FANUC NEWS 2023- I

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TOPICS

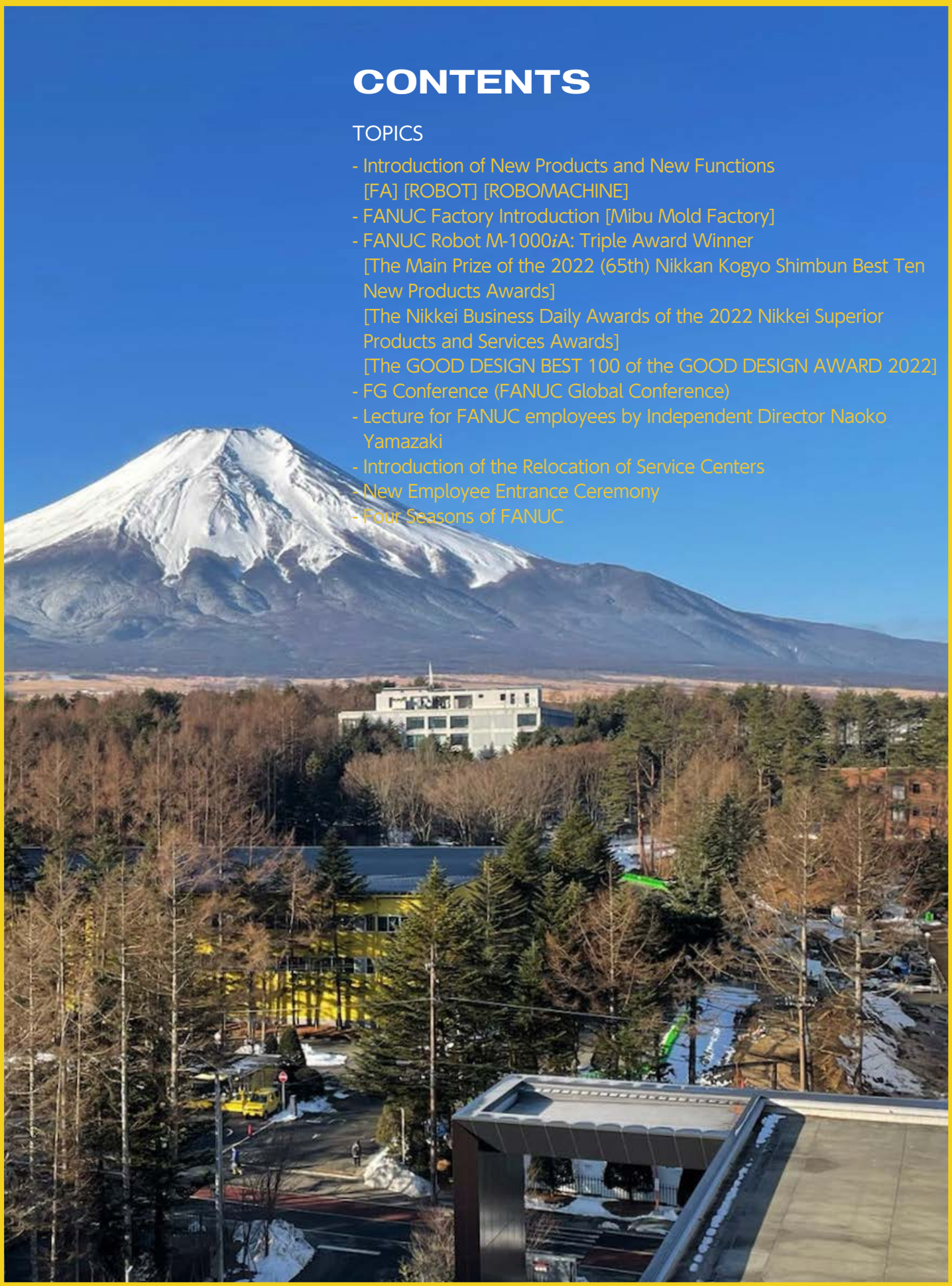


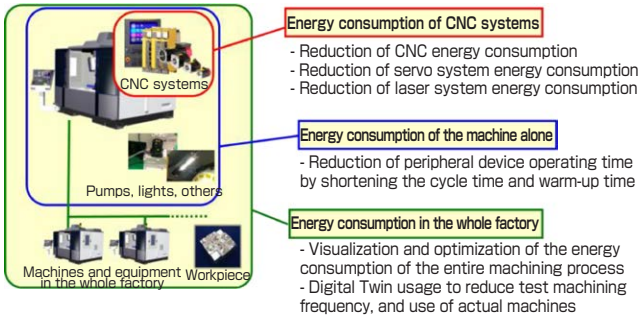
Photo taken in February 2023

Introduction of New Products and New Functions

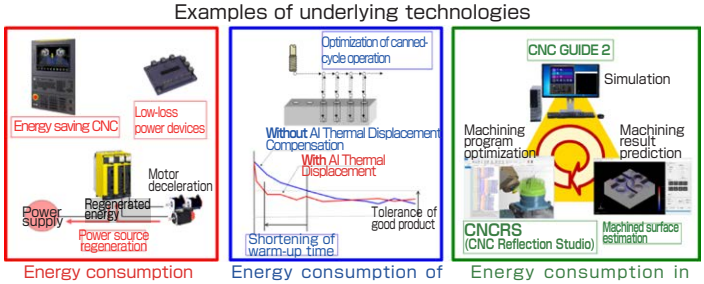
■ Approaches to energy saving

FANUC has been taking three approaches dedicated to the energy saving of machine tools.
The first approach is to reduce the energy consumption of the CNC systems themselves, which means reducing the energy consumption of the products offered by FANUC.
The second approach is to reduce the energy consumption of the machine from the perspective of the machine as a single entity. In general, machines are connected to various peripheral devices in addition to CNC systems. The energy consumption of peripheral devices is proportional to the operating time of the machine. FANUC has been developing functions to shorten the operating time of the machine itself in order to reduce its energy consumption, which will lead to lesser energy consumption of peripheral devices.
The third approach is to reduce the energy consumption in the whole factory.
FANUC provides means to visualize the energy consumption of each machine to optimize processes throughout the factory.
