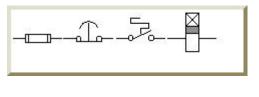


Here are some common formulas that are frequently used in the field.



Options:

- Motor Formulas

- Transformer Formulas

E = Voltage / I = Amps /W = Watts / PF = Power Factor / Eff = Efficiency / HP = Horsepower

| AC/DC Formulas | | | | | | |
|---------------------|--------------------|-----------------------------|---------------------------------|-----------------------------|--|--|
| To Find | Direct Current | AC / 1phase 115v or 120v | AC / 1phase 208,230, or 240v | AC 3 phase All Voltages | | |
| Amps when | HP x 746 | <u>HP x 746</u> | <u>HP x 746</u> | HP x 746 | | |
| Horsepower is Known | E x Eff | E x Eff X PF | E x Eff x PF | 1.73 x E x Eff x PF | | |
| Amps when | <u>kW x 1000</u> | <u>kW x 1000</u> | <u>kW x 1000</u> | <u>kW x 1000</u> | | |
| Kilowatts is known | E | E x PF | E x PF | 1.73 x E x PF | | |
| Amps when | | <u>kVA x 1000</u> | <u>kVA x 1000</u> | <u>kVA x 1000</u> | | |
| kVA is known | | E | E | 1.73 x E | | |
| Kilowatts | <u>l x E</u> | <u>I x E x PF</u> | <u>I x E x PF</u> | <u>I x E x 1.73 PF</u> | | |
| | 1000 | 1000 | 1000 | 1000 | | |
| Kilovolt-Amps | | <u>I x E</u> 1000 | <u>I x E</u> 1000 | <u>I x E x 1.73</u> 1000 | | |
| Horsepower | <u>I x E x Eff</u> | I x E x Eff x PF | I x E x Eff x PF | I x E x Eff x 1.73 x PF | | |
| (output) | 746 | 746 | 746 | 746 | | |

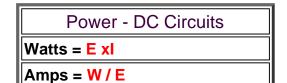
| Three Phase Values |
|--------------------------------|
| For 208 volts x 1.732, use 360 |
| For 230 volts x 1.732, use 398 |
| For 240 volts x 1.732, use 416 |
| For 440 volts x 1.732, use 762 |
| For 460 volts x 1.732, use 797 |
| For 480 Volts x 1.732, use 831 |

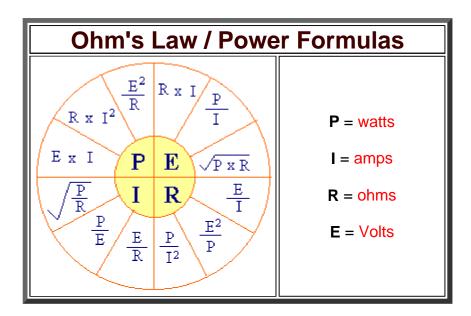
E = Voltage / I = Amps /W = Watts / PF = Power Factor / Eff = Efficiency / HP = Horsepower

http://www.elec-toolbox.com/Formulas/Useful/formulas.htm

Useful Formulas

| AC Efficiency and Power Factor Formulas | | | | | |
|---|-------------------------------|---------------------------------------|--|--|--|
| To Find | Single Phase | Three Phase | | | |
| Efficiency | <u>746 x HP</u> E x I x PF | <u>746 x HP</u> E x I x PF x 1.732 | | | |
| Power Factor | Input Watts V x A | Input Watts E x I x 1.732 | | | |





| Voltage Drop Formulas | | | | | |
|-------------------------------|------|---|---|--|--|
| Single Phase (2 or 3 wire) | VD = | $\frac{2 \times K \times 1 \times L}{CM}$ | K = ohms per mil foot (Copper = 12.9 at 75°) | | |
| | CM= | 2K x L x I VD | (Alum = 21.2 at 75°) Note: K value changes with temperature. See Code chapter 9, | | |
| Three Phase | VD= | 1.73 x K x I x L CM | Table 8 L = Length of conductor in feet | | |
| | CM= | 1.73 x K x L x I VD | I = Current in conductor (amperes) CM = Circular mil area of conductor | | |

Check out these Online Calculators!

If there is anything you would like to add or if you have any comments please feel free to email E.T.E. at <u>ete@elec-toolbox.com.</u>

http://www.elec-toolbox.com/Formulas/Useful/formulas.htm

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