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New Products Open House Show 2024

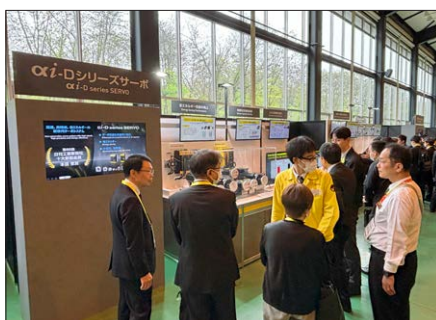
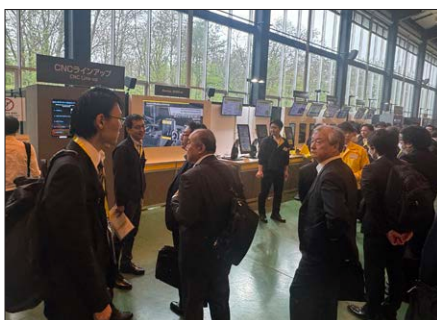
The 33rd New Products Open House Show took place at the Nature Hall at FANUC Headquarters for three days from Monday, May 13, to Wednesday, May 15. More than 6,800 visitors attended this year. The venue was full of energy and excitement every day. On Thursday the 16th, and Friday the 17th, FANUC welcomed over 800 guests from overseas. They zealously viewed our new products and functions in detail.



FA

The FA area introduced the latest CNC systems and new functions from the perspective of meeting the needs for machine tools, such as measures to address labor shortages and reducing environmental impact.

In addition to the new CNC system Series 500i-A and α i-D series SERVO, the captivating synergy between the work flow in manufacturing sites and Digital Twin, IoT technologies, along with technologies for integrating robots into CNC systems, attracted much attention.



ROBOT

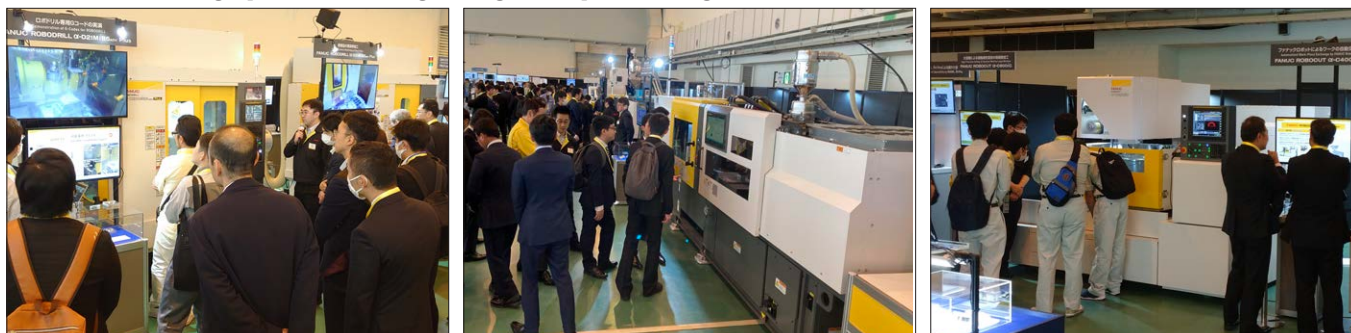
The ROBOT area showcased a wide range of applications using the CRX collaborative robot series, and the new palletizing model with a payload of 800 kg. New food grade variants and an ex-proof collaborative paint robot have been added to the CRX series. Visitors enjoyed experiencing palletizing operations using a tablet, which allowed them to easily set stacking patterns and perform production. The new RTUs (Robot Transport Units) also had a favorable response, with flexibility in the selection of its length - a benefit of its modular design.



ROBOMACHINE

The ROBOMACHINE area exhibited the latest models of ROBDRILL, ROBOSHOT and ROBOCUT, as well as automated systems that combined the robots with ROBOMACHINES. The theme was **Robomachines that contribute to automation and productivity improvement**.

The feedback was very positive for all demonstrations. These included compound machining using the high-speed rotary table and turning functions of the ROBODRILL, a proposal for streamlining using the flow analysis simulation software of ROBOSHOT, and high-precision cutting of large workpieces using the new ROBOCUT model, α -C800iC.



SERVICE

The SERVICE area introduced contents that are useful for maintenance. Visitors spoke highly of our remote maintenance tools such as dedicated tools for robots that connect to controllers and perform diagnosis, and our IoT-based diagnosis service tools, ZDT and AI Servo Monitor.



