User Manual

Hybrid 15KW
INVERTER / CHARGER

Version: 1.1

Table Of Contents

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.

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. **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. 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.
4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
5. **CAUTION** – Only qualified personnel can install this device with battery.
6. **NEVER** charge a frozen battery.
7. 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.
8. 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.
9. 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.
10. Fuses are provided as over-current protection for the battery supply.
11. 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.
12. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
13. **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 hybrid PV inverter can provide power to connected loads by utilizing PV power, utility power and battery power.

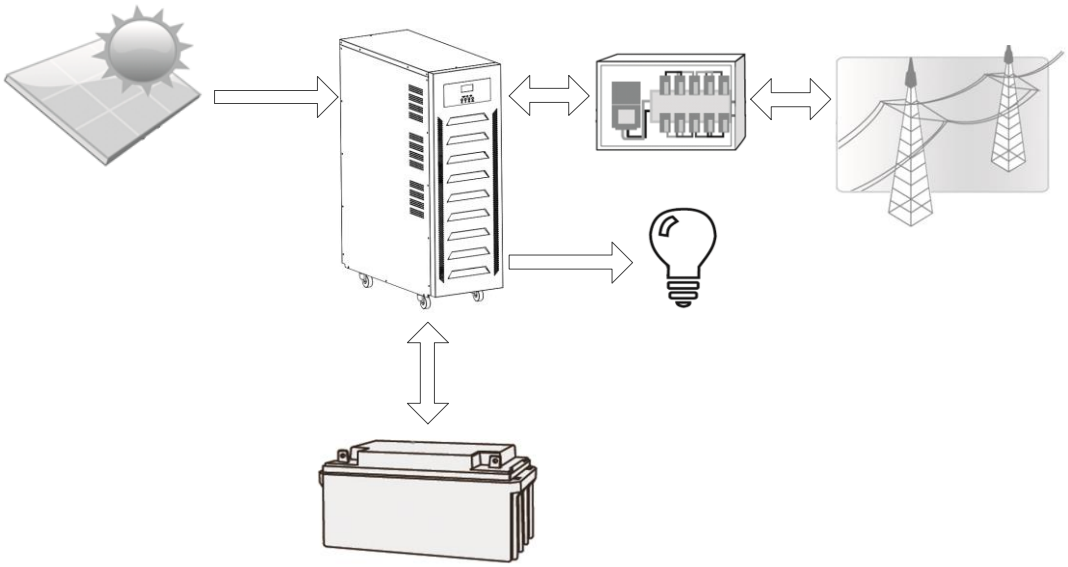
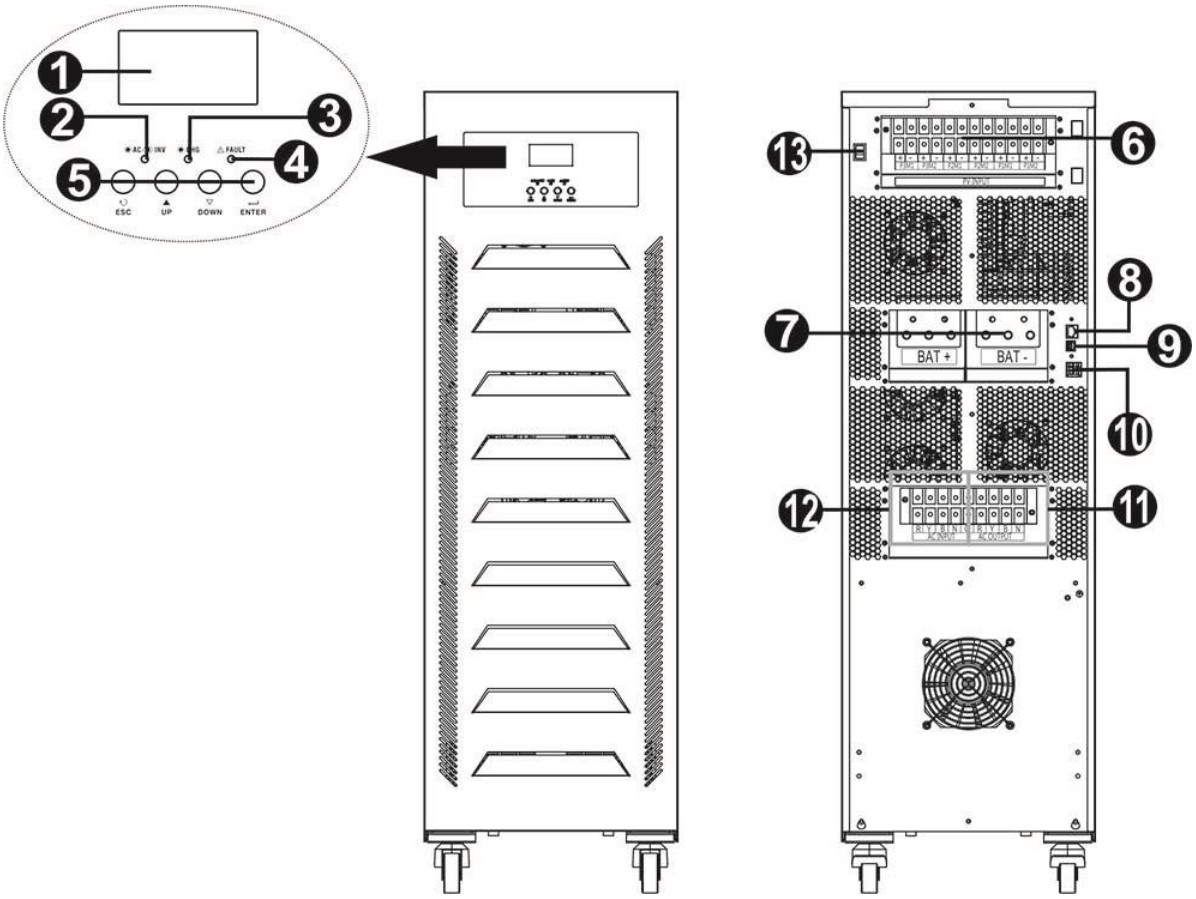


Figure 1 Basic hybrid PV System Overview

Depending on different power situations, this hybrid inverter is designed to generate continuous power from PV solar modules (solar panels), battery, and the utility. When MPP input voltage of PV modules is within acceptable range (see specification for the details), this inverter is able to generate power to feed the grid (utility) and charge battery. Galvanic isolation designed between PV/DC and AC output, so that user could connect any type of PV array to this Hybrid inverter. See Figure 1 for a simple diagram of a typical solar system with this hybrid inverter.

Product Overview



1. LCD display
2. Status indicator
3. Charging indicator
4. Fault indicator
5. Function buttons
6. PV connectors
7. Battery connectors
8. RS-232 communication port
9. USB communication port
10. Dry contact
11. AC output connectors (Load connection)
12. Grid connectors
13. Power on/off switch

