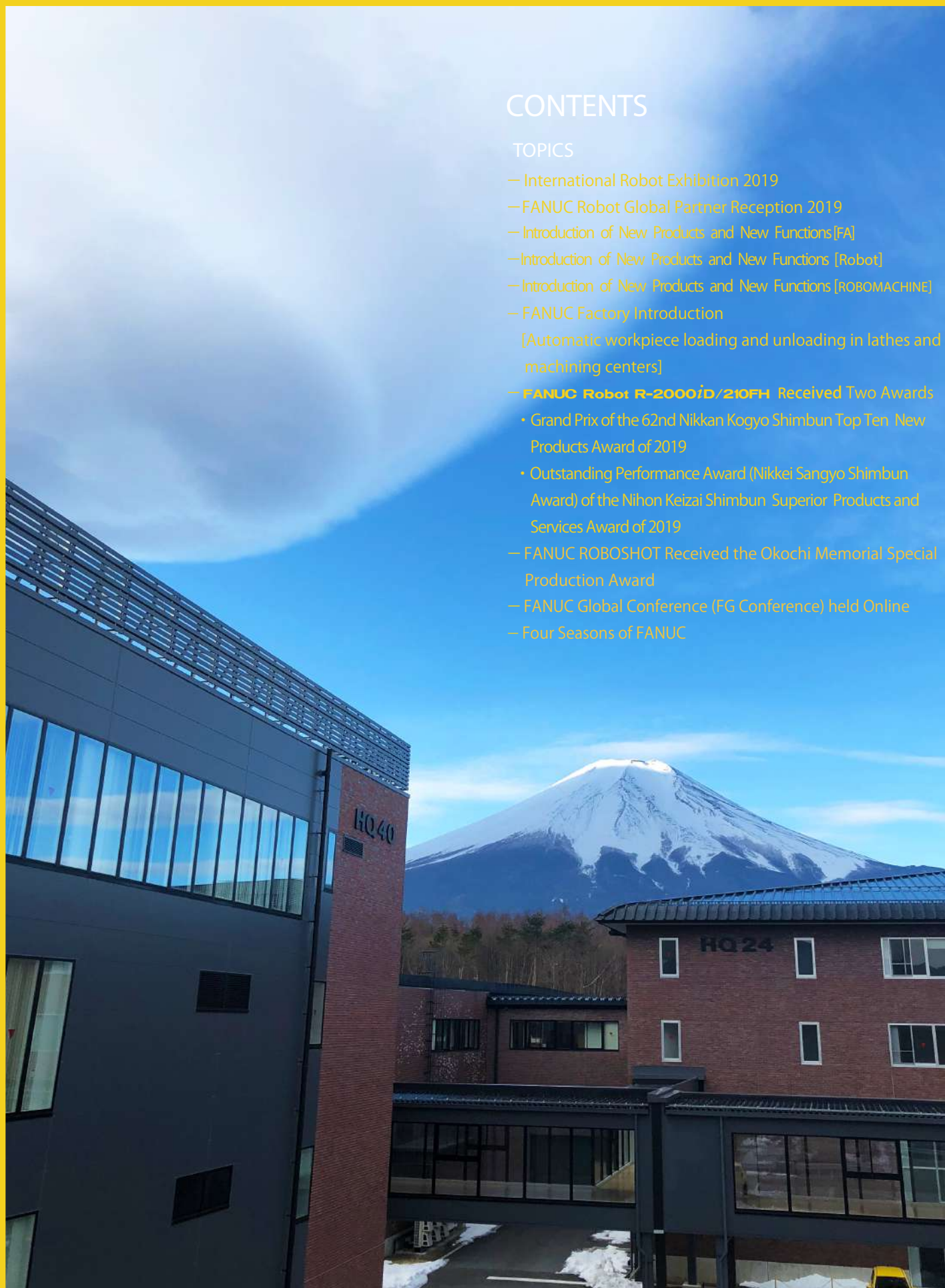


CONTENTS

TOPICS

- International Robot Exhibition 2019
- FANUC Robot Global Partner Reception 2019
- Introduction of New Products and New Functions [FA]
- Introduction of New Products and New Functions [Robot]
- Introduction of New Products and New Functions [ROBOMACHINE]
- FANUC Factory Introduction
[Automatic workpiece loading and unloading in lathes and machining centers]
- **FANUC Robot R-2000iD/210FH** Received Two Awards
 - Grand Prix of the 62nd Nikkan Kogyo Shimbun Top Ten New Products Award of 2019
 - Outstanding Performance Award (Nikkei Sangyo Shimbun Award) of the Nihon Keizai Shimbun Superior Products and Services Award of 2019
- FANUC ROBOSHOT Received the Okochi Memorial Special Production Award
- FANUC Global Conference (FG Conference) held Online
- Four Seasons of FANUC



International Robot Exhibition 2019



The International Robot Exhibition 2019 was held for four days from Wednesday, December 18, to Saturday, December 21, at Tokyo Big Sight. FANUC exhibited many systems that used collaborative robots, SCARA robots and robots for welding and other various applications. Under our slogan of "one FANUC," integrating FA and ROBOMACHINES, FANUC also focused on the display of machining automated with a robot.

