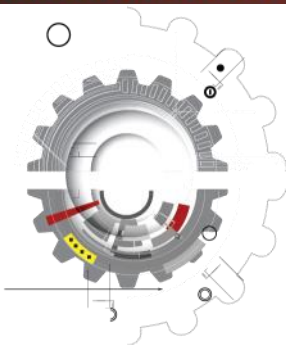




► Built for a *Lifetime*



CNC Machining Center Specifications

SOLUTION SERIES



Komo Machine, Inc.

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Machine Construction

Frame

The machine frame is constructed of heavy wall, structural steel tubing. The frame has been designed and analyzed using Finite Element Analysis (FEA) to provide a rigid and stable machining platform.

The frame components are stress relieved prior to machining. Machining is performed using a high precision machining center, capable of five sided machining in one set-up to insure parallelism and perpendicularity of the final product.



Table / Work Surface

The work surface is a precision machined composite high flow vacuum table. The surface is machined in a grid pattern to present a modular work area for easy setup. The modular design also facilitates quick changeover for a variety of material sizes. Table is expandable to 110' (33,000mm) in the X axis.

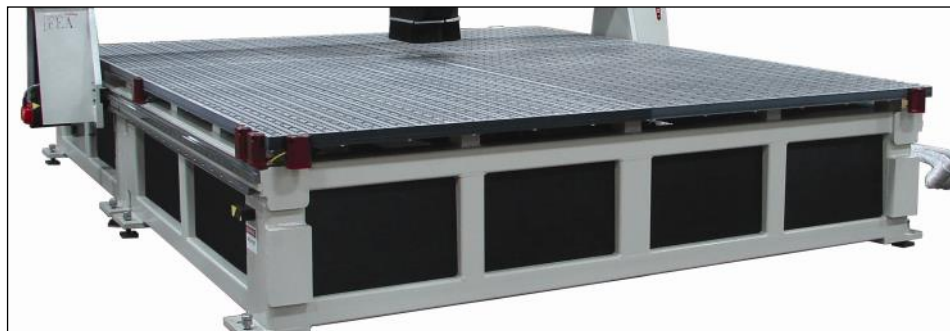
The machine comes equipped with a high flow manifold with a 4" (102mm) diameter butterfly valve to insure high vacuum transfer from a vacuum pump to the machine table.

All fittings and hoses necessary for the connection of the pump to the machine manifold are supplied as part of the vacuum system package, see Machine Options section.

Four (4) 1" (25.4mm) diameter part location pins are included as a standard feature with every machine. The pins are located in a fixed position at 4" (102mm), 4" (102mm), 21" (533mm) and 75" (1905mm).

Work Area Dimensions

Length	144" (3658mm)
Width (812)	96" (2438mm)
Width (1012)	120" (3048mm)
Width (1212)	144" (3658mm)
Table and X axis travel available up to 110' (33,000mm)	



Axis Configuration

The machine is configured with a traveling gantry, stationary table design.

X axis (gantry) motion is accomplished via dual precision helical racks mounted on each side of the base frame. Dual precision helical pinions with planetary gear reducers are driven by digitally synchronized Fanuc Alpha HVI servo motors.

Y axis motion is accomplished via precision rack and pinion and powered by a digital Fanuc Alpha HVI servo motor.

Z axis motion is accomplished via pre-loaded precision ball screw and powered by a Fanuc Alpha HVI servo motor.

The Z axis is supported by a pneumatic counterbalance system. The system is "closed loop" to minimize air use during operation.

Each axis is mounted on precision ground linear guide ways with pre-loaded precision bearing trucks.

The Fanuc servo motors provide the fastest acceleration/deceleration rates in the industry. The machine is also provided with High Speed High Precision (HSHP), found standard on all models of KOMO routers. This high rate of acceleration/deceleration, coupled with HSHP helps insure maximum tool life, along with reducing production times, resulting in a lower per piece part cost.

Travel positioning is maintained via the controller reading 1,000,000 pulse-per-revolution absolute encoders mounted on each servo motor.

