

# Sinergex™

## PureSine 600



# User's Manual

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# 1. Important Safety Instructions



## **WARNING!**

Before you install and use Your PS-600 Inverter, be sure to Read, follow and save these safety instructions.

### **1-1. General Safety Precautions**

- 1-1-1. Do not expose the PS-600 Inverter to rain, snow, spray, bilge or dust.  
To reduce risk of hazard, do not cover or obstruct the ventilation openings. Do not install the PS-600 Inverter in a zero-clearance compartment. Overheating may result.
- 1-1-2. To avoid the risk of fire and electronic shock. Make sure that existing wiring is in good electrical condition; and that wire size is not undersized.  
Do not operate the PS-600 Inverter with damaged or substandard wiring.
- 1-1-3. This equipment contains components which can produce arcs or sparks. To prevent fire or explosion do not install in compartments containing batteries or flammable materials or in locations that require ignition protected equipment. This includes any space containing gasoline-powered machinery, fuel tanks, or joints, fittings, or other connection between components of the fuel system.

### **1-2. Precautions When Working with Batteries**

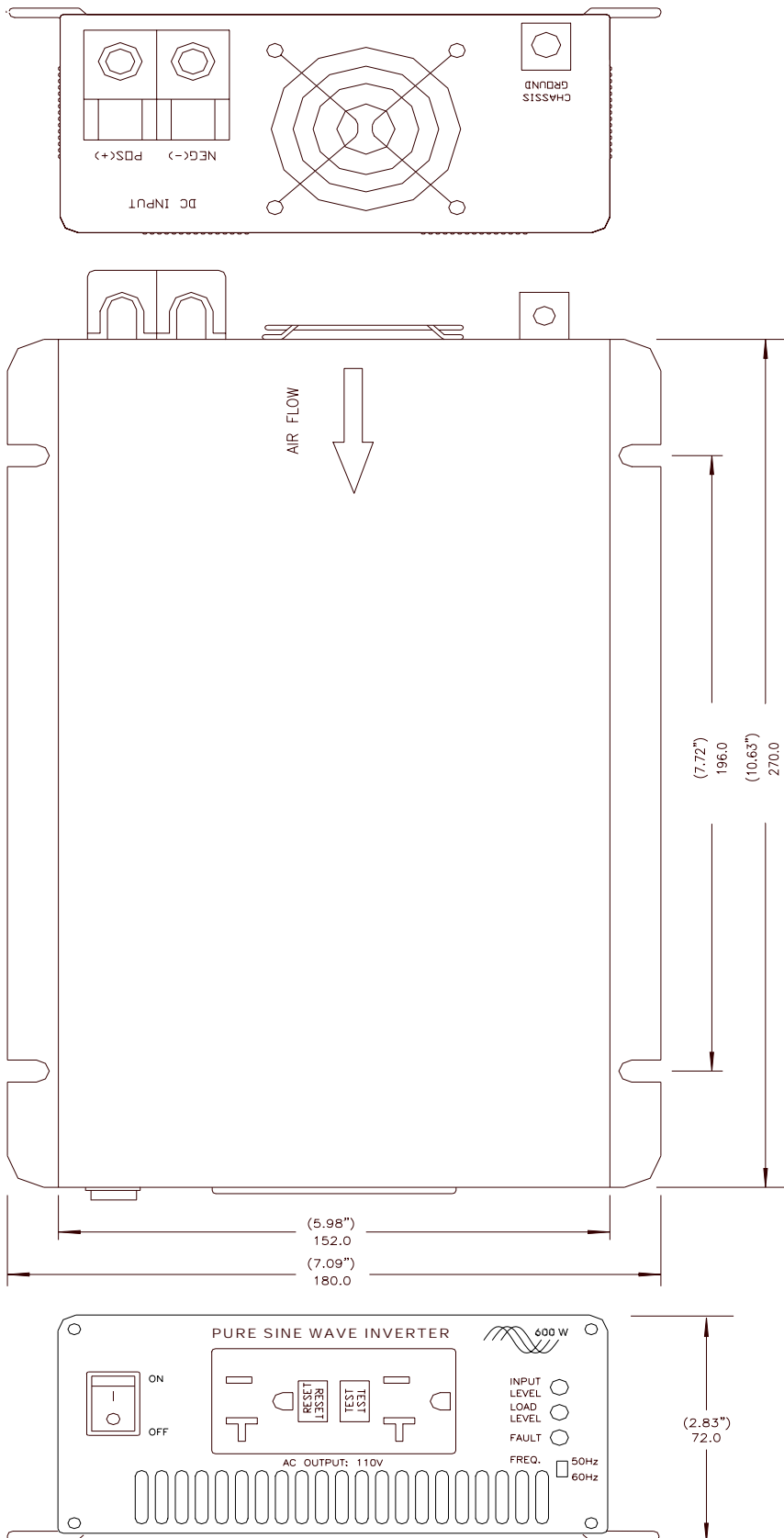
- 1-2-1. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 20 minutes and get medical attention immediately.
- 1-2-2. Never smoke or allow a spark or flame in vicinity of battery or engine.
- 1-2-3. Do not drop a metal tool on the battery. The resulting spark or short-circuit on the battery or other electrical part may cause an explosion.
- 1-2-4. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery.  
A lead-acid battery produces a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.



