



mitsubishi cnc 700 Series

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**
HEAD OFFICE: OFFICE TOWER Z 14 1-8-12, HARUMI CHUO-KU, TOKYO 104-6212, JAPAN

Nagoya works has acquired the certification for Environmental management system ISO 14001 and Quality assurance management system ISO 9001



New Heights of Operating Comfort

MITSUBISHI CNC 700

series



The Mitsubishi CNC 700 series is designed to provide unprecedented productivity and operating comfort.

The 700 series features nano-control technology to meet the needs of a new era, and also incorporates an original high-speed servo network. As Mitsubishi's flagship machining center, the 700 series continues to deliver world-class specifications and optimum performance to users. The new Mitsubishi CNC series opens up new horizons of productivity, leading you to the next level of success.

New Architecture to Respond to the Need for Higher Speed

The combination of the newest RISC-CPU and a high-performance ASIC has significantly improved CNC performance.

High-Precision Machining by Full-Fledged Nano-Control

Ultra-high-quality machining is achieved by the combination of full-fledged nano-control, which performs everything from NC computation to servo control processing in nano-units; cutting-edge SSS (Super Smooth Surface) control; and OMR (Optimum Machine Response) control.

Comfortable Operation Contributing to Dramatically Reduced Setup Time

The redesigned NC display screen provides powerful support to simplify all operations from setup to production. The display also provides a 3-D machining program check screen and shows machining status for easy visual verification.

MITSUBISHI CNC 750M

Number of control axes: **16** Number of maximum simultaneous contour control axes: **8** Minimum setting/command unit: **1 nm** Control unit: **1 nm**

MITSUBISHI CNC 750L

Number of control axes: **16** Number of maximum simultaneous contour control axes: **8** Minimum setting/command unit: **1 nm** Control unit: **1 nm**

MITSUBISHI CNC 730M

Number of control axes: **16** Number of maximum simultaneous contour control axes: **4** Minimum setting/command unit: **1 nm** Control unit: **1 nm**

MITSUBISHI CNC 730L

Number of control axes: **16** Number of maximum simultaneous contour control axes: **4** Minimum setting/command unit: **1 nm** Control unit: **1 nm**

MITSUBISHI CNC 720M

Number of control axes: **8** Number of maximum simultaneous contour control axes: **4** Minimum setting/command unit: **0.1 μm** Control unit: **10 nm**

MITSUBISHI CNC 720L

Number of control axes: **12** Number of maximum simultaneous contour control axes: **4** Minimum setting/command unit: **0.1 μm** Control unit: **10 nm**

New Architecture to Meet the Need for Higher Speed



Newest RISC-CPU Provides the Most Advanced Full-Fledged Nano-Control Capability

- The state-of-the-art RISC-CPU and the high-speed optical servo network enable high-speed, high-precision control, nano-control, and 5-axis control.
- Extension units allow for the easy addition of functions.
- The ultra-high-speed PLC engine substantially reduces cycle time.

High-Speed Optical Servo Network

- Full-fledged nano control performs everything from NC computation to servo control processing in nano-units, ensuring high-quality machining results.
- The combination of cutting-edge technologies such as full-fledged nano-control, SSS (Super Smooth Surface) control, and OMR (Optimum Machine Response) control leads to extremely high-quality, precision results.
- Full-fledged nano-control enables high-speed, high-precision cutting at a maximum 135kBPM (BPM: Blocks Per Minute) in fine segment feeding.

High-Speed Motor for Versatile Adaptability to Various Machines

- HF/HP series servo motors offer high speed and powerful torque, contributing to improved productivity.
- High-resolution encoder (16,000,000P/rev) supports high-precision processing.
- Ultra-high-speed built-in spindle motor (70,000r/min max.) is formed by a forging cast process.
- Linear servo motors and direct-drive servo motors are available for high-speed, high-precision machining operations.

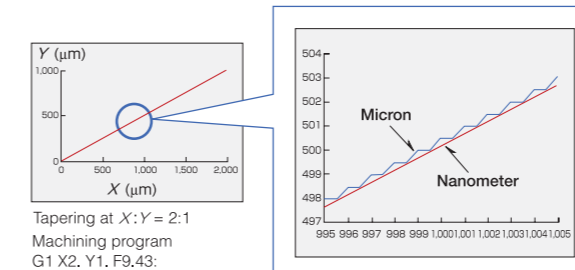
Communication Terminals Offering Easy Use and High Performance

- Improved graphic performance offers better visibility and easier operability.
- The 10/100-Mpps Ethernet connection ensures high-speed communication and also enables easy system upgrading.
- IC Card and Compact Flash are supported. High-speed program server operation is possible.

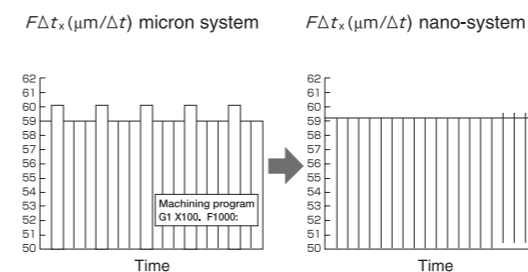
Cutting-Edge Full-Fledged Nano-Control

Nano-Interpolation for High-Quality Machining Results

- Even if the machining program uses micron-unit commands, interpolation is performed in nanometer units, providing smoother machining results.
- Positioning command fractions in interpolation calculation reduce speed fluctuations, for improved machining quality.
- Nano-interpolation offers better results in various applications such as turning, grinding, and milling.



Interpolation path of nanometer control



Full-Fledged Nano-Control for Optimum Performance

- Full-fledged nano-control performs all processing in nano-units, from NC computation (with a minimum command unit of 1 nanometer) to servo control processing.

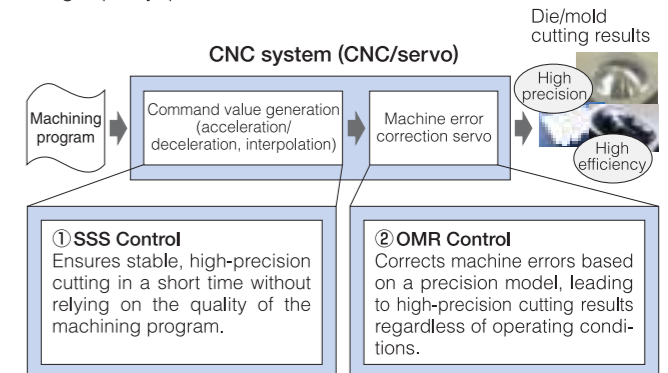
Circularity accuracy comparison—

Circular command speed: 10m/min, radius: 100mm (for motor unit)

Conventional system	MDS-D
Command resolution: 0.5μm	Command resolution: 0.5nm
<p>Circularity deviation: 1.9 μm (p-p)</p>	<p>Circularity deviation: 0.3 μm (p-p)</p>

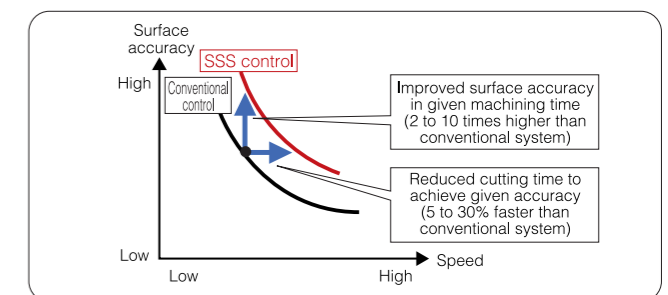
High-Speed, High-Precision Die/Mold Cutting

- Full-fledged nano-control enables high-speed, high-precision cutting at a maximum 135kBPM in fine segment feeding.
- Combined state-of-the-art technologies—such as full-fledged nano-control, SSS control, and OMR control—result in extremely high-quality, precision results.

