

Formulas

Measurement unit abbreviations

E	voltage
hp	horsepower
I	current
P	power
PF	power factor
R	resistance
VA	volt - ampere

Constants

$\sqrt{3}$	1.73
π	3.14

Formulas

Descriptions	Full	Abbreviated
Current	$\frac{\text{voltage}}{\text{resistance}}$	$\frac{E}{R}$
Frequency	$\frac{\text{poles} \times \text{speed}}{120}$	
Kilovolt-amperes	$\text{line voltage} \times \text{line current} \times \sqrt{3}$	$E_{\text{line}} \times I_{\text{line}} \times \sqrt{3}$
Line current (I_{line})	$\text{phase current} \times \sqrt{3}$	$I_{\text{phase}} \times \sqrt{3}$
Line current (I_{line})	$\frac{\text{volt - ampere}}{\text{line voltage} \times \sqrt{3}}$	$\frac{VA}{E_{\text{line}} \times \sqrt{3}}$
Line voltage (E_{line})	$\text{phase voltage} \times \sqrt{3}$	$E_{\text{phase}} \times \sqrt{3}$

Formulas (continued)

Power	current ² × resistance	$I^2 \times R$
Power	voltage × current	$E \times I$
Power	$\frac{\text{voltage}^2}{\text{resistance}}$	$\frac{E^2}{R}$
Power factor	$\frac{\text{true power}}{\text{apparent power}}$	
Resistance	$\frac{\text{voltage}^2}{\text{power}}$	$\frac{E^2}{P}$
Short-circuit current	$\frac{\text{secondary current}}{\text{impedance}}$	$\frac{I_{\text{secondary}}}{\%Z}$
Three-phase power	voltage × current × $\sqrt{3}$ × power factor	$E \times I \times \sqrt{3} \times \text{PF}$
Total power (P_{total})	line voltage × line current × power factor × $\sqrt{3}$	$E_{\text{line}} \times I_{\text{line}} \times \text{PF} \times \sqrt{3}$
Total power (P_{total})	phase voltage × phase current × power factor × 3	$E_{\text{phase}} \times I_{\text{phase}} \times \text{PF} \times 3$
Turn ratio	$\frac{\text{number of primary turns}}{\text{number of secondary turns}} =$ $\frac{\text{primary voltage}}{\text{secondary voltage}} =$ $\frac{\text{current in the secondary}}{\text{current in the primary}}$	$\frac{N_p}{N_s} = \frac{E_p}{E_s} = \frac{I_s}{I_p}$
Volt - amperes	line voltage × line current × $\sqrt{3}$	$E_{\text{line}} \times I_{\text{line}} \times \sqrt{3}$
Volt - amperes	phase voltage × phase current × 3	$E_{\text{phase}} \times I_{\text{phase}} \times 3$
Watts	horsepower × 746	hp × 746