We introduced our efforts in the areas of AI and IoT-related zero down time (ZDT), our FIELD system, and "Service First."

The new collaborative model, CRX, with a new friendlier design gathered much attention.

FANUC's booth was crowded with many visitors throughout the four-day exhibition.



The eye-catching new collaborative robot, CRX, was the center of attention.

Collaborative robot



FANUC exhibited its entire collaborative robot series.



Visitors were impressed by the easy teaching of the new CRX.

SCARA robot



Visitors appreciated the speed and drip-proof performance of the new model with a payload of 12 kg.

Delta robot



Much interest was shown in the new model, DR-3iB, and its soft gripper.

Super heavy payload robot



The powerful motion of lifting an airplane panel was astonishing.

Laser robot



Visitors highly praised the path precision of the new high precision robot model.

Painting robot



The addition of a compact painting robot has enhanced the series.

3D vision sensor



The new 3DV/1600, with a built-in gripper which enables measurements in wide ranges, attracted attention.

Machining



Easy teaching of the CRX and automatic path generation had a great impact.



ROBOTDRILL QSSR and AGV robot supplying parts.



Teaching using the manual handle and CNC G-code was popular with visitors.



FANUC demonstrated high-pressure washing using the washing robot.

AI, IoT, and services



Teaching by pointing of bin-picking through deep learning was exhibited.



The ability of FIELD system to gather data from machines of any manufacturer was highly acclaimed.



FANUC presented the practical use of ZDT, which has been implemented by many customers around the world.



Visitors were amazed by our part replacement service and visual guidance for work procedures.

FANUC ROBOT GLOBAL PARTNER RECEPTION 2019



The FANUC Robot Global Partner Reception 2019 was held on Tuesday, December 17, the night before the start of the International Robot Exhibition.

134 global partners from Japan and overseas who sell FANUC robots were invited.

Trophies were awarded to 34 companies as a token of our gratitude for their daily sales activities.

The Grand Award was awarded to RoboJob of Belgium, and Special Awards went to Yamazen Corporation, US-based Aloï ACE, and China-based Jiangsu Cenglary Engineering and Trading.

This reception turned out to be an outstanding event, where we felt a sense of unity with our global partners, and a powerful motivation to improve future sales.



Introduction of New Products and New Functions (FA)

New product FANUC Series 30i/31i/32i-MODEL B Plus

FANUC has developed the FANUC Series 30i/31i/32i-MODEL B Plus as the successor to the FANUC Series 30i/31i/32i-MODEL B, by significantly enhancing basic functions and pursuing usability.

● Brand new design of display unit and screen

A new black flat design display unit was added to the lineup. The size of the display unit ranges from 10.4" to 21.5", allowing the selection of the most suitable size. The 21.5" LCD is equipped with a newly developed capacitive touch panel that does not malfunction in an FA environment.

● FANUC's latest CNC and servo technologies

The following latest FANUC control technologies are implemented in the FANUC Series 30i/31i/32i-MODEL B Plus. The setup is simple, and machine performance can be improved effectively.

✓ Fine Surface Technology

High speed processing of machining programs that are output from CAD or CAM and generation of smooth tool paths enable high quality machining.

✓ Fast Cycle-time Technology

Cycle time is reduced through means such as acceleration or deceleration according to the operation status, maximum use of spindle capability, and reduction of non-machining time.

