

FACTORY AUTOMATION

# NUMERICAL CONTROL (CNC) M800V/M80V Series



**M800V/M80V Series**  
COMPUTERIZED NUMERICAL CONTROLLERS

# GLOBAL IMPACT OF MITSUBISHI ELECTRIC



Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

## Changes for the Better

"Changes for the Better" represents the Mitsubishi Electric Group's attitude to "always strive to achieve something better", as we continue to change and grow. Each one of us shares a strong will and passion to continuously aim for change, reinforcing our commitment to creating "an even better tomorrow".

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.

Our advances in AI and IoT are adding new value to society in diverse areas from automation to information systems. The creation of game-changing solutions is helping to transform the world, which is why we are honored to be recognized in the 2019 "Forbes Digital 100" as one of world's most influential digital corporations.



# INITIATIVES THAT CONTRIBUTE TO ADDRESSING SOCIAL ISSUES

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

## Environmental initiatives

The Mitsubishi Electric Group has set forth its 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 company's new Environmental Sustainability Vision 2050 positions environmental protection as a great corporate priority and stipulates increased initiatives toward this end. The vision establishes Mitsubishi Electric's future course for implementing key initiatives based on its Environmental Declaration and Three Environmental Action Guidelines toward 2050.



## The Mitsubishi Electric Group's Materiality



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



MITSUBISHI ELECTRIC CNC  
M800V/M80V Series  
Concept video



## M800V/M80V Series

COMPUTERIZED NUMERICAL CONTROLLERS

# The Evolution in Smart Manufacturing

Seven years on, M800/M80 Series ushers in a new dimension.

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

Industry-first\*1 built-in wireless LAN, which allows an operator to manage machining at a distance, high-definition 3D machining simulation, which minimizes trial cutting, and advanced user-friendly and intuitive operation will streamline overall manufacturing processes and unlock 'time' that has been unnoticed so far.

Our new CNC, keeping abreast of manufacturers' needs and the advancement of the times, will optimize manufacturing in a smarter way from the perspective of 'things' and 'time'.

The all new M800V/M80V Series.



## OVERVIEW

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

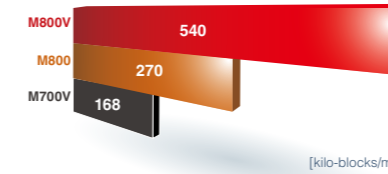
# FEATURES OF M800V/M80V SERIES

M800V/M80V Series smartly makes all the 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> <small>Coming soon</small> Image input expansion Camera connection <p>► See P.13</p>	<b>Multi-touch gestures</b> <p>► See P.6</p>	<b>Spline interpolation 2 improvement</b> Function OFF Function ON No mark <p>► See P.15</p>	<b>Two-dimensional barcode (QR code) engraving cycle</b> <p>► See P.16</p>
<b>MELSEC development tool (GX Works2)</b> <small>Coming soon</small> PLC on-board: Circuit monitor screen GX Works2 Project file Read Write <p>► See P.13</p>	<b>Parameter adjustment screen for high-accuracy control</b> <p>► See P.14</p>	<b>OMR-CC (Optimum machine response-contour control)</b> Improved cutting in arcs and free-form surfaces <p>► See P.15</p>	<b>Built-in wireless LAN and screen mirroring</b> <small>Coming soon</small> Tablet (sub-monitor) <p>► See P.7</p>
<b>Laser processing control</b> <small>Coming soon</small> <p>► See P.8</p>	<b>Interactive programming (JOB LATHE)</b> <small>Coming soon</small> <p>► See P.14</p>	<b>Chatter suppression</b> <small>Coming soon</small> Chatter suppression OFF Chatter suppression ON <p>► See P.8</p>	<b>Built-in remote service gateway unit functionality</b> <small>Coming soon</small> M800V/M80V Series <p>► See P.7</p>
<b>Motion transformation (coordinate transformation)</b> <small>Coming soon</small> Coordinate transformation process can be embedded for machines with special mechanism <p>► See P.8</p>	<b>3D machining simulation</b> <p>► See P.17</p>	<b>Cutting load control</b> Reduction in rough cutting time with an evaluation workpiece Cutting load control OFF Cutting load control ON 38m27s 14.4% 32m55s <small>*R10mm F4000 Circular interpolation</small> Evaluation workpiece (image) <p>► See P.15</p>	<b>Security feature for Windows display</b> security software Authorized applications <p>► See P.16</p>

# BASIC PERFORMANCE IMPROVEMENTS

Increased fine segment processing capability further reduces cycle time



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

Increased number of control axes

■Machining center system (M system)

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

■Lathe system (L system)

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

The number of some control axes is greater than M800/M80 Series, allowing control of more complex mechanisms.

