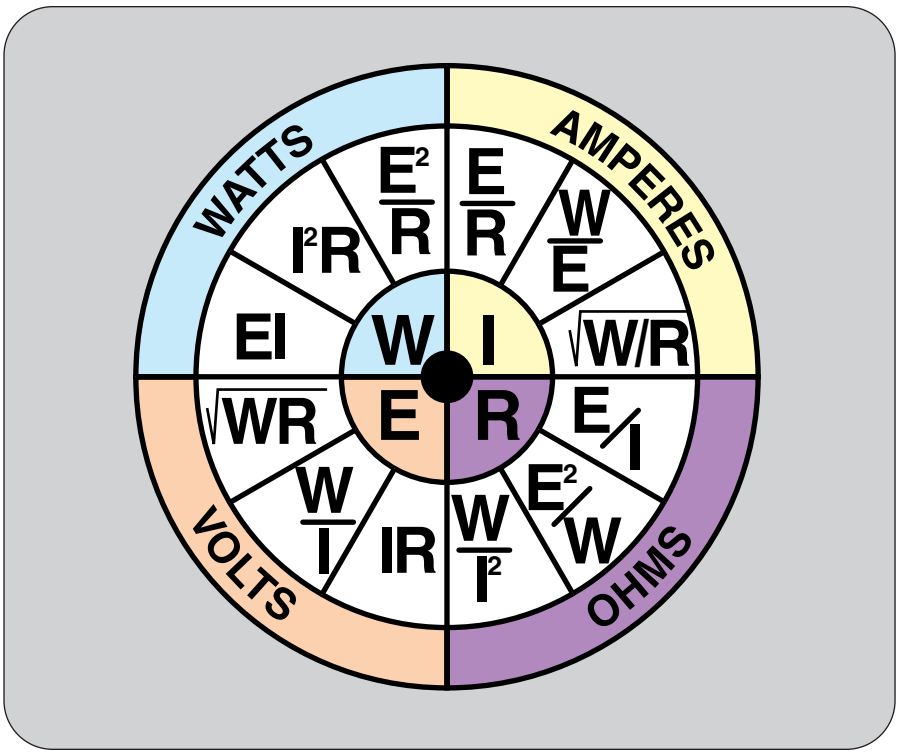
OHM'S LAW



VARIATIONS OF OHM'S LAW

VOLTS

$$\text{VOLTS} = \sqrt{\text{WATTS} \times \text{OHMS}}$$

$$\text{VOLTS} = \frac{\text{WATTS}}{\text{AMPERES}}$$

$$\text{VOLTS} = \text{AMPERES} \times \text{OHMS}$$

OHMS

$$\text{OHMS} = \frac{\text{VOLTS}}{\text{AMPERES}}$$

$$\text{OHMS} = \frac{\text{VOLTS}^2}{\text{WATTS}}$$

$$\text{OHMS} = \frac{\text{WATTS}}{\text{AMPERES}^2}$$

AMPERES

$$\text{AMPERES} = \frac{\text{VOLTS}}{\text{OHMS}}$$

$$\text{AMPERES} = \frac{\text{WATTS}}{\text{VOLTS}}$$

$$\text{AMPERES} = \sqrt{\frac{\text{WATTS}}{\text{OHMS}}}$$

WATTS

$$\text{WATTS} = \frac{\text{VOLTS}^2}{\text{OHMS}}$$

$$\text{WATTS} = \text{AMPERES}^2 \times \text{OHMS}$$

$$\text{WATTS} = \text{VOLTS} \times \text{AMPERES}$$

Currents for resistance heating loads

	Single phase					Three phase balanced load			
kW	120V	208V	240V	440V	480V	208V	240V	440V	480V
1	8.4	4.8	4.2	2.3	2.1	2.8	2.5	1.4	1.3
2	16.7	9.7	8.4	4.6	4.2	5.6	4.9	2.7	2.5
3	25.0	14.5	12.5	6.9	6.3	8.4	7.3	4.0	3.7
4	33.4	19.3	16.7	9.1	8.4	11.2	9.7	5.3	4.9
5	41.7	24.1	20.9	11.4	10.5	13.9	12.1	6.6	6.1
6	50.0	28.9	25.0	13.7	12.5	16.7	14.5	7.9	7.3
7.5	62.5	36.1	31.3	17.1	15.7	20.9	18.1	9.9	9.1
10	83.4	48.1	41.7	22.8	20.9	27.8	24.1	13.2	12.1
12	100.0	57.7	50.0	27.3	25.0	33.4	29	15.8	14.5
15	125.0	72.2	62.5	34.1	31.2	41.7	36.2	19.7	18.1
20	167.0	96.2	83.4	45.5	41.7	55.6	48.2	26.3	24.1
25	209.0	121.0	105.0	56.9	52.1	69.5	60.3	32.9	30.1
30	250.0	145.0	125.0	68.2	62.5	83.4	72.3	39.4	36.2
50	417.0	241.0	209.0	114.0	105.0	139.0	121.0	65.7	60.3
75	625.0	361.0	313.0	171.0	157.0	209.0	181.0	98.6	90.4
100	834.0	481.0	417.0	228.0	209.0	278.0	241.0	132.0	121.0

Currents for resistance heating loads

Heating elements are frequently used at voltages other than those shown in our catalog. The percentages shown below are used to determine the resulting wattage. Should you wish to use a heater on a voltage not shown above, you may calculate the resultant wattage with this formula:

$$\text{Actual Wattage} = \text{Rated Wattage} \times \frac{\text{Applied Voltage}^2}{\text{Rated Voltage}^2}$$

Percent of rated wattage for various applied voltages

Applied	Rated Voltage													
Voltage	110	115	120	208	220	230	240	277	380	415	440	460	480	550
110	100%	91%	84%	28%	25%	23%	21%	16%	8.4%	7.0%	6.2%	5.7%	5.2%	4.0%
115	109%	100%	92%	31%	27%	25%	23%	17%	9.0%	7.6%	6.7%	6.2%	5.7%	4.3%
120	119%	109%	100%	33%	30%	27%	25%	19%	10.0%	8.4%	7.4%	6.8%	6.3%	4.8%
208			300%	100%	89%	82%	75%	56%	30.0%	25.0%	22.0%	20.0%	19.0%	14.0%
220				112%	100%	91%	84%	63%	34.0%	28.0%	25.0%	23.0%	21.0%	16.0%
230				122%	109%	100%	92%	69%	37.0%	31.0%	27.0%	25.0%	23.0%	17.0%
240				133%	119%	109%	100%	75%	40.0%	33.0%	30.0%	27.0%	25.0%	19.0%
277							133%	100%	53.0%	45.0%	40.0%	36.0%	33.0%	25.0%
380								188%	100.0%	84.0%	74.0%	68.0%	63.0%	47.0%
415									119.0%	100.0%	89.0%	81.0%	75.0%	57.0%
440										112.0%	100.0%	91.0%	84.0%	64.0%
460										123.0%	109.0%	100.0%	92.0%	70.0%
480											119.0%	109.0%	100.0%	76.0%
550											156.0%	143.0%	131.0%	100.0%