



*Changes for the Better*

MITSUBISHI CNC  
M70V Series

*M70V*  
series



**The Best Partner for Your Success**

for a greener tomorrow



Further progress to the  
new MITSUBISHI standard CNC

Higher cost-performance for realizing higher-grade machines

High Speed  
Performance

[High-speed]  
Cycle time reduced with higher machining-control performance

Multi Axis  
Machining Control

[Multi-axis control]  
Multi-axis control and two-part systems for compatibility with various machines

NANO  
Control

[Nano interpolation]  
Smoother cutting surface is achieved with one-nanometer position interpolation

OMR  
Control

[High-accuracy]  
High-accuracy tapping with high-speed compensation control of spindle and servo

NAVI  
NAVIMILL  
NAVILATHE

[Easy operation]  
Simple programming system for machining center and lathe

Custom CNC  
Solution

[Customize]  
Development tools for providing a CNC with customized solutions

M70v TypeA

Max. number of part systems .....	2
Max. number of axes .....	11
Max. number of NC axes (in total for all the part systems)	
Machining center system .....	8
Lathe system .....	9
Number of simultaneous contouring control axes .....	4
Least command increment .....	0.1 micrometer
Least control increment .....	1 nanometer
Max. PLC program capacity .....	32,000 steps

M70v TypeB

Max. number of part systems .....	1
Max. number of axes .....	9
Max. number of NC axes (in total for all the part systems)	
Machining center system .....	5
Lathe system .....	4
Number of simultaneous contouring control axes .....	4
Least command increment .....	0.1 micrometer
Least control increment .....	1 nanometer
Max. PLC program capacity .....	20,000 steps

The Best Partner for Your Success  
MITSUBISHI CNC M70v series





# Versatile lines boasting compact size and less wiring

Operation panel I/O unit  
(Max.: 96 inputs/96 outputs)



Machine Operation Panel



<Display front side>  
USB memory interface  
CF card interface

High-speed optical communication

## Drive units



Multi-hybrid drive unit  
| MDS-DM Series



High-performance drive unit  
| MDS-D/DH Series



Ultra-compact drive unit with  
built-in power supply  
| MDS-D-SVJ3/SPJ3 Series

## Ethernet



Personal computer



Manual pulse generator

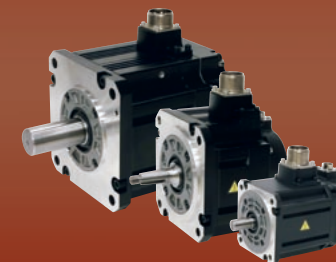


RIO 1 (Max.: 256 inputs/256 outputs)



RIO 2 (Max.: 96 inputs/96 outputs)

## Servo motors



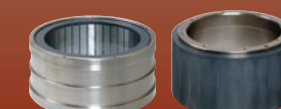
Medium-inertia motor  
| HF Series



Low-inertia motor  
| HF-KP Series



Linear servo motor  
| LM-F Series



Direct drive motor  
| TM-RB Series

## Spindle motors



High-performance spindle motor  
| SJ-D Series  
| SJ-V Series



Low-inertia and high-speed  
spindle motor  
| SJ-VL Series  
| SJ-VLS Series



Tool spindle motor  
| HF-KP Series  
| HF-SP Series



Built-in spindle motor

## Higher-grade CNC performance attained

## Remarkable reduction in cycle time

M70V  
series

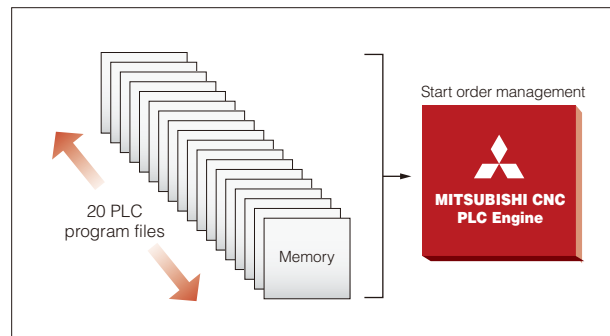
## Basic Performance

## Machining program

- Capacity  
Machining program capacity is greatly enhanced to the standard of 500kB [1,280m].
- Processing speed  
TypeA: 33.7k blocks/minute    TypeB: 16.8k blocks/minute

## Built-in PLC function

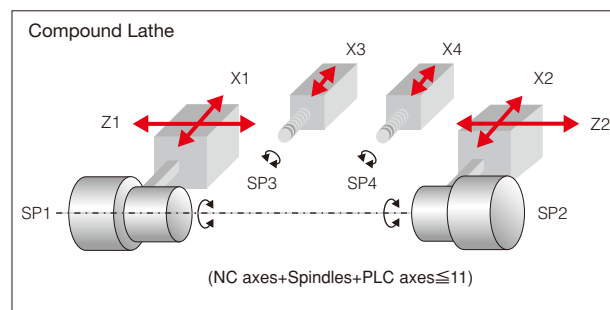
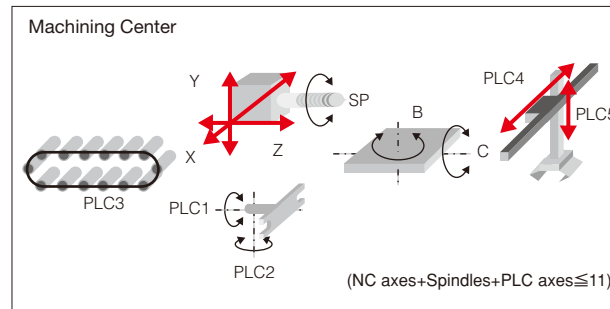
- Multi-program  
Up to 20 PLC program files can be registered, which are executed according to priority. A PLC program can be split into each process and developed.
- High-speed PLC engine installed (TypeA)  
TypeA is equipped with a high-speed PLC engine, helps enhance the performance.



## Multi-part Systems Multi-axis

Multi  
Axis  
Machining  
Control

A maximum of two part systems and 11 axes can be controlled for both the machining center and lathe.



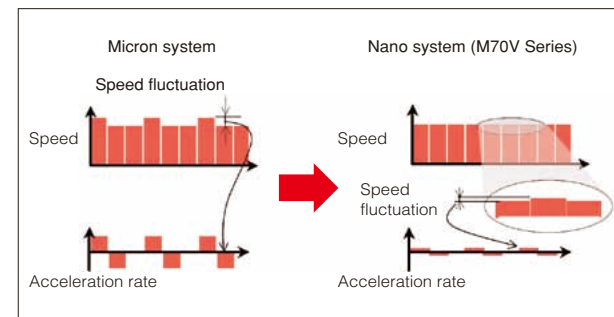
## Nano Control

NANO  
Control

The least control increment is one nanometer, the command increment is  $\pm 99999.9999$ , and the rapid traverse rate is 1000m/min. All processing from the analysis of machining programs to servo commands is performed in nanometers.

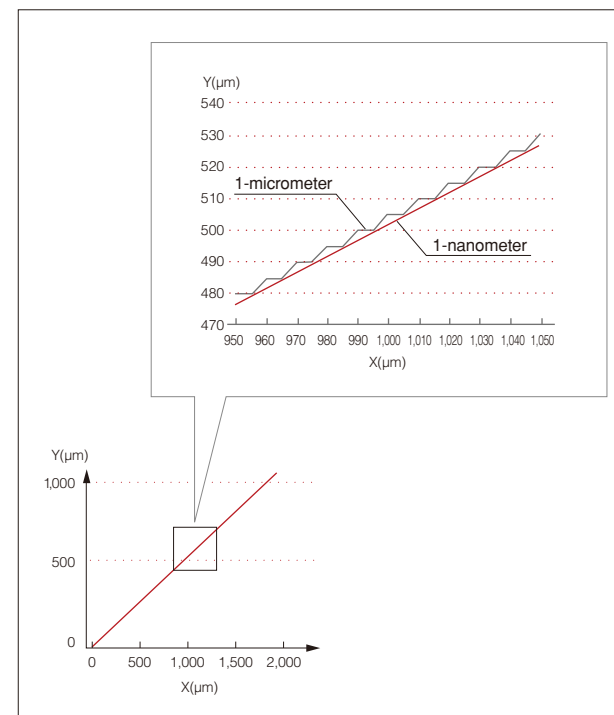
## Speed command fluctuation reduced

In nano control, the position command calculation fraction of the interpolation calculation is small, so fluctuations in speed command due to the fractions is reduced. This reduces acceleration fluctuations, resulting in finer lines at the time of repeated acceleration/deceleration.



## Interpolation calculation accuracy improved

Even with one-micron-unit commands in the machining program, interpolation is in nanometer units. As the calculation accuracy of a block intersection is improved, lines on the surface is finer.



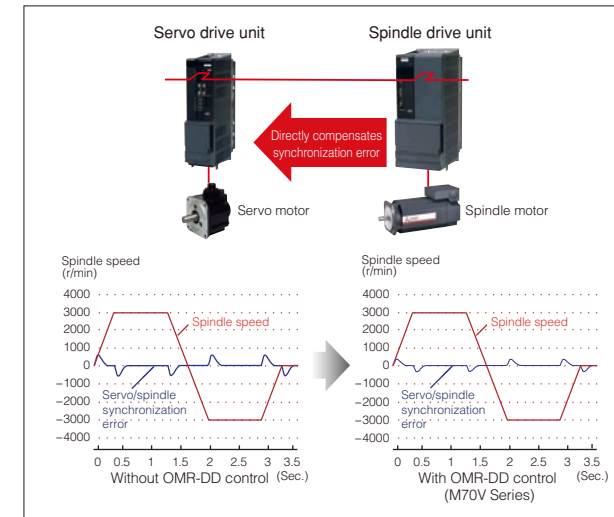
## OMR-DD Control (High-speed synchronous tapping)

OMR  
Control

Optimum Machine Response Direct Drive

A high-speed error-compensation function is used for controlling the spindle and servo, enabling accurate tapping.

(Note) This function is available with MDS-D/DH and MDS-DM (one axis only).



