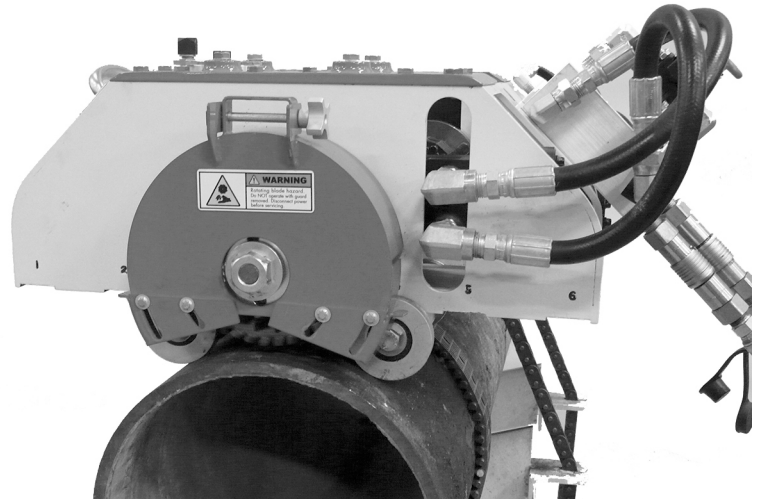




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Trav-L-Cutter SD Models E/HE

User's Manual



E.H. Wachs Part No. 02-MAN-02
Rev. A, July 2021

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**EU DECLARATION OF CONFORMITY
WITH
COUNCIL DIRECTIVE 2006/42/EC**

Issue Details:	DATE: 1/1/2011	Place: E.H.Wachs, Lincolnshire, IL USA
Directives:	Machinery Safety Directive 2006/42/EC	
Conforming Machinery:	<u>Trav-L-Cutter:</u>	
Model Number:	02-000-01, 02-000-02	
Serial Number:		
Manufacturer:	E.H. Wachs 600 Knightsbridge Parkway Lincolnshire IL 60069 USA	
Responsible Representative:	Orbitalum Tools GmbH Josef-Schüttler-Str. 17, 78224 Singen Germany Tel. +49 (0) 7731 - 792 872 Fax +49 (0) 7731 - 792 566	
Harmonised Standards & Other Technical Standards/Specifications Applied or Referenced:	EN ISO 12100-1:2003 + A1:2009 EN ISO 12100-2:2003 + A1:2009 EN 60201-1:2006 (for electric machines) EN ISO 13857:2008 EN 982:1996 + A1:2008 (E) (for hydraulic machines) EN 983:1996 (for pneumatic machines) EN 13732-1:2006 EN ISO 14121-1:2007 EN ISO 13850:2008 (for pneumatic machines)	
Provisions with which Conformity is Declared:	Essential Health and Safety Requirements of Annex 1 of the Machinery Directive	
We hereby certify that the machinery described above conforms to the provisions of Council Directive 2006/42/EC on the approximation of the laws of the Member States relating to the safety of machinery.		
Signed:		
Signatory:	Pete Mullally Quality Manager E.H. Wachs	

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Chapter 1

About this Manual

PURPOSE OF THIS MANUAL

This manual explains how to operate the Trav-L-Cutter SD. It includes safety information for safely operating the machine, preventive maintenance guidelines, and troubleshooting procedures.

Before operating the Trav-L-Cutter, you should read through this manual and become familiar with all instructions.

HOW TO USE THE MANUAL

This manual is organized into the following chapters:

- **Chapter 2, Safety**, provides important information and instructions for safe use of the Trav-L-Cutter machine. **Read this chapter carefully before operating the machine.**
- **Chapter 3, Equipment Description**, describes the operating features of the machine and lists all models, accessories, and kits available. **Read this chapter carefully to become familiar with the operating features of the Trav-L-Cutter and its accessories.**
- **Chapter 4, Operation**, describes how to configure the Trav-L-Cutter for the size of the pipe, mount it for operation, install appropriate tooling, and perform cutting and beveling operations. It describes the operating controls for both the pneumatic and hydraulic models.
- **Chapter 5, Preventive Maintenance**, describes how to lubricate the components of the Trav-L-Cutter and perform routine adjustments.
- **Chapter 6, Drawings and Parts Information**, provides ordering information for replacement parts, and includes exploded-view drawings of all assemblies with parts lists.

SYMBOLS AND WARNINGS

The following symbols are used throughout this manual to indicate special notes and warnings. Make sure you understand what each symbol means, and follow all instructions for cautions and warnings.



WARNING

A **WARNING** alert with the safety alert symbol indicates a potentially hazardous situation that **could** result in **serious injury or death**.



CAUTION

A **CAUTION** alert with the safety alert symbol indicates a potentially hazardous situation that **could** result in **minor or moderate injury**.



ATTENTION

This is the **equipment damage alert symbol**. It is used to alert you to **potential equipment damage situations**. Obey all messages that follow this symbol to avoid damaging the equipment or workpiece on which it is operating.



NOTE

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

Chapter 2

Safety

.....

E.H. Wachs 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 your E.H. Wachs equipment. It contains important safety instructions and recommendations.

SAFETY ALERTS IN THIS MANUAL

The following alerts are used throughout this manual to indicate operator safety hazards. In all cases, these alerts include a notice describing the hazard and the means to avoid or reduce risk. Carefully read all safety alerts.



WARNING

A **WARNING** alert with the safety alert symbol indicates a potentially hazardous situation that **could** result in **serious injury or death**.



CAUTION

A **CAUTION** alert with the safety alert symbol indicates a potentially hazardous situation that **could** result in **minor or moderate injury**.

SAFE OPERATING GUIDELINES

Follow these guidelines for safe operation of all E.H. Wachs equipment.

- **READ THE OPERATING MANUAL.** Make sure you understand all setup and operating instructions before you begin. Keep this manual with the machine.

- **INSPECT MACHINE AND ACCESSORIES BEFORE USE.** 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 STICKERS AND LABELS.** Make sure all labels and stickers are in place, clearly legible, and in good condition. Refer to “Safety Labels” later in this chapter for label locations on the machine. Replace any damaged or missing safety labels; see Chapter 6 for ordering information.
- **KEEP CLEAR OF MOVING PARTS.** Keep hands, arms, and fingers clear of all rotating or moving parts. Always turn the machine off and disconnect the power source 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.
- **FOLLOW SAFE PROCEDURES FOR HANDLING LUBRICANTS.** Refer to the manufacturer’s instructions and the Material Safety Data Sheets.

Safe Operating Environment

- Do not use this equipment in a potentially explosive atmosphere. Fire or explosion could result, with the risk of serious injury or death.
- Provide adequate lighting to use the equipment, in accordance with worksite and local regulations.
- **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.

Operating and Maintenance Safety

- This equipment is to be operated and maintained only by qualified, trained personnel.
- Make sure the equipment is stable when attached to the workpiece for the operation. Ensuring stability of the installed tool is the responsibility of the operator.
- Make sure the workpiece is supported adequately for installation of the equipment. This includes supporting any workpiece “fall-off” section when severing the workpiece. Ensuring support of the workpiece is the responsibility of the operator.
- Tooling on any cutting equipment—including lathe tools, saw blades, milling tools, etc.—may get very hot. Do not touch tooling until you have made sure it is cool enough to handle.
- Wear gloves when removing or cleaning up chips and cutting debris. Chips can be very sharp and cause cuts.
- Before performing any service on the equipment, disconnect the power source. Follow all lock-out/tag-out procedures required at the worksite.

Hydraulic Powered Equipment

- Hydraulic components such as hoses, motors, and manifolds will get hot during operation and may cause burns. Do not touch hydraulic components, except for operator controls, during or after operating the machine.
- **Hydraulic injection injury**—A pinhole in a hydraulic hose or fitting can eject fluid with enough force to pierce skin. Check hoses and fittings regularly for leaks. **Do not use bare hands to check for leaks while the system is pressurized.** If you suspect a leak, move a piece of paper or cardboard at least 6 inches (15 cm) over the suspicious area and watch for fluid spraying on the surface.



WARNING

Injection of hydraulic fluid through the skin is a serious injury that can result in infection, tissue damage, and possible loss of limb. **Seek medical treatment immediately.** First aid is not sufficient treatment for injection injury.

Pneumatic Powered Equipment

- Air motors may get hot during operation and may cause burns. Do not touch the air motor, except for operator controls, during or after operating the machine.
- Before disconnecting the air line from the equipment, always turn off air at the source and bleed all residual air pressure at the air motor.

Loss or Shut-Off of Power Supply

- If the power source to the equipment is lost, disconnect power from the equipment and lock out the power supply immediately to prevent accidental restarting of the machine.
- For all power sources, follow all lock-out/tag-out procedures required at the worksite when disconnecting or servicing the equipment.

Protective Equipment Requirements

Protective Clothing

Wear safety shoes when operating or servicing the equipment. Serious injury could result from dropping the machine or its components.

Do not wear gloves while operating the machine. Gloves can become entangled in moving parts, resulting in serious injury. Gloves may be worn when setting up the machine or cleaning up after the operation, but take them off when operating the machine.



NOTE

Gloves should be worn when cleaning up chips and other cutting debris. Chips can be very sharp and can cause serious cuts. **Do not wear gloves when the machine is operating.**

Eye Protection

Always wear impact-resistant eye protection while operating or working near this equipment.

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.

Hearing Protection

This equipment can produce noise levels above 80 dB. Hearing protection is required when operating the equipment. 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.

SAFE OPERATION OF THE TRAV-L-CUTTER

Intended Uses

The Trav-L-Cutter is designed to mount using a clamping chain on the O.D of in-line or open-ended pipe, and perform cut-off and beveling in a single operation. It uses cold-cutting mill tooling on a rotating spindle.

Make sure to follow all safety guidelines and procedures required for machining operations at the work site, including personal protective equipment (PPE). Do not use the Trav-L-Cutter in a manner that violates these guidelines.

Proper Use of the Trav-L-Cutter

- The Trav-L-Cutter should only be used by trained, qualified operators.
- The workpiece must be within the operating capacity of the Trav-L-Cutter and clamping chain configuration. See operating envelope information and drawings in Chapter 3, “Equipment Description”.
- Make sure the operating environment allows you to mount the machine securely and squarely on the workpiece.
- Make sure there is adequate clearance around the Trav-L-Cutter and workpiece to operate the machine controls as described in the operating instructions (Chapter 4).
- Use the Trav-L-Cutter only on empty, depressurized pipe.

Misuse

- Do not attempt to mount or operate the Trav-L-Cutter on non-cylindrical workpieces.
- Do not attempt to mount or operate the Trav-L-Cutter on any workpiece to which it cannot be securely mounted.
- Do not attempt to mount or operate the Trav-L-Cutter on any workpiece that is not stable enough to hold the machine.
- Do not mount the Trav-L-Cutter on the “fall-off” side of the cut line, unless you adequately rig and support the machine and workpiece.
- Do not operate the Trav-L-Cutter on pipe that is not horizontal, unless you mount it with the optional guide track. See “Setup Using the Guide Track” on page 58.
- Do not disable any safety feature of the Trav-L-Cutter or remove any safety labeling. Replace worn or damaged safety labels immediately. (See “Safety Labels” later in this chapter.)

Potential Hazards

The following figures illustrate potential hazards of operating the Trav-L-Cutter. Refer to the description of each hazard for guidelines on safe operation.

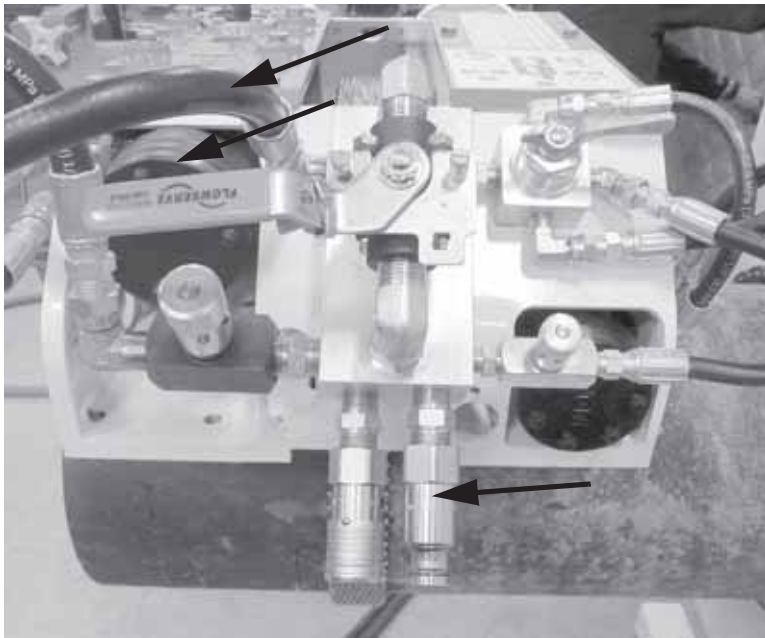


Rotating cutting tools—Keep clear of the cutting tools when operating the Trav-L-Cutter. Contact with tooling can cause serious injury. Always have the tool cover over the tooling when operating the machine.



Chips—The metal debris from the cutting process can be very sharp and very hot. Use care in cleaning debris from the machine and cleaning up the work area. Stop the machine before clearing chips. Use appropriate gloves when handling chips.

Fall-off workpiece—When you are severing the workpiece, make sure the fall-off section is supported or that a catch device is in place.



Hot surfaces—Air motors and hydraulic components such as hoses, manifolds, and motors can become very hot during operation. Make sure these components are not hot before touching them.



Lifting the machine—Use care when lifting the Trav-L-Cutter to avoid injury. Machines and components heavier than 40 lb (18 kg) should be lifted by two people or with a lifting device. The Trav-L-Cutter is provided with a lift cable to attach it to a lifting device.

Trav-L-Cutter Safety Features

The design of the Trav-L-Cutter incorporates the following features for safe operation.

Enclosed Spindle and Feed Drive Systems

The Trav-L-Cutter drive systems are enclosed inside the machine to prevent operator contact with them while the machine is running.

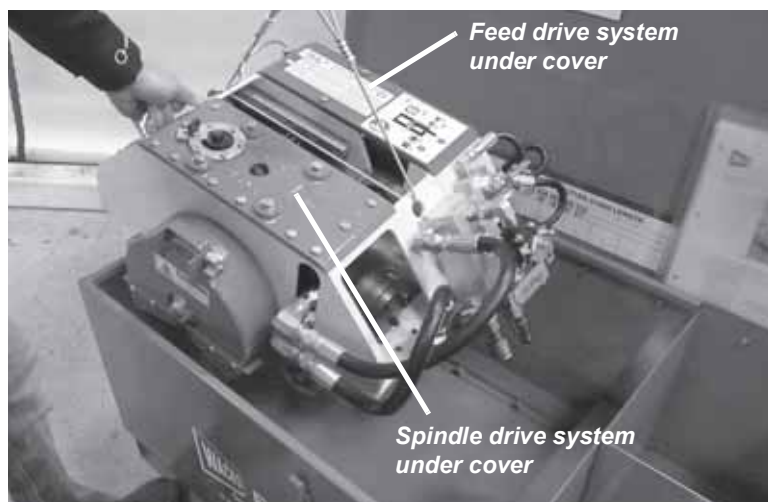


Figure 2-1. The drive systems are enclosed in the Trav-L-Cutter carriage.

Blade Guard

A blade guard covers the tooling when you operate the Trav-L-Cutter.



Figure 2-2. The blade guard covers the tooling during operation. Lift the blade guard to install tooling. Always lower the guard over the tooling when operating the machine.

Guidelines for Safe Setup, Operation, and Service

Pre-Operation Checklist

Every time you use the Trav-L-Cutter, perform the following checks to make sure it is in good operating condition:

- Check that all safety components are operating properly.
- Inspect it for damage or wear that could affect operation and safe use of the machine. Repair any defective component before using the machine.
- Make sure the machine is clean and properly lubricated.
- Make sure that tooling is sharp and in good condition. Poor quality tooling can cause difficult cutting and the possibility of machine malfunction and/or injury.
- Check power connections (pneumatic or hydraulic) to make sure they are in good condition.

Operating Safety

- Stop the drive motion to clear chips or make any machine adjustments.
- For parting (cut-off) operations, use a catch device to prevent the cut-off piece of the pipe from falling.
- Keep air and hydraulic hoses away from moving parts while operating the machine.

Service Checklist

- Disconnect power from the machine during service. See instructions in the following section.

Disconnecting Power

The following photos show the means of disconnecting power for the Trav-L-Cutter. Follow all lock-out/tag-out procedures at your work site.



WARNING

Before disconnecting the air line, always turn off air at the source and bleed all residual air pressure at the air motor. Disconnecting the air line while under pressure could result in serious injury.

- **PNEUMATIC POWER**—To disconnect power from the air motor, remove the air line from the air motor coupling.

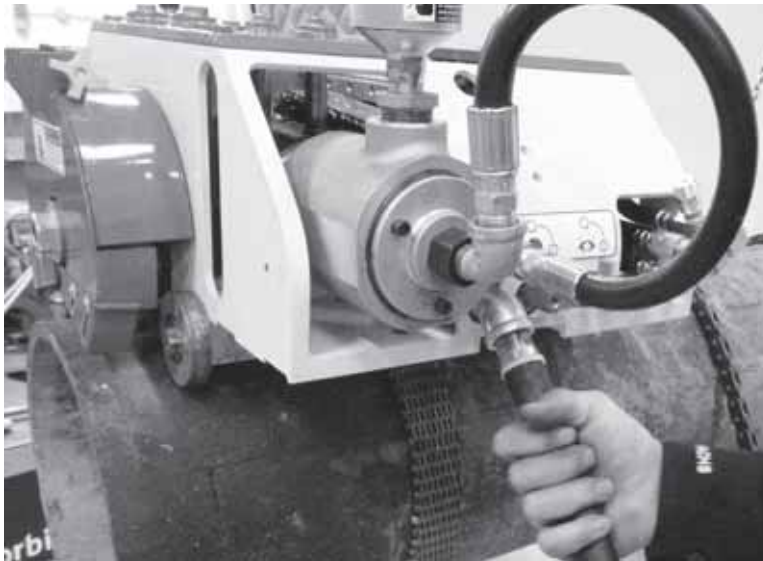


Figure 2-3. Disconnect pneumatic power by removing the air line from the connector on the machine.



WARNING

Hydraulic components such as hoses, motors, and manifolds will get hot during operation and may cause burns. Use appropriate gloves or wait until the components cool before touching them.

- **HYDRAULIC POWER**—To disconnect power from the hydraulic motor, remove the hydraulic hoses from the fittings.



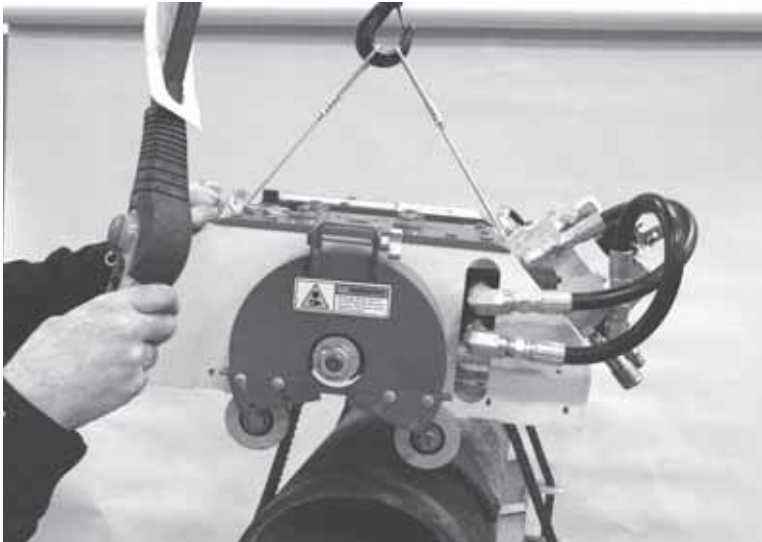
Figure 2-4. Disconnect hydraulic power by removing the hydraulic hoses from the fittings on the machine.

Safe Lifting and Handling

- Always use a lifting device and the provided lift cable to lift and move the Trav-L-Cutter. The Trav-L-Cutter weighs 215 lb (98 kg).
- Do not rig or lift the machine while power is attached. It is recommended to have tooling removed while lifting and handling the machine.
- Lift the Trav-L-Cutter using the provided lift cable, threaded through the lift holes in the frame as shown below.



- 1.** Use the lifting device with cable to move the Trav-L-Cutter in and out of its case.



2. Rig the Trav-L-Cutter as shown to lift it and mount it on the workpiece.
 - *Leave the lifting device attached and supporting the machine until you have fully tightened the chain.*

Machine Weight

The Trav-L-Cutter weighs 215 lb (98 kg) in both configurations. Always use an appropriate lifting device with the supplied lift cable to pick up and position the machine.

Safety Labels

The following safety labels are provided on the Trav-L-Cutter. If any of these labels is damaged or missing, replace it immediately. See Chapter 6 for ordering information.

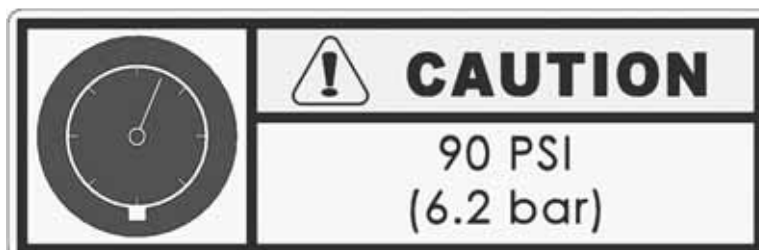


Figure 2-5. The air pressure label is attached to the carriage of the pneumatic Trav-L-Cutter. Do not operate the equipment with greater than 90 psi (6.2 bar) air pressure. (Part no. 02-010-00.)

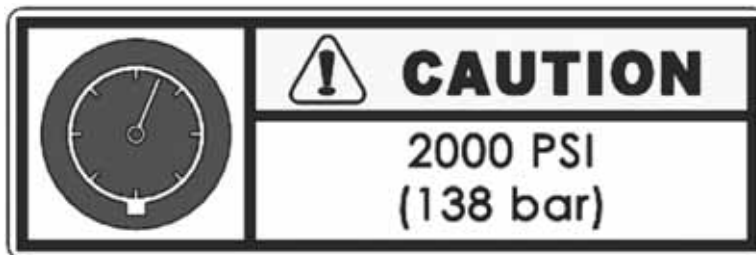


Figure 2-6. The hydraulic pressure label is attached to the carriage of the hydraulic Trav-L-Cutter. Do not operate the equipment with greater than 2000 psi (138 bar) hydraulic pressure. (Part no. 02-009-00.)

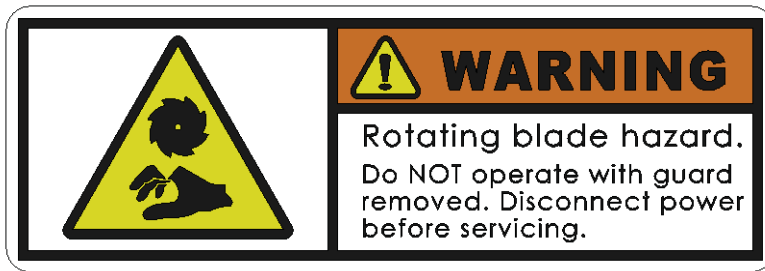


Figure 2-7. The rotating blade hazard label is attached to the blade guard of the Trav-L-Cutter. Always keep the guard over the blade when operating the machine. Keep hands away from the blade when the machine is attached to power.



Figure 2-8. The Read Manual label is attached to the carriage of the Trav-L-Cutter. Make sure you understand all operating and maintenance instructions before using the machine. (Part no. 90-900-01.)

Chapter 3

Equipment Description

TRAV-L-CUTTER SD CONFIGURATIONS

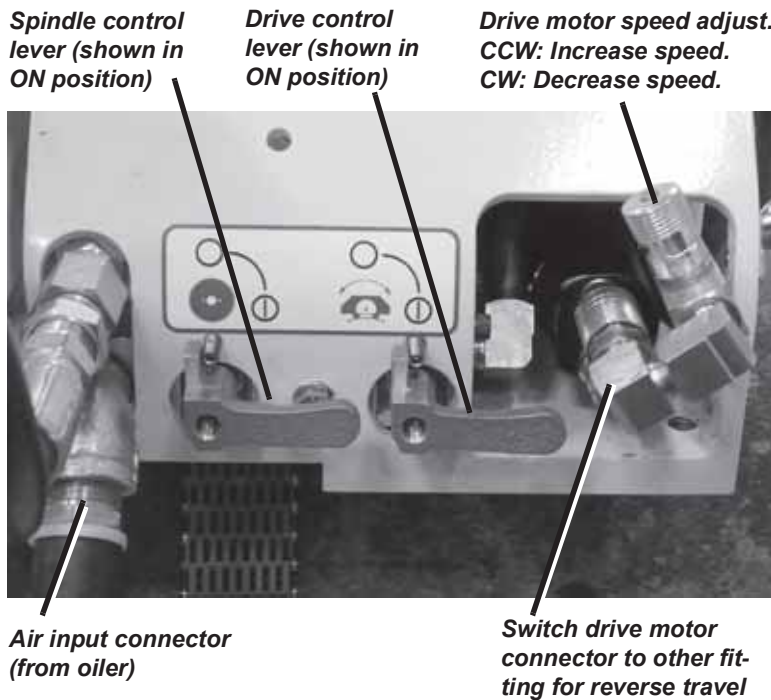
The Trav-L-Cutter SD is available in two power configurations, pneumatic and hydraulic:

- The pneumatic Trav-L-Cutter SD (model no. 02-0000-01) has built-in air motors to power the spindle drive and the carriage feed drive. Controls on the front of the machine provide separate control of the two drives. The machine is provided with an in-line oiler to lubricate the motors. Do not operate the machine without the oiler; damage to the air motors will occur.
- The hydraulic Trav-L-Cutter SD (model no. 02-0000-02) has built-in hydraulic motors to power the spindle drive and the carriage feed drive. Controls on the front of the machine provide separate control of the two drives, with a master power lever that turns on hydraulic flow to both drives.

Setup is the same for both Trav-L-Cutter configurations. The power connections and controls are different for the pneumatic and hydraulic versions, as shown in the following figures. Chapter 4, Operating Instructions, has separate sections for performing the cutting procedure for each machine configuration.

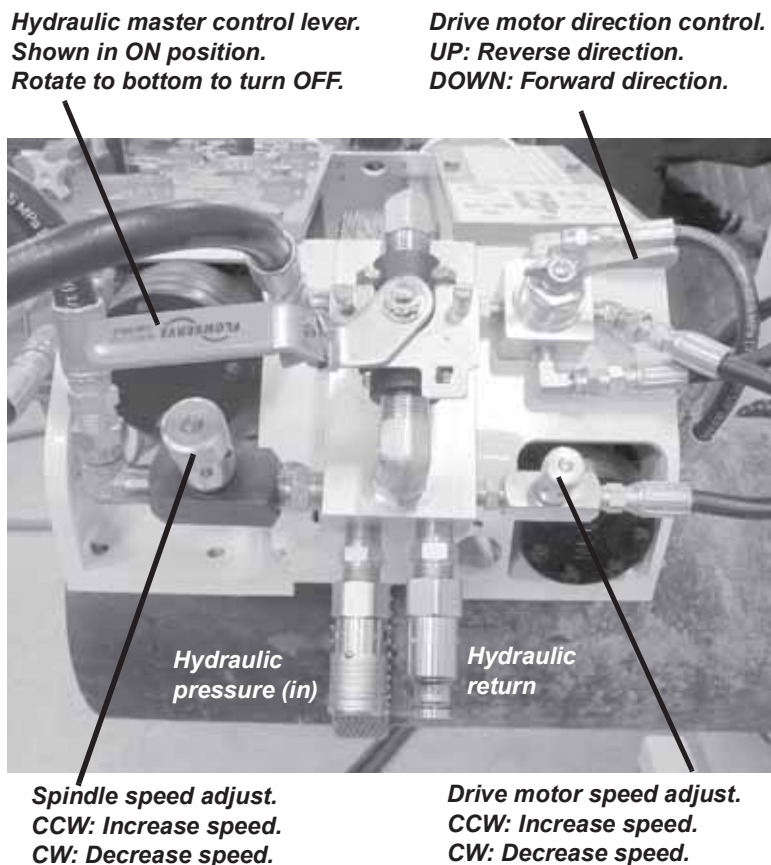
Cutting Time—As a rule of thumb, the Trav-L-Cutter can make a complete cut in as little as 1 minute per inch of pipe diameter. (For example, you can cut a 24-inch diameter pipe in about 24 minutes.) However, cutting speed depends on pipe wall thickness and material, and cutting time may be longer. Always adjust the feed speed for best cutting performance. See the cutting tips in the operating instructions.

The maximum free travel speed (not cutting) is about 2-1/4" per minute.



- When connecting the air hose or turning on the air supply, have the spindle control lever and drive control lever in the OFF (up) position.
- Spindle control is ON/OFF only—there is no spindle speed control.
- There are 2 air fittings on the drive motor. Switch the drive motor connector between fittings to set forward/reverse direction. (**Drive control lever must be OFF.**)
- Do not cut while drive motor direction is set to reverse.

Figure 3-1. The photo illustrates the controls on the pneumatic Trav-L-Cutter SD.



- When connecting hydraulic hoses and starting HPU, have the hydraulic master control lever in the OFF (down) position.
- Before you turn on the hydraulic master control lever, turn both speed adjust knobs clockwise all the way—both drives off.
- Do not cut while drive motor direction is in reverse.

Figure 3-2. The photo illustrates the controls on the hydraulic Trav-L-Cutter SD.

The Trav-L-Cutter is provided with a steel case for storing the machine and its accessories. Place the accessories in their compartments, and secure the machine in the case with the hold-down bracket.

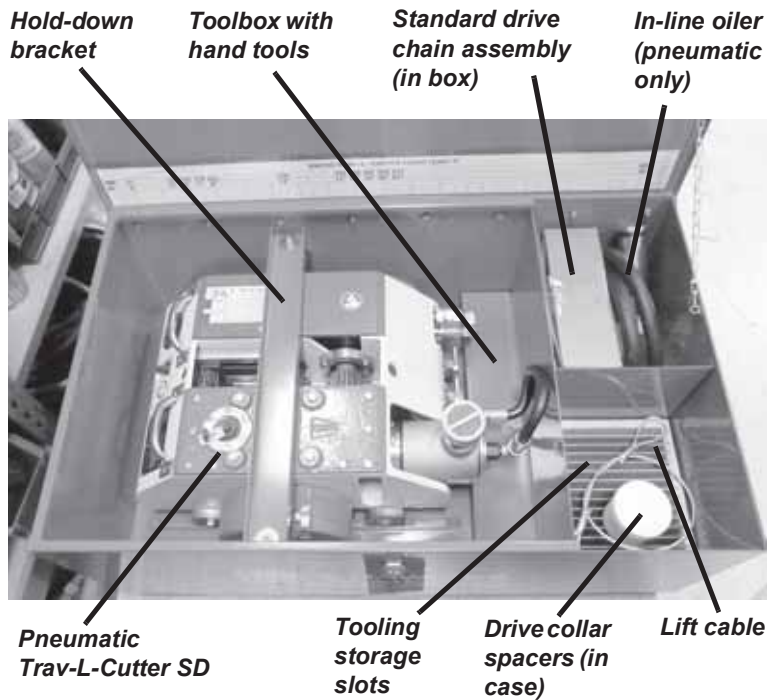


Figure 3-3. The Trav-L-Cutter SD and accessories in its storage case.