In addition, as reducing machine operations for test machining leads to energy saving, FANUC uses Digital Twin to evaluate machining, which eliminates the need to use actual machines.

Three approaches to reducing the energy consumption of machine tools



Examples of underlying technologies



Energy consumption of CNC systems | Energy consumption of the machine alone | Energy consumption in the whole factory

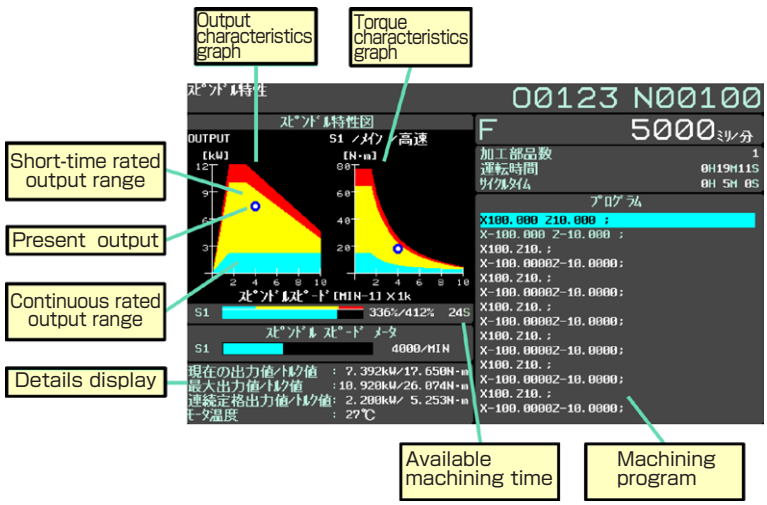
FA New Function: Improved power consumption monitor

FANUC provides a power consumption monitor as a means to enable a CNC system to display its power consumption. Improvements have been made so that the screen can be used to check not only the power consumption of the feed and main axes along with regenerative power data, but also the power consumption of peripheral devices. CO2 emission equivalence can also be calculated and confirmed. In addition, the power consumption status for each machining program can be checked on screen in chronological order as well as the power consumption history, thus offering clues on how to reduce power consumption.
Power consumption data can be retrieved by the PMC window or FOCAS2 functions to create original applications.

