



**samlex**power®

**DC-AC  
Inverter**  
⚡ Pure Sine  
Wave

SAM-450-12E

Owner's  
Manual

Please read this  
manual BEFORE  
installing your  
Inverter.

# OWNER'S MANUAL | Index

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## SECTION 1 | Important Safety Instructions

To ensure reliable service, your power inverter must be installed and used properly. Please read the installation and operating instructions thoroughly prior to installation and use. Pay particular attention to the WARNING and CAUTION statements in this manual.

The CAUTION statements advise against certain conditions and practices that may result in damage to your inverter. The WARNING statements identify conditions or practices that may result in personal injury. **Read All Instructions Before Using This Power Inverter!**



### WARNINGS

TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, EXPLOSION OR INJURY

1. Do not connect to AC distribution wiring.
2. Remove appliance plug from outlet strip or turn off inverter before working on the appliance.

Multiple outlet power strips with switches and circuit breakers interrupt power only to the "hot" receptacle terminals. The "neutral" terminals remain powered with respect to the "ground" terminals.

3. Do not make any electrical connections or disconnections in areas designated as IGNITION PROTECTED. This includes 12 VDC cigarette plug connections, and terminal connections.
4. This is not a toy - keep away from children.
5. DO NOT insert objects into air vents.



### CAUTIONS

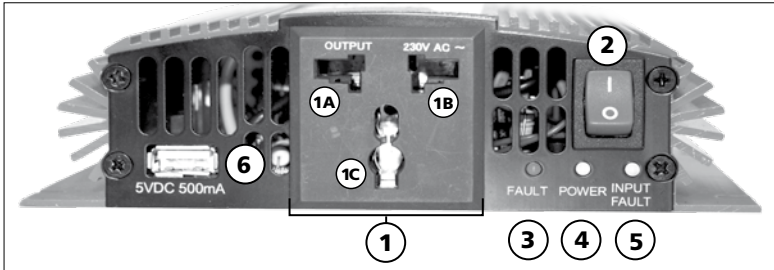
1. Do not use with positive ground electrical systems (the majority of modern automobiles, RVs, trucks and boats are negative ground). Reverse polarity connection will result in a blown fuse and may cause permanent damage to the inverter.
2. This inverter will not operate high wattage appliances over the output power limit or surge power limit.
3. Grounding the neutral will cause the inverter to shut down. Do not operate this inverter if it is wet. Do not install in engine compartment – please install in a well ventilated area.
4. This inverter is not tested for use with medical devices.

### IMPORTANT CABLE INFORMATION

Substantial power loss and reduced battery operating time results from inverters installed with cables that are not able to supply full power. Symptoms of low battery power can result from cables that are either excessively long or an insufficient gauge. The installer/operator should be especially aware of the requirements to maintain SECURE, TIGHT, WATER-RESISTANT electrical connections and to provide for strain relief for DC cables and appliance wiring. Cable insulation must be the appropriate type for the environment.

## SECTION 2 | Layout: SAM-450-12E

### Front Panel



### Back Panel



### Front Panel

1. Universal AC output receptacle  
1A - Current carrying prong  
1B - Current carrying prong  
1C - Grounding prong
2. ON/OFF Switch
3. RED LED - "Fault"
4. GREEN LED - "Power"
5. YELLOW LED - "Input Fault"
6. USB port

### Accessories

10. Battery input cable set with battery clamps
11. Battery input cable set with cigar plug



### Rear Panel

7. Red Thumb Screw (M4 size) for Positive (+) battery input terminal
8. Black Thumb Screw (M4 size) for Negative (-) battery input terminal.  
*\*NOTE: The Negative terminal is internally bonded to the metal chassis of the inverter.*
9. Opening for cooling fan discharge

Figure: SAM-450-12E Front & Back Panel Layout & Accessories

## SECTION 3 | Introduction

Your new SAM Series power inverter is one in a series of the most advanced DC to AC inverters available today. With proper care and appropriate usage, it will give you years of dependable service in your car, truck, RV or boat.

SAM Series inverters designed with a universal protection circuit that provide added safety features include automatic shutdown, earth fault protection and a low battery alarm to prevent damage to your battery.

