User Manual

5KVA
INVERTER/CHARGER

Version 1.0

Contents

ABOUT THIS MANUAL 1

PURPOSE 1
SCOPE 1

SAFETY INSTRUCTIONS 1

INTRODUCTION 2

FEATURES 2
BASIC SYSTEM ARCHITECTURE 3
PRODUCT OVERVIEW 4

INSTALLATION 5

UNPACKING AND INSPECTION 5
PREPARATION 5
MOUNTING THE UNIT 5
BATTERY CONNECTION 7
PV CONNECTION 9
AC INPUT/OUTPUT CONNECTION 10
FINAL ASSEMBLY 11

OPERATION 12

POWER ON/OFF 12
OPERATION AND DISPLAY PANEL 12
LCD DISPLAY ICONS 13
LCD SETTING 16
DISPLAY SETTING 20

SPECIFICATIONS 25

GENERAL SPECIFICATION 26

TROUBLE SHOOTING 27

APPENDIX: APPROXIMATE BACK-UP TIME TABLE 28

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. One piece of 150A fuse is 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 is a pure sine wave stand-alone inverter/charger system combining the function of inverter, solar charger and AC charger, and provides a long run-time uninterruptible power supply. Its comprehensive LCD display provides system status, and user-friendly panel eases parameters settings.

Features

- High-frequency switching technology for compact size and light weight
- Pure sine wave output for wide range of applications and harsh environment
- Build-in solar charger controller with MPPT technology to optimize the power utilization
- High efficient DC-to-AC conversion minimizing energy loss
- Standby Charging Mode enables battery charging even when the unit is switched off
- Intelligent cooling fan control
- Input/output isolated design for the maximum operation safety
- LCD displays comprehensive operation status
- Configurable AC input voltage range and priority for AC input or PV input
- Supports Home Appliances / Office Equipment/ Lighting Equipment/ Motor-based Equipment (such as Fan, Air-Conditioner, Washing Machines)
- Thorough protections: Input low voltage / Overload / Short circuit / Low battery alarm / Input over voltage / Over temperature
- Supports both rack and wall-mounting set-up for flexible installation

Basic System Architecture

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

Ÿ Generator or Utility.

Ÿ PV modules

Consult with your system integrator for other possible system architectures depending on your requirements.

This inverter can power all kinds of appliances in home or office environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner.

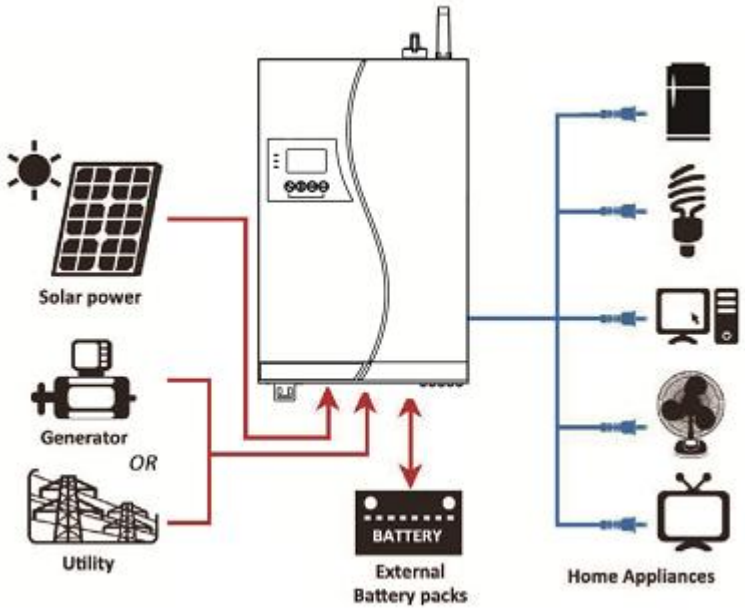
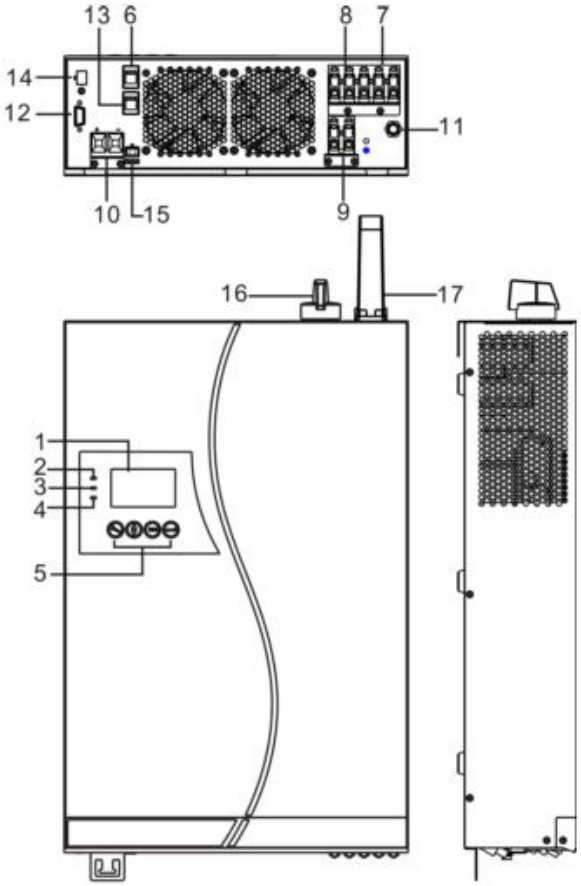


