

529205

## AUTHOR X5 EVOLUTION 5 AXIS MACHINING CENTER

### STANDARD DESIGN FEATURES:

#### BASE DESIGN AND CONSTRUCTION

The Morbidelli A X5 EVOLUTION owes its rigidity to the design and weight of its reinforced base and innovative one-piece frame utilizing a stationary "Y" axis support arm. All portions of the base are of heavy gauge steel and are normalized after welding, a process which ensures that all stress in the base is removed before it is machined and drilled for the guides.

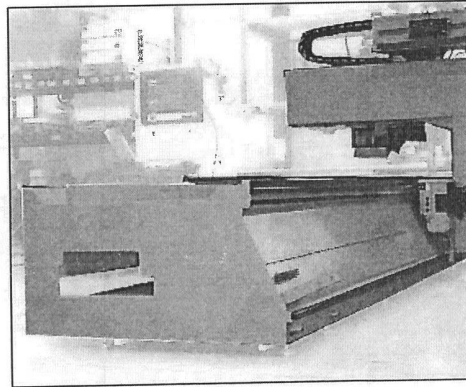
Today's machining centers are being asked to perform a wide variety of operations (sawing, routing, and drilling) in both the vertical and horizontal planes at the highest speeds possible while, at the same time, maintaining a high quality of cut. Micro-vibrations are created around all types of CNC machining centers where there is head positioning, drilling, and high speed routing taking place on the machine base. Morbidelli solves the problem of deadening vibration as well as offering rigidity by employing heavy gauge steel members for the base of the machine. This weight, coupled with the one-piece frame offers the best combination of rigidity and balanced strength on a cantilever design. Movement along the X, Y and Z-axes are driven by high precision ball screw systems.

#### *Author Advantage*

- \* No vibration means higher quality finish \*
- \* Rugged design provides maximum durability and flexibility \*

#### HIGH PRECISION, HIGH LOAD PRISMATIC BEARING GUIDES

Morbidelli uses prismatic guides for support in all axes. Due to their added weight load capability (approximately 4 times that of conventional round guides), prismatic type guides can permit accurate head positioning at high speeds.

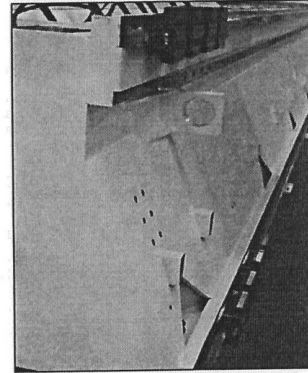
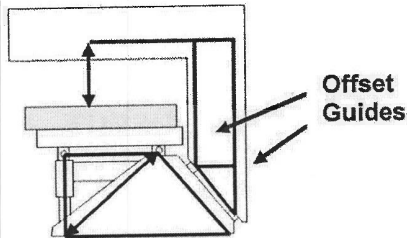


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In addition, these guides are offset to provide better weight and load distribution. The load is never concentrated on one point.



*Author Advantage*

- \* Design allows higher speeds without sacrificing longevity \*
- \* Even weight distribution increase life of guides \*

A.C. SERVO MOTORS IN ALL THREE AXES

A.C. servomotors, or A.C. brushless motors as they are sometimes called, are the latest in electronic linear motion technology. A.C. servomotors use less power and produce a more even output (drive) throughout the power band. The ability to maintain a constant torque setting when going from an idle setting into a heavy rout produces cleaner cuts and longer tool life. These motors are controlled by digital supply cards that offer the reliability and precision fine tuning associated with solid state electronics.

*Author Advantage*

- \* Clean, consistent, repetitive routing capability \*

SOLID STATE INVERTER CONTROLS ROUTER RPM

Solid State frequency inverters support the programmable router spindle speeds (S functions). By utilizing digital inverter technology, the programmer can select the correct cutter RPM and match it to the correct linear/rotational feed speed for the specific application and/or material being cut. This will give optimum quality of cut while greatly extending tool life. The inverter also acts as an electronic brake, stopping the router spindle motor in microseconds if an emergency signal is given.

