News Your Customer Can Use

by

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What is a GFCI & AFCI

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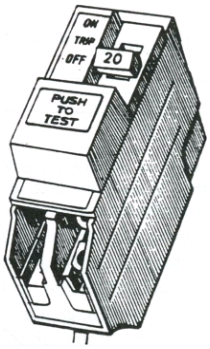
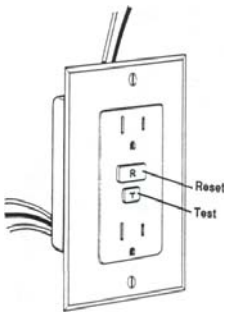
The following information is deemed reliable but should not be your sole source for decisions you make. Copies of this article and many more topics can be down loaded from my web site. 9/2006

A Ground Fault Circuit Interrupter (GFCI) is a safety device that senses a shock hazard and interrupts the flow of electricity in the circuit. The GFCI is designed to trip and interrupt the circuit at approximately 5 to 8 milliamps (MA). The standard fuses and breakers are not as sensitive and therefore slower in reacting. The purpose is to protect against electrocution in areas where a person is susceptible to grounding hazards, such as wet locations and when using equipment outside.



The circuit breaker type is installed in the electric panel and protects selected circuits. Although there are limits to the number of outlets protected sometimes a single wire will run from the breaker, through the house, to bathrooms, kitchens and outside locations protecting each of theses sites.



The receptacle type is used in place of the standard duplex receptacles found throughout the house. Some GFCI's may protect other outlets down line in the same circuit. Off times the protected outlets will be in different rooms. For example if an outlet in a patio does not work you should check other locations such as baths or the garage for a tripped GFCI which protects the entire circuit. It is important to **protect exterior outlets** with proper covers. Theses locations can be susceptible to moisture and can trip outlets at locations becoming a nuisance.

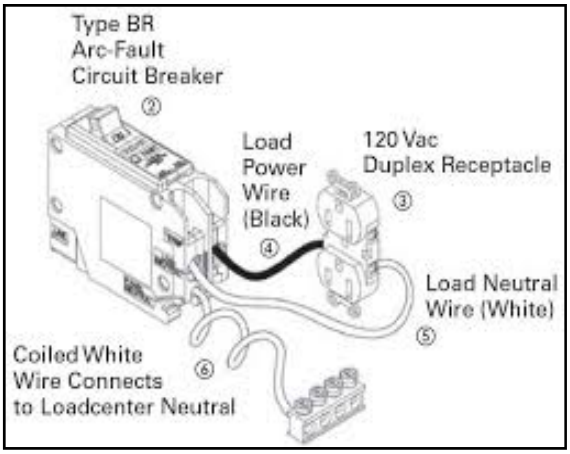
Why don't they work?

Unofficial survey by Home Inspectors reveled that 25% to 35% of GFCI type outlets were not functioning properly at the time of inspections. They are sensitive electronic equipment typically found in wet locations and need to be properly connected to the electric wirings. Some outlets provided power but not the desired protection creating a hidden hazard.

Some years ago they were redesigned so that if they are not providing proper protection they would not supply power. Unfortunately they still have the tendency to fail sooner than standard outlets. The cost of GFCI units has dropped over the years. This is why in newer houses most outlets are individual protected rather than run from a circuit breaker in the panel box or other outlet as described above.

What is an AFCI?

The function of the GFCI is to protect people from the deadly effects of electric shock. The function of the AFCI is to protect the branch circuit wiring from dangerous arcing faults that could initiate an electrical fire. An electric "arch" occurs when electricity jumps through the air from one point to the other. They can occur when wires become frayed or damaged and this can cause fires in residential dwellings. Conventional circuit breakers do not detect low level arcing that has the potential to initiate electrical fires. An AFCI is a product that is designed to detect a wide range of arcing electrical faults and a higher lever of protection than standard circuit breakers and thus help reduce the electrical system from being an ignition source of a fire. The 2005 NEC® states that AFCIs must be placed on bedroom power and lighting circuits.



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Where do I need a GFCI?

In 1971 GFCI's were first required in exterior locations and over the years the required locations have changed almost yearly. On porches the requirement was created in 1973 deleted for some locations in 1978 and changed back to all locations in 1996. Presently they are required in all wet locations.

When remolding outlets must comply to current code and it is suggested that all areas of potential hazard be upgraded.

