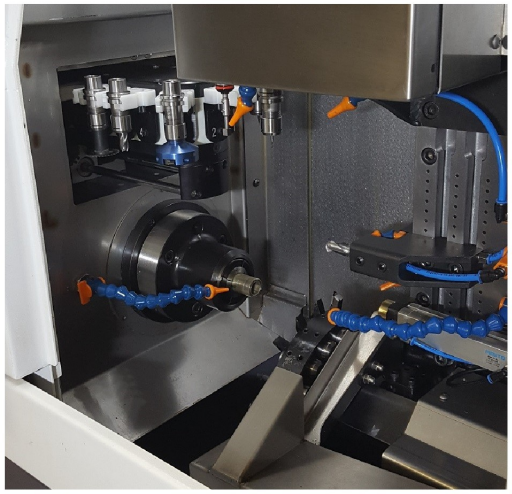
RTL-4000



Wedding Band Machining Center

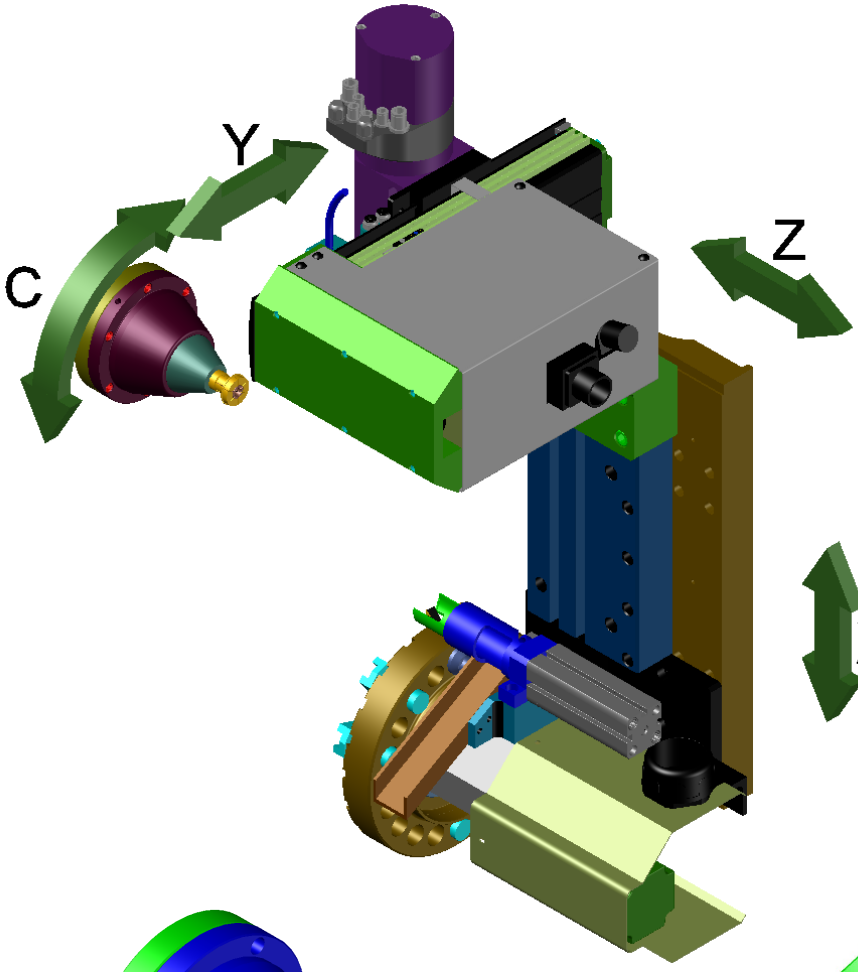
RTL-4000 Turn-Mill Center

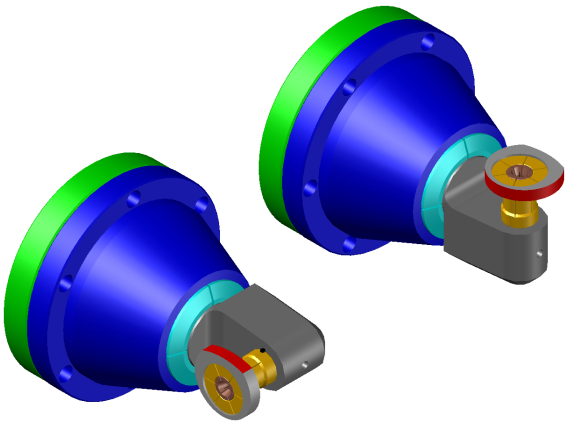
Unique, in compact size, available tools and with 4 axes of motion.
The RTL-4000 is a competitive solution to complex jewelry & band manufacturing.

- For simple or complex bands up to 32mm diameter x 20mm wide
- 4 axes of simultaneous motion. (X,Y,Z & C)
- 20 position servo driven turret
- 40,000rpm live spindle with 10mm capacity & 3.6Kw of power
- 18 position HSK25E tool changer for live tooling
- Gang slide for additional tools or accessories
- Probing capabilities for part inspection & setup
- Control connectivity through Ethernet, USB and RS232
- High speed servo system for fast rapid motion and accurate high speed contouring of complex surfaces
- Up to 4Gb of program memory
- World class components for easy maintenance
- World Class support for anywhere you do business

FAGOR FESTO HS² DENITOOL® NSK NAKANISHI INC. PHOENIX CONTACT

RTL-4000 Axis Motion





Fixturing to machine face profiles and drill and mill surfaces

Fixturing to machine flat surfaces and flip 180°

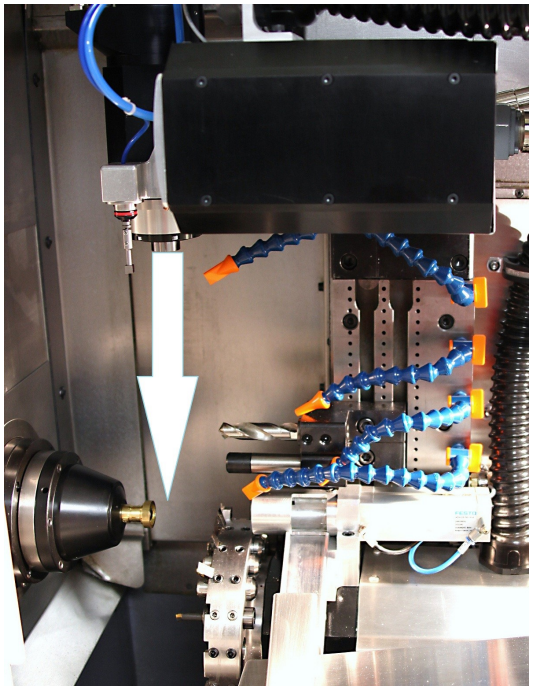
With 4 axes of motion,(X-Y-Z-C) mold work, watch components, class rings, anything that requires a milling machine format can be accomplished.
The C axis can be clamped in position and the spindle can accommodate different fixtures to allow 3 axis milling capabilities.
Combined with turning or indexing, your horizons expand to meet your machining needs.

RTL 4000 Design

The RTL 4000 is an extremely precise, high speed, vertical format lathe & machining center.

Designed for the rigors of high volume production in the aerospace, job shop and medical industries. This design is ideal for production jewelry manufacturing.

Vertical Design



The vertical design allows metal chips to flow down into the chip collection area.

Easy cleanout of chips eases change over of materials so that mixed metal is minimized.

Ergonomic location of the machine table allows easy access to tooling and ease of use for the operator when changing tools or loading & unloading tubing or ring blanks.

Extreme Accuracy

High accuracy is a result of the combination of machine components and servo systems working together to position the machine.

We use aged meehanite castings for machine construction, oversized headstock castings for spindle location, and NSK linear rails and ball screws for motion delivery.

