

February 15, 1994

DIRECTIONS  
FOR  
OPERATING AND MAINTAINING  
THE

**ROTTLER**  
MODEL SF-00 SURFACING MACHINE  
MACHINE SERIAL NUMBER

MANUFACTURED BY:

ROTTLER MANUFACTURING COMPANY

8029 South 200th Street  
Kent, Washington 98032  
U.S.A.

NOTE: WHEN ORDERING REPLACEMENT PARTS, PLEASE GIVE THE MODEL AND SERIAL NUMBER.

ORDER BY PART NUMBER

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

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## INTRODUCTION

This manual is divided into sections as listed in the table of contents.

It is required that the new user of the SF-00 read this manual, in particular the sections concerning safety, before operating the machine.

## DESCRIPTION

The model SF-00 surfacing machine is a precision, high speed surfacing unit.

The model SF-00 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.

SF-00 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, three phase. This provides power to the AC motor, the horizontal S.C.R. drive, and various relays and solenoid valves that actuate mechanical controls on the machine to engage feeds and travels. *See electrical section for proper electrical attachment.*

## LIMITED WARRANTY

Rottler Manufacturing Company model SF-00 parts and equipment are 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 instruction in this manual.

Standard air and electric components are warranted by their respective manufacturers (NOTE: their individual warranty periods may vary significantly from Rottler manufacturing policy).

Tools proven 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 other direct or indirect costs in connection with cases covered by the warranty.

Freight charges on warranty items (non-air shipment only) will be paid by Rottler Manufacturing for a period of 60 days only from date of installation or set-up by a qualified service technician or sales rep.

Freight charges after the 60 day period are the customers responsibility.

## **SAFETY INFORMATION**

### **CAUTION**

This machine is capable of causing severe bodily injury.

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

As with all machine tools Eye protection must be worn at all times by the operator and other personnel within in the area of the machine.

In particular, the operator should be very cautious of the cutting tool area.

When surfacing the machine is capable of projecting chips over 10 feet from the cutting area. Always use Guards.

Operator should be very careful to provide adequate clearances around the set-up area when using the machine.

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

**ELECTRICAL POWER** - Make sure all electrical equipment has the proper electrical overload protection

**MACHINE OPERATOR** - Operator of this surfacing machine should be a skilled machinist craftsman, that is, well versed in the caution, care, and knowledge required to safely operate a metal cutting tool.

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

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

1. **CUTTING TOOL AREA** - Any operation involving hands in the cutter head area, such as inspection or alignment of the cutterhead or cutting tools requires the power be turned off to the machine.

2. **SURFACING** - Eye protection must be worn

during this operation and hands must be kept completely away from cutter head. All chip guards must be kept in their normal operating positions.

4. OPERATOR PANEL CONTROLS -

Learn to identify and independently operate these control functions by habit while developing the awareness of keeping your fingers and hands well clear any moving machinery.

5. 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 of Block Handler Assembly. Lifting eye can eventually fail if the eye is reset in line with the 502-1-80 lift channel. Eye must be at right angle to this channel.

6. MACHINE MAINTENANCE - Any machine adjustment, maintenance or parts replacement absolutely requires a complete power disconnect to the machine. THIS IS AN ABSOLUTE RULE.

## MACHINE INSTALLATION

### LOCATION

The productivity of this ma-

chine will depend to a great extent 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 SF-00 machine is extremely important.

A slow travel (6' to 10'/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 would 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 would recommend that the open faces be placed at right angles to each other, with the machines approximately three feet apart.

### UNPACKING

Use care in removing the crate from the SF-00 machine, being careful not to use force on any part of the spindle unit.

Remove the tool box, parallels, and optional tooling lo-

cated 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, and any of this inhibitor left on the machine will result in considerable collecting of cast iron dirt.

#### SHIPPING HOLD DOWN BOLT

Remove cover (#7036A) from the rear of the spindle base by removing it's four mounting screws. Remove the bolt located between the two limit switches in the 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), two front leveling pads (7180A), and two rear leveling pads (7180C) 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 leveling pads below.

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 SF-00 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 p.s.i. 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 three phase, 50/60hz. Current requirement is 15 amps. Connect per electrical hook-up directions below. If the voltage is outside this range the machine will not operate properly and may be damaged.

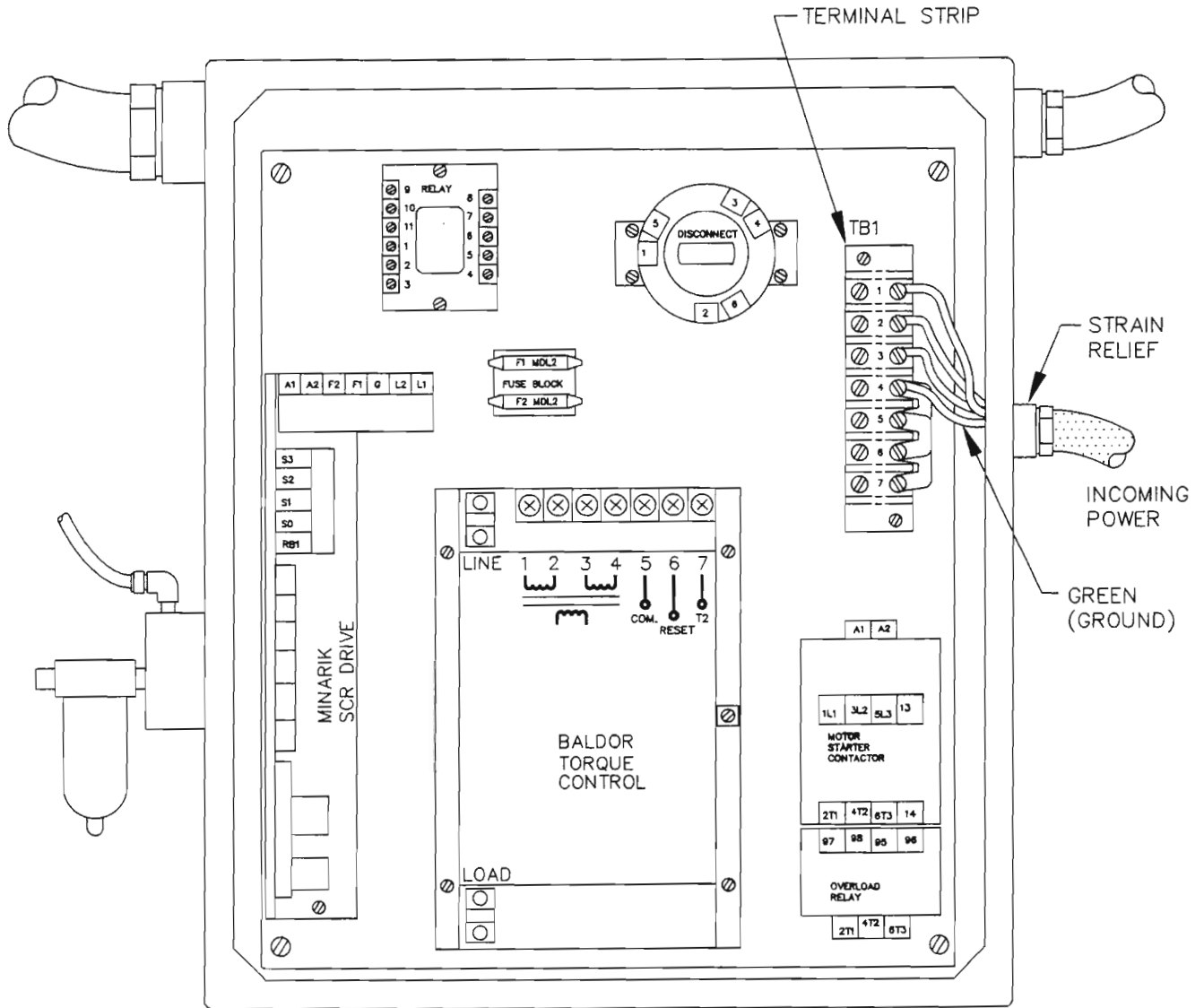
Connect three phase wiring to the 7 pole terminal strip in the lower right side of the electrical enclosure.

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#### CAUTION:

This machine must be connected to a good earth ground. Connect the earth ground wire to the terminal with the green grounding wire attached to it, on the terminal strip mounted at the right side of the electrical enclosure.

---



ELECTRICAL  
 208V, OR 220V/230V  
 3 PHASE, 50/60 HERTZ

**IMPORTANT**  
 ELECTRICALLY CONNECT  
 IN ACCORDANCE WITH  
 NATIONAL ELECTRICAL  
 CODE AND YOUR LOCAL  
 CODE.

ELECTRICAL HOOKUP  
SF-00



**POWER ON LIGHT**

This is an indicator light only. It indicates power is being supplied to the main breaker of the machine.

**RELIEF UP:ADJUST UP/DOWN:MILL SWITCH**

Relief Up- When in Relief Up the two air cylinders are activated which lift the spindle/cutterhead assembly up .020-.040 of an inch. Relief Up is used when the machine has finished a cut but before rapid traveling to the right.

Adjust Up/Down- When in Adjust Up/Down the two air cylinders are on low pressure. This allows for easy adjustment of the cutter head in either direction.

Mill- When in Mill the two air cylinders are off and the spindle/cutterhead is locked in its vertical position ready to mill.

**SPINDLE START/STOP SWITCH**

The spindle start/stop switch starts and stops the spindle rotation. After the Emergency stop button has been pressed, or power has been turned off, the spindle start/stop switch must be switched to the stop (reset) position. The spindle will not rotate until this is done.

**MODE SWITCH****RAPID LEFT POSITION**

Switching the Mode Switch to this position moves the spindle base to the left at a rapid speed. This move-

ment continues until the switch is moved to a different position or the left limit switch is contacted.

**FEED LEFT POSITION**

Switching the mode switch to this position feeds the spindle base to the left. The feed continues until the switch is moved to a different position or the left limit switch is contacted. The feed speed is controlled by the feed rate knob.

**OFF (RESET) POSITION**

Switching the mode switch to this position stops all traveling motion. After the Emergency stop button has been pressed, or power has been turned off, the mode switch must be switched to the off (reset) position. The spindle base will not travel until this is done.

**RAPID RIGHT POSITION**

Switching the Mode Switch to this position moves the spindle base to the right at a rapid speed. This movement continues until the switch is moved to a different position or the right limit switch is contacted.

**FEED RIGHT POSITION**

Switching the mode switch to this position feeds the spindle base to the right. The feed continues until the switch is moved to a different position or the right limit switch is contacted. The feed speed is controlled by the feed rate knob.

**FEED RATE KNOB**

This knob selects the feed rate for the machine in inches per minute. The range is from 0 to 40 inches per minute. The feed rate can be changed at anytime either with or with-out the machine feeding.

**RIGHT TRAVEL LIMIT SWITCH**

The Right Travel Limit switch stops the machine from traveling to the right.

---

**CAUTION:**

Rapid travel or feed will restart if limit stop block is moved after it comes in contact with stop rod and selector switch is left in feed or rapid travel position.

**LEFT TRAVEL LIMIT SWITCH**

The Left Travel Limit switch stops the machine when it is moving to the left.

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**CAUTION:**

Rapid travel or feed will restart if limit stop block is moved after it comes in contact with stop rod and selector switch is left in feed or rapid travel position.

---

**VERTICAL TRAVEL HANDWHEEL**

The Vertical handwheel moves the spindle up and down.

Small up, and all down adjustments are made with Relief Up: Adjust Up/Down: Mill switch in the Adjust Up/Down position. Long up movements are made with the switch in the Relief Up position.

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**CAUTION:**

Do not turn vertical handwheel when the Relief Up: Adjust Up/Down: Mill switch is in the Mill position.

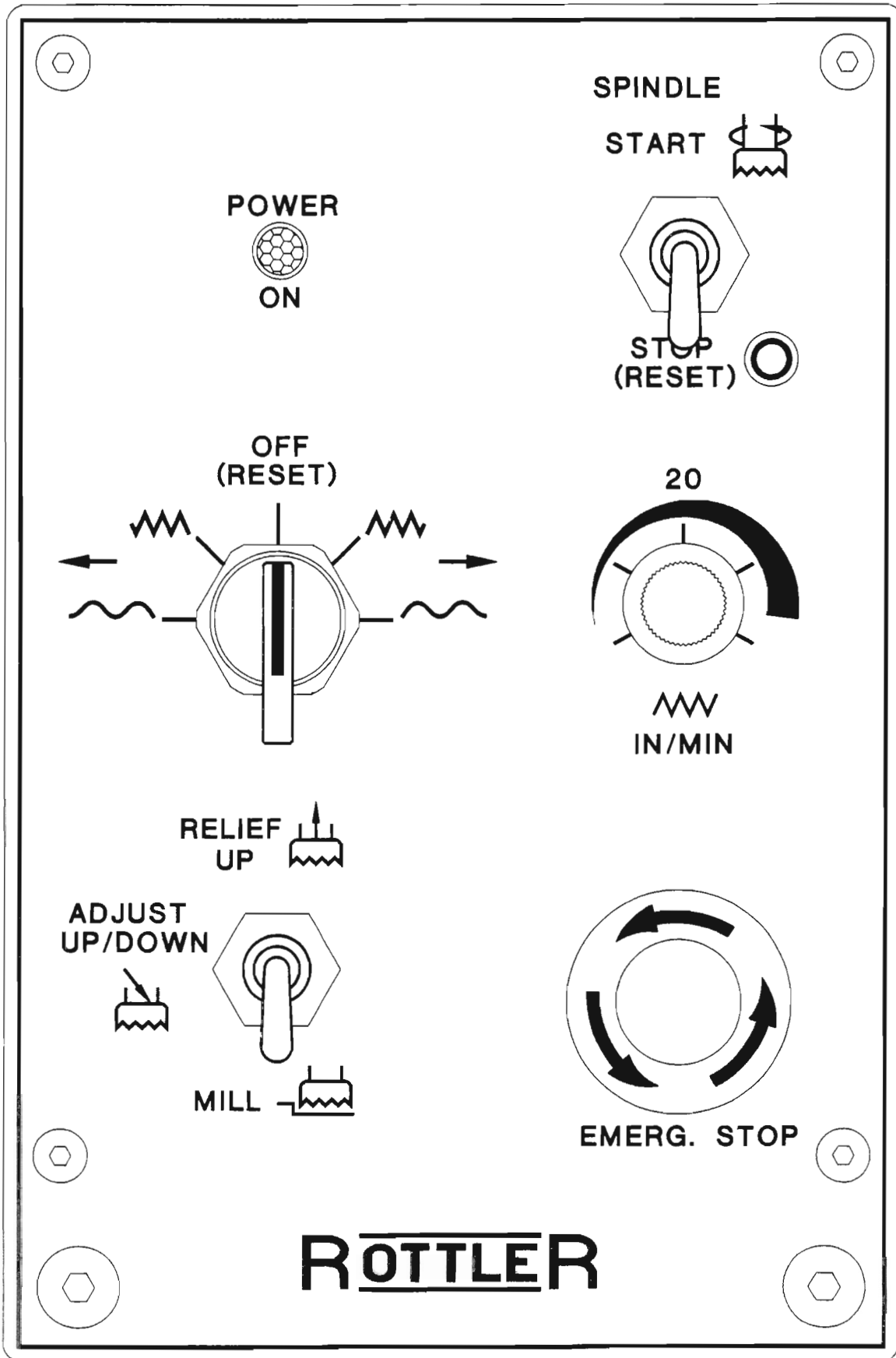
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**EMERGENCY STOP BUTTON**

Pressing the Emergency stop button will stop all motion of the machine. To start the machine again, the spindle start/stop switch, and the mode switch must be turned to their reset positions.

**SURFACE DEPTH DIAL INDICATOR**

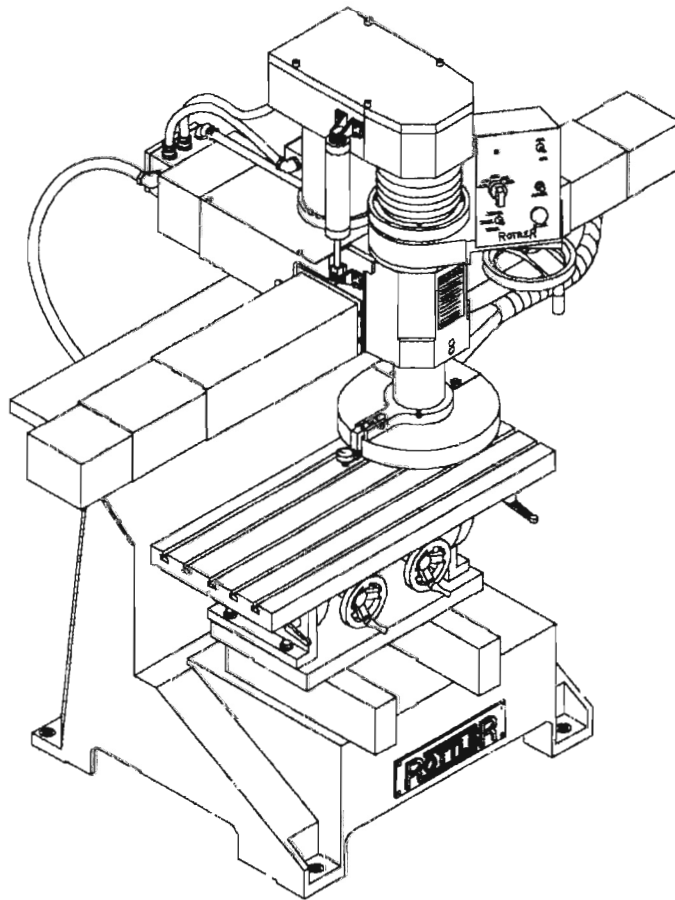
This dial indicator is mounted on the surfacing cutterhead guard. When properly adjusted this indicator will show the position of the cutterhead relative to the surface to be cut.



