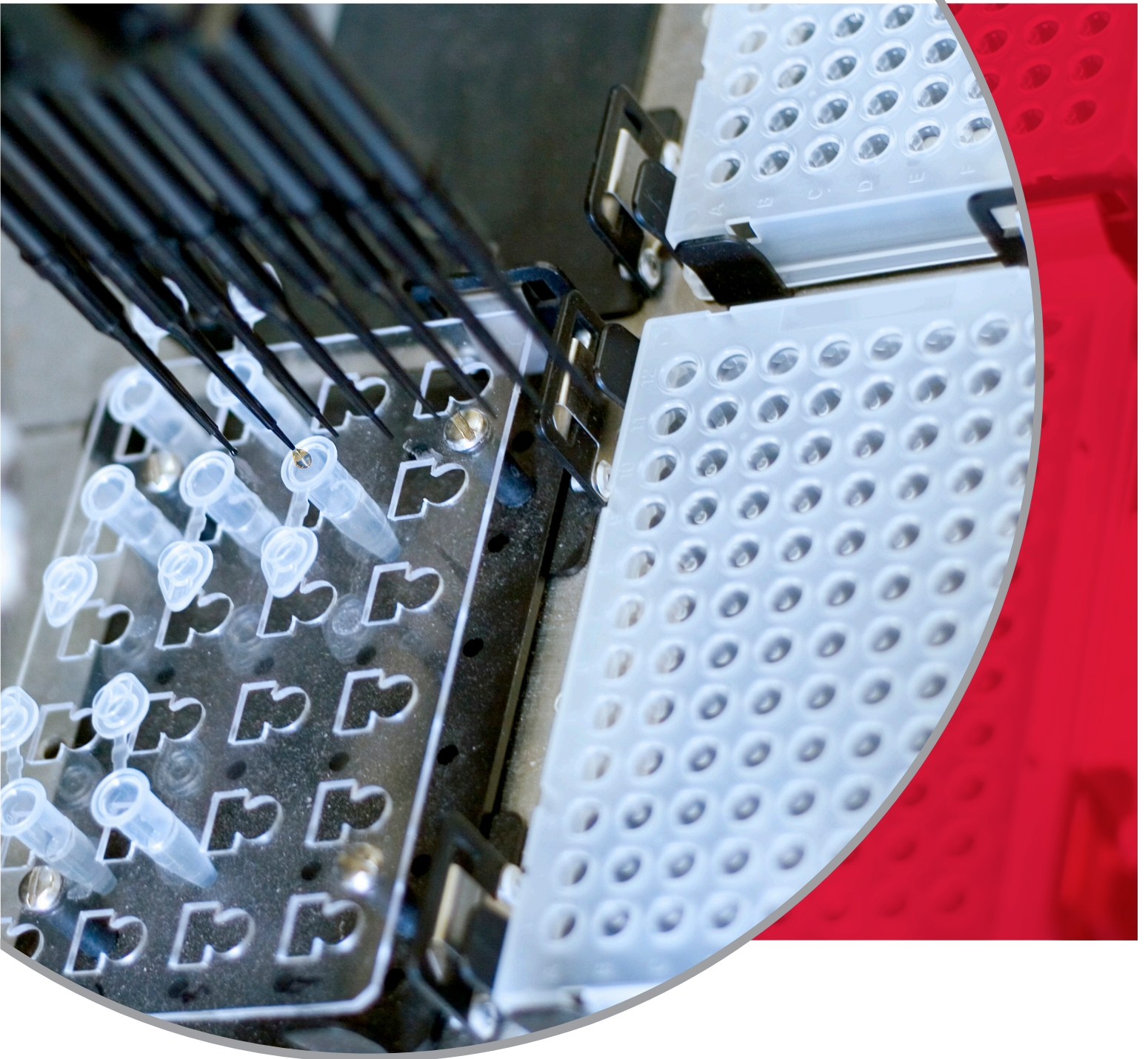


NSK SOLUTIONS FOR MEDICAL INDUSTRY



SOLUTIONS FOR MEDICAL INDUSTRY

As the world population continues to grow and develop, so does the demand for health care. The health care industry must constantly evolve to achieve best outcomes at an economical value.

