

# 10TA

## 10TA Turning CNC features:

- High speed 2400 RPM @ 0.0001"
- Fine resolution 0.00001" capability
- Background edit capability
- Fully automatic tool nose radius compensation
- Enhanced multi-path cycle
- Spindle positioning
- Software guided key operation
- In-process/post-process gauging capability
- Powerful custom macro
- DNC capability

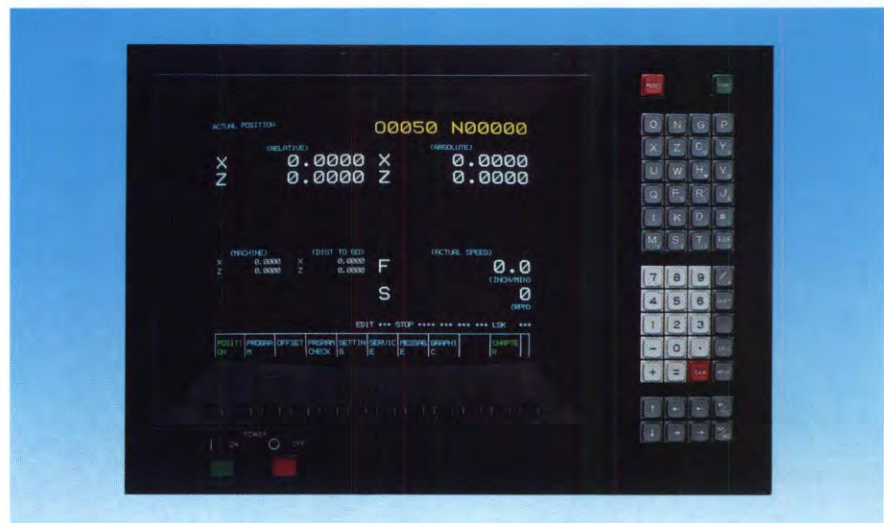
The Model 10TA is an advanced CNC for turning applications designed for high-production and relatively small lathes. The programming and operating features are user friendly. The 10TA offers sufficient capability to meet today's sophisticated needs in the area of Flexible Manufacturing Systems (FMS).

## MOST ADVANCED TECHNOLOGIES

The 10TA provides outstanding reliability and compact design with advanced technologies including 8000 gate custom VLSIs, high-speed, 16/32 bit microprocessors and high-density EPROMs and static RAMs. In addition, optical fiber connections between the main processor unit and remote units such as the Manual Data Input MDI/CRT unit and the machine interface unit [Data In (DI)/Data Out (DO)], allow high-speed transmission of data with high-noise immunity. The 10TA is the first CNC in the world using optical fiber technology.

## HIGH PERFORMANCE, HIGH PRODUCTIVITY

The 10TA is a high-performance CNC 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 third and fourth axis (optional) can be added for full turning center capabilities and for milling and drilling applications.



In addition, four more axes can be added for auxiliary axes positioning such as a programmable tailstock or cut-off slide.

## FRIENDLY PROGRAMMING

The 10TA can be programmed by "direct" entry. This means, 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
- inch per thread data
- machine position data
- absolute/incremental data
- feedrate data
- chamfer and corner radius insertion (optional)
- work surface profile data (optional)
- surface speed data (optional)
- spindle speed data (optional)

# GENERAL NUMERIC

390 Kent Avenue, Elk Grove Village, IL 60007 • (312) 640-1595

### SIMPLE SEMI-CONVERSATIONAL PROGRAMMING (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.

### FRIENDLY OPERATION

The 10TA has a CRT display with standard software defined keys. The control utilizes these keys fully 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 editing for characters, words, blocks and multi-blocks
- Programming guidance display (optional)

### FOREGROUND AND BACKGROUND

The 10TA offers the capability of "background editing" as a basic feature. The 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 programmer/operator efficiency.