Automatic Lubrication System

All positioning bearings, ball screws and racks are serviced by a centralized automatic lubrication system, activated directly by the machine control, the method recommended by the ball screw and linear guide way manufacturers.



Automatic Tool Changer

Each machine is supplied with a 12 station aggregate compatible tool changer. The tool changer is powered by a Fanuc servo motor for fast, reliable tool changes.

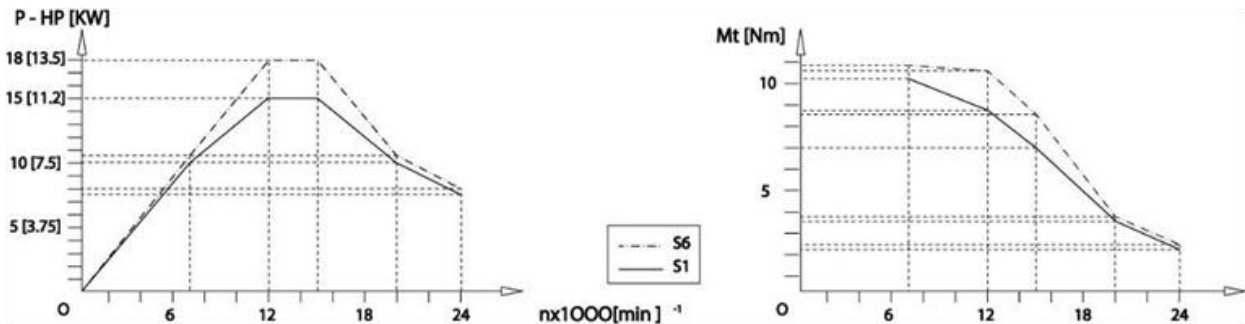


Head Configuration

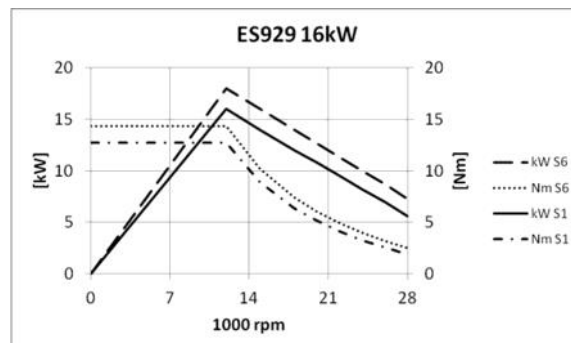
KOMO uses only the highest quality spindles on the entire router product line. Each spindle must meet exacting specifications, and is subject to a strict inspection process prior to being accepted into inventory. The main spindle is powered by an AC frequency inverter. The HSK tool connection provides a rigid tool interface to insure high cutting performance in a variety of materials, with the highest quality part finish.



Standard 18HP (13.5KW) S6, 24,000 RPM Fan-Cooled HSD HSK 63F Electro-Spindle



Optional 24HP (18KW) S6, 24,000 RPM Liquid-Cooled HSD HSK 63F Electro-Spindle



Dust and Chip Collection

Dust and chip collection is accomplished through an open/close dust shroud surrounding the main spindle. The dust shroud is connected to the customer supplied dust/chip extraction system through a 6" (152mm) diameter steel adapter.

The main spindle comes complete with a programmable air blast system for optimum dust collection performance.

Guarding

As a standard safety feature, a tube frame is provided that surrounds the spindle work zone. This tube frame is designed to prevent the operator from entering the machine work zone during operation. The tube frame utilizes a photo eye that is designed to put the machine into feed hold if an obstacle is encountered during machine operation.

Control

The machine features the latest version Fanuc 0i-MF control with integrated PC front end. As a Fanuc Authorized CNC System Integrator, KOMO has been installing Fanuc controls on our machines for over 30 years. We have worked closely with them to bring improvements and innovations to our products, resulting in some of the highest acceleration/deceleration rates and raw servo accuracies in the industry.



