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Rail Mill User's Manual



E.H. Wachs Company Part No. 03-012-MAN
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Table of Contents

Chapter 1: About this Manual	1
Purpose of This Manual	1
How to Use The Manual	1
Symbols and Warnings	1
Manual Updates and Revision Tracking	2
Chapter 2: Safety	3
Operator Safety	3
Safety Symbols	4
Protective Equipment Requirements	5
Safety Labels	5
Machine Safety	6
Chapter 3: Set-Up and Operation	7
Clamping the Mill to the Workpiece	7
Securing the Chain-Clamping Model	11
Securing the Cable-Clamping Model	12
Hydraulic Connections	14
Machine-Mounted Controls	14
Topside Control Unit	14
Connect Hoses to TCU	14
Connect Hoses to the Rail Mill	16
Installing the Blade	18
Operating the Mill	20
Machine-Mounted Controls	20
Topside Control Unit	22
Removing the Mill	29
Removing the Chain-Clamping Model	29
Removing the Cable-Clamping Model	30
Chapter 4: Routine Maintenance	33
Lubrication	33
Chapter 5: Parts Lists and Ordering Information	35
Drawings and Parts Lists	35
Ordering Information	46
Ordering Replacement Parts	46
Repair Information	46
Warranty Information	46
Return Goods Address	46

Chapter 1

About this Manual



PURPOSE OF THIS MANUAL

This manual explains how to operate and maintain the rail mill. It includes instructions for set-up, operation, and maintenance. It also contains parts lists and diagrams to help you order replacement parts and perform user-serviceable repairs.

HOW TO USE THE MANUAL

This manual is organized to help you quickly find the information you need. Each chapter describes a specific topic on using or maintaining the equipment.

Each page is designed with two columns. This large column on the inside of the page contains instructions and illustrations. Use these instructions to operate and maintain the equipment.

The narrower column on the outside contains additional information such as warnings, special notes, and definitions. Refer to it for safety notes and other information.

SYMBOLS AND WARNINGS

The following symbols are used throughout this manual to indicate special notes and warnings. They appear in the outside column of the page, next to the section they refer to.

In This Chapter

- PURPOSE OF THIS MANUAL
- HOW TO USE THE MANUAL
- SYMBOLS AND WARNINGS
- MANUAL UPDATES AND REVISION TRACKING

Throughout this manual, refer to this column for warnings, cautions, and notices with supplementary information.

Make sure you understand what each symbol means, and follow all instructions for cautions and warnings.



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.



NOTE

This symbol indicates a user notice. **Notices** provide additional information to supplement the instructions, or tips for easier operation.

Current versions of E.H. Wachs Company manuals are also available in PDF format. You can request an electronic copy of this manual by emailing customer service at sales@wachSCO.com.

MANUAL UPDATES AND REVISION TRACKING

Occasionally, we will update manuals with improved operation or maintenance procedures, or with corrections if necessary. When a manual is revised, we will update the revision history on the title page and at the bottom of the pages.

You may have factory service or upgrades performed on the equipment. If this service changes any technical data or operation and maintenance procedures, we will include a revised manual when we return the equipment to you.

Chapter 2

Safety

The E.H. Wachs Company takes great pride in designing and manufacturing safe, high-quality products. We make user safety a top priority in the design of all our products.

Read this chapter carefully before operating the rail mill. It contains important safety instructions and recommendations.

OPERATOR SAFETY

Follow these guidelines for safe operation of the equipment.

- **READ THE OPERATING MANUAL.** Make sure you understand all setup and operating instructions before you begin.
- **INSPECT MACHINE AND ACCESSORIES.** Before starting the machine, look for loose bolts or nuts, leaking lubricant, rusted components, and any other physical conditions that may affect operation. Properly maintaining the machine can greatly decrease the chances for injury.
- **ALWAYS READ PLACARDS AND LABELS.** Make sure all placards, labels, and stickers are clearly legible and in good condition. You can purchase replacement labels from E.H. Wachs Company.
- **KEEP CLEAR OF MOVING PARTS.** Keep hands, arms, and fingers clear of all rotating or moving parts.

In This Chapter

OPERATOR SAFETY

SAFETY LABELS

MACHINE SAFETY



Look for this symbol throughout the manual. It indicates a personal injury hazard.

Always turn machine off before doing any adjustments or service.

- **SECURE LOOSE CLOTHING AND JEWELRY.** Secure or remove loose-fitting clothing and jewelry, and securely bind long hair, to prevent them from getting caught in moving parts of the machine.
- **KEEP WORK AREA CLEAR.** Keep all clutter and nonessential materials out of the work area. Only people directly involved with the work being performed should have access to the area.

Safety Symbols



This icon is displayed with any safety alert that indicates a personal injury hazard.

WARNING

This safety alert indicates a potentially hazardous situation that, if not avoided, **could** result in **death or serious injury**.

CAUTION

This safety alert, with the personal injury hazard symbol, indicates a potentially hazardous situation that, if not avoided, **could** result in **minor or moderate injury**.

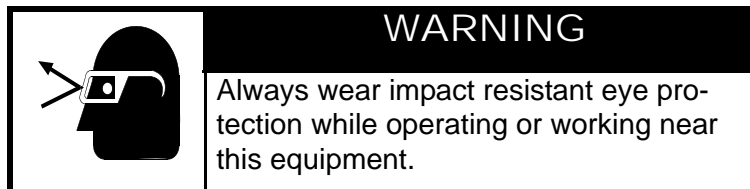
NOTICE

This alert indicates a situation that, if not avoided, **will** result in **damage to the equipment**.

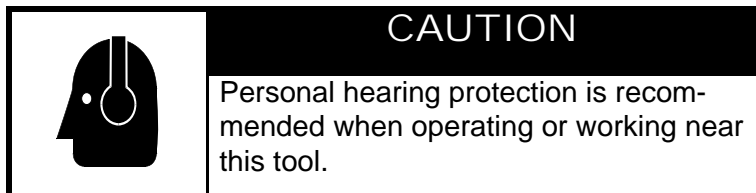
IMPORTANT

This alert indicates a situation that, if not avoided, **may** result in **damage to the equipment**.

Protective Equipment Requirements



For additional information on eye and face protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.133., Eye and Face Protection and American National Standards Institute, ANSI Z87.1, Occupational and Educational Eye and Face Protection. Z87.1 is available from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.



Hearing protectors are required in high noise areas, 85 dBA or greater. The operation of other tools and equipment in the area, reflective surfaces, process noises, and resonant structures can increase the noise level in the area. For additional information on hearing protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.95, Occupational Noise Exposure and ANSI S12.6 Hearing Protectors.

SAFETY LABELS

There is no safety labeling on the rail mill.

MACHINE SAFETY

To avoid damaging the equipment, follow these usage guidelines.

- Lubricate the machinery according to the recommendations in Chapter 4.
- Before starting the machine, make sure the blade is inserted and fastened securely.
- Make sure that the chain or cable clamping system is securely tightened.
- Make sure that all hydraulic connections are secure.

Chapter 3

Set-Up and Operation

.....

This manual explains how to install and operate the rail mill using either machine-mounted controls or the topside control unit (TCU). Follow the instructions in the appropriate section for your machine's configuration.

There are two rail mill models. Model number 03-012 has a manual plunge drive and uses a 6" milling blade. Model number 06-150 has a hydraulic plunge drive and uses a 7" milling blade.

CLAMPING THE MILL TO THE WORKPIECE

The rail mill cuts from the end with the feed motor and gear box, toward the opposite end. The maximum length of travel depends on the size of the rail mill frame.

Position the machine to take into account the direction of cut. The machine only performs conventional milling, not climb milling. Figure 3-1 and Figure 3-2 illustrate the machine's cutting motions.

In This Chapter

CLAMPING THE MILL TO THE WORKPIECE

HYDRAULIC CONNECTIONS

INSTALLING THE BLADE

OPERATING THE MILL

REMOVING THE MILL

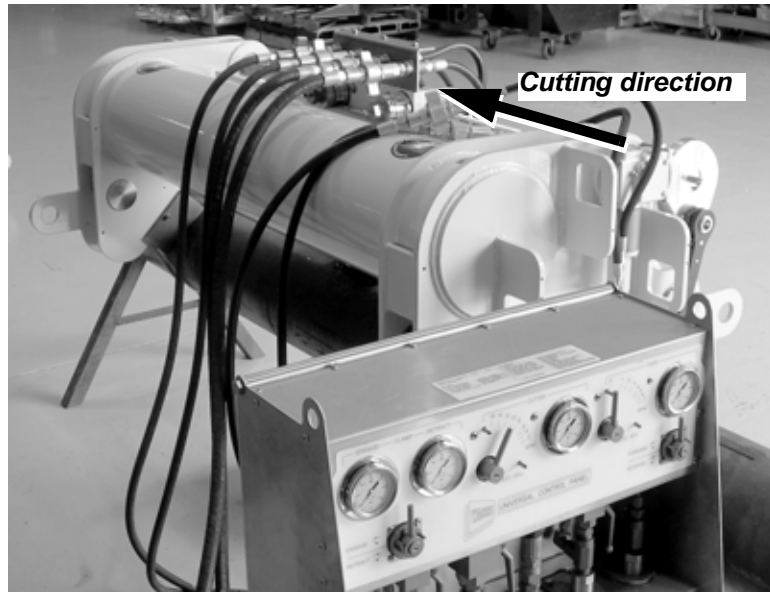


Figure 3-1. The rail mill is designed to cut only in one direction, as shown in the photo.

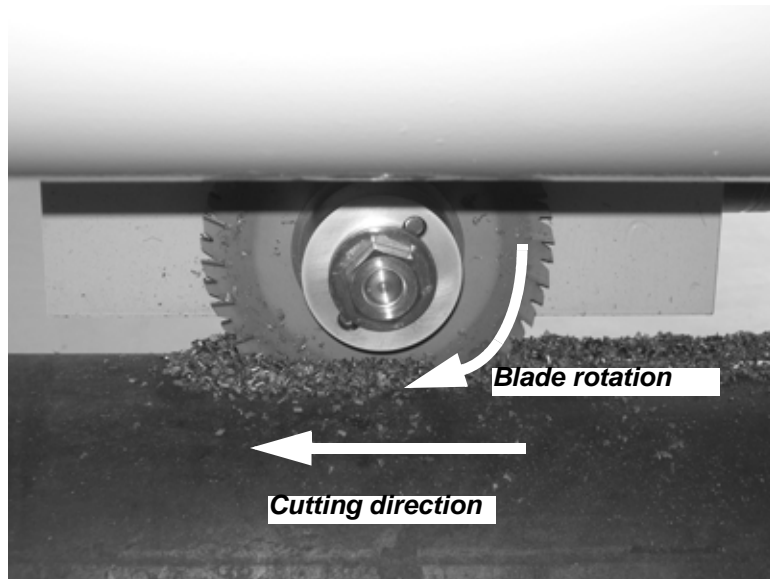


Figure 3-2. The blade rotates in the direction shown as the mill moves.

If you are cutting longer lengths than the rail mill's maximum travel, you will have to reposition the machine to continue the cut. Be sure to align the cut lines.

1. Attach a crane or hoist to the rail mill at its lifting locations.

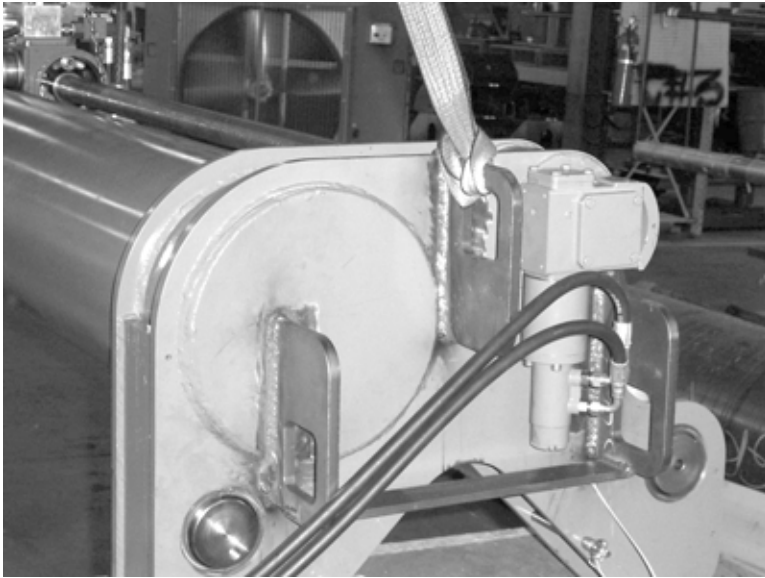


Figure 3-3. Connect a strap or chain to the lifting points. Use the center point at both ends for horizontal lifting; use all three points at one end for vertical lifting.