Figure 1 Hybrid Power System

Product Overview



1. LCD display
2. Status indicator
3. Charging indicator
4. Fault indicator
5. Function buttons
6. Power on/off switch
7. AC input
8. AC output
9. PV input
10. Battery input
11. Circuit breaker
12. RS232 communication port
13. Maintenance switch
14. Dry contact port
15. 12VDC output (optional)
16. PV switch (optional)
17. WIFI (optional)

INSTALLATION

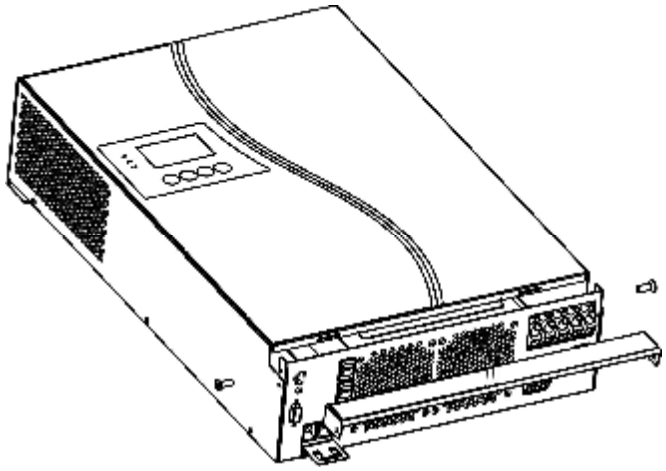
Unpacking and Inspection

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
- DC Fuse x 1
- Ring terminal x 1
- Strain relief plate x 1
- Screws x 4

Preparation

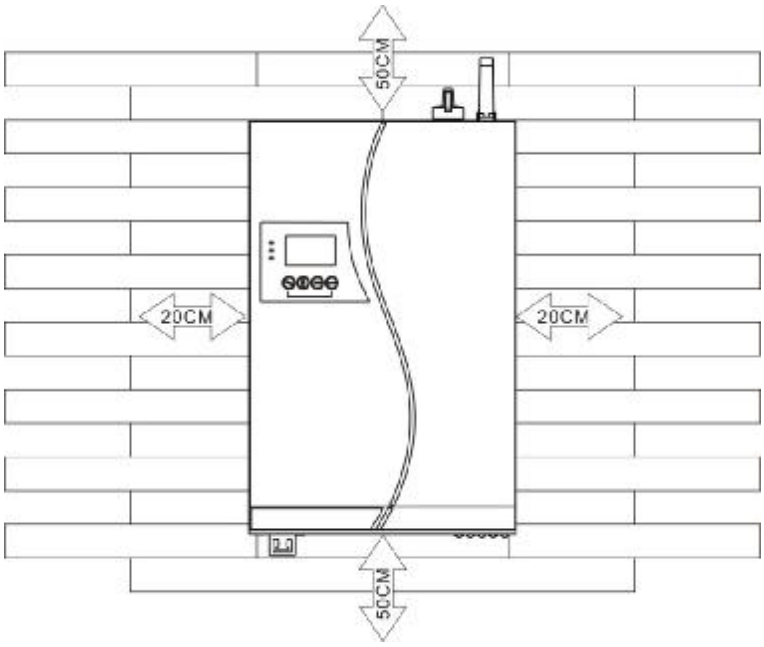
Before connecting ail wirings, please take off bottom cover by removing two screws as shown below.



Mounting the Unit

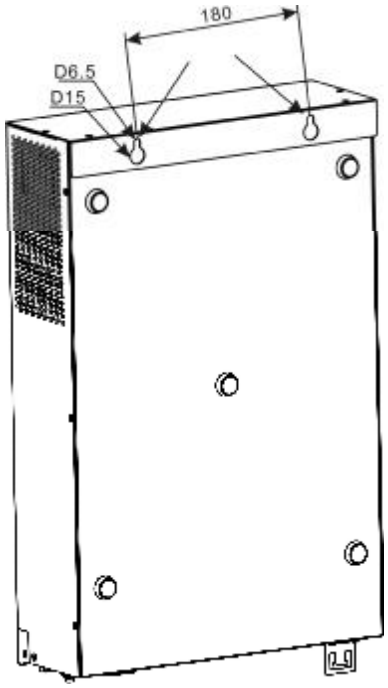
Consider the following points before selecting where to install:

- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- Install this inverter at eye level in order to allow the LCD display to be read at all times.
- For proper air circulation to dissipate heat, allow a clearance of approx. 20 cm to the side and approx. 50 cm 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 OR OTHER NON-COMBUSTIBLE SURFACE ONLY.

Install the unit by screwing two screws. It's recommended to use M5 screws.



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 instated. Please refer to typical amperage in below table as required fuse or breaker size.

WARNING! All wiring must be performed by qualified personnel.

