ROTTLER

H85AXY CNC
HONING MACHINE
MACHINE OPERATIONS MANUAL

PARTS ORDERING

For optional equipment catalogs, please visit https://www.rottlermfg.com/documentation.php

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

For customers outside of the U.S. requiring faster service, contact your local distributor.

In some cases, you may be requested to send a photo of the part you are ordering if it is a replacement part or does not appear in our database.

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

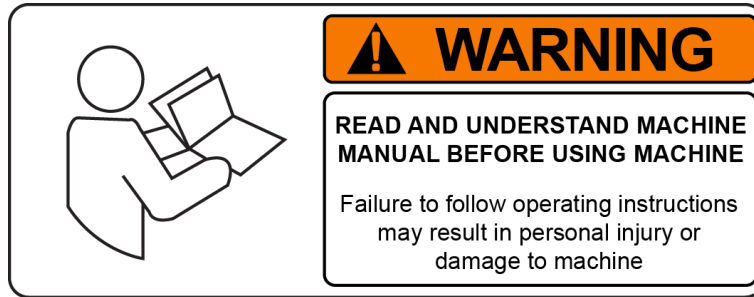**INTRODUCTION**
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OPERATING INSTRUCTIONS

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INTRODUCTION

⚠ WARNING

READ AND UNDERSTAND MACHINE MANUAL BEFORE USING MACHINE

Failure to follow operating instructions may result in personal injury or damage to machine

READ THE SAFETY CHAPTER BEFORE INSTALLING MACHINE. THROUGHLY 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 H85AXY 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 H85AXY 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 model H85AXY Honing Machine is a wet, complete cylinder block and general purpose-honing machine

A Windows based touch screen panel provides easy and convenient control of the H85AXY. Block programs can be created and stored to memory for later recall, providing a quick set up for honing common blocks. All preferences such as dwell setting, cross hatch angle, and honing loads are automatically set up when a block program is selected at time of machine set-up.

The support carriage is mounted on linear rails to provide simple and easy hole-to-hole setup.

Convenient devices are provided to properly control honing operations and provide easy handling.

Fixtures are available for doing a large variety of engine types. Special fixtures and tooling for doing large industrial engine sleeves is also available.

A coolant tank is located under the main splash tank and a coolant pump is located behind the machine. A button is provided on the control panel to operate the coolant system.

Disclaimer

The H85AXY 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 H85AXY 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.
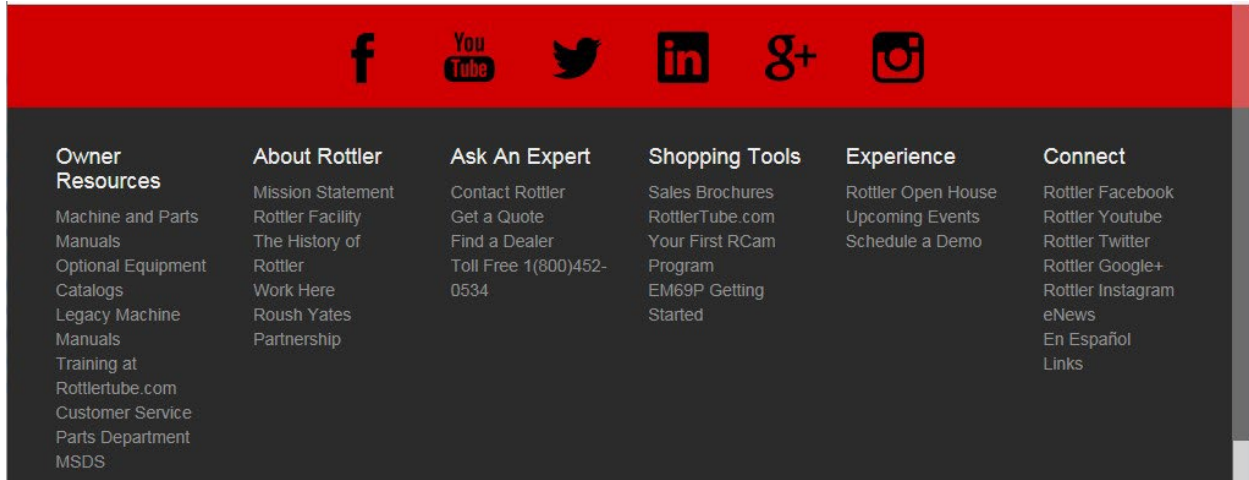
If a log in window pops up asking for user name and password fill in the blanks as shown.
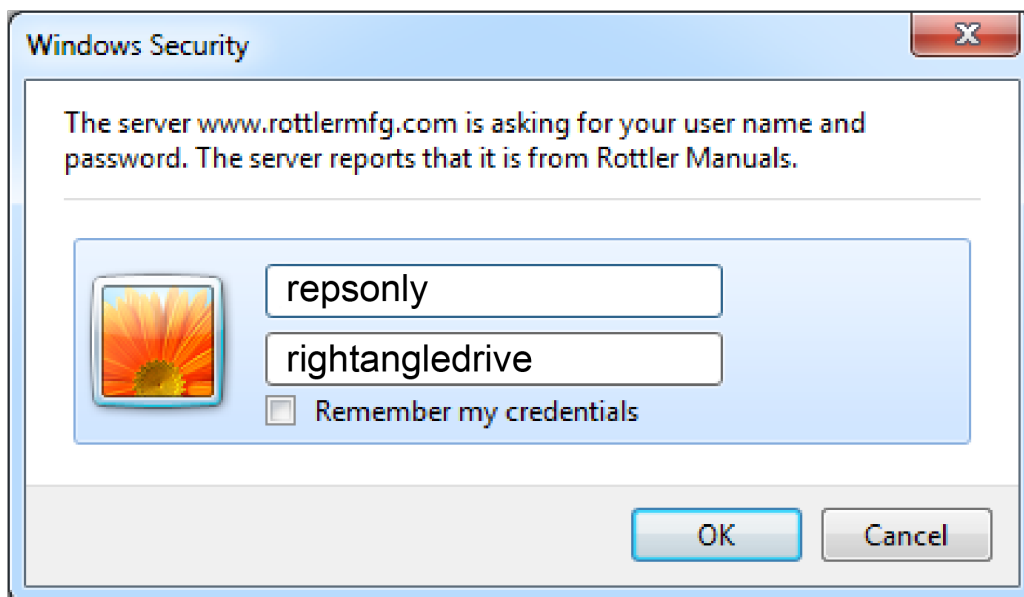
Specifications

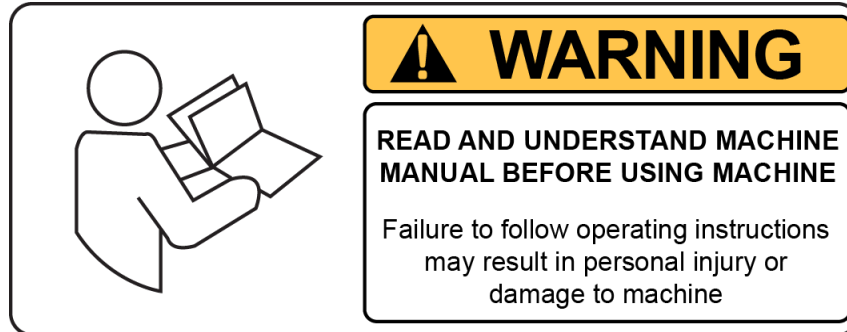| H85AXY Machine Specifications	American	Metric
Control	CNC Touch Screen	
Diameter Range	1.9" - 7.38"	48.16-187 - Xmm
Workpiece Capacity - Length	55"	1400mm
Torque at Hone Head	585in.lbs	265NM
Stroker Motor Torque	88.5in.lbs	40NM
Stroke System Acceleration	200in/sec^2	5m/sec^2
Spindle - Motor Torque	114in.lbs	53NM
Spindle Stroke Speed	0-1500ipm	0-38m/min
Stroker Motor Power	3.3HP	2.47KW
Travel - Horizontal (X Axis)	38"	965mm
Spindle - Rotation Speed	1 to 400 RPM	
Spindle - Motor	3.7 HP	2.77 Kw
Coolant Capacity	70 Gallons	265 Liters
Maximum Length of Cylinder	17"	432mm
Stroke Length	19"	483mm
Dimensions - Shipping	73D x 93W x 93" H	1854D x 2362W x 2362mm H
Machine Weight	3700 lbs	1678 kg
Electrical Requirements	208/240V, 30A, 50/60Hz, 3/1Ph	
Paint Color Code	RAL9002 (Grey White)	

Specifications and design subject to change without notice.

SAFETY

Contents

Safety Information

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

⚠ WARNING

READ AND UNDERSTAND MACHINE MANUAL BEFORE USING MACHINE

Failure to follow operating instructions may result in personal injury or damage to 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 DANGER indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury.

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

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

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

⚠ WARNING This machine is capable of causing severe bodily injury.

Safety Instructions for Machine Use

CAUTION

DO NOT OPERATE THIS MACHINE WITHOUT GUARDS IN PLACE

KEEP GUARDS IN PLACE and in proper working order.

KEEP WORK AREA CLEAN. Clean spilled coolant from floor to avoid slipping hazard.

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.

> ⚠ **WARNING**
>
> **RISK OF EYE INJURY WHEN OPERATING THIS MACHINE**
> EYE PROTECTION REQUIRED WHEN OPERATING THIS MACHINE

ALWAYS USE SAFETY GLASSES 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.

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.

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.

CAUTION

No list of safety guidelines can be complete. Every 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

DANGER

HAZARDOUS VOLTAGE
DISCONNECT POWER BEFORE
SERVICING MACHINE OR PANAL

FAILURE TO DO SO MAY RESULT IN
SERIOUS INJURY OR DEATH

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.**

Machine Operator

Operator of this H85AXY Honing machine should be a skilled machinist craftsman: that is well versed in the caution, care, and knowledge required to safely operating a metal cutting tool.

If the operator is not a skilled machinist, the operator must pay strict attention to the operating procedure outlined in this manual, and must get instruction from a qualified machinist in both the productive and safe operation of this H85AXY Honing Machine.

Rottler H85AXY Honing equipment has the following areas of exposed moving parts that you must train yourself to respect and stay away from when they are in motion:
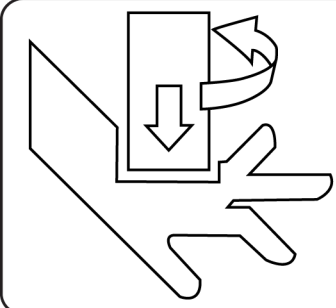

Safety glasses are recommended while machine is running.

⚠ **WARNING**   **Work Clamping** - Be sure work is clamped securely in accordance with the instructions.

Hone Head Area - Keep hands completely away from the rotating honing head at *ALL* times.

⚠ **DANGER**

IMPACT AND ROTATION HAZARD

KEEP HANDS CLEAR OF HONE HEAD
WHEN MACHINE IS IN OPERATION

DO NOT GRAB HONE HEAD WHILE
IT IS ROTATING OR IN MOTION

IMPROPER USE COULD RESULT
IN SERIOUS INJURY OR DEATH

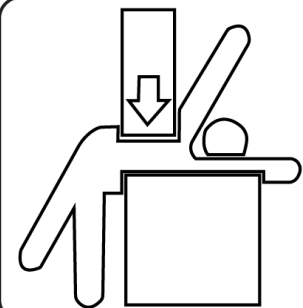**Honing** - Do not engage rotation power when hone is out of a cylinder.

⚠ **CAUTION**   **Operator Controls** - Familiarize yourself with the exact location of the e-stop button so you can immediately react to an emergency.

⚠ **DANGER**

**THIS MACHINE IS CAPABLE
OF STARTING AND RUNNING
AUTOMATICALLY**

⚠ **DANGER**

**CRUSH HAZARD
STAY CLEAR OF SPINDLE**

Keep clear of spindle when working in tank area. Spindle can drop if there is a failure in the machine. Move spindle out of work area when changing blocks or fixtures.

IMPORTANT

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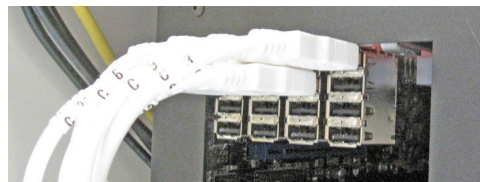
⚠ **WARNING** Downloading any program or changing any Rottler or Computer settings may cause the machine and/or software to become unstable. DO NOT install ANY screen saver, Anti-Virus, Spyware or any type of Security software on the computer. This could create a hazardous environment for the operator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

⚠ **WARNING** 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.

1. Current sensors in all motor control panels.
2. Electrical breakers to prevent voltage surges and spikes from reaching electrical system.
3. Electrical lockout on main electrical enclosure.
4. 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

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

NOTE: Not all modes of operation will be discussed in this Section. 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.

Definitions Of Terminology Used In This Section

Screen: This is what appears on the monitor. There are different screens for setting up the machine and to operate it.

Icon: A small graphic that is located on the screen. The Icon is used to activate various programs related to machine operation.

Button: A small graphic that is located on the screen as part of group of buttons that is used to set up or operate the machine. A button has two different possible functions. One is when it is used as switch. When it is used as switch the button will either be on or off after it has been pressed and must be pressed again to revert to start status. The second is as contact switch. This is also called a momentary contact button. This button is active only while it is being pressed by the operator.

Click: This is a method of activating an icon or button using a computer mouse. On a touch screen such as the one that this machine is equipped with you can use your finger tip or a stylus to activate the icon or button.

Press or Touch: Use your finger tip to activate a button on the screen.

Activate: A way of indicating that button, menu title, or tab has been clicked on or pressed.

Tab: A small box located near the top of the screen. A tab will be labeled with the function of a screen that will appear when the tab is clicked or touched.

Value Box: This is where values that are needed to run a program are entered. Touching a value box will case a number pad to appear so that the desired value can be input.

Menu Title: A one or two word title that describes the contents of a menu. Clicking or touching an Option Title will cause a menu to appear below it.

Menu: A box that appears below an Option Title when it is activated. A menu will contain a number of functions that can be activated or deactivated by clicking or pressing the title. Or when activated another menu will open up with more functions that can be activated.

Pop Up Window: This is a box that will appear when certain buttons, menu titles, or value boxes are activated. These Pop Up Windows can be warnings, requests for input, or confirmation requests.

Hand Controls

E-STOP Switch

This switch is used in an emergency situation. Pushing the button in will disconnect the power to all the motors that run the machine except the coolant pump motor. The machine will stop dead in place when activated. To restore power to the machine turn the button clockwise until it pops out.

Handwheel

The handwheel is used to manually move the machine in different directions according to which axis is activated. The handwheel is also used to manually feed the stones in or out.

Boot Up Screen

This is the screen you will see when first turn on the power.
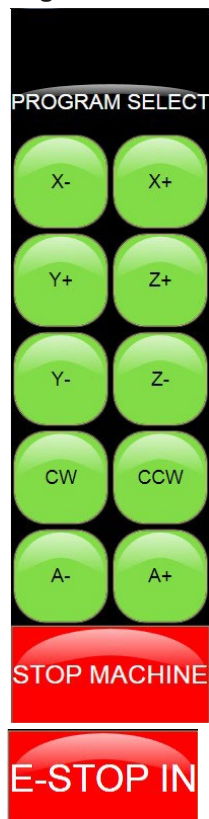

Start Icon

    Double Click or double press to start the Rottler operating program

Set Up Screen

Jog Button Panel

The jog buttons are momentary contact buttons. They activate rapid travel for the axis indicated on the button.

The X- button will move the carriage to the left.
The X+ button will move the carriage to the right.

The Z+ button will move the spindle up.
The Y+ button will move the carriage inward.

The Z- button will move the spindle down.
The Y- button will move the carriage outward.

The CW button will rotate the spindle clockwise.
The CCW button will rotate the spindle counter clockwise.

The A+ button will rotate the block fixture clockwise.
The A+ button will rotate the block fixture counter clockwise.

The Stop Machine button is used to stop the machine cycle before it has completed. The machine will complete a hone stroke and raise out of the cylinder.

When this icon replaces the Stop Machine button it indicates that the E-STOP switch is engaged and all motions buttons on the screen are disabled. The E-STOP switch must be released before any of the motion buttons on the display screen will respond.

Program Select Section Buttons

The Home button is use to index the hone head when it is installed on the machine. FIXTURE SELECT, and TABLE OF TOOLS buttons are not used on the H85AXY.

The New and Options, buttons are used for creating new engine block profiles that will be saved for later use. The Delete button is used for removing a block profile from the Program Select list.

Mode Select Sections Buttons and Menus.
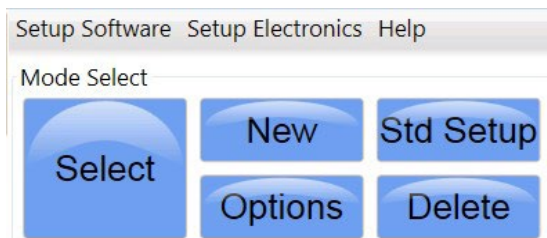
Setup Software and Setup Electronics menu titles will open new options menus. These are mostly used for machine setup at the factory or for service. There are 2 options that an operator can select if needed and will be explained further on.

The Help menu title will open the help and instruction files for the machine.

New Button: This button is used to bring up a pop up screen where a machining process will be chosen for use. The process will appear below the Mode Select buttons.

Std Setup Button: This button will insert all processes that are available for this machine in the area below the Mode Select buttons.

Options Button: This button will bring up a pop screen that will allow the operator to change the name of the process that was highlighted.

Delete Button: This button will delete any process that has been highlighted.

Select Button: This button will bring up the Operation Screen once a block program and a process have been highlighted.

Software Setup Menu
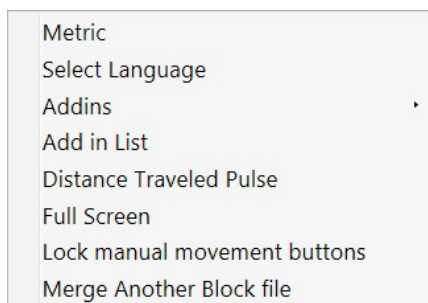
This is the menu that appears when the Setup Software title is touched. Here the operator can choose to change to metric display readings by checking the Metric title. Inch display readings can be restored by unchecking the Metric title box.
A different language can be used by touching the Select Language title and choosing for the languages that appear.

Operation Screen

At the top of the screen you will see the block and process that was selected. In the upper right section there is a readout of current location of the different axis's. ***All readings are plus or minus from the zero set points.*** (The A axis readout will only show a reading if the optional auto rotate fixture is installed)

Screen Tabs: When the Setup, Bore Locations, or Operation tab is touched the corresponding screen for that tab will appear. These different screens are used for programing and operation of the machine.

Handwheel Buttons

At the bottom of the screen are 4 buttons. When a button is touched and activated the operator will be able to control the axis indicated on the button by using the handwheel. The active button will turn red after it is touched.

Handwheel X Button: When this button is activated the operator will be able to move the carriage to the right or left using the handwheel. Each notch or click of the handwheel will move the carriage 0.010 of an inch. Turning the handwheel clockwise or to the plus side will cause the carriage to move to the right. Turning the handwheel counter clockwise or to the minus side will cause the carriage to move to the left.

Handwheel Y Button: When this button is activated the operator will be able to move the carriage inward or outward using the handwheel. Each notch or click of the handwheel will move the carriage 0.010 of an inch. Turning the handwheel clockwise or to the plus side will cause the carriage to move inward. Turning the handwheel counter clockwise or to the minus side will cause the carriage to move outward.

Handwheel Z Button: When this button is activated the operator will be able to move the spindle up or down using the handwheel. Each notch or click of the handwheel will move the spindle 0.010 of an

inch. Turning the handwheel clockwise or to the plus side will cause the spindle to move up. Turning the handwheel counter clockwise or to the minus side will cause the spindle to move down.

Handwheel Stones Button: When this button is activated the operator will be able to feed the stones in or out using the handwheel. Each notch or click will increase or decrease the diameter of the stones by 0.001 of an inch. Turning the handwheel clockwise or to the plus side will cause the stones in increase in diameter. Turning the handwheel counter clockwise or to the minus side will cause the stones to decrease in size.

Handwheel Spindle Button: When this button is activated the operator will be able to rotate the spindle clockwise or counter clockwise using the handwheel. Each notch or click of the handwheel will rotate the spindle 0.10 of an inch. Turning the handwheel clockwise or to the plus side will move the spindle clockwise. Turning the handwheel counter clockwise or to the minus side will move the spindle counter clockwise.

Handwheel A Button: When this button is activated the operator will be able to rotate the block fixture clockwise or counter clockwise using the handwheel. Each notch or click of the handwheel will rotate the spindle 0.050 of an inch. Turning the handwheel clockwise or to the plus side will move the cradle clockwise. Turning the handwheel counter clockwise or to the minus side will move the cradle counter clockwise.

Operation Screen: Setup Tab

Set Zeros Buttons

These button will set the zero point for each axis that is indicated on the button. When touched a conformation pop up screen will appear to confirm that the operator wants to set the zero point.

Z Stops

This section is where the clearance height for the hone head is set. A value can be entered by touching the value box and keying in the value on the pop up number pad. Or the hone head can be moved to the desired location using the Z Axis jog button or handwheel. When the hone head is in the desired position the operator can touch the set button to enter the value that is in the value box.

Cross Hatch Calculator

This section is where the operator will enter values into the appropriate boxes to set up the auto cross hatch function. The operator will input the cylinder diameter and desired crosshatch angle. The Roughing, Finish, and Plateau RPM's are also input in this section.

Stones Load Setup

This is the section where the operator will enter the desired running loads for different processes. Values are entered by touching the proper value box and entering the desired value on the number pad that appears. Short Stroke Sensitivity is set using the value box or by pressing the + or - buttons. The SS Sensitivity can be enabled or disabled by activating or deactivating the check mark. The operator will also indicate which hone head will be used for the job.

Stroke Setup

This is the section where the operator will enter information to determine how far the spindle will travel while it is stroking up and down. The bottom value box is where the number of strokes to be used in the plateau mode is entered.

