

Motor Power From Current Calculator

Enter line current, system voltage, phase count, power factor, and motor efficiency to create a transparent U.S. English current-to-power estimate. This calculator is not a full-load-current lookup, not a motor-nameplate substitute, does not reproduce NEC motor tables, does not apply NEMA design or code-letter data, does not select equipment, and does not verify code compliance.

Generated October 10, 2026

<https://www.elecatrix.com/motors-starters/motor-power-calculator/>

Inputs

Input	Value	Unit
Line current	12	A
System voltage	460	V
Phase count	Three-phase	phase
Power factor	0.85	PF
Motor efficiency	90	%
Line-current basis note	N/A	
Voltage basis note	N/A	
Power factor basis note	N/A	
Efficiency basis note	N/A	

Results

Result	Value	Unit
Estimated apparent power	9560.9205	VA
Estimated electrical input power	8126.7824	W
Phase multiplier	1.7321	x
Efficiency ratio	0.9	decimal
Estimated mechanical output power	7314.1042	W
Estimated output horsepower	9.8044	hp

Calculation details

Detail	Value	Unit
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Calculation basis	Entered line current, system voltage, phase count, power factor, and efficiency using the balanced equivalent phase model when three-phase is selected.
Current basis boundary	Line current is user-supplied; this calculator does not determine whether the current is measured, nameplate, full-load, partial-load, starting, or demand current.
Power factor boundary	Power factor is user-supplied; this calculator does not determine leading/lagging direction, load-dependent power factor, harmonics, correction equipment, or manufacturer-specific motor data.
Nameplate boundary	Nameplate and manufacturer data can differ from this estimate and must control equipment-specific review.
NEMA boundary	No NEMA design letter, code-letter, locked-rotor, motor rating, or manufacturer-specific design-data result is made by this calculator.
Phase model boundary	Balanced equivalent model only; no phase-balance, starting, duty-cycle, overload, overcurrent, conductor, or equipment-rating decision is made by this calculator.
Equipment selection boundary	No NEC motor table lookup, nameplate substitution, conductor sizing, overload setting, overcurrent protection, starter selection, service calculation, utility approval, or code-compliance result is made by this calculator.

Formulas

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$\phi = 1$ for single-phase; $\sqrt{3}$ for balanced three-phase

$\eta = (\text{Efficiency percent}/100)$

$S = V \times I \times \phi$

$P_{\text{input}} = S \times \text{PF}$

$P_{\text{output}} = P_{\text{input}} \times \eta$

Output horsepower = $\frac{P_{\text{output}}}{746}$

efficiency ratio = efficiency percent / 100

phase model boundary = balanced equivalent model only; no phase-balance, starting, duty-cycle, overload, overcurrent, conductor, or equipment-rating decision is made by this calculator

NEMA boundary = no NEMA design letter, code-letter, locked-rotor, motor rating, or manufacturer-specific design-data result is made by this calculator

equipment selection boundary = no NEC motor table lookup, nameplate substitution, conductor sizing, overload setting, overcurrent protection, starter selection, service calculation, utility approval, or code-compliance result is made by this calculator

Warnings and limitations

This is a U.S. English preliminary current-to-power estimate, not an NEC motor table lookup, not a motor-nameplate substitute, not conductor-sizing, not an overload calculation, not overcurrent-protection selection, not starter selection, not a service calculation, not NEMA design-letter or code-letter analysis, and not a code-compliance result. Actual motor power depends on motor design, load, voltage, frequency, phase balance, measured current, power factor, efficiency, starting condition, temperature, harmonics, manufacturer data, NEMA/design data, and project conditions. Verify the nameplate, manufacturer instructions, adopted NEC edition, AHJ requirements, equipment ratings, and field measurements with a qualified electrical professional before design or installation.