The chart below was produced by Jerry Peck & Norm Sage whom both of whom hold multiple qualifying licenses and held many elected positions in the Florida Association of Building Inspectors. Consider using their services for you inspection needs in the South Palm Beach to Miami area.

GFCI History Chart

By Jerry Peck (BN003269) and Norm Sage (BN001933)

The following GFCI History Chart has been updated with the new 2005 NEC requirements

DWELLING UNIT
120 volt GFCI Protected Receptacle Outlets—REQUIRED LOCATIONS

DATE OF NEC EDITION	SWIMMING POOLS	SPAS HOT TUBS	EXTERIOR	BATHROOMS	GARAGE	HYDRO TUBS MASSAGE	BOATHOUSES	KITCHEN	UNFINISHED BASEMENTS	CRAWLSPACE	WET BAR	LAUNDRY UTILITY
1971	X1b		X2									
1975	X1a		X	X								
1978	X1a		X3a	X	X4							
1981	X1a	X5a,b	X3a	X	X4							
1984	X1b	X5b	X3a	X	X4							
1987	X1b	X5b,c	X3a	X	X4	X5b	X	X6a	X7a			
1990	X1b	X5b,c	X3a	X	X4	X5b	X	X6a	X7b	X		
1993	X1b	X5b,c	X3a	X	X4	X5b	X	X6a	X7b	X	X8	
1996	X1c	X5b,c	X3b	X	X4, 9a	X5b	X	X6b	X7b,c	X	X8	
1999	X1c	X5b,c	X3b	X	X4, 9b	X5b, 10	X	X6b	X7b,c	X	X8	
2002	X1c	X5b,c	X3b	X	X4, 9b	X5b, 10	X	X6b	X7b,c	X	X8	
2005	X1c	X5b,c	X3b	X	X4, 9b	X5b, 10	X	X6b	X7c,d	X	X11	X11

Compiled by Jerry Peck and Norm Sage

With special thanks to Tarry Baker, Chief Electrical Code Compliance Officer, Broward County, Florida for all his time and input

1a. All receptacles outlets within 15 feet of the water, in any direction (also see EXTERIOR).
1b. All receptacles outlets within 20 feet of the water, in any direction (also see EXTERIOR).
1c. All receptacles outlets within 20 feet of the water, in any direction (also see EXTERIOR), receptacles for pump within 10 feet (but at least 5 feet) of inside of pool walls.
2. Effective January 1, 1973.
3a. Changed to 'with direct grade access to dwelling and outlets' in 1978. Direct grade access was defined in 1987 as 6 feet 6 inches or less above grade.
3b. Changed back to ALL dwelling unit exterior outlets in 1996; except an outlet for snow melting equipment IF on a dedicated circuit and NOT readily accessible.
4. All, except outlets not readily accessible (6 feet 8 inches? or higher) and outlets for dedicated appliances which are not easily movable (freezer, refrigerator, etc.).
5a. Outdoor spa, receptacles within 15 feet / Indoor spa, receptacles within 20 feet.
5b. Receptacles for motor and electrical equipment.
5c. Indoor spa or hot tub, receptacles within 10 feet, receptacles must be at least 5 feet from inside wall of spa.
6.a Outlets within 6 feet of kitchen sink to serve as counter top outlets, outlets not to be installed face up in work surfaces and counter tops.
6b. All outlets which serve as counter top outlets, except outlets for refrigerator or freezer.
7a. At least one, which must be identified as being GFCI protected.
7b. Changed to all receptacles in unfinished basements and crawl spaces, except: laundry, sump pump, refrigerator or freezer.
7c. Except where not readily accessible.
7d. Changed to all receptacles in unfinished basements, except: laundry appliances, refrigerator or freezer, or permanently installed burglar or fire alarm.
8. Outlets within 6 feet of wet bar sink to serve as counter top outlets, outlets not to be installed face up in work surfaces and counter tops.
9a. Unfinished accessory buildings are treated like garage.
9b. Accessory buildings that have a floor located at or below grade and not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use.
10. Receptacles within 5 feet.
11 Outlets within 6 feet of sink.

IT IS BEST TO INSTALL GFCI PROTECTION TO MEET, THE MOST CURRENT CODE, ALL WET AREAS, AREAS SUBJECT TO BECOMING WET, AND AREAS OF POTENTIAL ELECTRICAL SHOCK.