

PS Series Pure Sine Wave Inverter **User's Manual**

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M-PSINV As of January 2012



P.O. Box 1306

Newport Beach

California 92663



WARNING! Before using the Inverter, read and save the safety instructions.

1. Important Safety Instructions

1-1. General Safety Precautions

- **1-1-1.** 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.
- **1-1-2.** To avoid a risk of fire and electronic shock, make sure that existing wiring is in good electrical condition and not undersized. Do not operate the Inverter with damaged or substandard Wiring.
- **1-1-3.** There are some components in the inverter can cause arcs and sparks. To prevent from fire or explosion, do not put batteries, flammable materials, or anything should be ignition—protected around the inverter.

1-2. Precautions When Working with Batteries

- **1-2-1.** If battery acid contacts skin or clothing, you shall wash it out with soap and water immediately. If battery acid contacts your eyes, you shall wash it out with cold running water for at least 20 minutes and get medical attention immediately.
- 1-2-2. Never smoke or make a spark or flame in the vicinity of the battery or the engine.
- 1-2-3. Do not drop a metal tool on the battery. The resulting spark or short-circuit on the battery of other electrical part may cause an explosion.
- 1-2-4. Remove personal metal items such as rings, bracelets, necklaces, and watches when operating with a lead-acid batteries. Doing so may cause short circuit and very high temperature, which can melt metal items and even burn you.

2. Features

- Pure sine wave output (THD < 3%)
- Output frequency: 50/60Hz switch selections
- Input & output fully isolated design
- Power Saving Mode to conserve energy
- High efficiency 89~94%
- Driving highly reactive & capacitive loads at start moment
- Tri-Color indicators show input voltage & output load level
- Loading controlled cooling fan
- Advanced microprocessor
- Protection: Input low voltage Overload Short circuit
- Low battery alarm Input over voltage Over temperature

2-1. Application

- **2-1-1.** Power tools circular saws, drills, grinders, sanders, buffers, weed and hedge trimmers, air compressors, etc.
- **2-1-2.** Office equipment computers, printers, monitors, facsimile machines, scanner, etc.



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- **2-1-3.** Household appliances vacuum cleaners, fans, fluorescent and incandescent lights, shavers, sewing machines.
- **2-1-4.** Kitchen appliances coffee makers, blenders, ice markers, toasters, etc.
- **2-1-5.** Industrial equipment metal halide lamp, high pressure sodium lamp, etc.
- **2-1-6.** Home entertainment electronics television, VCRs, video games, stereos, musical instruments, satellite equipment, etc.

2-2 Electrical Specifications

Specification	Model No.					
Model	12-700PS	24-700PS	48-700PS	12-700FPS	24-700FPS	48-700FPS
Continuous Output Power			70	WOO		
Maximum Output Power			77	70W		
Surge Rating (Max.)			14	W00		
Input Voltage	12V	24V	48V	12V	254V	48V
Output Voltage	100 /	110 / 120V	+/-5%	220	/ 230 / 240	+/-3%
Frequency (Switch Selections)	50 / 60Hz +/- 0.05%					
Output Waveform	Pure Sine Wave (THD <3%)					
Efficiency (full load) Max. 1	89.0%	91.0%	92.0%	91.0%	93.0%	94.0%
No Load Current Draw (Max.)	1.25A	0.64A	0.31A	1.20A	0.60A	0.28A
Stand-By Current Draw (Max.)	0.25A	0.15A	0.08A	0.25A	0.15A	0.08A
Input Voltage Regulation (VDC)	10.5 - 15	21.0 - 30	42 - 60	10.5 - 15	21.0 - 30	42 - 60
Input Level Indicator	Red / Orange / Green LED					
Load Level Indicator				je / Green Li		
Failure Indicator			Red	d LED		
Protection	Overloc			Polarity (Fus er Temperatu	se), Over/Un ıre	der Input
Remote Control Unit			С	:R-8		
Safety Certification		UL458			EN60950-1	
EMC	FCC Class A EN55022: 1997 e-mark e13 0226 EN61000-3-2: 1998 EN61000-3-3: 1998			e-mark e13 022694		
Operating Temperature Range	0 - 40 °C					
Storage Temperature Range	-30 to 70 °C					
Cooling	Loading controlled cooling fan					
Dimensions]	3.39" D x 7.	17" W x 3.46	" H	
Weight			8.8	Lbs.		

