

HELIOS

POWER SOLUTIONS



SF-PSW200 / SF-PSW350W Series

Pure Sine Wave Inverter

User Manual

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1. Features

- Pure sine wave output (THD < 3%) R Load
- Output frequency: 50 / 60Hz switch
- Loading controlled cooling fan
- Advanced microprocessor
- Regulated output protects sensitive equipment
- Compact size for convenient use and storage
- Auto shutdown prevents total battery discharge
- Loading controlled cooling fan
- Protection: Input Undervoltage
Input Overvoltage
Overload
Short circuit
Over temperature
Reverse Polarity (Fuse)

1-1 Utilities Application

Such as laptop, vacuum cleaners, fans, fluorescent, incandescent lights, shavers, coffee makers, toasters, video games, etc.

1-2 Electrical Performance: 200W

Specification	Model					
Item	SF- PSW1220	SF- PSW2420	SF- PSW4820	SF- PSW1220E	SF- PSW2420E	SF- PSW4820E
Continuous Output Power	200W					
Maximum Output Power	250W (3Min.)					
Surge Rating	400W					
Input Voltage	12V	24V	48V	12V	24V	48V
DC Input Voltage Regulation	10-16 VDC	20-32 VDC	42-62 VDC	10-16 VDC	20-32 VDC	42-62 VDC
DC Input Over Voltage Alarm	15.5VDC	31.0VDC	61.0VDC	15.5VDC	31.0VDC	61.0VDC
DC Input Over Voltage Shut-down	16.0VDC	32.0VDC	62.0VDC	16.0VDC	32.0VDC	62.0VDC
DC Input Under Voltage Alarm	10.5VDC	21.0VDC	43.0VDC	10.5VDC	21.0VDC	43.0VDC
DC Input Under Voltage Shut-down	10.0VDC	20.0VDC	42.0VDC	10.0VDC	20.0VDC	42.0VDC
Efficiency (full load)	90%	92%	94%	92%	94%	96%
No Load Current Draw	0.65A	0.29A	0.15A	0.62A	0.33A	0.18A
Output Waveform	R Load Pure Sine Wave < 3% THD					
Output Voltage Regulation	100/110/115/120V RMS \pm 3%			200/220/230/240V RMS \pm 3%		
Frequency	50/60Hz \pm0.05%					
Peak Output Current	4A			2A		
Output Indicator	Green LED					
Protection indicator	OLP --- Red LED OTP --- Red LED UVP/OVP --- Red LED					
Protection	Overload, Short Circuit, Reverse Polarity (Fuse), Input Undervoltage, Input Overvoltage, Over Temperature.					
Safety	EN60950-1:2006 & IEC60950-1: 2005(2nd Edition)					
EMC	FCC Class B			EN55022:2010 /AC:2011 (Class B) EN55024: 2010 EN61000-3-2: 2006+A1:2009+A2:2009 EN61000-3-3: 2013 IEC 61000-4-2:2008 IEC61000-4-3:2006+A1:2007+A2:2010 IEC61000-4-4:2012 IEC61000-4-5:2005 IEC61000-4-6:2008 IEC61000-4-8:2009 IEC61000-4-11:2004		
Operating Temperature Range	-20°C to 50°C					
Storage Temperature Range	-30°C to 70°C					
Cooling	Fan is always turned on					
Dimensions	230.4 (L) \times 118.4 (W) \times 70.5 (H) mm					
Weight	1.2kgs					

Note: The specifications are subject to change without notice.

