

Innovative Products

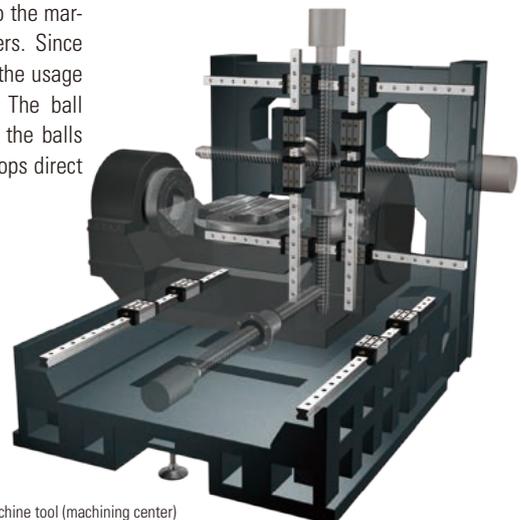
As a global pioneer, THK developed the linear motion (LM) guide, which is based on an original concept and innovative technology. Within the mechatronics sector, LM guides are used as a vital machinery component and have varied industrial applications. THK also develops, produces and supplies to the world a range of other vital machinery components, including ball splines and ball screws.

LM Guides



LM guides are critical elements in many types of machinery. By converting slippage into a rolling motion, they enable parts of machinery to move smoothly, easily and precisely in a straight line. As a result, LM guides help to enhance the precision, rigidity and speed of a wide range of industrial machinery. In 1996, THK became the first company in the world to successfully develop the next generation of LM guides featuring caged ball technology. Later, in 2001, the Company introduced to the market LM guides with caged rollers. Since then THK has striven to expand the usage of these improved LM guides. The ball cages are resin parts that keep the balls in place and guide them. This stops direct

contact between the balls or rollers, eliminating noise and friction. Compared with first-generation LM guides, the use of caged ball technology achieves long service life, low noise and long-term maintenance-free operation. LM guides based on caged technology are now vital components of many types of equipment. They have provided major contributions to the machine tool, semiconductor production equipment and related sectors.



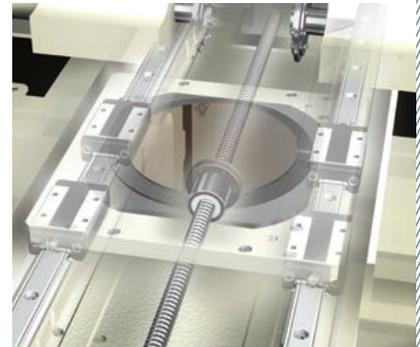
An example of use as a machine tool (machining center)

Ball Screws



Ball screws are machinery parts that function by causing a large number of balls to circulate between the screw shaft and the nuts. This mechanism of action efficiently converts rotary motion into linear motion. THK has adopted ball screws featuring caged ball technology, thus helping to realize longer life with lower noise and provide an extended maintenance-free period. As a result, these offerings are now essential elements in the machine tools, industrial robots, semiconductor production equipment and related sectors. These ball screws supplied by THK are designed to support high loads, making them ideally

suited for replacing the hydraulic cylinders used in capital equipment such as injection molding machines, presses and die-cast machines.



An example of use as a semiconductor production (Dicing saw)

Electric Actuators



Electric actuators are hybrid products combining a guide component such as an LM guide with a ball screw, linear motor or other drive component. In industries such as electronics, there is an increasing need to shorten development and manufacturing lead-times. Modularization allows electric actuators to realize benefits such as simplified design and fewer assembly components, thus helping to meet such requirements. THK supplies a varied lineup of electric actuators ranging from basic, low-priced units to high-end components designed to operate at high speed or

perform to clean-room specifications. Such advanced electric actuators have become indispensable parts in equipment used in the manufacture or inspection of semiconductors and flat-panel displays.



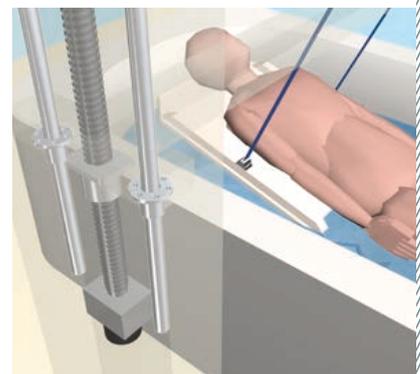
Electric actuators are used in medical equipment such as CT scanners

Ball Splines



Developed in 1971, the same year that the Company was established, ball splines were the precursor to the LM guide. Balls roll along an R-shaped groove machined into the spline axle. This critical advance boosts the load that the device can tolerate and permits the transmission of torque, resulting in a revolutionary linear motion system. Compared with the existing configuration, which does not contain such grooves, ball splines boost the tolerable load by a factor of 13 and service life by a factor of 2,200. Today, ball splines play a number of highly functionalized roles in

a variety of machines. Usage examples include industrial robots, medical equipment and chip mounters.



Used in bathing assistance equipment

Cross Roller Rings



Cross roller rings are roller bearings that feature internal cylindrical rollers arranged orthogonally so as to facilitate load bearing in every direction. The incorporation of the spacer cages between rollers prevents roller skew and reciprocal abrasion between the rollers. These rings are highly rigid despite their compact structure. Cross roller rings are used in the rotating parts of many different types of industrial machinery, including the joint areas and swiveling parts of industrial robots, machining

center swivel tables. Other applications include medical equipment and semiconductor production equipment.



Usage in industrial robots

Transportation Equipment-Related Products

Since the time of its foundation, THK has continued to upgrade and expand its lineup of transportation equipment-related products including the link ball, a spherical slide bearing with a ball stud. Made from aluminum, THK's link balls are highly resistant to corrosion and wear due to abrasion. They

are also considerably lighter than the steel parts traditionally used. The Company's lineup of link balls has been widely adopted for use in a number of undercarriage mechanisms, such as the joint sections connecting stabilizers to the suspension and height sensor joint.

Furthermore, Group companies THK RHYTHM and THK RHYTHM AUTOMOTIVE are actively engaged in transportation equipment-related product operations including steering and suspension components.

In addition to its mainstay cold-forged ball joints, THK RHYTHM is expanding operations in the component field, with aluminum links that are integrated ball joints with aluminum suspension links. As critical automotive safety components, these products meet the highest standards of quality and performance and help to enhance the safety and comfort of automobiles.