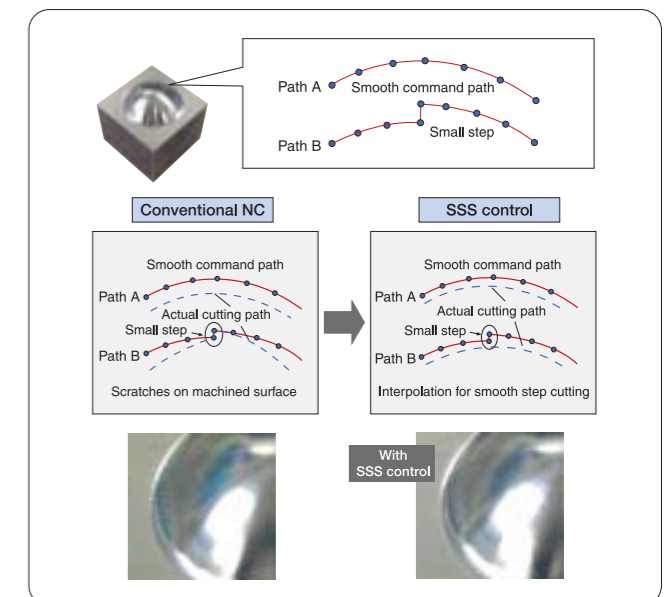


SSS Control for Stable Machining Quality

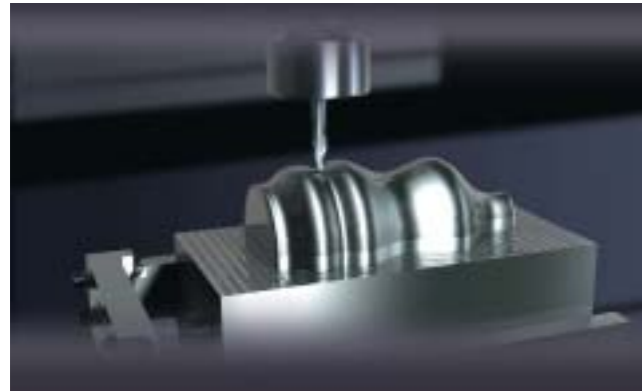
- SSS control ensures high machining stability and quality with virtually no effects resulting from cutting shape or speed.
- SS control reduces processing time by 5 to 30% relative to a conventional system, significantly increasing feed speed.



- An approximate shape is estimated from command paths to achieve smooth and even machining surfaces, even with stepped surfaces.



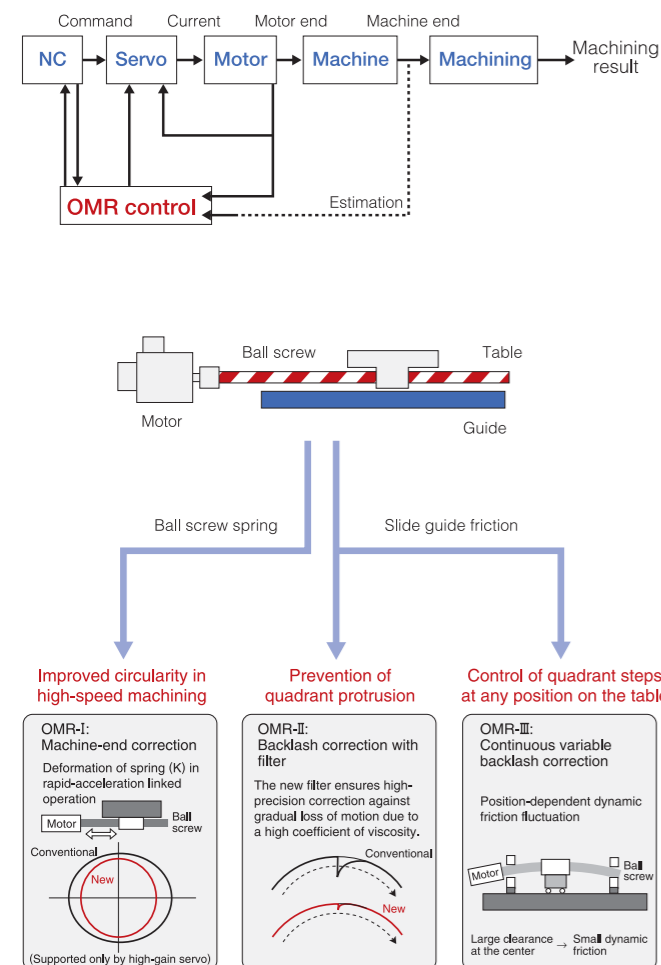
Support for Increased Speed, Precision, and Quality



OMR (Optimum Machine Response) Control

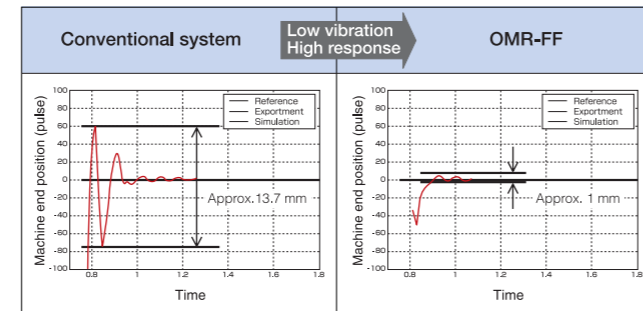
Unlike conventional control, which simply matches the motor path to the commands, OMR control estimates the machine's status based on a model and applies correction to motor control in order to match machine position—not motor position—to the commands.

OMR control—High-precision correction function adaptable to various machines



OMR-FF Control for Accurate Cutting In Accordance with Commands

The OMR-FF (Optimum Machine Response—Feed Forward) control provides machine-friendly feed forward control to minimize machine vibration and maximize machine performance.



