

FACTORY AUTOMATION

NUMERICAL CONTROL (CNC) C80 Series



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.



OVERVIEW

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Revolutionary, next-generation CNC opens a new era of production lines through compatibility with MELSEC iQ-R Series

C80 Series

Advanced technologies delivered by the breakthrough performance of our CNC-dedicated CPU. Reliable MELSEC quality accumulated in various industrial scenes. In addition, the CNC C80 Series can be expanded and updated over time.

Five features (productivity, expandability, usability, maintenance and safety) empower manufacturing lines with infinite possibilities and innovative values in terms of advancement, reliability and growth.

Infinite Possibilities



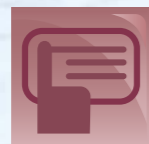
Productivity

C80 improves productivity through its advanced performance and functionality.



Expandability

C80 allows flexible system configuration to catch up with the MELSEC evolution.



Usability

C80 provides unprecedented user-friendliness.



Maintenance

Low maintenance reduces downtime and maintenance costs.



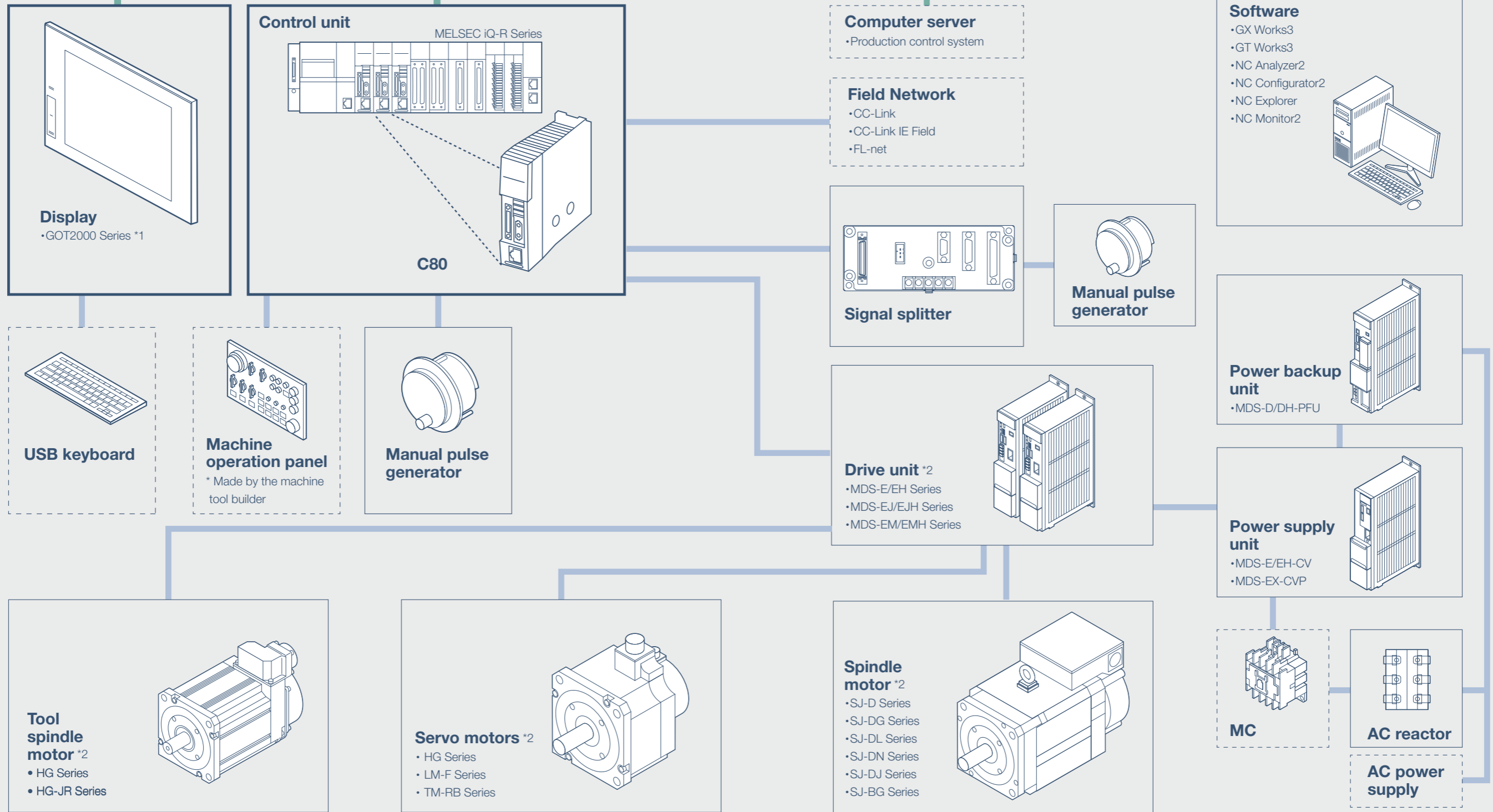
Safety

Easily implement a plethora of safety measures compliant with global standards.



CNC SYSTEM CONFIGURATIONS

Ethernet



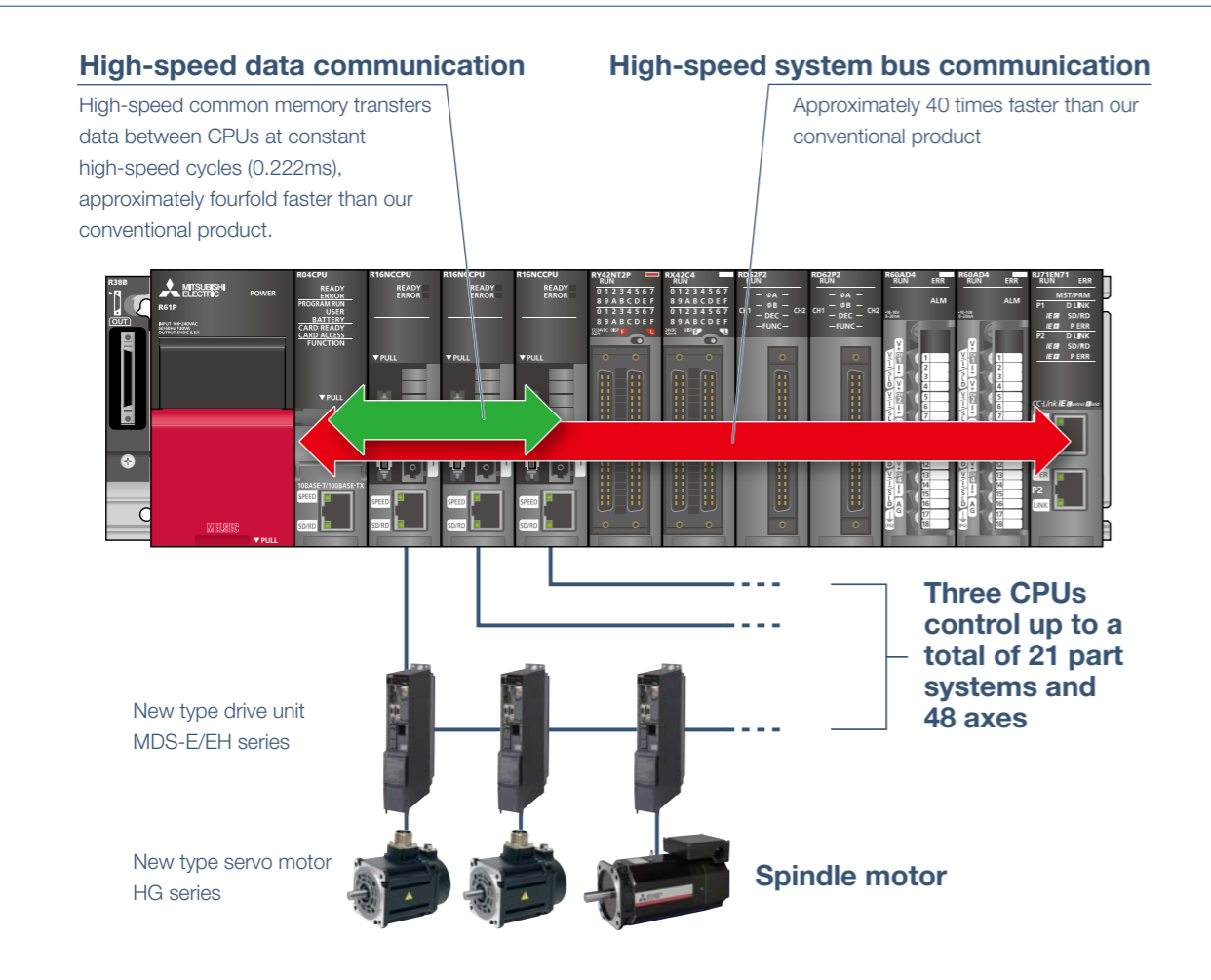
*1 For target models, refer to "List of Components".

*2 Use Mitsubishi CNC's dedicated drive unit and motor.

□ User-prepared: Please purchase desired components from a Mitsubishi Electric dealership, etc.

PRODUCTIVITY

Mitsubishi Electric's original CNC-dedicated CPU provides a major leap in basic performance. A newly developed high-speed system bus approximately 40 times faster than our conventional product provides high-speed, large-capacity data communication. CNC control functions and drive units have been improved, enabling high-speed, highly accurate machining. The C80 Series contributes to reducing cycle time and increasing productivity.



PLC processing capability (PCMIx value)



High processing capability of the PLC enables large-scale ladder logic to be processed at high speed in response to the demands in the era of IoT.

