PNI GreenHouse SC3000B
User manual

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Troubleshooting Guide

Troubleshooting contains information about how to troubleshoot possible error conditions while using the any Power Inverter with Charger.

The following chart is designed to help you quickly pinpoint the most common inverter failures.

Problem	Possible cause	Solution
battery Low voltage	run out of battery	continue to charge battery full
	Battery down to or below 10V while machine switched off, then battery is damaged.	change battery
battery Over voltage	machine fault/battery connection fault	turned off inverter, remove some loads
Over voltage	connected more loads	start power of motor load is huge,3-4 times of load itself, pls choose the correct load
	connected big motor load	Keep free space around the battery
over tempterature	There is not enough free space around the battery	Check if fan is working normally
	machine does not turn off but overload	remove some loads
Over charge	machine fault/machine "select" switch at wrong position	set "select "switch at correct position
without output	red power button wrong	Check position of the red power button
	Wire connection inside machine is incorrect	Check if LED lights are correct to make sure the wire connection inside is OK.
	machine components damaged	open machine case to check components
without charge	machine "select" switch at wrong position	set "select "switch at correct position
	Wire connection inside machine isincorrect	Check if LED lights are correct to make sure the wire connection inside is OK.
	Machine is not set at "AC Mode"	set at "AC mode"
Load light flashing	Load is less than 25W at power saver on	50W is better, so add more load until load light is back to normal.
Fan stops run	Fan blocked	check if somthing block fan, like insect, etc.
	Fan is jammed	Open the machine and find a white probe cable(on the cooling fin). Keep it at short-circuit, the small fan should be running again. If not, then there's something wrong with the fan.
Output short circuit	Load at short circuit	Check load carefully
	Mosfet broken	Check machine inside
Remark:1 KW to 3KW machine, the fan starts to run until temperature reaches 50-60 degrees.		
When a machine of 4kW to 6kW starts, the big fan runs simultaneously the small fan starts to run until the temperature reaches 50-60 degree.		

Need any support, contact our customer service

EU Simplified Declaration of Conformity
SC ONLINESHOP SRL declares that Solar inverter PNI GreenHouse SC3000B complies with the Directive EMC 2014/30/EU, Directive 2006/42/EC and LVD 2014/35/EU. The full text of the EU declaration of conformity is available at the following Internet address:
https://www.mypni.eu/products/7524/download/certifications

Warning code/Audible Alarm

Status	Item	Indicator on top cover				Buzzer
		CHARGER	LINE	INVERTER	Alarm	
Line Mode	CC	√	√	×	×	—
	CV	blink	√	×	×	—
	Float	blink	√	×	×	—
	Standby	×	√	×	×	—
Invert Mode	Inverter on	×	×	√	×	—
	Power saver	×	×	blink	×	—
Alarm Mode	Battery Low	×	×	√	×	Beep 0.5s every 5s
	Battery High	×	×	√	×	Beep 0.5s every 1s
	Over load on invert mode	×	×	√	×	Refer to "Audible alarm"
	Over Temp on invert mode	×	×	√	×	Beep 0.5s every 1s
	Over Temp on line mode	√	√	×	×	Beep 0.5s every 1s
	Over charge	√	√	×	×	Beep 0.5s every 1s
Fault Mode	Fan lock	×	×	×	√	Beep continuous
	Battery High	×	×	×	√	Beep continuous
	Inverter mode over load	×	×	×	√	Beep continuous
	Over Temp	×	×	×	√	Beep continuous
	Over charge	×	×	×	√	Beep continuous
	Back Feed Short	×	×	×	√	Beep continuous

Remark: shows the indicator on. shows the indicator. , blink shows the indicator blinking about 0.5s off.

Important Safety Information

⚠️ **WARNING!**

This manual contains important instructions for all Inverter/Charger models that shall be followed during installation and maintenance of the inverter.

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

General Safety Precautions
1 .Before installing and using the Inverter/Charger, read all instructions and cautionary markings on the Inverter/Charger and all appropriate sections of this guide be sure to read all instructions and cautionary markings for any equipment attached to this unit.
2. This unit is designed for indoor use only. Do not expose the Inverter/Charger to rain, snow, or spray.
3. To reduce risk of fire hazard, do not cover or obstruct the ventilation openings. Do not install the Inverter/Charger in a zero-clearance compartment. Otherwise overheating may occur.
4. Use only attachments recommended or sold by the manufacturer. Doing otherwise may result in a risk of fire, electric shock, or injury to persons.
5. To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that wire is not undersized. Do not connect the Inverter/Charger with damaged or substandard wiring.
6. Do not operate the Inverter/Charger if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the Inverter/Charger is damaged, read the Warranty section.
7.Do not disassemble the Inverter/charger. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the Inverter/Charger yourself may result in a risk of electrical shock or fire. Internal capacitors remain charged after all power is disconnected.
8. The Inverter contains more than one live circuits (batteries and AC line).Power may be present at more than one source. To reduce the risk of electrical shock, disconnect both AC and DC power from the Inverter/Charger before attempting any maintenance or cleaning or working on any circuits connected to the Inverter/Charger. Turning off controls will not reduce this risk.
9. Use insulated tools to reduce the chance of short-circuits when installing or working with the inverter, the batteries, or PV array.

Precautions When Working with Batteries
1 .Make sure the batteries are well ventilated to the environment around. 2. Never smoke or allow a spark or flame near the engine or batteries.
3. Use caution to reduce the risk of dropping a metal tool on the battery. It could spark or short circuit the battery or other electrical parts and could cause an explosion.

