F10X CNC
BORING MACHINE
OPERATIONS MANUAL

8029 S 200th Street, Kent, WA 98032 USA | www.rottlermfg.com | Ph: (253) 872-7050 | Fax: (253) 393-0230
Rev 092621

PARTS ORDERING

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

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

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

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

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INTRODUCTION

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Introduction

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

ATTENTION OWNER/BUSINESS MANAGER

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

We suggest that the new user of the F10X 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 F10X 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 F10X machine is a precision, single point boring unit. The machine can be equipped with tooling and accessories for re-boring most passenger car and truck engines, In-lines, as well as 90 and 60 degree V-types.

The machine is designed, to maintain alignment of cylinder bores to the pan rails and main bearing bore locations, as was done in the original factory machining. This overcomes the many inaccuracies and out-of-alignment problems associated with clamping portable boring bars to the cylinder head surface of blocks.

Convenient controls and fast block clamping means considerable savings in floor to floor time, and operator involvement.

Change over or resetting time required to set up V-type or in-line engines is a minimum, making this machine highly suited to the jobber shop where engines cannot be run through in model lots.

All feeds and rapid travels are power operated and controlled from the control panel.

Disclaimer

The F10X 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 F10X parts and equipment is warranted as to materials and workmanship. This limited warranty remains in effect for one year from the date of installation or two years from the date of the original shipment from Rottler or whichever date occurs first. This only applies is the machine is owned and operated by the original purchaser and is operated and maintained as per the instructions in the manual. A machine is warranted only if the Installation Report has been properly executed by a certified installation person and received by Rottler at the time of actual installation.

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

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

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

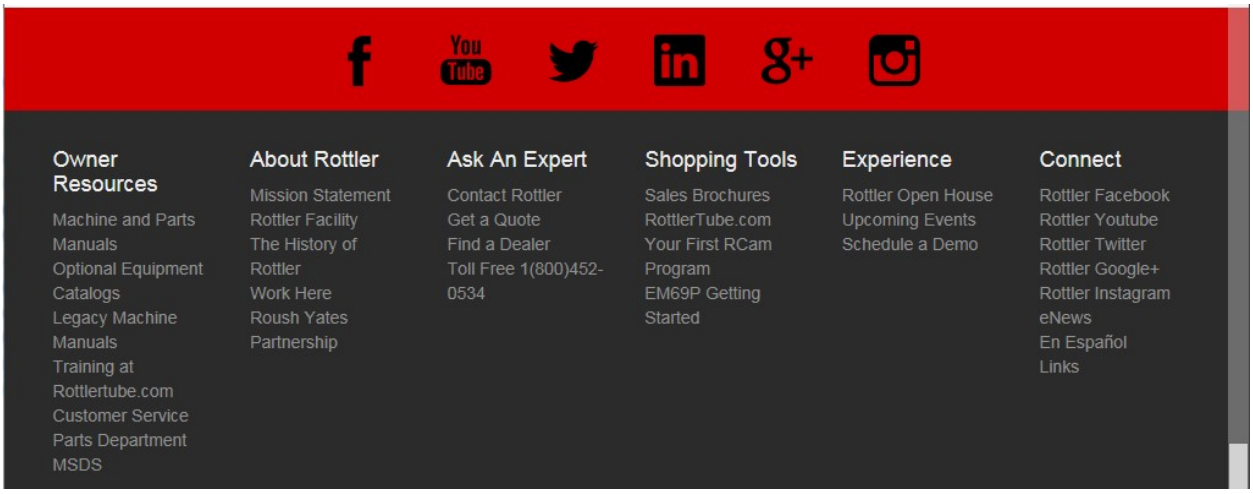
Tools proven to be defective within the warranty period will be repaired or replaced at the factory's option.

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

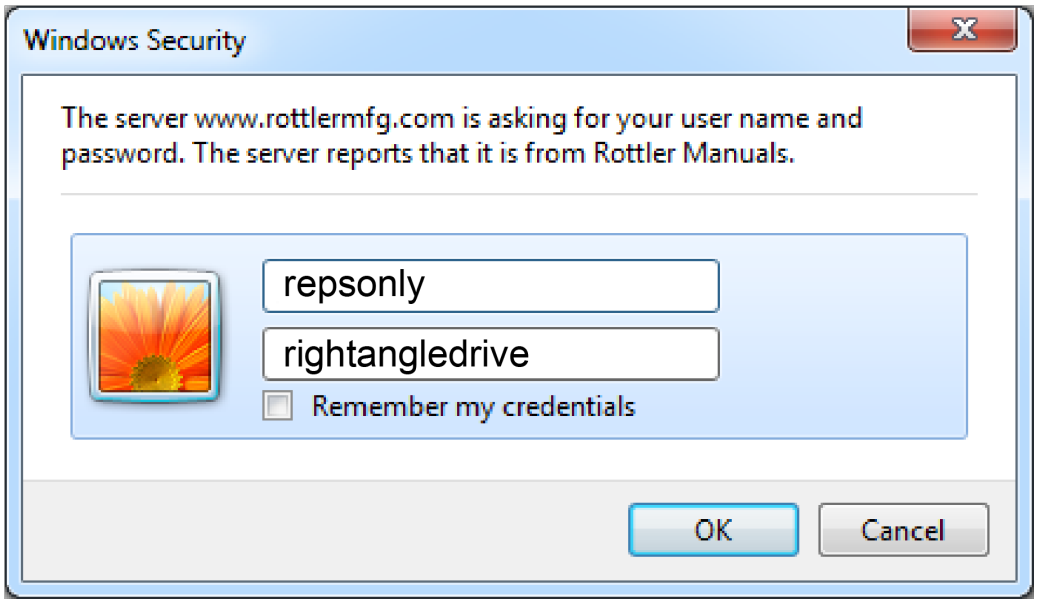
Online Documentation Access

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

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



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

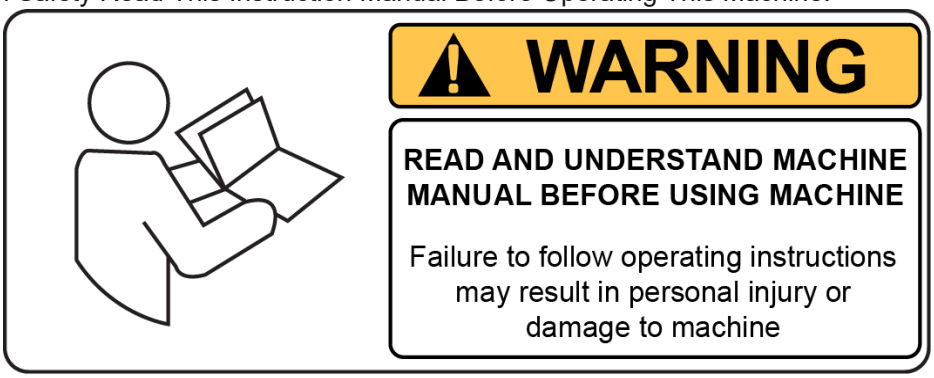


SAFETY

Contents

Safety Information

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



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

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

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

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

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

Safety Instructions for Machine Use WARNING This machine is capable of causing severe bodily injury

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

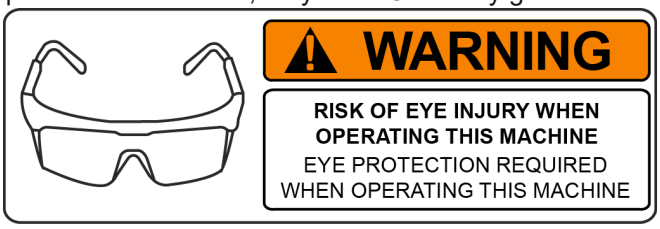
KEEP GUARDS IN PLACE and in proper working order. If equipped with doors, they must be in the closed position when the machine is in operation.

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

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

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

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



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

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

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

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

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

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

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

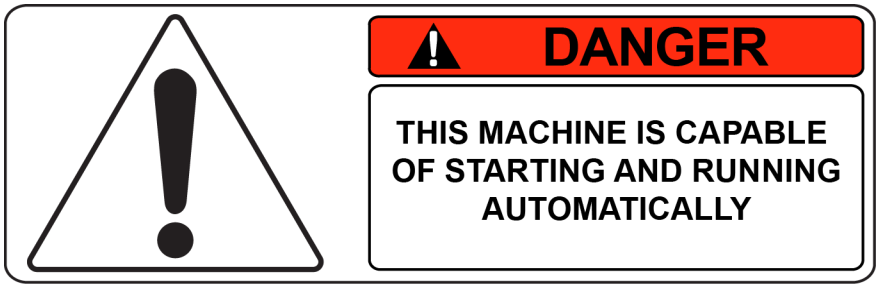
ALL LOCAL SAFETY CODES AND REGULATIONS should be followed when installing this machine.

ONLY QUALIFIED PERSONAL should perform service on the electrical and control systems.
When boring the machine is capable of throwing metal chips over 10- feet from the cutting area. Always use the guards. Eye protection must be worn at all times by the operator and all other personnel in the area of the machine.

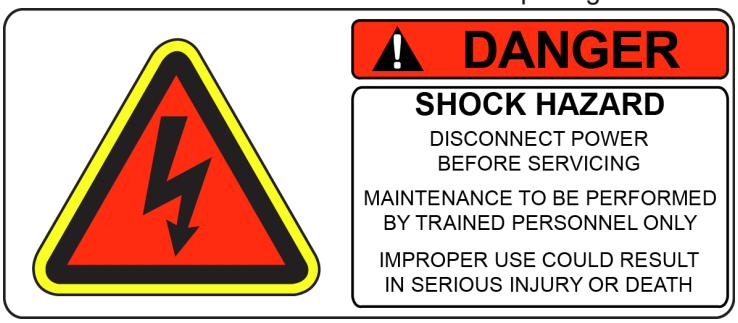
CAUTION No list of safety guidelines can be complete. Every piece of shop environment is different. Always consider safety first, as it applies to your individual working conditions. Use this and other machinery with caution and respect. Failure to follow guidelines could result in serious personal injury,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

Electrical Power

THIS MACHINE IS AUTOMATICALLY CONTROLLED AND MAY START AT ANYTIME

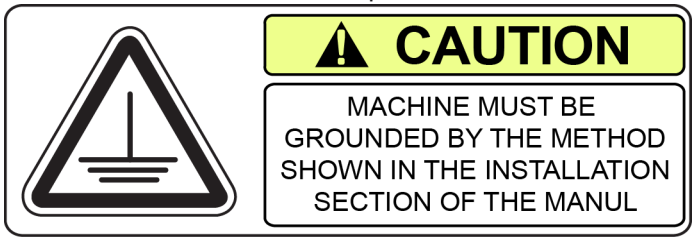


All electrical power should be removed from the machine before opening the rear electrical enclosure.



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

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



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

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

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

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

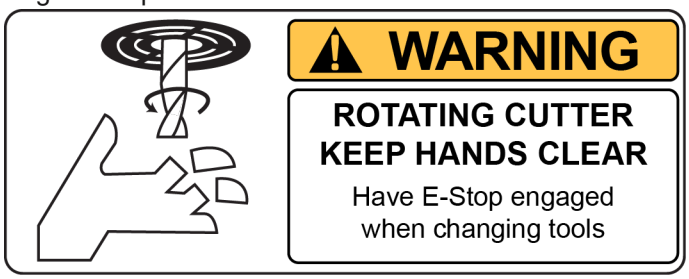
Machine Operator:

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

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

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

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



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

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

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

Emergency Procedure:

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

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

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

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

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

Computer and Controller System Safety:

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

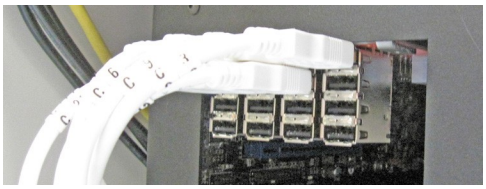
IMPORTANT The computer in this machine has the ability to connect to the World Wide Web via Ethernet or Wireless using a USB wireless (Wi-Fi) adapter. Updating the Rottler software should ONLY be done when directed to do so by a Rottler service technician. Updating Rottler Software when not directed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

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

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

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

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



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

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

Electrical Safety Features Of Rottler DM Controlled Machines

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

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.

Master Power On/Off Switch

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

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

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

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

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

Initialization Screen

When the F10X is powered up the Rottler program will not automatically start. It may take several minutes for the computer to power. MAKE SURE THE EMERGENCY STOP BUTTON IS PUSHED IN BEFORE you start the Rottler program by double tapping the Rottler_WPF icon on the desktop. Once the program is started, the Rottler Program Select screen will appear.

NOTE: Do not push any buttons or icons on the screen before the Rottler program starts or an error may be caused on the computer.

General Information

The Rottler software operates on a Block Model format. You select or create the block you are working with. Then select or create an operation to be performed on that block. The following are descriptions of the functions of the different buttons that appear on the display screen after the system has loaded.

Home

Release the emergency stop button before pressing this button. You will not see any movement, but the machine is homing itself. The machine MUST be homed after it is turned on. This is how the machine gets its reference points to operate.

Rapid Travel Buttons

X- will cause the spindle base to move left quickly at a fixed rate of speed. The button is a momentary button and contact must be maintained or the travel will stop.

X+ will cause the spindle base to move right quickly at a fixed rate of speed. The button is a momentary button and contact must be maintained or the travel will stop.

Z- will cause the spindle to move down quickly at a fixed rate of speed. The button is a momentary button and contact must be maintained or the travel will stop.

Z+ will cause the spindle to move up quickly at a fixed rate of speed. The button is a momentary button and contact must be maintained or the travel will stop.

CW and CCW Buttons

CW rotates the spindle in the Clockwise direction until released.

