

***Harmonic Drive Systems Inc.***

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# ***Investors' Guide FY 2022***

***Year ended March 31, 2023***

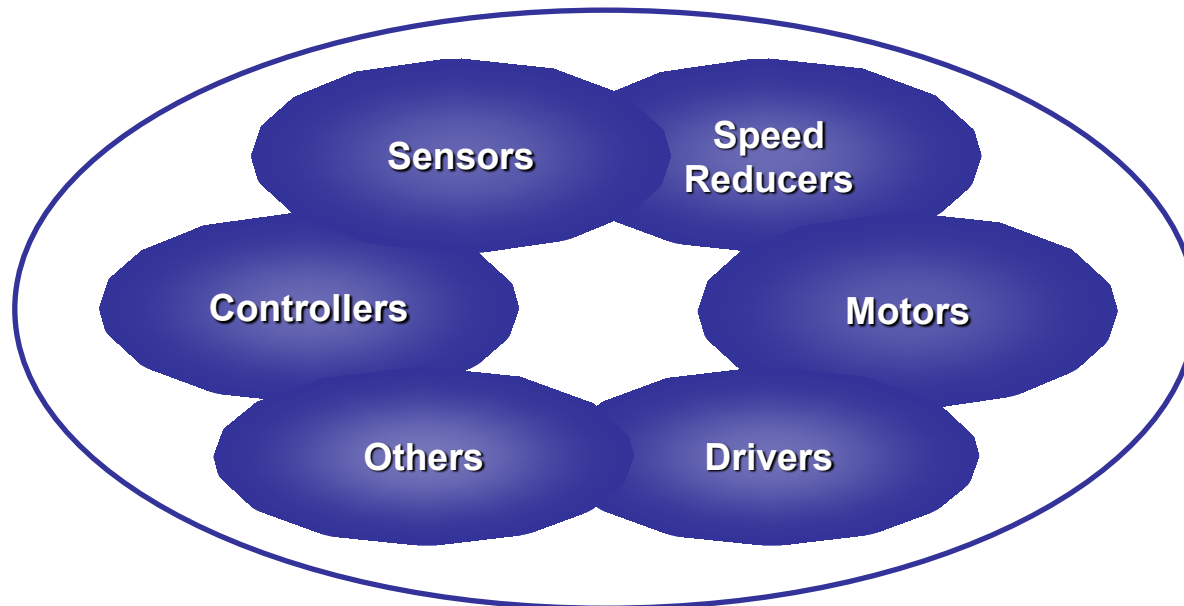
**Leadership in Total Motion Control**

**May 12, 2023**

# Primary Objectives

HDSI focuses our expertise and management resources on “Total Motion Control”, developing and producing Precision Control Equipment and Components for a broad range of applications. HDSI aims to become a world industry leader, as a highly skilled precision engineering expert with pioneering spirit. HDSI will strengthen our management processes and our flexibility to become a winner in the dynamic business environment.

## Schematic Concept of Total Motion Control



# Management Philosophy

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HDSI conducts management based on the following management philosophy.

## **1. Respect for the Individual**

HDSI aspires to be a company where the rights of every individual employee are respected, and where individuals can pursue a meaningful, cultural, and worthwhile life.

We will make HDSI a company that believes in each employee's aspirations, supports independent activities, creates an environment where employees can maximize their abilities through work, and where abilities and performance are rewarded.

## **2. A Meaningful Company**

HDSI wants to be recognized as a meaningful, superior company which manifests creativity, has personality and distinctive characteristics, and whose management foundation is based on ceaseless research and development activities and a constant emphasis on quality—a company where the entire organization finds meaning in making utmost efforts.

## **3. Coexistence and Co-prosperity**

HDSI is supported by many different parties including our employees, customers, shareholders, materials and parts suppliers, affiliated companies and trading partners.

We make our best efforts to create attractive products, services, compensation, working environments, and trading relations to satisfy all these concerned parties.

## **4. Contribution to Society**

HDSI broadly contributes to society and industry through our corporate activities as a good corporate citizen. The products and services we provide directly and indirectly contribute to the betterment of society.

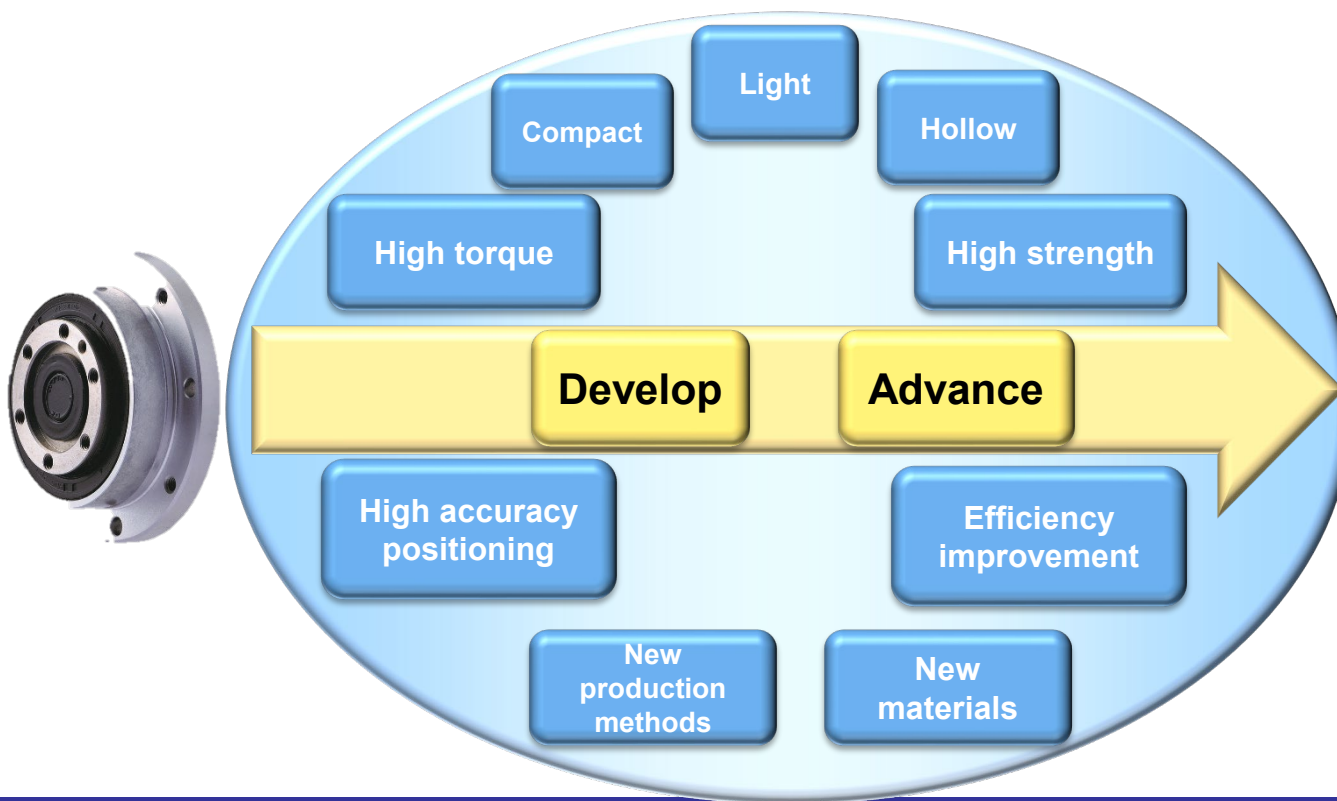
We aspire to be a company that helps to improve the environment and the quality of the communities where we are located.

# Basic Policy of Sustainability

Basic Policy of Sustainability (approved on March 25, 2022)

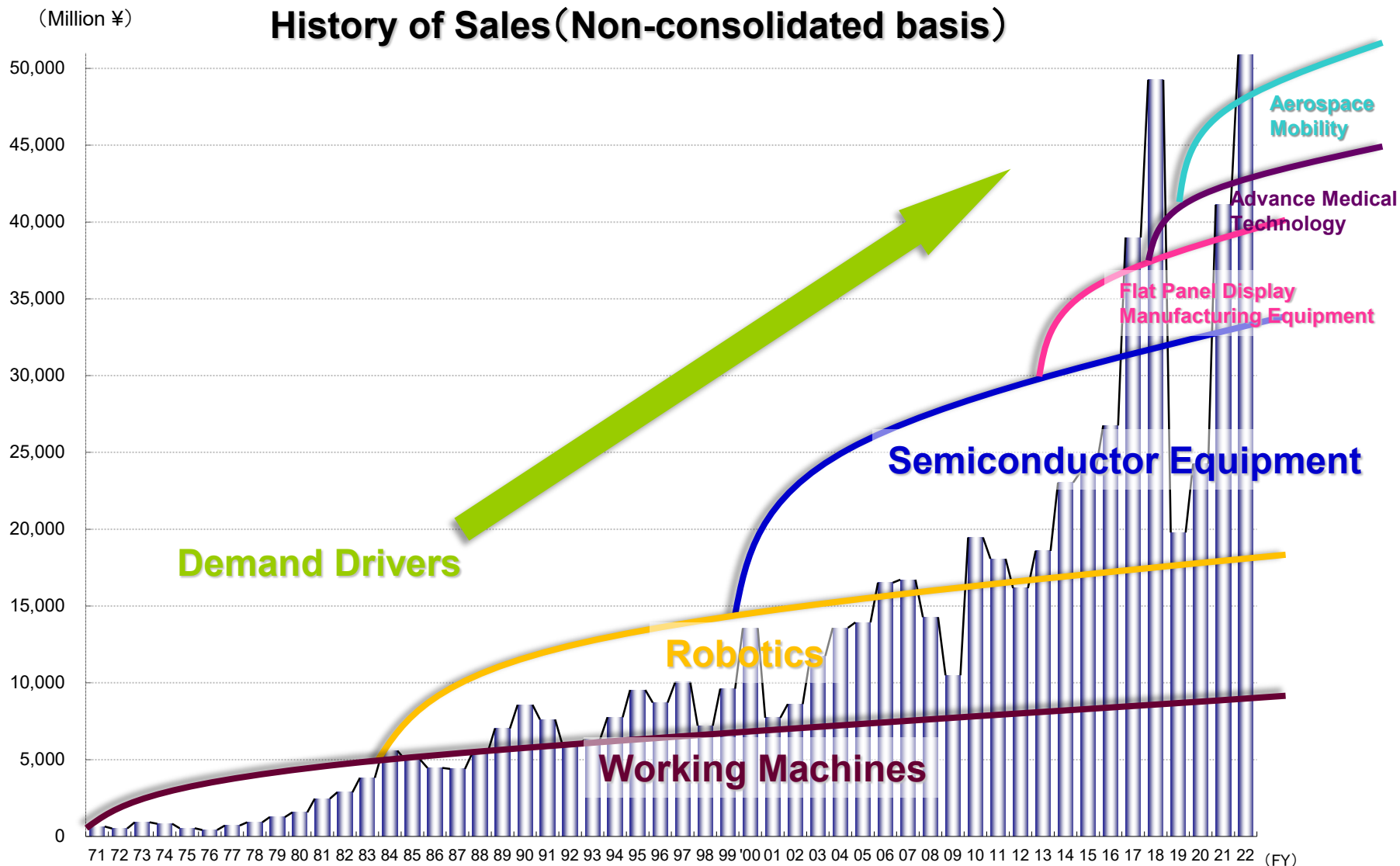
As a technology and skills-based organization in pursuit of Total Motion Control, the HDSI Group aims to enhance corporate value and realize a sustainable society by contributing to technological innovation for the betterment of society. We intend to achieve these goals based on our management philosophy comprising four pillars: **Respect for the individuals**, **be a meaningful company**, **coexistence and co-prosperity**, and **contribution to society**.

## Our mission



Contribute  
to the  
**Innovation**  
and  
**Ecology**  
of industrial  
society

# History of Sales



# Operational Risks

## 1.Plant and Equipment Investment Trends

Because the majority of HDSI Group's products are sold as components for industrial machinery such as industrial robots, semiconductor manufacturing equipment, and flat-panel display manufacturing equipment, plant and equipment investment trends have an influence on the operating performance of the HDSI Group.

In particular, for semiconductor and flat-panel display manufacturing equipment industries, while there is large growth from improved conditions in the semiconductor device and panel markets and from manufacturing technology innovations, an unexpected market contraction resulting from supply-demand adjustments or other developments could adversely affect the operating performance of the HDSI Group.

## 2.Research and Development Results

The HDSI Group develops and puts on the market distinctive, high-value-added products by intensively allocating resources to the research and development division as a technology and technical skills organization in the motion control field. A delay in the market release or market penetration of the resulting new products despite the continuous allocation of resources to research and development could adversely affect the operating performance of the HDSI Group.

