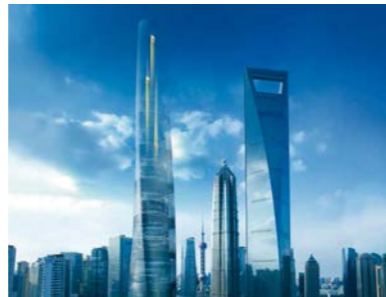


FACTORY AUTOMATION

NUMERICAL CONTROL (CNC) E80 Series





Our Factory Automation business is focused on "Automating the World" to make it a better, more sustainable environment supporting manufacturing and society, celebrating diversity and contributing towards an active and fulfilling role.

Mitsubishi Electric is involved in many areas including the following:

Energy and Electric Systems

A wide range of power and electrical products from generators to large-scale displays.

Electronic Devices

A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home Appliance

Dependable consumer products like air conditioners and home entertainment systems.

Information and Communication Systems

Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems

Maximizing productivity and efficiency with cutting-edge automation technology.



The Mitsubishi Electric Group is actively solving social issues, such as decarbonization and labor shortages, by providing production sites with energy-saving equipment and solutions that utilize automation systems, thereby helping towards a sustainable society.

Contents

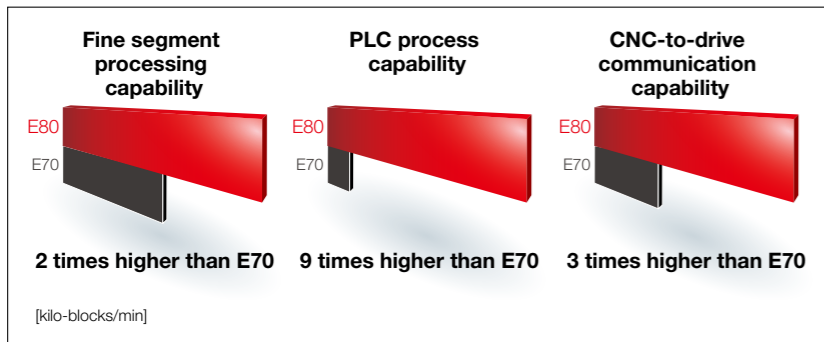
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E80 Series

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.

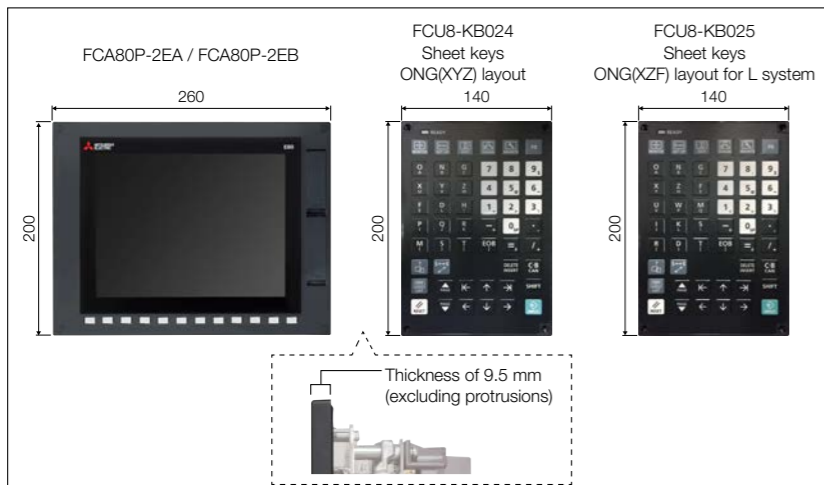


Machining center system

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



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 achieve higher accuracy in machining.