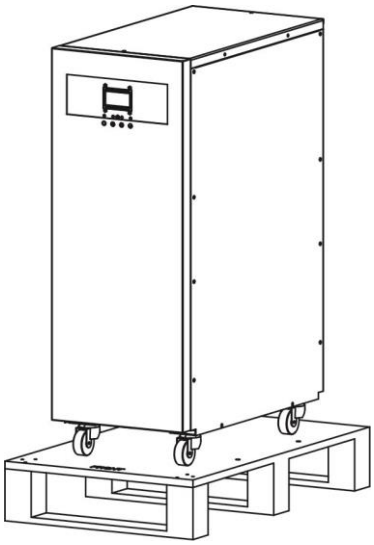
INSTALLATION

Unpacking and Inspection

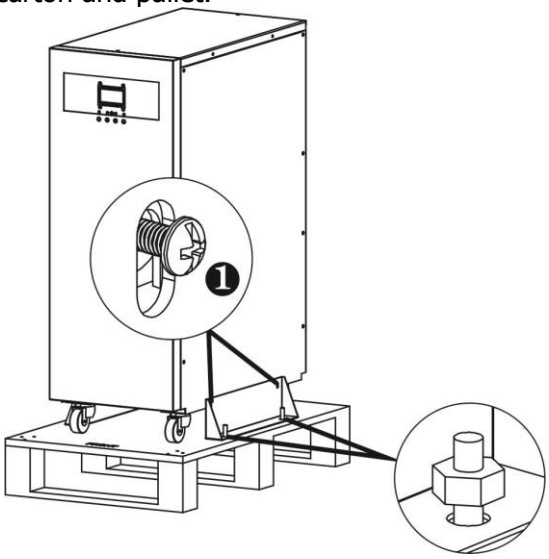
Before installation, please inspect the unit. Be sure that nothing inside the package is damaged.
You should have received the following items inside of package:

- The unit x 1
- User manual x 1
- Communication cable x 1
- Software CD x 1

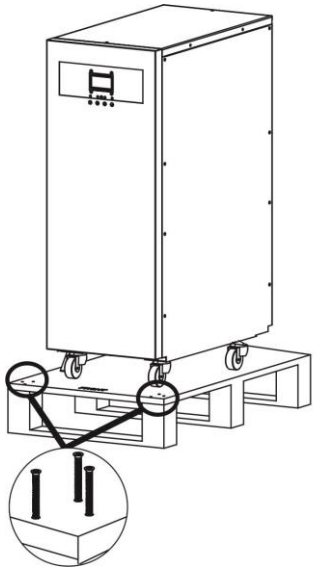
Then, follow below steps to remove the UPS from the carton and pallet.



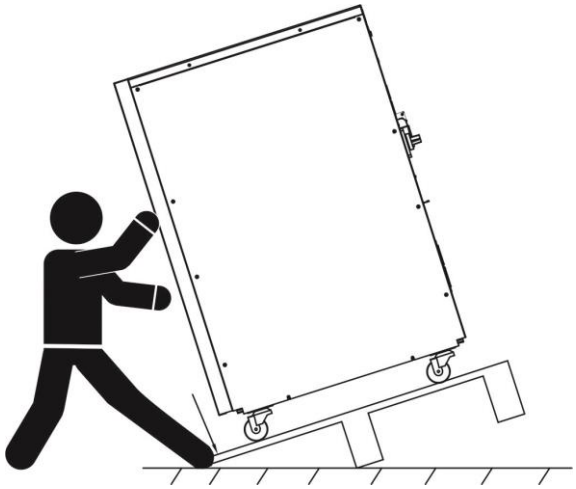
Step 1: Remove carton and foams.



Step 2: Remove fixing plates on the two sides of the UPS as shown in the chart. After removing fixing plates, please put #❶ screws back to UPS.



Step 3: Take off front foot of the pallet by removing screws as shown in chart.

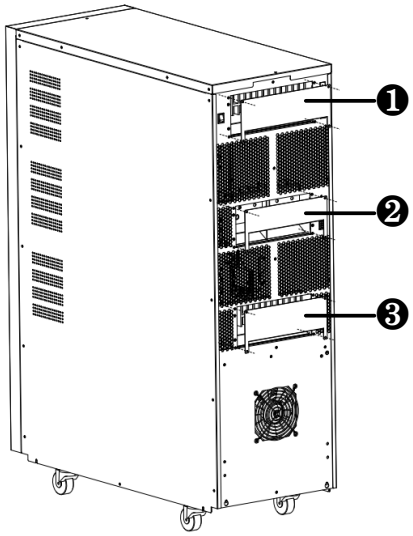


Step 4: Then, lean the pallet to remove the UPS from the pallet.

NOTE: Before installation, please inspect the unit. Be sure that nothing inside the package is damaged during transportation. Do not turn on the unit and notify the carrier and dealer immediately if there is any damage or lacking of some parts. Please keep the original package in a safe place for future use.

Preparation

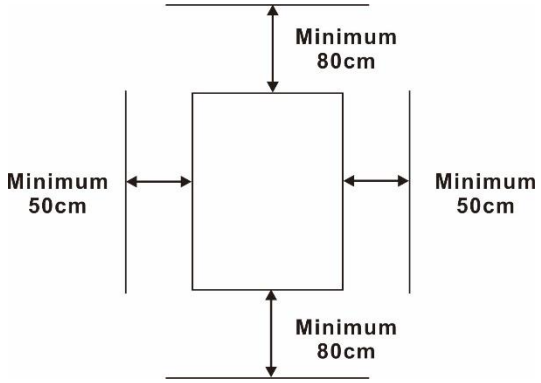
Before connecting all wirings, please take off three covers by removing 12 screws as shown in ❶, ❷ and ❸ below.



Unit Installation

Consider the following points before selecting where to install:

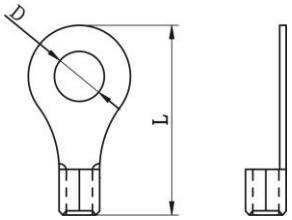
- Do not mount the inverter on flammable construction materials.
- It's requested to have a clearance of approx. 80 cm to the front and back of the unit and approx. 50 cm to the side.
- Dusty conditions on the unit may impair the performance of this inverter.
- The ambient temperature should be between 0°C and 55°C to ensure optimal operation.
- For proper operation, please use appropriate cables.



Battery Connection

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

Ring terminal:



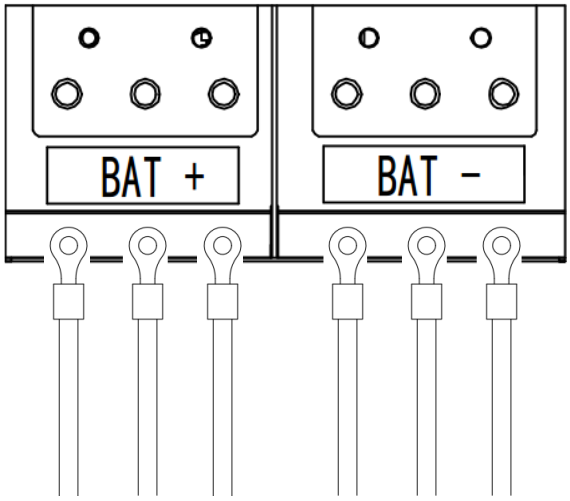
WARNING! All wiring must be performed by a qualified personnel.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, please use the proper recommended cable and terminal size as below.

Recommended battery cable and terminal size:

Model	Typical Amperage	Battery Capacity	Cable Size	Ring Terminal			Torque Value
				Cable mm^2	Dimensions		
					D (mm)	L (mm)	
15KW	540A	1800AH	3*2AWG	41.60	8.4	37.7	10~12 Nm

Please follow below steps to implement battery connection:

1. Assemble battery ring terminal based on recommended battery cable and terminal size.
2. Remove the terminal screws.
3. Insert the ring terminal of battery cable flatly into battery connector of inverter and make sure the screws are tightened with torque of 10-12 Nm. Make sure polarity at the battery and the unit is correctly connected and ring terminals are tightly screwed to the battery terminals.



⚠	**WARNING: Shock Hazard** Installation must be performed with care due to high battery voltage in series.

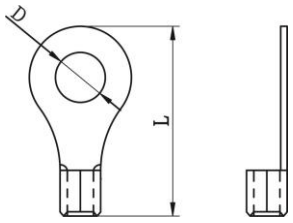
⚠	**CAUTION!!** Do not place anything between the flat part of the inverter terminal and the ring terminal. Otherwise, overheating may occur. **CAUTION!!** Do not apply anti-oxidant substance on the terminals before terminals are connected tightly. **CAUTION!!** Before making the final DC connection or closing DC breaker/disconnector, be sure positive (+) must be connected to positive (+) and negative (-) must be connected to negative (-).