## 3.Product Quality

The HDSI Group has received ISO9001 certification and otherwise strives to strengthen its quality assurance system to boost customer satisfaction and gain market advantages. Nevertheless, the emergence of unexpected product defects or other quality issues could adversely affect the operating performance of the HDSI Group.

## 4.Fluctuations in Foreign Exchange Rates

The HDSI Group has two consolidated subsidiaries in the US, one consolidated subsidiary in China, one consolidated subsidiary in South Korea, and one consolidated subsidiaries in Germany which has nine consolidated subsidiaries in Europe, and we are actively advancing internationalization in our businesses. Consequently, foreign exchange rate fluctuations sometimes have a negative effect on the business activities of the HDSI Group. Foreign exchange rate fluctuations also affect the yen-equivalent value of the Group's assets and liabilities and revenues and expenses from transactions denominated in foreign currencies, and may have a negative effect on the HDSI Group's operating results and financial conditions.

## 5.Retirement Benefits Obligations

Harmonic Drive Systems and some HDSI consolidated subsidiaries have defined benefit pension plans or lump-sum retirement benefit plans. Revisions of the assumptions for calculating retirement benefits obligations and retirement benefits expenses, changes in the investment environment for pension assets, and other financial developments could adversely affect the Group's operating performance and financial conditions.

## 6.Other Risks

Changes in the economic and political environment and the occurrence of natural disasters, wars, terrorism, and other unpredictable events that cannot be avoided by the HDSI Group alone could adversely affect the Group's operating performance and financial conditions.



# Mid-term to Long-term Management Strategies and Management Targets

## Mid-term to Long-term Management Strategies

The Group continues to pursue its unwavering mission of contributing to social and technological innovation through motion control technology, stated in our fiscal years 2021-2023 medium-term management plan. Market for mechatronics and precision speed reducers, in which we participate, is contributing greatly to the emerging social and technological innovation, including electrification of vehicles and surgical robots, and such demand will continue to expand. At the same time, as demand for collaborative robots increases amid the worldwide labor shortage, we see high growth potential in a mid-and-long term. With the whole group united, we aim for achieving sustainable society through our business, based on Basic Policy of Sustainability formulated in March 2022. In line with the policies outlined in our long-term vision and medium-term management plan, we aim to enhance corporate value over the medium to long term by maintaining a balance between defensive and offensive approaches in our management strategy.

The summaries of the Basic Policy of Sustainability, our Group's mission, long-term vision, and medium-term management plan are as follows.

## Basic Policy of Sustainability

As a technology and skills-based organization in pursuit of Total Motion Control, the HDSI Group aims to enhance corporate value and realize a sustainable society by contributing to technological innovation for the betterment of society. We intend to achieve these goals based on our management philosophy comprising four pillars: Respect for individuals, be a meaningful company, coexistence and co-prosperity, and contribution to society.

## Our Group's Mission

To contribute to technological innovation in society through motion control technology

## Long-term Vision

-In pursuit of total motion control-

- Take on the challenge of developing new technologies and skills that capture changes in the environment
- Achieve QCDS that goes beyond customer expectations
- Contribute to creating a sustainable society through corporate activities



# Mid-term to Long-term Management Strategies and Management Targets

## Mid-term Management Plan for fiscal years 2021–2023

-Toward the Next 50 Years: Moving to a Solid Growth Stage-

(Basic policies and strategies)

(a) Achieve QCDS that meets customer expectations

Q: Quality Control: Zero defects and zero claims

C: Improve productivity and further enhance Value Analysis / Value Engineering

D: Commit to delivery schedule requested by customers

S: Enhance ER activities by speeding up

(b) Expand RD, AD, and MT businesses by developing valuable products and enhancing services

[RD: HarmonicDrive®]

- Create and commercialize new technologies and skills to support next-generation applications

[AD: AccuDrive®, HarmonicPlanetary®]

- Expand product offerings tailored to regions and various applications through business restructuring

[MT: Mechatronics]

- Provide products that enable customers to bring their vision to life and further improve problem-solving capabilities

(c) Build a business foundation that meets the demands of the times

- Promote sustainable management (SDGs)

- Develop human resources capable of leading business expansion, and establish personnel systems and work styles that enhance diversity

- Execute IT enhancement strategy and implement our own IoT concept

- Establish a financial base to support growth and strengthen fundraising capabilities

(d) Strengthen coordination and maximize synergies with overseas group companies and institutions

- Maximize utilization of management resources at each site

- Maintain and promote proactive research activities with overseas research institutions

- Establish a global production system

(e) Create new standards that define the next 50 years through outside-the-box thinking

- Proactively take on the challenge of discovering new materials, new principles, new mechanisms, and new production methods

- Make strategic moves toward developing intelligent mechatronics

- Foster a culture that is sensitive to changes in society and accepts variant perspectives





# Mid-term to Long-term Management Strategies and Management Targets

## Management Indices Targets

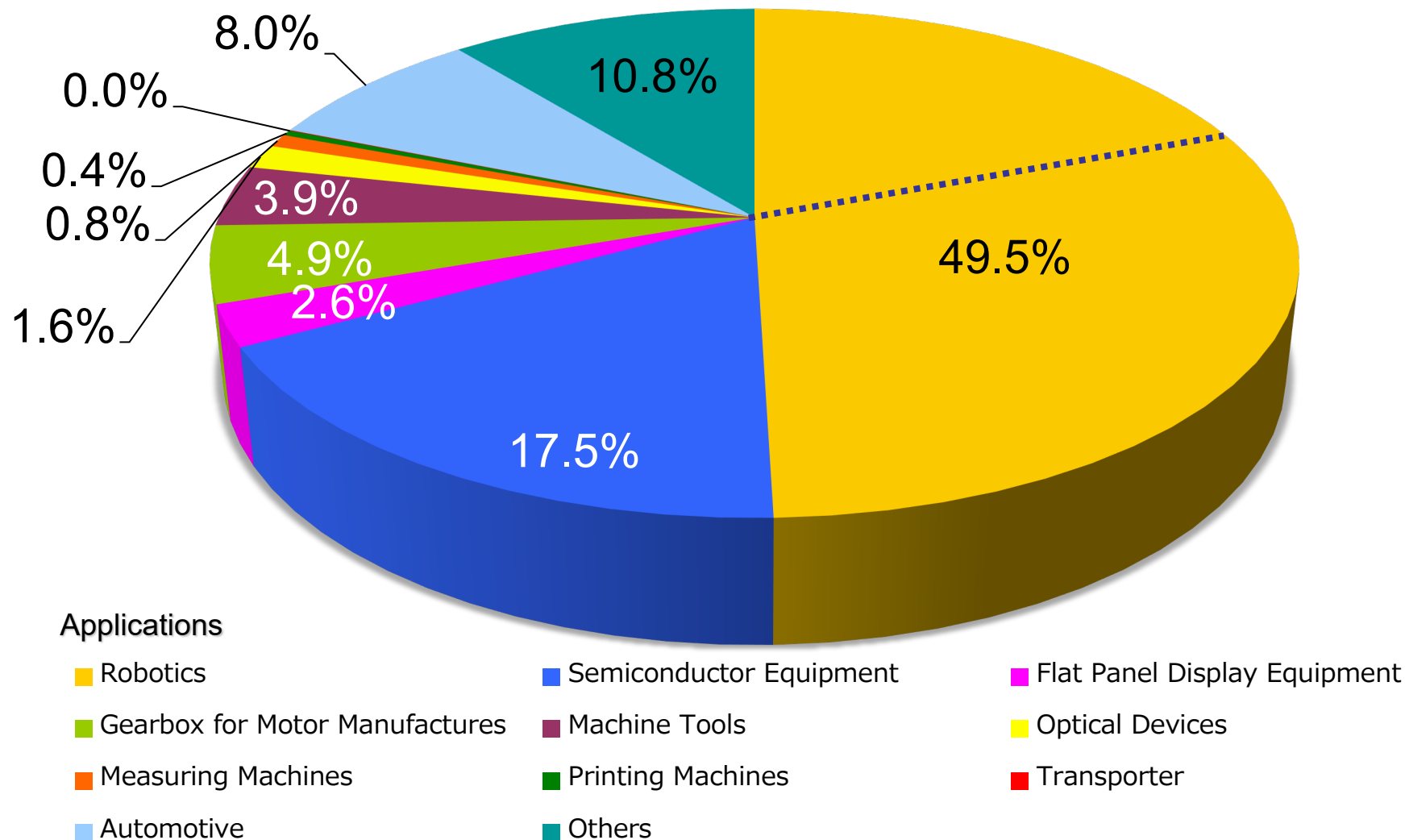
The HDS Group has established the following management indices targets.

- Profit Margin: At least 20%
- Return on Equity (ROE): At least 10%

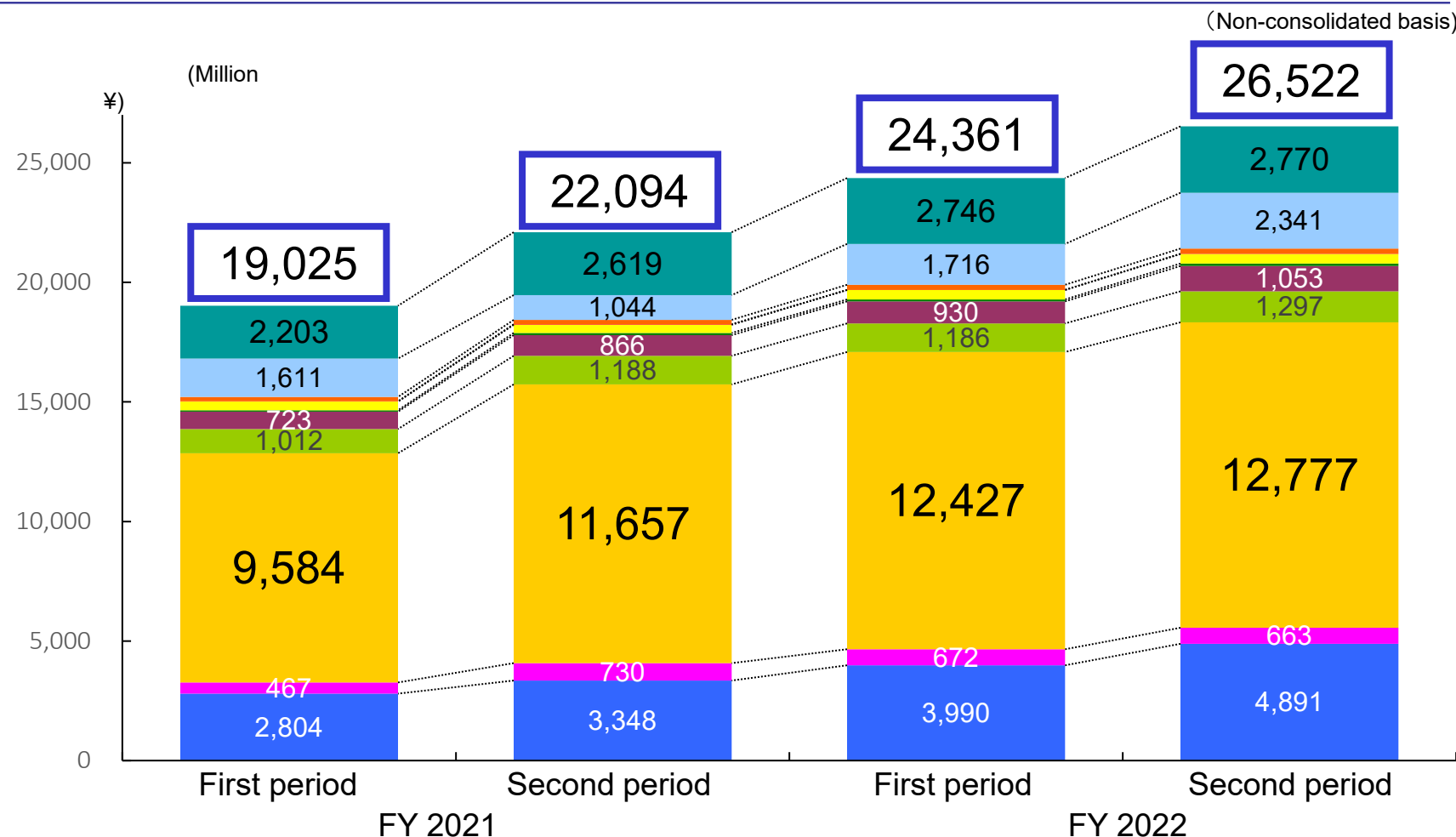
# Sales Composition by Application Fields

(Non-consolidated basis)

## Turnover (%) in FY 2022



# Semiannual Sales Composition by Application Fields



- Semiconductor Equipment
- Flat Panel Display Equipment
- Robotics
- Gear box Motor Manufactures
- Machine Tools
- Printing Machine
- Optical Devices
- Transporter
- Measuring Machines
- Automotive
- Others

# Operating Results

## During the fiscal year ended March 31, 20223

Future of the world economy increased uncertainty during this fiscal year under review due to factors such as the impact of China's lockdown to address the spread of COVID-19 infections, surge in resource and raw material prices caused by the worsening Ukrainian situation, the worldwide semiconductor shortage, and rapid changes in exchange rates due to interest rate increases in Europe and the United States. The situations concerning orders received by the Harmonic Drive Systems Group (hereinafter "the Group") generally became tough owing to cutbacks in future orders by customers who were concerned about demand trends, reflecting slower capital investment in China's manufacturing industry, impacts of reduced new investment resulting from saturation of capital investment in cutting-edge semiconductors, and others. Due to a decrease in orders caused mainly by these factors as well as rebound from orders received in the previous fiscal year that remained high reflecting customers' strong preceding orders, consolidated orders received decreased by 41.2% year on year to ¥55,760 million.

