

# About us | A History of Challenge and Development

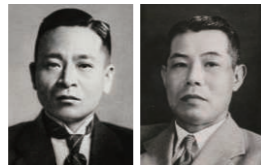
Since the company's inception, NTN has been committed to the "Quality First" principle, and has built up trust and achievements through its advanced technology. NTN will continue to contribute to the international society through creating new technologies and developing new products, aiming to realize a "NAMERAKA Society".

## History of NTN

### 1918

"Frontier Spirit" and "Coexistence and Co-prosperity Spirit" handed down from the company's founding  
Begins research and production of ball bearings at Nishizono Ironworks in Uchibori, Kuwana-cho, Kuwana-gun, Mie Prefecture

Since its founding in 1918, NTN has always valued two of its founder's spirits: the "Frontier Spirit" of continually challenging ourselves and the "Co-existence and Co-prosperity Spirit" of developing alongside society. These founder's spirits are embedded in the corporate philosophy as part of NTN's DNA, and we still possess them more than 100 years later. In 1918, Jiro Nishizono, a 21-year-old young engineer, founded Nishizono Ironworks in Kuwana, Mie Prefecture. Noboru Niwa, who later became the company's first president, started his own business at the age of 22, running a machine tool business in Osaka called Tomoe Trading Co.



Noboru Niwa Jiro Nishizono

In 1922, Tomoe Trading Co. purchased the entire cargo of bearings from a Swedish ship that sank in Japan and asked Nishizono Ironworks, with whom it had a business relationship, to recondition the bearings. With the profits from the sale of these bearings, new grinding machines were purchased and full-scale bearing production was started. From the beginning of production, the bearings were marked with NTN, the initials of Niwa, Tomoe and Nishizono.



Bearings at the time of the start of the business

### 1927

Established "NTN Mfg. Co., Ltd." with capital of 50,000 yen

### 1937

Company name changed to Toyo Bearing Mfg. Co., Ltd.



Old head office building

### 1954

First in the Japanese machinery industry to receive the Deming Prize\*

The Deming Prize is the world's highest ranking award for TQM (Total Quality Management), and NTN was the first company to receive this award in the bearing industry, as well as in the Japanese machinery industry. The company was the first in the machinery industry to introduce statistical quality control, and was recognized for its efforts in promoting quality control throughout the company.



\*Deming Prize: Established by the Union of Japanese Scientists and Engineers to commemorate the achievements of Dr. Deming of the U.S., who popularized statistical quality control in postwar Japan and laid the foundation for raising the quality of Japanese products to a world-class level.



Mettmann Plant, Germany

### 1960s to 1970s

Strengthened and expanded overseas sales and local production

Since 1950, momentum has been building for the expansion of bearing exports. In 1961, we established our first overseas sales company in Düsseldorf, Germany, to respond flexibly to local demand. In terms of manufacturing, in 1971 we became the first Japanese company to establish a manufacturing company in Europe in Germany, and in the same year we established a bearing manufacturing subsidiary in the U.S. Subsequently, the local production system was strengthened by establishing not only plants for finished products but also plants for pre-production processes.

Through these overseas expansions, we have promoted the shift to local production, producing our products where our customers around the world need them.

### 1989

Company name changed to NTN Corporation

In conjunction with the company name change, the meaning of NTN was changed to N.T.N, which stands for "For New Technology Network (connecting the world with new technology)," as a guiding principle for the new future.

### 2008

SNR ROULEMENTS becomes a subsidiary

To expand our business in the European market, we invested in SNR ROULEMENTS of France in 2007 and made it a subsidiary the following year.

### 2018

100th anniversary of the company's founding

On March 1, 2018, the company celebrated its 100th anniversary, and on this occasion, launched the communication word "Make the world NAMERAKA(smooth), NTN"

### 2020

Established the brand statement "Make the world NAMERAKA"

We have established a brand statement to communicate our commitment to a sustainable "NAMERAKA Society" in a consistent manner on a global basis.



### 2023

Toward improved brand awareness in Europe

The company name of NTN-SNR ROULEMENTS S.A. changed to NTN Europe S.A.

Head office relocation

The head office was relocated to Daibiru-Honkan to secure the business continuity and the safety and security of employees in the event of natural disaster.

