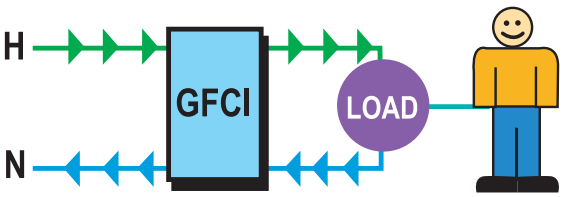
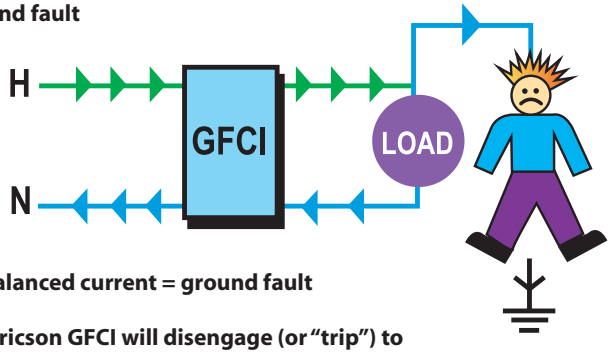
How a Ground Fault Circuit Interrupter (GFCI) works…

A GFCI is a fast acting circuit opening or breaking device that stops the flow of dangerous current in the event of electrical shock. The GFCI uses precise electronic circuitry to sense the imbalance of the load from the hot and neutral lines. In other words, the GFCI monitors the current flow leaving and coming on both the hot and neutral lines of the circuit. In the event of an imbalance, the GFCI immediately releases the holding relay and breaks both the hot and neutral lines simultaneously thereby stopping the current flow and preventing human injury. The GFCI is not a circuit breaker in that it does not sense the overall load and disconnect in the event of full or excess balanced current flow. The imbalance in current flow can be very small to "trip" a GFCI. Whenever the current flow "going" and "returning" differs more than 5 mA (+/- 1 mA), the GFCI opens the relay stopping the current flow.



Normal balanced current
No ground fault



Imbalanced current = ground fault

An Ericson GFCI will disengage (or "trip") to stop all current flow eliminating this hazard

Beware of "Open Neutrals" and "Reverse Phasing"…

Normally, GFCI receptacles (like those found in your bathroom) can sense ground-faults. However, if the line-side neutral conductor is opened or lifted at a panel, the circuitry in the GFCI receptacles will not have the necessary complete circuit path from which to operate. That means that GFCI is no longer capable of sensing and disengaging. This is called an "open neutral." Anyone using the receptacles protected by the disabled GFCI will not have GFCI protection. And if a faulted tool is connected to the now-unprotected receptacle, the user will be exposed to a shock or electrocution hazard.

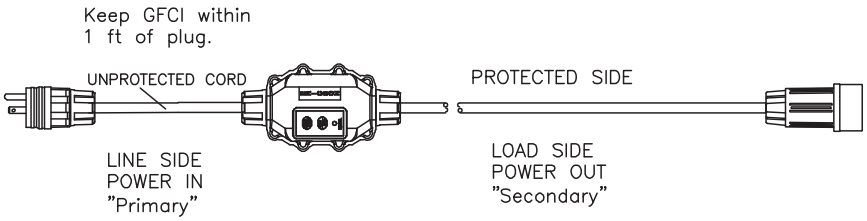
Agency Safety Testing (UL) for Portable Temporary GFCIs and Residential GFCIs is different…

UL 943 is the test standard for GFCIs. However, there is a difference in the requirements for temporary Jobsite GFCIs and the standard residential duplex wall mounted GFCI receptacle. These duplex receptacles are not designed for temporary jobsite power and personnel protection under OSHA, NEC or Canadian C22.2 safety workplace rules. The residential GFCI duplex can still operate with an open neutral condition due to the unlikely condition that the neutral line in a residential permanently wired home will not be loose or removed at the panel. The likelihood of a temporary panel on a jobsite having an incomplete neutral system is more likely and therefore jobsite portable GFCIs need to be able to handle reverse wiring and open neutral conditions.

