

FANUC's high-end CNC with extremely polished machining performance

FANUC

Series 30i/31i/32i

-MODEL B Plus



FANUC's high-end CNC with extremely polish

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

More powerful and easier to use

- Further improved productivity and high-quality machining with High-speed CPU
- Improved basic performance (required functions are included as standard)

Customizable functions for characteristic screens and operation

Advancing the IoT adaptability with Multi-function Ethernet

Extended memory capacity for storing large sized program

- Renewed design
- Equipped with FANUC 's latest CNC and servo technologies
- Combination of CNC and robot (CNC-QSSR)

Mach
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Significantly improved C

▶ Adopt high-speed CP

Improved productivity thr

▶ Fast Cycle-time Tec

Achieves high-quality

▶ Fine Surface Techno

5-axis machine tool wit

▶ 5-axis Integrated Te



Prevent sudden machine downtime with preventive maintenance

▶ Extensive failure prediction functions

Reduce recovery time by easily pinpointing faulty parts

▶ Diagnosis/maintenance functions

Minimizing
Downtime

ed machining performance

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mance

Optimal CNC based on the application

Multi-axis and multi-path CNC

FANUC Series 30i-MODEL B Plus

Max. number of paths : 10 - 15 paths

Max. total number of controlled axes :

96 axes (72 feed axes, 24 spindles) / 10 paths

72 axes (56 feed axes, 16 spindles) / 15 paths

Max. number of simultaneous controlled axes : 24 axes

CNC with support for simultaneous 5-axis control

FANUC Series 31i-MODEL B5 Plus

Max. number of paths : 6 paths

Max. total number of controlled axes : 34 axes (26 feed axes, 8 spindles)

Max. number of simultaneous controlled axes : 5 axes

Core CNC

FANUC Series 31i-MODEL B Plus

Max. number of paths : 6 paths

Max. total number of controlled axes : 34 axes (26 feed axes, 8 spindles)

Max. number of simultaneous controlled axes : 4 axes

Standard CNC

FANUC Series 32i-MODEL B Plus

Max. number of paths : 2 paths

Max. total number of controlled axes : 26 axes (18 feed axes(including Loader control system), 8 spindles)

Max. number of simultaneous controlled axes : 4 axes



Integrated support of the shop floor

▶ **FANUC iHMI**

Original screen for ease of use

▶ Comes standard with customizable functions

IoT integration

▶ Extensive compatibility with field networks

Ease of Use

System Configuration

CNC Control Unit (LCD mounted type/stand-alone type)

The display lineup supports a wide range of machines, from compact to large, including the FANUC *i*PC and PANEL *i*H with *i*HMI support, a 10.4" LCD unit, and more.



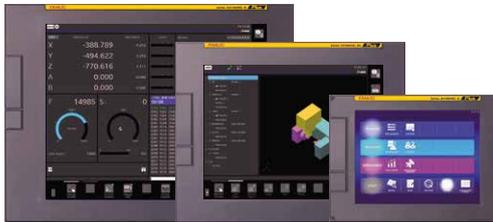
FANUC *i*PC
24"



FANUC *i*PC
21.5"



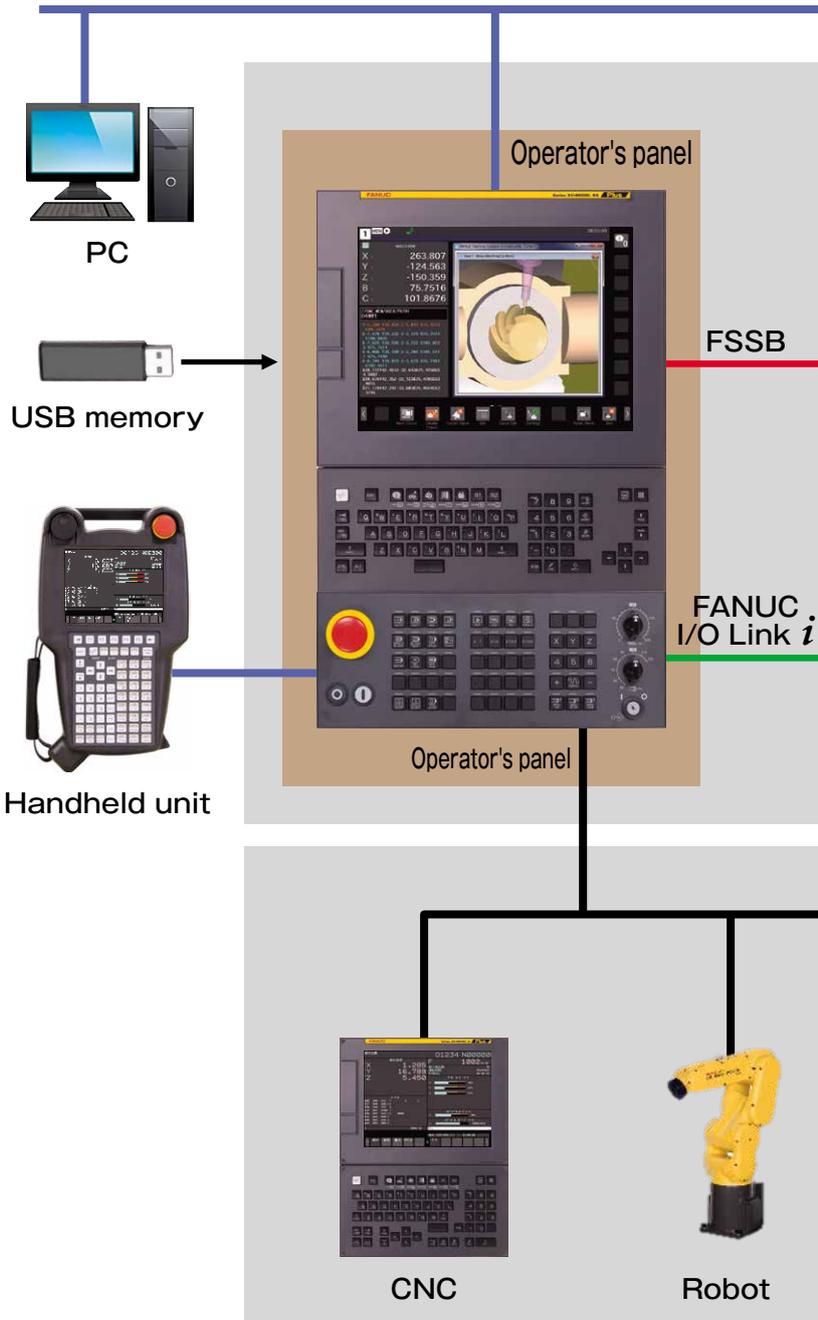
FANUC *i*PC
15"



PANEL *i*H/*i*H Pro
19"/15"/10.4" LCD



Standard display
10.4" LCD



Handheld Unit

Equipped with an emergency stop button and a manual pulse generator, this handy unit line-up achieves safe manual operation of machine tools.