NTN's Strengths (Competitive Advantages) → P.23



Original Technologies



Quality



Services



## History of Product and Services

### 1963

Started production of driveshafts

The company entered into a technical tie-up with Hardy Spicer Co., Ltd. of the U.K. and began production of driveshafts (constant velocity joints) at the Kuwana Works as a promising product for which demand for automotive applications was expected to rapidly increase in the future.



Driveshaft at the beginning of production

### 1964

Delivered journal bearings for the first 0 Series Shinkansen

We have contributed to the higher speed and lower weight of rolling stock by developing technologies in line with the evolution of high-speed rail and providing high-quality, highly reliable products.

Our products have been used on the first generation 0 series Shinkansen as well as on the latest generation of Shinkansens. The journal bearings for the 0 Series Shinkansen have also been recognized as a "Tribology Heritage" by the Japanese Society of Tribologists.

\*Tribology Heritage: Tribology-related technologies and objects recognized by the Japanese Society of Tribologists as having made particularly important contributions to the development of science and technology.



### Late 1970s

Evolution of hub bearings

The axle bearing (GEN1), the predecessor of the hub bearing for which we hold the top class share of the global market, was commercialized in the late 1970s. In the 1980s, the GEN1 evolved into a hub bearing (GEN2) with a knuckle and other peripheral parts integrated as a unit. The GEN3 was further evolved to integrate all of hub bolts, flange, and knuckle for easier assembly on vehicle assembly lines, and mass production of the GEN3 began in Japan for the first time in the mid-1980s. Even today, the product continues to evolve, such as in combination with various sensors and further improvements in ease of assembly.



GEN1 GEN2 GEN3

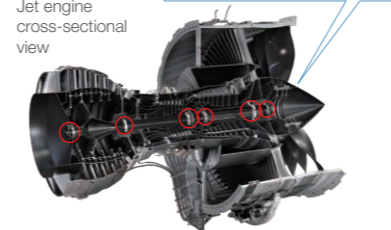
### 1986

Constructed Japan's first plant specialized in aerospace bearings

We have been producing high-function, high-quality bearings for aerospace applications and are currently the only company in Japan to be certified as a supplier of main shaft bearings by the four major jet engine manufacturers in the world.



Jet engine cross-sectional view



### From 2000 onward

Technical service units driving worldwide

For sales sites of the technical service cars running around the world, we visit our customers with fully customized, multifunctional technical service cars equipped with product samples and maintenance tools, and offer technical diagnosis and technical training sessions to provide detailed support for solving customer problems. Even after delivery of our products, we continue to support our customers to improve productivity and safe operation of their facilities by using our technical service cars. Above all, we work to solve problems in our society by talking directly with customers to find out what problems "customers around the world" are having.



### 2014

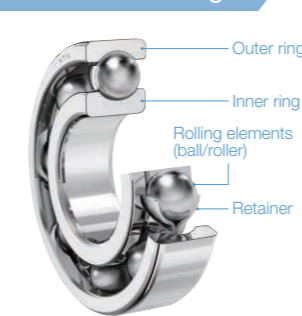
Provided bearings for the Asteroid Explorer "Hayabusa 2"

The H-IIA Launch Vehicle No. 26 with the Asteroid Explorer "Hayabusa 2" and others onboard was launched from the Tanegashima Space Center. Our spherical plain bearings are installed in the hinge section where Hayabusa 2 opens its solar panels in space, contributing to the accomplishment of Hayabusa 2's mission in space.



Spherical plain bearing used in Hayabusa 2

### What is a bearing?



Bearings are eco-friendly products that support the rotation of all kinds of machinery and reduce energy consumption by reducing friction. The coefficient of friction of a smoothly rotating bearing is 0.001. This means that an object weighing 1,000 kg placed on the ground can be moved by the pulling force of an object weighing about 1 kg. Bearings are used to move things lightly, contributing to reduced energy consumption.