2. Select the appropriate mounting shoes for the size of the pipe you are cutting. The shoes are different sizes for the two rail mill models; refer to Table 1 for model 03-012, and Table 2 for model 06-150.

Table 1: Mounting shoes for 03-012 Rail Mill

Pipe Diameter	Shoe Part No.	Shoe Height
24"	03-012-31	1-1/4"
20"	03-012-32	1-3/4"
16"	03-012-33	2-1/2"
13-3/8"	03-012-34	2-3/4"
10-3/4" 9-5/8"	03-012-35	3-3/8"
7-5/8"	03-012-36	3-5/8"

Table 2: Mounting shoes for 06-150 Rail Mill

Pipe Diameter	Shoe Part No.	Shoe Height
30"	None	--
24"	06-150-005A or 03-012-32	1-3/4"
20"	06-150-005B or 03-012-33	2-1/2"
16"	06-150-005C	3"
13-3/8"	06-150-005D or 03-012-35	3-3/8"
10-3/4" 9-5/8"	06-150-005E	4"
7-5/8" 7"	06-150-005F	4-3/8"

3. Install the four shoes by positioning them inside the channels at each end of the frame and inserting the quick release pins.

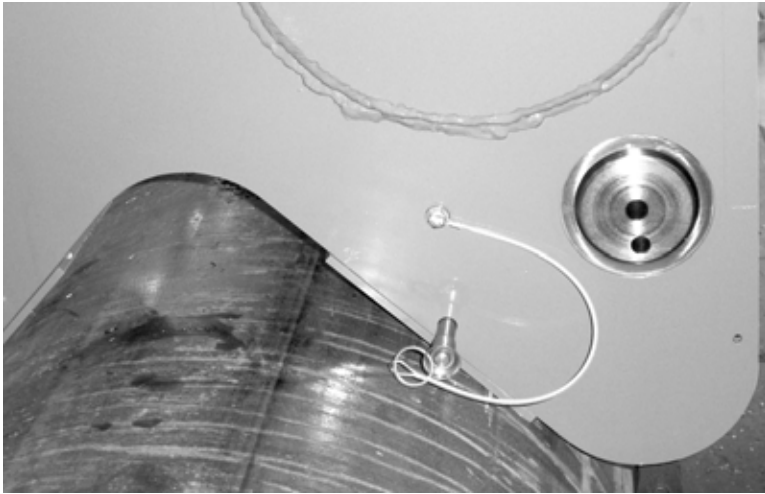


Figure 3-4. Put each mounting shoe in place and insert the quick release pin through the frame and shoe to secure it.

4. Lower the rail mill into position on the workpiece.

Securing the Chain-Clamping Model

1. Wrap the chain at one end of the mill frame around the casing and loop the chain pins onto the clamp screws.
2. Tighten the clamp nut with the supplied 2-1/2" combination wrench.



Figure 3-5. Tighten the chains to secure the rail mill to the workpiece.

3. Secure the chain at the other end of the mill frame in the same manner.
4. Release the tension on the crane supporting the rail mill. Leave the crane attached to the mill during cutting.

Securing the Cable-Clamping Model

1. Wrap the cable at one end of the mill around the casing and fasten the hook to the pin on the other side

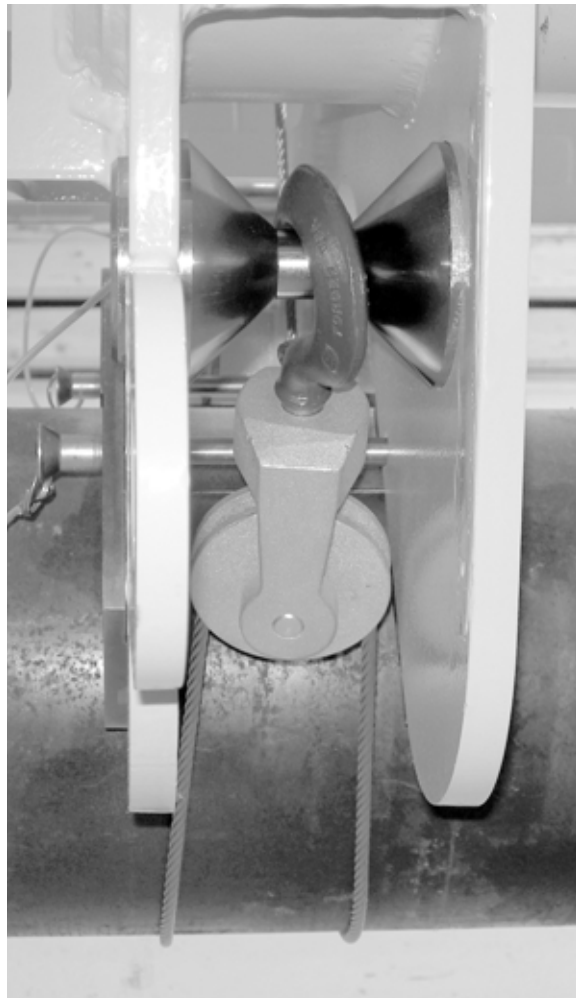


Figure 3-6. Run the cable around the pipe or casing and fasten the hook to the pin on the other side of the mill frame.

2. Use the ratchet handle to tighten the cable.



Figure 3-7. Push the ratchet handle forward to tighten the cable.

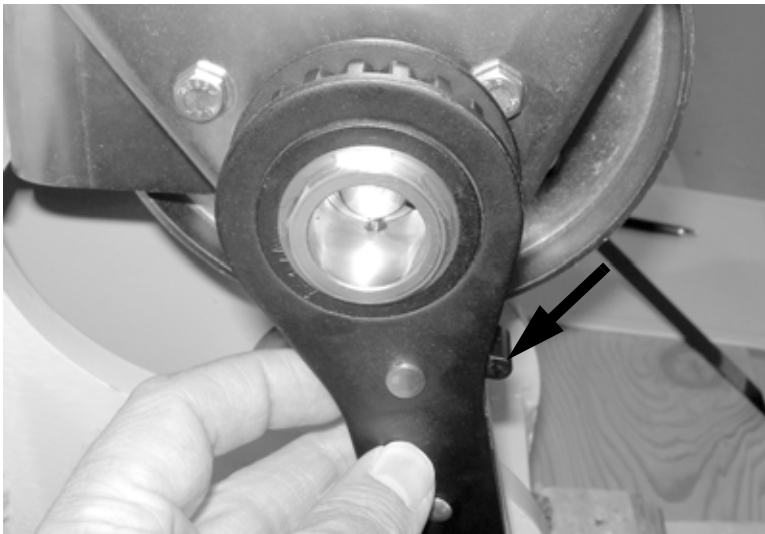


Figure 3-8. If the ratchet is set to turn in the wrong direction, switch the setting knob to reverse it.

3. Secure the cable at the other end of the mill frame in the same manner.
4. Release the tension on the crane supporting the rail mill. Leave the crane attached to the mill during cutting.

HYDRAULIC CONNECTIONS

Machine-Mounted Controls

One hydraulic hose pair supplies power to the control manifold. Connect the hoses as shown in Figure 3-9.

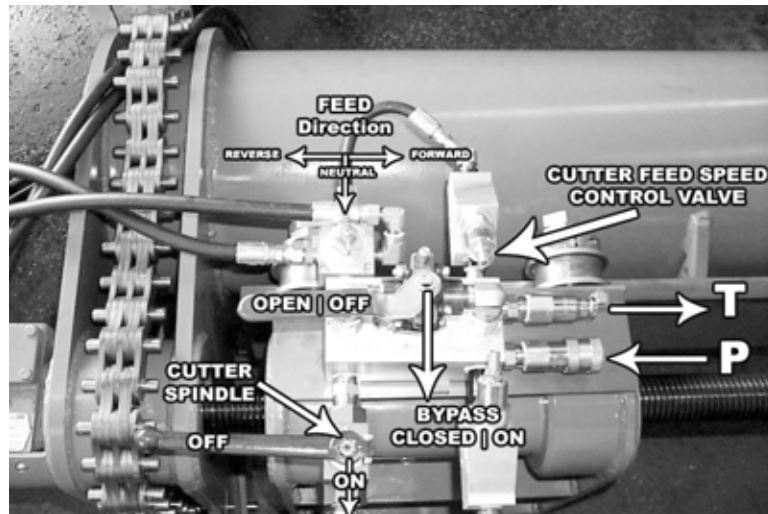


Figure 3-9. Connect the pressure hose to the fitting labeled **P**, and the return (tank) hose to the fitting labeled **T**.

Topside Control Unit

If you are operating the rail mill with the optional topside control unit (TCU), set up the hydraulic connections using the following procedure.

Connect Hoses to TCU

1. Wipe all hose couplers with a clean, lint free cloth before making connections.

2. Connect the hoses from the hydraulic power unit (HPU) to the HPU fittings on the back of the topside control unit (TCU).

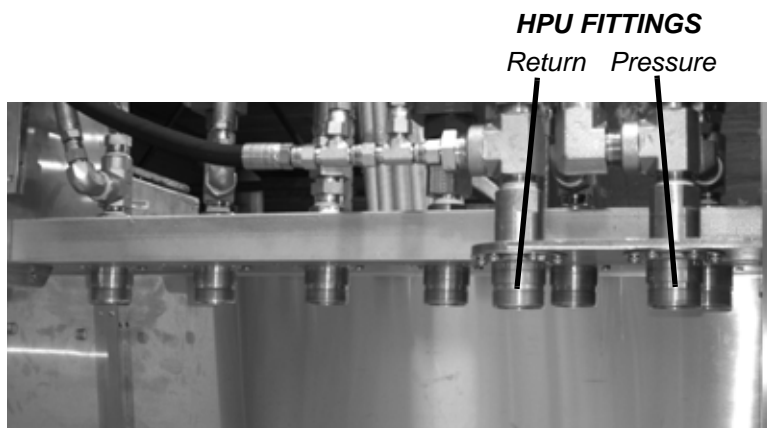
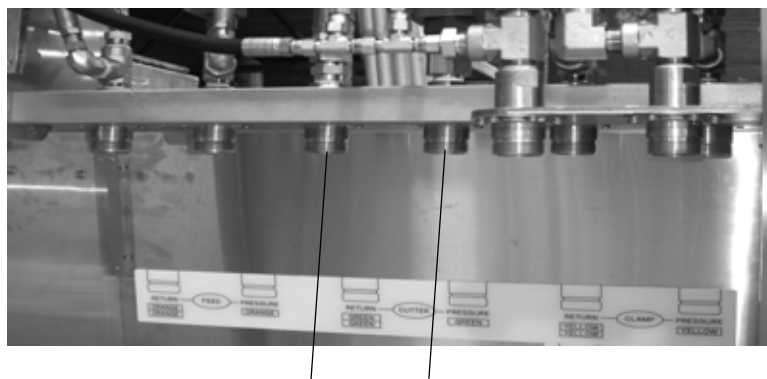


Figure 3-10. HPU hose fittings on the back of the control unit.