*i*Pendant



Handy Machine
Operator's Panel



Portable manual
pulse generator

I/O Unit

Wide range of I/O units compatible with various installation locations and I/O devices.

Optimized for operator's panels with its thin and space-saving design

Standard operator's panel with key input duplication



Safety Machine
operator's panel

Handles the output/input of safety signals



I/O module for operator's panel
supporting safety function

Compatible with original operator's panels



I/O module for
operator's panel

Optimized for control cabinets with high scalability and

Excellent cost performance with multi-point output/input



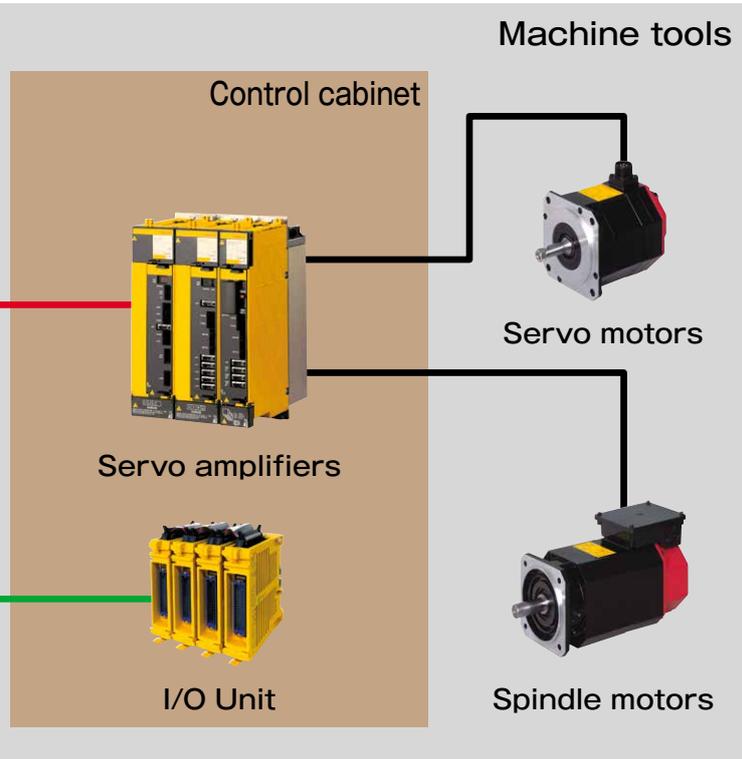
I/O unit for power
magnetics cabinet

Compact and with reduced wiring



I/O unit for
connector panel

Ethernet



Servo Motor

Line-up to meet the various needs of machine tools and contribute to the performance improvement of feed axes



AC SERVO MOTOR
αi-B/βi-B series



DD MOTOR
DiS-B series



LINEAR MOTOR
LiS-B series

Spindle Motor

Line-up to meet the various needs of machine tools and contribute to the performance improvement of spindles



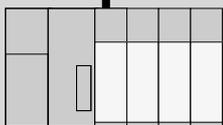
AC SPINDLE MOTOR
αi-B/βi-B series



BUILT-IN SPINDLE MOTOR
Bi-B series

Field networks

Peripheral equipment



Peripheral device

Compatible with various field networks

- FL-net
- EtherNet/IP
- PROFINET
- Modbus/TCP
- CC-Link IE Field
- DeviceNet
- PROFIBUS-DP
- CC-Link

Servo Amplifier

Line-up to be flexibly available for a variety of machine tools and contribute to the downsizing of cabinets



SERVO AMPLIFIER
αi-B series



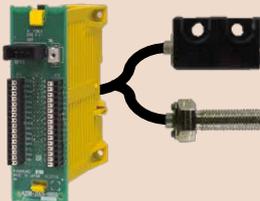
SERVO AMPLIFIER
βiSVSP-B series

Reduced wiring work with a dismantlable pole terminal block



Terminal Type I/O unit

Effective for thermal displacement compensation with multi-point temperature sensor input