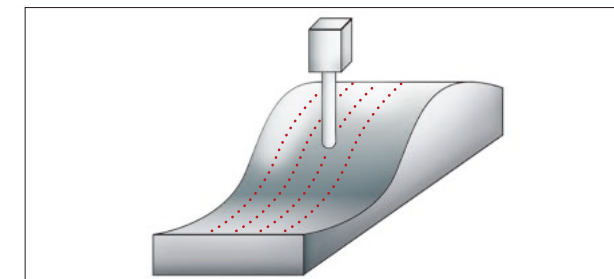
## High-speed Machining Mode

High  
Speed  
Performance

(Machining Center System)

By reading ahead some blocks in a program that contains successive fine travel distances, the program can be rapidly executed at up to 33.7k blocks/minute.

(8.4k blocks/minute for TypeB)

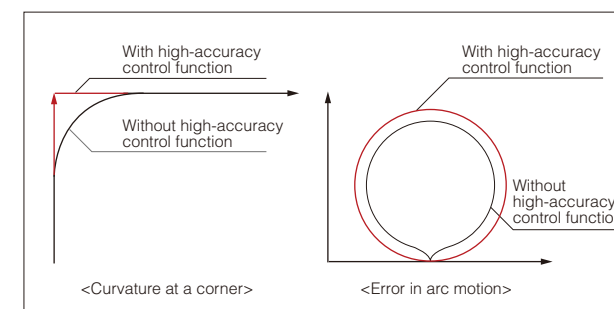


## High-accuracy Control Function

(Machining Center System)

\*1st part system only

- At a corner that consists of straight lines, sharp interpolation control is performed, allowing the commanded path to be followed by correcting curvature.
- Inward deviation error in arc motion is reduced for even higher-accuracy in following the command values.



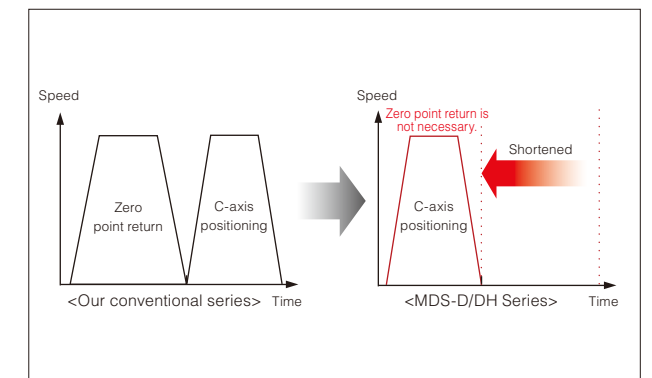
## Position Loop of Spindle Control

High  
Speed  
Performance

High traceability to command (High-gain control II), which has been developed in servo axis control, is now available for the spindles, contributing to shorter machining time and higher accuracy.

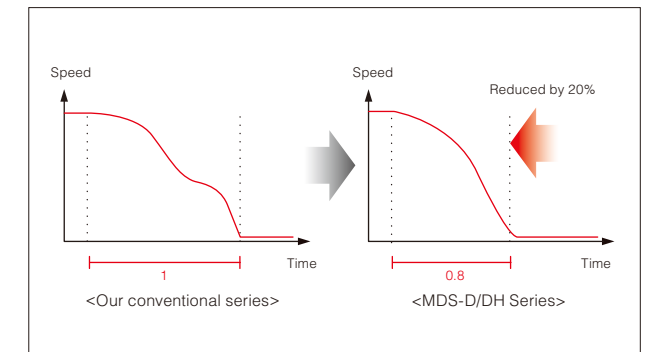
## Spindle/C-axis control

The spindle's constant position loop control has eliminated the zero point return time when switching from the spindle to C-axis.



## Orientation time is reduced

Deceleration is performed with the maximum torque to minimize the spindle orientation time.



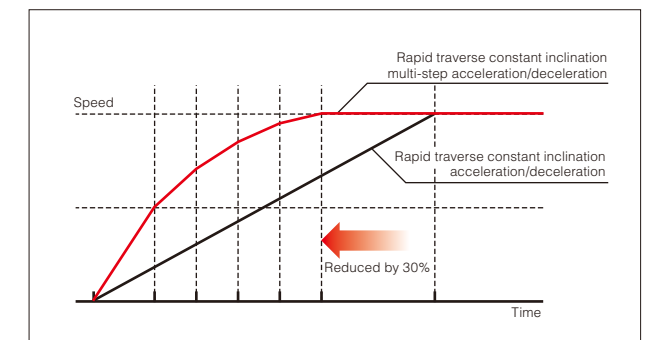
## Rapid Traverse Constant Inclination Multi-step Acceleration/Deceleration Function

High  
Speed  
Performance

(Machining Center System)

\*1st part system only

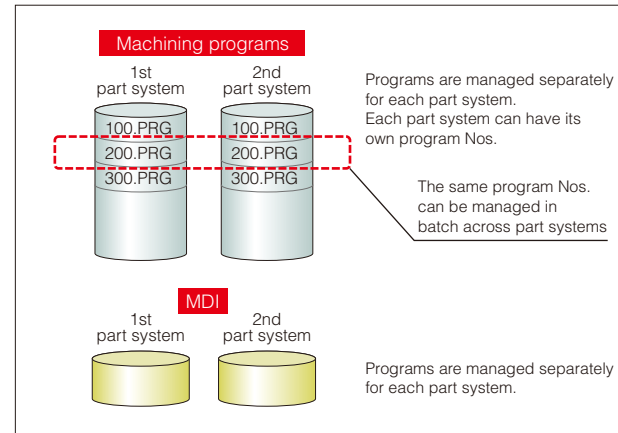
- Rapid traverse acceleration/deceleration is performed according to the motor's torque characteristics.
- As the motor's characteristics can be utilized optimally, positioning time is reduced, and cycle time is improved.





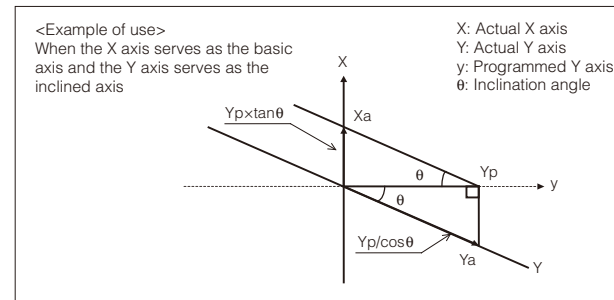
## Multi-part System Program Management (TypeA)

Separate programs, used in each part system, can be managed under a common name in the multi-part system. This function facilitates management of the process programs that are simultaneously executed in the multi-part systems.



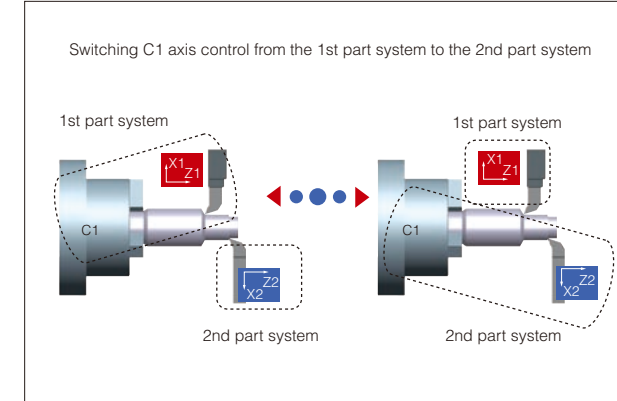
## Inclined Axis Control

- Even when the control axes configuring a machine are mounted at an angle other than 90 degrees, this function enables it to be programmed and controlled in the same way as with an orthogonal axis.
- The inclination angle is set using a parameter, and axes are controlled using the movement amounts of the axes which are obtained through conversion and compensation using this angle.



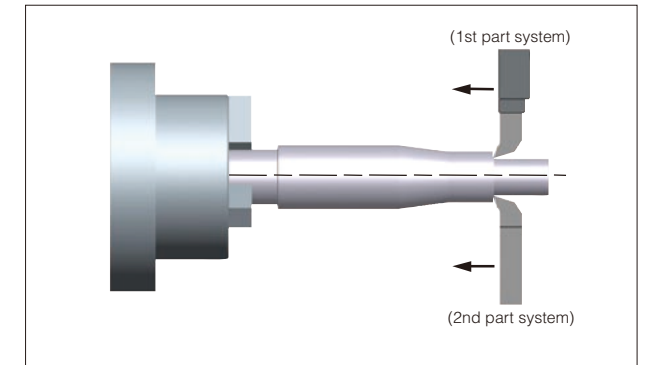
## Mixed Control (cross axis control) (TypeA)

The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.



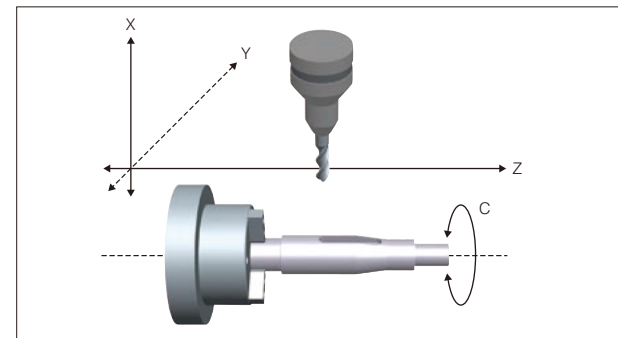
## Balance Cut (TypeA)

- Deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting).
- The machining time can be reduced by machining with two tools.



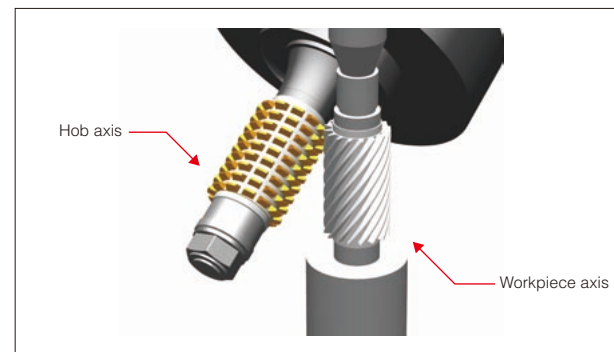
## Polar Coordinate Interpolation

- This function converts the commands programmed for the orthogonal coordinate axes into linear axis movements (tool movements) and rotary axis movements (workpiece rotation) to control the contours.
- It is useful for tasks such as cutting linear cutouts on the outside diameter of the workpiece and grinding camshafts.