The following accessories are supplied with the Trav-L-Cutter:

- Set of hand tools for setting up and operating the machine.
- Standard drive chain assembly, for pipes up to 48" (1219 mm) in diameter.
- Lift cable for attaching the machine to a lifting device.
- A set of drive collar spacers to mount on the spindle with the tooling.
- In-line oiler (pneumatic configuration only).
- Optional drive chain extension assembly, for pipes up to 72" (1829 mm) in diameter.
- Optional guide track assembly for vertical pipe mounting or precise machining applications (assemblies specific to each pipe size). See "Setup Using the Guide Track" on page 58.

Tooling is sold separately. A variety of slitting (cut-off) and beveling tools is available. See "Tooling Selection" on page 36.

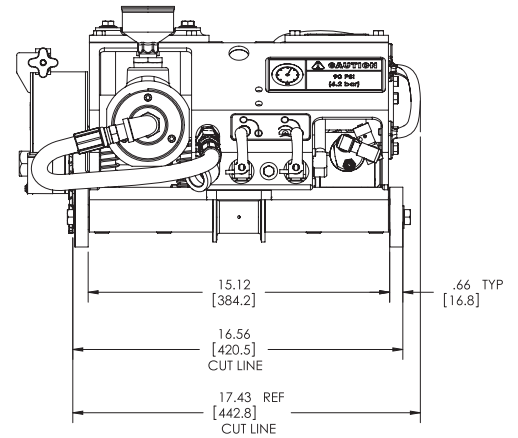
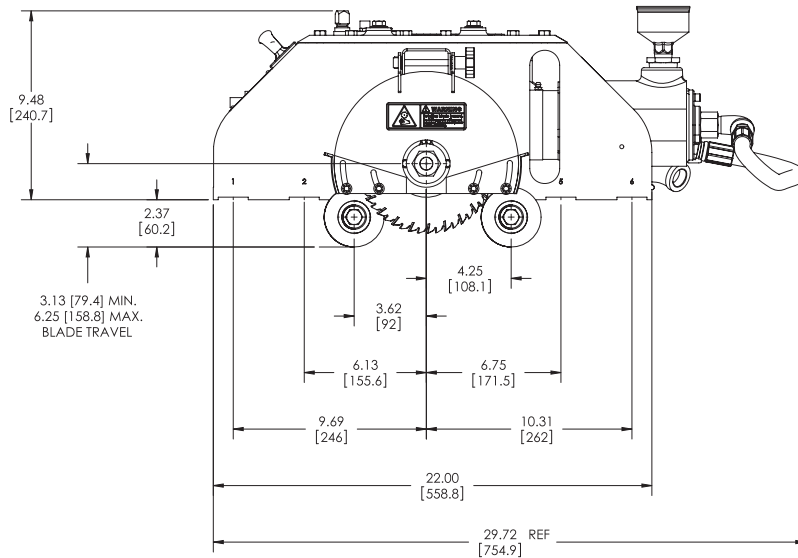
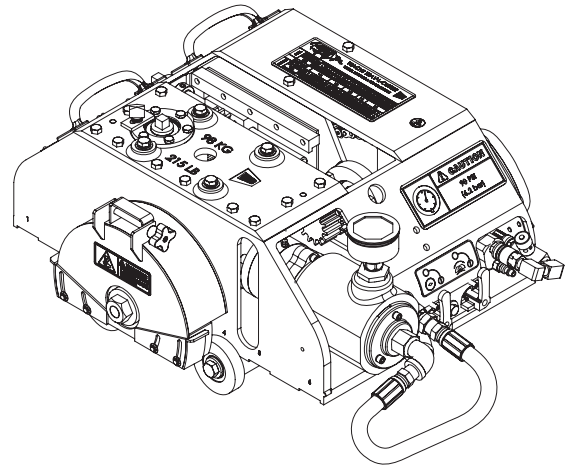
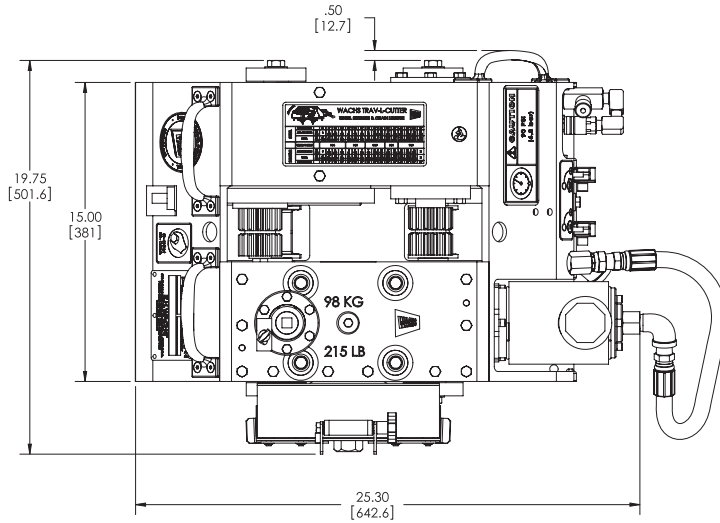
SPECIFICATIONS

Table 1: Trav-L-Cutter SD Specifications

Weight	Operating: 218 lb (98 kg) Shipping: 418 lb (190 kg)
Dimensions	Pneumatic: 29.72" x 20.25" x 11.85" (755 x 513 x 301 mm) Hydraulic: 27.18" x 21.10" x 12.49" (690 x 536 x 317 mm) See drawings in the next section for detailed dimensional information.
Power Requirements	Pneumatic: 100 cfm at 90 psi (2,800 l/m at 6.2 bar). Hydraulic: 13-15 gpm at 1,500 psi (49-57 l/m at 103 bar). Not to exceed 2,000 psi (138 bar).
Power Capability	Pneumatic: 4 HP spindle motor; 3/4 HP feed drive motor. Hydraulic: 4 HP spindle motor; 4 HP feed drive motor.
Spindle Speed	Pneumatic: Variable from 35-55 rpm. Hydraulic: Adjustable from 0-60 rpm.
Feed Travel Speed	Up to 2-1/4" per minute on pipe surface, when not cutting.
Cutting Speed	Up to 1" per minute on pipe surface, depending on wall thickness and material.
Pipe Size Capacity	6"-48" (153-1,219 mm) diameter with standard chain assembly. Up to 72" (1,829 mm) with extended chain.
Pipe Wall Thickness Capacity	Up to 2-1/8" (54 mm), depending on tooling. See "Tooling Selection" on page 36.
Spindle Plunge Feed Travel	3.13" (79.4 mm)

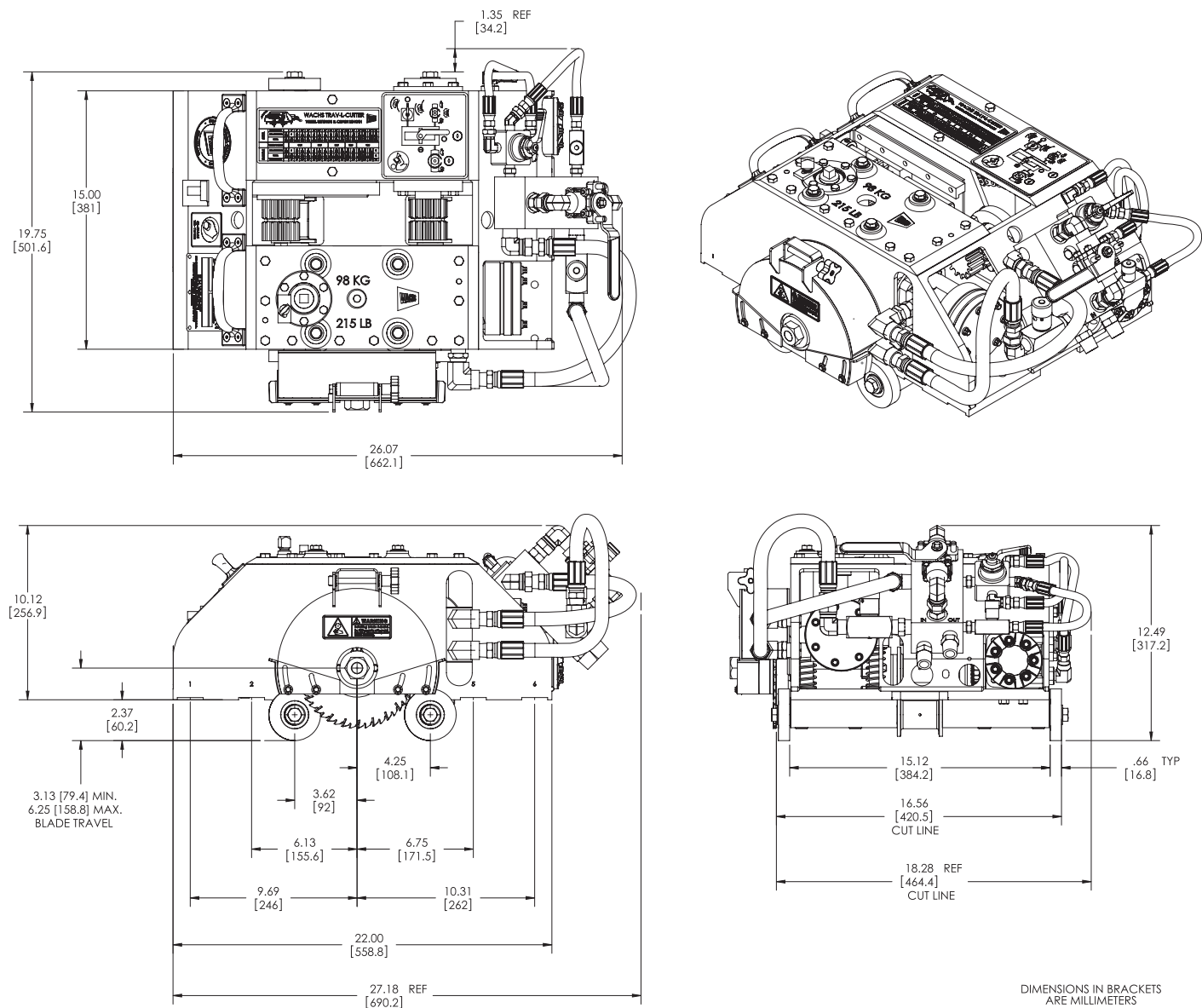
Dimensions

The following figures illustrate the dimensions for the pneumatic and hydraulic Trav-L-Cutter machines.

Pneumatic Trav-L-Cutter SD Dimensions (02-0000-01)

DIMENSIONS IN BRACKETS
ARE MILLIMETERS

Hydraulic Trav-L-Cutter SD Dimensions (02-0000-02)



Chapter 4

Operating Instructions

RIGGING AND LIFTING

Always use an appropriate lifting device to lift and transport the Trav-L-Cutter.

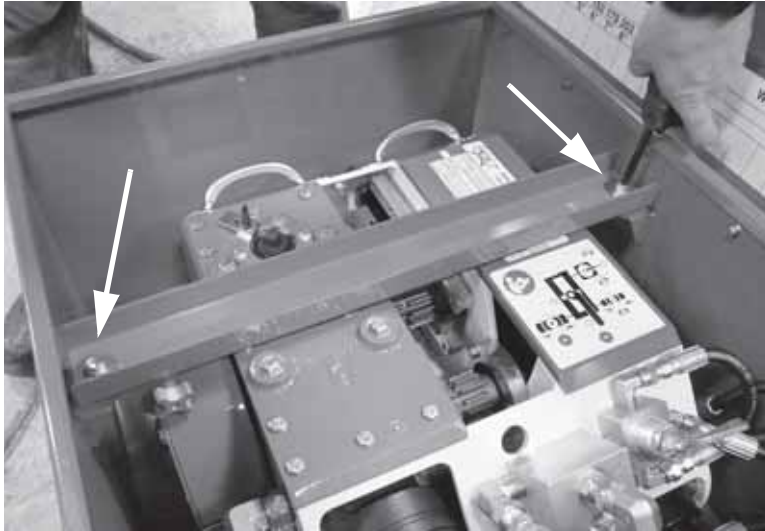


WARNING

The Trav-L-Cutter weighs 215 lbs. (98 kg). Do not lift or carry the machine by hand. Use a lifting device with the supplied cable to lift and mount the machine.

Rigging and lifting guidelines are the same for the pneumatic and hydraulic Trav-L-Cutter models.

The Trav-L-Cutter is secured in its case with a hold-down bracket. Remove the 2 screws and the bracket to take the machine out of the case. Be sure to replace the bracket when you store the machine.



- 1.** Remove the hold-down bracket to take the Trav-L-Cutter out of its storage case.
 - *Remove the 2 screws holding the ends of the bracket.*



- 2.** A lift cable is provided with the Trav-L-Cutter. Thread the ends of the cable through the lift holes in the carriage, as shown.
- 3.** Attach the cable loops to the lifting device.



- 4.** Use the lifting device with cable to move the Trav-L-Cutter in and out of its case.



- 5.** Rig the Trav-L-Cutter as shown to lift it and mount it on the workpiece.
- *Leave the lifting device attached and supporting the machine until you have fully tightened the chain.*

TRAV-L-CUTTER SETUP



- 1.** Measure the O.D. of the pipe to determine the wheel positions and chain length configuration.
 - *The pipe shown here, used for these instructions, is 13" in diameter.*



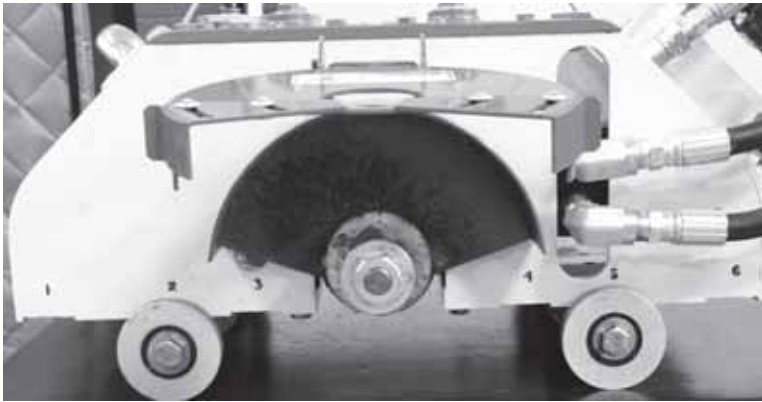
- 2.** Set the machine on a workbench or convenient work surface to configure the wheels and chain.

Setting the Wheel Positions

There are 6 wheel mounting positions on the underside of the Trav-L-Cutter carriage. Mount the wheel assemblies at the required positions for the pipe diameter. See the following table.

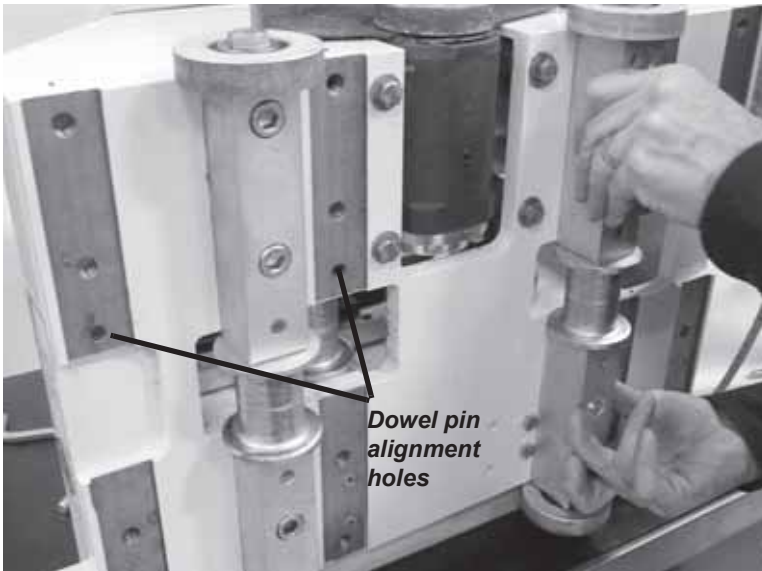
Table 1: Wheel Mounting Positions

Pipe Diameter (O.D.)	Wheel Positions
6"-14" (168-356 mm)	3 and 4
14"-20" (356-508 mm)	3 and 5
20"-36" (508-915 mm)	2 and 5
36"-48" (915-1219 mm)	2 and 6
48"-72" (1219-1829 mm)	1 and 6



1. The 6 wheel positions are stamped on both sides of the carriage (shown marked in the photo for visibility).

- Based on pipe size (Table 1), you will mount one wheel assembly at position 1, 2, or 3, and the other wheel assembly at position 4, 5, or 6.



2. Tip the machine on its side, spindle side up, to mount the wheel assemblies.

- Leave the machine attached to the lifting device while configuring it.

3. Attach the wheel assemblies at the required positions.

- Mount the wheel assembly with the dowel pin in the alignment hole.



4. Tighten the screws with the provided hex wrench to secure the wheel assemblies.
 - *You can tap the wrench with a mallet to make sure the screws are tight.*
5. Set the machine upright on its wheels.

Assembling the Drive Chain

The drive chain wraps around the pipe and is threaded through the Trav-L-Cutter drive mechanism. The chain is provided in multiple segments of various lengths. This allows you to connect a combination of segments for the chain length required for the pipe.

The standard chain set (for pipes up to 48" in diameter) includes a base chain 42" long, plus 18 smaller segments to extend the total length up to 173". A chain extension kit (for pipes up to 72" in diameter) includes 5 segments to extend the total length up to 240".

The Standard Drive Chain Assembly diagram illustrates the standard chain assembly. The Drive Chain Extension Assembly diagram illustrates the extension kit chain for larger pipes. Table 2 lists nominal and actual pipe diameters, and the required length of drive chain for each pipe size.

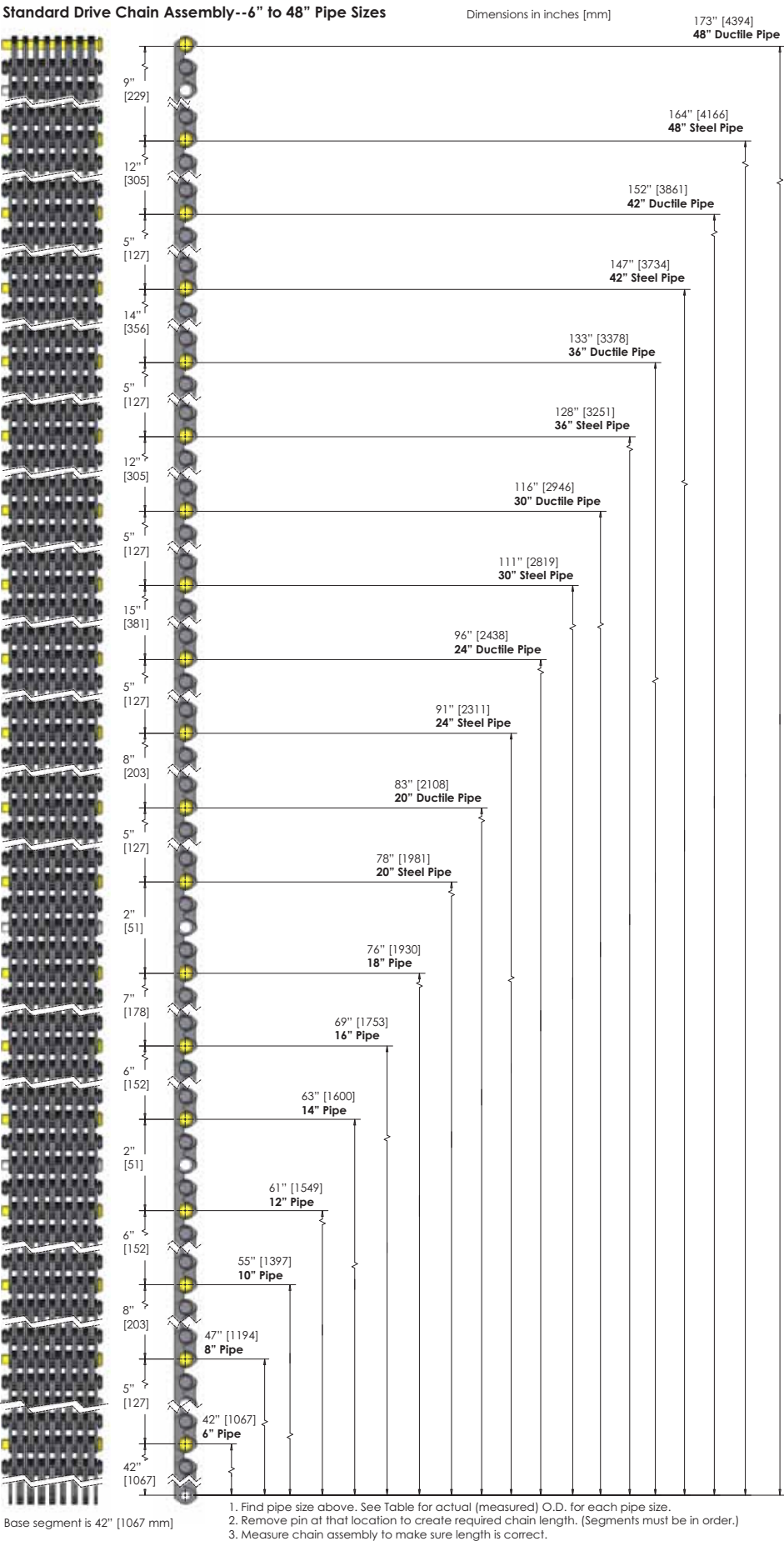
- The drive chain assemblies are delivered with the segments assembled as shown in the diagrams. It is recommended to keep the assemblies in their original configurations, to make it easy to select a chain length for the pipe size.
- Refer to the chain assembly diagrams to find the chain length for the pipe size you are cutting. Remove the pin at the location corresponding to the pipe size. The assembled section (with the base segment) will fit the pipe.
- For pipes larger than 48", start with the entire standard chain assembly. Add the required segments from the chain extension assembly.
- If the chain is not assembled as shown, select the segments you need to create the total required length (always start with the 42" base segment). You can use any combination that adds up to the required total.
- **Always measure the chain assembly before mounting it into the Trav-L-Cutter, to make sure the length is correct.**

Table 2: Pipe Sizes and Required Drive Chain Lengths

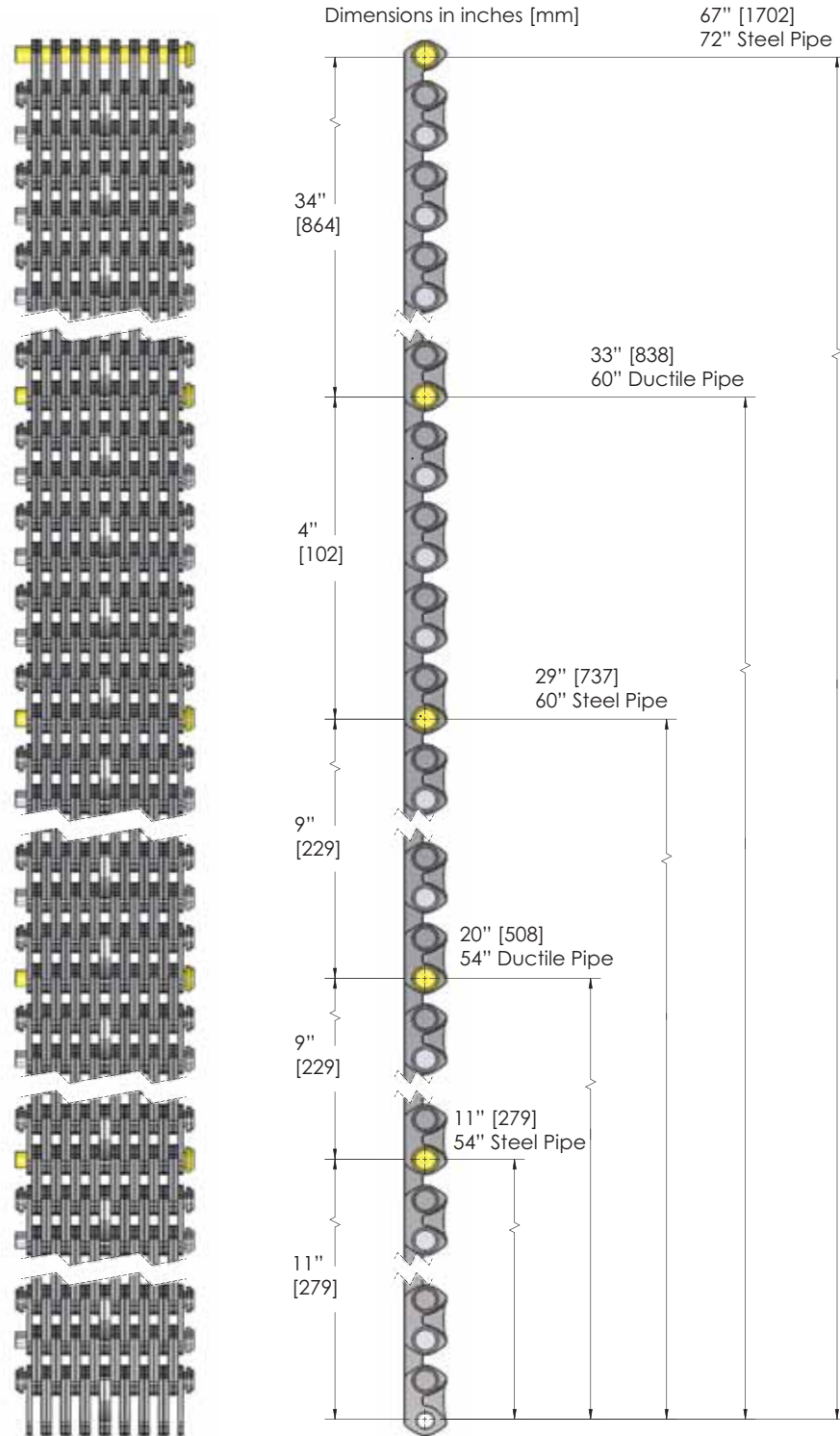
Pipe Size	Type (S/DI)	Measured (Actual) Pipe O.D.	Required Total Chain Length
6"	S	6.625" (168 mm)	42" (1067 mm)
	Di	6.90" (175 mm)	
8"	S	8.625" (219 mm)	47" (1194 mm)
	Di	9.05" (230 mm)	
10"	S	10.75" (273 mm)	55" (1397 mm)
	Di	11.10" (282 mm)	
12"	S	12.75" (324 mm)	61" (1549 mm)
	Di	13.20" (335 mm)	
14"	S	14.00" (356 mm)	63" (1600 mm)
	Di	15.30" (389 mm)	
16"	S	16.00" (406 mm)	69" (1752 mm)
	Di	17.40" (442 mm)	
18"	S	18.00" (457 mm)	76" (1930 mm)
	Di	19.50" (495 mm)	
20"	S	20.00" (508 mm)	78" (1981 mm)
	Di	21.60" (549 mm)	83" (2108 mm)
24"	S	24.00" (610 mm)	91" (2312 mm)
	Di	25.80" (655 mm)	96" (2438 mm)
30"	S	30.00" (762 mm)	111" (2819 mm)
	Di	32.00" (813 mm)	116" (2946 mm)
36"	S	36.00" (915 mm)	128" (3251 mm)
	Di	38.30" (973 mm)	133" (3378 mm)
42"	S	42.00" (1067 mm)	147" (3734 mm)
	Di	44.50" (1130 mm)	152" (3861 mm)
48"	S	48.00" (1219 mm)	164" (4166 mm)
	Di	50.80" (1290 mm)	173" (4394 mm)
54"	S	54.00" (1372 mm)	184" (4674 mm)
	Di	57.26" (1454 mm)	194" (4928 mm)
60"	S	60.00" (1524 mm)	202" (5131 mm)
	Di	61.61" (1565 mm)	207" (5258 mm)
72"	S	72.00" (1829 mm)	240" (6096 mm)

**NOTE**

There is a chain measuring label on the inside of the Trav-L-Cut-ter case lid.

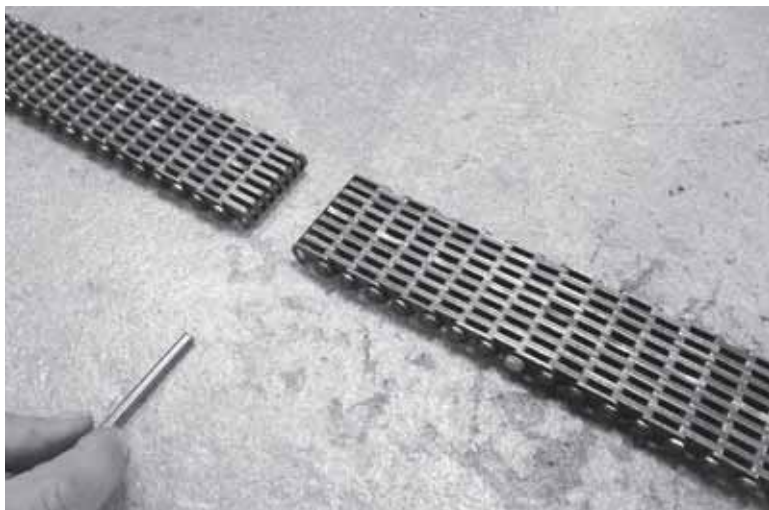


Drive Chain Extension Assembly--54" to 72" Pipe Sizes



Connect to Standard Chain Assembly

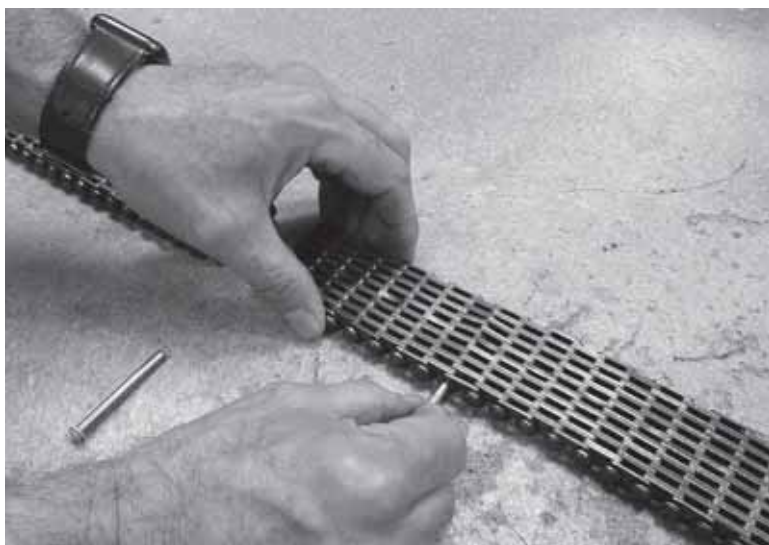
1. Find pipe size above. See Table for actual (measured) O.D. for each pipe size.
2. Remove pin at that location to create required extension length. (Segments must be in order.)
3. Connect extension to full standard chain assembly.
4. Measure chain assembly to make sure length is correct.