Temperature sensor input unit

Extensive modules including analog, temperature input, and high-speed counter



I/O Unit-MODEL A

Optimized for reduced wiring by enabling distributed setup

Can be positioned near sensors scattered inside and outside the machine cabinet

IP67 type

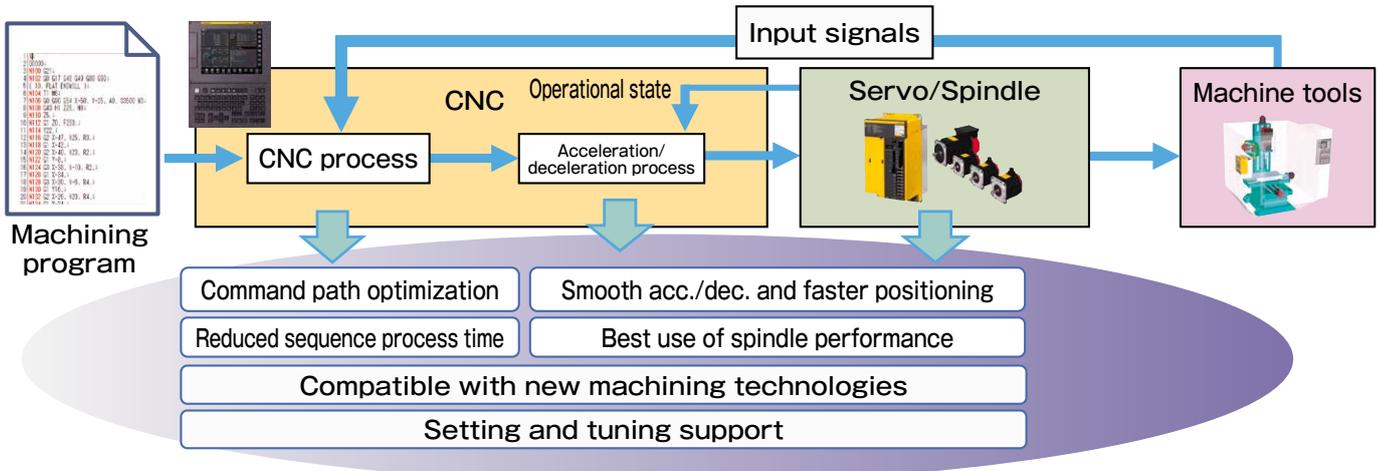


I/O Unit-MODEL B

High Performance

Fast Cycle-time Technology

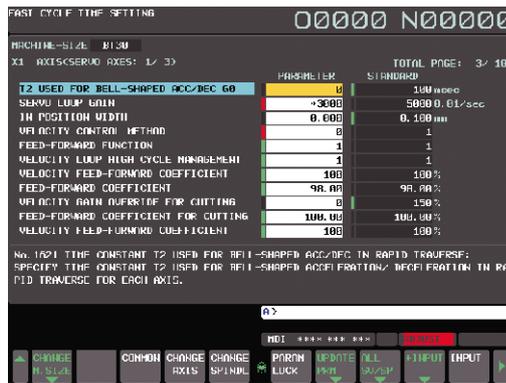
Fast Cycle Time Technology refers to CNC and servo technologies that achieve reduced cycle times. It reduces cycle times of machining programs through methods such as accelerating and decelerating depending on the operational state, making the best use of spindle performance, and reducing the sequence processing time for external signals.



Fast Cycle-time setting

Easily reduce cycle times

The Fast Cycle-time setting compares the currently set parameter setting to the FANUC default setting, allowing you to easily use the setting that most effectively reduces cycle time.



Reduced cycle time example:
Workpiece for evaluation



Before application 4 minutes 33 seconds → After application 3 minutes 58 seconds
Approx. 13% reduction

Smart Servo Control

Smart Servo Control is a group of functions to optimize control in real time according to the change of machine conditions such as load and temperature. These functions contribute to high-speed, high-precision and high-quality machining as the control technology supporting Fast Cycle-time Technology and Fine Surface Technology.

Smart Spindle-load Control

Smart Rigid Tapping

Smart Thermal Control

Smart Feed-axis Acc/Dec

Smart Spindle Acc/Dec

Smart Load Meter

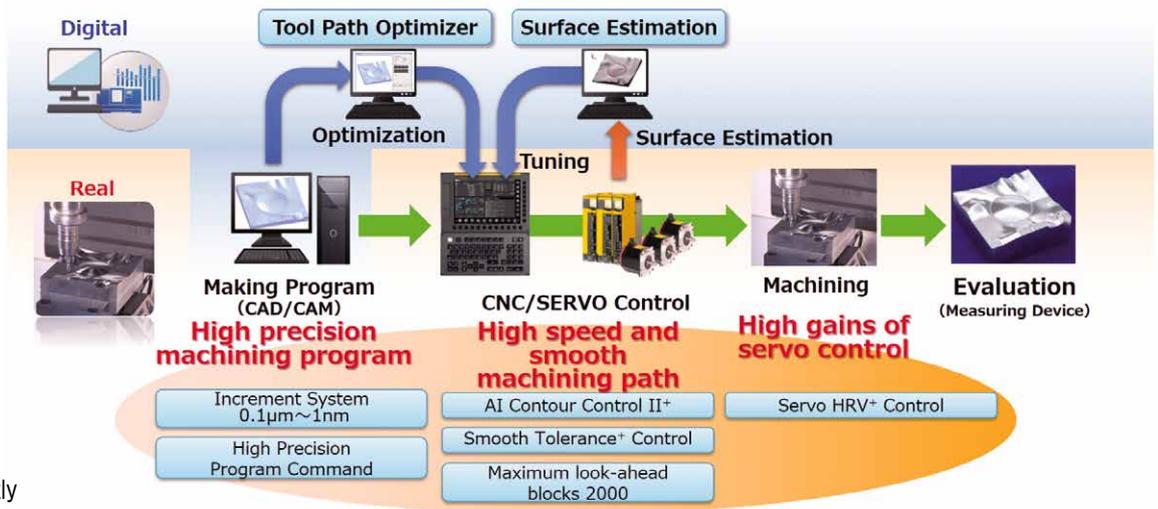
Smart Overlap

Smart Backlash Compensation

Smart Machining Point Control

Fine Surface Technology

Fine Surface Technology is a collective term for CNC and servo technologies that achieve fine surface machining. This technology allows for the interpolation of high precision machining program output from CAD/CAM, high-speed execution of small segment programs, the generation of a smooth tool path and accurate command follow-up. These tasks more efficiently by taking digital technology.



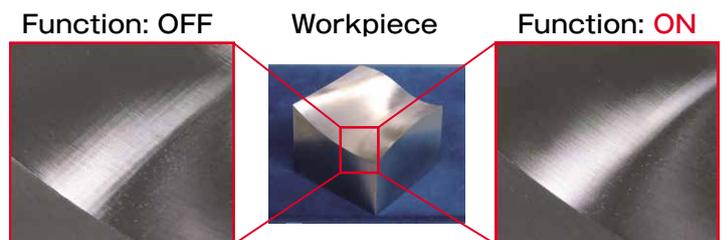
Fine Surface settings

Standard setting values are provided based on machining conditions (roughing, semi-finishing, or finishing), and slide bars can be intuitively used to set and adjust high-speed, high-precision machining parameters based on the machine. Machining under optimal conditions can be achieved by selecting machining processes during the machining itself using a machining program or screen operations. Settings for each machining condition can be saved for up to 10 patterns.