ACADEMY

The ACADEMY area featured FANUC's training facilities and on-demand seminars. The newly offered on-demand seminars particularly caught interest.



Sustainability

Under FANUC's basic sustainability policy, carbon neutrality is considered to be an important topic throughout the company. This exhibit not only gave an overview of the company's efforts, but also showed specific examples as well.

This is a continuation of last year's display, and included recent topics, such as the results of FANUC's efforts and evaluations by related organizations.

Open House Show for Employees' Families



On Saturday, May 18, the Show was opened to the families of FANUC employees. There were about 1,000 visitors, and it was a good opportunity for employees themselves to introduce FANUC's new products to their families.

New Products Open House Show (Nagoya)

The 2024 FANUC New Products Open House Show (Nagoya) took place for two days on Wednesday, June 19, and Thursday, June 20, in the Technical Center of the Nagoya Branch in Komaki, Aichi Prefecture. As with the New Products Open House Show held at FANUC Headquarters in May, the show featured the latest CNC and SERVO systems, new robot controllers focusing on cybersecurity, the newest robot lineup and applications, and examples of the latest machining and molding systems of ROBODRILL, ROBOSHOT, and ROBOCUT. Over 1,800 visitors from the Chubu, Hokuriku, and Kansai regions attended the two-day event and viewed the exhibits with great enthusiasm.



Four Seasons of FANUC

Spring and summer are the busiest seasons of the year in the forests surrounding FANUC.



Cypripedium japonicum

The valuable wildflowers were transplanted last year to be protected during construction within the FANUC grounds.

They firmly took root in the soil of their new home, blossoming as before this spring.



Doe

On one sunny day in spring, a deer stood by the pond and fixed its gaze on us.



Grey wagtail



Adult white wagtail



Young white wagtail

Introduction of New Products and New Functions

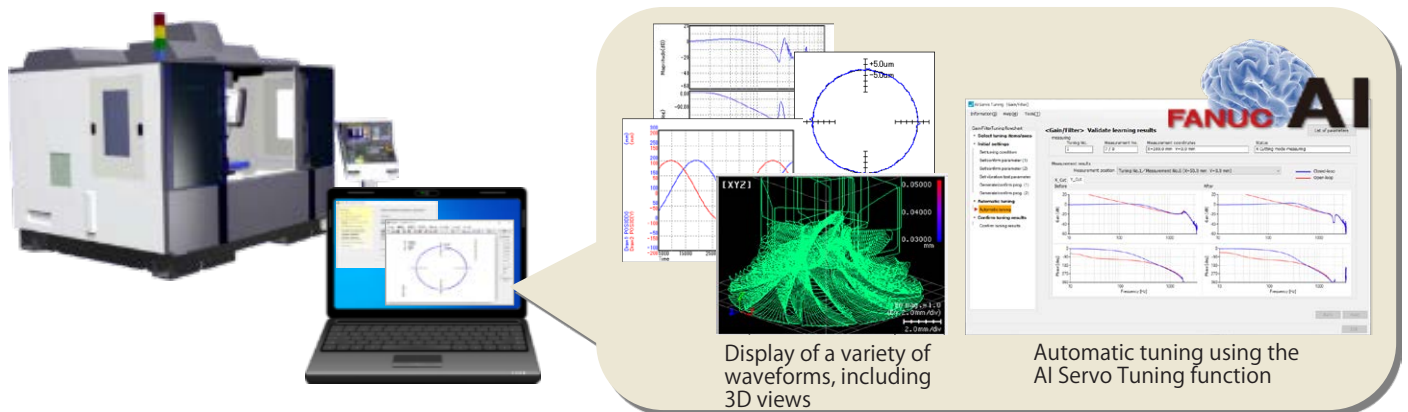
FA New Product FANUC SERVO GUIDE 2

FANUC has released FANUC SERVO GUIDE 2, a servo tuning tool for the Series 500i-A.

Servo tuning, which optimizes control parameters such as servo gain and acceleration/deceleration according to the characteristics of the machine, is essential for improving the machining performance of machine tools. In addition, data, such as position and torque used in servo and spindle control, is necessary for improving machining performance, troubleshooting, and preventive maintenance, among others. To meet these demands, FANUC has been offering FANUC SERVO GUIDE for the current CNC models since 2001, ahead of other companies. Now, FANUC has developed the new FANUC SERVO GUIDE 2 for the recently released CNC Series 500i-A. Compared to the existing SERVO GUIDE, FANUC SERVO GUIDE 2 has improved features, as listed below.