Control Features

Primary Features

High-speed industrial CNC
Network compatible
Windows® 7
4 GB RAM

High-speed serial bus
USB port
120 GB solid state hard drive
512k (1280M) part program memory

Operator Interface

19" color touch screen monitor
Run hour / parts count display
Actual feed rate display
Alarm / operator message display
Spindle load meter
KOMO Production Manager software

Controller keyboard
Current position display
Automated tool setter
Remote diagnostic capability
Vacuum gauge
On-screen drawing viewer

Manual Override Features

Full function hand wheel (MPG)
MDI operation
Feed rate override

Traverse override
Spindle override

Features to Simplify Programming

Custom Macro B
Work piece coordinate system preset
Absolute / incremental programming
Dry run
Tool offset memory C
Background editing
Programmable mirror image
Helical interpolation
Extended macro variables
Tool length compensation
54 work coordinates
Coordinate system rotation

400 tool length offsets
Linear / circular interpolation
Canned cycles for drilling
Dwell (G4)
Inch / metric capability
Optional block skip
Pattern data input
Extended part program editing
Cutter compensation type C
Programmable data input
Scaling

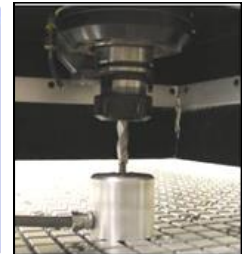
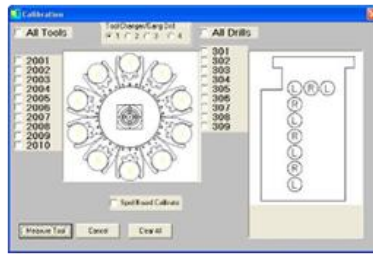
Enhanced Accuracy / Speed / Part Finish

APC – Advanced Preview Control
AI Advanced preview control
High speed skip

Simultaneous 4 axis control
Backlash compensation
Alpha HVI servo motors

Automated Tool Setter

The machine is supplied with an automated tool length measurement system. The tool setter can be placed in a fixed location for easy tool length offsetting or placed on the table for inputting spoil board or fixture offsets.



KOMO Production Manager Software

Each machine includes KOMO's exclusive Production Manager Software with Intelligent Spoil Board Management®. This productivity feature takes the guesswork out of managing your spoil board, insures optimum performance of the flow-through vacuum system when nesting and provides a fast and efficient way to load programs into your CNC machining center.



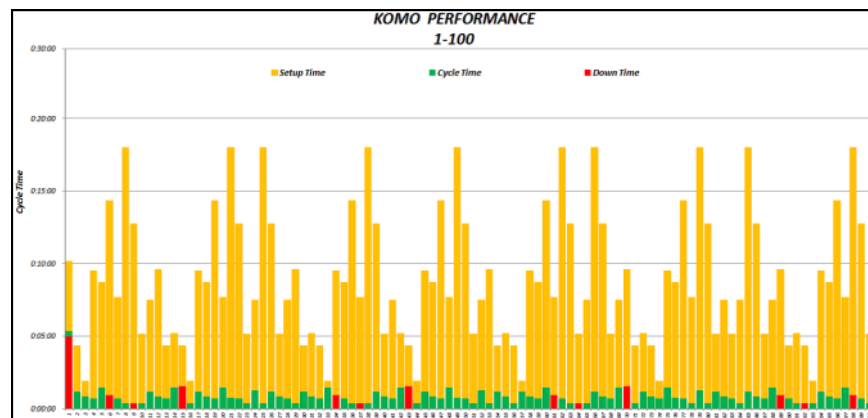
Intelligent Spoil Board Management

- User programmable buttons allow fast access to most commonly used programs
- Send programs to control memory in just seconds
- Ability to save partially run Schedule files due to production interruption
- Multiple file select and drag-and-drop support
- See your programs running on the control without switching screens



KOMO Machine Monitoring Software

Each machine now ships with KOMO's exclusive software that captures the machine's production data without any input from the operator. Specific events are recorded throughout the day, which are later imported into a spreadsheet and analyzed. This data is then graphically displayed, which can help to identify problem areas. The software starts up with the machine every morning, and is password protected against being disabled by the operator. This software also includes Tool Life Monitoring, which will visually warn the operator as each tool is nearing its end of life expectancy.



