STATPOWER

PORTAWATTZ™ 700

Installation & Operations Guide

XANTREX

Smart Choice For **Power**

About Xantrex

Xantrex Technology Inc. is a world-leading supplier of advanced power electronics with a product line that ranges from 50 Watt mobile units to 1 MW utility-scale or stand-alone systems for wind, solar, batteries, fuel cells, microturbines and backup power applications. Xantrex products include inverters, battery chargers, programmable power supplies, and variable speed drives that convert, supply, control, clean and distribute electrical power.

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1.0 Introduction

Thank you for purchasing the PORTAWATTZ 700 Power Inverter. The PORTAWATTZ 700 is part of an advanced family of high performance power inverters from Xantrex, the leader in the field of high frequency inverter design. From the 12 Volt battery in your vehicle or boat, or directly from a dedicated 12 Volt battery, the PORTAWATTZ 700 will efficiently and reliably power a wide variety of household AC products, such as TVs, computers, compact fluorescent lights, soldering irons, power tools (5.5 Amps or less), and many more. The PORTAWATTZ 700 employs reliable solid state power electronics for years of safe, trouble-free operation. It includes a built-in cooling fan and automatic safety monitoring circuitry to protect the inverter, and your battery, from inadvertent overload conditions.

Read this manual before installing or using the PORTAWATTZ 700 and save it for future reference.

The following main topics are covered in this guide:

- Important safety information
- Installation and operating instructions
- Warranty and service information

2.0 Safety First ... Before You Use the PORTAWATTZ 700

Incorrect installation or misuse of the PORTAWATTZ 700 may result in danger to the user or hazardous conditions. We urge you to pay special attention to all **CAUTION** and **WARNING** statements. **CAUTION** statements identify conditions or practices that may result in damage to the PORTAWATTZ 700 or to other equipment. **WARNING** statements identify conditions that may result in personal injury or loss of life.

WARNING! Shock hazard. Keep away from children.

- The PORTAWATTZ 700 generates the same potentially lethal AC power as a normal household wall outlet. Treat it with the same respect that you would any AC outlet.
- Do not insert foreign objects into the PORTAWATTZ 700's AC outlets, fan or vent openings.
- Do not expose the PORTAWATTZ 700 to water, rain, snow or spray.
- Do not, under any circumstances, connect the PORTAWATTZ 700's AC receptacles to utility power AC distribution wiring.

WARNING! Heated surface.

- The PORTAWATTZ 700's housing may become uncomfortably warm, reaching 140°F (60°C) under extended high power operation. Ensure that at least 2 inches (5 cm) of air space is maintained on all sides of the PORTAWATTZ 700. During operation, keep away from materials that may be affected by high temperatures.

WARNING! Explosion hazard.

- Do not use the PORTAWATTZ 700 in the presence of flammable fumes or gases, such as in the bilge of a gasoline powered boat, or near propane tanks. Do not use the PORTAWATTZ 700 in an enclosure containing automotive-type, lead- acid batteries. These batteries, unlike sealed batteries, vent explosive hydrogen gas, which can be ignited by sparks from electrical connections.
- When working on electrical equipment always ensure someone is nearby to help you in an emergency.

CAUTION!

- Do not connect live AC power to the PORTAWATTZ 700's AC outlets. The inverter will be damaged even if it is switched OFF.
- Do not connect any AC load, which has its neutral conductor connected to ground, to the PORTAWATTZ 700.
- Do not expose the PORTAWATTZ 700 to temperatures exceeding 104°F (40°C).

CAUTION! Do not use the PORTAWATTZ 700 with the following equipment:

- Small battery operated products such as rechargeable flashlights, some rechargeable shavers, and night-lights that are plugged directly into an AC receptacle to recharge.
- Certain battery chargers for battery packs used in hand powered tools. These chargers will have warning labels stating that dangerous voltages are present at the charger's battery terminals.

3.0 Quick Reference

3.1 Overview

These basic instructions are intended to provide a brief overview of the PORTAWATTZ 700. For complete information about the PORTAWATTZ 700, it is important to read this manual fully. Figure 1 below shows the PORTAWATTZ 700's key features.