The key advantages are facilitating servo tuning and analyzing axis motion in the Series 500i-A CNC system.

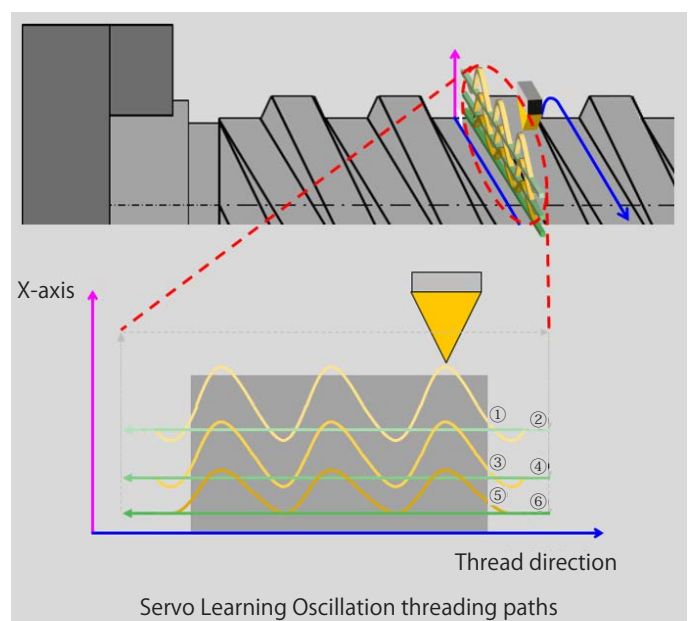
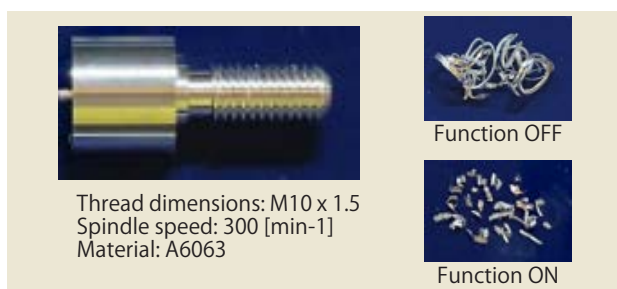
- AI servo tuning is standard, and allows optimization of servo parameters to be completed easily in a short time using AI.
- The 3D view function is standard, and enables 3D visualization of tool paths and path errors which is effective in troubleshooting machining errors.
- Simultaneous measurement has been increased to a maximum of 20 servo data, making servo tuning and servo data analysis easier on machines with many axes, such as 5-axis machine tools.



FA New Function Threading by Servo Learning Oscillation

Servo Learning Oscillation is a function that shreds chips by oscillating the feed axis during turning and drilling. Previously, Servo Learning Oscillation could not be applied to threading, but this has now become possible. In multi-threading motions, chips are shredded by alternating between oscillation and non-oscillation (paths 1, 3, 5 in the figure on the right are paths with oscillation, while paths 2, 4, 6 are paths without oscillation).

With this, the range of applications of Servo Learning Oscillation has expanded, as machine stoppages due to chip problems are eliminated, resulting in the improvement of uptime.