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.

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

Ring terminal:



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	Typical Amperage	Cable Size	Ring Terminal			Torque Value
			Cable mm^2	Dimensions		
				D (mm)	L (mm)	
15KW	21.7A	10 AWG	6.88	5.3	22.0	2.0 ~ 2.4 Nm

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 the terminal screws.
3. Insert the ring terminal of AC input wires flatly into AC input connector according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⏚) first.

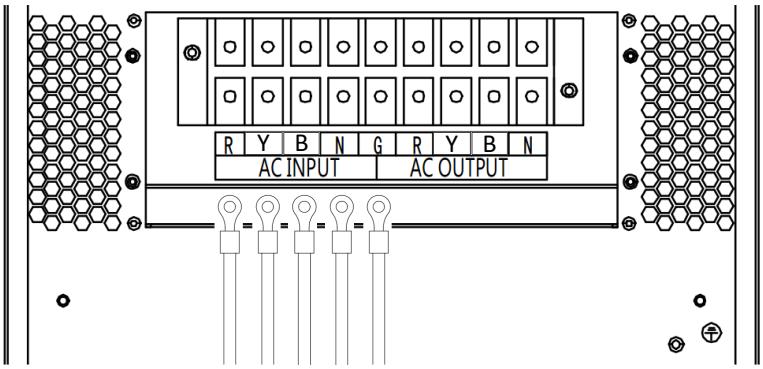
   ⏚**→Ground (yellow-green)**

   R Phase→LINE (black)

   Y Phase→LINE (gray)

   B Phase→LINE (brown)

   N→Neutral (blue)



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

4. Then, Insert the ring terminal of AC output wires flatly into AC output connector according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor (⏚) first.

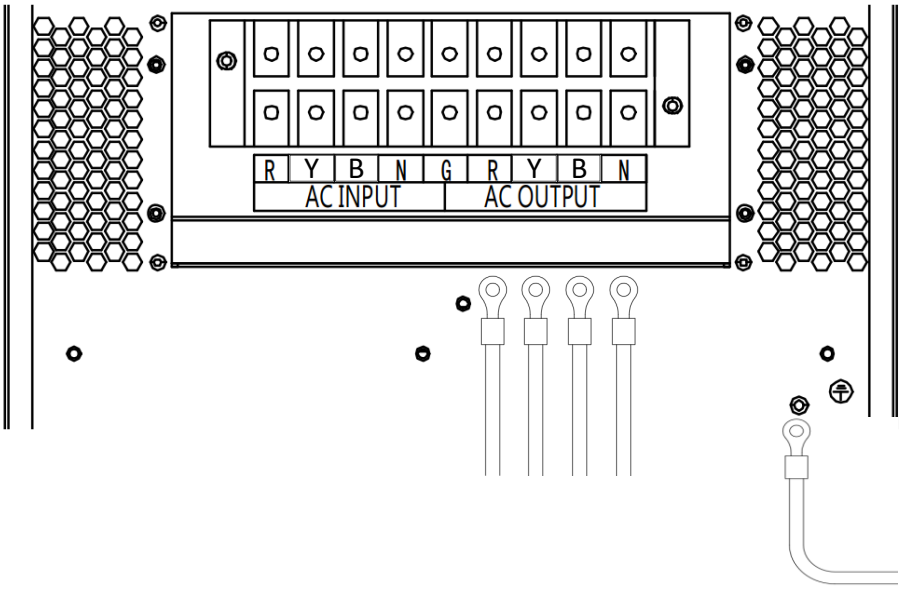
   ⏚**→Ground (yellow-green)**

   R Phase→LINE (black)

   Y Phase→LINE (gray)

   B Phase→LINE (brown)

   N→Neutral (blue)



5. Make sure the wires are securely connected.

CAUTION: Important

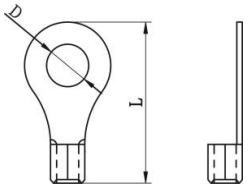
Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.

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.

Ring terminal:



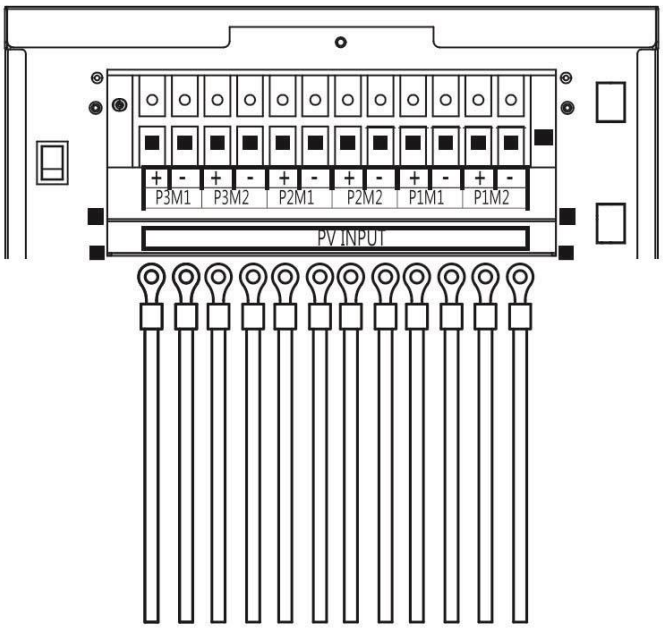
WARNING! All wiring must be performed by a qualified personnel.
WARNING! It's very important for system safety and efficient operation to use appropriate cable for PV module connection. There are six MPP trackers and each tracker contains two terminals: positive (+) and negative (-). To reduce risk of injury, please use the proper recommended cable size as below.

Model	MPP Number	Typical Amperage	Cable Size	Ring Terminal			Torque Value
				Cable mm^2	Dimensions		
					D (mm)	L (mm)	
15KW	R Phase PV1 (P1M1)	60A	8AWG	10.80	5.3	22.0	2.0~2.4Nm
	R Phase PV2 (P1M2)	60A	8AWG				
	S Phase PV1 (P2M1)	60A	8AWG				
	S Phase PV2 (P2M2)	60A	8AWG				
	T Phase PV1 (P3M1)	60A	8AWG				
	T Phase PV2 (P3M2)	60A	8AWG				

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.

Solar Charging Mode	
INVERTER MODEL	**15KW**
Max. PV Array Open Circuit Voltage	145Vdc
PV Array MPPT Voltage Range	60~115Vdc
MPP Number	6

Please follow below steps to implement PV module connection:
1. Remove the terminal screws.
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.



Recommended PV module specification

Maximum Power (Pmax)	250Wp
Max. Power Voltage Vmpp(V)	30.7Vdc
Max. Power Current Impp(A)	8.15A
Open Circuit Voltage Voc(V)	37.4Vdc
Short Circuit Current Isc(A)	8.63A

Recommended PV module Configuration

Phase		**R Phase**		**S Phase**		**T Phase**		**Q'ty of modules**
PV location / Combination #		**P1M1**	**P1M2**	**P2M1**	**P2M2**	**P3M1**	**P3M2**	
1	PV module numbers in series	2	2	2	2	2	2	72pcs
	PV module numbers in parallel	6	6	6	6	6	6	
2	PV module numbers in series	3	3	3	3	3	3	72pcs
	PV module numbers in parallel	4	4	4	4	4	4	

Communication Connection

Please use supplied communication cable to connect to inverter and PC. Insert bundled CD into a computer and follow on-screen instruction to install the monitoring software. For the detailed software operation, please check user manual of software inside of CD.

