MUST®

100% PURE SINE WAVE HOME INVERTER

USER'S MANUAL

ENERGY STORAGE INVERTER

3.5KW/5.5KW

Please download the software "SolarPowerMonitor2.2.81".
Download link:https://en.must-ee.com

Appliances

4200-100004-0000

CONTENT

ABOUT THIS MANUAL

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.

Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

The following cases are not within the scope of warranty

1. Out of warranty.
2. Series number was changed or lost.
3. Battery capacity was declined or external damaged.
4. Inverter was damaged caused of transport shift, remissness, ect external factor
5. Inverter was damaged caused of irresistible natural disasters.
6. Not in accordance with the electrical power supply conditions or operate environment caused damage.

SAFETY INSTRUCTIONS

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

1. Before using the unit, read all instructions and cautionary markings on the unit the batteries and all appropriate sections of this manual.
2. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
3. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
4. **CAUTION** --Only qualified personnel can install this device with battery.
5. For optimum operation of this inverter/charger, please follow required spec to select appropriate cable size. It' s very important to correctly operate this inverter/charger.
6. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
7. Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.
8. Fuses (1 piece of 150A, 63VDC for 5.5KW and 1 piece of 200A, 63VDC for 3.5KW) are provided as over-current protection for the battery supply.
9. GROUNDING INSTRUCTIONS- This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
10. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
11. **Warning!!** Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this inverter/charger back to local dealer or service center for maintenance.

INTRODUCTION

This is a multi-functional photovoltaic energy storage power station composed of batteries and a solar inverter integrated with MPPT solar charge controller, high frequency pure sine wave inverter and UPS function module. Its comprehensive LCD display offers user-configurable and easy-accessible button operation such as battery charging current, AC/solar charger priority, and acceptable input voltage based on different applications.

Features

- Pure sine wave inverter
- Configurable input voltage range for home appliances and personal computers via LCD setting
- Configurable battery charging current based on applications via LCD setting
- Configurable AC/Solar Charger priority via LCD setting
- Compatible to mains voltage or generator power
- Auto restart while AC is recovering
- Overload/ Over temperature/ short circuit protection
- Smart battery charger design for optimized battery performance
- Cold start function

Basic System Architecture

The following illustration shows basic application for this inverter/charger. It also includes following devices to have a complete running system:

- Generator or Utility.
- PV modules (option)

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 tube light, fan, refrigerator and air conditioner.

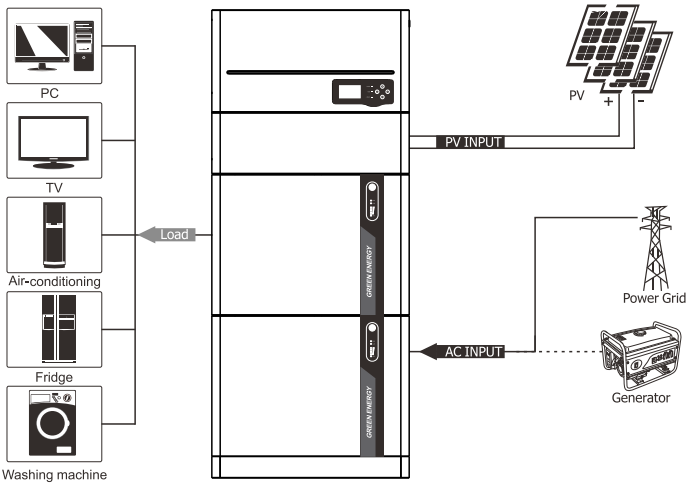
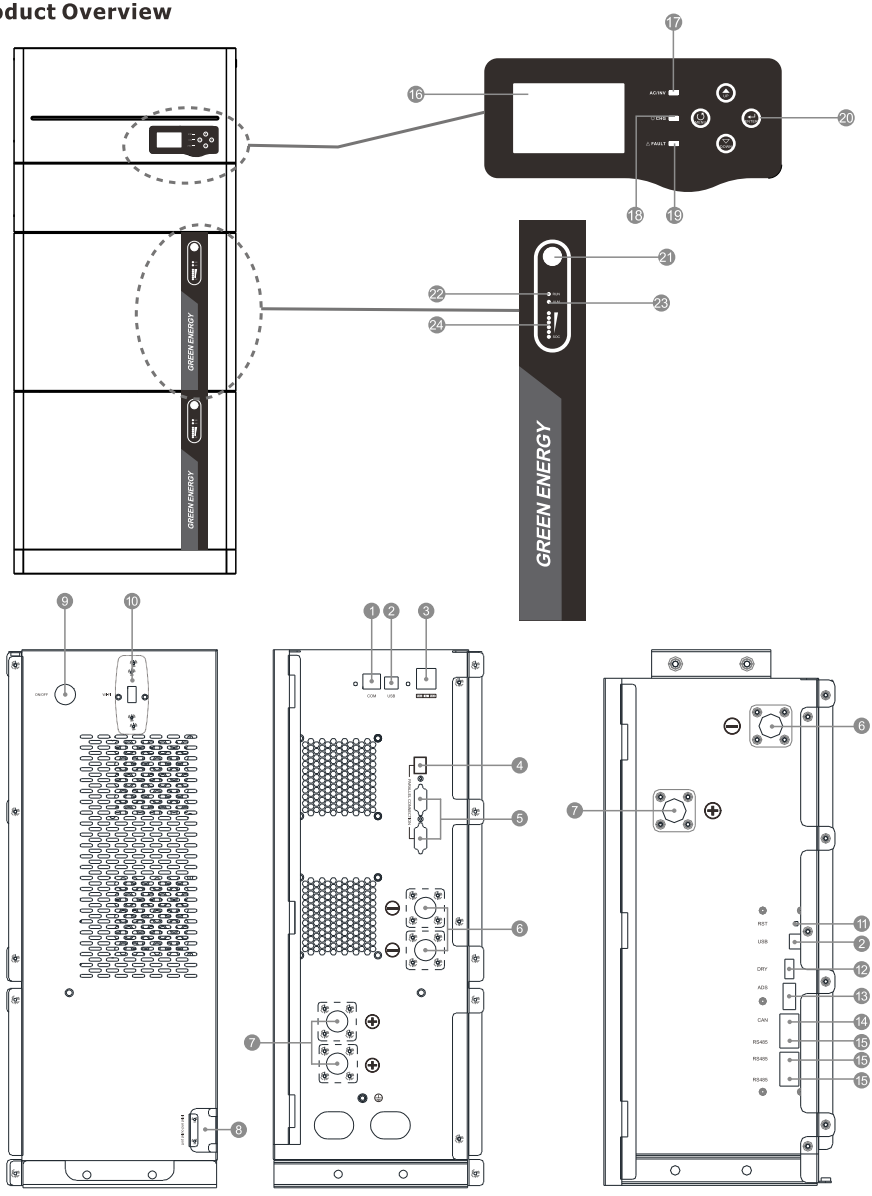


Figure 1 Hybrid Power System

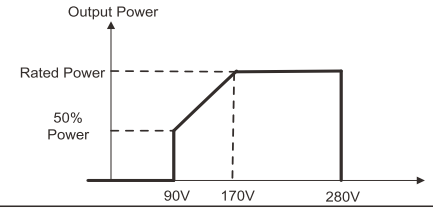
Product Overview



1. RS485 communication port
2. USB
3. Dry contact
4 Parallel switch
5. Parallel communication port (only for parallel model)
6.Battery negative
7.Battery positive
8.Inlet and outlet port
9.ON/OFF Switch
10. USB WIFI
11.RST
12.DRY
13.ADS
14.CAN
15.RS485
16.LCD display
17.Status indicator
18.Charging indicator
19.Fault indicator
20.Function buttons
21.Battery Switch
22.RUN
23.ALM
24.SOC