Consolidated net sales for the fiscal year under review reached ¥71,527 million, up 25.3% year on year. Factors contributing to this increase include an abundant order backlog at the beginning of the period thanks to a high level of orders in the previous fiscal year. Measures taken to increase production capacity inside and outside Japan also contributed to the sales increase. This includes investment in the Ariake Plant during the period to boost production and measures for enhancing production capacity in overseas production sites that had been pursued since the previous fiscal year.

Regarding net sales trend by application, net sales for industrial robots surged, reflecting expansion of investment in advanced automation such as EV-related capital investment and an increase in demand to cover perpetual labor shortage with collaborative robots. Net sales for semiconductor manufacturing equipment also climbed significantly, especially in the cutting-edge area, driven by voracious appetite for capital investment globally. Net sales for advanced medical applications such as surgical robots rose reflecting steady demand growth including introduction by new players. Net sales for automotive applications increased gradually, despite continued production adjustment by customers caused by the semiconductor shortage.

In terms of profit and loss, depreciation cost increased due to the enhancement of production capacity, and manufacturing cost rose due mainly to personnel increase in the manufacturing sector. Selling, general and administrative expenses also increased reflecting the higher transportation cost attributable to a surge in logistics costs and increased sales, and larger allocation for research and development expenses. However, the increase in profit due to increased net sales outweighed that of the cost, marking 17.0% year-on-year rise in operating profit to ¥10,224 million. In addition, the increase in operating profit resulted in 14.3% year-on-year rise in profit attributable to owners of parent to ¥7,595 million.

In terms of net sales by product group, speed reducers totaled ¥57,000 million, up 20.7% year on year and mechatronics products reached ¥14,527 million, up 47.5% year on year. They accounted for 79.7% and 20.3% of the total net sales, respectively.

In fiscal year 2022, which is the second year of the medium-term management plan for fiscal years 2021-2023, we worked on various measures set out in the plan.

On the sales front, in addition to taking advantage of online sales approaches that took root under the COVID-19 pandemic, we fully resumed face-to-face sales that had been restricted and worked to acquire orders with a greater sense of urgency in solving customer issues on a case-by-case basis. In the exhibition area, we held a private exhibition called "Mechatronics Show" in August 2022 as a first attempt, featuring three major manufacturers of core motion control components (THK Co., Ltd., SMC Corporation, and the Company). Through the appeal of the combined strength of each company, the show provided an opportunity for attracting many visitors and having substantive business negotiations.

# Operating Results

In terms of R&D, we worked on evolving our flagship product, the HarmonicDrive® strain wave gearing, as well as focused on joint research with external research institutes, working to develop and commercialize elements that are potentially essential to next-generation motion control technology. In the field of mechatronics, we also devoted efforts to the software development of next-generation drivers (control devices), partially by utilizing external resources. Additionally, our prospective flagship product, the Ultra-Light Weight (ULW) series, was recognized for achieving lightweight and labor-savings in its unit products and received the GOOD DESIGN AWARD 2022.

On the production front, anticipating growing demand for our products, we steadily moved forward with the Group production capacity expansion plan set out in the previous medium-term management plan. We carried out capital investment worth a total of 6.5 billion yen in the Ariake Plant and started mass production from October 2022. The newly established production system is a production line that actively incorporates automation and labor-saving measures, achieving more than twice the productivity compared to the previous system. As a result, we were able to achieve a prompt improvement in delivery lead times. After October 2022, our monthly production capacity in Japan increased by 46.7% compared to the previous level, with a monthly production of 130,000 units for industrial machinery and 90,000 units for automotive applications, resulting in a total monthly production capacity of 220,000 units. In addition, we implemented the visualization of various process data through the promotion of digitalization in production and process management functions, aiming not only to improve productivity but also to enhance quality.

In addition, we also increased production capacity at our overseas production sites in Germany and the United States in anticipation of increased demand. Furthermore, we transferred product production to increase locally produced products for customers in each region, with the aim of maximizing production efficiency within the Group.

In terms of quality, we reinforced our quality control framework by digitalizing process data. We also focused on coordination with the Group's overseas production sites and continued to maintain and raise our Common Global Quality initiative as we expand production transfers.

As part of our sustainability initiatives, we introduced "CO2-free electricity made from water in Azumino city" in April 2022 and completely switched the power source for the Ariake Plant to renewable energy, achieving zero CO2 emissions from electricity usage. In addition, we are promoting environmental conservation by using 100% recycled paper that was produced in-house.

# Operating Results

## Performance of reportable segments is stated below:

### <Japan>

Though sales to China temporarily declined due to the impact of COVID-19 lockdowns, sales in industrial robots increased due to aggressive capital investment for upgrading and automating production. Additionally, sales in semiconductor manufacturing equipment were strong aided by capital investment enthusiasm in the world. As a result, net sales increased by 21.9% year on year to ¥45,445 million. Segment profit (ordinary profit) rose by 7.2% year on year to ¥12,748 million due to increased sales.

### <North America>

While there were concerns about interest rate rises and price increases, demand for semiconductor manufacturing equipment and advanced medical applications (surgical robot-related) remained strong. As a result, net sales rose by 63.4% year on year to ¥10,858 million. Segment profit (ordinary profit) increased by 100.5% year on year to ¥1,406 million.

### <Europe>

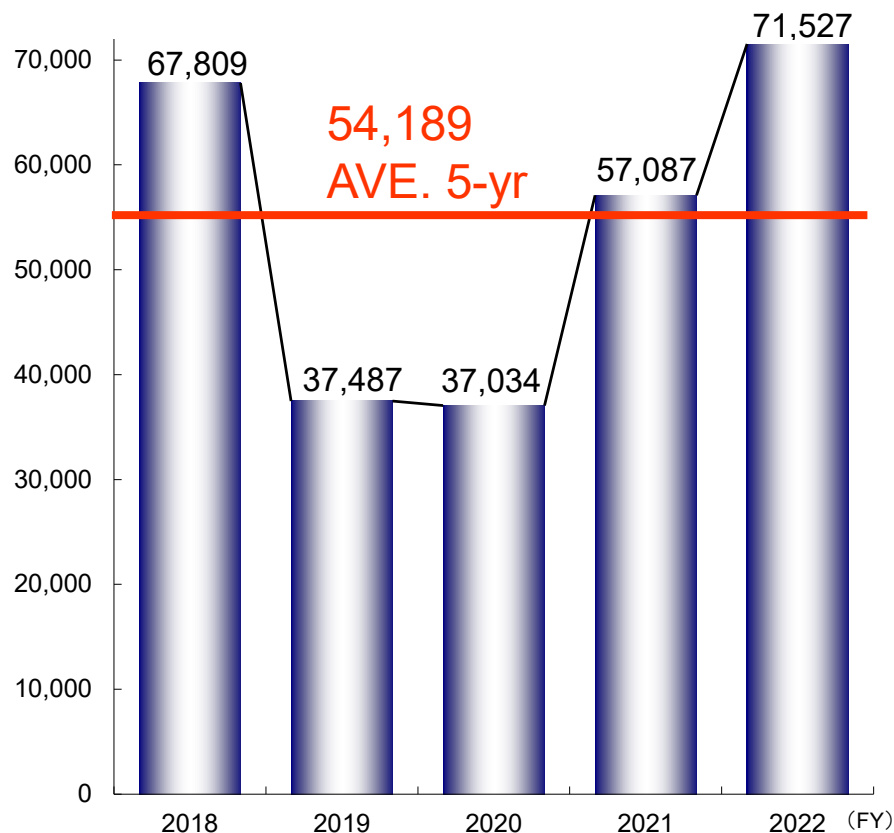
While there were concerns about interest rate rises and price increases as in North America, in Europe, there was steady demand for investment in automation, resulting in higher demand, mainly for industrial robots and general industrial machinery. As a result, net sales increased by 15.6% year on year to ¥15,222 million. Segment profit (ordinary profit) increased by 264.2% year on year to ¥624 million due to the increase in sales, which absorbed the amortization cost of ¥1,706 million on intangible assets posted at the time of acquisition of shares in Harmonic Drive SE.

# Results i Net Sales, EBIT

(Consolidated basis)

## Net Sales

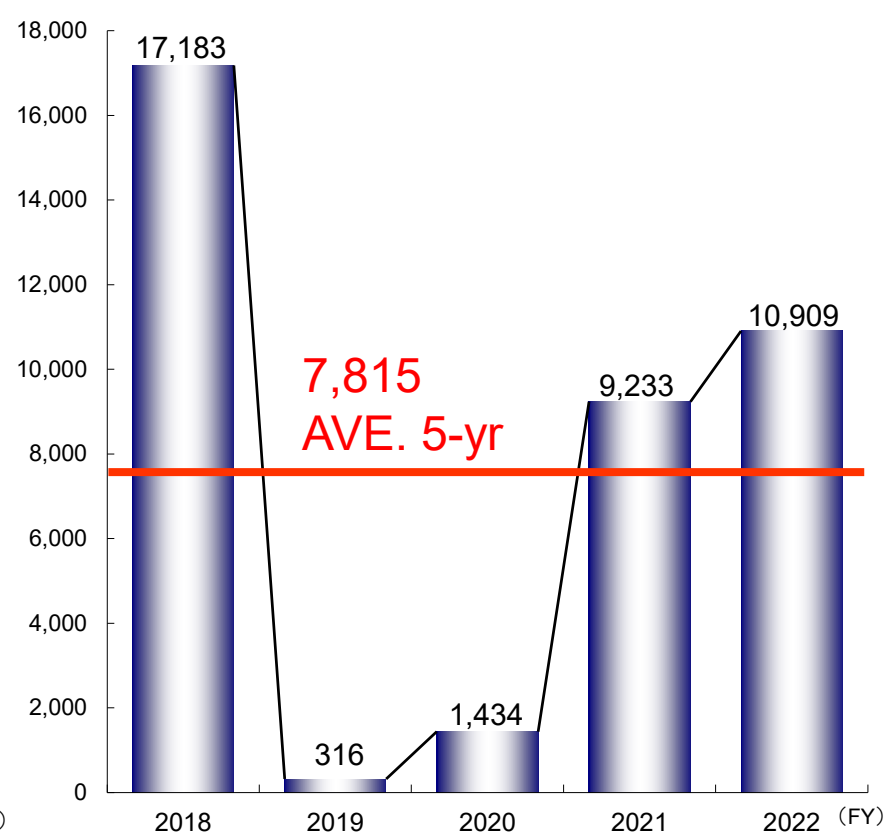
(Million ¥)



## EBIT

EBIT=Ordinary income + Interest paid - Interest income

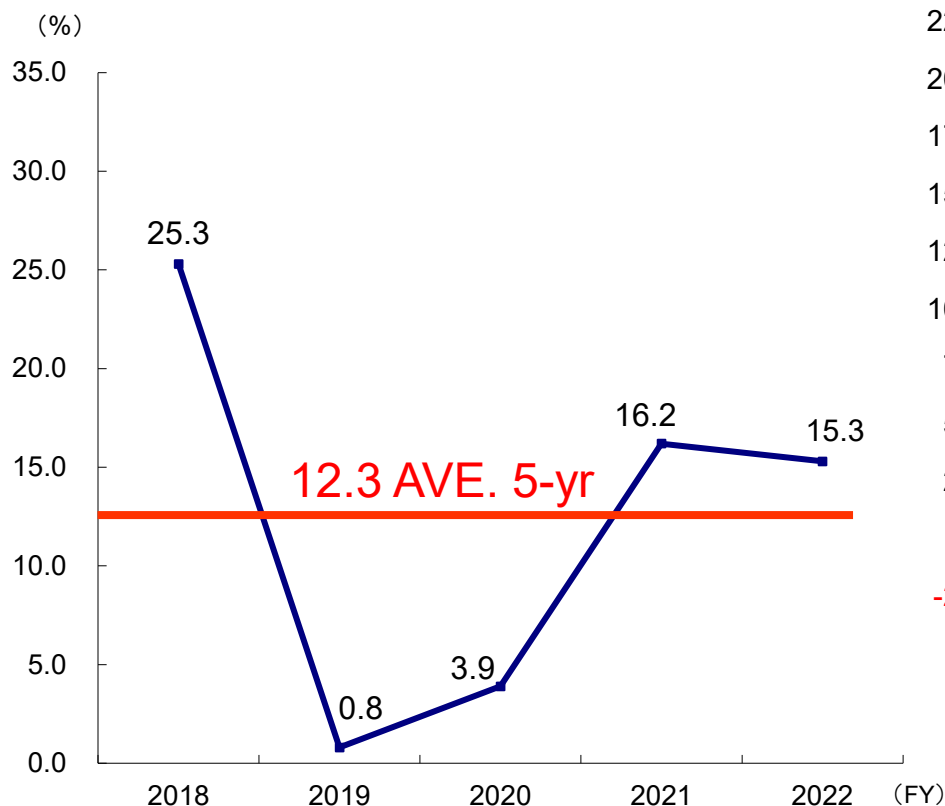
(Million ¥)