Smooth Tolerance+ Control

Smoothing continuous small blocks to realize fine surface machining. The machining path specified in continuous small blocks, like the one for mold machining, is smoothed out within the specified allowance error tolerance. The smooth machining path reduces mechanical shock and improves the quality of the machined surface.



Joints of blocks are visible

Smooth machined surface

Servo Learning Control/ Servo Learning Oscillation

Servo learning control enables high-speed, high-precision machining of workpieces that require repeatable cutting commands, such as aspherical workpieces, gears, and so on. Servo learning oscillation that applies servo learning control also accurately tracks oscillation commands with a high frequency, thereby achieving dependable chip shredding.

Example of the application of servo learning control

Aspheric lens Piston (Non-cylindrical) Example of piston machining

Spindle: 4500min⁻¹
Swing axis: 150Hz

EllipseLong and short diameter difference=0.4mm

Error 2µm or less

Combinations with a DD or liner motor are particularly effective for achieving high-precision machining.

Servo Learning Oscillation Normal path

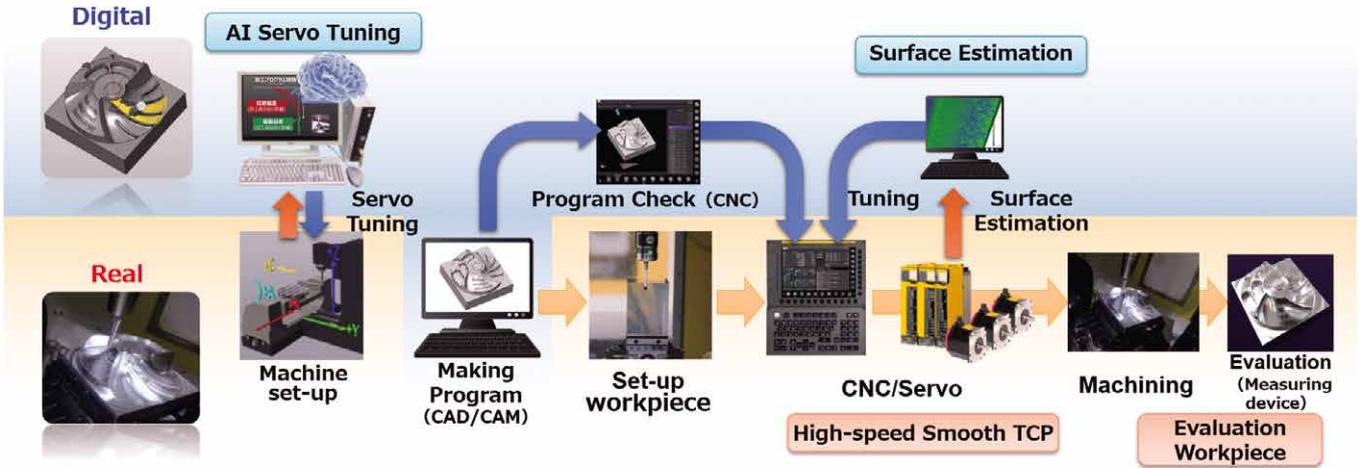
Z axis direction Oscillation

Note) Oscillation works on any one axis only

Shredded chips

5-axis Integrated Technology

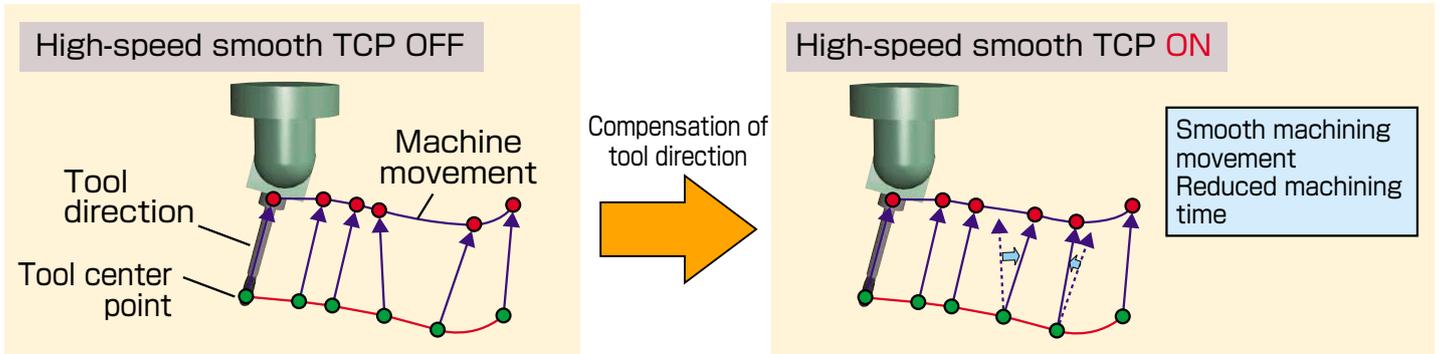
5-axis Integrated technology is used to achieve 5-axis machining that is even easier to use and higher in quality. High-quality 5-axis machining is achieved through strong support for all 5-axis machining processes, from machine setup to program creation and machining evaluation. In addition to die cutting, machining that is high-speed, high-precision, and smooth is also achieved when it comes to part machining, which demands speed.



High-speed Smooth TCP that Achieves Smooth High-speed and High-quality 5-axis Machining 307-B/31i-B5 Plus Only