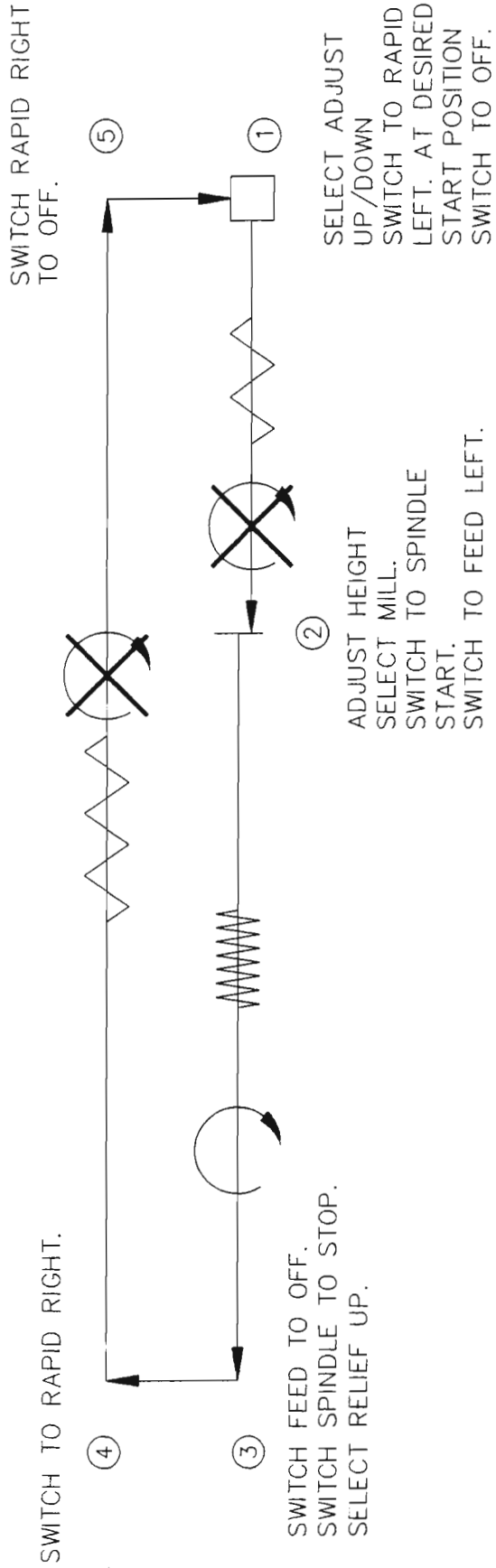
## OPERATING THE SF-00

Included in this chapter is a general description and diagrams of how to use the basic machine for surfacing, whether it is a cylinder head, cylinder block, or other type of job.

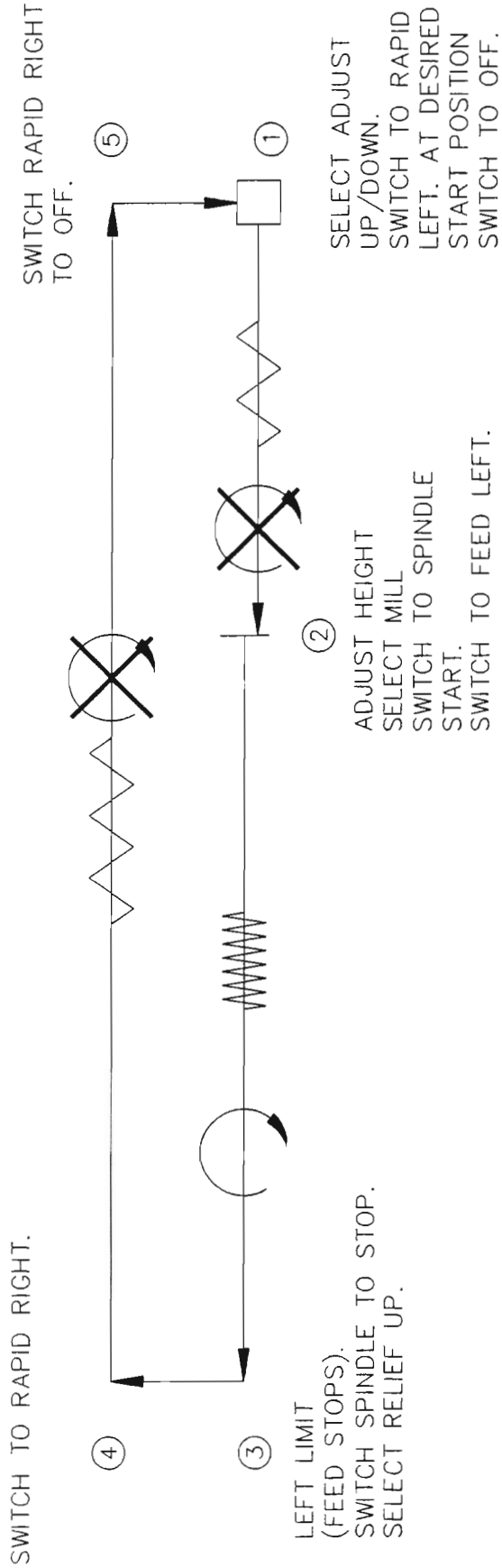
For details of operating the specific fixtures available for this machine refer to the Opt. Parts section of this manual.



MANUAL OPERATION



MANUAL OPERATION W/  
LEFT LIMIT SET.



There are several ways to use the SF cutting system depending on what type of work you do and your personal preferences. Following are some details that will help you decide which method will work best for you.

### CUTTING INSERTS

Rottler offers several different cutting inserts for the SF machines, below is a description of each.

#### **CBN - CUBIC BORON NITRIDE:**

This is a very high performance insert used for cutting cast iron. Using the 14 inch diameter cutterhead of the SF machines the RPM can be run between 500 and 1250. The lower end of the speed range is used primarily for cutting diesel blocks and heads since they are usually harder. The upper end of the speed range is used primarily for automotive blocks and heads. The optimum RPM for automotive work is about 950 RPM. This will give tool life resulting in insert cost per head of 5 to 15 cents. If a higher RPM is used tool life will be reduced, increasing tool cost per head to between 30 and 50 cents.

CBN can be used for cutting aluminum and usually is when you are cutting a few aluminum heads among a lot of cast iron heads. When the quantity of aluminum heads is higher it is more economical to change to an insert designed for aluminum. When cutting aluminum with CBN use some type of lubricant (WD40, PAM, or any type of oil) otherwise the aluminum will build up on the edge of the insert, The

tool life of a CBN insert is no greater than a coated carbide insert when machining aluminum so it is much less expensive to use coated carbide when machining quantities of aluminum.

CBN does not cut cylinder heads with pre-combustion chambers. CBN can be used to cut heads with exposed hard seats such as some Cummins heads but a slower RPM should be used and tool life will be reduced. Some shops dress the seats down with a seat and guide machine before surfacing.

CBN can be used to cut soft weld material. If you have a variable speed machine set the RPM between 500 and 800.

#### **COATED CARBIDE:**

Rottler Manufacturing has developed a special round high positive rake insert for cutting aluminum. In applications where a high percentage of the work is aluminum this insert will surface heads, more economically, with smoother finishes, without oil, and it is designed for chip removal. Considering the price of the insert and tool life the coated carbide insert is roughly 1/10 the cost of CBN. When cutting aluminum the spindle RPM can be run at it's maximum speed. Coated carbide can be used to cut cast iron but the RPM must be reduced to between 500 and 1000.

**ONE 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 tool holder. This creates 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 approx. .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 Rottler recommends misaligning them between .0003 and .0015. With the inserts misaligned you will get the same finish for a set RPM and feed rate that you would using on insert. The benefit on using two inserts is for stock removal. Since the one misaligned 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 data below assumes you are using a 3/8" diameter insert, either CBN or Coated Carbide.

	1 INSERT	2 INSERTS .0003-.0015	2 INSERTS .0001
RPM 1000 FR 2"/min.	12 rms	12 rms	10 rms
RPM 1000 FR 5"/min.	20 rms	20 rms	15 rms
RPM 1000 FR 10"/min.	30 rms	30 rms	25 rms
RPM 1000 FR 20"/min.	60 rms	60 rms	40 rms
RPM 1000 FR 30"/min.	90 rms	90 rms	60 rms

The above figures are to be used as a general guide line. Actual results may vary.



## LUBRICATION

Refer to illustrations on pages 4.2, 4.3 and 4.4

### BALLSCREW NUT

The ballscrew nut is located under the rear cover.

Every 175 hours, Grease the ball screw nut using **F2 Multi-purpose Grease**, or **Unoba F1 Grease**, or equivalent. 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 **Kerosene**. And occasionally a **light weight** oil applied to prevent excessive dryness.

### INNER SPINDLE

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

Every 40 hours, Add 2 or 3 drops of oil, **Union oil 315 klondyke oil**, or any **SAE #10 oil (non detergent motor oil)**  
Every 175 hours, Add one shot of, **Union oil - Unoba F1 or F2 lube**, **Lubriplate #930 AAA**, **Mobil oil - Mobilith A.W. grades 1 or 2**, **Chevron Durolith EP1 or EP2**, or any equivalent lithium barium grease. Run the spindle down near the lower limit and you will see a grease fitting located in the keyway. Add lubrication here. If the inner spindle is removed clean the lower bearing and repack it with grease.

### VERTICAL ADJUSTMENT NUT

This nut is what makes the spindle travel up and down when the handwheel is turned.

Every 40 hours, Add 3 squirts of **spindle oil** to the oil cap located as shown on the illustration.

### LUBRICATION MANUAL HEAD FIXTURE 7119F

Every 40 hours, Apply **multi-purpose grease** to the grease fittings.

Every 40 hours, Apply **multi-purpose grease** to the sliding surfaces.

### LUBRICATION 2-AXIS UNIVERSAL MACHINE TABLE 7119Q

Every 175 hours, Add 2 or 3 shots of grease to the grease fittings shown.

Every 40 hours, clean and apply grease to the bearing surfaces of the journals.

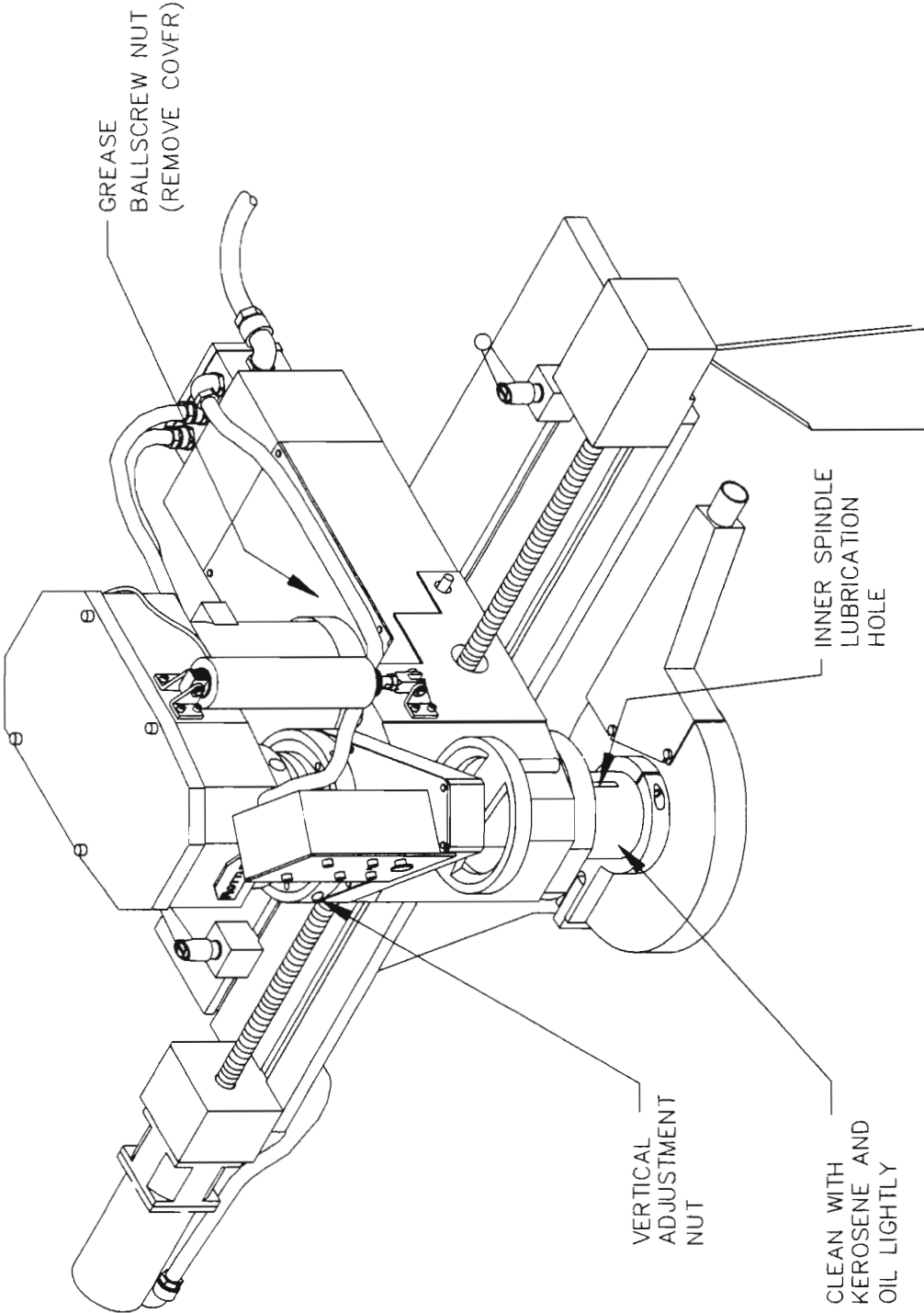
Every 1,000 hours, Disassemble clean and grease the spherical washer.

Use **F2 Multi-purpose Grease**, **Chevron Durolith**, or equivalent.

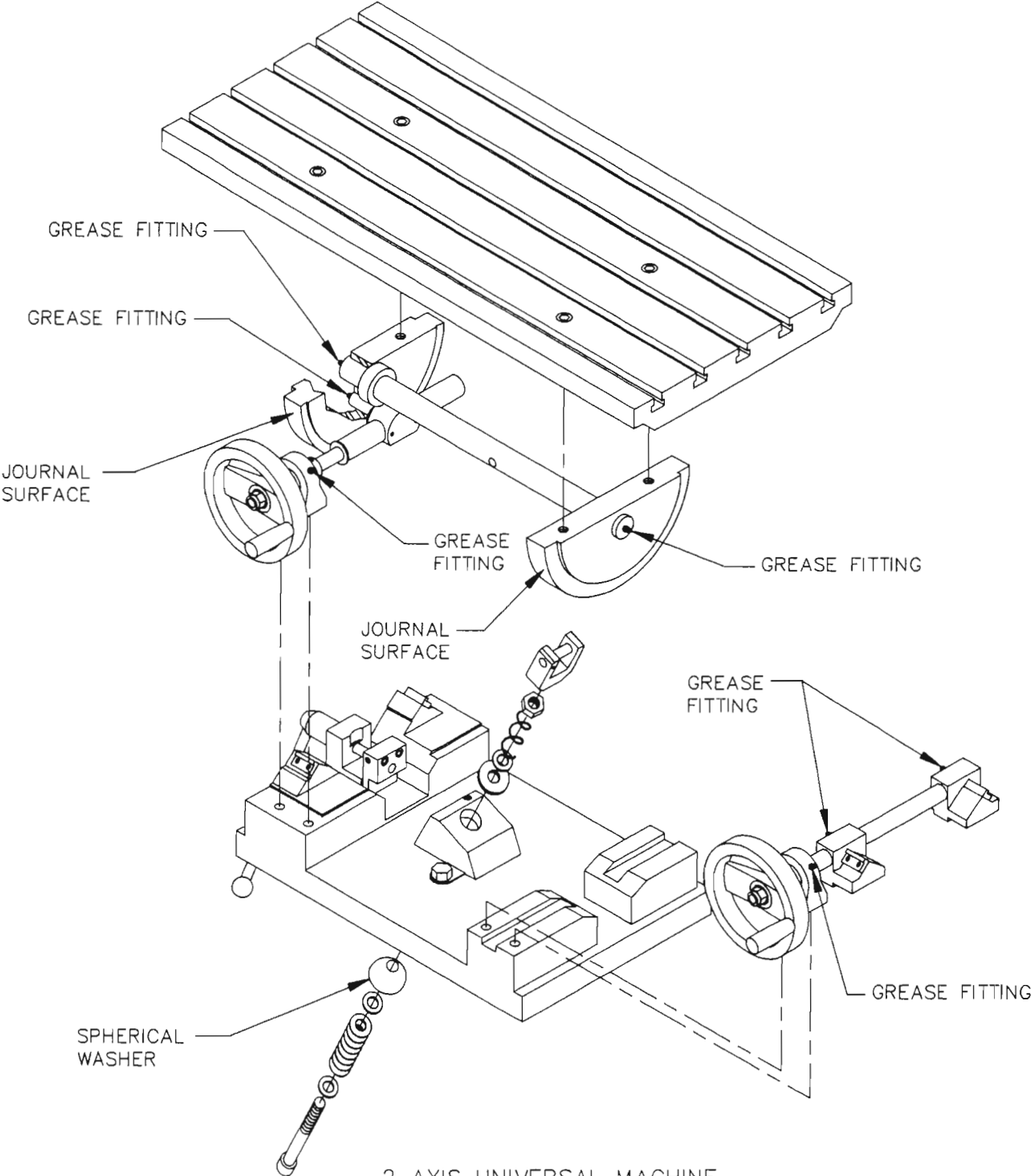
### Cleaning the Way Surface

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 the areas the way material 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.

