

USER'S MANUAL

PURE SINE WAVE INVERTER CHARGER TPS SERIES

WELCOME

Please read this manual thoroughly before installing and operating your inverter. This manual contains important information and safety instructions you need to obtain the performance required for your application. Keep this manual for future reference. This A series pure sine wave inverters featured with advanced MCU controller based circuit, high efficiency, configurable setting reliable design.

WARNINGS, CAUTIONS AND NOTES

It's very important that any operator and installer of this inverter read and follow all **WARNINGS, CAUTIONS AND NOTES** and all installation and operation instructions.



WARNINGS: INVERTER OUTPUT

1. This heavy-duty device produces voltages similar to commercial AC power.
2. Danger of shock or electrocution - treat inverter output the same as commercial AC power.
3. Do not use the inverter near flammable materials or in any locations that may accumulate flammable fumes or gases. This is an electrical device that can briefly spark when electrical connections are made or broken.
4. Do not allow water or other liquids to contact the inverter.
5. Do not use appliances with damaged or wet cords.



CAUTIONS: INVERTER OPERATING ENVIROMENT

1. Surrounding air temperature should be between -5°C and 40°C – ideally between 15°C and 25°C (60 - 80°F). Keep the inverter away from direct sunlight, if at all possible.
2. Keep the area surrounding the inverter clear to ensure free air circulation around the unit. Do not place items on or over the inverter during operation. The unit will shut down if the internal temperature gets too hot. Restart the inverter after it cools.
3. This inverter series must connect a 12V battery or 24V battery pack. Check very carefully of the rated DC voltage of your inverter, Connect it only to the correct DC power source. Verify the DC voltage with your seller if it is not clearly marked on the product or its package.



4. Do not reverse DC input polarity – this will damage the inverter and it will void the warranty.

WARNING: DANGER OF BATTERY EXPLOSION – INSTALL A FUSE

CAUTIONS:

5. Loose connections can result in a severe decrease in voltage, It can cause damage to cables and insulation.
6. Failure to make correct polarity (Positive, Negative) connection between the inverter and the battery bank can result in blowing fuses in the inverter and can permanently damage the inverter. Damage caused by

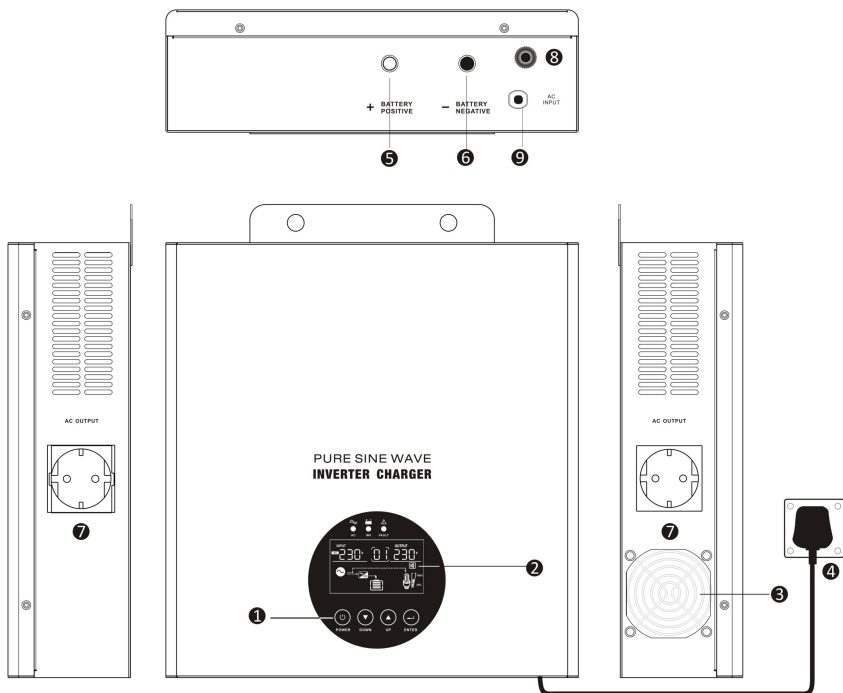
reversed polarity is not covered under the warranty.

7. Making the connection to the battery terminals may cause a spark as a result of current flowing to charge capacitors within the inverter. This is a normal occurrence.

8. Because of the possibility of sparking, however, it is extremely important that both the inverter and the battery(ies) be positioned far from any possible source of flammable fumes or gases. Failure to heed this warning could result in fire or explosion.

9. Operating the inverter without correctly grounding the unit may result in electrical shock.

PRODUCT PRESENTATION



1. **Power switch** Press ① for 3 seconds to turn ON the inverter, Press ① for 3 seconds again turn OFF the inverter. When the AC power is present, the inverter will automatically turn ON, and it cannot be turned OFF.