Note: The specifications are subject to change without notice.



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Specification	Model No.					
Model	12-1000PS	24-1000PS	48-1000PS	12-1000FPS	24-1000FPS	48-1000FPS
Continuous Output Power			,	1000W		
Maximum Output Power	1100W					
Surge Rating (Max.)	2000W					
Input Voltage	12V	24V	48V	12V	254V	48V
Output Voltage	100 /	110 / 120V	+/-5%	220) / 230 / 240 -	+/-3%
Frequency (Switch Selections)		50 / 60Hz +/- 0.05%				
Output Waveform	Pure Sine Wave (THD <3%)					
Efficiency (full load) Max. 1	89.0%	92.0%	93.0%	91.0%	94.0%	95.0%
No Load Current Draw (Max.)	1.43A	0.75A	0.38A	1.25A	0.65A	0.35A
Stand-By Current Draw (Max.)	0.25A	0.15A	0.09A	0.25A	0.15A	0.09A
Input Voltage Regulation (VDC)	10.5 - 15	21.0 - 30	42 - 60	10.5 - 15	21.0 - 30	42 - 60
Input Level Indicator	Red / Orange / Green LED					
Load Level Indicator			Red / Old	inge / Green i		
Failure Indicator			R	Red LED	,	
Protection	Overl	oad, Short C		se Polarity (Fu ver Temperat	use), Over/Und ure	der Input
Remote Control Unit				CR-8		
Safety Certification		UL458			EN60950-1	
EMC	FCC Class A EN55022: 1997 e-mark e13 022694 EN61000-3-2: 1998 EN61000-3-3: 1998					
Operating Temperature Range			0	- 40 °C		
Storage Temperature Range	-30 to 70 ℃					
Cooling	Loading controlled cooling fan					
Dimensions			13.39" D x	7.17" W x 3.40	6″ H	
Weight			3	3.8 Lbs.		



Specification	Model No.					
Model	12-1500PS	24-1500PS	48-1500PS	12-1500FPS	24-1500FPS	48-1500FPS
Continuous Output Power				1500W		
Maximum Output Power		1650W				
Surge Rating (Max.)		3000W				
Input Voltage	12V	24V	48V	12V	254V	48V
Output Voltage	100 /	110 / 120V	+/-5%	220) / 230 / 240 -	+/-3%
Frequency (Switch Selections)		50 / 60Hz +/- 0.05%				
Output Waveform	Pure Sine Wave (THD <3%)					
Efficiency (full load) Max. 1	88.0%	91.0%	92.0%	90.0%	93.0%	94.0%
No Load Current Draw (Max.)	1.45A	0.75A	0.40A	1.40A	0.70A	0.40A
Stand-By Current Draw (Max.)	0.28A	0.15A	0.09A	0.28A	0.15A	0.09A
Input Voltage Regulation (VDC)	10.5 - 15	21.0 - 30	42 - 60	10.5 - 15	21.0 - 30	42 - 60
Input Level Indicator	Red / Orange / Green LED					
Load Level Indicator			inca / Ora			
Failure Indicator				Red LED		
Protection	Overl	oad, Short C		se Polarity (Fu ver Temperat	use), Over/Und ure	der Input
Remote Control Unit				CR-8		
Safety Certification		UL458			EN60950-1	
EMC	FCC Class A EN55022: 1997 e-mark e13 022694 EN61000-3-2: 1998 EN61000-3-3: 1998			e-mark e13 022694		
Operating Temperature Range			0) - 40 °C		
Storage Temperature Range	-30 to 70 °C					
Cooling	Loading controlled cooling fan					
Dimensions			14.57" D x	7.52" W x 3.40	6″ H	
Weight			10	0.56 Lbs.		



