EP 424 End Prep Machine
User's Manual

E.H. Wachs
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E.H. Wachs Part No. 81-MAN-00
Rev. C, January 2016

Revision History:

Original	June 2010
Rev. A	April 2013
Rev. B	May 2014

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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>End Prep and Flange Facing Machines:</u> Model TSE, FSE, and TFS Tube and Fitting Squaring Machines. Model SDB 103, SDB 206, and SDB 412 Small Diameter Bevelers; Model FF 206; FF 313, and FF 424 Flange Facers. Model SB, LB, and MB Plus Boiler Tube Bevelers. EP 424 End Prep/Flange Facer.	
Model Number:	18-000-XX (TSE, FSE); 19-000-XX (TFS); 16-000-XX (SDB-103/FF-206); 56-000-XX (SDB-206/FF313); 66-000-XX (SDB-412/FF-424); 70-000-XX (SB); 71-000-XX (MB Plus); 72-000-XX (LB); 81-000-XX (EP 424)	
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 hydrailic 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 descrived 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	

Table of Contents

Chapter 1
About This Manual

Purpose of This Manual

This manual explains how to operate and maintain the EP 424 end prep machine. It includes instructions for set-up, operation, and maintenance. It also contains parts lists, diagrams, and service information to help you order replacement parts and perform user-serviceable repairs.

Before operating the EP 424, you should read through this manual and become familiar with all instructions. At a minimum, make sure you read and understand the following chapters:

- Chapter 1, About This Manual
- Chapter 2, Safety
- Chapter 3, Introduction to the Equipment
- Chapter 5, Operating Instructions
- Chapter 9, Accessories

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

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

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

How to Use The Manual

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

Use these instructions to operate and maintain the equipment.

Symbols and Warnings

The following symbols are used throughout this manual to indicate special notes and warnings. They appear in the outside column of the page, next to the section they refer to. Make sure you understand what each symbol means, and follow all instructions for cautions and warnings.

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

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**.

This is the **safety alert symbol**. It is used to alert you to **potential personal injury hazards**. Obey all safety messages that follow this symbol to avoid possible injury or death.

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.

CAUTION

A CAUTION alert with the damage alert symbol indicates a situation that will result in **damage to the equipment**.

IMPORTANT

An IMPORTANT alert with the damage alert symbol indicates a situation that **may** result in **damage to the equipment**.

NOTE

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

MANUAL UPDATES AND REVISION TRACKING

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

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

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

Chapter 2

Safety

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 the EP 424 end prep machine. It contains important safety instructions and recommendations.

Operator Safety

Follow these guidelines for safe operation of the equipment.

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

- READ THE OPERATING MANUAL. Make sure you understand all setup and operating instructions before you begin.
- INSPECT MACHINE AND ACCESSORIES. Before starting the machine, look for loose bolts or nuts, leaking lubricant, rusted components, and any other physical conditions that may affect operation. Properly maintaining the machine can greatly decrease the chances for injury.
- ALWAYS READ PLACARDS AND LABELS. Make sure all placards, labels, and stickers are clearly legible and in good condition. You can purchase replacement labels from E.H. Wachs Company.
- KEEP CLEAR OF MOVING PARTS. Keep hands, arms, and fingers clear of all rotating or moving parts. Always turn machine off before doing any adjustments or service.
- SECURE LOOSE CLOTHING AND JEWELRY. Secure or remove loose-fitting clothing and jewelry, and securely bind long hair, to prevent them from getting caught in moving parts of the machine.
- KEEP WORK AREA CLEAR. Keep all clutter and nonessential materials out of the work area. Only people directly involved with the work being performed should have access to the area.

Safety Symbols

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

WARNING

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

CAUTION

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

Protective Equipment Requirements

WARNING

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. Z87.1 is available from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

CAUTION

Personal hearing protection is recommended when operating or working near this tool.

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

Safety Labels

The following safety labels are on the EP 424 machine. If a label is lost or unreadable, order and attach a replacement. See ordering instructions in Chapter 10.

Figure 2-1. Crush hazard safety label (part no. 81-165-00).

Figure 2-2. Crush and cut hazard safety label (part no. 90-401-04).

Figure 2-3. Loud noise hazard safety label, provided with air drive configurations (part no. 90-401-03).

Figure 2-4. Eye injury hazard label, provided with hydraulic drive configurations (part no. 90-401-01).

