

Ground Fault Circuit Interrupter

(GFCI)

Ground Fault Circuit Interrupter (GFCI)

- Who needs to know about it?
- What is it and what purpose does it serve?
- When is it installed; when is it used?
- Where can I find one?
- Why do we need them?
- How does it work?

Types of GFCIs

Ground Fault Circuit Interrupters (GFCIs)



GFI Receptacle



GFI Circuit Breaker

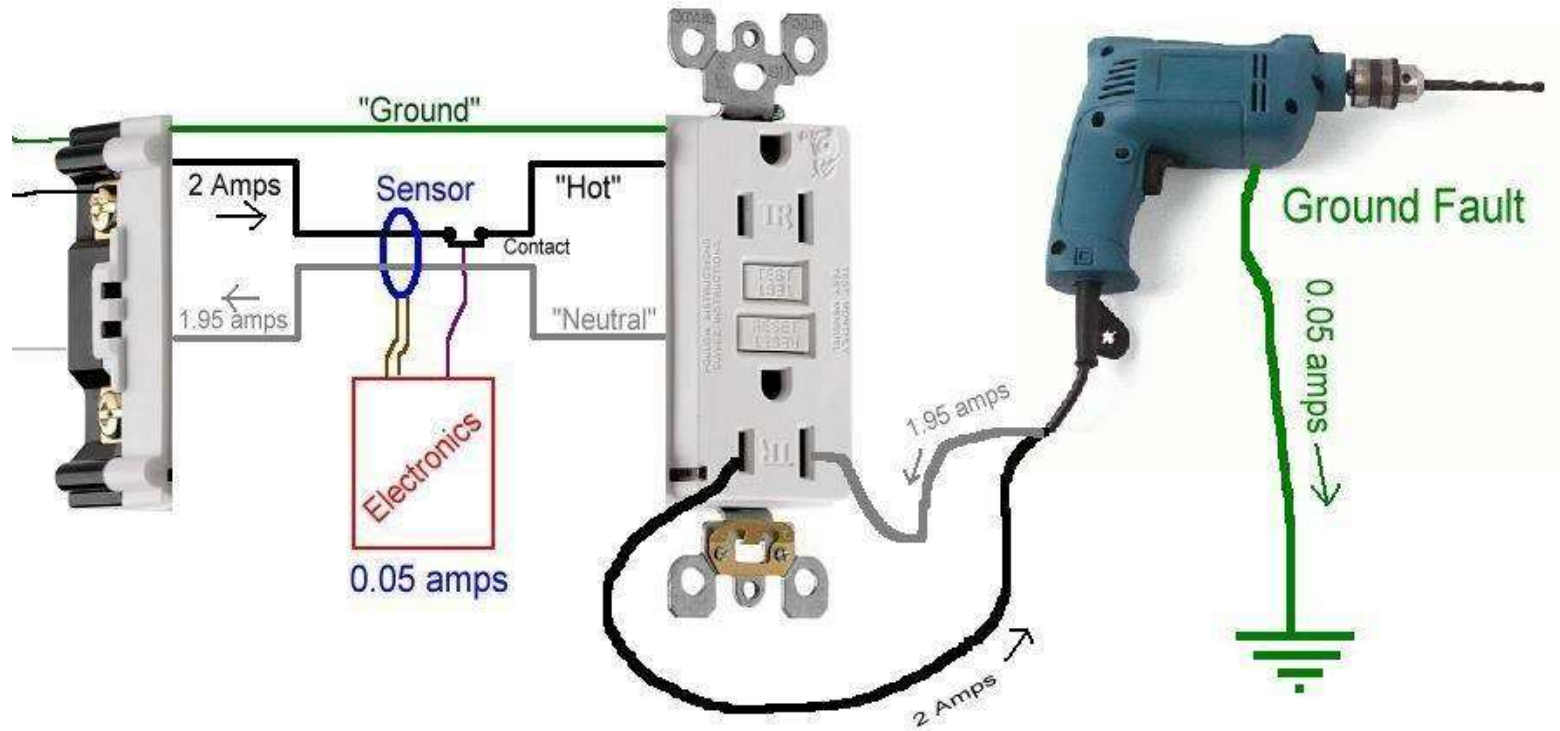


Portable GFI Device

GFCI Receptacle (outlet)



How Does a GFCI Work?