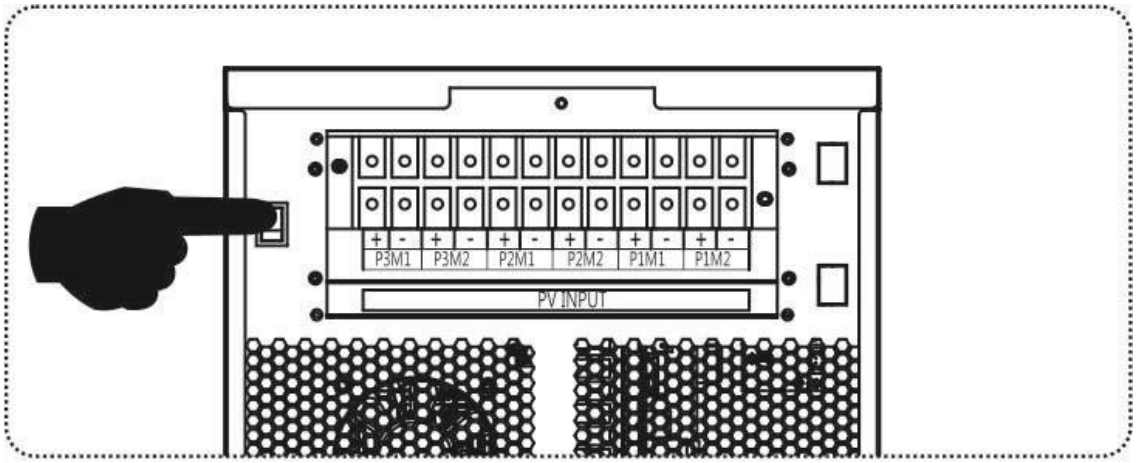
Dry Contact Signal

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

Unit Status	Condition			Dry contact port: 	
				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 SUB	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	Battery voltage < Setting value in Program 20	Open	Close
			Battery voltage > Setting value in Program 21 or battery charging reaches floating stage	Close	Open

OPERATION

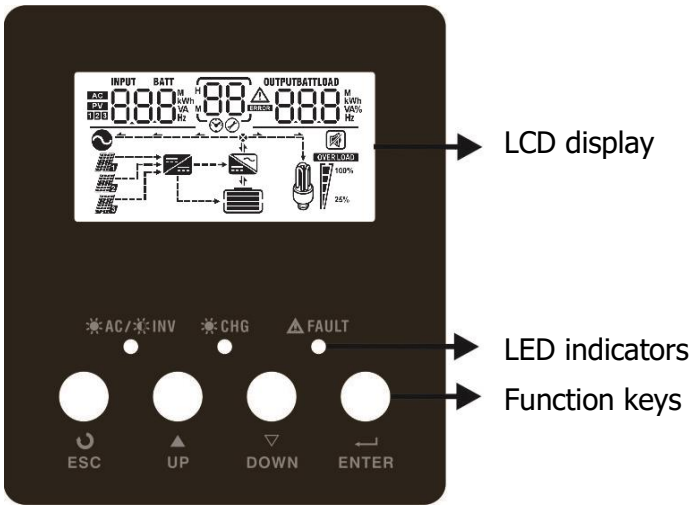
Power ON/OFF



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

Operation and Display Panel

The operation and display panel, shown in below chart, is on the front panel of the unit. It includes three indicators, four function keys and a LCD display, indicating the operating status and input/output power information.



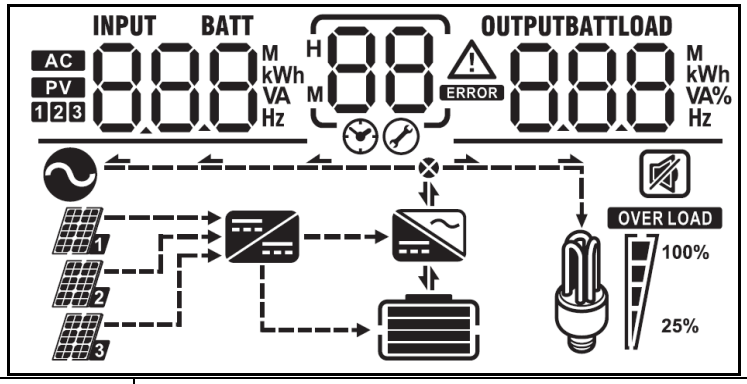
LED Indicator

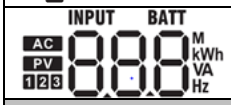
LED Indicator			Messages
AC / INV	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Green	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
⚠ FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning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

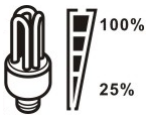
Function Keys

Function Key	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

LCD Display Icons

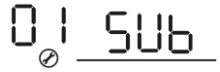
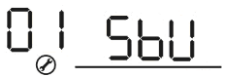


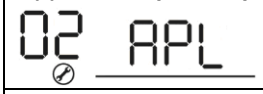
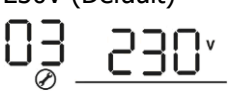
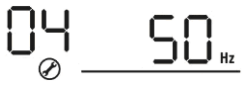
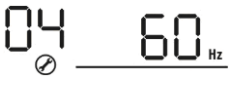
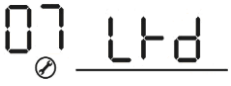
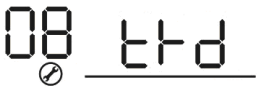
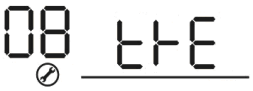
Icon	Function
Input Source Information	
AC	Indicates the AC input
PV 1	Indicates the PV1 panel input
PV 2	Indicates the PV2 panel input
	Indicate input voltage, input frequency, battery voltage, PV1 voltage, PV2 voltage and charger current.
Configuration Program and Fault Information	
	Indicates the setting programs.
	Indicates the warning and fault codes. Warning: Flashing  with warning code Fault: display  with fault code
Output Information	
	Indicate the output voltage, output frequency, load percent, load in VA, load in Watts, PV1 charger power, PV2 charger power and DC discharging current.
Battery information	
	Indicates battery level by 0-24%, 25-49%, 50-74%, 75-100% and charging status.
Load information	
OVER LOAD	Indicates overload.

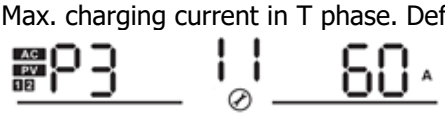
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.			
	0%~24%	25%~49%	50%~74%	75%~100%
				
Mode operation information				
	Indicates unit connects to the mains.			
	Indicates the unit connects to the PV panel in R phase			
	Indicates the unit connects to the PV panel in S phase			
	Indicates the unit connects to the PV panel in T phase			
	Indicates the solar charger is working			
	Indicates the DC/AC inverter circuit is working.			
Mute operation				
	Indicates unit alarm is disabled.			

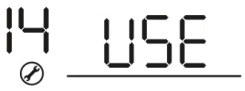
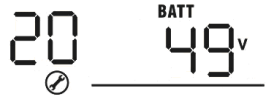
LCD Setting

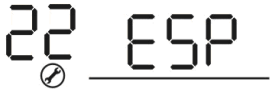
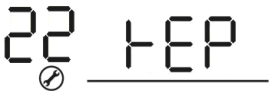
After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESC button to exit.

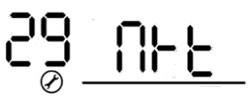
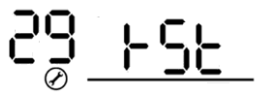
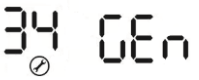
Program	Description	Selectable option	
00	Exit setting mode	Escape 	
01	Output source priority selection	SUB priority 	Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, utility energy will supply power to the loads at the same time.
		SBU 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 20 or solar and battery is not sufficient.