Multi-touch function provides superior usability

1 Swipe to display the menu list

2 Open the menu with a single touch!

Multi-touch gesture with four fingers

M800/M80 Series' usability has further evolved! Multi-touch gestures enables smarter operations such as

- Pinch-in/pinch-out in program display area to change text size
- 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 focused on 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.

The screen design and colors are optimized for readability considering information content. Better visibility aids in increasing work efficiency.

Watch the introduction video here. ►



# EVOLUTION OF CONTROL UNIT AND DISPLAY UNIT

Built-in wireless LAN and screen mirroring to a tablet drive work efficiency **Coming soon**

The gateway unit functionality for remote service is built into the NC **Coming soon**



Our industry-first\*1 NC control unit with built-in wireless LAN frees operation from the constraints of time and space. A tablet can be used as a sub monitor, allowing operators to work at a distance from the operation panel.

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

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

Watch the introduction video here. ▶

Watch the introduction video here. ▶

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



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

Watch the introduction video here. ▶

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



### ■ Evolved Windows display

Advanced design inherited from M800/M80 Series with doubled storage capacity. A new PC unit supporting Windows10.

### ■ New control unit with enhanced field network support

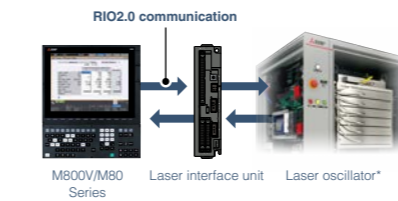
The added LAN connector on the control unit offers connectivity with a wider variety of networks. The expandability through the expansion slots is maintained while ensuring the installation compatibility with M800VW/M80V Series.

# EXPANSION AND EVOLUTION OF CONTROL FUNCTIONS

Sheet metal laser cutting machines can also be controlled **Coming soon**

## Laser processing control

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



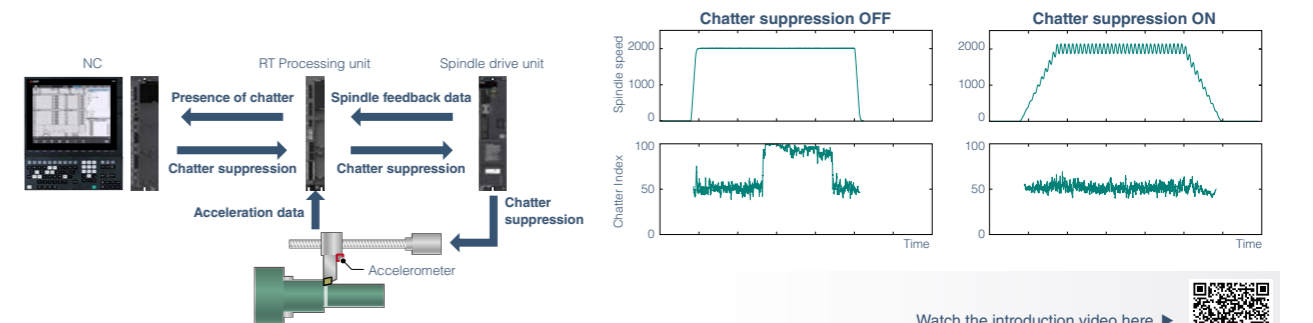
No.	Laser processing functionality	Description
1	Laser oscillator power control	The NC outputs to the laser oscillator the processing conditions (laser power value, etc.) it created for each interpolation cycle when the M code for laser ON is enabled
2	Laser oscillator digital I/O control	The NC device controls the digital I/O of the laser oscillator
3	Selection of laser processing conditions	The laser processing conditions are set on a dedicated screen (each condition can be selected using an M code.) (selection of conditions fit for 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 an acute corner is reduced, minimizing dross and increasing the 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 measured laser power from the laser head (Actual laser power is made consistent with the programmed value, contributing to oscillator protection)

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

## Chatter suppression increases lathe machining accuracy **Coming soon**

### Chatter suppression

Chatter is automatically detected during machining by connecting an accelerometer to the RT processing unit. Chatter is suppressed by adjusting the spindle speed, achieving high-accuracy high-quality machining.

