ROTTLER

SG80A HEAVY DUTY CNC CYLINDER HEAD SEAT & GUIDE MACHINE OPERATIONS MANUAL

8029 S 200th Street, Kent, WA 98032 USA | www.rottlermfg.com | Ph: (253) 872-7050 | Fax: (253) 393-0230
Rev 083022

PARTS ORDERING

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For fastest service ordering parts or equipment, contact us via e-mail with the information below. For customers within the U.S., send emails to parts@rottlermfg.com, for customers outside of the U.S., use intlparts@rottlermfg.com

Have the following information on hand to expedite the ordering process:

1. Your name, business name, and contact number
2. Customer number, or your billing address if you do not have a customer number
3. Shipping address if different from the billing address
4. Machine model and serial number
5. Part number and description of the item(s) to order
6. Preferred method of shipment

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If you are unsure which part you need to order, contact our service department, and ask to speak to one of our service consultants. They will assist you in determining which part(s) you require.

THERE IS A MINIMUM ORDER OF $25.00

MANUAL SECTIONS

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SAFETY

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OPERATING INSTRUCTIONS

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INTRODUCTION

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Introduction

READ THE SAFETY CHAPTER BEFORE INSTALLING MACHINE. THOROUGHLY UNDERSTAND ALL SAFETY ISSUES BEFORE OPERATING MACHINE.

ATTENTION OWNER/BUSINESS MANAGER

To validate the warranty on your new Rottler machine, please be sure to sign and complete the "Installation Report" located in the Installation Chapter of this manual.

We suggest that the new user of the SG80A read the CONTROL DEFINITIONS to get an idea how the machine operates.

The Operating Instructions chapter should be read in order to familiarize the user with the actual button pushing sequences required to carry out a job. These chapters in the manual should be considered an introduction. As the operators of the SG80A series machines gain experience with using the different functions of the machine, complicated setups and programs will make more sense.

The rest of the manual contains information and part number reference on fixtures, cutting tools, and machine maintenance. The operator should read and become familiar with these areas as well.

Description

The Rottler SG80A was created specifically 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. We put our trusted engine block machining technology to work designing a heavy duty machine that handles many operations required on a wide variety of cylinder heads.

At Rottler we believed that many large cylinder heads could be “plunge cut” with fixed tooling to save time and money. We realized that plunge cutting would require a very rigid machine utilizing many of our already established design features such as Rottlers exclusive spindle design.

Over the decades, Rottlers spindle design has proven that our engine block machines are able to “plunge cut” wide counterbores found in large engine blocks with exceptional results. We used this spindle design for the SG80A and it has since been proven, in over 50 machines, that the SG80A is capable of plunge cutting large valve seats very quickly and with excellent CONCEN and surface finish.

Disclaimer

The SG80A Manual (henceforth to be referred to as the “Manual”) is proprietary to Rottler Manufacturing LLC. (“Rottler Manufacturing”) and no ownership rights are hereby transferred. No part of the Manual shall be used, reproduced, translated, converted, adapted, stored in a retrieval system, communicated or transmitted by any means, for any commercial purpose, including without limitation, sale, resale, license, rental or lease, without the prior express written consent of Rottler Manufacturing.

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Rottler Manufacturing and its employees or representatives are not responsible for any information regarding final specifications of any workpiece that is created as a final product when using Rottler equipment. It is the responsibility of the end user of Rottler equipment to determine the final dimensions and finishes of the workpiece that they are working on. Any information regarding final dimensions and finishes that appears in any Rottler literature or that is expressed by anyone representing Rottler is to be regarded as general information to help with the demonstration of or for operator training of Rottler equipment.

Limited Warranty

Rottler Manufacturing Company Model SG80A parts and equipment is warranted as to materials and workmanship. This limited warranty remains in effect for one year from the date of installation or two years from the date of the original shipment from Rottler or whichever date occurs first. This only applies is the machine is owned and operated by the original purchaser and is operated and maintained as per the instructions in the manual. A machine is warranted only if the Installation Report has been properly executed by a certified installation person and received by Rottler at the time of actual installation.

The products are warranted upon delivery to conform to their published specifications and to be free from defects in material and workmanship under normal use for a period of one year from shipment. Should a product not be as warranted, Rottler sole obligation shall be, at its option, to repair, correct or replace the product or to refund the amounts paid for the Product upon its return to a location designated by Rottler. No warranty shall extend to rapid wear Products (including tooling) or to Products which have been subject to misuse (including any use contrary to Rottler instructions), neglect, accident (including during shipment), improper handling or installation, or subject to any modification, repair or service not certified by Rottler. Rottler shall not be liable for any consequential, direct or indirect damages or for any other injury or loss. Buyer waives any right, beyond the foregoing warranty, to make a claim against Rottler. No warranty is provided for any Products not paid in full.

Merchandise cannot be returned to Rottler without prior approval. Customer must contact the Parts Department to get approval and to be issued a Return Goods Authorization number **(RGR#).** Merchandise authorized for return must be returned prepaid. If merchandise is returned with shipping charges collect, the actual amount of these charges may be deducted from any credit which may be due the customer. The **RGR #** assigned by the Parts Department should be written on the shipping label and must appear on a copy of the invoice(s) covering the original shipment. This invoice copy must be included in the box with the parts. Shipment must contain ONLY those items on the **RGR** as approved for return. Merchandise must be received within 10 days of the date of **RGR** or the **RGR** will be canceled. All returned merchandise may be subject to a 20% restocking fee on under $1,000.00 amount or 10% on any items over $1,000.00. Parts or tooling over 30 days old are considered as customer property and can only be returned with prior approval from Rottler Corporation Management.

The issuance of a **RGR DOES NOT** guarantee credit - it is only authorization for the return of the goods. Credit for return merchandise is at the sole discretion of Rottler. Credit will be issued only after inspection of returned goods.

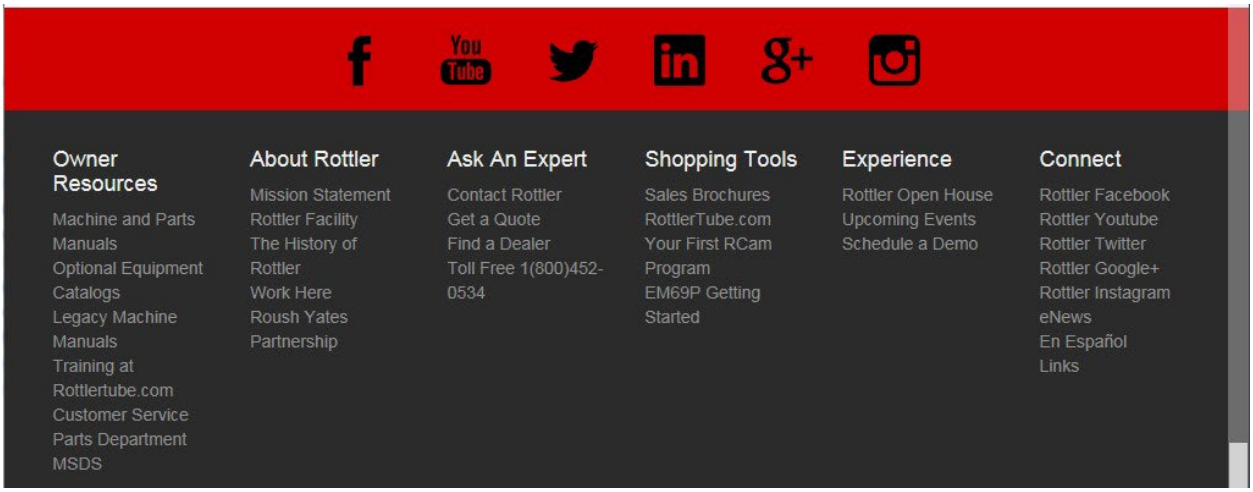
Tools proven to be defective within the warranty period will be repaired or replaced at the factory’s option.

We accept no responsibility for defects caused by external damage, wear, abuse, or misuse, nor do we accept any obligation to provide compensation for direct or indirect costs in connection with cases covered by the warranty.

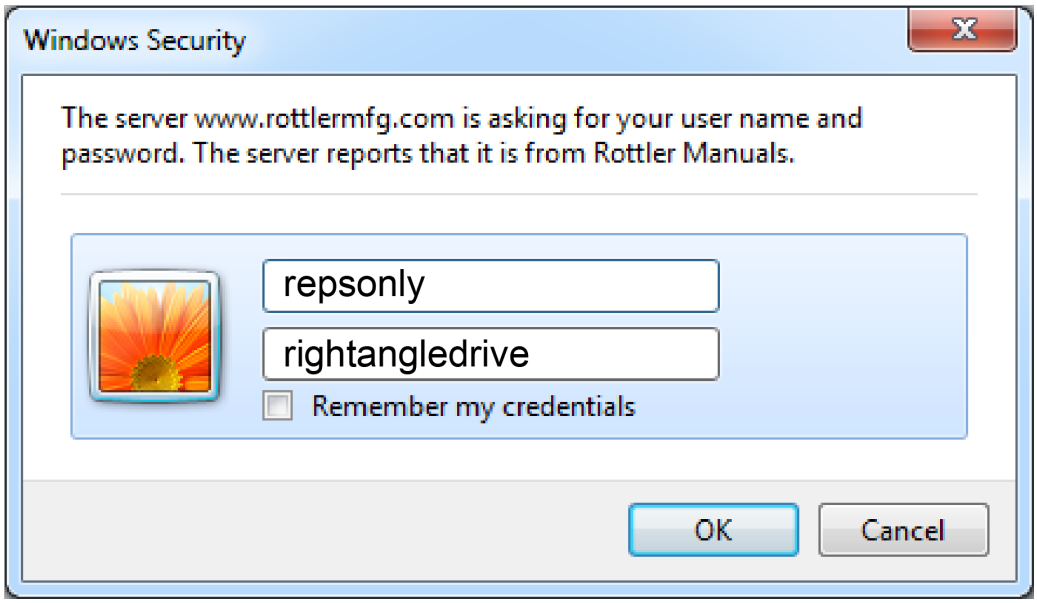
Online Documentation Access

Online documentation for machines and optional equipment can be accessed at the Rottler website. To access documentation open your browser and navigate to https://www.rottlermfg.com.

Scroll to the bottom of the page and under the Owner Resources title click the type of documentation you want to access.



If a log in window pops up asking for user name and password fill in the blanks as shown.



SAFETY

Contents

Safety Information

For Your Own Safety Read This Instruction Manual Before Operating This Machine.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Safety Instructions for Machine Use

This machine is capable of causing severe bodily injury

ONLY A QUALIFIED, EXPERIENCED OPERATOR SHOULD OPERATE THIS MACHINE. NEVER ALLOW UNSUPERVISED OR UNTRAINED PERSONNEL TO OPERATE THE MACHINE. Make sure any instructions you give in regards to machine operation are approved, correct, safe, and clearly understood. Untrained personal present a hazard to themselves and the machine. Improper operation will void the warranty.

KEEP GUARDS IN PLACE and in proper working order. If equipped with doors, they must be in the closed position when the machine is in operation.

KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents.

KEEP CHILDREN AND VISITORS AWAY. All children and visitors should be kept a safe distance from work area.

WEAR THE PROPER APPAREL. DO NOT wear loose clothing, gloves, rings, bracelets, or other jewelry which may get caught in moving parts. Non-Slip foot wear is recommended. Wear protective hair covering to contain long hair.

ALWAYS USE SAFETY GLASSES. Also use face or dust mask if cutting operation is dusty. Everyday eye glasses only have impact resistant lenses, they are NOT safety glasses.

DO NOT OVER-REACH. Keep proper footing and balance at all times.

USE THE RECOMMENDED ACCESSORIES. Consult the manual for recommended accessories. The use of improper accessories may cause risk of injury.

CHECK DAMAGED PARTS. Before further use of the machine, a guard or other part that is damaged should be checked to determine that it will operate properly and perform its intended function. Check for alignment of moving parts, breakage of parts, mounting, and other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.

NEVER OPERATE A MACHINE WHEN TIRED, OR UNDER THE INFLUENCE OF DRUGS OR ALCOHOL. Full mental alertness is required at all times when running a machine.

IF AT ANY TIME YOU ARE EXPERIENCING DIFFICULTIES performing the intended operation, stop using the machine! Then contact our service department or ask a qualified expert how the operation should be performed.

DO NOT MODIFY OR ALTER THIS EQUIPMENT in any way. If modifications are deemed necessary, all such requests must be approved and/or handled by Rottler Manufacturing. Unauthorized modifications could cause injury and/or damage to machine and will void the warranty.

SAFETY DECALS SHOULD NEVER BE REMOVED. They are there to convey important safety information and warn of potential hazards.

ALL LOCAL SAFETY CODES AND REGULATIONS should be followed when installing this machine.

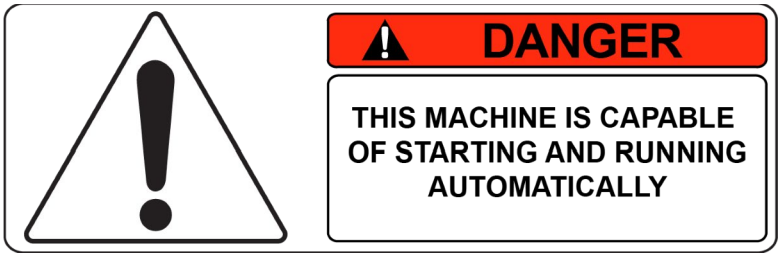
ONLY QUALIFIED PERSONAL should perform service on the electrical and control systems.

When boring the machine is capable of throwing metal chips over 10- feet from the cutting area. Always use the guards. Eye protection must be worn at all times by the operator and all other personnel in the area of the machine.

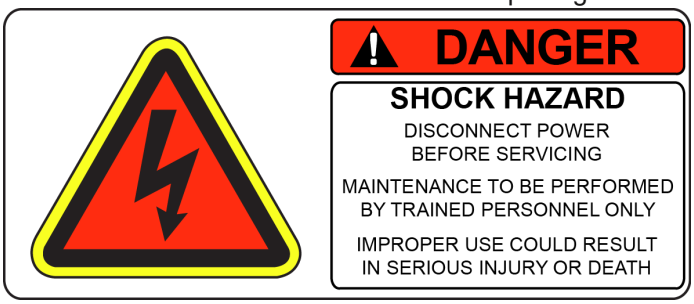
CAUTION No list of safety guidelines can be complete. Every piece of shop environment is different. Always consider safety first, as it applies to your individual working conditions. Use this and other machinery with caution and respect. Failure to follow guidelines could result in serious personal injury, damage to equipment or poor work results.

Electrical Power

THIS MACHINE IS AUTOMATICALLY CONTROLLED AND MAY START AT ANYTIME

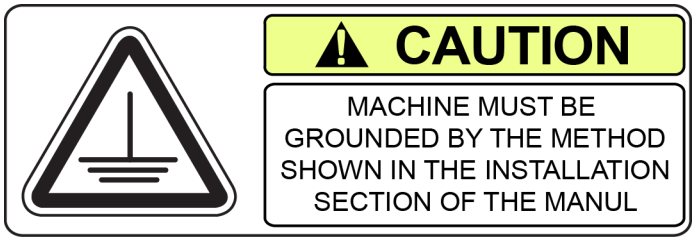


All electrical power should be removed from the machine before opening the rear electrical enclosure..



In the event of an electrical short, grounding reduces the risk of electric shock by providing a path of least resistance to disperse electric current.

Electrocution or a fire can result if the machine is not grounded correctly. Make sure the ground is connected in accordance with this manual. ***DO NOT*** operate the machine if it is not grounded.



CAUTION No single list of electrical guidelines can be comprehensive for all shop environments. Operating this machinery may require additional electrical upgrades specific to your shop environment. It is your responsibility to make sure your electrical system comply with all local codes and ordinances.

WARNING This machine operates under computerized control and, as is all computerized equipment, and is susceptible to extraneous electrical impulses internally for externally produced. The machine may make moves out of the operator control at any time. The operator should work in and around the machine with caution at all times.

The operator and nearby personnel should be familiar with the location and operation of the Emergency Stop Button.

Make sure all electrical equipment has the proper overload protection. This machine should have ***a fully isolated power supply*** to prevent damage and uncontrolled movement of the machine. If this machine is on the same power lines that are running to other electrical equipment (grinders, welders, and other AC motors) electrical noise can be induced into this machines electrical system. Electrical noise can cause the controller to see false signals to move. Not supplying a fully isolated supply to the machine may void factory warranty. Refer to the Power supply section located in the Installation section for voltage and amperage requirements of this machine.

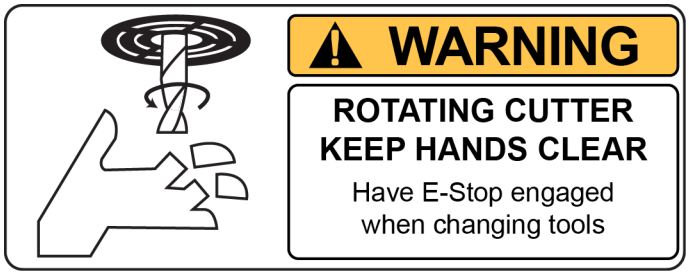
Machine Operator

The operator of this machine should be a skilled machinist craftsman who is well versed in the caution, care, and knowledge required to safely operate metal cutting tools.

If the operator is not a skilled machinist he/she must pay strict attention to the Operating Instructions outlined in this manual, and get instruction from a qualified machinist in both production and operation of this machine.

This machine has the following areas of exposed moving parts that you must train yourself to respect and stay away from when they are in motion:

Cutting Tool Area – Any operation involving hands in the cutter head area, such as inspection or alignment of the cutter head or tools, changing Centering Fingers, tool insertion, and removal, cutter head changes, and size checking etc. requires the machine to be in Neutral.



Machining – Eye protection must be worn during all operations of the machine. Hands must be kept completely away from the cutter head. All chip guards must be in position during machine operations.

CAUTION **Work Loading and Unloading** – Carefully develop handling methods of loading and unloading work pieces so that no injury can result if hoist equipment or lift connection should fail. Periodically check lift components for damage that may cause failure.

CAUTION **Machine Maintenance** – Any machine adjustment, maintenance or parts replacement absolutely requires a complete power disconnection from the machine.

Emergency Procedure

Assuming one of the following has occurred: tool bit set completely off size, work piece or spindle base not clamped, spindle is not properly centered, and these mistakes will become obvious the minute the cut starts

PRESS THE EMERGENCY STOP BUTTON (on the front control panel) ***IMMEDIATELY!***

Find out what the problem is; return the spindle to its up position without causing more damage. To restart the machine, turn the Emergency Stop Button CW until the button pops out

Be alert to quickly stop the machine in the event of a serious disruption of the boring process either at the top or bottom of the bores.

"REMEMBER" metal cutting tools have the speed and torque to severely injure any part of the human body exposed to them.

Computer and Controller System Safety

The computer and controller are located in the main rear electrical enclosure. This unit is a full computer, running Windows 7 64 Bit operating system. Contact the factory if more information on the computer system is required.

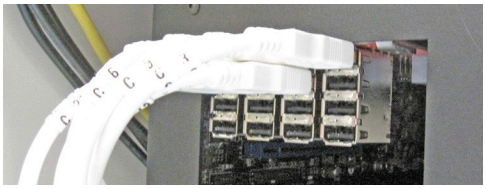
IMPORTANT The computer in this machine has the ability to connect to the World Wide Web via Ethernet or Wireless using a USB wireless (Wi-Fi) adapter. Updating the Rottler software should ONLY be done when directed to do so by a Rottler service technician. Updating Rottler Software when not directed by Rottler personnel will result in a non-operational machine.

