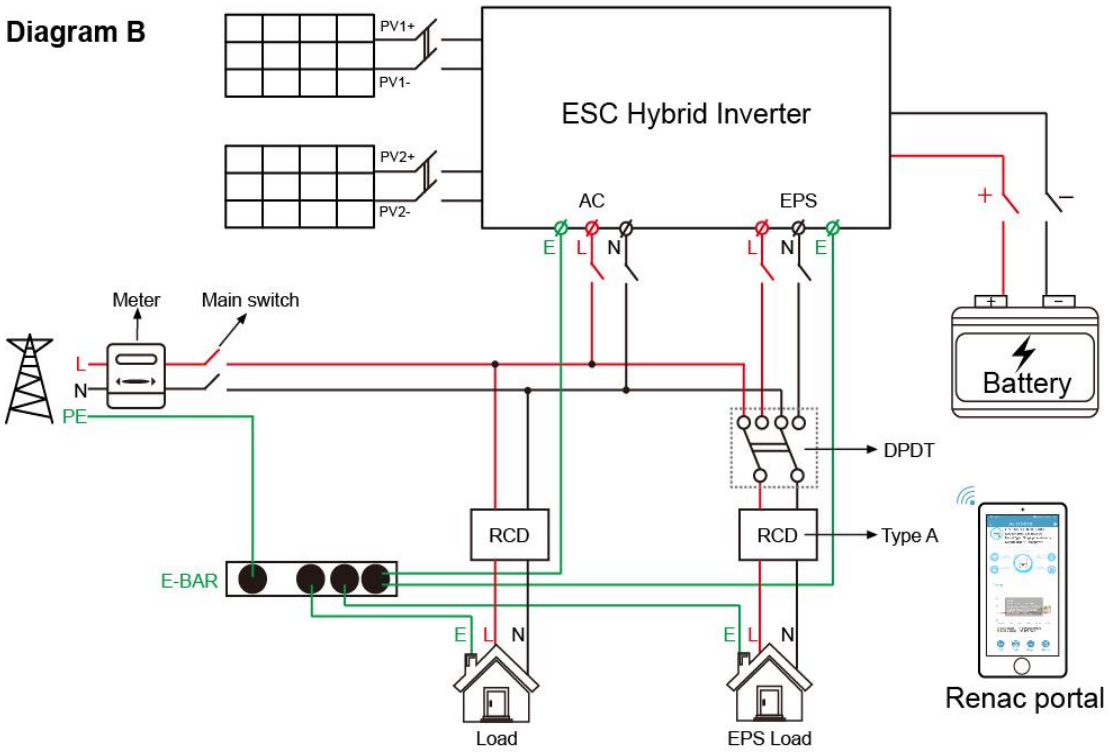


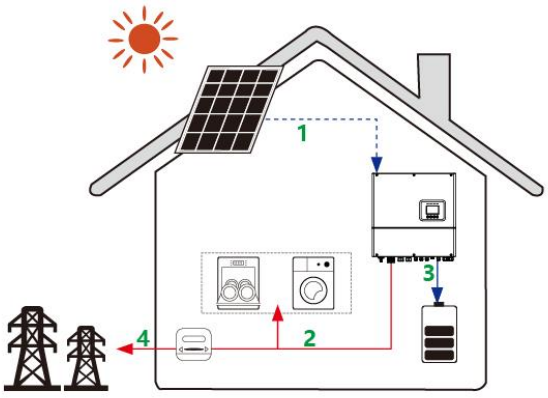
Figure 2-1 ESC Hybrid system wiring diagram

3.2 Work modes

The ESC-Hybrid inverter has below working modes for your home made energy storage system.

◆ **Work modes: Self-use (With PV Power)**

Priority: load>battery>grid



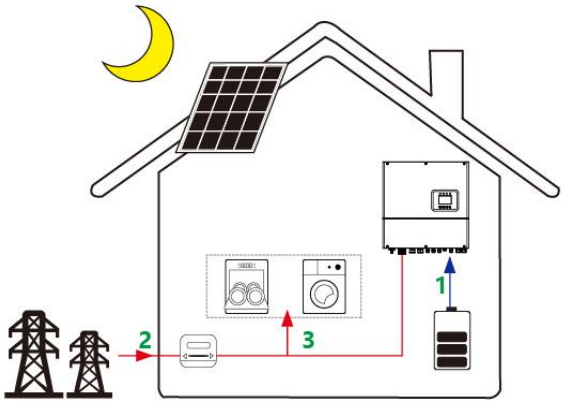
1) Generated solar energy
2) Load consumption
3) Storage in Battery
4) Feed the remaining solar energy into the grid

This mode applies the area that has low feed-in tariff and high energy price.

The power generated from PV will be used to supply the local loads firstly, then to charge the battery. The redundant power will export to the pubic grid.

◆ **Work modes: Self-use (Without PV Power)**

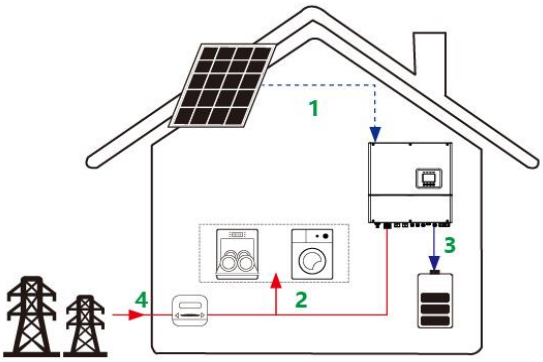
When no PV supplied, battery will discharge for local loads firstly, and. grid will supply power when the battery capacity is not enough.



1) Battery discharge for load
2) Grid supply power when the battery capacity is not enough
3) Load consumption

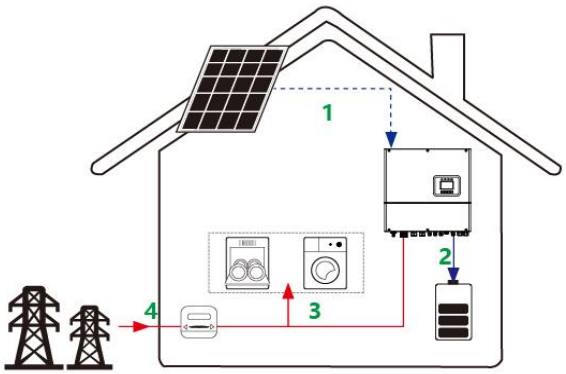
◆ **Work modes: Force time use**

Priority: battery>load>grid (when charging)



1) Generated solar energy
2) Storage in battery
3) Load consumption
4) Grid supply power when the battery capacity is not enough

Priority: load>battery>grid (when discharging)

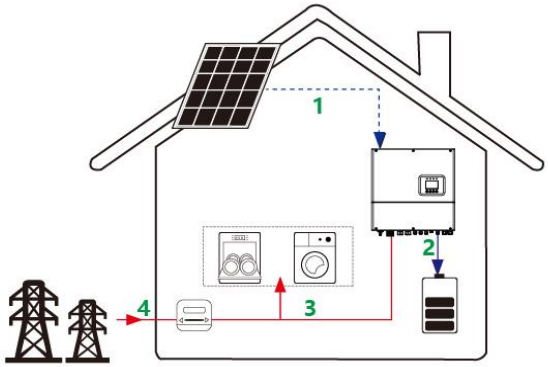


1) Generated solar energy
2) Load consumption
3) Self-use from battery
4) Grid supply power when the battery capacity is not enough

This mode applies the area that has electricity price between peak and valley. User can use off-peak electricity to change the battery. The charging and discharging time can be set flexibly, and it also allows choosing whether charge from the grid or not.

◆ **Work modes: Back up mode**

Priority: battery>load>grid



1) Generated solar energy
2) Storage in Battery
3) Load consumption
4) Grid supply power

This mode applies the area that has frequent power outages. And this mode ensures the battery will has enough energy to supply when the grid is off.

In this mode battery will be charging forcibly in the setting time and will never be discharged when the grid is on, and it also allows to choose whether charge from the grid or not.

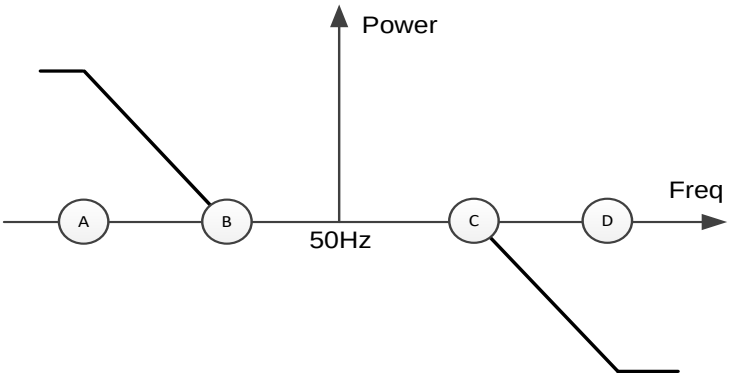
◆ **Work modes: FFR Use mode**

FFR (Firm Frequency Response) is a service provided by energy users to National Grid, which uses approved assets to quickly reduce demand or increase generation to help balance the grid and avoid power outages.

National Grid needs help when there are large deviations in system frequency caused by too much generation compared to demand or vice versa e.g. when a power station unexpectedly shuts down. In such events, to ensure that generation and demand can be quickly balanced

to avoid blackouts, FFR uses approved assets to quickly reduce demand or increase generation.

FFR function decription:



Four Frequency set point descriptions：

Point-A：FFR feed in to grid End Point (Maximum feed in power)；

Point-B：FFR feed in grid Trig Point；

Point-C：FFR consumed from grid Trig Point；

Point-D：FFR consumed from grid End Point (Maximum consumed power)；

◆ **Work modes: Remote Charge mode**

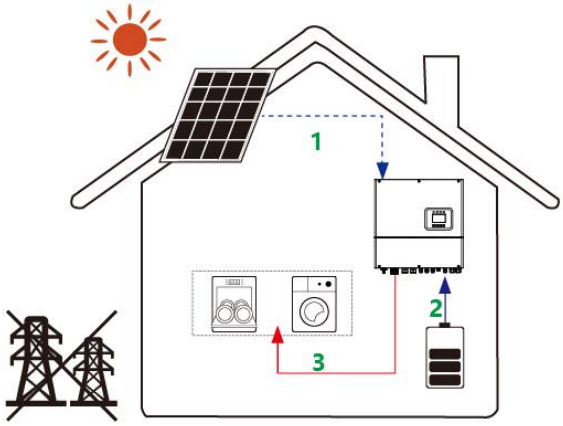
The battery charge and discharge can be remotely controlled through the monitoring platform or APP.