Operation Screen: Bore Locations Tab
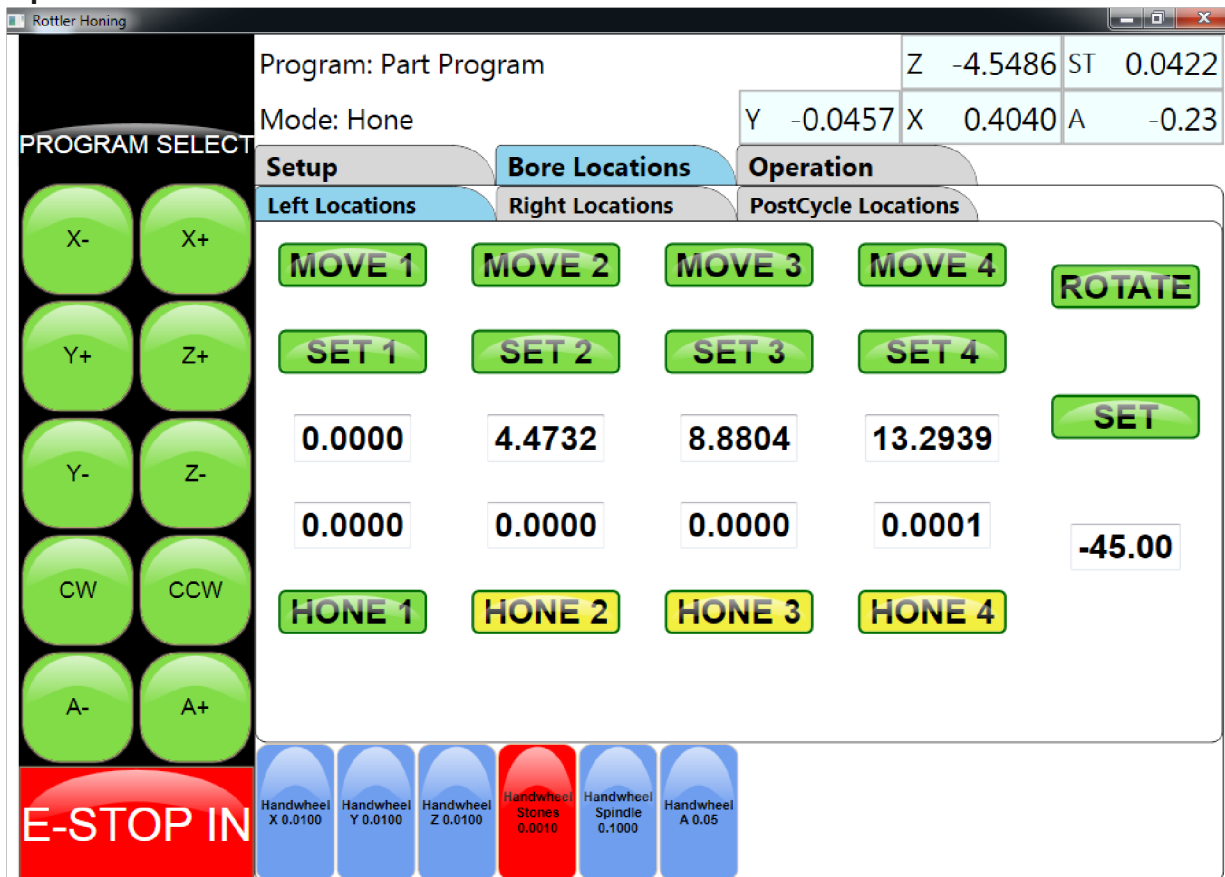
This is the screen where the operator will enter the values for center to center bore dimensions. This will enable the machine to move automatically from bore to bore. Move 1 value will be 0.000 since this is the start point for the honing process. Each succeeding value box will add the center to center bore dimension to the previous value.

Move Buttons

If the operator touches one of the Move buttons the carriage will move to the position that is entered in the value box below the bottom.

Hone Buttons

These buttons are used to determine if that cylinder will be honed during the auto honing process. When touched the button will turn yellow and indicated that the cylinder will not be honed during the auto honing process. Individual buttons can be deactivated if the operator wants to bypass honing a specific cylinder during the auto honing process.

Left and Right Locations Tabs

If a V Block is to be honed then it will be necessary to enter values for the right side bank after touching the Right Locations tab to bring up the screen. The values will be different than for the left side since there will be a need to account for the cylinder offset from bank to bank. This will be covered fully in the Operations Section.

Operation Screen: PostCycle Locations Tab
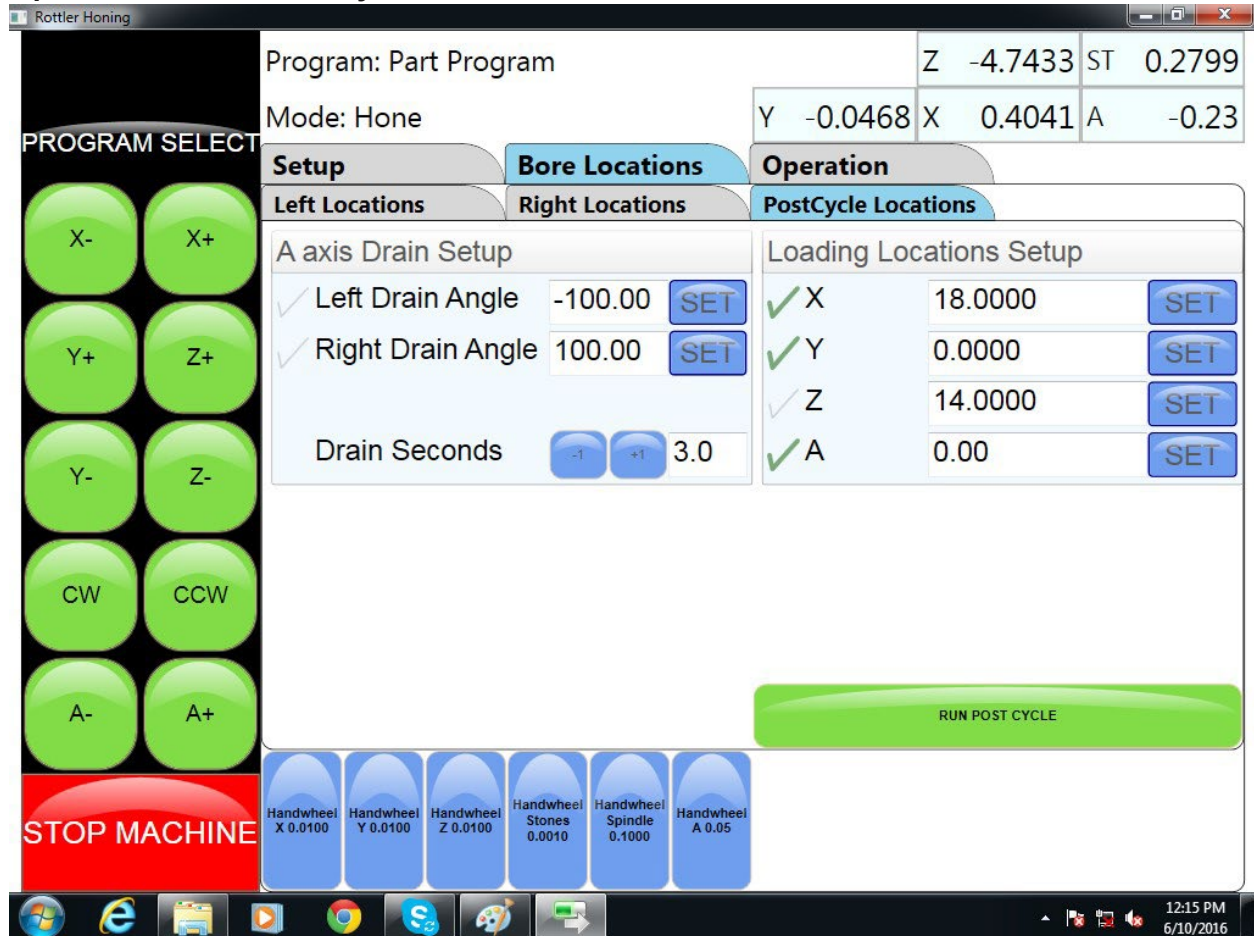
This tab is only used if the machine is equipped with a automated block fixture. The operator will set values to over rotate the block for drainage purposes and amount of time to pause at each point. The operator will also set the axises values to move the carriage and set the block fixture for unloading of the block.

Operation Screen: Operation Tab
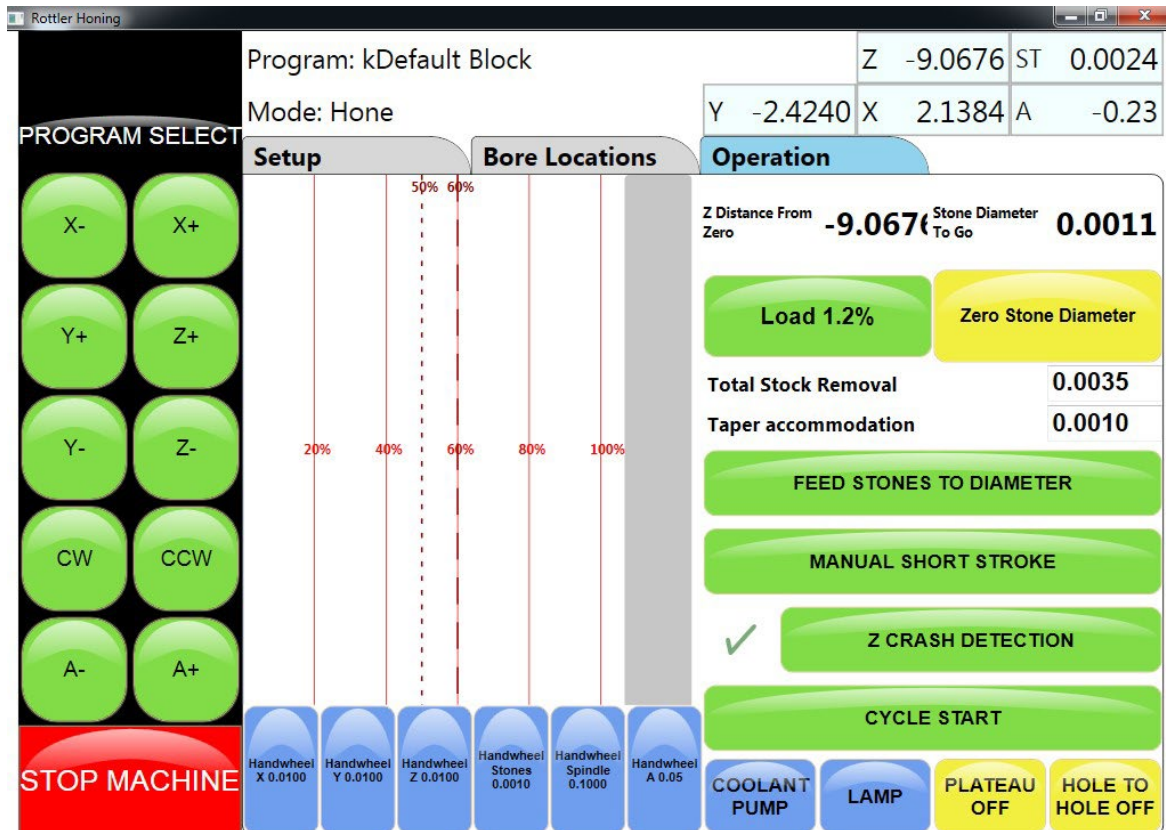
This is the screen where the honing operation will be run from. At the top under the Operation Tab are 2 readouts. The first is Z Distance From Zero. This reading shows the location of the spindle from the zero point. The second is Stone Diameter To Go. This readout shows how much the stones must still feed out to reach the Total Stock Removal setting.

Load Reading Button
This is a non-functional button. This is where the spindle motor load reading is displayed. The button color will change as load increases. Green indicates that the motor load is in its optimal area. Yellow indicates that the motor load is slightly high. Red indicates that the motor load is excessive.

Zero Stone Diameter Button
This button is used to set the zero setting for the stone diameter.

Total Stock Removal Value Box
This is where the operator will enter a value for the amount of stock to be removed from a cylinder.

Taper Accommodation Value Box
If the block to be honed has taper present, then the amount of taper must be entered in this box to prevent the Z Crash Detection system from activating due to encountering a smaller than expected bore.

Operation Buttons
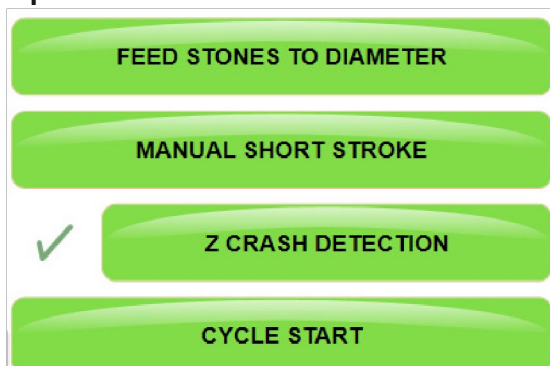

FEED STONES TO DIAMETER Button

When this button is active touching it will cause the spindle motor to start and the stones to feed out until the finish load setting is reached. When that occurs the spindle motor will shut off. This is the zero point for the stone diameter. The operator will touch the Zero Stone Diameter button to set the zero point for the stones. This button is active only if the check mark is visible next to the button. The check can be turned on or off by touching the check mark box.

MANUAL SHORT STROKE Button

When pushed and activated this button will cause the hone to short stroke ant the bottom of the bore for as long as the button is held on.

Z CRASH DETECTION Button

When this button is active the machine will automatically detect and interference points that will come in contact with the bottom of the stones. When auto cycle is started the machine will run a test to determine if there is any interference points on each cylinder before honing begins. If an interference point is detected the machine will stop. When the machine is moving from cylinder to cylinder the machine will detect if the stones are not properly entering the bore and stop before damage can occur.
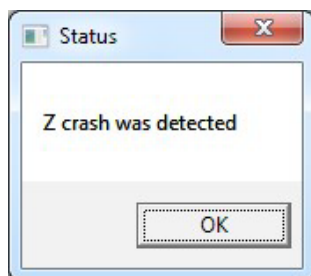
If there is an occurrence of an interference point being detected the machine will stop and a pop up screen will appear on the screen.

CYCLE START Button

This is the button that is touched to begin the auto honing cycle process. The machine will complete the entire process of honing all the cylinders that have been tagged to hone. The machine can be stopped mid cycle by touching the Stop Machine button. If an emergency arises or if the screen does not respond to touch commands the E-STOP can be used to stop the machine.

COOLANT PUMP and LAMP BUTTONS

These buttons turn the coolant pump and lamps on or off. When they are on they will be red in color. The coolant pump and lamps have an independent power supply and will work even if the E-STOP is engaged.

PLATEAU Button

This button will turn the Plateau mode on or off. When it is on the button will turn red and the numbers of strokes to be used for the process is displayed on the button.

HOLE TO HOLE Button

This button will turn on the automatic hole to hole honing process. When the button is red and ON is displayed the machine will automatically move to each hole in the programed process that is engaged by touching the CYCLE START button. When button is yellow and OFF is displayed on the button only the cylinder that is aligned with the stones will be honed.
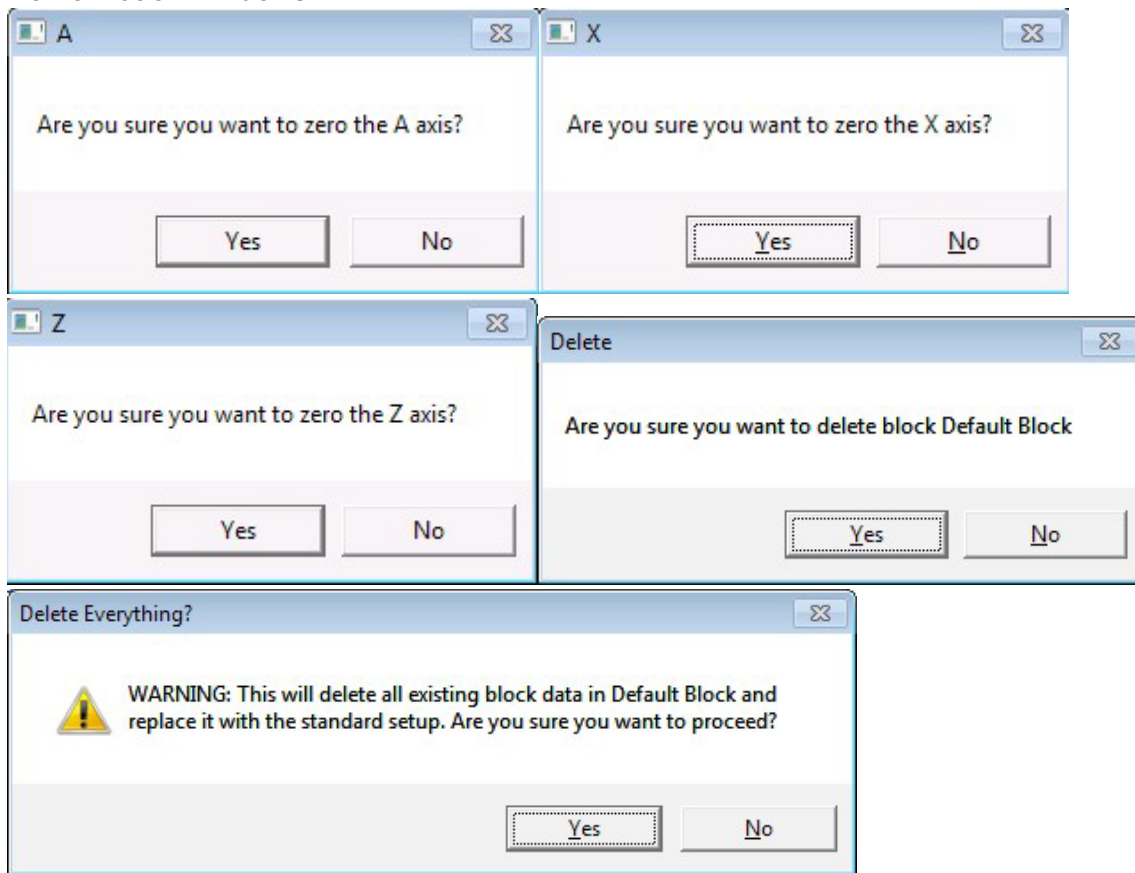
Pop Up Windows and Menus

Number Pad
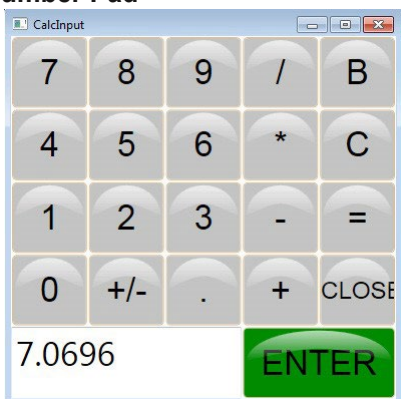
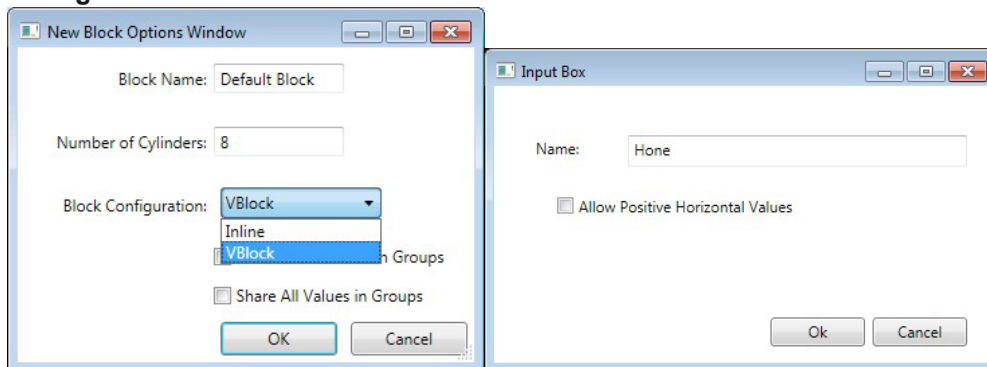This window will pop up when the operator touches a value box. The operator will input the value desired and then touch ENTER to place the value in the value box.
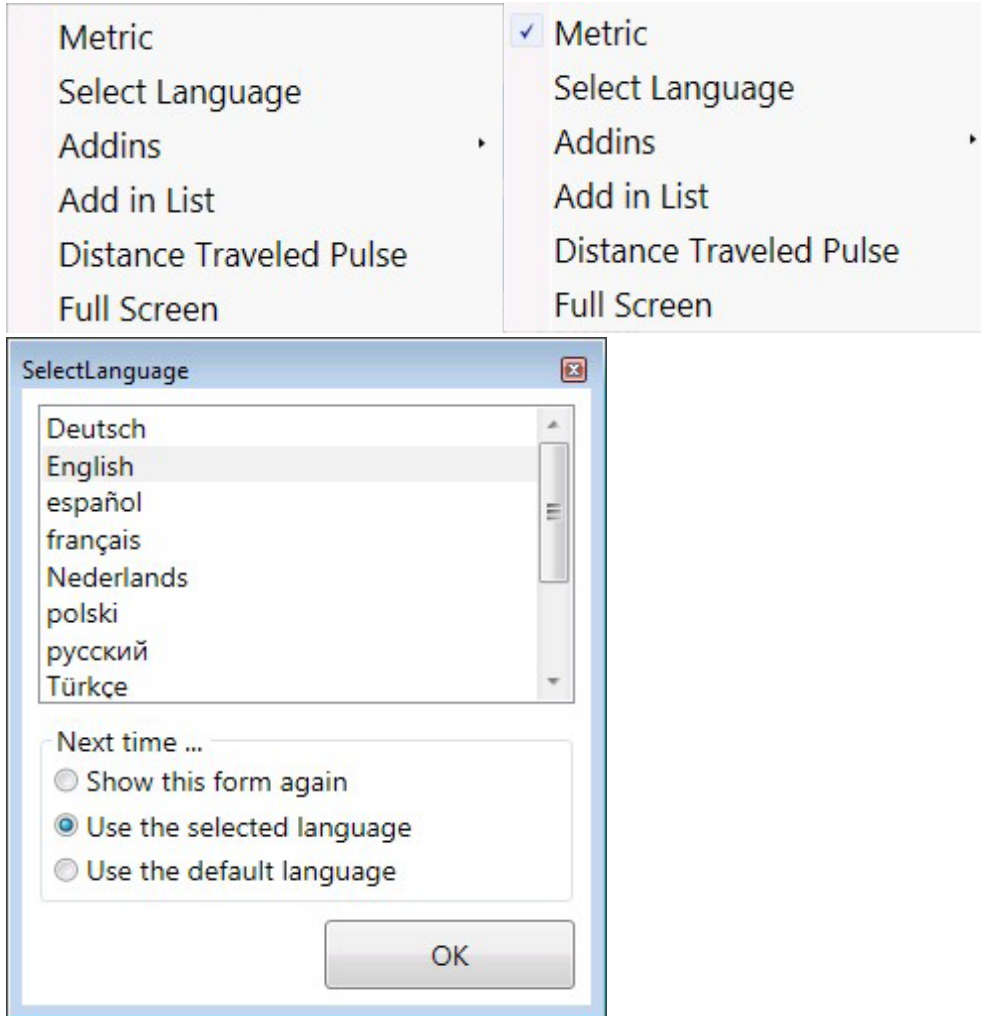
Conformation Windows

These windows will pop up to confirm that the operator wants complete an action.

Change and Choose Windows

These windows will pop up when the operator wants to enter or change information.

Software Set Menus

Metric
Select Language
Addins   ▸
Add in List
Distance Traveled Pulse
Full Screen

✓ Metric
Select Language
Addins   ▸
Add in List
Distance Traveled Pulse
Full Screen

SelectLanguage   ☒

Deutsch
English
español
français
Nederlands
polski
русский
Türkçe

Next time ...
◯ Show this form again
◉ Use the selected language
◯ Use the default language

OK

These menus are for selecting the metric screen readouts and language.
On Screen Keyboard
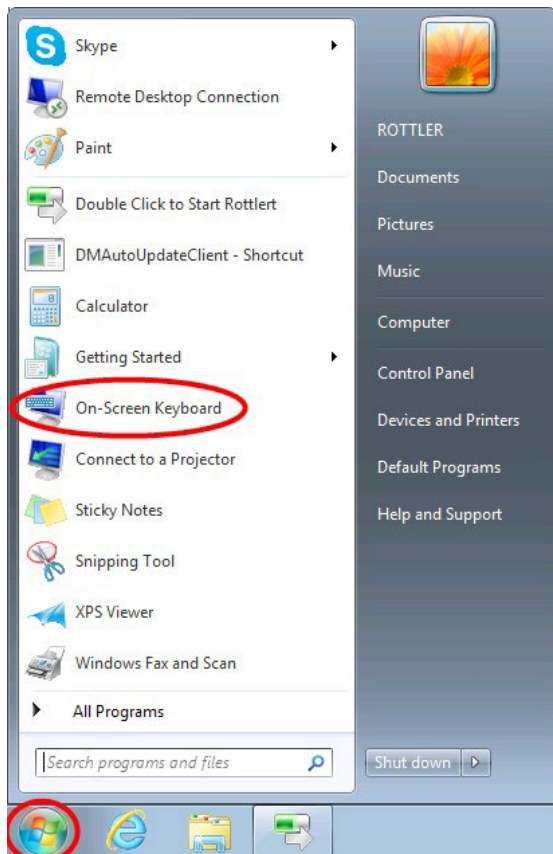
If a keyboard is not attached the machine an on screen keyboard can be used.
To access the on screen keyboard touch the Start button and then touch the On-Screen Keyboard Icon.