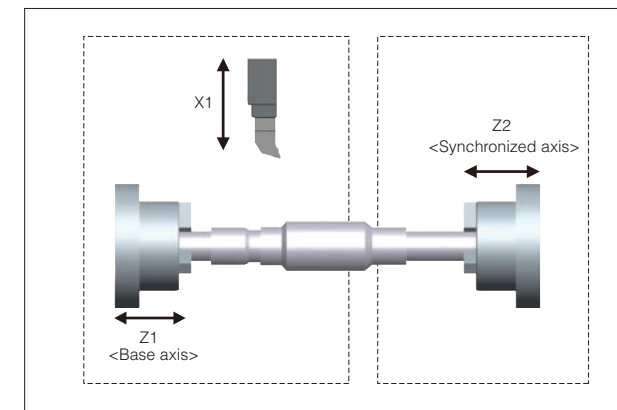
## Hobbing (TypeA)

- G code format is available for hobbing.
- A spur gear can be machined by synchronously rotating the hob axis and the workpiece axis in a constant ratio. A helical gear can be machined by compensating the workpiece axis according to the gear torsion angle for the Z axis movement.



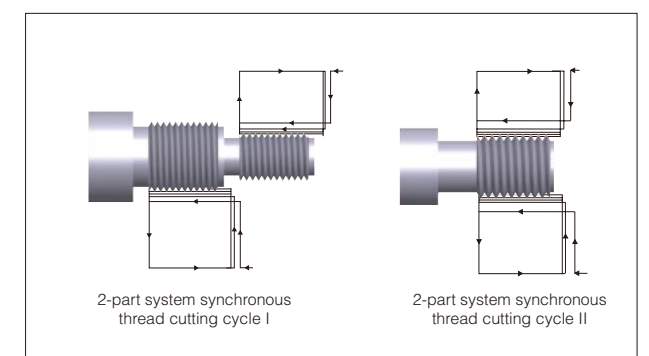
## Control Axis Synchronization Across Part Systems (TypeA)

Synchronization control enables an arbitrary control axis in the other part system to move in synchronization with the movement command assigned to an arbitrary control axis.



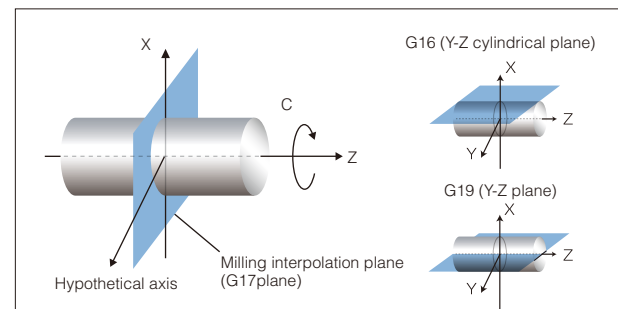
## 2-part System Synchronous Thread Cutting (TypeA)

- 2-part system synchronous thread cutting allows the 1st part system and the 2nd part system to perform thread cutting simultaneously for the same spindle.
- 2-part system synchronous thread cutting has two commands; command (G76.1) for cutting threads in two places simultaneously, which is known as "2-part system synchronous thread cutting cycle I"; and command (G76.2) for cutting a thread using the two part systems simultaneously, which is known as "2-part system synchronous thread cutting cycle II".



## Milling Interpolation (TypeA)

This function converts the commands programmed for the orthogonal coordinate axes into linear axis movements (tool movements) and rotary axis movements (workpiece rotation) to control the contours. This enables milling operations using a lathe without a Y axis.



### Machining Center System

#### Compact Milling Machine

The compact operation board, in which the control unit is integrated, and the ultra-compact drive units achieve downsizing of the control board and machine.



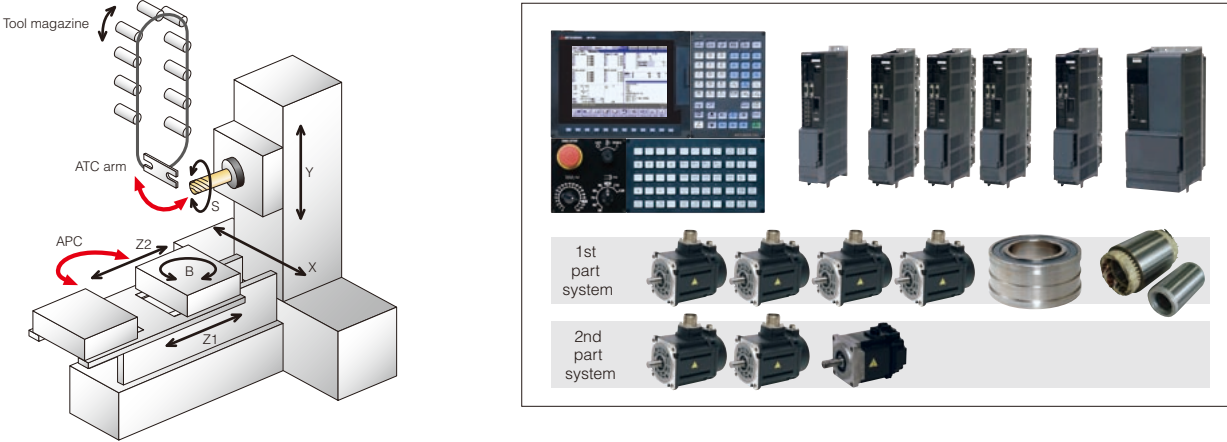
#### Tapping Machine

The multi-hybrid drive unit optimally controls the spindle motor for tapping to bring out the function of high-speed tapping OMR-DD. An NC five-axis control (simultaneous four-axis) enables control of the tilt table.



#### Multi-axis Machining Center (TypeA compatible)

A system with a maximum of 11 axes and two part systems achieves optimal control even for a compound axis configuration that includes a synchronization axis and a peripheral axis, such as in a large machine or in a line dedicated machine.



### Lathe System

#### Compact Lathe

The compact operation board, in which the control unit is integrated, and the ultra-compact drive units achieve downsizing of the control board and machine.



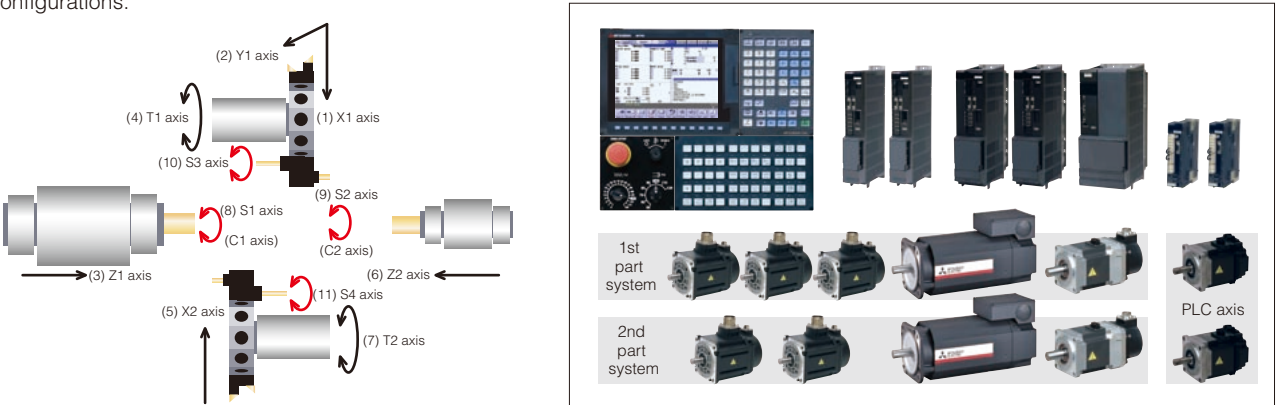
#### Milling-enabled Lathe (TypeA compatible)

Even without a Y axis, the milling function enables contour control machining on the side or face of a workpiece. Furthermore, the tool spindle motor contributes to downsizing of the turret.



#### Compound Multi-axis Lathe (TypeA compatible)

Up to four spindles can be controlled by a system with a maximum of 11 axes and two part systems. Owing to the drive units that drive three servo axes/two spindles, we offer an optimal system construction for machines of various axis configurations.



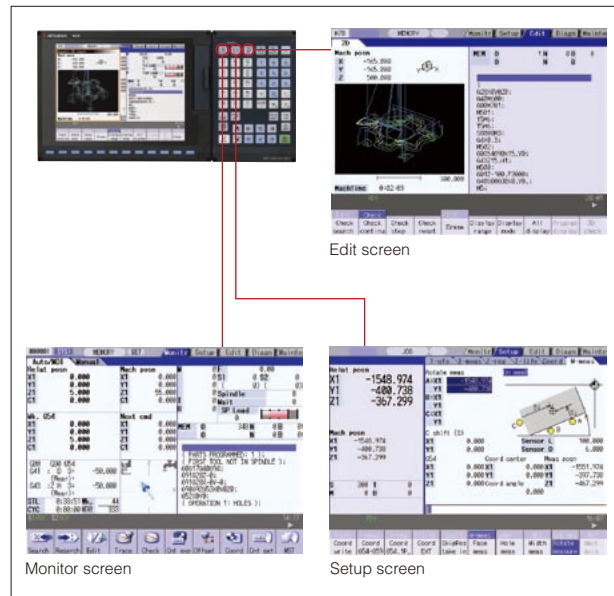


## HMI for Easier and More Visible Use

(HMI: Human Machine Interface)

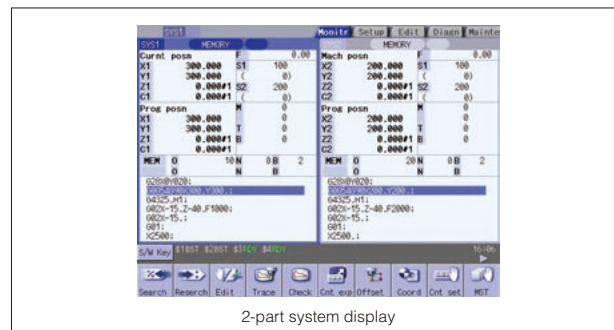
## Screen structure linked to operation processes

Operation processes are divided into three steps, "Monitor", "Setup" and "Edit", and necessary information is aggregated into three screens. These screens can be displayed by touching a single button on the keyboard.