CNC-to-drive communication capability



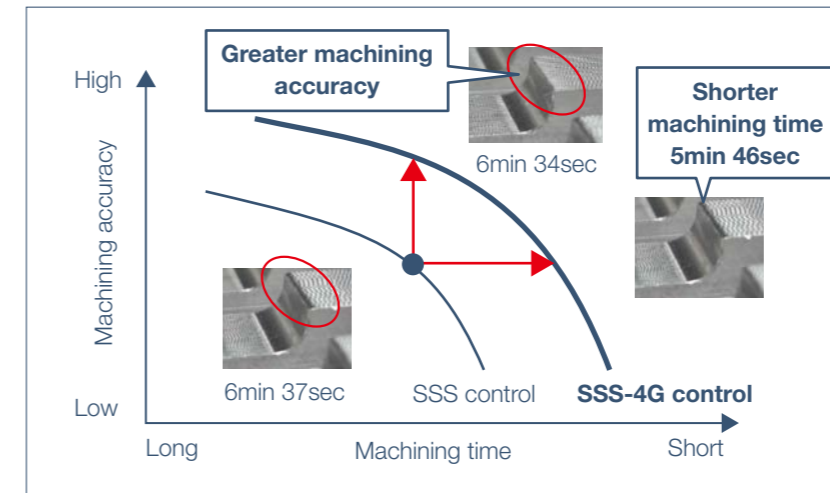
Optical communication speed between CNC and drive has been increased. This improves system responsiveness, leading to more accurate machining.

MSTB processing capability



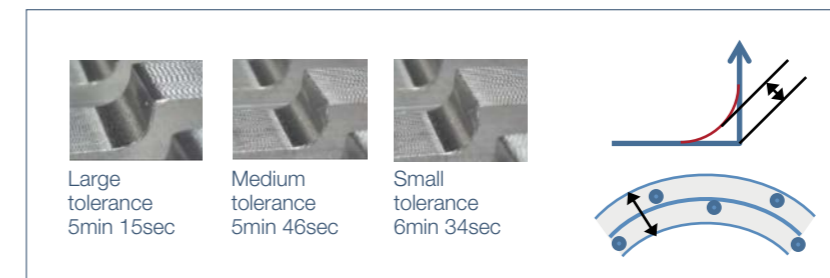
Miscellaneous command processing between CNC and PLC became 1.5 times faster than our conventional product. Shorter processing time leads to reduction in cycle time.

CNC functions ensure high speed and high accuracy



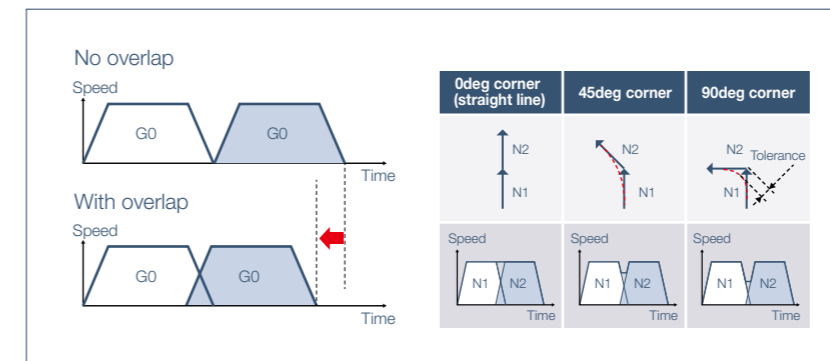
SSS-4G Control

The M80 Series is equipped with Super Smooth Surface 4th-Generation (SSS-4G) control. This feature effectively reduces tact time, including acceleration and deceleration appropriate for the characteristics of each axis. SSS-4G control simultaneously enhances cutting accuracy, reducing cutting time while maintaining the same degree of accuracy compared to our previous models.



Tolerance Control

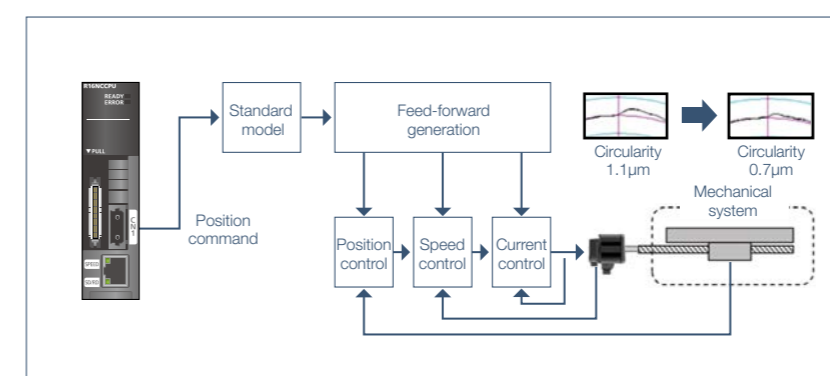
This function enables operators to make high-quality surfaces simply by specifying the desired surface dimensional accuracy and providing a smooth cutting motion within specified error tolerances.



Rapid Traverse Block Overlap

This function enables cutting of the next block to start before positioning deceleration (G00) or reference position return (G28/G30) has been completed, resulting in shorter intervals between cutting processes.

Drive function increases speed



OMR-FF Control

This function optimizes the position loop gain for each axis, leading to smoother and more accurate cutting, and drawing out the full potential of the machine tools.

EXPANDABILITY e-F@ctory

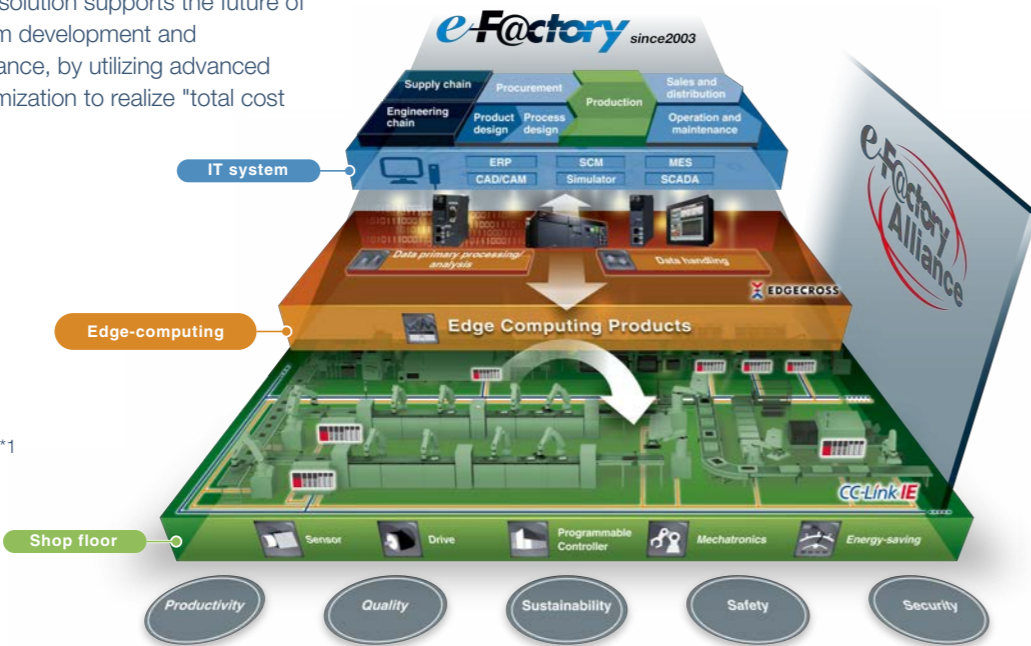
The e-F@ctory integrated solution supports the future of machining in all areas, from development and manufacturing to maintenance, by utilizing advanced expertise and factory optimization to realize "total cost reduction."

iQ Platform

The CNC C80 Series supports the iQ Platform, the integrated FA platform that forms the core of e-F@ctory.

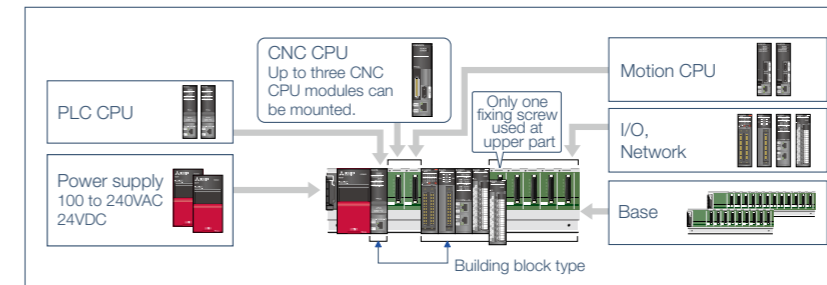
EDGE CROSS *1

Utilization of open software platform "Edgecross" which realizes FA-IT coordination in the edge computing level enhances Edge computing and e-F@ctory.



*1 Edgecross is a product of Edgecross Consortium

Flexible system configurations



Edge computing, the latest technology

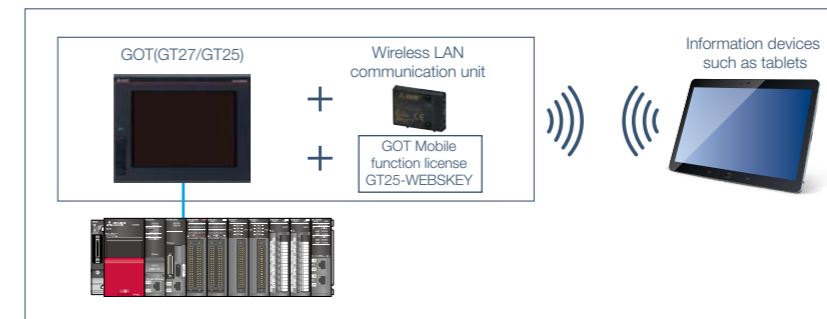


The PLC CPU is independent in the C80 Series, enabling selection according to production scale and application, and best-fit configuration of hardware.

MELIPC MI5000

One module realizes device control and information processing which were previously managed with a combination of computer and dedicated device for example. Equipped with real-time OS VxWorks®, the MELIPC realizes real-time control which cannot be achieved with general industrial computers, contributing to high-accuracy device control and information processing at high-speed.

Support for "visualization" of shop floor

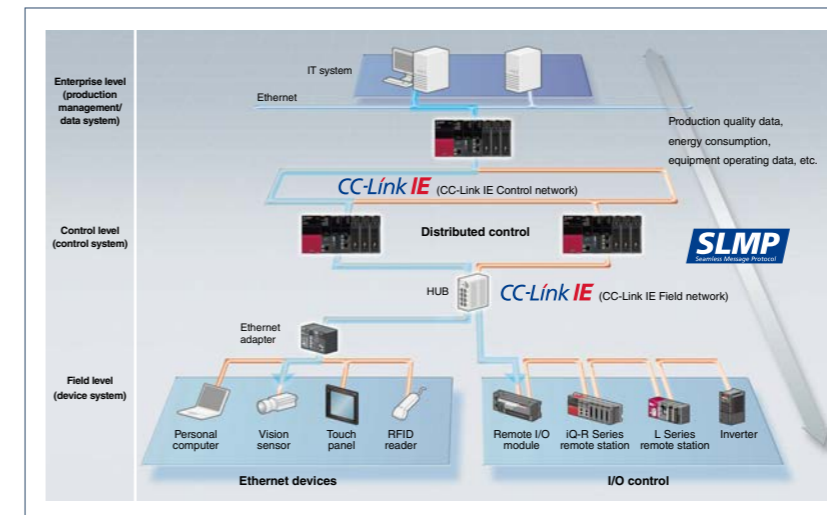


GOT Mobile

Via GOT at the worksite, connected devices can be monitored from computers and tablets in a remote location.