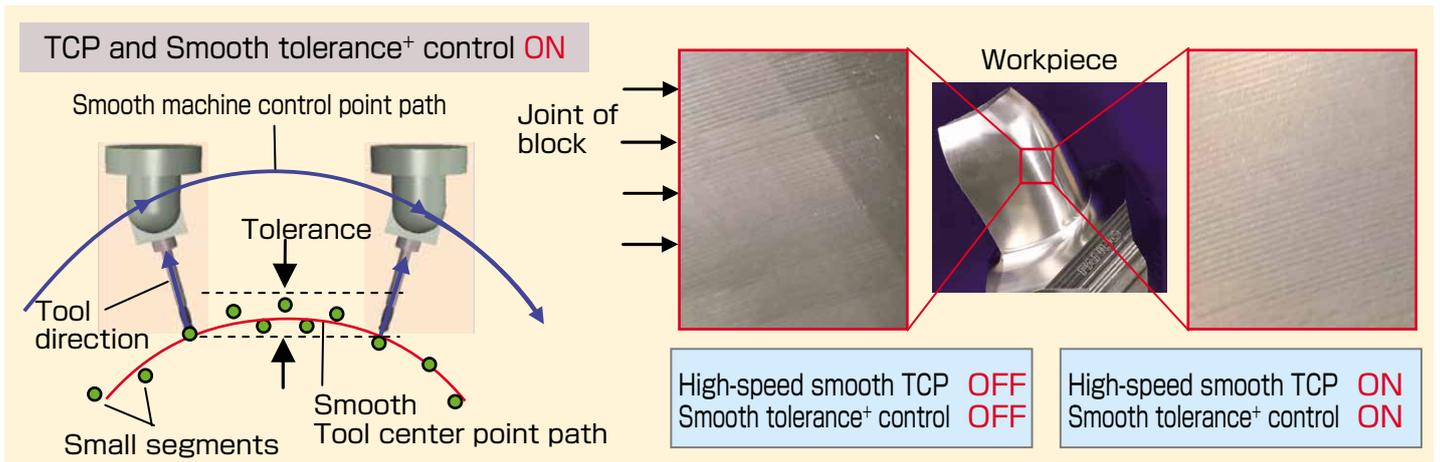
High-speed and smooth simultaneous 5-axis machining

High-speed smooth TCP makes the machining movement smooth by compensating tool direction to decrease the unevenness, and improves the quality of the machined surface and reduce machining time.



High-precision simultaneous 5-axis machining using Smooth tolerance+ control

By combining high-speed smooth TCP and smooth tolerance+ control, the quality of the cutting surface is improved greatly by smoothing the tool center point path even if machining programs consists of unnecessarily small segments.



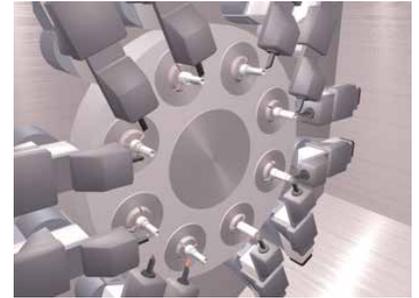
Flexible Support of Various Mechanical Configurations

Ease of Use

Expanded Multi-axis and Multi-path Functions

Multiple functions for multi-axis and multi-path control

- A single CNC can achieve complex control of a multi-path lathe with many turrets, compound machine tool with a milling head, or automatic lathe requiring many axes and command systems.
- This CNC provide many functions required for multi-path control, such as synchronous/composite control, superimposed control, flexible axis assignment, waiting function, and interference check.
- A combination of high-speed, high precision control technology that FANUC has cultivated for years and multi-axis multi-path control technology further promotes improvements in precision and efficiency of lathes and automatic lathes.



Rotary index machine

Excellent Operability

Ease of Use

Large Capacity Program Memory

You can use large capacity program memory that can store large sized program. Programs stored in program memory can be operated by memory operation. Also, edit can be done.

Extended Program Memory (CF card)

Using CF card installed in memory card slot of display unit as program memory.

- Maximum capacity is about 2GB.
- Recommended if you use standard display unit.
- Having excellent cost performance.
- Total number of programs and folders that you can register has expanded to 1000.

Extended Program Memory (PC)

Using HDD/SSD of PC like PANEL *iH/iH Pro* as program memory.

- Maximum capacity is 40GB.
- Recommended if you use display unit with PC function like PANEL *iH/iH Pro*.
- Having excellent cost performance.
- High speed GOTO jump and high speed search can be done.

Easy Robots Connection and Control

Ease of Use

CNC-QSSR

QSSR (Quick and Simple Startup of Robotization) is function to quickly and easily integrate robots into machine tools. Four functions are available, QSSR CONNECT, QSSR G-CODE, QSSR AUTO PATH and QSSR ON SITE.



QSSR CONNECT

This function makes it easy to connect robots to machine tool, to program and to verify the status of operation.

- Easy connection using one Ethernet cable
- Easy setup using the guidance function

QSSR G-CODE

This function makes it possible to control robots from CNC.

- By using CNC program (G-code commands), robots can be controlled like a loader
- By using familiar machine tool handles, robots can be positioned and taught easily from CNC screen

QSSR AUTO PATH

This function makes it possible to automatically generate a robot path that does not interfere with PC tools.

- Automatically generate path that does not interfere with the machine tool just by specifying the start point and end point
- The generated path can be confirmed by simulation, reducing man-hours for teaching robot.

QSSR ON-SITE

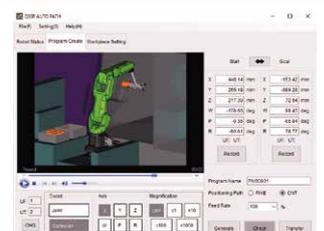
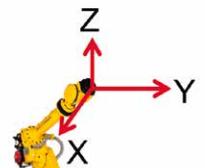
Robots can be installed on existing machines without changing machine tools.

- No need to change ladder and software of machine tools
- Interlock CNC with robots via macro variables

Manual Pulse Generator



G-code



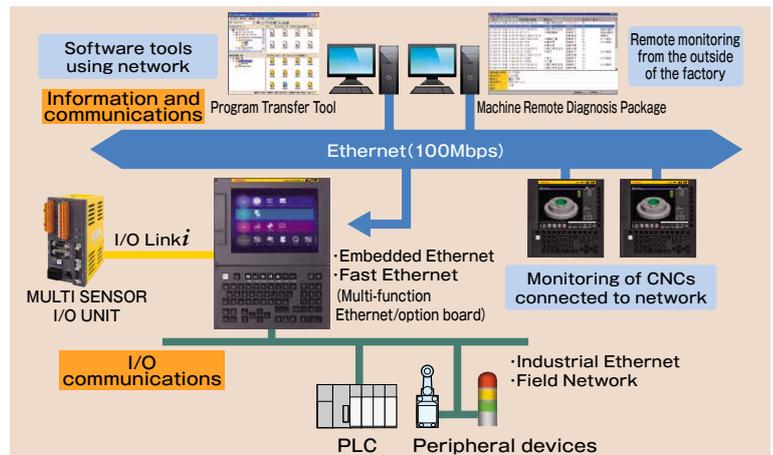
Network Support Functions

Ease of Use

Advancing the IoT adaptability of CNC machine tools with extensive network functions

Ethernet / Industrial Ethernet / Field Network

Multi-function Ethernet is included as standard in addition to embedded Ethernet. Moreover, information communication functions such as NC program transfer and remote diagnosis are supported as standard, as is control I/O communication. Multi-function Ethernet enables high-speed communication using a dedicated processor, and can be used for various types of industrial Ethernet communication. Various types of field networks are also supported as options. Industrial Ethernet and field networks enable connection with various peripheral devices, that includes the control of peripheral devices such as waterproof I/O devices and the collection of sensor information. It is also possible to read information from collision sensors, temperature sensors, etc., through an I/O Link*i*-connected multi-sensor I/O unit.