*Author Advantage*

- \* Flexibility for machining various types of materials \*

REMOTE CONTROL PENDANT:

The Morbidelli X5 utilizes a remote pendant to allow the operator to move freely about the machine and still control functions such as all axes movements, axes speeds and machining speeds. The remote also provides the operator with an emergency stop (e-stop) switch.

*Author Advantage*

- \* Safer operation \*

LOW VOLTAGE STABILIZER

This stabilizer cleans up the single-phase voltage running the microprocessor. This in conjunction with low capacitance filters ensures voltage spikes do not harm or interfere with the microprocessor.



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### SYMANTEC @ PC ANYWHERE

Through the use of PC Anywhere, real-time diagnostics can be provided from SCM's facility in Duluth, Ga. The PC control is equipped with a modem. The customer is responsible for providing a direct phone line to the machine.

#### *Author Advantage*

\* Remote troubleshooting capability means more machine uptime \*

### CONTROL UNIT:

#### OFFICE PC BASED CONTROLLER

The Morbidelli Author X5 EVOLUTION uses an office PC for operator interface.

#### *Author Advantage*

\* User friendly interface \*  
\* Non-proprietary controller \*

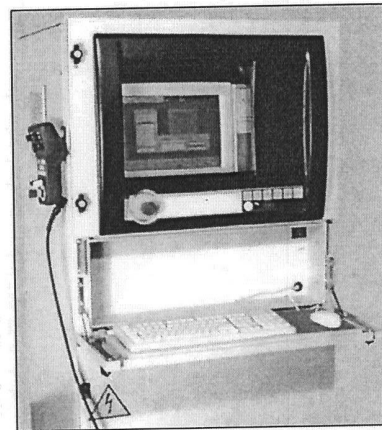
### XILOG-OPERATOR INTERFACE

- Controlled acceleration and deceleration
- Linear and circular interpolation
- Ball screw pitch error compensation
- Self diagnostics through error messages
- Dynamic tool correction via PLC due to active wear concerning space and time.

SPACE: Machine can be programmed to stop after pre-determined maximum linear usage has been reached.

TIME: Machine can be programmed to stop after pre-determined amount of work hours has been reached.

- Subroutine programming (canned cycle) with library
  - Specular programming: Allows writing of programs two different multiple reference points. For example the Left or Right corner of a panel.
  - Parametric scaling of programs through use of template type programs that the operator creates and stores in memory. Part programs can then be proportionally scaled up or down in size without the need to re-write the entire program.
  - Programs can be viewed from all 5 faces
  - Built in macros for simple, widely used programs
- On board cycle optimization



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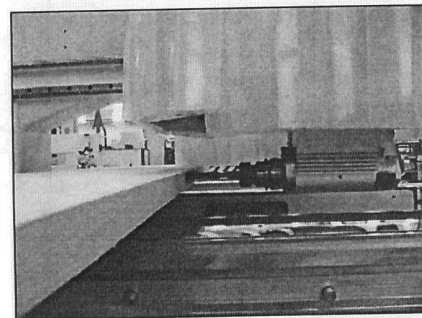
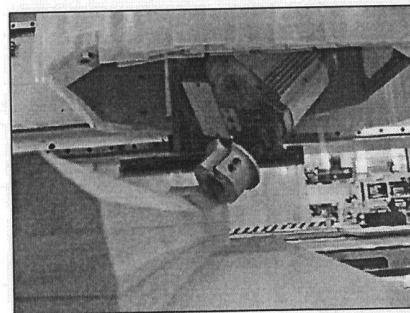
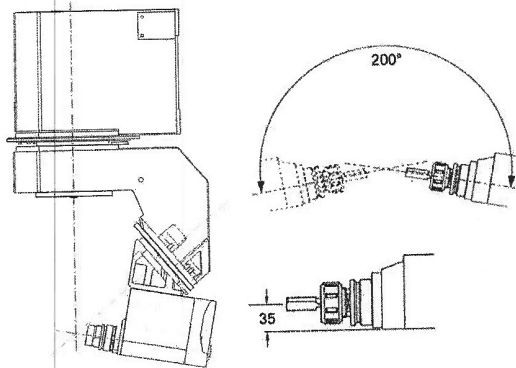
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CUSTOM EQUIPMENT:

PM0594 'PRISMA' 15HP FIVE AXIS ROUTER

The operating unit is a powerful 15 HP liquid cooled router with the capability of a five axis positioning system. This feature allows for machining with the tool oriented in any direction and avoids the use of many angular heads for every different application. The router uses an HSK63 tool holding system router and has a rotation speed of 1.200-20.000 rpm.