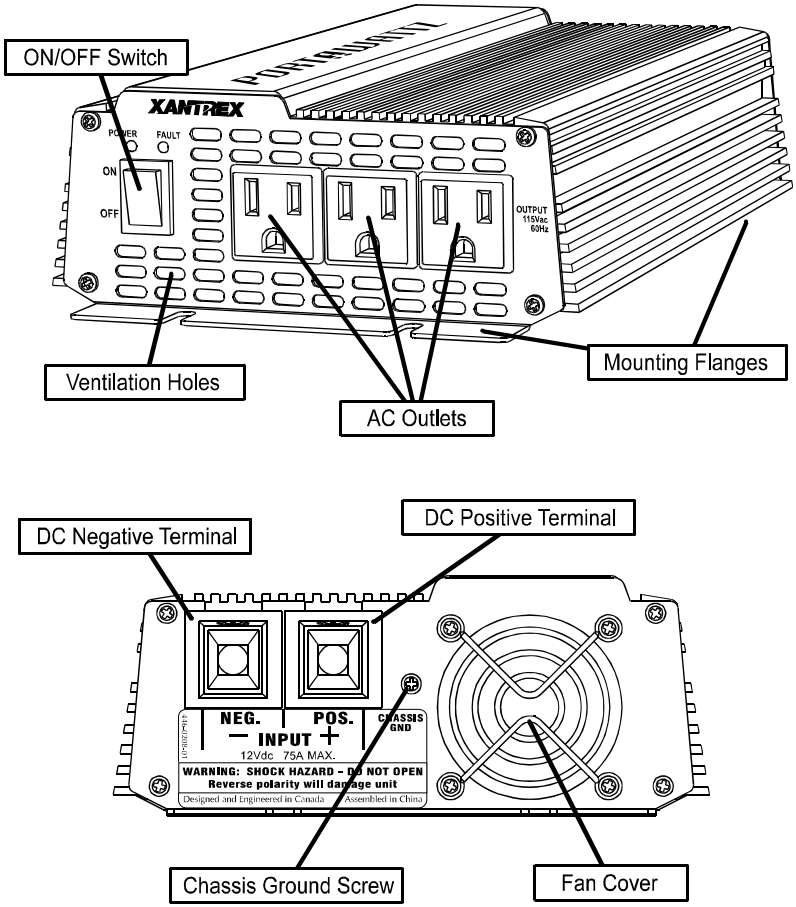

Figure 1 - Key Features

3.2 Operating 115 V AC Products

1. After proper installation and connection to a 12 Volt battery, the PORTAWATTZ 700 can be used to power products rated at 700 Watts or less (see section 5.0).

2. To supply power to the AC outlets, turn the ON/OFF Switch ON. The green POWER light indicates AC power is available.

3. Plug the AC products you wish to operate into the AC outlet(s) and switch them on, one at a time.

4. In the event of an overload, low battery voltage or overheating, the PORTAWATTZ 700 will automatically shut down (see section 8.0).

4.0 Design Features

4.1 Switchmode Power Conversion Technology

The PORTAWATTZ 700 employs advanced high frequency switchmode power conversion circuitry. This results in a smaller, lighter, more efficient and quieter inverter.

4.2 High Surge Power Capability

High performance Power FETs (Field Effect Transistors) are incorporated into a highly advanced circuit design to provide outstanding high surge capability.

4.3 Safety Features

These advanced safety features are built into the PORTAWATTZ 700:

- Electronic overload protection with automatic shutdown.
- Built-in internal backup DC fuse provides added safety.
- Low battery voltage warning followed by automatic shutdown.
- Over temperature protection with automatic shutdown.
- High input voltage protection with automatic shutdown.
- Output short circuit protection.
- Manual reset eliminates unexpected restarting.

5.0 Installation Guidelines

5.1 Selecting a Suitable Location

For safe and optimum performance, install the PORTAWATTZ 700 in a location that is …

…dry. Do not expose to water drip or spray.

…cool. Operate only in ambient temperatures between 32°F (0°C) and 104°F (40°C). Keep away from furnace heating vents or other heat producing equipment.

…well ventilated. Allow at least 2 inches (5 cm) clearance above and on all sides of the PORTAWATTZ 700 for proper cooling.

…safe. Do not install PORTAWATTZ 700 in a compartment with batteries or flammable liquids, such as gasoline, or explosive vapors.

…clean and free of dust and dirt. This is especially important when the PORTAWATTZ 700 is used in a work environment, such as a mobile service vehicle. Metal dust from key cutting machines or from grinding other types of metals can damage the PORTAWATTZ 700 if it gets inside the housing (will also void your warranty).

…relatively close to the battery source. This will minimize the cable length from the battery to the inverter. It is better to run an extension cord from the AC outlets of the inverter to your product, than add additional cable length from the battery to the DC terminals.

WARNING: To prevent overheating and the potential for fire, do not cover or obstruct the ventilation holes or fan opening on the PORTAWATTZ 700.

WARNING: The PORTAWATTZ 700 contains components, which may produce arcs or sparks. To prevent fire or explosion, do not install in compartments where batteries, flammable liquids, or explosive vapors may be present, or in locations that require ignition protected equipment.

5.2 DC Cable Selection and Preparation

Correct cable size and wiring is very important for safe operation and maximum performance of the PORTAWATTZ 700. Because the PORTAWATTZ 700 is designed for low voltage, high current input, low resistance cable from the battery to the DC terminals is needed to deliver the maximum amount of usable energy. Undersized cable will diminish battery and inverter performance.

Use copper wire rather than aluminum. Aluminum wire has 1/3 more resistance than copper wire of the same size and good, low resistance connections are more difficult to achieve.

For cable runs between the battery and inverter of 4 ft. or less use #4 AWG copper cable. For wire runs of 4 ft. to 12 ft. use #2 AWG copper cable. The insulation on the cable should be rated at 90ºC (minimum). Using undersized cable, or when the battery to inverter run is greater than 12 ft., may result in excessive voltage drop between the battery and PORTAWATTZ 700 and cause the inverter to prematurely shut down.

As a general rule, select a cable size that is heavier than the minimum required for your installation. A heavier cable will reduce the voltage drop from the battery to the inverter and provide greater run time.

The end of each cable that is connected to the PORTAWATTZ 700 must have its insulation stripped back ½" (1.25 cm) from the end, exposing the bare copper conductor. The end of each cable that is connected to the battery must be fitted with a terminal ring that is secured to the post on the battery. A solid, low resistance connection to the battery is essential for proper operation of the PORTAWATTZ 700.

IMPORTANT! Installation of an 80 Amp Class T fuse or 80 Amp circuit breaker on the cable that runs from the positive DC Input Terminal on the PORTAWATTZ 700 to the positive battery post is recommended. Install the fuse or circuit breaker near the end of the cable that is connected to the battery, following installation instructions provided by its manufacturer. Make sure the fuse or circuit breaker selected has an interrupt rating of at least 10 times the amp hour rating of the battery (or batteries).

5.3 Connecting PORTAWATTZ 700 to Ground

PORTAWATTZ 700 must be properly grounded before it is connected to a battery. The Chassis Ground Screw on the end of the unit or the DC Negative Terminal (see Figure 1) can be used to connect the PORTAWATTZ 700's chassis and three AC outlets to ground.

The grounding point varies, depending on where the PORTAWATTZ 700 is installed.