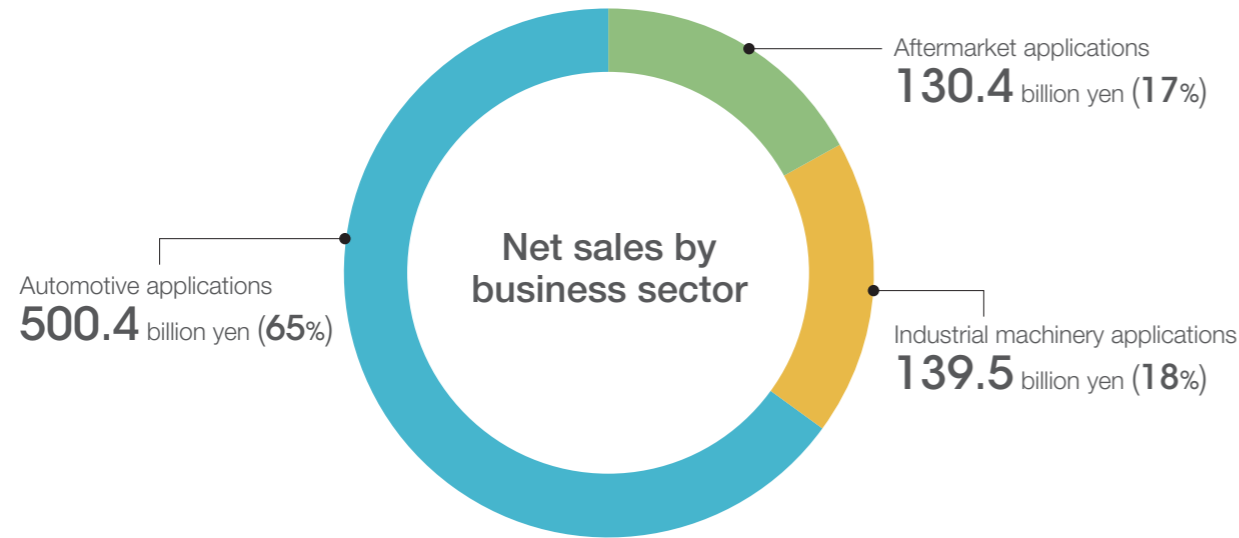
A typical bearing consists of four parts: the outer ring, the inner ring, the rolling elements, such as steel balls, between the rings, and the retainer, which sets the position of the rolling elements and maintains the spacing between them. Although the configuration is seemingly simple, bumps and distortions in the inner and outer rings and rolling elements prevent smooth rotation. Even a single ball in a bearing is so precise that the difference in surface bumps is less than 1/10,000th of a millimeter, requiring high technology in manufacturing.

Bearings are built into machines and used in places that are usually out of sight, but they are important parts that play a role in enhancing the safety and reliability of machines, contributing to the realization of a "NAMERAKA Society".

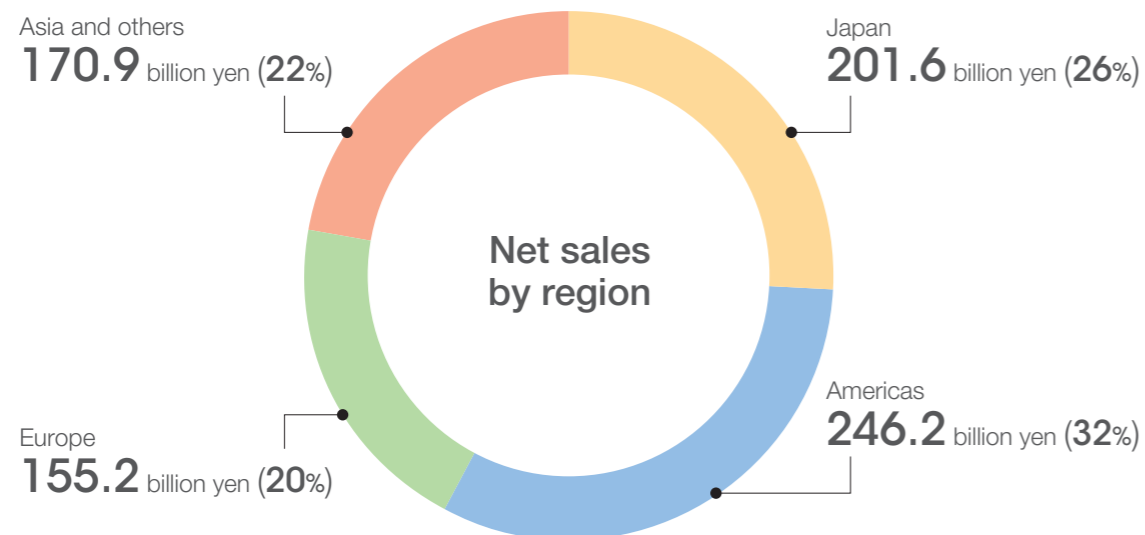


Bearings, Let's Learn!

