

# **ROTTLER**

## **SA SERIES SURFACING MACHINES**

### **OPERATION AND MAINTENANCE MANUAL**





# **MANUAL SECTIONS**

**INTRODUCTION**  
**INSTALLATION**  
**SAFETY**  
**CONTROL DEFINITIONS**  
**OPERATING INSTRUCTIONS**  
**MAINTENANCE**  
**TROUBLESHOOTING**  
**MACHINE PARTS**  
**OPTIONS**  
**MSDS**

## **ORDERING PROCEDURE**

Contact your regional Rottler sales rep for assistance in ordering optional equipment, replacement parts, or tooling.

If you are unable to contact your regional Rottler sales rep, call the factory at 253-872-7050 and ask to speak to the parts sales specialist.

Have the following information handy to expedite the ordering process:

1. Your name, business name, and contact number
2. Customer number
3. If you don't have a customer number, your billing address
4. Shipping address if different from billing address
5. Machine model and serial number
6. Part number and description of what you want to order
7. Preferred method of shipment
8. You may also contact us via e-mail with the above information. Send e-mail requests to:  
[parts@rottlermfg.com](mailto:parts@rottlermfg.com)

In some cases you may be requested to send a photo of the part you are ordering if it is a replacement part, or doesn't appear in the 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 you require.

**THERE IS A MINIMUM ORDER OF \$25.00**



# 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 S7A & S8A 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 S7A & S8A 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 S7A & S8A surfacing machine is a precision, high speed surfacing unit. The model S7A & S8A can be equipped with tooling and accessories for surfacing most American passenger car and truck, inline, 90 and 60 degree V-type blocks as well as cylinder heads. S7A & S8A machines may be readily tooled to resurface a wide variety of engines, including European and Asian models, as well as perform various other surfacing operations.

This machine is designed for two purposes:

1. The alignment of the deck surface to the pan rails and main bearing locations, as have been done in the original factory surfacing.
2. A considerable savings in surfacing time and operator involvement as a result of fast block clamping, and convenient controls.

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 conveniently located control panel. Power required is 230 volt, single phase. This provides power to the variable speed AC motor controller, the horizontal S.C.R. drive, and various relays and solenoid valves that actuate mechanical controls on the machine to engage feeds and travels.

## Disclaimer

The S7A & S8A 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.

Rottler Manufacturing does not make any representations, warranties or guarantees, express or implied, as to the accuracy or completeness of the Manual. Users must be aware that updates and amendments will be made from time to time to the Manual. It is the user's responsibility to determine whether there have been any such updates or amendments. Neither Rottler Manufacturing nor any of its directors, officers, employees or agents shall not be liable in any manner whatsoever to any person for any loss, damage, injury, liability, cost or expense of any nature, including without limitation incidental, special, direct or consequential damages arising out of or in connection with the use of the Manual.

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 S7A & S8A parts and equipment is warranted as to materials and workmanship. This limited warranty remains in effect for one year from the date of delivery, provided the machine is owned and operated by the original purchaser and is operated and maintained as per the instructions in the manual.

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

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 Order Department or representative 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 Order 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 written approval from Rottler Corporation Management and/or Shipping Department.

***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.

This page intentionally left blank

# INSTALLATION

## Contents

<b>S7/S8 Installation Report .....</b>	<b>2-2</b>
<b>Installation Procedure.....</b>	<b>2-6</b>
<b>Location.....</b>	<b>2-6</b>
<b>Unpacking .....</b>	<b>2-6</b>
<b>Shipping Hold Down Bolt .....</b>	<b>2-6</b>
<b>Leveling .....</b>	<b>2-6</b>
<b>Air Supply.....</b>	<b>2-6</b>
<b>Power Supply.....</b>	<b>2-7</b>
<b>Grounding .....</b>	<b>2-7</b>

**ATTENTION OWNER/BUSINESS MANAGER**

**To validate the warranty on your new Rottler machine, please be sure to sign the installation report after the installation technician has installed the machine and verified the machine is operating correctly and given the operators operation and maintenance training.**

**Thank you for your cooperation and the opportunity to be of service to you.**

***ROTTLER MANUFACTURING***



## INSTALLATION REPORT

S7 / S8 A & M SERIES

REV 031617

OFFICE USE ONLY

Route to: Servicer\_Mgr → Accounting → Andy → Accounting    Warranty Exp Date

### ROTTLER MANUFACTURING MUST HAVE THIS REPORT RETURNED TO PROPERLY QUALIFY WARRANTY ON EQUIPMENT

Customer: \_\_\_\_\_ Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ Phone: \_\_\_\_\_

Country: \_\_\_\_\_

Machine Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_ Representative: \_\_\_\_\_

**MACHINE INSTALLATION:** Electrical information MUST be complete to validate this report.

\_\_\_\_\_ Follow instructions in this section to uncrate, unpack, and prep machine.

#### CAUTION

**VERY IMPORTANT:** Modern design machines contain electronic low voltage circuitry that provides great advantages and a better machine life. BUT, you must have an excellent, stable, isolated power supply along with an isolated ground. If not, electrical noise problems are likely to interfere with machine operation unexpectedly.

*Customer is responsible for providing electricity to machine in a manner that meets the local electrical code requirements.*

\_\_\_\_\_ Check machine with precision level and for equal support on feet, then carefully adjust supports to precisely secure the best average flatness of the top table.

\_\_\_\_\_ This machine requires 208 to 240V AC 1-phase, 50/60HZ, isolated power supply (measured between L1 and L2). Current requirement is 15 amps. When using two legs of a three-phase supply, the voltage from each leg to ground must be between 100-120V AC. Measure the voltages of the power supply twice during installation (1) \_\_\_\_\_ VAC (2) \_\_\_\_\_ VAC.

#### CAUTION

IF VOLTAGE IS OUTSIDE THE CORRECT RANGE AT ANY TIME THE MACHINE WILL NOT OPERATE PROPERLY AND MAY BE DAMAGED.

\_\_\_\_\_ Briefly describe the isolated ground connection you have made: (Instructions to make a correct ground are included with the manual)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## MACHINE START-UP

- \_\_\_\_\_ **BEFORE** turning power on to the machine. Check all wires for security by using the correct screw driver and turning CW until movement stops. Stranded wire can "spread" slightly from vibration during transport.
- \_\_\_\_\_ Install electrical component covers inside the electrical enclosure with fasteners provided.
- \_\_\_\_\_ A dry air supply of at least 80 PSI will use 1 cu. ft./min., maximum. An industrial vacuum system with a flexible 1-1/2" hose should be used on the S7/8--explain the electrical control options for the vacuum.
- \_\_\_\_\_ Check the setting of the Relief Valve located at the back of the spindle base. Refer to operators manual under Maintenance, Air adjustments.

 **CAUTION** When starting the machine for the first time, it may move out of control. Make sure all hands are clear of machine parts. Be ready to press the Emergency Stop button if needed.

### OPERATION

#### Operator Training

**Note: Rotter employees and representatives per company policy are not permitted to provide end user of Rottler equipment with any OEM specifications for the workpiece that is created by end user using Rottler equipment.**

- \_\_\_\_\_ Explain controls per "Control" section in manual.
- \_\_\_\_\_ Demonstrate and explain hand feed system (see manual).
- \_\_\_\_\_ Thoroughly explain the cutter lock and relief system that utilizes the slack in the actuator nut with air cylinder control. Caution operator of result if a surfacing setting is ever made in the relief up position.
- \_\_\_\_\_ Exercise spindle rotation, speed controls, fast travel, feeds, and stop adjustments.
- \_\_\_\_\_ Have operator perform machine functions (and automatic cycles on applicable machines).
- \_\_\_\_\_ Remove back of cutter head guard and have operator unclamp, rotate, and clamp cutter inserts.
- \_\_\_\_\_ Point out the changing and adjustment of insert tool holders per manual.
- \_\_\_\_\_ Explain optional cutting inserts that are available and their correct application to the type of material being cut. Explain the use of one versus two inserts.
- \_\_\_\_\_ Explain availability of optional tooling.



### **STRESS CAUTION AND PERSONAL SAFETY**

- \_\_\_\_\_ Explain speeds required for carbide, coated carbides, CBN, etc., on specific work piece materials.
- \_\_\_\_\_ Cutter head change and clearance of guard from cutter level.
- \_\_\_\_\_ Review operator manual and emphasize safe, methodical operation.
- \_\_\_\_\_ **Parts ordering-show how to refer to manual for part numbers.**

## MACHINE MAINTENANCE

- \_\_\_\_\_ Overload device--Micarta key for spindle rotation.
- \_\_\_\_\_ Inner spindle adjustments (see manual).
- \_\_\_\_\_ Lubrication (see manual).

**CYLINDER HEAD RESURFACING**

- \_\_\_\_\_ Assemble cylinder head fixturing in accordance with the manual diagram.
- \_\_\_\_\_ Have operator clamp head properly, place and adjust jacks and level the work piece with level.
- \_\_\_\_\_ Point out value of a double axis level.
- \_\_\_\_\_ Use the first work piece to check dial indicator is set at zero, when cutters touch the surface of the work piece.
- \_\_\_\_\_ Set stop to use built-in 4" rapid approach or operator control rapid approach. (Automatic models only.)
- \_\_\_\_\_ Explain feed speed combinations for finish on cast iron and aluminum.

**V6/8 BLOCK RESURFACING**

- \_\_\_\_\_ Assemble V-block tooling in accordance with the manual diagram.
- \_\_\_\_\_ Demonstrate the convenience, strengths and weakness of block hold down and leveling capability where block surfaces require the adjustment.
- \_\_\_\_\_ Explain adjustments for block angles and rearrangement for large V-blocks, such as 3208 Cats and adaptations to odd angles such as the Ford super duty truck block.
- \_\_\_\_\_ Explain procedures to surface protruding cylinder sleeves flush with the block surface.

**IN-LINE BLOCK RESURFACING**

- \_\_\_\_\_ Assemble in-line tooling, demonstrating support levels to accommodate a great variety of blocks.
- \_\_\_\_\_ In addition to adequate hold down force, explain the use of chocking or providing stops that prevent the block sliding.
- \_\_\_\_\_ Thoroughly review speeds, feeds, cutter types including shell mills, and general productivity that the machine is capable of. Make sure operator demonstrates complete understanding.
- \_\_\_\_\_ Explain cleaning work piece if required and absolute prevention of direct air blast.
- \_\_\_\_\_ Similarly review all safety precautions and use of emergency stop.
- \_\_\_\_\_ Explain procedures to surface protruding cylinder sleeves flush with the block surface.

General remarks on machine performance, adjustments as received and any further organization or parts required to complete the installation.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

Instructions given to: \_\_\_\_\_

Sales/Service Engineer: \_\_\_\_\_ Date \_\_\_\_\_

Shop Foreman/Superintendent or Owner: \_\_\_\_\_ Date \_\_\_\_\_

**Once completed send this form to:**

**Rottler Manufacturing**  
attn: Service Manager  
8029 S 200 St  
Kent, WA 98032 USA

**Alternately you may send this form via fax or e-mail:**  
fax: [+1] 253-395-0230  
e-mail: [service@rottlermfg.com](mailto:service@rottlermfg.com)

## Installation Procedure

### Location

The productivity of this machine will depend a great deal on it's proper initial installation, particularly the means by which cylinder blocks/heads are lifted into the machine as well as the material handling to and from other operations in your shop.

The proper loading arrangement and location for your S7A & S8A machine is extremely important.

A slow travel (6 to 10 feet / min.) power hoist, operated from either a bridge crane or a jib crane arrangement works very well. A 1000-lb. hoist is generally adequate for lifting the engine block. An air hoist with speed control makes an ideal method for fast, convenient loading.

If some production surfacing with this machine is anticipated, and the cylinder blocks/heads are not directly loaded and unloaded from a conveyor, we recommend considerable attention be given to the crane so that it covers an adequate area to allow the operator to back up and remove cylinder blocks/heads without cluttering up his own area. If two machines are to be operated by one operator, we recommend that the open faces be placed at right angles to each other, with the machines about three feet apart.

### Unpacking

Use care in removing the crate from the S7A & S8A machine, do not use force on any part of the spindle unit.

Remove the tool box, parallels, and optional tooling, located at the lower portion of the machine and completely clean these articles, as well as the machine base pads and upper table, with solvent. Rust inhibitor is applied to the machine at the time of shipment, any of this inhibitor left on the machine will result in considerable collecting of cast iron dirt.

### Shipping Hold Down Bolt

Remove cover (#7036E) from the rear of the spindle base by removing it's four mounting screws. Remove the bolt located in the front bottom of the spindle base. Replace the cover and tighten the four mounting screws.

### Leveling

Four square head set screws (502-1-12A), jam nuts (502-1-12F), and chamfered washer (502-1-12), are provided with the machine for leveling. Insert the screw and nut at the base support points, being careful that the screw point seats in the washer.

Use a precision level and level the upper table within .0005" per foot in both directions and make sure that the machine weight is equally supported at the four support points of the base.

### Air Supply

***It is very important the air source for the S7A and S8A machine be moisture free.*** Water and oil in the line will result in early cylinder and valve failure. ***Our recommendation is the installation of a water trap at the machine.***

Attach a 100 PSI air source to the appropriate intake at the air filter on the side of the rear control enclosure.

## Power Supply

This machine requires 208 to 240 VAC single phase, 50/60 Hz, (measured between L1 and L2). Current required is 15 amps.

When using two legs of a three phase supply the voltage from each leg to ground must be between 100-120 VAC. Connect per following electrical hook-up instructions. **If the voltage is outside this range the machine will not operate properly and may be damaged.**



### CAUTION

Do not attempt to attach three phase voltage to this machine. The three phase spindle motor receives its power from a three phase variable frequency drive in the rear enclosure. The frequency inverter is powered by single phase.

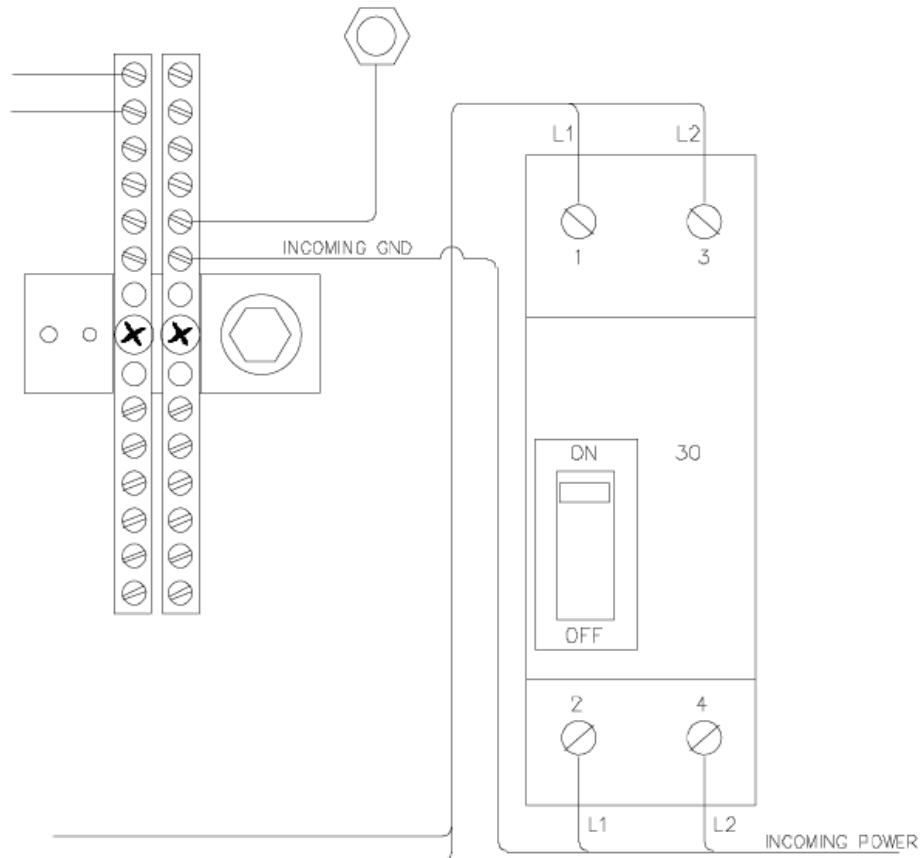
Connect single phase wiring to the breaker switch as shown below.

## Grounding



### CAUTION

This machine must be connected to a good earth ground. Connect the earth ground wire to grounding bar inside the electrical enclosure.



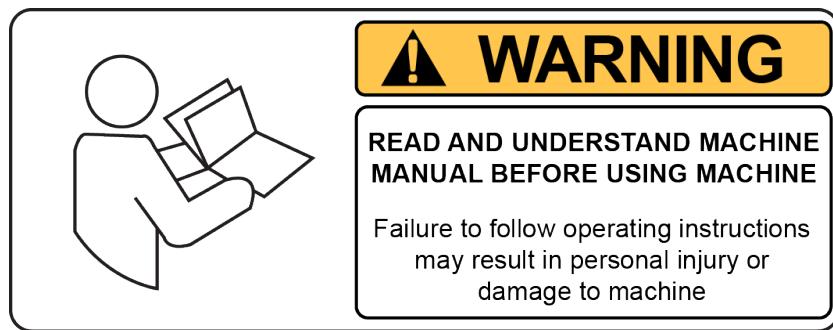
# SAFETY

## Contents

Safety Information .....	3-1
Safety Instructions for Machine Use .....	3-1
Electrical Power.....	3-3
Machine Operator.....	3-4
Emergency Procedure .....	3-5

## 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

**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.

## 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.

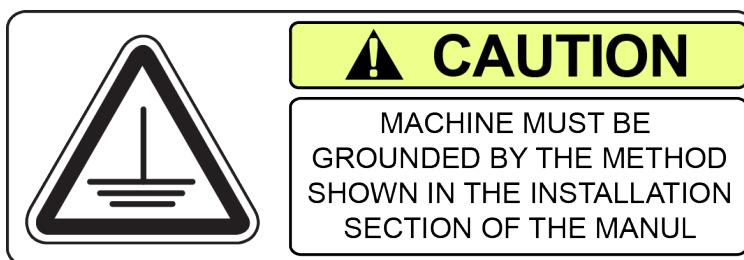
## Electrical Power

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.

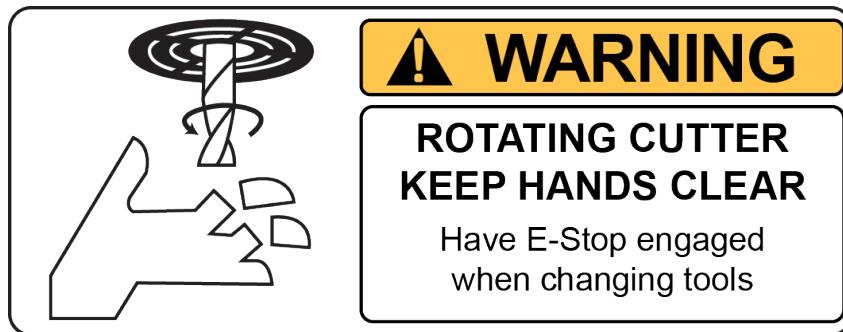
## Machine Operator

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.

# CONTROL DEFINITIONS

## Contents

<b>Control Definitions .....</b>	<b>4-1</b>
<b>CPU Control .....</b>	<b>4-1</b>
<b>Master Power On/Off Switch .....</b>	<b>4-1</b>
<b>Button Definition .....</b>	<b>4-1</b>
Emergency Stop.....	4-2
Homing.....	4-2
Right.....	4-2
Left .....	4-2
Spindle Start.....	4-2
Relief Up .....	4-2
Up/Dn Adjust .....	4-2
Mill .....	4-2
Rapid touch off Set .....	4-3
End of Cut Knob.....	4-3
Feed Rate.....	4-3
Spindle RPM .....	4-3
Cycle Start .....	4-3
<b>Surface Depth Dial Indicator .....</b>	<b>4-3</b>
<b>Machine Parameters.....</b>	<b>4-4</b>
<b>Spindle Auto Set-Up .....</b>	<b>4-5</b>
<b>Horizontal Auto Set-Up .....</b>	<b>4-5</b>
<b>Manual Power Up.....</b>	<b>4-5</b>

## Control Definitions

The purpose of this chapter is to define the function of buttons on the front control panel. Certain button functions may not appear clear when first reading this chapter. As the operator reads through the Operating Instructions chapter of this manual, these functions will become clear.

### CPU Control

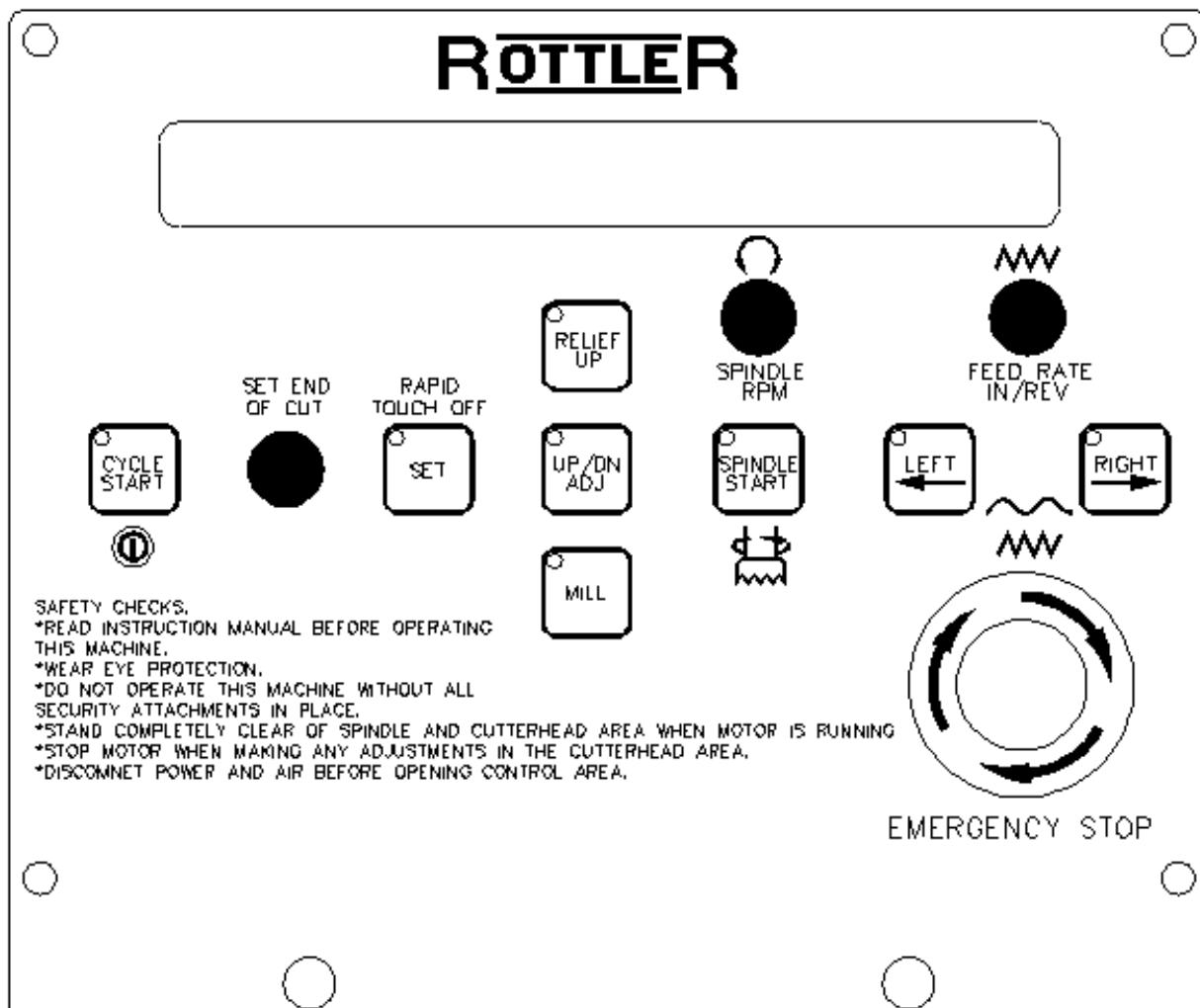
This machine is under control of a CPU located in the rear enclosure

### Master Power On/Off Switch

This switch is located on the upper right hand side of the rear electrical cabinet. This switch must be in the Off position to open the rear enclosure.

When first applying power to the machine it will take a short while for the system to be ready for operation. Do not press any buttons on the control panel until the display show the standard operating screen.

### Button Definition



**Emergency Stop**

IF the Emergency stop is pushed, all power to the spindle and horizontal drive is removed. Display will still have power and will display "EMERGENCY STOP". To release the emergency stop, turn the button to the right and it will "POP" out. Give the machine a minute to power up before pressing any buttons on the control panel.

**Homing**

When the machine is first powered up it needs to be homed. The left and right buttons flash. The display also tells you to home the machine. Press and hold the Left and Right buttons for two (2) seconds. The machine will travel to the right at 50 inches per minute to find the home sensor.

**Right**

This button has two functions. When pressed the machine will travel to the right at 120" per minute. Travel will continue until the button is pressed again or the right end of travel is reached.

If the spindle is on when this button is pressed, the machine will Feed to the right at the rate shown in the display. Travel will continue until the button is pressed again or the right end of travel is reached.

**Left**

This button has two functions. When pressed, and held, the machine will travel to the left at 120" per minute until the button is released or the Left end of travel is reached.

If the spindle is on when this button is pressed, the machine will Feed to the left at the rate shown in the display. Travel will continue until the button is pressed again or the left end of travel is reached.

**Note: When the machine is running an automatic cycle the Rapid Travel rate is at 160" per minute.**

**Spindle Start**

This button will start the spindle at the speed shown in the display. The spindle will continue to run until the button is pressed again.

The spindle will not start if any of the rapid travel or cycle buttons are active.

**Relief Up**

This button will put the spindle and upper housing in the full up position, about .020". This is used at the end of the cut in conjunction with the right travel button. It's purpose is to allow travel to the right without the cutter dragging back across the milled surface. The Relief Up function will operate if the spindle is turning, but not if Feed is active. Pressing this button cancels the Up/Dn Adjust and Mill buttons.

