

ROTTLER
THE CUTTING EDGE

EM69P

5 Axis CNC
Digitizing/Porting
and Machining Center



OPTIONAL
SPINDLE MOTOR
AVAILABLE 43HP
32kW UP TO
20,000RPM

Machining Equipment
Created for Performance
Racing & Engine
Remanufacturing.

So Advanced, It's Simple.

EM69P 5-AXIS CNC DIGITIZING, PORTING AND MACHINING CENTER

Rottler's Next Generation 5-Axis CNC Multi Purpose Machining Center offers the precision and speed needed to reproduce cylinder heads with exceptional accuracy – with no handwork needed. The **EM69P** also has the capability of porting intake manifolds with the same techniques used to port cylinder heads.

The **EM69P** has a huge high torque spindle motor that utilizes CAT40 spindle taper and the latest motor technology to give more torque than previous models. An optional high output 20,000rpm spindle is also available.

The **EM69P** is able to machine engine blocks such as boring, surfacing, line boring, lightening and additional machining requirements.

With the use of OPTIONAL Rottler PATH Conversational Software programs can be quickly and easily written for the machining of custom parts, no G-Code knowledge required.

The **EM69P** uses the exclusive Rottler CNC Touch Screen Control Software. With standard Windows user interface and animated training, training time and learning time is reduced. Operators can take full advantage of available features that will improve operator speed and efficiency.

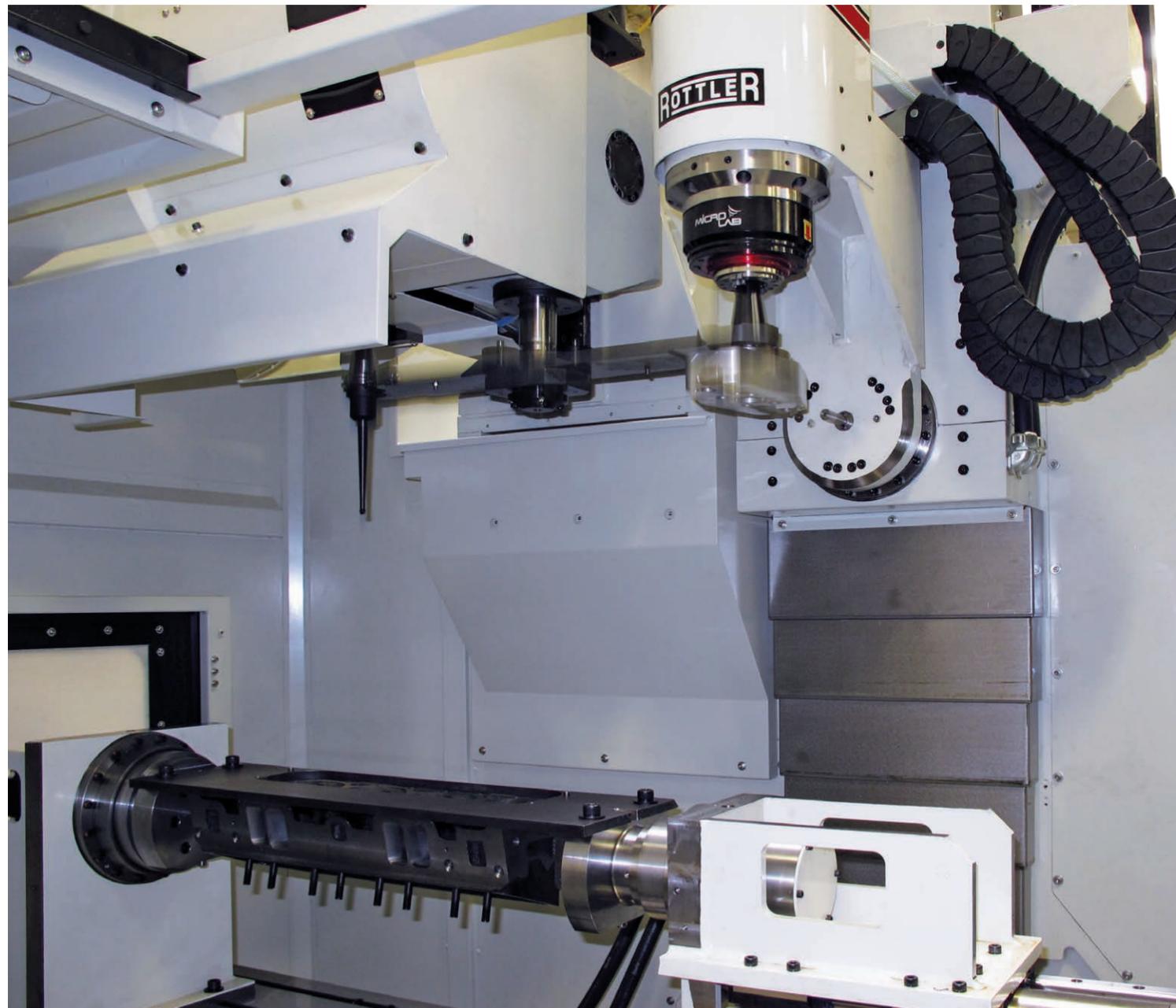
The **EM69P** features the new OPTIONAL 4C PC-based single processor control system by Direct Motion is highly interactive and very responsive. Our next generation 4C control system extends capability to include importing of solid models which can be semi-automatically converted to toolpaths that the machine can then use to execute actual machining operations. The upgradeable software can be networked for enhanced efficiency. The Advanced DM software tools allow manipulation of port design and minimize digitizing time. This allows an operator to pick up data once and tweak the design (including hand-ported designs) as needed.