SPECIFICATIONS

Line Mode Specifications

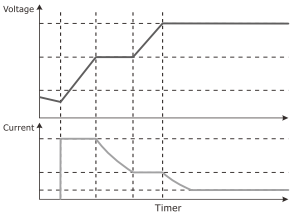
INVERTER MODEL	3.5KW DC24V	5.5KW DC48V
Input Voltage Waveform	Sinusoidal (utility or generator)	
Nominal Input Voltage	230Vac	
Low Loss Voltage	90Vac±7V(APL,GEN);170Vac±7V(UPS); 186Vac±7V(VDE)	
Low Loss Return Voltage	100Vac±7V(APL,GEN);180Vac±7V(UPS); 196Vac±7V(VDE)	
High Loss Voltage	280Vac±7V(UPS,APL,GEN); 253Vac±7V(VDE)	
High Loss Return Voltage	270Vac±7V(UPS,APL,GEN); 250Vac±7V(VDE)	
Max AC Input Voltage	300Vac	
Nominal Input Frequency	50HZ/60HZ(Auto detection)	
Low Loss Frequency	40HZ±1HZ(UPS,APL,GEN); 47.5HZ±0.05HZ(VDE)	
Low Loss Return Frequency	42HZ±1HZ(UPS,APL,GEN); 47.5HZ±0.05HZ(VDE)	
High Loss Frequency	65HZ±1HZ(UPS,APL,GEN); 51.5HZ±0.05HZ(VDE)	
High Loss Return Frequency	63HZ±1HZ(APL,GEN,UPS); 50.05HZ±0.05HZ(VDE)	
Output Short Circuit Protection	Line mode: Circuit Breaker Battery mode: Electronic Circuits	
Efficiency (Line Mode)	>95%(Rated R load, battery full charged)	
Transfer Time	10ms typical (UPS,VDE) 20ms typical (APL)	
Output power derating: When AC input voltage drops to 95V or 170V depending on models, the output power will be derated.	230Vac model:  	

Inverter Mode Specifications

INVERTER MODEL	3.5KW DC24V	5.5KW DC48V
Rated Output Power	3500W	5500W
Output Voltage Waveform	Pure Sine Wave	
Output Voltage Regulation	230Vac±5%	
Output Frequency	60Hz or 50Hz	
Peak Efficiency	90%	
Overload Protection	5s@≥150% load; 10s@110%~150% load	
Nominal DC Input Voltage	24Vdc	48Vdc
Cold Start Voltage	23.0Vdc	46.0Vdc

High DC Recovery Voltage	29Vdc	58Vdc
High DC Cut-off Voltage	30Vdc	60Vdc

Charge Mode Specifications

Utility Charging Mode		
INVERTER MODEL	3.5KW DC24V	5.5KW DC48V
Charging Current @ Nominal Input Voltage	80A MAX	100A MAX
Floating charging voltage	27.0Vdc (settable)	54.0Vdc (settable)
Bulk charging voltage(C.V voltage)	28.8Vdc (settable)	57.6Vdc (settable)
Charging Algorithm	4-Step(LI)	
Solar Charging Mode		
INVERTER MODEL	3.5KW DC24V	5.5KW DC48V
Rated Power	4000W	6000W
MPPT charger		
solar charging current	100A	120A
Max.PV Array Open Circuit Voltage	450Vdc max	
PV Array MPPT Voltage Range	150~430Vdc	
Min battery voltage for PV charge	17Vdc	34Vdc
Battery Voltage Accuracy	+/-0.3%	
PV Voltage Accuracy	+/-2V	
Charging Algorithm	4-Step(LI)	
Charging algorithm for Lithium battery		
Joint Utility and Solar Charging		
INVERTER MODEL	3.5KW DC24V	5.5KW DC48V
Max Charging Current	100A	120A
Default Charging Current	80A	

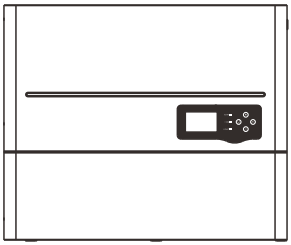
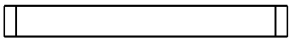
General Specifications

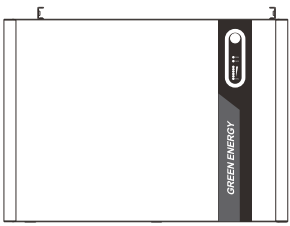
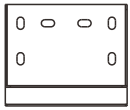
INVERTER MODEL	3.5KW DC24V	5.5KW DC48V
Safety Certification	CE	
Operating Temperature Range	-10°C to 50°C	
Storage temperature	-15°C~ 60°C	
Dimension (D*W*H), mm	5120Wh:596*220*920	10240Wh:596*220*1345

INSTALLATION

Unpacking and Inspection

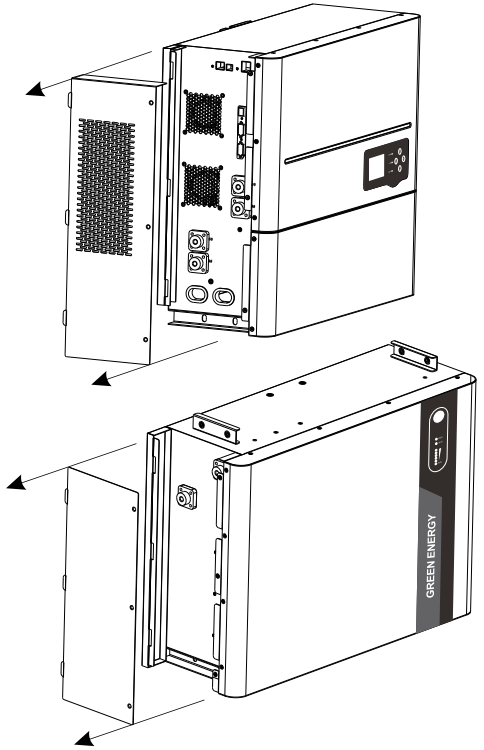
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. Check the following part list to ensure it is complete.

Inverter Package			
			
Inverter x 1	Mounting Panel x1	Communication Cable x 1	USB Cable x 1
			
Base x 1	User Manuel x 1	M5*12 x 4	φ10*50 x 4
For single-battery unit			
			
Short Power Cable X 2 (1 red , 1 black)			
For double-battery unit			
			
Short Power Cable X 2 (1 red , 1 black)	Long Power Cable X 2 (1 red , 1 black)		
For triple-battery unit			
			
Short Power Cable X 4 (2 red , 2 black)	Long Power Cable X 2 (1 red , 1 black)		

Battery Package			
			
	Mounting Panel x 1		
			
Battery x 1	M5*12 x 8	φ10*50 x 6	Battery Parallel Cable x 1

Preparation

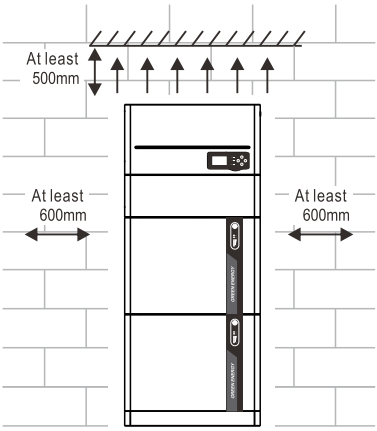
Before installation, please take off the left cover of inverter and battery modules.