*A separate license (GT25-WEBSKEY) is required.

Seamless connectivity between shop floor and host information system



Field network CC-Link IE Field

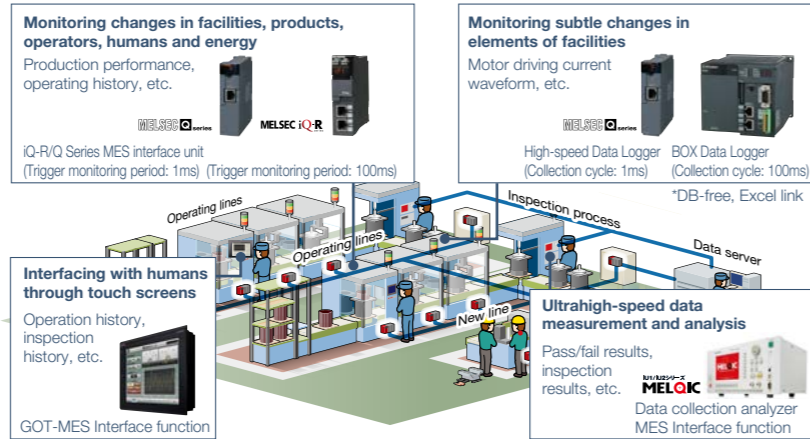
Single network covers high-speed controller distributed control, I/O control and safety control. The network allows a high degree of freedom in wiring for flexible equipment layouts.

Controller network CC-Link IE Control

The controller network builds a highly reliable high-speed, large-capacity system and dual optical loop.

This solution enables visualization and analysis that lead to improvements and increase availability at production sites.

The Manufacturing Execution System (MES) Interface is the link for data passing from production equipment to controlling devices. The High-speed Data Logger collects data from each measuring device directly without requiring dedicated logging equipment. The Box Data Logger can be connected to a network while existing equipment is running, and collect data thereafter. The C Language Controller provides control, information processing and higher-level communication using C/C++ programming. These products, which enable information sharing between FA and IT, implement factory-wide optimization, from higher-level information systems to facility management systems.



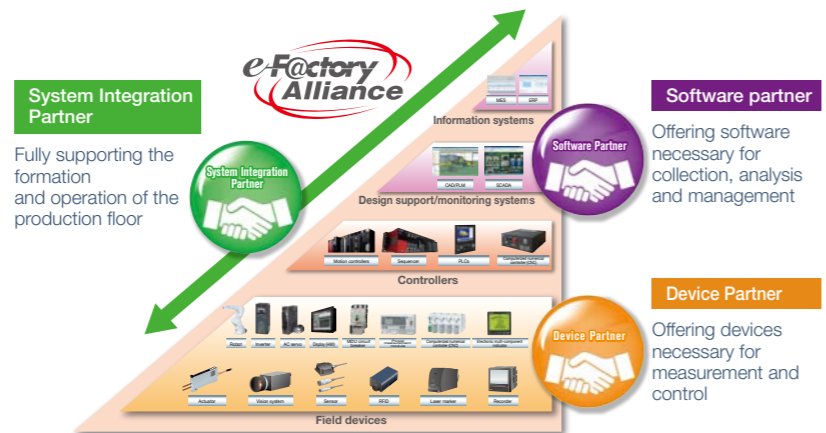
Data on shop floor have different characteristics according to their purposes

e-F@ctory Alliance

e-Factory Alliance offers our customers the optimal solution across entire supply and engineering chains through strong alliances with partners who provide software and devices highly compatible with Mitsubishi FA products, and system integration partners who build systems using those products.

Participating companies: 900 or more

(In total domestic and overseas, as of Sep. 2020)



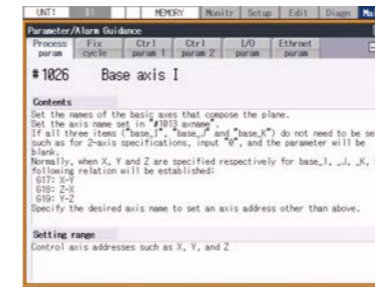
USABILITY

CNC monitor2 newly developed to simplify use through the introduction of touch-screen operation displays the equivalent screen to the M800/M80 Series standard screens available in 8.4, 10.4 and 12.1-type models.



More convenient guidance function

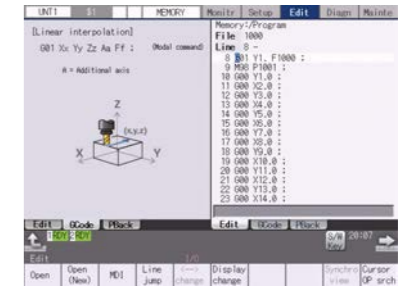
Pressing Help opens a guidance of the currently displayed screen (parameter, alarm or G-code format). This frees the operator from looking information up in a printed manual.



Parameter guidance



Alarm guidance



G code guidance

Simple screen with enhanced visibility from a long distance



Simple monitor screen

The simple monitor screen has been designed to make it easy to see and read only data required from a distance.

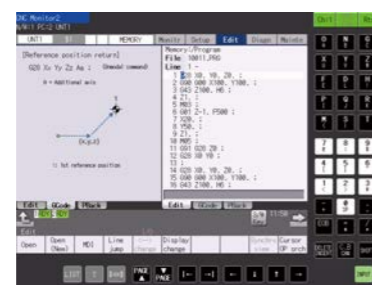
Switching between Normal screen and Simple screen is done from the screen menu.

*The simple display can be used only when the parameter #11019 (2-system display) is invalid.

CNC monitor2 screen designed with pursuit of ease-of-use



Monitor screen



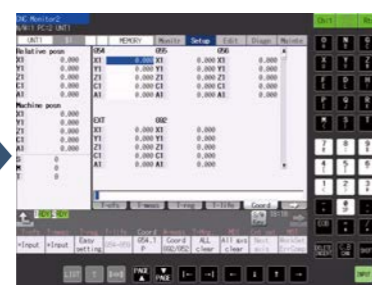
Program editor screen

Program edit screen enables direct-touch data entry, eliminating the use of cursor keys and realizing more intuitive operation.

Direct transition to CNC monitor2 screen



Example screen created by a machine tool builder. Press the [Setup] key.



Screen switches to NC monitor2 setup.

NC monitor2 allows a short-cut key to be designated for taking the operator directly to a specific CNC monitor2 screen from a machine builder-prepared screen. The key enables the operator to, for example, call up a parameter screen with a single touch instead of the conventional three-step operation. Additionally, machine builders can use CNC monitor2 screens as is, reducing the workload related to designing screens.

CNC monitor2 supports 17 languages



Display languages can be switched with a single parameter operation. This provides great ease of use for users worldwide.

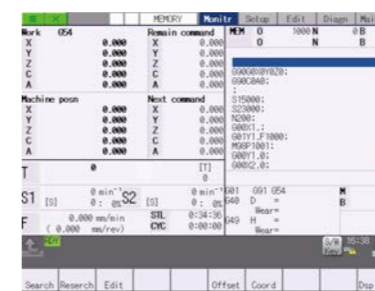
Languages supported

- Japanese
- Chinese (traditional)
- Swedish
- English
- Chinese (simplified)
- Turkish
- German
- Korean
- Polish
- Italian
- Portuguese
- Russian
- French
- Hungarian
- Czech
- Spanish
- Dutch

VGA added to product line



SVGA



VGA

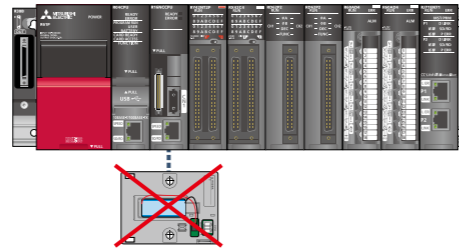
CNC monitor2 supports VGA in addition to the conventional SVGA resolution, which expands the availability of GOT2000 Series.

MAINTENANCE

The C80 Series has greatly improved maintenance features compared to our conventional product, including the ability to acquire three times the alarm and warning history data. The program number and PLC number of the machining program executed can also be acquired, leading to early problem solving and less downtime.

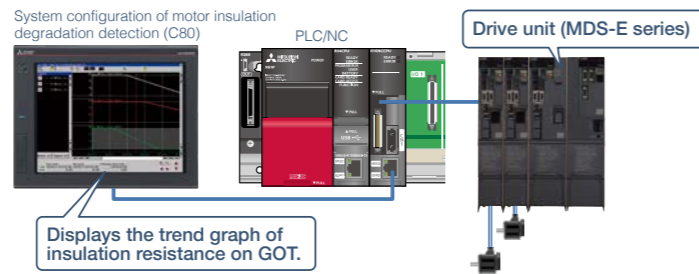
CNC CPU requires no batteries

The CNC CPU backs up NC data (e.g., parameters, machining programs and alarm history) without the use of batteries. Troubleshooting battery management and battery exchange are no longer required, leading to a reduction in maintenance costs.



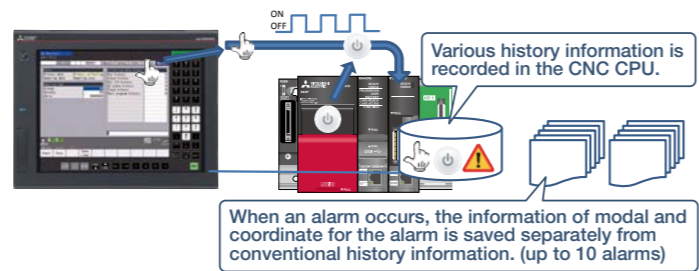
Motor insulation degradation detection function

Insulation resistance value measured by a drive unit can be displayed. The trend graph displayed on GOT can be used for preventive maintenance.



