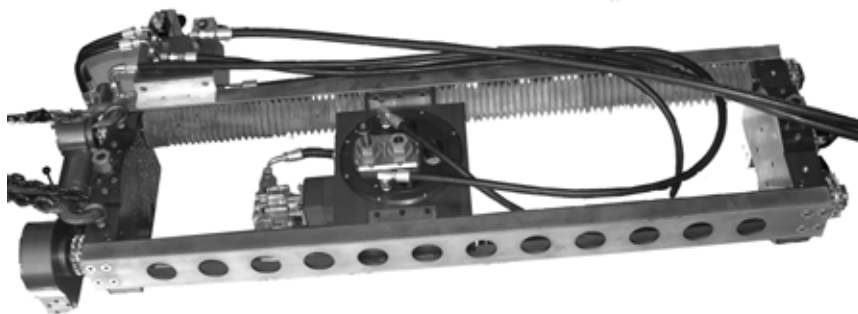




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Window Cutter User's Manual



E.H. Wachs Part No. 06-030-MAN
Rev. 2-0709, July 2009

Revision History:
Version 1 June 2006

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Chapter 1

About This Manual

PURPOSE OF THIS MANUAL

This manual explains how to operate and maintain your window cutter system. It includes instructions for set-up, operation, and routine maintenance. It also contains parts lists, assembly diagrams, and troubleshooting instructions to help you order replacement parts and perform user-serviceable repairs.

Before operating the window cutter, you should read through this manual and become familiar with all instructions. At a minimum, make sure you read and understand the following chapters:

- Chapter 1, About This Manual
- Chapter 2, Safety
- Chapter 3, Introduction
- Chapter 5, Operating Instructions.

If you will be performing service or repairs, make sure you read and understand these chapters:

- Chapter 1, About This Manual
- Chapter 4, Assembly, Disassembly, and Storage
- Chapter 6, Routine Maintenance
- Chapter 7, Service and Repair.

You will also want to refer to Chapter 8, Parts Lists and Drawings.

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.

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 window cutter.

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 window cutter.

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. 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. See Chapter 2 for more detailed safety information.

NOTE

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



MANUAL UPDATES AND REVISION TRACKING

Occasionally, we will update manuals with improved operation or maintenance procedures, or with corrections if necessary. Revised chapters will be available for customers. If you receive revised chapters for your manual, remove the old chapters from your binder and replace them with the new chapters.

When a manual is revised, we will update the revision history on the title page and at the bottom of the pages in the revised chapters. It is important to put the current title page with the revision history in your manual. This will help you make sure you have all current information.

You may have factory service or upgrades performed on your equipment. If this service changes any technical data or operation and maintenance procedures, we will include revised sections of the manual when we return the equipment to you. Remove the old chapters from your manual and replace them with the revised chapters.

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@ehwachs.com.

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.

WARNING

Read this chapter carefully before operating the window cutter system. Serious injury or death could result from improper repair or service of this equipment.

Repair and/or service to this equipment must only be done by an authorized and certified dealer.

OPERATOR SAFETY

Follow these guidelines for safe operation of any mechanical equipment associated with the data logger.

- **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

In This Chapter

OPERATOR SAFETY

SAFETY LABELS

SAFETY PRECAUTIONS

MACHINE SAFETY



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

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. 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**.

SAFETY LABELS

There is no safety labeling on the window cutter.

SAFETY PRECAUTIONS

- Perform all setup and configuration of the machine with the power supply disconnected. Connect the power supply when you are ready to start cutting.

MACHINE SAFETY

- Do not feed the cutter into the pipe too quickly. If the machine chatters, slow down your feed rate.
- Use the auxiliary clamp when feeding the cutter into the pipe when the cutter head is not at one end of the machine.



WARNING

Failure to follow the instructions for safe operation could result in operator injury.

NOTICE

Failure to follow the instructions for machine safety could result in damage to the equipment.

Chapter 3

Introduction to the Equipment

.....

Read this chapter carefully to become familiar with the components and features of your window cutter.

USAGE AND APPLICATIONS

The window cutter is designed to cut access windows in pipes ranging from 6" to 48" diameter, up to 1-1/4" thick. An adjustable-depth milling mechanism allows you to precisely cut through the thickness of the pipe without damaging any internal structures.

The window cutter is mounted directly on a horizontal pipe. For a vertical pipe, a guide ring the size of the pipe is installed on the pipe at the top of the machine. Rings are available for 16", 18", and 20" pipes; other sizes can be made to order.

The machine can cut windows up to 36" in length axially and from 10° to a full 360° radially.

SYSTEM COMPONENTS

Window Cutter

Figure 3-1 illustrates the components of the window cutter.

In This Chapter

USAGE AND APPLICATIONS

SYSTEM COMPONENTS

REQUIREMENTS

SPECIFICATIONS

ACCESSORIES

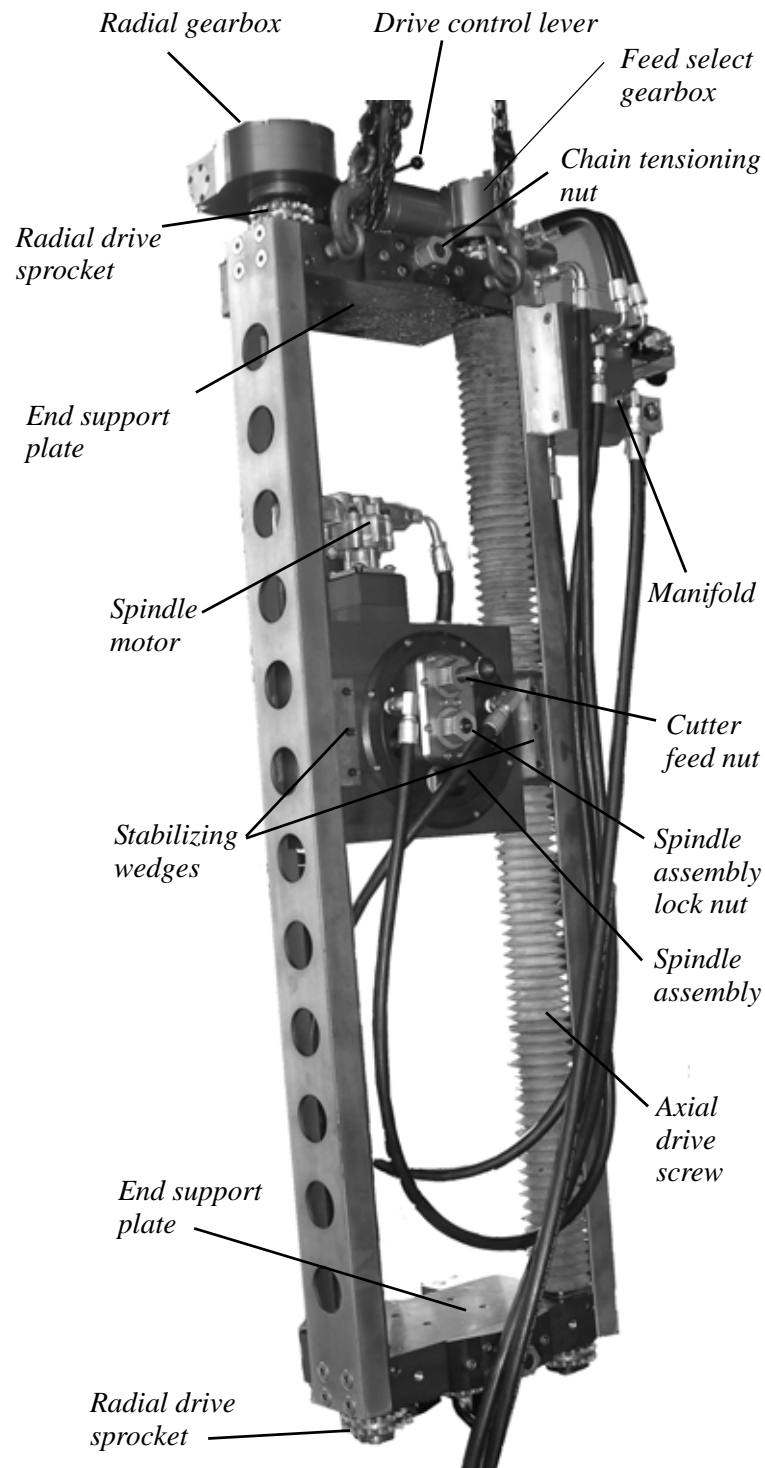


Figure 3-1. Window cutter components

Hydraulic Power Unit (HPU)

Figure 3-2 illustrates the hydraulic power unit (HPU) provided with the window cutter.

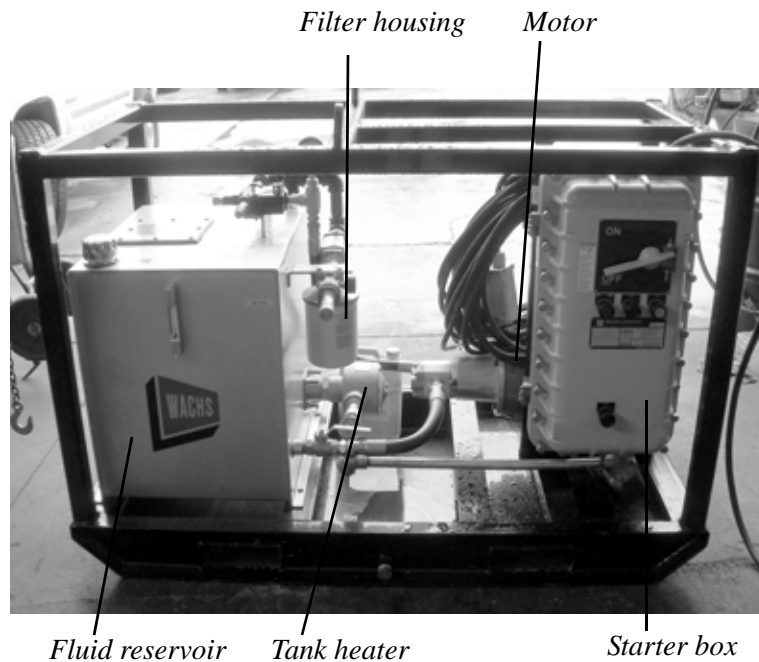


Figure 3-2. Hydraulic power unit provided with the window cutter.

REQUIREMENTS

Handling

The window cutter weighs approximately 400 lbs (182 kg). You will need a hoist or crane to move it and position it on the pipe for cutting.

The machine has four removable lift hooks installed on its frame. To position the machine horizontally, use all four hooks. To position the machine vertically, use the two hooks at the top end of the frame.

⚠ CAUTION
Do not attempt to lift or move the window cutter by hand.
Use a hoist or crane.

