



## Standby Generator Information

### Standby electric generators

An *emergency source of power* is important for any home or farm during an extended outage. They are essential for things like sump pumps, emergency heat, and special medical needs for home-bound residents; for ventilation and water needs in a livestock operation. A standby electric generator can *prevent costly losses* during a power failure.

### Types of generators

Standby generators come in either *engine-driven* or *tractor-driven* models; either stationary or portable. Engine-driven units are made with either manual or automatic start and are fueled by gasoline, LP (bottled) gas or diesel.

*Power-take-off (PTO) generators (tractor-driven)* are usually mounted on a trailer and cost about half as much as engine-driven units. This type of system is very common on most farms where tractors are common. Safety is always a concern around PTO-drives.

Generators must provide the same type of power at the same voltage and frequency as that which is supplied by the utility for the location at which it's used. This is usually 120/240 volt, single phase, 60-cycle alternating current (AC). An air-cooled engine often will be used for generators up to 15 kilowatts. Generators larger than 15 kilowatts usually require a liquid-cooled engine. An engine capacity of 2 – 2 ¼ hp is typical for each 1,000 watts of generator output.

### Sizes of generators

A *full-load system* will handle the entire electric load being served. Automatic, engine-driven, full-load systems will begin to furnish power within seconds after power is lost. Smaller and less expensive partial-load systems may be enough to handle essential equipment during an emergency. A *partial-load* generator will only supply the most essential equipment operating at any given time.

### Installation

Wiring and equipment must be installed in accordance with the National Electrical Code, local ordinances and CCEC requirements (see [www.kwh.com](http://www.kwh.com)). Proper equipment is essential for disconnecting the generator from public utility lines. CCEC requires the installation of a *double-pole double-throw transfer switch* or its equivalent.

### Location and safety features

Large-engine generators should be located in a building, preferably one that is heated. Inlet and outlet air ducts must be large enough to remove excess heat and provide adequate combustion air for the engine. They should be open at least a half a square foot for each 1,000 watts of generator capacity.

Combustion fumes must be carried outdoors safely. Exhaust pipes must be at least 6 inches from combustible material. To avoid any possible chance of carbon monoxide poisoning, never operate a combustion engine inside a building without running the exhaust to the outside!

## **Operation**

An automatic standby generator should start automatically when electric power is lost, and automatically stop and shut down when power has been restored. When using either an engine-driven generator with a manual start or a tractor-driven unit, follow this procedure when power fails:

1. Call your power supplier and advise them of the conditions.
2. Turn off or disconnect all electrical equipment.
3. Position the tractor or engine with the generator so as to allow sufficient room for connecting the electrical wires to the appropriate equipment.
4. Check on arrangement to carry off exhaust fumes.
5. Start the unit and bring the generator up to proper speed (1,800 or 3,600 rps).
6. Ensure fire prevention and make sure all moving parts are shielded, especially PTO shafts.
7. Check the voltmeter to make sure the generator voltage is set to the correct level; adjust the voltage setting as allowed/needed on the control panel.
8. Move the transfer switch to the generator position.
9. Start the largest electrical motor or load first and allow it to reach full operating speed before adding other loads. Do not add too much load too fast.
10. Check the engine and generator frequently for proper operating conditions, including open air intakes, operating temperature, and voltage levels.

If the generator breaker trips out for any reason, repeat step six above. If the generator breaker continues to trip, you may have too much load for safe operation; consider which loads are unnecessary to operate jointly.

Check the voltmeter frequently. If voltage falls below 220 volts for 240 volt service or below 110 volts for 120 volt service, reduce the load on the generator by turning off some electrical equipment.

When commercial power has been restored, put the transfer switch in normal power position and stop the standby unit. Be sure to allow the engine to cool down before shutting it off.

## **Maintenance**

Keep the unit clean and in good running order at all times; it should always be ready for immediate use. Dust and dirt accumulations on the motor and generator can cause it to overheat when operated. Be sure to check the generator for any signs of rodent infestation; look for nesting materials or droppings that indicate rodents may have been present. Be sure all ventilation openings and channels in the generator are free/open and clear. Check fluid levels (oil, coolant, and fuel).

Follow maintenance instructions in the owner's manual. A short operation at set intervals will keep the engine in good operating condition. Regularly scheduled warm-ups are necessary to keep a standby engine in working order.

If you plan to use a generator, be sure it's used safely. Use proper venting to avoid carbon monoxide poisoning. If you want a generator connected to your main electrical supply, contact a licensed electrician to ensure the setup meets all electrical codes and is compatible with your power systems. Or simply plug essential equipment such as pumps or lights into the generator outlets. Never backfeed your generator into your electric service

**For any further questions, please contact CCEC at 701-356-4666**