Details of remote control:

- Charge the battery only from Solar panels, and it doesn't consume power from Grid;
- Charge the battery to the maximum, and the energy both from Solar panels and the Grid;
- Discharge the battery，Solar power + Battery power to inverter feed in power to the maximum;
- Charge/Discharge the battery, Solar power + Battery discharge power feed in grid (the value can be set);

◆ **EPS Status**

When the grid is off, system will supply emergency power from PV or battery to supply the home loads. (Battery is necessary in EPS mode)



1) Generated solar energy
2) Self-use from battery
3) Load consumption

⚠	**WARNING!** • Make sure the load powering rating in within the EPS's output rating. Or the inverter will shut down with an "over load" warning. • When an "over load" is appeared, adjust the load power make sure it is with the range of the EPS output, and turn the inverter on. • For the nonlinear load, please pay attention to the inrush power make sure it is within the range of the EPS output.

3.3 Terminals

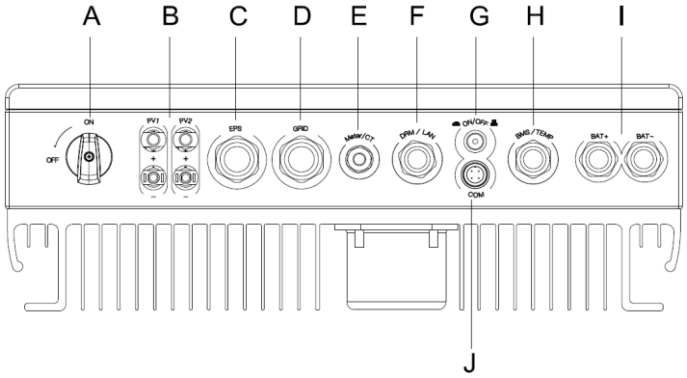


Figure 3-1 Terminals

Object	Description
A	DC switch
B	DC connector area
C	EPS output
D	Grid output
E	Outside current sensor or meter port
F	Communication port for dry contact
J	Communication port for update
G	ON/OFF button
H	Battery communication port
H	Temperature port for battery
I	Battery connector

3.4 Dimension

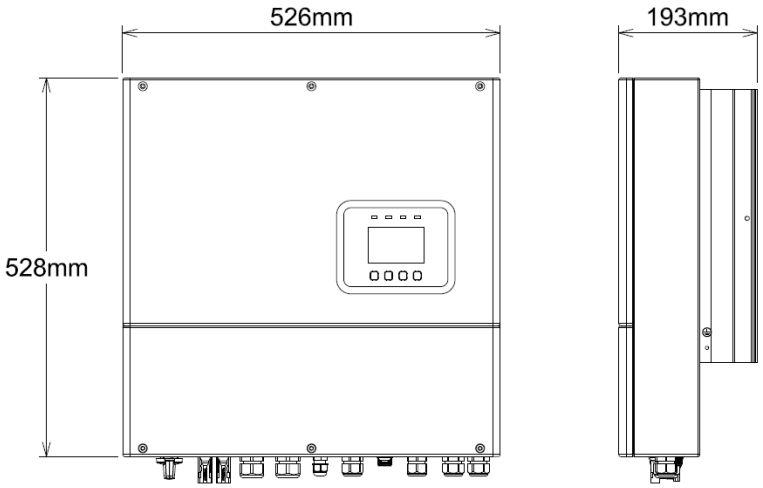


Figure 3-2 Dimension

4 Technical data

Model	ESC3000-DS	ESC3680-DS	ESC5000-DS
DC Input Data			
Max. Recommended PV Power	3900W	4600W	6500W
Max.DC Input Voltage	580V		
MPPT voltage Range	100-550V		
Start-up Voltage	110V		
No. of MPP Trackers	2		
No. of Input Strings per Tracker	1		
Max. DC Input Current	12A/12A		
DC Switch	Optional		
AC Output Data(on-grid)			
Rated AC Power	3000W	3680W	5000W[*1]
Max.output power	3000VA	3680VA	5000VA[*1]
Max. AC Current	13A	16A	21.7A
Rated AC Voltage/Range	220V/230V; 180-270V		
Grid frequency/ range	50HZ/60HZ ; ±5Hz		
Ajustable Power Factor[cos φ]	0.8leading ~0.8lagging		
Output THDi(@Rated Output)	<3%		
Ourput DC(Battery)			
Battery Type	Lead-acid battery/lithium battery		
Recommended Battery Voltage	48V		
Battery Voltage Range	40-60V		
Max. Charging / Discharging Power	3000W		
Max. Charging / Discharging Current	60A		
Communication Interface	CAN		
EPS Output(With Battery)			

EPS Rated Power	3000W		
EPS Rated Voltage	220V/230V		
EPS Rated Frequancy	50/60HZ		
EPS Rated Current	13A		
Output THDi(@Rated Output)	<3%		
Automatic switch time	<5s		
Peak power , Duration	4500W, 10S		
Efficiency			
Max.Efficiency	97.60%	97.60%	97.60%
Euro Effciency	97.00%	97.00%	97.00%
MPPT Effciency	99.90%	99.90%	99.90%
Battery Charge/Discharge efficiency	94.00%	94.00%	94.00%
Protection			
DC Insulation Monitoring	Intergrated		
Input Reverse Polarity Protection	Intergrated		
Anti-island Protection	Intergrated		
Residual Current Monitoring	Intergrated		
Over-heat Protection	Intergrated		
AC Overcurrent Protection	Intergrated		
AC Short-circuit Protection	Intergrated		
AC Overvoltage Protection	Intergrated		
DC Surge Protection	Integrated(Type III)		
AC Surge Protection	Integrated(Type III)		
General Data			
Size(Width*Height*Depth)	526*528*193mm		
Weight	29.5KG		
User Interface	LCD		
Communication	Ethernet(standard), RS485 or Wifi or GPRS		
Ambient Temperature Range	-25 ℃ ~ 60 ℃		
Relative Humidity	0-100%		
Operating Altitude	≤4000m		
Standby Self Consumption	<1W		
Topology	Transformerless		
Cooling	Natural Convection		
Protection Grades	IP65		
Noise	<35db		
Warranty	5 /7/10 years		
Certifications & Standards			
Grid Regulation	G98,G99,NRS-097 MEA, PEA, AS4777,EN50438,CEI-021		
Safety Regulation	IEC 62109-1, IEC 62109-2,IEC62040		
EMC	EN 61000-6-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4, EN 61000-4-16, EN 61000-4-18, EN 61000-4-29		

