

Ball Screws For High-Accuracy Machine Tools

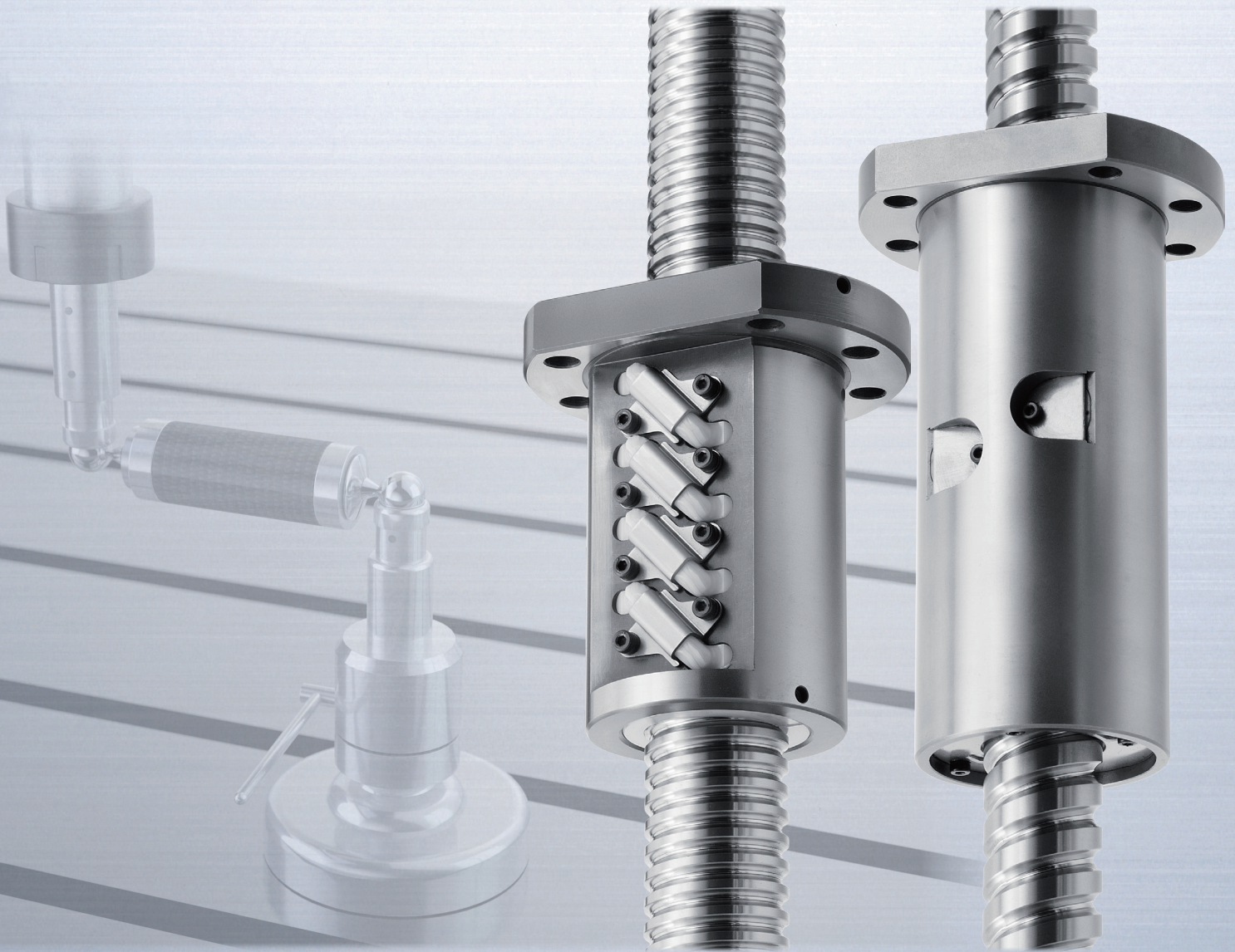
MOTION & CONTROL™

NSK

New!

Patent pending

Reduced motion errors help improve machine tool productivity through higher quality surface finishes



■ Features

1. Stable friction during reversals of ball screw direction

Building on exclusive analysis and manufacturing technologies, NSK has pioneered internal specifications that reduce fluctuations in friction when a ball screw reverses direction.

This helps achieve smoother motion when switching quadrants in circular interpolation machining and similar applications.

