

# *Generator Safety for the Home*



**Allegheny Power**

*an Allegheny Energy company*

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## ***Warning***

Failure to follow  
wiring requirements  
may endanger life.

*See page 7, no. 3*

# Introduction

Allegheny Power is continuously working to improve service reliability\*, however, it's impossible to completely eliminate power outages. The reason is simple. We have no control over many of the causes, such as lightning, high winds, ice and snow storms, or accidents where a vehicle hits a utility pole.

So for such times – especially if you need an uninterrupted supply of electricity for critical uses – a reliable standby or emergency generator may be a practical answer.

Investing in emergency generating equipment is a form of insurance that protects against potential loss. The length of time you can do without electricity and the severity of the potential loss are factors to consider. Whether or not to invest in emergency generating equipment is a personal judgment based on one's own need for uninterrupted service.

\*Except for major disasters and planned interruptions for maintenance, all major U.S. electric utilities now provide better than a 99 percent service reliability rating. (Basis for measuring is minutes of interruption of service per year divided by total customer minutes of electricity delivered.) Allegheny Power's rating is 99.98 percent service reliability.

## Some Uses to Consider

<b>HOMES</b>	<b>FARMS</b>
Home health care equipment	Ventilation fans
Freezers	Water supply
Refrigerators	Milkers
Water pump	Milk cooler
Sump pump	Feeder and chore equipment
Heating equipment	Lighting
Lighting	

# Generator Types

Probably the most practical generating units for the home are the ones with the engine connected directly to the generator—either portable or permanent. You must use a double-throw switch to keep power from feeding back on to utility company lines. (See DIAGRAM on page 8.) And remember, only a qualified electrician should install a generator.



For farms, where a tractor is available, the power-take-off-drive type is another option. If you have a farmstead meter pole, you should provide a generator connection at the pole. Such a connection makes it possible to distribute power to the home and/or farm buildings over your present wiring. Remember, only a qualified electrician should install a generator. The generator can be installed in a small building near the pole with permanent wiring and an opening for the power shaft from the tractor. Or it can be mounted on a two-wheel trailer for a portable installation using plug-in connectors for the wiring. ***But remember, whichever installation you choose, you MUST use the proper size double-throw switch.***

# Things to Check When Buying a Generator

## Voltage and Phase

Generators must deliver the correct voltage for the devices you intend to operate—normally 120 or 240 volts. Generators are available in single phase or three phase. Most homes and farms require single phase. Check the equipment nameplates to determine the requirements of your household or farm.

## Size

Take the data from the nameplates of your equipment and appliances to your dealer. The dealer will recommend the correct size based on the maximum emergency load you will carry at one time. For emergency situations, consider rotating the use of appliances so that you can use a smaller generator. On the farm, however, sizing a generator requires knowledge of the equipment that must operate at the same time, and this usually requires a larger generator.

## Availability

You may be able to obtain a generator to handle the minimum vital electrical needs of an average household (1.5 to 5.0 kilowatts) beginning at \$500. Some homeowners might share the purchase and use of a small portable generator.

Each home must have a double-throw safety switch so that the generator operates safely and is easy to connect. The additional cost of installing your generator, including the double-throw safety switch, will vary with each installation. A 100-amp, double-throw safety switch will cost around \$300.

Keep your generator in good working order and follow a strict maintenance schedule.

For construction power, local rental companies may have generators. Incidentally, for limited requirements,

