

Standby Electrical Generator Safety

Portable Generators

Portable, gasoline-driven generators are designed to be used for appliances with cords connected to them. They can be especially convenient to use in remote locations, such as camping sites or construction areas. Lights, small appliances, etc. can be plugged directly into outlets on portable generators. Typically, they are not designed to be connected to your home or any building wiring. Do not attempt to personally install these devices to your electrical panel.

Fixed Generators

Large, fixed generators generally are directly connected to building wiring to provide standby power during emergencies or power outages. However, the wiring needs to be properly installed by a qualified electrical contractor. Properly installing a "permanent" generator is extremely dangerous, and not a "do-it-yourself" job. If you plan to have this type of generator installed, you may need to obtain an electrical permit from your local electrical or building inspector's office. Contact Montana Building Codes Division at (406) 444-3933.

"Back feeding" - a dangerous condition

Improperly connecting a portable generator to electric wiring can produce "back feed" - a dangerous current that can electrocute or critically injure you or others. Back feed into power lines from a generator could create "hot" power lines during an outage. Linemen who expect the line to be de-energized could be injured.

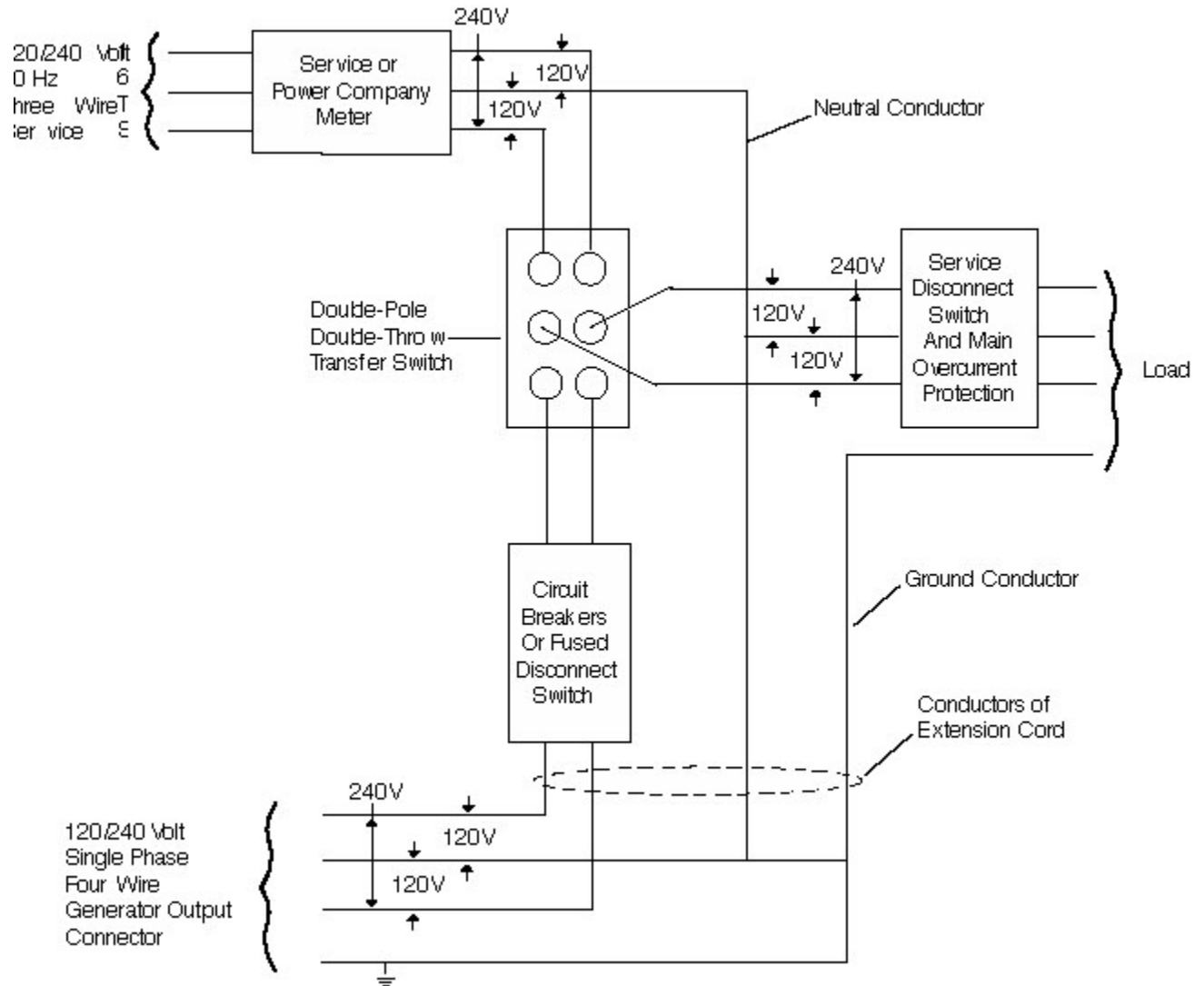
One good way to avoid back feeding is to install a double-pole, double throw transfer-switch gear. A qualified electrical contractor can install this transfer switch so that dangerous back feed can be prevented.