The **EM69P** has very fast rapid movements and cutting speed with infinite look-a-head capabilities offering fast production times. A common V8 cylinder head can be ported in about 1.5 hour.

Digitizing is done automatically on the machine using a Reinshaw probe, eliminating the need for an expensive coordinate measuring machine (CMM).

The 24 tool automatic tool changer is included as standard equipment for "set it and forget it" operation.

Large LED work lights mounted inside the enclosure provide a bright work area during setup and operation.



Spindle in 5th Axis

The high torque spindle of the **EM69P** is built into the 5th axis of the machine with the center of the cutting tool on the same center as the 5th axis. The spindle is able to tilt 60 degrees to the left and right.

This unique feature allows easier set up and faster porting time compared to fixed spindle machines.

Competitive machines have a fixed spindle and therefore have to tilt the cylinder head left and right which makes complicated programming and each port has to be programmed differently.

Touch Screen Technology

Rottler utilizes a 32" TOUCH SCREEN to simplify machine control operation. Touch screen allows separate control panels to display only the information and control buttons that are required for that particular operation to be displayed and hide the information and buttons not required. Most CNC machines have large control panels with many unnecessary buttons and this makes learning the machine slow and complicated, which is stressful to a new operator.

Electronic Hand Wheel

Offers operator infinite control of machine movement in all axes for quick and easy setup. Also controls variable feed rate during automatic cycles.

Linear Roller Bearing Slideways

All Axes of the EM machines are supported on low friction Linear Roller Bearing Slideways allowing fast acceleration and precise positioning for more production and precision parts.

Brushless Servo Motors with BISS Encoders

The **EM69P** has the latest technology servo motors with BISS encoders offering 100 times finer resolution compared to previous models. These new Servo motors give maximum torque and performance throughout the RPM range for improved accuracy and increased productivity. BISS encoders eliminate any limit switches and do not require homing at start up saving time and increasing reliability.

Direct Drive Ball Screws

Direct drive precision ball screws for faster rapid feed rates and accurate positioning eliminating backlash problems relating to belt drive systems.

Chip Auger

Automatically removes chips from enclosure and deposits chips into disposal cart.

Massive Frame

Massive frame boasts full enclosure with sight panels in front and on sides of enclosure to view work area.

Large T-Slot Table

Allows operator to clamp or fixture a wide variety of jobs quickly and easily.

Rottler's Advanced Optional 4C Software



What is 4C Software? Rottler's newest EM Series equipment offers Computer Numeric Control (CNC), Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) in the industry's most advanced Computer Measuring Machine (CMM). The 4C technology allows users to digitize, edit designs and begin cutting in less time but also requires less machining/programming expertise compared to many other systems. This brand new, revolutionary CNC machine CAD/CAM software allows 3D CAD Solid Models to be imported or created at the machine – the built-in CAM functions can be used to semi-automatically and interactively create complex 3D tool paths direct from the CAD geometry.

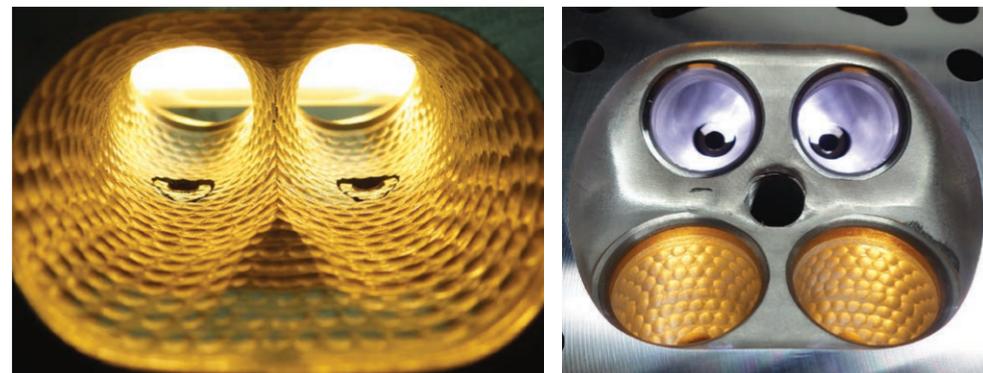
One of the main features is the EM series' expanded size 32" touch screen – by maximizing screen size, Rottler's CAM software allows unprecedented amounts of information to be displayed for the operator's use. The user can choose the information to be displayed for incremental and interactive functionality. 4C is available in 3, 4 and 5 axis modules to suit the application.

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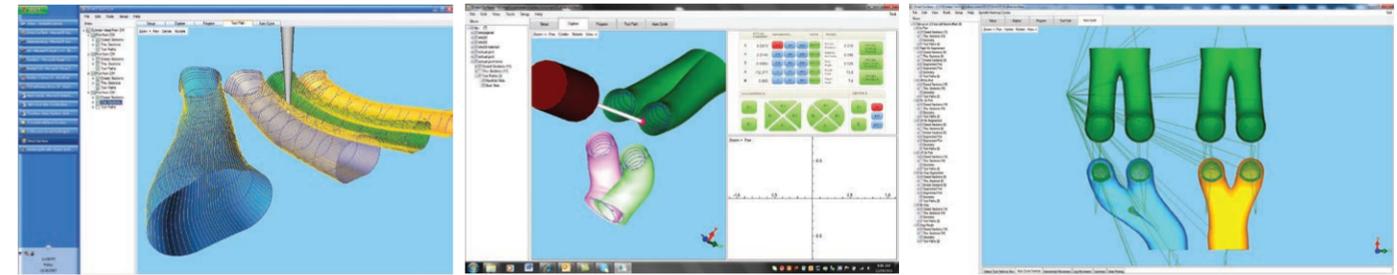
Exclusive Dimpling Feature



Customers using the unique Rottler software are able to dimple ports in certain areas reporting a 1½ - 2% increase in horsepower of non-dimpled ports. Not only are you gaining horsepower but you are preventing your competition from copying your exact port.

