

OHM'S LAW CIRCLE

To find AMPS - ($I = E/R$) or AMPS = VOLTS divided by OHMS
 To find VOLTS - ($E = I \times R$) or VOLTS = AMPS multiplied by OHMS
 To find RESISTANCE - ($R = E/I$) or OHMS = VOLTS divided by AMPS

WATTAGE (power)

To find VOLTAGE - ($E = W/I$) or VOLTS = WATTS divided by AMPS
 To find WATTAGE - ($W = E \times I$) or WATTS = VOLTS multiplied by AMPS
 To find AMPERAGE - ($I = W/E$) or AMPS = WATTS divided by VOLTS

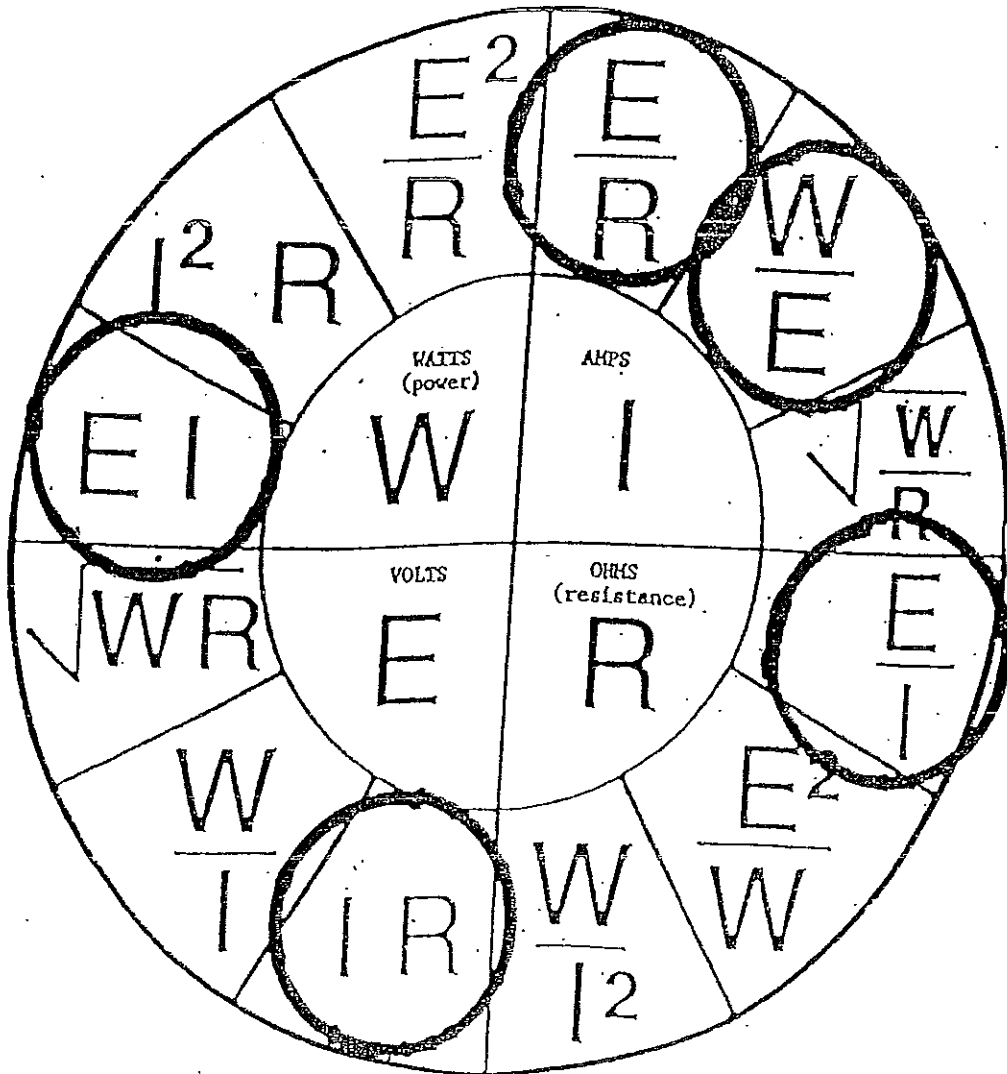


Table 8. Conductor Properties

Size AWG / kcmil	Area Circ. Mils	Conductors				DC Resistance at 75°C (167°F)		
		Stranding		Overall		Copper		Alumi- num
		Quantity	Diam. In.	Diam. In.	Area In. ²	Uncoated ohm / kFT	Coated ohm / kFT	ohm / kFT
18	1620	1	—	0.040	0.001	7.77	8.08	12.8
18	1620	7	0.015	0.046	0.002	7.95	8.45	13.1
16	2580	1	—	0.051	0.002	4.89	5.08	8.05
16	2580	7	0.019	0.059	0.003	4.99	5.29	8.21
14	4110	1	—	0.064	0.003	3.07	3.19	5.06
14	4110	7	0.024	0.073	0.004	3.14	3.26	5.17
12	6530	1	—	0.081	0.005	1.93	2.01	3.18
12	6530	7	0.030	0.092	0.006	1.98	2.05	3.25
10	10380	1	—	0.102	0.008	1.21	1.26	2.00
10	10380	7	0.038	0.116	0.011	1.24	1.29	2.04
8	16510	1	—	0.128	0.013	0.764	0.786	1.26
8	16510	7	0.049	0.146	0.017	0.778	0.809	1.28
6	26240	7	0.061	0.184	0.027	0.491	0.510	0.808
4	41740	7	0.077	0.232	0.042	0.308	0.321	0.508
3	52620	7	0.087	0.260	0.053	0.245	0.254	0.403
2	66360	7	0.097	0.292	0.067	0.194	0.201	0.319
1	83690	19	0.066	0.332	0.087	0.154	0.160	0.253
1/0	105600	19	0.074	0.373	0.109	0.122	0.127	0.201
2/0	133100	19	0.094	0.419	0.138	0.0967	0.101	0.159
3/0	167800	19	0.094	0.470	0.173	0.0766	0.0797	0.126
4/0	211600	19	0.106	0.528	0.219	0.0608	0.0626	0.100