■ Improved Smart Load Meter

FA New Function: Display of spindle motor characteristics graphs

The Smart Load Meter (bar-graph type) has been available as a function to assist in continuous operation while making maximum use of spindle performance.
This function can now display output and torque characteristics graphs so that the output area that is driving the motor can easily be identified.
This simplifies the monitoring of loads during cutting, by displaying the present output and torque values along with the machining program, available machining time, motor temperature, and rotation speed. As such, machining can be performed with optimum spindle performance. By referencing the data in the output and torque characteristics graphs, machining conditions for high-load cutting, such as rough machining, can be improved to reduce the cycle time.



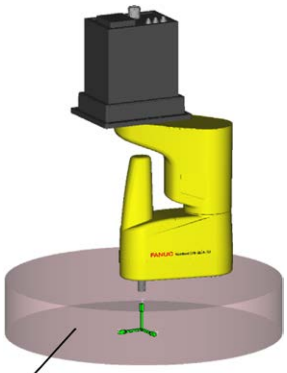
ROBOT New Product: FANUC Robot SR-3*i*A/U

FANUC has developed and started sales of the ceiling-mounted SCARA robot SR-3*i*A/U (3kg payload, 350 mm reach).

- This robot's greatest advantage is having a "no dead zone," meaning that there is nowhere within the arm's reach which is inaccessible by the arm's tip. As a ceiling-mounted robot has a work envelope directly underneath, there is no need to consider floor space for installation.
- The distance from the ceiling where the robot is mounted to the tip of the arm can be as short as 440 mm when the robot is at the top of the vertical axis. Its low height allows the entire system to be compact.
- The SR-3iA/U is optimal for transporting small parts between production lines and for assembly in small spaces.
- Another model has solenoid air valves built into the arm, which facilitates the production of systems that use air-driven devices.
- By specifying bellows that protect the vertical axis of the arm tip, and a gasket for the arm cover, which are both options, the robot can conform to the waterproof and dustproof IP65 standard.

SR-3*i*A/U helps to enhance customers' productivity through its compact body and agile movements.

FANUC Robot SR-3*i*A/U



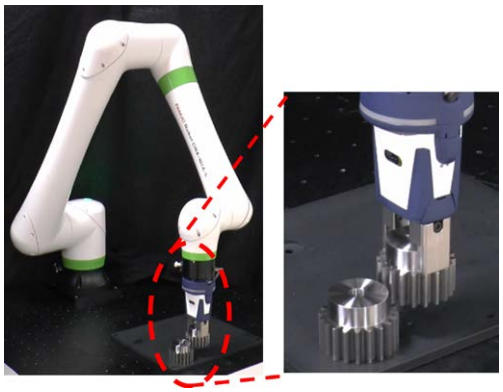
Work envelope of SR-3*i*A/U

ROBOT New Function: Easy force control of the collaborative robot CRX

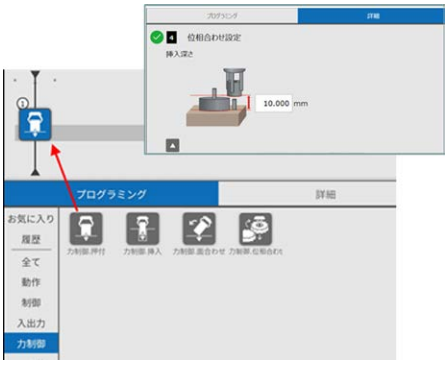
FANUC has developed and started sales of a force control function for the collaborative robot CRX that enables the robot to insert, and contour to polish workpieces.

