

FACTORY AUTOMATION

# NUMERICAL CONTROL (CNC) M800V/M80V 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.

**INITIATIVES THAT CONTRIBUTE TO ADDRESSING SOCIAL ISSUES**

# INITIATIVES THAT CONTRIBUTE TO ADDRESSING SOCIAL ISSUES

The Mitsubishi Electric Group will pursue value creation by addressing social challenges and will contribute to achieving the 17 goals of the SDGs\*1 through all corporate activities.

**Environmental Initiatives**

The Mitsubishi Electric Group has set forth Environmental Sustainability Vision 2050 to clarify the company's stance on addressing long-term environmental issues and creating new value for a sustainable future toward 2050.

The new vision identifies environmental protection as a top corporate priority and stipulates increased initiatives toward this end. It defines Mitsubishi Electric's future course toward 2050 for implementing key initiatives in the form of the Environmental Declaration and Three Environmental Action Guidelines.

**Environmental Sustainability Vision 2050**

**Environmental Declaration**

**Protect the air, land, and water with our hearts and technologies to sustain a better future for all.**

To solve various factors that lead to environment issues, the Mitsubishi Electric Group shall unite the wishes of each and every person, and strive to create new value for a sustainable future.

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**Three Environmental Action Guidelines**

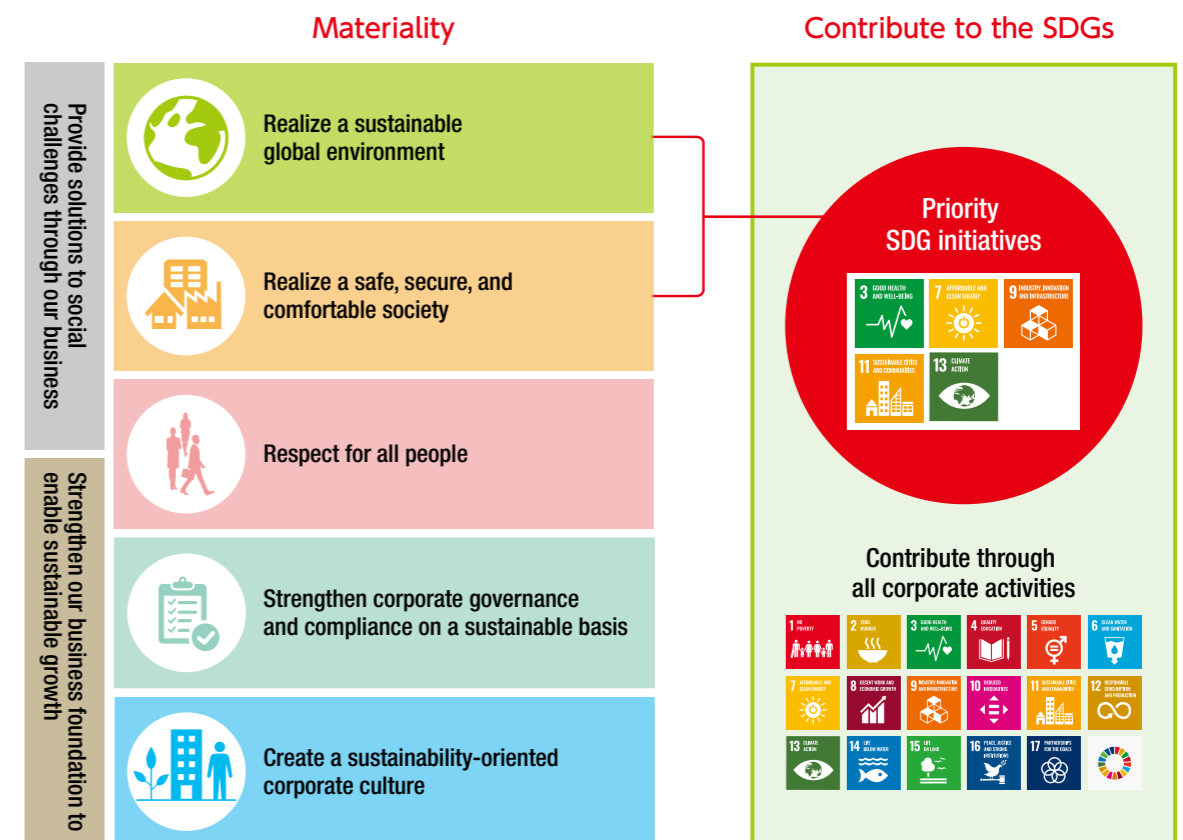
- 1 Apply diverse technologies in wide-ranging business areas to solve environmental issues
- 2 Challenge to develop business innovations for future generations
- 3 Publicize and share new values and lifestyles

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**Key Activities**

Climate Change Measures Resource Circulation Live in Harmony with Nature	Long-term Activities Innovation Nurturing Human Resources	Understanding Needs Co-create and Disseminate New Values Live in Harmony with the Region
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**The Mitsubishi Electric Group's Materiality**



\*1. Sustainable Development Goals adopted by the United Nations as goals to achieve by 2030.



**M800V/M80V Series**  
COMPUTERIZED NUMERICAL CONTROLLERS

# The Evolution in Smart Manufacturing

Seven years after its development, the M800/M80 Series ushers in a new dimension.

A variety of innovative control functions help machine various 'things' at high speed and with high accuracy.

The industry's first\*1 built-in wireless LAN, which reduces wiring and operators' movement, high-definition 3D machining simulation, which minimizes trial cutting, and advanced user-friendly and intuitive operations streamline overall manufacturing processes and create 'time' as never before envisioned.

Our new CNC, keeping abreast of manufacturers' needs and the advancement of the times, efficiently optimizes manufacturing from the perspective of 'things' and 'time'.

Introducing the all new M800V/M80V Series.

View the introduction video here. ▶



\*1. As of August 2021. According to research by Mitsubishi Electric Corporation.



