FANUC Series 30i/31i/32i/35i -MODEL B



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Nano CNC for High-Speed, High-Accuracy machining.

Wide Application Range

Select the CNC model best suited for the application.

FANUC Series 311-MODEL B

Max. number of paths: 4 paths

Max. total number of controlled axes: 26 axes (20 feed axes, 6 spindles)

Max. number of simultaneous controlled axes: 4 axes

With the world's highest level of performance, This is the core FANUC CNC model. With abundant functions and advanced control technology, it is ideal for high performance lathes and machining centers.

FANUC Series 31i-MODEL B5

Max. number of paths: 4 paths

Max. total number of controlled axes: 26 axes (20 feed axes, 6 spindles)

Max. number of simultaneous controlled axes: 5 axes

The 31i-B5 has 5-axis simultaneous machining functions and can machine complex shapes at high-speed with high accuracy and high quality. It is best suited for leading edge 5-axis machining centers

FANUC Series 32i-MODEL B

Max. number of paths: 2 paths

Max. total number of controlled axes: 16 axes (10 feed axes, 6 spindles)

Max. number of simultaneous controlled axes: 4 axes

This is a standard model with versatile CNC functions and is designed for the control of standard lathes and machining centers.

FANUC Series 30i-MODEL B

Max. number of paths: 10 paths

Max. total number of controlled axes: 40 axes (32 feed axes, 8 spindles)

Max. number of simultaneous controlled axes: 24 axes

The 30*i*-B is an advanced CNC for multi-axis, multi-path machine tools. Due to the high number of controlled axes and paths, various machining processes can be executed at the same time. The 5-axis machining function also allows machining of complex shapes. It has the flexibility to control various types of machine tools.

FANUC Series 35i-MODEL B

Max. number of paths: 4 paths

Max. total number of controlled axes: 20 axes (16 feed axes, 4 spindles)

Max. number of simultaneous controlled axes: 4 axes

The 35i-B CNC is for transfer lines. It has powerful PMC functions and basic CNC functions. The 35i-B can execute simple machining at high speed.





State-of-the-Art Hardware

Ultra-thin, high-speed and high reliability is achieved by state-of-the-art hardware, including ultra high-speed processors, high-speed CNC internal bus and optical fiber cables used for high-speed data transfer.

High-Speed, High Precision and High Quality Machining

High-speed, high accuracy machining is realized by using not only a CNC that controls the machine with nanometer resolution but also servos and drive systems that accurately position the machine.

High-Speed, High Precision and Smooth simultaneous 5-Axis Machining

These models are available for 5-axis machines with various configurations. A function which enables smooth, high-speed and high precision machining and easy programming of machining complex parts with tilted plane and a function of facilitating setup are included.

Excellent Operation

Various CNC data can be transferred easily by USB memory. An integrated guidance function helps an operator from creation of a part program to actual machining.

Various Network Functions

A management system with personal computers and a robot connected via Ethernet can be constructed easily. Various types of field networks are also supported.

High Reliability and Easy Maintainability

Highly reliable hardware allows stable operation in a harsh factory environment. Various types of enhanced diagnosis functions improve maintainability so that the cause of trouble can be identified quickly.