Coupled with the Fagor DDS Sercos (fiber optically linked) servo system, this provides speed and tolerance control when critical parts are being machined.

High accuracy provides accurate ring to ring weight when high volumes are the goal.

When you are milling designs or drilling stone locations or both, this accuracy provides the quality look only machined bands can provide.

RTL-4000 Design

High Speed

20 M/Min Rapids

0-6000rpm in 1.5 sec

1000 block look ahead and huge program storage capacity allows fast efficient machining of complex parts with the RTL 4000.

High speeds reduce cycle times and lower costs per ring. Speed is critical in the production of wedding bands.

Our methods lower the production time of finished bands making them instantly ready for setting and polishing.

Our Ringtech Software is the key to fast and efficient programming.

Space Efficient

The RTL4000 lathe is unique to any industry.
The compact format provides an easy to operate, ergonomic platform able to fit into most any shop floor space.

This feature-rich machining center concentrates tremendous manufacturing capacity in a very small 61”x48” footprint (1.5m x 1.2m)

State Of The Art Cnc Control

Fagor CNC controls allow customization beyond belief.
This is **THE** difference in how RingTech can integrate the machine control and user interface into a complete easy to use package.

The Man Machine Interface

The Fagor 8055i control has an integrated easy to use interface.
All machine operations can be accessed from an easy to read, well laid out panel.
Programmable buttons allow easy selection of machine operations and functions.

Connectability

With Ethernet, RS232 & USB, programs can be downloaded to a computer, or CAD CAM generated programs can be uploaded into the control.
Fagor WinDNC software allows easy connectivity to a PC.
And direct communication for maintenance and support.

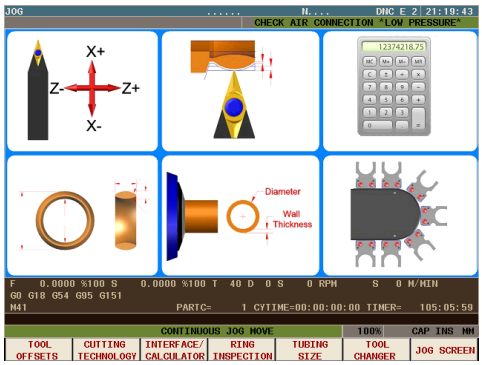
Speed

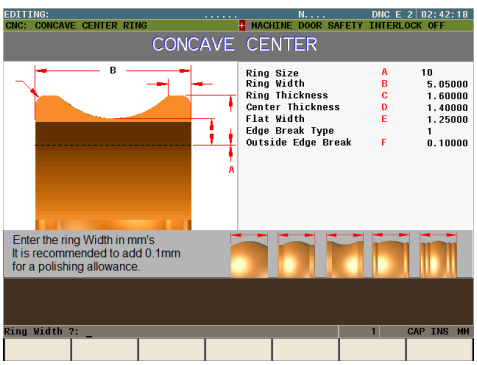
A 1000 block look-ahead capability and high-speed block processing capabilities allow even the most complex programs to run at an optimum speed.
Up to 4Gbytes of memory allow huge programs to be executed.

Customizable User Interface

We can develop custom software for specific applications.
Probing sequences to test part integrity, automatic offset and tool life management integrated into the program is at your fingertips, all controlled with an easy to use interface.

We created a complete system of programs and interfaces in multiple languages for our users.





RingTurn v6 Software

Every Design is based on a few simple questions:

- Ring Size
- Ring Width
- Ring Thickness
- Specific Information for each design
- Type of inside profile

Sample of domed cross sections

Turned Profiles

There are 47 basic profiles, these profiles can be modified into thousands of different shapes.
These shapes can have grooving, milling, drilling or all operations added.
We are constantly surprised by our customers ingenuity in developing new variations.