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

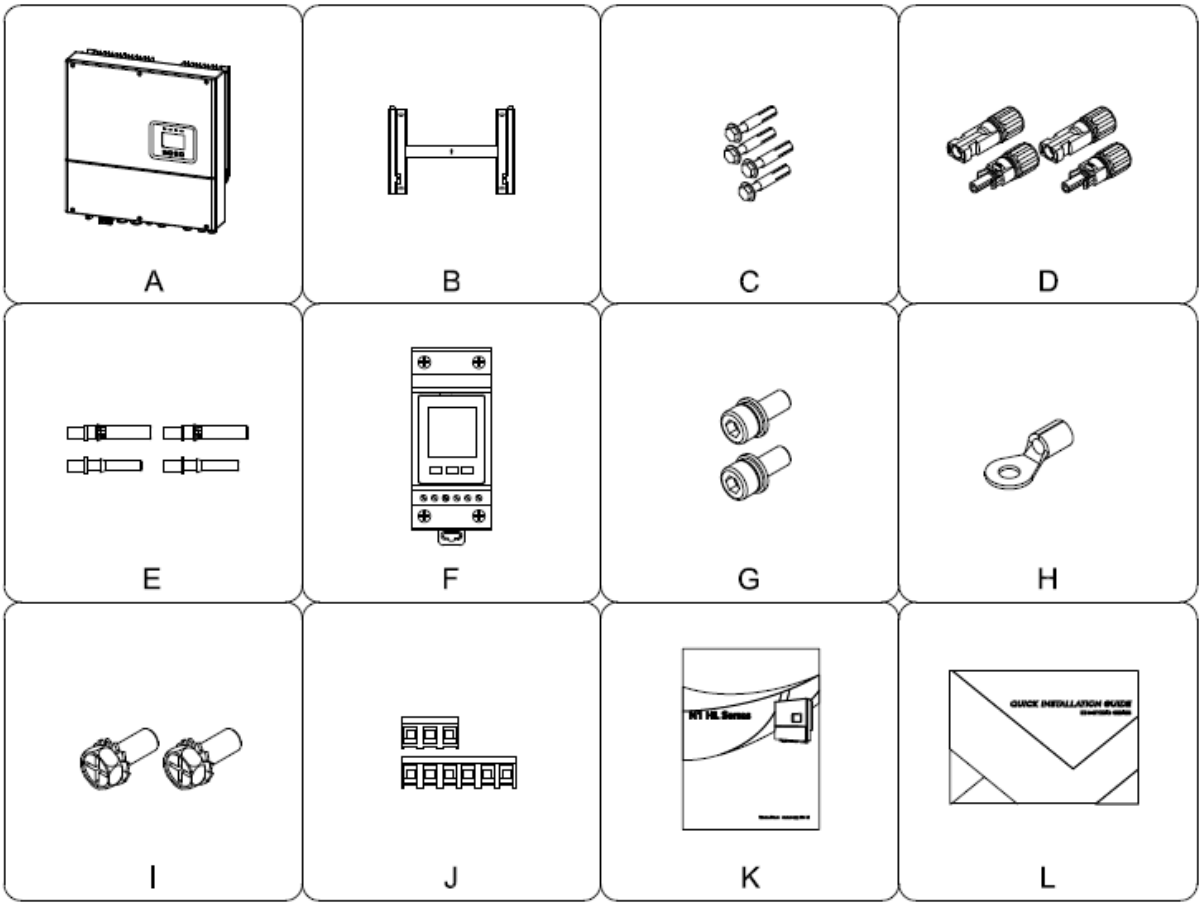
5 Grid codes

No.	National/Regional Grid Code	Description
1	VDE4105-DE	Germany power Grid, meet Grid standards “VDE-AR-N-4105”.
2	CEI0-21	Italy power Grid.
3	AS4777	Australia power Grid.
4	RD1699	Spain power Grid.
5	EN50549-TR	Turkey power Grid.
6	EN50549-DK	Denmark power Grid.
7	Greece	Greece power Grid.
8	EN50549-NL	Netherland power Grid, meet Grid standards “EN50438”.
9	C10/11	Belgium power Grid.
10	G59	UK power Grid.
11	China	China power Grid, meet Grid standards “CN-NBT”.
12	VDE0126-FR	France power Grid, meet Grid standards “VDE 0126”.
13	EN50549-PL	Poland power Grid.
14	BDEW-DE	Germany power Grid, meet Grid standards “BDEW-MV”.
15	VDE0126-DE	Germany power Grid.
16	CEI0-16	Italy power Grid, meet Grid standards “CEI 0-16”.
17	G83	UK power Grid.
18	Greece Island	Greece Island power Grid.
19	EN50549-CZ	Czech Republic power Grid, meet Grid standards “EN50438Y2007-CZ”.
20	IEC61727	India power Grid.
21	Korea	Korea power Grid.
22	EN50549-SW	Sweden power Grid.
23	China-W	China power Grid, Grid voltage range：160-290V Grid frequency range：47-53HZ.
24	China-H	China power Grid, meet standards”CQC”.
25	IEC61727-IN	India power Grid, meet Grid standards “IEC61727”.
26	Brazil	Brazil power Grid , meet Grid standards “NBT 16150”.
27	IEC61727-SL	Sri Lanka power Grid, meet Grid standards “IEC61727”.
28	Mexico	Mexico power Grid, meet Grid standards “IEC61727 60HZ”.
29	NZ4777	New Zealand power Grid.
30	Philippines	Philippines power Grid, meet Grid standards “IEC61727 60HZ spec”.
31	IEC61727-SL-W	Sri Lanka power Grid, Grid voltage range：160-290V, Grid frequency range：47-53HZ.
32	PEA	Thailand power Grid.
33	PEA-W	Thailand power Grid, Grid voltage range：160-290V, Grid frequency range：47-53HZ.
34	IEC61627-VN	Vietnam power Grid.
35	IEC61627-VN-W	Vietnam power Grid, Grid voltage range：160-290V, Grid frequency range：47-53HZ.

6 Installation

6.1 Unpacking

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



Object	Quantity	Description
A	1	ESC Series Hybrid inverter
B	1	Bracket
C	4	M8 screw
D	4	DC Connectors 2* positive, 2*negative
E	4	DC Pin contact 2* positive, 2* negative
F	1	Meter
G	2	M5 screw
H	1	Ground Terminal
I	2	Ground screw
J	1	3Pin & 6Pin terminal block male connector
K	1	Installation guide
L	1	Quick installation guide

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 and should therefore be read and kept carefully.

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

6.2 Check for transport damage

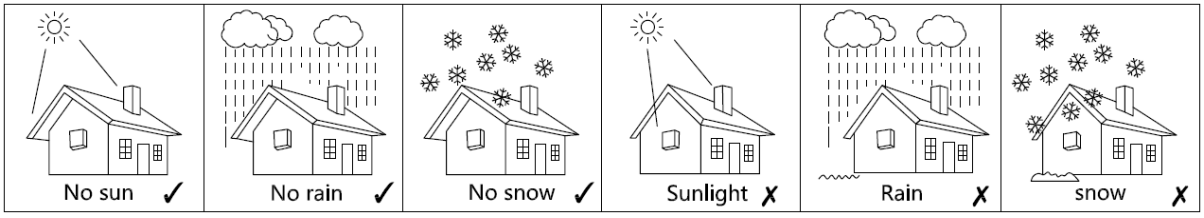
Check if the ESC-Hybrid series inverter has some visible external damage, such as cracks in the housing or display please contact with your dealer if you find any damage.

6.3 Installation precaution

The ESC-hybrid series inverter is designed for outdoor installation (IP65)

Make sure the installation site does not fall into one of the following conditions:

- Do not install the inverter in direct sunlight.
- Do not install the inverter on flammable construction material.
- Do not install the inverter in areas where highly flammable materials are stored.
- Do not install the inverter in potentially explosive areas.
- Do not install the inverter during periods of precipitation or high humidity (>95%); Moisture trapped within the location may cause corrosion and damage to the electric components.
- Provide adequate ventilation when using batteries, and also read the warning label on the bottom of the inverter.
- Install the inverter in a location that maintains an ambient air temperature that is less than 400C;That is to maintain a safe internal component temperature; the inverter would reduce power if the ambient air temperature exceeds 40°C. • The inverter should be installed in a location that is not accessible for children.
- The inverter emits a slight vibrating noise when operating, which is normal and no effect on performance.
- The slope of the wall should be within ±5°.
- The inverter is heavy, ensure the mounting place is strong enough to hold the weight of the inverter.
- If you install the inverter in a cabinet, closet or other small enclosed area, sufficient air circulation must be provided in order to dissipate the heat generated by the unit.



6.4 Available space

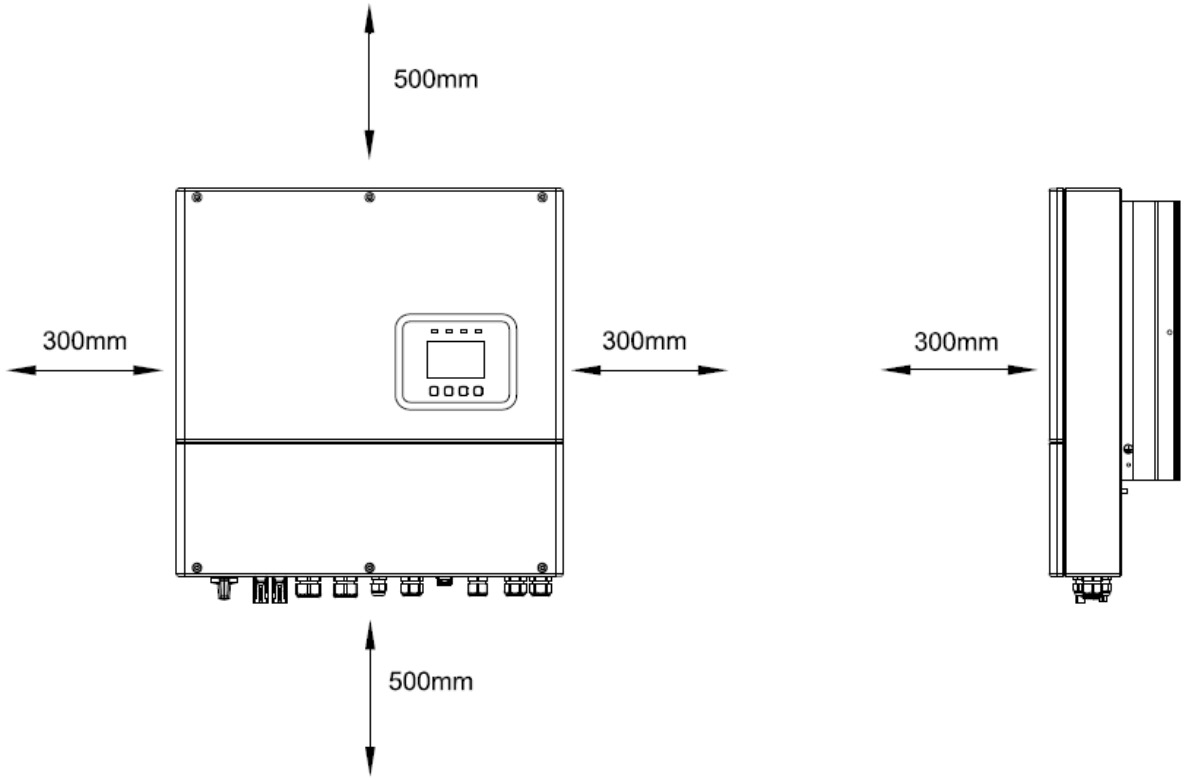
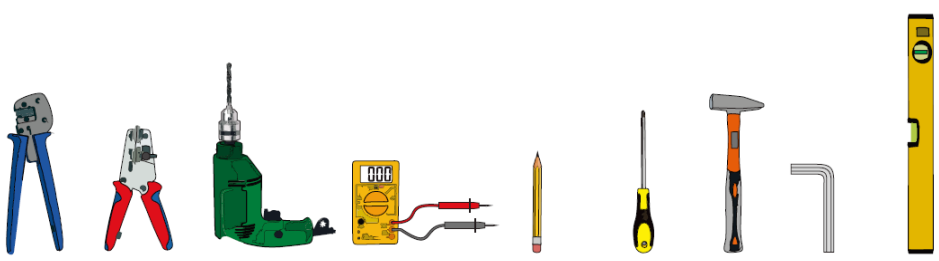


Figure 6-1 inverter space size

⚠	**WARNING!** Before installation and maintenance, AC and DC side doesn't carry electricity, but if DC side is just disconnected, capacitance still contains electricity, so please wait for at least 5 minutes to ensure the capacitors completely release the energy and inverter is not electrified.
☞	**NOTE!** Inverters should be installed by technicians.

6.5 Preparation

Below tools are needed before installation.



Installation Tools

Installation Tools: crimping pliers for binding post and RJ45, screwdriver, manual wrench, ф 6 driller and rubber hammer.

Lifting and Handling

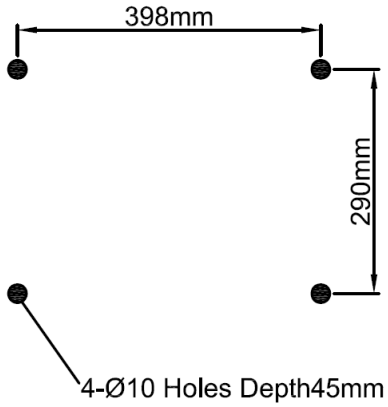
The unit is heavy. Do not lift it alone.