✓ 5-axis Integrated Technology

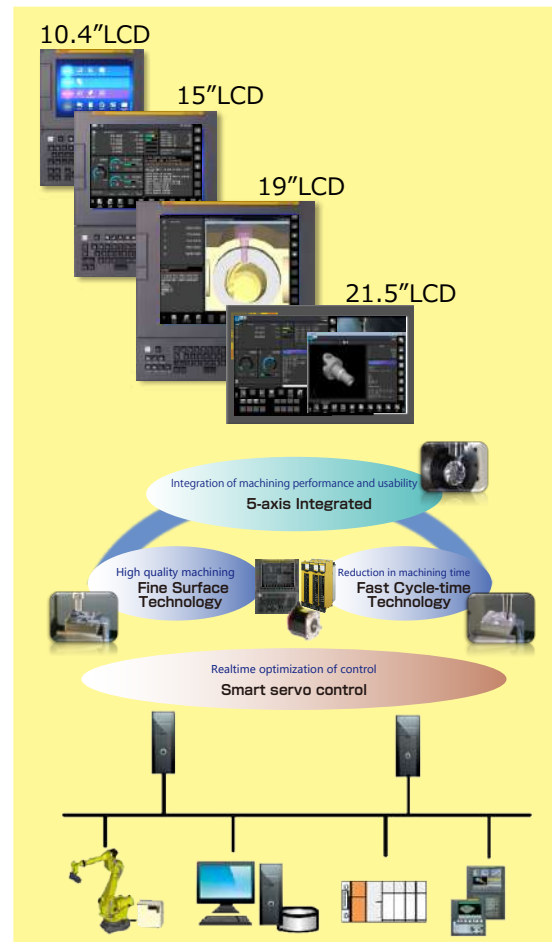
Improved usability of 5-axis machine tools by thoroughly supporting all 5-axis machining processes, from machine setup, program creation to machining assessment.

● Enhancement of the standard functions (customization functions)

FANUC's customization functions; FANUC PICTURE, C language executor, and macro executor, are included as standard functions. The drawing capabilities of the latest version of FANUC PICTURE has been drastically improved, providing more flexibility in creating suitable screens for machine tools.

● Enhancement of standard functions (network function)

Network functions including FOCAS/Ethernet, FL-net, EtherNet/IP, and PROFINET come as standard in the FANUC Series 30i/31i/32i-MODEL B Plus. This series can be connected to peripheral equipment or applied to IoT (Internet of Things) and QSSR (Quick & Simple Start-up of Robotization) without having to add an Ethernet board.



New function QSSR

QSSR (Quick & Simple Start-up of Robotization) is a function to connect a robot to a machine tool quickly and easily.

● QSSR for CNC and robot

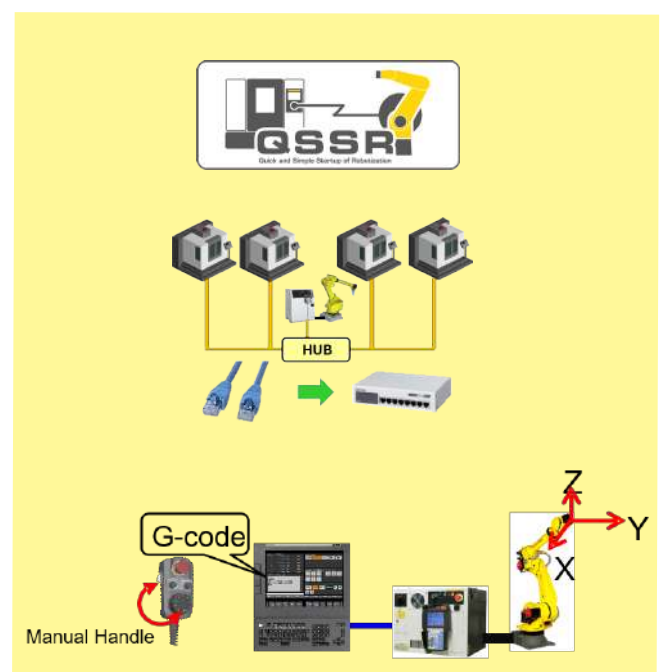
Connecting a machine tool to a robot or checking the operating status can be performed easily.

- ✓ Easy connection with one Ethernet cable
- ✓ Easy setup with the guidance function
- ✓ Start-up of robot controller programs from the CNC program with M-code
- ✓ Robot status check and manual continuous feed are available on the CNC screen.

● Robot control from CNC

Robots can be controlled by CNCs.

- ✓ Robot control using a CNC program in G-code
- ✓ Robot positioning is possible with the handle of the machine tool, and programs can be created easily on the CNC screen



FANUC Robot R-2000iD/210FH

FANUC developed and launched the R-2000iD/210FH with cables embedded, as the latest model of the best-selling R-2000iSeries.

