#### **Business Model Transformation and Initiatives for Value Creation**

Yaskawa launched the i<sup>3</sup>-Mechatronics solution concept in 2017. The three "i"s of i<sup>3</sup>, integrated, intelligent, and innovative, contribute to solving customer management issues\* and are concepts that transform internal business models.

Yaskawa Group is transforming its business model by realizing and implementing the concept of i<sup>3</sup>-Mechatronics through the integration and analysis of data in YASKAWA Digital Transformation (YDX), utilizing YASKAWA Solution Factory and YASKAWA Technology Center.

In order to transform the group's business model, we built a digital management foundation as YDX, and implemented various measures including integration of functions in the value chains of Technology/Product Development, Production, Sales, and Quality/Service in the previous mid-term business plan Challenge 25 Plus.\*<sup>2</sup>



#### Business model transformation through i<sup>3</sup>-Mechatronics

\*1 Yaskawa's unique approach to solving various manufacturing issues through i<sup>3</sup>-Mechatronics is described in "Differentiation Strategy" on page 9-10. \*2 Details are explained on page 31-36 "Business Model Transformation" in YASKAWA Report 2022. \*3 Marketing activities to understand management challenges through direct sales by top executives







## **Our Global Network**



Production: Robot

Production: AC drive

Production: AC servo drive

#### Breakdown of revenue by location (FY2022 results)

#### $\label{eq:Breakdown of personnel by region} (As of the end of FY2022)$



Yaskawa Group conducts optimal production at 29 sites in 13 countries and regions around the world based on its policy of production in demand areas. We strive to reduce risks associated with foreign exchange, natural disaster, and geopolitical issues while taking advantage of having manufacturing sites close to our customers in terms of delivery times and building relationships.

During the term of the mid-term business plan "Realize 25," we will invest in Japan to further improve efficiency and added value through the implementation of "i<sup>3</sup>-Mechatronics," restructuring of plants and offices, and the expansion of in-house manufacturing of parts. At overseas locations, in addition to increasing capacity in demand areas in the United States and Europe, we will promote automation and in-house manufacturing in China and examine the feasibility of establishment of new parts factories for servos and drives in Southeast Asia. As a result, we will flexibly respond to changes in demand and the environment, as well as to risks, and realize stable manufacturing on a global scale.



#### Local procurement rate at major production sites

,	(1 1 2022 1030it3)
YASKAWA ELECTRIC	85.4%
YASKAWA AMERICA	85.9%
YASKAWA ELECTRIC UK	66.8%
SHANGHAI YASKAWA DRIVE	92.8%
YASKAWA ELECTRIC (SHENYANG)	99.3%
YASKAWA (CHINA) ROBOTICS	91.9%
YASKAWA INDIA	30.8%

#### Regional breakdown of production capacity by product



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#### **Financial and Non-Financial Highlights**



Although there was the impact of rising raw material and logistics costs and an increase in overhead costs in response to inflation, operating profit saw year-on-year growth because of the improvement in profitability due to price pass-through and the impact of the depreciation of the yen, as well as other income related to changes in the retirement pension system and the sale of real estate.

#### Dividends per share / Payout ratio

Operating profit / Operating profit ratio



Annual dividend per share for FY2022 was record high at 64 yen, an increase of 12 yen from the previous year. The dividend payout ratio was 32.3% and kept the level of 30%+a, which is the standard for our shareholder returns.

Equity attributable to owners of parent / Ratio of equity attributable to owners of parent to total assets (billion JPY) (%)



Total equity attributable to owners of parent increased by 56.3 billion yen from the end of the previous fiscal year to 347.5 billion yen. The ratio of equity attributable to owners of parent was 53.2%, which is higher than 50%, the level we consider appropriate for stable management.

#### ROE / ROIC



In FY2022, ROE was 16.2% and exceeded the target of 15%. ROIC was 14.6% and was below the 15% target, as a result of increased borrowings due to strategic inventory buildup and shorter payment times.





Capital investments in FY2022 increased by 3.4 billion yen from the previous year to 27.6 billion yen. We focused on our core business areas, Motion Control and Robotics, and made investments to save labor, streamline operations, and improve product reliability. In FY2022, R&D expenses increased by 0.6 billion yen from the previous year.

#### Interest-bearing debt / Net debt-to-equity ratio



The amount of interest-bearing debt at the end of FY2022 was 99.6 billion yen, an increase of 31.6 billion yen from the end of the previous fiscal year. The net D/E ratio was 0.16 times, 0.12 points worse than the end of the previous fiscal year. Current liabilities increased compared to the end of the previous fiscal year due to an increase in short-term borrowings and other current liabilities.