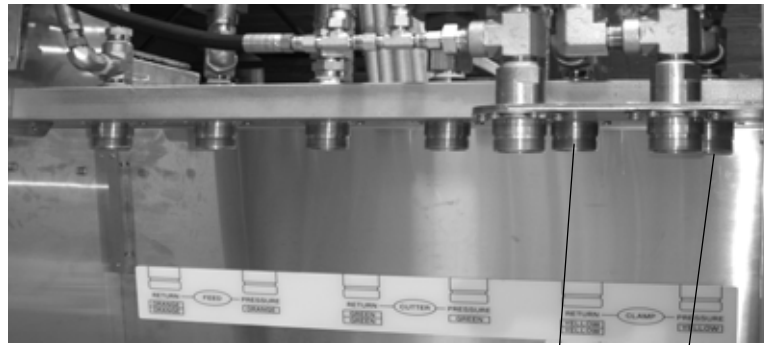
3. Connect the cutting drive hose set from the machine or from the hose reel to the cutting drive fittings on the back of the TCU. The hoses and fittings are color coded.



Return Pressure
CUTTER DRIVE

Figure 3-11. Connect the cutting drive hoses to the TCU.

4. Connect the auto-plunge hose set to the fittings labeled “clamp” on the back of the TCU. The hoses and fittings are color coded.



Return Pressure
AUTO-PLUNGE DRIVE

Figure 3-12. Connect the hoses for the auto-plunge drive to the clamping drive fittings on the TCU.

5. Connect the feed drive hose set to the feed drive fittings on the back of the TCU. The hoses and fittings are color coded.



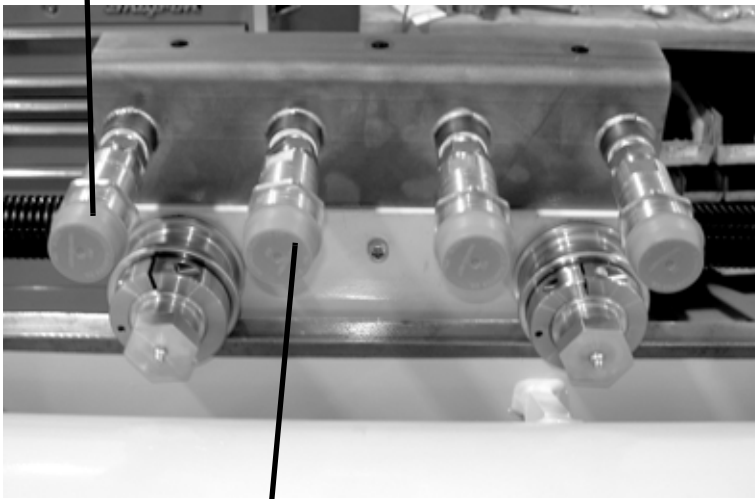
Return Pressure
FEED DRIVE

Figure 3-13. Feed drive connectors (for machines with hydraulic feed drives).

Connect Hoses to the Rail Mill

1. Connect the auto-plunge drive hoses from the TCU or hose reel to the fittings on the rail mill bulkhead as shown in Figure 3-14.

Auto-plunge drive pressure

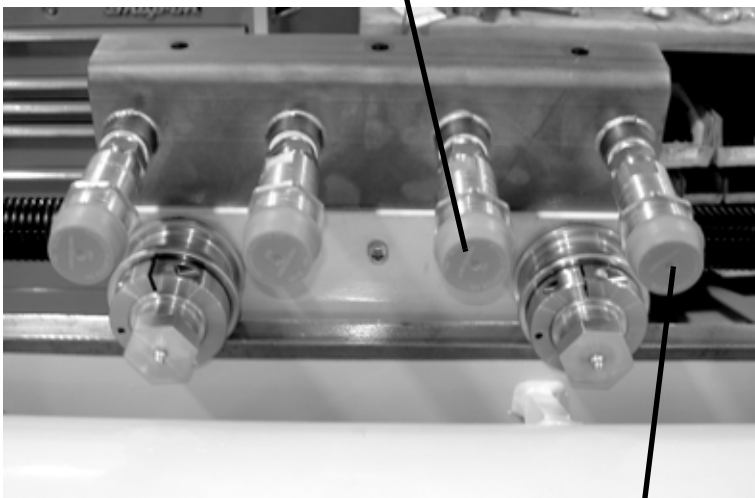


Auto-plunge drive return

Figure 3-14. Connect the auto-plunge drive hoses to the mill as shown.

2. Connect the cutting drive hoses from the TCU or hose reel to the fittings on the rail mill bulkhead as shown in Figure 3-15.

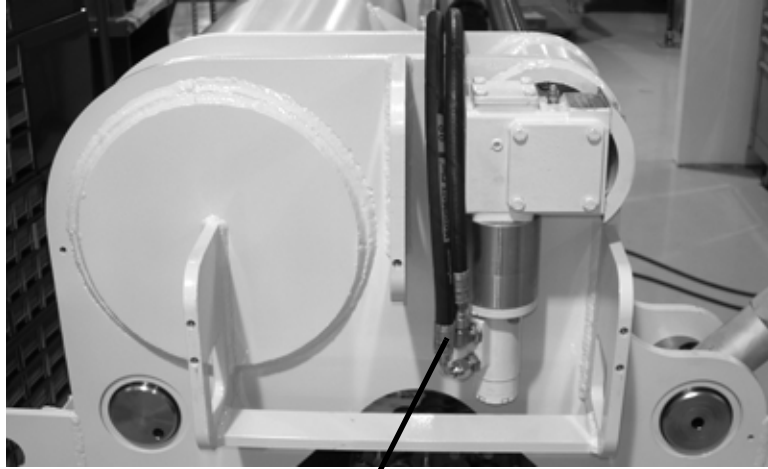
Cutting drive pressure



Cutting drive return

Figure 3-15. Connect the cutting drive hoses to the mill as shown.

3. Connect the feed drive hoses from the TCU or hose reel to the hoses on the end of the mill as shown in Figure 3-15.



Feed drive hose fittings

Figure 3-16. Connect the feed drive hoses to the hose fittings on the end of the rail mill.

NOTE: The feed drive hose fittings are physically interchangeable. If the feed drive is operating in the wrong direction, reverse the hose connections.

INSTALLING THE BLADE

1. Make sure the cutter spindle is in its uppermost position. Use the plunge drive on the TCU to raise the spindle, or turn the spindle wrench counterclockwise on the plunge drive nut.

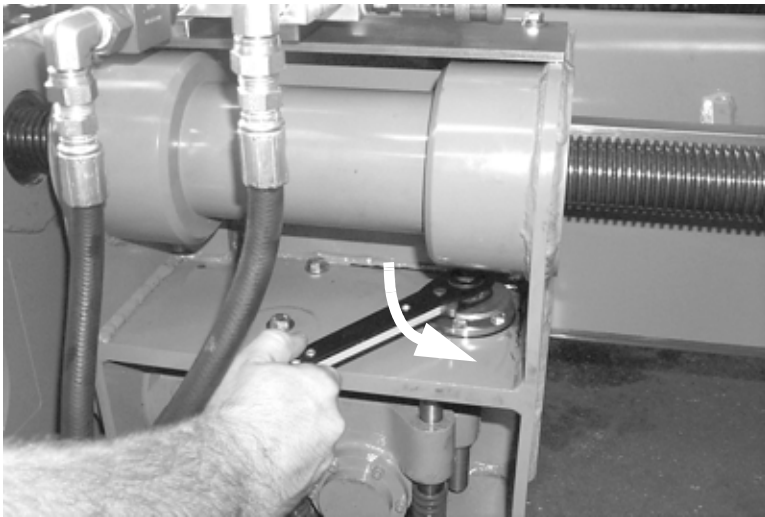


Figure 3-17. On mills with machine-mounted controls, turn the plunge drive nut counter-clockwise to retract the spindle.

2. Make sure the cutter drive collar spacer and lock nut are clean and free of chips and dirt so that the assembly can be tightened securely.
3. Install the cutter onto the spindle shaft. The cutter should be placed on the spindle so the flat, sharp cutting edges lead into the pipe.
4. Place the driving collar spacer on the spindle and lock the spacer and cutter tightly to the spindle with the lock nut.

NOTE: Left hand thread in nut turns counter-clockwise to tighten.

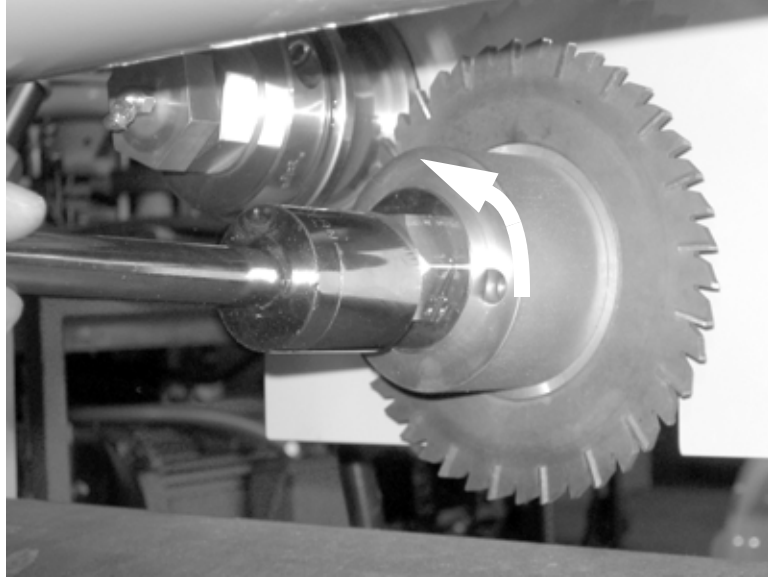


Figure 3-18. Turn the blade nut counter-clockwise, as shown, to tighten the blade.

OPERATING THE MILL

Machine-Mounted Controls

1. Visually inspect the machine for any loose bolts or fittings. Ensure the controls on the manifold are set to off or neutral.
2. Turn on the hydraulic power supply and start flow to the rail mill.
3. The controls for the rail mill are described in Figure 3-19. Close the bypass valve to direct hydraulic flow into the manifold.

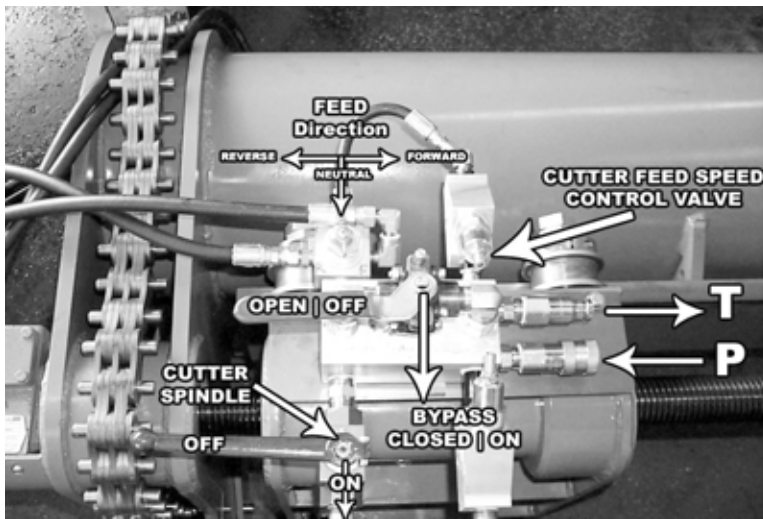


Figure 3-19. The photo illustrates the operation of the machine-mounted control unit.

4. If necessary, turn the feed direction handle to traverse the carriage to the desired starting position.
5. Turn on the cutter spindle valve.
6. Slowly feed the rotating cutter spindle down until it extends through the wall of the casing. This is done by turning the feed screw in a clockwise direction. One complete turn of the feed screw lowers the cutter 1/10".