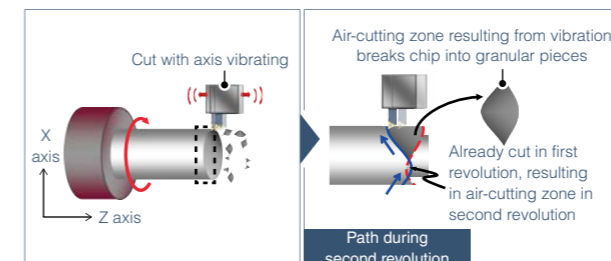


Watch the introduction video here. ▶

## Vibration cutting shortens the time required to remove chip, improving machine utilization

### Vibration cutting

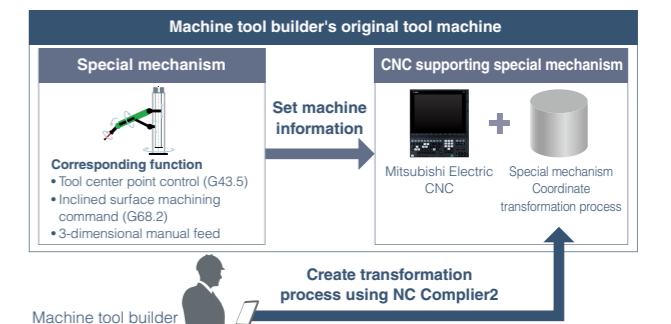
Vibration cutting, in which machining is performed with the feed axis vibrating to break up chip, reduces the time it takes to remove chip and increases machine utilization.



## Motion control release enables control of special mechanisms **Coming soon**

### Motion control release (coordinate transformation)

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



Watch the introduction video here. ▶

# CNC LINEUP

High Performance



## M800VW



### Premium CNC provides expandability and flexibility

- Separated type, a control unit separated from display
- Windows-based display is included in the lineup, which provides excellent expandability
- Four expansion slots are provided as standard specifications, allowing for expansion using option card slot

## M800VS



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

- Panel-in type, a control unit with integrated display
- Multi-CPU architecture allows for high performance and high functional graphics
- Windows-less display provides easy operability

## M80VW



### Standard CNC with expandability and flexibility

- Separated type, a control unit separated from display
- Windows-based display is included in the lineup, which provides excellent expandability
- Packaged type for selecting a machine type easily
- Two expansion slots are provided as standard specifications, allowing for expansion using option cards slot

## M80V



### Standard CNC provides high productivity and easy operability

- Panel-in type, a control unit with integrated display
- Provided in package (TypeA/TypeB) for easier selection
- Windows-less display provides easy operability