- In a vehicle, use #8 AWG cable to connect the Chassis Ground Screw to the vehicle's frame.
- In a boat, use cable one size smaller than the cable from the battery to the inverter for connecting to the boat's grounding system (engine negative bus or DC ground bus).

- In a building or fixed location, ground to the earth by means of a metal grounding rod designed for this purpose and use #8 AWG wire (preferably identified with green/yellow insulation) to the grounding point.

WARNING!: Electrical shock hazard. Do not operate the PORTAWATTZ 700 without proper grounding.

5.4 Connecting PORTAWATTZ 700 to a Battery

Follow the steps below to connect the PORTAWATTZ 700 to a battery. Read the **CAUTION** and **WARNING** statements that apply to this section carefully. If you are unsure how to make a safe connection, contact Xantrex Customer Service for assistance. Make sure your installation includes proper grounding of the PORTAWATTZ 700 before making the battery connection (see section 5.3).

1. Turn the ON/OFF Switch on the PORTAWATTZ 700 to OFF. If you are using a battery selector switch, turn it off as well. If you installed a circuit breaker (or a fuse) on the positive cable, switch it to OFF (or remove the fuse).

2. Connect the #4 or #2 cables to the DC Input Terminals on the end of the PORTAWATTZ 700. The positive cable is connected to the red (+) terminal and the negative cable is connected to the black (-) terminal. Secure each cable in its respective terminal by tightening the terminal screw. Make sure the insulation covering the end of each cable is removed before securing with the terminal screw.

3. Connect the negative cable from the PORTAWATTZ 700 to the negative battery post and fasten securely.

4. Check the cable which is not yet connected to the battery and confirm that it is connected to a circuit breaker or fuse, which in turn is connected to the positive (+) DC Input Terminal on the PORTAWATTZ 700.

5. Check the post on the battery that does not have a cable attached to it and confirm that it is the positive battery terminal.

6. Connect the positive cable from the PORTAWATTZ 700, which has the in-line circuit breaker or fuse, to the positive battery post and fasten securely. If you are using a battery selector switch, connect the positive cable from the PORTAWATTZ 700 to the positive terminal and fasten securely.

7. If a circuit breaker was installed on the positive cable, switch it ON, or insert the fuse. If a battery selector switch is used, select a setting that allows current to flow from one of the batteries to the PORTAWATTZ 700. Current (12 Volts) should now be flowing from the battery to the PORTAWATTZ 700.

8. Set the ON/OFF Switch on the PORTAWATTZ 700 to the ON position. The green POWER indicator should be illuminated and 115 Volt AC power available from the three outlets. If not, or if the red FAULT indicator is illuminated, check the battery and wiring to the PORTAWATTZ 700.

WARNING!

- Periodically check all cable connections and tighten as required. This is especially important if the PORTAWATTZ 700 is installed in a vehicle or boat. The vibration of the inverter, cables, and battery in these environments may cause connections to loosen. Connections that are not tight may create a hazard.

- Connections to battery posts must be made with permanent connectors that provide a reliable, low resistance connection. Temporary "alligator" type clips are not recommended. Loose connectors will cause excessive voltage drop and may cause the cables to overhead resulting in equipment damage or fire. Clean the permanent connectors regularly and prevent corrosion by using an insulating spray coating.

- Do not connect the PORTAWATTZ 700 to a battery if there are flammable fumes or liquids present. Explosion or fire may result. Remove any flammable materials and ventilate the area of any vapors before making a connection to the battery.

CAUTION!: A reverse polarity connection (positive to negative) will open internal fuses in the PORTAWATTZ 700 and may damage the unit. Damage caused by a reverse polarity connection is not covered under warranty.

5.5 Battery Connection Diagrams

Presented below are three different options for connecting the PORTAWATTZ 700 to a battery. These options require the use of one or more batteries and support run time requirements ranging from "brief" to "extended" or power requirements ranging from "light" to "heavy".

Connecting To A Vehicle's Starting Battery

Use this wiring option if your application loads have relatively low power requirements or when the application loads are higher, but used infrequently. While a vehicle starting battery is very acceptable for supplying 12 Volts DC to the PORTAWATTZ 700 for short periods of time, it is not designed for frequent, deep discharge.

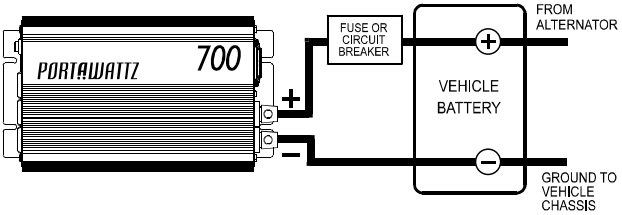

Figure 2 - Connection to Vehicle Battery

Although the PORTAWATTZ 700 can operate while the vehicle engine is running, the normal voltage drop that occurs when an engine is started may trigger the PORTAWATTZ 700's low voltage shutdown feature (see section 8.2).

Connecting To An Auxiliary Battery

Use this wiring option if your PORTAWATTZ 700 will be running applications frequently, especially if the applications have higher power requirements. Select a good quality, deep-cycle battery for this type of installation.

