Probenergy
REDEFINING ENERGY STORAGE

CHADHA POWER

SOLAR HYBRID HOME/INDUSTRIAL UPS/INVERTER

USER MANUAL

*Conditions Apply

Dual Charging Option - Solar & Mains*

www.probegroup.co.za

Dear Customer,

Congratulations! You are now a proud owner of Pure Sine Wave Solar Hybrid UPS with world's latest MOSFET based technology.

Please do spare some time to read this manual. This manual will provide you a thorough understanding of your Pure Sine Wave Solar Hybrid UPS for its optimum use. Please take note of installation and operating instructions in this manual carefully before installation and using your Pure Sine Wave Solar Hybrid UPS. Pay special attention to the section under precaution. In this section the manual lists out conditions and or practices which can not only result in damage to your Solar Hybrid UPS or to the other equipments but may result in personal injury or loss of life also.

Hope you shall be fully satisfied with the product for years to come.
We value your relationship with us.

With best wishes and warm regards
Management Team
Chadha Power

Contents

About Pure Sine Wave Solar Hybrid UPS

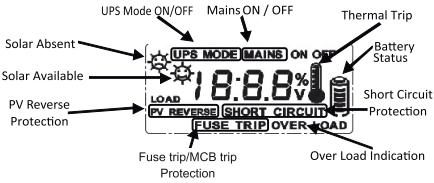
Let's begin the journey to explore our Solar Hybrid UPS. Solar Hybrid UPS transforms Direct Current (DC) to Alternating Current (AC). Preliminary source will be Solar Power and Mains will be treated as secondary source. The Battery Bank acts as a reservoir to ensure continuous supply of power whenever mains supply from utility power is not available.

Front Panel of the Pure Sine Wave Solar Hybrid UPS

Description of Switches & LEDs on Front Panel

S No	LED Indication	Function
1	LED 3 is Glowing	System is in ON condition
	LED 3 is not Glowing	System is in OFF condition
2	LED 1 is Glowing	System is in UPS Mode
	LED 1 is not Glowing	System is in Normal Mode
3	LED 2 is Glowing	High Charging Mode is ON
	LED 2 is not Glowing	Normal Charging Mode is ON
4	LED 4 is Glowing	Solar Hybrid is ON
	LED 4 is not Glowing	Solar Hybrid is OFF

Details of LCD



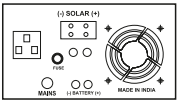
About LCD Display

SN	Display on LCD	Indication	Action
1	'Mains ON'	Mains voltage is available	No Action required
	'Mains OFF'	Mains not available	No Action required
2	'UPS Mode ON'	UPS Mode is selected	OK- No action required
	'UPS Mode OFF'	Normal Mode is selected	OK- No action required
3	'Battery' slab increasing	Charging	OK- No action required
	'Battery' slab decreasing	Discharging	OK- No action required
	Empty 'Battery' Blinking	Battery low cut	Switch off the load and wait for mains/ solar to resume
4	'Smiling Sun'	Solar is available	OK- No action required
	'Sad Sun'	Solar is not available	OK- No action required
5	'Overload'	Inverter is overloaded >100%	Reduce the load
	'Overload'	Inverter is overloaded & tripped	Reduce the load, Switch OFF and ON again
6	'Short Circuit'	System output is short circuited	Call the nearby electrician to check the household wiring
7	'Fuse Trip'	Mains fuse trip	Reset AC Mains MCB/ fuse check
8	'PV Reverse'	Solar wire is in reverse	Interchange the wires
9	LOAD _ _ _ %	Display load %	No Action required
10	_ _ . _ V	Display Battery Voltage	No Action required
11	MAINS _ _ _ V	Display Input Voltage	No Action required

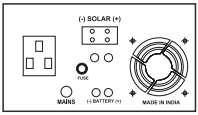
About Backlit Indication

Yellow Color	For Inverter Mode or Mains not available.
Green Color	When AC mains (Utility Power) is available
Red Color	In case of any Fault / Protection

