Further progress to the new MITSUBISHI standard CNC

Higher cost-performance for realizing higher-grade machines

[High-speed]
Cycle time reduced with higher machining-control performance

[Multi-axis control]
Multi-axis control and two-part systems for compatibility with various machines

[Nano interpolation]
Smoother cutting surface is achieved with one-nanometer position interpolation

[High-accuracy]
High-accuracy tapping with high-speed compensation control of spindle and servo

[Easy operation]
Simple programming system for machining center and lathe

[Customize]
Development tools for providing a CNC with customized solutions

**M70v TypeA**
- Max. number of part systems: 2
- Max. number of axes: 11
- Max. number of NC axes (in total for all the part systems): 8
  - Machining center system: 5
  - Lathe system: 3
- Number of simultaneous contouring control axes: 4
- Least command increment: 0.1 micrometer
- Least control increment: 1 nanometer
- Max. PLC program capacity: 32,000 steps

**M70v TypeB**
- Max. number of part systems: 1
- Max. number of axes: 9
- Max. number of NC axes (in total for all the part systems): 5
  - Machining center system: 5
  - Lathe system: 0
- Number of simultaneous contouring control axes: 5
- Least command increment: 0.1 micrometer
- Least control increment: 1 nanometer
- Max. PLC program capacity: 20,000 steps
Versatile lines boasting compact size and less wiring

Drive units
- Multi-hybrid drive unit | MDS-DM2 Series
- High-performance drive unit | MDS-D2/DH2 Series
- Ultra-compact drive unit with built-in power supply | MDS-D3 Series

Ethernet
- Operation panel I/O unit (Max.: 96 inputs/96 outputs)
- Manual pulse generator
- RIO 1 (Max.: 256 inputs/256 outputs)
- RIO 2 (Max.: 96 inputs/96 outputs)
- Personal computer
- High-speed optical communication

Servo motors
- Medium-inertia motor | HF Series
- Low-inertia motor | HF-KP Series
- Direct drive motor | TM-RB Series
- Linear servo motor | LM-F Series
- Rotary detector | MBA Series

Spindle motors
- High-performance spindle motor | SJ-D Series
- Low-inertia and high-speed spindle motor | SJ-DL Series
- Tool spindle motor | HF-KP Series
- Built-in spindle motor | SJ-B Series
- Detector for C axis | MBE Series
**Basic Performance**

- **Machining program**
  - Capacity: Machining program capacity is greatly enhanced to the standard of 500kB (1,280m).
  - Processing speed:
    - TypeA: 33.7k blocks/minute
    - TypeB: 16.8k blocks/minute
  - Built-in PLC function
- **Multi-program**
  - Up to 20 PLC program files can be registered, which are executed according to priority. A PLC program can be split into each process and developed.
  - High-speed PLC engine installed (TypeA)
  - TypeA is equipped with a high-speed PLC engine, helps enhance the performance.

**Nano Control**

The least control increment is one nanometer, the command increment is ±9999.9999, and the rapid traverse rate is 1000m/min. All processing from the analysis of machining programs to servo commands is performed in nanometers.

**Speed command fluctuation reduced**

In nano control, the position command calculation fraction of the interpolation calculation is small, so fluctuations in speed command due to the fractions is reduced. This reduces acceleration fluctuations, resulting in finer lines at the time of repeated acceleration/deceleration.

**Interpolation calculation accuracy improved**

Even with one-micron-unit commands in the machining program, interpolation is in nanometer units. As the calculation accuracy of a block interaction is improved, lines on the surface is finer.

**Multi-part Systems Multi-axis**

A maximum of two part systems and 11 axes can be controlled for both the machining center and lathe.

**Position Loop of Spindle Control**

A high-speed error-compensation function is used for controlling the spindle and servo, enabling accurate tapping.

**OMR-DD Control (High-speed synchronous tapping)**

High traceability to command (High-gain control II), which has been developed in servo axis control, is now available for the spindles, contributing to shorter machining time and higher accuracy.