### FLEXIBLE PROGRAMS

The 10TA offers a unique programming capability called "custom macro". This feature permits parametric programming, arithmetic functions, logical calculations, conditional jump functions, message display capability, 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 gauging routines
- Multi-function M codes
- Feedrate program by workpiece surface finish

### APPLICATION FLEXIBILITY

The 10TA offers a wide range of applications from a simple two axis lathe to a FMS cell. The powerful built-in

Programmable Controller (PC), with wide communication channels, along with the NC control software, offer access to all necessary data for construction of 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) and the large number of I/O (752 inputs/496 outputs), the system is more than adequate for construction of complex FMS 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

### TECHNICAL SPECIFICATIONS

BM BASIC MACHINE INTERFACE: System with BM interface (the only interface with which all functions of SYSTEM 10 can be used). PC is required.

3. . System with which interface is compatible with the current SYSTEM 3.

6. . System with which interface is compatible with the current SYSTEM 6.

## 1. BASIC FUNCTIONS

Specifications	With PC			Without PC		Note
	BM	3	6	3	6	
Controlled axes: 2 axes	★	★	★	★	★	
Name of axes: Optional from X, Y, Z, U, V, W, A, B, C	★	★	★	★	★	
Simultaneously controllable axes: 2 axes	★	★	★	★	★	
Tape Code: EIA RS244A, ISO840 Automatic recognition	★	★	★	★	★	
Decimal point programming	★	★	★	★	★	Pocket calculator type available
Max. command value: ±8 digits	★	★	★	★	★	
Rapid traverse override: F0, F1, 50, 100%	★	★	★	★	★	
Feed rate command: mm/min or inch/min, mm/rev or inch/rev (G94, G95)	★	★	★	★	★	E6 digits specify
Feed rate override: 0-254% per every 1%	★	✓	✓	✓	✓	✓: Up to 150% in 3 ✓: Up to 200% in 6 (per 10%)
Tangential speed constant control	★	★	★	★	★	
Automatic acceleration/deceleration: Rapid traverse; linear, cutting feed; exponential	★	★	★	★	★	Acceleration/deceleration after interpolation
Positioning (G00)	★	★	★	★	★	Linear interpolation type available also

★ = Available

✓ = Restricted

□ = Not Available

## 2. OPTIONAL FUNCTIONS CONTINUED

Specifications	With PC			Without PC		Note
	BM	3	6	3	6	
Inch/metric conversion (G20, G21)	★	★	★	★	★	
Programmable data input (G10)	★	★	★	★	★	
Stored stroke check 2,3 (G22, G23)	★	★	★	★	★	
Stroke check before move	★	★	★	★	★	
Stroke pitch error compensation	★	★	★	★	★	
Program restart	★	□	★	□	★	
Block restart	★	★	★	□	□	
Sequence number comparison and stop	★	★	★	★	★	
Optional block skip addition 2-9	★	□	★	□	★	
External work number search: 31 points	★	✓	★	✓	★	✓: Up to 15 points for 3
External data input/output	★	✓	✓	□	✓	✓: Some functions N/A or restricted
Input/output interface: RS232C x 2, RS422 x 1, 20mA current loop x 1	★	★	★	★	★	
Custom macro	★	✓*	✓**	✓*	✓**	* DI/DO: None ** DI/DO =16/16
Expanded macro	★	★	★	★	★	
Interruptive macro call	★	★	★	□	★	
Programmable mirror image (G50.1, G50.2)	★	★	★	★	★	
Mirror image for double turrets (G68, G69)	★	★	★	★	★	
Chamfering, Corner R:	★	★	★	★	★	
Handle interruption	★	□	★	□	★	
Play back	★	★	★	★	□	
Tool life management	★	□	★	□	★	
Menu switch	★	✓	★	✓	✓	✓: Status output of switches N/A
Manual numerical command under JOG mode	★	★	★	★	★	
G code system C	★	★	★	★	★	
Direct input of offset value measured	★	★	★	✓	★	✓: No position record
Direct input of offset value measured B	★	★	★	□	□	
Automatic tool compensation (G36, G37)	★	★	★	□	★	
14" color CRT (no graphic functions)	★	★	★	★	★	
Run hour display	★	★	★	★	★	
Bubble cassette & adaptor	★	★	★	★	★	
LSI cassette & adaptor	★	★	★	★	★	
Portable tape reader	★	★	★	★	★	
Printer punch reader	★	★	★	★	★	
Programmable controller	★	★	★	□	□	PC-MODEL I
PC window	★	□	□	□	□	
Axis status output	★	□	□	□	□	
2nd feedrate override	★	□	□	□	□	
Actual spindle speed output	★	□	□	□	□	
High speed skip signal	★	★	★	★	★	
High speed tool measuring input	★	★	★	★	★	
Additional common variables: 150/250 total	★	★	★	★	★	
Program encoding & password	★	★	★	★	★	
Auto-manual simultaneous control	★	□	□	□	□	
Simple semi-conversational programming	★	★	★	★	★	Program guidance display
Expanded part program edit	★	★	★	★	★	
External I/O port control	★	□	□	□	□	