The machine should be hooked up to the Internet anytime it is on. The software on the machine will automatically connect to our server to send back useful information on machine status.

Any "IT" personnel should ***ALWAYS*** get approval from Rottler before doing ***ANYTHING*** on the computer.

⚠ DANGER This machine is capable of causing severe injury or death. Doing any of the following without Rottler's direct consent may cause severe injury or death.

⚠ WARNING Do not attempt to install USB devices in the PCI ports. These ports have high voltage and any attempt to connect a USB device in these ports will result in destruction of that device. There is also the possibility of damage to the computer system of the machine.



IMPORTANT Downloading any program or changing any Rottler or Computer settings may cause the machine and/or software to become unstable. DO NOT install ANY screen saver, Anti-Virus, Spyware or any type of Security software on the computer. This could create a hazardous environment for the operator and personnel around the machine. Performing any of the above will also result in the machine warranty being NULL and VOID.

IMPORTANT DO NOT connect any type of external hardware to the computer via USB or any other means. Do not install any type of Device Driver. This could create a hazardous environment for the operator and personnel around the machine. Performing any of the above will also result in the machine warranty being NULL and VOID.

Electrical Safety Features Of Rottler DM Controlled Machines

All Rottler machines that use the DM operational control system are designed to comply with all applicable safety standards. This includes but is not limited to the following systems:

- Thermal sensors in all motors and motor controls.
- Current sensors in all motor control panels.
- Electrical breakers to prevent voltage surges and spikes from reaching electrical system.
- Electrical lockout on main electrical enclosure.
- E-Stop that shuts down all operational systems in an event of an emergency.

All thermal and current limits for motors and motor controls are preset at the factory. In the event that any of those parameters are exceeded during operation of the machine, the machine control system will shut down the machine and a warning of the specific fault will appear on the control screen.

CONTROL DEFINITIONS

Contents

Control Definitions

NOTE: It is important that the operator of the SG80A read the Control Definitions chapter in this manual before proceeding any further.

The purpose of this chapter is to define the function of the buttons throughout the various screens. Certain button functions may not make sense right away in this chapter. As the operator reads through the Operating Instructions chapter of this manual, the function of these buttons will become clear.

NOTE: Not all modes of operation will be discussed in this Chapter. The function of several buttons and actions are the same in many modes. The description of a function or button operation will not be repeated if it exists in another mode. All modes of operation will be discussed in the Operations Section of this manual

Computer and Controller System Safety for DM Controlled Machines

The computer and controller are located in the main rear electrical enclosure. This unit is a full computer, running Windows 7 64 Bit operating system. Contact the factory if more information on the computer system is required.

IMPORTANT The computer in this machine has the ability to connect to the World Wide Web via Ethernet or Wireless using a USB wireless (Wi-Fi) adapter. Updating the Rottler software should ONLY be done when directed to do so by a Rottler service technician. Updating Rottler Software when not directed by Rottler personnel could result in a non-operational machine.

It is recommended that the machine be hooked up to the Internet anytime it is on. The software on the machine will automatically connect to our server to send back useful information on machine status. It will also record performance parameters that will be used to evaluate any occurrence of a malfunction.

The Auto Update for the Windows Firewall (Security) and Windows Defender (Anti-Virus) is turned on. The computer will automatically download the updates and then install them when the computer is shut down every Friday night.

Any “IT” personnel should ALWAYS get approval from Rottler before doing ANYTHING on the computer.

⚠ WARNING Downloading ANY program from the Internet or by other means when not directed by Rottler is prohibited and will result in the machine warranty being NULL and VOID.

⚠ WARNING Downloading any program or changing any Rottler or Computer settings may cause the machine and/or software to become unstable. DO NOT install ANY screen saver, Anti-Virus, Spyware or any type of Security software on the computer. This could create a hazardous environment for the operator and personnel around the machine. Performing any of the above will also result in the machine warranty being NULL and VOID.

COMMON INTERFACE NOTICE

All Rottler machines using Direct Motion technology share a common control interface. This allows for a better environment for programing machine functions across a wide range of different machines. This also allows for easier deployment in shops already using Rottler Direct Motion machines.

Because of the common interface some machines may have buttons and menu tabs that may not be applicable to the machine that is being used. If the buttons or menu tabs are not mentioned in the control definitions section of the manual, they will not be used in machine operation.

Master Power On/Off Switch

This switch is located on the main electrical control enclosure on back of the machine. The switch must be in the off position before opening the rear enclosure door.

When first applying power to the machine the computer will need to boot up. Be patient, it will take several minutes to complete booting. The Rottler program will not automatically start. Double tap the Rottler_WPF icon on the screen to start Rottler.

When turning the main power to the machine off there is a specific procedure to follow so as not to damage the computer. The computer must shut down its internal systems before main power is removed from it.

Press the “Start” button in the left-hand side of the Start Bar. This will bring up the “Start Menu”. Press the “Shutdown” line at the bottom of the Start Menu. This will bring up a Pop Up menu, make sure that “shut down computer” is selected and press “OK”.

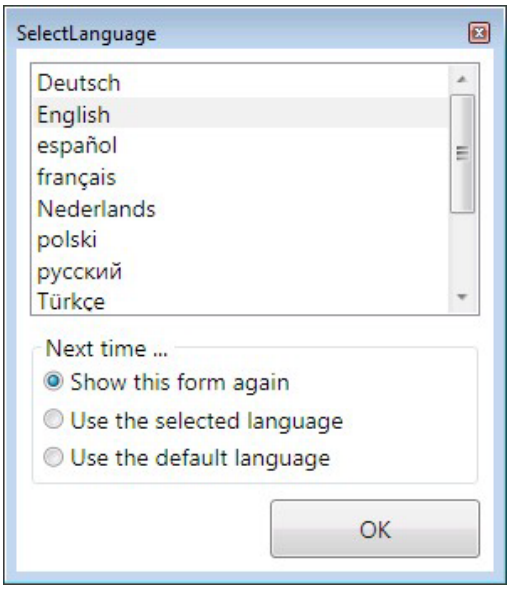
This will shut down the computer. It is now OK to turn Main Power off to the machine.

Note: The Rottler SG80A uses a touch screen for control and data transfer to the computer. Be careful not to touch the screen until the machine has fully booted up and a Rottler screen is showing. If the screen is touched prior to full boot –up it may activate a function or interfere with proper boot-up.

Initialization Screen

The first screen to appear is the Rottler Manufacturing Start Up screen. Double click icon to start.

The next screen to appear will be the select language screen. Highlight language wanted and click OK



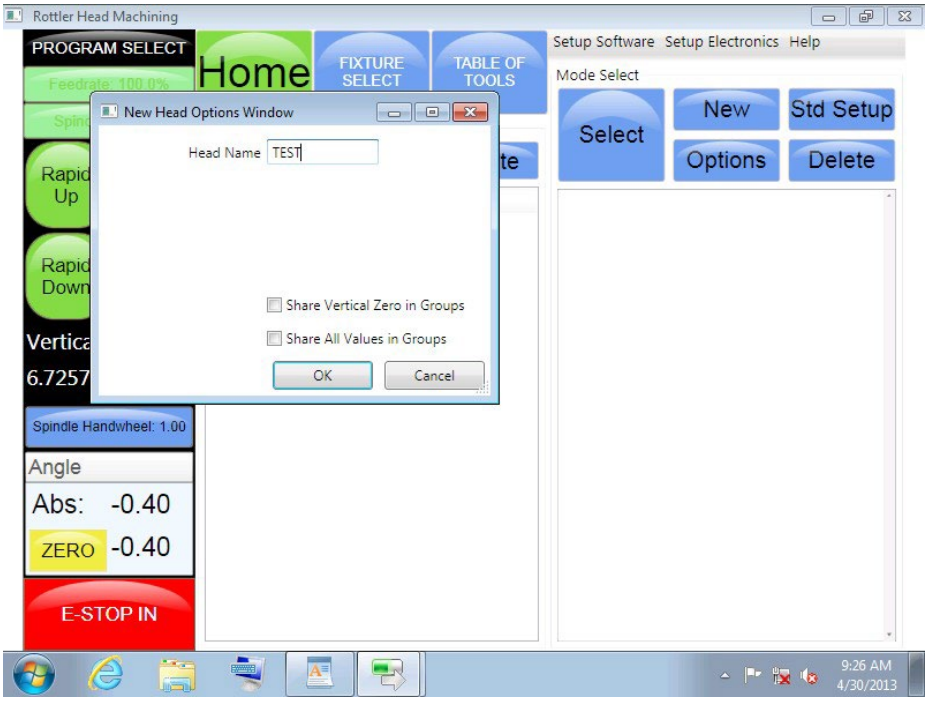
The next screen to appear is the program select screen.

Homing

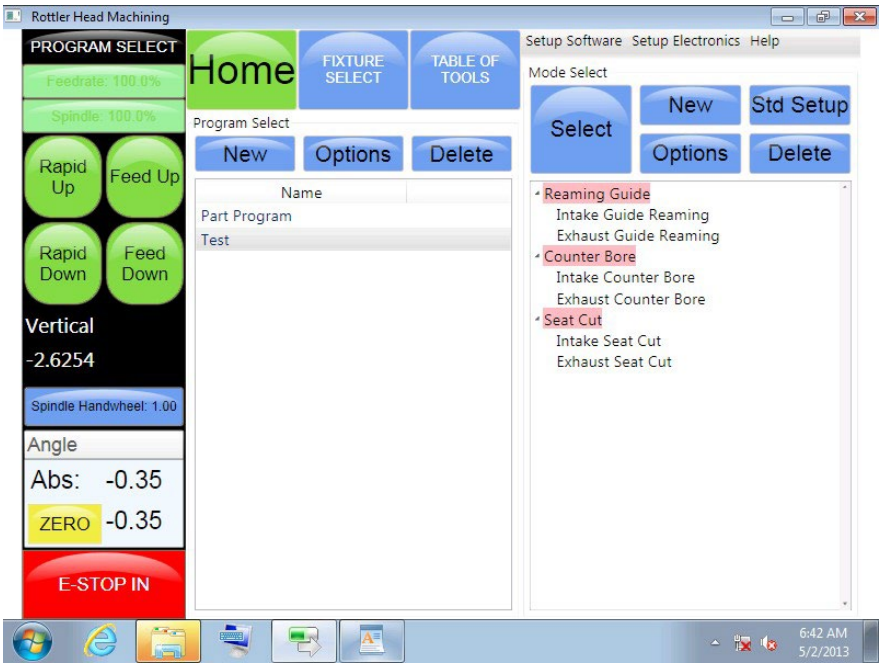
1st thing you want to do when this screen appears is to HOME the machine. Buy pressing this button the computer will sync itself with the motors.

This process must be done each time the SG80A has been shut off and restarted. If the HOME process is not done the machine will not operate.

Next press NEW under program select. Enter in the head name you are going to work on. (To do this either plug in the supplied keyboard or click on the on screen keyboard in the taskbar.) Then click OK



After this click on Std. Setup, a box will pop up saying “DELETE EVERYTHING” WARNING This will delete all existing block data in XXXXX and replace it with Std. Setup . Are you sure you want to precede? Press Yes. This screen will open.



Now you can start the operation you would like to do buy highlighting and pressing select.

Program select Buttons
These buttons work in all modes.

Rapid Up / Rapid Down
These buttons will move the spindle up or down quickly, it will stop when released.

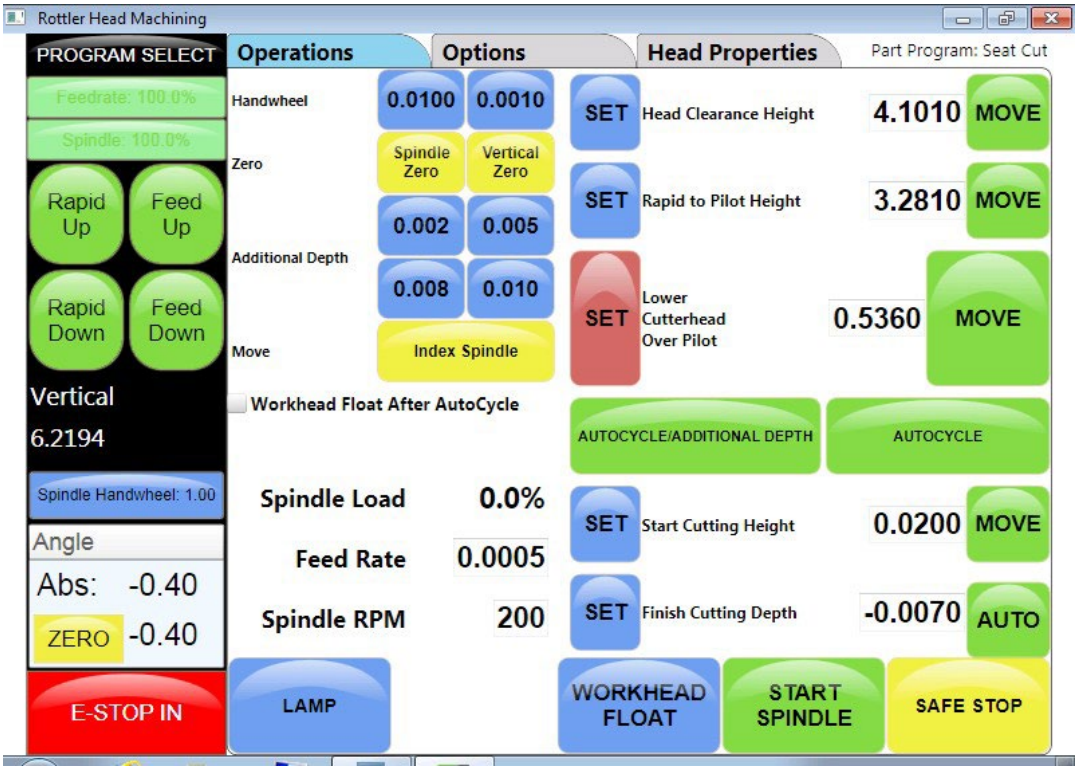
Feed Up / Feed Down
These buttons will move the spindle up or down slowly, it will stop when released.

Spindle Handwheel
This button lets you rotate the spindle with the handwheel. You can speed this motion up by pressing and holding the spindle handwheel button until the screen pops up to change the speed.

Feed rate override
You can lower and raise the FEED RATE when in the AutoCycle mode buy pressing this and turning handwheel.

Spindle override
You can change spindle RPM when in the AutoCycle mode buy pressing this and turning the handwheel.

These overrides work especially good when reaming and making long cuts in the seat counter bore and seat cut modes.



E STOP
By pressing this button the machine will stop running. Use this for ***EMERGENCY*** shutdown only. Engage by pressing the E STOP button. The STOP MACHINE button will now read E-STOP IN. Release E-STOP by turning button clockwise until it releases and pops back out.

LAMP
Turns work light on and off.

WORKHEAD FLOAT

Floats workhead when pushed RED and clamps when pushed BLUE

START SPINDLE
Turns spindle on and off.

SAFE STOP
Immediately stops downward feed and goes to finish options mode

HANDWHEEL: 0.0100 / 0.0010
Press these and you can move the spindle up and down with the handwheel. 0.0100 moves .010 per click of the handwheel. 0.0010 moves the spindle .001 per click. Press and hold and you can change movement.

SPINDLE ZERO
Indexes spindle in the position you want after auto cycle. Manually rotate into desired position and press “Spindle Zero” after auto cycle spindle will return to this position.

VERTICAL ZERO
Resets DRO to zero. Reference point all heights are set at. More on this later.

ADDITIONAL DEPTHS

Additional amount of material removed after auto cycle. If a seat does not clean up you can use these buttons to remove more material without changing finish cutting depth. Must be below “lower cutter head over pilot “and workhead float after auto cycle must be unchecked. These can be reprogrammed by pushing and holding the button and entering in a different figure.

Index spindle. Press this and spindle indexes to position set with “Spindle Zero” button

WORKHEAD FLOAT AFTER AUTO CYCLE
If its checked it floats, if not it doesn’t, after auto cycle.

FEED RATE
Press and hold to set Feed rate

SPINDLE RPM
Press and hold to set spindle RPM

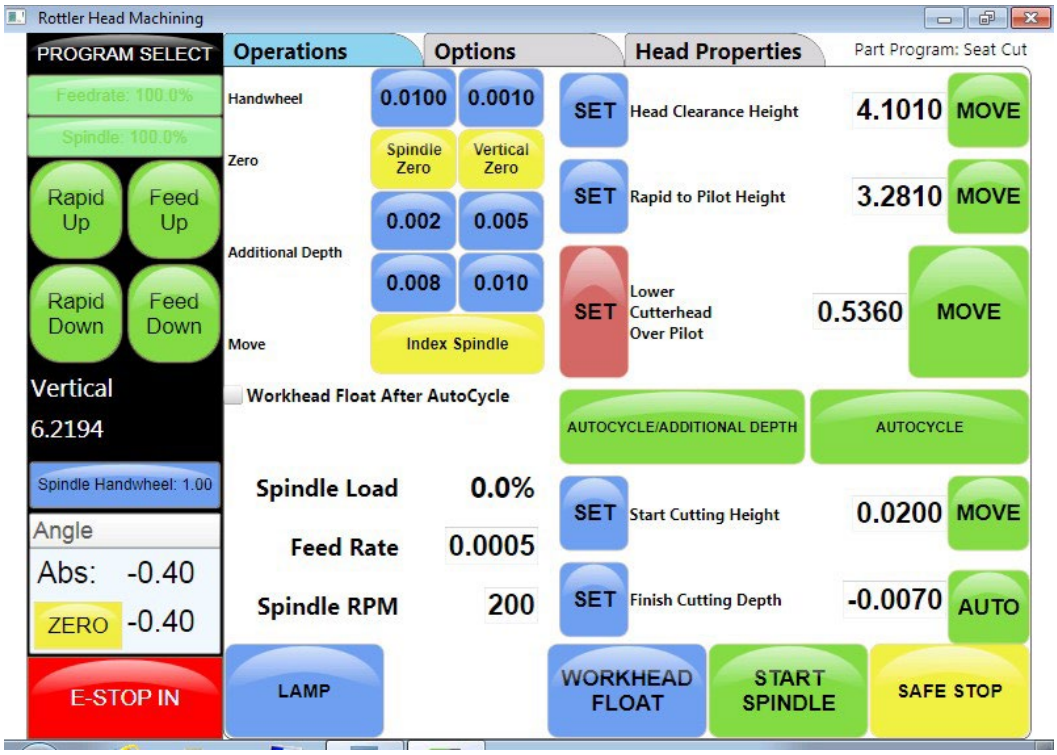
SET
Push and hold to set height. Whatever height the spindle is at will automatically be programed when pushed and held. This height is in reference to the preset vertical zero. More on this later.

MOVE
Push this and spindle will move to the position programed buy the SET button.

ANGLE
Abs - Actual angle the angle sensor is at.

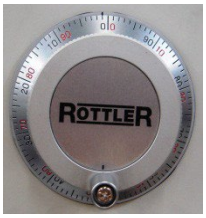
Zero – press to “0” angle sensor. Abs will not change.

Seat Cut: Operations screen



Vertical Zero

This is the first step you need to do to set up your program. All of the height figures entered will start from this position. This number represents the spindle vertical position. The “zero” position is when the cutting insert first comes in contact with the seat it is cutting. To set this the head needs to be leveled and all tooling set to cut. (This will be discussed in later chapter.)



