

# AC POWER SOURCE



SAMLEX AMERICA®

## DC-AC INVERTERS

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**MODELS:**

**PSE-12100A**

**PSE-12150A**

**PSE-12250A**

## OWNER'S MANUAL

Please read this manual before operating your charger.

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## WARNING



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

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

Although this inverter has an input OVER VOLTAGE SHUT DOWN at 15V, input voltages higher than 15V 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 15V.
- Do not use an unregulated solar panel. It's voltage can reach up to 18V on a very cold day. When using a regulated solar panel, it's voltage should not be set beyond 15V.
- Do not connect to a 24V Battery .
- Ensure that the voltage of the battery charger does not exceed 15V in any condition.

**DO NOT REVERSE THE POLARITY OF THE INPUT CONNECTIONS.  
THIS WILL PERMANENTLY DAMAGE THE INVERTER.**

# GETTING STARTED

Power equipment and appliances which operate with motors or tubes require an initial surge of power to get them up and running. This power surge is referred to as the "starting load" or "surge/peak load." (By comparison devices such as standard light bulbs do not require a starting load). Once the equipment or appliance has been powered up, it settles down to a slower pace and requires far less electrical power to operate. This lower power requirement is referred to as the "continuous load."

In order to ensure that the capacity of your power inverter is sufficient to meet the required start up load, you must first determine the power consumption of the equipment or appliance you plan to operate.

Power consumption is rated either in wattage or in amperage and information regarding the required "watts" or "amps" generally is stamped or printed on most appliances and equipment. If this information is not indicated on the appliance or equipment, check the owner's manual or contact the manufacturer.

If the power consumption is rated in amps, multiply the number of amps by 117 (AC voltage) to determine the comparable wattage rating. As a general rule, you can determine the required start up load by multiplying the wattage rating by 10. It is the start up load of the equipment or appliance you plan to operate that will determine whether or not your inverter has the required capacity to power it.

For further information on the fundamental operating principles of inverters and related data, see "Technical Information Section" on page 12.

## Don't Over Load Your Inverter!

Although your power inverter has the capacity to provide power output (excess current) equal to approximately two times its rated wattage capacity for a very brief period, it is designed to operate equipment and appliances with start up load wattage ratings no higher than its own maximum continuous wattage rating.

For example, the PSE-12150A model has a maximum continuous rating of 1500 watts. Although this model has the capacity to briefly provide up to 3000 watts of surge power (that is, excess current), it is designed to operate equipment and appliances with start up load requirements of 1500 watts or less.

Consequently, if the start up load rating of your equipment or appliance is the same or approximately the same as the maximum continuous rating of the inverter, the inverter may not have the capacity to provide the required start up load.

To determine whether your inverter will operate a particular piece of equipment or appliance, run a test. The inverter is designed to automatically shut down in the event of a power overload and testing equipment and appliances with start up load ratings comparable to the maximum wattage rating of the inverter will not damage it.

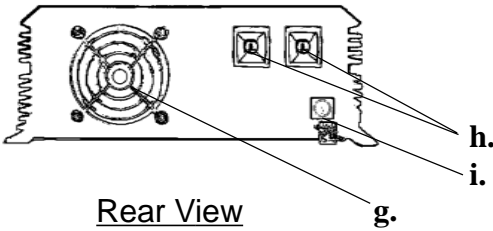
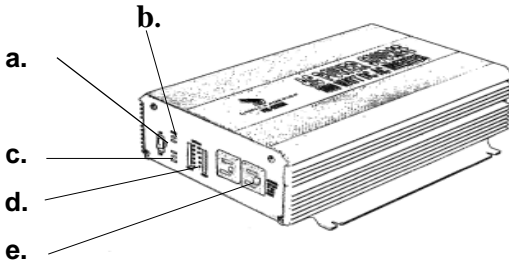
Some refrigerators, freezers, pumps and other similar equipment and appliances require very high start up loads to operate. Before attempting to power up this type of equipment or appliance, make especially certain that all connections have been properly made and that the power source is fully charged.

Once those conditions have been checked, turn the inverter switch ON and monitor the Battery Voltage Indicator (See Operating Guidelines & Safety Features). If the Voltage Indicator confirms that the input voltage is in the acceptable range, turn the inverter switch OFF, ON, OFF and ON again in quick succession. If this procedure is unsuccessful, it is likely that the inverter does not have the required start up capacity to operate the equipment or appliance in question.