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

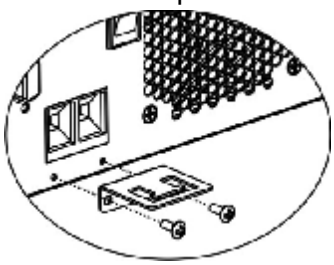
Recommended battery cable size:

Model	Wire Size	Cable (mm2)	Torque value (max)
5KVA	1 x 2AWG	35	2 Nm

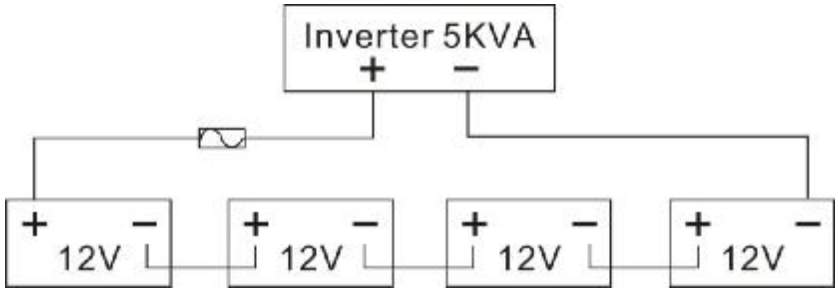
Please follow below steps to implement battery connection:

1. Remove insulation sleeve 18 mm for positive and negative conductors.
2. Suggest to put bootlace ferrules on the end of positive and negative wires with a proper crimping tool.

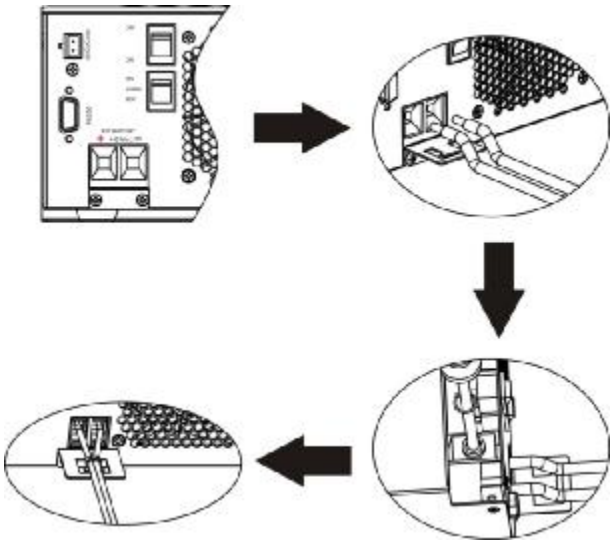
3. Fix strain relief plate to the inverter by supplied screws as shown in below chart.



4. Connect all battery packs as below chart.



5. Insert the battery wires flatly into battery connectors of inverter and make sure the bolts are tightened with torque of 2 Nm in clockwise direction. Make sure polarity at both the battery and the inverter/charge is correctly connected and conductors are tightly screwed into the battery terminals. Recommended tool: #2 Pozi Screwdriver



6. To firmly secure wire connection, you may fix the wires to strain relief with cable tie.

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

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

PV Connection

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

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

Model	Wire Size	Cable (mm2)	Torque value (max)
5KVA	1X10AWG	6	1.6 Nm

PV Module Selection: (For the model with MPPT solar charger)

When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
2. Open circuit Voltage (Voc) of PV modules should be higher than min, battery voltage.

INVERTER MODEL	5KVA
Max. PV Array Open Circuit Voltage	145Vdc
PV Array MPPT Voltage Range	60~115Vdc

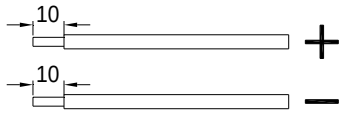
Take 250Wp PV module as an example. After considering above two parameters, the recommended module configurations for 5KVA are listed as below table.

Maximum Power (Pmax)	250W	5KVA: 2 pieces in serial and 6 sets in parallel, or 3 pieces in serial and 4 sets in parallel
Max. Power Voltage Vmpp(V)	30.1V	
Max. Power Current Impp(A)	8.3A	
Open Circuit Voltage Voc(V)	37.7V	
Short Circuit Current Isc(A)	8.4A	

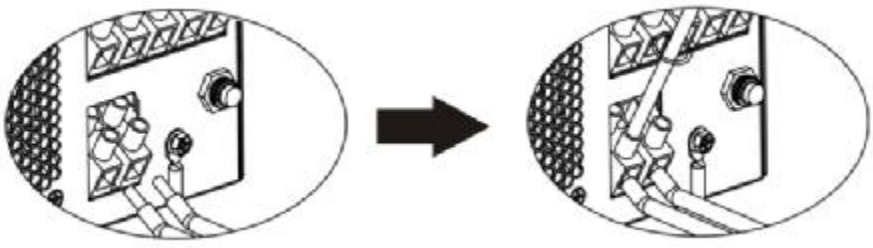
PV Module Wire Connection

Please follow below steps to implement PV module connection:

1. Remove insulation sleeve 10 mm for positive and negative conductors.
2. Suggest putting bootlace ferrules on the end of positive and negative wires with a proper crimping tool.



