

## Cable Sizing Table for 12V DC Systems (10% Voltage Drop)

This table provides guidance for selecting the minimum cable cross-section (mm<sup>2</sup>) for 12-volt DC systems, based on current (A) and one-way cable length (m). It is intended for use in onboard power installations, such as thrusters, windlasses, and other high-current equipment on pleasure craft.

The calculations are based on a 10% maximum voltage drop in accordance with ISO 10133 for motor and heavy-load circuits in 12V DC systems. These are minimum recommended values. Selecting a larger cable size or reducing the cable length will reduce voltage drop and improve overall performance.

### Method and Assumptions

The values in this table are calculated using the standard DC voltage drop formula:

$$V_d = 2 \times L \times I \times \rho / A$$

where:

V<sub>d</sub> = voltage drop (V)

L = one-way cable length (m)

I = current (A)

ρ = resistivity of copper (0.0175 Ω·mm<sup>2</sup>/m)

A = cable cross-sectional area (mm<sup>2</sup>)

The calculations assume a 10% voltage drop limit (1.2 V for a 12 V system). Values are rounded up to the next available standard cable size (ISO standard cross-sections).

Please note that the actual current-carrying capacity of a cable depends on installation conditions (ambient temperature, bundling, ventilation, etc.). This table is intended for voltage drop guidance rather than thermal current limits.

Current (A)	2 m	4 m	6 m	8 m	10 m	12 m	15 m	20 m
20 A	1.5 mm <sup>2</sup>	2.5 mm <sup>2</sup>	4 mm <sup>2</sup>	6 mm <sup>2</sup>	6 mm <sup>2</sup>	10 mm <sup>2</sup>	10 mm <sup>2</sup>	16 mm <sup>2</sup>
30 A	2.5 mm <sup>2</sup>	4 mm <sup>2</sup>	6 mm <sup>2</sup>	10 mm <sup>2</sup>	10 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>	25 mm <sup>2</sup>
40 A	2.5 mm <sup>2</sup>	6 mm <sup>2</sup>	10 mm <sup>2</sup>	10 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>	25 mm <sup>2</sup>	25 mm <sup>2</sup>
50 A	4 mm <sup>2</sup>	6 mm <sup>2</sup>	10 mm <sup>2</sup>	16 mm <sup>2</sup>	16 mm <sup>2</sup>	25 mm <sup>2</sup>	25 mm <sup>2</sup>	35 mm <sup>2</sup>
75 A	6 mm <sup>2</sup>	10 mm <sup>2</sup>	16 mm <sup>2</sup>	25 mm <sup>2</sup>	25 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	50 mm <sup>2</sup>
100 A	6 mm <sup>2</sup>	16 mm <sup>2</sup>	25 mm <sup>2</sup>	25 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	50 mm <sup>2</sup>	70 mm <sup>2</sup>
125 A	10 mm <sup>2</sup>	16 mm <sup>2</sup>	25 mm <sup>2</sup>	35 mm <sup>2</sup>	50 mm <sup>2</sup>	50 mm <sup>2</sup>	70 mm <sup>2</sup>	95 mm <sup>2</sup>
150 A	10 mm <sup>2</sup>	25 mm <sup>2</sup>	35 mm <sup>2</sup>	35 mm <sup>2</sup>	50 mm <sup>2</sup>	70 mm <sup>2</sup>	70 mm <sup>2</sup>	95 mm <sup>2</sup>
200 A	16 mm <sup>2</sup>	25 mm <sup>2</sup>	35 mm <sup>2</sup>	50 mm <sup>2</sup>	70 mm <sup>2</sup>	70 mm <sup>2</sup>	95 mm <sup>2</sup>	120 mm <sup>2</sup>
250 A	16 mm <sup>2</sup>	35 mm <sup>2</sup>	50 mm <sup>2</sup>	70 mm <sup>2</sup>	95 mm <sup>2</sup>	95 mm <sup>2</sup>	120 mm <sup>2</sup>	150 mm <sup>2</sup>
300 A	25 mm <sup>2</sup>	35 mm <sup>2</sup>	70 mm <sup>2</sup>	70 mm <sup>2</sup>	95 mm <sup>2</sup>	120 mm <sup>2</sup>	150 mm <sup>2</sup>	185 mm <sup>2</sup>
400 A	25 mm <sup>2</sup>	50 mm <sup>2</sup>	70 mm <sup>2</sup>	95 mm <sup>2</sup>	120 mm <sup>2</sup>	150 mm <sup>2</sup>	185 mm <sup>2</sup>	240 mm <sup>2</sup>
500 A	35 mm <sup>2</sup>	70 mm <sup>2</sup>	95 mm <sup>2</sup>	120 mm <sup>2</sup>	150 mm <sup>2</sup>	185 mm <sup>2</sup>	240 mm <sup>2</sup>	300 mm <sup>2</sup>

These values represent the minimum recommended cross-section sizes. Using thicker cables or shorter lengths will reduce voltage drop and increase efficiency.