Primary Wire Guide

The selection of the correct gauge primary wire is very important for automotive and other low-voltage wiring to assure safe and reliable performance.

When an insufficient gauge primary wire is used a voltage drop occurs due to electrical resistance. On lighting equipment there is also a loss of candlepower (visible light measurement).

The two factors that should always be considered in selecting an adequate gauge primary wire are (1) the total amperage the circuit will carry and (2) the total length of wire used in each circuit, including the return.

Use the automotive primary wiring guide below to determine the correct gauge size wire for 12 volt systems. Allowance for the return circuits, including grounded returns, has been computed on the recommendations below. The length cable should be determined by totaling both wires in a two-wire circuit.

Automotive Primary Wiring Guide

TOTAL APPROX. CIRCUIT AMPERES	WIRE GAUGE (FOR LENGTH IN FEET)											
12V	3'	5'	7'	10'	15'	20'	25'	30'	40'	50'	75'	100'
1	18	18	18	18	18	18	18	18	18	18	18	18
1.5	18	18	18	18	18	18	18	18	18	18	18	18
2	18	18	18	18	18	18	18	18	18	18	16	16
3	18	18	18	18	18	18	18	18	18	18	14	14
4	18	18	18	18	18	18	18	18	16	16	12	12
5	18	18	18	18	18	18	18	18	16	14	12	12
6	18	18	18	18	18	18	16	16	16	14	12	10
7	18	18	18	18	18	18	16	16	14	14	10	10
8	18	18	18	18	18	16	16	16	14	12	10	10
10	18	18	18	18	16	16	16	14	12	12	10	10
11	18	18	18	18	16	16	14	14	12	12	10	8
12	18	18	18	18	16	16	14	14	12	12	10	8
15	18	18	18	18	14	14	12	12	12	10	8	8
18	16	16	16	16	14	14	12	12	10	10	8	8
20	16	16	16	16	14	12	10	10	10	10	8	6
22	14	14	14	14	12	12	10	10	10	8	6	6
24	14	14	14	14	12	12	10	10	10	8	6	6
30	12	12	12	12	10	10	10	10	10	6	4	4
40	10	10	10	10	10	10	8	8	6	6	4	2
50	8	8	8	8	8	8	8	8	6	6	2	2
100	4	4	4	4	4	4	4	4	4	2	1	1/0
150	2	2	2	2	2	2	2	2	2	1	2/0	2/0
200	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	4/0	4/0

How to use chart

1. Measure Length of Wire in Circuit — Chart applies to ground return. Two-wire circuits will be total of both wire lengths. Be sure to include both vehicles on auto and trailer applications.
2. Find the total amperes, watts or candlepower and choose nearest value in proper column.
3. Move horizontally to proper footage column and find nearest wire gauge.

Based on maximum of 10% voltage drop @ 100°F (in free air)

NOTE:
18 gauge applications above the shaded area could be 20 gauge electrically but 18 gauge is recommended for tensile strength of the wire.