Installation

Installation of the machine will be performed by a Factory Trained and Certified Technician. Once the machine has been positioned, the technician will level the machine, perform power up and conduct a thorough pre-production test routine.

After the machine has been installed and tested, the technician will provide daily maintenance instruction and review machine operation. Travel and living expenses of technician are included with machine purchase.

Power and Air Requirements

Electrical Requirements

Machine is 480 volts with a full load amp draw of 40 amps *

Contact Komo Machine for new amp rating if any alterations are made to the head configuration and for transformer requirements.

* Does not include vacuum pump. Vacuum pump will require a separate electrical connection. Amp rating will be supplied with the New Owner's Manual and will vary depending on size and voltage of pump selected.

Plant wiring required: 440/480 volt, 3 phase brought to main machine disconnect. NEMA 12 electrical enclosure is equipped with an industrial grade cooling fan with intake filter for temperature control. A "closed loop" heat exchanger is available as an option.

Air Requirement

Machine requires 22scfm (900ml per minute) maximum usage, pressure is 90-95psi (7 bar) of filtered, dry air.

Ambient Working Temperature

41° - 95° Fahrenheit (5° - 35° Celsius)

Machine Training

Machine Operation training is provided at Komo Machine for up to two (2) persons for three (3) days. Each seat of training is available for one (1) year from machine installation.

Note: Customer is responsible for travel and living costs for all training programs.

Support

A Control Operator's Manual and a KOMO Operation and Maintenance Manual are supplied in CD-ROM format and are also loaded on the machine hard drive for access from the operator control station. Electrical schematics are provided in hard copy format.

Also included with each machine is our world class **24/7/365 toll free technical support**. As part of this support system, each machine comes equipped with Remote Diagnostics capability, allowing a KOMO Support Technician to "dial into" your machine to assist in troubleshooting and minimize response time to correct a problem.

Warranty

Each machine includes the KOMO **standard two year warranty**. See the Terms and Conditions document for full information.

Standard Machine Specifications

Machine Space - Overall with Guarding

Length	231" (5867mm)
Width (812)	170" (4318mm)
Width (1012)	194" (4928mm)
Width (1212)	218" (5537mm)
Height	80" (2032mm)
Clearance between columns (812)	100" (2540mm)
Clearance between columns (1012)	124" (3150mm)
Clearance between columns (1212)	148" (3759mm)
Clearance under the bridge	12" (305mm)
Table height (floor to table top)	30" (737mm)
Weight	11,000lbs (5990kg)

Table

Length	144" (3658mm)
Table and X Axis travel available up to 110' (33,000mm)	
Width (812)	96" (2438mm)
Width (1012)	120" (3048mm)
Width (1212)	144" (3658mm)
Part Location	Four (4) 1" (25.4mm) diameter pins
	One in Y direction at 4" (102mm)
	Three in X direction at 4", 21", 75" (102mm, 533mm, 1905mm)

Travels

X Axis	155" (3937mm)
Y Axis (812)	116" (2946mm)
Y Axis (1012)	140" (3556mm)
Y Axis (1212)	164" (4165mm)
Z Axis	10" (254mm)
	Optional 17.7" (450mm) Z travel available

Feed and Traverse Rates

X Axis	2100 ipm (53.5 mpm)
Y Axis	2300 ipm (58.5 mpm)
Z Axis	1200 ipm (30.5 mpm)
Acc/Dec	83 in/sec ²

Spindle / Tool Changer

Speed (fan cooled)	24,000 RPM
Power (S6)	18HP (13.5kw)
Tooling	HSK 63F
Tool changer	12 stations
Drive system	Precision gear box with Fanuc servo
Maximum diameter (adjacent pockets full)	3.25" (82mm)
Maximum diameter (adjacent pockets empty)	6.5" (165mm)
Maximum weight (per tool)	12lbs. (5.4kg)
Maximum weight (full carousel)	80lbs. (36.3kg)
Maximum tool length (70mm tool holder)	5" (127mm)