Models for various machine configurations TypeA/TypeB

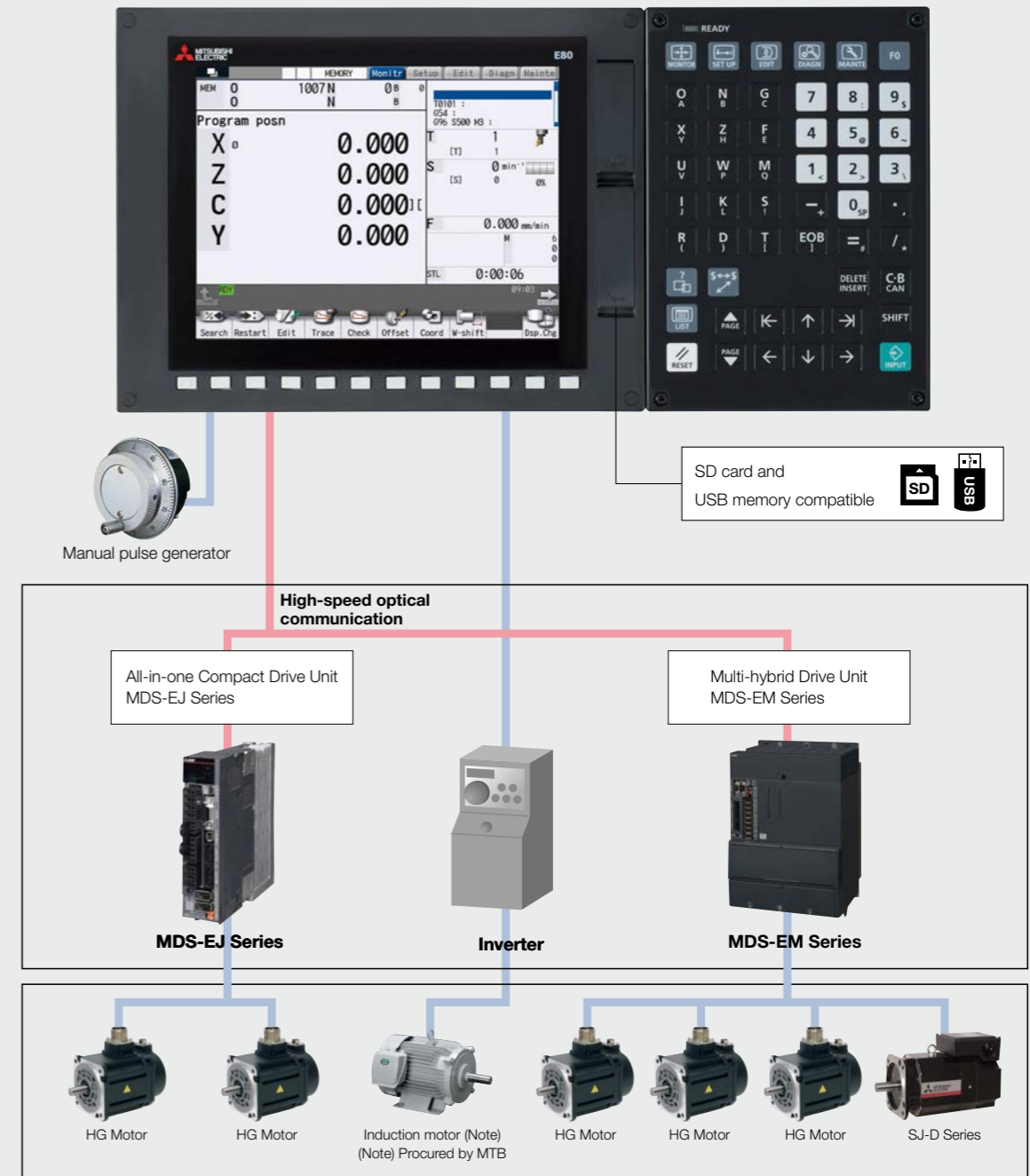
TypeA and TypeB models are available for both machining centers and lathes. Select the model with the specifications that suit the machine configuration best.