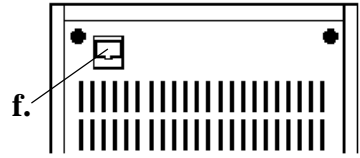
If the Voltage indicator reading falls below 11 volts during the start up process, a battery with greater CCA (Cold Cranking Amps) may be required.

# LAYOUT

## PSE-12100A, PSE-12150A

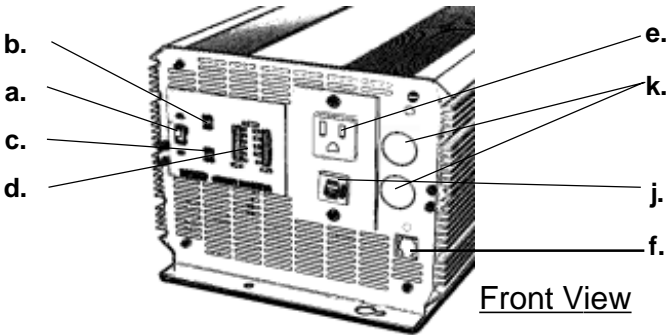


Rear View

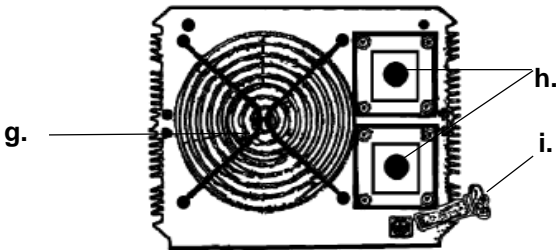


Bottom View

## PSE-12250A



Front View



Rear View

# FEATURES, CONTROLS & INDICATIONS

**Important :** Each of the following operating procedures and safety features must be carefully reviewed and thoroughly understood prior to using the inverter. Failure to do so may result in damage to the inverter or equipment or serious personal injury

- a. ON/OFF Switch.** This switch controls the flow of power from the power source to the inverter. It does not control the power running from the inverter to the equipment or appliance *being* operated.
- b. High Temperature LED Indicator Light.** This light will turn RED and the inverter will automatically shut down when the internal temperature exceeds design parameters for safe operation. When this occurs, turn the equipment or appliance off.

In the event of excess temperature, the High Speed Cooling Fan also will automatically turn on. Overheating may result when the inverter is being operated at levels exceeding its wattage rating or because it has been placed in a location or in a manner which prevents proper heat dissipation. After approximately 15 minutes, the High Temperature Indicator light and the Cooling Fan will turn off and the inverter will automatically restart indicating that the inverter temperature has dropped to a safe operating level.

- c. Over Load LED Indicator Light.** This light will turn RED and the inverter will automatically shut down when the continuous power draw from the inverter exceeds the maximum continuous power rating for the inverter. Turn the inverter OFF (0), determine and resolve the cause of the overload prior to resuming operation of the equipment or appliance. Turning the inverter ON (I) will re-set it.

## Battery Current & Voltage Bar Graph Meters (GREEN, YELLOW, RED).

**d. Current Indicator.** This illuminated Bar Graph monitors the current being drawn from the battery by the inverter. Depending on the amount of current being drawn, the Bar Graph reading generally will be in the GREEN or YELLOW zone. When the reading rises to the RED zone, the inverter may automatically shut down. In this event it is likely that the draw of the equipment or appliance being operated is greater than the battery is capable of producing.

**Voltage Indicator.** This Bar Graph indicates the DC voltage available at the input terminals of the inverter. This voltage will be lower than the voltage at the battery terminals by an amount equal to the voltage drop along the input cables and connectors. This drop is equal to the product of the input current and the resistance of the cables and the connectors. When the output power is low, the input current will be low and the drop will also be low. The input voltage at the inverter will thus be almost equal to the battery voltage. At higher output loads, the input current will be higher and the drop will also be higher, in this case, the input voltage at the inverter will be lower than the battery voltage.

The inverter is designed to operate with input voltages ranging from 10 to 15 volts of direct current (DC). When the voltage drops below 10.5 volts DC, the voltage indicator will register in the lower RED zone and an audible alarm will sound. If the voltage drops below 10 volts DC, the voltage indicator will go out and the inverter will automatically shut down.

