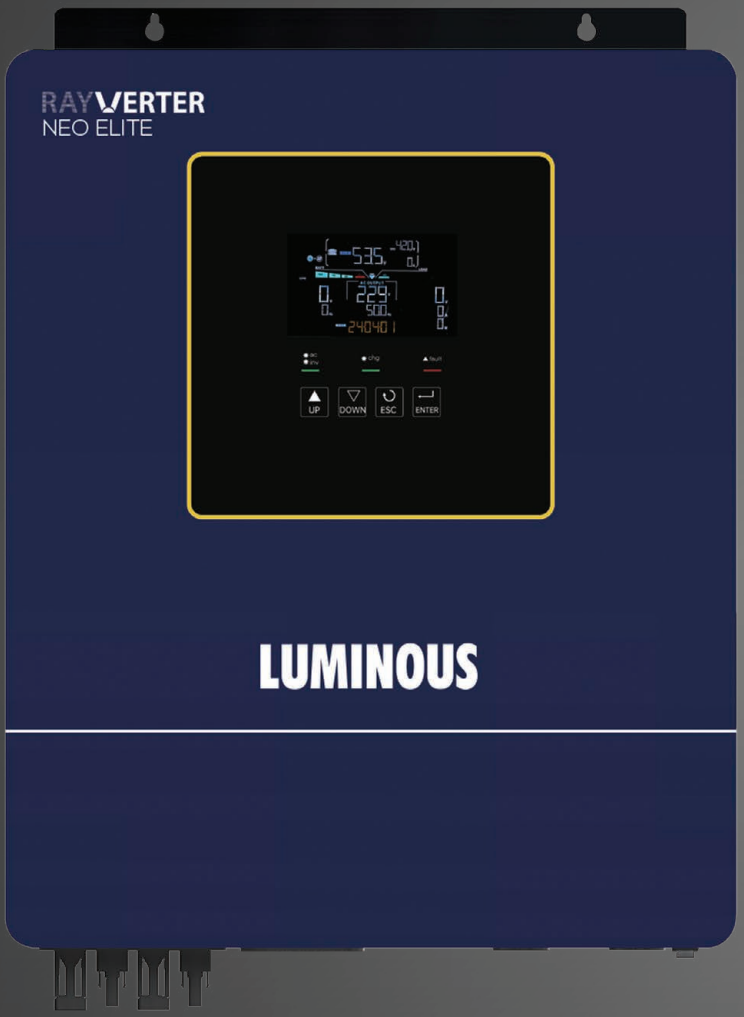
EXPORT ONLY

LUMINOUS

SOLAR



RAYVERTER

NEO ELITE

8KVA | 48V, 11KVA | 48V

Installation and Operation Manual

Contents

1. ABOUT THIS MANUAL

1.1 Purpose

This manual describes the assembly, installation, operation and troubleshooting of this unit.
Please read this manual carefully before installations and operations. Keep this manual for future reference.

1.2 Scope

This manual provides safety guidelines of installation, and the information on tools and wiring.

1.3 Safety instructions

WARNING: This chapter contains important safety and operating instructions.
Read and keep this manual for future reference.

1. Read and follow all installation, operation, and maintenance in formation carefully before using the product.
2. **CAUTION:** To reduce risk of injury, charge only deep - cycle lead acid type rechargeable batteries .Other types of batteries may burst, causing personal injury and damage.
3. Do not disassemble the unit personally. Take it to a qualified service center to repair
4. To reduce risk of electric shock, disconnect all wiring before attempting any maintenance or cleaning, turning off the unit will not reduce this risk.
5. **WARNING:** Disconnecting all power supply before any maintaining or cleaning, please noted that if you only turn off the unit are not safe enough.
6. **WARNING:** Only qualified service persons are allowed to operate this product. If fault not solved after following troubleshooting table, please send this inverter back to local dealer or service center for maintenance.
7. **WARNING:** Because this inverter is non-isolated, only three types of PV modules are adaptable: single crystalline, poly crystalline with class A-rated and CIGS modules. To avoid any malfunction, do not connect any PV modules which likely with current leakage flow to the inverter. For example, grounded PV modules may cause current leakage flow to the inverter. When using CIGS modules, please be sure of NO grounding.
8. **CAUTION:** It's requested to use PV junction box with surge protection. Otherwise, it may cause damage on inverter.

2. INTRODUCTION

This is a multifunctional inverter, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user configurable and easily accessible operation such as battery charging, AC/solar charging, and acceptable input voltage based on different applications.

2.1 Features

1. Grid-connected pure sine wave inverter.
2. Output power factor COS ϕ=1.0.
3. Support peak valley charging control.
4. Configurable AC/Solar Charger priority via touch screen.
5. Smart battery charger design for optimized battery performance.
6. Compatible with Utility and generator.
7. Overload, over temperature, short circuit protection, fault record, history record.
8. Built-in WIFI data logger (optional).
9. Parallel operation up to 6 units.
10. Two channels output.
11. Reserved BMS communication port (RS485&CAN).

2.2 Basic System Architecture

The following illustration shows basic application of this inverter. It also includes following devices to have a complete running system.

- Generator or Utility
- PV modules

Consult with your system integrator for other possible system architectures depending on your requirements. This inverter can power all kinds of appliances in home or office environment, including motor type appliances such as refrigerator and air conditioner.

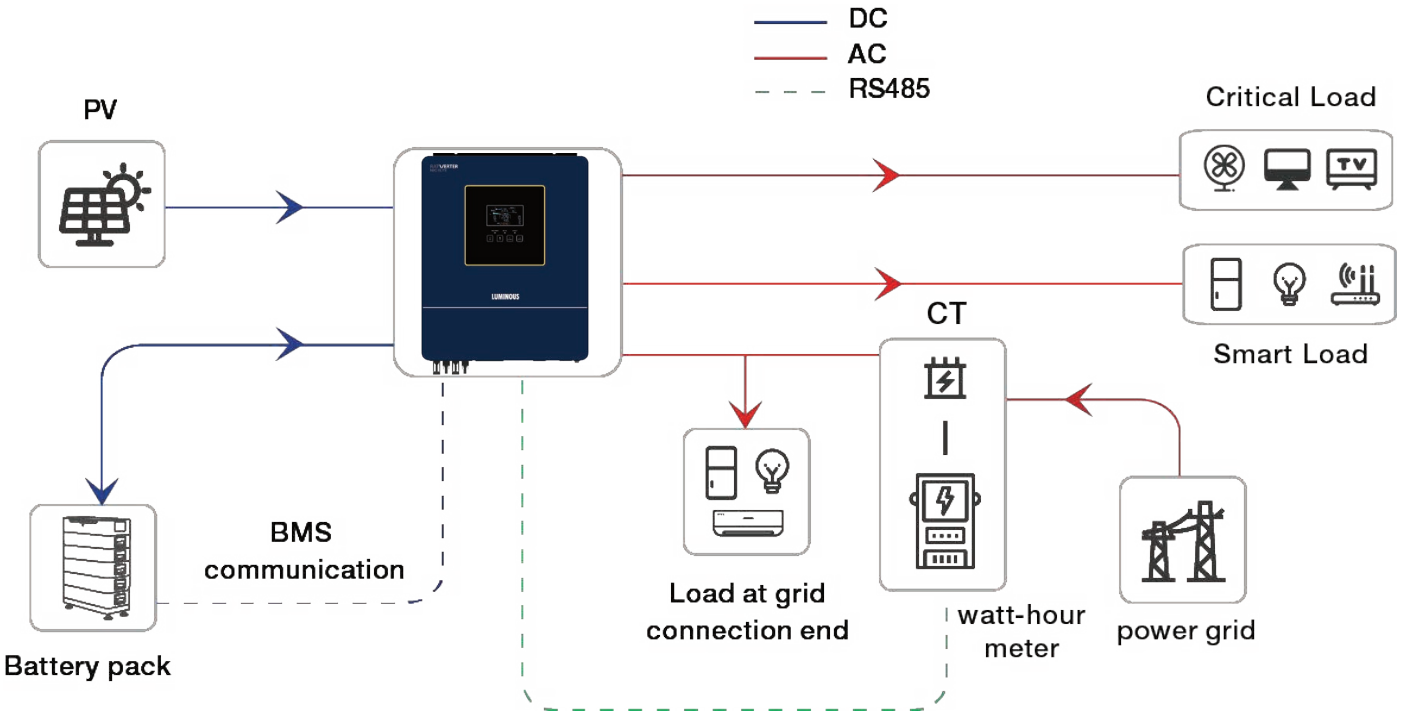
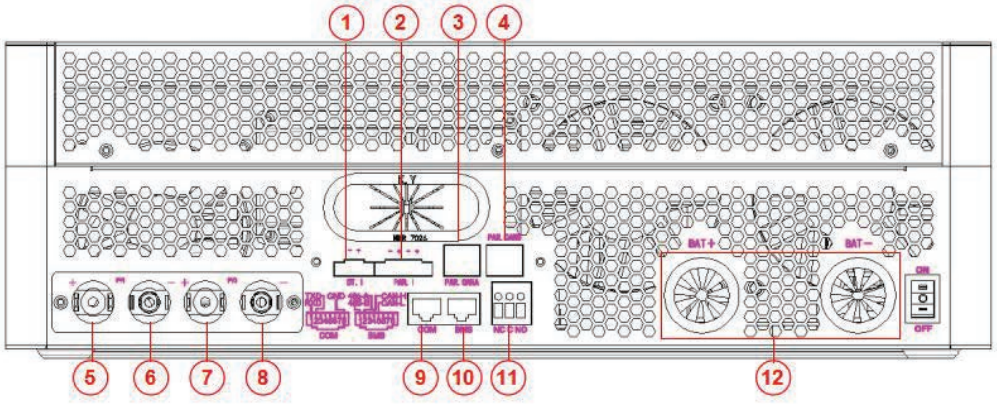
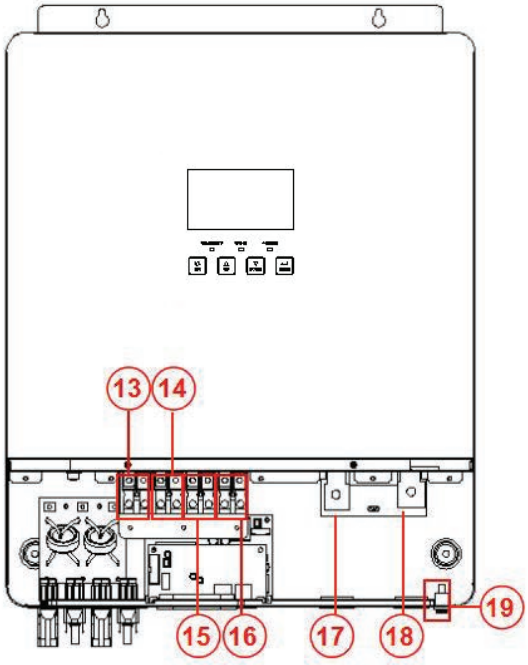


Figure 1

2.3 Product Overview



1. CT port (Optional)
2. Current sharing port
3. PAR.CANA
4. PAR.CANB
5. PV2 positive connector
6. PV2 negative connector
7. PV1 positive connector
8. PV1 negative connector
9. COMM port
10. BMS port
11. Generator dry contact
12. Battery terminals

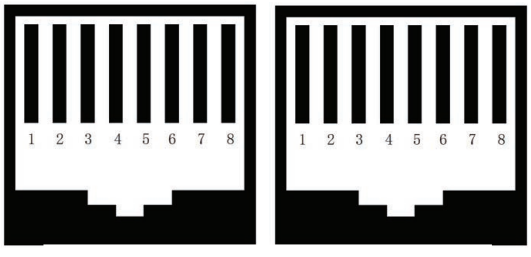


13. GEN
14. AC input terminal
15. O/P.Master
16. O/P.Slave(Second output)
17. Battery positive
18. Battery negative
19. Power on/off switch

Note: RS485,CAN communication share the same port ,so it can't be used at the same time.

Communication port definition:

COMM: RS232	1: RXD, 2: TXD 4: +VCC ,8: GND
BMS: RS485 CAN	1: 485-B , 2: 485-A 4: CAN-H , 5: CAN-L



3. INSTALLATION

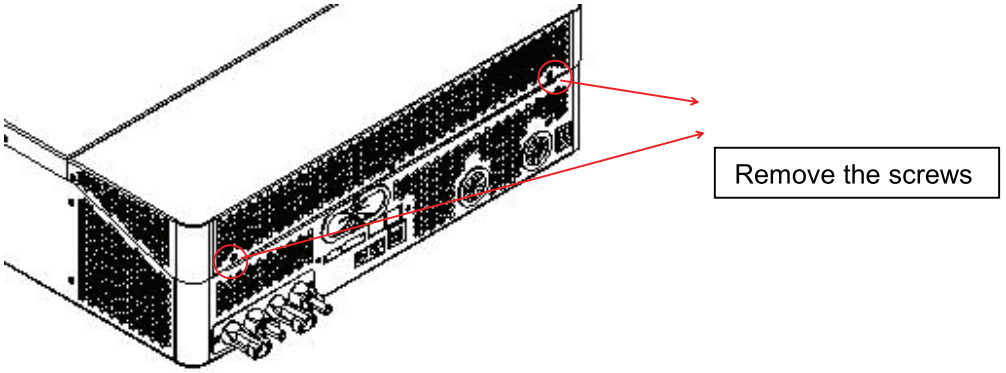
3.1 Unpacking and Inspection

Before installation, please inspect the unit. Be sure that everything in the package is not damaged. The following items inside of package would be received.

- The inverter x1
- User manual x 1
- BMS communication cable x 1
- Parallel communication cable x 1(No parallel machine ,No need)
- Current sharing cable x 1 (No parallel machine ,No need)
- PV connectors x 2 sets

3.2 Preparation

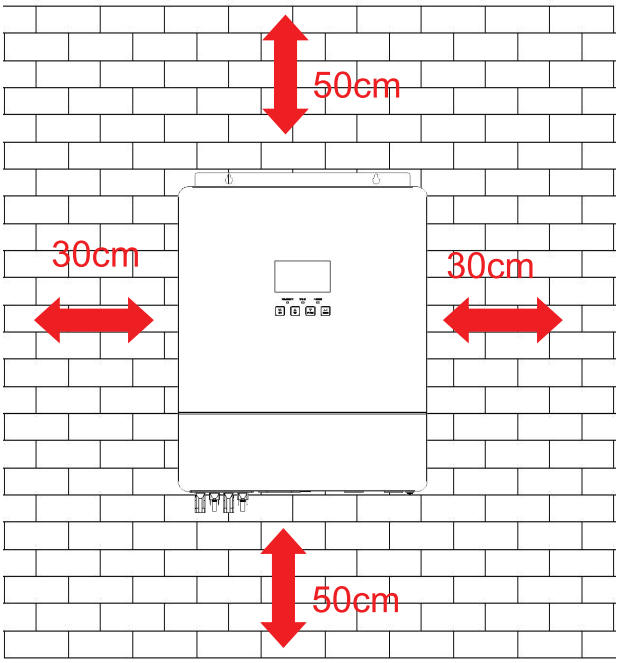
Please remove the two screws on the cover of the device before opening it.



3.3 Mounting the Unit

Consider the below points before selecting where to install:

1. Do not mount the inverter on the surface of flammable construction materials.
2. Mount on the surface of solid material.
3. Install this inverter at a visible place in order to allow the LCD display to be read at all times.
4. For proper air circulation and heat dissipate, make sure there is 20 cm distance from the two side 50 cm distance from bottom of the unit.



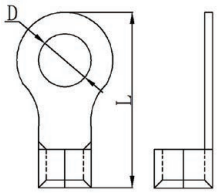
5. The ambient temperature should be between -10°C and 50°C to ensure optimal operation.
6. The recommended installation position is to be adhered to the wall vertically.
7. Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and to have enough space for collecting wires. Suitable for mounting on concrete or other non-combustible surface only

3.4 Battery Connection

CAUTION: For safety operation and regulation compliance, it's requested to adopt a separate DC over-current protector or disconnect device between battery and inverter. It may not be necessary to have a disconnect device in some applications, however, it's still need to have adopt over-current protection device. Please refer to typical amperage in below table as required fuse or breaker size.

WARNING! All wiring must be performed by qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable as below.



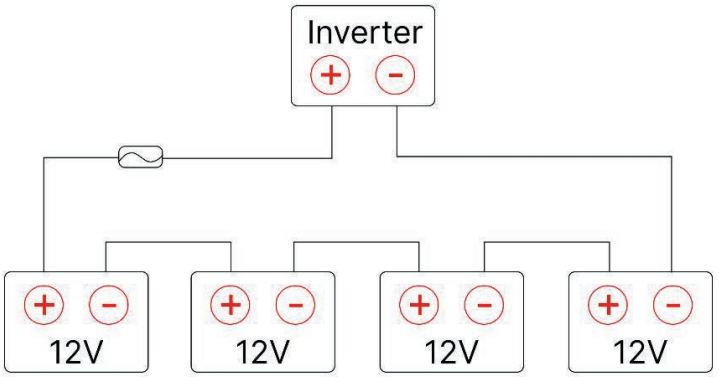
Recommended cable:

Model	Typical amperage	Battery capacity	Gauge	Cable(mm²) each
8kW	182.2A	200Ah	1/0AWG	70
11kW	228A	250Ah	1*3/0AWG	85

Please follow below steps to implement battery connection:

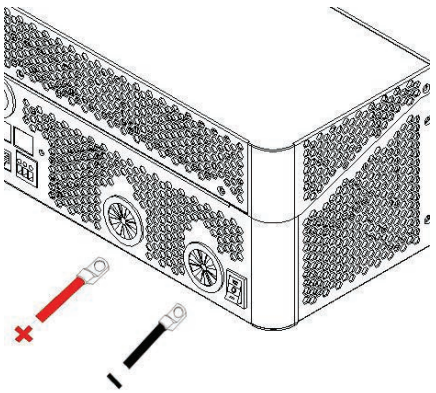
1. Assemble battery ring terminal based on recommended battery cable and terminal size.
2. Fix two cable glands into positive and negative terminals.

48VDC battery connection diagram



3. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the nuts are tightened with torque of 5 Nm. Make sure polarity at both the battery and the inverter/charge is correctly connected and ring terminals are tightly screwed to the battery terminals.

NOTE: The following picture is only a schematic diagram of the equipment .If the actual chassis does not conform to the schematic due to a structural upgrade, it is subject to prior notice.



WARNING: Shock Hazard

Installation must be performed with care due to high battery voltage in series

CAUTION! Before making the final DC connection or closing DC breaker/disconnection, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

3.5 GEN / AC Input / Output Connection

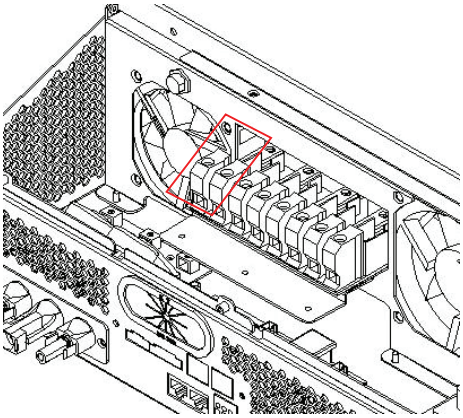
CAUTION! Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. There commended spec of AC breaker is 70A . There are three terminal blocks with “IN” and “OUT” markings. Please do NOT connect input and output connectors wrong.
WARNING! All wiring must be performed by qualified personnel. It's very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.

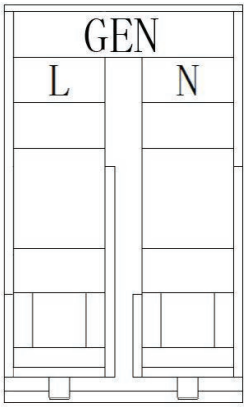
Model	Gauge	Torque Value
8kW	8AWG	1.4-1.6 Nm
11kW	6AWG	

Please follow below steps to implement GEN/AC input/output connection:
1. Before making AC input/output connection, be sure to protector disconnected first.
2. Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.
3. Fix two cable glands into input and output sides.
4. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws.

Be sure to connect PE protective conductor (⏚) first.

⏚**→Ground (yellow-green)**
L→LINE (brown or black)
N→Neutral (blue)
NOTE: The following picture is only a schematic diagram of the equipment .If the actual chassis does not conform to the schematic due to a structural upgrade, it is subject to prior notice.

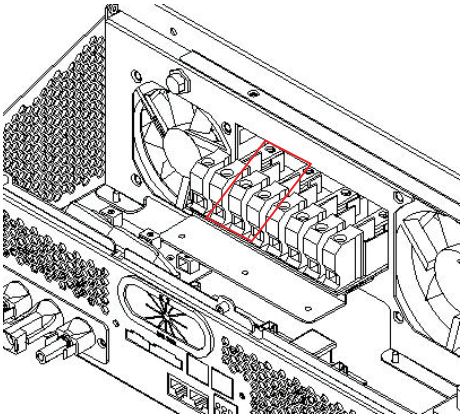


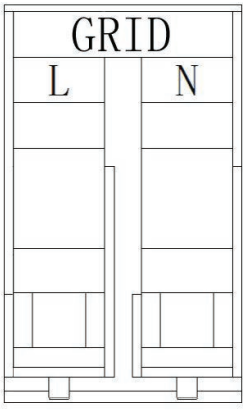


WARNING:
Be sure that AC power source is disconnected before connect wire to the unit.
5. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws.