CCW rotates the spindle in the Counter-clockwise direction until released

Definitions of Control Buttons

Program Select

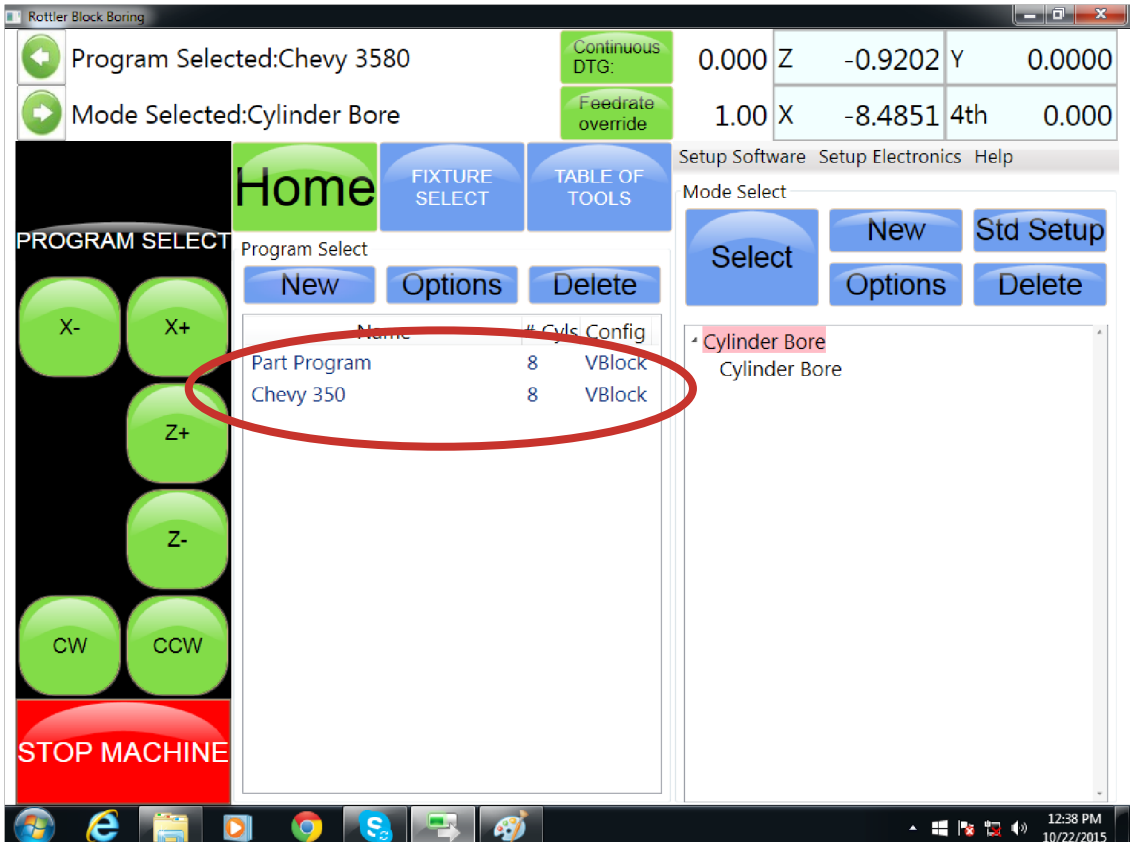
This button will bring you back to the home screen.

The Program Select section of the home screen is located above the spindle control buttons. This is where you create programs for boring different type of blocks.

New

Pressing this button will cause a dialog box to appear. Here is where you name and configure the block i.e. number of cylinders and Inline or V Block.

Pressing OK will result in the Block Model being inserted into the left hand side of the screen.



Options

This will bring up the same dialog box as described above if any of the information needs to be changed.

Delete

This will delete whatever block program is selected. A dialog box will appear to ask you if you want that program deleted.

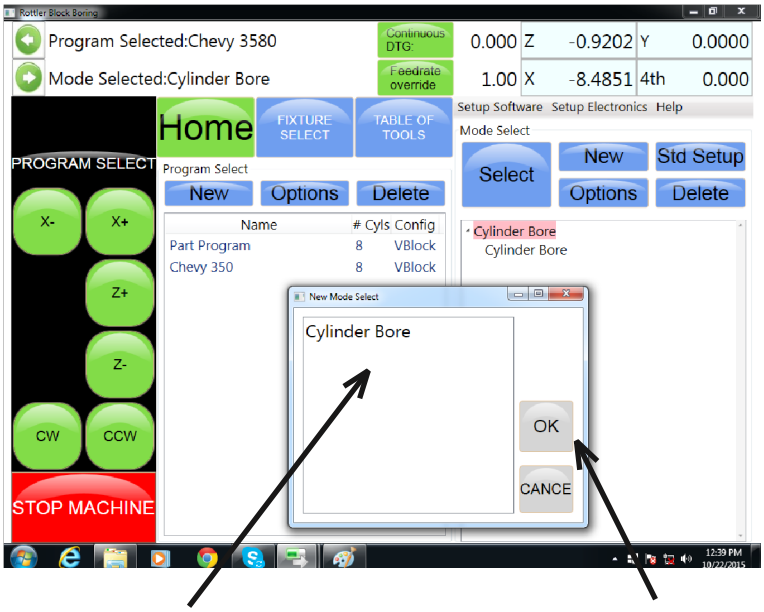
Mode Select

This is the right section of the screen. This is where you create or select operations to be performed on the selected Block. This area will be blank when you first create a block.

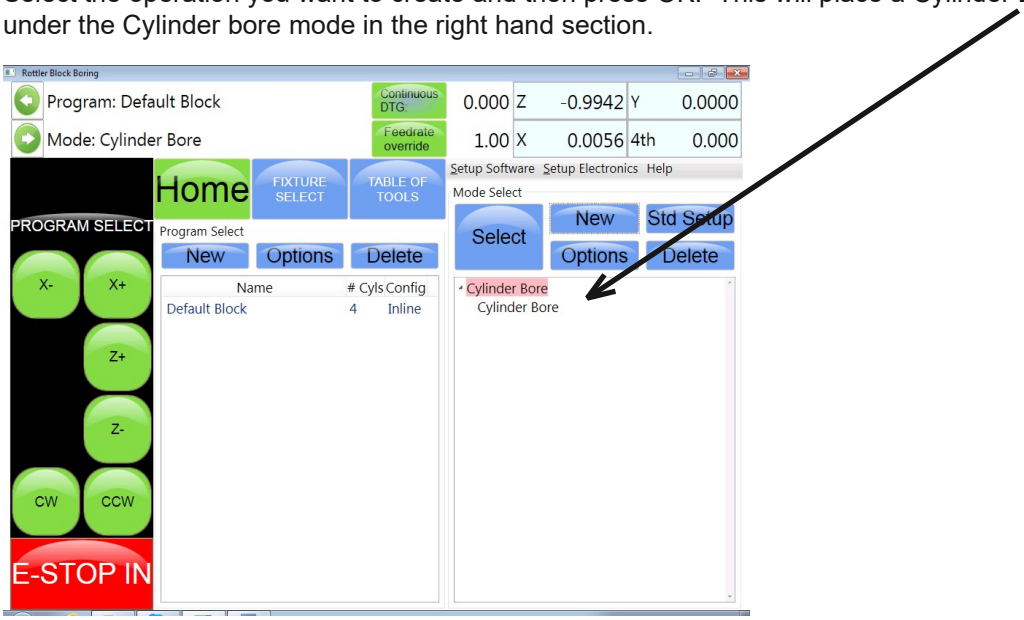
You can create only certain modes you will use on a block or use a standard set up that inserts all modes available. You can also create a new mode and rename if for a specific use.

New

Pressing this button will bring up a dialog box with Rottler standard operations.



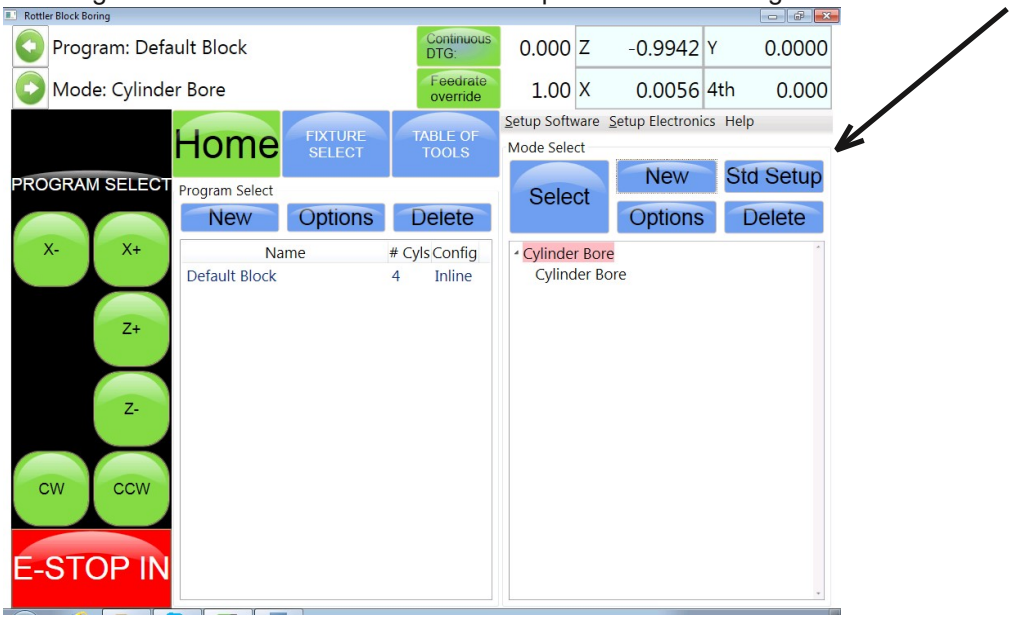
Select the operation you want to create and then press OK. This will place a Cylinder Bore operation under the Cylinder bore mode in the right hand section.



To enter Cylinder Bore mode highlight it and then press Select. This will take you to the operation screens that will be described later.

Std (Standard) Setup

Pressing this button will insert all the Rottler operations into the right hand section automatically.



Options

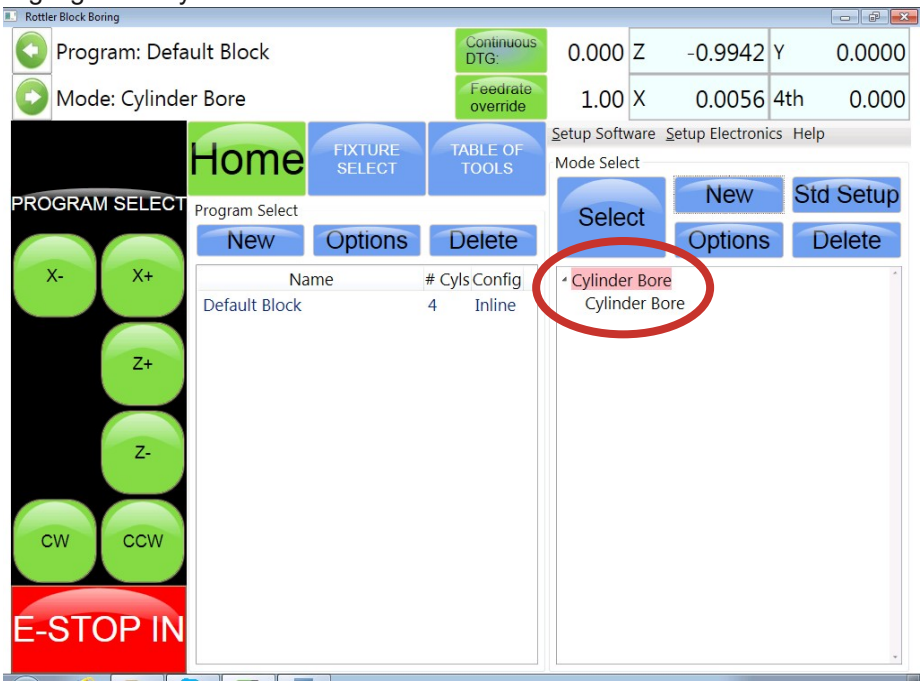
Highlighting the Cylinder Bore mode, then clicking the Options button allows you to rename the mode so that different operations can be differentiated in the same block program. **Delete**

This will delete the selected Mode. It will ask you if you want this mode deleted before deleting it.

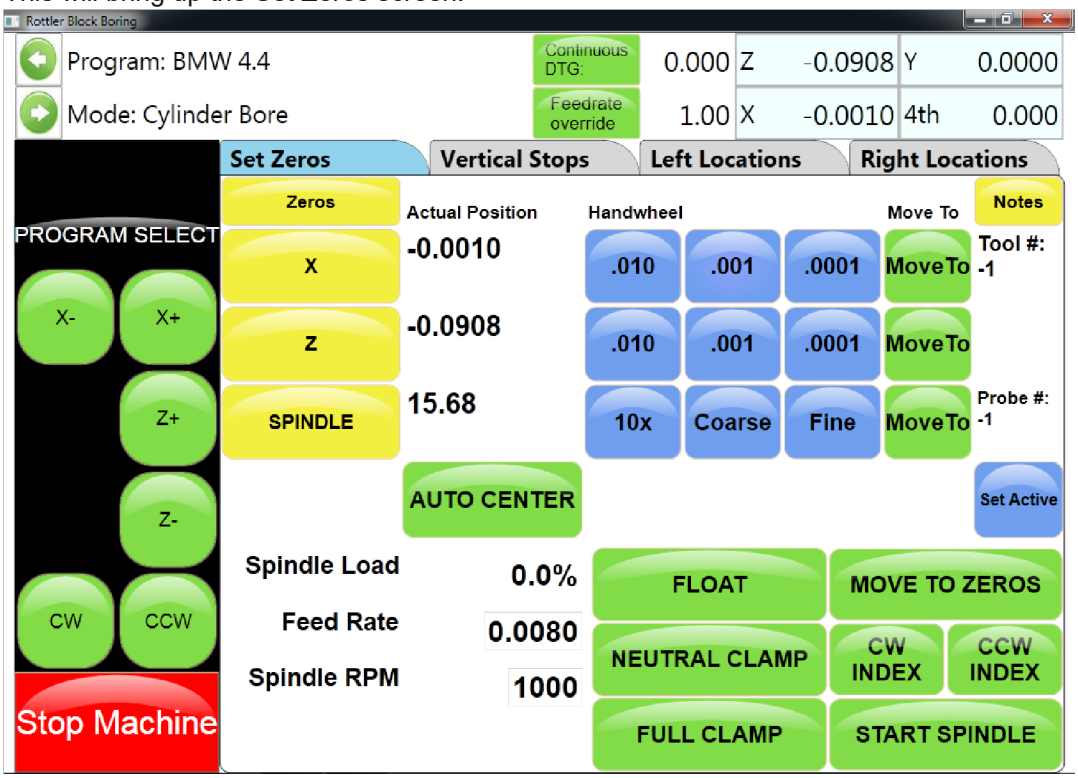
NOTE: Once the control definition for a particular button has been discussed it will not be repeated in the different modes of operation. Only new buttons or buttons with a different function will be discussed in different modes.