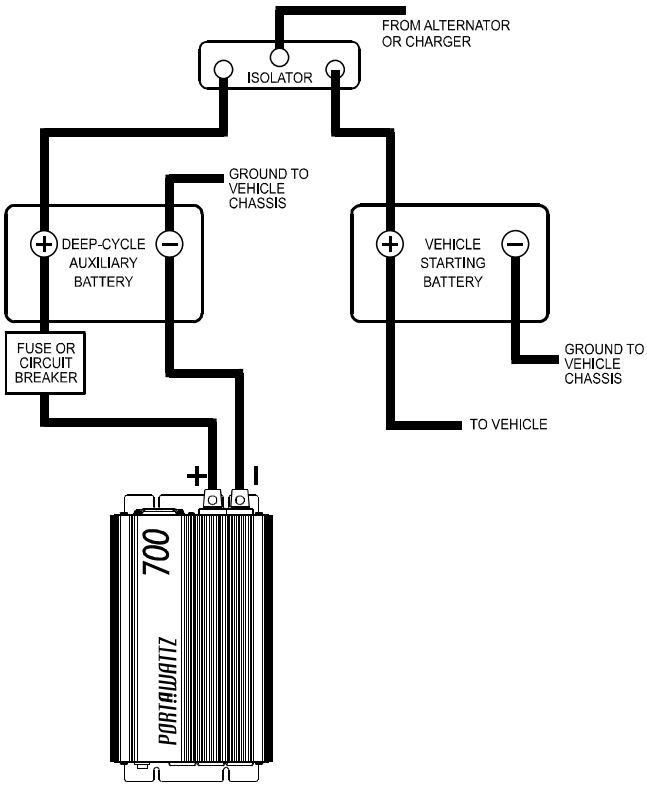

Figure 3 - Connecting to Auxiliary Battery

Connecting To Multiple Batteries

Use this wiring option if your PORTAWATTZ 700 will be running applications regularly and for extended periods of time. This option is ideal for RV and boat owners when away from shore power for more than a day. It's also well suited for home owners who use the PORTAWATTZ 700 to supply emergency back-up power.

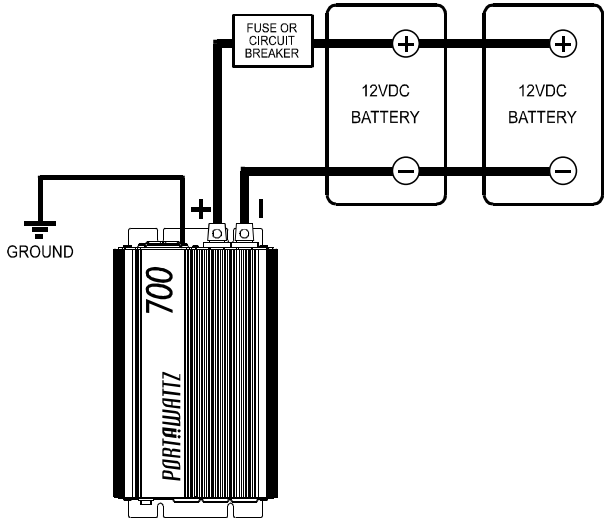

Figure 4 - Connecting to Multiple Batteries

Connect the terminals of identical batteries (same brand, model, and age) in parallel, positive to positive and negative to negative. Use #2 AWG cable and low resistance, permanent type connectors.

6.0 Battery Selection and Charging

6.1 Battery Sizing (General Information)

The battery or batteries selected should be determined based on the applications you plan on running with the PORTAWATTZ 700. These are two common battery types:

Automotive Lead Acid – These batteries are designed to deliver a large amount of current for a short period of time and are typically located in the engine compartment of a car or truck. This design works well for starting the engine of a vehicle.

Only a small portion of the battery's capacity is used for starting the engine, and once started, the vehicle's alternator quickly recharges the battery. Unlike deep cycle type batteries, automotive lead acid batteries are not designed for repeated cycles of full discharge and recharge. For this reason, we recommend using this type of battery when most of your applications are 300 Watts or less and operating times are relatively short (1-2 hours), or if your vehicle's engine is kept running when the inverter is used.

Deep Cycle Lead Acid – These batteries are designed for repeated cycles of full discharge and recharge and are often used in RVs, boats, and golf carts. Select this type of battery when most of your applications require higher power (more than 300 Watts), your use of the inverter is frequent, or when you run applications for extended periods of time (more than 2 hours).

When a deep cycle battery is used in a vehicle, we recommend installing a battery isolator to prevent the auxiliary deep cycle battery from discharging the vehicle's starting battery. (See Figure 3.) The isolator automatically directs the current from the vehicle's alternator to the battery requiring a charge. Isolators can usually be purchased at auto parts, marine, or RV stores/dealerships.

CAUTION! Connect PORTAWATTZ 700 only to batteries with a 12 Volt nominal output. A battery with 6-volt nominal output will not supply enough voltage and a battery with 24-Volt nominal output will damage the inverter.

Just as important as the type of battery selected is its size or capacity. A large battery will extend running time and ensure that your PORTAWATTZ 700 delivers its full rated surge. For most applications, batteries from 50Ah (120 reserve minutes) to 400Ah (1800 reserve minutes) will be sufficient, but depending on your needs, a battery bank with greater capacity may be appropriate. The minimum battery size recommended is 50Ah.

A number of different standards are used to rate battery energy storage capacity. Automotive and marine starting batteries are normally rated in cranking amps. This is not a relevant rating for continuous loads like an inverter.

Deep-cycle batteries use a more suitable rating system, either “amp-hours” (“Ah”) or “reserve capacity” in minutes. Battery reserve capacity is a measure of how long a battery can deliver a certain amount of current - usually 25 Amps. For example, a battery with a reserve capacity of 180 minutes can deliver 25 Amps for 180 minutes before it is completely discharged.

Amp-hour capacity is a measure of how many amps a battery can deliver for a specified length of time - usually 20 hours. For example, a typical marine or RV battery rated for 100Ah can deliver 5 Amps for 20 hours (5A x 20 hours = 100Ah). This same battery can deliver a higher or lower current for less or more time, limited approximately by the 100Ah figure (e.g. 50A for 2 hours, or 200A for 1/2 hour), but usually the capacity figure given is only accurate at the specified rate (20 hours).

6.2 Estimating Battery Requirements

To determine the proper battery size or battery bank, you need to compute the number of amp-hours that will be used between charging cycles. When the required amp-hours are known, size the batteries at approximately twice this amount. The expected Amp-hour requirements of each product to be used should be determined and then added together; this total multiplied by 2 is the recommended battery size.

