

Motor Voltage Drop Calculator

Estimates running and starting voltage drop and remaining motor voltage from current, one-way length, conductor resistance, system voltage, and phase model.

Generated October 10, 2026

<https://www.elecatrix.com/motors-starters/motor-voltage-drop-calculator/>

Inputs

Input	Value	Unit
Running current	28	A
Starting current	168	A
One-way length	150	ft
System voltage	480	V
Phase model	Balanced three-phase	
Conductor resistance	0.628	ohm/1000 ft

Results

Result	Value	Unit
Running voltage drop	4.5685	V
Running voltage drop	0.9518	%
Running remaining voltage	475.4315	V
Starting voltage drop	27.4107	V
Starting voltage drop	5.7106	%
Starting remaining voltage	452.5893	V
Phase multiplier	1.7321	x

Calculation details

Detail	Value	Unit
Calculation basis	Running and starting voltage drop use the entered current values, one-way length, conductor resistance per 1000 ft, and the selected single-phase or balanced three-phase multiplier.	

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Selection boundary

Motor voltage-drop estimate only;
verify conductor data, motor
starting profile, source impedance,
utility limits, equipment
ride-through, and code requirements
separately.

Formulas

$$k_{\phi}=2 \text{ for single-phase two-conductor; } \sqrt{3} \text{ for balanced three-phase}$$

$$V_{D, \text{running}}=k_{\phi} I_{\text{running}} R(L/1000)$$

$$V_{D, \text{starting}}=k_{\phi} I_{\text{starting}} R(L/1000)$$

$$\text{Voltage-drop (\%)}=\frac{V_{D, \text{system}}}{V_{\text{system}}} \times 100$$

$$\text{Remaining voltage}=V_{\text{system}}-V_D$$

Warnings and limitations

This motor voltage-drop estimate is planning arithmetic. It does not verify motor starting torque, source impedance, utility flicker limits, conductor ampacity, protection, equipment ride-through, or code compliance.