3. Check correct polarity of wire connection from PV modules and PV input connectors. Then, connect positive pole (+) of connection wire to positive pole (+) of PV input connector. Connect negative pole (-) of connection wire to negative pole (-) of PV input connector. Screw two wires tightly in clockwise direction, Recommended tool: 4mm blade screwdriver



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. The recommended spec of AC breaker is 32A for 5KVA.

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

WARNING! All wiring must be performed by qualified personnel.

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

Suggested cable requirement for AC wires

Model	Wire Size	Cable (mm2)	Torque value
5KVA	10AWG	6	1.2 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 insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor (⏚) first.

⏚ → Ground (yellow-green)

L → LINE (brown or black)

N → Neutral (blue)

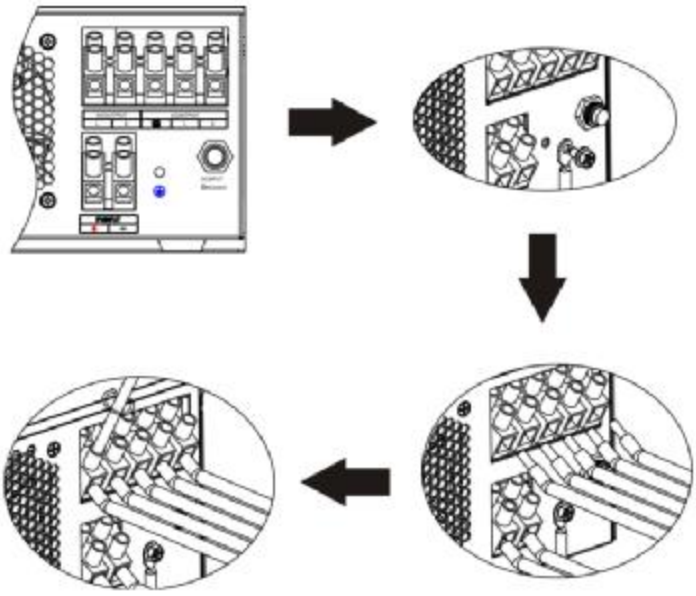
⚠	WARNING: Be sure that AC power source is disconnected before attempting to hardwire it to the unit

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

   ⏚ → Ground (yellow-green)

   L → LINE (brown or black)

   N → Neutral (blue)



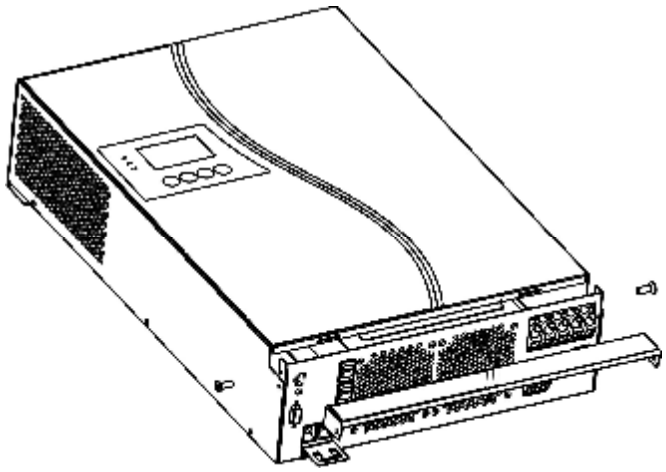
5. Make sure the wires are securely connected.

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.

Final Assembly

After connecting all wirings, please put bottom cover back by screwing two screws as shown below.



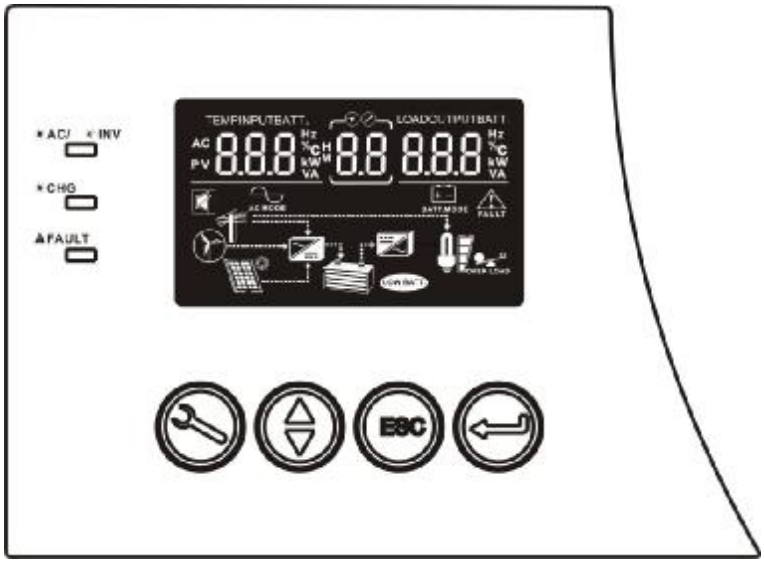
OPERATION

Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the button of the case) 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 inverter. It includes three indicators, four function keys and a LCD display, indicating the operating status and input/output power information.



