

PRECISION COMPONENTS

ADVANCED NSK TECHNOLOGY



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As one of the world's leading manufacturers of rolling bearings, linear technology components and steering systems, we can be found on almost every continent – with production facilities, sales offices and technology centres – because our customers appreciate short decision-making channels, prompt deliveries and local service.



The NSK company

NSK commenced operations as the first Japanese manufacturer of rolling bearings back in 1916. Ever since, we have been continuously expanding and improving not only our product portfolio but also our range of services for various industrial sectors. In this context, we develop technologies in the fields of rolling bearings, linear systems, components for the automotive industry and mechatronic systems. Our research and production facilities in Europe, Americas and Asia are linked together in a global technology

network. Here we concentrate not only on the development of new technologies, but also on the continuous optimisation of quality – at every process stage.

Among other things, our research activities include product design, simulation applications using a variety of analytical systems and the development of different steels and lubricants for rolling bearings.

Partnership based on trust – and trust based on quality

Total Quality by NSK: The synergies of our global network of NSK Technology Centres. Just one example of how we meet our requirements for high quality.

NSK is one of the leading companies with a long tradition in patent applications for machine parts. In our worldwide research centres, we not only concentrate on the development of new technologies, but also on the continual improvement

of quality based on the integrated technology platform of tribology, material technology, analysis and mechatronics.

More about NSK at www.nsk europe.com or call us on +44 (0) 1636 605 123

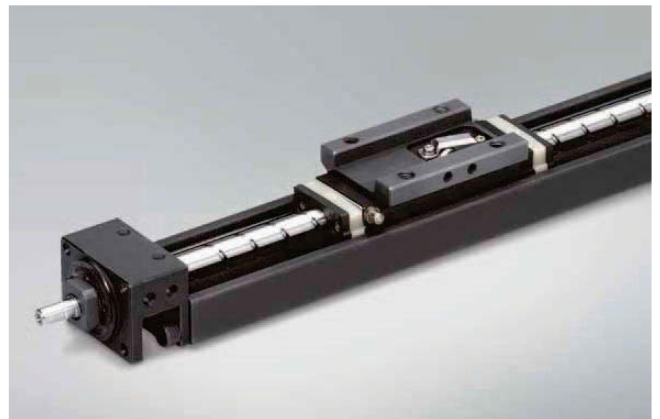


Global Brand

NSK products are known and used all over the world

Since 1916, when it was the first company in Japan to produce ball bearings, NSK has contributed to industrial growth both domestically and overseas for 90 years.

Now, the company's accumulated technology in bearings has been applied to precision products in order to support core components used in a variety of machinery. Precision products marketed under the trusted NSK brand, such as Ball Screws, Linear Guides, Monocarriers, Mechatronic Products, and Spindles are found in every corner of the earth.

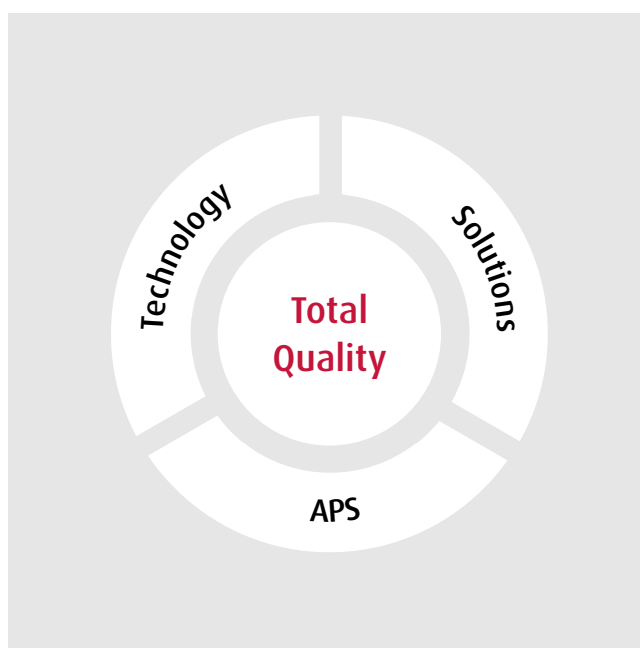




No. 1 in Total Quality

Product quality is essential for manufacturers. NSK builds on its solid foundation of quality to enhance its ability to offer solutions that add value for customers, taking advantage of capabilities afforded by supply chain management (APS: Advanced Production System), and further extending its technical expertise based on four core technologies.

Quality is the objective in all our business processes towards becoming **“No. 1 in Total Quality”**.



