LEWIS HOME INSPECTION

LHI

ELECTRIC

Reference Guide

MEMBER

WHAT IS ELECTRICITY

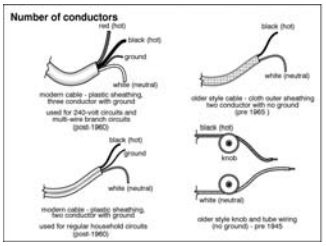
Think of a pipe or a garden hose. When you turn on the water, it moves through the pipe and out the faucet or hose end. In a similar way, you can think of electricity as a current of very tiny particles (electrons) flowing inside a wire and through a light bulb or an appliance that's been switched on. Home wiring is fundamentally a matter of transporting this current in a safe, efficient manner. Associated with this flowing current are some basic terms that electricians often work with.

VOLTS: Water inside a hose moves because it's under pressure from the water behind it. Likewise, electricity is also under pressure, and the force causing the current to flow is measured in volts. The utility company sets the household voltage level.

AMPERES: The amount of current that flows past a given point in one second is measured in amperes (amps). Amps are basically a function of wire size; the larger the wire, the higher the potential current-carrying capacity.

WATTS: The energy per second consumed by a light bulb or an appliance is expressed in watts. Household electrical usage is usually figured in kilowatt-hours (units of 1,000 watts multiplied by the time of usage in hours). The relationship between these three basic units is represented in this formula: volts x amps = watts. If you know two of these values, you can figure the third by multiplying or dividing. Some examples: A 20-amp circuit at 120 volts can deliver 2,400 watts; a microwave oven that uses 1,000 watts of 120-volt power consumes 8.3 amps; a 240-volt clothes dryer that pulls 5,600 watts of power requires at least a 23.3-amp circuit.

CONDUCTORS: The general term "conductor" applies to anything that permits, or conducts, the flow of electricity.

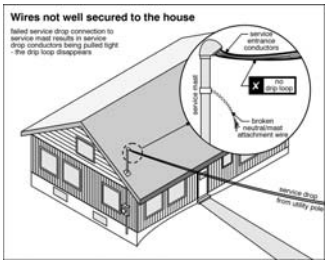


Electricity flows in the path of least resistance, and certain materials allow energy to flow more freely than others. Copper, for example, is a good conductor; most wires are made of copper, although aluminum and copper-clad aluminum wires are also used.

RESISTANCE: This is the property of an electric circuit that restricts the flow of current. Electrical resistance or impedance is measured in ohms.

ELECTRIC SERVICE

In older development or rural areas, the utility company provides power to homes through overhead conductors called the service drop. In urban areas and newer developments, the power comes to the house underground and is called a service lateral.



Typically the owner is responsible, through his or her electrical contractor, for maintaining the electrical system throughout the house up to the utility company connections which are generally just before the meter.

SERVICE SIZE

An electrician can determine the amperage of the service coming into the home. With heavy electrical demands in homes today, any service which is less then 100 amps and 120/240 volts may be considered inadequate. The exception is apartments and condos. A home with all electric appliances, water heater and central air conditioning may require 150 amps. If the home is heated by electricity, it may require 200 amps.

If the house is over 40 years old, and the electric has not been upgraded the chances are that the amount of power being supplied is inadequate. Some of the signs of

inadequate service are as follows:
1. The main panel is fused instead of breakers.
2. Fuses or breakers trip often.
3. Lights flicker or dim when appliances are utilized.
4. Extension cords are required in many areas in of the home.

THE METER

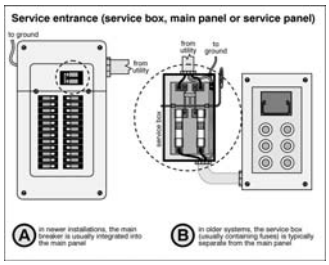
Electric usage is measured in units called watts. Watts are equivalent to the number of volts times the number of amps. The power company charges by the number of watts registered on the meter. The meter may be located inside in older homes and outside the newer homes.

THE MAIN PANEL

The main distribution panel is the heart of the electrical system. The panel is usually located in the basement or garage. The service disconnect can be an integral part of this panel, or it can be in a panel near the meter. Up to six disconnects are allowed to shut off all the power in the home. The homeowner must know the location of all service disconnects and understand how to use them.

WHEN THE ELECTRICITY GOES OUT?

Nearly everyone has experienced a power failure once or twice. When this happens, the first thing to do is determine whether the problem lies in your house's system or is a utility company outage. If the whole house is out and it looks like your neighbors have lost power too, call the utility company. If any of your homes electrical power works-receptacles or lights in another room, for example, the problem is with your own system.