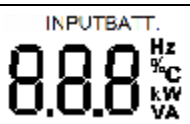
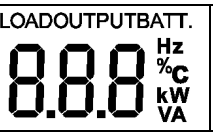
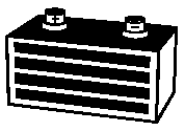
LED Indicator

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.

Button function

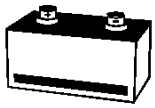
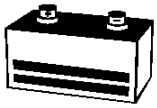
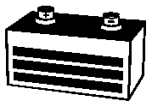
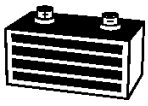
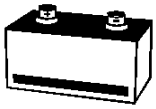
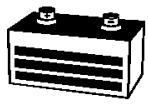
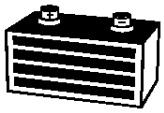
Button	Function	Description
	Configuration	Enter configuration mode, and switch between setting menus
	Up/down	Move to previous/next setting option
	ESC	Return to main menu
	Enter	Confirm setting

LCD Display Icons

Icon	Function description
Input Source Information	
	Indicates the AC input.
	Indicates the PV input
	Indicate input voltage, input frequency, PV voltage, charger current (if PV in charging for 5k models), charger power (only for MPPT models), battery voltage.
Configuration Program and Fault Information	
	Indicates the setting programs.
	Indicates the warning and fault codes.
Output Information	
	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.
Battery Information	
	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.	

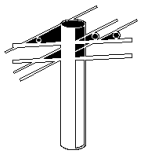
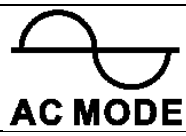
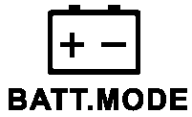
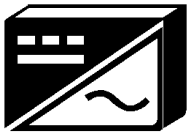
Status	Battery voltage	LCD Display
Constant Current mode / Constant Voltage mode	<2V/cell	4 bars will flash in turns.
	2 ~ 2.083V/cell	Bottom bar will be on and the other three bars will flash in turns.
	2,083 ~ 2.167V/cell	Bottom two bars will be on and the other two bars will flash in turns.
	>2.167V/cell	Bottom three bars will be on and the top bar will flash.
Floating mode. 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%	< 1.65V/cell	
	1.85V/CCII ~ 1.933V/cell	
	1.933V/cell ~ 2.017V/cell	
	> 2.017V/cell	
Load < 50%	< 1.892V/cell	
	1.892V/cell ~ 1.975V/cell	
	1.975V/cell ~ 2.058V/cell	
	>2.058V/cell	

Load Information

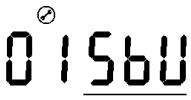
	Indicates overload.			
	Indicates the load level by 0-24%, 25-50%, 50-74% and 75-100%.			
	0%~25%	25%~50%	50%~75%	75%~100%

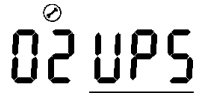
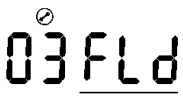
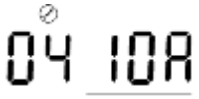
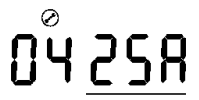
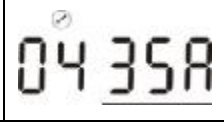
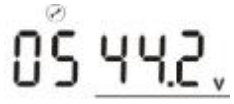
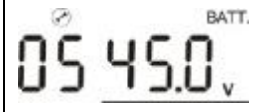
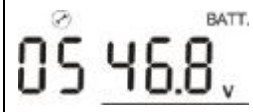
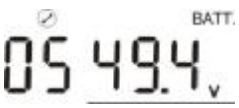
				
Mode Operation Information				
	Indicates unit connects to the mains.			
	Indicates unit connects to the PV panel.			
	Indicates load is supplied by utility power.			
	Indicates load is supplied by battery power or PV power.			
	Indicates the utility charger circuit is working.			
	Indicates the DC/AC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

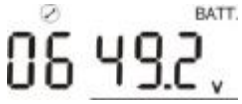
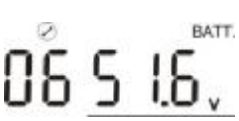
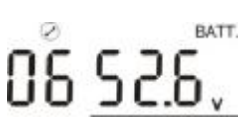
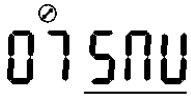
LCD Setting

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.

Setting Programs:

Program	Description	Selectable option	
01	Output source priority: To configure load power source priority	Solar first 	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 the loads at the same time. Utility provides power to the loads only when any one condition happens: -Solar energy is not available -Battery voltage drops to low-level warning voltage or the setting point in program 05.
		Utility first (default) 	Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.
		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 05.
02	AC input voltage range	Appliances (default)	If selected, acceptable AC input voltage range will be within 125-280VAC