**Up/Dn Adjust**

This button needs to be pressed before you use the manual hand wheel. Activating this button will put a small amount of air pressure on the lift cylinders to counteract the weight of the spindle and upper housing, this will make the handwheel easier to adjust. The Up/Dn Adjust function will operate if the spindle is turning, but not if Feed is active. Pressing this button cancels the Relief Up and Mill buttons.

**Mill**

This button clamps the outer spindle to keep it from moving during a cut. The Mill button should be pressed before starting a feed move. The Mill button will work if the spindle is turning, but not if the Feed is active. Pressing the Mill button while in Relief Up will de-energize the Relief Up solenoid, allowing the spindle to drop the .020". A half a second later the spindle will be clamped. The Mill button cancels the Up/Dn Adjust mode.

**Rapid touch off Set**

This button is used to set the Rapid Touch Off point. The Rapid Touch Off point is a distance, set by the operator, from the right home position to the start of the work piece. Every time this button is pressed the display will zeroed out and that position remembered at the Rapid touch Off position. More about the use of this button will be discussed later in this chapter under Auto Cycle and again in the Operating Instructions chapter of this manual.

**End of Cut Knob**

This knob is used to set the length of the mill cut. Turning this knob will change the display either negative or positive. This value will be the length of the cut from the Rapid to Touch Off position. More about the use of this button will be discussed later in this chapter under Auto Cycle and again in the Operating Instructions chapter of this manual.

**Feed Rate**

The feed rate knob will change the feed rate shown in the display. The available feed rate is from .001" to .080" per revolution of the spindle.

**Spindle RPM**

The Spindle RPM knob will change the RPM shown on the display. The available RPM is 350 to 1800.

**Cycle Start**

Pressing this button will start an automatic cycle. To start an automatic cycle the machine must be at home or at the Rapid Touch Off position. If the machine is at the home position when Cycle Start is pressed, the spindle will rapid travel over to the Rapid touch off position and then pause. The pause is for the operator to adjust the height of the spindle using the manual handwheel. If the Cycle Start is pressed when the machine is at the Rapid to Touch Off position the machine will go into Mill mode, Start the spindle at the RPM showing on the display. When the spindle gets to the desired speed, Feed to the Left will start at the rate shown on the display.

Feed will continue until the End of Cut is reached. The spindle will lift to the Relief Up position, Spindle rotation will be turned off and the machine will Rapid travel right to the home position.

**WARNING**

Even though the Spindle has been turned off, it will continue turning as it slows down and travels to the right. Keep all body parts away from the cutting area when in the automatic cycle. The Spindle Start light will blink until the spindle has come to a full stop.

**Surface Depth Dial Indicator**

This dial indicator is mounted on the surface of the cutterhead guard. When properly adjusted this indicator will show the position of the cutting insert relative to the surface to be cut.

## Machine Parameters

To access the machine parameters press and hold the SET button then press LEFT. This will bring you to the Password, you must still hold the set button, turn the Spindle RPM knob to read 311 then release the SET button.

The following is a list of parameters for the machine:

- 1) Board serial number.
- 2) Input Test – a solid square below the label means the input is active.
- 3) Machine Type = English.

**Note: You change the type by using the LEFT and RIGHT buttons.**

- 4) Machine Type = Automatic
- 5) Total Horizontal Length = SF8 = 42.5, SF7 = 32.5 These will be set when the machine does the Self Set-Up.
- 6) Horizontal Encoder Pulses per Inch = 2500

**Note: To change numeric values press and hold the SET key while rotating the SPINDLE RPM knob.**

- 7) Spindle Self Set-Up
- 8) Spindle RPM at full drive - A = 2774
- 9) Horizontal Self-Set-Up
- 10) Horizontal Frequency at full drive – A = 8429
- 11) Horizontal Acceleration = 120 In/Min
- 12) Horizontal Rapid jog speed – A = 120 in/min
- 13) Horizontal Auto Jog speed – A = 160 in/min
- 14) Spindle Maximum RPM – A = 1800
- 15) Horizontal Homing Speed = 50 in/min
- 16) Output Test – Relief Up – LEFT = on, RIGHT = OFF
- 17) Output Test – Mill
- 18) Output Test – Vacuum
- 19) Horizontal Enable
- 20) Spindle Enable
- 21) Spindle Monitor
- 22) Horizontal Monitor
- 23) Spindle KBAud Rate – 1786

To exit the programming mode press and hold SET then RIGHT buttons.

### **Spindle Auto Set-Up**

To run Spindle Self set-up. Press and hold the SET, UP/DN and SPINDLE START button for two seconds. The SET button will flash and the SPINDLE START button will light. Press and hold the SET button. The spindle will enable and drive to maximum speed, the speed will be measured by the controller and the drive will then decal and turn off the enable. Release the SET button. Press and hold the SET button then press the RIGHT button. This will leave the Spindle Self Set-up.

### **Horizontal Auto Set-Up**

To run the Horizontal Self set-up, press and hold the SET, UP/DN and LEFT buttons for two seconds. The SET button will flash and the LEFT and RIGHT buttons will light. Press and hold the SET button. The Horizontal drive will enable and Home if necessary. The control will then drive the spindle base to the left to measure the length of the base. The Control will then drive the spindle base at full speed to the right and then to the left to measure maximum encoder frequency. Release the SET button. Press and hold the SET button then press the RIGHT button. This will leave the Horizontal Self Set-up.

### **Manual Power Up**

To Manually power up the Spindle and Horizontal drive regardless of any error messages, press and hold the SET, UP/DN, LEFT and RIGHT for two (2) seconds. Press and release the E-Stop to exit this mode.

# OPERATING INSTRUCTIONS

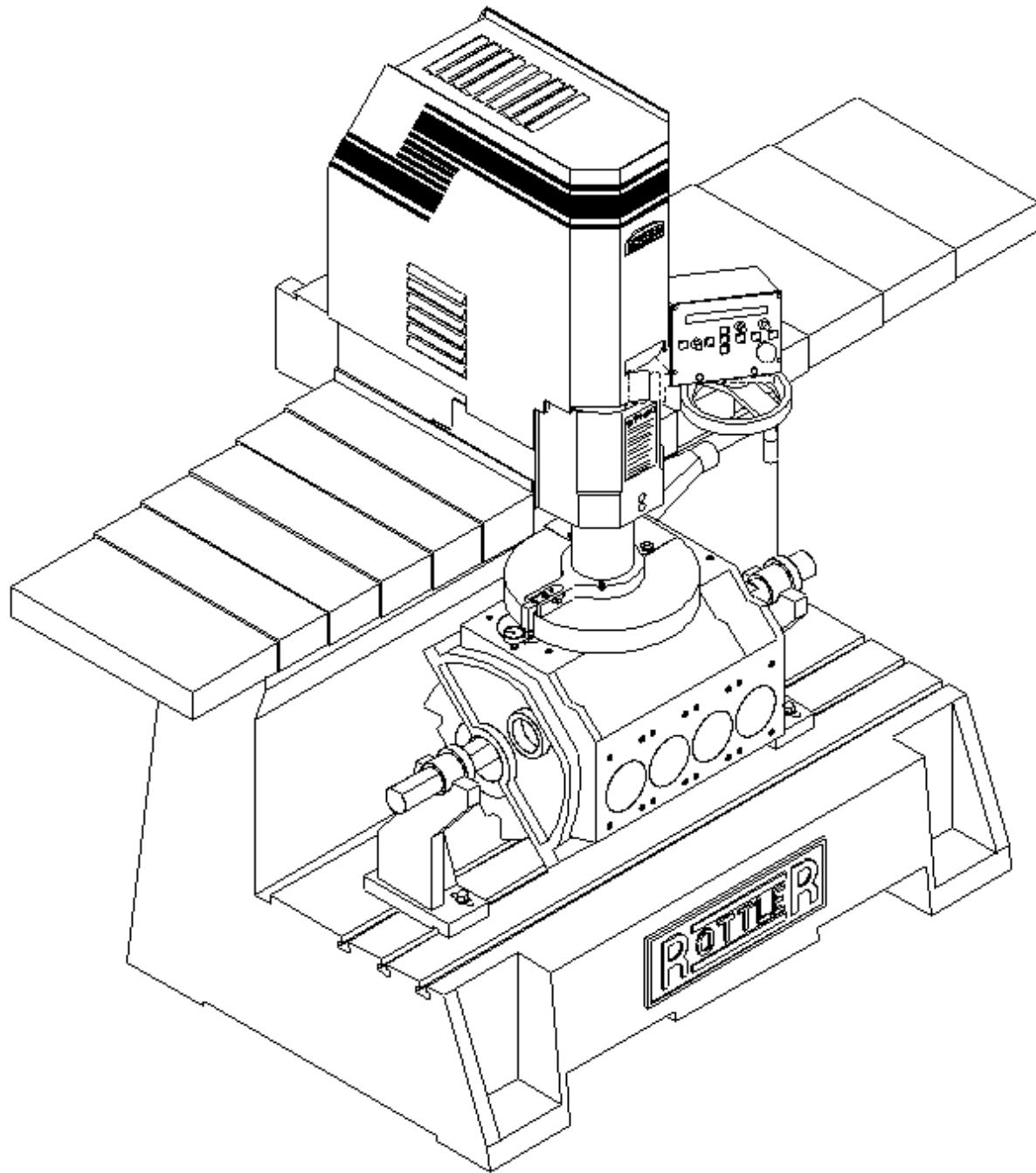
## Contents

<b>Operating Instructions .....</b>	<b>5-1</b>
<b>    Manual Operation .....</b>	<b>5-2</b>
<b>    Automatic Operation .....</b>	<b>5-3</b>
<b>    Cutting Inserts .....</b>	<b>5-4</b>
<b>6303B .....</b>	<b>5-4</b>
<b>6303M .....</b>	<b>5-4</b>
<b>6303K .....</b>	<b>5-4</b>
<b>6303S.....</b>	<b>5-4</b>
<b>6303R .....</b>	<b>5-4</b>
<b>501-29-6E R2.....</b>	<b>5-5</b>
<b>6301J .....</b>	<b>5-5</b>
<b>6303P.....</b>	<b>5-5</b>
<b>6303Q .....</b>	<b>5-5</b>
<b>    One Insert vs. Two Inserts .....</b>	<b>5-5</b>
<b>    General Information .....</b>	<b>5-6</b>
<b>    Cutting Speed Calculation.....</b>	<b>5-6</b>

## Operating Instructions

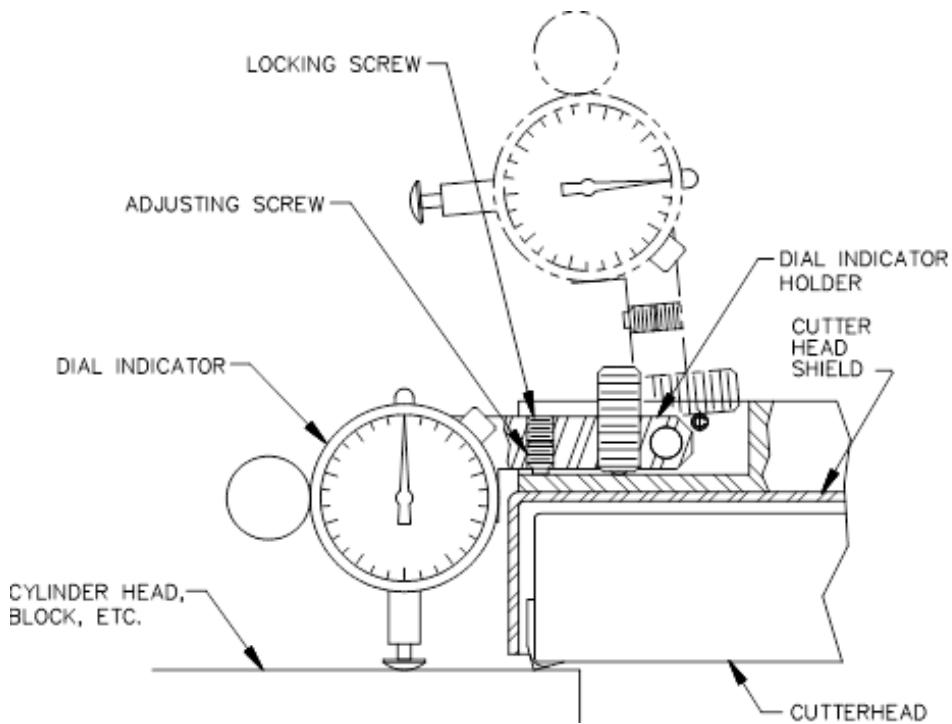
Included in this chapter is a general description of how to use this machine for surfacing, whether it cylinder head, block or other type of job. For details of operating specific fixtures available on this machine refer to the Optional Surfacing Fixtures and Tooling section of this manual.

There are several ways to use the S7A and S8A machine cutting system depending on the type of work you do and your personal preferences. Following are some details and descriptions that will help you decide which method is best suited to your application.



## Manual Operation

Press the Left rapid travel button and move the spindle over to the starting position. The starting position is just before the cutterhead guard passes over the work piece. Push the dial depth indicator, on the guard, down onto the top of the work piece. Assuming the dial indicator has been properly adjusted (see the Maintenance chapter of this manual for adjustment instructions) it will indicate the depth of the cut at your current height setting.



Press the Up/Dn Adjust button, adjust the depth of the cut using the manual handwheel. Press the Mill button to clamp the spindle. Adjust the Feed Rate and Spindle RPM knob for the desired finish. Press the Spindle Start button and the Feed Left button. The machine will start Feeding across the work piece.

When the machine has finished cutting, press the Left travel button to stop the feed, then the Spindle Start button to stop the spindle. Press the Relief Up button to raise the spindle up, then the press the right travel button. The spindle will rapid travel to the right home switch and stop.

## Automatic Operation

Press the right travel button so the machine will move to the Home position. Press the Left rapid travel button and move the spindle over to the starting position. The starting position is just before the cutterhead guard passes over the work piece. Press the Rapid Touch Off button. This will zero the Rapid Touch Off display. This also sets the Rapid Touch Off point for the next pass.

Push the dial depth indicator, on the guard, down onto the top of the work piece. Assuming the dial indicator has been properly adjusted (see the Maintenance chapter of this manual for adjustment instructions) it will indicate the depth of the cut at your current height setting.

Press the Up/Dn Adjust button, adjust the depth of the cut using the manual handwheel. Press the Mill button to clamp the spindle. Adjust the Feed Rate and Spindle RPM knobs for the desired finish.

Turn the Set End of Cut knob until the desired length of cut is displayed. Press the Cycle Start button, the spindle will start. Once the spindle is up to speed the left feed will start, cutting will continue until the Set End of Cut number is reached. The spindle will lift .020", spindle will turn off and rapid travel right to the home position.

Pressing the Cycle Start button from the home position will cause the spindle base to rapid over to the last known Rapid Touch Off position. You can manually adjust the depth of the cut at this point and then press Cycle Start again. The machine will finish the cut and return home as described above.



### CAUTION

Be careful when using the Rapid Touch Off feature, if the work piece is not placed in the same location relative to the Home position a crash could occur.

## Cutting Inserts

Rottler offers several different 3/8" and 1/2" IC negative rake inserts for the SF machine. Below is a description of each.

### 6303B

A round 3/8" IC, double sided, CBN Insert. An excellent, long life insert for surfacing cast iron heads and blocks -round shape gives many cutting edges on each side of insert. When using a 14" cutterhead (SF, F65, F80) speeds range from 900-1200 RPM. When using an 18" cutterhead (F80) speeds range from 600-800 RPM.

### 6303M

A round 3/8" IC, single sided, PCD Insert. For use on aluminum only - heads and blocks without liners. This insert has a thin layer of PCD applied to a carbide disk. The diamond appears to be a shiny black wafer. The hardness of the diamond resists the abrasive nature of the silica in aluminum heads and blocks. RPM speeds with a 14" cutter range from 900-2000 RPM.

### 6303K

A round, 3/8" IC, single sided, coated carbide Insert. This is a very economical, general purpose insert for surfacing aluminum. It is advisable to use this insert for rough cutting to remove welding or contaminants before. A PCD insert should be used for the final cut to give the super fine finish required for MLS (multi layer steel) head gaskets. RPM speeds with a 14" cutterhead range from 600-1000 RPM.

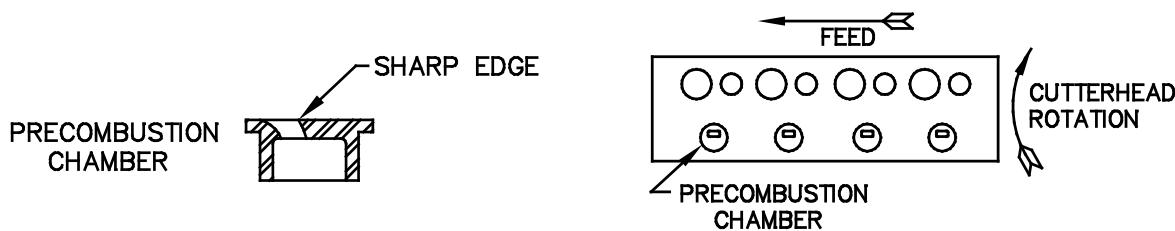
### 6303S

A round 3/8" IC, single sided, CBN Insert. For use on aluminum blocks with iron liners and aluminum heads with steel pre-combustion chambers. When cutting aluminum heads with pre-combustion chambers it is best to use Rottler Manufacturing's spray mist coolant system. RPM speeds with a 14" cutter range from 650-750 RPM.

### 6303R

A round 3/8" IC, single sided, CBN Insert. For use on cast iron heads with steel pre-combustion chambers. RPM speed with a 14" cutter range from 600-700 RPM and with a 18" cutter range from 500-600 RPM.

It is critical that the heads be mounted in the fixture correctly. If the head is not mounted in this way, the inserts will chip when they contact the sharp of the pre combustion chamber.



**Note:** There are at least two different materials used in the manufacture of the pre-combustion chambers. Rottler Manufacturing has experimented with only one of these materials. Rottler cannot guarantee cutting all materials.

**501-29-6E R2**

This is a 3/8" IC square carbide insert with a purple ceramic coating. This carbide insert is normally used for high speed boring. It works well as an economical insert for rough surfacing or heavy stock removal of cast iron. A CBN insert should be used for the final finish cut.

**6301J**

A square 3/8" IC, 1/16" Radius, double sided, CBN Insert. The 1/16" radius of this insert will produce a more accurate (flatter) finish than a round insert typically used for surfacing. This insert is often used on F80-Series machines when surfacing large diesel blocks which are high in nickel. The square surfacing insert is intended for F80 applications where it may encounter heavier cuts and greater interrupted cuts. When using an 18" cutter speeds range from 600-800 RPM, and with a 14" cutter speeds range from 900-1200 RPM.

**6303P**

A round 1/2" IC, single sided, PCD Insert. For use on aluminum only - heads and blocks without liners. This insert has a thin layer of PCD applied to the top of a carbide disk. The diamond appears to be a shiny black wafer. The hardness of the diamond resists the abrasive nature of the silica in aluminum heads and blocks. RPM speeds with a 14" cutter range from 1000-2000 RPM. This insert gives the maximum productivity when cutting aluminum. Requires the purchase of 1/2" negative rake tool holders. The standard Rottler 3/8" IC tool holders will not hold this insert.

**6303Q**

A round 1/2" IC double sided, CBN Insert. An excellent insert for machining cast iron heads and blocks. Round shape gives many cutting edges on each side of insert. Requires the purchase of 1/2" negative rake tool holders. The standard Rottler 3/8" IC tool holders will not hold this insert.

**One Insert vs. Two Inserts**

Rottler SF machines can be run effectively with either one or two inserts installed in the cutterhead.

***Note: Never remove one tool holder that holds the insert and run the machine with one insert. This will create an out of balance situation.***

If two inserts are installed and aligned within .0001 of an inch the feed rate can be run 2 times faster than if using only one insert.

The depth of the grooves made by the inserts for a typical finish is approximately .0003. Therefore for a second insert to be of any advantage in obtaining a smoother finish for a given feed rate or a similar finish at a higher feed rate the inserts must be aligned within .0003. Aligning them within .0001 will give you a significantly smoother finish than aligning them within .0002. Therefore for maximum quality and consistency Rottler recommends aligning the inserts within .0001 in a vertical plane, alignment of the horizontal plane within .002 is sufficient.

If aligning the inserts within .0001 is too time consuming we recommend mis-aligning them between .0003 and .0015. With the inserts mis-aligned you will get the same finish for a set RPM and feed rate that you would using one insert. The benefit on using two inserts is for stock removal. Since the one mis-aligned insert is removing some material the depth of cut can be increased up to .010 and acceptable tool life obtained.

If one insert is used (50 percent of our customers use one insert) you do not have to worry about alignment. It makes it very easy to change from CBN to coated carbide inserts. The following data assumes you are using a 3/8" diameter insert, either CBN or coated carbide.

## General Information

Rottler CBN and PCD Inserts are laser marked with our part number on one side. On single sided inserts, the part number is on the back side of the insert.

Rottler surfacing insert toolholders are designated IC (inscribed circle) which means they can hold square and round inserts with the same IC, for example, a 3/8" IC round and 3/8" IC square insert will fit into the standard 3/8" IC Rottler toolholders.

Rottler SF Series machines are supplied standard with Rottler 3/8" IC toolholders fitted to our surfacing heads. Optional 1/2" tool holders are interchangeable with 3/8" toolholders.

## Cutting Speed Calculation

Inserts are designed to cut within a speed range (S.F.P.M.). In order to convert from cutting speed to RPM, use the following formula:

$$\text{RPM} = \text{S.F.P.M.} \times \frac{3.82}{\text{DIAMETER}}$$

S.F.P.M. = Surface Feet per Minute

RPM = Revolutions per Minute

DIAMETER in Inches

	<b>One Insert</b>	<b>Two Inserts Set within .0015" - .0003"</b>	<b>Two Inserts Set within .0001"</b>
<b>RPM 1000 Feed Rate .002" Per Rev</b>	12 rms	12 rms	10 rms
<b>RPM 1000 Feed Rate .005" Per Rev</b>	20 rms	20 rms	15 rms
<b>RPM 1000 Feed Rate .010" Per Rev</b>	30 rms	30 rms	25 rms
<b>RPM 1000 Feed Rate .020" Per Rev</b>	60 rms	60 rms	40 rms
<b>RPM 1000 Feed Rate .030" Per Rev</b>	90 rms	90 rms	60 rms

This page intentionally left blank

# MAINTENANCE

## Contents

<b>Maintenance.....</b>	<b>6-1</b>
<b>Lubrication .....</b>	<b>6-1</b>
<b>Horizontal Ballscrew Nut.....</b>	<b>6-1</b>
<b>Vertical Ballscrew Nut.....</b>	<b>6-1</b>
<b>Outer Spindle .....</b>	<b>6-1</b>
<b>Inner Spindle.....</b>	<b>6-1</b>
<b>Cleaning The Way Surface.....</b>	<b>6-1</b>
<b>Lubrication – Quick Reference Chart .....</b>	<b>6-1</b>
<b>S7A -8A Machine Lubrication Illustration.....</b>	<b>6-2</b>
<b>2 Axis Universal Machine Table 7119Q – Lubrication Illustration.....</b>	<b>6-3</b>
<b>Setting Cutting Tool Inserts.....</b>	<b>6-4</b>
<b>Production Cutting .....</b>	<b>6-4</b>
<b>Aluminum &amp; Cast Iron .....</b>	<b>6-4</b>
<b>Dial Indicator Setting.....</b>	<b>6-5</b>
<b>Vertical Travel Belt.....</b>	<b>6-6</b>
<b>Upper Vertical Travel Belt .....</b>	<b>6-7</b>
<b>Drive Belt Replacement .....</b>	<b>6-8</b>
<b>Drive Sprocket / Motor Removal and Replacement .....</b>	<b>6-9</b>
<b>Removal of Drive Sprocket .....</b>	<b>6-9</b>
<b>Replacement of Drive Sprocket.....</b>	<b>6-9</b>
<b>Driven Sprocket Removal and Replacement .....</b>	<b>6-10</b>
<b>Removal of Driven Sprocket .....</b>	<b>6-10</b>
<b>Replacement of Driven Sprocket.....</b>	<b>6-10</b>
<b>Cutterhead and Chip Guard Removal.....</b>	<b>6-11</b>
<b>Upper Housing Removal.....</b>	<b>6-12</b>
<b>Inner Spindle Removal.....</b>	<b>6-13</b>
<b>Upper Spindle Bearing Removal .....</b>	<b>6-13</b>

<b>Spindle Sensor Adjustment.....</b>	<b>6-14</b>
<b>Horizontal Ball Screw and Belt Alignment and Adjustment .....</b>	<b>6-15</b>
<b>Air Adjustment of the S7A – 8A Machine .....</b>	<b>6-16</b>
Air Adjustments Illustration .....	6-16
<b>Pneumatic Control Diagram .....</b>	<b>6-17</b>
<b>Cutterhead Tilt Adjustment.....</b>	<b>6-18</b>
<b>Outer Spindle Adjustment .....</b>	<b>6-19</b>
<b>Inner Spindle Adjustment .....</b>	<b>6-20</b>
<b>Alignment Definitions for Angular Bearings and Belleville Washers.....</b>	<b>6-21</b>
Bearing Alignment .....	6-21
Belleville Washer Alignment .....	6-21
<b>Z-Axis Vertical Ballscrew Lower Bearing Stacking Order .....</b>	<b>6-22</b>
Z-Axis Vertical Ballscrew Lower Bearing Section View .....	6-22
<b>Inner Spindle Upper Section Belleville Washer Stacking Order .....</b>	<b>6-23</b>
Inner Spindle Upper Section Belleville Washer Section View .....	6-23
<b>Inner Spindle Lower Section Bearing Stacking Order .....</b>	<b>6-24</b>
Inner Spindle Lower Section Bearing Section View .....	6-25

## Maintenance

### Lubrication

Refer to the illustrations on the following pages.

#### Horizontal Ballscrew Nut

The horizontal ballscrew nut is located under the Spindle base inside the Main Base.

- Every 175 hours, Grease the ball screw nut using **NLGI #2 White Lithium Grease**. Wipe a small amount of grease on the screw just ahead of the nut.

#### Vertical Ballscrew Nut

The Vertical ballscrew nut is located in the Spindle base inside the cover.

