

## Research and Development

Guided by the business philosophy of “providing innovative products to the world and generating new trends to contribute to the creation of an affluent society,” THK continually strives to create original products as a creative development-driven enterprise.

### THK Product Development as a Contributor to Industrial Development

THK’s concept toward business is based on the philosophy of “providing innovative products to the world and generating new trends to contribute to the creation of an affluent society.” This thinking has guided our drive to be a creative development-driven enterprise, enabling us to develop a varied stream of products since our establishment in 1971. Besides contributing to industrial development, these efforts have also resulted in THK steadily accumulating technical expertise that has been a primary source of growth.

THK developed the world’s first linear motion (LM) guide. For the first 10 years after we started production and sale of these products in 1972, LM guides were primarily used in machine tools. During this period, we developed a series of new products to fulfill our customers’ needs for increased precision and lower cost. In the 1990s, other industries—such as manufacturers of semiconductor production equipment and industrial robots—began to adopt THK products. We responded by developing various new products that were optimized for customer-specific applications and operating environments in these sectors.

In 1996, we pioneered the development on the world’s first-ever LM guide using caged ball technology, an advance that enabled LM guides to operate without maintenance for much longer periods. Although such technology was already common in rotary bearings at that time, the

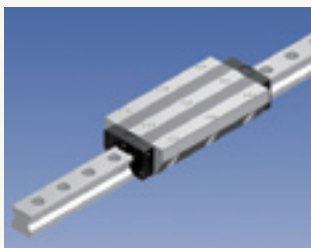
problem was the need to cope with both linear and circular movements. This made it extremely difficult to develop ball cages with sufficient durability to move along straight lines or curves. THK successfully took steps to overcome this issue. LM guides based on caged ball technology not only provide the benefit of long-term maintenance-free use, but have also made a significant contribution to the development of high-speed, low-noise industrial machinery with longer productive lives, particularly in the machine tool and semiconductor production equipment sectors. The advance also paved the way for the development of LM guides for additional applications. Today, we continue to develop products that use caged ball technology. Besides LM guides, this range has expanded to include ball screws, ball splines and hybrid units.

### A Global R&D System for the Next Generation

Drawing on elite minds from the ACE, FAI and IMT divisions, with a particular focus on the Engineering Division, a task force engages in R&D activities, primarily out of the Technology Center located in Tokyo, in such wide-ranging products as LM systems—a core THK product—and diverse markets including mechatronics, consumer products and automobiles.

In April 2010, operations commenced at an R&D facility established within the head office of THK (CHINA) CO., LTD. in Dalian, Liaoning Province. This is the Group’s first such overseas base. More recently, operations commenced at a new designated R&D Center in April 2012.

### MAJOR NEW PRODUCTS DEVELOPED IN FISCAL 2011



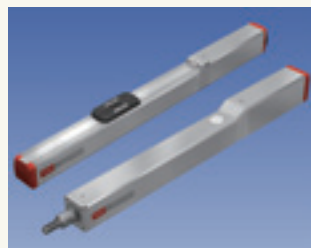
LM Guide with Caged Rollers (Ultra-Long Block Type): SRG

Model SRG was developed with an ultra-long block and uses roller cages to eliminate friction, enabling long-term maintenance-free operation, while delivering ultra-high rigidity. This particular model enables THK to meet the demand for even higher load-carrying capacity.



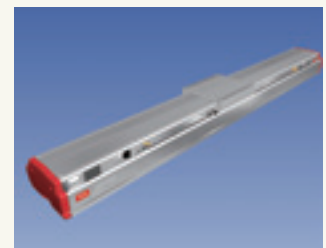
Caged Ball LM Guide with Lighter LM Rails: SHS Light

Model SHS caged ball LM guide sets the global standard. Model SHS Light, which utilizes hollow rails, realizes an overall reduction in weight of 40%. In addition to speeding up the operations of various machinery, Model SHS Light is expected to penetrate into fields where the Company’s products had previously been unable to enter due to issues concerning weight.



Economy Series Electric Actuator: ES/EC

THK’s economy series electric actuators, which boast outstanding energy efficiency, help realize a lighter weight, compact body by combining actuators with motors. By minimizing the number of component parts, costs are also reduced. Model ES/EC enables the computation of operating life in line with conditions of use.