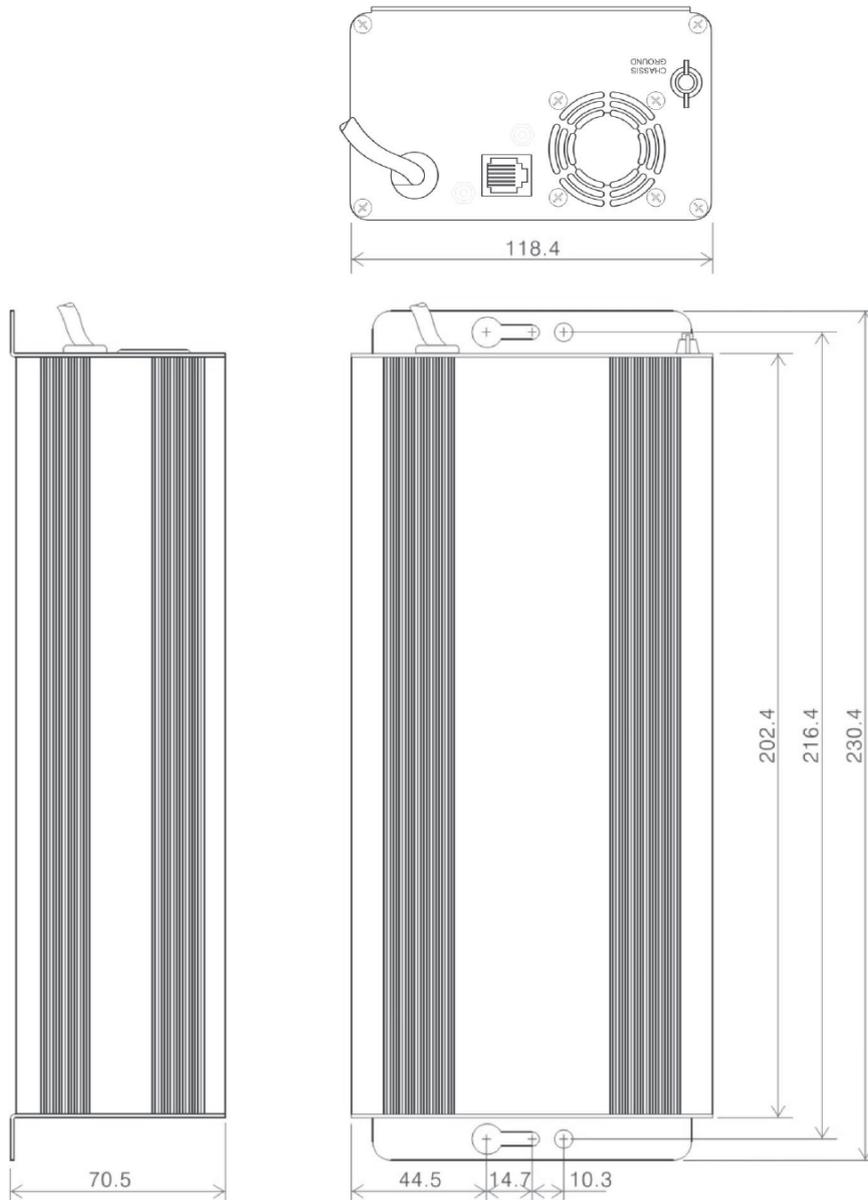
Electrical Performance: 350W

Specification	Model					
Item	SF- PSW1235	SF- PSW2435	SF- PSW4835	SF- PSW1235E	SF- PSW2435E	SF- PSW4835E
Continuous Output Power	350W					
Maximum Output Power	400W (3Min.)					
Surge Rating	700W					
Input Voltage	12V	24V	48V	12V	24V	48V
DC Input Voltage Regulation	10-16 VDC	20-32 VDC	42-62 VDC	10-16 VDC	20-32 VDC	42-62 VDC
DC Input Over Voltage Alarm	15.5VDC	31.0VDC	61.0VDC	15.5VDC	31.0VDC	61.0VDC
DC Input Over Voltage Shut-down	16.0VDC	32.0VDC	62.0VDC	16.0VDC	32.0VDC	62.0VDC
DC Input Under Voltage Alarm	10.5VDC	21.0VDC	43.0VDC	10.5VDC	21.0VDC	43.0VDC
DC Input Under Voltage Shut-down	10.0VDC	20.0VDC	42.0VDC	10.0VDC	20.0VDC	42.0VDC
Efficiency (full load)	90%	92%	94%	92%	94%	96%
No Load Current Draw	0.68A	0.37A	0.17A	0.62A	0.40A	0.19A
Output Waveform	R Load Pure Sine Wave < 3% THD					
Output Voltage Regulation	100/110/115/120V RMS ± 3%			200/220/230/240V RMS ± 3%		
Frequency	50/60Hz ±0.05%					
Peak Output Current	6A			3A		
Output Indicator	Green LED					