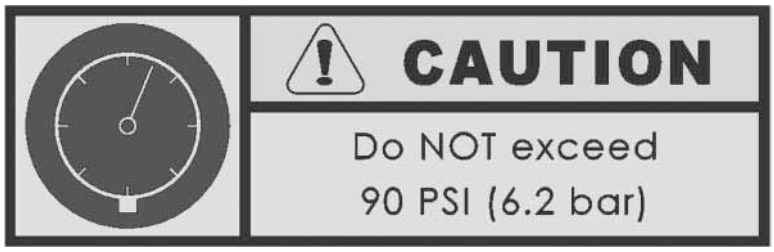


Figure 2-5. Compressed air pressure safety label (part no. 90-401-02).

Figure 2-6. Hydraulic pressure safety label (part no. 90-402-01).

Chapter 3

Introduction to the Equipment

Overview of the EP 424

The EP 424 is an I.D. (inside diameter) mounted end prep machine for facing, beveling, counter-boring, and J-prepping pipes and flanges. It can be used for pipes from 4-24 inches O.D., with wall thicknesses up to 1.6” (41 mm) using form tools, or 6.5” (165 mm) with single-point operation.

The EP 424 is provided in 4 configurations:

- Form tool machine with air drive, part no. 81-000-01
- Form tool machine with hydraulic drive, part no. 81-000-02
- Single-point machine with air drive, part no. 81-000-03
- Single-point machine with hydraulic drive, part no. 81-000-04.

Form tool operation is quick to set up and easy to perform on pipe walls up to schedule 160 (1.6” on 16” pipe). For heavier wall pipe up to 6.5” wall thickness, the single-point kit allows you to perform any bevel profile.

Form-Tool Configuration

The form tool configurations have a rotating tool head with 3 tool holders, for performing up to 3 simultaneous operations. Tooling is available for facing, single-angle beveling, compound beveling, and counterboring.

The form tool configuration will perform end prepping (facing, beveling, J-prepping, and counterboring), with the operator manually feeding the tool head.

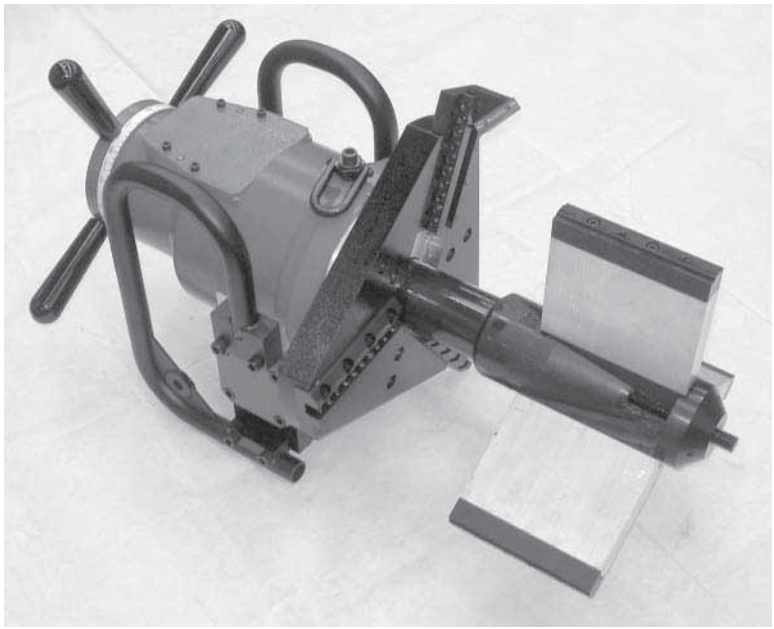


Figure 3-1. The photo shows the form tool configuration of the machine with the standard self-centering mandrel.

Single-Point Configuration

The single-point machine is provided with a tool slide that feeds the tool radially across the face of the pipe or flange. The slide is driven by a starwheel that engages trips on a ring mounted to the machine housing. Bevels are performed using the Speed Prep auto-feed system, which automatically feeds the machine axially as it cuts.

The single-point machine will perform facing or beveling of thick-walled pipes and flanges.