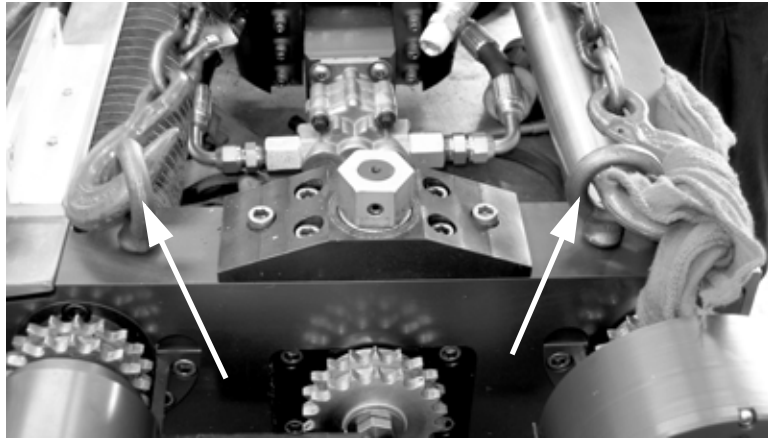


Figure 3-3. Two lift hooks are provided at each end of the frame for lifting the window cutter. The hooks are in threaded holes and can be removed.

Power Source

The hydraulic power unit for the window cutter provides 10 gpm (38 lpm) flow at 2,000 psi. The HPU operates on 230 V electric power at 28.4 amps.

SPECIFICATIONS

Length:	63" (160 cm)
Width:	31" (79 cm)
Height:	13" (33 cm)
Radial Clearance:	16.5" (42 cm)
Weight:	approx. 400 lbs (180 kg)
Max. Axial Feed:	36"
Axial Feed Rate:	6 inches per minute
Max. Radial Feed:	360°
Radial Feed Rate:	6 inches per minute
Blade RPM:	40-160 rpm
Tooling:	6" diameter slitting blade 5" diameter beveling blade

ACCESSORIES

- Guide rings for vertical pipe—16", 18", and 20"

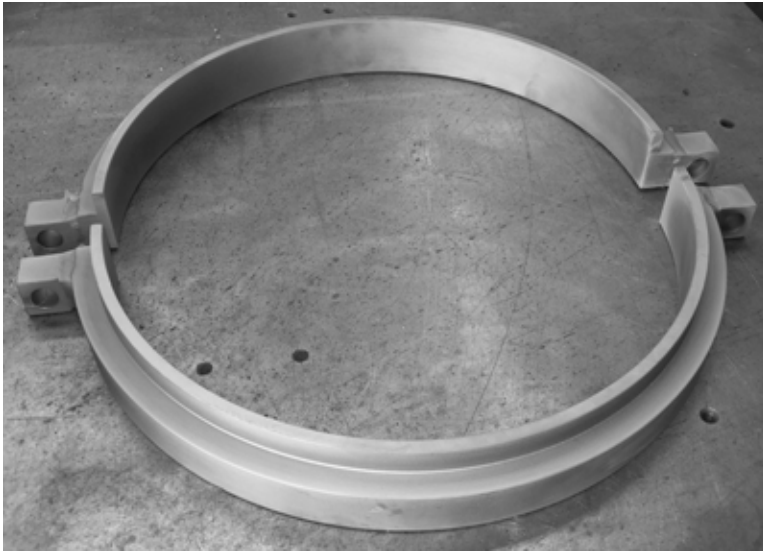


Figure 3-4. Guide ring for cutting on vertical pipe

- Radial cut support clamp

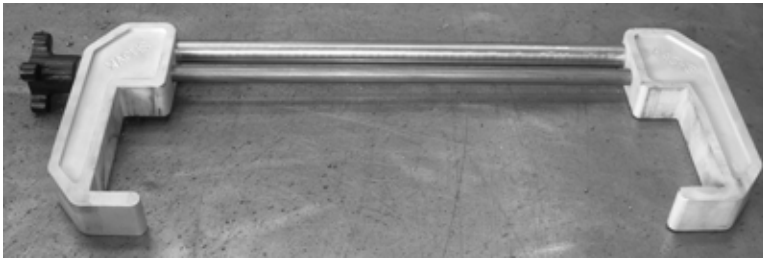


Figure 3-5. Support clamp for reducing vibration during radial cuts

Chapter 4

Assembly, Disassembly, and Storage

The window cutter is shipped fully assembled from the factory in a shipping/storage crate.

REMOVING THE MACHINE FROM THE SHIPPING/STORAGE CRATE

You will need to use a crane to pick up the window cutter.

1. Screw the lift hooks into the window cutter frame if they are not already in place.
2. Position the crane above the crate.
3. Attach a chain or cable to each of the four lift hooks on the machine, and attach the other ends to the crane.
4. Raise the crane until the cables or chains are taut, then slowly lift the machine. Make sure that the machine is fairly level and that it does not catch against the side of the crate.
5. You can mount the machine directly on a horizontal pipe as described in Chapter 5. If you are mounting it on a vertical pipe, first set it down on a level surface and detach the hooks from the bottom end of the machine.

In This Chapter

REMOVING THE MACHINE FROM THE SHIPPING/STORAGE CRATE

ENVIRONMENTAL REQUIREMENTS

LONG-TERM STORAGE

Always lift the machine out of the case using all four hooks. If you will be mounting it on a vertical pipe, set it down on a flat surface first and lift it from there with the two top hooks.

Make sure the crane hook is centered over the window cutter before lifting it.

ENVIRONMENTAL REQUIREMENTS

The window cutter can be operated in any environment, including undersea. If used underwater, it is especially important that you keep it well lubricated, and that you clean and oil it after each use.

The hydraulic power unit can get wet without damage but should not be operated in standing water.

LONG-TERM STORAGE

Clean the machine thoroughly before storage. If it has been used undersea, spray it with fresh water to remove salt residue. Remove the cutting blade from the machine.

Oil all machined surfaces and grease the machine according to the instructions in Chapter 6.

Secure the machine in its crate. If possible, store it in a non-corrosive atmosphere away from salt water.

Chapter 5

Operating Instructions

CONFIGURING THE MACHINE

Install the Tracking Wheels

The window cutter moves radially around the pipe on four tracking wheels, two on each end of the frame. There are four positions for the tracking wheels, depending on the diameter of the pipe you are cutting.

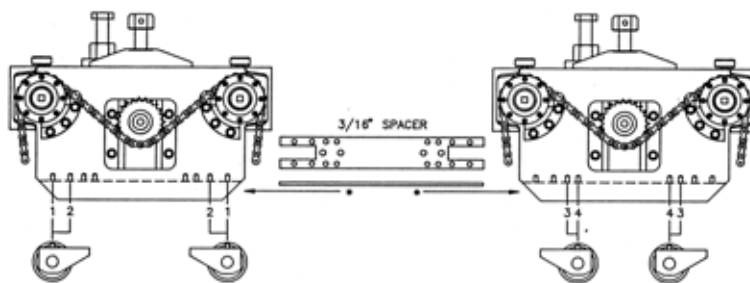


Figure 5-1. There are four mounting positions on the frame for the tracking wheels. Table 1 describes how to set the wheels correctly for the size of the pipe you are cutting. (Note that the 3/16" spacer is required for some pipe sizes as indicated in Table 1.)

In This Chapter

CONFIGURING THE MACHINE

INSTALLING THE MACHINE

CUTTING THE WINDOW

Note that the orientation of the wheel blocks is reversed for positions 3 and 4.



Attach the tracking wheels at the indicated position using one 3/8-16 x 1-1/2" socket head cap screw per block. Tighten the screws with a hex wrench.

Table 1: Tracking Wheel Mounting Positions for Various Pipe Sizes

Pipe Size (inch)	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	42	48
Wheel Position	4	4	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1
Space Required	Y		Y	Y			Y	Y				Y	Y	Y					

Setting the Chain Length

The mounting/drive chains are supplied with links of various sizes to extend them to the length required for the pipe you are cutting. The standard chains are 53 inches long; Table 2 describes the links required for each pipe size.

Table 2: Chain Length for Various Pipe Sizes

Pipe Size (inch)	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	42	48
Chain Length (in)	53	58	63	68	71	76	81	87	92	98	103	109	115	120	126	132	150	150	168
Add Links:																			
2 inch								2	2				1	1		2	1	1	
3 inch					1	1	1					2			1				
5 inch		1		1	1		1		1	1				1		1	1	1	1
10 inch			1	1	1			1	1				1	1					1
20 inch						1	1	1	1	2					1	1	2	2	
50 inch											1	1	1	1	1	1	1	1	2

Make sure both chains are the same length before you install them on the machine.



Attach the required links to each chain using the supplied master links or pins. Leave the ends of the chains disconnected; you will need the chain open to install it on the window cutter after you have the machine in place on the pipe.

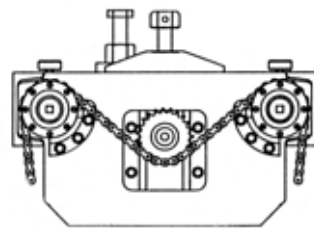
INSTALLING THE MACHINE

Mounting on Horizontal Pipe

Always use a crane or hoist to lift and move the window cutter.

Before lifting or moving the machine, do the following:

- Disconnect all hoses from the machine.
 - Make sure the cutting head is fully retracted.
 - Make sure the mounting chains are off the machine.
1. If necessary, install all four lift hooks by screwing them into the window cutter's frame.
 2. Position the crane over the center of the window cutter.
 3. Attach a chain or cable to each lift hook and connect them to the crane.
 4. Raise the crane slowly to lift the machine. Position the machine over the pipe at the cutting location and lower it onto the pipe.
 5. Wrap one of the mounting chains around the pipe at one end of the window cutter and thread it through the drive sprockets as shown in Figure 5-10.



Pipe Side

Figure 5-2. Thread the chain over the outside sprockets and between the inside sprocket and the pipe.

6. Connect the ends of the chain with the supplied pin.



Leave the crane attached to the machine and supporting its weight until you have the mounting chains installed and tightened.

Have one person hold the chain straight while the other person tightens it.



7. Make sure the chain is straight around the pipe. Tighten the chain until it is snug by turning the chain tensioning nut clockwise, as shown in Figure 5-11.