Protection indicator	OLP --- Red LED OTP --- Red LED UVP/OVP --- Red LED					
Protection	Overload, Short Circuit, Reverse Polarity (Fuse), Input Undervoltage, Input Overvoltage, Over Temperature.					
Safety	EN60950-1:2006 & IEC60950-1: 2005(2nd Edition)					
EMC	FCC Class B			EN55022:2010 /AC:2011 (Class B) EN55024: 2010 EN61000-3-2: 2006+A1:2009+A2:2009 EN61000-3-3: 2013 IEC 61000-4-2:2008 IEC61000-4-3:2006+A1:2007+A2:2010 IEC61000-4-4:2012 IEC61000-4-5:2005 IEC61000-4-6:2008 IEC61000-4-8:2009 IEC61000-4-11:2004		
Operating Temperature Range	-20°C to 50°C					
Storage Temperature Range	-30°C to 70°C					
Cooling	Fan is always turned on					
Dimensions	230.4 (L) × 118.4 (W) × 70.5 (H) mm					
Weight	1.6kgs					

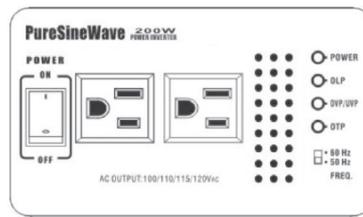
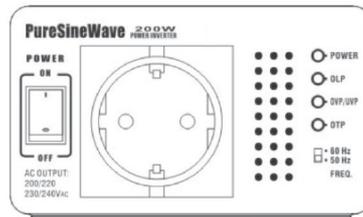
Note: The specifications are subject to change without notice.

1-3 Mechanical Drawings

200W

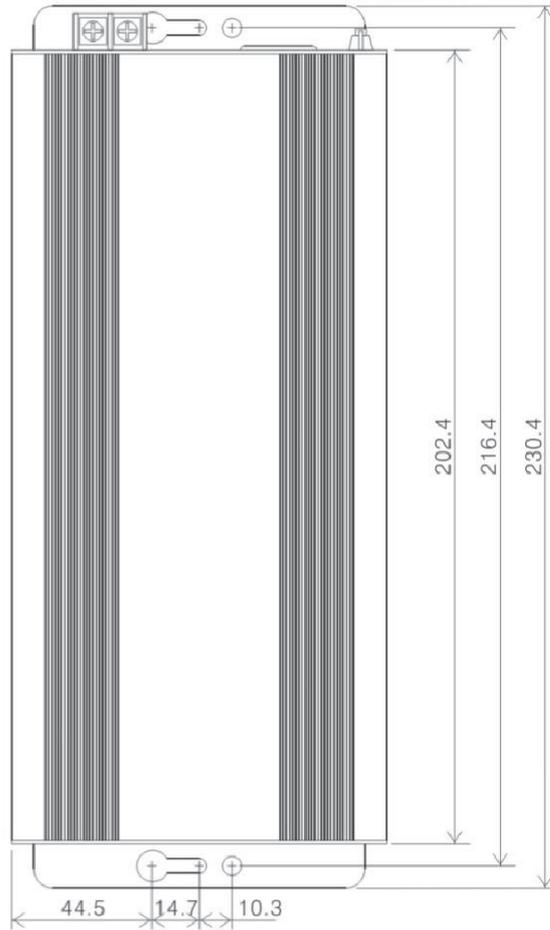
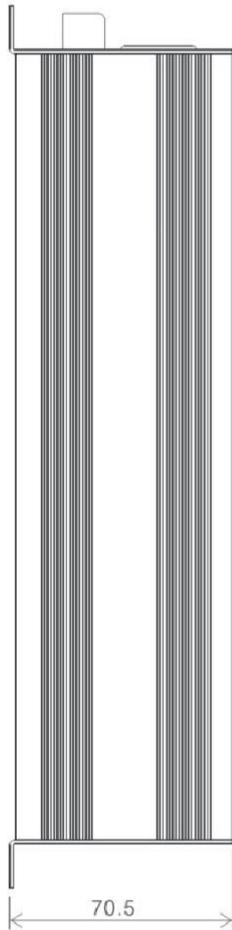
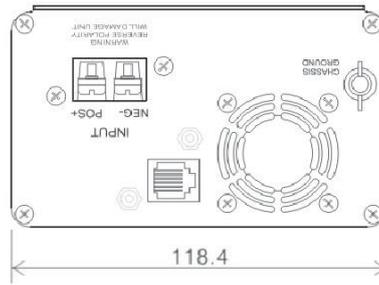