High-speed high-accuracy functions that further improve productivity on the shop floor

Connectivity and usability that further streamline the shop floor

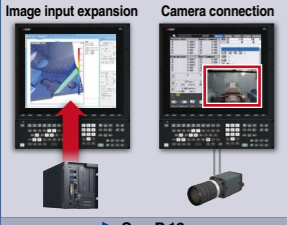
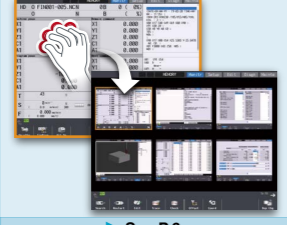
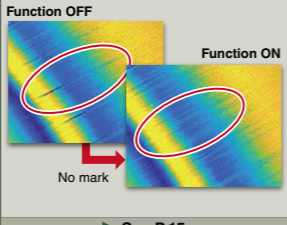

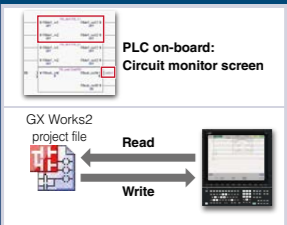


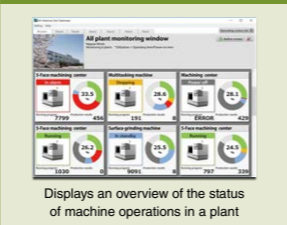
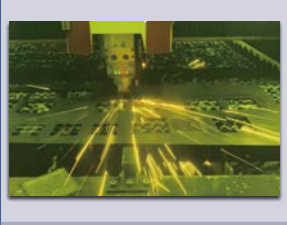
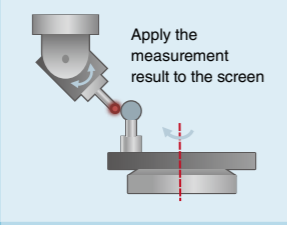
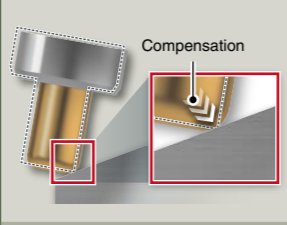
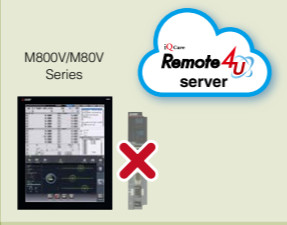

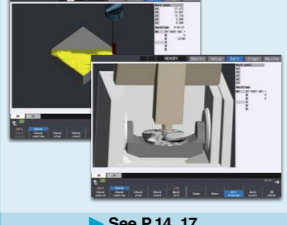
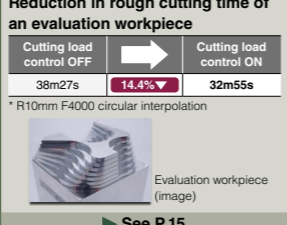

Functions that contribute to sustainability

## OVERVIEW

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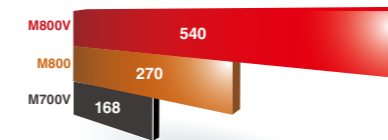
# FEATURES OF THE M800V/M80V SERIES

The M800V/M80V Series makes an effective difference in each phase of the engineering chain.

Mechanical and electrical design	Setup	Machining	Production maintenance
<ul style="list-style-type: none"> <li>Differentiation of machines through customization</li> <li>Easier PLC programming</li> <li>Expanded control area (sheet metal laser cutting machines, special mechanisms, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced usability</li> <li>Efficient programming and parameter adjustment</li> <li>High-definition simulation to reduce faulty machining and scrap</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced machining quality</li> <li>New function to reduce cycle time and extend tool life</li> </ul>	<ul style="list-style-type: none"> <li>Support for automation and traceability</li> <li>More features and improvements for operation monitoring and remote monitoring applications</li> <li>Support for security measures</li> </ul>
<b>Image input interface</b> Image input expansion Camera connection  ▶ See P.13	<b>Multi-touch gestures</b>  ▶ See P.6	<b>Spline interpolation 2 improvement</b> Function OFF Function ON No mark  ▶ See P.15	<b>Two-dimensional barcode (QR code) engraving cycle</b>  ▶ See P.16
<b>MELSEC development tool (GX Works2)</b> PLC on-board: Circuit monitor screen GX Works2 project file Read Write  ▶ See P.13	<b>Parameter adjustment screen for high-accuracy control</b>  ▶ See P.14	<b>OMR-CC (Optimum machine response-contour control)</b> Improved cutting in arcs and free-form surfaces  ▶ See P.15	<b>NC Machine Tool Optimizer</b> Displays an overview of the status of machine operations in a plant  ▶ See P.16
<b>Laser processing control</b>  ▶ See P.8	<b>Rotation center error measurement</b> Apply the measurement result to the screen  ▶ See P.14	<b>Tool cutting point control</b> Compensation  ▶ See P.15	<b>Built-in remote service gateway unit functionality</b> M800V/M80V Series Remote 4 server  ▶ See P.7
<b>Motion control release (coordinate transformation)</b>  Coordinate transformation process can be embedded in machines with special mechanism ▶ See P.8	<b>3D machining simulation</b>  ▶ See P.14, 17	<b>Cutting load control</b> Reduction in rough cutting time of an evaluation workpiece Cutting load control OFF Cutting load control ON 38m27s 14.4% 32m55s * R10mm F4000 circular interpolation Evaluation workpiece (image)  ▶ See P.15	<b>Security feature for Windows display</b> Security software Authorized applications  ▶ See P.16

# BASIC PERFORMANCE IMPROVEMENTS

Increased fine segment processing capability further reduces cycle time



\* The above is the maximum value. The maximum value differs depending on the function.

With improved hardware optimized for CNC, the dedicated CPU significantly improves fine segment processing capability. High machining program processing capability translates to a shorter cycle time.

