



for a greener tomorrow



*Changes for the Better*

FACTORY AUTOMATION

# MITSUBISHI ELECTRIC CNC M800/M80 Series





# Infinite Possibilities

High productivity, usability and flexibility delivered by breakthrough performance.  
 The next-generation CNC M800/M80 Series empowers the manufacturing industry with unlimited possibilities and the capability to create innovative value.



## Running the BEST Machines in the World

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# Key Benefits

With the convention-shattering performance of the world's fastest CNC series and features like Super Smooth Surface (SSS) control, the M800/M80 Series CNC controls from Mitsubishi Electric ensure you achieve faster, smoother operation, along with a better finish and less scrap – meaning higher productivity and profitability for your business.

## Advantages and Benefits

**CNC-dedicated CPU** – The world's fastest CPU, designed for high throughput and complicated machining applications. This gives you a faster cycle time due to a higher capability in program processing and more accurate machining due to faster CNC-to-drive communication.

**Intuitive Touchscreen Operation (excludes 8.4-inch)** – Icon-based navigation improves usability for experienced and novice operators. Screen sizes vary from 10.4-inch, 15-inch and 19-inch for improved screen visibility, along with integrated document viewing. You have the ability to pinch, flick and scroll like a smartphone or tablet.

**Solid State Hard Drive** – Solid state hard drives have no moving parts, which translates into superior reliability, faster processing speed and more uptime for your operations.

**Improved SSS Control** – Reduces machine vibration during high-speed cutting and optimizes acceleration/ deceleration times for each axis. This allows for shorter cutting times with a high degree of accuracy.

**Large Capacity SD Card Expansion** – The control has 2 expansion slots for 32GB SD cards allowing for a total of 64GB of added memory expansion. This enables you to read, write, run and transfer programs via the SD card without lag. Subprogram calls are available as well. The additional memory also allows for large capacity machining programs or graphic data, increasing the possibilities for you to add custom screens.

**High-speed, High-accuracy Mode** – G5P20000 comes standard, allowing you to run complex, highly precise 3D mold work without experiencing a reduction in performance.

Control	Blocks per minute
M80A	135,000
M830 & M850	270,000

## Target Applications

**Aerospace** – Propeller blade, bearing housing, distribution hub, wing rib, blisk and gyro components



**Automotive** – Contoured design elements, mechanical components, axles, brakes, power train, pistons and engine blocks



**Energy** – Drill pipes and casing, pipe control valves, mud pumps, frac pumps, downhole instrumentation, pump jack components, wind turbine blades and rotor shafts



**General Manufacturing** – Mold making, mass production, job shops, milling, turning, drilling and grinding



**Medical** – Orthopedic devices, surgical instruments, dental implants and other medical devices



# CNC-DEDICATED CPU

Mitsubishi Electric's first CNC-dedicated CPU, the sum of our industry-leading technologies.



## Development of Convention-breaking CNCs

Leading the way in today's industrial globalization, the innovative products of Mitsubishi Electric continue to exceed the expectations of users around the world. The outstanding performance of our CNC lineup consistently wins praise from users for their high levels of productivity, intuitive usability, and superior functionality. However, to develop the new M800/M80 Series, we went back to the drawing board and completely reexamined our cutting-edge control technologies. The result is a breakthrough in the control of high-speed, high-precision machining.

## User Performance Requirements Demand a Commitment to Development

The story of the new M800/M80 Series began with conventional development to produce incremental evolutionary improvements. But our goal was a revolutionary leap in CNC performance. Our project team determined that the only way to significantly boost processing performance and totally satisfy user demands would be the creation of a CPU optimized for CNC control. This insight inspired Mitsubishi Electric to develop a CNC-dedicated CPU and started a new chapter in CNC development.

## High-speed Processing Achieved Through in-depth Analysis and Simulations

Pursuit of a CNC-dedicated CPU began with design validation on an unprecedented scale as well as high-precision simulations to verify processing performance. Achieving a leap in processing performance demanded the integration of innovative technologies beyond optimizing processor manufacturing methods. Overcoming numerous hurdles and maximizing the potential of the processor, we succeeded in producing a CNC-dedicated CPU that achieves unprecedented high-speed processing performance.

## Experience the Revolutionary High-speed Processing of the New CNC-dedicated CPU

Incorporating the CNC-dedicated CPU in the new series not only results in phenomenal processing speed, but also reduces the number of required parts, leading to fewer possibilities of failure and increasing product quality. Equipped with Mitsubishi Electric's first-ever CNC-dedicated CPU, the long-awaited M800/M80 Series is the result of an original development process and the sum of our latest technologies. With the utmost confidence, we are proud to introduce the M800/M80 Series and invite customers to experience performance of the future today.

## Fine Program Segment Processing Capacity



High capability in program processing allows for a shorter cycle time.

## PLC Process Capability (PC MIX value)



High processing capability of the PLC enables large-scale ladder logic to be processed at high speed.

## CNC-to-Drive Communication Capability



Optical communication speed between CNC and drive has been increased. This improves the system responsiveness, leading to more accurate machining.

# CNC LINEUP

High Performance



## M800W

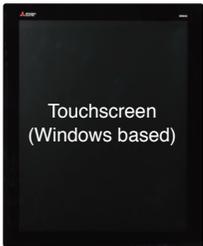


### Premium CNC with Windows-based Display Provides Expandability and Flexibility

- Windows-based 19-inch display with the latest PC operating system offers excellent expandability
- Four expansion slots come standard, which allows for multiple types of option cards
- Solid state hard drive for speed and reliability

Display unit size

19-inch



15-inch



## M800S



### High-grade CNC Well Suited for High-speed, High-accuracy Machining and Multi-axis, Multi-part System Control

- Multi-CPU architecture allows for high performance
- High functional graphics display
- Windows-less display provides easy operability

15-inch



10.4-inch



## M80



### Standard CNC Provides High Productivity and Easy Operability

- Provided in two packages (TypeA/TypeB) with landscape or portrait op panel layout
- Windows-less display provides easy operability

15-inch



10.4-inch



8.4-inch



Standard

# ADVANCED DESIGN

Improved display and keyboard design.

The advanced construction and sophisticated flat profile take machine design to the next level.

