



Electrical Service Requirements

PORTABLE GENERATORS

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PORTABLE GENERATORS

Maybe you want to make sure the food in your freezer stays frozen if there’s a power outage. Or you need to power the well pump that provides you with drinking water. Or you want to be able to use your gas or oil furnace when the power’s out. Or your at-home business requires that you have power to run computers or other equipment.

Whatever the reason, whenever there is an extended power outage, there is also the urge by many customers to fire-up the portable generator to get electricity flowing to certain appliances. But, if not used properly, that portable generator can pose a severe hazard to line workers and your neighbors. In addition, the generator itself also can be damaged if it’s not connected properly.

Portable Generator General Information

Here are some common questions, and answers, about portable generators and using them safely:

HOW TO SELECT A PORTABLE GENERATOR

The first step in purchasing a portable generator is to identify the things you absolutely cannot live without during a power outage. Usually high on the list will be the refrigerator and the freezer, a well pump, the furnace fan if you have natural gas or oil heat, or maybe some lighting. Consider your list carefully, because the bigger the portable generator, the more expensive it will be.

Once you have your list, calculate how much electricity those items need. Look at the wattage of each item on the equipment nameplate or in the owner’s manual, and add it all up. Then keep in mind that your generator should not be run continuously at more than 80 percent of its rated capacity and take into account that appliances that operate with a motor (like the refrigerator and freezer) can require two to ten times their listed wattage in order to start.

Once you factor in those conditions, you can determine the size of the portable generator you’ll need.

Here is the wattage of a few common items, just as a guide:

Appliance	Wattage
FURNACE FAN	500 to 2,350 starting watts, depending on its size
REFRIGERATOR OR FREEZER	1,500 to 2,200 starting watts
WELL PUMP	1,400 to 2,100 starting watts
SUMP PUMP	1,300 to 2,150 starting watts
GARAGE DOOR OPENER	1,100 to 1,400 starting watts
ELECTRIC FRY PAN	1,300 watts
COFFEE MAKER	750 to 1,750 watts
MICROWAVE OVEN	625 to 1,200 watts

WHAT CAN HAPPEN IF THE GENERATOR IS NOT USED PROPERLY?

The most common problem is something called back feed. This occurs when a generator is connected to the home's wiring system.

The problem typically occurs during a power outage when a homeowner with a forced-air natural gas or oil-fired furnace tries to operate the furnace fan by plugging the generator into an electrical outlet and feeding power into the home's electric system. That's when back feed happens.

The electricity from the generator will flow through the home's wiring, out of the house through the electric meter, the voltage will get increased to about 7,200 volts as the current passes through the transformer outside (yes, it works in reverse), and then it will flow into the PUD's electric system — posing a potentially fatal shock hazard to anyone working on the power line or coming in contact with a line that might be sagging or on the ground.

CAN BACK FEED ALSO DAMAGE THE GENERATOR?

Yes, it can. When our utility workers work on a power line, they routinely use a grounding system to protect themselves. If a portable generator is back feeding to that ground, the generator could be severely damaged.

Also, when the PUD restores power to a home that has a portable generator connected to the wiring, the sudden flow of utility power into the portable generator could burn out the machine.

HOW CAN I PREVENT BACK FEED?

There are two ways: 1) plugging directly into the generator and 2) installing a transfer switch. The easiest solution is to simply plug items you want powered by the generator (for example, your freezer) directly into the generator. But, that doesn't solve the problem of getting electricity to something that is hard-wired into the house, like the furnace fan.

If powering the furnace fan is your objective, you'll need to use a transfer switch, which disconnects the home's wiring system from the PUD's wiring system and also allows the homeowner to direct the flow of electricity from the generator to any circuit in the house, such as the one powering the furnace fan.

A transfer switch should only be installed by a licensed electrician and requires an electrical permit and an electrical inspection. Most electricians or dealers that sell portable generators can arrange to get one installed in your home.

WILL THROWING THE MAIN BREAKER CREATE THE SAME RESULT AS A TRANSFER SWITCH?

Not safely. Simple circuit breakers do not make a positive disconnection between the home electric system and the PUD system. What's more, they've been known to fail. And, the consequences are pretty high if it does fail.

The only safe way to create a positive disconnection between the two electric systems is through the use of a transfer switch.

ARE THERE OTHER SAFETY TIPS TO KEEP IN MIND?

Yes. Make sure extension cords are adequately sized to handle the electricity. If you're not certain, ask the dealer who sold you your generator or check with an electrician. Also, the generator itself should always be placed outside in a well-ventilated area and you should never refuel it when the engine is hot. Let it cool for at least 10 minutes to minimize the danger of fire.

Instructions on how to properly use a portable generator are included in most operating manuals. You should read them carefully.

Portable Generator Connections

There are two types of portable generation connections: permanent and temporary.