- 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 of lifting will not allow the unit to slip from chains and slings or turn-over or slide from lifting devices.
- Transportation must be carried by specialized person (truck operators. Hook-up personal), equipped with the necessary protection equipment (overalls, safe shoes, protective gloves, helmets, goggles)
- Do not walk or stand beneath or in the proximity of the load.
- Avoid sudden movements and jolts when unloading and positioning the unit. Internal handling procedures must be conducted with care. Do not exert leverage on the components of the machine.
- If the unit is not balanced apply ballast. Any protruding parts should not be supported by hand.
- The inverter should be installed so that the operating panel shall be easily accessible- easy access to the electrical power connection point.
- Accessible for maintenance and repair work.
- Parts serving for support or immobilization of unit shall be designed and manufactured so as to minimize the risk of physical injuries and accidental loosening of fixings.
- 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, material fatigue or ageing, This should be calculated by inspection of the design data of supporting material and consulting construction engineer.

6.6 Installation steps

Step 1: Screw the wall bracket on the wall

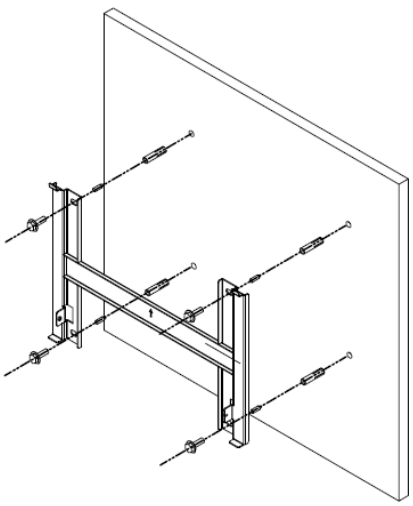
- Use the wall bracket as a template to mark the position of the 4 holes.

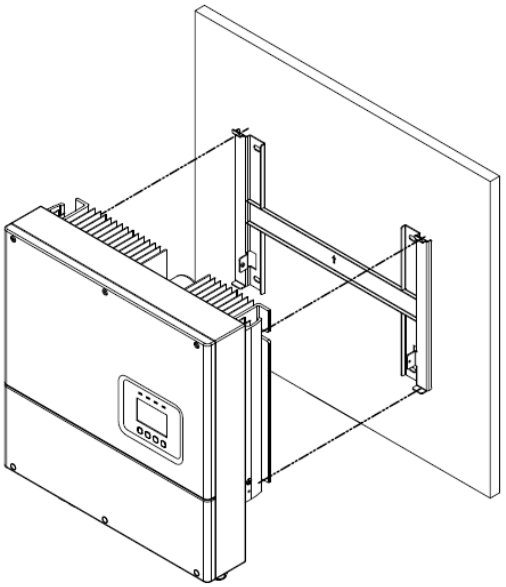


- Drill holes with ϕ10 driller carefully, make sure the holes are deep enough (at least 45mm) for install and tight the expansion tubes.
- Install the expansion tubes in the holes, and tight them. Install the wall bracket using the expansion screws in the screw package.

Step 2: Hang the ESC-Hybrid Inverter on the wall bracket.

- Transportation of the inverter needs at least 2 people, each one needs to use the handles at the sides of the inverter.
- Hang the inverter over the bracket, move the inverter close to it, slightly laydown the inverter make sure the 4 mounting bars on the back of the inverter is fixed well with 4 grooves on the bracket.





6.7 Connections of the ESC-Hybrid system

The Overview of the connection terminals of inverter please refer to Figure 3-1, and the detailed wiring connections please refer to Figure 2-1 the ESC system wiring diagram in chapter 3.1.

The main steps to connect the ESC-Hybrid system

- PV string connection
- AC output connection
- Battery connection
  - ✧ Battery power connection
  - ✧ Battery communication connection
  - ✧ Battery thermal sensor connection
- EPS connection
- Earth connection
- Communication connection

6.7.1 PV string connection

	**WARNING!** • PV module voltage is very high which belongs to dangerous voltage range, please comply with electric safety rules when connecting. • When the photovoltaic array is exposed to light, it supplies a D.C voltage to the PCE. • When there is something wrong with the modules arrays. Modules can be connected with inverter only after eliminating these problems.

ESC-hybrid series inverters can be connected in series into 2-strings PV modules, please select PV modules with excellent function and reliable quality.

Open-circuit voltage of module arrays connected in series should be <Max. DC input voltage; operating voltage should be conformed to MPPT voltage range.

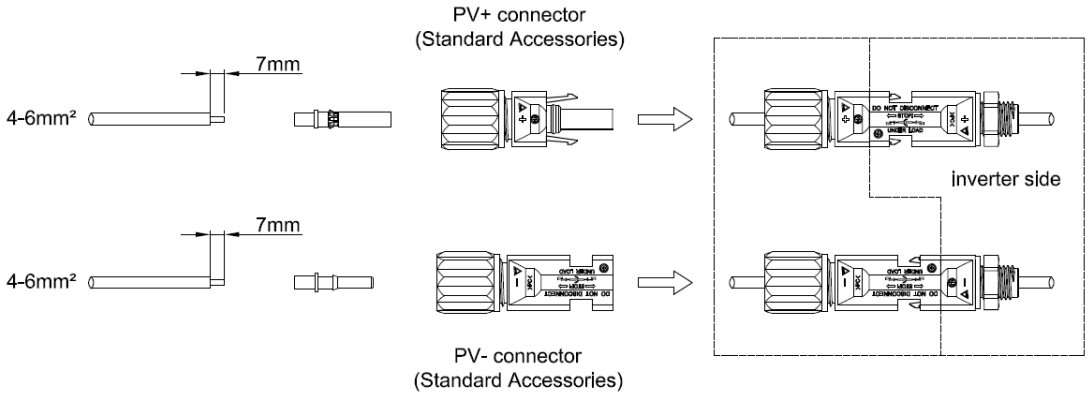
Please use PV cable to connect modules to inverter. From junction box to inverter, voltage drop is about 1-2%. So we suggest the inverter install near PV module, in order to save cable and reduce DC loss. (No longer than 30m)

	**NOTE!** • The following requirements of PV modules need to be applied for each input area; • Same type • Same quantity • Identical alignment • Identical tilt • Please do not make PV positive or negative ground!

Connection Step:

- Disconnect the DC switch.
- Choose 12 AWG wire to connect the PV module.
- Trip 7mm of insulation from the Wire end.

- Separate the DC connector.
- Insert striped cable into pin contact and ensure all conductor strands are captured in the pin contact.
- Crimp pin contact by using a crimping pliers. Put the pin contact with striped cable into the corresponding crimping pliers and crimp the contact.
- Insert pin contact through the cable nut to assemble into back of the male or female plug. When you feel or heard a “click” the pin contact assembly is seated correctly.
- Tight the DC connector.
    a. Slide the cable nut towards the back shell.
    b. Rotate the cable nut to secure the cable.
- After securing the cable tightly, align the 2 half connectors and mate them. together by hand until a “click” is felt or heard.
- Separate the DC connector
    a. Use the specified wrench tool.
    b. When separate the DC+ connector, push the tool down from upside.
    c. When separate the DC- connector, push tool down from the bottom side.
    d. Separate the connectors by hands.



⚠	**WARNING!** Before connecting, disconnecting the connection between solar generator and inverter and locked it to the open position during installation. Place a warning sign”do not turn on maintenance in progress” on the external disconnect switch when it is shut down, and make sure that on-off remote controls are inhibited.

6.7.2 AC Output connection

⚠	**WARNING!** Must comply with the connection requirement of your distribution grid.

ESC-Hybrid series inverters are designed for single phase grid. Voltage range is typical 230V according to different countries. The typical frequency is 50Hz/60Hz. Other technical requests should comply with the requirements of local public grid.

Earth conductor: PE screw terminal designed for clamping a cable lug or bar by means of a screw,nut and locking washer, before PE connection, strip the conductor end 12mm long to fit them into a cable lug or bar. For PE connection, the length of conductors between the cord anchorage and the terminal, shall be such that the current-carrying conductors became taut before the earthing conductor if the cable slips out of the cord anchorage.

Model	**ESC3000-DS**	**ESC3680-DS**	**ESC5000-DS**
Cable(Cu)	4-5mm^2	4-5mm^2	5mm^2
Micro-Breaker	20A	20A	25A

⚠	**WARNING!** Make sure you select the correct specification cables for installation. Otherwise the power will make the cable hot or burnt; it could result in death or serious injury.

Connection Step:

- Check the grid voltage and compare with the permissible voltage range. (see technical data).
- Disconnect the circuit-breaker from all the phases and secure against re-connection.
- Trip the wires:

  Trip all the wires (L, N and the PE wires) to 60mm.

  Use the crimping pliers to trip 12mm of insulation from all wire ends as below.

- Connect AC cables into the “GRID” connectors .

Selection of Fuse and Cables

Mains cable (AC line cable) shall be short circuit protected and thermal overload protected.

Always fit the input cable with fuse. Normal gG(US:CC or T) fuses will protect the input cable in short circuit situation. They will also prevent damage to adjoining equipment.

Dimension the fuses according to local safety regulations. Appropriate input voltage and the related current of the solar inverter.

AC output protected by external fuse (gG rated current 20A/250VAC for 3KW and 4KW; 25A/250VAC for 5KW) provide in all live connections to the AC supply.

The rated short circuit breaking capacity of the above protective device shall be at least equal to the prospective fault current at the point of installation.

See section technical data of this manual for details.

Ac output cable: Cu, L, N+PE,2*5 .0+5.0mm_ @40°C ambient with a max length of 5m with operating time of the fuse is less than 5seconds, installation method B2 according to EN60204-1:2006, annex D: cable in conduit cable trunking system, number of loaded circuit only one . Use H07RNF (cord designation 60245 IEC66) for an ambient temperature between 40°C and 60°C.
Note1: For conditions differing form those mentioned above ,dimension the cables according to local safety regulations, appropriate input voltage and the load and the load current of the unit.(You can choose a thicker cable but the fuses must be rated according to the cable.)
Note2: Fuses must be approved by Notified Body.
Inverter is not provided galvanic isolation from the mains to the PV array, back-feed current to the array is 20A/250VAC for 3KW and 4KW; 25A/250VAC for 5KW and 6KW, based on the fuse provided in the mains. Also in the worst case .the reverse current comprises the sum of the short-circuit currents of all intact lines.

