

# GROUND FAULT CIRCUIT INTERRUPTERS

Carson-Dunlop Technical Reports

The outlets with the coloured “Test” and “Reset” buttons are specially designed to better protect people than ordinary outlets. GFCI’s have been used in houses since the 1970’s.

## Why Are They Used?

GFCI’s are designed to shut power off if there is a very small leak of electricity (a ground fault) which ordinary outlets wouldn’t notice. Normal outlets are shut off by a fuse or breaker if more than 15 amps flows. This prevents fires, but since people can be killed by 1 amp or less, fuses may not protect people from shock. GFCI’s shut off power if a leak as small as .005 amp occurs.

## How Do They Work?

A GFCI detects a leak by comparing how much electricity comes back through the white wire to how much was sent in the black wire. When everything is working correctly, the current flow is the same. If a little electricity is leaking out, it may be going through a ground wire or through part of the house. If this happens, the black wire will have more electricity than the white wire. Electricity, like most people, will follow the path of least resistance. If a person touches a leaky electrical system, they may present a better route to ground for electricity, since they may offer very little resistance.

Another way of saying this, is that the person may be a very good conductor or the person may not be well insulated. The electricity will flow through the person, giving them a shock. Without a GFCI, this can be fatal. With a GFCI, the little leak would be detected and the power would be shut off.

## Where Are They Used?

In Canada, GFCI’s are **now** required by Code for outdoor outlets, bathroom outlets and whirlpool outlets. Electrical systems for swimming pools are also GFCI protected.

## Can The Outlet Be GFCI Protected If There Is No Button?

Yes, if for example, the circuit breaker back at the panel has a “Test” button, it is a GFCI breaker. This will protect everything on that particular circuit. Any outlets wired downstream of a GFCI outlet are also protected if the GFCI is wired correctly. Often, more than one bathroom can be operated by a single GFCI outlet, located in one of the bathrooms.

## Can They Be Added To Older Houses?

Yes, GFCI’s can be added to any electrical system. They are more expensive than regular outlets (\$15-\$20 vs. \$1-\$2), but are inexpensive insurance. While they do not replace grounding systems exactly, some Codes do allow GFCI’s in lieu of grounding in some cases. It is safe to say that a circuit protected by a GFCI is better protected than one without.