The structural design of the unit allows for the non-orthogonal axis to cross each other right close to the tool. This provides a rigid support for the heaviest routing operations.



Also, it allows different positioning within a restricted area compared to an orthogonal axis system, which will allow for complex shapes routing without collisions with the components being manufactured. All the operations are easier, thanks to the reduced dimension of the unit, with respect to the axis of the spindle rotation, that when it is in horizontal position is just 35mm.

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### 15 HP THREE AXIS ROUTER

The vertical routing unit, installed on independent carriage from the boring unit, is equipped with a very strong structure and long vertical stroke. This unit, equipped for the automatic tool change, has these features:

Special electrospindle (patent pending) to ensure optimum finish and high power even at low RPM.

Chuck is coaxial with the guide column on the Z axis, to guarantee high rigidity and machining precision under all working conditions.

HSK 63 attachment with double surface of reference to ensure a rigid chuck between the cone and the electrospindle.

Electronic spindle speed control from the program, from 1500 to 18000 RPM with inverter.

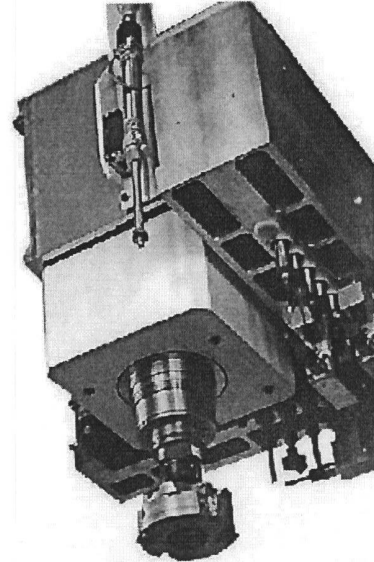
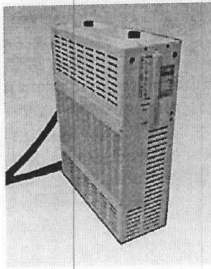
15 HP motor, with constant torque from 9000 to 18000 RPM.

Programmable left and right rotation.

Air blower to guarantee a sure tool-motor fitting.

Liquid cooling system.

Very low noise emission level.



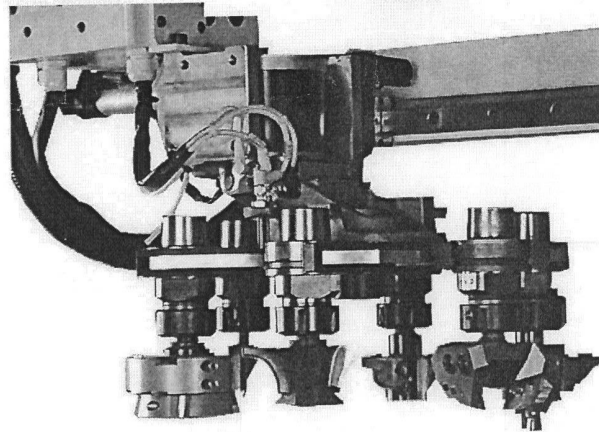
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### RAPID 6 AUTOMATIC TOOL CHANGER

This automatic tool changer is mounted directly with the three axis router and = can contain up to 6 different tools (routers up to Ø 120 mm).

The device moves on prismatic guides able to ensure absolute precision and reliability during the automatic tool change.

The support, placed in front of the routing unit, allows the automatic tool replacement in disguised time while the machine utilises other operating units or during the movements on the 5 axes.



