313011/01

GENERAL NUMERIC

CNC Engineering
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10/11/12MA
Milling CNC

The General Numeric 10/11/12MA Milling CNC features:

- **Up to 15 axes**
- **Background edit**
- **Fully automatic cutter radius compensation**
- **Tool life management**
- **In-process/post-process gaging capability**
- **Powerful custom macro**
- **Synchronous axis control**
- **Absolute position detection**
- **48 work coordinate systems**
- **Graphic display**
- **Powerful PMC**
- **DNC capability**
- **Analog/digital servo system**
- **Large part program storage (Max. 16,800 ft.)**
- **Scaling**
- **Dual feedback axis monitor (12MA only)**
- **Hybrid servo control (12MA only)**
- **Built-in tracing/digitizing (12MA only)**
- **3-dimensional rotation (12MA only)**

Adoption of Digital Servo Control

The **10/11/12MA** digital servo controls utilize a variety of advanced technologies. They include very high-speed signal processors, newly developed custom LSIs and high resolution encoders. These features provide outstanding reliability and performance in the following ways:

- High speed and high resolution
  A maximum traverse rate of 960 inch/min with a resolution of 0.00001 inch, incorporated with the high resolution detector
- Feed forward control
  This feature reduces contouring errors such as rounding at corners and small radius error on circular cutting without having a high position gain.
- Improved reliability
  Reduction of settings
  Elimination of drift in circuitry
- Flexible operation
  Parameter setting for optimum inertia, current limit, etc.

The General Numeric **10/11/12MA** series are the most advanced and highly sophisticated CNC's in the world. The **10MA** is an advanced CNC for milling applications designed for high production and relatively small machines; up to 4 axes can be controlled. The **11MA** is an advanced and highly sophisticated CNC for milling applications designed mainly for relatively large machines which produce complex workpieces; up to 5 axes can be controlled. The **12MA** is the most sophisticated CNC designed for applications of large machines such as gantry-type machines; up to 15 axes can be controlled.

The **10/11/12MA** CNC's offer the best capabilities to meet today's demanding requirements in the area of large scale Factory Automation Systems. However, their programming and operation features are structured to be user friendly.

High Performance & Productivity

The **10/11/12MA** are high-performance CNC's capable of controlling axes at a maximum traverse rate of 2400 IPM with a resolution of 0.0001 in. A unique acceleration/deceleration control technique (optional) increases servo loop gain, reducing contouring error. A resolution of 0.00001 in. is available as a basic feature for precision machining. A fourth and fifth axis (optional) can be added for full milling and drilling machining center capabilities. In addition, ten more axes can be added for auxiliary axes positioning, such as rotary tables, indexing heads, tool magazines and pallet changers.

Most Advanced Technologies

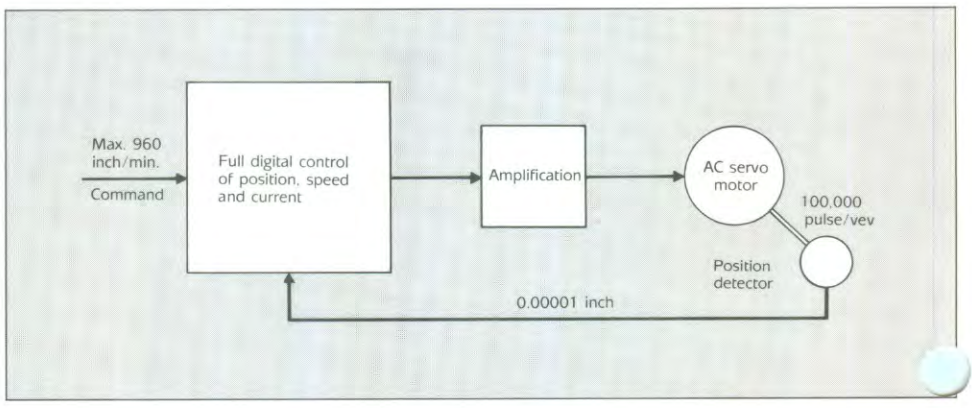
The **10/11/12MA** Series combines outstanding reliability and compact design with advanced technology, including 8000 gate custom VLSIs, high-speed, 16/32 bit microprocessors, and high-density EPROMs and static RAMs.

