CABLE SIZE
(CURRENT CARRYING CAPACITY AND VOLT DROP)

Cable size for any circuit is determined from a combination of various factors: the length of cable, the current flowing and the permissible volt drop. When a current A (amperes) flows through a cable there is always resistance "OHMS" to its passage which results in a loss of power "WATTS" within the cable and the reduced voltage. The difference between the voltage from the supply and the voltage at the appliance end of the cable is the VOLT DROP. Excessive loss of power within a cable can, therefore, cause overheating and serious voltage drop. To overcome this problem, it is important that correctly rated cables are used for all circuits, bearing in mind that cable resistance is cumulative. The longer the cable, the higher the resistance. Cables are rated for their current carrying capacity. This usually depends on the total cross sectional area (CSA) of the conductor(s). In general the larger the CSA, the greater the current carrying capacity. Details are shown on Chart 1. By using the correct cable, the loss of power (heating effect) and voltage drop can be maximised. The reduction of the heating effect is most important as vehicle cables are usually wrapped together in a harness. Volt drop in a circuit should be no greater than 10% of the system voltage, i.e. 1.2V for a 12V system. However, there are exceptions to this rule. In main alternator (charging) and starter circuits the maximum volt drop allowed is 0.5V. Audio circuits are also a special case.

The volt drop expected in a circuit can be calculated with the reference to Chart 1 and the simple formula:-

Current Flowing x Total Cable Resistance = Volt Drop

When cables carry current continuously for long periods, both power loss (heating effect) and volt drop must be carefully considered. In intermittent circuits (e.g. horns, etc.), the cable is not required to carry current for long periods. Heating effect is therefore minimal and the volt drop must be the main consideration.

CABLE APPLICATIONS

To provide flexibility, cable cores used for motor vehicle applications have a number of thin strands of wire rather than a single thicker strand. For example, 14/0.30 cable has 14 strands of wire, with each strand 0.30mm diameter to form a conductor which has a csa of 1.0mm (sq). Typical applications for Adroit cables are shown on Chart 1.

TYPE	NUMBER & DIAMETER OF STRANDS (MM)	NOMINAL CSA OF CORE (MM²)	NOMINAL OUTSIDE DIAMETER (MM)	RESISTANCE PER METRE AT 20°C (OHMS)	APPROXIMATE CONTINUOUS CURRENT	EQUIVALENT AMERICAN GAUGE	TYPICAL APPLICATIONS
General Purpose Cables	9/0.30	0.65	2.35	0.0294	5.75	19	LT Ignition, Side/Tail Lamps and Accessories
	14/0.30	1.00	2.55	0.0189	8.75	17	
	21/0.30	1.50	2.85	0.0125	12.75	15	Head Lamps and Accessories
	28/0.30	2.00	3.15	0.0094	17.50	14	
	35/0.30	2.50	3.55	0.0075	21.75	13	Battery Supply and Ammeter Circuits
	44/0.30	3.00	3.95	0.006	25.50	12	
	56/0.30	4.00	4.25	0.00471	32.00	11	Alternator, Ammeter and Dynamo Circuits
	65/0.30	4.50	4.85	0.0041	35.00	10	Alternator and Ammeter Circuits
	84/0.30	6.00	5.70	0.0031	42.00	9	
	97/0.30	7.00	6.00	0.0027	50.00	8	
	120/0.30	8.50	6.80	0.0022	60.00	8	Alternator and Ammeter Circuits
Thin Wall Cables	28/0.30	2.00	2.60	0.0094	25.00	15	
	32/0.20	1.00	2.00	0.0195	16.50	18	
Starter Cables	37/0.71	15.0	7.75	0.0011	105.00		Starter Circuits
	266/0.30	20.0	9.20	0.0010	135.00		
	336/0.90	25.0	12.00	0.0008	170.00		
	37/0.90	25.0	9.40	0.0008	170.00		
	61/0.90	40.0	11.45	0.0005	300.00		
	61/1.13	60.0	13.75	0.0003	415.00		
High-Flex	195/0.50	40	12.35	0.0005	300.00		