**Spindle/C-axis control**

The spindle’s constant position loop control has eliminated the zero point return time when switching from the spindle to C-axis.

**Orientation time is reduced**

Deceleration is performed with the maximum torque to minimize the spindle orientation time.

**Machining Center System**

- High traceability to command (High-gain control II)
- Even when fine steps exist, thereby, realizing smooth and deviation free die-mold machining. Machining time can be shorter by 5 to 30% relative to our conventional system, especially more effective at a higher feed rate.

**SSS Control**

By judging shapes in large from commanded paths, unnecessary deceleration is reduced even when fine steps exist, thereby, realizing smooth and deviation free die-mold machining. Machining time can be shorter by 5 to 30% relative to our conventional system, especially more effective at a higher feed rate.

**Rapid Traverse Constant Inclination Multi-step Acceleration/Deceleration Function**

- Rapid traverse acceleration/deceleration is performed according to the motor’s torque characteristics.
- As the motor’s characteristics can be utilized optimally, positioning time is reduced, and cycle time is improved.

**Note:** Additional hardware is required. In order to use this function also in the 2nd part system, the option “High-accuracy control in 2 part systems” is required.

**Advantages**

- Enhanced production efficiency
- Increased basic performance
- Remarkable reduction in cycle time

**MITSUBISHI CNC**

- **Nano system (M70V Series)**
  - Micron system
- **Multi-step Acceleration/Deceleration Function**
- **High-speed Machining Mode**
- **SSS Control**
- **OMR-DD Control**
- **Position Loop of Spindle Control**

**Key Features**

- Enhanced production efficiency
- Increased basic performance
- Remarkable reduction in cycle time

**Typically only**

- High traceability to command (High-gain control II)
- Even when fine steps exist, thereby, realizing smooth and deviation free die-mold machining. Machining time can be shorter by 5 to 30% relative to our conventional system, especially more effective at a higher feed rate.

**SSS Control**

- By judging shapes in large from commanded paths, unnecessary deceleration is reduced even when fine steps exist, thereby, realizing smooth and deviation free die-mold machining. Machining time can be shorter by 5 to 30% relative to our conventional system, especially more effective at a higher feed rate.

**Rapid Traverse Constant Inclination Multi-step Acceleration/Deceleration Function**

- Rapid traverse acceleration/deceleration is performed according to the motor’s torque characteristics.
- As the motor’s characteristics can be utilized optimally, positioning time is reduced, and cycle time is improved.

**Note:** Additional hardware is required. In order to use this function also in the 2nd part system, the option “High-accuracy control in 2 part systems” is required.
## Full of useful functions for combined machining

### Multi-part System Program Management (TypeA)
Separate programs, used in each part system, can be managed under a common name in the multi-part system. This function facilitates management of the process programs that are simultaneously executed in the multi-part systems.

### Inclined Axis Control
- Even when the control axes configuring a machine are mounted at an angle other than 90 degrees, this function enables it to be programmed and controlled in the same way as with an orthogonal axis.
- The inclination angle is set using a parameter and axes are controlled using the movement amounts of the axes which are obtained through conversion and compensation using this angle.

### Polar Coordinate Interpolation
- This function converts the commands programmed for the orthogonal coordinate axes into linear axis movements (tool movements) and rotary axis movements (workpiece rotation) to control the contours.
- It is useful for tasks such as cutting linear cutouts on the outside diameter of the workpiece and grinding camshafts.

### Milling Interpolation (TypeA)
This function converts the commands programmed for the orthogonal coordinate axes into linear axis movements (tool movements) and rotary axis movements (workpiece rotation) to control the contours. This enables milling operations using a lathe without a Y axis.

### Hobbing (TypeA)
- G code format is available for hobbing.
- A spur gear can be machined by synchronously rotating the hob axis and the workpiece axis in a constant ratio. A helical gear can be machined by compensating the workpiece axis according to the gear torsion angle for the Z axis movement.

### Mixed Control (cross axis control) (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Balance Cut (TypeA)
- Deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting).
- The machining time can be reduced by machining with two tools.