Be sure to connect PE protective conductor (⏚) first.

⏚**→Ground (yellow-green)**
L→LINE (brown or black)
N→Neutral (blue)
NOTE: The following picture is only a schematic diagram of the equipment .If the actual chassis does not conform to the schematic due to a structural upgrade, it is subject to prior notice.



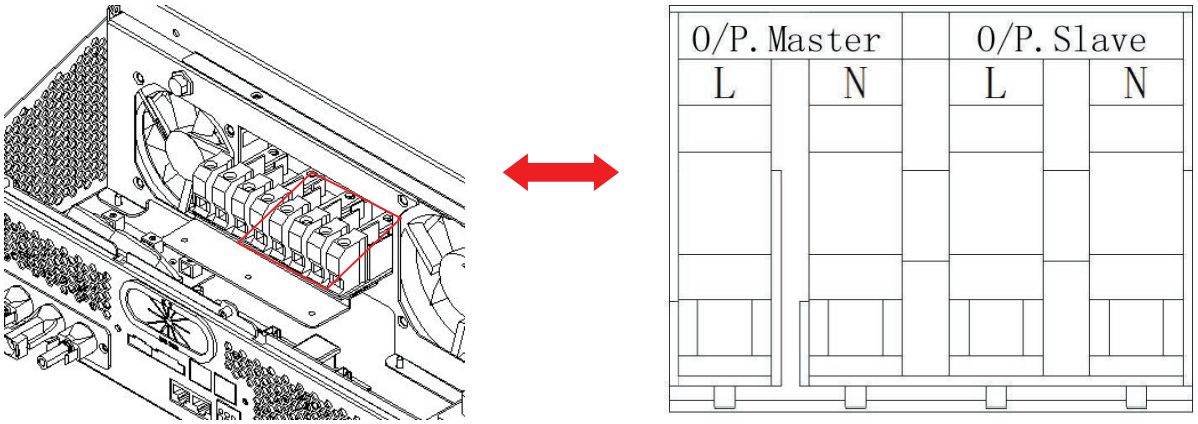


This inverter is equipped with dual-output.There are four terminals(Master:L/N,Slave:L/N[second output])available on output port.It's set up through LCD program "BAT Para" control the second output .Refer to "LCD setting"section for the details.

6. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (⏚) first.

⏚→**Ground (yellow-green)**
L→LINE (brown or black)
N→Neutral (blue)

NOTE: The following picture is only a schematic diagram of the equipment .If the actual chassis does not conform to the schematic due to a structural upgrade, it is subject to prior notice.



7. Make sure the wires are securely connected.

CAUTION: Important

Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

CAUTION: Appliances such as air conditioner requires at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter/charger will be trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

3.6 PV Connection

CAUTION: It is forbidden for inverter to share the same solar panel group.

CAUTION: Before connecting to PV modules, please install separately a DC circuit breaker between inverter and PV modules.

WARNING: It's very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper cable size as below.

Model	Gauge	Cable (mm^2)	Torque Value
8kW	10AWG	6	1.2-1.6 Nm
11kW			

WARNING: Because this inverter is non-isolated, only three types of PV modules are acceptable:
Single crystalline, poly crystalline with class A-rated and CIGS modules .To avoid any malfunction do not connect any PV modules with possible current leakage together inverter. For example, grounded PV modules will cause current leakage to the inverter.
When using CIGS modules, please be sure NO grounding connection.

CAUTION: It's requested to use PV junction box with surge protection. Otherwise, it will cause damage on inverter when lightning occurs on PV modules.

Step 1: Check the input voltage of PV array modules. This system is applied with two strings of PV array. Please make sure that the maximum current load of each PV input connector is 30A.

CAUTION: Exceeding the maximum input voltage can destroy the unit!! Check the system before wire connection.

Step 2: Disconnect the circuit breaker and switch off the DC switch.

Step 3: Assemble provided PV connectors with PV modules by the following steps.

Components for PV connectors and Tools:

Female connector housing	
Female terminal	
Male connector housing	
Male terminal	
Crimping tool and spanner	

Prepare the cable and follow the connector assembly process:
Strip one cable 8 mm on both end sides and be careful NOT to nick conductors.

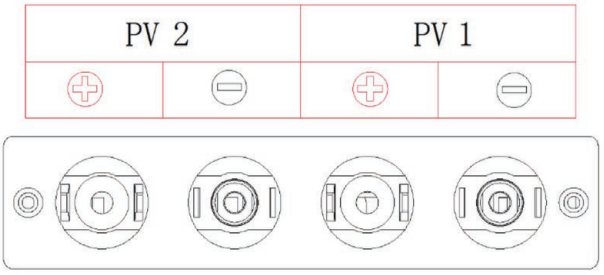
Insert striped cable into female terminal and crimp female terminal as shown below.

Insert assembled cable into female connector housing as shown below.

Insert striped cable into male terminal and crimp male terminal as shown below.

Insert assembled cable into male connector housing as shown below.

Step 4: Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.

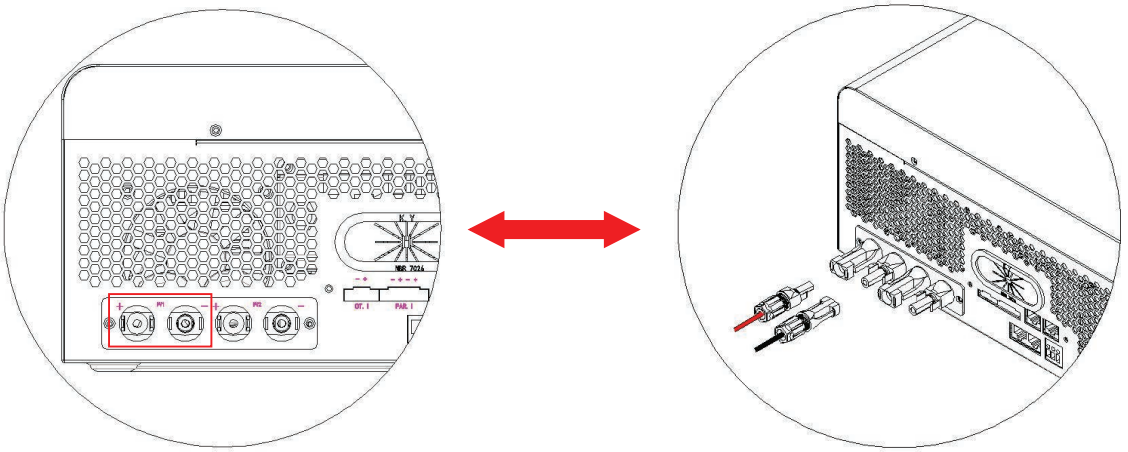


WARNING! For safety and efficiency, it's very important to use appropriate cables for PV module connection. To reduce risk of injury, please use the proper cable size as recommended below.

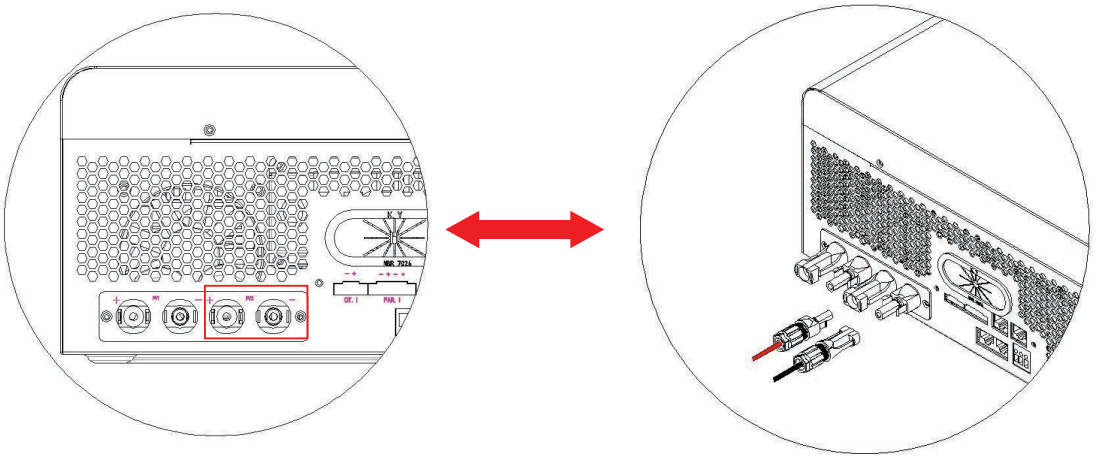
Model	Cable (mm^2)	AWG	Torque value(max)
8KW	4	12	1.2-1.6 Nm
11KW			

CAUTION: Never directly touch the terminals of inverter. It might cause lethal electric shock.
NOTE: The following picture is only a schematic diagram of the equipment .If the actual chassis does not conform to the schematic due to a structural upgrade, it is subject to prior notice.

PV2 Connection



PV1 Connection



PV Module Selection:
When selecting proper PV modules, please be sure to consider below parameters:
1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

Inverter Model	8kW	11kW
Maximum PV Array Open voltage(V)	500VDC	
PV Array MPPT Voltage Range	60-450VDC	

Application Example 1:

	SOLAR INPUT 1	SOLAR INPUT 2	Q'ty of panels	Total Input Power
	Min. in series: 6 pcs, per input Max. in series: 12 pcs, per input			
Solar Panel Spec. (reference) - 250Wp - Vmp: 30.7Vdc - Imp: 8.3A - Voc: 37.7Vdc - Isc: 8.4A	6pcs in series	X	6pcs	1500W
	X	6pcs in series	6pcs	1500W
	6pcs in series	6pcs in series	12pcs	3000W
	6pcs in series,2 strings	X	12pcs	3000W
	X	6pcs in series, 2 strings	12pcs	3000W
	8pcs in series,2 strings	X	16pcs	4000W
	X	8pcs in series, 2strings	16pcs	4000W
	10pcs in series, 1 string	10pcs in series, 1 string	20pcs	5000W
	12pcs in series,1 string	12pcs in series, 1 string	24pcs	6000W
	6pcs in series,2 strings	6pcs in series, 2 strings	24pcs	6000W
	8pcs in series, 2 strings	8pcs in series, 2 strings	32pcs	8000W
	11pcs in series, 2 strings	11pcs in series, 2 strings	44pcs	11000W

Application Example 2:

	SOLAR INPUT 1	SOLAR INPUT 2	Q'ty of panels	Total Input Power
	Min. in series: 4pcs, per input Max. in series: 8 pcs, per input			
Solar Panel Spec. (reference) - 550Wp - Vmp:41.96Vdc - Imp: 13.11A - Voc: 49.9Vdc - Isc: 14A	4pcs in series	X	4pcs	2200W
	X	4pcs in series	4pcs	2200W
	8pcs in series	X	8pcs	4400W
	X	8pcs in series	8pcs	4400W
	6pcs in series, 1 string	6pcs in series, 1 string	12pcs	6600W
	7pcs in series, 1 string	7pcs in series, 1 string	14pcs	7700W
	8pcs in series, 1 string	8pcs in series, 1 string	16pcs	8800W
	5pcs in series, 2 string	5pcs in series, 2 string	20pcs	11000W
	6pcs in series, 2 string	6pcs in series, 2 string	24pcs	13200W

PV Module Wire Connection:
Please follow below steps to implement PV module connection:
1. Remove insulation sleeve 10 mm for positive and negative conductors.
2. Suggest to put bootlace ferrules on the end of positive and negative wires with a proper crimping tool.
3. Fix PV wire cover to the inverter with supplied screws as shown in below chart.

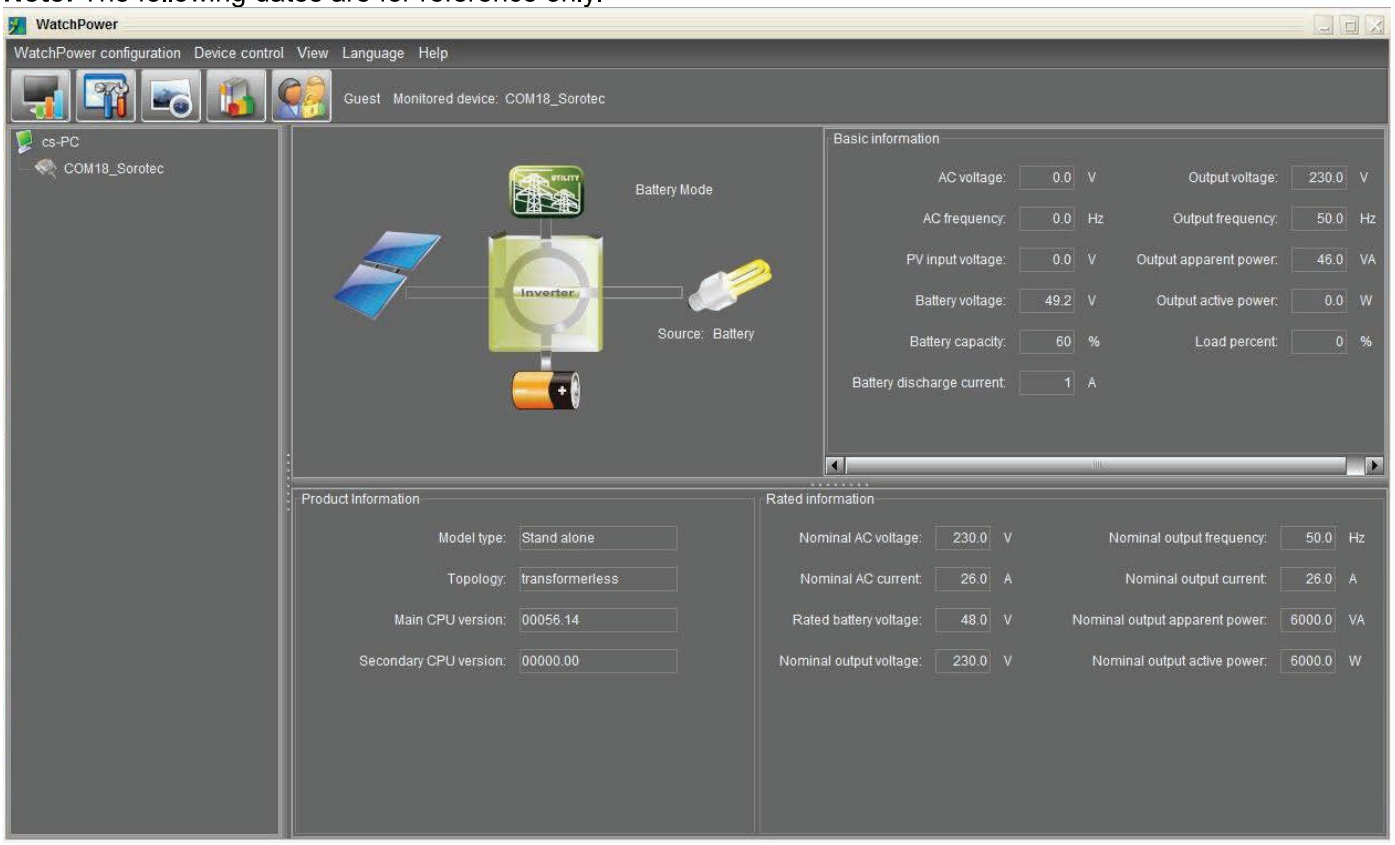
3.7 Final Assembly

After connecting all wires, please put bottom cover back by screwing screws.

3.8 RS232 Communication Connection

Please download software “Watch power” from the official website. When the inverter is connected to the computer, the following interface will be displayed.

Note: The following dates are for reference only.



3.9 Wi-Fi Connection(Optional)

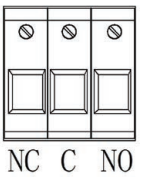
1.The device has its own standard WIFI port, if users need to monitor the status and information of the device through WIFI, they must connect to the WIFI collector.
2.Users can download "**Luminous NEO**" WIFI monitoring software from the app store on their phone.
3.Inverters come equipped with factory-integrated Wi-Fi capability which makes it very easy to integrate into a home network (Wi-Fi Dongle is Optional)This makes it ideal for local monitoring via the inverter's own wireless home network or for online monitoring platforms.

Please find "**Luminous NEO**" app from Apple® store or Google® Play Store. Install this app in your mobile phone.

(IOS) (Android)

3.10 Dry Contact

There is one dry contact (3A250VAC) available on the rear panel. It could be used to deliver signal to external device when battery reaches warning level.

Unit Status	Condition		
		NC & C	C & NO
Power Off	Unit is off and no output is powered	Open	Close
Power On	Battery voltage <Setting the voltage in program BAT Para	Close	Open
	Battery voltage >Setting the voltage in program BAT Para	Open	Close

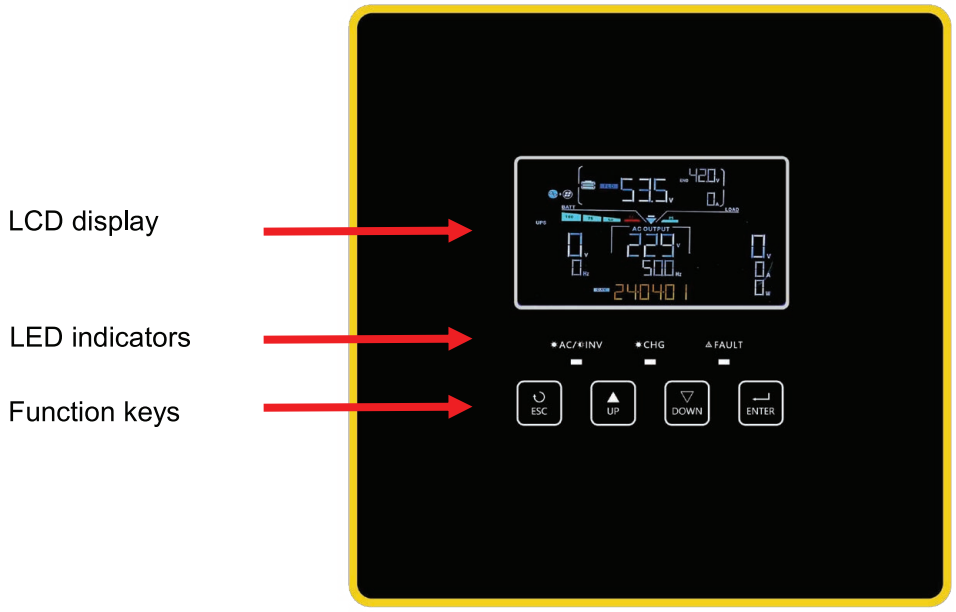
4. OPERATION

4.1 Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the button of the case) to turn on the unit.

4.2 Operation And Display Panel

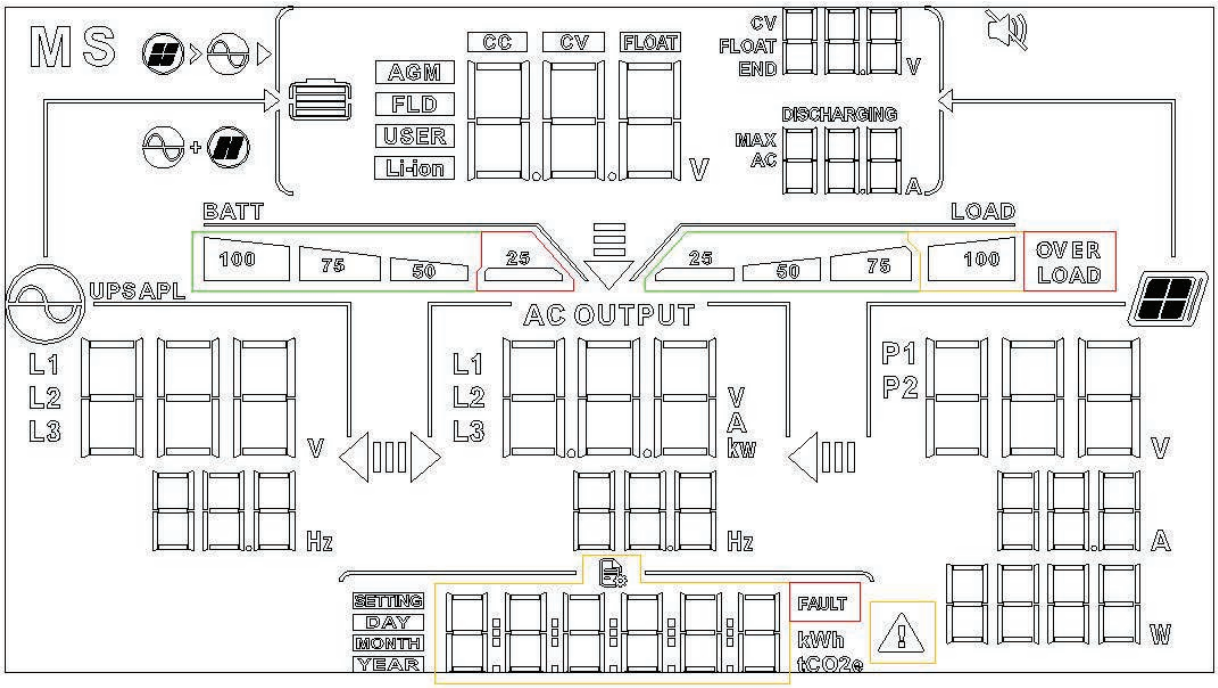
The operation LCD panel, shown in the chart below, includes one RGB LED ring, four touchable function keys and a LCD display to indicate the operating status and input/output power information.