Milled Designs

The RTL-4000's milling features add a level of band customization limited only by the imagination.
The built in designs are based on popular designs in the industry. With the addition of stone milling, the discerning jewelry manufacturer has an array of truly astounding design possibilities at their fingertips.

A cross sample of band designs, by no means complete. These graphics are based on 6mm wide profiles.
All milling patterns can be scaled for ring size and width.
Stone shapes:

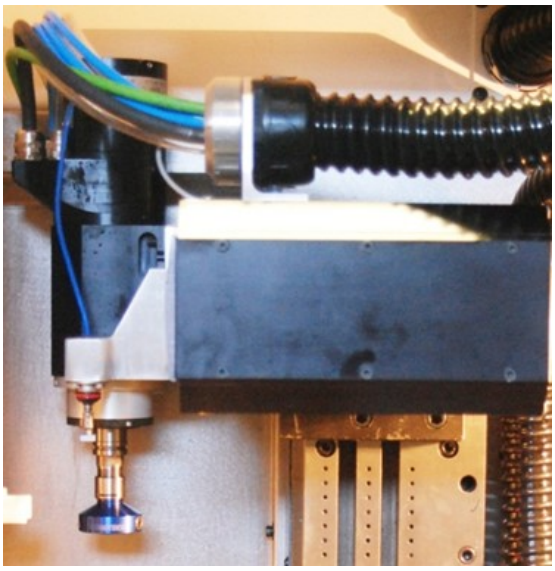
- Round
- Square (rotated at 45^{O})
- Baguette
- Trillion (In 4 directions)

Custom Designs

RingTech provides instruction to learn the required skills and become self sufficient.
Our designers can also create the programming needed for your unique creations.

Machine Options

Y Axis



The Y Axis expands the milling capability to 4 axes of motion.
This extra motion now allows tools to machine the rings from the side.
This allows faceting cuts to be made using fly cutters from the side of the ring.
The Y axis allows high speed milling of flat or contoured surfaces on the top and sides of rings.

* The Y axis is only available with the tool changer spindle option.

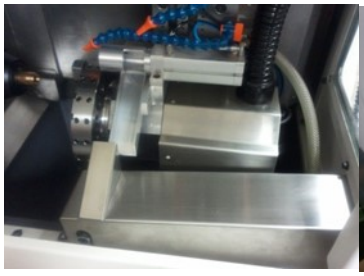
20 Position Turret

The 20 position turret expands the turning capability to allow more tools to be used.
Setup time is reduced as standard tools can be setup and left in position.
Multiple tool types can be used for different materials.
Diamond form tools and mill graining tools can be used.

Through tool coolant and air blast keep the tools free of chips for un-attended Machining.

Band Catcher & Conveyor

A programmable part catcher can be integrated into the turret system. The bands are caught by the band catcher and placed in a chute that moves the band to a conveyor for transport out of the machine.
The part conveyor is automatic and only operates when the band is deposited on the conveyor .



Customization

We can customize our equipment to meet your demanding needs, speak with us and find out how we can assist you.

Machine Components

The Precision of the RTL -4000 is derived from using only the best components available.
All of the systems we use are supported by companies that maintain a global service network.

