

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

CodePass.PRO · 2026-06-20

NEC 3% BRANCH / 5% TOTAL

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

$V_d\% = (2 \times I \times R \times L) / V \times 100$ . 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	<b>3.84</b>	2.41	1.51	0.95	0.61	0.39	0.24	0.19	0.15	0.12	0.10	0.08
100	<b>5.12</b>	<b>3.22</b>	2.02	1.27	0.82	0.51	0.32	0.26	0.20	0.16	0.13	0.10
150	<b>7.68</b>	<b>4.83</b>	<b>3.02</b>	1.91	1.23	0.77	0.48	0.39	0.30	0.24	0.19	0.15
200	<b>10.23</b>	<b>6.43</b>	<b>4.03</b>	2.55	1.64	1.03	0.65	0.51	0.41	0.32	0.26	0.20
250	<b>12.79</b>	<b>8.04</b>	<b>5.04</b>	<b>3.18</b>	2.05	1.28	0.81	0.64	0.51	0.40	0.32	0.25
300	<b>15.35</b>	<b>9.65</b>	<b>6.05</b>	<b>3.82</b>	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	<b>3.97</b>	2.50	1.57	1.01	0.64	0.40	0.32	0.25	0.20	0.16	0.13
100	<b>5.30</b>	<b>3.33</b>	2.10	1.35	0.85	0.53	0.42	0.34	0.27	0.21	0.17
150	<b>7.95</b>	<b>5.00</b>	<b>3.15</b>	2.02	1.27	0.80	0.63	0.50	0.40	0.32	0.25
200	<b>10.60</b>	<b>6.67</b>	<b>4.20</b>	2.69	1.69	1.06	0.84	0.67	0.53	0.42	0.33
250	<b>13.25</b>	<b>8.33</b>	<b>5.25</b>	<b>3.37</b>	2.12	1.33	1.05	0.84	0.66	0.53	0.42
300	<b>15.90</b>	<b>10.00</b>	<b>6.30</b>	<b>4.04</b>	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  $V_d\% = (3 \times I \times R \times L) / V \times 100$  — 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.