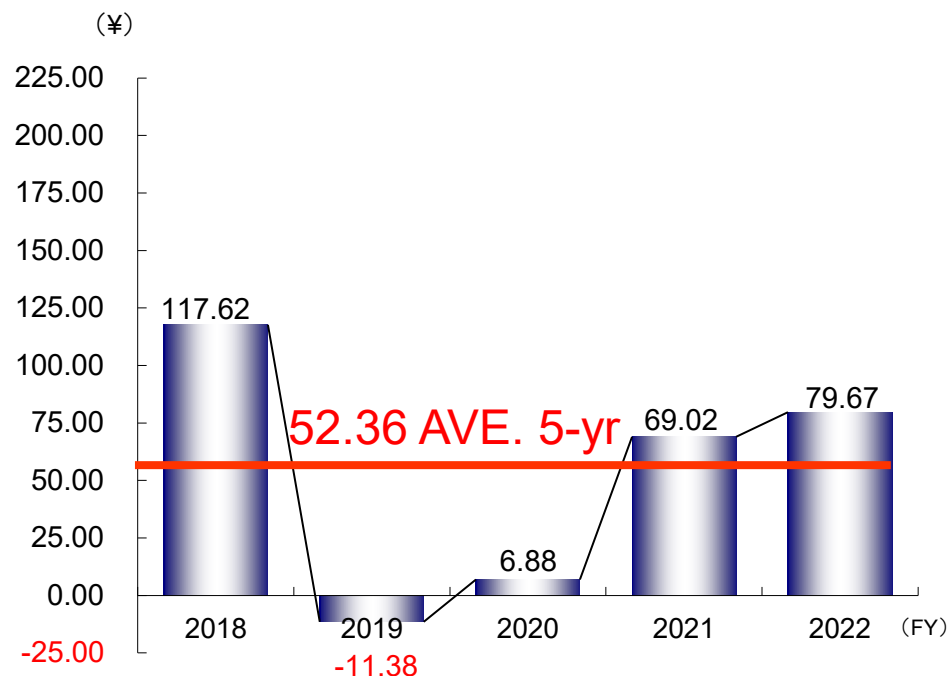
# Results ii EBIT to Net Sales Ratio, EPS

(Consolidated basis)

## EBIT to Net Sales Ratio



## EPS



## Dividends paid per share

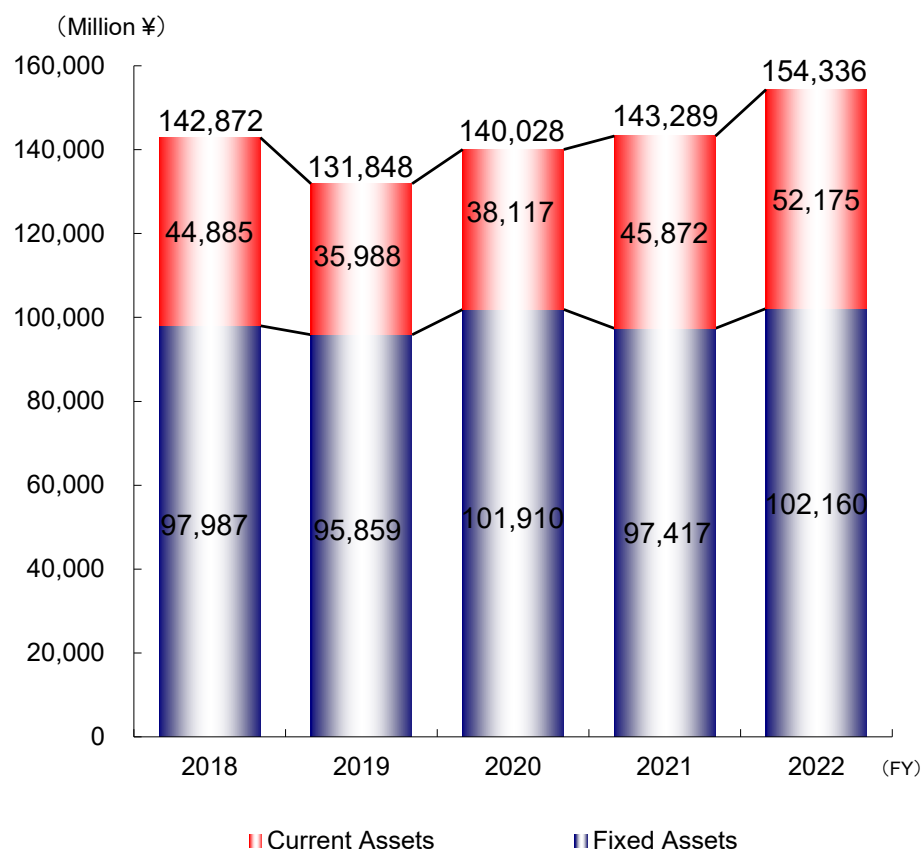
FY	2018	2019	2020	2021	2022
Dividends(¥)	38	20	20	21	28



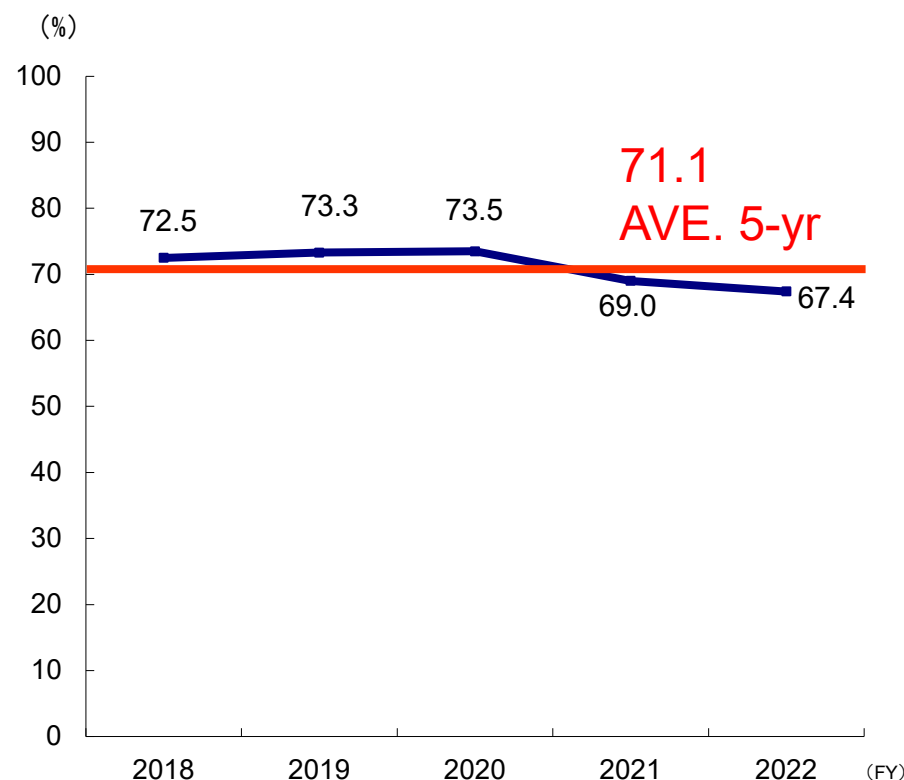
# Results iii Total Assets, Equity Ratio

(Consolidated basis)

## Total Assets



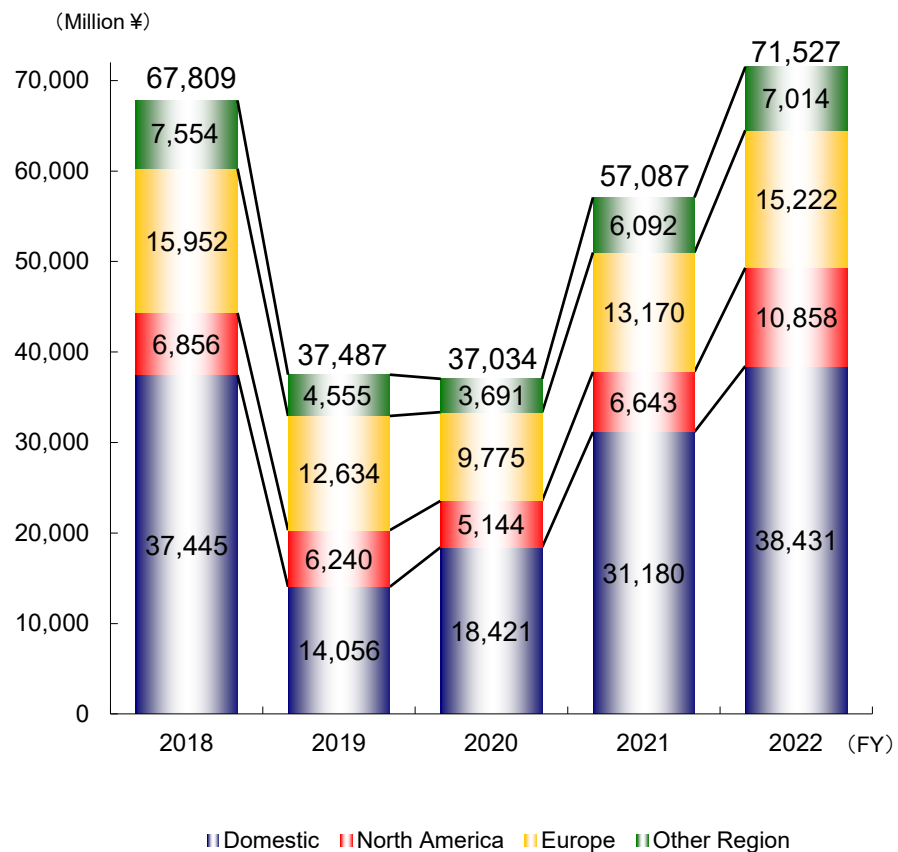
## Equity Ratio



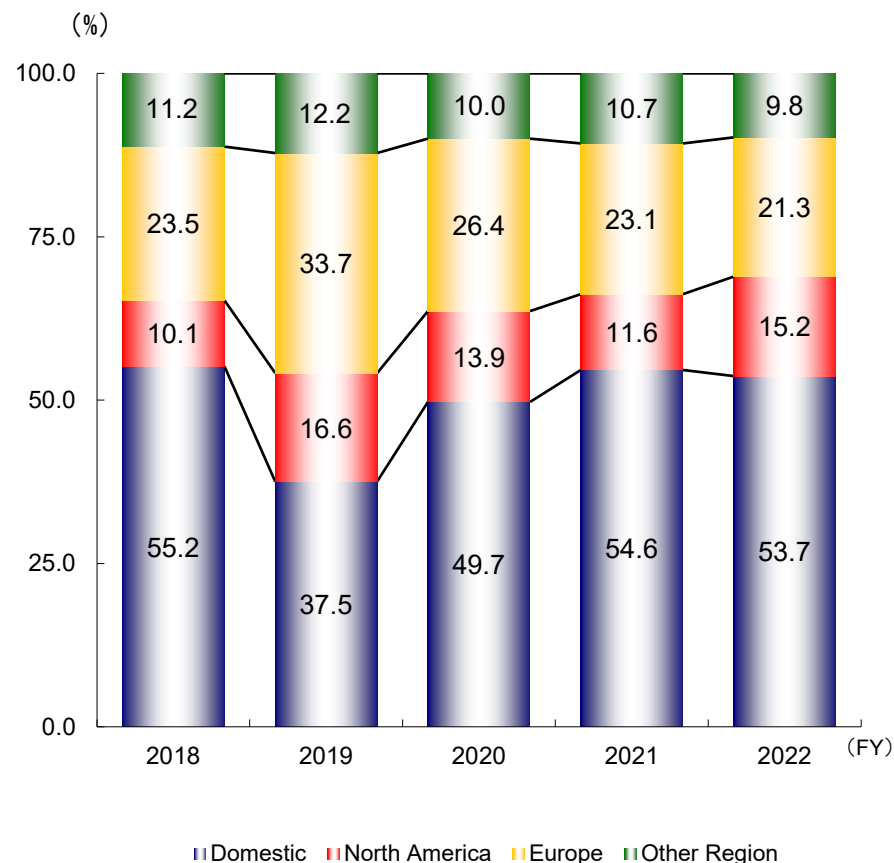
# Sales Structure by Regions

(Consolidated basis)