To meet such challenges, the health care industry relies on medical device and equipment OEM's to produce innovative, reliable, maintenance-free machines. To ensure the highest quality components are used within each machine, OEM's rely on trusted manufacturers, such as NSK.

Regarded as an industry leader, NSK linear motion components have been used within the medical imaging, diagnostics, robotic surgery and medical equipment sectors. Learn more about NSK products and solutions for OEM medical applications.

NSK – An International Company

The NSK Group is one of the world's leading manufacturers of rolling element bearings, linear motion and automotive component products for multiple industries and applications. Within the linear motion division, NSK is regarded as the world's leading manufacturer of precision ground ball screws. Serving a global market, with sales over \$8 billion, NSK has 143 business sites strategically located across the globe. NSK employs more than 25,000 employees in 28 countries worldwide.

With over 90 years of experience, NSK products and solutions have been chosen by leading brands around the world. NSK conducts rigorous tests to guarantee that the best selection of steel is used during the manufacturing process of all NSK products. Choosing NSK ensures unsurpassed quality, performance, reliability.

NSK Americas

Headquartered in Ann Arbor, Michigan, NSK Americas consists of United States, Canada, Mexico, Latin America and Brazil operations. Seven manufacturing facilities are located in the USA, including a linear precision components facility in Franklin, Indiana. Certified to ISO 9001:2008 and ISO 14001: 2004 standards, this state-of-the-art manufacturing plant ensures shorter lead times and faster turnaround. NSK has a dedicated team of sales, marketing, customer service, and engineering experts that not only serve as your personal guide to selecting the right product solution but also as a long-term solutions provider. NSK can assist in domestic repairs and replacement services minimizing potential downtime to provide significant cost savings.

NSK PRODUCT OFFERINGS



Ball Screw Products

- › High accuracy and rigidity ensure optimal performance.
- › Compact design for space saving applications.
- › Available in various diameter, length, lead, accuracy, preload and recirculation options.



Linear Guide Products

- › Interchangeable rail and linear slide sold separately or as assembled components.



Robot Modules™ Products

- › Integrated linear axis system that uses NSK linear guides, ball screws, and Monocarrier™ actuators.
- › Ergonomic design, sealed in an aluminum housing.
- › High rigidity, accuracy and repeatability.
- › Pre-assembled axis reduces time and labor cost.
- › Motor-ready design for customer flexibility.



Megatorque™ Motor Products

- › Direct drive technology.
- › Maintenance-free operation.
- › Easy Installation.
- › Compact design with through hole for easy wire management.
- › Accurate, micron-level repeatability with no backlash.
- › Accessories available including a drive controller, mounting brackets, etc.



Monocarrier™ Linear Actuator Products

- › Easy-to-install ball screw, linear guide and support units integrated into one structure.
- › Lightweight, compact design.
- › Long operating life and maintenance-free operation.
- › Rust-resistant, chrome plated standard material.



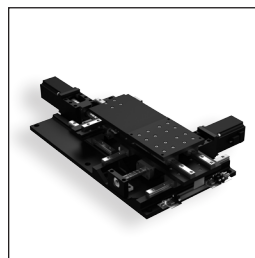
Support Units for Ball Screws

- › Reduces maintenance cost, no re-lubrication is required.
- › Offers high dust protection.
- › Extends ball screw product life.
- › Provides maximum performance for applications from light to heavy loads.
- › Standard stock options available.