- FANUC focused on functionality and external design in this robot, which has a payload of 210 kg and reach of 2.6 m. The lineup also includes the R-2000iD/165FH with a payload of 165 kg, and the R-2000iD/100FH with a payload of 100 kg, both having the same reach.
- FANUC has reduced the footprint by 23%, the wrist interference radius by 13%, and the weight of the mechanical unit by 10%, compared to conventional models, allowing for more installations in the same space.
- FANUC has embedded within the robot arm, all the pipings and cables, such as those for servo guns, which run to the end of the robot arm, while sufficiently ensuring the durability of cables, which is an issue of internal cables, to achieve high reliability.
- Maximum use of offline teaching is possible without having to worry about interference between peripheral equipment and the pipings and cables. In addition, the usability of these new models have improved, since there is no need to consider the effects on cables and other items when modifying teaching.



Support for OPC UA communication in FANUC robots

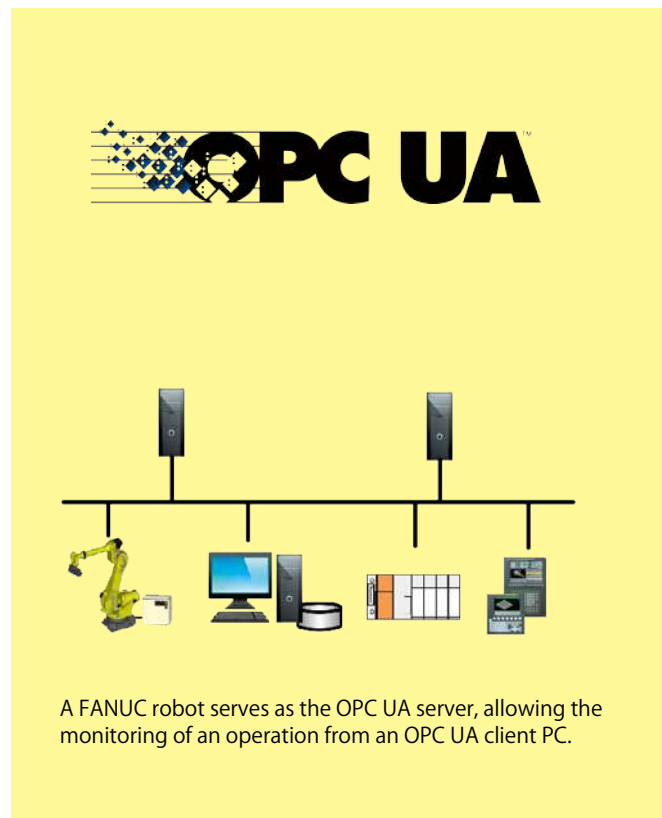
● OPC UA is one of the international standards for data exchange between industrial equipment such as machine tools, robots, and PLCs, via a communication network. FANUC's robots now support OPC UA communication as standard, as part of our endeavors to enhance IoT functions in production sites.

● Each industrial equipment industry is establishing a data format that complies with the OPC UA companion specifications. For industrial robots, the OPC Robotics companion specifications have been established. FANUC robots conform to these specifications using only a controller as standard. No special hardware is required.

● The OPC Robotics-compliant communication function enables the position of a FANUC robot, the status of the operating program, alarms, signals and others to be known and monitored via a network.

FANUC will continue to improve the communication functions of robots to contribute to the visualization and support of IoT in production sites.

(*) OPC UA is a registered trademark of the OPC Foundation.



Introduction of New Products and New Functions (ROBOMACHINE)

New function "Quick and Simple Start-up of Robotization" of ROBOMACHINE

FANUC has developed and launched QSSR (Quick and Simple Start-up of Robotization), which is a package of basic elements required to build robot systems with ROBOMACHINES.

By using QSSR to build a system, the workload for design and system setup time are significantly reduced, facilitating the installation, setup, and operation of automation systems consisting of ROBOMACHINES and robots.

ROBODRILL-QSSR

The ROBODRILL-QSSR, which consists of a compact machining center of the ROBODRILL α -D β Series and an LR Mate 200iD, is an ideal robot system for automatically changing workpieces.

- Basic elements to build a robot system such as robot installation base, safety fence, easy connection function, and robot sample programs are offered in packaged form for the robotization of machining sites.
- An automatic side door driven with a servo motor can be selected as an option. Compared to the air cylinder driven method, the time for the door to open and close is about 40%, and is much faster. In addition, the load and unload time of workpieces can be significantly reduced by combining with a robot.



ROBODRILL-QSSR

ROBOSHOT-QSSR

The ROBOSHOT-QSSR, which consists of an electric injection molding machine of the ROBOSHOT α -S β A Series and an LR Mate 200iD, is a robot system that is ideal for unloading molded parts and assembly after molding.