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

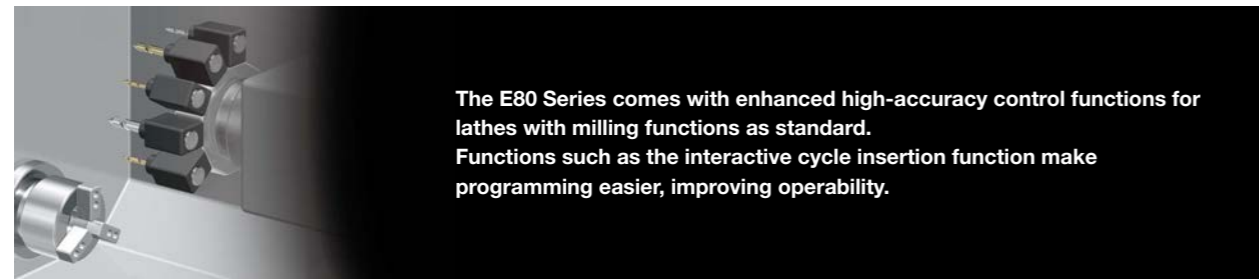
E80 Series Display-integrated Control Unit & Keyboard



[Examples of E80 Series system configurations]

The Best Partner for Your Success

ENHANCED LATHE SYSTEM



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)

	High-accuracy control OFF	High-accuracy control ON
Error at corner	Actual tool path: Corner is rounded NC Command path: Corner is sharper	Actual tool path: Corner is sharper NC Command path: Corner is rounded
Error at arc	Actual tool path: Error occurs	Actual tool path: Error amount decreases

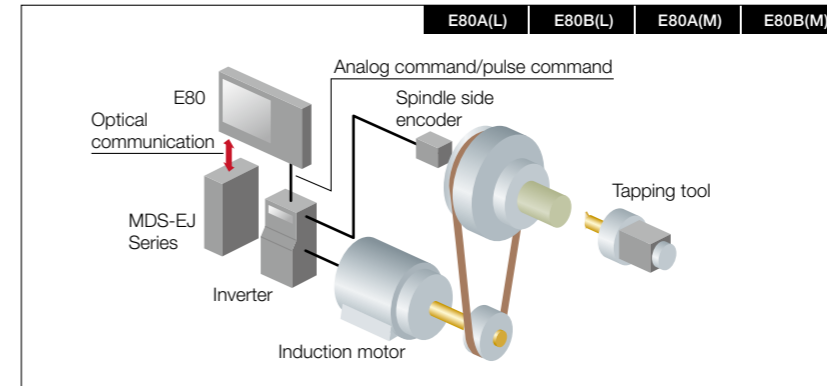
Improved machining accuracy High-accuracy Control

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.



Applicable to a wide array of machine specifications Synchronous Tapping with Analog I/F Spindle and Spindle Control with Pulse Train Output

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. Higher accuracy can be achieved by connection of a pulse command inverter. (Spindle control with pulse train output)

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)

```
G28 XZ
G00 X100 Z100. (1)
X200. (2)
G01 Z200. F1000 (3)
Z400. X100. (4)
...
```

Easier program creation Program Check Operation

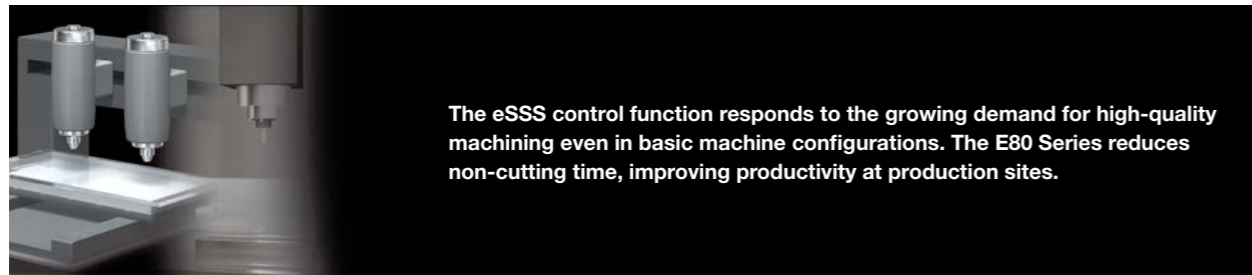
Check the machining program while viewing the actual operation of the machine. Also, forward run/reverse run operation can be checked meticulously at a desired feedrate (manual handle feed), making prototype checks more accurate and easier than before.