Net sales **774.0** billion yen    Operating income **17.1** billion yen  
Fiscal year ended March 31, 2023



		<small>(billion yen)</small>		
		Fiscal year ended March 31, 2022 Results	Fiscal year ended March 31, 2023 Results	Fiscal year ending March 31, 2024 Forecast
Net sales	Aftermarket	112.2	134.0	133.0
	Industrial machinery	126.1	139.5	133.0
	Automotive	403.7	500.4	544.0
	Total	642.0	774.0	810.0
Operating income (Operating margin)	Aftermarket	14.7 (13.1%)	22.3 (16.6%)	22.5 (16.9%)
	Industrial machinery	4.1 (3.2%)	7.3 (5.2%)	7.5 (5.7%)
	Automotive	-11.9 (-2.9%)	-12.4 (-2.5%)	0.0 (0.0%)
	Total	6.9 (1.1%)	17.1 (2.2%)	30.0 (3.7%)



## Aftermarket applications

→ P.33

In our aftermarket applications business, we provide bearings for repair for general machineries and automotive aftermarket parts, maintenance tools, and devices to detect abnormality in bearings through our distributors. In this way, we help improve productivity and ensure stable equipment operation.

We also provide a wide range of technical services to resolve issues related to bearings, such as how to handle them. Our remote technical support services share information about the customer's manufacturing site with NTN's technical experts by means of cameras and other equipment so that we can provide quick assistance in resolving issues.

We also provide a reporting service in which NTN's technical experts diagnose and analyze bearings based on the data measured by the "NTN Portable Vibroscope" that customers can use to easily diagnose bearing conditions simply by installing it on equipment. We provide full support for our customers, from supply to after services, such as "NTN Aftermarket Academy" online to enable customers to acquire bearing knowledge.

Mining machinery	Metal industry equipment	Paper-making machinery	Food processing machinery	Cement equipment
ULTAGE spherical roller bearings with high-strength cage EMA Type	ULTAGE sealed four-row tapered roller bearings CROU.LL	ULTAGE spherical roller bearings Type EA, Type EM	PolyLube sealed bearings for food processing machinery	Plummer blocks

### Remote technical support services

### NTN Portable Vibroscope

### Auto parts

Part kits with combinations of several bearings

### Technical training / maintenance tools









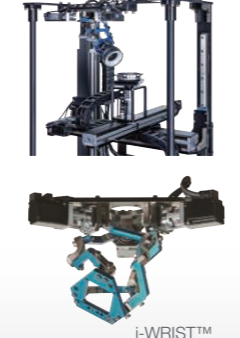

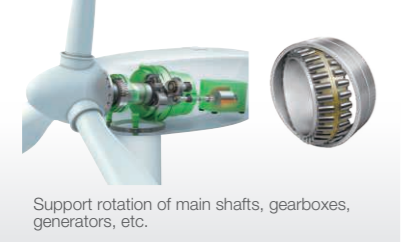
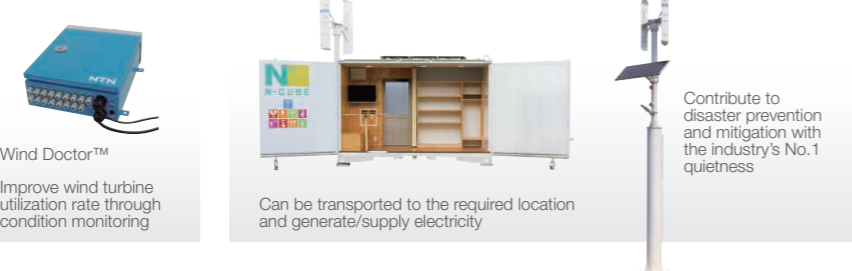
- Induction heater
- Self-centering hydraulic puller with arms
- Technical service units



## Industrial machinery applications

→ P.35

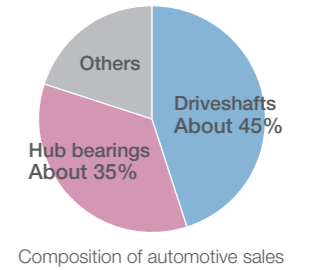
NTN supplies a wide range of bearings for various industrial machinery such as construction machinery, agricultural machinery, robots, aircrafts, wind turbines, machine tools, railway rolling stocks, and electronic equipment to reduce the environmental impact. NTN contributes to the development of industry and the creation of a sustainable society by providing products and services that meet the needs for automation and labor saving at manufacturing sites including detection of abnormality in bearings through sensing.

