

Voltage Loss for Copper Wire (AWG)

The voltage losses in the chart below were calculated using Ohm's Law, and are theoretical. Safety margin should be built into the design to take into consideration deterioration of wire splices, power brownouts, etc.

FLOW (AMPS)	VOLTAGE LOSS PER 1000' OF WIRE RUN (2 WIRES)															
	AMERICAN WIRE GAUGE (AWG)															
	18	16	14	14/1 2	14/1 0	12	10	8	6	4	2	1	0	00	00 0	000 0
0.1	1.28	0.80	0.51	0.41	0.35	0.32	0.20	0.13	0.08	0.05	0.03	0.03	0.20	0.02	0.01	0.01
0.2	2.56	1.61	1.01	0.82	0.70	0.63	0.40	0.25	0.16	0.10	0.06	0.05	0.40	0.03	0.03	0.02
0.3	3.83	2.41	1.52	1.23	1.06	0.95	0.60	0.38	0.24	0.15	0.10	0.08	0.60	0.05	0.04	0.03
0.4	5.11	3.22	2.02	1.64	1.41	1.27	0.80	0.50	0.32	0.20	0.13	0.10	0.80	0.06	0.05	0.04
0.5	6.39	4.02	2.53	2.06	1.76	1.59	1.00	0.63	0.40	0.25	0.16	0.13	1.00	0.08	0.06	0.05
0.6	7.67	4.83	3.03	2.47	2.11	1.90	1.19	0.75	0.48	0.30	0.19	0.15	1.20	0.10	0.08	0.06
0.7	8.95	5.63	3.54	2.88	2.46	2.22	1.39	0.88	0.57	0.35	0.22	0.18	1.40	0.11	0.09	0.07
0.8	10.22	6.43	4.04	3.29	2.82	2.54	1.59	1.00	0.65	0.40	0.26	0.20	1.60	0.13	0.10	0.08
0.9	11.50	7.24	4.55	3.70	3.17	2.86	1.79	1.13	0.73	0.46	0.29	0.23	1.80	0.14	0.11	0.09
1.0	12.78	8.04	5.05	4.11	3.52	3.17	1.99	1.26	0.81	0.51	0.32	0.25	2.00	0.16	0.13	0.10
2.0	25.56	16.08	10.10	8.22	7.04	6.35	3.98	2.51	1.62	1.01	0.64	0.51	4.00	0.32	0.25	0.20
3.0	38.34	24.13	15.15	12.34	10.56	9.52	5.97	3.77	2.42	1.52	0.96	0.76	6.00	0.48	0.38	0.30
4.0	-	32.17	20.20	16.45	14.08	12.70	7.96	5.02	3.23	2.02	1.28	1.02	8.00	0.64	0.50	0.40
5.0	-	40.21	25.25	20.56	17.60	15.87	9.95	6.28	4.04	2.53	1.60	1.27	10.00	0.80	0.63	0.50
6.0	-	48.25	30.30	24.67	21.12	19.04	11.94	7.54	4.85	3.04	1.92	1.52	12.00	0.96	0.76	0.60
7.0	-	-	35.35	28.78	24.64	22.22	13.93	8.79	5.66	3.54	2.24	1.78	14.00	1.12	0.88	0.70
8.0	-	-	40.40	32.90	28.16	25.39	15.92	10.05	6.46	4.05	2.56	2.03	16.00	1.28	1.01	0.80
9.0	-	-	45.45	37.01	31.68	28.57	17.91	11.30	7.27	4.55	2.88	2.29	18.00	1.44	1.13	0.90
10.0	-	-	50.5	41.12	35.20	31.7	19.9	12.5	8.0	5.0	3.2	2.5	20.0	1.6	1.2	1.00

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COPPER WIRE RESISTANCE (OHMS PER 1000' OF SINGLE WIRE) @ 68°F															
WIRE GAUGE (AWG)															
18	16	14	14/12	14/10	12	10	8	6	4	2	1	0	00	000	0000
6.390	4.021	2.525	2.056	1.760	1.587	0.995	0.628	0.404	0.253	0.160	0.127	1.000	0.080	0.063	0.050

