PURE SINE WAVE SOLAR PCU INVERTER

300/600/850/1000/1500/
2000VA/3500/5000VA

USER MANUAL

ABOUT THIS MANUAL

Purpose

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

Scope

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

SAFETY INSTRUCTIONS

1. Before operating your Pure Sine Wave Inverter, please review the safety precautions outlined in this manual to ensure safe and trouble-free operation. It is essential to follow these guidelines to prevent accidents and protect yourself and others from harm.

2. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.

3. The inverter should be installed in a dry, well ventilated environment.

4. Do not expose the inverter to the heat, moisture, flammable, explosive, corrosive environment, dry cloth cleaning, and avoid water.

5. CAUTION – Only qualified personnel can install this device with battery.

6. Fuse/MCB is provided as over-current protection for the AC Mains supply.

7. GROUNDING INSTRUCTIONS -This inverter/charger should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulations to install this inverter.

8. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.

9. Warning!! Only qualified service persons are able to service this device. If errors still persist after following the troubleshooting table, please send this inverter back to the local dealer or service center for maintenance.

WARNING: This chapter contains important safety and operating instructions. Read and

keep this manual for future reference.

WARNING: FIRE HAZARD

Even if the inverter is switched off, there might be a spark when connected to a battery

(powerful 1000W-2000W inverters create a strong spark). This is normal and caused by capacitors in the inverter circuit which require initial charging at connection. Once charged, reconnection of the inverter within a short time frame should not cause a spark again.

INTRODUCTION

Welcome to the user manual for your "***LiGEN Power***" Pure Sine Wave Inverter! This manual is designed to provide you with all the necessary information to effectively and safely operate your inverter. This is a multi-function Inverter/Charger, combining the function of Inverter MPPT/PWM Solar charger and battery charger to offer uninterruptible power support with portable size.

Key Features

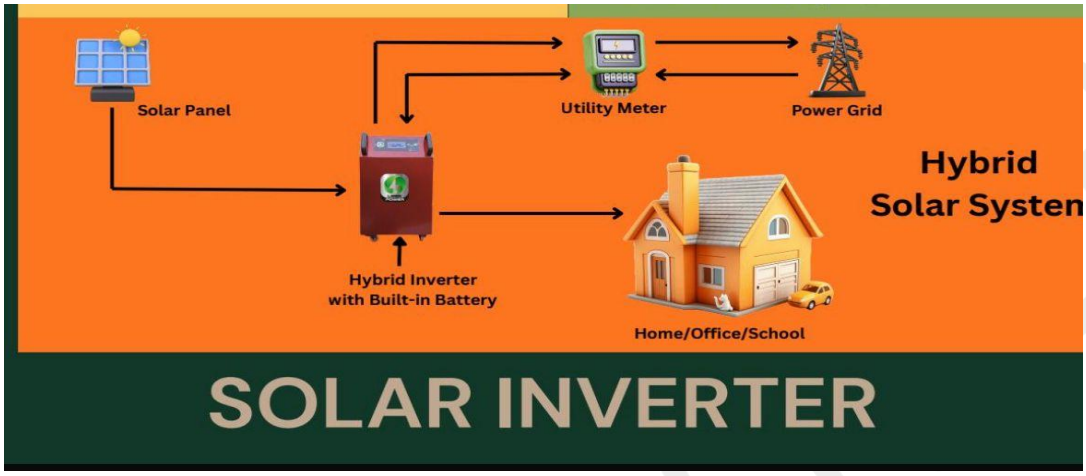
- Pure sine Wave Output: provides clean and stable power, suitable for sensitive electronics.
- Light on Weight & Ultra Long Life.
- Maintenance Free.
- No Fumes.
- Built-in MPPT/PWM solar controller.
- Smart battery charger (Priority to solar charging) design for optimized battery performance.
    - Auto switchover between Solar and Main charging. Simultaneous charging through mains as well as solar panels.
    - High Efficacy: optimized design for maximum energy conversion efficiency, minimizing energy wastage, Minimal no load current.
    - Overload/ Over temperature/ short circuit protection/Over & Under Voltage Protection: Built-in protection mechanisms to safeguard the inverter and connected devices from damage.
- Fast Charging.
- Automatic cooling fan operation.
- LCD Display for better user interface.
- User-Friendly Interface: Intuitive controls and indicators for easy monitoring and operation.
- Quiet Operation: Low-noise design for minimal disturbance during operation.