Touchscreen displays come standard, providing intuitive smartphone-like operation (10.4-inch and larger displays)



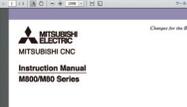
19-inch touchscreen provides easy operability (M800W Series only)



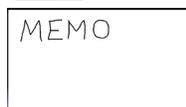
Software keyboard



Software operation panel



Document viewer



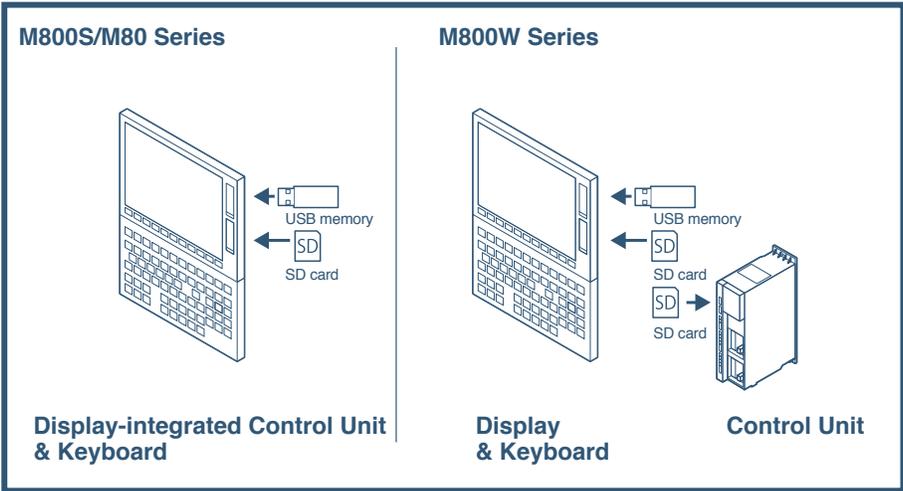
Memo pad (handwritten)

## 19-inch Vertical Display Unit Comes with Split-screen Capability to Run Multiple Applications

A vertical display is included in the M800W Series. The display provides the ability to view multiple windows via the split-screen that can be customized by arranging the software keyboard, document viewer or other applications.



Advanced display and keyboard designs



### Display Redesigned for Enhanced Visibility of Keyboard

The surfaces of display and keyboard are flush, providing usability as well as increased operability. 10.4-inch and larger displays have touchscreens made of beautiful, durable glass, which allows you easy day-to-day maintenance. Vertical mount and horizontal mount keyboards are included in the product line.

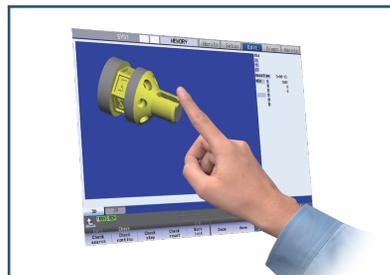
# INTUITIVE DURABILITY



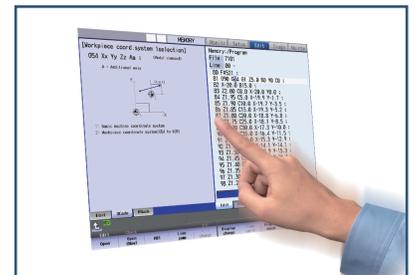
Touch operation provides unprecedented ease of use

## Smartphone-like Intuitive Touch Operation

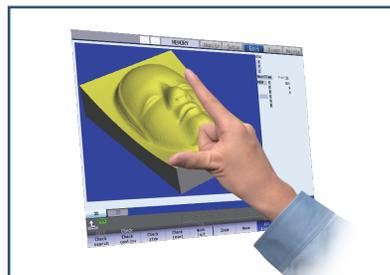
The display features a capacitive touchscreen that is commonly used in smartphones and tablets, allowing for intuitive and easy operation. With a simple flick of the finger, for instance, you can monitor a desired part of the program, or view and select a menu key on the next page without the need for tedious key operations. In 3D graphic check, you can view a 3D model at any desired size, in any desired position.



Drag



Program edit (flick)



Pinch-in/Pinch-out

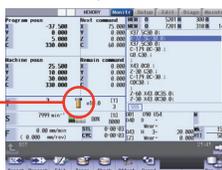


Menu scroll (flick)

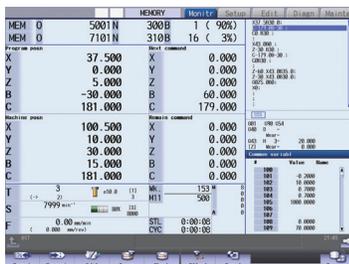
Tools displayed using icons



8.4-inch/10.4-inch



15-inch/19-inch



Various features and operation menus are indicated using easy-to-recognize icons. Tool icons show you the tool type, left- or right-hand, tool life and other information at a glance.

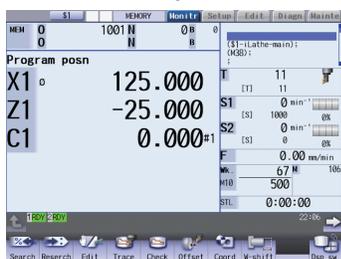
## Advanced Universal Design with a Focus on Ease of Use

The easy-to-use interface inherited from the M700V/M70V Series has advanced further, leading to greater visibility and usability. Iconized features and operation menus are easy to recognize and readily available for anyone to use. The simple monitor screen displays the information required for lathes and machining centers respectively in an enlarged view. The icons on the screen show you the status of tools and spindles. All of these interface features are worth a try.

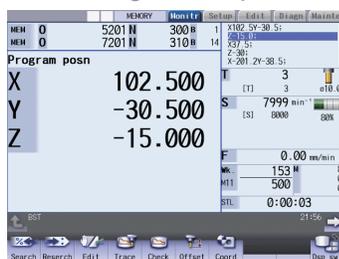
## Improved Lathe Usability with Tool Icons and 3D Work Simulations for Turning and Milling Operations

One of the highlights in the M800/M80 Series is improved usability in a lathe. The tool icons indicate the tool shape and bit direction in an easy manner, which can satisfy both inexperienced and experienced operators. The 3D graphic check supports for both turning and milling, so even a complex program can easily be checked through the 3D simulation.

Lathe System



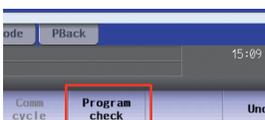
Machining Center System



Simple screen with concise information is clear and easy to see from a distance.

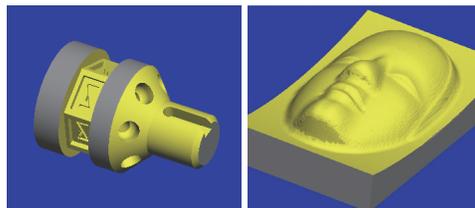
## Reduced Defects Caused by Human Error

The M800/M80 Series has a feature called “User level-based data protection” which allows you to set multiple levels of access permission. Permissible operation ranges can be set for each operator according to their roles in production. This can help prevent operation and human errors, resulting in less defective parts.

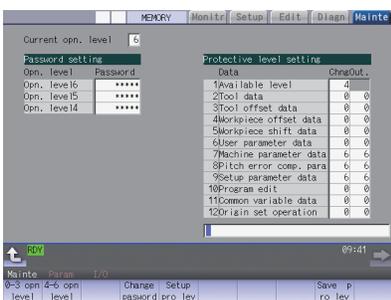


Lathe System

Machining Center System



A click of the menu button navigates you to 3D graphic check of the program currently being edited. For lathe systems, the 3D check supports both milling and turning operations.