- Every 175 hours, Grease the ball screw nut using **NLGI #2 White Lithium Grease**. Wipe a small amount of grease on the screw just ahead of the nut.

#### Outer Spindle

The Outer Spindle is the cylinder that travels up and down. It is supported in outer spindle bushings.

- Every 40 hours, The Outer Spindle should be cleaned with **WD-40**. And occasionally **ISO VG 32 Hydraulic Oil** applied to prevent excessive dryness.

#### Inner Spindle

The Inner Spindle is located inside the Outer Spindle. The Inner Spindle is directly connected to the cutterhead.

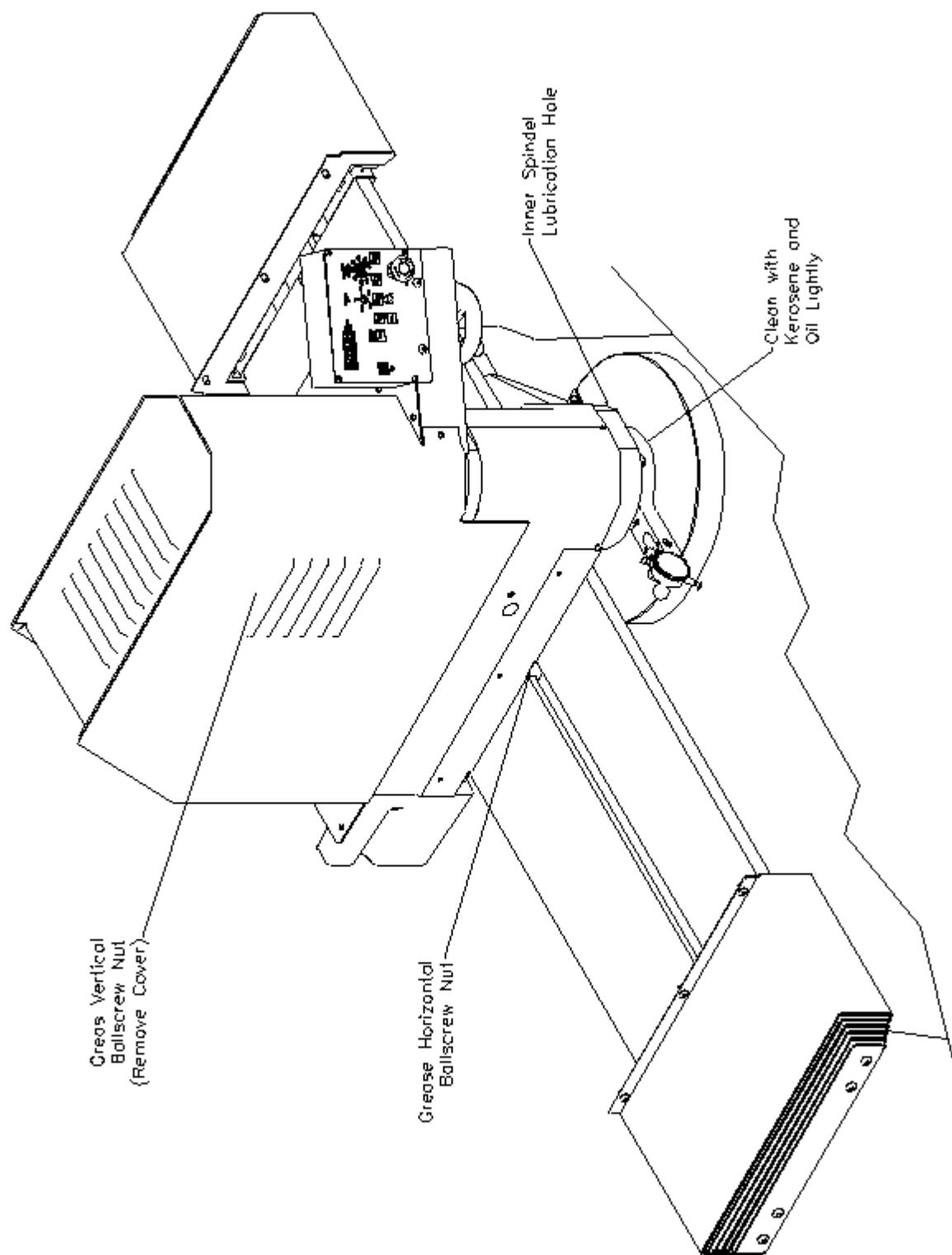
- Every 40 hours, Add 2 or 3 drops of **ISO VG 32 Hydraulic Oil**.
- Every 175 hours, Add one shot of **NLGI #2 White Lithium Grease**.
- Run the spindle down near the lower limit and you will see a flush type grease fitting in the spindle. Add lubrication here. If the inner spindle is removed clean the lower bearing and repack it with grease.

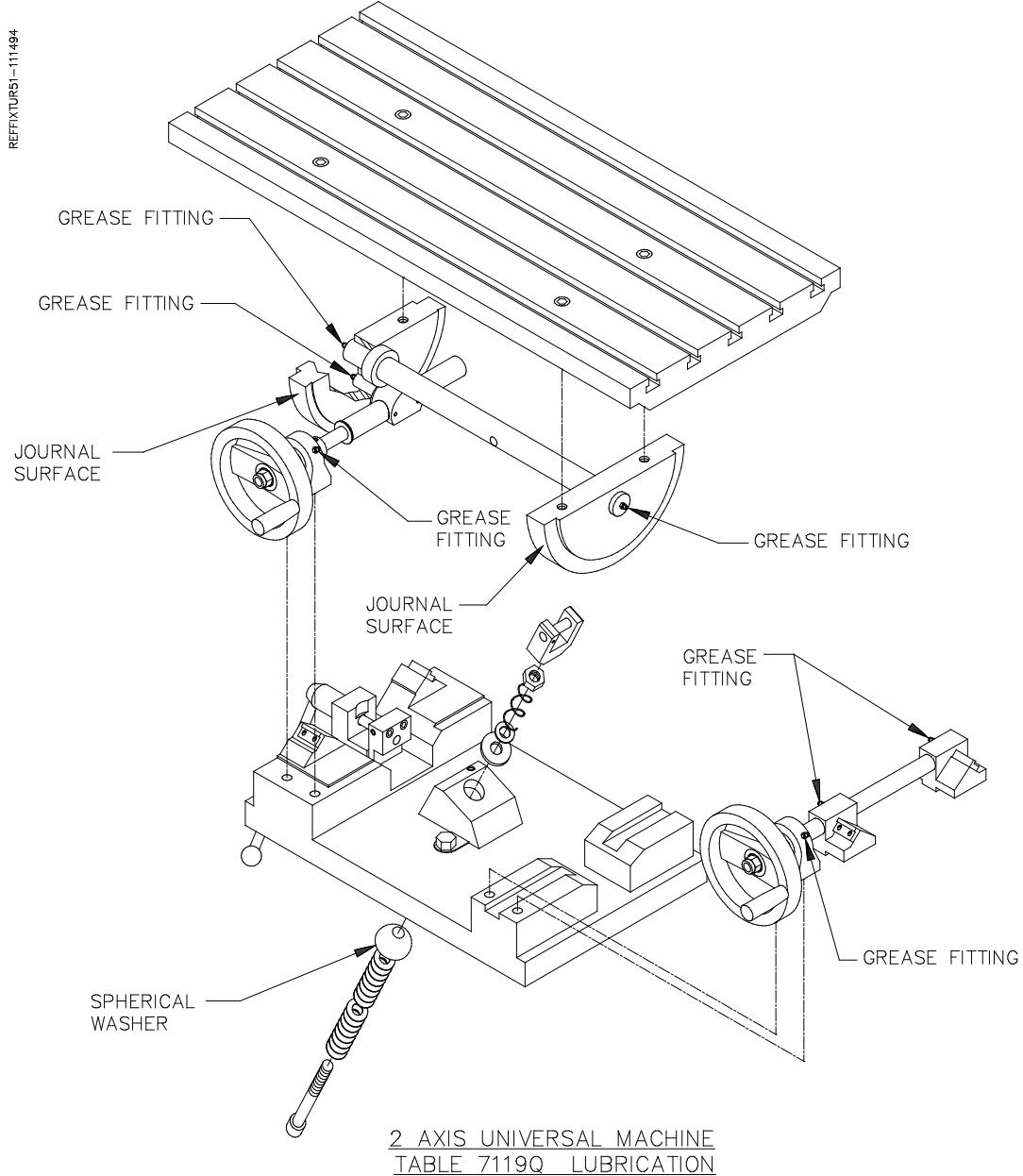
#### Cleaning The Way Surface

**Do not** clean way surfaces with abrasive or harsh cleaners, The sliding way material used under the spindle base, must “break in” which will deposit a small amount of the material into the top of the main base. Discoloration will occur in slides. If the way surface is cleaned of these deposits, the “break in” action will start all over. If this cycle is repeated premature wear will result.

#### Lubrication – Quick Reference Chart

Assembly	Frequency	Lube Operation
Horizontal Ballscrew Nut	Every 175 hours	Grease ballscrew nut
Vertical Ballscrew Nut	Every 175 hours	Grease ballscrew nut
Outer Spindle	Every 40 hours	Clean and wipe with oil
Inner Spindle	Every 40 hours	Add 2 to 3 drops of oil
Inner Spindle	Every 175 hours	Add Oil
Way Surface	Every 175 hours	Wipe and oil way surface

**S7A -8A Machine Lubrication Illustration**

**2 Axis Universal Machine Table 7119Q – Lubrication Illustration**

## Setting Cutting Tool Inserts

Travel the spindle base approximately to the center of the main base.



### CAUTION

Turn off all power to machine before proceeding.

Remove vacuum housing from chip shield. Attach a dial runout indicator to a cylinder head or engine block, etc.

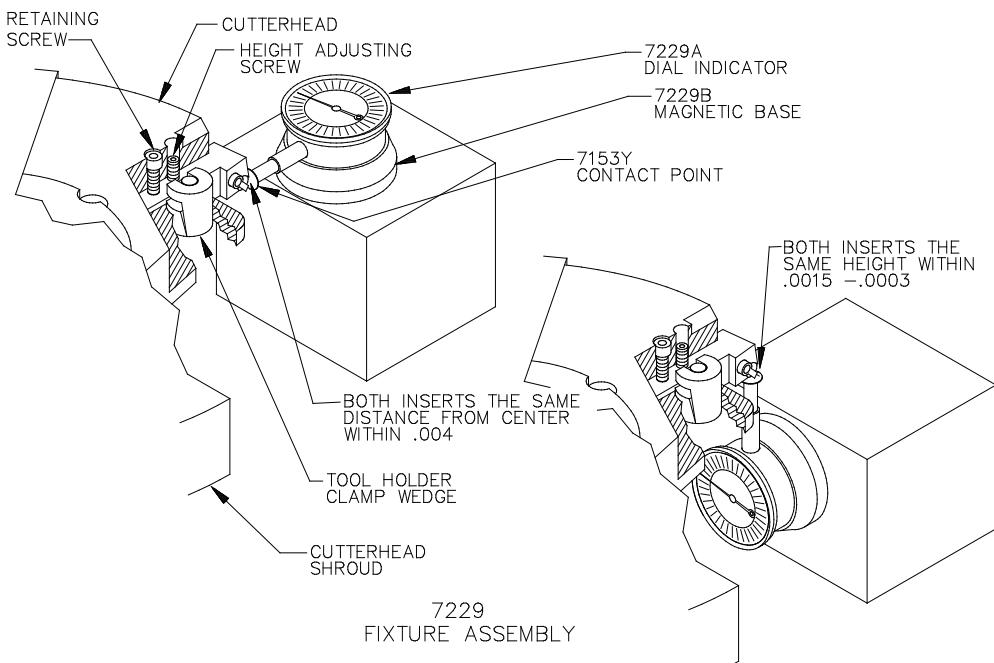
Rotate cutter head and check to see that both inserts are the same distance from the center of the spindle, within .004. If adjustment is necessary loosen the tool holder clamp wedge, and the height adjustment screw. Move tool in or out the required distance. Tighten the clamp wedge. Snug up the height adjustment screw. There is a set screw located at the bottom of the toolholder, it locks a dowel pin in place. When the in-out adjustment is set, loosen the set screw, the pin will pop out and hit the back of the slot. Tighten the set screw. This way, when a tool holder is removed and then replaced, it will be located very nearly where it was. Insert height will still need to be adjusted.

Rotate cutter head and check to see that both inserts are the same height within .0015-.0003. If adjustment is necessary loosen the tool holder clamp wedge, then alternately loosen and tighten the height adjusting screw and the retaining screw, until both inserts are set as desired. Retighten the tool holder clamp wedge, and recheck both inserts.

## Production Cutting

### Aluminum & Cast Iron

For fast tooling set-up, this machine can be set-up with one cast iron cutting insert and one aluminum cutting insert. Set the cast iron insert with no down or out adjustment. Set the aluminum style insert .02 further out and .005 lower than the first insert. With the cutter head set up this way, aluminum work can be easily cut. To cut cast iron simply remove the aluminum cutting insert from its holder.



## Dial Indicator Setting

If chip shield, cutting insert, or dial indicator have been moved, the dial indicator should be reset.

With the surfacing cutter in the fore and aft position, press the left travel button until the cutterhead overlaps a test piece by about 1/2" when rotated.

### **CAUTION**

Turn off all power to the machine whenever handling the cutter head.

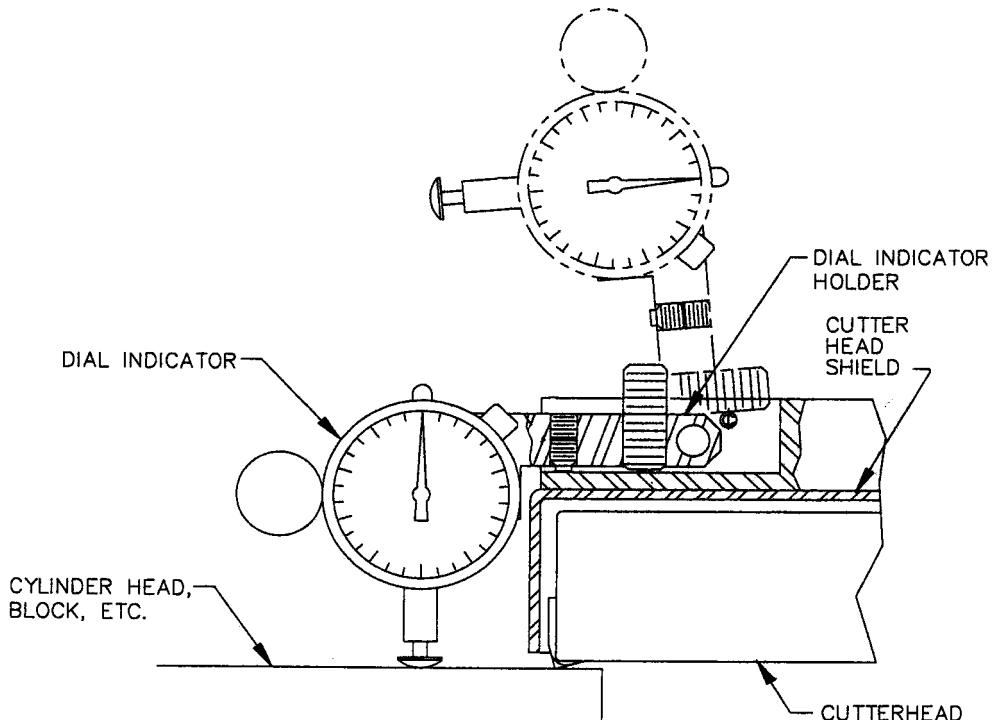
Touch off surface, by turning hand wheel clockwise until cutter insert just touches test piece surface when rotated back and forth.

**Note: Do not lower the cutter head directly onto surface, it may chip the cutting tool insert.**

Make a very light cut on your test piece about one inch in. Back out and without adjusting the height press the dial indicator down on this surface. Adjust it by: Loosing lock nut. Then turn adjusting screw up or down until the dial indicator is half way between its minimum and maximum range.

Tighten the lock nut firmly.

Set dial to zero.



**Vertical Travel Belt**

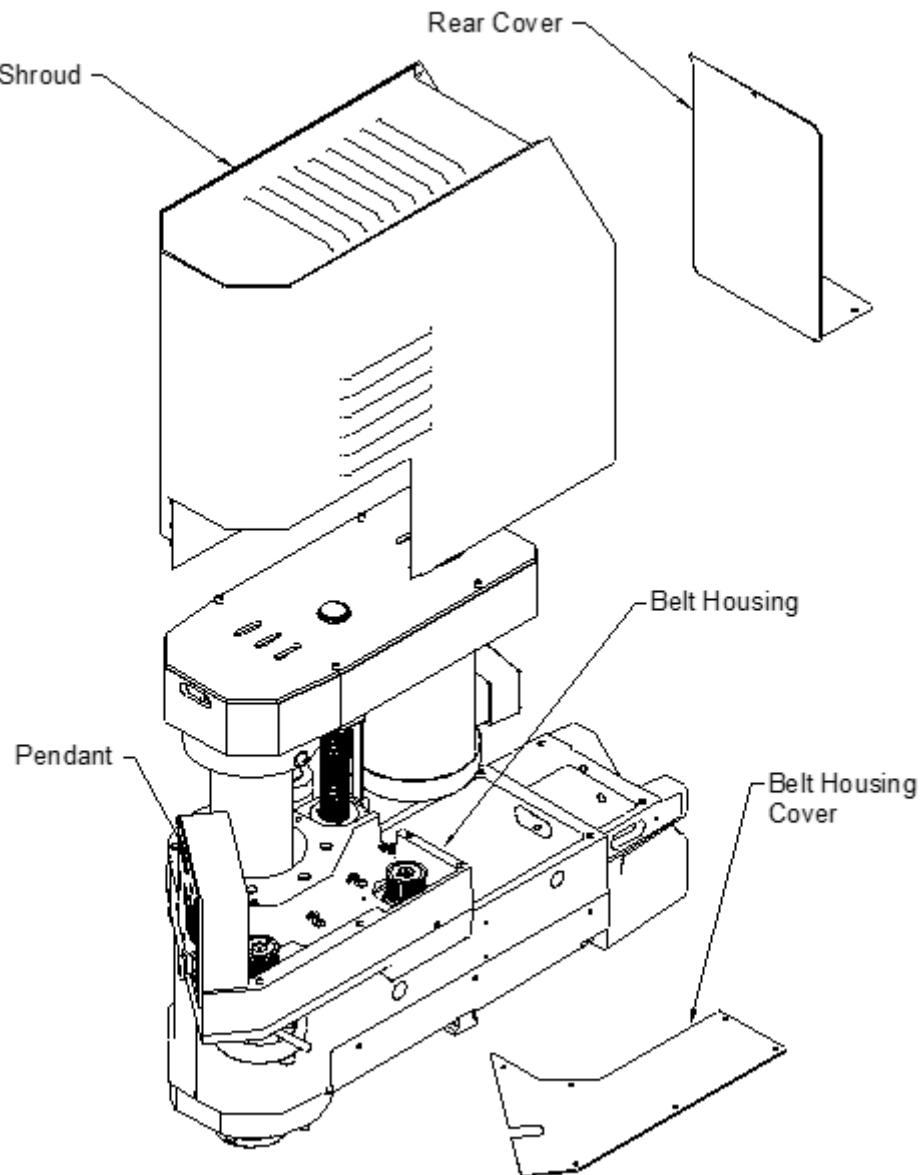
Removal, Replacement and Adjustment:

**CAUTION**

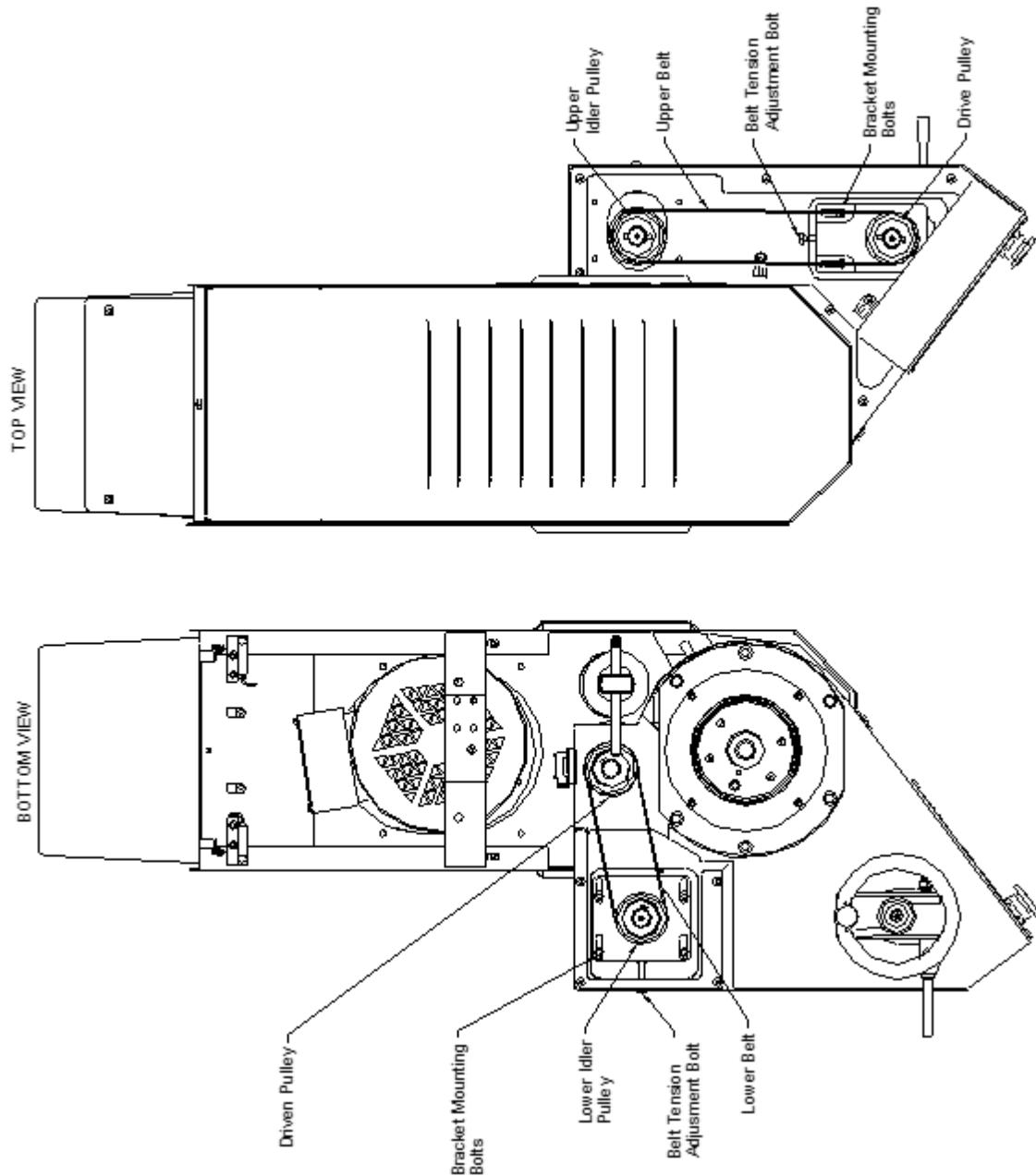
Turn off all power to the machine before continuing.

Remove the access panel at the rear of the machine shroud. Remove the five screws mounting the shroud to the machine. Four screws are located inside the enclosure and are accessed through the rear opening. The other screw is in the front on the left side, from the outside. Lift cover off the machine carefully. (As cover is lifted slide forward and up to clear motor and belt case.)

Remove six screws from the belt housing cover, and lift it off.



## Upper Vertical Travel Belt



The following replacement and adjustment procedure are for both the upper and lower belts.

Loosen the two (upper belt) or four (lower belt) bracket mounting bolts.

Turn the Belt Tension adjustment bolts CCW until they are our of the mounting brackets.

Push the idler pulleys and bracket towards the belt. Remove belts.

Follow this procedure in reverse order to install the belts.

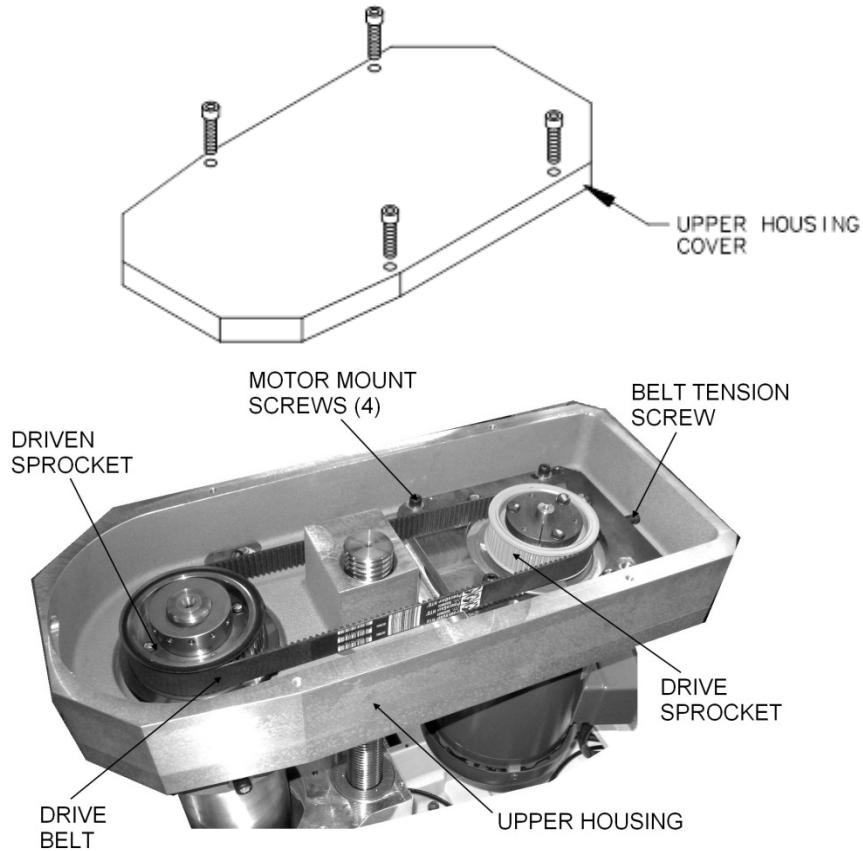
Adjust belts for .12" (3.17 mm) deflections when 3 to 4 lbs. (6.61 to 8.82 kg) pressure is applied.

