



"The Ten Things You Need To Know About Power Inverters"



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Graeme has for you!*



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POWER INVERTERS
or just needing some help with your
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“The Ten Things You Need To Know About Power Inverters”

What does a power inverter do, and what can I use one for?

A power inverter changes DC power from a battery into conventional AC power that you can use to operate all kinds of devices ... electric lights, kitchen appliances, microwaves, power tools, TVs, radios, computers, to name just a few. You just connect the inverter to a battery, and plug your AC devices into the inverter ... and you've got portable power ... whenever and wherever you need it.

1. What size inverter should I buy?

The size you choose depends on the watts (or amps) of what you want to run (find the power consumption by referring to the specification plate on the appliance or tool). We recommend you buy a larger model than you think you'll need (at least 20% more than your largest load).

Determine Continuous Load and Starting (Peak) Load: You need to determine how much power your tool or appliance (or combination of them that you would use at the same time) requires to start up (starting load), and also the continued running requirements (continuous load).

What is meant by the terms "continuous-2000 watts" and "peak surge-4000 watts" is that some appliances or tools, such as ones with a motor, require an initial surge of power to start up ("starting load" or "peak load"). Once started, the tool or appliance requires less power to continue to operate ("continuous load")

However from my experience, there can be a difference between a Modified Sine Wave and a Pure Sine Wave peak rating. For some items (fridges), a modified inverter will not start a fridge but a Pure sine wave with the same rating will. I have found the age of the appliance can make a difference.



2. Helpful formulas:

To Convert AMPS to WATTS:

Multiply: AMPS X 120 (AC voltage) = WATTS

This formula yields a close approximation of the continuous load of the appliance

To Calculate approximate Startup Load:

Multiply: WATTS X 2 = Starting Load

This formula yields a close approximation of the starting load of the appliance, though some may require an even greater starting load.

NOTE: Induction motors such as air conditioners, refrigerators, freezers and pumps may have a start up surge of 3 to 7 times the continuous rating.

Most often the start up load of the appliance or power tool determines whether an inverter has the capability to power it.

For example, you have a freezer with a continuous load of 4 amps, and a start up load of 12 amps:

4 amps x 240 volts = 960 watts continuous

12 amps x 240 volts = 2880 watts starting load

You would need an inverter with peak-surge rating greater than 3000 watts.

FORMULA to convert AC Watts to DC Amps:

AC Watts divided by 12 x 1.1 = DC Amps

(this is the size vehicle alternator you would need to keep up with a specific load; for example, to keep up with a continuous draw of 1000 watts, you would need a 91 amp alternator)

3. Do I need Modified Sine Wave, or Pure Sine Wave?

Advantages of Pure Sine Wave inverters over modified sine wave inverters:

- a) The Output voltage wave form is pure sine wave with very low harmonic distortion and clean power like utility-supplied electricity.
- b) Inductive loads like microwave ovens and motors run faster, quieter and cooler.



c) Reduces audible and electrical noise in fans, fluorescent lights, audio amplifiers, TV, Game consoles, Fax, and answering machines.

d) Prevents crashes in computers, weird print out, and glitches and noise in monitors. e) Reliably powers the following devices that will normally not work with modified sine wave inverters:

- Laser printers, photocopiers, magneto-optical hard drives
- Certain laptop computers (you should check with your manufacturer)
- Some fluorescent lights with electronic ballasts
- Power tools employing "solid state" power or variable speed control
- Some battery chargers for cordless tools
- Digital clocks with radios

Modified Sine Wave works well for most uses, and is the most common type of inverter on the market, as well as the most economical. Pure Sine Wave inverters (also called True Sine Wave) are more suited for sensitive electrical or electronic items such as laptop computers, stereos, laser printers, certain specialized applications such as medical equipment, digital clocks, bread makers with multi-stage timers, and variable speed or rechargeable tools Wave inverter. If you mostly want to run lights, TV, microwave oven, tools, etc, a Modified Sine Wave inverter is fine for your needs.