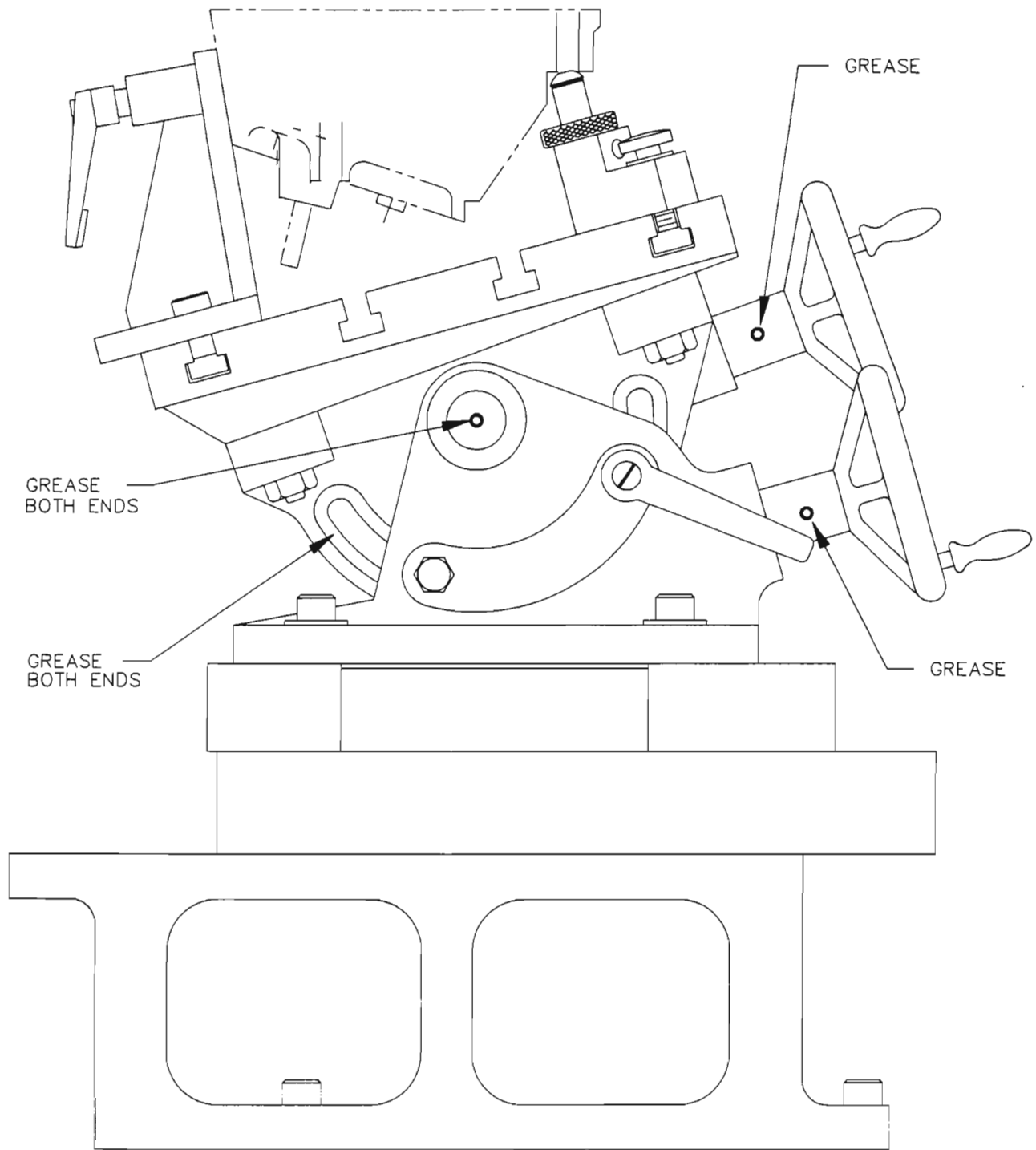
REFSF006-100292



SF-OO LUBRICATION



2 AXIS UNIVERSAL MACHINE  
TABLE 7119Q LUBRICATION



MANUAL HEAD FIXTURE LUBRICATION 7119F

## SETTING THE CUTTING TOOL INSERTS

Place the UP/ADJUST/MILL toggle switch into mill mode.

Switch to left travel and run the spindle base 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.

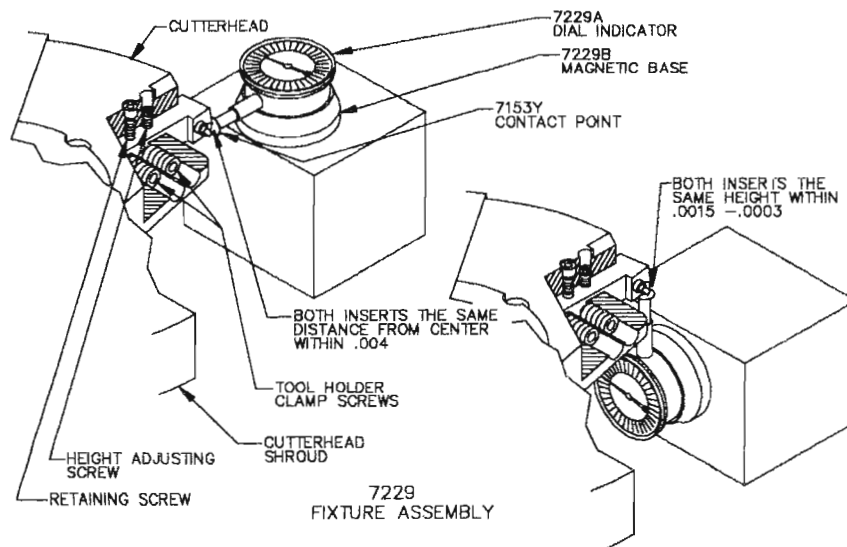
Rotate cutter head and check to see that both inserts are the same distance from the center of the spindle, within .004. If adjustment is necessary loosen the two tool holder clamp screws, and the up adjustment screw. Move tool holder in or out required distance. Retighten all screws and recheck both inserts.

Rotate cutter head and check to see that both inserts are

the same height within .0015-.0003. If adjustment is necessary loosen the two tool holder clamp screws then alternately loosen and tighten the up and down adjusting screws. Retighten all screws and recheck both inserts.

### Production Cutting Aluminum & Cast Iron

For faster tooling set up, this machine can be set up with one cast iron cutting tool bit and one aluminum cutting tool bit. The set up is very simple. Set the cast iron style toolholder with no down or out adjustment. Set the aluminum style toolholder .02 farther out and .005 lower than the cast iron style toolholder. With the cutter head set up this way, aluminum work can be easily cut. To cut cast iron simply remove the cutting insert from the aluminum style toolholder.



## DIAL INDICATOR SETTING

(See also illustration page 6.15)

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

To reset, switch the UP/ADJUST/MILL toggle switch into adjust mode.

With surfacing cutter in the for and aft position, switch to left travel and move spindle left until the cutter head over laps the cylinder head surface by 1/2" when rotated.

---

**CAUTION:**  
TURN OFF POWER TO THE MACHINE  
WHEN HANDLING CUTTER.

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Touch off cylinder head surface, by turning hand wheel clockwise until cutter insert just touches cylinder head surface when rotated back and forth over this surface.

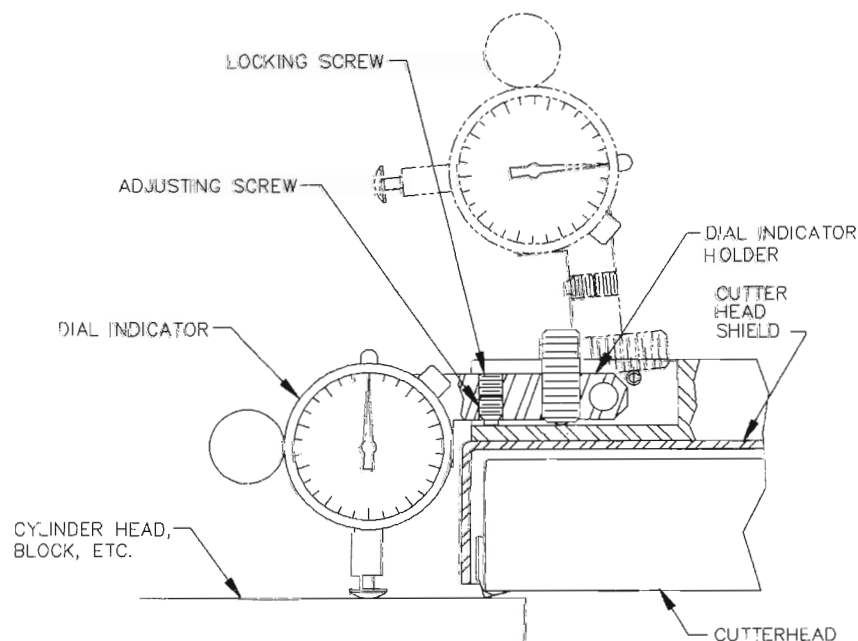
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(NOTE: DO NOT LOWER CUTTER HEAD DIRECTLY ONTO CYLINDER HEAD SURFACE, IT MAY CHIP THE CUTTING TOOL INSERT).

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Press the dial indicator down on the cylinder head surface. Adjust it by: Removing the lock screw. Then turn adjusting screw up or down until the dial indicator is half way between it's minimum and maximum range. Replace the lock screw and tighten firmly.

Set dial to zero.



## VERTICAL TRAVEL CHAIN REMOVAL AND REPLACEMENT

### CAUTION :

All power to this machine must be disconnected before continuing.

(See illustration page 6.6)

Remove the two screws securing the control panel, lay the panel and the enclosure aside.

Remove four screws from the chain cover, and lift it off.

Remove half round cover by removing its three screws.

Loosen the locknut, and the two bolts, on the adjusting block. Move the sprocket all the way in by turning the adjusting bolt.

Locate a master link in the chain and remove it. Remove the chain. Slide the new chain thru the opening around the large sprocket and reconnect

the master link.

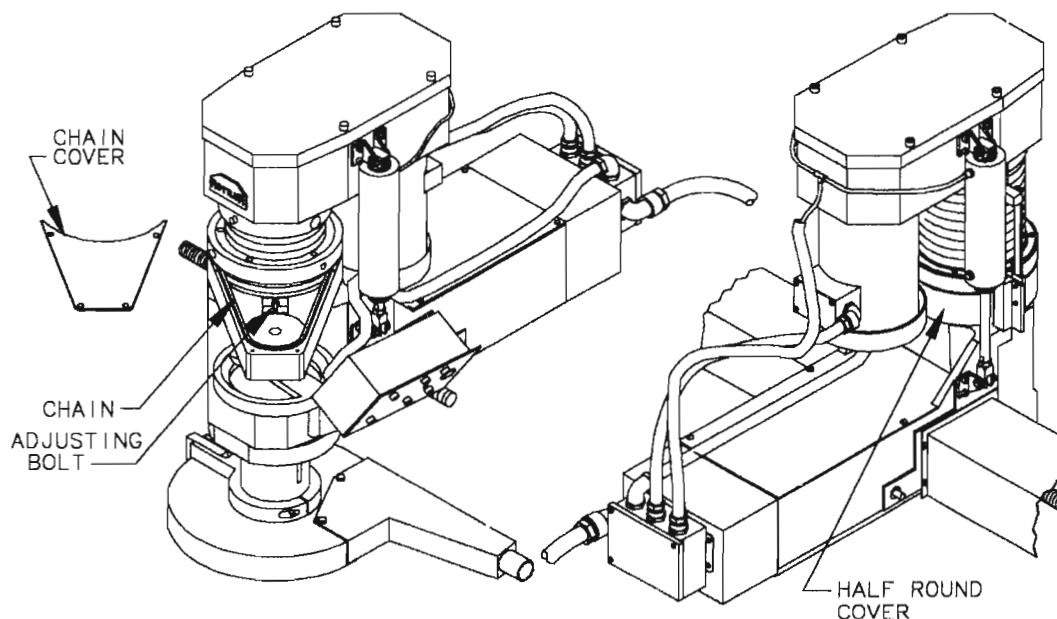
Place the chain over both sprockets, and take up the slack by turning the adjusting bolt. The chain should have approximately 1/4 inch play measured midway between the sprockets.

### CAUTION :

Do not Over tighten the chain, or the vertical spindle positioning system could fail.

Lock the adjusting bolt with the locknut. Tighten the two bolts in the adjusting block.

Replace both covers, and place the control panel back in position and tighten it's mounting bolts.



## DRIVE BELT REPLACEMENT

### CAUTION:

Turn off all power to surfacing machine before replacing belt.

(See also illustration  
page 6.5)

Remove the four screws holding the upper cover. Lift cover off.

Loosen the four motor mount screws.

Loosen the belt tension screw.

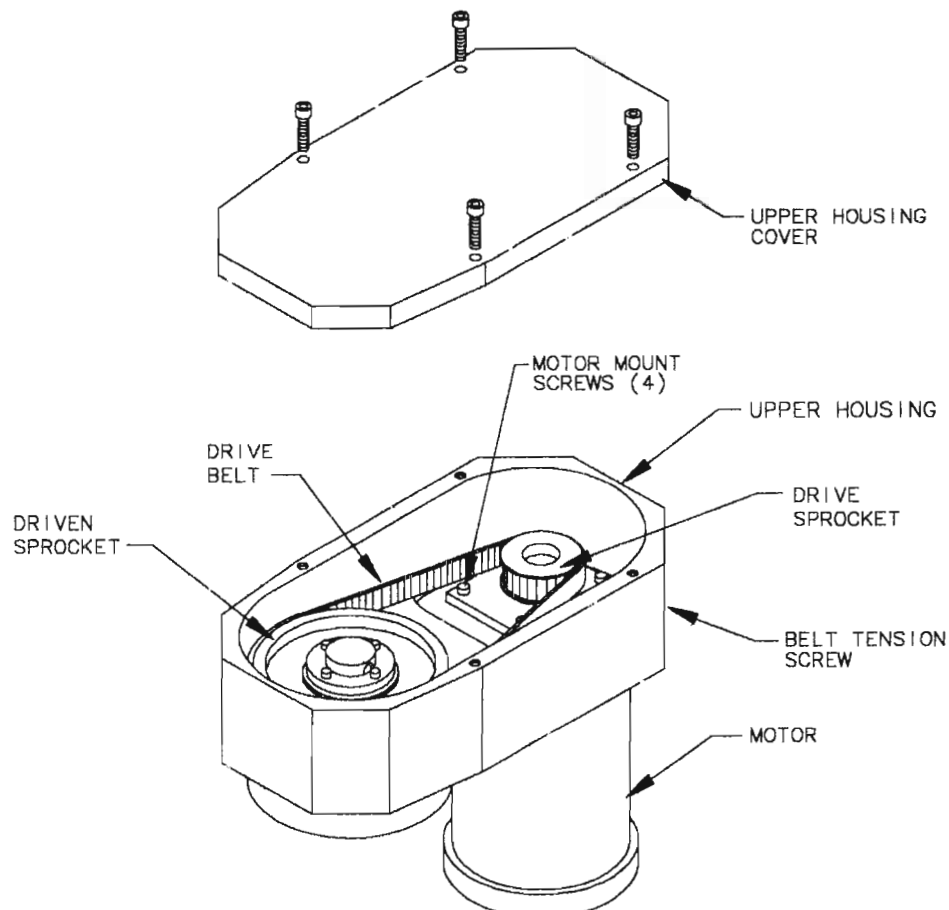
Lift the belt off.

Replace with new belt (7014K).

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.





