

OCTOBER 15, 1990

DIRECTIONS  
FOR  
OPERATING AND MAINTAINING  
THE

ROTTLER  
MODEL SF1 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 SF1 read this manual, in particular the sections concerning safety, before operating the machine.

## DESCRIPTION

The model SF1 surfacing machine is a precision, high speed surfacing unit. It can be equipped with tooling and accessories for surfacing most American passenger car and truck engines, both inline, 90 and 60 degree V-types. SF1 machines may be readily tooled to resurface a wide variety of engines including European and Asian engines as well as perform a wider variety of 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 are realized as a result of fast block clamping, push button controls, and automatic cycling.

Change over or resetting time required to set up V-type or inline 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 operator pendant.

Power required is 230 volt, 1 phase. This provides power to the variable speed AC motor controller, the horizontal stepper drive, the programable logic controller, 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.

CAUTION CAUTION CAUTION CAUTION CAUTION CAUTION 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 or 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 in an automatic mode.

This SF1 machine operates under computer control and is susceptible to extraneous electrical impulses internally or externally produced. The machine may make moves out of the control of the operator at any time, the operator should work in and around the machine with caution. 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 have 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 on 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.

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, 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), and leveling pads (502-1-12J) 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 SF1 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.

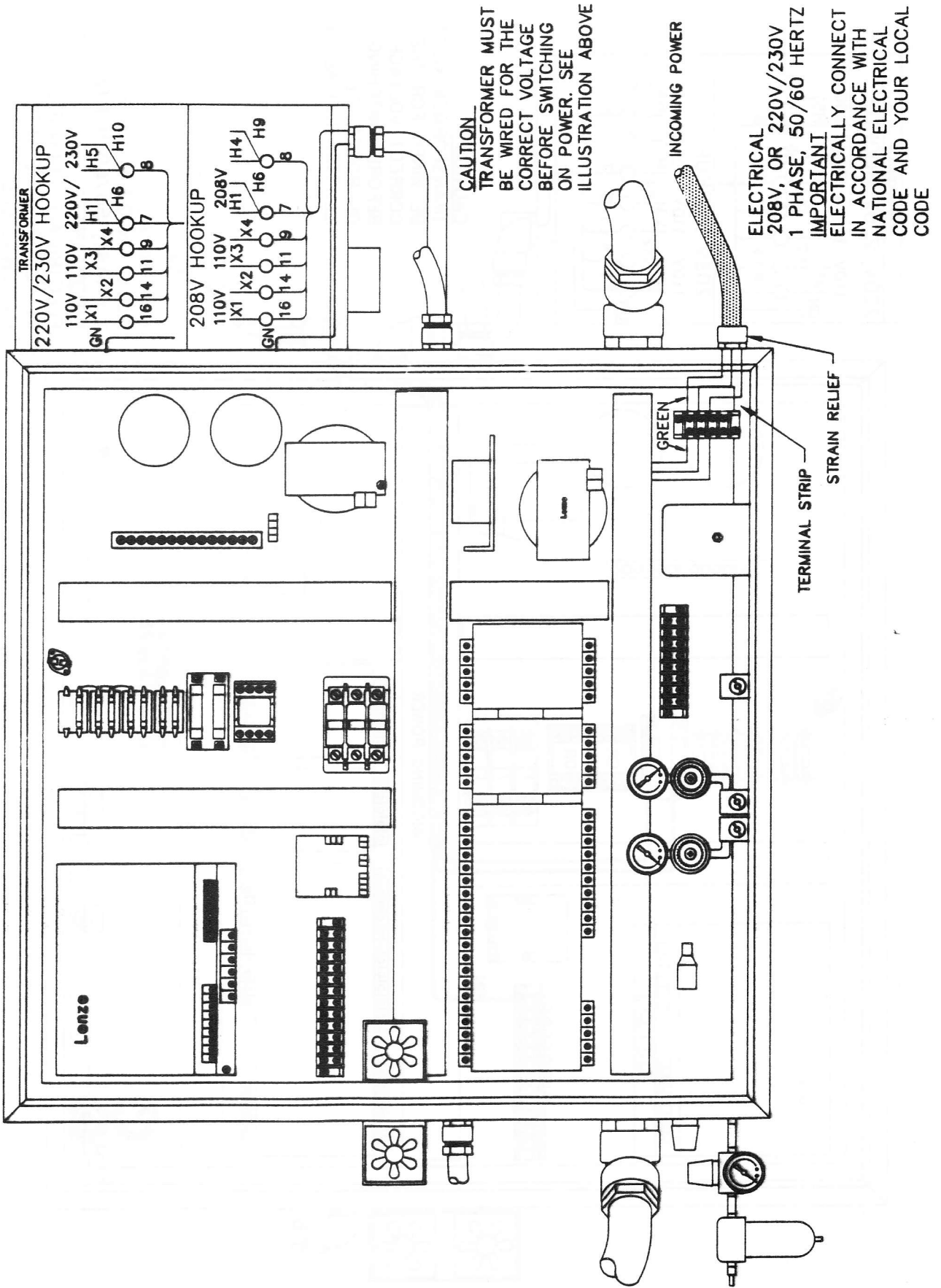
Attach a 100 p.s.i. air source to the appropriate intake at the air filter on the side of the rear control enclosure.

Check the gauge on the air regulator next to the filter on the lower portion of the enclosure to see if it is set to approximately 90 to 95 psi pressure after the air line is attached.

#### POWER SUPPLY

**THIS MACHINE REQUIRES 208 TO 240 VAC 1 PHASE, 50/60HZ, (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 100-120 VAC. CONNECT PER ELECTRICAL HOOK-UP DIRECTIONS IN BELOW. IF THE VOLTAGE IS OUTSIDE THIS RANGE MACHINE WILL NOT OPERATE PROPERLY AND MAY BE DAMAGED.**

CAUTION: Do not attempt to attach three phase. The 3 phase spindle motor receives its power from a three phase variable frequency inverter located in the main electrical enclosure.



## CONTROL DESCRIPTION

### POWER ON LIGHT

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

### AUTO/MANUAL SWITCH

Use this switch to change the machine operation from manual to automatic.

CAUTION; When in automatic mode the machine performs moves automatically. Read the instructions on automatic operations before using the machine.

### RELIEF UP/MILL ADJUST/MILL CLAMP SWITCH

This switch must be in the MILL CLAMP position for the machine to perform an automatic cycle. Below is a description of the three positions.

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 to handwheel the spindle/cutterhead assembly up. Relief Up is also used in the automatic program when the machine has finished but before it begins its rapid move to the right.

Mill Adjust- When in Mill Adjust the two air cylinders are on low pressure. This allows for easy adjustment in the down direction.

Mill Clamp- When in Mill Clamp the two air cylinders are off and the spindle/cutterhead is locked in its vertical position ready to mill. The switch must be in the Mill Clamp position before the machine will run in automatic mode.

### CYCLE START BUTTON

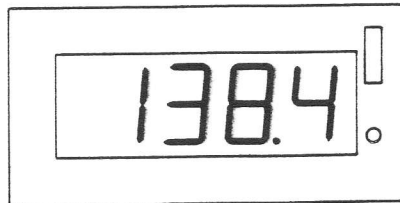
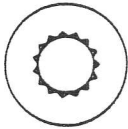
This button starts an automatic cycle. The Relief Up/Mill Adjust/Mill Clamp switch must be in the Mill Clamp position for the machine to begin an automatic cycle. When the machine is in Auto and in contact with the right limit switch the rapid left button will flash, indicating the machine will rapid to the left, six inches when the Cycle Start button is pressed. When it completes the six inch rapid move the machine will stop. Press cycle start button again to start spindle rotation and feed.

### SPINDLE START BUTTON

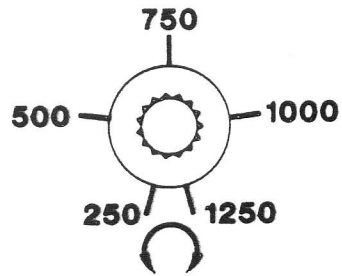
The spindle start button starts and stops the spindle rotation. When the spindle is on the light is on. When in automatic mode and the Cycle Start button is pushed the spindle will automatically start.

### RAPID LEFT BUTTON

When the Rapid Left button is pressed the machine will rapid to the left at 190 inches/minute. The button must be held "on" to maintain motion. When in automatic mode and the machine is contacting the right limit switch the Rapid Left Button will blink, indicating the machine will perform a rapid left move when



**FEEED RATE**  
IN/IN (MM/MM)



**SPINDLE RPM**

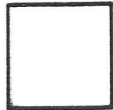
# ROTTLER



**CYCLE START**



**SPINDLE START**



**RELIEF UP**



**AUTO**



**ADJUST DOWN**

**MILL**



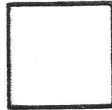
**MANUAL**



**VACUUM ON/OFF**



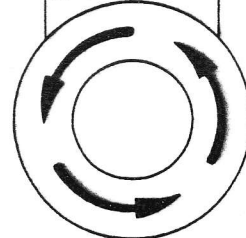
**CHUCK**



**FIXTURE IN/OUT**



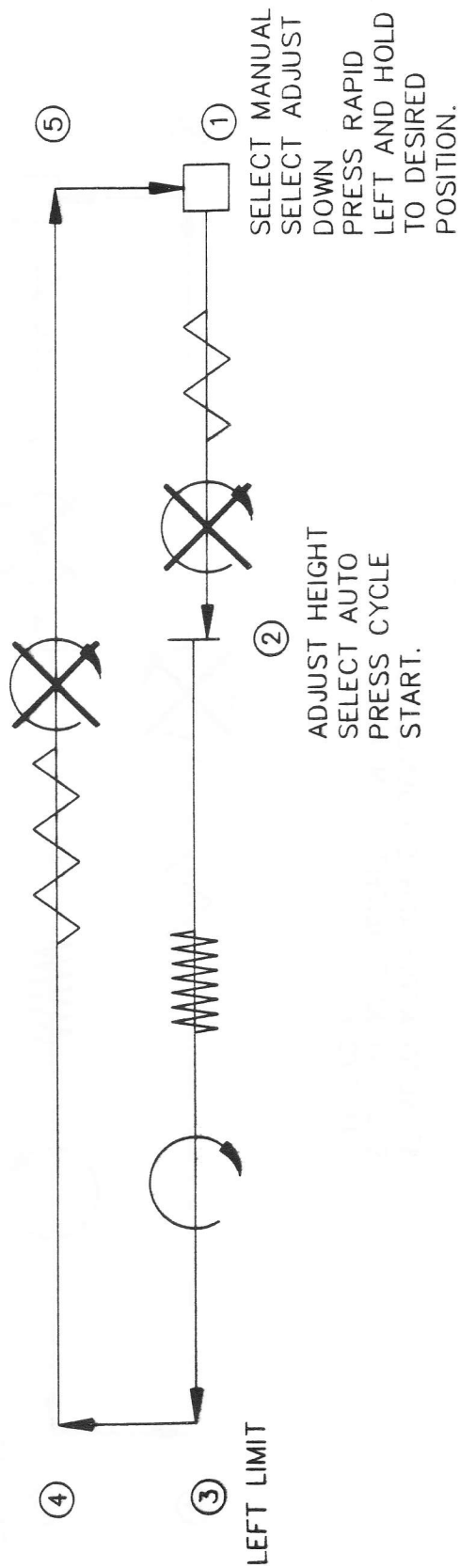
**EMERG. STOP**







MANUAL APPROACH TO WORK PIECE,  
AND ADJUST, THEN AUTO CUT CYCLE.