1. If possible, lay the chain assembly on a flat surface to work on it.

2. Remove the chain pin where required to separate the section of chain you need.

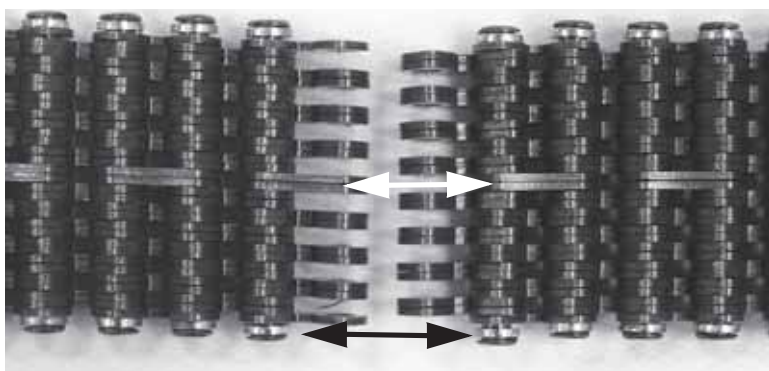
- *Always use the base (42") segment as the first part of the chain assembly.*
- *Verify that the section is the correct length.*
- *If the segments are already separated, or if the chain has been re-assembled, select appropriate segments (including the base segment) to make the required length.*



3. When connecting chain segments, make sure the chain edges align.

4. Make sure all pins are inserted in the same direction.

- *Use the provided pin guide tool to align the links for inserting the pin.*



CORRECT—Heads of link pins and center links are aligned

5. Make sure the segment ends are aligned correctly, as shown.

- *If one segment is "flipped", it is possible to connect the segments incorrectly. **Damage to the machine or the workpiece could occur if the chain is installed this way.***



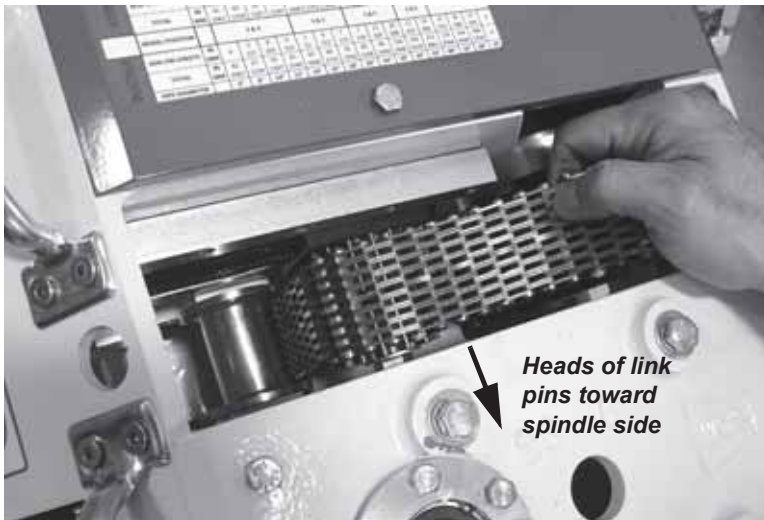
WRONG—Link pins and center links are not aligned

- 6.** If the segments are misaligned, as shown, flip one of the segments end-for-end.



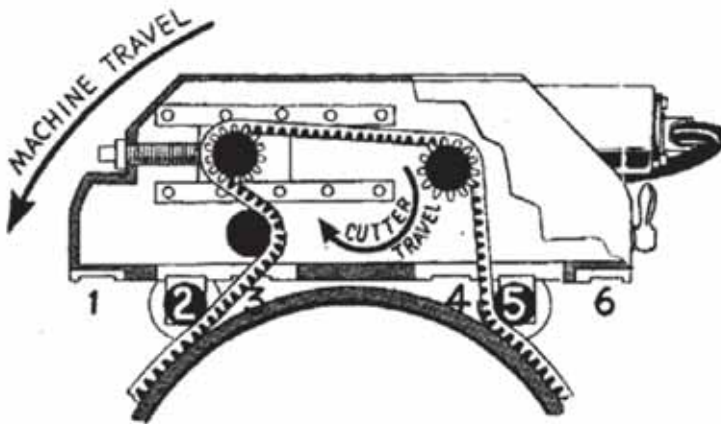
- 7.** Turn the chain tensioning screw counter-clockwise to fully loosen the chain tensioner.





8. Lay the assembled chain into the top of the Trav-C-Cutter carriage, on the drive gears.

- The side of the chain with the link pin heads **must** be toward the spindle side of the machine.
- Make sure the wheel assemblies have been installed in the correct positions for the pipe size, as described in the previous section.



9. Thread the chain through the drive gears and wheels as shown in the diagram.

- It is easiest to mount the chain with the machine lifted.
- Make sure the chain is threaded around the inside of the wheels, as shown.
- A label on the inside of the case lid illustrates the chain path, showing all wheel positions.



10. Arrange the chain so that a few inches of it extend out on the control side of the machine, with the rest hanging from the other side.

Chain Length Calculations

As an alternative to using the charts, you can calculate the required chain length for any pipe size using the following formulas. (Note that there is some overlap in acceptable wheel positions between pipe size ranges. Always **use the formula for the wheel positions** you are using.)

Table 3: Chain Length Formulas

Wheel Positions	Pipe O.D.	Chain Length Formula
3 and 4	6.0"-14.0"	$3.235 \times (\text{Pipe diameter in inches}) + 19.06"$
	168-356 mm	$3.235 \times (\text{Pipe diameter in mm}) + 484 \text{ mm}$
3 and 5	14.0"-20.0"	$3.204 \times (\text{Pipe diameter in inches}) + 16.33"$
	356-508 mm	$3.204 \times (\text{Pipe diameter in mm}) + 415 \text{ mm}$
2 and 5	20.0"-36.0"	$3.175 \times (\text{Pipe diameter in inches}) + 14.98"$
	508-915 mm	$3.175 \times (\text{Pipe diameter in mm}) + 380 \text{ mm}$
2 and 6	36.0"-48.0"	$3.162 \times (\text{Pipe diameter in inches}) + 12.82"$
	915-1219 mm	$3.162 \times (\text{Pipe diameter in mm}) + 326 \text{ mm}$
1 and 6	48"-72"	$3.149 \times (\text{Pipe diameter in inches}) + 12.61"$
	1219-1829 mm	$3.149 \times (\text{Pipe diameter in mm}) + 320 \text{ mm}$

Mounting the Machine on the Pipe

Before mounting the Trav-L-Cutter, remove loose scale from the cut line and wheel paths on the pipe. Mark the cut line location.



WARNING

Make sure the pipe is securely supported on both sides of the cut line.

If you are cutting off a pipe end, make sure to support or have a way to catch the fall-off piece.

Always mount the machine on a supported section of pipe—not on the fall-off side of the cut.



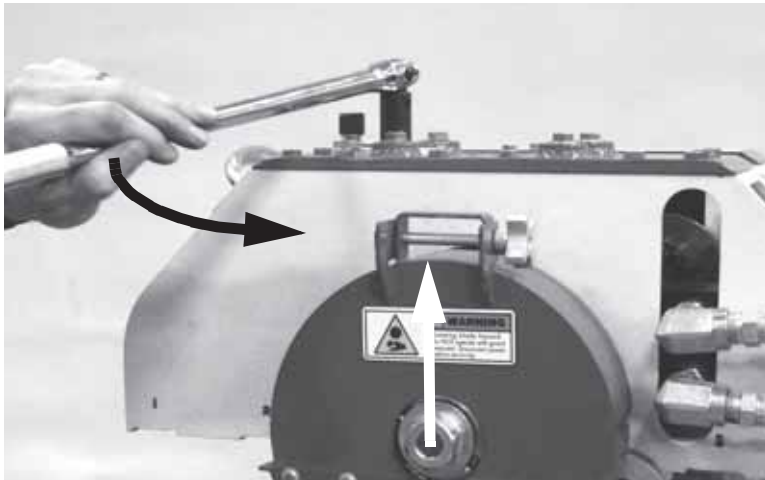
NOTE

For cuts requiring very precise straightness/squaring, or for mounting on vertical pipe, use the Trav-L-Cutter guide track. See "Setup Using the Guide Track" at the end of this chapter.



1. Make sure the cutter spindle is fully retracted (up).

- *Loosen the spindle feed lock thumbscrew.*
- *Turn the spindle feed screw counter-clockwise to retract the spindle.*



2. Lift the machine onto the pipe at the cutting location, with the ends of the chain hanging down the sides of the pipe.

- ***DO NOT*** mount the machine on the “fall-off” side of the cut.
- *Make sure the pipe can support the weight of the Trav-L-Cutter (215 lb/98 kg).*



3. Set the Trav-L-Cutter onto the pipe. Keep it supported with the lifting device and cable.



- 4.** Wrap the chain around the pipe and connect the ends with a link pin.
- *Make sure to insert the pin in the same direction as the other pins, with the head toward the spindle side of the machine.*
 - *Use the pin guide tool to align the holes when inserting the pin.*



- 5.** Turn the chain tensioning screw clockwise to take most of the slack out of the chain.
- *Leave the chain loose on the pipe, so you can move the machine to the cut line after you mount the tooling.*
 - ***Do not remove the lifting device from the machine until you have fully tightened the chain.***

Installing the Tooling and Aligning to the Cut Line

The following types of standard tooling are available for the Trav-L-Cutter:

- Slitting (cut-off)
- Inside bevel (bevels pipe end toward the machine), 30° and 37.5°.
- Outside bevel (bevels pipe end opposite machine), 30° and 37.5°.

A laminated tooling chart is provided with the machine, describing the standard tooling. If you have an application requiring custom tooling, contact E.H. Wachs customer support.

You can perform a cut with the following tool configurations:

- Slitting tool only
- Slitting tool plus inside bevel
- Slitting tool plus outside bevel
- Slitting tool with both inside and outside bevel.

Combine slitting and beveling tools as follows:

- Use 5" beveling tools with a 6" HSS slitting tool.
- Use 6" beveling tools with a 7" HSS slitting tool.
- Use an 8" slitting tool **without** a beveling tool—for heavy-wall pipe.

Tooling Selection

From the following tables, select the required tooling for your application.

Table 4: High-Speed Steel (HSS) Slitting Tools

Description	Part No.	Application
6" x 3/16" (152.4 x 4.76 mm)	02-601-00	Carbon and alloy steel pipe, up to 1" (25.4 mm) wall.
7" x 3/16" (177.8 x 4.76 mm)	02-602-00	Carbon and alloy steel pipe, up to 1-1/2" (38.1 mm) wall. Parting only (cannot be combined with bevelers).
7" x 9/32" (177.8 x 7.14 mm)	02-603-00	Carbon and alloy steel pipe, up to 1-1/2" (38.1 mm) wall.
8" x 3/16" (203.2 x 4.76 mm)	02-604-00	Carbon and alloy steel pipe, up to 2-1/8" (54.0 mm) wall. Parting only (cannot be combined with bevelers).

Table 5: Carbide-Tipped Slitting Tools

Description	Part No.	Application
6" x 3/16" (152.4 x 4.76 mm)	02-605-00	Ductile, cast, and concrete-lined pipe, up to 1" (25.4 mm) wall.
7" x 3/16" (177.8 x 4.76 mm)	02-606-00	Ductile, cast, and concrete-lined pipe, up to 1-1/2" (38.1 mm) wall. Parting only (cannot be combined with bevelers).
8" x 3/16" (203.2 x 4.76 mm)	02-607-00	Ductile, cast, and concrete-lined pipe, up to 2-1/8" (54.0 mm) wall. Parting only (cannot be combined with bevelers).

Table 6: High-Speed Steel (HSS) Beveling Tools

Description	Part No.	Application
30° left hand (inside) 5" x 1/2" (127 x 12.7 mm)	02-608-LH	Carbon and alloy steel pipe, up to 3/4" (19.1 mm) wall. Use with 6" (152.4 mm) slitting tool, part no. 02-601-00.
37.5° left hand (inside) 5" x 1/2" (127 x 12.7 mm)	02-609-LH	Carbon and alloy steel pipe, up to 5/8" (15.9 mm) wall. Use with 6" (152.4 mm) slitting tool, part no. 02-601-00.
30° right hand (outside) 5" x 1/2" (127 x 12.7 mm)	02-608-RH	Carbon and alloy steel pipe, up to 3/4" (19.1 mm) wall. Use with 6" (152.4 mm) slitting tool, part no. 02-601-00.
37.5° right hand (outside) 5" x 1/2" (127 x 12.7 mm)	02-609-RH	Carbon and alloy steel pipe, up to 5/8" (15.9 mm) wall. Use with 6" (152.4 mm) slitting tool, part no. 02-601-00.
30° left hand (inside) 6" x 3/4" (152.4 x 19.1 mm)	02-610-LH	Carbon and alloy steel pipe, up to 1" (25.4 mm) wall. Use with 7" (177.8 mm) slitting tool, part no. 02-603-00.
37.5° left hand (inside) 6" x 3/4" (152.4 x 19.1 mm)	02-611-LH	Carbon and alloy steel pipe, up to 7/8" (22.2 mm) wall. Use with 7" (177.8 mm) slitting tool, part no. 02-603-00.
30° right hand (outside) 6" x 3/4" (152.4 x 19.1 mm)	02-610-RH	Carbon and alloy steel pipe, up to 1" (25.4 mm) wall. Use with 7" (177.8 mm) slitting tool, part no. 02-603-00.
37.5° right hand (outside) 6" x 3/4" (152.4 x 19.1 mm)	02-611-RH	Carbon and alloy steel pipe, up to 7/8" (22.2 mm) wall. Use with 7" (177.8 mm) slitting tool, part no. 02-603-00.

Configure the Tooling

Mount the tooling on the spindle in a “stack”, in the following order:

- First, the inside bevel tool (if using).
- Then the slitting tool.
- Then the outside bevel tool (if using).

Note that all tooling is stamped **THIS SIDE OUT**. Mount the tooling with the stamp visible.

After mounting the tooling, select one or more of the provided drive collar spacers, as required, to mount on top of the tooling stack. The “shoulder” of the spindle shaft must not extend above the spacers. Select the smallest “stack” of spacers required to extend past the top of the shoulder. See Table 7 below for selecting the spacers for each tooling combination.

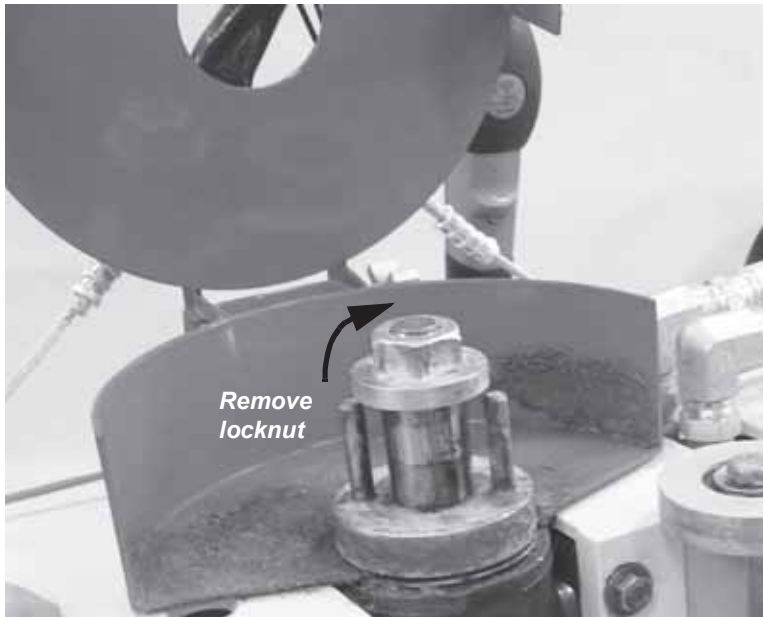
The length of the spindle shaft up to the shoulder is 1-3/4" (1.75").



- Four drive collar spacers are provided, with a storage case.
- The thickness (in inches) is engraved on each spacer.

Table 7: Spacers Required for Tooling Combinations

Slitting Tool Thickness	Inside Bevel Tool Thickness	Outside Bevel Tool Thickness	Total Tool Thickness	Spacers Required
3/16"	none	none	3/16" (0.188")	.750 and .688 and .187
3/16"	1/2"	none	11/16" (0.688")	.750 and .187 and .187
3/16"	none	1/2"		
3/16"	3/4"	none	15/16" (0.938")	.750 and .187
3/16"	none	3/4"		
3/16"	1/2"	1/2"	1-3/16" (1.188")	.688
3/16"	3/4"	1/2"	1-7/16" (1.438")	.187 and .187
3/16"	1/2"	3/4"		
3/16"	3/4"	3/4"	1-11/16" (1.688")	.187
9/32"	none	none	9/32" (0.281")	.750 and .688 and .187
9/32"	3/4"	none	1-1/32" (1.031")	.750
9/32"	none	3/4"		
9/32"	3/4"	3/4"	1-25/32" (1.781")	none



- 1.** Open the tool cover. The cover swings up against the side of the machine.
- 2.** Remove the locknut from the cutter spindle.
 - *The locknut is left-hand threaded.*
 - *A locknut wrench is provided with the Trav-L-Cutter.*

**Inside
bevel
tool**

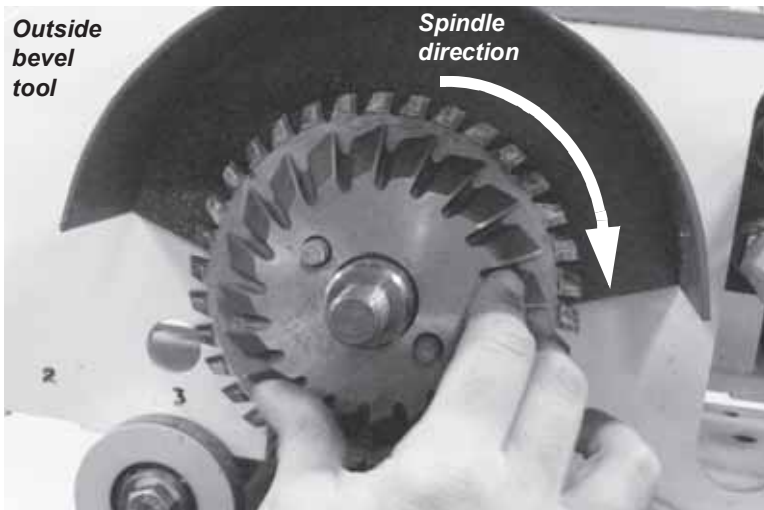


**Slitting
tool**



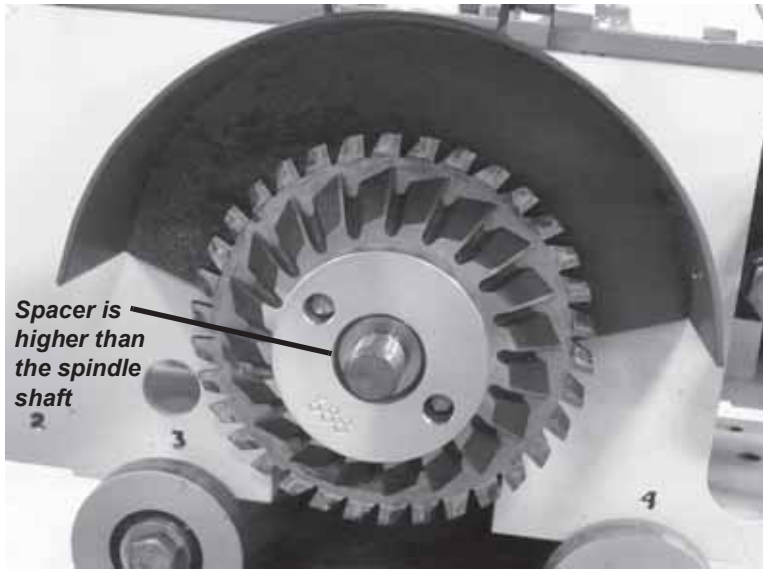
**Outside
bevel
tool**

**Spindle
direction**



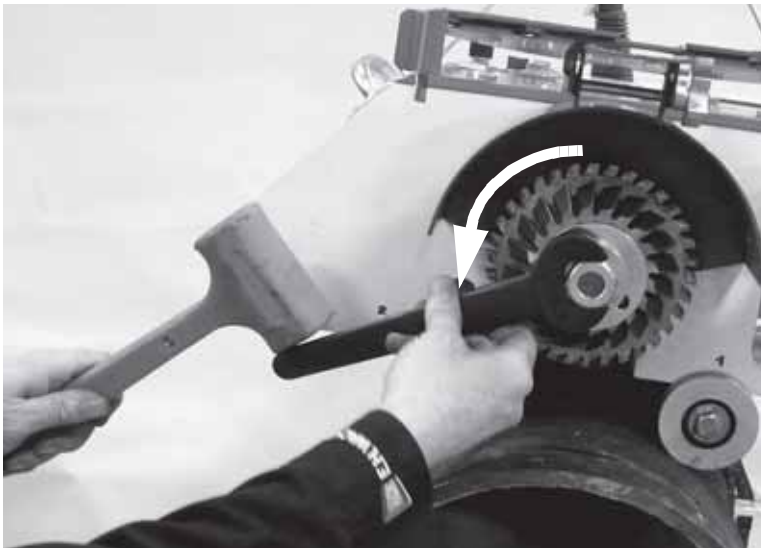
3. Mount the tooling on the spindle.

- Note **THIS SIDE OUT** stamp on all tooling.
- Inside bevel first (if using).
- Slitter.
- Outside bevel last (if using).
- Do not mount any spacers on the spindle before tooling.



4. Select the required combination of drive collar spacers.

- Use one or more spacers as required, depending on tooling configuration. See Table 7.
- Stack spacers onto tooling until they are higher than the “shoulder” on the spindle shaft.
- Use the smallest stack of spacers required.



5. Install the spindle locknut and turn counter-clockwise to tighten.

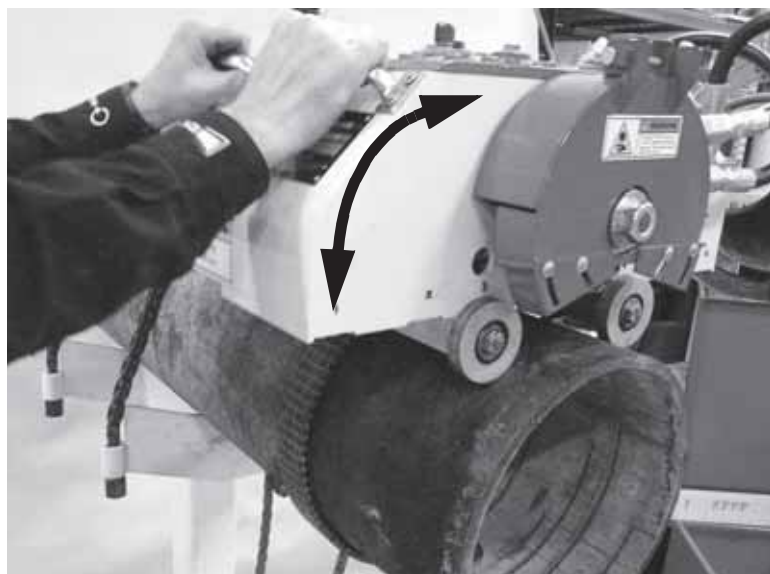
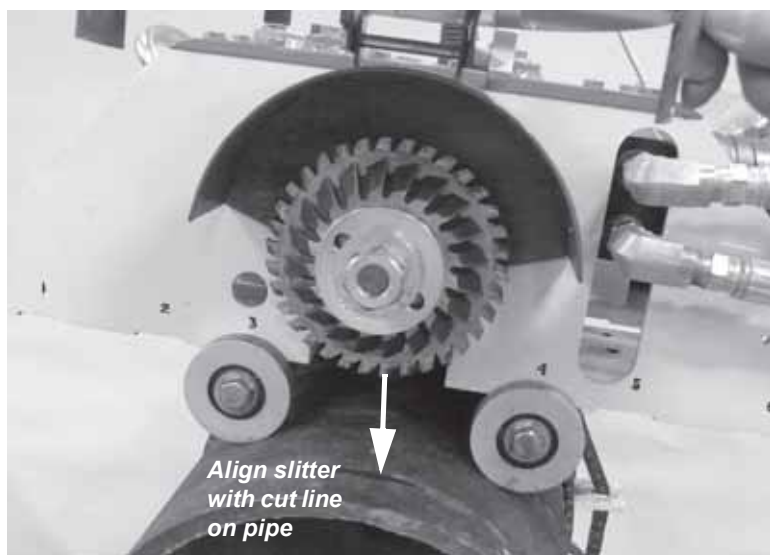
- The locknut is left-hand threaded.
- Use the provided wrench to tighten the locknut. Tap wrench with a mallet to securely tighten.
- Make sure the locknut is tight against the spacer.



Aligning the Machine to the Cut Line

Use the installed tooling as a guide to set the Trav-L-Cutter at the required position for the cut.

Start with the chain loose enough to move the machine on the pipe. **Do not remove the lifting device from the machine until the chain is fully tightened.**



- 1.** Raise the lifting device just enough to support the weight of the machine.
- 2.** Move the machine along the pipe to align the slitting tool above the cut line marking.
 - *If necessary, turn the chain tensioning screw to loosen the chain enough to move the machine.*
- 3.** Lower the lifting device to set the machine on the pipe, so it is resting on the wheels.
 - *Leave the lifting device attached to the machine.*
- 4.** Holding the handles on the front of the machine, rock it back and forth on the pipe to square it and seat the chain.
 - *For cuts requiring very precise straightness/squaring, use the Trav-L-Cutter guide track. See "Setup Using the Guide Track" at the end of this chapter.*



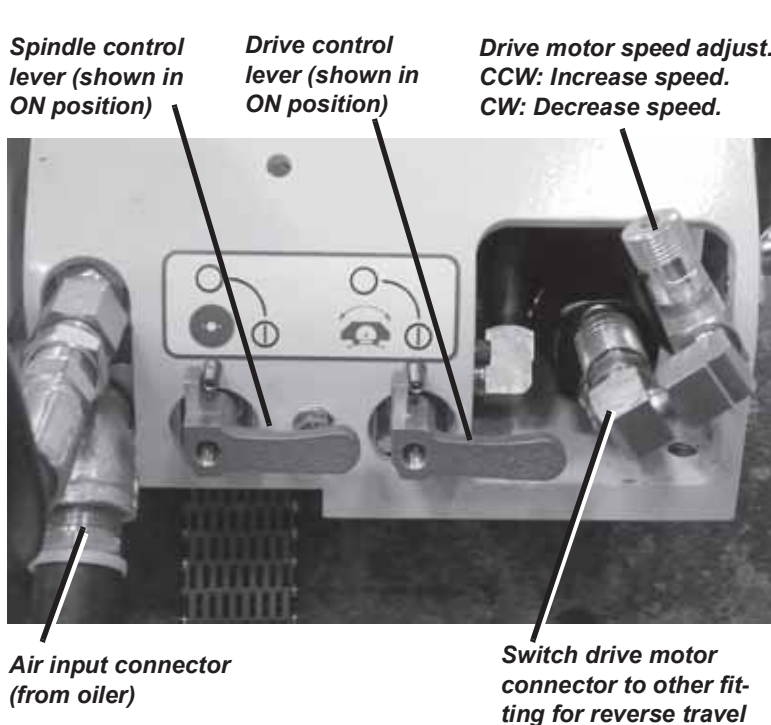
- 5.** Turn the chain tensioning screw clockwise to fully tighten the chain.
 - *Use the supplied torque wrench to tighten the screw to 80 ft-lb (115 Nm).*
 - *During the cutting operation, check the chain tension periodically and tighten if necessary.*
- 6.** Remove the lifting device and the lift cable.

PERFORMING THE CUTTING OPERATION

The cutting operation is similar for the pneumatic and hydraulic Trav-L-Cutter machines. The two machines have different controls, so follow the instructions in the section for your machine.

Cutting with the Pneumatic Trav-L-Cutter SD (02-0000-01)

This section describes the cutting procedure using the pneumatic Trav-L-Cutter. The following figure illustrates the pneumatic Trav-L-Cutter controls.

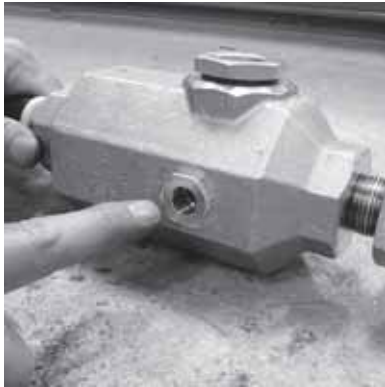


- When connecting the air hose or turning on the air supply, have the spindle control lever and drive control lever in the OFF (up) position.
- Spindle control is ON/OFF only—there is no spindle speed control.
- There are 2 air fittings on the drive motor. Switch the drive motor connector between fittings to set forward/reverse direction. (**Drive control lever must be OFF.**)
- Do not cut while drive motor direction is set to reverse.

Figure 4-1. The photo illustrates the controls on the pneumatic Trav-L-Cutter SD.

Pre-Operation Checklist:

- Make sure the chain tensioning nut is tightened to 80 ft-lb.
- Make sure the pipe is secured on both sides of the cut line.
- Make sure the tooling is installed correctly, and that the spindle locknut is tight.
- Make sure the lifting device and lift cable are removed from the machine.
- Make sure the drive motor connector is attached to the forward-direction fitting.
- Make sure the spindle control lever and drive control lever are OFF.
- Make sure the drive motor speed adjust knob is OFF (turned all the way clockwise).



- 1.** Check the oil level in the sight glass on the oiler. Add air motor oil if necessary.
 - *You should be able to see oil through the sight glass while holding the oiler level.*
 - *Remove the cap on top to add oil.*
 - *Use a high quality air motor oil.*
 - ***Do not operate the Trav-L-Cutter without the oiler. Damage to the air motor will occur.***



- 2.** Connect the air supply hose to the oiler, and connect the oiler hose to the air fitting on the machine. Insert the air connector safety pin if using a quick coupler.
 - *Make sure the spindle control lever and drive control lever are both in the OFF (up) position.*
 - *Make sure the drive motor speed adjust knob is turned fully clockwise (off).*
 - *Air supply requirements are 100 cu. ft. (2,800 liters) per minute at 90 psi (6.2 bar).*

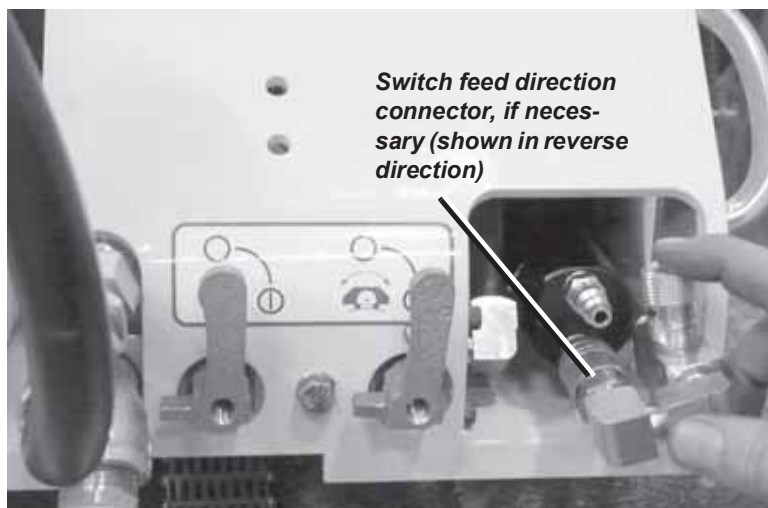


3. Turn on the air supply at the source.

4. Test that the drive motor connection is set for forward (cutting) direction:

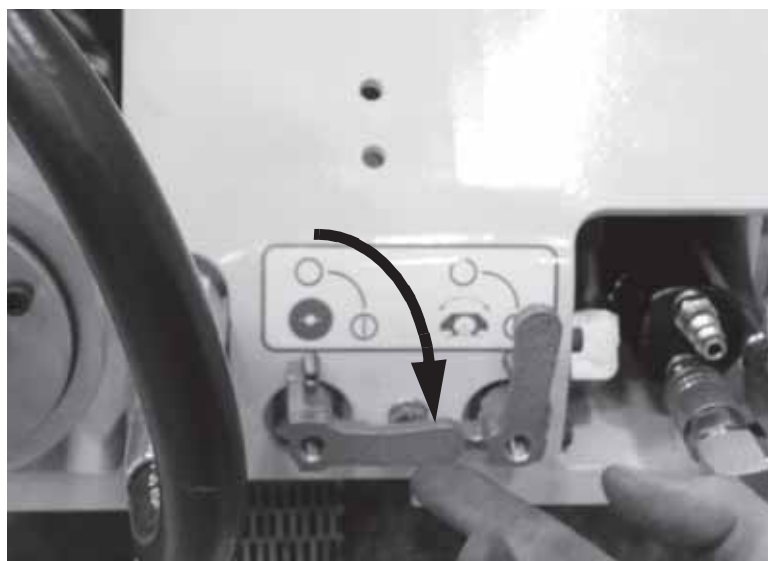
- Turn the drive control lever ON (fully to the right, 1/4 turn).
- Turn the drive motor speed adjust knob counter-clockwise to start the drive.
- Verify that the machine travels in the forward direction.
- If the machine travels in reverse, turn off the drive control lever. Switch the drive motor connector to the other fitting.
- **Do not remove the drive motor connection with the control levers ON.**

5. Turn the drive control lever OFF.



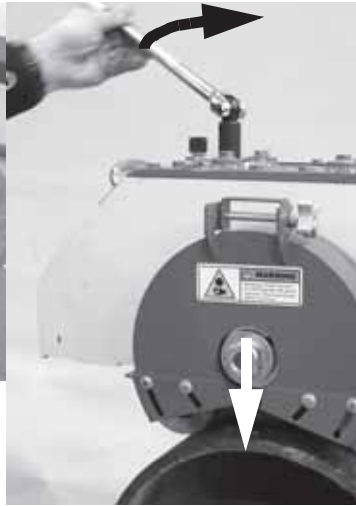
6. Turn the spindle control lever ON (fully to the right, 1/4 turn) to start the spindle.