The inverter will also shut down automatically when the input voltage exceeds 15 volts DC.

Despite this “built in” protection the inverter may be damaged if the input voltage exceeds 15 volts DC and damage caused by excess voltage input is not covered under the warranty. Under optimum conditions, the voltage reading will be in the GREEN zone.

### Note:

In the event of automatic shut down or continuous audible alarm, turn the inverter OFF (O) until the source of the related problem has been determined and resolved.

**e. Two Standard North American NEMA 5-15R Receptacles** are provided on models PSE-12100A and PSE-12150A. On PSE-12250A, the output is available from unconnected, Live (BLACK), Neutral (WHITE) and Earth ground (GREEN) wires for connection to an external breaker panel. A plate with standard North American NEMA 5-15 receptacles(e) wired in series with a 15 A circuit breaker (j) is provided as an accessory. Use this receptacle if you require power to be drawn from the front panel. (This will require connection). As this receptacle(e) is fed through a 15A breaker (j), the power drawn from here should be limited to 1500 watts.

**f.) Remote Operation Socket.** The inverter is designed to be operated from a remote location via the remote control switch which plugs into this socket. This optional accessory is available from Samlex.

**g.) High Speed Cooling Fan.** This fan will turn on automatically when the internal temperature exceeds design parameters for safe operation. The Cooling Fan will automatically turn off when the temperature drops to a safe operating level. **This fan does not run continuously.**

**h.) Power Input Terminals** (WHITE/Negative, RED/Positive)

**i.) Chassis Ground Terminal Lug**

**j.) Circuit Breaker.** This is provided for PSE-12250A

**k.) Punched Holes.** These holes are provided for entry of cables going to the external Breaker Panel (when hard wired)



# SELECTING THE OPTIMUM POWER SOURCE

Use a Deep Cycle Battery for powering an inverter as this type of battery is designed to deliver large currents for long durations. Do not use an automotive starter battery because these batteries are designed with thinner plates to provide large current for a very short duration to crank the engine. They are not designed to provide large currents for long durations.

The capacity of a battery is expressed in Ampere Hours (AH) or in Reserve Capacity (RC) in minutes. Multiply the Reserve Capacity in minutes by 0.3 to get Ampere Hour capacity ( e.g. RC of 166 minutes =  $166 \times 0.3$  AH or approx. 50 AH )

The approximate current drawn in Amperes by an inverter from a 12 V battery is determined by dividing the output power drawn from the inverter by 10. For example if the full 2500 Watts of output power is drawn from PSE-12250A inverter, the battery will be required to deliver 250 Amperes ( 2500 Watts divided by 10 = 250 Amperes )

**Example for determining battery capacity is given below:**

Let us say that it is required to run a 2500-Watt load from PSE-12250A inverter for 2 hours.

Current required to be delivered by the battery = 2500 Watts divided by 10 = 250 Amps

AH required to be delivered by the battery = 250 Amps x 2 Hours = 500 AH

Hence, the AH capacity of the battery should be more than 500 AH ( or 500 divided by 0.3 = 1666 RC )

Use 3 Type 8D 12 V batteries in parallel to get 600 AH capacity

**Note:**

The AH capacity can be increased by connecting 2 or more batteries in parallel. For example, if 3 type 8D , 12 V batteries ( Each 8 D has a capacity of 200 AH ) are connected in parallel, the net capacity will be  $200 \text{ AH} \times 3 = 600 \text{ AH}$

When using high capacity inverter in an automobile, do not use the starter battery but an auxiliary deep cycle battery as explained above. Also, if the starter battery is used and it gets discharged while powering a load connected to the inverter, it may not be able to start the automobile engine.

# USING PROPER WIRE CABLE SIZES

For safe and proper operation of the inverter, connect the inverter to the power source with the thickest wire available and in the shortest length practical.

**PSE-12100A (1000 Watt) and PSE-12150A (1500 Watt) Models.**

When the inverter and the battery are set up within four feet of each other, use a minimum of #4 gauge wire to make the connections. Within four to six feet, use a minimum of #2 gauge wire. At distances of more than six feet, use #0 gauge wire.

