MITSUBISHI ELECTRIC

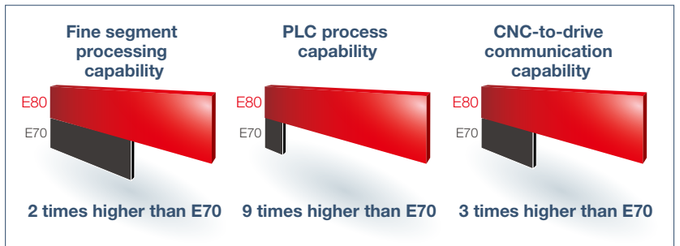
Changes for the Better

FACTORY AUTOMATION

NUMERICAL CONTROL (CNC)
E80 Series

E80 Series

The CNC E80 Series boasts drastic improvements in performance and a higher accuracy than ever before.
The simple and easy-to-use E80 Series helps in achieving a greater cost performance, and fits best with simple machine configurations.



Drastic improvements in performance CNC-dedicated CPU

With Mitsubishi Electric's high-speed CNC-dedicated CPU, the E80 Series reduces cycle times due to a higher program and PLC processing capability. Higher optical communication speeds between the CNC and drive acheive higher accuracy in machining.

Machining center system

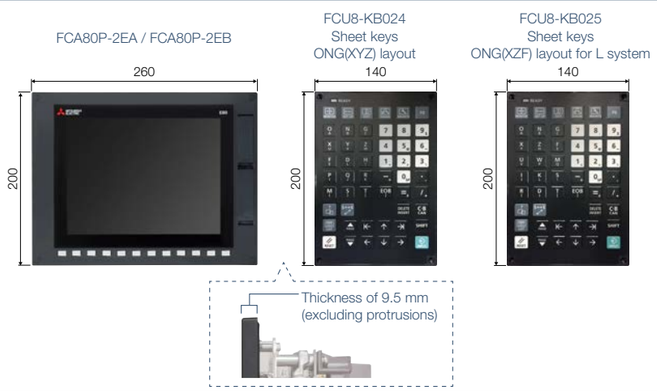
Specifications	E70	E80 TypeA	E80 TypeB
Max. number of part systems	1	1	1
Max. number of axes	6	6	4
Max. number of NC axes	3	5 Up to one rotary axis	3 Up to one rotary axis
Max. number of spindles	1	1	1

Lathe system

Specifications	E70	E80 TypeA	E80 TypeB
Max. number of part systems	1	1	1
Max. number of axes	7	8	6
Max. number of NC axes	4	5	4
Max. number of spindles	2	3	3

Models for various machine configurations TypeA/TypeB

TypeA and TypeB models are available for both machining centers and lathes. Select the model with the specifications that suit the machine configuration best.

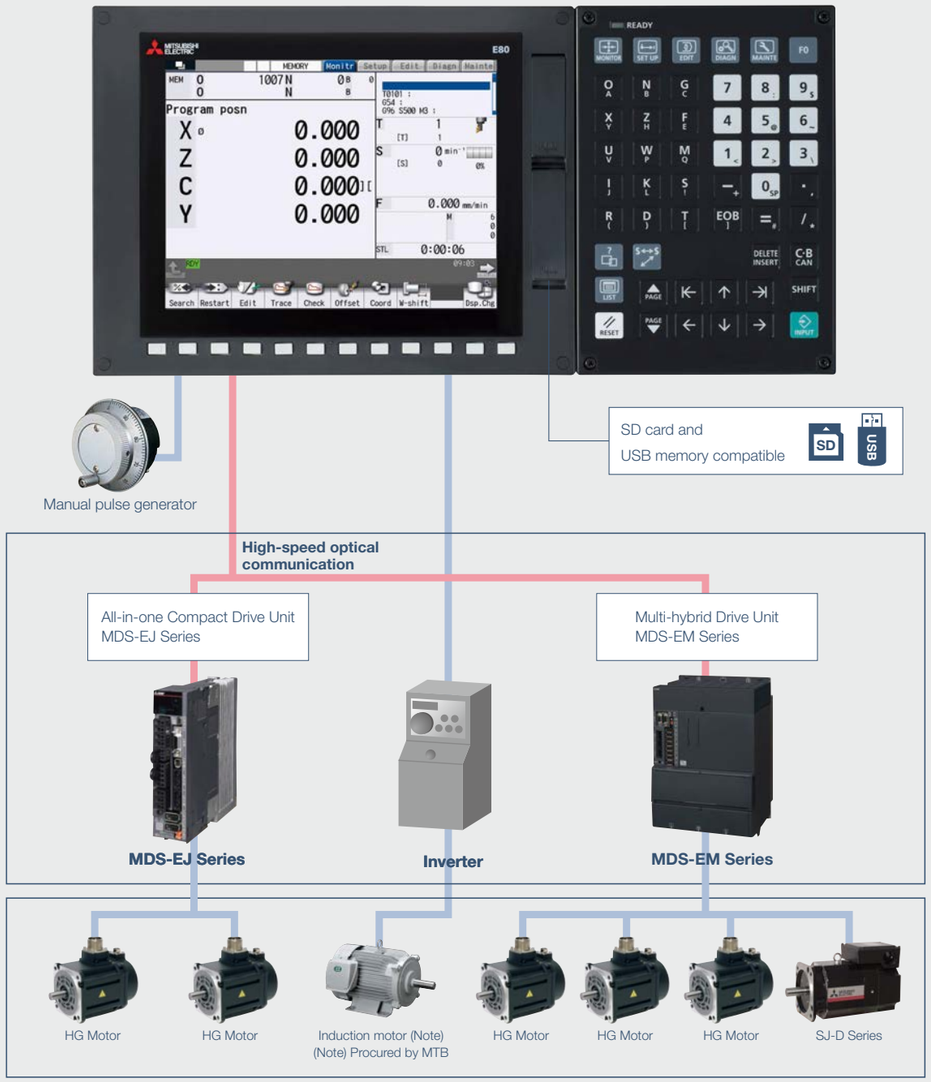


Leading design Display Units and Keyboards

The E80 Series adopts the M800/M80 Series design. The display unit and keyboard are only 9.5 mm thick, and their flat profile opens up new possibilities for machine design. There are 2 types of keyboard layouts, one for lathes and the other for milling.

