FORMULAS

Formulas - Electrical

VOLTS =

$Amps \times Ohms$ $\quad \frac{Watts}{Amps}$ $\quad \sqrt{Watts \times Ohms}$

AMPS =

$\frac{Volts}{Ohms}$ $\quad \frac{Watts}{Volts}$ $\quad \sqrt{\frac{Watts}{Ohms}}$

WATTS =

$Volts \times Amps$ $\quad Amps^2 \times Ohms$ $\quad \frac{Volts^2}{Ohms}$

OHMS =

$\frac{Volts}{Amps}$ $\quad \frac{Volts^2}{Watts}$ $\quad \frac{Watts}{Amps^2}$

$$Power\ Factor = \frac{KW}{KVA} = Cos\ \Theta$$

Single Phase	Three Phase
$KW = \frac{\sqrt{\ } \times A \times PF}{1000}$	$\frac{\sqrt{3} \times V \times A \times PF}{1000}$
$KVA = \frac{V \times A}{1000}$	$\frac{\sqrt{3} \times V \times A}{1000}$
$AMPS = \frac{KVA \times 1000}{V}$	$\frac{KVA \times 1000}{\sqrt{3} \times V}$

$\sqrt{3} = 173$

Approx. Motor KVA = Motor Horsepower (At Full Load)

Capacitors Connected In Parallel $C_1 + C_2 + C_3 = C\ Total$

Capacitors Connected In Series

For Two

$$\frac{C_1 \times C_2}{C_1 + C_2} = C\ Total$$

More Than Two

$$\frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}} = C\ Total$$

VOLTAGE UNBALANCE

% Voltage Unbalance =

$$\frac{100 \times Max.\ Voltage\ Deviation\ From\ Average\ Voltage}{Average\ Voltage}$$

BOOST TRANS.:

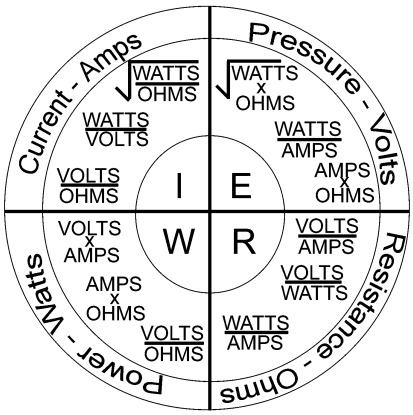
Rating Plate F.L.A. x Rating Plate VOLTS = KVA

$$\frac{Rating\ Plate\ VOLTS}{Rating\ Plate\ VOLTS - Norm.\ Line\ VOLTS} = FACTOR$$

$$\frac{KVA}{FACTOR} = Trans.\ KVA\ Rating$$

$$\left(\frac{V_2}{V_1}\right)2 \times Heater\ Rating = Rating\ @\ New\ Voltage$$

V_1 *Rated Volts* $\quad V_2$ *= Measured Volts*



This chart shows four ways to figure each value: Amps (I), Volts (E), Ohms (R) or Watts (W).

Example: A 4800 Watt electric heat element is connected to a 240 Volt circuit. How many Amps does it draw?

Solution: Locate Amps section of chart: $\frac{\text{Watts (W)}}{\text{Volts (E)}}$ =Amps (I)

Thus 4800 ÷ 240 = 20 Amps. Carried further, what is the resistance?

$\frac{\text{Volts}^2\ E^2}{\text{Watts (W)}}$ = Ohms (R) 240 x 240 ÷ 4800 = 12 Ohms.

Conversion Table For Watts - Amperes - Volts

Watts	Voltage (C - Single Phase) 120	208	240	277
	Amperes			
500	4.2	2.4	2.1	1.8
1000	8.3	4.8	4.2	3.8
1500	12.5	7.2	6.3	5.4
2000	16.7	9.6	8.3	7.2
2500	20.9	12.0	10.4	9.0
3000	25.0	14.4	12.5	10.6
3500	29.2	16.8	14.5	12.6