MOTION & CONTROL™

NSK

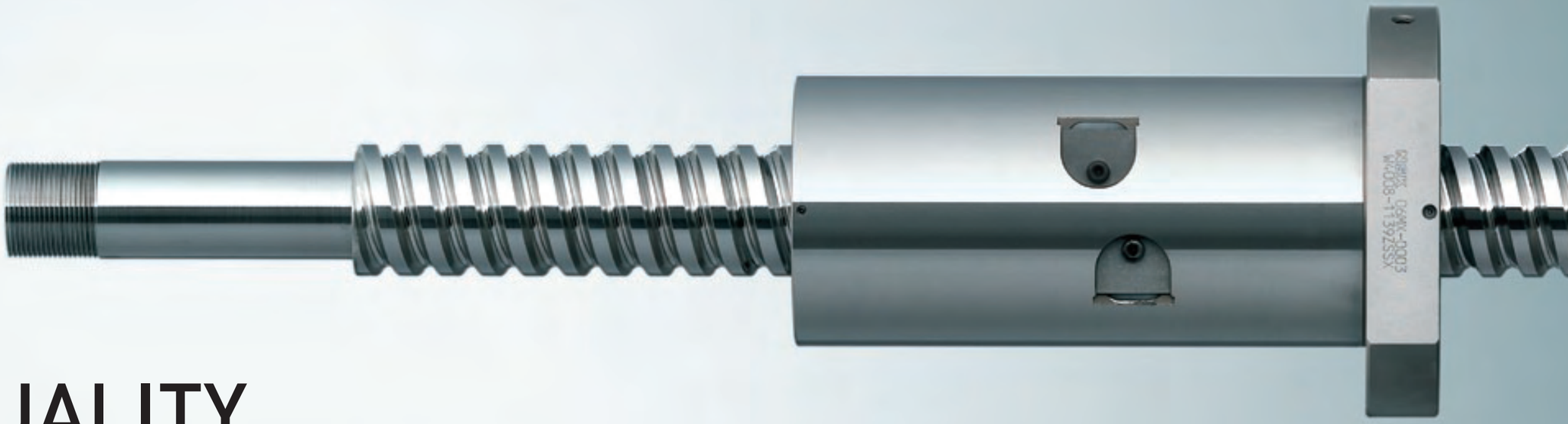
NSK Precision Products

Enabling the Future as Your Partner

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 globe.



TOTAL QUALITY

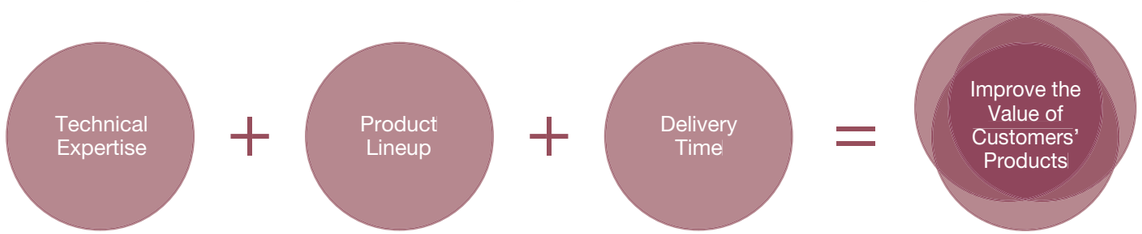
Focus on customers' total quality

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 toward becoming "No. 1 in Total Quality."

SOLUTIONS

Improvement of customers' product value by technical support

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

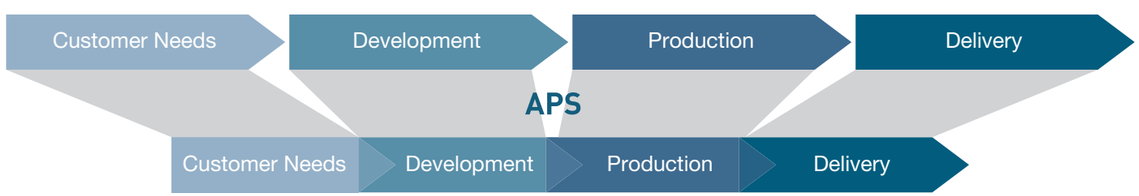


With its Technology Center as the cornerstone, NSK is able to provide technical support worldwide and quickly offer innovative solutions. We are able to more rapidly deliver the required products by combining a global production system with a broad lineup that includes precision products and bearings. 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.