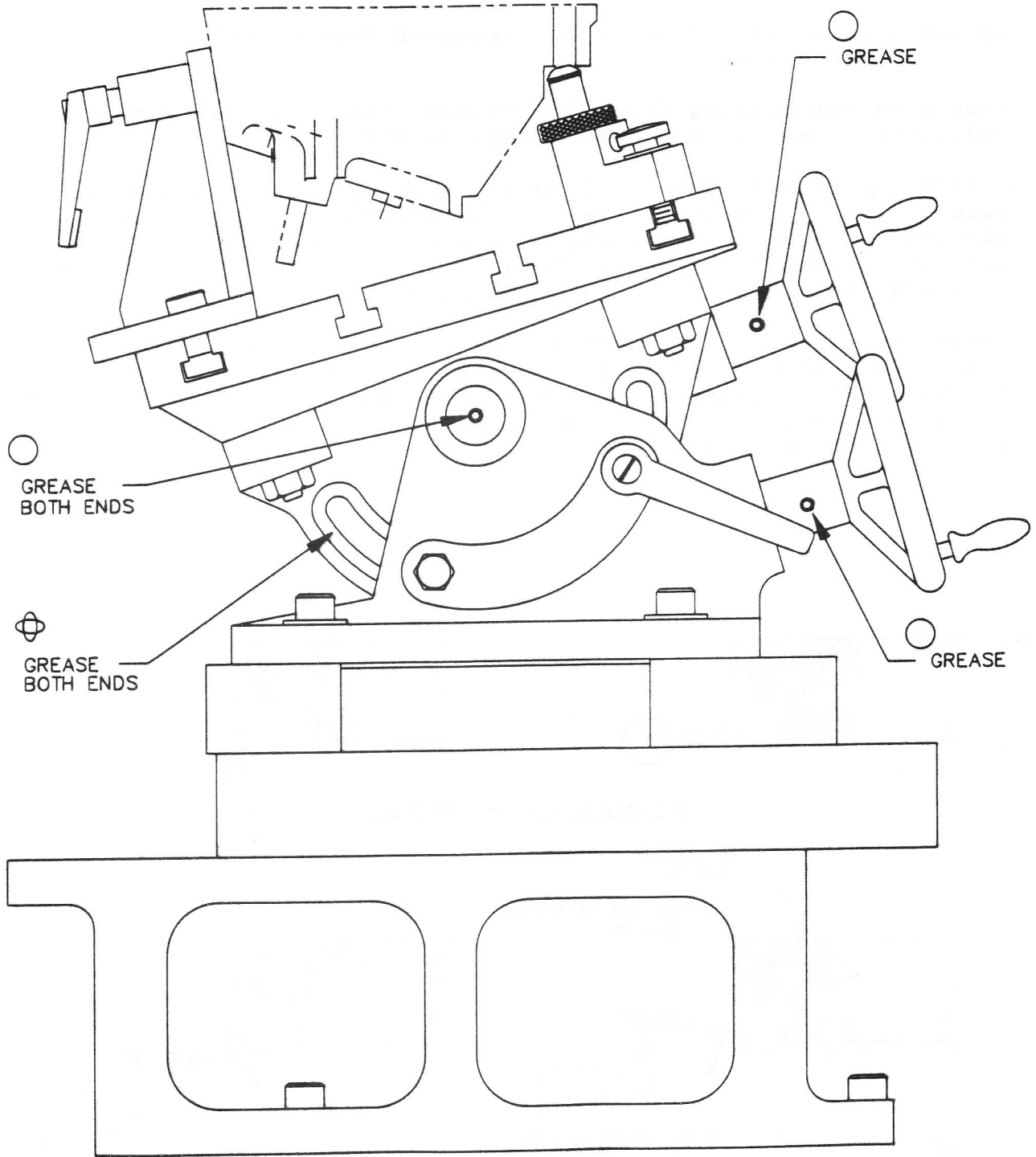


LUBRICATION SF-1 MACHINE

- \* GREASE, UPPER HOUSING - Every 2 months, with the machine running at slow speed, add grease to the grease fitting on top of the upper gear housing until the level reaches the hole located behind the rottler cover plate.
- \* OIL, UPPER HOUSING - Every two months, add 3 or 4 drops of spindle oil to the cap, just in front of grease fitting, on top of the upper gear housing.
- ☒ THE UPPER HOUSING unit should be repacked with a mixture of 4 parts grease and 1 part spindle oil approximately every 25,000 milling cycles. When this grease is changed the upper housing lid should be taken off and the original lubricant entirely removed. (Use Union oil-Unoba F1 or F2 lube, or Lubriplate #930 AAA, or Mobil oil - Mobilith A.W. grades 1 or 2, or Chevron Durolith EP1 or EP2, or any equivalent lithium barium grease)
- △ GREASE BALLSCREW NUT one or two shots every month. Remove spindle base cover to expose grease fitting.
- ⊗ GREASE these fittings monthly.
- ◊ MAIN SPINDLE surface should be cleaned with kerosene weekly and occasionally a light weight oil applied to prevent excessive dryness.
- ⊙ INNER SPINDLE - Add 2 or 3 drops of oil, Union oil 315 klondyke oil, or any SAE #10 oil (non detergent motor oil) WEEKLY, and 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 MONTHLY, to the hole in the spindle keyway. If the inner spindle is removed clean the lower bearing and repack it with the same grease.
- Grease lubrication, for machine with grease fitting. Add 2 shots of grease, to the grease fitting, and 3 squirts of spindle oil, every 2 months. Add oil by removing the 6 round headed screws from the spindle boot mounting ring and lifting mounting ring and boot up. (Use Union oil-Unoba F1 or F2 lube, or Lubriplate #930 AAA, or Mobil oil - Mobilith A.W. grades 1 or 2, or Chevron Durolith EP1 or EP2, or any equivalent lithium barium grease)
- Oil lubrication, for machine with flush type oil fitting. Add 3 squirts of spindle oil weekly.

LUBRICATION SF-1 MANUAL HEAD FIXTURE

- ☒ Grease these fittings, weekly.
- ⊗ Apply grease to this surface, both ends, weekly.

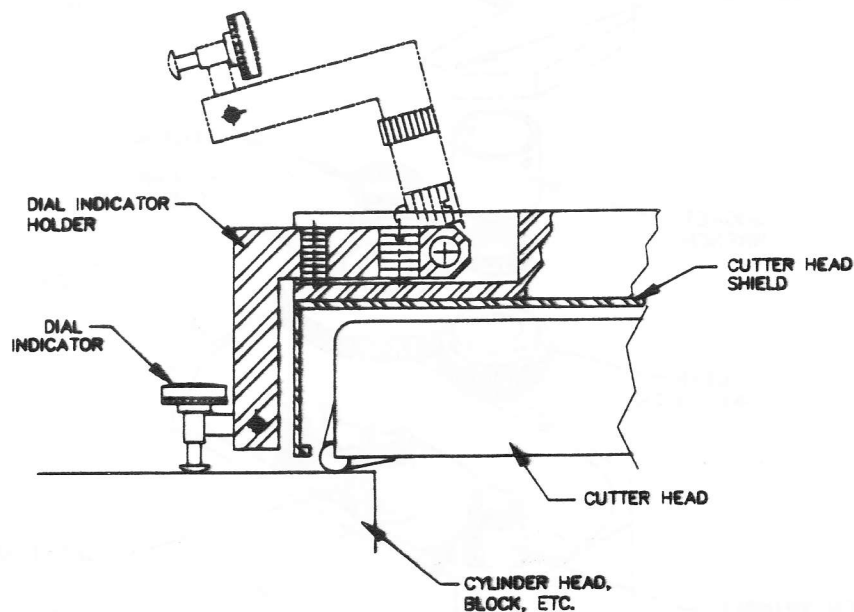


MANUAL HEAD FIXTURE LUBRICATION

DIAL INDICATOR SETTING

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

To reset, place the AUTO/MANUAL/TOGGLE switch into manual mode, and the UP/ADJUST/MILL toggle switch into adjust mode. With surfacing cutter in the for and aft position, press the jog left button and move spindle left until the cutter head overlaps the cylinder head surface by 1/2" when rotated. CAUTION: TURN OFF POWER TO THE MACHINE WHEN HANDLING CUTTER. 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. (NOTE: DO NOT LOWER CUTTER HEAD DIRECTLY ONTO CYLINDER HEAD SURFACE, IT MAY CHIP THE CUTTING TOOL INSERT). Press the dial indicator down on the cylinder head surface, and adjust it by turning its adjusting screw up or down until the dial indicator is half way between its minimum and maximum range, then set dial to zero.



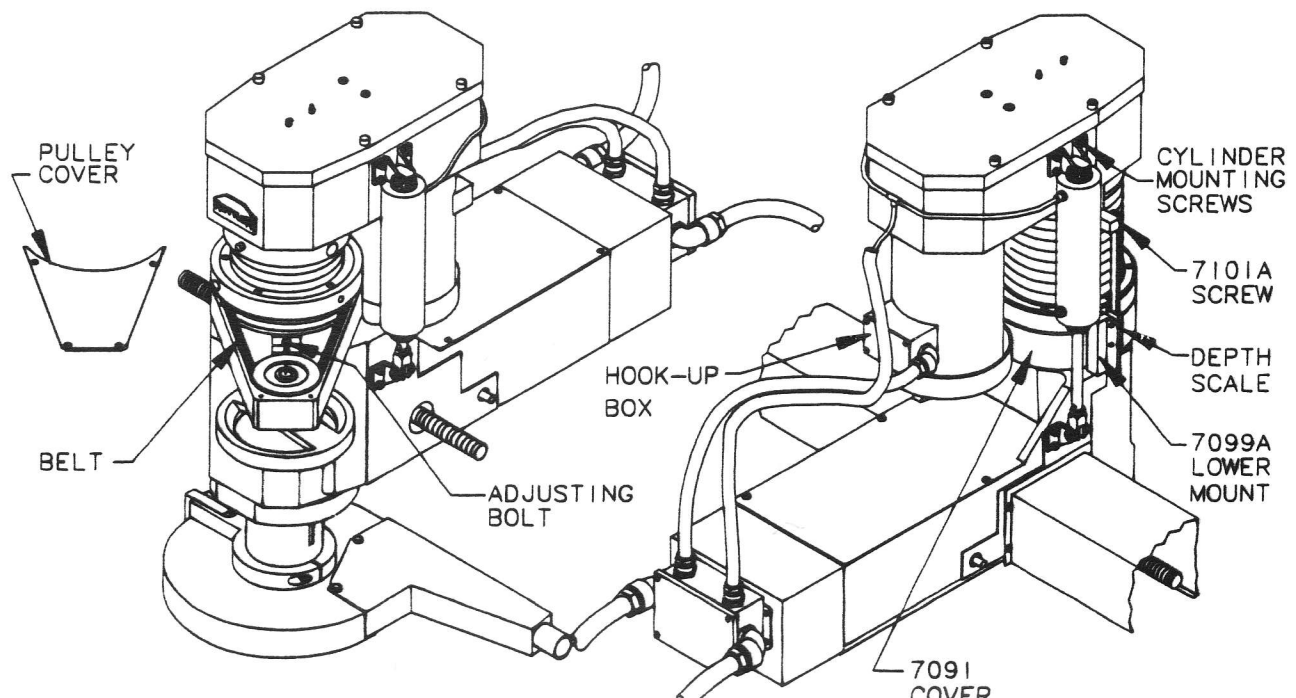
BELT TENSION ADJUSTMENT

Remove the four screws from the pulley cover. Lift off the cover. Loosen the locknut on the adjusting bolt, and the two bolts on the adjusting block. Turn the adjusting bolt to move the pulley in or out for loosening or tightening the belt. When properly adjusted the belt should have 1/2 to 5/8 inch deflection between pulleys, and the belt should slip before moving the spindle with air disconnected from machine. Do not over tighten the belt. Tighten the locknut on the adjusting bolt, and the two bolts on the adjusting block. Replace the cover, and tighten the four screws.