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### REAR TOOL CHANGER WITH 24 POSITIONS

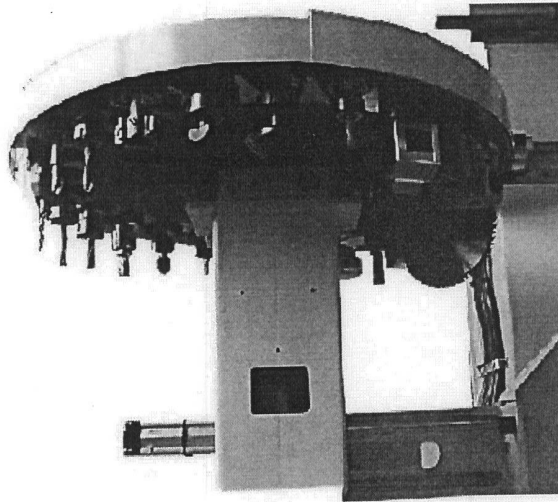
The rear tool crib is placed directly on the mobile support.

The device is composed by a rolling steel flat that slides along X axis on THK guides and is pneumatically controlled for the lifting phase.

Tool room - 24 stations supplementary tool magazine

Technical features:

- nr. 24 stations
- centre distance between stations 104,5 mm (4.09")
- maximum weight per tool 8 kg (17.6 lbs)
- maximum weight on tool magazine 96 kg (211 lbs.)
- possibility of magazine equipment:
  - nr. 24 tools 100 mm diam. (3.93")
  - nr. 12 tools 200 mm diam. (7.87")
  - max tool diam. 270 mm (10.62)



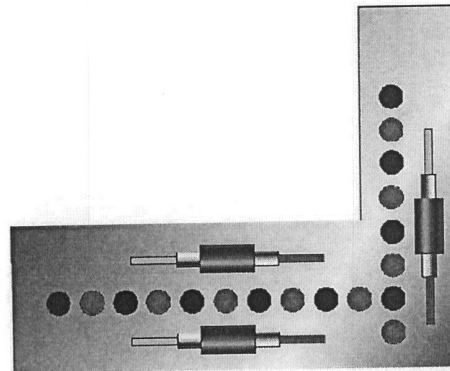
*Author Advantage*

\* Wide variety of tooling options increases versatility \*

### PM0597 24 SPINDLE DRILLING UNIT

The vertical spindles are spaced on a 32 mm center-to-center distance. Each spindle can be independently programmed and actuated including all horizontal drills. The spindles are arranged as follows:

- 10 spindles in a row in the X-axis.
- 8 spindles in a row in the Y-axis
- 2 + 2 independently controllable horizontal spindles in "X" axis
- 1 + 1 independently controllable horizontal spindle in "Y" axis
- Motor power – 3.0 kW (3 HP)
- RPM Adjustable through the inverter  
2000 - 4000 RPM



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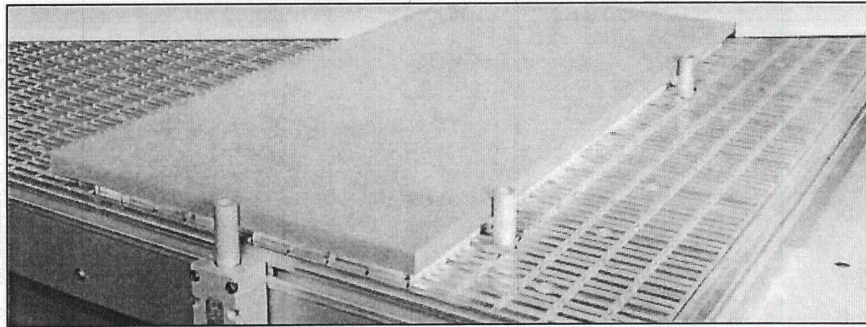
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529172 WORKTABLE FOR COMPONENT NESTING (4400 mm X 1500 mm)

The aluminum multi-function worktable has an answer to most component clamping and nesting scenarios. The table is designed of high tensile strength aircraft aluminum, and is slotted both transversely and longitudinally to accept many different fixturing devices.