UNIT: mm

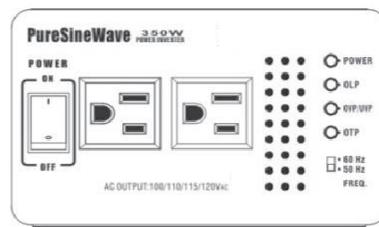
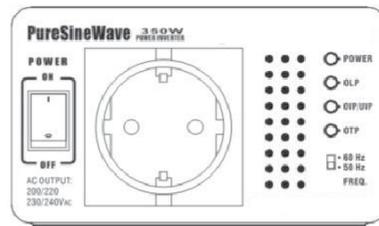


Note: RJ45 port (for remote control) on rear panel is optional.

350W



UNIT: mm



2. Introduction

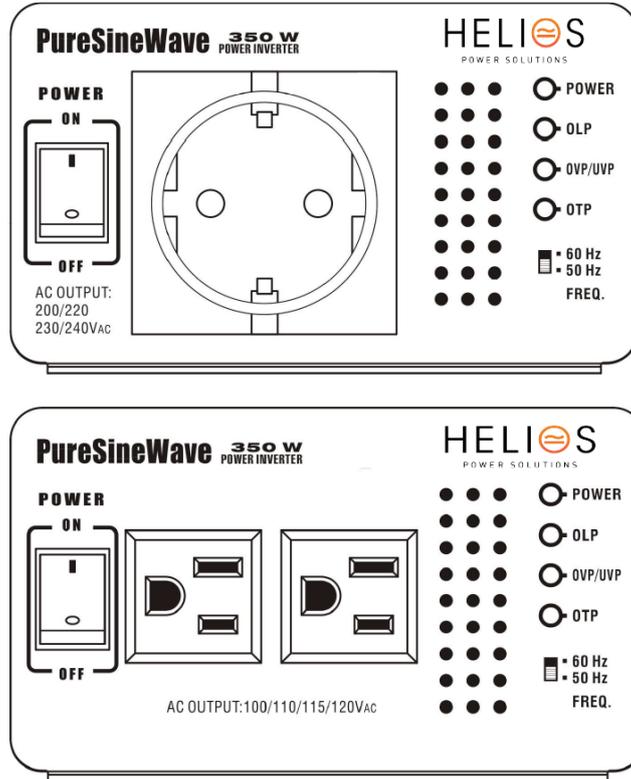
The power inverter series are the member of the most advanced line of mobile AC power systems available.

To get the most out of the power inverter, it must be installed and used properly.

Please read the instructions in this manual before installing and using this model.