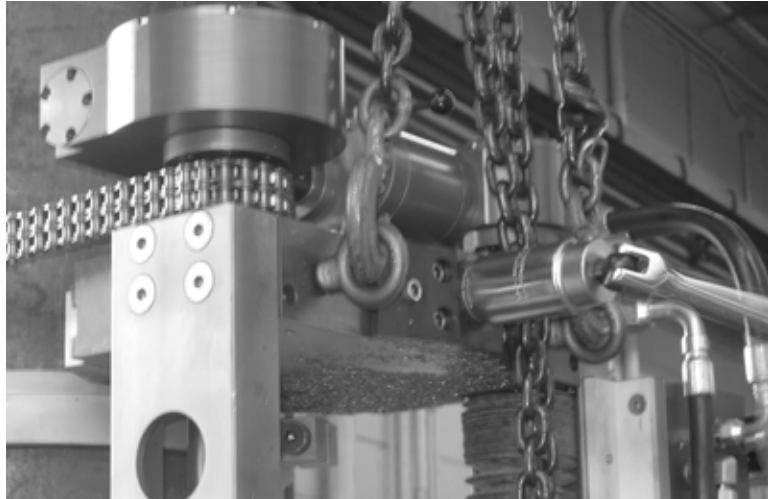


Figure 5-3. Tighten the tensioning nut until the chain is snug.

8. Install the chain at the other end in the same manner.
9. Tighten the chain by turning the chain tensioning nut counter-clockwise.

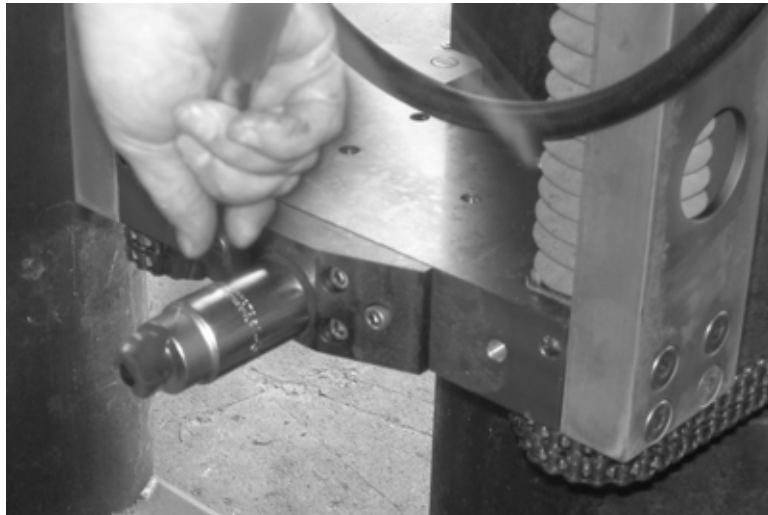
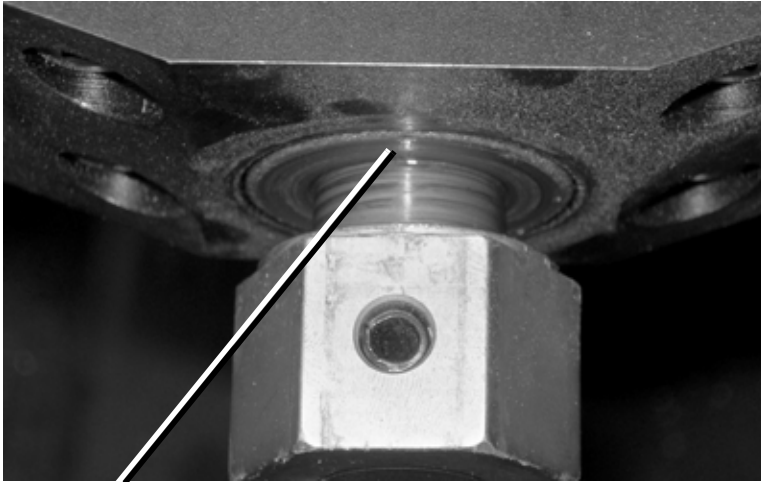


Figure 5-4. Turn the tensioning nut counter-clockwise to tighten the chain.

10. Turn the nut until you can see the red indicator line on the screw, as shown in Figure 5-13.



Indicator line

Figure 5-5. The red indicator line is on the screw inside the tensioner cover plate. Tighten the nut until you can see the line.

11. Tighten the first tensioning nut until you can see the red indicator line on the screw.
12. Lower the crane and remove the lift chains from the window cutter frame

Mounting on Vertical Pipe

The window cutter can be installed with either end up on a vertical pipe. Typically, you will install it with the controls at the top, to give the most clearance below the machine.

Always use a crane to lift and move the window cutter.

Mounting the Guide Ring

The guide ring mounts on the pipe at the top of the window cutter to support the machine's weight and ensure a straight radial cut. Mounting the guide ring will require two people.

You can special-order guide rings for other pipe sizes.



Guide rings for 16", 18", and 20" pipes are supplied with the window cutter.

1. If necessary, take the two halves of the guide ring apart by removing the screws.
2. Put the halves of the guide ring together over the pipe at the location where the top of the machine will be located. The support flange (thicker side of the ring) must be on the bottom, as shown in fig.



Figure 5-6. Hold both halves of the guide ring on the pipe and insert the screws through the brackets. Put the nuts on the screws.

3. Insert the screws on both sides of the ring. Tighten them securely with a 15/16" wrench or socket.



Figure 5-7. Tighten the nuts on the guide ring screws securely.

Mounting the Window Cutter

1. You will only need two lift hooks on the window cutter frame. Install the hooks at the end of the frame that will be on top.
2. Position the crane over the window cutter.
3. Attach a chain or cable to each lift hook and connect them to the crane.
4. Lift the window cutter slowly until the entire machine is off the floor.
5. Position the window cutter so that the tracking wheels at the top are just above the guide ring on the pipe.



Figure 5-8. Set the top of the machine against the pipe, with the tracking wheels on against the pipe and on top of the guide ring.

6. Lower the machine gently so that the wheels are resting on top of the guide ring.
7. Wrap a binding strap around the pipe and the middle of the window cutter. Tighten the strap to pull the machine against the pipe.

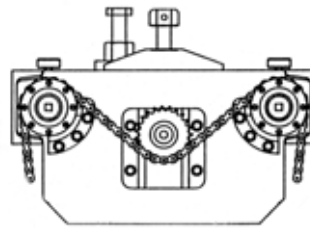


Make sure the wheels are against the pipe and are on top of the guide ring.



Figure 5-9. Use a binding strap around the pipe and center of the machine to pull it snug against the pipe.

8. Wrap one of the mounting chains around the pipe at the top of the window cutter (about six inches above the guide ring) and thread it through the drive gears as shown in Figure 5-10.



Pipe Side

Figure 5-10. Thread the chain over the outside gears and between the inside gear and the pipe.

9. Connect the ends of the chain with the supplied pin.
10. Make sure the chain is straight and parallel with the guide ring. Tighten the chain until it is snug by turning the chain tensioning nut clockwise, as shown in Figure 5-11.

Have one person hold the chain straight while the other person tightens it.



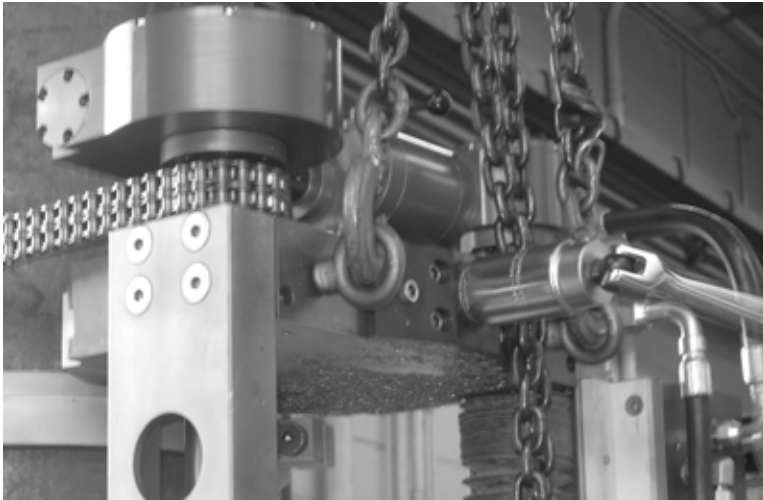


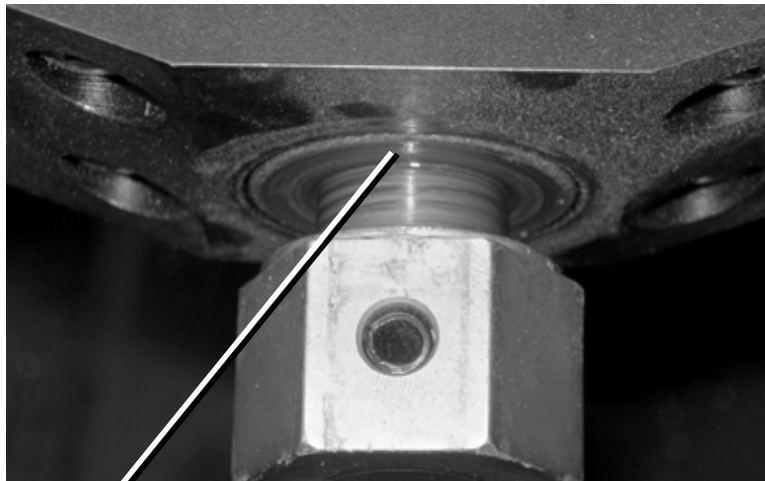
Figure 5-11. Tighten the tensioning nut on the top chain until the chain is snug.

11. Install the bottom chain in the same manner as the top chain.
12. Tighten the bottom chain by turning the chain tensioning nut counter-clockwise.



Figure 5-12. Turn the bottom tensioning nut counter-clockwise to tighten the chain.

13. Turn the nut until you can see the red indicator line on the screw, as shown in Figure 5-13.



Indicator line

Figure 5-13. The red indicator line is on the screw inside the tensioner cover plate. Tighten the nut until you can see the line.

14. Tighten the top tensioning nut until you can see the red indicator line on the screw.
15. Remove the binding strap.
16. Lower the crane and remove the lift chains from the window cutter frame.

Connect Power Supply

1. Connect the hoses from the power unit to the connectors on the window cutter manifold.

CUTTING THE WINDOW

Horizontal Pipe

To cut the pipe window, you will first make the two axial cuts along the length of the pipe. Then perform the radial cuts around the pipe's circumference. See the diagram in Figure 5-14.

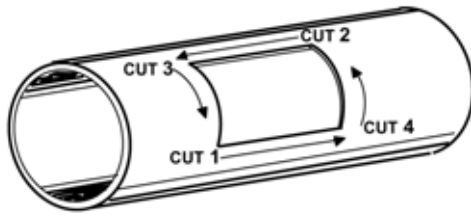


Figure 5-14. For a horizontal pipe, cut the pipe window as shown in the diagram. Perform both axial cuts first, then make the radial cuts at the ends.

Vertical Pipe

When window cutting on a vertical pipe, perform the side and bottom cuts first, then the top cut. This keeps the cutter above the fall-off piece on the final cut. See the diagram in Figure 5-16.