You will want to set this on the highest seat. Float workhead and manually lower spindle (with handwheel, press the .001 handwheel button and use handwheel, pictured on right) into cutting position so cutting insert is close to seat but not touching. Let workhead dwell for a couple seconds and then clamp workhead. Start spindle and press the .001 handwheel button on top of page, lower spindle with handwheel one click (.001) at a time until the cutter just comes into contact with seat. Then back off 1 click and stop spindle. Press the yellow “VERTICAL ZERO” button on top of page. A box will ask are you sure you want to vertical zero, press OK. You will notice that the vertical box on left has changed to “0.000” Now the rest of the heights can be set.

SETTING THE REST OF THE HEIGHTS

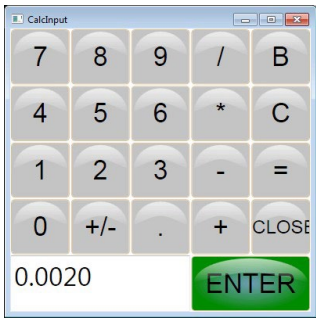
Raise the spindle with the rapid up or feed up button until the end of the pilot (using unipilot system) or cutter head (std. system) clears and can float guide to guide without interference, press and hold the “HEAD CLEARANCE HEIGHT “ set button until the figure changes. You will notice that this figure has changed and is now the same as the vertical figure on left.

Next, lower spindle with feed down or handwheel until the tip of pilot (unipilot system) is just above the top of valve guide. Or until the cutter head (std. system) is just above the pilot. Press and hold the “RAPID TO PILOT HEIGHT” button until figure changes.

Next, lower spindle until pilot is 1/2” into guide (unipilot system) or tool holder is over pilot 1/2” (std. system) press and hold the “LOWER CUTTERHEAD OVER PILOT” button until figure changes.

Next we need to set the “START CUTTING HEIGHT” This is where the spindle will start turning. This height needs to be above the highest seat. Usually .020-.030 is safe. If you know seats are all equal you can go lower but it is possible to crash machine if not careful here. I would suggest not going any closer until you have good experience with the machine.

To set this tap on the figure next to the MOVE button. A keyboard will pop up, enter in your height (.030) and press ENTER.



Last is to set the “FINISH CUTTING DEPTH” same thing here, tap the figure next to the MOVE button and enter in your depth you want to cut (.-003 is a good starting point) you must also tap the +/- button before you push ENTER. This will make the figure a negative number. This is how much below the preset vertical zero the machine will cut the seat.

Retract height: Set where spindle retracts to after cutting is done by taping any of the “SET buttons. When this is done the button will turn RED. This is where the spindle will retract to after cutting.

Set workhead float after auto cycle buy checking box.

CAUTION Make sure the Head Clearance Height is sufficient for the Tool holder or pilot to clear the Cylinder Head and the fixture when moving the work Head across.

The Vertical stops have now been set. These steps have to be done on every new cylinder head. This information will be save on the Head Selection mode.

Is importing to save changes every time you getting out of each mode.

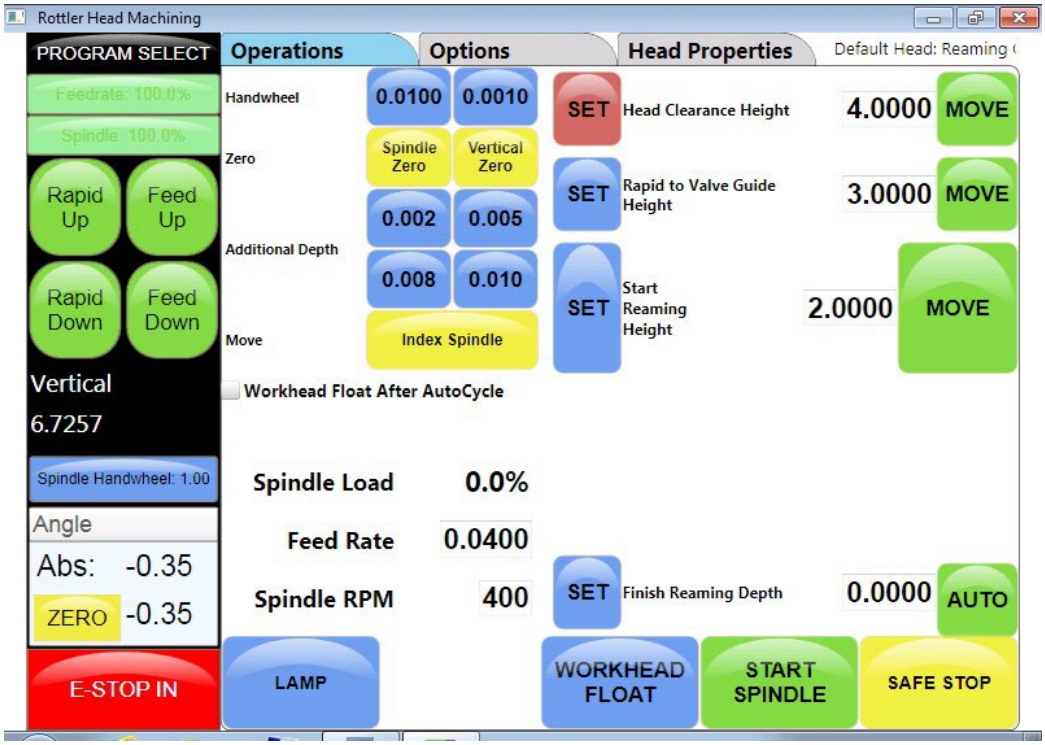
The next time you pull up the mode all settings will be stored. All you have to do is set your “vertical zero” and you are ready to go.

SEAT COUNTER BORING SCREEN

This will be the same seat cutting except for the vertical zero position.

This is set when the counter bore cutter first comes into contact with the casting it will be cutting.

REAMING PROGRAM: OPERATIONS SCREEN



VERTICAL ZERO

Set this height when tip of reamer just contacts head surface or top of guide. Your choice.

HEAD CLEARANCE HEIGHT and **RAPID TO VALVE GUIDE HEIGHT** is same as previously described.

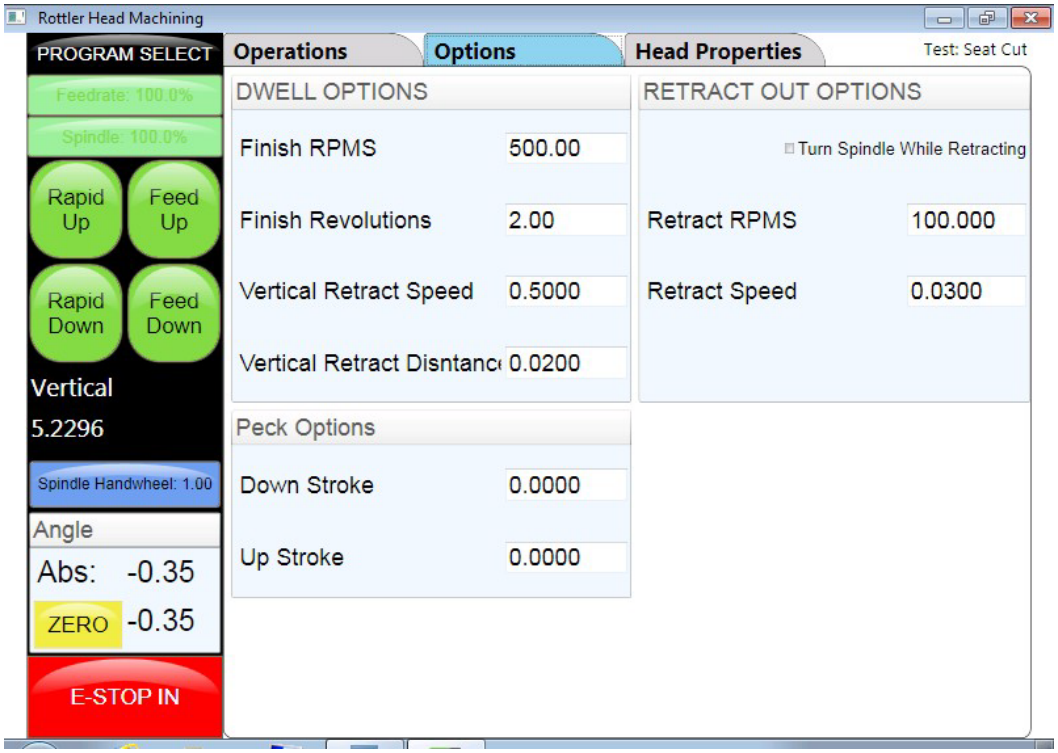
START CUTTING HEIGHT

Is set when reamer pilot is into guide enough to center but not yet to cutting edges.

FINISH CUTTING DEPTH

Is length of guide being cut. Add guide length to “start reaming height “ figure and add .100 to be safe. Remember to push the +/- for a negative #.

Options screen



DWELL OPTIONS

After finish “cutting depth” in the “seat cutting” and “seat counter boring” mode the “dwell options” go into effect. This means that after the finish cutting depth has been reached the machine will go to this stage. 500 RPM for 2 revolutions of the cutter then retract .020 at a rate of .0500. you can change all of these figures buy taping the figure and entering in your own figures. Normally you shouldn’t have to change the “vertical retract speed” and the “vertical retract distance”

The “finish revolutions shouldn’t need to be changed either, you will want a minimum of 2 revolutions here to clean seat after it has been cut. If you enter to many revolutions cutter will drag and possibly cause chatter.

Finish RPMs is the one you will need to change the most. Start with 100 RPM above cutting speed used . if you hear or see chatter after seat is cut, slow this down to cutting speed or below. Chatter usually goes away with a slower speed.

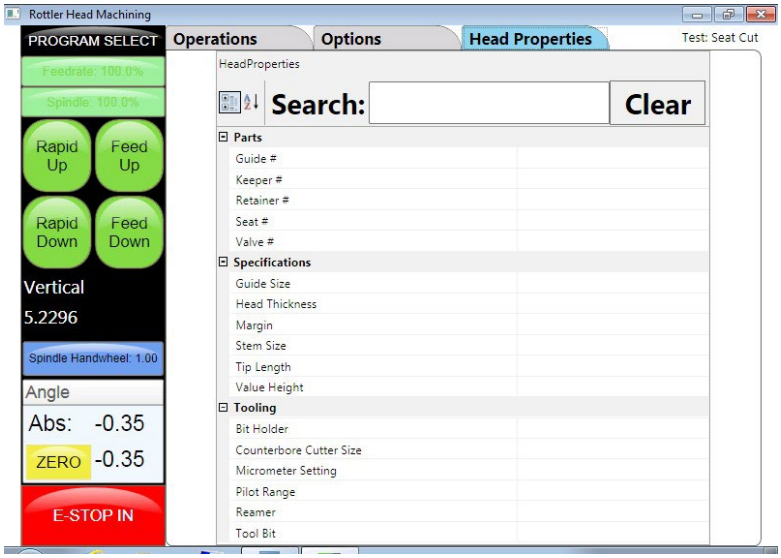
RETRACT OUT OPTIONS

This is used in the reaming program. After “finish reaming depth” has been reached, the retract out options go into effect. “Retract RPM” should be set at 100 “Retract Speed “ should be set at .5000 The “Turn spindle while retracting “ box SHOULD be checked.

PECK OPTIONS

This works with all modes. It works well when making heavy cuts. Buy entering a number in the “Down stroke” space the spindle will cut down this amount then come up the amount entered in the “upstroke” space. Then repeat until finish cutting depths are reached.

HEAD PROPERTY SCREEN



On this screen you can enter in all head information, it will be saved into the head program you are in.

General Information

Once selected, all operations of the SG80A can perform are stored in that Cylinder Head model.

The following is a more detailed list on the head selecting screen.

Program Select

This screen allows you to select, create, edit or delete a Cylinder Head model.

This will change the screen to the MODE SELECT Screen.

New

Pressing this button will bring up page to ADD new head programs . Using the keyboard, type the desired name for your head, click OK. This will add the head to the list on the left.

Options

To Edit a Cylinder Head Model name, select a Cylinder Head from the list on the left and then press Options. This will put the name of the selected head on the screen. Use the keyboard to edit the name, press OK when finished.

Delete

To delete a head, select the head from the list on the left. Press the DELETE button. The screen will ask you if you want to delete the Head. Select YES or No **Mode Select**

One you have selected a head, go to mode select on right half of page.

New

This will pull up different modes available for each head. (The BREAK IN mode is for factory break in only and will not be needed buy consumer.)

Options

To edit a mode select name click here and use keyboard to change. Example – change “Seat Cut” to “Seat Cut INTAKE” or just” INTAKE” press OK when done.

Delete

To delete an operation simply highlight and press delete. . The screen will ask you if you want to delete the operation. Select YES or No

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OPERATING INSTRUCTIONS

Contents

Operating Instructions

Insert Sharpener Operation

The Rottler sharpening can re-condition inserts to a finish almost identical to new. The grinding wheel is designed to provide a very fine lapped finish across the entire face of the insert. It should be noted that the grinding holder is deigned to accept RCA/RCB inserts on one side and the larger formant RCC inserts on the other. It should also be noted that the set screw which holds the inserts in the holder is specifically designed to not interfere with the grinding operation, at no time should a different set screw be used as this can result in damage to the grinding wheel.

Operation:

With the insert set into the holder, use two hands to support the holder and keep the insert face flush and stable against the grinding wheel. Sweep the insert across the face of the wheel with light pressure to clean up the entire face of the insert.

Check the insert as you grind it to make sure that it is cleaning up uniformly, also make sure that the set screw does not contact the grinding wheel. When done properly the insert face should look like the image below:

Built In Venturi Vacuum Tester

Designed to test valve seat and seat surface seal, and particularly to measure the valve seat surface quality after machining. Including a set of 7 pads and connecting extension to fit must common ports.

Mounting Cylinder Heads

Initial clamp height adjustments to the head trunions can be accomplished by measuring the head thickness then raising the turning clamping block assembly to the appropriate height using the clamping block acme screws. A 10mm T - handle allen wrench works well.

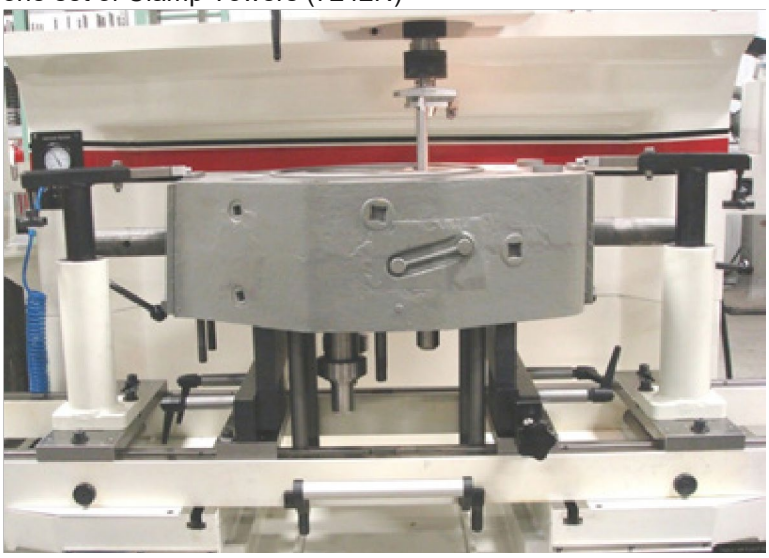
Roll Over Fixture with Safety Chains for Large Cylinder Heads

Measure the length of the cylinder head. Spread the trunion assemblies apart from each other so that the cylinder head can be clamped in between the trunions.

Each support has an adjustable stop, located to the front. The stops have indents, allowing a number of different settings. Position of the stops must be checked for each cylinder head put on the supports. In most cases we will install the cylinder head deck side down with the exhaust side of the head against the adjustable stops. This is particularly true of wedge style heads. It is necessary for the clamps to thrust the cylinder head against the stops when clamped. When heads are mounted in this fashion, the tallest portion of the combustion chamber will be at the rear of the machine when the head is rotated into the working position. Try to keep the valve guide center line parallel to the trunion centerline. A Safety chain has been added to this fixture to keep the head from dropping while you're working with large and heavy cylinder heads.

2 Degree Tilt Fixtures

Tilt Fixtures for large cylinder heads applications including adjustable base plate, Set of two 2” and 4” parallels; it required one set of Clamp Towers (7242N)



Alignment and Setup

Alignment and setup applies to both the cylinder head and the machine’s floating head. The goal is to perfectly align the spindle centerline to the centerline of the area of the head to be machined. Most machining operations on cylinder heads use the valve guide centerline as the reference point so we will use that as an example.

Note: think of the digital electronic level as a comparator. Because the leveling pin is square to the machines spindle, as long as you achieve the same readings front to rear and side to side then the spindle will be in perfect alignment.

Front to Rear Cylinder Head Alignment

Position the level on level pin to read front to rear and take a reading. Rotate the cylinder head so that the valve seats are facing up. Now place the level on a pilot in the cylinder head and position the level to read front to rear. Loosen the lock levers on the supports. Be certain the fine adjustment lock screw is loosened. Coarse adjustment is made by turning the work piece manually, until the level reading is within a couple of degrees of the reading on the leveling post.

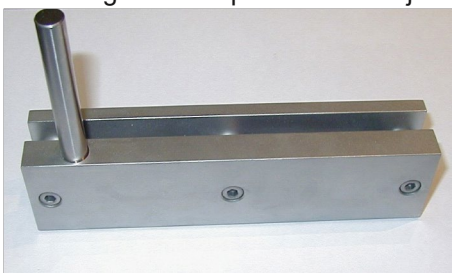
Lightly tighten the lock levers on the supports to remove any play. Now tighten the clamp on the fine adjustment screw. Turn the adjustment knob to achieve the exact reading that was observed on the leveling post. You can now completely tighten both the left and right support locks.

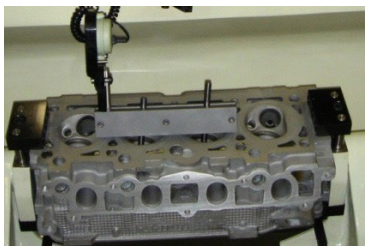
Left to Right Alignment

Obtain the left to right reading from a pilot mounted in a guide in the cylinder head. Now place the level on the leveling post . Loosen both of the tilt lock levers on each side of the quill housing. Use the tilt adjusting hand wheel to adjust the reading to be the same as that found on the pilot in the cylinder head. Tighten the tilt lock levers.