Increased number of control axes

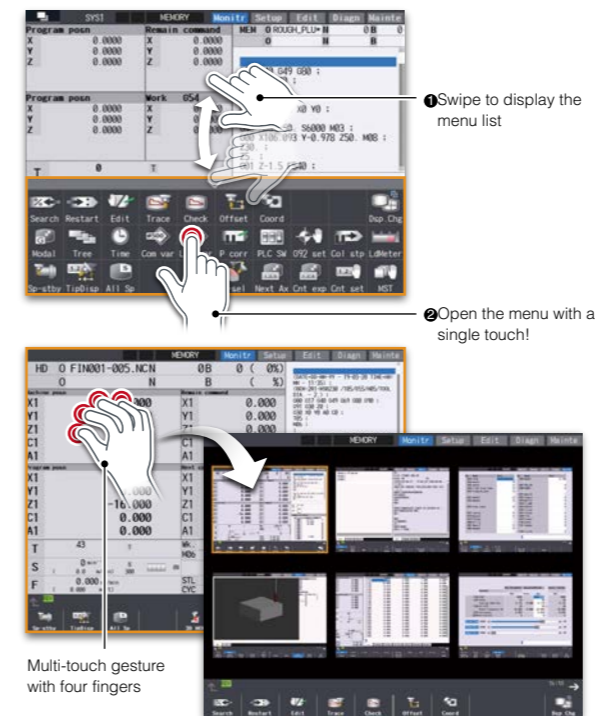
	M800VS M800VW	M80V (TypeA)	M80V (TypeB)
Max. number of axes	32	11	9
Number of spindles	4 ▶ 6	2 ▶ 4	2

Lathe system (L system)

	M800VS M800VW	M80V (TypeA)	M80V (TypeB)
Max. number of axes	32	12 ▶ 13	9
Number of spindles	8	5 ▶ 6	4

The number of some control axes has been increased from the conventional M800/M80 Series, allowing control of more complex mechanisms.

Multi-touch function provides superior usability



Swipe to display the menu list

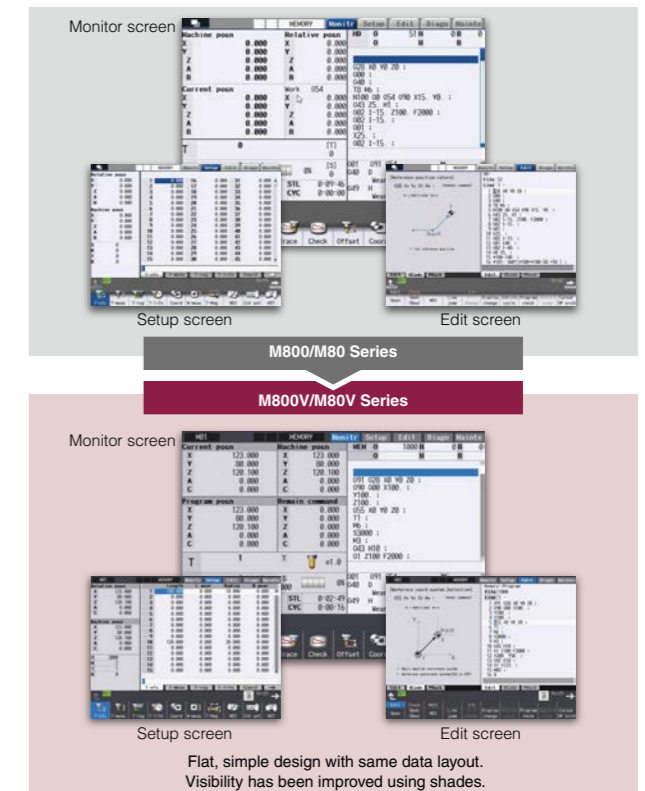
Open the menu with a single touch!

Multi-touch gesture with four fingers

Usability of the M800/M80 Series has further evolved! Multi-touch gestures enable smarter operations, such as:

- Drag/flick the menu upward to open the menu list
- Use grab operation with four or more points to open the list of recently selected screens.

Screen design that ensures visibility



Monitor screen Setup screen Edit screen

M800/M80 Series

M800V/M80V Series

Monitor screen Setup screen Edit screen

Flat, simple design with same data layout. Visibility has been improved using shades.

Screen design and colors are optimized for readability considering information content. Better visibility leads to increased work efficiency.

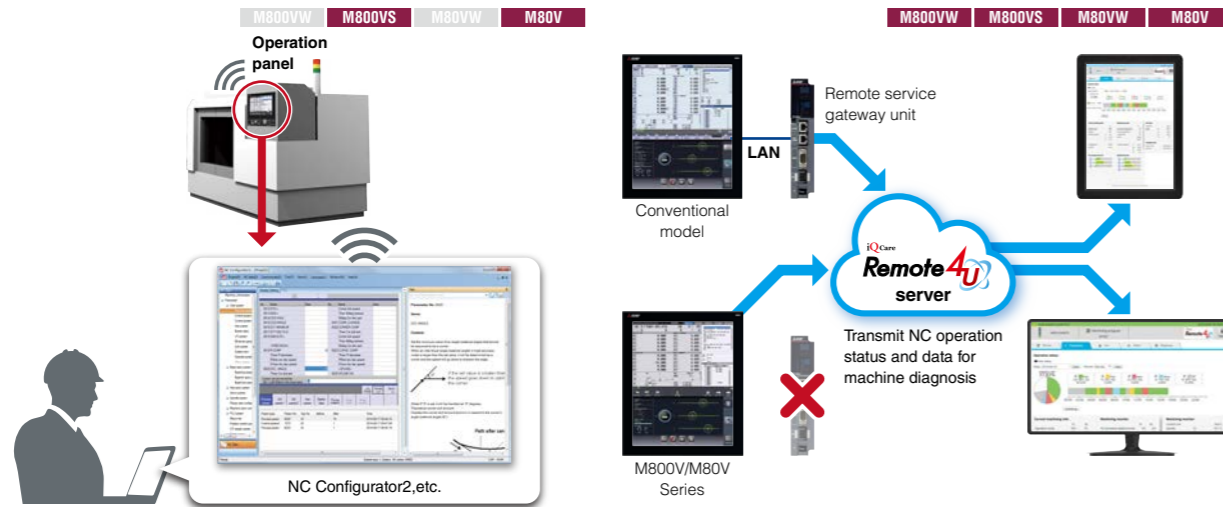
View the introduction video here. ▶



# EVOLUTION OF THE CONTROL UNIT AND DISPLAY UNIT

Built-in wireless LAN increases work efficiency

A gateway unit functionality for remote service is built into the NC



Our industry-first\*1 NC control unit with built-in wireless LAN frees operation from the constraints of time and space. It can be connected to software tools on a PC to exchange data using wireless communication.

\*1. As of August 2021. According to research by Mitsubishi Electric Corporation.  
\*2. The available legal wireless frequency bands and channels vary from country to country due to varying regulations governing use of radio waves. Ensure that the country code that matches the country of operation is configured before using the wireless LAN functionality.

The functionality of a remote service gateway unit required for remote service iQ Care Remote4U is built into the NC control unit\*1, leading to less wiring and easier remote diagnostics.