Supervisor

Operator



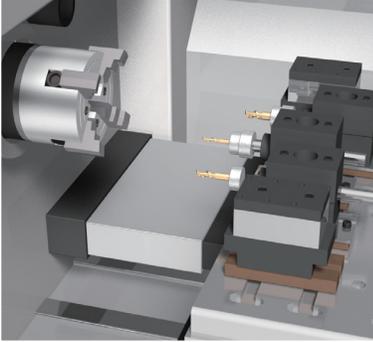
Edit machining program, Configure parameter, Register tool data, etc.



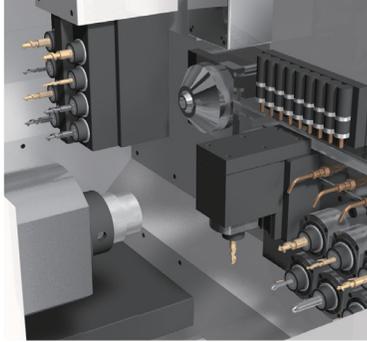
Up to 8 levels of access permission helps to prevent you from dispatching defective parts. Permissible operations can be set individually for each access level.

# ENHANCED LATHE SYSTEM

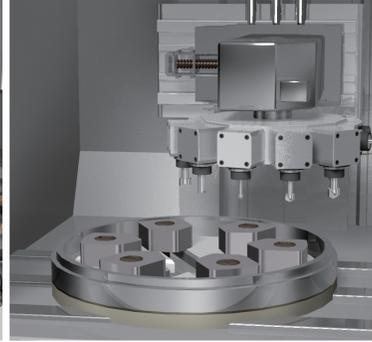
Milling features and multi-axis, multi-part system control features have been significantly improved. Advanced operability enables operators to implement more complex machining in an easy and efficient manner.



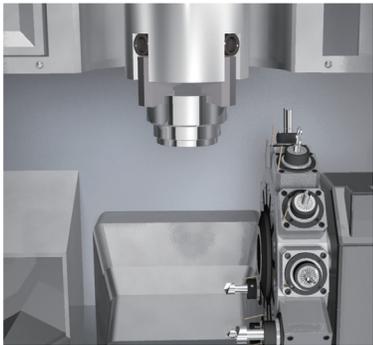
**Lathe**



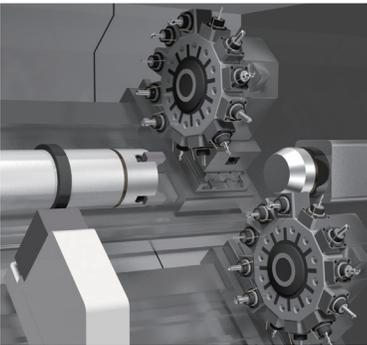
**Automatic Lathe**



**Vertical Lathe**



**Inverted Lathe**



**Multi-tasking Lathe**

### Milling features

- High-speed, high-accuracy control
- Super Smooth Surface (SSS) control
- Spindle-mode servo motor control

### Multi-axis, multi-part system control features

- Supports up to 8 part systems, 32 axes and 8 spindles
- Loader control via sub-part system control
- Spindle superimposition control
- Multiple spindle synchronization set control

### Features for large-sized lathes

- Re-thread cutting
- Thread cutting override
- Real-time tuning
- Large-sized display

### User operability

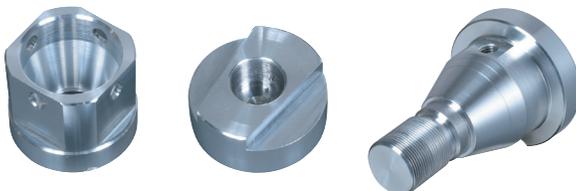
- Workpiece coordinate system shift
- Easy setup of barrier check parameters
- Simple monitor screen showing clear, concise information

### Conversational programming

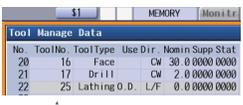
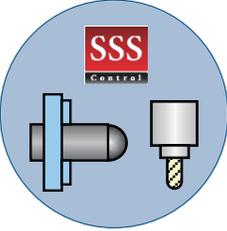
- Program edit with timing synchronization between part systems
- Interactive cycle insertion
- 3D program check

## Implement More Complex Machining in an Easy and Efficient Manner

Milling features have been improved through high-speed, high-accuracy control and SSS control. Multi-axis, multi-part system control features have also been upgraded. A wide array of these features help ensure high productivity. Significant progress has also been made in frequently used operations as well as programming, such as tool offset and workpiece coordinate system. This allows operators to easily implement more complex machining.



The features above vary from machine to machine. Check with MTB on availability.

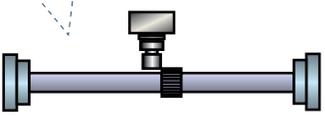
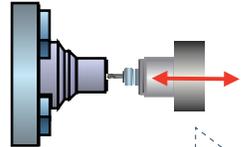
		M800W	M800S	M80
				
 <p>Milling and turning tools can be registered in tool management screen</p>				
				

High-speed, high-accuracy control and SSS control are available for lathes using milling capability. A servo motor driven by a servo drive unit can be controlled as a tool spindle.

## Improved Milling Features Using a Tool Spindle

High-speed, high-accuracy control features originally for machining centers are now available on lathe systems. High precision milling can be implemented at high speeds on a lathe.

This CNC enables a servo motor, instead of a spindle, to act as a tool spindle. Any servo control axes driven by a multi-hybrid drive can be used as a tool spindle. This contributes to the downsizing of machine tools.

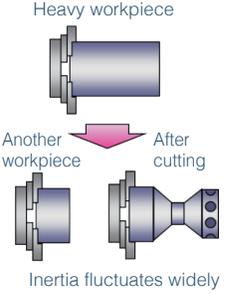
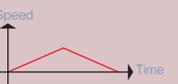
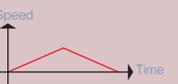
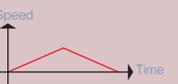
		M800W	M800S	M80
				
<p>(Multiple spindle synchronization set control) Tool spindle can be synchronized with the long workpiece held by the front and back spindles. The spindles can implement C axis indexing while holding the workpiece.</p>				
				
<p>Spindle superimposition (differential speed tap) Lathe turning and center tapping can be implemented simultaneously.</p>				

M800 Series controls up to 8 part systems, 32 axes and 8 spindles. This CNC provides advanced multi-axis, multi-part system control features including loader control using sub-part system, spindle superimposition and synchronization of multiple spindle sets.

## Multi-axis, Multi-part System Control Features Help to Reduce Cycle Time and Maintain Synchronization Between Part Systems

The M800/M80 Series provides “Spindle superimposition control” a feature that enables simultaneous execution of turning and center tapping (multi-part, multi-axis system needed).