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In FY2022, we made significant progress in reducing CO<sub>2</sub> emissions by switching to CO<sub>2</sub>-free electricity at lruna Plant and by the usage of diesel oil for transport trucks with business transfer of Yaskawa Transport Corporation, a second-tier subsidiary of Yaskawa.



(10,000 t- CO2)



In FY2022, our contribution to reducing CO<sup>2</sup> emissions increased significantly in line with the increase in revenue of environmental contribution products. We have two new models of super green products and green products, and expect to continue contributing to the reduction.

#### Frequency rate of lost-time injuries

(Number of cases / one million hours)



In FY2022, the frequency rate of lost-time injuries was 0.00 for Yaskawa Electric, 0.12 for the Yaskawa Group in Japan, and 0.22 for the Yaskawa Group overseas. All three figures improved from the previous year. These figures meet the targets for FY2025, keeping the figures for Yaskawa Electric below 0.2 and for the Yaskawa Group in Japan and overseas below 0.4.





At Yaskawa, the amount of water used in the production process is small, and the impact of the increase in revenue has been minimal. Most of the water used is domestic water used by employees. In FY2022, the amount of water used and the amount of water used per unit of revenue remained at the same level as in FY2021.

## Consolidated employees / Ratio of employees in bases outside Japan



In FY2022, the number of consolidated employees increased by 197 to 13,094. Overseas employees accounted for 56% of the total and there was no significant change from the previous year.

#### Local procurement rate at key business sites



In FY2022, there was no significant change in the local procurement rate at key business sites from the previous year.



#### 03 Creating Social Value and Solving Social Issues through Business

#### **Business Performance of FY2022**

#### FY2022 Management Review (Quantitative)

- Revenue and operating profit each set new record highs.
- The dividend payout ratio remained at 30.0%+α. Due to the growth in profit attributable to owners of the parent, the annual dividend reached a new record high.

		FY2022 targets *1	Previous mid-term business plan "Challenge 25 Plus" (FY2019 to FY2022 *2) targets	FY2022 results	
	Revenue	550.0 billion JPY	470.0 billion JPY	556.0 billion JPY	]
	Operating profit	70.0 billion JPY	61.0 billion JPY	68.3 billion JPY	_
tative	Operating profit ratio	12.7%	13.0%	12.3% Record	Achieved
Quanti	ROE		15.0% or more	16.2%	mid-term targets for the four items
	ROIC		15.0% or more	14.6%	
	Dividend payout ratio		<b>30.0</b> %+a	32.3%	

\*1 As of announcement of financial results for the second quarter of FY2022

\*2 Revised in April 2021

## FY2022 Management Review (Qualitative)

	Production	<ul> <li>Launched YASKAWA (Changzhou) Mechatronics system Co., Ltd. (in China), and started construction of machining plant for robot parts (in Japan) to improve the in-house production rate</li> <li>Enhanced inventory management at EMS and global production sites (real time visualization)</li> </ul>
live	Sales	<ul> <li>Launched "MOTOMAN-Craft" to enable easy robotization of skilled work that has been difficult to program</li> <li>Exhibited a sample of the latest robot that is applicable to the new back-end process accompanying the evolution of semiconductor packaging at "SEMICON Japan 2022," an international exhibition</li> <li>Strengthened sales by enhancing application packages (palletizing, etc.) of collaborative robots</li> <li>Promoted price pass through to cover rising prices of raw materials and parts</li> </ul>
Qualitat	Development	<ul> <li>Strengthened development process in view of production, sales, and services through rebuilding PLM*1 in YDX II*2</li> <li>Created synergies and accelerated development of new products through a cross divisional development system</li> <li>Developed to switch to alternative parts for bottleneck parts in collaboration with production department</li> </ul>
	Others	<ul> <li>Accelerated the construction of a product lifecycle management platform that offers value to customers (YDX- II)</li> <li>Revised reduction targets for Scope 1 + 2*<sup>3</sup> to higher ones and added a new reduction target for Scope3*<sup>4</sup> to achieve carbon neutrality by 2050</li> <li>Greenhouse gas reduction targets have been certified as 1.5 °C targets by the SBTi*<sup>5</sup></li> <li>Implemented position specific training programs to deepen understanding of the Yaskawa Principles</li> <li>Started application of new compensation system based on the role each person plays and the size of the duties</li> </ul>

\*1 Product Lifecycle Management

\*2 Abbreviation form for YASKAWA Digital Transformation. Activities to visualize and centralize management resources and to allocate them optimally were carried out in YDX I. In YDX-II we aim to achieve overall optimization through data linkage based on PLM reconstruction.