BELT REMOVAL AND REPLACEMENT

CAUTION: All power to this machine must be disconnected before removing or installing vertical adjustment belt, as you will be handling the power wires going to the motor.

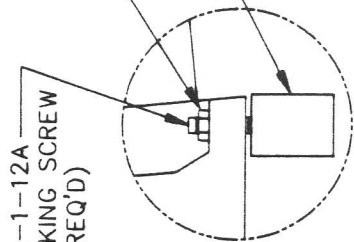
Remove the four screws from the pulley cover. Lift off the pulley cover. Loosen the locknut on the adjusting bolt, and the two bolts on the adjusting block. Move the pulley all the way in by turning the adjusting bolt. Remove (7099A) lower depth scale mount and (7101A) shoulder screw to remove depth scale. Remove (7091) cover from around the drive ring. Disconnect upper air lines from air cylinders. Remove the four screws holding the top of the air cylinders and lay them down to the side. Remove the four screws from the cover on the motor hook-up box. Cut the three crimped on caps that connect to wires T1, T2, T3. Then remove the screw holding the green ground wire. Loosen the nut holding the conduit fitting in the hook-up box, and pull the conduit, fitting, and wires away from the box. Lift belt off pulley and up over the upper gear box. Replace the new belt. Reconnect conduit fitting in hook-up box. Crimp the new lugs on the wires (be sure Wire T1 is connected to wires 1 and 7, Wire T2 is connected to wires 2 and 8, and Wire T3 is connected to wires 3 and 9.)



502-1-12A  
JACKING SCREW  
(2 REQ'D)

502-1-12F  
JAM NUT  
(2 REQ'D)

502-1-12J  
LEVELING PAD  
(2 REQ'D)  
(OPTIONAL)

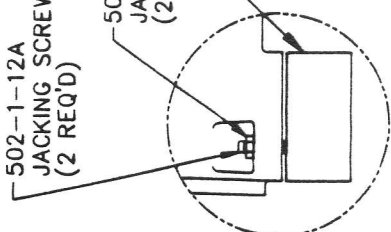


DETAIL B

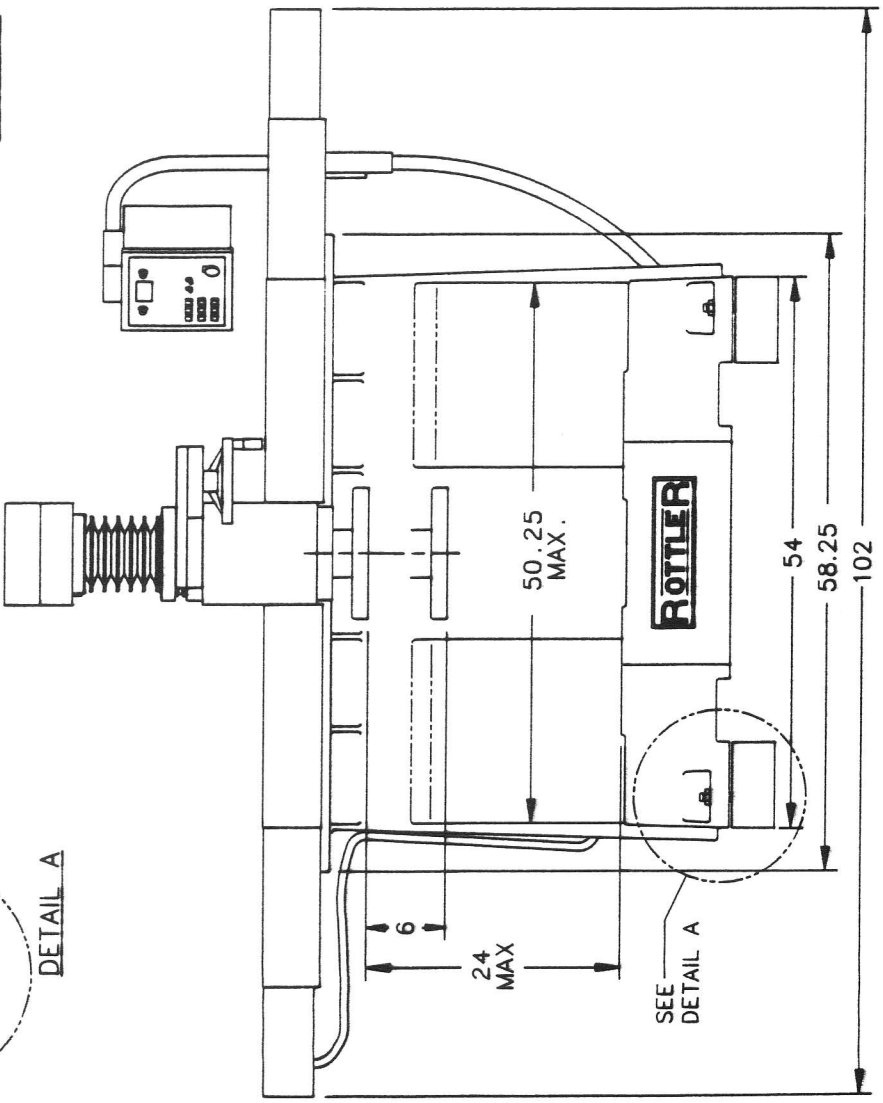
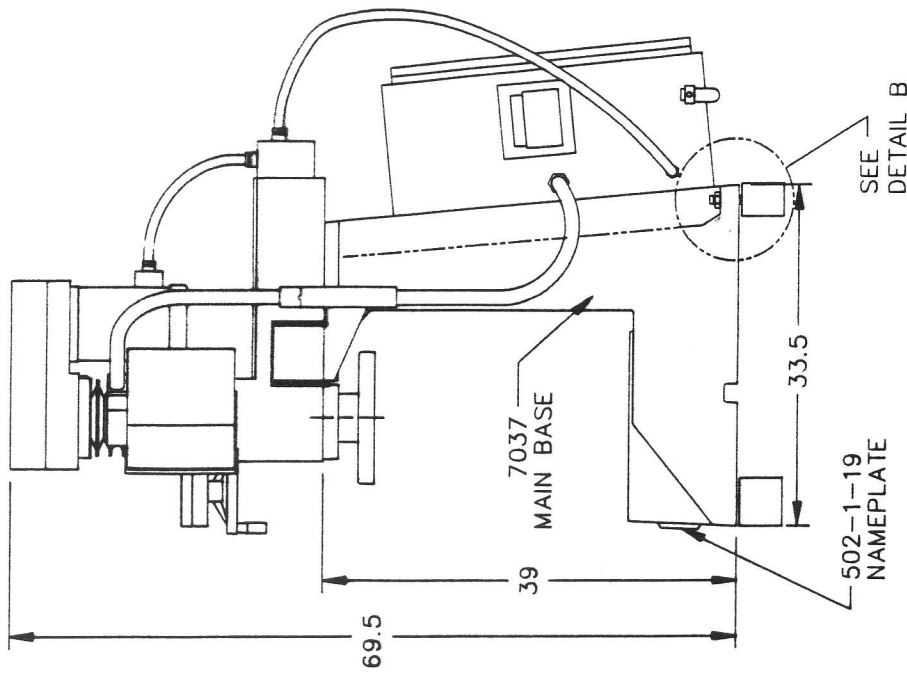
502-1-12A  
JACKING SCREW  
(2 REQ'D)

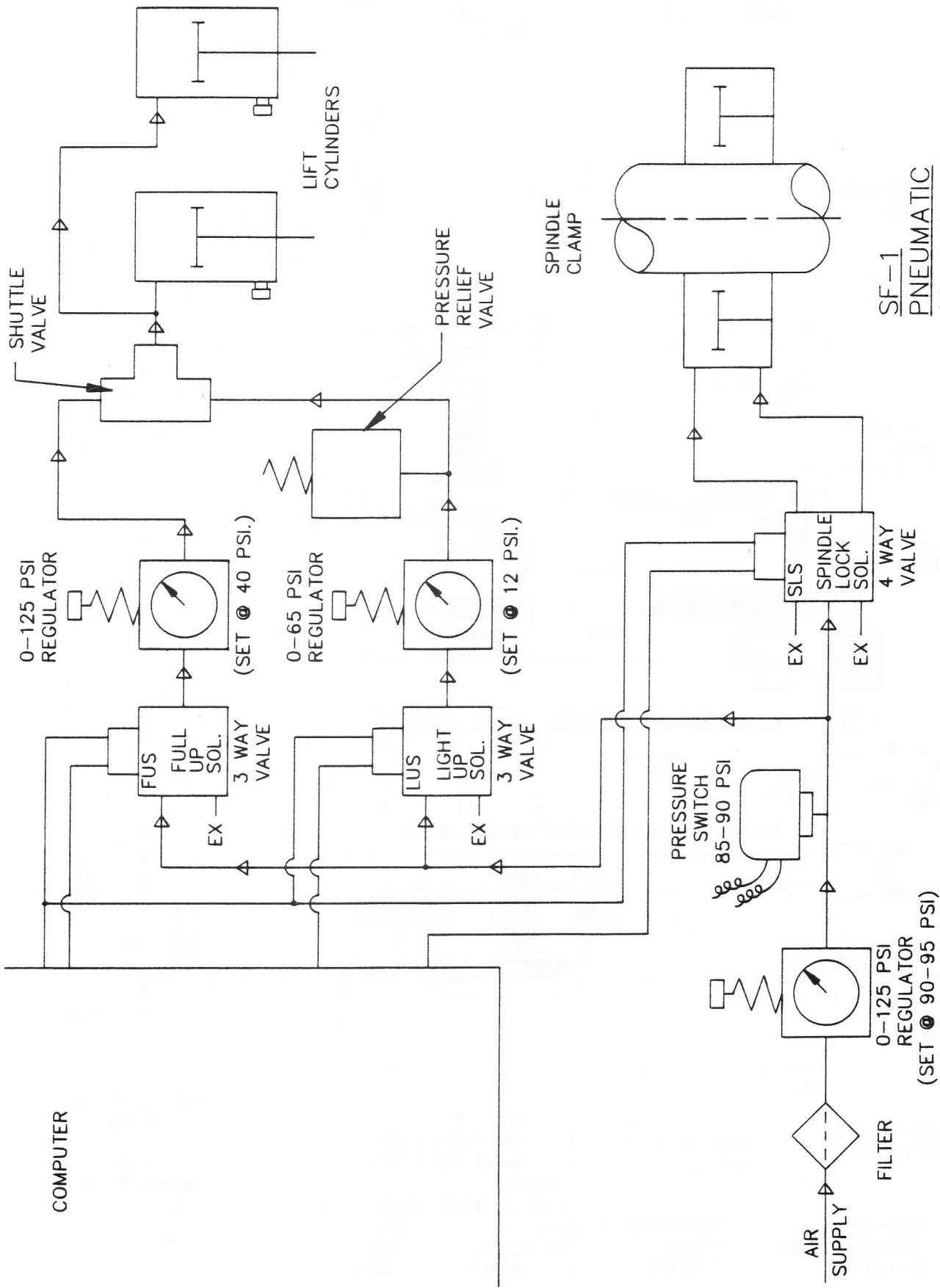
502-1-12F  
JAM NUT  
(2 REQ'D)