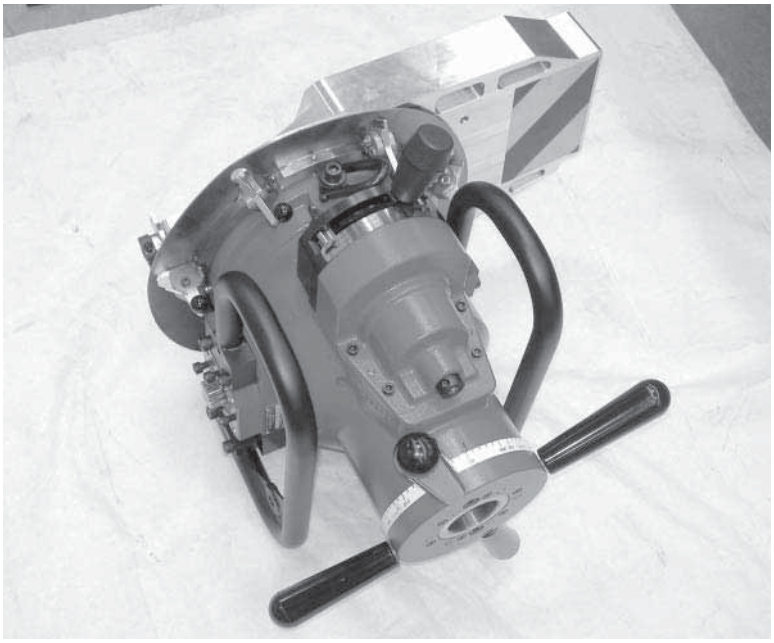


Figure 3-2. The photo shows the single-point configuration of the EP 424.

EP 424 Components

The following components are provided with the form tool configuration of the EP 424:

- main drive assembly with lifting attachments
- feed assembly
- rotating tool head
- standard self-centering mandrel
- drive motor (air or hydraulic)
- hand tool set

The single-point configuration includes the following additional components:

- single-point slide

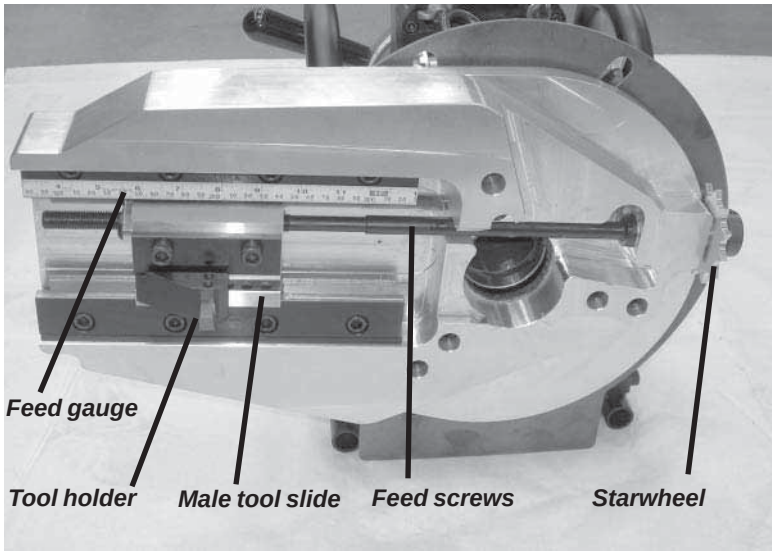


Figure 3-3. The single-point slide feeds the tool radially across the pipe face. It is driven along a feed screw by a starwheel.

- radial feed trip assembly

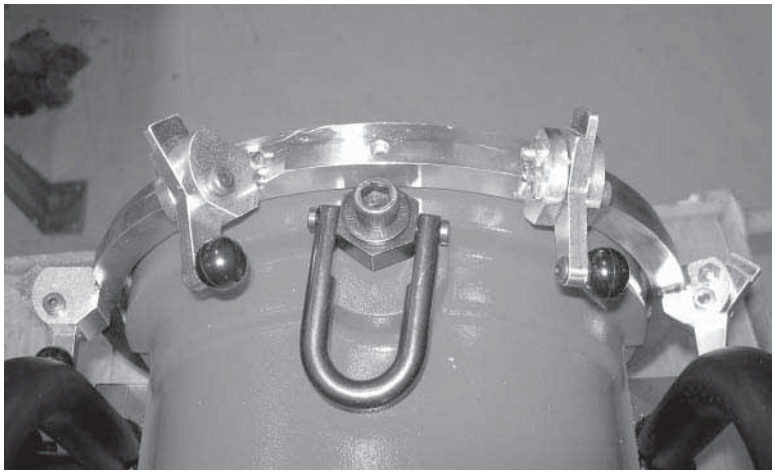


Figure 3-4. The photo shows the trip assembly mounted on the main drive housing.