Start with the nameplate ratings on your electrical products. If the wattage is marked on the product, you can use that number directly; otherwise, multiply the marked voltage and amperage: WATTS = VOLTS X AMPS. Once you know the AC wattage drawn from the inverter, multiply that by the length of time the appliance will be used to determine the energy the load will require: WATT-HOURS = WATTS X HOURS. You can then convert this to an estimate of the battery amp-hours that the products require:

$$\text{BATTERY AMP-HOURS USED} = \frac{\text{AC WATT-HOURS}}{10}$$

For example, a 100W light bulb that is used for 4 hours will use 400 Watt-hours (Wh) and the inverter will consume approximately 40Ah from a 12V battery.

Another useful rule of thumb is that the current drawn from the battery can be estimated from the AC output watts by using a factor of 10. For example, when running a 700W power drill, the inverter will draw approximately 70A (700 divided by 10) from a 12V battery.

6.2.1 Battery Sizing Example

The following example shows how battery size is calculated, assuming the battery can be recharged after two days:

Table 1 - Battery Sizing Example

Electrical Products	**Power Consumption** (A)	**Operating Time per Day** (B)	**Daily Watt-Hours Needed for Products** (= A x B)
TV/VCR Combo	200 W	2 Hours	400 Wh
Table Fan	50 W	4 Hours	200 Wh
Table Lamp	60 W	4 Hours	240 Wh
		Total Daily Watt-Hours of AC Load	840 Wh
		x Number of Days Between Charges	2
		= Total Watt-Hours of AC Load Between Charges	1680 Wh
		Battery Ah Used Between Charges (Divided by 10)	168 Ah
Recommended Battery (Bank) Size in Ah (multiply by 2)			**336 Ah**

This example illustrates how quickly your battery needs can escalate. To reduce the required battery size, you can either conserve energy by eliminating or reducing the use of some loads, or re-charge more frequently.

When sizing your battery, be conservative and resist the temptation to skip the last step of this calculation (multiply by 2). More capacity is better because you gain more reserve capacity, and therefore can better handle large loads and surge loads, and your battery won't be discharged as deeply.

Battery life is directly dependent on how deeply the battery is discharged; the deeper the discharge, the shorter the battery life.

6.2.2 Battery Sizing Worksheet

The following worksheet is a guide to help you determine your battery needs. Be generous in estimating the time for which you will run each of the loads to ensure sufficient battery capacity.

Table 2 - Battery Sizing Worksheet

Electrical Products	**Power Consumption** (A)	**Operating Time per Day** (B)	**Daily Watt-Hours Needed for Products** (= A x B)
			Wh
			Wh
			Wh
		Total Daily Watt-Hours of AC Load	Wh
		x Number of Days Between Charges	
		= Total Watt-Hours of AC Load Between Charges	Wh
		Battery Ah Used Between Charges (Divided by 10)	Ah
Recommended Battery (Bank) Size in Ah (multiply by 2)			**Ah**

6.2.3 Examples of Operating Times Based On Load

If you plan to use the PORTAWATTZ 700 with a specific product, the chart below (table 3) provides approximate operating times based on battery size. These operating times assume the battery's capacity is fully discharged when used, so be certain to purchase double the battery size shown if you will frequently operate the product for the time period stated.

Table 3 - Operating Times Based On Load

Inverter Output Power (Watts)	**Typical Load**	**12V AMP Draw From Battery**	**Battery Size**					
			BCI Group Size	**22NF**	**24**	**27**	**8D**	**Dual 8D's**
			Reserve Capacity	**90 min.**	**140 min.**	**180 min.**	**400 min.**	**900 min.**
			Amp Hours	**50**	**75**	**100**	**200**	**400**
100	19" Color TV	10	**Operating Time**	**4 Hrs.**	**6 Hrs.**	**10 Hrs.**	**20 Hrs.**	**40 Hrs.**
200	Computer System	20	**Operating Time**	**2 Hrs.**	**3 Hrs.**	**4.5 Hrs.**	**10 Hrs.**	**20 Hrs.**
300	Blender	25	**Operating Time**	**1.3 Hrs.**	**2.2 Hrs.**	**3 Hrs.**	**6 Hrs.**	**12 Hrs.**
400	Power Drill	35	**Operating Time**	**1 Hr.**	**1.5 Hrs.**	**2 Hrs.**	**4.5 Hrs.**	**10 Hrs.**
600	Bread Maker	60	**Operating Time**	**N.R.**	**N.R.**	**1 Hr.**	**2.5 Hrs.**	**6 Hrs.**
				N.R. = Not Recommended				

6.3 Important Information About Batteries

These are points to keep in mind when using or installing a battery:

- With the exception of sealed, gel cell batteries, lead acid batteries emit hydrogen and oxygen gases, and sulfuric acid fumes when recharging. Make sure the battery compartment is vented to prevent accumulation of gases and fumes and do not install electronic equipment in these areas. Also, do not smoke or have an open flame when working around batteries.

- The capacity of lead acid batteries is temperature sensitive. The stated capacity of a battery assumes the air temperature is 77ºF (25ºC). When the air temperature drops to 0ºF (–20ºC), the actual amp-hour capacity will be about one-half of the battery's rated capacity.

- Do not leave batteries in a discharged state for more than two days. Batteries left discharged too long undergo a chemical process called "sulfation", which can permanently damage the battery.

- Batteries self-discharge over time, even when they are not used. Recharge your battery every 3 months to maintain its rated capacity. Store batteries at room temperature; batteries subjected to high temperatures will have a shorter life. Do not recharge a frozen battery.

- If your batteries are not "maintenance free", check the electrolyte level at least once a month. If low, add distilled water. Excessive fluid loss is a sign of overcharging.

