

Parallel Circuit Calculator

Calculate equivalent resistance, total current, and branch currents for three fixed-resistance branches on a common DC-style voltage basis.

Generated October 10, 2026

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

Inputs		
Input	Value	Unit
Source voltage	120	V
Resistance 1	30	ohm
Resistance 2	60	ohm
Resistance 3	90	ohm
Source-voltage basis note	N/A	
Resistance basis note	N/A	
Results		
Result	Value	Unit
Total conductance	0.0611	S
Equivalent resistance	16.3636	ohm
Total current	7.3333	A
Branch current through R1	4	A
Branch current through R2	2	A
Branch current through R3	1.3333	A
Branch current total	7.3333	A
Current balance error	N/A	A
Calculation details		
Detail	Value	Unit
Calculation basis	Ideal fixed-resistance parallel circuit using Ohm law: conductances add, each branch sees the entered source voltage, and branch currents add at the source.	

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Ohm law boundary	Ohm law arithmetic only; no measured waveform, nonlinear component, tolerance, or temperature behavior is determined by this calculator.
Resistance model boundary	Simple fixed-resistance model only; no AC impedance, reactance, frequency, tolerance, thermal, transient, or component-rating analysis is made by this calculator.
Branch current boundary	Branch currents are arithmetic currents from the entered voltage and resistance values; no conductor ampacity, protection, fault, or load-sharing approval is made by this calculator.
Component selection boundary	No resistor wattage, component rating, conductor, protective device, enclosure, manufacturer approval, installation approval, or code-compliance result is made by this calculator.

Formulas

Total conductance = $(1/R_1) + (1/R_2) + (1/R_3)$

Equivalent resistance = $\frac{1}{G_{total}}$

Branch current_k = (V/R_k)

Total current = $I_1 + I_2 + I_3$

Branch current total = $I_1 + I_2 + I_3$

Current balance error = $I_{total} - (I_1 + I_2 + I_3)$

total conductance = $1/R1 + 1/R2 + 1/R3$

branch current total = branch current 1 + branch current 2 + branch current 3

current balance error = total current - branch current total

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Warnings and limitations

This calculator provides educational and preliminary component arithmetic for a simple fixed-resistance model only. It is not AC impedance analysis, not reactance or frequency analysis, not thermal analysis, not component selection, not manufacturer rating verification, not fault-current analysis, not conductor or protective-device selection, and not a code-compliance result. Verify component ratings, tolerances, power dissipation, manufacturer instructions, and project conditions before design, installation, or field decisions.