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

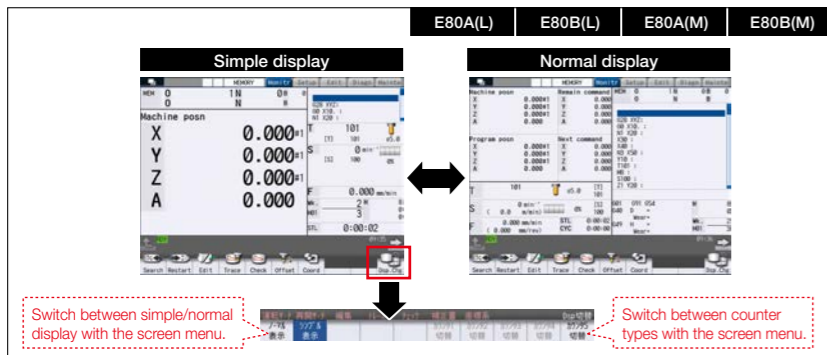
Program finalization 3D Solid Program Check

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

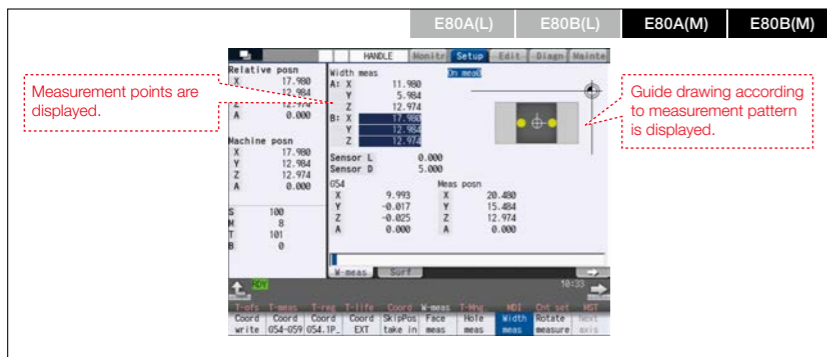


The eSSS control function responds to the growing demand for high-quality machining even in basic machine configurations. The E80 Series reduces non-cutting time, improving productivity at production sites.



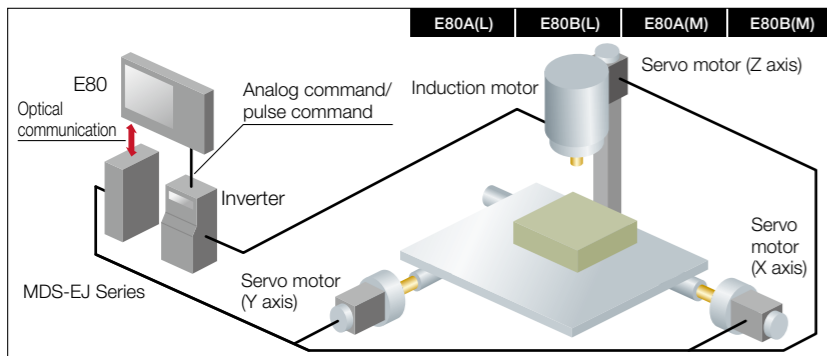
Pursuing usability The Simple Monitor Screen

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.



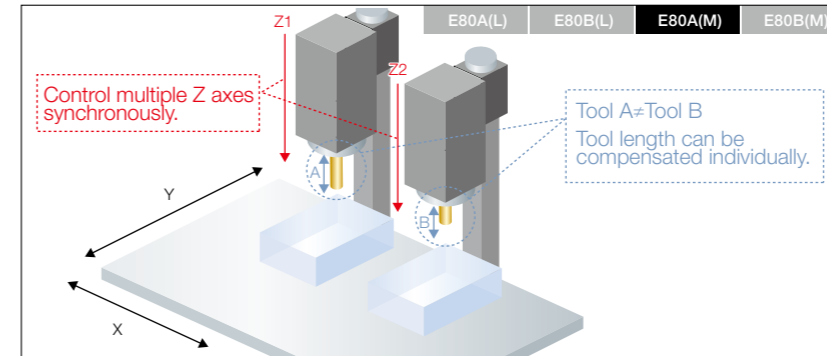
Reduce setup time Workpiece Position Measurement

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.



