

ROTTLER
THE CUTTING EDGE

SG80A

Heavy Duty CNC
Cylinder Head Machine

CONCEN™



Machining Equipment
Created for Performance
Racing & Engine
Remanufacturing.

Detroit Diesel DD15

So Advanced, It's Simple.

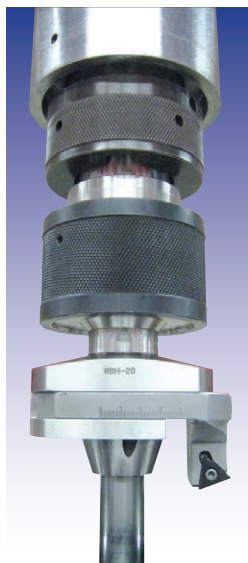
SG80A HEAVY DUTY CNC CYLINDER HEAD MACHINING CENTER

The Rottler SG80A was designed especially for machine shops that rebuild small to large cylinder heads found in the heavy duty engine industry. Large cylinder heads come in many shapes and sizes – from 24 valve single casting cylinder heads to huge single cylinder heads used in natural gas, mining and marine workboat engines. Rottler spent several months visiting cylinder head rebuilders around the globe and went about using our proven engine block machining technology to design a heavy duty machine that handles many operations required on a wide variety of cylinder heads.

We believed that many large cylinder heads could be ‘plunge’ cut with fixed tooling as this process is very fast and low cost. We realized that plunge cutting would require a very rigid machine using many machine design features such as Rottler’s exclusive spindle design. Rottler’s spindle design has proven over decades that our engine block machines are able to “plunge cut” wide counterbores found in large engine blocks with excellent results. The SG80A is capable of plunge cutting large valve seats very quickly and with excellent CONCEN and surface finish results.

Proven Rottler Spindle Design

Large Diameter Precision Spindle has R40 Taper with Quick Change Self Locking Spindle Adapter System. Tooling never comes loose and no wrenches are required to change tools. Rottler’s Unique Heavy Duty Tooling allows large and wide Valve Seats to be machined to accurate Concentricity. Solid Carbide Pilots offer maximum rigidity and long life for years of precision machine work.



Rigid Machine Construction

Heavy thick wall cast iron machine castings and precision machining during the manufacturing process give excellent chatter free valve seat cutting. Heavy duty cabinet/base extended to the rear for safe handling when machine has to be moved.

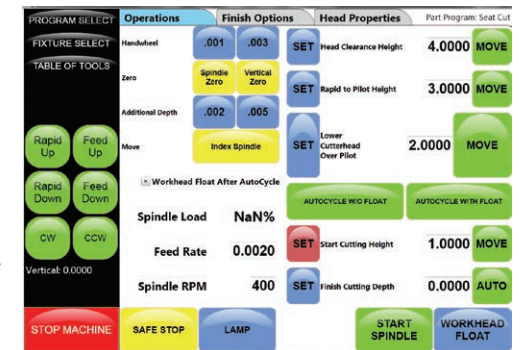
Oversize Valve Seat Rings

The SG80A is ideal for boring housings for oversize valve seat insert rings. Rottler manufactures special double diameter milling heads to bore both diameters and depth in one automatic cycle. Shown here are water cooled valve seat rings that require housing to be bored oversize to remove rust and corrosion.



Touch Screen Control Technology

The SG80A features a Conversational Touch Screen Control that allows the operator to program the machine to cut at certain RPM with a specific feed rate. This eliminates chatter when cutting hard valve seats by eliminating the human error of the operator trying to feel the cutting action. See controls for more information.



UNIPILOT Tooling

The UNIPILOT tooling system allows the carbide centralizing UNIPILOT to work like a live pilot. It stays in the spindle while moving from valve guide to valve guide, but all at the same time has a fixed pilot design to give improved concen. See brochure for more information.