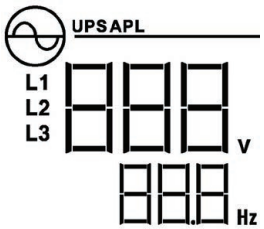
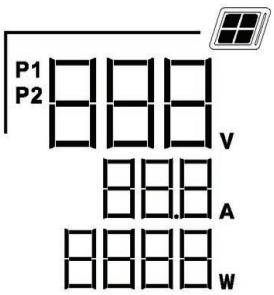
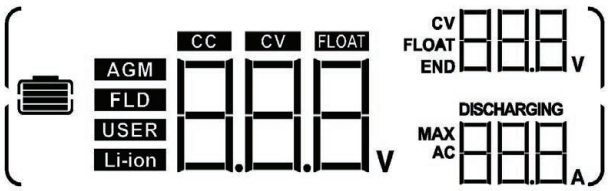


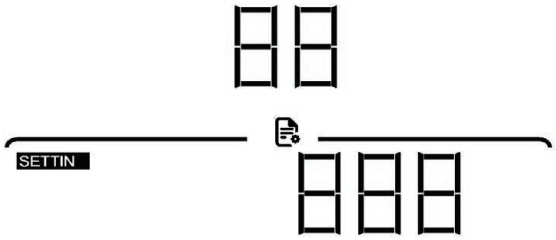
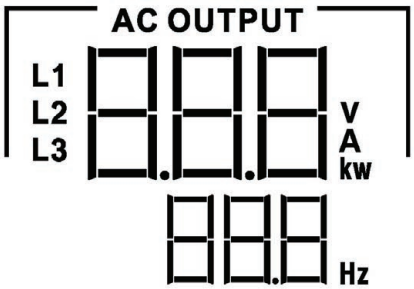
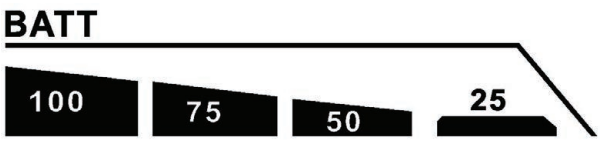
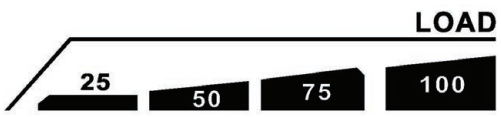
Touchable Function Keys

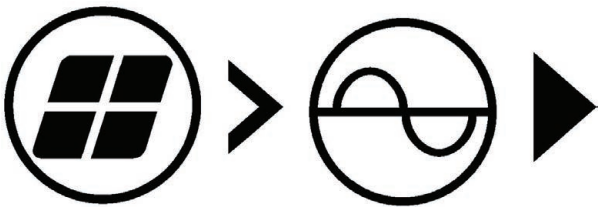
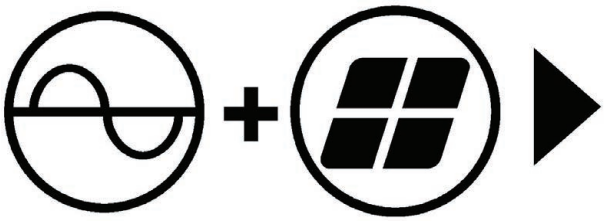
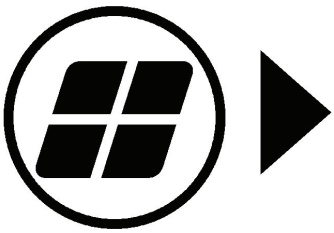
Function Key		Description
↺	ESC	To exit the setting
▲	Up	To last selection
▼	Down	To next selection
↵	Enter	To confirm/enter the selection in setting mode

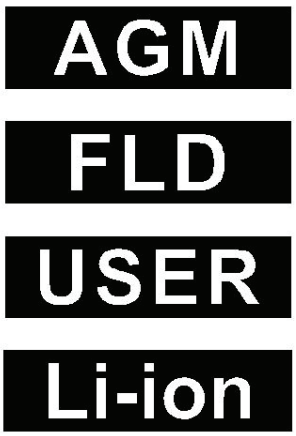
4.3 LCD Display Icons

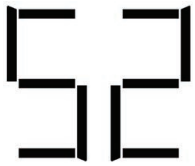
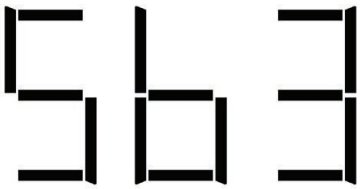


Icon	Function description
Input Source Information	
	Indicates the AC input voltage and frequency.
	Indicates the PV voltage, current and power.
	Indicates the battery voltage, charging stage, configured battery parameters, charging or discharging current.

Configuration Program and Fault Information	
	Indicates the setting programs.
	Indicates the warning and fault codes. Warning: flashing with warning code  Fault: lighting with fault code. 
Output Information	
	Indicate the output voltage, load in VA, and load in Watt and output frequency.
Battery Information	
	1.Indicates battery level by 1-25%, 26-49%, 51-75% and 76-100% in battery mode and charging status in line mode. 2.When battery is charging, it will present battery charging status. 3.Floating mode. Batteries are fully charged.4 bars will be on.
Load Information	
	Indicates overload.
	Indicates the load level by 0-25%, 26-50%, 51-75% and 76-100%.

Charger Source Priority Setting Display	
	Indicates setting program 16 “Charger source priority” is selected as “Solar first”.
	Indicates setting program 16 “Charger source priority” is selected as “Solar and Utility”.
	Indicates setting program 16 “Charger source priority” is selected as “Solar only”.
	Indicates setting program 01 “Output source priority” is selected as “Utility first”.
	Indicates setting program 01 “Output source priority” is selected as “Solar first”.
	Indicates setting program 01 “Output source priority” is selected as “SBU”.
AC Input Voltage Range Setting Display	
APL	The acceptable AC input voltage range will be within 90-280VAC.
UPS	The acceptable AC input voltage range will be within 170-280VAC.

Operation Status Information	
	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
	Indicates battery type.
	Date:Year,Month ,Day
	Power generation
	Indicates unit alarm is disabled.
	“H”: Master unit . “2”: there are two parallel machines in single phase

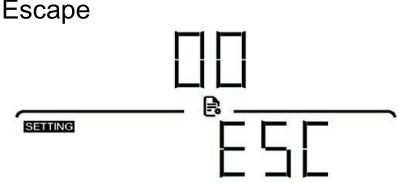
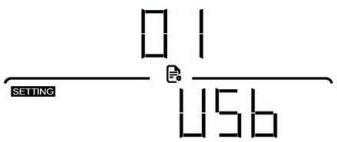
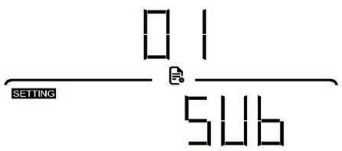
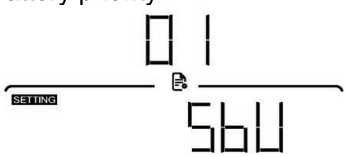
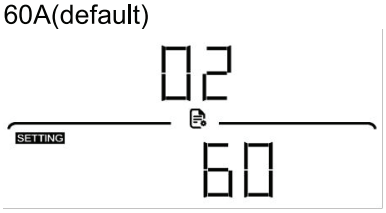
	“S”: Slave unit. “2”:there are two parallel machines in single phase
	“H”: Master unit “A”: A-phase “3”:there are three parallel machines in three phase
	“S”: Slave unit “B”: B-phase “3”:there are three parallel machines in three phase
	“S”: Slave unit “C”: C-phase “3”:there are three parallel machines in three phase
	Feed back into the grid

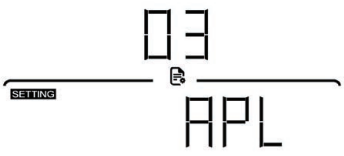
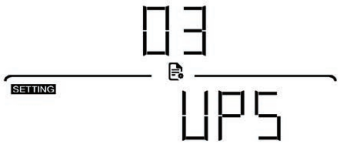
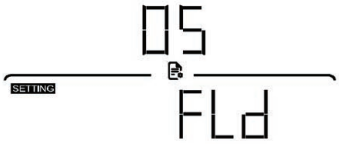
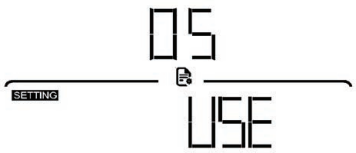
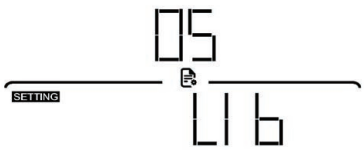
4.4 LCD Setting

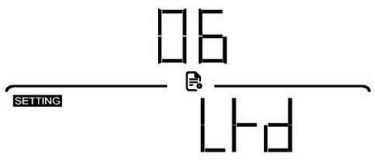
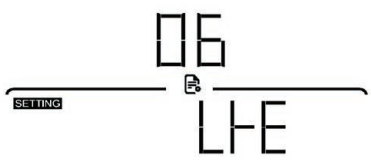
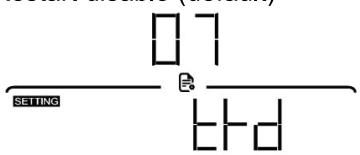
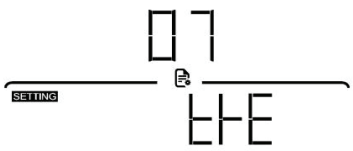
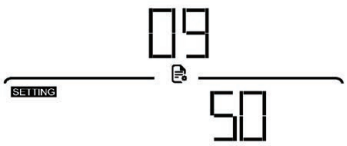
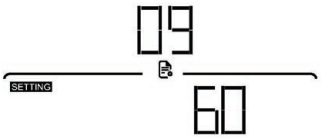
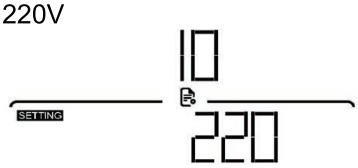
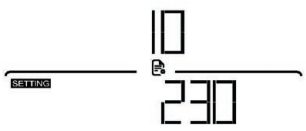
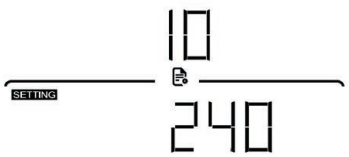
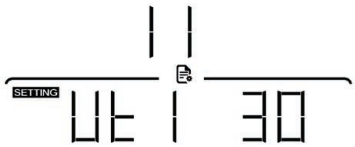
After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press “UP” or “DOWN” button to select setting programs. And then, press “ENTER” button to confirm the selection or ESC button to exit.

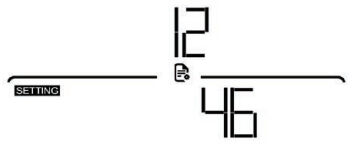
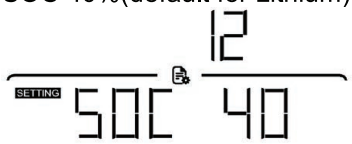
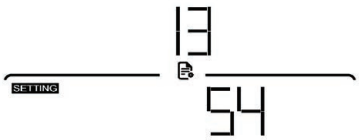
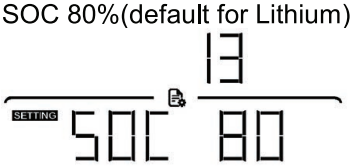
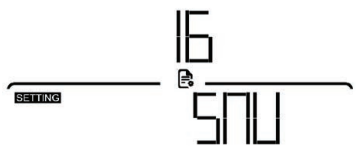
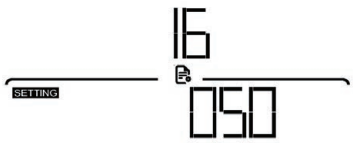
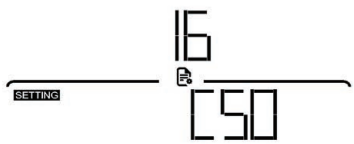
Note: All settings must be modified in battery mode and must be rebooted to be valid.

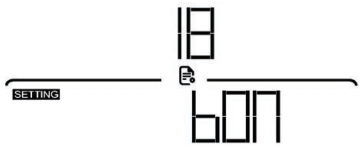
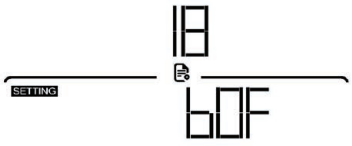
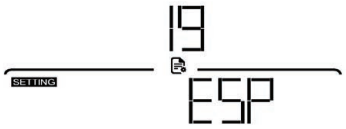
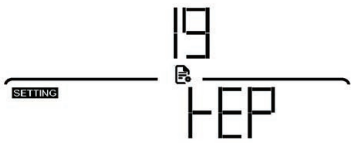
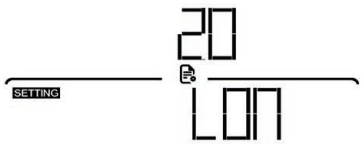
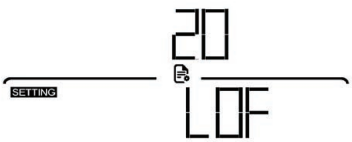
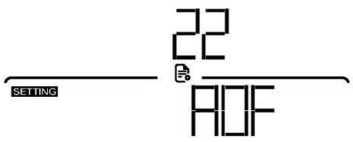
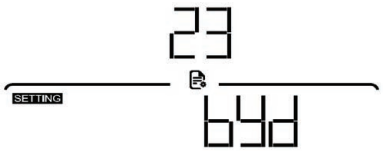
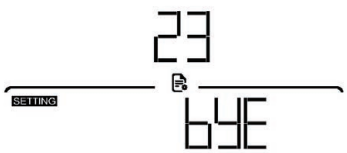
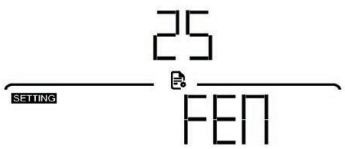
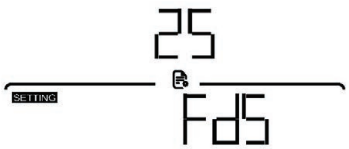
Setting Programs:

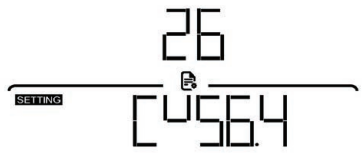
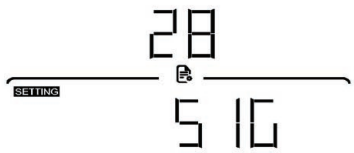
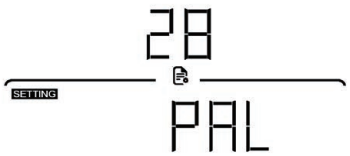
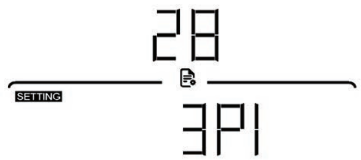
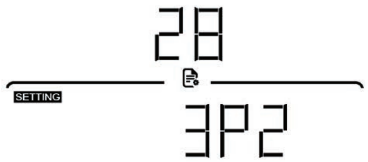
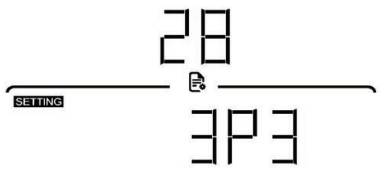
Program	Description	Select able option	
00	Exit setting mode	Escape 	
01	Output source priority: To configure load power source priority	Utility first (default) 	Utility will provide power to the loads as first priority. solar and battery energy will provide power to the loads only when utility power is not available
		Solar first 	Solar energy provides power to the loads as first priority. if solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time.
		Battery priority 	Solar energy provides power to the loads as first priority. if solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. utility provides power to the loads only when battery voltage drops to either low- level warning voltage or the setting point in program 12.
02	Maximum charging current: (Max. charging current = utility charging current + solar charging current)	60A(default) 	Setting range is 2A, then from 10A to 120A Increment of each click is 10A.

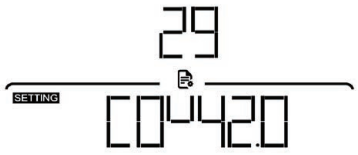
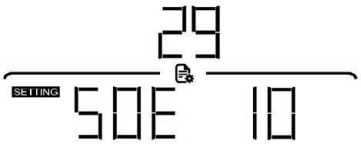
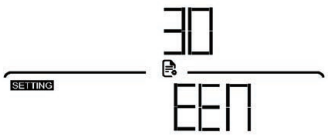
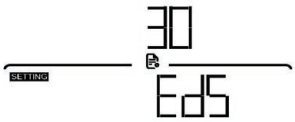
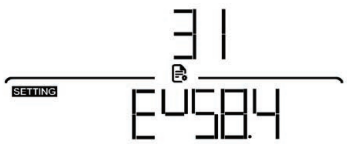
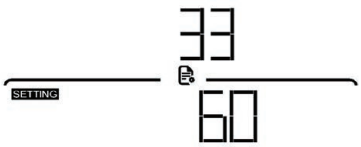
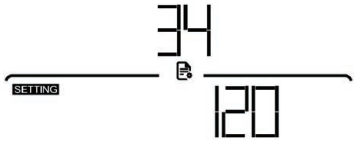
03	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within 90-280VAC.
		UPS 	If selected, acceptable AC input voltage range will be within 170-280VAC.
05	Battery type	AGM (default) 	Flooded 
		User-Defined 	If “User-Defined” is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.
		Lithium (suitable when lithium battery with BMS communication) If “ Lib” is selected, the setting option 12, 13, 29 will change to display percent. 	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting. Please contact the battery supplier for installation procedure. **Note**: if you have a lithium battery, you can choose this option. When you plug in BMS communications, screen will show “LIB”.

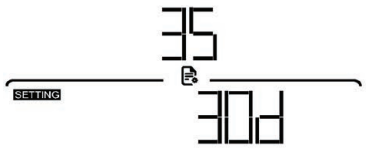
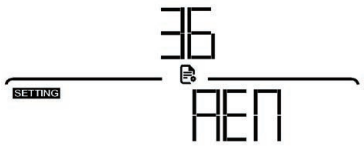
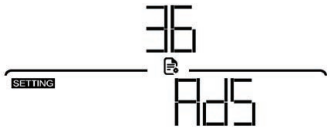
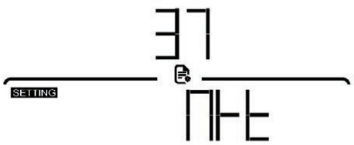
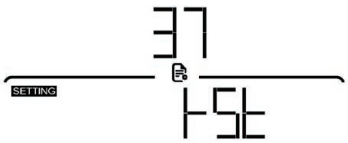
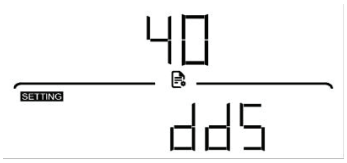
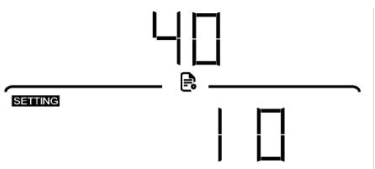
06	Auto restart when overload occurs	Restart disable (default) 	Restart enable 
07	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 
09	Output frequency	50Hz (default) 	60Hz 
10	Output voltage	220V 	230V (default) 
		240V 	
11	Maximum utility charging current **Note:** If setting value in program 02 is smaller than that in program in 11, the inverter will apply charging current from program 02 for utility charger.	30A (default) 	Setting range is 2A, then from 10A to 120A Increment of each click is 10A.