APS

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

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

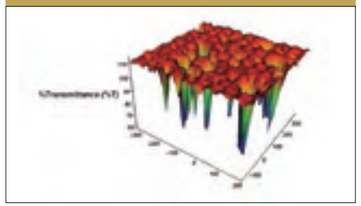


To more effectively respond to customer needs, NSK implemented APS (Advanced Production System) encompassing sales, development, design, manufacturing and distribution. Under our APS, we established a project for streamlining operations to shorten lead times. As a result, the system has boosted supply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

TECHNOLOGY

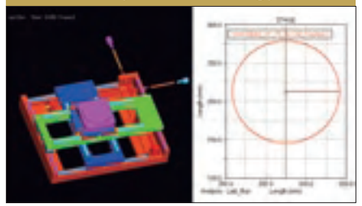
Developing innovative technologies and products by our four core technologies

Tribology



Precision products with rotational and linear movement require lubrication that supports high speed, low noise operation, load capacity, durability, and other desirable functionality. NSK has applied, and provided to customers, advanced tribology (friction control technology) to such areas as grease, solid lubricants, and surface processing methods for precision products.

Analysis Technology

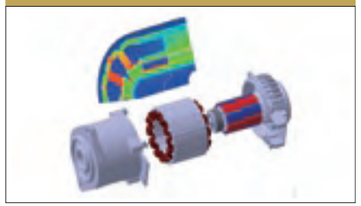


NSK utilizes computer simulations to conduct virtual experiments that require high precision or are difficult to run under actual machine operating conditions. Further improvements in analysis technology have accelerated product development.

Materials Technology

We are aggressively striving to advance material technology through material design, thermal treatment, performance evaluation, and analysis as the cornerstone for improving product performance and durability as well as for reducing costs and boosting productivity.

Mechatronics



Our mechatronics, which integrate mechanical and electronic elements, incorporates state-of-the-art advances in high-performance motors along with control and sensor technology.

Environmental Initiatives

Approach and Basic Policy for Development and Design

In its Environmental Code of Conduct, the NSK Group aims to develop technology and create products that reduce environmental impact. NSK Group products are incorporated into various machines and devices and have the ability to control friction and reduce the amount of energy consumed. In the product development and design stage, importance is placed on comfort, preservation of natural resources, and energy conservation at the end-user stage, as well as on reducing the environmental impact of the manufacturing process. Therefore, initiatives are being promoted to utilize the environmental features of NSK products. In fiscal 2001, a basic policy affecting all technical departments was established in order to steadily implement these goals.

Basic Policy for the Development of Environmentally Friendly Products

The NSK Group will minimize the environmental impact of its products at every stage—from R&D and design, to production, usage, and disposal—by upholding the following standards:

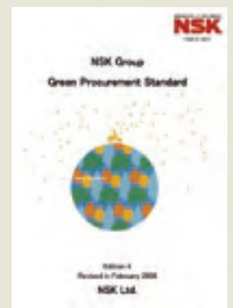
1. Each product should contribute toward the energy and resource conservation by the machine in which it is installed.
2. The amount of energy and resources required during product manufacturing should be minimal.
3. Environmentally harmful substances should not be used in products or manufacturing processes.
4. Products should contribute to the health and safety of end-users by having low emissions of vibration, noise, and dust.