2-1 Front Panel Operation:

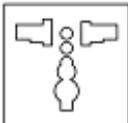
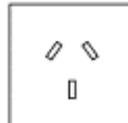
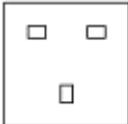
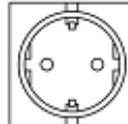
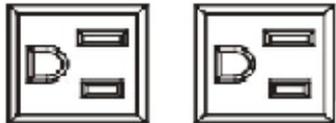
2-1-1 Front view:



2-1-2 ON / OFF switch:

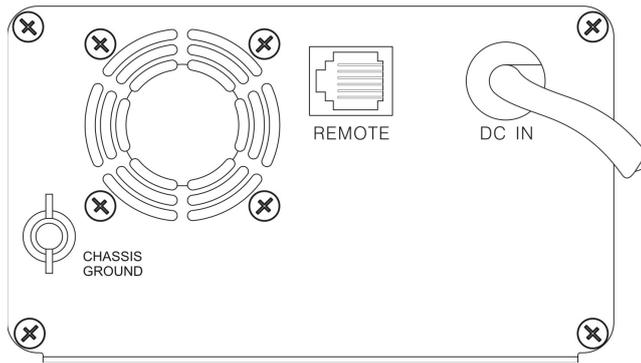
Power ON / OFF switch, leave in the OFF position during installation.

2-1-3 AC outlet (Outlet sockets available):

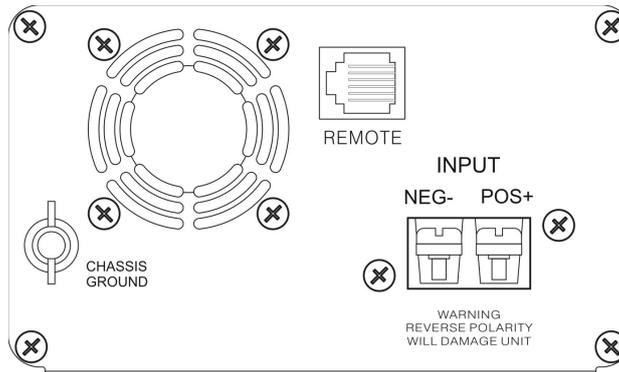
Universal	Australia / New Zealand
	
United Kingdom	Continental European(SCHUKO)
	
PC Connector 10A	North America
	

2-2 Rear Panel Operation:

Rear panel for 200W



Rear panel for 350W



Note: RJ45 port (for remote control) on rear panel is optional.

2-2-1 Ventilation openings:

Do not obstruct. Allow at least 3 inch for airflow.

2-2-2 Battery terminals:

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

【 + 】 is positive; 【 - 】 is negative. Reversing polarity connection will blow internal fuse and may damage inverter permanently.



WARNING!

Do not connect the 12V model to a 24 battery. The unit will be destroyed immediately.



WARNING!

Shock Hazard. Before proceeding further, carefully check the 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 inverter to an incoming AC source.

2-3 Installation:

Where to install:

The power inverter should be installed in a location that meets the following requirements.

2-3-1 Dry – Do not allow water to drip or splash on the inverter.

2-3-2 Cool – Ambient air temperature should be between -20°C and 50°C, the cooler the better.

2-3-3 Safe – Do not install in a battery compartment or other areas where flammable fumes may exist, such as fuel storage areas or engine compartments.

2-3-4 Ventilated – Allow at least three inch of clearance around the inverter for airflow. Ensure the ventilation openings on the rear and bottom of the unit are not obstructed.

2-3-5 Dust-free – Do not install the inverter in a dusty environment where are dust, wood particles or other filings/shavings.

These dusts can be pulled into the unit when the cooling fan is operating.

2-3-6 Close to batteries – Avoid excessive cable lengths but do not install the inverter in the same compartment as batteries.

Use the recommended wire lengths and sizes (see section 2-5).

Also do not mount the inverter where it will be exposed to the gases produced by the battery.

These gases are very corrosive and prolonged exposure that will damage the inverter.

2-4 Quick Hook – Up and Testing:

2-4-1 Unpack and inspect the power inverter, check to see that the power switch is in the OFF position.

2-4-2 Connecting with input source:

For **200W** inverter:

Plug the inverter's DC lighter into the vehicle cigarette lighter socket, then follow point 2-4-5.

For **350W** inverter:

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 relative nut to clamp the wires

securely. Follow point 2-4-3.