## Drive Belt Replacement

### CAUTION

Turn off all power to the machine before continuing.

- Remove the access panel at the rear of the machine enclosure. Remove the six screws mounting the enclosure to the machine. Four screws are located inside the enclosure and are accessed through the rear opening. The other two screws are in the front and the front right side, from the outside. Lift cover off the machine carefully. (As cover is lifted slide forward and up to clear motor and belt case.)
- Remove the four screws holding the upper cover. Lift cover off.
- Loosen the four motor mount screws.
- Loosen the belt tension screw.
- Lift the belt off. Replace with new belt (7247E).
- Tighten belt tension screw, until belt has 1/8 to 3/16 inch deflection, with 1-1/2 to 3 pounds pressure, measured in the middle of the belt.
- Tighten the four motor mount screws.
- Replace the upper housing cover and tighten the four screws.
- Replace the machine enclosure and tighten the mounting screws.



## Drive Sprocket / Motor Removal and Replacement

### **CAUTION**

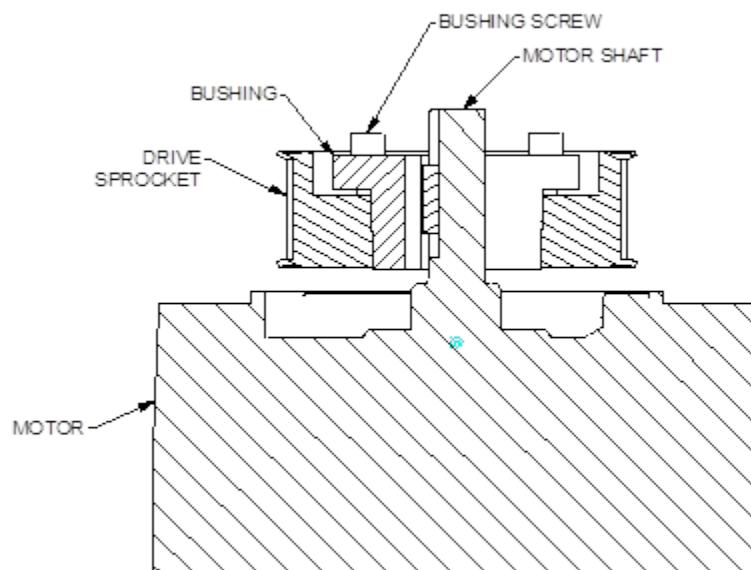
Turn off all power to the machine before continuing.

#### **Removal of Drive Sprocket**

- Remove the upper housing cover, and drive belt, as explained on page 4.7.
- Remove three screws, located on the top of the sprocket bushing.
- Use three screws, in the threaded holes in the bushing, to loosen the bushing from the sprocket. Lift off sprocket.

#### **Replacement of Drive Sprocket**

- Clean bushing, and sprocket. Do not use any lubrication on bushing, sprocket, or screws.
- Locate sprocket even with driven sprocket on the inner spindle. Tighten the #10-24 screws in the bushing EVENLY to 5 to 6 ft. lbs.
- Replace the drive belt, and adjust, as indicated in drive belt replacement.
- Replace upper housing cover and tighten the four screws.



## Driven Sprocket Removal and Replacement



### CAUTION

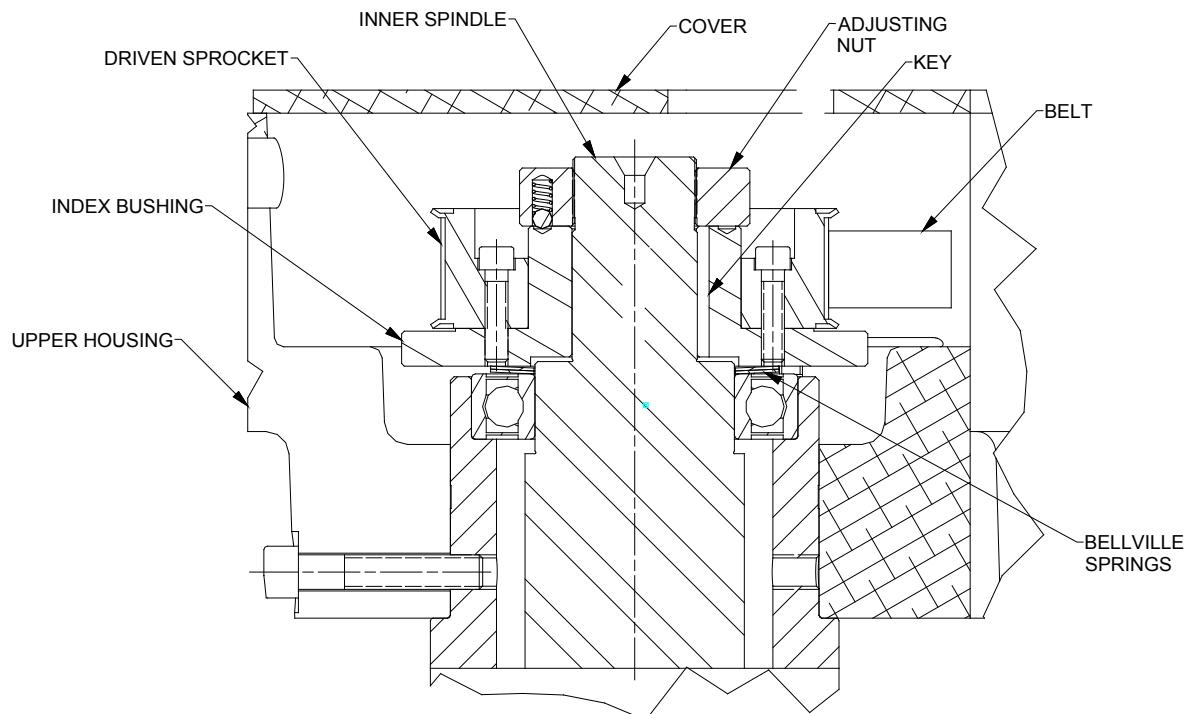
Turn off all power to the machine before continuing.

#### Removal of Driven Sprocket

- Remove the upper housing cover, and drive belt, as explained previously.
- Place a support under the Cutterhead to support the inner spindle from falling. Remove the adjusting nut using a 5/32 (4mm) diameter Rod through the slot in the upper housing. Once the nut is removed the index bushing and the sprocket can be lifted off. Note the position and arraignment of the two Belleville springs below the index bushing.

#### Replacement of Driven Sprocket

- Clean bushing, and sprocket. Do not use any lubrication on bushing, sprocket, or screws.
- Assemble the sprocket back onto the index bushing. Slide the index bushing and key back onto the inner spindle, making sure the Belleville springs are in place. Install the adjusting nut back on the inner spindle and adjust per inner spindle adjustment procedure.
- Replace drive belt, and adjust, as indicated in drive belt replacement.
- Replace upper housing cover and tighten the four screws.

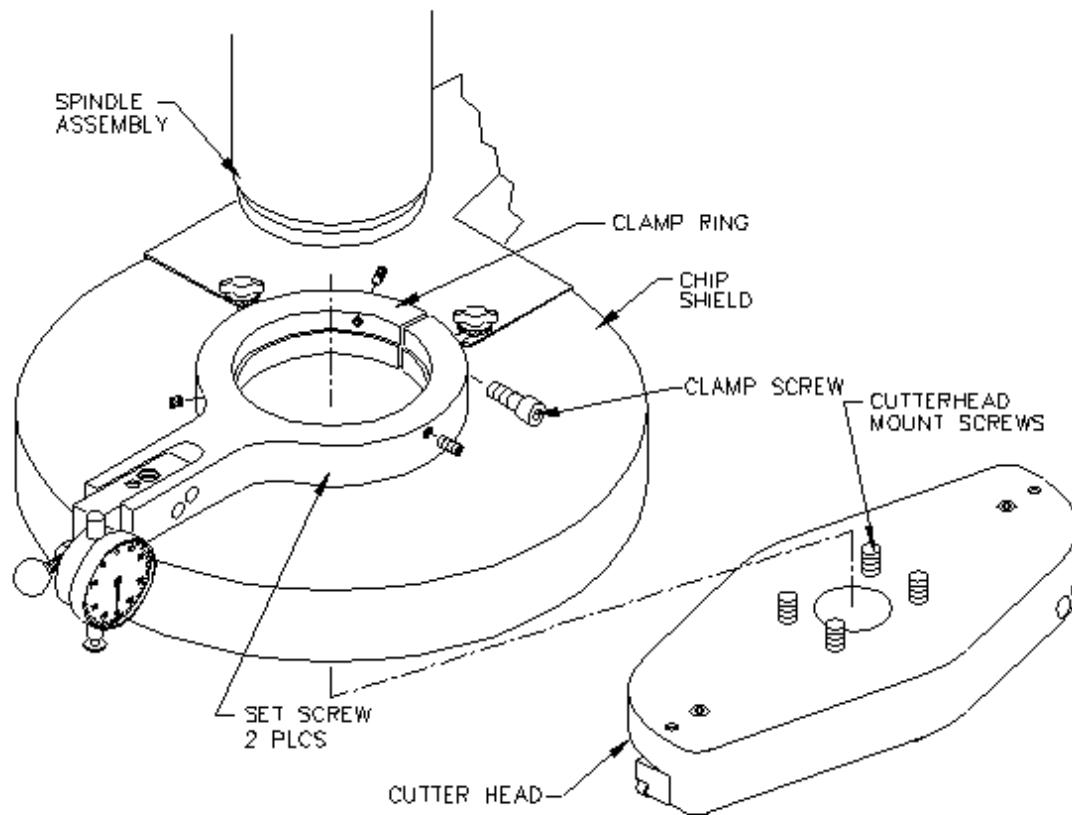


refdriven sprocket assembly-6/21/2008

**Cutterhead and Chip Guard Removal****CAUTION**

Turn off all power to the machine before continuing.

- Mark cutterhead and spindle so they can be reassembled in the same position.
- Remove cutterhead by removing its four 3/8-16 screws. Remove chip guard by removing its two 1/4-20 set screws that go into the clamp ring at an angle, and loosen the 3/8-16 cap screw in the split line of clamp ring.
- Remove cover.



## Upper Housing Removal

### **CAUTION**

Turn off all power to the machine before continuing.

Remove the Drive Belt, Motor and Driven Sprocket and described earlier in this chapter.

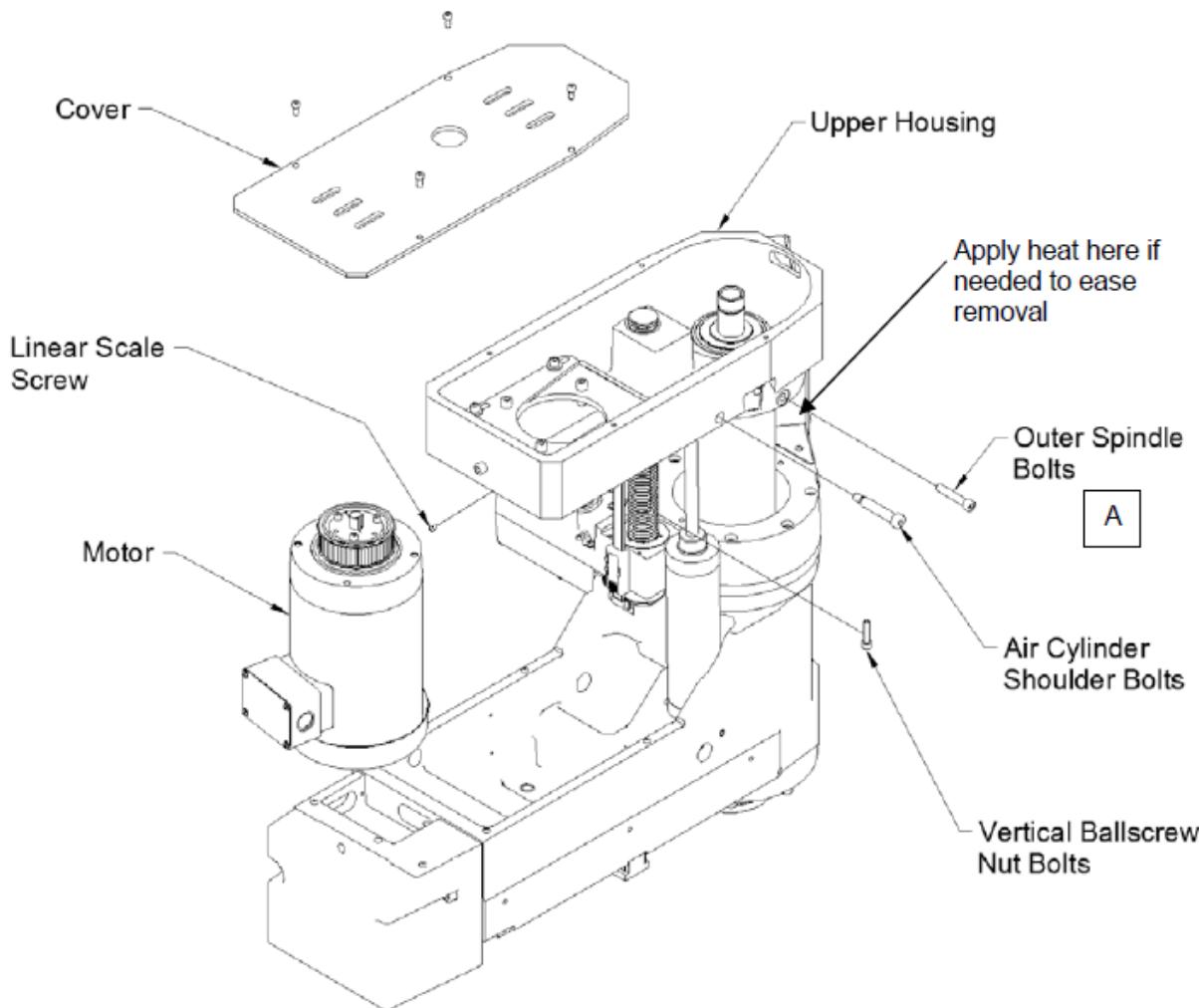
Remove the shoulder bolts holding the top of the air cylinder to the upper housing. Compress the air cylinder and lay it out of the way.

Remove the screw holding the top of the Linear Scale on to the Upper Housing.

Remove the four (4) bolts holding the vertical ballscrew nut to the Upper Housing.

Remove the three (3) bolts, located at the top of the Outer Spindle.(A) The Upper Housing will lift off. It may require some heat as you lift to get it off. If needed, apply heat to the area where the housing is bolted to the spindle using a propane torch.

Reassembly is the opposite of disassembly. Be sure the Outer Spindle and Upper Housing mating surfaces are clean and free from burrs.



## Inner Spindle Removal

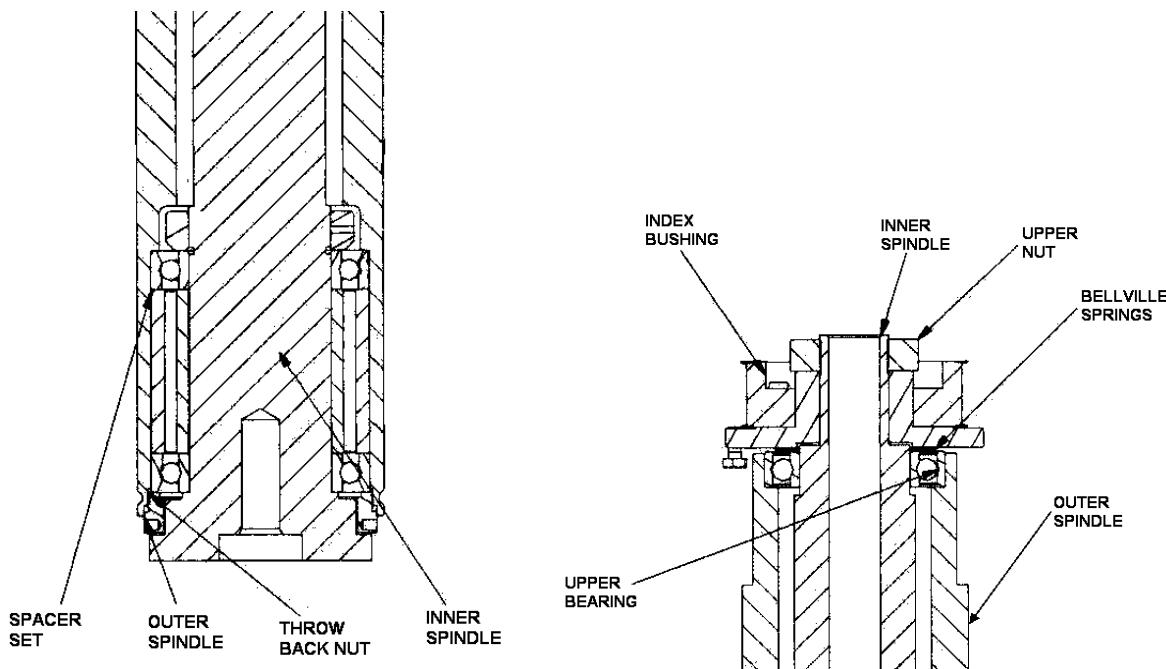
### CAUTION

Turn off all power to the machine before continuing.

- Remove the upper housing cover, and drive belt.
- Remove the driven sprocket.
- Remove the cutterhead and chip guard.
- Crank spindle up to its full up position.
- Insert a rod or punch through this opening and into the upper adjusting nut. Holding the cutterhead, loosen this nut by turning it counter-clockwise. Remove nut, index bushing (7246C), key (6062), and two Belleville spring washers (7052).
- Thread upper adjusting nut back onto inner spindle to keep the spindle from falling out, after throwback nut is unthreaded.
- Take a rod or punch and insert it into one of the holes in the outside of the throwback nut. This nut is located between the bottom of the outer spindle and the lower flange of the inner spindle.
- Turn the nut clockwise to loosen. As you back off the nut, tap on top of the inner spindle with a soft mallet. Do this until the nut is threaded out of the outer spindle.
- Place something under inner spindle, then unscrew the upper adjusting nut.
- Slowly lower the inner spindle out of the outer spindle.

## Upper Spindle Bearing Removal

Use a puller or a long bar from inside the outer spindle, to carefully remove the upper bearing.



## Spindle Sensor Adjustment



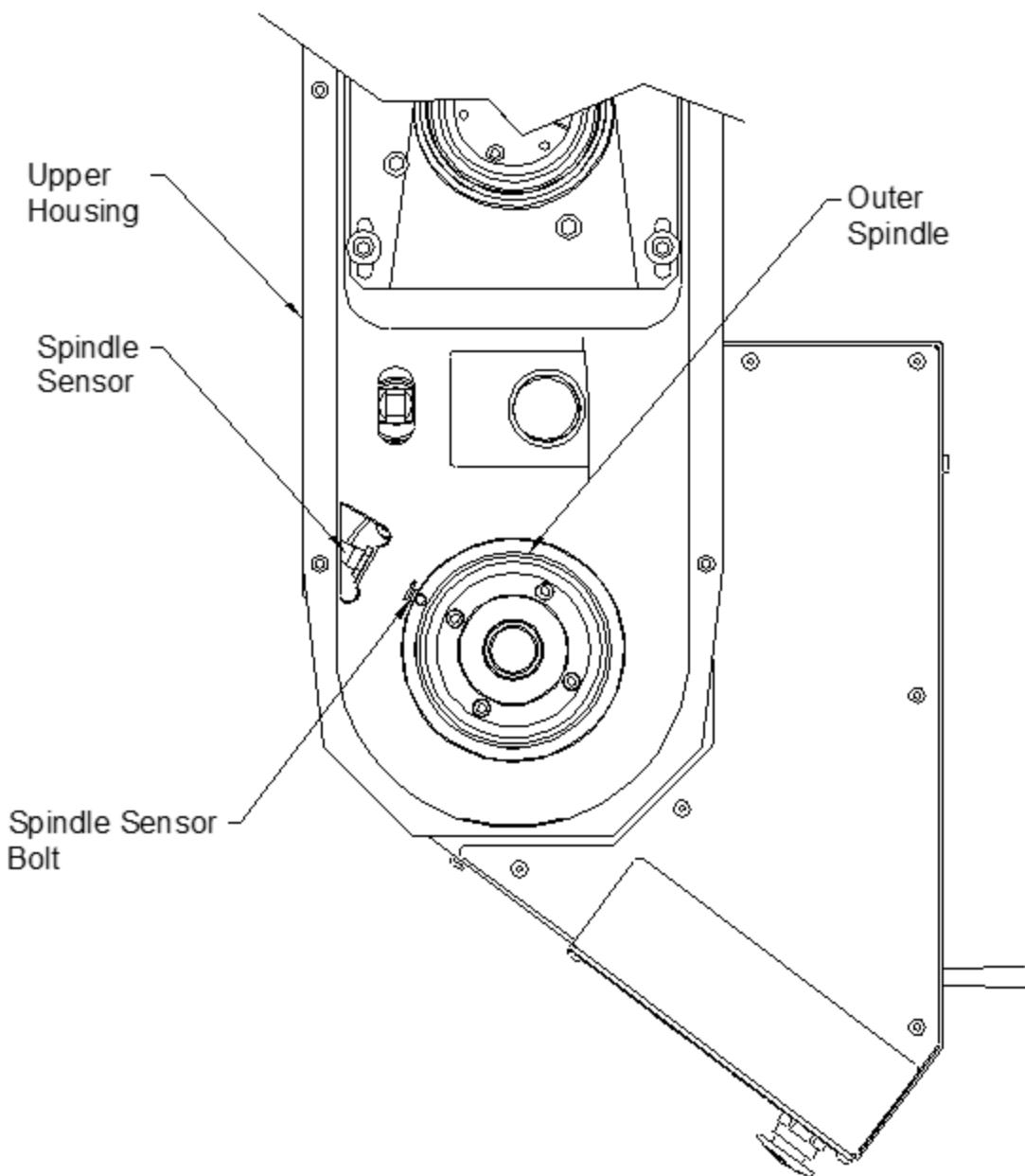
### CAUTION

Turn off all power to the machine before continuing.

Remove the Lid from the Upper Housing.

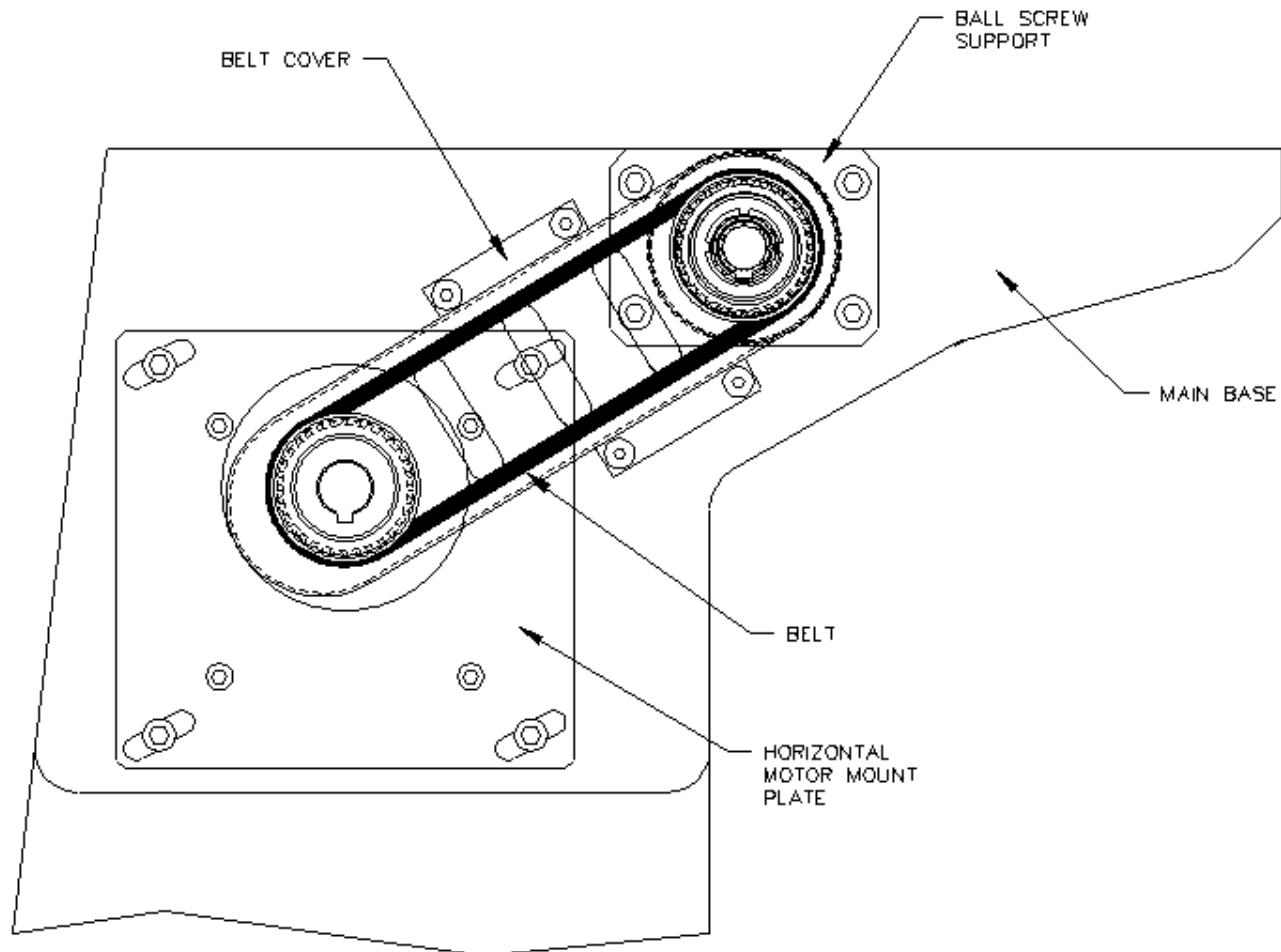
Rotate the spindle until the head of the Hex nut is directly in front of the sensor. The distance between the sensor and the hex bolt should be .030". If it is not, loosen the two nuts on the sensor and back them off until .030" is achieved.