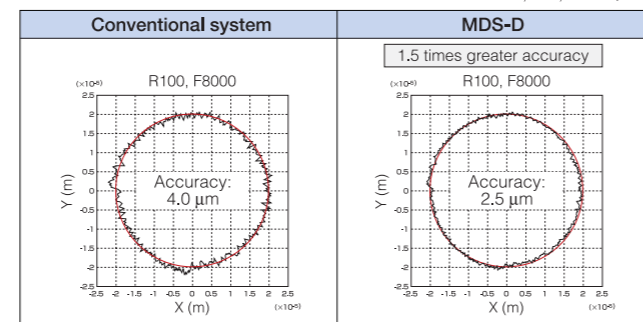
High-Gain Control II to Improve Basic Servo System Performance

Mitsubishi's original high-response current control system has been applied to improve basic servo performance.

Control cycle (comparison with previous system)

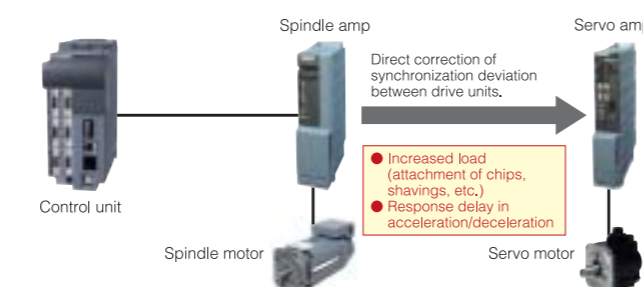
Current	Speed	Position
1/5	1/2	1/2

Circularity accuracy comparison—Simulation results—



M-DDC Function for Reduced Synchronized Tapping Time and Increased Precision

The servo axis detects the spindle's tracing delay directly through the network. This contributes to improved correction operation, reduced time constants, and faster machining speeds.



A Wealth of Functions to Respond to Combined Machining Needs

Synchronization Control (Milling)

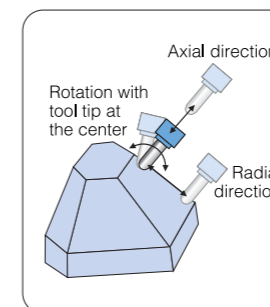
The synchronization control drives two motors in parallel in order to enhance machining speed and precision. Speed command synchronization control monitors the positions, speeds, and magnetic feedback signals of the motors in parallel drive and then issues speed commands based on the acquired data. "Current command synchronization control," on the other hand, uses current commands to drive the motors.



5-Axis Machining Function (Milling)

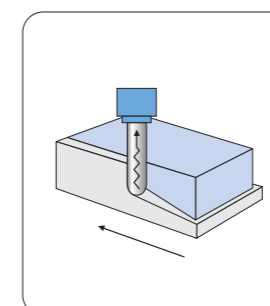
Manual handle feed to move the tool in the axial direction and to rotate with tool tip at the center

When the tool is tilted, the tool can be moved in the axial or radial directions relative to the tool. The rotation axis can be rotated with the tool tip at the center.



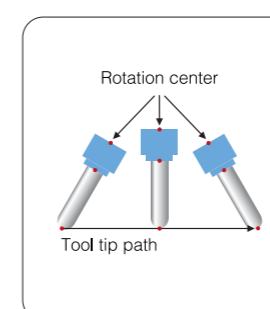
Manual handle feed to interrupt operation in axial direction

This interruption function allows you to move the tool manually in the axial direction relative to the tool during automatic operation.



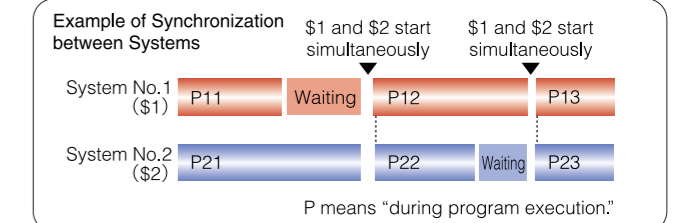
Tool tip control

Control can be provided using the center of the tool tip for positioning within the program's coordinate system.

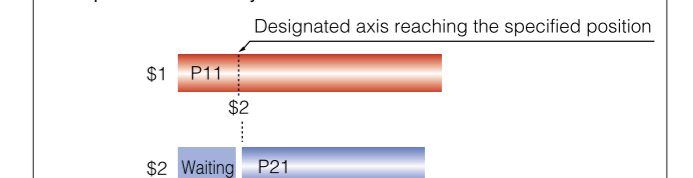


Synchronization between Systems/ Start Point Synchronization (Turning)

By simply designating the !-code in the machining program, you can control synchronization between systems. Moreover, by designating synchronization timing using the positions of the control axis, you can control synchronization in the middle of a block.

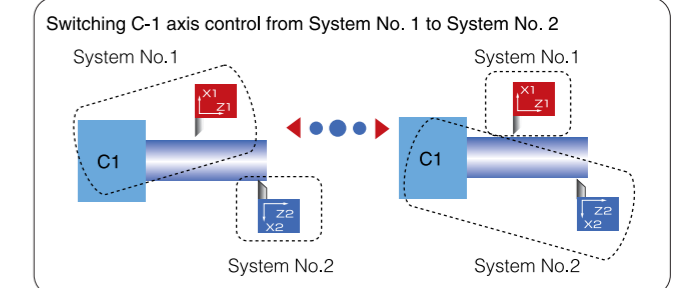


Example of Start Point Synchronization



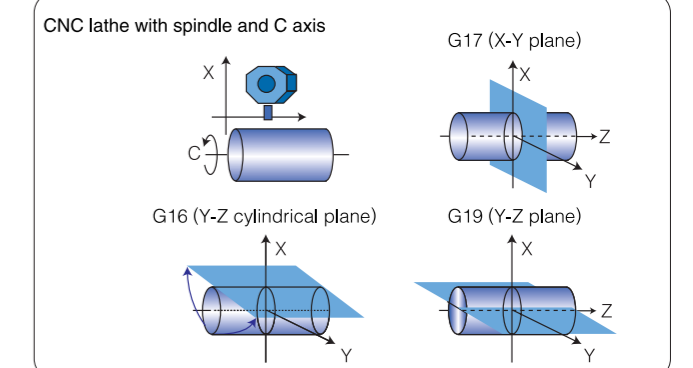
Mixed Machining Command (Turning)

The control axes of each system can be exchanged by a program command. This enables the axis defined as the axis of System No. 1 to be operated as the axis of System No. 2.



Milling Interpolation (Turning)

This function converts commands programmed with the orthogonal coordinate system into movements of the linear axis and the rotary axis (rotation of the workpiece) to enable contour control. This enables milling operations using a lathe not equipped with a Y axis.

