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IMTS 2022

IMTS 2022 was held at McCormick Place in Chicago, U.S., for six days from September 12 (Mon) to September 17 (Sat), 2022. The technology show was held as a real exhibition for the first time in four years and was lively throughout its duration with many visitors totaling approximately 86,000.

FANUC showcased its latest products and technologies with various live demonstrations of FA, Robot, Robomachine, and IoT products, under the theme, "Discover what's possible with Automation."



The FA area presented the latest CNC products such as FANUC iPC and FANUC Slice I/O, various technologies for high-quality machining and reduction of cycle time, as well as digital twin. Digital technologies drew particular attention for their contribution to efficient manufacturing.



The ROBOT area impressed visitors with the ease of use of FANUC's CRX collaborative robots through different demonstrations which allowed visitors to actually experience their usage. A total of 24 systems were on display, such as the handling of a sports car by a super heavy payload robot and high-precision laser cutting by M-800iA/60, and attracted many visitors every day.

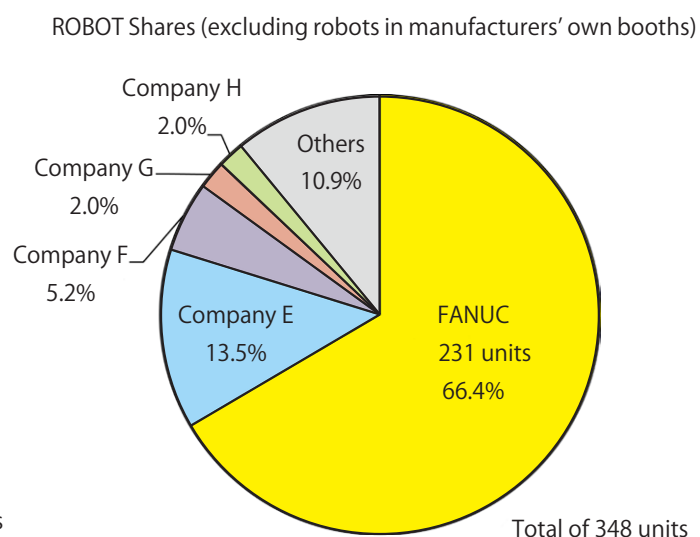
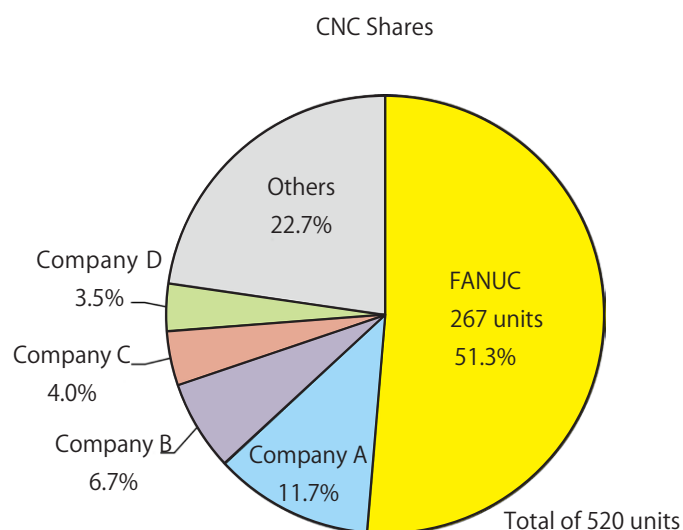
The Robomachine area had a live demo of the latest models of Robodrill α -DiB Plus, Robocut α -CiC, and Roboshot α -SiB, with which the excellence in machining and molding performance were presented. Proposals for automated systems using robots also gathered the attention of many visitors.



The IoT area showcased MT-Link*i*, AI Servo Monitor, ZDT, and various other software. Increase in productivity using digital data for operation monitoring, and preventive maintenance employing AI drew much attention.

The Service area presented FANUC's global service network, various services offered in the Americas, FabriQR Contact, and a wealth of training courses offered by the FANUC ACADEMY in different locations, making users feel reassured about using FANUC products anywhere in the world.

The shares of manufactures which exhibited machines at IMTS is as follows. We would like to express our deep appreciation to our customers who displayed our products.