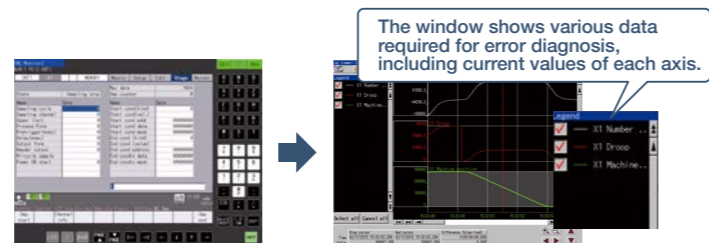
Operation history

This function traces various histories and NC operating information to analyze and solve troubles etc. This information is recorded in the history data file, it can be displayed on the screen and can also be output to a file.



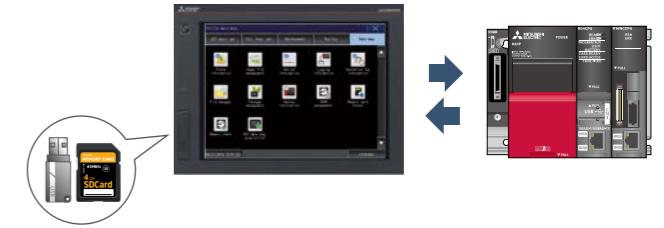
Log viewer function

GOT log viewer function displays the NC sampling data. This enables waveforms to be diagnosed on the spot for early troubleshooting. In addition, the trends of insulation resistance value can be checked on the viewer. (Displays last 13 months data on a monthly basis)



GOT backup/restoration

The C80 Series supports data storage (backup) and writing (restore) of not only C80 parameters and programs, but also PLC CPU data into SD memory card or the USB memory of the GOT. The system can be restored using GOT only, enabling parts to be exchanged for quick system restoration.



On-board ladder edit of GOT

Use the GOT "Sequence program monitor (R Ladder) function" to edit sequence ladder programs without requiring GX Works on a computer. Ladder program operation status can be confirmed as well.



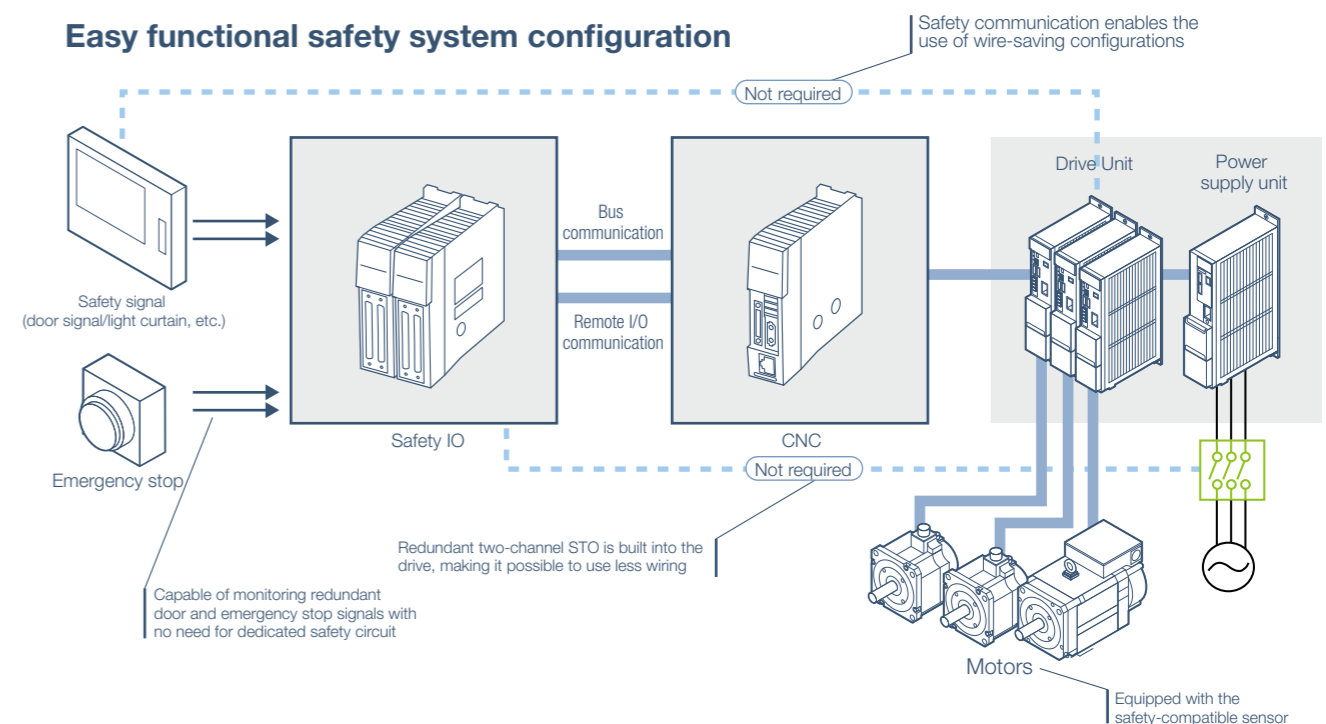
SAFETY

The C80 Series provides a range of safety features collectively called the "Smart Safety Observation Function". This function has achieved full conformity with the safety standards that cover the entire system including CNC, drive, I/O, sensors and communication.

Smart Safety Observation Function

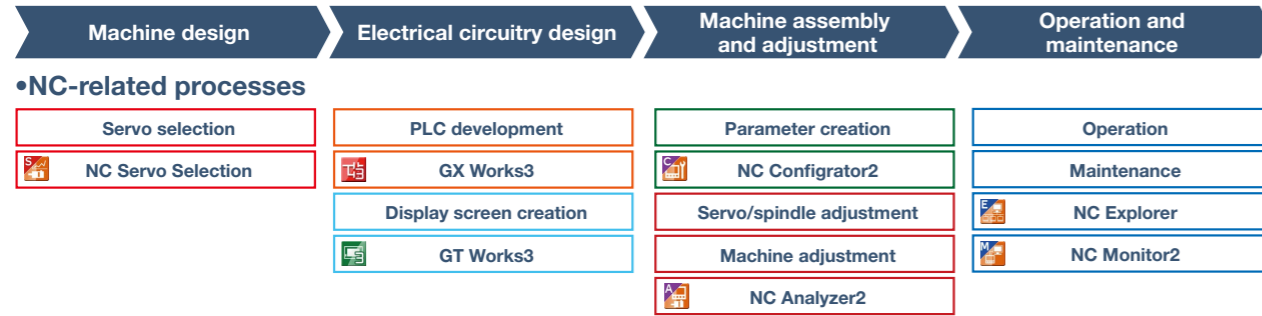
- | | | |
|--|-------------------------------|------------------------------------|
| Safety-related I/O observation | Emergency stop observation | Safety Communication Network (SCN) |
| Safely-Limited Speed (SLS) | Safely-Limited Position (SLP) | |
| Safe Operating Stop (SOS) | Safe Speed Monitor (SSM) | |
| Safe Brake Control/Safe Brake Test (SBC/SBT) | Safe Cam (SCA) | |
| Safe Stop (SS1/SS2) | Safe Torque Off (STO) | |

Easy functional safety system configuration



SOFTWARE TOOLS

Flow from machine design and development to operation and maintenance



•NC-related processes

Machine design	Electrical circuitry design	Machine assembly and adjustment	Operation and maintenance
<ul style="list-style-type: none"> Servo selection NC Servo Selection 	<ul style="list-style-type: none"> PLC development GX Works3 Display screen creation GT Works3 	<ul style="list-style-type: none"> Parameter creation NC Configurator2 Servo/spindle adjustment Machine adjustment NC Analyzer2 	<ul style="list-style-type: none"> Operation Maintenance NC Explorer NC Monitor2

•Machine design

Use the following instructions to set machining parameters

Calculation results of the spindle acceleration/deceleration times

[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.

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

Servo motor selection

•Electrical circuitry design

[GX Works3] GX Works3 is the programming and maintenance software designed for the MELSEC iQ-R Series control system. Graphic-based system configuration helps to reduce engineering time to 60% over our conventional product^{*1}

- Simple motion setting tool: Easily configure the simple motion module with this convenient integrated tool.
- Tab view multiple editors: Conveniently work on multiple editors without having to switch between software screens.
- Navigation window: Easily access project components. Organize program file list.
- Module label/FB: Automatically generate module function blocks simply by selecting one and placing it directly into the ladder editor.
- Module configuration: Easily parameterize each module directly from the configuration editor.
- Module list: Simply drag & drop modules directly into the module configuration.

[Global operation realized with multi-language support] To meet today's global production needs, the GX Works3 supports multi-language features at various levels, such as a multi-language software menu system and language-switching for device comment functions.

*1: Based on new project test benchmarks between GX Works2 and GX Works3.

[GT Works3] This integrated software is used to create professional screen designs for GOTs. Developed based on the concepts of simplicity, streamline and user-friendly, this powerful tool pushes operational boundaries to deliver infinite design possibilities.

- Property Sheet: Setting details are shown as a tree view, and can be changed in a batch!
- Data Browser: Settings are listed allowing settings to be confirmed and revised easily!
- Dialog Box: The easy-to-use display makes it simple to complete your settings!
- Data Check List: Identify errors quickly!
- Work Tree Upgrade: View projects, and easily add or delete screens!
- Data Transfer Upgrade: Transfer data with a single click!
- Simulator: Check operations with a single click!
- Library Upgrade: Easily create beautiful screens!
- Utilize Data Function: Search through existing screen assets with keywords and effectively use data!
- Sample Projects: A variety of samples are available for use!

For compatible versions, please contact us.
*GT Designer3 screen image

For details on GX Works3, please refer to the GX Works3 catalog (L(NA)08334).
For details on GT Works3, please refer to the GT Works3 catalog (L(NA)08170).
For details on each software tool, refer to the software tools catalog (BNP-A1224).

•Machine assembly and adjustment

Check and setup the parameters list using a computer.