Multi Angle Seat Cutting

Rottler's Precision CNC Ground Fine Grain Carbide Seat Cutting Inserts are available in many different designs to suit customer requirements. Single angle, multi angle or curves and radius shapes are available. Cutting tools are substantially faster and less expensive than grinding, where a different grinding stone is required for each angle.

Storage Cabinet

Three Drawers and Top Tray allow for convenient storage of wide selection of tooling available from Rottler. Built in Vacuum Tester For quick checking of valve seats before removing the cylinder head.

Optional 360 Degree Rollover Fixture

Provides quick loading and easy access to all sides of the head. Quickly levels head using the micro adjust feature. Fixture floats on an air cushion for quick, easy setup with both hands.

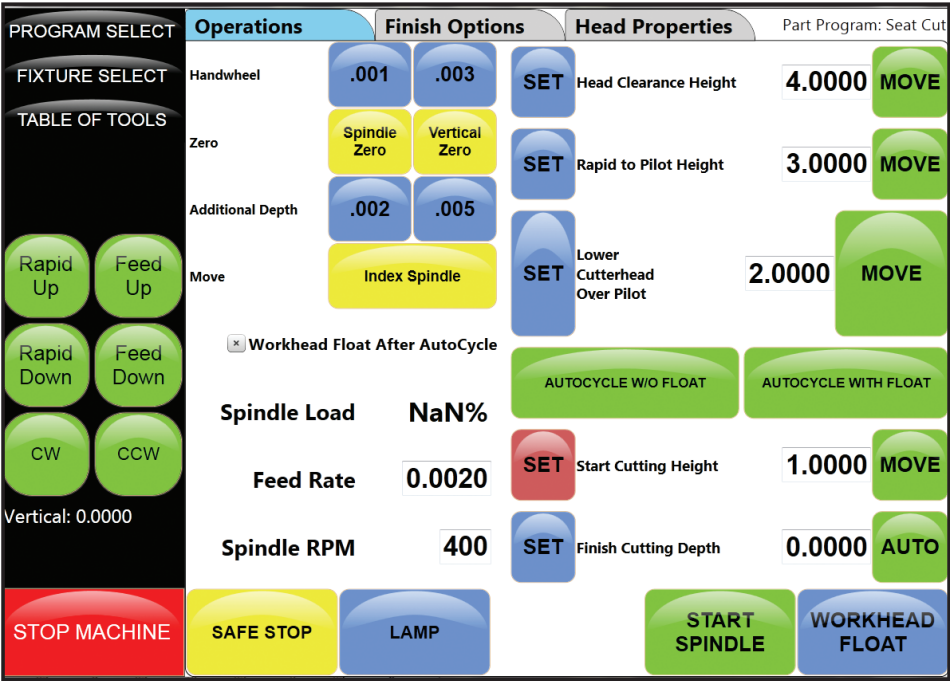
Adjustable Air Float and Air Clamp Work Table

The large worktable of the SG80A consists of 2 x 68" (1730mm) long parallels that are mounted on an air floating and air clamping base. These extra long T-slot parallels allow a wide variety of fixtures and jobs to be set up for machining. The complete table and fixture assembly is easily adjusted in/out with air float and locked rigidly with air clamping allowing cylinder heads with four valves per cylinders to be adjusted in/out and machined without any resetting of the cylinder head in the fixture – just press the foot pedal to float the table, slide in or out and the table locks in position ready for machining!

Foot Clearance

Foot clearance under the machine for the operator's comfort.

More than 20 years ago, Rottler realized that machining engine components of piston engines such as cylinder heads and blocks required many advanced skills and machinery features to be able to remanufacture as good as or better than new. Computer processor technology allowed multiple machine operations to take place simultaneously to give consistent and accurate results. Rottler pioneered Human Operator Interface (HOI) Technology and introduced the Touch Screen in the 1990s. Touch Screen allows the information and control buttons for each operation to be displayed while control screens and buttons for other operations are 'hidden' out of sight. This makes it easy and fast for new operators to learn to program and run these machines - automatically. Windows OS allows the touch screens to operate in multiple languages allowing operators to work in any language.