7180A  
LEVELING PAD  
(2 REQ'D)  
(OPTIONAL)



DETAIL A

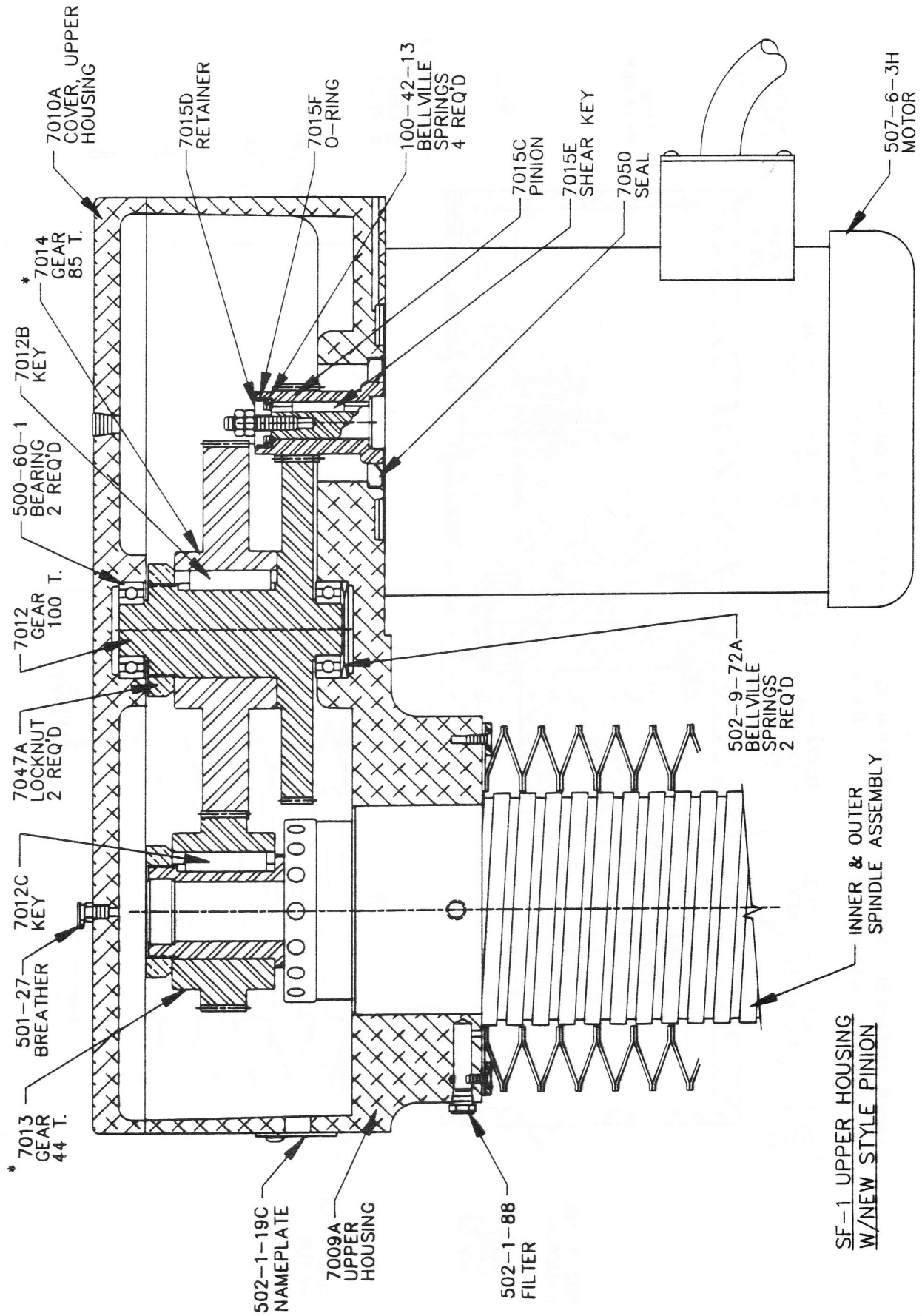




SF-1  
PNEUMATIC  
CONTROL DIAGRAM

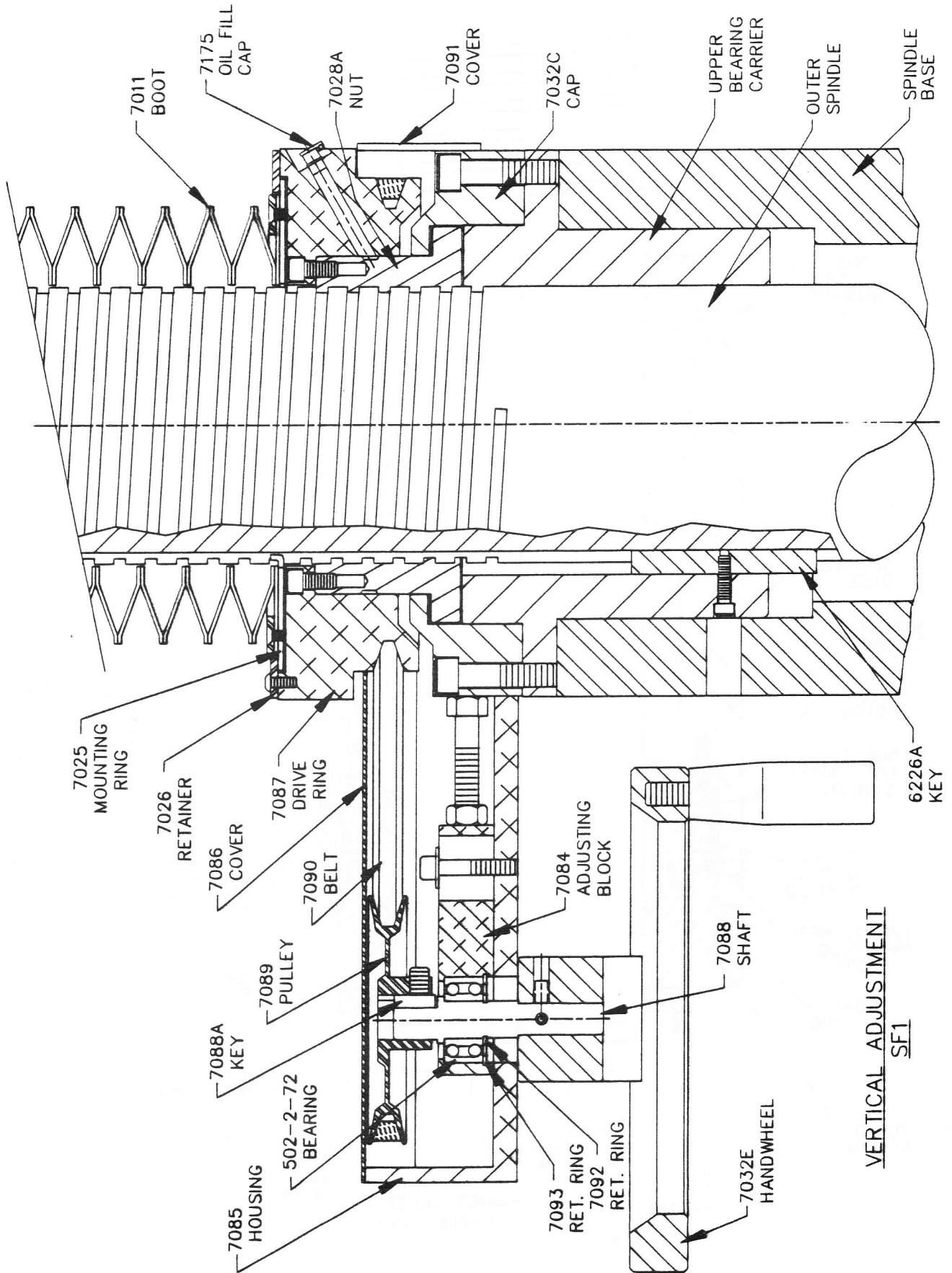


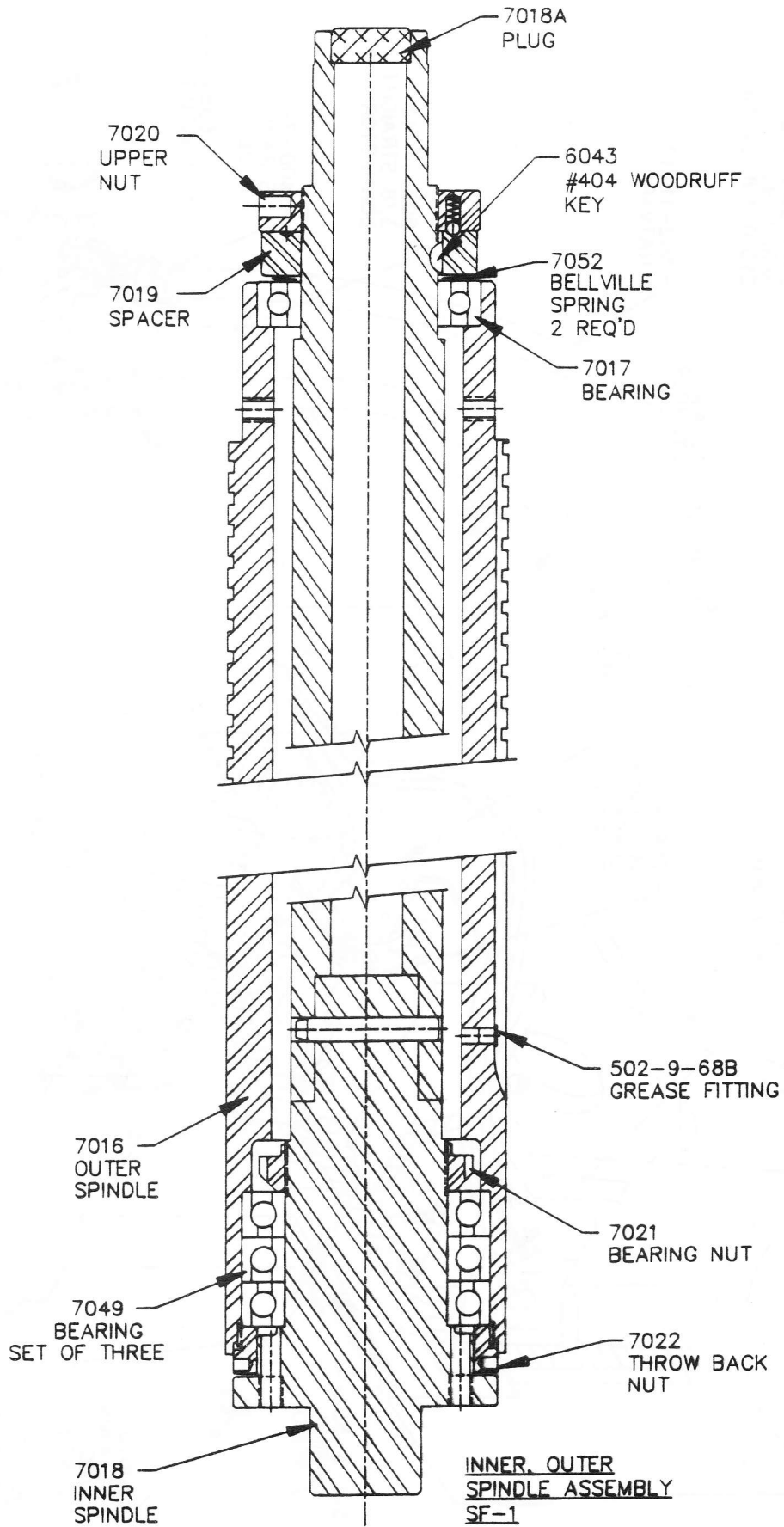
\*WHEN ASSEMBLED AS SHOWN SPINDLE R.P.M. IS 290 rpm TO 1280 rpm.  
REVERSED MOUNTING OF GEARS WILL GIVE R.P.M. OF 78 rpm TO 340 rpm.