Drive System

X/U Axes	Fanuc Alpha HVI digital servos (synch)
Y, Z Axes	Fanuc Alpha HVI digital servos
X/U Axes	Dual helical rack and pinion
Y Axis	Precision rack and pinion
Z Axis	Precision ball screw 0.98" (25mm) dia
Lubrication	Centralized automatic lubrication

Linear Guide Ways

X/U Axes	35mm, six (6) bearing trucks
Y Axis	35mm, four (4) bearing trucks
Z Axis	35mm, four (4) bearing trucks
Lubrication	Centralized automatic lubrication

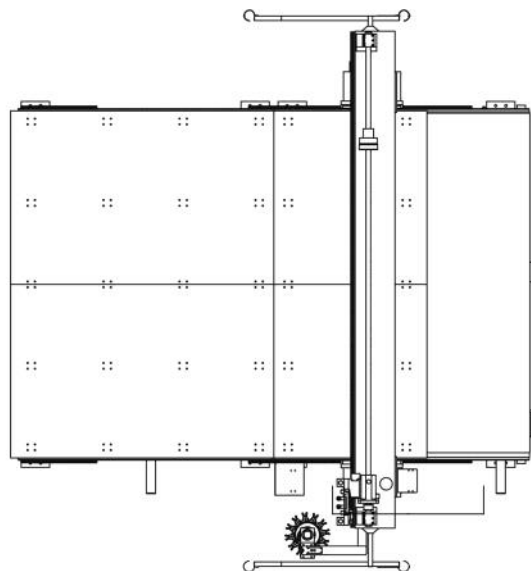
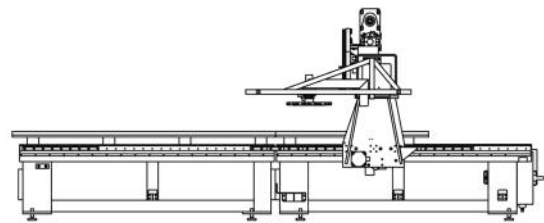
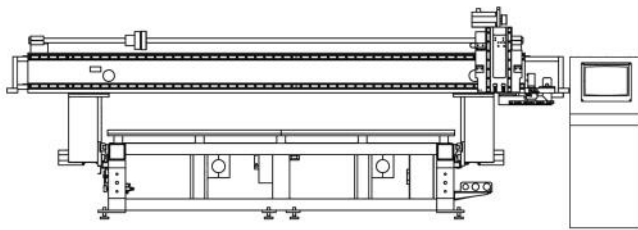
Accuracies

Unidirectional linear axis positioning (per meter)	$\pm 0.0008"$ ($\pm 0.020\text{mm}$)
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Dust Collection

Interface diameter	6" (152mm)
Recommended volume	900 CFM per head

All specifications are based on the standard machine configuration. Any options or changes may result in modifications to the machine specifications.



Model-specific drawings can be provided on request.

Machine Options

Non-Perishable Tooling Package

A complete set of HSK 63F tool holders with collets can be supplied as optional equipment. All tool holders are balanced to a specification of G2.5 at 24,000RPM for optimum tool performance and spindle life.

Non-Perishable Tooling Package for a 12 Station Tool Changer

- 12 76mm ER40 tool holders
- 12 ER40 collets
- Bench top tool changing block
- Collet wrench

Vacuum System Package

Choose the right vacuum pump for your application. All pumps available in multiple horsepower and voltage options.

Dekker AtlasCopco

Voltages available (3 phase): 208V, 240V, 380V, 480V, 575V
Additional voltages available upon request.

All pumps are designed for fast draw-down to an ultimate vacuum for fast cycle times and more powerful hold down.



The vacuum pumps are started via pushbutton on the main operator panel and come complete with a remote start relay, allowing the pump itself to be located either next to the machine, or in a remote location.

Boring Blocks

9 Spindle, 11 Spindle, 17 Spindle and 20 Spindle (other configurations available)

Enhance the productivity of your machine with a multiple spindle boring block. The boring block gives you the speed to drill multiple holes in one process, ideal for cabinet production. Spindles are on 32mm centers and all will have full table coverage in the X and Y axes.