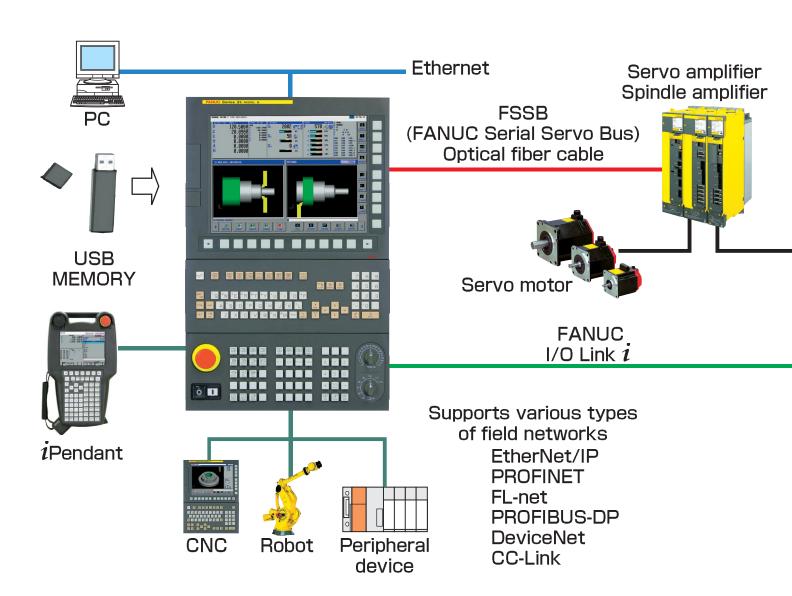
Easily Incorporated into Machine Tools

The CNC is mounted directly to the LCD panel in one unit which saves space in the power magnetics cabinet. The use of ultra high-speed serial communications reduces wiring. Powerful PMC allows flexibility of machine design, and built-in safety function helps MTB to conform safety regulation easily.

PC function with Windows® OSs

FANUC PANEL i is an enhanced combination of a CNC and PC with a original high-speed interface. The PC function with a compact operating system for embedded use is also available.

State-of-the-Art High-Speed, High-Reliability Hardware Ultra-Compact, Reduced wiring, High-Reliability



Enhanced basic performance

Leading-edge hardware has enhanced the basic performance of the CNC, servos and the PMC to support advanced CNC functionality such as 5-axis machining, multi-axis multi-path control.

Thin and compact Patent approved

The LCD-mounted type CNC with all the functionality implemented behind the display greatly reduces CNC mounting space on the machine. This contributes to downsizing. Intelligent communication functions are also embedded in the ultra-thin control unit of 60mm in depth, which helps design a compact operator's panel. 15", 10.4" and 8.4" color LCDs are available as a CNC display. The stand-alone type CNC, a control unit with a separate display, is also available. You can select a CNC suitable to your machine structure.

Leading-edge servo control with fast FSSB and high-speed DSP [Patent approved]

CNC and amplifiers are connected with FSSB (FANUC Serial Servo Bus) using an optical fiber cable. Leading-edge DSPs

and newly-designed FSSB offer advanced servo control such as multi axis control and fast current control. In addition, spindle amplifiers can be now connected to FSSB.

*i*Pendant

iPendant is a portable operating unit. It is possible to watch the CNC screen and operate the machines at a distant point from the main operator's panel. Moreover, touch panel and the manual pulse generator can be selected as an option.

FANUC AC SERVO MOTOR ©i-B series

AC SERVO MOTOR αi -B series, having compact size, smooth rotation and quick acceleration, is best suited to axis feed in machine tools.

Compact and high-resolution αi series Pulsecoder is built into all αi series motors.

AC SERVO MOTOR αi series also have high speed servo motors for live tooling.

FANUC AC SPINDLE MOTOR @i series

AC SPINDLE MOTOR αi series, having high power and high acceleration by optimum winding design and effective cooling structure, is best suited to high power, high speed spindles in machine tools.

AC SPINDLE MOTOR αi series also have large spindle motors suited to large size machine tools.

FANUC SERVO AMPLIFIER ©i-B series

 αi -B series SERVO AMPLIFIER has compact size and achieves energy saving [Reduced Wiring]

- FSSB (optical fiber cable) connection of Spindle amplifier in addition to Servo amplifier [Energy Saving]

- Output power increased, and also energy consumption reduced by adopting the latest low loss power device.

[Enhanced maintainability]

- Detachable fan motors from front side
- Built-in leakage detection function
- Power supply monitoring function
- Trouble diagnosis function

Enhanced network functions

Enhanced network functions support various types of field networks. Embedded Ethernet of 100Mbps is also supported as a standard function.

High reliability realized by ECC

[Patent approved

Error correcting code (ECC) is a leading-edge high reliability technology. Should an error occur during data transfer, it can be detected and corrected.

Although ECC is already being applied to various portions of the CNC, the range of applications are further expanded and the whole CNC system is protected. ECC and original low power technologies contribute to high reliability.