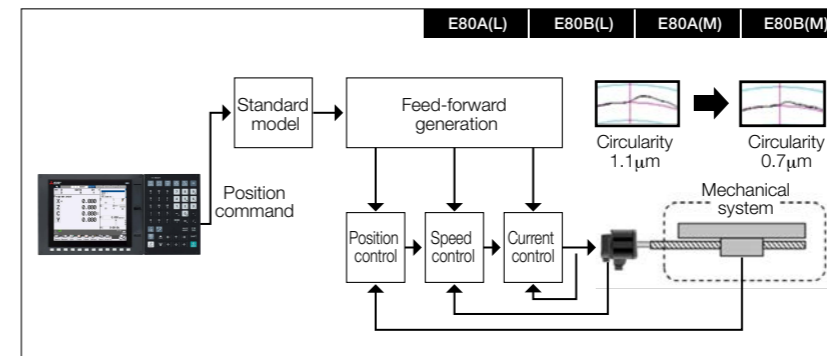
Applicable to a wide array of machine specifications Synchronous Tapping with Analog I/F Spindle and Spindle Control with Pulse Train Output

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. Higher accuracy can be achieved by connection of a pulse command inverter. (Spindle control with pulse train output)



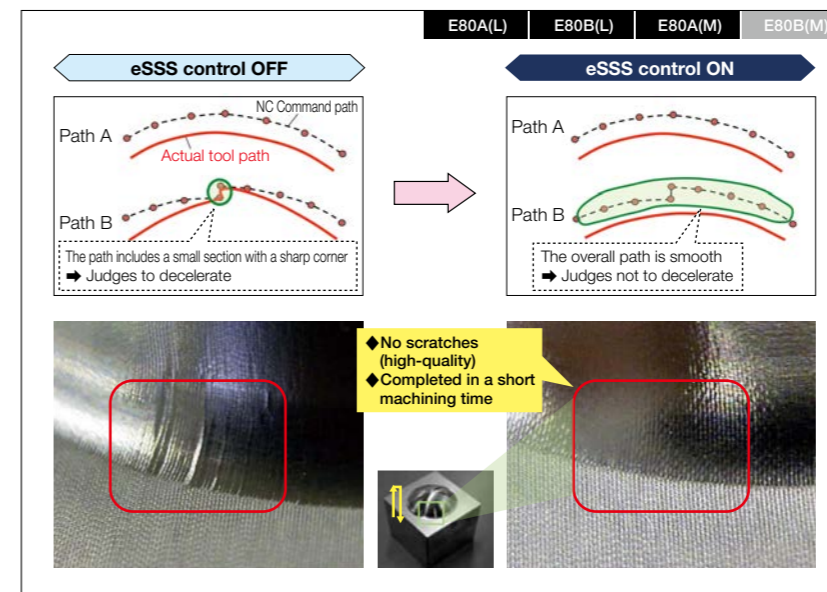
Applicable to a wide array of machine specifications Multiple-axis Synchronization Control

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.



Contribute to high-accuracy machining OMR-FF Control

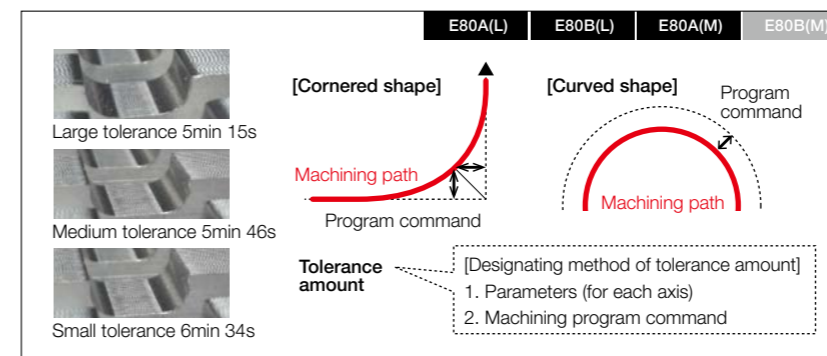
OMR-FF control adjusts the optimal position loop gain for each axis, leading to smoother and more accurate machining.



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.