- The spindle control lever is ON/OFF only—there is no spindle speed control knob.
- You can vary the spindle speed slightly by partially closing the spindle control lever.
- Spindle speed may vary depending on drive motor speed. Increasing the drive speed will reduce the spindle speed.





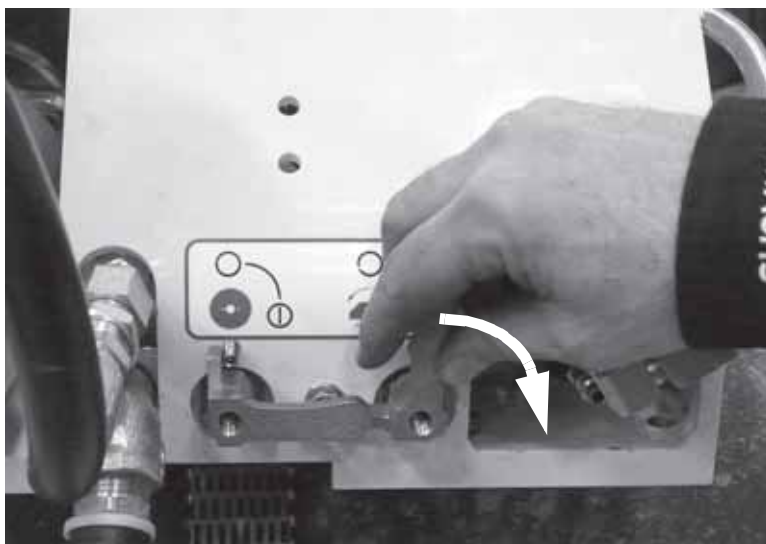
Loosen the lock to turn the spindle feed screw



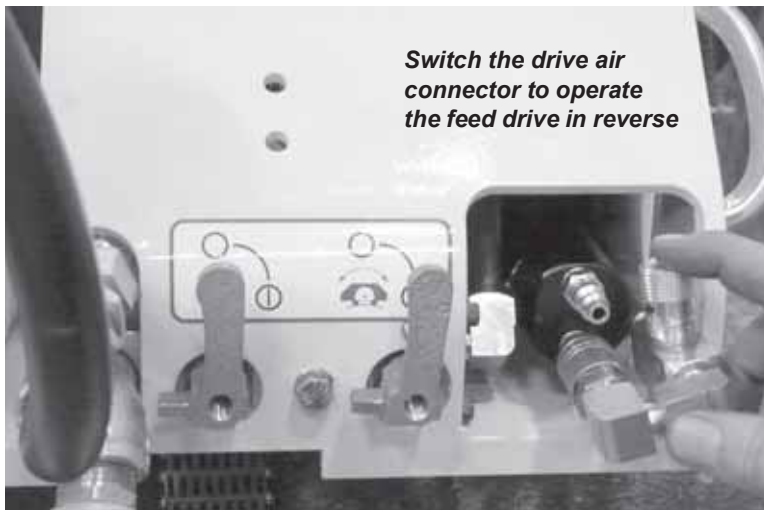
7. Turn the spindle feed screw on the top cover clockwise to plunge the cutting tool into the pipe.

- Loosen the locking thumbscrew to turn the spindle feed screw.
- Feed the cutter until it extends about 1/4" (6 mm) past the I.D. of the pipe.
- The spindle feed is 0.100" (2.54 mm) per turn of the spindle feed screw.
- If beveling, adjust the cutting depth for the required bevel.
- Tighten the locking thumbscrew to secure the cutter depth.





- 8.** Turn the drive control lever ON (fully to the right, 1/4 turn).
- 9.** Turn the drive motor speed adjust knob counter-clockwise to start the drive.
 - Turn the knob counter-clockwise to increase the feed rate, and clockwise to slow the feed rate.
- 10.** Adjust the drive motor speed for best cutting performance.
 - Slow the machine if the wheels lift off the pipe, or the machine vibrates excessively.
 - Best cutting speed is generally about 1 inch per minute on softer materials, or slower on steels and alloys.
 - As you increase the feed speed, the spindle speed may slow down. Take into account the change in spindle speed when setting the feed speed.
- 11.** Observe the following tips as you cut:
 - Insert the provided metal wedges into the cut gap to prevent tool binding.
 - Cut cast iron and ductile dry.
 - Use cutting oil on steel and stainless steel pipe.
 - Make sure the fall-off piece is properly supported.
 - If beveling, continue feeding after the pipe is severed until the bevel surface is complete.



12. If there is a problem during the cut—such as tool jamming, or broken or dulled tooling—stop the feed drive and the spindle drive.

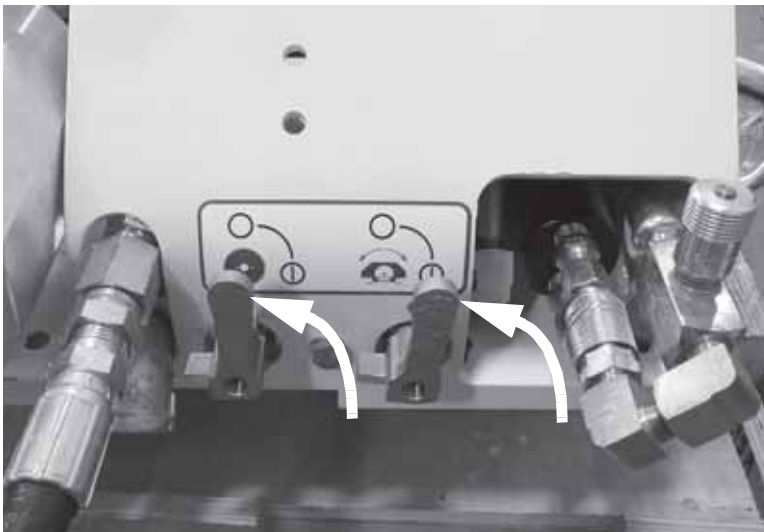
13. You can reverse the feed drive to back the tool up:

- Turn the feed drive lever OFF.
- Switch the drive motor air connector to the reverse fitting.
- Operate the feed drive to back up the machine.
- If the tool is jammed in the cut, reverse the machine with the spindle running until it is free.
- **Do not cut the pipe while running the machine in reverse.**

14. When the cut is completed, turn the drive motor speed knob clockwise, then turn off the drive control lever.

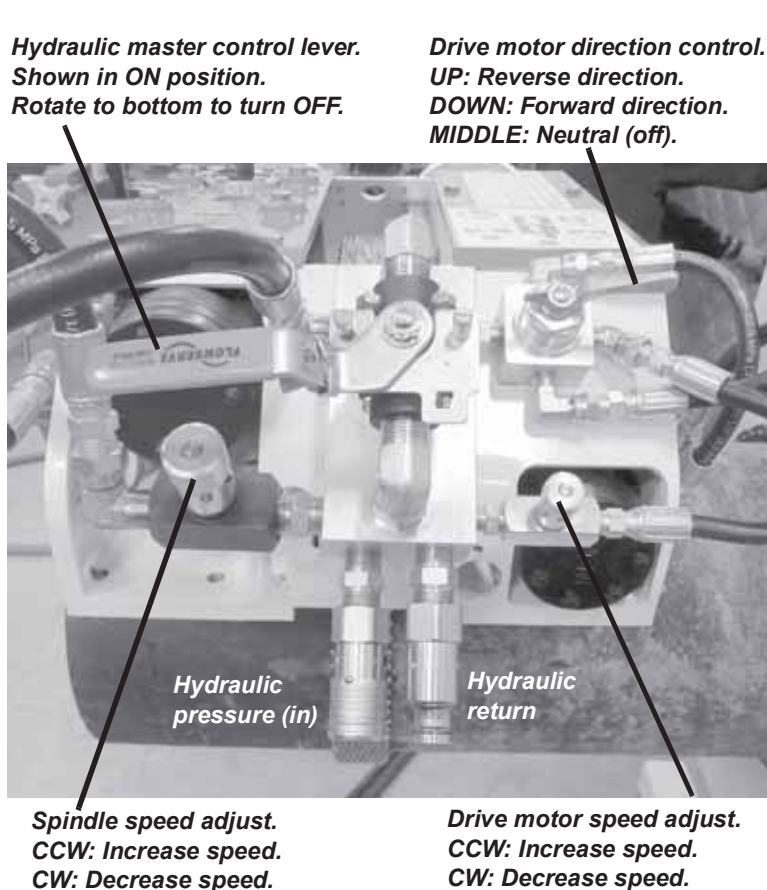
15. Turn off the spindle control lever.

16. Turn off the air supply at the source.



Cutting with the Hydraulic Trav-L-Cutter SD (02-0000-02)

This section describes the cutting procedure using the hydraulic Trav-L-Cutter. The following figure illustrates the hydraulic Trav-L-Cutter controls.

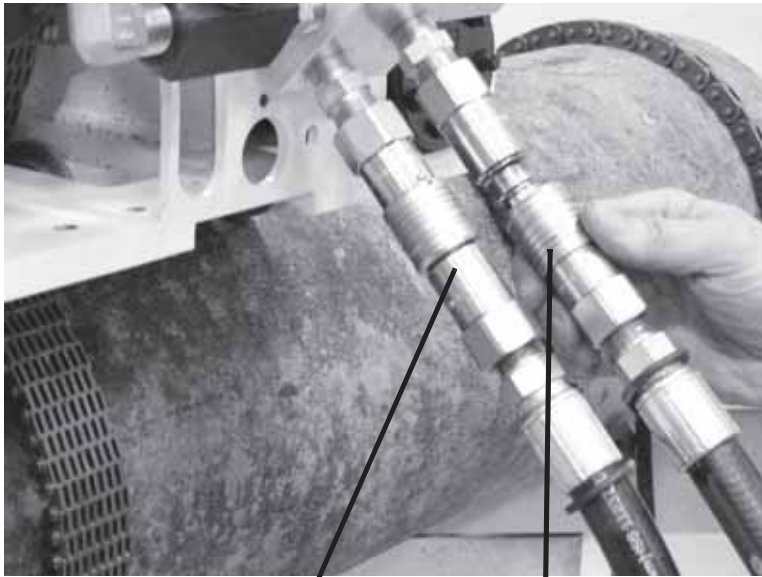


1. The photo illustrates the controls on the hydraulic Trav-L-Cutter SD.

- When connecting hydraulic hoses and starting the HPU, have the hydraulic master control lever in the OFF (down) position.
- Before you turn on the hydraulic master control lever, turn both speed adjust knobs clockwise all the way—both drives off.
- Do not cut while drive motor direction is in reverse.

Pre-Operation Checklist:

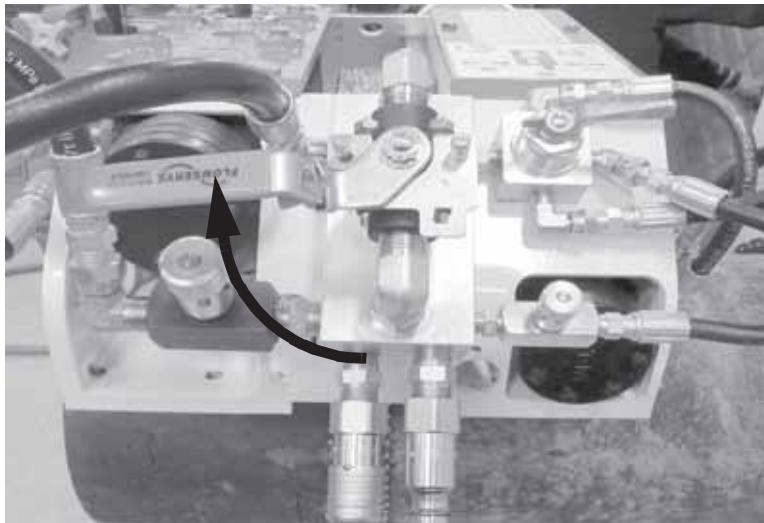
- Make sure the chain tensioning nut is tightened to 80 ft-lb.
- Make sure the pipe is secured on both sides of the cut line.
- Make sure the tooling is installed correctly, and that the spindle locknut is tight.
- Make sure the lifting device and lift cable are removed from the machine.
- Make sure the hydraulic master control lever is OFF (vertical).
- Make sure the drive motor control lever is in the neutral (middle) position.
- Make sure the spindle speed adjust knob and the drive motor speed adjust knob are OFF (turned all the way clockwise).



Pressure from HPU Return to HPU

2. Connect the hydraulic hoses to the fittings on the machine.

- *Make sure the hydraulic master control lever is in the OFF (down) position.*
- *Hydraulic power requirements are 13-15 gpm (49-57 l/m) at 1,500 psi (103 bar). Do not exceed 2,000 psi (137 bar).*



3. Turn on power at the HPU.

4. Turn the master hydraulic control lever to the ON (horizontal) position.

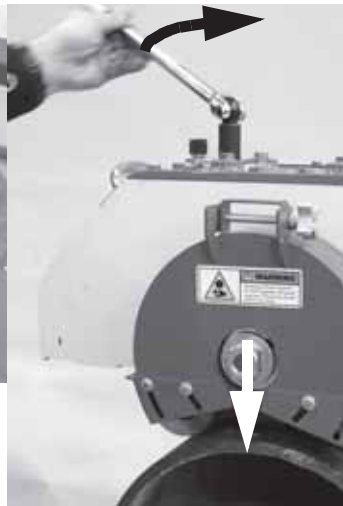
- *Make sure the spindle speed adjust knob is OFF (all the way clockwise).*
- *Make sure the drive motor control lever is in the neutral (middle) position.*



- 5.** Turn the spindle speed adjustment knob counter-clockwise to start the spindle.
- *Turn the knob counter-clockwise to increase the spindle speed.*
 - *Turn the knob clockwise to decrease the spindle speed.*



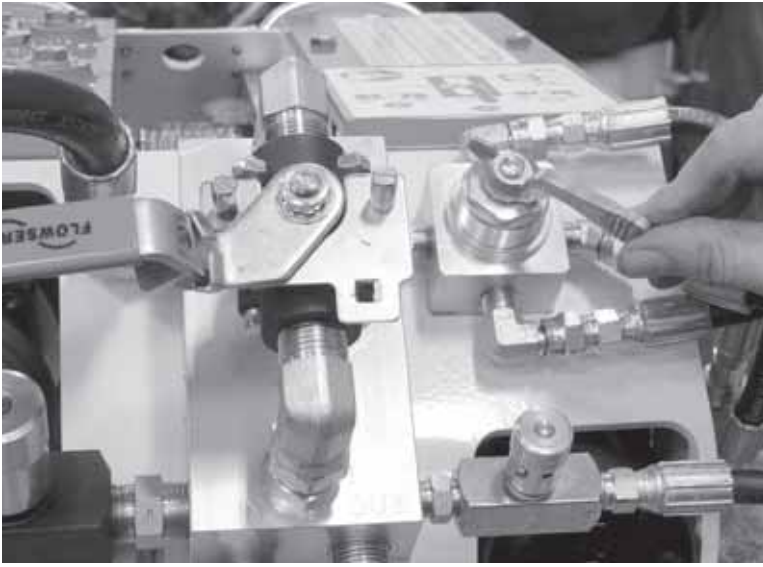
Loosen the lock to turn the spindle feed screw



6. Turn the spindle feed screw on the top cover clockwise to plunge the cutting tool into the pipe.

- Loosen the locking thumbscrew to turn the spindle feed screw.
- Feed the cutter until it extends about 1/4" (6 mm) past the I.D. of the pipe.
- The spindle feed is 0.100" (2.54 mm) per turn of the spindle feed screw.
- If beveling, adjust the cutting depth for the required bevel.
- Tighten the locking thumbscrew to secure the cutter depth.





7. Turn the drive motor control lever ON (down) to set the drive motion forward.

- ***Do not operate the drive motor in the reverse direction while cutting. Damage to the tooling and equipment will occur.***

8. Turn the drive motor speed adjust knob counter-clockwise to start the drive.

- *Turn the knob counter-clockwise to increase the feed rate, and clockwise to decrease the feed rate.*

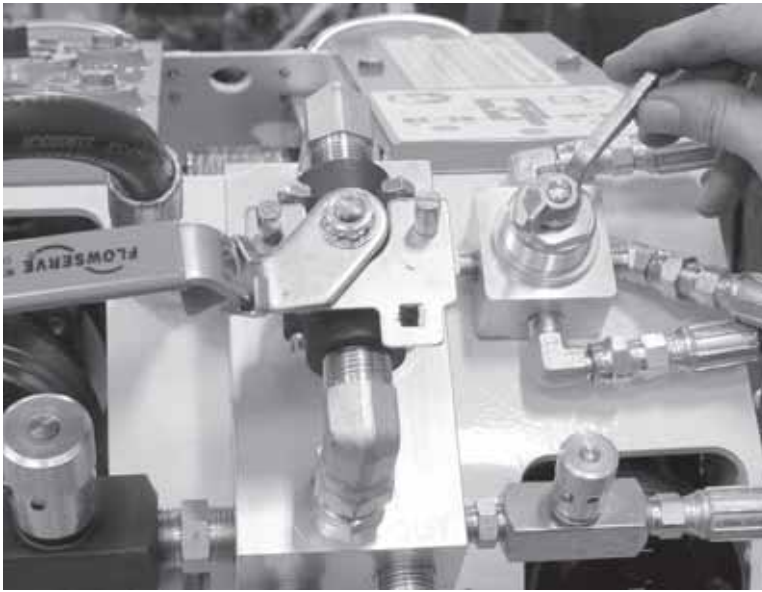


9. Adjust the drive motor speed for best cutting performance.

- *Slow the machine if the wheels lift off the pipe, or the machine vibrates excessively.*
- *Best cutting speed is generally about 1 inch per minute on softer materials, or slower on steels and alloys.*

10. Observe the following tips as you cut:

- *Insert the provided metal wedges into the cut gap to prevent tool binding.*
- *Cut cast iron and ductile dry.*
- *Use cutting oil on steel and stainless steel pipe.*
- *Make sure the fall-off piece is properly supported.*
- *If beveling, continue feeding after the pipe is severed until the bevel surface is complete.*



11. If there is a problem during the cut—such as tool jamming, or broken or dulled tooling—stop the feed drive and the spindle drive.

12. You can reverse the feed drive to back the tool up.

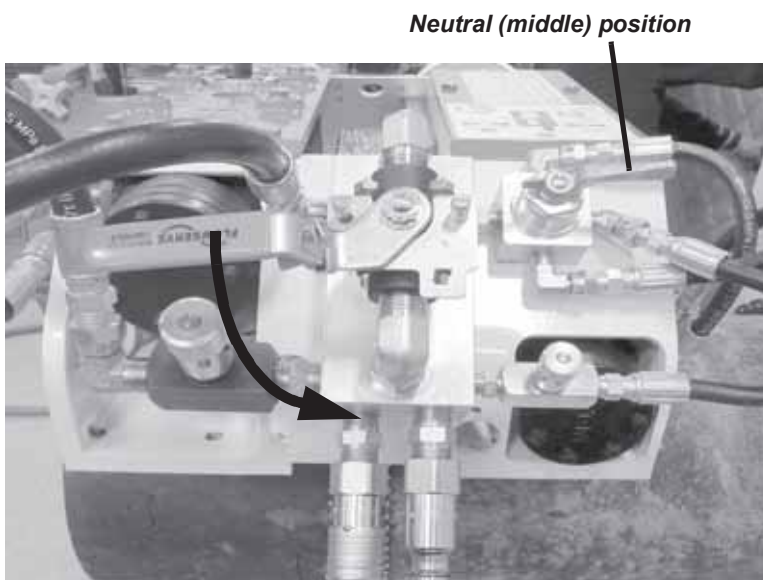
- Turn the spindle speed knob clockwise to OFF.
- Switch the drive motor control lever UP for reverse direction.
- Turn the drive motor speed knob counter-clockwise to start the feed drive in reverse.
- If the tool is jammed in the cut, reverse the machine with the spindle running until it is free.
- **Do not cut the pipe while running the machine in reverse.**

13. When the cut is completed, turn the drive motor speed knob clockwise, then turn the drive motor control lever OFF.

14. Turn the spindle speed adjustment knob clockwise to stop the spindle.

15. Turn the master hydraulic control lever OFF (vertical).

16. Turn off the HPU.



REMOVING THE MACHINE FROM THE PIPE



1. With the power source (air or hydraulic) off, bleed residual pressure from the machine.

- On the pneumatic Trav-L-Cutter, turn the spindle drive on.
- On the hydraulic Trav-L-Cutter, turn the master hydraulic lever on and open the spindle speed knob.

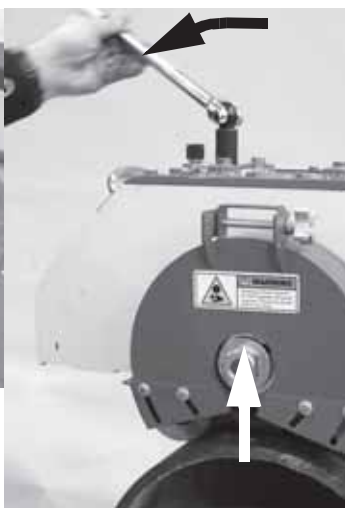
2. Remove the power hoses (air or hydraulic) from the machine.

3. Turn the spindle feed screw on the top cover counter-clockwise to fully retract the spindle.

- Loosen the locking thumbscrew to turn the spindle feed screw.
- Turn the screw to retract the spindle to the top of travel.
- Tighten the locking thumbscrew to secure the spindle feed.



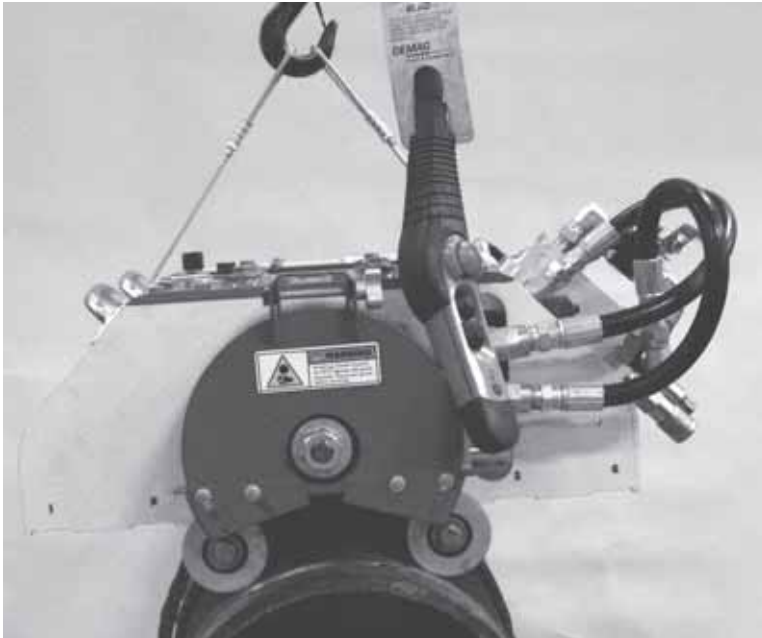
Loosen the lock to turn the spindle feed screw



4. Remove the locknut from the spindle, and remove the tooling and spacers.

- Inspect the tooling for wear and damage, and discard if it is no longer usable.
- Lubricate good tooling and store it in the case.
- Store the spacers in their case.





5. Attach the lift cable and the lifting device to the Trav-L-Cutter.
6. Raise the lifting device just enough to take the slack out of the lift cable.
 - *The lifting device needs to support the machine if it moves when you loosen the chain.*



7. Turn the chain tensioning screw counter-clockwise to fully loosen the chain tensioner.
8. On the control side of the machine, remove a link pin from the chain to separate it.
 - *Use the provided pin guide tool to push out the pin.*
9. Lift the Trav-L-Cutter off the pipe. Set it on a workbench or convenient surface to disassemble it.



10. Remove the chain from the carriage.

- *Clean the chain and spray it with WD-40 to lubricate it.*
- *Re-assemble the full chain assembly and store it in the Trav-L-Cutter case.*
- *If using the chain extension for larger pipes, re-assemble the extension assembly and store it.*

SETUP USING THE GUIDE TRACK

An optional guide track is available to mount the Trav-L-Cutter on vertical pipe, or for applications requiring very precise straightness/squaring.

Purchase the guide track kit for the pipe size you are mounting the machine on. The part number is 02-428-XX, where XX is the pipe size. The kit includes the following components:

- a split-ring track, specific to the pipe size, with mounting/clamping bolts to mount the track on the pipe
- 2 guide track wheels that replace the Trav-L-Cutter wheels, on the side opposite the spindle.

The drawing at the end of this section illustrates the guide mounted on the pipe with the Trav-L-Cutter. The Table on the drawing lists the kit part numbers for each pipe size.

Use the following instructions to mount the Trav-L-Cutter using the guide track. Refer to the section “Mounting the Machine on the Pipe” earlier in this chapter.

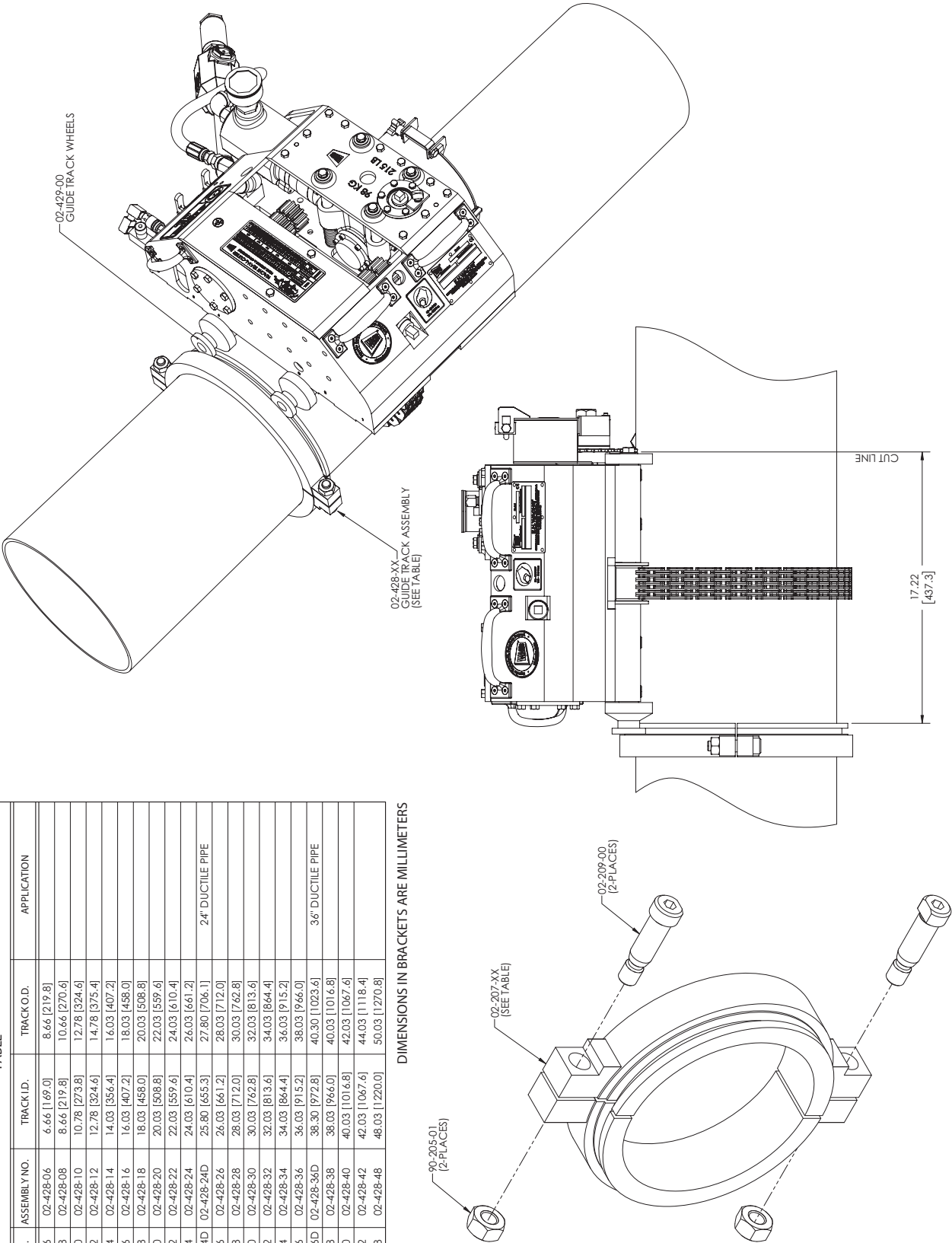
- 1.** Assemble the guide track ring on the pipe, using the provided bolts and nuts.
- 2.** Position the guide track **17.2” (437 mm)** from the cut line. Tighten the nuts securely.
- 3.** Make sure the wheels assemblies are mounted at the correct locations for the pipe size, and that the chain is configured for the pipe size.
- 4.** Remove the 2 wheels on the side of the Trav-L-Cutter **opposite** the spindle.
- 5.** Mount the provided guide track wheels in place of the standard wheels you removed.

- 6.** Mount the machine to the pipe as described in the section “Mounting the Machine on the Pipe”, with the guide track wheels in the track as shown in the following drawing. Square and tighten the chain according to the instructions.
- 7.** Follow the operating instructions in the section for your machine (pneumatic or hydraulic) to perform the cut.
- 8.** After removing the Trav-L-Cutter from the pipe, remove the 2 guide track wheels from the machine and replace the standard wheels.