K1™ Lubrication Units

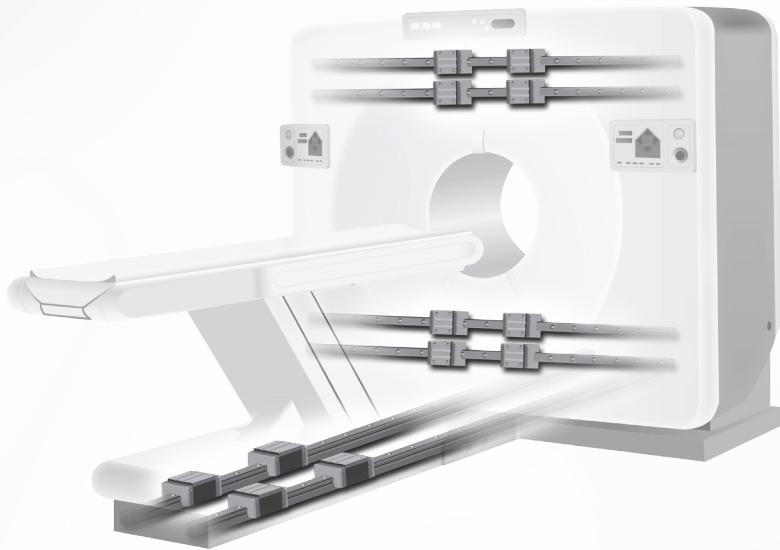
- › Long-term, maintenance-free lubrication unit that is available for ball screws, linear guides, Robot Modules™ and Monocarrier™ product.
- › No maintenance required for 5 years or up to 10,000 km operational distance.
- › All precision linear products can be equipped with K1™ lubrication units.



Integrated Products

- › Custom designs integrating NSK precision linear components.

MEDICAL IMAGING



Industry Challenges

Supply state-of-the-art equipment and adhere to changing regulations, while providing patients with the highest quality care. Improve patient wait time, comfort and safety when undergoing testing from CT, PET and MRI scanning devices.

NSK Approach

NSK Linear Guides provide smooth, quiet, and low friction motion. Optional K1™ Lubrication Units reduce maintenance cost and extend operating life.

Product Feature

LH Series Linear Guides

- › Increased load carrying capacity in vertical direction due to 50 degree contact angle between ball and ball groove.
- › DF structure absorbs installation error allowing for high self-aligning capability.
- › Offset Gothic arch groove minimizes friction.
- › Provides high resistance against impact loads.
- › Rails and ball slides are interchangeable and can be purchased separately for your convenience.
- › Stocked inventory available in various sizes and models of ball slide to facilitate fast delivery.
- › Optional K1™ Lubrication Units provide maintenance-free operation.

LH Series Linear Guides



* Dependent on application, Engineers may recommend other NSK product lines for medical imaging solutions.

MEDICAL DIAGNOSTICS

Industry Challenges

Diagnostic devices, such as blood analyzers, need to process multiple samples, while delivering consistent, accurate results in an efficient manner.

NSK Approach

NSK Monocarrier™ linear actuators are a low-maintenance solution. The MCM Series is ideal for light to medium loads and is available in miniature sizes for compact, space-saving designs. Smooth motion, low vibration high rigidity and long operating life are all achieved with the use of the NSK Monocarrier™ product line.