Technology

NSK is among the leaders when it comes to the development of rolling bearings that are even more reliable, longer lasting and robust – even at high speeds. In our research centres in Europe, America and Asia, we conduct research and development in four core technology areas:

› **Tribology**

Lubrication is crucial for rolling bearings designed to support linear and rotary motion. Improved lubricant formulations and surface treatment processes enable us to develop even faster, quieter and longer-lasting NSK products which are also capable of withstanding the highest possible stresses.

› **Material engineering**

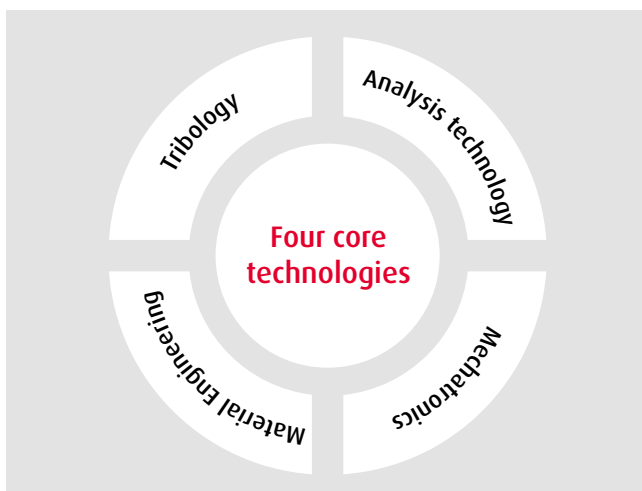
Materials science is undergoing continuous further development aimed at improving the functionality and strength of NSK products. And NSK ranks among the leaders. Our research is concentrated in the fields of material composition, heat treatment, performance evaluation and analytical assessment. The results of this research are then applied to new products.

› **Analysis technology**

In product development, analytical studies – primarily computer simulations – are indispensable. We use them to simulate the behaviour of products under extreme ambient conditions and gain valuable insights relative to product design and manufacturing processes.

› **Mechatronics**

Mechatronics – This combination of mechanics and electronics is creating new, groundbreaking solutions for high-performance engines, control system technology, precision sensors and biomedical micro-electromechanical systems. Mechatronics also play a role in assembly technology for applications that call for high resolution, power density and reliability.





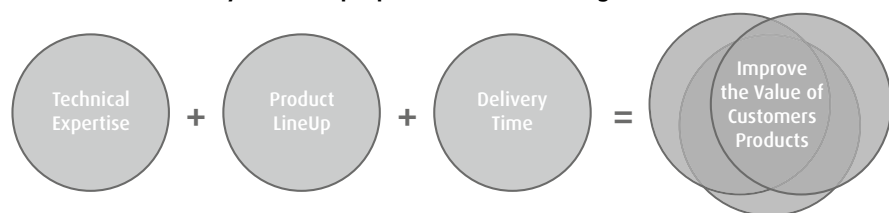
Solutions



Improvement of customers' product value by technical support

With its Technology Centres as the cornerstone, NSK is able to provide technical support worldwide and quickly offers innovative solutions. We are able to more rapidly deliver the required products by combining a global production system with a broad line up that includes precision products and bearings. These detailed solutions and technical support efforts enable us to enhance the value of our customers' products and thereby deepen our partnerships with those customers.

Solutions which only NSK can propose are contributing to the advanced of manufacturing for a new era.



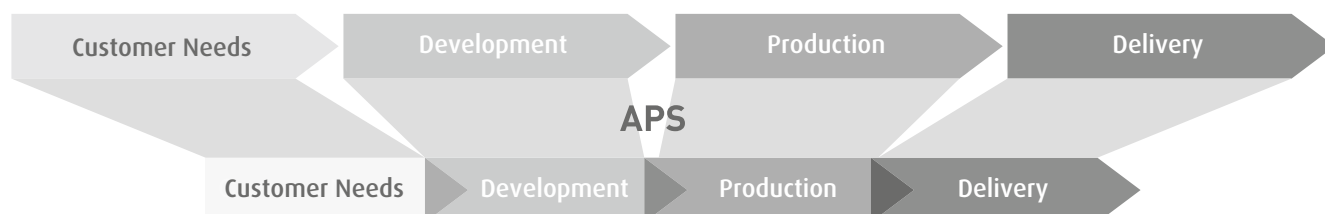
APS



Advanced production system for speed, quality and global supply chain management

To more effectively respond to customer needs, NSK implemented APS (Advanced Production System) encompassing sales, development, design, manufacturing and distribution. Under our APS, we established a project for streamlining operations to shorten lead times. As a result, the system has boosted supply capacity and directly addressed customer demand.