Exclusive Dimpling Pattern

Do you know why golf balls have dimples? To make them fly farther! By dimpling the surface of a golf ball, you eliminate surface area thus reducing drag of the air across the ball. By dimpling a port in the cylinder head, you can also reduce drag of the air going across the face of a port thus improving airflow. In tests of identical cylinder heads bolted on the same short block the dimpled ports reported an increased in horsepower on the dyno over heads that weren't dimpled.



The Rottler **EM69P** 5 axis CNC head porting machine is a revolutionary comprehensive solution. Our user friendly touch screen Direct Surface software handles the entire porting process from start to finish. No outside software tools are needed, drastically reducing the learning curve and time spent on training.

Advanced Rottler Software Allows Operator to View Cross Sectional Dimension of Port Area and Volume

Software can calculate cross section area to ensure that actual cross section area is calculated as port shape changes

With the **EM69P** software why hand port the first head? You can digitize the cast head and then use the **EM69P** software to modify ports rather than grinding by hand.

Beautifully machined ports are accurate to **close tolerances requiring** no hand work. Rottler's advanced port manipulation tools allow quick and easy "at the machine" modification of three dimensional data.

Advanced Direct Motion Software Tools

Allows manipulation of port design and minimizes digitizing time. This allows operator to pick up data once and modify the design on the screen. Operator can modify hand ported design if necessary.

Standard PC Hardware and Software

Offers the highest performance, can be networked, easily upgradeable and repairable.

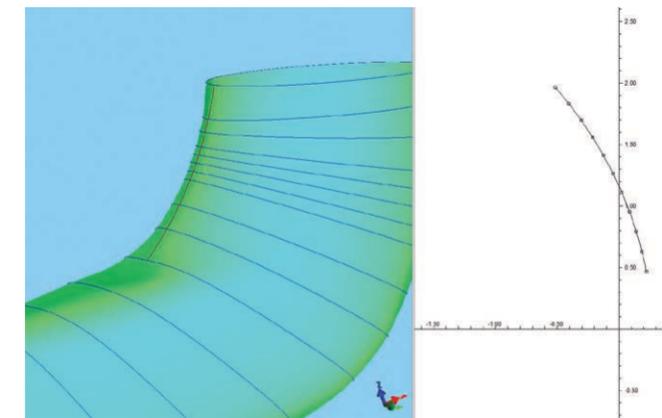
All Inclusive Flexibility

Our all-inclusive system ensures that the end user never has to transfer design data from computer to computer or convert data between separate software programs saving time and avoiding hassle.

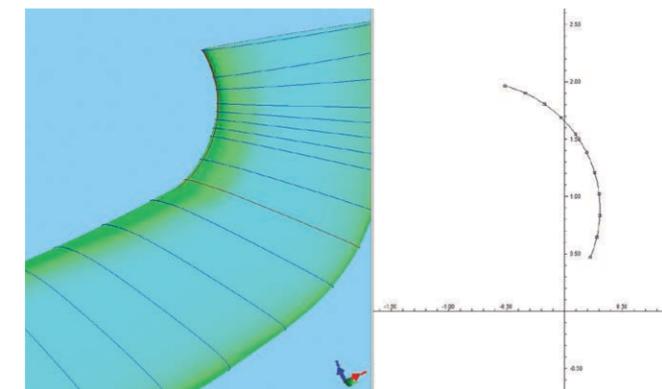
Our versatile software allows importing and exporting of designs between most common CAD/CAM software programs. This means Rottler customers are able to utilize previous knowledge and experience if familiar with another program such as Surfcam or Mastercam.

3D Arc Feature

The 3D Arc Feature allow operators to program an arc "through" the port and "around" the port. This is especially useful in the short turn of a port to mathematically define critical shapes. Using these features, changes to the 3D port can be made in seconds and is a useful tool in helping to develop the maximum flow in a port.



Arc with large radius



Arc with small radius

It takes seconds to change the port design between these two shapes and the machine is ready to run.