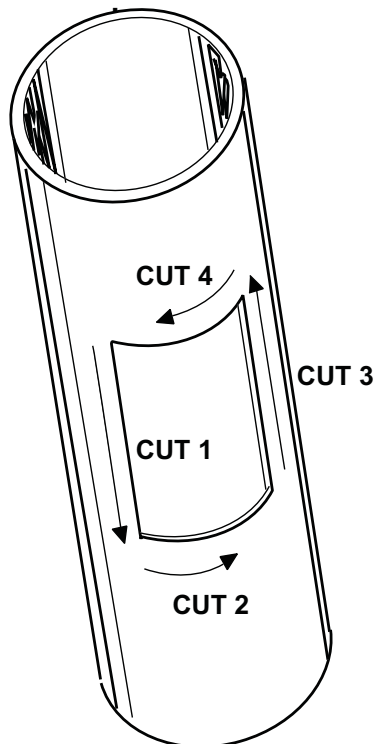


Figure 5-15. Perform the illustrated cut sequence when using the window cutter on a vertical pipe.

Machine Controls

There are three levers that control machine motion:

- The drive control lever at the end of the machine. This lever has three positions, as shown in Figure 5-16.

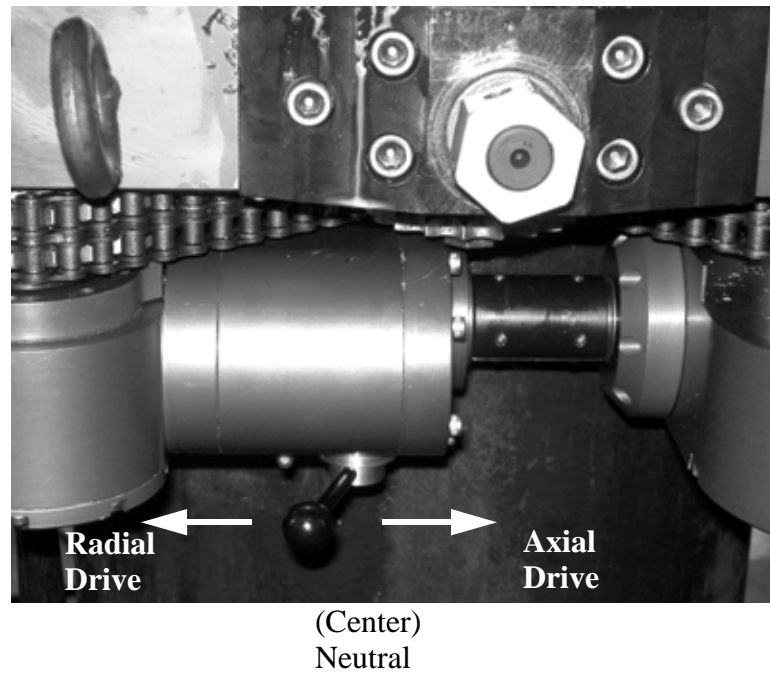


Figure 5-16. The photo shows the drive control lever at the bottom of the machine; directions are reversed when the controls are at the top.

- The spindle drive lever, which turns the blade spindle on and off, as shown in Figure 5-17.
- The motion drive lever, which has three positions, as shown in Figure 5-17.



Figure 5-17. The spindle (cutting) drive is on the top in this orientation (on the shorter manifold block). The motion drive lever is on the bottom (on the taller manifold block).

When the spindle drive is engaged, the motion drive is automatically in cutting feed (slow) mode. When the spindle is disengaged, the motion drive is in rapid feed mode.

Flow Control Valves

There are flow control valves for the drives on the manifold. These are illustrated in Fig.



Figure 5-18. Use the knobs to adjust the flow control valves for the drives.

To adjust the flow control valve, loosen the set nut behind the valve knob, turn the knob, then tighten the set nuts.

Radial Cut Stabilizing Clamp

A stabilizing clamp is provided to reduce vibration when making a radial cut with the machine head near the center of the window cutter frame.

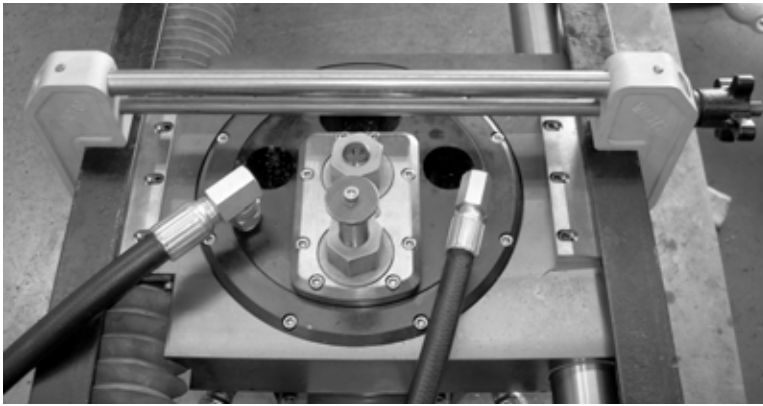


Figure 5-19. The stabilizing clamp attaches across the frame at the cutting head to reduce vibrations during a radial cut.

Rotating the Cutter Head

The entire cutter head rotates to set the cutting direction. Use the following procedure to rotate the head.

1. Loosen the center nut on the cutter head.

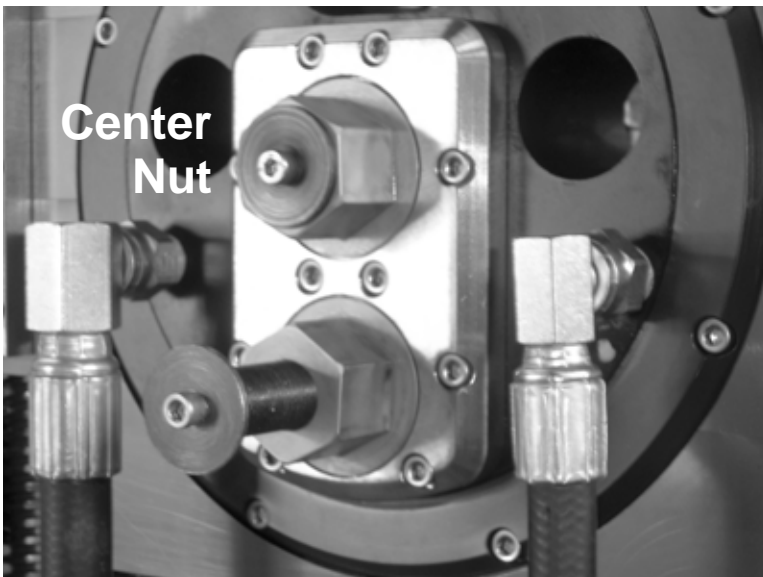


Figure 5-20. Loosen the center nut (top) to allow the cutter head to turn.

2. Turn the head to the desired cutting direction.
IMPORTANT: Make sure the blade is oriented correctly for the direction you are cutting, as illustrated in Figure 5-21.

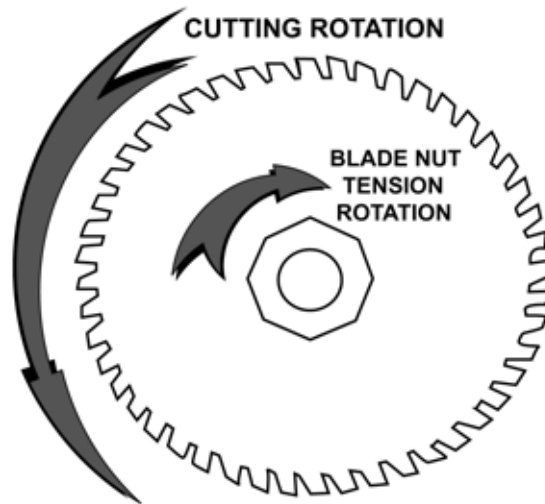


Figure 5-21. Make sure the blade is oriented to cut in the cutting direction indicated.

Feeding the Cutter into the Pipe

Before engaging either the axial or radial motion drive for cutting, first feed the cutter blade into the pipe.

1. Make sure the spindle drive lever is in the OFF position, and the motion drive lever is in the NEUTRAL (center) position.
2. Turn on the hydraulic power unit and turn on power to the window cutter with the HPU control pendant.
3. Use the drive select lever at the end of the machine and the motion drive lever on the manifold to position the blade where you want to start cutting.
4. If necessary, rotate the cutter head to the correct orientation as described in the previous section.
5. Set the drive select lever for the drive motion (axial or radial) that you will be cutting.

6. Put the spindle drive lever into the ON position to start the spindle drive motion.
7. Using the supplied 1-3/8" socket, turn the spindle feed nut on the cutter head counter-clockwise to feed the blade into the pipe.

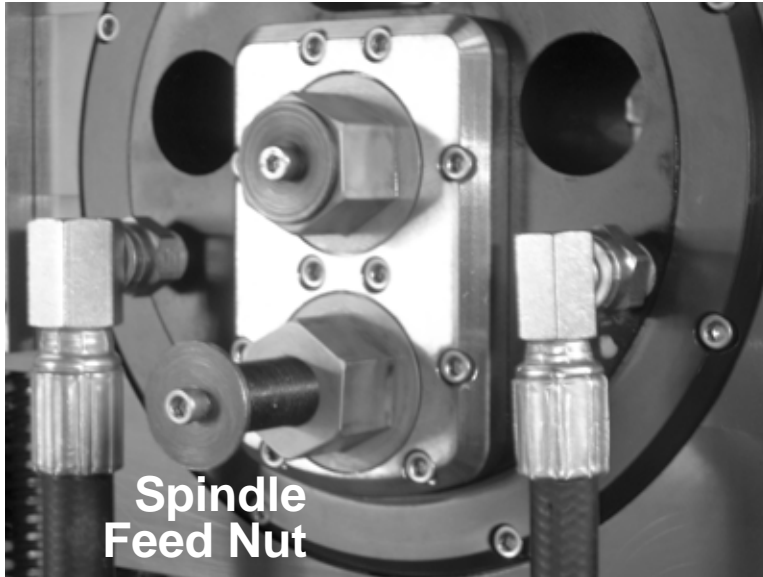


Figure 5-22. Turn the spindle feed nut counter-clockwise to feed the blade into the pipe.

8. Feed the blade in slowly. If the blade starts to chatter, stop for a few seconds, then resume feeding at a slower rate.
9. Feed the blade in until you have penetrated the pipe wall. Continue feeding as far as you can without cutting internal structures in the pipe.
10. Remove the socket from the spindle feed nut.
11. With the spindle drive still engaged and the blade turning, use the motion drive lever to start making the cut. The motion drive will automatically be in cutting (low-speed) mode while the spindle drive is running.
12. Continue until the cut is complete. Move the motion drive lever to the NEUTRAL position to stop the drive motion.