-TABLE-

PART NO.	ASSEMBLY NO.	TRACK I.D.	TRACK O.D.	APPLICATION
02-207-06	02-428-06	6.66 [219.0]	8.66 [219.8]	
02-207-08	02-428-08	8.66 [219.8]	10.66 [270.6]	
02-207-10	02-428-10	10.78 [273.8]	12.78 [324.6]	
02-207-12	02-428-12	12.78 [324.6]	14.78 [375.4]	
02-207-14	02-428-14	14.03 [356.4]	16.03 [407.2]	
02-207-16	02-428-16	16.03 [407.2]	18.03 [458.0]	
02-207-18	02-428-18	18.03 [458.0]	20.03 [508.8]	
02-207-20	02-428-20	20.03 [508.8]	22.03 [559.6]	
02-207-22	02-428-22	22.03 [559.6]	24.03 [610.4]	
02-207-24	02-428-24	24.03 [610.4]	26.03 [661.2]	
02-207-24D	02-428-24D	25.80 [655.3]	27.80 [706.1]	24" DUCTILE PIPE
02-207-26	02-428-26	26.03 [661.2]	28.03 [712.0]	
02-207-28	02-428-28	28.03 [712.0]	30.03 [762.8]	
02-207-30	02-428-30	30.03 [762.8]	32.03 [813.6]	
02-207-32	02-428-32	32.03 [813.6]	34.03 [864.4]	
02-207-34	02-428-34	34.03 [864.4]	36.03 [915.2]	
02-207-36	02-428-36	36.03 [915.2]	38.03 [966.0]	
02-207-36D	02-428-36D	38.30 [972.8]	40.30 [1023.6]	36" DUCTILE PIPE
02-207-38	02-428-38	38.03 [966.0]	40.03 [1016.8]	
02-207-40	02-428-40	40.03 [1016.8]	42.03 [1067.6]	
02-207-42	02-428-42	42.03 [1067.6]	44.03 [1118.4]	
02-207-48	02-428-48	48.03 [1220.0]	50.03 [1270.8]	

DIMENSIONS IN BRACKETS ARE MILLIMETERS



Chapter 5

Preventive Maintenance

LUBRICATION

Mechanical Components

All the ball bearings in the machine are sealed and require no further lubrication.

The bronze bushings are made of oil-impregnated sintered bronze. They should not require any lubrication under normal conditions. Under severe conditions (such as using the machine in very dirty conditions or submerged in water), apply a light coating of oil to the bushings in the chain guide rollers and in the chain tension sprocket.

After every use, apply a light coating of oil to the following components:

- Spindle feed screw
- Chain tensioning screw
- Guide rods.

Chain

After every use, clean the chain, using a solvent if necessary. Spray the chain with WD-40 to lubricate it.

Tooling

After every use, clean and oil the tooling and spacers before storing them.

Spindle Gear Box

Access the spindle drive assembly by removing the top cover on the spindle side of the machine.

Check the oil level in the cutter spindle gear box regularly. Remove the plug in the spindle gear assembly, and add oil if necessary. Use Mobile SHC 636 or equivalent. Do not overfill.

Replace the oil in the gear box periodically. Use exactly 10 oz of oil to fill the gearbox.

Refer to the following drawings in Chapter 6 for the pneumatic Trav-L-Cutter SD:

- 02-323-00, Air Motor and Frame Assembly
- 02-309-00, Air Motor and Spindle Assembly
- 02-020-00, Cutter Spindle Gear Assembly.

Refer to the following drawings in Chapter 6 for the hydraulic Trav-L-Cutter SD:

- 02-327-00, Hydraulic Motor and Frame Assembly
- 02-316-00, Hydraulic Motor and Spindle Assembly
- 02-020-00, Cutter Spindle Gear Assembly.

Feed Drive Gear Box

Access the feed drive assembly by removing the top cover opposite the spindle side of the machine.

Check the oil level in the feed drive gear box regularly. Remove the plug in the gear box (part no. 02-231-00), and add oil if necessary. Use Mobile Glygoyle 460 or equivalent.

Replace the oil in the gearbox periodically.

Refer to the following drawings in Chapter 6 for the pneumatic Trav-L-Cutter SD:

- 02-322-00, Carriage Drive and Frame Assembly
- 02-321-00, Carriage Drive Assembly
- 02-320-00, Feed Drive Assembly.

Refer to the following drawings in Chapter 6 for the hydraulic Trav-L-Cutter SD:

- 02-326-00, Hydraulic Carriage Drive and Frame Assembly
- 02-325-00, Hydraulic Carriage Drive Assembly
- 02-320-00, Feed Drive Assembly.

Chapter 6

Drawings and Parts Information

ORDERING INFORMATION

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

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.

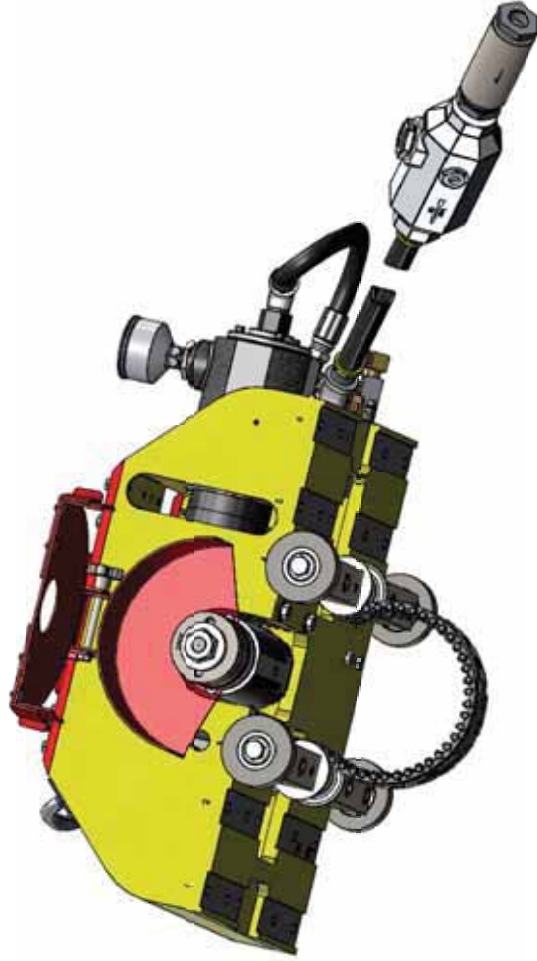
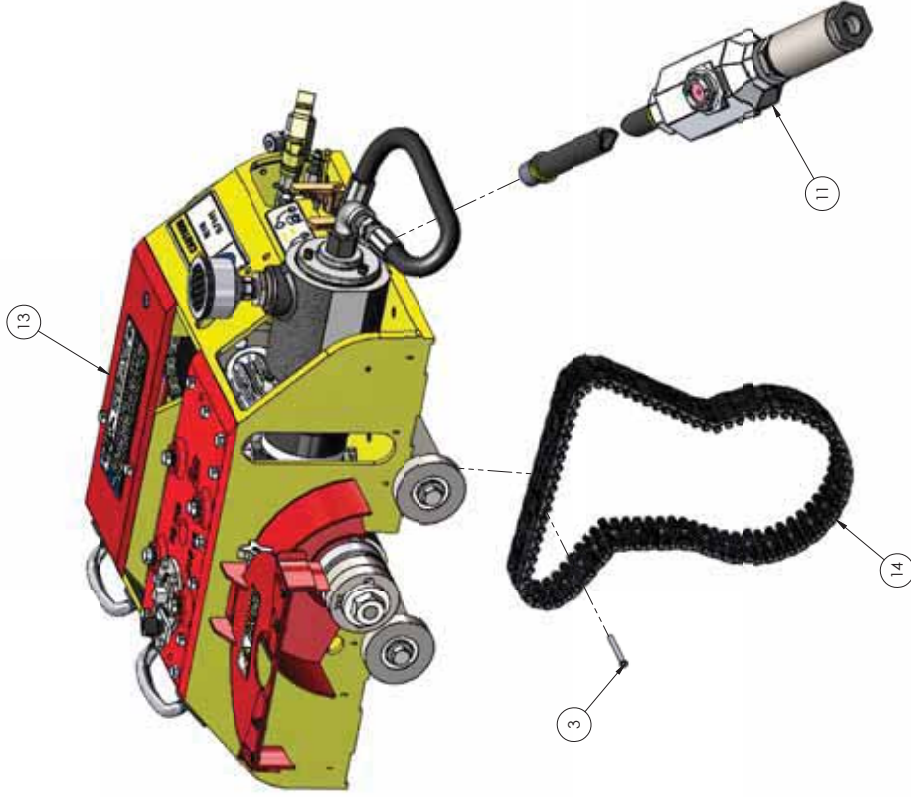
E.H. Wachs
600 Knightsbridge Parkway
Lincolnshire, Illinois 60069 USA

DRAWINGS AND PART LISTS

The drawings on the following pages illustrate the components of the Trav-L-Cutter SD, and include parts lists with part numbers.

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-125-00	1	LABEL SCALE; CHAIN LENGTH (NOT SHOWN)
2	02-155-00	1	STEEL CABLE (NOT SHOWN)
3	02-158-00	5	CONNECTING PIN FOR CHAIN
4	02-159-00	1	LINE-UP PIN (NOT SHOWN)
5	02-162-00	1	WRENCH; TORQUE (NOT SHOWN)
6	02-175-00	3	STEEL WEDGE (NOT SHOWN)
7	02-176-00	1	STORAGE CASE (NOT SHOWN)
8	02-177-00	1	CASE/DIVIDER FOR BLADES (NOT SHOWN)
9	02-287-00	1	WHEEL SETTING CHART (NOT SHOWN)
10	02-289-00	1	CHAIN LENGTHS CHART (NOT SHOWN)
11	02-303-00	1	OILER ASSEMBLY
12	02-319-00	1	LABEL CASE-TRAV "L" (NOT SHOWN)
13	02-324-00	1	PNEUMATIC CARRIAGE ASSEMBLY
14	02-450-48	1	SILENT CHAIN
15	02-LIT-01	1	TOOLING CHART, TRAV-L (NOT SHOWN)
16	02-MAN-01	1	MANUAL (NOT SHOWN)
17	90-800-01	1	WRENCH, 1-1/4 OPEN END (NOT SHOWN)
18	90-800-05	1	WRENCH, 1/2 DRV. BREAKER BAR (NOT SHOWN)
19	90-800-09	1	WRENCH, 1/2 COMBINATION (NOT SHOWN)
20	90-800-10	1	WRENCH, 3/8 HEX LONG ARM (NOT SHOWN)
21	90-800-11	2	SOCKET, 1/2 DRV. X 1/2 8PT. IMPACT (NOT SHOWN)

- NOTES:
1. CONNECTING PIN (02-158-00) QTY. (5) SHIPPED LOOSE WITH ASSEMBLY.
 2. OPERATING WEIGHT: TBD LB. [TBD kg]
 3. SHIPPING WEIGHT: TBD LB. [TBD kg]
 4. SHIPPING DIMENSIONS: 40.83 [1037.2mm] LENGTH X 25.10 [637.6mm] WIDTH X 18.35 [466.2mm] HEIGHT

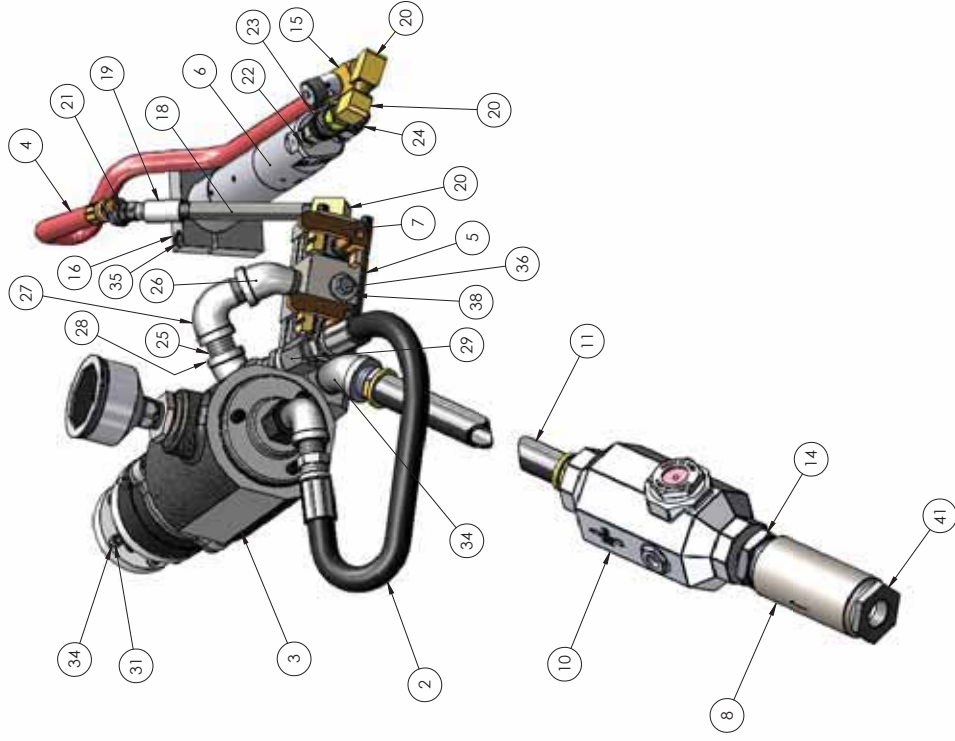
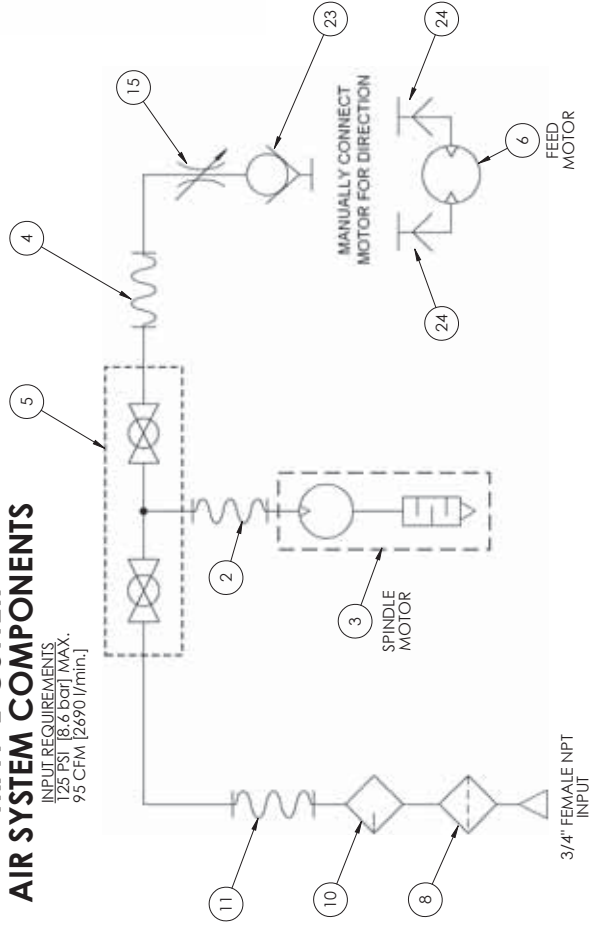


		E.H. WACHS 600 Knightsbridge Parkway Lincolnshire, IL 60069 www.ehwachs.com		A	
REV.		DESCRIPTION		TITLE	
A		RELEASED ECO 3945		2/18/2020	
BC		DATE		APR.	
REV.		DESCRIPTION		TITLE	
BC		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. E.H. WACHS COMPANY STANDARD (W1 1/10) SHALL APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED. DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.		TRAV-L-CUTTER ASSEMBLY-AIR	
DATE		01-10-20		SCALE	
01-10-20		DATE		RC	
01-10-20		DATE		1:4	
SIZE		DWG. NO.		SHEET	
C		02-0000-01		1 OF 3	
REV.		DESCRIPTION		TITLE	
A		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. E.H. WACHS COMPANY STANDARD (W1 1/10) SHALL APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED. DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.		TRAV-L-CUTTER ASSEMBLY-AIR	
02-0000-01		DATE		SCALE	
02-0000-01		DATE		RC	
02-0000-01		DATE		1:4	
SIZE		DWG. NO.		SHEET	
C		02-0000-01		1 OF 3	
REV.		DESCRIPTION		TITLE	
A		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. E.H. WACHS COMPANY STANDARD (W1 1/10) SHALL APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED. DIMENSIONS SHALL BE TO CENTER UNLESS OTHERWISE SPECIFIED.		TRAV-L-CUTTER ASSEMBLY-AIR	

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-010-00	1	LABEL, PRESSURE-AIR (NOT SHOWN)
2	02-027-01	1	HOSE, 1/2" HP X 20' LONG
3	02-029-00	1	AIR MOTOR SUB-ASSEMBLY
4	02-031-00	1	HOSE, TRAVEL MOTOR
5	02-033-00	1	MANIFOLD, AIR
6	02-035-00	1	MOTOR, TRAVEL-AIR
7	02-124-00	2	HANDLE, AIR VALVE
8	02-163-00	1	BODY, AIR FILTER
9	02-164-00	1	FILTER ELEMENT (NOT SHOWN)
10	02-166-00	1	AIR LINE LUBRICATOR
11	02-171-00	1	INLET AIR HOSE WHIP, 3/4" X 2"
12	02-185-00	1	LABEL, ON-OFF (NOT SHOWN)
13	02-191-00	1	SHIM, GEAR BOX (NOT SHOWN)
14	02-192-00	1	END PLUG
15	02-212-00	1	FLOW CONTROL VALVE 1/4"
16	02-219-00	1	MOUNT, AIR MOTOR SPLIT COLLAR
17	90-044-53	4	SSS, 10-32 X 5/16 CP (NOT SHOWN)
18	90-058-02	1	NIPPLE, 1/4 X 5 GALV LP
19	90-058-04	1	COUPLING, 1/4 CLASS 150
20	90-058-05	3	1/4 NPT F X 1/4 NPT M BRASS LP-90
21	90-058-51	1	ADAPTER, 1/4 NPT M X 1/4 NPT F SWIVEL-45
22	90-058-58	2	NIPPLE, 1/4 HEX H.P.
23	90-059-51	1	DISCONNECT, FEMALE 1/4 NPT M
24	90-059-52	2	DISCONNECT, MALE 1/4 NPT F
25	90-098-01	1	NIPPLE, 1/2 CLOSE LP BLACK (NOT SHOWN)
26	90-098-04	1	ELBOW, 1/2" 45 DEG. STREET
27	90-098-05	1	ELBOW, 1/2" 90 STREET
28	90-098-06	1	ELBOW, 1/2-90 LP
29	90-098-57	1	ADAPTER, 1/2 NPT F X 1/2 NPT F SWIVEL-STRAIGHT
30	90-098-58	1	1/2 HEX HP NIPPLE (NOT SHOWN)
31	90-150-08	5	SHCS, 1/4-20 X 7/8 SS18-8
32	90-153-10	4	FHCS, 1/4-20 X 1 SS18-8 (NOT SHOWN)
33	90-154-07	2	SSS, 1/4-20 X 3/4 SS18-8 (NOT SHOWN)
34	90-155-51	5	WASHER, 1/4" HI COLLAR SS18-8
35	90-160-12	1	SHCS, 5/16-18 X 1-1/4 SS18-8
36	90-161-07	1	FHCS, 5/16-18 X 5/8 SS18-8
37	90-161-10	2	FHCS, 5/16-18 X 1 SS18-8 (NOT SHOWN)
38	90-165-52	1	WASHER, 5/16 FLAT SS18-8
39	90-218-01	1	NIPPLE, 3/4 CLOSE LP (NOT SHOWN)
34	90-218-03	1	ELBOW, 3/4" 45 DEG. STREET
41	90-218-10	1	BUSHING, 1-1/4 X 3/4 GLV REDUCING

TRAV-L-CUTTER AIR SYSTEM COMPONENTS

INPUT REQUIREMENTS
125 PSI [8.6 bar] MAX.
95 CFM [2690 l/min.]

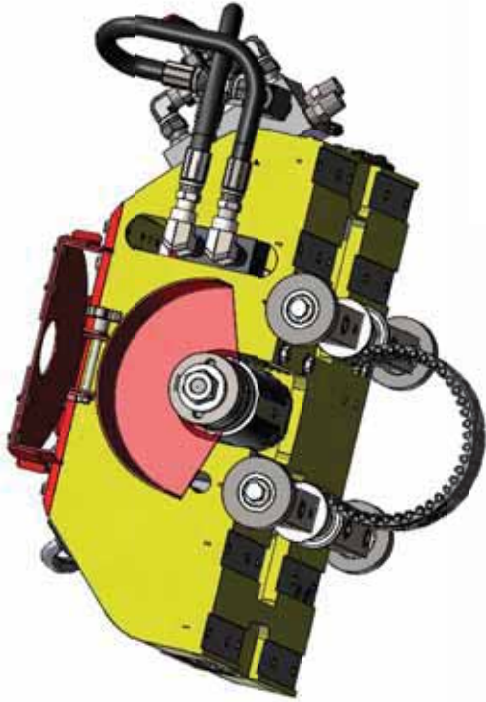
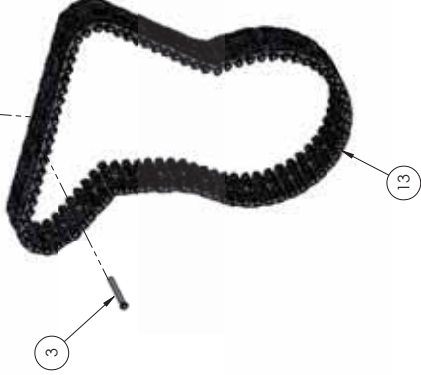
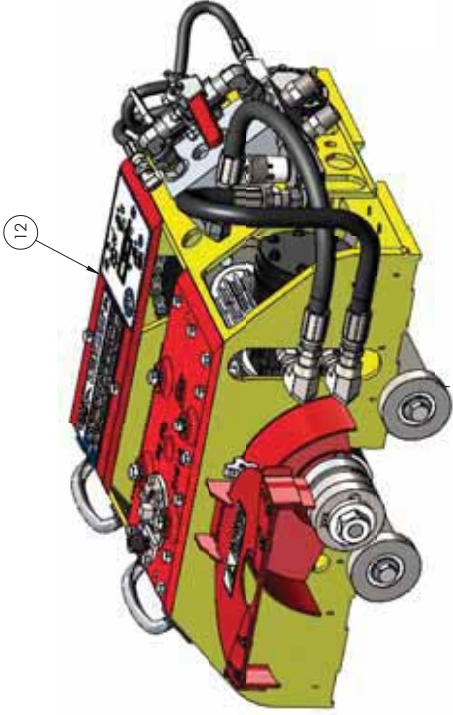


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600 Knightsbridge Parkway
Lincolnshire, IL 60069
www.ehwachs.com

TITLE			
TRAV-L-CUTTER ASSEMBLY-AIR	SCALE	1:3	
APPROVED BY	BC	RC	
DATE	01-10-20	DATE	01-10-20
SHEET	3 OF 3		
REV.	A		

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-125-00	1	LABEL SCALE, CHAIN LENGTH (NOT SHOWN)
2	02-155-00	1	STEEL CABLE (NOT SHOWN)
3	02-158-00	5	CONNECTING PIN FOR CHAIN
4	02-159-00	1	LINE-UP PIN (NOT SHOWN)
5	02-162-00	1	WRENCH, TORQUE (NOT SHOWN)
6	02-175-00	3	STEEL WEDGE (NOT SHOWN)
7	02-176-00	1	STORAGE CASE (NOT SHOWN)
8	02-177-00	1	CASE/DIVIDER FOR BLADES (NOT SHOWN)
9	02-287-00	1	WHEEL SETTING CHART (NOT SHOWN)
10	02-289-00	1	CHAIN LENGTHS CHART (NOT SHOWN)
11	02-319-00	1	LABEL, CASE-TRAV "L" (NOT SHOWN)
12	02-328-00	1	HYDRAULIC CARRIAGE ASSEMBLY
13	02-450-48	1	SILENT CHAIN
14	02-LIT-01	1	TOOLING CHART, TRAV-L (NOT SHOWN)
15	02-MAN-01	1	MANUAL (NOT SHOWN)
16	90-800-01	1	WRENCH, 1-1/4 OPEN END (NOT SHOWN)
17	90-800-05	1	WRENCH, 1/2 DRV. BREAKER BAR (NOT SHOWN)
18	90-800-09	1	WRENCH, 1/2 COMBINATION (NOT SHOWN)
19	90-800-10	1	WRENCH, 3/8 HEX LONG ARM (NOT SHOWN)
20	90-800-11	2	SOCKET, 1/2 DRV. X 1/2 8PT. IMPACT (NOT SHOWN)

- NOTES:
- CONNECTING PIN, (02-158-00) QTY. (5) SHIPPED LOOSE WITH ASSEMBLY.
 - OPERATING WEIGHT: 180 LB. (81.6 kg)
 - SHIPPING WEIGHT: 180 LB. (81.6 kg)
 - SHIPPING DIMENSIONS: 40.83 (1037.2mm) LENGTH X 25.10 (637.6mm) WIDTH X 18.35 (466.2mm) HEIGHT

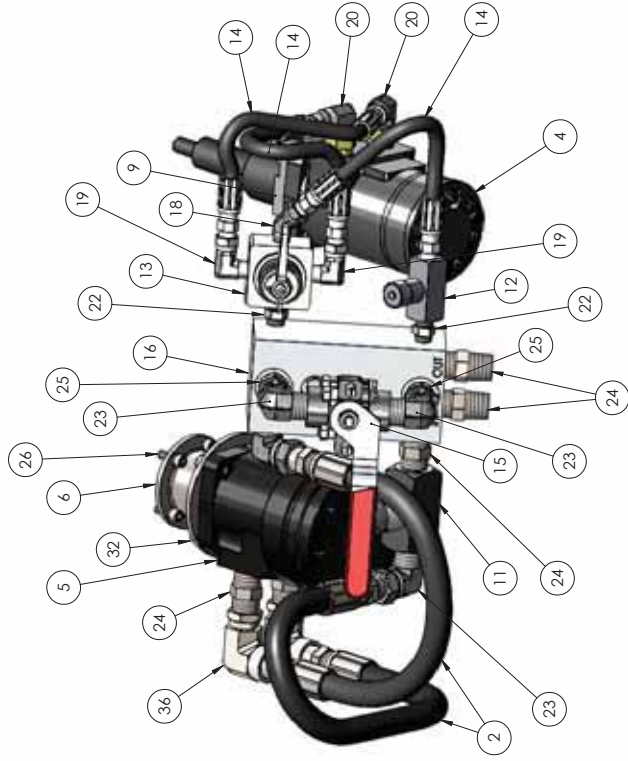
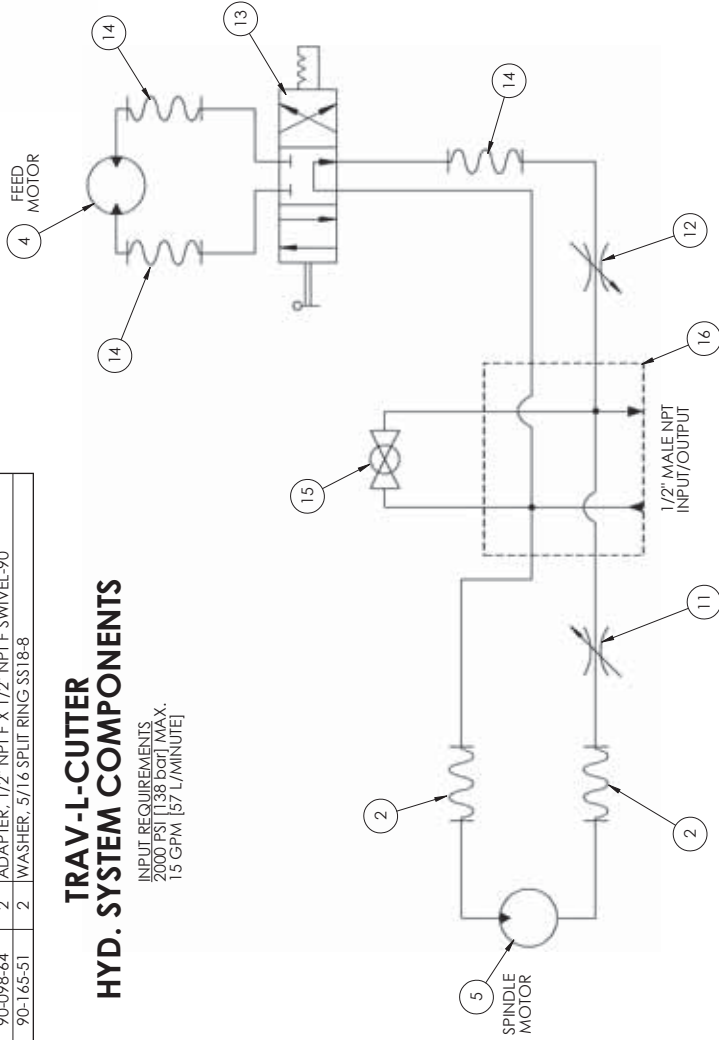


		E.H. WACHS 600 Knightsbridge Parkway Lincolnshire, IL 60069 www.ehwachs.com		TITLE TRAV-L-CUTTER ASSEMBLY-HYD.		A								
A	REV.	RELEASED	ECO 3965	2/18/2020	BC	APR.	DRAWN BY BC	SCALE 1:4						
REVISION HISTORY		UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES. DIMENSIONS IN PARENTHESES ARE SHALL APPLY TO UNNOTED SPECIFICATIONS. DO NOT SCALE DRAWING.				E.H. WACHS COMMAND & CONTROL DIVISION		DATE		1 OF 3				
A		REV.				01-10-20		01-10-20		1 OF 3				
C		DWG. NO.				02-0000-02		REV.		A				

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-009-00	1	LABEL, PRESSURE-HYD. (NOT SHOWN)
2	02-027-01	2	HOSE, 1/2" HP X 20" LONG
3	02-199-00	1	MOTOR COUPLING, DRIVE PIN
4	02-200-00	1	HYDRAULIC MOTOR, CARRIAGE DRIVE
5	02-201-00	1	HYDRAULIC MOTOR, CUTTER SPINDLE
6	02-202-00	1	ADAPTER, CUTTER SPINDLE MOTOR
7	02-203-00	1	COUPLING, MOTOR (NOT SHOWN)
8	02-204-00	1	ADAPTER, (DRIVE MOTOR)
9	02-205-00	1	BRACKET, MOUNTING-DRIVE MOTOR
10	02-206-01	1	SHIM, HYDRAULIC GEAR BOX (NOT SHOWN)
11	02-211-00	1	1/2" FLOW CONTROL VALVE
12	02-212-00	1	FLOW CONTROL VALVE 1/4"
13	02-213-00	1	1/4" 4-WAY VALVE REVERSING
14	02-214-01	3	1/4" HP HOSE ASSEMBLY
15	02-215-00	1	1/2" ON/OFF VALVE
16	02-218-00	1	MANIFOLD
17	02-298-00	1	LABEL, TRAV-L-CUTTER HYD. (NOT SHOWN)
18	90-058-51	1	ADAPTER, 1/4 NPT M X 1/4 NPT F SWIVEL-45
19	90-058-52	2	ADAPTER, 1/4 NPT M X 1/4 NPT F SWIVEL-90
20	90-058-56	2	ELBOW, 1/4-90 HP STREET
21	90-058-57	2	BUSHING, 1/2 X 1/4 HP REDUCING (NOT SHOWN)
22	90-058-58	2	NIPPLE, 1/4 HEX H.P.
23	90-098-55	4	ADAPTER, 1/2" NPT M X 1/2" NPT F SWIVEL-90
24	90-098-58	5	1/2 HEX HP NIPPLE
25	90-098-79	2	ADAPTER, 1/2 NPT M X 1/2 ORB M - STRAIGHT
26	90-150-07	5	SHCS, 1/4-20 X 3/4 SS18-8
27	90-153-12	4	FHCS, 1/4-20 X 1-1/4 SS18-8 (NOT SHOWN)
28	90-161-10	4	HHCS, 5/16-18 X 1 SS18-8 (NOT SHOWN)
29	90-161-27	2	HHCS, 5/16-18 X 2-3/4 SS18-8 (NOT SHOWN)
30	90-165-01	2	NUT, 5/16-18 HEX SS18-8 (NOT SHOWN)
31	90-165-52	2	WASHER, 5/16 FLAT SS18-8
32	90-171-07	4	HHCS, 3/8-16 X 7/8 SS18-8
33	90-171-08	4	HHCS, 3/8-16 X 7/8 SS18-8 (NOT SHOWN)
34	90-154-02	1	SSS, 1/4-20 X 1/4 SS18-8
35	90-155-51	5	WASHER, 1/4" HI COLLAR SS18-8
36	90-098-64	2	ADAPTER, 1/2" NPT F X 1/2" NPT F SWIVEL-90
37	90-165-51	2	WASHER, 5/16 SPLIT RING SS18-8