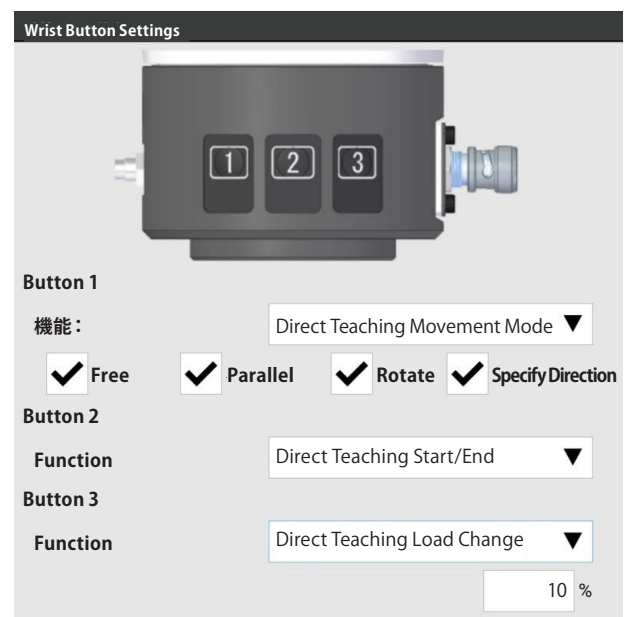
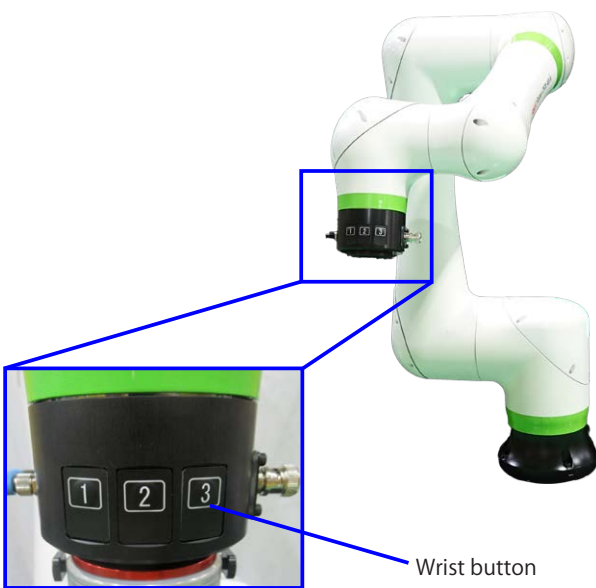


ROBOT New Function Wrist button option for the FANUC Robot CRX Series

FANUC has released a wrist button option that further enhances the usability of the well-received CRX series of collaborative robots.

- A wrist button function for supporting easy teaching of the CRX series has been released. Three buttons are aligned on the robot's wrist flange with which various functions can be performed, such as enabling/disabling direct teach, position teaching, and opening/closing a gripper.
- Teaching time can be reduced by using the wrist buttons, without having to operate the tablet TP.
- The setting a function to each button is easily done on the Wrist Button Settings screen.
- The wrist buttons are positioned not on an additional adapter but directly on the wrist flange, so the same conditions as not having wrist buttons are applicable, with no limitation for the allowable load capacity at the wrist.
- Wrist buttons can be retrofitted to the user's existing CRX.

The wrist button option enhances the usability of collaborative robots and contributes to further productivity improvement.



Wrist Button Settings screen

ROBOT New Function New ROBOGUIDE

FANUC has released a new ROBOGUIDE that supports the new R-50iA robot controller.

- Improved user interface

The user interface has been improved to be more user-friendly for first-time users of ROBOGUIDE, as well as for existing users. Users can smoothly access necessary functions, such as layout reviewing using a ribbon menu which can be operated intuitively.

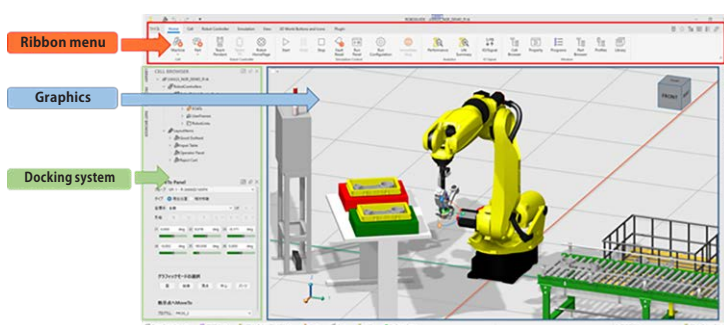
- Enhanced graphics

Graphics processing for shadows and reflections has been enhanced to improve the texture and visibility of cell elements through realistic 3D rendering. Operation is smooth even for large-scale work cells, improving work efficiency. In addition, as a standard feature, CAD files in various formats can be imported, simplifying the integration of peripheral devices into the ROBOGUIDE work cell.

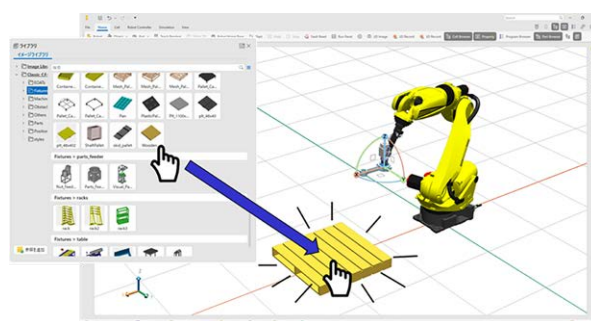
- Virtual reality (VR)

Using a commercially available VR headset, the 3D simulation content of the work cell created with ROBOGUIDE can be experienced with ease. This is a standard function of the new ROBOGUIDE. The point of view can be moved freely and quickly in the VR world, as if riding on a drone, enabling the system to be checked as though it were real. The interaction with peripheral devices in the VR world can also be checked from various angles. Virtual commissioning of the entire system is now available.