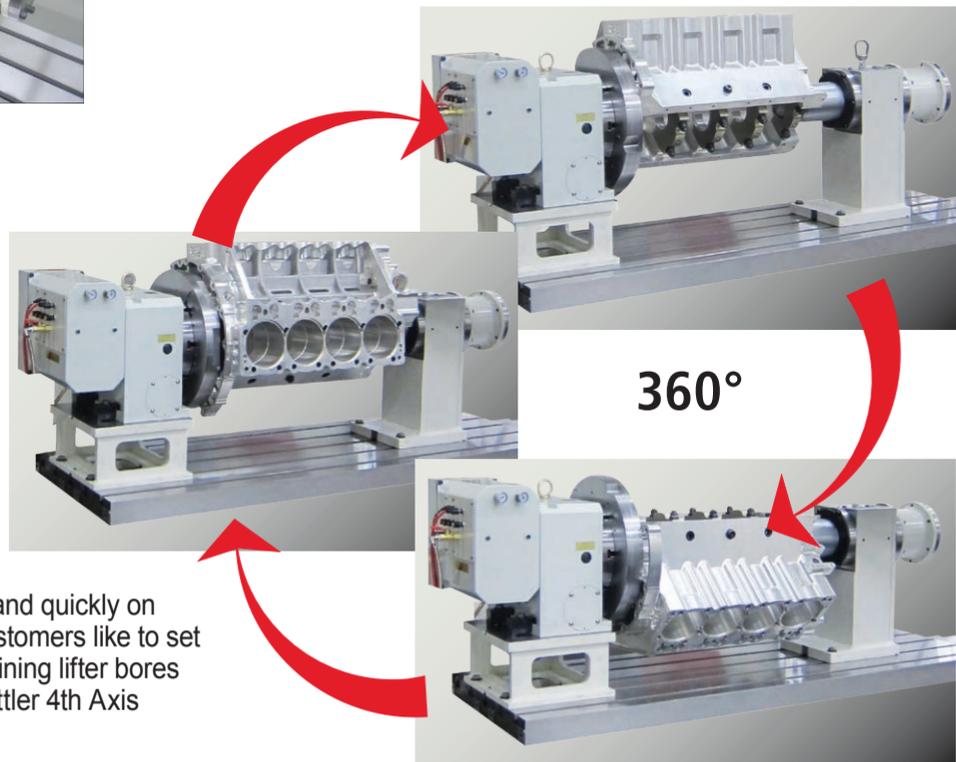
"I started CNC machining heads back in 1992 and I've used a couple different software programs since then. The beauty of Rottler's equipment is its digitizing software....I can port cylinder heads four to five times faster with this equipment than any of the systems I have used in the past. We've taken heads off the engine, recut them and had them back on the engine in two hours." - Warren Johnson, Atlanta, GA "The Professor of ProStock"

OPTIONAL FIXTURES



Automatic 4th Axis Block Roll Over Fixture

Rottler's Universal quick load/unload Automatic 4th Axis Block Roll Over Fixture and Software allows the computer to rotate the block or cylinder head during the automatic machining cycle. Large V blocks can be rotated 360 degrees to allow special machining jobs such as stroker clearancing in same set up as boring, surfacing and lifter bore machining. The tail stock is pneumatically operated allowing easy and fast loading and unloading of heavy blocks.



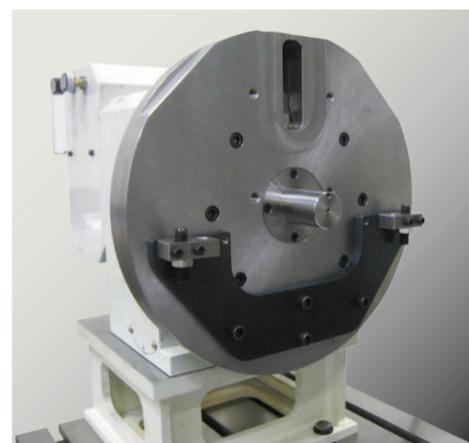
Crankshaft and Camshaft Centerline Fixture

All engine block machining should be done with reference to the Crankshaft or Camshaft Centerlines. It is not accurate to set up blocks on their pan rail or end faces! When any main line boring work is to be done, this should be completed before any other machine work is done to the block. The Rottler 4th Axis quick load/unload fixture utilizes precision locators to set up blocks accurately and quickly on their crankshaft centerline. Some customers like to set up on Camshaft Centerline for machining lifter bores and this can also be done on the Rottler 4th Axis Fixture.



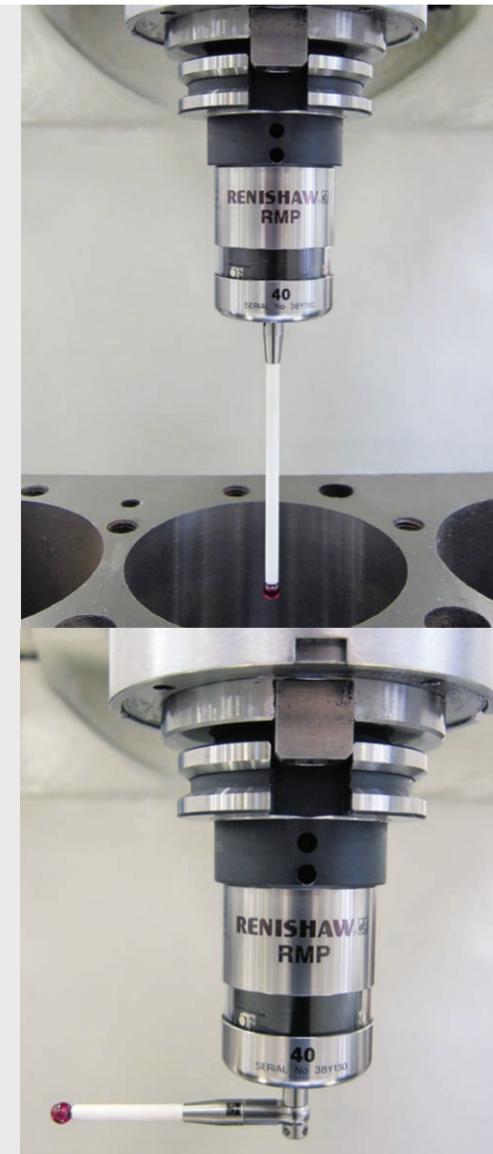
Main Cap Conversions and Line Boring

All operations for installation of splayed main caps including milling, drilling, tapping can be done in one automatic cycle with the 4th Axis Fixture. After the studs and main caps are fitted, line boring is done with Rottler exclusive Right Angle Drive and Line Bore Pivot Table. No line honing is required.