TRAV-L-CUTTER HYD. SYSTEM COMPONENTS

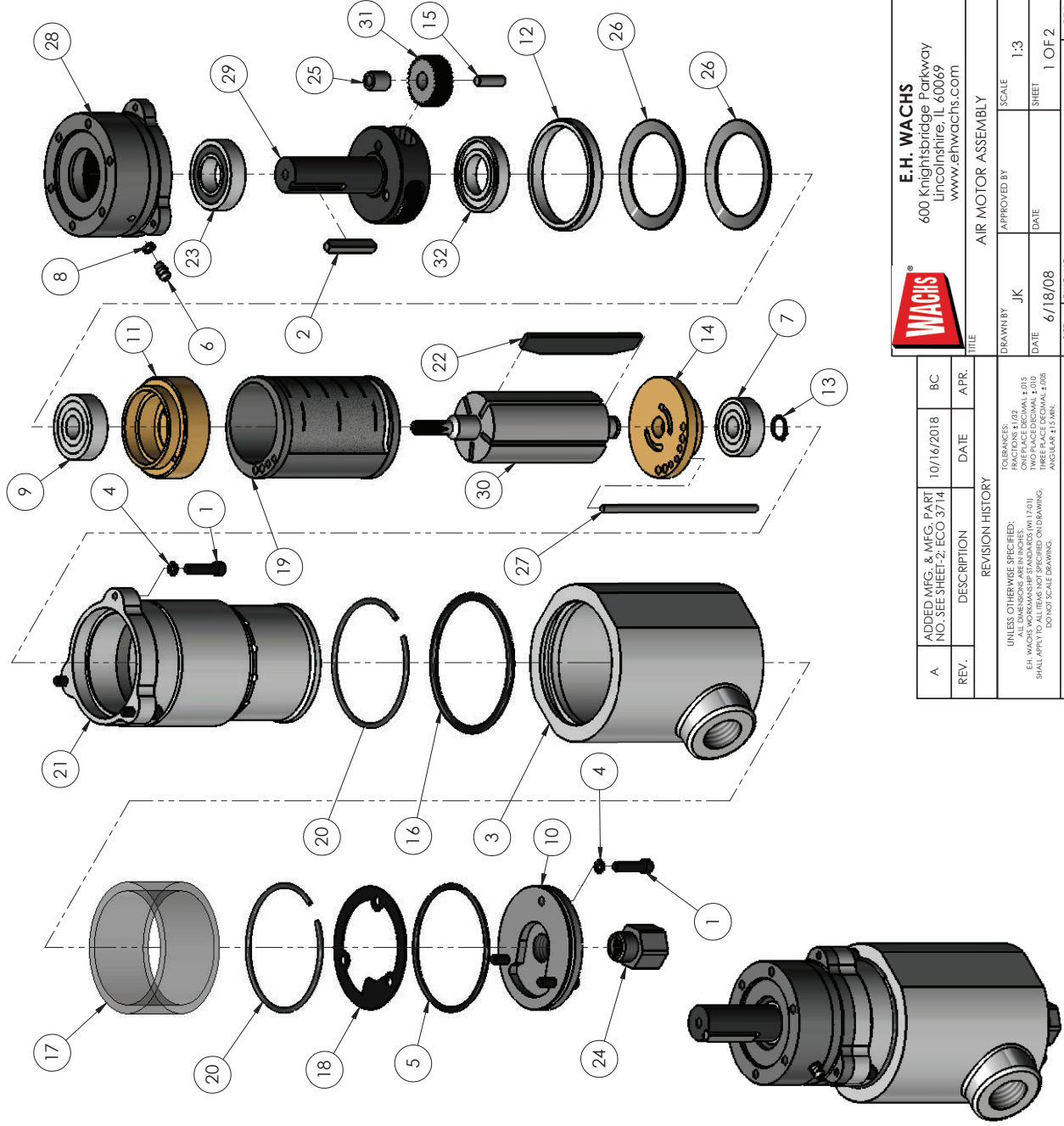
INPUT REQUIREMENTS
2000 PSI [138 bar] MAX.
1.5 GPM [57 L/MINUTE]



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TITLE		TRAV-L-CUTTER ASSEMBLY-HYD.	
DRAWN BY	BC	APPROVED BY	RC
DATE	01-10-20	DATE	01-10-20
SIZE	C	DWG. NO.	02-0000-02
UNLESS OTHERWISE SPECIFIED:		SCALE	
E.H. WACHS COMPANY STANDARD		1:3	
3 OF 3		SHEET	
REV.		A	

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	90-050-10	6	SHCS, 1/4-20 X 1 BLACK OXIDE
2	IR-107-54	1	SPINDLE KEY
3	IR-4800-123	1	EXHAUST DEFLECTOR
4	IR-8U-58	6	WASHER, 1/4 SPLIT RING
5	IR-MOV003AA-739	1	DEFLECTOR REAR SEAL
6	IR-R1-188	1	GREASE FITTING
7	IR-R2-24A	1	REAR ROTOR BEARING
8	IR-R3-92A	1	GREASE FITTING WASHER
9	IR-R3H-24	1	FRONT ROTOR BEARING
10	IR-R4800-102	1	BACKHEAD
11	IR-R4800-11	1	FRONT END PLATE
12	IR-R4800-118	1	MOTOR RETAINING RING
13	IR-R4800-119	1	REAR ROTOR BEARING RETAINER
14	IR-R4800-12	1	REAR END PLATE
15	IR-R4800-191	3	SPINDLE PLANET GEAR SHAFT
16	IR-R4800-210	1	DEFLECTOR FRONT SEAL
17	IR-R4800-23	1	MUFFLER
18	IR-R4800-283	1	BACKHEAD GASKET
19	IR-R4800-3	1	CYLINDER
20	IR-R4800-323	2	EXHAUST DEFLECTOR RETAINING RING
21	IR-R4800-40	1	MOTOR HOUSING
22	IR-R4800-42-5	5	ROTOR BLADE
23	IR-R4800-510	1	SPINDLE FRONT BEARING
24	IR-R4800-565	1	AIR STRAINER
25	IR-R4800-654	3	SPINDLE PLANET GEAR BEARING
26	IR-R4800-81	2	MOTOR RETAINING WASHER
27	IR-R4800-98	1	CYLINDER DOWL
28	IR-R4800M-37	1	GEAR CASE
29	IR-R4800N-108	1	SPINDLE
30	IR-R4900N2-53	1	ROTOR
31	IR-R4900N2-9	3	SPINDLE PLANET GEAR
32	IR-W44-97	1	SPINDLE REAR BEARING



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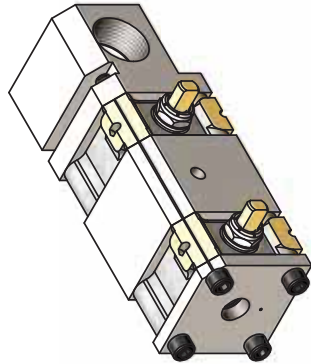
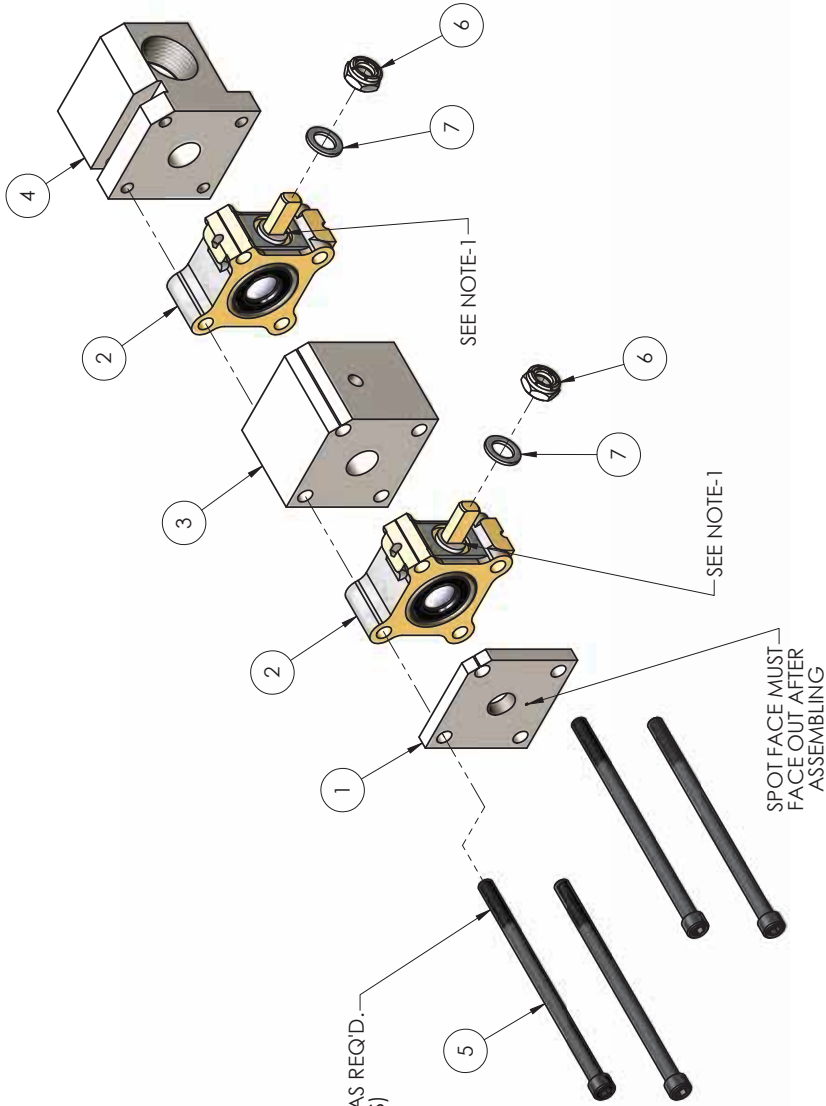
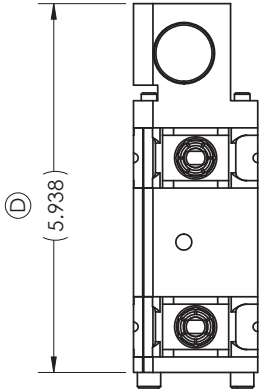
REVISION HISTORY			
REV.	DESCRIPTION	DATE	APR.
A	ADDED MFG. & MFG. PART NO. SEE SHEET-2: ECO 3714	10/16/2018	BC
UNLESS OTHERWISE SPECIFIED: FRACTIONS 1/32 ONE PLACE DECIMAL 1.015 TWO PLACE DECIMAL 1.015 THREE PLACE DECIMAL 1.015 ANGULAR .515 MIN. DO NOT SCALE DRAWING.			
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF E.H. WACHS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF E.H. WACHS IS PROHIBITED.			

AIR MOTOR ASSEMBLY			
DRAWN BY	JK	APPROVED BY	SCALE 1:3
DATE	6/18/08	DATE	SHEET 1 OF 2
SIZE	DWG. NO.	REV.	A
B			
02-030-00			

ITEM	PART NUMBER	QTY	DESCRIPTION
1	02-113-00	1	PLATE, END ^(D)
2	02-114-00	2	VALVE, AIR
3	02-115-00	1	BLOCK, INTERMEDIATE
4	02-117-00	1	BLOCK, AIR INLET ^(D)
5	90-050-45	4	SHCS, 1/4-28 X 4-1/2
6	90-075-04	2	NUT, 3/8-24 NYLOCK THN.
7	90-075-54	2	WASHER, 3/8 AN

NOTES:
1. REMOVE NUT AND SPRING WASHERS,
REPLACE WITH ITEM #6 AND #7.

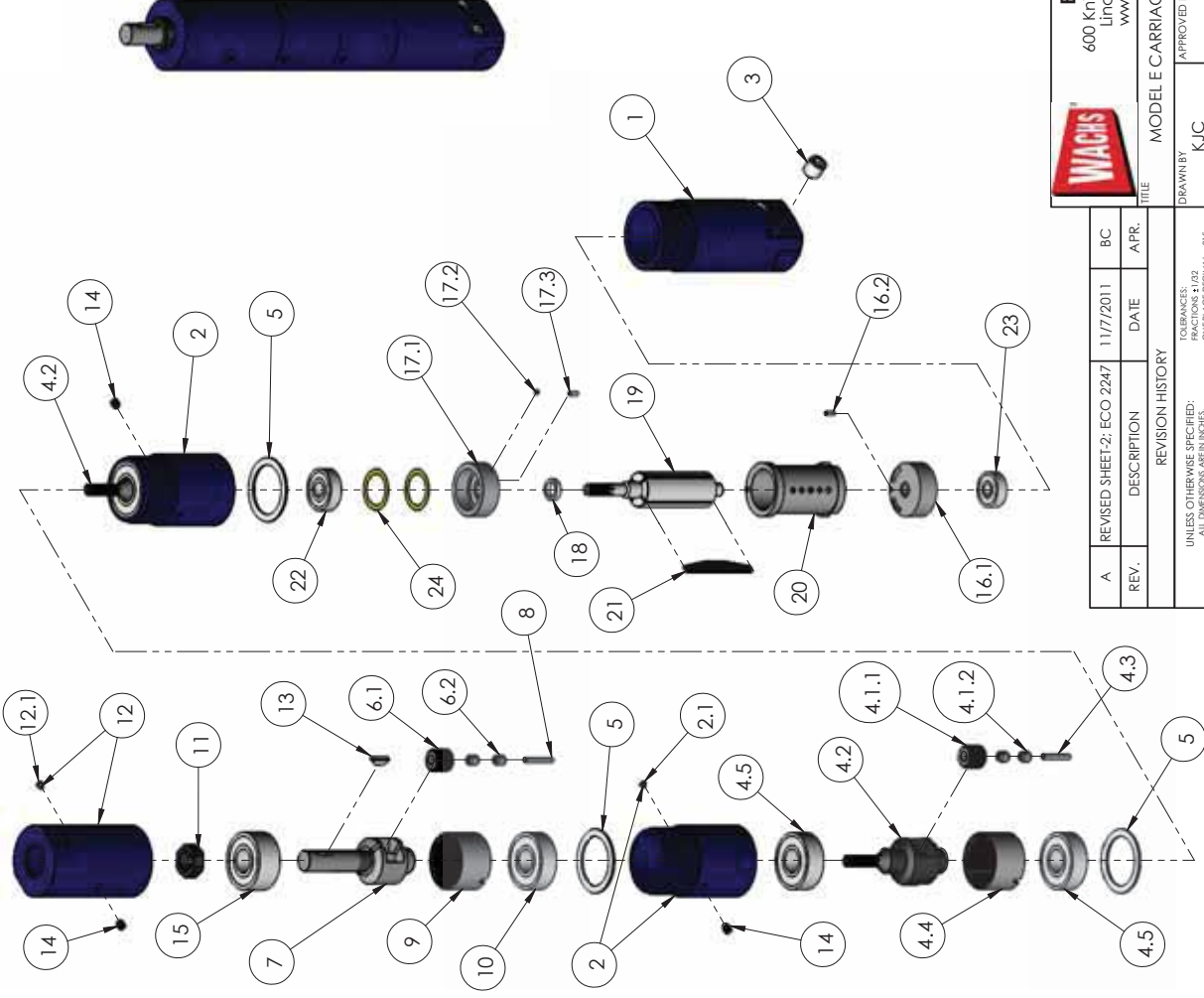
ADD LOCTITE 262 AS REQ'D.
(4-PLACES)



D	REVISED ECO 4069	2/10/2021	BC
C	REVISED AND REDRAWN ECO 2591	9/12/2013	BC
REV.	DESCRIPTION	DATE	APR.
REVISION HISTORY			
UNLESS OTHERWISE SPECIFIED: FRACTIONS 1/32 DECIMALS .005 DIMENSIONS ARE IN INCHES E.H. WACHS WORKMANSHIP STANDARDS (W17.01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING. DO NOT SCALE DRAWING. ANGULAR .515 MIN.			
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF E.H. WACHS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF E.H. WACHS IS PROHIBITED.			

 E.H. WACHS 600 Knightsbridge Parkway Lincolnshire, IL 60069 www.ehwachs.com		MANIFOLD, AIR TITLE	
DRAWN BY	MATSON	APPROVED BY	SWIATOWY
DATE	02-10-66	DATE	01-07-87
SIZE	DWG. NO. B	SCALE	1:2
REV.		SHEET	1 OF 1
			02-033-00
			D

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	DOT-02-7131	MOTOR HOUSING	1
2	DOT-2720	SUBASSY; PLANETARY GEAR HOUSING	2
2.1	DOT-1463	GREASE FITTING	1
3	DOT-2957	PIPE PLUG	2
4	DOT-2120B	SUBASSY; PLANETARY GEARSET	2
4.1	DOT-2809	SUBASSY; PLANETARY GEAR	2
4.1.1	DOT-2854	PLANETARY GEAR	1
4.1.2	DOT-1464	NEEDLE BEARING	2
4.2	DOT-2851	PLANETARY CARRIER	1
4.3	DOT-2509	GEAR SHAFT	2
4.4	DOT-2533	RING GEAR	1
4.5	DOT-556	BEARING	2
5	DOT-2022	SPACER	3
6	DOT-2809	SUBASSY; PLANETARY GEAR	2
6.1	DOT-2854	PLANETARY GEAR	1
6.2	DOT-1464	NEEDLE BEARING	2
7	DOT-01-2630	PLANETARY CARRIER; KEYED	1
8	DOT-2509	GEAR SHAFT	2
9	DOT-2533	RING GEAR	1
10	DOT-556	BEARING	1
11	DOT-2958	HEX NUT	1
12	DOT-2893	SUBASSY; PLANETARY GEAR HOUSING	1
12.1	DOT-1664	GREASE FITTING	1
13	90-029-44	KEY 1/8 X 1/2 #3 WOODRUFF (404)	1
14	DOT-2831	SET SCREW	3
15	DOT-557	DOUBLE BEARING	1
16	DOT-7061	SUBASSY; REAR BEARING PLATE	1
16.1	DOT-7013	BEARING PLATE; REAR	1
16.2	DOT-1041	ROLL PIN	1
17	DOT-2959	SUBASSY; FRONT BEARING PLATE	1
17.1	DOT-2508	BEARING PLATE; FRONT	1
17.2	DOT-2964	ROLL PIN	1
17.3	DOT-1041	ROLL PIN	1
18	DOT-2017	SPACER	1
19	DOT-7656	ROTOR	1
20	DOT-7099	CYLINDER	1
21	DOT-2906	ROTOR BLADE	4
22	DOT-500	BEARING	1
23	DOT-538	BEARING	1
24	DOT-2041-2	SHIM	2



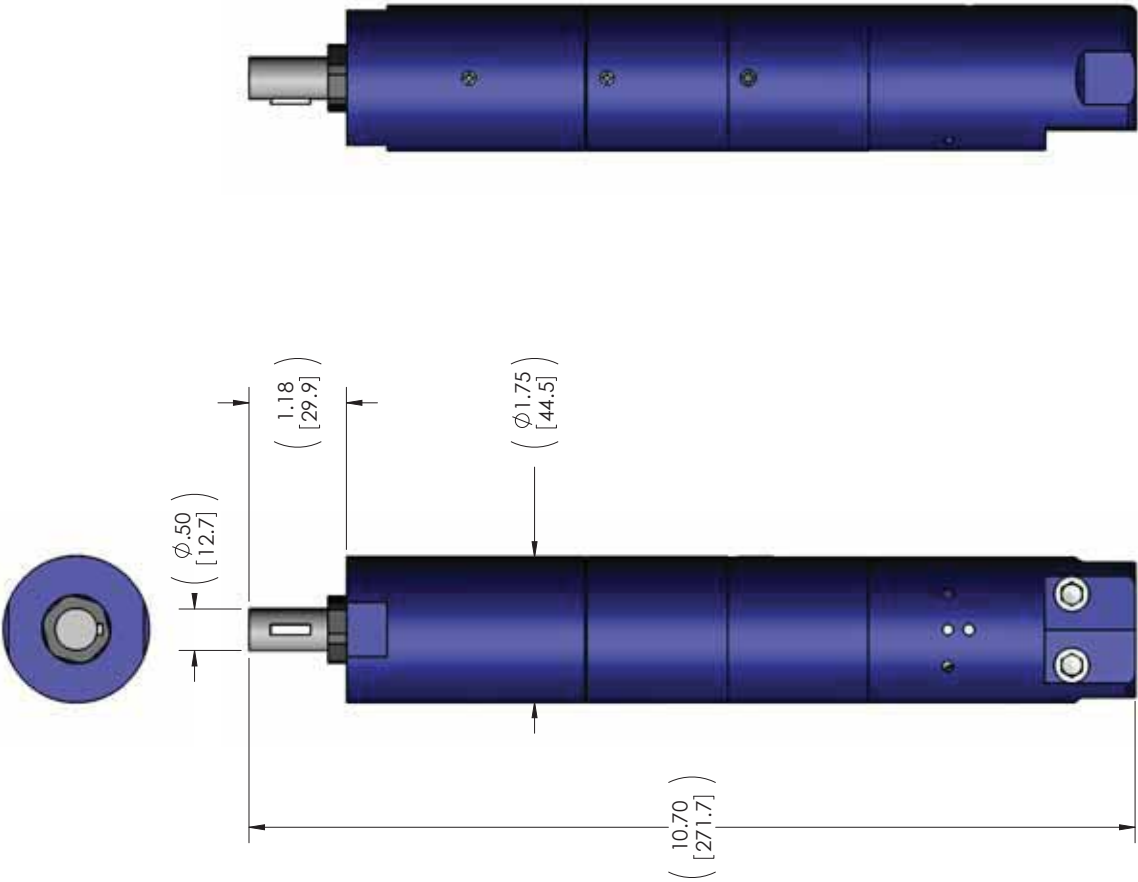
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Lincolnshire, IL 60069
www.ehwachs.com

REVISION HISTORY			
REV.	DESCRIPTION	DATE	APR.
A	REVISED SHEET 2; ECO 2247	11/7/2011	BC
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES FRACTIONS 1/32 ONE PLACE DECIMAL ±.015 TWO PLACE DECIMAL ±.005 E.H. WACHS WORKMANSHIP STANDARDS (W17.01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING. THREE PLACE DECIMAL ±.005 DO NOT SCALE DRAWING.			
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF E.H. WACHS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF E.H. WACHS IS PROHIBITED.			

TITLE			
MODEL E CARRIAGE DRIVE AIR MOTOR	APPROVED BY	SCALE	1:3
	KJC	DATE	6/13/08
		SHEET	1 OF 2
SIZE	DWG. NO.		REV.
B			A

02-035-00

DIMENSIONS IN BRACKETS ARE MILLIMETERS



NOTES:

1. MANUFACTURED BY: DOTCO
2. MANUFACTURER'S PART NO.: 22-50-5317 OR EQUIVALENT
3. WEIGHT: 3.35 LBS. [1.5 kg]
4. OPERATING PRESSURE MAX (RATED): 90 PSI [6.2 BAR]
5. FREE SPEED (RATED/MIN): 46/41 RPM
6. STALL TORQUE: 80 FT-LBS. [108.5 Nm]
7. **CRITICAL COMPONENT**-DECLARATION OF CONFORMITY, APPROVAL CERTIFICATE, TEST CERTIFICATE, OR EQUIVALENT REQUIRED.
8. SEE DESIGN BINDER FOR ADDITIONAL INFORMATION

(A)



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TITLE				MODEL E CARRIAGE DRIVE AIR MOTOR	
DRAWN BY	KJC	APPROVED BY		SCALE	2:3
DATE	6/13/08	DATE		SHEET	2 OF 2
SIZE	B	DWG. NO.	02-035-00	REV.	A

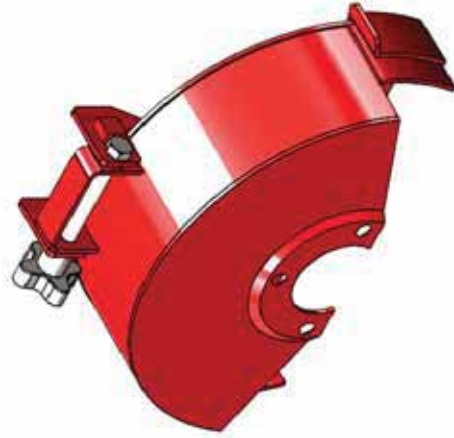
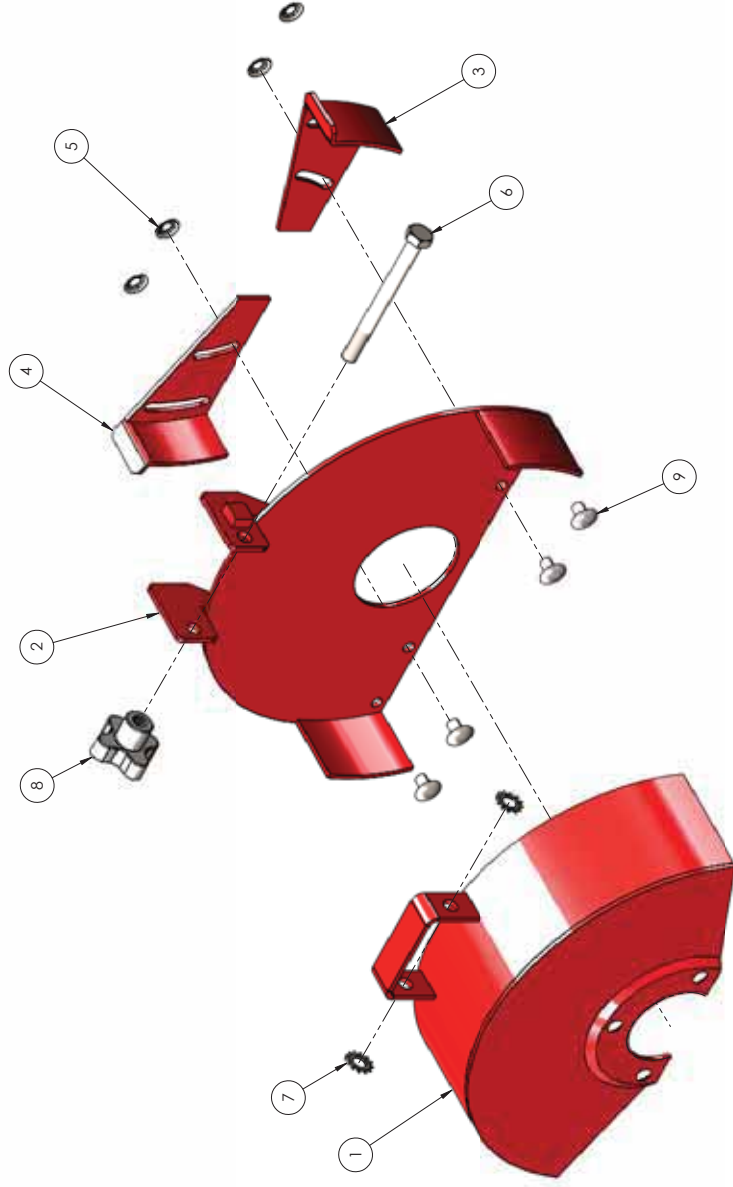
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE TO BE MAINTAINED
E.H. WACHS WORKMANSHIP STANDARDS (W17.01)
SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING.
DO NOT SCALE DRAWING.

TOLERANCES:
FRACTIONS 1/32
ONE PLACE DECIMAL ± 0.03
TWO PLACE DECIMAL ± 0.005
THREE PLACE DECIMAL ± 0.005
ANGULAR ± 15 MIN.

PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE
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WRITTEN PERMISSION OF E.H. WACHS IS PROHIBITED.