The SG80A has a Conversational Touch Screen Control that allows the operator to program the machine to cut at a certain RPM with a specific feed rate. This helps eliminate chatter when cutting hard valve seats by eliminating the human error of the operator trying to feel the cutting action. The machine feeds down at a constant feed rate with a precision ball screw and AC servo motor controlled by CNC to programmed depth. It then dwells on the seat at preset RPM's and number of revolutions, and then retracts, all without any operator involvement resulting in all valve seats machined to the exact same depth and finish – automatically every time. The SG80A is simple and fast to program and all information is saved in the computer's memory for future use.

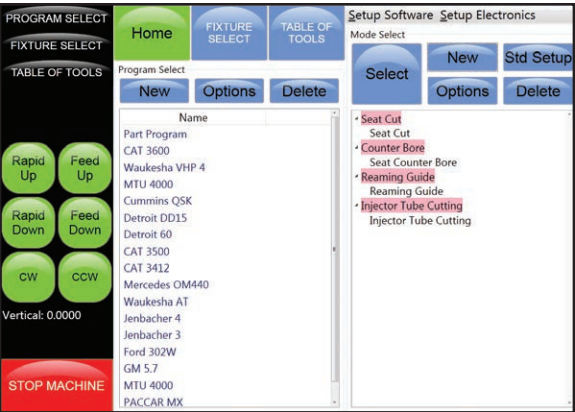
Valve Seats Machined to Equal Depth CNC Finishing Program

Programmable Finish Cutting System results in perfectly round and concentric valve seats machined to the exact same depth with reference to the head gasket fire deck. All settings are saved under the cylinder head name and available for future use whenever machining the same make of cylinder head in the future. Rottler cylinder head fixturing sets up cylinder heads with reference to their head gasket fire deck so that any time a saved program is used in the future, the valve seats will always be machined to same and equal depth. Should a valve seat not clean during cutting, a touch of additional depth button will quickly re-machine the seat until it fully cleans up. At the same time, the operator knows exactly how much has been removed from the valve seat to be sure it falls within the allowable depth tolerance.

Rottler's Touch Screen CNC Control uses "Direct Motion Control Technology" with Windows OS.

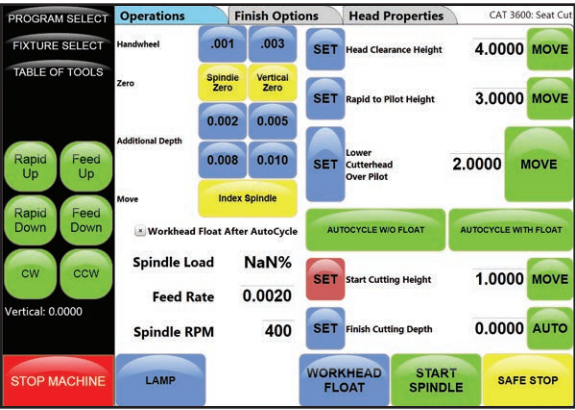
The Rottler Touch Screen Control found on Rottler's CNC machines allows simple and fast programming for all machining operations. This revolutionary system allows a non-CNC trained worker to program machining sequences for any cylinder head that meets the machining capacity requirements.

The highly advanced computer technology that powers our Touch Screen Control is also



Home Screen

The Home Screen allows each Cylinder Head Model to be input and saved for future use. Various automatic cycles such as Valve Seat Cutting, Valve Seat Counterbore, Valve Guide Reaming, and Injector Tube Cutting can be programmed for automatic operation.