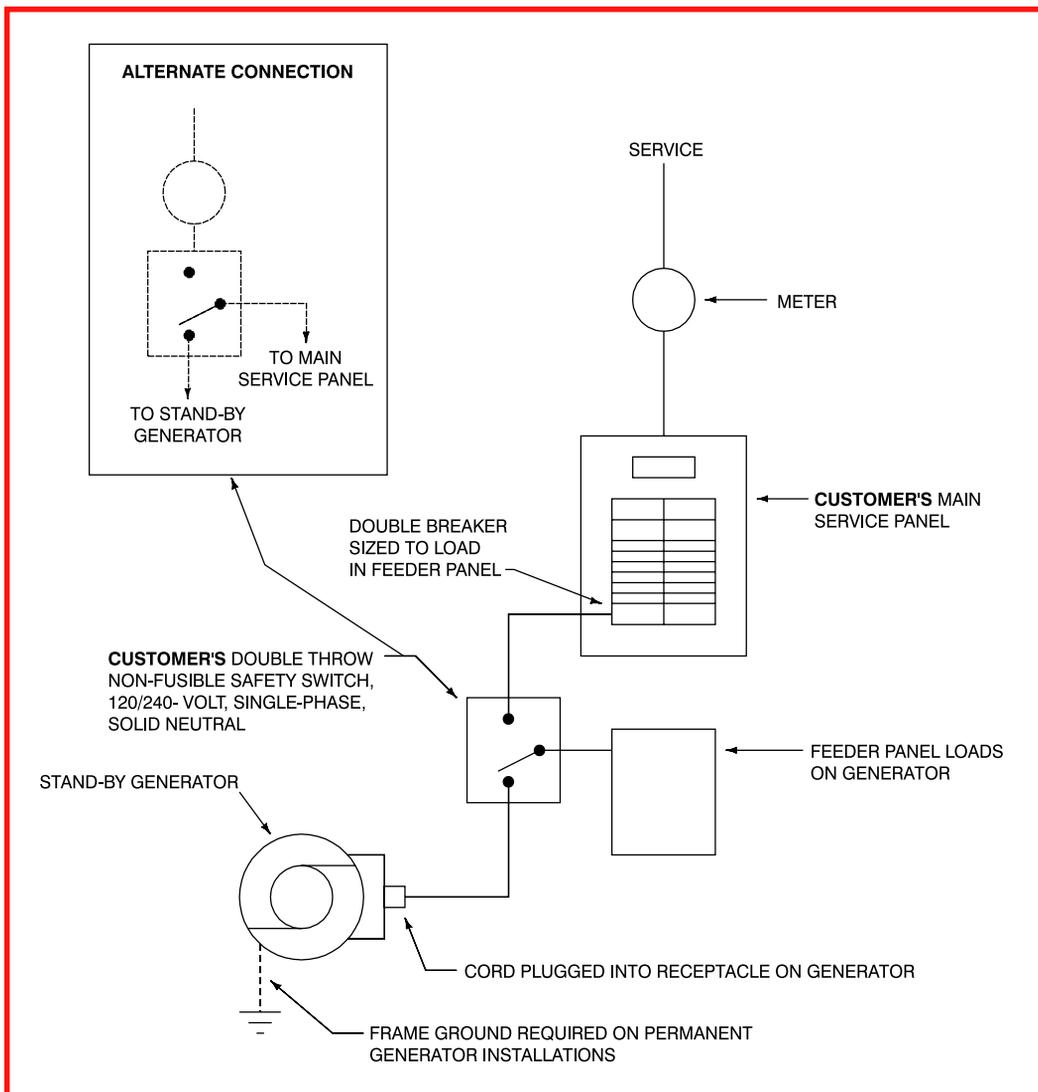
such as lights and power tools, but not induction-type motors, your car can serve as a source of emergency help with a power converter unit available from an auto parts store.

### Starting Ability

To operate an electric motor from a generator, you must have sufficient power available in the generator to start the motor. Usually 2.5 to 3 kilowatts (kW) per horsepower rating of the motor is adequate for small generators, and 2 kW per horsepower for large ones. (See table 1, page 10.)

## Typical Generator Connection For a Home

1. Meter socket.
2. Double-throw, non-fused, safety switch-120/240 volt, 2 pole, 3-wire solid neutral for single-phase service.
3. Customer's existing main service disconnect switch or wire trough or meter pole distribution to various buildings.