- The function is achieved using only the built-in sensors of the CRX collaborative robot series without any external force sensors.
- The force control function can be used for pushing, inserting, phase matching, screw tightening, contouring (polishing and deburring), surface matching, centering by a lathe chuck, among others.
- The easy-to-understand icon-based user interface, and manual guided teaching function with which robots can be taught by directly moving the robot by hand, allows force control programs to be created easily.
- Even during force control, robots stop safely just by coming into contact.
- The force control function using built-in sensors can be used in all models of the CRX series (CRX-5*i*A, CRX-10*i*A, CRX-10*i*A/L, CRX-20*i*A/L, and CRX-25*i*A).
- For even more advanced force control, external force sensors can be added to the CRX series.

With the introduction of the easy-to-use force control function to the CRX series, FANUC has expanded the capabilities of collaborative robots, thus enhancing productivity. FANUC is available for consultation when customers consider using automation.



Gear insertion using the force control function



Easy teaching using force control icons

ROBOMACHINE New Product: ROBOSHOT α-S450*i*B

The ROBOSHOT α-S*i*B series, which is the latest series in FANUC's electric injection molding machine lineup, has a new addition: α-S450*i*B with a clamping force of 450 tons.

- To meet a wider range of needs for moldings, the variations of available injection units has increased from two to four types; large capacity, standard capacity, small capacity, and ultra small capacity. Customers can choose the most suitable injection unit for their molding requirements.
- Like the previous model, the large capacity injection unit can have a screw diameter of Φ100 which is the largest in its class. Combined with the largest tie bar spacing in its class, demands for larger molds in the food and automotive industries can be satisfied, such as for producing food containers and automobile parts.
- The ultra small capacity injection unit can be equipped with a screw diameter of Φ40, which is the minimum possible. It is the perfect choice for molding multiple small parts using a large mold and for medical parts that require precise and superior molding repeatability.
- The combination with the built-in large 21.5 inch display unit, PANEL *i*H Pro, has enhanced ease-of-use. This display unit allows intuitive operation such as by swipe and multi-touch.

The expanded α-S*i*B series supports a wider range of applications, thus enhancing molding plant productivity.

Maximum clamp tonnage [kN]	4500 (450tonf)
Mold height (min/max) [mm]	1000 / 350
Tie bar spacing (w x h) [mm]	920 × 920

Injection specifications	Available screw diameter
Large capacity	Φ 68 – Φ 100
Standard capacity	Φ 64 - Φ 80
Small capacity	Φ 44 – Φ 72
Ultra small capacity	Φ 40 – Φ 56

ROBOMACHINE New Function: ROBOSHOT-LINK*i*2 Maintenance Support Function

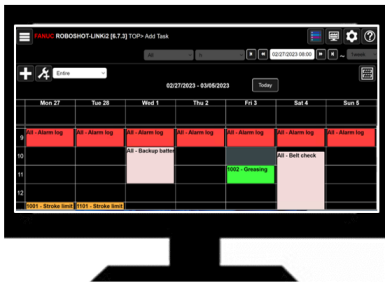
ROBOSHOT-LINK*i*2, a quality information management system for molding plants, has an additional function to support maintenance and inspection work for ROBOSHOT.

- Maintenance tasks and inspection dates can be scheduled on the calendar screen of ROBOSHOT-LINK*i*2. Items to be inspected periodically which are described in the ROBOSHOT maintenance manual, are registered by default to facilitate online management of periodic inspections.
- Inspection dates will be notified in the form of alarms on the screen of a PC or tablet according to the registered information.
- Procedures and items to be checked for inspection work can be confirmed on a tablet. The ROBOSHOT maintenance manual can be referenced as a work procedure manual. It is also possible to register customer-specific inspection items and work procedures, as well as referencing them during inspection work.
- Inspection results can be entered and recorded on a tablet. Photographs of the inspected object can also be taken to record the details of inspections as images.

With the Maintenance Support Function, scheduling to the execution of inspection work can be managed online, contributing to the digital transformation of molding plants.