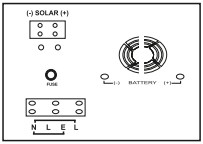
Rear Panel of the UPS



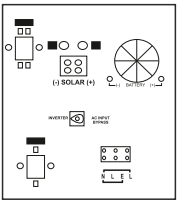
650/850/1050VA -12V



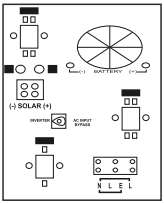
1450VA - 24V



2KVA - 24V



2.5/3/3.5KVA



5.2/7.5/10KVA

Description of Rear Panel

S.N.	Nomenclature	Functions / Remarks
1	Cooling Fan	Proper Air Ventilation of UPS
2	Mains Fuse (AC)	Input Protection from Mains Power
3	Battery (DC)	Input DC supply to UPS
4	Input Terminal / Mains Power Cord	Input Mains Power of UPS (Mains Power Cord upto 1450VA & terminal block above 1450VA)
5	Output Terminal / Output Socket	Output Power of Inverter (Socket upto 1450VA & terminal block above 1450VA)
6	Battery Wires (+ve)	+ve Battery wires of Inverter i.e. Red Color
7	Battery Wires (-ve)	-ve Battery wires of Inverter i.e. Black Color
8	Solar Terminal (+ve & -ve)	+ve & -ve Input supply from Solar Panel

Some Safety Measures

Important Precautions

Our Solar Hybrid UPS has two Battery terminals (Red and Black or Terminal Block (HT$_2$)), AC Fuse, DC MCB, AC Input and AC Output socket are also at the back panel of the Solar Hybrid UPS. Red wire has to be connected to the +ve terminal of the Battery & the Black wire has to be connected to -ve terminal only. Never reverse the battery connections it will trip off the battery fuse/ DC MCB.

Caution: Ensure that incoming phase is connected to 'L'. Neutral is connected to 'N' and earth is connected through OUTPUT socket of the Solar Hybrid UPS.

General Precautions:

Read all instructions & caution markings on the Solar Hybrid UPS before using.

Do not expose any kind of chemicals to Solar Hybrid UPS.

Disassembling the Solar Hybrid UPS without experienced service personnel may cause electric shock or fire hazard.

Always inform the authorised persons or take it to authorised service center. Disconnect all wiring before cleaning to prevent risk of electric shock. Avoid exposing your solar hybrid UPS or batteries to any type of explosive gases (in the vicinity, as batteries generate explosive gases during normal operations). Provide proper ventilation to battery compartment. The battery enclosure should be designed to prevent accumulation and concentration by Hydrogen gas in the pocket at the top of the Compartment. Vent the battery compartment from the highest point. A sloped lit can also be used to direct the flow to the vent opening location to reduce the risk of battery explosion, follow all the instructions of the battery manufacturer or any other equipment you intend to use in the vicinity of batteries. Always use the correct tools to make AC/DC wiring connections. Never install the Solar Hybrid UPS near highly flammable objects.

Caution:

The Solar Hybrid UPS connections should be properly grounded through permanent wiring system.

Installation should ensure that the UPS AC output should not be connected to AC input mains.

1. Before installing, connecting any wiring, or using the UPS , read all instructions of this instruction manual.

2. Never disconnect the battery cables while the UPS is delivering power or battery charger is operating. Always turn the switch OFF first and turn OFF AC mains input.

3. Do not install or connect batteries unless instructed to do so. Failing to comply with this instruction can cause damage or complete failure of the unit.

4. To reduce risk of injury, use only deep cycle lead acid battery.

5. Do not expose the system to rain, snow or liquids of any type. Do not disassemble the system; take it to nearby authorized service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.

6. To reduce risk of electric shock, disconnect all wiring from the system before attempting any maintenance or cleaning. Turning off the system will not reduce this risk.

