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Electrical (Tri-Fold Laminated Chart)

BasCharts, Inc. • QUICK REFERENCE GUIDE

Quick Study ELECTRICAL

HOME Your how-to guide to basic electrical

Rules of Electricity

OHM'S LAW

$P = \text{Power} = \text{Watts}$
 $I = \text{Intensity of Current Flow} = \text{Amperes}$
 $E = \text{Electromotive Force} = \text{Volts}$
 $R = \text{Resistance (Ω or Ohms)}$

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

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

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

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

EX: What is the current in a 120-volt circuit with a load of 1,800 watts?
 $I = P \div E = 1,800 \div 120 = 15 \text{ amperes}$

What is the power consumed in watts for a 240-volt circuit with a current draw of 25 amperes?
 $P = I \times E = 25 \times 240 = 6,000 \text{ watts}$

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 25 Ω?
 $I = E \div R = 240 \div 25 = 9.6 \text{ amperes}$

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?
 $R_t = 12 + 12 + 12 = 36 \text{ Ω}$

What is the total resistance of a circuit with 3-12 Ω resistors wired in parallel?
 $R_t = 12 \div 3 = 4 \text{ Ω}$

What is the total resistance of a circuit with 1-6 Ω, 1-8 Ω and 1-12 Ω resistors wired in parallel?
 $\frac{1}{R_t} = \frac{1}{6} + \frac{1}{8} + \frac{1}{12} = \frac{2}{3} + \frac{1}{8} + \frac{1}{12} = \frac{16}{24} + \frac{3}{24} + \frac{2}{24} = \frac{21}{24} = \frac{7}{8}$
 $R_t = \frac{8}{7} = 1.14 \text{ Ω}$

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.
- This is the cost per hour to operate the appliance.
- 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.

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 × \$0 = \$0.41 per hour
 \$0.41 × 4 hours per day = \$1.64
 \$1.64 per day × 30 days = \$49.20 per month to operate
 (Based on 4 hours per day use and electricity costs of \$0 per kWh/HR)

TIPS TO SAVE MONEY

- 4000+ resistors to protect an outlet (often reduces outlet break).
- Use surge protectors.
- Check for loose connections.
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DID YOU KNOW?

- World electricity consumption was estimated at approximately 16.35 trillion kilowatt hours in 2008.
- The United States consumed 27,236 per kWh/HR in 2007. The world average is 2,072 per kWh/HR in 2007.

DO 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.
 - Invest in turn-up on heating and cooling appliances.
 - Wash clothes in the coldest water (if possible).
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COST PER HOUR TO OPERATE COMMON HOUSEHOLD APPLIANCES

Appliance	1 hr	2 hr	3 hr	4 hr	5 hr
Refrigerator	1.00	2.00	3.00	4.00	5.00
Freezer	1.00	2.00	3.00	4.00	5.00
Washing Machine	1.00	2.00	3.00	4.00	5.00
Dishwasher	1.00	2.00	3.00	4.00	5.00
Water Heater	1.00	2.00	3.00	4.00	5.00
Electric Dryer	1.00	2.00	3.00	4.00	5.00
Stove	1.00	2.00	3.00	4.00	5.00
Lighting	1.00	2.00	3.00	4.00	5.00
TV	1.00	2.00	3.00	4.00	5.00
Computer	1.00	2.00	3.00	4.00	5.00
Video	1.00	2.00	3.00	4.00	5.00
Audio	1.00	2.00	3.00	4.00	5.00
Cell Phone	1.00	2.00	3.00	4.00	5.00
Video Game	1.00	2.00	3.00	4.00	5.00
Printer	1.00	2.00	3.00	4.00	5.00
Scanner	1.00	2.00	3.00	4.00	5.00
Router	1.00	2.00	3.00	4.00	5.00
Modem	1.00	2.00	3.00	4.00	5.00
Power Supply	1.00	2.00	3.00	4.00	5.00
UPS	1.00	2.00	3.00	4.00	5.00
Surge Protector	1.00	2.00	3.00	4.00	5.00
Outlet Strips	1.00	2.00	3.00	4.00	5.00
Extension Cords	1.00	2.00	3.00	4.00	5.00
Power Strips	1.00	2.00	3.00	4.00	5.00
Power Cords	1.00	2.00	3.00	4.00	5.00
Power Adapters	1.00	2.00	3.00	4.00	5.00
Power Filters	1.00	2.00	3.00	4.00	5.00
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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.

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Customer Reviews

Stashed this away for reference on projects if anything is forgotten or disputed. No longer need internet if its not available. The quality is good, but the amount of information is overwhelming. If you are going to actually be studying for a class, I recommend making your own study card in addition to buying this as there are many benefits to doing so.

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.

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!

Quick reference guide of the basics

These are great little quick reference guides.

as advertised

Great laminate. Has exactly what you need. I bought this to help my apprentices.

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