SF-1 UPPER HOUSING W/NEW STYLE PINION

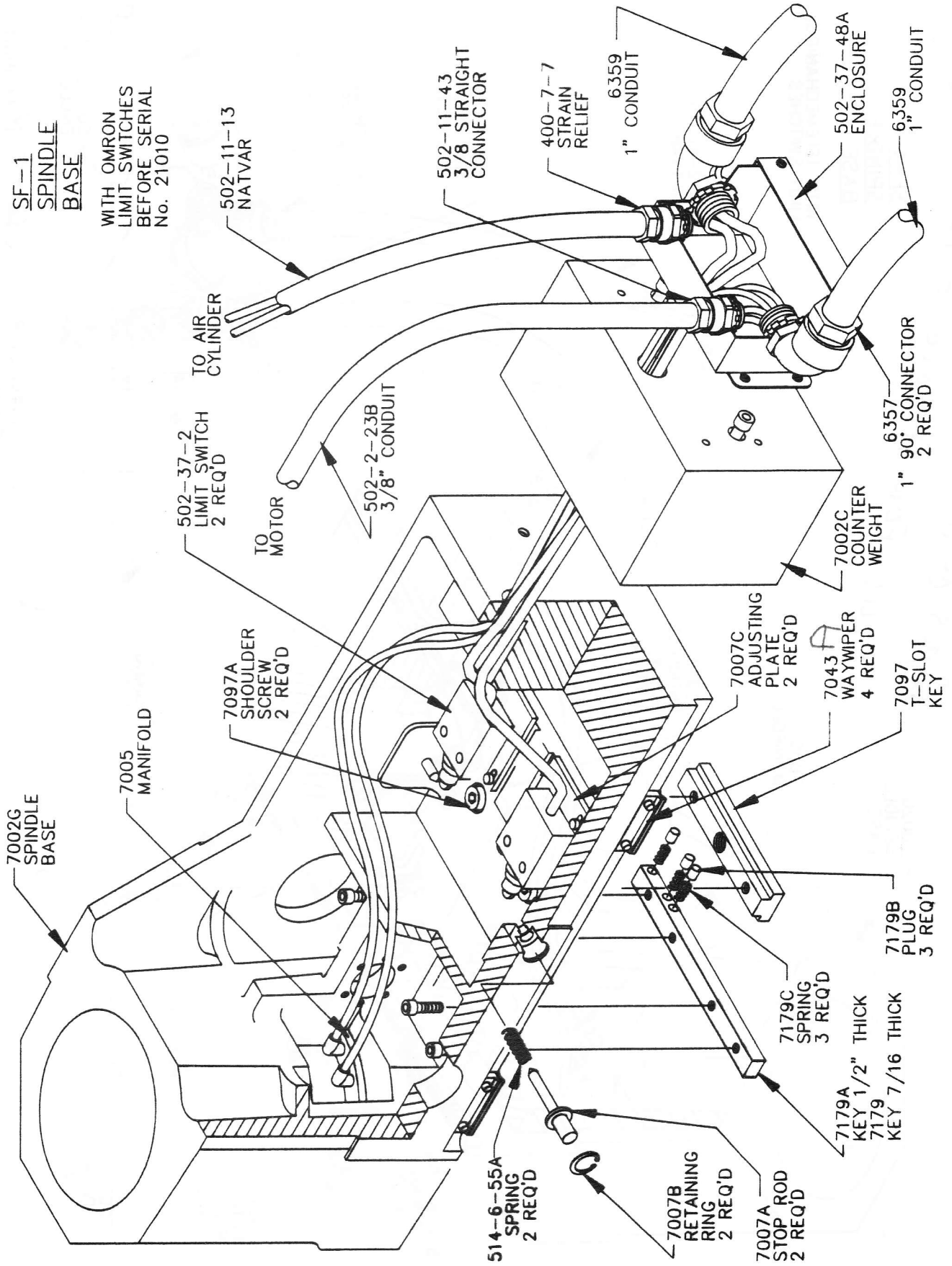
INNER & OUTER SPINDLE ASSEMBLY

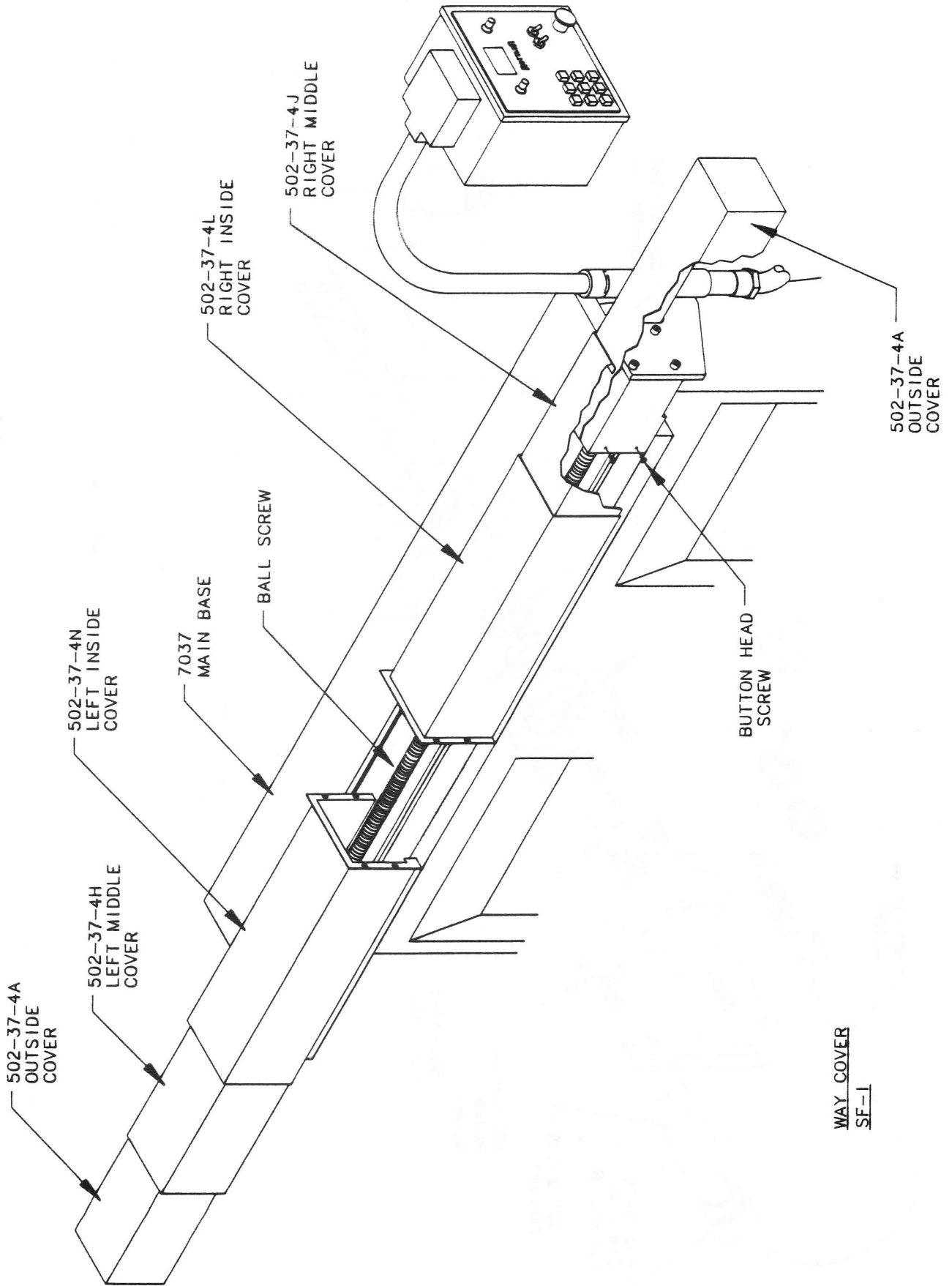




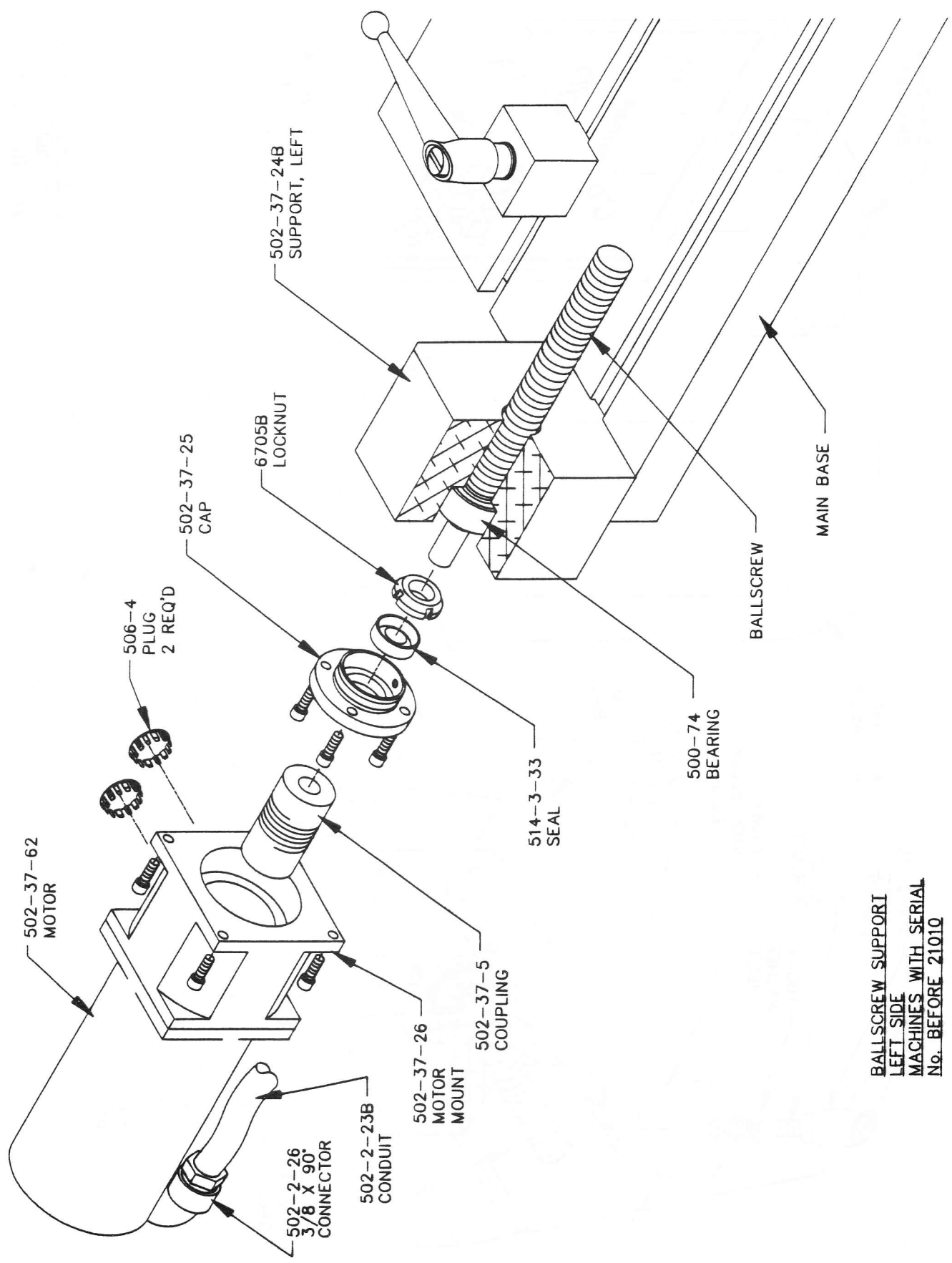
SF-1  
SPINDLE  
BASE

WITH OMRON  
LIMIT SWITCHES  
