

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

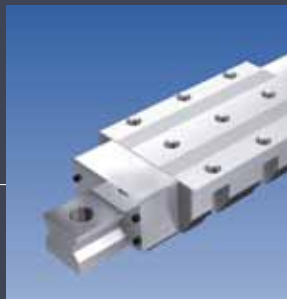
issue. LM guides based on caged ball technology not only provide the benefit of long-term maintenance-free use, but have also made a significant contribution to the development of high-speed, low-noise industrial machinery with longer productive lives, in such sectors as machine tools and semiconductor production equipment. 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, which combine LM guides and ball screws.

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 addition to such mainstay products as linear motion systems and mechatronics equipment, every effort is being made to develop innovative products with an eye toward developing new business areas. Drawing on its core linear motion system technologies and know-how, THK is therefore ramping up its product development activities in such wide-ranging fields as seismic isolation and damping systems, transportation equipment, medical equipment, aircraft, and renewable energy.

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

MAJOR NEW PRODUCTS DEVELOPED IN FISCAL 2013



Caged Roller LM Guide Model SRG ultra-long block type

In connection with its SRG caged roller LM guide, the Company introduced an ultra-long block version model. This initiative is aimed at addressing the need for higher load capacity.



High-Speed Rolled Ball Screw Model BTK-V

While twice as fast as its predecessor, the BTK-V offers lower noise levels and improved sound quality. The use of a plastic pipe full enclosure reduces assembly hours and increases bursting strength.



DIN Standard Compliant Precision Caged Ball Screw Model SDA

Aiming to expand its global market share in ball screws, THK offers the SDA caged ball screw compatible with DIN specifications, an industry standard in Germany. It enables high-speed motion with low noise levels and can be operated without maintenance for long periods.

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 2013: 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 2013 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 2013 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 and ball screws, 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.

With regard to our endeavors in new business areas, the Group focused on further raising competitiveness particularly from the perspective of costs in the transportation equipment field. 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. Particular attention was also directed toward development activities in other fields including aircraft, renewable energy, and robotics. In the aircraft field, THK worked to put forward proposals and engage in the development of interior-related products for such items as seats as a part of efforts to cultivate new markets. In the renewable energy field, the Company manufactured actual equipment for wind, hydroelectric and solar power generators. In addition, through business and university collaboration, we are working to develop optimal parts

and components. During the fiscal year under review, we started sales of shaft units that reduce the resistance of the rotating wings of vertical shaft-type wind power generators. In the robotics field, we strived to develop markets in the consumer-use robot, FA and education fields, while improving “SEED Solutions,” the element/components of a robotics technology system for next-generation robots, including version updates. We are also promoting developments in the robotics industry such as peripheral technologies for upper-body humanoid robots and robotic hand technologies.

The Company won the 2013 JSME Medal for New Technology, awarded by the Japan Society of Mechanical Engineers (JSME), for its Double-Row Angular Contact Roller Rings “model RW,” which was launched in the market in 2010 and has been widely adopted for rotating tables for machine tools and robotic joints. This award is given to publicly recognize superior products created via ingenious adjustments to and improvement of existing technologies and/or grassroots technological development.

Fiscal 2014 Policies and Initiatives

We plan to continuously focus our efforts in fiscal 2014 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. The THK Group boasts a wide variety of proprietary technologies. Looking ahead, we will actively promote technological interaction between Group companies in an effort to stimulate maximum synergies through the mutual routing of technologies thereby leading to new product development.



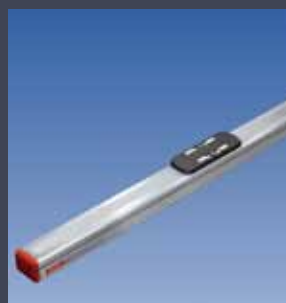
DIN Standard Compliant Precision Ball Screw Model EBA/EPA and Others

Aiming to expand its global market share in ball screws, THK offers the EBA/EPA and others ball screw compatible with DIN specifications. It is a compact product with an internal circulation system that uses deflectors.



Electric Actuator Compact Series KRF

The KRF is a single-axis fully enclosed actuator with high moment rigidity. It enables compact designs and prevents intrusion of foreign matter.



Electric Actuator Compact Series KSF

The KSF actuator features a larger shaft diameter ball screw in order to fully utilize motor capacity. This enables long strokes, high speeds and quick acceleration/deceleration.



Network Unit TNU

As control equipment for electric actuators, the TNU is compatible with EtherCAT specifications for general-purpose networks. It is an easy-to-use product that features simplified operations.