



**High Power
High Precision
High Performance**

EM69HP

**5 Axis CNC Digitizing/Porting
and Universal Machining Center**



EM69HP

Machining Equipment
Created for Performance
Racing & Engine
Remanufacturing.

So Advanced, It's Simple.

**High Output
Spindle Motor
43HP 32kW up to
20,000RPM**

Rottler's new EM69 CNC Machining Centers have been specifically designed to be the most technically advanced industry-specific systems ever. More than just a single machine, these new "Engine Machining" CNC Vertical Machining Centers are designed to give customers even more flexibility for engine parts machining, digitizing and porting, and custom parts manufacturing.

Rottler's totally new, next generation CNC control found in the EM Series machines continues to give users unmatched speed of learning and ease of use when probing/digitizing without the need of additional cumbersome and expensive software. This advanced 4C software lets users know they are machining with the most state-of-the-science equipment available.

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.

The EM69HP 5-axis CNC Machining Center offers the precision and speed needed to reproduce cylinder heads and intake manifolds with exceptional accuracy and speed, with no handwork required.

The advanced software design allows professional engine builders and head developers to maximize production and minimize preparation time. The next generation CNC control gives even greater capability beyond porting by letting users probe parts for duplication and modification all within the machine control – no external or third-party software or equipment required.

EM69HP

The EM69HP features a new 24-tool ATC Automatic Tool Changer – the system provides greater flexibility for general parts machining and less downtime waiting for an operator to manually change tools between operations.

The EM69HP CNC Machining Center is versatile and great for machining engine blocks and making custom parts.

Just as Rottler revolutionized CNC head porting with our unique "all at the machine approach," we are now focused on revolutionizing general CNC/ CAD/CAM/CMM by bringing the same "all at the machine approach" to the general machine tool industry.

EM Series Features

- Increased Spindle Power & Torque for Billet and Casting machining
- Maximum Functionality – operators can machine blocks and cylinder heads as well as create custom parts all in one machine
- All EM series machines feature linear roller bearing slideways with direct drive ball screws for smooth and movements and precise accuracy and repeatability.

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.



ADVANCED SPINDLE POWER

Machining parts from solid billet and castings requires serious cutting power and innovative software to convert designs from solid metal into completed parts. The new EM69HP has an advanced, very powerful spindle drive motor and is able to make huge cuts and remove a large quantity of material very fast. This system is also able to cut difficult to machine materials like steel and titanium.



STEP file of V8 block imported into the machine computer



Solid billet of aluminum starting to cut 268lbs (122kg)



Advanced stage of billet machining into a V8 Block



Complete V8 block from 268lbs to 38lbs (122kg to 17.3kg)

ROTTLER UNIVERSAL MULTI PURPOSE FIXTURE SYSTEM

There are 3 fixtures available for the EM69 machines:

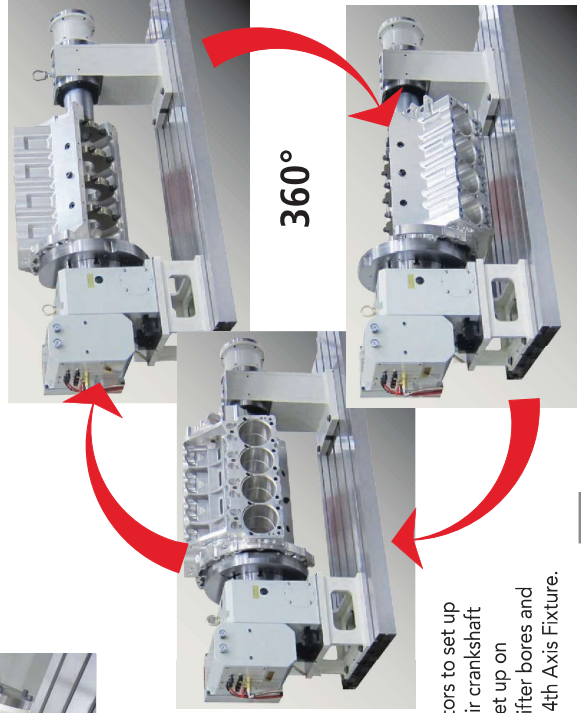
1. 5537 Universal Cylinder Head, Block and Rotational Parts
2. 5511 Cylinder Head only
3. 690-3-63 Cylinder Block only

