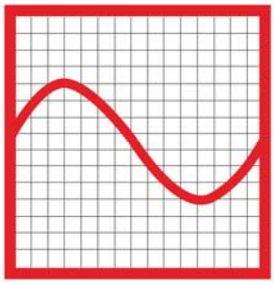
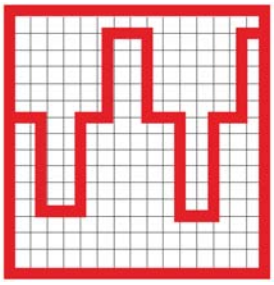
Inverter FAQs

Why do I need an inverter?
An inverter is the device that changes the DC power created by the solar panels and stored in the battery into AC power, like that used in your home. If you are planning on powering household items from the power generated by a solar panel you will need an inverter. The inverter draws its power from a 12Volt (preferably deep cycle battery) or a bank of batteries wired in parallel (positive to positive and negative to negative). The battery needs to be charged by solar or wind power as the inverter depletes the battery of power.

What is the difference between a pure sine wave inverter and a modified sine wave inverter?
A pure sine wave inverter most closely matches regular AC power that comes from your electric company. This clean power has very low harmonic distortion which allows for a clearer picture on your screen and less static or noise. Motors run faster, more quietly and produce less heat. The power wave when viewed through an oscilloscope is a smooth sine wave. A modified sine wave inverter's voltage fluctuates and may cause difficulties running sensitive electronic equipment. The power wave is not exactly the same as electricity from the power grid. It has a wave form that appears as a choppy squared-off wave when viewed through an oscilloscope.


Pure sine wave


Modified sine wave

What size inverter do I need?
When finding an appropriate inverter you must first look to see what you plan to be running from the inverter. If using multiple items add up the power ratings of all the appliances. Add at least 10% to the total and choose an inverter with a continuous power output that meets or exceeds that number. It is important to note that some appliances, such as table saws, refrigerators, and microwaves have a significant power surge at start up. Sunforce inverters are capable of supplying surge power but some appliances have surge requirements of up to 7 times their rated power. It may be necessary to use an inverter that is rated much higher than calculated. Also the battery and cables must be able to supply the surge as well. It is common to require multiple batteries in order to get the maximum draw from the inverter.

Conversion formulas to help determine the size of your inverter needed:
To Convert Amps to Watts for calculating the continuous load of appliances use the following formula:

Multiply: Amps x 120 (AC Voltage) = Watts

To figure out the approximate start up load of some appliances use the following formula:
Multiply Watts x 2 = Start up load

What items require a pure sine wave inverter?

Most appliances will work with a modified sine wave inverter, some exceptions are listed below. Any appliances or devices that involve screens and or frequencies will require a pure sine wave. Sensitive electronics will normally require a pure sine wave inverter for best performance.

- Laser printers, photocopiers, magneto-optical hard drives Laser printers, photocopiers, magneto-optical hard drives
- Certain laptop computers (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
- Some new furnaces and pellet stoves with microprocessor control
- Digital clocks with radios
- Sewing machines with speed/microprocessor control
- X-10 home automation system
- Medical equipment such as oxygen concentrators

What type of inverter is best for medical equipment?

When using medical equipment consult the manufacturer of the device to enquire whether the device should be used with an inverter. In the case of life saving equipment an inverter should be rated and tested for such use.

What is the surge protection?
All Sunforce Power Inverters come with an inbuilt surge protection system. This will automatically shut down the inverter to protect the circuitry when the current exceeds the limit of the unit.

What is the surge power?
Inverters have a rated surge power rating, normally double the continuous maximum output. The surge power is power greater than the continuous power rating. Surge output is usually available for only a short period.

What is the continuous maximum output?

Continuous maximum output is the rated wattage that an inverter can produce to run appliances. This number does not normally include the surge capacity. Inverters are normally labeled at their continuous maximum output for example 650W, 1000W.

What size cable do I need to wire the inverter to the battery?

The smaller inverters usually come with a 12V DC plug attached. The larger inverters need to be wired with a cable which is not included with your inverter. Please refer to our chart (Inverter cable chart location in website). Generally, when wiring the inverter to the battery you need to use the thickest cable possible and the shortest distance available for optimal transfer of energy. If more distance is needed it is better to have the longer cable running from the inverter to the appliance rather than the inverter wire to the battery.

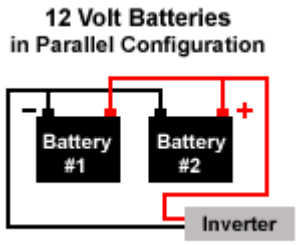
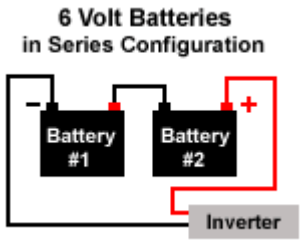
What type of battery should I use?

We recommend using deep cycle 12Volt batteries. The deep cycle batteries provide more charge and discharge cycles than regular batteries. If using your car's battery to power the inverter, it is recommended that a second battery be installed as well as a battery isolator. This ensures the car battery will not be fully drained and you will always be able to start your car.

How do I connect two or more batteries?

For full power it may be necessary to use more than one battery as the power source. 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
	

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.