The **10/11/12MA** are the first CNCs in the world to use state-of-the-art optical fiber technology. Optical fiber connections between the main processor unit and remote units, such as the MDI/CRT unit and the machine interface unit [Data In (DI) / Data Out (DO)], allow high-speed transmission of data with high-noise immunity.

A variety of I/O modules are also available, such as DC input/output modules, AC input/output modules, analog input/output modules, pulse counter modules and positioning modules which control turrets, ATC's (Automatic Tool Changers), APC's (Automatic Pallet Changers), AAC's (Automatic Attachment Changers), and other peripherals.

Foreground and Background Operation

The **10/11/12MA** offers the capability of "background editing" as a basic feature. This function allows the programmer/operator to load and edit programs while a machining program is being executed in the "foreground". Therefore, programs may be prepared for the next job without waiting for the completion of the current machining operation. This feature increases machine productivity as well as operator/programmer efficiency.



Friendly Programming

The programming of the control can be accomplished by "direct" entry. That is, the values from a blueprint can be directly input to the part program. The following elements may be directly input:

- arc radius data
- start angle for multiple-lead threading (optional)
- inch per thread data (optional)
- machine position data
- absolute/incremental data
- feedrate data
- chamfer and corner radius insertion (optional)
- work surface speed data (optional)
- spindle speed data (optional)

Friendly Operation

The Series offers a CRT display with software defined keys as standard. The control utilizes these keys to assist the operator in the following ways:

- Full-time status displays
- Software defined keys with guidance messages
- Program directory display with 16 character ID
- CRT display with intensity control to highlight operation status
- Full-time diagnostics with clear messages
- Dynamic display of ladder diagram
- Program edition for characters, words, blocks and multi-blocks

Large Part Program Storage

A large-capacity tape memory has been provided to facilitate NC part program management. The **11/12MA** adopt state-of-the-art 4M bit/chip bubble memories.

- Tape length
  GN**10MA**: Max. 2100 ft.
  GN**11/12MA**: Max. 16800 ft.
- Number of registerable programs
  Max. 400

Flexible Programs

The **10/11/12MA** Series offer a unique programming capability called "custom macro". This feature permits parametric programming, arithmetic functions, logical calculations, conditional jump functions, message display capabilities, etc. By using these capabilities, the control can be customized to meet the requirements of user-defined applications. The following are just a few of the examples of how the "custom macro" feature may be used.

- Family programs
- Customized canned cycles
- In-process/post-process gaging routines
- Multi-function M-codes
- Feedrate program by workpiece surface finish
- Automatic retraction and recover cycle at tool breakage

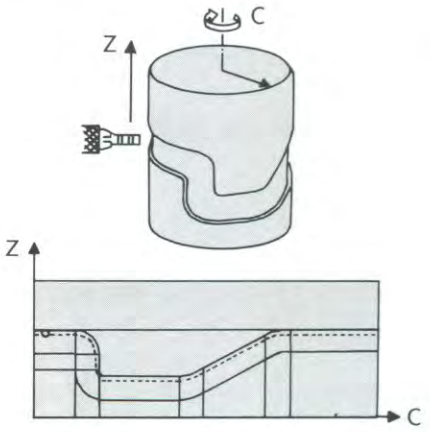
Application Flexibility

The Series offers a wide range of applications from a simple two axis machine to a FMS cell. The powerful built-in Programmable Controller (PC), with wide communication channels, along with the NC control software, offers access to all necessary data for constructing a FMS. The combination of a high-level language (PASCAL) and conventional ladder-type program provides for an optimum PC system. Along with a large memory 80K and 208K (optional) the large number of I/O (848 inputs/560 outputs), the system is more than adequate for construction of complex cells. The wide communication channels will accommodate the following items:

- Control of program loading/unloading through serial port
- Terminal emulation by MDI/CRT
- Reporting NC and machine status
- Supervising machining by a host computer
- NC command format conversion

Cylindrical Interpolation (Optional)

This feature is ideally suited to cylindrical groove cutting needs. The programming can be performed as the cylinder is devloped. The NC automatically converts the programmed profile to one linear motion (Z) and one rotary motion (C).



Cylinder development

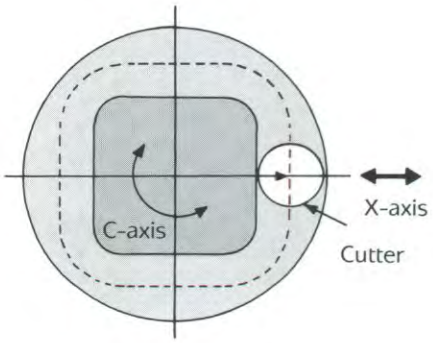
Powerful Display Feature (Optional)

The **10/11/12MA** has a CRT display, which shows the operator various information for editing and machining.

- Language selection (English, German, French, Italian, Japanese)
- Program name with 48 character ID
- Load meter display for General Numeric AC servos and AC spindles
- Run hour and parts counter display
- File directory for floppy cassette
- Machining time display
- Graphic display of tool path

Polar Coordinate Interpolation (Optional)

This feature is very useful for cam grinding and face milling (X & C axis). The machining profile is easily programmed as if the X and C axis are in an orthogonal coordinate system. The NC automatically converts the profile to one linear motion (X) and one rotary motion (C).



A Large Window Between PMC and NC (Optional)

A large window is provided between PMC and NC which enables easy incorporation of special functions such as bi-directional communication with a host computer. The following information can be read/written through the window.

- Machine position
- Skip position
- Servo following error
- Alarm status
- NC parameters
- Modal information
- Analog data
- Offsets
- Tool life management data
- MDI keys
- Serial port
- Overlapped motion axis command
- CRT screen data
- Actual feedrate
- Pitch error compensation data
- Others

Simple Semi-Conversational Programming (10MA only, Optional)

The NC cycle program can be created by selecting the appropriate G-code from the displayed menu. The programmer can then simply input numeric values of the selected G-code in response to questions displayed on the CRT.

Gas, Plasma, Laser, Cutting Application (11/12MA)

- Continuous retrace function (Up to 80 blocks)
- C-axis auto normalize for a bevel torch
- Acc./dec. signal output for corner power control
- Auto inposition check function

Jig Grinder Application (11/12MA)

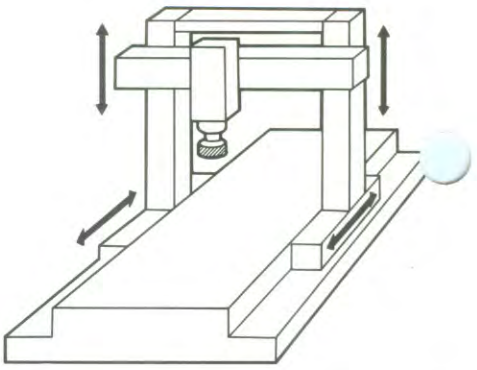
- C-axis normalize control
- Program by rev. for rotary axis

Gear Hobbing Application (11MA)

- Unique software electronic gear box
- Software electronic differential gear
- Custom program cycle can be made by PASCAL program

Synchronous Operation Control (Optional)

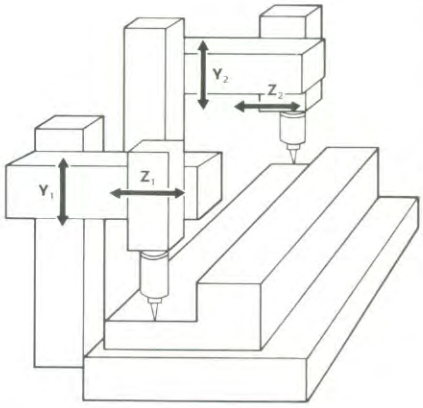
This function moves 2 movable bodies in the same manner as much as possible and, for example, is used to drive a gantry by 2 motors.