## DRIVE SPROCKET/MOTOR REMOVE AND REPLACE

### CAUTION:

All power to this machine must be disconnected before continuing.

#### REMOVAL OF DRIVE SPROCKET (SMALL SPROCKET)

Remove the upper housing cover, and drive belt, (as explained on page 4.8).

Remove two set screws, located on the bottom of the sprocket hub.

Lift the drive sprocket off the motor shaft.

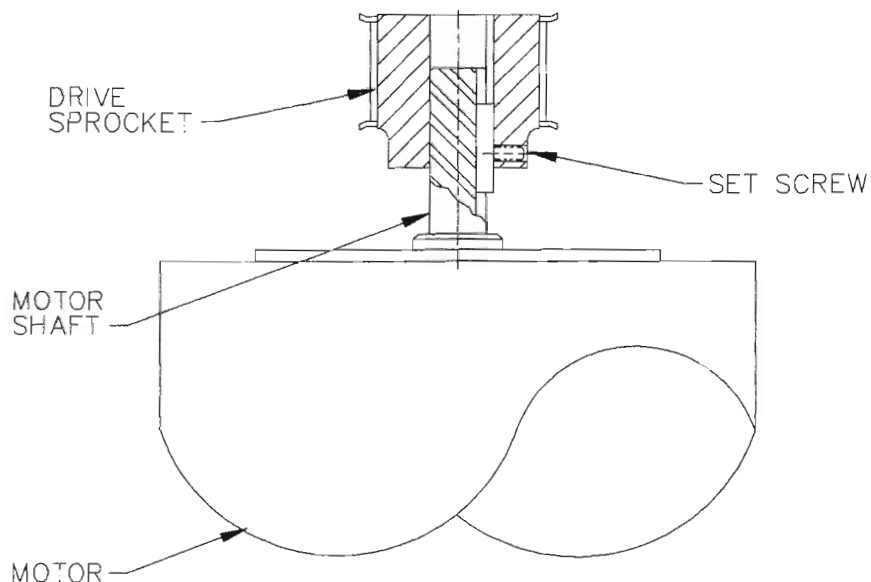
#### REPLACEMENT OF DRIVE SPROCKET (SMALL SPROCKET)

Clean motor shaft, and sprocket.

Locate sprocket on the motor shaft so it is at the same height as the driven sprocket.

Replace the drive belt, and adjust, as indicated in drive belt replacement.

Replace upper housing cover and tighten the four screws.



## DRIVEN SPROCKET REMOVE AND REPLACE

### CAUTION:

All power to this machine must be disconnected.

#### REMOVAL OF DRIVEN SPROCKET (LARGE SPROCKET)

Remove the upper housing cover, and drive belt, (as explained on page 4.8).

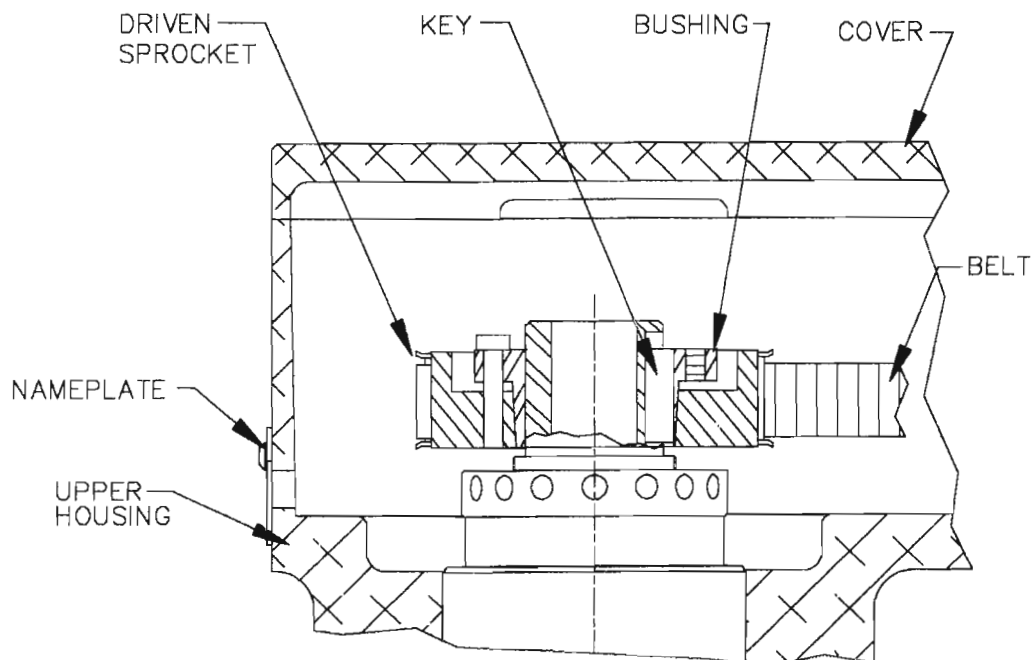
Remove the three 1/4-20 screws located on top of the sprocket bushing. Insert these bolts into the threaded holes in the top of the bushing. Turn these screws in evenly to force the bushing and sprocket apart.

Remove driven sprocket, the bushing, and the key.

#### REPLACEMENT OF DRIVEN SPROCKET (LARGE SPROCKET)

Clean bushing, and sprocket. Do not use any lubrication on bushing, sprocket, or screws.

Align the driven sprocket so that the bottom edge is slightly lower than the drive sprocket. Tighten the four 1/4-20 screws, located on top of the driven sprocket bushing, EVENLY to 9 to 10 ft. lbs. Check to see that it does not wobble.



## CUTTERHEAD AND CHIPGUARD REMOVAL

### CAUTION:

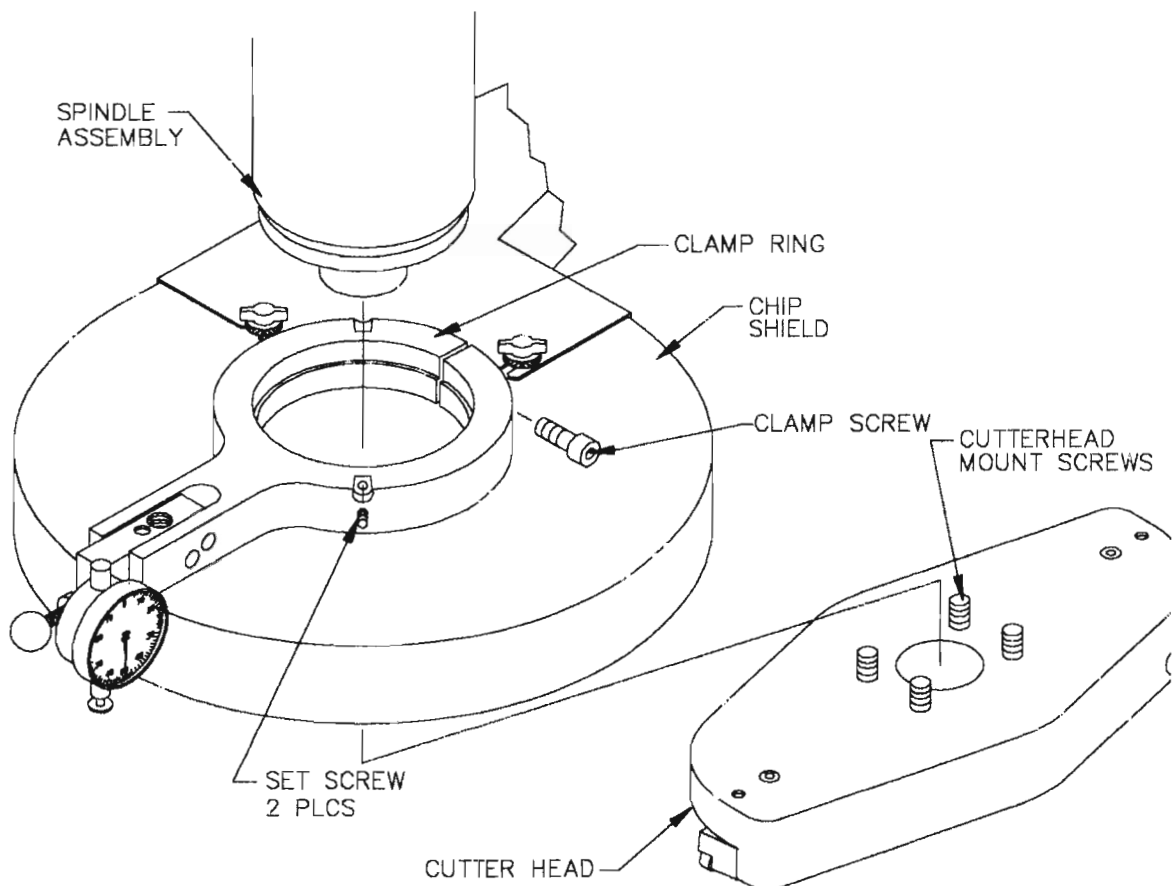
Disconnect power to surfacing machine before handling cutterhead.

Mark cutterhead and spindle so they can be reassembled in the same position.

Remove cutterhead by removing its (4) 3/8-16 screws.

Remove chip guard by removing its (2) 1/4-20 set screws that go into the clamp ring at an angle, and loosen the 3/8-16 capscrew in the split line of clamp ring.

Remove cover.



## INNER SPINDLE REMOVAL

Remove the upper housing cover, and drive belt, (as explained on page 4.8).

Remove the driven sprocket (as explained on page 4.10).

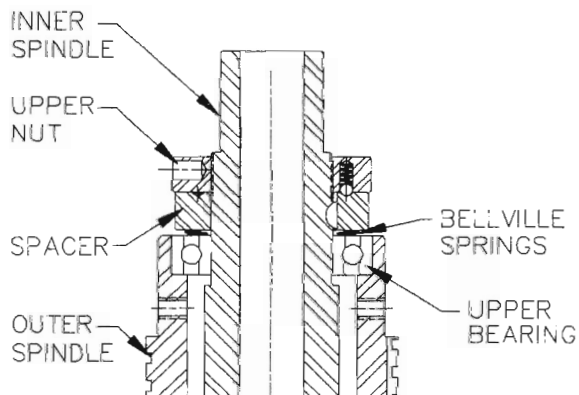
Remove the cutterhead and chip guard (as explained on page 4.11).

Crank spindle up to its full up position.

Remove the Rottler nameplate from the front of the upper gear housing.

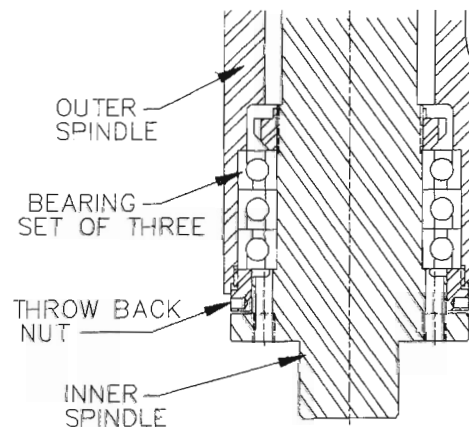
Insert a rod or punch thru this opening and into the upper adjusting nut (7020). Holding the cutterhead, loosen this nut by turning it counter-clockwise. Remove nut, spacer (7019), key (6043), and (2) Belleville springs (7052).

Thread upper adjusting nut (7020) 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 counter-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 unthread 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.

## AIR ADJUSTMENT SF-00 MACHINES

### Up-Relief Air Setting

1. Move control panel toggle switch to adjust position.
2. Adjust, relief up air regulator, to 0 pressure.
3. Move control panel toggle switch to up relief.
4. Adjust relief up regulator pressure until the spindle lifts (Note air pressure reading.)
5. Continue to adjust air pressure up until the vertical handwheel does not turn smoothly. (Note air pressure reading.)
6. Set the regulator half way between these two readings.
7. This pressure should be approximately 45 to 50 P.S.I.

### Adjust Air Setting

1. Move control panel toggle switch to adjust position.
2. Turn adjust air regulator to 0 pressure.
3. Increase regulator pressure until vertical handwheel can be turned clockwise with moderate resistance. (Note air pressure reading.)

4. Continue to adjust air pressure up until the spindle will snap up into a relief position while the vertical handwheel is turned counter-clockwise vigorously. (Note air pressure reading.)

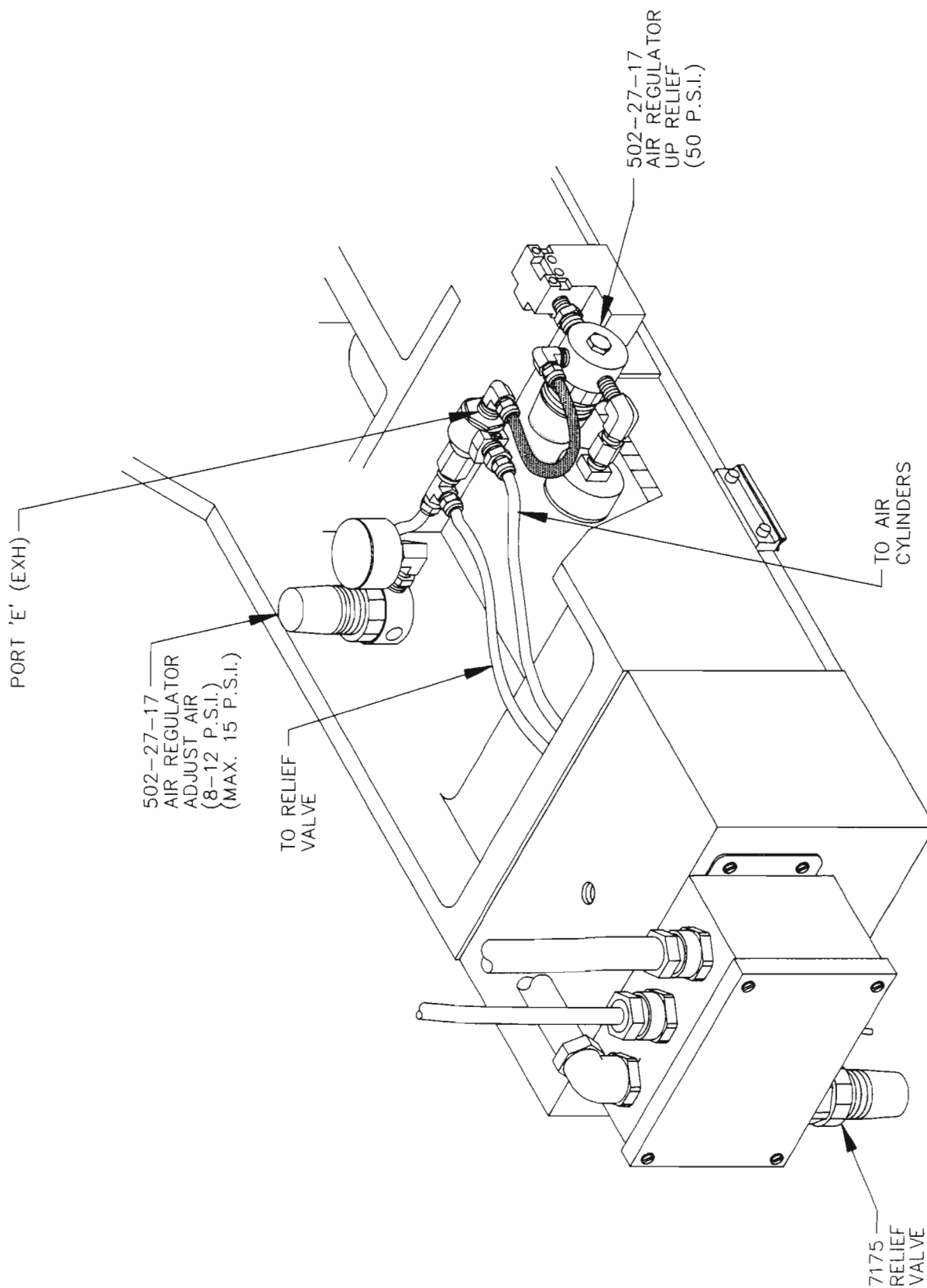
5. Set the regulator half way between these two readings.

6. This pressure should be approximately 8 to 12 P.S.I.

(CAUTION: Max 15 P.S.I.)