The 5511 fixture is designed for cylinder heads only and can handle extra long cylinder heads up to 41" (1,050mm) overall/outside length. The 690-3-63 fixture is designed for cylinder blocks only. The 5537 universal fixture has been further developed to be more versatile and universal for a wide variety of applications. One fixture can now be used for digitizing and porting cylinder heads, machining engine blocks such as boring and sleeving, surfacing, lifter bores, etc. The 5537 fixture also has a rotary part adapter kit including a chuck mounted on the headstock and a center mounted on the tailstock to allow round parts such as crankshaft to be set up and rotated for machining. The 5537 universal fixture has maximum cylinder head length capacity of 37" (940mm). The increased versatility and length capacity of the 5537 should allow most cylinder heads to be machined with 5537 fixture and the only application that require the 5511 fixture are extremely long cylinder heads longer than 37" (940mm) overall/outside length. Note that some cylinder heads have castings such as timing covers or protrusions cast onto the end of heads and this overall length must be considered when measuring the length of the cylinder head. When an EM69P machine is sold 'for heads only' and the maximum head length is not more than 37" (940mm) it is advisable to offer the 5537A and 5537B so that the customer can add additional adapters such as 5537C and 5537D in the future - increasing versatility.

Automatic 4th Axis Block Roll Over Fixture 690-3-63



Rottler's Universal quick load/unload Automatic 4th Axis Block Roll Over Fixture and Software allows the computer to rotate the block 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 done, this should be completed before any other machine work in 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.

The 5537 Universal Fixture has 3 main configurations:

5537A plus 5537B – this is the basic fixture plus parts to set up cylinder head fixture plates, semi-finished plates or T slot table

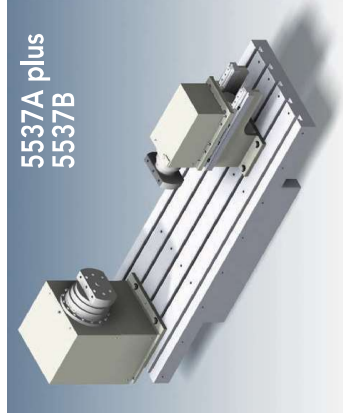
5537A plus 5537C – this is the basic fixture plus parts to set up cylinder blocks on crankshaft centerline.

5537A plus 5537D – this is the basic fixture plus parts to set up rotation parts such as crankshaft with a chuck and center.



5537A

This is the basic fixture only.



5537A plus 5537B

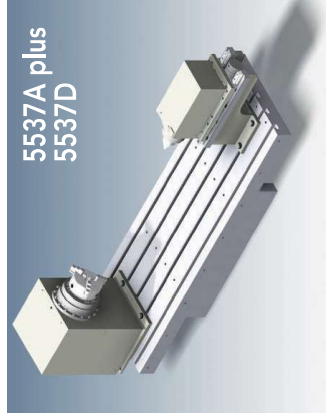
This is the basic fixture plus parts to set up cylinder head fixture plates, semi-finished plates or T slot table



5537A plus 5537C

5537A plus 5537C

This is the basic fixture plus parts to set up cylinder blocks on crankshaft centerline.



5537A plus 5537D

5537A plus 5537D

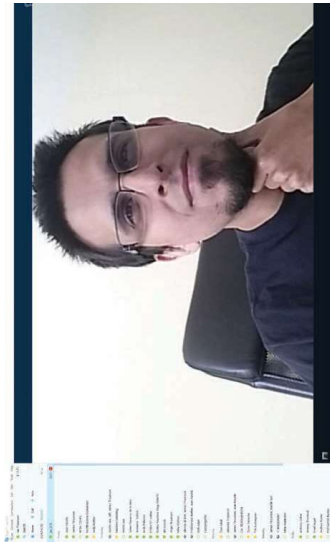
This is the basic fixture plus parts to set up rotation parts such as crankshaft with a chuck and center.