Select

Highlight the Cylinder Bore function and then touch the Select button.



This will bring up the Set Zeros screen.



Handwheel Buttons

.**010 button** allows the operator to use the hand wheel to move the spindle up, down, left, or right at .010" per click in either direction.
.001 button allows the operator to use the hand wheel to move the spindle up, down, left, or right at .001" per click in either direction.
.0001 button allows the operator to use the hand wheel to move the spindle up, down, left, or right at .0001" per click in either direction.
10x button rotates the spindle at fast speed.
Coarse button rotates the spindle at medium speed.
Fine button rotates the spindle at slow speed.
Pressing any of the spindle control buttons will disengage the handwheel.

Zero Buttons

Spindle Zero button is used to set the tool index position. The operator rotates the tool to the desired index position, always 3 o'clock for normal operation, and press the button to set that position as the tool index point.
Horizontal (X) Zero button is used to set the horizontal zero position which is used as reference for the horizontal stop points in the program
Vertical (Z) Zero button is used to set the vertical zero position which is used as reference for the vertical stop points in the program.

CW/CCW Index Spindle Button

This button does not turn the tool to the index position. This function cannot be made to work correctly due to the pulley ratio for the spindle rotation.

AUTO CENTER

This button will cause the spindle to perform the Auto Center routine. ***Caution: Cutterhead must be in bore when the button is pressed.***

Move To buttons

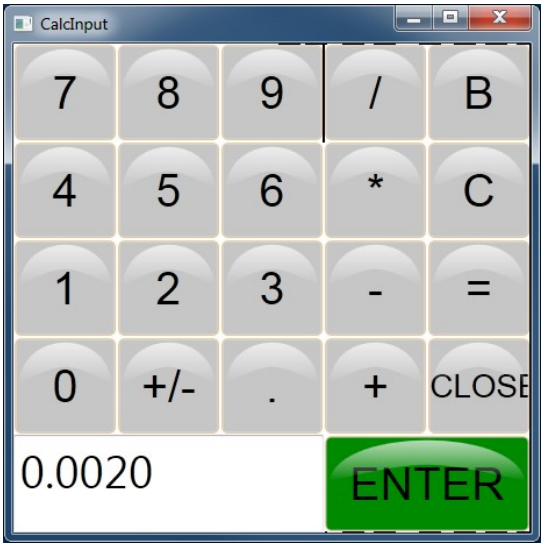
These buttons when pressed bring up the number pad where a desired value can be entered. When the ENTER button is pressed, the machine will move the Horizontal axis, Vertical axis, or rotate the Spindle to the desired value.

Spindle Load

Spindle Load indicates percent of motor load during operation.

Feed Rate

Operator clicks the box to the right to enter desired feed rate. Wherever there is a number box where a value can be entered, pressing value box will activate a pop up number pad to input values.



Feedrate override

Operator clicks the button and uses the hand wheel to slow down the feed rate.

Spindle RPM

Operator clicks the box to the right to enter desired spindle RPM.

FLOAT

This button causes the machine to release the clamps and the spindle base to float

NEUTRAL CLAMP

This button causes the machine to release the clamps or turn off the float air. The spindle base is in neutral.

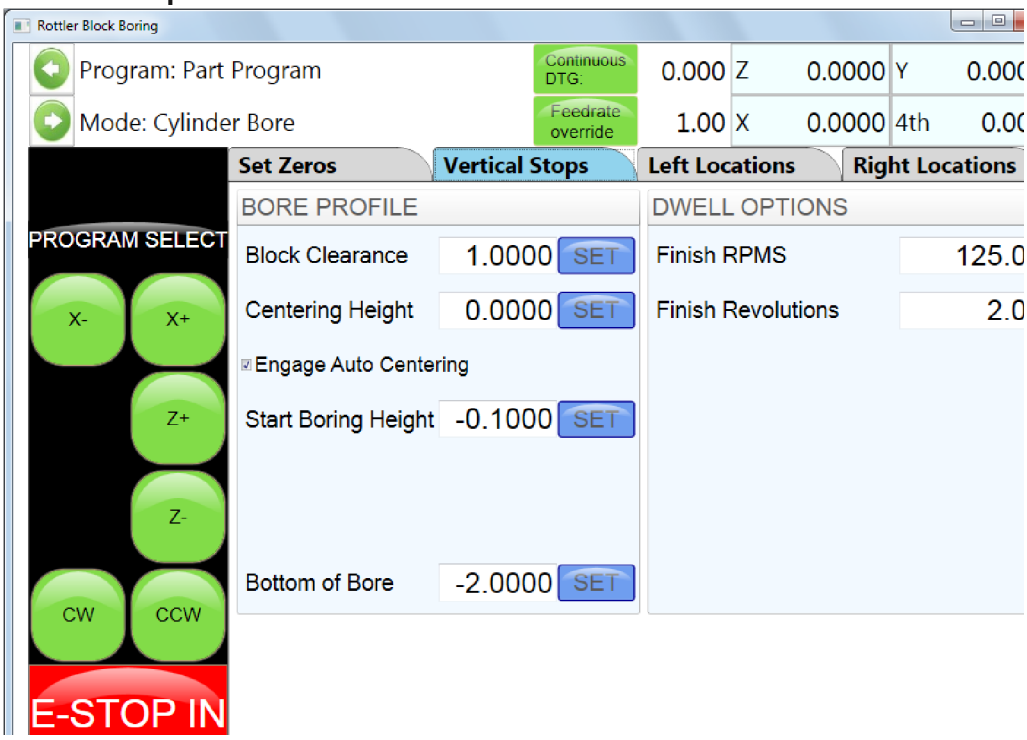
FULL CLAMP

This button causes the machine to turn off the float function and the spindle base to be clamped.

Notes & Set Active buttons

These buttons are not used on this machine.

Vertical Stops Tab



SET Block Clearance

Hold the button to select and set the current vertical position as the clearance height value shown in the window to the right.

Or click the number box to the right to bring up the number pad and enter the desired value. This value is positive if above the vertical zero.

SET Centering Height

Hold the button to select and set the current vertical position as the centering height value shown in the window to the right.

Or click the number box to the right to bring up the number pad and enter the desired value. This value is negative if below the vertical zero.

Engage Auto Centering

This box is checked if you wish to use Auto Centering during the Auto Cycle routine.

SET Start Boring Height
Hold the button to select and set the current vertical position as the start boring height value shown in the window to the right.

Or click the number box to the right to bring up the number pad and enter the desired value. This value is negative if below the vertical zero.

SET Bottom of Bore Depth

Hold the button to select and set the current vertical position as the finish cutting depth value shown in the window to the right.

Or click the number box to the right to bring up the number pad and enter the desired value. This value is negative if below the vertical zero.

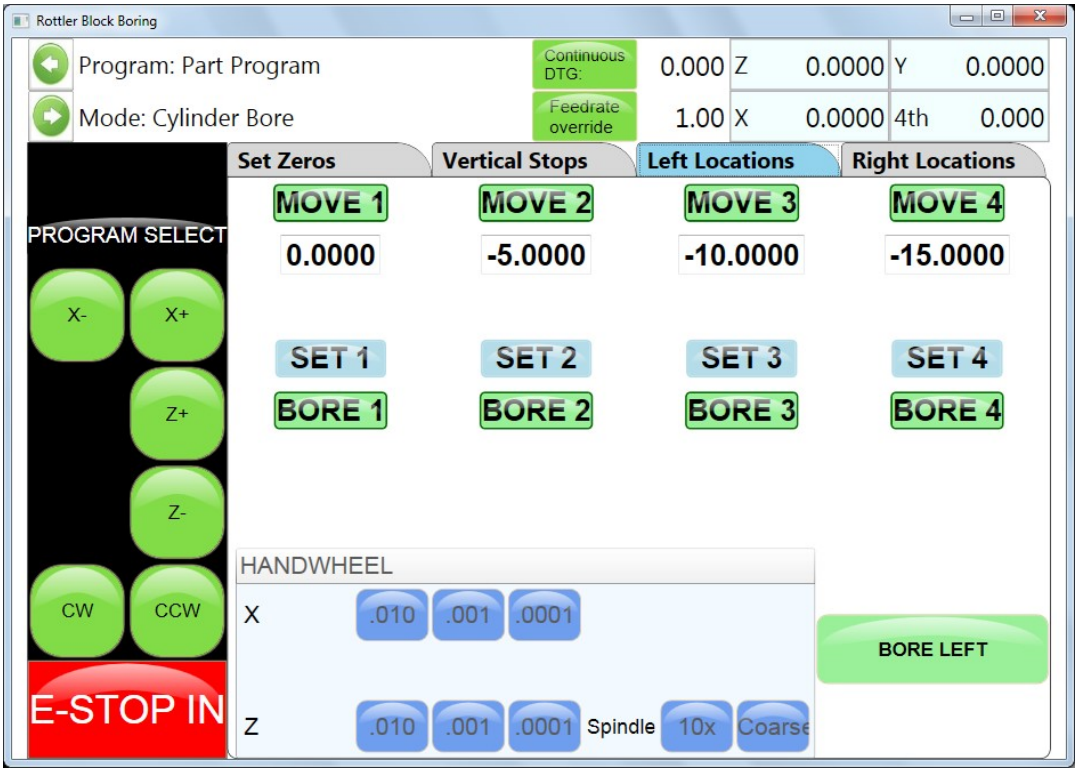
Finish RPMS

Click the number box to the right to bring up the number pad and enter the desired value. This is the washout speed, typically 125 RPMs for this machine.

Finish Revolutions

Click the number box to the right to bring up the number pad and enter the desired value. This is the number of revolutions the spindle rotates at the Finish speed before indexing the cutter head, typically the value is 2 for this machine.

Left Locations Tab



MOVE 1, MOVE 2

These buttons cause the spindle base to move horizontally to the desired horizontal position.

Clicking the number box below each MOVE button will bring up the number pad to allow for entry of the desired horizontal stop value. Each horizontal stop moving to the left of Horizontal Zero will be negative in value.

SET 1, SET 2

Hold this button to set the current horizontal position as the desired stop value.

BORE 1, BORE 2

The button for each cylinder to be bored is green in color. Click the button to remove the desired cylinder(s) from the BORE LEFT cycle, each button when pressed will turn yellow. To add the horizontal stop back to the BORE LEFT cycle, press the button and it will return to green in color.

BORE LEFT

Pressing the button will cause the machine to move to the first bore in the program, move to the Centering Height, center (unless ENGAGE AUTO CENTERING is unchecked), turn on the spindle and feed down to the Bottom of Bore stop, slow the spindle to the Finish RPMS value, feed vertically up 0.010", index the cutter head, jog the spindle base horizontally to the left .010", then move vertically up to the Block Clearance value, then move to the next horizontal stop and repeat the cycle. BORE LEFT function will only perform the cycle on the cylinders whose BORE buttons are green.

Right Locations Tab

This screen is only used in a VBLOCK program, for INLINE blocks use the LEFT LOCATIONS TAB.

MOVE 1, MOVE 2

These buttons cause the spindle base to move horizontally to the desired horizontal position.

Clicking the number box below each MOVE button will bring up the number pad to allow for entry of the desired horizontal stop value. Each horizontal stop moving to the left of Horizontal Zero will be negative in value.

SET 1, SET 2

Hold this button to set the current horizontal position as the desired stop value.

BORE 1, BORE 2

The button for each cylinder to be bored is green in color. Click the button to remove the desired cylinder(s) from the BORE RIGHT cycle, each button when pressed will turn yellow. To add the horizontal stop back to the BORE RIGHT cycle, press the button and it will return to green in color.

BORE RIGHT

Pressing the button will cause the machine to move to the first bore in the program, move to the Centering Height, center (unless ENGAGE AUTO CENTERING is unchecked), turn on the spindle and feed down to the Bottom of Bore stop, slow the spindle to the Finish RPMS value, feed vertically up 0.010”, index the cutter head, jog the spindle base horizontally to the left .010”, then move vertically up to the Block Clearance value, then move to the next horizontal stop and repeat the cycle. BORE RIGHT function will only perform the cycle on the cylinders whose BORE buttons are green.

The operator can press the START SPINDLE button and then press the Z- button. The spindle will rotate and feed continuously in the desired direction until either:

a. The operator presses the Z- button, then the STOP SPINDLE button.
b. The operator presses the STOP MACHINE button to stop all motion.
c. The machine reaches the end of vertical travel in either direction.

OPERATING INSTRUCTIONS

Contents

Operating Instructions

The purpose of this chapter is to explain and then guide the operator from loading a block through running an automatic cycle.

All modes of operation will be discussed in this chapter.

Note: We recommend, particularly for operators unfamiliar with the boring machine, to practice on a junk block in order to become familiar with the controls and procedures of the boring machine.

General Machine Information

Before starting to build or use any of the Rottler operating programs it is important to understand how the machine operates internally.

The Rottler F10X model uses Computerized Numeric Control (CNC). The CNC is always operating when the machine is turned on. However, you will not see the CNC controls unless you switch over to the CNC operating screen.

Homing

The F10X ***MUST*** be homed anytime it is turned off. If the machine has not been homed the reference positions for all programs will be off.