Mounting the Unit

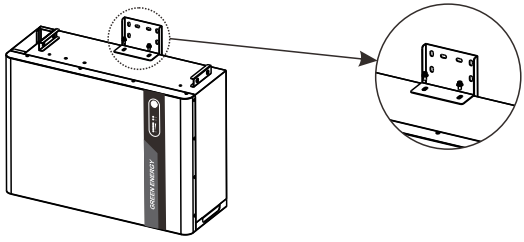
Consider the following points before selecting where to install:

- Do not mount the unit on flammable construction materials.
- Mount on a solid wall/surface.
- Mount on the flat and level floor.
- The area is completely water proof.
- The area shall avoid direct sunlight.
- For proper air circulation to dissipate heat, allow a clearance of approx. 600 mm to the side and approx. 500 mm above and below the unit.
- The ambient temperature should be between 0°c and 55°c to ensure optimal operation.
- The recommended installation position is to be adhered to the wall vertically.
- Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and to have enough space for removing wires

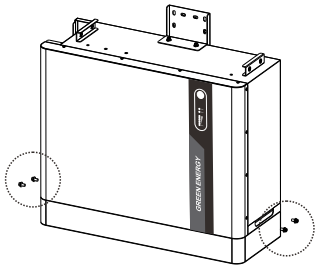


SUITABLE FOR MOUNTING ON CONCRETE OROTHER NON-COMBUSTIBLE SURFACE ONLY.

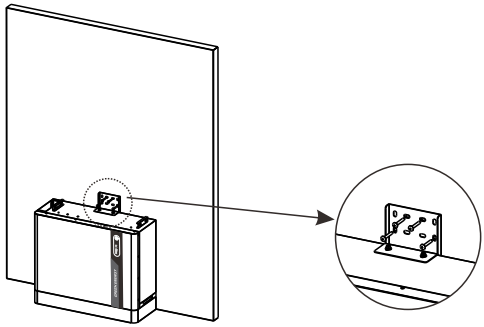
Step 1:Assemble the battery mounting panel on the battery.



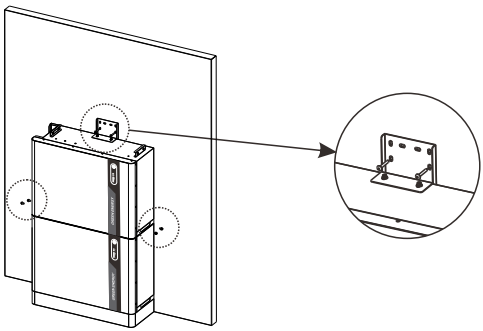
Step 2:Attach the battery to the base.



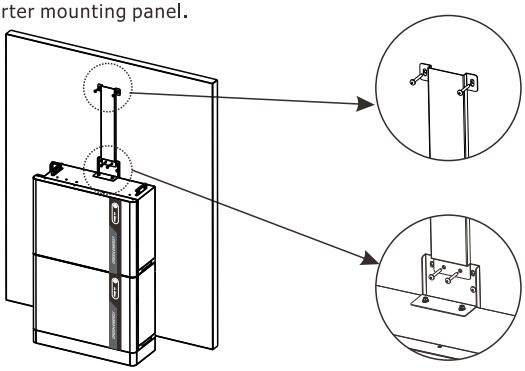
Step 3:Position the battery parallel to the wall and use a drill to drill holes at a depth of about 70mm in the wall for subsequent fixation of the mounting plates.Remove the debris baffle and secure the battery to the wall with screws.



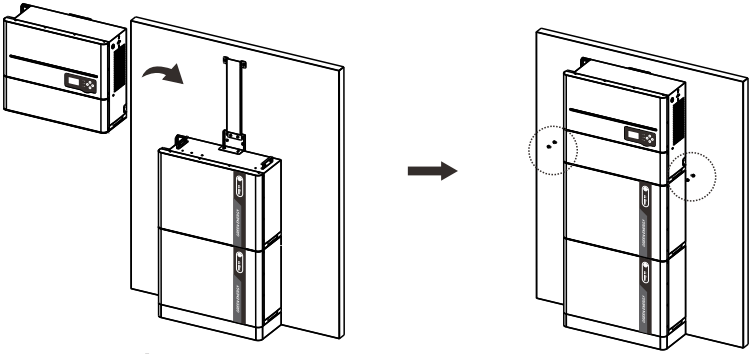
Step 4:To assemble the second (and all other) battery, repeat last two steps, respectively.Secure the screws on the left and right side.



Step 5:Install the inverter mounting panel.



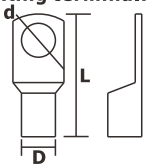
Step 6:Hang the inverter onto the mounting panels, adjust the entire system and ensure that the battery and the inverter have been securely hung onto the panels and brackets.



Battery Connection

WARNING!All wiring must be performed by a qualified person.
WARNING!It's very important for safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the cable inside the package or proper recommended cable and terminal size as below.

Ring terminal:

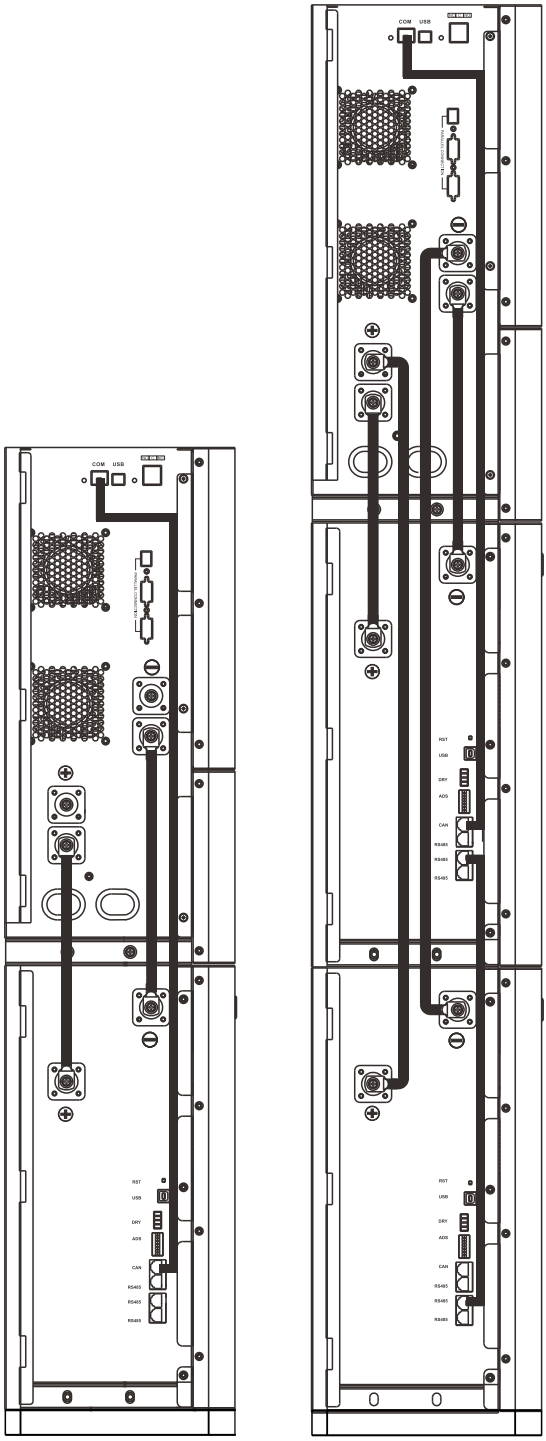


Recommended battery cable and terminal size

Model	Typical Amperage	Gauge	L	D	d
5.5KW DC48V	130A	2*4AWG	38mm	10.5mm	10.5mm
3.5KW DC24V	165A	2*4AWG	38mm	10.5mm	10.5mm

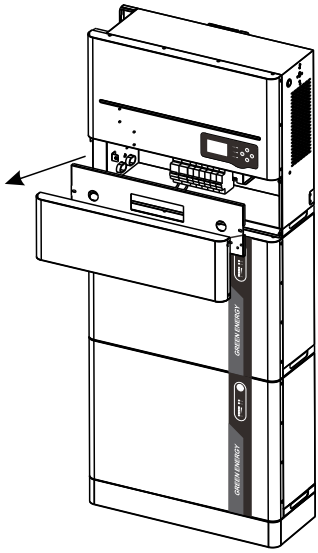
Please follow below steps to implement battery connection:
1.Assemble battery ring terminal based on recommended battery cable and terminal size.
2.Connect the battery modules and inverter as the figure shown below.
3.Tighten the ring terminals with torque of 2-3 Nm. Make sure polarity at both the battery and the inverter is correctly connected and ring terminals are tightly screwed to the battery and inverter terminals.