## 2-2. Electrical Performance

Specification	Model No.					
Item	PS-600-11 2	PS-600-12 4	PS-600-14 8	PS-600-21 2	PS-600-22 4	PS-600-24 8
Continuous Output Power	600W					
Maximum Output Power ( 3Min.)	680W					
Surge Rating	800W					
Input Voltage	12V	24V	48V	12V	24V	48V
Output Voltage	100 / 110 / 120V ± 3%			220 / 230 / 240V ± 3%		
Frequency (Switch Selectable)	50/60Hz +/- 0.05%					
Efficiency ( full load )	87.0%	90.0%	92.0%	90.0%	93.0%	94.0%
No Load Current Draw	0.87A	0.43A	0.23A	0.83A	0.43A	0.22A
Output Waveform	Pure Sine Wave (THD <3%)					
Output Voltage Regulation	100 / 110 / 120V RMS -10%/+4%			220 / 230 / 240V RMS -10%/+4%		
Input Voltage Regulation	10.5-15 VDC	21.0-30 VDC	42-60 VDC	10.5-15 VDC	21.0-30 VDC	42-60 VDC
Input Level Indicator	Red / Orange / Green LED					
Load Level Indicator						
Failure Indicator	Red LED					
Protection	Overload, Short Circuit, Reverse Polarity (Fuse), Over/Under Input Voltage, Over Temperature.					
EMC	FCC Class B					
Safety	UL458			EN60950		
EMC	FCC Class B			EN50081-1:1992 EN50082-1:1992 EN55022B:1994 EN61000-4-2:1995 EN61000-4-3:1996 ENV50204:1995	e-Mark e13-020866	
Operating Temperature Range	0 - 50					
Storage Temperature Range	-30 to 70					
Cooling	Loading controlled cooling fan					
Dimensions	295 (L) x 180 (W) x 72 (H) mm / 11.61 (L) x 7.09 (W) x 2.83 (H) Inch					
Weight	2.7 kgs. / 5.4 Lbs.					

### 2-3. Mechanical Drawings



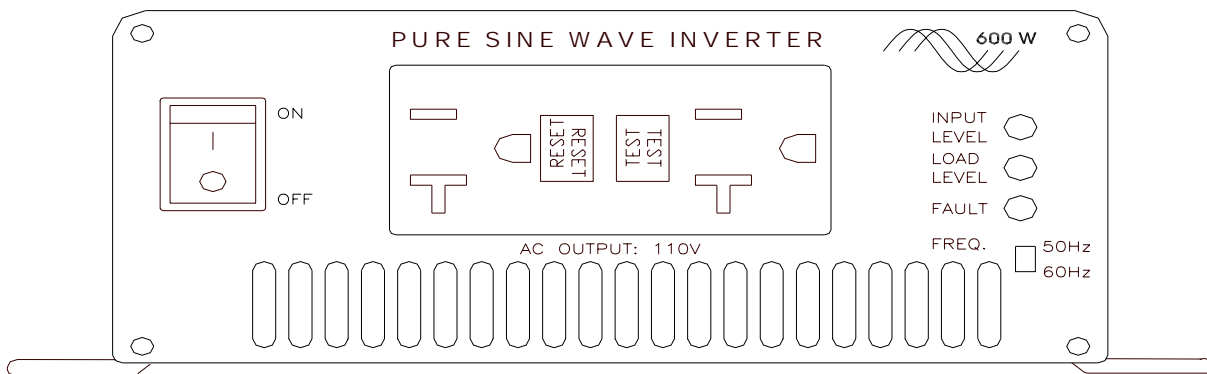
# 3. Introduction

This power inverter series is a the member of the most advanced line of mobile AC power systems available.

To get the most out of the power inverter, it must be installed and used properly. Please read the instructions in this manual before installation and operation this model.