Parallel Axis Control (12MA) (Optional)

This function moves 2 or more axes at a time by a command with a singular address. The following 3 types of motion for parallel axis are available, and selected by an external input signal.

- Normal: Move the axis as commanded
- Mirror: Move the axis opposite to the commanded direction
- Park: Ignore a motion

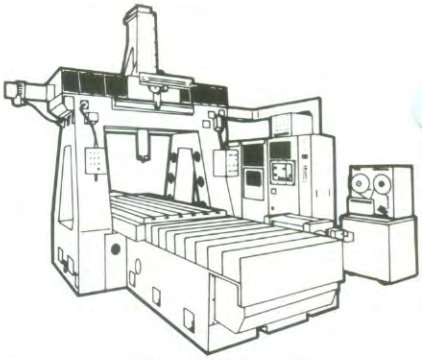


Digitizing Function (12MA) (Optional)

- 3-dimensional tool offset
- Large storage area for digitizing data

Hard disk:	165000 ft.
Floppy disk:	Max. 18000 ft.
Bubble Memory:	16000 ft.

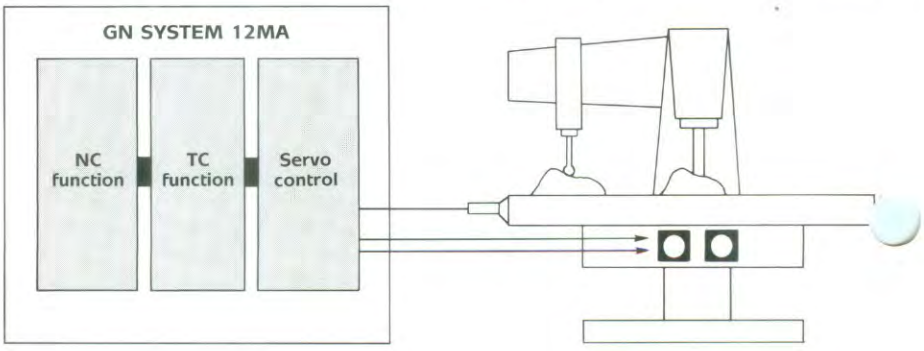
- Scaling



Tracing Control (TC) (12MA, Optional)

When furnished with the TC function, a single **12MA** controller can execute the function which two controllers (NC and TC) had executed. A machining system suited to a profile can be selected for efficient die shaping (patent pending).

- Tracing for 3-dimensional machining requiring difficult tape preparation
- NC machining for high-precision 2- and 3-dimensional shaping
- Combined use of NC and tracing for contours with convex and concave bottom surfaces or complex grooves, which are difficult to machine with only a single function of NC or tracing