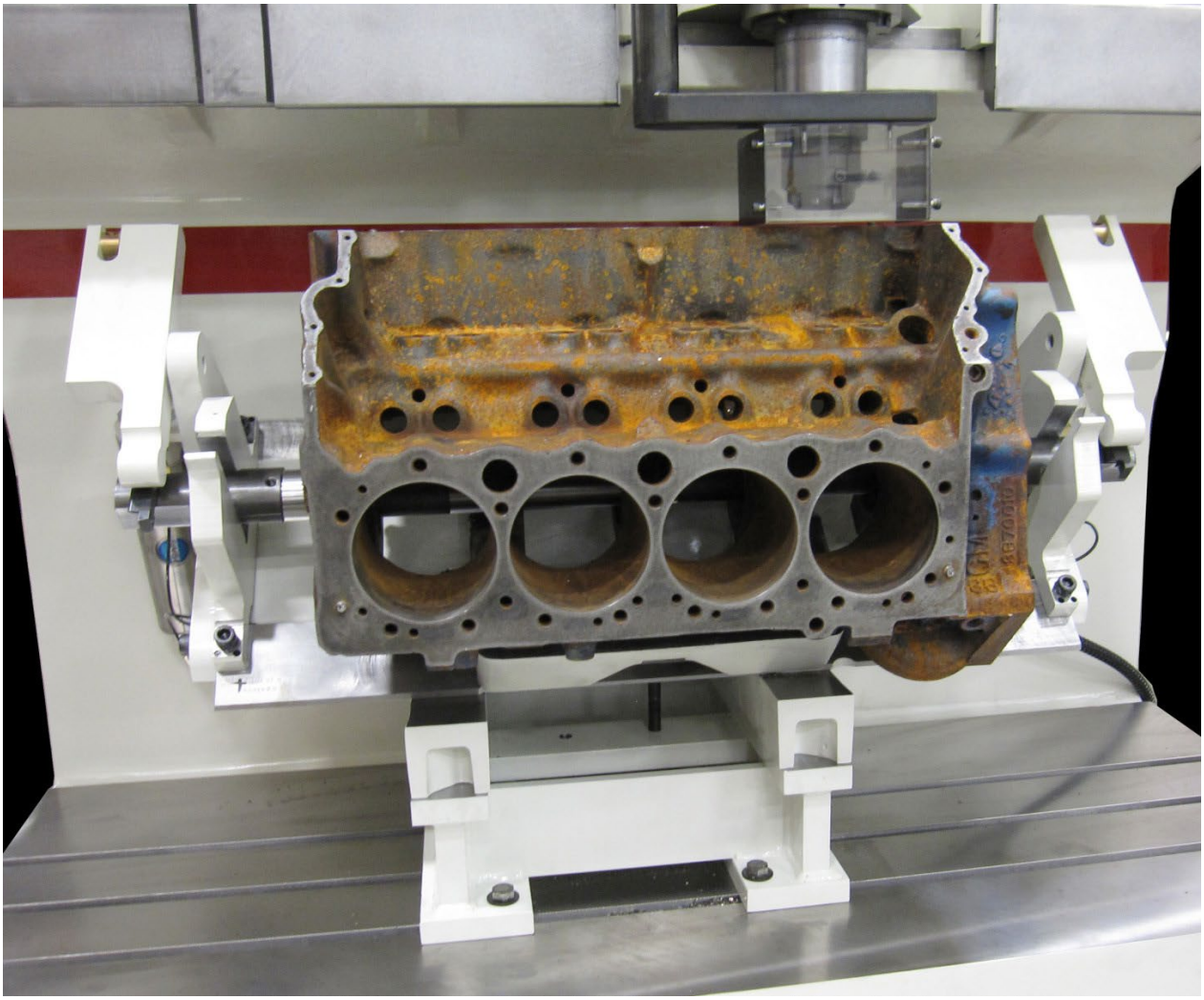
The purpose of Homing the machine is to set reference points in each axis for the machine to operate from. If the machine is not homed the reference points may be off position. The reference point is set in exactly the same position each time the machine is homed. The machine keeps track of these reference positions internally and the operator will not see them.

Loading a Block for Boring

504-37-10 V6/V8 Combination Fixture

⚠ WARNING Handle the block and fixture with EXTREME care and guidance. A block hoist is REQUIRED. Mishandling of a heavy engine block and fixture may result in the dropping of parts and personal injury.

The Model 504-37-10 V6/V8 combination fixture is a fast, simple and universal system to properly and accurately hold most 60 and 90 degree V-type engine blocks for either cylinder boring.



NOTE: The block must have the main bearing caps in place and torqued.

V-blocks

(blocks with main bearing center lines no more than 1/2” higher than the pan rail plane) are mounted with the 502-3-8B V-block frame in place. Select the 90-degree option placement of the frame to suit block length, or main bearing caps will interfere with frame. Rotate frame 90 degrees by moving its shoulder screws to alternate set of holes.

Y-Blocks

(blocks with main bearing center lines 2-3/8” to 3-1/2” higher than the pan rail plane) are mounted directly on the fixture. Some Y-blocks (GM 60 degree) have too narrow pan rails and some have too low main bearing location which will require the use of the 502-1-15C precision 1-1/4” x 3” parallel set to raise and or support the block. Use the shoulder screw from the V-block frame and hook the parallels over the back of the V-fixture.

This fixture may be easily repositioned on the support parallels (without a block in place) to shift from the 60 degree support surface to the 90 degree support surface or vice versa.

⚠ WARNING Extreme care must be taken by operator whenever handling large blocks. Large blocks may cause fixture to tip when floated too far outward. We recommend leaving hoist attached when moving these blocks. Large blocks should be lifted from the block bank surface.

Normal Operating Procedure

The normal operation procedure on smaller V-blocks is to first pick up the block. Place the locator bar through the main bearings and hoist the block into the fixture. Pulling the block towards you, with the locator against the positioners, will prevent jamming in the slot of the guides during the loading and unloading operations. After the locator bar is engaged in the positioners, pivot block outwards as you lower it.

Make sure the block is firmly seated in place and not resting on pan-rail burrs or other interference points. Accurate seating can also be a problem with extremely warped, distorted blocks. Another cause of problems is failure to remove main bearing inserts. The locator bar has a relief for blocks with a small main bearing or seal. Rotate locator bar clamps into position and activate the fixture clamps

Release locator bar clamps by pressing the Fixture Lock button. Lift the block, turn the block 180 degrees & reload to duplicate the operation on the other bank.

Install & Remove Cutterhead

CAUTION: Turn off power to machine before changing cutterhead.

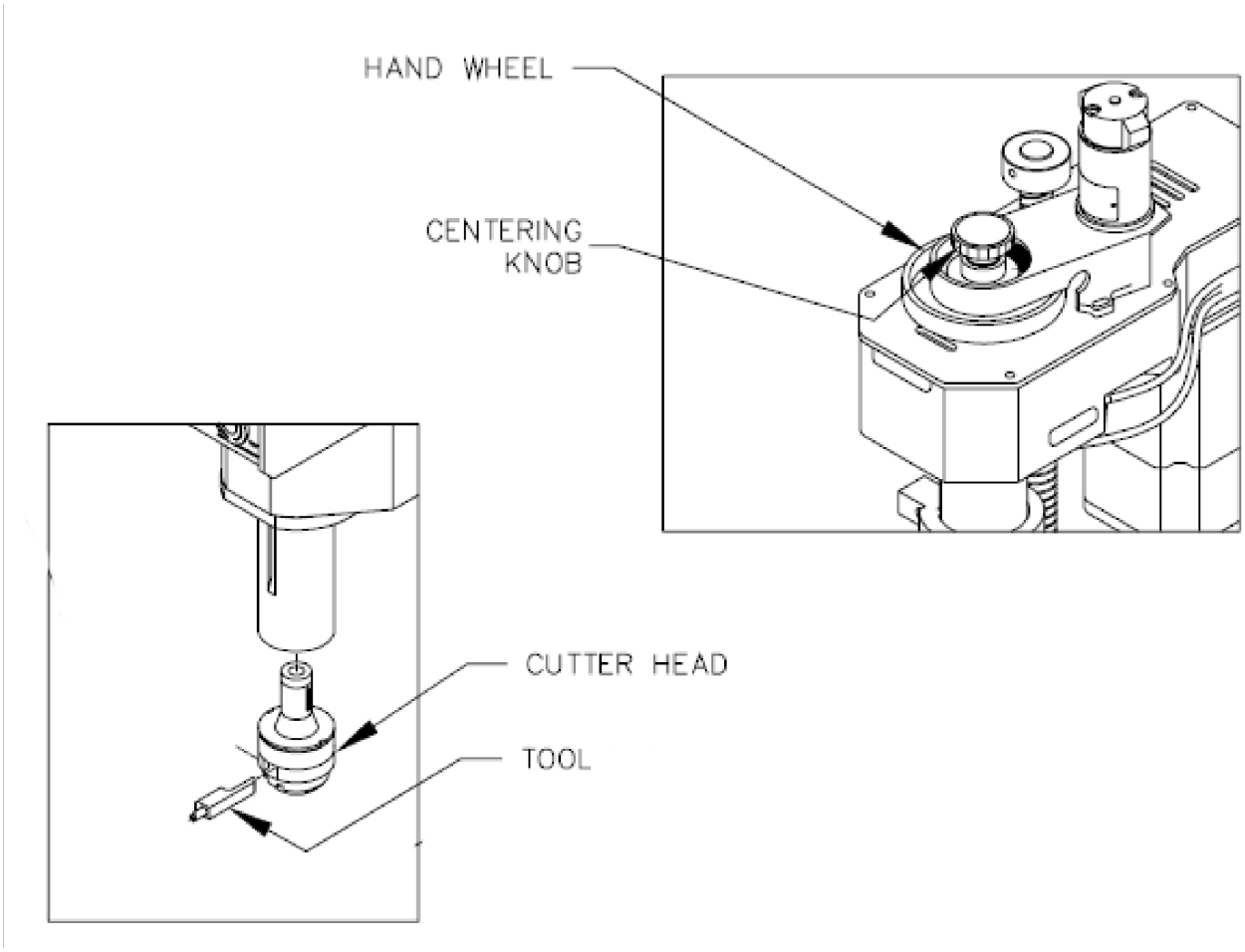
Centering fingers must be removed before changing cutterheads. Damage to the centering fingers could result if they are left in.

Turn the hand wheel counter clockwise (looking from the top). The hand wheel will be tight. There are a couple of ways to get it to come loose. It may be necessary to insert a long tool holder in the cutterhead to use for leverage. Be careful to avoid damage.

Unscrew the hand wheel the rest of the way. Keep your hand under the cutterhead so it doesn't fall out.

Thoroughly clean the end, including the threads, of the cutterhead that is going to be installed. Line up the key in the cutterhead, with the key way in the inner spindle and lift the cutterhead in.

Turn the centering knob on top of the machine, to engage spline inside cutterhead. Holding the cutterhead firmly lock upper hand wheel.



Building Programs

NOTE: The instructions in this section are done WITHOUT using tool or Fixture offset values.

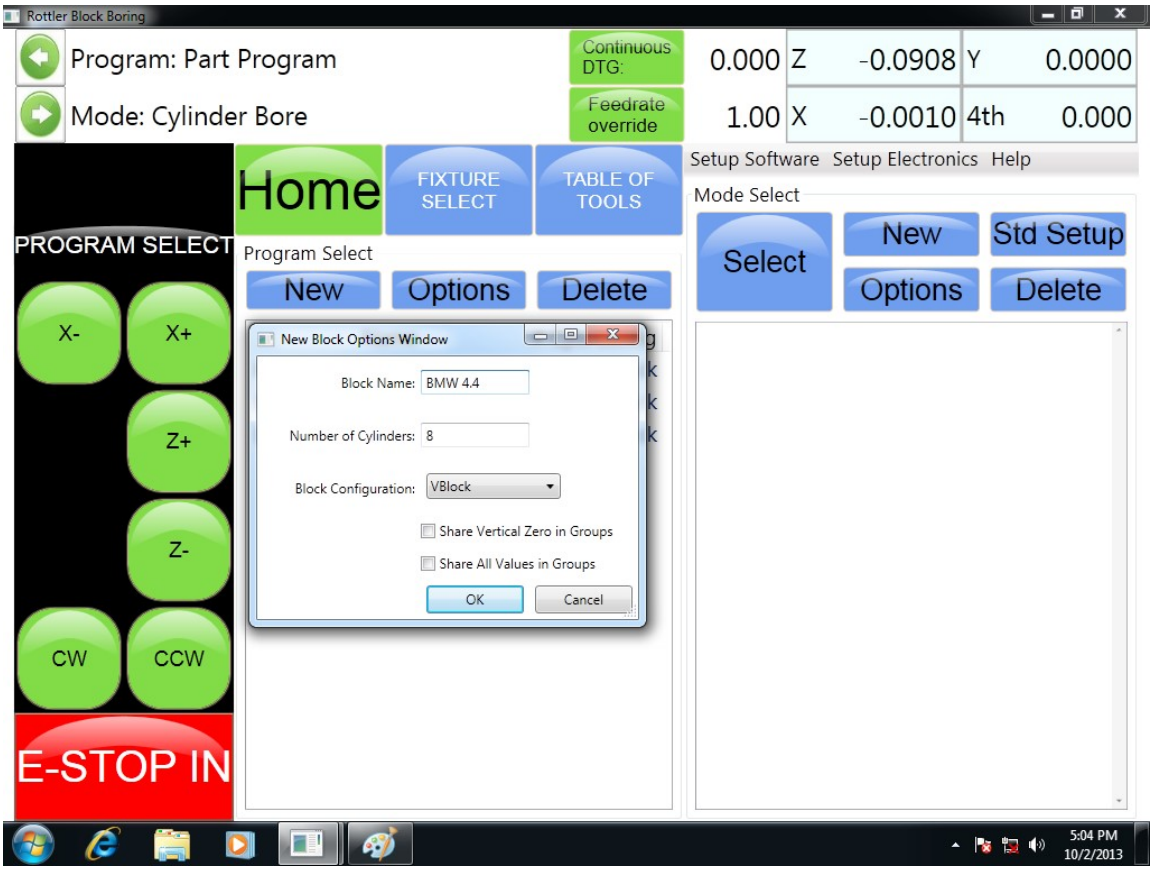
Create a Block Program

Block Programs are listed on the left hand side of the screen. Mode programs that are for a specific Block Model are listed on the right side of the screen.

New

From the Program Select screen select New from the Left hand menu. This will open a window where you will enter the Block name and configuration i.e. V6, V8 or Inline and number of cylinders.

NOTE: There is an existing program on start-up of new software called Part Program. This can be deleted after the first Block Program is entered.



