

Industrial Automation Business (IAB)

Domains

Factory Automation

Corresponding SDGs



With the vision to “Bring innovation to manufacturing by automation to enrich lives of people all over the world,” the Industrial Automation Business leverages OMRON technologies to generate innovations in manufacturing with a focus on automation. These innovations contribute to productivity advancements in the global manufacturing industry. We aim for a world where people everywhere are enriched by innovations at our customers’ manufacturing sites, with our technologies and solutions across a wide range of products at the top level in the industry, with our unique “innovative-Automation” concept.



Managing Executive Officer
Company President,
Industrial Automation Business Company

Junta Tsujinaga

VG2.0 Focusing on Innovation in Manufacturing

The environment surrounding the manufacturing industry is changing significantly. Changes are seen in “what to make,” “how to make,” “where to make,” and “who is making” as represented by increasingly advanced products, local production and consumption, and one-piece manufacturing, as well as seeds represented by artificial intelligence (AI), Internet of Things (IoT), robotics and other technological innovations. OMRON has been keeping up with these changes and aiming for advanced manufacturing with the unique value generation concept “innovative-Automation” since 2016, in order to solve issues facing manufacturing sites.

OMRON’s innovative-Automation has three pillars: “integrated (evolution in control),” “intelligent (development of intelligence),” and “interactive (new harmonization between humans and machines).”

With these three i’s as keywords, we have generated innovative control applications by integrating the extensive ILOR+S* product range with over 200,000 items, including software and services. We have created over 200 control applications in the past four years,

contributing to innovation at many customers’ manufacturing sites.

In terms of evolution in control, we are focusing on issues such as the aging of skilled engineers and a lack of successors to create control applications for work requiring ultra-high speed and precision, reproducing the “craftsmanship” of skilled engineers. Some of these applications wind film products with high speed and accuracy or laminate sheet products with high precision. These new applications properly respond to customers’ needs in digital industry, which change with greater performance of products (such as rechargeable batteries) or manufacturing methods. In the course of developing intelligence, we have created advanced applications that utilize information at manufacturing sites by adopting IoT or AI technology for control devices. Applications that predict product failures and equipment abnormality utilizing AI-based controllers and “sensory inspection” applications using AI-based vision systems that can detect defects beyond the five senses contribute to development of self-learning machines and no-failure production processes, respectively. The i-BELT co-creative data service is also highly regarded by customers for solving their issues through the collection and visualization of on-site data and data analysis in co-creative projects with customers. Further, in the context of pursuing new harmonization between humans and machines, we have realized new automations where workers and machines can collaborate by drawing out each other’s characteristics, utilizing autonomous mobile robots (AMRs) and collaborative robots. For example, the Mobile Manipulator (MoMa) mobile working robot, a combination of a mobile robot and a collaborative robot, contributes to flexible manufacturing that changes production lines depending on what to make.

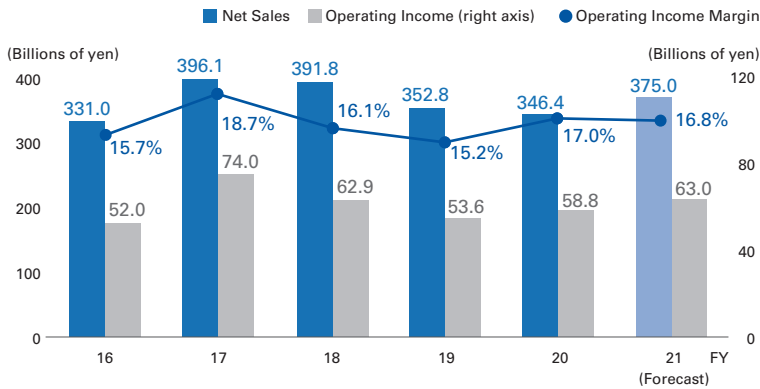
As mentioned above, we have developed products that enhance ILOR+S and implemented M&A alliances by focusing on developing applications that promote innovations for manufacturing sites with innovative Automation. We have also expanded infrastructure and human resources that help customers solve their issues. The number of Automation Centers (ATC) that reproduce manufacturing site devices and production lines with actual machine models, using applications created by combining the latest technologies and products, increased to 37 last year. ATCs welcome thousands of visitors every year, as Collaborative Creation sites where we verify and demonstrate solutions for manufacturing issues and create new applications with customers. Further, we have increased the number of sales engineers (SEs) with expertise in OMRON’s control technology and products and manufacturing site experience, strengthening their technology consultation capabilities for proposing applications and new solutions unique to each

customer. Currently, over 1,000 SEs are working on solving challenging new issues at customers' manufacturing sites.

