

# HORIZONTAL MACHINING CENTERS

HM20 HM35

## Some Things Are Just Done Better Horizontally

### Why Horizontal

- Chip relief in deep hole drilling and cavity milling
- Multiside machining with indexer or rotary with one setup
- Certain parts just fit better
- Milling on complex surfaces with full rotary table
- Heavy duty milling unlike rotary type pallet changers

### Machining Four Sides in One Setup Has Huge Benefits

- Better part integrity
- Better operator utilization
- Enormous time savings



Pictured above: HM20  
Linear roller ways, 24 pocket retractable arm ATC



Pictured above: HM35



Pictured above: Retractable tool changer  
Removes ATC from work envelope

### Heavier milling performance than rotary type pallet changer machines

	HM20		HM35	
<b>Table Size</b>	34 x 20"	864 x 510 mm	59 x 26"	1500 x 660 mm
<b>Travel X, Y, Z</b>	30 x 34 x 20"	760 x 860 x 510 mm	51 x 35 x 25"	1300 x 890 x 635 mm
<b>Optional Table</b>	45 x 20"	1150 x 510 mm	N/A	
<b>Optional Travel</b>	40 x 34 x 20"	1015 x 860 x 510 mm	N/A	
<b>Horsepower</b>	2 Speed 24/15 HP	2 Speed 18/11 kw	24/15 HP	18/11 kw
<b>Optional HP</b>	2 Speed 35/25 HP	2 Speed 26/18 kw	2 Speed 24/15 or 35/25 HP	2 Speed 18/11 or 26/18 kw
<b>ATC</b>	24 Pocket Arm		30 Pocket Arm	
<b>Weight</b>	10,000 lbs	4545 kg	24,000 lbs	11,000 kg
<b>Spindle</b>	Inline #40 — 10,000 or 15,000 RPM		#40 — 8,000 or 15,000 RPM	

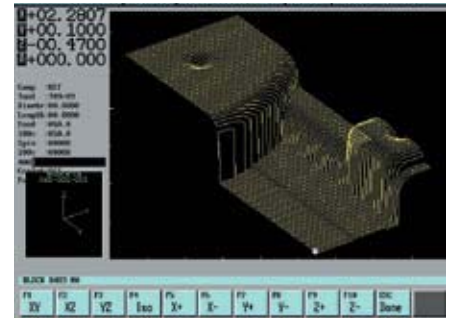
## Our New 7000 Series CNC and High Speed Milling 8000 Series CNC

### The Heart of Our Success

The heart of our success is our long history of control development. Amazingly, we may very well have engineered the finest, most operator-friendly CNC in the world. While that may be a daring statement, thousands of our customers will support it.

Our ingenious approach to connecting the operator to our control is recognized as a model in the industry. Though many have tried to emulate our conversational system, no one has really succeeded. This is because most other designs are developed by engineers without customer input. We keep our engineers connected to customers where we learn exactly what is really wanted. Yet we realize the control must still fit into a shop with G/M code programmers and CAD CAM systems, where conventional protocol is required. We fulfill this need while offering high speed performance, huge memory size, large program editing, and trig help. In fact, our conversational input actually develops a G/M code program which we run from and can be viewed. Even our graphics are unique showing the tool path and tool far ahead of the actual machine, so you can see where you're going.

Control development is a never-ending challenge as motion control algorithms, enhanced graphics, higher speeds, and management information continue to develop. But productivity gains through quick setup, utilization of lower skilled operators, and power programming shortcuts are still paramount in our design decisions. Have your distributor give you a demonstration.



# ABOUT THE MILLTRONICS CNC CONTROL

**The other half of a CNC machine is its control. The Milltronics CNC Control meets any challenge. We've been writing and building our own software and hardware since 1973.**

## A Front Panel Designed For The Operator

An operator will spend thousands of hours working with the front panel of any CNC. This is why we have designed our front panel around an oversized high resolution LCD color screen, rather than the tiny monochrome monitor often found on other CNC's. The operator panel is offered in two configuration, a simple economical panel with tactile keys or an enhanced panel with larger display and enhanced keys. Be assured, however, that regardless of your preference, you will find no equal to the power and simplicity of the Milltronics CNC based control.

## Full Color Graphics

Full color graphics allow verification of tool path and part profile prior to program execution. Zoom in/out, rotate or window on detail for a clearer view. Unlike graphic systems on other CNC controls, the Milltronics CNC Control graphics are intertwined with the motion control system of the machine. This provides synchronized display between the graphics and machine movement and guarantees that there will be no discrepancy between what is seen on screen and what the machine actually does. In fact, the tool on graphics is ahead of the machine so you can actually see where you are going. Solid modeling graphics are available on the 8000 Series CNC.

## Conversational Programming

Conversational programming is not only quick and easy, it is extremely powerful. A menu based question and answer format prompts the operator through program creation. In most applications there is no need to memorize complex G and M codes. In fact, many operations available with conversational programming are nearly impossible to duplicate with G and M code programming. For instance, the simple task of incrementing a tool to depth with G and M codes usually involves complex looping of subprograms or many redundant commands. With conversational programming this task is reduced to a simple event where only the cut increment and depths need to be entered.

## “SLS” Skill Level Select for Toolroom Machines

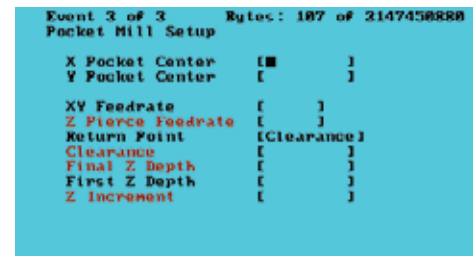
This innovative feature allows the CNC control to be configured to match the skills of the CNC operator. We have worked with a significant number of first-time CNC operators and have recognized that the more features, screens and selections a CNC control has, the more intimidating it is for the operator. Often these selections overwhelm a new operator, undermining confidence and lengthening the learning curve. Skill Level Select solves this by allowing the operator to enable/disable features to a comfortable level. SLS software incorporates “on-line help” which will pull down illustrations by the push of a button. Illustrations show all relevant parameters required to conversationally program the selected feature.

## Advanced Trigonometry Assist

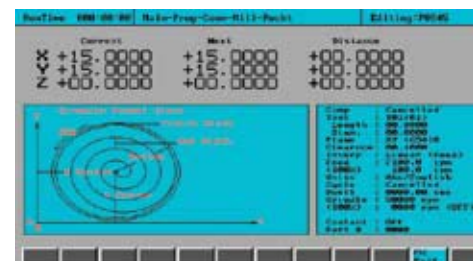
This feature is much more than the scientific calculator found on other CNC controls. “Trig Help” as we call it, is a concept where we use the CNC's computing power to calculate arc start and end points without the need for trigonometry. The programmer only needs to estimate the end point of the line or arc and the CNC connects the geometry to the nearest intersection on its own. On most other CNC controls intersection points need to be exactly calculated in order for the program to run.



Milltronics 7200 Series CNC



Conversational Input Screen



Pocket Milling Help Screen

## Irregular Cavity Clear With Islands

The Milltronics CNC software contains a powerful feature which will intelligently clear out cavities that contain islands by using defined parameters and depth increments. This feature can save hundreds of hours of programming.

## Concurrent Programming And More....

Maximize productivity by programming while the machine is in operation. Create new programs, modify existing programs, even edit the program in operation, all while the machine is cutting. Concurrent features do not stop with programming. Editing of tool and fixture offsets, copying of programs to/from floppy disk and sending programs through the RS232 port are allowed as well.

## Text Programming / Compatibility

All Milltronics CNC controls accept the G and M codes recognized as industry standard. If you currently program in code, utilize a CAD CAM system, or are considering adding a CAD CAM system in the future, you can rest assured that compatibility will not be an issue. A full word processor style editor is utilized on all Milltronics CNC controls and offers helpful features such as search, search and replace, cut, copy and move. Programs as large as 9 MB can be edited concurrent to program execution.

## Macro Programming

Powerful macro programming is available on all Milltronics CNC controls. Macro programming allows you to take full advantage of the CNC's capabilities and opens new doors to tool management and more.

## Unique Graphics-Based Mid Program Start Feature

Starting in the middle of a program is often one of the more challenging tasks facing a CNC operator. Although this would seem to be a simple task, the fundamental nature of CNCs make it anything but. Milltronics has solved this problem with a unique process where an operator can verify a program graphically up to the desired start point and then simply switch over to the Run mode. Not only is this easier and quicker than sorting through difficult machine code, it also ensures that modal codes are executed completely and in sequence.

## The Milltronics Graphics Advantage

Powerful graphics of the Milltronics CNC control show the programmer the part geometry as it will look when completed. The graphics screen shown below shows the operator exactly where the tool is relative to the workpiece at all times. This user-friendly screen shows the tool path (green), workpiece (yellow), rapid traverse (red) and the diameter of the active tool (blue). The graphic verify features show the operator the entire machining operation either in real time or in a dry run, each posting estimated runtimes including tool changes.



## Handwheel Controlled Program Execution — Handwheel Run Verify

This useful feature allows an operator to take total control of machine movement and run a program with confidence. With this feature enabled, program movement only occurs while the handwheel is being turned. If the operator stops turning the handwheel, machine movement stops immediately. The faster the handwheel is turned the faster the feedrate.

## Increased Data Storage

While the Milltronics CNC comes standard with a very large memory for program storage, expansion to over 250 MB is an option.

# ABOUT THE MILLTRONICS CNC CONTROL

## Large Program Execution

Programs under 10 MB can be executed conventionally without the need for DNC. This large program execution capability not only frees you from restrictive DNC methods, it also permits subprogram calls, greatly enhancing multiple cavity work.

## High Speed Control

All Milltronics CNC Controls have addressed the complex dynamics required for a CNC to truly be categorized as high speed. The end result is that Milltronics CNC controls offer performance equal to the most sophisticated controls. Many Milltronics customers are mold makers for whom high speed performance is an absolute requirement. Our new 8000 Series CNC incorporates many new features for high speed milling.

## Processor Speed

There are thousands of calculations required for each and every axis movement. When trying to machine complex geometry, often the microprocessor of the control creates a bottleneck restricting the attainable feedrate. To minimize processing bottlenecks, Milltronics CNC Controls utilize two processors. With these two processors working together, over 1200 blocks per second with the 7000 Series CNC's and over 2000 blocks per second with the 8000 Series CNC are attainable.

## Multi Processor Control Utilizes Latest Computer Technology

Milltronics CNC Controls take advantage of the multiple processors by sharing the calculations between them for maximum throughput. A high speed PC processor is used to handle the operator interface and a robust 32 bit Motorola® processor to handle the motion control.

## Feed Forward and Look-Ahead

Controlling how an axis decelerates and accelerates is one of the most crucial factors relating to machine speed. Understanding that it is impossible for a servo motor to stop and start a heavy machine slide anywhere close to 1000 times per second leaves the only hope of achieving speed through greater intelligence of the acceleration and deceleration slopes. All Milltronics CNC Controls search ahead into a program to determine the directional changes that lay ahead. Once these directional changes are known, the CNC dynamically adjusts the deceleration and acceleration slopes to minimize stopping and starting.



*Part machined on conventional CNC control **without** Feed Forward error correction*



*Part machined on a Milltronics CNC control **with** Feed Forward error correction*

## Accuracy

Milltronics CNC Controls utilize a complex "Feed Forward" error correction algorithm that reduces inaccuracy without compromising speed. Until now feed forward error correction has been found only on a handful of the world's most expensive CNC controls and should in no way be confused with inferior error correction systems that rely on slowing feedrates to maintain accuracy.

## Thermal Compensation

Rather than simply measuring ball screw temperature, a patent pending feature unique to Milltronics measures actual ball screw expansion and contraction using a non-contact LVDT device. This measurement is constantly updating the control to compensate for positioning change. This is a very important feature for machines requiring consistently high accuracy combined with many rapid moves or continuous contouring.

## Flexible Communications

Anyone who has struggled transferring programs to a CNC will appreciate the floppy disk drive and RS232 communications port standard on Milltronics CNC controls. An optional multi format flash memory drive allows transfer from several different types of flash memory, including: CF-I, CF-II, Smart Media™, Memory Stick™, Micro Drive™, Multimedia™ Card and Secure Digital™ Card. A USB port is incorporated in the 8000 Series CNC.

# ABOUT THE MILLTRONICS CNC CONTROL

## Networking

With the Milltronics CNC control's PC-based architecture it is possible to connect to a Local Area Network (LAN) taking full advantage of the ability to connect computers in network environments for high speed data transfers and file sharing. Networking offers numerous advantages over RS232 communications as it provides a transparent transfer of data at extremely high speeds - more than 100 times faster than typical RS232 communications. The Milltronics control is fully compatible with all current network technologies.

## Off-line Software

FastCAM and LatheCAM, our off-line software that emulates the CNC control on your desktop, allows programs to be created and graphically verified the same as they are at the machine. The software also serves as a storage library for part programs and supports communication with the CNC. An additional feature allows import of DXF or CDL CAD files which expands difficult part programming capabilities.

## Software Macros for Tool Setter Accessories

The Milltronics CNC incorporates software macros which operate with either a touch tool setter or laser tool setter. These tool setters automatically load tool diameter and tool length into the tool table as well as check for tool breakage.

## Software Macros for Part Probe Accessories

A family of software macros work with the probe which can be parked in the ATC. These macros can locate edges, centers, do part verification, and much more.

## Digiscan: Digitizing Probe Accessory

The Digitizing option permits quick, easy and cost effective duplication of parts with unattended operation. In lathe applications a digitized 2D part profile is ready to run at the CNC with no additional processing. In milling applications both 2D part profiles and complex 3D surfaces can be captured. With the use of the off-line Digiscan software a digitized file can be inverted (male to female), cutter compensated, scaled, rotated, mirror imaged and more. Digiscan can also translate the file into a DXF or CDL format for input into popular CAD CAM systems.



## WARRANTY & TERMS

**LIMITED WARRANTY ON ALL NEW MILLTRONICS MANUFACTURING COMPANY MACHINES**  
marketed under the commercial name of Milltronics Manufacturing Company. This warranty does not apply to equipment manufactured and sold by the International Machine Tools or Partner Machines divisions of Milltronics Manufacturing Company. Such equipment has a separate limited warranty.

### United States and Canada Shipments

Milltronics Manufacturing Company ("Milltronics" or "Company") warrants all of their CNC machines ("Machines") and the Centurion CNC systems supplied with these Machines shall be free from defects in workmanship under normal use and service for a period of two years or 4200 hours, whichever is shorter, from the date of delivery. This warranty is limited to all factory-supplied parts and accessories as indicated on the original purchase order as accepted by Milltronics and any parts necessary to repair such defects. Milltronics' liability for breach of warranty shall arise only upon the return of the defective parts at Buyer's expense after notice to Milltronics of claimed breach, and shall be limited to replacing or repairing, at Milltronics option, at its factory, any of said articles which shall within two (2) years after shipment be returned to Milltronics' factory of origin, transportation charges prepaid, and which are, after examination, disclosed to Milltronics' satisfaction to be defective. Notice to Milltronics of claimed defects discoverable by inspection must be given within ten (10) days after receipt of shipment. This warranty shall not apply to any of such articles which shall have been repaired or altered, except by Milltronics, or which shall have been subjected to misuse, negligence, or accident. The aforementioned provisions do not extend the original warranty period of any articles which have either been repaired or replaced by Milltronics. This warranty applies to the original purchaser only or the original end user if the equipment is financed by a third party. During the first six months the two-year warranty also includes all travel expenses incurred by a Milltronics factory representative if a problem occurs which is not repairable by the local distributor or a part exchange. For the second six months of the two-year warranty Milltronics will pay for all travel expenses except airfare. For the second year, Milltronics will not pay for any labor expense other than supplying the part. For the first year of the warranty, Milltronics will also cover any standard UPS freight charge for parts and repairs shipped from our facility. After the first year there will be a shipping and handling charge for parts and repairs shipped from Milltronics. Incoming freight for warranty items is not covered under this warranty, and Milltronics will not pay incoming freight charges unless pre-approved in writing.

Neither the Machine nor the Centurion CNC warranty will cover parts that are damaged or have failed due to abuse, improper operation, weather, act of God, terrorism or shipping. No Milltronics warranty covers damage to fixtures, tools, or parts, regardless of the cause of this damage. Accessories not supplied by Milltronics are not covered under this warranty, and any alterations to the Machine or CNC control done by other than Milltronics' authorized personnel, unless approved by Milltronics' personnel in writing, shall void any warranties.

EXCEPT AS SET FORTH IN ABOVE, THE COMPANY MAKES NO EXPRESS OR IMPLIED REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE MACHINE OR THE CENTURION CNC CONTROL, OR THEIR CONDITION, MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR USE BY CUSTOMER. THE COMPANY FURNISHES THE ABOVE WARRANTIES IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

MILLTRONICS SHALL NOT BE LIABLE FOR ANY: (A) SPECIAL, INDIRECT, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS, ARISING FROM OR RELATED TO THIS WARRANTY, THE BREACH OF ANY AGREEMENT OR WARRANTY OR THE OPERATION OR USE OF THE MACHINE OR CENTURION CNC CONTROL, INCLUDING WITHOUT LIMITATION, DAMAGES ARISING FROM DAMAGE TO FIXTURES, TOOLS, PARTS OR MATERIALS, LOSS OF DATA OR PROGRAMMING, DIRECT OR INDIRECT LOSS CAUSED BY THE DISTRIBUTOR OR DEALER REPRESENTATIVE, LOSS OF REVENUE OR PROFITS, FAILURE TO REALIZE SAVINGS OR OTHER BENEFITS, DAMAGE TO EQUIPMENT, FINANCING OR INTEREST CHARGES, AND CLAIMS AGAINST CUSTOMER BY ANY THIRD PERSON, EVEN IF MILLTRONICS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES; (B) DAMAGES (REGARDLESS OF THEIR NATURE) FOR ANY DELAY OR FAILURE BY THE COMPANY TO PERFORM ITS OBLIGATIONS UNDER THIS AGREEMENT DUE TO ANY CAUSE BEYOND THE COMPANY'S REASONABLE CONTROL; OR (C) CLAIMS MADE A SUBJECT OF A LEGAL PROCEEDING AGAINST THE COMPANY MORE THAN ONE (1) YEAR AFTER ANY SUCH CAUSE OF ACTION FIRST AROSE.

The validity, construction and performance of this Warranty and any sale made by Milltronics shall be governed by the laws of the State of Minnesota, without regard to conflicts of laws provisions of any jurisdiction and any action related in any way to any alleged or actual offer, acceptance or sale by Milltronics or any claim related to performance or agreement or warranty by Buyer or Milltronics shall be venued in federal or state district court in Hennepin County, Minnesota.

**MILLTRONICS MANUFACTURING COMPANY**  
1400 Mill Lane  
Waconia, MN 55387  
952-442-1410  
[www.milltronics.net](http://www.milltronics.net)

This warranty is invalid unless the customer has signed off on and returned to Milltronics or its distributor the factory-provided installation forms and Milltronics is funded in full for the equipment.