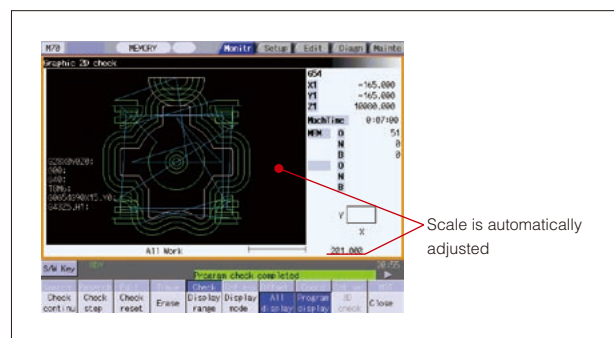
## 2-part system display

The Monitor screen of the 2nd part system can be displayed together with the 1st part system. Switching screens is not necessary.



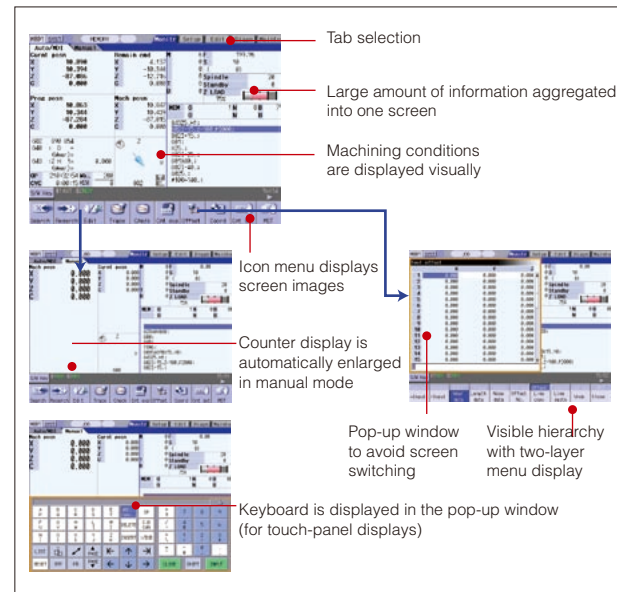
## Auto-scale adjustment of the graphic check function

When the automatic graphic check function is enabled, by selecting a file, the scale is automatically adjusted to draw the whole machining path. (In single-plane display mode)



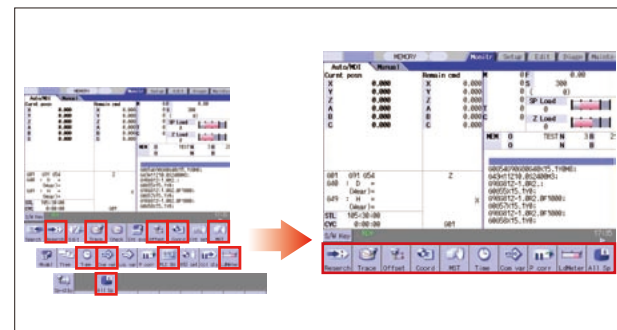
## Pop-up screens

Tabs allow the user to select necessary operations from the operation menu, and pop-up screens allow the user to access desired information while the original screen remains displayed. For displays with a touch panel, a keyboard can be displayed on the screen.



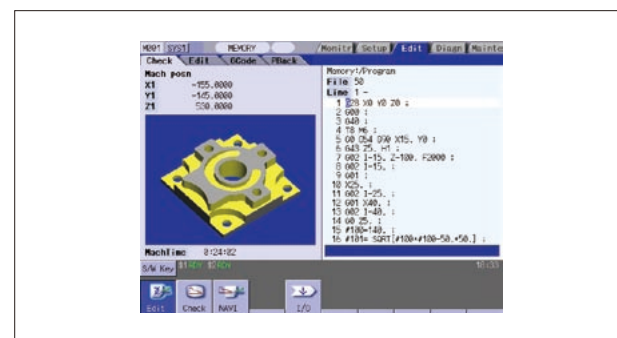
## Menu customization function

Menu keys on the bottom of the screen can be freely arranged. Frequently used menu keys can be put together on the first page.



## 3D solid program check

- The added 3D solid model check function allows more realistic cutting check.\*

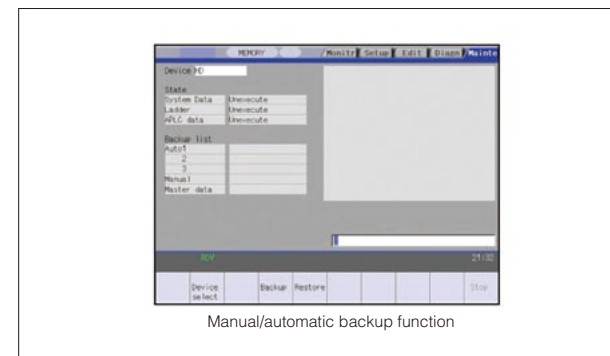


\*Available with M70V TypeA (M System) only.

## Operation Support

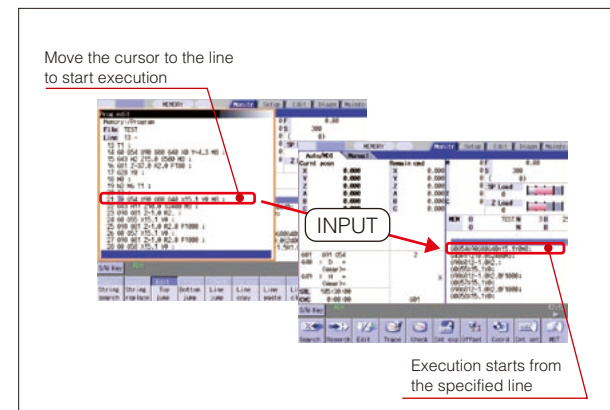
## Manual/Automatic backup function

- Batch-backup of the NC data into the CF card/USB memory inserted in the front interface of the display is possible.
- Data is automatically backed-up at a certain interval set by the parameter.



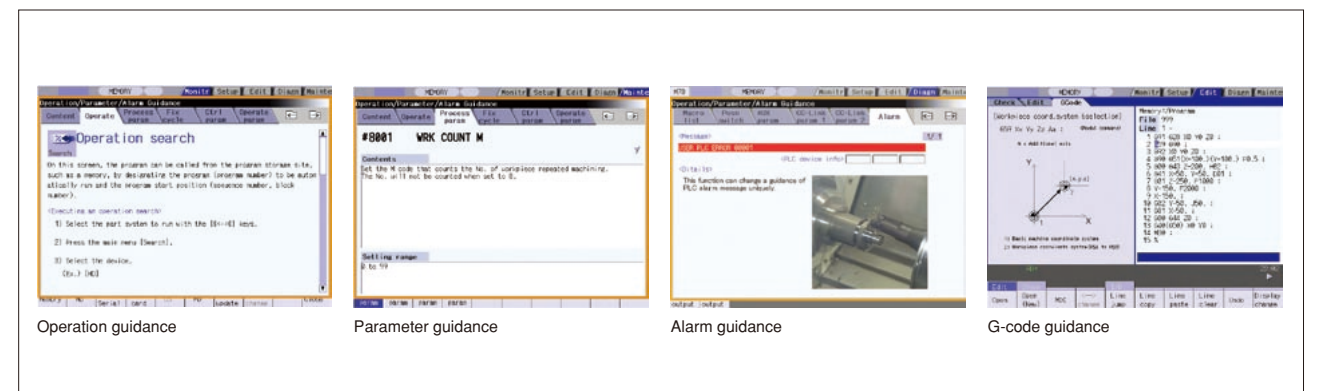
## Operability of operation search improved

Using the program edit screen, it is possible to execute a program from the line specified by the cursor. The operation search immediately detects the edited part to check the content of operation.



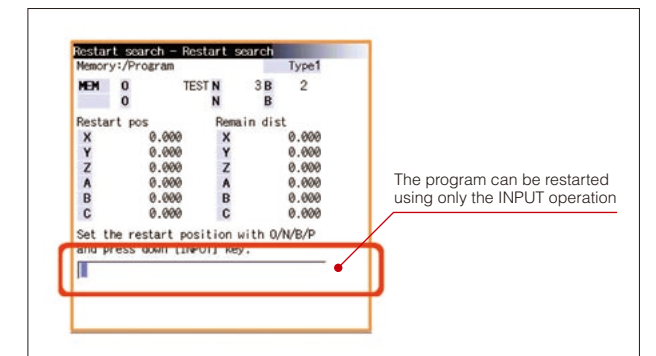
## Guidance function

By pressing the help button, guidance (operation procedure/parameter descriptions/alarm descriptions/G code format) regarding the currently displayed screen will be shown.



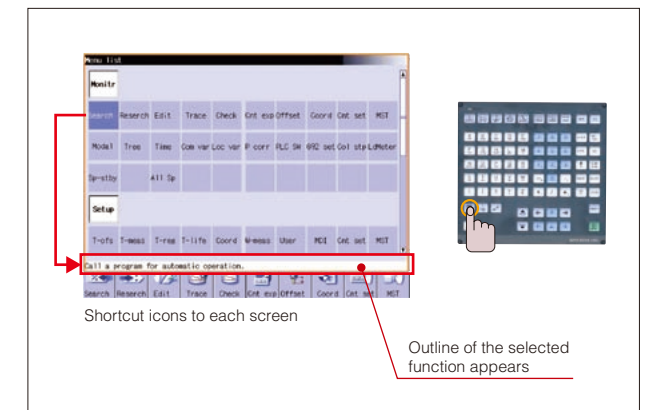
## Operability of program restart function improved

Even if a machining program is stopped for reasons such as tool breakage, the program can be restarted when it has been stopped using only the INPUT operation.



## Menu list

Menu list buttons are newly introduced. With these buttons, the screen desired for display can be called up directly. The selected screen's function outline is also displayed.