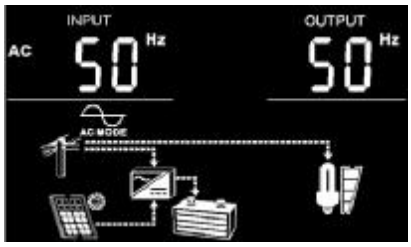
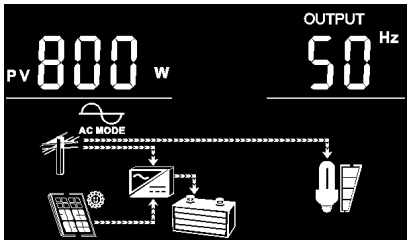
		02 APL	
		UPS 	If selected, acceptable AC input voltage range will be within 175-280VAC
03	Battery type	AGM (default) 	Flooded 
		User-Defined 	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 9,10 and 11.
04	Maximum utility charging current	Available options in 5KVA model:	
		10A 	15A 
		25A(default) 	35A 
05	Setting voltage point back to utility source when selecting "SBU priority" or "Solar first" in program 01.	Available options in 5KVA model:	
		44.2V 	45.0V 
		46.0V 	46.8V 
		47.6V 	48.6V 
		49.4V 	50.2V 
06	Setting voltage point	Available options In 5KVA model:	

	back to battery mode when selecting “SBU priority” or "Solar first" in program 01.	Battery fully charged 	49.2V 
		50.0V 	50.8V 
		51.6V 	52.6V 
		53.4V 	54.4V 
		55.2V 	56.0V 
		59.0V 	57.8V 
07	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.
		Utility first 	Utility will charge battery as first priority. Solar energy will charge battery only when utility power 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.	
08	Alarm control	Alarm on (default) 	Alarm off 
09	Bulk charging voltage (C.V voltage)	5KVA setting: 56.4V 	
		If self-defined is selected in program 3, this program can be set up. Setting range is from 50.0V to 59.0V for 5KVA model. Increment of each dick is about 0.2V.	
10	Floating charging voltage	5KVA setting: 54.0V 	
		If self-defined is selected in program 3, this program can be set up. Setting range is from 50.0V to 59.0V for 5KVA. Increment of each dick is about 0.2V.	
11	Low DC cut-off voltage	5KVA default setting: 40.0V 	
		If self-defined is selected in program 3, this program can be set up. Setting range is from 40.0V to 48.0V for 5KVA model. Increment of each dick is about 0.2V. Low DC cut-off voltage will be fixed to setting value no matter what percentage of load is connected.	

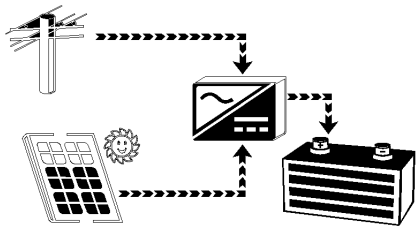
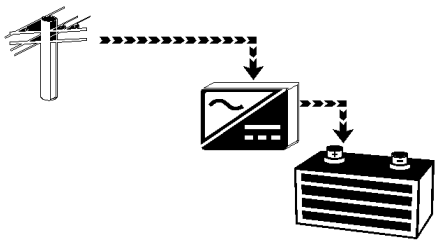
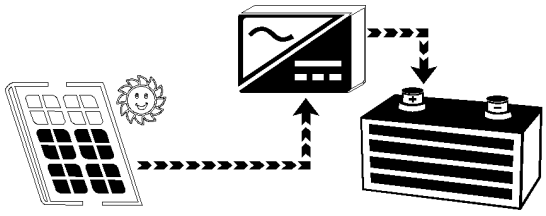
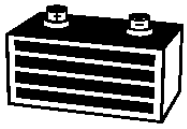
Display Setting

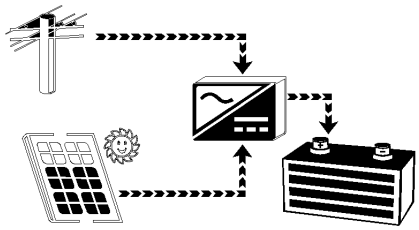
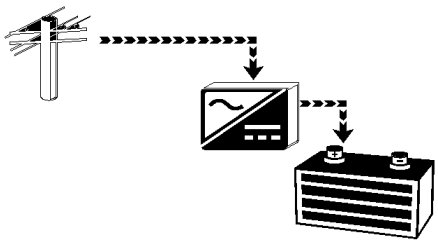
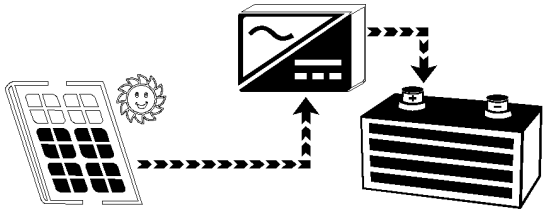
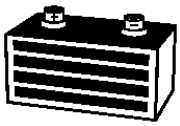
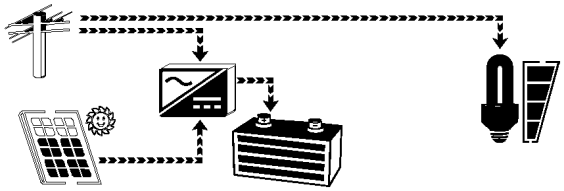
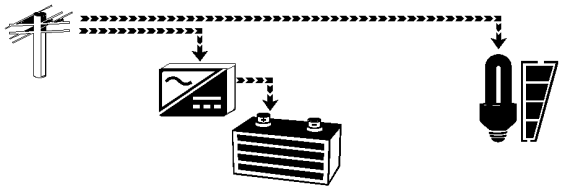
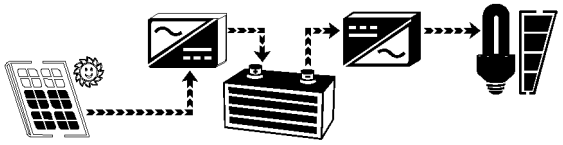
The LCD display information will be switched in turns by pressing “UP” or "DOWN” key. The selectable numerical information is as: input voltage, input frequency, PV voltage, PV charging power, battery voltage, output voltage, output frequency, load in Watt, load in VA, rated Watt, rated VA, main CPU Version and second CPU Version.

