

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 conducts R&D at the Technology Center and the new headquarters established in October 2017 in Tokyo. At these locations, the Company 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 fields related to consumer goods such as automotive parts, seismic isolation and damping systems, and medical equipment.

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 TRA'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.



Headquarters (Tokyo)



Technology Center (Tokyo)



R&D Center (China)

Initiatives During the 2018 Fiscal Year

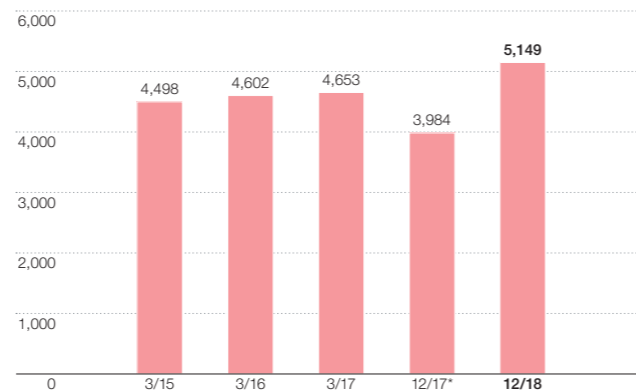
To meet the varied needs of its customers in the industrial machinery field, THK has expanded its lineup of LM Guide and ball screw products and developed a wide array of new products that contribute to the automation of customers' production lines. In terms of the IoT, the Company is preparing to operate its OMNIedge service, which has networking capabilities, introducing a system that can diagnose LM Guide failures and lubrication status as well as detect ball screw preload. In the robotics field, THK has expanded its lineup of SEED Solutions components for next-generation robots to help lower total costs for customers. It also served as a sponsor of the World Robot Summit (WRS) to contribute to the launch of the service robot industry. In the 2019 fiscal year, the THK Group plans to continue focusing its efforts on the efficient development of new products to further expand applications for THK's technology. Above all, with the acceleration of AI, the IoT, automation, and robotization, THK will promote the development of new products that incorporate IoT technology.

In the automotive and transportation field, THK has begun utilizing new production methods to introduce aluminum products to the market in order to expand sales and meet customer needs for more lightweight automobiles. Furthermore, the Company has used the unified R&D efforts of THK, THK RHYTHM, and TRA to actively develop and sell new products to support the increasing use of electronics in vehicles and self-driving car technology. THK aims to expand the range of products that adapt its core linear motion

technology for the automotive industry. To do so, the 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 create new products that suit the development needs of customers.

R&D Expenses

(Millions of yen)



* 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.

THK's Philosophy on Intellectual Property

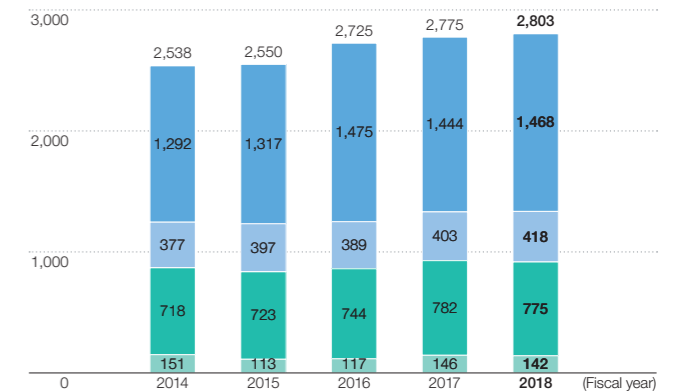
Basic policy

As a company focused on creation and development, THK values and promotes the creation and full utilization of its intellectual property to continue contributing to the development of its customers around the world and to the creation of an affluent society through the development of innovative products.

By applying for patents and preserving its specialized knowledge, THK exercises exclusive rights to its linear motion technology and eliminates imitations. At the same time, to avoid infringing upon the patents of others in the industry, THK works with its planning and development departments to conduct thorough patent searches while still in the development stage, and it internally educates its employees so that they respect the patent rights of third parties. Furthermore, through full-scale globalization and other means, the Company is striving to expand the breadth of its preservation of effective intellectual property rights that contribute to the business.

Intellectual Property

(Number of holdings)



Legend: Published in Japan (light blue), Registered in Japan (green), Published outside of Japan (medium blue), Registered outside of Japan (dark blue).
Due to the change in the fiscal year period in 2017, the data from the 2017 fiscal year onward reflects a period from January 1 to December 31, 2017, and the data for prior years reflects a period from April 1 to March 31.

Technical Exhibitions

InnoTrans 2018

In September 2018, THK exhibited at InnoTrans in Berlin, Germany. InnoTrans is the world's largest international railway technology trade fair. Over the course of the event, more than 160,000 people from roughly 60 countries around the world attended. In addition to displaying THK products, the Company's booth featured full-scale models showing how its products could be used in railway vehicle interiors, maintenance equipment, and station equipment.

THK also participated in the Ideenzug (Idea Train), a collaborative effort between railway interior manufacturers to propose the next generation of suburban railway interiors. The Group will continue its R&D activities to propose ways that its core technology can be applied to new fields.



Ideenzug (Idea Train)



WRS (World Robot Summit)

In October 2018, THK participated in the World Robot Summit (WRS) held in Tokyo, Japan, as a sponsor. At this summit, which was held to advance a society where people and robots coexist and collaborate, THK's SEED-Noid humanoid robot reproduced the traditional Japanese art of Noh, converting the dance of a Noh actor into data and faithfully replicating the operator's movements. Through efforts such as this, the Company will continue to develop and propose robots and robot-related products.



Noh dance made possible through SEED-Noid