Canted Valve Cylinder Heads (Automotive Application)

An optional alignment bar is available that helps establish the front to back alignment on canted valve cylinder heads. The bar is held against two pilots in two adjacent guides. Use the alignment post to adjust the angle. (See Picture)

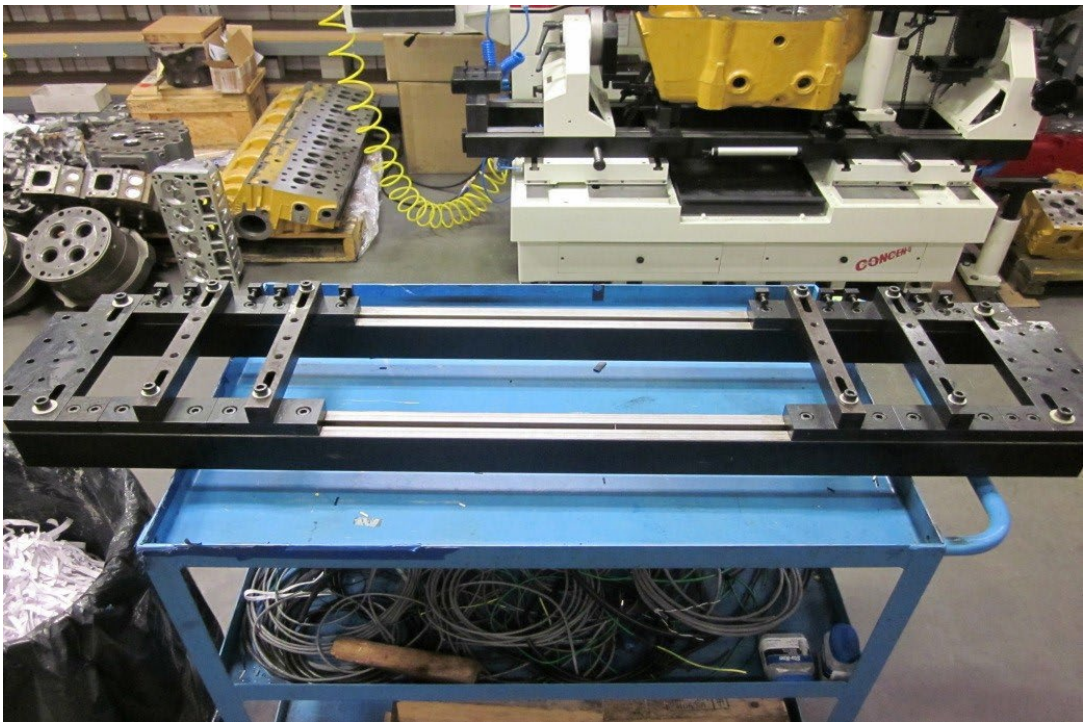




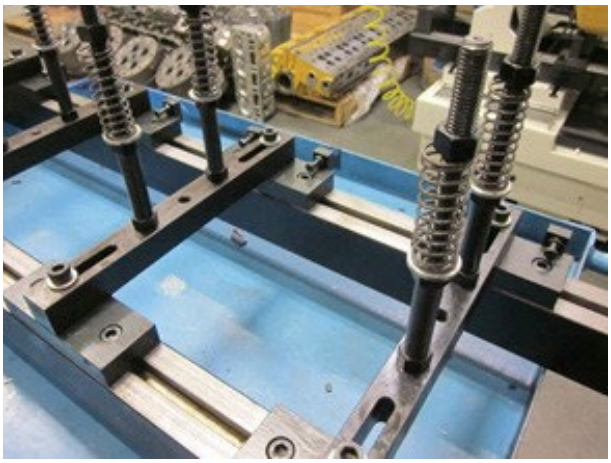
NOTE: It is important that the operator of the SG80A read the Control Definitions chapter in this manual before proceeding any further.

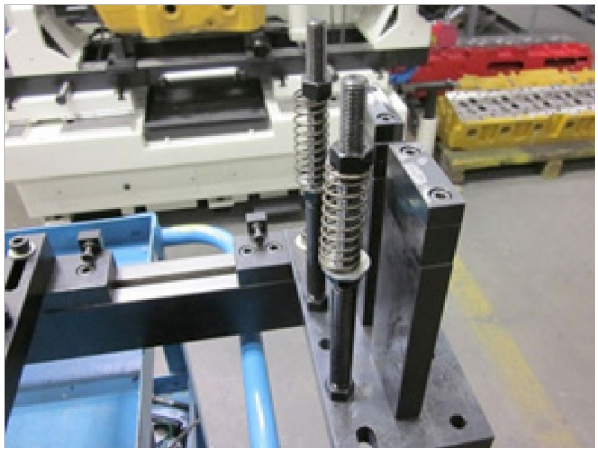
Multi Head Fixture

Fixture Assembly

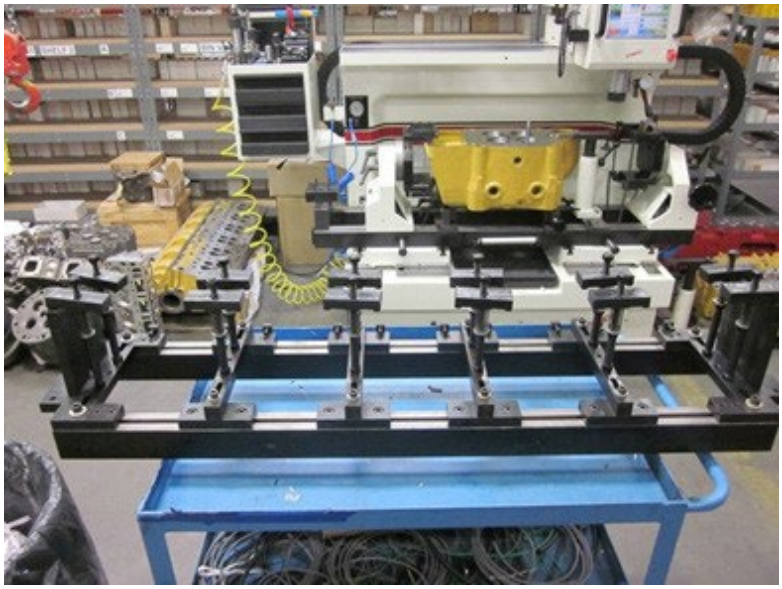


First install clamp bolts with 4 long on the outside. Next install clamp uprights (spacers on these can be removed for different head heights) and finally the clamps.



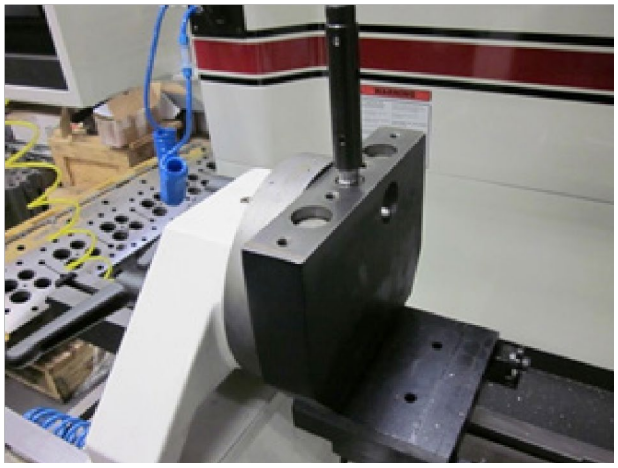


Completed Unit:



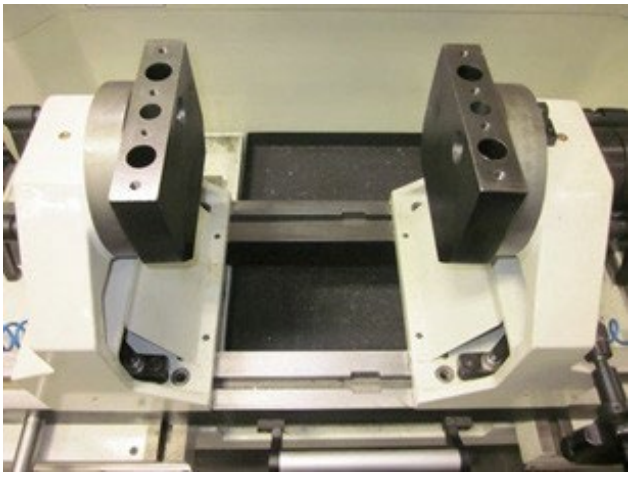
Installing Multihead Fixture On Machine

First remove fixed plates from cradle assembly, then clamp plate. To remove clamp plate you must first remove this allen screw.

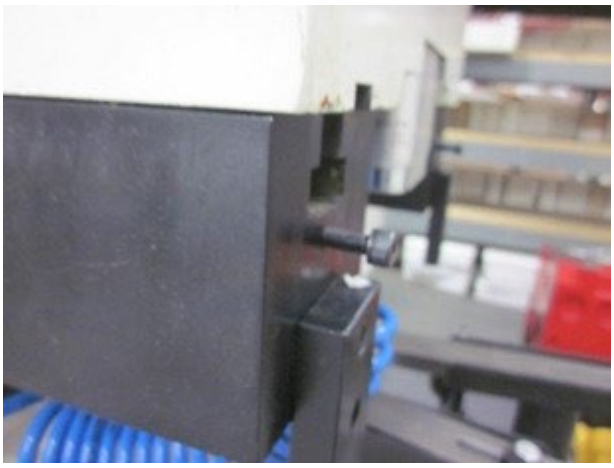


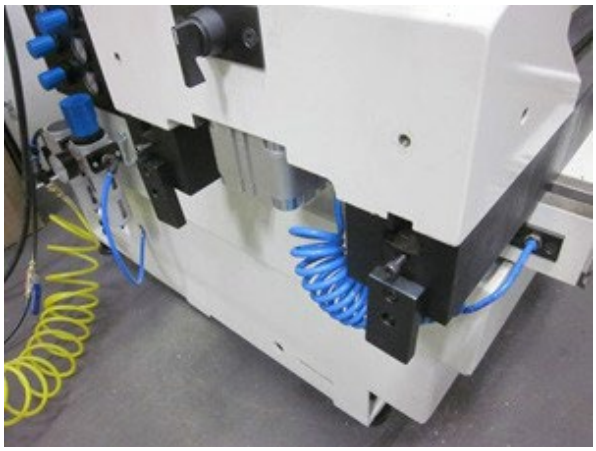
Then lift post off and remove keyway. Roll over and unscrew clamps to remove.

This is what you will have now.

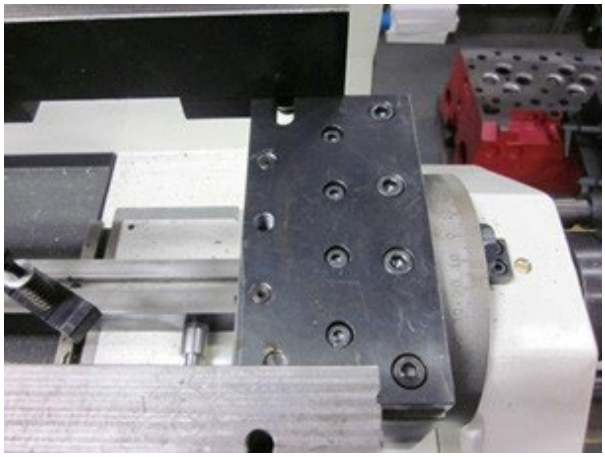


Remove end stoppers as cradles will hang over slightly. Be careful not to slide them off.

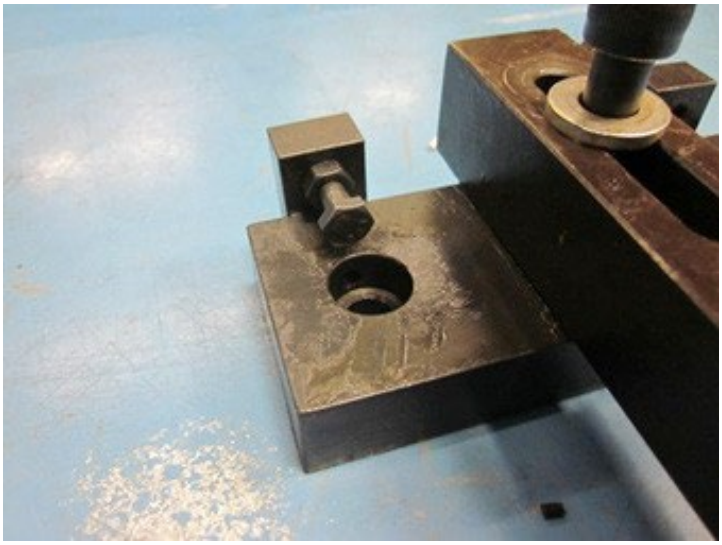




Move cradles to the far ends and lower assembly on and bolt down making sure the stoppers are facing you. Assembly must be flipped over to do this. Roll over for loading position.



Head Stopper.



Cutting position Loading position

You will need to adjust spacing according to the heads you are working on buy loosening all 3 allen bolts on each end of clamp screw assembles. There are end stoppers that can be adjusted also. Stoppers must be away from operator in loading position.

4 Cat 3500 heads in loading position.
4 Cat 3500 heads in cutting position

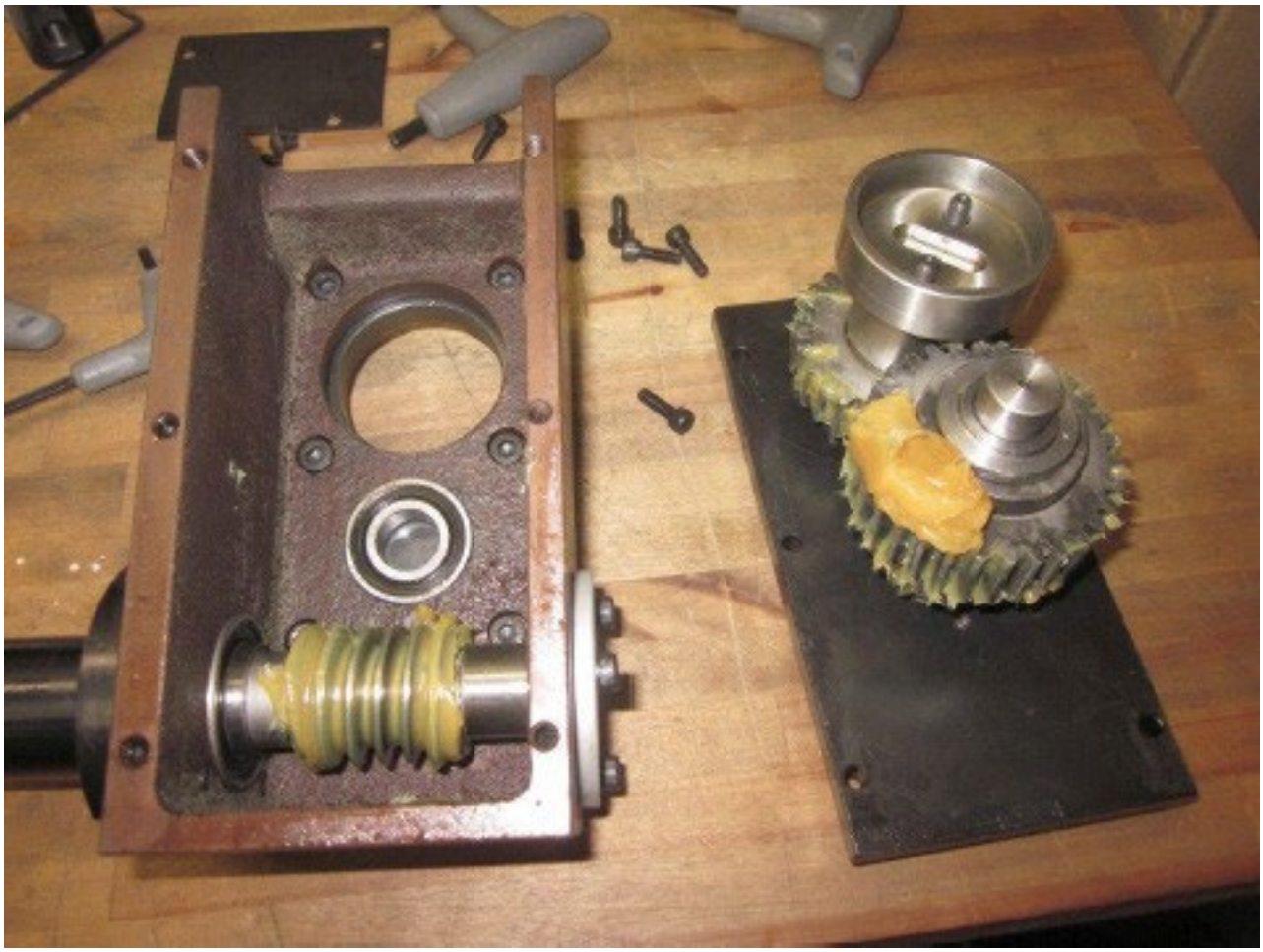
Installing the Gearbox

Remove 4 bolts from retainer ring

Remove 2 bolts from shaft cap

Remove ring and cap

Disassemble gearbox



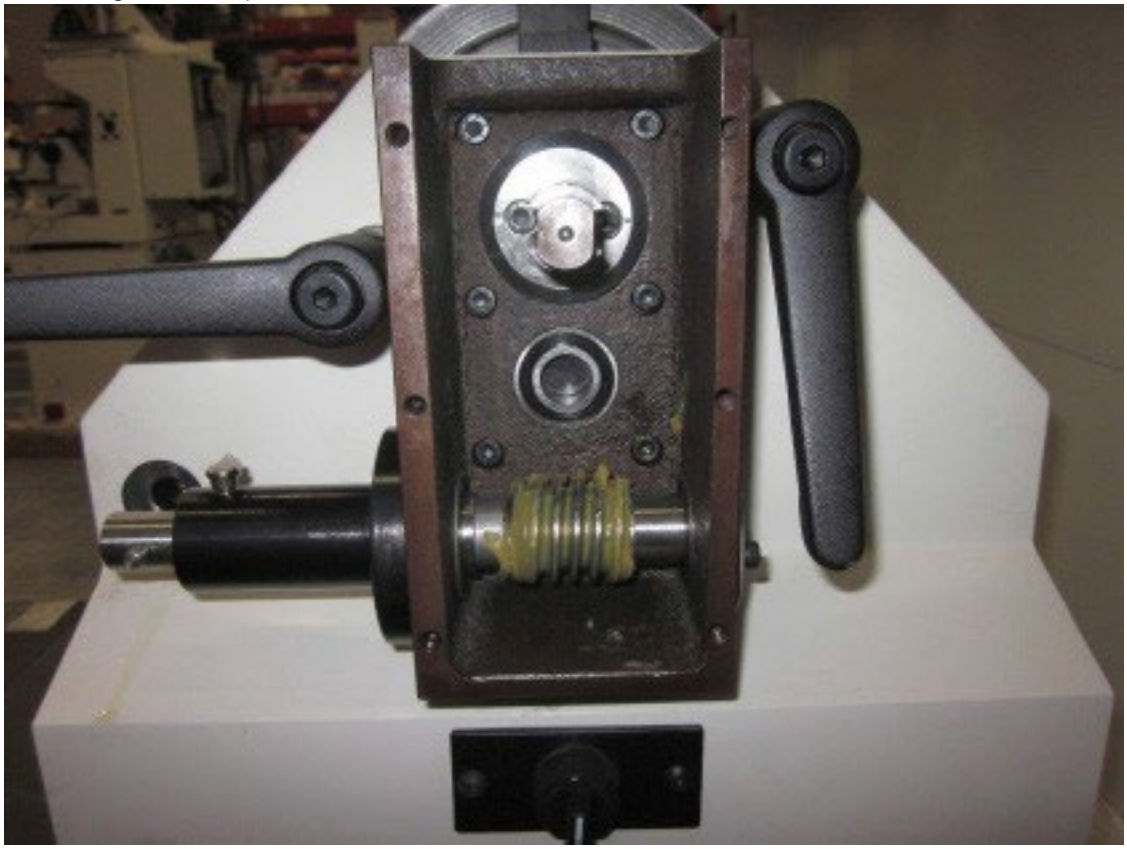
Take mount plate from gearbox and place on fixture

Remove shaft from gear as shown

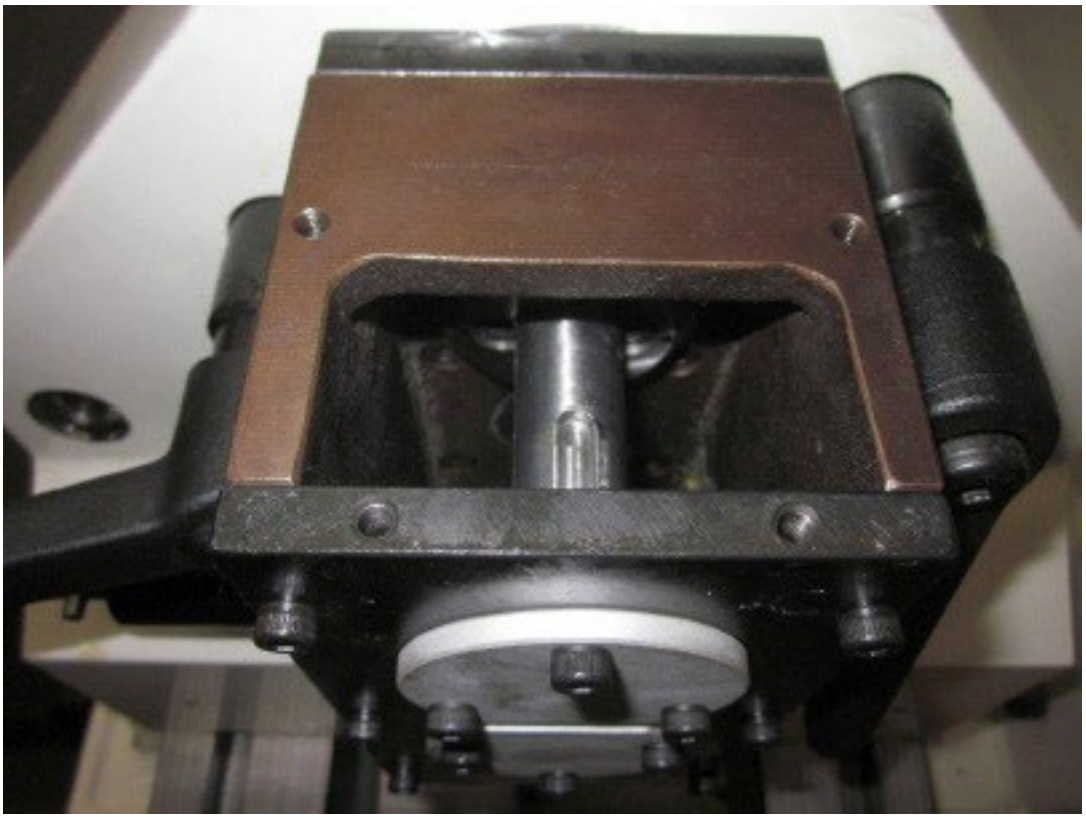
Remove key and spacer from shaft

Bolt gearbox shaft to fixture rotation shaft. Leave bolts loose.

