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Simtek (UK) Motorsport Electrical

Guide lines for circuit current draw and wire size

Line Nos	WIRE SIZE Sq mm	AWG	Current rating Amps	Watts	Max Working Temp C°	General Applications
1	Automotive thin wall PVC sleved wire					
2	0.1mm	28	0.9	10.8	70	Used for electronics
3	0.2mm	24	1.5	18	70	Used for control circuits in assemblies
4	0.35mm	22	5	60	105	Used for control circuits and low load circuits in harnesses
5	0.5mm	20	11	132	105	Generally used in low and medium load circuits
6	0.75mm	18	14	168	105	Generally used in low and medium load circuits
7	1.0mm	15	16.5	198	105	Generally used in medium load circuits
8	1.5mm	16	21	252	105	Generally used in medium load circuits
9	2.0mm	14	25	300	105	Generally used in high load circuits
10	2.5mm	13	29	348	105	Generally used in high load circuits
11	3.0mm	12	33	396	105	Generally used in heavy power supply circuits
12	4mm	11	39	468	105	Generally used in heavy power supply circuits
13	6mm	9	50	600	105	Generally used in heavy power supply and power distribution circuits
14	10mm	7	70	840	105	Generally used in power distribution and relay board supply circuits
15	16mm	5	110	1320	105	Generally used as battery cable, alternator connection and power distribution board supply cable
16	-	-	-	-	105	
17	25mm	3	170	2040	105	Generally used as battery cable and alternator connection cable
18	35mm	2	240	2880	105	Generally used as battery cable

Above is the **general** relationship between Sq mm and AWG

Above is the Nominal current rating -
ie the normal maximum continus current-
All wires can carry a higher value -
A safety margin of 20% allows for short periods of over-current for no greater than 1 minute.

All Amps are calculated at 12V
Amps = Watts / Voltage

If Voltage is increased, current draw will generally drop allowing the wire to supply a higher Wattage component
BUT you must allow for a low battery voltage situation.
Fans behave in a different way, as higher voltage causes them to spin faster and thus use more current

Version -	**V1.10**
Date -	**30/04/2013**

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All below information is for guidance only. When we are designing a system we test all components to verify current draw. Please read guidance notes on this subject

