

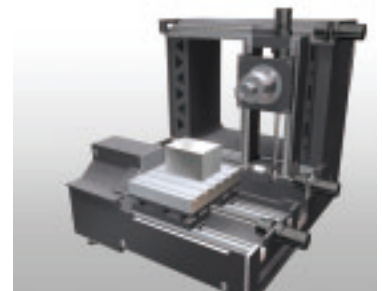
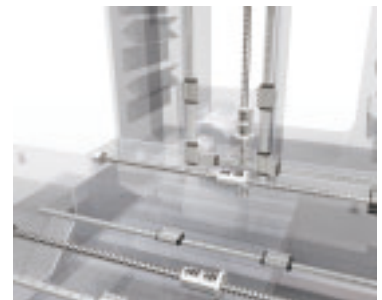
THK PRODUCTS

THK has been a global pioneer in the development of the linear motion (LM) guide, which is based on an original concept and innovative technology. Within the mechatronics sector, LM guides are a vital component of machinery 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.

Linear Motion (LM) Guides

LM guides are a critical element in many types of machinery. By converting slippage into controlled rotary motion, they enable parts of machinery to move smoothly, easily, and precisely in a straight line. 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 we have striven to expand the usage of these improved LM guides. The ball cages are plastic 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 reduces noise, extends service life, and enables longer maintenance-free periods. LM guides based on caged ball technology are now vital components of many types of equipment. They have made a major contribution to the development of high-speed, low-noise industrial machinery with longer productive lives, notably in the machine tool and semiconductor production equipment sectors.



LM guide used in a machining center
(a type of machine tool)

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. Primarily employed in various types of industrial machinery, ball screws are labor-saving devices that act as drive components in motors. THK has also developed ball screws featuring caged ball technology that have made a significant contribution to the development of high-speed, low-noise industrial machinery with extended service lives, especially in sectors such as machine tools, industrial robots, and semiconductor production equipment. Other 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, die-cast machines.



Ball screw used in a dicing saw (for semiconductor production)

Actuators

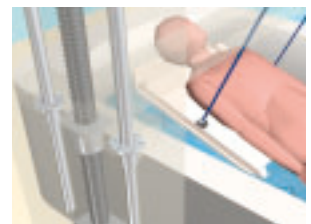
Actuators are hybrid products combining a guide component such as an LM guide with a ball screw, linear motor, or other drive component. In industries such as electronics, there is an increasing need to shorten development and manufacturing lead-times. Modularization allows actuators to realize benefits such as simplified design and fewer assembly components, thus helping to meet such requirements. THK supplies a varied lineup of 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 actuators have become indispensable parts in equipment used in the manufacture or inspection of semiconductors and flat-panel displays.



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.



Use 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 these orthogonally arranged 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, the rotating parts of industrial manipulators, and precision rotary tables. Other applications include medical equipment, measuring instruments, and equipment for manufacturing integrated circuits.



Usage in industrial robots

Link Balls

Link balls are spherical joints that are used primarily as automotive parts. THK has developed a proprietary process for link ball production in which a die-casting process is employed to fabricate holders for the high-precision steel ball bearings that form the spherical surfaces. The shank portions are then specially welded. We use an integral molding process for the aluminum die-cast, which makes the link balls highly resistant to corrosion and wear due to abrasion. They are also considerably lighter than the steel parts traditionally used. Link balls are used widely in automobile undercarriages, particularly in ground clearance sensors and the joint sections connecting the stabilizers to the suspension. As such, they play an important role in improving safety and comfort on the road. Over the past few years we have begun supplying link balls for an increasing number of vehicle models to leading automakers in Japan, Europe, and North America.



Usage in automotive parts

THK RHYTHM Products

RHYTHM CORPORATION (current THK RHYTHM CO., LTD.), which became a consolidated subsidiary in 2007, offers a product range that includes automotive parts used in steering, suspension, and braking systems as well as engines and transmissions. In addition to cold-rolled steel forged ball joints, RHYTHM is currently expanding into aluminum links that are integrated ball joints with aluminum suspension links. As critical automotive safety components, RHYTHM's products must meet the highest standards of quality and performance. In striving to meet market demands by offering guarantees of zero defects and zero delivery problems, RHYTHM seeks to contribute to the production of safer and more comfortable vehicles.