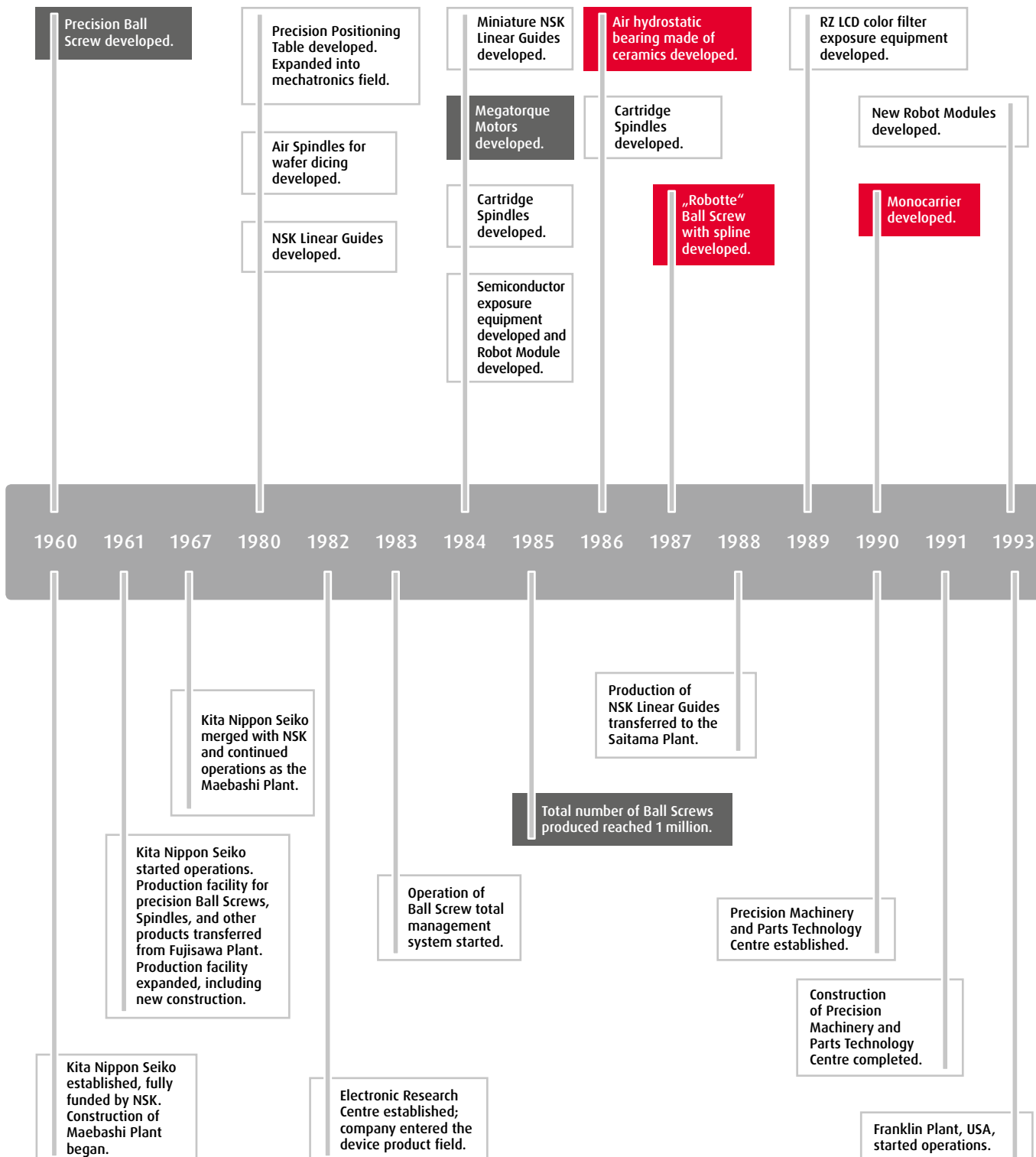
NSK has streamlined operations to cut lead times and achieve faster delivery.