Overhead Camshaft Fixture

Special Fixture allows overhead camshaft engine in-line and V blocks to be machined with the Rottler 4th Axis Automatic Roll Over Fixture.



Wireless Radio Probing

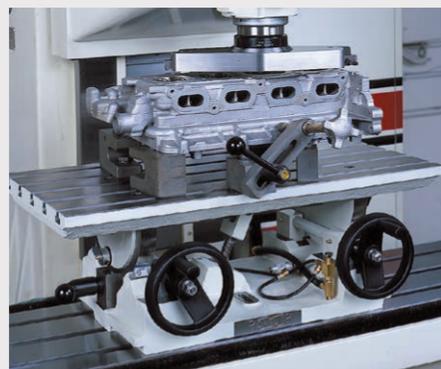
Computer controlled wireless probe automatically finds cylinder bore centers and at the same time measures bore diameters. The difference between the drawing blueprint and the probed dimensions can be displayed by touching one button.

The deck (head gasket face) can be probed to check flatness and squareness to ensure accuracy and minimum metal removal when surfacing.

Upper and Lower Centering

With the use of a radio probe, the upper and lower areas of a cylinder bore can be probed to check concentricity and perpendicularity to ensure that the block is setup correctly before machining.

Cylinder Head Surfacing

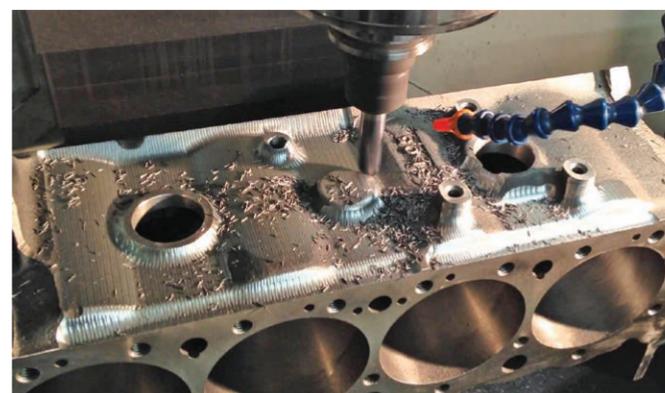


Leveling Table

Rottler's patented dual axis leveling table and universal quick clamping system for surfacing/milling heads, blocks and manifolds with CBN and PCD tooling. The Rottler Dual Axis Leveling Table allows clamping of the head to be completed first, then the level adjusted in both directions simply by rotating the two hand wheels. Combined with Rottler's Dual Axis Level, any job can be clamped and leveled in seconds! This process results in minimal stock removal when surfacing.

Dual Axis Level

Displays both axes simultaneously allowing quick leveling, eliminating any need for shimming and resulting in minimum metal removal when surfacing heads. Leveling table can be set up on parallels allowing heads to be surfaced on EM69P without moving the 4th Axis Fixture.



CNC Lightening

Lightening parts such as blocks and main caps requires simultaneous movement of 4th axis for complete lightening programs. The EM69P is able to complete advanced block lightening for maximum weight reduction.



Rottler Boring and Sleeving Cutterhead installed in massive heavy duty **EM69P** Spindle.

Block Lightening Tooling Packages

Rottler offers a range of block lightening tooling packages.

Part #650-2-44W - for Dart Small Block Chevy

Part #650-2-44X - for World Products Small Block Chevy

Part #650-2-45J - for Big Block Chevy

Drill Chuck

Precision Drill Chuck Assembly.

Part #650-2-44M

Tap Holder

Quick change tap holder assembly with adaptor. Torque control tap holders available for 1/4" (6.35mm), 5/16" (7.95mm), 3/8" (9.52mm), 7/16" (11.13mm), and 1/2" (12.70mm) taps

Part #650-2-11K

Shell Mill

We offer both 2 1/2" (63.50mm) and 4" (101.60mm) Shell Mill assemblies.

Part #650-2-44N - 2 1/2" (63.5mm)

Part #650-2-44P - 4" (101.6mm)

Cam Line Boring Tooling

Camshaft Line Bore Tooling Package allows camshaft tunnel line boring for jobs such as roller bearing conversions. Special right angle drive and fixture available for line boring blocks such as Cummins 5.9

Part #650-3-43T



Boring and Sleeving Cutterhead

Package includes Boring Head, Cartridges and Tool Holders, Digital Setting Fixture. Tools available for O-Ring groove cutting and chamfering.



Lifter Bore Tooling

Single point Lifter Tooling fixture for boring, facing and finishing lifter bores and bushings. Special tooling and software available to install lifter bushes automatically.



Special Porting Tool Holders

Porting tools are extremely long and need to run perfectly true to get best surface finish in ports for best air flow. Rottler porting tool holders are a special design allowing 4 way adjustment and perfect true running porting tools.



Spindle Adapters

The CAT40 worldwide standard Spindle Taper allows a wide selection of spindle adapters which allows the use of a wide variety of industrial tooling. ISO 40, R8, Morse Taper #5 and 1" (25.4mm) are available. Rottler also has a blank spindle adapter to allow customers to machine and adapt to special requirements.

Milling Cutter Holders

Collet Chuck Kits with CAT40 taper allow milling tools such as end mills, slot drills and reamers to be used.