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.

2-4-3 Before proceeding further, carefully check that cable you have just connected negative terminal of inverter to the negative output power source.



CAUTION!

Reverse polarity connection will blow a fuse in inverter and may permanently damage the inverter.

Damage caused by reversing polarity connection is not covered by our warranty.

2-4-4 Connect the cable from the positive terminal of the inverter to the positive terminal of the power source. Make a secure connection.



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.

2-4-5 Set the power switch to the ON position; you will hear the “bi-bi-bi” sound, then the inverter comes into standby state.

2-4-6 Set the power switch to the OFF position; the device shut down completely.

2-4-7 Please use a power meter to accurately measure the true output R.M.S. voltage of inverter.

Our company uses a power meter such as IDRC CP-350 or ABM 2019 to measure our product.

2-5 Making DC Wiring Connections:

Follow this procedure to connect the battery cables to the DC input terminals on the 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 positive cable. Failure to place a fuse on “+” cables running between the inverter and battery may cause damage to the inverter and will void warranty.

Increasing your DC cable size will help improve the situation.

Our company recommends the following cables for optimum inverter performance (apply both 120V and 230V versions)

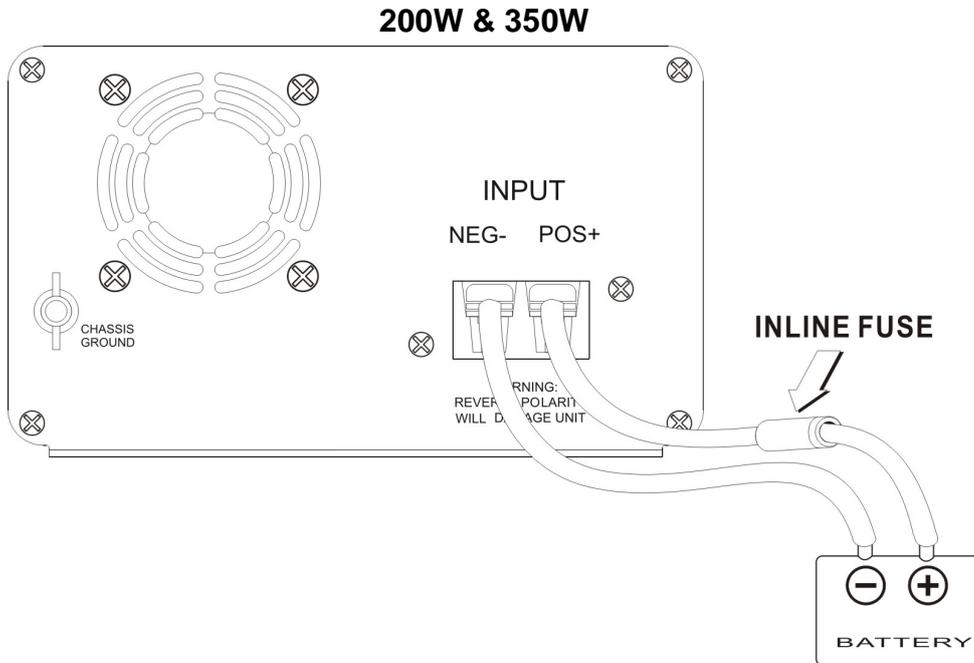
200W

Model No	Wire AWG	Inline Fuse
SF-PSW1220 SF-PSW1220E	#14	30A
SF-PSW2420 SF-PSW2420E	#16	15A
SF-PSW4820 SF-PSW4820E	#18	10A

350W

Model No	Wire AWG	Inline Fuse
SF-PSW1235 SF-PSW1235E	#6	50A
SF-PSW2435 SF-PSW2435E	#8	25A
SF-PSW4835 SF-PSW4835E	#16	15A

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



2-6 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.

2-6-1 Controls and indicators:

The ON / OFF switch turns the control circuit in the power inverter on and off.