4. Remove all metal items, like rings, brace lets, and watches when working with lead-acid batteries. Lead-acid batteries produce a short circuit current high enough to weld metal to skin, causing a severe burn.

5. Make sure someone is close enough to aid you if danger occur when you're working near a lead-acid battery.

6. Prepare enough fresh water and soap in case battery acid contacts skin, clothing, or eyes.

7. Wear complete eye protection and clothing protection. Avoid touching your eyes while working near batteries.

8. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flood it with cold water and get medical attention immediately.

9. If you need to remove a battery, always remove the grounded terminal from the battery first. Make sure all accessories are off so you don't cause a spark.

10. Always use identical types of batteries.

11 .Never install old or untested batteries. Check each batteries date code label to ensure age and type.

12. Batteries are temperature sensitive. For optimal performance, the should be installed in as table temperature environment.

13. Always recycle old batteries. Contact your local recycling center for proper disposal information.

General Information

Thank you for purchasing the Inverter/Charger.

The inverter is a combination of an inverter, charger, solar charger.

It is packed with unique features and it is one of the most advanced inverter/charger in the market today.

· The inverter features an AC bypass circuit, powering your home appliances from utility or generator power while charging the battery. When utility power fails, the battery backup system keeps your appliances powered until utility power is restored. Internal protection circuits prevent over-discharge of the batteries by shutting down the inverter when a low battery condition occurs. When utility or generator power is restored, the inverter transfers to the AC source and recharges the batteries.

· The series inverter can also serve as a central hub of renewable energy system. Set the series inverter to battery priority mode, designates the inverter-preferred UPS configuration.

· In this configuration, the load power is normally provided by the inverter, However, if the inverter output is interrupted, an internal transfer switch automatically transfers the load from the inverter to commercial utility power. The transfer time between inverter and line is short (6ms typical),and such transfers are normally not detected by even highly sensitive loads. Upon restoration of Battery capacity, the inverter will transfer back to inverter power.

· In the line priority mode, when utility power cuts off (or falls out of acceptable range), the transfer relay is de-energized and the load is automatically transferred to the inverter output.

· Once the qualified utility power is restored, the relay is energized and the load is automatic reconnected to utility power.

· The inverter is equipped with a powerful charger of up to 70Amp (depending on Mode). The overload capacity is 125%-150% of continuous output for up to 20 seconds to reliably support tools and equipment longer.

· Another important feature is that the inverter can be easily customized to solar priority by a DIP switch, this helps to extract maximum power from solar in renewable energy systems.

· To get the most out of the power inverter, it must be installed, used and maintained properly. Please read the instructions in the manual before installing and operating.

The AC priority and battery priority switch is SWS. When you choose battery priority, the inverter will draw DC energy from battery despite the AC input. Only when the battery voltage is reaches low voltage alarm point (11 .5V for 12V).the inverter transfers to AC input, charges battery, and switches back to battery when battery is fully charged. This function is mainly for wind/solar systems taking utility power as back up.

Other features

Battery voltage recover start

After low battery voltage shut off (10.5V for 12V model /20V for 24V model /40V for 48V model),the inverter is able to restore operation after the battery voltage recovers to 13VDC /26VDC/52VDC (with power switch still in the "On" position). This function helps to save the users extra work reactivating the inverter when the low battery voltage returns to an acceptable range in the renewable energy systems. The built in battery charger will automatically reactivate as soon as city/generator ac has been stable for 15 seconds.

Important:

Battery Type Setting BATTERY TYPE SELECTOR	Switch setting	Description	Boost			Float		
			Voltage			voltage		
			12V	24V	48V	12V	24V	48V
	0	Battery prefer mode	Low trip to AC model 11.5V/23V/46V			High trip to battery 13.5V/27V/54V		
	1	Gel USA	14.0	28.0	56.0	13.7	27.4	54.8
	2	AGM 1	14.1	28.2	56.4	13.4	26.8	53.6
	3	AGM 2	14.6	29.2	58.4	13.7	27.4	54.8
	4	Sealed lead acid	14.4	28.8	57.6	13.6	27.2	54.4
	5	Gel EURO	14.4	28.8	57.6	13.8	27.6	55.2
	6	Open lead acid	14.8	29.6	59.2	13.3	26.6	53.2
	7	Calcuim	15.1	30.2	60.4	13.6	27.2	54.4
	8	De sulphation	15.5	31.0	62.0	4 hours then off		
	9	Not used	-	-	-	-	-	-

Fault recovery	By restart the machine
FAN Operation	
Fan Operation	Variable speed fan operation is required in invert and charge mode. This is to be implemented in such a way as to ensure high reliability and safe unit and component operating temperatures in an operating ambient temperature up to 50°C. · Speed to be controlled in a smooth manner as a function of internal temperature and/or current. · Fan should not start/stop suddenly. · Fan should run at minimum speed needed to cool unit. Fan · noise level target <60db. The fan logic as below:

Condition	Condition	Speed	Recovery	Recovery Speed
Load% (Inverter mode	Start up	20%		
	Load>53%	80%	Load<50%	20%
	Load>80%	100%	Load<76%	80%
Heat sink Temperature	Start up	20%		
	T≥52°C	40%	T<45°C	20%
	T≥68°C	100%	T<60°C	40%
	T>100°C	Overtenperature alarm	T≤94°C	100%

Auto generator start (AGS)

There is an extra connector in front of the inverter used to start the generator. If the utility power is abnormal and single battery discharges below 11 Vdc, the inverter will send out a signal to the cable of the connector which is cascaded to the control circuit of the generator, owing to this the control circuit will get through and then generator will be started. if single battery is charged higher than 13.5Vdc,the signal will disappear to make the generator keeping closed again.