## By Regions



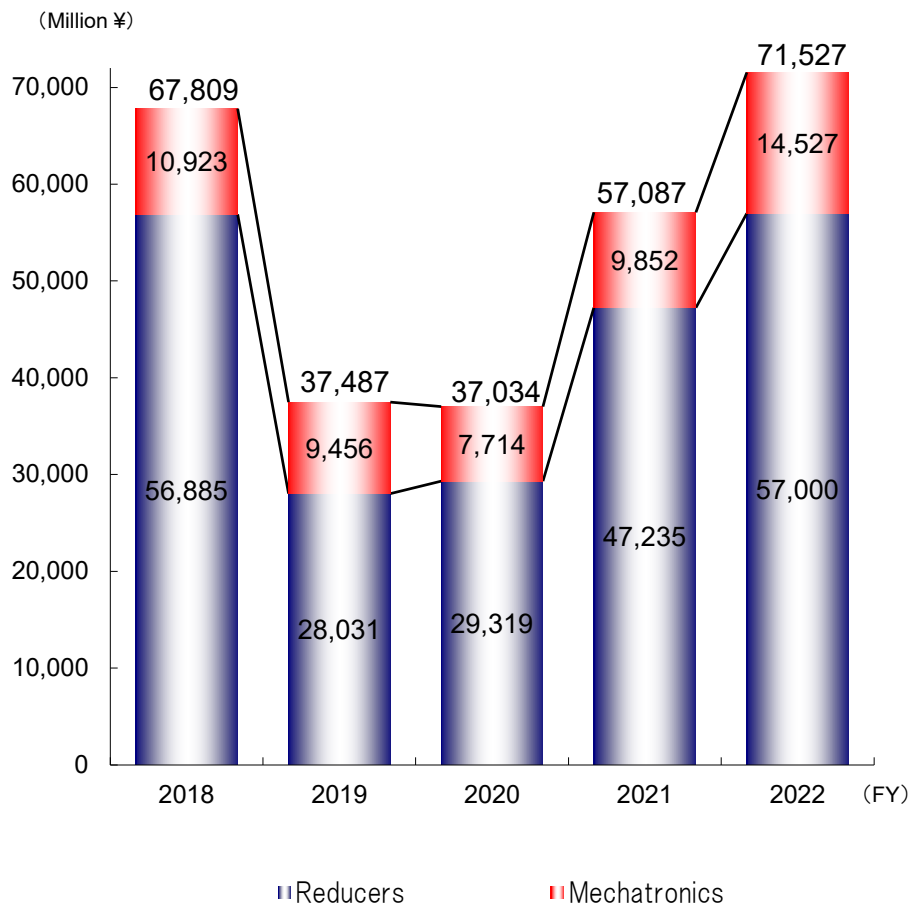
## By Regions



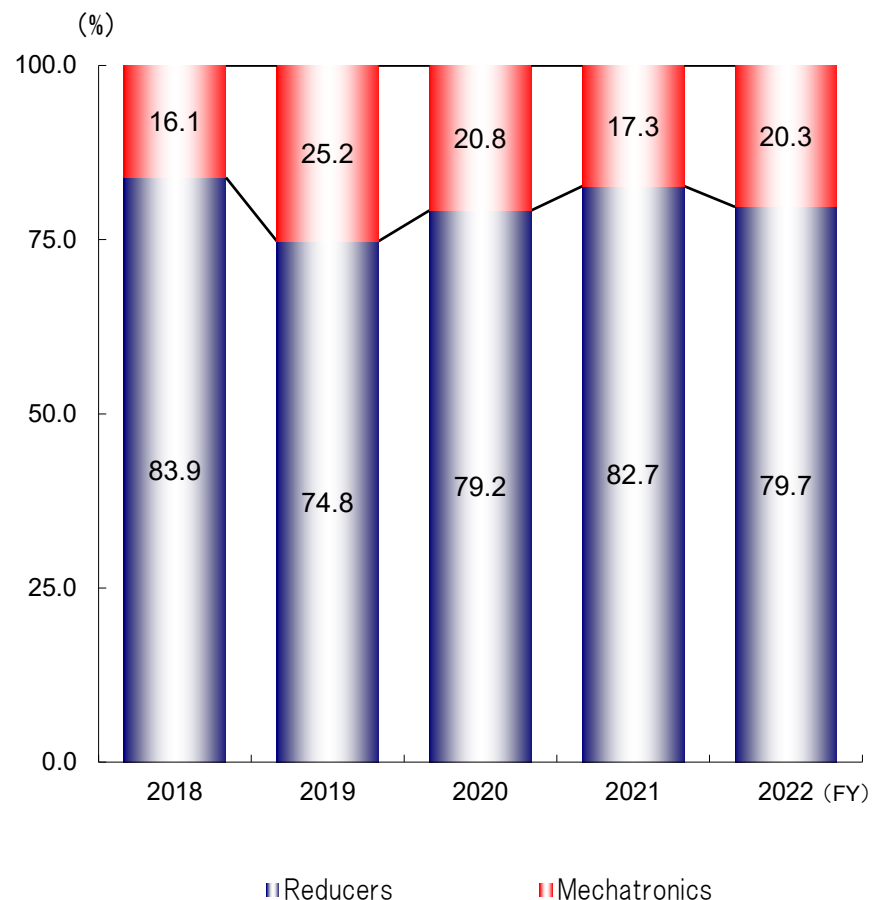
# Sales Structure by Product Types

(Consolidated basis)

## By Product Types



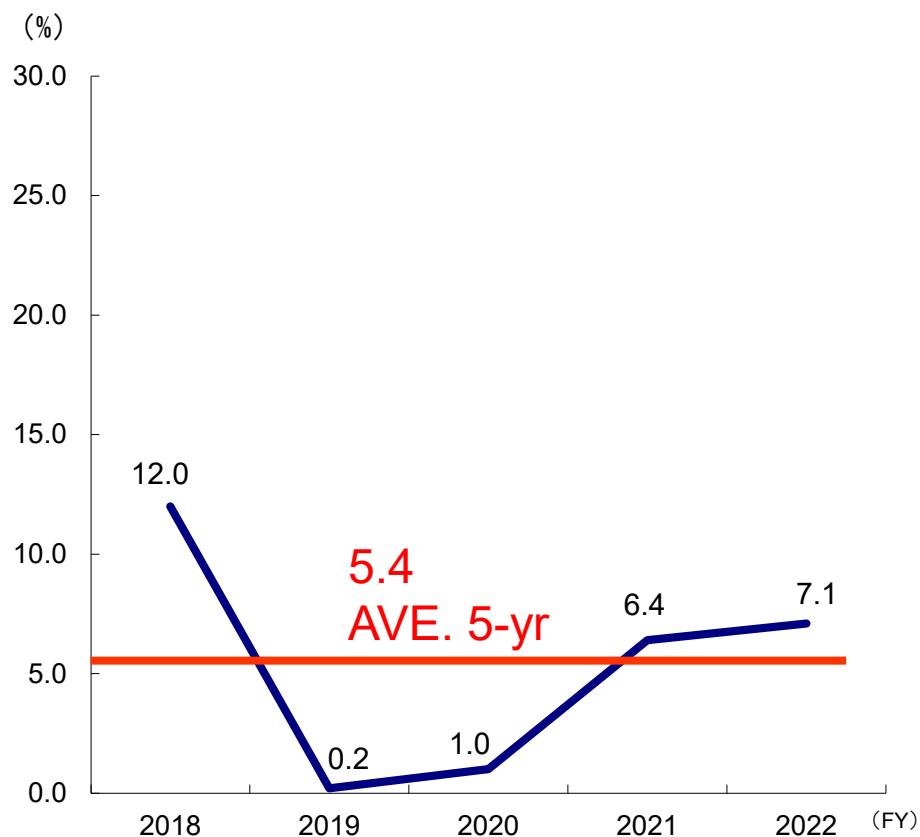
## By Product Types



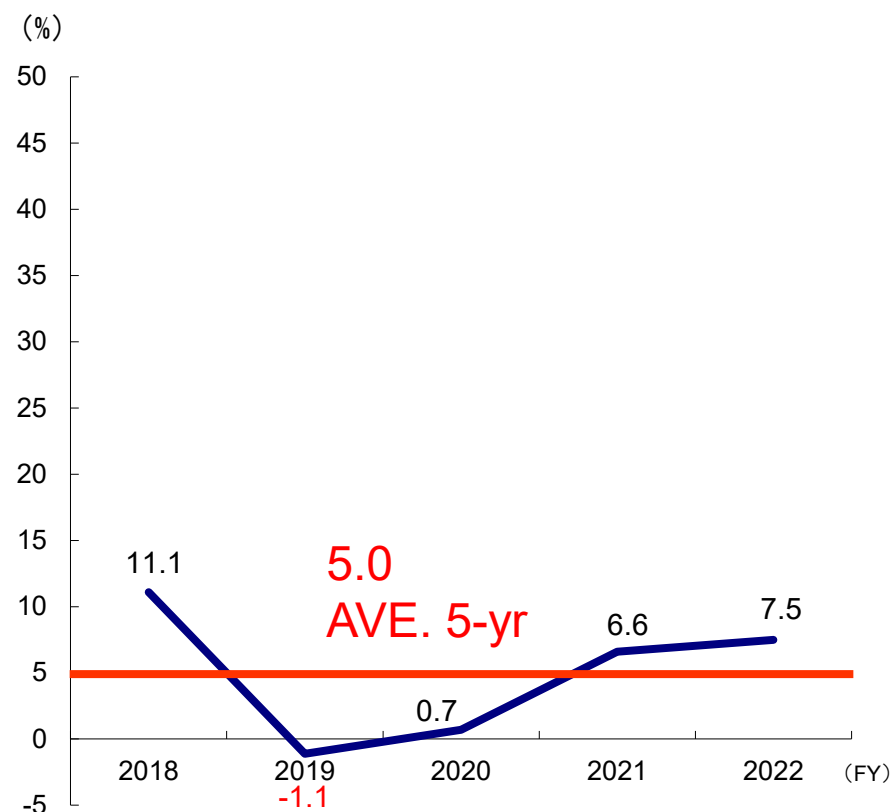
# Profitability EBIT to Total Assets Ratio, ROE

(Consolidated basis)

## EBIT to Total Assets Ratio



## ROE

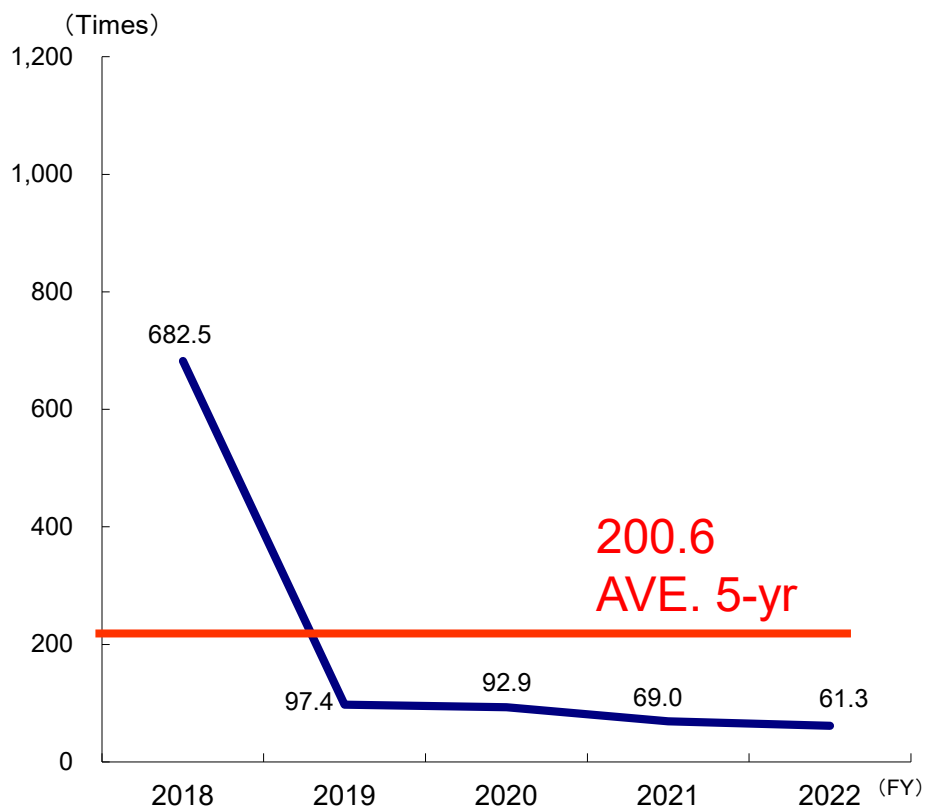


# Stability Interest Coverage Ratio, Debt / Equity Ratio

(Consolidated basis)