250	—	37	0.082	0.575	0.260	0.0515	0.0535	0.0847
300	—	37	0.090	0.630	0.312	0.0429	0.0446	0.0707
350	—	37	0.097	0.681	0.364	0.0367	0.0382	0.0605
400	—	37	0.104	0.728	0.416	0.0321	0.0331	0.0529
500	—	37	0.116	0.813	0.519	0.0258	0.0265	0.0424
600	—	61	0.092	0.893	0.626	0.0214	0.0223	0.0353
700	—	61	0.107	0.964	0.730	0.0184	0.0189	0.0303
750	—	61	0.111	0.998	0.782	0.0171	0.0176	0.0282
800	—	61	0.114	1.03	0.834	0.0161	0.0166	0.0265
900	—	61	0.122	1.09	0.940	0.0143	0.0147	0.0235
1000	—	61	0.128	1.15	1.04	0.0129	0.0132	0.0212
1250	—	91	0.117	1.29	1.30	0.0103	0.0106	0.0169
1500	—	91	0.128	1.41	1.57	0.00858	0.00893	0.0141
1750	—	127	0.117	1.52	1.83	0.00735	0.00735	0.0121
2000	—	127	0.126	1.63	2.09	0.00643	0.00662	0.0106

The resistances shown are based on 75°C or 167°F.

The first column shows the AWG (American Wire Gauge) size.

The second column shows the area of circular mils (cma). A circular mil is 0.001 inch.

The third column shows the quantity of stranding, 1 strand is a solid wire, whereas 7 strands means stranded wire.

The last three columns show the resistance for 1000 feet of wire. Uncoated copper, coated copper (tinned), and aluminum.

Example:

SOURCE VOLTAGE	3% PERMITTED VOLTAGE DROP
115 volts	3.45 volts
120 volts	3.6 volts - 116.4
208 volts	6.24 volts
230 volts	6.9 volts
240 volts	7.2 volts - 232.8
480 volts	14.4 volts

To find the voltage drop of a circuit use the formula $VD = I \times R$.

I = The load current flowing in the conductor in amps.

R = The resistance in ohms of the conductor. The resistance values of conductors are found in Chapter 9, Table 8 of the Code. Table 8 indicates the resistance of a conductor in ohms per 1000 feet.