7. Be extra cautious when working with metal tools on, or around batteries. The potential exists to drop a tool and short-circuit the batteries or other electrical parts resulting in sparks that could cause an explosion.

8. Baking soda neutralizes lead acid battery electrolyte. Keep a supply on hand in the area of the batteries.

Personal Precautions :

1. Someone should be within range of your voice to come to your aid when you work near batteries.

2. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eyes, immediately flood eyes with running cool water for at least 15 minutes and get medical attention immediately.

3. Never attempt to charge a frozen battery.

4. Before touching the battery terminal make sure that the system front switch is OFF and AC mains to the UPS is also OFF.

5. Never smoke or allow a spark or flame in the vicinity of the batteries.

6. If it is necessary to remove any battery, always remove the grounded terminal from the battery first. Make sure all the accessories are off, so as not to cause arcing.

7. Clean battery terminals. Be careful not to allow corrosion to come in contact with eyes.

8. Add only distilled water in each cell until acid reaches level specified by battery manufacturer. This helps purge excess gas from cells. Do not overfill. For a battery without caps, carefully follow manufacturer's recharging instructions.

Getting Started

Environment & Location

Pure Sine Wave Solar Hybrid UPS should be installed as close as possible to the battery bank to keep the battery wires short in length. Never place the Solar Hybrid UPS in the same compartment because batteries generate gases which are very corrosive to electronic equipments. As it is a sophisticated device it should be kept in non-condensing, well ventilated and moisture free environment.

Important precautions

Never connect the output wiring of the UPS to incoming Utility wiring. This situation is worse than short circuit, however if the Solar Hybrid UPS survives this situation the system will shutdown automatically until corrective action is taken. We suggest independent circuit breakers (MCB/MCCB) for I/P, O/P & Solar circuit as per the capacity of the Solar hybrid UPS.

Connecting Cable Requirements-

Rating	Input/ Output Wire (in sqmm)	Battery Wire (in sqmm)	Solar Wire (in sqmm)	Earthing Wire (in sqmm)
Solar 12V 850VA	0.75	10	6	0.75
Solar 24V 1450VA	1.00	10	6	1.00

Secure the wiring with ties or other non-conductive fasteners to prevent damages.

NOTE: There is no back feed current towards PV array.

WARNING: When sunlight is exposed on photovoltaic array, so it starts to supply DC Voltage to Solar Hybrid UPS.

Installation of Solar Hybrid UPS

Where to Install

The system should be installed in a location that is near to Distribution Box and meets the following requirements -

a. **Dry –** do not allow water to drip or splash on the UPS.
b. **Cool –** The ambient temp. near the system should be in between 0^{o}C and 45^{o} C (32 F and 113 F), the cooler environment is better for the system.
c. **Ventilated –** Allow at least 6 Inches (15 cm) of clearance around the system for air flow.
d. **Safe –** Do not install the UPS along with battery in any closed compartment without ventilation. Also, do not install the battery near to storage of inflammable gas/ liquid.
e. **Distance from the Battery –** Install the system at a safe distance from the battery as any electric spark on UPS fuse or output/ input connection may get in touch with the explosive gases of the battery which may cause fire. **Chadha Power** will not be responsible for any damage due to this.

CAUTION! TO PREVENT FIRE, DO NOT COVER OR OBSTRUCT VENTILATION OPENINGS. DO NOT INSTALL THE SYSTEM IN A ZERO-CLEARANCE COMPARTMENT. OVER HEATING MAY RESULT.

How to install

DC Cabling

1. Ensure that the ON/OFF switch on the front panel of the UPS is in the OFF mode before you begin the installation.
2. Connect the (-ve) terminal of the battery to the Black wire (-ve) of the system and then connect the (+ve) terminal of the battery to the Red wire (+ve) of the system. It is advised not to use any other extra cable for batteries other than those supplied by the company.
3. Connect +ve and –ve wires from Solar Panel to +ve and –ve terminals respectively available on the back panel of UPS.