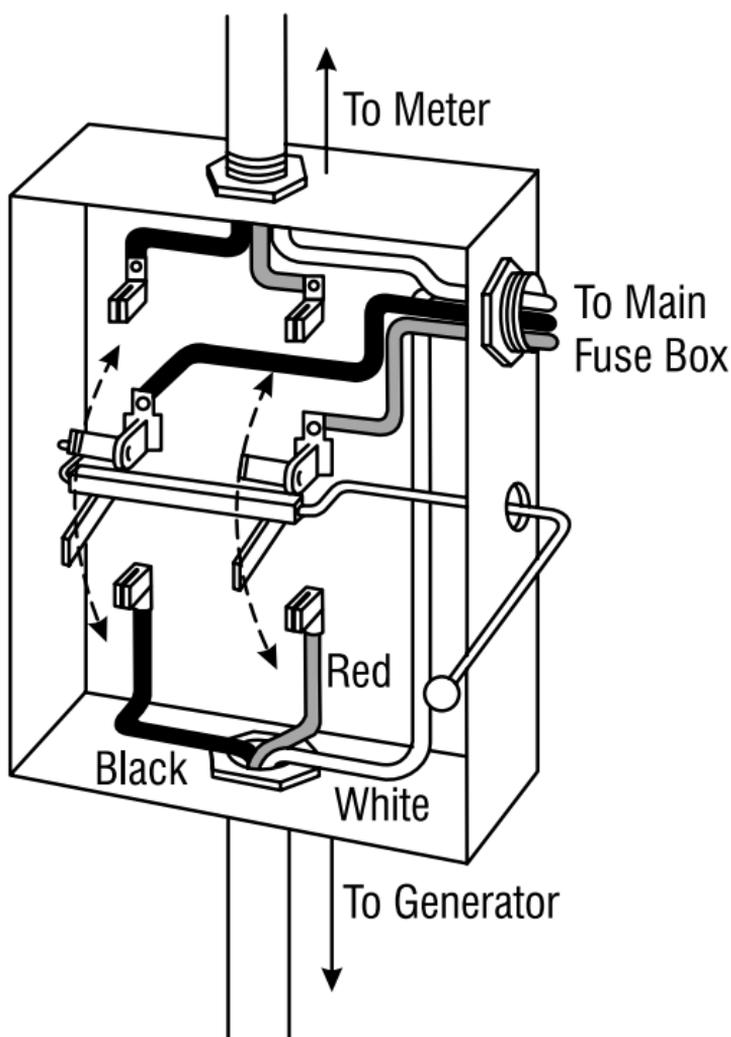


4. Emergency generator-size to carry necessary load.
5. Generator connection. If not permanently located, use plug connector and conductors to handle 115 percent of rated power output.
6. Follow manufacturer's instructions or bond generator frame to wiring system ground.

## Wiring Requirements

When installing a generator, either as a permanent installation or for temporary use, you must meet several very important requirements:

1. Follow the National Electrical Code and local ordinances to ensure all wiring is safe and approved. Also, some jurisdictions require an electrical inspection. **Have a qualified electrician make the installation.**
2. Install all grounding in compliance with the National Electrical Code.
3. Connect the energy supplied by this stand-by generator through a double-throw switch to eliminate any possibility of connecting the stand-by power to the Allegheny Power electric distribution system. Should you accidentally connect the generator to our secondary lines, our transformer will increase the voltage and deliver it into our system. When this happens, your generator could pick up load beyond your property and damage your generator. But even worse, that voltage could fatally injure an unsuspecting lineman working on our facilities.  
**You can help protect our linemen restoring power in your area. How? If you own or plan to install an emergency generator, please call Allegheny Power at 1-800-255-3443.**



**Double-Throw Switch**

4. Install the generator in a safe, dry location. Carry exhaust fumes directly to outside air. An open window is not enough protection. Also, shield the exhaust pipe to prevent fires.
5. Provide a voltmeter for any type of generator.

## Starting and Running

You and your family should study and follow the manufacturer's operating instructions carefully. You should follow these nine steps when placing the generator in operation:

1. Report the electric service interruption to Allegheny Power at 1-800-255-3443.

2. Shut off all electrical equipment. Your generator will not carry the operating load from a cold start if several appliances are connected on the circuit.
3. Start the generator.
4. Put the double-throw switch in a position to operate from the generator.
5. The voltmeter will indicate when the generator is ready to carry its load.
6. Start the largest electrical motor first. Add another motor when the others are up to operating speed. Don't add too much, too fast. If your standby generator cuts out for any reason, repeat steps 2, 3, 5, and 6.
7. When Allegheny Power resumes service, turn off all motors. Then turn off your stand-by generator.
8. Change the double-throw switch back to Allegheny Power service and restart your equipment, one piece at a time.
9. Reset electronic devices if applicable.

## Safety

Always make sure your wiring is in good condition. If it has been damaged, have a qualified electrician make any necessary repairs and inspections prior to using a generator. All electrical work should be done according to National Electrical Code standards.

Protect against fumes and fires. Carry engine exhaust fumes to the outside. Take precautions to prevent fires caused by sparks flying from the exhaust. Protect the generator in accordance with the manufacturer's guidelines.

# Maintenance

Once the generator is installed, follow your manufacturer's guidelines.

## Table 1

**Approximate Wattage and Power Required to Start and Run Most Electric Motor Powered Equipment**

Horsepower	Approx. Running Watts*	Approx. Starting Watts Full Load**	Size Generator Normal Operation	Minimum Driving Engine (Tractor)
1/4	300	1200	0.75 kW	1.5 HP
1/3	400	1600	1.0 kW	2 HP
1/2	550	2300	1.5 kW	3 HP
3/4	800	3345	2.0 kW	4 HP
1	1000	4000	2.0 kW	4 HP
1 1/2	1500	6000	3.0 kW	6 HP
2	2000	8000	5.0 kW	10 HP
3	3000	12000	7.5 kW	15 HP
5	4500	18000	10.0 kW	20 HP
7 1/5	7000	28000	15.0 kW	30 HP

*\*For estimating total motor load, single-phase motors—120 or 120/240 volts.*

*\*\*For checking generator size needed for largest motor. Starting load watts given in this table are for capacitor motors. Most split-phase motors will draw approximately 25 percent more power and most repulsion induction motors will draw approximately 25 percent less power during starting. Estimate accordingly.*

**For more information,  
call 1-800-Allegheny  
(1-800-255-3443)**

Stock #090-883