Scheduling of inspection dates

- Maintenance tasks and inspection dates are registered on the calendar screen



Confirmation of work procedures

- Work procedures are displayed on a tablet
- Inspection results are entered (photos can also be saved)

FANUC Factory Introduction

Mibu Mold Factory

FANUC's mold factories (in Headquarters and Mibu) produce resin moldings used in FANUC products. The Mibu Mold Factory was completed in June 2016 and began production in April 2017. Initially, the Factory produced resin moldings for products manufactured in Mibu. Presently, 39 injection molding machines in the tonnage range from 50 to 550 tons are installed to produce resin moldings for all factories, including the Headquarters Factory and the Tsukuba Factory.

Mibu Mold Factory

Products of the Mibu Mold Factory

The Mibu Mold Factory can operate unmanned for long periods, thanks to production management by ROBOSHOT-LINK*i*, automated unloading by robots, combined work between ROBOSHOTs and automated warehouses, and six large silos with piping to feed resin to individual ROBOSHOTs. In addition, information obtained from ROBOSHOT-LINK*i* can be monitored on employees' PCs in the office on another floor of the factory. In case of trouble, information is transmitted instantaneously, contributing to the reduction of downtime.

ROBOSHOT system

PC monitor screen

Resin moldings produced at the Mibu Mold Factory are automatically transported to an annexing product manufacturing factory in the Mibu area. This proximity helps to expedite deliveries and to facilitate emergency action if a problem occurs. In addition, the factory has been making proactive efforts to gain molding know-how and to improve quality in collaboration with FANUC's Research and Development Departments.

FANUC Robot M-1000*i*A

Winner of the Main Prize of the 2022 (65th) Nikkan Kogyo Shimbun Best Ten New Products Awards
Winner of The Nikkei Business Daily Awards of the 2022 Nikkei Superior Products and Services Awards
Winner of the GOOD DESIGN BEST 100 of the GOOD DESIGN AWARD 2022

FANUC Robot M-1000*i*A has won three awards; the Main Prize of the 2022 (65th) Nikkan Kogyo Shimbun Best Ten New Products Awards, the Nikkei Business Daily Awards of the 2022 Nikkei Superior Products and Services Awards, and the GOOD DESIGN BEST 100 of the GOOD DESIGN AWARD 2022.

Awarded product: FANUC Robot M-1000*i*A

FANUC Robot M-1000*i*A is a large robot with a wide motion range which has a high payload capacity of 1,000 kg.
It has outstanding strength for transporting heavy objects weighing 1,000 kg across an expansive range, while being highly precise with the capability of positioning objects with 0.1mm accuracy. The weight of the arm has been thoroughly reduced to conserve energy while still being able to handle large payloads. In addition, the design is attractive with a stylish appearance that harmonizes with its strength.
FANUC Robot M-1000*i*A is used in conventional fields such as the transport of construction materials, castings, and other heavy objects. In addition, it can transport large, heavy batteries for electric vehicles, which are becoming increasingly popular, thus automating manufacturing towards a carbon neutral society.


表彰状

Winner of the Main Prize of the 2022 (65th) Nikkan Kogyo Shimbun Best Ten New Products Awards

The Best Ten New Products Awards is a program with which Nikkan Kogyo Shimbun selects and recognizes products that assist in the development of manufacturing and honing Japan's global competitive edge from among the new products developed or commercialized by participating companies in that year.
The awards ceremony was held at Keidanren Kaikan on Thursday, January 26, where President and CEO Yamaguchi of FANUC received a certificate and a plaque from Nikkan Kogyo Shimbun President Imizu.

Winner of the Nikkei Business Daily Awards of the 2022 Nikkei Superior Products and Services Awards sponsored by Nihon Keizai Shimbun

The Nikkei Excellent Products and Services Awards are presented annually to extraordinarily excellent new products and services selected by Nihon Keizai Shimbun.
The awards ceremony was held at Hotel Okura Tokyo on Wednesday, February 1, where President and CEO Yamaguchi was honored with a certificate and a trophy.