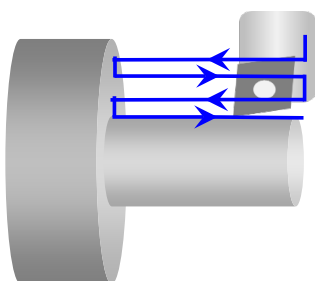
Introduction of New Products and New Features

FA New Features Turning functions to shorten cycle time and simplify programing

In pursuit of enhanced productivity in turning, FANUC has developed and continues to develop new features for more efficient turning and easier deployment of latest tools. The following are such new features for turning.

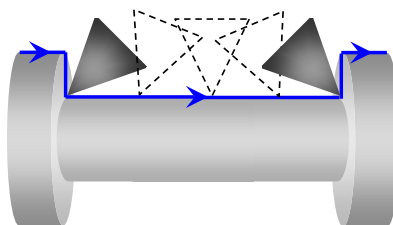
Canned Bi-directional Cutting Cycle

As bi-directional turning tools have become increasingly popular, a new canned cycle was added to accommodate such tools. Bi-directional turning can be performed with simple programming in which only the area to be machined has to be specified.



Tool Posture Turning

This feature enables a lathe equipped with a spindle for rotating tools, to machine even complex shapes without exchanging tools. This is made possible by having the tool tip follow the workpiece profile in turning. As the control of the tool posture is automated, only commands to move the two linear axes are required.



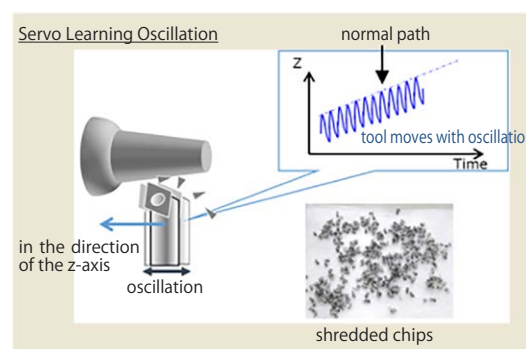
Eccentric Turning

Dedicated G code has been added for turning eccentric workpieces, such as eccentric pins. Eccentric and even ellipsoidal turning can be performed simply by programing the workpiece shape. Higher turning precision can be achieved in combination with Servo Learning Control.



FA New Feature Servo Learning Oscillation Screen for adjusting oscillation cutting conditions

Servo Learning Oscillation enables chip shredding during machining by oscillation of the feed axis. This feature eliminates the need of a chip shredder and thus saves shredding equipment costs. The feature also enhances productivity by preventing problems caused by chips, and facilitates continuous machining. It can be used not only in lathes, but also for drilling on milling machines. The Servo Learning Oscillation Screen has been developed to simplify oscillation condition settings and path visualization of oscillation movements for easier setting and reliable shredding.

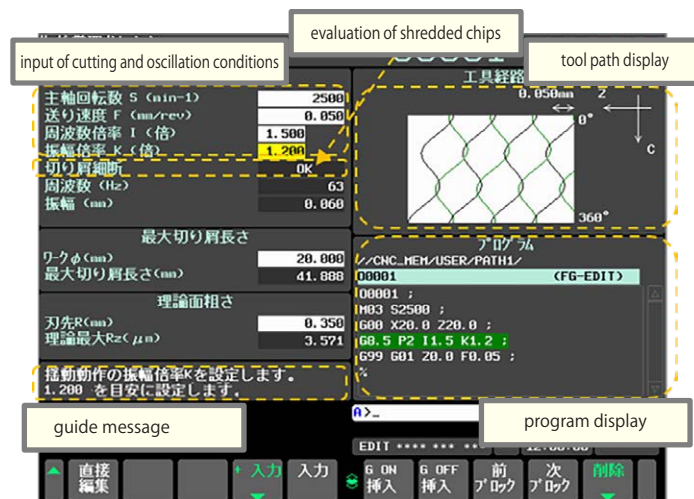


* Oscillation can only be used for one axis of choice.

By entering the conditions for cutting and oscillation following the guide on the bottom left of the screen, the evaluation of shredded chips as well as the tool path are displayed on the top left. Oscillation conditions can be adjusted by checking the results displayed.

Adjustments in oscillation conditions can be inserted into the program through the program display on the right bottom of the screen. The maximum length of shredded chips and theoretical surface roughness, which are displayed on the bottom left, can be used as reference in adjusting oscillation conditions.

The Servo Learning Oscillation screen is expected to decrease the burden of condition setting, reduce the number of test cuts, and shorten work time.