### Display unit size



### Main Specifications

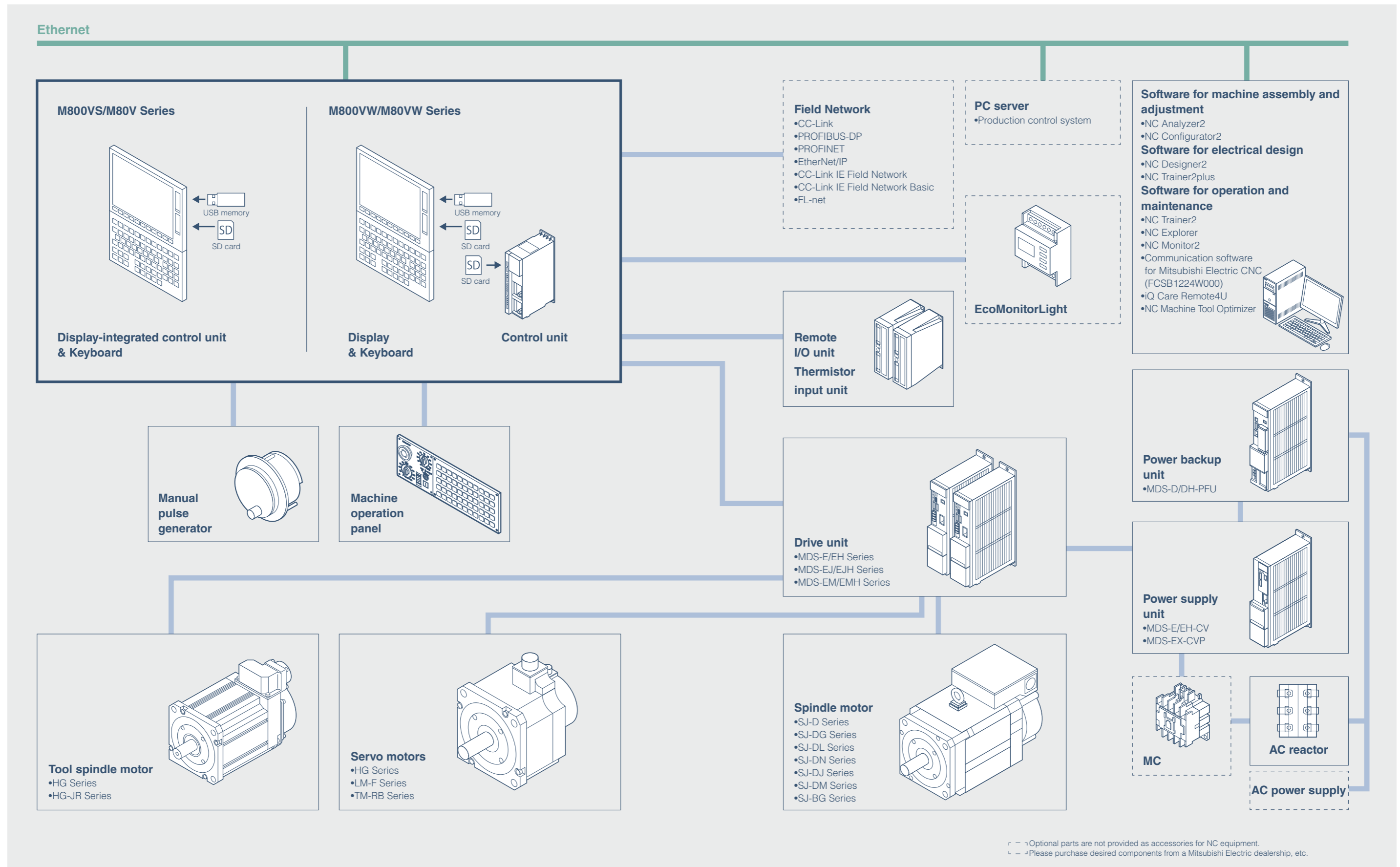
	Lathe system	Machining center system
Max. number of axes (NC axes + Spindles + PLC axes)	Standard:16	Optional:32
Max. number of spindles	8	6
Max. number of part systems (main+sub)	Standard:4 Optional:8	2
Fine segment processing capability [kilo-blocks/min]	168	540

	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

	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



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

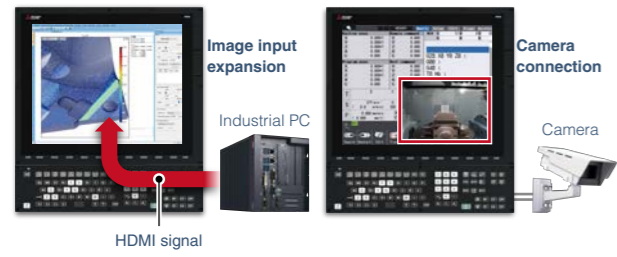
# INTRODUCTION TO FUNCTIONS



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

**Image input interface**  
 Coming soon M800VW M800VS M80VW M80V

The NC screen that can display the applications on the industrial PC or images from the camera inside the machine provides added value to machine tools. The applications on the industrial PC can be operated from the NC screen.



Watch 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 about robot language. The teaching and operation of a robot can be done using the NC screen on the tablet when screen mirroring to tablet (See P.7) is used together.

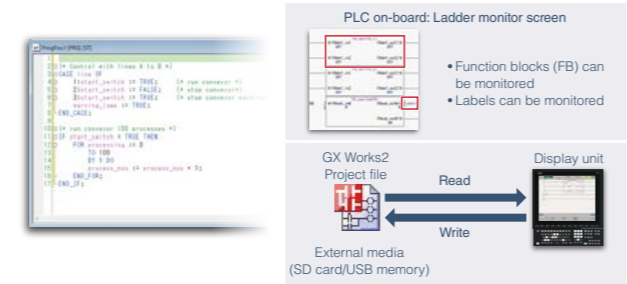


Handle operation is also available

ST language is supported in addition to the 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)**  
 Coming soon M800VW M800VS M80VW M80V

Unlike the 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. The monitoring of function blocks using PLC on-board makes development smarter and more efficient.