### Control Axis Synchronization Across Part Systems (TypeA)
The same program Nos. can be managed in parallel across part systems.

### Inclined Axis Control
- The inclination angle is set using a parameter and axes are controlled using the movement amounts of the axes which are obtained through conversion and compensation using this angle.

### Mixed Control (cross axis control) (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Balance Cut (TypeA)
- Deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting).
- The machining time can be reduced by machining with two tools.

### Control Axis Synchronization Across Part Systems (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Mixed Control (cross axis control) (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Balance Cut (TypeA)
- Deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting).
- The machining time can be reduced by machining with two tools.

### Control Axis Synchronization Across Part Systems (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Mixed Control (cross axis control) (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Balance Cut (TypeA)
- Deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting).
- The machining time can be reduced by machining with two tools.

### Control Axis Synchronization Across Part Systems (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Mixed Control (cross axis control) (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Balance Cut (TypeA)
- Deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting).
- The machining time can be reduced by machining with two tools.

### Control Axis Synchronization Across Part Systems (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Mixed Control (cross axis control) (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Balance Cut (TypeA)
- Deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting).
- The machining time can be reduced by machining with two tools.

### Control Axis Synchronization Across Part Systems (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Mixed Control (cross axis control) (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Balance Cut (TypeA)
- Deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting).
- The machining time can be reduced by machining with two tools.

### Control Axis Synchronization Across Part Systems (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Mixed Control (cross axis control) (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.

### Balance Cut (TypeA)
- Deflection can be minimized by holding tools simultaneously from both sides of the workpiece and using them in synchronization to machine the workpiece (balance cutting).
- The machining time can be reduced by machining with two tools.

### Control Axis Synchronization Across Part Systems (TypeA)
The control axes of each part system can be exchanged using a program command. This enables the axis defined as the axis of the 1st part system to be operated as the axis of the 2nd part system.
Optimum performance for various applications

Machining Center System

- **Compact Milling Machine**
  
  The compact operation board, in which the control unit is integrated, and the ultra-compact drive units achieve downsizing of the control board and machine.

- **Tapping Machine**
  
  The multi-hybrid drive unit optimally controls the spindle motor for tapping to bring out the function of high-speed tapping DMR-DD. An NC five-axis control (simultaneous four-axis) enables control of the tilt table.

- **Multi-axis Machining Center (TypeA compatible)**
  
  A system with a maximum of 11 axes and two part systems achieves optimal control even for a compound axis configuration that includes a synchronization axis and a peripheral axis, such as in a large machine or a line dedicated machine.

Lathe System

- **Compact Lathe**
  
  The compact operation board, in which the control unit is integrated, and the ultra-compact drive units achieve downsizing of the control board and machine.

- **Milling-enabled Lathe (TypeA compatible)**
  
  Even without a Y axis, the milling function enables contour control machining on the side or face of a workpiece. Furthermore, the tool spindle motor contributes to downsizing of the turret.

- **Compound Multi-axis Lathe (TypeA compatible)**
  
  Up to four spindles can be controlled by a system with a maximum of 11 axes and two part systems. Owing to the drive units that drive three servo axes/two spindles, we offer an optimal system construction for machines of various axis configurations.
Easy Operation

Enhanced operability with greater ease of use

**HMI for Easier and More Visible Use**

- **Screen structure linked to operation processes**
  Operation processes are divided into three steps, “Monitor”, “Setup” and “Edit”, and necessary information is aggregated into three screens. These screens can be displayed by touching a single button on the keyboard.

- **Pop-up screens**
  Tabs allow the user to select necessary operations from the operation menu, and pop-up screens allow the user to access desired information while the original screen remains displayed. For displays with a touch panel, a keyboard can be displayed on the screen.

- **2-part system display**
  The Monitor screen of the 2nd part system can be displayed together with the 1st part system. Switching screens is not necessary.

- **Auto-scale adjustment of the graphic check function**
  When the automatic graphic check function is enabled, by selecting a file, the scale is automatically adjusted to draw the whole machining path. (In single-plane display mode)

- **Menu customization function**
  Menu keys on the bottom of the screen can be freely arranged. Frequently used menu keys can be put together on the first page.