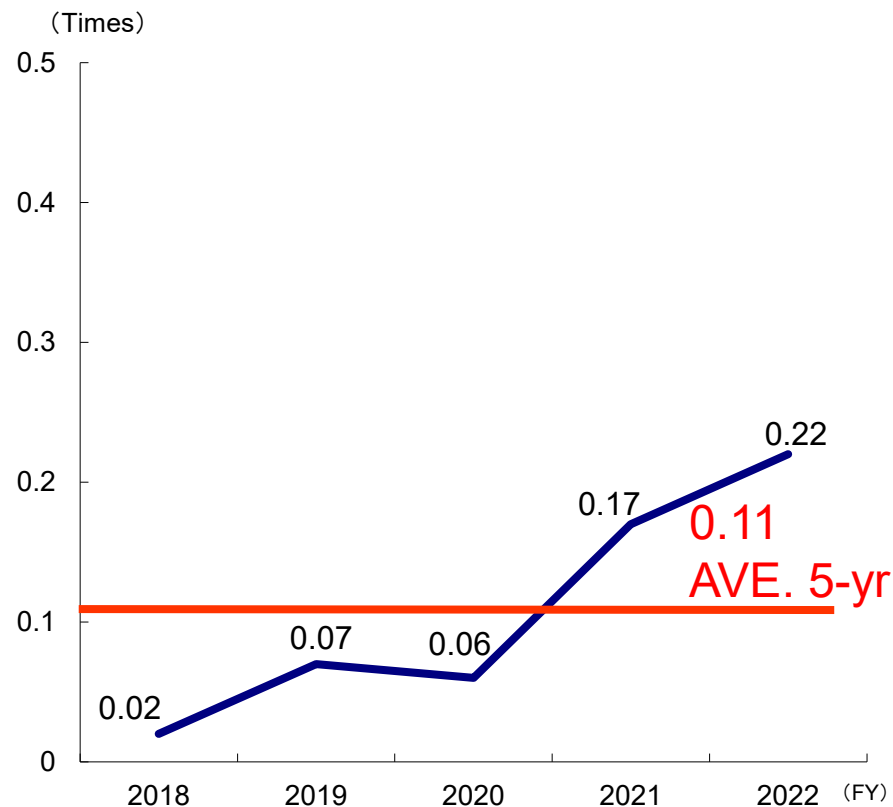
## Interest Coverage Ratio

Interest Coverage Ratio = Net Cash provided by operating activities / Interest paid-net



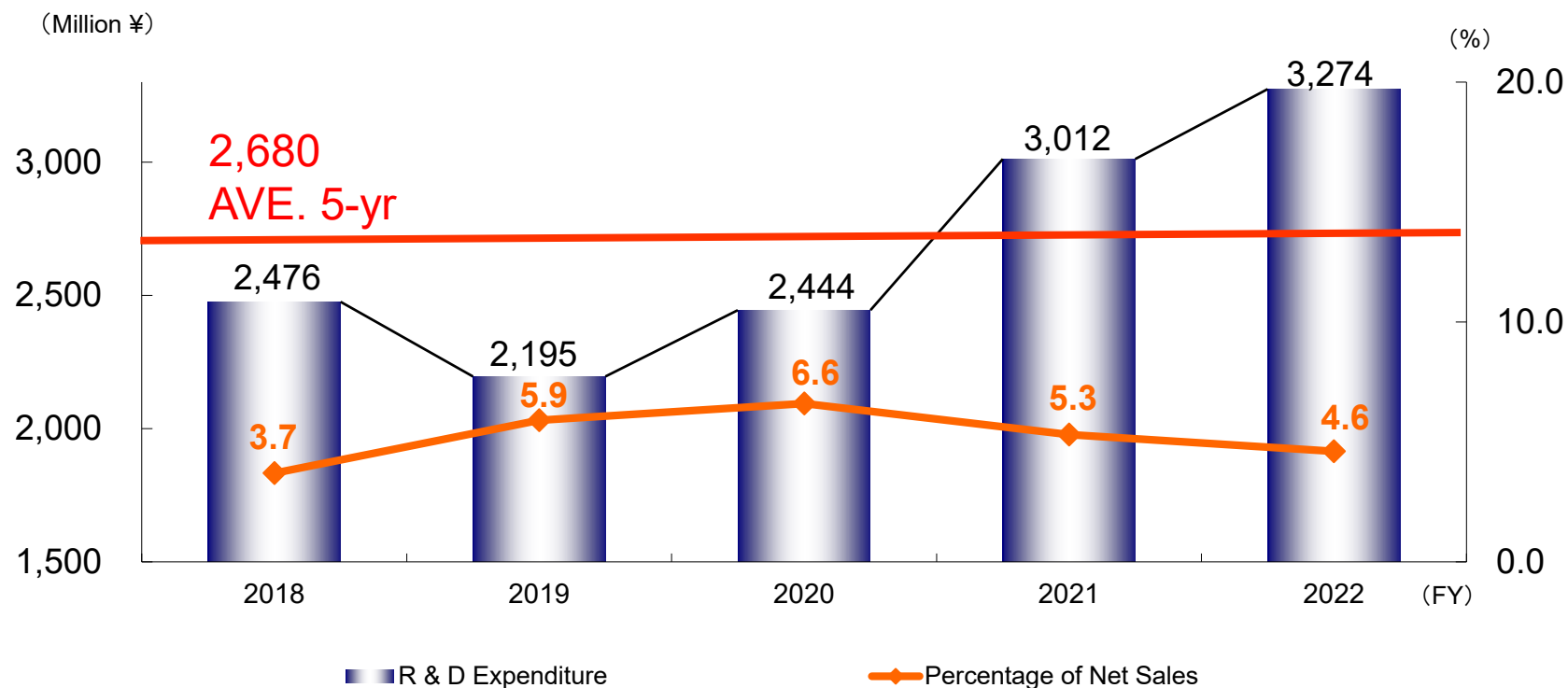
## Debt / Equity Ratio

Debt / Equity Ratio = interest-bearing debt / total shareholders' equity



# R&D Investments

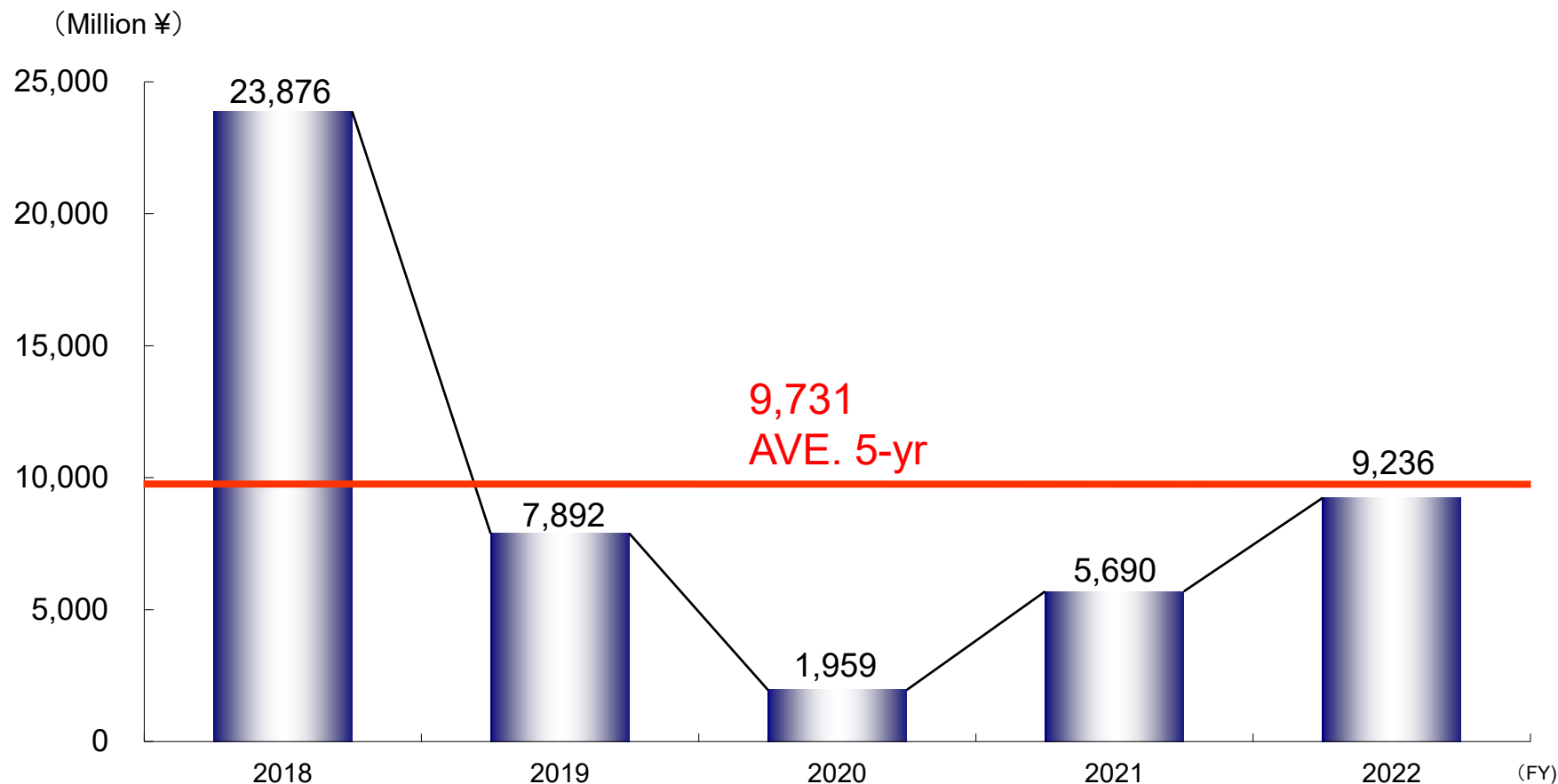
(Consolidated basis)



Fiscal Year	2018	2019	2020	2021	2022
Number of R&D persons	129	139	144	139	137
Share of total employees (%)	11.6	12.7	13.0	12.1	10.3

# Capital Expenditures

(Consolidated basis)



\*Purchases of tangible and intangible fixed assets

# Consolidated Balance Sheets

(Million ¥)

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Current Assets	44,885	35,988	38,177	45,872	52,175
Fixed Assets	97,987	95,859	101,910	97,417	102,160
Tangible fixed Assets	40,852	45,500	41,991	43,967	48,926
Intangible fixed Assets	44,415	40,212	41,003	40,435	40,332
Investment and other Assets	12,718	10,146	18,915	13,013	12,901
<b>Total Assets</b>	<b>142,872</b>	<b>131,848</b>	<b>140,028</b>	<b>143,289</b>	<b>154,336</b>
Total Liabilities	29,594	25,129	29,968	44,433	50,380
Current Liabilities	15,944	5,127	7,954	14,127	16,467
Long-term Liabilities	13,650	20,002	22,014	30,306	33,913
Total Net Assets	113,277	106,718	110,059	98,856	103,955
Shareholders' Equity	97,079	93,192	91,784	89,184	89,747
Other Comprehensive Income	6,564	3,435	11,104	9,671	14,207
Subscription rights to shares	625	625	—	—	—
Minority Interest (Non-controlling Interests)	9,008	9,464	7,170	—	—
<b>Total Liabilities and Net Assets</b>	<b>142,872</b>	<b>131,848</b>	<b>140,028</b>	<b>143,289</b>	<b>154,336</b>



# Consolidated Statement of Income

(Million ¥)

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Net sales	67,809	37,487	37,034	57,087	71,527
Gross profit	30,446	12,003	12,582	22,426	25,786
S G & A	13,821	12,198	11,716	13,686	15,561
Operating income	16,624	▲195	865	8,739	10,224
Ordinary income	17,185	236	1,366	9,108	10,757
Net income attributable to owners of parent	11,322	▲1,095	662	6,643	7,595

# Consolidated Statement of Income

(Million ¥)