\*1. For regular data retrieval, different interval applies to the built-in capability (Remote gateway unit, one second; built-in capability in NC control unit, 30 seconds).  
If the data needs to be retrieved at a one-second interval, use the remote gateway unit like the earlier models.

View the introduction video here. ▶



Addition of a 19-inch display to the lineup of display-integrated control units (M800VS/M80V Series)



A 19-type display has been added to the lineup of 8.4, 10.4 and 15 types. A large screen improves visibility and provides greater flexibility in designing an operation panel.

Evolution of the control unit and display unit (M800VW/M80VW Series)



### Evolved Windows display

Advanced design inherited from the M800/M80 Series with double storage capacity. Equipped with a new PC unit supporting Windows 10.

### New control unit with enhanced field network support

The added LAN connector on the control unit offers connectivity with a wider variety of networks. Expandability is maintained by the expansion slots while also ensuring installation compatibility with the M800VW/M80V Series.

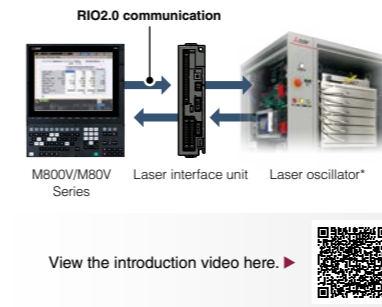
# EXPANSION AND EVOLUTION OF CONTROL FUNCTIONS

Sheet metal laser cutting machines can also be controlled

## Laser processing control

M800VW M800VS M80VW M80V

The introduction of laser processing functionality expands the areas of control.



View the introduction video here. ▶



No	Laser processing functionality	Description
1	Laser oscillator power control	The NC outputs to the laser oscillator the processing conditions (laser power value, etc.) it creates for each interpolation cycle when the M code for laser ON is enabled
2	Laser oscillator digital I/O control	The NC device controls the digital I/O of the laser oscillator
3	Selection of laser processing conditions	Laser processing conditions are set in a dedicated screen (each condition can be selected using an M code) (The selection of conditions appropriate to the processing situation leads to high-quality processing)
4	DR (dross reduction) control	Laser processing conditions are automatically adjusted according to the processing speed (The effect of heating at acute corners is reduced, minimizing dross and increasing processing accuracy)
5	F-CUT (flycutting) control	The timing of turning on/off the beam is controlled by checking the feedback position obtained from the motor-side encoder against the programmed position
6	Height control	The height from the workpiece surface is held constant based on the height sensor (Copying the workpiece, leading to high-quality processing)
7	Power calibration control	Laser power is adjusted based on the laser power measured from the laser head (Actual laser power is made consistent with the programmed value, contributing to oscillator protection)
8	Multi-part machining	Multiple parts of the same shape can be machined with a single G-code command. (Reduces programming time and improves productivity)

\* The laser oscillator must be prepared by the customer.

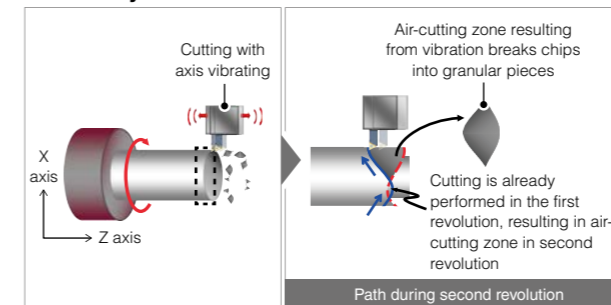
Vibration cutting shortens the time required to remove chips and improve machine utilization

## Vibration cutting

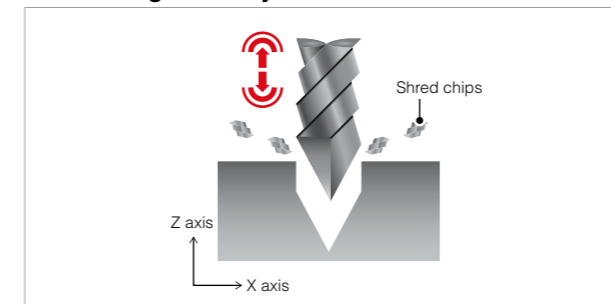
M800VW M800VS M80VW M80V

Vibration cutting, in which machining is performed with the feed axis vibrating to break up chips, reduces the time it takes to remove the chips and increases machine utilization.

### Lathe system



### Machining center system

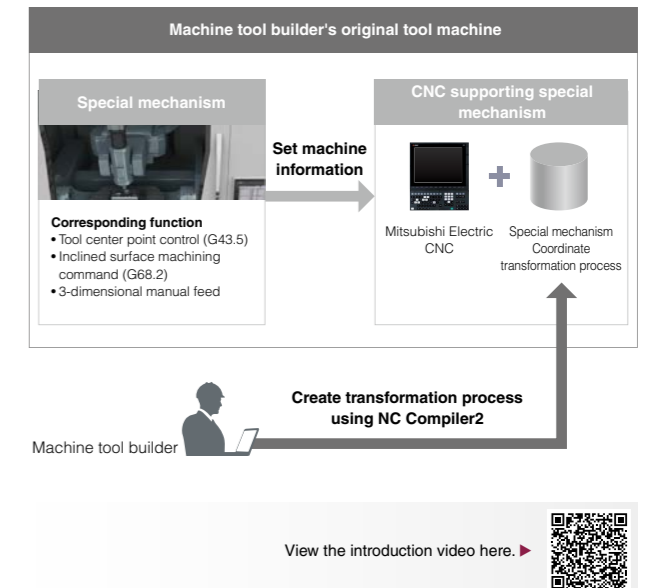


Motion control release enables control of special mechanisms

## Motion control release (coordinate transformation)

M800VW M800VS M80VW M80V

Motion control release allows transformation of coordinates that differ from the NC's rectangular coordinate system, making it possible to control special mechanisms such as parallel links.