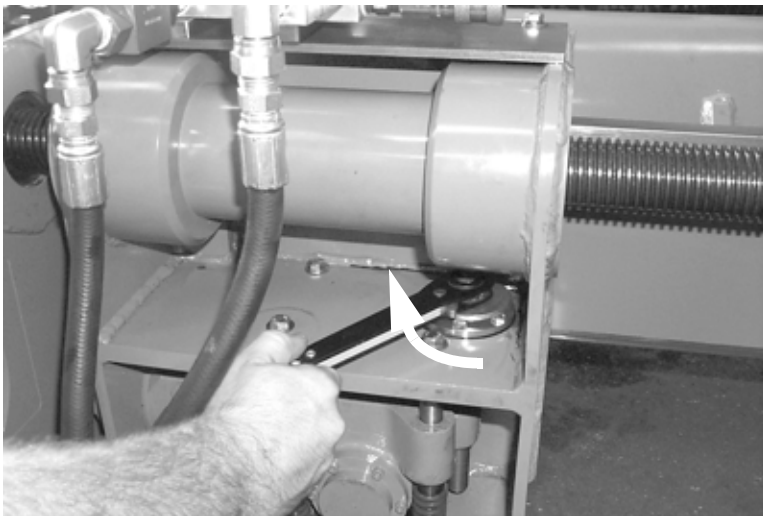


Figure 3-20. Turn the plunge drive nut clockwise to feed the spindle.

7. Turn the feed direction valve handle in the forward direction. The rail mill will begin cutting a longitudinal slit through the casing.
8. Adjust the cutting speed by changing the settings of the flow control valve.
9. Once the cut is complete, turn off the feed direction valve and cutter spindle valve.
10. Retract the cutter spindle up into the carriage.
11. Turn feed control valve to the Reverse position to bring carriage back to start position.
12. Turn off hydraulic fluid to the machine by opening the bypass valve.

Topside Control Unit

Brief instructions for operating the TCU are on the instruction label on the top of the unit.

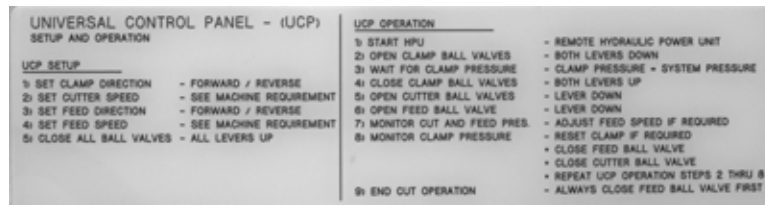


Figure 3-21. Instruction label on the topside control unit.

NOTE: The TCU has fittings and controls for a clamping drive, which are identified on the unit as “clamp” or “clamping”. With the rail mill, these controls are used for the auto-plunge drive.

1. Set all drive power levers to the up (closed) position, and make sure the clamping (auto-plunge) direction lever is set to the ENGAGE position.

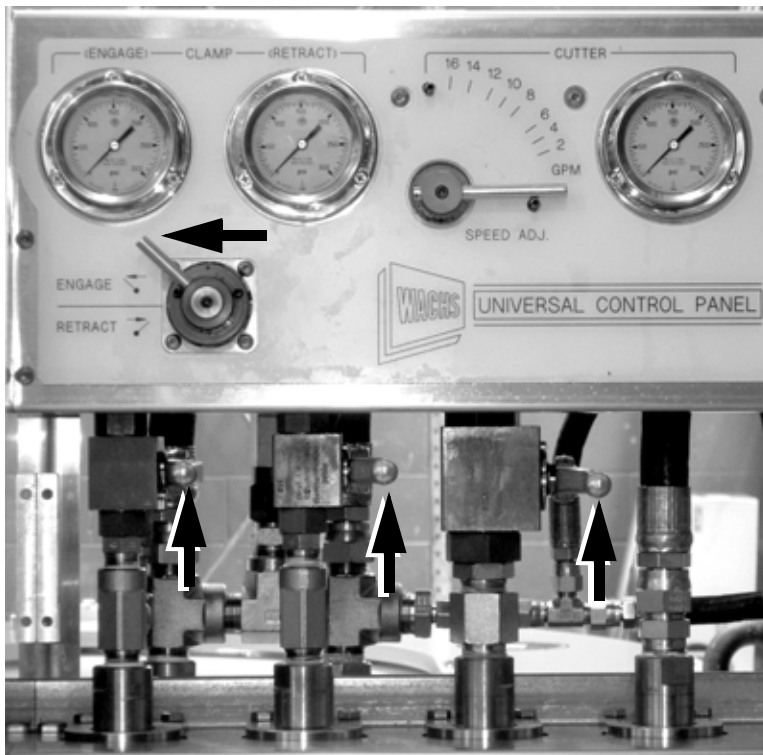


Figure 3-22. Before starting the HPU, make sure that all drive levers are in the up position, and that the clamping direction lever is in the ENGAGE position.

2. Start the hydraulic power unit.
3. Make sure the cutting drive speed control lever is set to 0.



Figure 3-23. Set the cutting drive speed lever to 0 before starting the mill.

4. Open the cutting drive lever (down position).

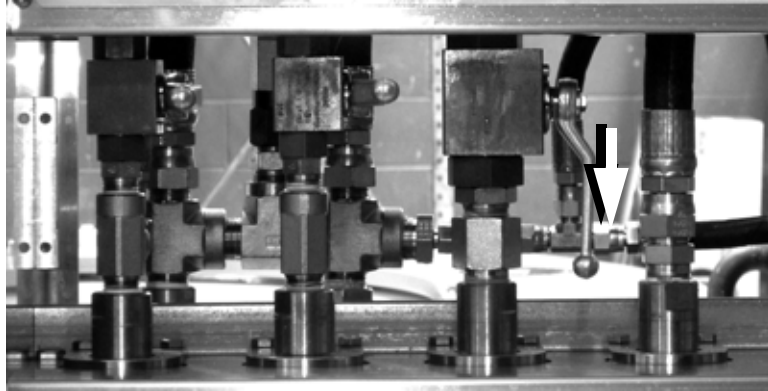


Figure 3-24. Push the cutting drive lever down to open it.

5. Move the cutting drive speed lever up gradually to the desired cutting speed.

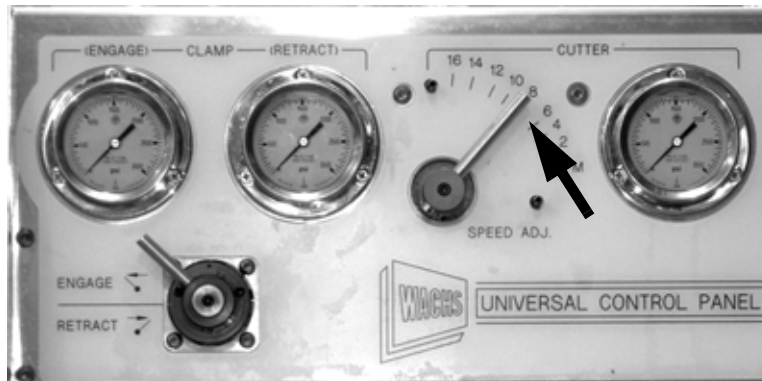


Figure 3-25. Push the cutting speed lever up slowly to the desired cutter speed.

6. Open both clamping drive levers (down position) at the same time to engage the auto-plunge drive. The cutter will move down into the surface of the work-piece.

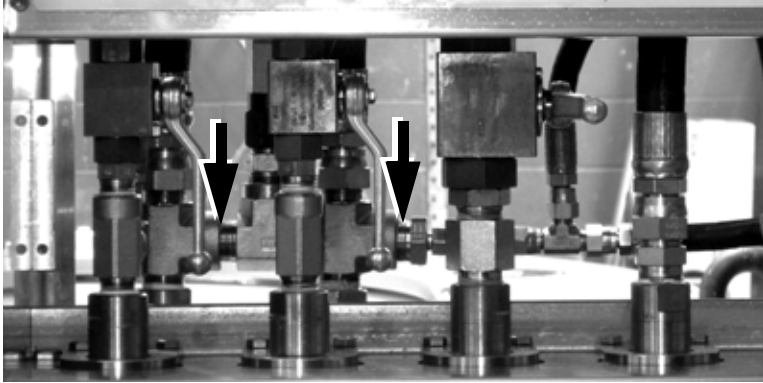


Figure 3-26. Put both clamping levers down at the same time to engage the auto-plunge drive.

7. When the cutter has reached the desired depth, close both clamping drive levers (up position) at the same time.

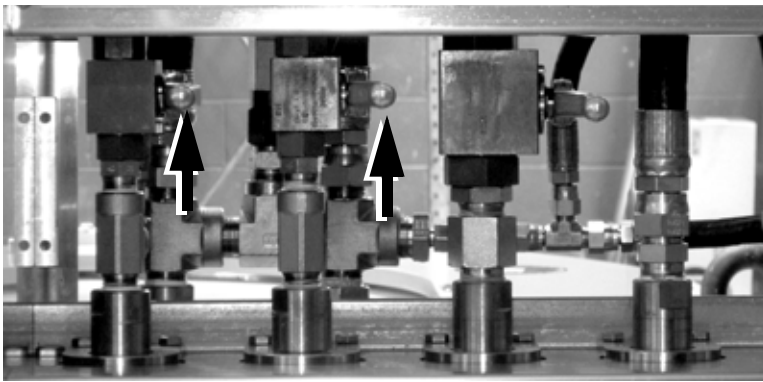


Figure 3-27. When the cutter has reached the desired depth, return both clamping levers to the up position.

8. Set the feed direction lever to the FORWARD position, as shown in Figure 3-28.
9. Open the feed drive lever by pushing it down.
10. Adjust the feed speed lever until the feed motion starts. Set the lever to the desired speed.



Figure 3-28. With the feed direction lever in the FORWARD position, move the feed drive lever up to start the drive. Then move the feed adjustment lever to start flow to the feed drive.

11. When the cut is complete, move the feed speed lever back to 0 to stop the feed motion.

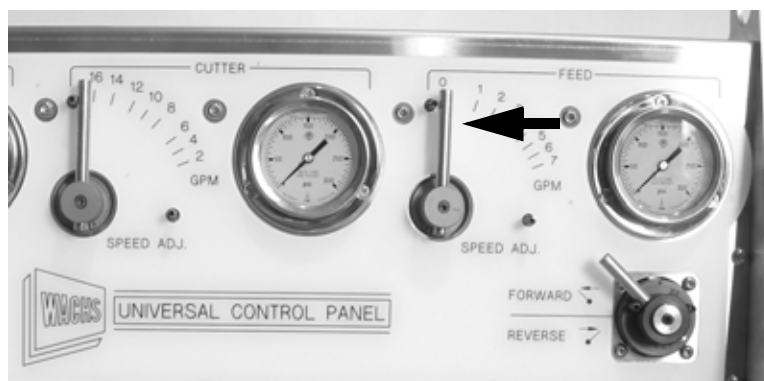


Figure 3-29. Stop the feed motion by setting the feed speed lever back to 0.

12. Move the feed drive lever back to the down position.

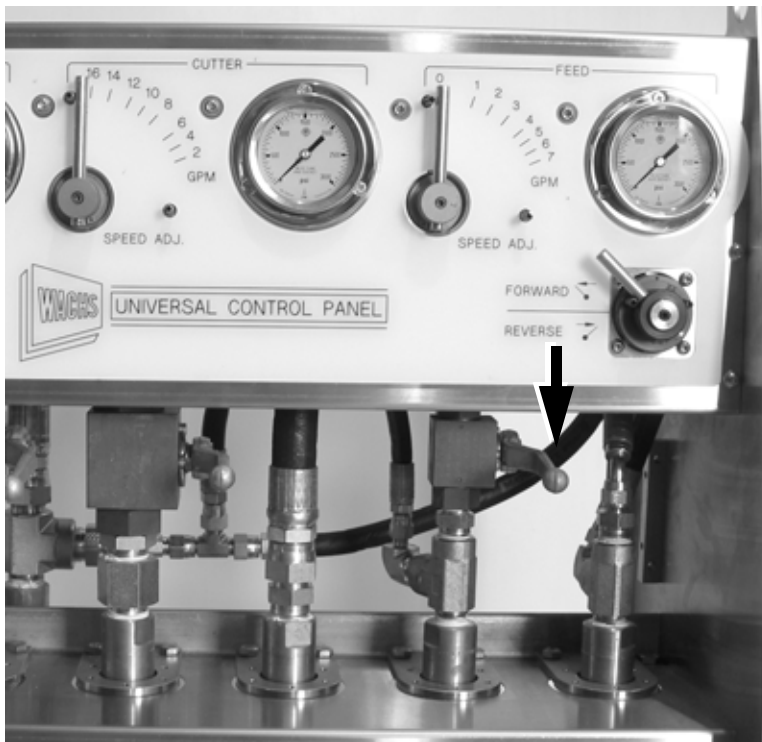


Figure 3-30. Move the feed drive lever down to stop the feed motion.