★ = Available

✓ = Restricted

□ = Not Available

## 1. BASIC FUNCTIONS CONTINUED

Specifications	With PC			Without PC		Note
	BM	3	6	3	6	
Sequence number : 5 digits	★	★	★	★	★	
Sequence number search	★	★	★	★	★	
Program number : 4 digits	★	★	★	★	★	
Program number search	★	★	★	★	★	
Exact stop (G09, G61/G64)	★	★	★	★	★	
NC status output	★	□	★	□	□	
External power on/off	★	★	★	★	★	
Connectable servo motors : AC/DC SERVO MOTOR	★	★	★	★	★	
Connectable servo units : AC/DC drive	★	★	★	★	★	
Connectable position detectors : Pulse coder/Optical scale	★	★	★	★	★	
Connectable spindle motor : AC/DC SPINDLE MOTOR	★	★	★	★	★	
Connectable spindle servo units : AC/DC drive	★	★	★	★	★	
Power supply : 200/220VAC, +10%, -15%, 1 phase, 50/60Hz ± 1Hz	★	★	★	★	★	
Display of actual feedrate per revolution	★	★	★	★	★	

## 2. OPTIONAL FUNCTIONS

Specifications	With PC			Without PC		Note
	BM	3	6	3	6	
Tape reader without reels	★	★	★	★	★	
Tape reader with reels	★	★	★	★	★	
Controllable axes expansion: Max. 4 axes plus spindle control (add. axes) Axes name optional from Y, C (A, B)	★	□	★	□	★	
Simultaneous controllable axes expansion: Max. up to all control axes	★	★	★	★	★	
Skip functions (G31)	★	★	★	★	★	
Multiple repetitive cycles (G70-76)	★	★	★	★	★	
Canned cycle for drilling (G80-89)	★	□	□	□	□	
Tool nose radius compensation (G40-G42)	★	★	★	★	★	
Additional offset memory, 64 pairs total	★	★	★	★	★	
Tool offset amount memory B: ±6 digits, geometry/wear memory,	★	★	★	★	★	32 pairs
Addition in registered programs: 100/200	★	★	★	★	★	
2nd reference point return: Automatic (G30)	★	★	★	★*	★**	See note below
Cutting feed automatic acc./dec.: Linear before interpolation	★	★	★	★	★	
External deceleration	★	□	★	□	□	
Manual pulse generator: Max. 3	★	★	★	★	★	
Variable lead thread cutting (G34)	★	★	★	★	★	
Spindle speed binary/analog output	★	★	★	✓	★	✓: analog only
Spindle speed change detection	★	★	★	□	□	
Spindle positioning	★	□	★	□	★	
Constant surface speed control (G96, G97)	★	★	★	★	★	
2nd miscellaneous functions: 8 digits (binary), select address from A, B, C so that it does not duplicate with control axes' address	★	□	□	□	□	

\* Completion signal output N/A

\*\* Requires 2nd connection unit

★ = Available

✓ = Restricted

□ = Not Available

Note: These specifications are subject to change without notice.

