Sizing electric motors

A good guide to what electrical power you need for a new model is to multiply the model weight in kilograms by the power values in the **Watts per kilogram** table below. Then you choose a motor based on the maker's data for number of cells and maximum continuous current. Some makers provide power data in watts but most don't.

Maximum power in watts = Battery voltage x maximum specified current
For example:

- You plan to run the motor on a 4S lipo battery of about 16V
- The maximum specified continuous current is 50 A
- Maximum power is 16 x 50 = 800 W

You must choose the best size of propellor based on its kV rating or by experiment with telemetry or a meter, advice for which is elsewhere on this site.

You should downrate the power by 10 or 20%, so in this case you will finish with perhaps 700 W

From the table below this 700 W will power a speedy scale model of about 3.2 kg, an aerobatic model of about 2.8 kg or a slow flyer of maybe 4 kg. It is always best to have more power than less and with electric motors this is easy. You can always limit the maximum throttle setting.

Watts per kilogram

Slow and park flyer	110 - 150
Trainers and slow scale	150 - 200
Sport aerobatic and fast scale	200 - 240
Advance aerobatic and high-speed	240 - 290
Light loaded 3D and ducted fan	290 - 330
Unlimited 3D and aerobatic	330 upwards

Converting an IC model to electric power

Of course this is best done when the model is new before liquid fuel has got to it. However the change is almost always good to do. If you read my model build notes on this website you will get an idea of what it involves. Motors always weigh less than IC engines of similar power.

The question is what size motor do I need if the model only has an IC engine specified or there already is an engine installed? The next table shows you what power in horsepower each size of a typical two-stroke glow engine is likely to produce, what the electric wattage equivalent is, and a suggestion from the AXI range of motors. I like to buy motors from 4-Max, whose website has size equivalents including AXI. Addresses are at the end.

Table for **two-stroke glow** engines

Size in^3	Size cm^3	Power HP	Power watts	Suggested AXI motor
0.20	3.2	0.4	300	2820
0.35	5.6	0.7	500	2826
0.40	6.4	1.0	750	2826 or 4120
0.60	9.6	1.3	975	4120 or 4130
0.90	14.4	1.6	1200	5320 or 4130
1.20	19.2	3.0	2250	5330

Note: electric power depends on the number of cells in the battery. 1 HP = 750 W

Four stroke glow and petrol engines

You will need to search the web for equivalence tables for these, preferably using duckduckgo, which does not track nor sell your search data.

Sources

4-Max	https://www.4-max.co.uk/
AXI	https://www.modelmotors.cz
Duckduckgo	https://duckduckgo.com

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