Servo Learning Oscillation Screen

ROBOT New Product FANUC Robot CR-35iB

FANUC has developed and started sales of the CR-35iB as a lighter and smaller successor to the green collaborative robot, CR-35iA.

- The CR-35iB is a collaborative robot with a high payload capacity of 35kg and maximum reach of 1,831 mm that is unchallenged by other companies. This latest model from the CR series is the culmination of FANUC's efforts in developing collaborative robots.
- Compared to the preceding model, the main mechanical unit is significantly lighter (by 61%) and lesser in height (by 18%).
- The green robot series was developed to be collaborative robots based on ordinary yellow robots that require safety fences. The CR-35iB is based on the M-20iD/35, which has a strong market reputation. Users who are already familiar with the yellow robots can easily deploy our green collaborative robots without hassle.
- In addition to the iPendant which is the conventional teach pendant, an easy-to-use Tablet Teach Pendant which allows intuitive operation, is also available.

With the CR-35iB, users can automate the handling of heavy objects, assembly, and equipping in work environments where people move back and forth, without having to set up a safety fence.



FANUC Robot CR-35iB



Handling of spare tires

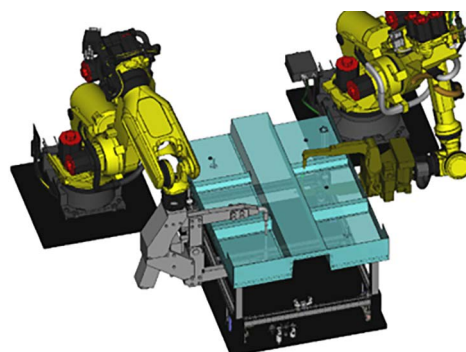
ROBOT New Feature ROBOGUIDE Automatic Path Generation

ROBOGUIDE is a PC-based simulation software for evaluating the installation of a robot system and also for offline teaching.

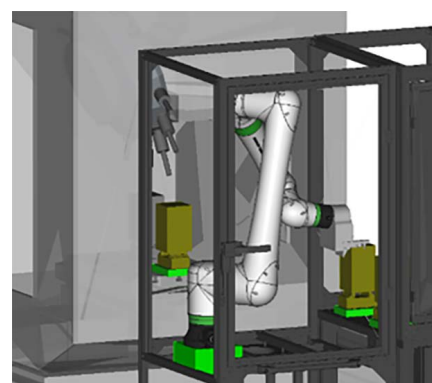
The automatic path generation function of ROBOGUIDE, which automatically generates a robot motion program on a PC, has been further enhanced.

- The new feature automatically generates a more natural robot motion path that does not interfere with peripheral equipment, in a shorter time. Users only need to specify the start and end points of the robot's path.
- For spot welding, a spot welding program, including air cut motions between welding points, is automatically generated based on the start, end, and spot welding points. CAD models of car bodies and parts with complex shapes can also be imported to ROBOGUIDE.
- In applications for handling machined parts, ROBOGUIDE automatically generates a program to transport the workpiece by specifying the positions to start a motion, and picking then placing the workpiece. Even in systems where the opening is narrow and internal space is limited, a motion path that does not interfere with other objects is identified in creating a program.

FANUC's ROBOGUIDE contributes to improving customers' productivity with the automatic path generation function which reduces the workload for teaching robots.



Automatically generates a program based on spot welding point information



Automatically generates a program for handling parts in confined space

ROBOMACHINE New Product ROBODRILL α -DiB Plus series with enhanced energy efficiency

The latest compact machining center Robodrill α -DiB Plus series has actively helped manufacturing sites achieve greater energy efficiency and has successfully improved energy saving performance.

- From the past, Robodrill has offered remarkable energy saving with the power regeneration function that regenerates the energy at deceleration of motors for spindle and feed axes.
- Energy saving settings have the flexibility of allowing specific settings, such as turning coolants and pumps off when no machining is performed. A new feature has been added to control settings for mist collectors that consume much more power compared to other peripheral devices.
- The power saving mode function saves power by decreasing the speed of acceleration and deceleration of motors for spindle and feed axes.
- The electric power consumption monitor offers real-time display of power consumption and regenerated power, as well as the power consumption history.



ROBOMACHINE New Product ROBOSHOT α -SiB series with enhanced networkability

The latest electric injection molding machine, the Roboshot α -SiB series, leverage their enhanced networkability with FANUC robots and other peripheral devices to improve the operability of an entire molding system, while simplifying connections and reducing the amount of cables required.