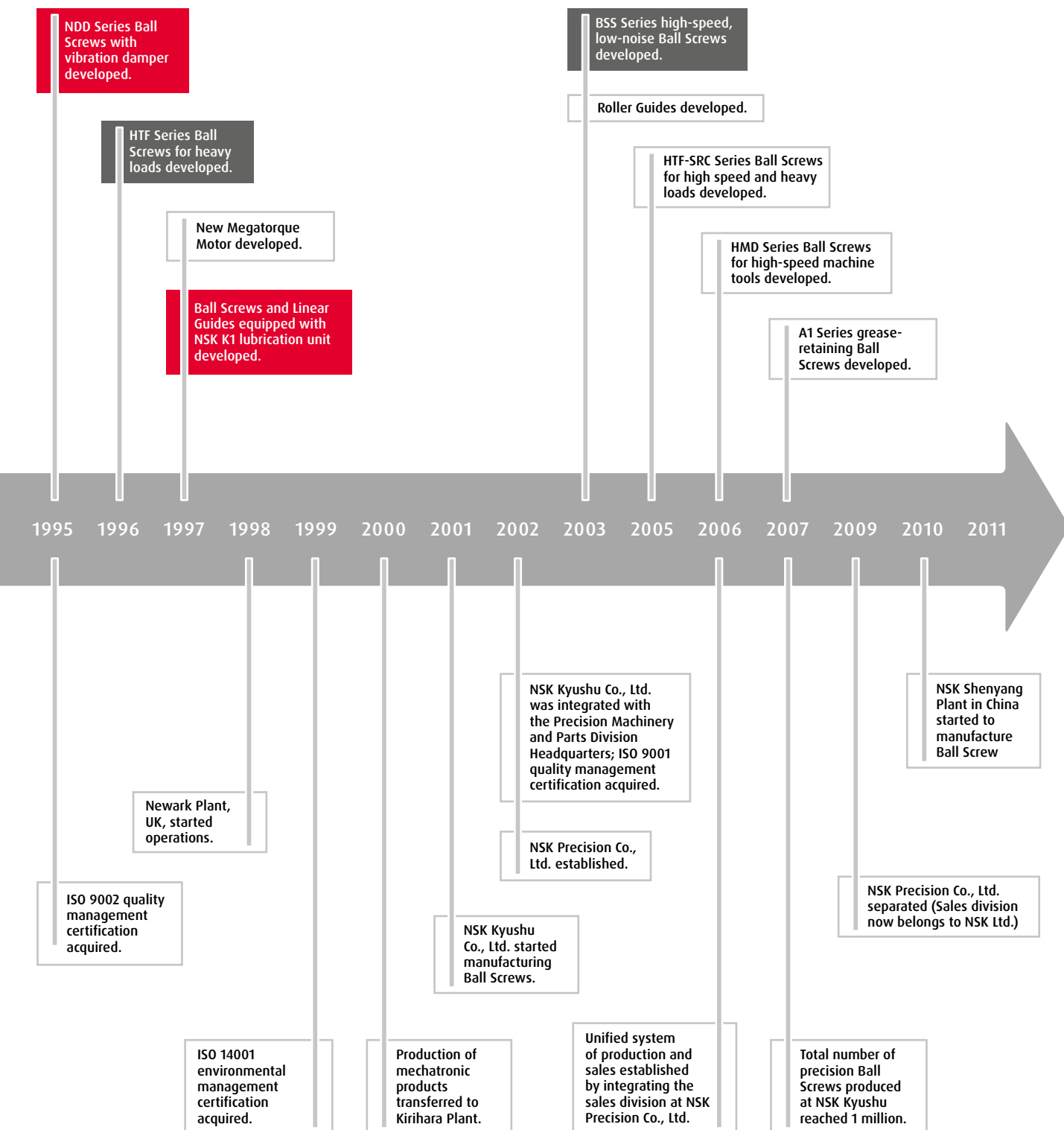


History

First in Japan

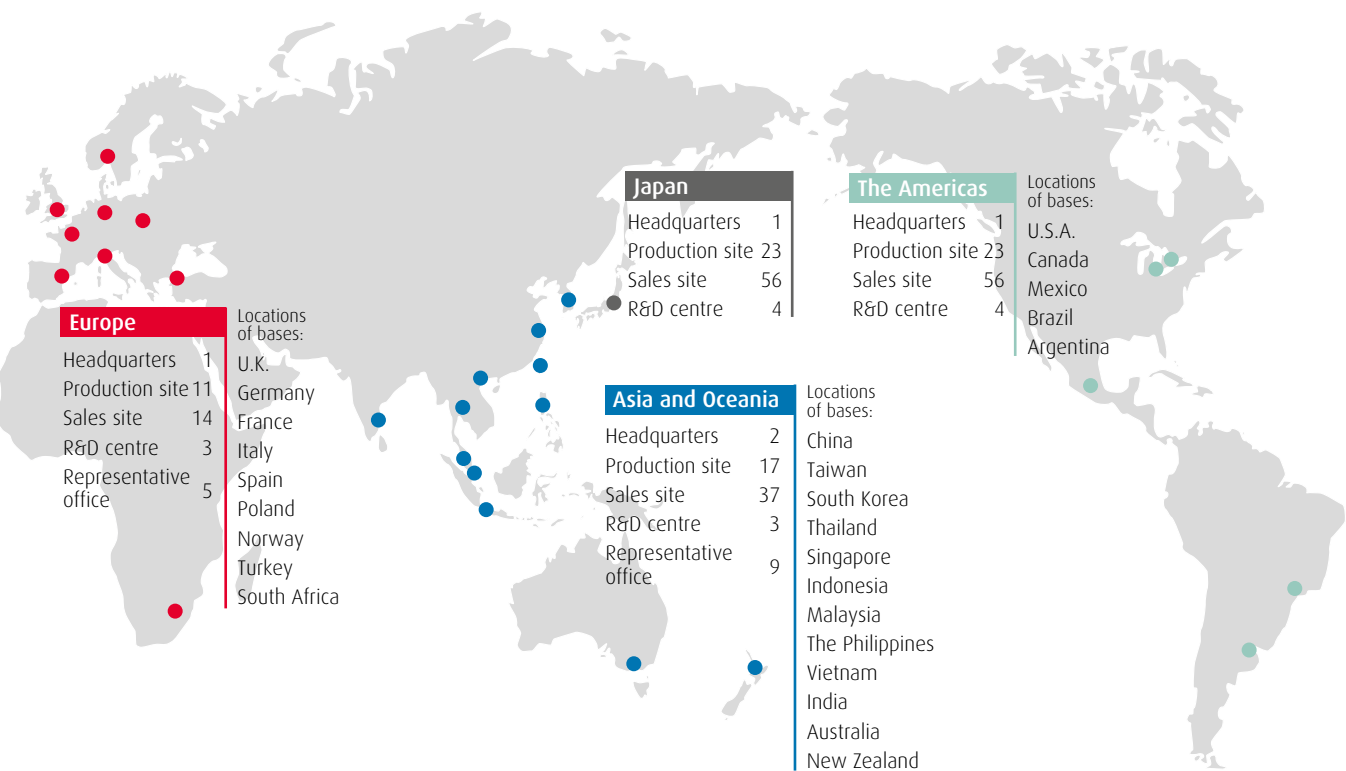
First in the world





NSK Global Network

NSK provides the best products all over the world by our global network



Research & Development

NSK's research system takes full advantage of knowledge on technology shared through its information network

Precision Machinery and Parts Technology Centre

The Precision Machinery and Parts Technology Centre plays a vital role in developing next-generation precision products in cooperation with NSK's Research and Development Centre. For new products or those used for special purposes, reliability testing is essential. Each technology division has introduced instruments developed by NSK to evaluate the various aspects of product performance. Experiments conducted by the Centre are designed according to specific application conditions, such as operating life and durability. The Centre also undertakes vacuum environment testing for semiconductor and LCD manufacturing equipment as well as sound and vibration testing. In addition, accumulated test data is stored in a database, which has proved to be a valuable resource. The Centre is constantly striving to develop new industry-leading products.

Fujisawa Research and Development Centre

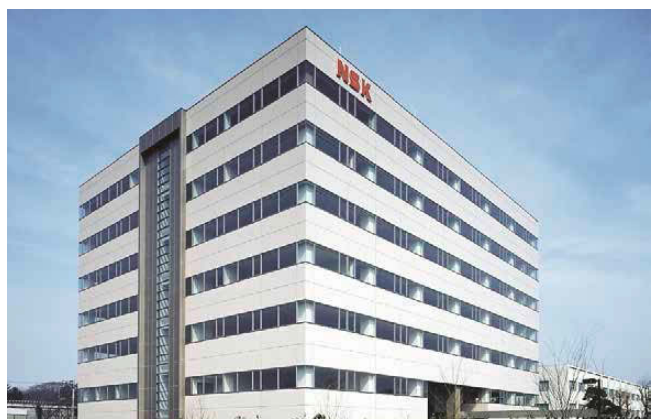