Flycutters and Milling Heads

Surfacing with the **EM69P** machine can be done during the same set up as boring. 10" (250mm) flycutter can be used with CBN/PCD inserts for high speed dry surfacing giving excellent surface finish results. The deck of a large block such as a V12 can be surfaced in less than 10 minutes. Multi Teeth Milling Heads can be used for milling welded and spray built up surfaces. Small diameter milling heads are ideal for facing main bearing housing contact surfaces in preparation for line boring to standard diameter. Special Surfacing Software allows very wide surfaces up to about 26" (660mm) to be surfaced.

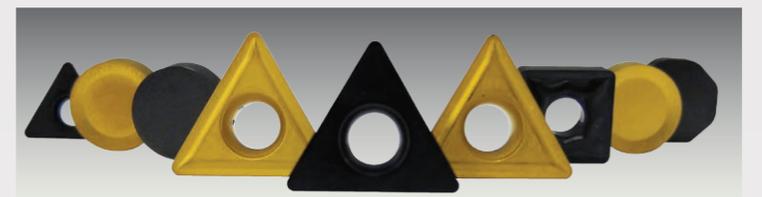
Boring Cutterheads

Rottler manufactures a complete range of CAT40 quick change boring cutterheads for boring and sleeving operations from .750" (19mm) to 5" (127mm). The air assisted CAT40 quick change retention system minimizes down time between tooling changes.

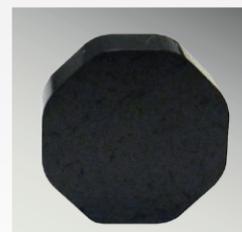


CUTTING INSERTS

Rottler's tag line is 'The Cutting Edge', and we take pride in offering many different grades of cutting inserts for dry, high speed cutting a wide variety of materials. Decades of experience machining engines worldwide allows Rottler machines to dry cut a wide variety of parts. **CBN inserts** give exceptional long life for surfacing gasket faces as well as produce fine surface finishes for reliable sealing of metal gaskets. Dry CBN surfacing eliminates the need for wet grinding and at the same time gives flatter surfaces as cutting pressure is substantially reduced compared to surface grinding. **PCD inserts** allow soft metals such as Aluminum to be surfaced at high speed without coolant.

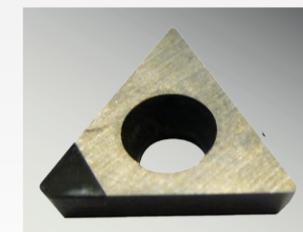


Rottler offers several different grades of **indexable carbide inserts** for cylinder boring & sleeving and main & cam line boring. **Special Black coated carbide inserts** are capable of standard to heavy sleeve cuts up to 1000rpm. **Triangle inserts** work well where cutting a bore to a square shoulder is needed, such as sleeves and counterbores. **Finishing Inserts** provide a sharper edge which results in a smoother surface finish on the cutting surface, ideal for finishing counterbores. **Carbide inserts** are available with 1/64" (0.4mm) and 1/32" (0.8mm) corner radius. Specially custom sharpened tools are available for operations such as chamfering, O-ring grooving, undercutting and blind hole boring.



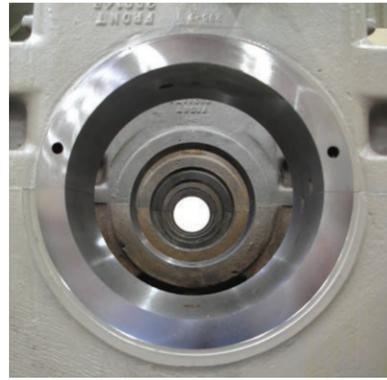
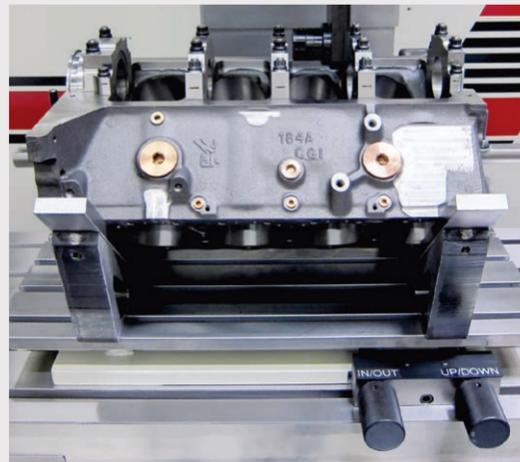
Octagonal Cutting Inserts

New Octagonal 16 Cutting Corner Surfacing Inserts have increased corner radius to allow faster feed rates and finer surface finish.



PCD Tipped Insert for Boring Aluminum

PCD cutting corner allows aluminum to be bored at high speed without any coolant.



Thrust Facing

Rottler's unique circular interpolation software and thrust facing tooling allow thrust faces to be machined perfectly square to bearing centerline using the same right angle drive that is used for line boring. Single point cutting allows build up to be removed without chatter resulting in fine surface finish.



Precision Line Boring with Right Angle Drive

Precision Line Boring with Rottler's exclusive 90 degree right angle drive provides perfectly round bores and straight lines, no honing necessary! Hard steel main caps and aluminum blocks can be line bored to final size in one process – no honing necessary! Crankshaft to camshaft centerline is accurately controlled – honing can cause centerline to deviate away from the steel main caps.

Line Bore Pivot Table

The Rottler Line Bore Pivot Table is a fast and easy system to set up blocks and heads for line boring. The table has five T-slots which allow set up of locating devices such as V-cradles. The pivot table is preloaded which allows machining without clamping.

