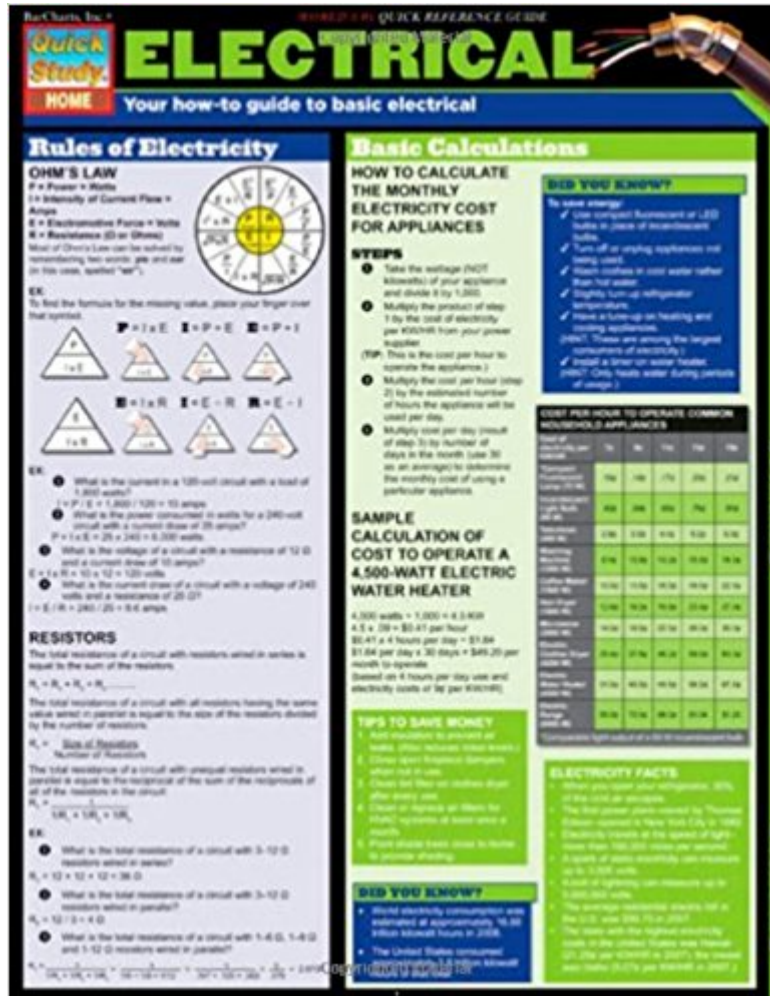


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# Electrical (Tri-Fold Laminated Chart)



**Quick Study HOME** **ELECTRICAL** Your how-to guide to basic electrical

### Rules of Electricity

**OHM'S LAW**  
 $P = \text{Power} \times \text{Watts}$   
 $I = \text{Intensity of Current Flow} \times \text{Amperes}$   
 $E = \text{Electromotive Force} \times \text{Volts}$   
 $R = \text{Resistance} \times \text{Ohms}$

Most of Ohm's Law can be solved by remembering two words: give and get (in this case, spelled "WAT").

**OHM'S LAW WHEEL**

**EX:** To find the formula for the missing value, place your finger over that symbol.

$P = I \times E$     $I = P \div E$     $E = P \div I$

$E = I \times R$     $I = E \div R$     $R = E \div I$

**EX:**

- What is the current in a 120-volt circuit with a load of 1,200 watts?  
 $I = P \div E = 1,200 \div 120 = 10 \text{ amperes}$
- What is the power consumed in watts for a 240-volt circuit with a current draw of 20 amperes?  
 $P = I \times E = 20 \times 240 = 4,800 \text{ watts}$
- What is the voltage of a circuit with a resistance of 12 Ω and a current draw of 10 amperes?  
 $E = I \times R = 10 \times 12 = 120 \text{ volts}$
- What is the current draw of a circuit with a voltage of 240 volts and a resistance of 20 Ω?  
 $I = E \div R = 240 \div 20 = 12 \text{ amperes}$

### RESISTORS

The total resistance of a circuit with resistors wired in series is equal to the sum of the resistors.

$$R_t = R_1 + R_2 + R_3 \dots$$

The total resistance of a circuit with all resistors having the same value wired in parallel is equal to the size of the resistors divided by the number of resistors.

$$R_t = \frac{\text{Size of Resistor}}{\text{Number of Resistors}}$$

The total resistance of a circuit with unequal resistors wired in parallel is equal to the reciprocal of the sum of the reciprocals of all of the resistors in the circuit.

