

How to choose a step motor

There have been a few changes in the step motor catalog curves since catalog 8000-3. We have added the full stepping curve, changed our thermal model, and re-rated the holding torque of each motor. Lets go through each one:

Full stepping curves

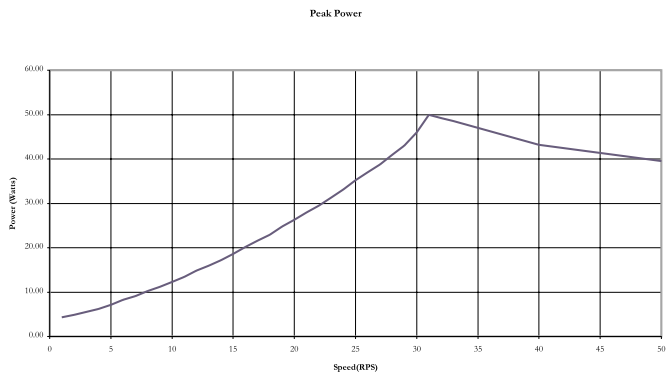
Although full stepping has its difficulties with stalling and resonance, it will produce more torque, especially in the lower speed applications. This is not to say it will outperform microstepping, as resonance points in the motor can be hard to overcome. For these reasons Compumotor does not recommend full stepping. Most, if not all, step motor companies use the full stepping curves in their literature, even though most applications require microstepping. In order to allow side by side comparisons we have added the full stepping curve to the catalog. This is the blue dotted line in the curve.

How Compumotor sets motor current

Compumotor always tests its motors as a drive-and-motor system. Each drive can heat the motor to a different degree, and we have found this is the only way to accurately depict the true performance of the system. Each drive and motor combination Compumotor offers has been tested using the following criteria.

Every stepping motor will run hotter when spinning than at rest. Furthermore, each motor has a speed at which it creates the most heat. This speed is both motor and drive dependant. Compumotor has determined this speed for each motor and drive combination, and uses it to set the thermal model. Each motor is run at this speed or 20RPS – whichever

is lower – using a 75% duty cycle (7.5 seconds on and 2.5 seconds off). The current is set at either the maximum current the motor is electrically rated for (saturation) or the current needed to bring the case temperature up to 100°C. These tests are performed at room temperature (25°C). Under certain circumstances the current will need to be reduced in order to maintain a case temperature of 100°C. Below is a sample Power vs. RPS heat curve. This curve is for the VS21B motor.



Holding Torque

Compumotor has rated its holding torque in past catalogs as shaft torque at 1RPS, microstepping. The holding torque listed in this catalog is now at 0 RPS, and in full stepping mode. This is a universal rating across all step motor manufacturers, and can be used to more accurately compare motors between different manufacturers.