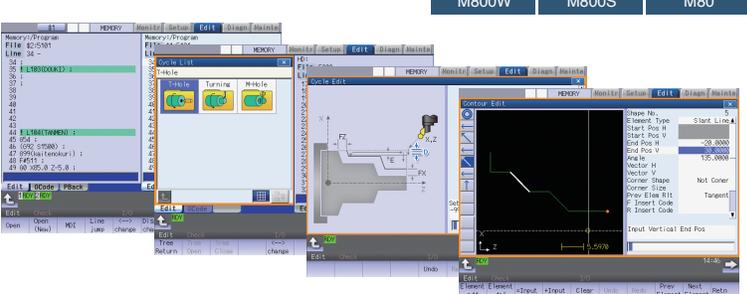
These features are effective in eliminating idle time, resulting in a significant reduction in takt time. This CNC also offers features that maintain synchronization between part systems, which is required for automatic lathes. These enable operators to implement more complex machining safely and effectively.

		M800W	M800S	M80																												
																																
<p>Heavy workpiece Another workpiece After cutting Inertia fluctuates widely</p>																																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th style="background-color: #0056b3; color: white;">M800W</th> <th style="background-color: #0056b3; color: white;">M800S</th> <th style="background-color: #0056b3; color: white;">M80</th> </tr> <tr> <th colspan="2"></th> <th style="background-color: #0056b3; color: white;">Real-time tuning OFF</th> <th colspan="2" style="background-color: #0056b3; color: white;">Real-time tuning ON</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="vertical-align: middle;">Stability</td> <td style="text-align: center;">  </td> <td colspan="3" style="text-align: center;">  </td> </tr> <tr> <td style="text-align: center;"> <p>Tends to vibrate (control gain is fixed)</p> </td> <td colspan="3" style="text-align: center;"> <p>Vibration is suppressed (control gain is automatically adjusted)</p> </td> </tr> <tr> <td rowspan="2" style="vertical-align: middle;">Acceleration</td> <td style="text-align: center;">  </td> <td colspan="3" style="text-align: center;">  </td> </tr> <tr> <td style="text-align: center;"> <p>Speed</p> <p>Acceleration remains unchanged whether the workpiece is heavy or light</p> </td> <td colspan="3" style="text-align: center;"> <p>Speed</p> <p>Acceleration is suited to the inertia → Acceleration time is shorter for a lighter workpiece</p> </td> </tr> </tbody> </table>							M800W	M800S	M80			Real-time tuning OFF	Real-time tuning ON		Stability					<p>Tends to vibrate (control gain is fixed)</p>	<p>Vibration is suppressed (control gain is automatically adjusted)</p>			Acceleration					<p>Speed</p> <p>Acceleration remains unchanged whether the workpiece is heavy or light</p>	<p>Speed</p> <p>Acceleration is suited to the inertia → Acceleration time is shorter for a lighter workpiece</p>		
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Real-time tuning helps maintain the stability of large lathes. This function detects vibration caused by significant fluctuation of work inertia and automatically adjusts the control gain.

## Significantly Easier Programming

Programming has been made much easier: program edit screen shows the synchronization points between part systems in an easy-to-understand display, and conversational programming allows insertion of canned cycles. After programming, operators can check the programs through 3D work simulation before actual cutting.

		M800W	M800S	M80
				

Conversational programming, tool measurement, work coordinate system shift and other features have been improved, making the lathe system significantly easier to use.

# ENHANCED MACHINING CENTER SYSTEM

SSS control has further evolved, realizing high-speed, high-accuracy, high-quality machining. In addition, this CNC offers features that bring out the full potential of each axis and minimize non-cutting time, leading to higher productivity.



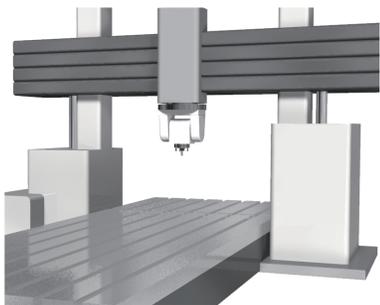
Vertical Machining Center



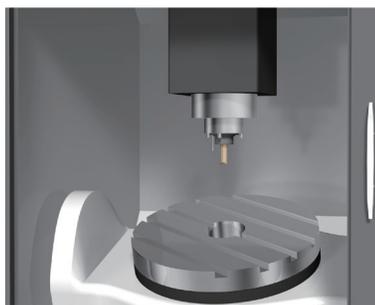
Tapping Center



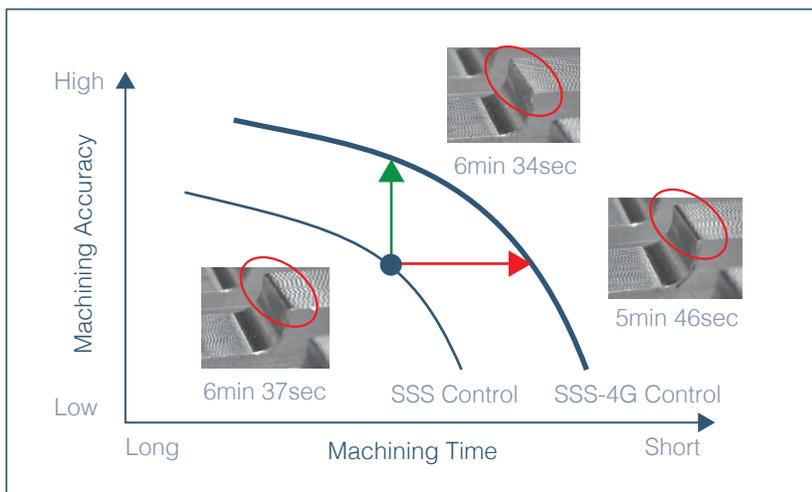
Horizontal Machining Center



Gantry-type Machining Center



5-axis Control Machine

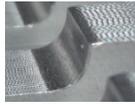


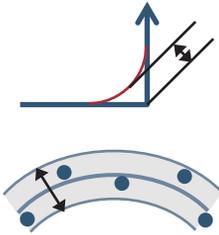
## High-speed, High-accuracy, High-quality Cutting Through SSS-4G Control

The M800/M80 Series offers SSS 4th-generation (SSS-4G) control, enabling high-speed, high-accuracy, high-quality machining. SSS-4G control provides features that are effective in reducing takt time, including optimal acceleration/deceleration suited to each axis' characteristics. In addition, SSS-4G is capable of reducing machine vibration during high-speed cutting.

SSS-4G control allows for greater cutting accuracy in a shorter amount of machining time when compared to our previous models.



M800W	M800S	M80
		
Large tolerance 5min 15sec	Medium tolerance 5min 46sec	Small tolerance 6min 34sec

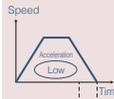
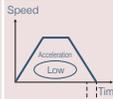
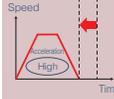
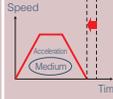
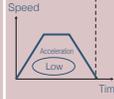


“Tolerance control” provides a smooth motion within specified error tolerances. Desired machining results can be achieved using simple parameter adjustments.