13. Set the clamping drive (auto-plunge) direction lever to the RETRACT position.



Figure 3-31. Set the clamping (auto-plunge) direction lever to the RETRACT position.

14. Engage both clamping drive levers down to retract the cutter out of the workpiece.

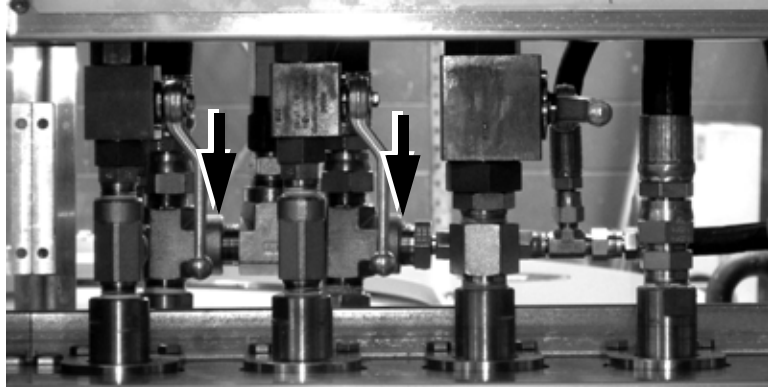


Figure 3-32. Push the clamping drive levers down to reverse the auto-plunge drive.

15. When the cutter is above the workpiece, pull both clamping drive levers back up.

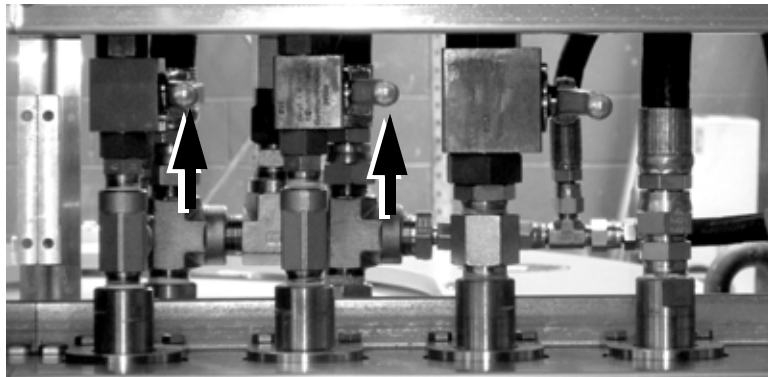


Figure 3-33. Return both clamping (auto-plunge) levers back to the up position when the cutter is fully retracted.

16. To reverse the feed and move the cutting head back to the start position, set the feed direction lever to the REVERSE position and use the feed drive lever to operate the drive.
17. Set the cutting speed lever back to 0 to stop the cutter. Close the cutting drive lever by moving it to the up position.

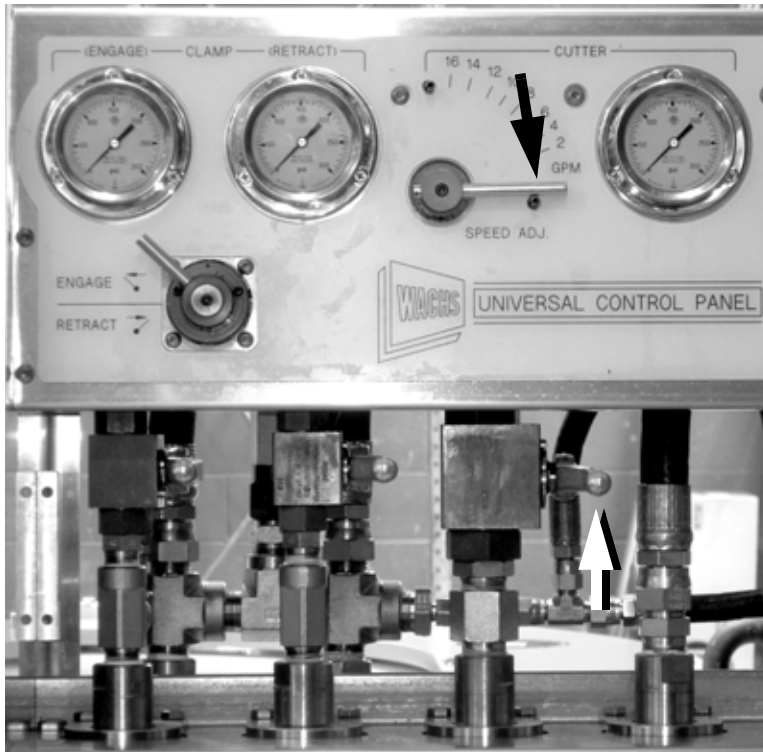


Figure 3-34. When the cut is complete, set the cutting speed lever back to 0. Then return the cutting drive lever to the off (up) position.

REMOVING THE MILL

1. Turn off power to the HPU.
2. Slowly raise the lift holding the mill until there is just enough tension to hold the mill in place.

Removing the Chain-Clamping Model

1. Loosen the chain tensioning nuts at both ends of the mill frame, using the supplied 2-1/2" wrench.

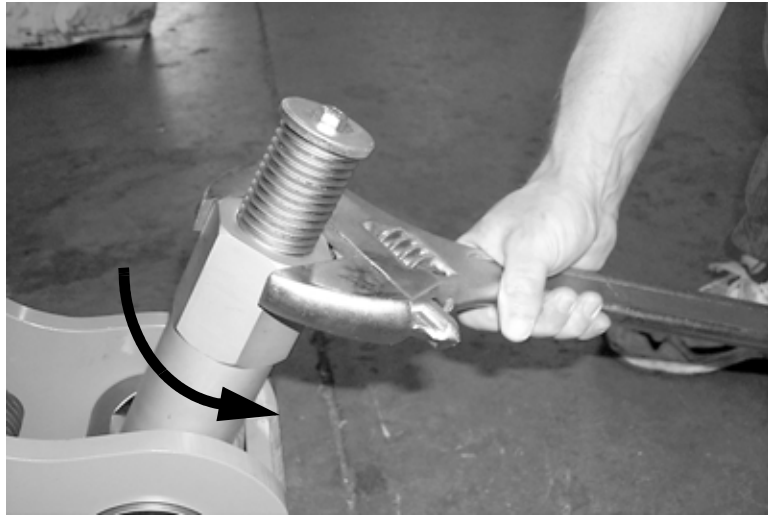


Figure 3-35. Loosen the clamping nuts to release the tension on the chains.

2. Remove the clamping chains from the slots on the back of the mill frame.
3. Use the crane to remove the mill from the workpiece.

Removing the Cable-Clamping Model

Use the following procedure to safely loosen the cable clamp one notch at a time.

1. Set the ratchet on the handle to the forward direction.



Figure 3-36. Push the right-side ratchet knob up to set the ratchet direction forward.

2. Push the handle forward just far enough to release the catch on the cable winch. Push the catch down to disengage it.



Figure 3-37. Turn the handle just enough to release the catch.

3. Back the handle off one notch of the gear and reset the catch.
4. Continue to loosen the winch one gear notch at a time until the cable is loose around the pipe.
5. Remove the cable hook from the pin on the back of the mill frame.

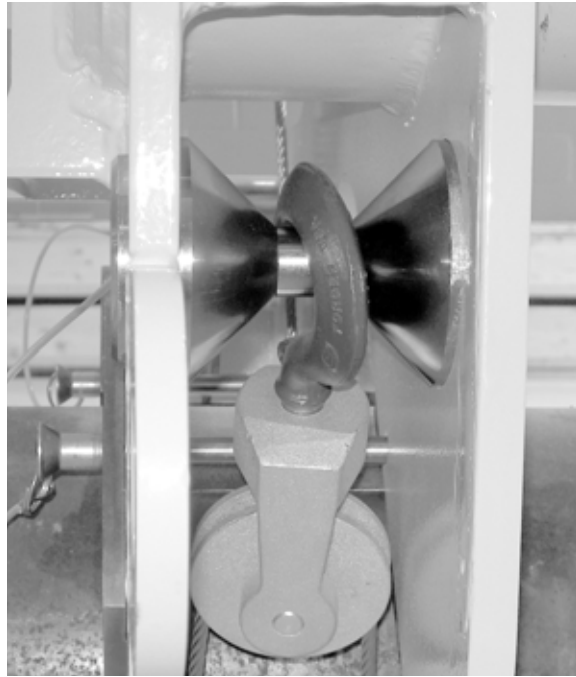


Figure 3-38. After loosening the cable, remove the hook from the pin on the back of the mill frame.

6. Repeat the procedure to remove the cable on the other end of the mill frame.
7. Use the crane to remove the mill from the workpiece.

Chapter 4

Routine Maintenance



LUBRICATION

Before each cut, apply grease to all grease fittings on the machine.

In This Chapter

LUBRICATION



Chapter 5

Parts Lists and Ordering Information

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Refer to the part assembly drawings and parts lists that accompany them for parts identification. To order spare or replacement parts, see the ordering instructions at the end of this chapter.

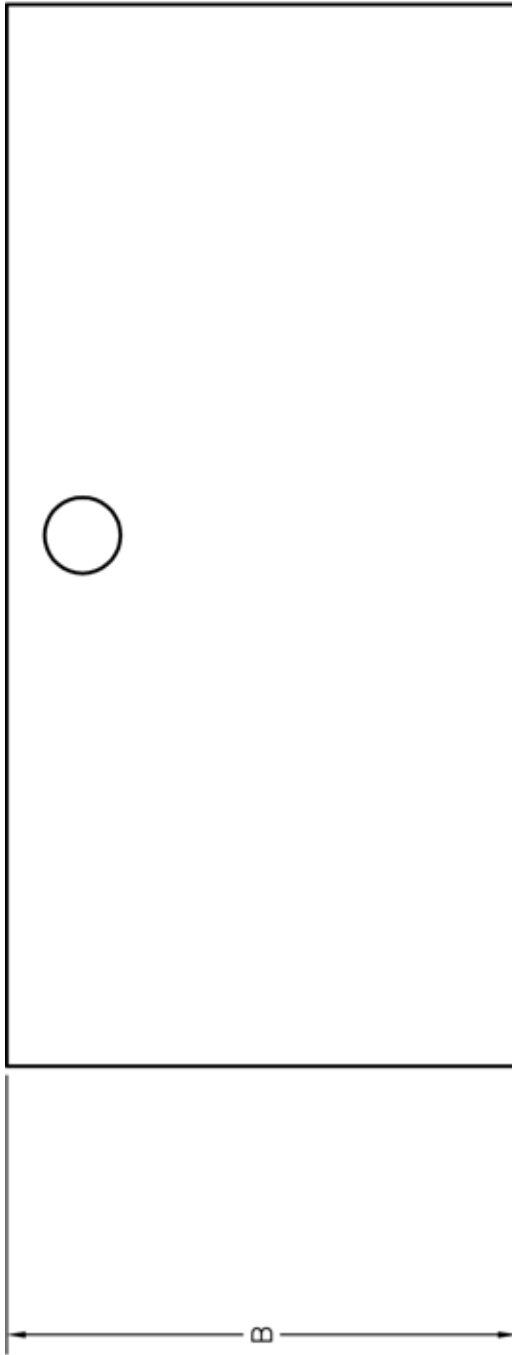
DRAWINGS AND PARTS LISTS

The following drawings with parts lists are provided.