Basic Features

Specification	10MA			11MA		12MA	Notes
	BMI	3	6	BMI	6	BMI	
Controlled axes: 2/3 axes Name of axes: Optional from X,Y,Z,U,V,W,A,B,C	O	O	O	O	O	O	
Simultaneously controllable axes: 2 axes	O	O	O	O	O	O	
Tape code: EIA RS244A, ISO 840 automatic recognition	O	O	O	O	O	O	
Decimal point programming	O	O	O	O	O	O	Pocket calculator type available
Increment system - 0.00001″, 0.0001″, 0.001″	O	O	O	O	O	O	
Max. command value: 8 digits	O	O	O	O	O	O	
Rapid Traverse rate: 2400 IPM @ 0.0001″	O	O	O	O	O	O	
Rapid Traverse override: F0, F1, 50%, 100%	O	O	O	O	O	O	F1 = 25% for 3 & 6
Feedrate command: mm/min or inch/min	O	O	O	O	O	O	
Feedrate range: 2400 IPM @ 0.0001″	O	O	O	O	O	O	
Feedrate override: 0 - 254% per every 1%	O	△	△	O	△	O	Up to 200% per 10% in 6 Up to 150% per 10% in 3
Override cancel	O	O	O	O	O	O	
Tangential speed constant control	O	O	O	O	O	O	
Automatic acc./dec.: rapid; linear; cutting; exponential	O	O	O	O	O	O	Acc./dec. after interpolation
Positioning (G00)	O	O	O	O	O	O	Linear interpolation type available
Linear interpolation (G01)	O	O	O	O	O	O	
Multi-quandrant circular interpolation (G02, G03)	O	O	O	O	O	O	By radius programming
Combined use of absolute/increment command: possible in the same block	O	O	O	O	O	O	
Coordinate system setting (G92)	O	O	O	O	O	O	
Local coordinate system setting (G52)	O	O	O	O	O	O	
Work coordinate system selection: (G54 - G59)	O	O	O	O	O	O	
Machine coordinate system selection (G53)	O	O	O	O	O	O	
Dwell (G04)	O	O	O	O	O	O	
Auxiliary functions: M 8 digits (Binary output)	O	△	△	O	△	O	BCD - 3 digit for 6 BCD - 2 digit for 3
Spindle function: S 8 digits (Binary output)	O	△	△	O	△	O	BCD - 2 digit for 3, 6
Tool function: T 8 digits (Binary output)	O	△	△	O	△	O	BCD - 2 digit for 3, 6
Reference point return: manual, automatic (G27 - G29)	O	O	O	O	O	O	
Program number: 4 digits	O	O	O	O	O	O	
Program number search	O	O	O	O	O	O	
Sequence number: 5 digits	O	O	O	O	O	O	
Sequence number search	O	O	O	O	O	O	
Part program storage, edit	O	O	O	O	O	O	
Main/sub program	O	O	O	O	O	O	
Background editing: editing during automatic operation	O	O	O	O	O	O	
Tape storage length: 260 ft.	△	△	△	O	O	△	66 ft. for 10MA 200 ft. for 12MA
Registerable program: 100	△	△	△	O	O	O	50 for 10MA
Program name: 16 character	O	O	O	O	O	O	