This power inverter is configured with the latest low interference technology (*L.I.T.*), Universal Protection Circuit (*UP-Circuit*) and Soft Start circuit to improve inverter operation.

### **UP-Circuit**

Provides full automatic inverter and battery protection. This includes overheat protection, battery protection, overload protection, short circuit protection and earth fault protection.

### **L.I.T.**

Greatly improve the interference problems of common power inverter. Before introduction of L.I.T., signal interference may occur on TV pictures, audio system or radio equipments. Now you can enjoy a clean and powerful AC source!

### **Soft Start Circuit**

Provides three major features. First, gradual voltage ramp-up during inverter start-up. This eliminates failed cold starts under load. Second, output that momentarily dips in voltage and quickly recovers. This eliminates most shutdowns from momentary overloads.

### **Load Controlled Cooling Fan**

The fan will switch on automatically when the load > 8 to 12W and switch off when load drops below 8 to 12W.

### **USB Charging Port**

A USB charging port rated at 5V, 500 mA is provided for charging devices provided with USB charging facility.

## SECTION 4 | How Your Inverter Works

The inverter converts low voltage DC (Direct Current) from a battery or other power source to standard 230 volt AC (Alternating Current) household power.

### PRINCIPLE OF OPERATION

The inverter converts power in two stages. The first stage is a DC to DC conversion process that raises the low voltage DC at the inverter input to around 300 volts DC. The second stage is the actual inverter stage that converts the high voltage DC into 230 VAC, 50 Hz AC (RMS). The DC-to-DC converter stage uses modern high frequency power conversion techniques that have replaced the bulky transformers found in less technologically-advanced models. The inverter stage uses advanced power MOSFET transistors in a full bridge configuration.

### THE OUTPUT WAVEFORM

The AC output waveform of the SAM Series inverter is known as "modified sine wave". It is a waveform that has characteristics similar to the sine wave shape of

utility power. This type of waveform is suitable for most AC loads, including linear and switching power supplies used in electronic equipment, transformers, and motors. (See Fig. 1 below).

The modified sine wave produced by the inverter has an RMS (root mean square) voltage of 230 volts, which is the same as standard household power. Most AC voltmeters (both digital and analog) are sensitive to the average value of the waveform rather than the RMS value. They are calibrated for RMS voltage under the assumption that the waveform measured will be a pure sine wave. These meters will not read the RMS voltage of a modified sine wave correctly. They will read about 20 to 30 volts low when measuring the output of the inverter. For accurate measurement of the output voltage of this unit, use a true RMS reading voltmeter such as a Fluke 87III, Fluke 8060A, Fluke 77/99 series or Beckman 4410.

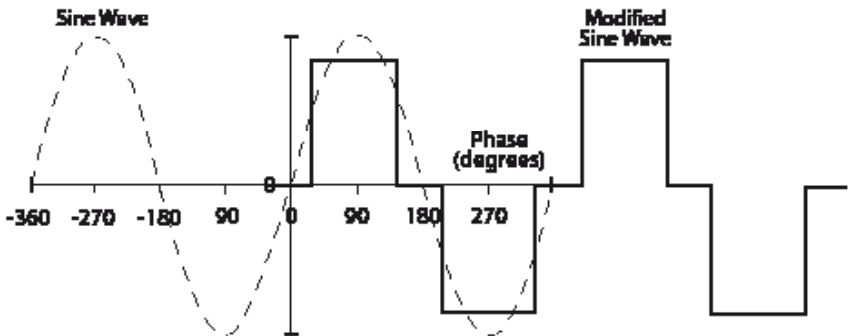


Fig. 1: Modified Sine Wave and Sine Wave Comparison

## SECTION 5 | Installation - DC Input Power Source, Grounding & Mounting

### POWER SOURCE REQUIREMENTS

The power source must provide > 10.0 and < 15.5 VDC and must be able to supply the necessary current to operate the load. The power source may be a battery or a well-regulated DC power supply. To obtain a rough estimate of the current (in amperes) the power source must deliver, simply divide the power consumption of the load (in watts AC) by 10.

#### Example:

If a load is rated at 100 watts AC, the power source must be able to deliver:  
 $100 / 10 = 10A$

The inverter will provide you 230 VAC, 50 Hz when powered by a 12 VDC source such as is found in a vehicle. This manual does not describe all of the possible types of battery configurations, battery charging configurations and battery isolation configurations.