⚠	**WARNING: Shock Hazard** Installation must be performed with care due to high battery voltage in series.
⚠	**CAUTION!!** Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur. **CAUTION!!** Do not apply anti-oxidant substance on the terminals before terminals are connected tightly. **CAUTION!!**Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).


COM
USB
RST
USB
DRY
ADS
CAN
RS485
RS485
RS485

AC Input/Output Connection

Before connecting wirings,please take off the front cover of inverter.



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. The recommended spec of AC breaker is 30A for 3. 5KW,40A for 5.5KW.

CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. Please do NOT-misconnect input and output connectors.

WARNING! All wiring must be performed by a qualified personnel.
WARNING! 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.

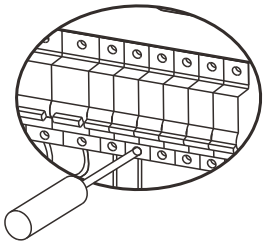
Suggested cable requirement for AC wires

Model	Gauge	Torque Value
5.5KW DC48V	10 AWG	1.2~ 1.6Nm
3.5KW DC24V	12 AWG	

Please follow below steps to implement AC input/output connection:

1. Before making AC input/output connection, be sure to open DC protector or disconnector first.
2. Remove insulation sleeve 10mm for the conductors. And shorten phase L and neutral conductor N 3mm.
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws.

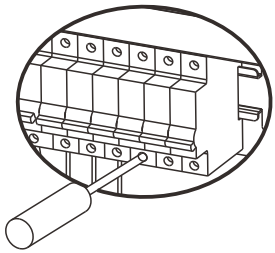
L → LINE (brown or black)
N → Neutral (blue)



⚠	**WARNING:** Be sure to that AC power source is disconnected before attempting to hardwire it to the unit.

4. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws.

L → LINE (brown or black)
N → Neutral (blue)



5. 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 are required 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 trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

PV Connection

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

WARNING! All wiring must be performed by a qualified personnel.
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 recommended cable size as below.

Model	Typical Amperage	Cable Size	Torque
5.5KW DC48V	27A	10AWG	1.2 ~ 1.6 Nm
3.5KW DC24V	18A	12AWG	

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.
3. Max. Power Voltage (Vmpp) of PV modules should be close to best Vmp of inverter or within Vmp range to get best performance. If one PV module can not meet this requirement, it's necessary to have several PV modules in series connection. Refer to below table.
   Note:* Vmp: panel max power point voltage.
   The PV charging efficiency is maximized while PV system voltage is close to Best Vmp.

Maximum PV module numbers in Series: Vmpp of PV module*X pcs = Best Vmp of Inverter or Vmp range
PV module numbers in Parallel: Max. charging current of inverter/Impp
Total PV module numbers=maximum PV module numbers in series*PV module numbers in parallel

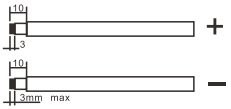
Solar Charging Mode		
INVERTER MODEL	**3.5KW DC24V**	**5.5KW DC48V**
Max. PV Array Open Circuit Voltage	450Vdc max	
PV Array MPPT Voltage Range	150~430Vdc	
MPPT Number	1	

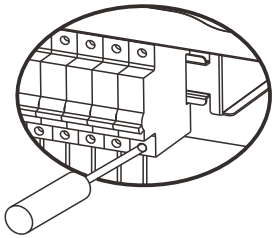
Recommended PV module configuration

	Total solar input power	Solar input	Q'ty of modules
PV Module Spec (reference) Maximum Power (Pmaxl): 330W Max. Power Voltage Vmpp(V) :38.70V Max. Power Current Impp(A) :8.54A Open Circuit Voltage Voc(V) :46.1V Short Circuit Current Isc(A) :9.17A	1980W	6 pieces in series	6 pcs
	2640W	8 pieces in series	8 pcs
	3300W	5pieces in series 2 strings in parallel	10 pcs
	3960W	6pieces in series 2 strings in parallel	12pcs
	4620W	7pieces in series 2 strings in parallel	14pcs
	5280W	8pieces in series 2 strings in parallel	16pcs
	5940W	9pieces in series 2 strings in parallel	18pcs

Please follow below steps to implement PV module connection:

1. Remove insulation sleeve 10 mm for positive and negative conductors
2. 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.
3. Make sure the wires are securely connected.





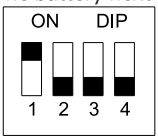
Grounding

Grounding cables shall be 10AWG or higher yellow-green cables. After connection, the resistance from the grounding point of the unit to Ground connection point of room or installed place shall be smaller than 0.1Ω.

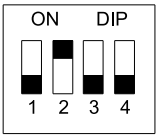
Battery Address Setting

There is one ADS DIP switch on the left of the battery for address setting.

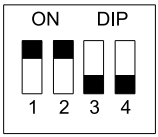
The battery next to the inverter should be set as shown bellow.



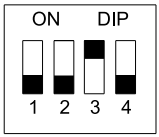
The second battery(or more) should be set as shown bellow.



Second Battery



Third Battery



Forth Battery

Fifth Battery

Communication Connection

Please use supplied communication cable to inverter and PC. Download the software by link on the last page of this manual into computer and follow on screen instruction to install the monitoring software.

For the detailed software operation, please consult the seller if you have any questions.

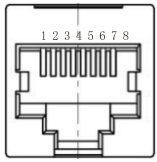
RJ45 interface

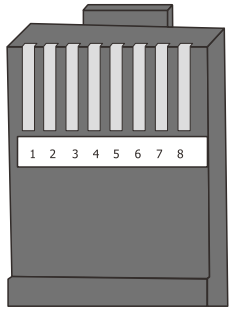
There is one RJ45 interface on the left panel of the inverter. It is only suitable for communication with the battery or professional operation.

WARNING: It's forbidden to use network cable as the communication cable to communication with the PC port directly. Otherwise, the internal components of the controller will be damaged.

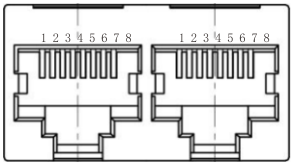
RJ45 pins definition of the inverter is shown below.

Pin	Definition
1	RS-485-B
2	RS-485-A
3	GND
4	
5	CANL
6	CANH
7	
8	

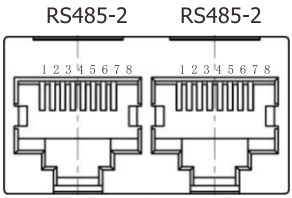




There are four RJ45 interfaces on the left panel of the battery. RS485 and CAN interfaces on the top are used to connect with inverter. RS485 interfaces on the bottom are used to connect with other batteries.RJ45 pins definition of the battery is shown below.



