

RESEARCH AND DEVELOPMENT

Guided by the corporate 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 company focused on creation and development.

A Global R&D System for the Next Generation

THK is endeavoring to use its core linear motion system technology and expertise to develop its mainstay linear motion systems, mechatronic devices such as XY precision stages and linear motor actuators, and products in the consumer goods-related fields of automotive parts, seismic isolation and damping systems, medical equipment, aircraft, robotics, and renewable energy at its centers for R&D: the Technology Center and the new headquarters established in October 2017 in Tokyo.



New headquarters (Tokyo)

Technology Center (Tokyo)

In 2010, the THK Group established the R&D Center in China. This facility, which was THK's first R&D facility outside of Japan, began full operation in 2012. With the addition of THK RHYTHM AUTOMOTIVE's German R&D facility in 2015, the THK Group is on its way to building R&D structures oriented toward the Americas, Europe, and Asia in order to more accurately meet the needs of customers around the world.

Initiatives During the 2017 Fiscal Year

To meet the varied needs of its customers in the industrial machinery field, THK has expanded its lineup of LM Guide and ball screw products and developed a diverse lineup of new products that contribute to the automation of customers' production lines, including low-inertia ball screw/splines and gripper-type electric actuators. In the robotics field, THK has expanded its lineup of SEED Solutions components for next-generation robots and introduced SEED Noid platform robots, which combine such components, in order to help lower total costs for customers. In addition, even as THK participates in robotics competitions, the Group has also actively been involved in sponsoring robotics events in order to contribute to the overall development of the service robot industry.

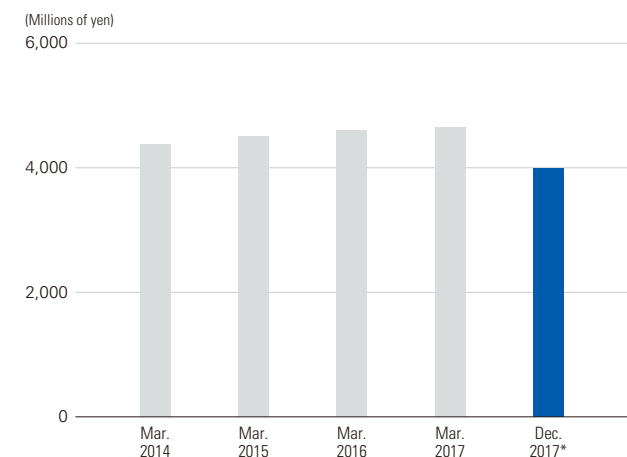
In the automotive and transportation industry, THK has utilized new production methods to introduce aluminum products to the

market in order to meet the customer need for more lightweight automobiles. The Company has also developed aluminum hot forging technology in-house in North America. Even in the new production methods it has developed—in cold forging, hot forging, and precision press technology—THK has distinguished itself from its competitors. Furthermore, the Company has used the unified R&D efforts of THK, THK RHYTHM, and TRA to begin developing and mass-producing linear motion products for the automotive industry to meet the needs generated by the increasing use of electronics in vehicles and self-driving car technology.

Policies and Initiatives for the 2018 Fiscal Year

In the 2018 fiscal year, the THK Group plans to continue focusing its efforts on the efficient development of new products with the aim of further expanding applications for THK's technology. Above all, with the acceleration in AI, the IoT, and robotization, THK will promote the development of new products that incorporate IoT technology into its products. Furthermore, as it strengthens its global development structure, THK will work with THK RHYTHM and TRA to incorporate its accumulated core linear motion technology into the development of products used in the automotive industry. In this manner, these members of the THK Group will work to maximize the synergistic effect of putting their respective technologies to use in one another's fields to contribute to the development of new products.

R&D Expenses



*This data reflects a modified reporting period that includes 9 months from consolidated companies whose fiscal years ended in March and 12 months from consolidated companies whose fiscal years ended in December.

NEW PRODUCTS



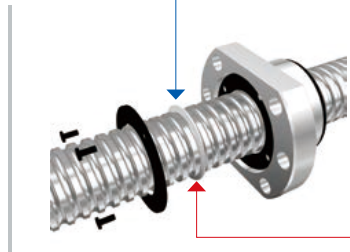
Caged Roller LM Guide Model SRN (Ultra-Long Block Type)

The ultra-long block improves the rated load and rigidity of the product.



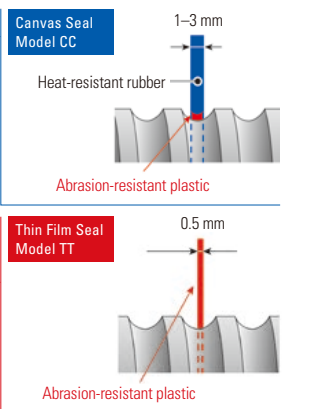
High-Load Ball Screw Model HBN-V

This product features improved ball circulation, which increases the rated load by 1.1 times and the product life by 1.3 times when compared to previous models.



Ball Screw Accessories Canvas Seal Model CC Thin Film Seal Model TT

The Canvas Seal Model CC is a contact-type seal that excels at dust-proofing and prevents grease from spattering or leaking. The Thin Film Seal Model TT is a cost-effective contact-type seal with low heat generation that can easily be used for different models.



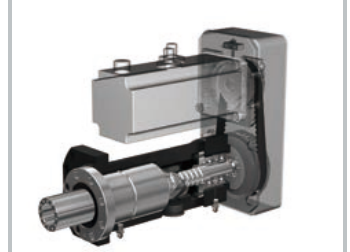
Low-Inertia Ball Screw/Spline Model BNS-V

This product achieves low inertia through the compact external diameter of the nuts on the ball screw/spline, which simultaneously performs linear and rotary motion. Capable of handling various types of movement, this product helps SCARA robots achieve high performance.



Electric Actuator Compact Series Model KSF (Small Lead Type)

This product improves thrust generation as much as it reduces maximum speed. It demonstrates a particular improvement in vertical transport capacity.



Electric Actuator Press Series Model PC100 and Model PC120

These products feature an integrated ball screw nut and ball spline shaft, which allow them to generate high thrust while remaining compact, thereby expanding the lineup of models that are compatible with higher thrust specifications.



Ball Spline with Integrated Ball Screw Model DSP

This product is the actuator for Press Series Model PC sold as an independent unit. Its compact structure enables even greater freedom in equipment design.



Electric Actuator Economy Series Model EG

This product is a gripper-type electric actuator. It contributes to improved repeatability and durability in comparison with pneumatic actuators.



SEED Platform Robots

Through SEED Solutions, SEED Platform Robots enable the easy and cost-effective construction of mobile manipulators. These products help customers reduce costs and develop applications more efficiently when developing robot bodies.

