Electrical Formulas

To Find	Direct Current	Alternating Current		
		Single Phase	Two-Phase* Four-Wire	Three Phase
Amperes when Horsepower is known	$\frac{HP \times 746}{E \times EFF}$	$\frac{HP \times 746}{E \times EFF \times PF \times 2}$	$\frac{HP \times 746}{2 \times E \times EFF \times PF}$	$\frac{HP \times 746}{E \times EFF \times PF \times 1.73}$
Amperes when Kilowatts are known	$\frac{KW \times 1000}{E}$	$\frac{KW \times 1000}{E \times PF}$	$\frac{KW \times 1000}{2 \times E \times PF}$	$\frac{KW \times 1000}{E \times PF \times 1.73}$
Amperes when "KVA" is known		$\frac{KVA \times 1000}{E}$	$\frac{KVA \times 1000}{E \times 1.73}$	$\frac{KVA \times 1000}{E \times I \times 1.73 \times PF}$
Kilowatts	$\frac{E \times I}{1000}$	$\frac{E \times I \times PF}{1000}$	$\frac{I \times E \times 2 \times PF}{1000}$	$\frac{E \times I \times 1.73 \times PF}{1000}$
Kilovolt-Amperes "KVA" -		$\frac{I \times E}{1000}$	$\frac{I \times E \times 2}{1000}$	$\frac{E \times I \times 1.73}{1000}$
Horsepower (Output)	$\frac{E \times I \times EFF}{746}$	$\frac{E \times I \times EFF \times PF}{746}$	$\frac{I \times E \times 2 \times EFF \times PF}{746}$	$\frac{E \times I \times EFF \times PF \times 1.73}{746}$

E = Voltage
I = Amps
PF = Power Factor
EFF = Efficiency
HP = Horsepower

Note: Direct current formulas do not use (PF, 2, or 1.73)

- Single phase formulas do not use (2 or 1.73)
- Two phase-four wire formulas do not use (1.73)
- Three phase formulas do not use (2)
- * For three-wire, two phase circuits the current in the common conductor is 1.41 times that in either of the other two conductors.