

Full-Load Current Estimate Calculator

Enter motor horsepower, system voltage, phase count, efficiency, and power factor to create a transparent U.S. English arithmetic full-load-current estimate. This calculator is not a table lookup, does not reproduce NEC motor full-load-current tables, does not apply a Table 430.250 value, does not replace nameplate current, and does not select a code-compliant conductor, breaker, starter, or motor overload setting.

Generated October 10, 2026

<https://www.elecatrix.com/motors-starters/full-load-current-calculator/>

Inputs

Input	Value	Unit
Motor horsepower	5	hp
System voltage	230	V
Phase count	Three-phase	phase
Motor efficiency	90	%
Power factor	0.85	PF
Horsepower basis note	N/A	
Voltage basis note	N/A	
Efficiency basis note	N/A	
Power factor basis note	N/A	

Results

Result	Value	Unit
Mechanical output power	3730	W
Efficiency ratio	0.9	decimal
Estimated input power	4144.4444	W
Estimated apparent power	4875.817	VA
Phase multiplier	1.7321	x
Arithmetic full-load-current estimate from entered assumptions	12.2394	A

Calculation details

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Detail	Value	Unit
Calculation basis	Entered horsepower, system voltage, phase count, efficiency, and power factor using 746 watts per mechanical horsepower.	
NEC table boundary	No NEC motor full-load-current table, Table 430.250 value, conductor ampacity, overload setting, overcurrent protection, or code-compliance result is made by this calculator.	
Nameplate boundary	Nameplate and manufacturer full-load current can differ from this estimate and must control equipment-specific review.	
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.	
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 conductor, breaker, fuse, overload, starter, controller, disconnect, service, utility, or code-compliance selection is made by this calculator.	

Formulas

$$P_{\text{shaft}} = \text{Motor horsepower} \times 746$$

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

$$P_{\text{input}} = \frac{P_{\text{shaft}}}{\eta}$$

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$S = \frac{P_{input}}{PF}$

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

$I_{FL} = (S/V \times \phi)$

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

NEC table boundary = no NEC motor full-load-current table, Table 430.250 value, conductor ampacity, overload setting, overcurrent protection, or code-compliance result is made by this calculator

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

Warnings and limitations

This is a U.S. English preliminary arithmetic estimate, not a reproduction of NEC Article 430 tables or NEC Table 430.250, not an NEC motor full-load-current table lookup, not a nameplate-current substitute, and not a code-compliance result. Actual motor current depends on motor design, rated voltage, frequency, load, efficiency, power factor, starting conditions, service factor, temperature, installation, and manufacturer data. Do not use this estimate by itself to select conductors, overcurrent protection, motor overloads, disconnects, starters, or equipment ratings. Verify the adopted NEC edition, AHJ requirements, nameplate data, manufacturer instructions, and project conditions with a qualified electrical professional.