Options

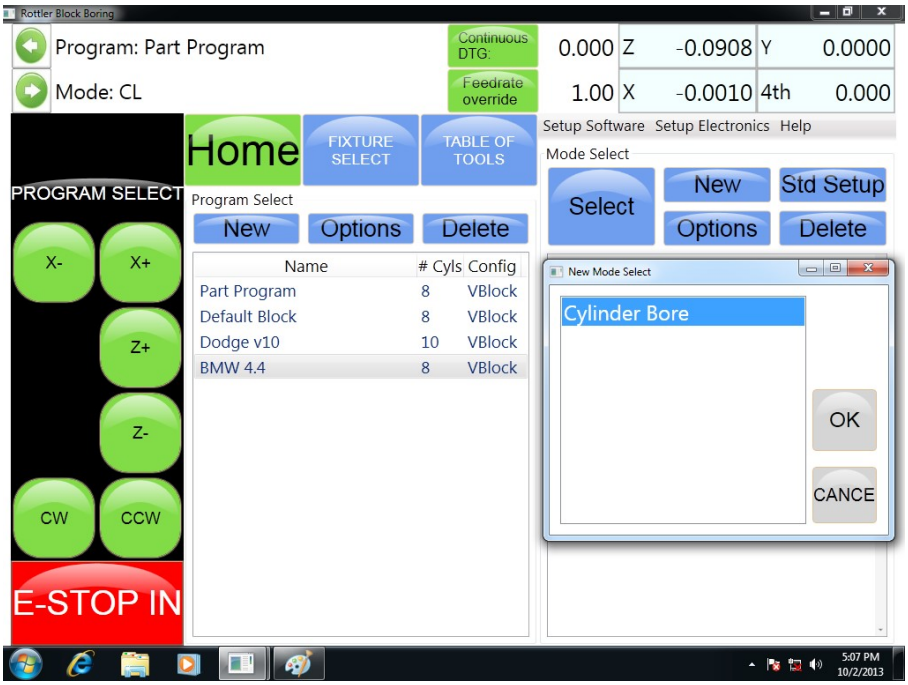
If you need to change the block configuration or name of a block that has already been created, use the Options button. This will bring up the same window as when the block was created.

Creating Operating Modes for a Block Model

Select the Block model on the left hand side of the screen.

New

Selecting New will bring up a window that lists all the Modes that can be performed on the selected block model. Highlight the Mode you want to create and press OK.



The selected mode will show up on the right hand side of the screen.

Select

Pressing Select with a Mode highlighted will open the operations screens for using the program.

Options

Pressing the Options button with a Mode highlighted will open a window where you can change the mode name. There is also a check box to allow positive number to be entered into the program where they are normally forced to a negative value.

Cylinder Bore Mode

Select Cylinder Bore and then press SELECT on the screen. This will bring up the boring program with the Set Zeros tab shown.

NOTE: Once a certain feature is discussed in a particular mode it will not be discussed again in the following modes.

Setting Zeros

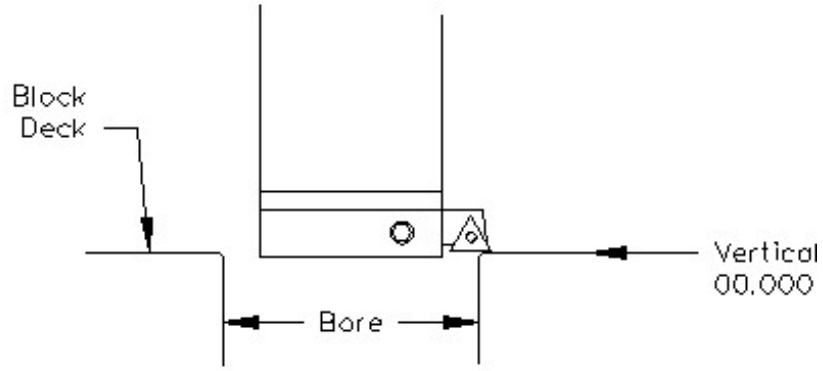
The purpose of setting zero points is to give the operator a specific point to build programs from. The machine also uses these zero points to run the program from. The zero points can be set at any point in the machines' travel. Each axis (except the Spindle rotation) will need to have a zero point set for the machine to operate from. Every program will save it's individual zero positions. The next time that program is selected the zero position will be the exact same distance from the Home position for each axis.

Horizontal

For this example, the first cylinder on the right side will be our zero point for the Horizontal. Using the handwheel, center the spindle over the first cylinder. Lower the cutterhead into the bore. Then press the AUTO CENTER button and wait for the cycle to complete. Set the Horizontal zero by pressing the X button under the Set Zeros tab.

Vertical Zero

For this example the deck will be our zero for the Vertical axis. Insert a tool holder into the cutterhead you will be using to bore the block. Center the cutterhead over a cylinder. Using the Vertical Handwheel, bring the cutterhead down until the tool just touches the deck and press the Vertical Zero button. The display next to this button will go to zero. The Vertical zero has now been set.



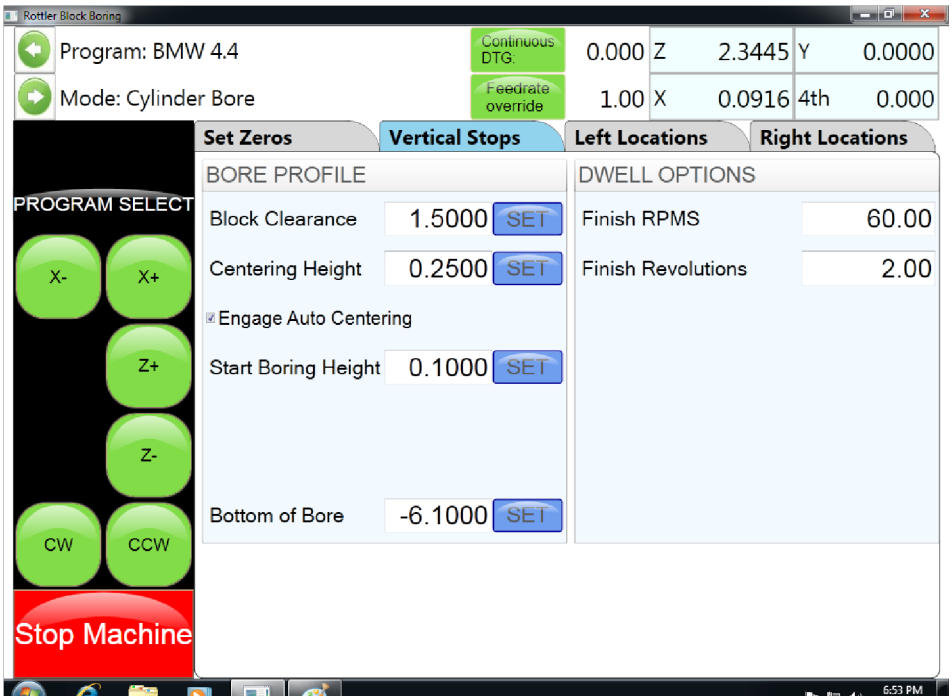
The zeros points for all axis have now been set. All the numbers entered from this point on will reference these zero positions. You are finished with the Set Zeros screen, select the next Tab to the Right, Vertical Stops.

Blueprinting

Even if you are not going to be boring a block to the blue print specifications it is recommended to have the Blueprint values entered. It will speed up the programming process of indicating and probing a block by giving the operator a close estimate of bore location.

Programming Vertical Stops

To build a program you must set the Vertical Stops for the program.

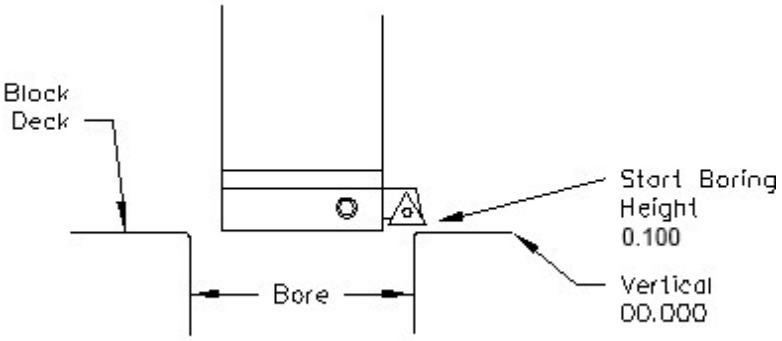


Centering Height

This is the distance above the block deck where the centering fingers are at correct position for the auto centering process

Start Boring Height

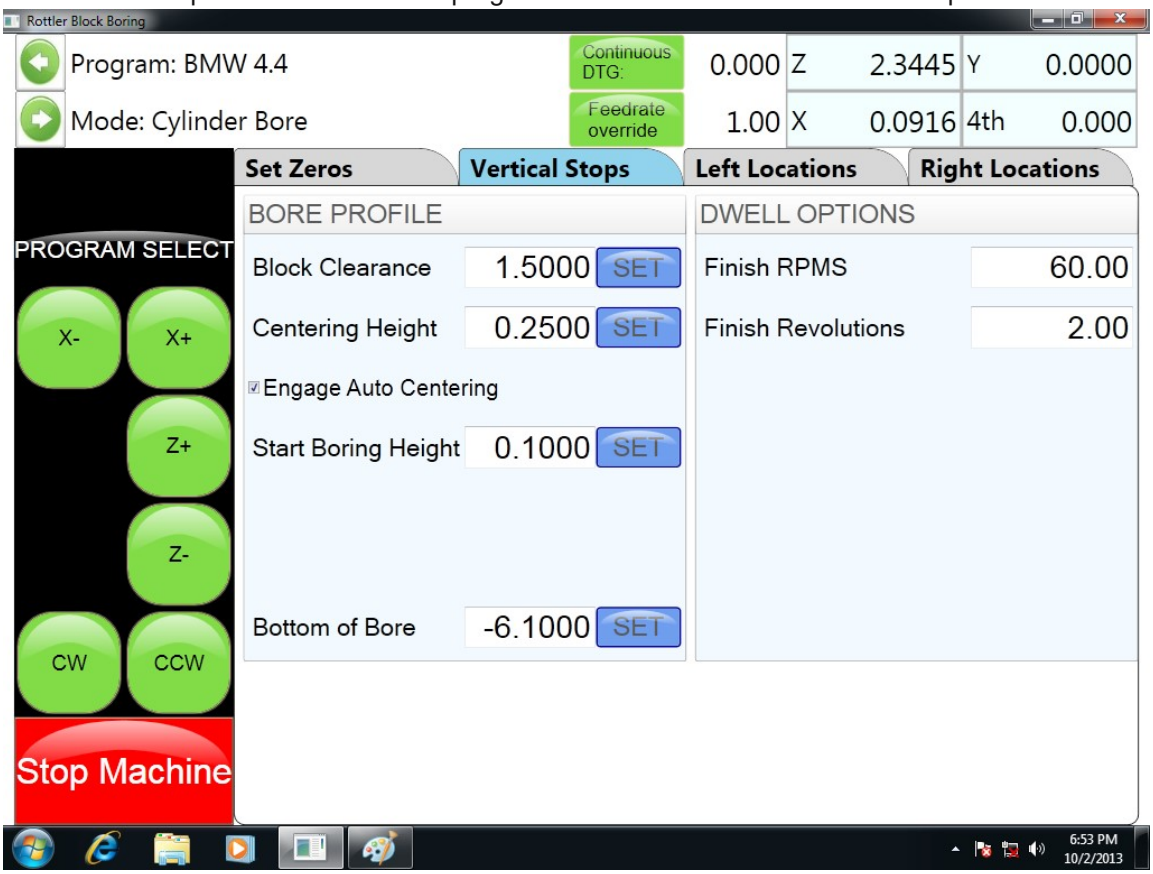
This is the distance above zero or the block deck where you want the cutterhead to start rotating and the downward feed to start. Generally this is just a short distance above the block deck to minimize the amount of time the machine bores through air.



Bottom of the Bore

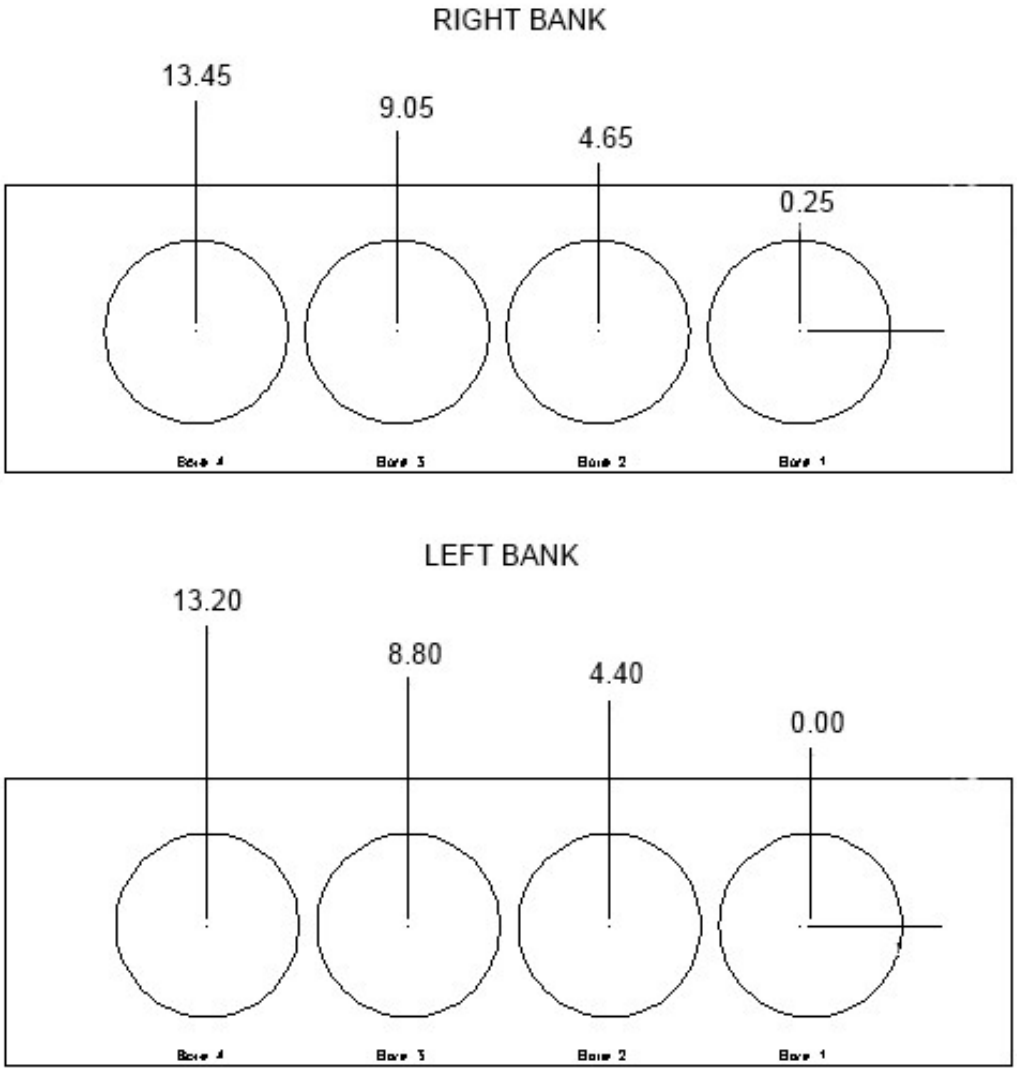
This is the distance below zero or the Block deck where you want the machine to stop boring and retract out of the cylinder. When the spindle retracts it will then go to the Block Clearance position.