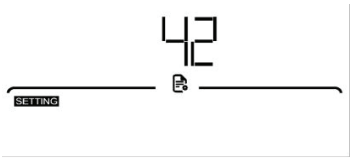
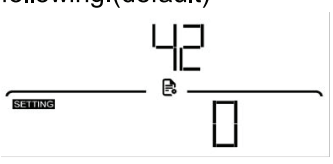
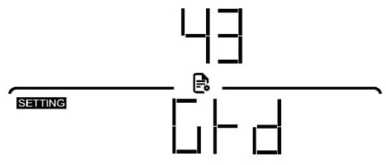
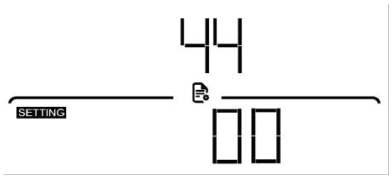
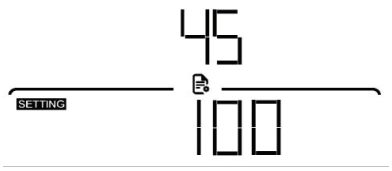
<table>
<tr><td rowspan="3">12</td><td rowspan="2">Setting voltage point back to utility source when selecting “SBU” (SBU priority) in program 01.program 01</td><td>46V (default)
  </td><td>Setting range is from 44V to 51V.
Increment of each click is 1V.</td></tr>
<tr><td>SOC 40%(default for Lithium)
  </td><td>If any types of lithium battery is selected in program 05,setting value will change to SOC automatically. Adjustable range is 10%to 80%.</td></tr>
<tr><td>second output(Option)</td><td colspan="2">When the battery voltage is lower than the 12 setting points, the second output will be turned off immediately after 5 seconds. If the main is connected, the second output will be turned on immediately</td></tr>
<tr><td rowspan="3">13</td><td rowspan="3">Setting voltage point back to battery mode when selecting “SBU” (SBU priority) in program 01.</td><td>  </td><td>54V (default)
Setting range is from 48V to 58V.
Increment of each click is 1V.</td></tr>
<tr><td>SOC 80%(default for Lithium)
  </td><td>If any types of lithium battery is selected in program 05,setting value will change to SOC automatically.Adjustable range is 50%to 100%.Increment of each click is 5%</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td rowspan="4">16</td><td rowspan="4">Charger source priority: To configure charger source priority</td><td colspan="2">If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:</td></tr>
<tr><td>Solar and Utility (default)
  </td><td>Solar energy and utility will charge battery at the same time.</td></tr>
<tr><td>Only Solar
  </td><td>Solar energy will be the only charger source no matter utility is available or not.</td></tr>
<tr><td>Solar first
  </td><td>Solar energy will charge battery as first priority.
Utility will charge battery only when solar energy is not available.</td></tr>
</table>

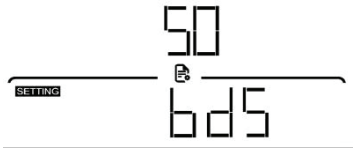
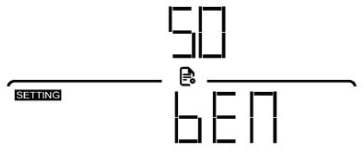
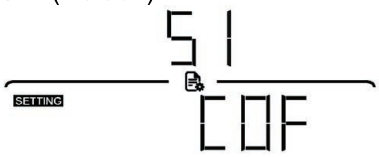
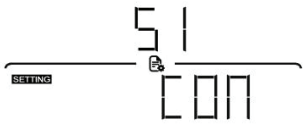
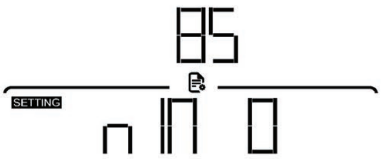
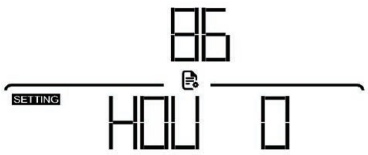
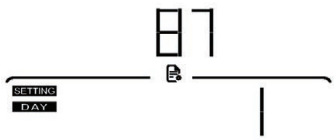
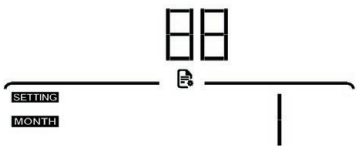
18	Alarm control	Alarm on (default) 	Alarm off 
19	Auto return to default display screen	Return to default display screen (default) 	If selected, no matter how users switch display screen, it will automatically return to default display screen after no button is pressed for 1 minute.
		Stay at latest screen 	If selected, the display screen will stay at latest screen user finally switches.
20	Backlight control	Backlight on 	Backlight off 
22	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
23	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 	Bypass enable 
25	Record Fault code	Record enable (default) 	Record disable 

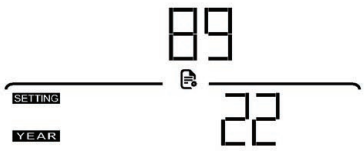
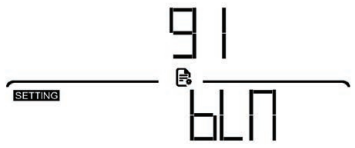
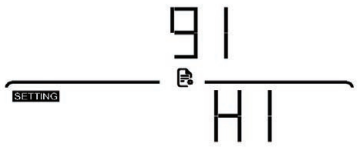
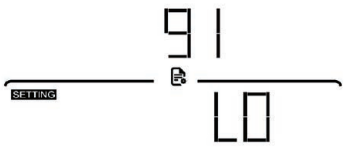
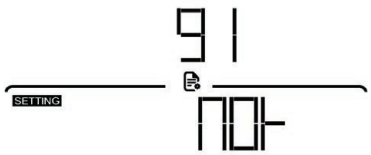
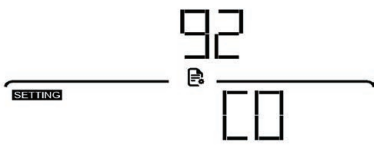
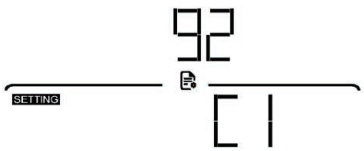
26	Bulk charging voltage (C.V voltage)	Available options for 48V model: 56.4V (default) 	If user-defined is selected in program 5, this program can be set up. Setting range is from 48.0V to 61.0V. Increment of each click is 0.1V.
27	Floating charging voltage	Available options for 48V model: 54.0V (default) 	If user-defined is selected in program 5, this program can be set up. Setting range is from 48.0V to 61.0V. Increment of each click is 0.1V.
28	Single and Parallel setting	default 	Single enable
		single-phase parallel 	single-phase parallel enable
		A phase 	A-phase parallel enable
		B phase 	B-phase parallel enable
		C phase 	C-phase parallel enable
		Please note: 1. when three-phase parallel,make sure that A-phase is the host; 2. after the parallel parameters are modified,the device must be restarted to be effective. 3. All inverters must share the same battery pack when paralleling 4. This setting is only available when the inverter is in standby mode (Switch off).	

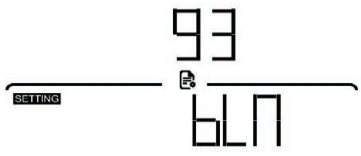
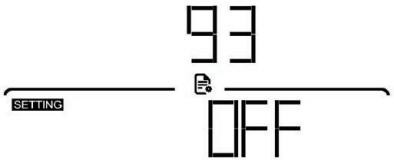
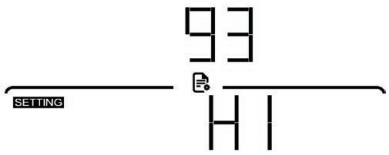
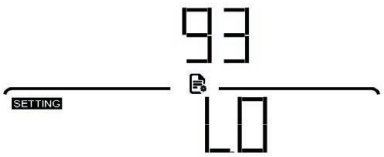
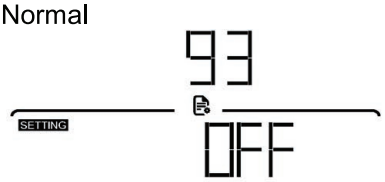
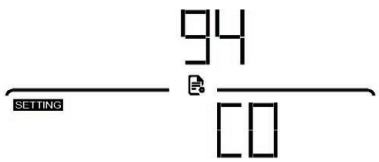
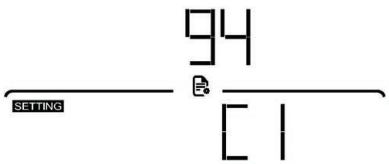
<table>
<tr><td rowspan="2">29</td><td rowspan="2">Low DC cut-off voltage</td><td>Available options for 48V model: 42.0V (default)
  </td><td>If user-defined is selected in program 5, this program can be set up. Setting range is from 42.0V to 52.0V. Increment of each click is 0.1V. Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.</td></tr>
<tr><td>The default value is 10%.
  </td><td>If Lithium battery is selected in program 5,setting value will change to SOC automatically. Setting range is From 5% to 50%.</td></tr>
<tr><td rowspan="2">30</td><td rowspan="2">Battery equalization</td><td>Battery equalization enable
  </td><td>Battery equalization disable (default)
  </td></tr>
<tr><td colspan="2">Note: If “Flooded” or “User-Defined” is selected in program 05, this program can be set up.</td></tr>
<tr><td>31</td><td>Battery equalization voltage</td><td>58.4V (default)
  </td><td>Setting range is from 48.0V to 61.0V. Increment of each click is 0.1V.</td></tr>
<tr><td>33</td><td>Battery equalized time</td><td>60min (default)
  </td><td>Setting range is from 5min to 900min. Increment of each click is 5min.</td></tr>
<tr><td>34</td><td>Battery equalized timeout</td><td>120min (default)
  </td><td>Setting range is from 5min to 900 min. Increment of each click is 5 min.</td></tr>
</table>

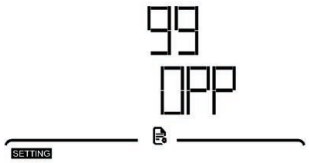
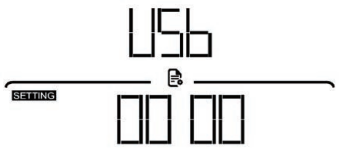
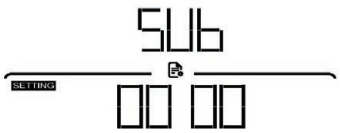
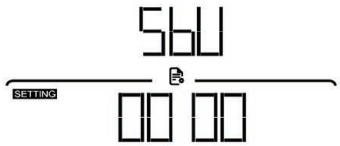
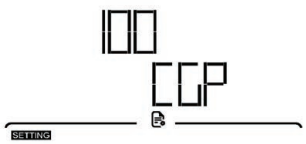
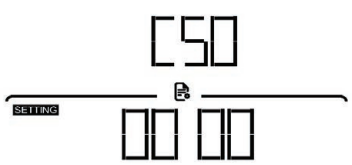
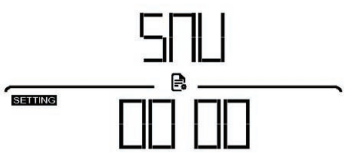
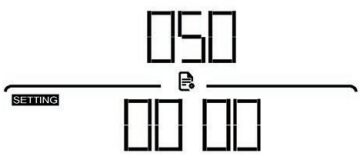
<table>
<tr><td>35</td><td>Equalization interval</td><td>30days (default)
  </td><td>Setting range is from 0 to 90 days.
Increment of each click is 1 day.</td></tr>
<tr><td rowspan="2">36</td><td rowspan="2">Equalization activated immediately</td><td>Enable
  </td><td>Disable (default)
  </td></tr>
<tr><td colspan="2">If equalization function is enabled in program 30, this program can be set up. If “Enable” is selected in this program, it’s to activate battery equalization immediately and LCD main page will show “E9”. If “Disable” is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, “E9” will not be shown in LCD main page.</td></tr>
<tr><td>37</td><td>Reset all stored data for PV generated power and output load energy</td><td>Not reset(Default)
  </td><td>Reset
  </td></tr>
<tr><td rowspan="2">40</td><td rowspan="2">Discharge limited current</td><td>  </td><td>discharge current limited disable</td></tr>
<tr><td>  </td><td>setting range :10A to 300A
setting increase or decrease of 10A .
NOTE:1. if you work in “SUB mode” or “SBU mode”, when the loads is greater than the current limiting point, it will automatically switch to utility mode.
2.if it only works in battery mode, when the load is greater than the current limiting point ,the inverter will shut down immediately.</td></tr>
</table>

<table>
<tr><td rowspan="2">42</td><td rowspan="2">Adjustment parameter for EARTH LED</td><td>If unit is not in Line mode,it will show nothing.
 
</td><td>If unit is in Line mode,it will show following.(default)
 
</td></tr>
<tr><td colspan="2">If EARTH LED of meter is on,it can be off by adjusting the parameter.If the unit is in Line mode,this program can be set up.Setting range is form -30 to 30.Increment of each click is 1. The condition of program changed automatically.</td></tr>
<tr><td rowspan="2">43</td><td rowspan="2">Solar energy feed to grid</td><td>Default
 
</td><td>Solar energy feed to grid disable</td></tr>
<tr><td> 
</td><td>Solar energy feed to grid enable</td></tr>
<tr><td>44</td><td>Re connection delay time</td><td> 
</td><td>When the utility is connected, the waiting time can be set. After reaching the waiting time, the utility will start working.
Range:0-999S</td></tr>
<tr><td rowspan="2">45</td><td rowspan="2">Zero-export to Load</td><td>If unit is not in Line mode,it will show nothing.
 
</td><td>If unit is in Line mode,it will show following.(Default)
 
</td></tr>
<tr><td colspan="2">If REVERSE LED of meter is on,it can be off by adjusting the parameter.If the unit is in Line mode,this program can be set up.Setting range is from 0 to 500W.Increment of each click is 10W.</td></tr>
</table>

50	Battery activation	OFF(Default)  ON 	Manual activation : In this mode, select "On", connect the AC or PV to the inverter, and turn it on. If the battery is not detected, an activation of the battery is performed. "Off" will be returned if activation is successful or fail
51	CT enable	OFF(Default) 	ON 
85	Time setting – Minute		For minute setting, the range is from 0 to 59.
86	Time setting – Hour		For hour setting, the range is from 0 to 23.
87	Time setting– Day		For day setting, the range is from 1 to 31.
88	Time setting– Month		For month setting, the range is from 1 to 12.

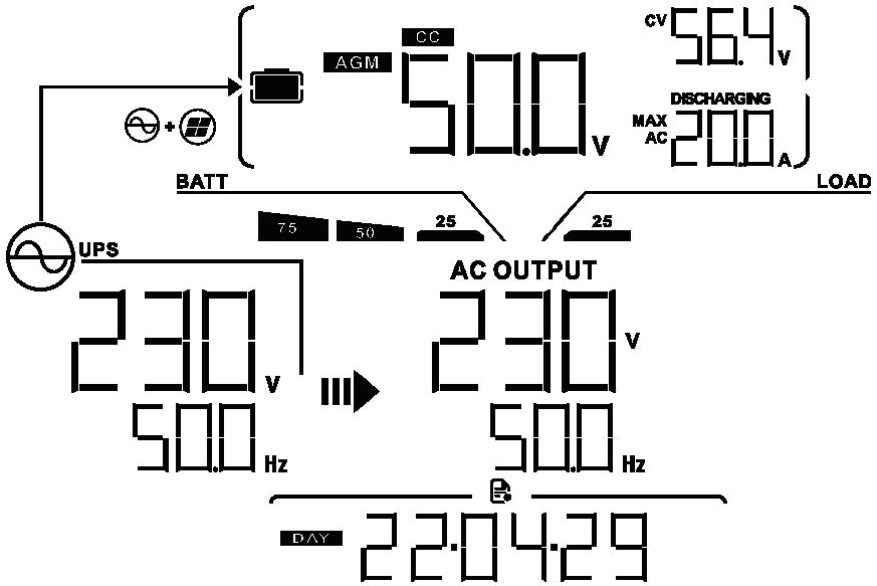
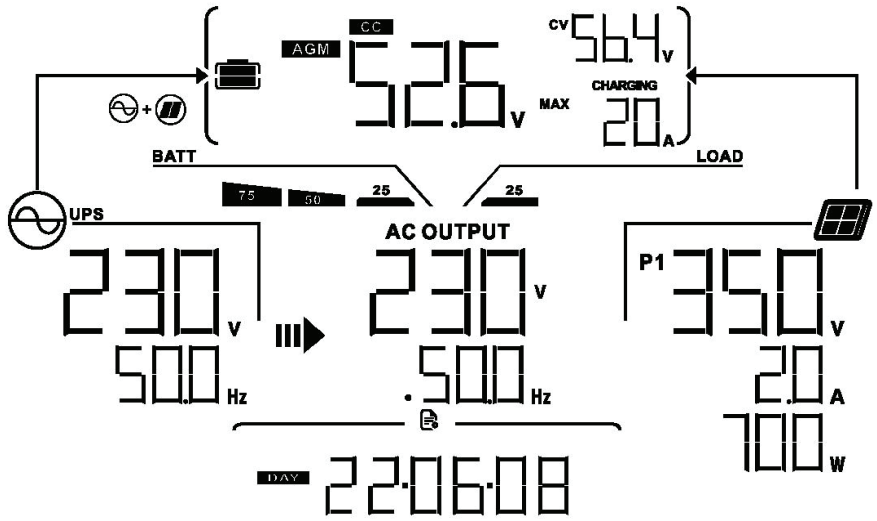
<table>
<tr><td>89</td><td>Time setting – Year</td><td> 
</td><td>For year setting, the range is from 17 to 99.</td></tr>
<tr><td rowspan="4">91</td><td rowspan="4">Surround RGB brightness</td><td>Default:
 
</td><td>Default: Breathing light effect disabled
 
</td></tr>
<tr><td colspan="2">On/Off control for RGB LED,It’s necessary to enable this setting to activate RGB LED lighting function.</td></tr>
<tr><td>Brightness of RGB LED: high
 
</td><td>Brightness of RGB LED: low
 
</td></tr>
<tr><td>Brightness of RGB LED: normal
 
</td><td></td></tr>
<tr><td rowspan="2">92</td><td rowspan="2">Surrounding the RGB LED lighting color</td><td>Default:
 
</td><td>The cycle of seven kinds of color.</td></tr>
<tr><td>Low
 
</td><td>“C7” to “C1” can be used in one of the colors</td></tr>
</table>

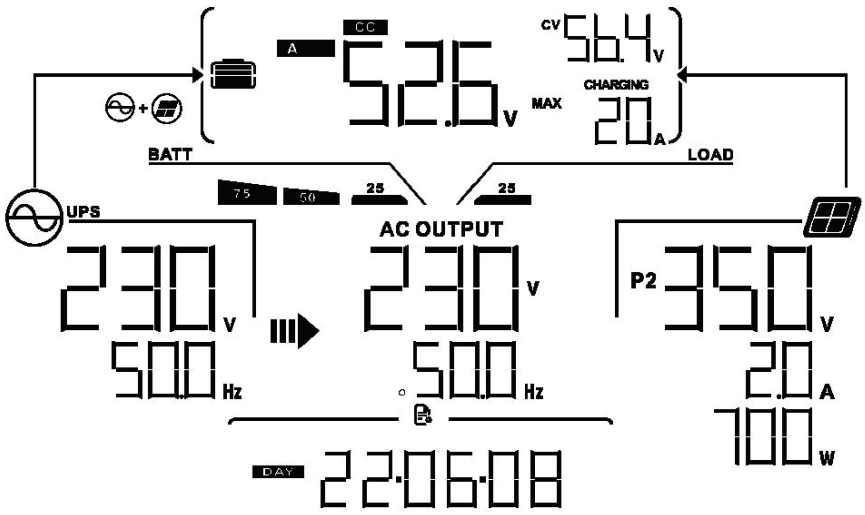
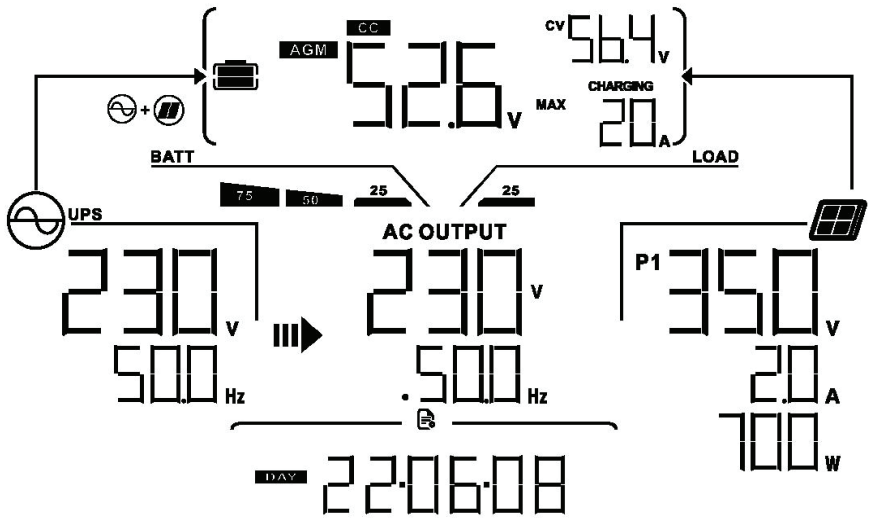
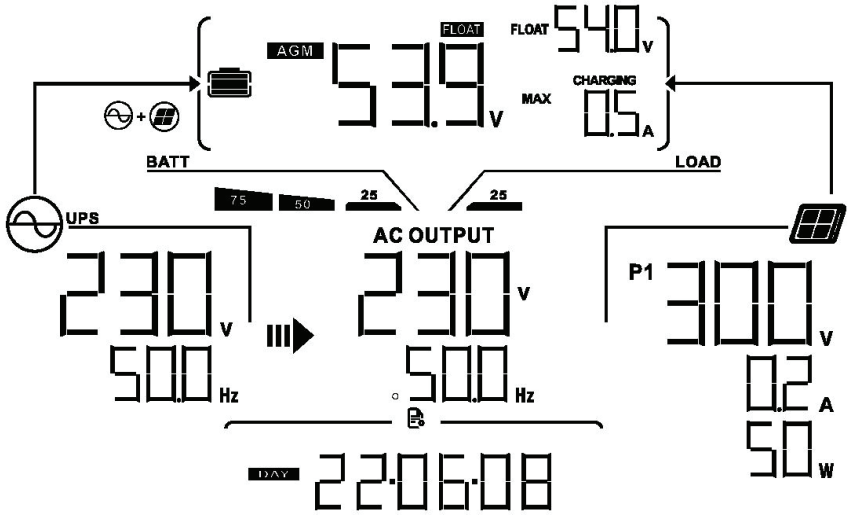
93	The Logo of brightness of RGB LED	Default: enabled 	Disabled 
		High 	Low 
		Normal 	
94	The Logo color of RGB LED		The cycle of seven kinds of color.
			“C1” to “C7” can be used in one of the colors