$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \dots$$

**EX:**

- What is the total resistance of a circuit with 3-12 Ω resistors wired in series?  
 $R_t = 12 + 12 + 12 = 36 \Omega$
- What is the total resistance of a circuit with 3-12 Ω resistors wired in parallel?  
 $R_t = 12 \div 3 = 4 \Omega$
- What is the total resistance of a circuit with 1-4 Ω, 1-4 Ω and 1-12 Ω resistors wired in parallel?  
 $\frac{1}{R_t} = \frac{1}{4} + \frac{1}{4} + \frac{1}{12} = \frac{3}{12} + \frac{3}{12} + \frac{1}{12} = \frac{7}{12}$   
 $R_t = \frac{12}{7} = 1.71 \Omega$

### Basic Calculations

**HOW TO CALCULATE THE MONTHLY ELECTRICITY COST FOR APPLIANCES**

**STEPS**

- Take the wattage (NOT kilowatts) of your appliance and divide it by 1,000.
- Multiply the product of step 1 by the cost of electricity per kWh from your power supplier.
- Multiply the cost per hour (step 2) by the estimated number of hours the appliance will be used per day.
- Multiply cost per day (result of step 3) by number of days in the month (use 30 as an average) to determine the monthly cost of using a particular appliance.

**DID YOU KNOW?**

- To save energy:
  - Use compact fluorescent or LED bulbs in place of incandescent bulbs.
  - Turn off or unplug appliances not being used.
  - Wash clothes in cold water rather than hot water.
  - Always turn up refrigerator temperature.
  - Point a fan up on heating and cooling appliances.
  - Direct. These are among the largest consumers of electricity.
  - Install a timer on water heaters.
  - PROT Only flush water during periods of water.

**COST PER HOUR TO OPERATE COMMON HOUSEHOLD APPLIANCES**

Appliance	10¢	15¢	20¢	25¢	30¢
Refrigerator (100W)	0.01	0.015	0.02	0.025	0.03
Freezer (150W)	0.015	0.0225	0.03	0.0375	0.045
Washing Machine (300W)	0.03	0.045	0.06	0.075	0.09
Dishwasher (1,200W)	0.12	0.18	0.24	0.30	0.36
Water Heater (4,500W)	0.45	0.675	0.90	1.125	1.35
Electric Range (1,500W)	0.15	0.225	0.30	0.375	0.45
Electric Dryer (3,000W)	0.30	0.45	0.60	0.75	0.90
Space Heater (1,500W)	0.15	0.225	0.30	0.375	0.45
Incandescent Light Bulb (60W)	0.006	0.009	0.012	0.015	0.018

**SAMPLE CALCULATION OF COST TO OPERATE A 4,500-WATT ELECTRIC WATER HEATER**

4,500 watts = 4,500 ÷ 1,000 = 4.5 kWh  
 4.5 × 30 = \$0.45 per hour  
 \$0.45 × 4 hours per day = \$1.80  
 \$1.80 per day × 30 days = \$54.00 per month to operate  
 Based on 4 hours per day use and electricity costs of 30¢ per kWh (10¢).

**TIPS TO SAVE MONEY**

- Add insulation to attics and basements.
- Use energy-efficient light bulbs.
- Use energy-efficient refrigerators.
- Check hot water tank combustion draft after every use.
- Use hot water sparingly.
- Use hot water only when needed.
- Point a fan back down to reduce moisture buildup.

**DID YOU KNOW?**

- World electricity consumption was estimated at approximately 16.20 trillion kilowatt hours in 2008.
- The United States consumed approximately 3.6 trillion kilowatt hours in 2008.

**ELECTRICITY FACTS**

- The average American consumes 30% more electricity than the average European.
- The first power plant powered by Thomas Edison in 1882 was a 100-horsepower, 110-volt, direct-current plant in New York City.
- A single drop of water (approximately one inch in diameter) can produce up to 100,000 kWh of electricity.
- The average American consumes 10% of the electricity used in the United States.
- The United States consumed 27.236 billion kilowatt hours in 2007. The average American consumes 10,000 kWh per year.



## Synopsis

For the professional electrician or anyone looking to have basic electrical knowledge, this 3-panel (6-page) guide is a handy resource to have at the ready. Color-coded sections feature comprehensive, easy-to-understand information on receptacles, conductors, wires and other electrical elements. In addition, each section is enhanced by charts, illustrations, diagrams, formulas and equations. Safety rules are indicated with easy-to-spot icons.

## Book Information

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## Customer Reviews

This study guide has information, formulas, and tips about home wiring (such as installing switches, receptacles, lights, etc.) as well as additional info like smoke detector installation locations and power consumption cost of various appliances. Being only 6 pages long, this guide is not comprehensive but it's a useful primer. But as always: if you're not totally sure about what you're doing, don't risk causing a fire or an electrocution; call an electrician. It's laminated and has 3 holes to fit in a 3-ring binder.

great product

I like everything about it! The data, all arranged so very well, the plasticized form, and the layout!! love the ability to have so very much essential data in so convenient a media.Keep it up! Find more subjects chart. Keep expanding your base!Jim Mendel

Perfect for studying and doing quick calculations for residential wiring! Saves me the trouble of opening NEC or other textbook frequently!

I loved this product

Quick reference guide of the basics

Small print but is good fit to have in notebook or binder.

Electrical reference worth having !!!!!!!!!!!!!

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