Check the contents of the parameters in the help section.

NC Configurator2

Adjusting with simple parameter settings

Servo parameters are adjusted automatically

Results displayed in bode diagram

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

[NC 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

Machining data file

Drag and drop to transfer machining data files

NC Explorer

Ethernet

Machining data file

Monitor the status of multiple CNCs on one computer

NC Monitor2

Ethernet

[NC 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.

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.

LIST OF COMPONENTS

CNC-CPU unit

Product	Model	Remarks
CNC control module	R16NCCPU-S1	

GOT2000 related unit

SD card

Product	Model	Model code	Remarks
SD card	NZ1MEM-2GBSD	1WC535	2GB SD memory card for GOT

GT27 Model

Product	Model	Model code	Remarks	
GT27 Model	GT2715	GT2715-XTBA	1EA790	15" XGA[1024x768 dots]TFT color LCD 65536 colors (Multimedia & Video/RGB compliant Multi-touch compliant) 100 to 240VAC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.117X or later is required.
	GT2712	GT2712-STBA	1EA780	12.1" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 100 to 240VAC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
		GT2712-STBD	1EA781	12.1" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
	GT2710	GT2710-STBA	1EA770	10.4" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 100 to 240VAC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
		GT2710-STBD	1EA771	10.4" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
	GT2708	GT2708-STBA	1EA740	8.4" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 100 to 240VAC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
		GT2708-STBD	1EA741	8.4" SVGA [800x600 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
	GT2710	GT2710-VTBA	1EA760	10.4" VGA [640x480 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 100 to 240VAC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
		GT2710-VTBD	1EA761	10.4" VGA [640x480 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
	GT2708	GT2708-VTBA	1EA730	8.4" VGA [640x480 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 100 to 240VAC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
		GT2708-VTBD	1EA731	8.4" VGA [640x480 dots] TFT color LCD 65536 colors (Multimedia & Video / RGB compliant Multi-touch compliant) 24VDC, User memory Memory for storage (ROM): 57MB, Memory for operation (RAM): 128MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
	GT2705	GT2705-VTBD	1EA721	5.7" VGA [640x480 dots] TFT color LCD 65536 colors (Multi-touch compliant) 24VDC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
		GT27-15PSCC	1EK313	Surface treatment: anti-glare, Sheet color: transparent, USB environmental protection cover area: open, Number of sheets included in a set: 5
	Protective sheet	GT25-12PSCC	1EK307	For 12.1" Clear type, Transparent, With a hole for the USB environmental protection cover, A set of 5 sheets.
		GT25-10PSCC	1EK304	For 10.4" Clear type, Transparent, With a hole for the USB environmental protection cover, A set of 5 sheets.
		GT25-08PSCC	1EK301	For 8.4" Clear type, Transparent, With a hole for the USB environmental protection cover, A set of 5 sheets.
		GT25-05PSCC	1EK316	For 5.7" Clear type, Transparent, With a hole for the USB environmental protection cover, A set of 5 sheets.

GT25 Model

Product	Model	Model code	Remarks	
GT25 Model	GT2512	GT2512-STBA	1EA580	12.1" SVGA [800x600 dots] TFT color LCD 65536 colors 100 to 240VAC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
		GT2512-STBD	1EA581	12.1" SVGA [800x600 dots] TFT color LCD 65536 colors 24VDC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.155M or later is required.
	GT2510	GT2510-VTBA	1EA560	10.4" VGA [640x480 dots] TFT color LCD 65536 colors 100 to 240VAC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
		GT2510-VTBD	1EA561	10.4" VGA [640x480 dots] TFT color LCD 65536 colors 24VDC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
	GT2508	GT2508-VTBA	1EA530	8.4" VGA [640x480 dots] TFT color LCD 65536 colors 100 to 240VAC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
		GT2508-VTBD	1EA531	8.4" VGA [640x480 dots] TFT color LCD 65536 colors 24VDC, User memory Memory for storage (ROM): 32MB, Memory for operation (RAM): 80MB GT Designer3 Version1 (GOT2000) 1.165X or later is required.
	GT25 Handy GOT	GT2506HS-VTBD	09J922	Display section: 6.5" VGA, TFT color LCD, 65536 colors, panel color: black, power supply: 24VDC GT Works3 Version1.195D or later.

MELSEC iQ-R Series modules

Product	Model	Model code	Remarks	
PLC CPU	R04CPU	1FMA00	Program capacity, 40K steps; basic operation processing speed (LD instruction), 0.98ns	
	R08CPU	1FMA01	Program capacity, 80K steps; basic operation processing speed (LD instruction), 0.98ns	
	R16CPU	1FMA02	Program capacity, 160K steps; basic operation processing speed (LD instruction), 0.98ns	
	R32CPU	1FMA03	Program capacity, 320K steps; basic operation processing speed (LD instruction), 0.98ns	
SD memory card	R120CPU	1FMA04	Program capacity, 1200K steps; basic operation processing speed (LD instruction), 0.98ns	
	NZ1MEM-2GBSD	1WC535	SD memory card, 2Gbytes	
Extended SRAM cassette	NZ2MC-1MBS	1FMB00	1Mbytes	
	R35B	1FME00	5 slots, for MELSEC iQ-R Series modules	
	R38B	1FME01	8 slots, for MELSEC iQ-R Series modules	
Main base	R312B	1FME02	12 slots, for MELSEC iQ-R Series modules	
	R65B	1FME07	5 slots, for MELSEC iQ-R Series modules	
	R68B	1FME06	8 slots, for MELSEC iQ-R Series modules	
Extension base	R612B	1FME05	12 slots, for MELSEC iQ-R Series modules	
	RQ65B	1FME08	5 slots, for MELSEC-Q Series modules	
RQ extension base	RQ68B	1FME03	8 slots, for MELSEC-Q Series modules	
	RQ612B	1FME04	12 slots, for MELSEC-Q Series modules	
	RC06B	1FM001	0.6m cable for extension and RQ extension base units	
Extension cable	RC12B	1FM002	1.2m cable for extension and RQ extension base units	
	RC30B	1FM003	3m cable for extension and RQ extension base units	
	RC50B	1FM004	5m cable for extension and RQ extension base units	
Power supply	R61P	1FMC00	AC power supply; input, 100 to 240VAC; output, 5VDC/3.5A	
	R62P	1FMC02	AC power supply; input, 100 to 240VAC; output, 5VDC/3.5A, 24VDC/0.6A	
	R63P	1FMC01	DC power supply; input, 24VDC; output, 5VDC/6.5A	
	R64P	1FMC03	AC power supply; input, 100 to 240VAC; output, 5VDC/9A	
Input	AC	RX10	AC input, 16 points; 100 to 120VAC (50/60 Hz)	
	DC (Positive/Common/Negative Common Shared Type)	RX40C7	1FM100	DC input, 16 points; 24VDC, 7.0mA
		RX41C4	1FM101	DC input, 32 points; 24VDC, 4.0mA
	RX42C4	1FM102	DC input, 64 points; 24VDC, 4.0mA	
Output	Relay	RX41C4-TS	1FM113	DC input, 32 points; 24VDC, 4.0mA, Spring clamp terminal block
		RY10R2	1FM153	Relay output, 16 points; 24VDC/2A, 240VAC/2A
	RY18R2A	1FM15A	Relay output, 8 points; 24VDC/2A, 240VAC/2A	
	Triac	RY20S6	1FM157	Triac output, 16 points; 100 to 240VAC/0.6A
	Transistor (Sink)	RY40NT5P	1FM150	Transistor (sink) output, 16 points; 12 to 24VDC, 0.5A
RY41NT2P		1FM151	Transistor (sink) output, 32 points; 12 to 24VDC, 0.2A	
RY42NT2P		1FM152	Transistor (sink) output, 64 points; 12 to 24VDC, 0.2A	
RY40PT5P		1FM154	Transistor (source) output, 16 points; 12 to 24VDC, 0.5A	
Transistor (Source)	RY41PT1P	1FM155	Transistor (source) output, 32 points; 12 to 24VDC, 0.1A	
	RY42PT1P	1FM156	Transistor (source) output, 64 points; 12 to 24VDC, 0.1A	
	RY41PT1P-TS	1FM15E	Transistor (source) output, 32 points; 12 to 24VDC, 0.1A, Spring clamp terminal block	
I/O combined	DC input/transistor output	RH42C4NT2P	1FM200	DC input, 32 points; 24VDC, 4.0mA Transistor (sink) output, 32 points; 12 to 24VDC, 0.2A
		A6CON1	13L101	Soldering 32 point-connector (40-pin connector)
Connector	A6CON2	13L102	Solderless terminal connection 32 point-connector (40-pin connector)	
	A6CON3	13L103	Flat-cable pressure displacement 32 point-connector (40-pin connector)	
	A6CON4	13L124	Soldering 32 point-connector (40-pin connector, bidirectional cable mountable)	
	Spring clamp terminal block	Q6TE-18SN	1W4299	For 16-point I/O modules, 0.3 to 1.5mm ² (22...16AWG)
Connector/terminal block conversion module	A6TBX70	13L112	For positive common input modules (3-wire type)	
	A6TBXY36	13L106	For positive common input modules and sink output modules (standard type)	
	A6TBXY54	13L109	For positive common input modules and sink output modules (2-wire type)	
	AC05TB	13L006	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 0.5m	
Connector/terminal block conversion module	AC10TB	13L007	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 1m	
	AC20TB	13L008	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 2m	
	AC30TB	13L009	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 3m	
	AC50TB	13L010	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 5m	
	AC80TB	13L026	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 8m	
	AC100TB	13L027	For A6TBXY36, A6TBXY54, and A6TBX70 (positive common/sink type), 10m	
	AC100TE	13L025	For A6TE2-16SRN, 10m	
Relay terminal module	A6TE2-16SRN	13L131	For 40-pin connector 24VDC transistor output modules (sink type)	
	AC06TE	13L021	For A6TE2-16SRN, 0.6m	
	AC10TE	13L022	For A6TE2-16SRN, 1m	
	AC30TE	13L023	For A6TE2-16SRN, 3m	
	AC50TE	13L024	For A6TE2-16SRN, 5m	
	AC100TE	13L025	For A6TE2-16SRN, 10m	
Analog input	Voltage input	R60ADV8	1FM503	8 channels for voltage inputs -10 to 10VDC, -32000 to 32000; 80μs/CH
		R60ADI8	1FM504	8 channels for current inputs 0 to 20mADC/0 to 32000; 80μs/CH
	Current input	R60AD4	1FM501	4 channels for voltage/current inputs -10 to 10VDC, -32000 to 32000; 0 to 20mADC, 0 to 32000; 80μs/CH
Analog output	Voltage/output	R60DAV8	1FM505	8 channels for voltage outputs -32000 to 32000, -10 to 10VDC; 80μs/CH
	Current output	R60DAI8	1FM506	8 channels for current outputs 0 to 32000, 0 to 20mADC; 80μs/CH
Temperature control	Platinum temperature-measuring resistor	R60TCRT4	1FY40E	RTD (Pt100, JPt100), 4 channels for input
		R60TCRT4BW	1FY40F	RTD (Pt100, JPt100), 4 channels for input, heater disconnection detection
	Thermocouple	R60TCRT2T2	1FY40C	Thermocouple (B, R, S, K, E, J, T, N, U, L, PL@, W5Re/W26Re), 4 channels for input (2 channels can also be used for RTD input)
		R60TCRT2T2BW	1FY40D	Thermocouple (B, R, S, K, E, J, T, N, U, L, PL@, W5Re/W26Re), 4 channels for input (2 channels can also be used for RTD input), heater disconnection detection

