

# Basic Electrical Engineering Formulas And Equations

## Electrical Formulas

These are the Basic Electrical Formulas, Related to Ohm's Law,

Variables used in these formulas are as follows:

V = Voltage in Volts

I = Current in Amperes

R= Resistance in Ohms

Power = In Watts

### Voltage Formulas

$$V=IR, \quad V=PI, \quad V=\sqrt{P \times R}$$

### Current Formulas

$$I = V/R, \quad I=P/V, \quad I=\sqrt{P/R}$$

### Resistance Formulas

$$R=V/I, \quad R=P/I^2, \quad R=P/V^2$$

### Power Formulas

$$P=VI, \quad P=I^2R, \quad P=V^2/R$$

Following are several additional formulas, which are useful for calculating Current, Horsepower, kW, and kVA for both Single Phase & Three Phase AC Current,

HP= Horsepower

EFE = EfficiencyFactor ( Use 0.9 when not mentioned)

PF=Power Factor ( Use 0.8 when not mentioned)

## AC = Alternating Current

To Find:	Single-Phase	Three Phase
Current, when Motor Hp is known	$\frac{HP \times 746}{V \times EFE \times PF}$	$\frac{HP \times 746}{V \times EFE \times PF \times 1.73}$
Ampers, when kW is known	$\frac{kW \times 1000}{V \times PF}$	$\frac{kW \times 1000}{V \times PF \times 1.73}$
Current, when kVA is Known	$\frac{kVA \times 1000}{V \times 1.73}$	$\frac{kVA \times 1000}{V \times 1.73}$
kilowatts (kW)	$\frac{V \times I \times PF}{1000}$	$\frac{V \times I \times PF \times 1.73}{1000}$
kW input, when Motor HP is Known	$\frac{HP \times 0.746}{EFE}$	$\frac{HP \times 0.746}{EFE}$
kilovolt-Amperes (kVA)	$\frac{V \times I}{1000}$	$\frac{V \times I \times 1.73}{1000}$
Horsepower (HP)	$\frac{V \times I \times EFE \times PF}{746}$	$\frac{V \times I \times EFE \times PF \times 1.73}{746}$

## Useful Electrical Formulas

To Obtain	Single Phase	Three Phase
kilowatts	$\frac{V \times L \times PF}{1000}$	$\frac{1.732 \times V \times L \times PF}{1000}$
kV-A	$\frac{V \times L}{1000}$	$\frac{1.732 \times V \times L}{1000}$
Horsepower required when generator kW unknown (if generator efficiency is unknown, use 0.93)	$\frac{kW}{0.746 \times \text{Efficiency (Generator)}}$	$\frac{kW}{0.746 \times \text{Efficiency (Generator)}}$
kW input when motor hp known (if motor efficiency is unknown, use 0.85 x hp)	$\frac{HP \times 0.746}{\text{Efficiency (Motor)}}$	$\frac{HP \times 0.746}{\text{Efficiency (Motor)}}$
Ampers when motor hp is known	$\frac{HP \times 0.746}{V \times PF \times \text{Efficiency}}$	$\frac{HP \times 0.746}{1.732 \times V \times PF \times \text{Efficiency}}$
Ampers when kW is known	$\frac{kW \times 1000}{V \times PF}$	$\frac{kW \times 1000}{1.732 \times V \times PF}$
Ampers when kW-A is known	$\frac{kV-A \times 1000}{V}$	$\frac{kV-A \times 1000}{1.732 \times V}$

# All Electrical Engineering Equation And Formulas

**M Walker**



## **All Electrical Engineering Equation And Formulas:**

**Pocket Book of Electrical Engineering Formulas** Richard C. Dorf, Ronald J. Tallarida, 1993-07-15 Pocket Book of Electrical Engineering Formulas provides key formulas used in practically all areas of electrical engineering and applied mathematics This handy pocket sized guide has been organized by topic field to make finding information quick and easy The book features an extensive index and is an excellent quick reference for electrical engineers educators and students

**Electrical Engineer**, 1888     *The Electrical Engineer*, 1900     [The Electrical Engineering Handbook](#) Wai Kai Chen, 2004-11-16 The Electrical Engineer's Handbook is an invaluable reference source for all practicing electrical engineers and students Encompassing 79 chapters this book is intended to enlighten and refresh knowledge of the practicing engineer or to help educate engineering students This text will most likely be the engineer's first choice in looking for a solution extensive complete references to other sources are provided throughout No other book has the breadth and depth of coverage available here This is a must have for all practitioners and students The Electrical Engineer's Handbook provides the most up to date information in Circuits and Networks Electric Power Systems Electronics Computer Aided Design and Optimization VLSI Systems Signal Processing Digital Systems and Computer Engineering Digital Communication and Communication Networks Electromagnetics and Control and Systems About the Editor in Chief Wai Kai Chen is Professor and Head Emeritus of the Department of Electrical Engineering and Computer Science at the University of Illinois at Chicago He has extensive experience in education and industry and is very active professionally in the fields of circuits and systems He was Editor in Chief of the IEEE Transactions on Circuits and Systems Series I and II President of the IEEE Circuits and Systems Society and is the Founding Editor and Editor in Chief of the Journal of Circuits Systems and Computers He is the recipient of the Golden Jubilee Medal the Education Award and the Meritorious Service Award from the IEEE Circuits and Systems Society and the Third Millennium Medal from the IEEE Professor Chen is a fellow of the IEEE and the American Association for the Advancement of Science 77 chapters encompass the entire field of electrical engineering THOUSANDS of valuable figures tables formulas and definitions Extensive bibliographic references     [Electrical Engineer's Reference Book](#) M. A. Laughton, D.F. Warne, 2002-09-27 For ease of use this edition has been divided into the following subject sections general principles materials and processes control power electronics and drives environment power generation transmission and distribution power systems sectors of electricity use New chapters and major revisions include industrial instrumentation digital control systems programmable controllers electronic power conversion environmental control hazardous area technology electromagnetic compatibility alternative energy sources alternating current generators electromagnetic transients power system planning reactive power plant and FACTS controllers electricity economics and trading power quality An essential source of techniques data and principles for all practising electrical engineers Written by an international team of experts from engineering companies and universities Includes a major new section on control systems

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