HOORVIA ? OHM'S LAW & POWER FORMULAS

Quick Reference Cheat Sheet · US Letter & A4 Printable

Crafting & DIY · Sheet #1102

Law / Discipline	Parameter Being Calculated	Standard Primary Equation	Derived Algebraic Equivalents	Standard SI Units	Practical Engineering Example
Ohm's Law (Voltage Drop)	Electromotive Force / Voltage (V)	V = I × R	I = V / R | R = V / I	Volts (V) = Amperes (A) × Ohms (?)	A 10.0 ? heating element drawing 12.0 A requires V = 12.0 A × 10.0 ? = 120.0 V
Ohm's Law (Current Draw)	Electric Current (I)	I = V / R	V = I × R | R = V / I	Amperes (A) = Volts (V) / Ohms (?)	120 V applied across a 15.0 ? resistance draws I = 120 V / 15.0 ? = 8.0 A
Ohm's Law (Resistance)	Electrical Resistance (R)	R = V / I	V = I × R | I = V / R	Ohms (?) = Volts (V) / Amperes (A)	A lamp drawing 0.50 A on 120 V has operating resistance R = 120 V / 0.50 A = 240.0 ?
Watt's Law (Direct Power)	Real Electric Power (P)	P = V × I	I = P / V | V = P / I	Watts (W) = Volts (V) × Amperes (A)	120 V circuit drawing 12.0 A consumes P = 120 V × 12.0 A = 1,440.0 W (80% continuous limit of 15A circuit)
Joule's Law (I²R Dissipation)	Power Dissipated via Current (P)	P = I² × R	I = ?(P / R) | R = P / I²	Watts (W) = (Amperes)² × Ohms (?)	15.0 A current flowing through conductor resistance of 0.40 ? dissipates P = 15² × 0.40 = 90.0 W heat loss
Voltage-Resistance Power	Power Dissipated via Voltage (P)	P = V² / R	V = ?(P × R) | R = V² / P	Watts (W) = (Volts)² / Ohms (?)	120 V across an 8.0 ? resistive element produces P = (120)² / 8.0 = 14,400 / 8.0 = 1,800.0 W (max 15A rating)
Single-Phase AC Real Power	Active AC Real Power (P)	P = V × I × PF	PF = cos(?) = P / (V × I) | S = V × I (VA)	Watts (Real W) vs Volt-Amperes (Apparent VA)	120 V single-phase motor drawing 10.0 A at 0.85 PF delivers P = 120 × 10.0 × 0.85 = 1,020.0 W real power (1,200 VA apparent)

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Three-Phase AC Real Power	Three-Phase Active Power (P)	P = ?3 × V_LL × I_L × PF	?3 ? 1.73205 | I_L = P / (?3 × V_LL × PF)	Watts (W) or Kilowatts (kW)	480 V line-to-line 3-phase industrial feeder drawing 30.0 A line current at 0.90 PF delivers P = 1.73205 × 480 × 30.0 × 0.90 = 22,447.4 W (22.45 kW)