INSTALLATION ENVIRONMENT CONDITIONS

CNC CPU module

Product	Model	Model code	Remarks	
High-speed counter	RD62P2	1FM50B	5/12/24VDC input, 2 channels; counting speed, max. 200k pulse/s; external output, transistor (sink type)	
	RD62D2	1FM50C	Differential input, 2 channels; max. counting speed, 8M pulse/s; external output, transistor (sink type)	
	RD62P2E	1FM50D	5/12/24VDC input, 2 channels; counting speed, max. 200k pulse/s; external output, transistor (source type)	
Ethernet	RJ71EN71	1FM601	1 Gbps/100Mbps/10Mbps, 2 ports Multi-network connectivity (Ethernet/CC-Link IE)	
Serial communication	RJ71C24	1FM604	Max. 230.4kbps; RS-232, 1 channel; RS-422/485, 1 channel	
	RJ71C24-R2	1FM605	Max. 230.4kbps; RS-232, 2 channels	
	RJ71C24-R4	1FM606	Max. 230.4kbps; RS-422/485, 2 channels	
MES Interface	RD81MES96	1FTD00	1000BASE-T/100BASE-TX/10BASE-T Database connection (MX MESInterface-R is required)	
CC-Link IE Control	RJ71GP21-SX	1FM602	1 Gbps, fiber-optic cable, control/normal station	
CC-Link IE Field	RJ71GF11-T2	1FM600	1 Gbps, master/local station	
CC-Link	RJ61BT11	1FM603	Max. 10Mbps, master/local station, CC-Link Ver.2 supported	
CC-Link Remote I/O module	Screw terminal block type	AJ65SBTB1-16D	1W5131	Input 16 points: 24VDC (positive/negative common shared) 1-wire type Terminal block type Response time 1.5ms
		AJ65SBTB1-32D	1W5141	Input 32 points: 24VDC (positive/negative common shared) 1-wire type Terminal block type Response time 1.5ms
		AJ65SBTB1-16TE	1W5128	Output 16 points: 12/24VDC (0.1A) Transistor output (source type) 1-wire type Terminal block type
	Waterproof connector type	AJ65SBTB1-32TE1	1W5452	Output 32 points: 12/24VDC (0.5A) Transistor output (source type) 1-wire type Terminal block type
		AJ65FBTA4-16DE	1W5108	Input 16 points: 24VDC (negative common) 4-wire type Thin, waterproof type Response time 1.5ms
AJ65FBTA2-16TE	1W5103	Output 16 points: 12/24VDC (1.0A) Transistor output (source type) 2-wire type Thin, waterproof type		

(Note) For other related units, please contact us.

MELSEC Q Series modules

Product	Model	Model code	Remarks	
Extension base	Q63B	1W4E07	3 slots, 1 power supply module required, for Q Series modules	
	Q65B	1W4E03	5 slots, 1 power supply module required, for Q Series modules	
	Q68B	1W4E04	8 slots, 1 power supply module required, for Q Series modules	
	Q612B	1W4E05	12 slots, 1 power supply module required, for Q Series modules	
	Q52B	1W4E14	2 slots, power supply module not required, for Q Series modules	
	Q55B	1W4E15	5 slots, power supply module not required, for Q Series modules	
Extension cable	QC05B	1W4006	0.45m cable for connecting extension base unit	
	QC06B	1W4000	0.6m cable for connecting extension base unit	
	QC12B	1W4001	1.2m cable for connecting extension base unit	
	QC30B	1W4002	3m cable for connecting extension base unit	
	QC50B	1W4003	5m cable for connecting extension base unit	
	QC100B	1W4004	10m cable for connecting extension base unit	
	Power supply	Q61P	1W4C11	Input voltage: 100 to 240VAC, output voltage: 5VDC, output current: 6A
Q63P		1W4C02	Input voltage: 24VDC, output voltage: 5VDC, output current: 6A	
Q64PN		1W4C12	Input voltage: 100 to 240VAC, output voltage: 5VDC, output current: 8.5A	
Output	Transistor (Independent)	QY68A	1W4310	8 points, 5 to 24VDC, 2A/point, 8A/module, response time: 10ms, sink/source type, 18-point terminal block, with surge suppression, all points independent
Analog output	Voltage/current output	Q62DA-FG	1W4571	2 channels, input (resolution): 0 to 12000, -12000 to 12000, -16000 to 16000, output: -12 to 12VDC, 0 to 22mAADC, conversion speed: 10ms/2 channels, 18-point terminal block, channel isolated
MELSECNET/H	Optical loop (SI)	QJ71LP21-25	1W4516	SI/QSI/H-PCF/broadband H-PCF fiber optic cable, dual loop, control network (control/normal station) or remote I/O network (remote mater station)
	Coaxial bus	QJ71BR11	1W4511	3C-2V/5C-2V coaxial cable, single bus, control network (control/normal station) or remote I/O network (remote master station)
FL-net(OPCN-2)	Ver.2.00	QJ71FL71-TF01	1W4593	10BASE-T, 100BASE-TX
AS-I		QJ71AS92	1W4524	Master station, AS-Interface Specification Version 2.11 compatible
DeviceNet		QJ71DN91	1W4518	Master station/local station combined use, for QCPU, DeviceNet(Release2.0) compatible.

Peripheral unit

Product	Model	Remarks	
Dual signal module	Dual-signal modules	R173SXY	IO redundant monitoring module (Up to three modules)
	Terminal block	FA-TBS40P	Terminal block conversion (separately prepared: Mitsubishi Electric Engineering) UL supported
	Terminal block	FA-LTB40P	Terminal block conversion (separately prepared: Mitsubishi Electric Engineering)
Signal splitter		FA-CBL□□FMV-M	Terminal block conversion connection cable (length □□= 05: 0.5m, 10: 1m, 20: 2m, 30: 3m, 50: 5m) (separately prepared: Mitsubishi Electric Engineering)
	FL-net (OPCN-2) Interface module	FCU7-HN387	Option (Necessary when manual pulse generator is used for two or three axes)
		ER-1FL2-T	10BASE-T, 100BASE-TX

Parts

Product	Model	Remarks
Manual pulse generator	UFO-01-2Z9	5V specification
	HD60C	12V specification, for the operation board signal splitter connection, 12V power supply separately necessary
Encoder	OSE 1024-3-15-68	6000r/min, no straight type connector enclosed, new JIS key, 68 square flange
	OSE 1024-3-15-68-8	8000r/min, no straight type connector enclosed, 68 square flange
	OSE 1024-3-15-160	6000r/min, no straight type connector enclosed, new JIS key, 160 square flange
Grounding plate	Grounding plate D	With cable clamp A(2)
	Grounding plate E	With cable clamp B(1)

Item	Specification				
Ambient operating temperature	0 to 55°C				
Ambient storage temperature	-25 to 75°C				
Ambient operating humidity	5 to 95%RH, non-condensing				
Ambient storage humidity	5 to 95%RH, non-condensing				
Vibration resistance	Frequency	Constant acceleration	Half amplitude	Sweep count	
	Under intermittent vibration	5 to 8.4Hz	-	3.5mm	10 times each in X, Y and Z directions (80 min.)
		8.4 to 150Hz	9.8m/s ²	-	
	Under continuous vibration	5 to 8.4Hz	-	1.75mm	
8.4 to 150Hz		4.9m/s ²	-		
Shock resistance	147m/s ² ; 3 times in each of 3 directions X, Y and Z				
Operating ambience	No corrosive gases or inflammable gases				
Operating altitude	2000m (6561.68ft.) or lower (Note 3)				
Installation location	Inside control panel				
Overvoltage category (Note 1)	II or less				
Pollution level (Note 2)	2 or less				

C80, which is open equipment, must be installed within a sealed metal control panel (IP54 or higher). C80 must also be used and stored under the conditions listed in the specifications table above. The following environmental conditions are also required for the layout design.

- No large amount of accumulated dust, iron filings, oil mist, salt, or organic solvents
- No direct sunlight
- No strong electrical or magnetic fields
- No direct vibrations or shocks

(Note 1) Assumes that module is connected between a public power distribution network and local machinery.

(Note 2) Indicates the degree to which material accumulates in terms of the environment where the equipment is used. Pollution level 2 means that only non-conductive pollution can occur. However, temporary conductivity may be caused by accidental condensation.

(Note 3) Do not use or store C80 Series modules under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause operation failure.

LIST OF MANUALS

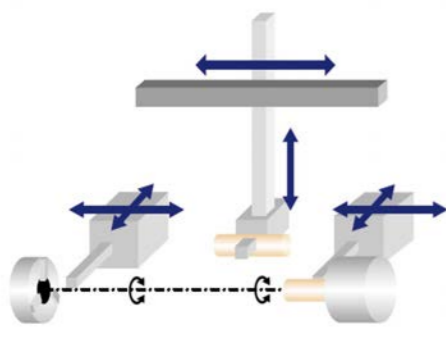
Manuals relating to the C80 are listed below. For the latest versions, please contact us.