STONE HOLDER SIZE CHART H85AXY

MEDIUM HONE HEAD

Diameter (New Stones)

	0.312 Stones		0.200 Stones	
	Min	Max	Min	Max
514-10-13A	2.34	2.45	2.12	2.23
514-10-13F	2.44	2.55	2.22	2.33
514-10-13B	2.54	2.65	2.32	2.43

514-10-13G	2.64	2.75	2.42	2.53
514-10-13C	2.74	2.85	2.52	2.63
514-10-13H	2.84	2.95	2.62	2.73
514-10-13D	2.94	3.05	2.72	2.83

Diameter (New Stones) (Metric)

	7.925 Stones		5.08 Stones	
	Min	Max	Min	Max
514-10-13A	59.44	62.23	53.75	56.54
514-10-13F	61.98	64.77	56.29	59.08
514-10-13B	64.52	67.31	58.83	61.62
514-10-13G	67.06	69.85	61.37	64.16
514-10-13C	69.60	72.39	63.91	66.70
514-10-13H	72.14	74.93	66.45	69.24
514-10-13D	74.68	77.47	68.99	71.78

Diameter (New Brushes)

	0.550 Brushes		0.395 Brushes	
	Min	Max	Min	Max
514-10-13A	2.82	2.93	2.51	2.62
514-10-13F	2.92	3.03	2.61	2.72
514-10-13B	3.02	3.13	2.71	2.82
514-10-13G	3.12	3.23	2.81	2.92
514-10-13C	3.22	3.33	2.91	3.02
514-10-13H	3.32	3.43	3.01	3.12
514-10-13D	3.42	3.53	3.11	3.22

Diameter (New Brushes) (Metric)

	13.970 Brushes		10.033 Brushes	
	Min	Max	Min	Max
514-10-13A	71.53	74.32	63.65	66.45
514-10-13F	74.07	76.86	66.19	68.99
514-10-13B	76.61	79.40	68.73	71.53
514-10-13G	79.15	81.94	71.27	74.07
514-10-13C	81.69	84.48	73.81	76.61

514-10-13H	84.23	87.02	76.35	79.15
514-10-13D	86.77	89.56	78.89	81.69

LARGE HONE HEAD

Diameter (New Stones)

	0.312 Stones		0.200 Stones	
	Min	Max	Min	Max
514-9-6J	2.99	3.45	2.77	3.23
514-9-6A	3.17	3.63	2.94	3.41
514-9-6B	3.42	3.88	3.19	3.66
514-9-6C	3.67	4.13	3.44	3.91
514-9-6D	3.92	4.38	3.69	4.16
514-9-6E	4.17	4.63	3.94	4.41
514-9-6F	4.42	4.88	4.19	4.66
514-9-6G	4.67	5.13	4.44	4.91
514-9-6H	4.92	5.38	4.69	5.16
514-9-6K	5.17	5.63	4.94	5.41
514-9-6L	5.42	5.88	5.19	5.66
514-9-6M	5.67	6.13	5.44	5.91
514-9-6N	5.92	6.38	5.69	6.16
514-9-6P	6.17	6.63	5.94	6.41
514-9-6Q	6.42	6.88	6.19	6.66
514-9-6R	6.67	7.13	6.44	6.91
514-9-6S	6.92	7.38	6.69	7.16

Diameter (New Stones) (Metric)

	7.925 Stones		5.08 Stones	
	Min	Max	Min	Max
514-9-6J	75.92	87.73	70.23	82.04
514-9-6A	80.39	92.20	74.70	86.51
514-9-6B	86.74	98.55	81.05	92.86
514-9-6C	93.09	104.90	87.40	99.21
514-9-6D	99.44	111.25	93.75	105.56

514-9-6E	105.79	117.60	100.10	111.91
514-9-6F	112.14	123.95	106.45	118.26
514-9-6G	118.49	130.30	112.80	124.61
514-9-6H	124.84	136.65	119.15	130.96
514-9-6K	131.19	143.00	125.50	137.31
514-9-6L	137.54	149.35	131.85	143.66
514-9-6M	143.89	155.70	138.20	150.01
514-9-6N	150.24	162.05	144.55	156.36
514-9-6P	156.59	168.40	150.90	162.71
514-9-6Q	162.94	174.75	157.25	169.06
514-9-6R	169.29	181.10	163.60	175.41
514-9-6S	175.64	187.45	169.95	181.76

Diameter (New Brushes)

	0.550 Brushes		0.395 Brushes	
	Min	Max	Min	Max
514-9-6J	3.47	3.93	3.16	3.62
514-9-6A	3.64	4.11	3.33	3.80
514-9-6B	3.89	4.36	3.58	4.05
514-9-6C	4.14	4.61	3.83	4.30
514-9-6D	4.39	4.86	4.08	4.55
514-9-6E	4.64	5.11	4.33	4.80
514-9-6F	4.89	5.36	4.58	5.05
514-9-6G	5.14	5.61	4.83	5.30
514-9-6H	5.39	5.86	5.08	5.55
514-9-6K	5.64	6.11	5.33	5.80
514-9-6L	5.89	6.36	5.58	6.05
514-9-6M	6.14	6.61	5.83	6.30
514-9-6N	6.39	6.86	6.08	6.55
514-9-6P	6.64	7.11	6.33	6.80
514-9-6Q	6.89	7.36	6.58	7.05
514-9-6R	7.14	7.61	6.83	7.30

| 514-9-6S | 7.39 | 7.86 | 7.08 | 7.55 |

Diameter (New Brushes) (Metric)

	13.970 Brushes		10.033 Brushes	
	Min	Max	Min	Max
514-9-6J	88.01	99.82	80.14	91.95
514-9-6A	92.48	104.29	84.61	96.42
514-9-6B	98.83	110.64	90.96	102.77
514-9-6C	105.18	116.99	97.31	109.12
514-9-6D	111.53	123.34	103.66	115.47
514-9-6E	117.88	129.69	110.01	121.82
514-9-6F	124.23	136.04	116.36	128.17
514-9-6G	130.58	142.39	122.71	134.52
514-9-6H	136.93	148.74	129.06	140.87
514-9-6K	143.28	155.09	135.41	147.22
514-9-6L	149.63	161.44	141.76	153.57
514-9-6M	155.98	167.79	148.11	159.92
514-9-6N	162.33	174.14	154.46	166.27
514-9-6P	168.68	180.49	160.81	172.62
514-9-6Q	175.03	186.84	167.16	178.97
514-9-6R	181.38	193.19	173.51	185.32
514-9-6S	187.73	199.54	179.86	191.67

OPERATING INSTRUCTIONS
Contents

Honing with a Rottler H85AXY

The basic process for honing with a Rottler H85AXY hone is as follows: select the required stones, create a program, set machining parameters, and run the cycle. The information in this section is designed to serve as guidelines for the various applications an operator may encounter.

While the H85AXY is running, the screen will show a representation of the hone head traveling up and down in the cylinder. The red lines along the sides of the hone head representation are an indication of the cylinder shape. The Rottler honing software senses the load on the hone stones to determine the straightness and diameter of the cylinder walls. "Tight" spots are indicated by the red lines being closer to the hone head image as it passes through the cylinder. If the software senses a significant "Tight" spot it will automatically run a series of extra strokes in the determined area to compensate and make the cylinder wall straightness within tolerance. This allows the H85AXY to not only create taper free bores, but it also will handle cylinders with non-uniform material density. Such cylinders may "breathe" which is a result of the cylinder walls deflecting away from the hone stones due to lack of structural support. The operator need not be concerned with attempting to manually compensate for this phenomenon as the Rottler software will handle it on its own.

The Rottler H85AXY's default strategy is comprised of two-steps. The first step is the roughing cycle which attempts to remove as much material as possible in the shortest time while creating a straight, but undersized cylinder. The second step is the finishing cycle which brings the cylinder to its final dimensions and creates the pre-determined crosshatch pattern. If a plateau strategy is being used, then the finish cycle is also where this will be accomplished. The Rottler H85AXY will automatically switch from the roughing cycle to the finishing cycle once the cylinder diameter has reached its prescribed undersized amount. Any programs that the operator creates will automatically have these cycles, so there is no need for the operator to create 2 cycles for any cylinders.

Large Amount of Material Removal

Material Removal Amount: .010" (.254mm) or **MORE**

Strategy: Rough and Finish

Roughing Stone: 80 grit

Finishing Stone: Match to desired RA for cylinder wall

Process:

Begin by using the 80 grit stones and run a roughing cycle to bring the cylinders to within .005" of final diameter. Switch to the selected finish stones and run the finish cycle to remove the remaining material and create the desired crosshatch and surface finish.

Material Removal Amount: .005"-.010" (.127mm - .254mm)

Strategy: Rough and Finish

Roughing Stone: 270 grit

Finishing Stone: Match to desired RA for cylinder wall

Process:

Begin by using the 270 grit stones and run a roughing cycle to bring the cylinders to within .002" (.0508mm) of the final diameter. Switch to the selected finish stones and run the finish cycle to remove the remaining material and create the desired crosshatch and surface finish.

An alternative method for finishing would be to use the 270 grit stones to finish the cylinder to the final diameter. Then install the finishing stones and utilize the plateau honing feature to give the cylinder wall the desired surface finish.

Common Surface Finishes in Modern Engines

Today's modern engines are demanding smoother and more precise surface finishes. We can define the types of surface seen today into two groups, these groups are non-plateau and plateau finishes. The non-plateau finish is no longer the standard for engine cylinder bores. Most engines will specify a plateau finish. The differences between these finishes and how to achieve them with the Rottler H85AXY are described in the following sections.

***Note*: If the engine or ring manufacturer recommends a particular finish the engine manufacturers specifications or ring manufactures recommendation should be followed.**

Non-Plateau

A **non-plateau** finish may be defined as a cylinder surface that has been honed and the surface finish, when examined under a microscope has sharp peaks and valleys. **Non-plateau** finishes are the standard finish that is achieved from a conventional honing operation. The peaks are then knocked off and smoothed out during the engine break-in period thus creating small flats or "plateaus" where the peaks were prior.

The typical surface roughness as measured by the Ra conventional measurement for a non-plateau finish should be in the 16-24µin (.41-61µm) range. This surface roughness specification leaves adequate peaks to be knocked off during the engine break in period yet is not so rough as to cause oil burning problems before the cylinder walls have been plateaued by the rings. During initial start-up of the engine the rings will create the plateau by knocking off the peaks of a non-plateau finish.

Plateau

Plateau surface finishes have become the standard honing specifications for most modern engines. A **plateau** surface may be defined as a honed cylinder surface that when examined under a microscope the peaks have been flattened to create "flat" spots or **plateaus**. This type of surface resembles the finish of a cylinder post engine break-in cycle. The benefits of the **plateau** surface are less wear on the rings from the break in cycle, improved contact area for the rings, and it minimizes the amount of loose material that is removed during an engine break-in cycle that can become contaminants in the engines oil pan. **Plateau** finish surface roughness is also measured with more than just a conventional Ra measurement, the measurement standards are RpK, RK, Rvk and the Mr1 and MR2 values. An electronic gage to measure these criteria is highly recommended and the operator should take some time consulting both the ring manufacturer's specifications and the device manual to understand how to attain these measurements. Beyond the measurements, ring manufacturers tend to specify requirements based on the engine type and intended use. Below are a set of guidelines that can be used for reference depending on the engine and application.

Blown and Turbo Charged applications:
RpK 8-14 microinch   .20-.35 µm
Rk 30-40 microinch .76-1.02 µm Rvk 50+
microinch 1.27+ µm

Nascar and Prostock applications:

RpK	4-6 microinch	.10-.05 µm
Rk	18-22 microinch	.46-.59 µm
RvK	28-32 microinch	.71-.81 µm

Performance Street and Track (*longer life*):

RpK	8-10 microinch	.20-.25 µm
Rk	25-30 microinch	.64-.76 µm
RvK	35-40 microinch	.89-1.02 µm

The **plateau** finish has become very popular. A **plateau** finish involves the use of a roughing abrasive to obtain the Rvk parameters followed by a finer grit finishing abrasive to obtain the proper RpK value. When the finishing abrasive is used, only a few strokes are required to create the **plateau**. If you were to continue honing with the fine abrasive, the **plateau** finish would be eliminated, and the result will be a **non-plateau** finish.

Plateau Caution

In the past in order to obtain a good plateau finish and eliminate the torn and fragment metal left behind from the diamond abrasive. A three-step process would be implemented which would a use rough abrasive for base finish followed by a fine abrasive for the **plateau** effect then follow that up with **plateau** brush to remove any torn and fragmented material from surface. If the operator feels the need to implement such a process, then a **maximum of 6 plateau strokes** should be used **during the brush finish cycle. Using any more strokes will result in over-stroking which will lead to glazed cylinder walls!**

Tooling Strategies for Plateau Honing

The new technology for **plateau** honing uses a cubic boron nitride abrasive or what is known as CBN. This is a very sharp abrasive that cuts very cleanly and does not tear and fragment the surface of cylinder. This allows operator to eliminate the **plateau brush step**.

When CBN is not used for **plateau** honing, and instead a **diamond abrasive** is used. The operator should rely on the conventional 3-step process discussed above, which utilizes the plateau brush finishing cycle to remove any torn or fragmented surfaces from the cylinder walls

Using Diamond Abrasives

General

Diamond abrasives in combination with the Rottler Precision Honing Head make a very rigid honing head. The system will do an excellent job of truing tapered or out of round holes with little or no operator attention. An operator can set the roughing and finishing loads and expect the machine to hone the cylinder to size unattended with little or no attention. It is important to use proper stone pressure when using diamond abrasives. The roughing motor load setting should be in the 0 - 60% range. The finishing load should be set in the 15 – 25% area. Generally, the higher the roughing motor load reading the faster the stock removal. The lower the finishing load is set, the more accurate the bore will be. If plateau finishing is required then it is recommended to use the plateau brush finishing strategy to improve surface finish. Lastly it is important to use **Rottler Synthetic Coolant**, part number **514-4-71C**, when using **diamond stones**. It must be mixed with water and maintained properly to give optimal results.

Using CBN Abrasives

The CBN abrasive is a very clean cutting abrasive and doesn't leave the torn and fragmented metal in cylinder that diamond will leave. CBN in general does not have the longevity of diamond stones, therefore if the cylinder requires a large amount of material removal then using a diamond stone followed by CBN stones will typically provide the most economical and efficient process. If plateau finishes are required, we suggest using diamond to hone to size in the required grit specification followed by a CBN abrasive. If you are only doing a one grit finish, then we suggest again honing with diamond to within .0005 to .001 (.0127-.0254mm) and then following up with a CBN abrasive in that same grit size. Typically for a finish like this we would recommend a 400 grit CBN abrasive.

The H85AXY can remove a large amount of material from a cylinder in a relatively short amount of time. However, it is generally best practice to use an engine block machining center to bore the cylinders to .003" (.0762mm) undersized before finishing the bores to their final geometry with the H85AXY. This strategy allows for the operator to use CBN abrasives and get the most longevity out of the CBN stones

Mounting Stones and Brushes on Stone Holders

When mounting stone and brushes on stone holders make certain that the stones or brushes to be mounted are clean and burr free. Place the stones or brushes in the stone holders so that they are flush with the bottom of the holder. Tighten the retaining screws by hand.

⚠️ **CAUTION** Do not exceed **36 in lbs (4nm)** of torque on the retaining screws. Exceeding **36 in lbs (4nm)** of torque could cause the stone holders to crack.

*Note: Warranty is voided if torque values are exceeded of if non Rottler stones or brushes are used.*

Breaking In A New Set of Diamond Abrasives
Rottler diamond abrasives are pre-radiused to minimize the breaking in period. When a new set of diamonds is installed the surface finish obtained on the first few blocks will be 5-10 (.13 -.25 μm) Ra rougher than after the break in period. **You must hone 2 - 5 blocks before the surface finish stabilizes.**

Truing New Diamond Abrasives
On grit sizes 500 and up to 1200 grit we recommend using the lapping compound that came with the machine to expedite the process. Use the following process to radius in a new set of stones.
To start take a small brush and apply the lapping compound into the cylinder.
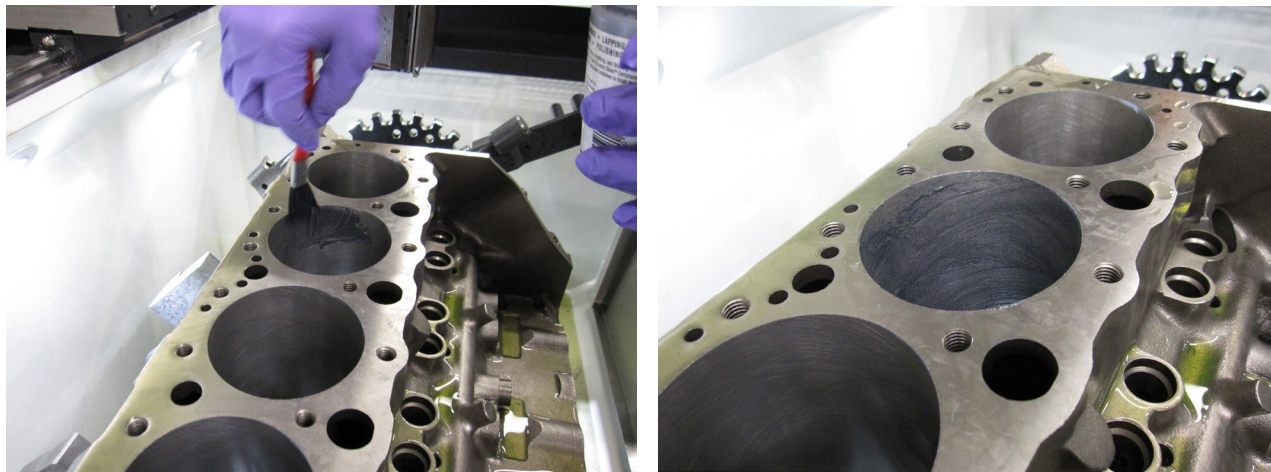
Set the cutting pressure in roughing and finishing mode to 20%. Set RPM to 80 rpm. You will need to set the stock removal for .010 to .015 in (.254 -.381mm) the stock removal window as abrasive will wear quickly with lapping compound. Insert hone head into bore. Start the machine with the coolant nozzle pointed away from the cylinder. Do not use the flow valve to shut off flow from the pump as that will cause the motor to overheat and trip out. You can shut the pump motor off in the Operation screen if you want. Run machine until it either shuts off or the DRO for stock removal stalls or quits moving. This indicates grit has either worn down or been swept from between cylinder wall and abrasive.
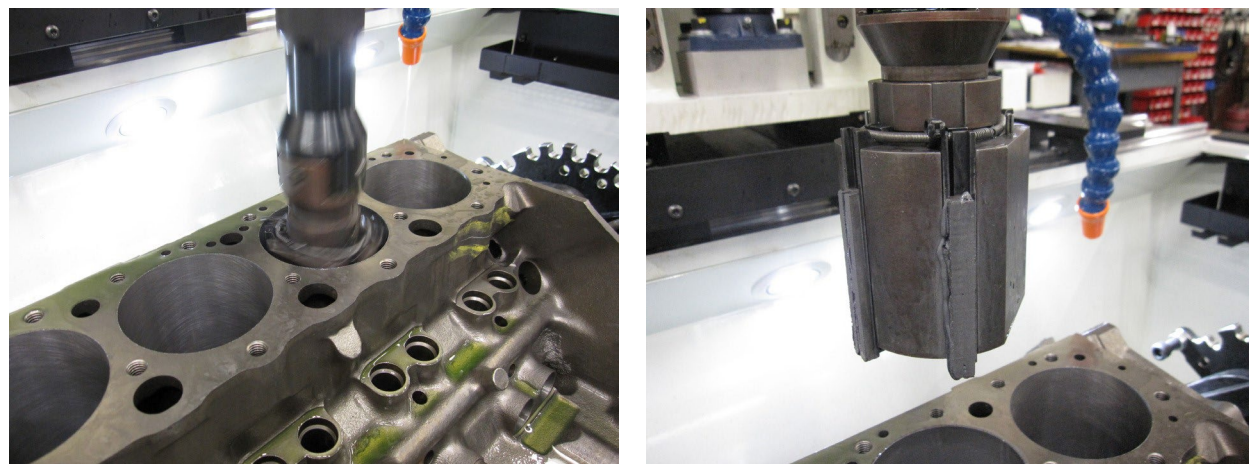
Remove hone head and clean the abrasive. Closely look at abrasive to determine if there is a solid line of contact the entire length of abrasive. If there is not a solid line contact on either the leading or trailing edge of abrasive then repeat the process again.

Once you have achieved the desired contact area you must clean the abrasive from the cylinder that was honed, diamond stones, stone holders and hone head. We recommend removing the stone holders, hone body and feed out cone rod from hone head and cleaning thoroughly to remove any lapping compound. If not completely removed, remaining lapping compound could cause excessive wear to moving parts in the hone head.

Dressing Diamond Abrasives

Diamond Abrasives use a metal bond to hold the individual diamond particles. Failing to dress the stones after honing 30 - 50 blocks will increase the pressure required to remove stock or the stock removal rate slows down significantly. This will result in finishes with excessive folded and torn metal. Undressed stones will also cause excess bore distortion and inaccuracies in the boring process. This is caused by the diamond abrasive dulling or the bond not breaking down. The edge of the stone will also become very sharp. This is a normal occurrence and is easily corrected by removing the holder/abrasive assembly, use a wire brush to dress the abrasive. A common method is to remove the stone holder from the hone head. Leave the stone in the stone holder and move the stone through a bench grinder wire wheel. The brush rotation should be across the narrow width of the stone. Turn the holder over and pass the stone through the wheel again. This process will return the abrasive to a like new cutting condition, and put a slight radius on the edge of the abrasive stick (approx. .005 inch .127mm).

Torn Metal

This is often caused by improper coolant mix, lack of dressing, or the use of high honing pressure during the finishing process. The Rottler hone head is capable of very high loads. If problems with torn metal are encountered verify the coolant mix, proper dressing of the abrasives, and reduce the finishing load during the final hone stage. If required make several strokes manually with minimum stone pressure (1020%).

Stock Removal Rate

The hardness of the cylinder you are honing will affect the stock removal rate. If you find the stock removal rate for a given cylinder is slower than normal check to make sure you have properly dressed the stones. Improperly dressed stones can increase honing time by as 50% or more. Improperly dressed stones will also produce an unacceptable finish.

Diameter Range

Because the diamond abrasives break down very slowly, a single set of stones is limited in its diameter range. One set of diamonds should be used for each stone holder range. A set of diamonds can not be constantly changed from one stone holder size to another. The stones would constantly be in the breakin process and very poor performance or finishes will result.

Cross Hatch Angle and Washout

The ideal situation would be for a hone to change the direction it is traveling instantaneously. If this was possible the angle of the cross hatch would stay consistent through the entire cylinder. The Rottler H85AXY uses high speed electronics in cooperation with a ball screw drive to change the direction of travel. This reduces the amount of Cross Hatch wipeout considerably from a crank driven rocker arm. As a rocker arm changes direction, the rate of travel slows but the rotation speed of the hone head stays consistent. This is the cause of washout at the top and bottom of cylinders. Since the H85AXY has a linear travel spindle this condition does not exist.