There for the current-carrying capacity of the components and sub-assemblies provided in the end-use system (connectors, cables, junction box, switch ger, etc.). And the reverse current PV module shall be considered based on the back feed current and reverse current. The direct current (DC) circuit breaker or fuse between each solar generator and inverter shall be provided based on solar inverter input ratings.

Select DC cables based on the above inverter back-feed current and Isc PV rating and Vmax ratings.

6.7.3 Battery Connection

When you want to build a self-use storage system, the battery is a necessary part. The ESC-Hybrid inverter provides the necessary part of the interfaces to connect the battery to the inverter.

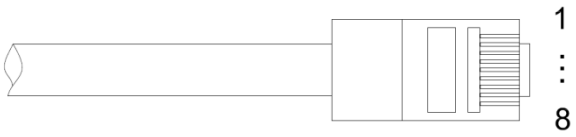
⚠	**WARNING!** Make sure you select the correct specification cables fo installation. Otherwise the power will make the cable hot or burnt; it could result in death or serious injury.

1. Battery Power Connection

- Connect one side of the battery connect wire to the inverter.
- Fit a fuse (63A slow blow) in the both positive and negative battery cable as close as possible to the battery.
- Connect the positive side of the battery connect wire to the positive side of the battery, the negative side of the battery connect wire to the negative side of the battery.
- Make sure the positive and negative side of battery are connected.

2. Battery communication connection

The communication interface between battery and inverter is CAN with a RJ45 connector. The Pin definition is as below.



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

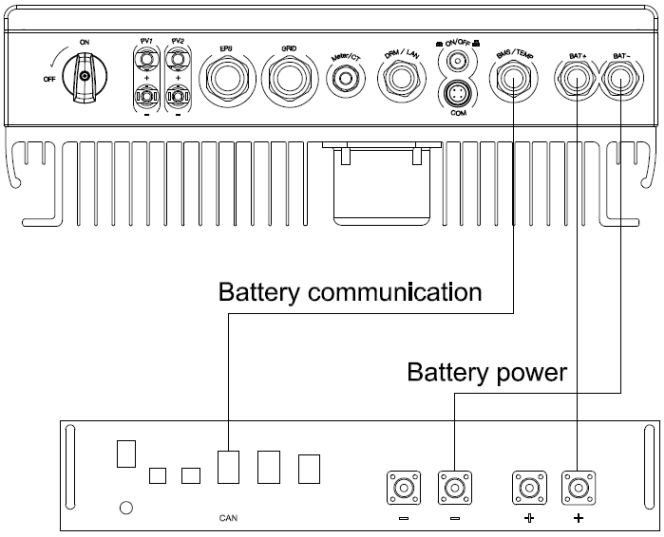
3. Battery thermal sensor connection

The thermal sensor is used to monitor the temperature of the environment, to do the temperature compensation and be ready for the winter mode for the winter. The winter mode is used to prevent the battery from the low temperature injure.

Connection Step:

- Set the RJ45 connector of the thermal sensor to the “TEMP” port of the inverter or the BMU.
- Place the other side ring of the thermal sensor near the battery for sampling the ambient temperature of battery.

Overview for all battery connections



☞	**NOTE!** • Do not place the sensor on the N Wire or the earth wire. • Do not place the sensor on the N and L wire simultaneously. • Do not place the sensor on the L wire going to the consumer. • Do not place the sensor with the arrow pointing to the generation meter. • Do not place the sensor on the non-insulated wires. • Do not place the sensor on the non-insulated wires. • The sensor can be upgraded to meter. • With a single phase meter provided by Renac Power can monitoring the 24hr usage of electric.

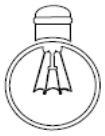
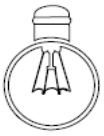
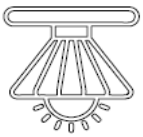
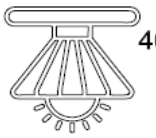
6.7.4 EPS Connection

The ESC-Hybrid inverter has on and off grid function, the inverter will have output through the grid output when the grid is on, and will have output through the EPS output when the grid is off.

This function can be achieved manually or automatically according to user's wishes. If user wants to use the off grid function manually, it need to be installed an external switch. Please refer to specific wiring diagram in Figure 2-1 of chapter 2.1. and on how to connect this external switch, the details please refer to "EPS Box user manual" .

☞	**NOTE!** In case of discrepancies between wiring mode of local policy and the operation guide above, especially for the wiring of neutral line, grounding and RCD, please contact Renac Power before any operation!

Below table shows some conventional and reasonable loads for you reference.

Type	Power		Common equipment	Example		
	Start	Rated		Equipment	Start	Rated
Resistive load	X1	X1	 Incandescent lamp	 100W Incandescent lamp	100VA (W)	100VA (W)
Capacitive load	X2	X1.5	 Fluorescent lamp	 40W Fluorescent lamp	80VA (W)	60VA (W)
Inductive load	X3~5	X2	 Fridge	 150W Fridge	450~750VA (W)	300VA (W)

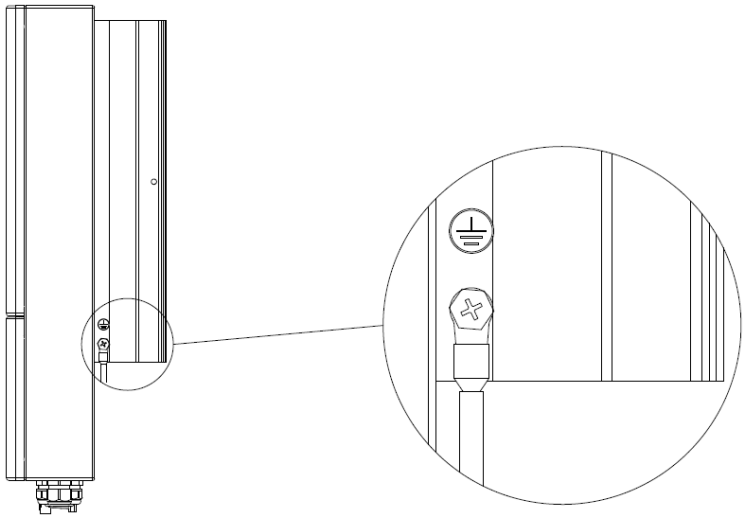
6.7.5 Earth Connection

You can additionally earth the inverter enclosure of a second earthling or equipotential bonding is required locally. This prevents touch current if the original protective conductor fails.

Cable size: 12AWG

Connection step:

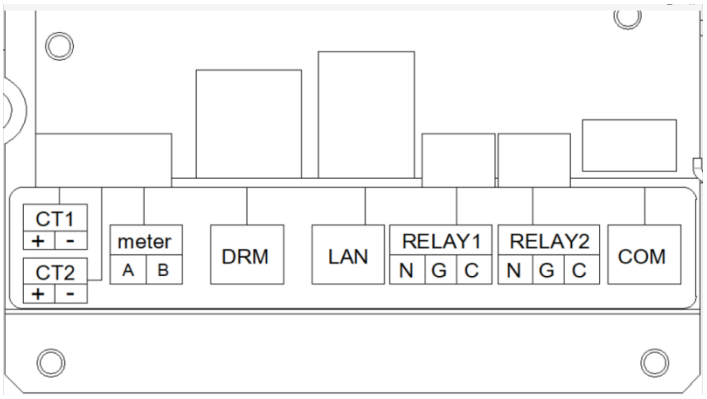
- Strip the earthling cable insulation.
- Insert the stripped cable into the ring terminal.
- Clamp the end of the ring terminal.
- Unscrew the screw of the earthling connector.
- Suit the ring terminal on the earthling connector .Suit the gasket on the earthling connector.
- Screw the screw of the earthling connector.



6.7.6 Communication connection

Communication interface

This product has a series communication interfaces besides WIFI &GPRS（optional）, LAN, Dry contact and extend port and for human and machine communication, etc., can be delivered to PC or other monitoring equipment via these interfaces.

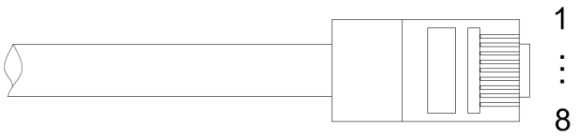


1. WIFI & GPRS

The details please refer to the WIFI and GPRS module user manual.

2. LAN

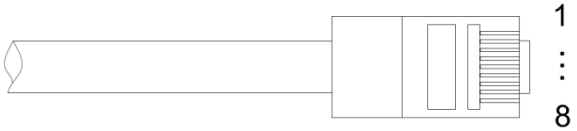
LAN communication is one standard communication interface. It transmits the data between the router and ESC-Hybrid series inverters in the local area network. User can set the parameters with specialized software provided by Renac Power. The pin definition of the connector is as below.



Pin	1	2	3	4	5	6	7	8
Function	TX+	TX-	RX+	N/C	N/C	RX-	N/C	N/C

3. Dry contact

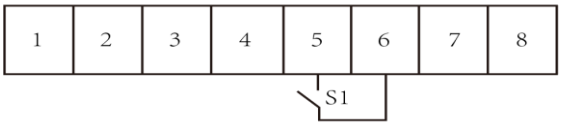
Dry contact is provided to give a remote monitor and remote control with the optional accessory. The remote monitor function provides an indication on the inverter's working status. The dry contact communication uses terminal blocks. The PIN definitions and the circuit connection are as below.



Pin	1	2	3	4	5	6	7	8
Function	AD1	AD2	AD3	AD4	+3.3V	AD0	N/C	N/C

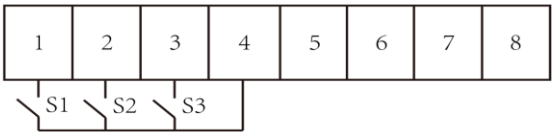
- DRM/Remote off

  The inverter will shut off if the PIN 5 and PIN 6 of DRM port are connected. together.