Green Procurement Policy

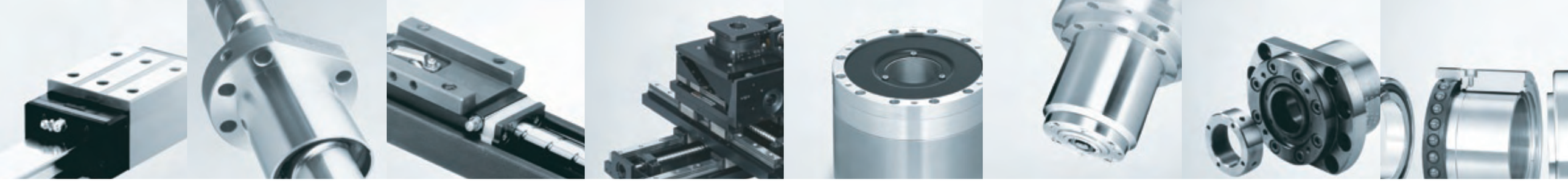
The NSK Group actively procures products, parts, and materials based on environmental considerations. By managing environmentally harmful substances with its suppliers, NSK is strengthening its environmental quality assurance system for its products.

Green Procurement Standards

The NSK Group must deliver products that ensure satisfaction and meet the ever-stricter requirements of customers and European regulations. Therefore, NSK has established standards for procurement such as the Master Purchase Agreement and the *Green Procurement Standards*, based on the idea that ecological considerations for parts and material procurement are indispensable to environmental protection. The company has asked its suppliers to cooperate in this effort.



Green Procurement Standards



HISTORY

	1960	Precision Ball Screw developed.
Kita Nippon Seiko established, fully funded by NSK. Construction of Maebashi Plant began.		
	1961	
Kita Nippon Seiko started operations. Production facility for precision Ball Screws, Spindles, and other products transferred from Fujisawa Plant. Production facility expanded, including new construction.		
Kita Nippon Seiko merged with NSK and continued operations as the Maebashi Plant.	1967	
	1980	Precision Positioning Table developed. Expanded into mechatronics field. Air Spindles for wafer dicing developed.
Electronic Research Center established; company entered the device product field.	1982	NSK Linear Guides developed.
	1983	
Operation of Ball Screw total management system started.	1984	Miniature NSK Linear Guides developed. Megatorque Motors developed. Cartridge Spindles developed.
Total number of Ball Screws produced reached 1 million.	1985	Semiconductor exposure equipment developed and Robot Module developed.
	1986	Air hydrostatic bearing made of ceramics developed. Ceramic Ball Screw developed.
	1987	"Robotte" Ball Screw with spline developed.
Production of NSK Linear Guides transferred to the Saitama Plant.	1988	
	1989	RZ LCD color filter exposure equipment developed.
Precision Machinery and Parts Technology Center established.	1990	Monocarrier developed.
Construction of Precision Machinery and Parts Technology Center completed. Franklin Plant, USA, started operations.	1991	
	1993	New Robot Modules developed.
ISO 9002 quality management certification acquired.	1995	NDD Series Ball Screws with vibration damper developed.
	1996	HTF Series Ball Screws for heavy loads developed.
	1997	Ball Screws and Linear Guides equipped with NSK K1 lubrication unit developed. New Megatorque Motor developed.
Newark Plant, UK, started operations.	1998	
ISO 14001 environmental management certification acquired.	1999	
Production of mechatronic products transferred to Kirihara Plant.	2000	
NSK Kyushu Co., Ltd. started manufacturing Ball Screws.	2001	Translide developed.
NSK Kyushu Co., Ltd. was integrated with the Precision Machinery and Parts Division Headquarters; ISO 9001 quality management certification acquired. NSK Precision Co., Ltd. established.	2002	
	2003	BSS Series high-speed, low-noise Ball Screws developed. Roller Guides developed.
	2005	HTF-SRC Series Ball Screws for high speed and heavy loads developed.
Unified system of production and sales established by integrating the sales division at NSK Precision Co., Ltd. Total number of precision Ball Screws produced at NSK Kyushu reached 1 million.	2006	HMD Series Ball Screws for high-speed machine tools developed.
	2007	A1 Series grease-retaining Ball Screws developed.
	2008	