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

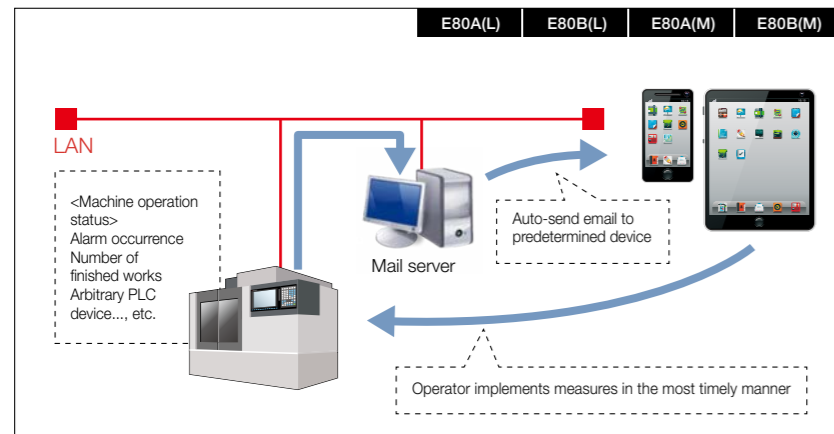
E80A(L) E80B(L) E80A(M) E80B(M)

- Displays an overview of the status of machine operations in a plant
- Visualize operational status
 - Aggregate data by plant, group, or machine
 - Real-time monitoring based on operation trends

NC Machine Tool Optimizer visualizes the status of various equipment in multiple factories

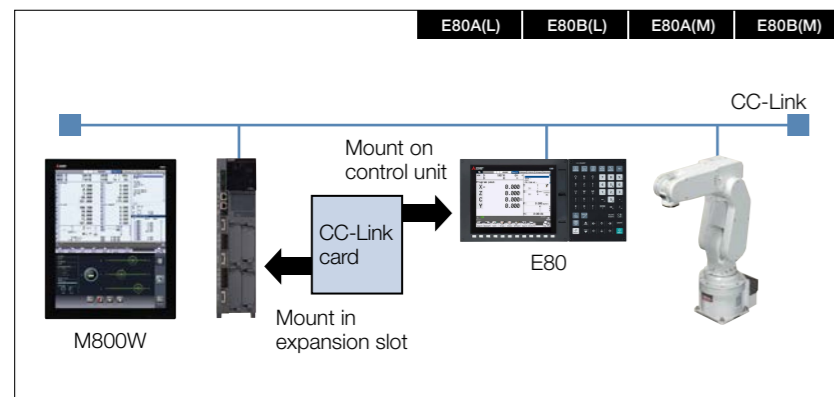
NC Machine Tool Optimizer is a software product that collects operation data from NC machine tools and peripherals to support the visualization and analysis of operational status. Besides being connected with controllers (of various makers, of various models) on the shop floor, it can monitor and analyze the operation of equipment in multiple factories, helping to increase productivity.

* Connection with Mitsubishi Electric CNC (old models) and third-party controllers is supported.



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.



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), CC-Link IE Field (Master/Local), EtherNet/IP, FL-net, and CC-Link IE Field Basic 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
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
Number of control axes	Max. number of spindles	3	3	1
	Max. number of PLC axes	3	3	2
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	○	○	○	○
Spindle control with pulse train output	○	○	○	○
Workpiece position measurement	-	-	○	○
PLC skip	○	○	○	○
Torque limitation skip	○	○	○	○
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)	○	○	○	○
BISS encoder I/F	○	○	○	○
CC-Link (Master/Local)	□	□	□	□
PROFIBUS-DP (Master)	□	□	□	□
CC-Link IE Field (Master/Local)	□	□	□	□
EtherNet/IP	□	□	□	□
FL-net	□	□	□	□
CC-Link IE Field Basic	□	□	□	□
MES interface library	○	○	○	○
EcoMonitorLight connection	○	○	○	○
System lock	○	○	○	○

(*1) Up to one rotary axis

* Trademarks

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PROFIBUS-DP is a trademark of Profibus International.

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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 enhanced 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

- Multi-hybrid drive units are capable of driving a maximum of three servo axes and one spindle. This contributes to downsizing 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.
- The fan unit facilitates fan exchange.
- An MDS-EMH drive unit is available for 400V systems.