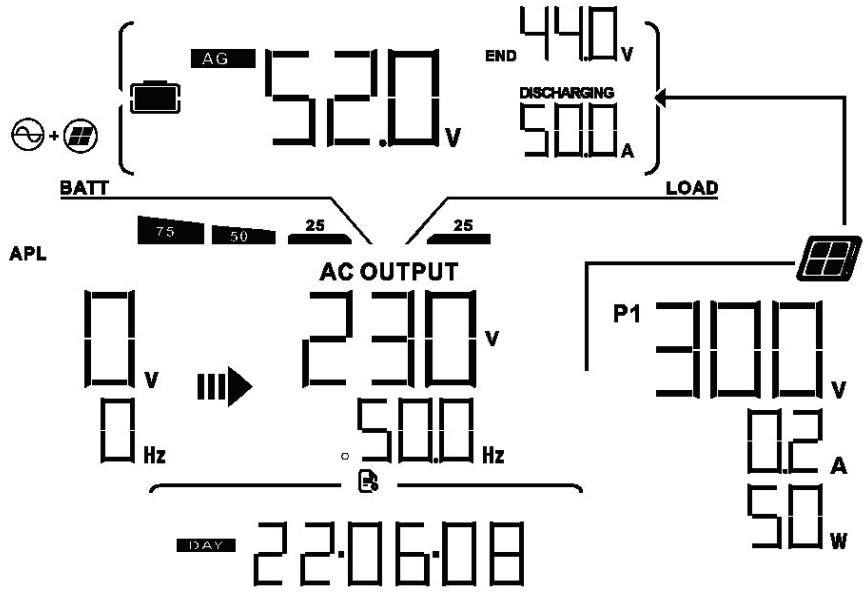
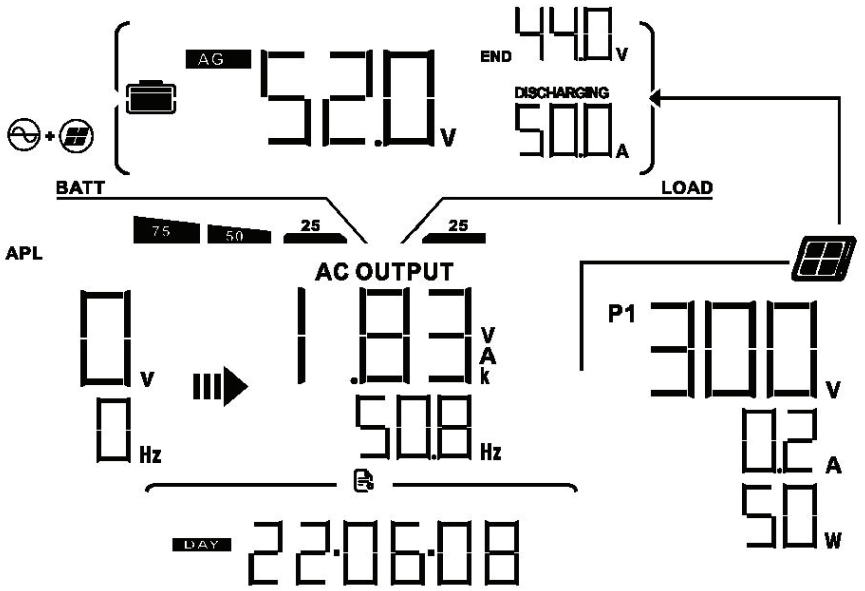
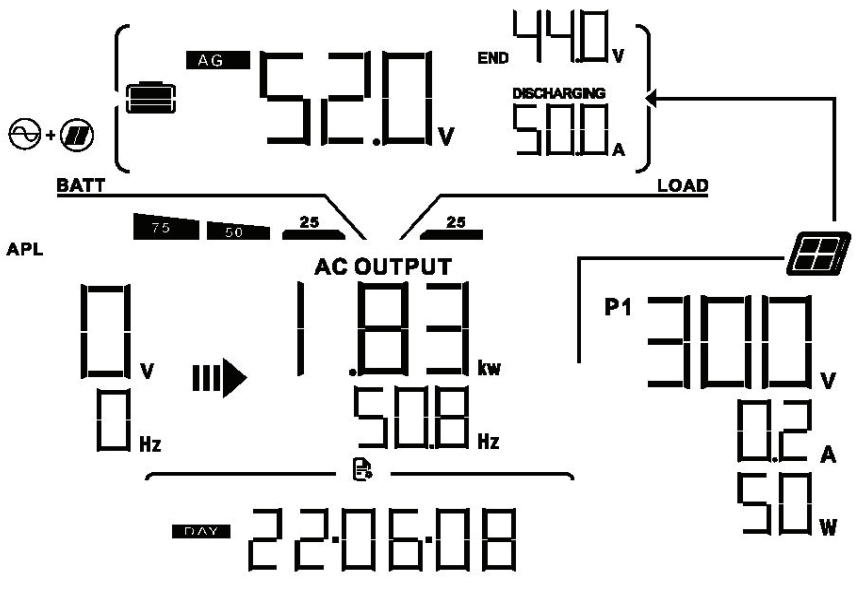
<table>
<tr><td rowspan="3">99</td><td rowspan="3">Timer Setting for Output source Priority
  </td><td colspan="2">Once access this program, it will show “OPP” in LCD. Press “↵” button to select timer setting for output source priority. There are three timers to set up. Press “▲” or “▼” button to select specific timer option. Then, press “↵” to confirm timer option. Press “▲” or “▼” button to adjust starting time first and the setting range is from 00 to 23. Increment of each click is one hour. Press “↵” to confirm starting time setting. Next, the cursor will jump to right column to set up end time. Once end time is set completely, press“↵” to confirm all setting.</td></tr>
<tr><td>Utility first timer
  </td><td>Solar first timer
  </td></tr>
<tr><td>SBU priority timer
  </td><td></td></tr>
<tr><td rowspan="3">100</td><td rowspan="3">Timer Setting for Charger Source Priority
  </td><td colspan="2">Once access this program, it will show “CGP” in LCD. Press “↵” button to select timer setting for charger source priority. There are three timers to set up. Press “▲” or “▼” button to select specific timer option. Then, press “↵” to confirm timer option. Press “▲” or “▼” button to adjust starting time first and the setting range is from 00 to 23. Increment of each click is one hour. Press “↵” to confirm starting time setting. Next, the cursor will jump to right column to set up end time. Once end time is set completely, press“↵” to confirm all setting.</td></tr>
<tr><td>Solar first
  </td><td>Solar and utility
  </td></tr>
<tr><td>Only solar
  </td><td></td></tr>
</table>

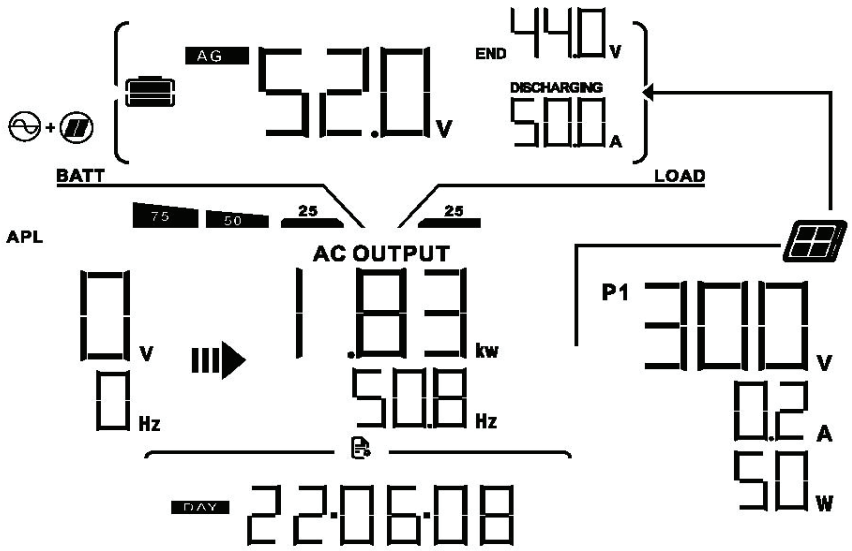
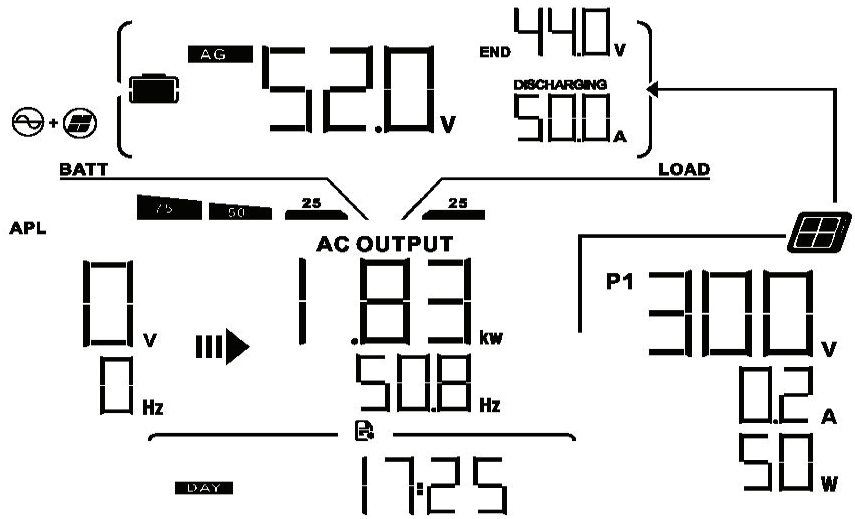
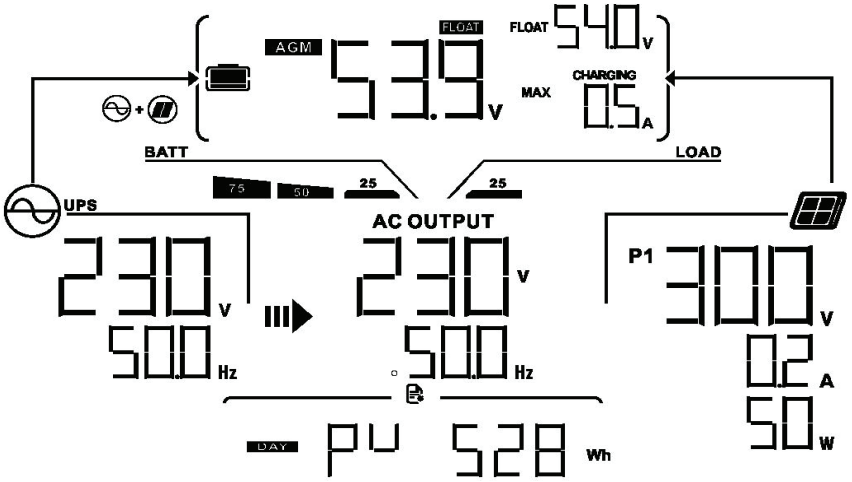
4.5 LCD Display

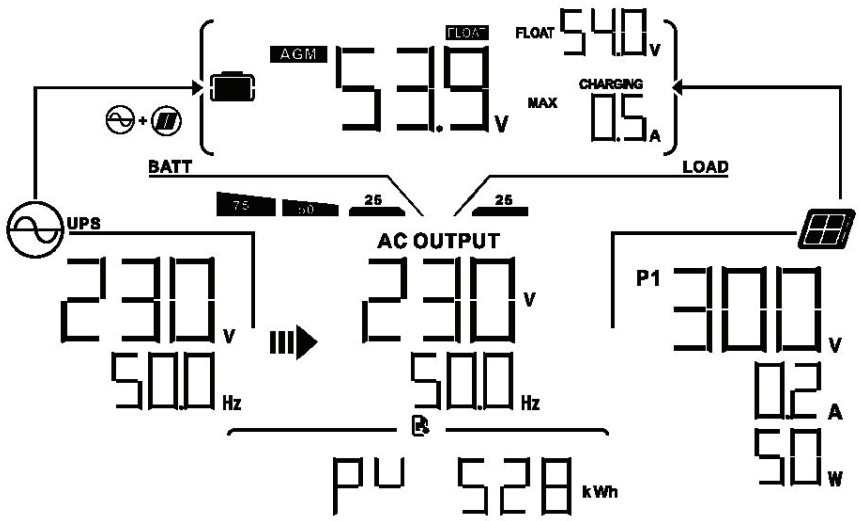
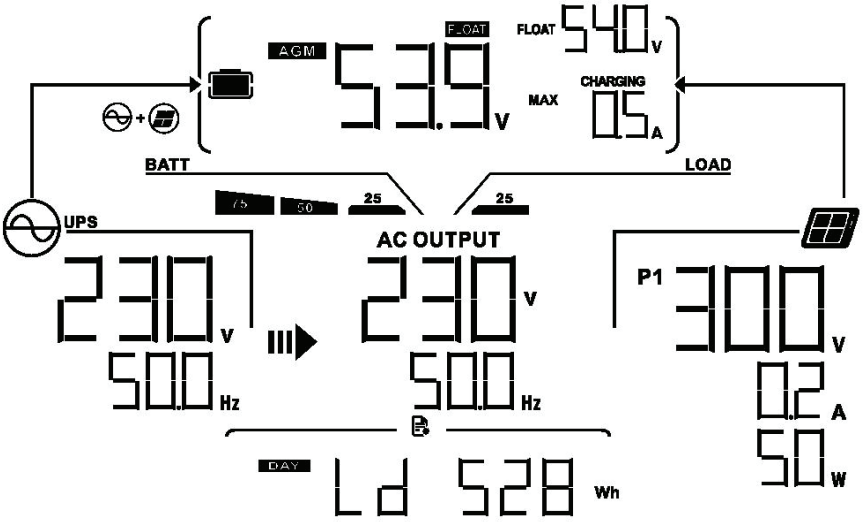
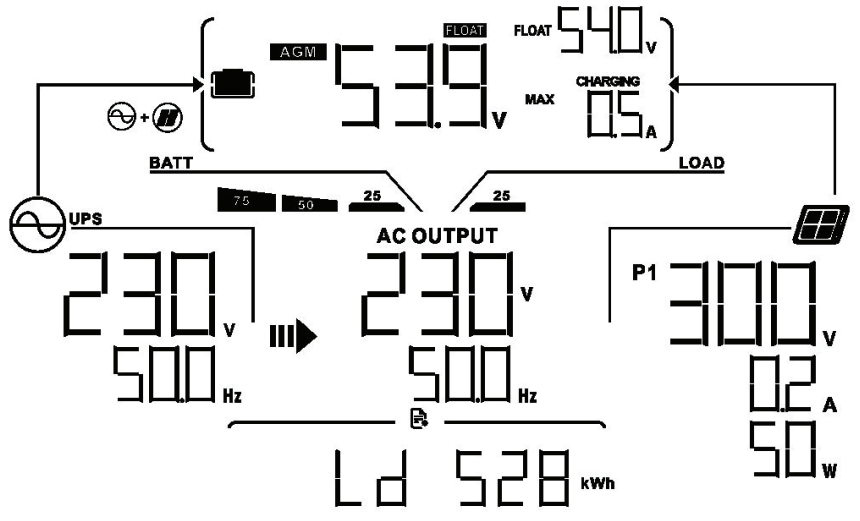
The LCD display information will be switched in turn by pressing the "▲" or "▼" button. The select able information is switched as the following table in order.

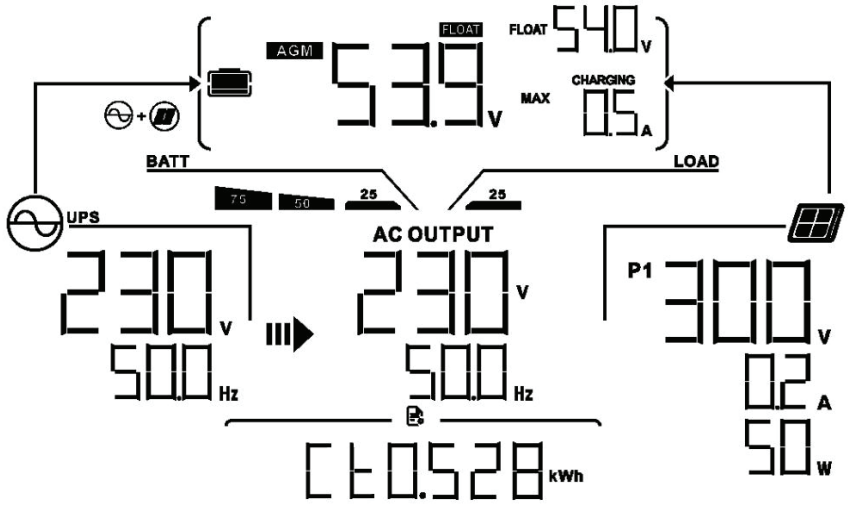
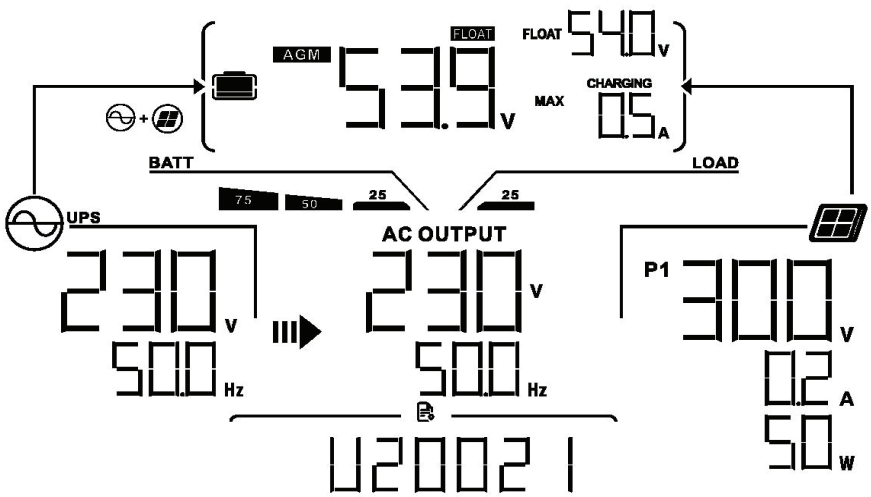
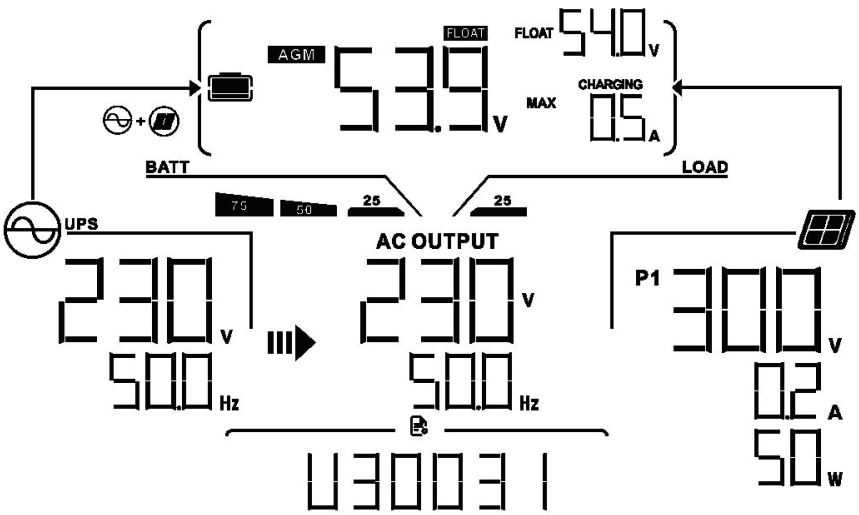
Select able information	Default LCD display
Utility voltage=230Vac Utility frequency=50.0Hz Output voltage=230Vac Frequency=50.0Hz	
PV1 voltage=350V PV1 current=2.0A PV1 power=700W (PV1 and PV2 switch every 5 seconds)	

PV2 voltage=350V PV2 current=2.0A PV2 power=700W (PV1 and PV2 switch every 5 seconds)	
Battery voltage=52.6Vdc Bulk charging voltage=56.4Vdc Charging current=20A	
Battery voltage=53.9V Floating charging voltage=54.0 Charging current=0.5A	

Low DC cut-off voltage=44.0V, Discharging current=50.0A	
Output power=1.83KVA **Note:** Output voltage, load in KVA, load in Watt switch every 5 second	
Output power=1.83KW **Note:** Output voltage, load in KVA, load in Watt switch every 5 second	

Date: June 8, 2022	
Real time 17:25.	
PV energy generation today =528Wh.	

