

Selecting Small Portable Electric Generators

The use of small portable electric generators in homes and on farms has increased greatly in the past several years. Prices are significantly lower than they once were, and models are now available that can be easily lifted by one person. These small generators are useful for operating power tools where electrical power is not available. These units are also being used for operating electrical devices while camping and tailgating.

When choosing a small generator, think about how you will use it. Make sure you select a generator that has enough current and power ratings for your individual needs. Make sure the voltage is correct for your appliances, and that the generator has an appropriate noise level for your environment. Also consider the weight of the unit, and whether you can conveniently move and operate it. Below are several items you'll want to consider in choosing a portable generator.

Fuel. Most small generators use gasoline for fuel. Most of these are four-cycle engines and use regular, un-mixed gasoline for power. Some of the newer generators are two-cycle and need to have oil mixed with the fuel. Refer to the owner's manual for fuel instructions. Two-cycle engines have the advantage of being lighter than four-cycle engines.

Types. Some newer generators use inverters to produce the AC current for the generator's output. Inverters regulate voltage and line frequency independent of the actual engine speed. This allows the engine to be slowed down when the load is light, resulting in quieter operation. Inverters may produce electrical noise that can interfere with electronic equipment. In non-inverter generators, the motor speed controls the operating line frequency.

While operating line frequency is less important in most electronic devices, it is highly important in electric motor operation. Non-inverter generators may or may not have built-in voltage regulators.

Regardless of the type of generator, you should use some type of voltage monitoring device. Several are available that simply plug into the power receptacle and display voltage, frequency, and power.

Noise. Noise can be an issue, and some generators are quieter than others. A noisy generator might be perfectly acceptable on the farm doing small jobs, while a generator for tailgating should be extremely quiet. If the generator will operate during sleeping hours, it should be quiet.

Noise is rated in dB (decibels) at a given distance. Currently, small generator manufacturers do not agree on the rating methods, so comparing noise between different brands is not a reliable indicator of noise. The noise ratings within a specific brand should tell you which generator is quieter for that brand. It is best to hear a generator operate before deciding if it is quiet enough.

Certifications. In some situations, small generators must meet certain regulations. Some areas require special certification or additional regulations for operating small generators. These are most common on federal lands.

Electric Start. Some generators have electric starters in addition to the standard pull starters. This is convenient but adds weight to the generator.

Size. Selecting the right size portable generator is key. Make sure it is adequate for the job it must perform. Using a generator that is too small can cause severe operating problems, and the generator may malfunction or not perform the task. Using a generator that is too large results in higher initial cost, higher operating cost, and added weight.

Electrical Considerations

Voltage. Voltage is either 120 or 240 volts AC (alternating current). Slight variations are allowable, but larger variations in voltage can destroy devices powered by the generator. Some generators have good voltage regulation while others do not. Electronic devices generally do not tolerate wide variations in voltage. Electric motors are more forgiving of short-term voltage problems.



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Some generators have a 12-volt power supply. This supply was mainly intended to charge 12-volt batteries and is not carefully regulated. Refer to your owner's manual for more information.

Current. Current is measured in amps. The generator must be able to supply the current required of all devices it is powering. Simply add up the current of all the devices powered and make certain that it does not exceed the continuous rating of the generator. If the current rating of the device is not given, it can be calculated by dividing power by voltage.

For example, if voltage on a hair dryer is 120 and the power is listed at 1100 watts, divide 1100 by 120 to get 9.16 amps. Remember that the generator will have a circuit breaker with a set current capacity. Do not exceed this value.

Starting Current. Most electrical devices draw more current when they are first switched on. This initial draw should not exceed the maximum instantaneous current for the generator. Electric motors draw a larger amount of current when they start than when they operate. Typically, the amount is three times the motor's operating current. This should be allowed for in the generator specifications. Inverter generators are highly susceptible to this current overload and can be damaged if the ratings are exceeded.

Frequency. The rate at which the current alternates in the circuit, measured in Hertz (Hz) or cycles per second, is its frequency. The U.S. standard is 60 Hz; Europe uses 50 Hz. Minor changes in frequency generally do not cause a problem for electronic appliances, but is it important that the correct standard be used. Most electric motors can tolerate small variances in Hz, but they may not operate at the correct speed and may overheat.

Power. Power is the amount of work a device can do in a given time. Apparent power of a device can be calculated by multiplying current by voltage. The apparent power is measured in VA (Volt-Amps) but is typically incorrectly reported in watts. Just as with current, the power requirements of the individual devices can be added, and the total should be less than the maximum

generator requirements. When selecting a generator, make sure the apparent power of the devices is less than the maximum rating for the generator. In other words, do not overload the generator. Overloading can damage appliances and the generator. See your generator documents for more information.

Safety. Portable generators are convenient, but they can also create serious safety hazards. Keep these points in mind:

- Gasoline or gasoline mixes are flammable.
- Never fill a hot generator with fuel.
- Any spilled fuel should be cleaned before starting the generator.
- The exhaust of the engine is hot. Never use it where small children can come in contact with the hot exhaust.
- Always use the generator in a ventilated area to avoid heat buildup that can result in fire.
- A portable generator, like other electrical devices, poses an electrocution hazard.
- Never use a generator in wet conditions.
- Always use the shortest extension cord possible.
- Small engines produce carbon monoxide when enclosed and should not be used inside. Make sure the exhaust does not exit toward an occupied area.
- The national electrical code requires that all portable generators be grounded. Typically an 8-foot grounding rod attached to the generator grounding stud will work.

Checklist for Selecting a Portable Generator

- Is the generator large enough for your needs? Remember, a generator that is too small can damage equipment; one that is too large wastes money.
- Is the fuel type acceptable?
- Is the voltage correct for the equipment?
- Is the noise level acceptable for the application?
- Can the generator be used safely at the location?
- Does the generator meet legal requirements for the location where it will be used?
- Is the generator light enough to be moved when and where needed?



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