- Shoe selection chart
- 03-012 Axial carriage assembly for manual plunge machine
- 03-012 Feed end view for manual plunge machine
- 03-012 Feed detail for manual plunge machine
- 06-150 Axial carriage assembly for autoplunge machine
- 06-150 Feed end view for autoplunge machine
- 06-150 Feed detail for autoplunge machine
- 06-150 Autofeed assembly
- 02-020-00 Cutter spindle gear housing

In This Chapter

DRAWINGS AND PARTS LISTS
ORDERING INFORMATION

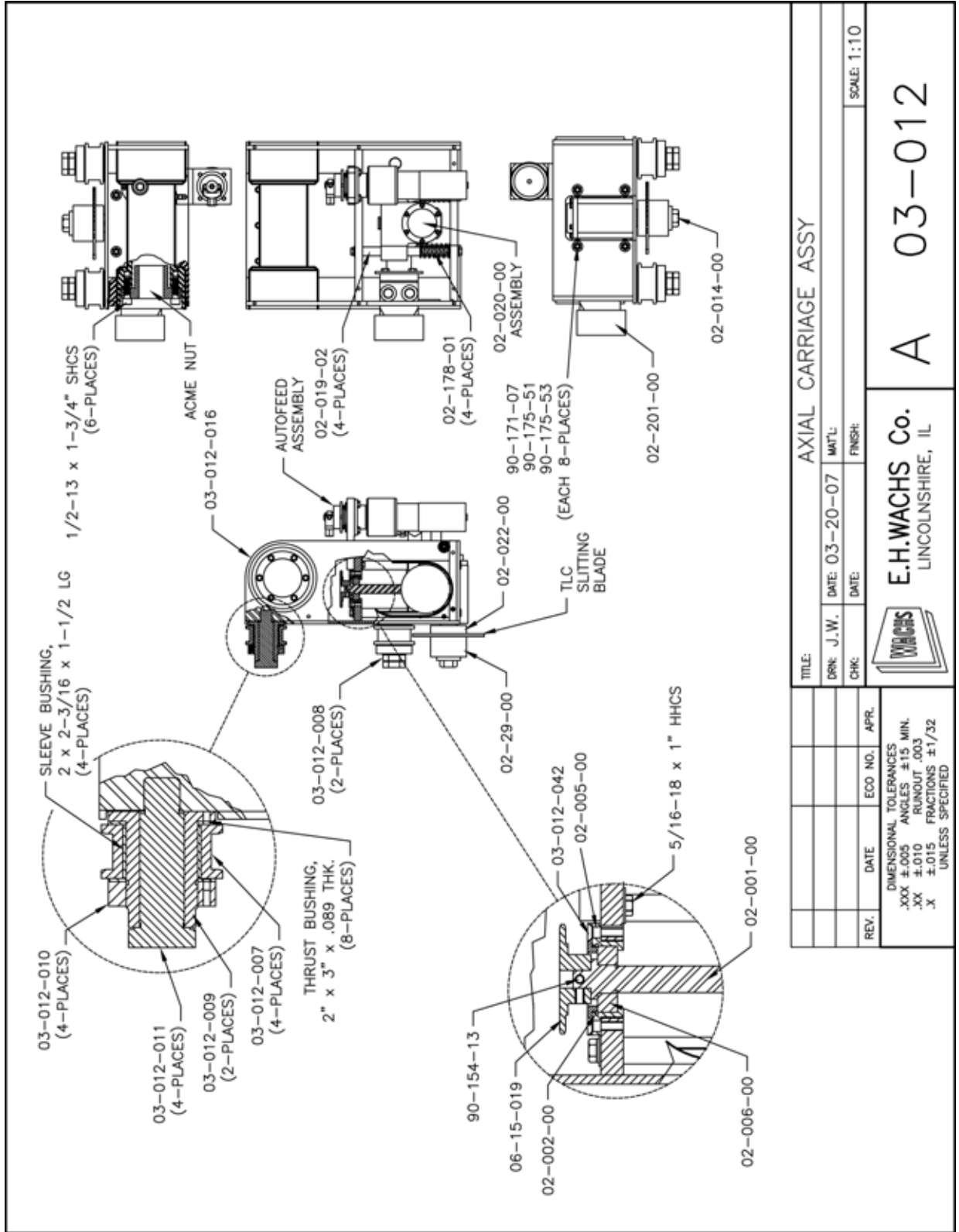


03-012 RAIL MILL

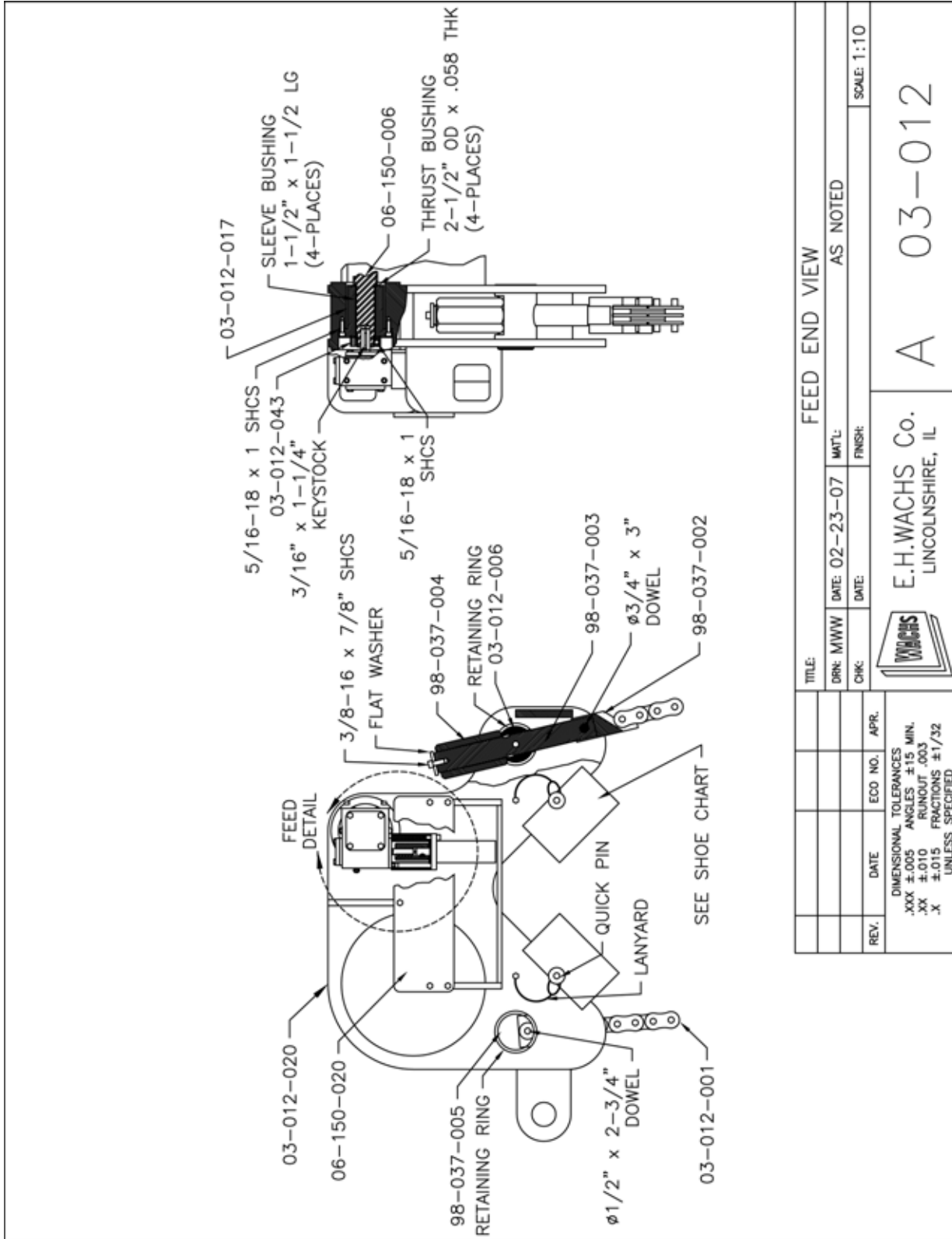
PIPE DIA.	SHOE	B
30"	NONE	NA
24"	03-012-031	1-3/4"
20"	03-012-032	2-1/2"
16"	03-012-033	3"
13-3/8"	03-012-034	3-3/8"
10-3/4" & 9-5/8"	03-012-035	4"
7-5/8"	03-012-036	4-3/8"

06-150 RAIL MILL

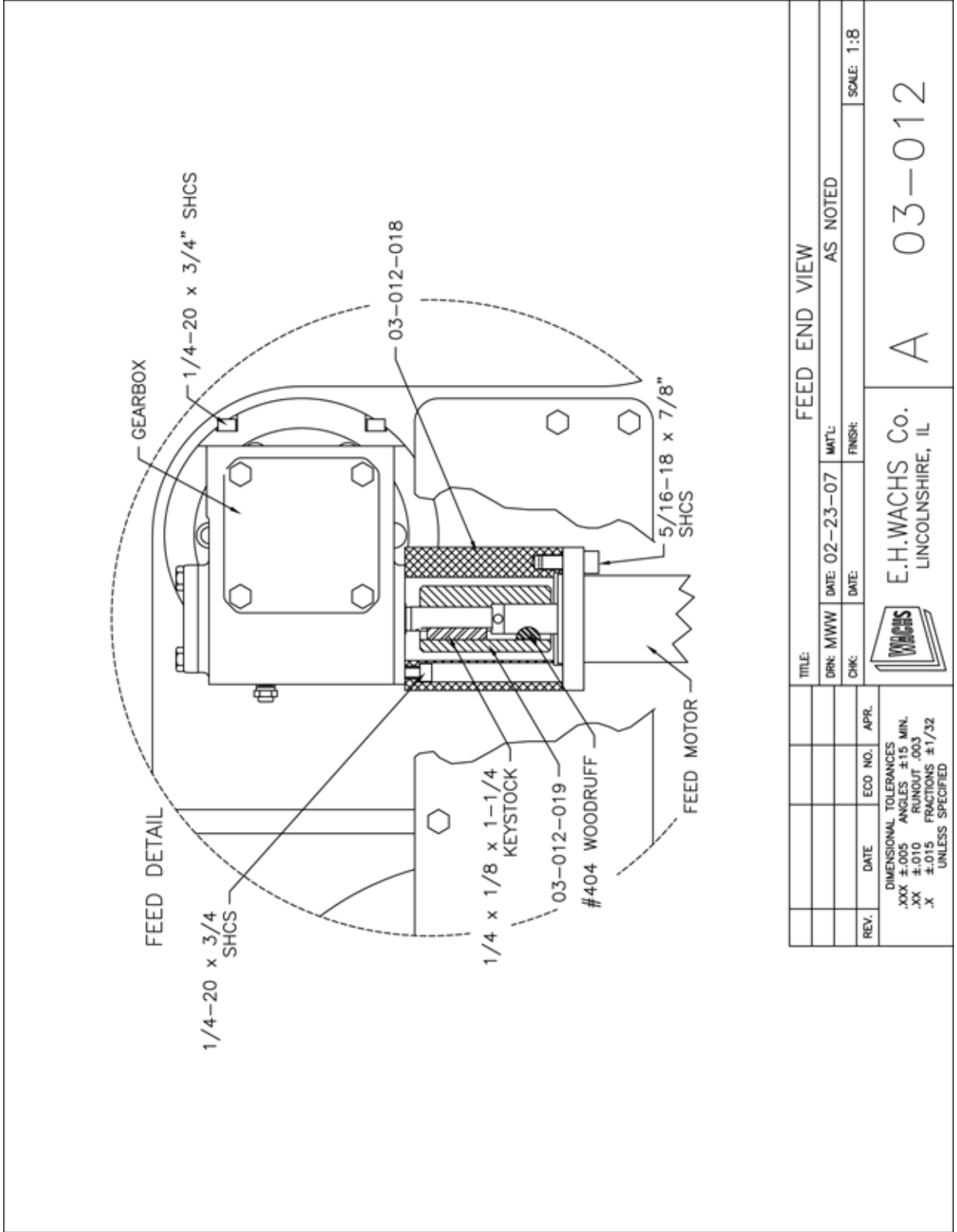
PIPE DIA.	SHOE	B
30"	NONE	NA
24"	06-150-005A = 03-012-032	1-3/4"
20"	06-150-005B = 03-012-033	2-1/2"
16"	06-150-005C	3"
13-3/8"	06-150-005D = 03-012-035	3-3/8"
10-3/4" & 9-5/8"	06-150-005E	4"
7-5/8" & 7"	06-150-005F	4-3/8"