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Basic Features Continued

Specification	10MA			11MA		12MA	Notes
	BMI	3	6	BMI	6	BMI	
Single block	O	O	O	O	O	O	
Optional block skip	O	O	O	O	O	O	
Program stop/end	O	O	O	O	O	O	
Buffer register	O	O	O	O	O	O	
Cycle start/feed hold	O	O	O	O	O	O	
Dry run	O	O	O	O	O	O	
Interlock: all axes, each axis	O	△	O	O	O	O	All axes or Z axis only for 3
Machine lock: all axes	O	O	O	O	O	O	
Machine lock: each axis	O	PC	PC	O	PC	O	
Manual absolute ON/OFF	O	PC	O	O	O	O	
Auxiliary function lock	O	PC	O	O	O	O	
Data protection keys	O	O	O	O	O	O	4 kinds of key available for BMI
Continuous jog	O	O	O	O	O	O	
Incremental feed: x1, x10, x100, x1000, x10000, x100000	O	△	O	O	O	O	Up to x1000 for 3
Emergency stop	O	O	O	O	O	O	
Servo off	O	PC	O	O	O	O	
Follow up: emergency stop, signal input	O	O	O	O	O	O	
Overtravel	O	X	O	O	O	O	No hardware OT for 3
External mirror image: each axis	O	PC	△	O	△	O	Only X, Y axis for 6 w/o PMC
Controlled axis detach	O	O	O	O	O	O	Only 4th/5th axis w/o PMC for 6
CRT character display: 9″ monochrome	O	O	O	O	O	O	
Keyboard type manual data input (MDI)	O	O	O	O	O	O	
Tool length compensation (G43, G44, G49)	O	O	O	O	O	O	
Tool offset memory A: ±6 digit, 32 pairs	O	O	O	O	O	O	
Backlash compensation	O	O	O	O	O	O	
Exact stop (G09, G61, G64)	O	O	O	O	O	O	
Self-diagnosis functions	O	O	O	O	O	O	
NC status output	O	△	△	O	△	O	
Read/punch of PC parameter	O	O	O	O	O	O	Digital servo system only
High speed M/S/T/B inteface	O	X	X	O	X	O	Digital servo system only
Feed forward function	O	O	O	O	O	O	Digital servo system only
External power ON/OFF	O	O	O	O	O	O	
Connectable servo motors: AC/DC servo motor	O	O	O	O	O	O	
Connectable servo units: AC/DC drive	O	O	O	O	O	O	
Connectable position detectors: pulse coder/optical scale	O	O	O	O	O	O	
Connectable spindle motor: AC/DC spindle motor	O	O	O	O	O	O	
Connectable spindle servo units: AC/DC drive	O	O	O	O	O	O	
Power supply: 200/220 VAC, +10%, -15%, 1 phase, 50/60 Hz ± 1 Hz	O	O	O	O	O	O	

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Optional Features

Specification	10MA			11MA		12MA	Notes
	BMI	3	6	BMI	6	BMI	
Controllable axis expansion: Max. 4 for 10MA, Max. 5 for 11MA, Max. 15 for 12MA	O	X	O	O	O	O	X: 3 axes only
Simultaneous controllable axes expansion: up to all control axes	O	O	O	O	O	O	
Single direction positioning (G60)	O	O	O	O	O	O	
Helical cutting	O	O	O	O	O	O	
Hypothetical interpolation	X	X	X	O	O	O	
Thread cutting, continuous Thread cutting, synchronous feed	O	O	O	O	O	O	
Inverse time feed	X	X	X	O	O	O	
F1 - digit	O	X	O	O	O	O	
2nd feedrate override cutting feed automatic	O	X	X	O	X	O	
Acc./dec.: linear before interpolation	O	O	O	O	O	O	
Automatic corner override	X	X	X	O	O	O	
2nd, 3rd, 4th reference point return	O*	△	△	O	O	O	* Digital servo only
Programmable data input (G10)	O	O	O	O	O	O	
Polar coordinate command (G15, G16)	X	X	X	O	O	O	
Inch/metric conversion	O	O	O	O	O	O	
Spindle speed binary/analog output	O	△	O	O	O	O	△: analog only w/o PMC
Constant surface speed control	O	O	O	O	O	O	
Actual spindle speed output	O	X	X	O	X	O	
T-code output: 4 digits	*	X	O	*	O	*	*: 8 digit as a basic
Tool life management	O	X	O	O	O	O	
2nd auxiliary function: 8 digits binary select address from A,B,C so that it does not duplicate with control axis address	O	△ PC	△	O	△	O	△: BCD 3 digits
Optional block skip addition 2 - 9	O	X	O	O	O	O	
Canned cycle (G73, G74, G76, G80 - G89)	O	O	O	O	O	O	
Chamfering, corner R: optional angle	O	O	O	O	O	O	
Programmable mirror image (G50.1, G50.2)	O	O	O	O	O	O	
Tool offset (G45 - G48)	O	O	O	O	O	O	
Cutter radius compensation B: (G38 - G42)	O	O	O	O	O	O	
Cutter radius compensation C: (G38 - G42)	O	O	O	O	O	O	
Tool offset memory B: ±6 digits, geometry/ wear memory, 32 pairs, common to all tool offset	O	O	O	O	O	O	
Tool offset memory C: ±6 digits, geometry/ wear, length/radius offset 32 pairs	O	O	O	O	O	O	
Additional tool offset pairs: 99/200 pairs	△	△	△	O	O	O	△: 99 pairs only
Stored pitch error compensation	O	O	O	O	O	O	
Inclination compensation	X	X	X	O	O	O	
Straightness compensation	X	X	X	O	O	O	
Scaling (G50, G51)	△	△	△	O	O	O	△: Not available for 14″ CRT analog software
Coordinate system rotation (G68, G69)	△	△	△	O	O	O	△: Not available for 14″ CRT analog software
Skip function (G31)	O	O	O	O	O	O	