This is an example of what the above program would look like on the vertical stops.



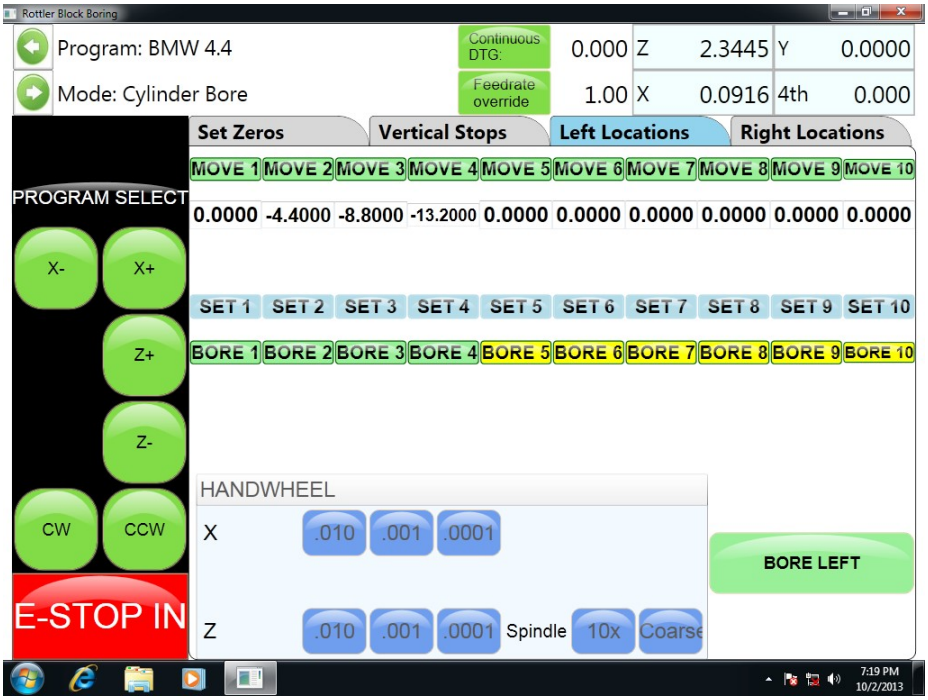
Bore Locations

To build a program you must set the Horizontal Stop for the program. All Horizontal stops are based from where their zero positions were set. The following illustration shows how the stop positions were derived.

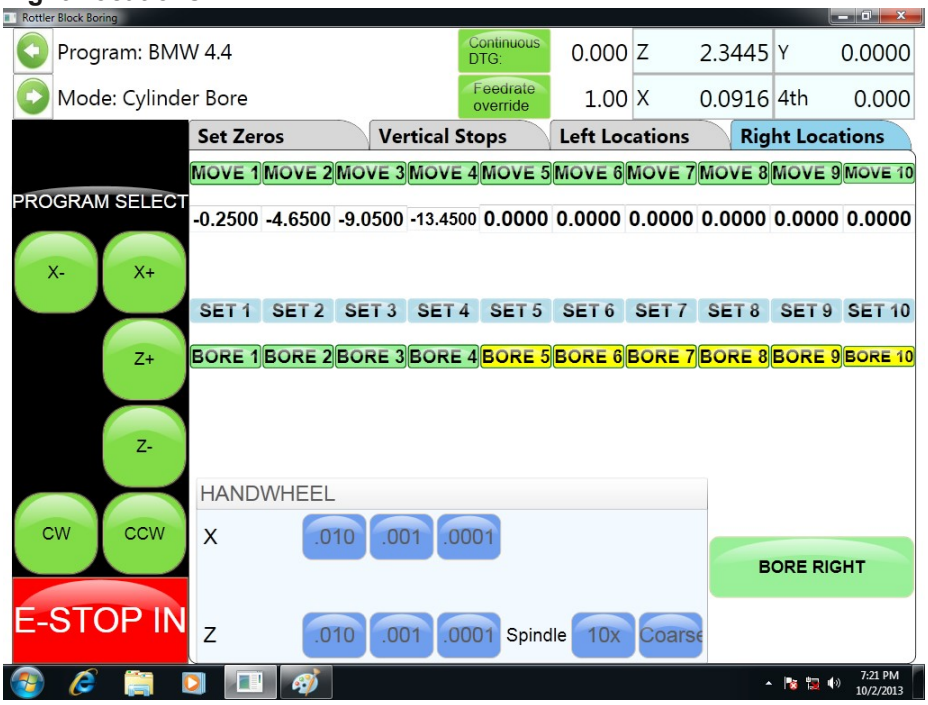


The following is an example of what the screens would look like for the above block.

Left Locations



Right Locations



The Horizontal and stops have now been set.

Boring a Block

Once the Vertical, Horizontal stops have all been entered the Spindle RPM and Feed Rate need to be entered. This is done on the Set Zeros screen. Once this is done you can go to the Left and/or Right Bore location screens and bore the cylinders.

Pressing the Bore Left or Bore Right buttons Will Bore all the cylinders that have Green bore button below them.

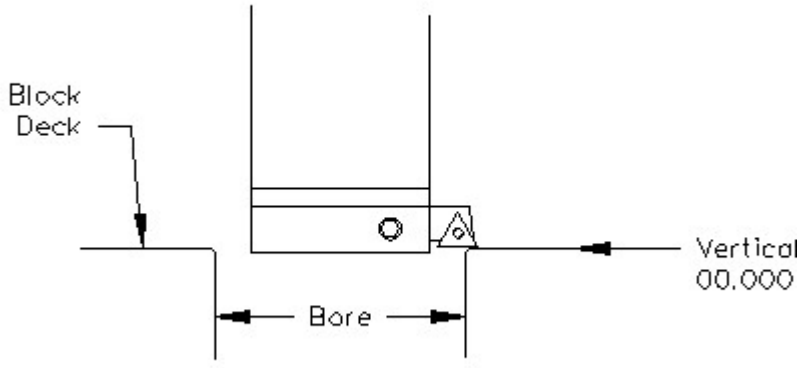
Pressing a Bore button once will turn that button Yellow. Any Yellow button will not be bored when the Bore Left or Right button is pressed.

Indicating

Even if you are not going to be boring a block to the blue print specifications it is recommended to have these values entered. It will speed up the process of indicating and probing a block by giving the operator a close estimate of bore location.

Vertical Zero

For this example the deck will be our zero for the Vertical axis. Insert a tool holder into the cutterhead you will be using to bore the block. Center the cutterhead over a cylinder. Using the Vertical Handwheel, bring the cutterhead down until the tool just touches the deck and press the Vertical Zero button. The display will go to zero. The Vertical zero has now been set.



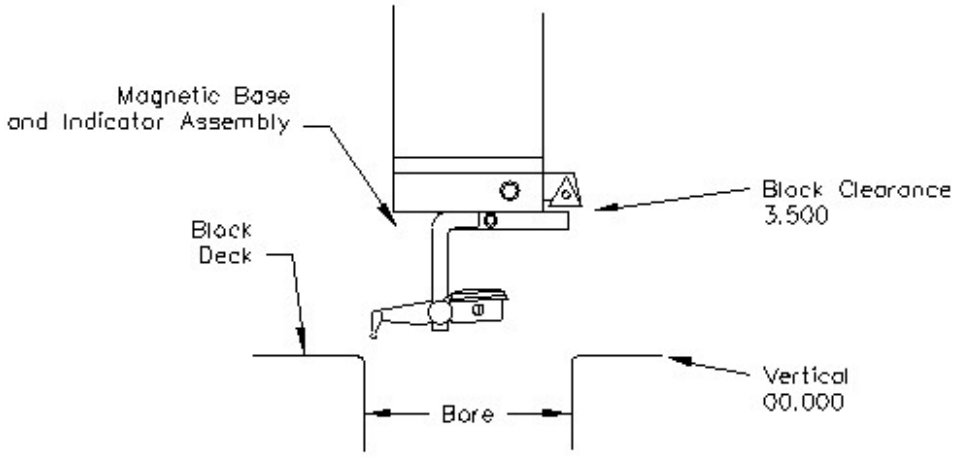
The zeros points for all axis have now been set. All the numbers entered from this point on will reference these zero positions. You are finished with the Set Zeros screen, select the next Tab to the Right.

Programming Vertical Stops

To build a program you must set the Vertical Stops for the program.

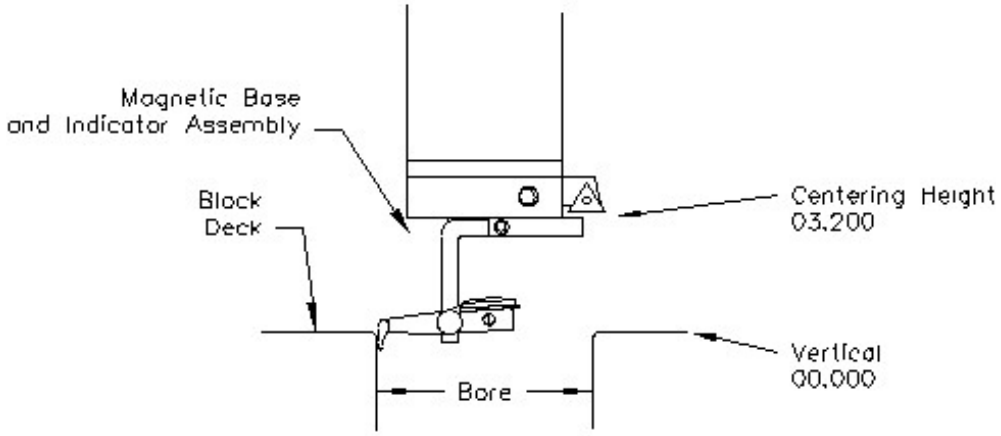
Block Clearance

This is the distance above the zero position or block deck allowing the cutterhead to move to the next bore unobstructed. When you are indicating the cylinders in you must have this stop set so the indicator will clear the block surface when traveling to the next cylinder.



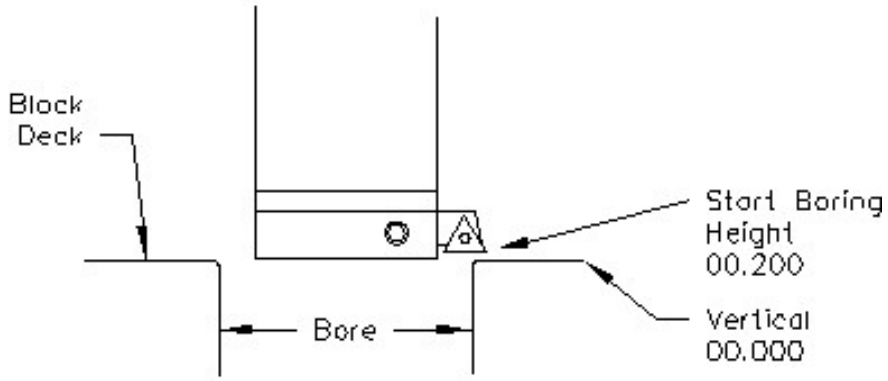
Centering Height

This is a distance above the vertical zero where you will be manually centering the block. The drawing below is a typical set up for manual centering or indicting a cylinder.



Start Boring Height

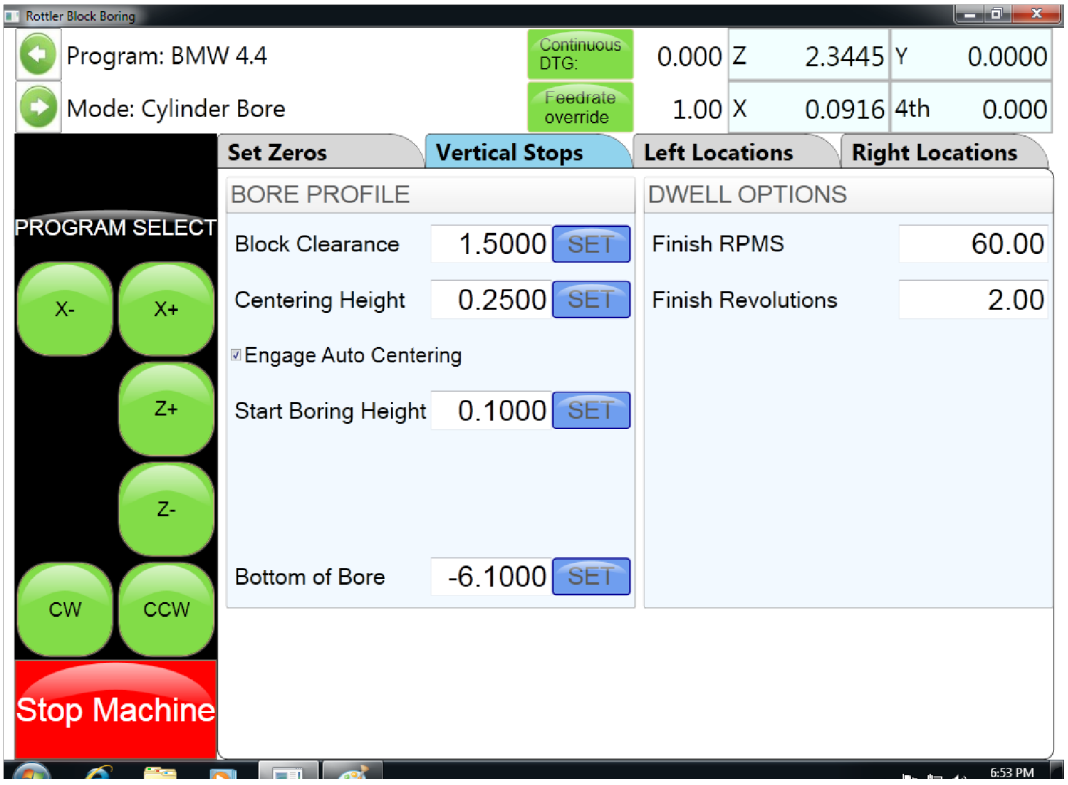
This is the distance above zero or the block deck where you want the cutterhead to start rotating and the downward feed to start. Generally this is just a short distance above the block deck to minimize the amount of time the machine bores through air. This will be a negative number.