Servo Systems

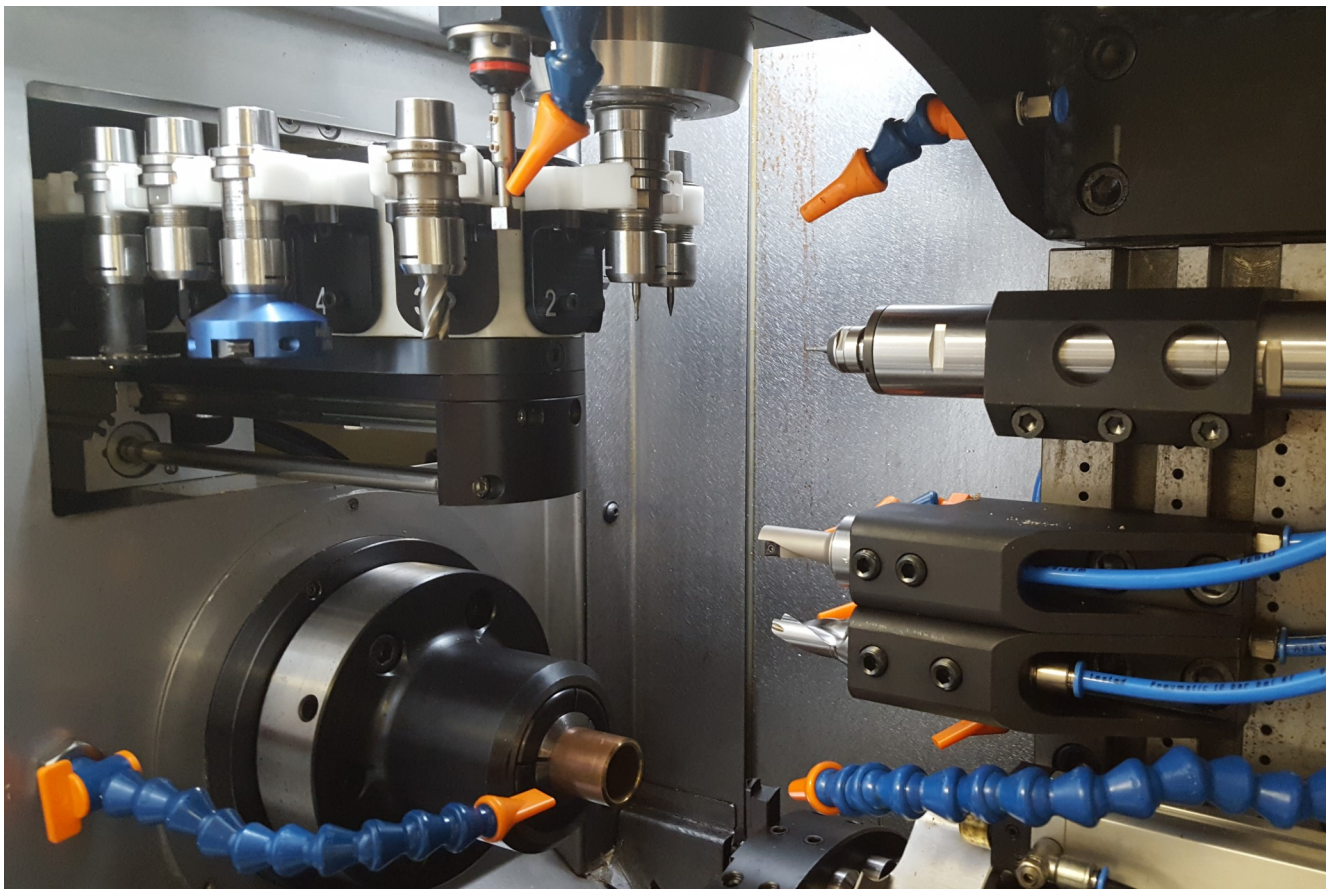
FAGOR Automation is a world renowned provider of control solutions.
The RTL-4000 uses only FAGOR components in the CNC system, either full fiber optically connected digital servos for the main axis motors and drives, or digital motors and drives for the auxiliary servo driven systems.

Pneumatic Systems

All of the pneumatic components are sourced from FESTO Corporation, the world leader in automation and integration systems. With Festo's global presence, Ringtech can provide fast parts and service support on all pneumatic systems.
Each system is carefully monitored by proximity switches that check every motion of the pneumatic system. Safety and correct operation of the machine is our upmost priority.