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Optional Features Continued

Specification	10MA			11MA		12MA	Notes
	BMI	3	6	BMI	6	BMI	
Multiple skip function (G31.1 - G31.3)	O	X	X	O	X	O	
High speed skip signal input	O	O	O	O	O	O	
Automatic tool length measurement (G37)	O	X	X	O	X	O	
High speed measuring position reach signal	O	X	X	O	X	O	
Tool length measurement	O	△	O	O	O	O	△: No position record signal without PMC
Custom macro	O	△	O	O	O	O	△: DI/DO not available without PMC
Custom macro common variable: Max. 300	△	△	△	O	O	O	△: Max. 250
Interruptive macro call	O	PC	O	O	O	O	
Key and program coding	O	O	O	O	O	O	
Parallel axis control	X	X	X	X	X	O	
Synchronous operation	X	X	X	X	X	O	
Hybrid control	X	X	X	X	X	O	
Double feedback check system	X	X	X	X	X	O	
Feed stop	X	X	X	O	O	O	
Sequence number comparison and stop	O	O	O	O	O	O	
Program restart	O	X	O	O	O	O	
Block restart	O	PC	PC	O	PC	O	
Manual handle interruption	O	X	O	O	O	O	
Auto/manual simultaneous operation	O	X	X	O	X	O	
Manual handle feed (1st)	O	O	O	O	O	O	
Manual handle feed (2nd, 3rd)	O	O	O	O	O	O	
Manual arbitrary angle Feed: unit of angle $1/16^0$	O	X	PC △	O	PC △	O	△: unit of angle 5^0
Manual numerical command	O	O	O	O	O	O	
14″ color CRT	O	O	O	O	O	O	
Run hour display	O	O	O	O	O	O	
Menu switch	O	O	O	O	O	X	
Software operator's panel	O	PC	PC	X	X	X	
Simple conversation automatic programming	O	O	O	X	X	X	
External position display	X	X	X	O	O	O	
Expanded part program editing	O	O	O	O	O	O	
Part program storage length: Max. 5120m	△	△	△	△	△	O	△: Max. 80m for 10MA, Max. 3840m for 11MA
Play back	O	O	PC	O	PC	O	
External I/O device control	O	X	X	O	X	O	
Tape reader without reel	O	O	O	O	O	O	
Tape reader with reel	O	O	O	O	O	O	
Reader/puncher interface	O	O	O	O	O	O	
Floppy cassette adaptor	O	O	O	O	O	O	
Stored stroke check 2	O	O	O	O	O	O	
Stroke check before move	O	O	O	O	O	O	
External deceleration	O	X	△	O	△	O	△: only for X, Y and Z axis