Total PV energy generation	
Load output energy today =528Wh.	
Total load energy =528KWH	

CT:528Wh	
Display control board software version:0021	
Inverter control board software version:0031	

4.6 Parallel function operation instructions

(Maximum of 6 parallel units)

CAUTION: It is forbidden for inverter to share the same solar panel group.

Single phase parallel：

1. Connecting the parallel communication line and power cable as shown below

Warning: All inverters must share the same battery pack when paralleling.

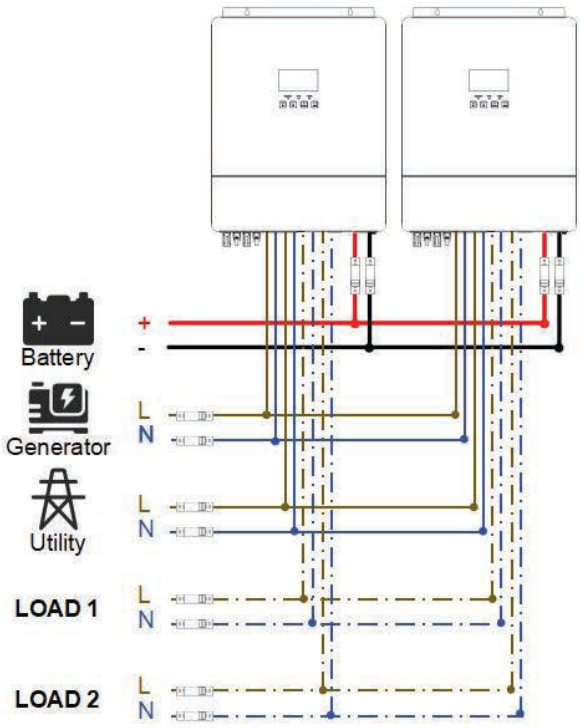
2. Set the parameters of each inverter separately (working mode, single-phase parallel function).

Warning: When working in parallel, the working mode of each inverter must be the same working mode.

3. After setting the parameters, turn on each inverter in turn.

Two inverters parallel：

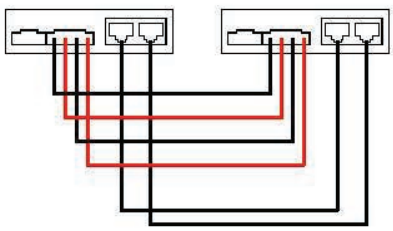
Power Connection:



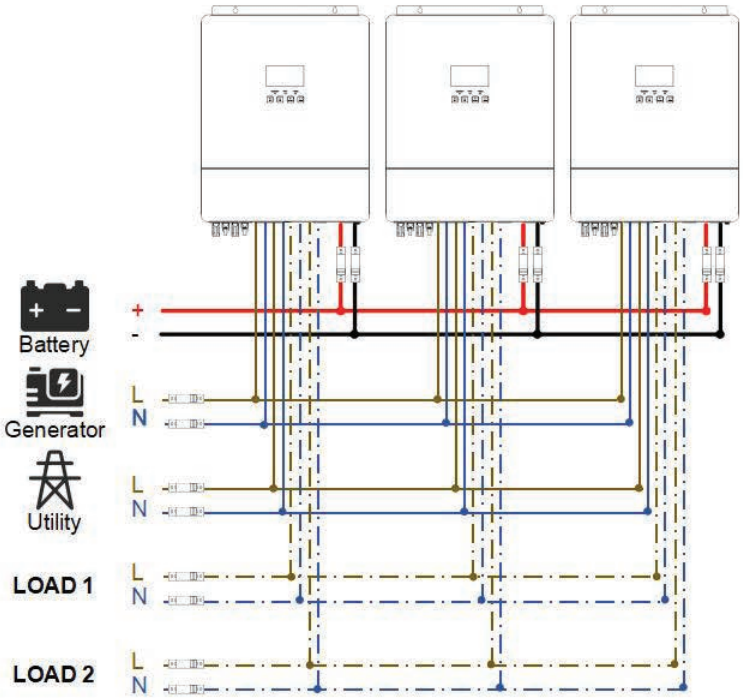
Communication Connection:

Black and Red (left)→Current sharing line

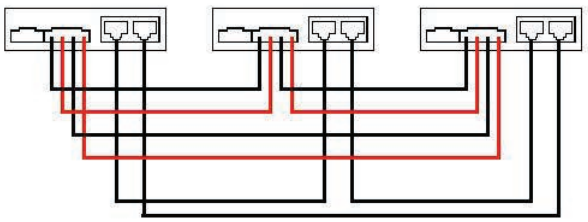
Black (right)→Parallel communication line



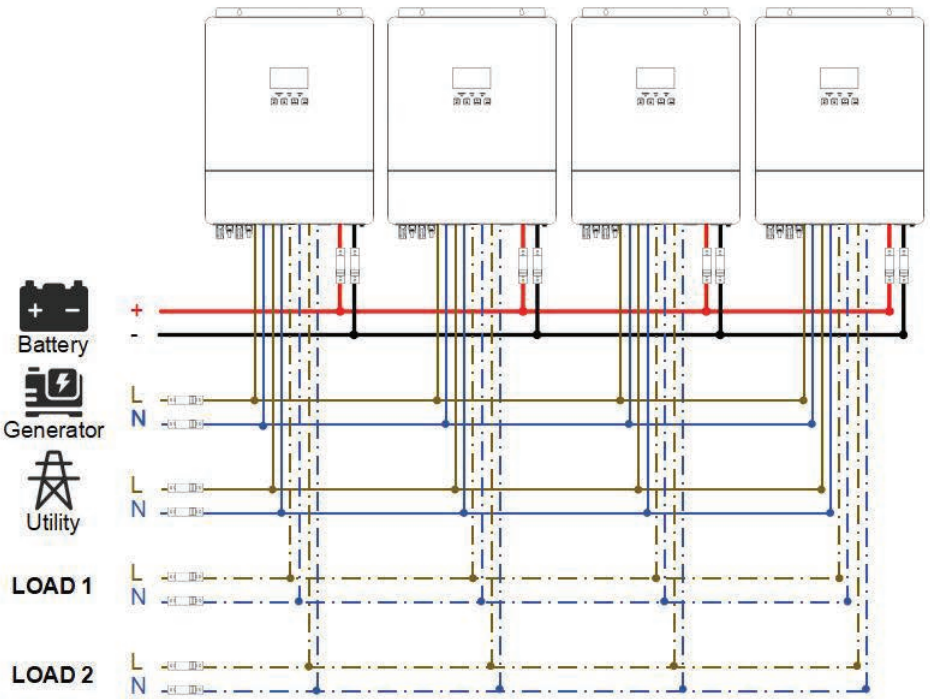
Three inverters parallel：
Power Connection:



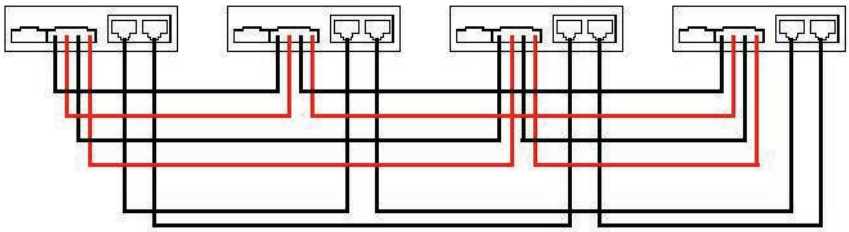
Communication Connection:
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



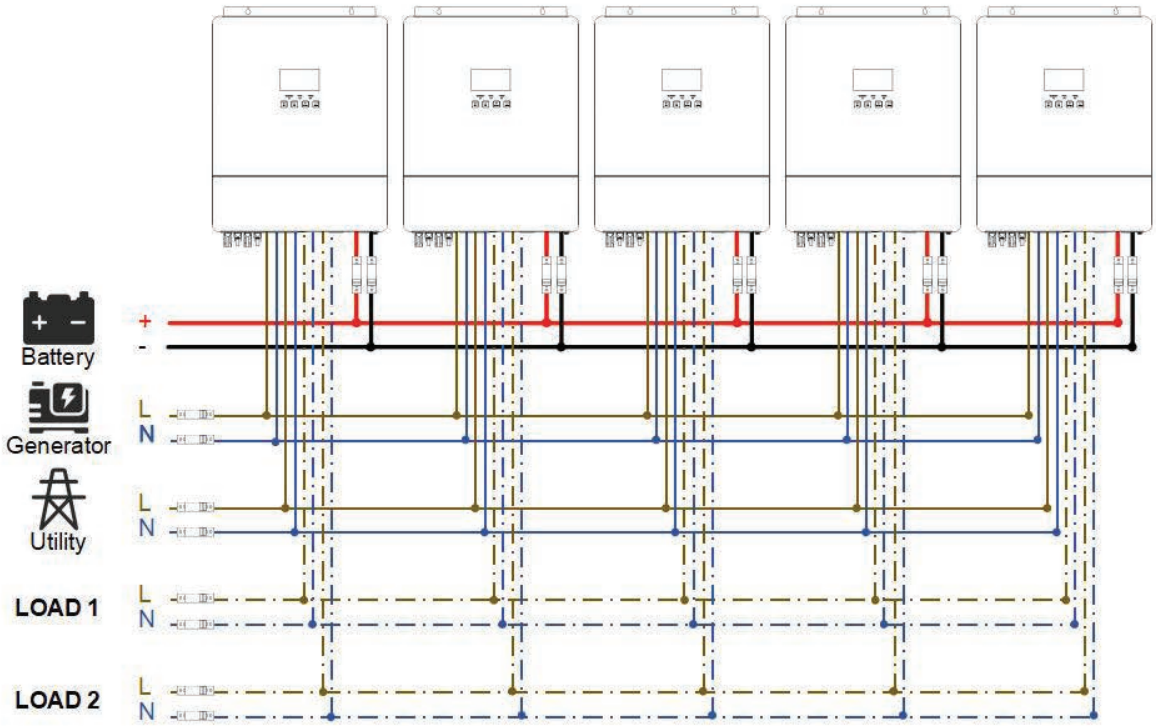
Four inverters parallel：
Power Connection:



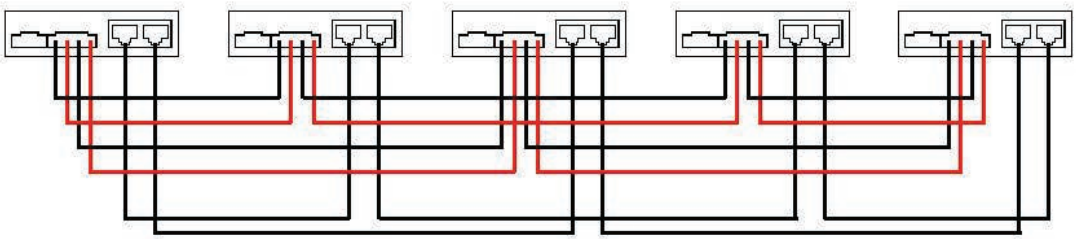
Communication Connection:
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



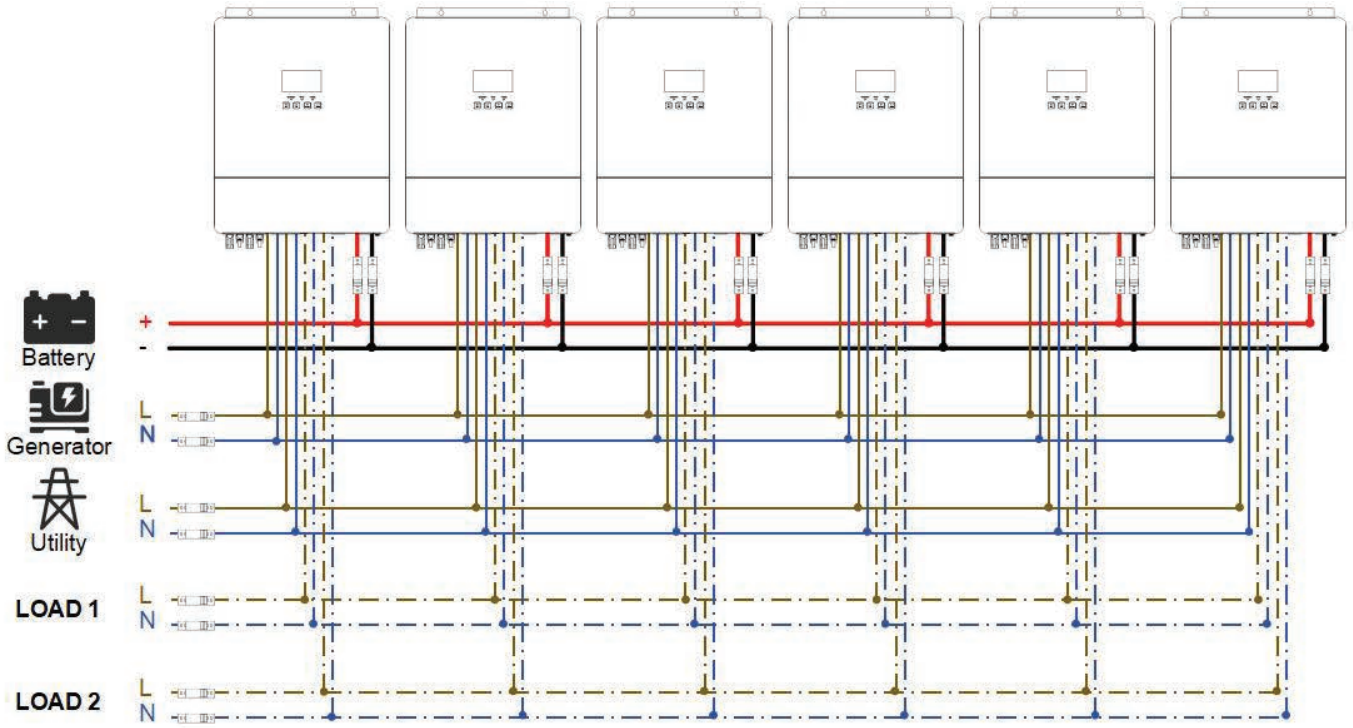
Five inverters parallel：
Power Connection:



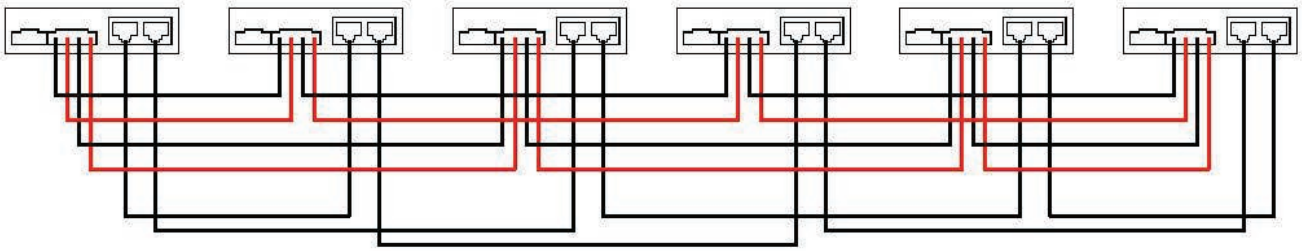
Communication Connection:
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



Six inverters parallel：
Power Connection:



Communication Connection:
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



Three-phase parallel：

CAUTION: It is forbidden for inverter to share the same solar panel group.

1. Connecting the parallel communication cables and power cables as shown below:

Warning： All inverters must share the same battery pack when paralleling

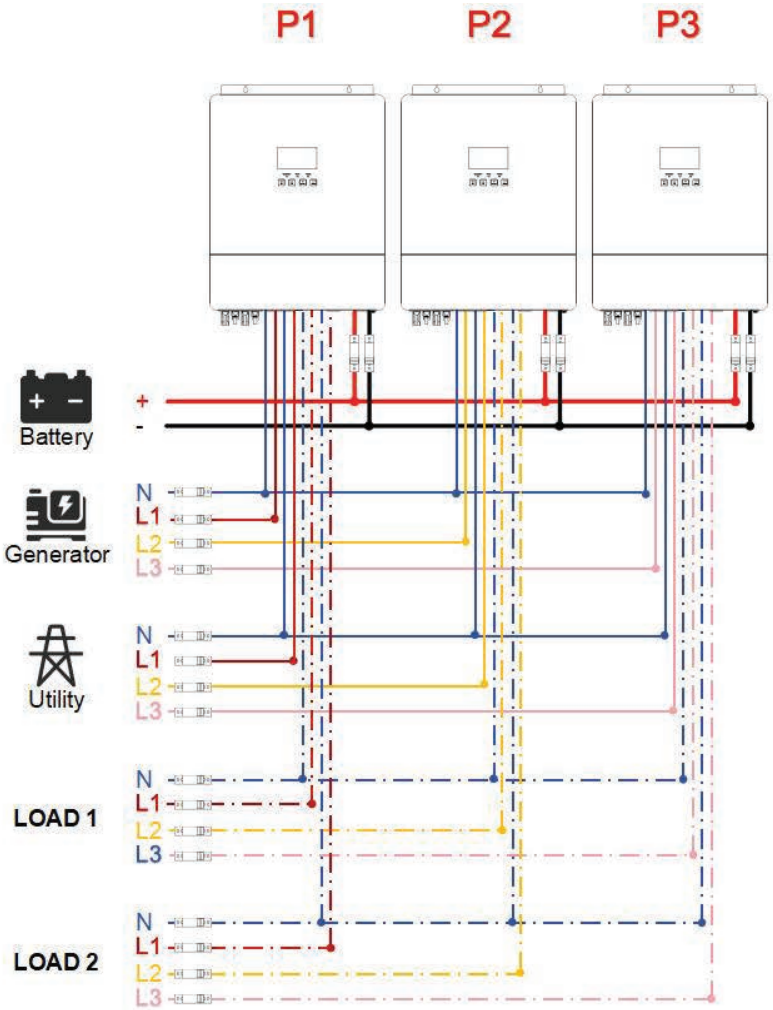
2. Set the parameters of each inverter independently (working mode, single-phase parallel function, three-phase parallel function and set A/B/C phase sequence).

Warning： When working in parallel, the working mode of each inverter must be the same.