I/O Unit

I/O module for connection panel

FANUC I/O Link i

[Patent approved]

FANUC I/O Link \dot{t} is a serial I/O interface between the PMC and various I/O units. The number of DI/DO points per channel is 2048/2048, doubled from conventional FANUC I/O Link

FANUC I/O Link i helps with quick recovery from trouble by making it easy to pinpoint the faulty part using various error detection capabilities such as bitwise DO ground fault detection and I/O power supply failure detection, etc. FANUC I/O Link i realizes Dual Check Safety with a single cable although conventional systems require two cables.

Reduced wiring

[Patent approved]

Faster FSSB and FANUC I/O Link i realize further reduction of wiring and lower wiring cost.

USB memory interface

A USB port is added on the front of the CNC display unit. USB memory is easily obtainable in the market and can be used to input and output various data in the CNC, so usability is enhanced.

5-axis machining functions achieve a smooth, high-speed,

Provided for a smooth, high-speed, and high-precision 5-axis machining 30/8 31/85 00/

FANUC's 5-axis machining functions achieve a smooth machining not only in a high-precision mold machining but also in a high-speed part machining.

Smooth

In the case of not only tool center point machining but also side cut machining, smooth 5-axis machining is achieved by automatic command compensation of the machining programs. It results in the reduction of machining time due to eliminating needless accelerations/decelerations.

Highspeed High-speed 5-axis machining is achieved by optimizing algorithms of CNC software.

Highprecision High-precision 5-axis machining is achieved by applying the high precision machining technology (Al contour control) that FANUC has refined for years.

Easy to use

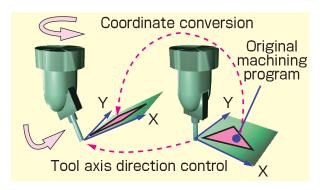
Convenient functions for use on the shop floor are supplied.

Cooperation with CAM

The latest 5-axis machining functions are supported by major CAM makers

Tilted working plane indexing

For machining a hole, pocket, or another figure on a tilted plane on a workpiece, specifying the working plane with plane (X, Y) makes programming very easy. The tilted working plane indexing enables this specification and also positions the tool automatically so that the tool becomes perpendicular to the tilted working plane without specifying the tool direction.



[Patent approved]

(30*i*-B, 31*i*-B, 31*i*-B5, 32*i*-B Only

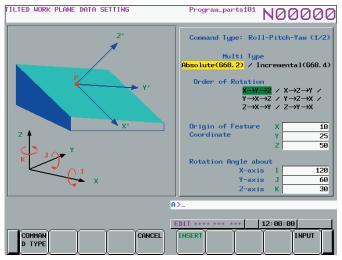
High-

precision

Conditions required for

5-axis machining

Smooth



High-

speed

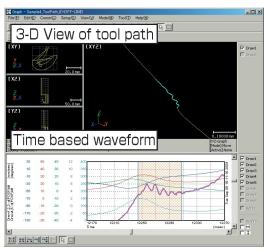
Guidance screen

FANUC SERVO GUIDE 3-D View Function

Servo tuning tool, FANUC SERVO GUIDE supports 3-D View Function.

"3-D tool path" and "Time based waveform of each servo axis" are displayed in the same window. Enhanced display or color-coded display of path deviation makes it easy to find a point to be tuned. FANUC SERVO GUIDE is useful servo tuning tool for 5-axis machining, which saves time for tuning parameters and precision evaluation.

[Patent approved]



Tool path with time based waveform

and high-precision machining

High-speed Smooth TCP that achieves a smooth high-speed and high-quality

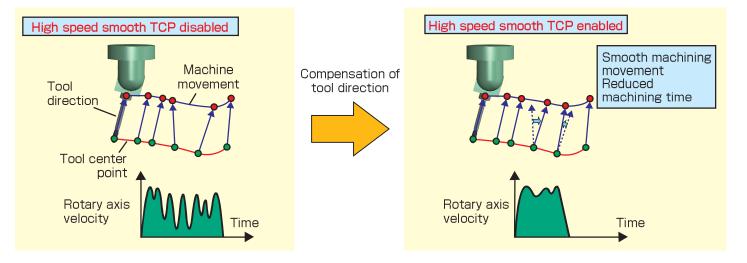
30*i*-B, 31*i*-B5 Only

High-speed and smooth machining using tool center point

[Patent approved]

When a machining program with TCP (Tool Center Point control) has unevenness in tool direction command in comparison with TCP movement command, the tool direction varies, and a machined surface is degraded (stripes appear) and a machining time increases.