## High Productivity and High Quality are our Primary Focus

A CNC-dedicated CPU is incorporated in the M800/M80 Series, providing significantly improved short segment processing capability. The benefits are not limited to improvements in basic performance alone. The “Tolerance control” function enables operators to achieve high quality surfaces simply by specifying the desired dimensional accuracy. This feature takes machining to a whole new level.

M800W	M800S
	
	
32min 48sec	29min 30sec

When operated by linear axes	When operated by linear and rotary axes	When operated by rotary axes
		
		

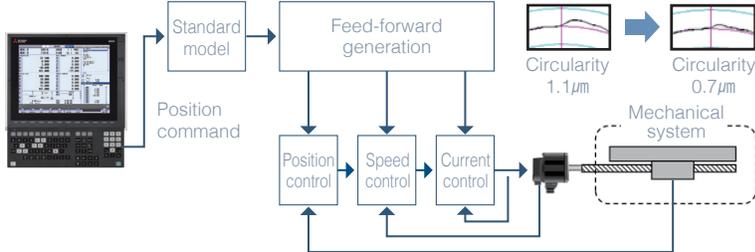
“Variable-acceleration pre-interpolation acceleration/deceleration” optimizes acceleration in accordance with the axis motion.

## The M800/M80 Series Brings Out the Full Potential of Machine Tools

The M800/M80 Series provides new features that can maximize the full potential of machine tools. “Variable-acceleration pre-interpolation acceleration/deceleration” provides optimized acceleration, with each axis’ characteristics fully exercised. For example, allowing a linear axis to accelerate irrespective of rotary axis responsiveness.

“OMR-FF control” allows for optimal position loop gain adjustments suited to each axis, leading to smoother and more accurate cutting. In addition to the above, this CNC has new functionality effective for higher productivity, including “Rapid traverse block override” that helps reduce non-cutting time by overlapping feed blocks.

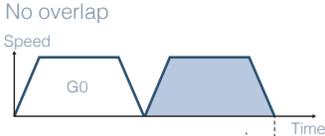
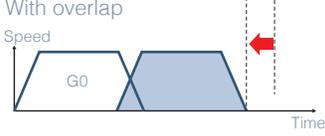
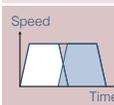
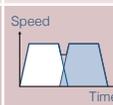
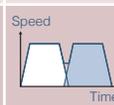
M800W	M800S	M80
		



“OMR-FF control” makes servo control smoother and more accurate, enabling optimal position loop gain adjustments suited to each axis.

## The M80 Series Includes SSS Control and Inclined Surface Machining Features

The SSS control function provides smoother surfaces at higher speeds. The “Inclined surface machining control” function makes it possible to issue normal program commands to an arbitrary plane (inclined surface) in space. These and various other features are incorporated in the M80 Series.

M800W	M800S	M80
		
		
		

“Rapid traverse block overlap” makes it possible to reduce non-cutting time. The overlap varies according to the path to keep the tolerance constant.

# UNIQUE CUSTOMIZATION

A high level of screen customization is attainable easier in a shorter period of time. Highly scalable hardware and advanced drawing applications make it possible to increase the added value of the control.



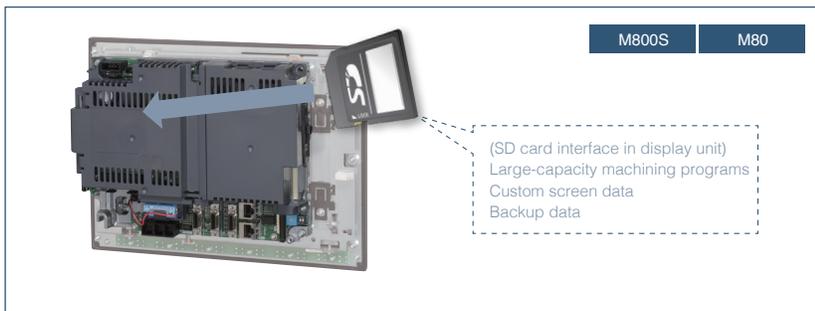
M800W Series is equipped with a 19-inch vertical display with a split multi-window screen. Home applications in the lower half can easily be customized.

## 19-inch Vertical Display Boosts the Added Value of the Control

The display shows the standard CNC screen on the upper half, while offering the lower half (home application) to be freely customized. It is possible to add some originality to the control, and with your ideas, the possibilities are infinite.

## Support for Large-capacity Custom Data Using the SD Memory on the Back of Display

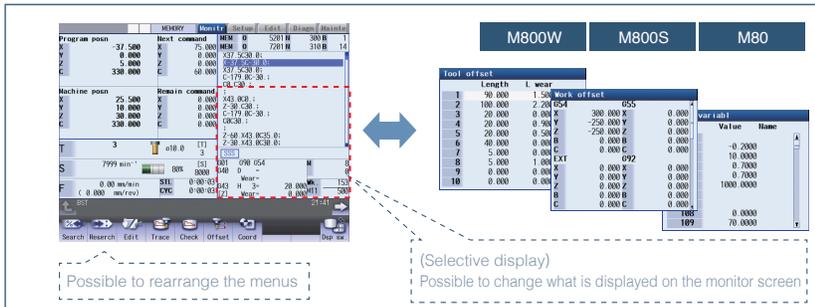
The M800/M80 CNC with integrated display has an SD card interface on the back of the display. The SD card can accommodate large-capacity machining programs and large-capacity graphic data for custom screens, which leads to increased possibilities of customization.



Additional SD memory card interface on the back of the display. The SD card can store large-capacity machining programs and custom screen data.

## Customize Standard Screens Per Operator's Preferences

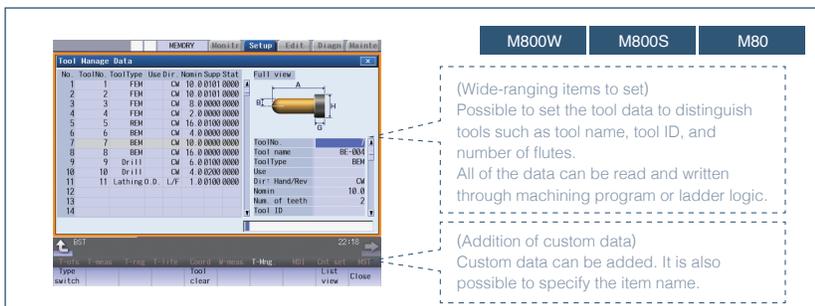
Each operator has their own set of frequently used menus. This CNC allows operators to rearrange their menus and hide any unused ones to easily navigate to their desired screen.



This CNC has a function called "Selective display" which enables partial customization of the monitor screen.