- Remote control for reactive power regulation

  The reactive power regulation is controlled by the signal provided by the circuit.



- Load remote control(optional)

  An optional accessory can make this function come true. External connection. between PIN1 and PIN2 of RELAY1 must be within the range of 300VAC 2A.

- Earth Fault Alarm(optional)

  The earth fault alarm is the additional detection, it will give an alarm once the. earth. impedance of the PV arrays is less than 30KΩ. External connection between PIN1 and PIN2 or RELAY2 must be within the range of 300V 2A.

6.8 Inverter manipulation

Start inverter after checking all below steps:

- Check that the device is fixed well on the wall.
- Make sure all the DC wiring and the AC wiring are completed.
- Make sure the meter or CT are connected well.
- Make sure the battery is connected correctly.

  Make sure the external EPS contactor is connected. (if needed)
- Turn on the eternal AC, DC switch.
- Turn on the DC switch to the “ON” position.
- Turn on the on/off button on the inverter.

Start 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 below:
  - All the connections are right.

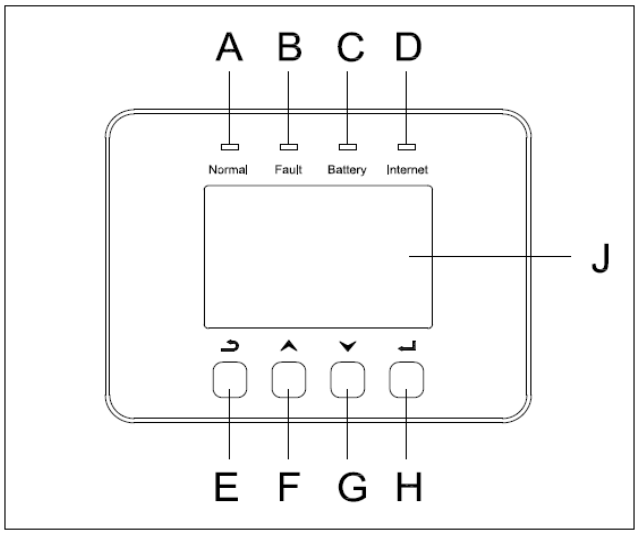
- All the external disconnect switches are closed.
- The DC switch of the inverter is in the “ ON “ positon.

- Enter the setting interface.
- Set the safety standard as page 35; Set the system time as page 35; PV connection mode as page 36; Set the work mode as page 36; Set charger as page 38; Set the EPS as page 40; Set WIFI according to the wifi manual;

☞	**NOTE!** Please set the inverter if it is the first time to start up. Above steps is for the regular start-up of the inverter. If it is the first time to start up the inverter , you need to start up the inverter.

7 Operation method

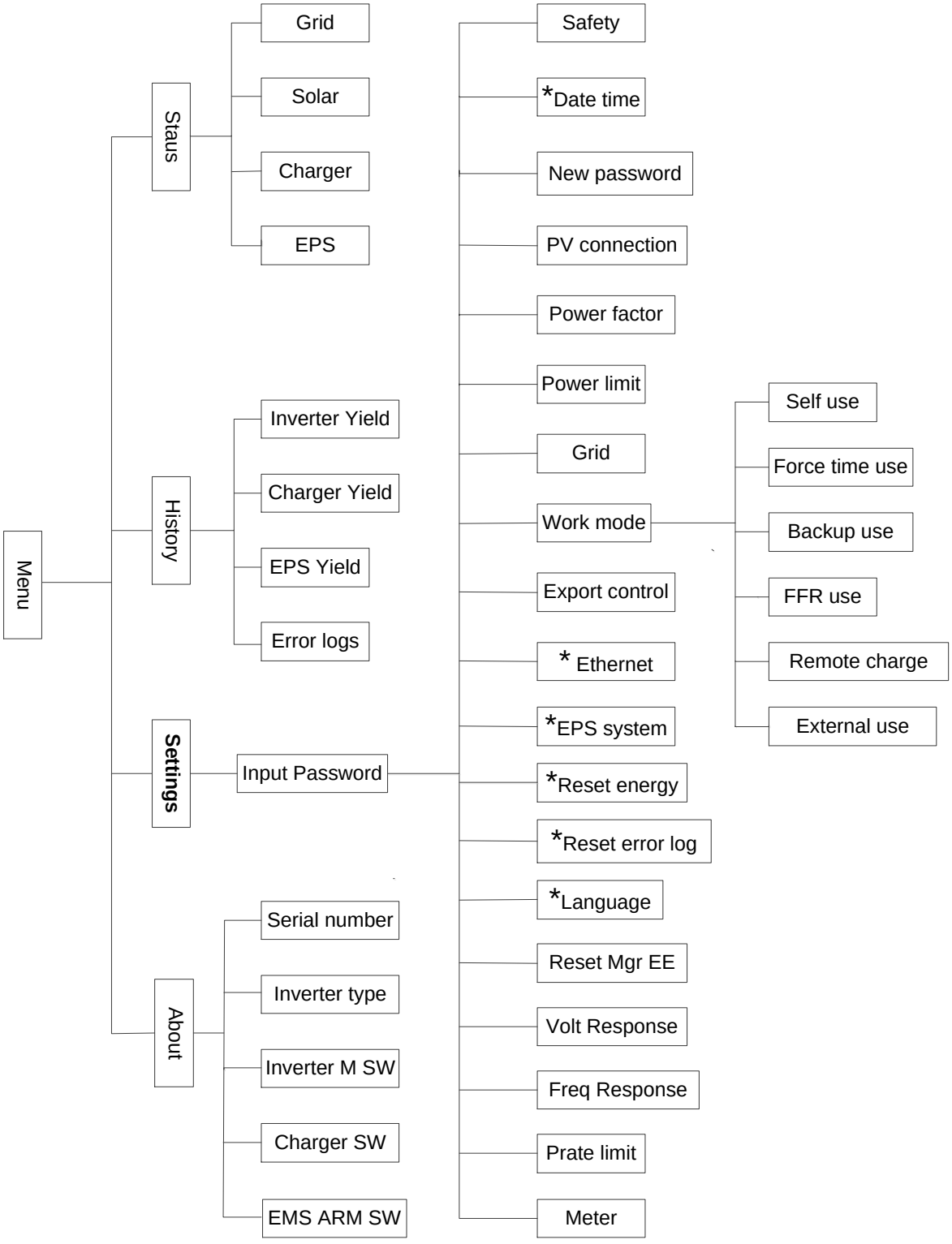
7.1 Control pane



Object	Name	Description
A	Indicator LED	Green: Normal working Status.
B		Red: Fault.
C		Blue: Battery charging or discharging.
D		Yellow: 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.

7.2 LCD function

Menu structure :



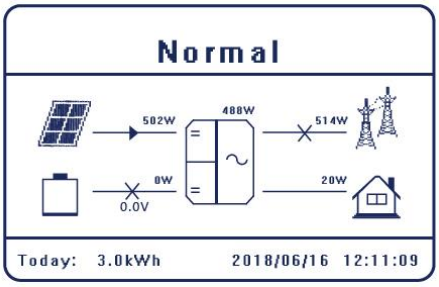
Note: * Can be set by end user (password: 0000). Others can only be set by the technician or installer with the installer password.

7.3 LCD operation

1. LCD display

The main interface is the default interface, and the inverter will automatically jump to this interface when the system starts up successfully or be not operated for a period of time.

The information of the interface is as below. “Today” means the power generated within the day. “Normal” shows the status of the inverter.



2. Menu interface

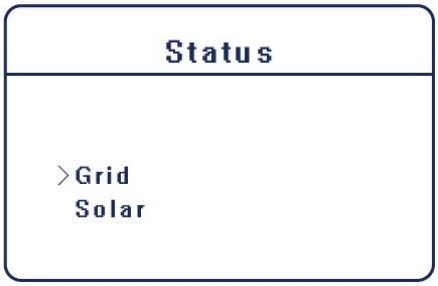
The main interface is a transfer interface for user to get into the other interface to finish the setting or to get the information.

- User can get into this interface by pressing “OK” button when the LCD displays the main interface.
- User can select interface by moving the cursor with the function button, and press “OK” to confirm.

3. Status

The status function contains four aspects of the inverter, grid , solar, battery and EPS.

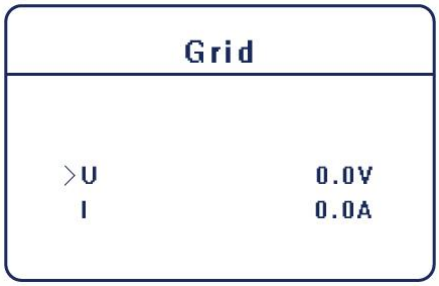
Press up and down to select and press “OK” to confirm the selection, press “ESC” to return to the Menu.



A) Grid

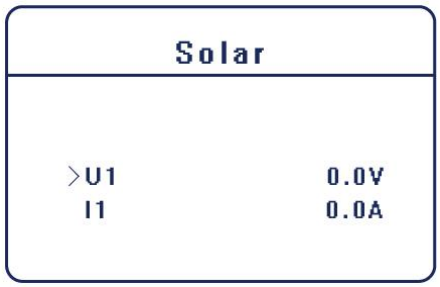
This status shows the real time grid condition such as voltage, current, output power and the local consumed power. Pout measures the output of the inverter, Pgrid measures the export to or import from the grid. Positive value means the energy feed into grid. Negative value means the energy used from grid.

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



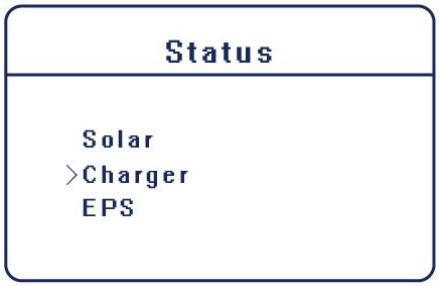
B) Solar

This status shows the real time PV condition of the system. The input voltage, current and power situation of each PV input. Press up and down button to review the parameter. Press” ESC” to return to Status.