<sup>\*3</sup> Scope 1 Emissions associated with fuel use (direct emissions). Scope 2: Emissions associated with the use of purchased electricity and heat (indirect emissions by electric power companies, etc.). \*4 Indirect emissions except for Scope 1 and 2. (emissions by other companies related to own business activities) \*5 International initiative to certify corporates' CO<sub>2</sub> reduction targets as consistent with scientific evidence

### Breakdown of Changes in Operating Profit (FY2021→FY2022)

- Operating profit increased year on year due to the impact of the depreciation of the yen, as well as increased revenue mainly of robots, changes in retirement pension plans and other revenues from the sale of idle real estate.
- Value added decreased due to the impact of high raw material and logistics costs, although profitability was improved through price shifting of products.
- Overhead costs increased due to inflation.



Breakdown	Effects of changes in forex rates	Change in profit due to change in revenue	Change in added value	Change in total expenses	Other
Motion Control	+5.8	-0.0	-4.2	-5.6	+2.1
Robotics	+6.3	+9.0	+0.3	-6.8	+0.1
System Engineering	+0.0	-1.2	+0.4	+1.4	-0.1
Other	+0.0	+0.9	+0.0	+1.2	+5.9

#### FY2023 Plan

As for the business environment surrounding Yaskawa Group during the FY2023, although the semiconductor market remains sluggish, capital investments for automation and labor-saving in overall manufacturing are expected to continue. We expect the revenue to grow by steadily filling order backlogs and by accurately capturing the continuing demand.

FY2023 is the first year of "Realize 25", the last mid-term business plan in "Vision 2025". We will deploy the transformation that we have made in "Challenge 25 Plus" globally, further enhance the effectiveness of our solution concept, i<sup>3</sup>-Mechatronics, and maximize added value through YDX (Yaskawa Digital Transformation) in an effort to respond flexibly and speedily to market changes, which result in further improvement of profitability.

#### Key Implementation Items

Increase added value	Continue to evolve our technology, production, sales, quality control and service centering on i <sup>3</sup> -Mechatronics solutions to provide highly effective solutions to our customers
Expand business	<ul> <li>In order to capture markets expected to grow substantially such as EV, lithium-ion battery and semiconductor industries, and growing markets such as food and agriculture, where automation is expected to accelerate in the future, we will strengthen cross-divisional sales activities from market perspective.</li> <li>By launching strategic new products, we will enhance our competitiveness and ensure that we capture global demand, which lead to earnings expansion.</li> </ul>
Maximize earnings	<ul> <li>Strengthen materials procurement functions by centralizing procurement of semiconductor and other key components at the headquarters</li> <li>Expand in-house manufacturing of machined parts for robots</li> <li>Increase production capacity and the rate of production automation, strengthen our ability to respond to demand fluctuations, and accelerate filling order backlog</li> <li>Achieve further earnings growth through price pass-through in response to the impact of soaring materials and labor costs</li> </ul>
Strengthen management foundation	<ul> <li>Work to build a robust supply chain by strengthening data linkage from product development to product quality and market quality (YDX-II)</li> <li>Expand the educational programs of Yaskawa Principles</li> </ul>



## At a Glance

The Yaskawa Group deploys the technology and knowhow of the highest global standards to its products and services through business activities in the three core business segments of Motion Control, Robotics and System Engineering.







#### **Drives business**

Contributing to sustainable development of society and industry by realizing energy-saving and higher performance of machinery through optimum motor control





Yaskawa AC Matrix converter drive series U1000

Flat-type eco PM motor





and automation at production sites, we are taking on the challenge of realizing a new industrial automation revolution

application MOTOMAN-GP8

Asian countries except China 15% China 32%

## System Engineering

Supporting prosperous life and society through technologies and proven performance accumu-



PV inverter

Japan 67%

Market share (company estimate) Steel plant systems (Blast furnace) Business breakdown by application (FY2022 results)





**Business Strategy** 

## **Motion Control**



Kenji Ueyama Senior Executive Officer General Manager, Motion Control Div.

AC Servo & Controller Business

#### AC servo drive's role in manufacturing digital transformation

In the manufacturing industry, it is important to collect, analyze and utilize various data obtained from equipment in order to improve productivity. AC servo & controller is a key component that is built into and drive a variety of equipment used in manufacturing. By making AC servo drive, which controls the movement of equipment (motion), function as a sensor and acquire various data from the equipment, it is possible to provide new added value to manufacturing, such as preventive maintenance of equipment and improvement of production quality. Yaskawa provides solutions to customers based on the concept of "i<sup>3</sup>-Mechatronics," which "realizes a new industrial automation revolution" by data utilization to improve productivity. In 2021, we released the new AC servo drive  $\Sigma$ -X series and the new controller YRM-X series as key products to realize this concept. By using the sensing function of  $\Sigma$ -X, we can collect operation data of the equipment without installing special sensors. In addition, we are enhancing the added value of customer equipment by expanding the scope of solutions through data-driven control of YRM-X.