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

- Ultra-compact drive units with built-in power supply contribute to smaller control panel size.
- A 2-axis type has been added for further downsizing.
- The servo control-dedicated core processor realizes improved 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.
- An MDS-EJH drive unit is available for 400V systems. (Note 1)



PWM Converter MDS-EX-CVP Series

- Products of the PWM converter series which provides a stabilizing DC voltage function and boost function. The MDS-EX-CVP Series reduces the output deceleration of the spindle motor and improves output in the high-speed range.
- Available for 400V system power supply units only.

•Servo motors



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

- Latest servo motor to help increase productivity.
- Range: 0.5 to 7 [kW]
- Maximum rotation speed: 2,000 to 6,000 [r/min]
- High power density design has improved motor efficiency.
- One-touch lock of the power connector for easy mounting (Note 2).
- Battery-free encoder helps reduce maintenance costs.



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

- Sensor resolution has been significantly improved. These servo motors, which boast smooth rotation and outstanding acceleration capabilities, are well-suited 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. Three sensor resolutions (i.e., 1, 4 or 67 million pulses/rev) are available.
- These motors can also be used as a tool spindle motor.
- The small-sized connector allows horizontal cable connection to save space in machines. (Note 3)



Linear Servo Motors LM-F Series

- These motors can be used in clean environments, since no ball screws are used, eliminating possible grease contamination.
- 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, making 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

- The addition of S3 rating (%ED rating) has improved output and torque acceleration/deceleration characteristics.
- A balance adjustment ring added to the counter-load side allows for fine tuning.
- Range: S3 rating: 5.5 to 15 [kW]
- Maximum rotation speed: 10,000 to 12,000 [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 rotation speed: 8,000 to 12,000 [r/min]

High-torque Spindle Motors SJ-DN Series

- Higher torque characteristics than those of the SJ-D Series with the same output. This series can be driven with a small-capacity multi-hybrid drive unit.
- Suitable for heavy cutting. Helps to improve productivity.
- Range: 7.5 to 18.5 [kW]
- Maximum rotation speed: 8,000 [r/min]

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

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

Compact, Lightweight Spindle Motors SJ-DJ Series

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

High-output High-torque IPM Spindle Motors SJ-DM Series

- The use of magnets allows for higher output and torque, leading to reduced cycle time.
- The 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 downsizing spindle units.
- Options for mold and cooling jacket specifications are available.



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 to save space in machines. (Note 3)

(Note 1) For servo motors only
(Note 2) Available only for flange sizes 90SQ, 130SQ, and 176SQ.
(Note 3) 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



•NC-related processes

Servo selection	Custom screen creation	Parameter creation	Training
NC Servo Selection	NC Designer2	NC Configurator2	NC Trainer2
	NC Compiler2	Servo/spindle adjustment	Operation and Maintenance
	Debug	Machine adjustment	NC Explorer
	NC Trainer2 plus	NC Analyzer2	NC Monitor2
		Operation monitoring and remote diagnostics	
		NC Machine Tool Optimizer*	
		iQ Care Remote 4U*	

•Machine design

* Refer to the catalog for each machine or the catalog for the software tools for details.

[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.

Use the following instructions to set machining parameters

Calculation results of the spindle acceleration/deceleration times

The spindle acceleration/deceleration times are shown in a graph.

Servo motor selection

•Electrical circuitry design

Combine the parts to customize the screen without programming.

Customize buttons with original pictures.

NC Trainer2 plus

NC Designer2

NC Trainer2 plus

Customize a screen using NC Designer2 and check its operation using NC Trainer2 plus.

Edit PLC program with PLC development tool of NC Trainer2 plus.

[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

Check and setup the parameters list using a computer.

Check the contents of the parameters in the help section.

[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.

NC Configurator2

For details on each software tool, refer to the software tools catalog (BNP-A1246).