6.4 Battery Charging

It is important to properly charge the batteries that supply 12 Volts to the PORTAWATTZ 700. Poor charging methods can damage a battery or shorten its life. When possible, recharge your battery when it is about 50% discharged. This will give you longer battery cycle life than when recharging the battery after it is fully discharged.

Charging Systems

Battery chargers from the TRUECHARGE product family are designed to maximize the performance and useful life of a battery and are the perfect recharging solution for deep cycle batteries. See your Xantrex retailer or visit our web site (www.xantrex.com) for more information.

Do not use chargers intended for occasional recharging of automotive starting batteries, since these are not intended for continuous use.

Your battery may also be recharged from a solar panel, but make sure it has an appropriate charge controller or that a charge controller is added.

Vehicle Alternators

The alternator on a vehicle can also be used to recharge your battery. Some alternators may not be an effective charging solution because when they become warm their output capability may drop by as much as 25% or they may not be able to produce more than 13.6 Volts.

One solution is to install an alternator controller that will bypass the voltage regulator and boost the alternator's output voltage during charging. This will increase the alternator's charging rate at higher battery voltages and ensure more complete and rapid charging. Another option is to install a high output alternator rated from 100 to 140 Amps. These alternators produce the higher current and voltage needed to recharge multiple batteries. Marine, RV, or auto parts stores typically sell these products.

CAUTION!: Do not operate the PORTAWATTZ 700 directly from a charging source, such as an alternator or solar panel. The PORTAWATTZ 700 should only be connected to a 12-Volt battery.

7.0 Operating 115 Volt AC Products and Equipment

7.1 General Information

The PORTAWATTZ 700 is capable of powering most 115 Volt AC products that use 700 Watts or less. Its AC output waveform, called “modified-sine wave” is designed to function similarly to the sine wave shape of utility power. Most AC products rated for 700 Watts or less will operate normally with the PORTAWATTZ 700.

The power, or “wattage”, rating of AC products is the average power they use. When many AC products are first switched on, they initially consume more power than their power rating. TVs, monitors, and electric motors are examples of products that have high “surge” requirements at start up. Although the PORTAWATTZ 700 can supply momentary surge power as high as 1300 Watts, occasionally some products rated less than 700 Watts may exceed its surge capabilities and trigger its safety overload shutdown feature. If this problem occurs when attempting to operate several AC products at the same time, try first switching on the inverter with all AC products switched off, then one by one switch each on, starting with the high surge product first.

The PORTAWATTZ 700 is not designed to be powered from a cigarette lighter or 12 Volt outlet in a vehicle. These outlets are designed to safely supply a maximum of 150 Watts. The PORTAWATTZ 150 is a better solution when you need “plug and play” capability for laptop computers, small TVs or other AC products with low power requirements.

7.2 Interference with Electronic Equipment

Generally, most AC products operate with the PORTAWATTZ 700 just as they would with household AC power. Below is information concerning two possible exceptions.

7.2.1 Buzzing Sound in Audio Systems and Radios

Some inexpensive stereo systems, “boom boxes”, and AM-FM radios have inadequate internal power supply filtering and “buzz” slightly when powered by the PORTAWATTZ 700. Generally, the only solution is an audio product with a higher quality filter.

7.2.2 Television Interference

The PORTAWATTZ 700 is shielded to minimize its interference with TV signals. However, with weak TV signals interference may be visible in the form of lines scrolling across the screen. The following should minimize or eliminate the problem:

- Use an extension cord to increase the distance between the PORTAWATTZ 700 and the TV, antenna and cables.
- Adjust the orientation of the PORTAWATTZ 700, television, antenna and cables.
- Maximize TV signal strength by using a better antenna and use shielded antenna cable where possible.
- Try a different TV. Different models of televisions vary considerably in their susceptibility to interference.

8.0 Using the PORTAWATTZ 700

Refer to Figure 1 in section 3.1 for location of the items identified below.

8.1 Indicators and Controls

- Three AC outlets are provided on one end of the PORTAWATTZ 700. Any combination of 115 Volt AC products with a total power consumption of 700 Watts or less may be plugged in.
- The ON/OFF switch enables output AC power at the AC outlets when switched ON. It also acts as a manual reset for overload, low / high battery voltage and over temperature fault conditions. Reset occurs by switching OFF for 5 seconds, then back ON again.
- The green POWER light indicates AC power is present at the three AC outlets and the PORTAWATTZ 700 is operating normally.
- The red FAULT light indicates inverter shutdown caused by low or high voltage, overload or excessive temperature.

8.2 Inverter Operation

1. When properly connected to a 12-Volt battery, turning the ON/OFF switch ON, will illuminate the green POWER light, activate the cooling fan, and deliver AC power to the three outlets.
2. As the battery charge is used up, battery voltage begins to fall. When the PORTAWATTZ 700 senses that the voltage at its DC input has dropped to 10.7 Volts, an audible alarm sounds. This allows time for computers or other sensitive devices to be shut down.
3. If the audible alarm is ignored, the PORTAWATTZ 700 will automatically shut down when the battery voltage drops to 10.0 Volts. This prevents battery damage from excessive discharge. After auto shut down, the green POWER light is switched off, and the red FAULT light illuminates.

IMPORTANT: Vehicle batteries are designed to provide brief periods of very high current needed for engine starting. They are not intended for constant deep discharge. Regularly operating the PORTAWATTZ 700 from a vehicle battery until the low voltage alarm sounds will shorten the life of the battery.

4. If an AC product rated higher than 700 Watts (or which draws excessive surge power) is connected, the PORTAWATTZ 700 will shut down. The green POWER light will turn off and the red FAULT light will turn on.

5. If the PORTAWATTZ 700 exceeds a safe operating temperature, due to insufficient ventilation or a high temperature environment, it will automatically shut down. The green POWER light will turn off and the red FAULT light will turn on.