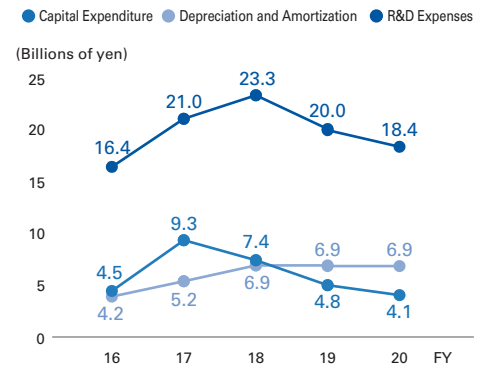
* ILOR+S is an abbreviation for Input (input devices such as sensors), Logic (control devices such as controllers), Output (output devices such as motors), Robot, and Safety (safety devices to ensure the safety of equipment)

Business Highlights

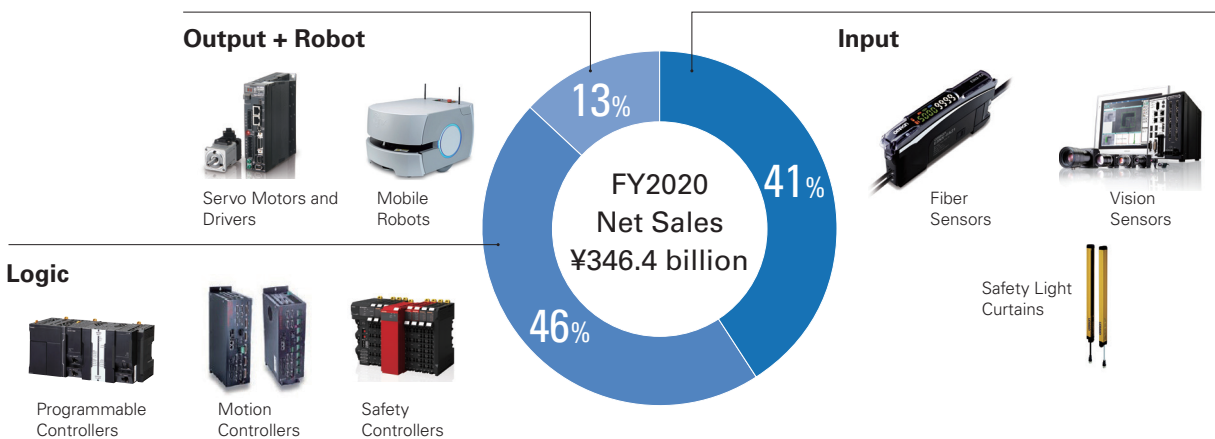
Net Sales / Operating Income / Operating Income Margin



Capital Expenditures / Depreciation and Amortization / R&D Expenses



Sales by Product



Social Issues to be Solved

- Labor shortages (shrinking labor force in developed countries and lack of skilled workers in emerging economies)
- Handling increasingly advanced and diversified manufacturing processes

VG2.0 Goals

- Developing new products to realize innovative Automation in the four focused industries (control technology for manufacturing innovation)

Actual Progress during VG2.0

INPUT

- R&D cost: Total ¥82.7 billion
 - Capital expenditure: Total ¥25.7 billion
 - Growth investment: Total ¥20.5 billion
- (Actual for FY2017 through FY2020)

OUTPUT

- Profitability improvements by value-added solutions, with GP ratio up 1.0 pt (vs FY2016)
- Deployed over 200 control applications that realize manufacturing innovation at manufacturing sites
- Strengthened product portfolio for innovative Automation improvement
 - M&A: Industrial code readers, industrial cameras
 - New products: Over 50 products such as robotic integrated controllers and AI-based vision systems (doubled from previous year)
- Official launch of co-creative on-site data solution business by i-BELT
- Increased number of sales engineers to embody control applications at customers' manufacturing sites (over 1,000 around the world)
- Increased number of Automation Centers around the world to 37 (was 8 as of 2016)
- Expanded business foundation into essential areas, such as mask manufacturing, medical and pharmaceutical industry
- Expanded production capacity for scaling up business (investment in second plant in Shanghai, China, etc.)

OUTCOME

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



SDGs 8.2.1



SDGs 9.2.1



SDGs 17.16

Contributing to Solving New Social Issues under the COVID-19 Pandemic

Under our policy that OMRON bears a social responsibility to support manufacturing sites around the world as a company that has been involved in a core field of the manufacturing industry, we started to address COVID-19 pandemic immediately as well.