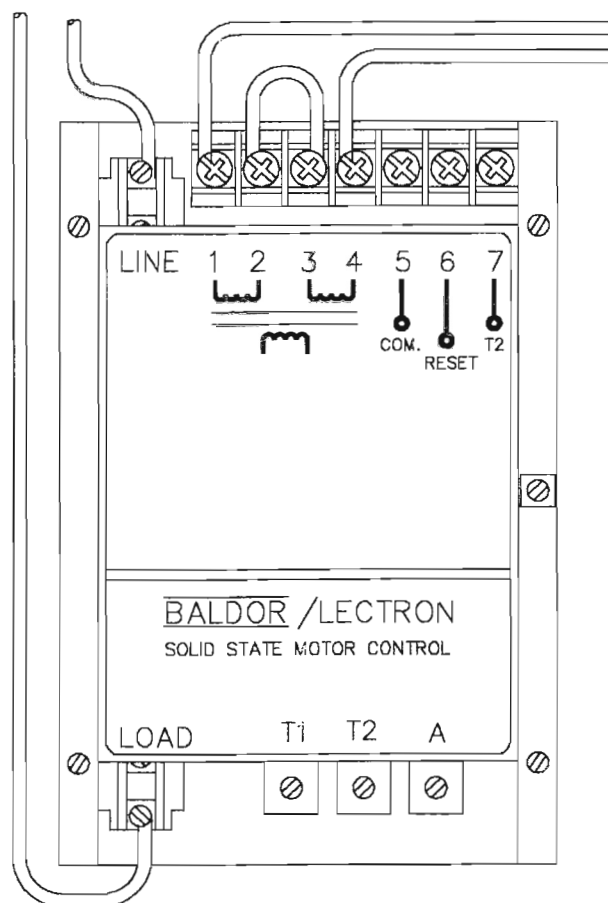
### Relief Valve Setting

1. Note: adjust air setting, procedure must be completed first.
2. Move control panel toggle switch to adjust position.
3. Adjust relief valve clockwise until air is heard escaping. Then turn counter-clockwise until air just barely escapes.
4. While viewing the adjust air regulator gauge, crank the vertical handwheel rapidly counter-clockwise several turns. (Note air pressure reading.) If the setting is correct there should be an increase of 5 to 7 P.S.I.



Adjust the Spindle Motor Initial  
Torque and Ramp Time

1. Turn off the machine.
2. On the Baldor Torque Controller, turn 'T1' and 'T2' completely counter clockwise (min.).
3. Turn 'A' completely clockwise (min.) then turn counter clockwise approximately 1/8 turn.
4. Turn on machine and verify spindle reaches full speed within 1-2 seconds and starter does not trip.



## CUTTER HEAD 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.

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### NOTE:

Turn off all power before continuing.

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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

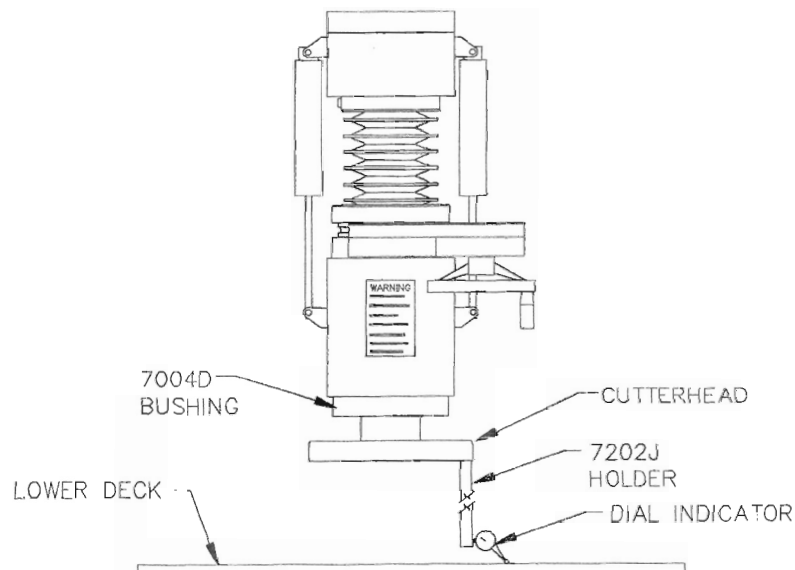
tolerance, it will need to be adjusted. Loosen the six allen head bolts holding the 7004D bushing to the bottom of the spindle base. (see illustration page 6.7). Snug the bolts up very lightly.

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.





## INNER SPINDLE ADJUSTMENT

**WARNING:** Disconnect all power to this 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 it's 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 - 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

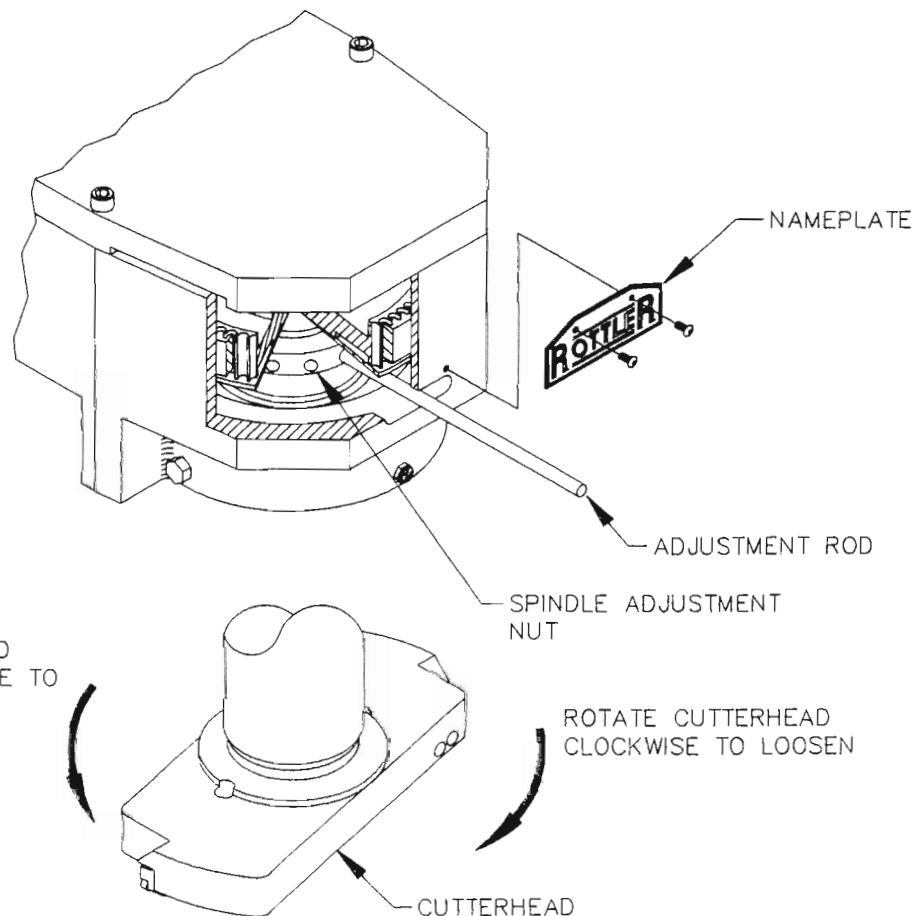
tightens the inner spindle adjustment. The cutterhead will be easy to turn and you should be able to feel the spring loaded detent in the adjustment nut.

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

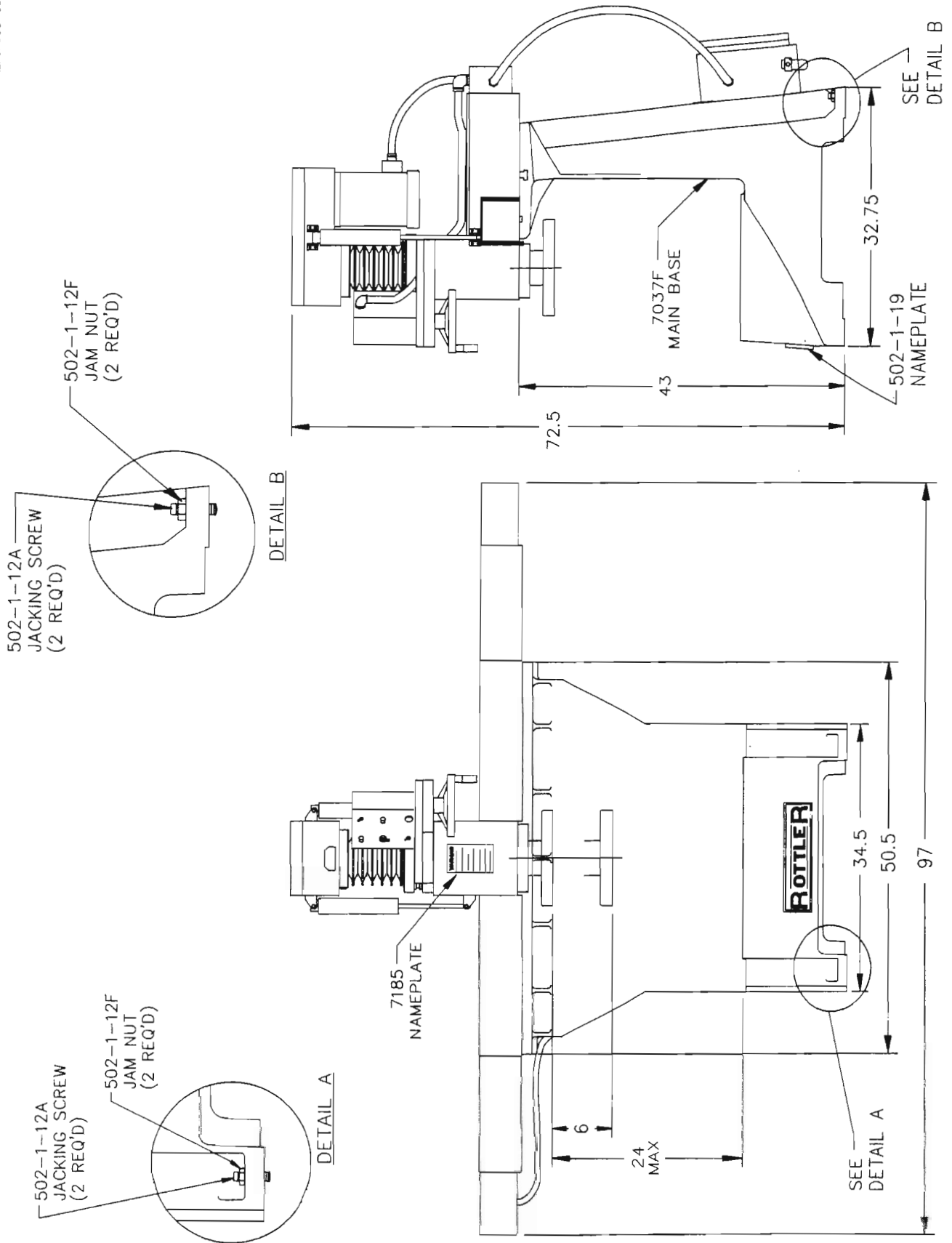
**CAUTION:** Do not overtighten or severe bearing damage will occur.

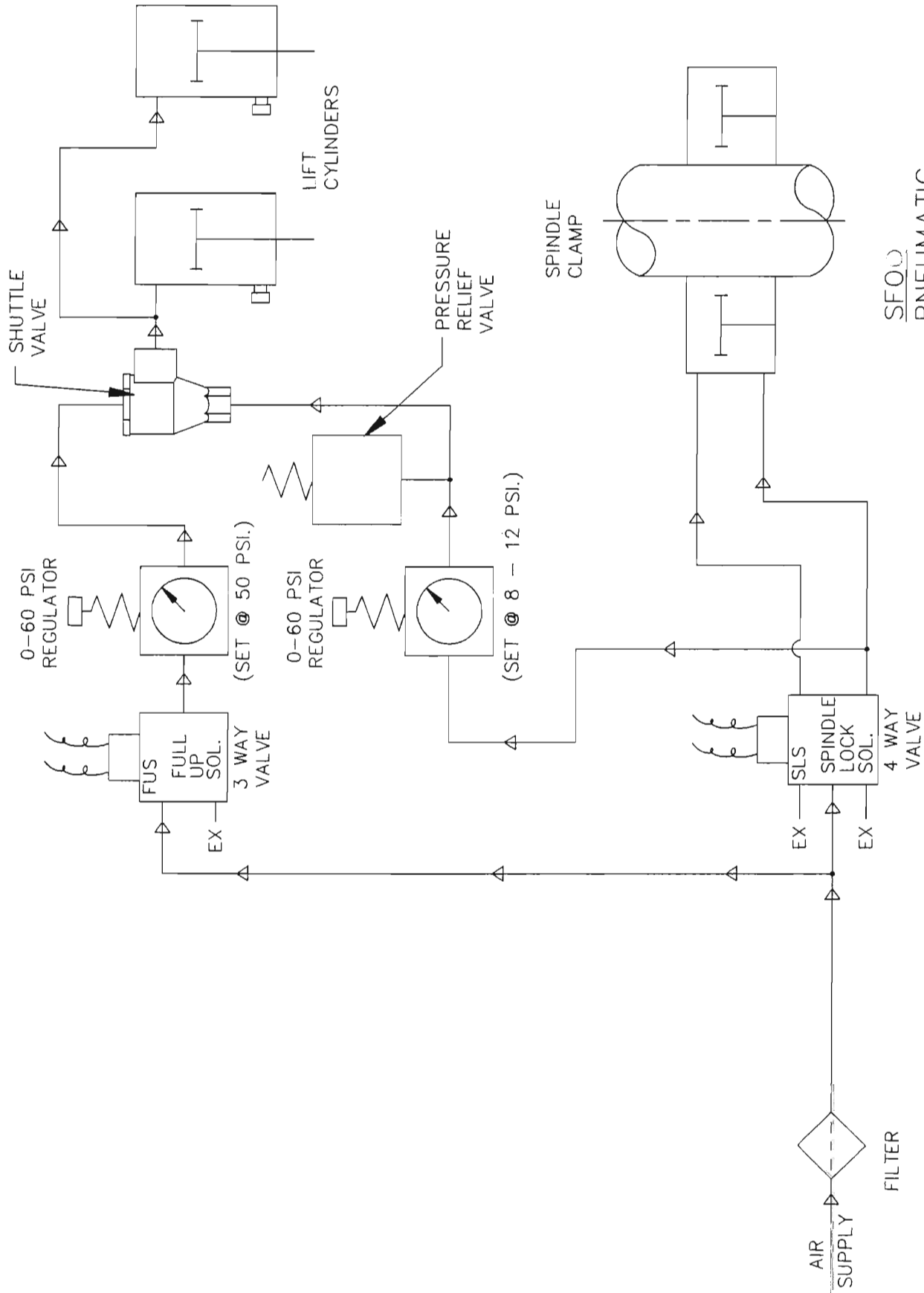
Turn the cutterhead clockwise one or two detents.

Remove the adjustment rod and replace the nameplate.