#### **Overview of FY2022 performance**

- High demand for semiconductors and electronic components mainly in the first half of the year in Japan and the United States
- · Continued revenue growth due to favorable demand environment caused by normalization from the COVID-19 pandemic
- · Profit was pressured by the difficulty in procurement and surging materials costs

#### SWOT analysis of business

Strengths: Strengths of Our Business and Differentiation	Weaknesses: Challenges
<ul> <li>Developed the world's first "minertia motor" which is the prototype of the current servo motor in 1958</li> <li>World-class performance and quality</li> <li>Brand value as global No.1 market share</li> <li>Hold strong relationships of trust with leading companies in various manufacturing equipment</li> <li>Contributing to the advancement and performance of machines through the pursuit of leading-edge technologies</li> <li>Practice of i<sup>3</sup>-Mechatronics</li> <li>Realization of new automation revolution</li> </ul>	• Reinforcement of response to rapid changes in demand in production
Opportunities: Business Opportunities	Threats: Business Risks
<ul> <li>Enhancement of the added value of manufacturing equipment</li> <li>Large-scale investment in the semiconductor industry in various countries</li> <li>Acceleration of the adoption of EVs</li> </ul>	<ul> <li>Supply chain dysfunction due to geopolitical risks</li> <li>Rise of emerging market competitors</li> </ul>

#### Future initiatives based on SWOT analysis results



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### Goals of mid-term business plan "Realize 25"

Accelerate the global expansion of "i<sup>3</sup>-Mechatronics" through the realization of Yaskawa Total Solutions, and aim to maximize profits by pursuing production efficiency and building a high-profit structure by strengthening manufacturing

#### Market size and CAGR (from 2022 to 2025)

	FY2022	FY2025
Market size	Approx. 0.8 tn. JPY	Approx. 0.9 tn. JPY
CAGR	4.0%	



#### "Realize 25" market outlook

Semiconductor	<ul> <li>Large-scale investment plans continue globally, in Europe, the U.S., South Korea and Japan</li> <li>Potential demand for IoT and other services is firm and expected to recover from the second half of FY23</li> </ul>
Electronic components	<ul> <li>Smartphone demand remains weak, but in-vehicle and solar-related applications remain strong</li> <li>Potential demand for IT related products remains strong, and demand is expected to grow steadily</li> </ul>
Battery	<ul> <li>Market expansion is expected to continue as EVs are adopted globally to reduce environmental impact</li> <li>Use in other industries is expected to further expand the market</li> </ul>
Machine tool	<ul> <li>The automobile industry transition due to the adoption of EVs cause demand to increase in new markets and fields</li> <li>Expansion of processing applications caused by the recovery of the Chinese domestic demand</li> </ul>

#### FY2022 results and future initiatives

	FY2022 results	FY2023 initiatives	FY2025 goals
Development	<ul> <li>Launched Σ-X series and YRM controller to expand components for "i<sup>3</sup>-Mechatronics"</li> </ul>	<ul> <li>Expand lineup of Σ-X series and YRM controllers</li> </ul>	<ul> <li>Expand solution coverage by expanding lineup of Σ-X series YRM controllers</li> </ul>
Production	• Y'sF production system which achieved 50% increase in production efficiency was introduced to plants in China (Shenyang)	<ul> <li>Accelerating global development of Y'sF production system and expanding production models in demand areas</li> </ul>	<ul> <li>Improve production efficiency by using Yaskawa products and expand local production</li> </ul>
Sales	• Introduced new products to global growth markets (semiconductors, 3C*, new infrastructure, etc.) especially in China and Asia to increase orders	<ul> <li>Demonstrating and building "i<sup>3</sup>-Mechatronics" solutions based on new products through collaboration with customers</li> </ul>	<ul> <li>Accelerate approach to growth markets by providing "i<sup>3</sup>-Mechatronics" solutions</li> </ul>

\* 3C: Abbreviation for consumer and digital communication devices (three acronyms for Computer, Communication, and Consumer Electronics)



03 Creating Social Value and Solving Social Issues through Business **Business Strategy** 

## Launch of FT55 and FT56 specifications with data customization added to the AC servo drive $\Sigma$ -X series

The AC servo drive  $\Sigma$ -X series, which was commercialized in 2021 based on the concept of "accelerating evolution through Motion×Digital Data Solutions," has been increasing optimal functions to standard servo packs according to customers' devices and applications. On January 30, 2023, the  $\Sigma$ -X series FT55 and FT56 specifications, which are equipped with functions to customize sensing data, became available for feedback to motion control in addition to sensing data collection and primary analysis.