The Fujisawa Research and Development Centre supports the future of NSK by conducting research and development into innovative technologies, such as tribology, analysis technology, materials technology, and mechatronics. This Centre develops high added-value, next-generation products by broadly disseminating data and exchanging information with the Precision Machinery and Parts Technology Centre and R&D centres in the Americas, Europe and Asia.



NSK Ltd. Headquarters (Shinagawa, Tokyo)



Maebashi, Gunma



Fujisawa, Kanagawa

Manufacturing Bases

Global manufacturing bases assist in maintaining the high-quality “NSK brand”



Kiri-hara, Fujisawa, Kanagawa

NSK Ltd. Precision Machinery and Parts Division-Headquarters, Systemized Products Business Department

This division produces mechatronic products and system components, including Megatorque Motors and air bearings. By adopting the most advanced grinders and proprietary evaluation systems, the division conducts meticulous quality control in its quest to manufacture products with ever-higher precision and functionality.

Products: Megatorque Motors, system components, air bearings



Hanyu, Saitama

NSK Precision Co., Ltd.

Saitama Precision Machinery and Parts Plant

The Saitama Precision Machinery and Parts Plant manufactures Linear Guides that are widely used in machine tools, transportation systems, and other applications. With its ground-breaking processing technology and thorough factory automation, the plant contributes to enhancing customer satisfaction by producing high-quality products.