Slide Systems

The main slide systems use NSK linear slides and ball screws. Each component is lubricated from a central lubrication unit, that times the lubrication to the use of the machine.
These slides together with the cnc control system contribute to the speed and accuracy of the RTL-4000



Machine Accessories

RingTech customizes each machining center to meet the specific needs of each application. Our technical staff can assist customers in choosing the options that best meet the needs of specific work to be done.
The RTL-4000 can be equipped with the following options:

Work holding

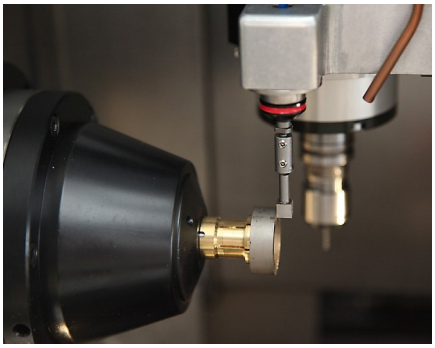
The RTL-4000 features a unique adaptable spindle that provides rapid change-over for different rings based on required machining operations - changeovers from inside, outside or tube within 2 minutes
Machining blanks or 2 tones requires machining the inside profile of the band and the outside profile in 2 separate operation. The Adaptable spindle allows each operation to be completed in minimal time.

Material Loading

When machining precious metals, a reliable method of material loading is required.

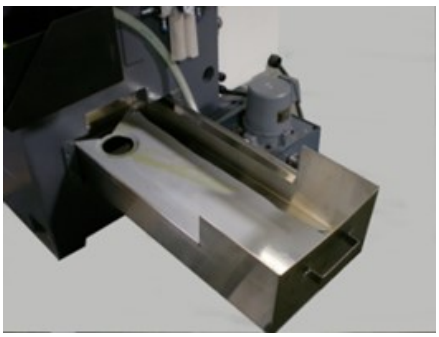
We have developed an 850mm feeder to suit the needs of precious metal manufacturers, combining the advantages of a small footprint and safe reliable operation.

Probing Systems



RingTech's probing system can locate a blank or tube automatically,
Set the ring or material diameter, set the reference position and allow error -free machining instantly.
Using a single button, the operator can initiate the probing cycles.
Each type of operation has a unique probing profile.
For blank rings we can detect ring size, width and position.
Our software checks these values and eliminates the possibility of machine the wrong sized blank.
This option compliments the Adaptable Spindle Nose option.

Precious Metal Management



A problem critical to the jewelry manufacturer is the cost of raw materials. RingTech has created a simple but effective solution to access the chips and reclaim the precious metals for reprocessing.

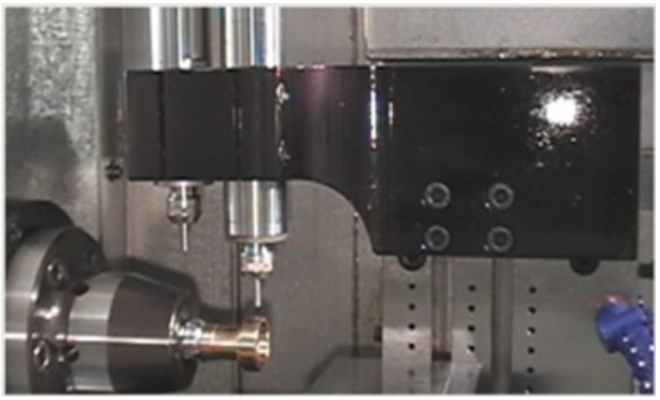
We have multiple solutions available depending on your requirements.

Live Tooling Options

With so many live spindle options available, we carefully reviewed the industry and came to one conclusion, flexibility is the most requested feature for milling capability.

RingTech offers two types of live spindles encompassing the widest range in flexibility – fixed, manual tool change spindles or automatic tool change capable spindles with preset capable cutting tools.

Fixed NSK Spindles



Many different parts can be made using two manual tool change NSK spindles.
This milling spindle option offers reasonable cost on a 3-axis machine package.
Speeds up to 80,000rpm are available.
Spindles can be mounted in different angles.
* This option is not available on the 4-axis (Y) machine.