Basic System Architecture

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

- **Generator** or **Utility**.
- **PV (option)**

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



Hybrid Power System

Starting Operation

- Connect the male and female XT60/90/150 connectors or DC MCB in the ON position, as per the specific model. Connect the AC input of the inverter to the AC mains supply using either the supplied plug or the terminal block on the back panel, depending on the model. Connect the load to the female socket or terminal block located on the back panel of the inverter, as per the model. Finally, connect the PV terminal to the PV terminal block on the inverter's back panel and switch the PV MCB to the ON position.
- Use appropriately rated wires to connect all wiring terminal blocks on the inverter's back panel
- After connecting the XT60/90/150 connector or switching the DC MCB to the ON position, two beep sounds (from the Inverter/UPS and MPPT/PWM) will be heard from the buzzer with a short delay. The inverter will then enter Setup Mode. The message 'Enter Setup' will appear on the inverter LCD. After a few seconds, the inverter status will be displayed on the LCD, and the inverter will be ready for operation.
- After connecting the XT60/90/150 connector or switching the DC MCB ON, turn the PV MCB ON later, not before.
- Press the power button or switch on the front control panel of the inverter to turn it ON. After powering ON, the inverter will perform a self-check routine to verify proper operation.
- Observe the LCD display on the control panel of the inverter unit as well as on the MPPT unit.
- The primary LCD display provides essential information about the inverter's operating status, including power status, battery voltage, AC input and output status, charging current, load wattage, temperature (°C), overload conditions, over-temperature conditions, and fault notifications.
- The secondary LCD display provides detailed information about the MPPT's operating status, including MPPT ON/OFF status, array voltage, array current, battery voltage, battery current, charging status (Battery Full/Charging), daily energy generation (kWh), and cumulative

energy generation (kWh).

- In models with PWM technology, LED indicators (SR, BR, and PR) are used instead of an LCD display. The inverter LCD display is common to both MPPT and PWM models. The PWM model features three LEDs—Red, Green, and Yellow—to indicate solar status. SR (Yellow LED) indicates solar charging; it blinks during charging, with faster blinking when the battery is deeply discharged and slower blinking when the battery is full or nearly full. BR (Green LED) indicates that the PWM is connected to the battery. PR (Red LED) indicates PWM operation status when solar power is available; otherwise, it remains OFF.
- After powering ON, the system can operate a load solely on battery power in the event of a power outage. During the day, it primarily uses solar power to supply the load. If the solar power is insufficient, the deficit is supplied by the battery.
- When both AC mains and solar power are available, the system prioritizes battery charging during the daytime using solar energy. The battery continues to charge via solar power until it reaches full charge voltage. Once fully charged, the system switches to inverter mode, supplying power to the load directly from the battery, ensuring that AC mains power is not used as long as solar energy is sufficient. If the battery becomes fully discharged, the system automatically shifts to mains mode, where both the load and battery charging are supplied through the AC mains. This operation ensures that solar power is always utilized first, with AC mains serving as a backup only when solar energy is insufficient.
- The system will draw power from solar, battery, or both, depending on the load requirement and the solar power generated, to ensure continuous operation of the load. The load will continue to operate uninterrupted in the event of a power failure (solar, grid, or both), provided the inverter power button is turned ON. If the inverter is not turned ON, the load will be interrupted.
- Keep the inverter power turned ON to ensure proper and seamless switching between mains, solar, and inverter modes.
- After turning ON the PV MCB, always keep the inverter power button ON; otherwise, in some models, the MPPT may shut down due to overheating and will only restore after it cools down.
- There is a slider switch on the back panel of the inverter cabinet. Keep it in the ON position only when solar power is very weak, such as during cloudy or rainy weather; otherwise, keep it OFF to save grid power and reduce your electricity bill. After powering ON, this slider switch activates hybrid mode, allowing the battery to be charged by both grid and solar power.
- Manual Bypass (Applicable only for models above 600VA)
- Use bypass mode as a temporary solution while addressing an inverter malfunction. Once the inverter is repaired or replaced, switch back to normal operation mode to utilize its full functionality.
- The above steps complete the functional test of the inverter. If all checks pass, the system is ready for use. If any issue occurs, identify the cause before proceeding or contact the service center.