- Basic elements to build a robot system such as a robot installation base, safety fence, safety mechanism, and robot sample programs are offered in a packaged form for the robotization of molding sites.
- Customization of robot operations is possible by adding information to a preinstalled robot sample program. The information teaches proper positions for the application.



ROBOSHOT-QSSR

ROBOCUT-QSSR

The ROBOCUT-QSSR, which consists of a wire electrical discharge machine of the ROBOCUT α -C β B Series and an M-20iA, is an optimal robot system for the automatic exchange of machining workpieces to be machined.

- Basic elements to build a robot system such as a robot installation base, safety fence, safety mechanism, and robot sample programs are offered in a packaged form for the robotization of machining sites.
- The core stitch function temporarily adheres cores that must be removed after rough cutting to workpieces. Then the robot removes the cores before finishing. This function and the automatic workpiece exchanging function enables continuous unmanned operation for long periods of time.



ROBOCUT-QSSR

Automatic workpiece loading and unloading in lathes and machining centers

In the machining process in FANUC factories, robots load and unload workpieces to and from lathes and machining centers, enabling continuous unmanned operation for a long time.

For handling workpieces in lathes, various types of workpieces are supplied from the automatic warehouse. They are loaded in and unloaded from lathes with hands (servo hands), which are driven by servo motors for picking operations. By controlling the position and gripping force, the hand can pick workpieces in a wide range of sizes and accurately attaches them to the chuck of the lathe.

For handling workpieces in fixtures in machining centers, the robot detects workpieces on the pallet with a vision sensor and picks them up.

After picking up a workpiece, the robot detects the position and posture of the workpiece with the vision sensor again, and corrects any misalignment that may occur when the robot picks up the workpiece (misalignment during picking), then loads the workpiece in a reliable fashion on the fixture.

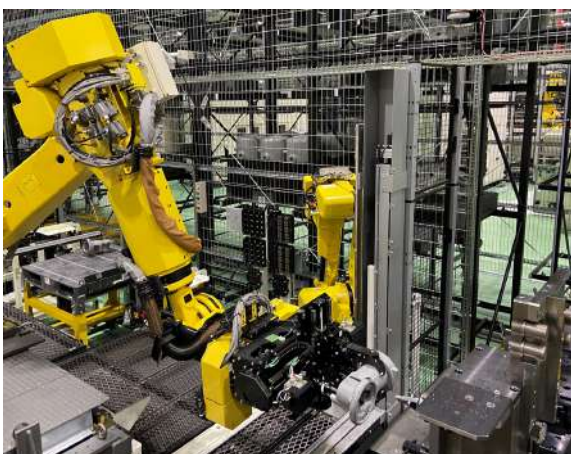
For the stable pick up of workpieces, the picking part (resembling a claw) of the servo hand is changed automatically according to the shape of the workpiece, thus enabling a large variety of workpieces to be handled. In some cases, the robot may have to operate in line with an external force, such as the chuck drawing in a workpiece, or when a workpiece is pressed against the reference surface of the fixture. In these cases, the soft-float function is used to flexibly control the robot. Since chips stuck between workpieces, chucks and fixtures cause machining errors, the robot thoroughly cleans workpieces, chucks, and fixtures. In addition, the chips that are left inside workpieces along with discharged cutting fluid, deteriorate the environment of surrounding equipment. Therefore, the air blow and suction functions have been added to completely eliminate chips. Although cutting fluid and mist will spatter and attach to robots in machining sites, the highly reliable FANUC robots provide stable production for a long time.



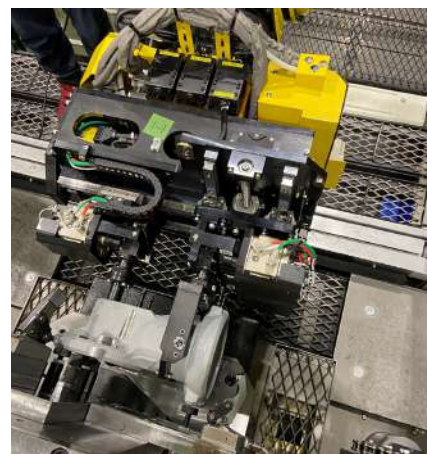
Automatic workpiece loading and unloading in a lathe



Use of a servo hand



Automatic workpiece loading and unloading in a machining center



Loading and unloading of a workpiece to and from a fixture

New Spot Welding Robot

FANUC Robot R-2000iD/210FH

- Grand Prix of the 62nd Nikkan Kogyo Shimbun Top Ten New Products Award of 2019
- Outstanding Performance Award (Nikkei Sangyo Shimbun Award) of the Nihon Keizai Shimbun Superior Products and Services Award of 2019

FANUC's new spot welding robot, R-2000iD/210FH, received both the Grand Prix of the 62nd Nikkan Kogyo Shimbun Top Ten New Products Award of 2019 and the Outstanding Performance Award (Nikkei Sangyo Shimbun Award) of the Nihon Keizai Shimbun Superior Products and Services Award of 2019.