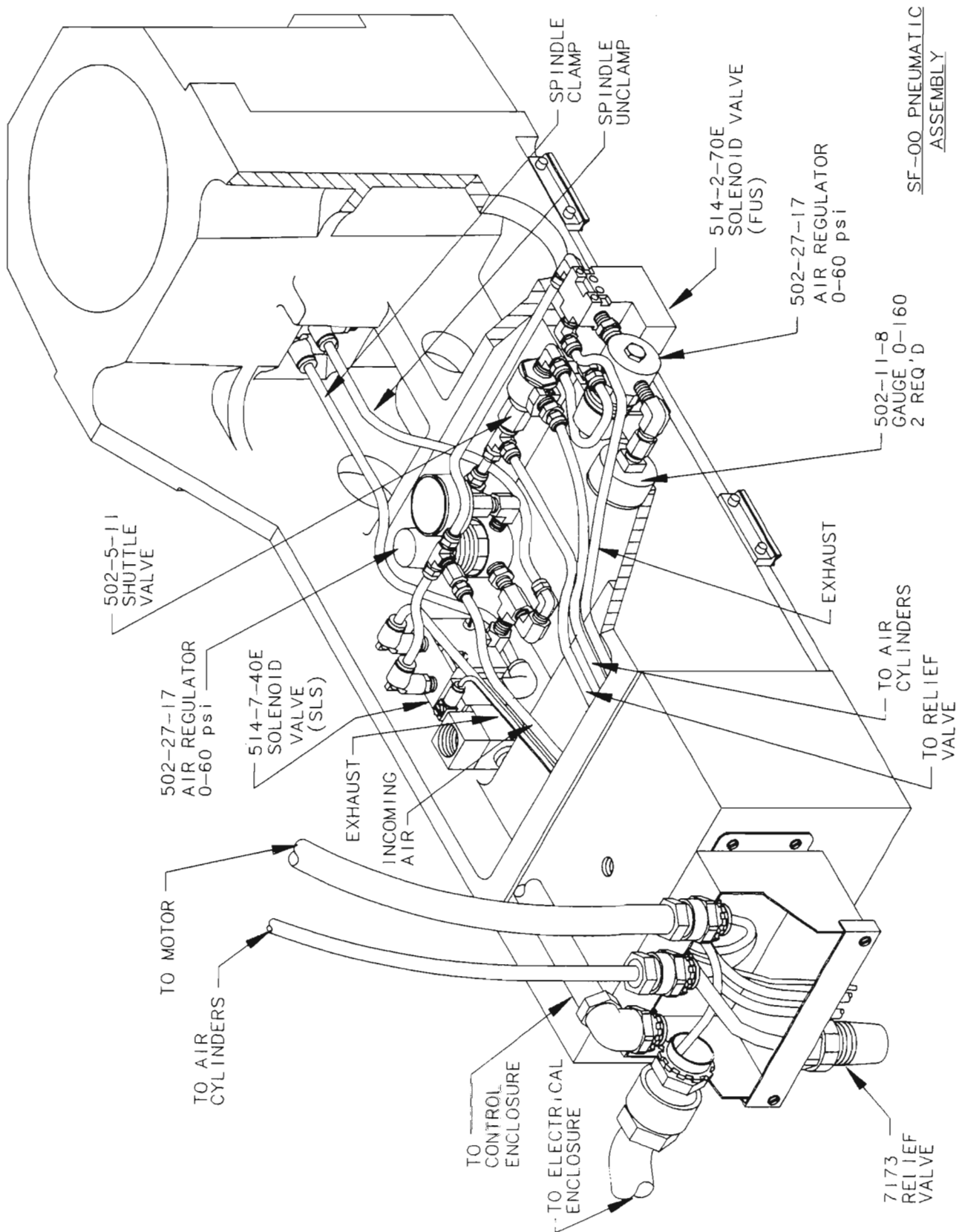


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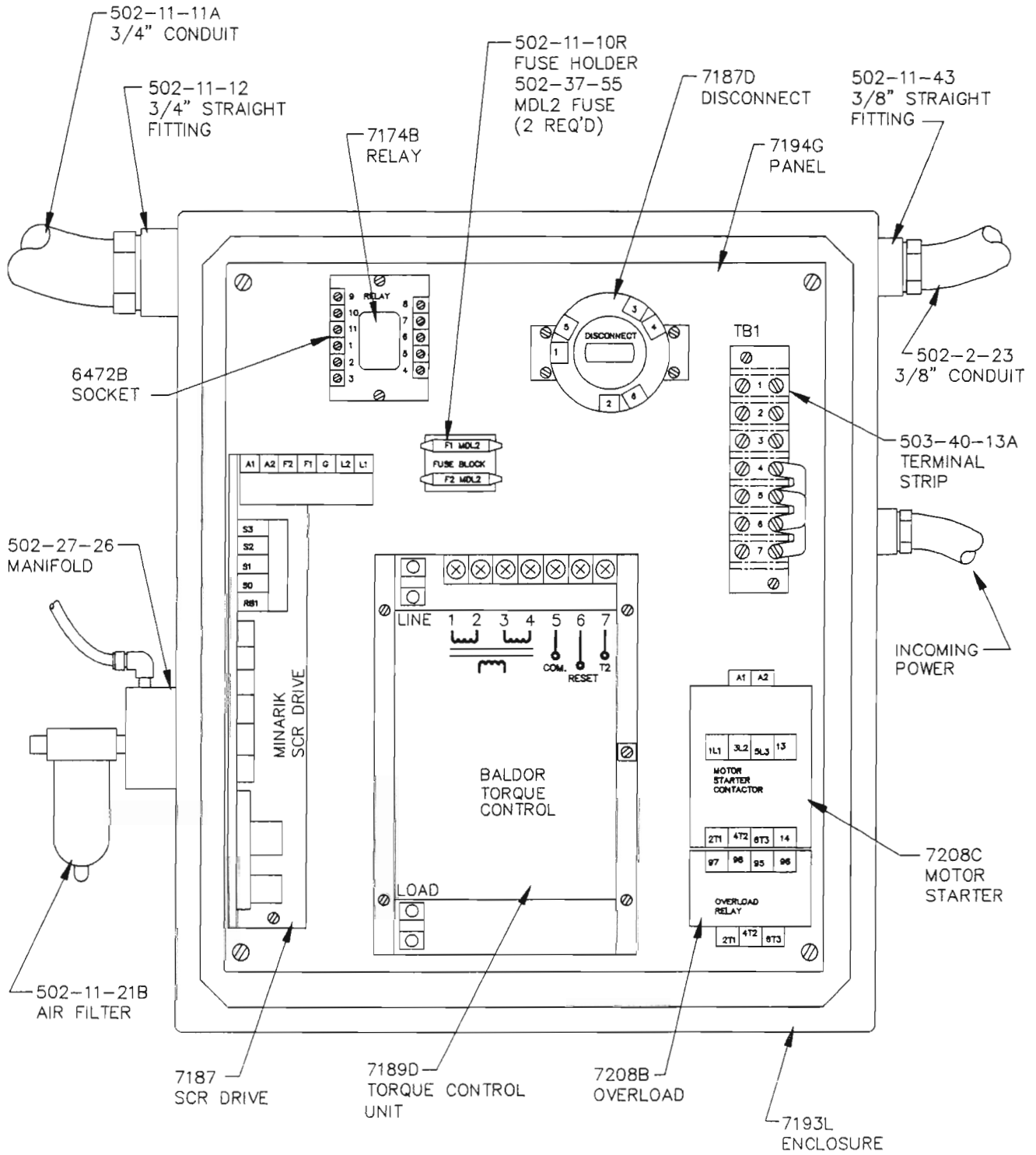


SF00  
PNEUMATIC  
CONTROL DIAGRAM



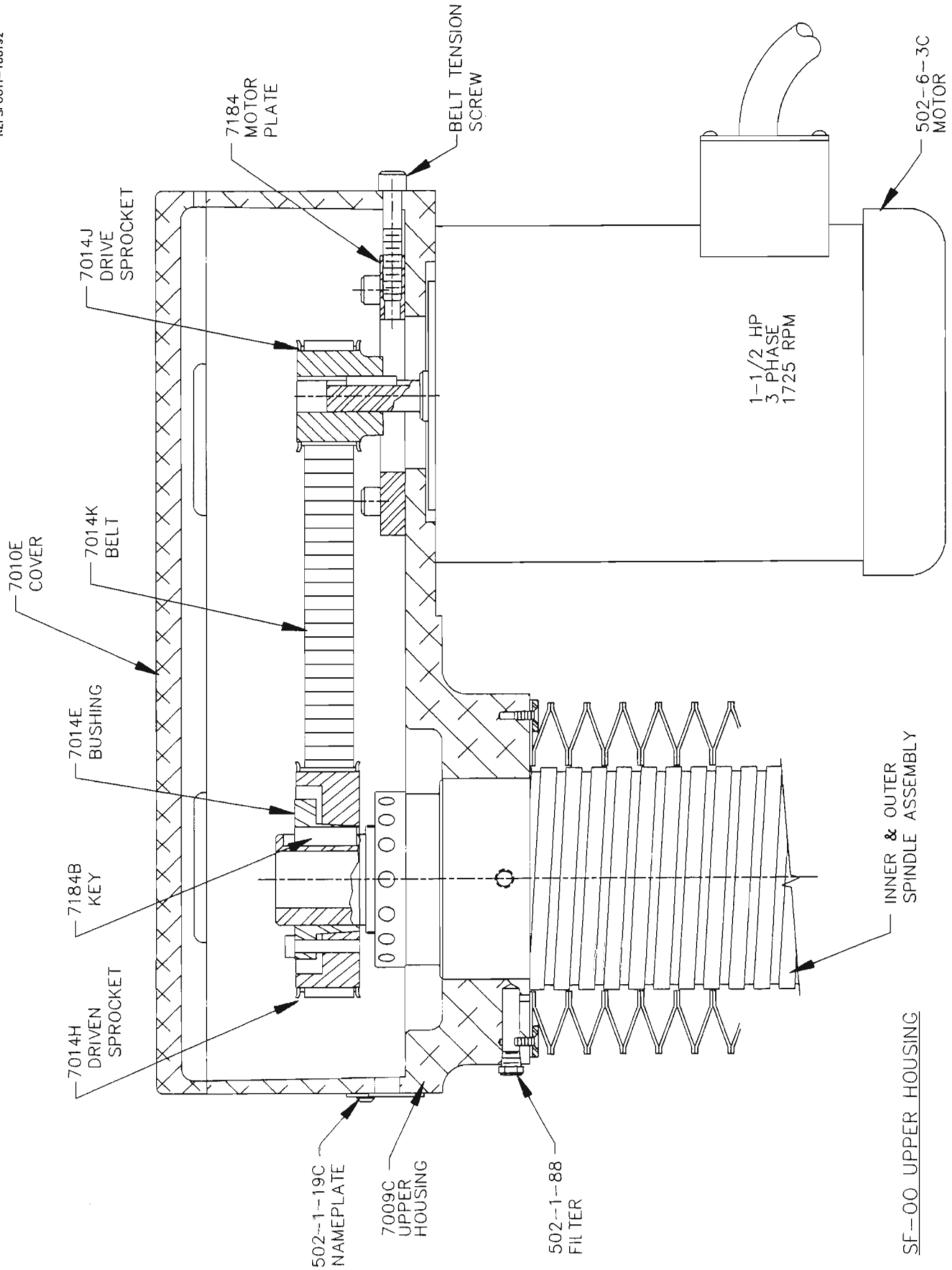
SF-00 PNEUMATIC ASSEMBLY

REFSF0028-082593

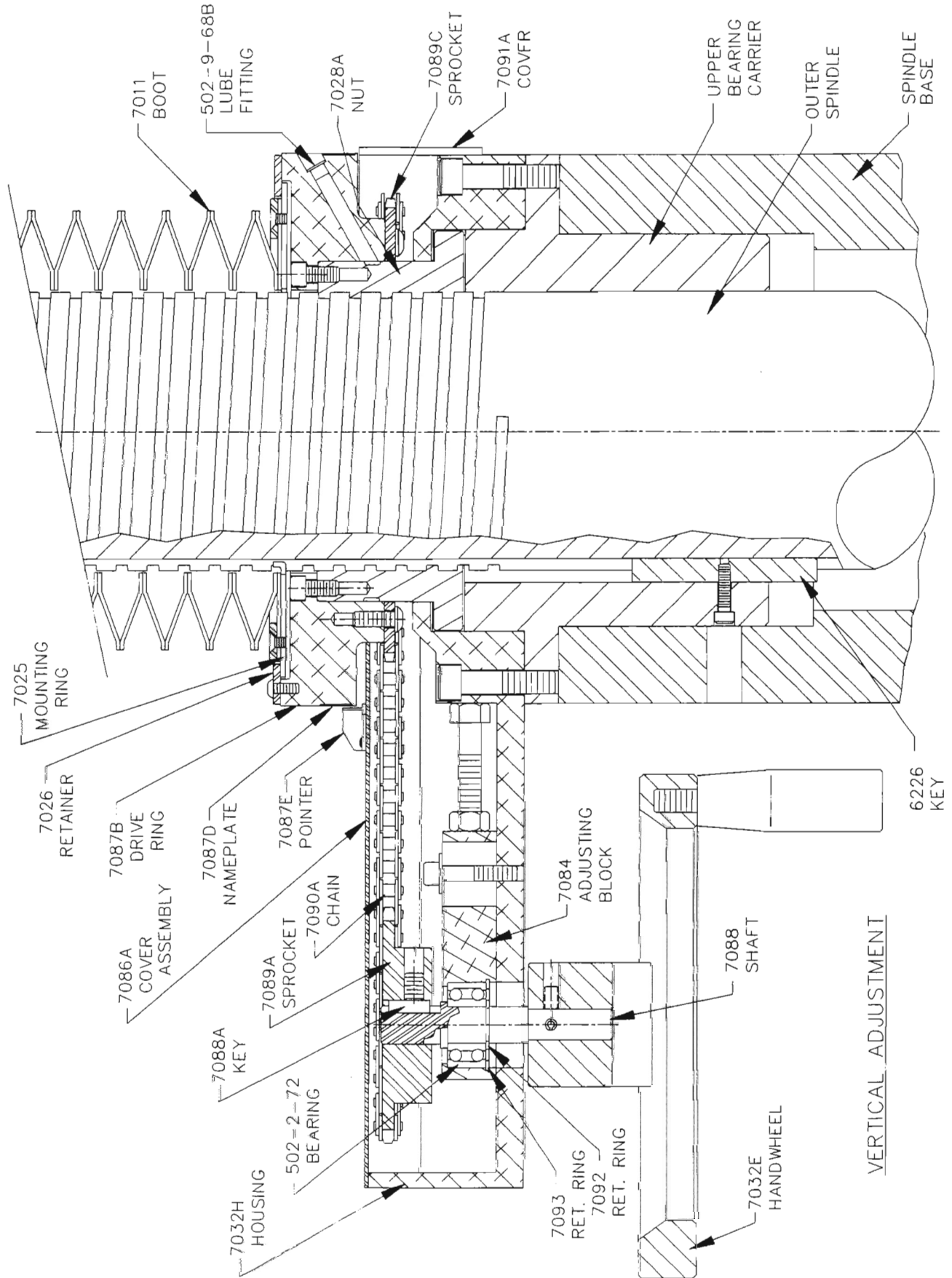


ELECTRICAL ENCLOSURE  
SF-00

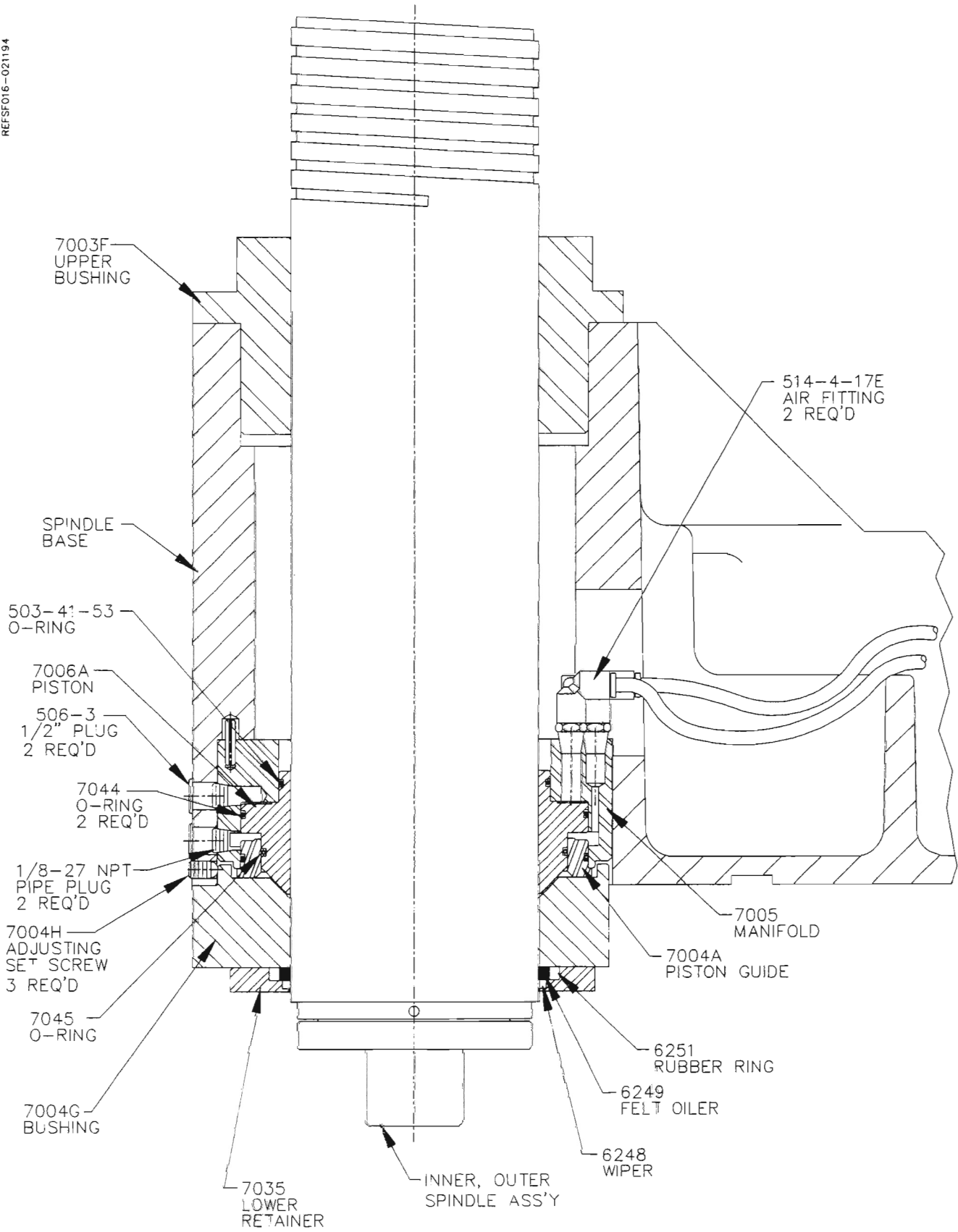
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REFSFO.38--021194