Note: ***When powerful appliances are connected to the inverter, the battery voltage drops more quickly, triggering a low battery shutdown sooner. This means that even after shutdown, there may still be power remaining in the battery. Conversely, lighter loads allow for deeper battery discharge before shutdown. It's important to consider connected appliance power requirements to optimize battery usage.***

Product Overview

1. LCD Display (Inverter)
2. LCD Display (Solar)
3. ON/OFF Metallic Switch
4. Fan Vent (Back)
5. Fan Vent (Side)
6. MCB/FUSE (AC)
7. 6A/16A Black Color Socket (AC Out)/AC OUT (3 Way Terminal Block)
8. AC IN (with 6A/16A Male Top)/AC IN (3 Way Terminal Block)
9. XT 60/90/150 Male Female Connector/DC MCB
10. PV in (2 Wat Terminal Block)
11. PV MCB
12. Manual Bypass Switch
13. Hybrid Slider 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

Mounting /Placement of Unit

Consider the following points before selecting where to install:

- Do not place the inverter on flammable
- Place on a solid surface
- Place this inverter at eye level in order to allow the LCD display to be read at all times.
- The ambient temperature should be between 0°C and 50°C to ensure optimal operation.
- Be sure to keep other objects and surfaces away from the cooling fan to guarantee sufficient heat dissipation. Keep a maintained distance at least 20cm.

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 miss-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 below.

AC Input & Output wiring Table - All Models (300VA to 5000VA)

Single consolidated table for installation manual

Model (VA)	AC Input Breaker	AC Output Breaker	Input wire (≤10m)	Input wire (10-20m)	Input wire (20-30m)	Output wire (≤10m)	Output wire (10-20m)	Output wire (20-30m)
300VA	6A	6A	1.0 mm²	1.0 mm²	1.0 mm²	1.0 mm²	1.0 mm²	1.0 mm²
600VA	6A	6A	1.0 mm²	1.0 mm²	1.5 mm²	1.0 mm²	1.0 mm²	1.5 mm²
850VA	6A	6A	1.0 mm²	1.0 mm²	1.5 mm²	1.0 mm²	1.0 mm²	1.5 mm²
1000VA	6A	6A	1.0 mm²	1.0 mm²	1.5 mm²	1.0 mm²	1.0 mm²	1.5 mm²
1500VA	10A	6A	1.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²	1.5 mm²	2.5 mm²
2000VA	10A	10A	1.5 mm²	2.5 mm²	4.0 mm²	1.5 mm²	2.5 mm²	4.0 mm²
3500VA	(20-25)A	16A	2.5 mm²	4.0 mm²	6.0 mm²	2.5 mm²	4.0 mm²	6.0 mm²
5000VA	(25-32)A	25A	4.0 mm²	6.0 mm²	10.0 mm²	4.0 mm²	6.0 mm²	10.0 mm²

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

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 powering.

CAUTION:
Appliances such as air conditioners 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 the manufacturer of the air conditioner if it's equipped with a time-delay function before installation. Otherwise, this inverter/charger will trigger an overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

Please follow below steps to implement AC input/output connection:
1. Before making an AC input/output connection, be sure to use a DC protector or disconnector first.
2. Insert AC Input/Output wires according to polarities indicated on the terminal block and tighten the terminal screws. Be sure to connect the PE protective conductor first.
3. Make sure the wires are securely connected.

⏚ Ground (Green) **L -** Line (Red) **N** - Neutral (Black)

PV Connection

CAUTION: Before connecting to PV modules, please install separately a DCDB circuit breaker between inverter and PV modules
WARNING! All wiring must be performed by a qualified personnel.
WARNING! It" very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below

Model	Typical Amperage	Cable Size
300VA/600VA/850VA/ 1000VA/1500VA/2000VA/ 3500VA/5000VA	**PV Array String:** Typically, 15A DC **PV Array (Home Run):** Typically, 50A DC	**DC Cable (String):** 4.0 mm² Cu, UV resistant, 1.5KV DC, Red/Black **DC Cable (Home Run):** 10.0 mm² Cu, UV resistant, 1.5KV DC, Red/Black

PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:
1. Open circuit Voltage (Voc) of PV modules does not exceed 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	**0.3KVA - PWM**	**0.6/0.85/1.0KVA - PWM**	**1.5/2.0KVA - PWM**	**2.0KVA - MPPT**	**3.5KVA - MPPT**	**5.0KVA - MPPT**
Max. PV Array Open Circuit Voltage	≤ 23V DC	≤ 25V DC	≤ 50V DC	≤ 100V DC	≤ 150 VDC	≤ 250V DC
PV Array MPPT Voltage Range	14.5V – 19V DC	17V – 22V DC	29V – 36V DC	36V – 75V DC	60V – 120V DC	120V – 220V DC