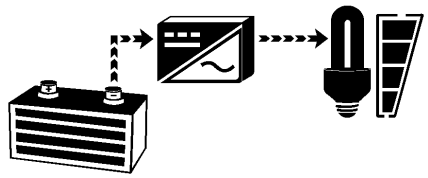
LCD Display	Remark
Note：The LCD display information will be switched in turns by pressing “UP” or “DOWN” button. The default page is ①， the display will show default page after pressing “ESC” button.	
 	①. AC input voltage / frequency & AC output voltage /frequency
 	②. Battery voltage & AC output voltage / frequency
 	③. Battery voltage & Load VA /WATT
 	④.PV voltage / PV charge power & AC output voltage / frequency

 	⑤.Rating power KVA / KW & Firmware version U1/U2

Operating Mode Description

Operation mode	Description	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	No output is supplied by the unit but it still can charge batteries.	Charging by utility and PV energy. 
		Charging by utility. 
		Charging by PV energy. 
		No charging. 
Fault mode Note:	PV energy and utility can	Charging by utility and PV Energy

*Fault mode: Errors are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.	charge batteries.	
		Charging by utility 
		Charging by PV energy 
		No charging 
Line Mode	The unit will provide output power from the mains. It will also charge the battery at line mode.	Charging by utility and PV energy. 
		Charging by utility. 
Battery Mode	The unit will provide output power from battery and PV power.	Power from battery and PV energy. 
		Power from battery only.

Fault Reference Code

Fault Code	Protect Function	Active Mode	Condition	Warning (O/P=ON)	Fault (O/P=OFF)	Restart	
						Operate	Condition
--	Low DC Voltage Alarm	Inv. mode	DC voltage<Low DC Alarm	1beep/2s	--	--	--
1	Over Charge Protection	Line mode	DC Voltage>High DC input Shut-down	Beep continuous	--	Manual	--
1	Over Voltage Protection	Standby	DC Voltage>High DC input Shut-down	--	Beep continuously	Auto	DC Voltage<High DC input Shut-down Recovery
2	Over Load Protection	Line/ Inv. mode	110%~150% load	1beep/0.5s, and continue for10s	Beep continuously	Manual	--
			>150% load	1beep/0.5s, and continue for 5s	Beep continuously	Manual	--
3	Output Short Circuit protection	Inv. mode	Output Voltage<20Vrms	--	Beep continuously	Manual	--
4	Inverter Fan Fault Protection	Line/ Inv. mode	Fan Locked Fan Defected	2beep/2s, and continue for 1min	Beep continuously	Manual	--
5	Inverter Over Temp Protection	Line/ Inv. mode	HEAT SINK over temp	--	Beep continuously	Auto	HEAT SINK Temp≤ 55℃

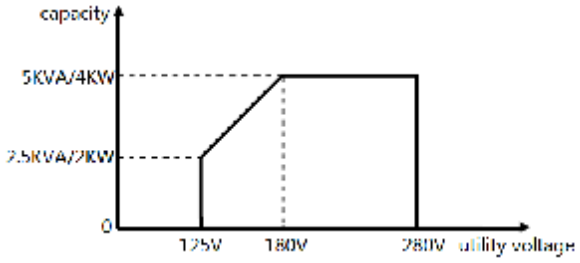
6	Output Abnormal	Inv. mode	(Output Voltage <170Vrms and output current under 32Arms) or Output Voltage >280Vrms	--	Beep continuously	Manual	--
7	Bus Over Protection	Standby/ Line/ Inv. mode	Bus voltage over/ AC Input and output reconnect	--	Beep continuously	Manual	--
11	SCC charger Current Over FAULT	SCC	SCC charger current over 60A(5k)	--	Beep 1time/2Second	Manual	--
12	SCC over temp.	SCC	SCC NTC Temperature over 85℃(5k)	--	Beep 1time/2Second	Manual	--
13	SCC Output voltage Over	SCC	SCC Output voltage over 60V(5k)	--	Beep 1time/2Second	Manual/ Auto	SCC Output voltage low then 54V(5k)
14	SCC PV voltage Over	SCC	PV Input voltage over 150V(5k)	--	Beep 1time/2Second	Manual/ Auto	PV Input voltage low then 130V(5k)

Note: when SCC Fault, press ENTER Key will clear this fault message.

1) Unit will shut down after alarm for 1min, when unit on both fault mode and Switch-off mode.

2) Unit will shut down immediately without any alarm, when unit on Switch-on mode with low DC input.

