

Series Circuit Calculator

Calculate total series resistance, circuit current, and individual resistor voltage drops from a fixed DC-style source and three resistance values.

Generated October 10, 2026

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

Inputs		
Input	Value	Unit
Source voltage	120	V
Resistance 1	10	ohm
Resistance 2	20	ohm
Resistance 3	30	ohm
Source-voltage basis note	N/A	
Resistance basis note	N/A	
Results		
Result	Value	Unit
Total resistance	60	ohm
Circuit current	2	A
Voltage drop across R1	20	V
Voltage drop across R2	40	V
Voltage drop across R3	60	V
Voltage drop total	120	V
Voltage balance error	N/A	V
Calculation details		
Detail	Value	Unit
Calculation basis	Ideal fixed-resistance series circuit using Ohm law: series resistances add, the same current flows through each resistor, and voltage divides across the resistors.	

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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.
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 resistance = $R_1 + R_2 + R_3$

Circuit current = $\frac{V_{\text{source}}}{R_{\text{total}}}$

Voltage drop_n = $I \times R_n$

Voltage drop total = $V_1 + V_2 + V_3$

Voltage balance error = $V_{\text{source}} - (V_1 + V_2 + V_3)$

voltage drop total = voltage drop 1 + voltage drop 2 + voltage drop 3

voltage balance error = source voltage - voltage drop total

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

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.