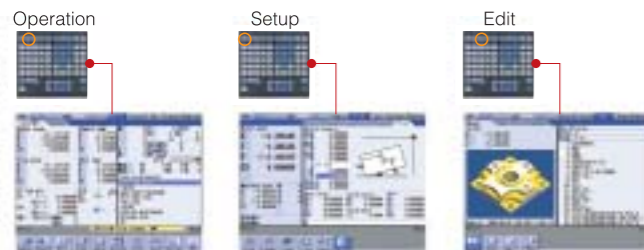


Enhanced Operability for Reduced Setup Time



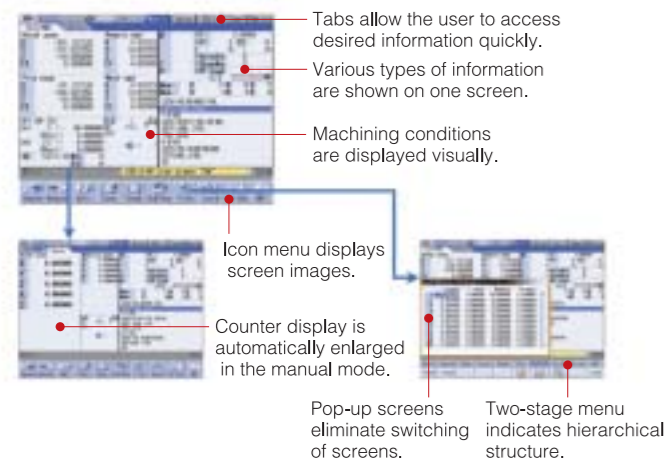
Display of Essential Information for Easy Understanding

The interface was developed to provide information in an easy-to-understand format. Work is categorized into "operation," "setup," and "edit," processes, and all essential information is provided on three screens.



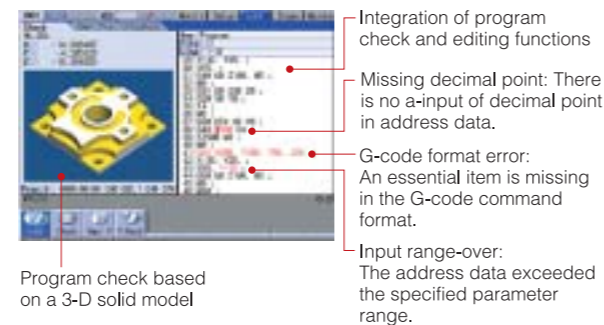
Pop-Up Screens for Added Ease of Use

Screen switching is minimized to prevent the division of processes into many levels of operation. The tabs allow easy and quick access to information, and pop-up screens allow the original screen to remain displayed.



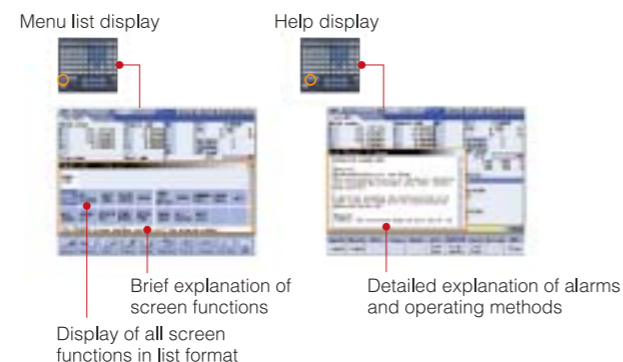
Program Input Error Warning Function

- A newly added check function uses a 3-D solid model for greater accuracy.
- A function to support the operator in program input and confirmation is also provided. The input error warning function lets the user know when the allowable decimal point/input numerical range is exceeded and when a G code input error is made.



Easy-to-Use Menu List Display and Help Function

- A new Menu List button allows even first-time users to access the desired screen.
- Pressing the Help button displays detailed alarm information and operation explanations.



Screens Developed for Optimum Ease of Use

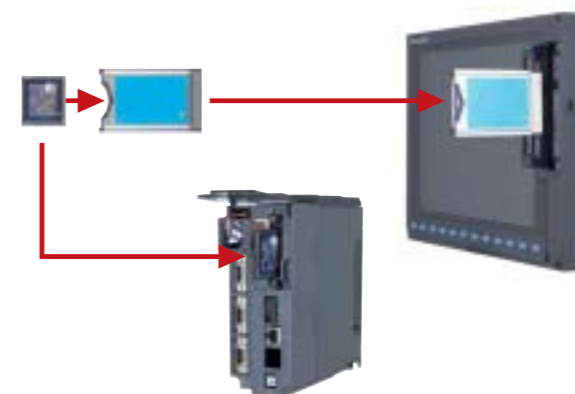


Communication Terminals Offering Easy Use and High Performance

- The communication terminal is available in three types: Type 8.4 (standard type), Type 10.4 (standard type), and Type 10.4 (advanced-function type).

Standard PCMCIA Slot

- The IC card interface, located on the front panel of the communication terminal, accepts IC Cards and Compact Flash Cards.
- Since the cover can be closed with a card in the slot, the card will not be in the way or detach accidentally.
- The IC card interface (located on the front panel of the communication terminal) and the Compact Flash interface (featuring a built-in control unit) enable batch input/output of required maintenance data.



Advanced-Function Model Equipped with WindowsXPe

- User-developed software developed may be used. CPU may be either PentiumIII or Celeron.

* Windows is a registered trademark of Microsoft Corp.
PentiumIII and Celeron are registered trademarks of Intel Corp.

USB Port

- The advanced-function model is provided with a USB port on the front panel. USB allows easy input and output of programs and data.