Coolant:

Coolant types and Selection:

When using Vitrified honing stones you must use a petroleum based coolant. Such as Mobil Met 33 or Upsilon or any equivalent light honing oil. This is required since vitrified honing stones are not compatible with water based synthetic coolants.

Diamond stones will work with oil or water based synthetic coolants, but work most efficiently with the water based synthetic coolants. Rottler Manufacturing recommends the use of Rottler 514-4-71C water based, synthetic coolant for diamond only applications. This coolant works best when mixed to a 5% – 8% solution.

Refractometer:

A Refractometer is used to measure the amount of coolant to water ratio. A 5% to 8% ratio will read a 3 – 5 on the Refractometer. It is important not confuse the ratio with the actual Refractometer reading. Coolant to Water Ration is 1:20 thus 1 gallon of coolant to 20 gallons of water.

Coolant Pump System:

The coolant tank on the H85AXY will hold a maximum of 70 gallons of the selected coolant.

Scratching

Scratching in the cylinder looks as though a single grit of a larger abrasive particle has lodged between the cylinder wall and the hone head. Often the scratch will be less than one revolution of the hone head and it will follow the crosshatch angle of the honing machine. Several things can cause this problem.

Improper coolant mix

The ratio of water to synthetic additive to water will change after the initial mix is put in the coolant tank. A Refractometer can be purchased to accurately check the ratio. When the ratio is measured as a percentage it should be 5 – 8%. This corresponds to a reading of 3-5 on the Refractometer. It is important not to confuse the percentage with the true Refractometer reading.

Unacceptable synthetic coolant brand

Lack of abrasive dressing

Dirty Coolant

Honing Methods

Method 1: 2 Step Using CBN Stones

OEM Blocks And Other Standard Duty Applications

Roughing (large material removal):
Use a 270-325 grit diamond abrasive. Use the Hone process with a roughing load of 50% and a finish load of 40%. Hone the cylinder to size. If you experience out of roundness in OE blocks due to cylinder wall thickness variations reduce the roughing load to 40% and the finish load to 30%.

Finishing:
Use a 600 grit CBN abrasive for 4 strokes at 15% load. When plateau honing with fine abrasive, slow the rpm down to 80 rpm. The H85AXY machine will adjust the stroke speed to maintain the proper cross hatch angle during this process. Typical cross hatch angles range from 38 to 45 degrees included angle.

Performance Blocks and Darton Sleeves (Harder Materials)

Roughing:
Use a 170-200 grit stone to maintain a high enough initial RvK number to allow for some drop in the RvK number when following with fine abrasive. Use 50% roughing load and 40% finishing load to size. Reduce load setting if there is a problem with maintaining proper bore geometry.

Finishing:
Use a 600 grit CBN abrasive for 4 to 6 strokes at 15% load. When plateau honing with fine abrasive slow the RPM down to 80 rpm.

Method 2: 3 Step Using Plateau Brushes OEM

Blocks and Other General Duty Applications

Roughing:
Start with 270-325 grit Diamond abrasive and hone to size with roughing load of 50% and finish load of 40% unless cylinders become out of round then use 40% roughing and 30% finishing.

Finishing:
Use a 550 grit diamond abrasive as the second step of a three step process by using plateau mode at 15% load and 80 rpm for 4 strokes.

Brush Finishing:
Use plateau brushes for 3 strokes at 15% load in the plateau mode at 80 rpm.

Performance Blocks and Darton Sleeves (Harder Materials)

Roughing:
Start with 170-200 grit diamond stones and hone cylinder bore to size with 50% roughing load and 40% finishing load. Reduce load setting if there is a problem with maintaining proper bore geometry.

Finishing:
Next step is to follow-up in the plateau mode with 550 grit diamond abrasive at 15% load for 4 strokes at 80 rpm.

Brush Finishing:

Final step use plateau brushes at 15% load for 4 strokes at 80 rpm.

OEM Engines That Are Force Induction, Race Applications, Or Nitrous Powered

Method 1: 2 Step Using CBN Stones

Roughing:
Start by honing the cylinders with 170-200 grit diamond abrasive to size. Roughing load should be set at 50% and finish load at 40% unless cylinder become out of round. Then drop to 40% roughing and 30% finishing load. In this application most piston ring manufacturers want RvKs in the +50 microinch (1.27 μm) category.

Finishing:
Use 600 grit CBN abrasive with a load of 15% for 4 to 6 strokes at 80 rpm.

Performance Blocks And Darton Sleeves (Harder Materials) That Are Forced Induction, Race Applications Or Nitrous Powered

Roughing:
Start with 140-170 grit diamond abrasive and hone to size at 50% rough load and 40% finish load.

Finishing:
Use 600 grit CBN abrasive with load pressure of 15% with rpm of 80 for 4 to 6 strokes.
Method 2: 3 Step Using Plateau Brushes

Roughing:
Start with 170-200 grit diamond abrasive and hone to size at 50% roughing load and 40% finishing load. Reduce load setting if there is a problem with maintaining proper bore geometry.

Finishing:
Follow-up with 550 grit diamond abrasive in the plateau mode at 15% load for 4 strokes at 80 rpm.

Brush Finishing:
Continue with the plateau brushes in plateau mode at 15% load for 4 strokes at 80 rpm.

Nascar/Prostock   Applications

Method 1: 2 Step Using CBN Stones

Roughing:
In this form of racing, only high-performance materials are used so there is no need to discuss OE blocks. Start by honing block to size with 270-325 grit Diamond abrasive at rough load of 50% and finish load of 40%.

Finishing:
Follow-up by using 800 grit Diamond abrasive for 4 to 6 strokes at 15% load with rpm of 80.

Special Procedure for Subaru Blocks
Roughing:
Use 80 grit stones, remove stock until .002" from finish size. Use 45% for the rough load and 35% for the finish load.

Finishing:
Hone to final size using 325-400 grit stones using 45% for the rough load and 35% for the finish load.

Plateau Finish:
Use 1000 grit stones in plateau mode at 80 RPM and load set at 20% for 2 - 3 strokes.

Brush Finishing:
Use plateau bushes in plateau mode at 80 RPM and the load set at 20% for 4 strokes.

Single Step Honing Process

There still may be a call for a simple one step process where you may use one grit size abrasive and follow up with a plateau brush for a few strokes. Typically, this is done with part number using 325-400 grit diamond abrasive to size, using 50% roughing load and 40% finishing load. This is then followed by 4 to 6 strokes in the plateau mode at 15% load with plateau brushes. This won't allow for much plateau or RvK, but it does produce a 18 to 24 microinch (.46 -.61 µm) Ra finish.

Honing Alusil, Silitec, and Lokasil Cylinders Using Synthetic Coolant

These instructions are for honing Alusil, Silitec and Lokasil cylinders with Rottler honing machines that have water based synthetic coolant in the sump tank.

Equipment And Parts Needed:
*   **Machine**: Rottler HP6A, HP7A, H70 Series, H80 Series
*   **Coolant**: Commercial honing oil with a low or medium viscosity.
*   **Hone Head:** For HP6A and HP7A Rottler part # 514-9B, For H70 and H80 Series machines Rottler part # 514-9R.
*   **Stone Holders:** Rottler parts determined by size of bore.
*   **Abrasives:** Rottler 500 grit diamonds part # 514-9-14V (do not substitute different grit size)
        Rottler 600 grit diamonds part # 514-9-14G (do not substitute different grit size)
        KS finishing diamonds Rottler part# 514-9-18P (do not substitute different grit size)
        Rottler felt wipers part # 514-9-21E
        Rottler silicon compound part # 514-9-21F

Instructions for Honing Alusil, Silitec, and Lokasil Cylinders

Cylinders should be bored to within .002 with a PCD insert. This is very important to prevent fracturing of silicon particles below the finish surface of bore. If PCD isn't used the exposure of the silicon will result in a defective sliding surface for piston and rings.

Turn off the coolant motor. Use a spray bottle with honing oil to spray the cylinders during the honing process. Place a drip tray under the block to catch the honing oil runoff to prevent contaminating machine coolant.

Cylinders should then be honed using Rottler 500 grit diamond stones (514-9-14V no substitutes) to size with tolerance of +.0002 -.0000 (.00508 -.0000mm). Machine parameters should be set as follows: RPM 170 to 180, Honing loads should be set at 20% to 25% for roughing and 15% finish load.

NOTE: When using the diamond stones they should be trued in to diameter of cylinder by using them in cast iron cylinder the same diameter of aluminum cylinder being honed. This includes the KS finish diamonds also.

Next install the Rottler 600 grit finishing diamonds (514-9-14G no substitutes) and run one cycle in the plateau mode. The plateau mode parameters are different in each type of hone machine. You will need to change these parameters (see operating instructions) to 10 strokes per cycle and a honing load of 15%. Cylinders should already be to size from previous step. You are not trying to remove much material with this operation. The need for this operation is to lower the surface finish for the next step.

Next install the KS finishing diamonds (514-9-18P no substitutes) and run one cycle in the plateau mode. This operation will prepare the surface finish for the final step.
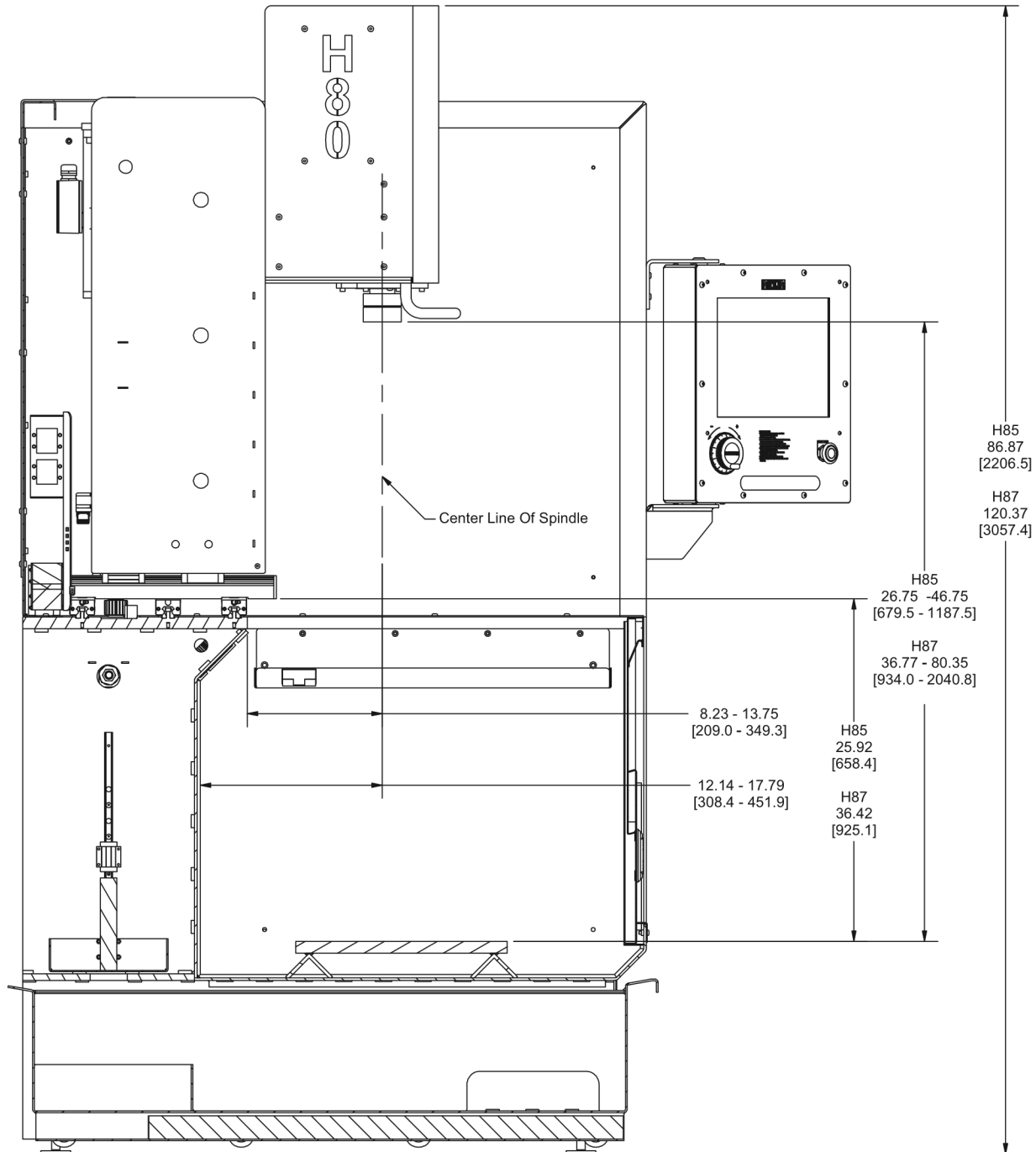
NOTE: Chamfer or break the edge of the exposing stones prior to using them in bore. This will help prevent chipping on stone edges.

The last step in the process is to expose the silicon particles by eroding the surrounding metal away from the silicon particles using Rottler felt pads part # 514-9-21E. These are used with Rottler silicon compound paste part # 514-9-21F. Take a small paint brush and apply paste to felt wipers and the entire cylinder. Install hone head in bore and hone for approximately 45 to 60 seconds per cylinder. Machine settings for this operation should be RPM 160 to 170, strokes per minute of 60, shut-off automatic stone feed up. Start machine and feed stones up manually until load reaches 15%. Let machine run for 45 to 60 seconds per cylinder. Reapply silicon compound to felt pads and to each following cylinder. There is no need to over stroke cylinder during this process so shorten stroke length accordingly.

Honing Alusil, Silitec, and Lokasil Cylinders Using Hone Oil

These instructions are for honing Alusil, Silitec and Lokasil cylinders with Rottler honing machines that have mineral based honing oil in the sump tank.

Equipment And Parts Needed:
- **Machine**: Rottler HP6A, HP7A, H70 Series, H80 Series
- **Hone Head:** For HP6A and HP7A Rottler part # 514-9B, For H70 and H80 Series machines Rottler part # 514-9R.
- **Stone Holders:** Rottler parts determined by size of bore.
- **Abrasives:** Rottler 500 grit diamonds part # 514-9-14V (do not substitute different grit size)
    Rottler 600 grit diamonds part # 514-9-14G (do not substitute different grit size)
    KS finishing diamonds Rottler part# 514-9-18P (do not substitute different grit size)
    Rottler felt wipers part # 514-9-21E
    Rottler silicon compound part # 514-9-21F

Instructions for Honing Alusil, Silitec, and Lokasil Cylinders

Cylinders should be bored to within .002 with a PCD insert. This is very important to prevent fracturing of silicon particles below the finish surface of bore. If PCD isn't used the exposure of the silicon will result in a defective sliding surface for piston and rings.

Cylinders should then be honed using Rottler 500 grit diamond stones (514-9-14V no substitutes) to size with tolerance of +.0002 -.0000 (.00508 -.0000mm). Machine parameters should be set as follows: RPM 170 to 180, Honing loads should be set at 20% to 25% for roughing and 15% finish load.

NOTE: When using the diamond stones they should be trued in to diameter of cylinder by using them in cast iron cylinder the same diameter of aluminum cylinder being honed. This includes the KS finish diamonds also.

Next install the Rottler 600 grit finishing diamonds (514-9-14G no substitutes) and run one cycle in the plateau mode. The plateau mode parameters are different in each type of hone machine. You will need to change these parameters (see operating instructions) to 10 strokes per cycle and a honing load of 15%.

Cylinders should already be to size from previous step. You are not trying to remove much material with this operation. The need for this operation is to lower the surface finish for the next step.
Next install the KS finishing diamonds (514-9-18P no substitutes) and run one cycle in the plateau mode. This operation will prepare the surface finish for the final step.

NOTE: Chamfer or break the edge of the exposing stones prior to using them in bore. This will help prevent chipping on stone edges.

Turn off the coolant motor for the final process.

The last step in the process is to expose the silicon particles by eroding the surrounding metal away from the silicon particles using Rottler felt pads part # 514-9-21E. These are used with Rottler silicon compound paste part # 514-9-21F. Take a small paint brush and apply paste to felt wipers and the entire cylinder. Install hone head in bore and hone for approximately 45 to 60 seconds per cylinder. Machine settings for this operation should be RPM 160 to 170, strokes per minute of 60, shut-off automatic stone feed up. Start machine and feed stones up manually until load reaches 15%. Let machine run for 45 to 60 seconds per cylinder. Reapply silicon compound to felt pads and to each following cylinder. There is no need to over stroke cylinder during this process so shorten stroke length accordingly.

Work Envelope Dimensions

Refer to the dimensions in the illustration below to determine if the machine can handle the intended work piece.

Center Line Of Spindle

H85
86.87
[2206.5]

H87
120.37
[3057.4]

H85
26.75 -46.75
[679.5 - 1187.5]

H87
36.77 - 80.35
[934.0 - 2040.8]

8.23 - 13.75
[209.0 - 349.3]

H85
25.92
[658.4]

12.14 - 17.79
[308.4 - 451.9]

H87
36.42
[925.1]

Honing a Cylinder Block

Introduction

The purpose of this section is to familiarize the operator with various features of the H85AXYY.

The operator should have a working knowledge of honing and be familiar with using a power hone.

It is suggested that scrape block be used for the following walk-through.

Definitions of terms used in this section:

Button: A labeled icon on the control display screen.
Touch: To activate an icon button we will use the term touch. ie: Touch CYCLE START button to start the programed honing process. Some buttons will stay active once they have been touched and must be touched a second time to deactivate.
Touch and Hold: Some buttons are momentary buttons and you must maintain contact with the button to keep it active. ie: When the Z- button is touched and contact maintained the hone head will travel downward until contact with the button is released.
Value Box: A small box section of the screen that contains a number that indicates a value for the function listed next to it.

Safety Reminders:

When machine is idle the spindle should always be keep in the full up position and the E-STOP engaged. This deactivates touchscreen controls to prevent any accidental activation. The word E-STOP IN will be displayed on the red Stop Machine button at the lower left corner of the operation screen

The operator can stop the honing process at any time by touching the STOP MACHINE button. Touching the CYCLE START button again will restart the process.

If an emergency situation arises or if the touchscreen is not responding, pressing the E-STOP button will shut off power to all motors and solenoids and bring the hone to a stop. The word E-STOP IN will be displayed on the Stop Machine button. To release the E-STOP turn the button clockwise until it pops out.

Getting Started

Once the machine is set up and ready to run turn on power to machine by flipping the power switch to the on position.

It will be assumed that the machine is being operated without a keyboard or mouse attached.

The computer will start up and boot screen will appear on the monitor. This may take a few minutes if operating system is doing an update.

Double Touch the Start Rottler icon. The HOME screen will appear on the monitor.

This is the Home screen. Using the jog buttons touch the X+ button to move the carriage to the right side of the machine. Touch the Z+ button to raise the spindle all the way to the top. Now the machine is in its block loading position. Engage the E-STOP by pressing the red E-STOP switch.

The Stop Machine button now reads E-STOP IN. It is now safe to work inside the tank area.

Planning the Job

Block Specifications
- You will need to know the following information for the job you are planning:
- Finish bore size, cross hatch angle, and finish.
- Bore length.
- Center to center dimension of cylinders.
- If the job is a V type block, the pan rail to crank line center dimension, and cylinder offset between cylinder banks.

Tooling Selection
You will need to decide what honing process will be used and if there will be a final plateau process for the job. Based on that decision use the following charts to select which hone head, stone holders, stones, and if need brushes.

Now is also a good time to set your bore gauge to desired final size.

Stone and Brush Selection

Use the following charts to select the stones and brushes to obtain the desired finish

NOTE: Ra - Roughness Average. Value before Ra is in micro inches. Value in brackets um is micro meters. Long designates length of stone. Height designated thickness of stone.

Set of 4	Set of 6	Diamond Stones, .312" (7.90mm) Height
514-9-14F	514-9-32F	80 grit, 3" (76mm) long, 90Ra (2.25um)
514-9-14R	514-9-32R	80 grit, 3 1/2" (89mm) long, 90Ra (2.25um)
514-9-21R		80 grit, 4" (102mm) long, 90 Ra, (2.25um)
514-9-14W	514-9-32W	140/170 grit, 3" (76mm) long, 50-75Ra (1.25 - 1.875um)
514-9-21W		140/170 grit, 4" (102mm) long, 50-75 Ra, (1.25 - 1.875um)
514-9-14K	514-9-32K	170/200 grit, 3 (76mm) long, 45-60Ra (1.125 - 1.5um)
514-9-14M		170/200 grit, 3 1/2" (89mm) long, 45-60Ra (1.125 - 1.5um)
514-9-21M		170/200 grit, 4" (102mm) long, 45-60 Ra, (1.125 - 1.5um)
514-9-14J	514-9-32J	270/325 grit, 3" (76mm) long, 35-45Ra (.875 - 1.125um)
514-9-14T	514-9-33B	270/325 grit, 3 1/2" (89mm) long, 35-45Ra (.875 - 1.125um)
514-9-14Z		270/325 grit, 4" (102mm) long, 35-45Ra (.875 - 1.125um)
514-9-14E	514-9-32E	325/400 grit, 3" (76mm) long, 24-30Ra (.6 - .75um)
514-9-14Q		325/400 grit, 3 1/2" (89mm) long, 24-30Ra (.6 - .75um)
514-9-14X		325/400 grit, 4" (102mm) long, 24-30Ra (.6 - .75um)
514-9-14V		500 grit, 3" (76mm) long, 15-19Ra (.375 - .475um)
514-9-14C	514-9-32C	325/400 grit, 3" (76mm) long, 18-22Ra (.45 - .55um)
514-9-14P		500 grit, 3-1/2" (89mm) long, 18-22Ra (.45 - .55um)
514-9-14U		500 grit, 2 1/2" (64mm) long, 18-22Ra (.45 - .55um)
514-9-14L	514-9-32L	550 grit, 3" (76mm) long, 15-19Ra (.375 - .475um)
514-9-14N		550 grit, 3 1/2" (89mm) long, 15-19Ra (.375 - .475um)
514-9-14G	514-9-32G	600 grit, 3" (76mm) long, 8-12Ra (.2 - .3um)
514-9-14S		600 grit, 3 1/2" (89mm) long, 8-12Ra (.2 - .3um)
514-9-21G	514-9-33	800 grit, 3" (76mm)
	514-9-33A	800 grit, 3 1/2" (89mm)
	514-9-33C	800 grit, 4" (102mm)
514-9-21H		1000 grit, 3" (76mm)
514-9-21J	514-9-33J	1200 grit, 3" (76mm)
Set of 4	Set of 6	Diamond Stones, .200" (5.10mm) Height

514-9-14D	514-9-33B	325/400 grit, 3" (76mm) long, 18-22Ra (.45 - .55um)
Set of 4	**CBN Stones, .321" (7.90mm) Height**	
514-9-35C	CBN Stones, 320 grit, 3" (76mm) long	
514-9-35D	CBN Stones, 400 grit, 3" (76mm) long	
514-9-35B	CBN Stones, 600 grit, 3" (76mm) long	
Set of 4	**Brushes for Plateau Finishing**	
514-9-14H	Plateau Finishing, .550" (14mm) height, 3 1/2" (89mm) long, requires one or two size smaller stone holder compared to .312" (7.90mm) height diamond stone	
514-9-14Y	Plateau Finishing, .395" (10mm) height, 3 1/2" (89mm) long, requires same or one size smaller stone holder compared to .312" (7.90mm) height diamond stone	

Loading the Block

The next step is to load the block that will be honed onto the fixture. In this tutorial the optional auto rotate fixture is shown. The block loading procedure is the same for the manual fixture. Select the block that will be used. In this tutorial a small block V-8 will be used.