BTS	Battery temperature sensor (optional)	Variances in charging voltage&S.D. voltage base on the battery temperature.

Setting Sine

On the rear panel of inverter, there are 5 DIP switches which enable users to customize the performance of the device.

Table dip switch function setting

DIP switch NO	Switch function		Position:1	Position:0
SW1	Low battery trip volt		10.5VDC	11.0VDC
			*2 for 24VDC, *4 for 48VDC	
SW2	AC input range/ (AVR)	120VAC	75-140VAC	95-140VAC
		230VAC	145-272VAC	185-272VAC
SW3	Power saver auto setting		Detect load per 5secs	Detect load per 30secs
SW4	O/P frequency setting		50Hz	60Hz
SW5	Solar/AC priority setting		Utility priority	Solar priority

SW1:Low battery trip volt:

For 12VDC model ,the Low battery trip volt is set at 10.5VDC by typical deep cycle lead acid battery. It can be customized to 11.0VDC using SW 1 for sealed car battery, this is to prevent batteries from over-discharging while there is only a small load applied on the inverter.
(*2 for24VDC, "4 for 48VDC)

SW2: AC input range:

There are different acceptable AC input ranges for different kinds of loads.
For some relatively sensitive electronic devices, a narrow input range of 185-272VAC (95- 140 VAC for 120VAC model) is required to protect them.
While for some resistive loads which work in a wide voltage range, the input AC range can be customized to 145-272VAC (75-140VAC for 120VAC model), this helps to power loads with the most AC input power without frequent switches to the battery bank.

SW3: Power saver auto setting:

By default the inverter is set to detect the load for 250ms every 5 seconds. This cycle can be customized to 30seconds through the SW3 on the DIP switch.

SW4: O/P frequency setting:

Set the inverter frequency in battery mode.

SW5: Solar/AC priority:

Our inverter is designed with AC priority by default. This means, when AC input is present, the battery will be charged first, and the inverter will transfer the input AC to power the load. Only when the AC input is stable for a continuous period of 15 days, the inverter will start a battery inverting cycle to protect the battery. After 1 cycle normal charging and ac through put will be restored.

Application

Power tools-circular saws, drills, grinders, sanders, buffers, weed and hedge trimmers, air compressors.
Office equipment such as computers, printers, monitors, facsimile machines, scanners.
Household items-vacuum cleaners, fans, fluorescent and incandescent lights, shavers, sewing machines.
Kitchen appliances-coffee makers, blenders, ice markers, toasters.
Industrial equipment-metal halide lamp, high-pressure sodium lamp.
Home entertainment electronics-television, VCRs, video games, stereos, musical instruments satellite equipment.

Features

· Pure sine wave output
· Configure inbuilt MPPT solar charge controller 40A~60A
· AC/Battery priority Via function switch
· Auto generator start(AGS)
· Max. AC charge current 70A.(Optional)
· Inbuilt pure copper transformer
· Low battery trip volt 10.5V/11.0V
· 50HZ/60HZ sense automatically
· RS232 with free CD

Basic System Architecture

The following illustration shows basic application for this inverter. It also includes following devices to have a complete running system:
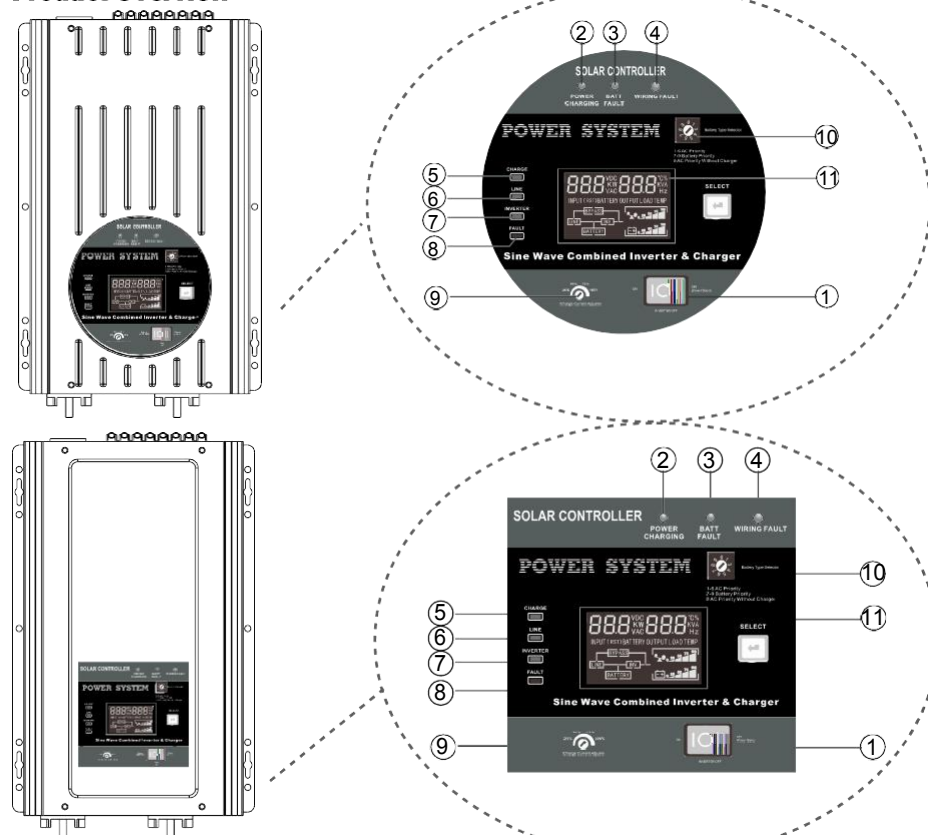   Generator or Grid. Battery
Consult with your system integrator for other possible system architectures depending on your requirements.
This inverter can power all kinds of appliances in home or office environment, including motor-type appliances such as tube light, fan, refrigerator and air conditioner.
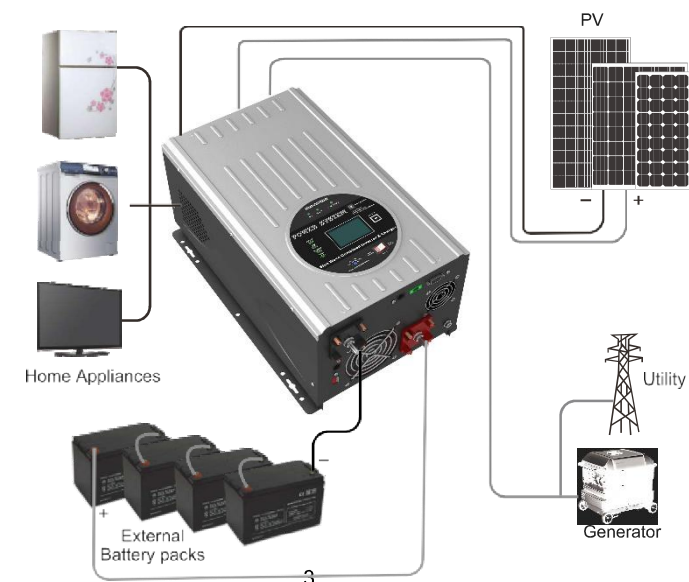
Product Overview

