

Industrial Automation Business (IAB)

VISION

Enriching the Future for People, Industries and the Globe by Innovative-Automation

Ideas and Insights Shaping the SF2030 Vision

The Industrial Automation Business achieved record-high sales of ¥432.6 billion and record-high operating income of ¥78.1 billion in fiscal 2021, as we captured continued strong demand for semiconductors, digital equipment, EVs and rechargeable batteries, and our solutions embodying our “innovative-Automation” manufacturing concept successfully penetrated into the market. On the other hand, owing to shortages of parts and materials, especially semiconductors, and global logistics disruptions, product supply to many customers was delayed. In response to this situation, we have been implementing various measures to strengthen our product supply capabilities and will continue to accord the highest priority to supply chain reforms to enable us to respond quickly to customer needs.

At the start of SF2030, the Industrial Automation Business established the business vision “Enriching the Future for People, Industries and the Globe by Innovative-Automation” Through automation, we aim to achieve sustainable industrial development that supports a rich medical, food, and living infrastructure, while ensuring the happiness of workers and protecting the global environment.

In setting the business vision, we envisioned the social changes we would face over the next decade. We forecast an era in which changes take place at a dizzying pace and various social issues are coming to the fore. Against this market backdrop, we have identified two aspects of social issues that we should address: “working people” and “advancement of industries.”

By “working people,” we mean the changing values espoused particularly by Millennials and Generation Z, the changing mindset of workers as technology evolves, and the changing world of work. By “advancement of industries,” we mean not only innovation in manufacturing in secondary industry through cutting-edge technologies that are created one after another, but also major transformation that extends to primary and tertiary industries. The social issue we must address is how best to realize the balance of high engagement of working people and the advancement of industries, which is the strength of the Industrial Automation Business, and to contribute to the protection of the global environment, which is also a social requirement. Our goal is to contribute to the creation of a society with a rich medical, food, and living environment desired by people around the world through sustainable industrial evolution. This is a challenge only possible for us as we have supported “Monozukuri (manufacturing)” at the upstream for many years. Our ideas and insights are shaping the business vision.

To achieve the business vision, we will evolve our unique “innovative-Automation” manufacturing concept, which we proposed in 2016. By offering the industry’s broadest lineup of control devices and technologies and solutions and creating a stream of innovation to resolve social issues, we will contribute to the sophistication of manufacturing that supports a sustainable society.

Under SF 1st Stage, we aim to achieve stable business growth by resolving diversifying social issues based on the business foundation we have built to date. Specifically, we are focusing on growth domains (Digital, Environmental Mobility, Food/ House-hold daily goods, Medical Care, and Logistics) that are undergoing major changes toward a sustainable society. Behind this is the growing global momentum toward achieving the SDGs and the expanded social implementation of new innovations based on ESG-related investment. Regarding digital and environmental mobility industries, for new products created by applying technological innovations, such as 5G-related devices, next-generation displays, as well as EVs and advanced driver-assistance systems (ADAS), we will provide automation that takes manufacturing to new heights based on the high-speed, high-precision control solutions we have developed to date, while also boosting efficiency of energy use. For food and house-hold daily goods industries, we will provide solutions that contribute to reduction of food loss and waste and elimination of the use of plastic, which are pressing social issues, in addition to solutions for labor shortages. For the pharmaceuticals industry, we will propose solutions that help ensure safety and security, such as preventing counterfeit medicines, in addition to automation to address on-site labor shortages. And for the logistics industry, we will continue to offer various innovative applications that we have cultivated in manufacturing industry, centering on solutions to the serious shortage of on-site workers.

In order to achieve our business goals through the provision of such value, we will pursue three key initiatives from fiscal 2022: “evolution of innovative-Automation,” “expansion of service businesses,” and “reform of the supply chain.”

