

**Portawattz™ 140
POWER INVERTER**

OWNER'S MANUAL

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Table of Contents

1. Introduction	1
2. How Your Portawattz 140 Works	1
2.1 Principle of operation.....	1
2.2 Portawattz 140 output waveform.....	2
3. Installation	4
3.1 Power source	4
3.2 Connecting to power source	4
3.3 Fuse replacement.....	5
3.4 Connection to load	5
3.5 Placement of inverter	6
4. Operating Tips	7
4.1 Rated versus actual current draw of equipment.....	7
4.2 Battery operating time	8
5. Troubleshooting	9
5.1 Common problems	9
5.2 Troubleshooting Guide.....	10
6. Warranty	12
6.1 Warranty terms.....	12
6.2 To obtain warranty service.....	13
7. Other Products From Statpower Technologies	15
8. Product Specifications	16

1. Introduction

Your new Portawattz 140 power inverter is a member of the most advanced line of DC to AC inverters available today. It will give you years of dependable service in your vehicle, boat, RV, or remote home.

To get the most out of your Portawattz 140 it must be installed and used properly. Please read the installation and operating instructions in this manual carefully before installing and using your Portawattz 140. Pay special attention to the **CAUTION** and **WARNING** statements in this manual and on the Portawattz 140. **CAUTION** statements identify conditions or practices that could result in damage to your Portawattz 140 or to other equipment. **WARNING** statements identify conditions or practices that could result in personal injury or loss of life.

2. How Your Portawattz 140 Works

The Portawattz 140 is an electronic device that converts low voltage DC (direct current) electricity from a battery or other power source to standard 115 volt AC (alternating current) household power. In designing the Portawattz 140, Statpower has used design techniques previously employed in computer power supplies. This advanced design gives you an inverter that is smaller, lighter, and easier to use than any other inverter with a similar power rating.

2.1 Principle of operation

The Portawattz 140 converts power in two stages. The first stage is a DC-to-DC converter that raises the low voltage DC at the inverter input to 145 volts DC. The second stage is the actual inverter stage. It converts the high voltage DC into 115 volts, 60 Hz AC.

The DC-to-DC converter stage uses modern high frequency power conversion techniques that eliminate the bulky transformers found in inverters based on older

technology. The inverter stage uses advanced power MOSFET transistors in a full bridge configuration. This gives you excellent overload capability and the ability to operate tough reactive loads like lamp ballasts and small induction motors.

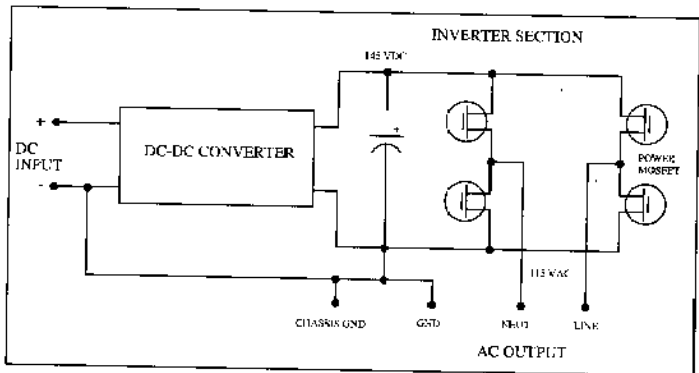


Figure 1. Portawattz 140 - Principle of Operation

2.2 Portawattz 140 output waveform

The AC output waveform of the Portawattz 140 is called a "quasi-sine wave" or a "modified sine wave." It is a stepped waveform that is designed to have characteristics similar to the sine wave shape of utility power. A waveform of this type is suitable for most AC loads, including linear and switching power supplies used in electronic equipment, transformers, and motors. This waveform is much superior to the square wave produced by many other DC to AC inverters.

The modified sine wave produced by the Portawattz 140 is designed to have an RMS (root mean square) voltage of 115 volts, the same as standard household power. Most AC voltmeters (both digital and analog) are sensitive to the average value of the wave form 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 2 - 20 volts low (i.e. about 100 V) when measuring the output of the Portawattz 140. For accurate measurement of the output voltage of the Portawattz 140, a true RMS reading voltmeter such as a Fluke 87, Fluke 8060A, Beckman 4410, or Triplet 4200 must be used.