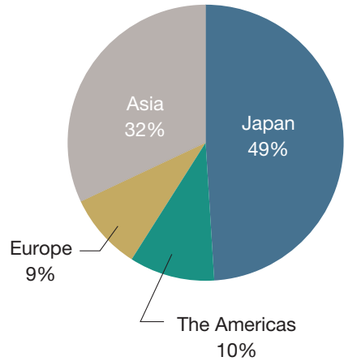
First in Japan　First in the world

REVIEW

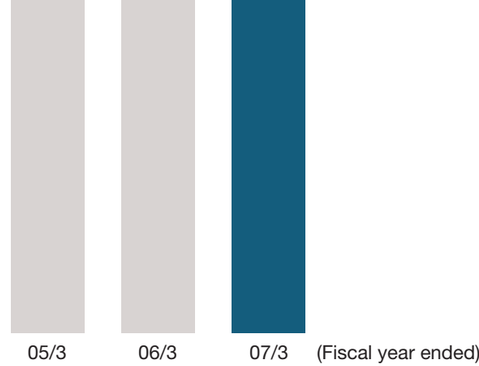
Global activities of NSK's precision machinery and parts business

Net Sales by Region

(Based on customer location, fiscal year ended March 2007)



Net Sales



Overseas Exhibitions

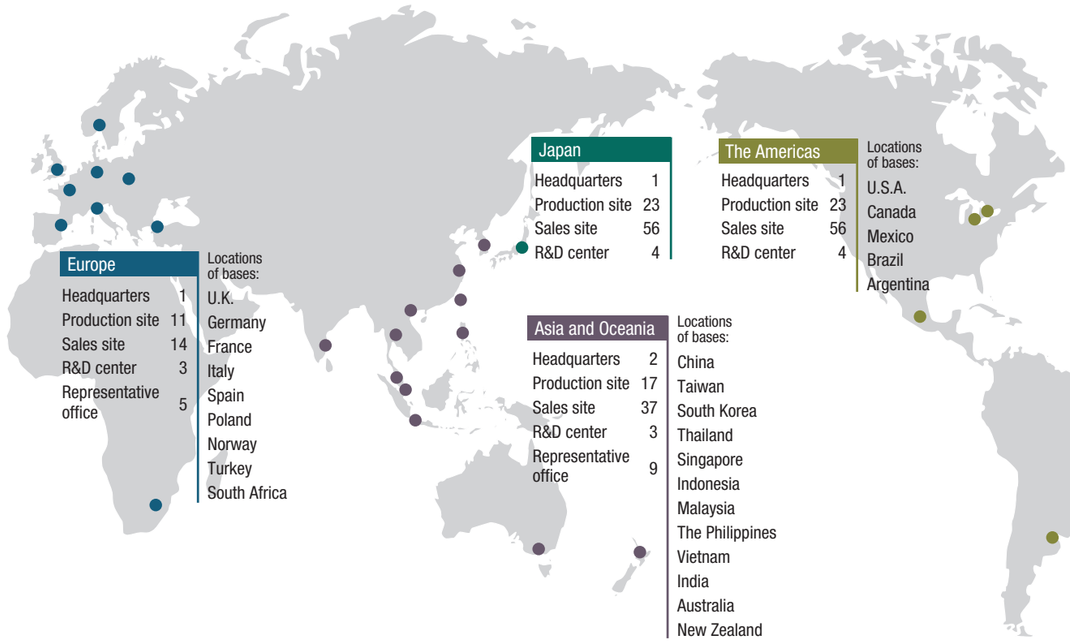
■ EMO Hannover 2007

EMO (Exposition Mondiale de la Machine Outil) is one of the world's premier trade shows for metalworking, involving areas such as machine tools, and is held in Hanover, Germany every two years. NSK participated in this trade show to further reinforce the comprehensive strength and brand of "Global NSK."
At the exhibition, we displayed a machining center to present NSK's total capabilities, that is, the ability to offer all the main component products that constitute machine tools (Ball Screws, Linear Guides, bearings, and Spindles), and illustrate the significance of NSK's contribution to the machine tool industry.