Specification	Model No.					
Model	12-2000PS	24-2000PS	48-2000PS	12-2000FPS	24-2000FPS	48-2000FPS
Continuous Output Power			:	2000W		
Maximum Output Power		1200W				
Surge Rating (Max.)		4000W				
Input Voltage	12V	24V	48V	12V	254V	48V
Output Voltage	100 /	110 / 120V	+/-5%	220) / 230 / 240 -	+/-3%
Frequency (Switch Selections)		50 / 60Hz +/- 0.05%				
Output Waveform		Pure Sine Wave (THD <3%)				
Efficiency (full load) Max. 1	89.0%	92.0%	93.0%	91.0%	94.0%	95.0%
No Load Current Draw (Max.)	2.8A	1.5A	0.7A	2.64A	1.32A	0.65A
Stand-By Current Draw (Max.)	0.601A	0.30A	0.15A	0.60A	0.25A	0.15A
Input Voltage Regulation (VDC)	10.5 - 15	21.0 - 30	42 - 60	10.5 - 15	21.0 - 30	42 - 60
Input Level Indicator	Red / Orange / Green LED					
Load Level Indicator						
Failure Indicator				Red LED		
Protection	Overl	oad, Short C		se Polarity (Fu ver Temperat	ise), Over/Uno ure	der Input
Remote Control Unit				CR-8		
Safety Certification		UL458			EN60950-1	
EMC	FCC Class A EN55022: 1997 e-mark e13 022694 EN61000-3-2: 1998 EN61000-3-3: 1998					
Operating Temperature Range			0	- 40 °C		
Storage Temperature Range	-30 to 70 ℃					
Cooling	Loading controlled cooling fan					
Dimensions			14.49" D x	8.23" W x 6.53	3″ H	
Weight			1	9.8 Lbs.		



Specification	Model No.					
Model	12-3000PS	24-3000PS	48-3000PS	12-3000FPS	24-3000FPS	48-3000FPS
Continuous Output Power				3000W		
Maximum Output Power	3300W					
Surge Rating (Max.)			(W0000		
Input Voltage	12V	24V	48V	12V	254V	48V
Output Voltage	100 /	110 / 120V	+/-5%	220) / 230 / 240 -	+/-3%
Frequency (Switch Selections)		50 / 60Hz +/- 0.05%				
Output Waveform	Pure Sine Wave (THD <3%)					
Efficiency (full load) Max. 1	88.0%	91.0%	92.0%	90.0%	93.0%	94.0%
No Load Current Draw (Max.)	3.0A	1.6A	0.80A	2.80A	1.5A	0.70A
Stand-By Current Draw (Max.)	0.55A	0.35A	0.19A	0.55A	0.35A	0.19A
Input Voltage Regulation (VDC)	10.5 - 15	21.0 - 30	42 - 60	10.5 - 15	21.0 - 30	42 - 60
Input Level Indicator	Red / Orange / Green LED					
Load Level Indicator			ica / Ora			
Failure Indicator			R	Red LED		
Protection	Overl	oad, Short C		se Polarity (Fu ver Temperat	use), Over/Und Ture	der Input
Remote Control Unit				CR-8		
Safety Certification		UL458			EN60950-1	
EMC	FCC Class A EN55022: 1997 e-mark e13 022694 EN61000-3-2: 1998 EN61000-3-3: 1998			e-mark e13 022694		
Operating Temperature Range			0) - 40 °C		
Storage Temperature Range	-30 to 70 °C					
Cooling	Loading controlled cooling fan					
Dimensions			15.67" D x	8.23" W x 6.53	3″ H	
Weight			-	22 Lbs.		