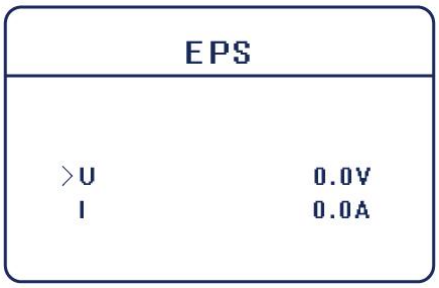
C) Charger

This status shows the charger situation of the system. Include the battery voltage, charge or discharge current. Charge or discharge power, battery capacity and battery temperature. “+” means in charging; “-” means in discharging. Press up and down button to review the parameter. Press “ESC” to return to Status.



D）EPS

EPS will only have data when the iverter 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. Press”ESC” to return to Status.



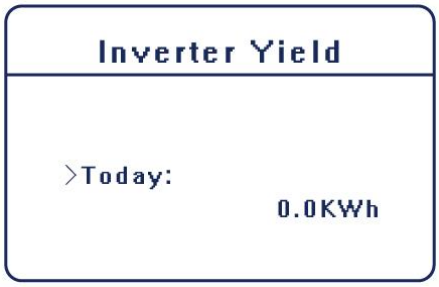
3. History

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

Press up and down to select, and press" OK" to confirm the selection, press"ESC" to return to the Menu.

A) Inverter Yield

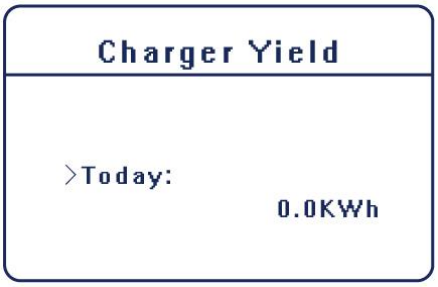
The inverter yield function contains the energy generated by today, yesterday, this month, last month and total. Press up and down button to review the parameter. Press "ESC" to return to History.



B）Charger Yield

The charger Yield function contains the energy generated from battery by today, yesterday, this month, last month and total.

Press up and down button to review the parameter. Press" ESC" to return to History.

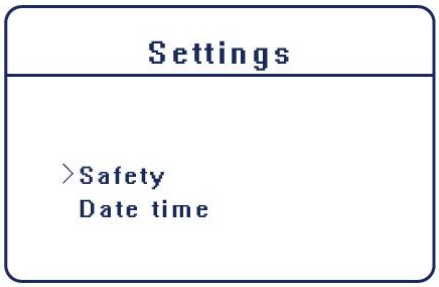


C) Error Logs

The Error logs contain the error information happened, which can record for three items. Press up and down button to review the parameter. Press " ESC" to return to History

4. Settings

Setting function is used for set the inverter for time, connection, battery, Ethernet, Grid and so on. Since the function will change the inverter's parameter, the end user with the user password as "0000" have the limited authority to change the settings. We need installer password to do the most of professional setting.



A) Password

The default password is "0000" for end user , which only allow the user to review the current setting and some easy settings. If professional change is needed, please contact with the distributor or factory for the installer password.

B) Safety

User can set safety standard according to different counties and grid tied standards, please refer to chapter 5 for the details.

C) Date time

This interface is for user to set the system date and time. Increase or decrease the word by pressing up or down button. Press "OK" to confirm and alternate to the next word. After all the words are confirmed. Press "OK" to enter the date and time.

D) New Password

User can set the new password here. We need to increase or decreased the word by pressing up or down button, Press “OK” “ to confirm and alternate to the next word.

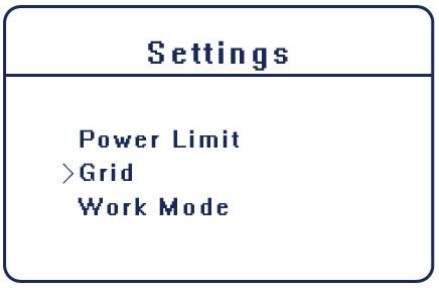
After all the words are confirmed. Press “OK” to reset the password.

E) PV Connection

This function can set the mode of PV input. There are two modes for choice; 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.

F) Power limit

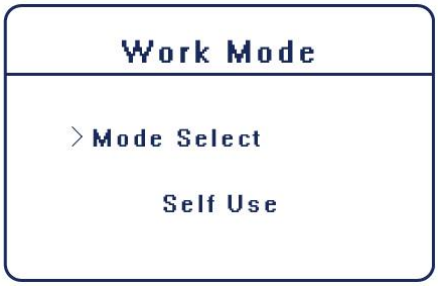
User can set the output power limitation of the inverter here, the setting value is from 0.00-1.00.



G) Work mode

The default work mode of the inverter is Self-Use mode. User can set the work mode as Self Use or Force Time Use here as describe in 3.1.

For the Force Time Use. User can set 2 periods of the start and end time of charger or discharge. Also can select if charging from grid for each charging period.



The following is the description of working modes:

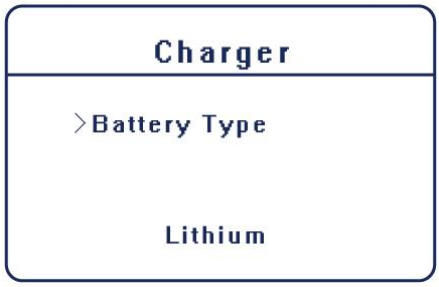
Work mode	Parameter	Comment
Force Time Use	Charger start time 1	The start time of the first charger period.
	Charger end time 1	The end time of the first charger period.
	Charger start time 2	The start time of the second charger period.
	Charger end time 2	The end time of the second charger period.
	Discharger start time 1	The start time of the first discharger period.
	Discharger end time 1	The end time of the first discharger period.
	Discharger start time 2	The start time of the second discharger period.
	Discharger end time 2	The end time of the second discharger period.
Self Use	N/A	The default work mode of the inverter.
FFR use	N/A	Firm Frequency Response.
Remote Charge	N/A	Remotely Charge / Discharge battery through RS485.
External Use	N/A	Remote control mode, local EMS unit to control two value: Solar power and battery power.

H) Export control

With this function the inverter can control the energy exported to the grid. There are user value and factory value. The factory value is default which cannot be changed by user. The user value setting by installer must be less than the factory value. Press up and down button to select and press “OK” to confirm.

I) Charger

Here the user can set the parameters of charger; the inverter is compatible with Lead acid and lithium batteries. Users can set the battery type, charge and discharge parameters, awaken mode here.Press up or down button to select and press”OK” to confirm. For the detailed parameters, please refer to below table.



Parameter	Comment
Min capacity	The remaining capacity of the battery when inverter is working in online mode.
Charge Cut Voltage	When the battery voltage reached this value, the system will stop charging the battery.
Discharge Cut Voltage	When the inverter is working in online mode the battery voltage reached this value, the system will stop discharging the battery.
Charge Absorb Voltage	For lead acid battery, when charging begins, it will enter constant voltage charging mode in order to accelerate charging speed. The value can be set for 50-58V.
Charge Float Voltage	For lead acid battery, it will switch to float charging mode after exiting constant voltage charging mode. The value can be set for 50-58V.
Charge Max Current	The charge current can be set for 0-60A. The charge power can also be set.
Discharge Max Current	The discharge current can be set for 0-60A. The charge power can also be set.

☞	**NOTE!** Please confirm the Inverter setting for maximum charge/discharge current is within the range of battery rated charge/discharge current.

Only for lithium battery and its BMS is compatible with inverter's protocol, the parameter "Min capacity" need to be set.

Example:

Lithium Battery: usually the lithium will have communication with the inverter, when the BMS is connected all the charger setting will updated to the default value as below.

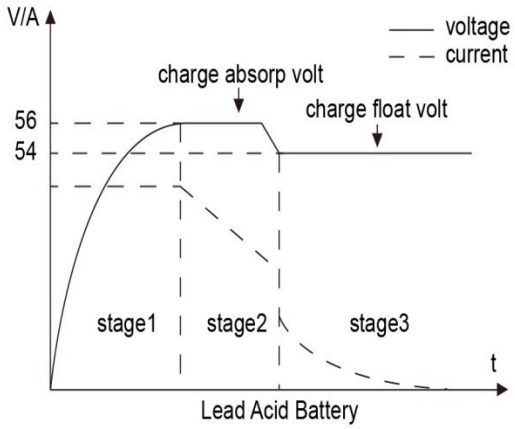
Charger	**Default value**
Min Capacity:	10%
Charge cut voltage:	53.5V
Discharge cut voltage:	47V
Charge Max current:	60A
Discharge Max current:	60A
Battery backup discharge Volt:	46V

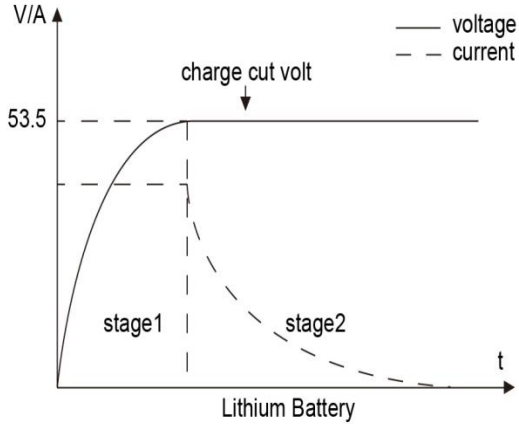
Lead acid battery: all the data need to be set as the suggestion from the battery Supplier. For default setting is as below.

Charger	**Default value**
Charge absorb voltage:	56V
Charge float voltage:	54V
Discharge cut voltage:	47V
Charge Max current:	60A
Discharge Max current:	60A
Battery backup discharge Volt:	46V

Note: Installer can set the parameters manually .The parameters"Battery backup discharge Volt" needs to be set in the EPS System page.