Main products displayed:
TW Series Ball Screws for Twin-Drive Systems, RA Series NSK Roller Guides, HMD Series Ball Screws for Machine Tools and 40,000 min^{-1} Spindles

NSK Global Network

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



NSK Ltd. Headquarters (Shinagawa, Tokyo)

Research & Development

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

Precision Machinery and Parts Technology Center

Maebashi, Gunma

The Precision Machinery and Parts Technology Center plays a vital role in developing next-generation precision products in cooperation with NSK's Research and Development Center. 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 Center are designed according to specific application conditions, such as operating life and durability. The Center 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 Center is constantly striving to develop new industry-leading products.

Fujisawa Research and Development Center

Fujisawa, Kanagawa

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

Manufacturing Bases

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

NSK Precision Co., Ltd.
Maebashi Precision Machinery and Parts Plant

Maebashi, Gunma

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

NSK Precision Co., Ltd.
Saitama Precision Machinery and Parts Plant

Hanyu, Saitama

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

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

Kirihara, Fujisawa, Kanagawa

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

NSK Kyushu Co., Ltd.

Ukiha, Fukuoka

As the world’s No. 1 production base for small precision Ball Screws, NSK Kyushu Co., Ltd. is striving to realize 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

NSK Precision America, Inc.
Franklin Plant

Indiana, U.S.A.

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 toward even faster delivery systems to meet the demands of a broader market.

Products: Ball Screws, XY Tables

NSK Precision UK, Ltd.
Newark Plant

Nottinghamshire, U.K.

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 globalization and plays an active role as a global sourcing facility by supplying products to the Americas.

Products: Linear Guides

NSK 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 lineup, 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.

NSK Roller Guides — RA Series

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

Features:
1. High rigidity
2. High accuracy
3. Long operating life
4. High dust resistance

CAT. No. E3328

NSK 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:
1. Self-aligning capability
2. Impact-load resistance
3. Wide variety

CAT. No. E3161

NSK High-Accuracy Linear Guides — High-Accuracy Series

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

Features:
1. High motion accuracy
2. High rigidity
3. Extra long bearing

CAT. No. E3329

NSK Low-Noise Linear Guides — NSK S1™ Series

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

Features:
1. Quiet, non-obtrusive sound emission
2. Smooth motion
3. Low dust emission
4. Wide variety

CAT. No. E3320

NSK Linear Guides—Miniature — PU Series / PE Series

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

Features:
1. Smooth motion
2. Light weight
3. Incorporates stainless steel
4. Low dust emission

CAT. No. E3327

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:
1. Long-term, maintenance-free operation
2. Long operating life
3. NSK K1™ for food processing or medical equipment also available

CAT. No. 9009

Highly Dust-Resistant NSK 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:
1. High dust-resistance (multi-lip structure seal)
2. Long operating life

CAT. No. E3233, E3330

Thin-Film Lubrication for Vacuum Environments — NSK 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:
1. Suitable for high vacuum environments
2. Low outgassing
3. Low friction

CAT. No. ESP-051209

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:
1. Low noise
2. High speed
3. Compact design

CAT. No. E3229

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:
1. High rigidity and long operating life
2. High accuracy
3. Excellent responsiveness

CAT. No. ESP-061104

Ball Screws for High-Speed Machine Tools — HMD Series

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

Features:
1. High-load capacity
2. Low noise
3. High speed

CAT. No. ESP-061105

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:
1. Short-term delivery
2. High speed and low noise
3. Dust resistance

CAT. No. JSP-061103

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:
1. Long-term, maintenance-free operation
2. Long operating life
3. NSK K1™ for food processing or medical equipment also available

CAT. No. 9009

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:
1. High dust-resistance (specially profiled ball groove of the screw shaft)
2. Long operating life

CAT. No. E3233, E3330

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:
1. Super high-load capacity
2. Low noise
3. High speed

CAT. No. ESP-050922, 3234

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:
1. High-load capacity
2. Low noise
3. Compact design

CAT. No. JSP-061102, 3234

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:
1. Compact design
2. Low noise
3. High speed

CAT. No. E3230

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:
1. Suitable for high vacuum environments
2. Low outgassing
3. Low friction

CAT. No. ESP-051209

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:
1. Wide variety
2. Equipped with NSK K1™ as a standard feature
3. Rust prevention

CAT. No. E3419, ESP-060920

Optional components for MCM Series

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

Monocarriers™ MCH Series

MCH Series features a rail with higher rigidity than the MCM Series allowing it to be used as a beam member.