Universal Series Electric Actuator: US

Model US realizes a smart structure by incorporating a sensor into the actuator. The amount of space required can also be reduced at the time of set up. In addition to the industry’s leading operating life, Model US allows for long-term maintenance-free use. Moreover, by lining up double the lead with respect to the ball screw shaft diameter, Model US delivers outstanding speed.

This is helping to accelerate product development. Amid a Chinese market that continues to enjoy growth, the THK Group will develop products that address local needs in a timely manner by locating this R&D base at the point of demand.

### Product Development in Fiscal 2011: Realizing the “cubic E” Concept

Leveraging creative ideas and the Group's unique technologies, the main theme of THK's current R&D activities is the “cubic E” concept, which embraces the three keywords “Ecological,” “Economical” and “Endless.” Based on this theme, we continued throughout fiscal 2011 to speed up development with the aim of extending the range of applications for our technologies while at the same time seeking to develop highly original and attractive products for launch 5–10 years in the future. Major achievement in fiscal 2011 included the development of products for a number of original applications. In the industrial machinery field, and again with an emphasis on mainstay LM guides, we developed electric actuator-related new model products for use in areas where demand is projected to increase in line with the ongoing progress toward electric-powered living. In the transportation equipment field, the Group focused on further raising competitiveness particularly from the perspective of costs. In this context, steps were taken to develop new crafting techniques, more compact and lightweight products as well as products

for use in electric vehicles. In seismic isolation systems, THK worked diligently to introduce its seismic isolation platform to the market that protects business assets including servers and a variety of production equipment from damage caused by earthquake vibrations. Moreover, in April 2012 we developed a new damping system that suppresses the depth and breadth of swaying motions in super high-rise buildings brought on by long-period ground vibration. In this manner, THK is upgrading and expanding its product lineup while taking steps to diversify its product range.

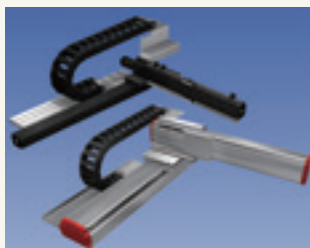
### Fiscal 2012 Policies and Initiatives

We plan to focus our efforts in fiscal 2012 on the efficient development of new products with the aim of expanding applications for THK technology further. Specifically, we will pursue themes such as customer convenience while promoting designs that incorporate the potential for enhanced productivity and quality. Moreover, by conducting in tandem basic and applied development activities, we will focus on developing products that can quickly generate commercial returns. Complementing these endeavors, and while strengthening our global development capabilities, the R&D base within THK CHINA will serve at the center of efforts to actively promote product development that addresses local market needs.



Press Series Electric Actuator: PC

Model PC is designed for use in servo presses and delivers high thrust in a compact body. This is essentially achieved by combining the precision ball screws nut with the ball spline shaft. Distinguished by its high load capacity, high rigidity and high feed precision, Model PC is approximately 30% shorter in length than existing models.



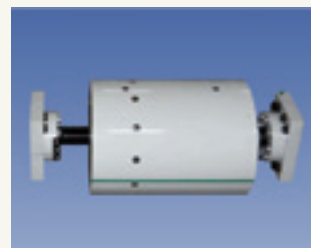
Multi-Axis Series Electric Actuator: MA

Model MA is an actuator that employs two axes and shafts, thereby delivering a selection of various combinations from horizontal to vertical and optimal in the reduction of labor hours with respect to device design and assembly. Furthermore, the model offers extended operating life and long-term maintenance-free use through the application of caged ball technology, as well as provides the potential for a change in motors.



Seismic Isolation Module: TGS

A seismic isolation platform specifically for use with heavy loads, TGS differs from conventional seismic isolation platforms due to its additional damping function. Offering complete freedom in connectivity, this module enables a seismic isolation platform that protects specific pieces of equipment across entire floors of server rooms and data centers. Model TGS received the 54th 10 Major New Products Awards sponsored by Nikkan Kogyo Shimbun.



Inertial Rotary Damping Tube: iRDT

A viscous damping system that helps suppress the shaking of super high-rise buildings caused by long-period ground vibration. The system enables the reduction of costs by curtailing the number of units required for set up while retaining high damping efficacy. In addition, it can be used not only for new buildings, but also in the renovation of existing properties against earthquakes. Due to a host of benefits, this product is expected to attract considerable demand.