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-179-01K	1	SHROUD, GUARD
2	02-179-01L	1	COVER, GUARD
3	02-179-01M	1	EXTENDER, GUARD-LEFT
4	02-179-01N	1	EXTENDER, GUARD-RIGHT
5	90-055-19	4	NUT, 1/4 PUSH
6	90-061-34	1	HHCS, 5/16-18 X 3-1/2 GRADE 5
7	90-065-56	2	WASHER, 5/16 EXT. LOCKING
8	90-900-57	1	KNOB, FOUR LOBE 5/16-18
9	90-919-03	4	RIVET, 1/4 X 3/8 LG. SOLID

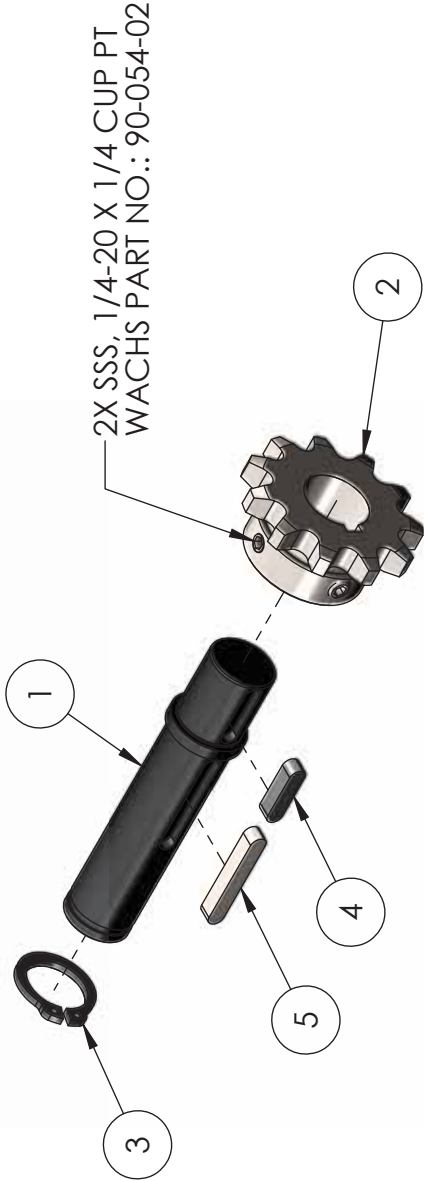
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C	REVISED B.O.M.: ECO 3970	2/4/2020	BC	TITLE			
B	REDRAWN	8/1/2008	JL	CUTTER GUARD ASSEMBLY			
REV.	DESCRIPTION	DATE	APR.	DRAWN BY: C. LEWAN, SWIAOWY			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. E.H. WACHS COMPANY STANDARD FINISHES (W/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000/1001/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/1030/1031/1032/1033/1034/1035/1036/1037/1038/1039/1040/1041/1042/1043/1044/1045/1046/1047/1048/1049/1050/1051/1052/1053/1054/1055/1056/1057/1058/1059/1060/1061/1062/1063/1064/1065/1066/1067/1068/1069/1070/1071/1072/1073/1074/1075/1076/1077/1078/1079/1080/1081/1082/1083/1084/1085/1086/1087/1088/1089/1090/1091/1092/1093/1094/1095/1096/1097/1098/1099/1100/1101/1102/1103/1104/1105/1106/1107/1108/1109/1110/1111/1112/1113/1114/1115/1116/1117/1118/1119/1120/1121/1122/1123/1124/1125/1126/1127/1128/1129/1130/1131/1132/1133/1134/1135/1136/1137/1138/1139/1140/1141/1142/1143/1144/1145/1146/1147/1148/1149/1150/1151/1152/1153/1154/1155/1156/1157/1158/1159/1160/1161/1162/1163/1164/1165/1166/1167/1168/1169/1170/1171/1172/1173/1174/1175/1176/1177/1178/1179/1180/1181/1182/1183/1184/1185/1186/1187/1188/1189/1190/1191/1192/1193/1194/1195/1196/1197/1198/1199/1200/1201/1202/1203/1204/1205/1206/1207/1208/1209/1210/1211/1212/1213/1214/1215/1216/1217/1218/1219/1220/1221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ITEM	PART NUMBER	QTY	DESCRIPTION
1	02-220-00	1	OUTPUT SHAFT, FEED DRIVE
2	02-221-00	1	SPROCKET, DRIVE
3	02-222-00	1	RING, RETAINING-EXTERNAL (5160-75)
4	90-047-07	1	KEY, 3/16 SQ. X 3/4 GRADE 1018
5	90-047-12	1	KEY, 3/16 SQ. X 1-1/4 GRADE 1018-1045

(B)

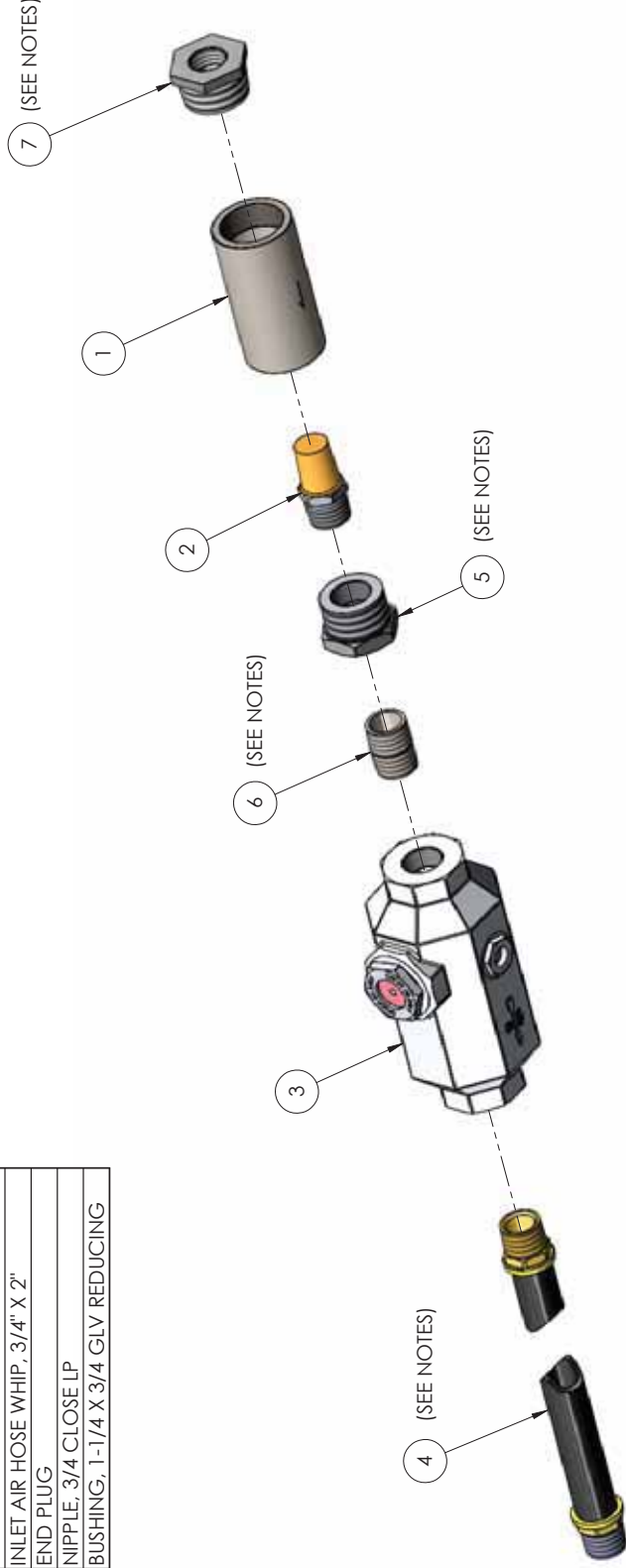


 E.H. WACHS 600 Knightsbridge Parkway Lincolnshire, IL 60069 www.ehwachs.com		BC	2/10/2021	BC
A	RELEASED ECO 3965	BC	4/14/2020	BC
REV.	DESCRIPTION	DATE	APR.	
REVISION HISTORY UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES. E.H. WACHS WORKMANSHIP STANDARDS (W1 17-01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING. DO NOT SCALE DRAWING.				
TOLERANCES: FRACTIONS $\pm 1/32$ ONE PLACE DECIMAL ± 0.015 TWO PLACE DECIMAL ± 0.010 THREE PLACE DECIMAL ± 0.005 ANGULAR ± 15 MIN.		FEED SHAT AND SPROCKET ASSEMBLY TITLE DRAWN BY BC DATE 01-08-20 SIZE A DWG. NO. 		
APPROVED BY ROY C. DATE 01-08-20 SHEET 1 OF 1		SCALE 1:2 		
REV. 02-223-00 		REV. B 		

PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF E.H. WACHS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF E.H. WACHS IS PROHIBITED.

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-163-00	1	BODY, AIR FILTER
2	02-164-00	1	FILTER ELEMENT
3	02-166-00	1	AIR LINE LUBRICATOR
4	02-171-00	1	INLET AIR HOSE WHIP, 3/4" X 2"
5	02-192-00	1	END PLUG
6	90-218-01	1	NIPPLE, 3/4 CLOSE LP
7	90-218-10	1	BUSHING, 1-1/4 X 3/4 GLV REDUCING

⑧ NOTES:
1. APPLY LOCTITE 569 THREAD SEALANT.



E.H. WACHS
600 Knightsbridge Parkway
Lincolnshire, IL 60069
www.ehwachs.com

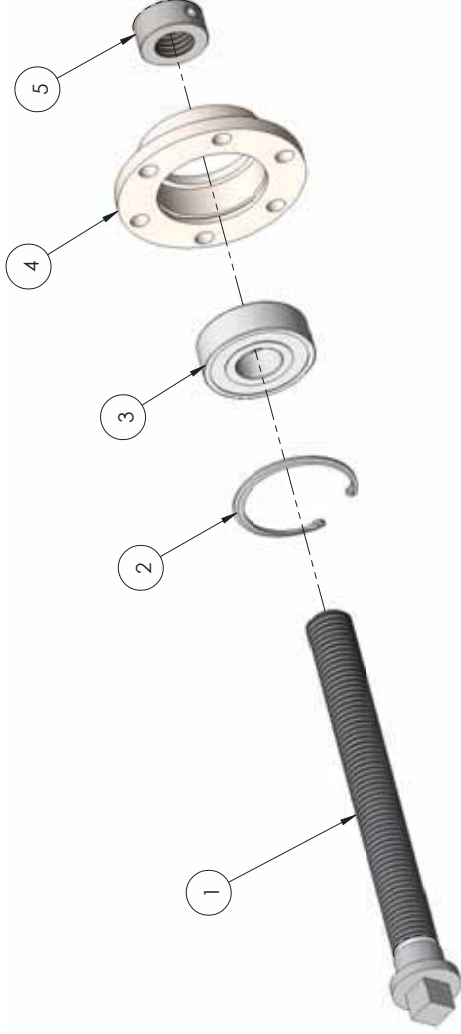
B	ADDED NOTES: ECO 3777	8/12/2019	BC
A	NEW	12/4/2008	JL
REV.	DESCRIPTION	DATE	APR.

REVISION HISTORY			
UNLESS OTHERWISE SPECIFIED: FRACTIONS 1/32 ONE PLACE DECIMAL ±.015 TWO PLACE DECIMAL ±.005 THREE PLACE DECIMAL ±.005 DO NOT SCALE DRAWING.			

TOLERANCES: FRACTIONS 1/32 ONE PLACE DECIMAL ±.015 TWO PLACE DECIMAL ±.005 THREE PLACE DECIMAL ±.005 DO NOT SCALE DRAWING.			
PROPERTY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF E.H. WACHS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF E.H. WACHS IS PROHIBITED.			

OILER ASSEMBLY			
DRAWN BY	BC	APPROVED BY	JL
DATE	12-04-08	DATE	12-04-08
SIZE	B	DWG. NO.	02-303-00
REV.	B	SHEET	1 OF 1
		SCALE	1:3

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-001-00	1	SCREW, FEED
2	02-002-00	1	RING, RETAINING
3	02-003-00	1	BEARING, BALL
4	02-005-00	1	BEARING HOUSING, FEED SCREW
5	02-006-00	1	LOCK NUT, FEED SCREW BEARING



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Lincolnshire, IL 60069
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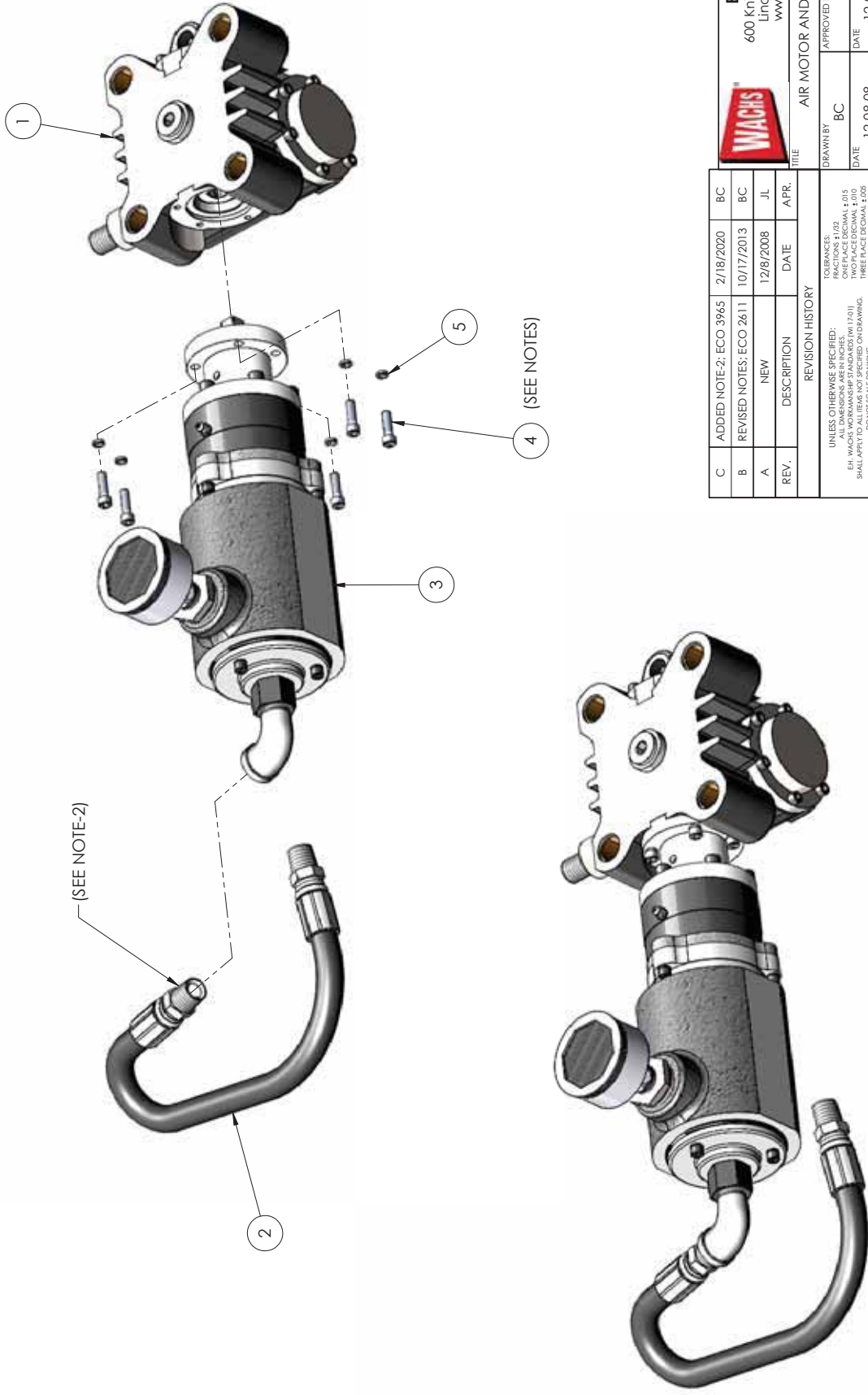
A	NEW	12/3/2008	JL	APR.
REV.	DESCRIPTION	DATE	DATE	DATE
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES FRACTIONS 1/32 ONE PLACE DECIMAL ±.015 TWO PLACE DECIMAL ±.010 E.H. WACHS WORKMANSHIP STANDARDS (W17.01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING. DO NOT SCALE DRAWING.				
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF E.H. WACHS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF E.H. WACHS IS PROHIBITED.				

REVISION HISTORY				
REV.	DESCRIPTION	DATE	DATE	DATE
FEED SCREW ASSEMBLY DRAWN BY: BC APPROVED BY: JL SCALE: 1:2 DATE: 12-03-08 DATE: 12-03-08 SHEET: 1 OF 1 SIZE: B DWG. NO.: 02-304-00 REV.: A				

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-020-00	1	CUTTER SPINDLE GEAR ASSEMBLY
2	02-027-01	1	HOSE, 1/2" HP X 20" LONG
3	02-029-00	1	AIR MOTOR SUB-ASSEMBLY
4	90-150-08	5	SHCS, 1/4-20 X 7/8 SS18-8
5	90-155-51	5	WASHER, 1/4" HI COLLAR SS18-8

NOTES:

- ③ ①. ADD RED LOCTITE 262 TO SOCKET HEAD CAP SCREWS (90-150-08) AT ASSEMBLY.
2. APPLY LOCTITE 569 THREAD SEALANT.



C	ADDED NOTE-2: ECO 3965	2/18/2020	BC
B	REVISED NOTES: ECO 2611	10/17/2013	BC
A	NEW	12/8/2008	JL
REV.	DESCRIPTION	DATE	APR.

REVISION HISTORY			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES FRACTIONS 1/32 ONE PLACE DECIMAL ±.015 TWO PLACE DECIMAL ±.005 THREE PLACE DECIMAL ±.005 DO NOT SCALE DRAWING.			
E.H. WACHS WORKMANSHIP STANDARDS (W17.01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING.			
TOLERANCES: FRACTIONS 1/32 ONE PLACE DECIMAL ±.015 TWO PLACE DECIMAL ±.005 THREE PLACE DECIMAL ±.005 ANGULAR ±15 MIN.			

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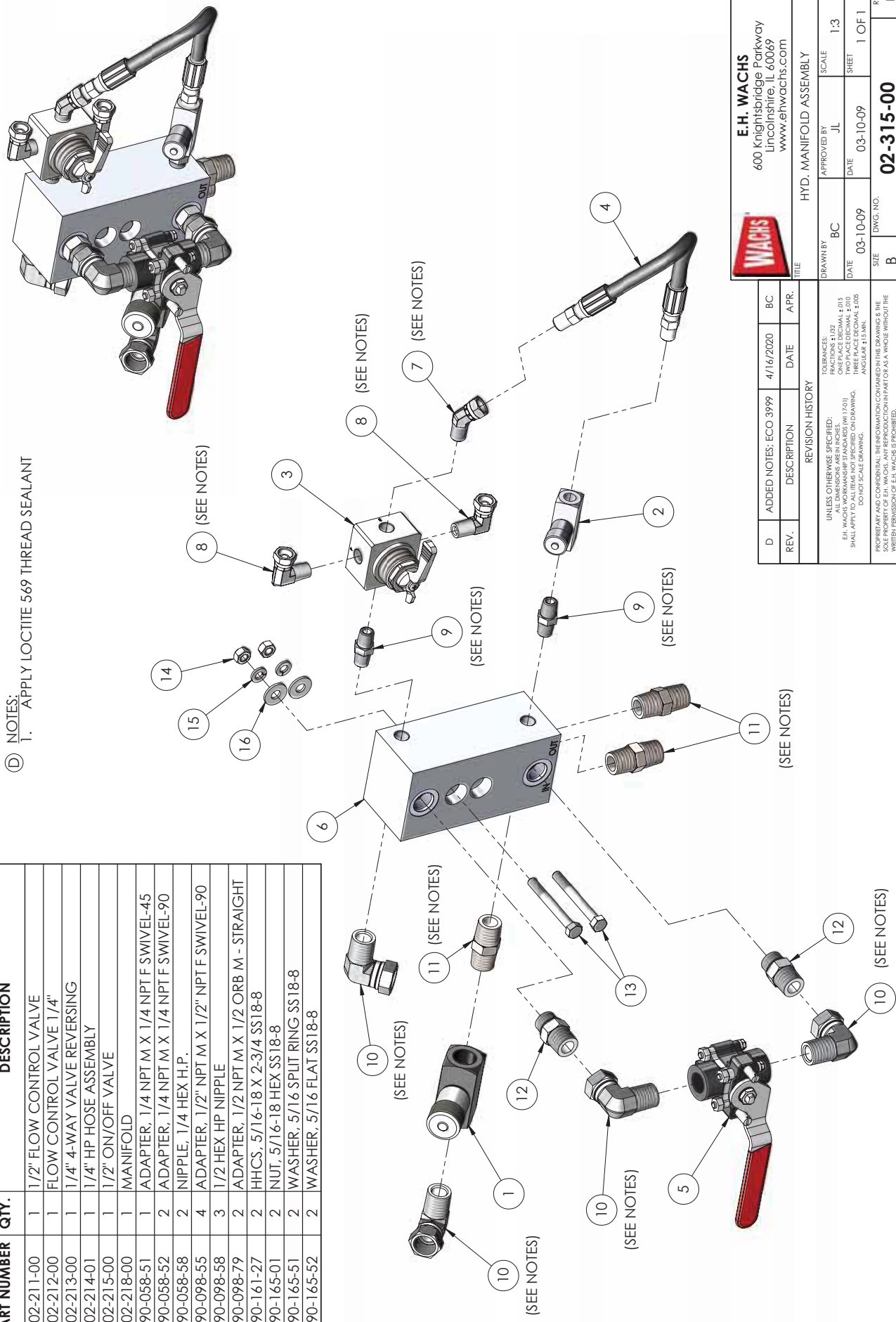
 E.H. WACHS 600 Knightsbridge Parkway Lincolnshire, IL 60069 www.ehwachs.com			
TITLE			
AIR MOTOR AND SPINDLE ASSEMBLY			

DRAWN BY	BC	APPROVED BY	JL	SCALE	1:3
DATE	12-08-08	DATE	12-08-08	SHEET	1 OF 1

SIZE	B	DWG. NO.	02-309-00	REV.	C
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ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-211-00	1	1/2" FLOW CONTROL VALVE
2	02-212-00	1	FLOW CONTROL VALVE 1/4"
3	02-213-00	1	1/4" 4-WAY VALVE REVERSING
4	02-214-01	1	1/4" HP HOSE ASSEMBLY
5	02-215-00	1	1/2" ON/OFF VALVE
6	02-218-00	1	MANIFOLD
7	90-058-51	1	ADAPTER, 1/4 NPT M X 1/4 NPT F SWIVEL-45
8	90-058-52	2	ADAPTER, 1/4 NPT M X 1/4 NPT F SWIVEL-90
9	90-058-58	2	NIPPLE, 1/4 HEX H.P.
10	90-098-55	4	ADAPTER, 1/2" NPT M X 1/2" NPT F SWIVEL-90
11	90-098-58	3	1/2 HEX HP NIPPLE
12	90-098-79	2	ADAPTER, 1/2 NPT M X 1/2 ORB M - STRAIGHT
13	90-161-27	2	HHCS, 5/16-18 X 2-3/4 SS18-8
14	90-165-01	2	NUT, 5/16-18 HEX SS18-8
15	90-165-51	2	WASHER, 5/16 SPLIT RING SS18-8
16	90-165-52	2	WASHER, 5/16 FLAT SS18-8

(D) NOTES:
 1. APPLY LOCTITE 569 THREAD SEALANT



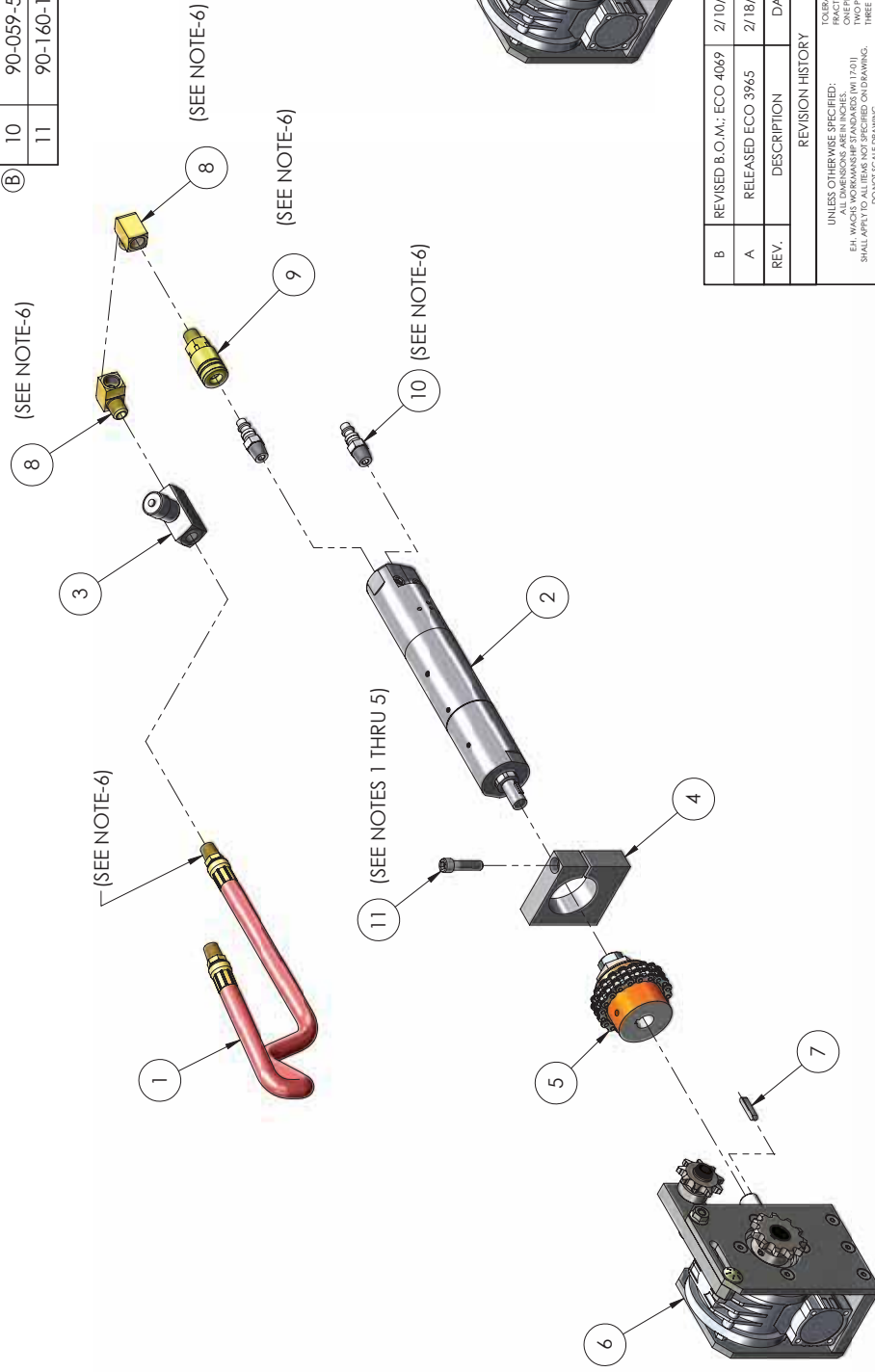
E.H. WACHS
 600 Knightsbridge Parkway
 Lincolnshire, IL 60069
 www.ehwachs.com

D	ADDED NOTES:	ECO 3999	4/16/2020	BC
REV.	DESCRIPTION	DATE	APR.	
UNLESS OTHERWISE SPECIFIED: FRACTIONS 1/32 DECIMALS .001 DIMENSIONS ARE IN INCHES E.H. WACHS WORKMANSHIP STANDARDS (W17.01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING. DO NOT SCALE DRAWING.				
TOLERANCES: FRACTIONS 1/32 DECIMALS .001 DIMENSIONS ARE IN INCHES E.H. WACHS WORKMANSHIP STANDARDS (W17.01) SHALL APPLY TO ALL ITEMS NOT SPECIFIED ON DRAWING. DO NOT SCALE DRAWING.				
PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF E.H. WACHS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF E.H. WACHS IS PROHIBITED.				

REVISION HISTORY				
REV.	DESCRIPTION	DATE	APR.	
1	HYD. MANIFOLD ASSEMBLY	03-10-09	03-10-09	1 OF 1
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SCALE 1:3
 SHEET 1 OF 1
 DWG. NO. 02-315-00
 REV. D

- NOTES:**
1. CLEAN AND DEGREASE THREADED SURFACES
 2. APPLY (LOCTITE 7471) PRIMER TO THREADS
 3. APPLY (LOCTITE 243) MEDIUM THREAD LOCKER TO THREADS
 4. REMOVE ALL EXCESS LOCTITE
 5. LET DRY FOR MINIMUM 24 HOURS BEFORE USE
 6. APPLY LOCTITE 569 THREAD SEALANT.



ITEM	PART NUMBER	QTY	DESCRIPTION
1	02-031-00	1	HOSE, TRAVEL MOTOR
2	02-035-00	1	MOTOR, TRAVEL-AIR
3	02-212-00	1	FLOW CONTROL VALVE 1/4"
4	02-219-00	1	MOUNT, AIR MOTOR SPLIT COLLAR
5	02-232-00	1	OVERLOAD SAFETY COUPLING
6	02-320-00	1	FEED DRIVE ASSEMBLY
7	90-047-10	1	KEY, 3/16 SQ X 1
8	90-058-05	2	1/4 NPT F X 1/4 NPT M BRASS LP-90
9	90-059-51	1	DISCONNECT, FEMALE 1/4 NPT M
10	90-059-53	2	DISCONNECT, MALE 1/4 NPT M
11	90-160-12	1	SHCS, 5/16-18 X 1-1/4 SS18-8



B	REVISED B.O.M.; ECO 4069	2/10/2021	BC
A	RELEASED ECO 3965	2/18/2020	BC
REV.	DESCRIPTION	DATE	APP.

REVISION HISTORY

UNLESS OTHERWISE SPECIFIED:
 ALL DIMENSIONS ARE IN INCHES.
 E.H. WAKES WORKMANSHIP STANDARDS (W1.01)
 SHALL APPLY TO ALL DRAWINGS, INCLUDING, BUT NOT LIMITED TO, **DO NOT SCALE DRAWING.**

TOLERANCES:
 DIMENSIONS: ±.01
 ONE PLACE DECIMAL ±.015
 TWO PLACE DECIMAL ±.010
 THREE PLACE DECIMAL ±.005
 ANGULAR ±1/2° MAX.