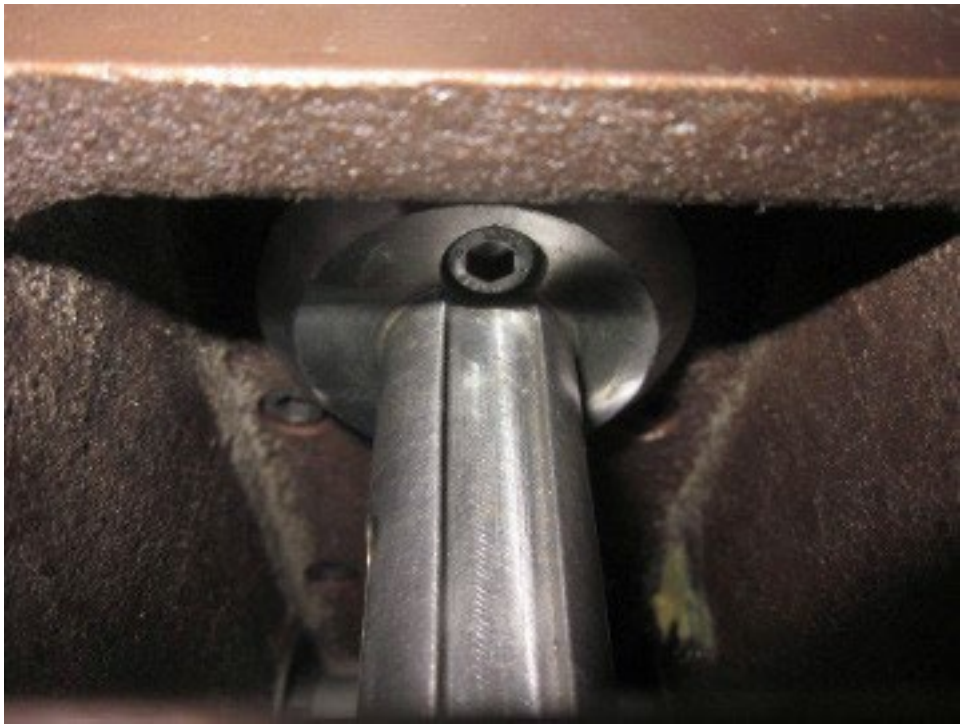
Bolt gearbox housing to mount plate on fixture



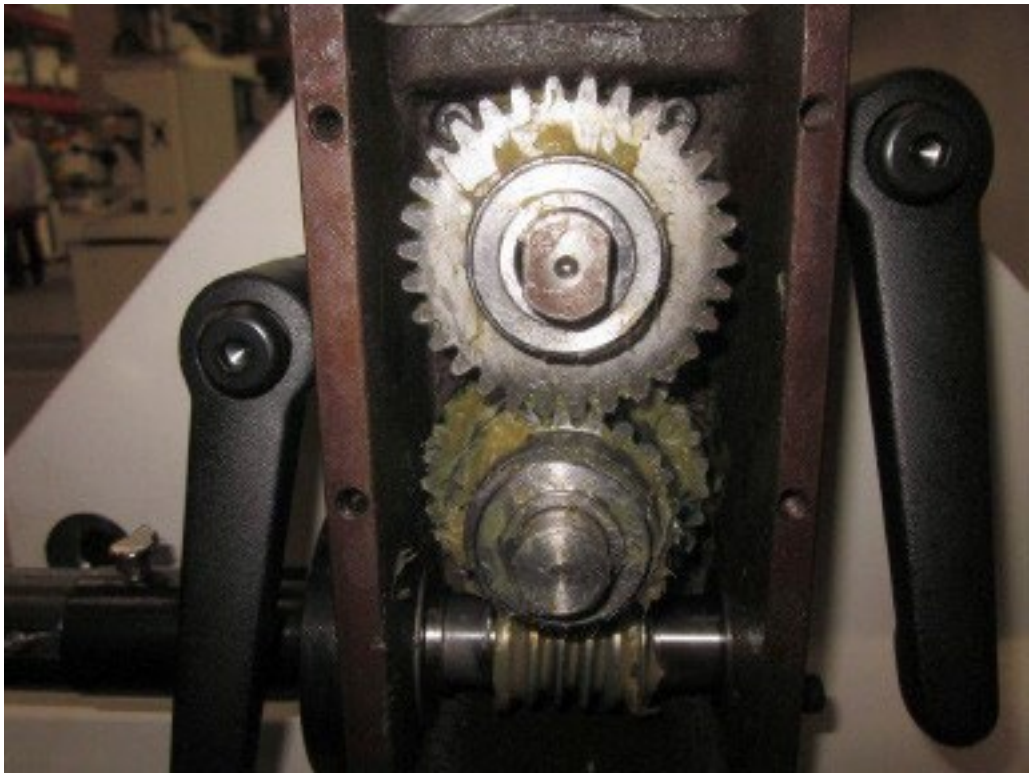
Install gearbox side cover to align shaft



Tighten shaft bolts

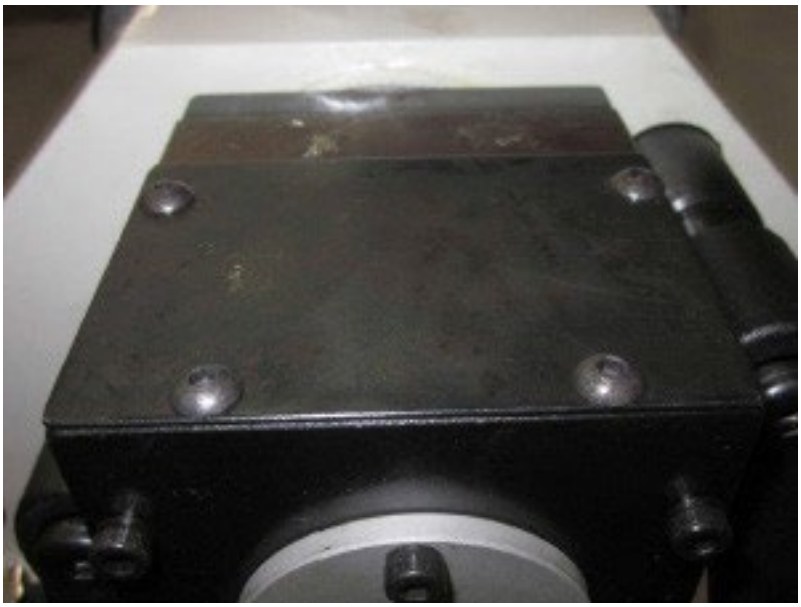


Remove side cover and reinstall spacer and key on shaft. Install gears



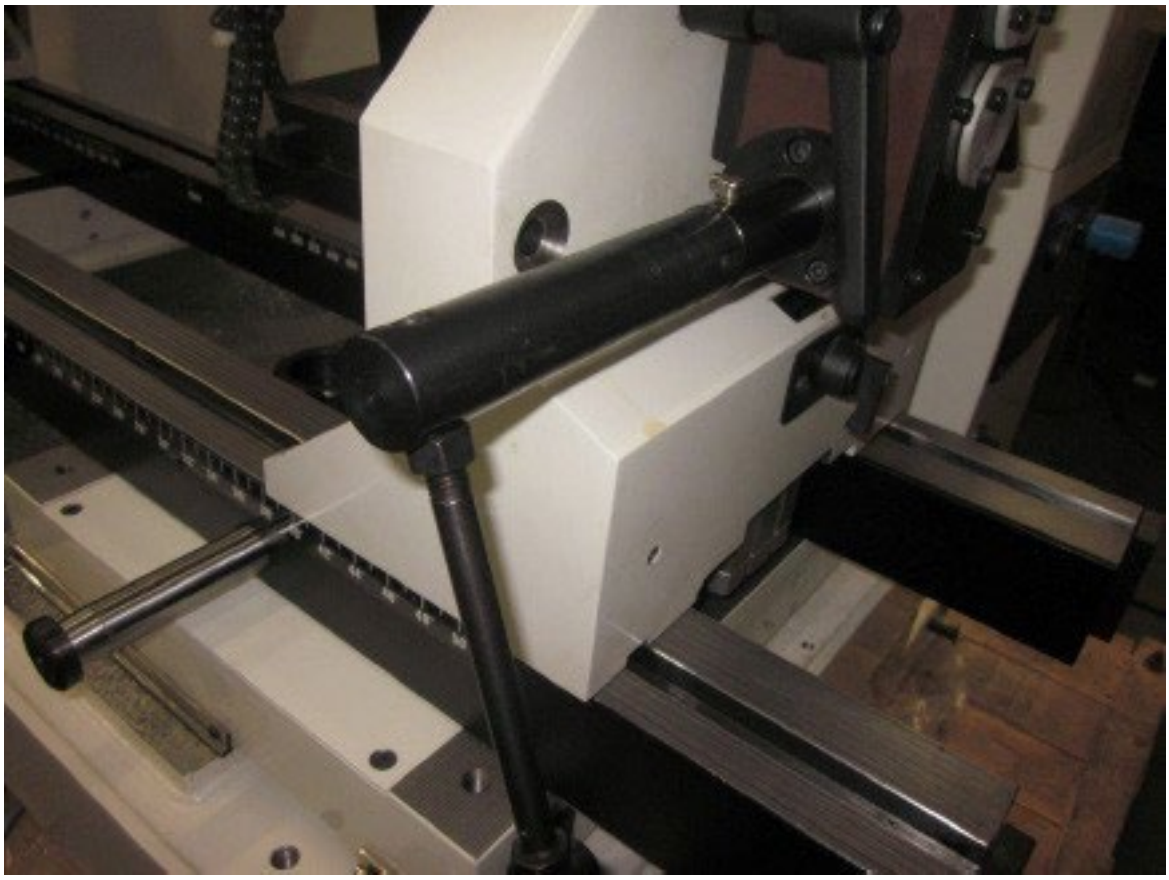
Install side cover

Install top cover



Assemble handle as shown

Install handle on gearbox



Three Angle Seat Cutting

1. Place the ball drive adapter in the spindle.
2. Align spindle to valve guide.
3. Place a valve in the setting fixture. Position the pointer on the valve where you wish to place the top of the seat.
4. Remove the valve; replace it with the correct pilot.
5. Select the proper diameter tool holder. Place the carbide insert in tool holder. Slide tool holder onto ball head.
6. Place ball head over the pilot in setting fixture. Use radial adjusting screw to set diameter of cutter to correspond to position of pointer on setting fixture.
7. Tighten hex socket screws on bottom of ball head. See figure 9
8. Remove ball head assembly from setting fixture. Place fixed carbide pilot in cylinder head.
9. Center the spherical ball head toolholder over the pilot shank.
10. Required spindle rotation speed will vary, depending on seat hardness. As seat hardness increases, so does the required spindle speed. Some will require full speed.
11. Special care should be taken in centering the floating head above the valve guide, to achieve a concentric seat.
12. Cut seat only enough to clean up surface.

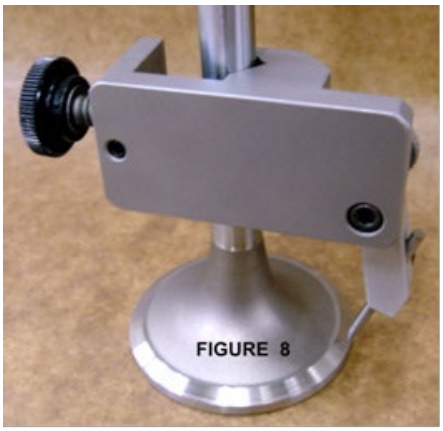


FIGURE 8

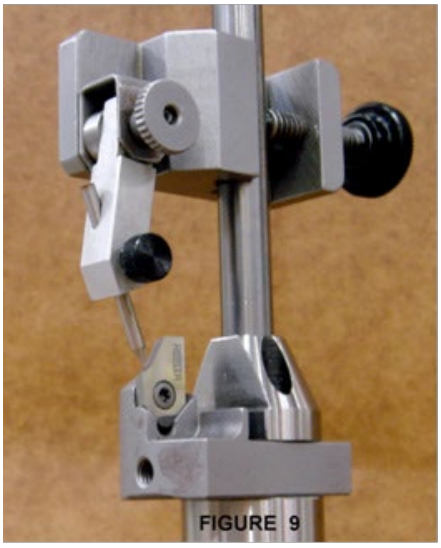


FIGURE 9

Too much cutting will sink the valve too far in the head. Many operators prefer to use the spindle fine feed when machining seats as extreme control of spindle down feed can be accomplished.

The capacity of the Rottler SG80A associated with a complete tooling range allow working on seats of diameters up to 210 millimeters (8.25”).

Four tooling ranges are possible:

1) For seats diameters between 18 and 60 mm (0.71’’- 2.4’’): tool holder BH375R1 or UPTSH375R1 and tip holder TH2000 for seat range .710” - 1.180” (18mm-30mm) or TH2001 for seat range 1.100” - 1.570” (28mm-42mm) or TH2002 for seat range 1.570” - 2.360” (40mm-60mm), with 9,52 mm (3/8 ’’) pilots of shank diameter

2) For seats diameters between 40 and 80 mm (1,570”- 3.150”): tool holder BH375WR1 or UPTSH375WR1and tip holder TH2003 for seat range . 1.570’’ - 2.360’’ (40mm - 60mm) or TH2004 for seat range 2.280” - 3.150” (58mm - 80mm), with pilots with 9,52 mm (3/8 ’’) shank diameter

3) For seats diameters between 60 and 110 mm (2,362” – 4.330”): tool holder BH20R and tip holder TH3005 or TH3006 for pilots with 20mm shank

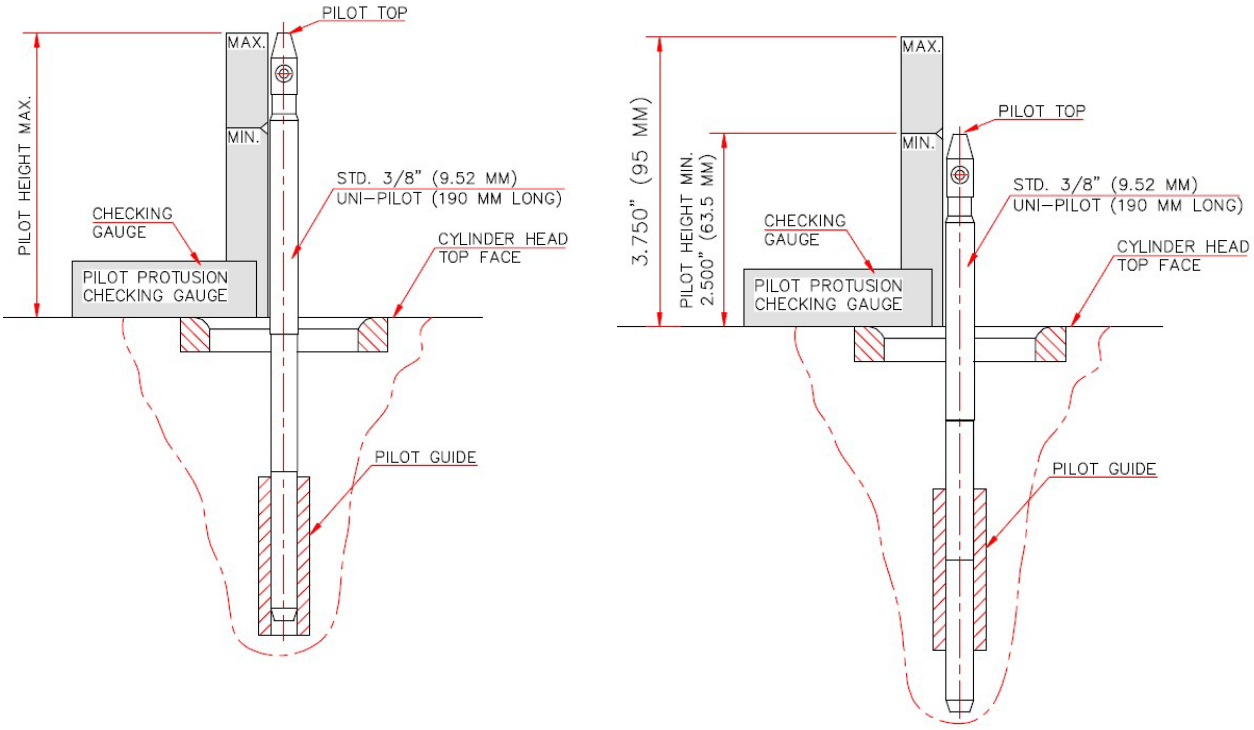
4) For seats diameters between 95 and 150 mm (3.740” – 5.905): tool holder BH20RW and tip holder TH3007 or TH3008 for pilots with 20mm shank

IMPORTANT: When the form tips, the square tips or the triangle inserts are fitted, check that their reference faces are perfectly clean. The accuracy of the seat angles depends on this.