Features:
1. Enhanced rail rigidity
2. Equipped with NSK K1™ as a standard feature
3. Rust prevention

CAT. No. E3419, ESP-060921

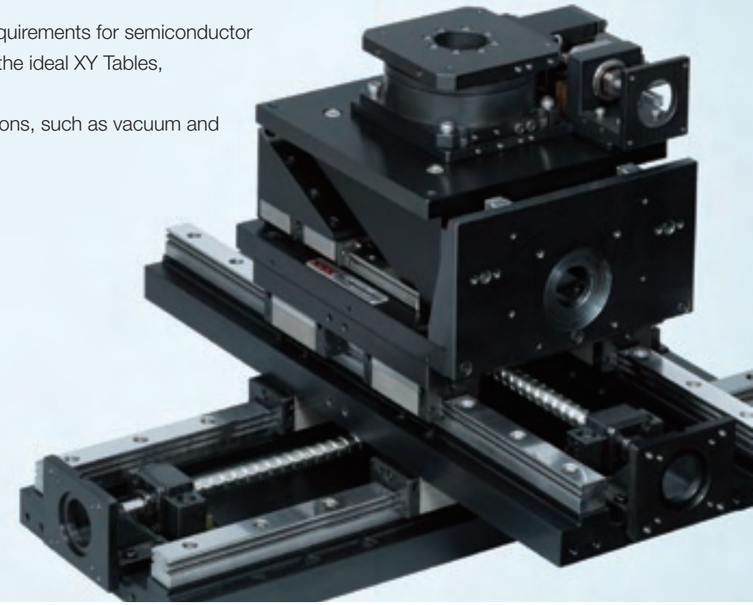
Optional components for MCH Series

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

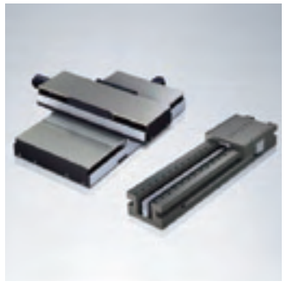
XY Tables

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:
1. Wide variety
2. High motion accuracy
3. Precision positioning table for air slides available

CAT. No. 3418

XY Modules

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

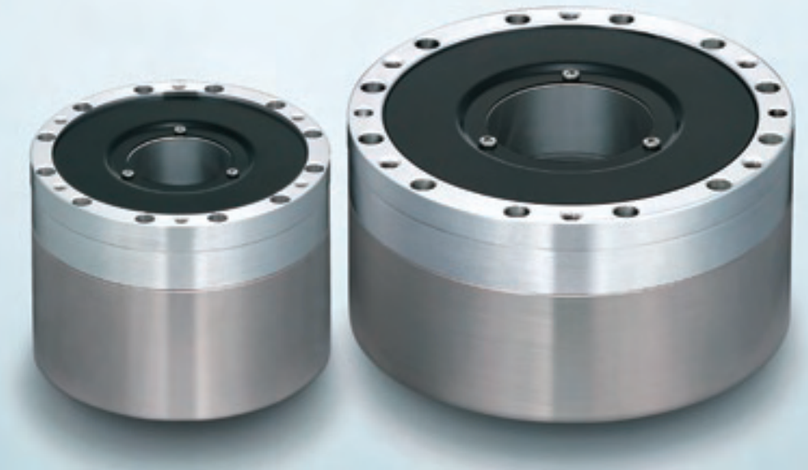
Features:
1. Flexible options for the choice of motor
2. Specification for clean environments available (optional)
3. Multi-axis combination available