1. Switch ON/OFF
2. Power ON/Charging indicator
3. Fault and warning indicator
4. Wiring fault indicator
5. AC Charge
6. AC power on
7. Inverter mode
8. Fault
9. Charge Current Adjuster:25%,50%,75%,100%. (Optional)
10. Battery Type Selector
11. LCD display

Audible Alarm

Battery Voltage Low	Inverter green LED Lighting, and the buzzer beep 0.5s every 5s
Battery Voltage High	Inverter green LED Lighting, and the buzzer beep 0.5s every 1s, and Fault after 60s.
Inverter Mode Over-Load	110%< load<125%, no audible alarm in 2 minutes, and Fault after 2 minutes. 125% <load<150%, beeps 0.5s every 1s, and Fault after 20s. Load>150%, beeps 0.5s every 1s, and Fault after 2s.
Over Temperature	Heat sink temp. ≥105°C, Over temp red LED Lighting, beeps 0.5s every 1s.

Line Mode

When utility is the unit the battery from the utility, LCD indicate charge current:
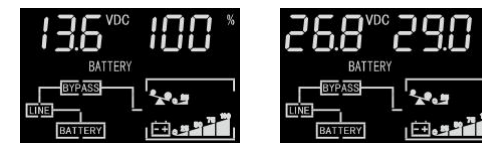
In utility mode the unit provide output power from the utility, the indication and displays are following figures:
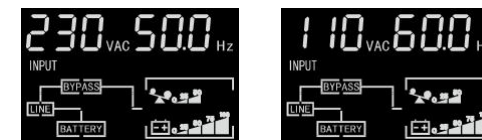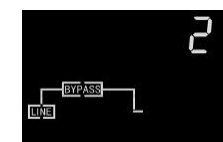

Battery Mode

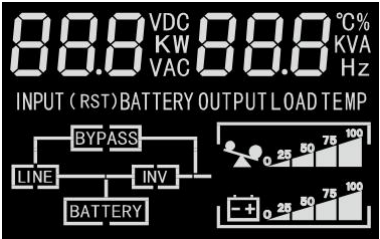In battery mode the unit will provide output power from battery or PV, LCD indicate battery capacity

Fault Mode

When inverter fault, the indication and displays are as following figures:

1: fan jam
2: overload
3/6/7: output short circuit 4: over temperature
8/9: battery over voltage.

LCD Display Icons

Icon	Function description
Inverter input / output parameters Information	
	1. Indicate input voltage, input frequency, battery voltage and charger current. 2. Indicate output voltage, output frequency, load in VA, load in W.
Inverter Work Status Information	
	Inverter work status display, output and bypass mains electricity charge, the inverter output of the inverter power saving mode status display.
Load Information	
	Indicates load level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.
Battery Information	
	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.

Switch	ON(Power Saver)	Power on with saver mode (power saver ≦25W)
	INVERTER OFF	Power totally off (If there is AC power Inverter have charger function)
	ON	Power on without saver mode
Protection		
Over Temperature Protection	Heat sink temp. ≥105°C, Fault (shutdown Output) after 30 seconds	
Back-Feed Protection	Yes	
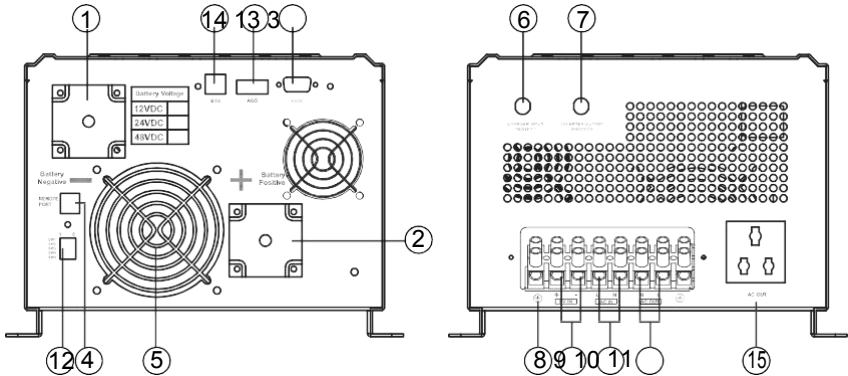
1. BAT -
2. BAT +
3. RS232 communication port
4. Remote port
5. FAN
6. AC input/Bypass breaker
7. AC output breaker