- **3D solid program check**
  The added 3D solid model check function allows more realistic cutting check.*

**Operation Support**

- **Manual/Automatic backup function**
  - Batch-backup of the NC data into the CF card/USB memory inserted in the front interface of the display is possible.
  - Data is automatically backed-up at a certain interval set by the parameter.

- **Operability of operation search improved**
  Using the program edit screen, it is possible to execute a program from the line specified by the cursor. The operation search immediately detects the edited part to check the content of operation.

- **Menu list**
  Menu list buttons are newly introduced. With these buttons, the screen desired for display can be called up directly.

- **Guidance function**
  By pressing the help button, guidance (operation procedure/parameter descriptions/alarm descriptions/G code format) regarding the currently displayed screen will be shown.

**Operation Support**

- **Operability of program restart function improved**
  Even if a machining program is stopped for reasons such as tool breakage, the program can be restarted when it has been stopped using only the INPUT operation.

- **Menu list**
  Menu list buttons are newly introduced. With these buttons, the screen desired for display can be called up directly.

- **Guidance function**
  By pressing the help button, guidance (operation procedure/parameter descriptions/alarm descriptions/G code format) regarding the currently displayed screen will be shown.

- **Operation Support**
  - Manual/Automatic backup function
  - Data is automatically backed-up at a certain interval set by the parameter.

- **Operability of program restart function improved**
  Even if a machining program is stopped for reasons such as tool breakage, the program can be restarted when it has been stopped using only the INPUT operation.
Memory Card/USB Memory Interface

Easy to import external data

Front IC Card Mode
- It is possible to directly search and run the machining programs from the CF card. Subprogram calls are also available.
- The machining programs in the CF card can be edited directly.

Easy to Change Languages
- Display languages can be switched with a single parameter operation.
- Easy to change languages of the guidance function using a CF card. (English & Two more languages are selectable)
- Support for 17 languages, securing reliable use worldwide.

Ethernet Communication
By connecting a personal computer and a CNC via Ethernet, the machining programs and parameters can be input and output.

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

Data Backup Function
It is possible to backup NC data collectively and periodically to a CF card/USB memory on the front of the display. This backup data is helpful for restoring the system in the case of an accident.

Program Restart Function
It is possible to restart a program even when a machining program is interrupted due to tool breakage or power outages by automatically searching the block that was last executed before the interruption.

Tapping Retract
Even when tapping is interrupted due to emergency stops or power outages, retraction of the tool out of a workpiece can be automatically carried out upon restarting operation.

Vertical Axis Drop Prevention Function at Power Failure
The drive system instantly detects a power failure, and the gravity axis is retracted so as to prevent a crash with a workpiece.

Ground Fault Detection for Each Motor
Ground fault detection, which was formerly centrally performed by a power supply unit, has changed so that the fault can be detected per motor. As detecting a faulty axis is possible, the restore time is shorter.

Drive Unit with Higher Oil-proof
A cooling fan for the radiator fin outside the panel is molded so as to further prevent the oil from entering. The absence of a fan inside the drive unit contributes to the avoidance of electric circuit failures caused by inhaled dust and oil-mist.

<Application example> Remote monitor via tablet PC
When combined with Ethernet, NC Monitor enables remote monitoring via a tablet device. Within reach of wireless LAN, NC Monitor can display on a tablet PC and NC screen that is running on a shop floor. This allows an operator who is distant from workpiece to remote-monitor program running status and presence of alarms, etc. This application also serves as a sub-monitor of large-size or difficult-to-approach machines.