Set the riser blocks on the fixture cradle so that the pan rails are sitting on the surface that was determined to be closest to ideal.

⚠ **CAUTION**   The main caps must be on when a V-Block is honed and on an Inline Block if the optional clamp arms are not be used.
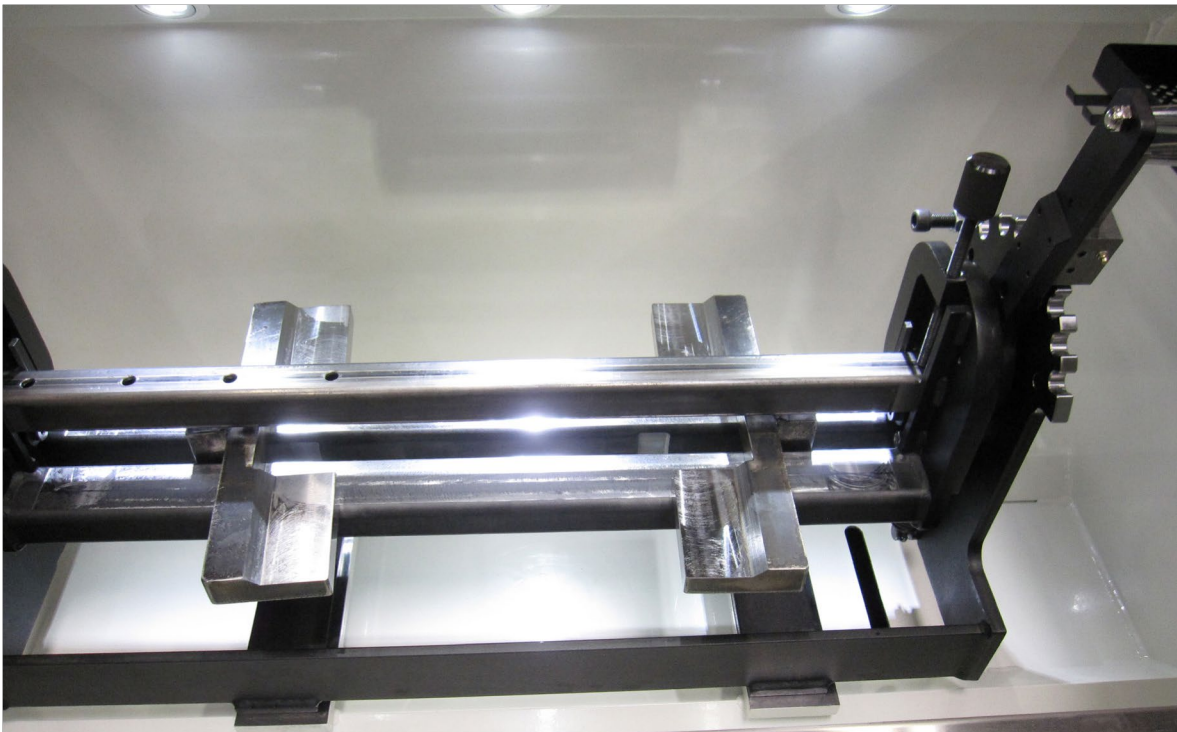
Place the clamp bar tube through the main bore of the block. Be certain that the machined flats at the end of the clamp bar tube are in a vertical position.

Use an appropriate method to place the block on the riser parallels with the front of the block facing left or away from the control pendent. Take care to align the clamp tube with the receiver slots on the cradle. Once the block is sitting on the riser blocks place the clamp bar lock downs over the tube and turn the knobs until the clamp tube is secured.
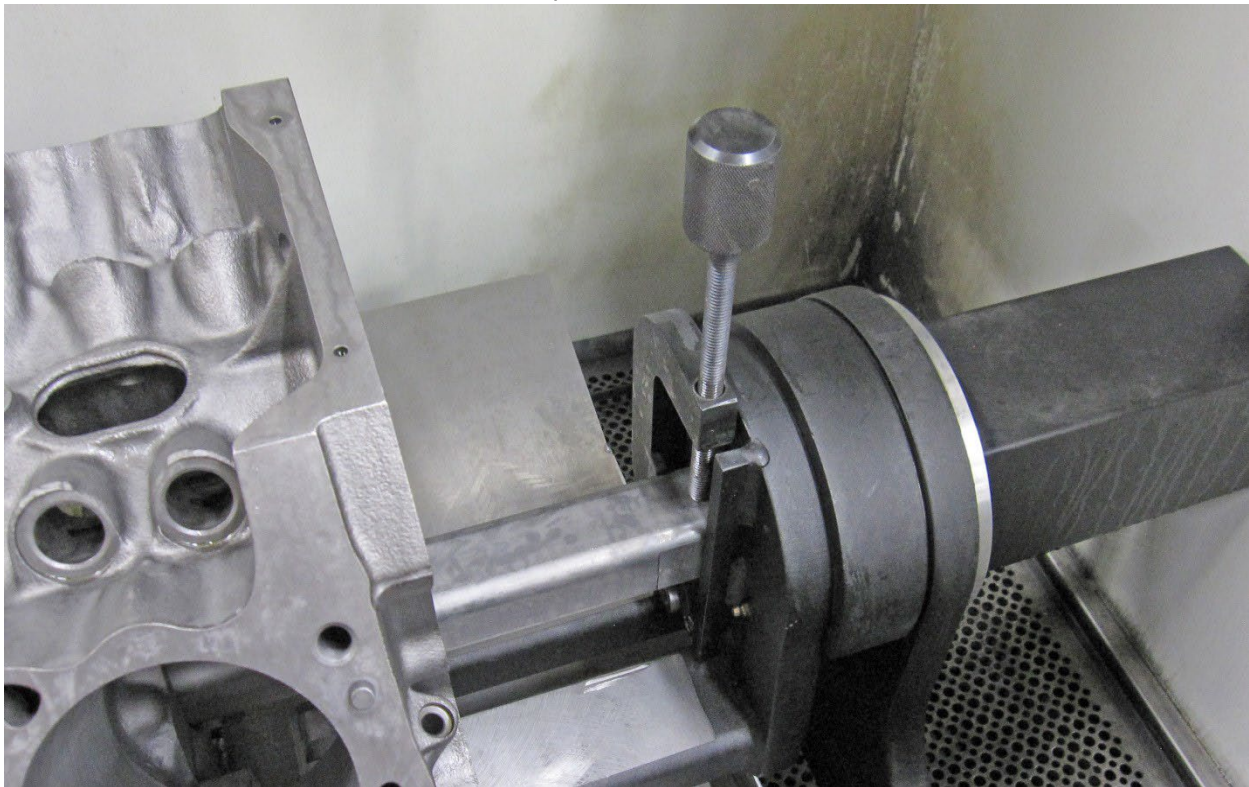
Programing Set Up

Now that the block has been placed on the fixture and tooling has been chosen, select the stones and holders to be used in the first process. Put holders and stones into the hone head and mount hone head on spindle of machine.
The H85AXYY machines use a standard Kwik Switch mount system for the hone heads.

To mount a hone head confirm that the locknut is in the open position.
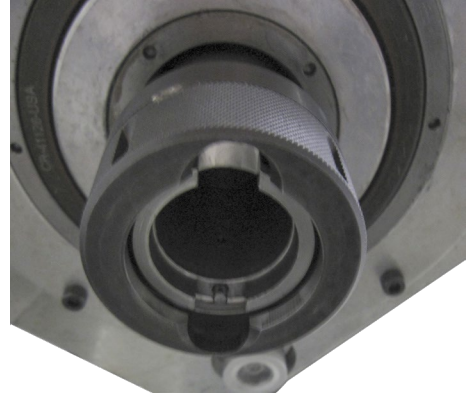
The hone head will have the standard locking tabs on the mounting adaptor and a drive coupler for adjusting the stones. When mounting the hone head it will be necessary to align the drive coupler with its receiver inside the drive spindle. Once they are aligned the adaptor tabs will fit into the receiver slots. The tabs will activate the release pin and the locknut will automatically turn to lock the hone head in place.

Due to design the nut will continue tighten during use. When it comes time to change or remove the hone head it may become so tight that the release wrench will be needed to loosen the locknut. Turn locknut clockwise to release the hone head.
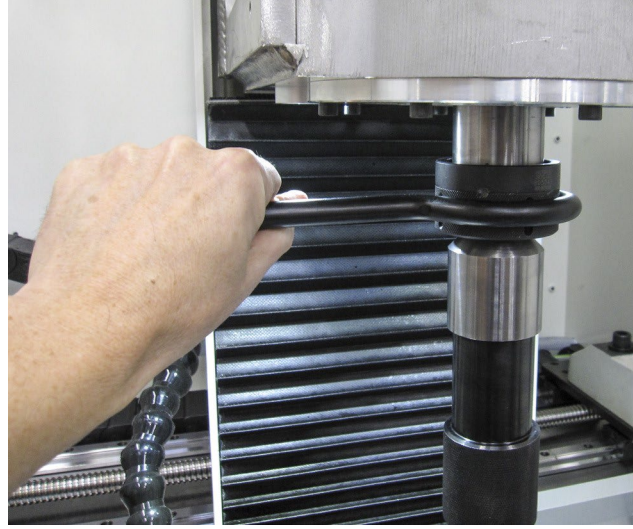
Consult the tooling charts in the previous section to determine which hone head and stone holders will be needed for the job you are setting up for.

Prior to hone head installation confirm that the con rod is at least 1/4"(6mm) up inside the hone body. This will assure that the homing procedure will function correctly.

Once the hone head is attached release the E-STOP switch and touch the Home button to calibrate the hone head set up to the machine program.

Once homing is complete, check that cone rod is all the way up inside the hone head before proceeding. *THIS IS CRITICAL*. If for some reason the cone rod doesn't reach it's upper most travel point when homing is completed, then the bore size range will not be properly calibrated. This could result in the cone rod coming out of the hone body during operation and could potentially cause damage.

IMPORTANT: Whenever a hone head set up is changed the machine must be Homed.

Now that the machine is set up for honing we will construct a program to hone the block.

Creating a Program
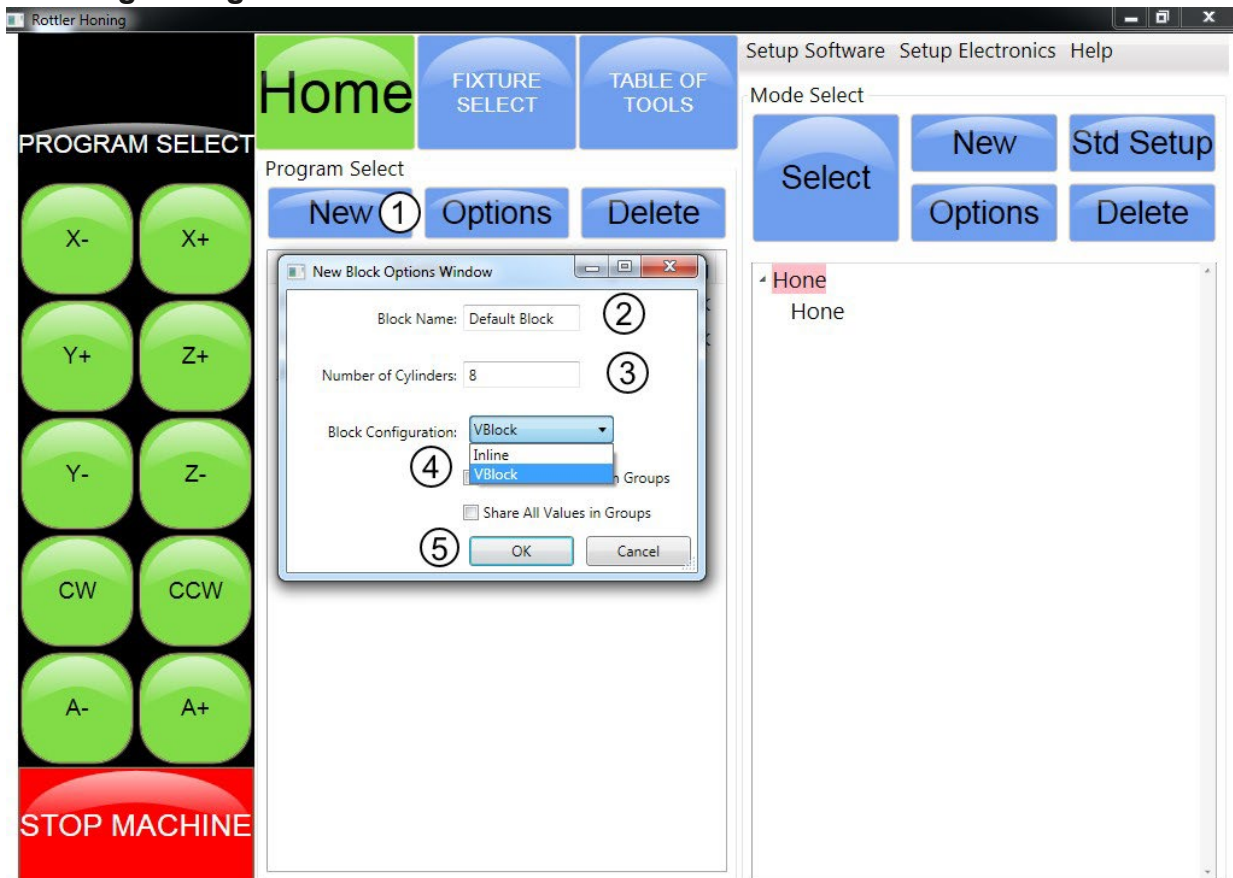
On the home screen under the Program Select touch the New button (1) and the New Block Options Window will appear.

Name the block,(2) input number of cylinders (3) and choose VBlock or Inline.(4) Touch OK (5) when finished.

The new block program title (1) will appear on the list.

For this tutorial we will use the standard kDefault Block and its settings.
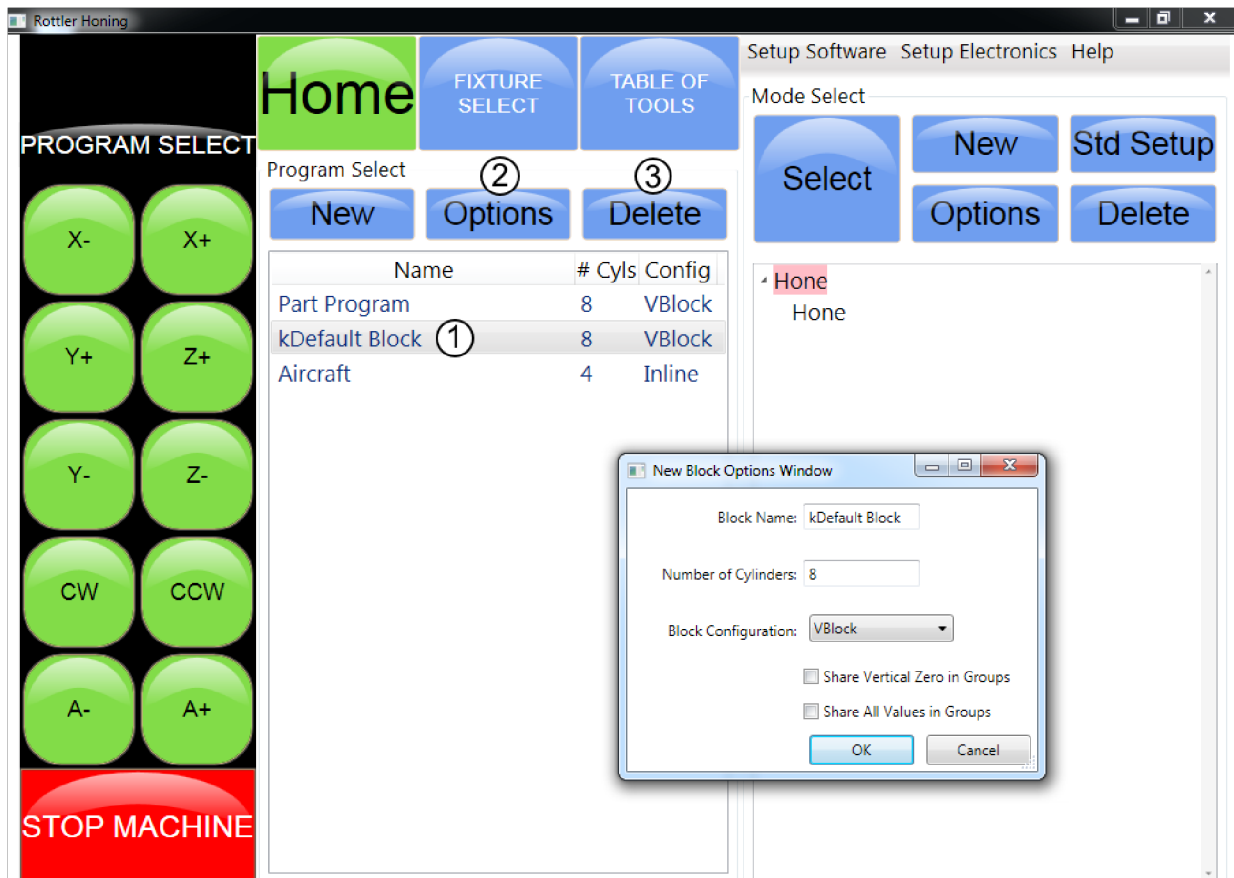
The Options button (2) will bring New Block Options Window back where you can edit information for the block that is highlighted. Highlight the block program you want to edit, then touch the Options button.

The Delete button (3) while bring up the Delete Window.(4) Highlight a block program and touch the Delete button.

Touch the Yes button (5) if you want to delete the block that is highlighted.

Mode Select Section of Home Screen

Click the Setup Software menu tab and this drop down menu will appear.
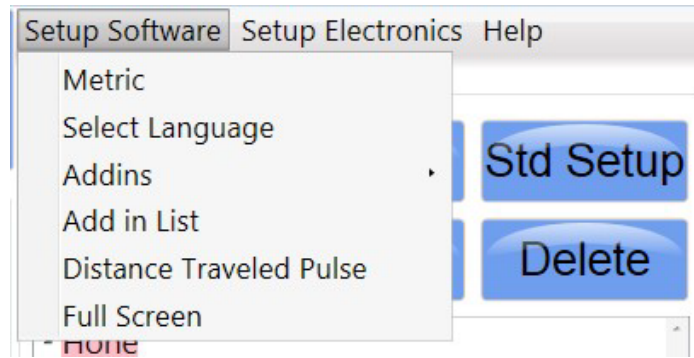
Operator should only concern themselves with the first two. Click on Metric and all readings and settings on the monitor will be metric. Uncheck Metric to return all readings and settings to inch. Click on Select Language to have everything on screen in a different language.
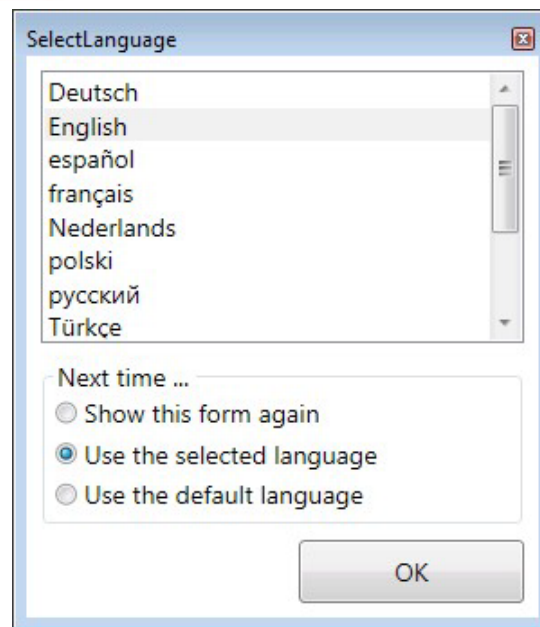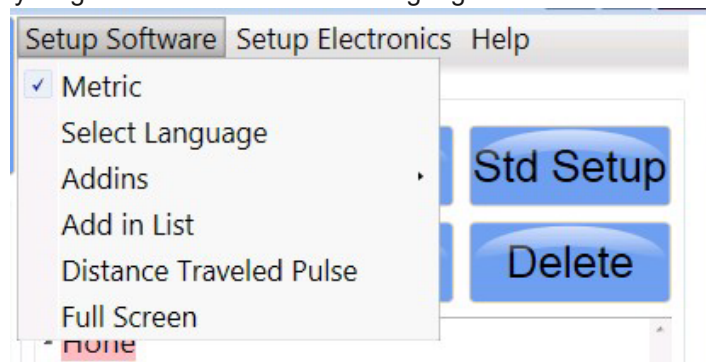
⚠ **CAUTION**   The rest of the menu items and those of the Setup Electronics tag are used only for machine setup at the factory or for use by qualified service person when needed.