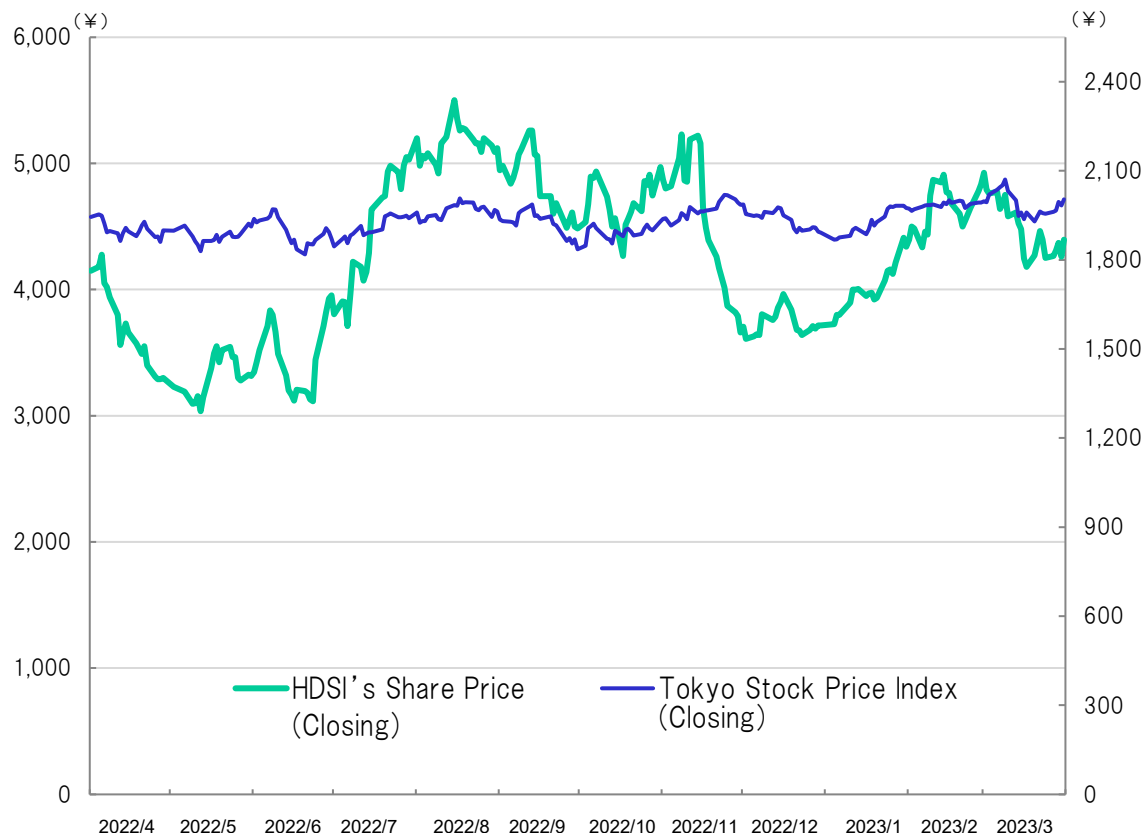
	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Cash flow from operating activities	15,121	10,950	9,555	9,881	10,850
Cash flow from investing activities	▲22,399	▲12,537	▲1,230	▲4,703	▲8,663
Cash flow from financing activities	▲3,271	2,362	▲6,561	▲6,663	▲1,599
Effect of exchange rate changes on cash and cash equivalents	▲171	▲33	▲108	256	567
Net increase (decrease) in cash and cash equivalents	▲10,720	742	1,654	▲1,229	1,154
Cash and cash equivalents at end of year	17,600	18,342	19,996	18,767	19,921

# Share Price Trend

## Share Price

HDSI's Share Price (Closing)

Tokyo Stock Price Index (Closing)



- Number of shares of common stock issued and outstanding:  
96,315,400 shares (As of March 31, 2023)
- Number of shareholders:  
9,053 persons (As of March 31, 2023)
- Market capitalization:  
¥417,808,029,210 (As of March 31, 2023)

Note: TOPIX is a stock index calculated and published for stocks listed on the Tokyo Stock Exchange (TSE).

Harmonic Drive Systems Inc. is listed on the Standard Market of the TSE.

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***Harmonic Drive Systems Inc.***

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***Business Activity — Products***

Leadership in Total Motion Control

May 12, 2023

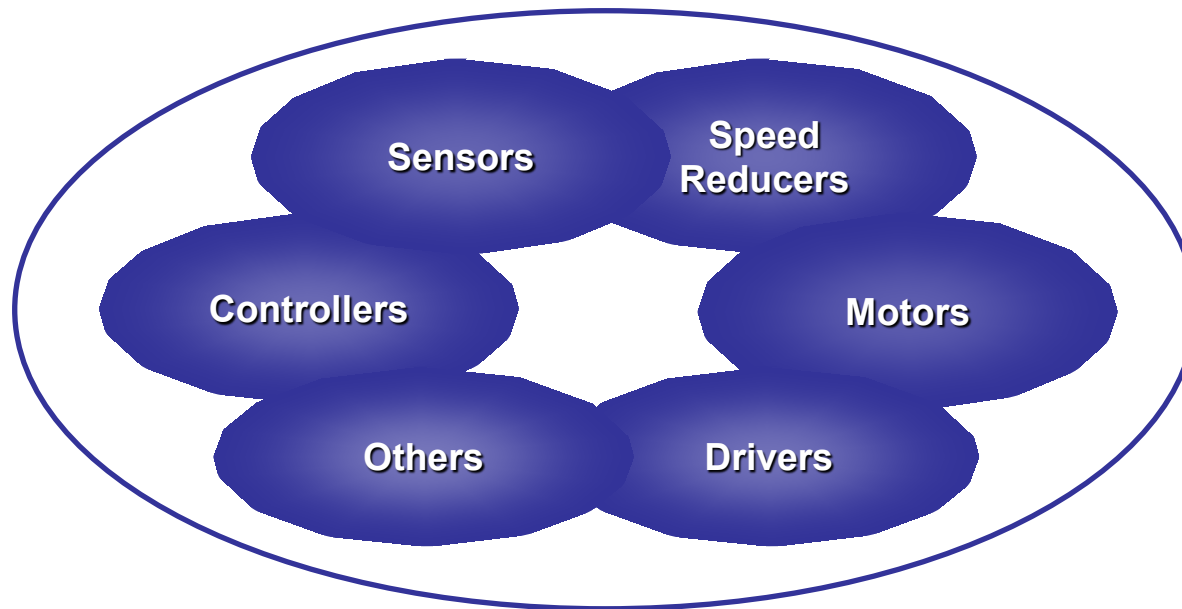
# Total Motion Control

## Our business Domain



Developing and producing Precision Control Equipment and Components for a broad range of applications, focus on “Total Motion Control”

## Schematic Concept of Total Motion Control



# History of Harmonic Drive Systems Inc.

1950.....1960.....1970.....1980.....1990.....2000.....2010.....

## History

55



Invented  
HD

64



First  
Introduced  
to Japan

76

J/V  
USM+  
Hasegawa  
Gear Works

79

100%  
subsidiary  
of USM/  
EMHART

Current HDSI

95



ISO  
9001

98



ISO  
14000

(IPO)

## Products



HarmonicDrive®

MECHATRONICS  
Fine Mechanics & Motion Control

AccuDrive®

## Our Growth

Before Dawn

Equipments for Optical, Aero, Space and Environment

Semiconductor and Flat Panel Display Equipment

Robotics

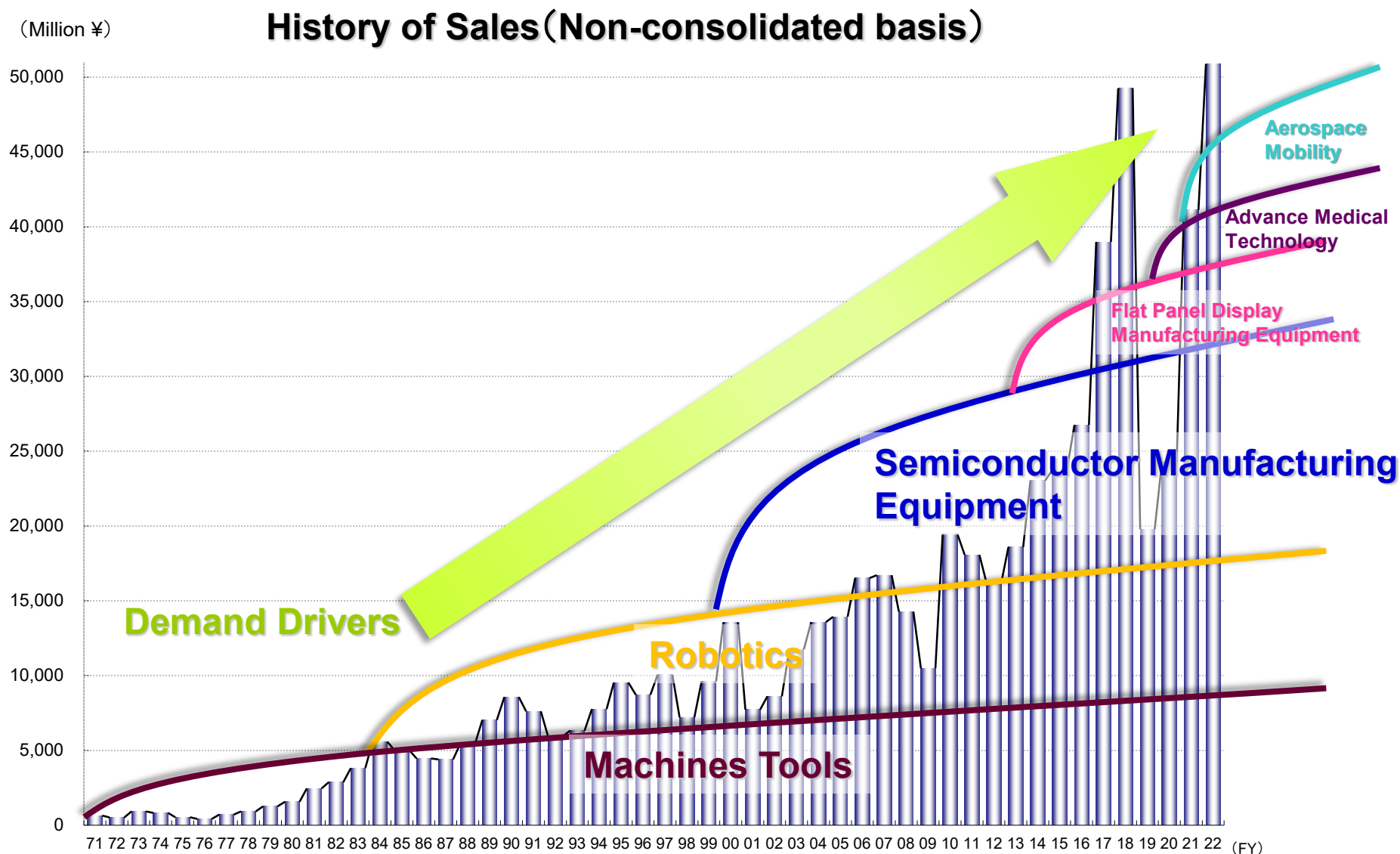
## Community Relations

Harmonic Concert (Classical music concert)