The  $\Sigma$ -X series is a product lineup that uses sensing data to implement our company solution concept "i<sup>3</sup>-Mechatronics" and their sales are steadily increasing. By using the know-how we have accumulated over many years of using AC servo drives, we will accelerate the materialization of "i<sup>3</sup>-Mechatronics" and improve the added value of our customers' devices by increasing the number of models of the  $\Sigma$ -X series equipped with optimal functions for each application.



Topics

AC servo drive  $\Sigma$ -X series FT55/FT56 specifications

#### Example of customer introduction

#### Remote shooting system utilizing servo motor

Our company develops, designs, manufactures and sells special equipment and systems for shooting live concerts and broadcasting sports. When we were working on the development of the world's best remote-controlled camera, we decided to introduce Yaskawa's servo motor to take advantage of their characteristics, which enables accurate control from high speed to very low speed. Although the noise (magnetic resonance) emitted by the motor was a major issue, we succeeded in developing the world's first remote imaging system using servo motors in 2006 through trial and error with Yaskawa engineers. The ability to shoot smoothly while moving by remote control has been recognized by people in the industry and artists.



Masahiko Hashimoto TECHNICAL CENTER MANAGER SiS CO., LTD.



Servomotors used for wire hoisting machine

## **Motion Control**

### **Drives Business**



#### Tatsuya Yamada

Senior Executive Officer General Manager, Drives Div. General Manager, Environmental Energy Business

#### AC drive's role in society and industry

AC drives can continuously change the motor's rotational speed by converting the voltage and frequency of the power supply. The use of AC drive not only enables advanced motor control, but also contributes to energy saving by operating as much as necessary. AC drive is widely applied to machinery and equipment in which motors are used, and the global market is estimated to reach 1.8 trillion yen. In the past, AC drive's growth drivers were (1) the advance of electrification in line with industrial sophistication, and (2) the rise of emerging economies. In recent years, however, the energy-saving effects of using AC drives have attracted renewed attention as part of efforts to achieve carbon neutrality in countries around the world. AC drive is increasing its presence as an indispensable device for the sustainable development of society and industry.

#### Overview of FY2022 performance

- · Accelerating energy conservation investment with a global focus on decarbonization (carbon neutrality)
- Significant increase in oil and gas-related demand in the United States
- · Increased backlog of orders as production fails to keep pace with high levels of demand due to difficulties in procurement

#### SWOT analysis of business

## Strengths: Strengths of Our Business and Differentiation

- Power electronics technology and high-efficiency motor technology
- Control and sensing technologies based on motor drives developed over many years
- Knowledge of how machines and facilities are used (applications) based on system engineering
- Worldwide sales and service bases, development centers, and production plants

### Opportunities: Business Opportunities

- Expansion of energy conservation promotion policies in each country based on the sustainability codes (SDGs, carbon neutral, etc.)
- Accelerate factory automation including 5G and IoT
- Enhancing the performance of industrial equipment through AI, etc.
- Rise of market in emerging countries
- Enhancement of high-efficiency motor regulations

## Weaknesses: Challenges

- Creating added value for customer machines
- Improvement of development speed including new technologies
- Improvement in cost competitiveness
- In-house production of main parts
- Reducing the impact of global shortages of material

### Threats: Business Risks

- Geopolitical risks in Russia and China
- Movement toward in-house production by some customers
- · High dependence on specific markets such as oil and gas markets
- Rise of emerging market competitors

· Accelerate deployment of high-value-added products and solutions for emerging

Future initiatives based on SWOT analysis results

- economies, particularly in Southeast Asia
- Enhance QCD (Quality, Cost, Delivery) of technologies and products by fully utilizing the functions of YASKAWA Technology Center
- Realization of BCP through review of component, substrate, and product supply systems and expansion of in-house production of parts
- Increase the revenue ratio of stable growth markets (HVAC\*, elevators, etc.) by capturing energy conservation demand

\* Heating, Ventilation and Air Conditioning

### Goals of mid-term business plan "Realize 25"



#### Market size and CAGR (from 2022 to 2025)

"Evolution of global business"

carbon neutrality"

and "business growth in line with

	FY2022	FY2025
Market size	Approx. 1.8 tn. JPY	Approx. <b>2.1</b> tn. JPY
CAGR	+4.7%	