BEFORE SERIAL  
No. 21010

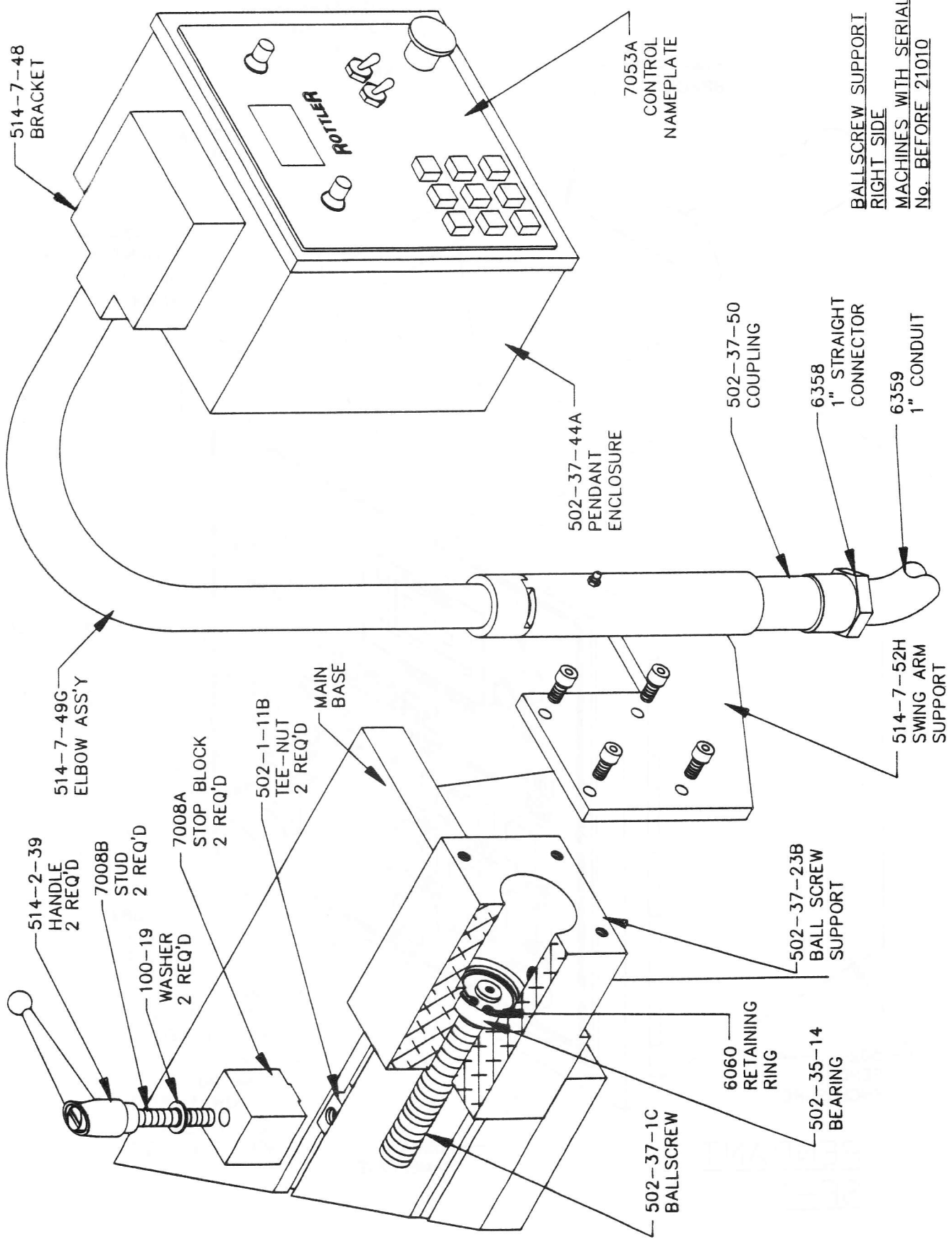




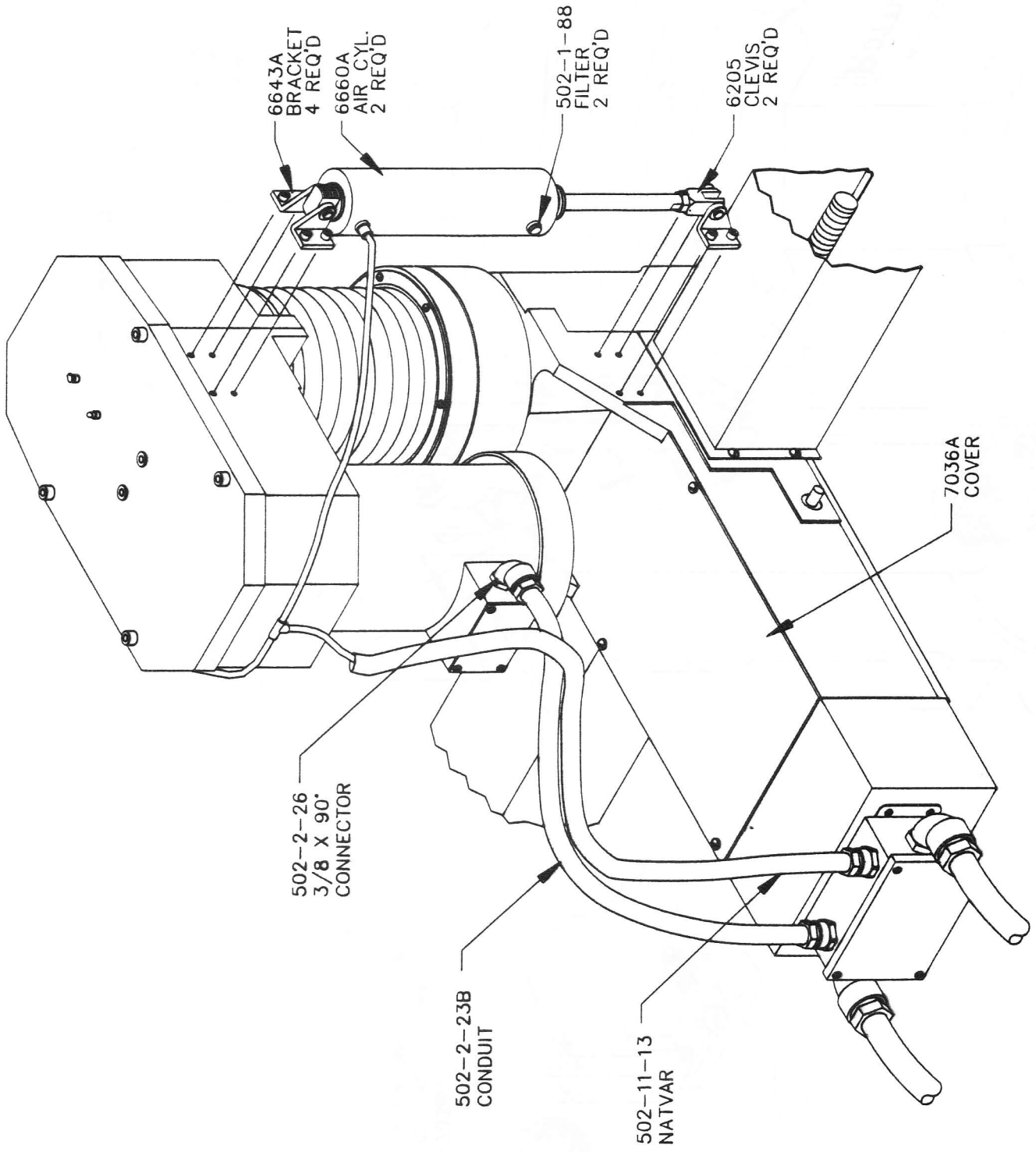
WAY COVER  
SF-1



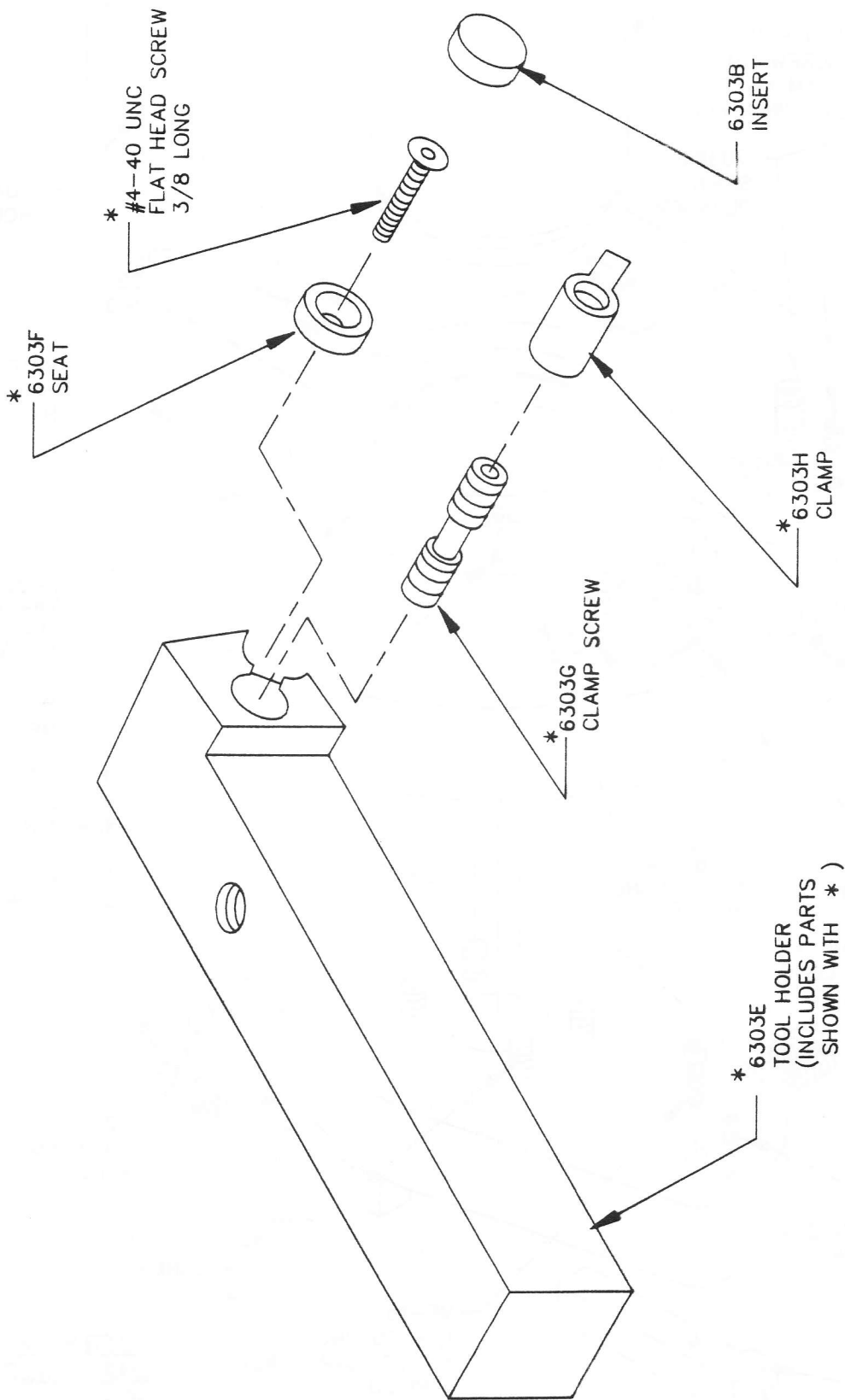
BALLSCREW SUPPORT  
LEFT SIDE  
MACHINES WITH SERIAL  
No. BEFORE 21010