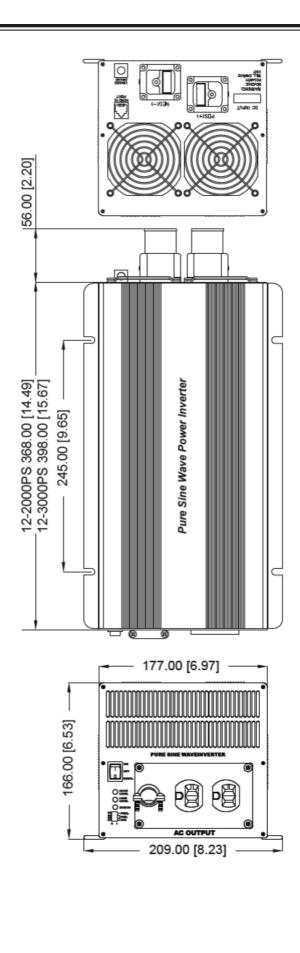


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2-3 Mechanical Drawings 12-700PS 33.5 [1.32] 12-1000PS 43.5 [1.71] | 12-1500PS 43.5 [1.71] Pure Sine Wave Power Inverter 12-700PS 273.00 [10.75] 12-1000PS 340.00 [13.39] 12-1500PS 370.00 [14.57] 196.00 [7.72] 12-700PS 151.00[5.94] 12-1000PS 154.00 [6.06] 12-1500PS 163.00[6.42] 12-700PS 71.50[2.83] 12-1000PS 88.00[3.46] 12-1500PS 88.00[3.46] 12-700PS 179.00[7.05] 12-1000PS 182.00[7.17] 12-1500PS 191.00[7.52] Pg. 7

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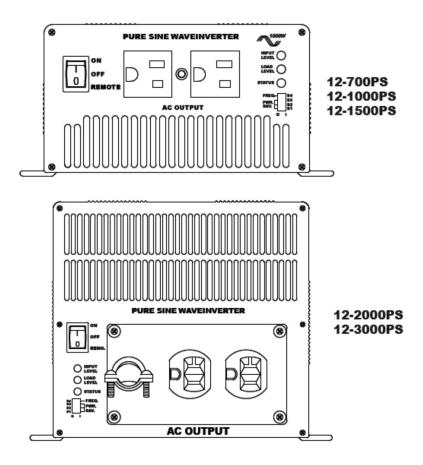
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3. Introduction

This power inverter series is one of the most advanced line of mobile AC power systems. To get the most effective power inverter, it must be installed and used properly. Please read the instructions of this manual before you install and operate this model.

3-1. Front Panel Options

3-1-1 Front Panel View:



3-1-2. ON / OFF/ REMOTE (Main) switch:

- a. Before installing the inverter, you need to ensure the main switch must be "OFF".
- b. Before using the remote unit, you need to ensure the main switch must be "REMOTE".

3-1-3. Input Level: Display Input Voltages

LED Status	DC 12V	DC 24V	DC 48V
RED Slow Blink	10.3 - 10.6	20.5 - 21.2	40.8 - 42.4
RED	10.6 - 11.0	21.2 - 21.8	42.4 - 43.5
ORANGE	11.0 - 12.1	21.8 - 24.1	43.5 - 48.1
GREEN	12.1 - 14.2	24.1 - 28.6	48.1 - 56.3
ORANGE Blink	14.2 - 15.0	28.6 - 30.0	56.3 - 59.6
OVER RED Blink	15 ♠	30.0 ↑	59.6 ↑

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3-1-4. Load Level: Display AC Loads (Watts)