Bottom of the Bore

This is the distance below zero or the Block deck where you want the machine to stop boring and retract out of the cylinder. When the spindle retracts it will then go to the block Clearance position.

This is an example of what the above program would look like on the vertical stops.

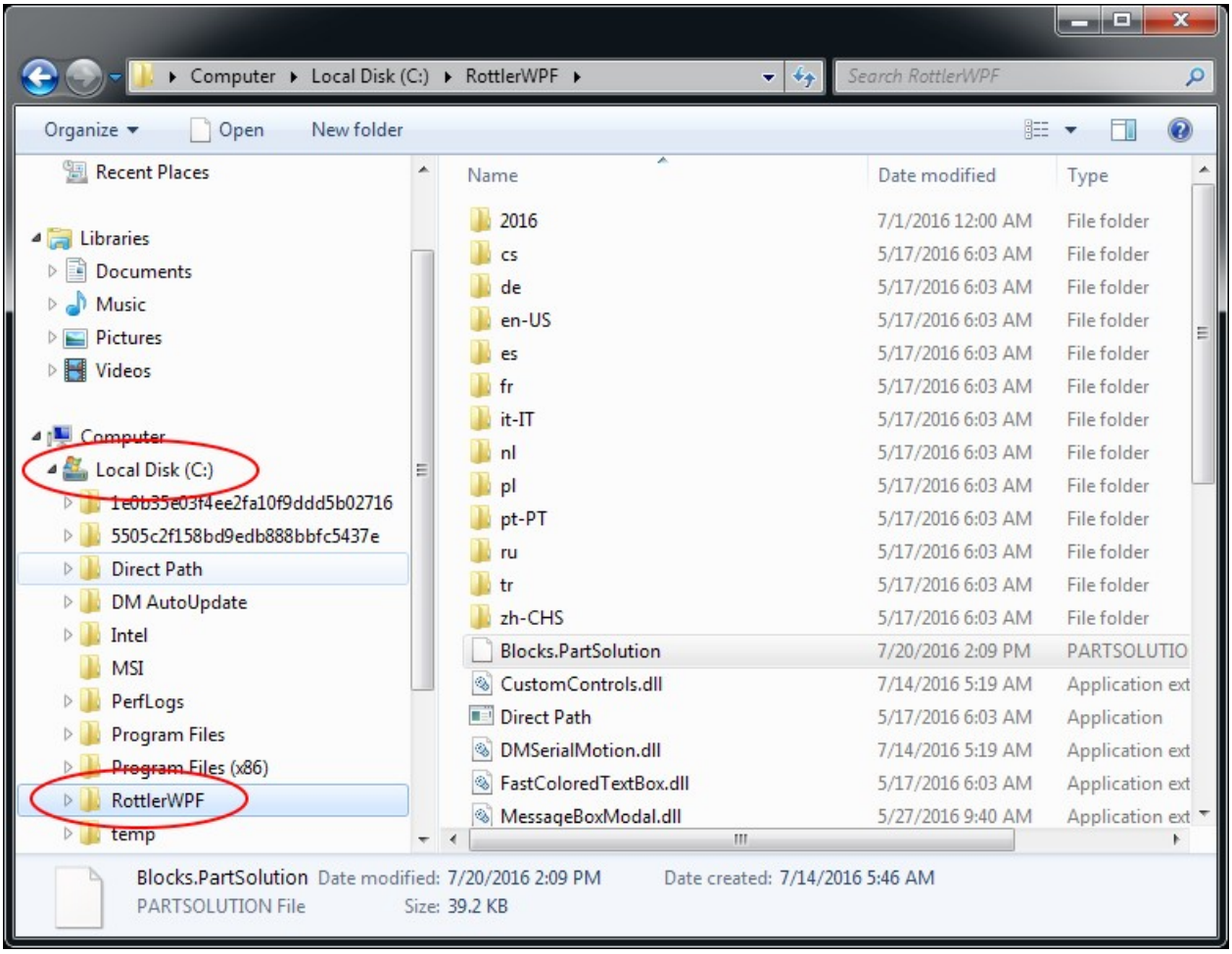


The Vertical stops have now been set. You are finished with the Vertical Stops screen, select Left and/or Right Locations.

Backing Up and Restoring Block Profiles

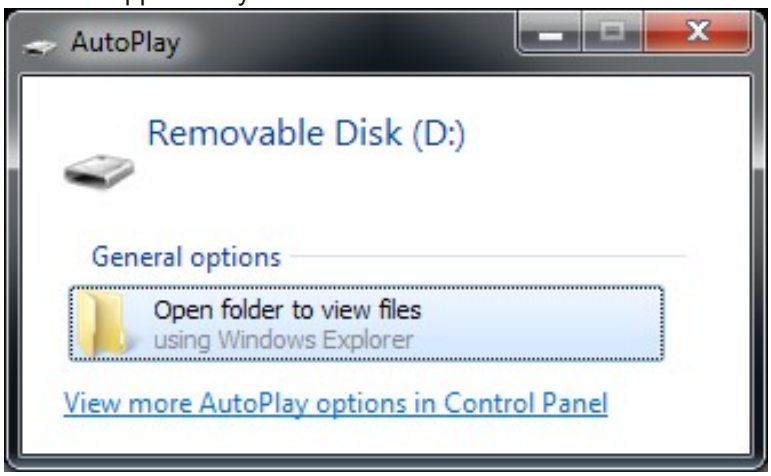
This section will explain how to back up and restore the operator created block profiles for DM controlled machines for archival purposes or to transfer to a different machine.

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

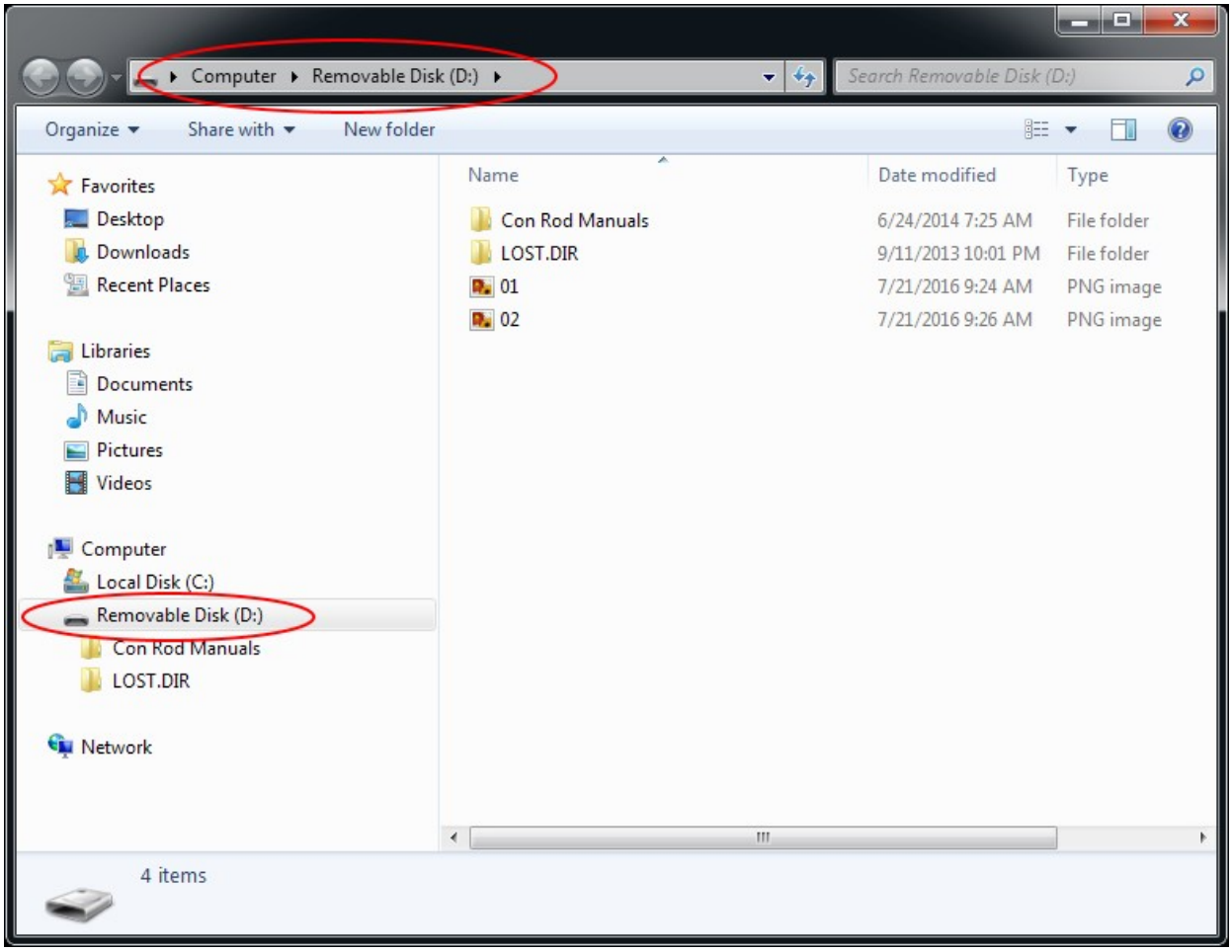


The next step is to plug in a flash drive to an open USB port

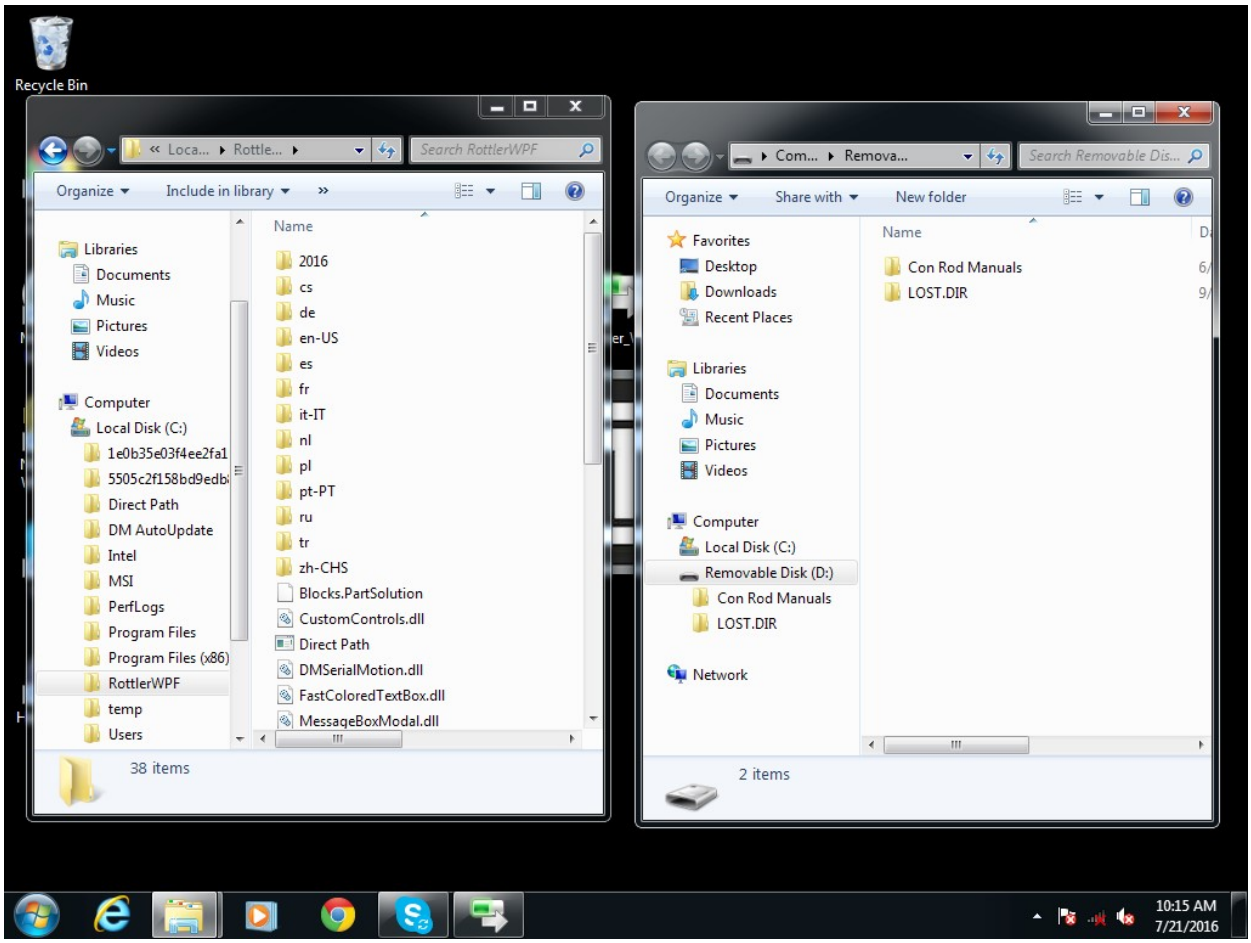
The following pop up box will appear on your screen.



