

Customized Performance Considerations

There are many factors to be considered when designing applications for a direct drive models. Please review the following formulas carefully, and feel free to contact our customer service department with questions.

Screw Specifications:

Dia x Lead (inches)	D _{min}	L ₁₀ rating	Max RPM
1.00 x .25	0.82	1612	3000
1.17 x .413	0.87	3894	2560
1.50 x .474	1.14	10050	2000

Max RPM = maximum screw speed due to ball velocity limit.

L₁₀ rating = Load (lbs) to produce 10% failure rate after 1,000,000 inches of travel.

D_{min} = Screw minor dia.(in.)

Design Formulae:

$$\text{Speed (in/sec)} = \frac{\text{Screw Lead} \times \text{Motor rpm}}{60}$$

$$\text{Capacity (lbs)} = \frac{5.65 \times \text{Motor torque (in-lbs)}}{\text{Screw Lead}}$$

$$\text{Motor torque (in-lbs)} = \frac{\text{Horsepower} \times 63000}{\text{RPM}}$$

$$\text{Screw Life (million inches of travel)} = \left[\frac{\text{L}_{10} \text{ Rating}}{\text{Load}} \right]^3 \times \text{Screw Lead}$$

Critical Speed: High speed rotating shafts are subject to destructive vibrations. To prevent instability, the speed and length must be held within limits per the following equation:

$$\text{RPM}_{\text{max}} = \frac{1.37 \times 10^6 \times D_{\text{min}}}{L^2} \quad \text{where } L = \text{Actuator stroke (inches)}$$

(Note: This equation for critical rpm includes a 0.80 factor of safety.)