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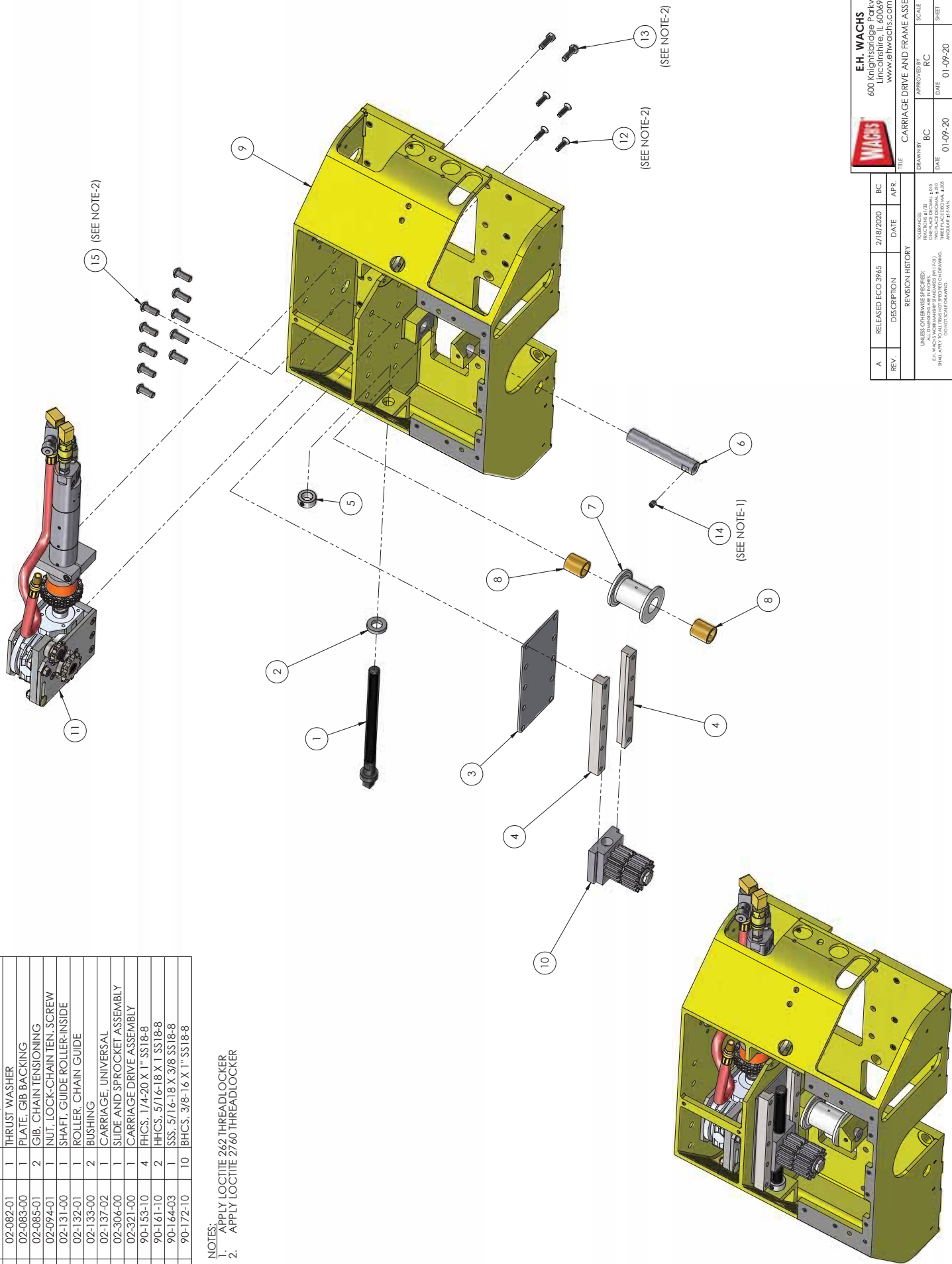


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Lincolnshire, IL 60069
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TITLE		CARRIAGE DRIVE ASSEMBLY			
DRAWN BY	ROY C.	APPROVED BY	BC	SCALE	1:4
DATE	01-09-20	DATE	01-09-20	SHEET	1 OF 1
SIZE	B	DWG. NO.	02-321-00		
		REV.	B		

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-081-01	1	SCREW, CHAIN TENSION
2	02-082-01	1	THRUST WASHER
3	02-083-00	1	PLATE, GIB BACKING
4	02-085-01	2	GIB, CHAIN TENSIONING
5	02-094-01	1	NUT, LOCK-CHAIN TEN. SCREW
6	02-131-00	1	SHAFT, GUIDE ROLLER-INSIDE
7	02-132-01	1	ROLLER, CHAIN GUIDE
8	02-133-00	2	BUSHING
9	02-137-02	1	CARRIAGE, UNIVERSAL
10	02-306-00	1	SLIDE AND SPROCKET ASSEMBLY
11	02-321-00	1	CARRIAGE DRIVE ASSEMBLY
12	90-153-10	4	FHCS, 1/4-20 X 1" SS18-8
13	90-161-10	2	FHCS, 5/16-18 X 1" SS18-8
14	90-164-03	1	SSS, 5/16-18 X 3/8 SS18-8
15	90-172-10	10	BHCS, 3/8-16 X 1" SS18-8

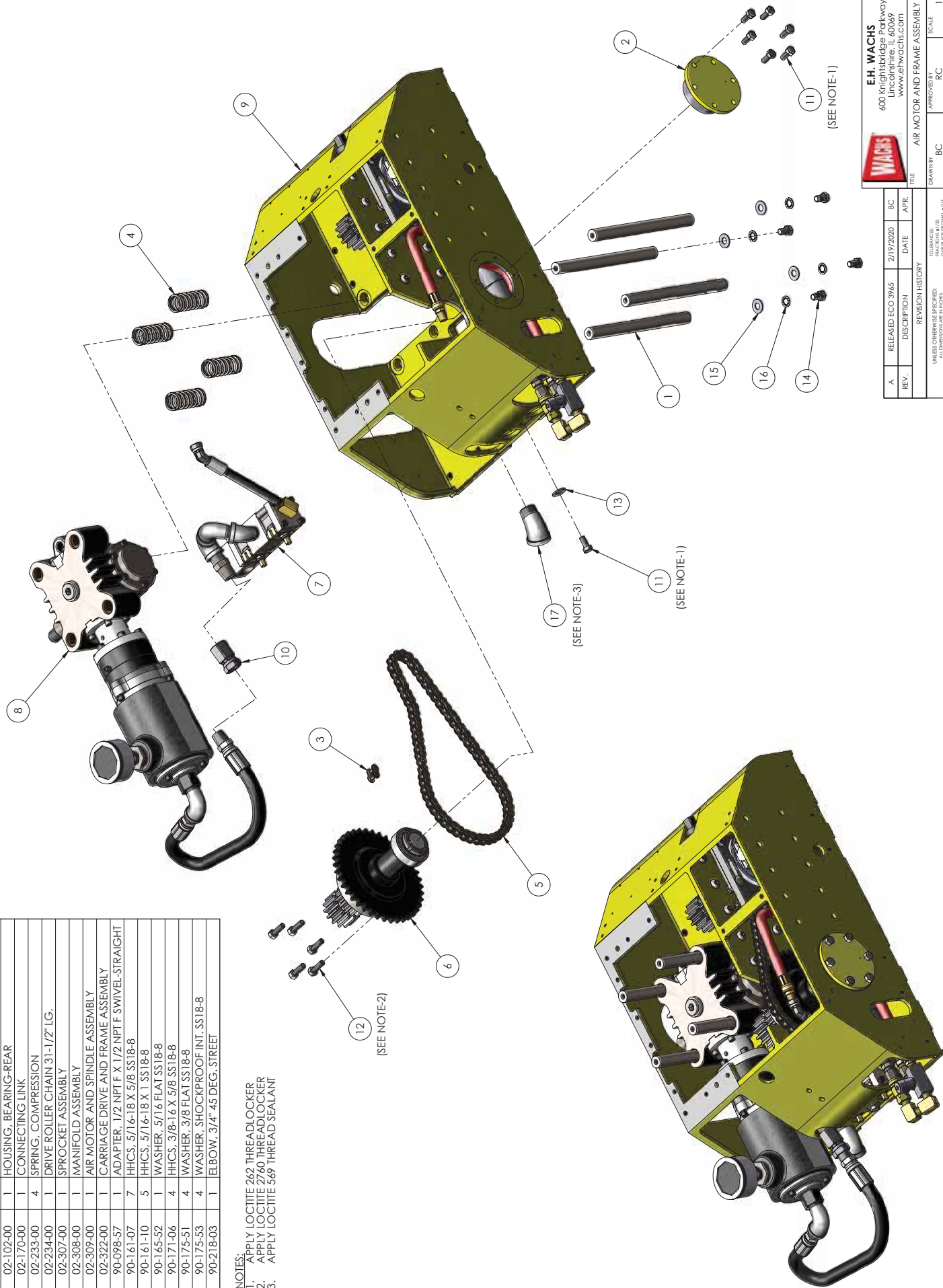
- NOTES:
1. APPLY LOCTITE 262 THREADLOCKER
2. APPLY LOCTITE 2760 THREADLOCKER



		E.H. WACHS 600 Knightsbridge Parkway Lincolnshire, IL 60069 www.ehwachs.com	
WACHS		02-322-00	
REV.		SCALE	
DESCRIPTION		DATE	
RELEASED		DATE	
ECO 3945		01-09-20	
2/18/2020		01-09-20	
BC		BC	
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2/18/2020		01-09-20	
BC		RC	
APR.		RC	

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-019-02	4	ROD, GUIDE-STAINLESS
2	02-102-00	1	HOUSING, BEARING-REAR
3	02-170-00	1	CONNECTING LINK
4	02-233-00	4	SPRING, COMPRESSION
5	02-234-00	1	DRIVE ROLLER CHAIN 31-1/2" LG.
6	02-307-00	1	SPROCKET ASSEMBLY
7	02-308-00	1	MANIFOLD ASSEMBLY
8	02-309-00	1	AIR MOTOR AND SPINDLE ASSEMBLY
9	02-322-00	1	CARRIAGE DRIVE AND FRAME ASSEMBLY
10	90-098-57	1	ADAPTER, 1/2 NPT F X 1/2 NPT F SWIVEL-STRAIGHT
11	90-061-07	7	HHCS, 5/16-18 X 5/8 SS18-8
12	90-161-10	5	HHCS, 5/16-18 X 1 SS18-8
13	90-165-52	1	WASHER, 5/16 FLAT SS18-8
14	90-171-06	4	HHCS, 3/8-1.6 X 5/8 SS18-8
15	90-175-51	4	WASHER, 3/8 FLAT SS18-8
16	90-178-53	4	WASHER, SHOCKPROOF INT. SS18-8
17	90-215-00	1	ELBOW, 3/4" 45 DEG. STREET

NOTES:
1. APPLY LOCTITE 262 THREADLOCKER
2. APPLY LOCTITE 2760 THREADLOCKER
3. APPLY LOCTITE 569 THREAD SEALANT

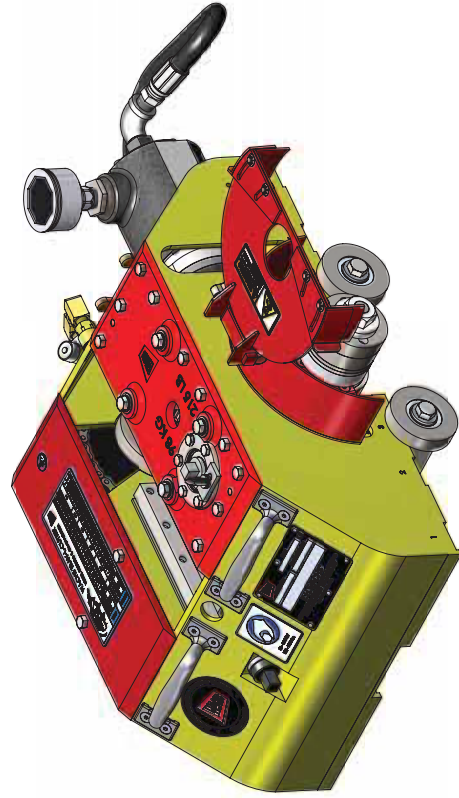


		E.H. WACHS 600 Knightstridge Parkway Countryside, IL 60609 www.ehwachs.com							
TITLE		AIR MOTOR AND FRAME ASSEMBLY							
REVISION HISTORY		<table border="1"> <tr> <td> DRAWN BY BC </td> <td> APPROVED BY RC </td> <td> SCALE 1:4 </td> </tr> <tr> <td> DATE 01-09-20 </td> <td> DATE 01-09-20 </td> <td> SHEET 1 OF 1 </td> </tr> </table>		DRAWN BY BC	APPROVED BY RC	SCALE 1:4	DATE 01-09-20	DATE 01-09-20	SHEET 1 OF 1
DRAWN BY BC	APPROVED BY RC	SCALE 1:4							
DATE 01-09-20	DATE 01-09-20	SHEET 1 OF 1							
UNLESS OTHERWISE SPECIFIED: 1. E.H. WACHS INFORMATION STANDARDS (M 17.01) 2. E.H. WACHS INFORMATION STANDARDS (M 17.02) 3. E.H. WACHS INFORMATION STANDARDS (M 17.03) 4. E.H. WACHS INFORMATION STANDARDS (M 17.04) 5. E.H. WACHS INFORMATION STANDARDS (M 17.05) 6. E.H. WACHS INFORMATION STANDARDS (M 17.06) 7. E.H. WACHS INFORMATION STANDARDS (M 17.07) 8. E.H. WACHS INFORMATION STANDARDS (M 17.08) 9. E.H. WACHS INFORMATION STANDARDS (M 17.09) 10. E.H. WACHS INFORMATION STANDARDS (M 17.10) 11. E.H. WACHS INFORMATION STANDARDS (M 17.11) 12. E.H. WACHS INFORMATION STANDARDS (M 17.12) 13. E.H. WACHS INFORMATION STANDARDS (M 17.13) 14. E.H. WACHS INFORMATION STANDARDS (M 17.14) 15. E.H. WACHS INFORMATION STANDARDS (M 17.15) 16. E.H. WACHS INFORMATION STANDARDS (M 17.16) 17. E.H. WACHS INFORMATION STANDARDS (M 17.17) 18. E.H. WACHS INFORMATION STANDARDS (M 17.18) 19. E.H. WACHS INFORMATION STANDARDS (M 17.19) 20. E.H. WACHS INFORMATION STANDARDS (M 17.20) 21. E.H. WACHS INFORMATION STANDARDS (M 17.21) 22. E.H. WACHS INFORMATION STANDARDS (M 17.22) 23. E.H. WACHS INFORMATION STANDARDS (M 17.23) 24. E.H. WACHS INFORMATION STANDARDS (M 17.24) 25. E.H. WACHS INFORMATION STANDARDS (M 17.25) 26. E.H. WACHS INFORMATION STANDARDS (M 17.26) 27. E.H. WACHS INFORMATION STANDARDS (M 17.27) 28. E.H. WACHS INFORMATION STANDARDS (M 17.28) 29. E.H. WACHS INFORMATION STANDARDS (M 17.29) 30. E.H. WACHS INFORMATION STANDARDS (M 17.30) 31. E.H. WACHS INFORMATION STANDARDS (M 17.31) 32. E.H. WACHS INFORMATION STANDARDS (M 17.32) 33. E.H. WACHS INFORMATION STANDARDS (M 17.33) 34. E.H. WACHS INFORMATION STANDARDS (M 17.34) 35. E.H. WACHS INFORMATION STANDARDS (M 17.35) 36. E.H. WACHS INFORMATION STANDARDS (M 17.36) 37. E.H. WACHS INFORMATION STANDARDS (M 17.37) 38. E.H. WACHS INFORMATION STANDARDS (M 17.38) 39. E.H. WACHS INFORMATION STANDARDS (M 17.39) 40. E.H. WACHS INFORMATION STANDARDS (M 17.40) 41. E.H. WACHS INFORMATION STANDARDS (M 17.41) 42. E.H. WACHS INFORMATION STANDARDS (M 17.42) 43. E.H. WACHS INFORMATION STANDARDS (M 17.43) 44. E.H. WACHS INFORMATION STANDARDS (M 17.44) 45. E.H. WACHS INFORMATION STANDARDS (M 17.45) 46. E.H. WACHS INFORMATION STANDARDS (M 17.46) 47. E.H. WACHS INFORMATION STANDARDS (M 17.47) 48. E.H. WACHS INFORMATION STANDARDS (M 17.48) 49. E.H. WACHS INFORMATION STANDARDS (M 17.49) 50. E.H. WACHS INFORMATION STANDARDS (M 17.50) 51. E.H. WACHS INFORMATION STANDARDS (M 17.51) 52. E.H. WACHS INFORMATION STANDARDS (M 17.52) 53. E.H. WACHS INFORMATION STANDARDS (M 17.53) 54. E.H. WACHS INFORMATION STANDARDS (M 17.54) 55. E.H. WACHS INFORMATION STANDARDS (M 17.55) 56. E.H. WACHS INFORMATION STANDARDS (M 17.56) 57. E.H. WACHS INFORMATION STANDARDS (M 17.57) 58. E.H. WACHS INFORMATION STANDARDS (M 17.58) 59. E.H. WACHS INFORMATION STANDARDS (M 17.59) 60. E.H. WACHS INFORMATION STANDARDS (M 17.60) 61. E.H. WACHS INFORMATION STANDARDS (M 17.61) 62. E.H. WACHS INFORMATION STANDARDS (M 17.62) 63. E.H. WACHS INFORMATION STANDARDS (M 17.63) 64. E.H. WACHS INFORMATION STANDARDS (M 17.64) 65. E.H. WACHS INFORMATION STANDARDS (M 17.65) 66. E.H. WACHS INFORMATION STANDARDS (M 17.66) 67. E.H. WACHS INFORMATION STANDARDS (M 17.67) 68. E.H. WACHS INFORMATION STANDARDS (M 17.68) 69. E.H. WACHS INFORMATION STANDARDS (M 17.69) 70. E.H. WACHS INFORMATION STANDARDS (M 17.70) 71. E.H. WACHS INFORMATION STANDARDS (M 17.71) 72. E.H. WACHS INFORMATION STANDARDS (M 17.72) 73. E.H. WACHS INFORMATION STANDARDS (M 17.73) 74. E.H. WACHS INFORMATION STANDARDS (M 17.74) 75. E.H. WACHS INFORMATION STANDARDS (M 17.75) 76. E.H. WACHS INFORMATION STANDARDS (M 17.76) 77. E.H. WACHS INFORMATION STANDARDS (M 17.77) 78. E.H. WACHS INFORMATION STANDARDS (M 17.78) 79. E.H. WACHS INFORMATION STANDARDS (M 17.79) 80. E.H. WACHS INFORMATION STANDARDS (M 17.80) 81. E.H. WACHS INFORMATION STANDARDS (M 17.81) 82. E.H. WACHS INFORMATION STANDARDS (M 17.82) 83. E.H. WACHS INFORMATION STANDARDS (M 17.83) 84. E.H. WACHS INFORMATION STANDARDS (M 17.84) 85. E.H. WACHS INFORMATION STANDARDS (M 17.85) 86. E.H. WACHS INFORMATION STANDARDS (M 17.86) 87. E.H. WACHS INFORMATION STANDARDS (M 17.87) 88. E.H. WACHS INFORMATION STANDARDS (M 17.88) 89. E.H. WACHS INFORMATION STANDARDS (M 17.89) 90. E.H. WACHS INFORMATION STANDARDS (M 17.90) 91. E.H. WACHS INFORMATION STANDARDS (M 17.91) 92. E.H. WACHS INFORMATION STANDARDS (M 17.92) 93. E.H. WACHS INFORMATION STANDARDS (M 17.93) 94. E.H. WACHS INFORMATION STANDARDS (M 17.94) 95. E.H. WACHS INFORMATION STANDARDS (M 17.95) 96. E.H. WACHS INFORMATION STANDARDS (M 17.96) 97. E.H. WACHS INFORMATION STANDARDS (M 17.97) 98. E.H. WACHS INFORMATION STANDARDS (M 17.98) 99. E.H. WACHS INFORMATION STANDARDS (M 17.99) 100. E.H. WACHS INFORMATION STANDARDS (M 18.00)	SIZE Dwg. No.	REV. A							
A	REV.	RELEASED ECO 3945	DATE 2/19/2020	BC					

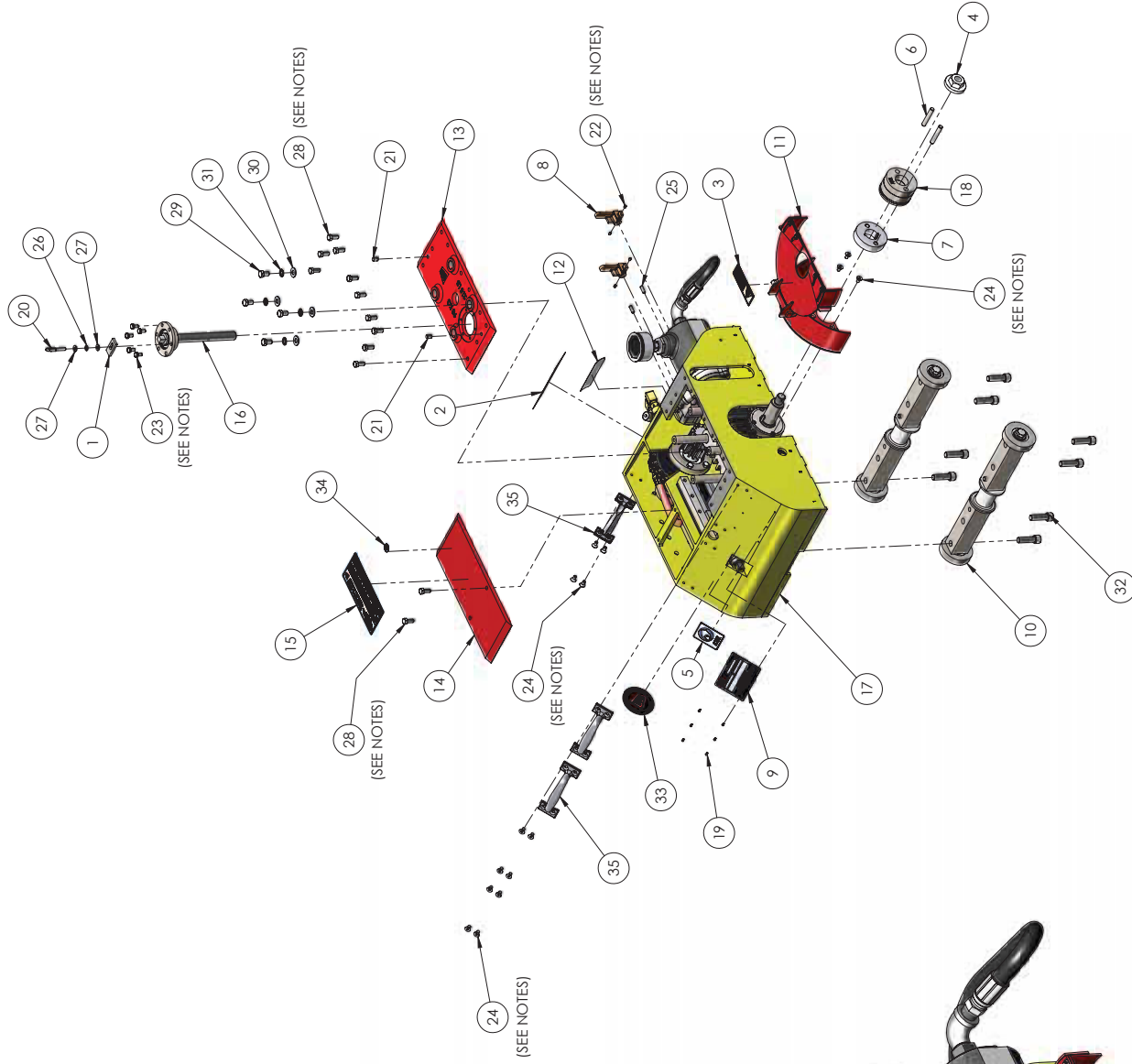
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ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-008-00	1	LOCK, FEED SCREW
2	02-010-00	1	LABEL, PRESSURE-AIR
3	02-011-00	1	LABEL, WARNING-BLADE GUARD
4	02-014-00	1	LOCK NUT, DRIVE COLLAR
5	02-015-00	1	LABEL, TORQUE
6	02-021-01	2	PIN, CUTTER DRIVE
7	02-022-01	1	COLLAR, CUTTER DRIVE
8	02-124-00	2	HANDLE, AIR VALVE
9	02-141-00	2	NAME PLATE
10	02-142-00	2	WHEEL ASSEMBLY
11	02-179-00	1	CUTTER GUARD ASSEMBLY
12	02-185-00	1	LABEL, ON-OFF
13	02-235-00	1	COVER, SPINDLE CARRIAGE
14	02-237-00	1	COVER, DRIVE SIDE
15	02-300-00	1	MACHINE CHAIN & WHEEL CHART
16	02-304-00	1	FEED SCREW ASSEMBLY
17	02-323-00	1	AIR MOTOR AND FRAME ASSEMBLY
18	02-500-03	1	KIT, CUTTER SPACERS 3/16, 11/16, & 3/4
19	90-048-01	6	SCREW, #4 X 1/4 ROUND U-DRIVE SS18-8
20	90-059-04	1	SCREW, 1/4-20 X 1-1/4 THUMB
21	90-066-05	2	PIN, 5/16 X 1/2 DOWEL
22	90-144-52	4	SSS, 10-32 X 1/4 SS18-8 CP
23	90-151-05	5	HHCS, 1/4-20 X 1/2 SS18-8
24	90-153-05	15	FHCS, 1/4-20 X 1/2 SS18-8
25	90-154-07	2	SSS, 1/4-20 X 3/4 SS18-8
26	90-155-52	1	WASHER, 1/4 SPLIT RING SS18-8
27	90-155-56	2	WASHER, #12 FLAT SS18-8
28	90-161-07	12	HHCS, 5/16-18 X 5/8 SS18-8
29	90-171-06	4	HHCS, 3/8-16 X 5/8 SS18-8
30	90-175-51	4	WASHER, 3/8 FLAT SS18-8
31	90-175-53	4	WASHER, SHOCKPROOF INT. SS18-8
32	90-190-17	8	SHCS, 1/2-13 X 1-3/4 SS18-8
33	90-400-02	1	LABEL, WACHS CIRCLE LOGO 3.00
34	90-900-01	1	LABEL, READ MANUAL
35	90-900-53	3	HANDLE, 6-1/2 X 1-3/4

NOTES:
1. APPLY LOCITITE 262 THREADLOCKER



SCALE 1:4



E.H. WACHS
600 Knightsbridge Parkway
Lincolnshire, IL 60069
www.ehwachs.com

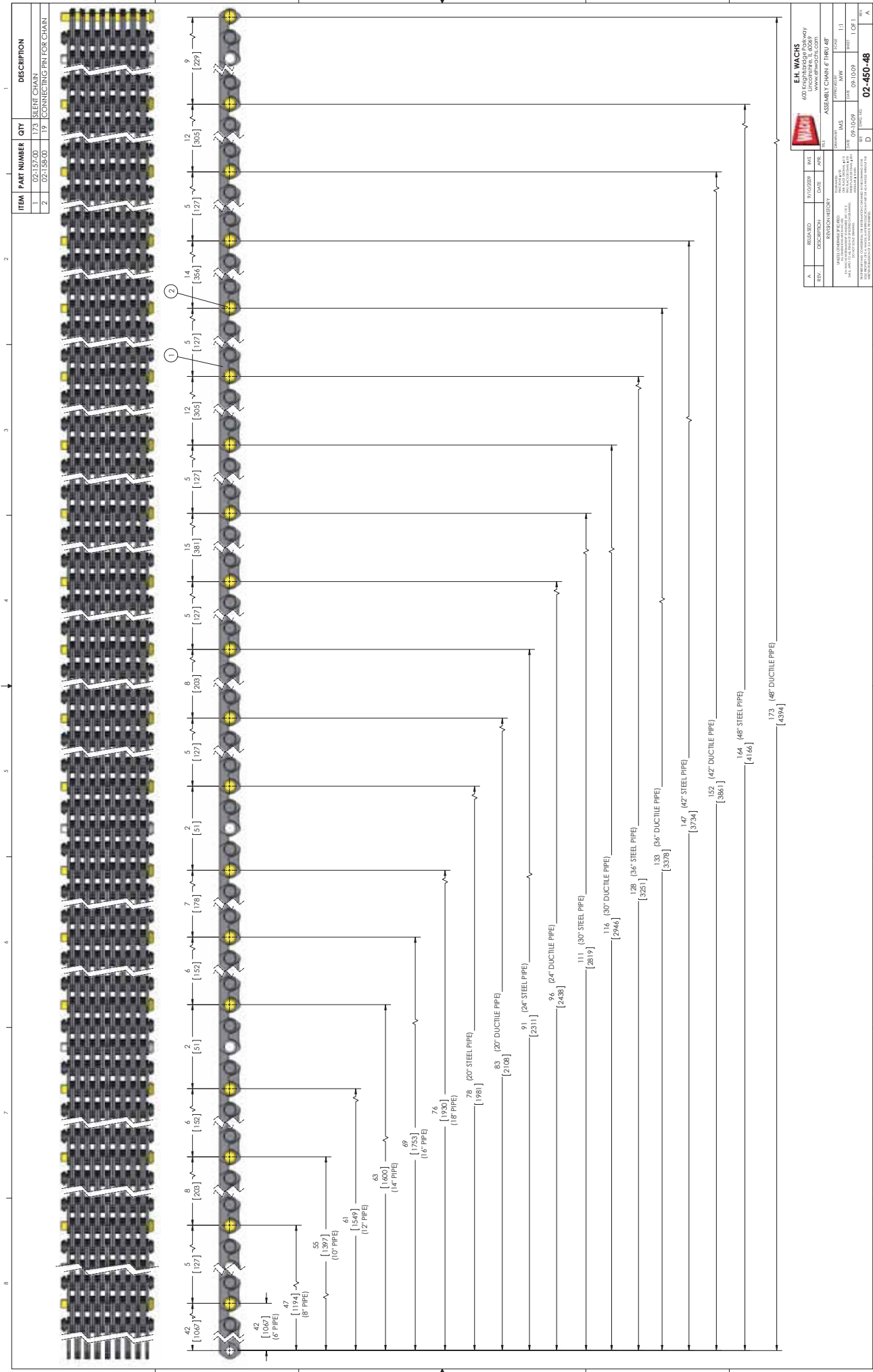
PNEUMATIC CARRIAGE ASSEMBLY		TITLE	
REV.	DESCRIPTION	DATE	APPR.
A	RELEASED ECO 3945	2/19/2020	BC
REVISION HISTORY		SCALE	
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.		BC	1:8
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UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.		SHEET	1 OF 1
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.		SIZE	DWG. NO.
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS. DIMENSIONS IN PARENTHESES ARE IN MILLIMETERS.		02-324-00	

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-019-02	4	ROD, GUIDE-STAINLESS
2	02-102-00	1	HOUSING, BEARING-REAR
3	02-170-00	1	CONNECTING LINK
4	02-233-00	4	SPRING, COMPRESSION
5	02-234-00	1	DRIVE ROLLER CHAIN 31-1/2" LG.
6	02-307-00	1	SPROCKET ASSEMBLY
7	02-315-00	1	HYD. MANIFOLD ASSEMBLY
8	02-316-00	1	HYD. MOTOR AND SPINDLE ASSEMBLY
9	02-326-00	1	HYD. CARRIAGE DRIVE AND FRAME ASSEMBLY
10	90-161-07	6	HHCS, 5/16-18 X 5/8 SS18-8
11	90-161-10	5	HHCS, 5/16-18 X 1 SS18-8
12	90-171-06	4	HHCS, 3/8-16 X 5/8 SS18-8
13	90-175-51	4	WASHER, 3/8 FLAT SS18-8
14	90-175-53	4	WASHER, SHOCKPROOF INT. SS18-8

NOTES:
1. APPLY LOCTITE 2760 THREADLOCKER
2. APPLY LOCTITE 262 THREADLOCKER



		E.H. WACHS 600 Knightsbridge Parkway Lincolnshire, IL 60069 www.ehwachs.com	
REV.	DESCRIPTION	DATE	APPROVED BY
A	RELEASED ECO 3965	2/19/2020	BC
HYD. MOTOR AND FRAME ASSEMBLY			
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES (PARENETS IN MILLIMETERS) E.H. WACHS COMMANDER PATENTED (WI 1,101) THREE FACE CORDING, 8.008 SHALL APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED. PARENETS TO SCALE.		DRAWN BY: BC SCALE: 1:4 DATE: 01-10-20 SHEET: 1 OF 1 DATE: 01-10-20 DWG. NO.: 02-327-00	
PROPERTY OF E.H. WACHS. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF E.H. WACHS IS PROHIBITED.		REV: A	



ITEM	PART NUMBER	QTY	DESCRIPTION
1	02-157-00	173	SILENT CHAIN
2	02-158-00	19	CONNECTING PIN FOR CHAIN

		REV.		DATE	BY	CHK
E.H. WACHS 600 Kingsbridge Parkway Suite 100 Westborough, MA 01581 www.ehwachs.com		REVISION HISTORY		1. 02-157-00 2. 02-158-00 3. 02-159-00 4. 02-160-00 5. 02-161-00 6. 02-162-00 7. 02-163-00 8. 02-164-00 9. 02-165-00 10. 02-166-00 11. 02-167-00 12. 02-168-00 13. 02-169-00 14. 02-170-00 15. 02-171-00 16. 02-172-00 17. 02-173-00 18. 02-174-00 19. 02-175-00 20. 02-176-00 21. 02-177-00 22. 02-178-00 23. 02-179-00 24. 02-180-00 25. 02-181-00 26. 02-182-00 27. 02-183-00 28. 02-184-00 29. 02-185-00 30. 02-186-00 31. 02-187-00 32. 02-188-00 33. 02-189-00 34. 02-190-00 35. 02-191-00 36. 02-192-00 37. 02-193-00 38. 02-194-00 39. 02-195-00 40. 02-196-00 41. 02-197-00 42. 02-198-00 43. 02-199-00 44. 02-200-00 45. 02-201-00 46. 02-202-00 47. 02-203-00 48. 02-204-00 49. 02-205-00 50. 02-206-00 51. 02-207-00 52. 02-208-00 53. 02-209-00 54. 02-210-00 55. 02-211-00 56. 02-212-00 57. 02-213-00 58. 02-214-00 59. 02-215-00 60. 02-216-00 61. 02-217-00 62. 02-218-00 63. 02-219-00 64. 02-220-00 65. 02-221-00 66. 02-222-00 67. 02-223-00 68. 02-224-00 69. 02-225-00 70. 02-226-00 71. 02-227-00 72. 02-228-00 73. 02-229-00 74. 02-230-00 75. 02-231-00 76. 02-232-00 77. 02-233-00 78. 02-234-00 79. 02-235-00 80. 02-236-00 81. 02-237-00 82. 02-238-00 83. 02-239-00 84. 02-240-00 85. 02-241-00 86. 02-242-00 87. 02-243-00 88. 02-244-00 89. 02-245-00 90. 02-246-00 91. 02-247-00 92. 02-248-00 93. 02-249-00 94. 02-250-00 95. 02-251-00 96. 02-252-00 97. 02-253-00 98. 02-254-00 99. 02-255-00 100. 02-256-00 101. 02-257-00 102. 02-258-00 103. 02-259-00 104. 02-260-00 105. 02-261-00 106. 02-262-00 107. 02-263-00 108. 02-264-00 109. 02-265-00 110. 02-266-00 111. 02-267-00 112. 02-268-00 113. 02-269-00 114. 02-270-00 115. 02-271-00 116. 02-272-00 117. 02-273-00 118. 02-274-00 119. 02-275-00 120. 02-276-00 121. 02-277-00 122. 02-278-00 123. 02-279-00 124. 02-280-00 125. 02-281-00 126. 02-282-00 127. 02-283-00 128. 02-284-00 129. 02-285-00 130. 02-286-00 131. 02-287-00 132. 02-288-00 133. 02-289-00 134. 02-290-00 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