<b>Construction machinery</b>  Applications for resource mining and civil engineering	<b>Agricultural machinery</b>  Helping ensure stable food production	<b>Gearboxes</b>  Helping ensure high robot productivity	<b>Aerospace</b>  Used for worldwide jet engine applications	<b>Machine tools</b>  Helping ensure high machining precision
<b>Rolling stock</b>  Helping ensure safety of worldwide high-speed railways	<b>Office equipment</b>  Helping ensure precision operation of copier/multifunctional printer	<b>Electronic devices</b>  Used for hard disc drive and thin fan motor applications	<b>Robots</b>  Realizing high-speed, high-performance visual inspection and space saving i-WRIST™  Realizing continuous and stable parts picking TRINITE™	
<b>Wind turbine</b>  Support rotation of main shafts, gearboxes, generators, etc. Wind Doctor™ Improve wind turbine utilization rate through condition monitoring	<b>Green energy products</b>  Can be transported to the required location and generate/supply electricity Contribute to disaster prevention and mitigation with the industry's No.1 quietness			

## Automotive applications

→ P.37

NTN provides a wide range of products for automobiles as a specialist in the power/drive train system, contributing to fuel efficiency and reducing CO2 emissions. In addition to core products of hub bearings, driveshafts, and various bearings, NTN provides module products with high functions by combining our products with peripheral components and fusing our core technologies to contribute to the creation of safe, secure, and comfortable future automobiles.