Ground Fault Circuit Interrupter

- The GFCI type of outlet constantly monitors electricity flowing in a circuit, to sense any loss of current.
- Every year, hundreds of Americans die due to electrical accidents called **electrocution** – death caused by electric shock.
- Sometimes electrocution happens in utility and construction incidents, but these tragic accidents happen in homes, too.

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- Before the widespread adoption of **GFCI (ground-fault circuit interrupter)** outlets, around 800 people died annually in the United States.
- Now, thanks largely to the proliferation of GFCI technologies, particularly in areas near water, such as bathroom sinks or in places exposed to rain or standing water, that number has dropped to around 200 deaths per year.

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- In short, GFCI outlets exist to protect people from **electrical shock** — it is completely different from a house fuse.
- The idea behind a fuse is to protect a structure from an electrical fire.
- If the hot wire were to accidentally touch the neutral wire for some reason, an incredible amount of current will flow through the circuit and start heating it up like one of the coils in a toaster.
- The fuse heats up faster than the wire and burns out before the wire can start a fire. Catastrophe averted.

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- Unlike a home's fuse, the **GFCI** is integrated in the outlet itself.
- When you plug in an appliance, such as a hair dryer, the GFCI outlet monitors the amount of power going to the device.
- If you accidentally drop the appliance into a sink full of water, the GFCI detects the interruption in current and cuts the power ... and possibly saves your life.
- So how do you know if you're looking at an outlet equipped with GFCI capabilities? You'll see a "Test" and a "Reset" button (and perhaps an indicator light) built right into the outlet.

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- When you view a normal 120-volt outlet in the United States, there are two vertical slots and then a round hole centered below them.
- The left slot is slightly larger than the right.
- The left slot is called "neutral," the right slot is called "hot" and the hole below them is called "ground."

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- If an appliance is working properly, all electricity that the appliance uses will flow from hot to neutral.
- A GFCI monitors the amount of current flowing from hot to neutral. If there is any imbalance, it trips the circuit.
- The GFCI senses a mismatch as small as 4 or 5 milliamps, and it can react as quickly as one-thirtieth of a second.
- That's a key specification, because at around 10 milliamps, human muscles "freeze" from electrical overload, meaning that you're unable to let go of an object that's causing a shock; just two seconds at that level of current can cause death.

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- If you've ever experienced even a second of paralysis caused by electrical shock, it's not a feeling you'll ever forget. In short, you were part of what's called a **ground fault**.
- A ground fault is an instance in which the hot wire touches any area of a grounded device or even the grounded part of a junction box.