Two awards !!



Grand Prix of the 62nd Nikkan Kogyo Shimbun Top Ten New Products Award of 2019



Outstanding Performance Award (Nikkei Sangyo Shimbun Award) of the Nihon Keizai Shimbun Superior Products and Services Award of 2019

With the Top Ten New Products Award, Nikkan Kogyo Shimbun selects and awards products that contribute to the development of manufacturing and enhancement of the international competitiveness of Japan, from a range of new products that applicant companies developed or have put into practical use in that year.

President Yamaguchi of FANUC received a certificate of commendation and plaque from President Imizu of Nikkan Kogyo Shimbun, at the awards ceremony held on Thursday, January 23, at the Keidanren Kaikan.

With the Nihon Keizai Shimbun Superior Products and Services Award, Nihon Keizai Shimbun selects and awards outstanding new products and services once a year.

President Yamaguchi of FANUC received a certificate of commendation and statue from President Okada of Nihon Keizai Shimbun at the awards ceremony held on Wednesday, February 5, at The Okura Tokyo.

About the awarded product, FANUC Robot R-2000iD/210FH

Completely redesigned from the previous R-2000i Series, the FANUC Robot R-2000iD/210FH has a simple compact installation section, a lower arm with a sharp edge line that neatly stores cables, a round middle section that leads to the upper arm, and a V-shaped design is painted in two beautiful colors.

Besides having a good appearance, the mechanical unit is high in reliability and maintainability, resulting in an embodiment of industrial design that also offers functional aesthetics. The R-2000iD/210FH is packed with FANUC's technologies, contributing to the improvement of appearance and productivity of the production line.

FANUC's fully electric injection molding machine, ROBOSHOT, received the 66th (fiscal year 2019) Okochi Memorial Special Production Award from the Okochi Memorial Foundation, for the development of a fully electric injection molding machine for ultra-high precision compact plastic parts, due to its contribution to the ultra-high precision molding market for compact plastic parts. Although the annual awards ceremony was canceled due to COVID-19, FANUC received the certificate of commendation and a large prize plaque as an extra prize on March 24, 2020. FANUC turned its attention to the potential of the plastics industry early on, and in 1983, started developing a fully electric injection molding machine, driven by FANUC's servo motor and using a CNC for controlling. In developing a fully electric injection molding machine, FANUC developed element technologies such as a ball screw for high load driving for injection molding, and a large servo motor with high power and high response, achieving operation accuracy and repeatability, which could not be attained with conventional hydraulic injection molding machines, for the first time in the world.

We have boldly pioneered the precision molding market while contributing to the spread of fully electric injection molding machines. As the market for compact, thin wall IT products such as smartphones, grew in the 2000s, higher performance was demanded for high precision compact plastic molded parts. With the ROBOSHOT, FANUC has pursued repeatability of molding quality to provide ultra-high precision molding, and has addressed market needs by continuing to be a leader in the field of ultra-high precision injection molding technology.

ROBOSHOT has enhanced smartphone performance and reduced their size at the same time, by making it possible to mass-produce compact ultra-high precision plastic parts such as thin lenses for digital cameras, light guide panels for the backlights of LCD panels, and precision connectors, contributing to the spread and stable supply of smartphones.



Extra prize for the Okochi Memorial Special Production Award (large prize plaque)

In the future, the need to reduce the burden that plastics place on the environment will increase. FANUC will continue to enhance the performance of ROBOSHOT to further improve functions, precision, and reduce the size of ultra-high precision compact plastic parts, in order to minimize the environmental load, while contributing to the development of an information society and innovative global lifestyle. FANUC has received the Okochi Memorial Production Award five times under the themes of practical application of large-scale flexible production system using machining cells as the core (fiscal year 1981), development of a fully automatic production system of a multilayer printed wiring board (fiscal year 1995), development of continuous unmanned machining systems using intelligent robots (fiscal year 2002), construction of a sophisticated automated motor assembly factory consisting of intelligent robot cells (fiscal year 2008), and highly efficient assembly systems through collaboration between a collaborative robot and humans (fiscal year 2016).

This year, FANUC received the Okochi Memorial Special Production Award for the first time.