CNC SYSTEM CONFIGURATIONS

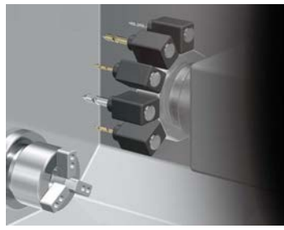
E80 Series
Display-integrated Control Unit & Keyboard



[Examples of E80 Series system configurations]

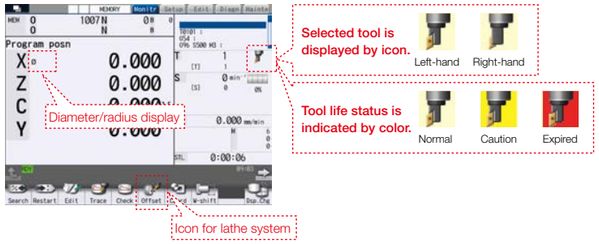
The Best Partner for Your Success

ENHANCED LATHE SYSTEM



**The E80 Series comes with enhanced high-accuracy control functions for lathes with milling functions as standard.
Functions such as the interactive cycle insertion function make programming easier, improving operability.**

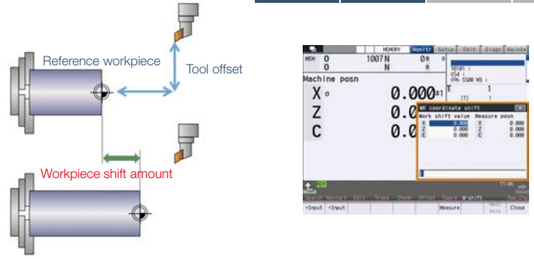
E80A(L) E80B(L) E80A(M) E80B(M)



Pursuing usability
The Simple Monitor Screen

The simple monitor screen puts all the essential information for mass production on one screen, making it simple to find information immediately.
Information such as the selected tool and the remaining lifetime can be checked by viewing the tool icon.

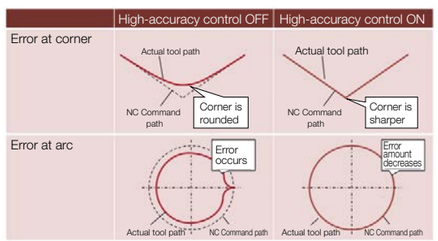
E80A(L) E80B(L) E80A(M) E80B(M)



Reduce setup time
Workpiece Coordinate System Shift

The same machining program can be used when the workpiece coordinate system does not match the actual workpiece coordinate system, or when the actual workpiece length is different. This function helps to create machining programs easier.

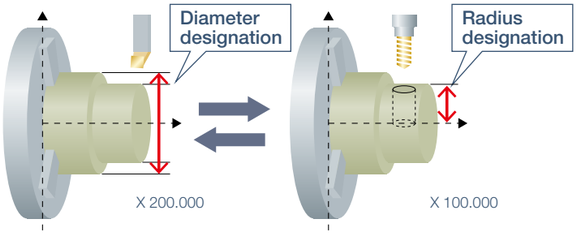
E80A(L) E80B(L) E80A(M) E80B(M)



Improved machining accuracy
High-accuracy Control

E80 Series high-accuracy control minimizes deviation of the actual tool path from the command path, improving the accuracy of the machining of corners and arcs.

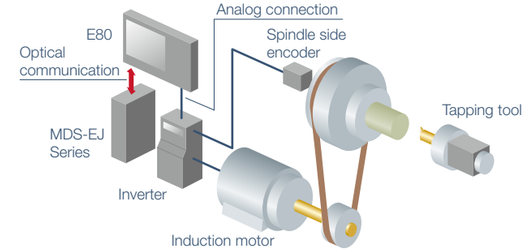
E80A(L) E80B(L) E80A(M) E80B(M)



Flexible commands
Diameter/Radius Designation Switch

Flexible commands allow the user to switch between diameter/radius designation for each axis with the G-code at any time.
Flexible commands are particularly useful for programs where turning and milling coexist.

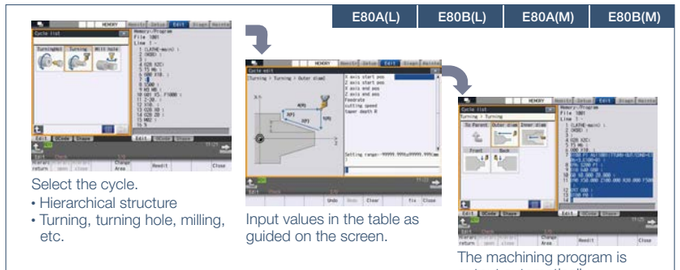
E80A(L) E80B(L) E80A(M) E80B(M)



Applicable to a wide array of machine specifications
Synchronous Tapping with Analog I/F Spindle

Synchronous tapping can be performed with an analog-connected spindle such as an inverter without using a dedicated tool holder. The applicability to a wide array of machine specifications allows for more efficient machining.