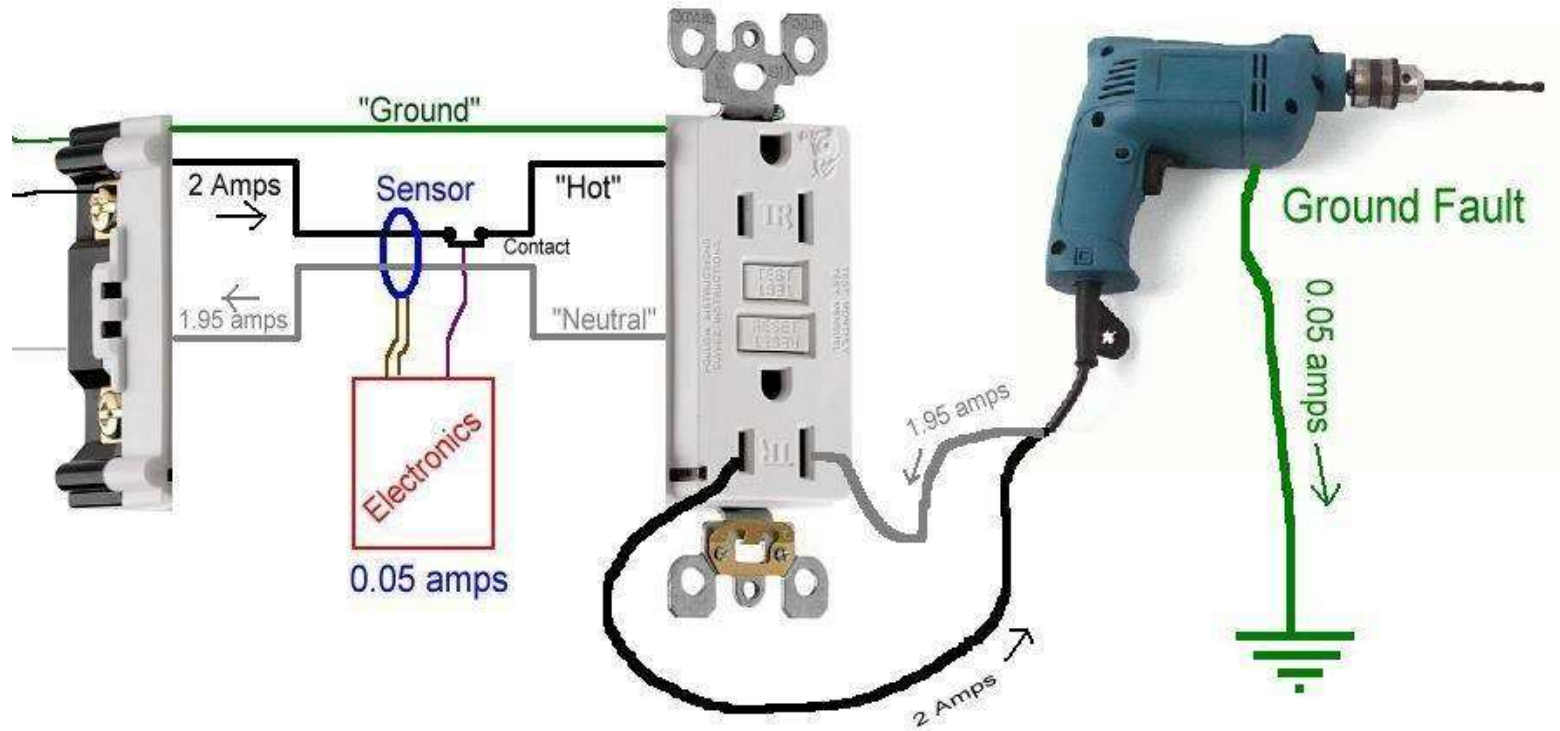
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- Moisture and dampness are two of the biggest causes of ground faults, and the consequences can be life-altering.
- For example, let's say you are outside with your power drill and it is raining. You are standing on the ground, and since the drill is wet there is a path from the hot wire inside the drill through you to the ground.

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- If electricity flows from hot to ground through you, the result is a ground fault, and it could be fatal.
- The GFCI can sense the current flowing through you because not all of the current is flowing from hot to neutral as it expects -- some of it is flowing through you to the ground.
- As soon as the GFCI senses this "leakage" of power, it trips the circuit and cuts off the electricity.

How Does a GFCI Work?



Testing a GFCI

- GFCI outlets always eventually wear out, so you should test them about once per month.
- To test the outlet:
 - Press the “Reset” button, and then plug in a simple night light or other electrical device. The device should turn on.
 - Then press the “Test” button. If the GFCI is working, the power will immediately be cut.
 - Press “Reset” again, and your device should turn on again. If so, the outlet is working as it should.