

NEUTRAL AND HOT WIRES

Current flows from the panel toward the load along the hot wires and returns along the neutral. Each hot wire's copper tip ultimately connects to its control switch at the circuit breaker, and each neutral connects to a common terminal called a bus bar.

BREAKER SIZES

Main breaker

This is the on/off switch to the entire breaker panel. A 200-amp breaker is appropriate for a home upwards of 2000 square feet. Smaller buildings can use 150-amp or 100-amp; small homes and subpanels can use as little as 50-amp.

Double-pole breaker

Uses the entire 240 volts available to the panel. The 15-amp and 20-amp breakers often handle baseboard heaters, 30-amp serve water heaters and electric dryers, 40- and 50-amp are for electric ranges, and the 70-amp could serve a large air conditioner or a subpanel.

Single-pole breaker

The 15-amp and 20-amp are all-purpose breakers, running everything from lights and outlets to garage-door openers.

15-amp AFCI breaker

Arc fault circuit-interrupter breakers can prevent fires caused by accidental electrical discharge.

HOW ELECTROCUTION HAPPENS

Ventricular fibrillation, the erratic, lethal spasm that occurs as electric current passes through the heart, happens when both of a person's hands touch hot and neutral conductors, causing the current to complete its circuit through the chest. In a ground fault, current can flow into a single hand, zapping the heart as it passes through the body on its way to the ground. When changing live fuses in the old days, electricians worked with one hand while keeping the other in their back pocket—this spared the heart by isolating the current to the nerves of the one hand in the fuse box.

WIRE GAUGE

12-gauge wire

Common for low-demand connections to light switches and outlets, attached to either 15- or 20-amp breakers.

14-gauge wire

Too thin for anything other than 15-amp breakers under small loads.

10-gauge wire

Appropriate for a two-pole 20-amp breaker or a single-pole 30-amp breaker.

8-gauge or 6-gauge wire

Used for 40-, 50- and 60-amp two-pole breakers; large appliances. Also used to serve subpanels.

GROUND WIRES

Grounding prevents a conductor not meant to carry current (such as the metal side of a clothes dryer) from causing injury if it's energized by a frayed hot wire. In a properly grounded system, appliances and metal boxes connect back to the grounding bus of the breaker panel. From there, the system is grounded to the earth via buried ground rods.

STANDARD RESIDENTIAL PANEL
200-amp
30-breaker
240-volt service