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Are You Under-Specifying Your Ball Screw Drives?

Ball screw drives deliver repeatable, accurate and high speed \hat{A} rotary-to-linear and linear-to-rotary motion, making them a very popular solution in a wide range of applications.

The challenge for machine builders is avoiding under-specifying a ball screw drive that will compromise machine performance, or over-specifying a ball screw drive that will unnecessarily drive up costs.

Selecting the right ball screw assembly for optimized machine performance in your application doesn't require a magic 8 ball – in fact selecting it is an iterative process that determines the smallest envelope and most cost-effective solution.

Read *Selecting and Sizing Ball Screw Drives* (Power Transmission Engineering, October 2012) to learn more.

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PROBLEM: How can backlash be minimized or even eliminated in a ball screw assembly?

SOLUTION: \hat{A}

When repeatability of the system is critical, then the backlash of the ball nut must be eliminated. There are different solutions but the most common means to remove the lash in a ball nut are: 1) skip lead, 2) double nut and 3) 4pt contact. Each solution has benefits and challenges.

A skip lead preload is typical of a ground screw solution and produces a stiff nut with a higher level of preload (approximately 10%). This is a single nut solution but reduces the dynamic capacity of the system as only ½ the ball bearings are loaded at one time.

A double nut preload can be achieved in many configurations. Two nuts are combined and configured to remove axial free play. This style of nut maintains full load capacity, can be loaded with compensating springs, and can be adjusted to compensate for wear and load capacity. The downside is cost and space.

A 4pt contact nut uses selective ball bearings to remove the axial free play. This type of preload maintains full load capacity and the smallest footprint. It also requires a mating screw with higher lead accuracy requirements and typically only good up to a 5% preload.

When a preload option is not available, Thomson can preselect higher lead accuracy screws and combine with selective ball bearings to minimize lash for standard industrial product. Application requirements, length of the screw, and ball nut return system also are important factors to consider when attempting to minimize ball nut back lash.

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UPCOMING WEBINAR:

Ball Screws 102: Sizing and Selection

December 13, 2012 - 11 am ET/ 10 am CT

Design smarter, more efficient machines with ball screw technology. The high accuracy and reliability of ball screws can create simpler, more efficient machine designs. This webinar continues to expand the basics of ball screws and how to improve application design with ball screw technology. Get the basics and more in one hour.

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Clutch/Brake or Servo System – Which is Right for Your Application?

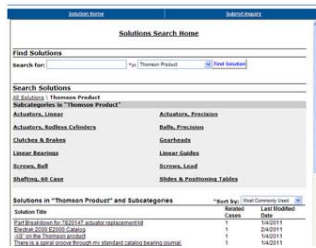
If you're an OEM who uses servo systems you'll want



to spend four minutes watching our new educational video, *Thomson Clutches & Brakes vs. Servo Systems*, to learn more about how using wrap-spring brakes and clutches can deliver big benefits in certain applications.Â

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