## 1. BASIC FUNCTIONS CONTINUED

Specifications	With PC			Without PC		Note
	BM	3	6	3	6	
Linear interpolation (G01)	★	★	★	★	★	
Multi-quadrant circular interpolation (G02, G03)	★	★	★	★	★	
Radius designation on arc	★	★	★	★	★	
Thread cutting, continuous thread cutting, synchronous feed (G33)	★	★	★	★	★	
Combined use of absolute/incremental command: poss. in the same block	★	★	★	★	★	G90, G91 or XZ/UW
Coordinate system setting (G92)	★	★	★	★	★	
Local coordinate system setting (G52)	★	★	★	★	★	
Work coordinate system selection (G54-G59)	★	★	★	★	★	
Machine coordinate system selection (G53)	★	★	★	★	★	
Buffer register	★	★	★	★	★	
Dwell (G04)	★	★	★	★	★	
Auxiliary functions : M 8-digit (Binary output)	★	✓	✓	✓	✓	✓: BCD 2-digit output
Spindle functions : S 8-digit (Binary output)	★	✓	✓	✓	✓	
Tool functions: T 8-digit (Binary output)	★	✓	✓	✓	✓	
Tool offset: T code command	★	★	★	★	★	
Tool offset amount memory A: ±6 digits, 32 pairs	★	★	★	★	★	
Keyboard type manual data input (MDI)	★	★	★	★	★	
Incremental offset	★	★	★	★	★	
Offset counter input	★	★	★	★	★	
CRT character display: 9" monochrome	★	★	★	★	★	
Part program storage, editing	★	★	★	★	★	
Background editing functions: Editing during automatic operation	★	★	★	★	★	
Tape storage length: CMOS memory 66 ft. (20m)	★	★	★	★	★	
Registerable program: 50	★	★	★	★	★	Program name display also possible
Canned cycle: (G77, 78, 79)	★	★	★	★	★	
Reference point return A: Manual, Automatic (G27-G29)	★	★	★	★	★	
Diameter and radius programming for X axis	★	★	★	★	★	
Self-diagnosis functions	★	★	★	★	★	
Backlash compensation: Max. 9999 pulses	★	★	★	★	★	
Single block	★	★	★	★	★	
Optional block skip	★	★	★	★	★	
Manual absolute on/off	★	★	★	□	★	
External mirror image: For all axes	★	★	★	✓	✓	✓: X axis only
Dry run	★	★	★	★	★	
Interlock	★	✓	★	✓	★	✓: All axes common or Z axis only for 3
Every axis interlock	★	□	★	□	★	
Machine lock	★	★	★	★	★	
Every axis machine lock	★	★	★	□	□	
Auxiliary functions lock	★	★	★	□	★	
Feed hold	★	★	★	★	★	
Continuous Jog	★	★	★	★	★	
Manual incremental feed: x1, x10, x100, x1000, x10000, x100000	★	✓	★	✓	★	✓: Up to x10 for 3w/oPC, x1000 for 3w/PC
Overtravel	★	✓	★	✓	★	✓: No hardware OT for 3
Stored stroke check	★	★	★	★	★	
Emergency stop	★	★	★	★	★	
Servo off signal input	★	★	★	□	★	
Follow up : Emergency stop, signal input	★	★	★	★	★	

★ = Available

✓ = Restricted

□ = Not Available

## 2. OPTIONAL FUNCTIONS CONTINUED

Specifications	With PC			Without PC		Note
	BM	3	6	3	6	
Thread cutting feed hold	★	★	★	★	★	
Software operator's panel	★	★	★	☐	☐	
Tape storage length: CMOS memory max. 132 ft. (40m), 262 ft. (80m)	★	★	★	★	★	Additional memory required. Limits in max: storage may occur according to offset memories, etc.
Parts count	★	★	★	★	★	
MDI key input from PCI	★	★	★	☐	☐	
Parameter input by G10	★	★	★	★	★	
Rewind of tape reader w/RS232	★	★	★	★	★	
Absolute position detection	★	★	★	★	★	
Sync/Indep. switch	★	☐	☐	☐	☐	
Turret axis control	★	☐	★	☐	☐	
Cylindrical interpolation	★	★	★	★	★	
Polar coordinate interpolation	★	★	★	★	★	
Graphic display A (14" color MDI/CRT)	★	★	★	★	★	
Manual feed per revolution	★	★	☐	★	☐	
Blueprint programming	★	★	★	★	★	

★ = Available

↙ = Restricted

☐ = Not Available

# GENERAL NUMERIC

390 Kent Avenue, Elk Grove Village, IL 60007 • (312) 640-1595