# CNC LINEUP

High performance



## M800VW



### Premium CNC provides expandability and flexibility

- Separated type with the control unit separate from the display
- A Windows-based display is included in the lineup, providing excellent expandability
- Four expansion slots are provided as a standard specification, and further expansion is realized by an optional card slot

## M800VS



### High-grade CNC well suited to high-speed high-accuracy machining and multi-axis multi-part system control

- Panel-in type with an integrated control unit and display
- Multi-CPU architecture allows for high performance and high functional graphics
- A non-Windows-based display provides easy operability

## M80VW



### Standard CNC with expandability and flexibility

- Separated type with the control unit separate from the display
- A Windows-based display is included in the lineup, providing excellent expandability
- Packaged type for easy selection of machine type
- Two expansion slots are provided as a standard specification, and further expansion is realized by an optional card slot

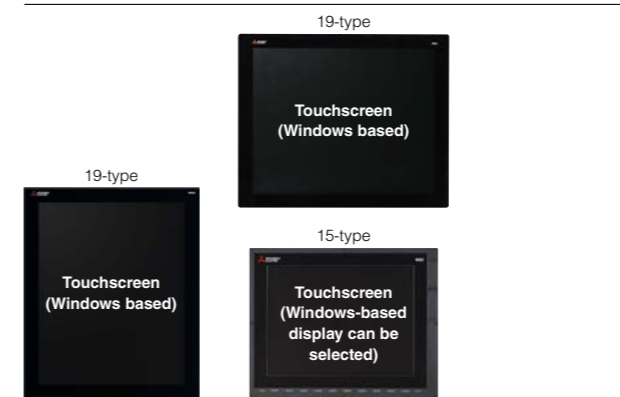
## M80V



### Standard CNC provides high productivity and easy operability

- Panel-in type, with an integrated control unit and display
- Pre-packaged (TypeA/TypeB) for easier selection
- A non-Windows-based display provides easy operability

### Display unit size



### Main specifications

	Lathe system	Machining center system
Max. number of axes (NC axes + spindles + PLC axes)	Standard: 16	Optional: 32
Max. number of spindles	8	6
Max. number of part systems (main+sub)	Standard: 4 Optional: 8	2
Fine segment processing capability [kilo-blocks/min]	168	540

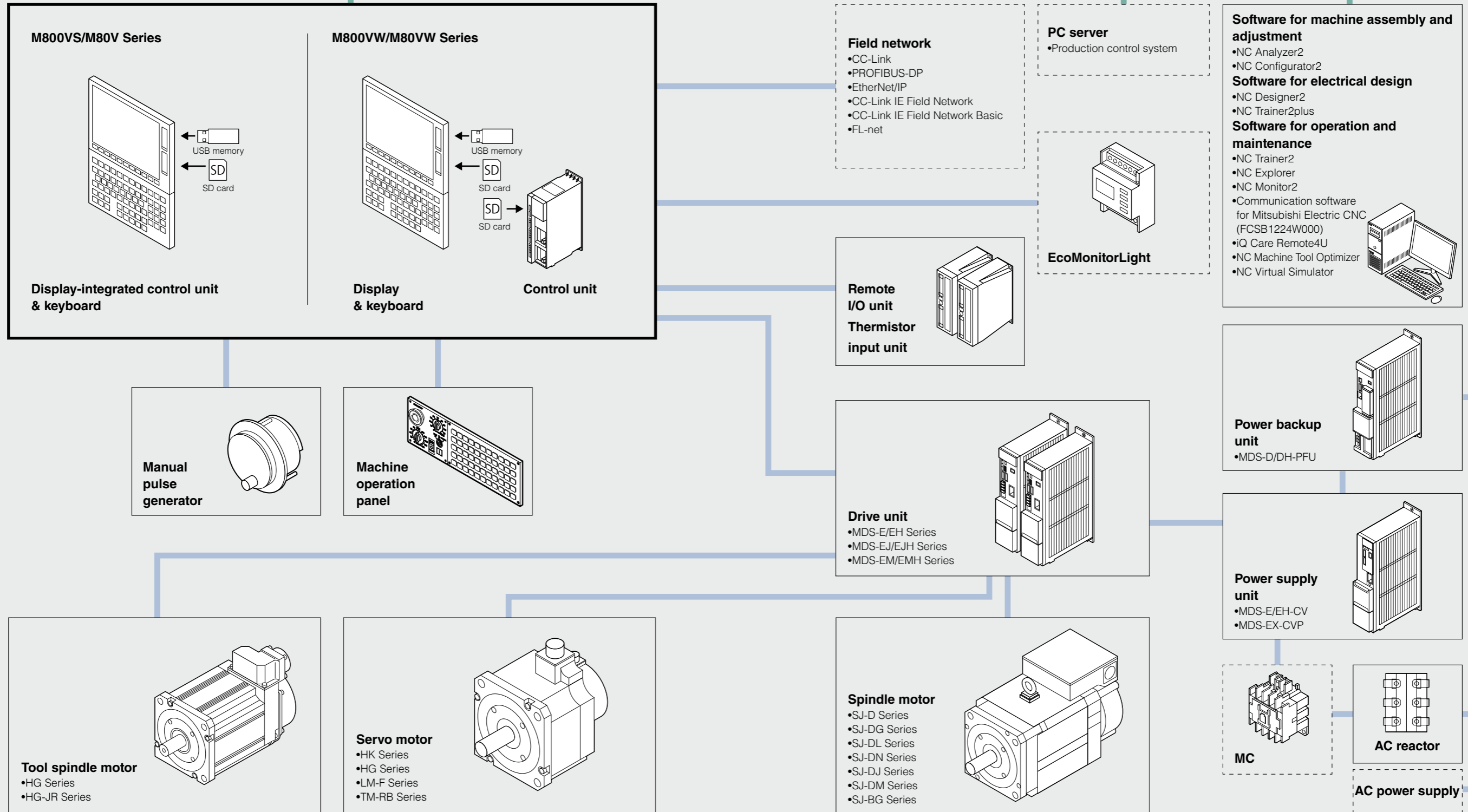
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Fine segment processing capability [kilo-blocks/min]	168	540

	Lathe system	Machining center system
Max. number of axes (NC axes + spindles + PLC axes)	13	11
Max. number of spindles	6	4
Max. number of part systems (main+sub)	4	2
Fine segment processing capability [kilo-blocks/min]	101	202

	Lathe system	Machining center system
Max. number of axes (NC axes + spindles + PLC axes)	TypeA: 13 TypeB: 9	TypeA: 11 TypeB: 9
Max. number of spindles	TypeA: 6 TypeB: 4	TypeA: 4 TypeB: 2
Max. number of part systems (main+sub)	TypeA: 4 TypeB: 2	TypeA: 2 TypeB: 1
Fine segment processing capability [kilo-blocks/min]	TypeA: 101 TypeB: -	TypeA: 202 TypeB: 67.5

# SYSTEM CONFIGURATIONS

Ethernet



Optional parts are not provided as accessories for NC equipment.  
Please purchase desired components from a Mitsubishi Electric dealership, etc.