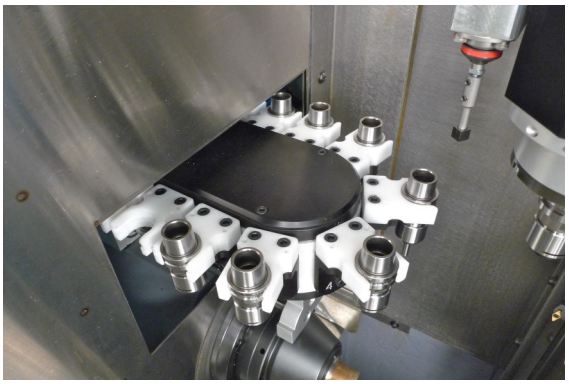
Tool changeable Spindles

The tool-change spindle system option can be used as a stand alone spindle or with an integrated automatic tool changer.
Add Y-axis and fixturing options, and you have a complete 4-axis mill/turn machining center.
This spindle uses HSK25 tool holders with a collet capacity of 10mm
Speeds from 3000 to 40,000rpm are fully programmable.
This 2.7KW (3.6Hp) spindle has the sufficient torque needed to machine aerospace style materials and the rigidity for fine finishing precious metals.

An oil cooling system is used to provide thermal stability when in use.

18 Position Tool Changer

RingTech has designed an integrated tool changer system with 18 tool capacity.
The toolchanger is servo driven for fast accurate positioning. 1.25 seconds between the furthest tool,
The RTL-4000 is fast at machining complex parts with a chip-to-chip tool change times of less than 8 seconds.



Capacity	27mm	42mm
X Axis Travel	260mm (10.23”)	260mm (10.23”)
Y Axis Travel	145mm(5.7”)	145mm(5.7”)
Z Axis Travel	145mm (5.7”)	145mm (5.7”)
C Axis Travel	360^{O}	360^{O}
Axis Speed	20M/min (787”/min)	
Axis Power Rating	6N/m (53.1”/lb)	
Workholding		
Bar / Tube Capacity	27mm (1.062”)	42mm (1.562”)
Collet Types	Hardinge 5C Benzinger Inside & Outside	Hardinge 16C Benzinger Inside & Outside
Clamping System	Hydraulic (Air optional)	
Spindle Motor Power	5.4Kw (7.4hp)	
Spindle RPM	60-6,000rpm in 1.5 sec	50-5000rpm in 2.0 sec
Precision		
Positional Repeatability	0.0127mm (0.00005”)	
Positional Accuracy	0.0127mm (0.00005”)	
Spindle Runout (TIR)	0.0127mm (0.00005”)	
Interpolation	Plane Selectable X-Y-Z-C	
Control Information		
CNC Control	FAGOR 8055iT Power	
Communication method	Ethernet, USB, RS232	
Drive System	Sercos (Fiber optic link)	
Turning Tooling		
Gang Tool Center Height	42mm (1.653”)	
Turret Positions	20	20
Turning Holder Size	3/8”	3/8”
Mill Grain Tool Holders	YES	YES
Posilux Diamond Tool Holders	YES	YES
Boring / drilling Holder Size	3/4"	3/4"
Heavy Duty Drilling Positions	2	2
Barstop Positions	1	1
Live Tooling		
Number of Live Tools	18	
Tool Size	HSK-25E	
Tool Max Diameter Capacity	10mm (ER16 Collet)	
Faceting Tool Max Diameter	50mm	
Maximum RPM of Spindle	40,000rpm	
Spindle power	2.7Kw (3.6hp)	
Tool to Tool Change Time	5 Seconds	
Miscellaneous		
Coolant Capacity	94 Liters (25 Gallon)	
Compressed Air Required	1.0 cu.m/ min	
Total Power Required	440v 3 phase 8Kva	220V transformers available
Machine Dimensions	1.55M x 1.22M x 1.8M	(61” x 48” x 72”)
Wieght	1800kg	(3750lb)

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