**Steering components**  
Mechanical Clutch Unit for Next-generation Steering

**Seats**  
Clutches for seat lifters

**Brakes**  
Ball Screw Drive Module for Electric Hydraulic Brake

**Axle/Drivetrain**  
Needle Roller and Cage Assemblies for Planetary Gear

**Motor**

**High Speed Deep Groove Ball Bearings for EVs and HEVs**

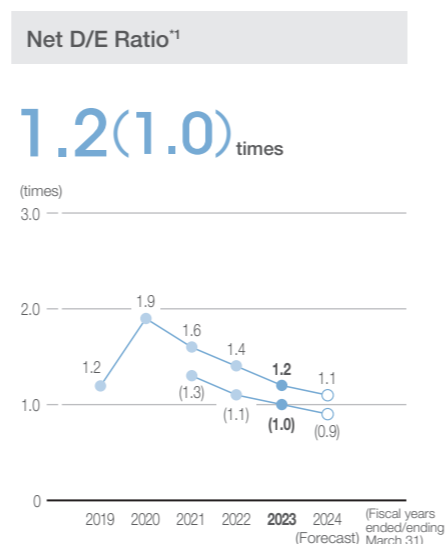
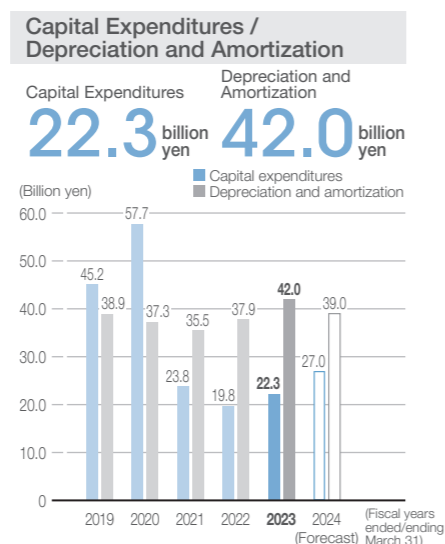
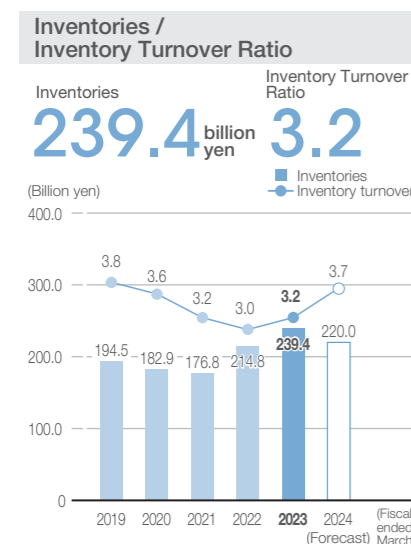
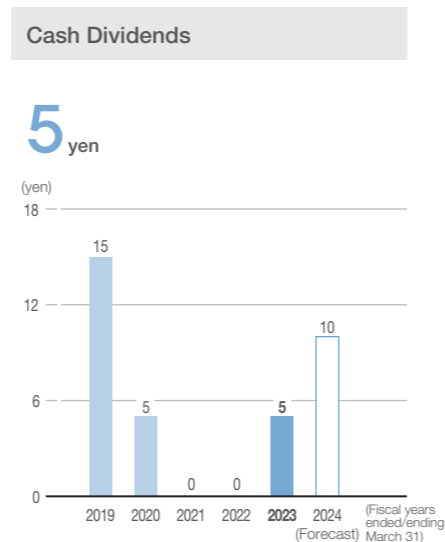
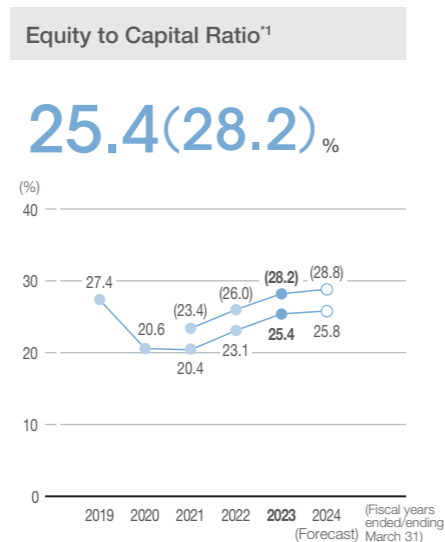
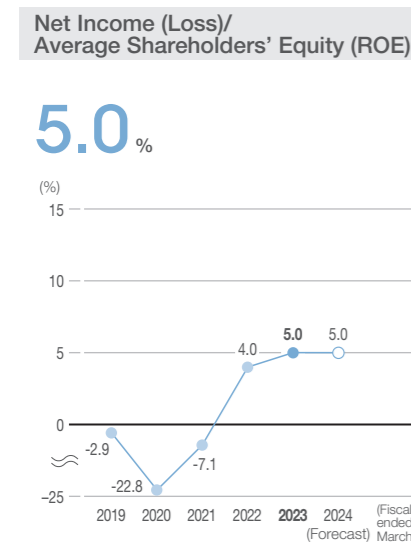
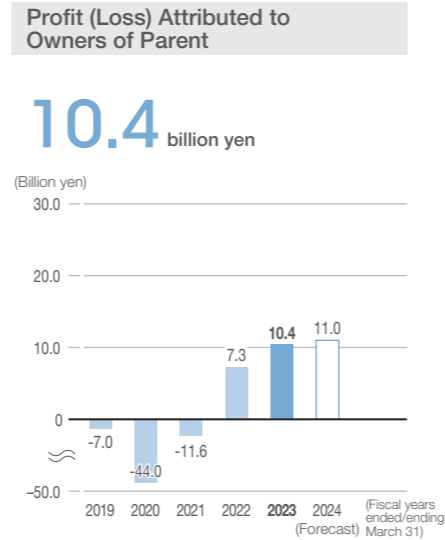
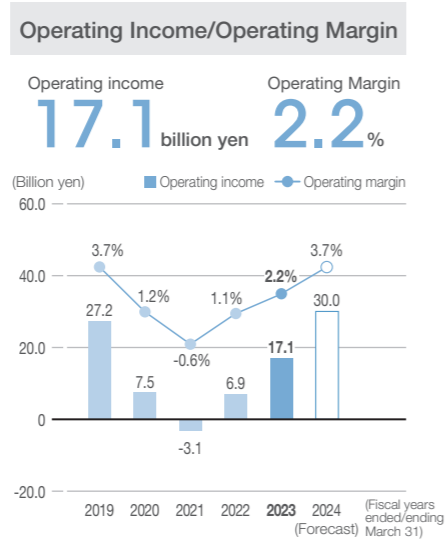
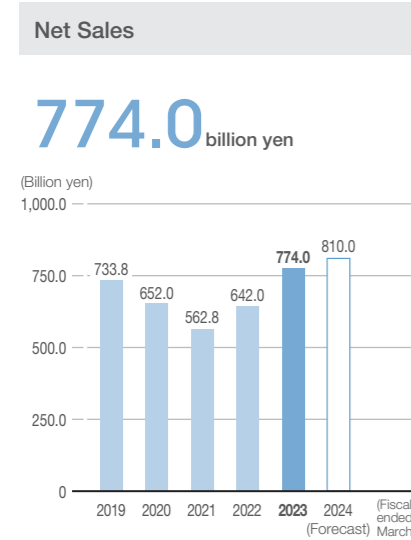
**Bearing with Insulating Coating**

