

VOLTAGE DROP CHART · 1-PHASE 240 V · 20 A LOAD

CodePass.PRO · 2026-05-05

NEC 3% BRANCH / 5% TOTAL

SOURCE · NFPA 70 (NEC) Article 210.19(A) FPN · Chap 9 Table 8 (DC resistance)

$Vd\% = (2 \times I \times R \times L) / V \times 100$. Values shown are %drop for 20 A at 240 V 1-phase.

Linear scaling: at 40 A double the drop; at 120 V double the % drop. Cells > 3% bold orange; > 5% bold red.

COPPER (Cu) — 75 °C THWN/THHN

Length (ft)	#14	#12	#10	#8	#6	#4	#2	#1	#1/0	#2/0	#3/0	#4/0
25	1.28	0.80	0.50	0.32	0.20	0.13	0.08	0.06	0.05	0.04	0.03	0.03
50	2.56	1.61	1.01	0.64	0.41	0.26	0.16	0.13	0.10	0.08	0.06	0.05
75	3.84	2.41	1.51	0.95	0.61	0.39	0.24	0.19	0.15	0.12	0.10	0.08
100	5.12	3.22	2.02	1.27	0.82	0.51	0.32	0.26	0.20	0.16	0.13	0.10
150	7.68	4.83	3.02	1.91	1.23	0.77	0.48	0.39	0.30	0.24	0.19	0.15
200	10.23	6.43	4.03	2.55	1.64	1.03	0.65	0.51	0.41	0.32	0.26	0.20
250	12.79	8.04	5.04	3.18	2.05	1.28	0.81	0.64	0.51	0.40	0.32	0.25
300	15.35	9.65	6.05	3.82	2.46	1.54	0.97	0.77	0.61	0.48	0.38	0.30

ALUMINIUM (Al) — 75 °C XHHW-2

Length (ft)	#12	#10	#8	#6	#4	#2	#1	#1/0	#2/0	#3/0	#4/0
25	1.33	0.83	0.53	0.34	0.21	0.13	0.11	0.08	0.07	0.05	0.04
50	2.65	1.67	1.05	0.67	0.42	0.27	0.21	0.17	0.13	0.10	0.08
75	3.97	2.50	1.57	1.01	0.64	0.40	0.32	0.25	0.20	0.16	0.13
100	5.30	3.33	2.10	1.35	0.85	0.53	0.42	0.34	0.27	0.21	0.17
150	7.95	5.00	3.15	2.02	1.27	0.80	0.63	0.50	0.40	0.32	0.25
200	10.60	6.67	4.20	2.69	1.69	1.06	0.84	0.67	0.53	0.42	0.33
250	13.25	8.33	5.25	3.37	2.12	1.33	1.05	0.84	0.66	0.53	0.42
300	15.90	10.00	6.30	4.04	2.54	1.59	1.27	1.01	0.80	0.63	0.50

NOTES

- Branch-circuit rule (NEC 210.19 Informational Note): aim for 3 % drop on the branch.
- Total feeder + branch: 5 % per NEC 215.2 IN. Long runs almost always need an upsize.
- 3-phase: use $Vd\% = (3 \times I \times R \times L) / V \times 100$ — values run ~13 % lower than the chart above.
- AS/NZS 3000 limit is 5 % from origin to outlet (no separate branch limit).
- Conductor temperature affects R: at 90 °C copper rises by ~6 %, at 60 °C drops by ~6 %.

Reference values for engineering education only. Verify with an interactive calculator and a licensed engineer before installation.