#### FY2022 results and future initiatives

	FY2022 results	FY2023 initiatives	FY2025 goals
Development	<ul> <li>Accelerate replacement of tight- supply parts</li> </ul>	<ul> <li>Enhancement of product lineup of Yaskawa AC drive series</li> </ul>	<ul> <li>Completion of product lineup of Yaskawa AC drive series</li> <li>Development of flagship devices to create customer value</li> </ul>
Production	<ul> <li>Improve global production capability</li> <li>Expand in-house production</li> </ul>	<ul> <li>Eliminate backlogs by maximizing production</li> <li>Expand in-house production</li> </ul>	<ul> <li>Expand demand area production</li> <li>Expand in-house production</li> </ul>
Sales	<ul> <li>Penetration of new series products in the global market</li> <li>Capture demand for decarbonization by combining with flat type Eco PM motor</li> <li>Accelerate switching to new products</li> </ul>	<ul> <li>Increase revenues in global focus segments (US HVAC market, Chinese semiconductor/ rechargeable battery market)</li> <li>Capture energy conservation demand through carbon neutral proposals</li> </ul>	<ul> <li>Strengthen customer responsiveness in global scale</li> <li>Expand sales opportunities for green products by accelerating energy conservation proposals</li> </ul>

Example of customer introduction

#### Food processing machine utilizing AC drives

Our company manufactures and sells food processing machines that automatically make rice balls and serve rice in bento boxes. To dish up bento boxes, it is necessary to fine-tune the speed of the rollers and the torque at the time of molding, depending on the variety of rice, the water content, and the hardness and viscosity of the rice, which vary depending on the climate. The Yaskawa AC drives can perform this adjustment independently, thereby reducing the number of parts and contributing to the reduction of equipment failures. In addition, food processing machines can cause inconvenience to customers if they stop. We appreciate the fact that the motor can be rotated to the limit of performance despite variations in food conditions, and we use drives manufactured by Yaskawa, for almost 100% of our noodle making machines.



(from left) **Tatsuya Yoshida** Head office Sales Dept. (Technical sales), Fujiseiki Co., Ltd

Masashi Ono Assistant Manager, Development & Design Dept. (Production Development office), Fujiseiki Co., Ltd

## Robotics



Manabu Okahisa Senior Executive Officer Regional Manager, China General Manager, Robotics Div. Department Manager, Business Planning Dept., Robotics Div.

#### Role of robots in manufacturing

Industrial robots are used to automate welding, painting, assembly and transportation in various fields, including the automotive market. In recent years, against the backdrop of global labor shortages, demand has been increasing in general industrial fields such as the food, medical, pharmaceuticals, and 3C (computers, consumer electronics and communications equipment.)

Going forward, the demand for automation of the manufacturing sites is expected to grow in response to

the sophistication of manufacturing, such as data utilization and variable-mix variable-volume production. In this context, Yaskawa will contribute to further automation and optimization at manufacturing sites by providing solutions based on the "i<sup>3</sup>-Mechatronics" concept, and will contribute to creating value for customers by providing new automation solutions in areas where robots have traditionally been difficult to apply.

#### **Overview of FY2022 performance**

- Adoption of EVs accelerated in the global automotive market and expansion of battery-related capital investment continued.
- Increased labor costs and labor shortages in general industries, including logistics, food, and industrial machinery, accelerated investment aimed at upgrading and automating production.
- Revenue and profits greatly increased as a result of improving production efficiency through in-house manufacturing of parts and other measures to accurately capture the expansion of overall market demand.

#### SWOT analysis of business

Strengths: Strengths of Our Business and Differentiation	
<ul> <li>Improved performance and evolving solutions through in-house production of motion control products (servo motors, drives, and controllers) that are the most important for robot performance</li> <li>Providing the cross-divisional solution based on the i<sup>3</sup>-Mechatronics concept</li> <li>Cross-business development system utilizing YASKAWA Technology Center</li> <li>Global sales, production and service bases</li> </ul>	• Strengthening adaptability to rapid changes in demand in production
Opportunities: Business Opportunities     Expansion of automation needs in a wide range of fields     Manufacturing innovation in the automotive industry (including the adoption of EVs and eco-friendly system)     Advances in robot-related technolonies	Constant Strength Strengt

#### Future initiatives based on SWOT analysis results

Further evolution of the production system which is flexible to the volume fluctuations     realized at the mother plant, and its expansion to overseas production bases	Ē,	
Corporate-wide enhancement of supply chain strategy and expansion of in-house production		
Proposing high-value-added Yaskawa solutions based on the i <sup>3</sup> -Mechatronics concept		Ð