Harmonic Lecture Meeting

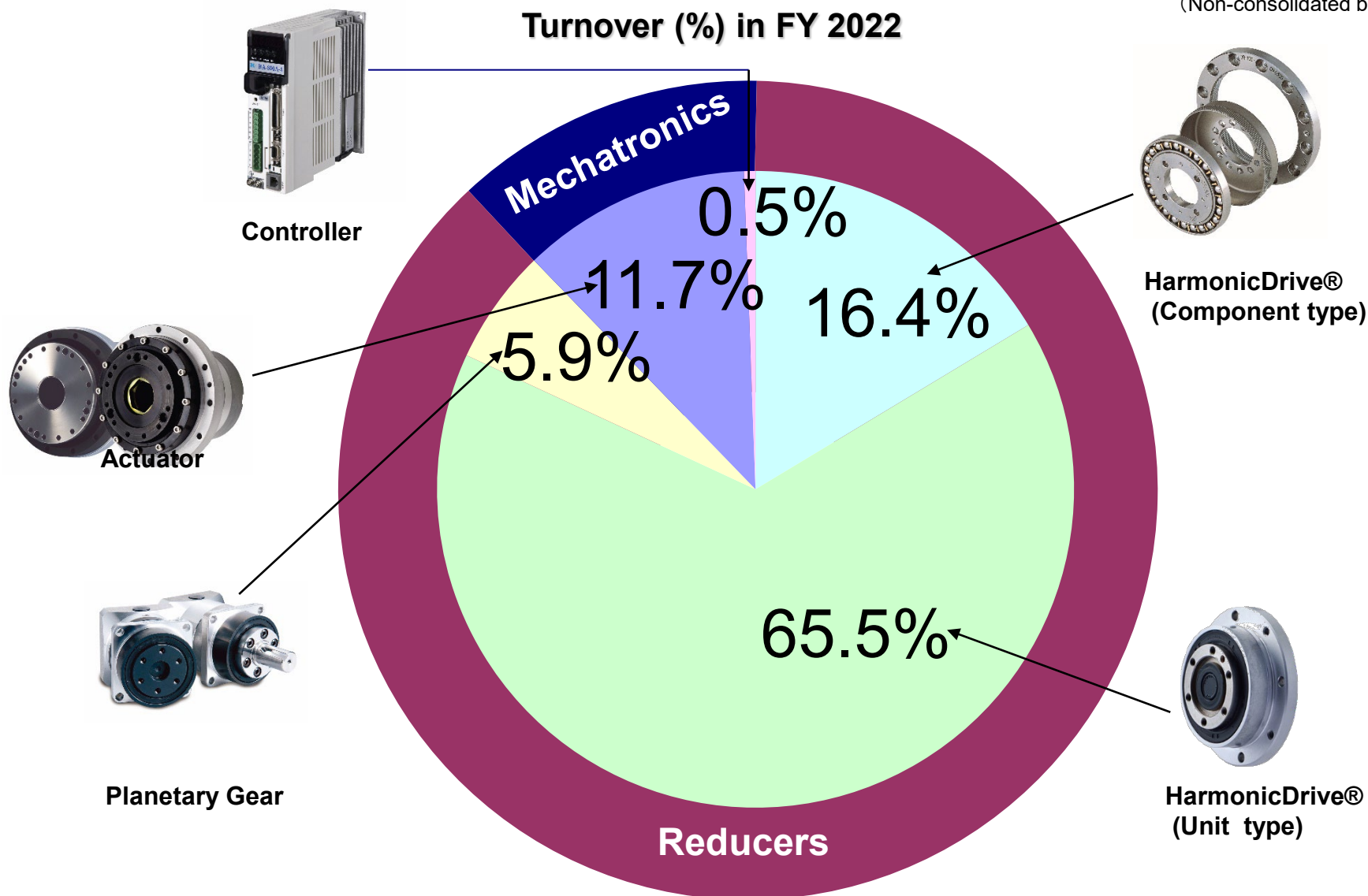
TRIAD

# History of Sales



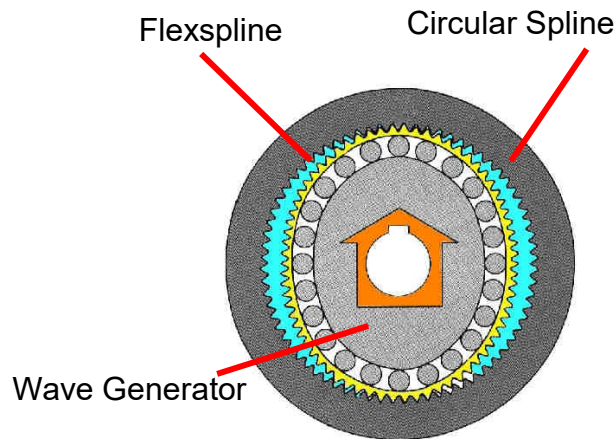
# Sales Structure by Product Types

(Non-consolidated basis)

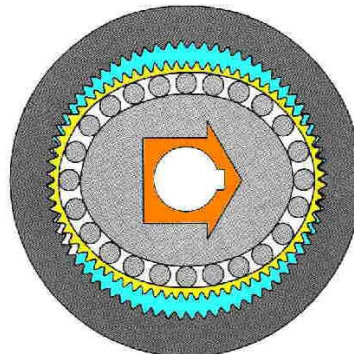




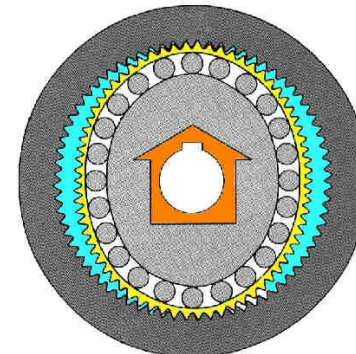
# Principle and Advantages of “HarmonicDrive®”



The flexspline is deflected by the wave generator into an elliptical shape, so the flexspline teeth to engage with those of the circular spline at the major axis and to be completely disengaged across the minor axis.



A clockwise rotation of the wave generator causes the flexspline to rotate in the opposite direction while subjecting it to elastic deformation.



When the wave generator rotates one revolution clockwise, the flexspline moves counterclockwise by two teeth relative to the circular spline.

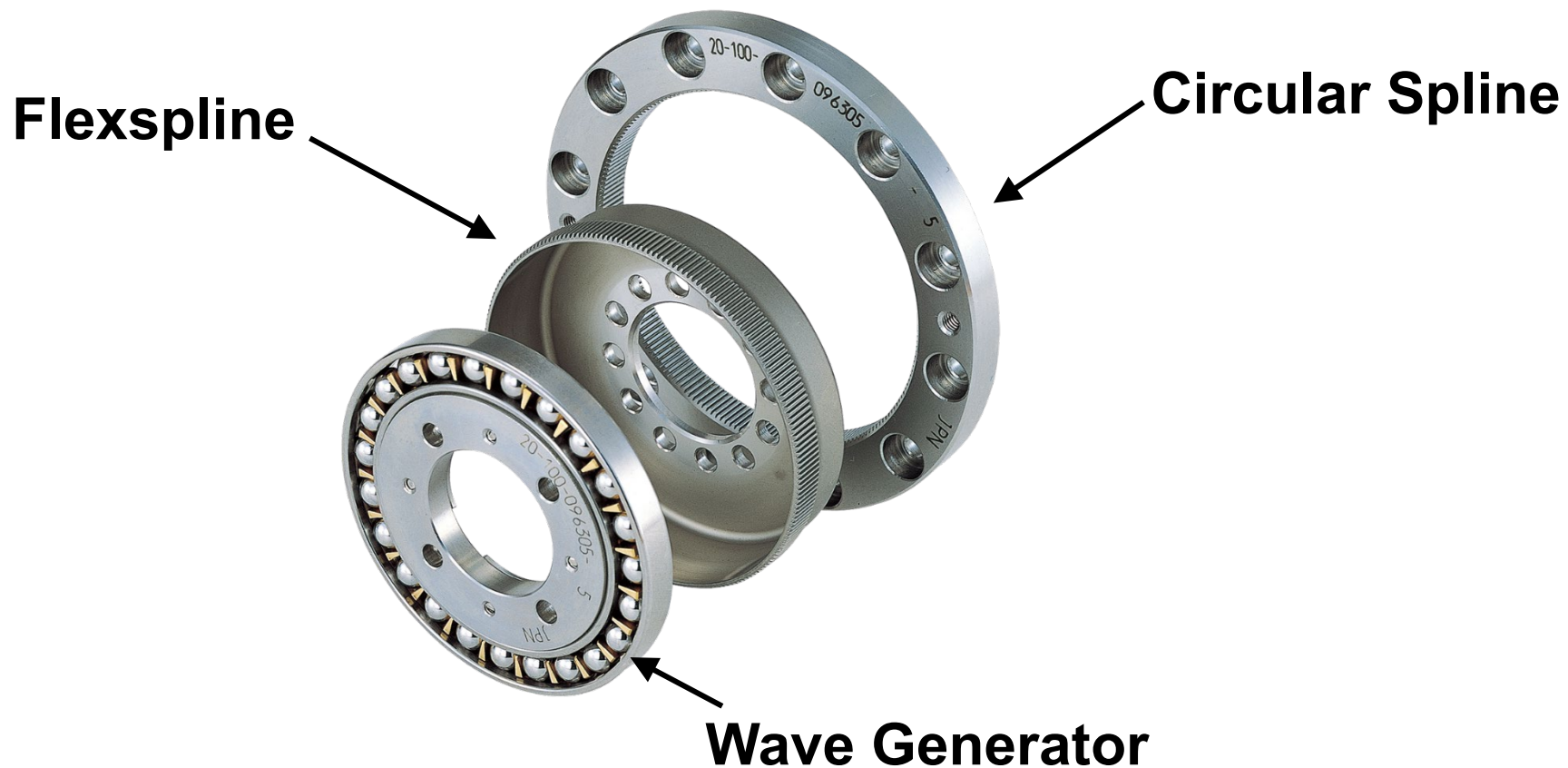
## Advantage of “HarmonicDrive®”

- Compact Design/ Reduced Weight
- Non-backlash
- Hollow Construction
- High Reduction Ratio by Single Stage
- High Efficiency
- High Torque Capacity
- High Positioning Accuracy and Repeatability
- High Torsional Stiffness
- Simple Installation and Assembly
- Low Noise and Smoothness operation

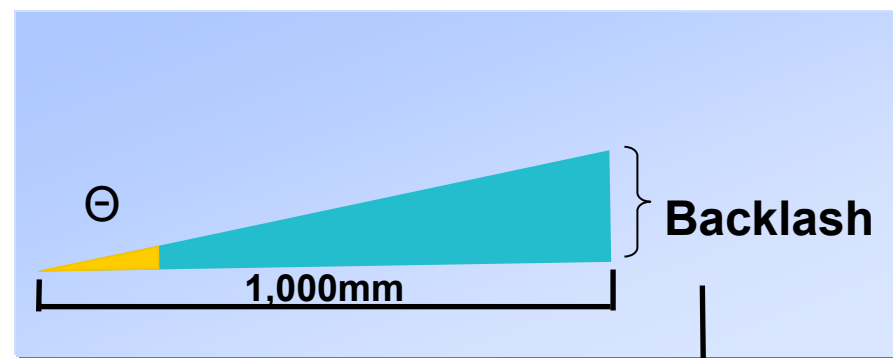
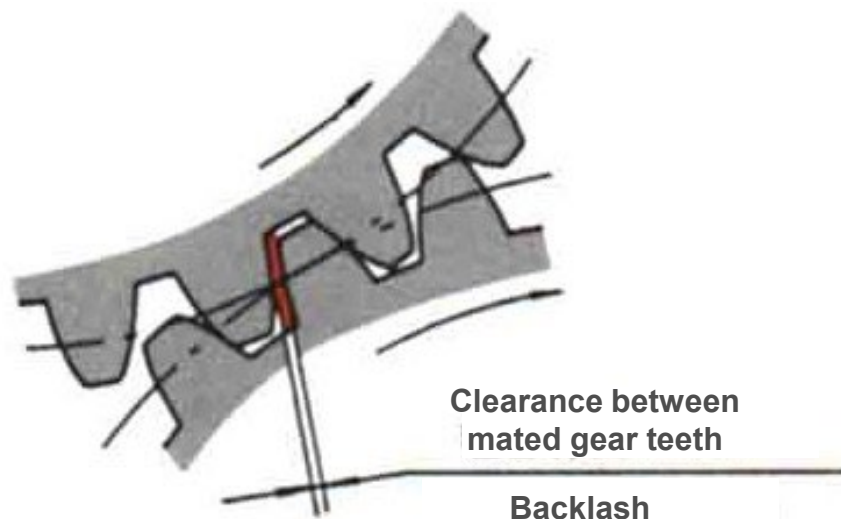


# Features and Benefits “ Compact and Lightweight”

Comprised of just three basic components → Compact and Lightweight



# Features and Benefits “Zero Backlash”



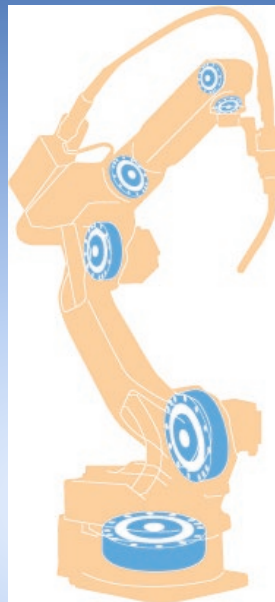
Applications	Backlash	Backlash after 1m	Our Products
General Industrial Machinery	0.5 degrees	8.7mm	None
Transporters and Processing Machinery	0.05~0.25 degrees	0.9mm~4.3mm	AccuDrive <sup>®</sup> HarmonicPlanetary <sup>®</sup>
Robotics and Semiconductor Equipment	0~0.02degrees	0~0.3mm	HarmonicDrive <sup>®</sup>

# Feature Applications

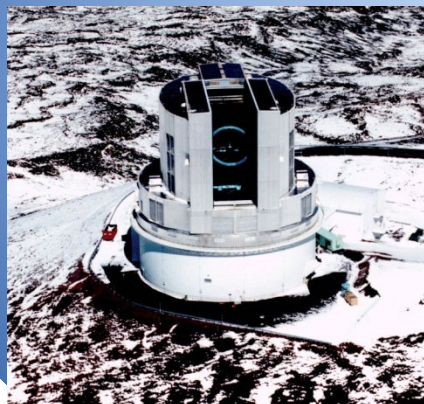
**Hayabusa 1.2** Photograph courtesy of Japan Aerospace Exploration Agency (JAXA)



**Industrial robots**



**eVTOL**



**Optical-infrared telescope "Subaru"**  
installed on Mauna Kea on the island of Hawaii

Photograph courtesy of the National Astronomical Observatory of Japan, National Institutes of Natural Sciences



**Cobot** Photograph courtesy of Techman Robot Inc.



**Robotic Surgical System**



# Target Segment Image