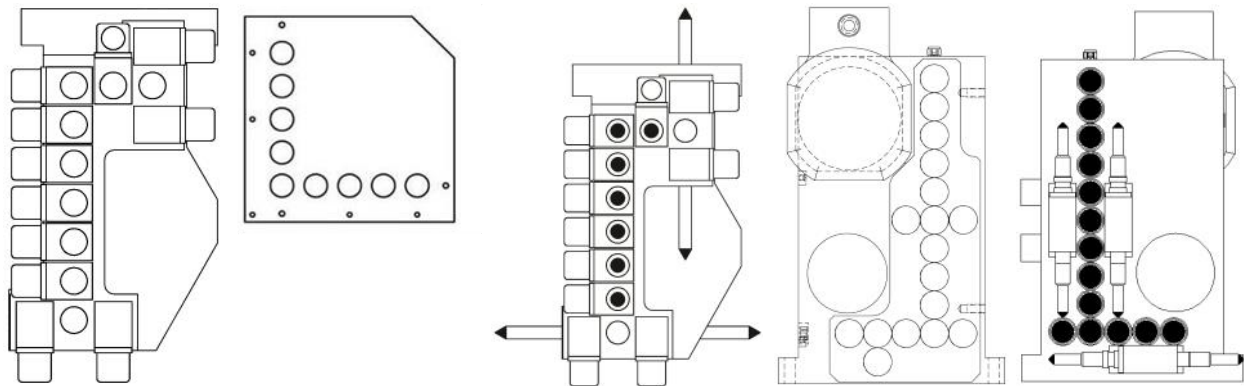
**9 Spindle (7+2
All Vertical)**

**9 Spindle (5+4
All Vertical)**

**11 Spindle (6+1 with
4 Horizontal Outlets)**

**17 Spindle
(All Vertical)**

**20 Spindle (5+9 with
6 Horizontal Outlets)**



Additional Safety Equipment

KOMO offers a variety of add-on safety equipment that can be configured to any specific model and application, including but not limited to:

Laser Scanners



Light Curtains



Pressure Mats



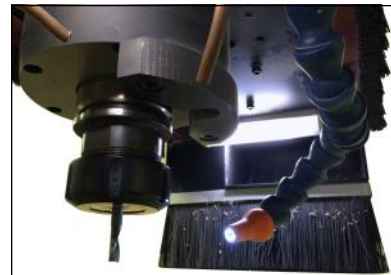
KOMO Material Management System

Create a high productivity work cell by adding an automated material management system. This is designed to remove the machined parts and clean the spoil board all in one pass, allowing you to prepare new material for the next cycle.



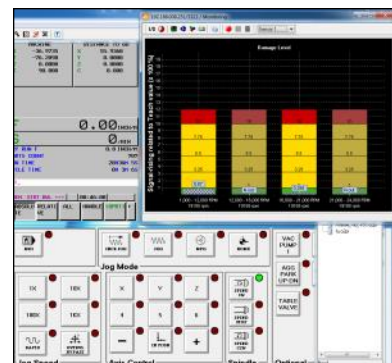
KOMO Real Time Tool View

An industrial-hardened camera (and LED work light) mounted under the spindle (inside the dust shroud) takes continuous video feed of the tool while it is cutting. This video feed is viewable from the machine control screen, and can be viewed remotely as well.



KOMO Spindle Condition Monitoring

This option is designed to monitor the vibration levels of the spindle as it is operating, and those levels are viewable from the machine control screen and can be fed to a remote office location. This allows an operator or production manager to know when a spindle is worn or overloaded - or being perfectly utilized.



Dual Screen

The dual screen option gives you the ability to be running the standard CNC screen with the touch screen interface while running program controls and other operations on the attached 19" screen.