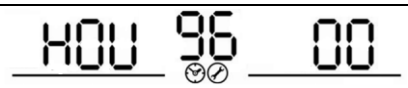
02	AC input voltage range	Appliances (default) 	If selected, acceptable AC input voltage range will be within 90-280VAC.
		UPS 	If selected, acceptable AC input voltage range will be within 170-280VAC.
03	Output voltage	220Vac 	After output voltage is selected, please also set up country customized regulations in program 34 to determine acceptable feed-in grid voltage and frequency range.
		230V (Default) 	
		240Vac 	
04	Output frequency	50Hz (default) 	If 50Hz is selected here, the output frequency is 50Hz.
		60Hz 	If 60Hz is selected here, the output frequency is 60Hz.
05	Solar supply priority	Charge battery first 	Solar energy provides power to charge battery as first priority.
		Provide load first 	Solar energy provides power to the loads as first priority.
06	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 	Bypass enable 
07	Auto restart when overload occurs	Restart disable (default) 	Restart enable 
08	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 
09	Solar or battery energy feed to grid configuration		Solar or battery energy feed to grid disable.

			Solar or battery energy feed to grid 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 or Power saving mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.	
11	Maximum charging current in R, S and T phases: To configure total charging current for solar and utility chargers in R, S and T phases. (Max. charging current = utility charging current + solar charging current)	Max. charging current in R phase. Default setting: 60A 	
		Max. charging current in S phase. Default setting: 60A 	
		Max. charging current in T phase. Default setting: 60A 	
		Setting range is from 10A to 180A. Increment of each click is 10A.	
13	Maximum utility charging current in R, S and T phases	Utility charging current in R phase. Default setting 30A. 	
		Utility charging current in S phase. Default setting 30A. 	
		Utility charging current in T phase. Default setting 30A. 	
		Setting options are 2A, 10A, 20A, 30A, 40A, 50A and 60A.	
14	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 17, 18 and 19.
17	Bulk charging voltage (C.V voltage)	Default setting: 56.4V 	
		If self-defined is selected in program 14, this program can be set up. Setting range is from 48.0V to 58.4V. Increment of each click is 0.1V.	
18	Floating charging voltage	Default setting: 54.0V 	
		If self-defined is selected in program 14, this program can be set up. Setting range is from 48.0V to 58.4V. Increment of each click is 0.1V.	
19	Low DC cut off battery voltage setting	48V model default setting: 40.8V 	
		If self-defined is selected in program 14, this program can be set up. Setting range is from 40.8V to 48.0V. 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.	
20	Battery stop discharging voltage when grid is available.	44.0V 	45.0V 
		46.0V (Default) 	47.0V 
		48.0V 	49.0V 
		50.0V 	51.0V 
21	Battery stop charging voltage when grid is available.	Battery fully charged 	48.0V 

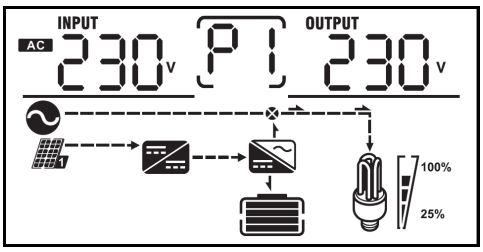
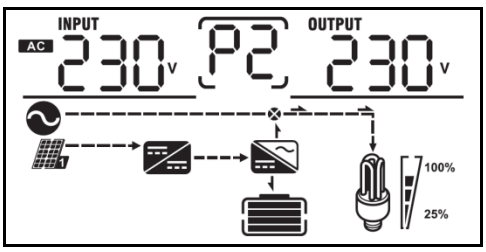
21	Battery stop charging voltage when grid is available.	49.0V 	50.0V 
		51.0V 	52.0V 
		53.0V 	54.0V 
		55.0V 	56.0V 
		57.0V 	58.0V 
22	Auto return to default display screen	Return to default display screen (Default) 	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage /output voltage) 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.
23	Backlight control	Backlight on (Default) 	Backlight off 
24	Alarm control	Alarm on (Default) 	Alarm off 
25	Beeps while primary source is interrupted	Alarm on (Default) 	Alarm off 
27	Record fault code	Record enable (Default) 	Record disable 

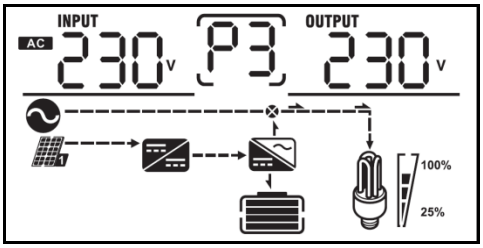
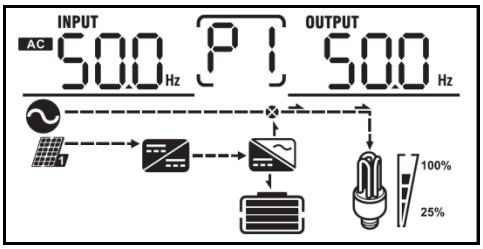
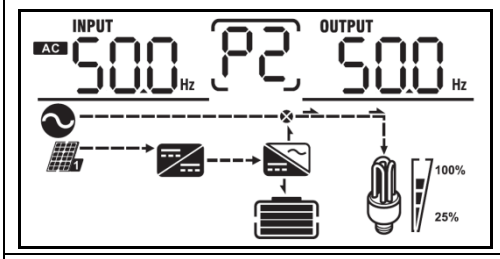
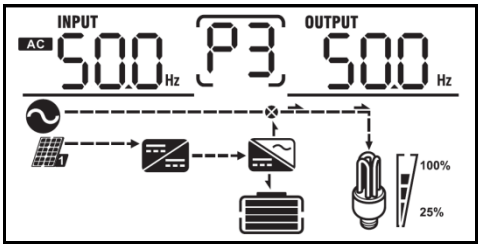
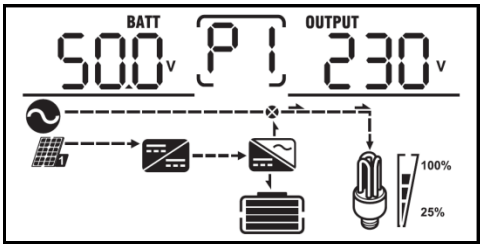
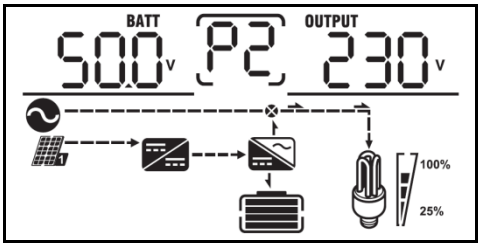
29	Reset PV energy storage	Not reset (Default) 	Reset 
30	Start charging time for AC charger	00:00 (Default)  The setting range of start charging time for AC charger is from 00:00 to 23:00. Increment of each click is 1 hour.	
31	Stop charging time for AC charger	00:00 (Default)  The setting range of stop charging time for AC charger is from 00:00 to 23:00. Increment of each click is 1 hour.	
32	Scheduled time for AC output on	00:00 (Default)  The setting range of scheduled Time for AC output on is from 00:00 to 23:00. Increment of each click is 1 hour.	
33	Scheduled time for AC output off	00:00 (Default)  The setting range of scheduled Time for AC output off is from 00:00 to 23:00. Increment of each click is 1 hour.	
34	Set country customized regulations	India (Default) 	If selected, acceptable feed-in grid voltage range will be 195.5~253VAC. Acceptable feed-in grid frequency range will be 49~51Hz.
		Germany 	If selected, acceptable feed-in grid voltage range will be 184~264.5VAC. Acceptable feed-in grid frequency range will be 47.5~51.5Hz.
		South America 	If selected, acceptable feed-in grid voltage range will be 184~264.5VAC. Acceptable feed-in grid frequency range will be 57~62Hz.
35	AC output voltage soft time	Default setting:10s 	Setting range is from 00s to 59s. Increment of each click is 1s.