CAT. No. 3417

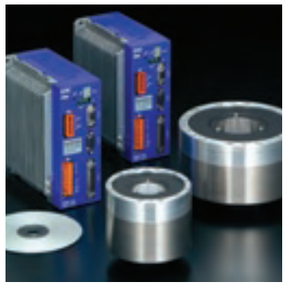
Megatorque Motors

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

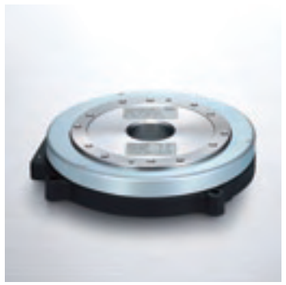


Advanced Megatorque Motors with high-speed, high-resolution capabilities.

Features:
1. High-speed positioning
2. Compact
3. High-accuracy position sensor
4. Outer rotor

CAT. No. E3510

Low Profile Megatorque Motors™



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

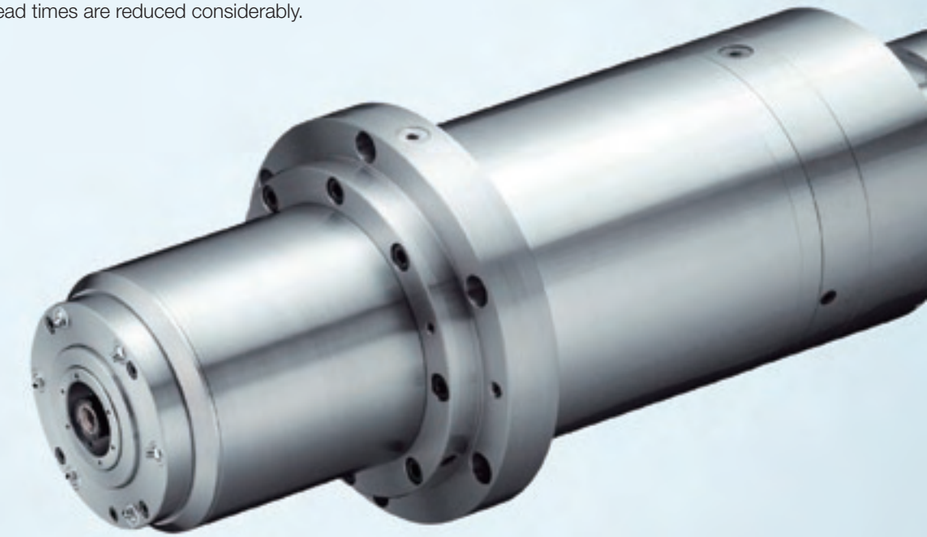
Features:
1. Low profile
2. High-speed positioning
3. High-accuracy position sensor
4. Inner rotor

CAT. No. ESP-070724

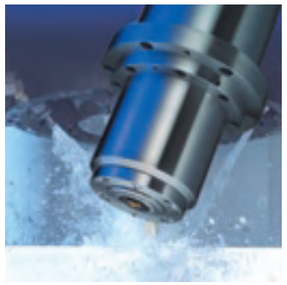
Spindles

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:
1. Low noise
2. High rigidity
3. All-in-one design
4. Maintenance-free operation

CAT. No. E2204

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:
1. Provides small quantities of grease
2. Maintenance-free operation
3. Eco-friendly

CAT. No. E1273

Others

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

We provide special bearings, Support Units and replenishing grease that maximize 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:
1. High productivity
2. Originally developed precision positioning technology
3. 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:
1. Wide variety
2. High accuracy
3. High speed

CAT. No. E1257

Ball Screw Support Bearings — TAC B Series

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

Features:
1. High rigidity
2. Long operating life
3. Universal combination

CAT. No. E1254

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:
1. High-load capacity
2. Compact design
3. Universal combination

CAT. No. 1248

For Heavy Loads and Machine Tools — Support Units

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

Features:
1. Ease of use
2. Short-term delivery
3. Wide variety

CAT. No. E3161

Air Bearings

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

Features:
1. High rigidity, low flow consumption
2. Seizure resistant
3. Suitable for air turbines

CAT. No. 1389

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:
1. Ease of use
2. Short-term delivery
3. Low torque