Superb Environmental Performance

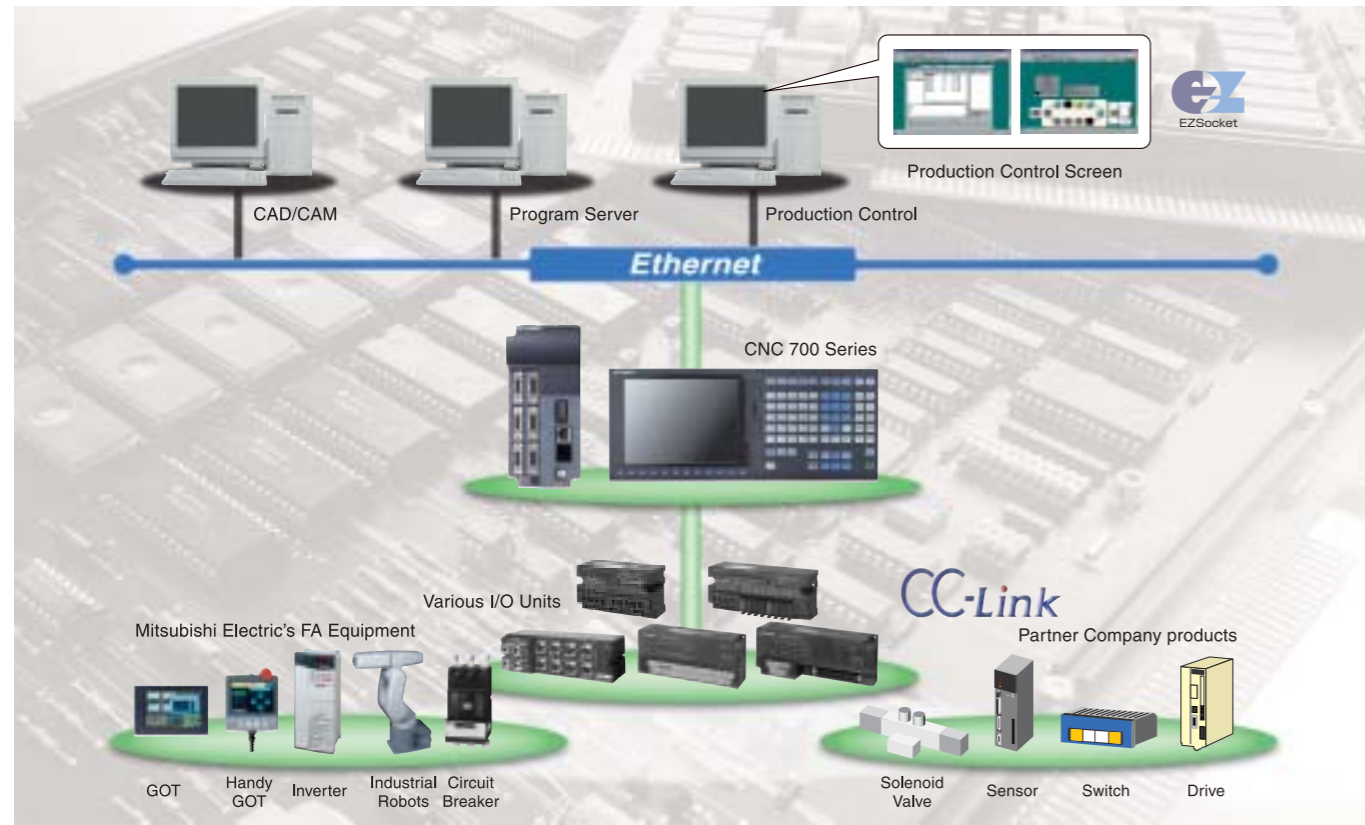
- Meets the IP65F environmental resistance performance standards for reliable operation in factory environments.

Compatible with 13 Languages (12 National Languages)

The new CNC series is adaptable to 12 national languages used around the world. Boasting extensive functions and superb performance, the Mitsubishi CNC 700 series aims to become the global-standard CNC, conforming to overseas standards for safe and reliable operation worldwide.

Applicable languages
Japanese
Simplified Chinese
Traditional Chinese
Korean
German
Portuguese
Hungarian
Italian
Swedish
Dutch
English
French
Spanish

Network Function Adaptable to Diverse Factory Environments; Extensive Development Environment



Ethernet

- The 700 series features high-speed 10/100-Mbps Ethernet as standard equipment. This enables input and output of large programs and operation of a high-speed program server.
- Compatibility with EZSocket communication software for Mitsubishi FA expands production system capabilities through enhanced network connectivity.

CC-Link

- CC-Link is a field network that offers high-speed simultaneous data processing for both control and communication. The most suitable FA equipment can be selected from among a broad range of product lines offered by Mitsubishi Electric and its partner companies.

*For more details, please refer to our partner company catalogs.

Network Service

- The remote-diagnosis service links machine tool makers, end users, and Mitsubishi Electric through a global network, for rapid restoration of equipment operation in the event of system problems.

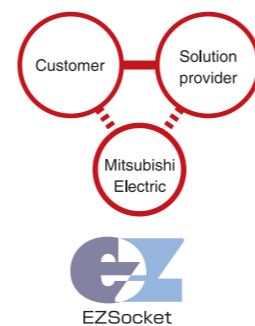


Field Networks

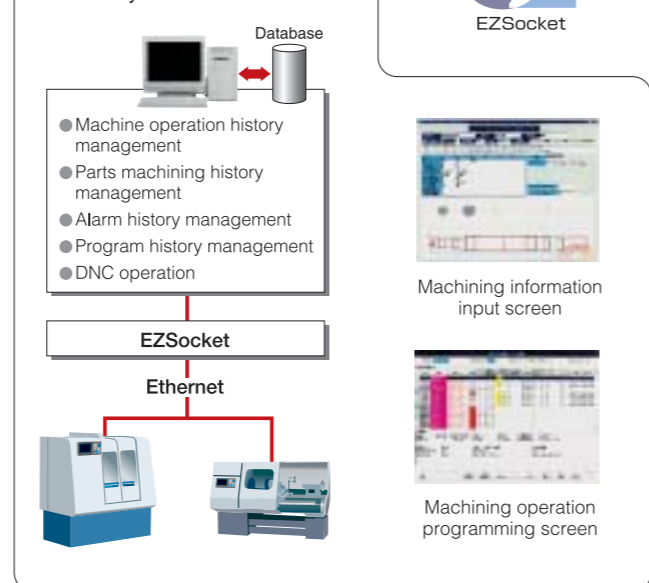
- Mitsubishi offers global field networks such as DeviceNET and PROFIBUS.

EZSocket Communication Middleware

- EZSocket is FA communication middleware designed to maximize the effectiveness of Mitsubishi FA equipment. Mitsubishi Electric has joined hands with a solution provider specializing in information technology in order to respond flexibly to diverse customer needs.



Example of production control system

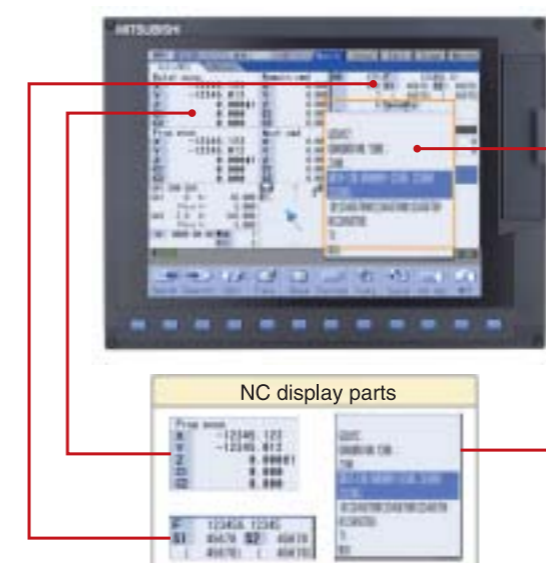


Easy Development of Screens Using MELSOFT NC Designer

- By combining ready-made standard parts, you can create custom screens with no need for special programming.
- Macro functions can be used to describe individual parts processing.
- C-language libraries provide powerful support for the development of more advanced screens.

Custom screens

- In addition to standard screens, custom screens created by end users may be displayed.

