

Voltage Drop Length Calculator

Solve the inverse voltage-drop relationship for maximum one-way length while keeping conductor selection and installation review outside the formula.

Generated October 10, 2026

<https://www.elecatrrix.com/wire-raceway-ampacity/voltage-drop-length-calculator/>

Inputs		
Input	Value	Unit
Load current	20	A
System voltage	120	V
Conductor resistance	1.588	ohm/1000 ft
Entered drop limit	3	%
Phase model	Single phase or DC	

Results		
Result	Value	Unit
Maximum one-way length	56.6751	ft
Entered voltage-drop limit	3.6	V
Phase multiplier	2	x
Drop percentage used	3	%

Status		
Status	Value	Unit
Calculation note	Maximum one-way length solved from the entered voltage-drop limit	

Calculation details		
Detail	Value	Unit
Calculation basis	Maximum one-way length is solved from entered voltage, drop limit, current, resistance, and phase multiplier.	
Boundary	Mode arithmetic only; conductor, raceway, protection, and installation review remain separate.	

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Formulas

$$V_{\text{allowable}} = V_{\text{system}} \times \frac{\text{fracp_drop}}{100}$$

$$L_{\text{max, one-way}} = \frac{\text{frac} V_{\text{allowable}}}{1000 k_{\text{phase}} I R_{1000}}$$

$$k_{\text{phase}} = 2 \text{ for single-phase or DC; } \sqrt{3} \text{ for three-phase}$$

Warnings and limitations

Inverse voltage-drop arithmetic only; review conductor data, load behavior, installation conditions, adopted guidance, and qualified design context separately.