We often are asked if computers will work with Modified Sine Wave. It's been our experience that most (with the exception of some laptops) will work (though some monitors will have interference such as lines or a hum). The difference between them is the Pure Sine Wave inverter produces a better and cleaner current. They are also considerably more expensive. You might find it practical to get a small Pure Sine Wave inverter for any "special need" you may have, and also a larger Modified Sine Wave inverter for the rest of your applications

4. Operating a Microwave with a Power Inverter

The power rating used with microwave ovens is the "cooking power" which refers to the power being "delivered" to the food being cooked. The actual operating power requirement rating is higher than the cooking power rating (for example, a microwave with "advertised" rating of 600 watts usually corresponds to almost 1100 watts of power consumption). The actual power consumption is usually stated on the back of the microwave. If the operating power requirement cannot be found on the back of the microwave, check the owner's manual or contact the manufacturer.



5. Television and Audio Suggestions

Although most inverters are shielded and filtered to minimize signal interference, some interference with your television picture may be unavoidable, especially with weak signals.

Here are some suggestions that may improve reception:

1. First make sure that the television antenna produces a clear signal under normal operating conditions (i.e., at home plugged into a standard 240AC wall outlet). Also insure that the antenna cable is properly shielded and of good quality.
2. Change positions of the inverter, antenna cables and television power cord.
3. Isolate the television, its power cord and antenna cables from the 12 volt power source by running an extension cord from the inverter to the TV set. Insure that any excess AC power cord is a distance away from the TV set.
4. Coil the television power cord and the input cables running from the 12 volt power source to the inverter.
5. Attach a "Ferrite Data Line Filter" to the television power cord. More than one filter may be required. These are available at electronic supply stores. NOTE: Some inexpensive audio systems may discharge a slight "buzzing" sound when operated with an inverter. This is caused by deficient filters in the audio system. The only solution to this problem is using a sound system with a higher quality power supply.

6. Appliance Cautions:

DO NOT plug small appliances into the inverter AC receptacles to directly recharge their nickel-cadmium batteries. Always use the recharger provided with that appliance.

DO NOT plug in battery chargers for cordless power tools if the charger carries a warning that dangerous voltages are present at the battery terminals.

Not all fluorescent lamps operate properly with an inverter. If the bulb appears to be too bright, or fails to light, do not use the lamp with an inverter.



Some fans with synchronous motors may slightly increase in speed (RPM) when powered by an inverter. This is not harmful to the fan or to the inverter.

Certain rechargers for small nickel-cadmium batteries can be damaged if plugged into an inverter. In particular, two types of appliances are susceptible to damage:

- Small, battery-operated appliances such as flashlights, cordless razors and toothbrushes that can be plugged directly into an AC receptacle to recharge.
- Certain battery chargers for battery packs that are used in some cordless hand-tools. Chargers for these tools have a warning label stating that dangerous voltages are present at the battery terminals.

DO NOT use an inverter with the above two types of equipment.

The majority of portable appliances do not have this problem. Most portable appliances use separate transformers or chargers that plug into AC receptacles to supply a low-voltage DC or AC output to the appliance. If the appliance label states that the charger or adapter produces a low-voltage DC or AC output (30 volts or less), there should be no problem powering that charger or adapter.

7. Why is Cable Size is Important?

Keep the cables between your inverter and batteries as short as possible. This will help your batteries perform their best and keep the inverter's signal clean. The cables that come with the inverter are very short (500mm) as I think they should be.

You can make them longer but you are best to buy a larger diameter cable or use two together. I have supplied two of each in the box.. . If the cables between your battery and inverter get hot while under heavy load, then you should use heavier cables.

It is best to run your inverter right next to the batteries and run an extension cord from your inverter to the job site or to the caravan. That is the correct way to run the system.