### GROUNDING

For safety, the metal chassis of the inverter is required to be grounded to the earth ground or to the other designated ground (For example, in a mobile RV, the metal frame of the RV is normally designated as the Negative DC ground).

Internally, the metal chassis of the inverter is bonded (connected) to the Negative DC input terminal (8). When the unit is operated in a Negative Grounded Vehicle System (the Negative of the vehicle battery is bonded to the metal chassis of the vehicle), the metal chassis of the inverter will be automatically bonded to the Vehicle Chassis Ground.



### WARNINGS

If the inverter is not being used in a vehicle, please ensure that the Negative of the battery is firmly bonded to Earth Ground (through water pipe / Ground Rod / other Earth grounding arrangement). This will ensure that the chassis of the inverter is firmly "grounded". Use a # 8 AWG insulated stranded copper wire for the above bonding.

Prongs (1A) and (1B) of the AC output receptacle (1) are isolated from the metal chassis of the inverter and the Vehicle / Earth Ground. The grounding prong (1C) is connected to the Leakage Detection and Shutdown Circuit. This implementation and internal circuit design results in elevated voltages of 80 to 150 VAC of prongs (1A) / (1B) relative to prong (1C) or to the chassis. Do not touch prongs (1A) or (1B).

Connecting output from prongs (1A) or (1B) to chassis or ground will result in shut down due to activation of leakage protection circuit.

Do not connect to AC distribution wiring where the neutral is bonded to earth ground. Inverter will shut down due to leakage protection

## SECTION 5 | Installation - DC Input Power Source, Grounding & Mounting

### INSTALLATION NOTES



#### WARNING

Ensure ventilation when using batteries. Batteries may generate flammable gas during charging or discharging.

### MOUNTING

The inverter has four slots in its mounting bracket that allow the unit to be fastened against a bulkhead, floor, wall or other flat surface. Ideally, the mounting surface should be cool to the touch.

It is more electrically efficient to use longer AC wiring than DC wiring, so install the inverter as close as possible to the 12 VDC power source.

If inverter is to be installed in a moving vehicle, we strongly recommends that the

inverter be shock-mounted either on the floor (in a clear, safe area) or on a secure flat surface.



#### CAUTION

The power inverter must be connected only to batteries with a nominal output voltage of 12 volts. The unit will not operate from a 6 volt battery, and **WILL SUSTAIN PERMANENT DAMAGE IF CONNECTED TO A 24 VOLT BATTERY.**

#### CAUTION

Loose connectors may cause overheated wires and melted insulation. Check to make sure you have not reversed the polarity. Reverse polarity connection will result in a blown fuse and **MAY CAUSE PERMANENT DAMAGE** to the inverter.

## SECTION 6 | Input, Output Connections & Operation

### OPERATING ENVIRONMENT

The inverter should only be used in locations that meet the following criteria:

**DRY** - Do not allow water or other liquids to come into contact with the power inverter. In marine applications, do not install the inverter below or near the waterline and keep the inverter away from moisture.

**COOL** - Ambient air temperature should be between 32°F (0°C) non-condensing, and 105°F (40°C). Do not place the inverter on or near a heating vent or any piece of equipment which is generating heat above room temperature. Keep the inverter away from direct sunlight.

**VENTILATED** - 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 exceeds operating temperatures.

**SAFE** - Do not use the inverter near flammable materials or in any locations that may accumulate flammable fumes of gases.

### DC INPUT CONNECTIONS

12 VDC input voltage from the battery is fed to the DC input terminals (7, 8). For feeding 12 VDC battery input, two sets of



## SECTION 6 | Input, Output Connections & Operation

cables (10, 11) have been provided (see page 4):

- Use the battery input cable with the battery clamps if the full 450 W output is required. Ensure that a 60 A to 70A Class T fuse is used in series with the battery Positive wire as close to the battery as possible (within 7").
- Use the battery cable with the cigar plug if the maximum load is less than 80 W. Please note that the cigar plug has an internal fuse rated at 8 A and this fuse will blow if the wattage of the AC load is more than 80 W. The cigar plug wiring in the vehicle is normally protected by a 10 A fuse inside the fuse box of the vehicle
- Ensure that the connections are tight