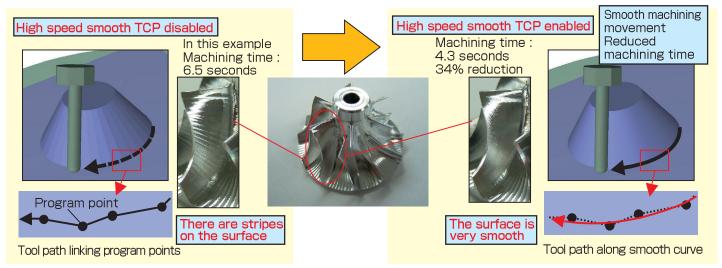
Smooth TCP makes the machining movement smooth by compensating tool direction to decrease the unevenness, and improves the quality of the machined surface and reduce machining time.



High-speed and smooth machining using tool side cutter

[Patent Pending]

High speed smooth TCP improves the quality of the surface greatly by moving tool posture and tool center point smoothly.



Cooperation with CAM

With the cooperation of major CAM makers(%), the NC programs can be made using the latest 5-axis machining functions.

(*) C&G System CNC software, Dassault Systems, DELCAM, DP Technology, Gibbs and Associates, OPEN MIND, Sescoi KK, Tebis AG, Vero International (Alphabetical order)

High-Speed, High-Quality Machining

High-Quality Machining Realized for All Types of Machining from Part Machining to Complex Die Mold Machining

Nano CNC System

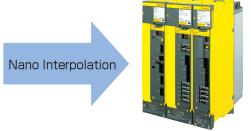
[Patent approved

High-Quality Machining Achieved by Coordination between "High-Precision Operation in Nanometers" and "State-of-the-Art Servo Technology"

Nano interpolation that computes position commands for the digital servo control unit in nanometers, SERVO HRV Control and SPINDLE HRV Control for which the control cycle is made faster, and FANUC AC SERVO MOTOR α i-B series with a high-resolution pulse coder are used as standard and make up "Nano CNC System," which achieves high-speed, high-quality

machining.





FANUC SERVO AMPLIFIER αi-B series

High-response and high-resolution pulse coder 32 million/rev

> FANUC AC **SERVO MOTOR** αi -B series



SERVO HRV Control

SPINDLE HRV Control

FANUC AC SPINDLE MOTOR αi series

Al Contour Control I / Al Contour Control II [Patent approved]

Optimum the feedrate and acceleration control by reading blocks in advance

In machining of complex free-form curved surfaces of aircraft parts, automobile parts and metal dies that are specified in continuous small blocks, advanced lookahead algorithms evaluate the programmed path to determine the optimal feedrate and acceleration resulting in reduced cycle times and improved accuracy.

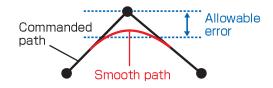


Smart Tolerance control

30i-B, 31i-B, 31i-B5, 32i-B only

Reducing steps and time of adjusting precision and achieving high-quality machining

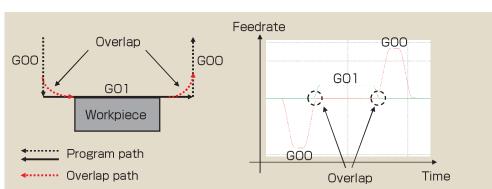
It is possible to change machining precision easily by specifying allowable error (Tolerance), and time of adjusting precision by parameters can be reduced. If continuous small segments are also specified, it is possible to prevent mechanical shock and improve smoothness of finishing surface by creating smooth path.

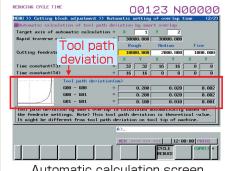


Smart Overlap

Reducing cycle time in part machining

It is possible to reduce cycle time by enabling overlap between blocks of cutting feed and rapid traverse. Confirmation of tool path deviation is easy by automatic calculation screen for tool path deviation.