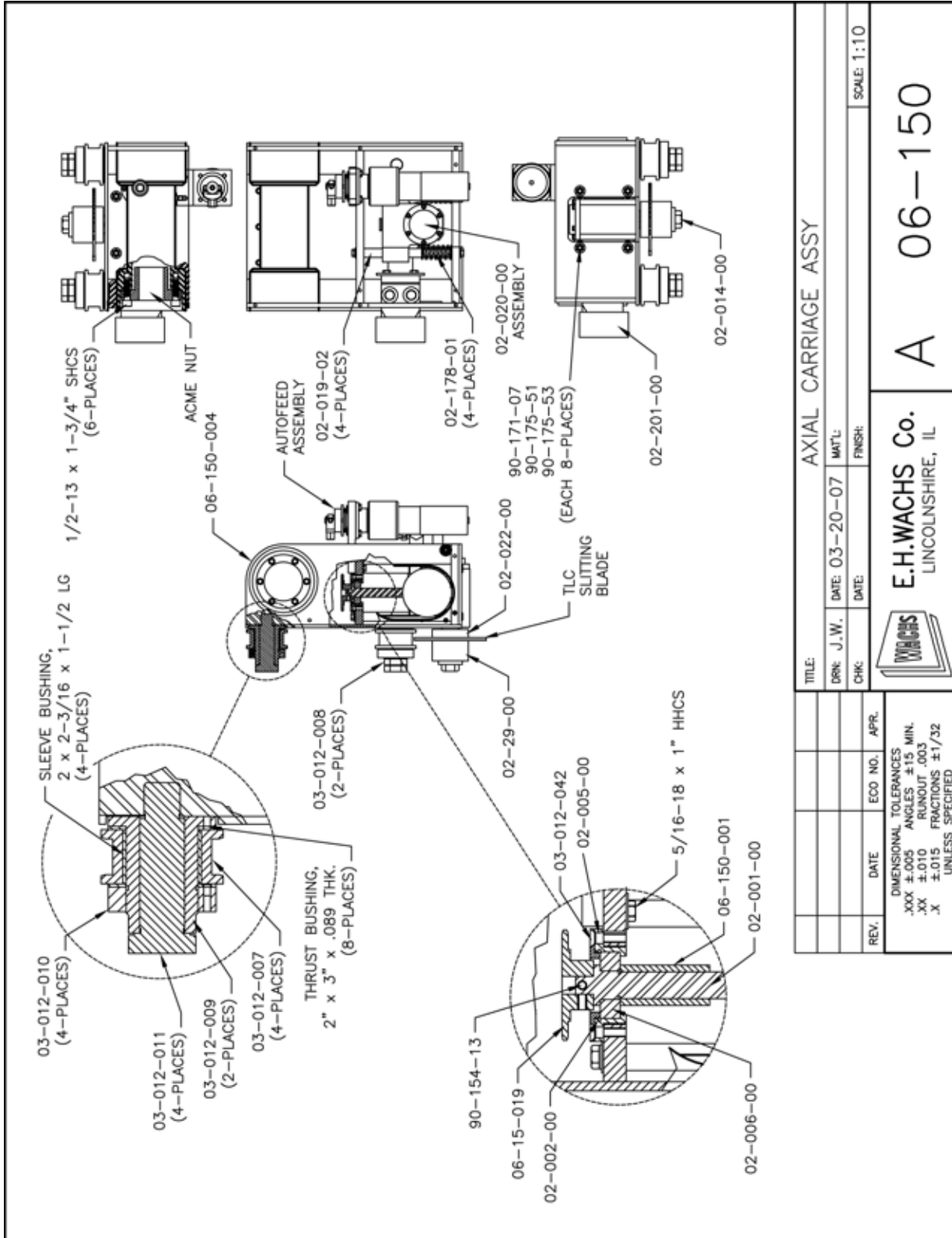
TITLE: AXIAL CARRIAGE ASSY		DATE: 03-20-07	MAT'L:	SCALE: 1:10
DRN: J.W.	CHK:	DATE:	FINISH:	
REV.		DATE	ECO NO.	APR.
DIMENSIONAL TOLERANCES .XXX ±.005 ANGLES ±15 MIN. .XX ±.010 RUNOUT .003 .X ±.015 FRACTIONS ±1/32 UNLESS SPECIFIED				
E.H. WACHS Co. LINCOLNSHIRE, IL			A 03-012	



TITLE: FEED END VIEW	
DRN: MWW	DATE: 02-23-07
CHK:	DATE:
MATL: AS NOTED	
FINISH: SCALE: 1:10	
	
E.H. WACHS Co. LINCOLNSHIRE, IL	
A 03-012	
REV.	DATE
	ECO NO.
	APR.
DIMENSIONAL TOLERANCES .XXX ±.005 ANGLES ±15 MIN. .XX ±.010 RUNOUT .003 .X ±.015 FRACTIONS ±1/32 UNLESS SPECIFIED	



TITLE:		DATE: 02-23-07		MATERIAL: AS NOTED		SCALE: 1:8	
DRN: MWW	CHK:	DATE:	DATE:	FINISH:			
				E.H. WACHS Co. LINCOLNSHIRE, IL			
DIMENSIONAL TOLERANCES .XXX ±.005 ANGLES ±15 MIN. .XX ±.010 RUNOUT .003 .X ±.015 FRACTIONS ±1/32 UNLESS SPECIFIED				A 03-012			
REV.	DATE	ECO NO.	APR.				

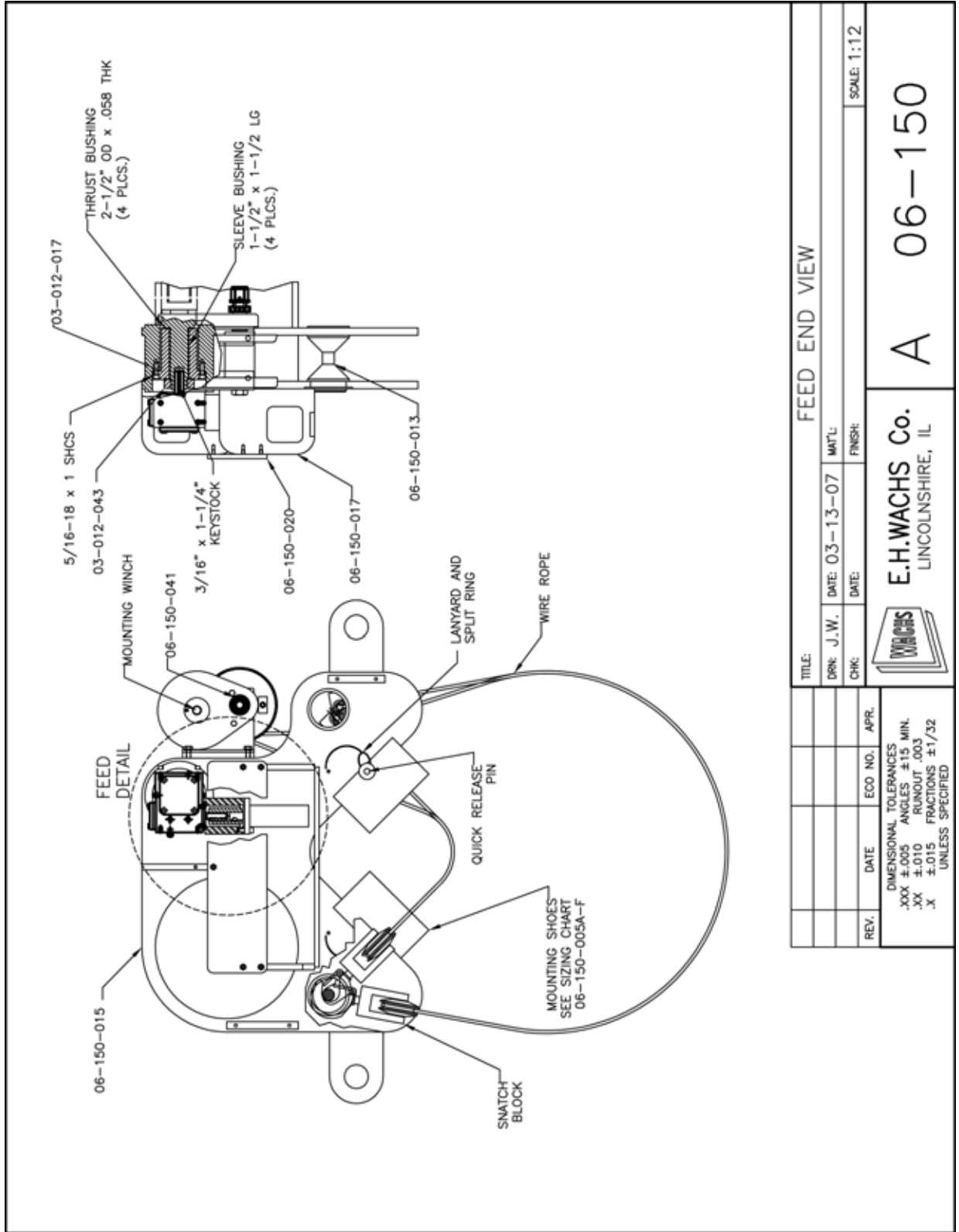


TITLE: AXIAL CARRIAGE ASSY			
DRN: J.W.	DATE: 03-20-07	MATL:	SCALE: 1:10
CHK:	DATE:	FINSH:	
REV.		DATE	ECO NO. APR.
DIMENSIONAL TOLERANCES .XXX ±.005 ANGLES ±15 MIN. .XX ±.010 RUNOUT .003 .X ±.015 FRACTIONS ±1/32 UNLESS SPECIFIED			