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Optional Features Continued

Specification	10MA			11MA		12MA	Notes
	BMI	3	6	BMI	6	BMI	
Move signal output, move direction signal output	O	X	X	O	X	O	
External work number search: 31 points	O	△	O	O	O	O	△: 15 points
NC window	O	X	X	O	X	O	
Resolver/inductosyn	X	X	X	O	O	O	Not available for digital servo
Portable tape reader	O	O	O	O	O	O	
Multi-tap transformer 200 - 550 VAC	O	O	O	O	O	O	
High speed machining	△	△	△	O	O	O	△: Only with digital servo
Multi-buffer	△	△	△	O	O	O	△: Only with digital servo
Table indexing function	O	X	O	O	O	O	
Parts number display	O	O	O	O	O	O	
Absolute position detector	O	O	O	O	O	O	No battery alarm signal w/o PMC
Programmable parameter entry	O	O	O	O	O	O	
Tool compensation 499 pairs	X	X	X	O	O	O	
Key input from PMC	O	PC	PC	O	PC	O	
Tool life management 512 pairs	X	X	X	O	X	O	
Expanded custom macro	O	O	O	O	O	O	
NC window B	O	X	X	O	X	O	
Spindle positioning	O	X	X	O	X	O	
Coordinate rotation	O	O	O	O	O	O	
Scaling	O	O	O	O	O	O	

Optional Features Only With Digital Servo

Specification	10MA			11MA		12MA	Notes
	BMI	3	6	BMI	6	BMI	
Helical interpolation B	X	X	X	O	O	O	
Polar coordinate interpolation	O	O	O	O	O	O	
Cylindrical interpolation	O	O	O	O	O	O	
Exponential function interpolation	X	X	X	O	O	O	
Circular threading B	X	X	X	O	O	O	
Linear acc./dec. after cutting feed interpolation	X	X	X	O	O	O	
Additional work coordinate system	O	O	O	O	O	O	
Tool compensation 999 entries	X	X	X	O	O	O	
Tool offset by tool number	X	X	X	O	O	O	
Tool length/work zero point measurement B	O	PC	PC	O	PC	X	
Custom macro common variables-600 variables	X	X	X	O	O	O	
Automatic corner deceleration	X	X	X	X	X	O	
Feedrate clamp by circular radius	X	X	X	O	O	O	
Feed stop	X	X	X	O	O	O	
Arbitrary command multiply	O	O	O	O	O	X	
Axis switching	X	X	X	O	O	O	
Part program storage length	Max. 640m	Max. 640m	Max. 640m	Max. 5120m	Max. 5120m	Max. 5120m	

O = Available △ = Restricted X = Not available PC = need PMC

Optional Features Only with Digital Servo Continued

Specification	10MA			11MA		12MA	Notes
	BMI	3	6	BMI	6	BMI	
Graphic display A	O	O	O	O	O	O	Need 14″ CRT
Two CRT/MDI control	X	X	X	X	X	O	Not available with 9″ CRT
Directory display of floppy cassette	O	O	O	O	O	O	
Rewind of portable tape reader w/RS232C	O	O	O	O	O	O	
Programming axis name addition	X	X	X	X	X	O	Up to 13 axes
High resolution interface (0.0001mm/0.00001″)	O	O	O	O	O	O	
Floating reference point return	O	△	△	O	△	O	△: No confirmation signal
Work coordinate system presetting	O	O	O	O	O	O	
Spindle speed fluctuation detection	O	X	X	O	X	O	
48 - character program name	O	△	△	O	△	O	△: No program search by window
Rigid tap	O	PC	PC	O	PC	X	
Figure copying	X	X	X	O	O	O	
Full-closed loop backlash compensation	X	X	X	O	O	O	
Scaling B	X	X	X	O	O	O	
3-dimension coordinate conversion	X	X	X	X	X	O	
Simple synchronous control	O	PC	PC	O	PC	X	
Automatic corner deceleration	X	X	X	X	X	O	
Twin table control	X	X	X	O	PC	X	
Normal direction control	X	X	X	O	O	O	
Chopping function	X	X	X	O	X	O	
Tool retract & recover	O	X	X	O	X	O	
Override playback	X	X	X	O	X	O	
Retrace	X	X	X	O	X	O	
Language selection	O	O	O	O	O	O	
Run hour and parts number display	O	PC	PC	O	PC	O	
Load meter display	O	O	O	O	O	O	
Machine time stamp function	O	O	O	O	O	O	

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GENERAL NUMERIC

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