SUPPORT & TRAINING

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.

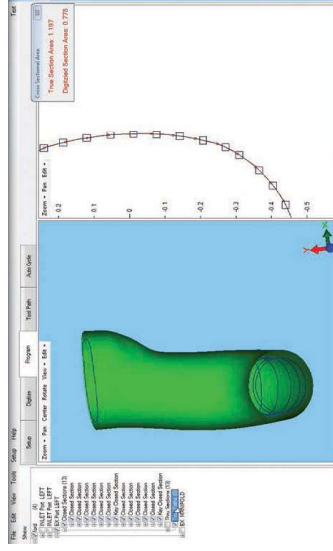
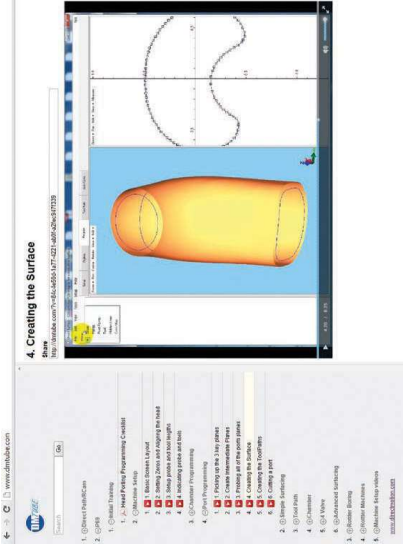


Video Chat and Instant Messaging

Skype™ and a webcam are installed on the **EM69HP** 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.rotlertube.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 **EM69HP** 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

EM69HP STANDARD EQUIPMENT

- High Power 43HP 32kW - High Torque 60Ft.Lb 80 Nm Continuous S6. Up to 20,000RPM High Performance Liquid Cooled Integral CAT140 Taper Spindle Motor. Spindle Motor mounted on 5th Axis.
- 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
 - 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 Sep - 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
- ABB Brushless AC Servo Motors
- Linear Roller Bearing 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
- 2 Bright LED Lights clearly illuminate the complete work area of the machine

SPECIFICATIONS

Specifications and design subject to change without notice

American	Metric
Control	Rottler CNC Control
High Speed Spindle Motor available for increased speed and output up to 20,000RPM, 42HP (32kW), 60ft.lbs @ 1000RPM	80Nm @ 1000RPM
Axis Feed Method (X/Y/Z)	Direct Coupled Servo Driven Ball Screw
Slideway Type (X/Y/Z)	Linear Roller Bearing Slideways
Table - Size	500 x 1500mm
Table - T Slots	5
Travel - Horizontal (X Axis)	39.4"
Travel - In/Out (Y Axis)	19.68"
Travel - Vertical (Z Axis)	30"
Travel - Spindle Nose to Table	40"
Spindle - Taper	CAT40
Spindle - Rotation Speed	0 to 20,000 RPM Std.
Coolant Capacity	120deg (+/- 60 Deg)
Weight Capacity	24
5th Axis Rotation	7kgs
Feed Rate - Variable	3000mm
Tool Changer - Number of Tools	2827D x 3025W x 2745mmH
Tool Changer - Maximum Weight of Tool	11.8"
Tool Changer - Maximum Length of Tool	111.30D x 119.09W x 108.07"H
Dimensions - Machine	136.22D x 170.67"W
Dimensions - Floor Space Requirements	3460D x 4335Wmm
Machine Weight - Approx.	13277 lbs
Electrical Requirements	208-240V, 50A, 50/60Hz, 3Ph
Air Requirements	1 cfm @ 90 psi
Paint Color Code	28 l/min @ 6 bar RAL9002 (Grey White)