Classification	Manual title	Manual No.	Intended purpose/contents
C80	M800/M80/E80/C80 Series Specifications Manual (Function)	IB-1501505	-Model selection -Outline of various functions
	M800/M80/E80/C80 Series Specifications Manual (Hardware)	IB-1501506	-Model selection -Specifications of hardware
	M800/M80/E80/C80 Series PLC Interface Manual	IB-1501272	-Electrical circuitry design -Interface signals between NC and PLC
	M800/M80/E80/C80 Series Programming Manual (Lathe System) (1/2)	IB-1501275	-G code programming for lathe system -Basic functions, etc.
	M800/M80/E80/C80 Series Programming Manual (Lathe System) (2/2)	IB-1501276	-G code programming for lathe system -Functions for multi-part system, high-accuracy function, etc.
	M800/M80/E80/C80 Series Programming Manual (Machining Center System) (1/2)	IB-1501277	-G code programming for machining center system -Basic functions, etc.
	M800/M80/E80/C80 Series Programming Manual (Machining Center System) (2/2)	IB-1501278	-G code programming for machining center system -Functions for multi-part system, high-accuracy function, etc.
	C80 Series Connection and Setup Manual	IB-1501452	-Detailed specifications of hardware -Installation, connection, wiring, setup (startup/adjustment)
	C80 Series Instruction Manual	IB-1501453	-Operation guide for NC -Explanation for screen operation, etc.
	C80 Series Maintenance Manual	IB-1501454	-Cleaning and replacement for each unit -Other items related to maintenance
	C80 Series Alarm/Parameter Manual	IB-1501560	-Alarms -Parameters
	Drive system (servo/spindle)	MDS-E/EH Series Specifications Manual	IB-1501226
MDS-E/EH Series Instruction Manual		IB-1501229	-Handling of regenerative power modules
MDS-EJ/EJH Series Specifications Manual		IB-1501232	-Specifications of resistor regeneration type units
MDS-EJ/EJH Series Instruction Manual		IB-1501235	-Handling of resistor regeneration type units
MDS-EM/EMH Series Specifications Manual		IB-1501238	-Specifications of multi-axis integrated, regenerative power modules
MDS-EM/EMH Series Instruction Manual		IB-1501241	-Handling of multi-axis integrated, regenerative power modules
iQ-R	DATA BOOK	IB-1501252	-Specifications of servo drive unit, spindle drive unit, motor, etc.
	MELSEC iQ-R Module Configuration Manual	SH-081262	Outline of system configuration, specifications, installation, wiring, maintenance, etc.
	MELSEC iQ-R CPU Module User's Manual (Startup)	SH-081263	Outline of specifications, procedures before operation, troubleshooting, etc. for CPU module
	MELSEC iQ-R CPU Module User's Manual (Application)	SH-081264	Outline of memory, functions, devices, parameters, etc. for CPU module
	QCPU User's Manual (Hardware Design, Maintenance and Inspection)	SH-080483	Outline of specifications, necessary knowledge to configure the system and maintenance-related descriptions for Q series CPU module, etc.
GOT	GX Works3 Operating Manual	SH-081215	Outline of functions, programming, etc.
	GOT2000 Series User's Manual (Hardware)	SH-081194	Outline of hardware such as part names, external dimensions, installation, wiring, maintenance, etc. of GOTs
	GOT2000 Series User's Manual (Utility)	SH-081195	Outline of utilities such as screen display setting, operation method, etc. of GOTs
	GOT2000 Series User's Manual (Monitor)	SH-081196	Outline of each monitor function of GOTs
	GOT2000 Series Connection Manual (Mitsubishi Electric Products)	SH-081197	Outline of connection types and connection method between GOT and Mitsubishi Electric connection devices
GT Designer3 (GOT2000) Screen Design Manual	SH-081220	Outline of screen design method using screen creation software GT Designer3	

CASE STUDY

One CNC CPU controls up to seven part systems and 16 axes. Up to three CNC CPUs can be mounted on a single base. The C80 Series modules can control not only the machines in automobile parts production lines, but also various other machines.

Lathe system (two spindles and two turrets, equipped with workpiece loading robot)



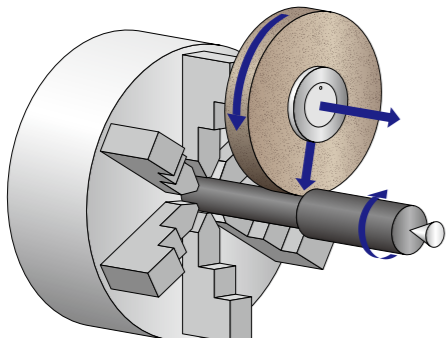
[Point to adopt C80 Series]

- Multi-part system control (up to 7 systems) enables independent control of lathe machining and work loading.
- iQ Platform-based robot control is supported.
- The system enables concurrent use of networks (field network, between controllers) are required in manufacturing lines.

[Main functions]

- Multi-part system control (start point designation timing synchronization, etc.)
- Machine group-based alarm stop
- Rapid traverse block overlap
- Connection to various networks

Grinder



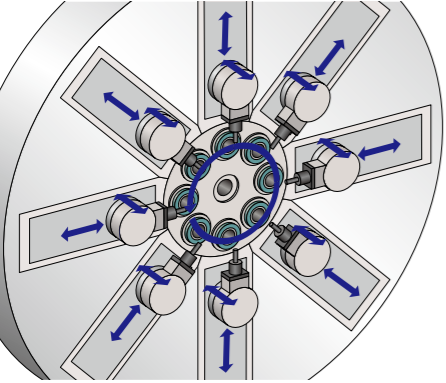
[Point to adopt C80 Series]

- GT Works3 helps design a variety of customized screens.
- Tool offset and tool life management functions support automation.
- Subprogram control allows modular part programming.

[Main functions]

- Tool offset and tool radius compensation
- Tool life management
- Subprogram control (up to eight nesting levels)

Multi-station machine



[Point to adopt C80 Series]

- C80 modules support up to three CPUs mounted, which enables multi-axis multi-part system control (up to 21 part-systems and 48 axes).
- A great number of tools can be managed through tool offset and tool life management functions.

[Main functions]

- Timing synchronization between part systems^(*)
- Start point designation timing synchronization^(*)
- Multi-part system program management^(*)
- Multi-part system simultaneous high-accuracy control^(*)
- Number of tool offset sets [machining center system: up to 400 sets, lathe system: up to 256 sets]
- Number of tool life management sets [machining center system: up to 400 sets, lathe system: up to 256 sets]

(*) Specifications for each CNC CPU.

FUNCTIONAL SPECIFICATIONS

○Standard △Optional □Selection

class	C80		General explanation	
	Lathe system	Machining center system		
1 Control axes				
1 Control axes				
1	Number of basic control axes (NC axes)	○2	○3	The NC axis, spindle, and PLC axis are generically called the control axis. The NC axis can be manually or automatically operated using a machining program. The PLC axis can be controlled using a sequence program. The number of axes that is within the max. number of control axes, and that does not exceed the max. number given for the NC axis, spindle and PLC axis, can be used.
2	Max. number of axes (NC axes + Spindles + PLC axes)	16	16	
1	Max. number of NC axes (in total for all the part systems)	16	16	
2	Max. number of spindles	7	7	
3	Max. number of PLC axes	8	8	
4	Max. number of PLC indexing axes	8	8	
5	Number of simultaneous contouring control axes	4	4	Number of axes with which simultaneous interpolation control is possible.
6	Max. number of NC axes in a part system	8	8	Max. number of NC axes possible to control in the same part system.
7	Axis name extension	○	○	The axis name (command axis name) to issue the absolute/incremental command to NC control axis can be expanded to two letters.
2 Control part system				
1	Standard number of part systems	1	1	One part system is the standard.
2	Max. number of part systems (main + sub)	○7	○7	Up to seven part systems.
1	Max. number of main part systems	○7	○7	
2	Max. number of sub part systems	○2	—	
3 Control axes and operation modes				
2	Memory mode	○	○	Machining programs stored in the memory of the CNC module are run.
3	MDI mode	○	○	MDI data stored in the memory of the CNC unit are executed.
4	High-speed program server mode			This function allows high-speed transfer of machining programs from the FTP server to the large-capacity buffer memory in CNC CPU via Ethernet to execute the program.
3	FTP high-speed program server mode	△	△	
2 Input command				
1 Data increment				
1	Least command increment			The data increment handled in the controller includes the input setting increment and command increment. Each type is set with parameters.
	Least command increment 1μm	○	○	Possible to command in increments of 0.001mm (linear axis) and 0.001° (rotary axis).
	Least command increment 0.1μm	○	○	Possible to command in increments of 0.0001mm (linear axis) and 0.0001° (rotary axis).
2	Least control increment			The least control increment determines the CNC's internal operation accuracy.
	Least control increment 0.01μm (10nm)	○	○	Possible to control in increments of 0.00001mm (linear axis) and 0.00001° (rotary axis).
	Least control increment 0.001μm (1nm)	○	○	Possible to control in increments of 0.000001mm (linear axis) and 0.000001° (rotary axis).
3	Indexing increment	○	○	This function limits the command value for the rotary axis.
3 Positioning / Interpolation				
1 Positioning				
1	Positioning	○	○	This function carries out positioning at high speed using a rapid traverse rate with the travel command value given in the program.
2	Unidirectional positioning	—	△	The G code command always moves the tool to the final position in the direction determined by parameters.
2 Linear / Circular interpolation				
1	Linear interpolation	○	○	Linear interpolation is a function that moves a tool linearly by the travel command value supplied in the program at the cutting feedrate designated by the F code.
2	Circular interpolation (Center / Radius designation)	○	○	This function moves a tool along a circular arc on the plane selected by the travel command value supplied in the program.
3	Helical interpolation	○	○	With this function, any two of three axes intersecting orthogonally are made to perform circular interpolation while the third axis performs linear interpolation in synchronization with the arc rotation. This control can be exercised to machine large-diameter screws or 3-dimensional cams.
4	Spiral / Conical interpolation	—	△	This function interpolates arcs where the start point and end point are not on the circumference of the same circle into spiral shapes.
5	Cylindrical interpolation	△	△	This function transfers the shape that is on the cylinder's side surface (shape yielded by the cylindrical coordinate system) onto a plane, and when the transferred shape is designated in the program in the form of plane coordinates, the shape is converted into a movement along the linear and rotary axes of the original cylinder coordinates, and the contours are controlled by means of the CNC unit during machining.
6	Polar coordinate interpolation	△	△	This function converts the commands programmed by the orthogonal coordinate axes into linear axis movements (tool movements) and rotary axis movements (workpiece rotation) to control the contours. It is useful for cutting linear cutouts on the outside diameter of the workpiece, grinding cam shafts, etc.
7	Milling interpolation	△	—	When a lathe with linear axes (X, Z axes) and rotary axis (C axis) serving as the control axes is to perform milling at a workpiece end face or in the longitudinal direction of the workpiece, this function uses the hypothetical axis Y, which is at right angles to both the X and Z axes, to enable the milling shape to be programmed as the X, Y and Z orthogonal coordinate system commands.
3 Curve interpolation				
3	Spline interpolation (G05.1Q2 / G61.2)	—	△	This function automatically generates spline curves that smoothly pass through rows of dots designated by a fine-segment machining program, and performs interpolation for the paths along the curves. This enables high-speed and high-accuracy machining.
4 Feed				
5 Thread cutting				
1	Thread cutting (Lead / Thread number designation)	○	△	Thread cutting with a designated lead can be performed. Inch threads are cut by designating the number of threads per inch with the E address.
2	Variable lead thread cutting	○	—	By commanding the lead increment/decrement amount per thread rotation, variable lead thread cutting can be performed.
3	Synchronous tapping			* With digital i/F spindle
1	Synchronous tapping cycle	○	○	This function performs tapping through synchronized control of the spindle and servo axis. This eliminates the need for floating taps and enables tapping to be conducted at a highly accurate tapping depth.
2	Pecking tapping cycle	△	△	The load applied to the tool can be reduced by designating the depth of cut per pass and cutting the workpiece to the hole bottom with a multiple number of passes.
3	Deep-hole tapping cycle	△	△	In the deep-hole tapping, the load applied to the tool can be reduced by designating the depth of cut per pass and cutting the workpiece to the hole bottom with a multiple number of passes.
4	Multiple spindle synchronous tapping	△	△	This function enables two or more spindles to perform synchronous tapping at a time, thereby improving the tapping efficiency.
4	Chamfering	○	—	Chamfering can be enabled during the thread cutting cycle by using external signals.
8	Circular thread cutting	—	—	Circular thread in which the lead is in longitudinal direction can be cut.
8	High-speed synchronous tapping (OMR-DD)	○	○	The servo axis directly detects and compensates the spindle's delay in tracking by using the communication between drive units over the high-speed optical servo network. By minimizing the synchronization error, the accuracy of the synchronous tapping is increased.
11	Thread cutting override	△	—	The thread cutting feedrate can be changed by changing the spindle override depending on rough cutting, finish machining, etc.
12	Variable feed thread cutting	△	—	This function changes the cutting feedrate by the spindle override at the time of the thread cutting. The machining condition during thread cutting can be changed.

