

Impedance Calculator

Estimates AC impedance magnitude, phase angle, and power-factor magnitude from resistance and reactance values already matched to the frequency under review.

Generated October 10, 2026

<https://www.elecatrix.com/circuits-components/impedance-calculator/>

Inputs

Input	Value	Unit
Resistance	12	ohm
Inductive reactance	16	ohm
Capacitive reactance	4	ohm

Results

Result	Value	Unit
Net reactance	12	ohm
Impedance magnitude	16.9706	ohm
Phase angle	45	deg
Power factor magnitude	0.7071	PF

Status

Status	Value	Unit
Reactance type	inductive	

Calculation details

Detail	Value	Unit
Calculation basis	Impedance magnitude uses resistance and net reactance. Net reactance equals inductive reactance minus capacitive reactance.	
Selection boundary	AC impedance estimate only; verify frequency-dependent reactance values, component ratings, waveform assumptions, and measurement data before design use.	

Formulas

$$X = X_L - X_C$$

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$$|Z| = \sqrt{R^2 + X^2}$$

$$\theta = \arctan2(X, R)$$

$$PF = (R / |Z|)$$

Warnings and limitations

This impedance estimate uses entered reactance values. It does not calculate frequency-dependent reactance from component values, verify ratings, model harmonics, or approve a circuit design.