Supported Industrial Ethernet/Field Networks

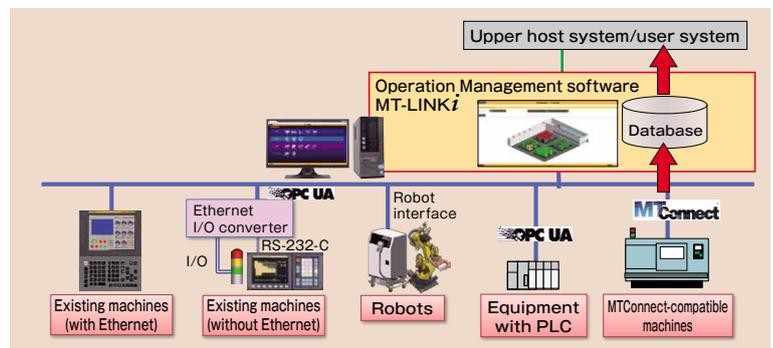
- FL-net
- EtherNet/IP (master/slave)
- PROFINET (master/slave)
- Modbus/TCP (slave)
- CC-Link IE Field (slave)
- DeviceNet (master/slave)
- PROFIBUS-DP (master/slave)
- CC-Link (slave)

FANUC MT-LINK*i* (Operation Management software)

MT-LINK*i*

MT-LINK*i* is a software product that can collect, manage, and help visualize various information of machines connected via Ethernet. It helps visualize the machines in factories, and contributes to minimizing downtime.

- It can collect device information not only from machine tools equipped with FANUC CNCs, but also from FANUC robot controllers, OPC-compatible PLCs, and MTConnect-compatible machine tools.
- Information of existing devices that do not have Ethernet I/F can also be collected by using an Ethernet I/O converter.
- Many standard screens that display various pieces of information such as the operational states and operational results of machines are available.



Standard screen example)



Overview screen

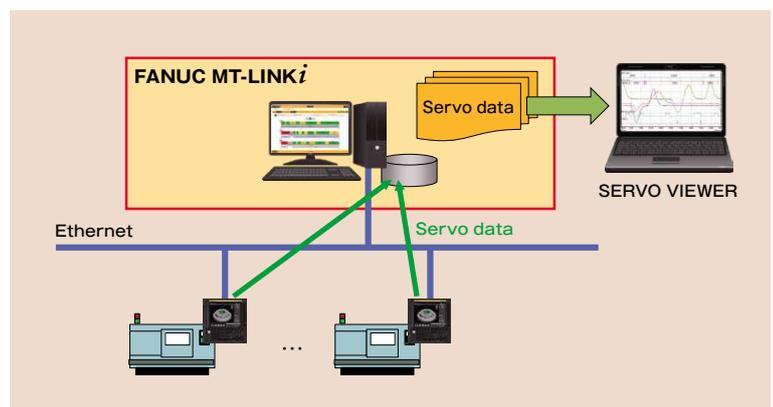


Operational results screen

Visualization of machine operation

A combination of MT-LINK*i* and SERVO VIEWER makes servo data and various status signals to be collected, achieving the visualization of detailed machine operations.

- High-speed sampling (1 ms) servo data is efficiently collected from multiple machine tools.
- Various schedule and trigger functions enable efficient analysis by collecting only required data at the right timing.



High-Speed, Large Capacity, and Multi-path PMC

High-Speed and Large Capacity

The internal PMC functions can also process large-scale sequence control at a high speed through the use of a powerful dedicated processor and the latest custom LSI.

- Program capacity Max. 300,000 steps (Total of all PMC paths)
- Internal relay (R) Max. 60,000 bytes
- Data table (D) Max. 60,000 bytes
- PMC paths Max. 5 paths (Max. 40 ladder programs)

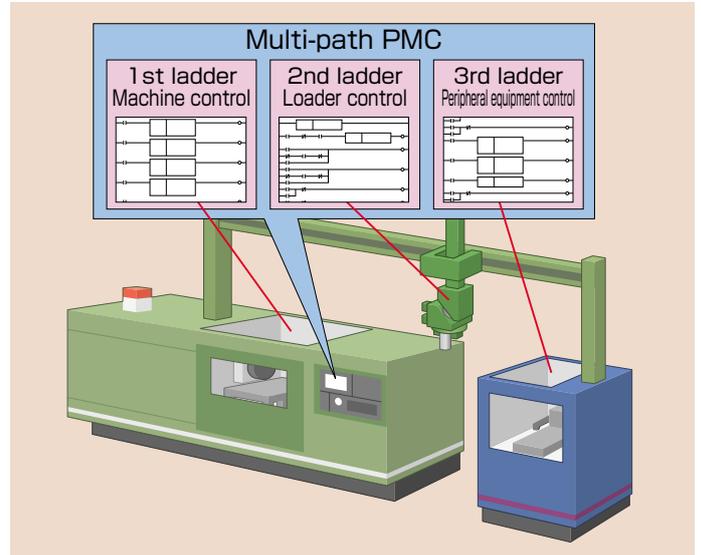
Multi-path PMC

One PMC can execute up to five independent ladder programs, including loader control and peripheral equipment control.