SPECIFICATIONS

MODEL	5KVA
CAPACITY	5KVA/4KW
INPUT	
Input Voltage Waveform	Pure sine wave (utility or generator)
Nominal Input Voltage	230Vac
Input voltage range	170Vac-280Vac(UPS); 125Vac -280Vac(Appliances)
Max AC Input Voltage	300Vac RMS
Nominal Input Frequency	50Hz / 60Hz (Auto detection)
OUTPUT	
Wave form	Pure sine wave (Inverter mode)
Voltage Regulation (Inverter Mode)	230Vac±5%
Output Frequency	50Hz / 60Hz ± 1Hz
Nominal Efficiency	93% peak (Inverter mode) 95% typical (Line mode)
Capable of starting electric motor	1.5HP
Power Factor	0.8
Over-Load Protection	Tripped off after 5s@>=150% load Tripped off after 10s@110%~150% load
Transfer Time (AC to DC)	UPS Mode : 10ms (typical) 15ms (max) Appliance Mode: 20ms (typical) 40ms (max)
Power Limitation	
BATTERY	
Battery Voltage	48Vdc
Battery low alarm voltage	42.0Vdc
Battery low shut-down voltage	40.0Vdc
AC CHARGER	
Charger Current	10A/15A/25A/35A selectable

Boost charger voltage (Battery Type)	Flooded Battery	58.4Vdc
	AGM / Gel Battery	56.4Vdc
Floating charger voltage (Battery Type)		27.4Vdc
Over Charge Voltage		60.0Vdc
SOLAR CHARGER MODULE (MPPT)		
Max Charger current		60A
Charger Power		3000W
System DC Voltage		48.0Vdc
Operating Voltage Range		60~150Vdc
Max. PV Array Open Circuit Voltage		150Vdc
AUDIBLE ALARM		
Low Battery at Inverter Mode		Beeps 1 time every 2s
Overload		110%~150%load: beep 10 times every 0.5s; >150% load: beep 5times every 0.5s then fault.
Fault		Beeps continuously
PHYSICAL		
Dimension(D*W*H)mm		486mm*317mm*105mm
Net weight		11.6KG

General Specification

Safety Certification	CE EN62040-1: 2008
EMC Classification	EN62040-2, C2
Operating Environment	-10°C to 50°C; 5% to 95% non-condensing
Altitude, operational	Elevation: 0~1500 Meters
Storage temperature	-15°C ~ 60°C

TROUBLE SHOOTING

Problem	Possible Causes	Remedy
No LCD display	1. Battery weak	1. Re-charge battery
	2. Battery defective (can't be charged)	2. Battery replacement
	3. Power switch is not pressed	3. Press and hold power switch
	4. Battery polarity reversed, can't start up the unit	4. Contact dealer or supplier for service
Mains normal but works in inverter mode	1. AC Input is missing	1. Check AC input connection
	2. Input protector tripped off	2. Reset the input protector
PV input normal but works in inverter mode	1.PV weak	1.Check PV power or reduce loading
	2.PV input is missing	2.Check PV input connection
Alarm buzzer beeps continuously	1. Overload (fault code: F2)	1. Reduce loading so the loads' capacity is no larger than the upper limit
	2. Output short-circuited (fault code: F3)	2. Check wiring or remove abnormal load
	3. Inverter over-temperature (fault code: F5)	3. Check the ventilation at installed location and make sure the air vent of inverter is clear
	4. Over charging (fault code: F1)	4. Restart the unit, If the fault persists, contact dealer or supplier for service.
	5. Fan error (fault code: F4)	5. Check if the fan is blocked by obstacle. if not, contact dealer or supplier for service
	6. DC voltage is under low DC shut-down point (fault code: F0)	6. Make sure mains is normal to recharger the battery
	7. Output abnormal (fault code: F6)	7. Contact dealer or supplier for service
	8. Back-EMF (fault code: F7)	8. Check the AC Input and output wire connection
	9.SCC output over current (fault code: F11)	9.Check wiring or remove abnormal load

	10.SCC over temp(fault code: F12)	10. Check the ventilation at installed location and make sure the air vent of inverter is clear
	11.SCC Output over voltage(fault code: F13)	11. Restart the unit. If the fault persists, contact dealer or supplier for service
	12.SCC PV input over voltage (fault code: F14)	12.Check PV input voltage. If the voltage is normal, contact dealer or supplier for service
Back up time is shortened	1. Overload	1. Reduce the loading
	2. Battery voltage is too low	2. Charge battery for 8 hours or more
	3. Battery bank is too small	3. Increase battery bank capacity

Note: If the unit fails to operate properly after installation and the setup has been re-examined thoroughly, use the troubleshooting table to determine the probable cause and remedy. For unlisted faults, please contact your local dealer or supplier for service assistances.

Appendix: Approximate Back-up Time Table

Model	Load (VA)	Backup Time @ 48Vdc 100Ah (min)	Backup Time @ 48Vdc 200Ah (min)
5KVA	500	613	1288
	1000	268	613
	1500	158	402
	2000	111	271
	2500	90	215
	3000	76	182
	3500	65	141
	4000	50	112
	4500	44	100
	5000	40	90