3. After setting the parameters, first turn on the A phase inverter and then turn on each inverters in turn.

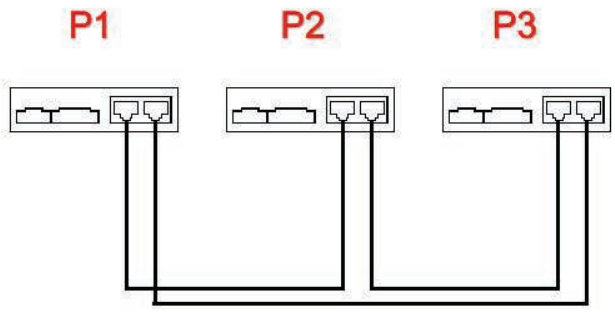
One inverters in each phase:

Power connection:

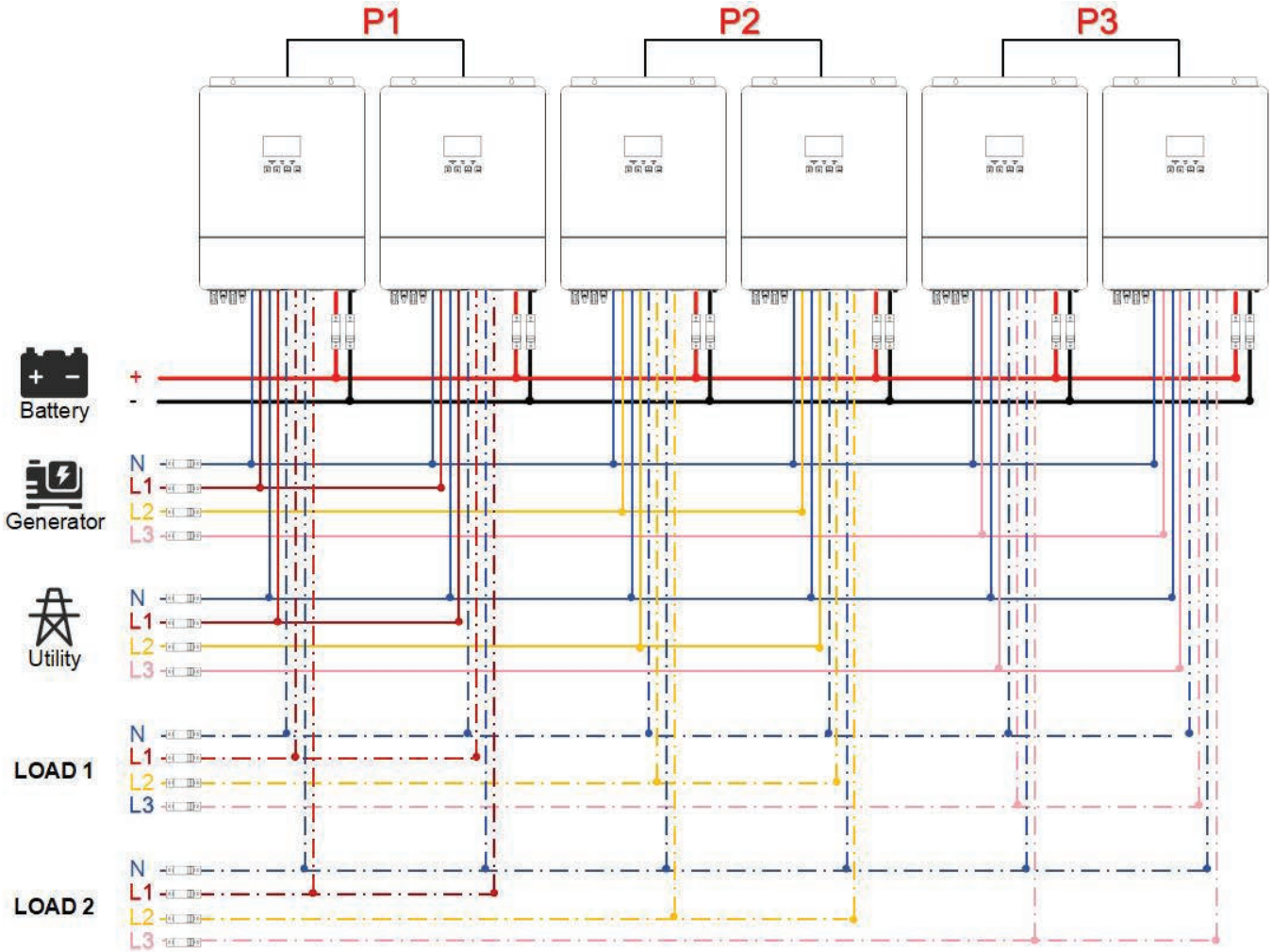


Communication Connection:

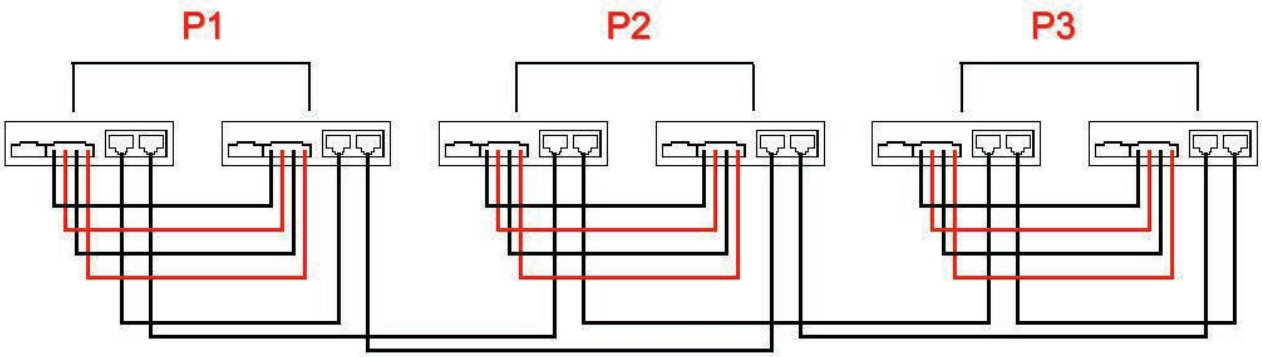
Black→Parallel communication line



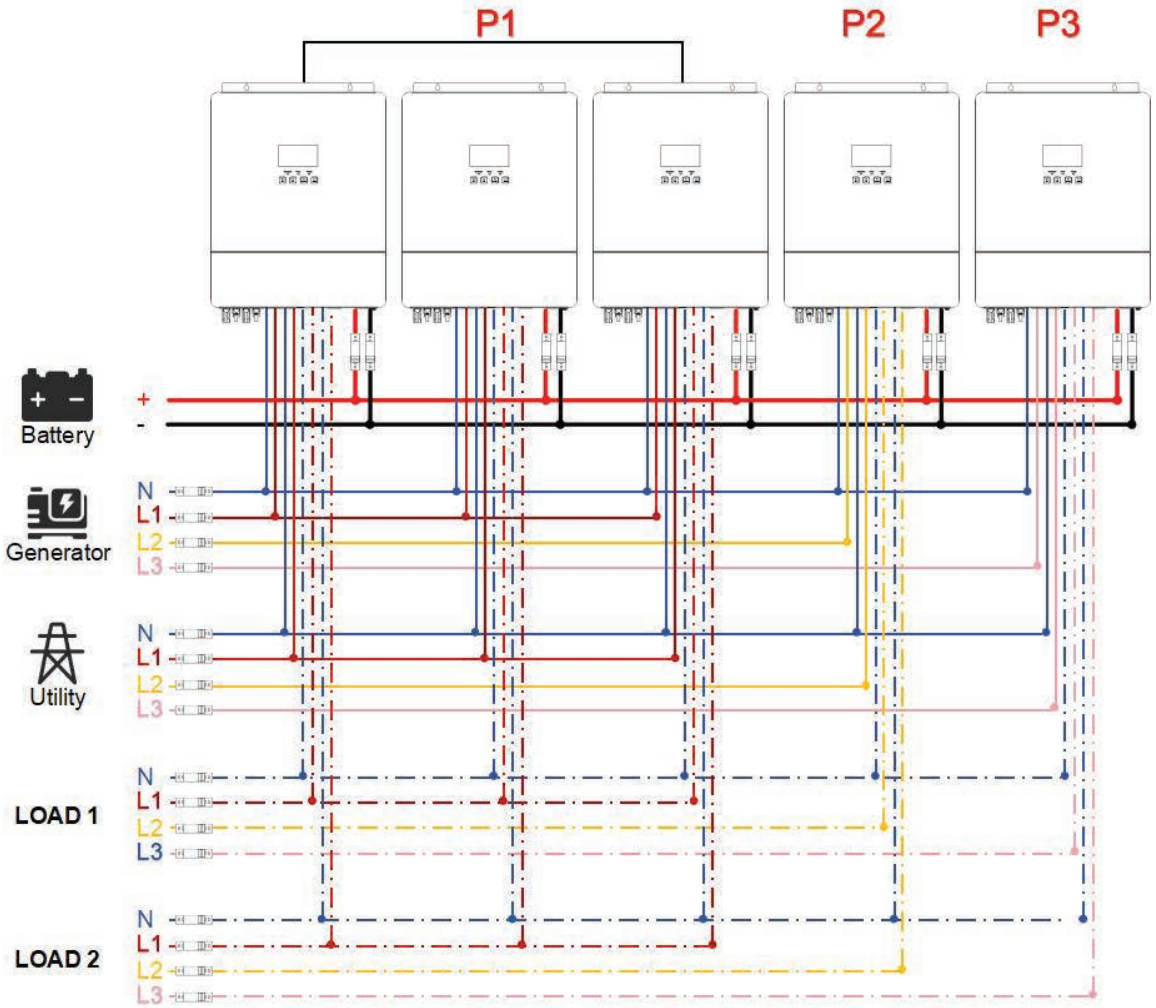
Two inverters in each phase:
Power connection:



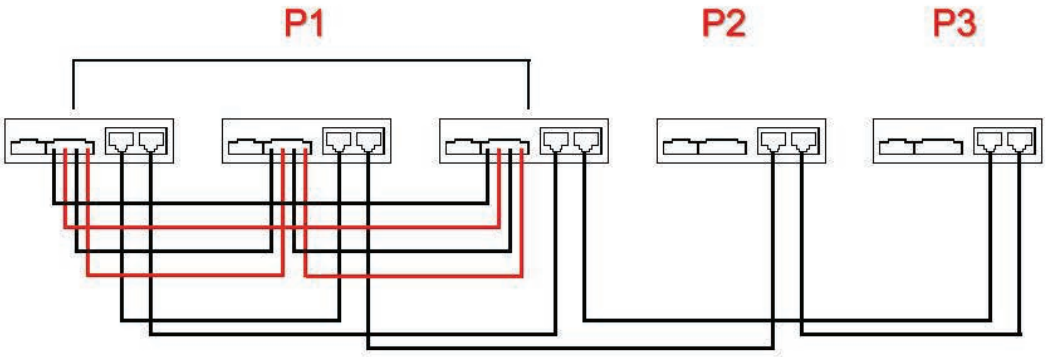
Communication Connection:
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



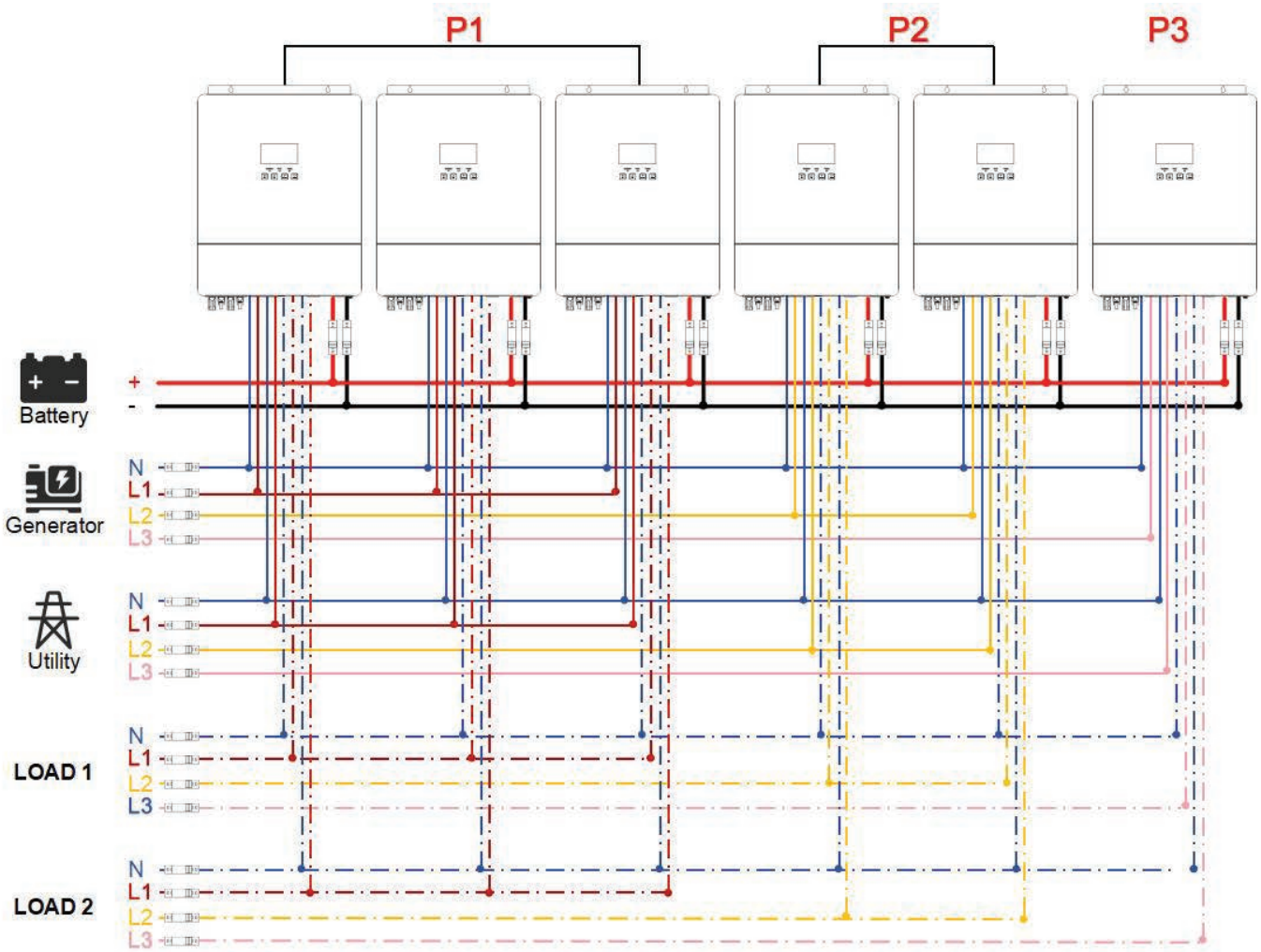
Three inverters in one phase and only one inverter for the remaining two phases:
Power Connection:



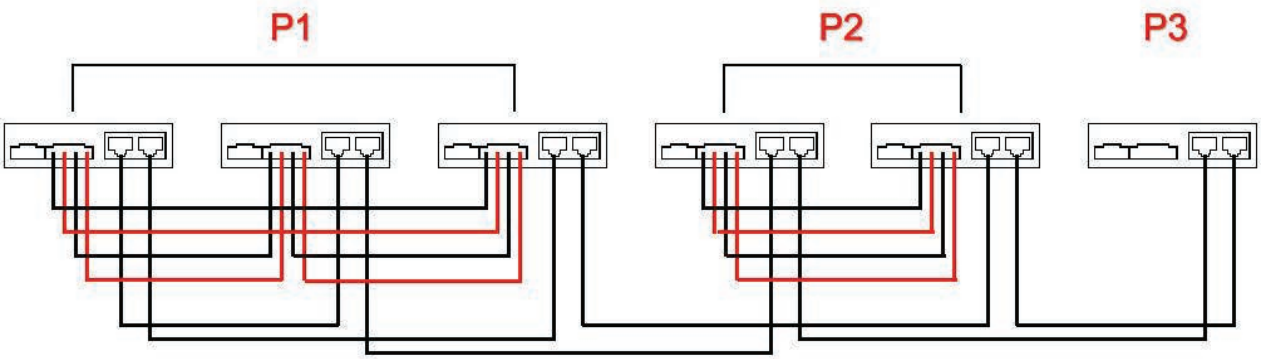
Communication Connection
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



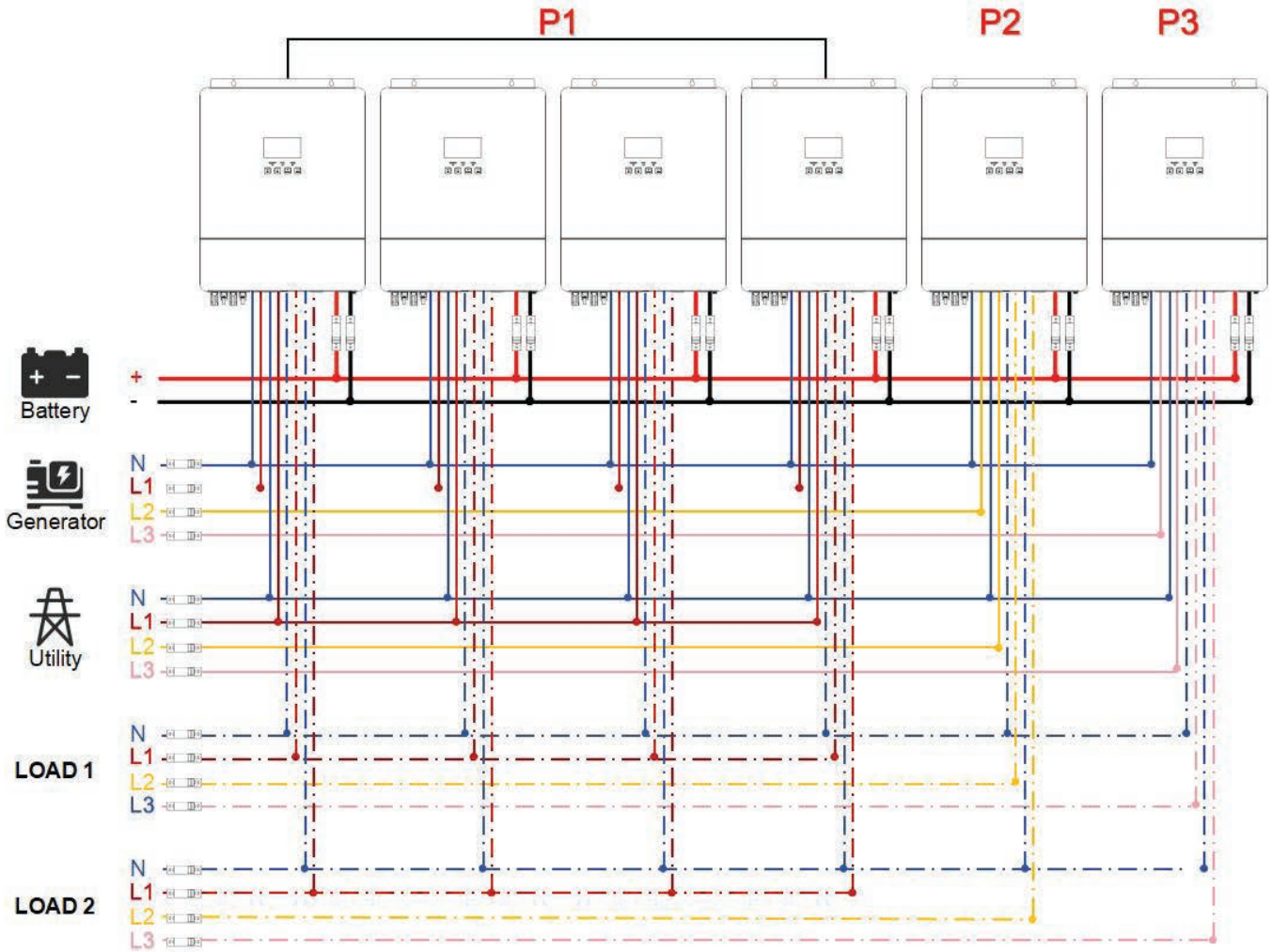
Three inverters in one phase, two inverters in second phase and one inverter for the third phase:
Power Connection:



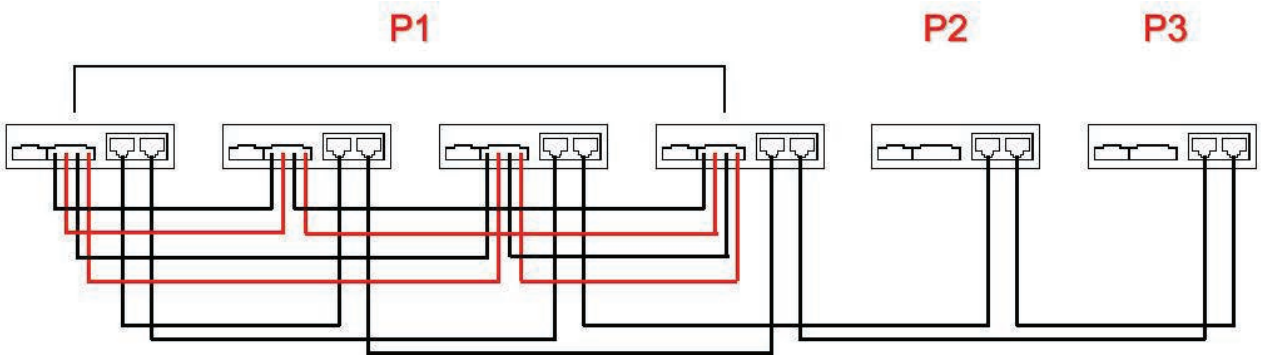
Communication Connection
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