The outbreak of COVID-19 caused lockdowns and travel restrictions, leading to confusion not only for the manufacturing industry but also for various social infrastructures. Our Industrial Automation Business has been independently taking actions for this situation in order to solve various social issues caused by COVID-19 around the world. For example, we supported urgent production increases and the start-up of new production lines by proposing automation applications including industrial robots for worldwide shortages of masks, ventilators, and medicines. For hospitals and medical institutions busy with taking care of infected patients, we have contributed to automating labor-intensive sanitizing processes by developing mobile sterilization robots with UV lights and applications that automate the sanitization of medical equipment, collaborating with system integrators as partners. Also, for production of foods and daily necessities, which has become more serious due to the worsening lack of workforce under COVID-19, we have helped maintain production of consumables by deploying applications of collaborative robots that can work with workers.

We also started working on development of products to promote digital transformation (DX) globally, which was adopted to manufacturing sites earlier than planned due to the pandemic. Our robotic integrated controllers, which had their worldwide launch in July 2020, automate advanced and complex work that only skilled workers could do by seamlessly integrating robots and peripheral devices, as well as realizing remote engineering by precisely simulating technology in the real and virtual worlds. While travel restrictions are in place and access to production sites is limited all over the world due to COVID-19, this remote engineering has enabled us to commission production equipment and conduct maintenance remotely. For the new issue of travel restrictions, we have enabled remote performance of checks that were done by production engineers and maintenance personnel onsite, reducing workloads by over 50% for processes like equipment start-up and maintenance. Also, with online factory tours and virtual ATC tours, we have been contributing to customers' continuous production activities by strengthening global consultation activities by our SEs and sales teams utilizing our digitalized infrastructure.

OMRON has deployed these applications in our own factories and utilizes them for maintaining production activities amid the COVID-19 crisis. The OMRON Shanghai manufacturing site improved workers' work efficiency and realized unified production and quality by machines supporting workers with data, after adopting the Cell Line Control System (CLCS), an intelligent production line where workers and machines work together utilizing on-site data. As a result of addressing new social issues due to COVID-19 crisis, we were able to contribute to continued production activities in the global manufacturing industry.



Manufacturing floor where humans and machines work in harmony



Mobile robot equipped with UV light irradiator to prevent infection



Mobile robots that transport medical waste at hospitals in Finland

Industrial Automation Business in the Post-COVID World

While production and social activities under COVID-19 become the new normal, changes in the market and society have been accelerating globally towards the post-COVID world. This shift includes acceleration of green recovery actions including increased use of electric vehicles (EVs) and renewable energy and shifts to eco-friendly materials. This will also drive changes to infrastructure for realizing a digital society, represented by increased demand for semiconductors, 5G and DX. OMRON views these changes as significant business opportunities for our IAB business and is preparing to respond to various market needs based on technologies and products developed during VG2.0 and many control applications that embody innovative Automation.

As COVID-19 has significantly changed people's lifestyles, ways of working, and values, the post-pandemic manufacturing industry will not simply go back to what it was before COVID-19. Social issues such as aging of skilled engineers, lack of successors, and shortage of workforce are further accelerating, along with increased market needs for new automation. Amid these challenges, OMRON is further driving DX in manufacturing. For example, we joined Nokia's Local 5G Technology Partnership to develop solutions that utilize 5G, collaborating with other partner companies as well. We are also working on realizing automated solutions that can respond to the growing need to shift from a centralized production structure to region-based diversified and close-to-consumption production as quickly as possible. Examples include CLCS that utilizes mobile robots and collaborative robots modularize production equipment, aiming for production lines that can be started up in short periods of time according to what to make or manufacturing locations.

Issues of manufacturing quality are becoming more serious due to the aging of skilled engineers and lack of production engineers, along with higher demands for quality from markets and consumers. Our "i-BELT" service, with advanced AI technology, can help manufacturers to continuously maintain and improve manufacturing quality, turning skilled engineers' know-how into reusable assets.

For the globally increasing green recovery, we have started developing new solutions in various fields by collaborating with customers. To combat marine pollution due to plastic waste, we are participating in initiatives to change packaging materials to renewable biodegradable plastic in partnership with food and consumable manufacturers and machine manufacturers. We have also been contributing to the growth of green energy use by developing durable, high-quality parts in collaboration with manufacturers of key parts for wind power generator manufacturers. OMRON will continue these initiatives that enrich lives of people all over the world by innovating manufacturing with automation, in response to various post-COVID market changes.