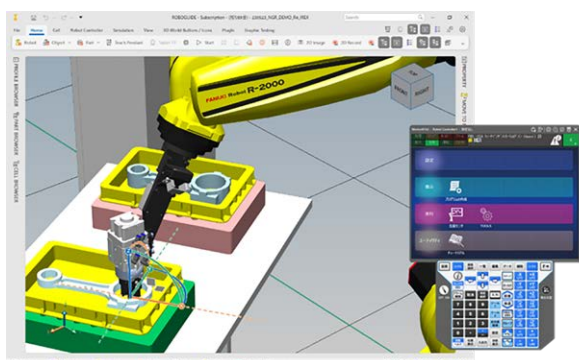
With the new ROBOGUIDE, FANUC has simplified the introduction of robots, thus promoting automation.



Improved interface



Layout reviewing



Programming

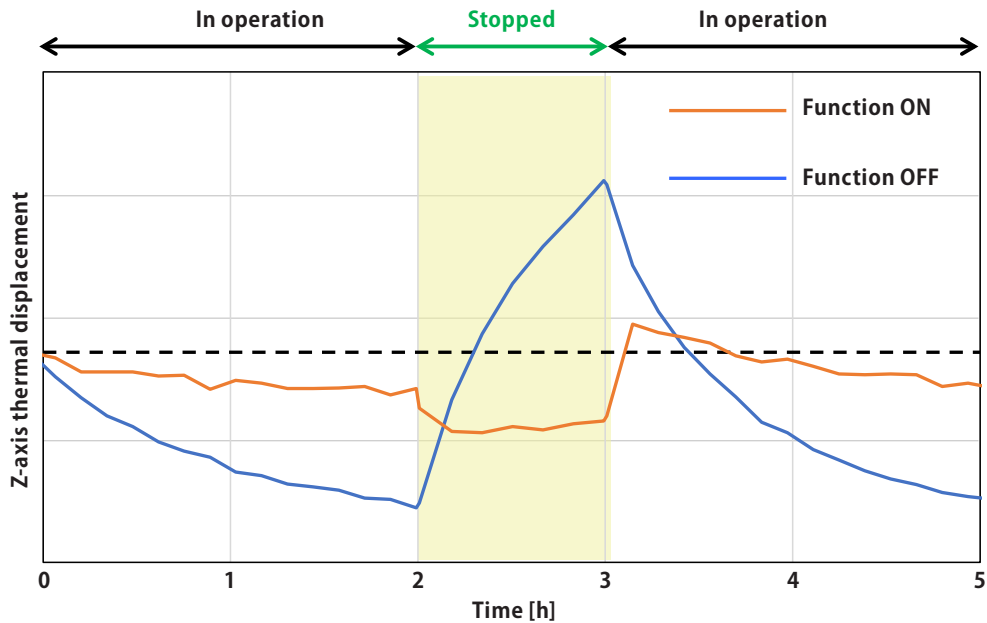


Virtual commissioning using a VR headset

ROBOMACHINE New Function Upgraded thermal displacement compensation function

The thermal displacement compensation function has been improved in the latest compact machining center, the ROBODRILL α -DiB Plus series.

- The thermal displacement compensation function is a standard ROBODRILL function that compensates thermal displacement of the machine without the use of sensors. This function estimates the amount of thermal displacement from the operating records of the spindle and each axis, for real-time compensation of thermal displacement which changes moment by moment.
- By adopting a new thermal displacement estimation method, the ability to compensate for complex changes due to heat transfer to the mechanical parts has been improved.
- This enables high-precision compensation, for example, for sudden changes in heat dissipation when operation is stopped, and for thermal displacement in the Y-axis direction, which is difficult to estimate due to multiple factors.
- It is now possible to maintain stable machining accuracy even in situations where there are large thermal displacements, such as during cold starts at the beginning of the work day or resuming operation after a break. What is more, the function helps to reduce warm-up time.