The worktable is equipped with pop-up side stops, which creates 2 independent work zones.

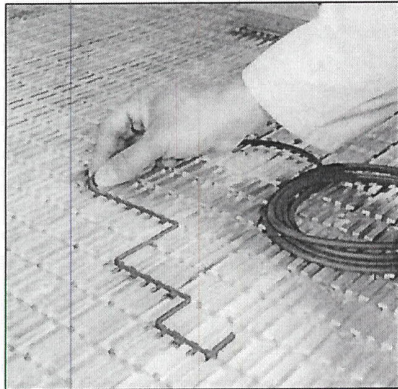


Note: Standard stops are adjustable on the outside of table. Stops located in center (as pictured) of table are special order.

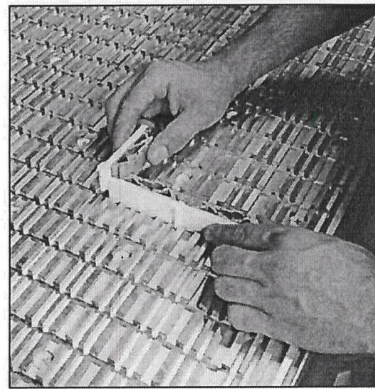
528654 12 REFERENCE STOP WITHIN THE TABLE (Locations per attached drawing)

In addition to nesting full sheets, the Evolution X5 can also be used for routing smaller components. For work on the face of the component, rubber gasketing material can be used to isolate the vacuum for part hold-down. This eliminates the need for special fixturing devices as is necessary on many machines. When machining the edges of parts, the patented MODULSET system raises the component so work can take place without damage to the worktable.

528660 N.4 MODULESET H=20mm (LINEAR DEVELOPMENT 2240mm)



Rubber gasket



Patented MODULSET system

0000630007H

TWENTY METERS OF RUBBER GASKET

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529166 CENTRALIZED DUST COLLECTION SYSTEM

The Author X5 comes with a centralized dust system that connects all of the on board systems to one central dust output. The system is ported internally to maximize CFM at each work unit. The connection to the main manifold opening has a 250mm diameter.

*Author Advantage*

- \* Single connection to dust collection \*
- \* Internal porting controlled by PLC to maximize dust/chip removal \*

528110 AUTOMATIC LUBRICATION

Automatically controlled lubrication to guides, bearing blocks, and the Y and Z axes ball screws . Some locations still need manual intervention.

528655 TWO (2) 300 CUBIC METER/HOUR VACUUM PUMPS / INCLUDES HI / LOW VACUUM

The vacuum hold-down system features twin 300 cubic meter/hour vacuum pumps. It offers the reliability of a substantial increase in vacuum power and allows the use of spoil boards for nesting full sheets.

*Author Advantage*

- \* Simple, oil-less design for maximum durability and easy maintenance \*

528233 SAFETY BUMPERS AND PROTECTIVE CAGE

Due to the increased speeds of today's machining centers, the Author X5 is equipped with Safety Bumpers. The Bumpers allow for pendulum operation (load one side while the machine is working on the other). The sides and rear of the machine are also surrounded by a protective cage to prevent intrusion during operation.

*Author Advantage*

- \* Safe solution while still allowing pendulum operation \*

528520 AUTOTRANSFORMER

Autotransformer allows the choice of 208, 230 or 460 volt, 3-phase, 60 cycle.

AlphaCAM - ADVANCED ROUTER 5-AXIS WITH NETWORK KEY

CAD functionality including lines, arcs, circles and rectangles plus snap and ortho modes, dimensioning, access to user layers and APS layers. Auto-snap. APS fast geometries and special geometries including polygon and ellipse. 3D polyline capability. Import for DXF, DWG and IGES CAD files. Editing functions including undo, change start point, move, copy, rotate, mirror, scale, stretch, skew, break, trim, explode, join, extend, fillet, chamfer and offset. Change function - construction to geometry and reverse. Viewing options include 3D wire frame, full 3D simulation, ghost tools, single steps, rapid positioning and all zoom functions. Typed-in TrueType® text with editing capability, creation and editing of splines, conversion of points to lines or arcs and digitizing. Utilities for distance and angles.