Automatic calculation screen for tool path deviation

High Quality and Energy Saving Servo

SERVO HRV (High Response Vector) Control

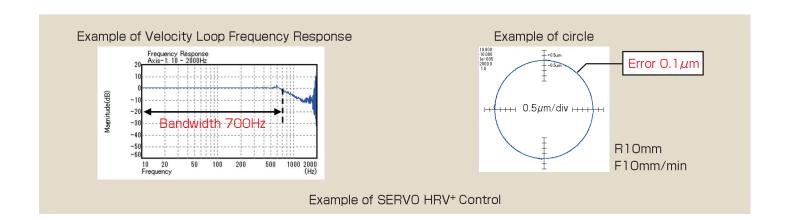
[Patent approved]

High-speed and high precision SERVO HRV Control realizes a Nano CNC system. Higher surface quality is achieved with SERVO HRV+ Control with higher response current control. Features include:

- Always using servo position commands specified in nanometers
- \bullet Using the αi Pulsecoder with an ultra-high resolution of 32 million resolution/rev as standard detector
- Using an ultra high-speed servo control processor, enabling high response current control and velocity control
- Elimination of mechanical resonance using an auto following HRV Filter

With a combination of these functions, nano-level control achieves high-quality machining.

Each component of SERVO HRV Control has excellent performance, including response to commands and disturbance suppression characteristics. Current control, basis of servo control, shows a fast response of more than 1 kHz at the maximum. High-speed current control can realize higher gain velocity control.

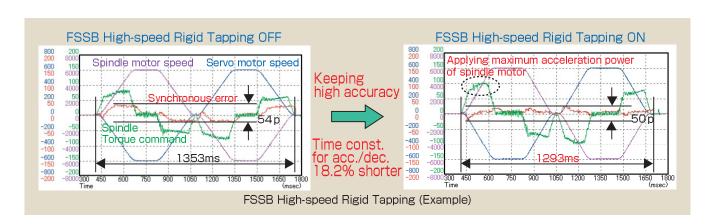


SPINDLE HRV (High Response Vector) Control

[Patent approved]

SPINDLE HRV Control realizes fast response and high precision of spindle. SPINDLE HRV4 Control is an extension of SPINDLE HRV3 Control which features high precision control. Features include:

- Achieving high gain control and low heat generation at high-speed rotation by faster sampling time of the current control loop
- Optimum orientation automatically changing the deceleration control according to the inertia of works or tools
- Supporting Nano Interpolation in position control enabling Nano CNC system for spindle as well as feed axis
- FSSB High-speed Rigid Tapping achieving both high speed and high accuracy with maximum acceleration power of spindle motor



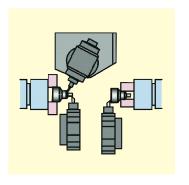
Flexible Support of Various Mechanical Configurations

Expanded multi-axis and multi-path functions [Patent approved]

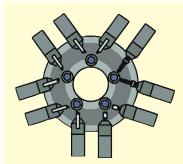
30*i*-B, 31*i*-B, 31*i*-B5, 32*i*-B Only

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.







Automatic lathe

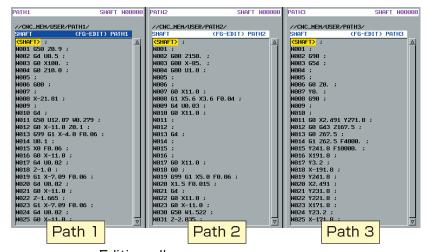
Multi-path program management function

[Patent approved] (30*i*-B, 31*i*-B, 31*i*-B5, 32*i*-B Only

30*i*-B, 31*i*-B, 31*i*-B5, 32*i*-B Only

Program management function is suitable for machining by multi-path programs.

- All part programs for machining can be created and selected by one operation easily.
- These programs can be displayed and edited on one screen simultaneously (maximum 3 programs).
- These multi-path programs for one machining can be input or output to as one file.

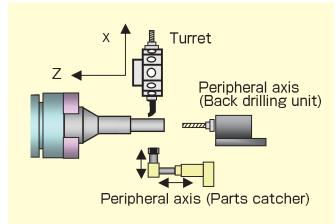


Editing all programs on one screen

Peripheral axis control

Easy control of peripheral axes by an NC program

- This function provides an operator an easy way to control a peripheral axes close in proximity to machining, such as a back drilling unit or a parts catcher, only by using an NC program.
- A peripheral axis controlling program can work with an NC program for machining and run concurrently.
- A ladder program is no longer necessary to control a peripheral axis.