Operators can constantly view and monitor Tool Offsets, Work Offsets, Common Variables or other commonly used functions.

Standard screens can be customized using the "Selective display" and by rearranging menus. Screens matching operators' preferences and needs enable even greater ease of use.



Tool-related information is collected and centrally managed on the Tool Management Screen. A wide range of settings such as tool name and tool ID are readily available. It is also possible to add custom data.

# EXCELLENT MAINTAINABILITY

For the M800/M80 series, the number of spare parts has been reduced, environmental resistance improved and provides easier maintenance due to simplifying the control assembly.

## Control Unit



M800W



M800S



M80

No-fan structure

- Heat generation suppressed by introducing an original CPU
- Spare parts reduced

ECC-embedded memory

- Memory error detection and correction possible with built-in ECC
- Noise tolerance improved

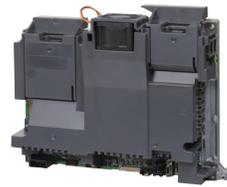
## Display Unit



Display panel

Capacitive touchscreen panel

- Easy operation and longer service life
- Separated front I/F ports
- Protects the SD card slot from any fluid even while a USB memory device is inserted



Personal computer unit

No hard-disk drive (M800S/M80)

- Vibration resistance improved

## I/O Unit



Front-side wiring

- All wiring can be done from the front side of the unit
- Assembly simplified

DIN rail mount

- All types are mountable on DIN rails (can also be attached using screws)

# SPECIFICATIONS

○Standard △Optional □Selection

		Lathe system					
		M800W Series		M800S Series		M80 Series	
		M850W	M830W	M850S	M830S	TypeA	TypeB
Number of control axes	Max. number of axes (NC axes + Spindles + PLC axes)	○16 △32	○16 △32	○16 △32	○16 △32	12	9
	Max. number of NC axes (in total for all part systems)	○16 △32	○16 △32	○16 △32	○16 △32	10	7
	Max. number of spindles	8	8	8	8	4	3
	Max. number of PLC axes	8	8	8	8	6	6
	Number of simultaneous contouring control axes	8	4	8	4	4	4
	Max. number of NC axes in a part system	8	8	8	8	8	5
Max. number of part systems		○4 △8	○4 △8	○4 △8	○4 △8	3	2
Control unit high-speed program server mode		△	△	—	—	—	—
Display unit high-speed program server mode		△	△	△	△	○	○
Front SD card mode		○	○	○	○	○	○
Least command increment		○0.1μm △1nm	○0.1μm △1nm	○0.1μm △1nm	○0.1μm △1nm	0.1μm	0.1μm
Least control increment		1nm	1nm	1nm	1nm	1nm	1nm
Max. number of tool offset sets		○128 sets △999 sets	○128 sets △999 sets	○128 sets △999 sets	○128 sets △999 sets	256 sets	99 sets
Max. PLC program memory capacity [steps]		○128000 △512000	○128000 △512000	○128000 △512000	○128000 △512000	64000	32000
Multi-project PLC (max. number of projects)		○1 △6	○1 △6	○1 △6	○1 △6	3	1
Touchscreen operation		○	○	○	○	○	○
User level-based protection		△	△	△	△	○	○
Workpiece coordinate system shift		○	○	○	○	○	○
3D program check		○	○	○	○	○	○
Interactive cycle insertion		△	△	△	△	○	○
Multiple spindle synchronization set control		○	○	○	○	○	○
Spindle superimposition control		△	△	△	△	○	—
High-accuracy control		△	△	△	△	○	—
High-speed high-accuracy control I		△	△	△	△	○	—
High-speed high-accuracy control II		△	△	△	△	○	—
SSS control		△	△	△	△	○	—
Tolerance control		—	—	—	—	—	—
Variable-acceleration pre-interpolation acceleration/deceleration		—	—	—	—	—	—
OMR-FF control		△	△	△	△	○	—
Rapid traverse block overlap		△	△	△	△	○	○
Spindle-mode servo motor control		△	△	△	△	○	○
Real-time tuning 1 (speed gain changeover)		△	△	△	△	○	—
Real-time tuning 2 (rapid traverse time constant changeover)		△	△	△	△	○	—
Tool center point control		—	—	—	—	—	—
Inclined surface machining command		△	△	△	△	○	—
3D manual feed		—	—	—	—	—	—
R-Navi		—	—	—	—	—	—
CC-Link (Master/Slave)		□	□	□	□	□	□
PROFIBUS-DP (Master)		□	□	□	□	□	□
EtherNet/IP (Scanner)		□	□	□	□	□	□
MES interface function		△	△	△	△	○	○
EcoMonitorLight connection		□	□	□	□	□	□
Machine group-based alarm stop		△	△	△	△	○	—
Smart safety observation		△	△	△	△	—	—

○Standard △Optional □Selection

		Machining center system					
		M800W Series		M800S Series		M80 Series	
		M850W	M830W	M850S	M830S	TypeA	TypeB
Number of control axes	Max. number of axes (NC axes + Spindles + PLC axes)	○16 △32	○16 △32	○16 △32	○16 △32	11	9
	Max. number of NC axes (in total for all part systems)	16	16	16	16	8	5
	Max. number of spindles	4	4	4	4	2	2
	Max. number of PLC axes	8	8	8	8	6	6
	Number of simultaneous contouring control axes	8	4	8	4	4	4
	Max. number of NC axes in a part system	8	8	8	8	8	5
Max. number of part systems		2	2	2	2	2	1
Control unit high-speed program server mode		△	△	—	—	—	—
Display unit high-speed program server mode		△	△	△	△	○	○
Front SD card mode		○	○	○	○	○	○
Least command increment		○0.1μm △1nm	○0.1μm △1nm	○0.1μm △1nm	○0.1μm △1nm	0.1μm	0.1μm
Least control increment		1nm	1nm	1nm	1nm	1nm	1nm
Max. number of tool offset sets		○200 sets △999 sets	○200 sets △999 sets	○200 sets △999 sets	○200 sets △999 sets	400 sets	400 sets
Max. PLC program memory capacity [steps]		○128000 △512000	○128000 △512000	○128000 △512000	○128000 △512000	64000	32000
Multi-project PLC (max. number of projects)		○1 △6	○1 △6	○1 △6	○1 △6	3	1
Touchscreen operation		○	○	○	○	○	○
User level-based protection		△	△	△	△	○	○
Workpiece coordinate system shift		—	—	—	—	—	—
3D program check		○	○	○	○	○	○
Interactive cycle insertion		—	—	—	—	—	—
Multiple spindle synchronization set control		—	—	—	—	—	—
Spindle superimposition control		—	—	—	—	—	—
High-accuracy control		△	△	△	△	○	○
High-speed high-accuracy control I		△	△	△	△	○	○
High-speed high-accuracy control II		△	△	△	△	○	—
SSS control		△	△	△	△	○	—
Tolerance control		△	△	△	△	○	—
Variable-acceleration pre-interpolation acceleration/deceleration		△	△	△	△	—	—
OMR-FF control		△	△	△	△	○	○
Rapid traverse block overlap		△	△	△	△	○	○
Spindle-mode servo motor control		△	△	△	△	○	○
Real-time tuning 1 (speed gain changeover)		△	△	△	△	○	—
Real-time tuning 2 (rapid traverse time constant changeover)		△	△	△	△	○	—
Tool center point control		△	—	△	—	—	—
Inclined surface machining command		△	△	△	△	○	—
3D manual feed		△	△	△	△	○	—
R-Navi		△	△	△	△	○	—
CC-Link (Master/Slave)		□	□	□	□	□	□
PROFIBUS-DP (Master)		□	□	□	□	□	□
EtherNet/IP (Scanner)		□	□	□	□	□	□
MES interface function		△	△	△	△	○	○
EcoMonitorLight connection		□	□	□	□	□	□
Machine group-based alarm stop		△	△	△	△	○	—
Smart safety observation		△	△	△	△	—	—

Refer to the specifications manuals for details.

# DRIVE SYSTEM

## Drive Units



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

- 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.
- Motor power connector comprises 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 supported in an effort to enhance safety features.



### Multi-hybrid Drive Units MDS-EM Series

- The multi-hybrid drive unit is capable of driving a maximum of three servo axes and one spindle. This contributes to the downsizing of machines and offers technical advantages.
- Motor power connector comprises an anti-misinsertion mechanism. This helps to eliminate connection errors.
- Safe Torque Off (STO) and Safe Brake Control (SBC) are supported in an effort to enhance safety features.



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

- Ultra-compact drive units with built-in power supplies contribute to reduced control panel size.
- 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 supported in an effort to enhance safety features.
- MDS-EJH 400V system drive unit is available (Note 1).

## Servo Motors



### Medium-inertia, High-accuracy and 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: 0.5 to 9 [kW]
- Max: 4,000 or 5,000 [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 and 67 million pulses/rev) are available.



### Linear Servo Motor 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 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 motor combined with high-gain control provides 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-performance Spindle Motor SJ-D Series

- Motor energy loss has been significantly reduced by optimizing the magnetic circuit.
- High-speed bearing incorporated as a standard feature helps to achieve higher speed, lower vibration and improved durability.
- Range:  
Normal SJ-D Series 3.7 to 11 [kW]  
Compact & light SJ-DJ Series 5.5 to 15 [kW]
- Max speed: 10,000 or 12,000 [r/min]



### High-output, High-torque Spindle Motor SJ-DG Series

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



### Low-inertia, High-speed Spindle Motor SJ-DL Series

- The spindle motors are dedicated to tapping machines requiring 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]



### Built-in Spindle Motor 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.
- A mold with cooling jacket is available as an optional feature.

# SOFTWARE TOOLS

## ● Training

**Education**

**Operation check**

**Results**

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

NC Trainer2 / NC Trainer2 plus

This is an application for operating the CNC screen and machining programs on a computer without the CNC control unit or a special display unit. It can also be used for learning CNC operations and checking machining programs. The machining programs created on NC Trainer2 / NC Trainer2 plus can be used on actual CNCs.

## ● Operational Support

**Machining data file**

Drag and drop to transfer machining data files

NC Explorer

Ethernet

Machining data file

NC Explorer

CNC machining data files can be manipulated using Windows® Explorer on a computer connected to multiple CNCs via Ethernet.

**Monitor the status of multiple CNCs on one computer**

NC Monitor2

Ethernet

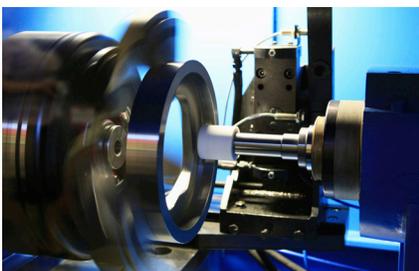
NC Monitor2

Taking advantage of the network in a plant, CNC operation status can be monitored from remote locations. Several CNCs can be connected and monitored simultaneously.

# VALUE-ADDED SERVICES

## CloudCNC®

Backing up machines in advance of catastrophic, unplanned or planned downtime gives our customers the opportunity to readily and more efficiently get back up and running. CloudCNC is a service that offers you a complete backup of your machine's data, available to you from our servers, 24/7. While on-site, our service engineers can perform a CloudCNC backup for a nominal fee.



## Machine Tuning

Mitsubishi Electric's Machine Tuning service can reduce motion disturbance – like mechanical and electronic resonance – and improve cycle times. We accomplish this by fine-tuning the motor to the ideal speed that reduces vibration, shock and provides optimum machining tolerance. In turn, the faster the axes can respond to speed changes in the part program, the shorter your overall cycle time can become.

## Spindle Upgrade

An upgrade to current digital technology means parts will be more readily available for years to come, ultimately maximizing your system's uptime. In today's competitive marketplace, you need to be able to maximize productivity and simultaneously minimize costs. Whether you have analog or digital systems, a Mitsubishi Electric spindle amplifier retrofit can be a good solution to both of these needs.

## Service Agreements

Your machine tool is your company's lifeline to revenue. Unplanned downtime can incur a large, unexpected expense. Benefit from both maximum uptime and predictable service costs by choosing the right coverage for you – ranging from one that covers parts only to one that includes unlimited service calls.

## 24/7 Telephone Support

When you need technical support, you can be confident that our service experts will provide the help you need. Fully staffed with experienced engineers who are knowledgeable in every aspect of your equipment, our technical support staff can provide troubleshooting, operation advice, and parts recommendations anytime day or night. \*\*a fee is charged for this service outside normal business hours.

## Knowledge Base

We've collected all technical and product information in one location to provide a comprehensive collection of documents to facilitate support of Mitsubishi Electric's products. Here you'll find videos, manuals, specifications and guides for installing, configuring and troubleshooting your Mitsubishi Electric devices.

## Preventative Maintenance

With regular, proper service and maintenance from Mitsubishi Electric experts, you can avoid premature failure and costly, unplanned downtime. We scan for potential causes of future failures and confirm all voltages are within specified tolerances. We change batteries and fans, verify safety circuits and report on current feedback to determine possible mechanical issues. We can add this service to our on-site visit or plan a scheduled maintenance call at a time that makes sense for your production schedule.