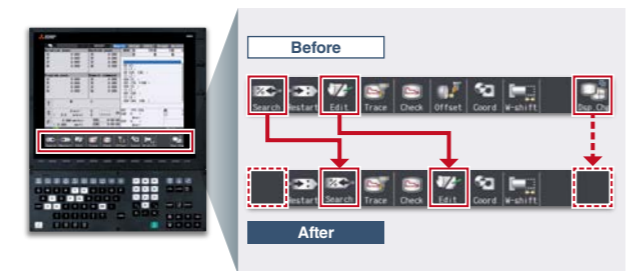


Watch the introduction video here. ▶

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

**Menu key customization**  
 M800VW M800VS M80VW M80V

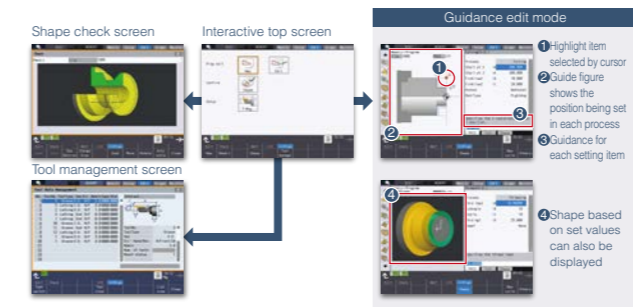
It also allows the optional functions of the machine tool to be hidden from the menu key. Gathering frequently used menu keys streamlines setup work.



“Interactive programming” allows the user to set values by simply following guidance, streamlining the creation of machining programs.

**Interactive programming (JOB LATHE)**  
 Coming soon M800VW M800VS M80VW M80V

A machining program can be developed easily by selecting items displayed on the screen. The programmed shape can be checked each time data is entered, and the created machining program can be directly run without converting into a G code program.



Watch the introduction video here. ▶

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 an operator to be a highly skilled expert to make adjustments for optimal machining.



Machining program management linked with images makes it possible to find a machining program smartly.

**Machining program management**  
 Coming soon M800VW M800VS M80VW M80V

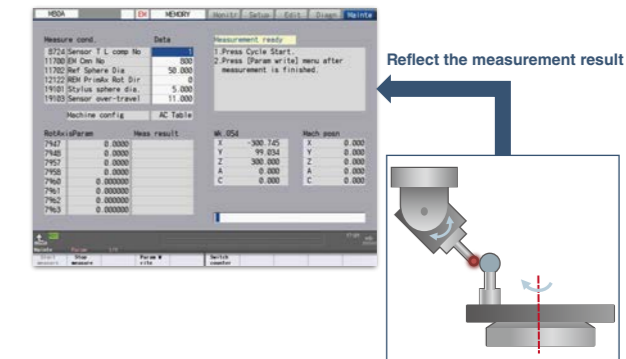
The photo of the workpiece registered in association with a machining program visually helps to find a program. It is also possible to download the images on the tablet to the NC using the application on the tablet and use them as preview.



“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 the rotation center error to be measured using the reference sphere and touch probe and the compensation value 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 M800V/M80V Series.





Mechanical and electrical design | Setup | **Machining** | Production maintenance

**OMR-CC (Optimum machine response-contour control) smartly reduces cycle time while maintaining the current machining accuracy.**

**OMR-CC (Optimum machine response-contour control)**

M800VW M800VS M80VW M80V

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

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

OMR-FF (Conventional control)	OMR-CC (New control technology)
34m22s	Cycle time 11%▼
9.7um	Path error*1 15%▼
2447mm/min	Arc passing speed*1 41%▲
	3465mm/min

\*1. R10mm F4000 arc command

Watch the introduction video here. ▶



**Spline interpolation 2 function achieves high-quality fine surface by making adjacent machining paths globally smooth.**

**Spline interpolation 2**

M800VW M800VS M80VW M80V

The function solves the problem of uneven (marked) surface 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

Watch the introduction video here. ▶



**Cutting load control function automatically controls cutting load, leading to a longer tool life and shorter cycle time.**

**Cutting load control**

M800VW M800VS M80VW M80V

The 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 the eight parameter groups.

**Extending tool life**

**Reducing time**

**Reduction in rough cutting time with an evaluation workpiece**

Cutting load control OFF	Cutting load control ON
38m27s	14.4%▼
	32m55s

\* R10mm F4000 Circular interpolation

Evaluation workpiece (image)

Legend: FB speed, Cutting load

Watch 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 for tool wear**

The cutting point shifts

**Compensation**

Automatically compensated without setting

Watch the introduction video here. ▶



Mechanical and electrical design | Setup | Machining | **Production maintenance**

**The QR Code engraved directly on the 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. The QR Code engraved on the workpiece helps automation of high-mix low-volume production and traceability of workpieces.

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

G136[<Machining date> <Workpiece No.> <Any string>]

Machining result (simulation)

The NC engraves an internally generated QR Code.