Turn the spindle by hand to make sure the dowel pin is not coming in contact with the sensor.



## Horizontal Ball Screw and Belt Alignment and Adjustment

1. The Way Covers do not need to be removed to align the ballscrew or adjust the belt tension. They can be accessed underneath the way covers at each end.
2. Move the spindle unit to the middle of it's travel.
3. Loosen the four mounting bolts on the Horizontal Motor Mount Plate.
4. Remove the belt.
5. Loosen the four mounting bolts on both of the ballscrew supports (one at each end).
6. Move the machine to the home position (all the way right). Tighten the four mounting bolts on the right hand ballscrew support.
7. Move the machine to it's full left hand travel. Tighten the four mounting bolts on the left hand ballscrew support.
8. Install the belt onto the ballscrew and motor pulleys. The motor mount bolts should still be loose at this point.
9. Let the weight of the motor tighten the belt. This is sufficient tension on the belt. Tighten the four motor mount bolts.

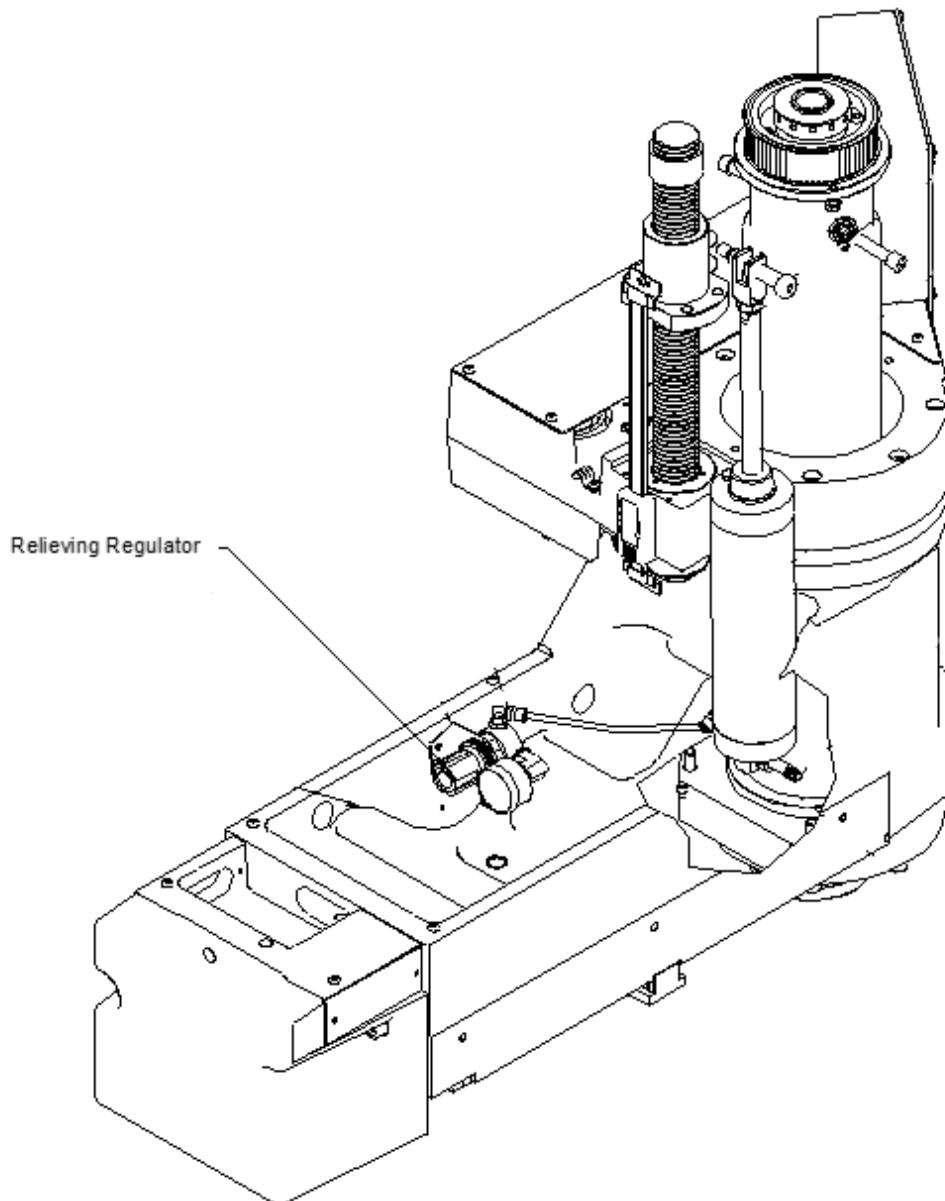


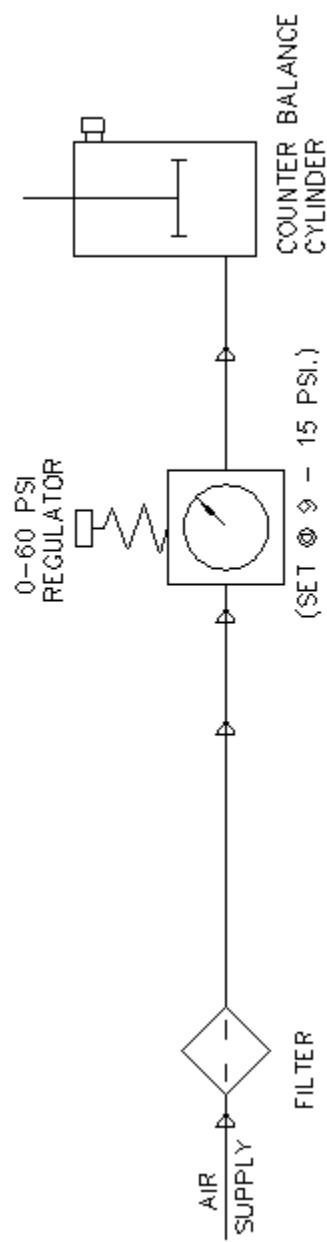
## Air Adjustment of the S7A – 8A Machine

The Regulator for the counter balance air cylinder is located in the Spindle Base. Remove the rear cover to access the regulator. This pressure should be approximately 9 to 15 psi.

**Note: Maximum 20 psi**

### Air Adjustments Illustration



**Pneumatic Control Diagram**

## Cutterhead Tilt Adjustment

Remove all work pieces, fixturing and parallels, from the lower surface of the main base. Travel the spindle unit over to the center of the main base.



### CAUTION

Turn off all power to the machine before continuing.

Remove one tool holder from the cutterhead. Insert 7202J holder, fitted with a dial indicator, in the open tool holder slot. Using the handwheel, adjust the cutterhead down until you are in the middle of the dial indicator's range. The dial indicator will be indicating from the lower deck surface. Zero the dial indicator. Manually rotate the cutterhead clockwise. The left, leading edge, of the cutterhead should be .0025 to .004 inch lower than the right, trailing edge, of the cutterhead.

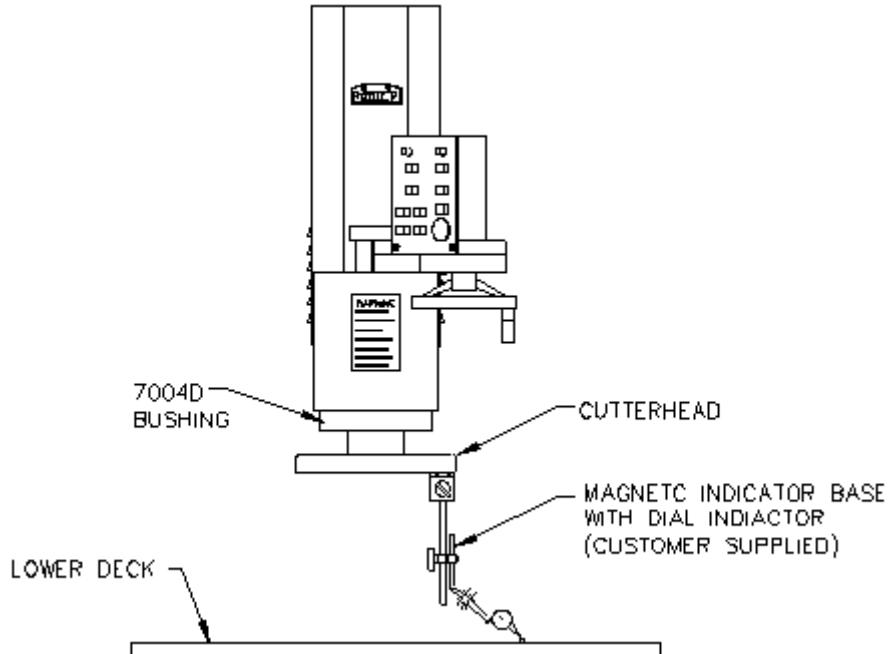
If the tilt is not within this tolerance, it will need to be adjusted. Loosen the six allen head bolts holding the 7004D bushing to the bottom of the spindle base. Snug the bolts up very lightly.

Use the three set screws, located just above the lower bushing, near the lower edge of the spindle base, to move the bushing for the proper tilt. If the spindle needs to tilt to the left, loosen the left set screw and tighten the right, the opposite is true if the tilt needs to be to the right.

Tighten the six allen head bolts firmly. Snug all set screws to prevent them from backing out.

Recheck tilt with dial indicator to be sure it is correct.

Remove the indicator holder from the cutterhead. Replace tool holder. Turn the power back on and operate normally.



## Outer Spindle Adjustment

The main spindle bearings are tapered split cast iron rings, held in a seat by an adjustment nut. These bearings normally require no adjustment for many surfacing cycles.

**CAUTION:** Be careful not to over tighten these bearings. An over tight condition only serves to wear out the machine and make control operation difficult.

If it is necessary to adjust, see the following instructions:

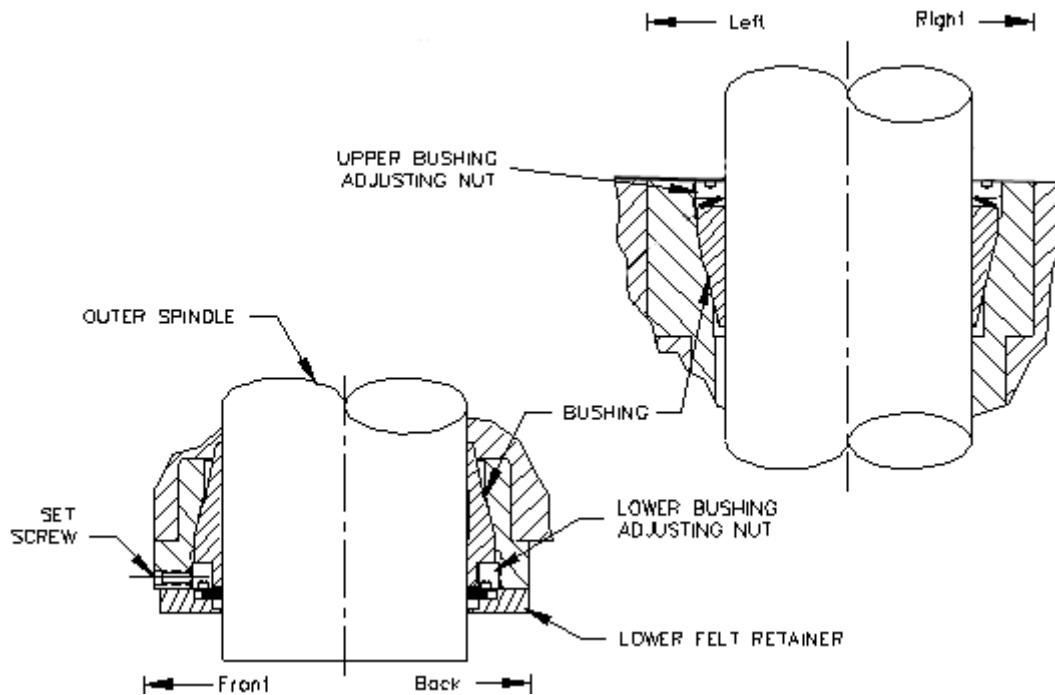
Move the spindle base to a clear position making sure the spindle can travel its full vertical length. Thoroughly clean and lightly oil the Outer Spindle before adjustment.

Remove the lower wiper retainer ring along with the wipers and felts to expose the lower spindle bushing adjustment nut.

Loosen the set screws located on the front of the upper and lower portion of the Spindle Base. Loosen the upper and lower bushing adjustment nuts to remove any pressure on the bushings. Tighten the upper and lower adjustment nuts evenly until they are lightly touching, but have no load on them.

Move the spindle down 3-4". Tighten the upper bushing. Tighten only by hand.

Move the spindle up. Tighten the lower bushing. Tighten only by hand.



## Inner Spindle Adjustment

### **CAUTION**

Turn off all power to the machine before continuing.

Remove the two screws holding the small nameplate (502-1-19C) to the front of the upper housing. Inside the exposed opening is the spindle adjustment nut (7020). The spindle adjustment nut has holes drilled around its perimeter to accept an adjustment rod.

Insert an adjustment rod into the spindle adjustment nut. The adjustment rod should be 1/4 - 5/16 inch diameter and 8 to 10 inches long.

Carefully rotate the cutterhead counter-clockwise, (looking from above the cutterhead) letting the adjustment rod move against the end of the slot. This tightens the inner spindle adjustment. The cutterhead will be easy to turn and you should be able to feel the spring loaded detent in the adjustment nut.

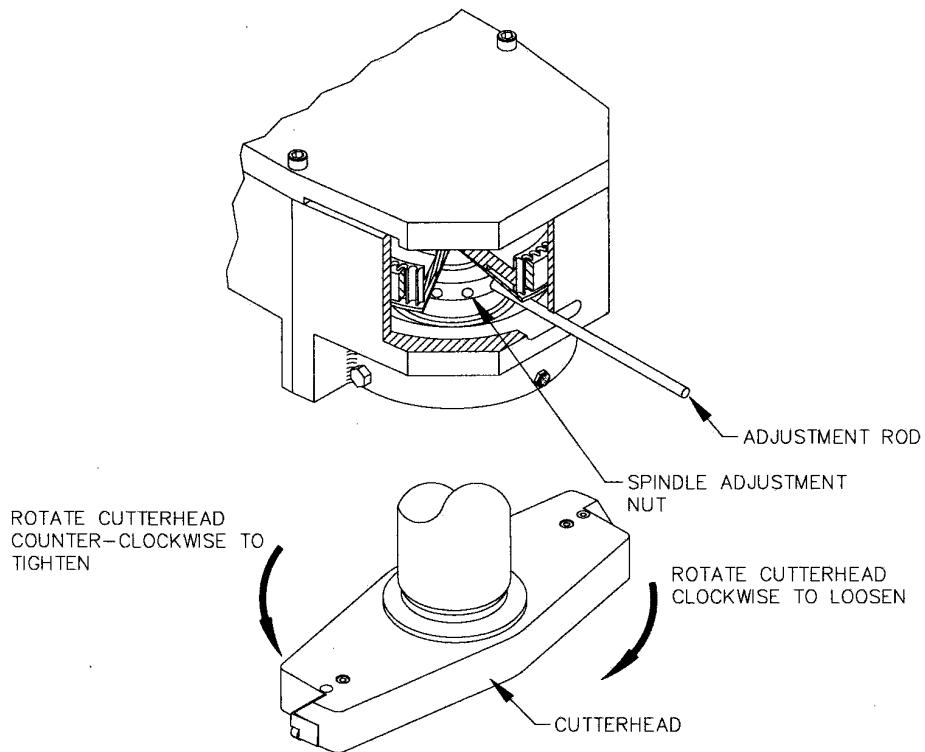
At some point the torque required to turn the cutterhead will sharply increase, immediately stop turning the cutterhead.

### **CAUTION**

Do not over tighten or severe bearing damage will occur.

Turn the cutterhead clockwise one or two detents.

Remove the adjustment rod and replace the nameplate



**Alignment Definitions for Angular Bearings and Belleville Washers****Bearing Alignment**

VIEW OPEN END UP



VIEW CLOSED END UP

**Belleville Washer Alignment**

VIEW CUP UP

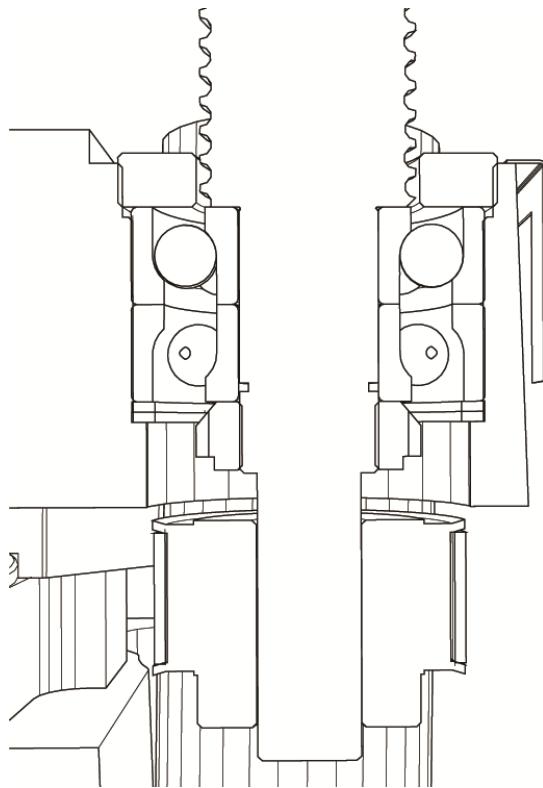


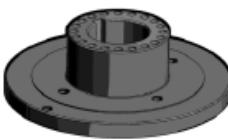
VIEW CUP DOWN

**Z-Axis Vertical Ballscrew Lower Bearing Stacking Order**

Install 1<sup>st</sup> bearing with open end up.

Install 2<sup>nd</sup> bearing with closed end up.

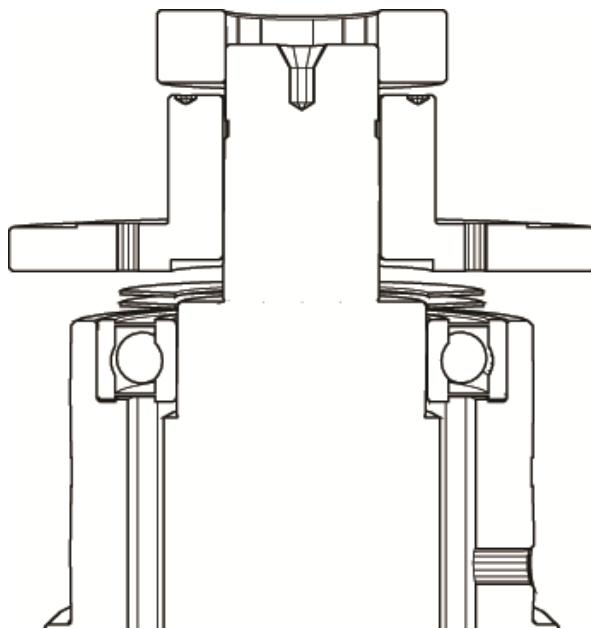
**Z-Axis Vertical Ballscrew Lower Bearing Section View**

**Inner Spindle Upper Section Belleville Washer Stacking Order**

Install both Belleville washers with cup side up.

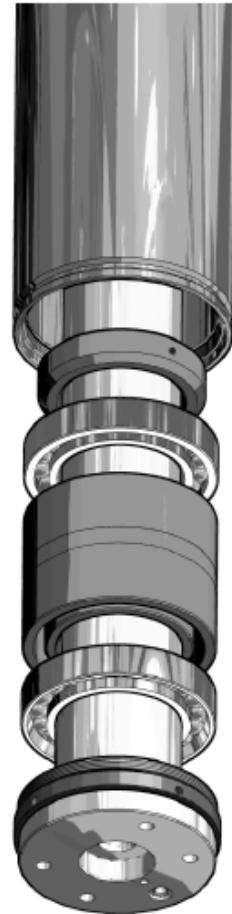


CUP UP

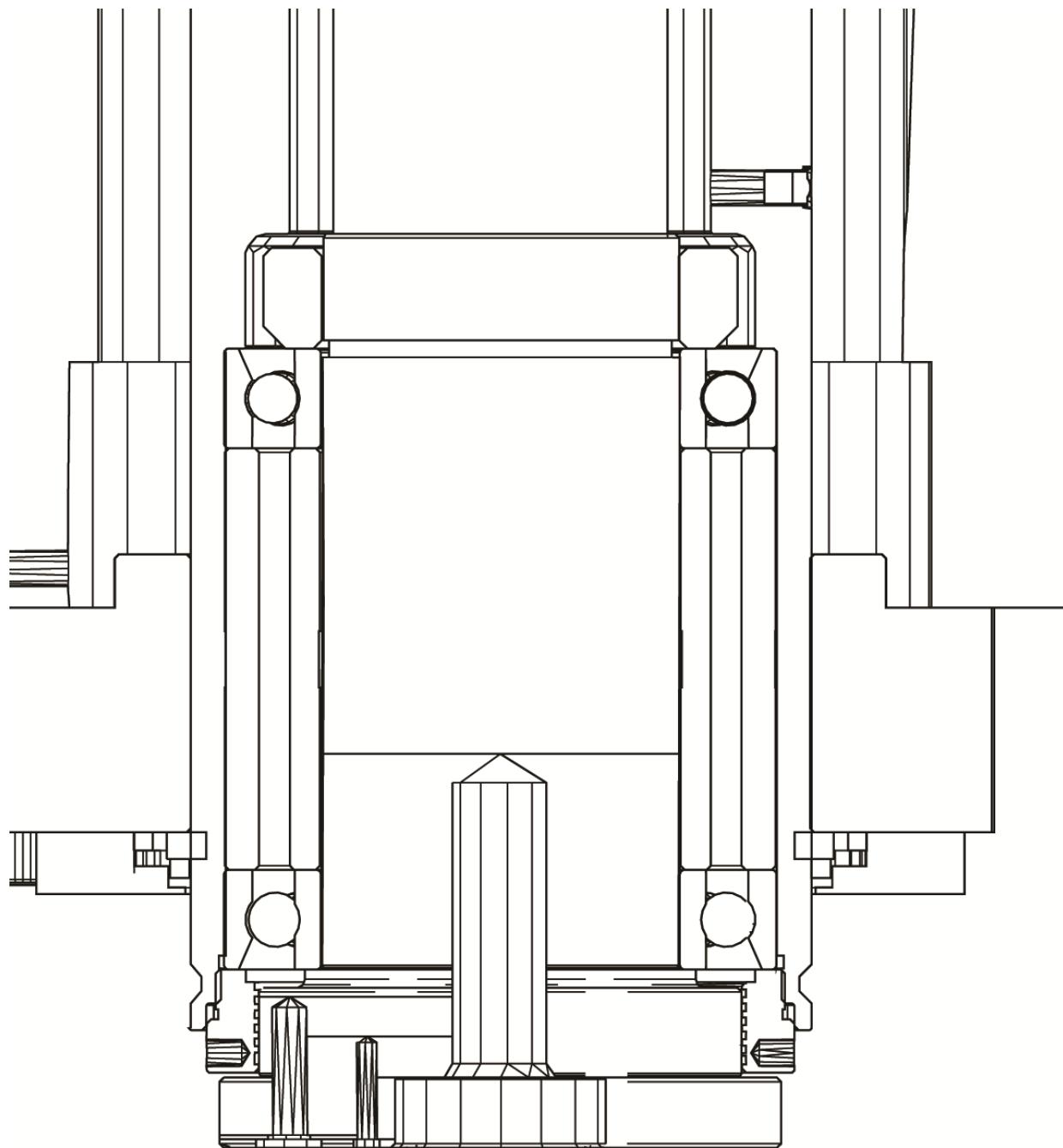
**Inner Spindle Upper Section Belleville Washer Section View**

**Inner Spindle Lower Section Bearing Stacking Order**

Install 2<sup>nd</sup> bearing with closed end down.



Install 1<sup>st</sup> bearing with open end down.

**Inner Spindle Lower Section Bearing Section View**

This page intentionally left blank

# TROUBLESHOOTING

Please visit the service tab of our web page at Send a Service Request [www.rottermfg.com](http://www.rottermfg.com) or contact the Rottler Factory Service at [service@rottermfg.com](mailto:service@rottermfg.com) for assistance and your service request.