•Machine assembly and adjustment

Adjusting with simple parameter settings

Servo parameters are adjusted automatically

Results displayed in bode diagram

[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

Education

Operation check

Results

- Put skills obtained into practice
- Smooth start-up
- Quick setup/machining

Machining data file

Drag and drop to transfer machining data files

NC Explorer

Ethernet

Machining data file

Monitor the status of multiple CNCs on one computer

NC Monitor2

Ethernet

[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

Development language: VC++/VB

Example of application

- Data collection/monitoring
- Graphic check
- Display/operation panel function
- Program creation/edit
- Production control
- CAD/CAM

Example of communication with CNC

- Start/stop the machining program
- Upload/download files
- Acquire coordinate value, alarm/diagnosis information
- Read/write NC data such as tools and variables
- Read/write device information

PC

Mitsubishi Electric CNC Communication Software (FCSB1224W000)

Runtime Library

API API API API

Windows OS

Ethernet

Mitsubishi Electric CNC

Mitsubishi Electric CNC

Mitsubishi Electric CNC

[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.

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, repair services shall be provided at no cost through the distributor from which the product was purchased or through a Mitsubishi Electric service provider. Note, however, that this does not apply if the customer was informed prior to purchasing 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 the product to the end user, provided the product purchased from Mitsubishi Electric or a distributor in Japan is installed in Japan (but in no event longer than thirty (30) months, including distribution time after shipment from Mitsubishi Electric or a distributor).

Note that, in the case where the product purchased from Mitsubishi Electric or a distributor 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" below.

[Limitations]

- (1) The machine tool builder is requested to conduct an initial failure diagnosis, as a general rule. The diagnosis may also be carried out by Mitsubishi Electric or our service provider for a fee at the machine tool builder's request.
- (2) This warranty applies only when the conditions, method, environment, etc., of use are in compliance with the terms, 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 will 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 a problem with the customer's hardware or software

- (b) a failure caused by any alteration, etc., to the product made by the customer without Mitsubishi Electric's approval
- (c) a failure which could have been avoided if the customer's equipment in which this product is incorporated had been equipped with a safety device required by applicable laws or has any function or structure considered indispensable in the light of industrial common sense
- (d) a failure which could have been avoided if consumable parts designated in the instruction manual, etc. had been duly maintained and replaced
- (e) any replacement of consumable parts (including the 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 earthquakes, lightning, and natural disasters
- (g) a failure which could not have been foreseen under technologies available at the time of shipment of this product from Mitsubishi Electric
- (h) any other failures which are not attributable to Mitsubishi Electric or which the customer acknowledges are not attributable to Mitsubishi Electric

2. Service in Overseas Countries

If the customer installs a product purchased from Mitsubishi Electric in a machine or equipment and exports it to any country other than where it was purchased, the customer may sign a paid warranty contract with our local FA center.

This applies in 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 product was purchased.

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

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

- (1) Damage arising from any cause found not to

- be the responsibility of Mitsubishi Electric.
- (2) Lost opportunity or lost profit incurred by the user due to a failure of a Mitsubishi Electric product.
- (3) Special damage or secondary damage, whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi Electric 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 use of this product, applications should be those that will not result in a serious damage even if a failure or malfunction occurs in the product, and a backup or fail-safe function should operate on an external system when any failure or malfunction occurs to the product.
- (2) Mitsubishi Electric CNC is designed and manufactured solely for applications to machine tools for industrial purposes. Do not use this product in applications other than those specified above, especially those which have substantial influence on public interest or which are expected to have significant influence on human lives or properties.

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Creating Solutions Together.



Mitsubishi Electric's product lineup, from various controllers and drives to energy-saving devices and processing machines, all help you to automate your world. They are underpinned by software, innovative data monitoring, and modelling systems supported by advanced industrial networking and Edgex IT/OT connectivity. Together with a worldwide partner ecosystem, Mitsubishi Electric factory automation (FA) has everything to make IoT and Digital Manufacturing a reality.

With a complete portfolio and comprehensive capabilities that combine synergies with diverse business units, Mitsubishi Electric provides a one-stop approach to how companies can tackle the shift to clean energy and energy conservation, carbon neutrality and sustainability, which are now a universal requirement of factories, buildings, and social infrastructure.

We at Mitsubishi Electric FA are your solution partners waiting to work with you as you take a step toward the realization of sustainable manufacturing and society through the application of automation. Let's automate the world together!

Global Partner. Local Friend.



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Safety Warning

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

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