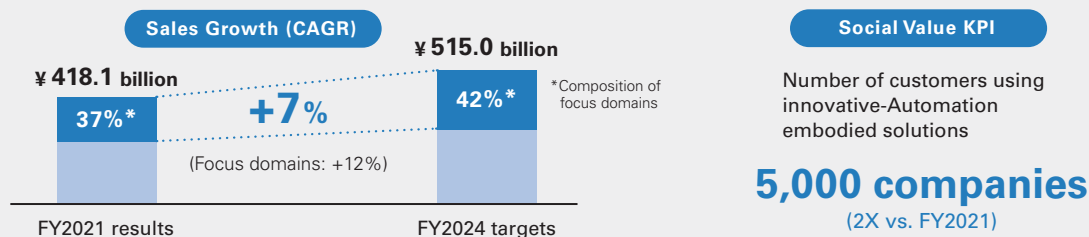


Managing Executive Officer
Company President,
Industrial Automation Company

Junta Tsujinaga

About SF 1st Stage

Targets



Focus Domains



Digital

Environmental
MobilityFoods /
House-hold GoodsMedical
Care

Logistics

Major Initiatives

1. Evolution of innovative-Automation

The environment in which manufacturing industry operates is changing dramatically, and social issues related to manufacturing are becoming increasingly grave. Labor shortages, including the aging of skilled workers and lack of successors, which became apparent during the COVID-19 pandemic, are the most critical management issue for manufacturing industry. In addition, companies are increasingly urged to respond to environmental issues and human rights issues with a sense of urgency. With the aim of resolving such social issues, we announced the evolution of “innovative-Automation” (innovative-Automation-Next) in January 2022 that effectively utilizes over 250 innovative-Automation applications we have created so far to realize manufacturing geared to near-future needs through further integration and evolution of these accumulated assets.

With the renewed concept, we are seeking new automation that realizes coexistence with the global environment as well as job satisfaction and wellbeing of workers, and moreover, contributes to sustainable industrial development while driving manufacturing innovation. Under SF 1st Stage, we will accelerate resolution of social issues through active investment in these value creation initiatives.

2. Expansion of service businesses

In addition to the pursuit of productivity and profitability of manufacturing sites, it is becoming increasingly important for our customers to engage in SDGs initiatives and address complex management issues, such as labor shortages and the achievement of job satisfaction. Addressing these issues requires a co-creative process to identify latent issues, of which customers may be unaware, through close dialogue at customers' sites. In response to the changing market environment, it is becoming important to maintain the solutions adopted by the customers and to provide support for improvement and evolution. In 2017, we launched the i-BELT service for collaborative creation with our customers through their value chains. Furthermore, we will contribute to resolving our customers' business issues by offering the optimal services through the combination of engineering services, maintenance services, education services, etc. corresponding to the customers' processes. Through collaborative creation with more customers, we aim to expand our high-value-added service business.

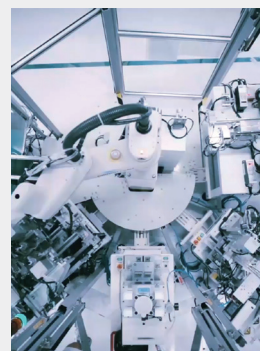
3. Reform of the supply chain

In fiscal 2021, we prioritized three measures to address the global shortage of parts and materials and disruptions of logistics. Firstly, we promoted product design changes aimed at switching to parts that are easier to procure and reducing the parts count. Through this initiative, approximately 750 product series of design changes were completed during the year. Secondly, we invested to increase production capacity of OMRON's control devices factories in China and Japan, centering on installation of new production lines and other production facilities. Thirdly, we strengthened concurrent production at multiple sites to increase the ratio of local production for local consumption by utilizing OMRON's global network of production sites. This will not only improve transportation efficiency between the places of production and the places of consumption and shorten supply lead times but also mitigate geopolitical risks and risks inherent in the geographical concentration of production sites. Already, these measures, particularly design changes, are steadily yielding results. From fiscal 2022 onward, we will continue to strengthen these measures to enhance our product supply capabilities. At the same time, by entering into new strategic partnerships with electronics manufacturing service (EMS) providers outside the OMRON Group, we will increase flexibility of production to meet rapidly changing market needs and establish a product supply system that can respond quickly to customer demand by applying reinforced parts procurement capabilities.