Watch the introduction video here. ▶



**Security feature for Windows display smartly protects the NC from virus and other threats using whitelist technique.**

**Security feature for Windows display**

M800VW M800VS M80VW M80V

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

Display unit (Windows display)

List of authorized applications

- StandardScreen.exe
- notepad.exe

Unauthorized application

- XXXX.exe

Not whitelisted - Not executable

Watch 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

Display list of data of selected time.

Email notification condition list screen

Displays the list of the 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

Watch 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 being able to be connected with a variety of controllers (made, model) on the shop floor, it can monitor and analyze the operation of multiple factories together, helping to increase productivity.

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

- Displays the overview of machine operation statuses for a plant
- Visualize operational status
- Aggregations by plant, by group, or by 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

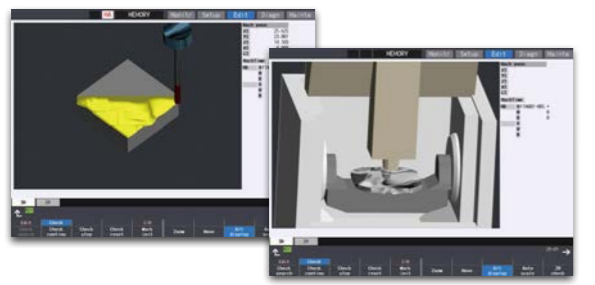
# Contribute to sustainability through the reduction of scrap and visualization of power consumption



## 3D machining simulation

M800VW M800VS M80VW M80V

Machine interference and machining quality can be checked before machining, which reduces workpieces discarded because of trial cutting and defective machining.



Watch the introduction video here. ▶



## Power consumption calculation

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.



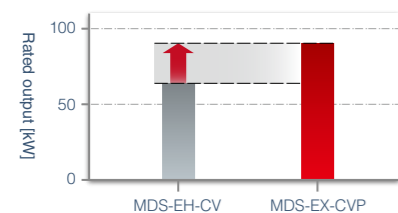
## PWM converter MDS-EX-CVP Series

M800VW M800VS M80VW M80V

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

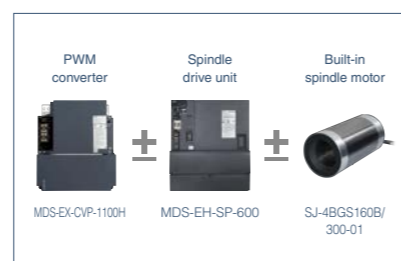
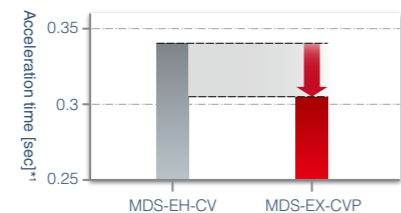
Comparison of rated output

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 Standard specification A	Rotary switch (Spindle override, cutting override)
		FCU8-KB931 Standard specification A	Selective switch (memory protection)
		FCU8-KB941 Standard specification B	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 <b>Coming soon</b>	—	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(XYZ) 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 advanced high-speed optical communication, this drive contributes to high-speed, high-accuracy control.
- The motor power connector is equipped with an anti-misinsertion mechanism. This helps to eliminate connection errors.
- Improved diagnostic and preventive-maintenance features
- Safe Torque Off (STO) and Safe Brake Control (SBC) are also incorporated as additional safety features.

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

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

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

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

### PWM Converter MDS-EX-CVP Series

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

## •Servo motors



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

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

### Linear Servo Motors LM-F Series

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

### Direct-drive Servo Motors TM-RB Series

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

## •Spindle motors



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

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

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

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

### High-performance Spindle Motors SJ-D Series

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

### High-torque Spindle Motors SJ-DN Series

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

### Compact, Lightweight Spindle Motors SJ-DJ Series

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

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

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



### Built-in Spindle Motors SJ-BG Series

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

### Tool Spindle Motors HG-JR Series

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

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

# SOFTWARE TOOLS

## Process flow from machine design and development to operation and maintenance



### NC-related processes

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

\* For more information, see P.16.

### Machine design

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

### Electrical circuitry design

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

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

**[NC Designer2]**  
We provide a developmental environment where the MTB 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 applied.

### Machine assembly and adjustment

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

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

### Machine assembly and adjustment

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

### Operation and maintenance

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

**[NC Explorer]**  
CNC machining data can be managed using Windows Explorer on a computer when the computer is connected to multiple CNCs via Ethernet.