You may also call Rottler at 1-800-452-0534 or 1-253-872-7050

Please ensure you have the Machine Model and Serial Number available when contacting Rottler for Service

This page intentionally left blank

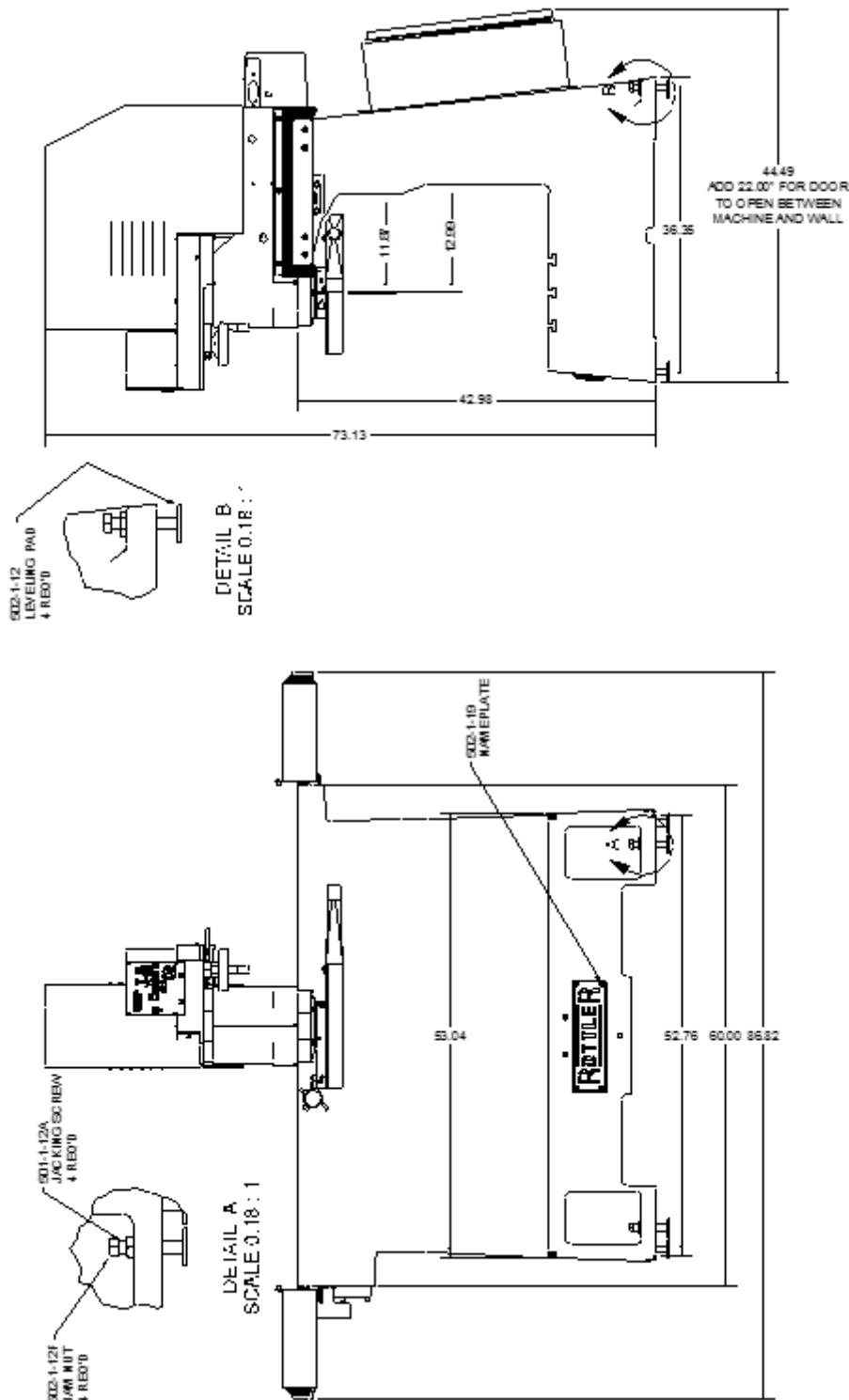
# MACHINE PARTS

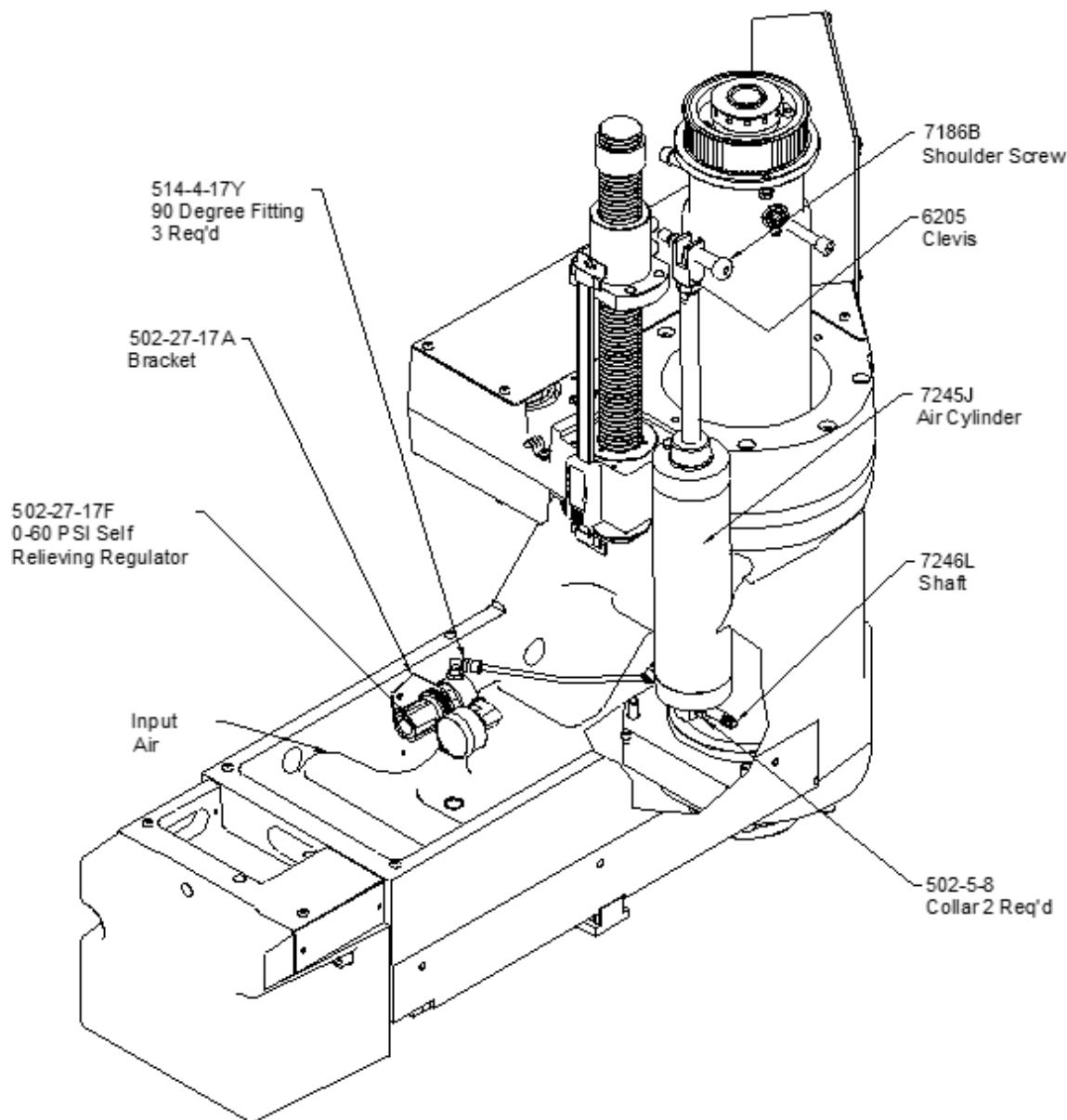
## Contents

<b>Machine Parts .....</b>	<b>8-1</b>
<b>Front / Right Side View S7-8A .....</b>	<b>8-1</b>
<b>Pneumatic Assembly.....</b>	<b>8-2</b>
<b>Electrical Wiring Diagram .....</b>	<b>8-3</b>
<b>Electrical Enclosure .....</b>	<b>8-4</b>
<b>Upper Housing.....</b>	<b>8-5</b>
<b>Upper Vertical Travel Belt Parts .....</b>	<b>8-6</b>
<b>Spindle Base Front Section.....</b>	<b>8-7</b>
<b>Inner / Outer Spindle Assembly .....</b>	<b>8-8</b>
<b>Spindle Base Bushings.....</b>	<b>8-9</b>
<b>Spindle Base Assembly .....</b>	<b>8-10</b>
<b>Left Ballscrew Support .....</b>	<b>8-11</b>
<b>Right Ballscrew Support.....</b>	<b>8-12</b>
<b>Home and Limit Switches .....</b>	<b>8-13</b>
<b>Pendant Assembly.....</b>	<b>8-14</b>
<b>Spindle Base Cover.....</b>	<b>8-15</b>
<b>Chip Shield 14" &amp; 16".....</b>	<b>8-16</b>
<b>14" Fly Cutter.....</b>	<b>8-17</b>
<b>Chip Chute .....</b>	<b>8-18</b>
<b>Waycovers and Optional Chip Catcher Assembly .....</b>	<b>8-19</b>
<b>Riser Set .....</b>	<b>8-20</b>

## Machine Parts

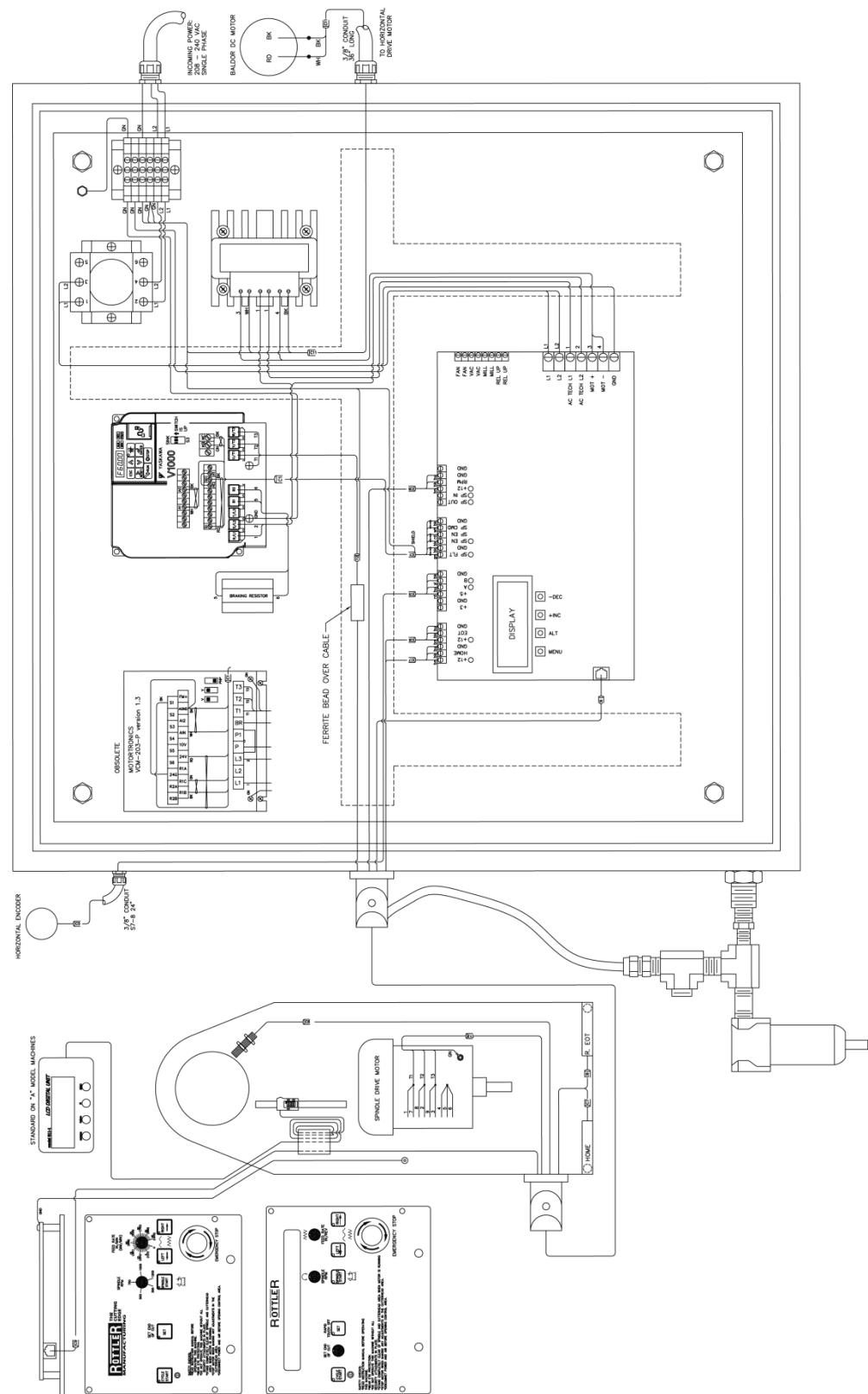
### Front / Right Side View S7-8A

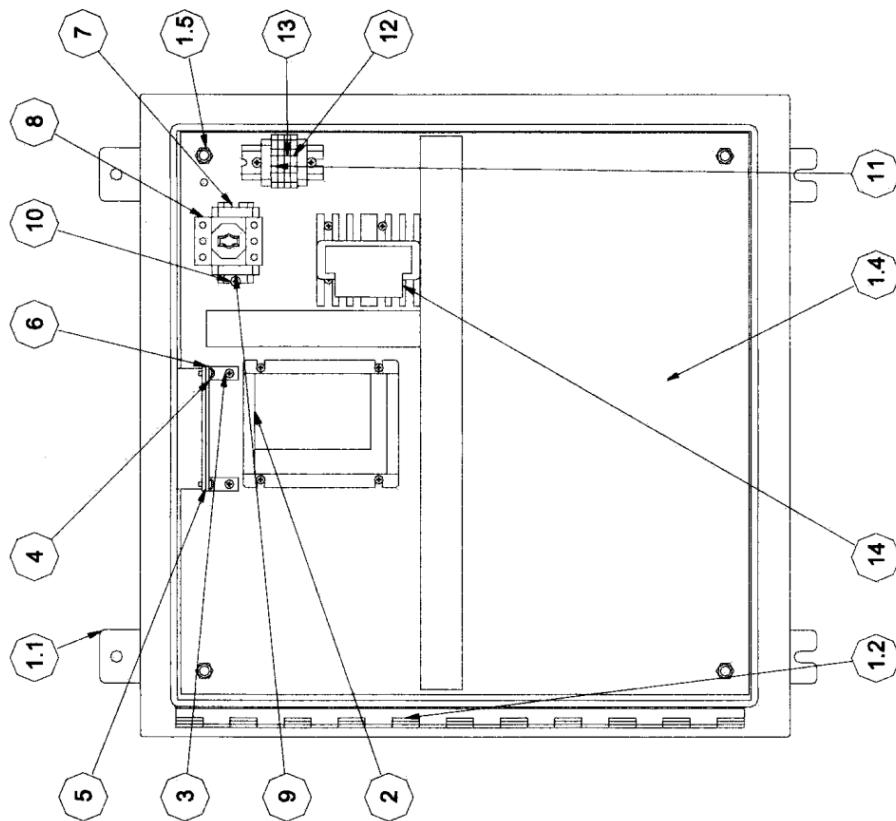


**Pneumatic Assembly**

## Electrical Wiring Diagram

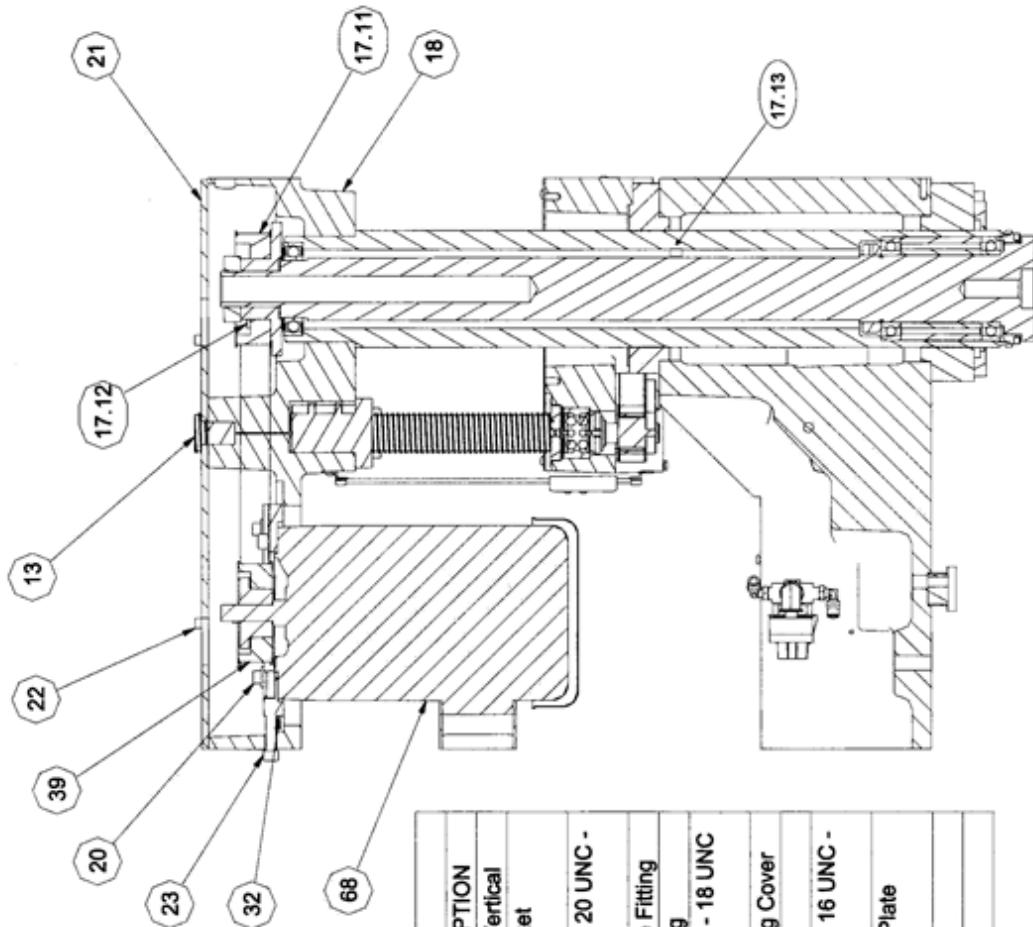
A scalable version of this wiring diagram is located on the manual CD.



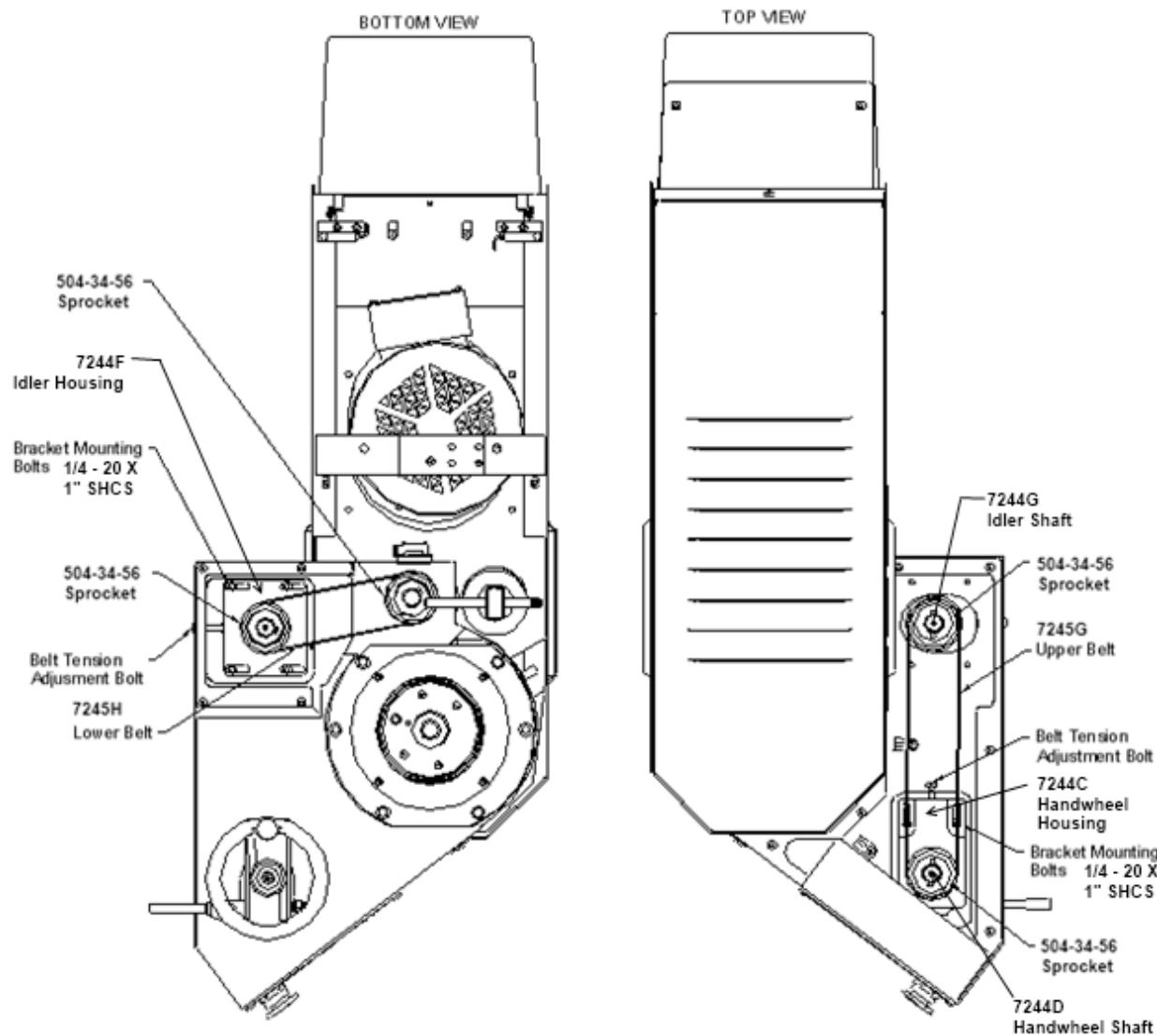
**Electrical Enclosure**

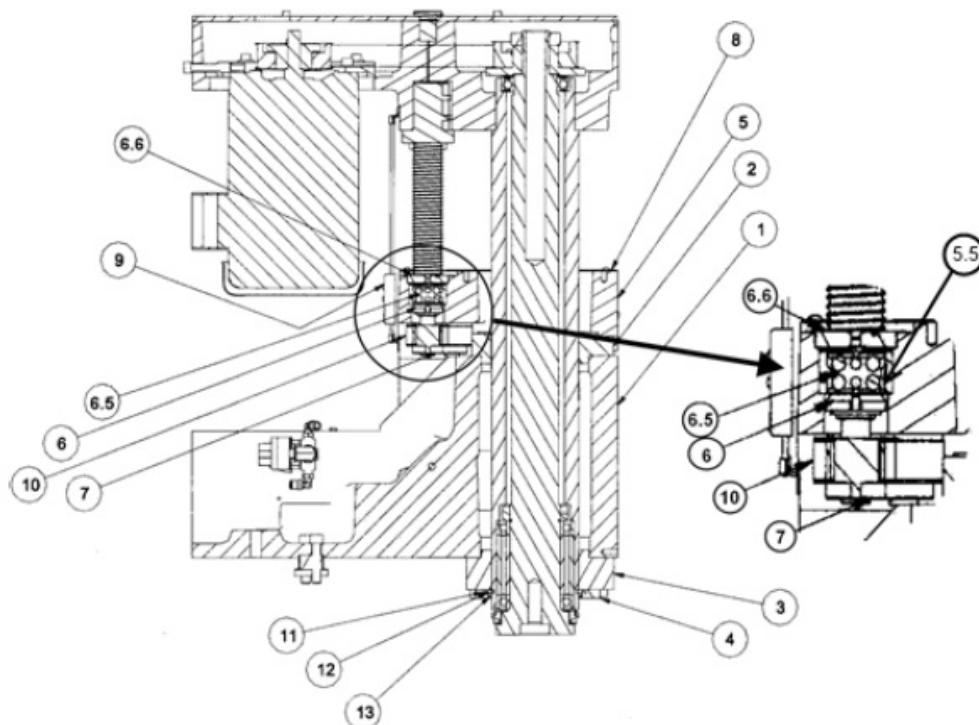
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	502-38-12A	
1.1	1	502-38-12A Box	
1.2	1	502-38-12A Hinge	
1.3	1	502-38-12A Door	
1.4	1	502-38-11B	Panel, Electrical Enclosure SF-7/8
1.5	4	IFI - 10.375 - 16	Hex Flange Nut
2	1	7506	AC Tech Inverter, 3 HP
3	18	ANSI B18.6.3 - No. 8 - 32 - 3/8	Cross Recessed Pan Head Machine Screw - Type I
4	2	7192A	Bracket
5	1	7192	Fan
6	2	7192B	Cover, Fan
7	2	504-35-3F	Din Rail
8	1	7187D	Disconnect Switch
9	4	504-35-3M	End Cap
10	4	ANSI B18.6.3 - No. 10 - 24 - 3/8	Cross Recessed Pan Head Machine Screw - Type I
11	2	514-7-74E	Ground Block
12	1	514-7-74C	Terminal Block, Blue
13	1	514-7-74D	Terminal Block, Grey
14	1	502-36-42H	Line Reactor

REFS8M09

**Upper Housing**

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
13	1	7244L	Ball Screw - Vertical
17.11	1	504-34-56	Driven Sprocket
17.12	4	MF-15	S.H.C.S. 1/4 - 20 UNC - 1
17.13	1	502-9-68B	Flush Grease Fitting
18	1	7247A	Upper Housing
20	8	MF-24	S.H.C.S. 5/16 - 18 UNC - 1 1/4
21	1	7247D	Upper Housing Cover
22	6	MF-12	"Varies"
23	3	MF-34	S.H.C.S. 3/8 - 16 UNC - 2
32	1	7247	Motor Mount Plate
39	1	504-34-56	Sprocket
68	1	507-6-3G	

**Upper Vertical Travel Belt Parts**

**Spindle Base Front Section**

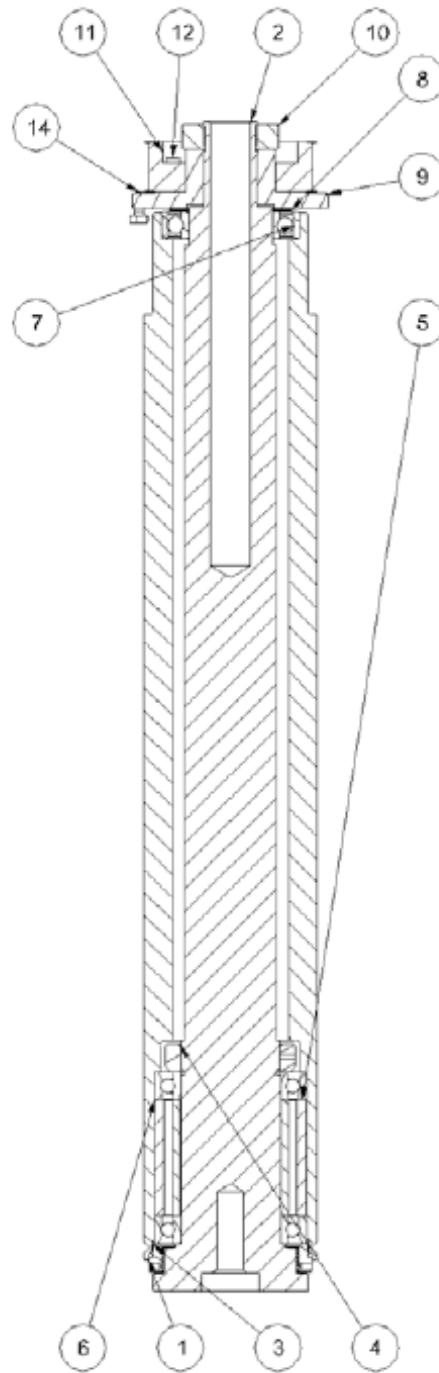
**NOTE:** See maintenance section for correct bearing installation procedure

Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	7002Z	Spindle Base SF/7&8
2	1	7246K	Bushing, Upper SF, outer spindle
3	1	7246J	Lower Bushing SF
4	1	7035	Felt Retainer
5	1	7244A	Vertical Adjustment Housing (Machining)
5.5	2	504-34-73	Steel Spacer
6	1	504-34-54	Bearing Nut
6.5	1	7245K	Bearing
6.6	1	7244K	Bearing Retainer Nut
7	4	504-34-56	Sprocket
8	1	7244J	Cover, Vertical Adjust Housing SF
9	1	Linear scale head	
10	1	504-34-59	Belt, Vertical
11	1	6251	Square Ring
12	1	6249	Felt Oiler
13	1	6248	Square Ring

**Inner / Outer Spindle Assembly**

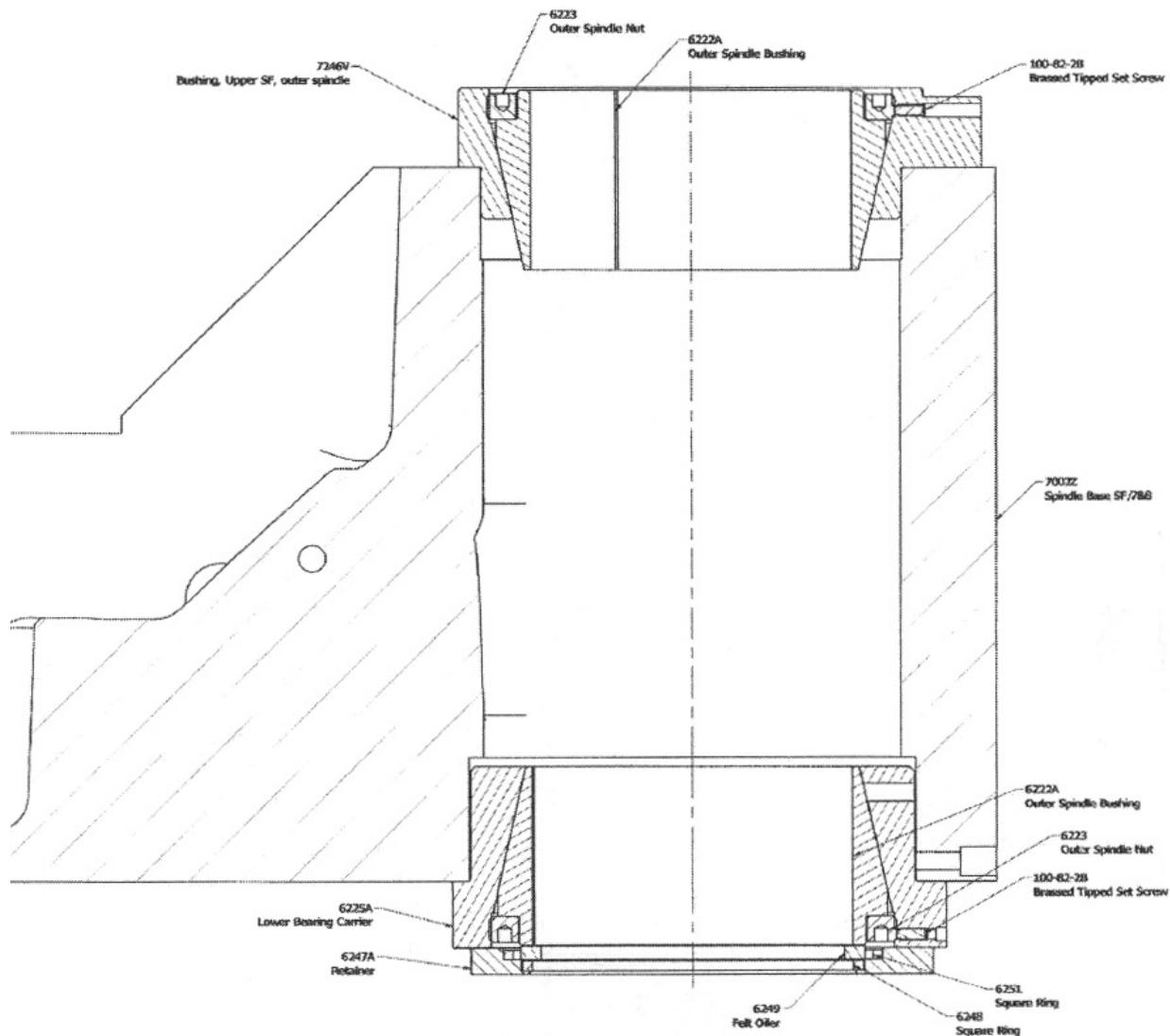
**NOTE:** See maintenance section for correct bearing and Belleville washer installation procedure.

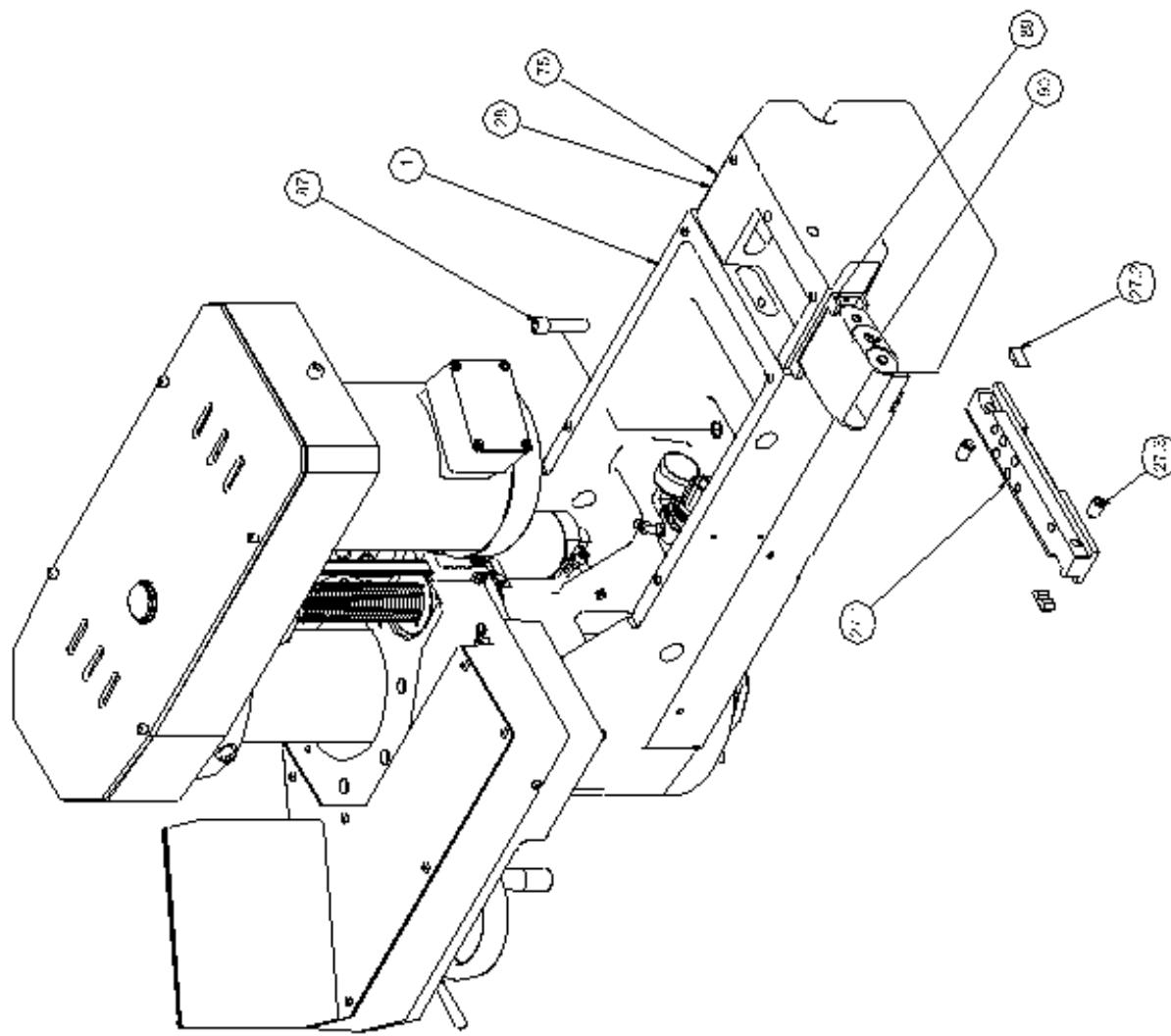
Parts List			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	7246D	Outer Spindle
2	1	7246E	Inner Spindle
3	1	7022	Throw Back Nut - Inner Spindle
4	1	7021A	Bearing Lock Nut
5	2	7049A	Spindle Bearing
6	1	7246H	Spacer Set (Precision) SF Spindle
7	1	7017	Bearing
8	2	7052	Belleville Spring
9	1	7246C	Index Bushing
10	1	504-34-25	Nut, Spindle Adjustment, Upper Housing
11	1	7246B	Driven Sprocket 68 Tooth
12	4	MF-15	S.H.C.S. 1/4 - 20 UNC - 1
13	1	502-9-68B	Flush Grease Fitting
14	1	ANSI/ASME B18.2.1 - 1/4-20 UNC - 0.625	1/4-20 UNC X 0.625 HHMS



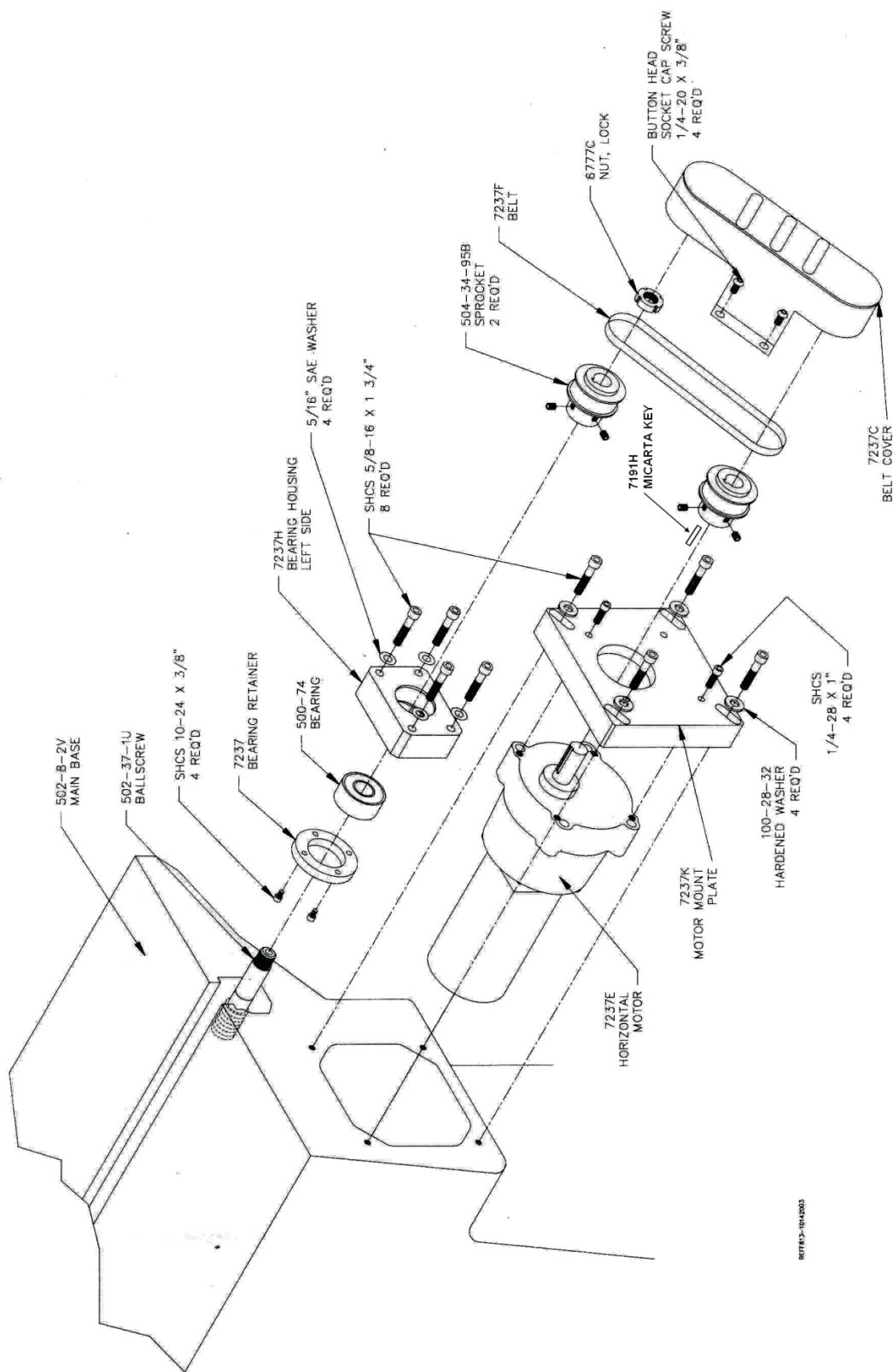
## Spindle Base Bushings

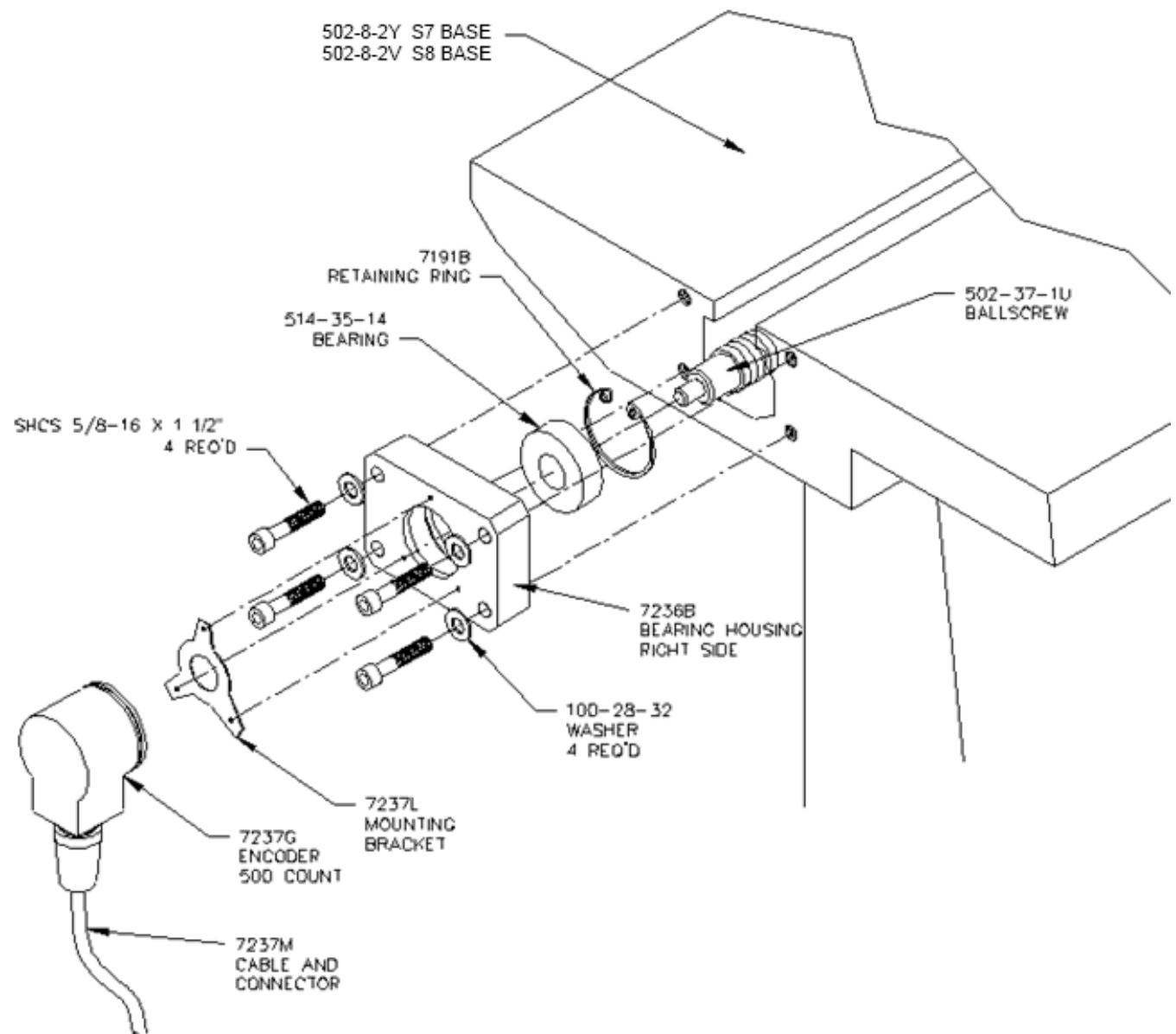
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	7002Z	Spindle Base SF/768
2	1	6247A	Retainer
3	1	6225A	Lower Bearing Carrier
4	1	7246V	Bushing, Upper SF, outer spindle
5	2	6222A	Outer Spindle Bushing
6	2	6223	Outer Spindle Nut
7	2	100-82-2B	Brass Tipped Set Screw

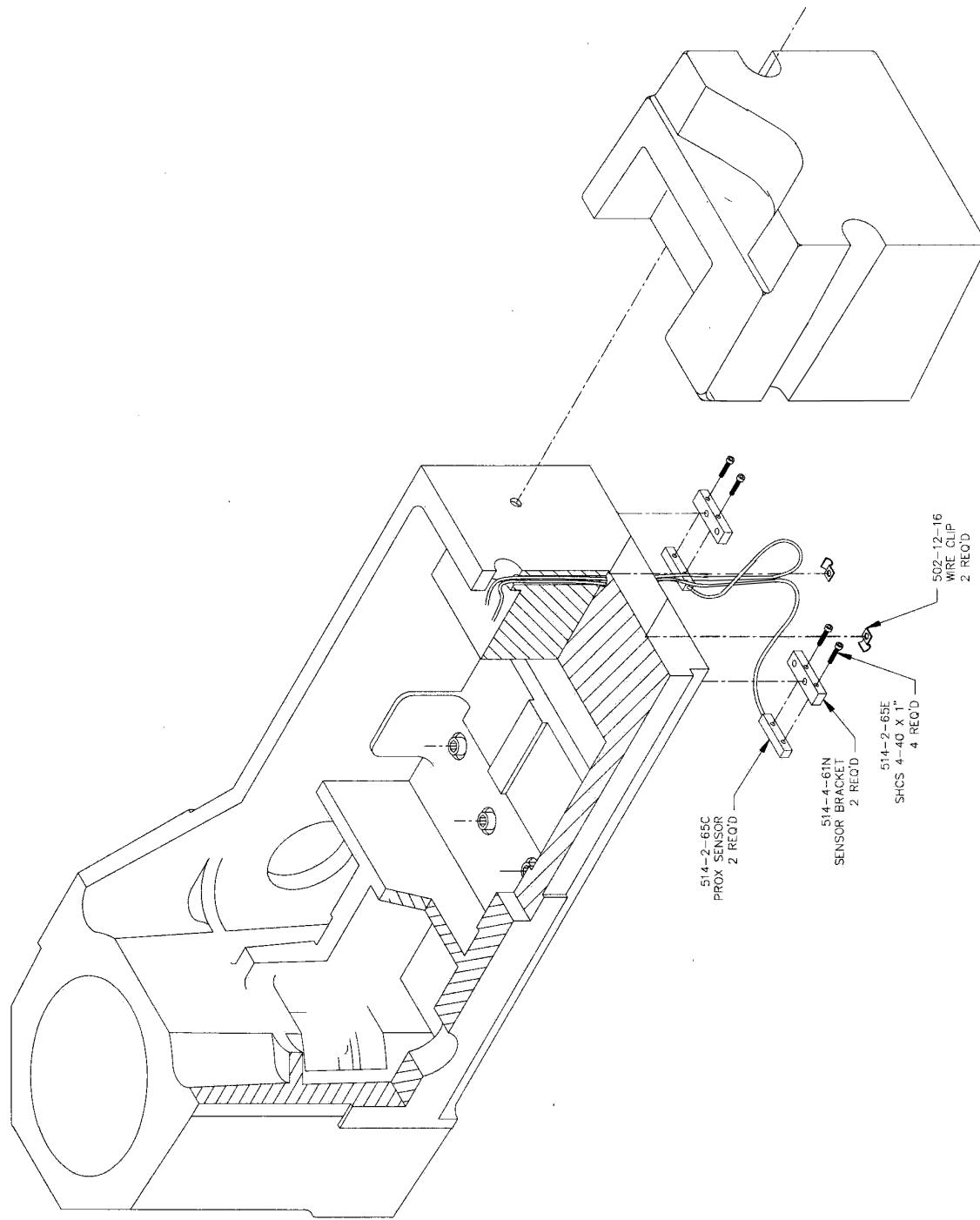


**Spindle Base Assembly**

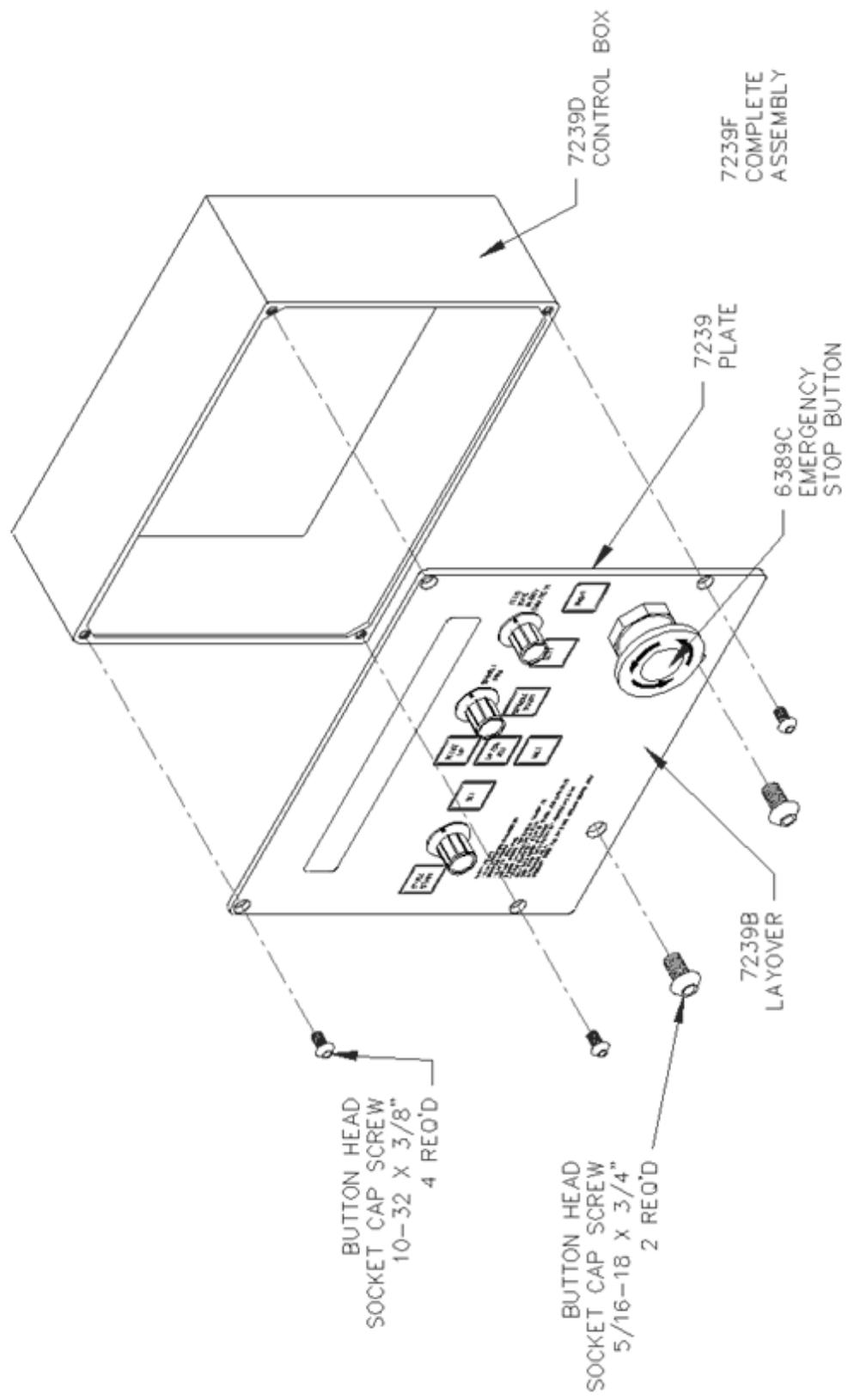
Part List		PART \ U1-SP-2:		U1-SP-2 H1 ON	
REF	Q'ty	Part No.	Description	Ref	Q'ty
1	1	72322	Spindle Base Spindle	27	1
27	1	72365	Spindle Base Assembly	27.1	1
27.1	1	72365C	Spindle Assy	27.2	2
27.2	2	72365	Spindle	27.3	2
27.3	2	152-04-00	Spring Plunger	28	1
28	1	72324	Coupling M. Spindle	75	1
67	3	650-7-1P	Base (Castig) SF	68	1
68	3	AHSI 348.0 7118-12	Base Plate	92	2
69	1	152-04-00	Hexagon Steel Headed Cap Screw		
92	2	50-32-0000	KLJ-5 White Thread		

