



037: GFCI Protection

What a GFCI does

While a GFCI does provide personnel protection, it does not protect equipment or circuit conductors. No device or policy provides complete protection from shock. The GFCI is one part of a larger protection plan that involves grounding conductors, double-insulated tools, and attention to potential hazards. A GFCI will not protect you from:

- Line to line faults. For example, you grab Phase A with one hand and Phase B with the other.
- Line to neutral faults. For example, you grab a hot with one hand and a neutral with the other.

You do not need a ground for a GFCI to work. A GFCI receptacle uses a Current Transformer to measure current in the hot and current in the neutral. When the difference in current flow between the hot and neutral exceeds a certain value, the device assumes the difference is due to a fault to ground. That value is 4 to 6 mA. This value is on the threshold of the “let go” current. The GFCI, if undamaged, will interrupt the circuit. Because it does this in about 1/40th of a second, it should easily prevent electrocution. If the GFCI is damaged, however, it may not do this. Most GFCIs in use today will still provide power, even if unit no longer provides GFCI protection. Power transients, such as those from lightning, can damage a GFCI.

Devices that incorporate GFCI protection include panel-mounted breakers, receptacles, and portable cords. New GFCI protection products arrive on the market all the time.

When and where you must use a GFCI

If you don't have an assured equipment grounding conductor program in place, you must use GFCI devices on your construction site. These other “must use” notes assume you don't have an assured equipment grounding system.

- You must use a GFCI for all temporary wiring.
- You must use a GFCI when doing work outdoors, even if power comes from a permanent receptacle inside the building.
- You must use a GFCI with all portable cords.
- You must use a GFCI when working near water, such as a pool or fountain.

GFCI wiring

Every GFCI device comes with wiring instructions. GFCI receptacles are normally marked with **LOAD** and **LINE** designations. You must connect the upstream wiring (from the supply panel) to the **LINE** side, and any subsequent downstream receptacles to the **LOAD** side. If you reverse these connections, the GFCI probably will not work correctly, if at all.

Proper connection of the hot, neutral, and ground is critical. A common mistake is connecting the ground wire to the neutral wire and the neutral wire to the ground. Another mistake is swapping the hot and neutral.

Never ground the neutral at any point other than the supply ground. For the whole

Discussion leader duties for this session:

Obtain a GFCI receptacle.

What this Safety Talk covers:

Proper use of GFCI devices.

Discussion notes :