SAFE CURRENT VALUES	
Milliamperes - 1 or less	**Effect on Average Human** Causes no sensation - not felt, is at threshold of perception.
1 to 8	Sensation of shock. Not painful. Individual can let go at will, as muscular control is not lost. (5mA is accepted as maximum harmless current intensity.)
UNSAFE CURRENT VALUES	
Milliamperes - 8 to 15	**Effect on Average Human** Painful shock. Individual can let go at will, as muscular control is not lost.
16 to 20	Painful shock. Muscular control of adjacent muscles lost. Cannot let go.
21 to 99	Painful. Severe muscular contractions. Breathing is difficult.
100 to 200	Ventricular fibrillation. (A heart condition that may result) Disrupts or changes rhythm of the heart.
200 & over	Severe burns. Severe muscular contractions - so severe that chest muscles clamp heart and stop it during duration of shock. (This prevents ventricular fibrillation.)

Where and How to properly use a GFCI...

GFCIs only sense an imbalance on the load side of the circuit. If the imbalance or path to ground occurs BEFORE the GFCI, then the sensing circuit will not release the relay stopping the current. Because of this fact, you should always place the GFCI as close as possible to the voltage source. Ericson encourages the placement of any GFCI on a cordset to within 1 foot of the primary power plug. This way, there is little cord exposed to damage and not being sensed by the GFCI.



OSHA and the NEC call for the use of GFCIs in all 125 volt 15,20 and 30 amp circuits. Consult your local safety codes for additional GFCI use regulations.

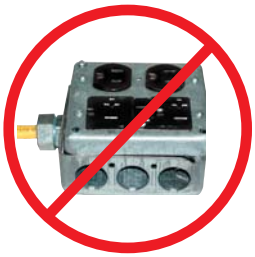
What is the difference between AUTO and MANUAL GFCIs?

The GFCI terms "auto" and "manual" have been in the electrical industry for years. These simple terms refer to the operation of the GFCI when first plugged into a voltage source. These terms have nothing to do with the "tripping and subsequent resetting" of the GFCI. Separate the two main events for a GFCI: (1) Power up mode and (2) Trip and Reset Mode. Power up mode is the condition of the GFCI after being plugged into a correct voltage source.

AUTO - The "auto" GFCI will immediately energize the relay and allow protected voltage to be available at the "load" side of the GFCI. The GFCI has automatically powered up and is ready for use without the assistance of the human pressing any buttons. Think plug-n-play.

MANUAL - On the "manual" GFCI, the RESET button has a dual role in functionality. [1]Powering up the unit and [2]resetting after a fault. The "manual" GFCI operates slightly different in that it requires the human to press the "RESET" (which is operating as a power up button on this unit) so the GFCI can close the relay and operate as required.

RESET - After a "trip" situation, both styles of GFCI require the pressing of the reset button to re-start the GFCI. CAUTION: Only reset a GFCI after an investigation as to the fault cause has been identified and repaired. GFCIs cannot, nor are ever designed to reset themselves automatically.



Metal Gang Box Danger

The "traditional" metal gang box on the end of a cord has been a danger for many years.

There are several reasons for the danger:

- Metal boxes are designed for permanently wired installations, not portable temp power.
- No weatherproofing except for outdoor location FS types.
- HOT box danger. (See below)
- Hand Hazard with sharp edges

The GFCI False Sense of Security

As the diagram shows, the metal gang box can have a common situation in which the earth ground is poor or not connected. There can be a hot short to the metal box in which you now have a "hot" box. The short will not trip the circuit breaker nor will the GFCI trip. The GFCI sensor only watches the "load" side of the receptacle, not the line side. The GFCI is worthless in this situation.