Products: Linear Guides



Hanyu, Saitama

NSK Kyushu Co., Ltd.

As the world's No. 1 production base for small precision Ball Screws, NSK Kyushu Co., Ltd. is striving to realise unsurpassed QCD (quality, cost, delivery) and earn customer trust. NSK Kyushu Co., Ltd. endeavors to shorten delivery time with NSK's proprietary production management system.

Products: Ball Screws



Shenyang, China

NSK Precision Co., Ltd.

Shenyang NSK Precision Co., Ltd. was established in 2009 as a precision ball screw production base to meet the market needs of the emerging countries such as China which can expect demand expansion. By adopting own production technology developed in Japanese plant, and conducting meticulous quality control, Shenyang NSK Precision Co., Ltd. endeavours to shorten delivery time.

Products: Ball Screws

NSK Precision Co., Ltd.

Maebashi Precision Machinery and Parts Plant

As a production base for precision machinery components, the Maebashi Precision Machinery and Parts Plant manufactures world-class products, including large Ball Screws and Monocarriers, by fully applying state-of-the-art techniques based on the highest level super-precision technologies. NSK's own production methods ensure meticulous quality control throughout the entire production process.

Products: Ball Screws, Monocarriers, XY Tables, Support Units



Maebashi, Gunma

NSK Precision America, Inc.

Franklin Plant

Established in 1993, this plant serves as a production base for Ball Screws. It actively supplies Linear Guides and mechatronic products to meet a wide range of market needs in such areas as machine tools, semiconductors, medical equipment and general industrial applications. The plant also promotes various projects and advanced production system (APS) activities in concert with other plants in Japan to achieve further advances towards even faster delivery systems to meet the demands of a broader market.

Products: Ball Screws, XY Tables



Indiana, U.S.A.

NSK Precision UK, Ltd.

Newark Plant

The Newark Plant was established in 1998 as a Linear Guide production base that supports short-term delivery along with a European warehouse, a sales base in Europe, and a workshop. The plant is part of a system that covers not only major markets in Europe but also general industrial markets in Eastern Europe and the Middle East. It also pursues streamlining in accordance with globalisation and plays an active role as a global sourcing facility by supplying products to the Americas.

Products: Linear Guides



Nottinghamshire, U.K.

Linear Guides



A wide range of products, from machine tools to medical equipment, that satisfy the needs of customers

The manufacturing process for NSK Linear Guides incorporates production technologies that ensure high precision and outstanding quality. We offer an extensive product line up, high-load capability, and excellent dust-resistant performance to meet the needs of a variety of industries, from semiconductor manufacturing equipment to general industrial devices. We are able to quickly and reliably meet expanding customer needs by offering various products such as miniature Linear Guides for special specifications.



Roller Guides – RA Series

The most advanced Roller Guides, representing the culmination of NSK's analysis technology and tribology. With a complete line up featuring high-load capacity and high rigidity, the RA Series meets the needs of a wide range of applications.

Features:

- › High rigidity
- › High accuracy
- › Long operating life
- › High dust resistance



Standard Linear Guides – LH Series / LS Series

NSK's standard Linear Guide series satisfies the requirements of every industry with its versatile performance and conforms to international standard dimensions.

Features:

- › Self-aligning capability
- › Impact-load resistance
- › Wide variety



High-Accuracy Linear Guides – HA and HS Series

High-performance Linear Guides with outstanding motion accuracy are designed for super high-accuracy machine tools or measuring equipment.

Features:

- › High motion accuracy
- › High rigidity
- › Extra long bearing



Low-Noise Linear Guides – NSK S1 Series

NSK S1 Series ensures quiet, non-obtrusive sound and low dust emission while exhibiting smooth operation.

Features:

- › Quiet, non-obtrusive sound emission
- › Smooth motion
- › Low dust emission
- › Wide variety



Linear Guides – Miniature PU Series / PE Series

Light weight, compact and easy to use, NSK miniature Linear Guides ensure smooth operation.

Features:

- › Smooth motion
- › Light weight
- › Incorporates stainless steel
- › Low dust emission



Lubrication Units – NSK K1

NSK K1 lubrication unit ensures long-term, maintenance-free operation as well as the long operating life of components under tough lubrication environments; clean lubrication method exerts less impact on the environment.

Features:

- › Long-term, maintenance-free operation
- › Long operating life
- › NSK K1 for food processing or medical equipment also available



Highly Dust-Resistant Linear Guides – V1 Series

NSK's most advanced high-performance seals deliver more than four times longer operating life under contaminated environments than conventional models.