8. GND
9. PV1 input
10. AC input
11. AC output
12. Function Switch(SW1~SW5)
13. AGS
14. BTS
15. AC Output 10A(MAX)

INSTALLATION

Unpacking and Inspection

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

|		
The unit x 1	RS485 Line x 1(Option)	RS232 Line x 1
User manual x 1	BTS Line x 1(Option)	
CD x 1	Remote Line x 1(Option)	

Preparation

Before connecting all wirings , please take off bottom cover by removing eight screws as shown below
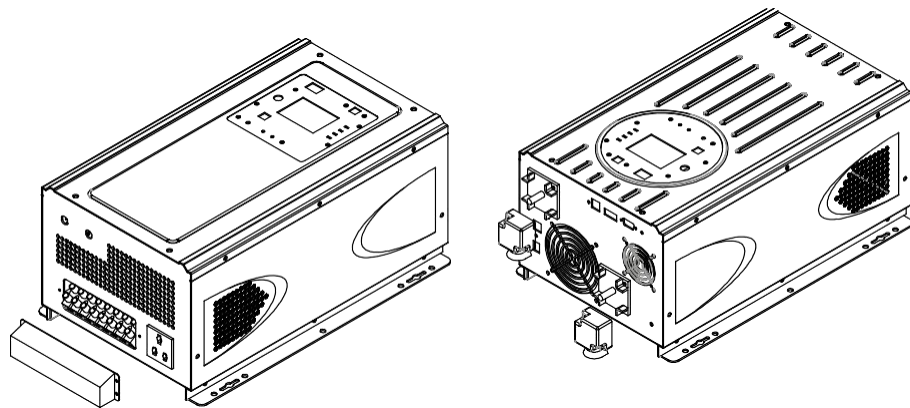
Mounting the Unit

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 read the LCD display clearly.
· For proper air circulation to dissipate heat, require a clearance about 50 cm to the side and 80 cm above and below the unit.
· The ambient temperature should be between $0°$C and $40°$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 tohave enough space for removing wires.
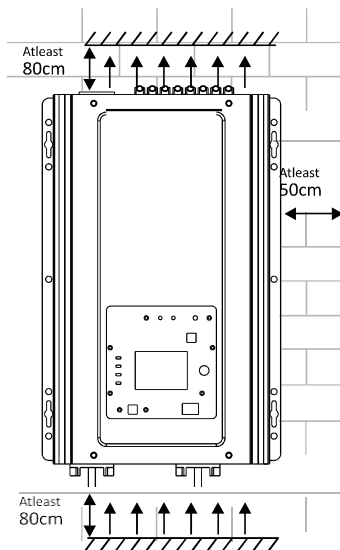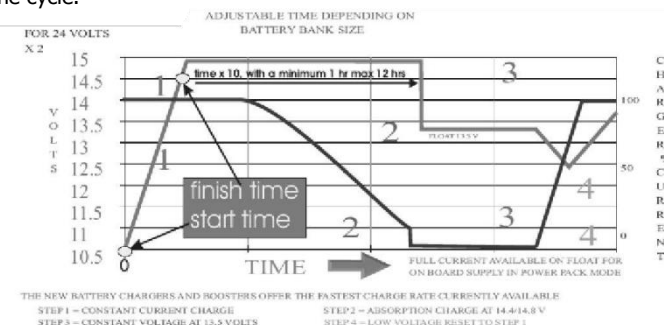
⚠ **SUITABLE FOR MOUNTING ON CONCRETE OROTHER NON-COMBUSTIBLE SURFACE ONLY.**

Atleast 80cm
Atleast 50cm
Atleast 80cm

Charge Mode Specifications

MODEL	1012	1024	1512	1524	2012	2024	3012	3024	3048	4024	4048	5024	5048	6024	6048
Nominal Input Voltage	110Vac/120Vac/220Vac/230Vac											220Vac/230Vac			
Input Voltage Range	96-132Vac/155-272Vac											155-272Vac			
Nominal Output Voltage)	Same as input voltage														
Nominal Charge Current	35A	20A	45A	25A	65A	35A	75A	45A	30A	65A	35A	70A	40A	75A	50A
Charge Current Regulation	Charge current adjustable: 25%, 50%, 75%, 100%. (Optional) 10-														
Battery initial voltage	15.7Vdc/20-31.4Vdc/40-62.8Vdc														
Charger Short Circuit Protection	Circuit breaker														
Circuit breaker	40A														
Over Charge Protection	Bat. V ≥15.7Vdc / 31.4Vdc, 62.8Vdc beeps 0.5s every 1s & fault after 60s.														
Charge Algorithm															
Algorithm	**Three stage:** Boost **CC** (constant current stage) Boost **CV** (constant voltage stage) Float → (constant voltage stage)														
Charge Stage Transition Definitions	◆ **Boost CC Stage:** If A/C input is applied, the charger will run at full current in CC mode until the charger reaches the boost voltage. ◆ Software timer will measure the time from A/C start until the battery charger reaches 0.3V below the boost voltage, then take this time asT0 and T0×10 = T1. ◆ **Boost CV Stage:** Start a T1 timer; the charger will keep the boost voltage in Boost CV mode until the T1 timer has run out. Then drop the voltage down to the float voltage. The timer has a minimum time of 1 hour and a maximum time of 12 hours. ◆ **Float Stage:** In float mode, the voltage will stay at the float voltage. If the A/C is reconnected or the battery voltage drops below 12Vdc/ 24Vdc, the charger will reset the cycle above. ◆ If the charge maintains the float state for 10 days, the charger will reset the cycle.														