Checking Working Range of UNI-PILOT

Checking Procedure

1. Insert Standard 3/8 (9.52mm) Shank diameter UNI-PILOT in the cylinder head valve guide.
2. Place checking gauge along pilot section that is exposed above cylinder head surface.
3. If pilot top is within Min & Max range of the gauge, then you may proceed with machining seat.
4. If pilot top is above Max range on gauge a smaller diameter pilot must be used.
5. If pilot top is below Min range mark on gauge a larger pilot must be used.



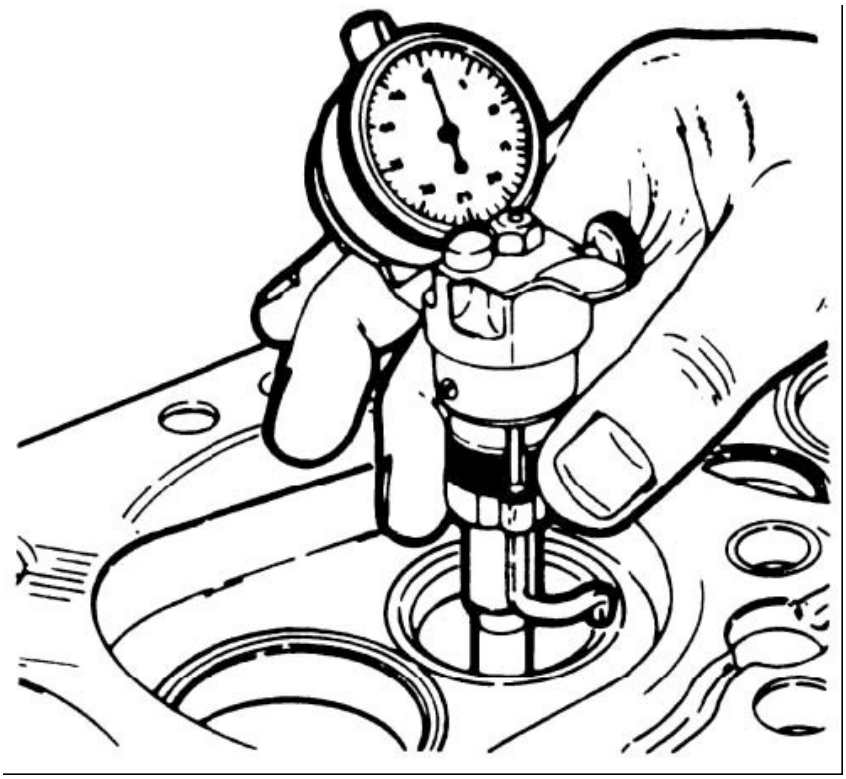
Checking Valve Seat Concentricity

Make sure pilot and valve seat to be measured are free from dust, burrs, etc. A drop of oil or similar lubricant on valve seat will aid measuring. Loosen brass locking screw and lower dial gauge down over pilot. Make certain the tip of the probe is centered on the valve seat to be inspected.

Grasp brass frame in middle of gauge and move upward approximately 1/8". The dial pointer should move as this is done. Center the pointer of the indicator pointing upward and lock the gauge to the pilot using the brass locking screw. Test proper alignment by moving the brass frame up and down. The pointer should move.

Set the pointer at (0) by turning the dial face.

Inspect the seat run out by rotating the probe around the valve seat by twisting the knurled sleeve with your fingers. Each number on the dial indicator is equal to 0.001", (0.0254mm) run out of the valve seat. Each mark on the dial indicator is equal to 0.0001", (0.00254mm) run out of the valve seat.



Machining Seats

1. After all height settings are made, you now are ready to cut seats. Cut counter bores
2. Set “feed rate”.0008 is a good starting point.
3. Set “spindle RPM” 400 is a good starting point.
4. Set “retract height”
5. Set ” workhead float after auto cycle” to float or not to float after auto cycle.
6. Best to set “retraction height” to “lower cutter head over pilot” height and uncheck “float after auto cycle” on the first seat cut. This way if the seat doesn’t cut you can use the additional depth buttons and auto cycle without float.
7. Float workhead over seat to be machined.
8. Press “Rapid to valve guide height” MOVE button. This will lower spindle into position just above guide or pilot.
9. Tap “lower cutter head over pilot” height MOVE button. This is a JOG button and only moves the spindle down when it is being pressed. Let up and spindle stops. Align the pilot and keep taping this until the preset depth is met, workhead float will automatically switch to clamp.
10. Press “AUTO CYCLE” This will “float workhead”, lower spindle to “start cutting height”, dwell to center and “clamp workhead”, turn urn on spindle, cut to “finish cutting depth” and then retract to preset “retract height” floating if checked.
11. At this point, if you have retracted to “lower cutter head over pilot” and workhead is not floating, you can push any of the additional depth buttons and tap “ auto cycle without float” a box will appear asking if you want to add this depth to your “finish cutting depth” if you press yes, the “finish cutting depth” figure you have entered will be changed. If you press no it will cut the additional depth but not change your pre entered figure.

Reaming Guides

1. After all heights are set you are now ready to ream guides.
2. Set “feed rate” .030 is a good starting point.
3. Set “spindle RPM” 200 is a good starting point.
4. Set “retraction height”
5. Set “workhead float after auto cycle “
6. Float workhead over guide to be reamed.
7. Press “rapid to valve guide height”
8. Tap “start reaming height” jog button, works same as “lower cutter head over pilot” button.
9. Press “finish reaming depth “ AUTO button. Spindle will start and ream to the finished reaming depth figure, slow to preset retract RPM and retract to start reaming height while turning, stop turning and retract to the preset “retract height” floating is checked.

Changing the Spindle Adapters

Once that you have the tool holder setup, fit the ball head tool holder into the spring free spindle adapter.

The spindle has been engineered to allow ultra-fast tooling changes.

Make sure the that spindle spring free locking nut is in the off lock position, line up the two ears of the spindle adapter and insert into the spindle ISO 40 taper. The locking nut automatically will be on the lock position, to remove turn the self-locking nut to the left position, hold the spindle adapter, it may drop on the machine table. Damage will result

Installing the Spherical self Aligning Toolholder

Once the spring free adapter is in the spindle, fit the Rottler Spherical Self aligning Tool holder assembly into the spindle adapter; make sure to align the locator pins before you fit it into the spindle adapter and push it until you feel that is lock.

UNIPILOT Centralizing Pilots

Rottler UNIPILOT Solid Carbide Centralizing Pilots are manufactured from fine grain, sintered tungsten carbide and are ground to a very high degree of accuracy, straightness, and surface finish. They are designed for a lifetime of precision machining

Pilot Diameter

The straight/parallel part of the pilot that fits in to the valve guide is referred to as the pilot diameter. Rottler pilots are available in 0.01mm (0.0004”) increments. For best results, the clearance between the pilot and valve guide should not be more than 0.01mm (0.0004”)

Most new valve guides are manufactured to a nominal size and the valve stem diameters are manufactured to be smaller than the nominal size to allow clearance for heat expansion of the valve stem when the engine is operating. For example: a 7mm valve guide has an internal diameter of exactly 7.00mm (.2756”) The valve stem diameter of the intake valve is 6.98mm (.2748”) and the exhaust is 6.96mm (.2740”). In order for the pilot to fit most of the valve guides, the first choice could be UCP0699 to give .01mm (0.0004”) clearance. If the valve guide is used and has some wear, then the second choice of pilot could be UCP0700 (0.2756”).

Shank Diameter

The part of the pilot that fits inside the tool holder is referred to as the shank. Rottler offers three different shank sizes (6.00mm, 9.52mm, and 20.00mm). For longest tool life and best seat cutting results, the shank needs to go as far as possible inside the tool holder when cutting valve seats or boring out valve seat housings.

Extended Length (EL) Pilots

Some cylinder heads require extended length pilots because the distance from the top of the valve guide to the head gasket surface is longer than normal. Normally this distance is about 1.0” - 1.5”, it is when this distance becomes greater that extended length pilots are needed. The pilots are extended by adding material below the shank and above the tapered section of the pilot.

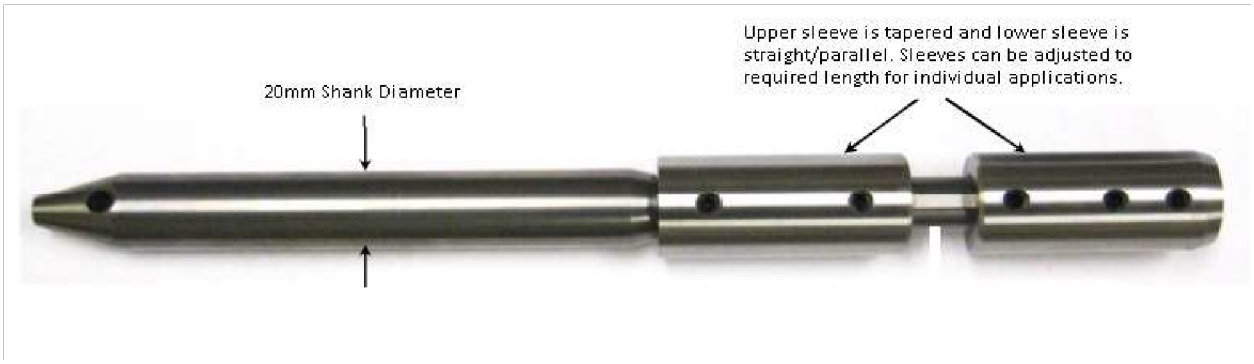
If you think you need an extended length pilot, please see the order form in the back of the catalog and contact Rottler for ordering assistance.

PILOT DIAMETER SHOULD ALWAYS BE GREAT ER THAN VALVE STEM DIAMETER FOR BEST CONCENTRICITY

Modular Carbide Centralizing Pilot System for Valve Guides Over 0.875” (22.23mm)

Rottler also offers a modular carbide centralizing pilot system for very large engine applications. This system is versatile because it allows you to use different size sleeves, which are adjustable for different lengths, for different applications while using only one pilot. These sleeves are MADE TO ORDER.

Contact Rottler for more information and ordering assistance.



FCM20EL380 Modular Carbide Centralizing Pilot for Valve Guides Over 0.875” (22.23mm). Requires a set of Interchangeable Sleeves (FCMSLXXX & FCMSUXXX) - 20mmShank Pilot

FCMSUXXX Modular Pilot Upper (Tapered) Sleeve - Hardened and Heat Treated - For .XXX” (XX.XXmm) Guide ID

FCMSLXXX Modular Pilot Lower (Straight) Sleeve - Hardened and Heat Treated - For .XXX” (XX.XXmm Guide ID - 3.0” Overall Length

Carbide Inserts

See Carbide Insert Catalog for a complete list of Insert Profiles available from Rottler Manufacturing.

Special Profiles

Special Profile Cutter Inserts can be manufactured to your exact specifications and can include a combination of angles and radius blends. See insert list and profile catalog for custom order form.

Unipilot Tooling

Rottler’s patent pending UNIPILOT tooling system allows the UNIPILOT carbide centralizing pilot to remain in the spindle when moving from guide to guide like a live pilot machine, but at the same has a fixed pilot design to give the best concentricity. This system offers the speed of a live pilot machine, with the accuracy of a fixed pilot machine.

It is a common known fact to engine rebuilders that all valve guide centerlines are not at the same exact angle. The sphere in the UNIPILOT tooling system allows compensation for minor inconsistencies as the pilot is inserted in the guide, allowing the machine to quickly move from one guide to the next and automatically compensate for these inconsistencies to center the pilot accurately and give the best concentricity.

Due to demand from customers that needed the large size of the SG80 machines and the speed and accuracy of the UNIPILOT system, Rottler has developed four new parts that bring this time saving feature to the SG80A and SG80MTS.

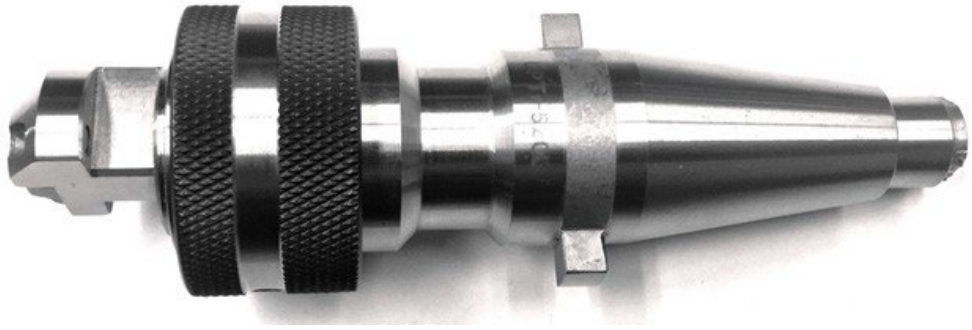
The RBHAR40UPT2 spindle adapters and UPT5200SH and UPT5400SH spherical tool holders are what make the use of the UNIPILOT system possible on the SG80 models. These tool holders use .375” (9.52mm) shank UNIPILOTS and are spring loaded to help get the pilot into the guide easily and quickly. If the pilot misses the guide as the spindle moves downwards, the pilot will compress upwards into the toolholder and will quickly release and insert the pilot in the guide once it is located inside the guide.

The adapter and tool holder must be fixed together to prevent them from separating as the pilot is moved in and out of the guide. This is done simply with two set screws on either side of the adapter. Switching tool holders on these adapters takes only a few seconds.

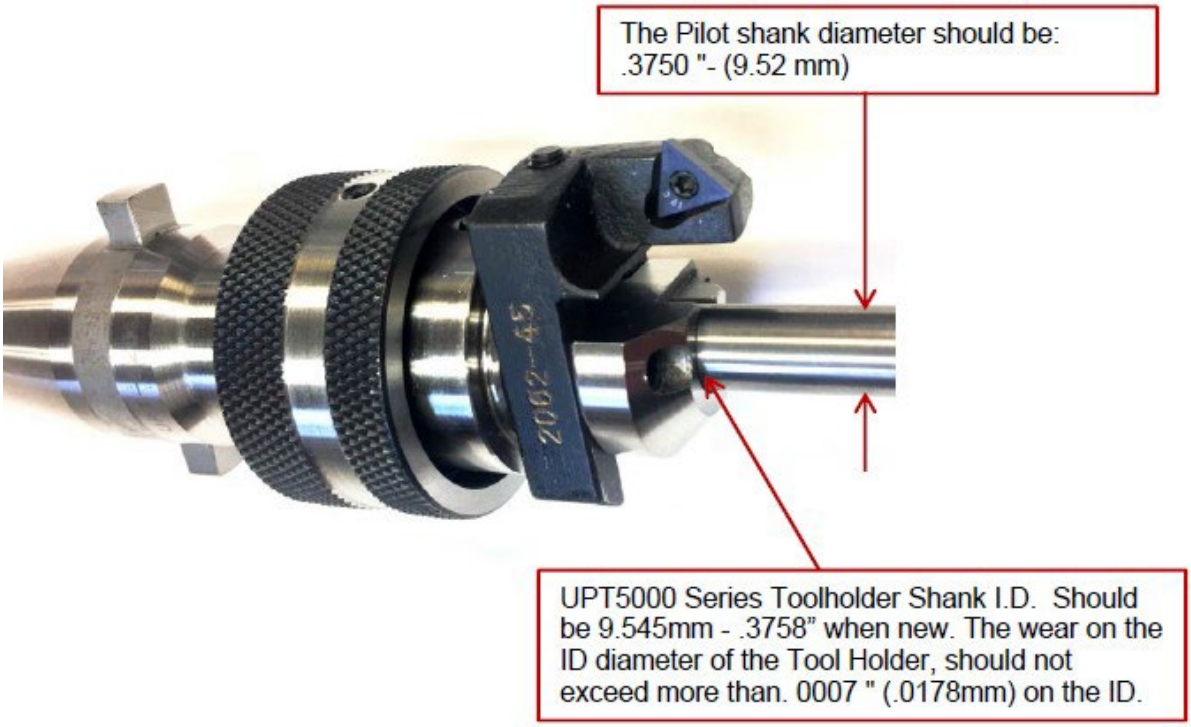
For high volume production applications, Rottler recommends having multiple adapters and tool holders preassembled with UNIPILOT and cutting tool to facilitate the quickest possible tooling change when going from intake to exhaust seats or even for different heads.

RBHAR40UPT and UPT5400SH assembled. Note one of the two screws (center) that locks them together

How to Use UPT Series Uipilot Toolholders



1. Pilot shank and toolholder Inside Diameter for the pilot shank must be clean from cast iron dust, few drops on lite oil may be necessary at least twice a day.
2. Measure pilot shank diameter for wear, it’s supposed to be .3758 “- 9.545mm. The shank should not have more than .0007” - .0178mm of wear less the shank diameter of .375”-(9.525mm) diameter.



3. The UPT5200 Series toolholder shank ID it supposed to be 9.545mm - .3758" when new. The ID diameter should not be more than .0010" - .0254mm of wear.

Note: *Please make sure to follow these inspections to avoid concentricity problems on every valve seat that has been machined.*

4. Is very important not to over tighten the "C" Looking screws that lock the insert holder on the Toolholder, tightening the locking screws will collapse the ID bore diameter on the toolholder keeping the shank of the pilot not to fit easy into the Toolholder ID.

This is the correct way to lock the Insert holder using the long part of the Allen wrench like you see on the picture below to avoid too much torque and collapse the Pilot shank ID Bore of the Toolholder.

For safety please avoid overtighten the insert holder, it will be better to use the 2.5mm Ball End Metric Screwdriver like the one you see on the picture below.

The 2.5mm Ball End Metric Screwdriver will work to lock the insert holder and it will also to adjusting screw to set the diameter for the seat that you will be machining.

On the Picture below is showing the wrong way to Lock the Insert holder, will put too much torque and collapse the Pilot shank ID bore of the Toolholder. The Pilot shanks will not slide smoothly into the toolholder shank inside diameter; it will create excessive wear on the toolholder and possible over tolerance in concentric limits problems when machining the valve seat.

Using the Unipilot System for the UPT5200 / UPT5400 Series Tool Holders

1. Insert standard 3/8” (9.52mm) shank UNIPILOT into the cylinder head valve guide.
2. Place checking gage next to Pilot shank to inspect range.
3. If pilot is with in MIN. and MAX. range of the checking gauge, (Figure 3) proceed to machine seat inserts after removing gage from the cylinder head.
4. In case pilot height exceeds MAX. limit of the gauge. Inspect valve guides and ream guide if need to be or use proper pilot size diameter till pilot height is within tolerance of the checking gauge.
5. In case pilot is below the MIN. limit of the Gauge, select next size up pilot until pilot height is Gauge within tolerance.