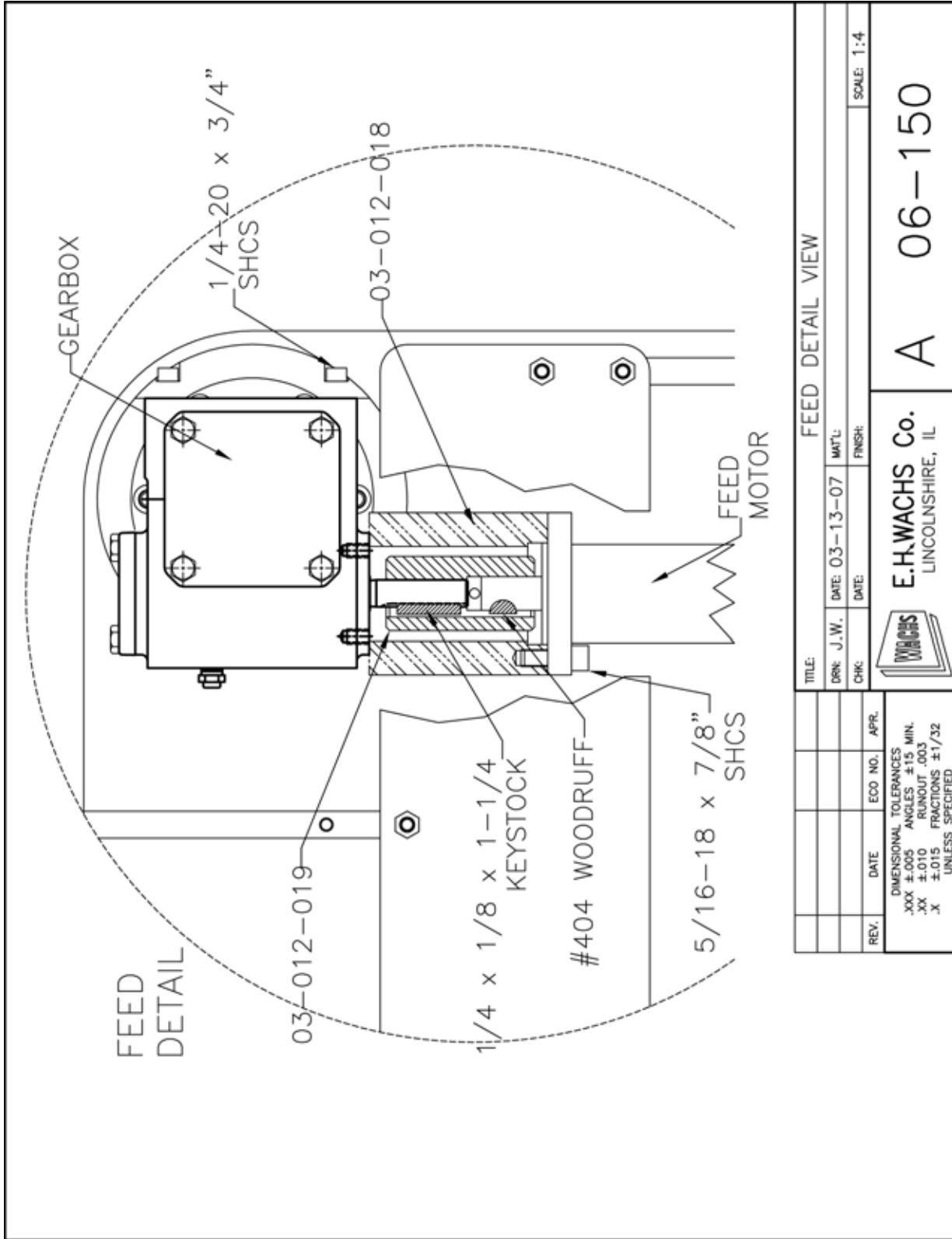
E.H. WACHS Co.
LINCOLNSHIRE, IL



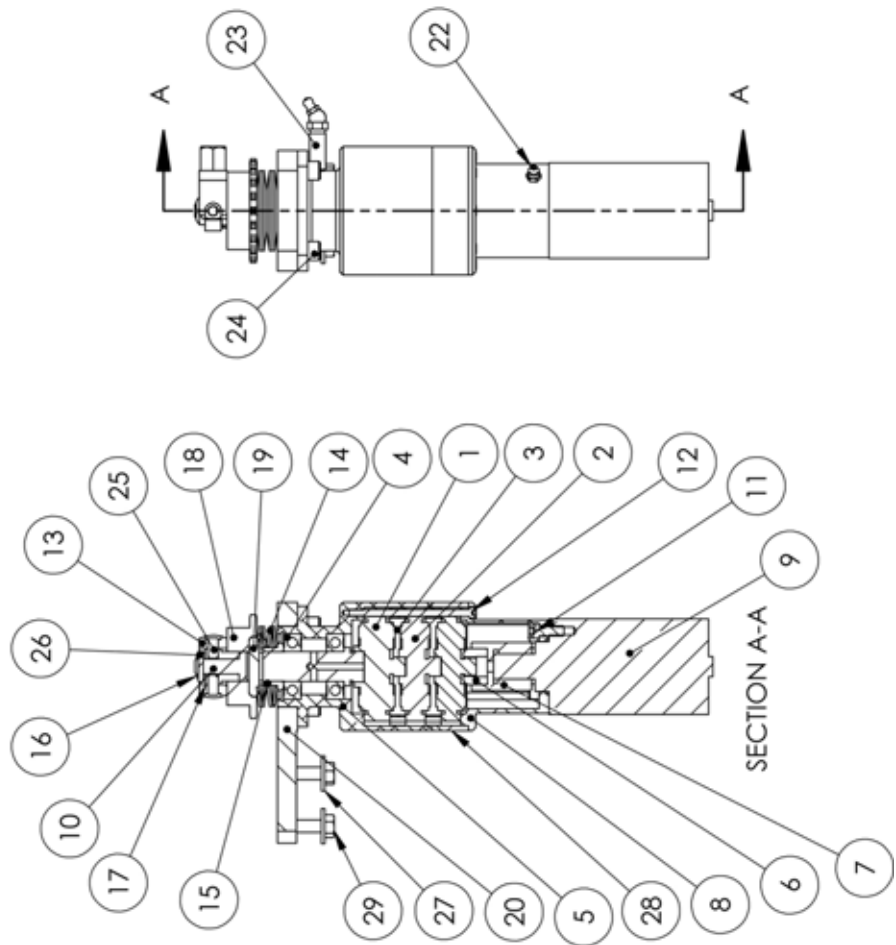
A 06-150



TITLE: FEED END VIEW	
DRN: J.W.	DATE: 03-13-07
CHK:	DATE:
ECO NO.:	APR.
DIMENSIONAL TOLERANCES .XXX ±.005 ANGLES ±15 MIN. .XX ±.010 RUNOUT .003 .X ±.015 FRACTIONS ±1/32 UNLESS SPECIFIED	
E.H. WACHS Co. LINCOLNSHIRE, IL	
A 06-150	
SCALE: 1:12	



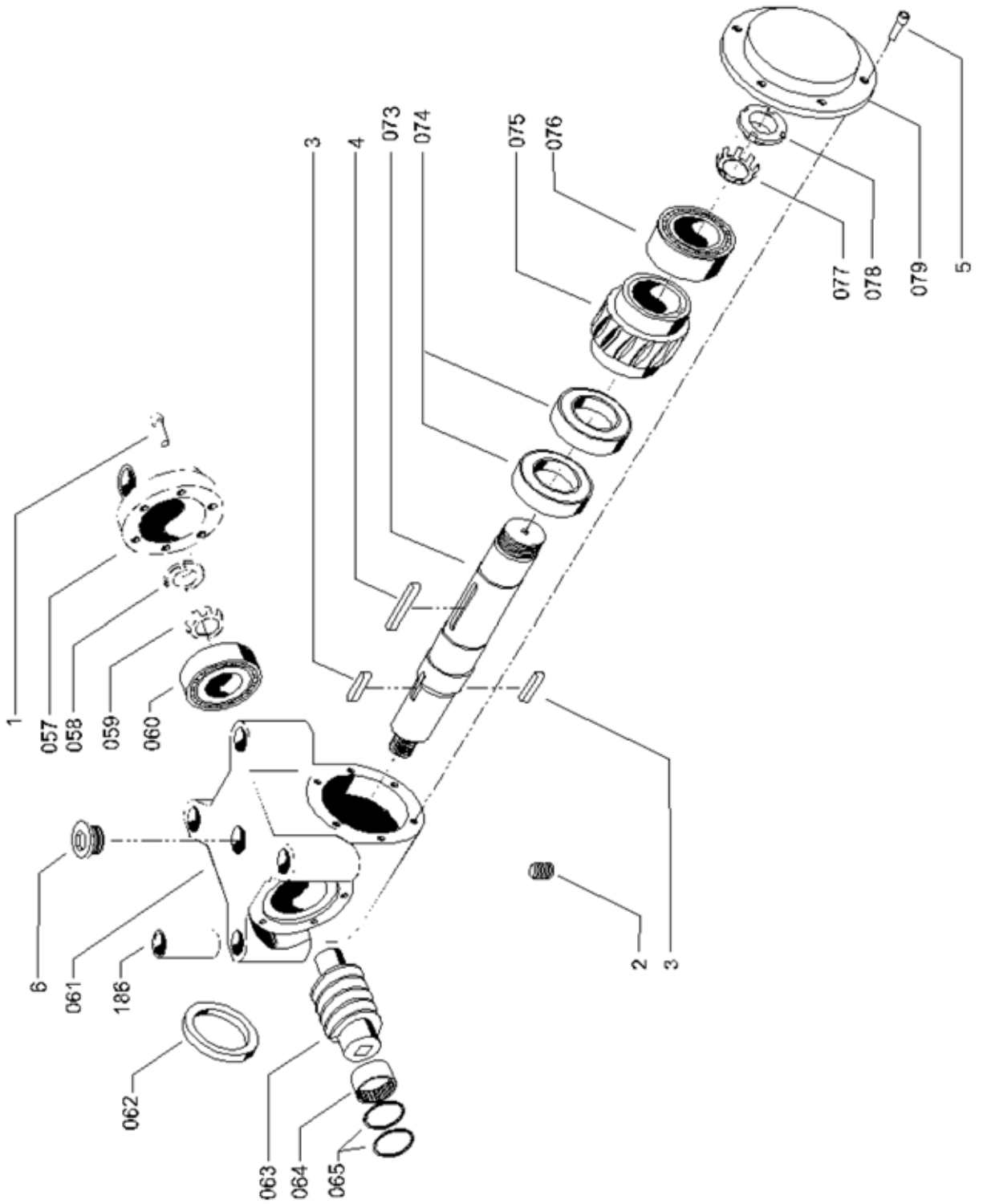
ITEM NO.	PART NUMBER	QTY.
1	11-103-00	1
2	P06-150-036	2
3	P06-150-037	2
4	BEARING, COUPLER	2
5	P06-052-150	1
6	P06-052-156	1
7	P06-052-157	1
8	P06-052-159	1
9	MOTOR, EATON #129-0458-002	1
10	06-150-002	1
11	SHCS 1/4-28 x 5/8" LG.	5
12	SHCS #8-32 x 3" LG.	7
13	P06-052-160	1
14	BELLEVILLE WASHER	4
15	06-150-009	1
16	06-150-010	1
17	06-150-011	1
18	06-150-007	1
19	06-150-003	1
20	06-150-008	1
21	06-150-012	1
22	90-500-05	1
23	90-500-04	1
24	SHCS 5/16-18 x 3/4" LG.	4
25	Dowel Pin 1/4" x 1/2" LG.	2
26	Dowel Pin 1/8" x 3/4" LG.	1
27	Flat Washer 5/16" Type A Wide	3
28	P06-052-333	1
29	HHCS 5/16-18 x 1-1/8" LG.	3



Rail Mill Cutter Spindle Gear Housing

REF	PARTNO	QTY	DESCRIPTION
057	02-057-00	1	ELEVATING NUT AND BEARING CAP
058	02-058-00	1	BEARING LOCK NUT
059	02-059-00	1	BEARING LOCK WASHER
060	02-060-00	1	BALL BEARING
061	02-061-00	1	CUTTER SPINDLE GEAR HOUSING
062	02-062-00	1	SEAL
063	02-063-00	1	STEEL WORM SHAFT
064	02-064-00	1	NEEDLE BEARING
065	02-065-00	2	SEAL
073	02-073-01	1	CUTTER SPINDLE
074	02-074-00	2	BALL BEARING
075	02-075-00	1	BRONZE WORM GEAR
076	02-076-00	1	BALL BEARING
077	02-077-00	2	BEARING LOCK WASHER
078	02-078-00	2	BEARING LOCK NUT
079	02-079-00	1	CUTTER SPINDLE BEARING CAP
186	02-186-00	1	BRONZE BUSHING
FASTENERS			
1	90-151-10	6	SHCS, 1/4"-20 x 1"-SS
2	90-028-02	1	SHPP, 1/8 FLUSH MOUNT
3	90-057-08	2	KEY, 1/4" SQ. x 7/8" LG.
4	90-067-22	1	KEY, 5/16" SQ. x 2-1/4" LG.
5	90-150-07	6	SHCS, 1/4-20 x 3/4" -SS
6	02-070-00	1	PLUG, OIL

Reference numbers refer to drawing on the next page.



ORDERING INFORMATION

To place an order, request service, or get more detailed information on any E.H. Wachs Company products, call us at one of the following numbers:

U.S. 800-323-8185
International: 847-537-8800

Ordering Replacement Parts

When ordering parts, refer to the parts lists earlier in this chapter. Please provide the part description and part number for all parts you are ordering.

Repair Information

Please call us for an authorization number before returning any equipment for repair or factory service. We will advise you of shipping and handling. When you send the equipment, please include the following information:

- Your name/company name
- Your address
- Your phone number
- A brief description of the problem or work to be done.

Before we perform any repair, we will estimate the work and inform you of the cost and the time required to complete it.

Warranty Information

Enclosed with the manual is a warranty card. Please fill out the registration card and return to E.H. Wachs Company. Retain the owner's registration record and warranty card for your information.

Return Goods Address

Return equipment for repair to the following address.

E.H. Wachs Company
600 Knightsbridge Parkway
Lincolnshire, Illinois 60069 USA