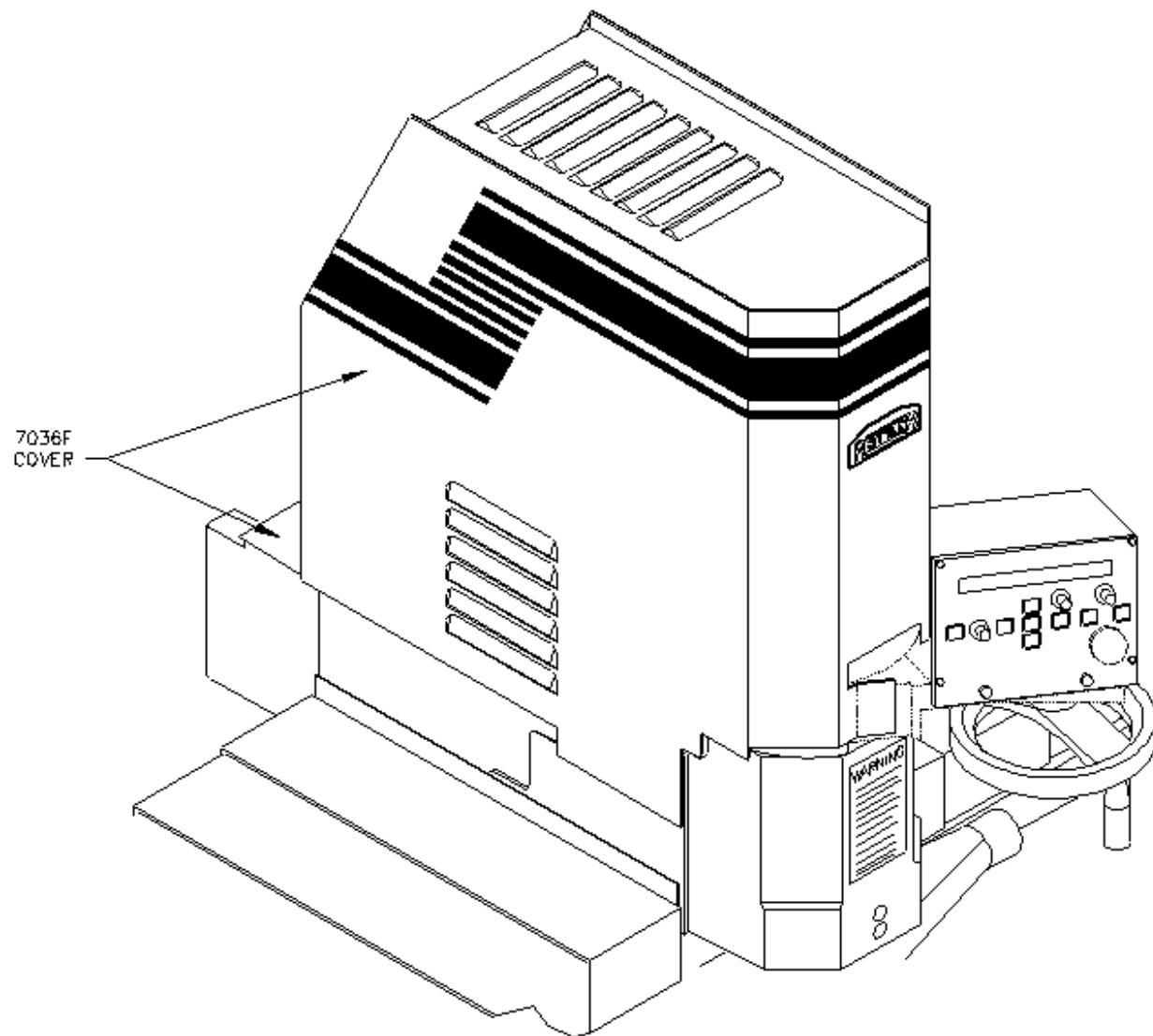
**Left Ballscrew Support**

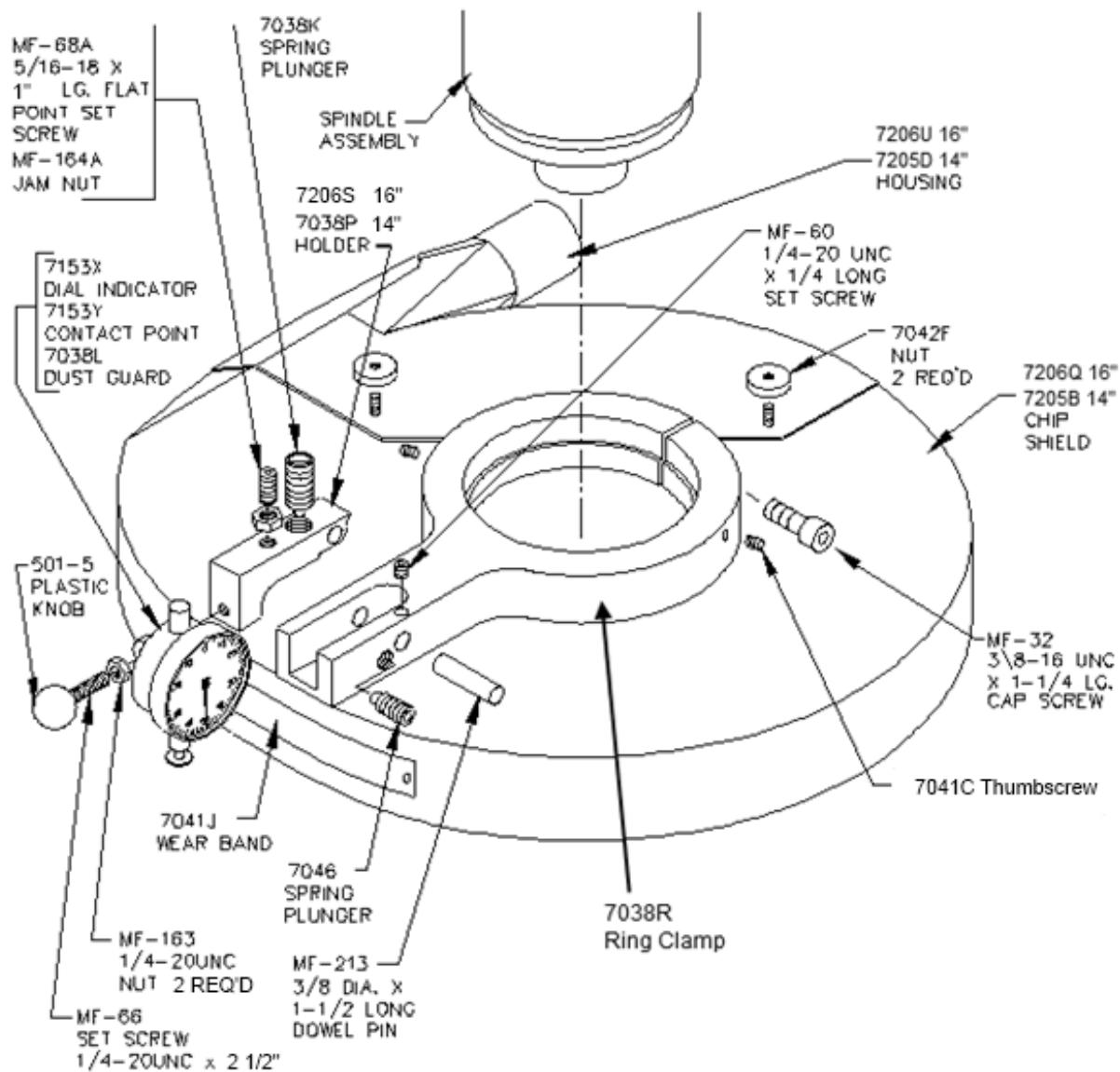
**Right Ballscrew Support**

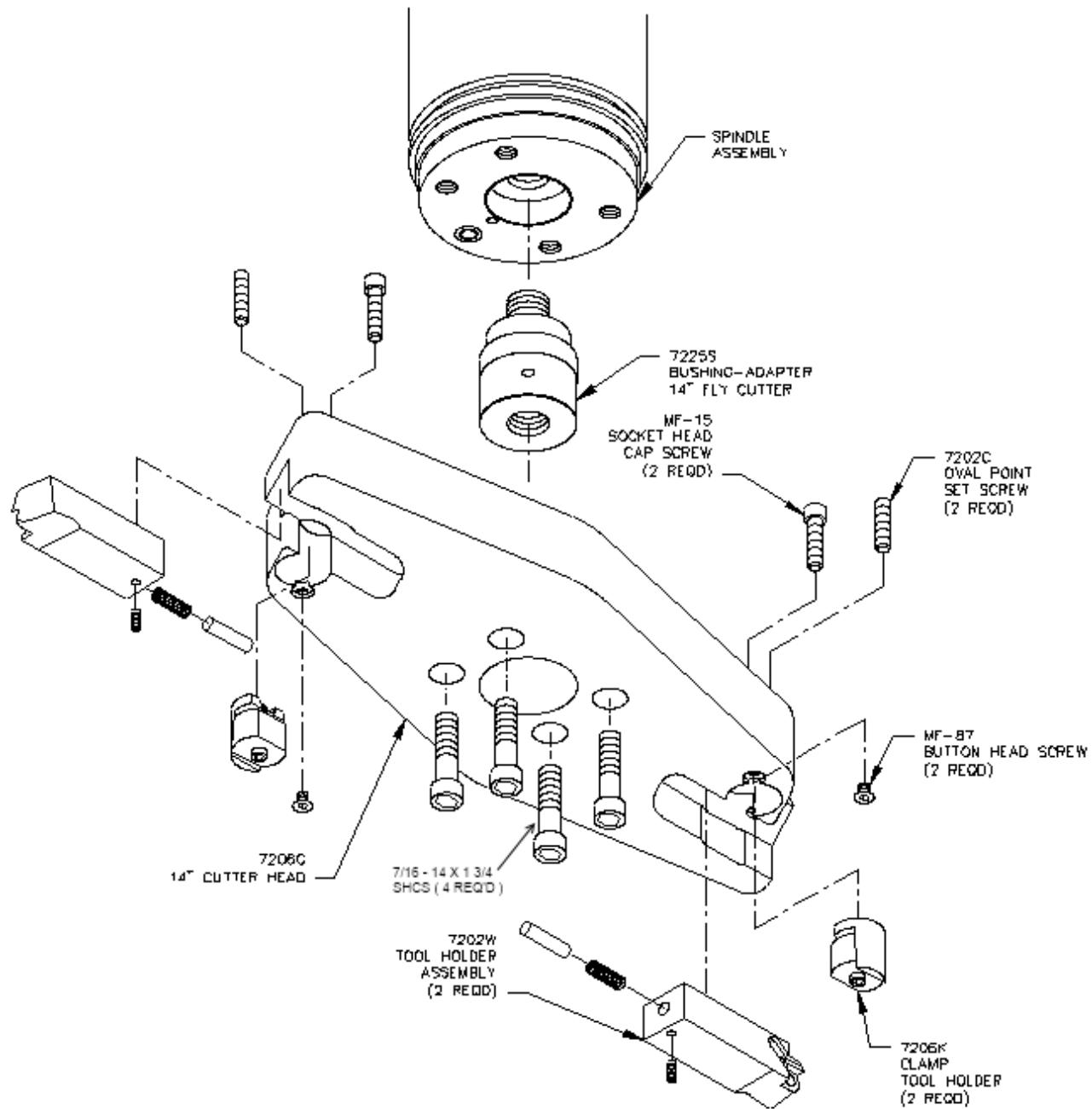
**Home and Limit Switches**

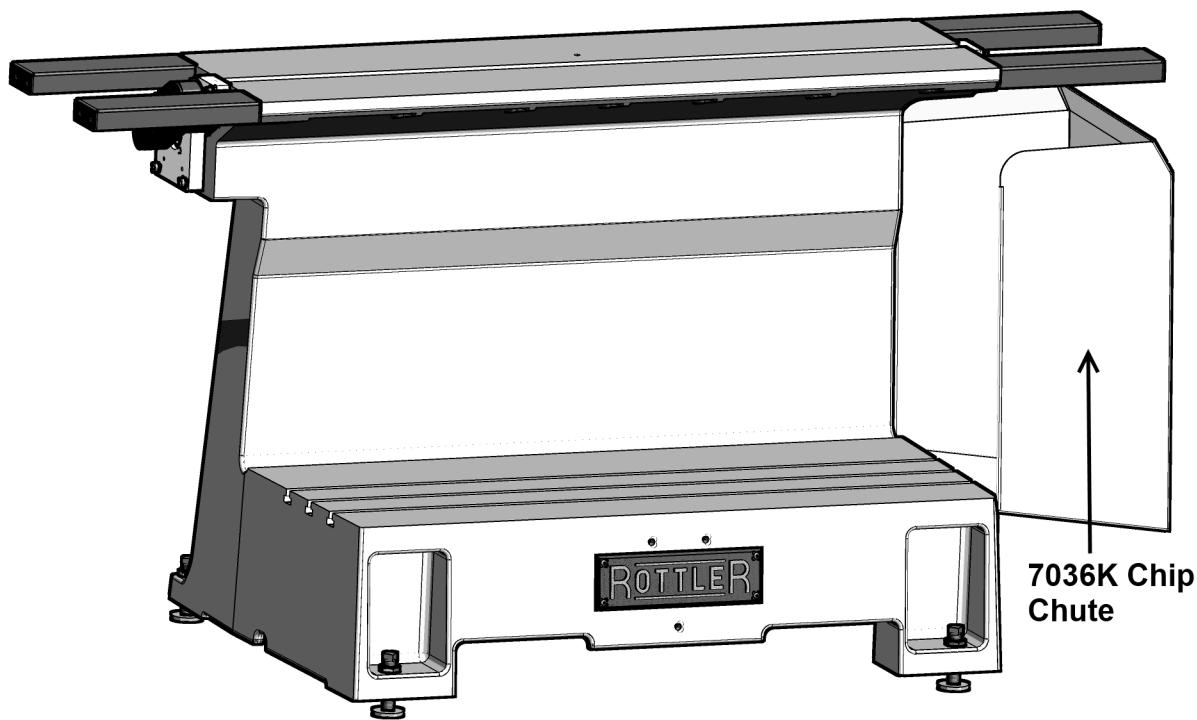
REFSP815-10172003

**Pendant Assembly**

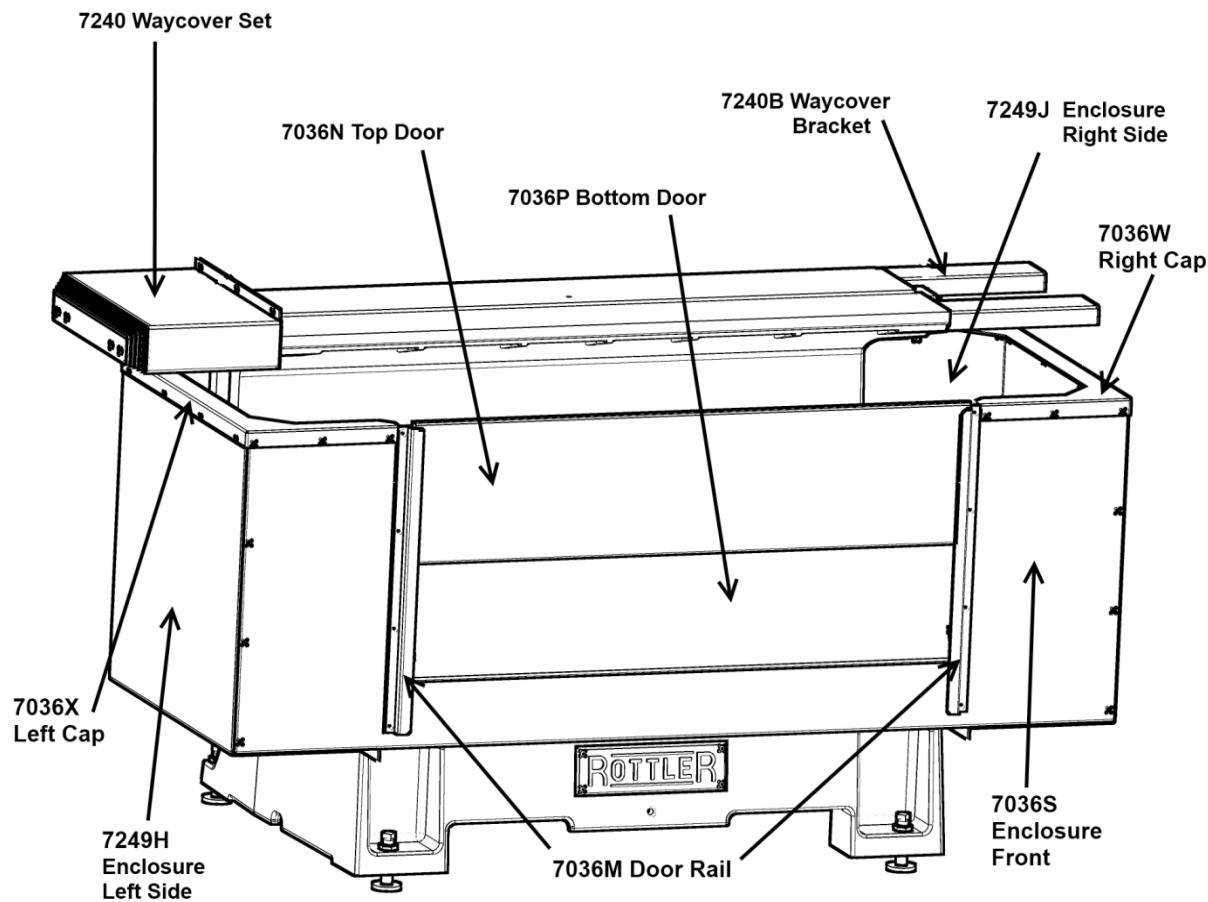
**Spindle Base Cover**

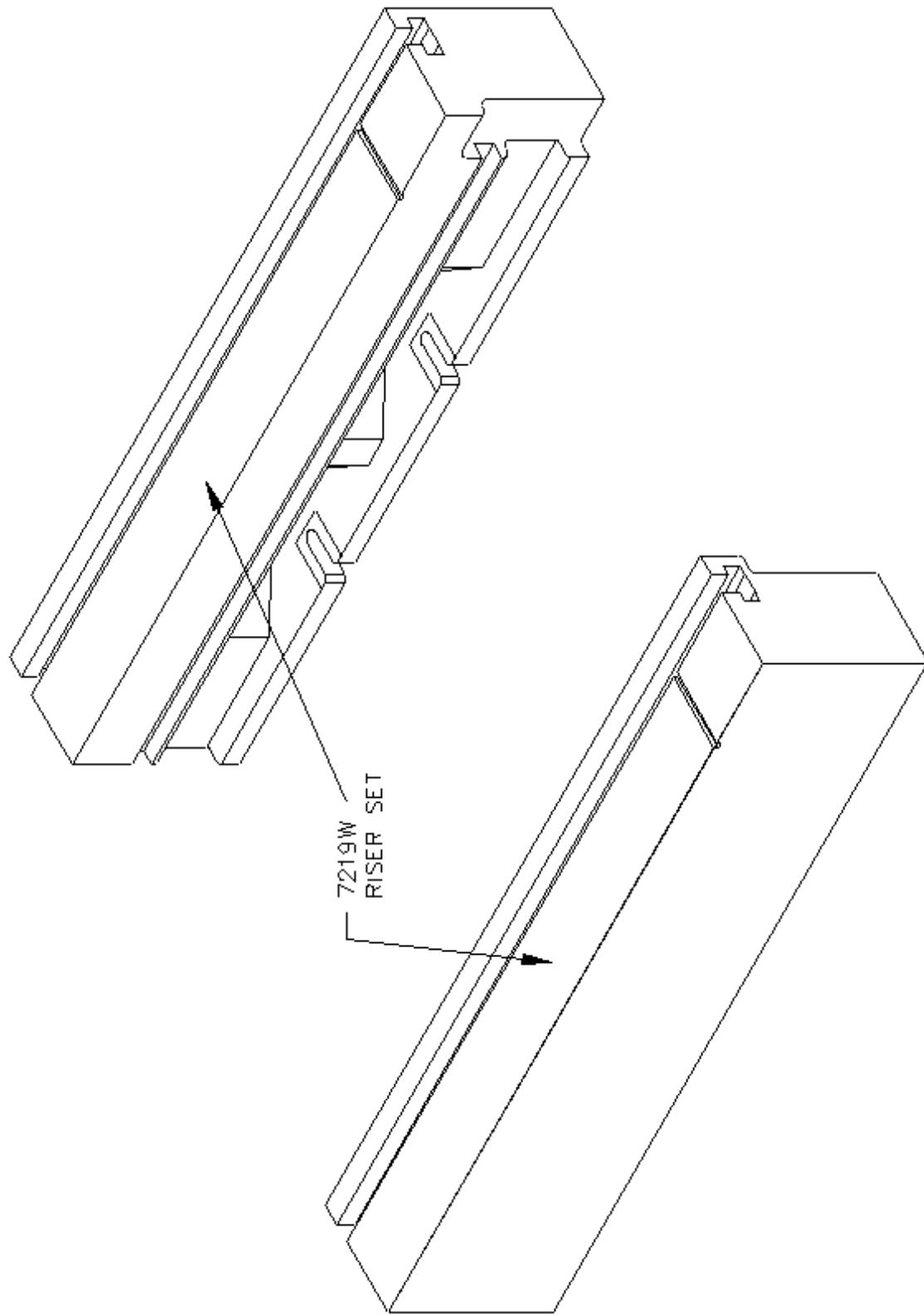
**Chip Shield 14" & 16"**

**14" Fly Cutter**

**Chip Chute**

**7036K Chip  
Chute**

**Waycovers and Optional Chip Catcher Assembly**

**Riser Set**

This page intentionally left blank

# OPTIONS

## Optional Equipment

Optional Equipment Catalog and Parts Manual are located on the Manual CD shipped with machine.

This page intentionally left blank

# MSDS

The Material Data Safety Sheets list shown in this section are the substances and materials that an operator is most likely to come in contact with while using this machine.

Other substances and materials are used in the manufacture, testing, and shipping of this machine. A complete list of the Material Data Safety Sheets of substances and materials used by Rottler Manufacturing during manufacturing, testing, and shipping is located on the Manual CD shipped with the machine. Material Data Safety Sheets are also located on the company web site: <http://www.rottermfg.com/documentation.php>

## 1) NAPA Lithe-Ease Grease

<b>MATERIAL SAFETY DATA SHEET</b>			
<b>Product:</b>	765-1393	<i>Note: The information herein is given in good faith. No warranty, expressed or implied, is made.</i>	
<b>Printed:</b>			
<b>Printed For:</b>			
<b>Original Issue Date:</b>	11/12/85	<b>Approved By:</b>	Chuck Hiddema
<b>Revision No. 3 Date:</b>	07/25/01	V.P. Technical Operations	
<b>Section I - Identification</b>			
<b>Manufacturer:</b>	AGS Company		
<b>Street Address:</b>	2651 Hoyt St		
<b>City/State/Zip</b>	Muskegon Hts., MI 49444		
<b>Phone:</b>	800-253-0403		
<b>Phone:</b>	231-733-2101		
<b>FAX:</b>	231-733-1784		
<b>Transportation Emergency:</b>	CHEM-TEL		
<b>Phone:</b>	800-255-3924		
<b>Trade Name:</b>	NAPA Lith-Ease Grease		
<b>Catalog No.:</b>	765-1393		
<b>Common Name:</b>	Lith-Ease		
<b>Container/Size:</b>	1 pound plastic tub		
<b>NFPA - Health:</b>	0		
<b>Flammability:</b>	1		
<b>Reactivity:</b>	0		
<b>Specific Hazard:</b>			
<b>HMIS - Health:</b>	0		
<b>Flammability:</b>	1		
<b>Reactivity:</b>	0		
<b>Protective Equipment:</b>	A		
<b>Section II - Hazardous Ingredients</b>			
<b>Hazardous Ingredient</b>	<b>CAS No.</b>	<b>Wgt. %</b>	<b>TLV</b>
1 White Lithium Grease	Not Assigned	100%	5 cu. m.
2			
3			
4			
5			
6			
7			
8			
9			
10			
<b>NOTES:</b>			

<b>Section III Physical Data</b>		<b>Catalog No. 765-1393</b>
pH - Supplied:	Not Applicable	
pH - Diluted:	Not Applicable	
Water Solubility:	Nil	
Specific Gravity:	(Water=1) 0.90	
Melting Point:	360°F (min.)	
Boiling Point:	Not Determined	
% Volatiles:	Not Applicable	
Vapor Pressure:	Not Applicable	
Vapor Density:	Not Applicable	
Evaporation Rate:	Not Applicable	
Appearance:	Pale yellow semi-solid with mineral oil odor.	
<b>Section IV Fire &amp; Explosion Data</b>		
Flash Point:	> 400°F.	
Method:	C.O.C.	
Auto Ignition Temperature:	Not Determined	
Flammable Limits In Air	LEL:	Not Determined
	UEL:	Not Determined
Extinguishing Media:	Dry chemical, carbon dioxide, foam, water fog, sand or earth.	
Special Procedures:	Wear self-contained breathing apparatus.	
Unusual Hazards:	Dense smoke.	
<b>Section V - Reactivity Data</b>		
Unstable and/or Auto Reactive:	Stable	
Incompatible Materials:	Strong oxidizing agents.	
Hazardous Decomposition Products:	CO and carbon dioxide.	
<b>Section VI - Emergency First Aid</b>		
Eyes:	Flush with water for at least 15 minutes. Call physician immediately.	
Skin:	Wash thoroughly with soap & water.	
Ingestion:	Do not induce vomiting. Call physician immediately.	
Inhalation:	Of oil mist from grease; remove victim to fresh air. Administer oxygen or artificial respiration as required. Consult physician.	
<b>Section VII - Health Effects</b>		
Eyes:	May cause irritation.	
Skin:	May cause irritation on prolonged or repeated contact.	
Ingestion:	Contains petroleum, may cause diarrhea and nausea.	
Inhalation:	When at elevated temperature or aerosolized, may cause irritation of the respiratory tract.	
Other Effects:	Not known.	

<b>Section VIII - Ventilation and Protective Measures</b>		Catalog No. 765-1393
Ventilation Requirement:	General exhaust acceptable where a TLV of 5 cu. M. as mineral oil will not be exceeded.	
Eyes:	Yes	
Gloves:	Yes	
Clothing:	No	
Respiratory:	No	
Other:	Eye wash in work area.	
<b>Section IX - Storage and Handling Procedures</b>		
Conditions to Avoid:	None listed.	
<b>Section X - Spill Procedures and Waste Disposal</b>		
Spill Procedure:	Transfer bulk material to a container. Remove the residue with an absorbent material.	
Disposal Method:	Removal by an approved, licensed waste hauler.	
EPA Waste I.D. NO.:	Not Reg.	