

# R&D AND NEW PRODUCT 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.

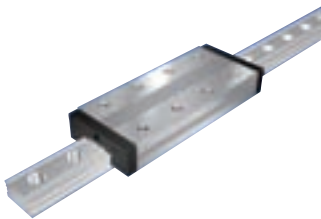
## THK product development as a contributor to industrial development

THK's business philosophy is based on the idea 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.

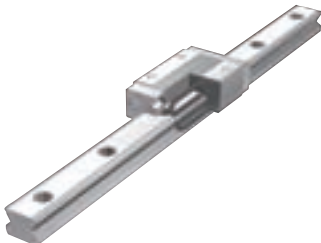
THK developed the world's first linear motion (LM) guide. For the first ten years after we started production and sale of these products in 1972, LM guides were primarily used in machine tools. During this period we developed a series of new products to fulfill our customers' needs for increased precision 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 of 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 the time, the problem was that these bearings had 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 demonstrated superior technical prowess in overcoming 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 cage-embedded technology. Besides LM guides, this range has expanded to include ball screws, ball splines and hybrid units combining LM guides with ball screws.

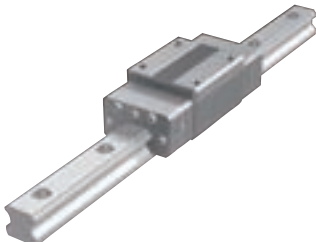
LM Guide with Caged Ball (SPR)



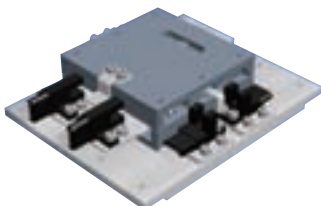
Oil-free LM guide



Medium-to-low vacuum LM guide



High-vacuum non-magnetic stage



## Fiscal 2008 achievements: launch of diverse selection of new products

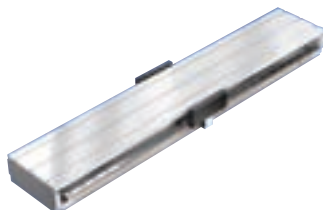
Maintaining the previous year's focus, the main theme of R&D activities in fiscal 2008 was the “cubic E” concept, which embraces the three keywords Ecological, Economical and Endless. Based on this theme, we worked to speed up development with the aim of extending the range of applications for THK's technology while at the same time seeking to develop highly original and attractive products for launch five or ten years in the future.

Major achievements in fiscal 2008 included the development of products for a number of original applications. These are outlined below.

### ■ LM Guide with Caged Ball (SPR/SPRS)

Extending THK's range of LM guides based on caged ball technology, we developed the SPR/SPRS-type LM guide, which offers ultra-high rigidity as well as ensuring extremely low levels of waving (rippling effects due to vertical or lateral movement of balls inside the block). The use of low-diameter balls and an ultra-long block significantly reduces waving. The product also realizes a dramatic improvement in rigidity by doubling the number of grooves in which the balls circulate from four to eight.

Linear motor actuator (GLM25)



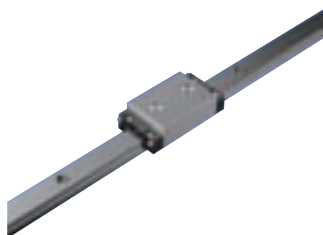
Super-FA HS series



LM actuator (TY)



Utility slide (UGR)



■ Oil-free and medium-to-low vacuum LM guides; high-vacuum non-magnetic stage

We developed and launched three new products for use in highly specialized environments. The oil-free and medium-to-low vacuum LM guides are for use in high-vacuum environments where oil cannot be used for lubrication. The high-vacuum non-magnetic stage is designed to be most effective when used in manufacturing processes for electronic components or flat-panel displays where magnetic substances such as iron must be excluded.

■ Linear motor actuator (GLM series)

We added the GLM15 and the GLM25 models to our range of linear motor actuators. The GLM series has gained both the CE Mark (an EU safety standard) and the UL Mark (a U.S. safety standard), enabling us to expand sales of these products worldwide.

■ Super-FA HS series

The Super-FA HS series is a system solution that links THK's diverse range of actuators to a newly developed high-performance controller using fiber-optic connections. This enables customers to extract maximum performance from the actuators.

■ LM actuator (TY)

Based on the application of belt-drive technology, the TY-type LM actuator offers the dual benefits of a long stroke (of up to 4,700 mm) and high-speed performance (up to 3.4 m/s).

■ Utility slide (UGR)

We developed and introduced this product to apply linear motion technology to a greater range of consumer applications. These utility guide rails can be used in motor vehicles, household furnishings and other types of equipment.

## An efficient and effective R&D system

Organizational changes were implemented within the Engineering Division in June 2009 to boost development efficiency and further promote development of new applications for THK technology.

A new unit, the Business Development Department, was established to target the development of new business areas. This department works alongside the Engineering and Development Department, which has traditionally overseen all development related to vital machinery components and hybrid units. In a separate move, the Application Engineering Development Department was also added to the Engineering Division to provide timely technical support in line with the needs of customers.

The Technology Center, the Tokyo-based facility that undertakes all of THK's R&D activities, currently employs approximately 200 staff (including the IMT Division, which was established to expand the hybrid unit business).

## Fiscal 2009 policies and programs

Based on the revamped R&D system, we plan to focus our efforts in fiscal 2009 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 basic and applied development programs in parallel, we will focus on developing products that can quickly generate commercial returns. In addition, we will focus on nurturing accelerated development by continuing to promote the internal "To Be Project," a human resources development program that is aimed at cultivating the technical personnel needed to foster the growth of THK as a creative development-driven enterprise.