MCM Monocarrier™



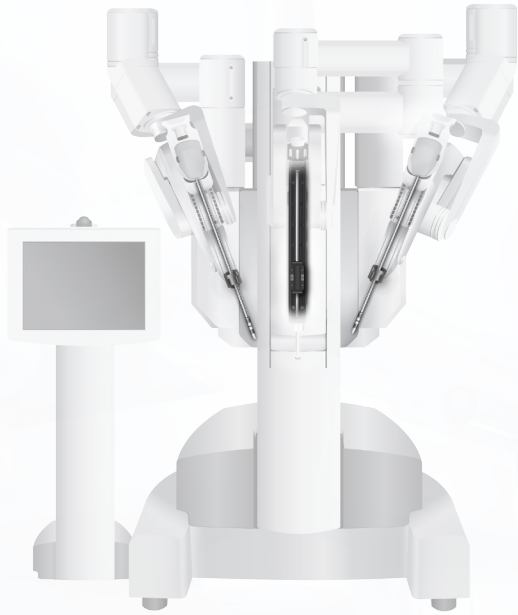
Product Feature

Monocarrier™ Actuators: MCM Series

- › NSK ball screws, linear guides and support units integrated into one unit.
- › Lightweight, compact design.
- › Reduced design and installation time.
- › Equipped with K1™ Lubrication Units to extend product life and provide maintenance-free operation.
- › Chrome plating provides rust protection.
- › Optional features available for MCM Series:
 - Sensor units
 - Sensor rails
 - Cover units
 - Combining brackets
 - Motor bracket / Motor Adaptors
 - Premium anti-corrosion coating
 - Fluoride chrome plating provides increased rust protection

* Dependent on application, Engineers may recommend other NSK product lines for medical diagnostic solutions.

ROBOTIC SURGERY



Industry Challenges

Deliver smooth, accurate, and precise movement to ensure reliable and repeatable results, while continually evaluating level of patient care received.

NSK Approach

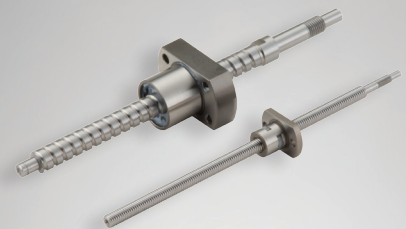
NSK BSS Series ball screws are available in miniature sizes and can be used within the arm of a surgical robot. Each ball screw is designed to deliver high precision and accuracy, which results in unparalleled smooth motion. With the use of K1™ Lubrication Units maintenance costs are significantly reduced.

Product Feature

BSS Series Ball Screws

- › High speed.
- › Reduced operating noise.
- › Compact design - 30% smaller than conventional models.
- › Low profile support units are available to allow for space-saving designs.
- › Lubrication options available for use in clean room environments.
- › Superior seals reduce entry of dust and other contaminants.
- › Optional K1™ Lubrication Units provide maintenance-free operation.

BSS Series Ball Screws



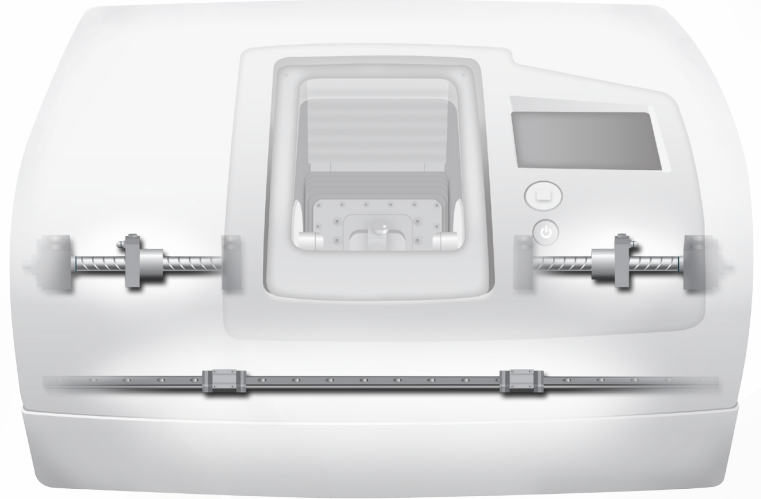
MEDICAL EQUIPMENT

Industry Challenges

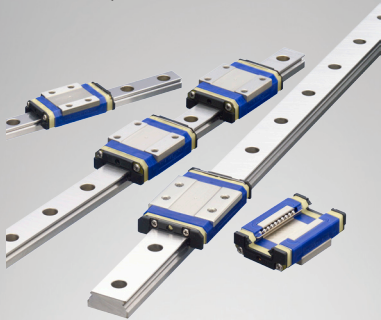
Integrated motion that successfully combines accuracy, rigidity, and speed.