Economic Value and Social Value provided by Evolved “innovative-Automation”

“Autonomation beyond human abilities”

Based on the high-speed, high-precision control application technology we have cultivated to date, we are aiming at automation that allows people to engage in creative work, making full use of IoT, AI, and robotics technology, and leaving the work that was previously dependent on people to machines. For example, difficult-to-automate assembly operations and visual inspections that rely on skilled workers and human flexibility can be automated by means of applications, such as “intelligent assembly” and “AI sensory inspection,” that utilize robotic integrated controllers. To resolve labor shortages in manufacturing industry and to shift on-site personnel to high-value-added work, we will take on the challenge of completely automating tasks that only people were able to do and that were dependent on people. By realizing autonomation that truly “goes beyond human abilities,” we will pursue workplace innovation so that people can engage in creative work with peace of mind. Furthermore, by combining the energy management technologies we have developed over the years mainly for OMRON factories, we are aiming at automation that achieves both productivity and energy efficiency.



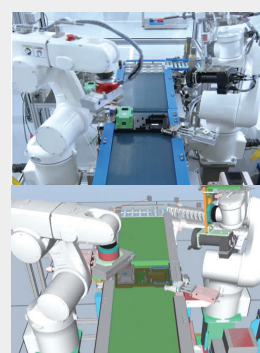
“Advanced collaboration between people and machines”

While promoting the replacement of people with machines, we will promote manufacturing innovation that makes the maximum use of human sensitivity and creativity. The Cell Line Control System (CLCS), which fully utilizes on-site data and makes full use of autonomous mobile robots and collaborative robots, has realized manufacturing sites where robots perform heavy labor and simple repetitive tasks while people and robots help each other in response to day-to-day changes at the production site. In addition, the CLCS uses information from various sensors installed across the production line, and the machines help workers become proficient so that inexperienced workers or workers transferred from another line can work smoothly and become skilled quickly. Furthermore, by incorporating cutting-edge technologies, such as 5G and AI, and utilizing on-site data including data on workers’ performance and skills, we aim to realize manufacturing sites where machines help people learn quickly and encourage them to gain new manufacturing skills, where workers experience job satisfaction and enjoy manufacturing, and productivity is enhanced.



“Digital engineering transformation”

We leverage cutting-edge digital technology to realize innovations that eliminate geographic and physical constraints on our customers’ production activities. Simulations and remote monitoring using virtual technology played a major role in the development of our products and the maintenance of our manufacturing sites when we faced restrictions on movement and access during the COVID-19 pandemic. Going forward, such on-site innovation by digital transformation (DX) will be indispensable for the sophistication of manufacturing. The 3D simulation by robotic integrated controllers, which many customers have already adopted, provides verification of operation of the entire equipment including the robot with the same accuracy as that of the actual equipment, thereby shortening the period for commissioning and start-up. Going forward, we will expand the scope of “digital engineering transformation” to our customers’ engineering activities. Using our proprietary sensing and control technologies, we will reproduce manufacturing sites and facilities in a digital space to accelerate DX at manufacturing sites and contribute to business process innovation.



Collaborative Creation with Customers to Realize Production Surpassing “Craftsmanship” using AI

At manufacturing sites, expectations are growing for the introduction of DX and the use of data to address increasingly complex manufacturing issues, such as the growing labor shortage, the pursuit of ever higher quality, and the decentralization of production due to the trend toward local production for local consumption. To solve these issues, OMRON has been offering i-BELT, an on-site data utilization service that improves manufacturing productivity and quality, since 2017. Described below is an example of how OMRON is collaborating with customers to resolve increasingly complex manufacturing issues by combining OMRON's unique control devices, such as a wealth of IoT-enabled sensors and controllers capable of collecting data with high precision, with its expertise gained through the introduction of AI technology to manufacturing sites.

At a factory of Asahi Breweries, Ltd., the designated volume of beer is filled accurately and at high speed, at 25 bottles per second, using “craftsmanship” that takes advantage of the “sleight of hand,” “sixth sense,” and experience of skilled workers. However, it took a lot of time to adjust the machine for accurate filling. Moreover, it is expected to become more difficult to pass on craftsmanship to the next generation because of the aging of skilled workers and lack of successors. Therefore, Asahi started collaborative creation with OMRON to realize sustainable manufacturing. OMRON, together with Asahi, collected more than 10 billion pieces of data on factors that affect filling volume, such as the characteristics of the 120 filling valves on a single production line, outside temperature, and differences in beer characteristics. Based on these data, through repeated analysis and trial and error, application engineers who have both knowledge of machine control and knowledge of AI implementation developed automation technology that optimally adjusts machine conditions. They achieved filling with precision that surpasses the “craftsmanship” of skilled workers. OMRON will continue to develop and propose new solutions for continuous evolution of customers' manufacturing sites and take on the challenge of manufacturing innovation together with its customers.