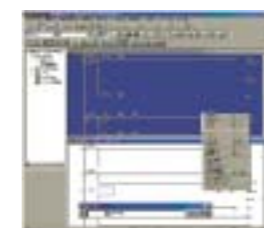


NC Designer custom screen



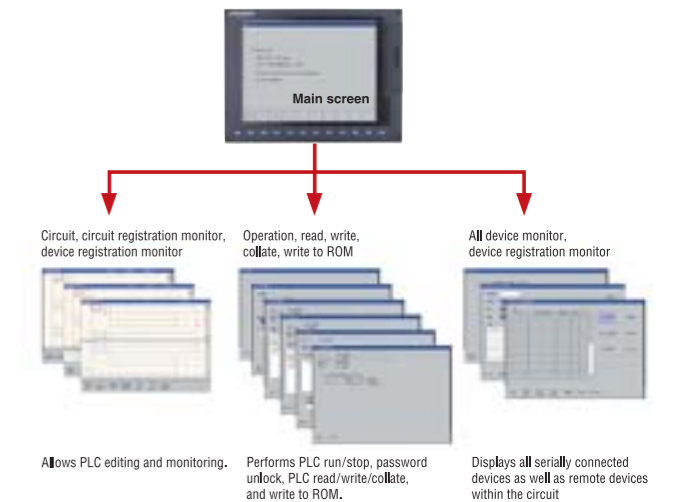
Mitsubishi Sequencer Programming Tool GX Developer

- The MELSEC programming tool, offering a wide array of functions and easy use, allows for convenient program design and debugging. Linking with a simulator or other utility allows for the efficient creation of desired programs.



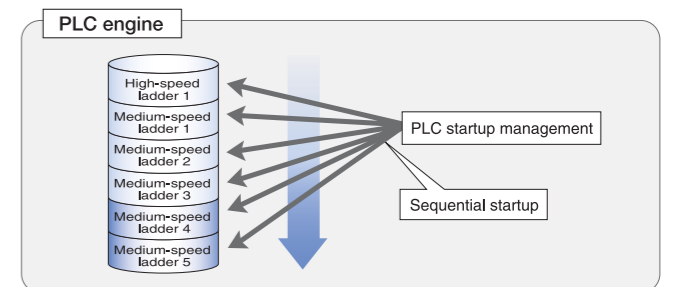
Onboard Ladder Editor

- The NC screen offers significantly improved on-machine ladder editing and monitor operability with a variety of functions from multi-screen display to searching and monitoring operations.



High-Speed PLC

- PLC scan time can be reduced to less than half that of our conventional model (PCMI value of 3.3 relative to our conventional product).
- Program capacity has been expanded to 42,000 steps.
- Device capacity is about twice the former level.
- Multiple PLC programs can be registered, and they can be executed sequentially according to a preset priority order (divided-process programming).
- Up to 20 PLC programs can be registered.

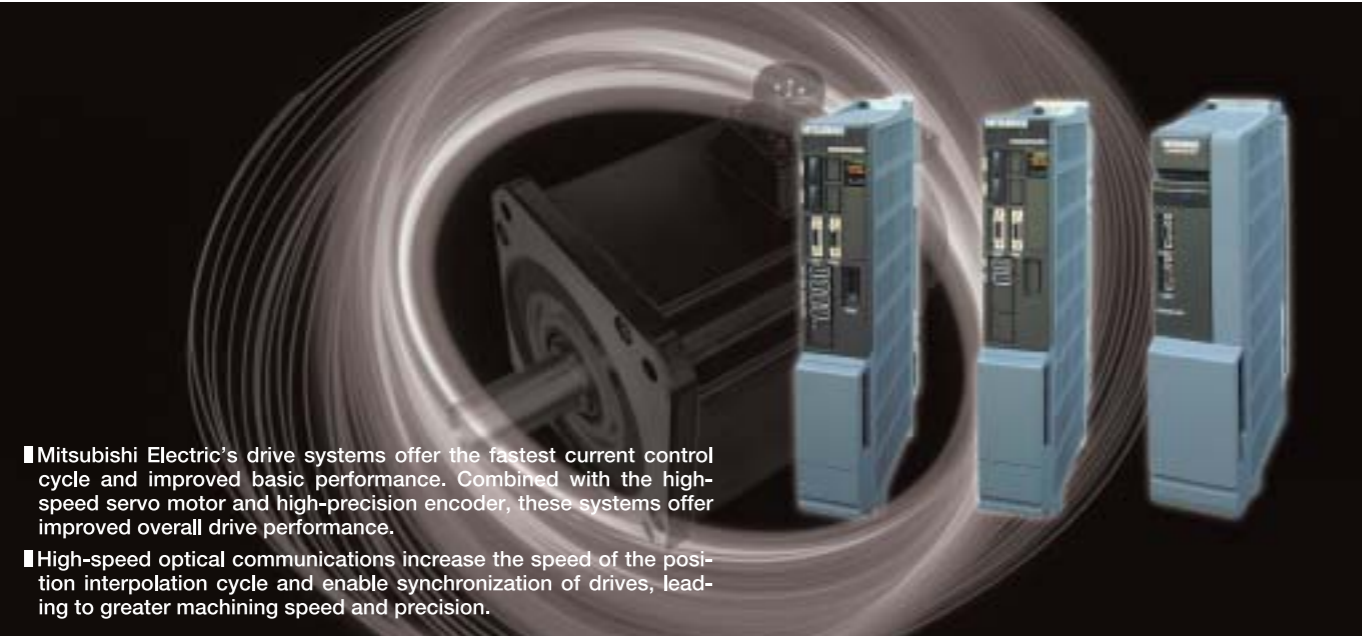


Integrated NC Setup Tool NC Configurator

- Auto tuning function available to support machine startup procedure.
- Automatic adjustment function and data analysis function enable reliable and efficient adjustment operations.



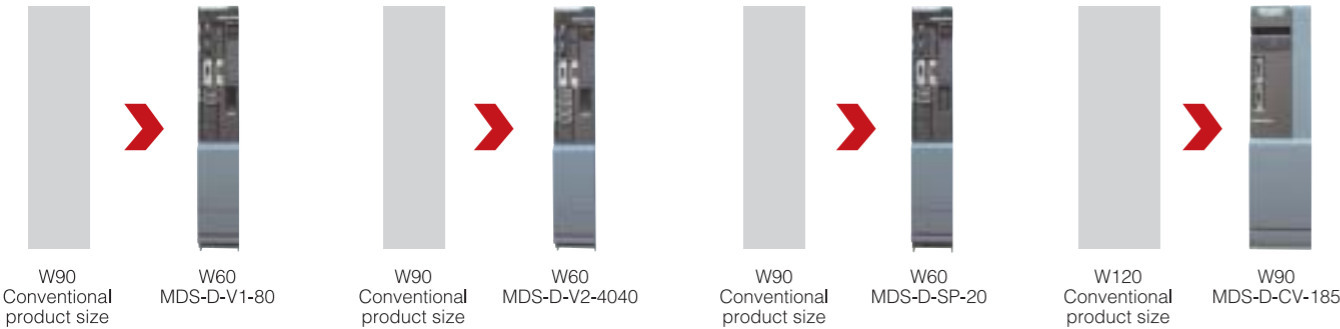
Cutting-Edge Drive Systems Engineered to Complement Control Units and Boost Machining Performance



- Mitsubishi Electric's drive systems offer the fastest current control cycle and improved basic performance. Combined with the high-speed servo motor and high-precision encoder, these systems offer improved overall drive performance.
- High-speed optical communications increase the speed of the position interpolation cycle and enable synchronization of drives, leading to greater machining speed and precision.

