

Impedance Magnitude Calculator

Estimate single-frequency AC impedance magnitude, phase angle, and power-factor magnitude from resistance and net reactance.

Generated October 10, 2026

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

Inputs		
Input	Value	Unit
Resistance	3	ohm
Signed net reactance	4	ohm

Results

Result	Value	Unit
Resistance used	3	ohm
Reactance used	4	ohm
Impedance magnitude	5	ohm
Phase angle	53.1301	deg
Power-factor magnitude	0.6	PF
Reactance type	inductive	

Calculation details

Detail	Value	Unit
Calculation basis	Impedance magnitude is the vector magnitude of resistance and signed net reactance. Phase angle uses atan2(reactance, resistance).	
Boundary	Single-frequency sinusoidal impedance arithmetic only. It does not calculate reactance from component values, model harmonics, verify ratings, or approve a circuit.	

Formulas

`impedance magnitude = sqrt(resistance^2 + reactance^2)`

`phase angle degrees = atan2(reactance, resistance)`

`power-factor magnitude = resistance / impedance magnitude`

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positive reactance is inductive and negative reactance is capacitive

Warnings and limitations

This is single-frequency sinusoidal impedance arithmetic. It does not calculate reactance from component values, model harmonics, verify frequency, check ratings, or approve a circuit.