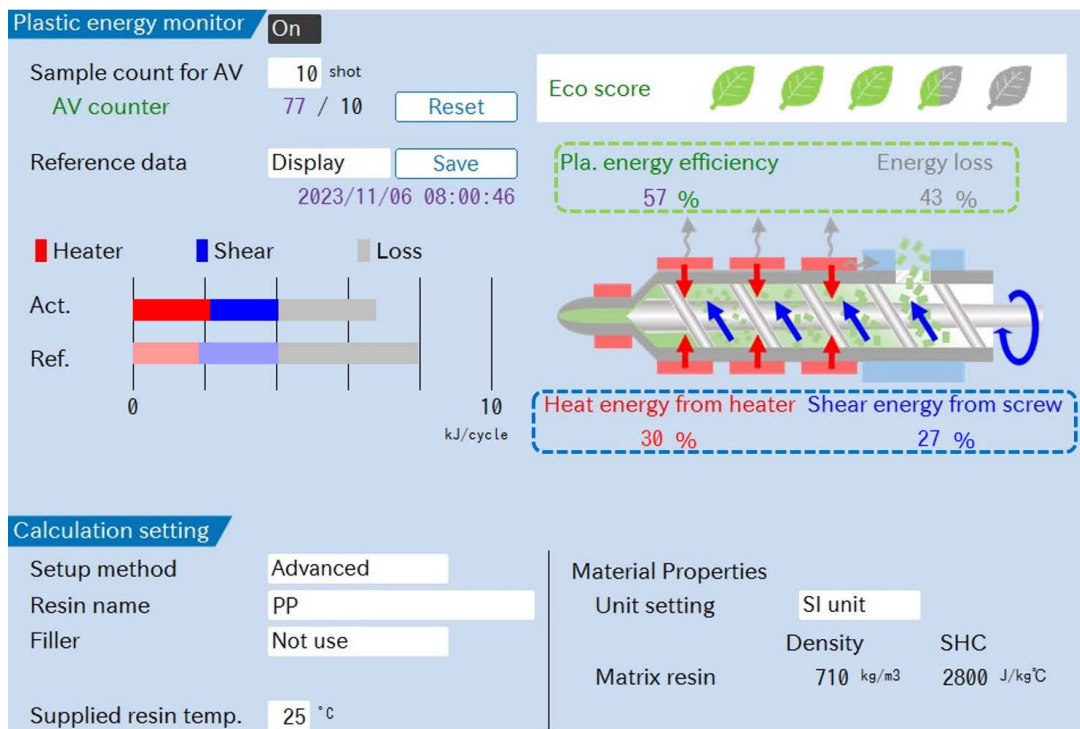


Example of thermal displacement with a break time in the middle of operation

ROBOMACHINE New Function Plasticizing energy monitor

The latest ROBOSHOT α -SiB series electric injection molding machine is equipped with a plasticizing energy monitor function that calculates and visualizes the energy balance in the melting (plasticizing) process, and support energy saving by optimizing molding conditions.

- The energy consumed in plasticizing resin is calculated and visualized in three categories: Heater, Shear, and Emission
- By referencing the heat and shear ratio, molding conditions can be adjusted so that the ratio is optimal for the variations in resin and molding applications.
- Energy loss due to heat dissipation from the injection barrel and waste heat from cooling the hopper bottom can be recognized with figures.
- The percentage of energy loss is displayed with the ECO score. By reviewing molding conditions such as barrel temperatures to improve the ECO score, less energy is lost and more energy saved.



Plasticizing energy monitor

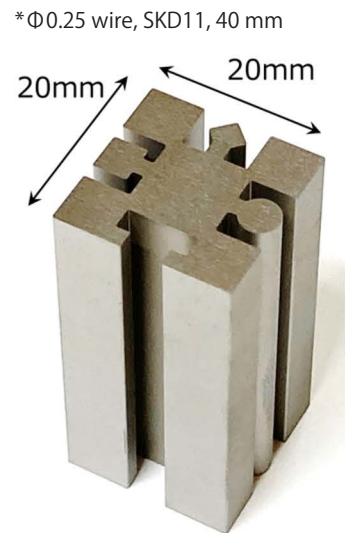
ROBOMACHINE New Product ROBOCUT α -C800i

The lineup of the latest wire electrical discharge machine, ROBOCUT α -CiC series, has been completed with the addition of the large α -C800iC (X-Y-axes travel: 800 x 600 mm).