2. **LCD display:** This is a comprehensive LCD display ,It displays the input voltage, output voltage, battery voltage, load percentage, inverter working mode(AC mode, battery mode),Battery capacity, and protection and

or error code of the inverter.

3. **Cooling fan.** This fan is controlled by thermal sensor. It automatically start and stop according to the internal temperature.

4. AC input power cord, connect to an utility powered socket.

5. DC Red Positive input terminal, connect it to the battery positive terminal(+).

6. DC Black Negative input terminal,connect it to the battery negative terminal(-).

7. AC output sockets. Connect your electrical appliance to this socket.

8. AC input circuit breaker, to prevent the input from short circuit, and to protect the inverter from over load at AC mode. If it trip off, eliminate the short circuit or reduce the load and then press in it to restore.

9. AC input power cord, connect to an utility powered socket.

10. Indicators

LED indicators			Descriptions
	Green	ON	AC input connected and within acceptable voltage range, Inverter output on bypass mode.
		OFF	AC input not connected or out of the input range.
		BLINK	AC input connected, but inverter is switched OFF.
	Yellow	ON	The inverter is operating on battery mode.
		OFF	The inverter is not on battery mode
	Red	ON	The inverter is on overload, over heat, short protection, or faulty.
		OFF	The inverter is not on protection mode and not faulty.

SIZING THE BATTERY

To determine the minimum battery bank ampere-hour (AH)rating that you will need to operate appliances from the inverter, and any DC appliances powered by the battery bank. Follow this algorithm to calculate an approximate battery capacity you need:

Battery Ampere-Hour= **Back up time(hours) x Load Power / (battery voltage x 80% x90%)**

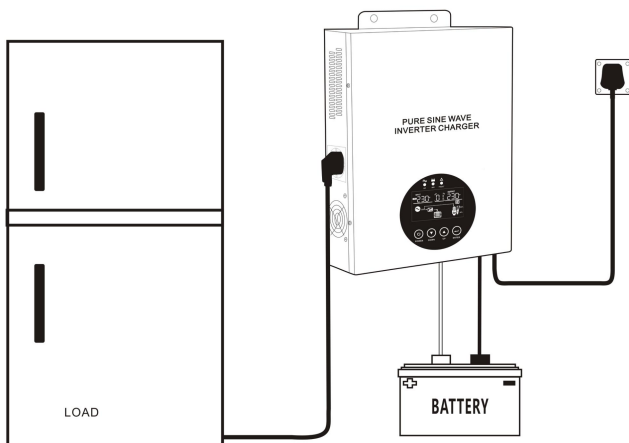
Example: To calculate the the battery amperage need for back up 300W for 2 hour with a 12V battery:

Battery Ampere-Hour= $2 \times 300W / (10V \times 80\%) = 75AH$ (12V/75AH)

Notice: The larger the rated power wattage of the inverter, the bigger the minimum battery capacity is required. A minimum battery capacity(AH) is recommended as below:

Model	Minimum Battery capacity
TPS-500	50AH
TPS-800	80AH
TPS-1000	100AH
TPS-1300	120AH
TPS-1500	120AH
TPS-2000	100AH (24V)

INSTALLING AND CONNECTION OF THE INVERTER



1. Check the battery voltage to make sure it matches the DC input voltage of the inverter. Only connect a 12VDC input inverter to a 12VDC battery, 24V DC input inverter to a 24VDC battery pack and so on.
2. Connect the the Negative (-) terminal of the inverter to the Negative (-) terminal of the battery. Connect the the Positive (+) terminal of the inverter to the Positive (+) terminal of the battery and secure their connection.
DO NOT REVERSE THE POLARITY CONNECTION BETWEEN POSITIVE AND NEGATIVE. *Sparking is normal for the first connection.*
3. Connect the input power plug to a AC mains (utility power) socket.

OPERATION

1. Press the function key “**ON/OFF**” for 3 seconds to turn On the inverter. The inverter alarm buzzer will beep,

and the fan runs for a short time.

2. Check the rated power of the appliance which is ready to be connected to the inverter, make sure that the **rated power of the appliance is lower than the rated power of the inverter** (printed or labeled on the inverter). **Notice: Motorized appliances such as pumps, freezers and air conditioners. These appliances can have startup loads of up to 2-8 times the rated watts. Choose a inverter with rated power 2-3 times greater than motor's rated power.**
3. Confirm that the appliance to be operated is **turned OFF**, plug the appliance power plug into a AC output socket of the inverter.
4. Turn the appliance ON and start to use it.

DISPLAY

This inverter has an informative display LCD, showing multiple the operation status, mode, input and output voltages, battery voltage, frequency, load percentage etc.

Press function key "UP" or "DOWN" will display the following pages one by one.