6. To reset the PORTAWATTZ 700 after automatic shutdown, the OFF/ON switch must be switched OFF for 5 seconds, then ON again. This manual reset feature prevents unexpected or hazardous restarting of connected AC loads.

7. Should a defective battery charging system cause the battery voltage to rise to dangerously high levels, the PORTAWATTZ 700 automatically shuts down.

CAUTION! Although the PORTAWATTZ 700 incorporates protection against over-voltage, it may still be damaged if the input voltage exceeds 16 Volts.

8. The cooling fan is designed to operate continuously anytime the PORTAWATTZ is turned ON to ensure optimal internal temperature control of the electronics. If you need to conserve battery power, turn the PORTAWATTZ 700 off when you are not operating a product. This eliminates drain on the battery caused by the fan.

9.0 Troubleshooting

Problem: AC product will not operate, red FAULT light ON.

Possible Cause	Suggested Remedy
AC product(s) connected are rated at more than 700 Watts; overload shutdown has occurred.	Use product(s) with a total power rating less than 700 Watts (120 Volts/5.5 Amps).
AC product is rated less than 700 Watts; high starting surge has caused overload shutdown.	Product exceeds inverter's surge capability. Use a product with starting surge power within the PORTAWATTZ 700's capability.
Battery is discharged (alarm is also sounding).	Recharge battery.
PORTAWATTZ 700 has overheated due to poor ventilation and has caused over temperature shutdown.	Switch PORTAWATTZ 700 OFF and allow to cool for 15 minutes. Clear blocked fan or remove objects covering unit. Locate unit to a cooler environment. Reduce load if continuous operation is required. Restart.
Input voltage is greater than 15.0 Volts.	Verify charging system is properly regulated and battery is 12 Volts nominal.

Problem: AC product will not operate, no inverter lights are ON.

Possible Cause	Suggested Remedy
Battery is defective.	Check battery and replace if required.
Inverter has been connected with reverse DC input polarity.	Check connection to battery. Probable inverter damage has occurred. Have unit repaired (not covered in warranty).
Loose cable connections.	Check cables and connections. Tighten as required.

Problem: Measured inverter output is too low.

Possible Cause	Suggested Remedy
Standard "average-reading" AC voltmeter used to measure output voltage, resulting in an apparent reading 5 to 15 Volts too low.	Inverter's "modified sine wave" output requires "true RMS" voltmeter, such as Fluke 87 series multimeter, for accurate measurement.
Battery voltage is too low.	Recharge battery.

Problem: Battery run time is less than expected.

Possible Cause	Suggested Remedy
AC product power consumption is higher than rated.	Use a larger battery to make up for increased power requirement.
Battery is old or defective.	Replace battery.
Battery is not being properly charged.	Many simple chargers are unable to charge a battery fully. Replace charger with better model such as a TRUECHARGE™ smart charger.
Power dissipation in DC cables.	Use shorter/heavier DC cables.

Problem: Inverter will run some small loads, but not larger ones.

Possible Cause	Suggested Remedy
Voltage drop across DC cables.	Shorten cables or use heavier cables.

Problem: Siren on.

Possible Cause	Suggested Remedy
Low or high voltage shut down has occurred.	Shorten cables or use heavier cables. Recharge battery.

10.0 Limited Warranty and Performance Guarantee (USA and Canada Only), and Out-of-Warranty Service Information

What Does This Warranty Cover? Xantrex manufactures its products from parts and components that are new or equivalent to new, in accordance with industry standard practices. This warranty covers any defects in workmanship or materials.

How Long Does The Coverage Last? This warranty lasts for 6 months from the date of purchase. Implied warranties of merchantability and fitness for a particular purpose are limited to six months from date of purchase. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

What Does This Warranty Not Cover? This warranty will not apply where the product has been misused, neglected, improperly installed, physically damaged or altered, either internally or externally, or damaged from improper use or use in an unsuitable environment. Xantrex does not warrant uninterrupted operations of its products. Xantrex shall not be liable for damages, whether direct, incidental, special, or consequential, or economic loss even though caused by the negligence or fault of Xantrex. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

What Will Xantrex Do? At its option, Xantrex will repair or replace the defective product free of charge. Xantrex will, also at its option, use new and/or reconditioned parts made by various manufacturers in performing warranty repair and building replacement products. If Xantrex repairs or replaces a product, its warranty term is not extended. Xantrex owns all parts removed from repaired products.

Service During Warranty. In order to qualify for the warranty, dated proof of purchase must be provided and the product must not be disassembled or modified without prior authorization by Xantrex. If your product requires warranty service, please return it to the place of purchase along with a copy of your dated proof of purchase. If you are unable to contact your merchant, or the merchant is unable to provide service, contact Xantrex directly:

BY PHONE: (604) 420-1585
(toll free) 1-800-670-0707
BY FAX: (604) 420-1591
(toll free) 1-800-994-7828
BY EMAIL: support.portawattz@xantrex.com

You must obtain a Return Material Authorization (RMA) number from Xantrex before returning a product directly to Xantrex. Do not return a product to Xantrex without first obtaining an RMA number. When you contact Xantrex to obtain service, be prepared to supply the serial number of your product and its date of purchase as well as information about the installation or use of the unit.

If you are returning a product from the USA or Canada, follow this procedure:

1. Obtain an RMA number and a shipping address from Xantrex. *Product(s) returned without an RMA number or shipped collect, will be refused.*
2. Package the unit safely, preferably using the original packing materials. Include the RMA number, a copy of your dated proof of purchase, 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 address provided in Step 1, freight prepaid. Obtaining proof of delivery is recommended.

The Performance Guarantee. Xantrex guarantees the PORTAWATTZ 700 will run any 5.5 Amp AC power drill or Xantrex will replace your unit with another inverter (selected at Xantrex's option) that will run your particular power drill. This performance guarantee is offered because we are confident you will find the PORTAWATTZ 700's performance superior to any other brand with similar power ratings.

