

AC Circuit Current Calculator

Calculate line current for a single-phase or balanced three-phase AC load from real power, RMS voltage, power factor, and the selected phase model.

Generated October 10, 2026

<https://www.elecatrix.com/voltage-current-resistance/ac-circuit-current-calculator/>

Inputs		
Input	Value	Unit
Real power	9600	W
RMS voltage	480	V
Power factor	0.8	PF
Phase count	Balanced three phase	
Results		
Result	Value	Unit
Line current	14.4338	A
Apparent power	12000	VA
Real power used	9600	W
Voltage used	480	V
Power factor used	0.8	PF
Phase multiplier	1.7321	x
Calculation details		
Detail	Value	Unit
Calculation basis	Line current equals real power divided by power factor, phase multiplier, and RMS voltage.	
Review boundary	Screening AC arithmetic only. No waveform, harmonics, unbalance, equipment rating, conductor ampacity, overcurrent protection, utility, or code-compliance result is made.	

Formulas		
$S = (P/PF)$		

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$$I_{\text{single}} = (P/V \times PF)$$

$$I_{\text{three}} = (P/\sqrt{3}) \times V \times PF$$

Warnings and limitations

This is ideal AC current arithmetic only and does not size a feeder, breaker, conductor, or equipment.