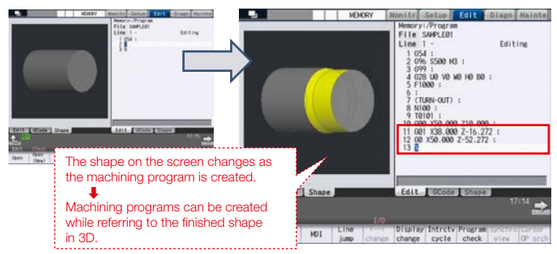
E80A(L) E80B(L) E80A(M) E80B(M)



Easier program creation
Interactive Cycle Insertion

Create a machining program automatically simply by inserting a machining shape in a selected machining cycle. Interactive cycle insertion enables the user to create programs intuitively while referring to drawings on the screen, reducing the time required for program creation compared with G-code input.

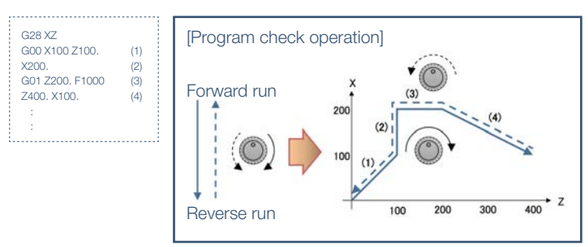
E80A(L) E80B(L) E80A(M) E80B(M)



Easier program creation
Finish Shape View Programming

The finished shape is displayed in 3D while creating a machining program. Checking the finished shape in real-time during program creation allows the user to correct mistakes as they appear in the finished shape.

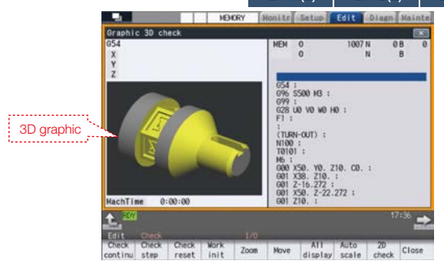
E80A(L) E80B(L) E80A(M) E80B(M)



Easier program creation
Program Check Operation

Check the machining program while viewing the actual operation of the machine. Also, forward run/reverse run operation can be checked meticulously at a desired feedrate (manual handle feed) , making prototype checks more accurate and easier than before.

E80A(L) E80B(L) E80A(M) E80B(M)



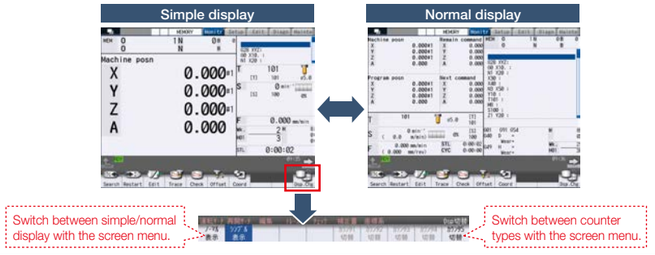
Program finalization
3D Solid Program Check

3D solid program check allows the user to check a finalized machining program against the 3D graphic of the final shape for the program.
Being able to perform a detailed check of the final shape before production on the actual machine is a major advantage.

ENHANCED MACHINING CENTER SYSTEM

The eSSS control function responds to the growing demand for high-quality machining even in basic machine configurations. The E80 Series reduces non-cutting time, improving productivity at production sites.

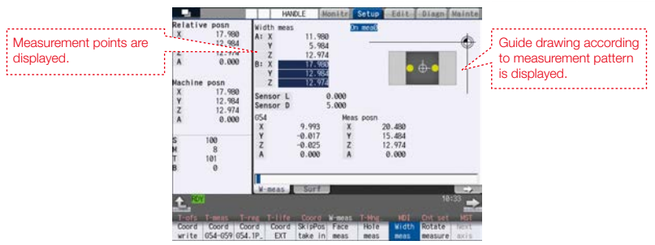
E80A(L) | E80B(L) | E80A(M) | E80B(M)



Pursuing usability The Simple Monitor Screen

The simple monitor screen puts all the essential information for mass production on one screen, and is easy to view from distance.
The screen configurations (simple/normal), and the types of counters being displayed can be changed using the screen menu, making the customization of displays easier than before.

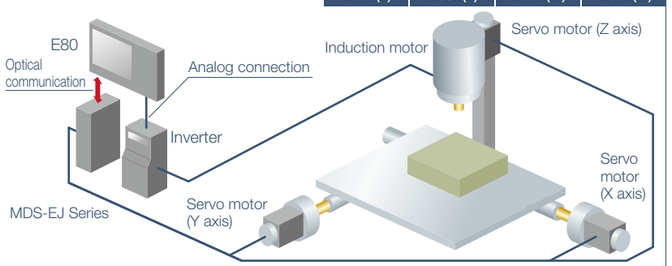
E80A(L) | E80B(L) | E80A(M) | E80B(M)



Reduce setup time Workpiece Position Measurement

The coordinate points can be measured on the workpiece measurement screen, and values automatically calculated from the measured coordinates are set. Manual measurements using jigs or dial gauges are no longer necessary.