After considering above two parameters, the recommended module configurations are listed in the table below

Solar Panel Spec. (Reference)	SOLAR INPUT	Q'ty of panels	Total Input power	Inverter Models
➔ 150Wp, ➔ Vmp: 18.5VDC, ➔ Imp: 8.13A, ➔ Voc: 21.7VDC, ➔ Isc: 8.73A	1 pcs in series 1 pcs in parallel	1	0.15KW	0.3KVA - PWM
➔ 240Wp, ➔ Vmp: 19.2VDC, ➔ Imp: 12.6A, ➔ Voc: 23.01VDC, ➔ Isc: 13.55A	1 pcs in series 2 pcs in parallel	2	0.48KW	0.6KVA - PWM
	1 pcs in series 3 pcs in parallel	3	0.72KW	0.85KVA - PWM
				1.0KVA - PWM
➔ 335Wp, ➔ Vmp: 38.10VDC, ➔ Imp: 8.8A, ➔ Voc: 46.8VDC, ➔ Isc: 9.3A	1 pcs in series 4 pcs in parallel	4	1.34KW	1.5KVA - PWM
	1 pcs in series 4 pcs in parallel			2.0 KVA - PWM
	2 pcs in series, 2 pcs in parallel			2.0KVA - MPPT
➔ 450Wp, ➔ Vmp: 41.81VDC, ➔ Imp: 10.77A, ➔ Voc: 50.1VDC, ➔ Isc: 11.46A	2 pcs in series, 3 pcs in parallel	6	2.7KW	3.5KVA - MPPT
	4 pcs in series, 3 pcs in parallel	12	5.4KW	5.0KVA - MPPT

PV Module Wire Connection:

Please follow below steps to implement PV module connection:

1. Remove the insulation sleeve 10 mm for positive and negative conductors.
2. Check the correct polarity of connection cable from PV modules and PV input connectors.
3. Then, connect the positive pole (+) of the connection cable to the positive pole (+) of the PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.
4. Make sure the wires are securely connected.

Maintenance

Maintaining your Inverter is a breeze as it requires minimal upkeep. Simply grab a damp cloth and wipe down the exterior of the unit from time to time to keep dust and dirt at bay. This simple routine helps ensure smooth operation and longevity for your inverter.

TROUBLESHOOTING

Problem	LCD/Buzzer	Possible Causes/Explanation	Solution
The unit shuts down automatically during the startup process.	LCD and buzzer will be active for a few seconds and then complete off.	The battery voltage is too low	1. Re-charge battery. 2. Replace battery.
No response after power ON.	No indication.	1. The battery voltage is far too low. 2. Battery polarity is connected reversed.	1. Check if batteries and the wiring are connected well. 2. Re-charge battery. 3. Replace battery.
No Output voltage No Display	No Indication	Poor battery condition or battery connection loose, BMS Cut off	Use new battery or make proper connections, Charge battery

No Output Voltage	LCD Display	Excess heat, faulty internal component, Poor ventilation	Clean Ventilation or go to service center
Low Output Voltage	No Indication	Low battery voltage, Overloaded inverter	Charge Battery, Reduce Load, Inspect inverter Component
Mains exist but the unit works in battery mode.	Input voltage is displayed as 0 on the LCD	Input protector is tripped or Fuse blown, Faulty automatic transfer switch, Inverter not detecting mains	Check if the AC breaker is tripped or the fuse blown and the AC wiring is connected well. Inspect the inverter's mains power detection circuitry and sensors. Repair or replace if needed
	No Indication	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 the input voltage range setting is correct.
When the unit is turned on, the internal relay is switched on and off repeatedly.	LCD display	Faulty internal relay, Loose or damaged wiring connections	Check if battery wires are connected well. faulty internal relay
	LCD display	Overload error. The inverter is overload 110% and time is up	Reduce the connected load by switching off some equipment.
	LCD display	Output short circuited.	Check if the wiring is connected well and remove abnormal load. Check output shortage
	LCD display	The internal temperature of the inverter component is over 100°C.	Check whether the air flow of the unit is blocked or whether the ambient temperature is too high. Return to repair
Buzzer beeps continuously	LCD Display	Battery Low or Too Low, Excess Heat, Overload	Charge Batt. Reduce Load, Clean Ventilation or replace fan if damage.
Abnormal Noise or Heating	LCD Display	Faulty internal components. Poor ventilation	Clean Ventilation or go to the service center, inspect the inverter component.
No Feedback	LCD Display	Transformer Continuity issue, Faulty internal component.	Call the Service Support.