Features:

- › High dust-resistance (multi-lip structure seal)
- › Long operating life



Thin-Film Lubrication for Vacuum Environments – Linear Guides with E-DFO for Vacuum Environments

Further evolved DFO thin-film lubrication technology ensures significantly longer operating life and lower outgassing in vacuum environments.

Features:

- › Suitable for high vacuum environments
- › Low outgassing
- › Low friction

Ball Screws

With the world's leading Ball Screw, NSK has been contributing to industrial growth



NSK Ball Screws were developed through cutting-edge tribology (friction control technology), and NSK manufactures the largest volume in the world with its outstanding production and quality control techniques. We offer a complete selection of Ball Screws, from miniature to ultra-large sizes, for machine tools, injection molding machines, and general machinery as well as for use under special environments, such as semiconductor and LCD production equipment.



High-Speed, Low-Noise Ball Screws – BSS Series

Quiet and compact, with unparalleled high-speed performance. Low-noise BSS Series Ball Screws are suitable for an extensive range of uses, from transportation equipment to machine tools.

Features:

- › Low noise
- › High speed
- › Compact design



Ball Screws for Twin-Drive Systems – TW Series

TW Series Ball Screws deliver the ideal functionality for twin-drive systems and easily realize the high rigidity, accuracy and responsiveness of twin-drive tables.

Features:

- › High rigidity and long operating life
- › High accuracy
- › Excellent responsiveness



Ball Screws for High-Speed Machine Tools – HMD Series HMD Series

Upgraded version of the highly regarded HMC Series, featuring new recirculation method that enables high-speed, low-noise operation.

Features:

- › High-load capacity
- › Low noise
- › High speed



Ball Screws for Small Lathes – BSL Series

Unified component shape facilitates short-term delivery; new lubrication method adopted for high-speed and low-noise operation.

Features:

- › Short-term delivery
- › High speed and low noise
- › Dust resistance



Lubrication Units – NSK K1

NSK K1 lubrication unit ensures long-term, maintenance-free operation and the long operating life of components under tough lubrication environments; clean lubrication method exerts less impact on the environment.

Features:

- › Long-term, maintenance-free operation
- › Long operating life
- › NSK K1 for food processing or medical equipment also available



High-Speed, High-Load Ball Screws – HTF-SRC Series

Next-generation Ball Screws for heavy load applications, evolved from the best-selling HTF Series of high-load Ball Screws.

Features:

- › Super high-load capacity
- › Low noise
- › High speed



Ball Screws for Mold Clamping Systems in Injection Molding Machinery – HTF-SRD Series

Supplements the HTF Series as a large-lead series; employs new recirculation method proven in the BSS Series to support even higher speeds for Ball Screws under heavy loads.

Features:

- › High-load capacity
- › Low noise
- › Compact design



Highly Dust-Resistant Ball Screws – V1 Series

NSK's most advanced high-performance seals deliver more than four times longer service life under contaminated environments than conventional models.

Features:

- › High dust-resistance (specially profiled ball groove of the screw shaft)
- › Long operating life



NSK Ball Screws for Standard Stock – Compact FA Series

Standard stock series for immediate delivery of BSS Series high-speed, low-noise Ball Screws; next-generation compact Ball Screws offer quiet, high-speed operating performance.

Features:

- › Compact design
- › Low noise
- › High speed



Thin-Film Lubrication for Vacuum Environments – Ball Screws with E-DFO for Vacuum Environments

Further advanced DFO thin-film lubrication technology ensures significantly longer life and lower outgassing in vacuum environments.

Features:

- › Suitable for high vacuum environments
- › Low outgassing
- › Low friction

Monocarriers

All-in-one linear products that NSK originally developed ahead of any other manufacturer



A light-weight, single-axle actuator that embodies the technology NSK has accumulated over the years, with an all-in-one structure integrating a Ball Screw, Linear Guide, and support bearing. NSK Monocarriers offer long-life, maintenance-free operation and are suitable for a wide range of applications. Monocarriers for clean environments are also available.



Monocarriers – MCM Series

Light weight, compact, and high accuracy MCM Series is suitable for small-sized transporting equipment.

Features:

- › Wide variety
- › Equipped with NSK K1 as a standard feature
- › Rust prevention



Optional components for MCM Series

- › Sensor unit
- › Sensor rail
- › Cover unit
- › Motor mounting bracket



Monocarriers – MCH Series

MCH Series features a high rigid rail as frame, which allows the customer to use it without support as a beam.