- The interface between Roboshot and FANUC robot supports FL-net communication (industrial Ethernet communication) in addition to the conventional I/O Link digital communication interface. Roboshot and FANUC robot exchange position information and signals in real-time so that motions can be more complex and harmonized.
- In addition to the existing SPI protocol for communicating with peripheral devices, the new Roboshot is capable of using EUROMAP82.1 (interface for temperature control devices for data exchange) and EUROMAP82.2 (interface between injection molding machines and hot runner devices for data exchange), which are new interfaces which conform to OPC UA specifications. This allows the Roboshot to centrally control peripheral devices, and makes traceability possible by collecting and recording their operation data.



ROBOMACHINE New Product ROBOCUT α -CiC series with enhanced machining performance

The Robocut α -CiC series is FANUC's latest wire electrical discharge machine. The series employs FANUC's original discharge control "iPulse3" and the SF3 power supply for finishing with which cutting performance is improved. The enhanced precision is especially effective for high-precision press molds which require cutting at a micro-precision level.

- The discharge control iPulse3 optimizes the control of feed rates and discharge energy for stable cutting of complex and extremely detailed shapes, including small corners and a continuance of corners.
- The SF3 power supply for finishing employs FANUC's newly developed circuit to generate micro-discharge pulses at a high frequency to improve machining precision in finishing.
- With such improvements, cutting precision has improved significantly even for complex and extremely detailed shapes.



IoT Product Introduction

FIELD system Case Study Kanzaki Kokyukoki Mfg. Co., Ltd.

Issues before introduction

Kanzaki sought to increase productivity by minimizing equipment downtime, and for this end, the operating rate of the company's machines had to be improved. They explored ways to raise the operating rate from the original level of 70% to 90%. Simply knowing the duration of the downtime was not sufficient. It was important to find the cause, by obtaining detailed data from the equipment and PLC. FANUC's FIELD system can obtain data that is immediately needed. Moreover, compared to products offered by other companies, only a small investment is required to visualize the operating status of a new production line during its small-scale start.

Effectiveness

With FIELD system in place, Kanzaki successfully reached the targeted operating rate of 90% and plans to speed up IoT deployment. Operation monitoring is an application for monitoring the operation of machine tools and other equipment in a factory and displaying their operating status in a list so that abnormalities can quickly be detected. Also, progress in production and delays can be displayed by analyzing the data collected from equipment, such as the number of units produced.

Solution for improving the operating rate: Previous IoT systems could provide notice of a downtime in a machine tool or equipment, but were not capable of finding the cause. The newly introduced FIELD system performs in-depth analysis of the data collected from a machine tool or equipment and visualizes the reason why it is not in operation. In this manner, FIELD system helps users to take necessary measures and enhance the operating rate.



FIELD system Case Study Maeda Precision Manufacturing Limited Kobe

Issues before introduction

In response to growing customer demand for shorter delivery times, Maeda Precision Manufacturing continues to pursue the efficient operation of their equipment. To achieve this, the client needed to minimize downtimes by swiftly responding to unscheduled outages based on accurate monitoring of the operational status of equipment, even without Ethernet connection. Equipment for high-mix low-volume production may or may not be operational for different reasons depending on the product. As such, the client chose IoT deployment with the FIELD system, given its ability to collect a variety of data from CNC machines and the extensive applications it offers even after the initial deployment.

Effectiveness of the introduced system

Real-time and accurate information obtained at the Yasutomi Plant facilitated managers to issue proper instructions. In one year, 80% of the plant equipment experienced an increase in capacity utilization by 10%. The client now intends to roll out the system to other plants and enhance the digital literacy of personnel in pursuit of more efficient plant operation and greater customer satisfaction.



FANUC Factory Introduction

Hayato Factories

Hayato Factories are surrounded by a natural forest in the Shirasu Plateau. The premises of 170,000m² with three manufacturing buildings are 10 minutes away from Kagoshima Airport by car. Since December 1991, the factories have been manufacturing servo motors, as well as pulse coders and spindle sensors for detecting the speed and position of servo motors and spindle motors with high precision. The most striking feature of these factories is the extensive deployment of robots for boosting production capacity through unmanned operation during night hours and weekends. In recent years, these factories have been deploying collaborative robots in earnest for the transition of the small β *i*Pulsecoder from

manual to automated assembly. As safety fences are no longer necessary, they saved half the space occupied earlier by conventional robots, while doubling the production capacity.