Winner of the GOOD DESIGN BEST 100 of the GOOD DESIGN AWARD 2022 sponsored by the Japan Institute of Design Promotion

The GOOD DESIGN BEST 100 of the GOOD DESIGN AWARD is a Japanese initiative to evaluate and promote excellence in design, and is a global design award with many domestic and overseas companies/organizations participating.
The "G" logo that is proof of being awarded is well known as a symbol of excellent design. On October 7, 2022, the winners of the award were announced on the GOOD DESIGN AWARD website.

FG Conference (FANUC Global Conference)

For three days from Monday, March 13 to Wednesday, March 15, the FG Conference (FANUC Global Conference) was held face-to-face for the first time in four years. Employees representing FANUC Group companies from around the world assembled to discuss product development and sales strategies for the coming years. As COVID-19 infection has still not been suppressed, all possible measures, such as carefully selecting and limiting the number of participants, and holding hybrid (online and physical) meetings were implemented, resulting in a fruitful conference.
Heated discussions in the business fields of FA, ROBOT and ROBOMACHINE were held, focusing on what values to deliver in order to thoroughly support customers around the world who manufacture to meet the needs of the new era amidst an unstable global environment.

The main topics were as follows:

FA)	Expanding Digital Twin functions that contribute to enhancing productivity and machining quality by visualizing customers' manufacturing sites
ROBOT)	Further enhancing the capabilities and ease-of-use of FANUC robots, starting with the collaborative robot CRX series
ROBOMACHINE)	Pursuing machining and molding capabilities that satisfy the needs in rapidly changing sectors, such as IT and EVs
All Products)	Enhancing energy-saving and robotizing functions that assist customers to achieve carbon neutrality

At the Conference, Top Sales Support Persons (TSSPs) who engaged in global sales activities last year and provided strong underlying support to the frontline of sales were awarded. Although their efforts were not reflected directly in the numbers for sales and bookings, the importance of the role that they played was honored by this award. The Conference participants praised their significant contribution to the business.

On the final day of the FG Conference, the overseas members who visited Headquarters for the first time in four years, were taken on a tour of the showroom where the latest products and functions are exhibited, as well as the Reliability Evaluation Building, from which the high reliability of FANUC products is derived. This tour further propelled the sharing of information on FANUC's latest technologies and unchanging vision.

Lecture for FANUC employees by Independent Director Naoko Yamazaki

On Friday, February 17, Ms. Naoko Yamazaki, an independent director of FANUC and an astronaut, delivered a lecture for FANUC employees in the FANUC Forum of Headquarters.
The topic was "Thoughts on team building in space." She shared her experiences as an astronaut to highlight the skills and mental attitude required to maximize teamwork.
As the lecture was a valuable opportunity to listen to the experiences of an astronaut directly, it attracted a large audience totaling approximately 300 employees, attending both in person and online, who absorbed themselves in her speech.
At the end of the lecture, photographs of the Japanese islands and Mount Fuji taken from space were displayed, leaving an indescribably profound impression.

Introduction of the Relocation of Service Centers

To offer services that meet customers' needs, FANUC relocated and expanded the Kokura Service Center in January 2023, and the Mikawa Service Center in March 2023. These new technical support bases aim to make service speedier and satisfy customers even more.

Kokura Service Center

Relocated to the north of the old Service Center, the Kokura Service Center can quickly dispatch support engineers and offer services to the northern part of the island of Kyushu and western Yamaguchi Prefecture, via the Kokura-Higashi Interchange.

Mikawa Service Center

The former Service Center which was located in Anjo City, has been relocated to Kariya City and can quickly dispatch support engineers and offer services not only to the Mikawa region but also to Mie and Shizuoka Prefectures, via the Toyota-Minami Interchange.