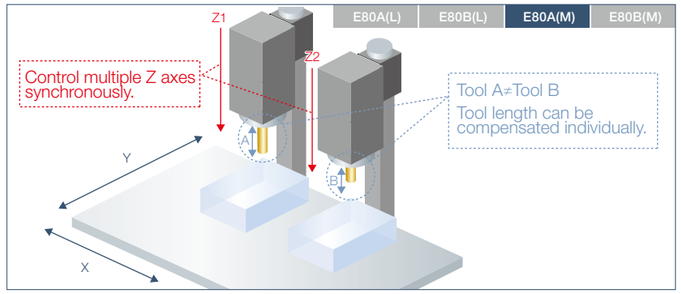
E80A(L) | E80B(L) | E80A(M) | E80B(M)



Applicable to a wide array of machine specifications Synchronous Tapping with Analog I/F Spindle

Synchronous tapping can be performed with an analog-connected spindle such as an inverter without using a dedicated tool holder. The applicability to a wide array of machine specifications allows for more efficient machining.

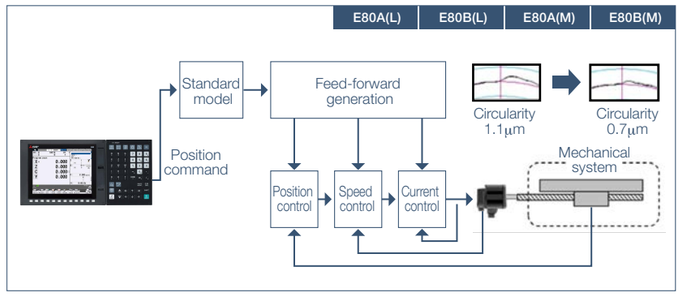
E80A(L) | E80B(L) | E80A(M) | E80B(M)



Applicable to a wide array of machine specifications Multiple-axis Synchronization Control

This function enables the synchronous control of multiple Z axes. Synchronizing multiple axes enables the controlling of machines that perform the same operation over multiple axes such as multi-head machines. The tool length for each Z axis can be compensated individually, and it improves machining accuracy.

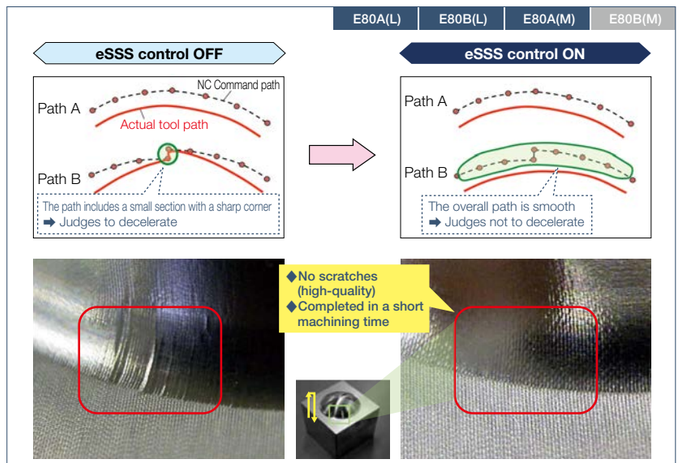
E80A(L) | E80B(L) | E80A(M) | E80B(M)



Contribute to high-accuracy machining OMR-FF Control

OMR-FF control adjusts the optimal position loop gain for each axis, leading to smoother and more accurate machining.

E80A(L) | E80B(L) | E80A(M) | E80B(M)

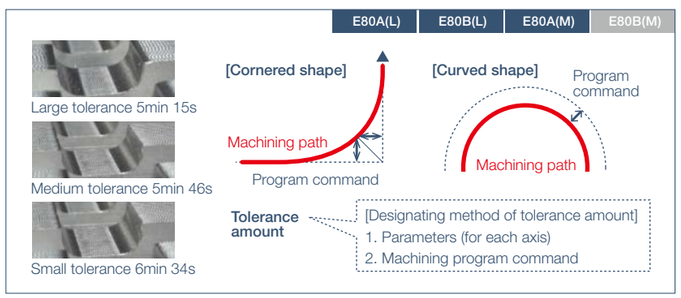


Contribute to high-quality machining eSSS Control*1

When the tool passes through the corner portion at high acceleration and high speed, eSSS control determines the machining shape comprehensively, suppresses excessive feedrate change and vibration, and smoothens the operation.
This ensures consistent high-quality machining which is not affected by the quality of machining programs.

*1 The control process of this function is equivalent to "SSS Control" (Super Smooth Surface Control) of the M800/M80 Series.
Some of the relevant parameters are fixed for this function, however, "SSS Control" can be used by making some simple settings.

E80A(L) | E80B(L) | E80A(M) | E80B(M)

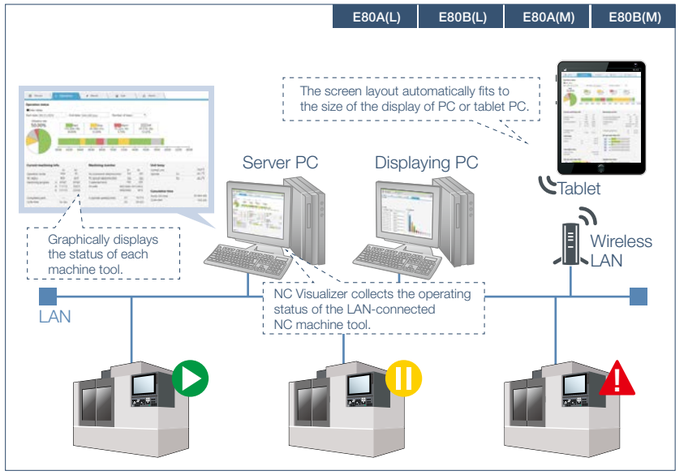


Easy operation, high quality Tolerance Control

This function obtains the optimum clamp speed for corners or curves based on the designated tolerance to perform operations. It also ensures smooth passing in corner sections within the tolerance range, which suppresses machine vibrations. The cycle time is reduced because the clamp speed can be increased to a higher speed than usual.
Simply set the amount of tolerance, and the machine operates at the optimal speed and tool path, making it easy to achieve a high-quality machined surface.