		Minimum - Suggested. Per component				All amps are calculated at 12V Amps = Watts / Voltage	Minimum - Suggested. Per channel			
Line nos	Function	Wattage	Ampage	Wire conductor size for single circuit	Subjected fuse rating for	Notes	Wattage	Ampage	Wire conductor size for the	Suggested STD BLADE fuse rating for circuit/s
1	Side lights - Left	5W	0.4A	0.2mm - 0.35mm	1A	This circuit is usually 2 X 5W plus dash illumination approx 6 X 2w bulbs so total of	24W	2A	0.35mm - 0.5mm	3Amp
2	-	-	-	-	-		-	-	-	-
3										
4	Side lights - Right	5W	0.4A	0.2mm - 0.35mm	1A	This circuit is usually 2 X 5W plus dash illumination approx 6 X 2w bulbs so total of	24W	2A	0.35mm - 0.5mm	3Amp
5	-	-	-	-	-		-	-	-	-
6										
7	Illumination on its own	2W	0.16A	0.2mm - 0.35mm	1A	Illumination approx 6 X 2w bulbs split over left, right or both channels	12W	1A	0.35mm - 0.5mm	3Amp
8	-	-	-	-	-		-	-	-	-
9										
10	Fog light	21W	1.75A	0.2mm - 0.35mm	3A	This circuit usually has 2 light units per channel	42W	3.5A	0.35mm - 0.5mm	5Amp
11										
12	Brake light	21W	1.75A	0.2mm - 0.35mm	3A	This circuit usually has 2 light units per channel plus a highlevel brake light of 32W	56W	4.66A	0.35mm - 0.5mm	7Amp
13	-	32W	2.66A	0.35mm - 0.5mm	5A		-	-	-	-
14										
15	Reverse light	21W	1.75A	0.2mm - 0.35mm	3A	This circuit generally has 2 light units per channel	42W	3.5A	0.35mm - 0.5mm	5Amp
16										
17	Indicator left	21W	1.75A	0.2mm - 0.35mm	3A	This circuit usually has 2 light units per channel plus dash warning 3W and side repeater 5w	45W	3.78A	0.35mm - 0.5mm	5Amp
18	-	-	-	-	-		-	-	-	-
19										
20	Indicator right	21W	1.75A	0.2mm - 0.35mm	3A	This circuit usually has 2 light units per channel plus dash warning 3W and side repeater 5w	45W	3.78A	0.35mm - 0.5mm	5Amp
21	-	-	-	-	-		-	-	-	-
22										
23	Dipped beam	55W	4.58A	0.35mm - 0.5mm	7A	This circuit usually has 2 light units per channel plus dash warning 3W	113W	9.41A	0.5mm - 0.75mm	15Amp
24	-	-	-	-	-		-	-	-	-
25										
26	Main beam	60W	5A	0.35mm - 0.5mm	7A	This circuit usually has 2 light units per channel plus dash warning 3W	123W	10.25A	0.5mm - 0.75mm	15Amp
27	-	-	-	-	-		-	-	-	-
28										
29	Spot light	55W	4.58A	0.35mm - 0.5mm	7A	This circuit usually has 2 light units per channel plus dash warning 3W	110.25W	9.18A	0.75mm - 1.0mm	15Amp
30	-	-	-	-	-					
31										
32	Spot light	90W	7.5A	0.5mm - 0.75mm	10A	This circuit usually has 2 light units per channel plus dash warning 3W	183.00W	15.25A	1.0mm - 1.5mm	20Amp
33	-	-	-	-	-		-	-	-	-
34										
35	Spot light	130W	10.83A	0.75mm - 1.0mm	15A	This circuit usually has 2 light units per channel plus dash warning 3W	261.00W	21.75A	2.0mm - 2.5mm	25Amp
36	-	-	-	-	-		-	-	-	-
37										
38	Ignition control power A - (Ig coil/s)	90W	7.5A	0.5mm - 0.75mm	10A	This is an average for a coil, multi coils don't increase the current draw as only one coil is charging at any one time. We have never seen a coil draw more than 10A	90W	7.5A	0.5mm - 0.75mm	10Amp
39	-	-	-	-	-		-	-	-	
40	-	-	-	-	-		-	-	-	7Amp
41	-	-	-	-	-		-	-	-	
42	-	-	-	-	-	NOTE if multi coil and ECU is put in to coil test more than one coil might be triggered at the same time	-	-	-	14Amp
43	-	-	-	-	-		-	-	-	-
44										
45	Ignition control power B - (Inj/s)	20W	1.66W	0.35mm - 0.5mm	3A	In Sequential mode only one injector is triggered at any one time but in Batch fire mode injectors tend to be fired in pairs OR in batches of 4	40W	3.33A	0.35mm - 0.5mm	5Amp
46	-	-	-	-	-		-	-	-	-
47	-	-	-	-	-		80W	6.66A	0.35mm - 0.5mm	10Amp
48										
49	Ignition control power 1 (Dash etc)	24W	2A	0.2mm - 0.35mm	3A	This would run multiple gauges (Eg the SPA kit dash is fused at 1A total)	20W	2A	0.2mm - 0.35mm	3Amp
50	-	-	-	-	-		-	-	-	-
51										
52	Crank power	150W	12.5A	1.0mm - 2.0mm	15A	The average large starter solenoid has an inrush current of 20A to 25A but this lasts around 250Ms the hold current is around 10A to 15A	150W	12.5A	1.0mm - 2.0mm	15Amp
53	-	-	-	-	-		-	-	-	-
54	-	-	-	-	-		-	-	-	-
55										
56	Fuel pump	100W	8.33A	0.75mm - 1.0mm	10A	This is for a large Bosch running at 45PSI. The current increases exponentially with fuel pressure and the Bosch quoted 25A is at the the point the internal safety valve opens at 90 psi	100W	8.33A	0.75mm - 1.0mm	10Amp
57	-	-	-	-	-		-	-	-	
58	-	-	-	-	-		-	-	-	
59	-	-	-	-	-		300W	25.0A	1.5mm - 2.5mm	30Amp
60										
61	Lift pump / Low pressure pump	30W	2.5A	0.35mm - 0.5mm	3A	-	30W	2.5A	0.35mm - 0.5mm	3Amp
62										
63	Cooling fan (11Inch)	160W	13.33A	1.0mm - 1.5mm	15A	Cooling fans tent to be about 1.25A per Inch but above 12 inch they tend to be about 1.6A per inch	160W	13.33A	1.0mm - 1.5mm	15Amp
64	Cooling fan (22 Inch)	400W	35A	3.0mm - 4.0mm	40A		400W	35A	3.0mm - 4.0mm	
65										
66	Wiper motor - Wet screen	90W	7.5A	0.5mm - 0.75mm	10A	The current draw on a wiper motor is affected by the condition of the screen and allowances must be made for a dry screen	150W	12.5A	0.75mm - 1.0mm	15Amp
67	Wiper motor - Dry screen	150W	12.5A	0.75mm - 1.0mm	15A		-	-	-	-
68	-	-	-	-	-		-	-	-	-
69										
70	Washer pump - Small	30W	2.5A	0.35mm - 0.5mm	3A	-	30W	2.5A	0.35mm - 0.5mm	5Amp
71	Washer pump - Power wash	150W	12.5A	0.75mm - 1.0mm	15A	-	150W	12.5A	0.75mm - 1.0mm	15Amp
72										
73	Horn - Standard type	40W	3.07A	0.35mm - 0.5mm	5A	This circuit usually has 2 horns fitted High tone and Low tone	80W	6.33A	0.35mm - 0.5mm	10Amp
74	-						-			-
75										
76	Horn - Air compressor type	150W	12.5A	0.75mm - 1.0mm	15A	-	150W	12.5A	0.75mm - 1.0mm	15Amp
77										
78	Heater blower - Old 2 speed type	100W	8.33A	0.75mm - 1.0mm	10A	11				-
79						30				-
80		300W	23.07A	2.0mm - 2.5mm	25A	-	300W	23.07A	2.0mm - 2.5mm	25Amp
81	Heater blower - New multi speed type	-	-	-	-	-				