



Ground Fault Circuit Interrupters

(GFCI'S)

Ground Fault Circuit Interrupter is an electrical wiring device that disconnects a circuit whenever it detects that the electric current is not balanced between the energized (line) conductor(s) and the return (neutral) conductor. In normal circumstances, these two wires are expected to carry matching currents, and any difference usually indicates a short circuit or other electrical anomaly is present. Even a small leakage current can mean a risk of harm or death due to electric shock if the leaking electric current passes through a human being; a current of around 30mA (0.030 Amps) is potentially sufficient to cause cardiac arrest or serious harm if it persists for more than a small fraction of a second. GFCIs are designed to disconnect the conducting wires quickly enough to prevent serious injury from such shocks. (This is commonly described as the GFCI being "tripped".) Injury may still occur in some cases, for example if a person falls after receiving a shock.

A GFCI does not provide protection against unexpected or dangerously high current *when current is flowing in the usual wires in the circuit*, therefore they cannot replace a fuse or protect against overheating or fire risk due to overcurrent (overload) or short circuits if the fault does not lead to current leakage. Therefore GFCIs are often used or integrated as a single product along with some kind of circuit breaker, such as a fuse or MCB ("miniature circuit breaker"), which adds protection in the event of excessive current in the circuit. GFCIs also cannot detect the situation where a human being accidentally touches both conductors at the same time, since the flow of current through an expected device, an unexpected route, or a human being, are indistinguishable *if the current returns through the expected conductor*.

GFCIs are usually testable and resettable devices. Commonly they include a button that when pressed safely creates a small leakage condition, and a switch that reconnects the conductors when a fault condition has been cleared.

A GFCI is required for all receptacles in wet locations defined in the Code. The NEC also has rules about how many circuits and receptacles should be placed in a given residential dwelling, and how far apart they can be in a given type of room, based upon the typical cord-length of small appliances.

Unlike circuit breakers and fuses, which only open the circuit when the current exceeds a fixed value for a fixed time, a GFCI device will interrupt electrical service when more than 4 to 6 milliamperes of current in either conductor leaks to ground. A GFCI detects an imbalance between the current in the "hot" side and the current in the "neutral" side. One GFCI receptacle can serve as protection for several downstream conventional receptacles. GFCI devices come in many configurations including circuit-breakers, portable devices and receptacles.

Both State of Wisconsin and ASHI (American Society of Home Inspectors) Standards of Practice, require that all GFCIs be tested and reported as to their condition in the home inspection report.

Source: Wikipedia, National Electric Code (NEC)

For additional information, or to schedule an inspection, please call Jeff @ (608) 434-0790

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