



## GROUND FAULT CIRCUIT INTERRUPTERS

**T**here is a common misconception by the general public that a circuit breaker is a personal safety device. Circuit breakers are in place to protect equipment, wiring, and circuitry. Ground Fault Circuit Interrupters, or GFCIs, were invented to protect people. The following information affords insight into the value and use of ground fault circuit interrupters.

**Definition:** A GFCI (Ground Fault Circuit Interrupter) is a device that is designed to protect personnel against electrocution. The device immediately shuts off power when it senses a difference in current between the two circuit conductors. Since the original introduction of the GFCI in the 1971 Code, these devices have proven to their users and the electrical community that they are worth the added cost during construction or remodeling.

**P**ublished data from the Consumer Product Safety Commission show a decreasing trend in the number of electrocutions in the United States since the introduction of GFCI devices. Unfortunately, no statistics are available for the actual number of lives saved by GFCI devices. However, most would agree that the number of saved lives and prevented injuries are substantial.

**F**igure 210.8 shows a typical circuit arrangement of a GFCI for personnel protection. The line conductors are passed through a toroidal coil and connected to a shunt-trip device.

**A**s long as the current in each conductor remains equal, the device remains in a closed position. If one of the conductors comes in contact with a grounded object, either directly or through a person's body, resulting in an unbalanced current. The toroidal coil senses the unbalanced current, and a circuit is established to the shunt-trip mechanism that reacts and opens the circuit. Note that the circuit design does not require the presence of an equipment-grounding conductor.

**A** variety of GFCIs are available, including portable and plug-in types and circuit-breaker types, types built into attachment plug caps, and receptacle types. Each has a test switch so that the unit can be checked periodically to ensure proper operation.