

Ball Screw Systems

Highly efficient ball screw systems provide long, predictable, accurate performance for a variety of linear and rotary motion applications.

Duff-Norton Ball Screw Systems provide quiet, precise rotary-to-linear and/or linear-to-rotary motion for machine tools and other applications with negligible transmission loss. They can be used with smaller, more economical motors than Acme screw systems, and can be used in synchronized, multiple configurations easily.

The ball bearing design is 90% efficient, more efficient than Acme screws. The high efficiency virtually eliminates friction-induced heat. Rolled thread ball screws provide accurate positioning with maximum lead error only $\pm .009$ inch per foot cumulative.

Life of the system can be predicted accurately once operating conditions are known. The system will perform like new for its entire operating life, never needing adjustment. Its simple design is virtually maintenance-free, requiring only lubrication.

Standard ball screw ends and end journals are also available and can be used for either fixed or supported end bearing arrangements. See page 152 for recommended bearing arrangements.

Especially suited for applications requiring:

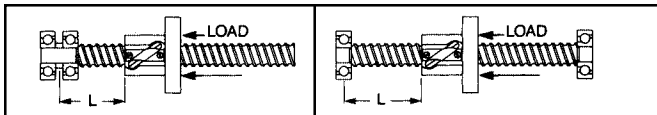
- Accurate positioning
- High efficiency
- Back-driving
- Synchronization
- Superior rigidity
- Simple design



Performance Specifications

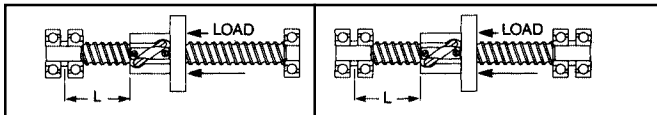
Compression Loads

1. Determine the maximum compression load the ball screw will see.
2. Determine the type of end fixity to be used (see Bearing Support Arrangement).
3. Determine the maximum length between the bearing support and the load.
4. Locate the point where a vertical line (representing length between bearing support and load) intersects a horizontal line (representing compression load). Select the proper screw size on or to the right of this point.



Fixed-Free

Simple-Simple

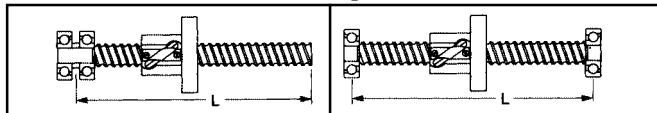


Fixed-Simple

Fixed-Fixed

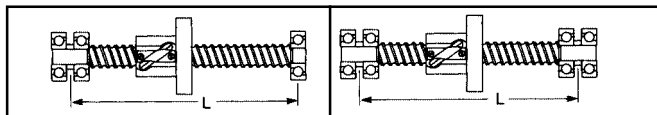
Critical Speed

1. Determine the maximum rpm the ball screw will see.
2. Determine the type of end fixity to be used (see Bearing Support Arrangement).
3. Determine the length between bearing supports.
4. Locate the point where a vertical line (representing length between bearing supports) intersects a horizontal line (maximum rpm). Select the proper screw size on or above this point.



Fixed-Free

Simple-Simple



Fixed-Simple

Fixed-Fixed

Load Life

1. Determine the operating load the ball screw and nut will see.
2. Determine the desired life.
3. Locate the point where a vertical line (representing desired life) intersects a horizontal line (operating load). Select the proper screw size on or to the right of this point.

The graph at right illustrates the relationship between the operating load and the operating life that can be expected from a ball screw. Operating life is considered to end at the first sign of surface fatigue.

The relationship between load and life is a cubic equation. For example, halving the load increases operating life by a factor of eight.