**CreepLess Bearing**

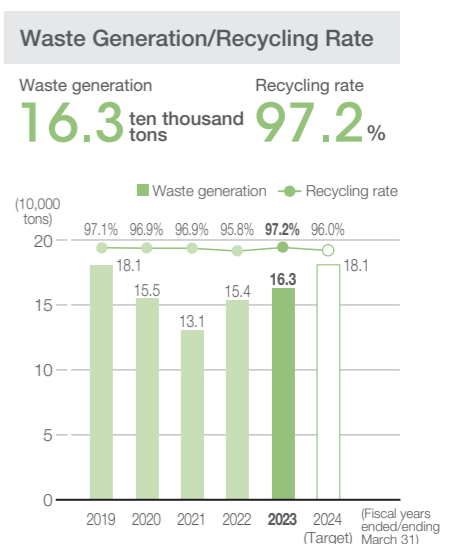
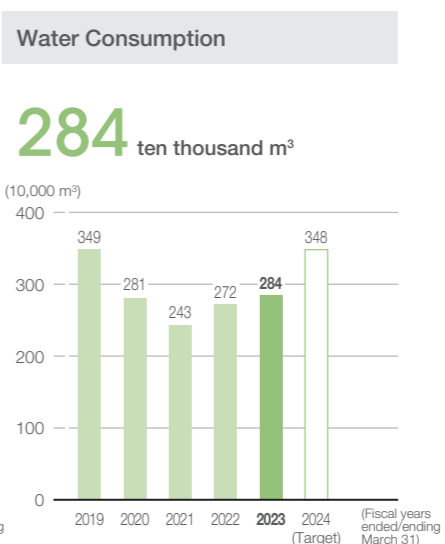
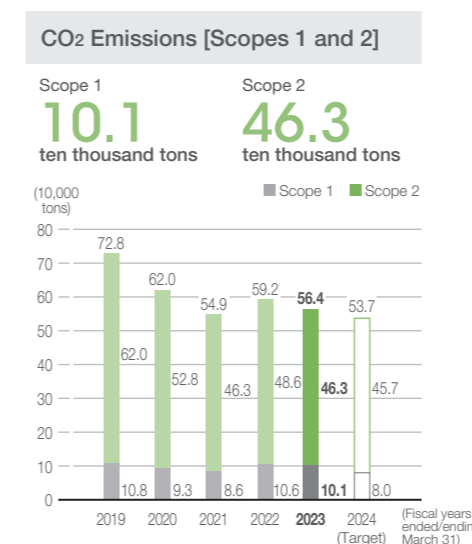
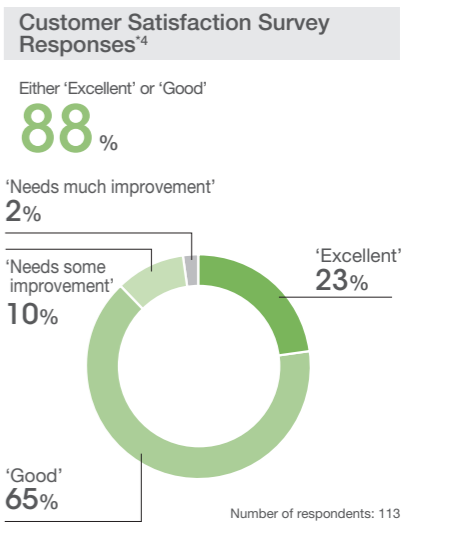
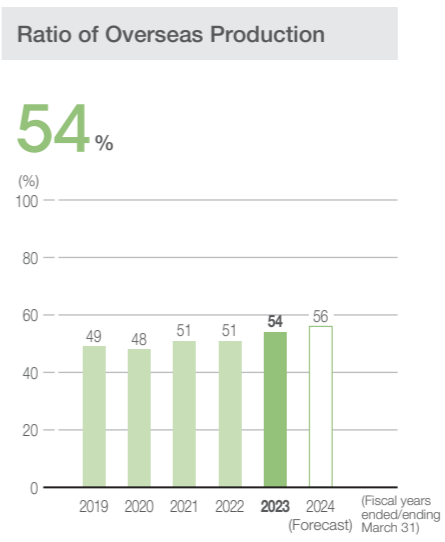
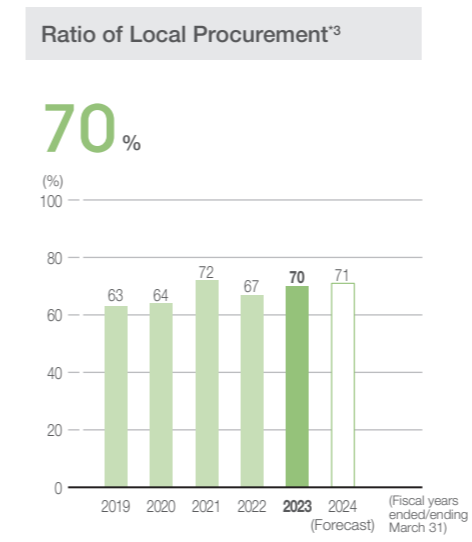
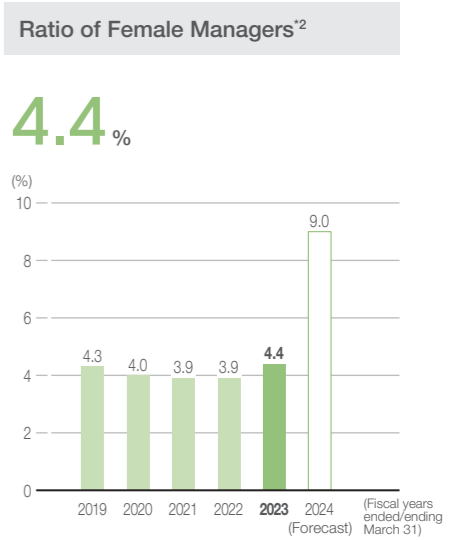
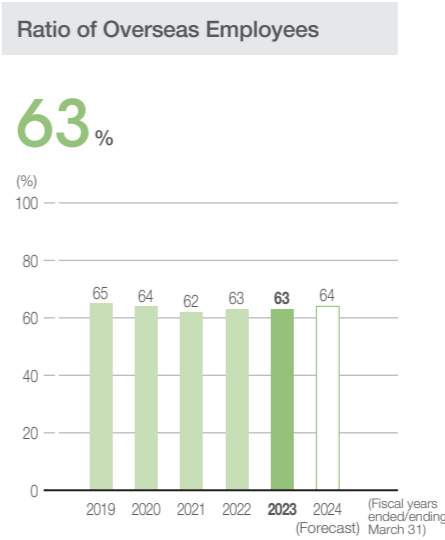
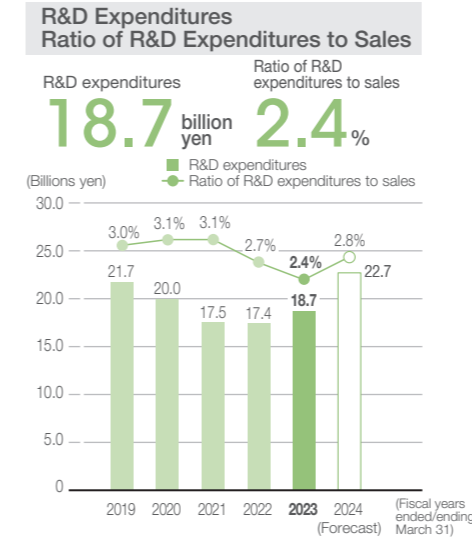
**Hub bearings**  
Ra-sHUB, sHUB, eHUB  
Hub Bearings with High Resolution Rotational Sensors, Low Friction Hub Bearing III

**Driveshafts**  
Compact Lightweight Rear Driveshaft R Series, GEN4 Hub Joint, High Efficiency Fixed Type CWJ "CFJ"

Financial Data



Non-financial Data



<sup>1</sup> The figures in ( ) take into account a part of the subordinated bonds through public offering that is recognized as equity (50%).

<sup>2</sup> Organization covered: NTN only

<sup>3</sup> From NTN Report 2021, the ratio of direct materials procurement in own country (region) is calculated and presented.

<sup>4</sup> Survey period: From October 2021 to September 2022