MAXIMUM AND MINIMUM PILOT HEIGHT FROM HEAD SURFACE

Figure 1
On the picture below you will see that the Pilot shank is above the Pilot Gauge. This will damage the Toolholder

Figure 2
On the picture below you will see that the Pilot shank is minimun on the Pilot Gauge mark. If it's below the minimun will create poor centering and possible concentricy problems

Figure 3
On the picture bellow you will see that the Pilot shank is within the MAX and MIN range of the Pilot Height Gauge. This is the correct pilot to be used to machine the valve seats

Rottler Six and One Instructions

1- Checking the calibration of the six and one Setting Fixture included two tool setting fixtures, 1.250" / 31.750MM and .375" / 9.52MM and on the other end is 6.00MM. On the picture you will see master setting tool (.375" / 9.52MM) this one also will be using it to set you tool holders, for.375" (9.52mm) and 6.00MM ID tooling.,

Fig.1

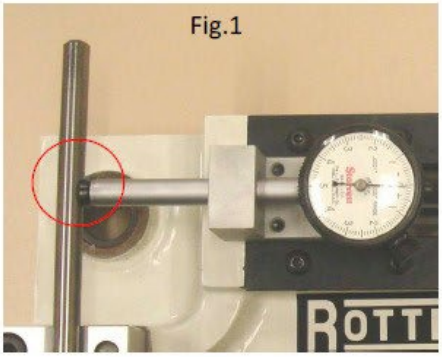
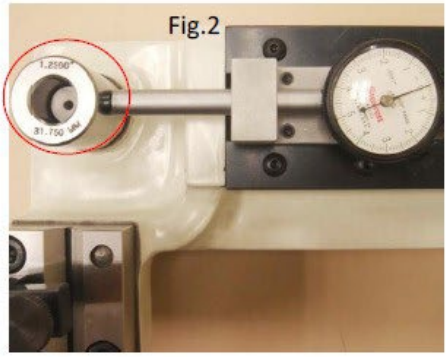


Fig.2



Calibrating the Digital Micrometer

2- Turn the digital micrometer thimble in until the end of the micrometer is flush with the edge of the micrometer frame. Then turn the thimble out until the '0' mark on the thimble lines up exactly with the line on the barrel (see fig.1).

a. Select mode: Press the **mm/in** button until the desired mode is shown in the digital display.
***Note**: use a small instrument such as a pen to gently push the buttons; they are quite small and a bit delicate.*

b. Determine which calibrating setting tool you will be using to calibrate the micrometer is going to be used on. (example; calibrating pilot .375" / 952mm side)

c. Press and hold the **SET** button, then press **+** or **–** button. "SET" will be flash in the display. This will places the micrometer in the edit mode

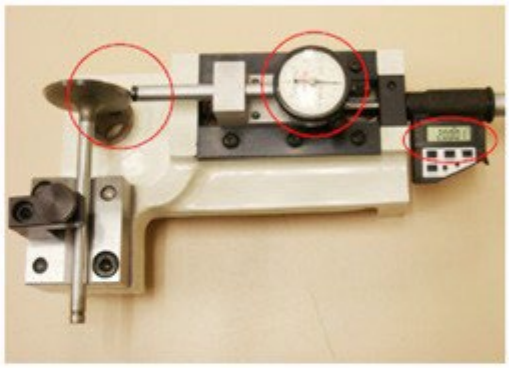
d. Press and hold the **+** or **–** buttons to change the display number to the minimum set diameter Determined earlier (example; setting tool, pilot .375" / 9.52mm side).

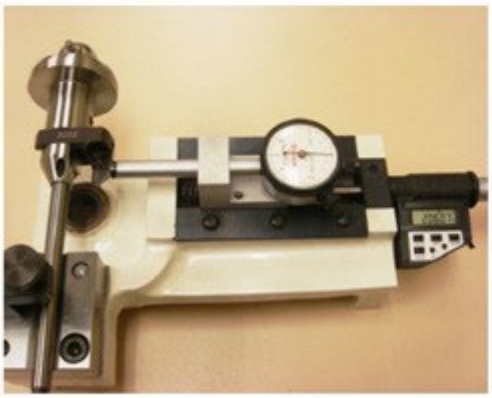
e. After it reach the proper reading, press the **SET** button to exit the edit mode. **"SET"** should no longer be shown in the display. The digital micrometer head is now set to the setting tool. (After initial setting, there is no need to press the SET button again unless display is lost at which time the micrometer must be reset)

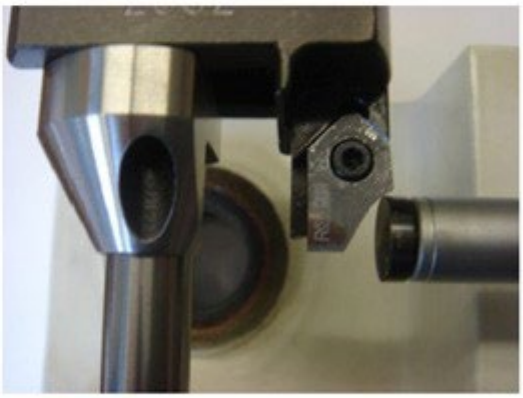
3- MEASURE THE HEAD OF THE VALVE

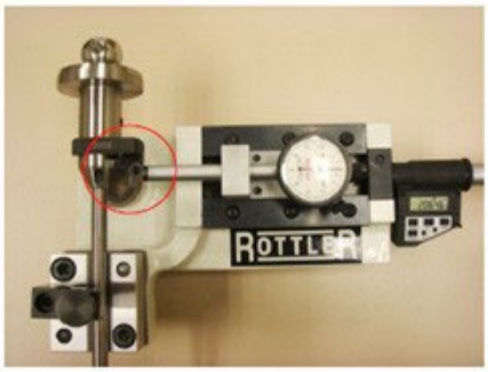
a. Position the Valve Stem on V Block and bring the Indicator tip to may contact with the head of the Valve until zero show on the indicator dial, the amount showing of the digital micrometer display is the actual diameter of the Head of the Valve.

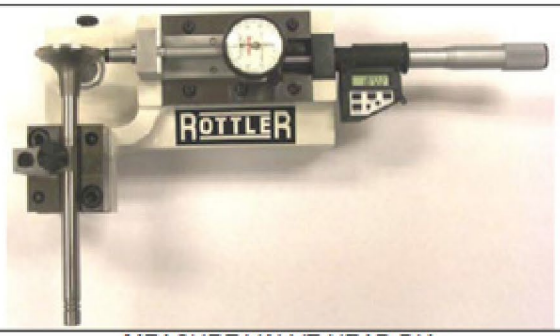
b. From that reading 2.0001"







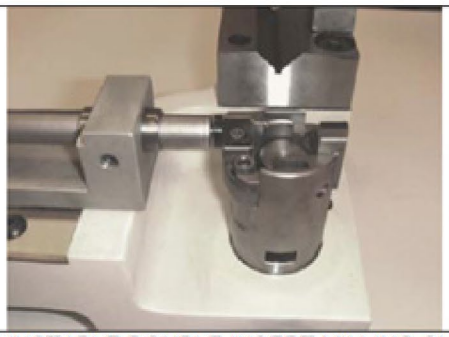




MEASURE VALVE HEAD DIA

MEASURE VALVE STEM AND PILOT DIA.

SET ADJUSTABLE DOUBLE INSERT MILLING CUTTERS



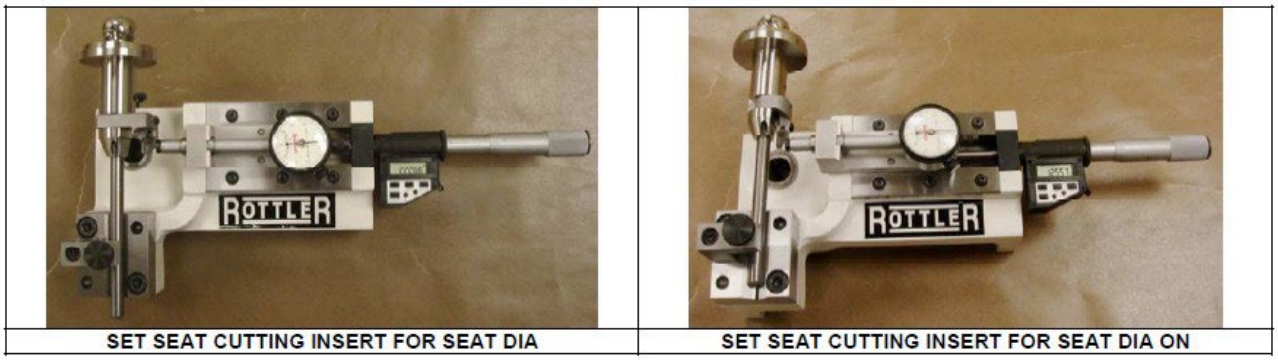
SET ADJUSTABLE DOUBLE INSERT MILLING CUTTERS

SET BORING INSERT FOR HOUSING DIA.

SET BORING INSERT FOR HOUSING DIA WITH TRIANGLE

SET BORING INSERT FOR HOUSING DIA.

SET BORING INSERT FOR HOUSING DIA



SET SEAT CUTTING INSERT FOR SEAT DIA | SET SEAT CUTTING INSERT FOR SEAT DIA ON

USING THE .375" (952MM) SETTING PILOT | SIX IN ONE WITH STD 1.250"

Adjusting the Square Carbide Inserts

- The micrometer should be used.
- Set the Digital micrometer (BM) according to the valve seat insert diameter and the required interference.
- Slide the tool holder without the pilot on the micrometer.
- With the setting screw, adjust the square tip holder offset.

IMPORTANT: When 90 degreed bits (RCA512) or the Triangle bits are fitted, check that their reference faces are perfectly clean.

The accuracy of the seat angles depends on this:

- While rotating the assembly tool holder/carbide tip holder, the carbide bit's cutting edge should just touch the micrometer spindle.
- Once in contact with the micrometer spindle, the carbide tip should not be moved at all. If this is not observed, the cutting edge may be damaged and the resulting surface quality, when machining, will be deteriorated.

Cutting Small Diameter Valve Seats

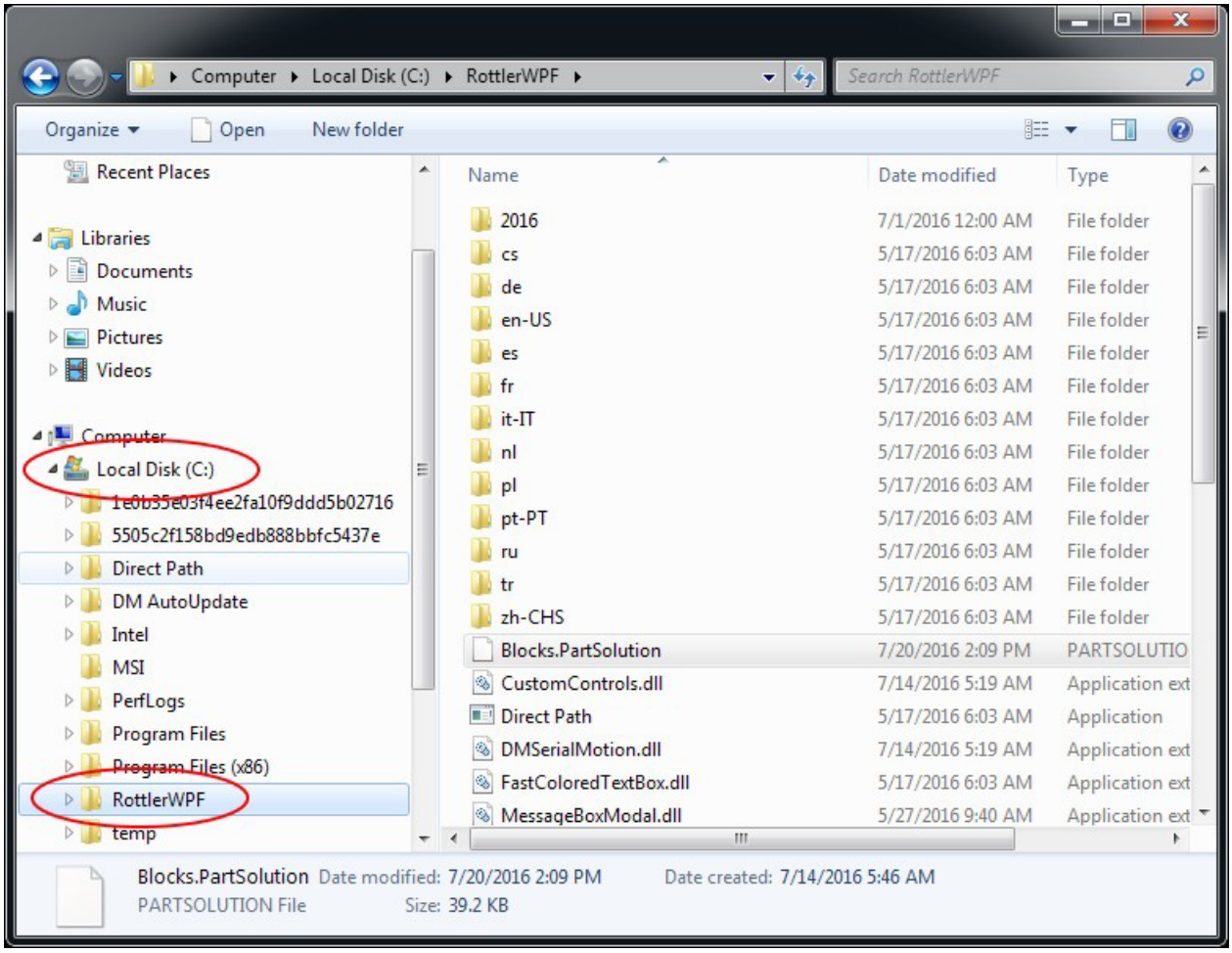
The UPT5200 adapter has a set screw as shown in photo below – push pilot all the way into the UPT5200 and tighten set screw to hold pilot inside the UPT5200. Install the Tip Holder TH1999, adjust

diameter, release set screw, and remove pilot. Be sure to use special small diameter cutting inserts such as RCA625 or RCA628 where the seat is close to the pilot side of the insert.

Backing Up and Restoring Block Profiles

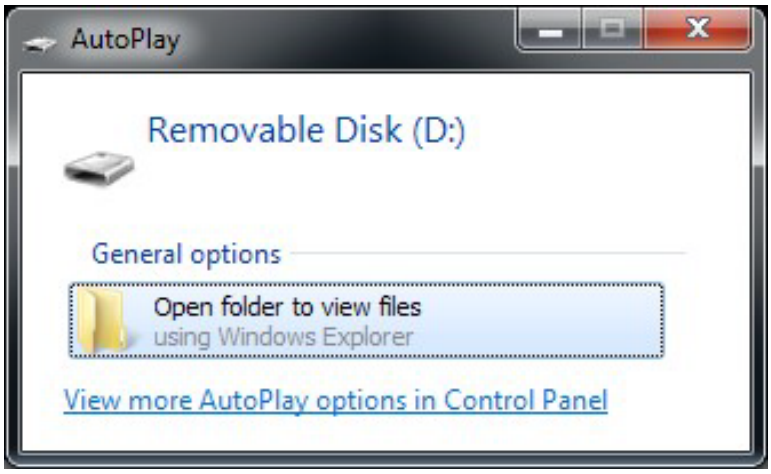
This section will explain how to back up and restore the operator created block profiles for DM controlled machines for archival purposes or to transfer to a different machine.

First step is to open your file bowser and locate the RottlerWPF file on the C disk drive.

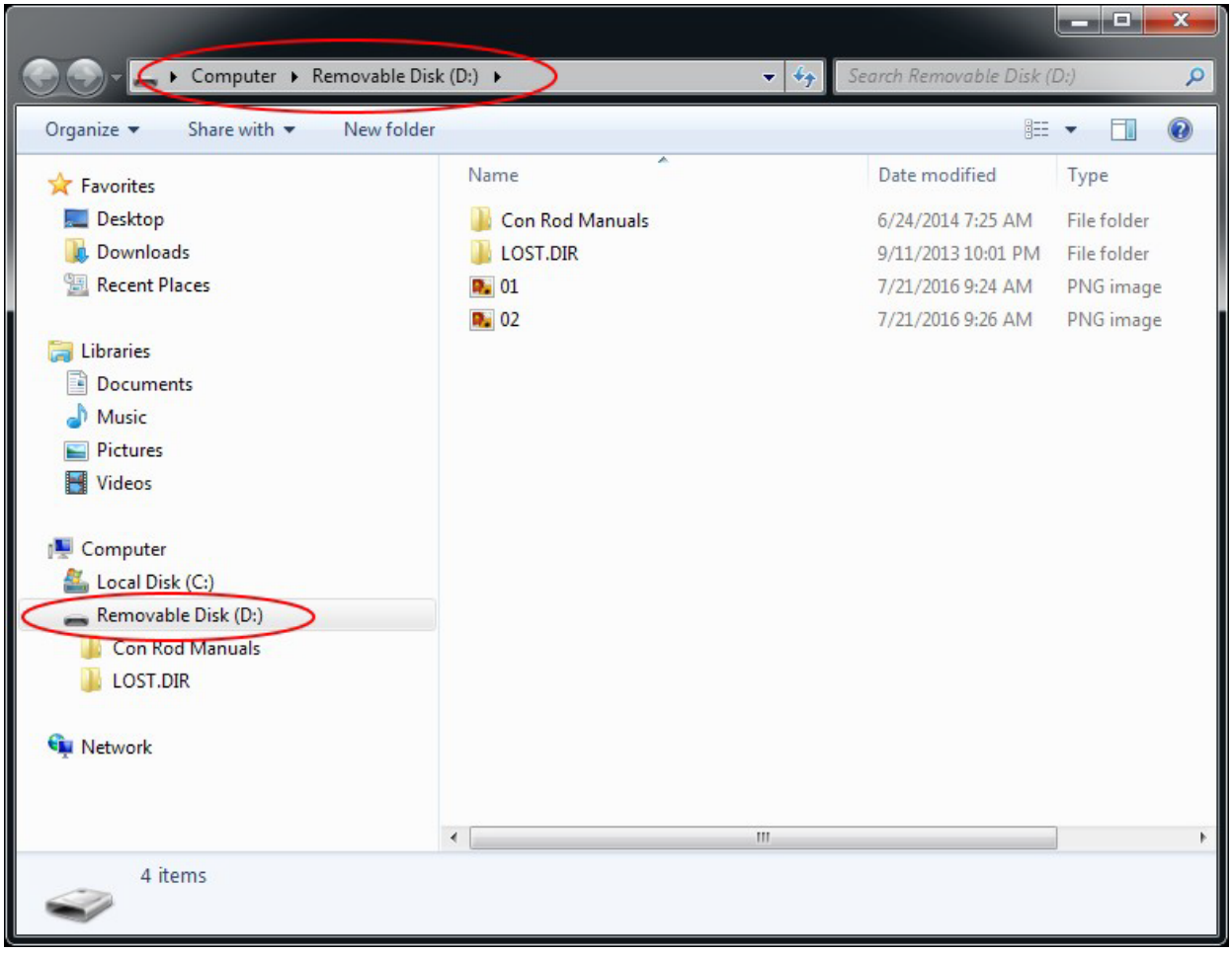


The next step is to plug in a flash drive to an open USB port

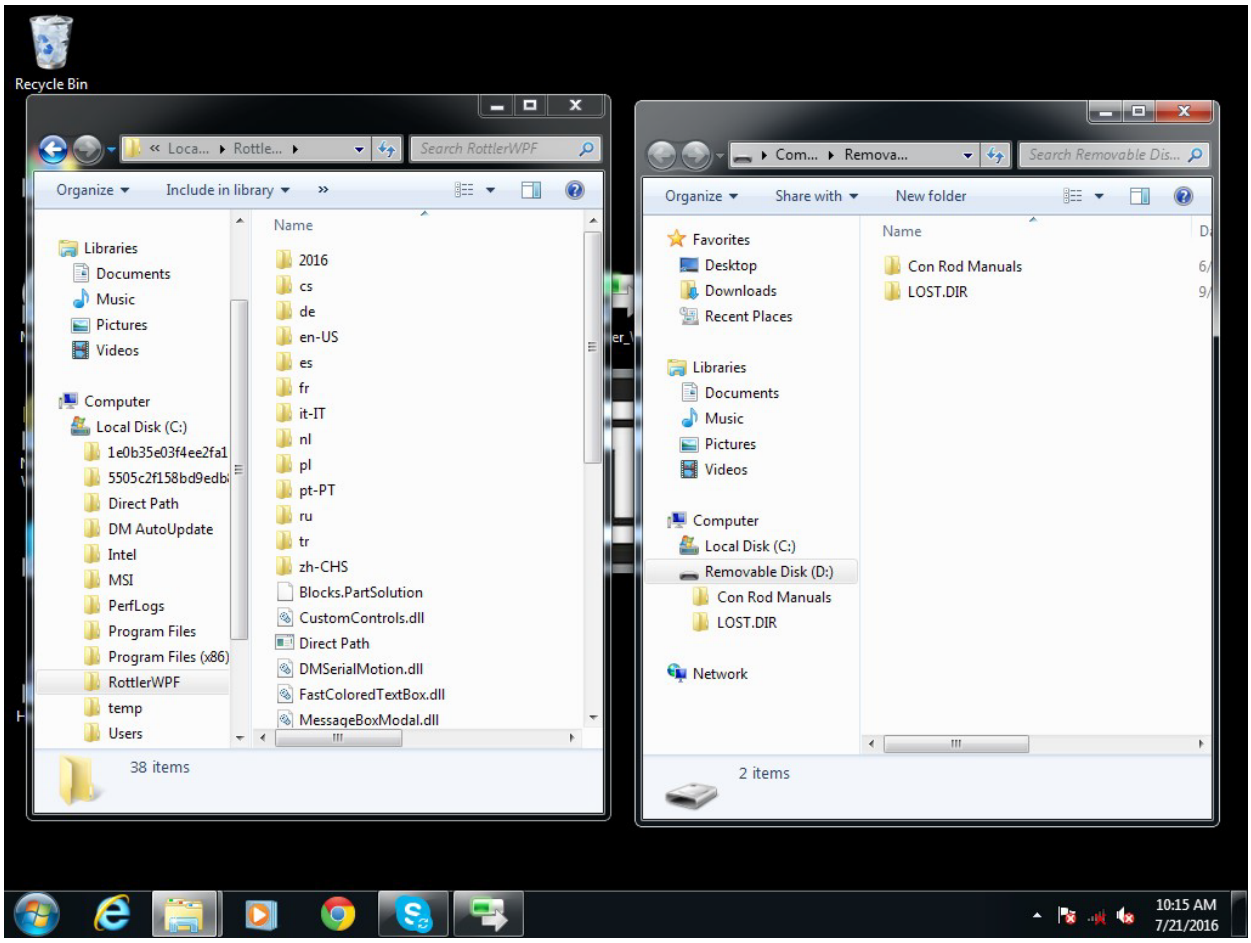
The following pop up box will appear on your screen.