Regardless of the wire gauge selected to make the connections to the battery, we recommend use of an "0 Ring Adapter." Use of #0 gauge wire to make the connections to the inverter may require a "0 to 4 Gauge Adapter". Both adapters are available through electronic supply stores including Radio Shack.

### **PSE-12250A ( 2500 Watt ) Model.**

When the inverter and the battery are set up within four feet of each other, use a minimum of #2 gauge wire to make the connections. Within four to six feet, use a minimum of #0 gauge wire. At distances of more than six feet, use two #0 gauge wires connected in parallel to the battery. This connection will require eight 0 Ring Adapters as referenced above. Alternatively, use #00 (2/0) gauge wire with the appropriate adapters. These #00 gauge wire adapters are available through most electronic supply stores.

## **INSTALLATION & OPERATION**

1. Make certain the inverter power switch is in the OFF position.
2. Connect one wire each to the Negative and Positive terminals at the rear of the inverter and tighten the screws to make a secure connection. Do not over tighten these screws. (To make these connections on the PSE-12250A model, remove the supplied nut at each terminal on the inverter, install the wire connectors flush with the metal backing plates and refasten the nuts securely. **DO NOT** over tighten these nuts).
3. Connect the wire from the Negative (-) terminal (WHITE on the PSE-12100A and PSE-12150A models, BLACK on the PSE-12250A model) on the inverter to the Negative (-) terminal on the 12 volt power source. Make certain the connection is secure.
4. Confirm that the wire you have just installed is properly connected. (Specifically, make certain that the wire is connected to the Negative (-) terminals on both the inverter and the 12 volt power source).
5. Connect the wire from the Positive (+) terminal (RED on all three models) on the inverter to the Positive (+) terminal on the power source. Make certain that the connection is secure.

### **Note:**

**DAMAGE CAUSED BY REVERSING POLARITY IS NOT COVERED UNDER WARRANTY**

Failure to make a proper connection between the inverter and the power source will result in reverse polarity. Reverse polarity will blow the internal fuses in the inverter and permanently damage the inverter. Damage caused by reverse polarity is not covered under the warranty.

Loose connections can result in a severe decrease in voltage which may cause damage to the wires and insulation.

The audible alarm may make a momentary "chirp" when the inverter is being connected to or disconnected from the power source. This is normal. Making the connection between the Positive terminals may cause a spark as a result of current flowing to charge capacitors within the inverter. This is a normal occurrence. Due to the possibility of sparking, however, it is extremely important that both the inverter and the 12 volt battery be well removed from any possible source of flammable fumes or gases.

**CAUTION ! Failure to heed this warning could result in fire or explosion.**

6. Run a ground from the Ground Lug Terminal at the rear of the inverter to a proper grounding point using the shortest practical length of 8 AWG wire. Selection of the grounding point will depend on where you are using the inverter. The ground wire may be connected to the chassis of your vehicle or to the grounding system in your boat or to the earth if you are operating the inverter in a remote location. Before connecting the ground, make certain that the inverter is turned off. Operating the inverter without properly grounding it may result in electrical shock.
7. Turn the inverter ON (I). Check the Bar Graph Meter on the front panel. The Voltage Bar Graph should read between 11 and 14 volts depending on the voltage of the power source. If the reading is not within this range, check the voltage of the power source and the terminal connections on the power source and the inverter to make sure they are secure.  
Neither the High Temperature or Over Load LED Indicators should be lighted.
8. Turn the inverter OFF (O). The High Temperature and Over Load Indicators may “blink” briefly. This is normal. Also, the internal audible alarm may make a momentary “chirp.” This is normal.
9. Confirm that the equipment or appliance to be operated is turned off. Plug the equipment or appliance into one of the two AC receptacles on the front panel of the inverter.
10. Turn the inverter on. Turn the equipment or appliance on.

**Note :**

The use of an extension cord from the inverter to the appliance or equipment being operated will not significantly decrease the power being generated by the inverter. For best operating results, the extension cord should be no more than 50 feet long.

**The following precautions apply to the PSE-12250A ( 2500 Watt ) model only.**

- a). The AC receptacle on the **PSE-12250A** is equipped with a 15 amp circuit breaker. Consequently, **this outlet is rated for a maximum output of 1500 watts** (117 volts x 15 amps).  
To generate the maximum output of 2500 watts, the 2500 model should be connected to a power supply source which has the capacity to produce 250 amps.  
If more than one piece of equipment or appliance is to be operated at the same time, first turn on the inverter and then turn on each piece of equipment or appliance separately to enable the inverter to produce the required start up loads.
- b). The 2500 Watt model is designed for direct wiring to an External Breaker Panel via the direct wire connection “cut out” (k) on the front panel of the inverter.