User defined tool library. User defined materials library. Tool direction settings include inside, outside, left and right. Vertical rough and finish machining, contour, linear or spiral pocketing with unlimited islands, panel edge accessibility, automatic lead ins and lead outs, automatic calculation of speeds and feeds. Cut corner options include strait, roll round, or loop. 3D engraving plus addition and removal of tagging supports. 3D approach.

Operation and toolpath editing capability. Automatic toolpath update when geometries are modified. G41/42 tool compensation. Drill, peck, tap and bore holes using controller cycles. Graphic printing and plotting. Support for Machining styles: Machining styles are sets of machining instructions that can be saved away into a user configurable library independent of any geometry relationship. Advanced Nesting gives the user options of Manual or automatic nesting of toolpaths and geometries with rectangular or true-shape nesting strategies.

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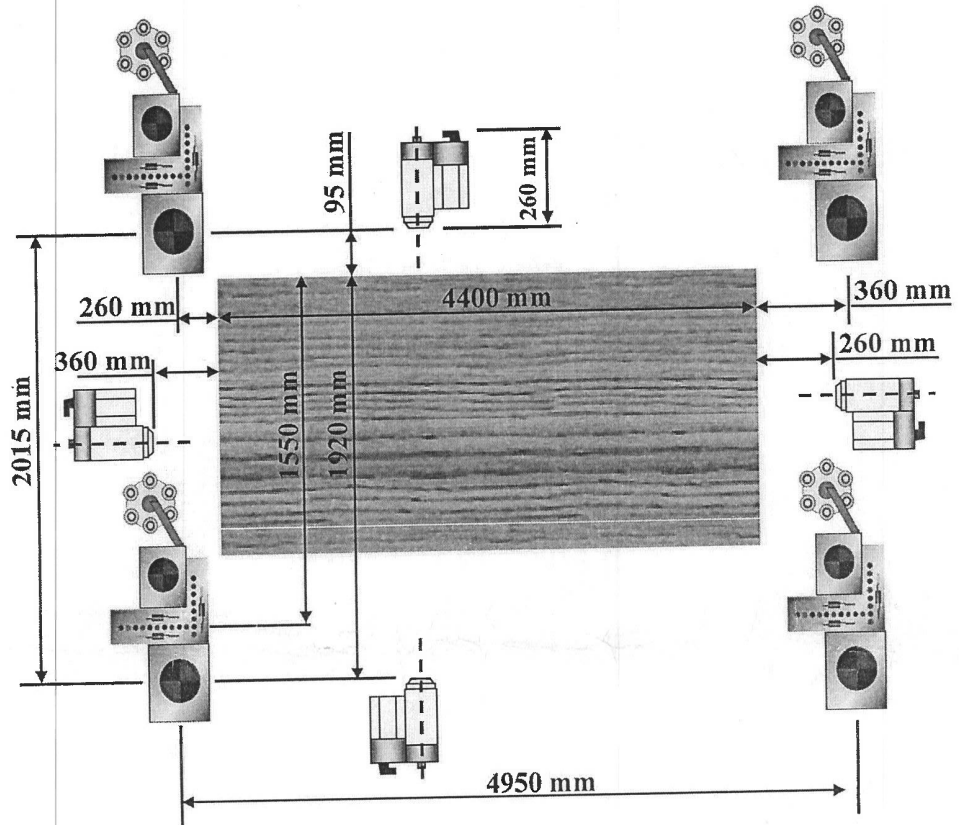
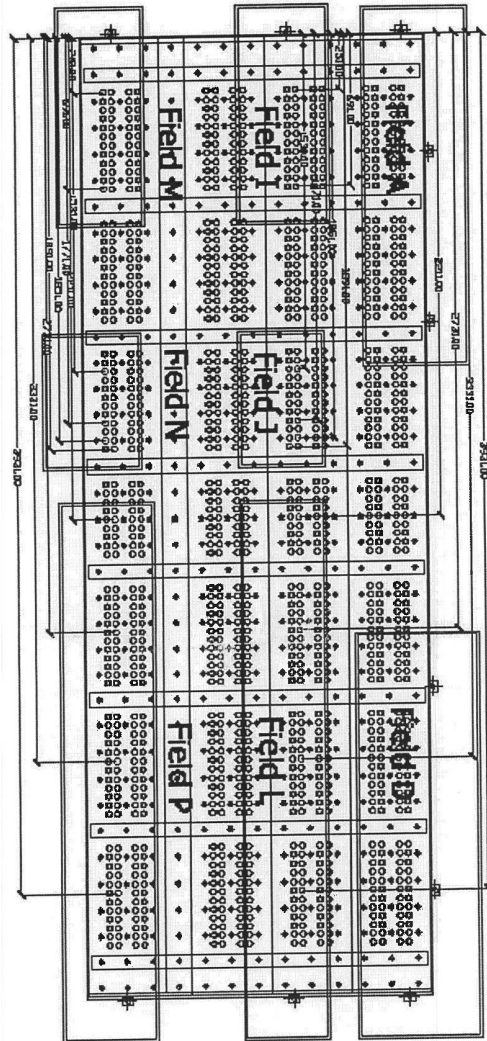


