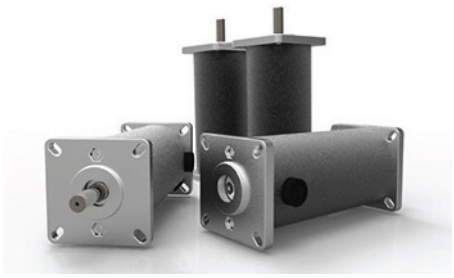
GROSCHOPP® BLOG

Fractional HP Motors and the Problem with Single Load Points

January 29, 2014



Sometimes a single load point, or the rated load point, is the only data available when determining the specifications of a fractional hp motor. In order to better explain why one load point isn't typically enough to select a motor, we'll compare two different sample motors to show the variations and why it's important to know the range of load points within an application.

(For this discussion we'll focus on Permanent Magnet DC (PMDC) motors due to the linear nature of speed versus torque and ease of explanation; however, this principle holds true for AC motors and Brushless motors as well.)

First, the application's designed load point is 1.5in-lbs at 1700 RPM.

Motor Speed Ratings at 1.5 in-lbs	
Motor #1	1680 RPM
Motor #2	1760 RPM

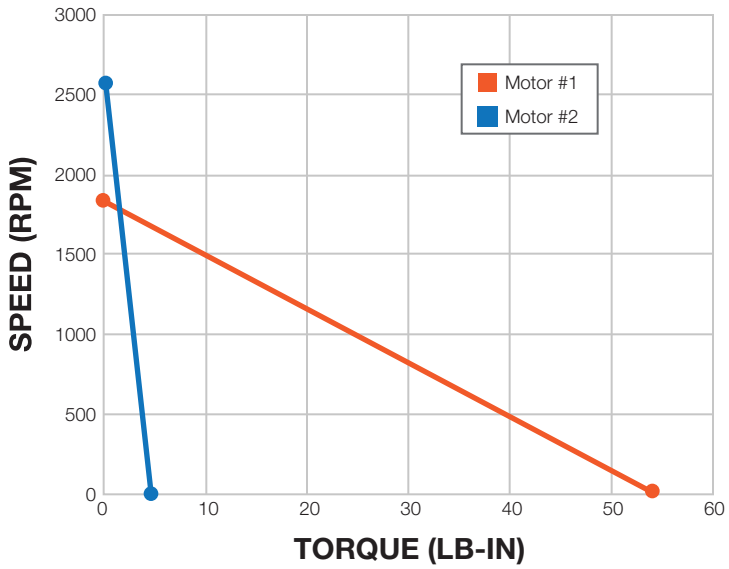
When selecting a fractional hp motor for your application be sure to let your motor manufacturer know if you will have varying load points, as it can affect the design and size of the motor.

According to the ratings, both of these PMDC motors will work for the application. The speed of both motors are the tested speeds, but know that it's common to have some slight deviation from the target speed, in this case 1700.

However, if it's determined that, in reality, the application has variations and the actual **load may get as high as 3in-lbs** but the **speed cannot vary more than 10-15%** through the load range. Will both motors still fit the application?

Motor Speed Ratings at 3 in-lbs	
Motor #1	790 RPM
Motor #2	1710 RPM

When selecting a fractional hp motor for your application be sure to let your motor manufacturer know if you will have varying load points, as it can affect the design and size of the motor.



As the ratings show, only motor #2 will fit the application requirements. The torque versus speed plot of both motors confirms the ratings by showing the drop in speed as the torque increases for each motor.

One load point is not enough to determine a motor's ability to operate properly within an application.

We can safely assume Motor #2 is larger than Motor #1, evidenced by the slope of the speed/torque lines. Motor #1 has a rated peak output of .05 hp and motor #2 has a .3 hp rated peak output. Motor #2 experiences less speed loss with increases in torque; thus, Motor #2 will be the best fit for the application.

When selecting a motor for your application, be sure to let your motor manufacturer know if you will have varying load points, as we've seen it can affect the design and size of the motor.