This direct wire connection must be performed only by a licensed electrician. Failure to make this connection properly may result in severe injury.

## **APPLIANCES THAT MAY NOT OPERATE CORRECTLY ON MODIFIED SINEWAVE**

The output waveform of this inverter is a modified sinewave (see page 12)

NOTE: A sine wave rises and falls smoothly (at a slope) and also crosses 0V instantly at a slope. A modified sinewave rises and falls abruptly (no slope) and also sits at the 0V level for sometime before crossing over abruptly (no slope). Thus, any appliance that uses a control circuitry that is required to sense a slope and/or instant zero crossing will not operate correctly with a modified sinewave. Examples of such appliances are given below:

- Some models of appliances that have built-in clocks, such as clock radios, alarm clocks, coffee makers, breadmakers, VCR and microwave ovens may not keep time correctly.
- Most devices with variable speed such as electric drills may work irrationally when operating with modified sinewave. The variable speed control may not work, and the unit may work only at full speed.

### **CAUTION:**

**CERTAIN BATTERY CHARGERS FOR CORDLESS BATTERY OPERATED TOOLS, FLASHLIGHTS, VIDEO CAMERAS AND LAPTOP COMPUTERS MAY GET EXCESSIVELY HOT AFTER 10 TO 15 MINUTE OF USE. THESE CHARGERS SHOULD NOT BE POWERED FROM THIS WAVEFORM.**

## **POWERING TELEVISION AND AUDIO EQUIPMENT**

Although the inverter is shielded and filtered to minimize signal interference, some interference with your television picture may be unavoidable, especially with weak signals. However, here are some suggestions that may improve the reception.

1. First, make certain that the television antenna produces a clear signal under normal operating conditions (i.e., at home plugged into a standard 117 AC wall outlet). Also, ensure that the antenna cable is properly shielded and of good quality.
2. Change the relative positions of the inverter, antenna cables and television power cord.
3. Isolate the television, its power cord and antenna cables from the 12 volt power source by running an extension cord from the inverter to the television set.
4. Coil the television power cord and the input cables running from the 12 volt power source to the inverter.
5. Attach a "Ferrite Data Line Filter" to the television power cord. More than one filter may be required. These filters are available at most electronic supply stores including Radio Shack.

### **Note :**

Inexpensive sound systems may emit a "buzzing" sound when operated with the inverter. This is due to inadequate filters in the sound system. There is no solution to this problem short of purchasing a sound system with a higher quality power supply.

# USING THE INVERTER TO POWER MICROWAVE OVENS

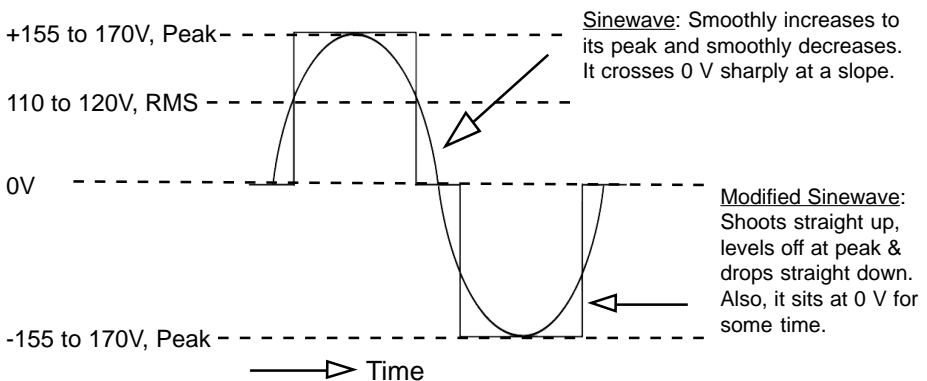
The power rating commonly associated with microwave ovens is the "cooking power" which is the power being "delivered" to the item being microwaved. The actual operating power requirement rating is higher than the cooking power rating and typically is referenced on the back of the microwave. If the operating power requirement does not appear on the back of the microwave, check the owner's manual or contact the manufacturer. As a thumb rule, the electrical power drawn by the microwave oven can be taken as 2 times the cooking power.