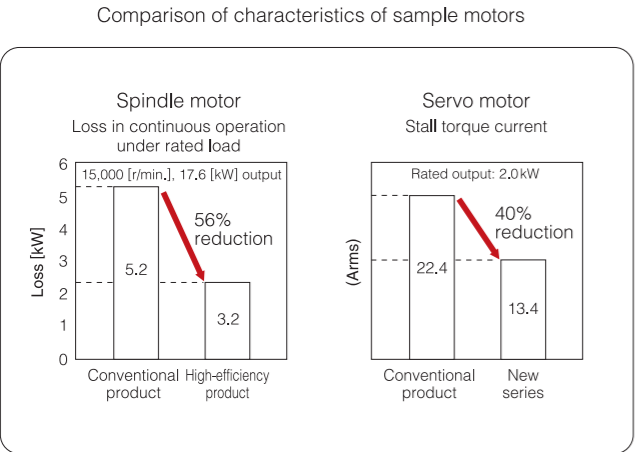
Reduction in Size of Control Panels

■ Unit width has been reduced noticeably, thanks to high-efficiency fins and a newly developed low-loss, compact power module.



Energy-Saving Performance

■ Increased torque in the servo motor has led to a significant reduction of drive current. The low-loss, compact module also reduces loss in the drive unit.



Compatibility with Worldwide Power Sources

■ Mitsubishi offers drive units and motors for 200-V and 400-V power sources for use around the world.

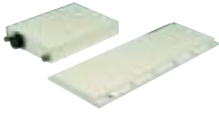
Servo Motors

- HF series
 - Medium-inertia, high-precision, high-speed, high-torque motors
 - Suitable for maintaining machining accuracy in high-inertia equipment with high acceleration rates.
 - Model lineup: 0.5 to 11kW
 - Maximum rotation speed: 5,000r/min
- HP series
 - Low-inertia, high-speed motors
 - Suitable for equipment requiring quick acceleration.
 - Model lineup: 0.5 to 9kW
 - Maximum rotation speed: 4,000r/min
- Adaptable to the standard detector, at 1,000,000P/rev, and to the high-precision type, at 16,000,000P/rev.



LM-F Series Linear Servo Motors

- Offers improved thrust and reduced cogging for use in high-speed, high-precision machines.
- Model lineup: Maximum thrust ranging from 1,800 to 18,000N·m



Direct-Drive Servo Motors (DD motors)

- High-torque DD motor combined with a high-gain control system provides quick acceleration and positioning as well as smooth rotation.
- Maximum torque: 700 to 3,000N·m



Spindle Motors

- Mitsubishi offers a standard series, a high-speed series, a wide-range constant-output series, a hollow shaft type, and an oil-cooled type.
- Model lineup: 0.4 to 60kW



Built-in Spindle Motors

- Mitsubishi's high-speed built-in spindle motors offer high efficiency and dramatically reduce loss.
- Compact stator coil end leads to reduced overall motor length.
- Maximum rotation speed: Up to 70,000rpm

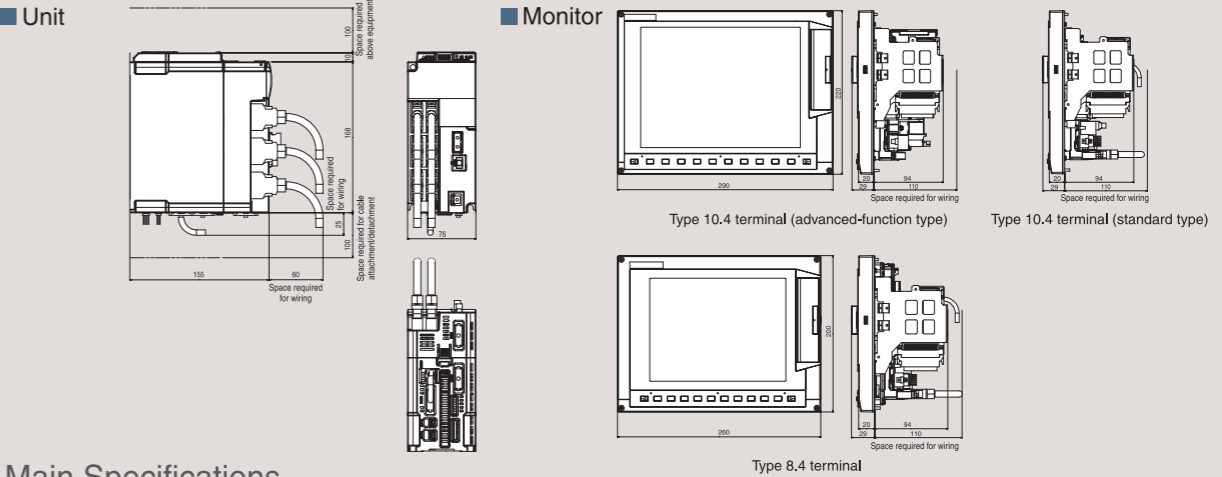


IPM Spindle Motor

- Mitsubishi has incorporated an IPM system to respond to demands for compact size, higher efficiency, and reduced power consumption.
- Shorter acceleration/reduction helps reduce cycle time.



External View



Main Specifications

Model name		Milling system			Lathe		
		720M	730M	750M	720L	730L	750L
Number of control axes	Number of control axes (NC axis + PLC axis + spindle)	3 △8	3 △16		2 △12	2 △16	
	Number of maximum simultaneous contour control axes	4		8	4		8
	Number of spindles	2	4		2	4	
	Peripheral axes	4			4		
Number of systems		1	1 △2		1 △2	1 △4	
Minimum setting/command unit		1μm △0.1μm	1μm △1nm	1μm △1nm	1μm △0.1μm	1μm △1nm	1μm △1nm
Control unit		10nm	10nm △1nm	10nm △1nm	10nm	10nm △1nm	10nm △1nm
High-speed/high-precision control		△16.8m/min	△135m/min		—	—	—
SSS control (high-precision control)		—	△	△	—	—	—
5-axis-related function		—	—	△	—	—	△