ADJUSTABLE TIME DEPENDING ON BATTERY BANK SIZE
FOR 24 VOLTS X 2
time x 10, with a minimum 1 hr max 12 hrs
VOLTS
finish time
start time
TIME
FULL CURRENT AVAILABLE ON FLOAT FOR ON BOARD SUPPLY IN POWER PACK MODE
CHARGER % CURRENT

THE NEW BATTERY CHARGERS AND BOOSTERS OFFER THE FASTEST CHARGE RATE CURRENTLY AVAILABLE
STEP 1 – CONSTANT CURRENT CHARGE   STEP2 – ABSORPTION CHARGE AT 14.4/14.8 V
STEP 3 – CONSTANT VOLTAGE AT 13.5 VOLTS   STEP 4 – LOW VOLTAGE RESET TO STEP 1

Inverter Mode Specification

MODEL	1012	1024	1512	1524	2012	2024	3012	3024	3048	4024	4048	5024	5048	6024	6048
Output Voltage Waveform	Pure Sine wave														
Rated Output Power (VA)	1000VA		1500VA		2000VA		3000VA			4000VA		5000VA		6000VA	
Rated Output Power (W)	1000W		1500W		2000W		3000W			4000W		5000W		6000W	
Power Factor	1.0														
Nominal Output Voltage (V)	110Vac/120Vac/220Vac/230Vac ± 10%									220Vac/230Vac ± 10%					
Nominal Output Frequency (Hz)	60Hz ± 0.3Hz / 50Hz ± 0.3Hz														
Auto tracking Main Frequency (Hz)	Yes (Following Main first connection) 50Hz @40-80Hz 60Hz @40-80Hz														
Output Voltage Regulation	±10% rms														
Nominal Efficiency	>80%														
Over-Load Protection (SMPS load)	(110 %<load<125%)±10%: Fault (shutdown output) after 2 minutes; (125%<load<150%)±10%: Fault (shutdown output) after 20s; Load>150%±10 %: Fault (shutdown output) after 2 s														
Surge rating (10s)	3000VA		4500VA		6000VA		9000VA			12000VA		15000VA		18000VA	
Capable of starting electric motor	1HP						2HP					3HP			
Output Short Circuit Protection	Current limit (Fault after 10s)														
Nominal DC Input Voltage	12V	24V	12V	24V	12V	24V	12V	24V	48V	24V	48V	24V	48V	24V	48V
Min DC start voltage	11V/22V/44V														
Low Battery Alarm	11Vdc ± 0.3Vdc for 12V battery 22.0Vdc ± 0.6Vdc for 24V battery 44.0Vdc ± 0.6Vdc for 48V battery														
Low DC input Shut-down	10.5Vdc ± 0.3Vdc for 12V battery 21.0Vdc ± 0.6Vdc for 24V battery 42.0Vdc ± 0.6Vdc for 48V battery														
High DC input Alarm & Fault	16.0Vdc ± 0.3Vdc for 12V battery 32.0Vdc ± 0.6Vdc for 24V battery 64.0Vdc ± 0.6Vdc for 48V battery														
High DC input Recovery	15.5Vdc ± 0.3Vdc for 12V battery 31.0Vdc ± 0.6Vdc for 24V battery 62.0Vdc ± 0.6Vdc for 48V battery														
Power saver	Load ≤ 25W														

Install the unit by screwing four screws
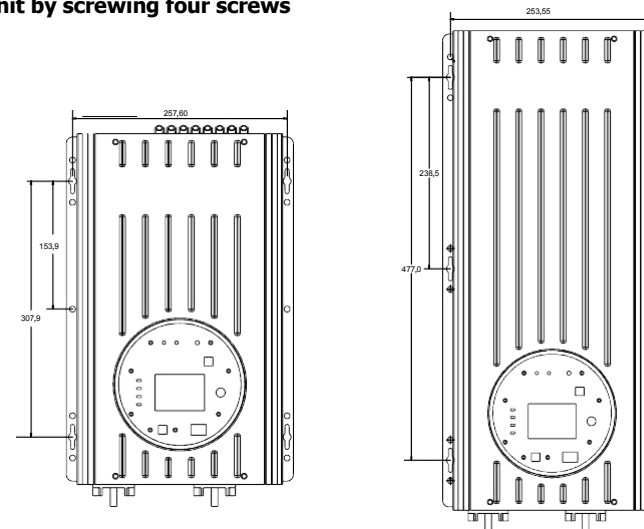
Battery Connection

CAUTION: For safety operation and regulation compliance, it's requested to install a separate DC over Current protector 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.

DC Wiring recommendation

It is suggested the battery bank be kept as close as possible to the inverter. The following ableis a suggested wiring option for 1 meter DC cable.

