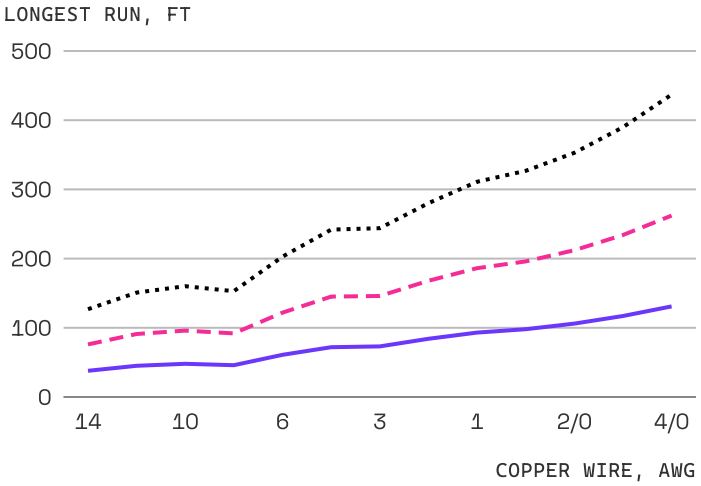
Voltage drop chart

12 AWG copper loaded to 20 A can run 45 ft one way at 120 V before the voltage drop passes 3%, and 91 ft at 240 V. 10 AWG at 30 A reaches 48 ft at 120 V.

Longest one-way copper run, by wire size loaded to its largest 75 °C breaker, that keeps the voltage drop within 3% at 120 and 240 V or 5% at 240 V

COPPER WIRE	LOAD	120 V, 3%	240 V, 3%	240 V, 5%
14 AWG	15 A	38 ft	76 ft	127 ft
12 AWG	20 A	45 ft	91 ft	151 ft
10 AWG	30 A	48 ft	96 ft	160 ft
8 AWG	50 A	46 ft	92 ft	153 ft
6 AWG	60 A	61 ft	122 ft	203 ft
4 AWG	80 A	72 ft	145 ft	242 ft
3 AWG	100 A	73 ft	146 ft	244 ft
2 AWG	110 A	84 ft	168 ft	280 ft
1 AWG	125 A	93 ft	186 ft	311 ft
1/0 AWG	150 A	98 ft	196 ft	327 ft
2/0 AWG	175 A	106 ft	212 ft	353 ft
3/0 AWG	200 A	117 ft	234 ft	390 ft
4/0 AWG	225 A	131 ft	262 ft	437 ft



Longest one-way run by wire size, each wire at its own 75 °C breaker load.

How to use the voltage drop chart

Distances are one way, from the panel to the load, with the circuit loaded to the largest breaker the wire can take at 75 °C. At half the load the distance doubles. Aluminum reaches about 60% of the copper distance at the same size.

The 3% target is a common recommendation for a branch circuit, with 5% for the feeder and branch together. Drop is calculated as 2 × K × amps × feet ÷ circular mils, with K = 12.9 for copper.

SOURCES

- NFPA 70, National Electrical Code (2023): Conductor properties, Chapter 9 Table 8
- NFPA 70, National Electrical Code (2023): Allowable ampacities of insulated conductors, Table 310.16

▶ Compared with 7 published documents, last on 2026-11-13

Calculated by Calculate.diy with the method of the National Electrical Code® (NEC®), 2023 edition; not the NEC text. Methodology. For planning only: check local code and use a licensed electrician.