

# **AC POWER SOURCE**



SAMLEX AMERICA®

## **PURE SINE WAVE DC-AC INVERTERS**

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**MODEL:**

**PST-60S-24A**

# **OWNER'S MANUAL**

Please read this manual before operating your inverter.

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# PLEASE READ THIS MANUAL BEFORE OPERATING THIS INVERTER!

## General Safety and Installation Information



**Warning!** Exclamation mark ! indicates fundamental safety measures to be observed when using electrical equipment to avoid the danger of:

- **electric shocks**
- **fire**
- **injury**

### 1.1 About the unit itself:

- Do not connect the output to other power sources!
- The inverter must only be used for the purpose specified by the manufacturer!
- When working on the inverter, always disconnect it from the mains!
- A failure of the protective device means that danger is still possible from parts which remain under voltage during repair!
- Do not operate the inverter if housing or cables are damaged!
- Do not expose the inverter to direct sunlight in order to avoid additional heating!
- The inverter must be positioned and fixed in such a way that it cannot fall over or fall down!
- The inverter must be kept in a safe place out of the reach of children!
- The inverter must not be operated in a damp or wet environment!
- Air intake and outlets must not be blocked!
- Ensure good ventilation!
- **Do not operate without connecting to ground. Shock may result!**

### 1.2 Cables:

- If cables have to be inserted through metal walls or other sharp-edged materials, use a cable duct or cable bushing!
- Do not lay cables loosely or in sharp bends in electrically conductive materials!
- Do not pull the cables!
- Do not lay 115/230 VAC mains cable and 12/24 V DC cable together in the same cable duct!
- The specified minimum cable cross-section must be complied with!
- Fix cables properly!
- Lay cables in such a way that no one can trip over them!
- Lay cables in such a way that they are not exposed to the risk of damage!

### 1.3 Installation on Boats:

- Wrong installation of electrical units on a boat may lead to corrosion of the boat. Therefore, please let a boat electrician carry out the installation of the inverter.

# WARNING



**PLEASE TAKE THE FOLLOWING PRECAUTIONS. FAILURE TO ABIDE BY THESE REQUIREMENTS WILL VOID WARRANTY.**

**2.1 Never parallel the 115V AC output of the inverter with the output from a generator or electric mains, or with the output of another inverter. This will instantly burn the inverter.**

Although this inverter has an input OVER VOLTAGE SHUT DOWN at 30V, input voltages higher than 30V will cause permanent damage. Ensure the following when the battery is being charged simultaneously (the output voltage of the charging device will be fed to the inverter):

- Ensure that the charging voltage of the alternator has not been set above 30V.
- Do not use an unregulated solar panel. It's voltage can reach up to 36V on a very cold day. When using a regulated solar panel, its voltage should not be set beyond 30V.
- Do not connect to battery other than 24V
- Ensure that the voltage of the battery charger does not exceed 30V in any condition.

**2.2 Do not reverse the polarity to the input connections. This will permanently damage the inverter.**

**2.3 Do not connect the inverter to positive grounded vehicle.**

## DESCRIPTION AND APPLICATION

**3.1** This inverter converts 24V DC from 24V battery system into 115V AC, 60Hz. The waveform of its AC output voltage is pure sine wave like the wave form of the electric utility power supply. (Cheaper commercial grade inverters have a quasi-sinewave/modified sinewave output wave form which is not suitable for sensitive equipment.) Advantages of Pure Sine Wave inverters over commercial grade modified sine waver inverters are:

- a.) Output voltage wave form is pure sine wave with very low harmonic distortion and clean power like utility supplied electricity.
- b.) Inductive loads like microwaves and motors run faster, quieter and cooler.
- c.) Reduces audible and electrical noise in fans, fluorescent lights, audio amplifiers, TV, Fax, & answering machines.
- d.) Prevents crashes in computers, weird print out, and glitches in monitors.
- e.) Reliably powers the following devices that will normally not work with modified sine wave inverters:
  - Laser printers, photocopiers, magneto-optical hard drives
  - Some fluorescent lights with electronic ballasts
  - Power tools employing “solid state” power or speed control
  - Some battery chargers for cordless tools
  - Some new furnaces with microprocessor control
  - Digital clocks with radios
  - Sewing machines with speed/microprocessor control
  - X-10 home automation system