- In terms of machining performance, an accuracy of $\pm 2 \mu\text{m}$ with five cuts and $\pm 3 \mu\text{m}$ with three cuts for complex contour shapes has been achieved with the nozzle open. High-quality machining of approach parts has also been made possible through improvements to the discharge control, iPulse3.
- For ease of use, the positioning direction can be selected by touching the screen, improving operability.
- To increase uptime, FANUC has released the ROBOCUT Robot Package. This Package facilitates the introduction of an automatic system for loading and unloading workpieces for high-mix low-volume production.



ROBOCUT α -C800iC



$\pm 3 \mu\text{m}$ with three cuts

FANUC ROBOCUT α -CiC series

Headquarters SERVO AMPLIFIER Factory

The SERVO AMPLIFIER Factory, located in FANUC Headquarters, produces the α i-B and β i-B series servo amplifiers, which drive servo motors at high speed and with high precision, as well as servo amplifiers for FANUC robots. The factory mainly manufactures with fully automated production lines that combine FANUC robots and automated warehouses. The maximum production capacity is 72,000 units per month. In order to align with recent improvements in machine performance and diversification of functions, FANUC rationally and flexibly deals with high-mix, low-volume production by introducing a production line based on a partial automation concept in which some manual processes are automated by robot modules, and a fully automated line (hereafter referred to as a “man-machine line”). In a man-machine line, FANUC has designed a manufacturing process that merges human flexibility with the precise repeatability of robots, in pursuing high quality, high productivity, space saving, layout freedom, and lighter burden on workers.

- In the fully automated production line for mass-produced models, an automated warehouse is combined with robots on rails, and the assembly process is divided into segments so that the takt time is optimal for handling mass production. Photo 1 shows the manufacturing environment of the servo amplifier α i-B series. One servo amplifier is completed in about 3.5 minutes.

- High-mix, low-volume production consists of a man-machine line that combines robot modules and manual labor. Photo 2 shows the manufacturing of the β iSVSP-B series. Robot modules with automatic sealing and screwing functions enable stable, high-quality production that does not rely on human skill, while human participation allows flexible manufacturing that can accommodate a wide variety of products.

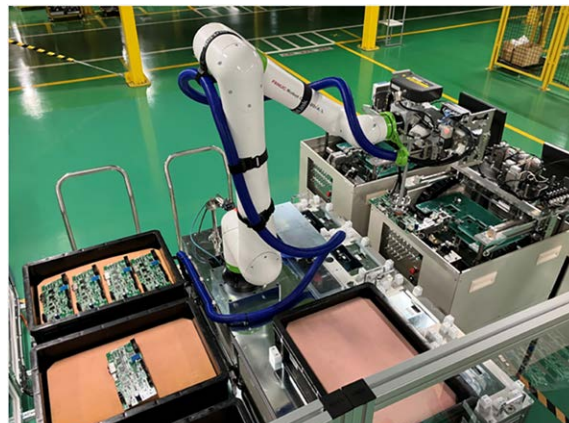
- In the testing process, collaborative robots are used to realize layouts that allow humans and robots to work closer together, resulting in improved workability and space saving. Photo 3 shows the automatic testing equipment for the new α i-D series. Reducing the fences and conveyors in the area where humans filled the printed circuit board stocker has enhanced workability, downsized equipment, and reduced costs.



Fully automated line for the α i-B series (Photo 1)



Man-machine line for the β iSVSP-B series (Photo 2)



Automatic testing equipment for the α i-D series (using CRX-20iA/L) (Photo 3)

FANUC α -i-D series SERVO Won the Main Prize of the 2023 (66th) Nikkan Kogyo Shimbun Best Ten New Products Awards

Through the Best Ten New Products Awards, Nikkan Kogyo Shimbun selects and awards the new products developed or commercialized by companies for the year, that they felt would help the development of the manufacturing industry and reinforcement of Japanese international competitiveness. FANUC's latest servo system, FANUC α -i-D series SERVO, was presented the Main Prize of the 2023 (66th) Nikkan Kogyo Shimbun Best Ten New Products Awards.

About the award-winning product: FANUC α -i-D series SERVO

The FANUC α -i-D series SERVO is a new generation of servo systems that offers not only high-performance but can also respond to changes in machining technology. Usability is also improved, such as being more compact and requiring less wiring. The α -i-D series SERVO contributes to energy saving by reducing energy loss of the entire servo system by about 10% compared to previous systems.