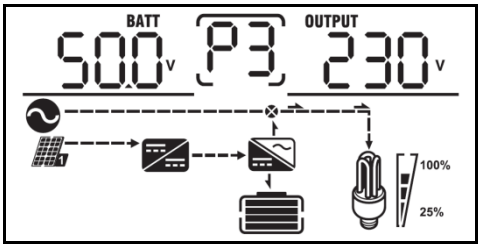
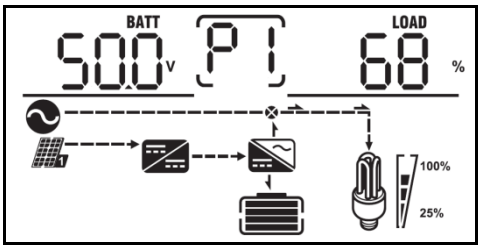
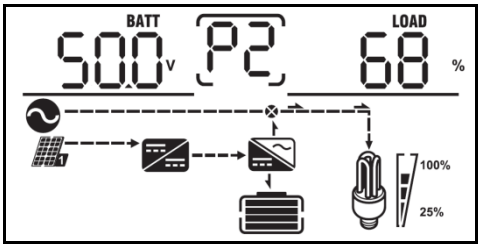
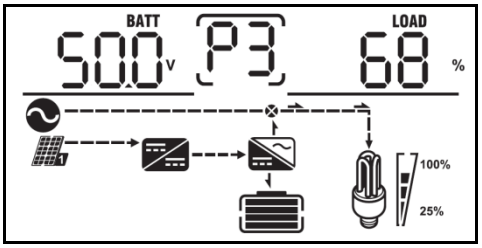
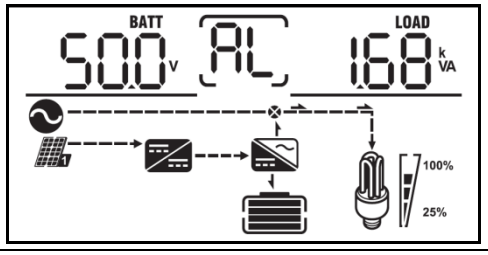
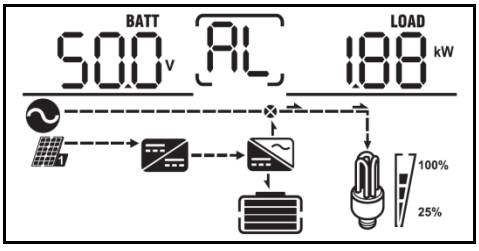
95	Time setting – Minute	 For minute setting, the range is from 00 to 59.
96	Time setting – Hour	 For hour setting, the range is from 00 to 23.
97	Time setting– Day	 For day setting, the range is from 00 to 31.
98	Time setting– Month	 For month setting, the range is from 01 to 12.
99	Time setting – Year	 For year setting, the range is from 16 to 99.

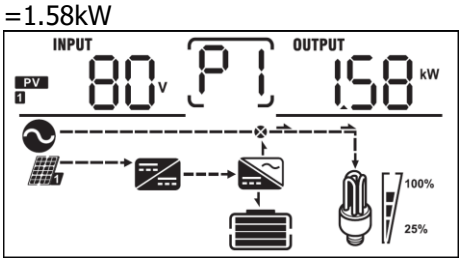
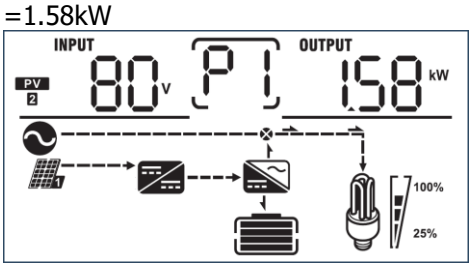
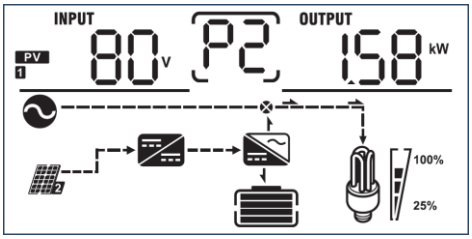
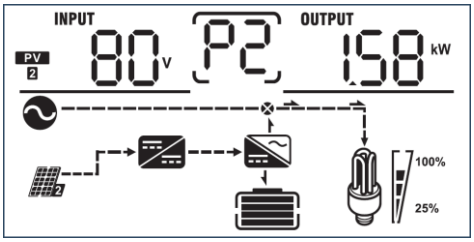
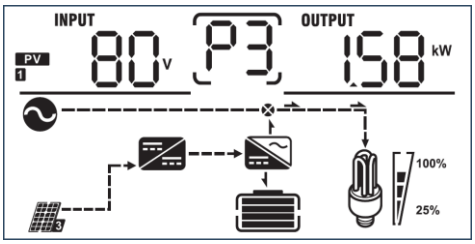
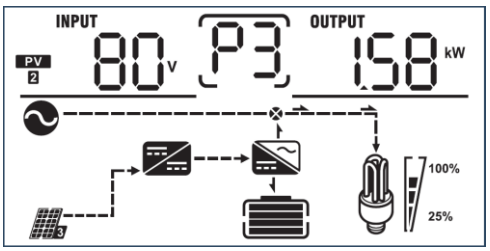
Display Setting

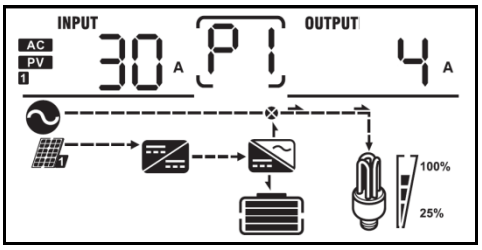
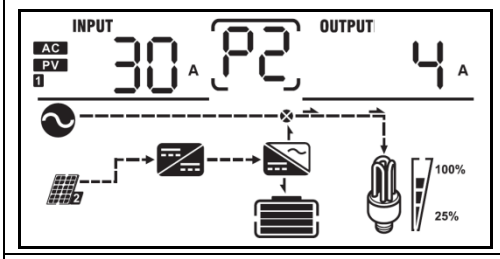
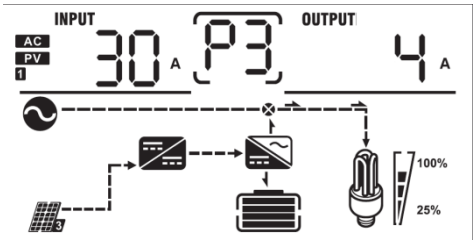
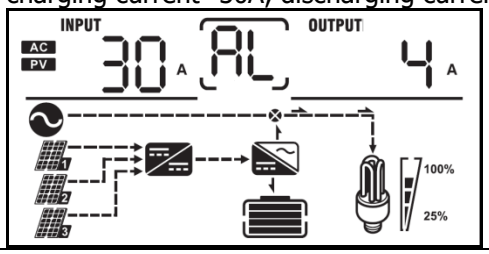
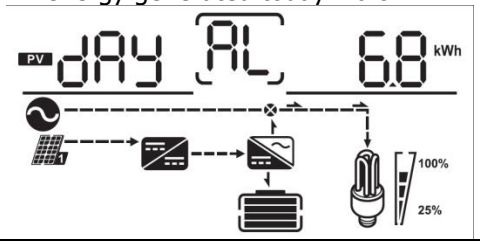
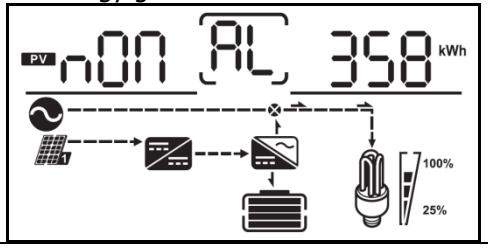
The LCD display information will be switched in turns by pressing "UP" or "DOWN" key. The selectable information is switched as below order: input voltage, input frequency, PV voltage, charging current, battery voltage, output voltage, output frequency, load percentage, load in Watt, load in VA, load in Watt, DC discharging current, main board firmware version and SCC firmware version.