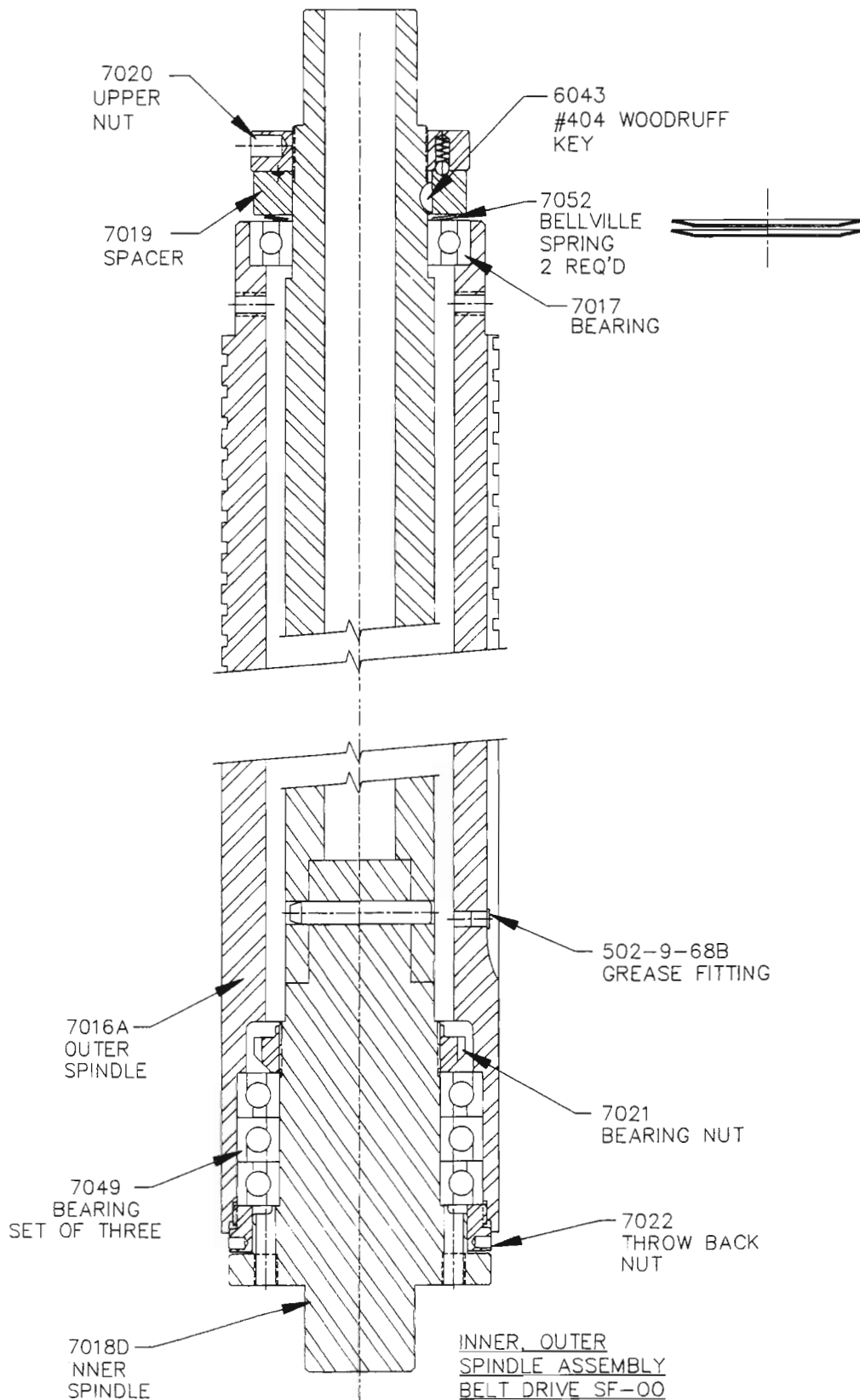


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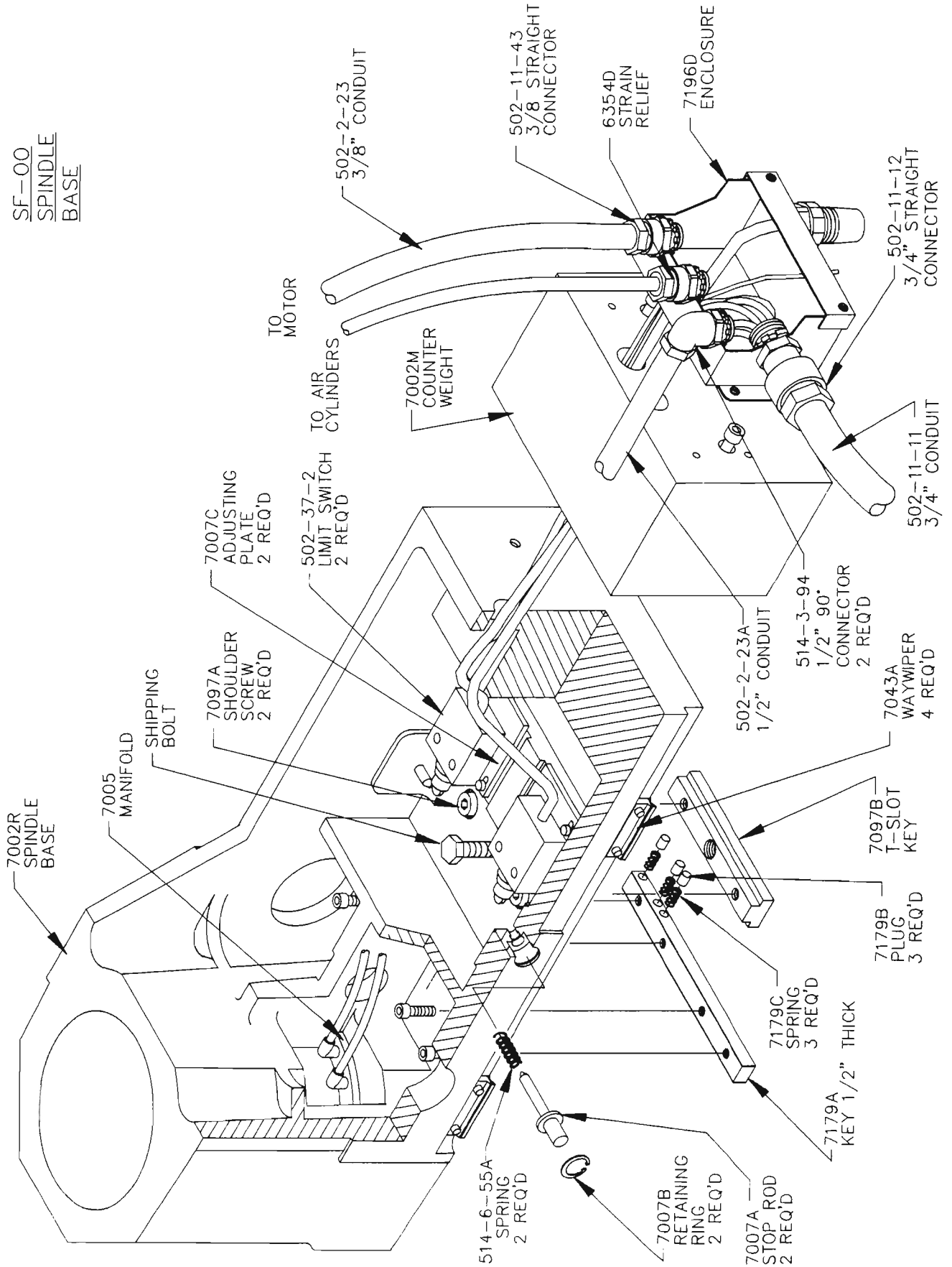




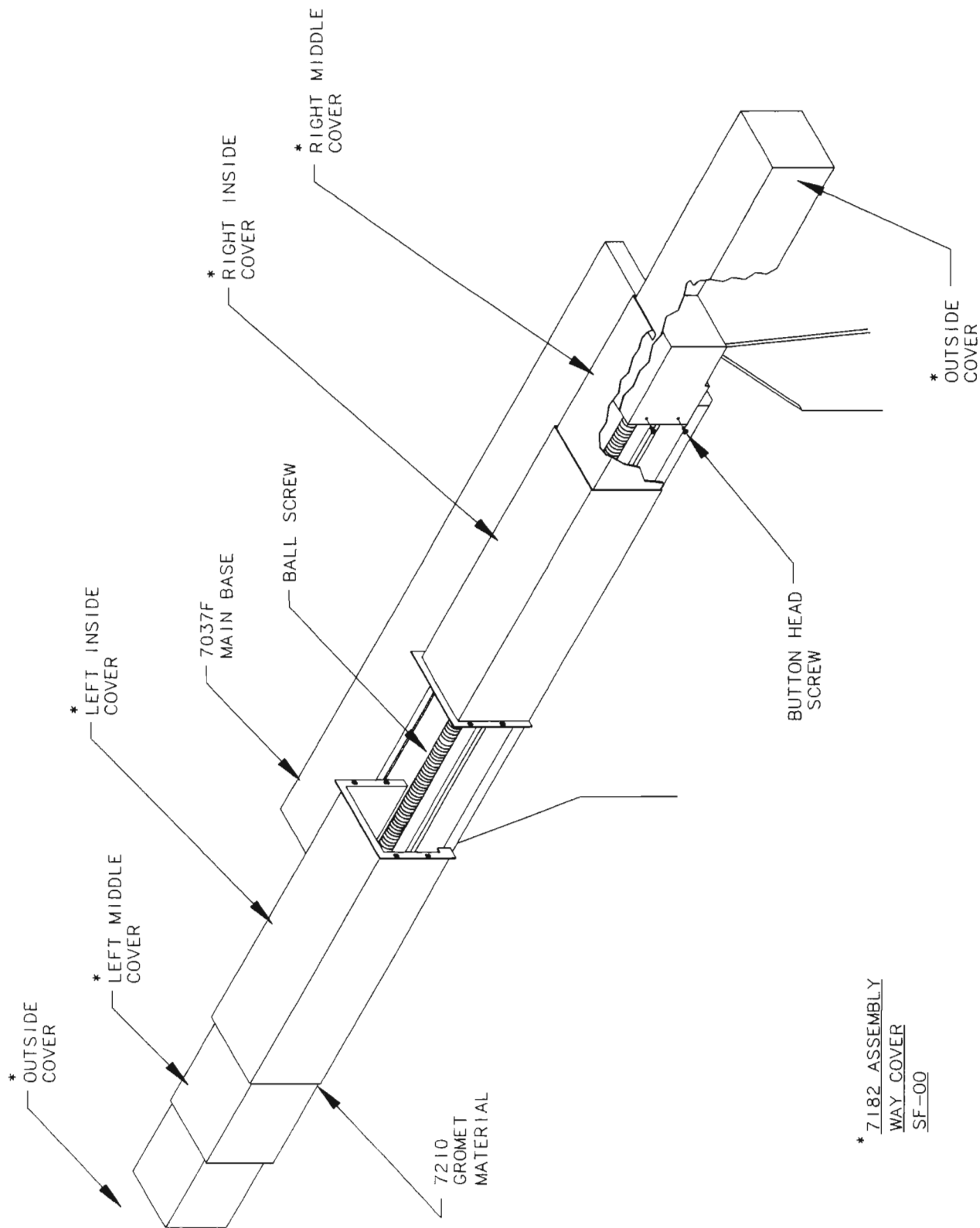
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SF-00  
SPINDLE  
BASE