### AC OUTPUT CONNECTIONS

The AC output of the inverter is fed through a Universal, 2-Pole Grounding Receptacle (1). Internally, the 2 AC current carrying conductors providing 230 VAC, 50 Hz voltage from the output section of the inverter are wired to the 2 current carrying prongs (1A and 1B) of the receptacle and BOTH THE PRONGS (1A) AND (1B) ARE ISOLATED FROM THE CHASSIS OF THE INVERTER AND VEHICLE / EARTH GROUND. Voltage measured between the 2 current carrying prongs (1A) and (1B) will read 230 VAC, 50 Hz (see page 4).

### POWERING ON AC LOADS

After the inverter is switched on, it takes a finite time for it to become ready to deliver full power. Always switch on the load(s) after a few seconds of switching on the inverter. Avoid switching on the inverter with the load already switched on. This may prematurely trigger the overload protection. When a load is switched on, it

may require initial higher power surge to start. If multiple loads are being powered, they should be switched on one by one so that the inverter is not overloaded by the higher starting surge.

### OPERATION

Plug the cord from the equipment you wish to operate into the AC receptacle. The green LED indicator lights to indicate that the inverter is functioning. Make sure the combined load requirement of your equipment does not exceed inverter's output rating.

Do not connect the power inverter to household or RV AC distribution wiring. Do not connect the power inverter to any AC load circuit in which the neutral conductor is connected to ground (earth) or to the negative of the DC (battery) source.

### RATED VERSUS ACTUAL CURRENT DRAW OF EQUIPMENT

Most electrical tools, appliances and audio/video equipment have labels that indicate the power consumption in amps or watts. Be sure that the power consumption of the item you wish to operate is less than inverter's power. (If the power consumption is rated in amps AC, simply multiply by the AC volts (230) to determine the approximate wattage). The inverter will shut down if it is overloaded. The overload must be removed before the inverter will restart. Resistive loads are the easiest for the inverter to run. However, larger resistive loads, such as electric stoves or heaters, usually require more wattage than an average sized inverter can deliver. Inductive loads, such as TV's and stereos, require more current to operate than do resistive loads of the same wattage rating. Induction motors, as well as some televisions, may require 2 to 6

## SECTION 6 | Input, Output Connections & Operation

times their wattage rating to start up. The most demanding in this category are those that start under load, such as compressors and pumps. To restart the unit after a

shutdown due to overloading, remove the overload if necessary turn the power switch OFF then ON.

## SECTION 7 | Protective Features of the Inverter

### OVER TEMPERATURE PROTECTION

If the temperature inside the inverter is too high, the unit will automatically shut down. Allow the unit to cool for at least 15 minutes before restarting. Unplug unit while cooling. Status of LEDs and buzzer:

Red LED "FAULT" (3) ..... OFF  
 Green LED "Power" (4) ..... ON  
 Yellow LED "Input Fault"(5) ..... ON  
 Buzzer ..... OFF  
 Reset ..... Auto-reset on cooling

### LOW DC INPUT VOLTAGE PROTECTION

This condition is not harmful to the inverter but could damage the power source. The inverter automatically shuts down when input voltage drops to 10.0 volts. Status of LEDs and buzzer:

Red LED "FAULT" (3) .....OFF  
 Green LED "Power" (4) .....OFF  
 Yellow LED "Input Fault" (5) .....ON  
 Buzzer .....ON  
 Reset\* ..... Auto- reset  
 \*When DC input voltage rises to 11.5 VDC

### HIGH DC INPUT VOLTAGE PROTECTION

The inverter will automatically shut down when the input voltage exceeds 15.5 volts DC. Input voltage exceeding 16 volts could damage the inverter. Status of LEDs and buzzer:

Red LED "FAULT" (3) .....OFF  
 Green LED "Power" (4) .....OFF

Yellow LED "Input Fault" (5) .....ON  
 Buzzer .....OFF  
 Reset\* ..... Auto-reset  
 \* When DC input voltage < 15.5 V

### OVERLOAD PROTECTION

The inverter will automatically shut down when the continuous draw exceeds rated watts.