Innovations in Manufacturing by innovative-Automation

intelligent
Development of intelligence

integrated
Evolution in control

interactive
New harmonization between humans and machines

i-Automation!
Driving innovation in manufacturing with three i's

- Sensory inspection to automate visual inspection relying on human's senses**
- Equipment failure prevention to predict equipment failures with AI**
- Non-stop high-precision alignment systems to position parts moving at high speed at the micron level**
- Robotic integrated solutions to precisely synchronize industrial robots, machines, and peripheral devices**
- High-speed 3D picking machines to automate picking of bulk parts by robots**
- AI-based tightening inspection to predict and correct screw tightening variance in real time**
- "Cell Line Control System" where workers and machines collaborate and machines support unskilled workers with data**
- Flexible cell line where mobile robots carry parts and products**

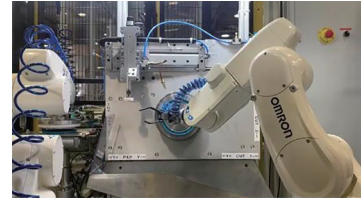
integrated (evolution in control)

Improvement of the Engineering Experience on a New Architecture - Integrated Solution for All Machine and Robot Control, an All-in-one Platform

Trelleborg Sealing Solutions is a leading global supplier of sealing solutions. With their wide range of patented product designs for static and dynamic sealing systems, Trelleborg's Livorno Plant in Italy provides high-quality thermoplastic polyurethane (TPU) sealing solutions for a wide range of hydraulic and pneumatic applications, along with accessories.

To support rising demand for green energy resources as well as favorable government policies to encourage renewable energy, Trelleborg decided to increase production of polyurethane parts for wind power generator turbines and needed to add flexibility in manufacturing to support various type of products. Their wish was to reduce the time for setting and programming a new trimming machine that comes with two robots for seals finishing and can be operated on a single platform.

Trelleborg then employed an OMRON-proprietary robotic integrated controller, which can enable real-time synchronization between all relevant equipment, including robots, vision sensors, drives, and safety devices, facilitate easy programming for in-house technicians, improve the speed and accuracy of production, simulate the entire production line, streamline maintenance, and reduce time to market. As a result, Trelleborg has shortened its cycle time by 30%, leading to speedy delivery. With the new architecture, the production engineering team can build the machine in a shorter time, streamlining a formerly time-taking and complex task. With its unique combination of robots, software and integrated control architecture, OMRON will continue challenging to meet today's social issues as well as expanding green energy with our customers.



Two OMRON robots shaping blue polyurethane circle parts

As a world leader in engineered polymer solutions that seal, damp, and protect critical applications in demanding environments, our innovative solutions accelerate performance for customers sustainably and support environment-friendly activities. With OMRON as our partner, we were able to satisfy a sudden demand increase for several applications in the fluid power, agriculture and energy segments. For this project, we expect a pay-back period of about two years, with future plans to develop and introduce three more machines in the coming three years. It is also interesting to look at further possibilities, as OMRON's product portfolio can cover the whole production process such as machine tending by collaborative robots and intralogistics with mobile robots. I am excited to take manufacturing to the next level with OMRON and to contribute to a more sustainable society.

TRELLEBORG



Machinery and Energy Supervisor Trelleborg Sealing Solutions Livorno

David Caluri

integrated (evolution in control)

OMRON's Perfect Sealing Technology Solution to Drive Sustainable Manufacturing

Plastic containers may be convenient, but they are detrimental to the environment, causing environmental pollution and risking harm to marine and terrestrial life with the resultant microplastics. To avoid these tragedies and achieve a sustainable society, many companies, especially in food and commodity industries in Europe, are taking on the challenge of making products with other recyclable or eco-friendly materials to use less plastic.

OMRON supports this challenge of sustainability with our Perfect Sealing technology. Unlike conventional virgin plastics, recycled materials tend to be more vulnerable to heat and require higher precision in handling for production. Thus, drawing on high-precision temperature control technology that has been refined in other industries, such as semiconductors, OMRON achieved a solution to monitor the machine's speed and the pressure and temperature being applied to the sealing process. This enables a new recyclable paper-based film to be formed as planned.

As a result of improved product quality, our customers have been shifting to eco-friendly manufacturing with our products at an unexpectedly high pace. With our customers, OMRON will continue to lead the movement of sustainable business and manufacturing globally, driving superior business performance for customers and a better society for all.

