

Home Owners Guide Fuse vs Circuit Breaker



Circuit Breakers and Fuses...Are they the same?

For most people, a fuse and a circuit breaker are basically the same — they both serve to protect an overload electrical circuit by interrupting the continuity, or the flow of electricity. Overloaded circuits may potentially destroy electrical equipment, or in more serious cases, cause a fire. However, how each interrupts the flow of electricity is different.

How Fuses Work

There are many different types of fuses for residential and commercial use, but the most common type is made up of a metal wire or filament that is enclosed in a glass or ceramic and metal casing. In a home, the fuse is typically plugged into a central fuse box where all the building's wiring passes. When the electricity is flowing normally, the fuse permits the power to pass unobstructed across its filament, between circuits.

If an overload occurs, the filament melts, stopping the flow of electricity.

It generally takes very little time for the filament in the type of fuse used in a home to melt, so any power surge is quickly stopped. Once a fuse is blown, however, it must be discarded and replaced with a new one. There are many different voltage and ratings available that handle different capacities of electricity, and the best fuse for a circuit is typically one that is rated for slightly higher than the normal operating current.

How Circuit Breakers Work

A circuit breaker works in one of two ways, with an electromagnet (or solenoid) or a bi-metal strip. In either case, the basic design is the same: when turned on, the breaker allows electrical current to pass from a bottom to an upper terminal across the solenoid or strip. When the current reaches unsafe levels, the magnetic force of the solenoid becomes so strong that a metal lever within the switch mechanism is thrown, and the current is broken. Alternately, the metal strip bends, throwing the switch and breaking the connection.

To reset the flow of electricity after the

problem is resolved, the switch can simply be turned back on, reconnecting the circuit. Circuit breakers are often found in a cabinet of individual switches, called a breaker box. The simple switch action of a circuit breaker also makes it easy to turn off an individual circuit in a house if it's necessary to work on the wiring in that location.

Another use of the circuit breaker is a ground fault circuit interrupter (GFCI) outlet, which functions to prevent electric shock instead of overheating.



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It works by breaking the circuit in an outlet if the current becomes unbalanced, and can be reset by the push of a button. This technology is particularly useful in bathrooms or kitchens where electrocution is a risk due to the frequent use of electric appliances near a source of water.

Advantages and Disadvantages

The fuse and circuit breaker both have advantages and disadvantages, each of which can depend on the situation in which they are used. Fuses are inexpensive and can be purchased from any hardware store. They also tend to react very quickly to overloading, which means that they can offer more protection to sensitive electronic devices. This quick reaction can be a disadvantage, however, if the circuit is prone to surges that regularly cause fuses to blow.

Fuses must always be replaced once they are blown, which can be challenging in a darkened room or if the appropriate replacement is not immediately available.

Another issue is that a do-it-yourselfer can mistakenly select a fuse that has a

voltage or current rating that is too high for his needs, which can result in an overheated circuit. In addition, there may be exposed electrical connections in a fuse box, which can pose a danger to someone who does not follow the proper safety precautions.

Circuit breakers have many advantages,



not the least of which is how quickly they can be reset. It is usually clear which switch has tripped, and it can be easily reset in most cases. For the average homeowner, it is also safer because there is no question about choosing the right fuse rating and all of the electrical connections are hidden in a breaker box.

New advanced circuit breaker devices like Arc Fault and GFCI are far more advanced than glass fuses. Arc Fault circuit breakers protect from arc induced fires.

Arc's occur from damaged overheating or stressed electrical wiring or devices. Arc fault can occur when older wires become frayed or cracked, an outlet device becomes loose or worn, a table lamp or floor lamp gets knocked over and the arc fault breaker turns off the flow of current to prevent arc induced fire. In 2014 all new residential residences will require Arc Fault Circuit Breaker to protect all new or extended branch circuit wiring.

GFCI circuit breaker protects people from electrocution. In 2014 manufacturers will be introducing combination Arc fault and GFCI Circuit Breakers. The latest 2014 National Electrical Code has updated new requirements for GFCI Protection in both Residential and Commercial Buildings.

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