Office
Worksite
Tablet PC
Ethernet
NC Monitor
Remote network software (application) is required.
Remote LAN system and security environments need to be set up by the user.
Simple Programming Functions

Simple programming tools, "NAVI MILL" and "NAVI LATHE"

<table>
<thead>
<tr>
<th>Interface Design with Overall View</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intuitively view system configuration and machining programs</td>
</tr>
<tr>
<td>LIST VIEW</td>
</tr>
<tr>
<td>LIST VIEW displays objects such as programs, processes, file data and parameters.</td>
</tr>
<tr>
<td>OPERATION VIEW</td>
</tr>
<tr>
<td>OPERATION VIEW displays the items corresponding to the object selected in LIST VIEW. Data can be input easily referencing the guidance drawing for input items.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Automatic Setting of Cutting Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simply input the tool number. The cutting conditions for each process are automatically set based on previously registered tool files and cutting-condition files.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Checker and Guidance Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detects input errors for troubleshooting.</td>
</tr>
<tr>
<td>Message guidance</td>
</tr>
<tr>
<td>Troubleshooting options for input errors are displayed.</td>
</tr>
<tr>
<td>Parameter guidance</td>
</tr>
<tr>
<td>Displays parameter details and setting range.</td>
</tr>
<tr>
<td>Tool guidance</td>
</tr>
<tr>
<td>Displays primary data of the tool data previously registered in the tool file.</td>
</tr>
<tr>
<td>Checker</td>
</tr>
<tr>
<td>Displays the tool path or machining shape of a program in graphic form.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customize Machining Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machining programs using macro programs enable commands to be added between processes via the editing screen. Machine tool builders can customize the macro program of each process according to machine specifications and machining know-how.</td>
</tr>
</tbody>
</table>

User Support Tools

Create machining programs on a personal computer

<table>
<thead>
<tr>
<th>NC Explorer (Data Transfer Tool)</th>
</tr>
</thead>
<tbody>
<tr>
<td>By connecting the NC and host personal computer via Ethernet, data such as machining programs can easily be shared. This tool is free of charge. Please contact us.</td>
</tr>
<tr>
<td>NC Explorer</td>
</tr>
<tr>
<td>By connecting the NC and host personal computer via Ethernet, data such as machining programs can easily be shared.</td>
</tr>
<tr>
<td>Ethernet</td>
</tr>
<tr>
<td>Machining program</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NC Trainer / NC Trainer plus (MITSUBISHI CNC Training Tool)</th>
</tr>
</thead>
<tbody>
<tr>
<td>● NC Trainer is an application for operating the screens of MITSUBISHI CNC M70V Series and machining programs. This application can be used for learning operating CNC and checking the operations of the machining programs.</td>
</tr>
<tr>
<td>● NC Trainer plus can also be used for checking the PLC program and custom screens.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA VI MILL</td>
</tr>
<tr>
<td>Turning</td>
</tr>
<tr>
<td>Face cutting</td>
</tr>
<tr>
<td>Hole drilling</td>
</tr>
<tr>
<td>Slotting</td>
</tr>
<tr>
<td>NA VI LATHE</td>
</tr>
<tr>
<td>Turning</td>
</tr>
<tr>
<td>Face cutting</td>
</tr>
<tr>
<td>Hole drilling</td>
</tr>
<tr>
<td>Slotting</td>
</tr>
<tr>
<td>Assist</td>
</tr>
<tr>
<td>Turning</td>
</tr>
<tr>
<td>Face cutting</td>
</tr>
<tr>
<td>Hole drilling</td>
</tr>
<tr>
<td>Slotting</td>
</tr>
<tr>
<td>Hole drilling</td>
</tr>
<tr>
<td>Keyway</td>
</tr>
<tr>
<td>Grooving</td>
</tr>
<tr>
<td>Trapezoid grooving</td>
</tr>
<tr>
<td>Holing by milling</td>
</tr>
</tbody>
</table>
Development Tools

More comfortable development environment

<Custom screen development>
Make your CNC more user-friendly by developing original screens

NC Designer (Screen Design Tool)

- Simply by locating parts of various functions on the screen, it is possible to create custom screens easily.
- It is possible to check the performance of custom screens on a personal computer.

Development Tools

<Sequence program development> Editable on both personal computers and HMI screens

GX Developer (Sequence Programming Tool)
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
Operability of ladder editing/monitoring on the NC display is widely improved. Various functions are enhanced, such as divided screens, the search function and the monitoring screen.