AC Cabling

Plug in the power cord to the mains socket on the wall. The cabling should have proper earthing. Connect AC input supply to the 3 way terminal of the system such that the line is connected to 'L', neutral is connected to 'N' and earth is connected to 'E'. AC input supply should remain ON once the system is installed. Take output from 6/16A output socket or terminal block available at back panel

Start Operation

Once the AC and DC wiring have been completed and connected, take a moment to re-examine all the connections and make sure they are secured and in the proper terminals.

1. Switch ON the UPS. The system should run a load without AC input (battery only). Place a load on the system and make sure it works.
2. To charge the batteries, connect mains cord to the mains socket & check the connection of wires from Solar PV panel and turn it ON. Battery BAR running upward on LCD indicates the charger is working properly. AC load connected to the UPS should also work at this time since the AC power fed to the load is passed through the UPS in both (Normal and High) modes.
3. Disconnect the AC power. The UPS will transfer the supply to the load from Mains to Battery mode immediately. This will be indicated by Battery BAR running downward on LCD with clicking sounds as the internal relay changes its connection. The system will begin to take power from the batteries and use it to power the load uninterruptedly.

The above steps will complete a functional test of the UPS. If all steps pass the system is ready for use. If any steps fail, figure out the reason before proceeding and contact the service support.

Note:-

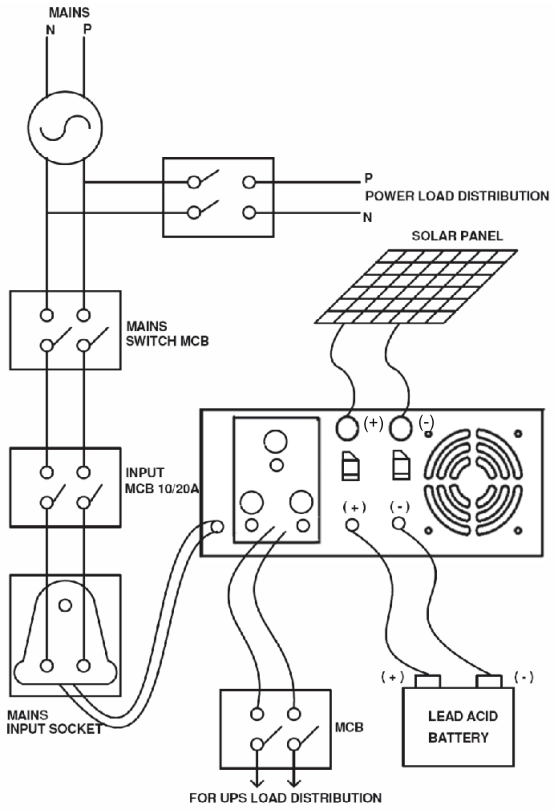
Fuses and disconnects must be sized to protect the wiring in the system. The fuse has to be blown before the wire reaches its maximum current carrying capacity .

Applications*

- Power Backup for House Hold as well as Computers
- Emergency Power Systems
- Small Water Pumps and all motor based applications
- TV Sets, Fans, Tube Lights, CFL etc.