The problem is generally caused by an overloaded circuit, a short circuit or loose wiring. If the problem occurred when someone was using a hair dryer, electric heater or some other device that draws a lot of current, it was probably caused by a simple overload. If the circuit is overloaded, a circuit breaker should have tripped or a fuse should have blown.

Check the sub-panel or main panel that serves the circuit. If the problem isn't that simple, turn off or unplug everything from the troubled circuit. Then reset the breaker or replace the fuse. If the circuit blows immediately, there is probably a charred wire or defective device in the circuit that will require replacement. If it doesn't blow, turn lights back on and plug in appliances one at a time to check for the overload or short circuit. If the lights or receptacles still don't work call an electrician.

FUSES AND BREAKER

Fuses are commonly found in homes over 50 years old. They have to be replaced when they blow off. Breakers are used in newer homes and can be reset when they trip off. There is a maximum current of amperage that can be carried safety by each size and type of wire used in a home. Fuses and breakers must be the correct amperage in order to properly protect each circuit.

SERVICE GROUND

Every electric service must be grounded so that electricity from a lightening strike or a power surge will be harmlessly discharged into the earth rather than into the home. System grounding is achieved by connecting the neutral wires from all the electrical circuits to a grounding rod or a buried metal water supply pipe.

OUTLETS

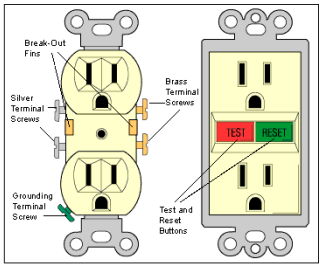
Outlet should be available for convenience, one for every 12 feet of running wall space, or one on each wall of the average 10 to 12 foot room. The reason is to avoid the use of extension cords, which can become worn, broken, or cause a fire. In the kitchen, there should be 20 amp appliance circuits with outlets serving counters one for every four feet of running wall space.

New homes are equipped with grounded three slot outlets. Grounding is installed to provide a safe path for electricity to return to the electrical panel if it gets out of its intended path.

Many older homes have two slot outlets. If you only use appliances with two prong plugs, it isn't necessary to upgrade. Any appliance with three prong plug needs a properly grounded three slot outlet. Sometimes an electrician can easily upgrade outlets; other times rewiring may be required.

GROUND FAULT INTERRUPTERS

Even if a system is properly grounded, minor faults in a circuit can cause dangerous shock to person using an electrical appliance in a damp location or near water.



Ground Fault Interrupters are now required in damp locations such as, kitchens/bar countertops, swimming pools, unfinished basements, garages, accessory buildings, crawlspaces and exterior receptacles.

Check the sub-panel or main panel that serves the circuit. If the problem isn't that simple, turn off or unplug everything from the troubled circuit. Then reset the breaker or replace the fuse. If the circuit blows immediately, there is probably a charred wire or defective device in the circuit that will require replacement. If it doesn't blow, turn lights back on and plug in appliances one by one to check for the overload or short circuit. If the lights or receptacles still don't work call an electrician.

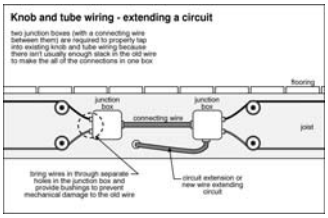
CONDUCTORS

Most homes are wired with copper wire. Aluminum wiring was widely used in residential construction from 1960 to the mid 1970s. The wire can be identified by its dull silver color. This should not be confused with older tin coated copper wiring.

Homes with solid aluminum wire have a greater potential of having hazardous conditions. Some of the problems are as follows:

1. Expand and contracts at different rates than copper creating loose connections.
2. Tendency to oxidize.
3. Incompatibility with the switches and outlets that were designed to be used with copper.
4. Unusually warm or warped outlets or switches.
5. Smoke or snapping noise coming from outlets and switches.
6. Plastic burning odors in the area of outlets and switches.
7. Intermittent operation of a switch or outlet.

In older homes, the conductors sometimes are not enclosed in jackets, but run as pairs of wires supported by porcelain insulators. This wiring is called Knob and Tube. Modern wire such as Romex or BX wire has double insulation. The single insulation on the Knob & Tube wiring can fray or fall off over time creating a hazardous condition.



Many insurance companies have started limiting or restricting insurance on homes found to have Aluminum or Knob & Tube wiring. The aluminum wire can be corrected with a process called pig tailing. The Knob & Tube wire may require rewiring of the home.