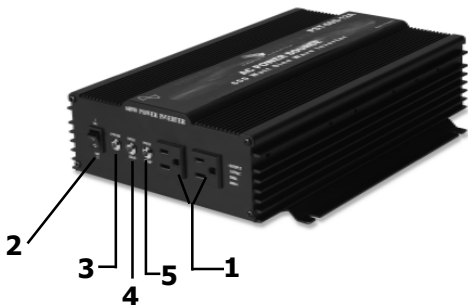
## DESCRIPTION AND APPLICATION

**3.2** The maximum continuous power rating of this inverter is 600 watts. It can provide a surge power of 1000 watts (for a few seconds) to start motor driven loads.

### **REMARKS:**

- Please note that motor driven loads (e.g. power tools, pumps, compressors, refrigerators etc.) require 5 to 10 times their normal running power for initial starting. Ensure that the starting power of these loads is not more than 1000 watts.
- Please also note that the output power indicated for microwave ovens is generally the “cooking power”. The “electrical input power” in this case will be almost 2 times the “cooking power”. Ensure that the “electrical input power” of the microwave is less than the “continuous power” output of the inverter (600 watts).

# INSTALLATION & MAKING CONNECTIONS



- 1 115V AC output receptacles
- 2 Power on/off Switch
- 3 Green L.E.D. - Power output status
- 4 Red L.E.D. - Overload
- 5 Red L.E.D. - Over temperature
- 6 Input terminals (back of unit -not shown)  
RED - Positive (+)  
WHITE - Negative (-)
- 7 Cooling fan (back of unit - not shown)
- 8 Grounding lug (back of unit - not shown)

## **CAUTION!**

Reverse polarity of input connection will blow the fuse inside the inverter and may cause permanent damage. Please ensure that the **RED** positive terminal is connected to the positive(+) terminal of the battery and the **WHITE** negative (-) terminal is connected to the negative (-) terminal of the battery. **Damage due to reverse polarity is not covered by warranty.**

## INSTALLATION & MAKING CONNECTIONS

**4.1** Ensure that the power ON/OFF switch is turned off.

**4.2** Place the inverter in a cool & ventilated space. Ensure that there is at least 10cm of open space around the inverter. Do not block the openings on the inlet side of the cooling fan and the vent holes.

**4.3** Use #6 AWG red and black color coded cables to connect the inverter to the battery. The red wire is positive (+) and the black wire is negative (-). Connect the red wire to the **RED** (+) terminal of the inverter and the black wire to the **WHITE** (-) terminal of the inverter. Now connect the black wire to the negative (-) terminal of the battery and then the red wire to the positive (+) terminal of the battery. **A spark may be observed when connecting the positive wire to the battery (+) due to charging of capacitors inside the inverter. This is normal.**

**4.4 Ground the inverter using the Grounding Lug at the rear of the unit.**



## OPERATING THE INVERTER

**5.1** Switch off all loads connected to the output of the inverter.

**5.2** Push the power ON/OFF switch to "ON" position. The "green power" L.E.D will be lit and AC output voltage will be available under normal conditions. **The cooling fan will be off ( the fan is temperature controlled).**

**5.3** Now switch on the load.

**5.4** When running on full load for longer duration, keep the vehicle's engine running to prevent batteries from discharging.

**5.5 CAUTION!** Do not start the vehicle's engine with the inverter in "ON" condition. The inverter may shut down during cranking due to drop in the battery voltage below the inverter's low battery shut down threshold of 20V.

## COOLING FAN

The cooling fan is temperature controlled. It will come on when the hot spot inside the unit reaches 40°C.

**The fan may, therefore, not come on at light or medium loads. This is normal**

## PROTECTIONS AGAINST ABNORMAL CONDITIONS

**6.1 LOW BATTERY ALARM:** In case the battery voltage drops below 21.4V, a buzzer alarm will be sounded. Green "Power" L.E.D. will remain on. Output voltage will still be available.

**6.2 LOW BATTERY SHUTDOWN:** In case the battery voltage further drops to 20V or below, the inverter will shut down the output voltage. Buzzer will be sounded and the green "Power" LED will be off.