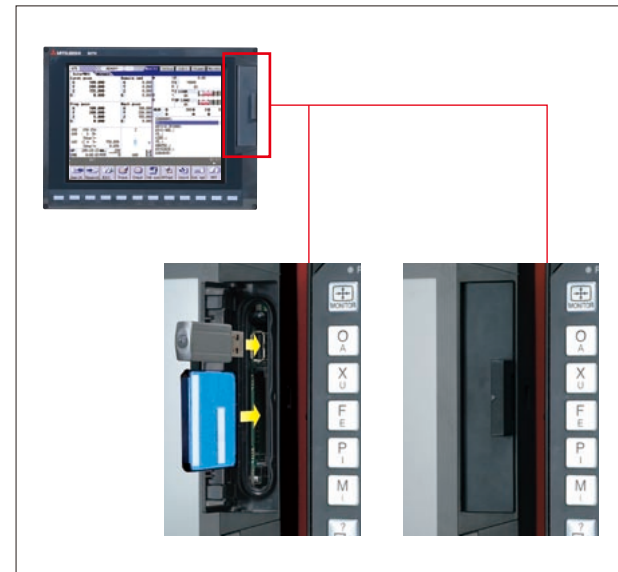
## Easy to import external data

## Various support functions minimize downtime

M70v  
series

## Memory Card/USB Memory Interface

A compact flash memory card (CF card) /USB memory interface is located on the front of the display. In using CF card, the card slot can be completely covered by a lid so as to prevent foreign materials from entering (IP67).

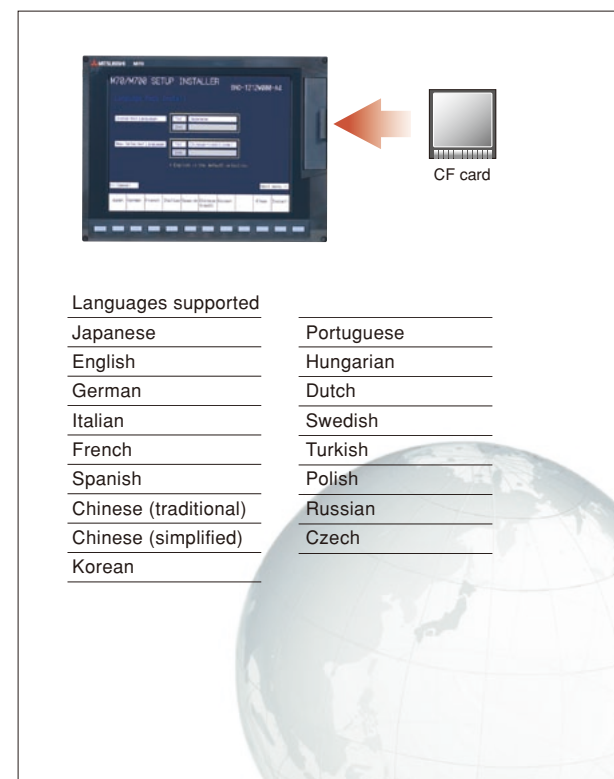


## Front IC Card Mode

- It is possible to directly search and run the machining programs from the CF card. Subprogram calls are also available.
- The machining programs in the CF card can be edited directly.

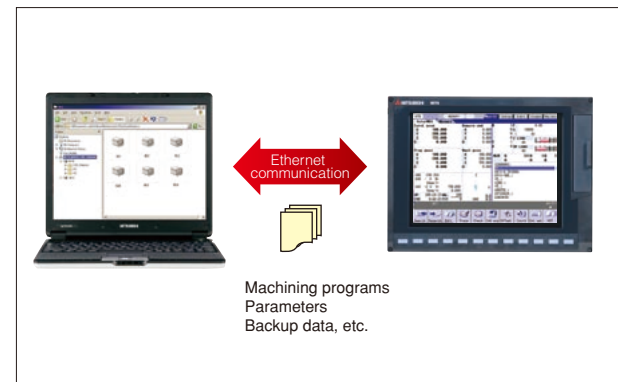
## Easy to Change Languages

- Easy to change languages using a CF card.
- Support for 17 languages, securing reliable use worldwide.



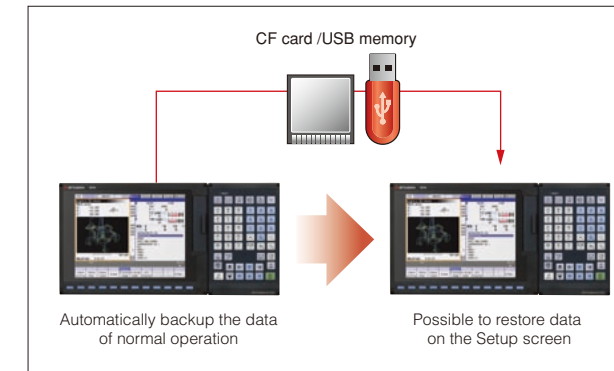
## Ethernet Communication

By connecting a personal computer and an CNC via Ethernet, the machining programs and parameters can be input and output.



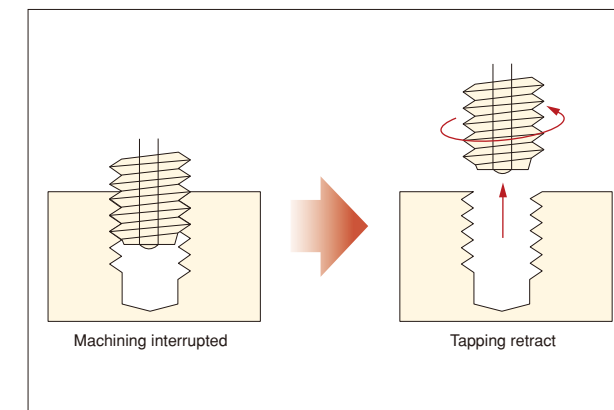
## Data Backup Function

It is possible to backup NC data collectively and periodically to a CF card /USB memory on the front of the display. This backup data is helpful for restoring the system in the case of an accident.



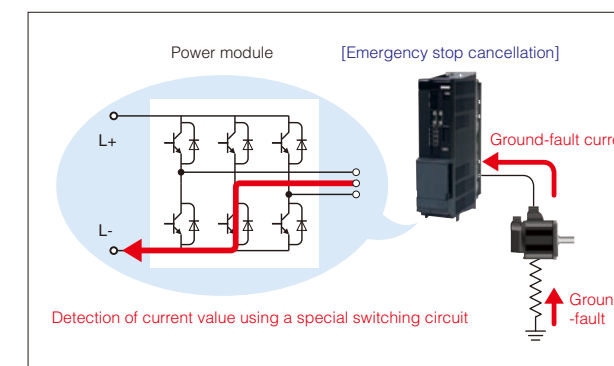
## Tapping Retract

Even when tapping is interrupted due to emergency stops or power outages, retraction of the tool out of a workpiece can be automatically carried out upon restarting operation.



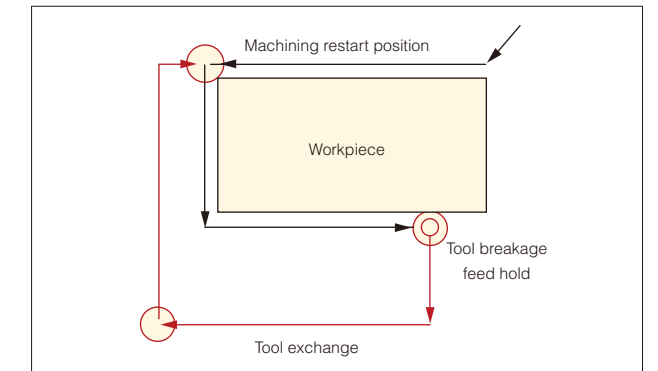
## Ground Fault Detection for Each Motor

Ground fault detection, which was formerly centrally performed by a power supply unit, has changed so that the fault can be detected per motor. As detecting a faulty axis is possible, the restore time is shorter.



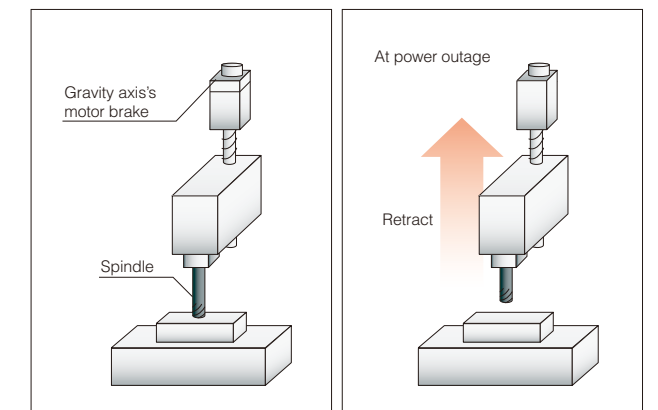
## Program Restart Function

It is possible to restart a program even when a machining program is interrupted due to tool breakage or power outages by automatically searching the block that was last executed before the interruption.



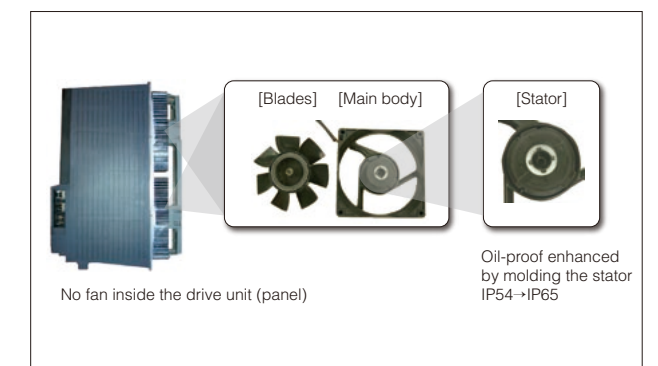
## Vertical Axis Drop Prevention Function at Power Failure

The drive system instantly detects a power failure, and the gravity axis is retracted so as to prevent a crash with a workpiece.



## Drive Unit with Higher Oil-proof

A cooling fan for the radiator fin outside the panel is molded so as to further prevent the oil from entering. The absence of a fan inside the drive unit contributes to the avoidance of electric circuit failures caused by inhaled dust and oil-mist.





Simple programming tools, "NAVI MILL" and "NAVI LATHE"



Interface Design with Overall View

Intuitively view system configuration and machining programs

LIST VIEW

LIST VIEW displays objects such as programs, processes, file data and parameters.