The CRX-10*i*A is a collaborative robot with a payload of 10 kg. Its wrist is equipped with *i*RVision to accurately detect the presence or position of workpieces on a pallet, screws that fasten printed circuit boards, and adjustable resistors for signal control. With collaborative robots in place, human workers can now remove any unacceptable workpieces from their production line before checking, fixing, and bringing them back to the line—all in a timely manner without stopping the robot system.



Hayato Factories



Pulsecoder assembly line



*i*RVision



*i*RVision



Signal adjustment system for the small β *i*Pulsecoder using the collaborative robot CRX-10*i*A

The 18th All Japan Student's Indoor Flying Robot Contest

The 18th All Japan Student's Indoor Flying Robot Contest was held at Katayanagi Arena on the Kamata Campus of Nihon Kogakuin College from September 23 (Fri) to September 25 (Sun), 2022. The contest instills manufacturing spirit among students and serves as a good occasion for developing their manufacturing skills, especially in aircraft design and control. Despite the difficulties posed by the COVID-19 pandemic as in the year before, the exciting contest hosted a record-high number of participating schools. There was a total of 72 teams from 43 schools, including two schools from

Thailand as the first teams from abroad.

Participants competed in the categories of flight performance, flight control and auto-piloting of aircrafts by completing missions such as transporting goods and automated flights.

FANUC has been a special sponsor for this contest which brings together skilled students who can immediately take on professional work. This year, the FANUC Award was presented to Chiba Institute of Technology as the winner in the auto-pilot category.



Contest scene



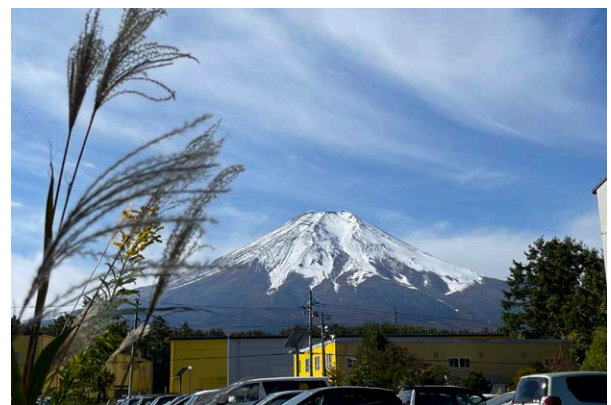
Awards ceremony



Robot on display

Four Seasons of FANUC

The cover photo had been taken a week earlier than this picture from the same spot. Mount Fuji changed its attire in just a few days, to be snowcapped depicting a winter scenery. Even in October, the temperature in Oshino Village, home to FANUC Headquarters, sometimes drops close to zero degrees Celsius in the mornings and evenings, and light snow falls. Such untimely changes in the seasons hints of the onset of a harsh winter.



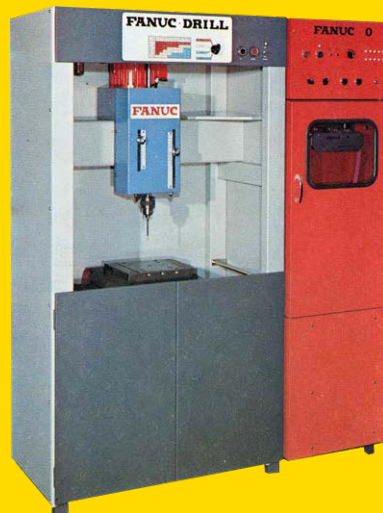
Lance asiabell

These round nodding bell-shaped flowers appear greenish-white on the outside, but their hidden interior is bright red-purple. This plant from the bellflower family was widely used in Asia as an edible wild vegetable and a natural medicine.



Touch-me-not

The round bag-shaped flower is full of nectar which attracts bumblebees. The seed pods burst when touched even lightly to scatter seeds far away.



FANUC's History Series 6

FANUC·DRILL

In 1972, FANUC internally developed this low-cost NC drill which was dedicated to drilling holes, and named it "FANUC·DRILL."

In those days, numerical control was rarely used in drilling. In order to spread the use of NCs in the drilling sector, FANUC developed this compact low-end machine tool, which other manufacturers had little interest in developing.

At a trade show, FANUC·DRILL was displayed alongside The Gleaners by Millet, symbolizing FANUC's determination to become a pioneer in fields neglected by other machine tool manufacturers.



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