PERMANENT PORTABLE GENERATOR SYSTEMS

- The methods shown in Figures 2-1 and 2-2, with switches that disconnect the loads from the line side before those same loads are connected to the generator are acceptable methods of installing a standby/emergency generator.
- Installation of the Generator Connection Cabinet shown in Figures 2-1 and 2-2 must be approved by the appropriate governmental agency and Snohomish County PUD.

- All nonessential lighting and appliance circuits should be turned off before connecting a generator.
- Damage to the house wiring, appliances, heavy-duty flexible cord, and/or multiple outlet strip may result from exceeding their rate capacity. Damage to the generator may also result from exceeding the rating of the generator. This capacity is usually given on the generator nameplate in watts.

TEMPORARY PORTABLE GENERATOR SYSTEMS

If the generator is not connected as shown in Figures 2-1 and 2-2 (which are both considered permanent connections), the arrangement shown in Figure 2-3 (a temporary connection) is an acceptable alternative.

FIGURE 2-1: GENERATOR TRANSFER SWITCH/CONNECTION CABINET SIDE TAP

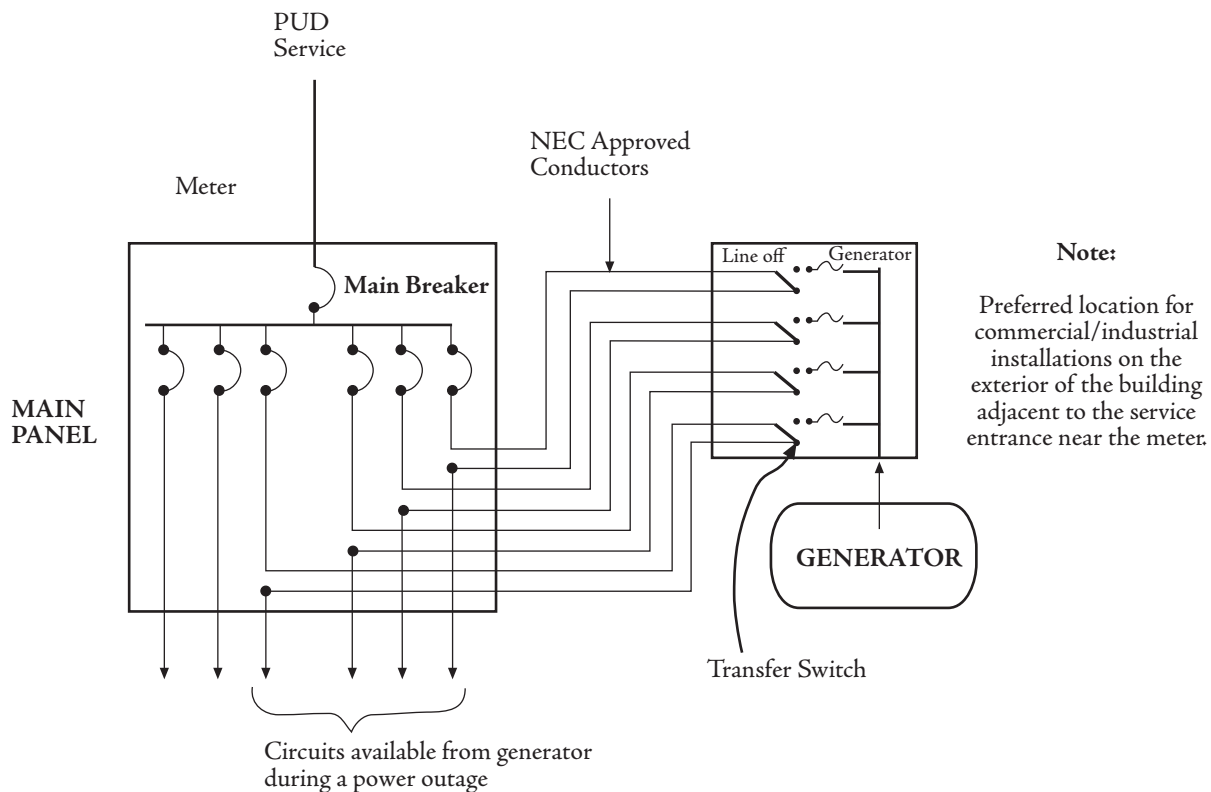
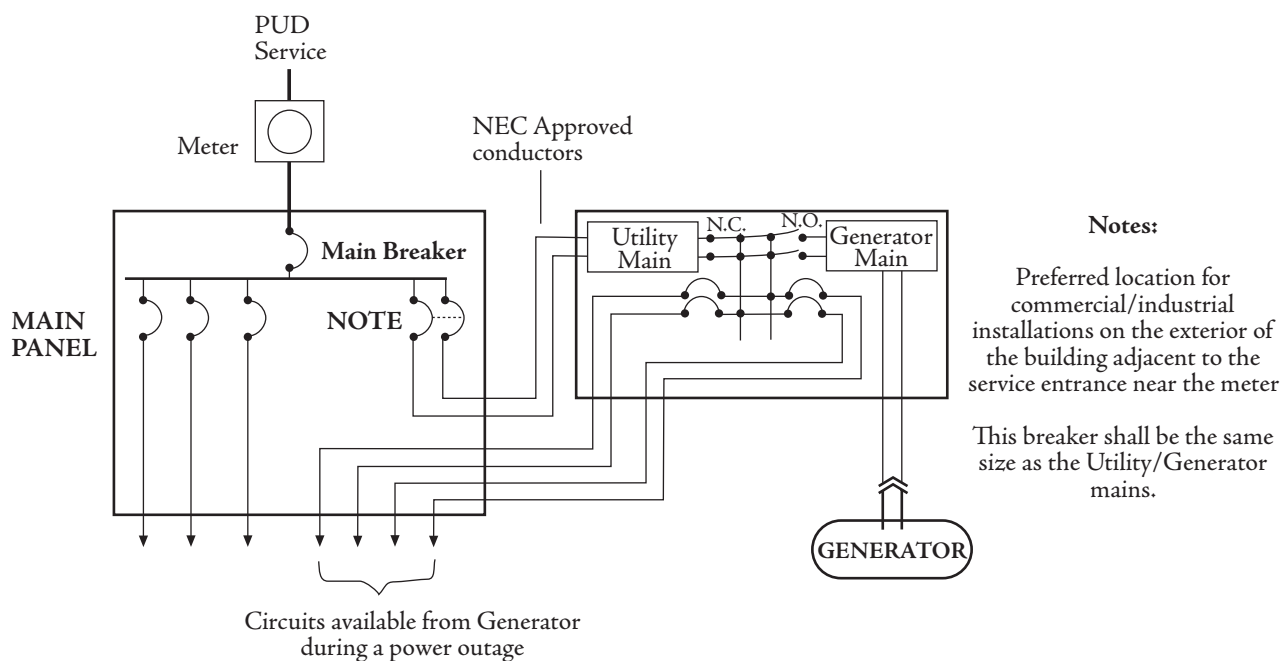
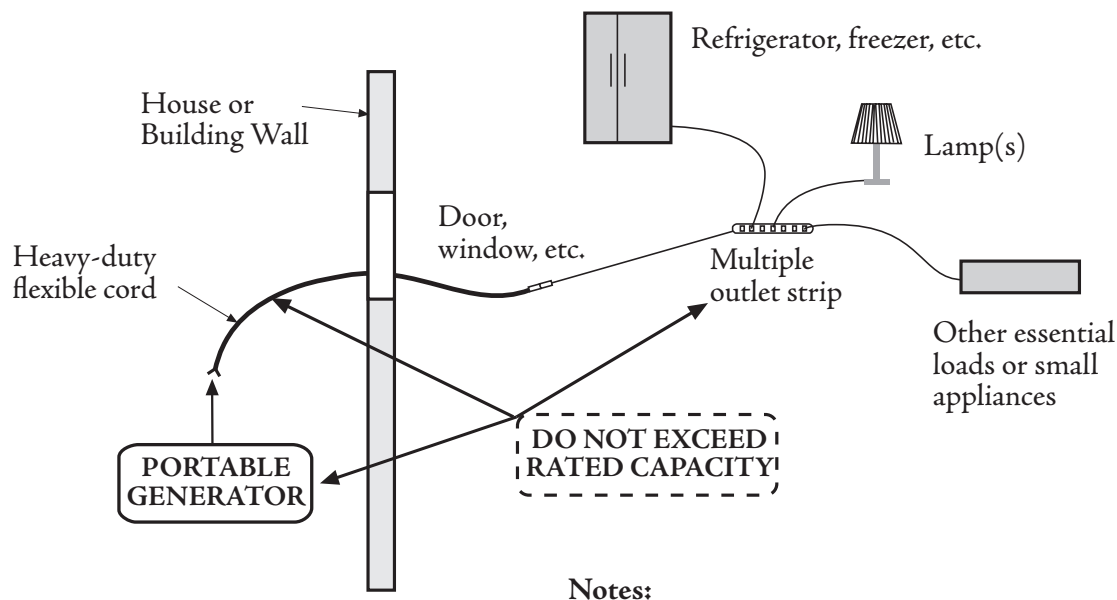


FIGURE 2-2: GENERATOR TRANSFER SWITCH/CONNECTION CABINET FEED THROUGH



NOTE: This breaker shall be the same size as the Utility/Generator mains.

FIGURE 2-3: GENERATOR CONNECTION EXTENSION CORD



Notes:

To assure safety of PUD linemen and to avoid potential damage to customer devices when portable generators are used, all electrically operated devices shall be connected directly to the portable generator.

Portable generators shall not be plugged directly into any building outlet receptacle creating a back feed safety hazard for the PUD and potential damage to customer equipment.

Caution! Damage to the house wiring, appliances, heavy duty flexible cord, and/or multiple outlet strip may result from exceeding their rated capacity. Damage to the generator may also result from exceeding the rating of the generator. This capacity is usually given on the generator nameplate in watts. Do not plug generator cord into any existing building outlets.



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