OPERATION VIEW

OPERATION VIEW displays the items corresponding to the object selected in LIST VIEW. Data can be input easily referencing the guidance drawing for input items.

Automatic Setting of Cutting Conditions

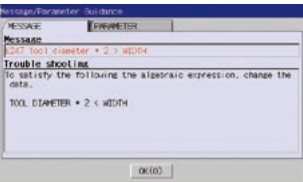
Simply input the tool number. The cutting conditions for each process are automatically set based on previously registered tool files and cutting-condition files.

Checker and Guidance Functions

Detects input errors for troubleshooting.

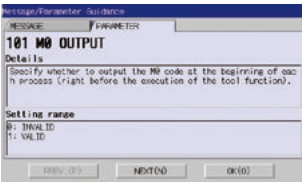
Message guidance

Troubleshooting options for input errors are displayed.



Parameter guidance

Displays parameter details and setting range.



Tool guidance

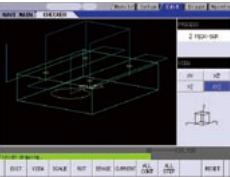
Displays primary data of the tool data previously registered in the tool file.



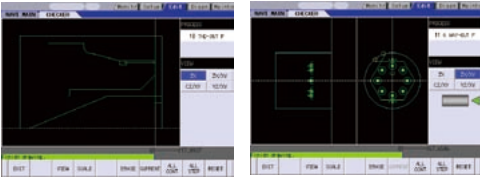
Checker

Displays the tool path or machining shape of a program in graphic form.

NAVI MILL



NAVI LATHE

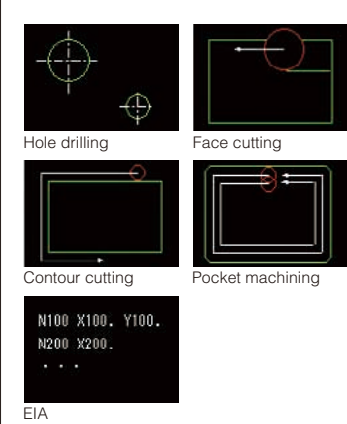


Customize Machining Programs

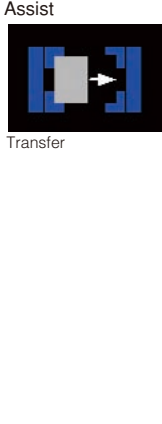
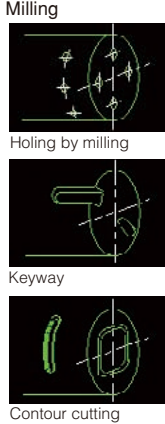
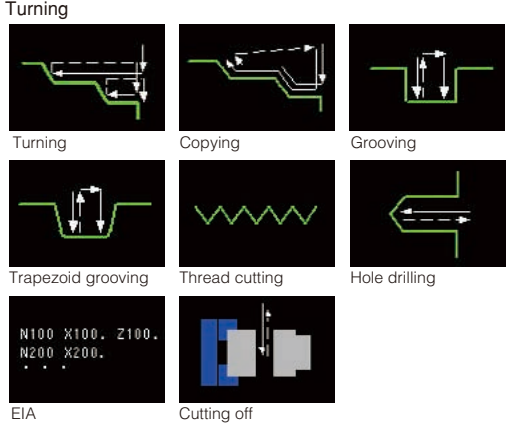
Machining programs using macro programs enable commands to be added between processes via the editing screen. Machine tool builders can customize the macro program of each process according to machine specifications and machining know-how.

Menu

NAVI MILL



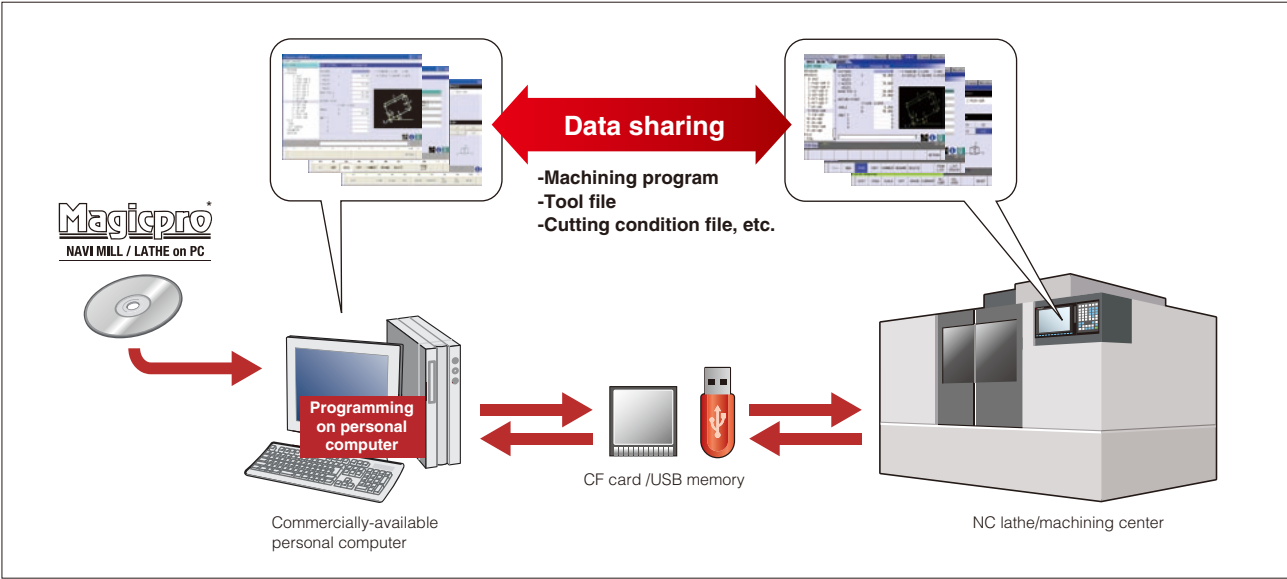
NAVI LATHE



Create machining programs on a personal computer

Magicpro-NAVI MILL on PC / Magicpro-NAVI LATHE on PC\* (Simple programming tool for use with personal computer)

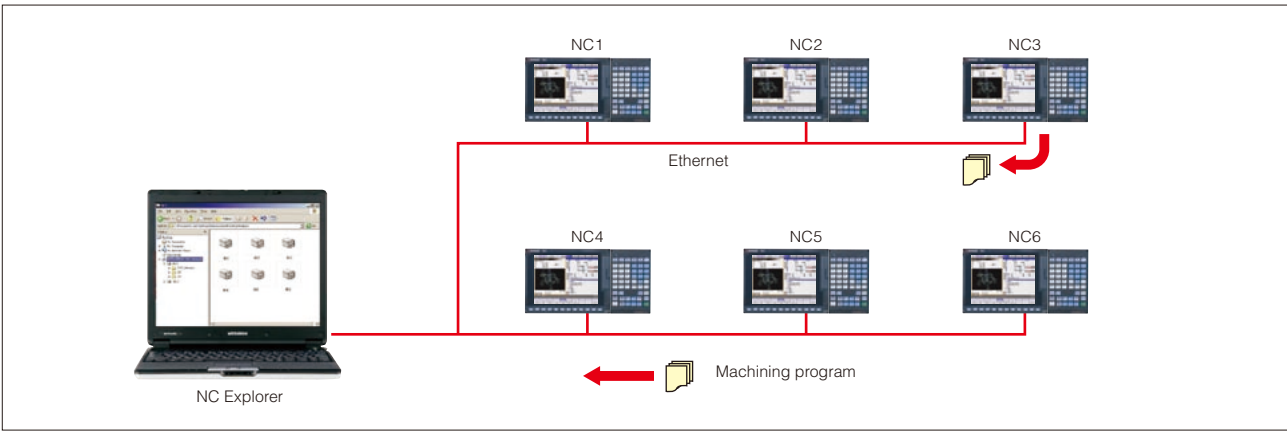
- With Magicpro-NAVI MILL/LATHE on PC\*, the same machining programs created with NAVI MILL/LATHE on a CNC can be created on a personal computer.
- Items such as machining programs, tool files and cutting-condition files can be shared between the NAVI programs on the CNC and a personal computer.



\*Magicpro is a registered trademark of Mitsubishi Electric Mechatronics Software Corporation.

NC Explorer (Data Transfer Tool)

By connecting the NC and host personal computer via Ethernet, data such as machining programs can easily be shared. This tool can be downloaded from MELFANSweb free of charge.



NC Trainer (MITSUBISHI CNC Training Tool)

- NC Trainer is an application for operating the screens of MITSUBISHI CNC M70V Series and machining programs. This application can be used for learning operating CNC and checking the operations of the machining programs.
- NC Trainer plus can also be used for checking the sequence program and custom screens.

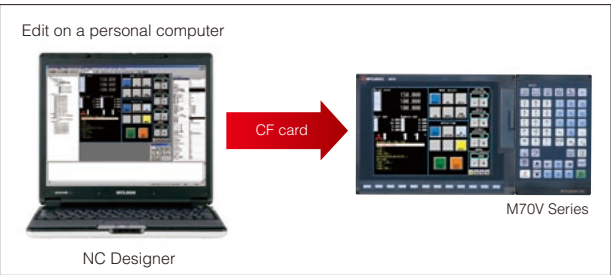


More comfortable development environment

<Custom screen development>  
Make your CNC more user-friendly by developing original screens

NC Designer (Screen Design Tool)

- By laying out ready-made standard parts, you can easily create original screens without programming.
- When using a touch-panel display, a machine operation panel can be built on the NC display.
- Events of the standard parts can be described using macros.
- Using the C language source generation function of NC Designer, customized functions can be added by programming in C language. (Dedicated development environment necessary.)



- Simply by locating parts of various functions on the screen, it is possible to create custom screens easily.
- It is possible to check the performance of custom screens on a personal computer.

Element	Outline
Screen	Physical display area
Panel	Base screen
Window	Pop-up window
Figure	Seven types of figures such as rectangles and circles
Control	Standard graphic parts such as buttons and lamps, and NC display parts such as counters and programs

**Parts displayed on NC (example)**

Develop screen configuration

**Resource window**

Common information such as character strings, fonts and images is managed here; available among multiple controls.