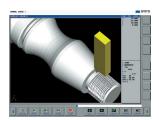


Excellent operability.

FANUC Platform Provides Convenience of PC on CNC

Convenient platform with useful functions (e.g. high-speed graphics, large memory, etc.) can be added on the CNC.

- MANUAL GUIDE i advanced guidance function (help for the screen and scaling and rotation of animation) can be enabled. (30i-B, 31i-B, 31i-B, 32i-B only)
- Remote desktop function improves convenience of CNC by enabling operation of the PC connected via Ethernet from CNC. (e.g. operating the CAD/CAM, referencing the manual, etc.)
- Large programs can be edited and operated with built-in large memory. (30i-B, 31i-B, 31i-B5, 32i-B only)



MANUAL GUIDE *i* Scaling and rotation of animation



Remote desk top function Operating the PC connected via Ethernet from CNC



Memory operation with large memory

FANUC MANUAL GUIDE i

[Patent approved] 30*i*-B. 31*i*-B. 31*i*-B5. 32*i*-B Only

Integrated operation & programming guidance with efficient simulation functions

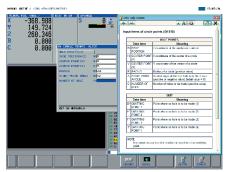
This is a guidance function, which makes operation easy for programming through machining on all-in-one screen.

- Various machining cycles reduce programming time.
- Animation that simulates cycle motion immediately makes checking of input data easy. (Advanced guidance function is required)



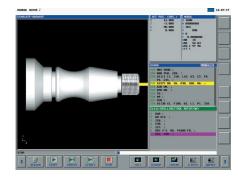
Input data check by simulation

 HELP button gives explanation for operation immediately and operator doesn't lose his place. (Advanced guidance function and PANEL i or FANUC Platform are required)



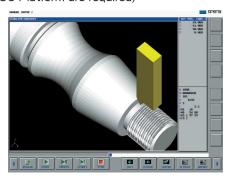
Help for the screen

 Program display during simulation enables checking tool motions closely. (Advanced guidance function is required)



Decomposing cycle display

 Scaling and rotation of simulation enables checking workpiece details. (Advanced guidance function and PANEL i or FANUC Platform are required)



Scaling and rotation

- Various automatic measurements for tools and workpiece reduce set-up.
- Machining center, lathe and compound machine are supported.

Easy Incorporation into Machine

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

High-Speed and Large-Capacity

PMC, which consists of a dedicated processor and custom LSI, is much faster due to processing a large sequence of programs at a high speed.

Program capacity Max. 300,000 steps (Total of all PMC paths)

Internal relay (R)Data table (D)Max. 60,000 bytes

PMC paths
 Max. 5 paths (Max. 40 ladder programs)

Multi-path PMC

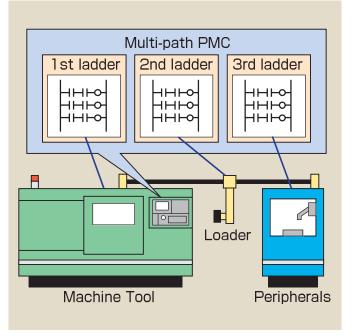
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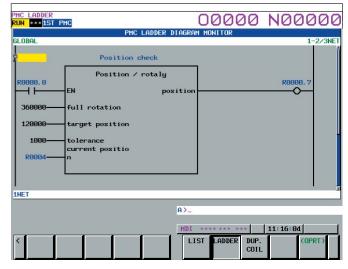
One PMC can execute up to 5 independent ladder programs. Each ladder program has an independent data area, which enables programs to be developed as independent modules. Ladder programs for loader and peripheral control can be created, added and modified separately. Ladder programs can easily be developed and the machine can easily be systematized according to each user's machine configuration. External PLC or other devices for peripheral control becomes unnecessary, which reduces system costs.