Please note that this manual serves as a guide for using our product. In the event of any issues or concerns, we encourage you to reach out to our technical service department for assistance. Our team of professional engineers will provide expert guidance and support to resolve any problems you may encounter. Your satisfaction and the optimal performance of our products are our top priorities, and we are committed to ensuring that you receive the assistance you need

SERVICING

If you encounter a problem that troubleshooting doesn't resolve, please reach out to your authorized dealer for assistance. Provide them with details of the issue, including the serial number and installation date. This will ensure prompt attention from our authorized service team, minimizing any downtime you may experience. Your satisfaction and the swift resolution of any issues are our top priorities.

WARRANTY

LIGEN POWER retains the authority to modify designs and specifications without prior notice, and without any obligation to implement these changes on units already distributed. This allows us to continually improve our products to better meet the evolving needs of our customers, ensuring that they receive the most up-to-date and innovative solutions.

We provide a 6-year warranty on the lithium battery and a 1-year warranty on the inverter circuit. This means that if any defects occur within these time frames due to materials or workmanship issues under normal use, we will repair or replace the components accordingly. The warranty does not cover misuse, modifications, or normal wear and tear. Contact us for warranty claims or assistance.

GOING TO VACATIONS

Before leaving for vacation, it's important to follow these steps regarding your Inverter:

1. Turn the Inverter ON/OFF switch to the OFF position. This helps conserve energy and ensures the Inverter is not unnecessarily draining the battery while you're away.
2. Keep the mains input connected to the Inverter to ensure the battery remains charged at all times. This ensures that your Inverter is ready for use when you return and helps maintain its performance and longevity.

Dos:	Don'ts:
1. Do choose the right inverter: Selecting the right inverter battery is crucial. Consider factors like longer lifecycle, light weight, faster charging environment friendly and maintenance free requirements, before making a purchase. **2. Do install the inverter in a well-ventilated area:** Avoid placing the inverter in closed or confined spaces. **3. Do ensure proper ventilation:** Avoid covering or obstructing the battery/inverter with objects that may restrict airflow. **4. Do use proper connections:** Ensure that connectors to maintain a secure and reliable connection. Loose or damaged connections can lead to power fluctuations, reduced efficiency, and potential safety hazards. **5. Handle with Care:** Carefully handle your lithium battery inverter. The sensitive components inside can be harmed by needless shaking or hard handling. Do it gently!	**1. Don't overload the inverter:** Each inverter battery has a specific capacity. Avoid overloading it by connecting too many appliances or devices. Overloading can lead to excessive heat generation, reduced battery life, and even safety hazards. Be mindful of the power requirements of the devices you connect to the inverter. **2. Don't ignore warning signs:** If you notice any warning signs such as unusual odors, excessive heat, or unusual noises coming from the inverter, take immediate action. **3. Don't place flammable objects near the inverter:** Keep flammable objects like paper, cloth, or chemicals away from the inverter. **4. Fire Safety 101:** Avoid covering your inverter with anything restricting the airflow. Make sure it has enough ventilation. Keep anything combustible far away from it. **5. Don't attempt DIY ("Do it yourself") repairs:** In case of any issues or damage to the battery, avoid attempting DIY repairs unless you have the necessary knowledge and expertise. Mishandling the battery or attempting repairs without proper guidance can be dangerous. Contact a qualified professional for assistance and repairs.
Using inverter batteries to maintain power during outages is essential, but safety is paramount. Follow these dos and don'ts to ensure a secure setup. Choosing the right battery, proper ventilation, regular inspections, and cleanliness are key. On the flip side, avoid overloading, extreme temperatures, mixing batteries, and ignoring warning signs.	

Registered Office:
Amossys Portable Power LLP,
Shed No-B4-05(FF), B4-06(FF),
B4-07(FF) & B4-08(FF), BIADA
Industrial Area, Sikandarpur,
Bihta, Patna, Bihar - 801103

R&D Center:
Amossys Portable Power LLP,
1st Floor, Incubation Center,
Indian Institute of Technology
Patna, Amhara Road, BIHTA -
801106, Patna, Bihar

Support: +91-9031086083

Sales: +91-9031086082

Email: support@ligenpower.com

Website: http://www.ligenpower.com