Pin	Definition			
1	RS485-1	RS485-1-B	CAN	NC
2		RS485-1-A		NC
3		RS485-1-GND		NC
4		NC		CANH
5		NC		CANL
6		RS485-1-GND		NC
7		RS485-1-A		GND
8		RS485-1-B		NC

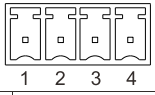


Pin	Definition			
1	RS485-2	RS485-2-B	RS485-2	RS485-2-B
2		RS485-2-A		RS485-2-A
3		RS485-2-GND		RS485-2-GND
4		NC		NC
5		NC		NC
6		RS485-2-GND		RS485-2-GND
7		RS485-2-A		RS485-2-A
8		RS485-2-B		RS485-2-B

Dry Contact Signal

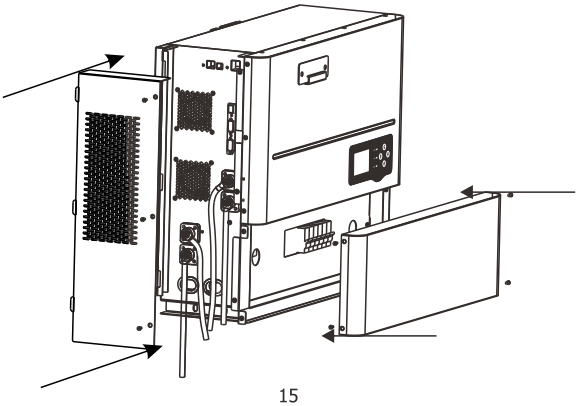
There is one dry contact(3A/250VAC) available on the left panel of the inverter and battery. It could be used to deliver signal to external device when battery voltage reaches warning level or battery is protected.

Unit status	Condition			Dry Contact port of inverter 	
				NC&C	NO&C
Power Off	Unit is off and no output is powered.			Close	Open
Power On	output is powered from Utility			Close	Open
	Output is powered from Battery or Solar.	Program 01 set as utility	Battery voltage<Low DC warning voltage	Open	Close
			Battery voltage>Setting value in Program 21 or battery charging reaches floating stage	Close	Open
		Program 01 is set as SBU, SUB, solar first	Battery voltage<Setting value in Program 20	Open	Close
			Battery voltage>Setting value in Program 21 or battery charging reaches floating stage	Close	Open

Unit status	Condition	Dry contact port of battery: 	
		PIN1&PIN2	PIN3&PIN4
Power off	Battery is off	Open	Open
Power on	Battery voltage<Low warning voltage	Close	/
	Battery voltage>Recover voltage	Open	/
	Fault or protection has occurred	/	Close
	Fault or protection has ecovered.	/	Open

Final Assembly

After connecting all wiring, please put all covers back.

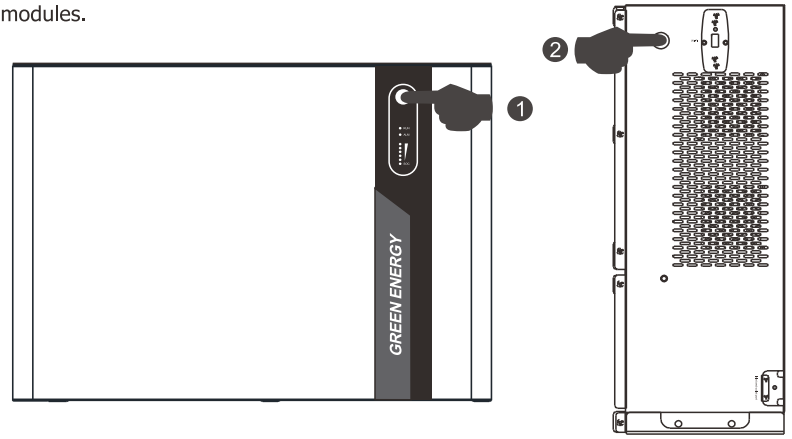


OPERATION

Power ON/OFF

Once the unit has been properly installed and all wires are connected well, the unit can be turned on.

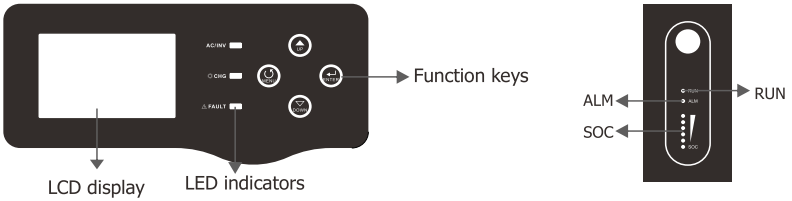
Step 1：Switch on all the battery modules by pressing the ON/OFF switch on the front of the battery modules.



Step 2: When the RUN and SOC indicator lights of the battery modules are ON, press the ON/OFF switch on the right side of the inverter to turn on the unit.

Operation and Display Panel

The operation and display panels, shown as below, are on the front panel of the inverter and the battery modules. The operation and display panel of inverter includes three indicators, four function keys and a LCD display, indicating the operating status and input/output information. The operation and display panel of battery modules includes eight indicators, indicating the operating status and SOC of the battery.



LED Indicator

LED Indicator			Messages
AC/ INV	Green	Solid On	Output is powered by grid in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Yellow	Flashing	Battery is charging or discharging.
⚠ FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.

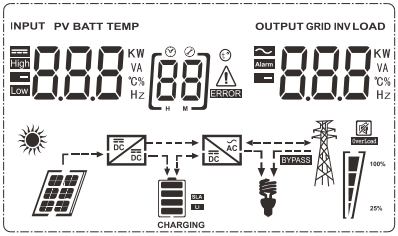
Function Keys

Function Keys	Description
MENU	Enter reset mode or setting mode go to previous selection.
UP	Increase the setting data.
DOWN	Decrease the setting data.
ENTER	Enter setting mode and Confirm the selection in setting mode go to next selection or exit the reset mode.

Battery LED Indicator

LED Indicator			Massages
RUN	Green	Solid On	The battery is charging.
		Flashing:On 0.3s,Off 3.7s	The battery is normal,not charging or discharging.
		Flashing:On 0.5s,Off 1.5s	The battery is discharging.
ALM	Red	Solid On	BMS fault or battery protection has occurred.
		Flashing	Alarm has occurred.
SOC	Green	/	Show the current capacity of the battery.

LCD Display Icons



Icon	Function description
Input Source Information and Output Information	
	Iindicates the AC information
	Indicates the DC information
KW VA ℃% Hz	Indicate input voltage, input frequency, PV voltage, battery voltage and charger current. Indicate output voltage, output frequency, load in VA, load in Watt and discharging current.
Configuration Program and Fault Information	
	Indicates the setting programs
ERROR	Iindicates the warning and fault codes. Warning: ⚠ flashing with warning code. Fault: ERROR lighting with fault code.
Battery Information	
SLA Li CHARGING	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.

In AC mode, it will present battery charging status.

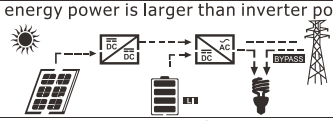
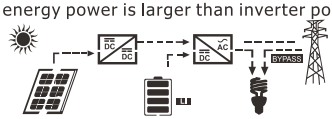
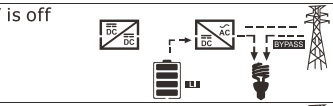
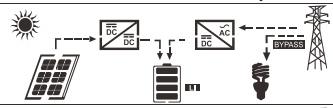
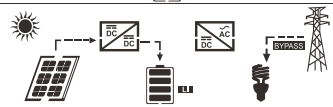
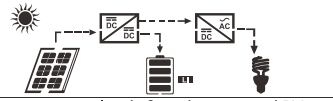
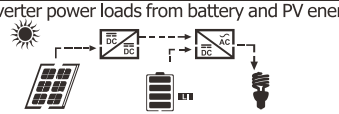
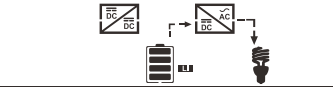
Status	Battery voltage	LCD Display
Constant Current mode/Constant Voltage mode	<2V/cell	4 bars will flash in turns
	2v/cell~2.083v/cell	Bottom bar will be on and the other three bars will flash in turns.
	2.083v/cell~2.167v/cell	Bottom two bars will be on and the other two bars will flash in turns.
	>2.167V/cell	Bottom three bars will be on and the top bar will flash.
Batteries are fully charged.		4 bars will be on.