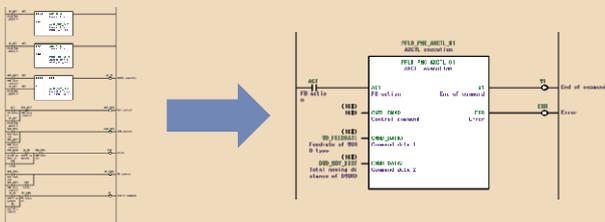
- Ladder programs can easily be developed according to each user's machine configuration.
- Cost reductions are achieved by eliminating external PLCs or other devices for peripheral equipment control.

Function Block function

- This function enables repeated ladder circuit patterns to be arranged in function blocks and easily reused.
- The PMC function libraries attached to FANUC LADDER-III include functions ready for immediate embedding such as PMC axis and peripheral equipment control, and can be freely customized.

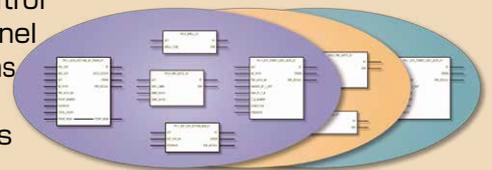


Reuse ladder circuits as function blocks



A full range of libraries are included in FANUC LADDER-III

- PMC axis control
- Operator's panel
- Spindle functions
- I/O devices
- CNC functions
- Others



Safety Functions

Improvement of the Safety of Machine Tool and Machining Line

Dual Check Safety Function

This is a safety function integrated into the CNC that conforms to ISO 13849-1 PL d.

Multiple processors perform dual monitoring of the actual positions, speed, and safety-related I/O of servo motors and spindle motors, securing a high level of safety by providing duplicated paths for cutting off power.

Network safety function

By combining this function with the Dual Check Safety function, safety functionality of the machining line is achieved.

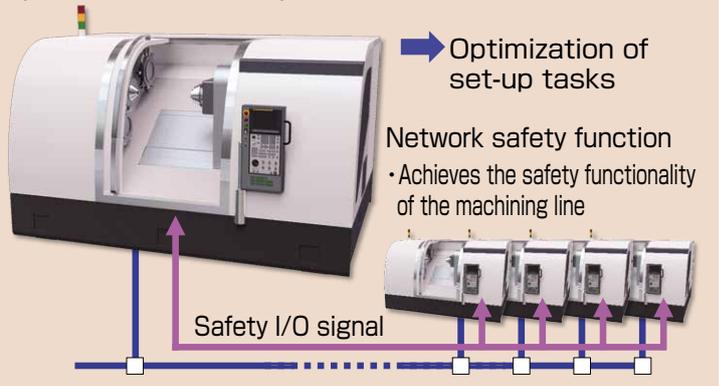
- Safety function by FL-net
- EtherNet/IP Adapter Safety function
- PROFINET IO Device Safety function
- PROFINET I/O Controller Safety function

Safe Torque Off (STO) function

This is a safety function integrated in servo amplifiers that conforms to IEC 61800-5-2. Motor power can be safely cut off by the duplicated cut-off path within the amplifier.

Dual Check Safety Function

• The machine can be operated safely while the protective door is open



Functions for minimizing downtime

Contribution to Preventive Maintenance

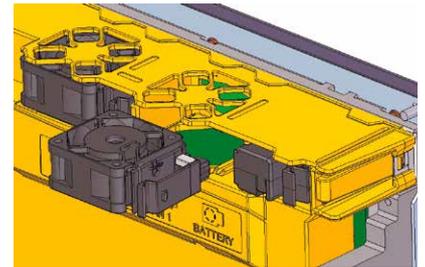
Leakage Detection Function

In a harsh environment of a cutting coolant, the coolant may infiltrate into a motor and the machine may stop suddenly due to the insulation deterioration. The Leakage Detection Function built into the amplifier automatically measures the insulation resistance of motors, and detects the insulation deterioration before the machine leads to stop, enabling preventive maintenance.



Cooling Fan Warning Function

By monitoring a decrease in the rotational speed of each cooling fan motor of the CNC and the servo amplifier, signs of fan abnormalities can be detected. This function enables preventive maintenance. Fans are stored in a cartridge and can be replaced quite easily, so maintainability is enhanced.



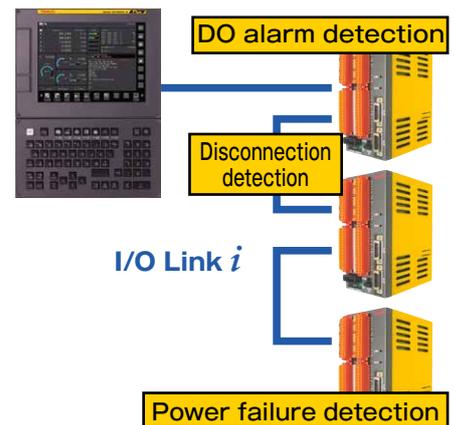
Failure Part Detection

Trouble Diagnosis Function

Various failure detection functions provided to the I/O Link *i* and FSSB can detect interruptions in the power supply to the I/O modules or servo amplifier and identify disconnection locations of the communication cable. In addition to that, I/O Link *i* can detect the ground fault of each DO.

The trouble diagnosis function enables you to see diagnosis information helpful in determining the status when an alarm occurs on the CNC screen.

- Trouble diagnosis guidance screen
- Trouble diagnosis monitor screen
- Trouble diagnosis graph screen



Encoder Communication Check Circuit

This check circuit enables a quick recovery from encoder communication alarm by identifying which part such as encoder, feedback cable or servo amplifier has failed.



Prevent Machine Damage at Power Failure

Machine Protection at Power Failure

Damage of machines and workpieces at power failure is prevented where a power supply is unstable or in a lightning-prone areas.

- Gravity-axis drop prevention
The holding brake of gravity axis are quickly activated by detecting power failure in the circuit incorporated into the amplifier.
- Stop distance reduction *1)
Feed axes are quickly stopped to avoid a crash in high-speed machine tools.
- Retraction *2)
The tool is retracted from the workpiece while keeping synchronization in gear cutting machines and others.