Certificate of commendation for the Okochi Memorial Special Production Award



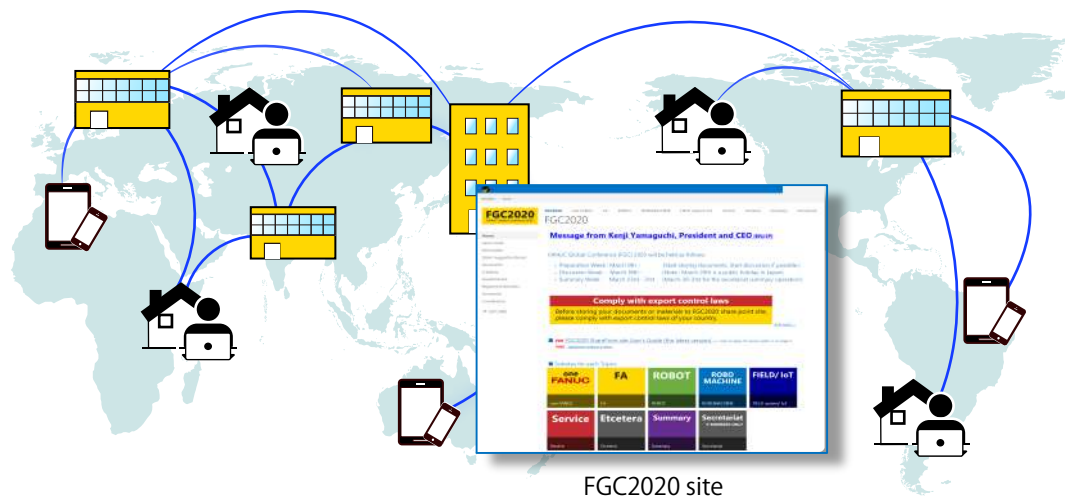
Fully electric injection molding machine, the ROBOSHOT α-S50iA with high precision clamp specifications

*The Okochi Award is granted to outstanding accomplishments in the production engineering and production technology domains every year, to contribute to the advancement of science and technology for production, as Dr. Masatoshi Okochi (1878–1952) had wished. The Award is in memory of the great achievements in academia and industry that Dr. Okochi made as the president of RIKEN for 25 years from 1921 until the end of World War II.

FANUC Global Conference (FG Conference) held Online

Each year, the FANUC Global Conference (commonly referred to as the "FG Conference") is held intensively for three days in mid-March. This event brings together FANUC sales representatives and researchers from all over the world to the headquarters in Oshino, Yamanashi Prefecture, to discuss future products and sales strategies. This year, the event was held as a global online conference making full use of SharePoint due to the COVID-19 outbreak, for a duration of nearly a full month in March. This was the first large-scale online international conference held by FANUC, so there were some concerns. However, in the midst of countries around the world issuing stay-at-home orders, participants from all over the world, regardless of time differences, were able to utilize mobile access to join the event at any time, from anywhere.

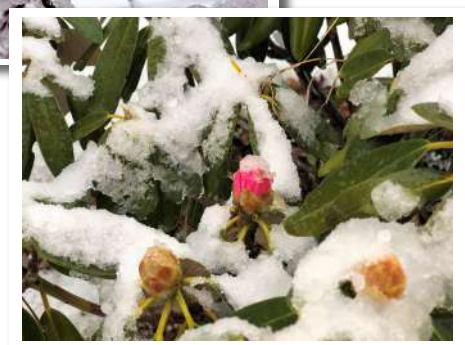
Many topics were discussed in depth in online discussions that were held in parallel, making this a very well-received event. While there are advantages to having face-to-face meetings, a variety of online methods were used to fill in the gaps and improve the effective-ness of the meetings, such as using video conferencing systems that take time zone differences into consideration. This event was an excellent opportunity to learn not only about products and sales strategies, but also about various aspects of global online conferences. We will continue to promote DX (digital transformation) in order to improve the quality and efficiency of our work by fully utilizing digital technology.



Four Seasons of FANUC

Spring arrived late in Oshino, bringing the butterbur sprouts into view and the Fuji cherry trees into full bloom in mid-April when we unexpectedly received heavy snowfall.