Please find the following minimum wire size. In case of DC cable longer than 1 m, please increase the cross section of cable to reduce the loss.

| Model	Battery Voltage	Wire gage/Min 0-1.0m	Model	Battery Voltage	Wire gage/Min 0-1.0m
1KW	12VDC	1*6AWG	4KW	24VDC	4*2AWG
1KW	24VDC	1*6AWG	4KW	48VDC	1*6AWG
1.5KW	12VDC	1*4AWG	4KW	48VDC	1*6AWG
1.5KW	24VDC	1*6AWG	5KW	24VDC	1*2AWG
2KW	12VDC	1*2AWG	5KW	24VDC	1*2AWG
2KW	24VDC	1*4AWG	5KW	48VDC	1*3AWG
3KW	12VDC	1*2AWG	6KW	24VDC	1*2AWG
3KW	24VDC	1*3AWG	6KW	24VDC	1*2AWG
3KW	48VDC	1*6AWG	6KW	48VDC	1*3AWG

One cable is always best, but cable is simply copper and all you require is the copper, so it does not matter if is one cable or 10 cables as long as the square area adds up. Performance of any product can be improved by thicker cable and shorter runs, so if in doubt round up and keep the length as short as possible.

Please follow below steps to implement battery connection:

1. Assemble battery ring terminal based on recommended battery cable and terminal size. 2. Connect all battery packs as units requires, It's suggested to connect at least 100Ah capacity battery for 1KW-3KW model, at least 200Ah capacity battery for 4KW-6KW model.

NOTE: Please only use sealed lead acid battery or sealed GEL/AGM lead-acid battery.

3. Insert the ring terminal of battery cable into battery connector of inverter and make sure the bolts are tightened with torque of 2-3Nm. Make sure polarity at both the battery and the energy storage inverter is correctly connected and ring terminals are tightly screwed to the battery terminals
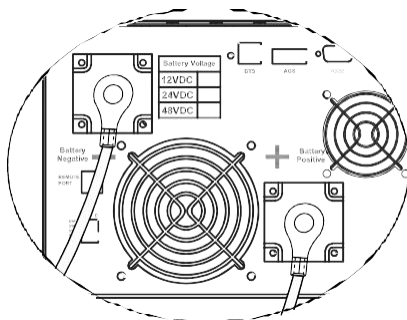
⚠	**WARNING:Shock Hazard** Installation must be performed with care due to high battery voltage in series.

⚠	**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 antioxidant substance on the terminals before terminals are connected tightly. **CAUTION!!** Before making the final DC connection or closing DC breaker/ dis-connector, 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. The recommended spec of AC breaker is 30A for 1KW-3KW,40A for 4KW-6KW.

CAUTION!! Please don't connect the output wring to "Grid" terminal or connect the grid wring to the "Load" terminal.

Electrical Performance

MODEL	1012 1024 1512 1524 2012 2024 3012 3024 3048 4024 4048 5024 5048 6024 6048	
Input Voltage Waveform	Sinusoidal (utility or generator)	
Nominal Input Voltage	110Vac/120Vac/220Vac/230Vac	220Vac/230Vac
Low Line Disconnect Low	96Vac ± 4% /155Vac ± 2%	155Vac ± 2%
Line Reconnect High Line	100Vac ± 8 % / 164Vac ± 2%	164Vac ± 2%
Disconnect High Line	132Vac ± 4%/ 272 Vac ± 2%	272 Vac ± 2%
Reconnect Max AC Input	127Vac ± 4% /265 Vac ± 2%	265 Vac ± 2%
Voltage Nominal Input	140Vrms/270Vrms	270Vrms
Frequency Low Line	50Hz/ 60Hz (Auto detection)	
Frequency Re-connect Low Line	44±0.3Hz for 50Hz	
Frequency Disconnect High Line	40±0.3Hz for 50Hz	
Frequency Re-connect High Line	75±0.3Hz for 50Hz	
Frequency Disconnect Output	80±0.3Hz for 50Hz	
Voltage waveform Over-Load	As same as Input Waveform	
Protection (SMPS load) Output Short	Circuit breaker	
Circuit Protection	Circuit breaker	
Efficiency (Line Mode)	>95%	
Transfer Time (Ac to Dc)	10ms (typical)	
Transfer Time (Dc to Ac)	10ms (typical)	
Pass through without Battery	YES	
Max Bypass Overload Current	120VAC 1-1.5KW 30A/2-4KW 40A 230VAC 1-3KW 30A/3-6KW 40A	

Table 2 Battery Charging

MODEL	60A	80A
Charging Algorithm	3-Step or 4-Step(LI)	
Charging stages	Bulk, Absorption, Float	
Temperature compensation coefficient	-5 mV/°C/cell(25°C ref.)	
Temperature compensation range	0°C to +50°C	
Temperature compensated set points	Absorption, Float	
Charging Set points	Absorption Stage	Float Stage
Flooded Battery	14.2V/28.4V/42.6V/56.8V	13.7V/27.4V/41.1V/54.8V
AGM/Gel/LEAD battery (Default)	14.4V/28.8V/43.2V/57.6V	13.7V/27.4V/41.1V/54.8V
Over-charging voltage	15.5V/30.0V/45.0V/60.0V	
Over-charging comeback voltage	14.5V/29.5V/44.5V/59.0V	
Battery defect voltage	10.0V/17.0V/25.5V/34.0V	
Charging Curve		