Function Block function

- This function is used to call up repeatedly used ladder circuit patterns in blocks.
- By combining multiple Function Blocks, machine tool builders can create complex ladder programs more efficiently, as if assembling components, with fewer steps for ladder program development and fewer ladder diagram drawings for maintenance.

(Note: Function block does not have an effect on reducing the total program size.)





Function Block function

Dual Check Safety + Servo STO

[Patent approved]

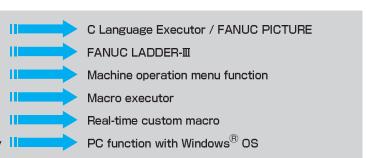
Dual Check Safety is a safety function that conforms to the international safety standard (ISO 13849-1). This function offers a high level safety by redundant monitor, and by providing duplicate paths of breaking power for the servo/spindle amplifier. Safety functions built into the CNC make it easier to conform to the safety standards for machine tools.

- Cost can be reduced by significantly simplifying additional circuits for adherence to the safety standard.
- Two PMC functions have been incorporated into the CNC to duplicate sequence control for safety-related input/output signals.
- Safety-related input/output that is defined by a MTB allows redundant monitoring for controlling peripheral devices.
- ullet By using FANUC I/O Link i, 1 channel I/O Link cable can configure safety function.
- The safety machine operator's panel which can make the key signals a safety-related signal is prepared.
- STO (Safe Torque Off function) is equipped in the servo amplifier. Power lines for the motor can be shut off without using the electro-magnetic conductor.

Many Customizable Functions

Customizable functions are available, which allow machine tool builders to customize their own machine tools

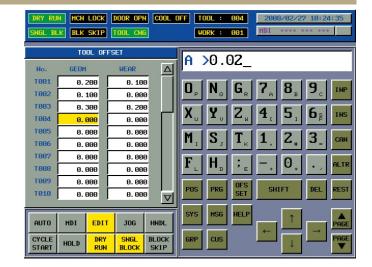
- Customizing operation screens
- · Implementing original sequence control based on PMC
- · Machine operator's panel is realized by softkey
- · Customizing machining and measuring cycle
- · Control of a peripheral device with an NC program
- Make the machine tool intelligent by using PC technology



C Language Executor

Machine tool builders can create their own operation screens, which enables unique CNC display and operation.

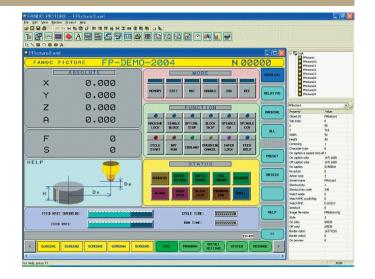
- C language is used for programming.
- Multi-window display enables creation of pop-up menus.
- Operation screens using the touch panel can be created.
- In addition to standard ANSI functions, many functions are available for CNCs and PMCs.
- High-level tasks to which high execution priority is assigned can monitor signal and position information.



FANUC PICTURE

FANUC PICTURE enables a machine operation screen to be created only by pasting screen components such as buttons and lamps on PC.

- Easy-to-use interface unique to FANUC.
- A screen usable on a display unit with or without a touch panel can be created.
- A screen usable on a 15-inch display unit and with vertical soft keys can be created.
- A created screen is executed by C language executor, and can coexist with a C language executor application created by a machine tool builder.

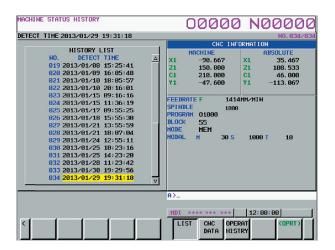


Easy Maintenance

In case of a fault, quick solution of the problem is supported

Machine State Monitoring Function

When an error such as machine collision, defective, and damaged tooling occur, Machine State Monitoring function memorizes the following data into CNC memory: position, actual speed, spindle speed, program name (O number), modal, PMC signal, operation history (MDI key operation, PMC signal change, and alarm history),etc. This data is important to diagnose the cause of the error.

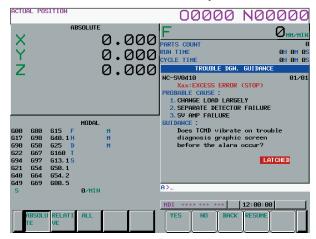


Trouble Diagnosis Function. Machine Alarm Diagnosis [Patent approved]

The cause of an alarm can be diagnosed by answering questions displayed on Trouble Diagnosis Guidance Screen when an alarm occurs on CNC. As a result, downtime can be shortened.