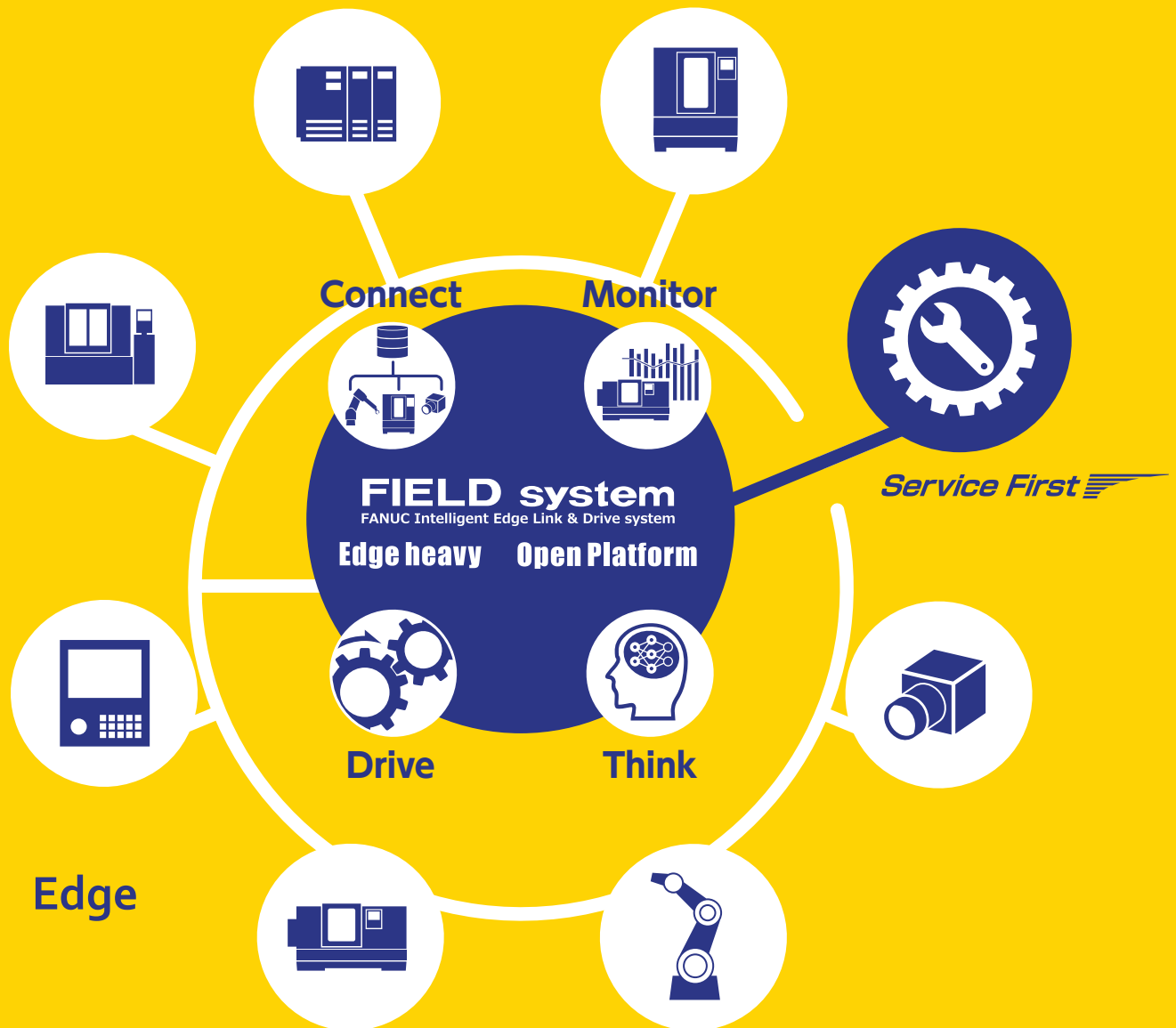
The forests of FANUC were enduring the heavy, cold snow. As the snow melted, spring finally arrived.



Smart Machine Smart Factory

Driving machinery smartly and efficiently for a smarter factory.

Discover new values with FIELD system: an ecosystem for manufacturing that utilizes production data more effectively.



FIELD system is a platform open to everyone, and was developed for edge-heavy computing by bringing together the latest IoT and cutting-edge AI technologies. By using this system, FANUC aims to work with partners around the world to innovate manufacturing.



FANUC News 2020 - I

FANUC CORPORATION

Oshino-mura, Minamitsuru-gun, Yamanashi 401-0597 Japan

www.fanuc.co.jp

Phone: (81) 0555-84-5555

Fax: (81) 0555-84-5512

Person in charge of publishing:

Shunsuke Matsubara, Executive Managing Officer, General Manager, Research & Development Promotion / Support Division



Reprint or reproduction is not permitted without permission. All rights reserved.
©FANUC CORPORATION August, 2020 Printed in Japan