**GUI screen edit area**

By locating controls offered by NC Designer, it is possible to design screens easily.

\*GUI (Graphical User Interface)

**Message window**

**Property window**

Each control's attributes are managed as properties. It is possible to customize controls by setting the properties.

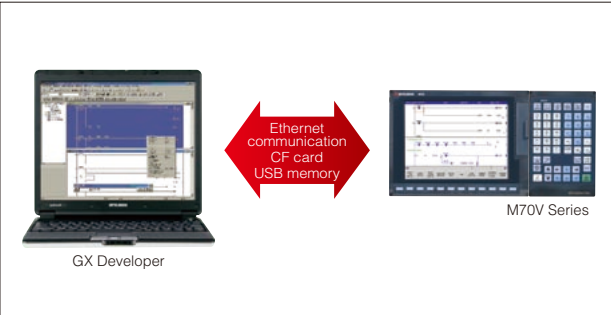
**Controls**

GUI parts used for screen creation with NC Designer. Standard parts such as buttons and NC dedicated controls are available.

<PLC development> Editable on both personal computers and HMI screens

GX Developer (PLC Programming Tool)

The MELSEC programming tool, offering a wide array of functions and easy use, allows for convenient program design and debugging. Linking with a simulator or other utility allows for the efficient creation of desired programs.



Onboard Ladder Editor

Operability of ladder editing/monitoring on the NC display is widely improved. Various functions are enhanced, such as divided screens, the search function and the monitoring screen.



<Easy setup>  
Offering a wide range of support tools, from machine design to setup

Servo Selection Tool

By selecting the machine configuration model and inputting the machine specifications, the optimal servo motor meeting specifications can be selected. Other selection functions which fully support drive system selection are also available. This tool can be downloaded from MELFANSweb free of charge.

<Main functions>  
Servo motor capacity selection, regenerative resistor capacity selection, spindle acceleration/deceleration time calculation, power supply capacity selection, power supply facility capacity calculation, etc.

When the machine model and input specifications are selected, the selection result for the motor will be displayed. The result can be output in PDF format.

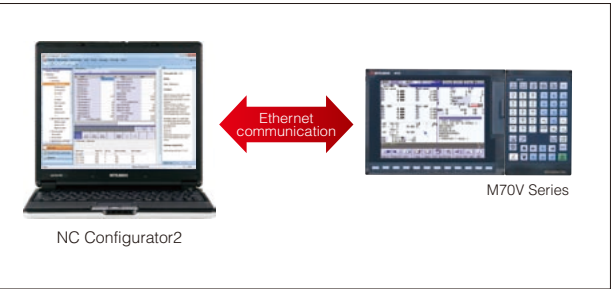
Setup Installer

Register the desired display language.



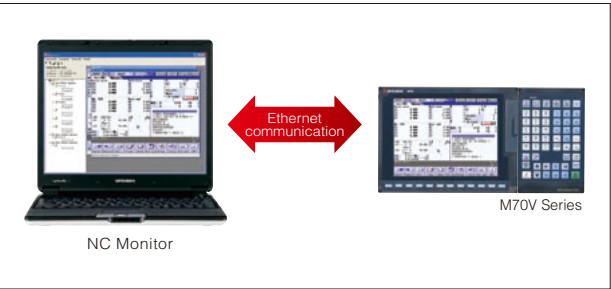
NC Configurator2 (Parameter Setup Support Tool)

The NC data file necessary for NC control and machine operation (such as parameters, tool data and common variables) can be edited on a personal computer. This tool can be downloaded from MELFANSweb free of charge. (Some functions are subject to fees.)



NC Monitor (Remote Monitoring Tool)

An identical NC display screen can be displayed on a personal computer. By connecting a personal computer to the NC unit when necessary, various data can be checked and set using the same HMI as the standard NC screen.



MS Configurator (Servo Adjustment Support Tool)

Servo parameters can be automatically adjusted by activating the motor using machining programs for adjustment or vibration signals, and measuring/analyzing the machine characteristics. This tool can be downloaded from MELFANSweb free of charge.

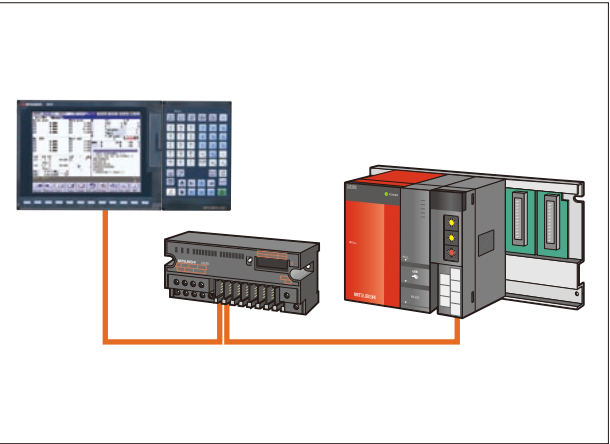
<Main functions>  
Bode diagram measurement display, speed loop gain adjustment, position loop gain adjustment, notch filter setting, acceleration/deceleration time constant adjustment, circularity adjustment and servo waveform measurement.



A wide range of support features according to various machine configurations

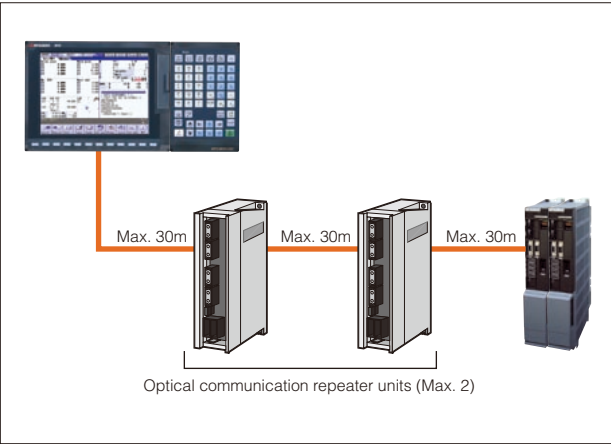
CC-Link

The NC unit can be connected to a network to serve as the master/local station of the MELSEC CC-Link.



Optical Communication Repeater Unit

The optical cable can be extended to a maximum of 90m by connecting up to two optical servo communication repeater units between the CNC unit and a servo drive unit.



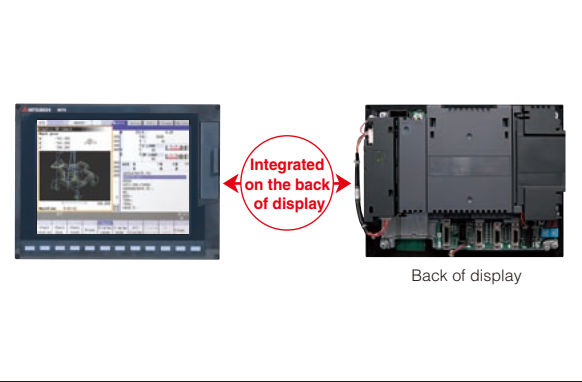
Displays & Keyboards

Keyboard \ Display		M70V [mm]		
		FCU7-DU120-12	FCU7-DU140-12	FCU7-DU140-32
		8.4-type	10.4-type	10.4-type touch panel
Horizontal layout	FCU7-KB024	8.4-type sheet keys	260 140 200 8.4-type	140 -
	FCU7-KB026	8.4-type clear keys	260 140 200 8.4-type	140 -
	FCU7-KB044	10.4-type sheet keys	290 140 220 10.4-type	290 140 220 10.4-type touch panel
	FCU7-KB046	10.4-type clear keys	290 140 220 10.4-type	290 140 220 10.4-type touch panel
	FCU7-KB048	10.4-type clear keys	290 230 220 10.4-type	290 230 220 10.4-type touch panel
Vertical layout	FCU7-KB029	8.4-type sheet keys	260 140 200 8.4-type	140 -
	FCU7-KB047	10.4-type clear keys	290 160 220 10.4-type	290 160 220 10.4-type touch panel

The internal components of the keyboard are protected against water and oil (IP65F). The interface for the CF card is mounted on the front panel of the display.

Control Unit

The control unit is integrated into the back side of the display.



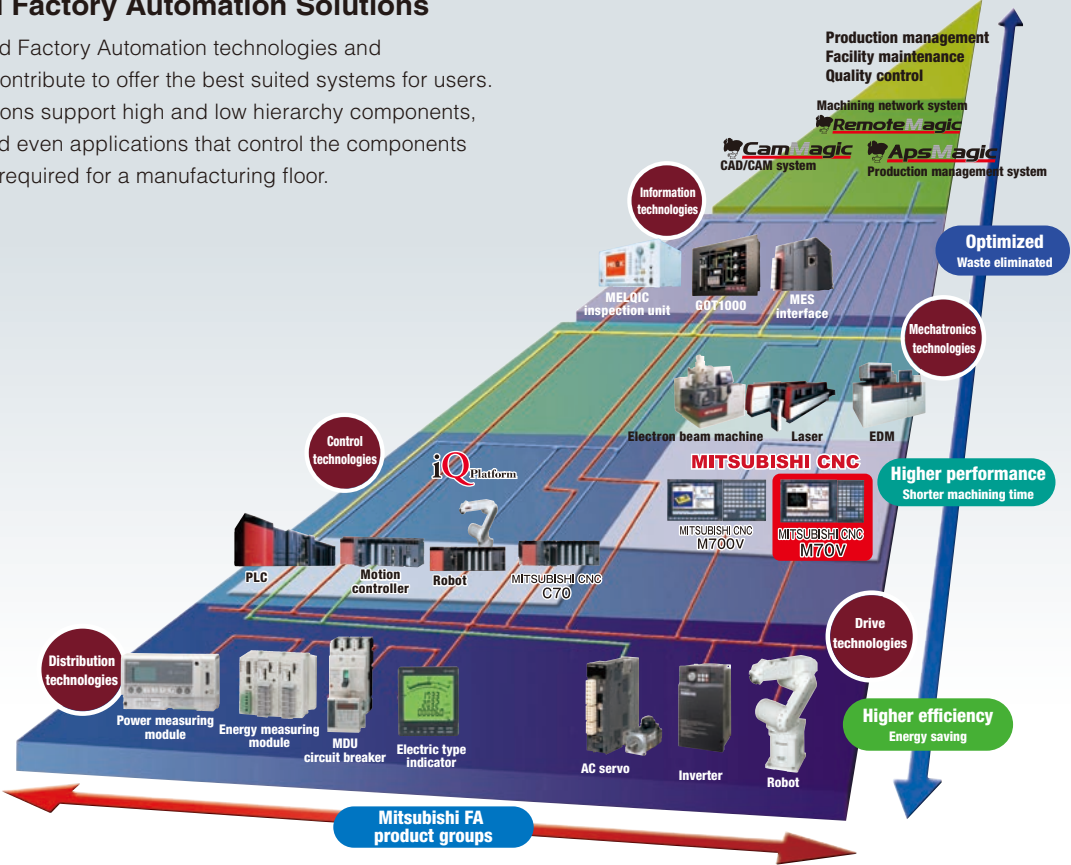
MITSUBISHI CNC Machine Operation Panel

		[mm]
FCU7-KB921	Key switch 55 points, LED 55 points MITSUBISHI standard key layout	260 140
FCU7-KB926	Rotary switches (spindle override, cutting override) Select switch (memory protection) Emergency stop push-button	140 140

-The internal components of the machine operation panel are protected against water and oil (IP65F).  
-Refer to the product brochure for details.