Moreover, the cause of original alarms and operator messages on the machine, made by MTB, can also be diagnosed with a question form.

This function appropriately informs the operator of a breakdown point, replacement of parts, etc. on in the machine. This data can be made easily with PC tool.



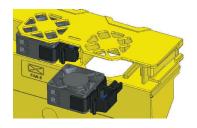
Excellent maintainability of hardware

Easy-maintenance of fans and battery in a cartridge

Fans for cooling and the backup battery are stored in a cartridge and can be replaced quite easily enhancing maintainability. (LCD-mounted type CNC)

On the amplifier, fan motors are detachable from the front side for easy access.

[Patent approved]

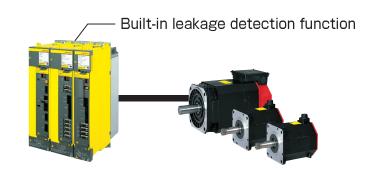


Preventive maintenance

[Patent approved]

Unexpected system downtime can be prevented by predictive trouble detection and warning indication.

- A decrease in rotational speed of each cooling fan motor of the CNC and the amplifier is detected as warning.
 Also the status of fan motors can be monitored on the fan monitor screen easily, and it is useful for preventive diagnosis.
- FSSB signal quality deterioration due to a damaged fiber cable or noise are detected by the observation of the optical signal.
- Insulation deterioration sometimes causes abnormal machine stop when cutting fluid infiltrates the motor, especially in a severe machining environment. The amplifier automatically measures insulation resistance of the motor and gives a signal when insulation deteriorates to an abnormal level, thereby preventing an unexpected stop.



PC function with Windows® OS

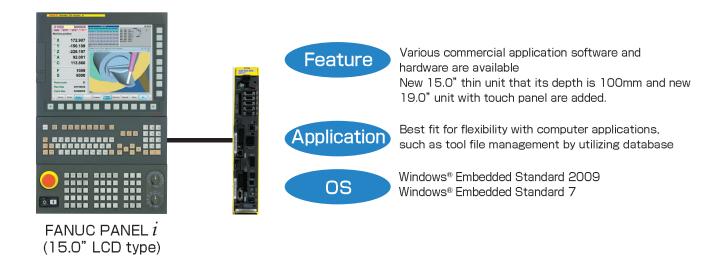
The best combination between a CNC and PC is realized by transferring bulk data via an original high-speed interface. Unique dedicated applications can be achieved easily using a PC, and the machine tools can meet special needs for machine tool customers.

PC functions bring a lot of enhancement through up-to-date computer and information technology for intelligent machine tools.

PC functions are maintained long-term by FANUC worldwide service network.

FANUC PANEL i

The FANUC PANEL i is a display unit that incorporates high reliability PC functions. PANEL i has high performance PC functionality with Windows[®] Embedded Standard connecting to a stand-alone CNC. Various commercial Windows applications can be used.

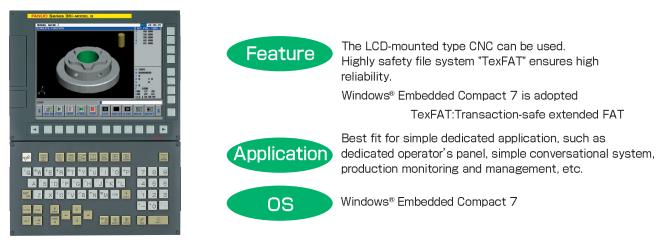


PC function with Windows® Embedded Compact 7

[Patent approved] 30*i*-B, 31*i*-B, 31*i*-B5, 32*i*-B only

[Patent approved]

PC function using Windows® Embedded Compact 7, a compact operating system for embedded use. This PC function is for simple dedicated operator's panel design, dedicated machine operations and/or real-time applications, and can be used with LCD-mounted type CNC with Windows® Embedded Compact 7 GUI function.



LCD-mounted type CNC with Windows® Embedded Compact 7

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