* Conditions Apply

Installation Diagram



Technical Specifications

TECHNICAL SPECIFICATIONS		
Model	650VA	1450VA
Back-up Mode		
Output Wave Shape	Pure Sine Wave	
Nominal Battery Voltage	12V DC	24V DC
No Load Output Voltage	220V ±7V AC	
Output Frequency	50Hz ±1Hz	
No Load Battery Current	≤ 2.2Amp	
Max. Discharging Current (DC)	53A ± 1A	46A ± 1A
Battery Low Alarm	10.8V ±0.2V / Battery	
Battery Low Cut OFF	10.5V ±0.2V / Battery	
Max. Output Current (AC) ± 0.5A	2.7A	5.0A
Max. Output Power	650VA	1450VA
Mains Mode		
Recommended Nominal Mains Input	220V AC, 50Hz	
Max Charging Current(HC) ± 1A	17A	17A
Max Charging Current(NC) ± 1A	12A	12A
Mains Low Voltage Charge Facility	Available	
Battery Boost Voltage	14.4V ±0.2V / Battery	
Battery Float Voltage	13.7V ±0.2V / Battery	
Input Frequency	50Hz ±1Hz	
Normal Mode (Mains Mode)		
Mains Input Voltage Range	90V - 300V ±10V AC	
Change Over Time (Mains to Back-up)	< 40msec	
Change Over Time (Back-up to Mains)	< 10msec	
UPS Mode (Mains Mode)		
Mains Input Voltage Range	180V - 270V ±10V AC	
Change Over Time (Mains to Back-up)	< 10msec	
Change Over Time (Back-up to Mains)	< 10msec	
Solar Mode		
Rating of Solar Charge Controller	12V 30A	24V 30A
Max Charging Current by Solar	30A ± 2A	
Solar Input Range (Voc)	16V - 25V	32V - 50V
PV Vmax.	25V	50V
Recommended Solar Input	450W	900W
Efficiency of Solar Charge Controller	≥ 95%	
Charge Sharing Option	Available	
Type of Solar Charge Controller	True Hybrid	
Protections		
Overload Retry	6 Auto Retries	
Battery Retry	4 Auto Retries	
Short Circuit Retry	Available	
Protections	Short Circuit Trip, Overload Trip, Battery Low & Over Charge Protection, Over Temperature, AC Fuse Blown/ MCB trip, PV Reverse, Reverse Current Flow etc.	
Display		
Display	Mains Input Voltage, Battery Voltage, Applied Load in %age, Battery Charging/ Charged, Battery Low, Short Circuit, Overload, Over Temperature, AC Fuse Blown/ MCB Trip, PV Reverse, Solar ON/ OFF etc.	

Trouble Shooting

Problems/ Symptoms	Condition/ Protection	Probable Root Cause	Recommended Solution
No Indication on LCD	Not ON Condition	1. Discharged Battery	1. New/ Charged Battery Recommended
		2. Loose Battery Connection	2. Battery Connections Should be Proper
		3. Battery Fuse Blown	3. Check DC Fuse & Replace if found faulty
"OVERLOAD" with Buzzer & Red Backlight of LCD	Overload Protection	Excess Load Applied	Reduce Applied Load
"SHORT CIRCUIT" with Buzzer & Red Backlight of LCD	Short Circuit Protection	Short Circuit in Household Wiring	Call Electrician for Checking & Switch OFF the UPS
"THERMOMETER" Symbol with Buzzer & Red Backlight of LCD	Over Temperature Protection	UPS is under Thermal Trip/ Shutdown	Call for Service Support
"FUSE TRIP" with Buzzer & Red Backlight of LCD	AC Fuse Blown/ AC MCB Trip	AC Fuse Blown/ AC MCB Trip	Replace AC Fuse/ Reset AC MCB and reduce excess load connected at Mains Mode
"Lo" with Buzzer & Red Backlight of LCD	Battery Low Pre Alarm	Weak Battery Condition	Recharge the Battery
"BATTERY SYMBOL EMPTY" with Buzzer & Red Backlight of LCD	Battery Low Cut Off	Battery Low Cut Off	Switch OFF the UPS and Allow to Charge the Battery when Mains is resumed
"PV REVERSE" with Buzzer & Red Backlight of LCD	PV Reverse Protection	Connected PV in Reverse Polarity	Check Solar Connections & Reconnect in Correct Polarity

- Buzzer will sound only when the UPS switch is in ON condition.

SAFETY MEASURES

DO NOT MIX WITH OTHER WASTES FOR DISPOSAL

To prevent possible harm to the environment or human health this product should not be disposed with other waste. Household users should contact either their retail seller or local government office for safe recycling. Business users should contact their supplier and check the terms and conditions of the purchase contract for proper disposal.