**6.3 INPUT OVERVOLTAGE SHUT-DOWN:** In case the input voltage is 30V or higher, the output voltage will be shut down. (**CAUTION!** This condition may cause permanent damage.) The green "Power" L.E.D. will be off and the buzzer will be on.

**6.4 OUTPUT OVER-LOAD OR SHORT:** If there is overload or short in the output, the output voltage will be shut down. The green "Power" L.E.D. will be off. The red "over-load" L.E.D. will be lit. Remove the overload/short circuit condition. Switch off the D.C. power with the on/off switch, and switch on again. **(Unit will remain latched in shut down condition. Input power is required to be switched off and on again to reset the latch).**

**6.5 REVERSE POLARITY SHUT-DOWN:** In case the positive (+) or negative(-) connections on the input side are reversed, the 20A fuses inside the unit will blow. The LED green "Power" will be OFF. (**CAUTION!** This condition may cause permanent damage.)

**6.6 OVER TEMPERATURE SHUT-DOWN:** In case the unit gets overheated due to inadequate cooling, the output voltage will be shut-down. The green "Power" L.E.D. will be off. The buzzer will be sounded and the red "over-temp." L.E.D. will be on. Switch off the load. Determine and remove the cause of overheating. **The unit will auto reset when it cools down.**

**NOTE:** Check the Troubleshooting Guide for possible remedies to prevent the above abnormal conditions.

# TROUBLESHOOTING GUIDE

## REASON

## POSSIBLE REMEDY

### **7.1 PROBLEM: No output. Green "power" LED is OFF. Buzzer is OFF.**

- Break in battery connection
- 2 x 20A fuses inside the inverter are blown due to reverse polarity or defect in the
- Check connections are tight
- Replace the fuses. If they blow again, the unit needs to be sent for repair.

### **7.2 PROBLEM: No Output. Green "Power" LED is off. Red "Overload" LED is on. Buzzer is OFF**

- Shut down due to overload or short circuit in output
- Reduce load/ Remove short.  
**Switch off and switch on again to re-set**

### **7.3 PROBLEM: No output. Green "Power" LED is off. Buzzer is ON**

- Input voltage at inverter terminals is below 20V due to discharged battery or excessive voltage drop in the cabling from the battery to the inverter.
- Re-charge the battery  
Ensure cable from battery to inverter is thick enough to carry 60A (AWG#6)  
Ensure connection from battery to the inverter is tight and firm.

Shut down due to input voltage beyond 30V.

**(CAUTION!** This may permanently damage the inverter.)

- Inverter wrongly connected to 36V Battery instead of 24V Battery.
- Charging alternator's voltage has been set beyond 30V, or it's regulator has become defective.
- Batteries are being charged simultaneously from an unregulated solar panel set beyond 30V
- Batteries are connected to a battery charger with its boost voltage set beyond 30V
- Ensure battery is 24V
- Set the voltage correctly or repair the alternator
- Ensure that the voltage of solar panel does not exceed 30V
- Ensure that the boost voltage of the battery charger is less than 30V

# TROUBLESHOOTING GUIDE

## REASON

## POSSIBLE REMEDY

### **7.4 PROBLEM: No output. Red "Overtemp" LED is on. Buzzer is ON**

- Over temperature shut down due to inadequate cooling.
- Switch off the load. The unit will auto reset when it cools down. Check that the fan is working and it's vents are not blocked. Check ambient temp. and improve ventilation. Reduce the load

### **7.5 PROBLEM: No output when load is switched on. Green "Power" LED switches off. Red "Overload" LED comes on**

- The starting current required by the load is higher than the surge rating of 1000 watts
- Use inverter with appropriate surge rating.

### **7.6 PROBLEM: There is no output when the vehicle's engine is cranked. Green "Power" LED turns off & buzzer comes on.**

- On cranking, the battery voltage drops below 20V
- Switch OFF the inverter when cranking the engine.