Features:

- › Enhanced rail rigidity
- › Equipped with NSK K1 as a standard feature
- › Rust prevention



Optional components for MCH Series

- › Sensor unit
- › Sensor rail
- › Cover unit
- › Intermediate plate for motor mounting

XY Tables

Suitable for semiconductor and LCD production equipment and medical analysis devices, XY Tables realize advanced positioning accuracy

With its positioning technology and proprietary evaluation technology, NSK provides high-quality XY Tables that contribute to the further development of the state-of-the-art electronics industry. Based on our thorough research into performance requirements for semiconductor and LCD production equipment, we are able to offer the ideal XY Tables, exclusively designed using analysis technology. We have also developed XY Tables for special conditions, such as vacuum and non-magnetic environments.



Precision Positioning Tables

Different combinations of NSK products and unique components to offer the ideal XY Table for each specific application.

Features:

- › Wide variety
- › High motion accuracy
- › Precision positioning table for air slides available



XY Modules

A single-axis module combining NSK Linear Guides and Ball Screws for greater freedom in control system design.

Features:

- › Flexible options for the choice of motor
- › Specification for clean environments available (optional)
- › Multi-axis combination available

Megatorque Motors

Our Megatorque Motors demonstrate outstanding performance in highly accurate positioning and transportation equipment



With their high accuracy, high torque, light weight, and compact size, NSK direct drive motors improve productivity and contribute to higher accuracy, lighter weight, and greater compactness of various devices, such as high-speed robot arms.



Megatorque Motors – PS Series

Advanced Megatorque Motors with high-speed, high-resolution capabilities.

Features:

- › High-speed positioning
- › Compact
- › High-accuracy position sensor
- › Outer rotor



Low Profile Megatorque Motors

Newly developed, low profile Megatorque Motors that inherit the performance advantages of the PS Series.

Features:

- › Low profile
- › High-speed positioning
- › High-accuracy position sensor
- › Inner rotor

Spindles

The world's premier product lineup boasts superior performance, including unprecedented machining ability and maintenance advantages

NSK Spindles take advantage of the company's world-class bearing technology. In particular, our integrated motor Spindle for machining centers features heavy machining capability and is the first high-speed rotation Spindle to adopt grease replenishment lubrication. With NSK Spindles, production lead times are reduced considerably.



High-Speed Integrated Motor Spindles – B1 Series

Achieved energy-efficient, quiet operation with grease lubrication; the world's premier, high-performance integrated motor Spindle.

Features:

- › Low noise
- › High rigidity
- › All-in-one design
- › Maintenance-free operation



Grease Replenishing System – Fine-Lub II

Enhanced eco-friendly performance; grease lubrication ensures energy-efficient, quiet and environmentally sound operation. It is incorporated in the B1 Series.

Features:

- › Provides small quantities of grease
- › Maintenance-free operation
- › Eco-friendly

Others

A wide lineup of peripheral devices for Ball Screws and NSK Linear Guides



We provide special bearings, Support Units and replenishing grease that maximise the performance potential of our superior precision products. In addition, we manufacture and sell exposure equipment that uses cutting-edge technology, which we have accumulated in our precision products.





Exposure Equipment for Large LCD Color Filter – RZ Series

Cost-effective exposure equipment that realizes high accuracy with the proximity method.

Features:

- › High productivity
- › Originally developed precision positioning technology
- › High reliability



Precision Bearings for Machine Tools – Robust Series

The Robust Series of high-accuracy, high-speed bearings represents the epitome of NSK's craft, in materials, evaluation and analysis technologies; reliable support for high-performance machine tools.

Features:

- › Wide variety
- › High accuracy
- › High speed



Ball Screw Support Bearings – TAC B Series

High-rigidity, long-life angular contact thrust ball bearings developed specifically for machine tools.

Features:

- › High rigidity
- › Long operating life
- › Universal combination



Ball Screw Support for Heavy Loads – TAC03 Series

A series of high-load capacity, angular contact thrust ball bearings that deliver optimal support for Ball Screws under heavy load conditions.

Features:

- › High-load capacity
- › Compact design
- › Universal combination



For Heavy Loads and Machine Tools – Support Units

Heavy load support unit developed for machine tools incorporating TAC Series.

Features:

- › Ease of use
- › Short-term delivery
- › Wide variety



Air Bearings

Ideal rotating body that reaches beyond the conventional concept of a bearing; essential for high-tech industries that require super precision.

Features:

- › High rigidity, low flow consumption
- › Seizure resistant
- › Suitable for air turbines



For Light Loads and Small Equipment – Support Units

Support unit for light loads and small equipment, aligned with standard angular-contact ball bearings; low-dust emission type for clean environments and low-profile type also available.

Features:

- › Ease of use
- › Short-term delivery
- › Low torque



NSK Clean Grease – LG2 / LGU

With excellent low dust emission and low torque, LG2 proves its worth in clean room environments; LGU is suitable over a wide temperature range and offers superior durability. Various greases for general use are also available.

Features:

- › Low dust emission
- › Low torque
- › Long life

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