PAGE 1



PAGE 2



PAGE 3



PAGE 4

PROFESSIONAL DIY CONFIGURATION

*The inverter is set by default for Lead acid battery usage. If the user have a customized battery and require specific setting. This inverter support DIY setting of battery parameters for experienced professional users, Please follow the following chart of common setting menu. However, we **DO NOT RECOMMEND USER TO PERFORM DIY SETTING.***

CONFIGURATION	CONFIGURABLE RANGE	SET METHOD
Operation Mode 	01 or 02 (Default 01 mode)	1.Press function key “ENTER” for 3 seconds until “P0” flashes. 2.Press function key “UP” to “P1”, then short press “ENTER”. the Operation mode 01 flashes. 3.Press function key “UP” or “DOWN” to to choose the mode, On 01 mode, the inverter is on AC priority mode, as long as AC power presents, it always use AC power, it switches to battery mode when there is an AC power outage or abnormal AC power supply. On 02 mode, the inverter is on energy saving mode in order to save as much as possible of the battery energy. On 03 mode, the inverter is on Battery Priority mode. As long as the battery has power. It always use battery power. 4.Short press “ENTER” to confirm the setting. “P1” keep flash. 5.Short press “DOWN” to “P0” 6.Short Press “ENTER” to complete the setting. Wait 1 minute the display will return to homepage automatically.
Battery charge voltage 	12V-15V (Default 13.8V) 24-30 V	1.Press function key “ENTER” for 3 seconds until “P0” flashes. 2.Press function key “UP” to “P2”, then short press “ENTER”. the battery voltage flashes. 3.Press function key “UP” or “DOWN” to adjust the battery charge voltage. 4.Short press “ENTER” to confirm the setting. “P2” keep flash.

	(Default 27.6V)	5.Short press"DOWN" to "P0" 6.Short Press "ENTER" to complete the setting.Wait 1 minute the display will return to homepage automatically.
Charger current percentage setting 	10%-100% (Default 100%)	1.Press function key "ENTER" for 3 seconds until "P0" flashes. 2.Press function key "UP" to "P3", then short press "ENTER". the charger current percentage flashes. 3.Press function key "UP" or "DOWN" to adjust the charger current percentage. 4.Short press "ENTER" to confirm the setting. "P3" keep flash. 5.Short press"DOWN" to "P0" 6.Short Press "ENTER" to complete the setting.Wait 1 minute the display will return to homepage automatically.
AC outage alarm ON/OFF setting. 	ON/OFF (Default OFF)	1. Press function key "ENTER" for 3 seconds until "P0" flashes. 2. Press function key "UP" to "P4", then short press "ENTER". the "OFF" symbol on the top left corner of the LCD flashes. 3. Press function key "UP" or "DOWN" to select ON or OFF. 4. Short press "ENTER" to confirm the setting. "P4" keep flash. 5. Short press"DOWN" to "P0" 6. Short Press "ENTER" to complete the setting.Wait 1 minute the display will return to homepage automatically.
Battery low voltage protection 	9.6V-12.5V (Default 10.5V) 19.2-25V (Default 21V)	1. Press function key "ENTER" for 3 seconds until "P0" flashes. 2. Press function key "UP" to "P5", then short press "ENTER". the battery voltage flashes. 3. Press function key "UP" or "DOWN" to adjust the battery low voltage protection set. 4. Short press "ENTER" to confirm the setting. "P5" keep flash. 5. Short press"DOWN" to "P0" 6. Short Press "ENTER" to complete the setting.Wait 1 minute the display will return to homepage automatically.
Battery low voltage alarm 	9.8V-13V (Default 11.0V) 19.6-26V (Default 22V)	1. Press function key "ENTER" for 3 seconds until "P0" flashes. 2. Press function key "UP" to "P6", then short press "ENTER". the battery voltage flashes. 3. Press function key "UP" or "DOWN" to adjust the battery low voltage alarm set. 4. Short press "ENTER" to confirm the setting. "P6" keep flash. 5. Short press"DOWN" to "P0" 6. Short Press "ENTER" to complete the setting.Wait 1 minute the display will return to homepage automatically.
Battery full capacity	11.5-14.5V	1. Press function key "ENTER" for 3 seconds until "P0" flashes.