## TECHNICAL INFORMATION

### Basic Operating Principles of Modified Sine Wave Inverters.

Inverters work in two stages. During the first stage, the DC to DC converter increases the DC input voltage from the power source (e.g. a 12 volt battery) to approx. 155 to 170 VDC. In the second stage, the high voltage DC is converted to 110 to 120 volts (60 Hz AC), using advanced power MOSFET transistors. The output waveform resulting from this conversion is a "quasi-sine wave" or a "modified sine wave" as shown below.

This stepped waveform is nearly similar to the sinewave power generated by utilities and has a broad range of applications.



The modified sine wave produced by inverters has a root mean square (RMS) voltage of 110 to 120 volts. The majority of AC voltmeters are not calibrated to measure true RMS voltage and assume that the measured waveform will be a pure sine wave.

Consequently, these meters will not read the true RMS modified sine wave voltage correctly and when measuring the inverter output, the meters will read about 20 to 15 volts too low. To accurately measure of the output voltage of the inverter, use a true RMS reading voltmeter such as a Fluke 87, Fluke 8060A, Beckman 4410, Triplet 4200 or any multi-meter identified as true RMS.

## INSTALLATION LOCATIONS

The inverter will work best when placed on a reasonably flat surface. The floor of your car or truck is an acceptable location as long as the area is dry and well ventilated.

To maintain the inverter in proper working condition, note the following important safety precautions:

### ! CAUTION !

- **MOISTURE.** Keep the inverter dry. Do not expose it to moisture. Do not operate the inverter if the devices being operated, or any other surfaces that may come in contact with any power source, are wet. Water and many other liquids can conduct electricity which may lead to serious injury or death.
- **HEAT.** The ambient air temperature should be between 50° and 80° F. Avoid placing the inverter on or near heating vents, radiators or other sources of heat. Do not place the inverter in direct sunlight.
- **VENTILATION.** In order to properly disperse heat generated while the inverter is in operation, keep it well ventilated. While in use maintain several inches of clearance around the top and sides of the inverter.
- **FUMES & GASES.** Avoid using the inverter near flammable materials. Do not place the inverter in areas such as battery compartments where fumes or gases may accumulate.

## REVIEW

- Never parallel the AC output of the inverter with another inverter or other AC power source
- Never attempt to operate the inverter from any power source other than a 12 volt battery.
- Always ensure the power cable terminal connections run Negative (-) to Negative (-) and Positive (+) to Positive (+). Check these connections frequently to ensure they are secure.
- Use the heaviest gauge wire available to connect the inverter to the power source.
- While connecting the inverter to the power source, make certain that the inverter is well removed from any potential source of flammable fumes or gases.
- Direct connection of the PSE-12250A (2500 Watt) model inverter to an external breaker panel is to be made only by a licensed electrical technician.
- Always ground the inverter before operating it.
- Make certain the power consumption of the appliance or equipment you wish to operate is compatible with the capacity of the inverter.
- If the rated power consumption of the equipment is in the range of the rated capacity of the inverter, test the inverter to ensure that it will operate properly.
- When attempting to recharge battery chargers, monitor the temperature of the battery charger for approximately 10 minutes. If the battery charger becomes abnormally warm, disconnect it from the inverter immediately.
- When operating the inverter with an automobile or marine battery, start the engine every 15 to 60 minutes and let it run for approximately 10 minutes to recharge the battery.
- In the event a continuous audible alarm or automatic shut off, turn the inverter OFF immediately. Do not restart the inverter until the source of the problem has been identified and corrected.
- Always disconnect the inverter when not in use.
- Do not expose the inverter to moisture.
- Avoid placing the inverter near sources of heat or in direct sunlight.
- When in use, make certain the inverter is properly ventilated.
- Always operate the inverter in accordance with the instructions in this manual. Failure to do so may result in property damage, personal injury or loss of life.