Certificate and plaque

FANUC M-2000iA Received the Okochi Memorial Special Production Award

In recognition of FANUC's M-2000iA contribution to the automation of ultra-heavy load transport, this 2.3 t payload robot was granted the 70th [year 2023] Okochi Memorial Special Production Award from the Okochi Memorial Foundation, in having accomplished the "development of a large 6-axis articulated robot with a maximum payload of 2.3 tons." At the award ceremony held at the Japan Industry Club Hall on March 26, Okochi Memorial Foundation Chairman Hiroo Yamasaki presented FANUC President Yamaguchi with a certificate.

Industrial robots are increasing the rate of automation in various manufacturing sites, helping to improve manufacturing quality and productivity. In the past, it was difficult to use robots to transport extremely heavy objects that weighed over a ton, such as car bodies, large machined parts and molds, due to the robots' payload capacity being insufficient. Therefore, it was necessary to rely on special lifters or manually operated cranes. To deal with this issue, FANUC developed a six-axis articulated robot capable of transporting super-heavy loads of over one ton, specifically up to 2.3 tons with a wide motion range.

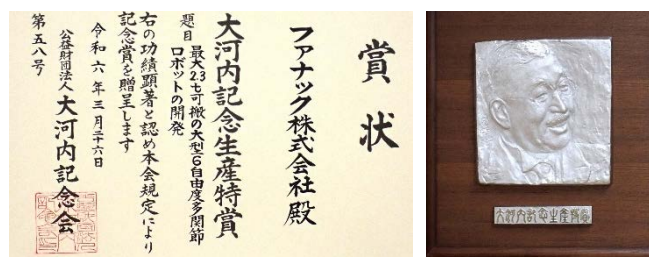
The biggest technical challenge in acquiring the ability to transport super-heavy loads greater than one ton was to significantly increase the torque of the arm axes that support the heavy loads. FANUC developed a unique structure and control technology featuring dual-motor drives on each of the main axes, and having the dual motors power a single large reducer. This allowed the robot to have both a powerful payload capacity enabling transportation of a finished car body with a large offset of its center of gravity from the wrist and a high positioning accuracy of 0.1 mm even with the extremely heavy workpieces.



M-2000iA, the large 6-axes articulated robot with a maximum payload of 2.3 tons



President Yamaguchi (center) and General Manager Abe (left) receive the award from Chairman Hiroo Yamasaki of the Okochi Memorial Foundation

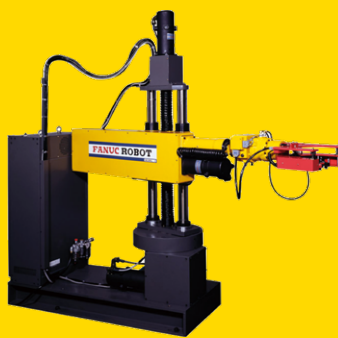


Okochi Memorial Special Production Award: Certificate and plaque

The M-2000iA is used in a variety of manufacturing industries, including automotive, construction machinery, aircraft, steel, heavy industry, and logistics, thanks to its overwhelming payload capacity of up to 2.3 tons, the highest in the world. It boasts a global market share of 100% since there are no competitors that can offer payloads exceeding 1,350 kg. With the goal of creating a carbon-neutral society, the use of electric vehicles is becoming more widespread, leading to rapidly increasing demands to automate the transport of large battery units. In addition, the adoption of manufacturing processes such as Giga Casting, which uses aluminum alloys and other materials to integrate many parts to produce a single ultra-large casting of a car body, is expected to accelerate the use of the M-2000iA.

Since receiving the Okochi Memorial Production Award in 1981 for "the practical application of a large-scale flexible production system centered on machining cells," FANUC has received the Award five times. In 2019, FANUC won the Okochi Memorial Special Production Award for the first time for the "development of a fully electric injection molding machine for ultra-high precision compact plastic parts." Following the 2019 Award, this is the second time that FANUC has won the Okochi Memorial Special Production Award.

*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's History Series 12

FANUC ROBOT MODEL 1

FANUC's cylindrical coordinate robot, developed in 1977, with a 20 kg payload and simultaneous single-axis control.

This robot was designed as an unmanned system for loading and unloading workpieces from machine tools. Once materials were placed on the table for workpieces, the robot could work automatically until all the materials were machined. If a spare tool holder was placed near the robot, automatic tool changing of a milling machine was also possible.



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