BALLSCREW SUPPORT  
RIGHT SIDE  
MACHINES WITH SERIAL  
No. BEFORE 21010

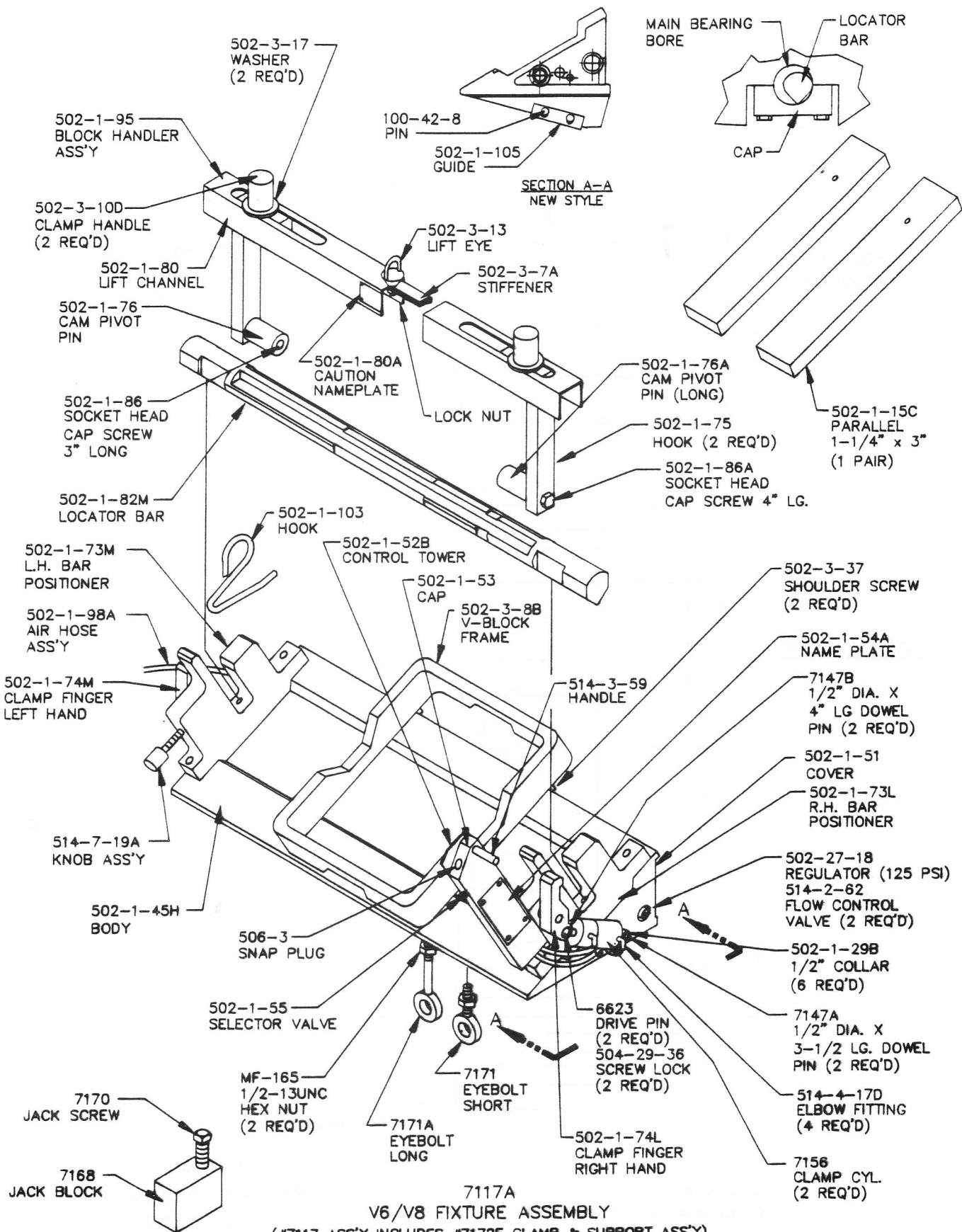




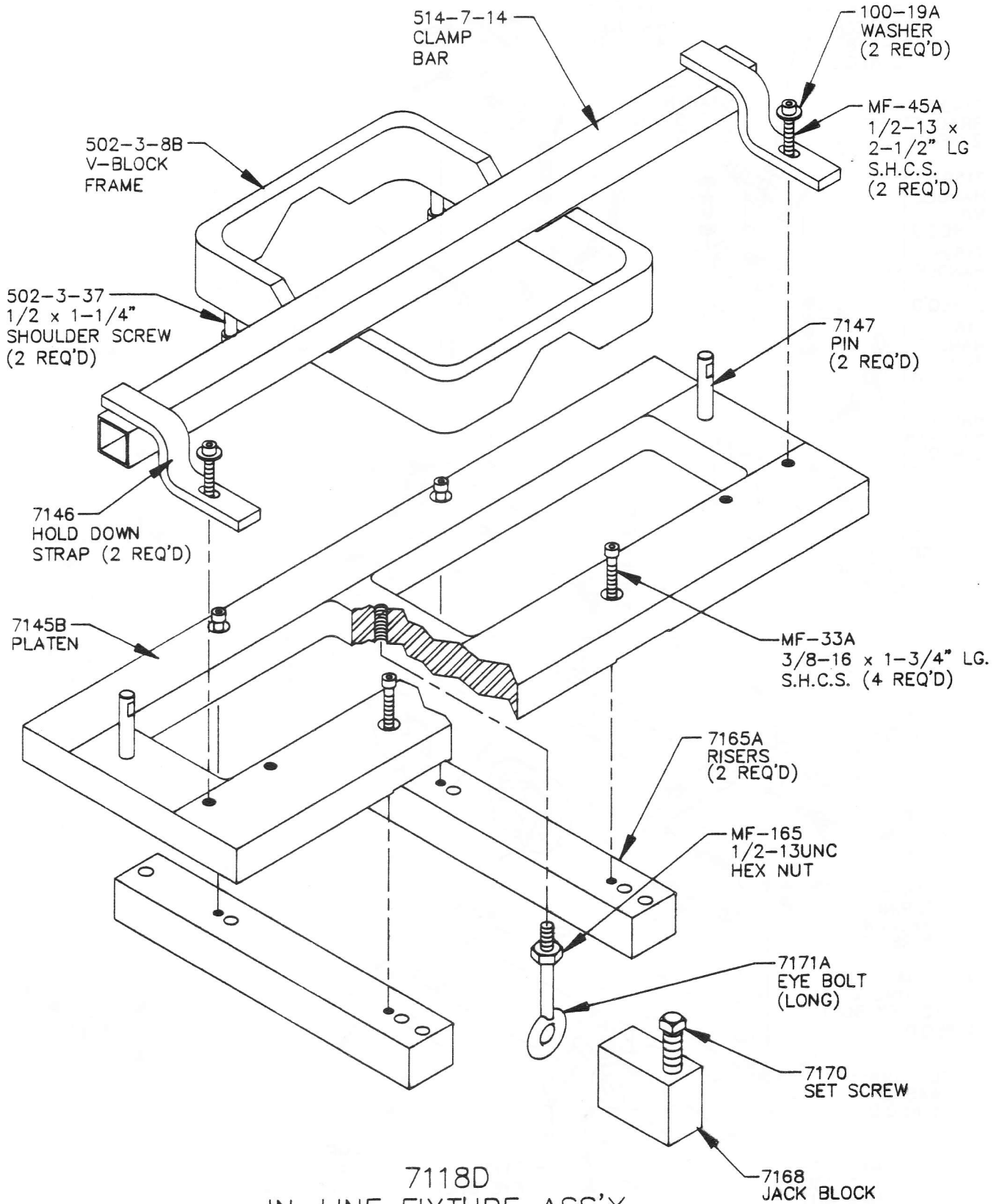


\* 6303E ASSEMBLY INCLUDES PARTS WITH \*, OR INDIVIDUAL PARTS MAY BE ORDERED SEPARATELY.