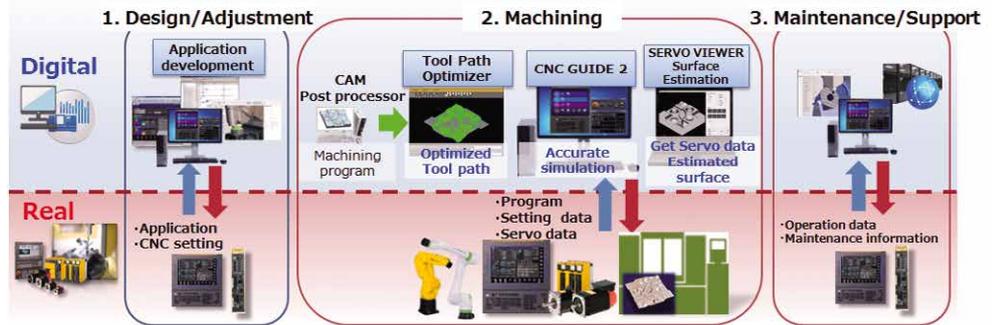


Digital Twin for FANUC CNC

Supporting productivity improvement for machine tool makers and machine users

Supports efficiency for machine tool design, processing and maintenance

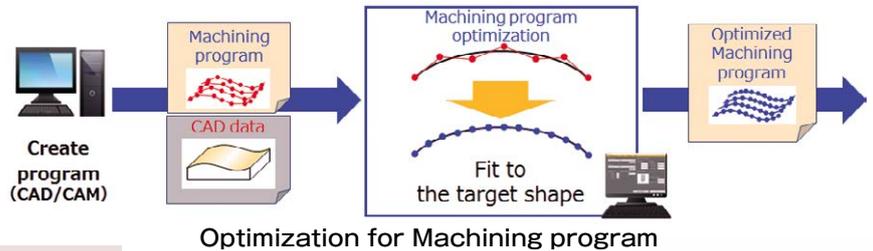
FANUC's Digital technology centered on CNC GUIDE2 and SERVO VIEWER are fused with real information such as servo data, to provide as a lot of tools for efficient to streamline a series of processes such as machine design, machining and maintenance.



FANUC Tool Path Optimizer

It is a software tool that compensates the tool path of the machining program using the machining shape (CAD data).

- Input the machining program and CAD data, and output the machining program optimized for FANUC CNC.
- It can be optimized regardless of the type of CAM that generated the machining program, and high-quality machining can be achieved.
- The quality of the machined surface is improved by reducing scratches and steps on the machined surface caused by the tool path.



FANUC CNC GUIDE2

It is a software tool that can verify the CNC function on a personal computer. It faithfully reproduces CNC operations such as acceleration / deceleration and smoothing functions, and it can accurately simulate tool paths and machining times.

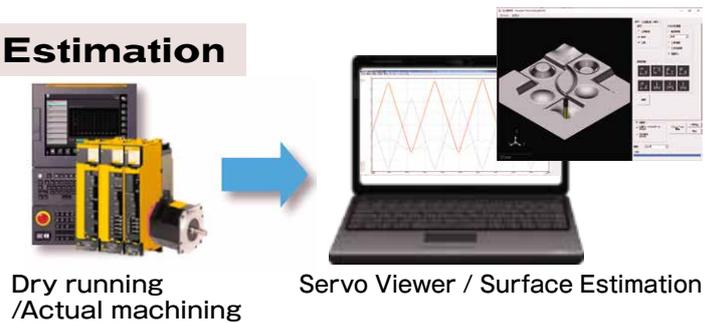
- In cooperation with Tool Path Optimizer and Surface Estimation, it is possible to optimize the machining program and simulate the machining surface.
- In cooperation with FANUC PICTURE and FANUC LADDER III, it is possible to efficiently develop / debug custom screens and ladder programs. In addition, it can be boiled a CNC simulation environment easily by connecting to CNC and acquiring parameters, programs, customized data of FANUC PICTURE, etc.
- By connecting the MOP simulator that integrates the MDI and the operation panel, it is possible to train CNC operation with the same operation feeling as an actual machine tool.



FANUC SERVO VIEWER Surface Estimation

By dry running the machining program on the machine before actual cutting, the machining surface is estimated from the measured servo position data and tool information of each axis.

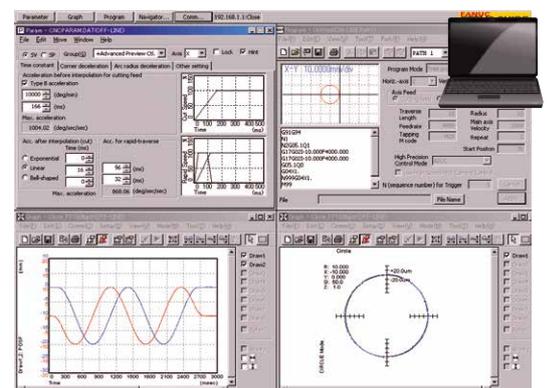
- The motion on the machine tool is simulated by digital technology, and the machining result close to the actual machining is estimated.
- Productivity is improved because the quality of the machined surface can be confirmed by dry running without actual cutting.



Support of Efficient Servo Tuning for High-Speed and High-Precision Machining

FANUC SERVO GUIDE

FANUC SERVO GUIDE supports you to perform tuning of the servo and spindle in an integrated manner, including creating test programs, setting parameters and measuring data. You can use it easily by connecting a PC to a CNC directly. In addition to the motions of each servo axis and spindle axis, you can observe program execution status inside the CNC and PMC signals as waveform data and analyze the machine operation in detail. Continuous measurement for a long period is also possible. Tuning Navigator offers automatic process for tuning gain, filter and others and enables you to perform the advanced servo tuning in a short time. The automatic tuning function for protrusion compensation significantly shortens the time of tuning for high-speed and high-precision.



Service & Support

Excellent Maintenance Services

FANUC service team delivers customer trust and confidence based on direction of service “Maximizing Uptime”, “Global Service” and “Lifetime maintenance”.

Service First

Conforming to the spirit of “Service First”, FANUC provides lifetime maintenance to its products for as long as they are used by customers, through more than 260 service locations supporting more than 100 countries and regions throughout the world.

Maximizing Uptime



Global
Service



Lifetime
Maintenance

FANUC ACADEMY

FANUC ACADEMY operates versatile training courses to develop skilled engineers effectively in several days.



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