The filling machine that fills beer into containers is the equipment for this project.

Previously, our experienced employees had been adjusting the filling machine settings. We considered using AI technology as a means of optimizing the setting values and consulted OMRON in 2017. Since then, we have been working with OMRON. By joining forces, OMRON and Asahi overcame the numerous obstacles we faced and introduced AI technology to our factory in 2022.

As a result, AI technology has surpassed the skills of our master craftsmen. Thanks to OMRON's high technological capabilities and enthusiasm, we were able to realize practical application of AI technology at our factory.

Manager, Production Technology Center, ASAHI BREWERIES, LTD. **Koji Mima**



Innovation of Intralogistics and Production Processes by Mobile Robots

Serious labor scarcity is spreading not only to manufacturing sites but also to distribution warehouses. OMRON is working on automating the logistics in warehouses using its latest automation technology that has been refined at the manufacturing sites. Here are some examples of how we are taking on the challenge of solving social issues in a wide range of industries.

Garnet, an Italian importer and distributor, develops high-value-added business by combining a wide variety of electronic components and providing them to customers as electronic device modules. However, due to the large variety of parts and combinations used in the work process, workers were required to have a high level of proficiency. This has caused the problem of labor scarcity more serious. Therefore, Garnet decided to solve the problem through co-creation with OMRON and OMRON's partner company FasThink, which supports customers to deploy automation solutions for manufacturing industry and distribution warehouses. As a result, this partnership have realized an automated system that accurately selects and assembles parts without mistakes and shortens the lead time from order receipt. First, by introducing a combined solution of OMRON's mobile robot and FasThink's parts selection system, Garnet's manufacturing site has been able to select appropriate items from many parts without human errors and fully automate the in-house transport process. Furthermore, by making use of the robot's controller "Fleet Manager", which can be easily integrated with higher-level systems such as production management systems, Garnet's manufacturing work has been synchronized with customer orders, leading to a very convincing productivity improvement.

OMRON will continue to free workers from simple repetitive work such as transportation, creating more time for them to concentrate on high-value-added work at various sites with its automation technology.

The reason that prompted us to renew our entire process was to resolve some discrepancies between logistics and production which involved longer management times than expected.

Thanks to the combined use of OMRON mobile robotics technology and FasThink wireless & touchless Pick2Light system, it has been possible to obtain a versatile and flexible application that allows us to take a further step towards innovation in Logistics and Production processes; in fact, we have been able to implement picking quality by eliminating management system discrepancies; in this way our operators can spend less time doing activities related to products physical movement and focus more to qualified activities. Through the innovation and implementation of industry 4.0, we feel more and more ready to take up challenges that the market will reserve in the near future, and we are glad to be partner of innovative companies that use smart manufacturing technologies and industry 4.0.

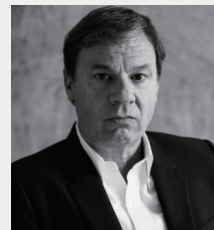
Garnet CEO **Leopoldo Iurino**



As part of the partnership with OMRON, FasThink has developed a truly innovative solution that integrates the proprietary Pick to Light technology (wireless & touchless Pick2Light system) on an OMRON mobile robotics system. The combined use of the two technologies has allowed us to create an extremely versatile, flexible and scalable application, generating a significant improvement and reduction of production time and logistics management.

A highly qualified and performing response within the reach of small and medium-sized enterprises, at Manufacturing & Logistics 4.0.