# INTRODUCTION OF FUNCTIONS

Mechanical and electrical design

Setup

Machining

Production maintenance

**“Image input interface” enables flexible customization of NC screens and applications to differentiate machine tools, creating added value.**

Image input interface

M800VW M800VS M80VW M80V

By displaying applications that are installed in an industrial PC and camera images stored inside the machine, the NC screen provides added value to machine tools. Applications in an industrial PC can be operated from the NC screen.



View the introduction video here. ▶



**“Direct robot control” enables the NC to directly control a robot, allowing more flexible machine design including workpiece transportation.**

Direct robot control

M800VW M800VS M80VW M80V

Guidance on the dedicated screen and special G codes allow easy programming and operation without requiring knowledge of robot language. For example, you can run an NC program that coordinates the loading/unloading of workpieces by the robot with the machining of workpieces by the machine tool.



Handle operation is also available

View the introduction video here. ▶

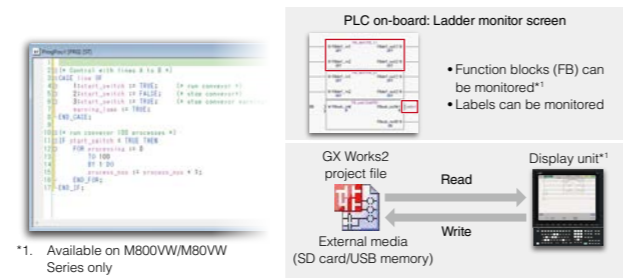


ST language is supported in addition to ladder language. This allows PLC programs to be created and edited efficiently using the syntax resembling that of conventional programming languages.

MELSEC development tool (GX Works2)

M800VW M800VS M80VW M80V

Unlike ladder language, ST language allows flexible text-based programming and compact operation processing. The use of function blocks (FB) also makes PLC programming more flexible. Monitoring function blocks using PLC on-board\*1 makes development easier and more efficient.



\*1. Available on M800VW/M80VW Series only

View the introduction video here. ▶

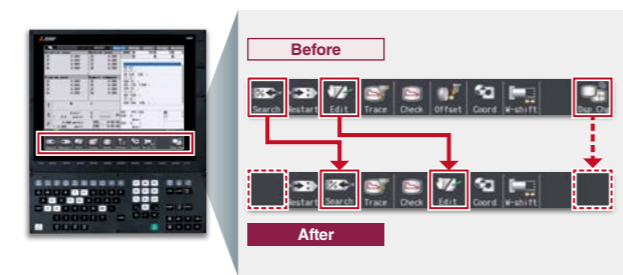


**“Menu key customization” allows the screen menu to be moved or hidden to meet machine specifications and the needs of machine tool users.**

Menu key customization

M800VW M800VS M80VW M80V

The optional functions of the machine tool can also be hidden from the menu key. Gathering frequently used menu keys streamlines setup work.



Mechanical and electrical design

Setup

Machining

Production maintenance

**Parameter setting guidance on the dedicated screen makes it easy for anyone to improve machining quality.**

Parameter adjustment screen for high-accuracy control

M800VW M800VS M80VW M80V

The parameters for high-accuracy control can be adjusted through intuitive operation using three machining indexes (cycle time, accuracy, quality) displayed in the guidance. This makes it unnecessary for operators to be highly skilled at making adjustments for optimal machining.



View the introduction video here. ▶

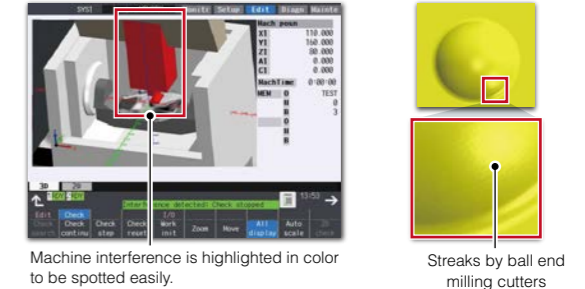


**Sophisticated simulations help to shorten work period and reduce material losses.**

3D Machining simulation

M800VW M800VS M80VW M80V

Machine interference and machining quality can be checked before actual machining, preventing collision and faulty machining, which leads to a shorter overall work period. High-definition simulations, which make even the streaks by cutters visible, allows the machining results to be checked on the NC screen.



Machine interference is highlighted in color to be spotted easily.

Streaks by ball end milling cutters

View the introduction video here. ▶

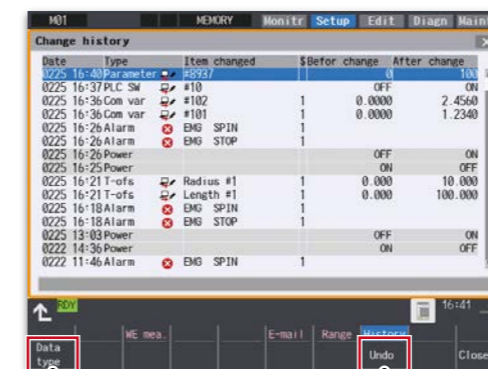


**All operational history for setup is displayed on one screen to prevent errors and missed settings, facilitating setup work.**

Setup change history display

M800VW M800VS M80VW M80V

When the settings like tool data and coordinate system offset are changed, all operations are displayed as a change history on one screen. This helps to easily identify errors and missed settings and allows erroneous settings, if found, to be undone with a single touch. It shortens the time for setup work.



Whether to display or hide data can be set for each data type.