NSK Approach

NSK miniature linear guides combined with miniature ball screws are a good solution for dental milling machines and other medical equipment. Their compact size, ideal for space limitations, delivers high speed, accuracy and rigidity to successfully provide a long term solution.



PU/PE Linear Guides



Product Feature

PU/PE Linear Guides

- › Ball slide is formulated out of resin material.
- › 20% lighter weight than conventional miniature linear guide models.
- › Reduced noise.
- › Compact space between side of rails and inner walls of ball slide prevents entrance of foreign contaminants.
- › Stainless steel material provides excellent corrosion resistance.
- › Ball slide features retained steel balls for easy handling.
- › Equipped with K1™ Lubrication Units to extend product life and provide maintenance-free operation.
- › Inventory available in various sizes and models of ball slide to facilitate fast delivery.
- › Special coatings can be applied to ball screw and linear guides to prevent corrosion and provide added protection in high contaminant environments.
- › PE series are a miniature wide rail type.
- › Ideal for single rail use because of its load carry capacity against high moment loads.

* Dependent on application, Engineers may recommend other NSK product lines for medical equipment solutions.

Worldwide Sales Offices

NSK Ltd. Headquarters, Tokyo, Japan

Asia Business Strategic Division-
Headquarters tel: 81-03-3779-7145
Industrial Machinery Bearings Division-
Headquarters tel: 81-03-3779-7227
Automotive Division-Headquarters
Needle Roller Bearings Strategic
Division-Headquarters tel: 81-03-3779-7189
Precision Machinery & Parts
Division-Headquarters tel: 81-03-3779-7219

Africa

South Africa:

NSK South Africa (Pty) Ltd.
Johannesburg tel: 27-011-458-3600

Asia and Oceania

Australia:

NSK Australia Pty. Ltd. www.nskaustralia.com.au
Melbourne tel: 61-03-9764-8302

China:

NSK Hong Kong Ltd. tel: 86-2739-9933
Hong Kong
Kunshan Plant tel: 86-0520-730-5654
Kunshan Plant
Changshu NSK Needle Bearing Co., Ltd. tel: 86-0512-5230-1111
Jiangsu Plant
Guizhou HS NSK Bearings Co., Ltd. tel: 86-0853-3521505
Anshun Plant
NSK Steering Systems Dongguan Co., Ltd. tel: 86-0769-262-0960
Dongguan Plant
Zhangjiagang NSK Precision Machinery Co., Ltd. tel: 86-0512-5867-6496
Jiangsu Plant
Timken-NSK Bearings (Suzhou) Co., Ltd. tel: 86-0512-6665-5666
Jiangsu
NSK China Technology Center
Jiangsu tel: 86-0512-5771-5654
NSK (Shanghai) Trading Co., Ltd.
Shanghai tel: 86-021-6235-0198
Beijing tel: 86-010-6590-8161
Guangzhou tel: 86-020-3786-4833
Anshun tel: 86-0853-3522522
Chengdu tel: 86-028-8661-4200
Shenzhen tel: 86-0755-25904886
Changchun tel: 86-0431-8988682
NSK (China) Investment Co., Ltd.
Shanghai tel: 86-021-6235-0198

India:

Rane NSK Steering Systems Ltd. tel: 91-044-274-66002
Chennai
NSK Ltd. India Branch Office
Chennai tel: 91-044-2446-6862

Indonesia:

PT. NSK Bearings Manufacturing Indonesia
Jakarta tel: 62-021-898-0155
PT. NSK Indonesia
Jakarta tel: 62-021-252-3458

www.nsk.com

Korea:

NSK Korea Co., Ltd. www.kr.nsk.com
Seoul tel: 82-02-3287-0300
Changwon Plant tel: 82-055-287-6001