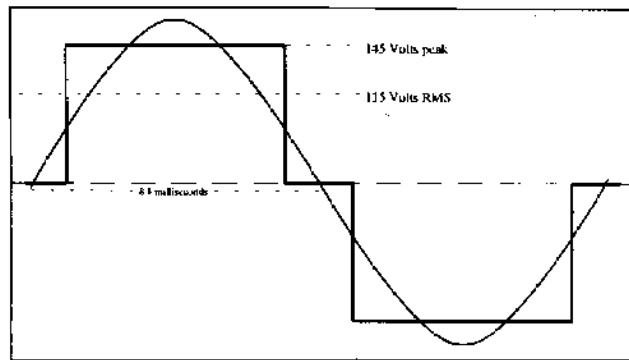


Figure 2. Portawattz 140 Modified Sine Wave

3. Installation

3.1 Power source

For optimum performance, the power source must provide between 11 and 14.5 volts DC and must be able to supply sufficient current to operate the load. The power source may be a battery or a well-regulated DC power supply. As a rough guideline, divide the power consumption of the load (in watts) by 10 to obtain the current (in amperes) the power source must deliver.

Example: Load is rated at 100 watts. Power source must be able to deliver

$$100 \div 10 = 10 \text{ amperes}$$

CAUTION: The Portawattz 140 must be connected only to batteries with a nominal output voltage of 12 volts. The Portawattz 140 will not operate from a 6 volt battery and will be damaged if it is connected to a 16 volt battery.

3.2 Connecting to power source

The Portawattz 140 is equipped with a cigarette lighter plug for connection to the power source. The tip of the plug is positive and the side contact is negative. Connect the plug to the cigarette lighter socket in a vehicle or to the cigarette lighter socket on a battery pack.

CAUTION: REVERSE POLARITY CONNECTION WILL DAMAGE INVERTER

If the inverter is connected to the incorrect polarity, an external fuse will open. If the unit does not function after replacement of the fuse, it must be returned to Statpower for repair. Repair costs for this type of damage are not covered by your warranty.

CAUTION: DO NOT USE WITH POSITIVE GROUND ELECTRICAL SYSTEMS

The Portawattz 140 is designed for use with negative ground vehicle electrical systems. The Portawattz 140 should not be used with positive ground vehicle electrical systems.

3.3 Fuse replacement

The fuse is located on the back panel of the unit. It is a 15-amp blade type automotive fuse. Should the fuse blow, unplug it and replace it with a new one.

3.4 Connection to load

The Portawattz 140 is equipped with a standard AC receptacle. Plug the cord from the equipment you wish to operate into this receptacle.

CAUTION: DO NOT CONNECT TO AC DISTRIBUTION WIRING

The Portawattz 140 is designed to be directly connected to standard electrical and electronic equipment in the fashion described above. Do not connect the Portawattz 140 to household or RV AC distribution wiring. Do not connect the Portawattz 140 to any AC load circuit in which the neutral conductor is connected to ground (earth) or to the negative of the DC (battery) source.

CAUTION: RECHARGEABLE APPLIANCES

Certain rechargers for small nickel cadmium batteries can be damaged if connected to the Portawattz 140. Two particular types of equipment are prone to this problem:

- 1) Small battery operated appliances such as flashlights, razors, and night-lights that can be plugged directly into an ac receptacle to recharge.

- 2) Certain battery chargers for battery packs used in hand power tools. These chargers will have a warning label stating that dangerous voltages are present at the battery terminals.

Do NOT use the Portawattz 140 with the above equipment.

This problem does not occur with the vast majority of battery operated equipment. Most of this equipment uses a separate charger or transformer that is plugged into the AC receptacle and produces a low voltage output. If the label on the AC adapter or charger states that the adapter or charger produces a low voltage AC or DC output (less than 30 volts), the Portawattz 140 will have no trouble powering this charger or adapter safely.

3.5 Placement of inverter

For best operating results, the inverter should be placed on a flat surface, such as the floor or seat of a vehicle. Approximately 3 feet (1.0m) of cord has been provided for this purpose. The inverter should only be used in locations that meet the following requirements:

- a) **Dry** - do not allow water to drip or splash on the Portawattz 140.
- b) **Cool** - ambient air temperature should be between 0° C to 40° C, ideally between 15° C and 25° C. Do not place the inverter on or near a heating vent or any piece of equipment that is generating heat above room temperature. Do not place the inverter in direct sunlight if avoidable.
- c) **Ventilated** - allow at least one inch of clearance around the Portawattz 140 for air flow. Do not place items on or over the inverter during operation. Make sure that air is allowed to circulate freely around the unit.