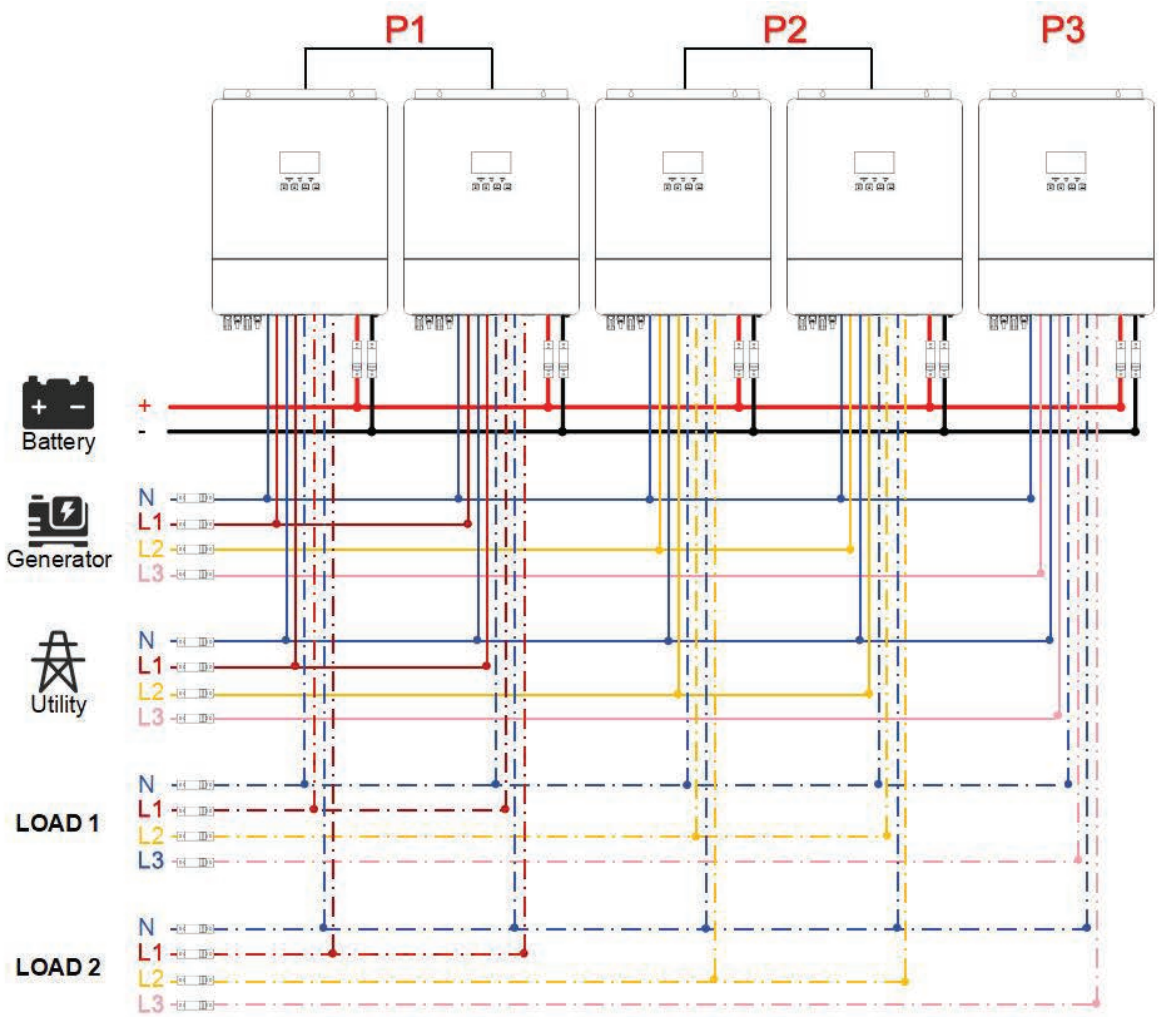
Four inverters in one phase and one inverter for the other two phases:
Power Connection:



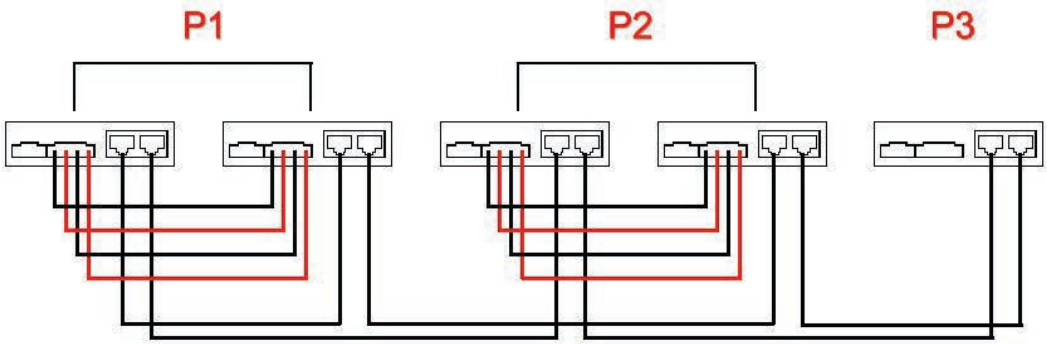
Communication Connection
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



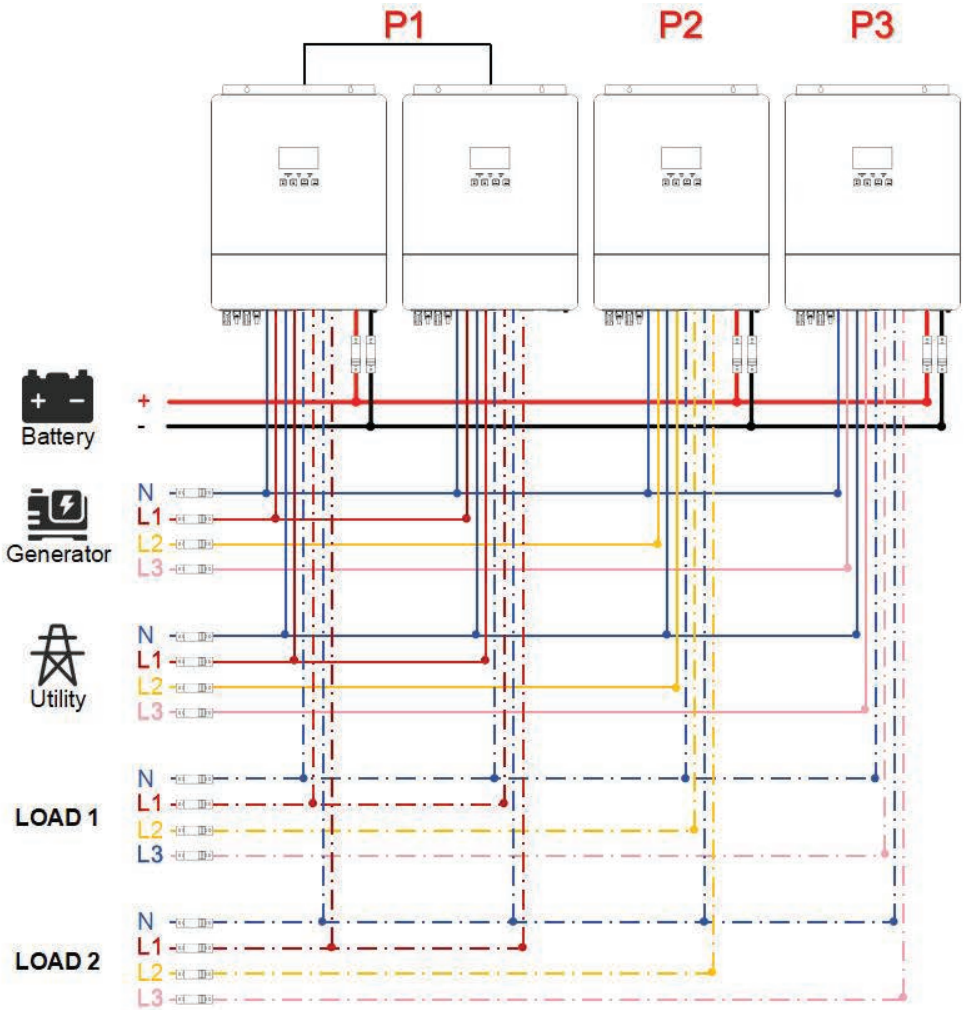
Two inverters in two phases and only one inverter for the remaining phase:
Power Connection:



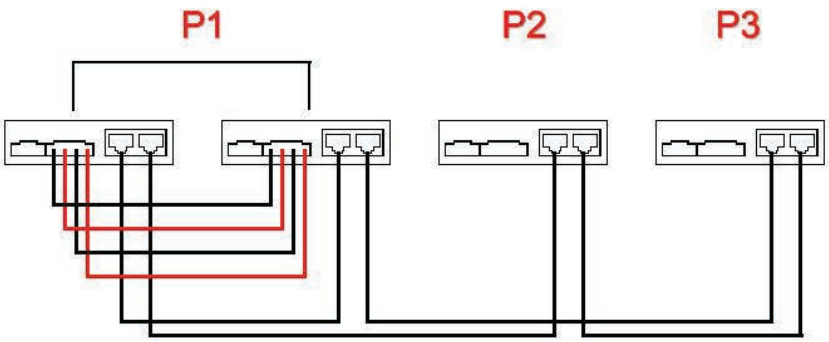
Communication Connection
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



Two inverters in one phase and only one inverter for the remaining phases:
Power Connection:



Communication Connection
Black and Red (left)→Current sharing line
Black (right)→Parallel communication line



4.7 Fault Code

Fault Code	Fault Event
01	Fan is locked
02	Over temperature
03	Battery voltage is too high
04	Battery voltage is too low
05	Output short circuited.
06	Output voltage is too high.
07	Overload time out
08	Bus voltage is too high
09	Bus soft start failed
52	Bus voltage is too low
53	Inverter soft start failed
55	Over DC voltage in AC output
57	Current sensor failed
58	Output voltage is too low

4.8 Warning Code

Warning Code	Warning Event
01	Fan is locked
02	Over temperature
03	Battery is over-charged
04	Low battery
07	Overload
08	Discharge over current
10	Output power derating
15	PV energy is low
16	High AC input (>280VAC) during BUS soft start
22	PV over voltage
24	PV over temperature
59	PV low voltage

4.9 Parallel Faults Code

Fault Code	Fault Event
60	Power feedback protection
71	Firmware version inconsistent
72	Current sharing fault
73	Output voltage different
80	CAN fault
81	Host loss
82	Synchronization loss
83	Battery voltage detected different
84	AC input voltage and frequency detected different
85	AC output current unbalance
86	AC output mode setting is different

5. TROUBLE SHOOTING

Problem	LCD/LED/Buzzer	Possible cause	What to do
Unit shuts down automatically during start up process	LCD/LED and buzzer will be active then complete off	The battery voltage is too low	1.Re-charge battery. 2.Replace battery
No response after power on	No indication	1.The battery voltage is too low. 2.Internal fuse tripped	1.Contact repair center for replacing the fuse. 2.Re-charge battery. 3.Replace battery.
Mains exist but the unit works in battery mode	Input voltage is displayed as '0' on the LCD and green LED is flashing	Input protector is triggered	Check if AC breaker is turned on and AC wiring is connected well.
	LED is flashing	Insufficient quality of AC power(grid or generator)	1.Check if AC wires are too thin and/or too long. 2.Check if generator (if applied) is working well or if input voltage range setting is correct.
When the unit is turned on, internal relay is switched on and off repeatedly	LCD display and LED flashing	Set "Solar First" as the priority of output source.	Change output source priority to utility first.
Buzzer beeps continuously and red LED is on	Fault code 01	Fan fault	Replace the fan
	Fault code 02	Internal temperature of inverter component is over 85°C	Check whether the environment around the equipment well ventilated
	Fault code 03	The battery voltage is too high	Check if spec and quantity of batteries are meet requirements
		battery is over charged	Return to repair center
	Fault code 04	The battery voltage is too low	1.The battery is dead, please charge the battery immediately 2.Check the battery for damage
	Fault code 05	Output short circuited	1.Check that the output cable is connected 2.Return to the maintenance center
	Fault code 06/58	Output abnormal (Inverter voltage range 180-260VAC)	Return to the maintenance center
	Fault code 07	Overload error , the inverter is overload 110% and overload time reaches the upper limit	Reduce load

Buzzer beeps continuously and red LED is on	Fault code 08/09/12/53/57	Internal fault of inverter	Return to the maintenance center
	Fault code 10	Over current or surge	Remove abnormal load or check PV input
	Fault code 11	The configuration of the solar panel is higher than the PV input voltage required by the inverter	Remove the excess solar panels
	Fault code 13	Battery discharge over current	Please check whether the discharge current of Item 40 is lower than the discharge current of the inverter
	Fault code 52/55	Internal fault of inverter	Return to the maintenance center
	Fault code 60	Power feedback protection	1.Restart the inverter. 2.Check if L/N cables are not connected reversely in all inverters. 3.For parallel system in single phase ,make sure the sharing are connected in all inverters. for supporting three-phase system, make sure the sharing cables are connected in the inverters in the same phase. and disconnected in the inverters in different phase.
	Fault code 71	Firmware version inconsistent	1.Update all inverter firmware to the same version 2.If the problem remains, please contact your installer.
	Fault code 72	The output current of each inverter is different	1.check if sharing cables are connected well and restart the inverter. 2.if the problem remains, please contact your installer.
	Fault code 73	AC output voltage setting is different	Check whether the output voltage of each inverter are set the same

Buzzer beeps continuously and red LED is on	Fault code 80	CAN data loss	1.Check if communication cables are connected well and restart the inverter 2.If the problem remains, please contact your installer.
	Fault code 81	Host data loss(only for three-phase parallel)	
	Fault code 82	Synchronization data loss	
	Fault code 83	The battery voltage of each inverter is not the same.	1.Make sure all inverters share same groups of batteries together. 2.Remove all loads and disconnect AC input and PV input. Then, check battery voltage of all inverters. If the values from all inverters are close, please check if all battery cables are the same length and same material type. Otherwise, please contact your installer to provide SOP to calibrate battery voltage of each inverter. 3.If the problem still remains, please contact your installer.
	Fault code 84	AC input voltage and frequency detected different	Check whether the input voltage and frequency of each inverter are set the same
	Fault code 85	AC output current unbalance	1.Restart the inverter 2.Remove some excessive loads and re-check load information from LCD of inverters. If the values are different, please check if AC input and output cables are in the same length and material type.
	Fault code 86	AC output mode setting is different.	1.Check whether it is set to parallel mode 2. Return to the maintenance center

6. SPECIFICATIONS

Table 1 Line Mode Specifications

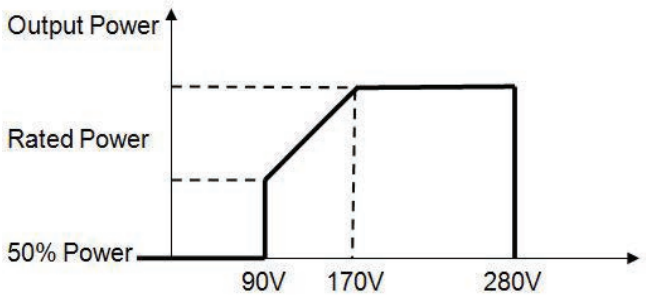
INVERTER MODEL	8kW	11kW
Input Voltage Waveform	Sinusoidal (utility or generator)	
Nominal Input Voltage	230Vac	
Low Loss Voltage	90Vac±7V (wide range) 170Vac±7V (narrow range);	
Low Loss Return Voltage	100Vac±7V (wide range) 180Vac±7V (narrow range);	
High Loss Voltage	280Vac±7V	
High Loss Return Voltage	270Vac±7V	
Max AC Input Voltage	300Vac	
Max AC Input Current	60A	70A
Nominal Input Frequency	50Hz / 60Hz (Auto detection)	
Low Loss Frequency	40±1Hz	
Low Loss Return Frequency	42±1Hz	
High Loss Frequency	65±1Hz	
High Loss Return Frequency	63±1Hz	
Output Short Circuit Protection	Circuit Breaker	
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)	
Transfer Time	10ms typical (wide range); 20ms typical (narrow range)	
Output power derating: When AC input voltage drops to 170V, the output power will be derated.		

Table 2 Inverter Mode Specifications

INVERTER MODEL	8kW	11kW
Rated Output Power	8000W	11000W
Output Voltage Waveform	Pure Sine Wave	
Output Voltage Regulation	230Vac±5%	
Output Frequency	50Hz/60Hz	
Max. Peak Efficiency	93%	
Overload Protection	5s@≥110%load; 10s@101%~110% load	
Surge Capacity	2* rated power for 5 seconds	
Nominal DC Input Voltage	48Vdc	
Cold Start Voltage	46Vdc	
Low DC Warning Voltage	46.0Vdc±0.5V	
Low DC Warning Return Voltage	47.0Vdc±0.5V	
Low DC Cut-off Voltage	42.0Vdc±0.5V	
High DC Recovery Voltage	60±1Vdc	
High DC Cut-off Voltage	63±1Vdc	
No Load Power Consumption	<100W	

Table 3 Charge Mode Specifications

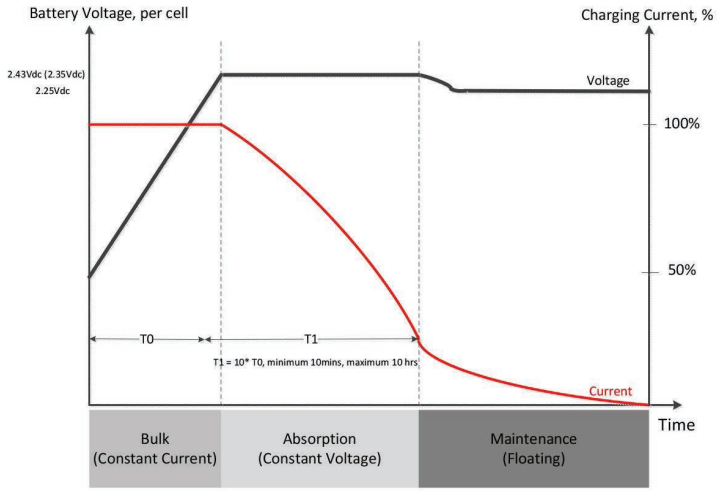
Utility Charging Mode			
INVERTER MODEL		8kW	11kW
Charging Algorithm		3-Step	
AC Charging Current (Max)		120A(@VI/P=230Vac)	150A(@VI/P=230Vac)
Bulk Charging Voltage	Flooded Battery	58.4Vdc	
	AGM / Gel Battery	56.4Vdc	
Floating Charging Voltage		54Vdc	
Charging Curve			
MPPT Solar Charging Mode			
INVERTER MODEL		8kW	11kW
Max. PV Array Power		5500W*2	6500W*2
Nominal PV Voltage		270Vdc	340Vdc
Start-up Voltage		70Vdc +/- 10Vdc	
PV Array MPPT Voltage Range		60-450Vdc	
MAX. PV Input Current		(One way) 27A or (Dual channel) 20A*2	
Max. PV Array Open Circuit Voltage		500Vdc	
Max Charging Current (AC charger + solar charger)		120A	150A

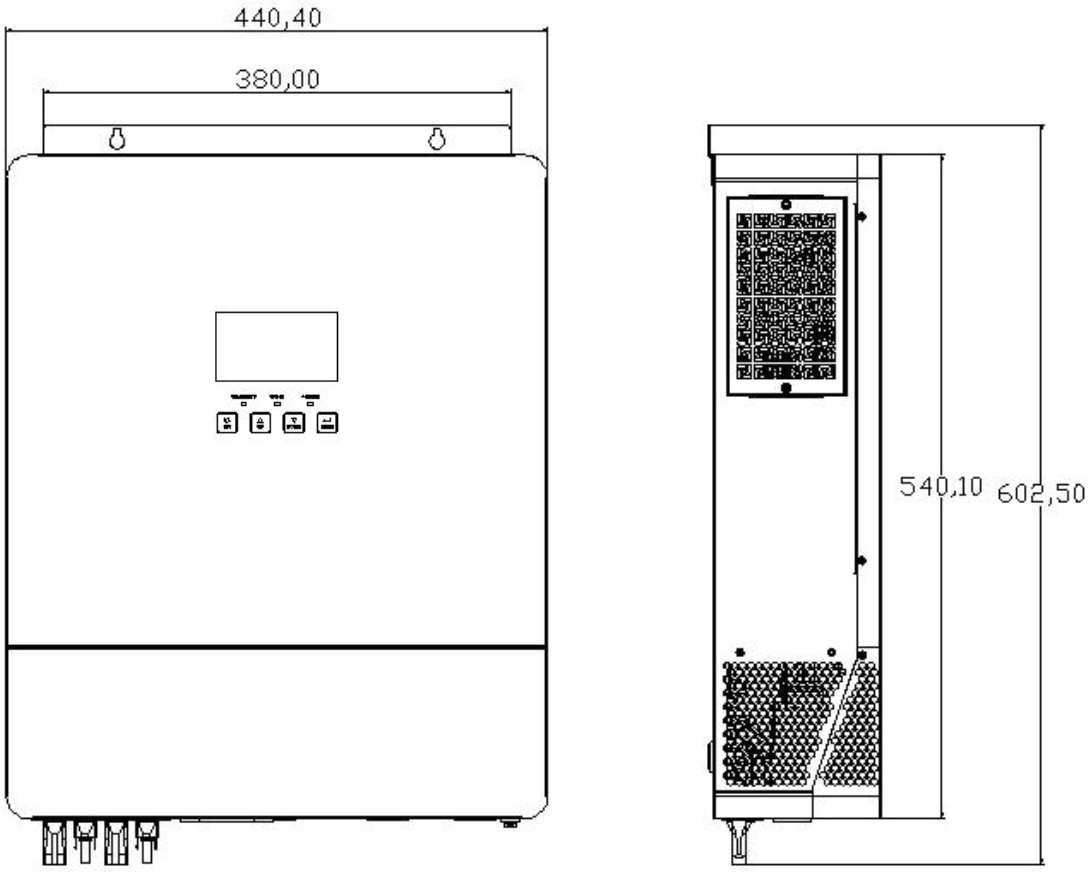
Table 4 General Specifications

INVERTER MODEL	8kW	11kW
Operating Temperature Range	-10°C to 50°C	
Storage temperature	-15°C~ 60°C	
Humidity	5% to 95% Relative Humidity (Non-condensing)	
Dimension (D*W*H), mm	136*440*540	
Net Weight, kg	18	18.5

7. INSTALLATION DIMENSION DRAWING

(unit: mm)

NOTE: The following picture is only a schematic diagram of the equipment .If the actual chassis does not conform to the schematic due to a structural upgrade, it is subject to prior notice.



614.C07072-03

LUMINOUS

Luminous Power Technologies Pvt.Ltd.
Plot No.150, Sector-44,Gurgaon-122003 (ndia)
Website : service@luminous-global.com | Website: www.luminous-global.com