Photo shown may include optional equipment

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**TECHNICAL SPECIFICATIONS:**

|  |   |
|--|---|
| Worktable dimensions:<br>Length<br>Width   | 4422 mm (174.09")<br>1500 mm (59.05")   |
| Boring pattern dimensions:<br>Maximum in Y axis Vertical (10 Drills)   | 1550 mm (61")   |
| Router working dimensions:<br>Maximum in X axis<br>Maximum in Y axis   | 4422 mm (174.09")<br>1920 mm ( 75.59")  |
| Spindle (main) motor:<br>Power (24 spindles)<br>Spindle rotation speed   | 3 HP<br>2000-4000 RPM   |
| Electrospindle One - Front<br>Electrospindle Two - Rear  | 15 HP, liquid cooled (5 Axis)<br>15 HP, liquid cooled (3 Axis)  |
| Tool Changers<br>Main Rear<br>Electrospindle two<br>Attachment   | 24 position, Rear Tool Room<br>6 position, Router two only<br>HSK 63F   |
| Main Drilling Unit<br>No. of vertical spindles<br>No. of horizontal spindles   | 10 in X-axis, 8 in Y-axis<br>2+2 in X-axis, 1+1 in Y-axis   |
| Maximum linear positioning speeds:<br>X axis<br>Y axis<br>Z axis   | 40 meters/minute (131 feet/minute)<br>40 meters/minute (131 feet/minute)<br>22.5 meters/minute (74 feet minute)             |
| Panel passage  | 280 mm (11")  |
| Z Axis stroke  | 400 mm (15.75")   |
| Dust extraction required   | 3500 CFM  |
| Operating air pressure (3/4" I.D. hose)  | 7 ATM (102 psi)   |
| Installed power (dependent upon options)   | 35 kW   |
| Weight of machine  | 4200 Kg (9,240 lbs)   |
| Electrics  | 208/230/460 volts, 3-phase balanced, 60 cycles  |
| Tooling included<br>(12) 1036237408A HSK63F Tool holders<br>(9) 50-00033-08150 LH Drill adapters<br>(9) 50-00033-08200 RH Drill adapters | (6) 0000410126D ER32 Collets 1/2"<br>(3) 0000410120A ER32 Collets 1/4"<br>(3) 0000410123G ER32 Collets 3/8"                 |
| PC Specifications (minimum):<br>Processor<br>Hard drive<br>Memory (RAM)<br>Operating system<br>Monitor<br>Other                          | Intel Pentium 4 531 3 GHz<br>80GB<br>512MB<br>Windows XP Professional<br>19" Flat Panel<br>CD-ROM, Ethernet Network Adaptor |

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