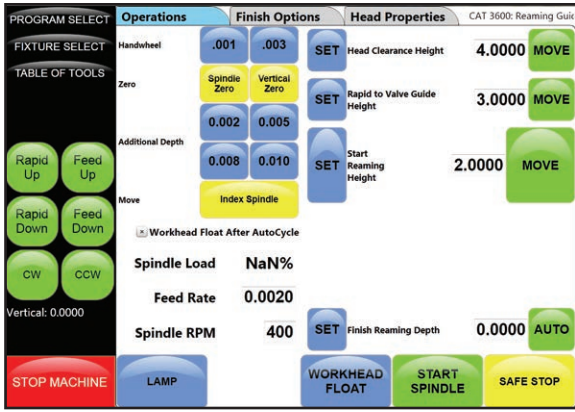


Seat Cut Screen

The Seat Cut touch screen allows easy set up and automated cutting resulting in ALL valve seats cut to equal depth. The machine moves to exact positions at the touch of 'MOVE' buttons.

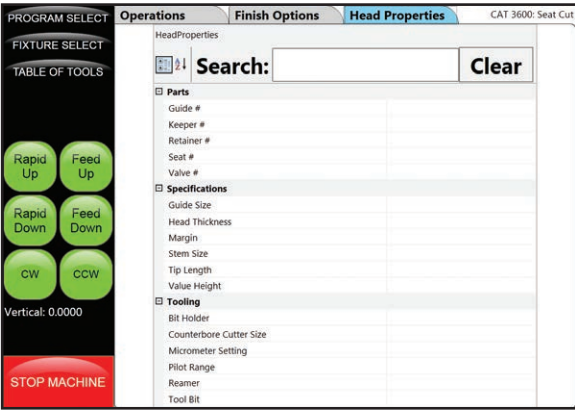
responsible for its simplicity. You won't be overwhelmed with options because, with Rottler programming, only the buttons and interactive menus you need for a particular machine operation are displayed on the screen. Yet all other functions are easily accessed when needed. The process is intuitive, simple to learn and operate, and easily changed when needed.

The Rottler factory is able to connect to your machine through the internet to troubleshoot any problems and update software when needed.



Ream Guide Screen

The Ream Guide touch screen allows settings for automated valve guide reaming which is ideal for reaming new semi-finished valve guides to final size.



Head Properties Screen

The Head Properties touch screen allows all the information, tooling, fixtures and specifications to be saved and available when machining the cylinder head in the future.

Unipilot[®]

ROTTLER TOOLING

*The Speed of Live and
the Accuracy of Fixed*

**Rottler's patent pending UNIPILOT TOOLING
is now available for the SG80A**

The **UNIPILOT TOOLING** system allows the carbide centralizing **UNIPILOT** to work like a live pilot – stays in the spindle while moving from valve guide to valve guide – but at the same time has a fixed pilot design to give improved **CONCEN**.

Fixed and dead pilots have proven over the years to give more accurate **CONCEN** compared to live pilots, mainly because live pilots have clearance between the pilot and the valve guide. The section of the UNIPILOT that fits into the valve guide is straight/parallel but it has a tapered upper area which is spring loaded and fixes in the valve guide while centering to eliminate any clearance between the pilot and valve guide. After cutting the valve seat, when the spindle lifts up automatically, the **UNIPILOT** remains in the spindle and is lifted at the same time ready to float over the head gasket fire decks and ready to enter the next valve guide.

To prepare the machine for cutting valve seats, the spindle of the **SG80A** is controlled by the operator by holding the two handles on the workhead and operating the spindle travel with his thumb on the touch screen. The spring loaded **UNIPILOT** has a taper on it's lower end so that it is easy to enter into the valve guide. As the spindle moves downwards, the spring loaded **UNIPILOT** is able to resist and, as the spring pressure increases, this pressure allows the tapered section to enter into the guide and then the complete pilot is then able to travel into the valve guide with rapid feed rate to the start cutting height. At this position, the **UNIPILOT** is fixed inside the guide as it's upper tapered part is in contact with inside bore of the valve guide, at the same time, the computer pauses for 2-3 seconds while the final centering of the **UNIPILOT** and workhead takes place, then the workhead clamps rigidly and the cutting rotation and feed starts. When the spindle reaches the programmed depth, the machine automatically starts the finish cycle and travels up to the programmed clearance height after completion of the automatic cutting cycle.