FACTORY-WIDE OPTIMIZATION

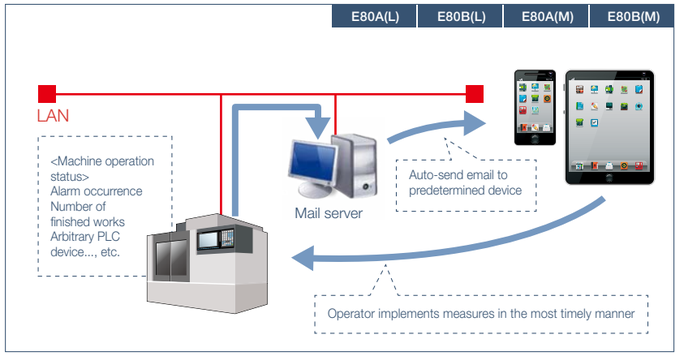
E80A(L) E80B(L) E80A(M) E80B(M)



NC Visualizer enables to visualize the operating status of machine tools easier.

To build the "Operation monitoring system", install NC Visualizer, an operation monitoring application, to your server PC.
NC Visualizer displays the machine tool's status such as "operating", "stopped", "alarm", and "power OFF" in a list, which helps operators to improve the productivity or to analyze the cause of alarms.
In addition, the operators can monitor the operating status with an external PC/tablet PC via a Web browser.

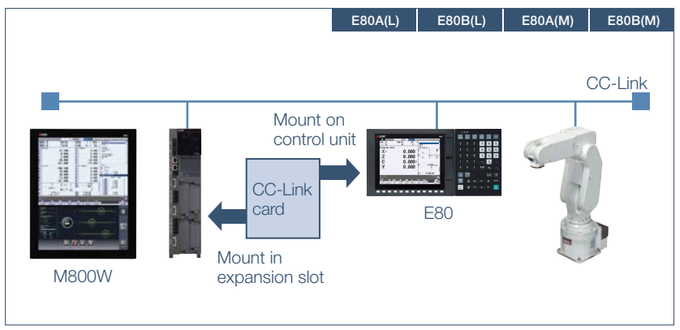
E80A(L) E80B(L) E80A(M) E80B(M)



Remote confirmation of machine status Email Notification to Operator

This sends you an e-mail about machine condition automatically at the specified timing to a computer, tablet or smartphone. No dedicated line is needed, so you can set up easily.
Machine condition can be monitored at anytime, anywhere. This helps you to deal with emergent situations timely, leading to shorter downtime and higher productivity.

E80A(L) E80B(L) E80A(M) E80B(M)



Wider compatibility with peripheral devices Connection to Various of Field Networks

By inserting an optional card in the slot on the back of the display unit, CNC can support CC-Link (master/local), PROFIBUS-DP (master), and EtherNet/IP connections, making it possible to connect with many peripheral devices through a wide range of field networks.

SPECIFICATIONS

		E80 Series			
		Lathe system		Machining center system	
		TypeA	TypeB	TypeA	TypeB
Number of control axes	Max. number of axes (NC axes + Spindles + PLC axes)	8	6	6	4
	Max. number of NC axes (in total for all part systems)	5	4	5 (*1)	3
	Max. number of spindles	3	3	1	1
	Max. number of PLC axes	3	3	2	0
	Number of simultaneous contouring control axes	4	4	4	3
Max. number of part systems		○1	○1	○1	○1
Display unit-side High-speed program server mode		○	○	○	○
Front-side SD card mode		○	○	○	○
Least command increment		0.1μm	0.1μm	0.1μm	1μm
Least control increment		1nm	1nm	1nm	1nm
Program memory capacity (number of programs stored)		230KB [600m] (400 programs)	230KB [600m] (400 programs)	500KB [1280m] (1000programs)	500KB [1280m] (1000programs)
Max. number of tool offset sets		99 sets	99 sets	200 sets	99 sets
Built-in PLC capacity [number of steps]		○20000	○20000	○20000	○20000
Multi-program [number of programs]		○60	○60	○60	○60
Multi-project [number of projects stored]		○2	○2	○2	○2
Macro program Variable command		600 sets	200 sets	600 sets	200 sets
Machine tool builder macro		○	○	○	○
Workpiece coordinate system shift		○	○	-	-
3D solid program check		○	○	○	○
Manual arbitrary reverse run (program check operation)		○	○	-	-
Interactive cycle insertion		○	○	○	○
Diameter/Radius designation switch		○	○	-	-
Synchronous tapping with analog I/F spindle		○	○	○	○
Workpiece position measurement		-	-	○	○
Simple inclined surface machining command		-	-	○	-
High-accuracy control (G61.1/G08)		○	○	○	-
eSSS control		○	○	○	-
Tolerance control		○	○	○	-
OMR-FF		○	○	○	○
Spindle-mode servo motor control		○	○	-	-
Finish shape view programming		○	○	-	-
Email notification to operator		○	○	○	○
Operation history (detailed alarm history information)		○	○	○	○
CC-Link (Master/Local)		□	□	□	□
PROFIBUS-DP (Master)		□	□	□	□
EtherNet/IP		□	□	□	□
MES interface library		○	○	○	○
EcoMonitorLight connection		○	○	○	○
System lock		○	○	○	○

(*1) Up to one rotary axis

DRIVE SYSTEM

•Drive units

High-performance Servo/ Spindle Drive Units MDS-E/EH Series

- The servo control-dedicated core processor realizes improved control speed, leading to enhanced basic performance. When combined with a higher resolution motor sensor and advanced high-speed optical communication, this drive contributes to high-speed, high-accuracy control.
- The motor power connector is equipped with an anti-misinsertion mechanism. This helps to eliminate connection errors.
- Improved diagnostic and preventive-maintenance features
- Safe Torque Off (STO) and Safe Brake Control (SBC) are also incorporated as additional safety features.