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### Goals of mid-term business plan "Realize 25"

Work to expand the field of automation that will contribute to a sustainable society through the actual deployment of "i<sup>3</sup>-Mechatronics" solutions, and strengthen business execution capabilities by accelerating its internal implementation and realize the world's top profit structure

#### Market size and CAGR (from 2022 to 2025)

	FY2022	FY2025
Market size	Approx. 1.4 tn. JPY	Approx. 1.8 tn. JPY
CAGR	+7%	



#### "Realize 25" market outlook

Automobile	Driven by investment in EV-related businesses, steady growth in capital investment is expected
Semiconductor	Although market trends may fluctuate in the short term, stable growth is expected in the mid-to-long term
General industries	Investment continues in growth areas such as solar/ battery. Also, automation needs expands in a wide range of areas (industrial machinery, construction machinery) against the backdrop of global labor shortages.

#### FY2022 results and future initiatives

	FY2022 results	FY2023 initiatives	FY2025 goals
Development	<ul> <li>Development of MOTOMAN NEXT, a new type of autonomous robot</li> </ul>	<ul> <li>Launch of MOTOMAN NEXT and expansion of partners</li> </ul>	<ul> <li>Expansion of MOTOMAN NEXT lineup and development of business channels</li> </ul>
Production	<ul> <li>Expansion of automation and labor saving areas at the mother plant</li> </ul>	<ul> <li>Launch of new machining plant to improve internal manufacturing rate</li> <li>Global expansion of mother plant initiatives</li> </ul>	<ul> <li>Construction of integrated production system from parts to assembly as a mother factory</li> <li>Strengthen global production</li> </ul>
Sales	<ul> <li>Unlocked potential demand in the collaborative robots, EV and semiconductor markets, and proposed solutions</li> </ul>	<ul> <li>Increase orders through providing accurate solutions to collaborative robot, EV and semiconductor markets</li> </ul>	• Expand the automation fields by expanding solutions for collaborative robots, EV, and semiconductor markets

#### Topics

#### Launch of MOTOMAN-Craft that enables demonstration teaching of the robot movements

On November 15, 2022, MOTOMAN-Craft, a demonstration teaching package that enables direct teaching of human movement (demonstration) in order to roboticize the work process of subtle force adjustments and complex movements that require skill. This makes it possible to easily roboticize skilled work that is difficult to quantify and program.

For example, in the field supported by workers with high skills, such as polishing resin and metal surfaces, the skilled workers are aging, and the shortage of successors is increasing the amount of time and money spent on skills transfer and human resource development.

In addition, smooth force adjustment and skillful movements are required in these field operations, making it difficult to quantify and program techniques, and thus making it difficult to teach and utilize robots. Against this background, we developed a package that can teach human movement directly to robots, which is completely different from the previous teaching methods.



#### Example of customer introduction

#### Automation of manhole manufacturing process using robots

We manufacture and sell lifeline-related cast iron products such as manhole covers for water supply and sewage. When we were considering automating deburring operations<sup>\*1</sup> in order to solve labor shortages, we decided to introduce Yaskawa robots, which are capable of automating small quantity, high variety of production, which is our strength. After many discussions with the person from Yaskawa about "how to realize automation of a large variety of products" and "how to make the robot handle heavy frames<sup>\*2</sup> to get them shaved accurately," we realized the automation of deburring operations in 2021. We are also aiming to further improve productivity by using Yaskawa robots in the line for casting consumer products currently under construction.



Isao Etoh Executive Officer & General Manager Saga Plant HINODE, Ltd.

\*1 Scraping of unnecessary protrusions generated during metal processing \*2 A frame for covering manhole covers 03 Creating Social Value and Solving Social Issues through Business **Business Strategy** 

## System Engineering



#### Tatsuya Yamada

Senior Executive Officer General Manager, Drives Div. General Manager, Environmental Energy Business



#### Jiro Nakagawa

President & CEO Yaskawa Automation & Drives Corp.

#### **Overview of System Engineering business**

The System Engineering segment consists of the environmental energy business of Yaskawa Electric Corporation and the industrial automation drive business of Yaskawa Automation & Drives Corporation\*. In the environmental energy business, we are contributing to the expansion of the use of renewable energy through products such as PV inverter for solar power generation and generators for large-scale wind power generation. In the industrial automation drive business, we have developed system engineering technologies and electrical products that we have cultivated over many years. This contributes to the high productivity and stable operation of water treatment plants, large crane control, and industrial plants (textile, paper, film lines, etc.).

