

## OHM'S LAW

Voltage =  $E = \text{Volts} = I \times R = W/I = \text{Square Root } (W \times R)$

Current =  $I = \text{Amperes} = E/R = W/E = \text{Square Root } (W/R)$

Resistance =  $R = \text{Ohms} = E/I = E \times E/W = W / (I \times I)$

Power =  $W = \text{Watts} = E \times I = I \times I \times R = E \times E/R$

## WIRE FACTS

Interesting information about wire!

### WIRE COLORS

Most wire comes in the same 10 standard colors as used in the resistor color code: BLK, BRN, RED, ORG, YEL, GRN, BLU, VIO, GRY and WHT.

Unfortunately there are no standards established for the color shade, so actual wire colors vary over a large range.

### INSULATION WALL THICKNESS

UL only specifies a nominal and minimum wall thickness on most common hookup wire. This means that excess buildup in the plastic insulation, 5 to 10 times the normal thickness is acceptable. However, Military specifications which are more exact always call out a maximum wall thickness.

### IRRADIATED INSULATION

Regular PVC wire insulation softens and discolors at soldering temperatures. Irradiated PVC insulation is special PVC that has been exposed to high-energy radiation to cross link the plastic molecules, this reducing the problems encountered during soldering.

## WIRE GAUGE CONVERSION CHART

Gages Arranged In Columns As Follows:

**AWG**= American Wire Gauge

**B&S**= Brown & Sharpe

**SWG**= Imperial Standard Wire Gauge- (British legal standard)

Comment: Values are stated in approximate decimals of an inch excluding the metric numbers. As a number of gauges are in use for various shapes and metals, it is advisable to state the thickness in thousands when specifying in gauge number. Metric wire gauge is 10 times the diameter in millimeters.

SWG (Inches)	Wire Number (Gauge)	AWG or B&S (Inches)	AWG Metric (MM)
0.500	0000000 (7/0)	...	...
0.464	000000 (6/0)	0.580000	...
0.432	00000 (5/0)	0.516500	...
0.400	0000 (4/0)	0.460000	11,684
0.372	000 (3/0)	0.409642	10,404
0.348	00 (2/0)	0.364796	9,266
0.324	0 (1/0)	0.324861	8,252
0.300	1	0.289297	7,348
0.276	2	0.257627	6,543
0.252	3	0.229423	5,827
0.232	4	0.2043	5,189
0.2120	5	0.1819	4,621
0.1920	6	0.1620	4,115
0.1760	7	0.1443	3,665
0.1600	8	0.1285	3,264
0.1440	9	0.1144	2,906
0.1280	10	0.1019	2,588
0.1160	11	0.0907	2,304
0.1040	12	0.0808	2,052
0.0920	13	0.0720	1,829
0.0800	14	0.0641	1,628

SWG	Wire Number	AWG or B&S	AWG Metric
0.0720	15	0.0571	1,450
0.0640	16	0.0508	1,291
0.0560	17	0.0453	1,150
0.0480	18	0.0403	1,024
0.0400	19	0.0359	0,9119
0.0360	20	0.0320	0,8128
0.0320	21	0.0285	0,7239
0.0280	22	0.0253	0,6426
0.0240	23	0.0226	0,5740
0.0220	24	0.0201	0,5106
0.0200	25	0.0179	0,4547
0.0180	26	0.0159	0,4038
0.0164	27	0.0142	0,3606
0.0148	28	0.0126	0,3200
0.0136	29	0.0113	0,2870
0.0124	30	0.0100	0,2540
0.0116	31	0.0089	0,2261
0.0108	32	0.0080	0,2032
0.0100	33	0.0071	0,1803
0.0092	34	0.0063	0,1601
0.0084	35	0.0056	0,1422
0.0076	36	0.0050	0,1270
0.0068	37	0.0045	0,1143
0.0060	38	0.0040	0,1016
0.0052	39	0.0035	0,0889
0.0048	40	0.0031	0,0787
0.0044	41	0.0028	0,0711
0.0040	42	0.0025	0,0635
0.0036	43	0.0022	0,0559
0.0032	44	0.0020	0,0508
0.0028	45	0.0018	0,0457

SWG	Wire Number	AWG or B&S	AWG Metric
0.0024	46	0.0016	0,0406
0.0020	47	0.0014	0,0350
0.0016	48	0.0012	0.0305
0.0012	49	0.0011	0,0279
0.0010	50	0.0010	0,0254
...	51	0.00088	0,0224
...	52	0.00078	0,0198
...	53	0.00070	0,0178
...	54	0.00062	0,0158
...	55	0.00055	0,0140
...	56	0.00049	0,0124