Multi-hybrid Drive Units MDS-EM/EMH Series

- The multi-hybrid drive units are capable of driving a maximum of three servo axes and one spindle. This contributes to the downsizing of machines and offers technical advantages.
- The motor power connector is equipped with an anti-misinsertion mechanism. This helps to eliminate connection errors.
- Safe Torque Off (STO) and Safe Brake Control (SBC) are also incorporated as additional safety features.
- Fan unit contributes to easier fan exchange
- MDS-EMH 400V system drive unit is available.

All-in-one Compact Drive Units MDS-EJ/EJH Series

- Ultra-compact drive units with built-in power supplies contribute to smaller control panel size.
- The 2-axis type is added for further downsizing.
- The servo control-dedicated core processor realizes an increase in control speed, leading to improved basic performance. When combined with a higher resolution motor sensor and enhanced high-speed optical communication, this drive contributes to high-speed, high-accuracy control.
- Safe Torque Off (STO) and Safe Brake Control (SBC) are also incorporated as additional safety features.
- MDS-EJH 400V system drive unit is available (Note 1).

PWM Converter MDS-EX-CVP Series

- Product of the PWM converter series which has a stabilizing DC voltage function and boost function. MDS-EX-CVP series reduces the output deceleration of the spindle motor and improves output in the high-speed range.
- Only 400V system power supply unit is available.

•Servo motors

Medium-inertia, High-accuracy, High-speed Motors HG Series

- Sensor resolution has been significantly improved. The servo motors, which boast smooth rotation and outstanding acceleration capabilities, are well-suited to serve as feed axes of machine tools.
- Range: 0.2 to 11 [kW]
- Maximum rotation speed: 2,000 to 6,000 [r/min]
- Safety support sensors are included as standard specification. Sensor connectors are screw-locked and have enhanced vibration resistance. Three sensor resolutions (i.e., 1, 4 or 67 million pulses/rev) are available.
- This can also be used as a tool spindle motor.
- Small-sized connector allows horizontal cable connection, which helps to save space in machines. (Note 2)

Linear Servo Motors LM-F Series

- Use in clean environments is possible since no ball screws are used, eliminating possible contamination from grease.
- Elimination of transmission mechanisms, including backlash, enables smooth, quiet operation even at high speeds.
- Range: Maximum thrust: 900 to 18,000 [N·m]

Direct-drive Servo Motors TM-RB Series

- High-torque, direct-drive motors combined with high-gain control provide quick acceleration and positioning, which makes rotation smoother.
- Suitable for rotary axes that drive tables or spindle heads
- Range: Maximum torque: 36 to 1,280 [N·m]

•Spindle motors

High-output, High-speed Spindle Motors SJ-DG Series

- Addition of S3 rating (%ED rating) has improved output and torque acceleration/deceleration characteristics.
- Balance adjustment ring added to the counter-load side for fine tuning.
- Range: S3 rating: 5.5 to 15 [kW]
- Maximum speed: 10,000 to 12,000 [r/min]

Low-inertia, High-speed Spindle Motors SJ-DL Series

- This series of spindle motors is dedicated to use in tapping machines that require faster drilling and tapping.
- The latest design technologies have made it possible to attain lower vibration and greater rigidity even with the lighter weight.
- Range: 0.75 to 7.5 [kW]
- Maximum speed: 10,000 to 24,000 [r/min]

High-performance Spindle Motors SJ-D Series

- Motor energy loss has been significantly reduced by optimizing the magnetic circuit.
- High-speed bearings are incorporated as a standard feature, helping to achieve higher speed, lower vibration and improved durability.
- Range: 3.7 to 26 [kW]
- Maximum speed: 8,000 to 12,000 [r/min]

High-torque Spindle Motors SJ-DN Series

- Higher torque characteristics than those of SJ-D series with the same output. This series has made it possible to drive with the small-capacity multi-hybrid drive unit.
- Suitable for heavy cutting. This helps to improve productivity.
- Range: 7.5 to 18.5 [kW]
- Maximum speed: 8,000 [r/min]

Compact, Lightweight Spindle Motors SJ-DJ Series

- Spindle motors that are smaller and lighter than those of SJ-D series with the same output. This helps to further downsize machines.
- Range: 5.5 to 15 [kW]
- Maximum speed: 8,000 to 12,000 [r/min]

High-output high-torque IPM spindle motor SJ-DM Series

- The use of magnets allows for a higher output and torque, leading to a reduced cycle time.
- SJ-DM Series can provide torque characteristics comparable to the former SJ-D Series of the next frame number.
- Maximum rotation speed: 12,000 [r/min]

Built-in Spindle Motors SJ-BG Series

- The electrical design has been optimized to increase the continuous rated torque per unit volume, contributing to the downsizing of spindle units.
- Options for mold specification and cooling jacket specification are prepared.

