



# Operating a Toyostove Heater on an AC Portable Generator

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## **WARNING**

*Rural Energy Enterprises, Inc. does not accept liability for the improper use of this information. Installation, service, and maintenance of heating equipment should be performed by a qualified technician. Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life.*

**The Laser Heater is an electronically operated system. All electronic systems require a steady state AC power source.**

A Portable Generator can provide a suitable emergency AC power source. However, the Generator and system must meet certain requirements:

1. Power connection should be a good quality, grounded 14-gauge (minimum) copper wiring system (maximum run 50 feet).
2. Generator should be a minimum of 1800W.
3. Generator must provide a steady state 115-120 VAC, 60 Hz.
4. Output must be a true/pure sine wave; a modified sine wave will not allow the heater to operate properly.
5. Heater should not be connected until Generator has run for a minimum of 5 minutes.
6. Never allow the Generator to run out of fuel.
7. Never overload system when Laser Heater is connected to a Generator.

## **Technical Points**

When the igniter is activated during the ignition cycle, there is an approximately six second seven Amp surge (~800 W).

The Laser Heater changes the rpm of the combustion blower motor and circulation fan by changing the supplied voltage. Chopping part of the AC 60 Hz sine wave creates the

different voltages. This method is commonly used in high efficiency, direct vent heating systems.

When a Generator runs out of fuel, it tends to oscillate from low to high RPMs. This oscillation creates a voltage spike. If the spike exceeds approximately 160 VAC, the spike can damage the surge protection components on the main circuit board. The surge rule applies to all electronically operated systems.

When a Generator is overloaded, the voltage and cycles drop. This creates a low voltage condition. Extended low voltage conditions (brownout) can damage operating motors (combustion blower motor, refrigerator, well pump).

### **Electrical Surge Protection**

If a person purchases a computer, they should always connect the computer to a surge protector. A Toyotomi stove and water heater are computer operated. Surge Protection specifications: UL listed; Marked transient surge protection; Clamping voltage, less than 400V; Energy dispersion, greater than 200 joules.