13. Using the 1-3/8" socket, turn the spindle feed nut clockwise to retract the blade from the pipe. Be sure to retract the blade completely.
14. Turn off the spindle drive motion.
15. Position the cutter head for the next cut using the drive select lever and the motion drive lever. If necessary, rotate the cutter head as described in the previous section.

Chapter 6

Routine Maintenance

Grease the machine using Phillips 66 X/C 22CF Aviation Grease or equivalent.

Phillips 66 X/C® 22CF Aviation Grease	
Typical Properties	
Property	Typical Value
NLGI No.	2
Penetration mm, 25°C/77°F	
Worked	275
Stability, 100,000 DS	298
Soap Type (Thickener)	Inorganic Gel
Base Oil Viscosity, cSt	
@ 100°C	5.75
@ 40°C	30.5
Base Oil Viscosity Index	135
Dropping Point, °C	320
Oil Separation, %, 177°C/30 hours	3.5
Evaporation, %, 350°F/22 hours	6.25
Load Wear Index	35
Copper Corrosion	1B
Water Resistance, 105°F, %	11.0
Low-Temperature Torque, -65°F, Nm	
Starting	0.39
Running	0.06

Chapter 7

Service and Repair

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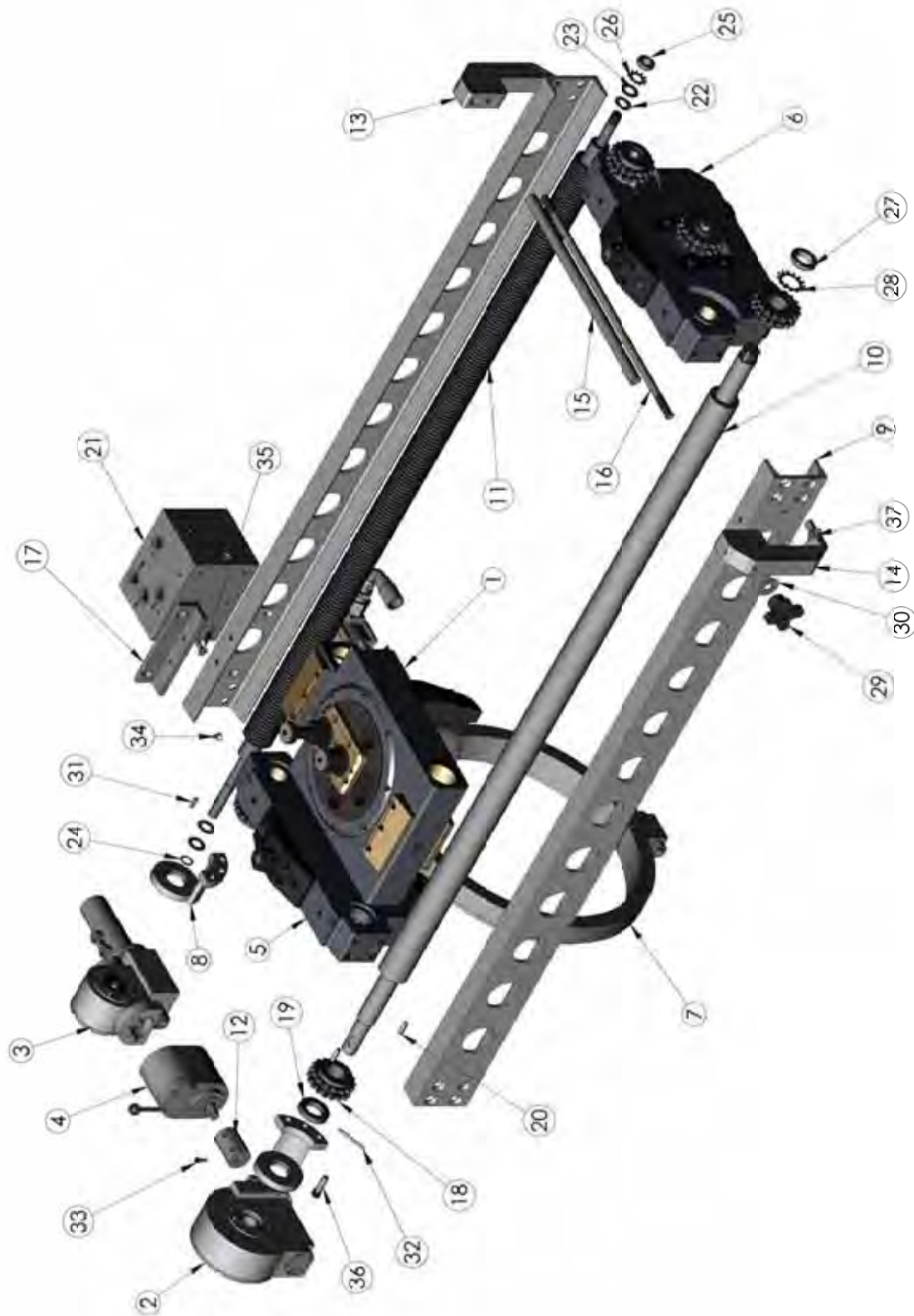
Refer to the drawings and parts lists in Chapter 8 for service and repair information on window cutter components.

Chapter 8

Parts Lists and Drawings

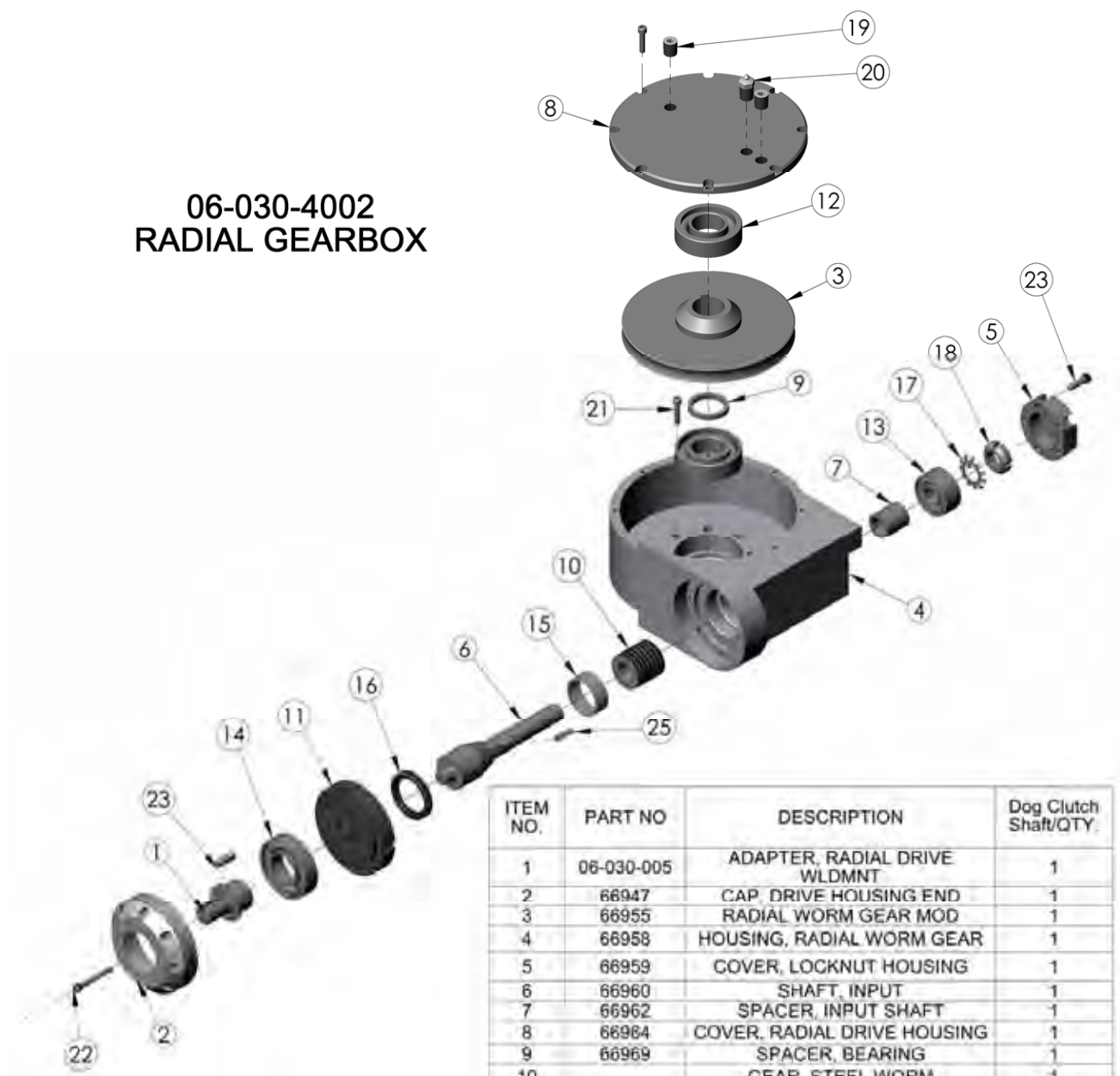
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Refer to the drawing and the parts list on the following pages for ordering spare and replacement parts.