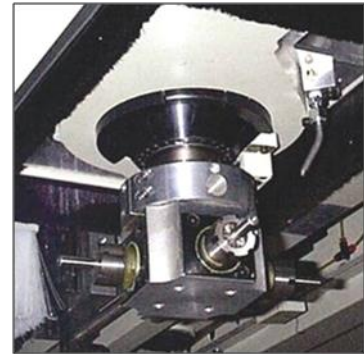
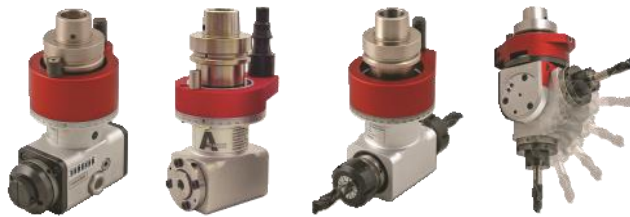
Mist Coolant System

The optional mist coolant system gives you the capability of cutting non-ferrous metals.



C (Rotating) Axis

The C (rotating) axis lets you use a wide assortment of aggregate tooling for four axis machining capability.



2.4HP

(1.8kW) 90 Degree Indexing Saw

The indexing saw gives you a convenient way to make long, straight cuts at a high machining speed. The saw is independently controlled on its own slide assembly.



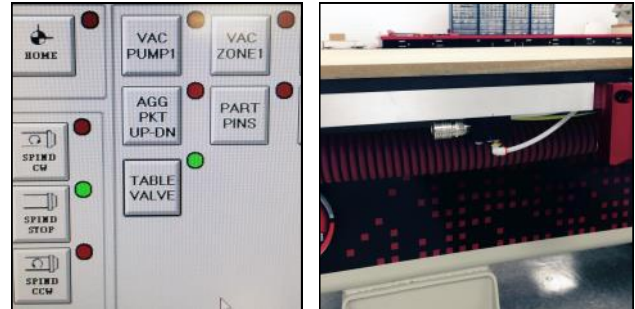
On-Machine Part Labeling

Eliminate the need for stick-on labels with the VideoJet inkjet printer head that can print labels directly onto parts before they are machined. This option can be selected in Router-CIM for an easy and efficient way to keep parts organized.



Table Fixture Air Supply

In cases where a vacuum system is not always required for part holding, an air supply can be provided if fixtures will be utilized on the machine table. This option is manually operated by a pushbutton, or can be controlled by an M code in the part program.



Software Options

Software is an important part of your machine purchase, and KOMO has a number of options available to meet your needs in addition to those described here.



Router-CIM® Automation Suite CAD/CAM Programming Software

Shaped by years of experience in custom, industry-specific programming, CIM-Tech offers a deeper, more robust software solution. Router-CIM Automation Suite offers a familiar Windows®-style interface, and its enhanced capability supports a variety of third party software to control other equipment.

Router-CIM® Automation Suite is a complete CNC machine programming package. This versatile product combines Computer Aided Manufacturing (CAM) features with the power of AutoCAD®, the world's premiere Computer Aided Design (CAD) software. Now one complete package can take you from concept drawing to machine-ready code automatically!



Alphacam is a leading CAM solution for wood, stone, composites and metal

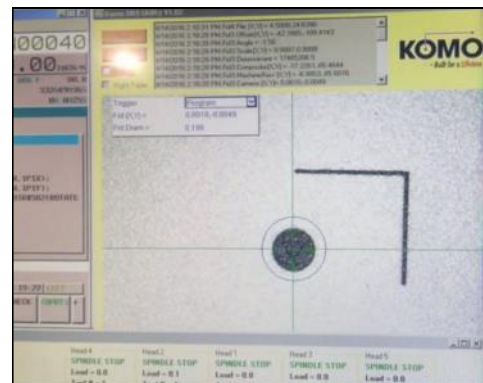
through to 5 axis NC programming applications. The emphasis behind the development of Alphacam is to provide customers with productivity, reliability, and flexibility. Improving these attributes in any company will help increase profitability.

KOMO Pathfinder Part Registration System

This option allows "print and cut" type parts to be placed in rough position on the router table and still be cut with precision. The part is printed with reference points (typically solid black dots) which are recognized by a camera utilizing vision processing software.



These dots are then used to calculate the offset and rotation on the fly for each part. The needed corrections are applied and the part is cut - all without changing the program or manually acquiring work offsets. The rotation and offset can vary from part to part and will be corrected automatically without the need for operator intervention.



Notes



► Built for a *Lifetime*



From Us to You - Since 1966

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international association
of plastics distribution



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