PV LED Indicator

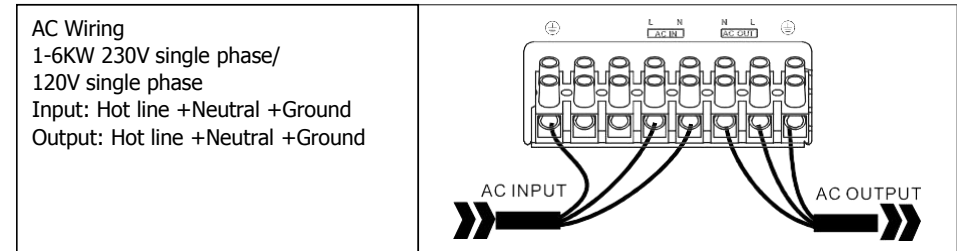|				
			Solid ON	The controller is on
			Flashing	The controller is charging
			Bulk charge stage	Flashing every 0.5 second
LED1	POWER CHARGING	Green	Absorption stage	Flashing every second
			Equalize stage	Flashing every 3 seconds
			Float stage	Flashing every 5 seconds
LED2	BATT FAULT	Yellow	Solid ON	Battery over range lighting
LED3	WIRING FAULT	Red	Solid ON	Fault occurs
			Flashing	Warning situation occurs

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 Grid connection. To reduce risk of injury, please use the proper recommended cable size as below.

AC Wiring
We recommend using 10-5Awg wire to the ac terminal block.
There are 3 different ways of connecting to the terminal block depending on the model. All the wirings are CE compliant, call our tech support if you are not sure about how to wire any part of your inverter.


AC Wiring
1-6KW 230V single phase/
120V single phase
Input: Hot line +Neutral +Ground
Output: Hot line +Neutral +Ground

Suggested cable requirement for AC wires

Model	Gauge	Torque Value
1-3KW	12AWG	1.2-1.6Nm
4-6KW	10AWG	1.4-1.6Nm

Please follow below steps to implement Load/Grid connection:
1. Before making Load/Grid 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 grid 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)**
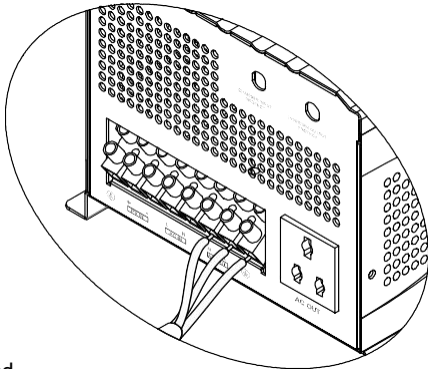**N Neutral (blue)**
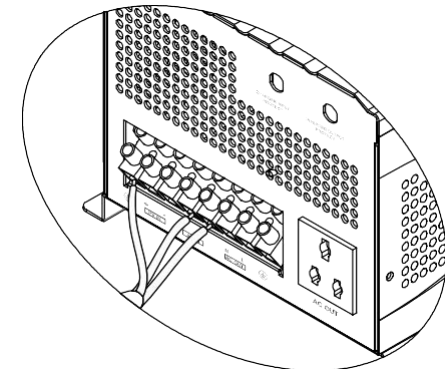
⚠	**WARNING:** Be sure that AC power source is disconnected before attempting to hardwired it to the unit

4. Then, insert Load 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)**

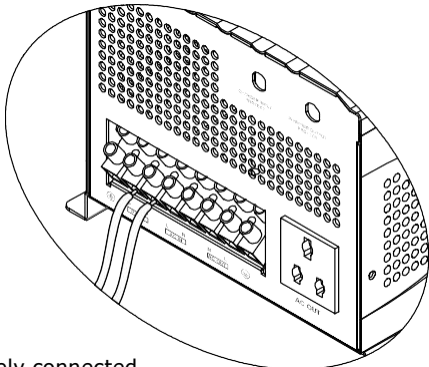5. Make sure the wires are securely connected.

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 will be triggered overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

PV CONNECTION

Please follow below steps tp implement PV module connection:
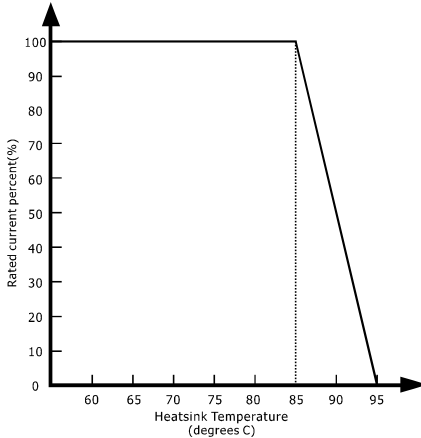1. Remove insulation sleeve 10 mm for positive and negative conductors.
2. Check correct polarity of connection cable from PV module and PV input conductors. Then connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative (-) of PV input connector.

3. Make sure the wires are securely connected.

SPECIFICATIONS

Table 1 Electrical Specifications

MODEL	60A		80A	
Nominal System Voltage	12V,24V, or 48V(Auto detection);36V(setting)			
Maximum Battery Current	60Amps		80Amps	
Battery Voltage	12V	24V	36V	48V
Maximum Solar Input Voltage	100V		145V	
PV Array MPPT Voltage Range	15~95V	30~130V	45~130V	60~130V
Maximum Input Power	12 Volt-940W 24 Volt-1880W 36 Volt-2820W 48 Volt-3760W		12 Volt-1250W 24 Volt-2500W 36 Volt-3750W 48 Volt-5000W	
Heatsink temperature &Battery current	*Rated current percent(%) vs Heatsink Temperature (degrees C) graph*			
Protections	Solar high voltage disconnect Solar high voltage reconnect Battery high voltage disconnect Battery high voltage reconnect High temperature disconnect High temperature reconnect			