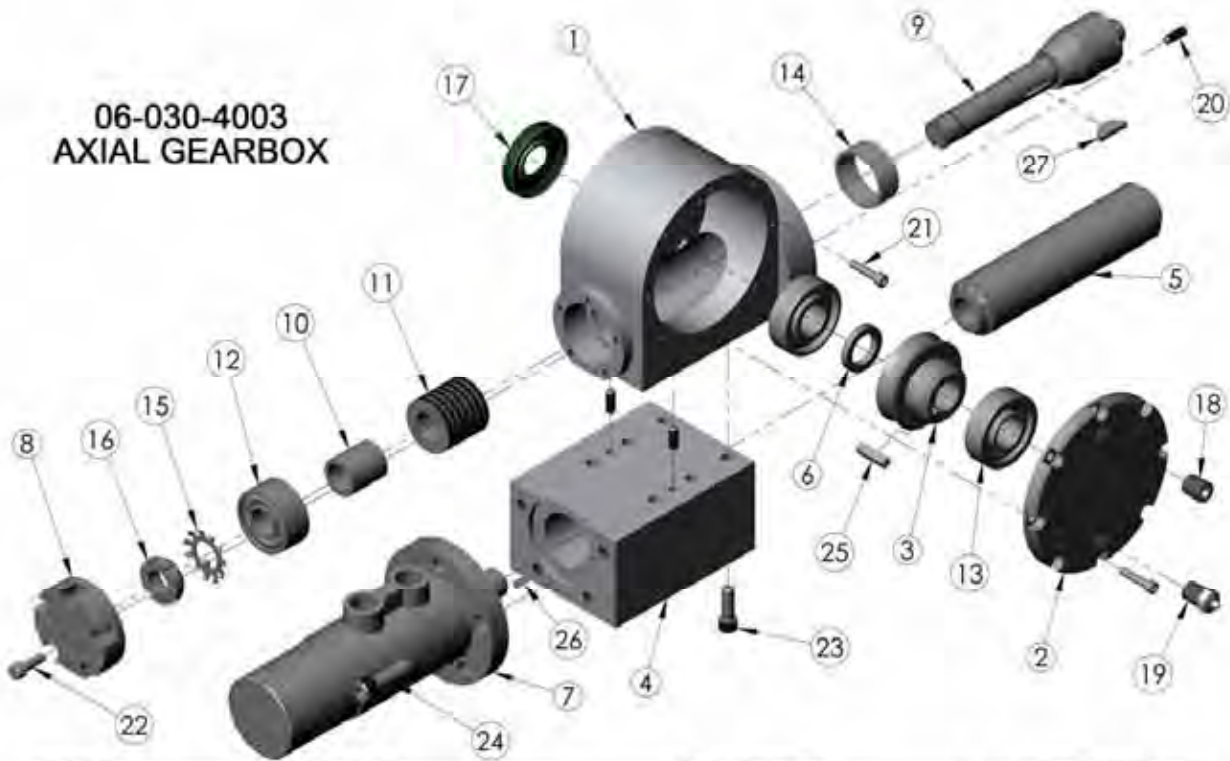
ITEM NO.	PartNo	DESCRIPTION	Exploded/QTY.
1		ASSEMBLY, CUTTER HEAD	1
2	06-030-4002	ASSEMBLY, RADIAL GEARBOX	1
3	06-030-4003	ASSEMBLY, AXIAL GEARBOX	1
4	06-030-4004	ASSEMBLY, SELECTOR GEARBOX	1
5		ASSEMBLY, GEARBOX END SUPPORT PLATE	1
6		ASSEMBLY, LOCKNUT END SUPPORT PLATE	1
7	06-030-40XX	RING, SUPPORT	1
8	00-023-01	HOUSING, DRIVE	2
9	06-030-001	CHANNEL, SIDE	2
10	06-030-002	SHAFT, AXIAL GUIDE	1
11	06-030-003	SCREW, AXIAL FEED	1
12	06-030-032	COUPLING, SHAFT	1
13	06-030-038	BRACKET, END CLAMP	1
14	06-030-039	BRACKET, CLAMP	1
15	06-030-040	BAR, CLAMP	1
16	06-030-041	BAR, THREADED CLAMP	1
17	06-030-104	BRACKET, MANIFOLD MOUNTING	1
18	66933	SPROCKET, RADIAL FEED	2
19	66934	COLLAR, CHAIN FEED SPROCKET	1
20	66965	KEY, SPINDLE	3
21		BLOCK, HYDRAULIC IC	1
22		BEARING, THRUST	2
23		WASHER, THRUST	2
24		RING, EXT. RETAINING	1
25		LOCKNUT	1
26		LOCKWASHER	1
27		LOCKNUT	1
28		LOCKWASHER	1
29		KNOB, HAND	1
30		1/2 WASHER	1
31		3/16 X 3/4 SQUARE KEY	1
32		3/16 X 2 ROLL PIN	1
33		10-24 X 5/8 SHCS	4
34		1/4-20 X 1/2 FHCS	2
35		5/16-18 X 1 FHCS	4
36		3/8-16 X 1-1/4 SHCS	6
37		1/2-13 X1 FHCS	16

06-030-4002 RADIAL GEARBOX

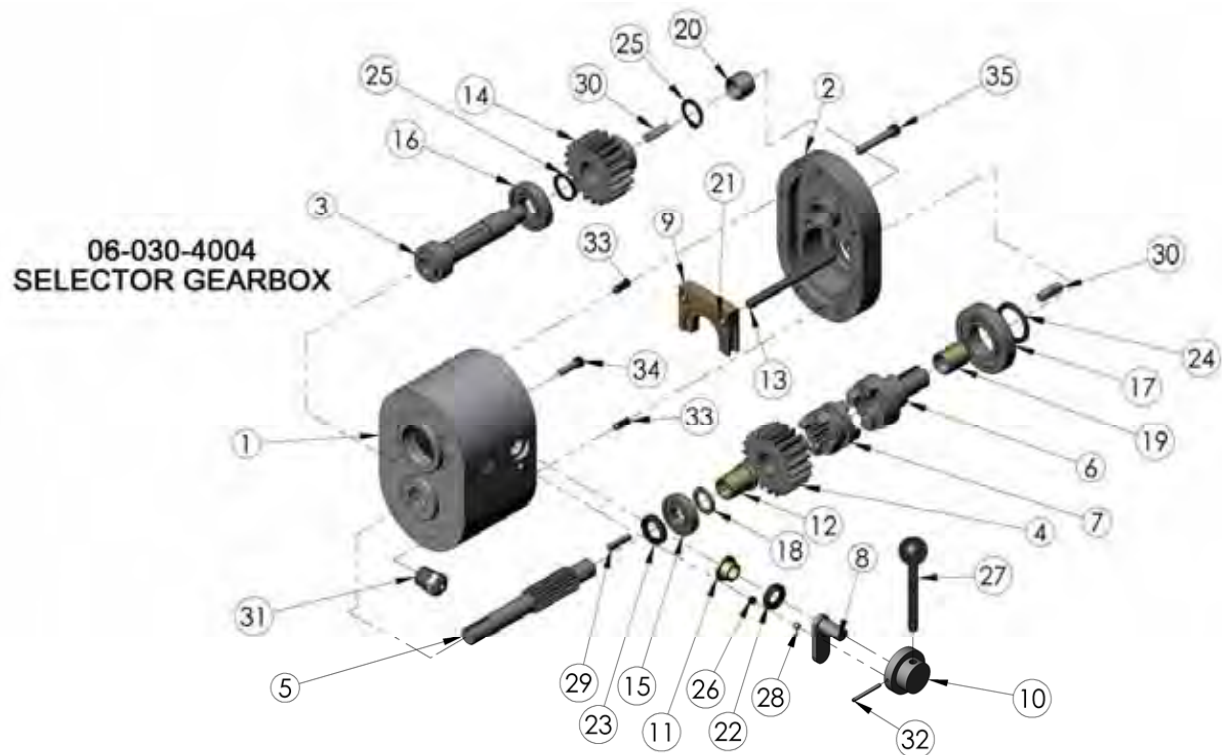


ITEM NO.	PART NO	DESCRIPTION	Dog Clutch Shaft/QTY.
1	06-030-005	ADAPTER, RADIAL DRIVE W/LDMNT	1
2	66947	CAP. DRIVE HOUSING END	1
3	66955	RADIAL WORM GEAR MOD	1
4	66958	HOUSING, RADIAL WORM GEAR	1
5	66959	COVER, LOCKNUT HOUSING	1
6	66960	SHAFT, INPUT	1
7	66962	SPACER, INPUT SHAFT	1
8	66964	COVER, RADIAL DRIVE HOUSING	1
9	66969	SPACER, BEARING	1
10		GEAR, STEEL WORM	1
11		PLANETARY GEAR	1
12		BEARING, ANGULAR CONTACT	2
13		BEARING, DOUBLE ROW	1
14		BEARING, INPUT BALL	1
15		SLEEVE BUSHING	1
16		SEAL	1
17		LOCKWASHER	1
18		LOCKNUT	1
19		PLUG, HEX SOCKET	2
20		FITTING, GREASE	1
21		8-32 X 3/4 SHCS	16
22		8-32 X 1-3/8 SHCS	7
23		10-24 X 5/8 SHCS	5
23		3/16 X 3/4 SQUARE KEY	1
25		KEY, 406 WOODRUFF	1