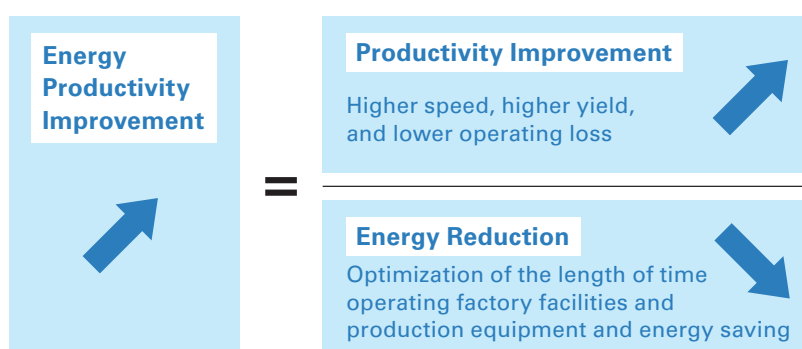
General Manager FasThink srl-OMRON certified partner **Marco Marella**



Realizing Sustainable Manufacturing that Achieves Outstanding Productivity and QCD with Reduced Energy Consumption

In recent years, amid the sharp increase in demand for manufacturing that achieves coexistence with the global environment, the Ayabe Factory, one of the main plants of OMRON's Industrial Automation Business, has been working for more than a decade to achieve both outstanding quality, cost, and delivery (QCD) of manufacturing and protection of the global environment. In recognition of its efforts, the Ayabe Factory received the Minister of Economy, Trade and Industry Award of the Energy Conservation Grand Prize in 2013. The Ayabe Factory has been continuing its initiatives and made progress. Here are some examples.

Firstly, the Ayabe Factory's efforts to reduce energy consumption extend to production equipment and control methods. Many manufacturing companies have begun implementing measures to save energy in lighting, air conditioning, and other facilities as they endeavor to decarbonize their factories. However, measures to enhance energy efficiency of production facilities, which account for 70% of the total energy consumption of factories, have tended to be put off due to concerns about the impact on quality and productivity. In response to this issue, the Ayabe Factory has vigorously introduced innovative applications that embody the innovative-Automation concept and has achieved quality and productivity improvement and energy efficiency. Secondly, the Ayabe Factory has introduced the concept of "energy productivity," which is an indicator with energy consumption as the denominator and value added as the numerator. Hence, the idea is not to merely reduce energy consumption. Smart utilization of the time generated by improved productivity, which is the numerator, and facilities, will directly lead to reduced energy consumption.



The Ayabe Factory manufactures 20,000 different specifications of products in variable volumes. For example, the assembly process for sensors, a typical product of the Ayabe Factory, was converted to a mixed-flow line and automated using collaborative robots. This resulted in a 25% increase in productivity, leading to greater output per unit of energy consumed, as well as a decrease in energy consumption due to more efficient use of space.

As a result of these initiatives, over the 10-year period from 2010 to 2021, power consumption on production lines of the Ayabe Factory has been reduced by approximately 15% although shipments from the Ayabe Factory have increased by more than 35% in value terms.

At OMRON, we believe that the people who work at manufacturing sites must be the primary focus of our decarbonization initiatives. Specifically, the energy management system developed at the Ayabe Factory, which we call "Environment-ANDON," provides necessary information in real time corresponding to the roles of workers at the manufacturing site. Based on daily on-site improvement actions and their progress, OMRON considers ways to improve innovative-Automation solutions every day. As a result, in addition to the basic patents related to energy visualization, OMRON has obtained more than 10 patents for energy control technologies that also relate to production facilities and control methods. We use these technologies not only for improvement of "energy productivity" of OMRON factories but also have started external sales to our customers as the i-BELT service. For manufacturing in harmony with the global environment, OMRON will continue to set the pace, considering it a corporate social responsibility as we have long supported the core field of manufacturing industry.



Message of Ayabe Factory Manager

Manufacturing workplaces are in a period of drastic change. In addition to longer time required for procurement due to shortages of semiconductors and other parts and materials, soaring costs of materials, and the COVID-19 pandemic, there are numerous other issues, such as a decline in the number of workers engaged in manufacturing, including skilled workers, and labor shortages, to cite just a few. Moreover, capital investment and technological development to achieve carbon neutrality are becoming essential in manufacturing industry, too, in response to growing international momentum toward carbon neutrality. In these circumstances, the Ayabe Factory will further evolve innovative-Automation and will lead the realization of sustainable manufacturing with the aim of achieving both outstanding QCD in manufacturing and protection of the global environment, which are goals that we have been pursuing for more than a decade.