In battery mode, it will present battery capacity.		
Load Percentage	Battery Voltage	LCD Display
Load >50%	<1.717V/cell	
	1.717V/cell~1.8V/cell	
	1.8V/cell~1.883V/cell	
	>1.883 V/cell	
50%> Load>20%	<1.817V/cell	
	1.817V/cell~1.9V/cell	
	1.9 V/cell ~1.983V/cell	
	>1.983 V/cell	
Load<20%	<1.867V/cell	
	1.867V/cell~1.95V/cell	
	1.95V/cell~2.033V/cell	
	>2.033 V/cell	

Load Information				
OverLoad	Indicates overload.			
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.			
	0%~24%	25%~49%	50%~74%	75%~100%
				

Mode Operation Information	
	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
BYPASS	Indicates load is supplied by utility power.
	Indicates the solar charger circuit is working.
	Indicates the DC/AC inverter circuit is working.
Mute Operation	
	Indicates unit alarm is disabled.

Operating State Description

Operating State	Description	LCD display
Match load state Note: DC power produced from your solar array is converted by the inverter into AC power, which is then sent to your main electrical panel to be used by your household appliances. Any excess power generated is not sold back to the grid, but stored in battery.	PV energy is charger into the battery or convertered by the inverter to the AC load	PV energy power is larger than inverter power  PV energy power is larger than inverter power  PV is off 
Charge state	PV energy and grid can charge batteries.	
Bypass state	Error are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.	
Off-Grid state	The inverter will provide output power from battery and PV power.	Inverter power loads from PV energy.  Inverter power loads from battery and PV energy.  Inverter power loads from battery only. 
Stop mode	The inverter stop working if you turn off the inverter by the soft key or error has occurred in the condition of no grid.	

Display Setting

The LCD display information will be switched in turns by pressing "UP" or "DOWN" key. The selectable information is switched as below order: battery voltage, battery current, inverter voltage, inverter current, grid voltage, grid current, load in Watt, load in VA, grid frequency, inverter frequency, PV voltage, PV charging power, PV charging output voltage, PV charging current.

Selectable information	**LCD display**
Battery voltage/DC discharging current	
Inverter output voltage/Inverter output current	
Grid voltage/Grid current	

Load in Watt	
Grid frequency/Inverter frequency	
PV voltage and power	
PV charger output voltage and PV charging current	

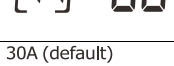
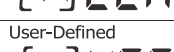
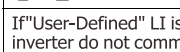
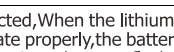
LCD Setting

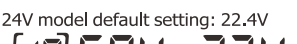
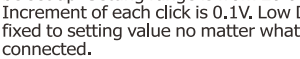
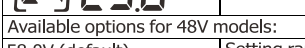
After pressing and holding "ENTER" button for 2 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" or "MENU" button to confirm the selection and exit.

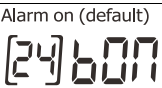
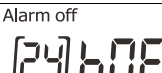
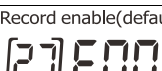
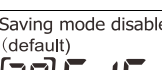
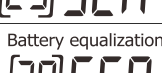
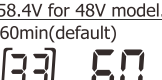
Setting Programs:

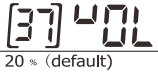
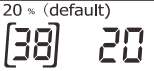
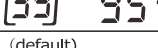
Program	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority selection	(default) 	Solar energy provides power to the loads as first priority, If solar energy is not sufficient to power all connected loads, Utility energy will supply power to the loads at the same time. The battery energy will supply power to the load only in the condition of the utility is unavailable. If the solar is unavailable, the utility will charge the battery until the battery voltage reaches the setting point in program 21.If the solar is available, but the voltage is lower than the setting point in program 20, the utility will charge the battery until the battery voltage reaches the setting point in program 20 to protect the battery from damage.
			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 20 or solar and battery is not sufficient. The battery energy will supply power to the load in the condition of the utility is unavailable or the battery voltage is higher than the setting point in program 21(when BLU is selected) or program 20(when LBU is selected). If the solar is available, but the voltage is lower than the setting point in program 20, the utility will charge the battery until the battery voltage reaches the setting point in program 20 to protect the battery from damage.

			Solar energy provides power to the loads as first priority. If battery voltage has been higher than the setting point in program 21 for 5 minutes, and the solar energy has been available for 5 minutes too, the inverter will turn to battery mode, solar and battery will provide power to the loads at the same time. When the battery voltage drops to the setting point in program 20, the inverter will turn to bypass mode, utility provides power to the load only, and the solar will charge the battery at the same time.
			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.
02	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within90-280VAC.
		UPS 	If selected, acceptable AC input voltage range will be within 170-280VAC.
		GEN 	When the user uses the device to connect the generator, select the generator mode.
		VDE 	If selected, acceptable AC input voltage range will conform to VDE4105 (184VAC-253VAC)
03	Output voltage		Set the output voltage amplitude, (220VAC-240VAC)
04	Output frequency	50HZ(default) 	60HZ
05	Solar supply priorit	(default) 	Solar energy provides power to charge battery as first priority. When the utility is available, if the battery voltage is lower than the setting point in program 21, the solar energy will never supply to the load, only charge the battery. If the battery voltage is higher than the setting point in program 21, the solar energy will supply to the load or recharge the battery.
			Solar energy provides power to the loads as first priority. If the battery voltage is lower than the setting point in program 20, the solar energy will never supply to the load, only charge the battery. If the battery voltage is higher than the setting point in program 20, the solar energy will supply to the load or recharge the battery.

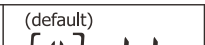
06	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable 	Bypass enable(default) 
07	Auto restart when overload occurs	Restart disable(default) 	Restart enable 
08	Auto restart when over temperature occurs	Restart disable(default) 	Restart enable 
10	Charger source priority: To configure charger source priority	If this inverter/charger is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Solar and Utility(default) 	Solar energy and utility will charge battery at the same time.
		Only Solar 	Solar energy will be the only charger source no matter utility is available or not
		If this inverter/charger is working in Battery mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.	
11	Maximum charging current: To configure total charging current for solar and utility chargers.(Max. charging current =utility charging current + solar charging current)	80A (default) 	Setting range is from 1 A to 100A for 3.5kw model and from 1A to 120A for 5.5kw model Increment of each click is 1A.
13	Maximum utility charging current	30A (default) 	Setting range is from 1A to 80A for 3.5k model and from 1A to 100A for 5.5kw model Increment of each click is 1A.
14	Battery type	AGM 	Flooded 
		GEL 	LEAD 
		Lithium Ion(default) 	User-Defined 
		If"User-Defined" LI is selected,When the lithium battery and the inverter do not communicate properly,the battery icon will flash. If"LI" is selected,the battery icon does not flash,program of 11,13, 17,18 will be set automatically,No need for further setting. If"User-Defined" is selected, battery charge voltage and charge current can be set up in program 11,13,17 and 18.	
17	Bulk charging voltage (C.V voltage)	24V model default setting: 28.8V 	
		If "User-Defined" LI is selected in program 14, this program can be set up. Setting range is from 24.0V to 29.2V for 24Vdc model. Increment of each click is 0.1V.	