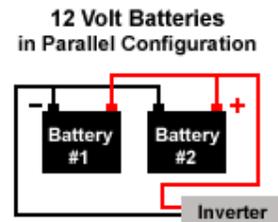


8. How do I connect more than one battery together.

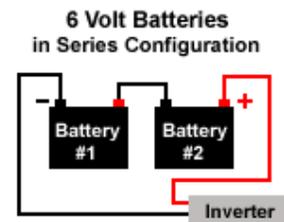
It may be advisable to operate the inverter from a bank of 12 Volt batteries of the same type in a "parallel" configuration. Two such batteries will generate twice the amp/hours of a single battery; three batteries will generate three times the amp/hours, and so on. This will lengthen the time before your batteries will need to be recharged, giving you a longer time that you can run your appliances.

You can also connect 6 Volt batteries together in "series" configuration to double the voltage to 12 volts. Note that 6 Volt batteries must be connected in pairs.

12 Volt Batteries connected in Parallel to double the current (amp/hours)



6 Volt Batteries connected in Series to double the voltage to 12 Volts



9. How Long Will My Batteries Last?

The run time on your inverter depends solely on the amount and size (capacity) of your batteries. Here's how you work it out..

Your battery has an amp rating...say 75amps for an example..Divide by 12 making it 6.25...Look at the appliance plate for the amps..say 4.5amps...Divide it into the last number (6.25) and this will be your running time in hours. 1.388 running hours.

Now there are two things you can do to make the running time longer... the first is you can start your car and recharge the battery as you use the inverter or you can use more than one battery at a time. Wire two batteries in parallel.. eg positive to positive, and negative to negative.



10. How Many Watts Is it?

Toaster	800 to 1500 w
Microwave (600 to 1000watt Cooking Power)	1100 to 2000w
Frying Pan	1200w
Toaster Oven	1200w
Blow Dryer	900 to 1500w
Laptop	50 to 75w
Pc and monitor	200 to 400w
Inkjet printer	60 to 75w
VCR	40 to 60w
CD or DVD	35w
Stereo	30 to 100w
Clock Radio	50w
Iron	1000w
TV 25inch	300w
19inch	160w

Electrical Horse Power to Amps Calculator

Assumption: Spa is running on 220 volts

Math: 1 HP = 1000 Watts
 $220\text{Volts}/1000 \text{ Watts} = 4.5 \text{ Amps}$

2.5 HP electrical motor draws ????

$2.5\text{HP} \times 1000 \text{ Watts} = 2500 \text{ Watts}$
 $220\text{Volts}/2500 \text{ Watts} = 11.4 \text{ Amps}$

Two 2.5 electrical motors will need how many amps ???

$11.4 \text{ amps} \times 2 = 22.8 \text{ amps}$

1.0 HP draws 4.5 Amps = 1000watts
 1.5 HP draws 6.8 Amps = 1500watts
 2.0 HP draws 9.0 Amps = 2000watts
 2.5 HP draws 11.3 Amps = 2500watts
 3.0 HP draws 15.0 Amps = 3000watts
 3.5 HP draws 17.5 Amps = 3500watts
 4.0 HP draws 20.0 Amps = 4000watts
 5.0 HP draws 25.0 Amps = 4500watts
 5.5 HP draws 27.5 Amps = 5000watts
 6.0 HP draws 30.0 Amps = 5500watts



**Well I hope this has helped you with
your Power Inverter ideas!**

But if you have any further questions you can
[Email me](#), phone me, or [log on to our website](#):

www.Life-Positive-Energy.com

Just Ask Away!

What ever you need I will have it in stock or I can get it for you.

Have fun,

Cheers

A handwritten signature in black ink, appearing to read "Geoff", with a long horizontal line extending to the right.



Telephone: (08) 9571 1936

Bullsbrook, Western Australia

**Yes, we are the CHEAPEST supplier of QUALITY,
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