Touch the New Button (1) and the New Mode Select screen (2) will appear.
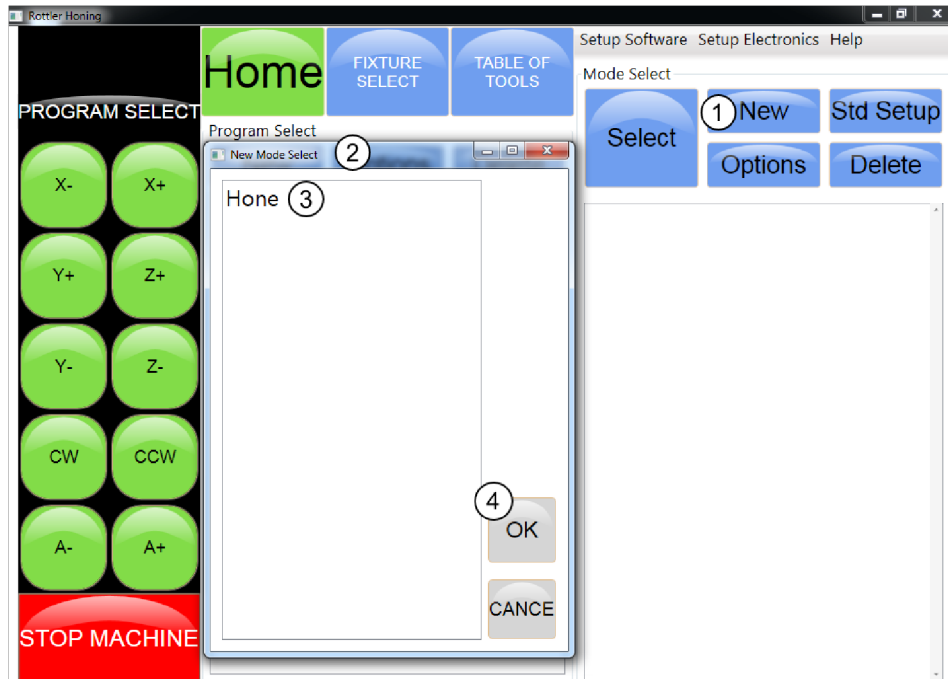
Highlight Hone (3) and touch OK.(4) The Hone program (5) will appear in the Mode Select section
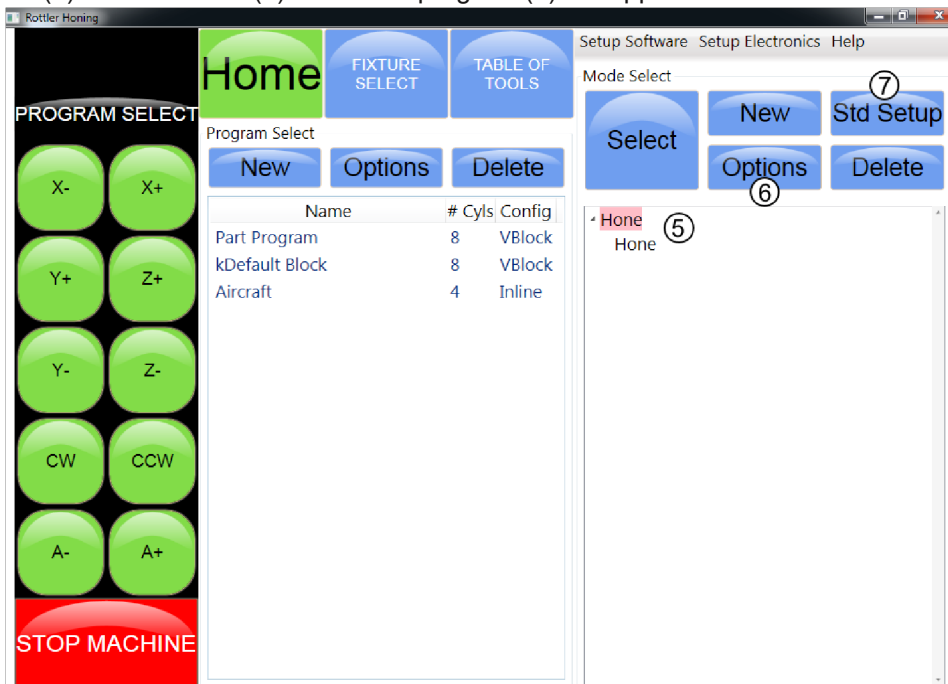
Clicking the Options button (6) will bring the following window. Name of Hone process can be changed in this window.
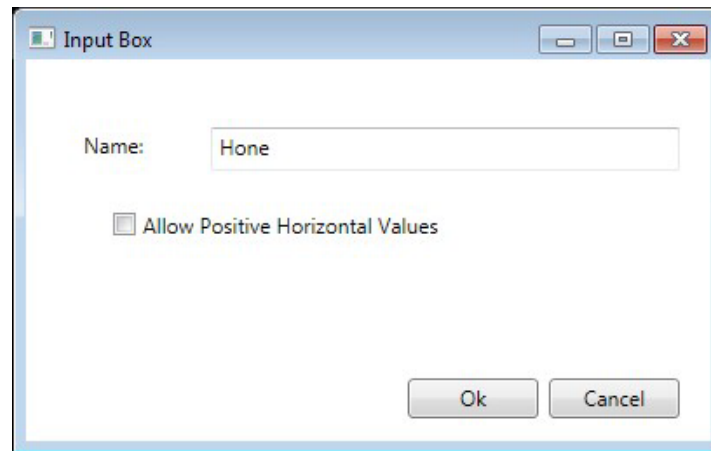
The Std Setup button (7) will bring up the following window. If you want to delete all settings in a block program that is highlighted and return the factory default setting click Yes.
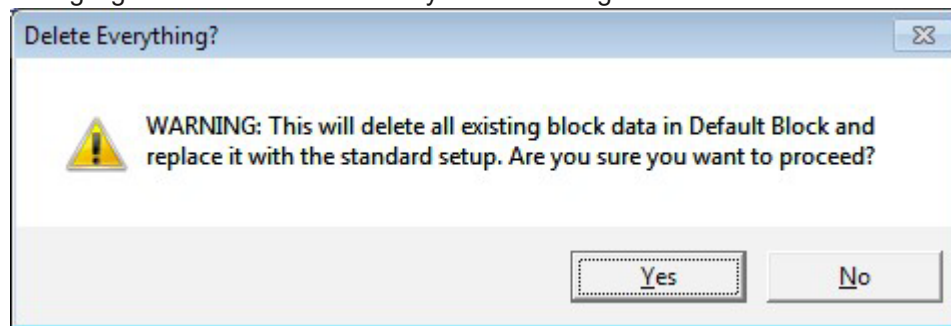
If you choose the Std Setup the following Hone Modes will be loaded onto the Mode Select screen.

Highlight the Hone (1) process for the block program you just created. If the Std Setup was chosen select either Rough Hone or Finish Hone.
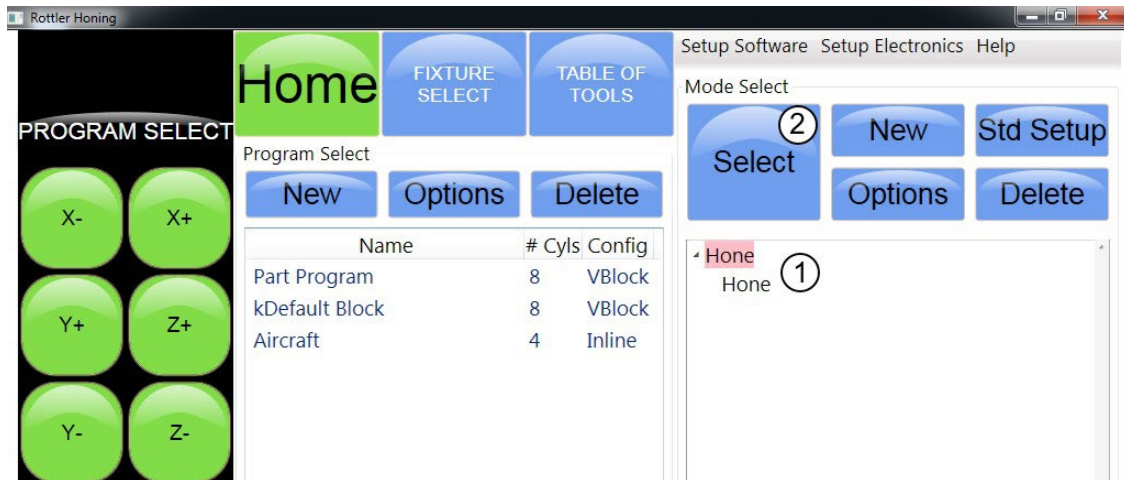
Click on the Select button (2) to bring up the Setup screen.

Operations Setup Screen

Setup Tab
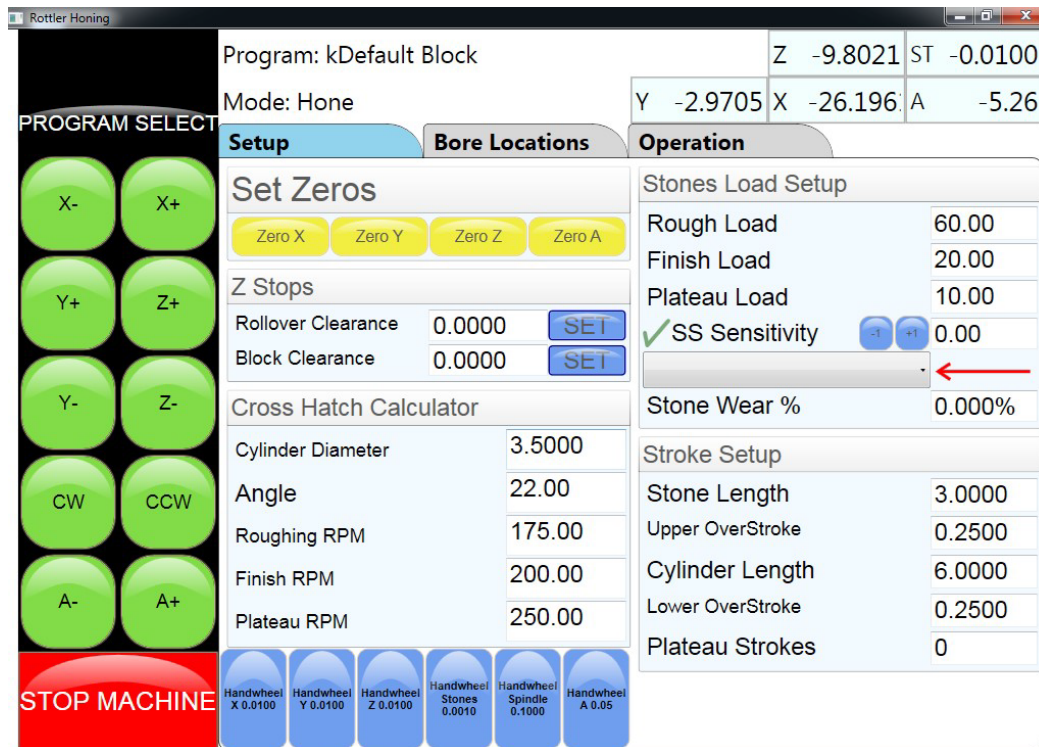
This is where machines setting are input.

Stones Load Setup	
Rough Load	60.00
Finish Load	20.00
Plateau Load	10.00
✓ SS Sensitivity	−1 +1 0.00
LARGE HONE HEAD ▾	

Begin be going to the Stones Load Setup section and inputting the values that will be used for the block you are going to hone. Touching one of the value boxes will bring up the number pad that can be used to input the value you wish to use. Set the short stroke sensitivity.
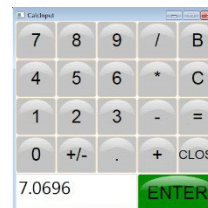
Select the hone head to be used by using the drop down menu.

Move down to the Stroke Setup section and input the values for this section. Cylinder Length is the measurement of the longest section of the cylinder. The amount of OverStroke is usually dictated by the clearance of bottom of the cylinder to the main web. When clearance is not an issue a setting of .250-.500 is a good place to start.

Stroke Setup	
StoneLength	3.0000
Upper OverStroke	0.2500
Cylinder Length	6.0000
Lower OverStroke	0.2500
Plateau Strokes	0

Cross Hatch Calculator	
Cylinder Diameter	3.5000
Angle	22.00
Roughing RPM	175.00
Finish RPM	200.00
Plateau RPM	250.00

Move over to the Cross Hatch Calculator section and input the values for this section. Cylinder Diameter will be the finished size of the cylinders you are honing. Angle will be whatever angle specified by the ring manufacturer or requested by the customer. Roughing and Finish/Plateau RPM is generally set in the 120-200 range. Operator preference and experience will by the final determining factor.

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Zero A

A   ✕

Are you sure you want to zero the A axis?

Yes   No

With the auto rotate fixture you will have to set the zero point. Use a level and hand controls to rotate the cradle to its zero point. Once the cradle is level touch the Zero A button, then Yes on the confirm box to set the zero point.
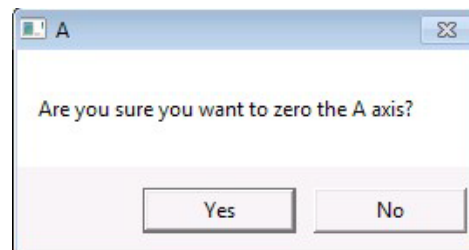
Now touch the Bore Locations tab (1) and the following screen will appear.

Bore Locations Tab
Left Locations Sub Tab
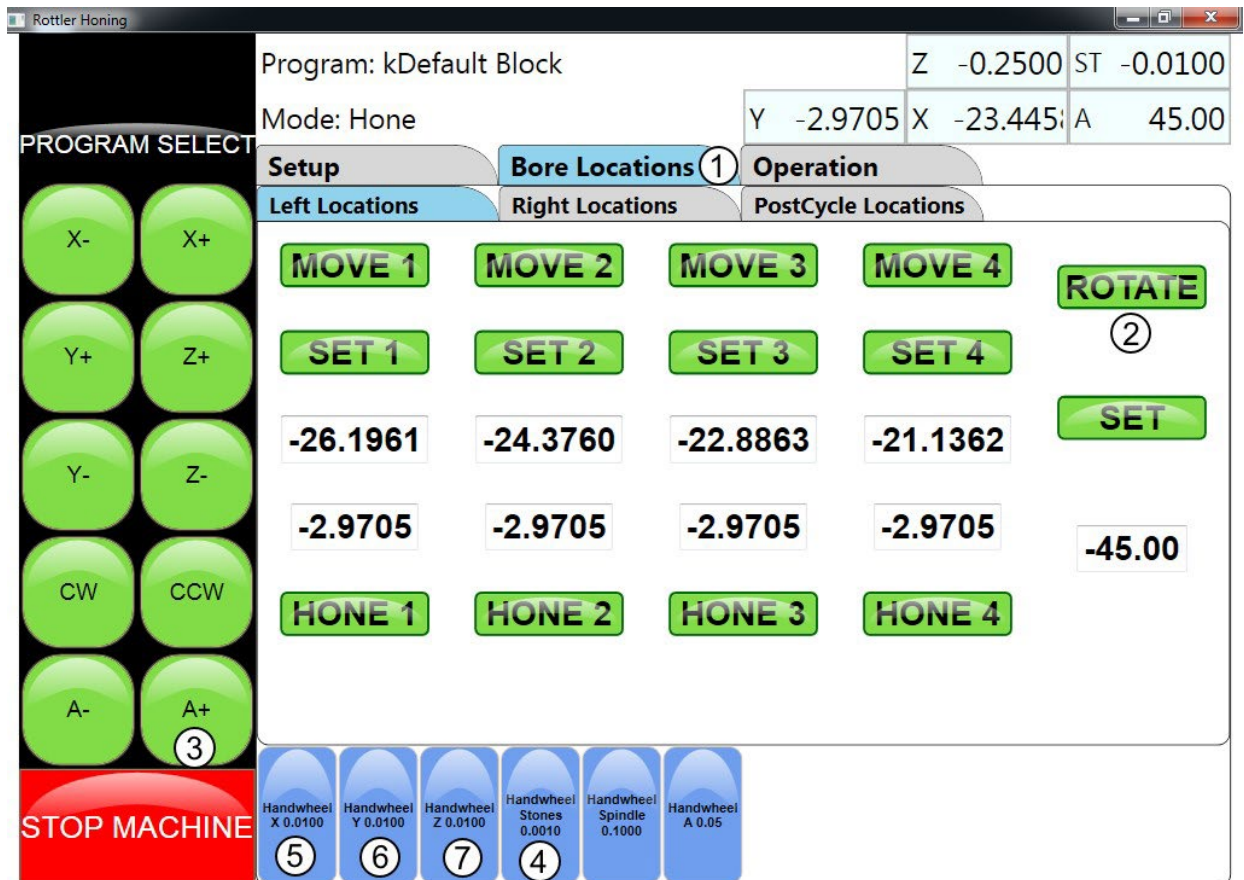
The first thing to do is rotate the fixture so that the left cylinder deck of the block is level. This can be done 3 different ways.
1. Touch the ROTATE button (2) and the fixture will automatically rotate to the proper position.
2. Touch the 4th + button (3) and maintain contact until the proper position is reached.
3. Touch the Handwheel Forth button (4) to activate it. The button will turn red and you can then use the handwheel to rotate the fixture into position.
Note: If your machine is not equipped with the auto rotate fixture then you will simply use the handle lever to move the block from one bank to the other.

Once the left deck is level touch the Handwheel X button (5) to activate it. Using the handwheel or X-button move the carriage until it is over the number 1 cylinder. Activate the Y button (6) and using the handwheel move the carriage until the hone head is centered over the cylinder. Activate the Handwheel Z button (7) and using the handwheel lower the hone head down until the bottom is almost touching the deck. Carefully observe the position of the hone head. It should be aligned with the center of the bore. If needed the side to side position can be adjusted by activating the Handwheel X button (5) and using the handwheel to move the carriage until it is centered over the cylinder. Fore and Aft position can be set by activating the Y Axis button (6) and using the handwheel to move the carriage until it is centered over the cylinder.

Now that the hone head is in its proper position activate the Handwheel Stones button.(4) Using the handwheel retract the stones until there is enough clearance for them to be lowered into the cylinder. Activate the Handwheel Z button (7) and using the handwheel lower the stones into the cylinder. Lower them until the top of the stones are flush with the deck.

Activate the Handwheel Stones button (4) and feed the stones out until they are almost touching the cylinder wall. Again observe the position of the hone head in relation to the center of the bore. If needed make adjustments to get the hone head as near to center as possible.
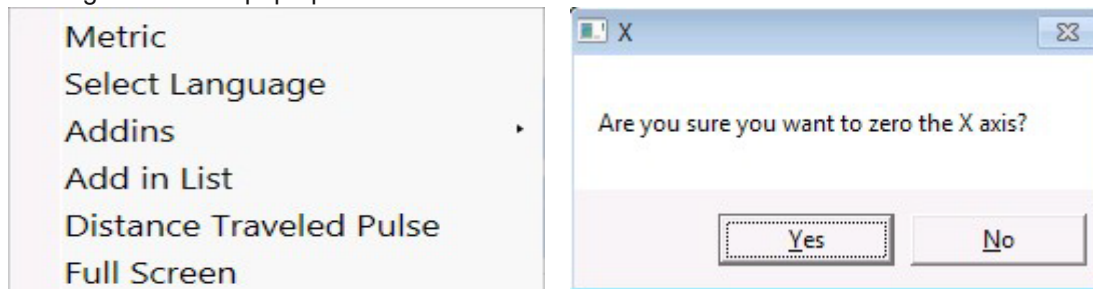
Setting Zeros

Touch the Setup tab to bring back the Setup screen.
In the Set Zeros section touch the Zero X button and then the Zero Z button.

You will get a confirm pop up for each. Touch Yes to continue.

Using the handwheel raise the hone head out of the cylinder out of the bore until the bottom clears the deck by 1-2 inches. In the Z Stops section touch the SET button that is in the same line as the Block Clearance value.
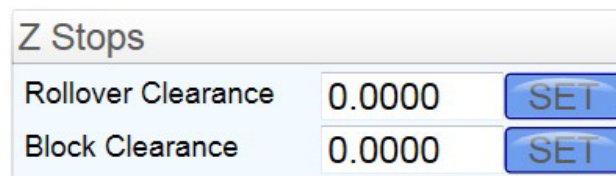
This will tell the machine how much to raise the hone head when it has completed honing a cylinder and will be moving to next during an auto cycle process. If you are honing a V type block then raise the hone head high enough to clear the block when the fixture is moved from one bank to the other. Touch the SET button that is on the same line as the Rollover Clearance value. It should look something like this.
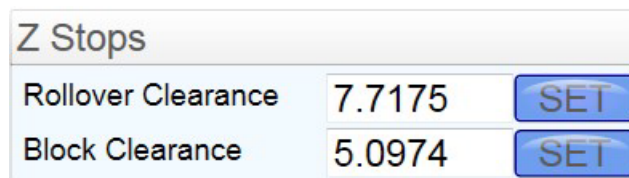

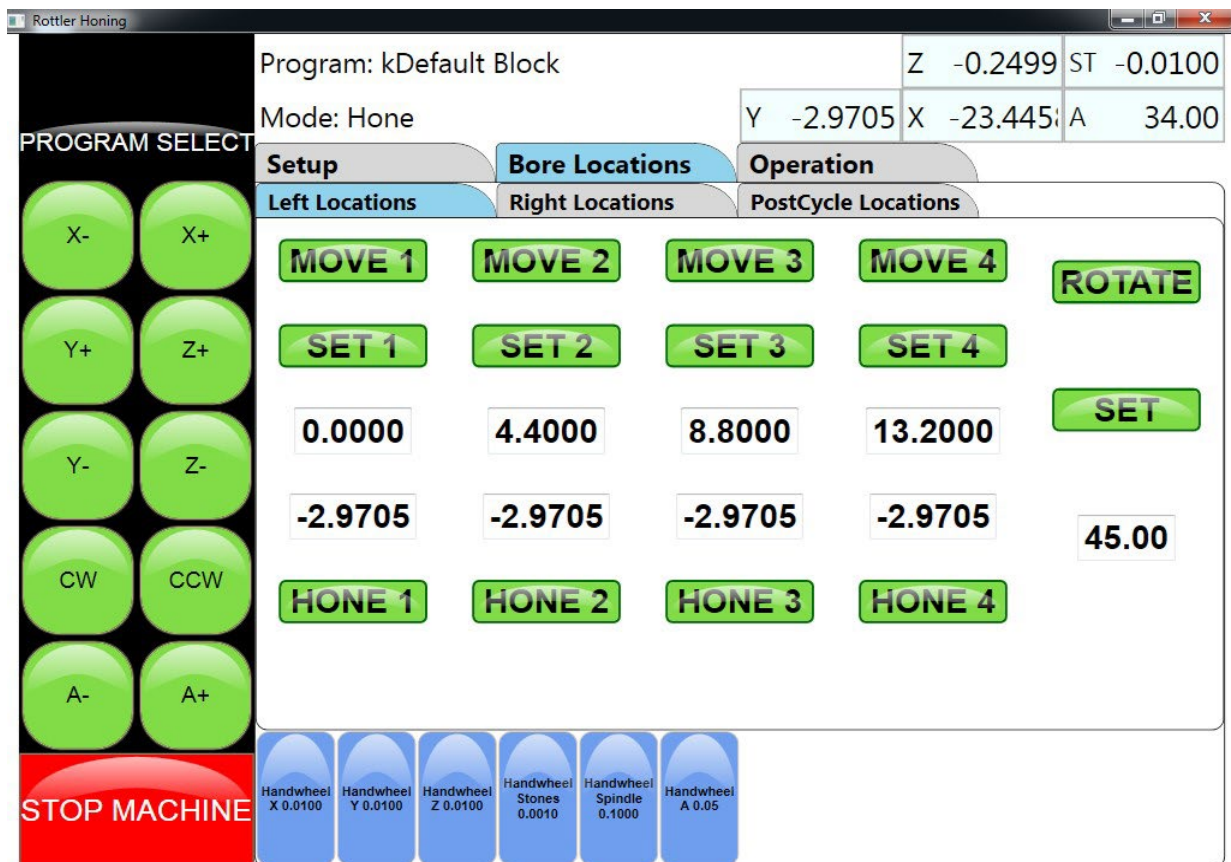These settings also apply to the manual block fixture.
Touch the Bore Locations tab to return to the Bore Locations, Left Locations sub tab.