TOOL HOLDER  
SF-1



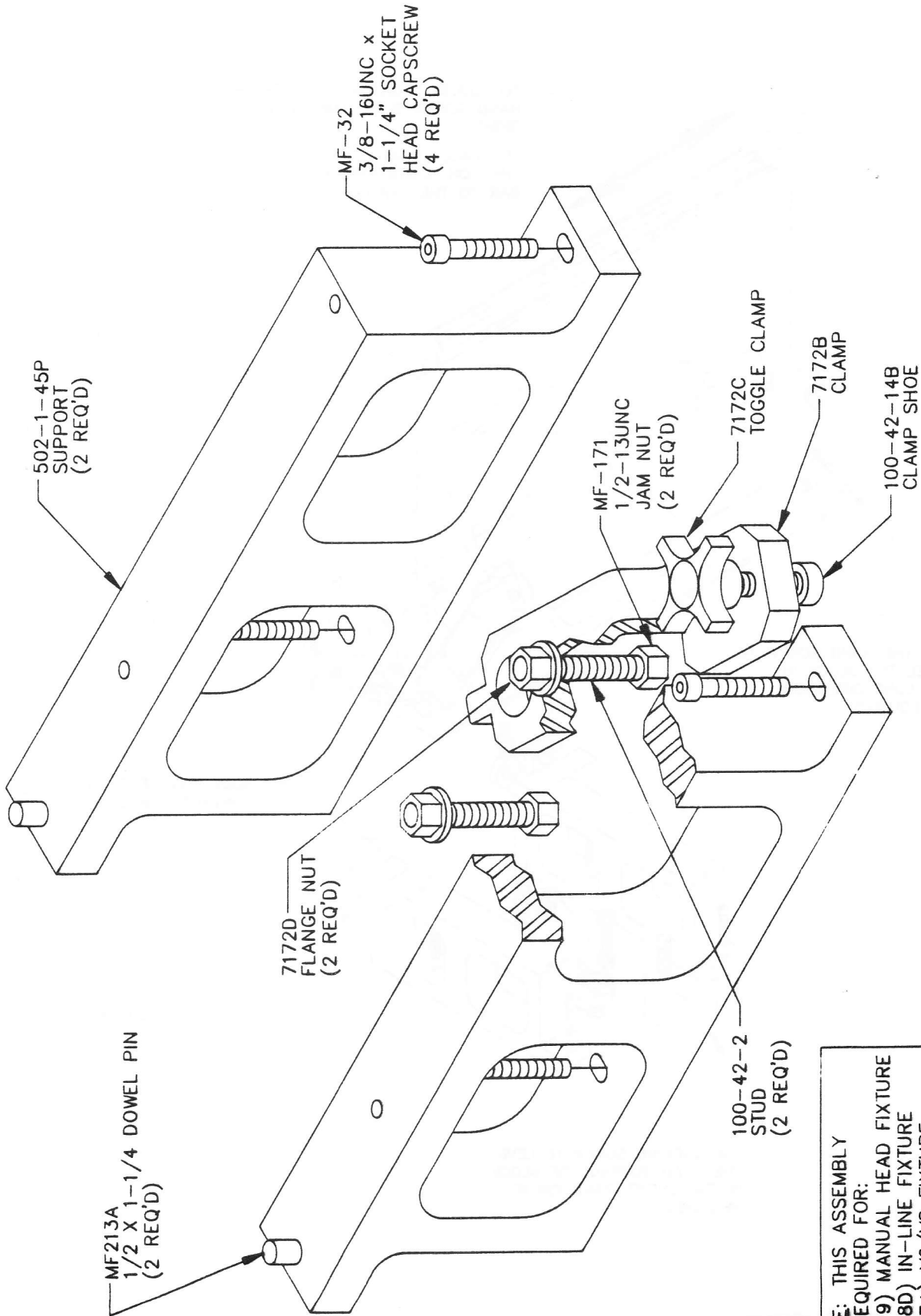
7117A  
**V6/V8 FIXTURE ASSEMBLY**  
 (#7117 ASS'Y INCLUDES #7172E CLAMP & SUPPORT ASS'Y)  
**NOTE:** FOR TYPICAL AUTOMOTIVE BLOCKS THIS FIXTURE  
 REQUIRES USE OF #7172E FIXTURE CLAMP & SUPPORT ASSEMBLY



7118D  
IN-LINE FIXTURE ASS'Y

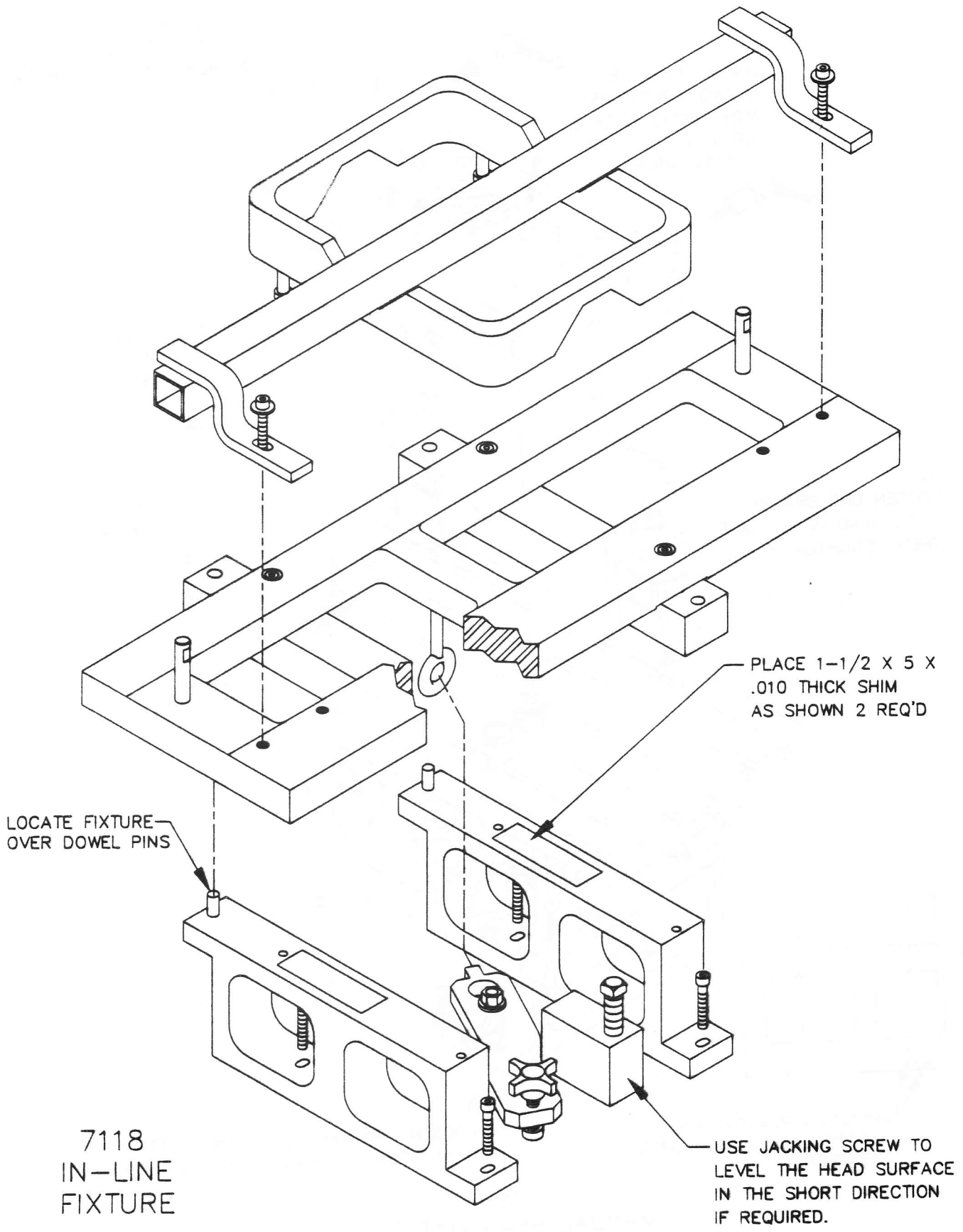
(#7118 ASS'Y INCLUDES #7172E CLAMP & SUPPORT ASS'Y)

**NOTE:** FOR TYPICAL AUTOMOTIVE BLOCKS THIS FIXTURE  
REQUIRES USE OF #7172E FIXTURE CLAMP & SUPPORT ASSEMBLY

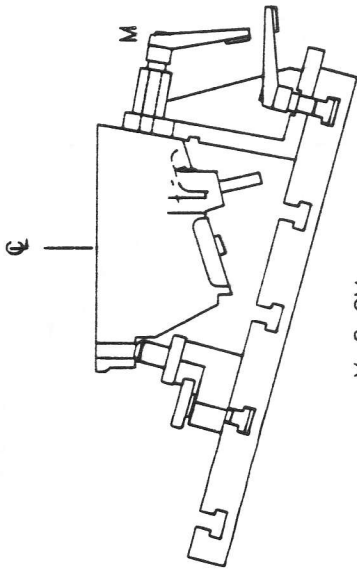


7172E  
FIXTURE CLAMP & SUPPORT ASSEMBLY

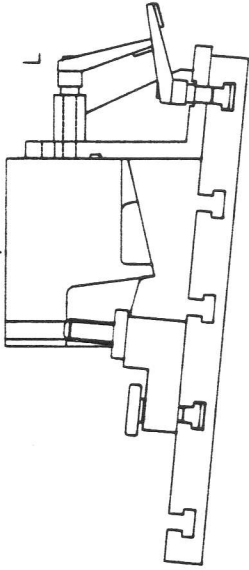
**NOTE:** THIS ASSEMBLY  
IS REQUIRED FOR:  
(7179) MANUAL HEAD FIXTURE  
(7118D) IN-LINE FIXTURE  
(7117A) V6/V8 FIXTURE



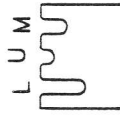
CENTER LINE OF CUTTERHEAD, AND WORKPIECE SHOULD BE APPROX. CENTERED.



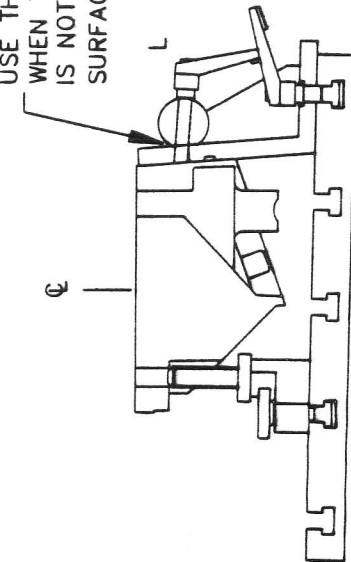
V-8 GM  
283/305/327



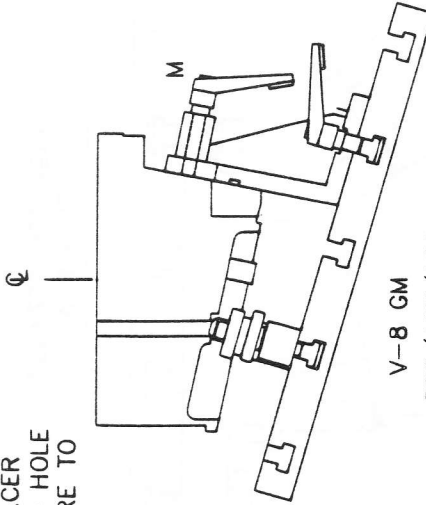
V-8 FORD  
390/428



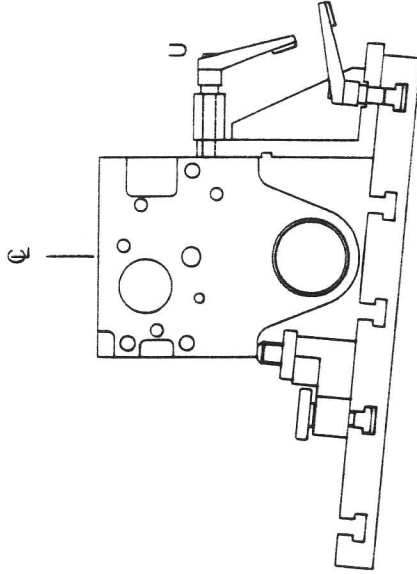
USE THIS SPACER WHEN TAPPED HOLE IS NOT SQUARE TO SURFACE



V-8 CHRYSLER  
318/360



V-8 GM  
396/427/454



INLINE 4 CYLINDER  
FORD 140

TYPICAL SETUP POSITIONS FOR SURFACING CYLINDER HEADS WITH THE MANUAL HEAD FIXTURE SYSTEM