

Motor Branch Voltage Drop Calculator

Estimate running and starting voltage drop, terminal voltage, and approximate loss from entered motor branch-circuit values.

Generated October 10, 2026

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

Inputs

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

Results

Result	Value	Unit
One-way resistance	0.0942	ohm
Phase multiplier	1.7321	x
Running voltage drop	4.5685	V
Running voltage drop	0.9518	%
Running terminal voltage	475.4315	V
Starting voltage drop	27.4107	V
Starting voltage drop	5.7106	%
Starting terminal voltage	452.5893	V
Approximate running loss	127.9168	W
Approximate starting loss	4605.0049	W

Calculation details

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Detail	Value	Unit
Calculation basis	The branch-circuit screen uses entered conductor resistance and length with running and starting currents under the selected phase model.	
Screening boundary	Motor branch voltage-drop arithmetic only; no source impedance, starting torque, conductor ampacity, protection, utility, manufacturer, or code approval result is made.	

Formulas

one-way resistance = one-way length x conductor resistance / 1000

phase multiplier = 2 for single-phase two-conductor; sqrt(3) for balanced three-phase

running voltage drop = phase multiplier x running current x one-way resistance

starting voltage drop = phase multiplier x starting current x one-way resistance

terminal voltage = system voltage - voltage drop

Warnings and limitations

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