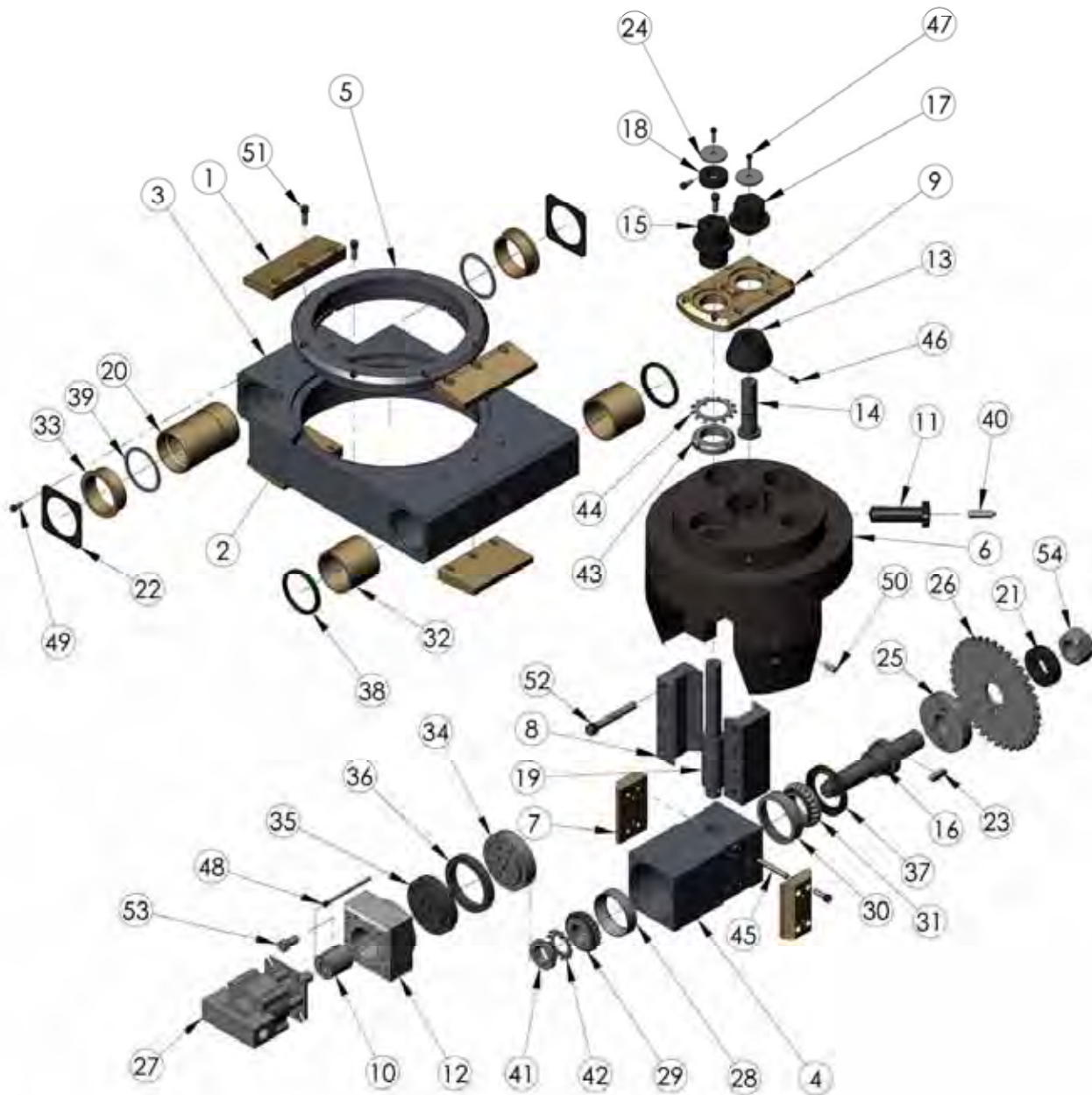
06-030-4003 AXIAL GEARBOX



ITEM NO.	PART NO	DESCRIPTION	explode/QTY.
1	06-030-006	HOUSING, AXIAL WORM DRIVE	1
2	06-030-007	COVER, AXIAL WORM DRIVE HOUSING	1
3	06-030-008	AXIAL WORM GEAR MOD	1
4	06-030-009	MOUNT, FEED MOTOR	1
5	06-030-028	SHAFT, FEED MOTOR ADAPTER	1
6	06-030-029	SPACER, AXIAL BEARING	1
7	05-048-025	MOTOR, FEED	1
8	66959	COVER, LOCKNUT HOUSING	1
9	66960	SHAFT, INPUT	1
10	66962	SPACER, INPUT SHAFT	1
11		GEAR, STEEL WORM	1
12		BEARING, DOUBLE ROW	1
13		BEARING, ANGULAR CONTACT	2
14		SLEEVE BUSHING	1
15		LOCKWASHER	1
16		LOCKNUT	1
17		SEAL	1
18		PLUG, HEX SOCKET	1
19		FITTING, GREASE	1
20		3/16 X 1/2 DOWEL PIN	3
21		8-32 X 3/4 SHCS	16
22		10-24 X 5/8 SHCS	5
23		1/4-20 X 3/4 SHCS	6
24		5/16-18 X 1 SHCS	4
25		3/16 X 3/4 SQUARE KEY	1
26		KEY, 404 WOODRUFF	1
27		KEY, 406 WOODRUFF	1



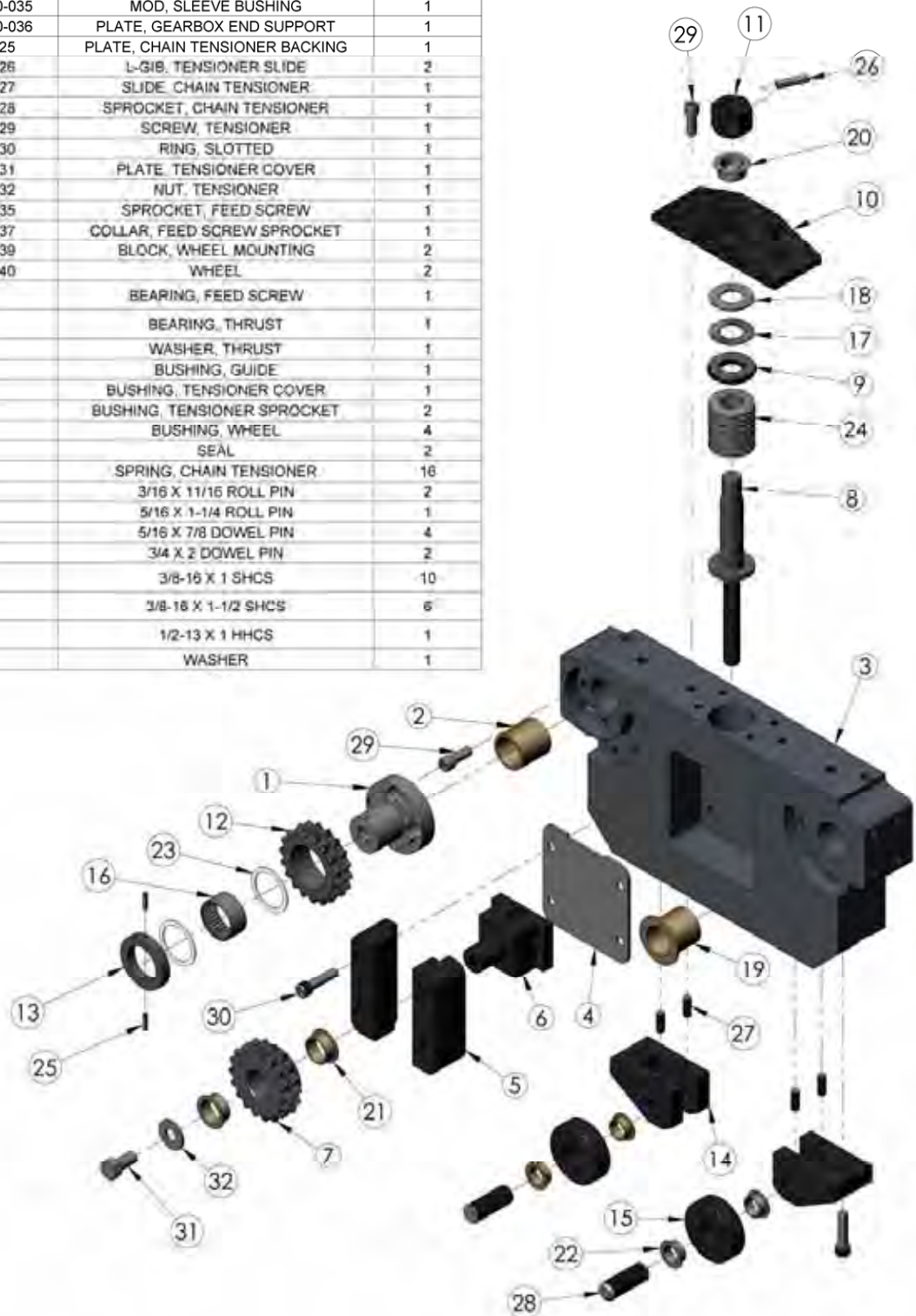
Item No.	Part No.	Description	Qty.
1	06-030-011	HOUSING, SELECTOR GEARBOX	1
2	06-030-012	COVER, SELECTOR GEARBOX	1
3	06-030-013	SHAFT, SELECTOR AXIAL OUTPUT	1
4	06-030-014	PINION, SELECTOR GEARBOX AXIAL	1
5	06-030-015	SHAFT, SELECTOR GEARBOX INPUT	1
6	06-030-016	SHAFT, SELECTOR GEARBOX RADIAL OUTPUT	1
7	06-030-017	SLIDER, DOG	1
8	06-030-018	CAM, SHIFT	1
9	06-030-019	FORK, SHIFT	1
10	06-030-020	ADAPTER, SHIFT SELECTOR DRIVE	1
11	06-030-021	BUSHING, SHIFT CAM	1
12	06-030-022	BUSHING, PINION	1
13	06-030-023	RAIL, SHAFT	1
14		GEAR, SPUR	1
15		BEARING, INPUT BALL	1
16		BEARING, AXIAL OUTPUT BALL	1
17		BEARING, RADIAL OUTPUT BALL	1
18		BEARING, PLAIN THRUST	1
19		BEARING, RADIAL OUTPUT SLEEVE	1
20		BEARING, AXIAL OUTPUT SLEEVE	1
21		BUSHING, SHIFT FORK SLEEVE	2
22		SEAL, SHIFT CAM	1
23		SEAL, SELECTOR INPUT SHAFT	1
24		SEAL, RADIAL OUTPUT SHAFT	1
25		RING, AXIAL GEAR RETAINING	2
26		SPRING, DETENT DISC	8
27		LEVER, GEAR SELECTOR	1
28		DETENT, BALL	1
29		1/8 x 3/4 KEY	1
30		3/16 x 3/4 KEY	2
31		FITTING, GREASE	1
32		3/32 X 1 ROLL PIN	1
33		3/16 x 1/2 DOWEL PIN	2
34		8-32 x 5/8 SHCS	1
35		10-24 x 1-1/4 SHCS	1



ITEM NO.	PART NO.	DESCRIPTION	EXPLODED/QTY.
1	06-030-100	WEDGE, TOP	2
2	06-030-101	WEDGE, BOTTOM	2
3	SP-669-01	HOUSING, CUTTER HEAD	1
4	SP-669-02	HOUSING, SPINDLE	1
5	SP-669-03	RING, CUTTER HEAD POSITIONING	1
6	SP-669-04	HEAD, ROTATING	1
7	SP-669-05	SLIDE, RAILS	2
8	SP-669-06	DOVETAIL	2
9	SP-669-07	PLATE, HEAD COVER	1
10	SP-669-08	INPUT COUPLER	1
11	SP-669-10	LEG, CLAMP	4
12	SP-669-11	ADAPTER, SPINDLE MOTOR	1
13	SP-669-12	CONE, DRAW	1
14	SP-669-13	BAR, DRAW	1
15	SP-669-14	NUT, CUTTER FEED	1
16	SP-669-15	SHAFT, SPINDLE	1
17	SP-669-16	NUT, DRAW	1
18	SP-669-17	COLLAR, DEPTH STOP	1
19	SP-669-18	SCREW, CUTTER FEED	1
20	SP-669-19	NUT, AXIAL FEED	1
21	SP-669-20	COLLAR, SPINDLE	1
22	SP-669-23	RETAINER, BELLOWS	2
23	SP-669-65	KEY, SPINDLE	1
24	SP-669-66	WASHER, STOP	2
25	SP-657-71	COLLAR, STANDARD CARBIDE CUTTER	1
26	02-605-00	SAW, 6" CARBIDE TIPPED	1
27		MOTOR, SPINDLE	1
28		CUP, SPINDLE BEARING	1
29		CONE, SPINDLE BEARING	1
30		CUP, SPINDLE BEARING	1
31		CONE, SPINDLE BEARING	1
32		BUSHING, CUTTER HEAD GUIDE SHAFT	2
33		BUSHING, CUTTER HEAD FEED SCREW	2
34		GEAR, PLANETARY	1
35		GEAR, PLANETARY	1
36		SPACER, PLANETARY	1
37		SEAL, SPINDLE	1
38		SEAL, CUTTER HEAD HOUSING	2
39		RING, AXIAL FEED NUT RETAINING	2
40		PLUNGER, SPRING	4
41		LOCKNUT, SPINDLE SHAFT	1
42		LOCKWASHER, SPINDLE SHAFT	1
43		LOCKNUT, CUTTER FEED	1
44		LOCKWASHER, CUTTER FEED	1
45		1/4 X 2 ROLL PIN	1
46		3/16 X 1/2 DOWEL PIN	1
47		8-32 X 5/8 SHCS	2
48		8-32 X 3 SHCS	1
49		10-24 X 1/2 SHCS	2
50		1/4-20 X 3/4 SSS	1
51		1/4-20 X 3/4 SHCS	4
52		3/8-16 X 2-3/4 SHCS	8
53		3/8-16 X 3/4 HHCS	4
54		1-12 HEX NUT	1

