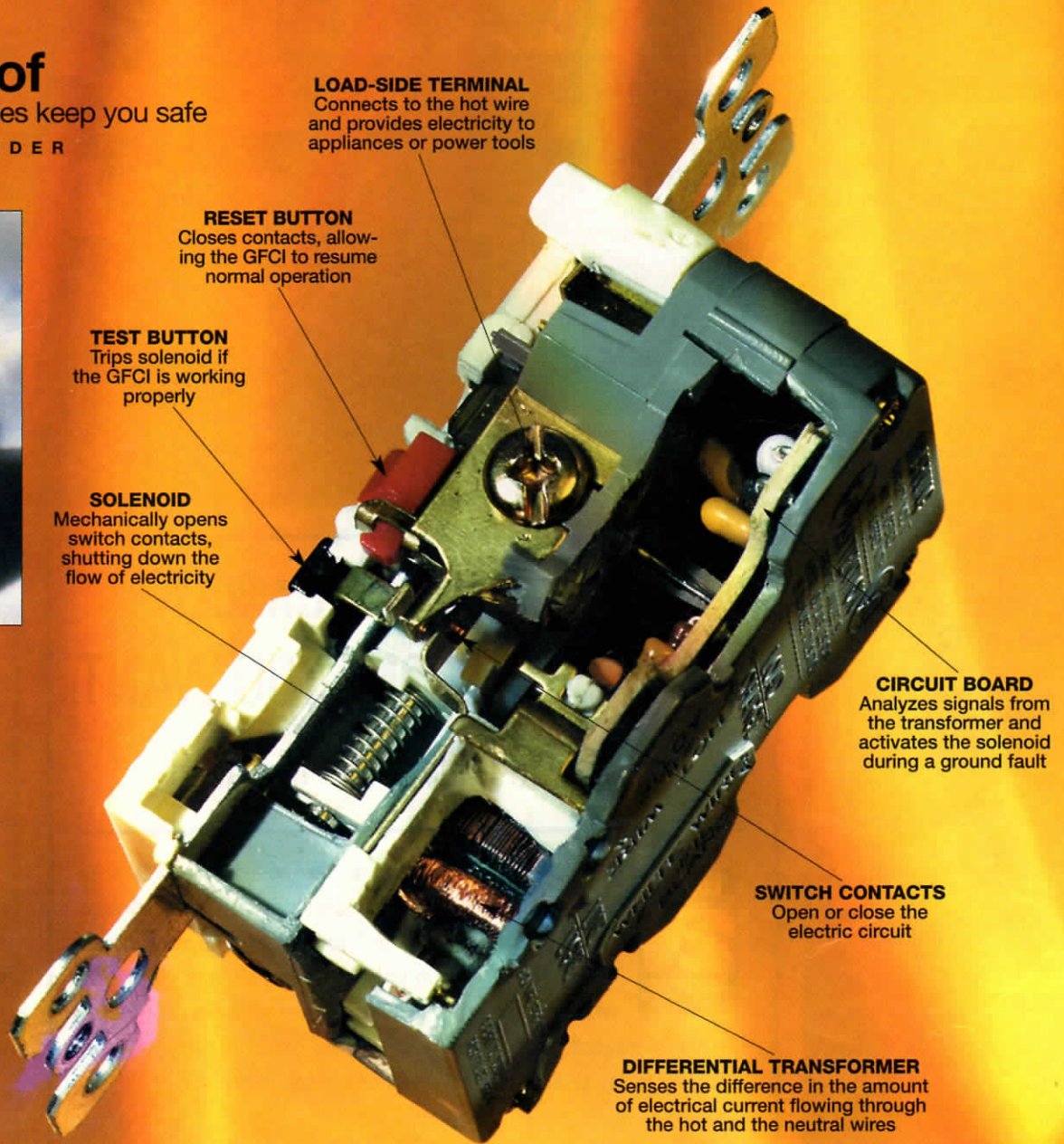


Shockproof

How GFCI receptacles keep you safe

BY MAX ALEXANDER



LOAD-SIDE TERMINAL
Connects to the hot wire and provides electricity to appliances or power tools

RESET BUTTON
Closes contacts, allowing the GFCI to resume normal operation

TEST BUTTON
Trips solenoid if the GFCI is working properly

SOLENOID
Mechanically opens switch contacts, shutting down the flow of electricity

CIRCUIT BOARD
Analyzes signals from the transformer and activates the solenoid during a ground fault

SWITCH CONTACTS
Open or close the electric circuit

DIFFERENTIAL TRANSFORMER
Senses the difference in the amount of electrical current flowing through the hot and the neutral wires

A ground fault happens whenever electricity escapes the confines of the wiring in an appliance, light fixture, or power tool and takes a shortcut to the ground. When that shortcut is through a human, the results can be deadly. About 200 people in the U.S. alone die of ground faults each year, accounting for two thirds of all electrocutions occurring in homes.

To prevent such accidents, Charles Dalziel, a professor of electrical engineering at the University of California, invented the ground-fault circuit interrupter (GFCI), in 1961. Most of the time, his invention does nothing; it just monitors the difference in the current flowing into and out of a tool or appliance. But when that difference exceeds 5 milliamps, an indication that a ground fault may be occurring, the GFCI shuts off the flow in an instant—as little as .025 second.

GFCIs are required by the National Electric Code in all new kitchens, bathrooms, crawl spaces, unfinished basements, and most outdoor receptacles. Owners of older houses can retrofit \$10 GFCI receptacles (shown) at those locations or have GFCI breaker switches (which run as much as \$108 for 50-amp models) mounted in the main breaker panel. Portable GFCI adapters, which plug into regular wall receptacles, are available for about \$40.

“The great thing about GFCIs is that they protect you whether or not your wiring is grounded,” says Bill Grande, manager for safety products at Leviton, a manufacturer of GFCIs. Because lightning and other power surges can damage a GFCI’s delicate circuitry at any time, Grande recommends the following monthly test: Plug in a light fixture and turn it on. Then push the device’s test button. If the light stays on, the GFCI needs to be replaced.

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