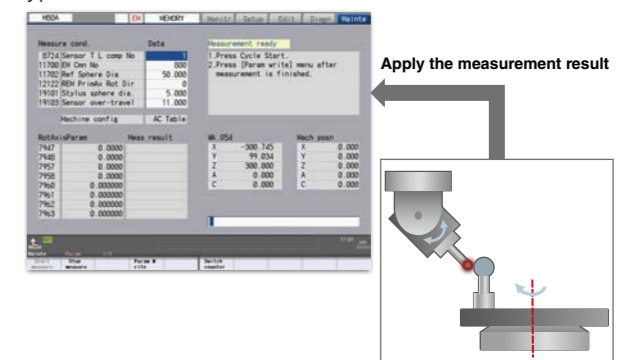
Settings can be undone if an error is found

**“Rotation center error measurement” can be used to instantly set the error compensation amount for rotation center error of the machine.**

Rotation center error measurement

M800VW M800VS M80VW M80V

This function allows rotation center errors to be measured using the reference sphere and touch probe. It also allows compensation values to be applied effortlessly from the screen. The measurement result can be reflected in the rotary axis configuration parameters. The machine configurations that support the function now includes not only table-tilt type but also combined type in the M800V/M80V Series.



Apply the measurement result



Mechanical and electrical design

Setup

**Machining**

Production maintenance

“OMR-CC (Optimum machine response-contour control)” efficiently reduces cycle time while maintaining machining accuracy.

OMR-CC (Optimum machine response-contour control)

M800VW M800VS M80VW M80V

Cycle time is reduced without compromising accuracy by outputting movement commands considering position error resulting from servo response delay.

The red circle indicates areas where OMR-CC is particularly effective.

OMR-FF (Conventional control)	OMR-CC (New control technology)
34m22s	30m21s
9.7um	8.2um
2447mm/min	3465mm/min
Cycle time: 11%▼	
Path error*: 15%▼	
Arc passing speed*: 41%▲	

\*1. R10mm F4000 arc command

View the introduction video here. ▶



“Cutting load control” automatically controls cutting load, leading to longer tool life and shorter cycle time.

Cutting load control

M800VW M800VS M80VW M80V

Feedrate is automatically adjusted so that the actual load rate matches the predefined target load rate during machining. The parameters appropriate for the tool and workpiece can be selected from eight parameter groups.

**Extending tool life**  
Target load vs High load. Speed DOWN.

**Reducing time**  
Target load vs High load. Speed UP.

**Reduction in rough cutting time of an evaluation workpiece**  
Cutting load control OFF: 38m27s, 14.4%▼  
Cutting load control ON: 32m55s

\* R10mm F4000 circular interpolation

Evaluation workpiece (image)

Legend: FB speed (blue line), Cutting load (orange line)

View the introduction video here. ▶



“Spline interpolation 2” delivers high-quality fine surfaces by making adjacent machining paths globally smooth.

Spline interpolation 2

M800VW M800VS M80VW M80V

This function solves the problem of uneven (marked) surfaces resulting from the variance of programmed points that occur when a machining program is generated by a CAM tool, improving machining quality.

Variance reduction control OFF

Variance reduction control ON

No mark from machining. High quality with less variance with adjacent paths.

View the introduction video here. ▶



“Tool cutting point control” enables optimum machining without modifying the machining program even when the tool shape changes.

Tool cutting point control

M800VW M800VS M80VW M80V

In five-axis machining, it was necessary to modify the machining program as tool wear occurs to keep the cutting point constant. Now tool wear is automatically compensated for by simply setting the tool length and tool shape (tool radius, corner radius).

**Example of tool wear**  
The cutting point shifts

**Tool cutting point control**  
Automatically compensated without setting

View the introduction video here. ▶



Mechanical and electrical design

Setup

Machining

**Production maintenance**

A QR Code engraved directly on a workpiece allows automatic selection of programs and tools and helps to implement traceability easily.

Two-dimensional barcode (QR code) engraving cycle

M800VW M800VS M80VW M80V

A program for engraving a QR code can be created easily using a fixed cycle. A QR Code engraved on a workpiece helps automation of high-mix low-volume production and traceability of workpieces.

- Order and production management data are engraved on the workpiece.
- Product traceability is implemented by reading the engraved QR Code.
- The QR Code helps automate the selection of machining programs and tools according to orders.

Machining result (simulation)

The NC engraves an internally generated QR Code.

View the introduction video here. ▶



Remote service “iQ Care Remote4U” has evolved. Remote diagnostics through a cloud server help to reduce machine downtime.

iQ Care Remote4U

Machine downtime is reduced by automatic email notifications sent upon occurrence of an alarm and alarm diagnostics, in addition to the built-in remote service gateway unit functionality in the NC control unit (see P.7).

Alarm screen

Alarm Diagnosis screen

Click on alarm date

Data before and after alarm can be displayed

Displays a list of data for a selected time

Email notification condition list screen

Displays a list of notification conditions that are currently set

Notification conditions:  
• Device  
• Common variable  
• Emergency stop  
• Machining completion

Detect condition

Email address

Message

Email notification condition edit screen

View the introduction video here. ▶



“Security feature for Windows display” effectively protects the NC from virus and other threats using the whitelist technique.

Security feature for Windows display

M800VW M800VS M80VW M80V

Virus attacks can be blocked by preventing software not whitelisted (unauthorized) for the NC from being run. It addresses security needs posed by the growth of IoT.

Display unit (Windows display)

- List of authorized applications: StandardScreen.exe, notepad.exe
- Unauthorized application: XXXX.exe

Not whitelisted - Not executable

View the introduction video here. ▶



Operation monitoring software “NC Machine Tool Optimizer” visualizes the status of various equipment in multiple factories.

NC Machine Tool Optimizer

Besides connecting with a variety of controllers (maker, model) 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

- 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

All plant monitoring window

Operating status overview

NC Machine Tool Optimizer

Software product that collects operation data from NC machine tools and peripherals to support the visualization and analysis of operational status

Built-in wireless LAN  
No wiring required

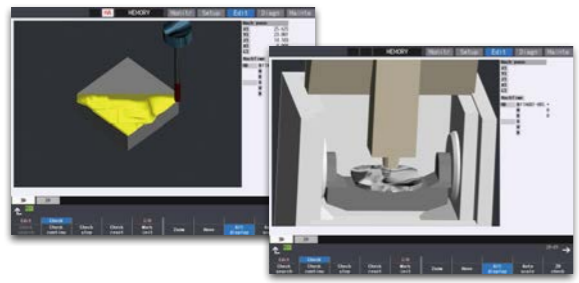
# CONTRIBUTION TO SUSTAINABILITY



## “3D machining simulation” contributes to reducing waste.

M800VW M800VS M80VW M80V

Machine interference and machining quality can be checked before machining, to reduce the number of workpieces that are discarded due to trial cutting and defective machining.