New EM Series Spindle Motor Power and Torque Ratings

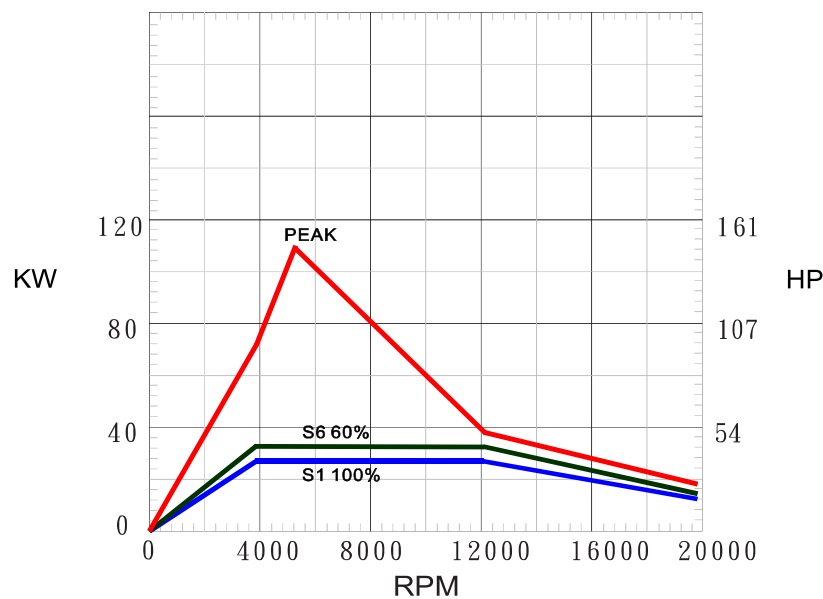
A lot of research and development has been put into sourcing and engineering the new high output spindle motors in the EM machines. CNC machine spindle motor power and torque is commonly given in 2 different ways – continuous and peak.

Continuous power and torque rating refers to the maximum cutting load that a spindle can sustain running non-stop 24 hours per day without overheating. Advanced technology spindle motors are able for a limited time period to deliver substantially more power and torque before overheating.

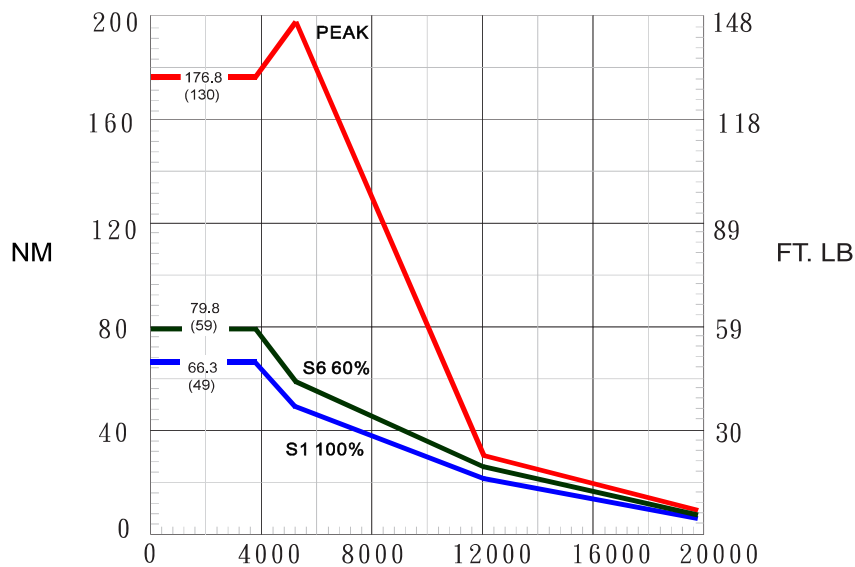
Peak power and torque rating can be significantly, or many times more compared to continuous rating but the limiting factor is heat. It is common when CNC machining that spindle motors are not running continuously for example when changing tools. The depth of cut and feed rates will also determine to amount of heat that the spindle motor has to overcome. The integral spindle motors on the EM 5 axis models are liquid cooled and the liquid's temperature is accurately controlled by special AC chiller unit allowing peak operation for longer periods of time.

The most common measure of continuous spindle motor use is S6 60% as shown in the graphs below. This means that the spindle motor is running at full load for 60% of the time the machine is in use. S6 is the specifications for power and torque that is given out as specifications in literature such as brochures. As the graphs below show, the peak power and torque is substantially higher but can only be for shorter period of time.

POWER



TORQUE



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