		48V model default setting: 57.6V  If "User-Defined" LI is selected in program 14, this program can be set up. Setting range is from 48.0V to 58.4V for 48Vdc model. Increment of each click is 0.1V.
18	Floating charging voltage	24V model default setting: 27.0V  If "User-Defined" LI is selected in program 14, this program can be set up, Setting range is from 24.0V to 29.2V for 24Vdc model. Increment of each click is 0.1V. 48V model default setting: 54.0V  If "User-Defined" LI is selected in program 14, this program can be set up, Setting range is from 48.0V to 58.4V for 48Vdc model. Increment of each click is 0.1V.
19	Low DC cut-off voltage or SOC percentage	24V model default setting: 22.4V  If "User-Defined" LI is selected in program 14, this program can be set up. Setting range is from 20.0V to 24.0V for 24Vdc model. 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. 48V model default setting: 44.8V  If "User-Defined" LI is selected in program 14, this program can be set up. Setting range is from 40.0V to 48.0V for 48Vdc model. 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. SOC 0% (default)  If"User-Defined" LI is selected in program 14,and the SOC percentage method is selected in program 37 ,the low DC cut-off SOC percentage will be able to be set.Low DC cut-off SOC percentage will be fixed to setting value no matter what percentage of load is connected Setting range is from 0%-90%. Increment of each click is 1%
20	Battery stop discharging voltage when grid is available	Available options for 24V models: 24.0V (default)  Setting range is from 22.0V to 29.0V. Increment of each click is 0.1V. Available options for 48V models: 48.0V (default)  Setting range is from 44.0V to 58.0V. Increment of each click is 0.1V.
21	Battery stop charging voltage when grid is available	Available options for 24V models: 29.0V (default)  Setting range is from 22.0V to 29.0V. Increment of each click is 0. 1V. Available options for 48V models: 58.0V (default)  Setting range is from 44.0V to 58.0V. Increment of each click is 0. 1V.

22	Auto turn page	(default) 	If selected, the display screen will auto turn the display page.
			If selected, the display screen will stay at latest screen user finally switches.
23	Backlight control	Backlight on 	Backlight off (default) 
24	Alarm control	Alarm on (default) 	Alarm off 
25	Beeps while primary source is interrupted	Alarm on 	Alarm off (default) 
27	Record Fault code	Record enable(default) 	Record disable 
29	Power saving mode enable/ disable	Saving mode disable (default) 	If disable, no matter connected load is low or high, the on/off status of inverter output will not be effected.
		Saving mode enable 	If enable, the output of inverter will be off when connected load is pretty low or not detected.
30	Battery equalization	Battery equalization 	Battery equalization disable(default) 
31	Battery equalization voltage	Available options for 24V models:28.8V 	
		Available options for 48V models:57.6V 	
		Setting range is from 24.0V to 29.2V for 24V model and 48.0V to 58.4V for 48V model. Increment of each click is 0.1V.	
33	Battery equalization time	60min(default) 	Setting range is from 5 min to 900min. Increment of each clink is 5min.
34	Battery equalization timeout	120min(default) 	Setting range is from 5 min to 900min. Increment of each clink is 5min.
35	Equalization interval	30days(default) 	Setting range is from 0 to 90days. Increment of each clink is 1 day.
36	Equalization activated immediately	Enable 	Disable(default) 
		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 shows"  ". If "Disable"is selected, it will cancel equalization function until next activated equalization time arrives based on program 35 setting. At this time, " " will be shown in LCD main page too.	

37	BMS control method	Voltage method(default) 	SOC Percentage method 
38	Battery stop discharging percent When SOC is available	20 % (default) 	Setting range is from 5%-95% Increment of each click is 1 % .
39	Battery stop charging percent When SOC is available	95 % (default) 	Setting range is from 10%-100% Increment of each click is 1 % .
40	BMS communication	(default) 	when the communication between BMS and converter is faulted ,the converter still charge or discharge from the battery
			when the communication between BMS and converter is faulted ,the converter stop charging or discharging from the battery
41	Lithium battery protocol		Setting range is from 0 to 31 Increment of each click is 1
		If LI is selected in program 14, program 41 can be set. After the program 41 is set,please restart the inverter to take effect.For example,if you set the program 41 to 0,the inverter can communicate with the company's lithium battery.	

After pressing and holding "MENU" button for 6 seconds, the unit will enter reset model. Press "UP" and "DOWN" button to select programs. And then, press "ENTER" button to exit.

	(default) 	Reset setting disable
		Reset setting enable

Fault Reference Code

Fault Code	Fault Cause	LCD Indication
01	Fan is locked when inverter is off	
02	Inverter transformer over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited	
06	Inverter output voltage is high	
07	Overload time out	
08	Inverter bus voltage is too high	
09	Bus soft start failed	
11	Main relay failed	

21	Inverter output voltage sensor error	
22	Inverter grid voltage sensor error	
23	Inverter output current sensor error	
24	Inverter grid current sensor error	
25	Inverter load current sensor error	
26	Inverter grid over current error	
27	Inverter radiator over temperature	
31	Solar charger battery voltage class error	
32	Solar charger current sensor error	
33	Solar charger current is uncontrollable	
41	Inverter grid voltage is low	
42	Inverter grid voltage is high	
43	Inverter grid under frequency	
44	Inverter grid over frequency	
51	Inverter over current protection error	
52	Inverter bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
56	Battery connection is open	
57	Inverter control current sensor error	
58	Inverter output voltage is too low	

Warning Indicator

Warning Code	Warning Event	Icon flashing
61	Fan is locked when inverter is on.	
62	Fan 2 is locked when inverter is on.	
63	Battery is over-charged.	
64	Low battery	
67	Overload	
70	Output power derating	
72	Solar charger stops due to low battery	
73	Solar charger stops due to high PV voltage	
74	Solar charger stops due to over load	
75	Solar charger over temperature	
76	PV charger communication error	
77	Parameter error	
90	Battery voltage is too high.	
91	Battery voltage is too low.	
92	Battery charging over current.	
93	Battery discharging over current.	
94	Battery is over temperature.	
95	Battery is under temperature.	
96	Battery is short-circuit.	
97	Battery hardware failure.	
98	Other error occurs in battery.	

TROUBLE SHOOTING

Problem	LCD/LED/Buzzer	Explanation / Possible cause	What to do
Unit shuts down automatically during startup process.	LCD/LEDs and buzzer will be active for 3 seconds and then complete off.	The battery voltage is too low (< 1.91V/Cell)	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication.	1. The battery voltage is far too low. (<1.4V/Cell) 2. Battery polarity is connected reversed. Input protector is tripped	1.Check if battery wires are connected well. 2.Check if battery module is ON. 3.Re-charge battery. 4.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 tripped	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is flashing.	Insufficient quality of AC power (Shore 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.(Appliance=>wide)
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LEDs are flashing	Battery is disconnected.	1.Check if battery wires are connected well. 2.Check if battery module is ON.
Buzzer beeps continuously and red LED is on.	Fault code 07	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 05	Output short circuited.	Check if wiring is connected well and remove abnormal load.
	Fault code 02	Internal temperature of inverter component is over 90°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
	Fault code 03	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity of batteries are meet requirements.
	Fault code 01	Fan fault	Replace the fan.
	Fault code 06/58	Output abnormal (Inverter voltage below than 202Vac or is higher than 253Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 08/09/53/57	Internal components filed.	Return to repair cente
	Fault code 51	Over current or surge	Restart the unit, if the error happens again, please return to repair center.
	Fault code 52	Bus voltage is too low	
	Fault code 55	Output voltage is unbalanced	
	Fault code 56	Battery is not connected well or fuse is burnt.	If the battery is connected well, please return to repair center.