View the introduction video here. ▶



## “Power consumption calculation” enables visualization of power consumption.

M800VW M800VS M80VW M80V

Visualization of machine power consumption enables users to see which process has higher power consumption, contributing to power savings in factories.



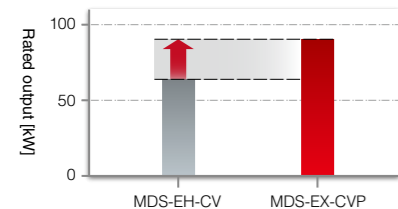
## PWM converter MDS-EX-CVP Series

M800VW M800VS M80VW M80V

PWM converter MDS-EX-CP Series controls the boost and stabilization of DC link voltage, for increased output and shorter acceleration and deceleration times in the below combination. Reduced supply current harmonics and improved power factor help to lower power supply equipment capacity.

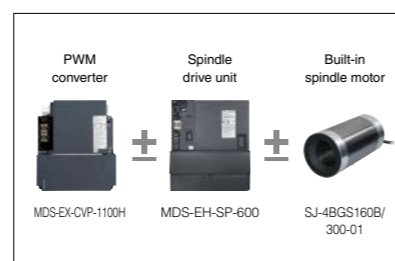
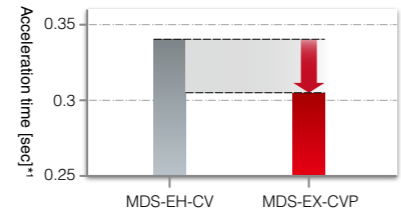
Comparison of rated output

Approx. 28% UP



Comparison of acceleration time (0⇄30,000 r/min)

Approx. 9% DOWN



\*1. Varies with inertia

# HARDWARE

[mm]

Control unit		Machine operation panel	
M800VW/M80VW Series (Separated type)	M800VS/M80VS Series (Integrated type)	FCU8-KB921 FCU8-KB923 Standard specification A	Key switch: 55 points, LED: 55 points Mitsubishi Electric standard key layout
Separated from display	Integrated on back of display	FCU8-KB925 FCU8-KB926 Standard specification B	Key switch: 55 points, LED: 55 points Custom specification key layout
M800VW : 90×180×380 (W×D×H) M80VW : 60×180×380 (W×D×H)		FCU8-KB922 FCU8-KB924	Key switch: 55 points, LED: 55 points Custom specification key layout
		FCU8-KB931 Standard specification A	Rotary switch (Spindle override, cutting override)
		FCU8-KB941 Standard specification B	Selective switch (memory protection) Emergency stop button

Display	Keyboard	M800VW Series	M800VS Series	M80VW Series	M80V Series
19-type touchscreen	—	365 440 Windows based	—	365 440 Windows based	—
19-type, horizontal touchscreen	—	440 365 Windows based	—	440 365 Windows based	—
19-type touchscreen	FCU8-KB091 Clear key Full keyboard	—	475 400 120	—	475 400 120
15-type touchscreen	FCU8-KB083 Clear key Full keyboard	400 320 140 Windows based display can be selected	400 320 140	400 320 140 Windows based display can be selected	400 320 140
10.4-type touchscreen	FCU8-KB047 Clear key Full keyboard	—	290 220 160	—	290 220 160
10.4-type touchscreen	FCU8-KB041 Clear key ONG (XZF) layout for L system FCU8-KB046 Clear key ONG (XYZ) layout	—	290 140 220	—	290 140 220
10.4-type touchscreen	FCU8-KB048 Clear key ABC layout	—	290 230 220	—	290 230 220
8.4-type	FCU8-KB026 Clear key ONG (XYZ) layout FCU8-KB028 Clear key ONG (XZF) layout for L system	—	—	—	260 140 200
8.4-type	FCU8-KB029 Clear key ONG layout	—	—	—	260 200 140



# 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.

## •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]

### 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]

### 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]

### 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]

## •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]



### 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
			NC Virtual Simulator*
			Operation monitoring and remote diagnostics
			NC Machine Tool Optimizer*
			iQ Care Remote 4U*

\* Refer to P.16 or individual catalogs for details.

## Machine design

Use the following instructions to set machining parameters

Servo motor selection

Calculation results of spindle acceleration/deceleration times

Spindle acceleration/deceleration times are shown in a graph.

**[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

Combine the parts to customize the screen without programming.

Customize buttons with original pictures.

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

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

**[NC Designer2]**

NC Designer2 provides a development environment where machine tool builders can customize screens easily. Two types of screen development methods are available: the interpreter method (programming without C++) for simple screen development and the compilation method with a complex controller (programming with C++).

**[NC Compiler2]**

NC Compiler2 is required when the compilation method is used.

**[NC Trainer2 Plus]**

NC Trainer2 plus supports customization development. It helps to program and debug the ladder programming of the user PLC that is developed by machine tool builders and to check the operations of customized screens.

## Machine assembly and adjustment

Check and set up the parameters list using a computer.

NC Configurator2

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.

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

## Machine assembly and adjustment

**[NC Analyzer2]**

Servo parameters can be adjusted automatically by measuring and analyzing machine characteristics. Measurement and analysis can be performed 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]**

This is an application for operating the CNC screen and machining programs on a computer without a CNC control unit or 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 in actual CNCs.

**[NC Explorer]**

CNC machining data can be managed using Windows Explorer when the computer is connected to multiple CNCs via Ethernet.

**[NC Monitor2]**

Taking advantage of the 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

**Example of application**

- Data collection/monitoring
- Display/operation panel function
- Production control

**Example of communication with CNC**

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

**[Mitsubishi Electric CNC Communication Software (FCSB1224W000)]**

This software provides a host of API functions. It facilitates the development of Windows applications that require connection and communication with Mitsubishi Electric CNC\*. Its interface is common to all Mitsubishi Electric CNC models, for high development efficiency.

\* Compatible with 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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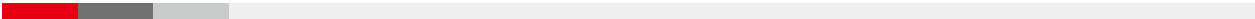
# Creating Solutions Together.



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!




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**Official Mitsubishi Electric CNC Facebook/LinkedIn account**  
Visit our page for information about exhibitions, products, technologies, and FAQ.

 **Safety Warning**

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

M800V/M80V Series  
BNP-A1243-F / ENG

**MITSUBISHI ELECTRIC CORPORATION**  
HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN