

VM Series – Inline

Milltronics USA



Waconia, Minnesota

Milltronics USA



Headquarters in Waconia, Minnesota

Founded in 1973 with over 45 years building machines and controls

- 14,000 machines installed worldwide

Member of Hurco Machine Tool Group

- Publicly traded company on NASDAQ
- About 800 employees (250 in USA)
- Plants in Indiana, Minnesota, Italy and Taiwan

Minnesota team includes machine design, software, controls, electrical and mechanical engineering

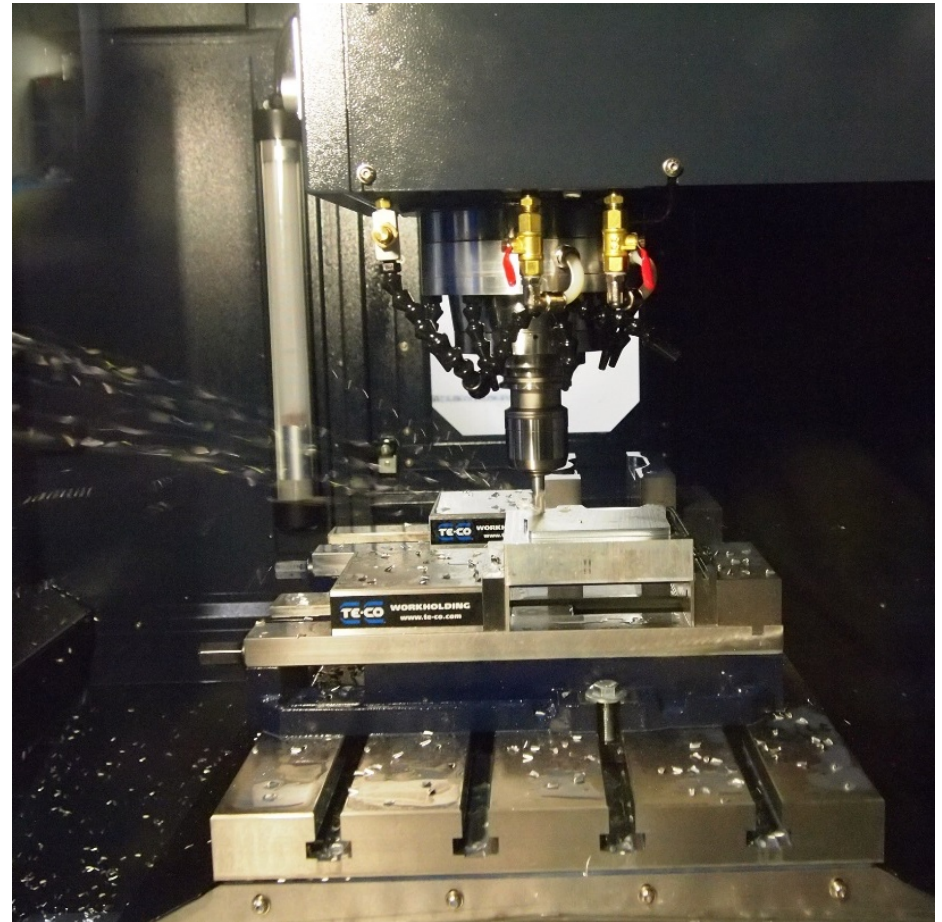
- Also manufacturing, assembly, finance, sales, service, training and applications

VM Inline

Performance

VM-IL Series

- VM-IL Series machines are inline spindle performance vertical machining centers designed for variety of machining applications
- Available in four different sizes:
 - VM3018IL
 - VM4222IL
 - VM5025IL
 - VM6030IL
- All feature the Milltronics 9000 Series control



VM3018IL – Spec Summary

- 30" x 18" x 22" travels
- 34" x 18" table, 3,000 lbs. capacity
- 24 hp (peak) – 85 ft lbs torque at 1,500 rpm
- 10,000 rpm Inline Spindle (15k option)
- #40 taper BIG-PLUS® dual contact
- Direct-coupled ballscrews
- 1,200 ipm rapid traverse (X,Y), 1,000 ipm (Z)
- Up to 500 ipm feed rates
- Linear motion roller guideways
- 24 station swing arm ATC
- Coolant ring, washdown system and chip conveyor
- Dual LED worklights, coolant gun and air gun
- +/- .0002" positioning accuracy (VDI 3441)
- .0002" repeatability (VDI 3441)
- Weighs 10,692 lbs.
- Shop floor conversational or offline programming (G-code) with Milltronics 9000 control (includes remote jog)



Machine shown with options

VM4222IL – Spec Summary

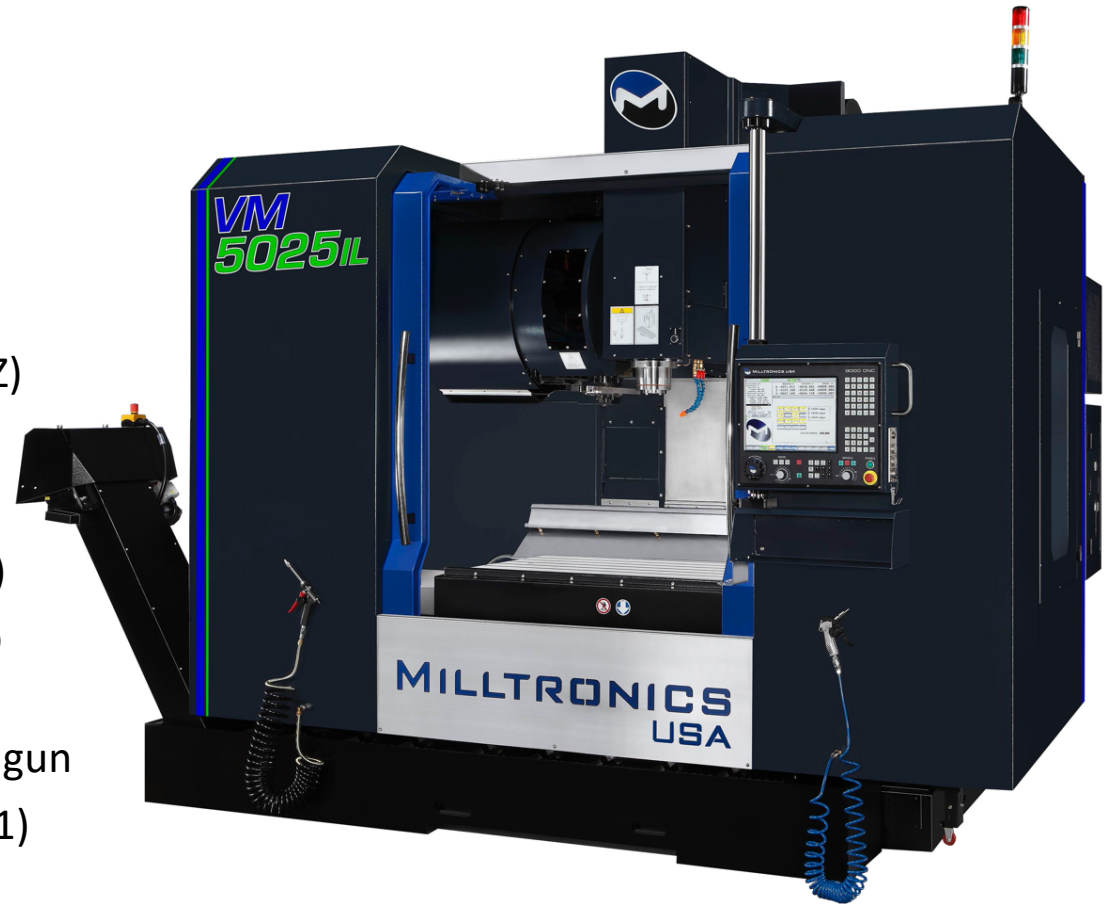
- 42" x 22" x 24" travels
- 46" x 22" table, 3,000 lbs. capacity
- 24 hp (peak) – 85 ft lbs torque at 1,500 rpm
- 10,000 rpm Inline Spindle (15k option)
- #40 taper BIG-PLUS® dual contact
- Direct-coupled ballscrews
- 1,200 ipm rapid traverse (X,Y), 1,000 ipm (Z)
- Up to 500 ipm feed rates
- Linear motion roller guideways
- 24 station swing arm ATC (40 ATC option)
- Coolant ring, washdown system and chip conveyor
- Dual LED worklights, coolant gun and air gun
- +/- .0002" positioning accuracy (VDI 3441)
- .0002" repeatability (VDI 3441)
- Weighs 14,775 lbs.
- Shop floor conversational or offline programming (G-code) with Milltronics 9000 control (includes remote jog)



Machine shown with options

VM5025IL – Spec Summary

- 50" x 25" x 24" travels
- 54" x 25" table, 3,000 lbs. capacity
- 35 hp (peak) – 122 ft lbs torque at 1,500 rpm
- 10,000 rpm Inline Spindle (15k option)
- #40 taper BIG-PLUS® dual contact
- Direct-coupled ballscrews
- 1,000 ipm rapid traverse (X,Y), 787 ipm (Z)
- Up to 500 ipm feed rates
- Linear motion roller guideways
- 24 station swing arm ATC (40 ATC option)
- Coolant ring, washdown system and chip conveyor
- Dual LED worklights, coolant gun and air gun
- +/- .0002" positioning accuracy (VDI 3441)
- .0002" repeatability (VDI 3441)
- Weighs 17,937 lbs
- Shop floor conversational or offline programming (G-code) with Milltronics 9000 control (includes remote jog)



Machine shown with options

VM6030IL – Spec Summary

- 60" x 30" x 24" travels
- 66" x 30" table, 3,000 lbs. capacity
- 35 hp (peak) – 122 ft lbs torque at 1,500 rpm
- 10,000 rpm Inline Spindle (15k option)
- #40 taper BIG-PLUS® dual contact
- Direct-coupled ballscrews
- 1,000 ipm rapid traverse (X,Y), 787 ipm (Z)
- Up to 500 ipm feed rates
- Linear motion roller guideways
- 24 station swing arm ATC (40 ATC option)
- Coolant ring, washdown system and chip conveyor
- Dual LED worklights, coolant gun and air gun
- +/- .0002" positioning accuracy (VDI 3441)
- .0002" repeatability (VDI 3441)
- Weighs 21,826 lbs
- Shop floor conversational or offline programming (G-code) with Milltronics 9000 control (includes remote jog)



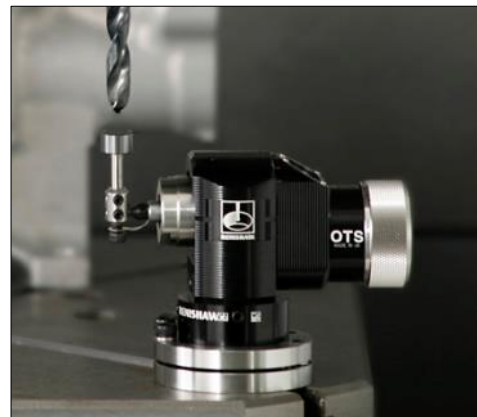
Machine shown with options

Options

Accessories

Options and Accessories

- 40 station ATC (not available on VM30IL)
- Coolant thru spindle (300 psi)
- Programmable spray mist
- Programmable air blast
- BT tooling
- Spindle chiller
- Rotary tables
- Tool and part probes
- Auxiliary keyboard
- Offline software

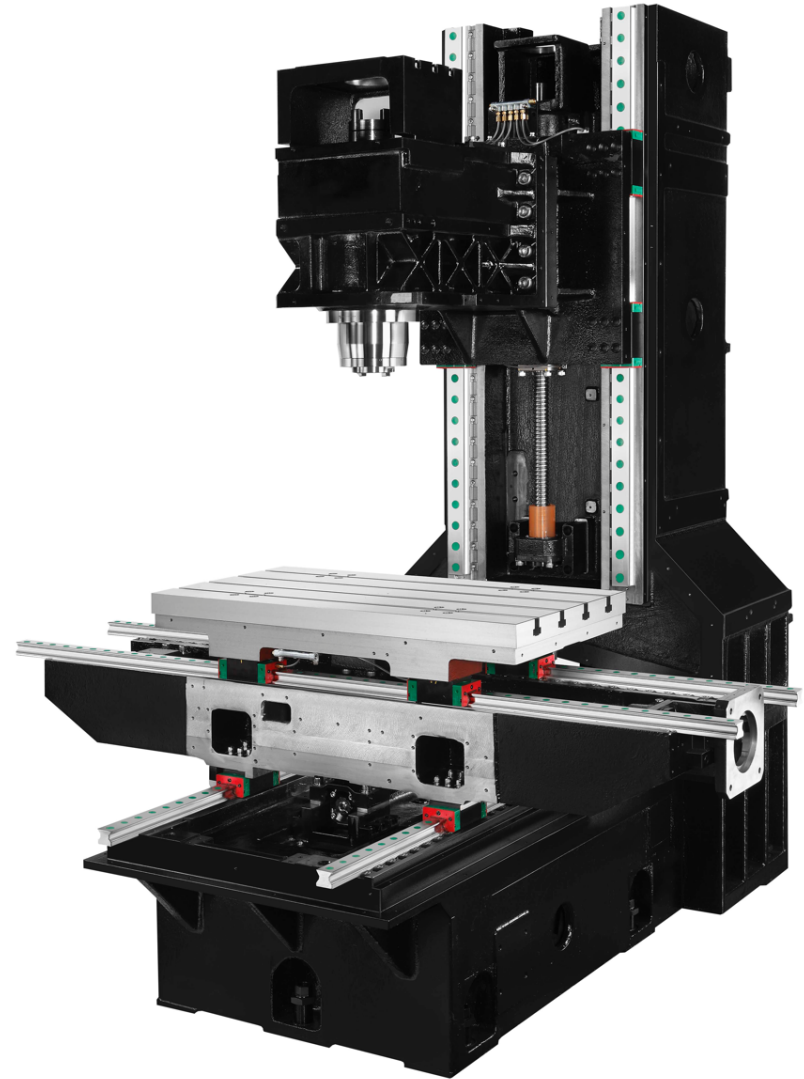


VM Inline

Well Made

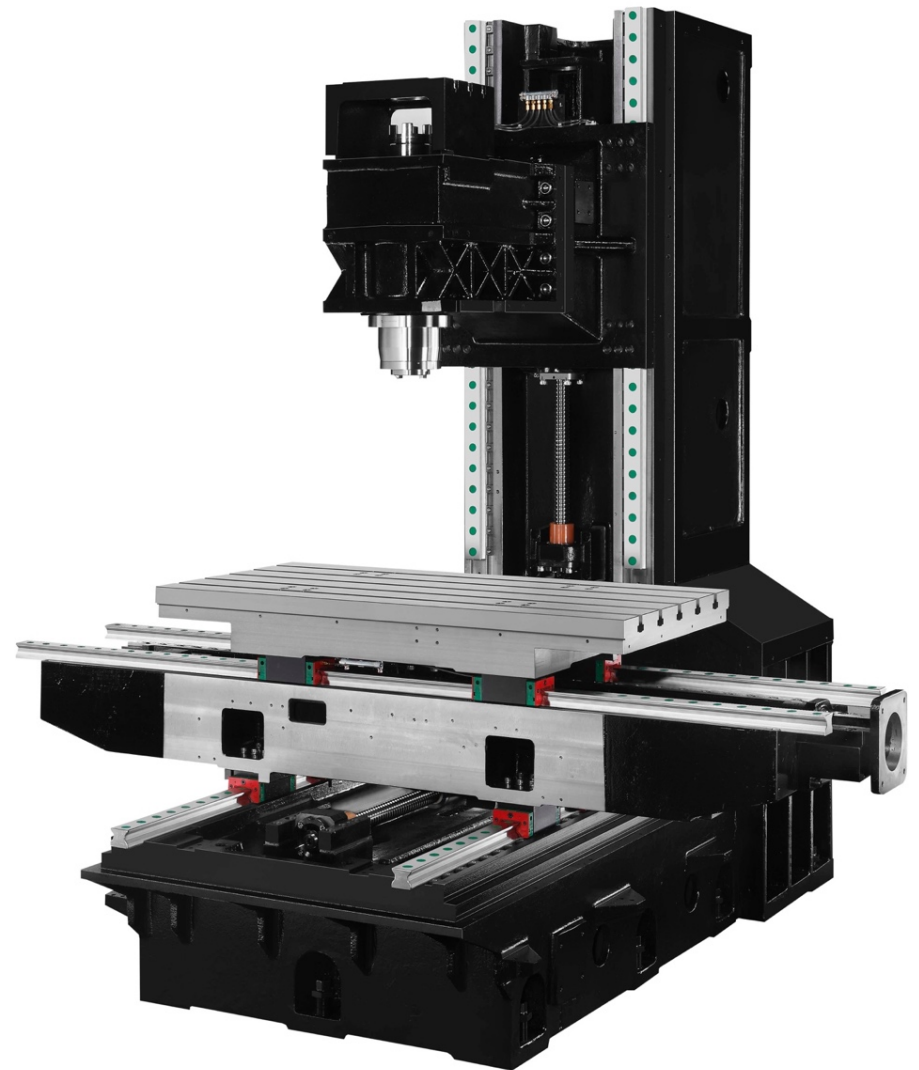
Made Right – VM3018IL

- High-grade cast iron frame optimized with Finite Element Analysis (FEA)
- Brushless Mitsubishi digital AC servos
- Direct drive Z axis – no counterbalance
- Hiwin® pretensioned ballscrews doublenut pre-loaded and anchored at both ends
- Direct coupled 32 mm ballscrews (X/Y), 40 mm (Z)
- 35 mm Hiwin® roller linear motion guideways (X/Y) 45 mm (Z) – two trucks per rail
- Distance between X axis ways 11.81”
- Distance between Y axis ways 22”
- Distance between Z axis ways 15”
- Dual wound Mitsubishi AC spindle motor
- Cartridge spindle
- Spindle air purge and blast
- Electronic spindle orient (encoder)
- Electric swing arm ATC



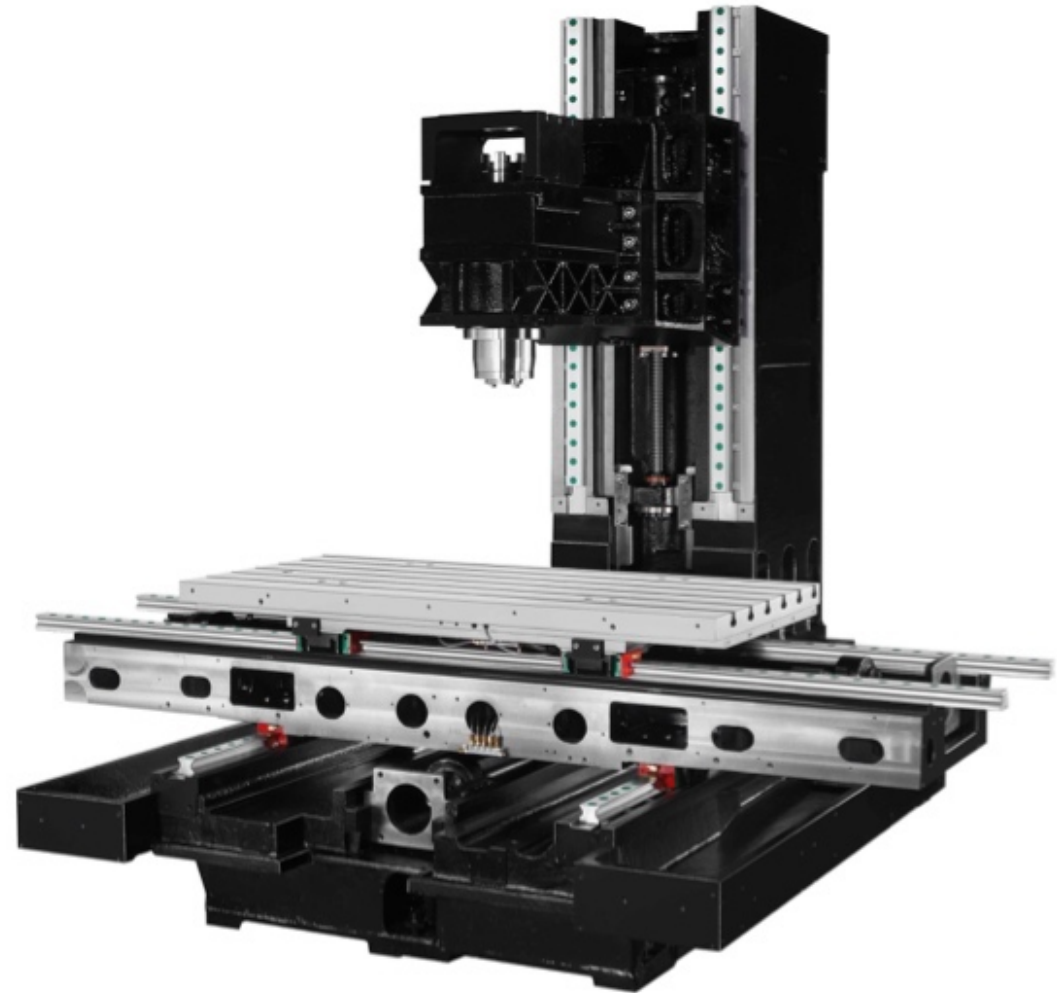
Made Right – VM4222IL

- High-grade cast iron frame optimized with Finite Element Analysis (FEA)
- Brushless Mitsubishi digital AC servos
- Direct drive Z axis – no counterbalance
- Hiwin® pretensioned ballscrews doublenut pre-loaded and anchored at both ends
- Direct coupled 40 mm ballscrews (X/Y/Z)
- 45 mm Hiwin® roller linear motion guideways (X/Y/Z) – two trucks per rail
- Distance between X axis ways 13.4"
- Distance between Y axis ways 26.8"
- Distance between Z axis ways 17.8"
- Dual wound Mitsubishi AC spindle motor
- Cartridge spindle
- Spindle air purge and blast
- Electronic spindle orient (encoder)
- Electric swing arm ATC



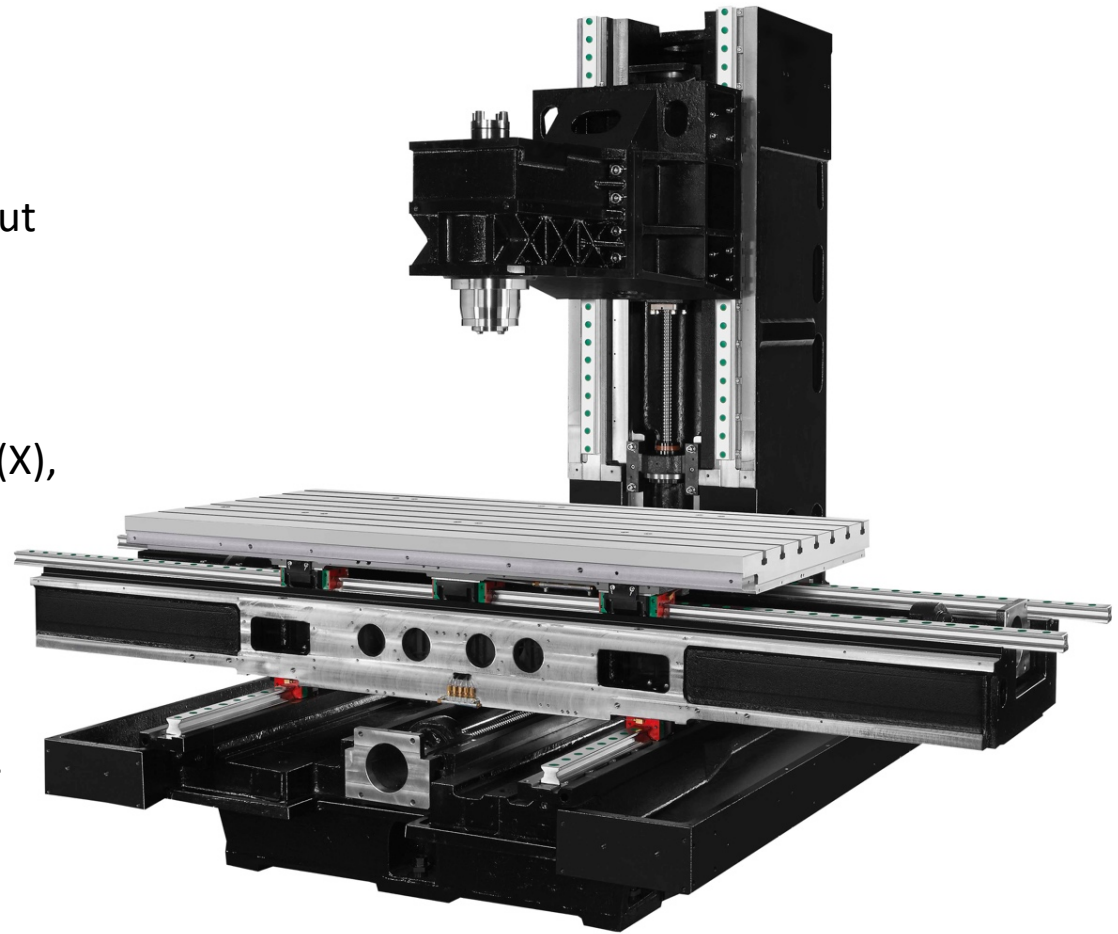
Made Right – VM5025IL

- High-grade cast iron frame optimized with Finite Element Analysis (FEA)
- Brushless Mitsubishi digital AC servos
- Direct drive Z axis – no counterbalance
- Hiwin® pretensioned ballscrews doublenut pre-loaded and anchored at both ends
- Direct coupled 45 mm ballscrews (X/Y/Z)
- 45 mm Hiwin® roller linear motion guideways (X/Y/Z) – two trucks per rail
- Distance between X axis ways 15.75"
- Distance between Y axis ways 39.37"
- Distance between Z axis ways 16.93"
- Dual wound Mitsubishi AC spindle motor
- Cartridge spindle
- Spindle air purge and blast
- Electronic spindle orient (encoder)
- Electric swing arm ATC



Made Right – VM6030IL

- High-grade cast iron frame optimized with Finite Element Analysis (FEA)
- Brushless Mitsubishi digital AC servos
- Direct drive Z axis – no counterbalance
- Hiwin® pretensioned ballscrews doublenut pre-loaded and anchored at both ends
- Direct coupled 45 mm ballscrews (X/Y/Z)
- 45 mm Hiwin® roller linear motion guideways (X/Y/Z) – three trucks per rail (X), two trucks per rail (Y/Z)
- Distance between X axis ways 15.75"
- Distance between Y axis ways 39.37"
- Distance between Z axis ways 16.93"
- Dual wound Mitsubishi AC spindle motor
- Cartridge spindle
- Spindle air purge and blast
- Electronic spindle orient (encoder)
- Electric swing arm ATC



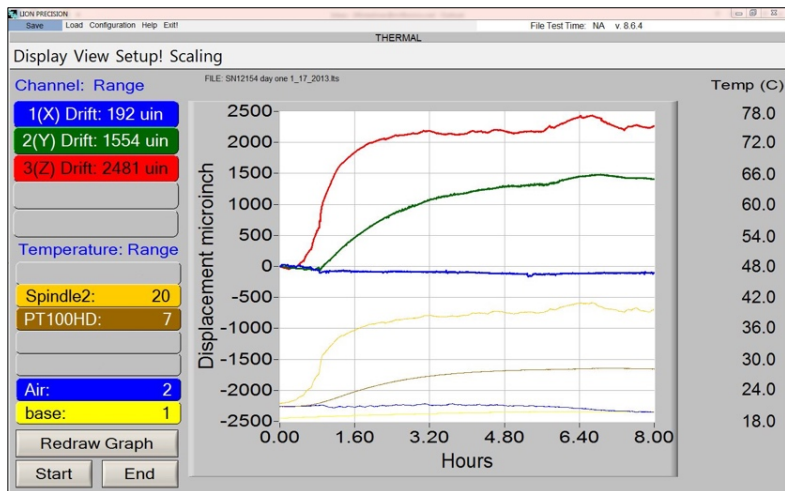
Inline Spindles

VM Series inline spindles are designed and manufactured by Kenturn and assembled in clean room. Inline spindles offer:

- Runs smooth and quiet
- Reduced heat – no belt, major source of heat in belt driven machines
- Reduced vibration, better surface finish and longer tool life
- Faster spindle acceleration and de-acceleration
 - VM3018IL & VM4222IL
 - Zero to 10,000 rpm in 2 sec
 - 10,000 rpm to zero in 3.5 sec
 - VM5025IL and VM6030IL
 - Zero to 10,000 rpm in 2 sec
 - 10,000 rpm to zero in 4.3 sec
- BIG-PLUS® dual contact
- Larger diameter for rigidity
- Made of chrome-moly alloy for longer wear & corrosion prevention
- ABEC 7 precision class angular contact bearings
- Permanently grease packed
- Air purged top & bottom to prevent contamination
- Precision balanced for long life

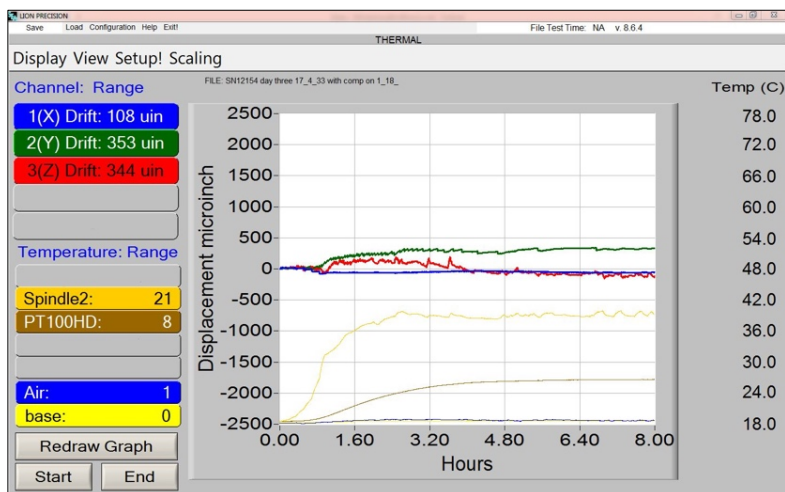
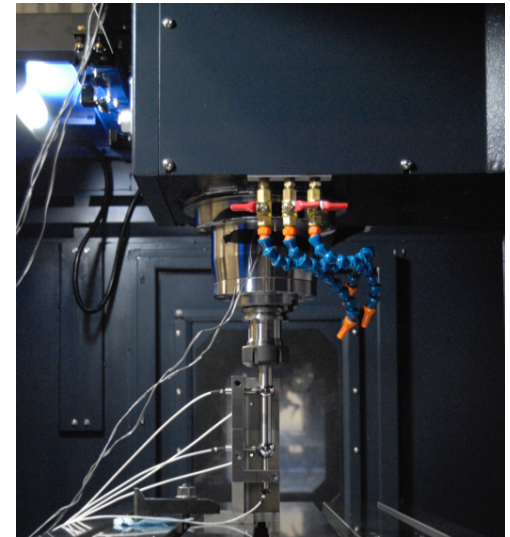


*BIG-PLUS®
greatly
improves
rigidity by
simultaneous
fit of taper and
face – better
heavy or high
speed cutting,
deep or large
diameter
boring – also
longer tool life*



Without head comp

Thermal Head Comp (option)



With head comp

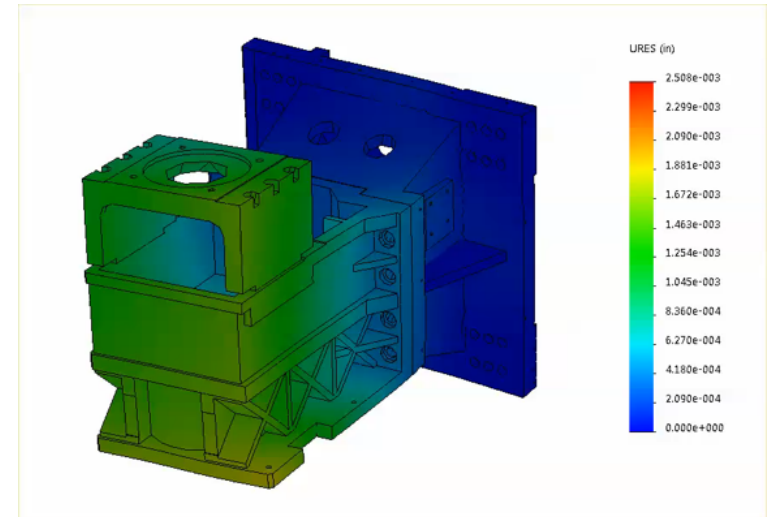
Milltronics offers optional thermal head mapping compensation to dramatically reduce head casting growth

- Uses twin thermal sensors and Milltronics' proprietary algorithms to automatically offset growth in head casting
- Compensates for Y and Z growth
- Works best with linear glass scales for maximum growth reduction

Finite Element Analysis

Finite Element Analysis (FEA) is used to evaluate structural rigidity, torsional stiffness, thermal characteristics and natural frequency to achieve the best frame design

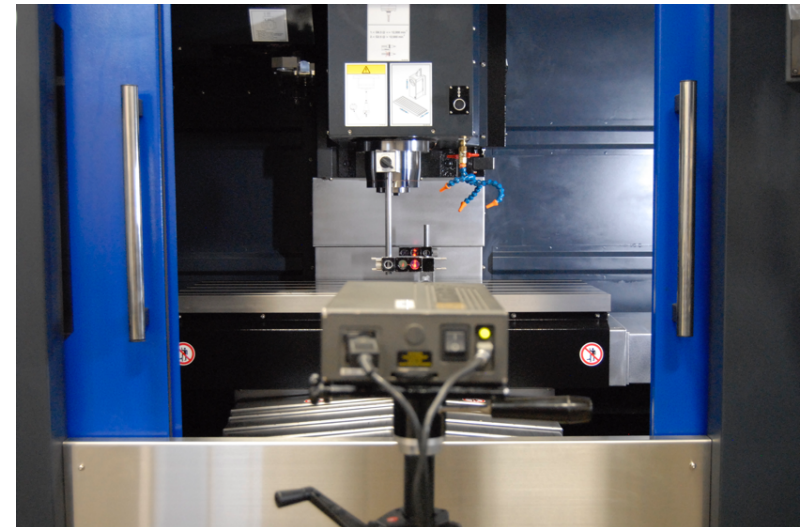
- Critical with today's high velocities and accelerations - machine performance must be carefully optimized in order to maintain part quality



Laser Interferometer

After assembly, Milltronics VM machines are tested – including the use of a laser interferometer:

- The laser interferometer provides comprehensive accuracy assessment of machine alignment and any roll-pitch-yaw errors in machine



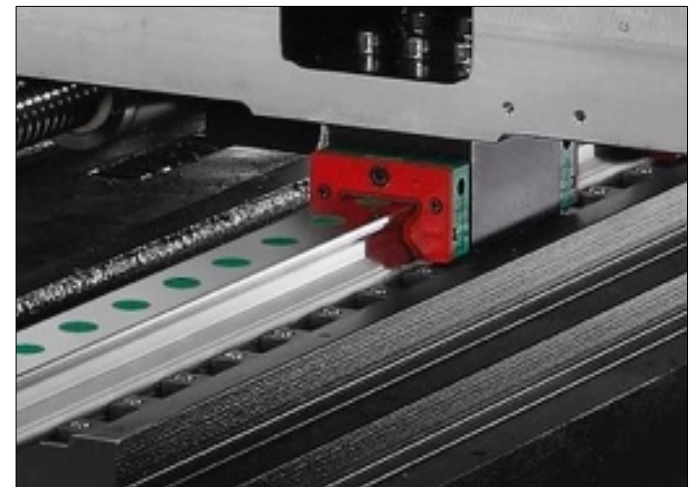
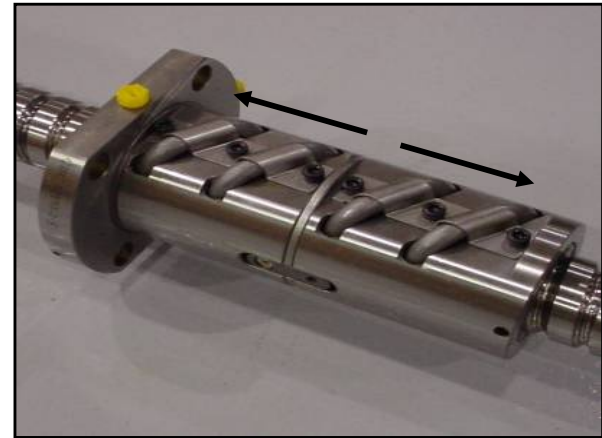
Ballscrews and Linear Guides

Hiwin® pre-tensioned double-nut pre-loaded ballscrews anchored at both ends:

- Pre-tensioning mitigates thermal growth
- Double-nut presents pressure in opposite directions to the ballscrew
 - Keeps the nut under tension and prevents backlash

Hiwin® linear motion roller guides – provide excellent rigidity during heavy cutting with very low friction:

- Roller ways have more surface contact between the rail and roller than typical ball ways – this increased surface contact adds 40% more rigidity to the machine tool
- Milltronics castings are machined with slot and shoulder for rail - rail is then wedge-locked to ensure straightness and rigidity



Mitsubishi

Milltronics uses state-of-the-art premium servos and drives from Mitsubishi, one of the world's largest manufacturer of motors and drives

- Mitsubishi Melservo J3 digital drives .476 millisecond velocity loop frequency response time (2.1 kHz)
- Encoders: 262,144 pulses per revolution
- Enhanced vibration suppression – delivers 3G resistance
- Higher speed acceleration and deceleration



ITX Technology

Modular design minimizes downtime as the one-piece control module can quickly and easily be swapped out in the field:

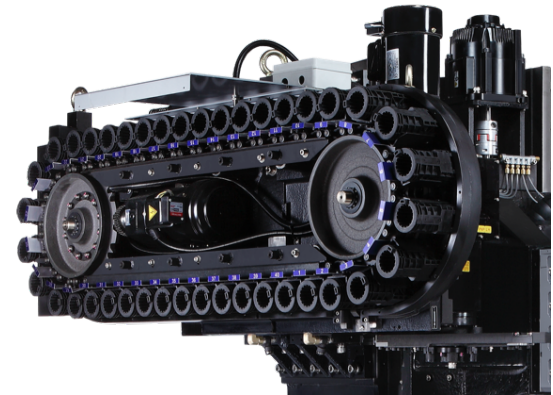
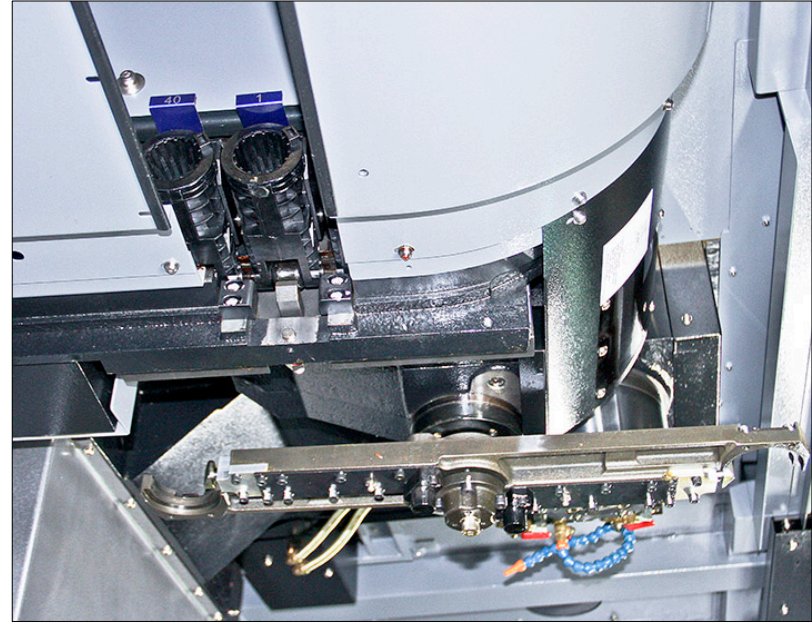
- Eliminated more than 200 plug in connections and over 100 board level parts = higher reliability



Swing Arm ATC

Milltronics uses electric swing arm automatic tool changers rather than pneumatic or carousel-style on the VM Series:

- 24 stations (40 station optional on VM4222IL, VM5025IL and VM6030IL)
- Side-mounted on column
- Tool-to-tool change in 2.5 seconds
- Chip-to-chip (2,000 rpm, 12" of Z travel) in 6 seconds
- Random pot, bi-directional
- Max tool diameter 3.1"
 - 5.1" with adjacent empty
- Max tool weight 15.4 lbs



40 station ATC option on all IL (except VM3018IL)

Chip Management

Milltronics IL Series machines come standard with a coolant ring, washdown system and lift-up chip conveyor

- Separate Grundfos pumps for cutting coolant and washdown
- Generous coolant tank with sight levels

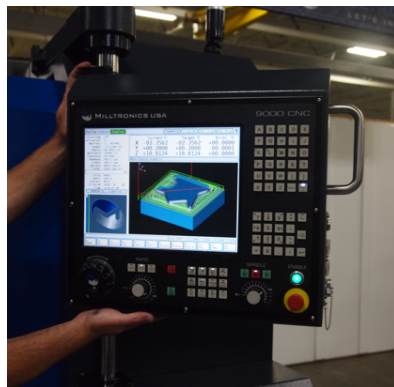


Series 9000

Conversational or G-code



New 9000 control is Windows-based and features a 15" color LCD touch screen



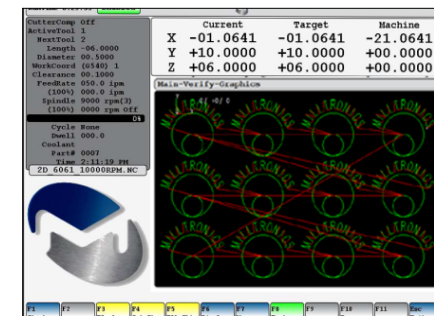
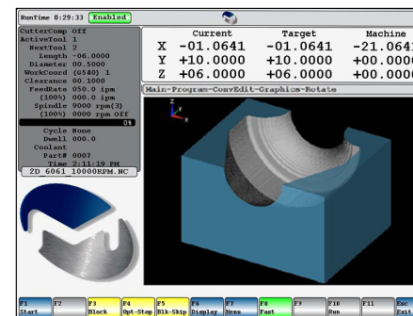
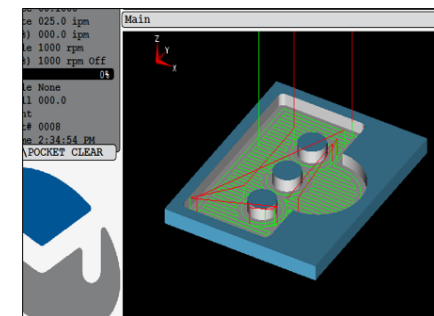
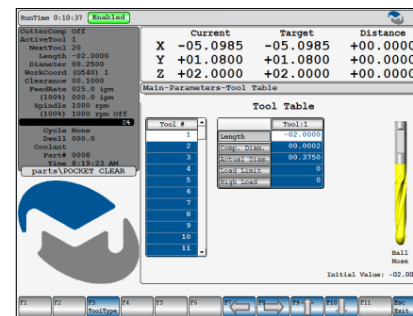
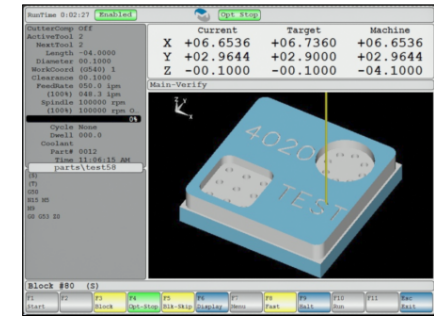
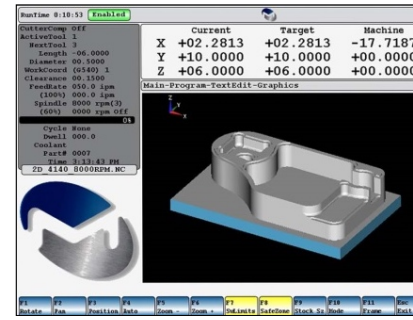
New 9000 Series

The 9000 Series CNC is our newest and upgraded control offered on VM milling machines

- Windows®-based platform that offers all the user-friendly features that Milltronics controls are known for
- Intel® Dual Core i5-3610ME processor (64 bit)
- 4GB memory, 120 GB disk storage, 2 USB ports, mid-travel tactile keys and an enlarged 15" LCD touch screen
- Control swivels and features height adjustment
- Remote jog standard

Milltronics Software

- Easy navigation function keys
- Solid model graphics
- Auto trig help
- 3D pocket/sweep
- DXF import
- Pockets and islands
- Tool tables
- Help screens
- Prompted tool setting routine
- Mid-program restart
- Handwheel run
- Scaling, mirror image, rotate
- Canned cycles – drilling, boring, tapping, facing, threading, bolt hole pattern, text/engraving, tangent/circle generate

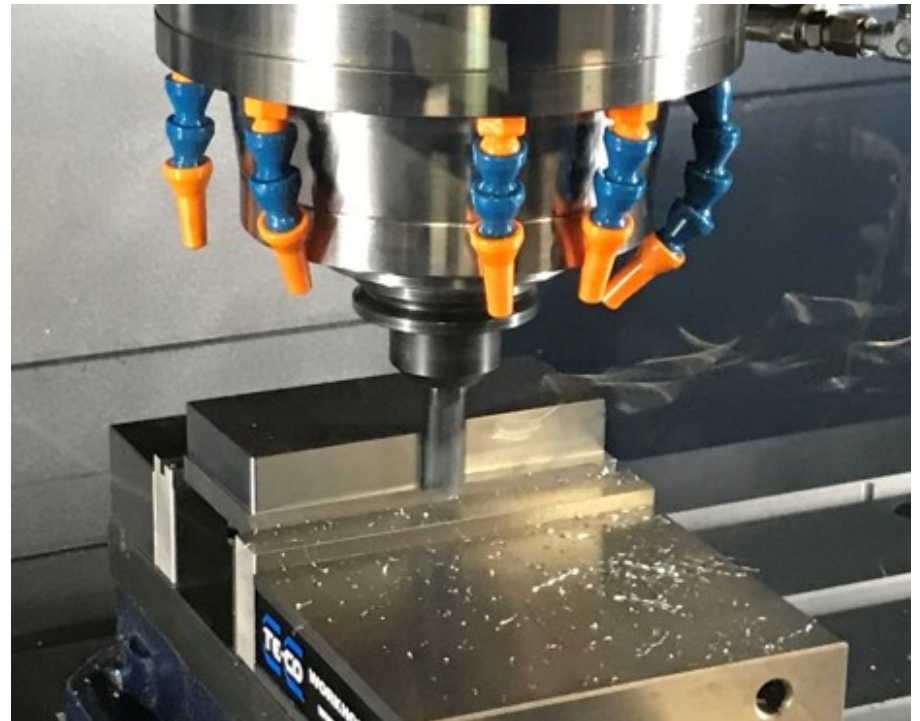


Watch control demo [here](#)

ChipBoss™ Software (option)

New optional software from Milltronics uses proprietary algorithms to calculate toolpaths and control the maximum allowable cutter engagement resulting in:

- Faster cycle times
- Better tool life
- More accurate parts
- Cycle times can be reduced by as much as 50% (or more) and 3-5 times better tool life



Part accuracy can improve through reduction in tool deflection

ChipBoss™ Software (option)



Automatically controls the chip load, keeping it constant and creating the optimal chip

Watch video [here](#)

ChipBoss™ uses trochoidal milling strategies with deeper depths of cut and smaller step overs:

- Feed rates can be much higher than what conversational users are used to experiencing
- Reduces the number of times a machine needs to accelerate and decelerate – “less wear and tear”
- Includes “Rest Roughing” – automatically calculates the areas to be machined and uses a smaller cutter to get just those areas that can’t be cut with larger tool, saving even more time

Why Milltronics? 10 Reasons

1. Easy to Use Control

The Milltronics control is straightforward and easy-to-use. Choose between conversational, G-code or use a CAM system – whatever is the most efficient way to program the part.



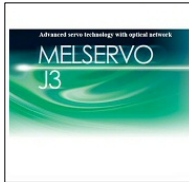
2. Made Right

Using a machine design process that is ISO 9001 certified, Milltronics starts with FEA analysis and designs accurate, rigid and reliable machines built to last. No shortcuts here.



3. Superior Components

Milltronics partners with top suppliers such as Mitsubishi, Kenturn, Hiwin® and Grundfos. You can judge a machine tool builder by the company it keeps.



4. Upgradeable

Milltronics controls are designed, built and supported by Milltronics – and are designed to be upgradeable. You don't have to miss out on new software or hardware advancements as time marches on.



5. Availability

We recognize that sometimes you need a machine *fast*. We work hard to make sure we have our most popular models in stock for quick shipment.



6. Fastest Learning Curve

Because Milltronics machines are so easy to learn and use, you'll be making chips quicker. And don't confuse easy with simple – the 9000 is packed with advanced features and capabilities.



7. Service Network

According to customer surveys, Milltronics and our distributor network offer the best service and support in the industry. We do what it takes!



8. Complete Solution

A complete line – 50 different models of tool room mills and lathes, general purpose and performance VMC, CNC lathes, bridges and boring mills.



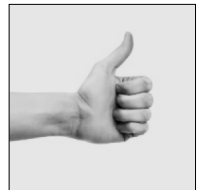
9. Global American Company

Milltronics is part of the Hurco Companies Machine Tool Group. Publically traded with solid financials, we're in it for the long haul.



10. More for Your Money

Finally, Milltronics offers better built machines with more standard features for the price. Period.



MOMENTUM



Thank you!