What is **CONCEN**

CONCEN is Rottler's trade mark that promises that our customers get the most accurate and versatile seat and guide machine possible. The combination of Rottler's precision carbide centralizing **UNIPILOT** supported on a balanced air float workhead give perfect centering in the valve guide. This guarantees the best **CONCEN** of valve seat to valve guide in the industry.

TOOLING & ACCESSORIES



Universal Chuck

Universal Chuck can be used for odd jobs like drilling out broken bolts and tapping threads



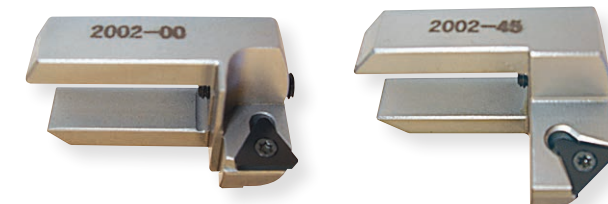
Fire Ring Groove

Special cutterhead for machining fire ring groove in head gasket surface. Can also be used to bore large valve guide housings/bores.



Modular Carbide Centralizing Pilot

Rottler offers a Modular Carbide Centralizing Pilot System for very large engine applications with valve guides larger than .875" (22.23mm) diameter. This system is versatile as it allows the use of different size sleeves which are adjustable for different lengths and diameters of valve guides



Triangle Tool Holders

Indexable Triangular Coated Carbide Tool Holders in 10, 20, 30, 45 degrees. Ideal and economical when cutting only one seat angle and for boring our old inserts and boring new insert housings.

CBN Cutting Inserts

CBN triangular cutting inserts are now available for cutting extremely hard valve seat materials found in natural gas, biogas and alternate fuel engines



Collet Chuck

can hold a wide range of precision tools for valve guide reaming, injector tube boring and facing, thread tapping, etc.

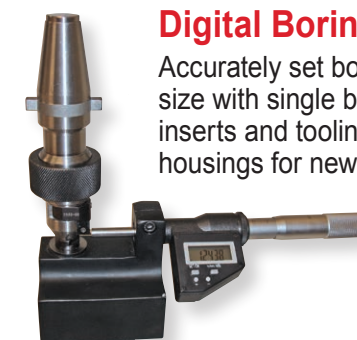


CONCEN Gage

Rottler's **CONCEN** gage allows concentricity to be easily and quickly checked to ensure accuracy

Digital Boring Micrometer

Accurately set boring diameter to any size with single blade adjustable cutting inserts and tooling for boring valve seat housings for new seat rings



MULTI HEAD FIXTURE

Optional 360 Degree Rotation of Large Cylinder Heads

Many cylinder head rebuilders asked us that they need to rotate cylinder heads 360 degrees to be able to do machine work on all sides of the cylinder head such as injector tube or spark plug work, and odd jobs such as drilling and tapping broken studs on exhaust flange surfaces. Rottler's 360 degree roll fixture is the answer, allowing large 24 valve cylinder heads to be clamped with reference to their head gasket fire deck and rolled 360 degrees in one set up. The heavy duty clamping and fine adjust system allow quick leveling and rigid clamping for heavy cutting during machining.

Three, four, five or six single cylinder heads can be set up at once in the 360 degree roll over fixture allowing machine work on all faces of the cylinder heads. Cylinder heads are located with reference to their head gasket fire deck surface so that all valve seats are machined to equal depth automatically – every time.