Malaysia:

NSK Bearings (Malaysia) Sdn. Bhd. tel: 60-03-7722-3372
Kuala Lumpur
NSK Micro Precision (M) Sdn. Bhd. tel: 60-03-961-6288
Malaysia Plant

New Zealand:

NSK New Zealand Ltd. www.nsk-rhp.co.nz
Auckland tel: 64-09-276-4992

Philippines:

NSK Representative Office
Makati City tel: 63-02-893-9543

Singapore:

NSK International (Singapore) Pte Ltd. tel: 65-6496-8000
Singapore
NSK Singapore (Pte) Ltd. www.nsk-singapore.com.sg
Singapore tel: 65-6496-8000

Taiwan:

Taiwan NSK Precision Co., Ltd. tel: 886-02-2509-3305
Taipei

Thailand:

NSK Bearings (Thailand) Co., Ltd. tel: 66-02-6412-150
Bangkok
SIAM NSK Steering Systems Co., Ltd. tel: 66-038-522-343-350
Chachoengsao
NSK Asia Pacific Technology Center (Thailand) Co., Ltd. tel: 66-038-454631-454633
Chonburi

Vietnam:

NSK Representative Office
Hanoi tel: 84-04-935-1269

Europe

NSK Europe Ltd. www.eu.nsk.com
(European Headquarters) tel: 44-01628-509800
Maidenhead, U.K.

France:

NSK France S.A.S. tel: 33-01-30-57-39-39
Paris

Germany:

NSK Deutschland GmbH tel: 49-02102-481-0
Düsseldorf
NSK Steering Systems Europe Ltd. tel: 49-0771-79082-277
Stuttgart
Neuweg Fertigung GmbH
Munderkingen tel: 49-07393-540

Italy:

NSK Italia S.p.A. tel: 39-02-995-19-1
Milano
Industria Cuscinetti S.p.A. tel: 39-0119824811
Torino Plant

Netherlands:

NSK European Distribution Centre B.V. tel: 31-013-4647647
Tilburg

Poland:

NSK Polska Sp. z o.o. tel: 48-022-645-1525
Warsaw Branch
NSK Iskra S.A. tel: 48-041-366-6111
Kielce
NSK European Technology Center, Poland Office
Kielce tel: 48-041-366-5812

Spain:

NSK Spain S.A. tel: 34-093-289-27-63
Barcelona

Turkey:

NSK Rulmanlari Orta Dogu Tic. Ltd Sti tel: 90-0216-442-7106

United Kingdom:

NSK Bearings Europe Ltd. tel: 44-0191-586-6111
Peterlee Plant
NSK European Technology Centre
Newark tel: 44-01636-605123
NSK UK Ltd. tel: 44-01636-605123
Newark
NSK Steering Systems Europe Ltd. tel: 44-024-76-337100
Coventry

North and South America

NSK Americas, Inc. (American Headquarters)
Ann Arbor tel: 1-734-913-7500

Argentina:

NSK Argentina SRL tel: 54-011-4762-6556
Buenos Aires

Brazil:

NSK Brasil Ltda. www.br.nsk.com
São Paulo tel: 55-011-3269-4700

Canada:

NSK Canada Inc. www.ca.nsk.com
Toronto tel: 1-905-890-0740

Mexico:

NSK Rodamientos Mexicana, S.A. de C.V. www.mx.nsk.com
Mexico City tel: 52-55-36822900

United States of America:

NSK Corporation www.nskamericas.com
Ann Arbor tel: 1-734-913-7500
NSK American Technology Center
Ann Arbor tel: 1-734-913-7500
NSK Precision America, Inc. www.nskprecision.com
Franklin tel: 800-255-4773
NSK Steering Systems America, Inc. www.nssa.nsk.com
Bennington, Vermont tel: 1-802-442-5448
NSK Latin America, Inc. www.la.nsk.com
Miami tel: 1-305-477-0605