voltage setting. (for more accurate battery bar display) 	(Default 12V) 23-29V (Default 24V)	- Press function key "UP" to "P7", then short press "ENTER". the battery voltage flashes. - Press function key "UP" or "DOWN" to adjust the battery full capacity voltage(consult the battery supplier). - Short press "ENTER" to confirm the setting. "P7" keep flash. - Short press "DOWN" to "P0" Short Press "ENTER" to complete the setting.Wait 1 minute the display will return to homepage automatically.
03 mode only, Battery Priority starting voltage. 	11.5V-14.5V (Default 13.5V)	- Press function key "ENTER" for 3 seconds until "P0" flashes. - Press function key "UP" to "P8", then short press "ENTER". the battery voltage flashes. - Press function key "UP" or "DOWN" to adjust the starting battery voltage to enable the inverter operates on 03 mode, Battery priority mode. - Short press "ENTER" to confirm the setting. "P8" keep flash. - Short press "DOWN" to "P0" Short Press "ENTER" to complete the setting.Wait 1 minute the display will return to homepage automatically.
03 mode only, Battery Priority ending voltage. 	9V-14V (Default 10.8V)	- Press function key "ENTER" for 3 seconds until "P0" flashes. - Press function key "UP" to "P9", then short press "ENTER". the battery voltage flashes. - Press function key "UP" or "DOWN" to adjust the ending battery voltage to disable the inverter operates on battery mode. - Short press "ENTER" to confirm the setting. "P9" keep flash. - Short press "DOWN" to "P0" Short Press "ENTER" to complete the setting.Wait 1 minute the display will return to homepage automatically.
Output Frequency setting 	50Hz/ 60Hz (Default 50Hz)	- Press function key "ENTER" for 3 seconds until "P0" flashes. - Press function key "UP" to "P10", then short press "ENTER". the battery voltage flashes. - Press function key "UP" or "DOWN" to select the frequency for output. - Short press "ENTER" to confirm the setting. "P10" keep flash. - Short press "DOWN" to "P0" Short Press "ENTER" to complete the setting.Wait 1 minute the

		display will return to homepage automatically.
Output Voltage setting 	200V-240V (Default 220V)	1. Press function key “ENTER” for 3 seconds until “P0” flashes. 2. Press function key “UP” to “P11”, then short press “ENTER”. the battery voltage flashes. 3. Press function key “UP” or “DOWN” to adjust the voltage for output. 4. Short press “ENTER” to confirm the setting. “P11” keep flash. 5. Short press “DOWN” to “P0” Short Press “ENTER” to complete the setting.Wait 1 minute the display will return to homepage automatically.
Auto-starting of the inverter with PV charger 	ON/OFF (Default OFF)	1. Press function key “ENTER” for 3 seconds until “P0” flashes. 2. Press function key “UP” to “P12”, then short press “ENTER”. the battery voltage flashes. 3. Press function key “UP” or “DOWN” to choose On or OFF. 4. Short press “ENTER” to confirm the setting. “P12” keep flash. 5. Short press “DOWN” to “P0” Short Press “ENTER” to complete the setting.Wait 1 minute the display will return to homepage automatically.
Warning : Mode 3, and Page 8, Page 9, and page 12 are only applicable if you have an external Solar charge controller charge the battery and ensure your battery capacity is very big to avoid constant swtich between battery and grid power supply.		

BATTERY BACK UP TIME

You may take this simple algorithm to calculate the use time of your battery pack with the inverter:

Back up time(t)=Battery voltage X Battery Amperage X 80% / Load power.

Example: To calculate the back up time of a 12V/100Ah battery with a 300Watts load,

Back up time(t)=12x100x80%/300W=3.2Hours(approximately)

Note: This back up time calculation algorithm is for your reference only. Actual back up is subject to many other factors as mentioned in **SIZING THE BATTERY**.

TROUBLESHOOTING

This following chart shows the protection code and protection description.

Protection Code	Protection Descriptions	Solution
E08  Buzzer long beep	Output low voltage protection	1. Reduce the load power capacity. 2. Disconnect the load and charge the batteries.

Battery type	Lead acid /AMG/GEL/ Flood / LiFePO4 battery 12V					...24V
Charge current	8A(max)	15A(max)	18A(max)	23A(max)	34A(max)	23A(max)
Protection						
Full protection	Over voltage protection, under voltage protection, over heat protection, short circuit protection, and overload protection					
Overload capability	AC mode: Continuous buzzer alarm, Do not cut off output. Battery mode: 105% overload: Alarm buzzer triggers. 110%-120% overload: Inverter system shut down after 1 minute. 130-140% overload: Inverter system shutdown after 10 seconds. ≥ 150% overload: Inverter system shutdown immediately.					
Display & Indicators						
Status display	LCD display: AC input voltage, output voltage, battery voltage,battery capacity, load percentage etc.					
Physical						
Operation Temperature	-5~40 ℃(non condensing)					
Operation Humidity	Relative humidity 20-90%,Non condensing					
Net Weight	5.3kgs	6.6kgs	6.8kgs	8.0kgs	10.2KGS	11.5KGS
Dimensions(LXWXH)mm	310*270*85mm				355*285*115mm	

Specifications are subject to change without prior notice.

WARRANTY

This product is warranted to the original purchaser for a period of one (1) Year from the original purchase date, to be free of defects in material and workmanship. We disclaims any liability for consequential damages. In no event will we be responsible for any amount of damages beyond the amount paid for the product at retail.