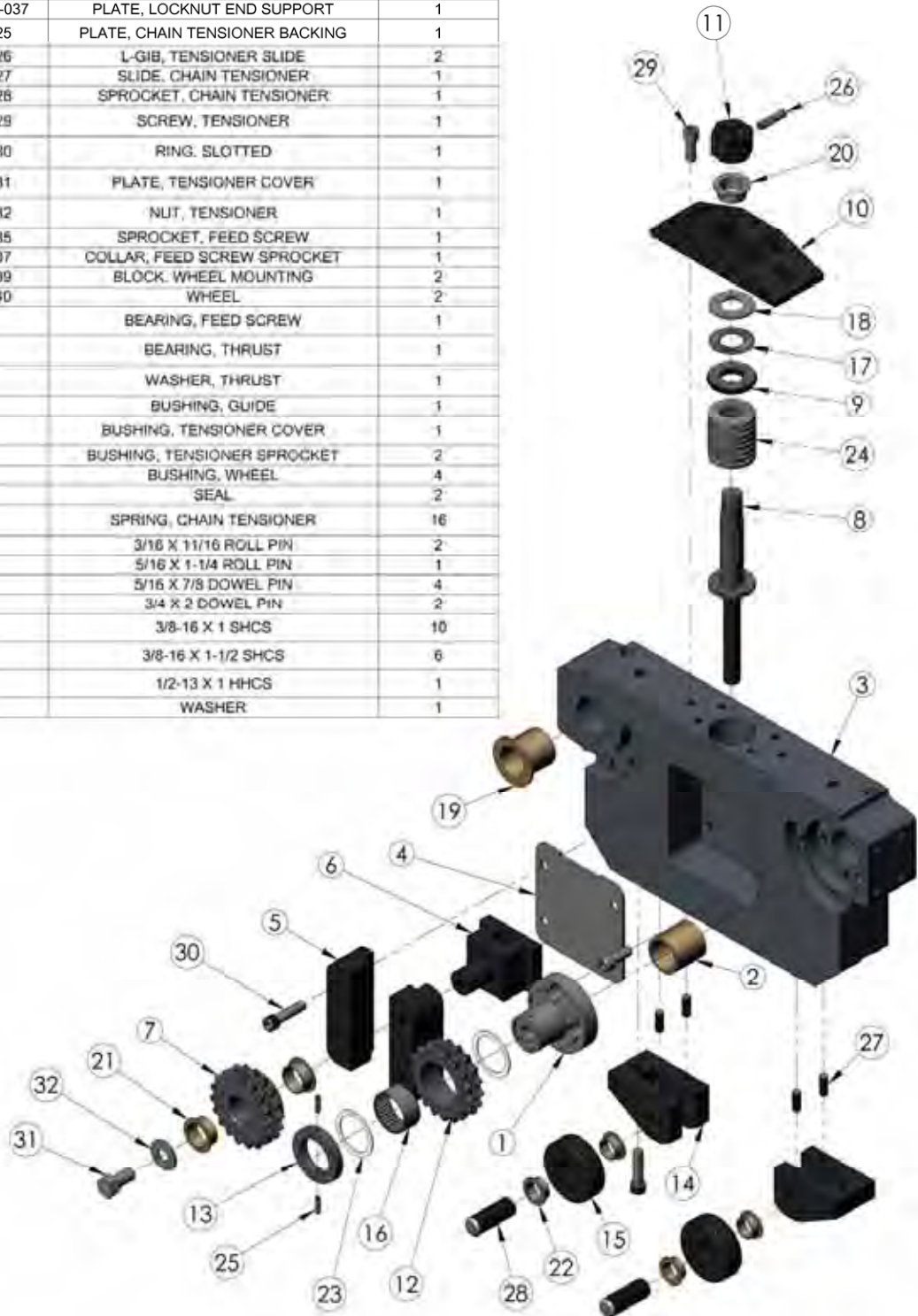
END SUPPORT PLATE, GEARBOX END

ITEM NO.	PartNo	DESCRIPTION	Default/QTY.
1	06-030-033	SUPPORT, FEED SCREW SPROCKET	1
2	06-030-035	MOD, SLEEVE BUSHING	1
3	06-030-036	PLATE, GEARBOX END SUPPORT	1
4	66925	PLATE, CHAIN TENSIONER BACKING	1
5	66926	L-GIB, TENSIONER SLIDE	2
6	66927	SLIDE, CHAIN TENSIONER	1
7	66928	SPROCKET, CHAIN TENSIONER	1
8	66929	SCREW, TENSIONER	1
9	66930	RING, SLOTTED	1
10	66931	PLATE, TENSIONER COVER	1
11	66932	NUT, TENSIONER	1
12	66935	SPROCKET, FEED SCREW	1
13	66937	COLLAR, FEED SCREW SPROCKET	1
14	66939	BLOCK, WHEEL MOUNTING	2
15	66940	WHEEL	2
16		BEARING, FEED SCREW	1
17		BEARING, THRUST	1
18		WASHER, THRUST	1
19		BUSHING, GUIDE	1
20		BUSHING, TENSIONER COVER	1
21		BUSHING, TENSIONER SPROCKET	2
22		BUSHING, WHEEL	4
23		SEAL	2
24		SPRING, CHAIN TENSIONER	16
25		3/16 X 11/16 ROLL PIN	2
26		5/16 X 1-1/4 ROLL PIN	1
27		5/16 X 7/8 DOWEL PIN	4
28		3/4 X 2 DOWEL PIN	2
29		3/8-16 X 1 SHCS	10
30		3/8-16 X 1-1/2 SHCS	6
31		1/2-13 X 1 HHCS	1
32		WASHER	1



END SUPPORT PLATE, LOCKNUT END

ITEM NO.	PartNo	DESCRIPTION	Default/QTY.
1	06-030-034	SUPPORT, BOTTOM FEED SCREW SPROCKET	1
2	06-030-035	MOD. SLEEVE BUSHING	1
3	06-030-037	PLATE, LOCKNUT END SUPPORT	1
4	66925	PLATE, CHAIN TENSIONER BACKING	1
5	66926	L-GIB, TENSIONER SLIDE	2
6	66927	SLIDE, CHAIN TENSIONER	1
7	66928	SPROCKET, CHAIN TENSIONER	1
8	66929	SCREW, TENSIONER	1
9	66930	RING, SLOTTED	1
10	66931	PLATE, TENSIONER COVER	1
11	66932	NUT, TENSIONER	1
12	66935	SPROCKET, FEED SCREW	1
13	66937	COLLAR, FEED SCREW SPROCKET	1
14	66939	BLOCK, WHEEL MOUNTING	2
15	66940	WHEEL	2
16		BEARING, FEED SCREW	1
17		BEARING, THRUST	1
18		WASHER, THRUST	1
19		BUSHING, GUIDE	1
20		BUSHING, TENSIONER COVER	1
21		BUSHING, TENSIONER SPROCKET	2
22		BUSHING, WHEEL	4
23		SEAL	2
24		SPRING, CHAIN TENSIONER	16
25		3/16 X 11/16 ROLL PIN	2
26		5/16 X 1-1/4 ROLL PIN	1
27		5/16 X 7/8 DOWEL PIN	4
28		3/4 X 2 DOWEL PIN	2
29		3/8-16 X 1 SHCS	10
30		3/8-16 X 1-1/2 SHCS	6
31		1/2-13 X 1 HHCS	1
32		WASHER	1



Chapter 9

Accessories and Spare Parts

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The following accessories are provided with the window cutter.

- Guide rings for vertical pipe—16", 18", and 20"

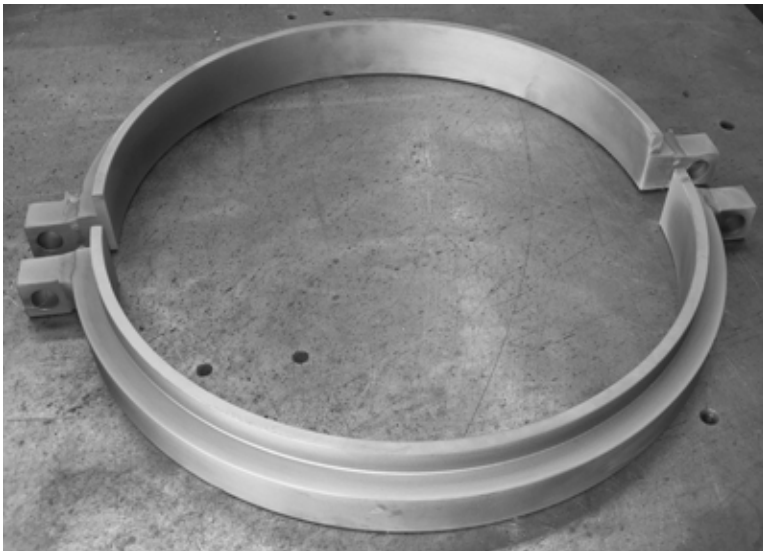


Figure 9-1. Guide ring for cutting on vertical pipe

- Radial cut support clamp

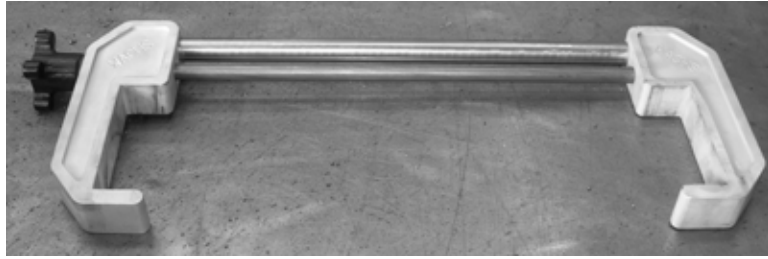


Figure 9-2. Support clamp for reducing vibration during radial cuts

Chapter 10

Ordering Information

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

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

You can also visit our Web site at:

www.ehwachs.com

In This Chapter

ORDERING REPLACEMENT
PARTS

REPAIR INFORMATION

WARRANTY INFORMATION

RETURN GOODS ADDRESS

ORDERING REPLACEMENT PARTS

When ordering parts, refer to the parts lists 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 description of the problem or the work to be done.

Before we perform any repair, we will estimate the work and inform you of the cost and the time 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. 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
600 Knightsbridge Parkway
Lincolnshire, Illinois 60069 USA