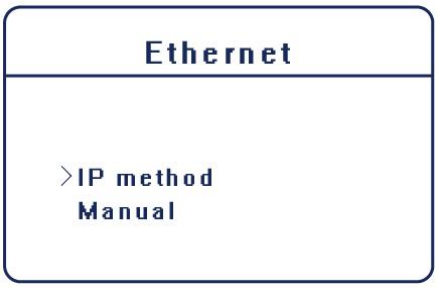
Based on the different energy platforms between lithium battery and lead acid battery, lead acid battery need to be set to 3 stages during charging, which is in order to increase its charging efficiency. In stage 1, it will be charged with constant current till the voltage rises to charge absorb volt to enter stage 2. In stage 2, it can be charged efficiently with constant voltage, then it will enter stage 3 for floating.





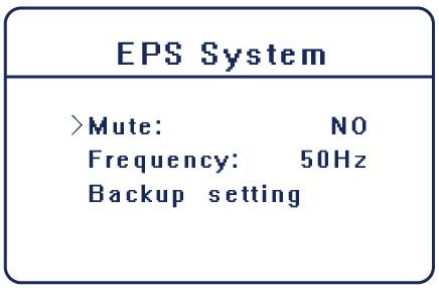
J) Ethernet

Users can set the information about Ethernet here, such as IP address, subnet mask number, and default gateway number. Press up or down button to select and press “OK” to confirm.



K) EPS system

The ESC-Hybrid inverter can work in the EPS mode. Installer can set the EPS parameters here.

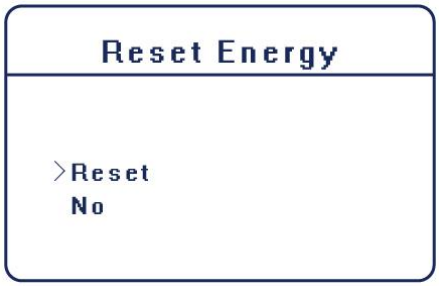


- “Mute “means you can set the warning of system which has entered EPS mode. “No “means there will be a buzzing and it is the default value. “Yes “means you choose to shut down the warning function. Besides, if the buzzing is sharp, it means EPS output takes over loads.
- “Frequency “here can be set 50Hz or 60Hz please based on correlative loads.
- “Backup setting “here can be set “Battery backup discharge Volt”.End user can only set the “Mute” and “Frequency” here.

☞	**NOTE!** 1) When you want to use the EPS function, the setting of the discharge cut voltage need to be higher than the Battery backup discharge Volt. 2) The battery backup discharge Volt is the min Voltage of the battery. 3) In online mode, the discharge cut voltage is 47V. In EPS mode, the battery backup discharge voltage is 46V. 4) You can adjust the discharge cut voltage and the battery backup discharge Voltage or increase Min capacity to adjust the Capacity for EPS usage in case you have frequently power cut.

L) Reset energy

User can reset the energy record here. Press up or down button to select and press “OK” to confirm.



M) Reset error logs

User can reset the error log here. Press up or down button to select and press “OK” to confirm.

N) Language

User can choose the language “English” or “Deutsch” here. Press up or down button to select and press “OK” to confirm.

O) About

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

8 Troubleshooting

This section contains information and procedures for solving possible problems with the ESC-Hybrid series inverters, and provides you with trouble shooting tips to identify and solve most problems that could occur with the ESC-Hybrid 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 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.

Faults	**Diagnosis and Solution**
SCI Fault	SCI communication fault •Disconnect solar power PV+ , PV- and battery, reconnect them. •Or seek help from us, if cannot go back to normal state.
CAN1 Fault	CAN communication fault • Disconnect solar power PV+ , PV- and battery, reconnect them. • Or seek help from us, if cannot go back to normal state.
SPI Fault	SPI communication fault •Disconnect solar power PV+ , PV- and battery, reconnect them. •Or seek help from us, if cannot go back to normal state.
PV Config Fault	PV Connection Setting Fault • Resetting the PV connection. • Or seek help from us, if cannot go back to normal state.
Inv EEPROM Fault	Inverter EEPROM fault • Disconnect solar power PV+ , PV- and battery, reconnect them. • Or seek help from us, if can not go back to normal state.
Sample Fault	The detection circuit Fault • Disconnect solar power PV+ , PV- and battery, reconnect them. • Or seek help from us, if cannot go back to normal state.
RCD Fault	Residual Current Device Fault • Check the impedance of DC input and AC output. • Disconnect solar power PV+ , PV- and battery, reconnect them. • Or seek help from us, if cannot go back to normal state.
Relay Fault	Relay Fault • Disconnect solar power PV+ , PV- and battery, reconnect them. • Or seek help from us, if cannot go back to normal state.
Fan Fault	Fan Device Fault • Disconnect solar power PV+ , PV- and battery, reconnect them. • Check if the fan is stopped by dust or other foreign. • Or seek help from us, if cannot go back to normal state.

Overload Fault	Over Load in EPS Mode. • Turn off high power device , press “ESC” to restart the inverter. • Or seek help from us, if cannot go back to normal state.
EPS OCP Fault	Over Current in EPS Mode. • Make sure the load power is within the EPS power range. • Check if any nonlinear load is connect on the EPS. Remove this load to check if can recover. • Or seek help from us, if cannot go back to normal state.
DCI Device Fault	DCI Device Fault • Disconnect solar power PV+ , PV- and battery, reconnect them. • Or seek help from us, if cannot go back to normal state.
AC HCT Fault	AC Current Sensor Fault • Disconnect solar power PV+ , PV- and battery, reconnect them. • Or seek help from us, if cannot go back to normal state.
EPS Relay Fault	EPS Relay Fault • Disconnect solar power PV+ , PV- , grid and battery, reconnect them. • Or seek help from us, if cannot go back to normal state.
TZ Protect Fault	Over current Fault. • Wait for a while to check if go back to normal status. • Disconnect solar power PV+ , PV- and battery, reconnect them. • Or seek help from us, if cannot go back to normal state.
Grid Lost Fault	Grid is Lost. • System will reconnect if the utility is back to normal. • Or seek help from us.
Grid Volt Fault	Grid Voltage Out of Range • System will reconnect if the utility is back to normal. • Or seek help from us.
Grid Freq Fault	Grid Frequency out of range • System will reconnect if the utility is back to normal. • Or seek help from us.
PLL Lost Fault	The Grid is Not Good. • System will reconnect if the utility is back to normal. • Or seek help from us.
Bus Volt Fault	Bus Voltage out of Normal Range. • Disconnect solar power PV+ , PV- and battery, reconnect them. • Check if the PV input is within the range of the inverter. • Or seek help from us, if cannot go back to normal state.
In OCP Fault	Inverter over current protection fault • Wait for a while to check if back to normal. • Or seek for help from us.
PV Volt Fault	PV Voltage Fault • Check the output of the PV voltage. • Or seek for help from us.
AC10M Volt Fault	The grid's Voltage is out of range for the last 10 minutes. • The system will back to normal if the grid is back • Or seek for help from us.
Isolation Fault	Isolation Fault • Check the connection of the inverter. • Or seek for help from us.

Temp Over Fault	Temperature over the limitation • Check if the fan is running normally. • Check if the environment temperature is over limitation. • Or seek help from us.
Cr Can Fault	The battery groups can communication fault. • Reconnect the charger communication cable. • Or seek help from us.
Cr Temp High	The battery charger is over temperature. • Check if the air ducting of the charger is blocked. • Improve the working environment or reduce the charging or discharging current. • Or ,Seek help from us.
Cr FAN Fault	The fan of the charger is broken. • Check if the fan is working normally. • Check if anything blocking the fan. • Or, Seek help from us.
Cr TZ Fault	The protection of the charger fault. • Wait for a while to check if back to normal. • Or, Seek help from us.
Cr EEPROM Fault	The charger's EEPROM fault. • Wait for a while to check if back to normal. • Or, Seek for help from us.
Cr HCT1/HCI2 Fault	The charger's current detection fault. • Reconnect the charger. • Or, Seek for help from us.
Cr Temp Low	The charger is under temperature • Improve the working environment of the charger. • Or, Seek for help from us.
Cr Boost OVP	The Boost voltage of the charger over limit. • Wait for a while to check if back to normal. • Or. Seek for help from us.
Cr Bat OVP	The battery voltage is over limit. • Wait for a while to check if back to normal. • Or, Seek for help from us.
Cr Bus OVP	The Bus voltage of the charger over limit. • Wait for a while to check if back to normal. • Or, Seek for help from us.
Cr Charger OCP	The charger is over current protected. • Wait for a while to check if back to normal. • Or, Seek help from us.
Cr Boost OCP	The boost current of the charger is over limit. • Wait for a while to check if back to normal. • Or, Seek help from us.
Meter lost	The meter is not connected well. Check the connection of the C T or the meter. Or, Seek help from us.
DCI OCP Fault	DCI over current protection Fault. • Wait for a while to check if back to normal. • Or seek for help from us.
Other device Fault	Other device fault. • Turn off the PV, battery and grid , reconnect them. • Or seek for help from us if cannot back to normal.
SW OCP Fault	Over current fault detected by software. • Turn off the PV, battery and grid , reconnect them. • Or seek for help from us if cannot back to normal.

Dm9000 Fault	Network DSP fault. • Turn off the PV, battery and grid , reconnect them. • Or seek for help from us if cannot back to normal.
RTC Fault	RTC Fault • Turn off the PV, battery and grid , reconnect them. • Or seek for help from us if cannot back to normal.
Mgr EEPROM Fault	Manager EEPROM Fault. • Turn off the PV, battery and grid , reconnect them. • Or seek for help from us if cannot back to normal.
Mgr CAN Fault	Manager CAN Fault • Turn off the PV, battery and grid , reconnect them. • Or seek for help from us if cannot back to normal.
Cr SPI Fault	Charge can communication fault. • Turn off the PV, battery and grid , reconnect them. • Or seek for help from us if cannot back to normal.
Cr TZ Fault	Charge over current detected by hardware. • Turn off the PV, battery and grid , reconnect them. • Or seek for help from us if cannot back to normal.
Cr sample Fault	Charge sample fault. • Turn off the PV, battery and grid , reconnect them. • Or seek for help from us if cannot back to normal.

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.

9 Decommissioning

9.1 Dementling the 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.

9.2 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.

9.3 Storage

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

9.4 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.

Renac Power Technology Co.,Ltd.

Contact information

If you have any further technical questions about our products, please contact us:

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Email: Service@renacpower.com
Web: www.renacpower.com

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