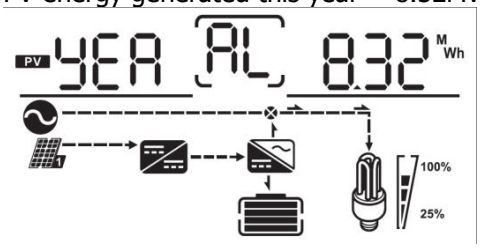
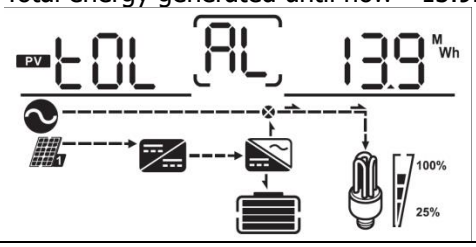
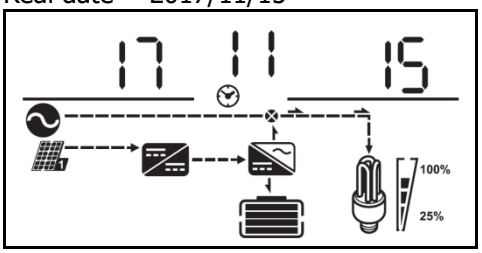
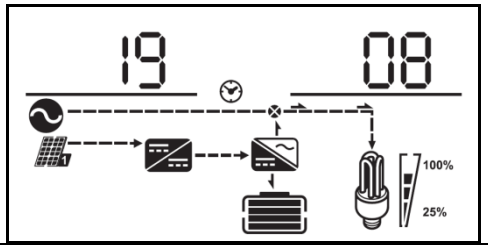
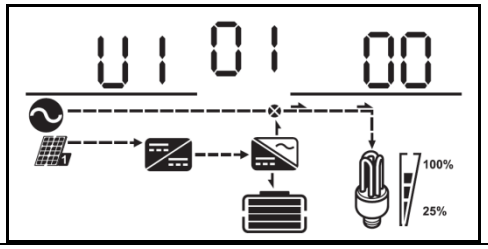
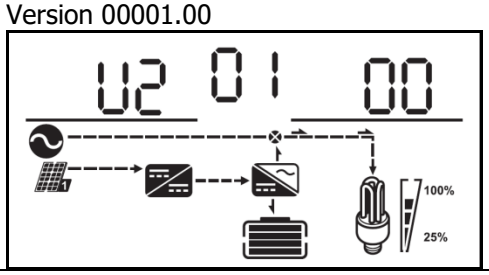
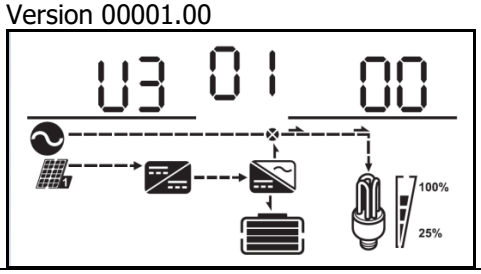
Select item	LCD display
Input voltage and output voltage (Default Display Screen)	Input Voltage in R phase=230V, output voltage=230V  Input Voltage in S phase=230V, output voltage=230V 

	Input Voltage in T phase=230V, output voltage=230V 
Input frequency and output frequency	Input frequency in R phase=50.0Hz, output frequency = 50.0Hz 
	Input frequency in S phase=50.0Hz, output frequency = 50.0Hz 
	Input frequency in T phase=50.0Hz, output frequency = 50.0Hz 
Battery voltage and output voltage	Battery voltage in R phase=27.0V, output voltage=230V 
	Battery voltage in S phase=27.0V, output voltage=230V 

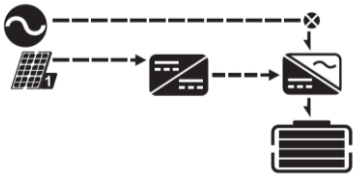
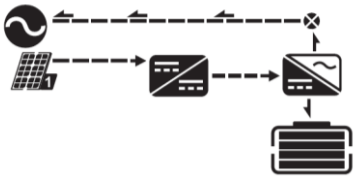
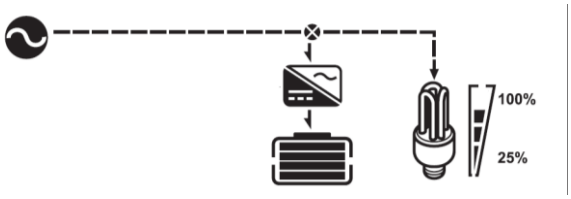
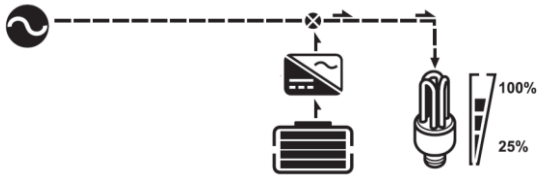
	Battery Voltage in T phase=27.0V, output voltage=230V 
Battery voltage and load percentage	Battery voltage in R phase=27.0V, load percentage = 68% 
	Battery voltage in S phase=27.0V, load percentage = 68% 
	Battery voltage in T phase=27.0V, load percentage = 68% 
Battery voltage and total load in VA	Battery voltage=50.0V, total load in VA=1.68kVA 
Battery voltage and total load in Watt	Battery voltage=50.0V, total load in Watt=1.88kW 

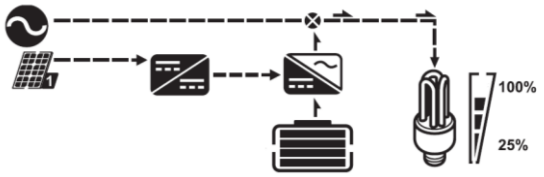
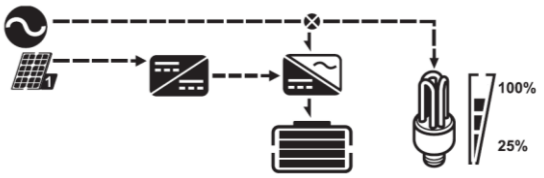
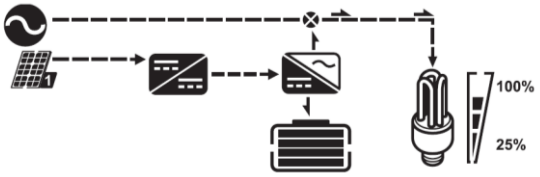
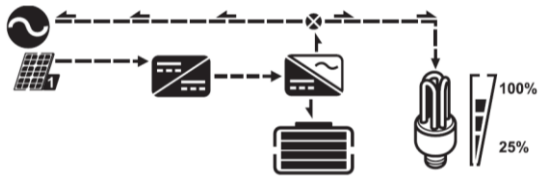
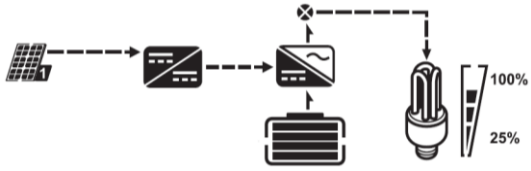
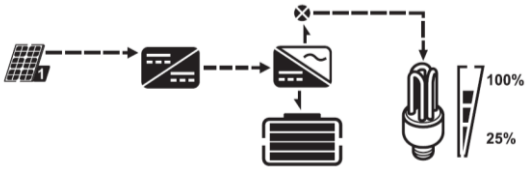
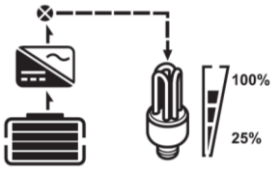
PV voltage and charging power in R, S, T phases	PV1 voltage in R phase=80V, PV1 charging power in R phase =1.58kW 
	PV2 voltage in R phase=80V, PV2 charging power in R phase =1.58kW 
	PV1 voltage in S phase=80V, PV1 charging power in S phase =1.58kW 
	PV2 voltage in S phase=80V, PV2 charging power in S phase =1.58kW 
	PV1 voltage in T phase=80V, PV1 charging power in T phase =1.58kW 
	PV2 voltage in T phase=80V, PV2 charging power in T phase =1.58kW 