Tool Spindle Motors HG-JR Series

- Compact tool spindle motors are designed to have the small, high-output characteristics of servo motors yet offer high-speed rotation (8,000r/min). These motors contribute to downsizing spindle size, like rotary tool spindles.
- Range: 0.75 to 1.5 [kW]
- Maximum rotation speed: 8,000 [r/min]
- Small-sized connector allows horizontal cable connection, which helps to save space in machines. (Note 2)

(Note 1) For servo motors only
(Note 2) Options supported (Flange size 90SQ only)
* Use Mitsubishi Electric CNC's dedicated drive unit and motor.

SOFTWARE TOOLS

Process flow from machine design and development to operation and maintenance

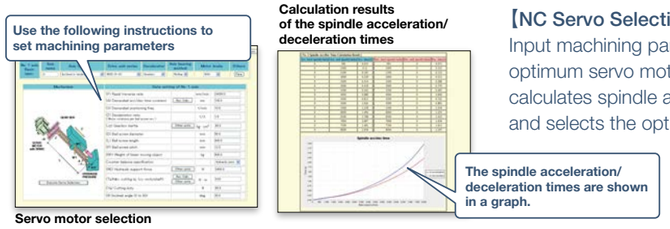
Machine design → Electrical circuitry design → Machine assembly and adjustment → Operation and maintenance

•NC-related processes

Servo selection	Custom screen creation	Parameter creation	Training
NC Servo Selection	NC Designer2	NC Configrator2	NC Trainer2
	NC Compiler2	Servo/spindle adjustment	Operation
	Debug	Machine adjustment	Maintenance
	NC Trainer2 plus	NC Analyzer2	NC Explorer
			NC Monitor2
			NC Visualizer [*]

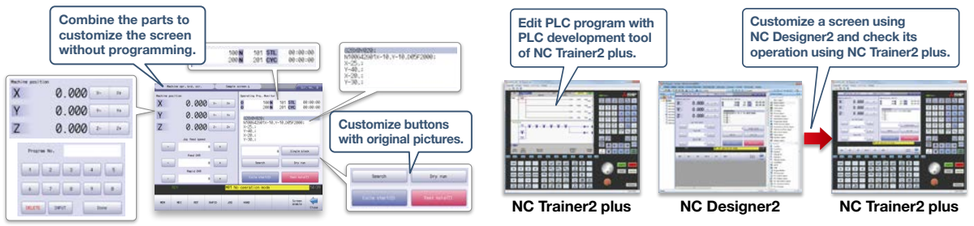
[*] Refer to page 7 for details.

•Machine design



【NC Servo Selection】
Input machining parameters to determine the optimum servo motor. This function automatically calculates spindle acceleration/deceleration time and selects the optimum power supply module.

•Electrical circuitry design

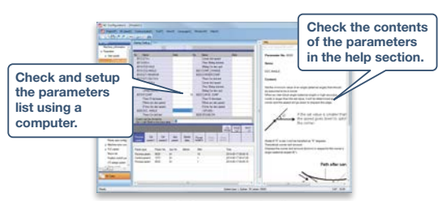


【NC Designer2】
We provide a developmental environment where the MTB can customize screens easily. Two types of screen development methods are available; the interpreter system (programming without C++) for simple screen development, and the compiler system with a complex controller (programming with C++).

【NC Compiler2】
NC Compiler2 is required when the compilation method is applied.

【NC Trainer2 Plus】
NC Trainer2 plus supports customization development; it helps to program the ladder programming of the user PLC to be developed by machine tool builders and debug it and check the operations of customized screens.

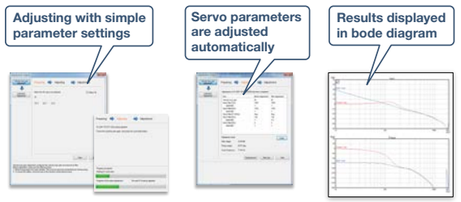
•Machine assembly and adjustment



【NC Configurator2】
NC parameters required for NC control or machine operation can be edited on a computer. It is also possible to create initial parameters simply by inputting the machine configuration.

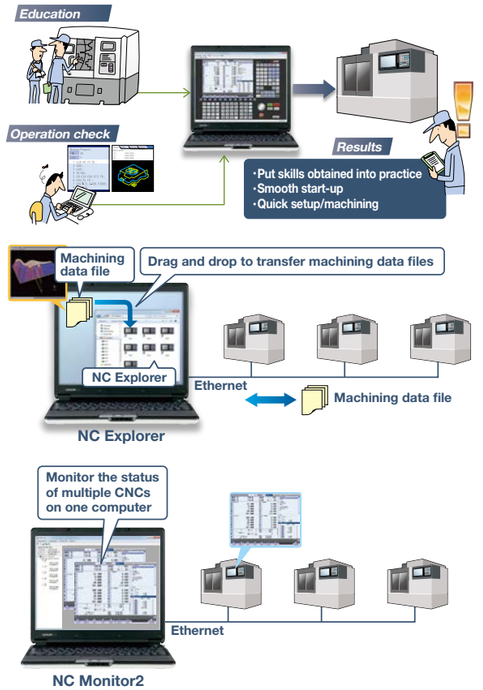
For details on each software tool, refer to the software tools catalog (BNP-A1224).

•Machine assembly and adjustment



【NC Analyzer2】
Servo parameters can be adjusted automatically by measuring and analyzing machine characteristics. Measurement and analysis can be done by running a servo motor using the machining program for adjustment, or using the vibration signal. This function can sample various types of data.