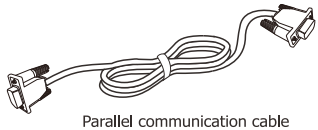
PARALLEL INSTALLATION GUIDE

Only for parallel model

CONNECTION

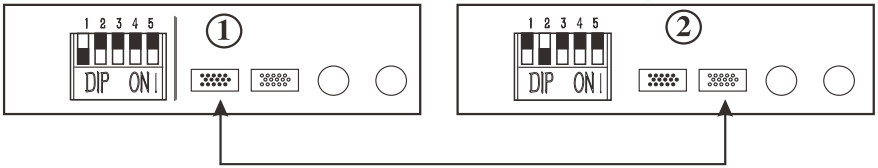
Package Contents

There is a parallel communication cable in the package of parallel model.



Parallel communication cable

Communication Connection (For Two Units Parallel in Single Phase)

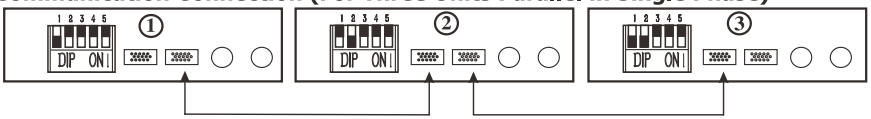


INVERTER①: Setting the key 1 of DIP Switch to the ON position, and the key 2,3,4,5 of DIP Switch to the OFF position.

INVERTER②: Setting the key 2 of DIP Switch to the ON position, and the key 1,3,4,5 of DIP Switch to the OFF position.

Connect the communication ports of INVERTER① and INVERTER② via the parallel communication cable as shown above.

Communication Connection (For Three Units Parallel in Single Phase)



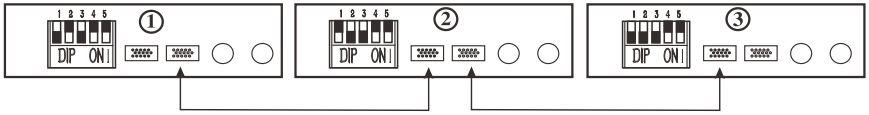
INVERTER①: Setting the key 1 of DIP Switch to the ON position, and the key 2,3,4,5 of DIP Switch to the OFF position.

INVERTER②: Setting the key 2 of DIP Switch to the ON position, and the key 1,3,4,5 of DIP Switch to the OFF position.

INVERTER③: Setting the key 1,2 of DIP Switch to the ON position, and the key 3,4,5 of DIP Switch to the OFF position.

Connect the communication ports of INVERTER① ,INVERTER②and INVERTER③via the parallel communication cables as shown above.

Communication Connection (For Parallel in Three Phase)



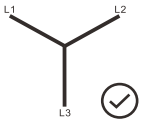
INVERTER①: Setting the key 1,3 of DIP Switch to the ON position, and the key 2,4,5 of DIP Switch to the OFF position.

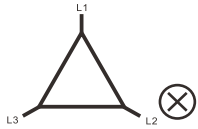
INVERTER②: Setting the key 2,3 of DIP Switch to the ON position, and the key 1,4,5 of DIP Switch to the OFF position.

INVERTER③: Setting the key 1,2,3 of DIP Switch to the ON position, and the key 4,5 of DIP Switch to the OFF position.

Connect the communication ports of INVERTER① ,INVERTER②and INVERTER③via the parallel communication cables as shown above.

NOTE: Don't connect 3-phase equipment of delta connection





PV Connection

Please refer to user manual of single unit for PV Connection.

CAUTION: Each inverter should connect to PV modules separately.

COMMISSIONING

Support Single-Phase Equipment

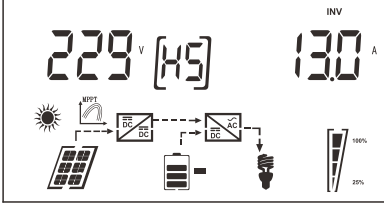
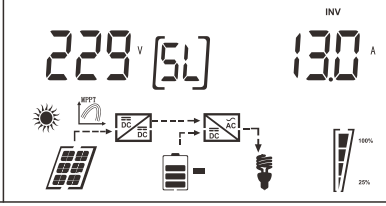
Step 1:Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step2: Check the parallel communication cables connection and DIP switch setting with the reference to **Communication Connection (For Two/Three Units Parallel in Three Phase).**

NOTE : It's necessary to turn off the machines when setting the DIP switches. Otherwise, the setting can not be programmed.

Step 3: Turn on each unit.

LCD display in Master unit	LCD display in Slave unit
	

NOTE: Master and slave units are randomly defined.

Step 4: If there is no more fault alarm, the parallel system is completely installed.

Step 5: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

Support three-phase equipment

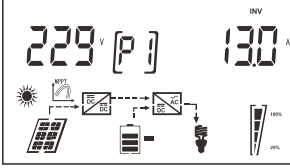
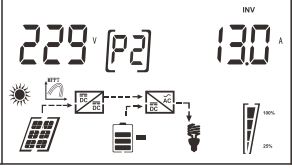
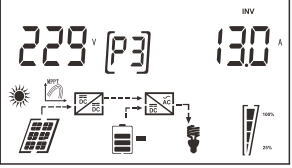
Step 1: Check the following requirements before commissioning:

- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step2: Check the parallel communication cables connection and DIP switch setting with the reference to **Communication Connection (For Parallel in Three Phase).**

NOTE: It's necessary to turn off the machines when setting the DIP switches. Otherwise, the setting can not be programmed.

Step 3: Turn on all units sequentially

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit
		

Step 4: If there is no more fault alarm, the system to support 3-phase equipment is completely installed.
Step 5: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.
Note 1: To avoid overload occurring, before turning on breakers in load side, it s better to have whole system in operation first.
Note 2: Transfer time for this operation exists. Power interruption may happen to critical devices, which cannot bear transfer time.

Fault Reference Code

Fault Code	Fault Event	Icon on
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	
87	Power feedback protection	
88	Firmware version inconsistent	
89	Current sharing fault	

TROUBLE SHOOTING

Situation		Solution
Fault Code	Fault Event Description	
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.
81	Host data loss	
82	Synchronization data loss	
83	The battery voltage of each inverter isnot the same.	1.Make sure all inverters share same groups of batteries together. 2.If the problem remains, please contact your installer.
84	AC input voltage and frequency are detected different	1.Check the utility wiring conncetion and restart the inverter. 2.If the problem remains, please contact your installer.
85	AC output current unbalance	1.Restart the inverter. 2.If the problem remains, please contact your installer
86	AC output mode setting is different	1.Switch off the inverter and check the DIP switch setting. 2.If the problem remains, please contact your installer.
87	Current feedback into the inverter is detected.	1.Restart the inverter. 2.If the problem remains, please contact your installer.
88	The firmware version of each inverter is not the same.	1.Update all inverter firmware to the same version. 2.If the problem remains, please contact your installer.
89	The output current of each inverter is different.	1.Check if communication cables are connected well and restart the inverter. 2.If the problem remains, please contact your installer.
90	CAN ID setting Error	1.Switch off the inverter and check the DIP switch setting. 2.If the problem remains, please contact your

GUARANTEECERTIFICATE

Serial No.: _____

Customer`s Name				Contact Person	
Address				Telephone No.	
Product/Model:		Post Code		Fax No.	
Date of purchase			Expire Date		
Dealer Signature			Customer Signature		

GUARANTEECERTIFICATE

Serial No.: _____

Customer`s Name				Contact Person	
Address				Telephone No.	
Product/Model:		Post Code		Fax No.	
Date of purchase			Expire Date		
Dealer Signature			Customer Signature		