○Standard △Optional □Selection

class	C80		General explanation
	Lathe system	Machining center system	
5 Program memory / editing			
1 Memory capacity			
1	Memory capacity (number of programs stored)		
	500kB [1280m] (1000 programs)	○	○
	1000kB [2560m] (2000 programs)	△	△
	2000kB [5120m] (2000 programs)	△	△
2 Editing			
1	Program editing	○	○
2	Background editing	○	○
3	Buffer correction	○	○
5	Multi-part system simultaneous program editing	○	—
6	Special program editing display for synchronization between part systems	△	—
6 Operation and display			
1 Structure of operation / display panel			
11	GOT (GOT2000 Series GT27 / GT25 12.1 / 10.4 / 8.4 / 5.7)	○	○
2 Operation methods and functions			
1	Operation input	○	○
2	Absolute value / Incremental value setting	○	○
3	Multiple display connection	○(GOT)	○(GOT)
4	Common display to multiple NCs	○(GOT)	○(GOT)
5	Displayed part system switch	○	○
6	Menu list	○	○
7	Display switch by operation mode	○	○
8	External signal display switch	○	○
9	Screen saver	○(GOT)	○(GOT)
10	Parameter guidance	○	○
11	Alarm guidance	○	○
14	Screenshot capture	○(GOT)	○(GOT)
15	User selectable menu configuration	○	○
19	MTB selectable menu configuration	○	○
8 Spindle, Tool and Miscellaneous functions			
1 Spindle functions (S)			
1	Spindle control functions		
6	Spindle-mode servo motor control	△	△
15	Multiple spindle synchronization set control	○	○
11 Operation support functions			
4 Interrupt operation			
16	Machining interruption	△	△
12 Program support functions			
1 Machining method support functions			
7	Axis control		
1	Chopping		
	1 Chopping	△	△
8	Multi-part system control		
3	Mixed control		
	2 Arbitrary axis exchange control	△	△
11	High-speed parts machining		
	1 Rapid traverse block overlap	△	△
3	High-speed and high-accuracy functions [kBPM: k Block per Minute]		
	3 SSS control	—	△
	4 Tolerance control	—	△

○Standard △Optional □Selection

class	C80		General explanation
	Lathe system	Machining center system	
13 Machine accuracy compensation			
1 Static accuracy compensation			
1	Backlash compensation	○	○
2	Memory-type pitch error compensation [sets]	○10	○10
3	Memory-type relative position error compensation	○	○
4	External machine coordinate system compensation	△	△
5	Circular error radius compensation	△	△
6	Ball screw thermal expansion compensation	△	△
8	Position-dependent gradually increasing-type backlash compensation	△	△
9	Two-way pitch error compensation	△	△
2 Dynamic accuracy compensation			
1	Smooth high-gain (SHG) control	○	○
2	Dual feedback	○	○
3	Lost motion compensation	○	○
4	OMR II (Backlash with filter)	△	△
6	OMR-FF	△	△
15 Safety and maintenance			
4 Maintenance and troubleshooting			
12	Backup / Restore	○	○
5 Functional safety			
2	Smart Safety observation		
1	Safety-related I/O observation	△	△
2	Emergency stop observation	△	△
3	Drive safety function		
	1 SLS (Safely-Limited Speed)	△	△
	2 SLP (Safely-Limited Position)	△	△
3	SOS (Safe Operating Stop)	△	△
4	SSM (Safe Speed Monitor)	△	△
5	SBC / SBT (Safe Brake Control / Safe Brake Test)	△	△
6	SCA (Safe Cam)	△	△
7	SS1 / SS2 (Safe Stop)	△	△
8	STO (Safe Torque Off)	△	△
9	SCN (Safety Communication Network)	△	△
17 Machine support functions			
6 External PLC link			
1	CC-Link (Master / Local)	△ (MELSEC)	△ (MELSEC)
3	CC-Link IE Field network (Master / Local)	△ (MELSEC)	△ (MELSEC)
8	FL-net	△ (MELSEC)	△ (MELSEC)
7 Installing S/W for machine tools			
4	APLC release (Note 1)	△	△
10	GOT2000 screen design tool GT Works3	○	○
8 Others			
2	CNC remote operation tool		
	1 NC Monitor2 (Note 1)	○	○
	2 NC Explorer (Note 3)	○	○
3	Automatic operation lock	○	○
4	Power consumption computation	○	○
6	GOT Window	○	○
7	Log Viewer	○	○

(Note 1) Please contact us to purchase this tool.
(Note 3) This tool is free of charge. Please contact us.

Refer to the specifications manuals for details.

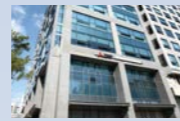
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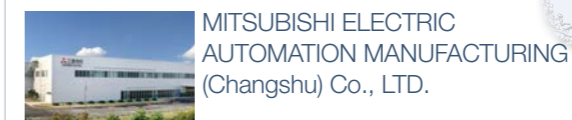
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WARRANTY

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.

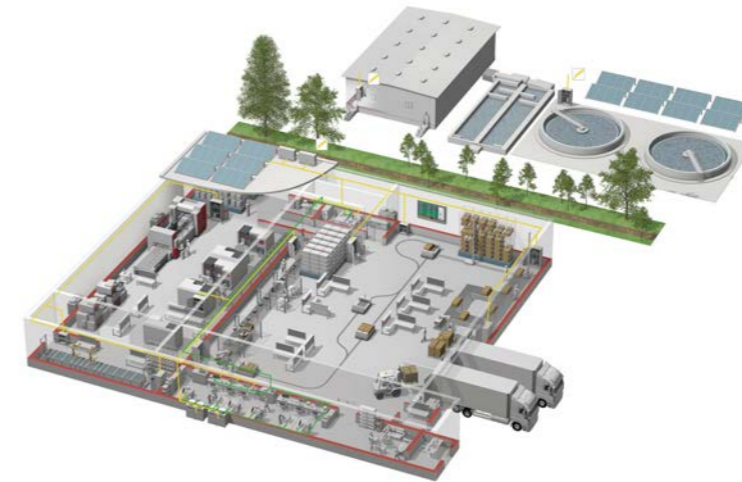
5. Product Application

- (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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Power Monitoring and Energy Saving Products



Power (UPS) and Environmental Products



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Servos, Motors and Inverters



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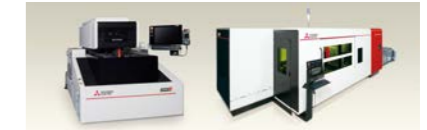
Edge Computing Products



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.



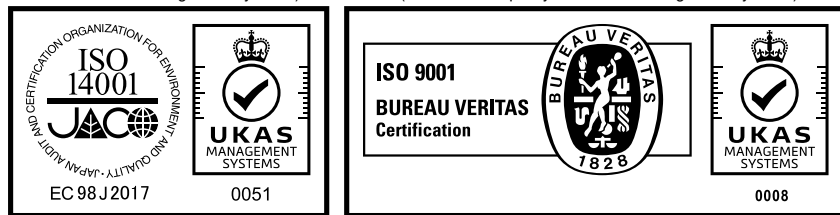
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