Useful Tables

Electrical formulas for determining amperes, horsepower, kilowatts and kilovolt-amperes				
DESIRED DATA	**ALTERNATING CURRENT**			**DIRECT CURRENT**
	Single-Phase	**Two-Phase* Four-Wire**	**Three-Phase**	
Amperes when kva is shown	$\frac{\text{kva} \times 1000}{E}$	$\frac{\text{kva} \times 1000}{2 \times E}$	$\frac{\text{kva} \times 1000}{1.73 \times E}$	$\frac{\text{kva} \times 1000}{E}$
Amperes when kilowatts are shown	$\frac{\text{kw} \times 1000}{E \times pf}$	$\frac{\text{kw} \times 1000}{2 \times E \times pf}$	$\frac{\text{kw} \times 1000}{1.73 \times E \times pf}$	$\frac{\text{kw} \times 1000}{E}$
Amperes when horsepower is shown	$\frac{\text{hp} \times 746}{E \times \%Eff \times pf}$	$\frac{\text{hp} \times 746}{2 \times E \times \%Eff \times pf}$	$\frac{\text{hp} \times 746}{1.73 \times E \times \%Eff \times pf}$	$\frac{\text{hp} \times 746}{E \times \%Eff}$
Kilovolt-Amperes	$\frac{I \times E}{1000}$	$\frac{I \times E \times 2}{1000}$	$\frac{I \times E \times 1.73}{1000}$	$\frac{I \times E}{1000}$
Kilowatts	$\frac{I \times E \times pf}{1000}$	$\frac{I \times E \times 2\ pf}{1000}$	$\frac{I \times E \times 1.73 \times pf}{1000}$	$\frac{I \times E}{1000}$
Horsepower	$\frac{I \times E \times \%Eff \times pf}{746}$	$\frac{I \times E \times 2 \times \%Eff \times pf}{746}$	$\frac{I \times E \times 1.73 \times \%Eff \times pf}{746}$	$\frac{I \times E \times \%Eff}{746}$

Voltage Drop Formulas			
Single Phase (2 or 3 wire)	VD =	$\frac{2 \times K \times I \times L}{CM}$	**K** = ohms per mil foot **(Copper = 12.9 at 24°C)** **(Alum = 21.2 at 24°C)** **Note: K** value changes with temperature **L** = Length of conductor in feet **I =** Current in conductor (amperes) **CM** = Circular mil area of conductor
	CM=	$\frac{2K \times L \times I}{VD}$	
Three Phase	VD=	$\frac{1.73 \times K \times I \times L}{CM}$	
	CM=	$\frac{1.73 \times K \times L \times I}{VD}$	

Useful Formulas

Ohm's Law - **E=IR**
where:
E=electricity in volts
I=current in amps
R=resistance in ohms

Power Formula - **P=IE**
where:
P=watts
I=amps
E=volts
(W=VA - another way of stating the same thing)

Peak Voltage=RMS x 1.414

RMS Voltage=Peak Voltage x.707

Total Resistance in a Series Circuit
Rt = R1 + R2 + R3 .....

Total Resistance in a Parallel Circuit
Rt = 1 /
1/R1 + 1/R2 + 1/R3 .....

Secondary Voltage (Turns Ratio) of a Transformer
Es = ns / np x Ep
where:
Es = secondary voltage
ns = number of turns in secondary
np = number of turns in primary
Ep = primary voltage