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

### Application development support

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

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

**Example of application**

Data collection/monitoring	Operation monitoring
Display/operation panel function	Program creation/edit
Production control	CAD/CAM

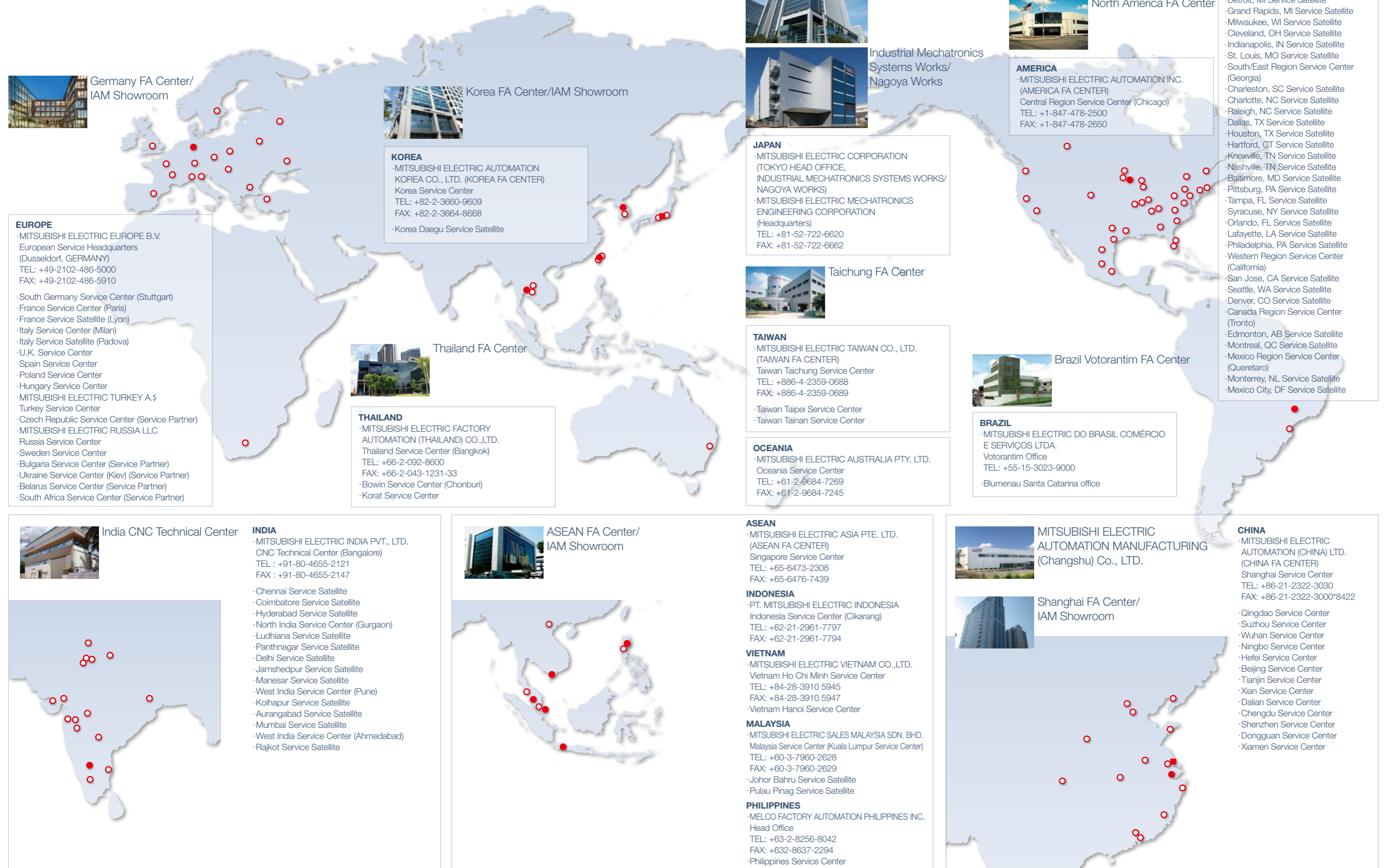
**Example of communication with CNC**

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

# GLOBAL SALES & SERVICE NETWORK

■: Production site ●: FA Center ○: Service Center/Service Satellite

Providing reliable services in regions around the world  
- our Best Partner commitment to you





# WARRANTY

Please confirm the following product warranty details before using MITSUBISHI CNC.