## 3-1. Front Panel Operations:

### 3-1-1. Front view:



### 3-1-2. ON / OFF switch:

Power ON/OFF switch, leave in the OFF position during installation.

### 3-1-3. Input Level : Display Input Voltage

LED Status	DC 12V	DC 24V	DC 48V
RED Blink (slow)	10.5~10.9	21.0~21.8	42.0~43.6
RED	10.9~11.3	21.8~22.6	43.6~45.2
ORANGE	11.3~12.0	22.6~24.0	45.2~48.0
GREEN	12.0~14.0	24.0~28.0	48.0~56.0
ORANGE Blink	14.0~14.7	28.0~29.4	56.0~58.8
OVER RED Blink	14.7□	29.4□	58.8□

### 3-1-4. Load Level : Display AC Load Watts

LED Status	Load Condition
DARK	0~30W
GREEN	30W~200W
ORANGE	200W~450W
RED	450W~580W
RED BLINK	Over 580W

### 3-1-5. Fault : Display fault status

OVP: over voltage protection.

UVP: under voltage protection.

OTP: over temperature protection.

OLP: over load protection.

### 3-1-6. AC outlet (Outlet sockets available ):

North America (GFCI )

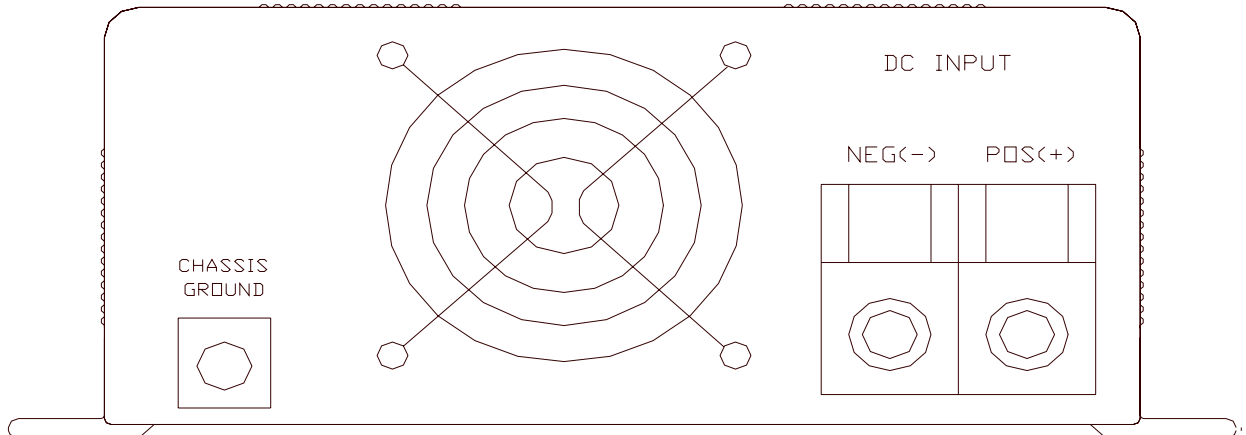
North America

Continental European (Schuko)

Australia / New Zealand

United Kingdom

## 3-2. Rear Panel Operations:



### 3-2-1. Ventilation window:

Do not obstruct! Allow at least 1 inch for air flow.

### 3-2-2. Input terminals:

Connect to 12V / 24V / 48V battery or other 12V / 24V / 48V power source.

Red is positive, black is negative. Reverse polarity connection will blow internal fuse and may damage inverter permanently.

### 3-2-3. Chassis ground or to vehicle chassis using 8 AWG wire.



#### **WARNING!**

Operation of the inverter without a proper ground connection may result in an electrical safety hazard.

### **3-3. Installation:**

Where to install. The power inverter should be installed in a location that meets the following requirements :

- 3-3-1. Dry – Do not allow water or other liquids to drip or splash on the inverter.
- 3-3-2. Cool – Ambient air temperature should be between 0\* and 40\*, the cooler the better.
- 3-3-3. Safe – Do not install in a battery compartment or other areas where flammable fumes may exist, such as fuel storage areas or engine compartments.
- 3-3-4. Ventilated – Allow at least one inch of clearance around the inverter for air flow. Ensure the ventilation openings on the rear and bottom of the unit are not obstructed.
- 3-3-5. Dust-free – Do not install the PS-600 Inverter in a dusty environments where are dust, wood particles or other filings/shavings are present. These dust can be pulled into the unit when the cooling fan is operating.
- 3-3-6. Close to batteries – Avoid excessive cable lengths but do not install the PS-600 Inverter in the same compartment as the batteries. Use the recommended wire lengths and sizes (see section 3-6 ). Also do not mount the PS-600 Inverter where it will be exposed to the gases produced by the battery. These gases are very corrosive and prolonged exposure also will damage the PS-600 Inverter.