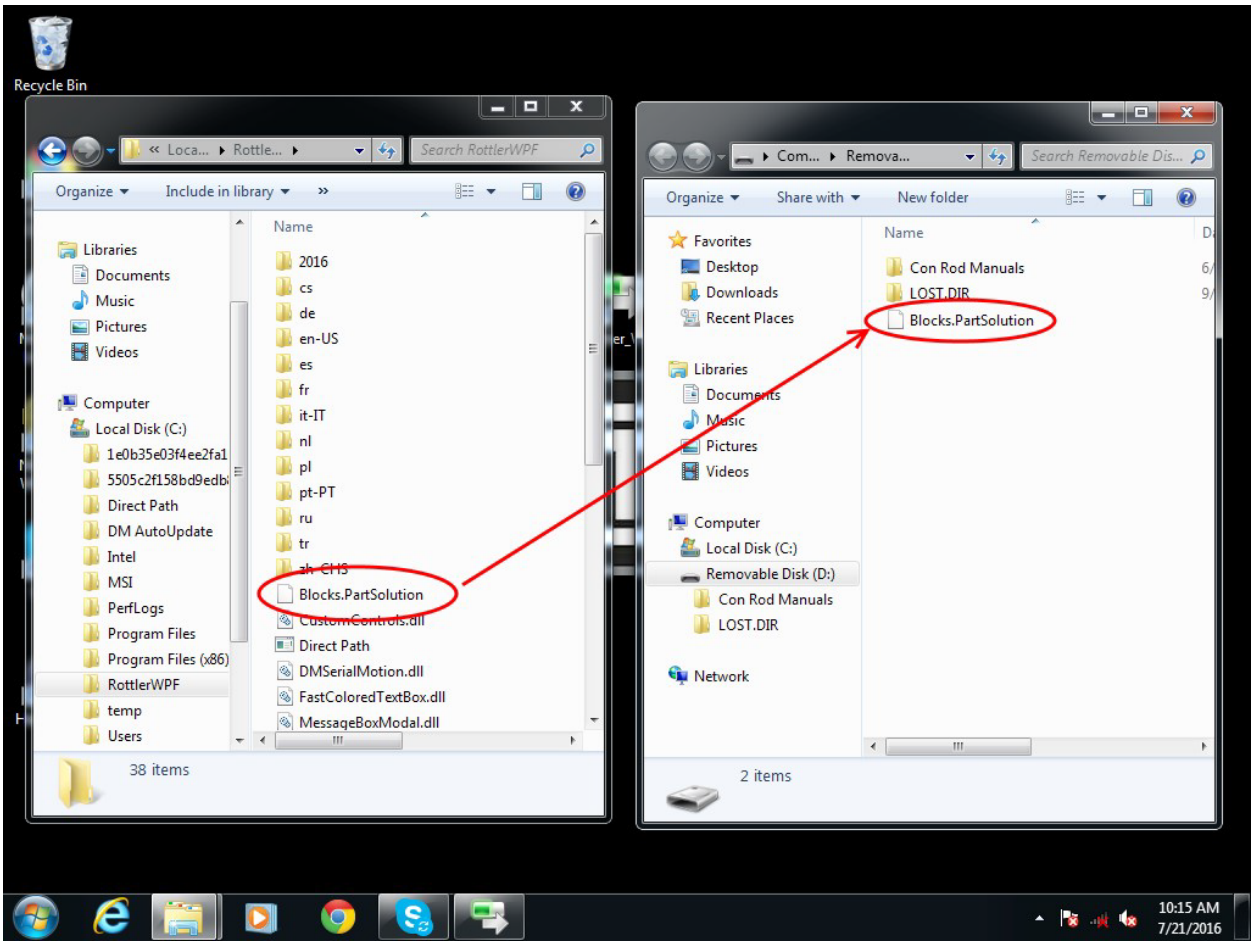
Click on the Open folder to view files option and the following screen will appear. This is the contents of the flash drive you just plugged in.



Next resize and arrange both file browsers so that they are side by side.



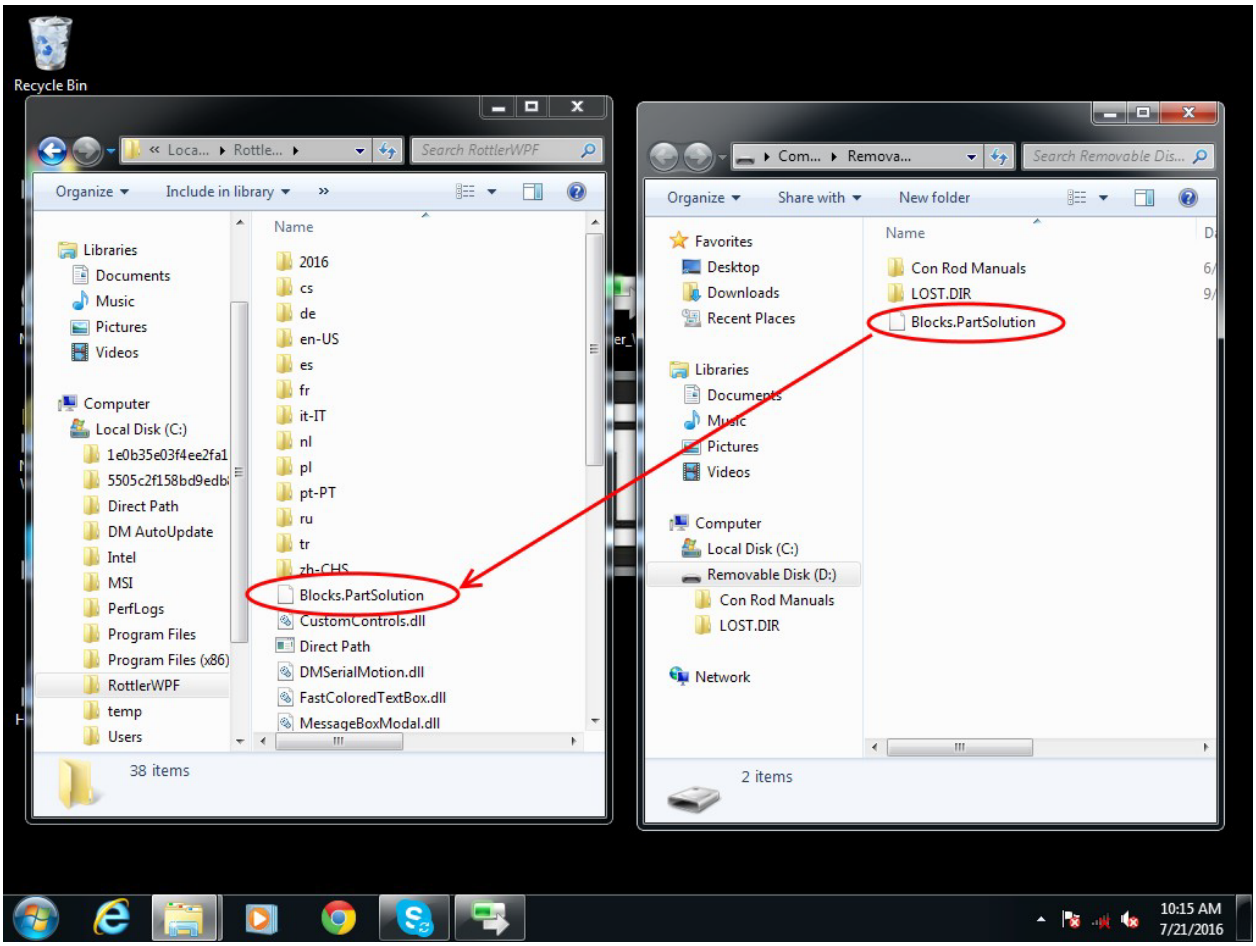
Block profiles are backed up each time the machine is run with the current profiles being shown in the RottlerWPF folder. All that needs to be done to back up the current profile is to simply drag it from the RottlerWPF folder to the flash drive folder. A copy of the file will be placed on the flash drive.



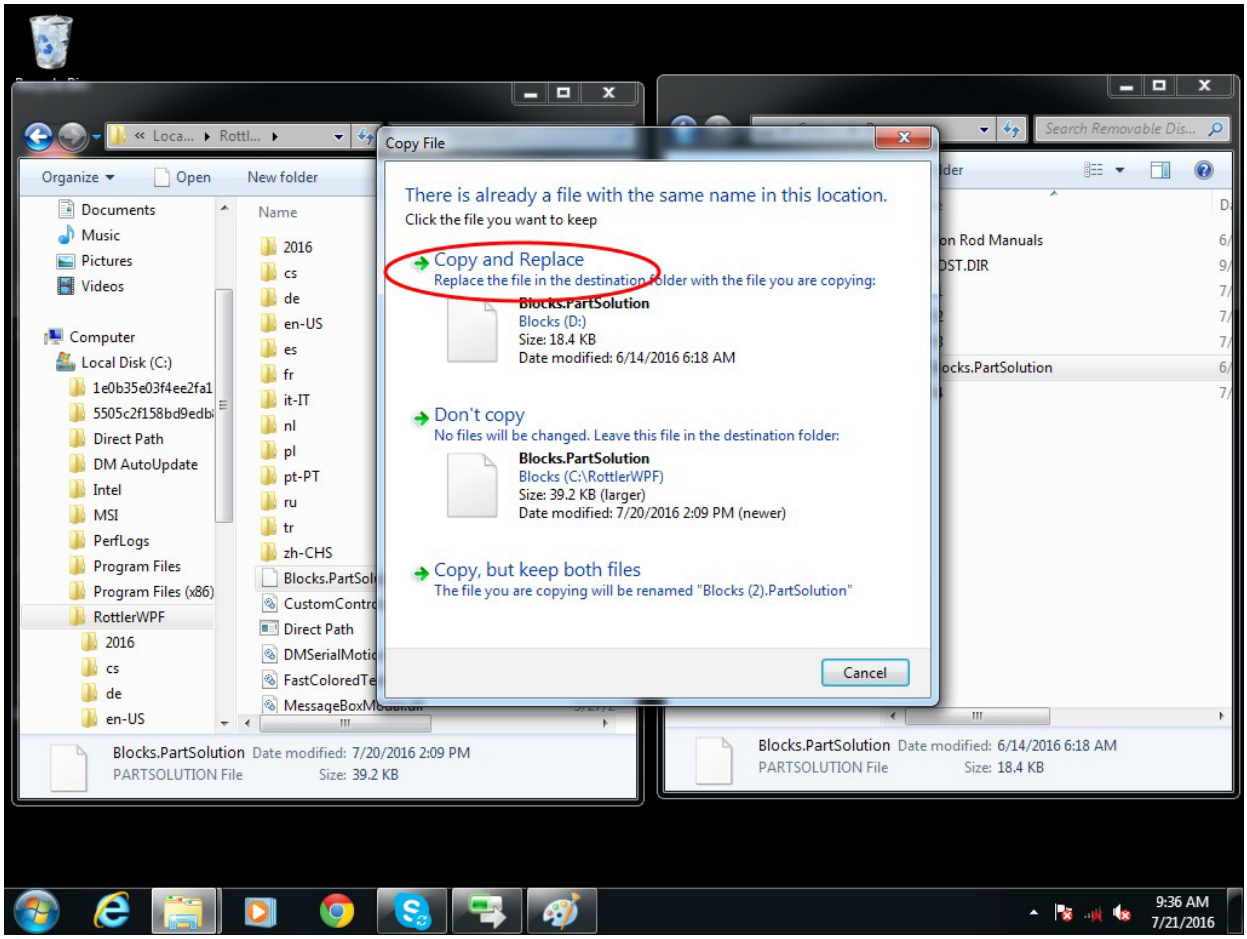
Backup is now complete. Close both file browser windows and remove the flash drive.

To restore or add block profiles go through the first 5 steps explained previously.

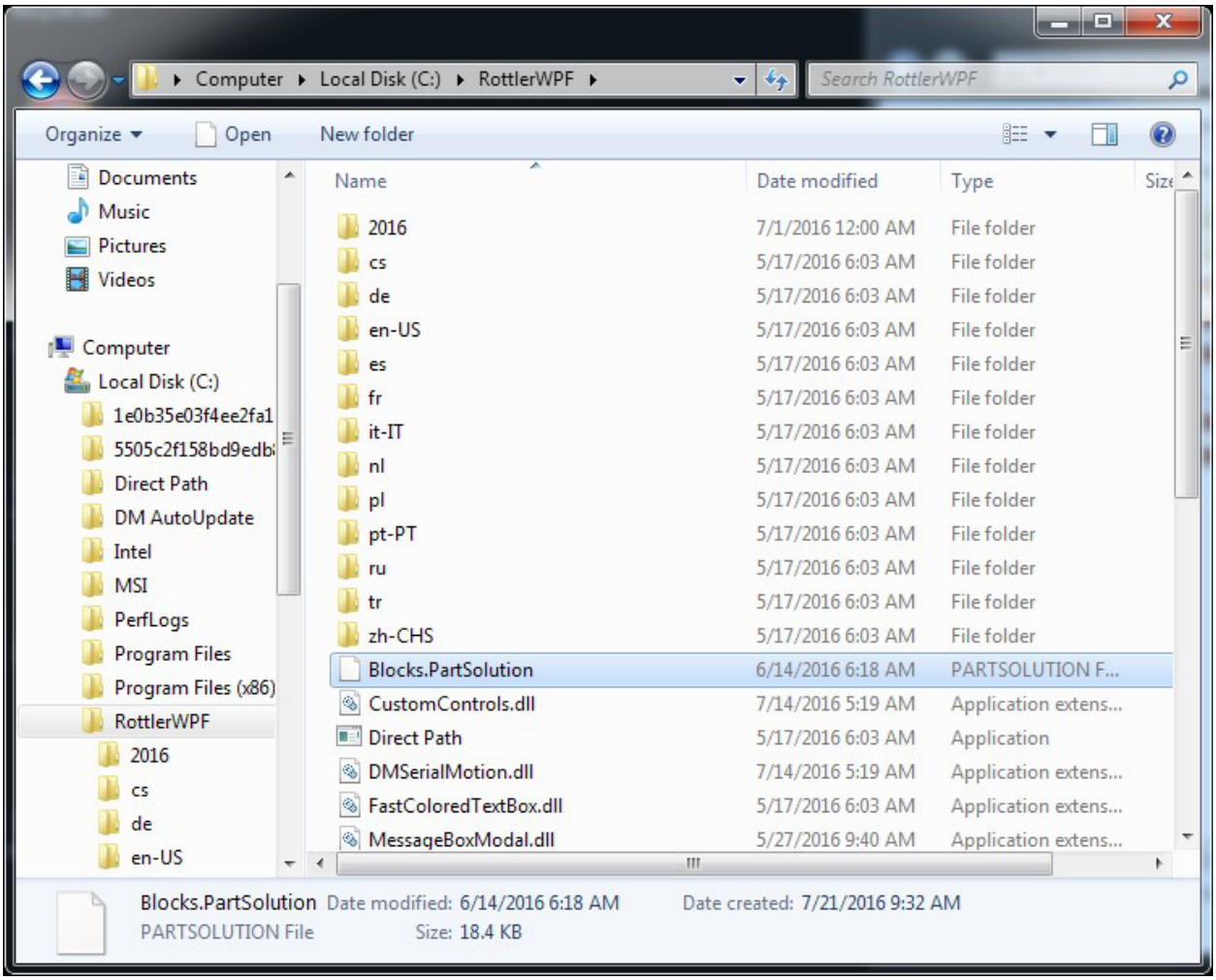
Highlight the block profiles file in the flash drive and drag it into the RottlerWPF folder on the local hard drive.



You will get a pop up window about there being a file of the same name in the destination folder. Click on the Copy and Replace option.



The archived block profiles will now be installed.



Close both browser windows and remove the flash drive. The restore process is now complete.

Tooling for Counterboring Small Diameter Valve Seat Pockets

Rottler offers two options for counterboring small diameter valve seat pockets:

6 mm Pilots Boring Combos

BH600R1 Mini Spherical Toolholder TH2000-00 Tip Holder RT211 Triangular Insert Bore diameter: 1.055” – 1.400” (26.80 mm – 35.55 mm) 	BH600R1 Mini Spherical Toolholder TH1999 Tip Holder RCA513 Seat Cutting Insert Bore diameter: .800” – 1.200” (20.80 mm – 30.48 mm) 

.375” Pilot Combos

BH375R1 Spherical Toolholder TH2000-00 Tip Holder RT211 Triangular Insert Bore diameter: 1.270” – 1.580” (32.26 mm – 40.15 mm) 	BH375R1 Spherical Toolholder TH1999 Tip Holder RCA513 Seat Cutting Insert Bore diameter: 1.000” – 1.280” (25.42 mm – 32.51 mm) 

Rottler can also provide Fixed Milling Heads to cut valve seat pockets. They are available in fixed diameters from 1.000” to 2.250” in .0625” increments