Red LED "FAULT" (3) ..... ON  
 Green LED "Power" (4) ..... ON  
 Yellow LED "Input Fault" (5) .....OFF  
 Buzzer .....OFF  
 Reset\* ..... Manual reset  
 \*Switch OFF, wait for around 3 min, switch ON

### SHORT CIRCUIT PROTECTION

The inverter will shut down. Remove the short circuit and restart inverter. Status of LEDs and buzzer:

Red LED "FAULT" (3) .....ON  
 Green LED "Power" (4) .....ON  
 Yellow LED "Input Fault" (5) .....OFF  
 Buzzer .....OFF  
 Reset\* ..... Manual reset  
 \*Switch OFF, wait for around 3 min, switch ON

### EARTH FAULT PROTECTION

This inverter complies with the standard current leakage allowance. When large current leakage to earth terminal occurs, the protection circuit is activated and shuts down the inverter, which prevent s electric shock. Status of LEDs and buzzer:

## SECTION 7 | Protective Features of the Inverter

Red LED "FAULT" (3) .....ON  
Green LED "Power" (4) .....ON  
Yellow LED "Input Fault" (5) .....OFF  
Buzzer .....OFF  
Reset\* .....Manual reset  
\*Switch OFF, wait for around 3 min, switch ON

Red LED "FAULT" (3) .....OFF  
Green LED "Power" (4) .....ON  
Yellow LED "Input Fault" (5) .....OFF  
Buzzer .....ON  
Reset .....Auto- reset

### LOW INPUT VOLTAGE ALARM

An alarm will sound when the DC input voltage from the battery drops to 10.5 volts. This is an indication that the battery needs to be recharged. The user should stop operation of the electronic device at this time since the inverter will shut down shortly thereafter, when the battery voltage drops to 10 volts. Start your engine to recharge the battery. Status of LEDs and buzzer:

If the low DC input voltage alarm sounds when the battery is fully charged, follow the steps for solving lack of output power in the Troubleshooting guide. The alarm will sound when the inverter is overloaded, in thermal shutdown, or if there is an excessive voltage drop between the battery and inverter.

**NOTE:** It is normal for the alarm to sound while the unit is being connected to, or disconnected from, the power source. This is not indicative of a problem.

## SECTION 8 | Common Problems

### POWER TOOLS AND MICROWAVE OVENS WON'T START

Read the information panel on each power tool carefully to accurately determine the tool's input wattage. Please remember that the power needed to start the power tool may be as much as 2 to 6 times its continuous wattage requirements.

### "BUZZING" SOUND IN AUDIO SYSTEMS

Some inexpensive stereo systems and "boom boxes" emit a buzzing sound from their speakers when operated from the power inverter. This occurs because the power supply in the electronic device does not adequately filter the modified sine wave produced by the inverter. The only solution to this problem is to use a higher quality sound system that incorporates a higher quality power amplifier supply.

### TELEVISION INTERFERENCE

The inverter is shielded to minimize interference with TV signals. The problem may not be with the inverter. However, in some instances, some interference may still be visible, particularly with weak TV signals. Try the following corrective measures:

- Position the inverter as far as possible from the television, the antenna and the antenna cables. Use an extension cable, if necessary.
- Adjust the orientation of the inverter, the antenna cables and the TV power cord to minimize interference.
- Make sure that the antenna feeding the television provides an adequate ("snow free") signal and that high quality, shielded antenna cable is used.
- Do not operate high-power appliances or tools when you are watching TV.

The advanced technology of SAMLEX, L.I.T greatly reduces the possibility of interference with TV signals and audios.

## SECTION 9 | Troubleshooting Guide

### **ISSUE: No AC Output - Green LED is NOT ON, Yellow LED is ON, Buzzer is ON**

#### **POSSIBLE CAUSES:**

Low DC input voltage shut down due to DC input voltage at the inverter terminals dropping below 10.0 VDC. Auto reset when the DC input voltage is > 11.5 VDC.

#### **SUGGESTED REMEDIES:**

- Low battery terminal voltage. Recharge the battery. If battery voltage does not rise to fully charged voltage even after long charging time, replace the battery.
- Excessive drop in DC input wires due to thin DC input wires. Check firmness of connections and increase wire size
- If the battery terminals read higher voltage at no load but the terminal voltage drops appreciably when the load is turned on, the battery may have sulfated due to undercharging. Equalize the battery (only flooded or wet cell types).