## 1. Warranty Period and Coverage

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

### [Warranty Term]

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

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

### [Limitations]

- (1)The machine tool builder is requested to conduct an initial failure diagnosis, as a general rule. It can also be carried out by us or our service provider upon the machine tool builder's request and the actual cost will be charged.
- (2)This warranty applies only when the conditions, method, environment, etc., of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual, user's manual, and the caution label affixed to the product, etc.
- (3)Even during the term of warranty, repair costs shall be charged to the customer in the following cases:
  - (a)a failure caused by improper storage or handling, carelessness or negligence, etc., or a failure caused by the

customer's hardware or software problem

- (b)a failure caused by any alteration, etc., to the product made by the customer without Mitsubishi Electric's approval
- (c)a failure which may be regarded as avoidable, if the customer's equipment in which this product is incorporated is equipped with a safety device required by applicable laws or has any function or structure considered to be indispensable in the light of common sense in the industry
- (d)a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
- (e)any replacement of consumable parts (including a battery, relay and fuse)
- (f)a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning, and natural disasters
- (g)a failure which is unforeseeable under technologies available at the time of shipment of this product from our company
- (h)any other failures which we are not responsible for or which the customer acknowledges we are not responsible for

## 2. Service in Overseas Countries

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

This falls under the case where the product purchased from us in or outside Japan is exported and installed in any country other than where it was purchased. For details please contact the distributor from which the customer purchased the product.

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

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

- (1)Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2)Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3)Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4)Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

## 4. Changes in Product Specifications

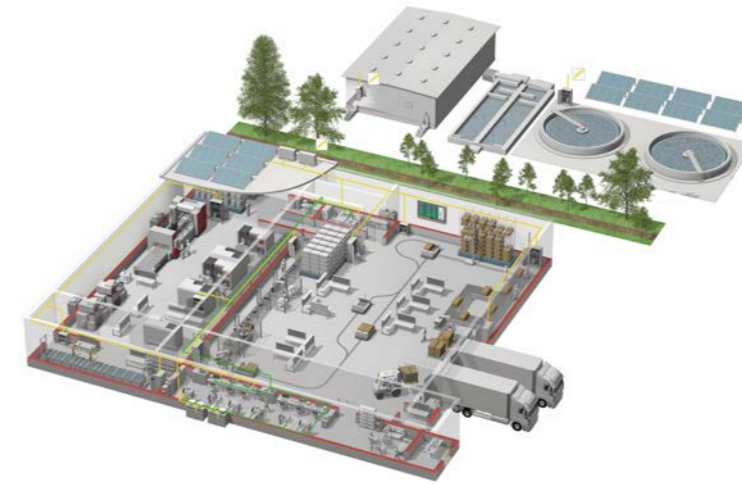
Specifications shown in our catalogs, manuals or technical documents are subject to change without notice.

## 5. Product Application

- (1)For the use of this product, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in the product, and a backup or fail-safe function should operate on an external system to the product when any failure or malfunction occurs.
- (2)Mitsubishi CNC is designed and manufactured solely for applications to machine tools to be used for industrial purposes. Do not use this product in any applications other than those specified above, especially those which are substantially influential on the public interest or which are expected to have significant influence on human lives or properties.

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# YOUR SOLUTION PARTNER



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

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Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

The Mitsubishi brand name is recognized around the world as a symbol of premium quality.

Mitsubishi Electric Corporation, established in 1921, 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, and has 183 factories, laboratories and offices worldwide in over 140 countries.

This is why you can rely on Mitsubishi Electric automation solution - 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 146,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.



Low-voltage Power Distribution Products



Transformers, Med-voltage Distribution Products



Power Monitoring and Energy Saving Products



Power (UPS) and Environmental Products



Compact and Modular Controllers



Servos, Motors and Inverters



Visualization: HMIs



Edge Computing Products



Numerical Control (NC)



Collaborative and Industrial Robots



Processing machines: EDM, Lasers

\* Not all products are available in all countries.



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User support videos will be available, including how to backup/restore data and replace batteries as well as introduction to our products and technologies.



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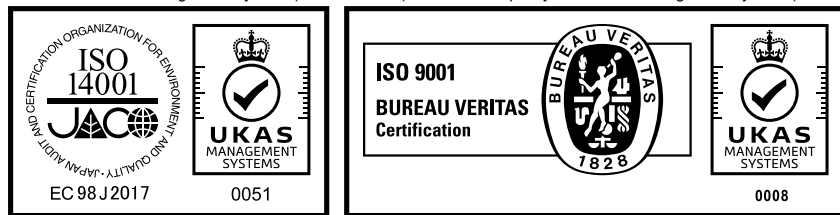
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Visit our page for information about exhibitions, products, technologies, and FAQ.



## Safety Warning

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

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



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