



**Quick Overview**

As electric current flows through wire, there is a loss in voltage. This loss is referred to as IR voltage drop.

Voltage (Drop) = Wire Resistance X Amps of current (E=IR)

Calculating the voltage loss for a pair of wires gets a little complicated, so we have constructed a quick look up table for what size wire you will need for your application. The table below is for 12-volt ac or dc devices only. You just need to know the power in Watts (VA), or Amps and the table will show how far you can go in feet for any size wire pair listed. The table is based on a 10% loss of voltage on a pair of wires. This should work for most 12-volt devices. Checking the manufacturer's specifications, use the maximum watts or current and be sure the minimum operational voltage is 10v or below. The footage in the table is linear, a 20% loss would double the distance, or 5% would cut it in half.

The table calculations are based on the ohms of the wire at 70°F. If the wire temperature is raised to 130°F the voltage drop would increase by about 3%. The voltage drop calculations are also based on a conventional load. If manufacturer makes recommendations for wire sizes, use them instead of this table.

**Wire Length Table**

12V Power Required W(VA)/Amps	The recommended maximum distances for 12volts, ac or dc, is the cell below the wire size, adjacent to watts (VA) or required current.									
	WIRE GAUGE									
	8awg	10awg	12awg	14awg	16awg	18awg	20awg	22awg	24awg	26awg
3W/.25A	3,733	2,396	1,508	947	595	376	234	146	93	59
4W/.33A	2,828	1,815	1,142	717	451	285	177	111	70	44
5W/.42A	2,222	1,426	898	564	354	224	139	87	55	35
10W/.83A	1,124	722	454	285	179	113	71	44	28	18
20W/1.67A	559	359	226	142	89	56	35	22	14	9
30W/2.50A	373	240	151	95	60	38	23	15	N/A	N/A
40W/3.33A	280	180	113	71	45	28	18	11	N/A	N/A
50W/4.17A	224	144	90	57	36	23	14	N/A	N/A	N/A
60W/5.00A	187	120	75	47	30	19	12	N/A	N/A	N/A
70W/5.83A	160	103	65	41	26	16	10	N/A	N/A	N/A
80W/6.67A	140	90	57	35	22	14	N/A	N/A	N/A	N/A
90W/7.50A	124	80	50	32	20	13	N/A	N/A	N/A	N/A
100W/8.33A	112	72	45	28	18	11	N/A	N/A	N/A	N/A
110W/9.17A	102	65	41	26	16	10	N/A	N/A	N/A	N/A
120W/10.00A	93	60	38	24	15	N/A	N/A	N/A	N/A	N/A

1/02 © Technical Literature jdb Calculating wire length for 12v  
 \products\applicationNotes\an212-WireSizeTable



Electronic Security Devices  
 6111 Southfront Road, Suite J  
 Livermore, CA 94550

**Manufacturers of High Quality Security Devices**

Phone: (925) 243-8990 Fax: (925) 243-8999  
 ESD@SecurityPower.com [www.SecurityPower.com](http://www.SecurityPower.com)