Employee Comments

The project was not without its challenges along the way. We required multiple sources of support from OMRON businesses globally and coordination from different OMRON departments. However, with our passion for contributing to solving marine plastic waste problems, the teamwork and attention to detail shown by OMRON members around the world led us to success in this project. I am extremely proud of the team members supporting this project and multiple installations around the world. The accomplishment was also awarded the gold prize at TOGA for FY2020 as an outstanding example of OMRON Corporate Principles practice out of 6,461 entries. The next challenge is to secure our Perfect Sealing specifications, locking this solution into the DNA of the customer's ongoing advances in digital manufacturing.



Global Account Manager Industrial Solutions, OMRON Electronics Ltd.

Allan Gibbons

intelligent (development of intelligence)

Realizing evolving manufacturing sites through Collaborative Creation with customers

Today, society is transforming with focus shifting from things to experiences and services. Ahead of this shift, OMRON has been providing an on-site data utilization service “i-BELT” that improves productivities and qualities of manufacturing since 2017. With the i-BELT service, OMRON combines customers’ knowledge with our unique know-how in control devices and software that we have accumulated as a company well-versed in front-line manufacturing operations, thereby taking on various field tasks. Kaneka Corporation, which provides solutions to various social challenges with its cutting-edge technology based on chemical material development, had been working on solving errors in transporting materials in the production of high-performance film. In order to minimize operational losses due to the film transporting errors, OMRON started collaborating with the customer by providing the i-BELT service in February 2020. First, we tried to identify causes of the errors in the relevant process by using the vibration measurement system. This system can collect and monitor various data via multiple sensors installed within the production line. Together with Kaneka, we strived to build a framework to visualize the production line, while repeatedly verifying hypotheses on causes and signs of transporting issues through continuously analyzing collected data. As a result of verifications, the abnormal signs monitoring system was created, which can detect abnormality in the film production line, based on waveform data of the sensors. With this monitoring system, even less experienced workers can check changes in the film production status, succeeding in suppressing errors. In order to realize evolving manufacturing sites, we contribute to innovation in manufacturing with proposals for process visualization and solutions to challenges our customers are facing.

At Shiga Manufacturing Site, Kaneka continues activities for improvement on a daily basis to pursue the purpose of providing reasonable and high-quality products safely. In this task to stabilize film transporting, we made most strenuous efforts to quantify operators’ sensory information among others. The quantification has been established by sensing and data analysis with OMRON, and the improvement has been made steadily. I am impressed by OMRON’s approach where their engineers always make discussions together with our engineers based on i-BELT data analysis before employing a new solution. As a result of these efforts, we were able to address challenges as a team beyond the company, and reduce transporting errors with satisfaction. I am looking forward to tackling new challenges together with OMRON in the future.

kaneka



Manager of AI & Digital Platform Center Shiga Manufacturing Site Kaneka Corporation
Koji Hanada

interactive (new harmonization between humans and machines)

Automating Small Waste Logistics in Finnish Hospital with Mobile Robots

Labor shortages have long been a major problem in social welfare and medical fields globally, especially in Finland. With the spread of COVID-19, this problem has become a serious social issue. According to a survey conducted by the Finnish hospital union, the majority of nurses are considering leaving the medical field.

Under these circumstances, OMRON has collaborated with a major hospital, universities, and the partner system integrator Dimalog Oy Ltd. to develop a medical waste transport automation system using mobile robots, which are usually used in factories. In this project, the team focused on the daily work of hospitals that does not require human-to-human interaction and could use robotics and IT technology, and they aimed for a state in which robots take on this routine work on a daily basis. The pilot experiment was conducted to automatically transport the waste generated in the hospital’s clinical chemistry laboratory to the waste collection center in the basement of the hospital. To automate waste transportation, OMRON worked with Dimalog to develop a control system for mobile robots to transport waste on request using a button or according to a schedule, while optimizing the mobile robots’ travel route.

OMRON will continue to contribute to labor saving in hospital operations, starting from the development of disinfecting robots mounted with a UV light irradiator to prevent the spread of infection, automated hospital floor cleaning, automated medical waste transportation, and other solutions to address new social issues in the medical field caused by the COVID-19 pandemic.

Conducting the pilot experiment during the COVID-19 pandemic was a unique challenge, but it was also an interesting opportunity to witness how OMRON’s autonomous robot technology can easily handle simple hospital transport tasks and enable the human staff to focus on more critical work amid the pandemic. The test gave us a lot of ideas and insight into how the future of hospital environments can be shaped by robots and smart technology. All participants in the trial were impressed by the results and we are currently discussing several future robot tests and projects for the Finnish health care sector.

Dimalog



CTO, Dimalog Oy Ltd
Teemu Kytömäki