- NOTE:**
1. These figures were derived by using Ohm's law and the above values for copper wire resistance, which were obtained from Table 8 of the 2005 edition of the National Electrical Code.
 2. The distances should be reduced by 20% as a safety factor for losses caused by corrosion to connections, equipment deterioration, brownouts, etc.
 3. The heading 14/12 means 14 AWG "hot" wire and 12 AWG "common" wire
 4. Based on operating temperature of 68°F (20°C)

Low Voltage Landscape Lighting

Voltage Drop Per 10 Linear Feet Of Cable

LAMP POWER FLOWING IN CABLE SECTION (WATTS @12V)	FLOW (AMPS)	WIRE GAUGE (AWG), CLASS K COPPER				
		18	16	12	10	8
		WIRE RESISTANCE (Ohms/10' of cable, both conductors) @ 77 °F (25 °C)				
		0.1358	0.0852	0.0336	0.0212	0.0136
20	1.67	0.226	0.142	0.056	0.035	0.023
25	2.08	0.283	0.178	0.070	0.044	0.028
30	2.50	0.340	0.213	0.084	0.053	0.034
35	2.92	0.396	0.249	0.098	0.062	0.040
40	3.33	0.453	0.284	0.112	0.071	0.045
45	3.75	0.509	0.320	0.126	0.080	0.051
50	4.17	0.566	0.355	0.140	0.088	0.057
55	4.58	0.622	0.391	0.154	0.097	0.062
60	5.00	0.679	0.426	0.168	0.106	0.068
65	5.42	0.736	0.462	0.182	0.115	0.074
70	5.83	0.792	0.497	0.196	0.124	0.079
75	6.25	0.849	0.533	0.210	0.133	0.085
80	6.67	0.905	0.568	0.224	0.141	0.091
85	7.08	0.962	0.604	0.238	0.150	0.096

90	7.50	1.019	0.639	0.252	0.159	0.102
95	7.92	1.075	0.675	0.266	0.168	0.108
100	8.33	-	0.710	0.280	0.177	0.113
105	8.75	-	0.746	0.294	0.186	0.119
110	9.17	-	0.781	0.308	0.194	0.124
115	9.58	-	0.817	0.322	0.203	0.130
120	10.00	-	0.852	0.336	0.212	0.136
125	10.42	-	-	0.350	0.221	0.141
130	10.83	-	-	0.364	0.230	0.147
135	11.25	-	-	0.378	0.239	0.153
140	11.67	-	-	0.392	0.247	0.158
145	12.08	-	-	0.406	0.256	0.164
150	12.50	-	-	0.420	0.265	0.170
155	12.92	-	-	0.434	0.274	0.175
160	13.33	-	-	0.448	0.283	0.181
165	13.75	-	-	0.462	0.292	0.187
170	14.17	-	-	0.476	0.300	0.192
175	14.58	-	-	0.490	0.309	0.198
180	15.00	-	-	0.504	0.318	0.204
185	15.42	-	-	0.518	0.327	0.209
190	15.83	-	-	0.532	0.336	0.215
195	16.25	-	-	0.546	0.345	0.221
200	16.67	-	-	0.560	0.353	0.226
205	17.08	-	-	0.574	0.362	0.232
210	17.50	-	-	0.588	0.371	0.238
215	17.92	-	-	0.602	0.380	0.243
220	18.33	-	-	0.616	0.389	0.249
225	18.75	-	-	0.630	0.398	0.255
230	19.17	-	-	0.644	0.406	0.260
235	19.58	-	-	0.658	0.415	0.266
240	20.00	-	-	0.672	0.424	0.272

- NOTE:**
1. Do not use a cable whose ampacity is less than the rating of the transformer circuit breaker.
 2. Above chart shows voltage drops for maximum flows of 80% of the cables' ampacities.
 3. Above chart shows voltage drops for maximum wattage of 240 watts (80% of 300 watt transformer circuit rating.)