We provide total solutions with advanced system technologies and high-quality products, and contribute to building reliable social and industrial systems, comfortable lifestyles, and a sustainable society.

#### **Overview of FY2022 performance**

- · Revenue from steel plants, water and sewage systems stagnated.
- Revenue from PV inverter for solar power generation grew.
- While revenue decreased year-on-year, profits increased due to efficient business management and strict cost control.

#### SWOT analysis of business

Strengths: Strengths of Our Business and Differentiation	
<ul> <li>Power conversion technology and automation/remote technology for energy saving and high efficiency</li> <li>Ability to respond to diversified needs such as solar and large-scale wind power generation</li> <li>Achievements in the field of electric systems for water supply and sewage and system technology development capabilities</li> <li>100% domestic share of systems for blast furnaces in steel plants</li> <li>Share higher than 50% in port crane market in Japan, China and Southeast Asia</li> <li>Top-class share in Japan in the industrial electric business including film, textiles, and paper machinery</li> </ul>	<ul> <li>Improvement in cost competitiveness</li> <li>Improvement in product development speed</li> <li>Creating business synergies by integrating systems businesses</li> <li>Building optimal overseas systems for growth areas (Secondary battery and crane)</li> </ul>
Opportunities: Business Opportunities	Threats: Business Risks
<ul> <li>Accelerated efforts to achieve carbon neutrality</li> <li>The market for wind power generation grows over the medium to long term, particularly for offshore wind power.</li> <li>Increasing demand for electrification of large ships</li> <li>Need for labor-saving and high-efficiency electricity systems for water and sewage systems using IoT, AI and robots</li> <li>Increasing demand for lithium-ion battery production facilities</li> </ul>	<ul> <li>Oligopolization of wind turbine manufacturers and their in-house production</li> <li>Modification of renewable energy systems and grid interconnection regulations</li> <li>Concerns over project delays and cancellations due to rising prices of materials and procurement difficulties in building equipment and facilities</li> <li>Intensifying cost competition</li> <li>Decline in infrastructure investment in Japan</li> </ul>

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#### Future initiatives based on SWOT analysis results

Improvement of profitability through optimization of procurement, production structure and cost structure and introduction of new products
Improvement of technological capabilities and development speed utilizing YASKAWA Technology Center
Expansion of market and customer base and development of new business
System response to customer manufacturing processes to achieve carbon neutrality in the steel market
Strengthening our business structure toward secondary battery manufacturers in China and Japanese companies in the growing materials market
Capturing large-scale investment projects in port cranes in Southeast and South Asia
Securing profits by building efficient production systems and in-house production of high-value-added products (Drive panel for cranes and motor)

#### Goals of mid-term business plan "Realize 25"

Achieve stable profitability in the environmental energy business. In the steel, social systems, cranes, and industrial electric (paper, film, etc.) business, maximize added value and generate stable profits by pursuing engineering technologies to solve production issues and collaborating with customers to create system solutions to realize production innovation.



#### FY2022 results and future initiatives

	FY2022 results	FY2023 initiatives	FY2025 goals
Development	<ul> <li>Completion of development of new PV inverter</li> <li>Started development of the next integrated controller</li> <li>Completion of development and market launch of a drive panel for cranes</li> </ul>	<ul> <li>Evaluation of the integrated controller prototype</li> <li>Market launch of standard drive panels for steel market</li> </ul>	<ul> <li>Complete lineup of new PV inverter Enewell-SOL P3A models</li> <li>Complete development of integrated controller STEP1</li> <li>Complete verification of vision system for cranes at domestic ports</li> </ul>
Production	<ul> <li>Started planning to optimize procurement and strengthen production systems</li> <li>Expansion of in-house production of drive panels for industrial uses and cranes, and motors</li> </ul>	<ul> <li>Design and manufacturing CAD automatic design and modularization</li> </ul>	<ul> <li>Implementation of design and manufacturing database for efficient production of drive panels</li> </ul>
Sales	<ul> <li>Increased share in growth markets (self-consumption markets) with new products</li> <li>Expanded sales of carbon neutral systems in the steel market</li> <li>Accelerated sales expansion into globally growing markets such as harbor cranes and secondary batteries</li> </ul>	<ul> <li>Expanding sales of the new PV inverter Enewell-SOL P3A for the self-consumption market</li> <li>Co-creation of hydrogen heating and blowing technology with customers</li> <li>Completion of crane automation project</li> </ul>	<ul> <li>Acquisition of project by actual application of hydrogen blast furnace</li> <li>Acquisition of orders for Asian automated port cranes</li> </ul>