<Easy setup>
Offering a wide range of support tools, from machine design to setup

Servo Selection Tool
By selecting the machine configuration model and inputting the machine specification, the optimal servo motor meeting specifications can be selected. Other selection functions which fully support drive system selection are also available. This tool is free of charge. Please contact us.

Setup Installer
Register the desired display language.

NC Configurator2 (Parameter Setup Support Tool)
The NC data file necessary for NC control and machine operation (such as parameters, tool data and common variables) can be edited on a personal computer. Please contact us to purchase a full function version. (A limited function version is also available free of charge.)

NC Monitor (Remote Monitoring Tool)
An identical NC display screen can be displayed on a personal computer. By connecting a personal computer to the NC unit when necessary, various data can be checked and set using the same HMI as the standard NC screen.

NC Analyzer (Servo Adjustment Support Tool)
Servo parameters can be automatically adjusted by activating the motor using machining programs for adjustment or vibration signals, and measuring/analyzing the machine characteristics.

<Main functions>
- Block diagram measurement display, speed loop gain adjustment, position loop gain adjustment, notch filter setting, acceleration/deceleration time constant adjustment, velocity adjustment and servo waveform measurement.
Network Functions / Extendibility

A wide range of support features according to various machine configurations

| Optical Communication Repeater Unit |

The NC unit can be connected to a network to serve as the master/local station of the MELSEC CC-Link.

The optical cable can be extended to a maximum of 90m by connecting up to two optical servo communication repeater units between the CNC unit and a servo drive unit.

Mitsubishi Factory Automation Solutions

- Our cultivated Factory Automation technologies and experience contribute to offer the best suited systems for users.
- Our FA solutions support high and low hierarchy components, a network and even applications that control the components and network required for a manufacturing floor.

WARRANTY

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

1. Warranty Period and Coverage

   Should any fault or defect (hereinafter 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. 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.

2. 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.

3. Limitations

   (1) The customer is requested to conduct an initial failure diagnosis by himself/herself, as a general rule. It can also be carried out by us or our service provider upon the customer’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 unavoidable 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

4. Service in Overseas Countries

   If the customer installs the product purchased from us in his/her machines or equipment, and export 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.

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

   Whether during or after the term of warranty, we assume no responsibility for any damages arising from causes for which we are not responsible, any losses of opportunity and/or profit incurred by the customer due to a failure of this product, any damages, secondary damages or compensation for accidents arising under specific circumstances that either unforeseen or unforeseen by Mitsubishi Electric, any damages to products other than this product, or compensation for any replacement work, readjustment and startup test run of on-site machines or any other operations conducted by the customer

6. Changes in Product Specifications

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

7. 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 which are expected to have significant influence on human lives or properties.

8. Trademarks

   MELDAS, MELSEC, CISServer, EDVision, ID Platform, MELSOFT, GOT, CC-Link, CC-LinkAT and CC-Link IE are either trademarks or registered trademarks of Mitsubishi Electric Corporation in Japan and/or other countries.
   Ethernet is a registered trademark of Xerox Corporation in the United States and/or other countries.
   Microsoft® and Windows® are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.
   CompactFlash and CF are either trademarks or registered trademarks of SanDisk Corporation in the United States and/or other countries.
   Other company and product names that appear in this manual are trademarks or registered trademarks of the respective companies.

Microsoft® and Windows® are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.
CompactFlash and CF are either trademarks or registered trademarks of SanDisk Corporation in the United States and/or other countries.
Other company and product names that appear in this manual are trademarks or registered trademarks of the respective companies.

Microsoft® and Windows® are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries.
CompactFlash and CF are either trademarks or registered trademarks of SanDisk Corporation in the United States and/or other countries.
Other company and product names that appear in this manual are trademarks or registered trademarks of the respective companies.
Specifications

Drive System

Direct Drive Servo Motor TM-RB Series

- With the fastest current control cycle, basic performance is drastically improved. A combination of high-speed servo motor and high-precision detector helps enhance overall drive performance.
- High-efficiency and low-loss power module has enabled unit downsizing. A line of drive units offering a maximum of two spindle axes is available, contributing to a reduction in control panel size.
- STO (safe torque off) is now available.