### **ISSUE: No AC Output - Green LED is NOT ON, Yellow LED is ON, Buzzer is OFF**

#### **POSSIBLE CAUSES:**

1. Over temperature shutdown
2. High DC input voltage shut down. DC input voltage is > 15.5 V. Auto-reset when voltage < 15.5 VDC

#### **SUGGESTED REMEDIES:**

##### *IF Cause #1:*

- Fan failure: Check that the fan runs when the unit is loaded to > 8 to 12 W
- Ventilation openings are blocked: Remove any obstructions in the ventilation openings
- Not enough cool, replacement air: Install the unit in an open, cool and dry area
- High ambient temperature > 40 C: The temperature of the unit will slowly rise even if the fan is working

##### *IF Cause #2:*

- The battery charger may be charging at > 15.5 V, especially during Equalization. Disconnect the DC input of the inverter when equalizing the batteries > 15.5 VDC
- It is likely that 24 VDC battery has been connected instead of 12 VDC battery. **ONLY USE A NOMINAL 12 VDC BATTERY WITH THIS PRODUCT.**

### **ISSUE: No AC Output - Green, Red and Yellow LEDs are NOT ON and Buzzer is OFF**

**POSSIBLE CAUSE:** No DC input power.

#### **SUGGESTED REMEDIES:**

- Check DC voltage at the DC input terminals
- If DC input cable with cigar plug is being used, the 8 A fuse in the front of the cigar plug may have blown if the load being powered was > 80 W. Replace the fuse in the cigar plug, if blown.
- If powered from the cigar receptacle in a vehicle, the fuse in the vehicle that is supplying the cigar receptacle may have blown. Check and replace. After replacing the fuse, check DC input voltage at the inverter terminals. If DC input voltage is available, the internal fuses may have blown. Call Technical Support.
- If DC input cable with battery clamps is being used without inline fuse, the internal DC fuses in the inverter may have blown. Call technical support
- If DC input cable with battery clamps is being used with inline fuse, check the inline fuse and replace if blown. If the fuse is intact, the internal DC fuses in the inverter may have blown. Call technical support.

**ISSUE: No AC Output - Green LED is ON, Red LED is ON, Yellow LED is OFF and Buzzer is OFF**

**POSSIBLE CAUSES:**

1. Inverter has shut down due to internal short circuit / overload
2. Inverter has shut down due to short circuit / overload in the AC load connected to the inverter
3. Inverter has shut down due to leakage in the AC Load

**SUGGESTED REMEDIES:**

- Switch off and disconnect the load
- The unit will be latched in shutdown condition and will require manual reset. Switch off the On / Off switch and wait for 3 minutes. Switch on the On / Off switch to reset the unit

*IF Cause #1:*

- If the unit shows the same symptoms on no load, the unit is defective. Call Tech Support

*IF Cause #2:*

- Check that there is no short circuit in the AC load and that the rating of the load is not > 450 W continuous or > 900 W surge.

- Power a different good load of up to 450 W and confirm that the unit does not shut down

*IF Cause #3:*

- Power a different good load of up to 450 W and confirm that the unit does not shut down
- Check that there is no leakage in the load that created shut down. Leakage will occur if there is a direct short or electrical path from live, current carrying section in the load to the chassis of the load. Remove faulty load.

**ISSUE: AC Output is Available - Green LED is ON, Red LED is OFF, Yellow LED is OFF, Buzzer is ON**

**POSSIBLE CAUSE:** Low DC input voltage alarm due to DC input voltage < 10.5 VDC. Will automatically reset when > 10.5 VDC.

**SUGGESTED REMEDIES:**

- Low battery terminal voltage. Recharge the battery. If battery voltage does not rise to fully charged voltage even after long charging time. Replace the battery
- Excessive drop in DC input wires due to thin DC input wires. Check firmness of connections and increase wire size
- If the battery terminals read higher voltage at no load but the terminal voltage drops appreciably when the load is turned on, the battery may have sulfated due to undercharging. Equalize the battery (only flooded or wet cell types).