This fixture is used for main and camshaft line boring. It can also be used for jobs such as roller bearing conversions, stroker crankshaft clearancing and machining registers for new main caps and four bolt conversions.

Rottler's slim line extended right angle drive can line bore both main and camshaft tunnel in one set up for blocks such as Cummins 5.9.

PARTS MANUFACTURING

CNC offers the real, tangible benefits of accuracy and repeatability, meaning your rebuilding machining operations will be precise, each and every time. But Rottler's CNC machines and our unique C4 software not only ensure your block and head machining operations are on the money, but give you the ability to create a whole new reality.

Can't find the parts you need for that one-off project? Make them yourself! We find that more and more customers - after researching the real-world adequacy of top-of-the-line industrial CNC machines - have recognized the parts manufacturing capabilities built into Rottler's state of the industry machines. Many of Rottler's machines can easily be programmed to custom-create the parts you need, when you need them.

What are our customers making in their own shops?

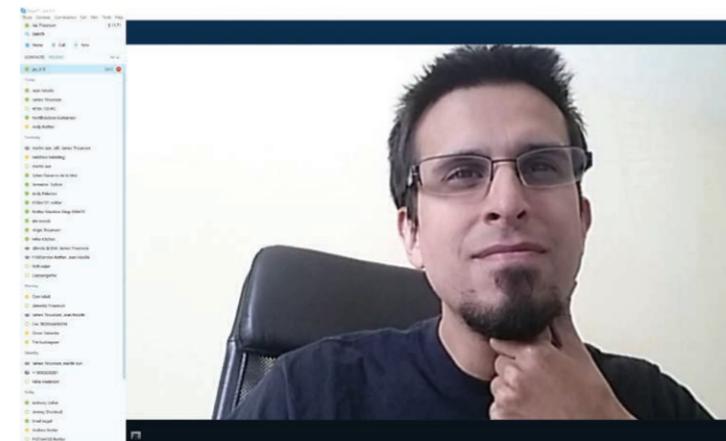
- Custom Tools and Fittings · Carburetor Spacers
- Suspension Components · Connecting Rods
- Bushings · Custom Intake and Exhaust Manifolds
- Non-Standard Blocks and Cylinder Heads · Industrial Components



Internet Support

Rottler offers cutting edge internet support direct from your machine to the factory. Our cutting edge internet support even enables us to "Log In" and remotely control your machine from our factory if necessary.

Shop too busy or noisy for talking? The pre-installed Skype™ application gives you instant messaging capabilities with Rottler Factory Technicians.

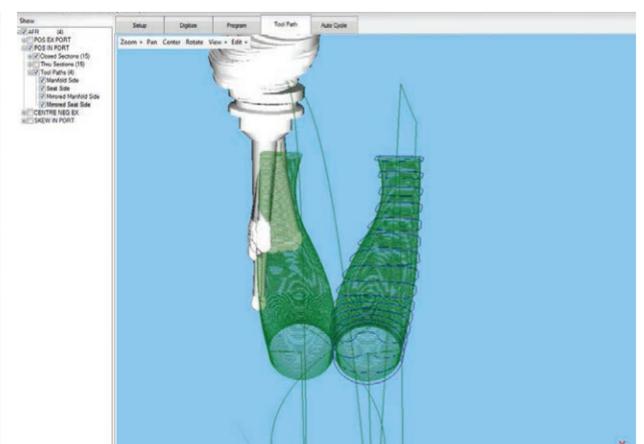
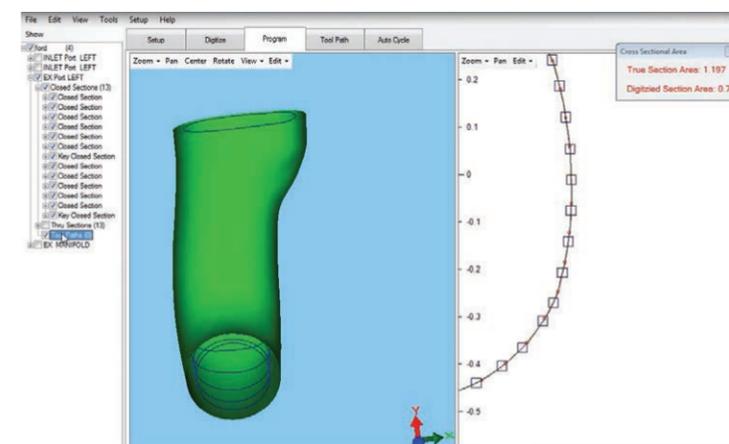
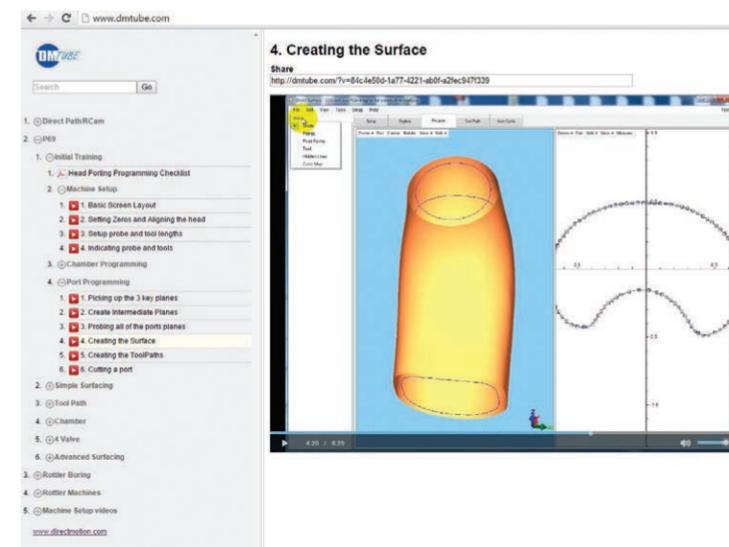