### **7.7 PROBLEM: There IS output. Green "Power" LED is ON. Buzzer is ON.**

- Low input voltage alarm. Input voltage at inverter terminal is below 21.4V
- Check battery voltage
- Excessive voltage drop in the cable connection from battery to inverter. Tighten connections and use thicker gauge cable #6 AWG

# SPECIFICATIONS

8.1	Input Voltage .....	20 to 30 V DC
8.2	Input Current at No Load .....	450 milliamps
8.3	Output Voltage .....	115 V AC +/- 3%
8.4	Output Frequency .....	60 Hz
8.5	Output Voltage Waveform .....	Pure Sine Wave
8.6	Total Harmonic distortion .....	3%
8.7	Output Power	
	-Continuous .....	600 Watts
	-Surge (for few seconds) .....	1000 Watts
8.8	Low Battery Alarm .....	21.4 V
8.9	Low Battery Shutdown .....	20 V
8.10	Input Over Voltage Shut-down .....	15 V
8.11	Operating Ambient Temp. ....	0-40°C +/- 5°C
8.12	Efficiency .....	85%
8.13	Connection	
	-Input .....	Tubular type screw down terminals
	-Output .....	2 x Standard North American Outlet (NEMA 5-15R)
8.14	Fuse (Input side) .....	2 of 32V, 20A
8.15	Dimensions ( L x W x H) .....	335 x 236 x 83mm
8.16	Weight .....	3 kg / 6.6 lbs.

**Note:** Specifications are subject to change without notice.

# 1 YEAR Limited Warranty

This DC-AC inverter manufactured by Samlex America, Inc. ( the " Warrantor " ) is warranted to be free from defects in workmanship and materials under normal use and service. This warranty is in effect for 1 year from the date of purchase by the user ( the " Purchaser " )

For a warranty claim, the purchaser should do the following :

1. Prepare a written statement of the nature of the defect to the best of the Purchaser's knowledge, and include the date of purchase, the place of purchase, and the Purchaser's name, address and telephone number.
2. Call Samlex America, Inc. 1-800-561-5885 or 1 (604) 525-3836 and request a Returning Merchandise Authorization Number ( RMA ).
3. Return the defective part or unit along with the statement at the Purchaser's expense to the Warrantor ; Samlex America Inc., #110 - 17 Fawcett Road, Coquitlam, B.C. V3K 6V2 Canada.  
The RMA number must be marked clearly on the outside of the packaging.

If upon the Warrantor's examination, the defect proves to be the result of defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense.

No refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so.

Warranty service shall be performed only by the Warrantor. Any attempt to remedy the defect by anyone other than the Warrantor shall render this warranty void.

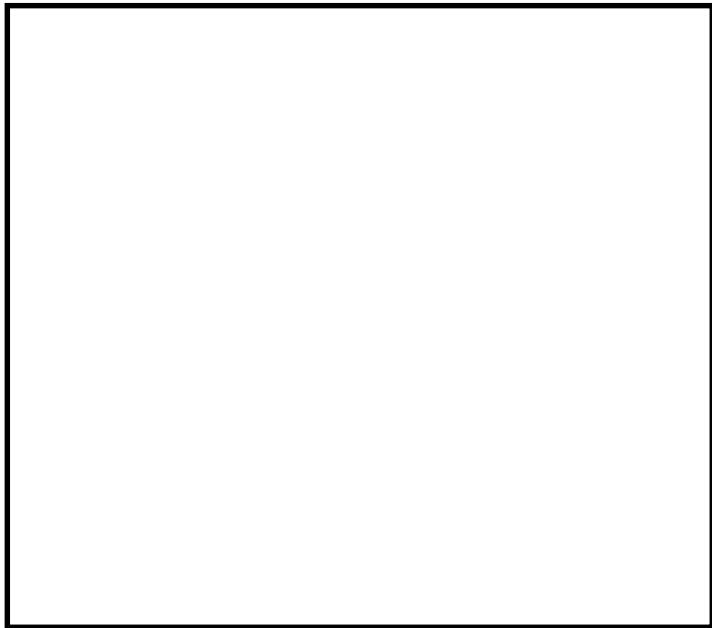
There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion.

No other express warranty is hereby given and there are no warranties which extend beyond those described herein. This warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, or any other obligations on the part of the Warrantor or its employees and representatives.

There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any persons, or damage to person or persons, or damage to property, or loss of income or profit, or any other consequential or resulting damage which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure of malfunction of the equipment, or part thereof.

The Warrantor assumes no liability for incidental or consequential damages of any kind.

Attach Receipt



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