Mitsubishi Factory Automation Solutions

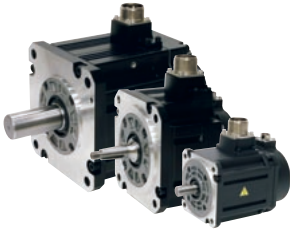
- Our cultivated Factory Automation technologies and experience contribute to offer the best suited systems for users.
- Our FA solutions support high and low hierarchy components, a network and even applications that control the components and network required for a manufacturing floor.



Servo Motors

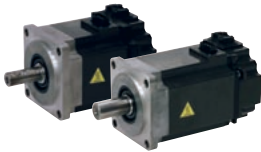
HF Series

- Medium-inertia, high-accuracy and high-speed motors
- High-inertia machine accuracy is ensured. Suitable for machines requiring quick acceleration.
- Range: 0.5 to 9 [kW]
- Maximum speed: 4,000 or 5,000 [r/min]
- Supports three types of detectors with a resolution of 260,000, 1 million or 16 million p/rev.



HF-KP Series

- Small-capacity, low-inertia motors
- Suitable for an auxiliary axis that require high-speed positioning
- Range: 0.2 to 0.75[kW]
- Maximum speed: 6,000 [r/min]
- Supports a detector with a resolution of 260,000p/rev.



Linear Servo Motor LM-F Series

- Use in clean environments is possible since no ball screws are used and therefore contamination from grease is not an issue.
- Elimination of transmission mechanisms which include backlash, enables smooth and quiet operation even at high speeds.
- Dimensions:  
Length: 290 to 1,010 [mm]  
Width: 120 to 240 [mm]



Direct Drive Servo Motor TM-RB Series

- High-torque direct-drive combined motor with a high-gain control system provides quick acceleration and positioning, which makes rotation smoother.
- Suitable for a rotary axis that drives a table or spindle head.
- Compared with a conventional rotary axis with a deceleration gear, this motor has higher accuracy and is maintenance-free, having no wear or backlash.
- Range:  
Maximum torque: 36 to 1,280 [N·m]



Spindle Motors

High-performance New Type Spindle Motor SJ-D Series

- Motor energy loss has been significantly reduced by optimizing the magnetic circuit.
- High-speed-specification bearings are equipped as standard, achieving higher-speed, lower vibration and improved durability.
- Product line:  
Normal SJ-D Series 3.7 to 11 [kW]  
Compact & light SJ-DJ Series 5.5 to 15 [kW]



High-performance Spindle Motor SJ-V Series

- A vast range of spindle motors is available, including standard, high-speed and wide-range output units, all ready to support diversified machine tool needs.
- Product line:  
Normal SJ-V Series 0.75 to 55 [kW]  
Wide-range constant output SJ-V Series 5.5 to 18.5 [kW]  
High-speed SJ-V-Z Series 2.2 to 22 [kW]  
Hollow-shaft SJ-VS Series 5.5 to 18.5 [kW]



Low-inertia, High-speed Spindle Motor SJ-VL Series

- The spindle dedicated to tapping machines requiring faster drilling and tapping.
- The low-inertia reduces acceleration/deceleration time, resulting in higher productivity. In addition, when driven by a multi-hybrid drive (MDS-DM-SPV Series), this motor contributes to downsizing of the cabinet, and energy savings.
- Hollow-shaft specifications are also available.
- Product line:  
Low-inertia normal SJ-VL Series 3.0 to 11 [kW]  
Low-inertia hollow shaft SJ-VLS Series 3.7 to 11 [kW]



Built-in Spindle Motor

- Electricity loss is minimized by providing better efficiency during high-speed rotation.
- Stator coil-end size has been reduced, realizing a shorter overall motor length.
- As feedback communication is serial, the resolution is significantly enhanced (Max. 4 million p/rev)
- The adjustment PCB has been eliminated to achieve adjustment-free conditions. The standard gap has been reduced to 0.3mm.



IPM Spindle Motor

- In answer to demands for downsizing and higher efficiency, an IPM motor has been introduced for further energy savings.
- A reduction in acceleration/deceleration time contributes to shorter cycle times.



Drive Units

High-performance Servo/Spindle Drives  
MDS-D/DH Series

- With the fastest current control cycle, basic performance is drastically enhanced (high-gain control). A combination of high-speed servo motor and high-accuracy detector helps enhance overall drive performance.
- High-speed optical communication enables a shorter position interpolation cycle and direct communication between drives, promoting further high-speed and high-accuracy machining.
- A high-efficiency fin and low-loss power module have enabled unit downsizing. A line of drive units driving a maximum of two spindles is available, contributing to a reduction in control panel size.



Servo/Spindle Drives  
MDS-D-SVJ3/SPJ3 Series

- Ultra-compact drive units with built-in power supplies contribute to reducing control panel size.
- High-speed optical communication enables a shorter position interpolation cycle and direct communication between drives, promoting further high-speed and high-accuracy machining.
- A high-efficiency fin and low-loss power module have enabled unit downsizing, which also leads to a reduction in control panel size.



Multi-hybrid Drives  
MDS-DM Series

- A line of high-performance multi-hybrid drive units are available. The multi-hybrid drive unit drives a maximum of three servo axes and one spindle, supporting the downsizing of units and offering technical advantages.
- The connection between the drive unit and CNC is fast and reliable optical communication. A power regeneration system that efficiently uses energy during deceleration as power contributes to highly-frequent acceleration/ deceleration and energy savings.



Specifications

					○:Standard △:Optional □:Selection			
Specifications		Model name		Machining Center system		Lathe system		
				TypeB	TypeA	TypeB	TypeA	
Number of control axes	Max. number of axes (NC axes + Spindles + PLC axes)			9	11	9	11	
	Max. number of NC axes (in total for all the part systems)			5	8	4	9	
	Max. number of spindles			2	2	3	4	
	Max. number of PLC axes			6	6	6	6	
	Max. number of PLC indexing axes			4	4	4	4	
	Number of simultaneous contouring control axes			4	4	4	4	
Max. number of NC axes in a part system				5	8	4	8	
Max. number of part systems				1	2	1	2	
Front IC card mode				○	○	○	○	
Least command increment				0.1 μm	0.1 μm	0.1 μm	0.1 μm	
Least control increment				1nm	1nm	1nm	1nm	
Polar coordinate interpolation				—	—	○	○	
Milling interpolation				—	—	—	○	
Rapid traverse constant inclination multi-step acceleration/deceleration (1st part system only)				○	○	—	—	
High-speed synchronous tapping				○	○	○	○	
Max. program capacity				○500kB [1,280m]	○500kB [1,280m] △2,000kB [5,120m] <sup>*1</sup>	○500kB [1,280m]	○500kB [1,280m] △2,000kB [5,120m] <sup>*1</sup>	
Tool spindle synchronization II (Hobbing)				—	—	—	○	
Graphic check				○	○	○	○	
3D solid program check				—	○	—	—	
Graphic check rotary axis drawing				—	△ <sup>*1</sup>	—	△ <sup>*1</sup>	
Mixed control (cross axis control)				—	—	—	○	
Control axis synchronization across part systems				—	—	—	○	
Balance cut				—	—	—	○	
2-part system synchronous thread cutting				—	—	—	○	
Multi-part system program management				—	○	—	○	
High-speed machining mode I (G5P1) Max.[kBPM] <sup>*3</sup>				○8.4	○16.8	—	—	
High-speed machining mode II (G5P2) Max.[kBPM] <sup>*3</sup>				—	○33.7	—	—	
High-speed high-accuracy control 1 (G5.1Q1) Max.[kBPM] <sup>*3</sup> (1st part system only)				○16.8	○16.8	—	—	
High-speed high-accuracy control 2 (G5P10000) Max.[kBPM] <sup>*3</sup> (limited to 1-part system configuration)				—	○33.7	—	—	
High-accuracy control 1 (G61.1/G08) (1st part system only)				○	○	—	—	
Max. PLC program capacity				○20,000 steps	○32,000 steps	○20,000 steps	○32,000steps	
CC-Link (Master/Slave) <sup>*1</sup>				□	□	□	□	
Customization (NC Designer) <sup>*2</sup>				○	○	○	○	
Customization data storage capacity [MByte]				○3 △6 <sup>*1</sup>	○3 △6 <sup>*1</sup>	○3 △6 <sup>*1</sup>	○3 △6 <sup>*1</sup>	
Customization workpiece data size [MByte]				3	3	3	3	

<sup>\*1</sup>:Additional hardware is required. <sup>\*2</sup>:Optional software is required. <sup>\*3</sup>:BPM is a number of machining program blocks processed per minute.

Refer to the specifications manuals.





### Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001 (standards for quality assurance management systems)



**for a greener tomorrow**

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



## MITSUBISHI ELECTRIC CORPORATION

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