Five Jenbacher cylinder heads set up on special Multi Head 360 Degree Roll Over Fixture

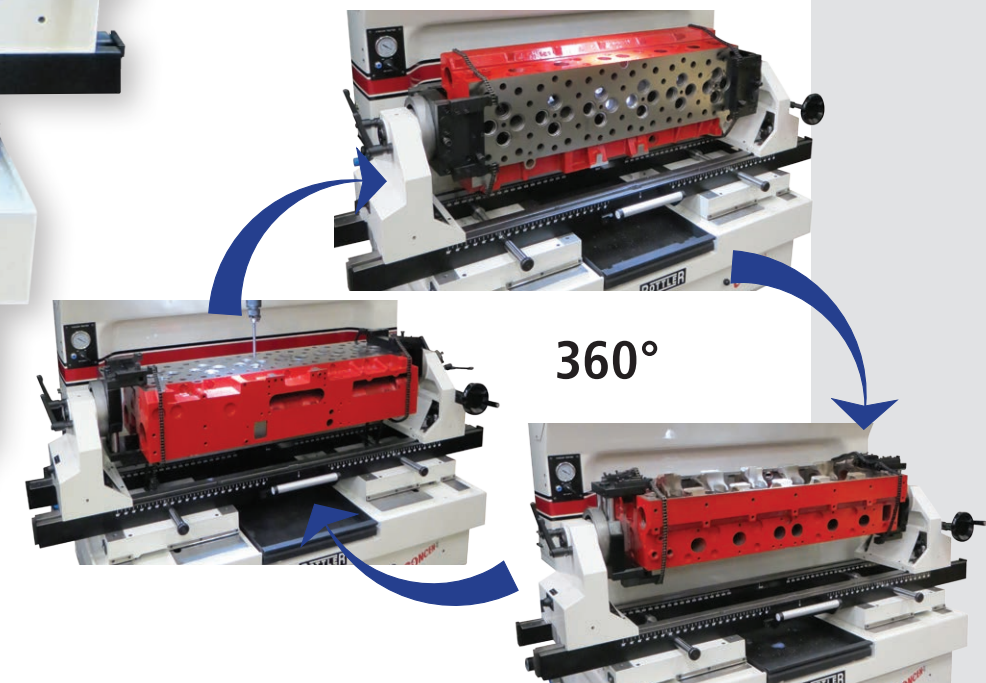


Optional Production Multihead Fixture

Rottler production fixture allows cylinder heads to be front loaded, pneumatically clamped upwards, machined and unloaded - fast and easy - no adjustments or leveling required.

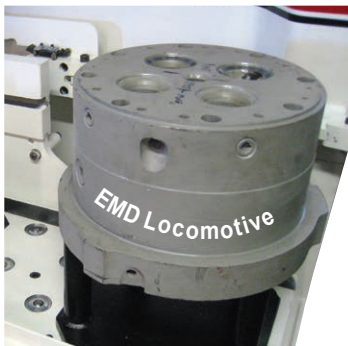


All 24 valve seats, counterbores, and guides can be machined in one set up. Fixture can be rolled 360 degrees for diesel injector and valve spring seat work. Difficult jobs like drilling broken bolts and tapping threads on side of cylinder head can be also done in same set up.



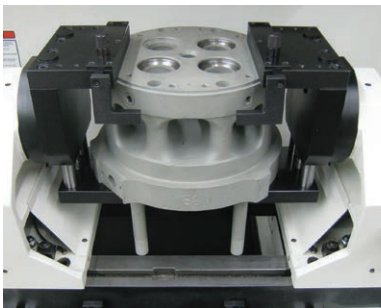
CUSTOM DESIGNED FIXTURES

Rottler is able to design and manufacture special fixtures for production applications such as this automatic palletized roll on/roll off conveyor fixture for EMD locomotive cylinder heads.



Connecting Rod Boring

Rottler's Connecting Rod Boring Fixture can be used on the SG80A for boring semi-finished small end bushes/bearings.