•Operation and maintenance

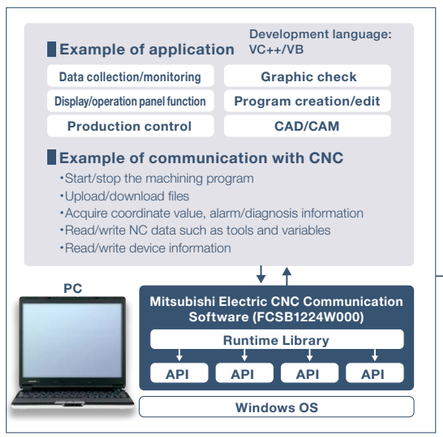


【NC Trainer2】
NC Trainer2 plus supports customization development; it helps to program the ladder programming of the user PLC to be developed by machine tool builders and debug it and check the operations of customized screens.

【NC Explorer】
CNC machining data can be managed using Windows® Explorer on a computer when the computer is connected to multiple CNCs via Ethernet.

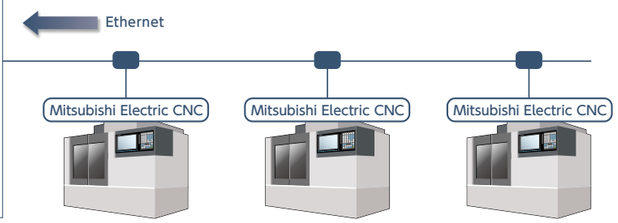
【NC Monitor2】
Taking advantage of connection with a factory network, CNC operation status can be monitored from remote locations. Several CNCs can be connected and monitored simultaneously.

Application development support



【Mitsubishi Electric CNC Communication Software (FCSB1224W000)】
This software provides a bunch of API functions. They facilitate development of an Windows application which requires connection and communication with Mitsubishi Electric CNC(*). You can use the common interfaces for any Mitsubishi Electric CNC model, which leads to high efficiency in development.

(*) The compatible model is Mitsubishi Electric CNCs after M700/M70.



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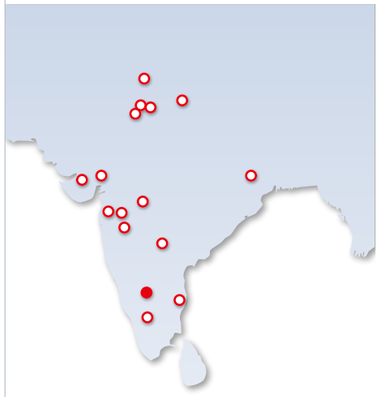

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WARRANTY

Please confirm the following product warranty details before using Mitsubishi Electric CNC.

1. Warranty Period and Coverage

Should any fault or defect (hereafter called "failure") for which we are liable occur in this product during the warranty period, we shall provide repair services at no cost through the distributor from which the product was purchased or through a Mitsubishi Electric service provider. Note, however that this shall not apply if the customer was informed prior to purchase of the product that the product is not covered under warranty. Also note that we are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit is replaced.

[Warranty Term]

The term of warranty for this product shall be twenty-four (24) months from the date of delivery of product to the end user, provided the product purchased from us in Japan is installed in Japan (but in no event longer than thirty (30) months, Including the distribution time after shipment from Mitsubishi Electric or its distributor).

Note that, for the case where the product purchased from us in or outside Japan is exported and installed in any country other than where it was purchased; please refer to "2. Service in overseas countries" as will be explained.

[Limitations]

(1) The machine tool builder is requested to conduct an initial failure diagnosis, as a general rule. It can also be carried out by us or our service provider upon the machine tool builder's request and the actual cost will be charged.

(2) This warranty applies only when the conditions, method, environment, etc., of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual, user's manual, and the caution label affixed to the product, etc.

(3) Even during the term of warranty, repair costs shall be charged to the customer in the following cases:

(a) a failure caused by improper storage or handling, carelessness or negligence, etc., or a failure caused by the customer's hardware or software problem

(b) a failure caused by any alteration, etc., to the product made by the customer without Mitsubishi Electric's approval

(c) a failure which may be regarded as avoidable, if the customer's equipment in which this product is incorporated is equipped with a safety device required by applicable laws or has any function or structure considered to be indispensable in the light of common sense in the industry

(d) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced

(e) any replacement of consumable parts (including a battery, relay and fuse)

(f) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning, and natural disasters

(g) a failure which is unforeseeable under technologies available at the time of shipment of this product from our company

(h) any other failures which we are not responsible for or which the customer acknowledges we are not responsible for

2. Service in Overseas Countries

If the customer installs the product purchased from us in his/her machine or equipment, and export it to any country other than where he/she bought it, the customer may sign a paid warranty contract with our local FA center.

This falls under the case where the product purchased from us in or outside Japan is exported and installed in any country other than where it was purchased.

For details please contact the distributor from which the customer purchased the product.

3. Exclusion of Responsibility for Compensation against Loss of Opportunity, Secondary Loss, etc.

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

4. Changes in Product Specifications

Specifications shown in our catalogs, manuals or technical documents are subject to change without notice.

5. Product Application

(1) For the use of this product, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in the product, and a backup or fail-safe function should operate on an external system to the product when any failure or malfunction occurs.

(2) Mitsubishi Electric CNC is designed and manufactured solely for applications to machine tools to be used for industrial purposes.

Do not use this product in any applications other than those specified above, especially those which are substantially influential on the public interest or which are expected to have significant influence on human lives or properties.

⚠ 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 Industrial Mechatronics Systems Works is a factory certified for ISO 14001(standards for environmental management systems)and ISO 9001(standards for quality assurance management systems)

ISO 14001 JACO EC 98 J 2017 UKAS MANAGEMENT SYSTEMS 0051

ISO 9001 BUREAU VERITAS Certification UKAS MANAGEMENT SYSTEMS 0008

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