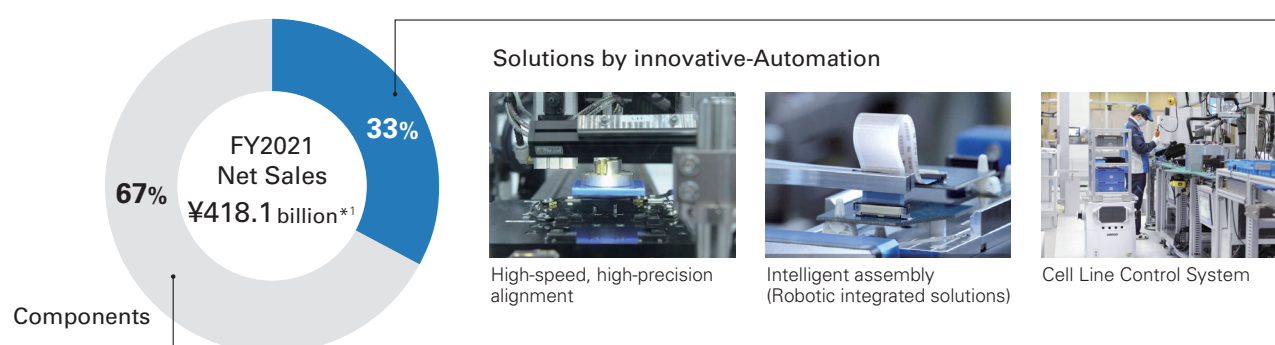


Ayabe Factory Manager
Tatsuya Benkan

Fiscal 2021 Business Highlights

In fiscal 2021, demand for capital investment rose in manufacturing industry in all areas of the world. Demand for secondary batteries and semiconductor-related capital investment in digital industry expanded, particularly in Greater China, Asia, and the Americas, and demand among Japanese equipment manufacturers also increased. At the same time, demand for capital investment related to electric vehicles continued to increase in the automotive industry. The food and house-hold goods industry experienced firm demand, mainly for packaging machines. We accurately captured these rising demands through solution proposal-based sales, which we have strengthened over time, while also engaging in production increases, etc. As a result, net sales significantly grew year on year, reaching a record high. Operating income significantly increased year on year, reaching a record high, mainly due to the large increase in sales. As a result, net sales for fiscal 2021 totaled ¥418.1 billion, an increase of 24.6% compared with the previous fiscal year, and operating income totaled ¥76.3 billion, an increase of 33.4%*¹ compared with the previous fiscal year.

Sales Composition by Business Domains



Strengths of the Industrial Automation Business (IAB)

- “innovative-Automation” concept for innovation in manufacturing
- Unique automation technology that combines cutting-edge technologies such as AI/IoT/robotics with control technology for factory automation
- The industry’s broadest product lineup (ILOR+S), covering a wide range of manufacturing sites
- More than 250 innovative applications that embody the innovative-Automation concept
- Globally, 1,600 application engineers who implement applications for customers’ manufacturing sites
- Automation Centers (ATC) (37 locations worldwide) to create solutions to customer issues
- Wealth of knowledge to support the i-BELT on-site data utilization service

INPUT

- Growth investment*²: Total ¥2.5 billion
- R&D cost: Total ¥22.6 billion
- Capital expenditure: Total ¥7.0 billion (Results for FY2021)
- Evolution of the innovative-Automation concept for innovation in manufacturing (January 2022)
- Increased the number of application engineers (30 more than in the previous fiscal year)
- Reopened ATC-KUSATSU and established 5G PoC. (January 2022)
- Invested in Techman Robot Inc., the world’s second largest manufacturer of collaborative robots (December 2021)

OUTPUT

- Net sales: ¥418.1 billion (+24.6% YoY)
- Operating income: ¥76.3 billion (+33.4% YoY)*¹
- Orders received for FY2021: +55% YoY
- Sales of the solutions business as a proportion of total sales of IAB: 33% (+5.0 percentage points YoY)
- Created innovative applications (approx. 1.5 times more from the previous year)
- Strengthened product supply capability to support business growth

OUTCOME

Contributed to economic development by enhancing social productivity through innovative-Automation



SDGs 8.2.1



SDGs 9.2.1



SDGs 17.16

*¹ Some products in the Industrial Automation Business have been reclassified to the Device & Module Solutions Business. *² Including M&A