The inverter operates from an input voltage range:

10.0 to 16.0 VDC for 12V models

20.0 to 32.0 VDC for 24V models

42.0 to 62.0 VDC for 48V models

The inverter will indicate high and low DC voltage conditions as follows:

Model		DC Input Over Voltage Shut-down	DC Input Over Voltage Alarm	DC Input Under Voltage Alarm	DC Input Under Voltage Shut-down
SF-PSW1220	SF-PSW1235	16.0VDC	15.5VDC	10.5VDC	10.0VDC
SF-PSW1220E	SF-PSW1235E				
SF-PSW2420	SF-PSW2435	32.0VDC	31.0VDC	21.0VDC	20.0VDC
SF-PSW2420E	SF-PSW2435E				
SF-PSW4820	SF-PSW4835	62.0VDC	61.0VDC	43.0VDC	42.0VDC
SF-PSW4820E	SF-PSW4835E				

2-6-2 Over Voltage Protection indicator: (OVP)

The over voltage indicator indicates that the power inverter has shut itself down because its input voltage exceeded 12V/24V/48VDC (Ref. point 2-7-1).

2-6-3 Under Voltage Protection indicator: (UVP)

The under voltage indicator indicates that the power inverter has shut itself down because its input voltage fell below 12V/24V/48VDC (Ref. point 2-7-1).

2-6-4 Over Temp Protection indicator: (OTP)

The over temp indicator indicates that the power inverter has shut itself down because its temperature has become overheated. The power inverter may overheat because it has been operated at power levels above its rating, or because it has been installed in a location which does not allow it to dissipate heat properly. The power inverter will automatically back up, once it has cooled off.

2-6-5 Over Load Protection indicator: (OLP)

The overload indicator indicates that the power inverter has shut itself down. When output voltage over its continuous voltage, then must return to operate manually.

2-7 Cooling Fan Working Code:

Cooling fan of inverter start to work when turning on the inverter, in other words, the cooling fan is always turned on.

If the ventilation opening is obstructed, the inverter will enter over temperature protection mode (OTP) and inverter shut down. When the temperature comes down to normal situation, the inverter will turn on automatically.

3. Maintenance:

Very little maintenance is required to keep your inverter operating properly.

You should clean the exterior of the unit periodically with a dry cloth to prevent accumulation of dust and dirt. At the same time, tighten the screws on the DC input terminals.

4. Troubleshooting guide:



WARNING!

Do not open or disassemble the inverter. Attempting to service the unit yourself may result in a risk of electrical shock or fire.

Problem and Symptoms	Possible Cause	Solution
Low output voltage (110V: 95-105VAC 220V: 190-210VAC)	Using average reading voltmeter	Use true RMS reading meter and cable (Ref. point 2-4-7).
No output voltage Fault input voltage	Input Undervoltage Input Overvoltage	Recharge battery. Check connections and cable. (Ref. point 2-5 & point 2-6)
No output voltage	Thermal shutdown	Improve ventilation. Make sure ventilation openings in inverter are not obstructed. Reduce ambient temperature.
No output voltage	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. Warranty:

We warrant this product against defects in materials and workmanship during warranty period and will repair or replace any defective power inverter when directly returned (postage paid) to us.

This warranty will be considered void if the unit has suffered any obvious damage by natural and man-made factors, or alteration either internal or external and does not cover damage arising from improper use such as plugging the unit into an unsuitable power source attempts to operate products with excessive power consumption requirement, or use in unsuitable environments.

This is the only warranty that the company makes.

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.

6. Important Safety Instructions



WARNING!

Before you install and use your inverter, be to read and save these safety instructions.

6-1 General Safety Precautions

6-1-1 Do not expose the 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 inverter in a zero-clearance compartment. Overheating may result.

6-1-2 To avoid a 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 inverter with damaged or substandard wiring.

6-2 Precautions When Working with Batteries

6-2-1 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.

6-2-2 Never smoke or allow a spark or flame in vicinity of battery or engine.

6-2-3 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.

6-2-4 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.

RE-MARK:

The user manual is subject to change without notice.