**WARNING!**

Shock Hazard. Before proceeding further, carefully check that the PS-600 Inverter is NOT connected to any batteries, and that all wiring is disconnected from any electrical sources. Do not connect the output terminals of the PS-600 Inverter to an incoming AC source.

**3-4. Quick hook – up and testing:**

For a quick test of the PS-600 to check its performance before going ahead with permanent installation, please follow these guidelines:

- 3-4-1. Unpack and inspect the power inverter, check to see that the power switch in the OFF position.
- 3-4-2. Connect the cables to the power input terminals on the rear panel of power inverter . The red terminal is positive (+) and black terminal is negative (-). Insert the cables into the terminals and tighten allen nut to clamp the wires securely.



**WARNING!**

You may observe a spark when you make this connection since current may flow to charge capacitors in the power inverter.

Do not make this connection in the presence of flammable fumes. Explosion or fire may result.



**WARNING!**

Make sure all the DC connections are tight (torque to 9-10 ft-lbs, 11.7-13Nm). Loose connections will overheat and could result in a potential hazard.

3-4-3. Before proceeding further, carefully check the cables you have connected are connected correctly. Red cable to the red terminal and black cable to the black terminal.



**CAUTION!**

Reverse polarity connection will blow a fuse in the inverter and may permanently damage the inverter. Damage caused by reverse polarity connection is not covered by warranty.

- 3-4-4. Connect the cable from the negative terminal of the inverter to the negative terminal of the power source. Make a secure connection.
- 3-4-5. Set the power switch to the "ON" position. The inverter will sound a "Beep". At that moment the inverter will do self-diagnosis and the LED's indicators will also appear various colors. Finally the inverter will sound another "Beep" and the input Level LED indicators will turn to "Green" color and the inverter is now ready for operation.
- 3-4-6. Set the power switch to the OFF position, the inverter shuts down And the LED display turns off.
- 3-4-7. Set power inverter switch to the ON position and turn the test load on. The inverter should supply power to the load. If you plan to accurately measure the true output r.m.s. voltage of inverter, a meter such as FLUKE 45 BECKMAN 4410 or TRIPLETT 4200 must be used.

### 3-5. AC Safety Grounding:

During the AC wiring installation, AC input and output ground wires are connected to the inverter. The AC input ground wire must connect to the incoming ground from your AC utility source.

The AC output ground wire should go to the grounding point for your loads ( for example, a distribution panel ground bus ).

#### 3-5-1. Neutral Grounding (GFCI'S):

3-5-1-1. **120V models:** The neutral conductor of the AC output circuit of the PS-600 Inverter is automatically connected to the safety ground during inverter operation. This conforms to National Electrical Code requirements that separately derived AC sources (such as inverter and generators) have their neutral conductors tied to ground in the same way that the neutral conductor from the utility is tied to ground at the AC breaker panel. For models configured with a transfer relay, while AC utility power is presenting and the PS-600 Inverter is in bypass mode, this connection (neutral of the PS-600 Inverter's AC output to input safety ground ) is not present so that the utility neutral is only connected to ground at your breaker panel, as required.

3-5-1-2. **230V models:** There is no connection made inside the PS-600 Inverter from either the line or neutral conductor to the safety ground.

### **Ground Fault Circuit Interrupters (GFCI):**

Installations in Recreational Vehicles (for North American approvals) will require GFCI protection of all branch circuit connected to the AC output of the hardwire terminal equipped PS-600 Inverter. In addition, electrical codes require GFCI protection of certain receptacles in residential installations.

While the pure sine wave output of the PS-600 Inverter is equivalent to the waveform

provided by utilities, compliance with UL standards requires us to test and recommend specific GFCI.

Our Company has tested the following GFCI-protected 15A receptacles and found that they functioned properly when connected to the output of the PS-600 Inverter.



#### **WARNING!**

Do not operate the power inverter without connecting it to ground.  
Electrical shock hazard may result.

### **3-6. Making DC Wiring Connections :**

Follow this procedure to connect the battery cables to the DC input terminals on the PS-600 Inverter. Your cables should be as short as possible. (Ideally, less than 10 feet / 3 meters ) and large enough to handle the required current in accordance with the electrical codes or regulations applicable to your installation.

Cables that are not an adequate gauge (too narrow) or are too long will cause decreased inverter performance such as poor surge capability and frequent low input voltage warnings and shutdowns.

These low input voltage warnings are due to DC voltage drop across the cables from the inverter to the batteries.