Conditions that apply to the Performance Guarantee. This guarantee is valid only if your PORTAWATTZ 700 is installed to a properly functioning power source according to guidelines in this manual. Your PORTAWATTZ 700 must be within the warranty period and all conditions that apply to the Warranty also apply to the Performance Guarantee. The drill must be a 120Volt AC powered model designed for use in the USA or Canada, in proper working condition, and not altered in any way or used in an unsuitable environment. This performance guarantee only applies when the drill bit used is ¾" or smaller and when drilling into a kiln dried wood material.

Submitting Performance Guarantee claims. If your PORTAWATTZ 700 fails to run any 5.5 Amp power drill and all conditions stated above apply, contact Xantrex Customer Service directly at the telephone number listed above. Do not return your unit for upgrade to the retailer where purchased.

In order to process your claim, you will need to provide dated proof of purchase confirming your PORTAWATTZ 700 is within the warranty period. You will also need to provide the model, amp rating, manufacturer and serial number of the AC power drill that the inverter will not run as well as the operating conditions under which it did not work. In most cases you will receive a Return Authorization Number and return shipping instructions from Customer Service, which allows you to return your PORTAWATTZ 700 for an upgraded model. However, Xantrex reserves the right to conduct an independent test to verify whether or not the PORTAWATTZ 700 will operate your particular drill model.

How Other Laws Apply: This warranty gives you specific legal rights, and you may also have other rights, which vary from jurisdiction to jurisdiction.

For Our Canadian Customers: When used herein "implied warranties of merchantability and fitness for a particular purpose" includes all warranties and conditions, express or implied, statutory or otherwise, including without limitation implied warranties and conditions of merchantability and fitness for a particular purpose.

Service Out Of Warranty: If the warranty period for your PORTAWATTZ 700 has expired, if the unit was damaged due to misuse, incorrect installation or if other conditions of the warranty have not been met, or if no dated proof of purchase is available, your unit may be serviced/replaced for a minimum flat fee of $75.00 US ($110.00 CDN). To return your PORTAWATTZ 700 for out of warranty service, contact Xantrex customer service for a Return Material Authorization (RMA) number and follow the other steps outlined in the section "Service During Warranty" above. Options for payment (e.g. credit card or money order) will be explained by the customer service representative. In cases where the minimum flat fee does not apply (e.g. incomplete units or units with excessive damage), and additional fee will be charged. If applicable, you will be contacted by customer service once your unit is received. The minimum flat fee is subject to change without notice.

11.0 Specifications

AC output voltage (nominal)	115 Volts AC
DC input voltage range	10 – 15 Volts DC
Maximum Continuous AC output power	700 Watts
Maximum AC output surge power	1300 Watts
AC output frequency	60 ± 4 Hz
AC output waveform	modified sine wave
Battery drain with no AC load (at 12V input)	0.3 Amps
Efficiency (maximum)	90%
Ambient operating temperature range	32°F- 104°F 0°C - 40°C
Low battery alarm trigger point (nominal)	10.7 Volts
Low battery shut down point (nominal)	10.0 Volts
High battery shut down point (nominal)	15 Volts
Dimensions (L x W x H)	280mm x 160mm x 65mm 11 ” x 6.25 ” x 2.5 ”
Weight	4.5lbs/2Kg

Specifications subject to change without notice.

12.0 Other Products from Xantrex

The PORTAWATTZ 700 is part of the PORTAWATTZ family of DC to AC power inverters. Other inverters, chargers, and portable power products include:

PORTAWATTZ 150 Inverter A compact, versatile inverter that provides 150 Watts of AC power for running everything from compact TVs and VCRs to laptop computers to recharging camcorders and cellular phones.

PORTAWATTZ 300 Inverter Designed for running larger TVs and desktop computers, the PORTAWATTZ 300 produces 300 Watts of AC power continuous and surges to 500 Watts. This rugged, yet affordable inverter is a popular choice with consumers.

PORTAWATTZ 400 Inverter A compact, yet powerful inverter that's perfect when requirements call for installation in a small space and operation of loads up to 400 Watts continuous and 800 Watts surge.

PORTAWATTZ 1000 Inverter A 1000 Watt inverter designed for installation in trucks, vans, boats and RV's. This inverter can operate more powerful tools and equipment, and even many smaller microwave ovens.

PORTAWATTZ 1750 Inverter A 1750 Watt inverter designed for installation in a boat, vehicle, or remote home for operating power tools, kitchen appliances, and a wide range of other equipment.

PORTAWATTZ 3000 Inverter A heavy duty 3000 Watt inverter perfect for running multiple higher power loads simultaneously, or for starting tough motor-driven loads.

PORTAWATTZ PowerPAC Provides AC power that's truly portable. An 18 Amp hour AGM battery, 300 Watt inverter, and charging system are integrated into a compact and attractive housing. PowerPAC can even jump-start a boat or vehicle. Complete with jump-start cables, AC charger, and DC charging cable.

xPower 300 An excellent backup power product that provides AC power from its integrated 21 Ah battery and 300 Watt inverter. Accessories include an emergency fluorescent light that runs for 29 hours, AC charger, DC charging cable, jump-start cables, and storage case for these items.

xPower 600 A 600 Watt portable AC power source that can be used indoors or outdoors. It runs many power tools, small appliances, and even lawn and garden equipment. Its rugged design allows it to roll easily over rough terrain.

Xantrex also designs and manufactures the **PROsine** line of high performance true sine wave inverters and **PROsine** inverter-chargers, and the **TRUE*CHARGE*** line of "smart" battery chargers.

Contact your Xantrex retailer for more information or visit our web site at

http://www.xantrex.com

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