New Employee Entrance Ceremony

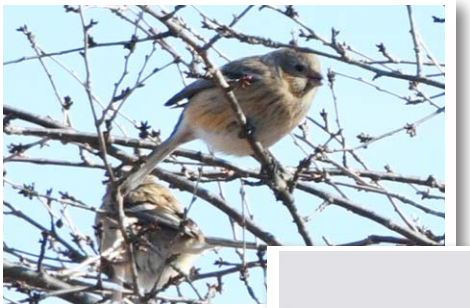
On Monday, April 3, a ceremony to welcome 232 new FANUC employees, consisting of fresh graduates, was held in the FANUC Forum at Headquarters.
This year, new employees stationed outside Headquarters also assembled at the venue, making this ceremony the first in four years in which all new employees gathered face-to-face.
President and CEO Yamaguchi made a speech welcoming and encouraging the new employees, who with a new mindset, took their first steps as members of society.

[Excerpt of President Yamaguchi 's speech]

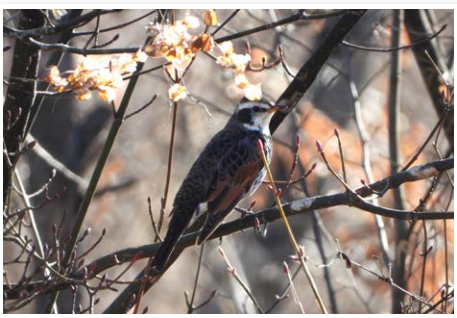
To all our new employees, welcome aboard. I am truly happy you have joined FANUC.
FANUC supports factories around the world. While placing ultimate priority on the safety and health of our employees, we strive to fulfill our responsibilities to supply products and services to customers across the globe. Each and every one of us must act responsibly as a member of society and as a member of FANUC.
FANUC has been promoting business activities with a primary focus on factory automation, and we are a global leader in this area. However, we do not simply aim to expand in scale; instead, we focus on the sustainability and resilience of our strong corporate structure.
The philosophy of FANUC is concentrated in the words “Strictness” and “Transparency.” These words imply that strictness is the source of the sustainability and soundness of a company, and opacity is the onset of organizational corruption and corporate decline. Going forward, when you perform your jobs, please always continue to keep these two concepts in mind.
I believe that many of you joined FANUC because you wanted to, just as many of us did. We want to keep the company strong and worthy of meeting your expectations.
For FANUC to keep its corporate structure strong for more than 40 years from now, through the time of your retirement and beyond, it is important not only to focus on corporate strategies, but also to pool the strengths of individual employees, including yourselves.
I truly want FANUC to remain a company that continues to deliver indispensable value around the world and to earn the trust of all stakeholders through continuous innovation in factory automation.
Last year, we celebrated our 50th anniversary. This year is the first year of the next 50 years. Over the mid to long term, the trend of factory automation will gain even more momentum, creating more opportunities where FANUC will be needed. Our company has made many contributions to the development of society through our business activities, and we will continue to do so.

Four Seasons of FANUC

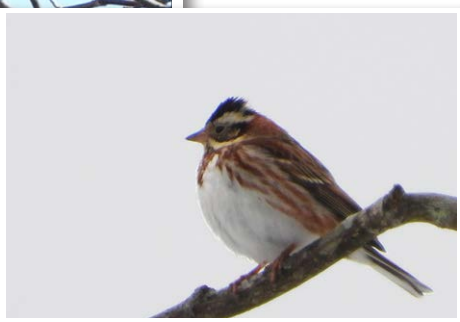
Even in this season, when plants shed their leaves and go dormant, the chirping of many birds are heard in the forests of FANUC.
Migrating birds visit the forests in winter. In preparation for the long journey north that they will make in spring, the forests of FANUC generously offer a place for them to store energy.



Siberian long-tailed rosefinch (female)



Dusky thrush



Rustic bunting

FANUC's History Series 8
"FANUC 2000C"
This CNC for two-axis control was launched in 1975. It offered many CNC-specific features, such as software computation for smooth motor acceleration and deceleration, various fixed cycles, tape storage (NC program memory), and stored pitch error compensation.
FANUC 2000C was completely different from conventional NCs, and had many problems such as reliability. Nevertheless, the FANUC C series became the basis for later CNC development.

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