"In accordance with the National Electrical Code, paragraph 700-6; Transfer equipment shall be designed and installed to prevent the inadvertent interconnection of normal and emergency sources of supply in any operation of the transfer equipment. Automatic transfer switches shall be electrically operated and mechanically held." The transfer switch must be a break-before-make switch which will "break" the electrical connection with commercial power lines before it "makes" the connection between your generator and wiring. The switch also will prevent utility power from damaging the generator when regular service is restored. Make sure the transfer switch is rated at the same or greater amperage than the main over current protection. An electrical diagram of an installation using a transfer switch appears in Figure 1.

Standby Power Equipment and Connections

Figure 1



Since transfer switches can be expensive, another way to install a generator is to have a sub-panel with main breakers and power from the main panel or generator. Main panel breaker and generator breaker in sub-panel would have handles interlocked to prevent both from being opened and closed at the same time. This prevents back feed to commercial power when generator is in use. See Figure 2.

1. Install breaker and wiring from main panel to feed sub-panel. Note: Wiring and breaker sizes are determined by circuit load needed.

Breaker/Wiring Size Chart

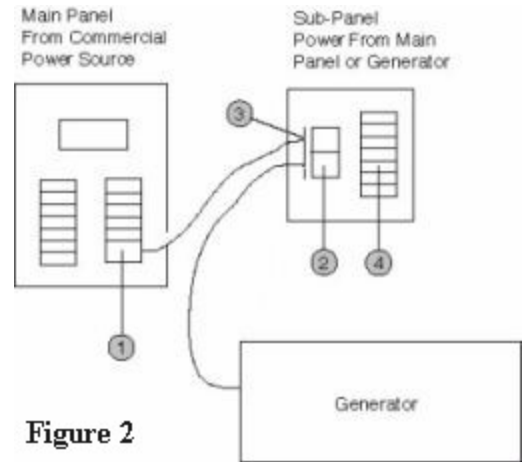
30 Amp	10-3 with ground wiring
40 Amp	8-3 with ground wiring
50 Amp	6-3 with ground wiring

2. Install sub-panel with proper sized main breakers. Power for one from the main panel and the other from the generator.

3. Install dual supply main breaker/service disconnect retaining kit and handle interlock. Note: Not all manufacturers supply the handle interlock retaining kits for all models of breaker disconnects.

4. Install breakers in sub-panel for circuits desired to be energized from generator.

Note: Smaller generators may not be able to carry the total load for all circuits. Use the load calculation chart (Figure 3) to determine total load. A smaller generator than the total load can be used by turning off some of the breakers when the appliance or lights are not needed. Always use a generator that is at least 25% larger than most necessary loads. This will allow for some of the nonessential loads to be used.



The dangers of carbon monoxide

When using a generator, be sure to locate it outside so poisonous carbon monoxide gas is exhausted. Never operate a generator in an enclosed building, especially in a building attached to a dwelling. Make certain, too, that the generator has enough air to breath and that its exhaust is vented properly. Fumes from burnt fuel can be deadly. Always insure proper ventilation, and air flow around the generator.

Generators and water don't mix

Do not use a portable generator in a flooded basement. That could be a dangerous combination. In addition, make sure your hands are dry, that you are standing in a dry place, and the generator is properly grounded whenever you operate your generator.

Using gasoline safely

Gasoline should be stored in approved containers, and out of reach of children. It goes without saying that all flames or cigarettes should be extinguished when handling gasoline. Have a fully charged, approved extinguisher located near the generator, and never fuel a generator when the generator is running or is hot.

Other Safety Reminders

Here are some rules to follow to help assure that generators are installed and used safely:

- Always check the unit thoroughly each new season before you fire it up.
- Never attempt to repair an electric generator, only a qualified serviceman should perform repairs.
- Don't remove or tamper with safety devices; they are there to protect you and your property.
- Many engine parts are very hot during operation, severe burns may result if touched.
- Keep children away from generators at all times.
- Always properly disconnect from your utility service before starting your backup generator.

Don't put your life at risk

Electric generators can provide you with peace of mind and convenience as long as you don't take chances with your safety or the safety of others. Be sure to follow these safety guidelines so you don't put yourself or the lives of others in danger. Improper use or installation of an electric generator can cause property damage, serious injury and even death.

Approximate Load Calculations

Figure 3

Check with your specific equipment & appliance instructions for exact specifications.

	Running Watts	Start up Watts		Running Watts	Start up Watts		Running Watts	Start up Watts
Pumps:			Electric Range			Furnace Motors		
1/3 HP 3600RPM	800	1200	6" Element	1500	0	1/6 HP	500	600
1/2 NP 3600 RPM	1000	2000	8" Element	2100	0	1/4 HP	600	900