Setting Bore Locations

Now the bore locations will be entered for the left bank. Location 1 under the MOVE 1 button is 0.00 since that is the zero point that you set when you set the Zero X on the Setup screen. Touch the value box (2) under the MOVE 2 button and the number pad will appear.
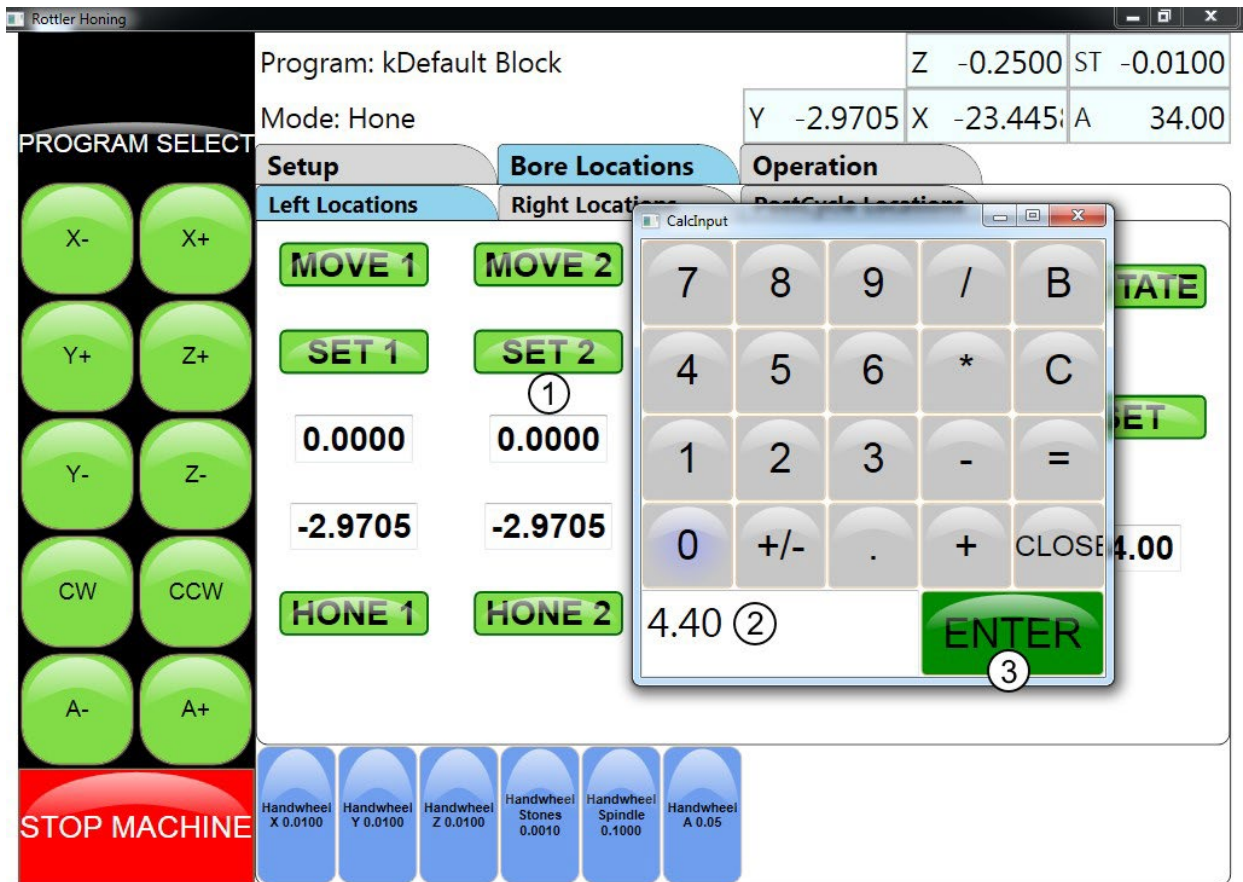
Enter the center to center value (2) for the block you are honing and touch ENTER.(3) In this case the center to center distance is 4.40. Continue on to the next value boxes in line and add the value to the previous setting. In this case I will add 4.40 to 4.40 to obtain 8.80 for the value box under MOVE3. Finally I will add 4.40 to 8.80 to obtain the final value under the MOVE 4 button. When competed it will look like this.

You can check your values by pressing any of the MOVE buttons. The carriage will move to the location that was touched and stop. Touch each button and visually check that the hone head is centered over the bore.

Press the Right Locations tab (1) to bring up the screen for Right Locations.

This is where you will use the bore offset dimension to calculate the bore locations for the right bank. If you do not know the bore offset dimension you can measure the width of the con rod big end and that will give you a close value for the bore offset. In this example the bore offset is .880. Enter .880 in the value box under the MOVE 1 button.(2) Note: The measurement of the width of the big end of the connecting rod only applies to engines where the two connecting rods share a common rod journal.

Continue to add the center to center value in each of the following value boxes. So in this example 4.40 will be added to .880 to obtain the value that is entered in the value box under the MOVE 2 button. When completed it will look like this.
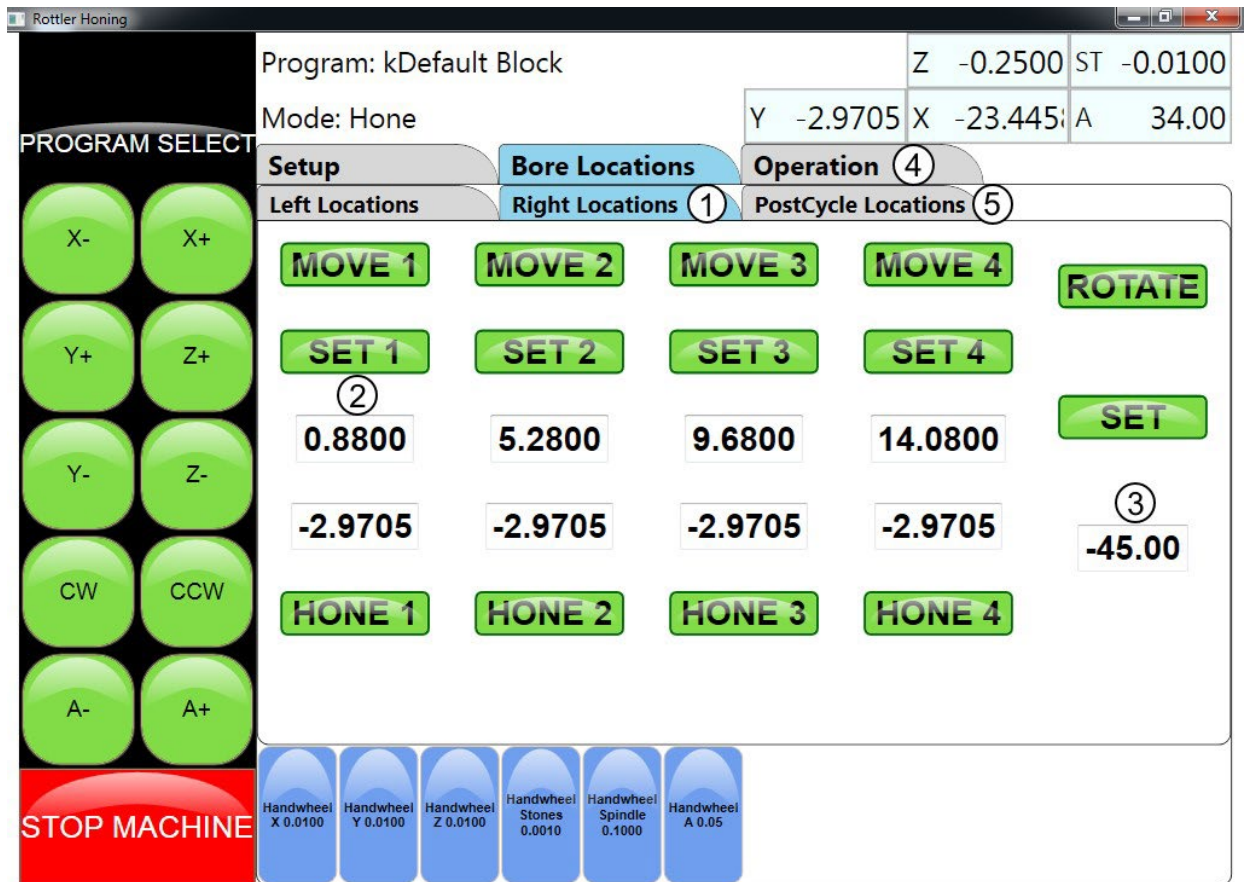
Again verify the settings by touching each of the MOVE buttons and visually checking the location of the hone head.

On machines equipped with the auto rotate fixture touch the ROTATE button to verify that the fixture is moving to the proper bank and that deck is level. On blocks that have a bore angle other than 90º you will have to enter the values in the box under the ROTATE button.(3) For example if you are honing a 60º block you will enter -30.0 in the Right Locations section and 30.0 in the Left Locations section.

Touch the PostCycle Locations tab (5) to bring up the following screen.
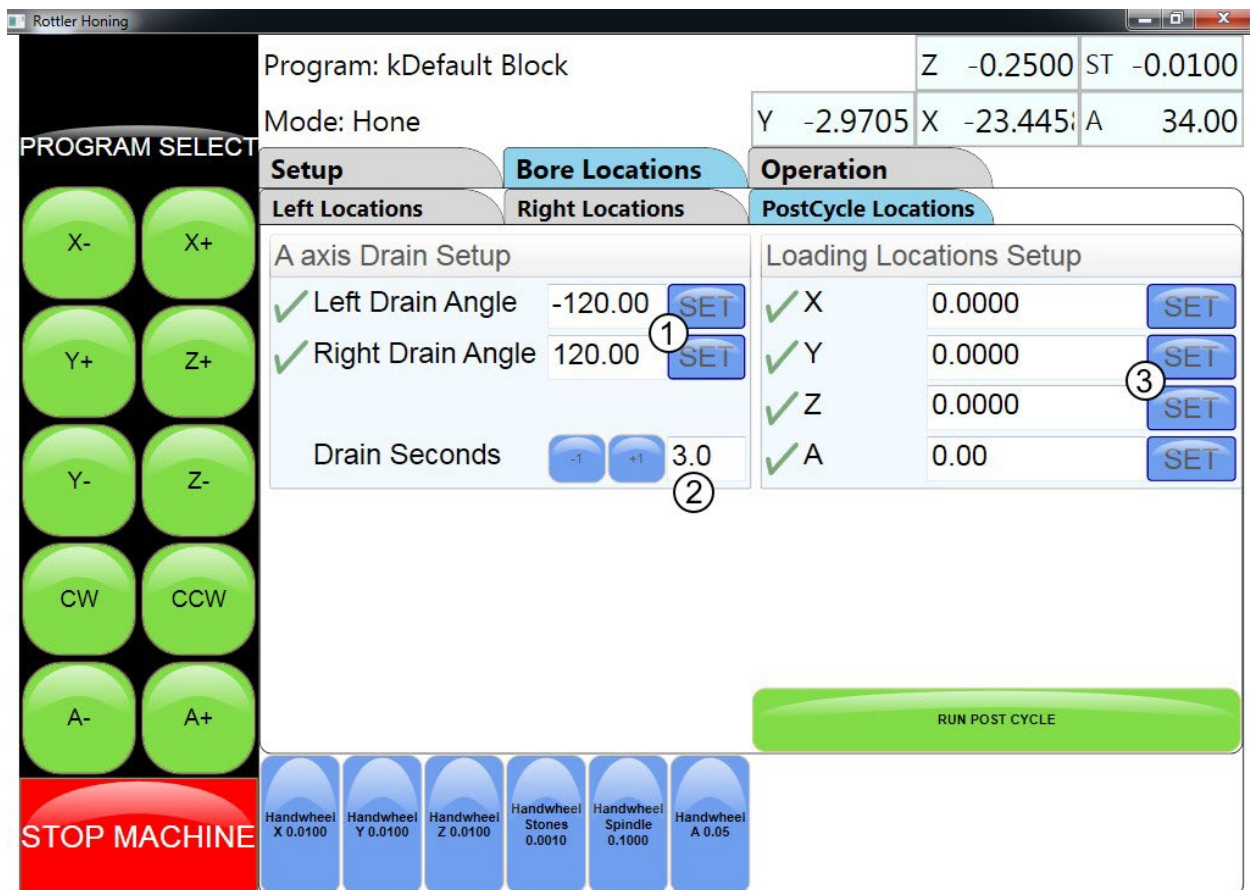
This screen only applies to machines that have the optional auto rotate block fixture installed.

Using the job buttons rotate the block fixture to a point that will allow coolant to drain from the block. Use the SET buttons (1) to lock in the locations. Enter the amount of time in seconds (2) that the block will maintain that position for drainage.

Using the jog buttons move the carriage and spindle to a position that will provide clearance for removing the block from the fixture. Use the SET buttons (3) to lock in the locations.

Operation Tab Settings
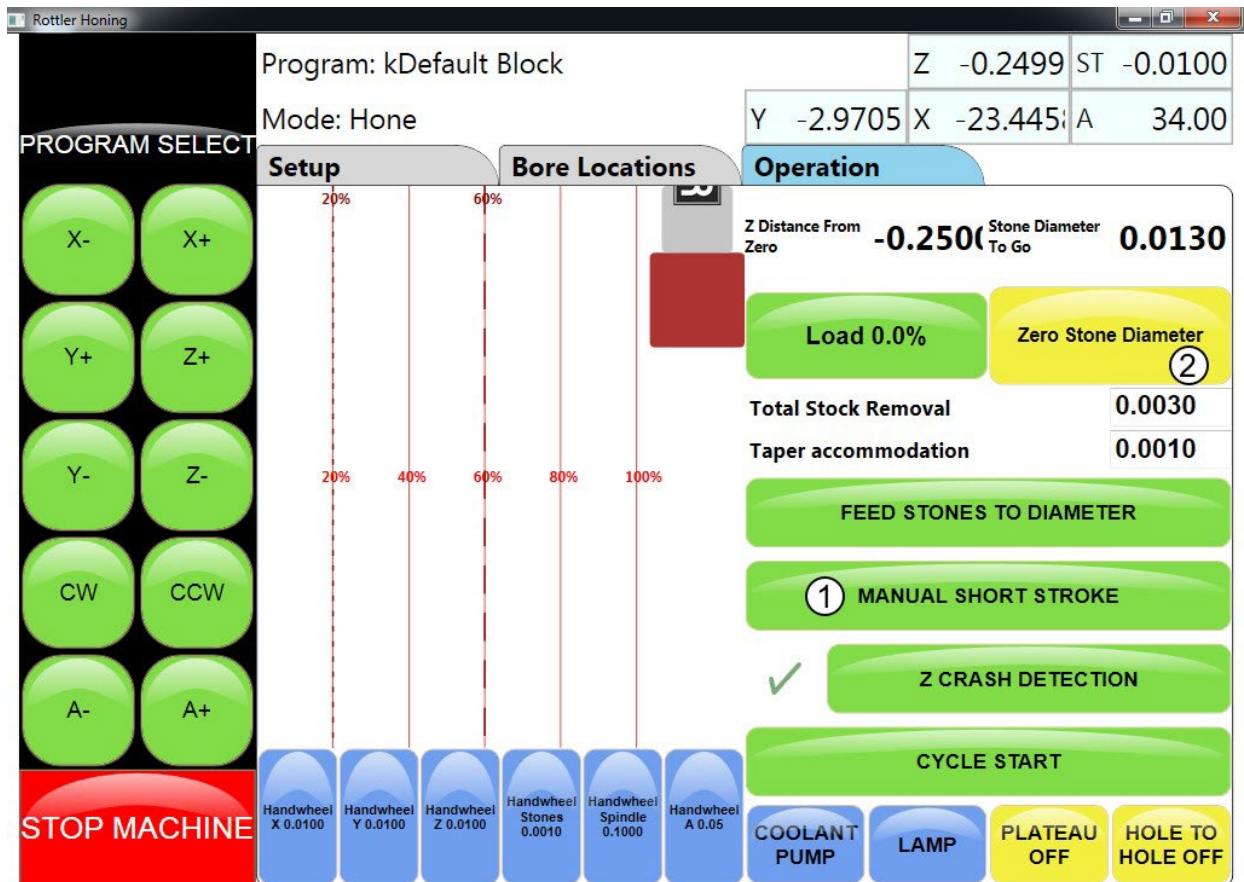
This is the screen where all honing operations take place.

The final setting is the Zero Stone Diameter. This will establish the zero point for hone stone sizing. Move the hone head over the first cylinder of the left bank. This can be done by using the handwheel, however the most accurate way to locate the hone head is to go to the Bore Locations tab and touch the MOVE 1 button. This will move the carriage to the location that is indicated on the screen. Go back to the Operation tab and lower the hone head into the cylinder until the top of the stones are below the deck. Feed the stones out using the handwheel until they are almost touching the cylinder wall.

Touch the FEED STONES TO DIAMETER button.(1) The machine will start up feed the stones out until the preset load is reached. The machine will then shut off. Touch the Zero Stone Diameter button (2) to set the zero point for stone size. Touch the Yes button on the pop up conformation.

Setting Final Bore Size
To set the final bore size you will need to have the current and final desired bore size of the block you are honing. Use your preset bore gauge to determine how much material needs to be removed. Generally .003 is left in bored blocks to hone. In our example the final bore size will be 4.150. Current bore size is 4.147. This leaves .003 to be honed.

With the zero point set enter the amount of stock that needs to be honed to reach final size. In this example we will enter .0020 in the Total Stock Removal value box. We entered .0020 instead of .0030 in order to confirm stock removal rate for the stones being used.

Using the handwheel retract the stones a few thousandths Touch the CYCLE START button. The machine will start, the stones will feed out until the zero point is reached, then go to the bottom of the bore to check for any potential interference. If none is detected the machine will begin the honing process and continue until the amount of stock entered is removed.

When the cycle is completed the hone head will raise out of the cylinder. Move the carriage so that the bore can be checked with a bore gauge.

Note the amount still needed to be removed. In our example the reading is -0.00012 from zero. Go to the Total Stock Removal value box and enter the sum of the current value and amount still needed to be honed. In this case the new value will be 0.0032.

Operation

Z Distance From Zero	**-0.250(**
Stone Diameter To Go	**0.0130**

Load 0.0%	Zero Stone Diameter

Total Stock Removal	0.0030
Taper accommodation	0.0010

FEED STONES TO DIAMETER

MANUAL SHORT STROKE

✓ Z CRASH DETECTION

CYCLE START

COOLANT PUMP	LAMP	PLATEAU OFF	HOLE TO HOLE OFF

Go to the Bore Locations tab and touch the MOVE 2 button to locate the hone head over the next cylinder to be honed. Return to the Operation tab retract the stones slightly and lower the hone head into the cylinder. Touch CYCLE START to repeat the process done on the first cylinder.

If the bore gauge reading for cylinder 2 matches the desired final size the set up process is complete. If the size still doesn't match the final desired size repeat the process done on the second cylinder with the third cylinder. For our example we'll assume that the final size was obtained and we are ready to run the auto cycle.

Go to the Bore Locations tab and touch the HONE 2 button to deactivate it. It will turn yellow to indicate that it is inactive. The HONE 2 button is deactivated because it is already at its final size, so it doesn't need to be honed.

Return to the Operations tab and touch the HOLE TO HOLE button to activate the auto cycle process. The button will turn red and show ON to indicate that it is active.

HOLE TO HOLE ON

Touch the CYCLE START button and the machine will automatically go to the first cylinder, lower the hone head into the bore, go through the setup process, then hone the cylinder to final size. After the honing is complete, the stones will be automatically retracted, the hone head will raise out of the cylinder, and move to the next cylinder and repeat the process. In this case since cylinder 2 is not active the carriage will move to cylinder 3.

When the 4th cylinder is completed the hone head will raise to the rollover clearance height, the fixture will rotate to the other bank, and the 4 cylinders on that bank will be honed.
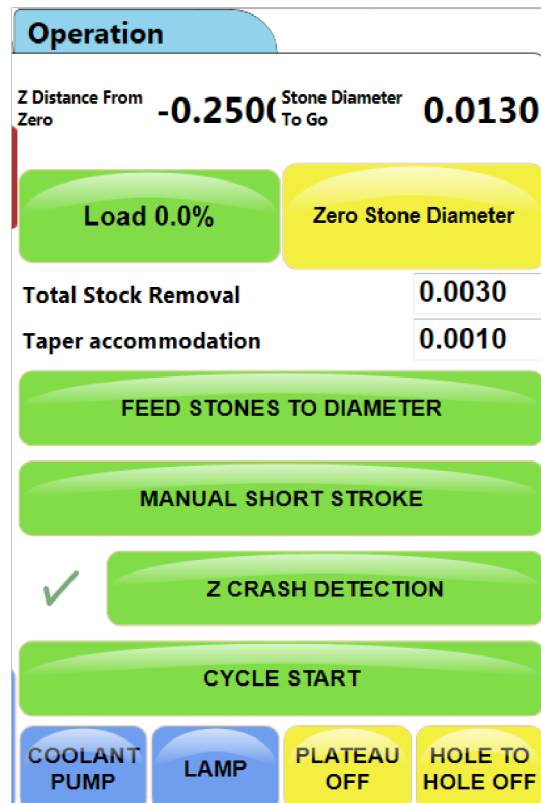
After the final cylinder is honed the hone head will raise out of the block and the auto cycle will be complete.