Quick Action Air Float/Air Clamp Roll Over Fixture

Adjusts effortlessly along parallels on air cushion and clamps with the flick of a switch. It is Dual Purpose and can be used as 360 Degree Roll Over Fixture for smaller heads or Quick Clamp for larger single cylinder heads such as CAT 3600. Digital Level and Fine Adjustment System allow Valve Guides to be leveled accurately and rigidly clamped in seconds for heavy machine work.



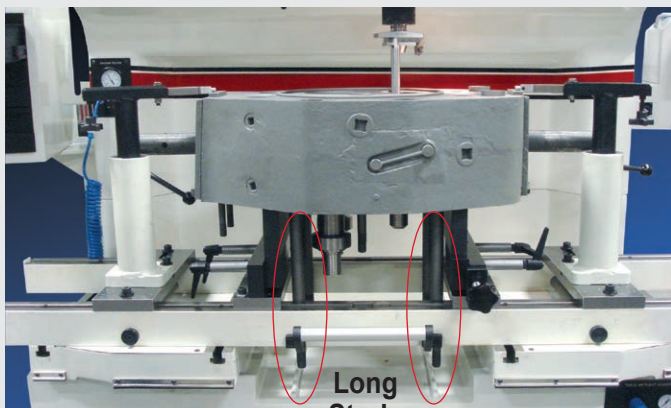
Tilt Fixture

The massive envelope and the optional Tilt Fixture allows very large heads to be set up and leveled, and clamped with the roll fixture or tower clamps.



Tower Clamps

Adjustable tower clamps allow quick clamping of odd jobs.



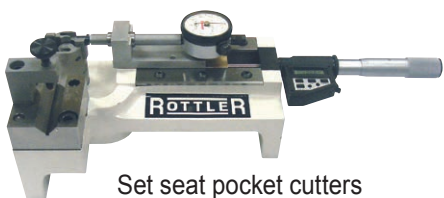
Extra Long Studs

The SG80 machines have clearance in the lower center area of the machine to allow clearance for long studs that are difficult and time consuming to remove from cylinder heads. The attached cylinder head has 17"/430mm long studs (above) that do not have to be removed to be able to set up and machine valve seats, counterbores and guides.

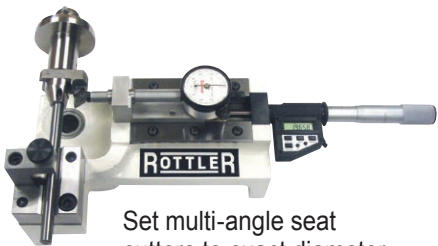
6 IN 1 SETTING FIXTURE



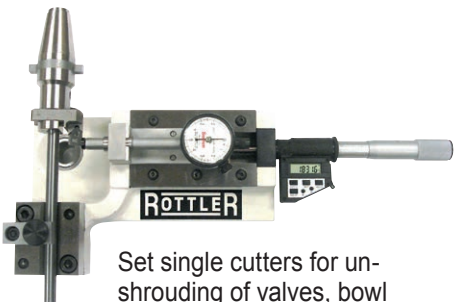
Check pilots for bend and diameter



Set seat pocket cutters to proper diameter



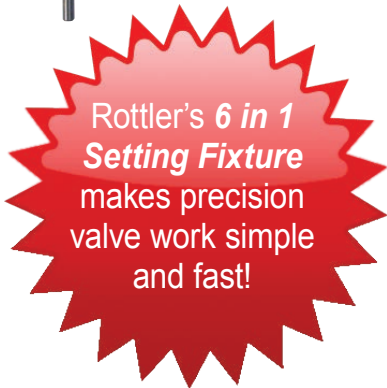
Set multi-angle seat cutters to exact diameter



Set single cutters for unshrouding of valves, bowl work or seat ring removal.



