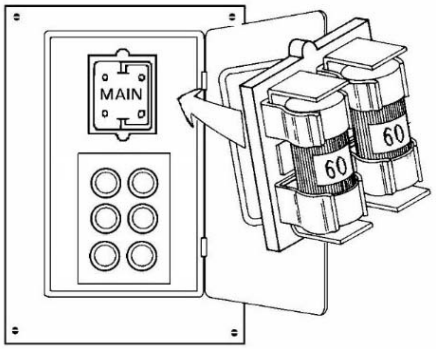
HOMEOWNER REPAIR GUIDE

SOME ELECTRICAL "BASICS"

For do-it-yourself or contracted repairs

THE SERVICE PANEL



Cartridge main box with 6 circuits

Every house should have an **electric service panel** with a **main shutoff**, whether circuit breakers or fuses are used (cartridge main box with 6 circuits shown). The number of circuits will vary with the electrical loads in the house.

The National Electric Code (NEC) states that 240 volt/100 amp service is the minimum standard for residential usage. All new electrical work must be grounded to conform to the electric code.

PROTECTION	WHERE IT IS REQUIRED
Ground Fault Circuit Interrupters (GFCI)	All outdoor outlets, bath outlets, most kitchen outlets and basement outlets are to be protected by Ground Fault Circuit Interrupters (GFCI).
Arc Fault Circuit Interrupters (AFCI)	New work in other living areas of the house is to be protected by Arc Fault Circuit Interrupters (AFCI).

WIRE COLORS

Ideally –

WIRE COLOR	FUNCTION
Black	“Hot”
White	“Neutral”
Green or bare	“Ground”

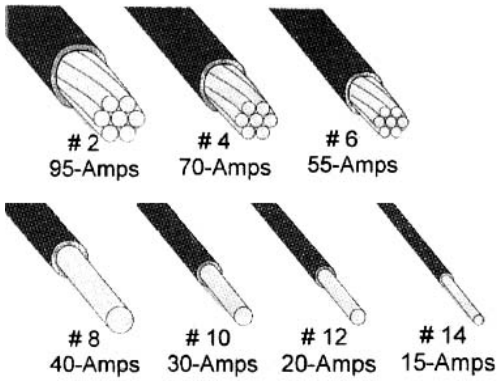
ALWAYS CHECK – DON'T ASSUME!

But, with old knob-and-tube wiring (common in houses built prior to the 1950s), all of the wires may be black.

SIZING FUSES AND BREAKERS

All fuses or circuit breakers used must be sized for the wire for which they are used – and the load on the circuit. Each wire size has a number (gauge) which corresponds to a **rated ampere load** that determines the **"total watts"** that can be used on that circuit (see wire chart).

The maximum wattage permitted for 12-gauge wire is 2400 watts, with a 20-amp fuse or circuit breaker; for 14-gauge wire, 1800 watts, with a 15-amp fuse or circuit breaker.



Wire chart: gauge and rated ampere load

OLD KNOB-AND-TUBE CIRCUITS

Unless you can determine the wire size, it's safest to assume any old knob-and-tube circuits to be 14-gauge, to prevent using too high a fuse.

FORMULAS FOR COMPUTING ELECTRICAL LOADS

FORMULA	EXAMPLE
Volts times Amperes = Wattage	120V x 15A = 1800W
Watts divided by Volts = Amperage	1800W ÷ 120V = 15A
Watts divided by Amperes = Voltage	1800W ÷ 15A = 120V

DEDICATED CIRCUITS



Circuit breakers and screw-in fuses

Many household appliances use so much current that they are required by the code to be on "dedicated" circuits to prevent nuisance tripping of the circuit breakers. A dedicated circuit means that a single item is on the circuit. For example, a forced-air gas furnace should be on its own separate 20-amp circuit. Although the blower motor, when running, is rated at 1600 watts, a surge of 2200 watts is needed to get it to start spinning. If another appliance is drawing power from the same circuit as the furnace when it starts, the circuit breaker will trip.

Home Repair Resource center

Home Repair Resource Center empowers homeowners to maintain their homes for sustainable and diverse communities.

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