The unit will shut down if the internal temperature exceeds 90° C. It will restart once it cools off.

CAUTION: Portawattz 140 CASE GETS HOT

The case of the Portawattz 140 acts as a heat sink, dispersing internally generated heat. When the Portawattz 140 is operating at high power levels (above 100 watts) for extended periods, the case will get hot. Surface temperatures may approach 60° C (140° F) on some parts of the case. When operating at high power levels, do not place the Portawattz 140 on or near materials that may be affected by these temperatures. Use caution when handling the Portawattz 140 if it is operating at high power levels.

d) Safe - do not use the Portawattz 140 near flammable materials or in any location that may accumulate flammable fumes or gases.

4. Operating Tips

4.1 Rated versus actual current draw of equipment

Manufacturers of electrical and electronic equipment often overrate the current drawn by their products. If a piece of electrical or electronic equipment is rated at 200 watts (2 A) or less, the Portawattz 140 will probably operate it. The inverter has overload protection, so it is safe to try it with equipment rated at 200 watts or more. The inverter will shut down if it is overloaded. To restart the unit after an overload shutdown, momentarily turn off power to the unit by using the on/off switch on the inverter.

The Portawattz 140 will NOT operate appliances that produce heat, such as hair dryers, microwave ovens, and toasters.

4.2 Battery operating time

With a typical vehicle battery, a minimum operating time of 2 - 3 hours can be expected. In most cases, 5 to 10 hours of operating time is achievable. Statpower recommends that the operator start the vehicle every 2 - 3 hours to recharge the battery system. This will prevent any unexpected shutdowns of the equipment and will ensure that there is always sufficient battery capacity to start the vehicle engine.

The inverter may be used either while the engine is running or turned off. However, the inverter may not operate while the engine is starting since the battery voltage can drop substantially during cranking.

The Portawattz 140 draws less than 0.1 ampere from the battery when it is not supplying power to a load. In most cases the Portawattz 140 may be left connected to the battery when it is not in use since it draws so little current. If the vehicle will not be used for several days, disconnect the Portawattz 140 from the battery.

5. Troubleshooting

5.1 Common problems

Buzz in audio systems Some inexpensive stereo systems and "boom boxes" will emit a buzzing sound from their loudspeakers when operated from the Portawattz 140. This is because the power supply in the device does not adequately filter the modified sine wave produced by the Portawattz 140. The only solution is to use a sound system that incorporates a higher quality power supply.

Television interference The Portawattz 140 is shielded and filtered to minimize interference with TV signals. In some cases, particularly with weak TV signals, some interference may still be visible. Try the following corrective measures:

- a) Position the Portawattz 140 as far as possible from the television, the antenna and the antenna cables. Use an extension cord to move the Portawattz 140 away from the television.
- b) Adjust the orientation of the Portawattz 140, the antenna cables, and the TV power cord to minimize interference.
- c) Make sure that the antenna feeding the television provides an adequate ("snow free") signal and that high quality, shielded antenna cable is used.

These measures will usually improve the situation. If they do not, you may wish to try a different make of TV set or an antenna that can provide a stronger signal. Experience has shown that different models of TV sets vary in their susceptibility to interference.

5.2 Troubleshooting Guide

Problem: Lack of power output

Possible cause

Poor contact with lighter.

Automotive electrical accessory system requires ignition to be on.

Cigarette lighter circuit fuse open (blown).

Poor connection or inadequate wiring between battery and cigarette lighter.

Battery voltage below 10 volts.

Load draws too much power.

Inverter in thermal shutdown.

Fuse in inverter is open.

Suggested remedy

Clean out thoroughly. Replace outlet if necessary. Spread contacts on lighter plug.

Turn ignition key to on position.

Check vehicle fuses, replace damaged fuse.

Repair connections and use heavier gauge wire (14 AWG suggested).

Recharge or replace battery.

Reduce load to 140 watts max.

Allow inverter to cool. Ensure there is adequate ventilation. Ensure that load is no more than 140 watts for continuous operation.