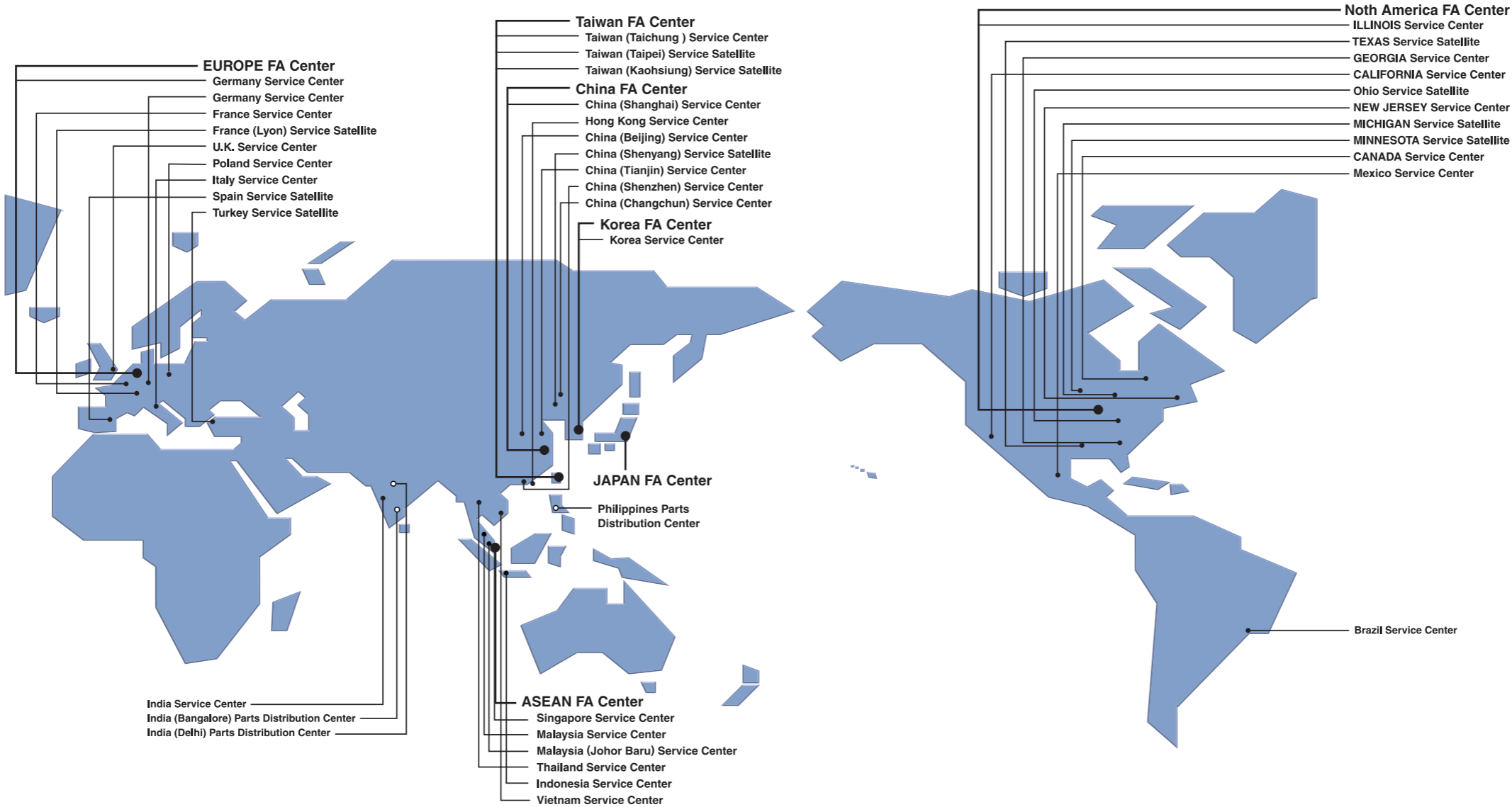
△Option * For detailed specifications, please see the specification list or specification guide.

Conformity with Safety Standards and Guidelines

■ The Mitsubishi CNC 700 series offers safe and reliable operation to customers around the world.



Overseas Service Network



North America FA Center (MITSUBISHI ELECTRIC AUTOMATION INC.)
ILLINOIS Service Center
500 CORPORATE WOODS PARKWAY, VERNON HILLS, ILLINOIS 60061, U.S.A.
TEL: +1-847-478-2500 / FAX: +1-847-478-2650

CANADA Service Center
4229 14TH AVENUE MARKHAM, ONTARIO L3R 0J2, CANADA
TEL: +1-905-475-7728 / FAX: +1-905-475-7935

MICHIGAN Service Satellite
2545 38TH STREET ALLEGAN, MICHIGAN 49010, U.S.A. (office in a house)
TEL: +1-847-478-2617 / FAX: +1-616-686-8022

MINNESOTA Service Satellite
TEL: +1-847-478-2500 / FAX: +1-847-478-0328

TEXAS Service Satellite
1000, NOLAN DRIVE, SUITE 200 GRAPEVINE, TEXAS 76051, U.S.A.
TEL: +1-817-251-7468 / FAX: +1-817-416-1439

CALIFORNIA Service Center
5665 PLAZA DRIVE CYPRESS, CALIFORNIA 90630, U.S.A.
TEL: +1-714-220-4796 / FAX: +1-714-229-3818

GEORGIA Service Center
2810 PREMIERE PARKWAY, SUITE 400 DULUPH GEORGIA 30097, U.S.A.
TEL: +1-678-258-4500 / FAX: +1-678-258-4598

Ohio Service Satellite
7566 PARAGON ROAD CENTERVILLE, OHIO 45459, U.S.A.
TEL: +1-937-291-4600 / FAX: +1-937-291-2097

NEW JERSEY Service Center
VANTAGE COURT SOUTH 200 COTTONTAIL LANE, SOMERSET, NEW JERSEY 08873, U.S.A.
TEL: +1-732-560-4500 / FAX: +1-732-560-4531

Mexico Service Center (MELCO DE MEXICO, S.A. DE C.V.)
MARIANO ESCOBEDO 69 TLALNEPANTLA, 54030 EDO. DE MEXICO
TEL: +52-5-384-0410 / FAX: +52-5-565-4926

Brazil Service Center (AUTOMOTION IND. COM. IMP. E EXP. LTDA)
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Singapore Service Center
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India Service Center (MESSUNG SYSTEM SALES & SERVICE PVT. LTD.)
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India (Bangalore) Parts Distribution Center (MESSUNG SYSTEM SALES & SERVICE PVT. LTD.)
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India (Delhi) Parts Distribution Center (MESSUNG SYSTEM SALES & SERVICE PVT. LTD.)
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Malaysia Service Center (FLEXIBLE AUTOMATION SYSTEM SDN. BHD.)
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Indonesia Service Center (PT. AUTOTEKNINDO SUMBER MAKMUR)
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Philippines Parts Distribution Center (FLEXIBLE AUTOMATION SYSTEM CORPORATION)
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