## 24/7 Parts Support

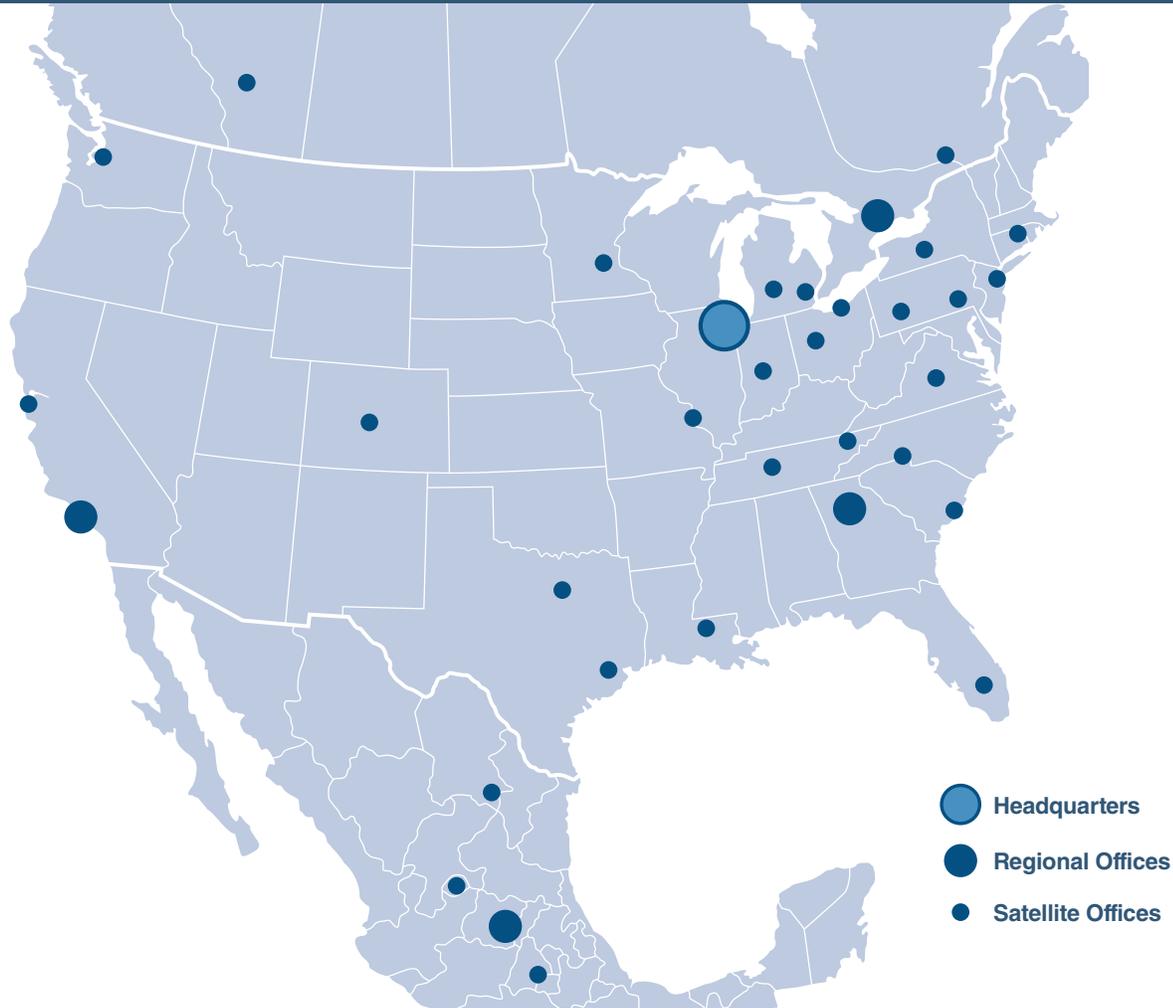
We stock the largest selection of spare parts for Mitsubishi Electric machine tool controls. Our primary service centers in the United States, Canada and Mexico have more than \$10MM in combined inventory of parts for generations of Mitsubishi Electric controls and equipment, strategically stocked with a focus on reducing downtime due to issues like customs delays. If you're not sure what part you need, you can utilize our online parts catalog. This easy-to-use guide shows pictures and product details to help you identify the correct part. You may also qualify for an additional credit by returning your damaged core-eligible unit to Mitsubishi Electric.\*

## MTConnect® Adapter

Mitsubishi Electric has developed an MTConnect adapter, which is a software package, to capture NC data and send to the agent. The agent then formats the data per the MTConnect standard. Combined with 3rd party software, users are able to see operation status in real time, collect streaming data points from equipment events, and extract machining and operator patterns through data collection. Users can monitor dashboard visualization, establish metric warning thresholds, or oversee their equipment through a mobile app. You will see improvements in Overall Equipment Effectiveness (OEE) along with a quick Return On Investment (ROI).

# NORTH AMERICAN SERVICE NETWORK

We provide satisfying after-sales services, aiming to be your best partner.



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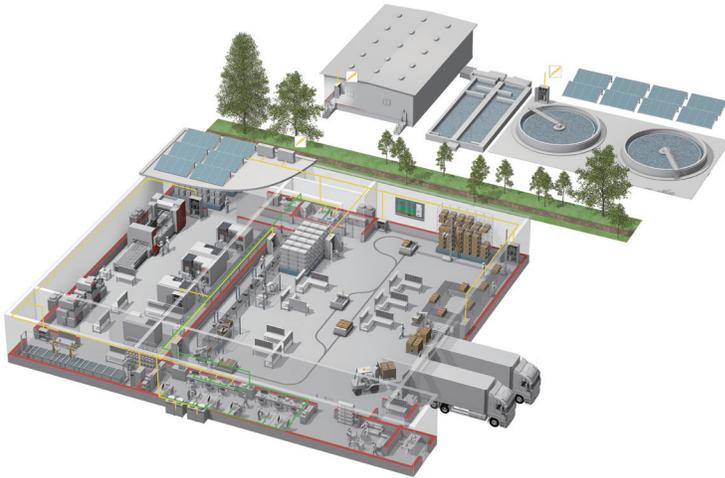
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# YOUR SOLUTIONS PARTNER



Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.

## A Name to Trust

Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry. The Mitsubishi brand is recognized around the world as a symbol of premium quality.

Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems. We have 237 factories and laboratories worldwide in over 121 countries.

You can rely on Mitsubishi Electric automation solutions because we know first-hand about the need for reliable, efficient, easy-to-use automation and control in our own factories. As one of the world's leading companies with a global turnover of over 4 trillion Yen (over \$40 billion), employing over 100,000 people, Mitsubishi Electric has the resources and commitment to deliver the ultimate in service and support as well as the best products.



Low voltage: MCCB, MCB, ACB



Medium voltage: VCB, VCC



Power monitoring, energy management



Compact and Modular Controllers



Inverters, Servos and Motors



Visualization: HMIs, Software, MES connectivity



Numerical Control (NC)



Robots: SCARA, Articulated arm



Processing machines: EDM, Lasers, IDS



Air-conditioning, Photovoltaic, EDS

**MITSUBISHI ELECTRIC AUTOMATION, INC.**

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[us.MitsubishiElectric.com/fa/en/support](http://us.MitsubishiElectric.com/fa/en/support)

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L-VH-00095