Battery charging current and DC discharging current (PV 1 indicates PV1, PV 2 indicates PV2)	Battery charging current from AC, PV1 or PV2 in R phase = 30A, DC discharging current=4A 
	Battery charging current from AC, PV1 or PV2 in S phase = 30A, DC discharging current=4A 
	Battery charging current from AC, PV1 or PV2 in T phase = 30A, DC discharging current=4A 
Total charger current and total DC discharging current	charging current=30A, discharging current=4A 
PV energy generated today	PV energy generated today= 6.8kWh 
PV energy generated this month	PV energy generated this month = 358kWh. 

PV energy generated this year	PV energy generated this year = 8.32MWh 
PV energy generated until now	Total energy generated until now= 13.9MWh 
Real date	Real date = 2017/11/15 
Real time	Real time = 19:08 
Main board firmware version	Version 00001.00 
SCC1 firmware version	Version 00001.00 
SCC2 firmware version	Version 00001.00 

Operating Mode Description

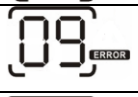
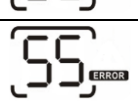
Operating mode	Behaviors	LCD display
Standby mode **Note:** *Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output. *Power saving mode: If enabled, the output of inverter will be off when connected load is pretty low or not detected.	No output power, solar or utility charger available	Battery is charged by utility. 
		Battery is charged by PV energy. 
		Battery is charged by utility and PV energy. 
		Battery is charged by PV energy and feed PV energy to grid. 
		No charging. 
Line mode	Output power from utility. Charger available	Utility charges battery and provides power to load. 
		Utility and battery power provide power to load. 
		PV energy, battery power and utility provide power to load.

		
Line mode	Output power from utility. Charger available	PV energy and utility charge battery, and utility provides power to load. 
		PV energy charges battery, utility and PV energy provide power to the load. 
		PV energy charges battery, PV energy provides power to the load and feeds remaining energy to the grid. 
Battery mode	Output power from battery or PV	PV energy and battery energy supply power to the load. 
		PV energy charges battery and provides power to the load. 
		Battery provides power to the load. 
Fault mode **Note:** *Fault mode: Errors are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.	No output, no charging.	No charging. 

Warning Indicator

Warning Code	Warning Event	Icon flashing
01	Fan locked	
03	Battery over charged	
04	Low battery	
07	Overload	

Faults Reference Code

Fault Code	Fault Event	Icon on
01	Fan locked	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited	
06	Output voltage abnormal	
07	Over load time out	
08	Bus voltage is too high	
09	Bus soft start failed	
51	Over current or surge	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC offset in AC output	
56	Battery disconnected	
57	Current sensor failed	

58	Output voltage is too low	
60	Power feedback protection	
71	Internal firmware version inconsistent	
72	Internal current sharing fault	
80	Internal CAN fault	
81	Internal host loss	
82	Internal synchronization loss	
83	Internal battery voltage detected different	
84	Internal AC input voltage and frequency detected different	
85	Internal AC output current unbalance	
86	Internal AC output mode setting is different	

SPECIFICATIONS

MODEL	**15KW**
RATED OUPUT POWER	15000W
PV INPUT (DC)	
Max. PV Power	18000W
Max. PV Array Open Circuit Voltage	145VDC
MPPT Range @ Operating Voltage	60 VDC~145 VDC
Number of MPP Tracker	6
GRID-TIE OPERATION	
GRID OUTPUT (AC)	
Nominal Output Voltage	220/230/240 VAC
Feed-in Grid Voltage Range	195.5~253 VAC @India regulation 184 ~ 264.5 VAC @Germany regulation 184~264.5VAC @ South America regulation
Feed-in Grid Frequency Range	49~51Hz @India regulation 47.5~51.5Hz @Germany regulation 57~62Hz @ South America regulation
Nominal Output Current	21.7A per phase
Power Factor Range	>0.99
Maximum Conversion Efficiency (DC/AC)	90%
OFF-GRID, HYBRID OPERATION	
GRID INPUT	
Acceptable Input Voltage Range	90 - 280 VAC or 170 - 280 VAC
Frequency Range	50 Hz/60 Hz (Auto sensing)
Fuse	40A
BATTERY MODE OUTPUT (AC)	
Nominal Output Voltage	220/230/240 VAC
Output Waveform	Pure Sine Wave
Efficiency (DC to AC)	93%
BATTERY & CHARGER	
Nominal DC Voltage	48 VDC
Maximum Charging Current (from Grid)	60 A per phase
Maximum Charging Current (from PV)	60 A per MPP tracker
Maximum Charging Current	540 A
GENERAL	
Dimension, D X W X H (mm)	743 x 320 x 1012
Net Weight (kgs)	132
INTERFACE	
Parallel-able	No
External Safety Box (Optional)	No
Communication	USB or RS232/Dry-Contact
ENVIRONMENT	
Humidity	0 ~ 90% RH (No condensing)
Operating Temperature	0 to 50°C

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.	1. Check if batteries and the wiring are connected well. 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 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. (UPS→Appliance)
	Green LED is flashing.	Set "Solar First" as the priority of output source.	Change output source priority to Utility first.
When the unit is turned on, internal relay is switched on and off repeatedly.	LCD display and LEDs are flashing	Battery is disconnected.	Check if battery wires are connected well.
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 100°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 is lower than 190Vac or higher than 260Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 08/09/53/57	Internal components failed.	Return to repair center.
	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 but the problem remains, please return to repair center.

Buzzer beeps continuously and red LED is on.	Fault code 60	Current feedback into the inverter is detected.	1. Restart the inverter. 2. If the problem remains, please contact your installer.
	Fault code 71	Internal firmware version of each inverter is not the same.	1. Restart the inverter. 2. If the problem remains, please contact your installer.
	Fault code 72	Internal current sharing fault.	1. Restart the inverter. 2. If the problem remains, please contact your installer.
	Fault code 80	Internal CAN data loss	1. Restart the inverter. 2. If the problem remains, please contact your installer.
	Fault code 81	Internal Host data loss	1. Restart the inverter. 2. If the problem remains, please contact your installer.
	Fault code 82	Synchronization data loss	1. Restart the inverter. 2. If the problem remains, please contact your installer.
	Fault code 83	Internal battery voltage is detected different.	1. Restart the inverter. 2. If the problem remains, please contact your installer.
	Fault code 84	Internal AC input voltage and frequency detected different.	1. Restart the inverter. 2. If the problem remains, please contact your installer.
	Fault code 85	Internal AC output current unbalance.	1. Restart the inverter. 2. If the problem remains, please contact your installer.
	Fault code 86	Internal AC output mode setting is different.	1. Restart the inverter. 2. If the problem remains, please contact your installer.