Multi-high Drive Units MDS-DM2 Series

- All line of high-performance multi-high drive units are available. The multiphase drive of this series features the maximum of three servos axes and one spindle, supporting the operation of units and offering technical advantages.
- Power regulation system that efficiently uses energy during deceleration as power contributes to highly frequent acceleration/deceleration and energy savings.
- STO (safe torque off) is now available.

All-in-one compact drive units MDS-DJ Series

- Drives compact drive units with built-in power supplies to reduce control panel size. The 2.1kW is added for further downsizing.
- High-speed optical communication enables a shorter position interpolation cycle and direct communication between drives, supporting the operation of units and offering technical advantages.
- High-efficiency and low-loss power module has enabled unit downsizing, which also leads to a reduction in control panel size.
- STO (safe torque off) is now available.

Displays & Keyboards

- The internal components of the keyboard are protected against water and oil (IP65F).
- The internal keyboard is now available.

Servo Motors

HF Series

- Available for an auxiliary axis that requires high-speed positioning.
- Range: 0.5 to 7.5 [kW]
- Maximum speed: 6,000 [r/min]
- Supports a detector with a resolution of 600,000/1,000,000/16,000,000 p/rev.

HF-KP Series

- Suitable for an auxiliary axis that requires high-speed positioning.
- Range: 0.7 to 11 [kW]
- Maximum speed: 1,000 [r/min]
- Supports a detector with a resolution of 200,000 p/rev.

Linear Servo Motor LM-F Series

- Available for use in clean environments where noiseless axes are used and high-speed positioning is necessary.
- Supports three types of detectors with a resolution of 360,000, 1 million or 16 million p/rev.

Direct Drive Servo Motor TM-RB Series

- High-torque direct-drive combined motor with a high-speed control system provides quick acceleration and positioning, which makes rotation smoother.
- Suitable for all axes that drive a table or spindle head.
- Range: 10 to 20 [kW]
- Maximum torque: 36 to 1,280 [N·m]

Spindle Motors

High-performance New Type Spindle Motor SJ-D Series

- Motor volume has been significantly reduced by optimizing the magnetic circuit.
- Product line: Normal SJ-D Series 3.7 to 11 [kW]
- Compact & light SJ-D Series 5.5 to 15 [kW]

Low-Inertia, High-speed New Type Spindle Motor SJ-DL Series

- Tapping machine dedicated spindle motors have gained the support of spindle motor type SJ-DL Series in an effort to speed up drilling and tapping.
- The low-inertia reduces accelerations/decelerations and time, resulting in higher productivity.
- Product line: Low-inertia SJ-DL Series 0.75 to 7.5 [kW]

Low-Inertia, High-speed Spindle Motor SJ-VL Series

- The spindle dedicated to tapping machine requires better drilling and tapping.
- This low-inertia reduces accelerations/decelerations and time, resulting in higher productivity.
- Product line: Low-inertia normal SJ-V Series 3.0 to 11 [kW]
- Low-inertia hollow shaft SJ-V Series 3.7 to 11 [kW]

Tool Spindle Motor HF-KP/HF-SP Series

- Various advantages of the characteristics of a high-speed motor such as smallness and high-output, this motor series can be used as a compact and high-output spindle motor which achieves high-speed rotation (6,000,000 rpm). This type of spindle motor is also applicable to high-speed machining in demanding of spindles, such as the rotary tool spindle.
- Product line: Small capacity HF-KP Series 0.4 to 0.9 [kW]
- Medium capacity HF-SP Series 2.2 to 4 [kW]

MITSUBISHI CNC Machine Operation Panel

- The control unit is integrated into the back side of the display.
- Refer to the product brochure for details.
Safety Warning
To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
http://Global.MitsubishiElectric.com

Revised publication, effective Dec. 2013.
Specifications are subject to change without notice.