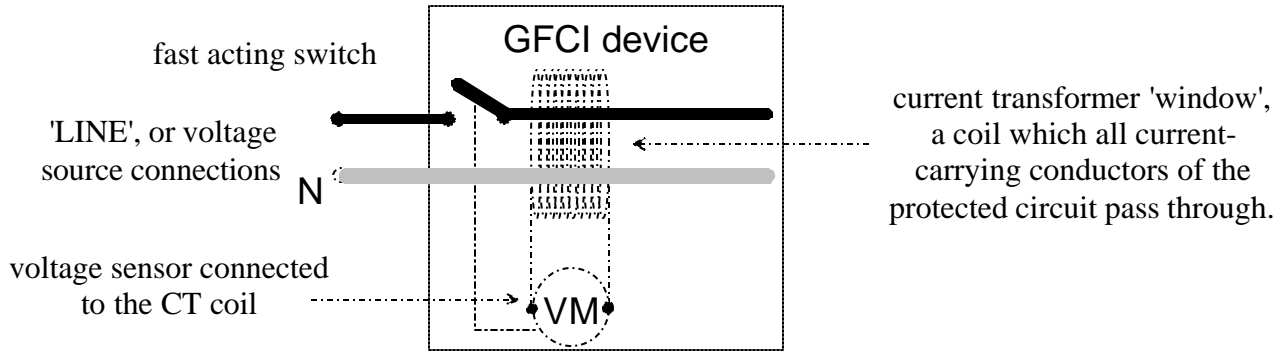
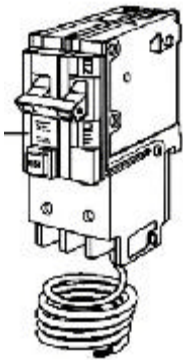
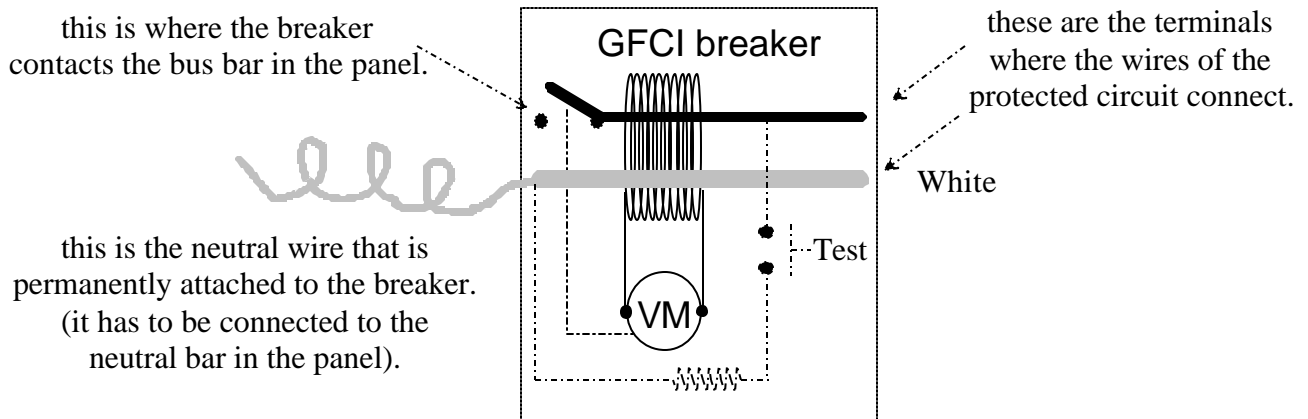


## More Information About GFCIs and AFCIs

Every GFCI device has the same basic components, and the same operating principle.  
(see article on GFCI Theory)



In a GFCI Breaker . . .



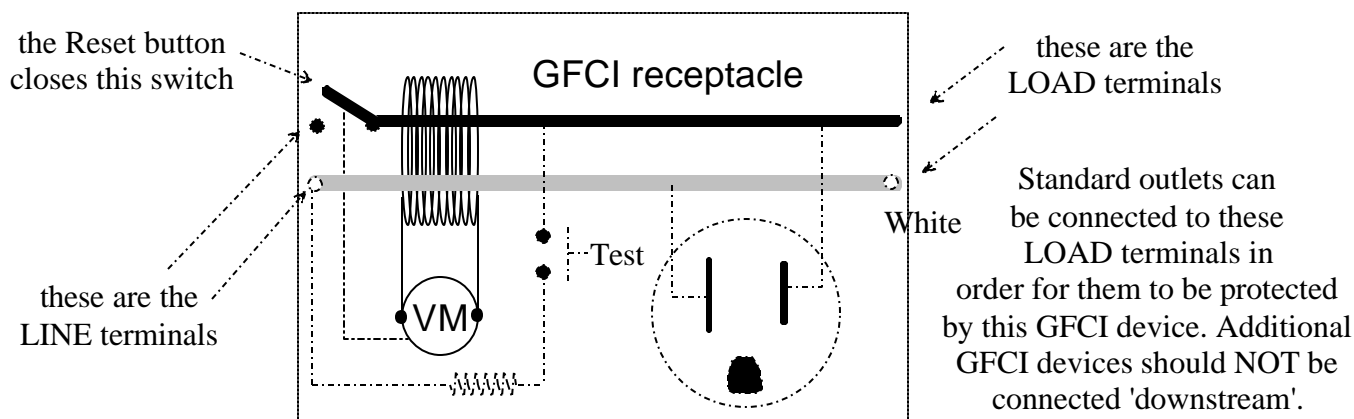
This GFCI illustration is a 2-pole breaker, typical of the kind used in hot tubs and spas. GFCI breakers have a permanently attached white wire that must be terminated on the neutral bar in the panel. The white wire, (neutral), of the protected circuit cable must be connected to the breaker. This allows all of the current-carrying conductors of the circuit to be routed through the CT coil of the breaker. When the Test button is pushed, a small current flows through a resistor, around the current transformer to the neutral, to simulate a ground fault, and the breaker trips. This breaker will also trip if its current rating is exceeded for more than a few seconds.

## The Arc Fault Circuit Interrupter



The Arc Fault Circuit Interrupter is very similar to a GFCI in appearance, but it contains a very high-tech microprocessor that constantly monitors the current waveform as electricity passes through the breaker. The control circuit in the AFCI is capable of 'tripping' the breaker when the microprocessor detects certain current waveforms that are associated with line-to-neutral arcing. A GFCI can protect personnel from ground faults, but if the fault is line-to-neutral, the same current passes through both of the intended conductors of the circuit, and there is no magnetic imbalance. The AFCI acts like an electronic oscilloscope programmed to open the circuit breaker when it identifies particular current waveforms. AFCI protection of bedroom circuits is required by the 2002 NEC, but these devices have yet to be time-tested and refined by the manufacturers.

## GFCI Receptacles



If there are no outlets being protected 'downstream' from this GFCI, no wires are connected to the LOAD terminals, and the GFCI is a 'stand alone' device. Multiple GFCI receptacles can be connected to a single circuit as long as each device is connected in a 'stand alone' configuration, and none of them are connected 'downstream' from the load terminals of another.

Got Questions?

e-mail your questions to [a.step@comcast.net](mailto:a.step@comcast.net)