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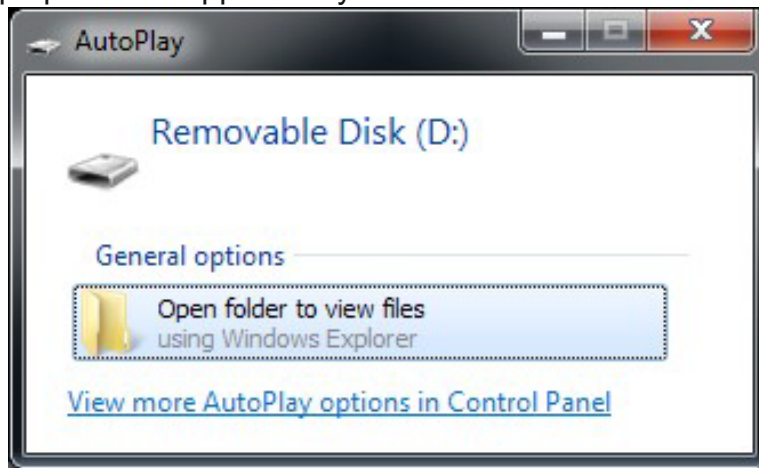
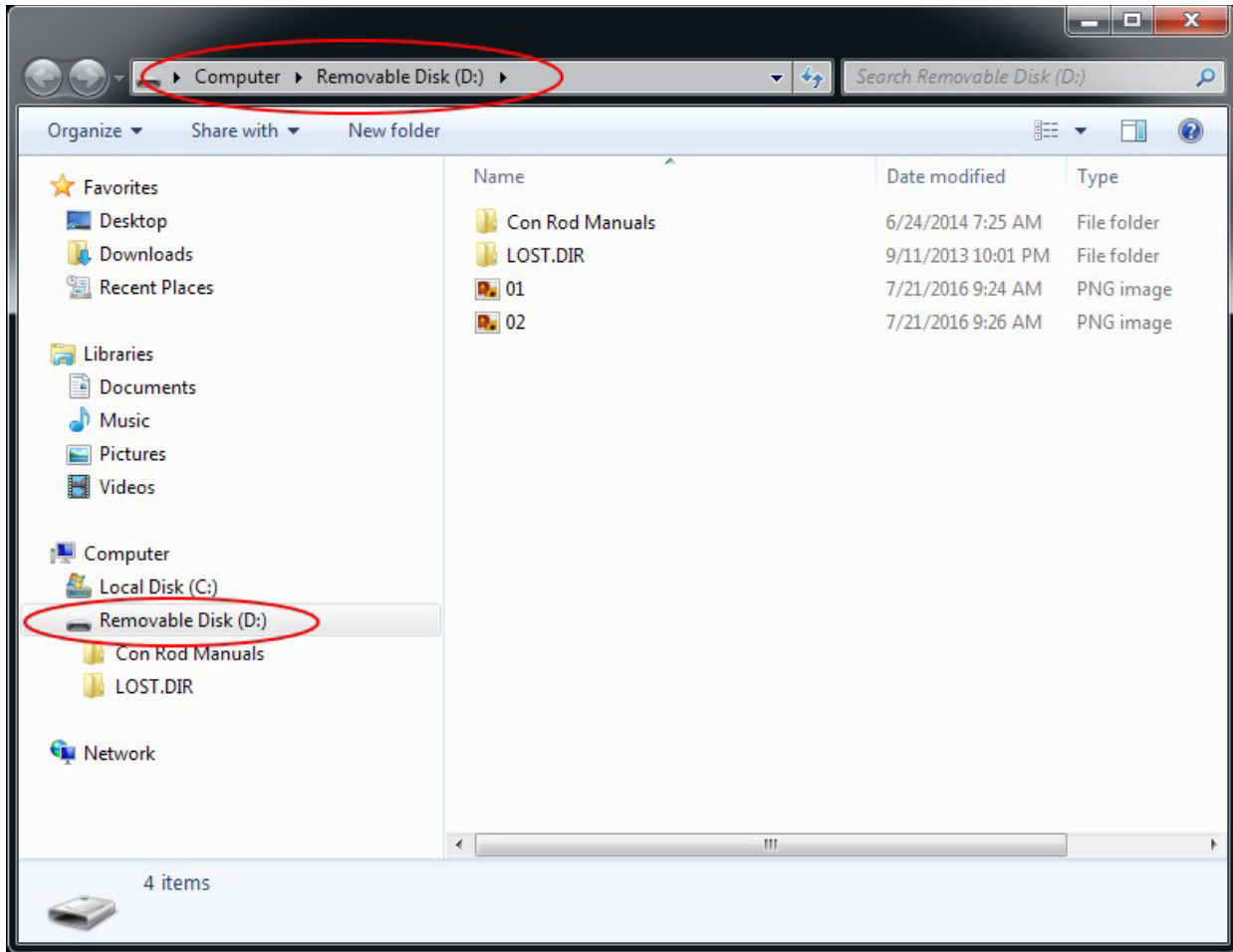First step is to open your file bowser and locate the RottlerWPF file on the C disk drive.
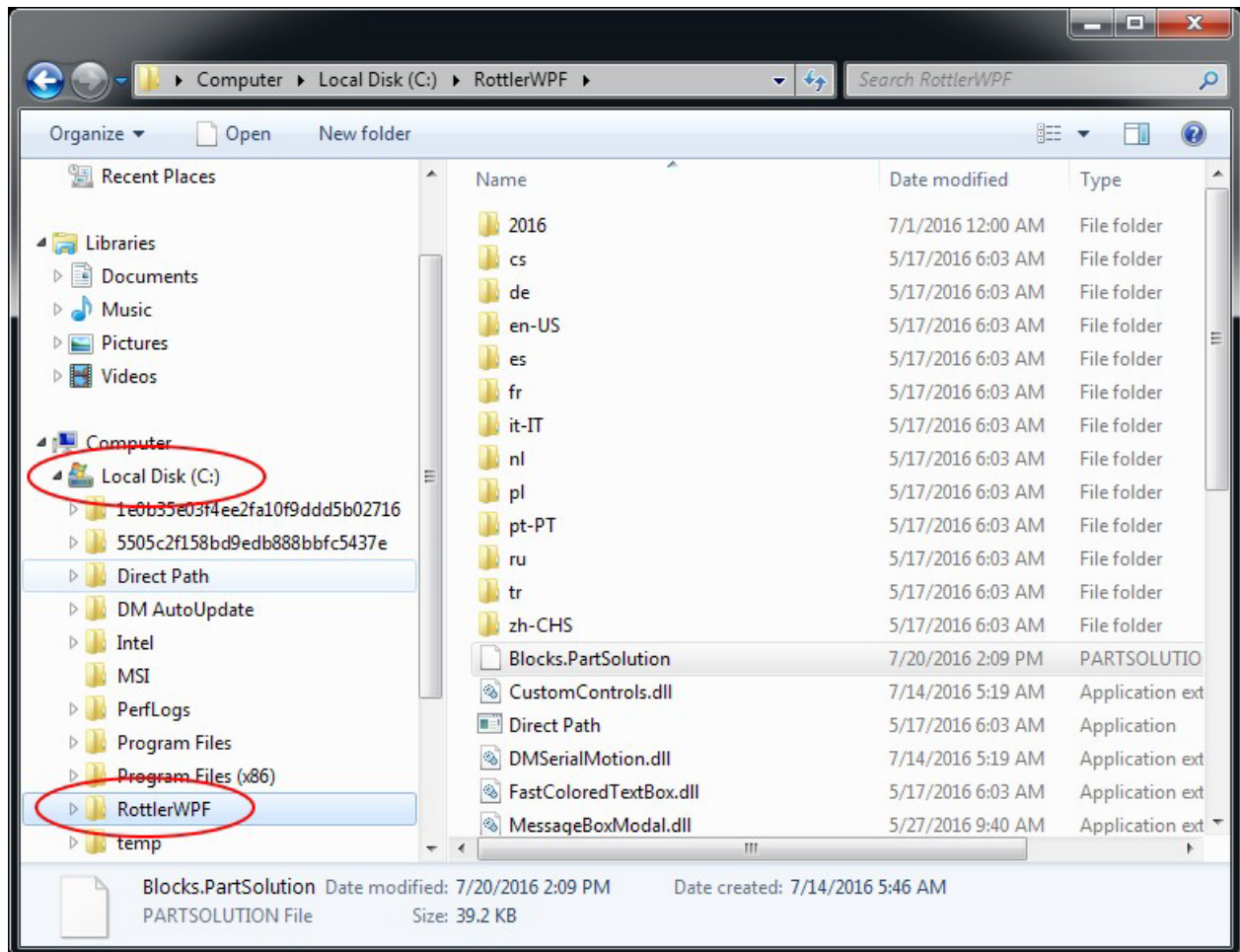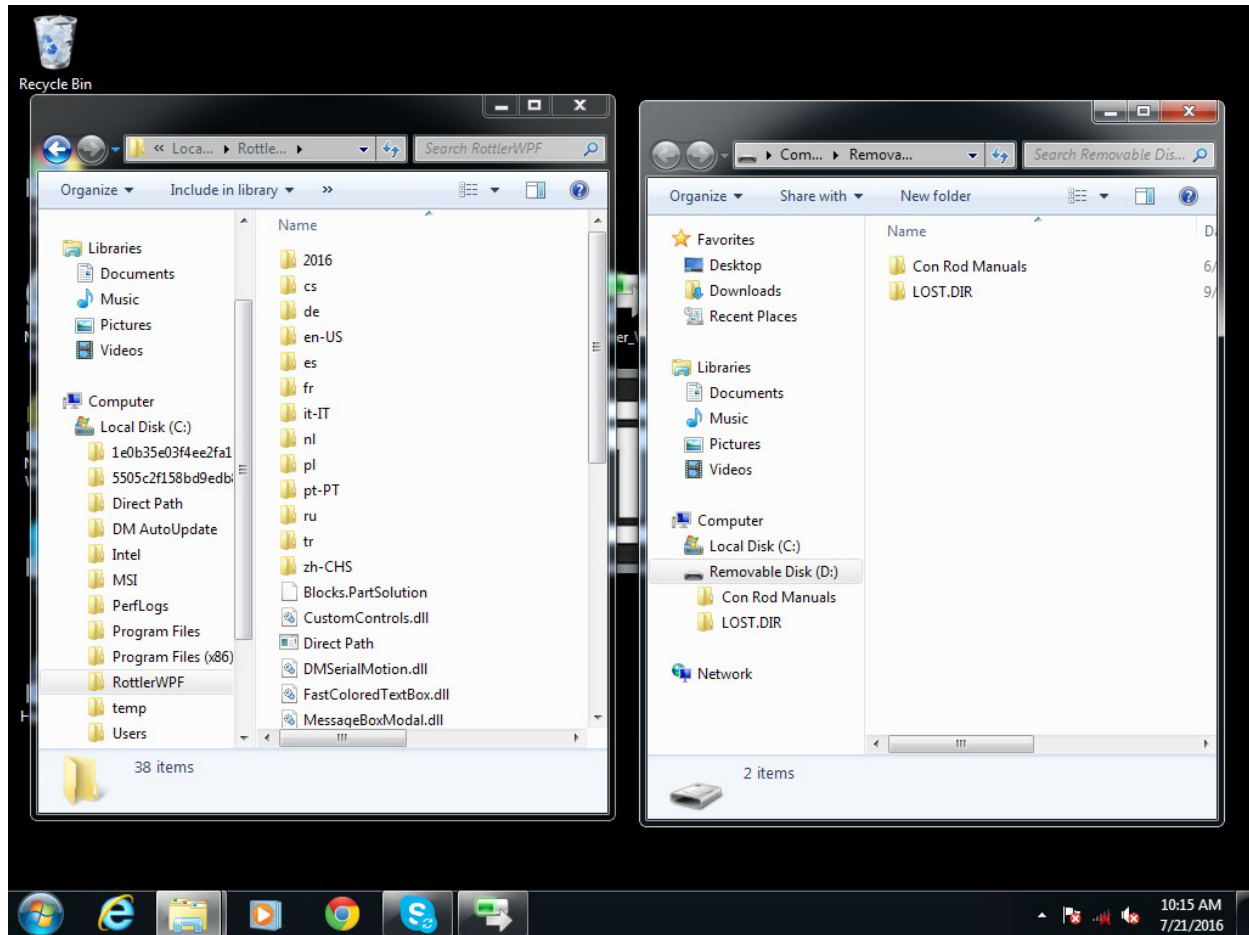

The next step is to plug in a flash drive to an open USB port

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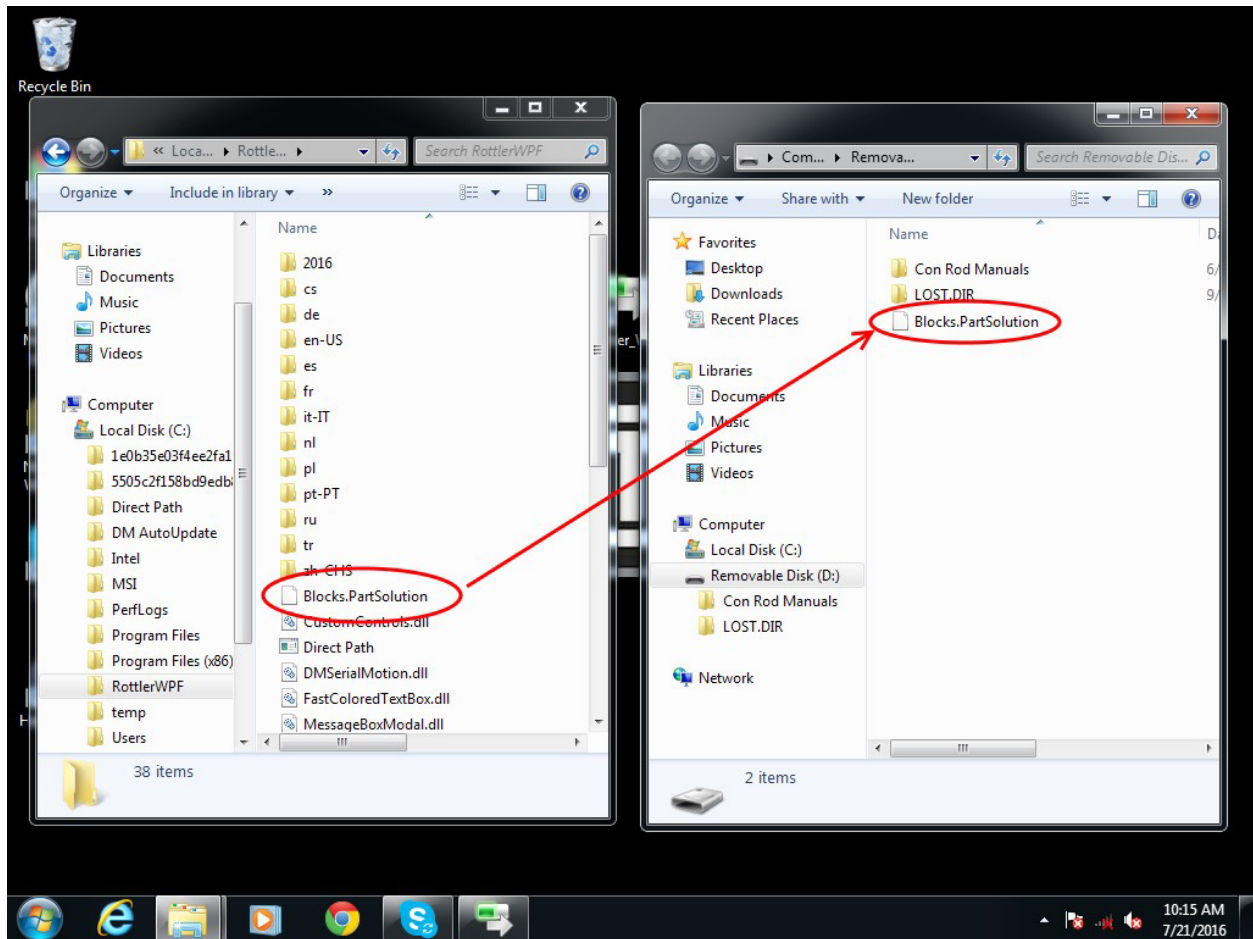
Backup is now complete. Close both file browser windows and remove the flash drive.

To restore or add block profiles go through the first 5 steps explained previously.
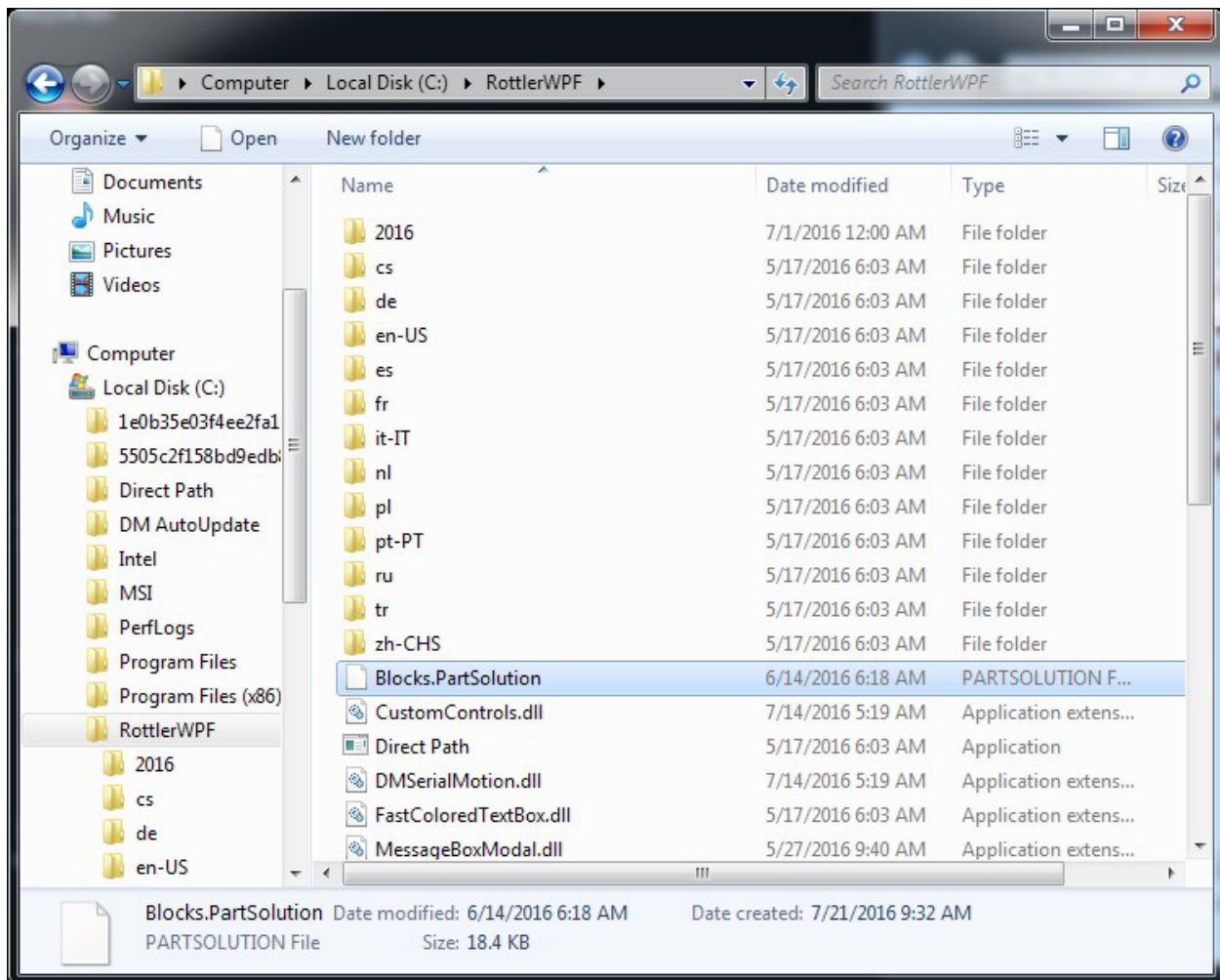
Highlight the block profiles file in the flash drive and drag it into the RottlerWPF folder on the local hard drive.
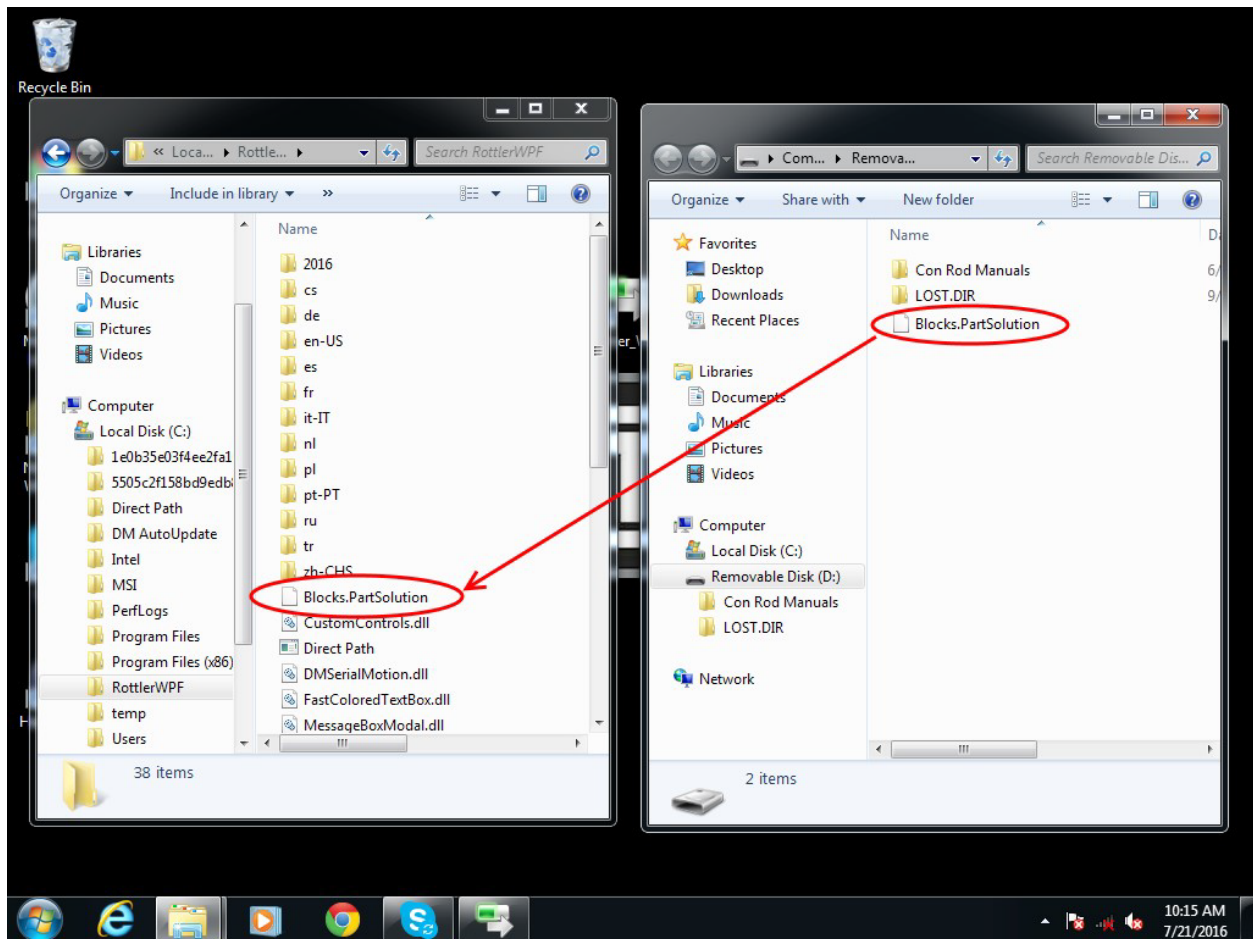
You will get a pop up window about there being a file of the same name in the destination folder. Click on the Copy and Replace option.
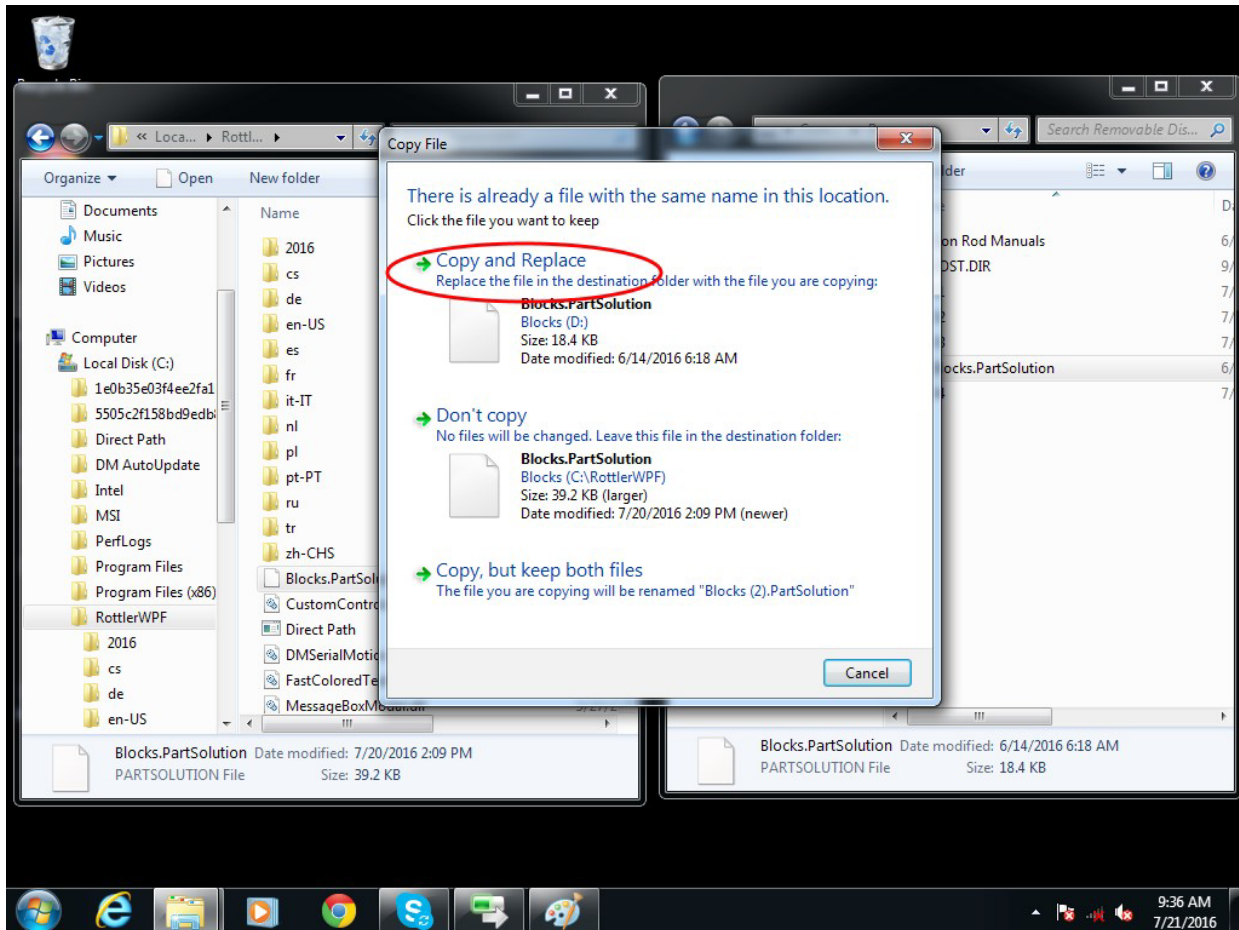
The archived block profiles will now be installed.

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