The longer and narrower these cables, the greater the voltage drop.



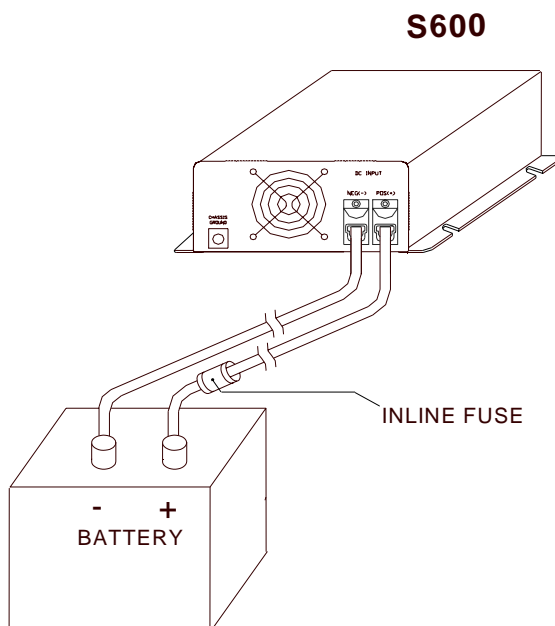
**WARNING!**

The installation of a fuse must be on the positive cable. The failure to place a fuse on “+” cable running between the inverter and battery may cause damage to the inverter and will void warranty.

Increasing your DC cable size will help improve performance. Recommendations for cables for optimum inverter performance are below: (Recommendations apply for both 120V and 230V models.)

Model No	Wire AWG	Inline Fuse
PS-600-112	# 4	100A
PS-600-212	# 4	100A
PS-600-124	# 6	50A
PS-600-224	# 6	50A

Also, use only high quality copper wiring and keep cable length short, a maximum of 3-6 feet.



### 3-7. Inverter Operation:

To operate the power inverter, turn it on using the ON/OFF switch on the front panel. The power inverter is now ready to deliver AC power to your loads.

If you are operating several loads from the power inverter, turn them on separately after the inverter has been turned on.

This will ensure that the power inverter does not have to deliver the starting currents for all the loads at once.

#### 3-7-1. Controls and indicators:

The ON/OFF switch turns the control circuit in the power inverter on and off. It does not disconnect power from the power inverter.

The PS-600 Inverter operates from an input voltage ranging from:

**10.5 to 15.0 VDC for 12V models**

**21.0 to 30.0 VDC for 24V models**

**42.0 to 60.0 VDC for 48V models**

The PS-600 Inverter will indicate high and low DC voltage conditions as follows :

Model	Dc Input over voltage shut-down	Dc Input under voltage alarm	Dc Input under voltage shut-down
PS-600-112 PS-600-212	15.3	11.0	10.5
PS-600-124 PS-600-224	30.6	22.0	21.0
PS-600-148 PS-600-248	61.2	44.0	42.0

## 4. Troubleshooting guide:



### WARNING

Do not open or disassemble the PS-600 Inverter. Attempting to service the unit yourself may result in a risk of electrical shock or fire and void warranty.

Problems and Symptoms	Possible Cause	Solutions
Low output voltage  (110V : 95-105VAC, 220V : 190-210VAC)	Using average reading  Voltmeter.	Use true RMS reading meter and cable.  See page 9 Point 2-7-7. of manual
Load LED bar flash.	Overload	Reduce load.
No output voltage. And voltage indicator in lower red zone.	Low input voltage.	Recharge battery, check connections and cable.
No output voltage. Over Temp indicator on, load less than 600W.	Thermal shutdown	Improve ventilation, make sure ventilation openings in inverter are not obstructed. Reduce ambient temperature.
No output voltage, Over Load indicator On.	Short circuit or Wiring error.  Very high power load	Check AC wiring for short circuit or improper polarity (hot and neutral reversed). Remove load.

## **5. Maintenance:**

Very little maintenance is required to keep your inverter operating properly. You should clean the exterior of the unit periodically with a damp cloth to prevent accumulation of dust and dirt.

At the same time, tighten the screws on the DC input terminals.

## **6. Warranty:**

We warrant this product against defects in materials and workmanship for a period of 24 months from the date of purchase and will repair or replace any defective power inverter.

This warranty will be considered void if the unit has suffered any obvious physical damage or alteration either internally or externally and does not cover damage arising from improper use or incorrect installation.

No other warranties express or imply including warranties of merchantability and fitness for a particular purpose.

Repair and replacement are your sole remedies and the company shall not be liable for damages, whether direct, incidental, special or consequential, even though caused by negligence or other fault.