LED Status	DARK	GREEN	ORANGE	RED	RED BLINK
12-700PS	0 - 56W	56 - 230W	230 - 525W	525 - 672W	Over 672W
12-1000PS	W08 - 0	80 - 330W	330 - 750W	750 - 960W	Over 960W
12-1500PS	0 - 120W	120 - 495W	495 - 1125W	1125 - 1450W	Over 1450W
12-2000PS	0 - 160W	160 - 660W	660 - 1500W	1500 - 1920W	Over 1920W
12-3000PS	0 - 240W	240 - 990W	990 - 2250W	2250 - 2880W	Over 2880W

3-1-5. AC Frequency: Selected by "S4" Dip Switch

Frequency	\$ 4
50 Hz.	OFF
60 Hz.	ON

3-1-6. Status: Display Power and Fault Status

Green LED	LED Signal	Status
Solid		Power OK
Slow Blink		Power Saving
Red LED	LED Signal	Status
Fast Blink		OVP
Slow Blink		UVP
Intermittent Blink		OTP
Solid		OLP

3-1-7. Power Saving Mode: Power Saving Mode is adjustable and set by the Dip Switches, S1, S2 and S3 on the front panel.

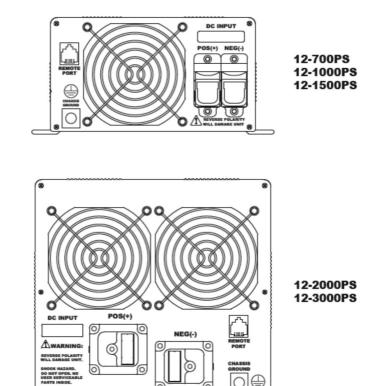
Example: With the watt setting at 15W, a 15W \uparrow load will make the inverter operate normally, a 15W \downarrow load will enter into the Power saving mode.

12-700PS	12-1000PS 12-1500PS	12-2000PS 12-3000PS	S1	S2	S 3
Disable	Disable	Disable	OFF	OFF	OFF
15W	20W	40W	ON	OFF	OFF
25W	40W	W08	OFF	ON	OFF
40W	55W	125W	ON	ON	OFF
50W	75W	170W	OFF	OFF	ON
65W	95W	210W	ON	OFF	ON
75W	115W	245W	OFF	ON	ON
85W	135W	280W	ON	ON	ON



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3-2 Rear Panel Operations:



3-2-1. Remote Port:

The PS Series Inverter is compatible with any of the remote controllers, CR-6, CR-7 or CR-8. Before using the remote unit, you need to ensure the main switch is in the "REMOTE" position and the input voltage of the power inverter is the same as it of the remote unit.

3-2-2. Fan Ventilation:

Be sure to keep it a distance (at least 1 inch) form surrounding things.

3-2-3. DC Input Terminal:

Connect DC input terminal to 12V / 24V / 48V battery or the other power sources. (+) represents positive, and (-) represents negative. Reverse polarity connection will blow the internal Fuse and may damage the inverter permanently.

Model	DC Input Voltage			
Model	Minimum	Maximum		
12 V	10.5	15.0		
24 V	21.0	30.0		
48 V	42.0	60.0		

3-2-4. Use wire # 8 AWG to connect Chassis ground with vehicle chassis.



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WARNING! Operating the inverter without a proper ground connection may cause an electrical hazard.

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3-3. Protective Features

Model		DC	Input (VD	C)	Over Temperature Protection				
	Over Voltage		Under	Under Voltage		INTERIOR		HEAT SINK	
	Shutdown	Restart	Voltage Alarm	Shutdown	Restart	Shutdown	Restart	Shutdown	Restart
12 V	15.3V	14.3V	11.0V	10.2V	12.7V				
24 V	30.6V	28.6V	22.0V	20.3V	25.2V	70 ℃	45 ℃	90 ℃	60 ℃
48V	61.0V	57.2V	44.0V	40.8V	49.7V				

3-4. Installation:

The power inverter should be installed in an environment that meets the following requirements:

- **3-4-1.** Dry Do not allow water to drip on or enter into the inverter.
- **3-4-2.** Cool Ambient air temperature should be between 0° and 40°, the cooler the better.
- **3-4-3.** Safe Do not install the inverter in a battery compartment or other areas where flammable fumes may exist, such as fuel storage areas or engine compartments.
- **3-4-4.** Ventilated –Keep the inverter a distance (as least 1 inch) away from surrounding things. Ensure the ventilation shafts on the rear and the bottom of the unit are not obstructed.
- **3-4-5.** Dust Do not install the Inverter in a dusty environments The dust can be inhaled into the unit when the cooling fan is working.
- **3-4-6.** Close to batteries Avoid excessive cable lengths. Do not install the Inverter in the same compartment as batteries. Use the recommended wire lengths and sizes (see section 3-5). 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 will damage the Inverter.

WARNING! Shock Hazard. Before proceeding further, carefully check that 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.

3-5. DC Wiring Connections:

Follow this procedure to connect the battery cables to the DC input terminals of the Inverter. The cables should be as short as possible (less than 10 feet / 3 meters ideally) and large enough to handle the required current in accordance with the electrical codes or regulations applicable to the installation.

Cables that are not an adequate gauge (too narrow) or too long will deteriorate 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 the cables, the greater the voltage drop. Increasing DC cable size helps improve the situation.

Newmar recommends the following cables for optimum inverter performance. (Apply both 120V and 230V versions). Two crimp ring terminals for the following wire sizes on the next page are provided with the inverter.



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Model	Wire AWG	Inline Fuse*
12-700FPS	# 4	100 A
24-700FPS	# 6	50 A
48-700FPS	# 8	30 A
12-1000FPS	#2	150 A
24-1000FPS	# 4	80A
48-1000FPS	# 6	40 A
12-1500FPS	# 2	200 A
24-1500FPS	# 4	100 A
48-1500FPS	# 6	50 A
12-2000FPS	# 2/0	250 A
24-2000FPS	# 1/0	125 A
48-2000FPS	# 2	70 A
12-3000FPS	# 4/0	400 A
24-3000FPS	# 2/0	200 A
48-3000FPS	# 1/0	100 A

^{*} Newmar recommends AFB-500 Fuse Block and ANL fuses.

3-5-1. Connect the cables to the power input terminals on the rear panel of the inverter. The red terminal is represents positive (+) and black terminal represents negative (-). Insert the cables into the terminals and tighten the screw to clamp the wires securely.



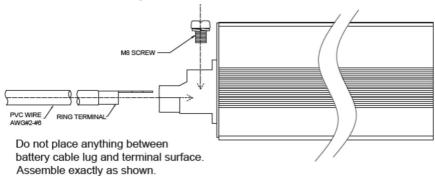
Warning! Ensure all the DC connections are tight (torque to 9 - 10 ft/lb, 11.7 - 13 Nm). Loose connections may cause overheat and fire.



WARNING! The installation of a fuse must be on a 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.