# SPECIFICATIONS

	<b>PSE-12100A</b>	<b>PSE-12150A</b>	<b>PSE-12250A</b>
Input Voltage, Volts DC	10-15V	10-15V	10-15V
Input current at rated continuous output power, Amperes	125A	200A	300A
Output voltage, Volts RMS	117 +/- 5% / -10%	117 +/- 5% / -10%	117 +/- 5% / -10%
Output frequency, Hz	60Hz	60Hz	60Hz
Continuous output power, Watts	1000W	1500W	2500W
Instantaneous overload (surge) for 2 sec., Watts	2000W	3000W	4000W
Output Waveform	Modified Sine Wave	Modified Sine Wave	Modified Sine Wave
No load current draws, milli-ampere	<0.35A	<0.45A	<0.80A
Optimum efficiency	85 to 90%	85 to 90%	85 to 90%

## **PROTECTIONS:**

High input voltage shut down & latch, Volts DC	15V	15V	15V
Low input voltage alarm, volts DC	10.5V	10.5V	10.5V
Low input voltage shutdown & latch, Volts DC	10V	10V	10V
Temperature controlled fan for cooling	Yes	Yes	Yes
Overtemp. shut-down and automatic recovery	Yes	Yes	Yes
Continuous overload shut-down & auto recovery, Watts	1500W +/- 10%	2000W +/- 10%	3500W +/- 10%
Output short circuit shut down & auto recovery	Yes	Yes	Yes

## **INDICATIONS:**

INPUT VOLTAGE LED BAR GRAPH	Yes	Yes	Yes
INPUT CURRENT LED BAR GRAPH	Yes	Yes	Yes
RED LED FOR OVERLOAD	Yes	Yes	Yes
RED LED FOR OVERTEMP	Yes	Yes	Yes
Input side DC Fuses	30A x 5 pcs.	30A x 8 pcs.	30A x 12 pcs.
Automotive Type ATC, 32V			

## **ENVIRONMENT CONDITIONS:**

Operating Temp, deg. C	0 to 40C	0 to 40C	0 to 40C
Storage Temp, deg. C	-10 to 65C	-10 to 65C	-10 to 65C
Relative Humidity	Up to 85%	Up to 85%	Up to 85%

## **OUTPUT CONNECTORS:**

Wires for connection to external distribution panel	No	No	Yes
Receptacle, NEMA 5-15R	2	2	1
Dimensions W x D x H, mm	238 x 342 x 86	238 x 462 x 86	216 x 495 x 160
Weight, Kg.	4.1	5.7	10.1



# TROUBLESHOOTING GUIDE

## PROBLEM: Low or No Output Voltage

REASON	POSSIBLE SOLUTION
Capacity of the battery is inadequate.	Use higher capacity battery.
Poor contact with battery terminals.	Clean terminals thoroughly.
Automatic Shutdown due to battery voltage below 10 volts.	Recharge or replace battery.
Automatic Shutdown as equipment being operated draws too much power. Red overload LED lights.	Use a higher capacity inverter or do not use this equipment.
Automatic Shutdown as the inverter is too hot.	Allow inverter to cool. Check for adequate ventilation. Reduce the load on the inverter to rated continuous power output.
Using incorrect type of voltmeter.	Use true RMS reading meter See Page 12 "Technical Information" .
Automatic Shutdown due to input voltage beyond 15V (this may permanently damage the inverter).	
Inverter connected to 24V battery instead of 12V.	Ensure battery is 12V.
Charging alternator's voltage has been set beyond 15V, or its regulator has become defective.	Set the voltage correctly or repair.
Batteries are being charged simultaneously from an unregulated solar panel or a regulated solar panel set beyond 15V	Disconnect unregulated solar panel when using the inverter or set voltage of regulated solar panel to less than 15V.
Battery charger connected to the batteries with its boost voltage higher than 15V.	Disconnect the battery charger when using the inverter or ensure its boost voltage is less than 15V.
Polarity of input connection was reversed.	None. Will cause permanent damage.

# TROUBLESHOOTING GUIDE

## PROBLEM: Low Battery Alarm is On All The Time

REASON	POSSIBLE SOLUTION
Input voltage below 10.5V due to poor or weak battery condition.	Charge or replace the battery.
Input voltage below 10.5V due to thin/long battery cables which cause excessive voltage drop.	Use lower gauge wire. See Page 8 "Wire Cable Sizes" section of this manual. Keep wire length as short as possible.

## PROBLEM: TV Interference

REASON	POSSIBLE SOLUTION
Electrical interference from inverter.	Add a Ferrite data line filter onto the TV power or See Page 11 "Television and Audio Equipment" section of this manual.





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