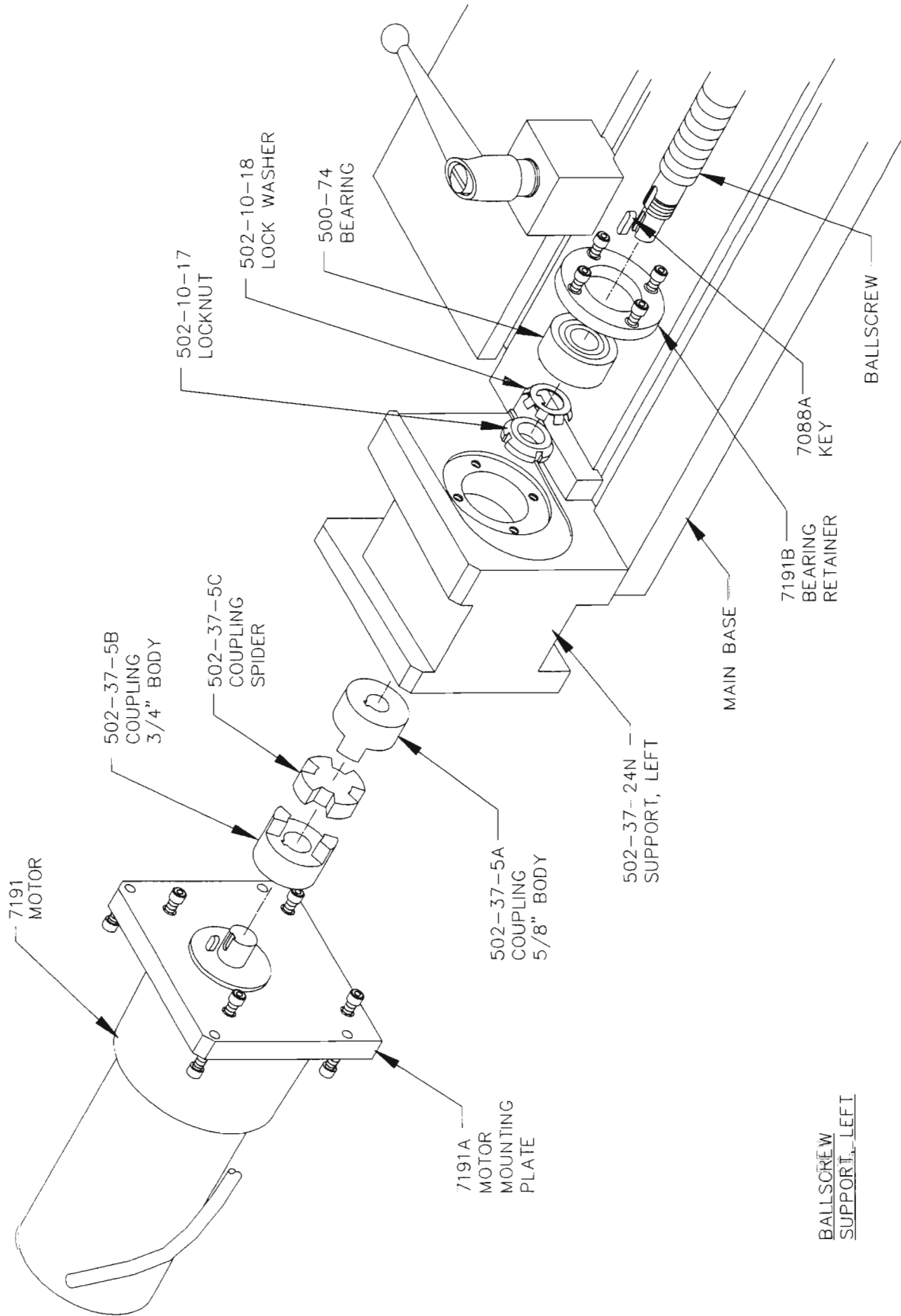


REFSF0016-100592

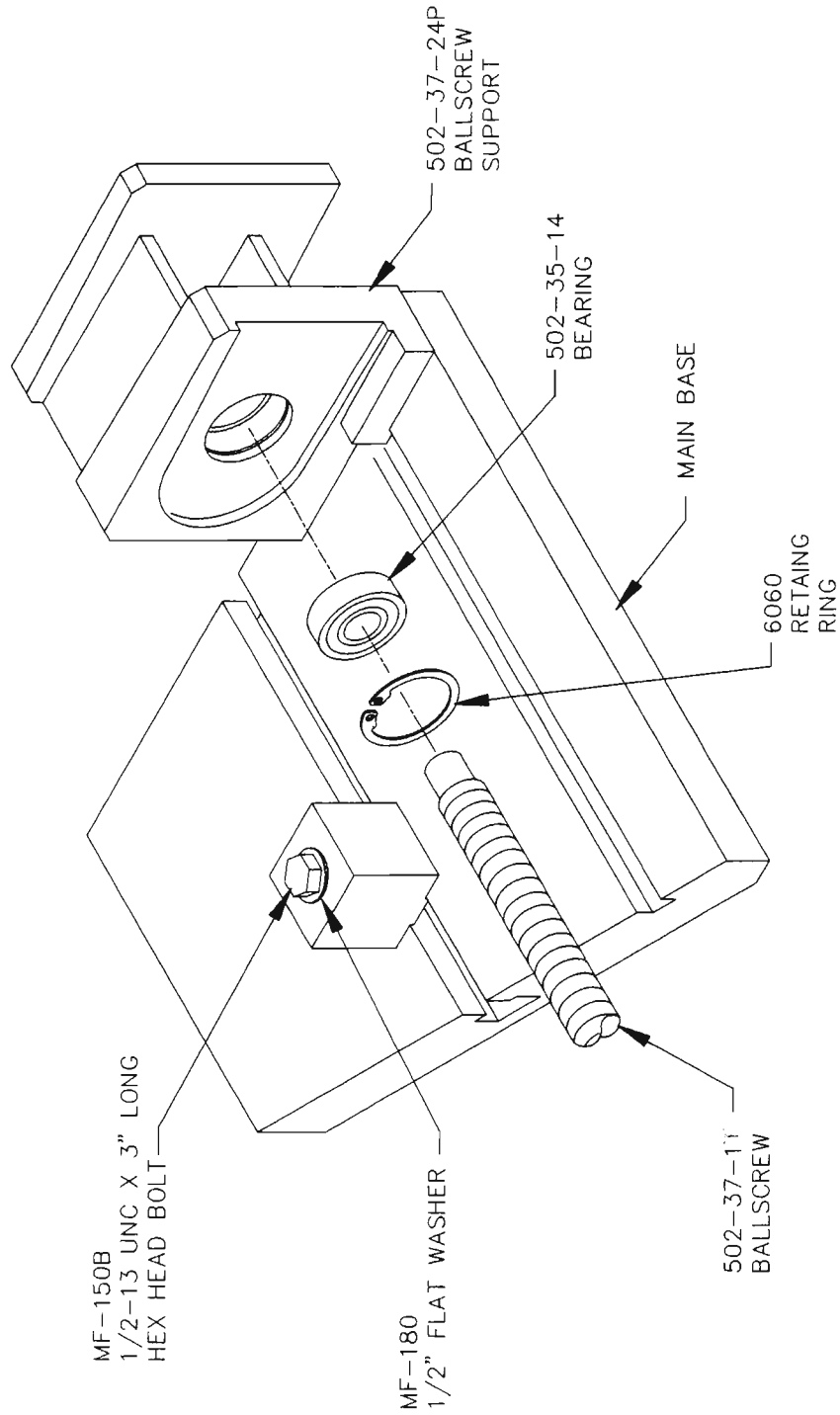


\* 7.182 ASSEMBLY  
WAY COVER  
SF-00

REFSF020-021194

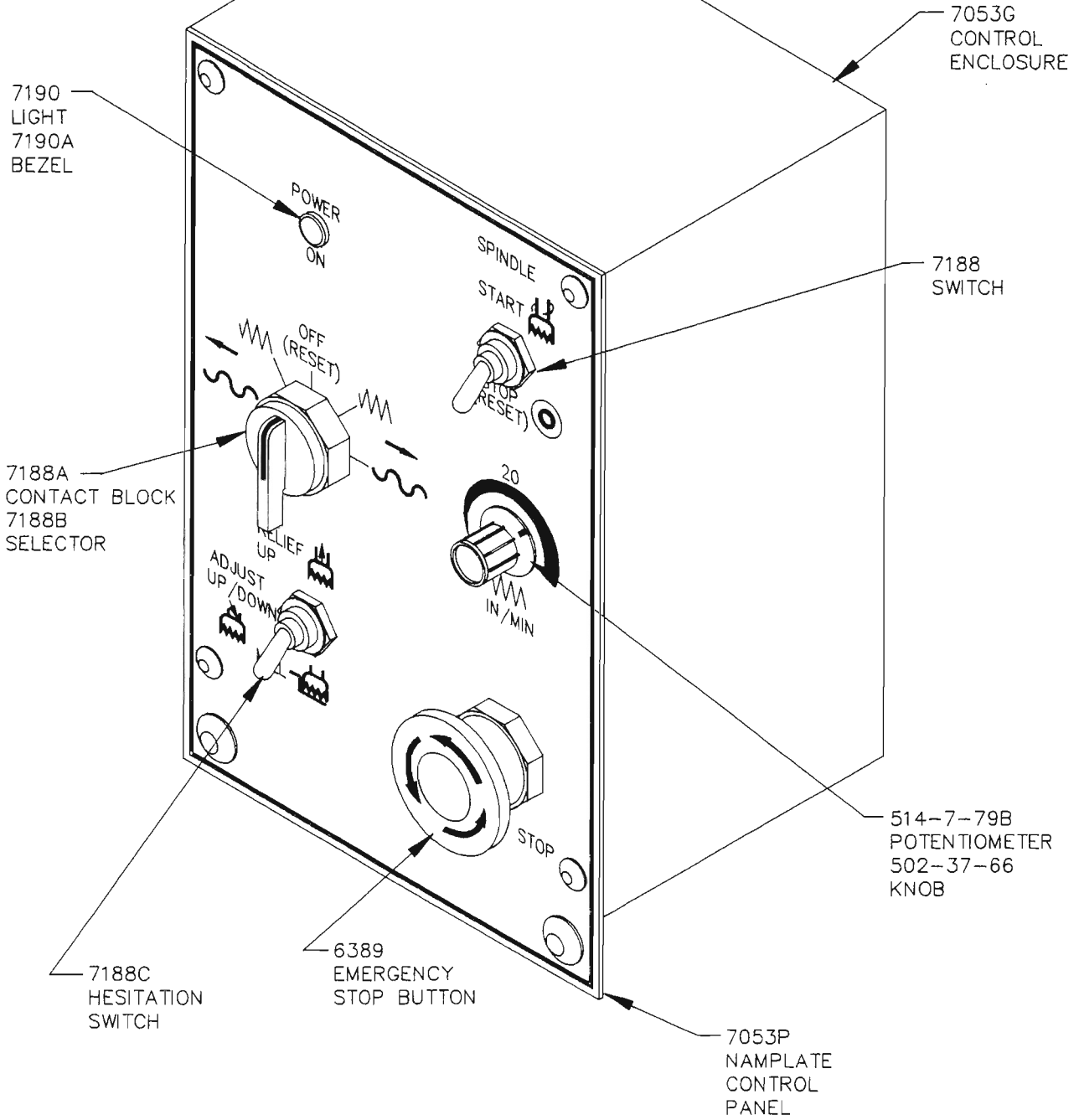


REFSF001B-100592

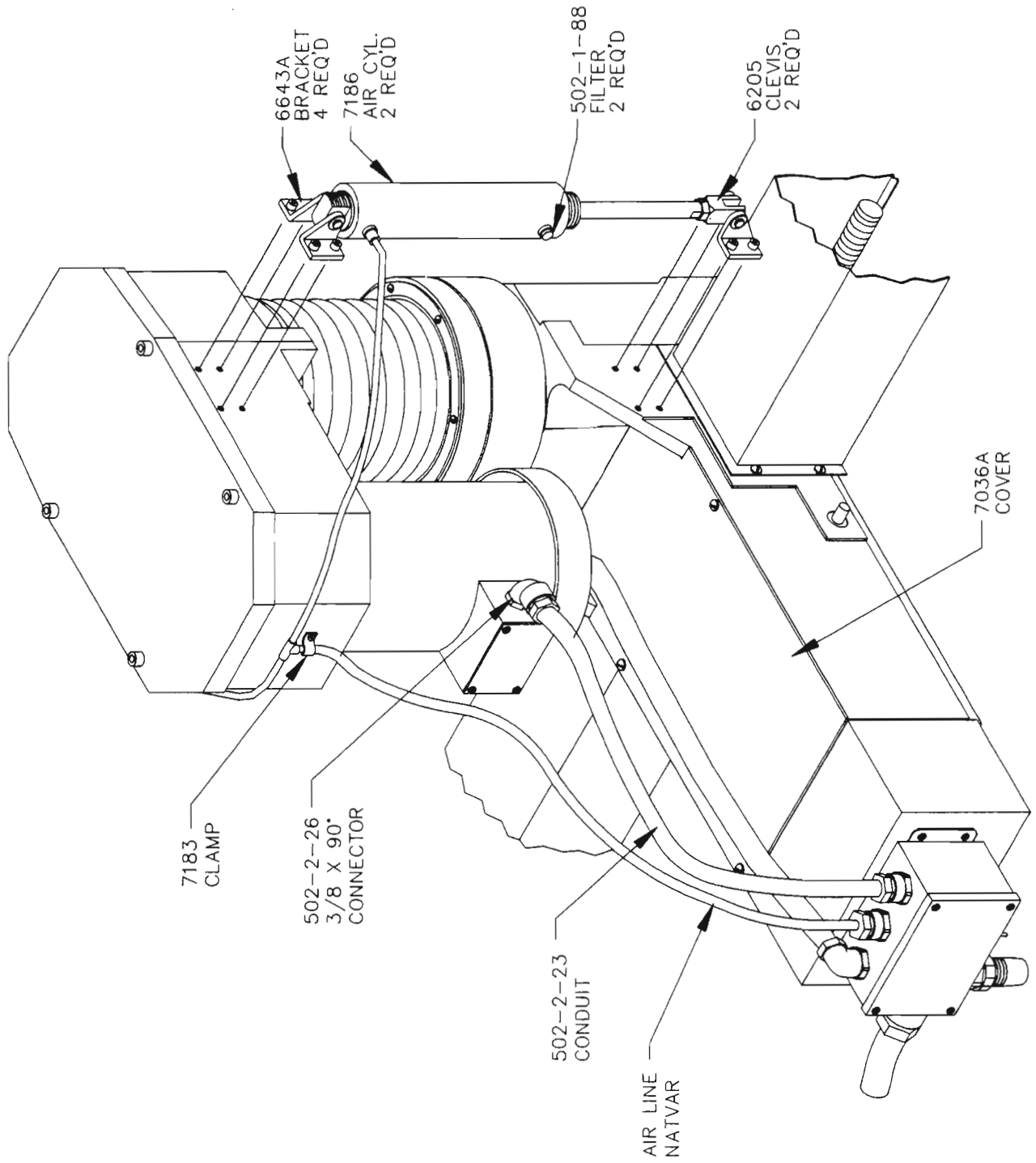


BALLSCREW  
SUPPORT, RIGHT  
SF-00

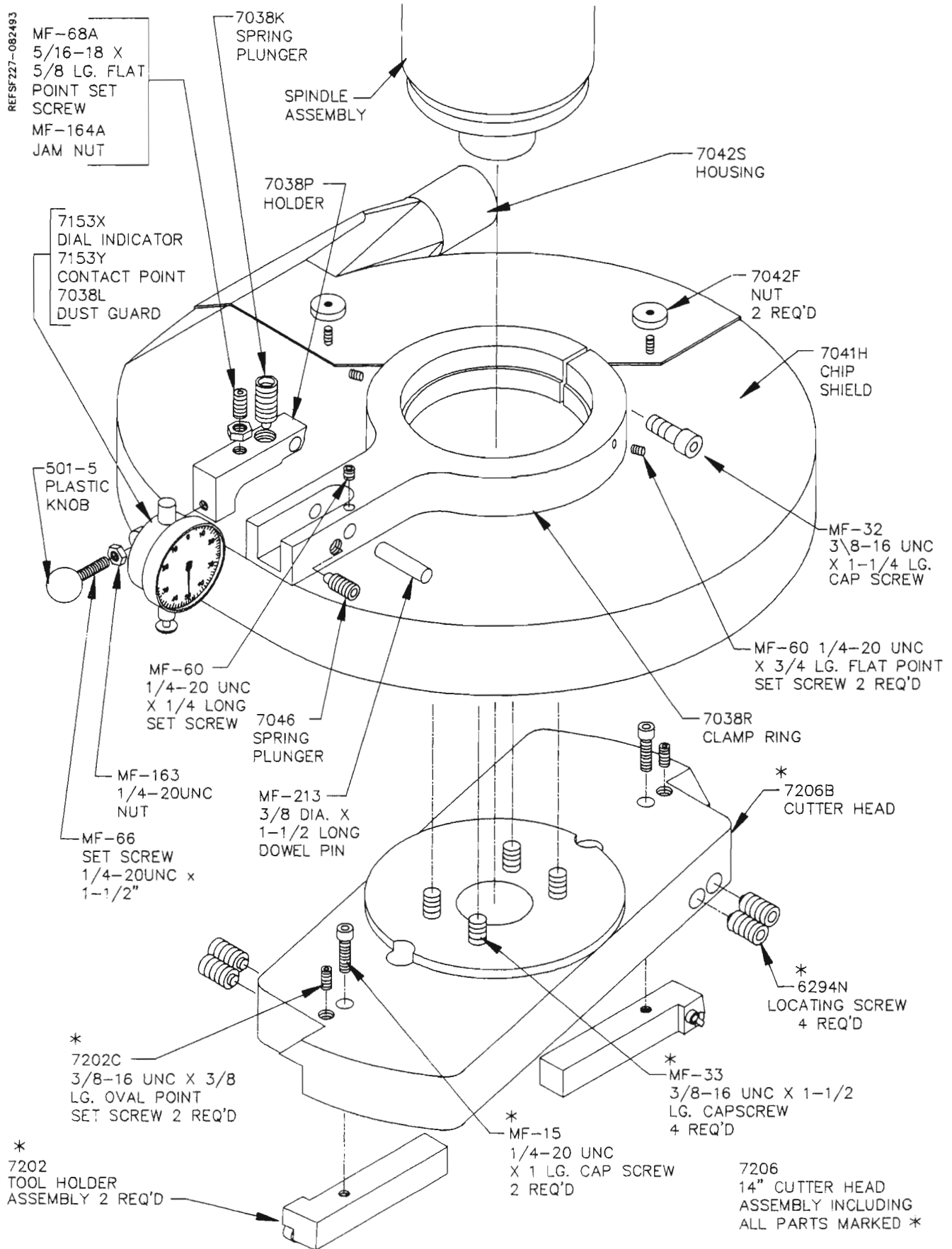
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CONTROL  
PANEL  
SF-00

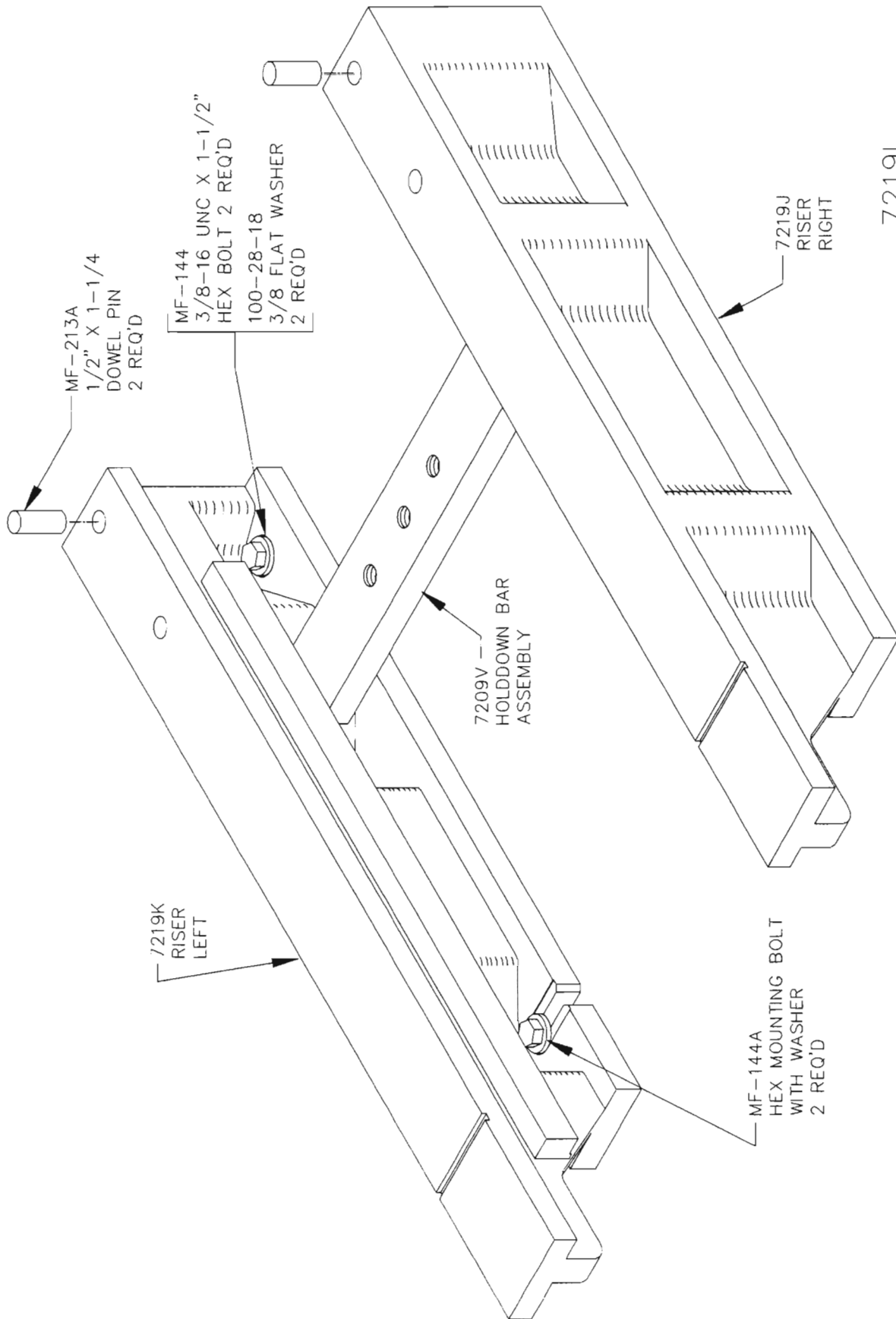


(see also old style parts assemblies at the end of this manual)





REFFIXTURE67-021194



MF-213A  
1/2" X 1-1/4"  
DOWEL PIN  
2 REQ'D

MF-144  
3/8-16 UNC X 1-1/2"  
HEX BOLT 2 REQ'D  
100-28-18  
3/8 FLAT WASHER  
2 REQ'D

7209V —  
HOLDDOWN BAR  
ASSEMBLY

7219K  
RISER  
LEFT

7219J  
RISER  
RIGHT

MF-144A  
HEX MOUNTING BOLT  
WITH WASHER  
2 REQ'D

7219L  
RISER SET