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

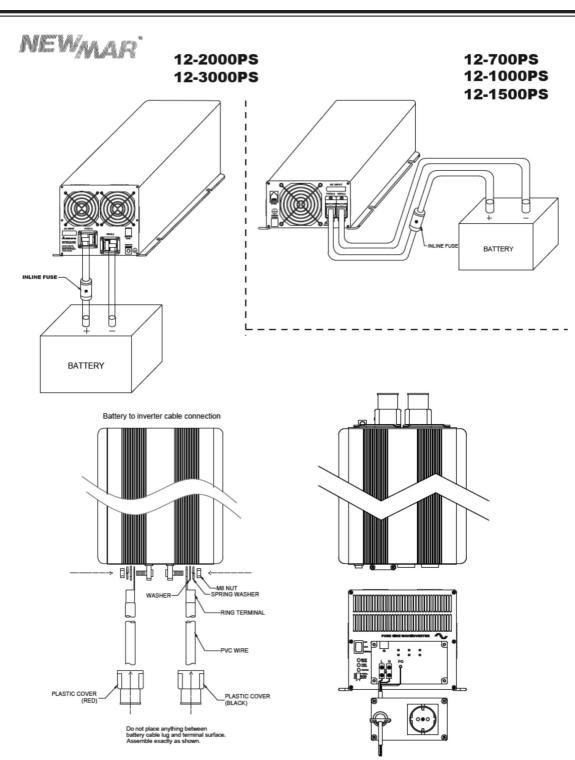
Battery to inverter cable connection



Note: It may be easier to attach the ring lug to the input terminal with the red or black plastic insulating cover removed. To do this, remove the two small Philips head screws – one on top and one on bottom, from each cover.

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3-6. AC Safety Grounding:

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

3-6-1. Neutral Grounding (GFCI'S):

3-6-1-1. 120V models: The neutral conductor of the AC output circuit of the Inverter is automatically connected to the safety ground during inverter operation. This conforms to National Electrical Code requirements that separately derived from AC sources (such as inverters and generators) which have their neutral conductors tied to ground in the same way as the neutral conductors from the utility tied to ground at the AC breaker panel. For models configured with a transfer relay, while AC utility power is present and the Inverter is in bypass mode, this connection (the neutral of the 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.

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 with Inverter. In addition, electrical codes require GFCI protection of certain receptacles in residential installations. While the pure sine wave output of the Inverter is equivalent to the waveform provided by utilities, compliance with UL standards requires us to test and recommend specific GFCI. Newmar has tested the following GFCI - protected 20A receptacles and found that they functioned properly when connected to the output of the Inverter.

3-7. Inverter Operation:

To operate the power inverter, use the ON / OFF switch on the Front panel to turn the power on. Then the power inverter is ready to deliver AC power to your loads. If there is several loads use, turn them on separately after the inverter is "ON" in order to prevent OVP resulted from the surge power.

- 3-7-1. Set the power switch to "ON" position and the buzzer will send out "Beep" sounds at the moment. Then the inverter will make selfdiagnosis, and the LED's indicators will also appear various colors. Finally the buzzer will "Beep" again and the Input Level and Status LED indicators will turn to "Green" color, then the inverter starts to work successfully.
- 3-7-2. Set the power switch to the OFF position, then the inverter stops and all the lights go Off.
- 3-7-3. Set the power inverter switch to 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 the inverter, a meter such as FLUKE 45 BECKMAN 4410 or TRIPLETT 4200 must be used.

4. Troubleshooting:



WARNING! Do not open or disassemble the Inverter. Attempting to service the unit yourself may cause the risk of electrical shock or fire.

Problems and Symptoms	Possible Cause	Solutions
"No AC Power Output"		
STATUS illuminates the red LED		
a. Blinking fast	Over input voltage. (OVP)	Check input voltage. Reduce input voltage.
b. Blinking slowly.	Low input voltage. (UVP)	Recharge battery. Check connections and the cable.



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c. Blinking Intermittently. Thermal shutdown. Improve ventilation.

Make sure ventilation shafts in the (OTP)

> inverter are not obstructed. Lower ambient temperature.

d. Solid ON. Short circuit or Check AC wiring for short circuit.

> Reduce the load. Wiring error.

Overload.(OLP)

5. Maintenance:

To keep your inverter operating properly, there is very little maintenance required. You should clean the exterior 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 and Contact Information

NEWMAR warrants with original purchase of products sold by NEWMAR, that they shall be free from defects of material and workmanship for two years from the date of purchase.

If you have a problem with the PS Series Inverter, or have any questions about the installation and proper operation of the inverter, please contact NEWMAR's Technical Services Manager:

Phone: 714-751-0488 - From the hours of 7:00 A.M. to 4:30 P.M. weekdays, P.S.T.

Fax: 714-957-1621 - Anytime

Email: techservice@newmarpower.com - Anytime



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