Wire Gauge Explained?

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The term wire gauge refers to the thickness of a wire. Wire gauge can be used to determine electrical resistance and the current handling capability of the wire. There are two major standards for describing wire gauge, Metric Wire Gauge (MWG) and American Wire Gauge (AWG). B&S is another commonly used measure of wire gauge, B&S means Brown & Sharpe and B&S is equal to AWG.

Metric Wire Gauge is used outside of the US. Metric Wire Gauge is quoted using its cross sectional area in mm² to describe the wire thickness.

American Wire Gauge is most commonly used in the US. The AWG is determined via the cross sectional area of the conductor, the same as MWG however AWG is described using a list of gauge numbers. AWG gauge numbers work in the opposite direction to MWG descrpitions, with the smallest numbers representing the largest diameter wires.

B&S is commonly used for thicker wires in Australia. B&S follows the same gauge descriptions as AWG and is simply another way of explaining the wire gauge. AWG = B&S.

AWG/B&S - Small gauge number for large wire cross sectional area - smaller the gauge/larger the wire.

MWG - Small gauge number for small wire cross section area, described in mm² - smaller the gauge/smaller the wire.

Wire Gauge Conversion Table

Common Gauge Reference	AWG/B&S Gauge	Area (mm²)	Strand Numbers/Size
3mm	17	1.13	16/0.3
4mm	15	1.81	26/0.3
5mm	13	2.9	41/0.3
6mm	11	4.59	65/0.3
8B&S	8	7.91	112/0.3
6B&S	6	13.56	192/0.3
3B&S	3	25.72	364/0.3
2B&S	2	32.15	455/0.3
1B&S	1	39.55	560/0.3
0B&S	0	49.2	700/0.3
00B&S	00	64.9	910/0.3
000B&S	000	85	1204/0.3

Common Redarc Installations

Type of Installation	Total cable length (m)	Cont. Current Draw (A)	Required Cross Sectional Area	Recommended Cable Gauge*
SBI12 under bonnet	2	60	8mm²	**8B&S**
SBI12 under bonnet with override	2	100 +	13mm²	**2B&S**
BCDC1220 under bonnet	2	20	2.7mm²	**6mm auto**
BCDC1220 in rear of vehicle	6	20	4mm²	**8B&S**
BCDC1225 under bonnet	2	25	3.4mm²	**8B&S**
BCDC1225 in camper trailer	10	25	17mm²	**4B&S**
BCDC1240 under bonnet	2	40	5.5mm²	**6B&S**
BCDC1240 in rear of vehicle	6	40	16mm²	**4B&S**

*Note: The recommended cable size may not actually reflect the required cable cross sectional area.

Required Wire Gauge Chart

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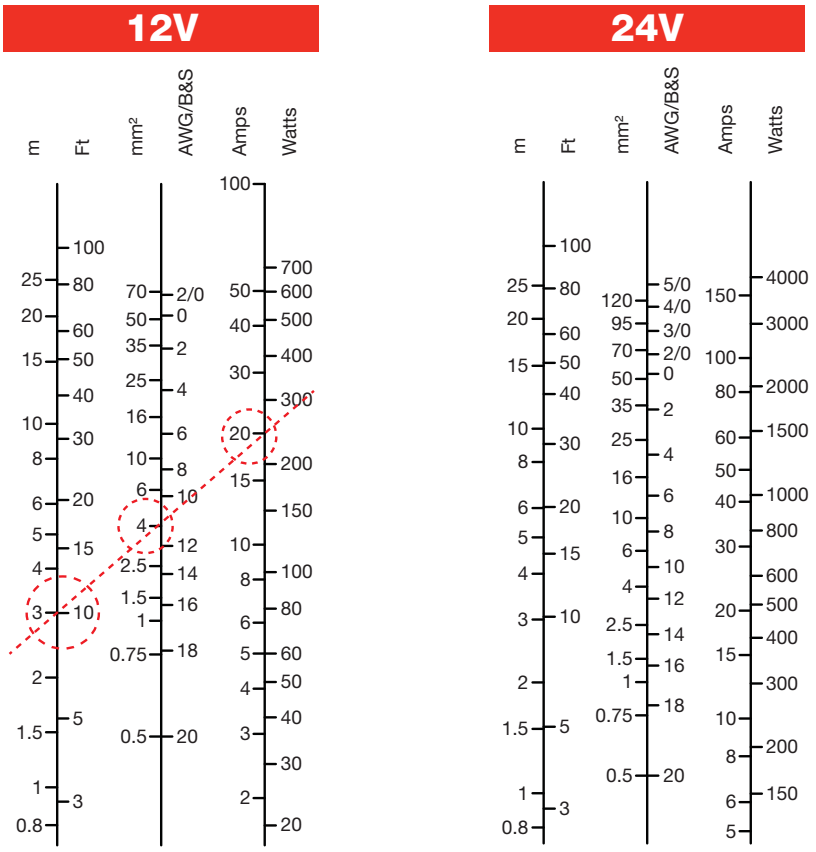
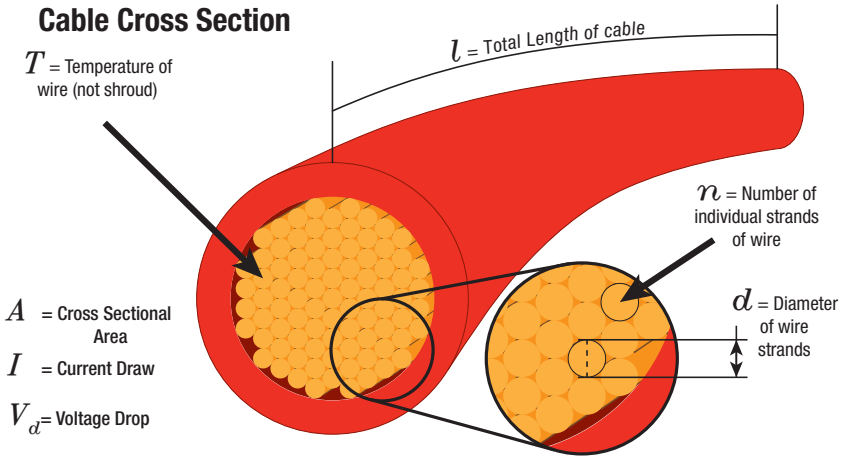
The below diagram will advise the minimum required wire gauge for a given cable length and the current draw or wattage. Simply draw a line from the required cable length (meters or feet), to the required current draw or wattage figure. Where the line passes through the gauge column will indicate the required wire gauge.

The example shows a BCDC1220 install with a total cable length of 3 metres. The chart suggests a 4mm² cross sectional area to handle the 20A maximum current draw.



Gauge chart supplied by Ashdown-Ingram

How to Calculate Voltage Drop or Cable Size



Cross Sectional Area (cable size)

$$A = \frac{\pi d^2}{4} \times n$$

Cross Sectional Area (cable size)

$$A = \frac{l \times I \times 0.017}{V_d}$$

Voltage drop (at 25°C)

$$V_d = \frac{l \times I \times 0.017}{A}$$

Voltage drop (other temperatures)

$$V_d = \frac{l \times I \times 0.017}{A} \times (1 + 0.004 \times (T - 25))$$

Want an easier way to work out Voltage Drop or required Cable Size?

www.redarc.com.au/handy-hints/calculator/