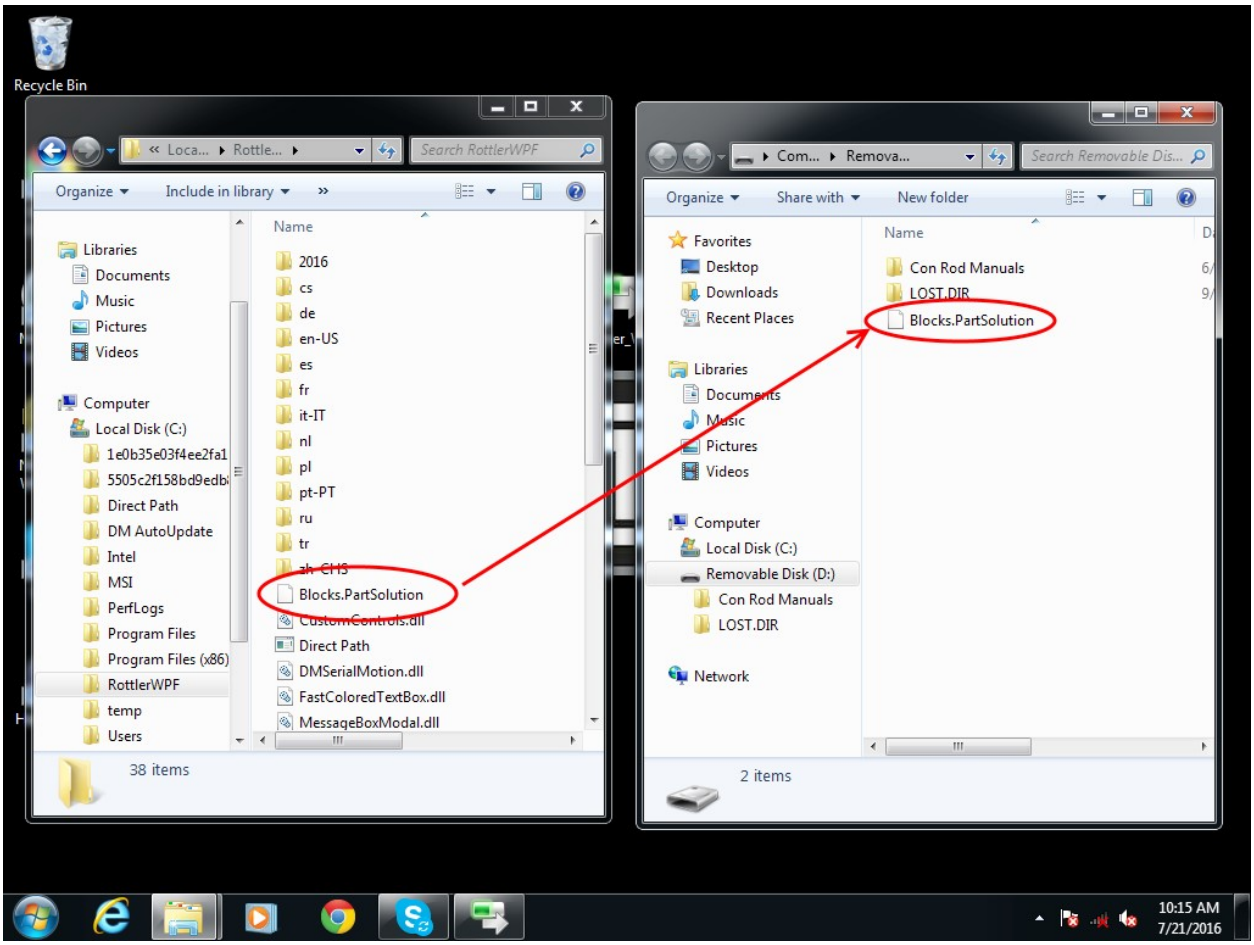
Click on the Open folder to view files option and the following screen will appear. This is the contents of the flash drive you just plugged in.



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



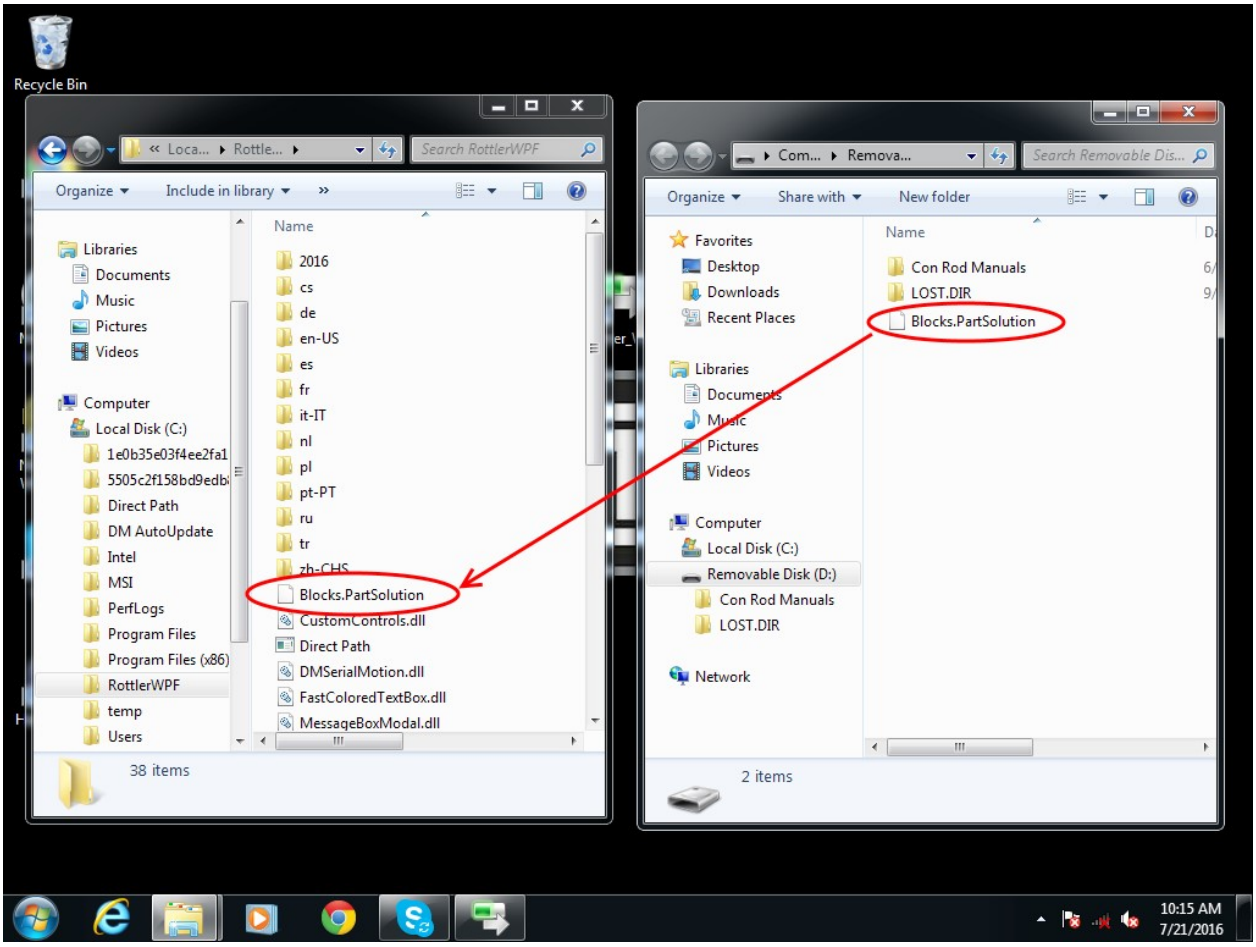
Block profiles are backed up each time the machine is run with the current profiles being shown in the RottlerWPF folder. All that needs to be done to back up the current profile is to simply drag it from the RottlerWPF folder to the flash drive folder. A copy of the file will be placed on the flash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



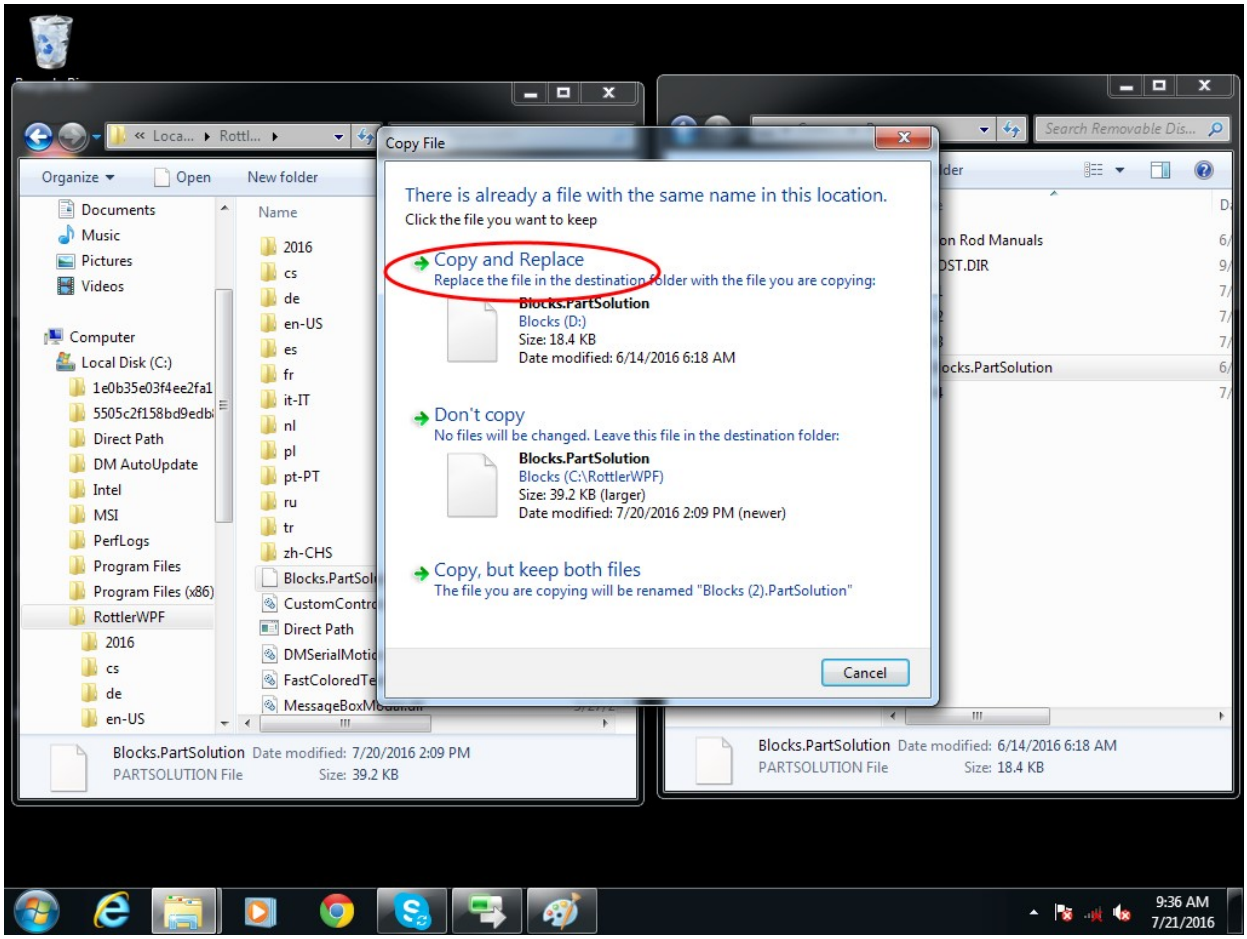
Backup is now complete. Close both file browser windows and remove the flash drive.

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

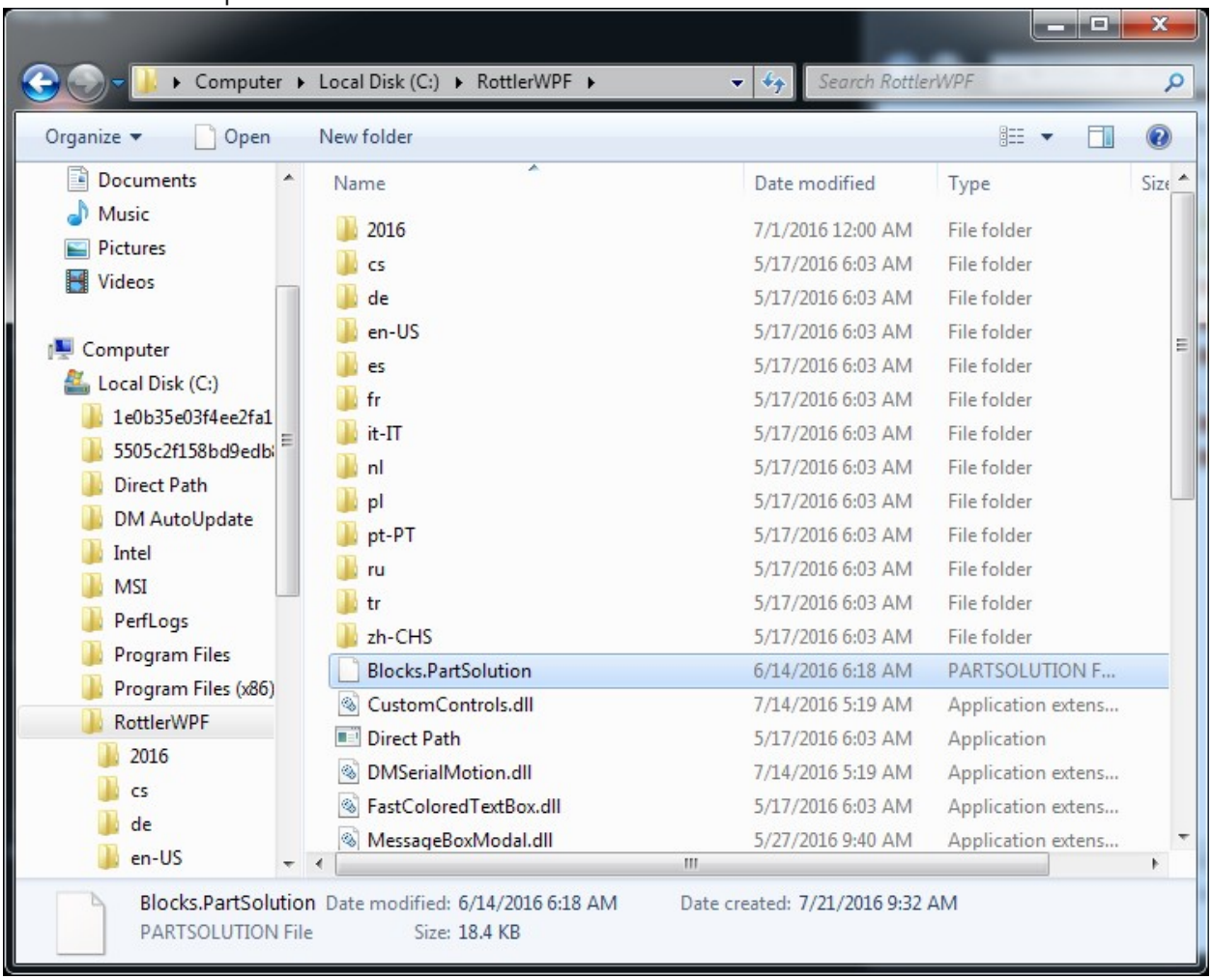
Highlight the block profiles file in the flash drive and drag it into the RottlerWPF folder on the local hard drive.



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.