CAT. No. E3281, E3230

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:
1. Low dust emission
2. Low torque
3. Long life

CAT. No. E3314, E3312

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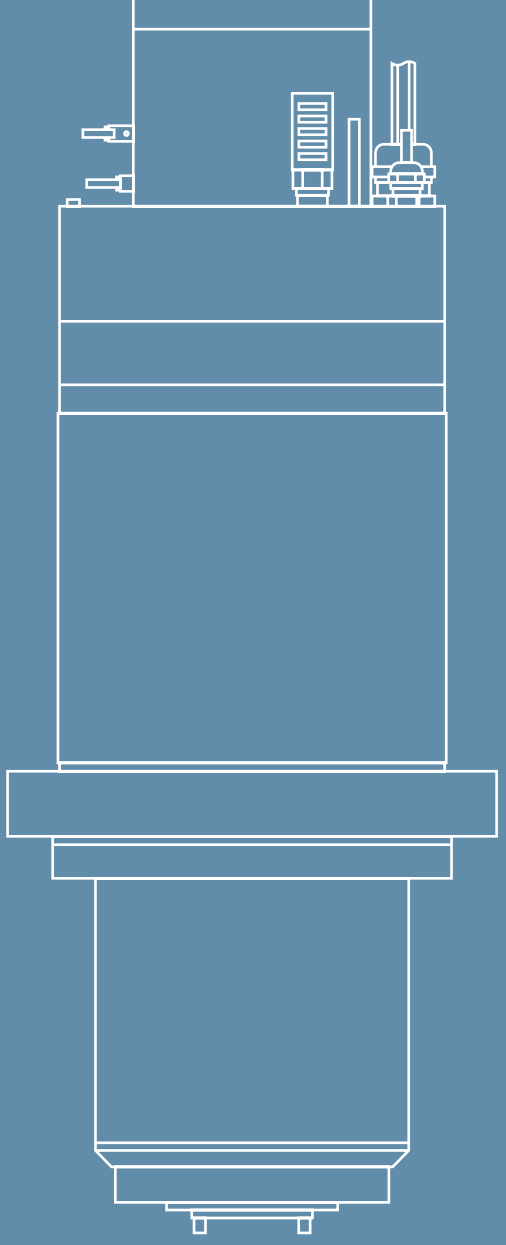

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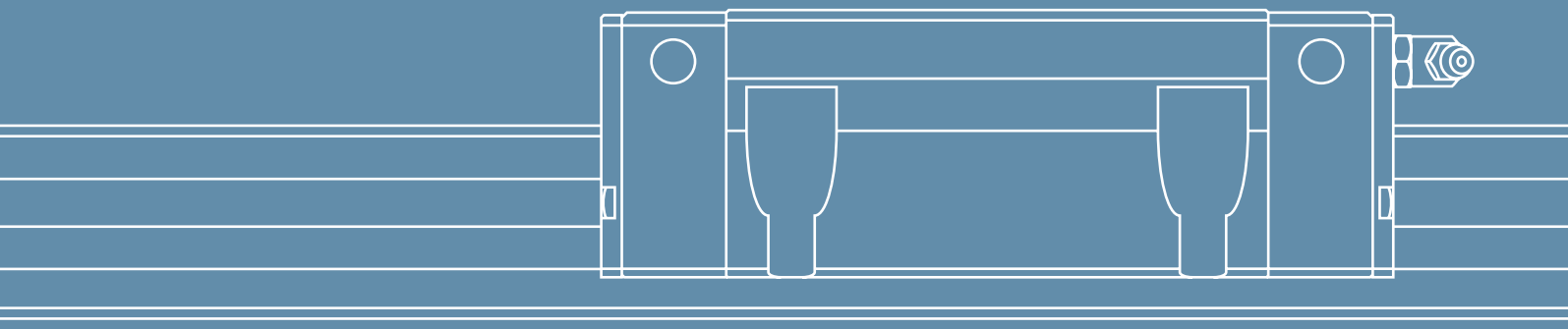

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