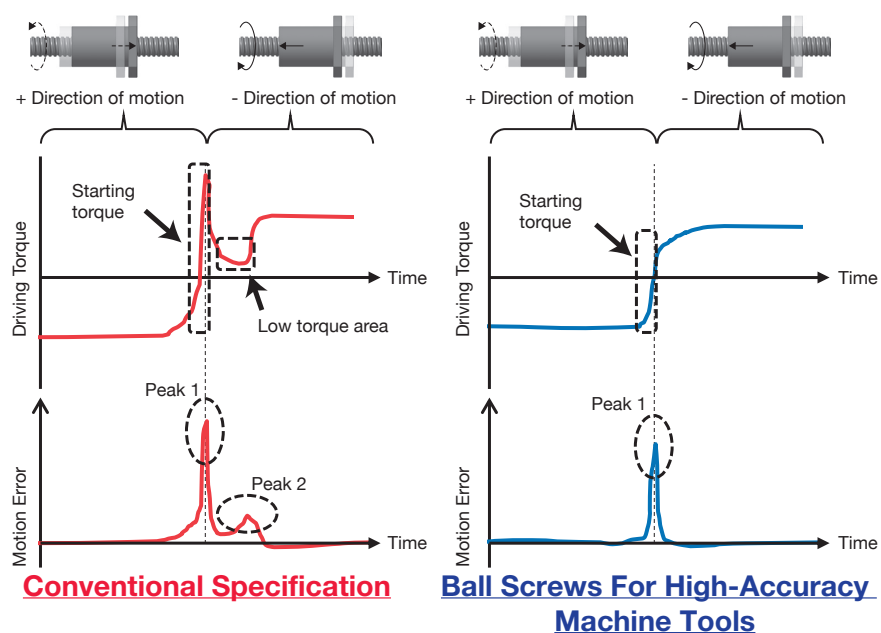
2. Reduced motion errors contribute to better surface quality

By combining this technology with servo controller compensation, ball screws with quadrant glitch control significantly reduce errors, helping machine tools achieve a high-quality finished surface.

Optimized Internal Specifications Reduce Quadrant Glitches

Stable Drive Torque During Reversals Eliminates a Quality Roadblock

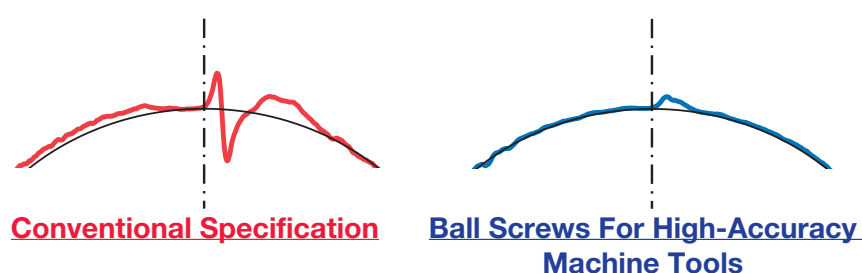
In typical ball screws, when the drive system reverses direction, the motor cannot maintain proper tracking for the resulting sudden changes in friction characteristics (driving torque). This causes motion errors leading to “quadrant glitches” that leave streaks requiring additional machining on the surface of the workpiece. When using ball screws with two points of contact, quadrant glitches appear as two error peaks. Though this problem was thought to be unavoidable, ball screws for high-accuracy machine tools eliminate the “low torque area” characteristic of typical designs. This advancement completely erases the 2nd peak and improves surface finish quality through smooth motion.



Motion error and drive torque when reversing direction

Improving the Effectiveness of Controller Compensation for Motion Errors

Controlling the 2nd peak with the ball screw itself allows the servo controller to better correct for the 1st peak. As there's no need to correct for the 2nd peak, control parameters can be identified more easily, greatly reducing quadrant glitches overall. With simplified controller compensation, machine tools can achieve a higher quality finished surface.



Motion error during circular interpolation machining (with servo controller compensation)

Compatible with Existing Mountings

Mountings are fully interchangeable with those of conventional products, allowing ball screws with quadrant glitch control to be used without costly equipment changes.

Applicable Specifications

Shaft Diameter	ø25 to ø63 [mm]	Preload Type	•Offset preload (Z preload) •Double nut preload (D preload) •Spring double-nut preload (J preload)
Lead	Lead / Shaft diameter ≤ 1/2		
Ball Diameter	3.175 (1/8) to 7.9375 (5/16)		

For other specifications, please contact NSK.

For more information about NSK products, please contact: www.nsk.com

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