Replace fuse. Ensure that inverter is connected to power source with correct voltage and polarity.

Problem: Low output voltage

Possible cause

Using average reading voltmeter.

Inverter is overloaded.

Power source voltage below
11.5 volts.

Suggested remedy

Use true RMS reading meter.
See section 2.2 of manual.

Reduce load to 140 watts
maximum to maintain regulation.

Keep power source voltage
above 11.5 volts to maintain
regulation.

6. Warranty

6.1 Warranty terms

Statpower manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. Statpower warrants the Portawattz 140 to be free from defects in workmanship or materials for 12 months from the date of purchase. During this period, Statpower will, at its option, repair or replace the defective product free of charge. This warranty will be considered void if the unit has suffered any physical damage or alteration, either internally or externally, and does not cover damage arising from improper use or from use in an unsuitable environment. This warranty will not apply where the product has been misused, neglected, improperly installed, or repaired by anyone other than Statpower. In order to qualify for the warranty, the product must not be disassembled or modified without prior authorization by Statpower.

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

Statpower owns all parts removed from repaired products. Statpower uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Statpower repairs or replaces a product, its warranty term is not extended.

THIS IS STATPOWER'S ONLY WARRANTY, AND THE COMPANY MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

6.2 To obtain warranty service

If your Portawattz 140 requires service, please return it to your place of purchase. If you are unable to contact your merchant, or the merchant is unable to provide service, contact the Statpower Customer Department directly:

BY PHONE: (604) 420-1585
BY FAX: (604) 420-1591
BY MAIL: Statpower Technologies Corporation
7725 Lougheed Highway
Burnaby, BC Canada V5A 4V8
BY EMAIL: support@statpower.com

In order to assist you, the customer service representative will need the following information:

- a description of the problem,
- a serial number of the unit (the serial number is located on the back panel or on the bottom of the unit),
- name and address of the dealer where you purchased the unit,
- date of purchase.

If your Portawattz 140 requires service, the customer service representative will issue you a RETURN AUTHORIZATION NUMBER.

DO NOT RETURN ANY PRODUCT TO STATPOWER WITHOUT A RETURN AUTHORIZATION NUMBER.

If you are returning a Portawattz 140 from the USA, follow this procedure:

1. Obtain a Return Authorization Number from Statpower.
2. Package the unit safely, preferably using the original box and packing materials. Include the Return Authorization Number, a return address where the repaired unit can be shipped, a contact telephone number, and a brief description of the problem.
3. Ship the unit to the following address, freight prepaid:

Statpower Technologies Corporation
c/o International Parcel Service Warehouse
#8 - 14th Street
Blaine, WA 98230

If you are returning a Portawattz 140 from Canada, follow the procedure above but ship the unit, freight prepaid, to the following address:

Statpower Technologies Corporation
7725 Loughheed Highway
Burnaby, BC V5A 4V8

If you are returning a Portawattz 140 from outside North America please contact the local Statpower dealer in your country.

7 Other Products From Statpower Technologies

Statpower Technologies develops, manufactures and markets power electronic products. Our goal is to offer you top quality products that convert and control electric power. We specialize in DC to AC inverters, battery packs, battery chargers, backup power supplies and other products associated with mobile or power backup applications.

Portawattz 300 Inverter A higher power product than Portawattz 140, the Portawattz 300 delivers 300 watts of AC power yet is still small enough to hold in the palm of a hand. Ideal for small power tools, full size TV sets, desktop computers and other applications that are beyond the power capacity of the Portawattz 140.

Portawattz 1000 Inverter and Portawattz 1750 Inverter Compact 1000 and 1750 watt DC to AC inverters designed for permanent installation in a boat, vehicle, or remote home. These inverters operate power tools, kitchen appliances, and a wide range of other electrical and electronic equipment.

B Product Specifications

Output power	
continuous	140 watts
surge	200 watts
Output voltage	115 VAC RMS \pm 5%
Output frequency	60 Hz \pm 4Hz.
Output waveform	modified sinewave
Input voltage	10 - 15 VDC
Optimum Efficiency	90%
No-load current draw	<0.1 A
Low battery shutdown	10 V
Dimensions	42 x 120 x 120 mm
Weight	600 g

* Specifications subject to change without notification.