**ISSUE: Some loads do not power up properly.**

**POSSIBLE CAUSES:** If these are connected permanently to the inverter, are in ON condition always and these are switched ON and OFF using the On / Off Switch of the inverter. Extremely high reactive inrush currents during the voltage ramp up of soft start phase on switching on of the inverter drives the inverter into hiccup and subsequent overload.

**SUGGESTED REMEDIES:**

- Always switch on the inverter first and then the AC load.
- In order to reduce the inrush current, add a small resistive load like incandescent lamp and this may allow normal startup

**ISSUE: AC output voltage reads low ( 192 to 208 VAC) when measured with an ordinary voltmeter**

**POSSIBLE CAUSE:**

The voltmeter being used is not designed to read the true RMS value of modified sine wave-form

**SUGGESTED REMEDY:**

- Use a voltmeter which is designed to measure "true RMS values" like Fluke 87, Fluke 8060A, etc.

# SECTION 10 | Specifications

MODEL NO.		SAM-450-12E
INPUT	BATTERY SYSTEM VOLTAGE	12 VDC
	NOMINAL INPUT VOLTAGE	12.5 VDC
	INPUT VOLTAGE RANGE	> 10 to < 15.5 VDC
	INPUT CURRENT AT CONTINUOUS POWER	41.3 A to 43.3 A
	INPUT CURRENT AT NO LOAD	0.25 A to 0.35 A
	DC SIDE GROUNDING	DC Negative (-) input terminal bonded to chassis
OUTPUT	OUTPUT VOLTAGE WAVE FORM	Modified Sine Wave
	OUTPUT VOLTAGE; FREQUENCY	230 VAC + 10% / -2%; 50 Hz ± 5%
	AC OUTPUT SIDE GROUNDING	Both AC current carrying conductors isolated from chassis
	OUTPUT POWER, CONTINUOUS (RESISTIVE LOAD)	450 W
	OUTPUT POWER, SURGE (< 1 SEC, RESISTIVE LOAD)	900 W
	PEAK EFFICIENCY (AT 50% OF CONTINUOUS POWER)	90%
	USB CHARGING PORT	5 VDC, 500mA
PROTECTIONS	LOW INPUT VOLTAGE ALARM	10.5 VDC. Auto reset at > 10.5 VDC
	LOW INPUT VOLTAGE SHUTDOWN	10.0 VDC. Auto reset at 11.5 VDC
	HIGH INPUT VOLTAGE SHUTDOWN	15.5 VDC. Auto reset at < 15.5 VDC
	OVERLOAD AND LEAKAGE SHUT DOWN	Latches in shutdown condition. Manual reset by switching off the ON/OFF switch, waiting for 3 minutes and switching on the ON/OFF switch
	COOLING	Load controlled fan. Comes on at 8 to 12W
	OVER TEMPERATURE SHUTDOWN	By sensing internal hot spot. Auto reset on cooling
	INTERNAL INPUT FUSE, 32 V	70 A (2 X 35 A)
CONNECTIONS	BATTERY INPUT AC OUTPUT USB OUTPUT	Red (+) & Black (-) thumb screws; M4 size Universal outlet USB connector
	ACCESSORIES SUPPLIED	Battery input cable set with battery clamps Battery input cable set with cigar plug
GENERAL	OPERATING TEMPERATURE RANGE	0 to 25 C at 100% loading; 26°C to 35°C at 80% loading
	OPERATING HUMIDITY	< 80%
	DIMENSIONS (L X W X H)	154 x 154 x 46 mm; 6 x 6.1 x 1.8 inches (size includes protrusions)

## SECTION 11 | Warranty

### 2 YEAR LIMITED WARRANTY

SAM-450-12E manufactured by Samlex America, Inc. (the "Warrantor") is warranted to be free from defects in workmanship and materials under normal use and service. The warranty period is 2 years for the United States and Canada, and is in effect from the date of purchase by the user (the "Purchaser").

Warranty outside of the United States and Canada is limited to 6 months. For a warranty claim, the Purchaser should contact the place of purchase to obtain a Return Authorization Number.

The defective part or unit should be returned at the Purchaser's expense to the authorized location. A written statement describing the nature of the defect, the date of purchase, the place of purchase, and the Purchaser's name, address and telephone number should also be included.

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. (Contiguous US and Canada only)

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.

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