Check valves for run out and diameter (also allows precision setting of valve margin when setting up multi-angle cutters)



STANDARD EQUIPMENT

- CNC Touch Screen Control, Windows OS Professional Operating System with Intel Processor Memory to save unlimited number of makes of cylinder head for future use.
- Internet connection for future support and software updating
- Programmable Automatic Vertical Cycles for Seat Cutting, Seat Housing Boring, Valve Guide Reaming, Injector tube machining, Drilling, Thread Tapping.
- Programming and Machine Operation thru 15" (400mm) extra bright touch screen.
- Electronic Handwheel for manual operation in .001" (.01mm) or .005" (.125mm) increments per Handwheel Detent
- Precision Digital Readout, .0001" (.002mm) Resolution
- Spindle Travel by Precision Ball Screw & AC Servo Motor - Infinitely Variable Vertical Movement - Z Axis - Up and Down - 9.5" (240mm)
- Spindle Rotation by High Torque AC Servo Motor - Infinitely Variable to 1000 RPM
- Digital Electronic Level for Quick, precise alignment of Carbide Centralizing Pilots Complete with Digital electronic level pick-up
- Halogen Work light
- Machine Workhead Floats on Air Cushion for Precision Centering controlled from the Touch Screen - Total Travel in In/Out Direction 2.312" (58mm) and Left/Right Direction 44" (1120mm)
- Spindle Head Tilt - 10 Degrees to left and right
- Heavy Duty Spindle 3.75" (95mm) Diameter with Inner Precision Angular Contact Bearings supported in Adjustable Outer Bearings
- Rottler Automatic Tightening and Quick Release Spindle Lock Nut System for One Hand Operation for fitting and removing tooling to and from the spindle
- Table Cross Slide operated by Foot Pedal with Air Float for Easy Adjustment for In/Out Positioning of the Fixture - Total Travel 7.5" (190mm)
- Tooling Storage Cabinet and Mounting Arm
- Removable center tray for Chip Disposal
- Built In Vacuum Tester including Hose, Bracket, Filter and selection of pads

SPECIFICATIONS

	INCHES	METRIC
Valve Seat Diameter Range	.550" to 8.25"	14mm to 210mm
Valve Guide Diameter Range	.160" to 1.5"	4mm to 38mm
Cylinder Head Length with 360 degree rollover fixture	49"	1250mm
Cylinder Head Width with 360 degree rollover fixture	14"	355mm
Cylinder Head Height with 360 degree rollover fixture	10"	254mm
Cylinder Head Length with Tilt Fixture or Parallels	Unlimited	Unlimited
Cylinder Head Width with Tilt Fixture or Parallels	16"	40mm
Cylinder Head Height with Tilt Fixture	12" & 14.5"	305mm & 370mm
Cylinder Head Height with Parallels	17"	430mm
Spindle Diameter	3.75"	95mm
Spindle Taper	R40 Quick Change with Automatic Lock Nut	
Spindle Speed	50-1000 RPM	
Spindle Motor	AC Servo Motor	
Spindle Motor Power Maximum	6HP	4.48KW
Spindle Motor Torque Peak	44 Lb/Ft	60NM
Spindle Travel/Stroke Vertical	9.5"	240mm
Workhead Travel Horizontal - Airfloat/Airclamp	44"	1120mm
Workhead Travel In/Out - Airfloat/Airclamp	2.312"	58mm
Worktable Travel In/Out - Airfloat/Airclamp	7.5"	190mm
Workhead Tilt (either side of vertical zero)	10 Degrees	
Maximum Distance from Parallels to Spindle	26"	660mm
Electrical Requirements	208-240V AC 30 Amps, 50/60Hz, 1PH	
Air Requirements (Pressure and Usage)	90psi - 15 CFM	6bar - 400 l/min
Working Dimensions with Sharpener and Tooling Cabinet	48"D X 105"W X 86"H	1220 x 2670 x 2185mm
Shipping Dimensions	62"D X 91"W X 92"H	1575 X 2310 X 2340mm
Shipping Weight	5000 lbs	2273 kg
Paint Color Code	RAL9002 (Grey White)	

Specifications and design subject to change without notice.

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