Video Chat and Instant Messaging

Skype™ and a webcam are installed on the EM69P for video conferencing, instant messaging and internet support. This feature gives you instant, direct contact with Rottler right on the machine without even making a phone call. The standard webcam comes pre-installed so that Rottler technicians can see exactly what you are seeing. This saves a tremendous amount of time when trying to answer questions.

www.rottlertube.com

An extensive library of video tutorials is available online 24 hours a day. Many customers find that they can get quick answers to their questions regarding the EM69P with the use of this library without even contacting Rottler for support. Tutorials are added with each software enhancement.



Examples of screens from training videos

STANDARD EQUIPMENT

- High Torque 18ft.lb (24Nm) @ 1000RPM High Torque Liquid Cooled Integral CAT40 Taper Spindle Motor. Optional High Speed Spindle Motor available for increased speed and output up to 20,000RPM
- A 24 tool Automatic Tool Changer is included. Tool changes are accomplished via a dual arm tool changer and the rotary tool carousel traveling on linear slides in the Y axis for clearance.
- Optional Software System available for the machine:
- Port and Chamber CAD/CAM software to quickly manipulate port dimensions, view cross section area, calculate volume, create surfaces, create tool paths and machine ports and chambers. Requires CNC program - either ADP-PROBE4 digitizing system or Rottler PATH as detailed below.
- After an order is placed, the training videos on www.RottlerTube.com must be studied before Rottler training technician travels to the machine for onsite training. Operators must continue to view these training videos after training to keep up to date with operation of the control and up to date with the latest features.
- Internet connection to the machine computer must be provided and connected at all times during the use of the machine. This is required for service support. The control sends information to the Rottler service department.
- Customer must have laptop with videocam for software and programming support.
- Highly Interactive & Very Responsive PC Based Single Processor Control System by Direct Motion Control Technology
- Standard Windows User Interface with Animated Training & Remote Diagnostics
- CNC 32" Touch Screen Control, Windows Operating System with Intel Processor, Networking and Internet Connection included.
- Internet enabled with the ability for a technician to "take over" the machine for remote training and diagnostics from anywhere in the world
- Programming and Machine Operating through 32" (813mm) extra bright touch screen
- Precision Digital Readout, .0001" (.002mm) Resolution
- Accuracy ensures Ports will Line Up with No Step - No Hand Blending Required
- 120 Degree Range of Motion on 5th Axis
- Custom Specialized Cutters and Tool Holders Minimize Run Out, Chatter, Noise, Clogging
- High Spindle Speeds (up to 20,000 RPM) with low speed torque for fast stock removal when machining billet castings and boring engine blocks
- Linear Roller Bearing Slideway construction on all axes for smooth and precise axis movement
- Direct Drive Precision Ground Ball Screws on all axes for improvement accuracy and repeatability
- High Feed Rates of 100 IPM (2.5MPM) with Integrated Design & Sophisticated Look Ahead Software
- Rotary Vector Gear Reducers in 4th and 5th Axis for extended life and near zero backlash
- Direct Drive AC Servo Motors on all 5 axis - no belts
- ABS Brushless AC Servo Motors
- Linear Motion Slide Way construction for smooth and precise axis feed.
- Fully Enclosed with Sliding Doors and Coolant System with chip auger and roll out coolant tank

SPECIFICATIONS

Specifications and design subject to change without notice.

	American		Metric
Control		Rottler CNC Spindle Motor	
Torque	18ft.lbs @ 1000RPM		24Nm @ 1000RPM
Optional High Speed Spindle Motor available for increased speed and output up to 20,000RPM, 42HP (32kW).			
Axis Feed Method (X/Y/Z)		Direct Coupled Servo Driven Ball Screw	
Slideway Type (X/Y/Z)		Linear Motion Bearing Slideways	
Table - Size	19.68" x 59.09"		500 x 1500mm
Table - T Slots		5	
Travel - Horizontal (X Axis)	39.4"		1000mm
Travel - In/Out (Y Axis)	19.68"		500mm
Travel - Vertical (Z Axis)	30"		762mm
Travel - Spindle Nose to Table	40"		1016mm
Spindle - Taper		CAT40	
Spindle - Rotation Speed		0 to 10,000 RPM Std. (Opt. 20,000RPM)	
Coolant Capacity	84.5 Gallons		320 Liters
Weight Capacity	1543lbs		700kgs
5th Axis Rotation		120deg (+/- 60 Deg)	
Feed Rate	0-100ipm		0-2.54mpm
Tool Changer - Number of Tools		24	
Tool Changer - Maximum Weight of Tool	15.4lbs		7kgs
Tool Changer - Maximum Length of Tool	11.8"		300mm
Dimensions - Machine	111.30D x 119.09W x 108.07"H		2827D x 3025W x 2745mmH
Dimensions - Floor Space Requirements	136.22D x 170.67"W	3460D x 4335Wmm	
Machine Weight	13277 lbs		6000 kg
Electrical Requirements		208-240V, 50A, 50/60Hz, 3Ph	
Air Requirements	1 cfm @ 90 psi		28 l/min @ 6 bar
Paint Color Code		RAL9002 (Grey White)	

May 2018

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