- Speed Prep autofeed module

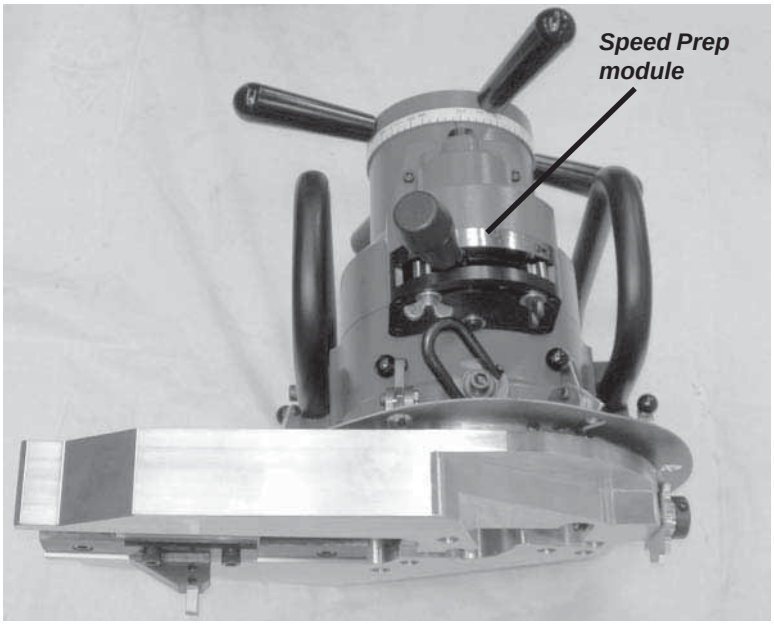


Figure 3-5. The speed prep module is installed on the main drive to operate the feed mechanism for single-point beveling.

WARNING

The Speed Prep autofeed can feed the machine until it comes off the mandrel. Crushing or other serious injuries could occur. Use the autofeed stop plate (81-316-00) to keep the machine from feeding too far.

- independent chuck mandrel

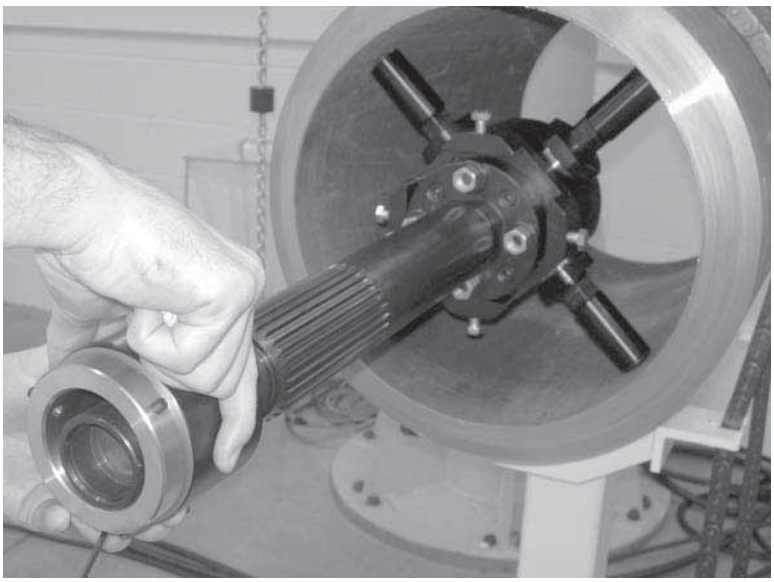


Figure 3-6. The independent chuck mandrel allows you to center the machine on the O.D. of the pipe.

- extension leg kit for standard mandrel

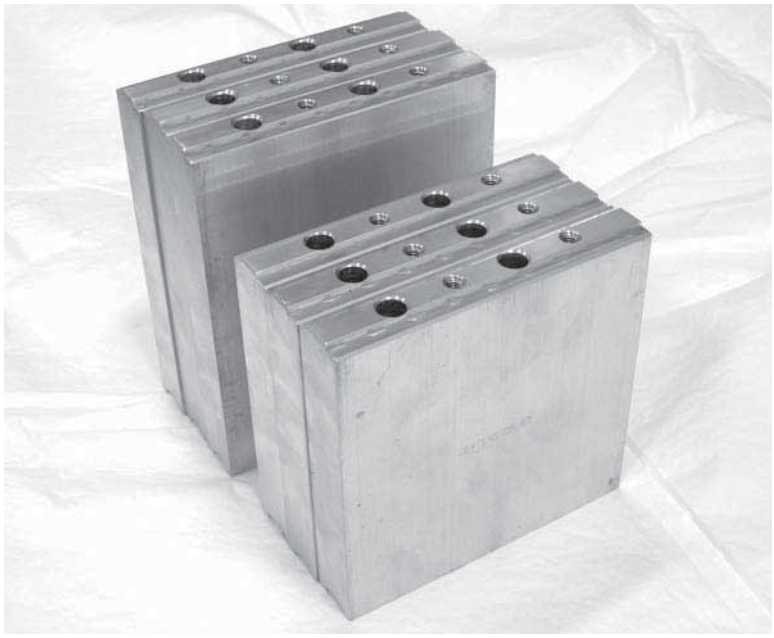


Figure 3-7. Two sets of extension legs allow the standard mandrel to be mounted in pipes up to 23.64" I.D.

- dial indicator assembly

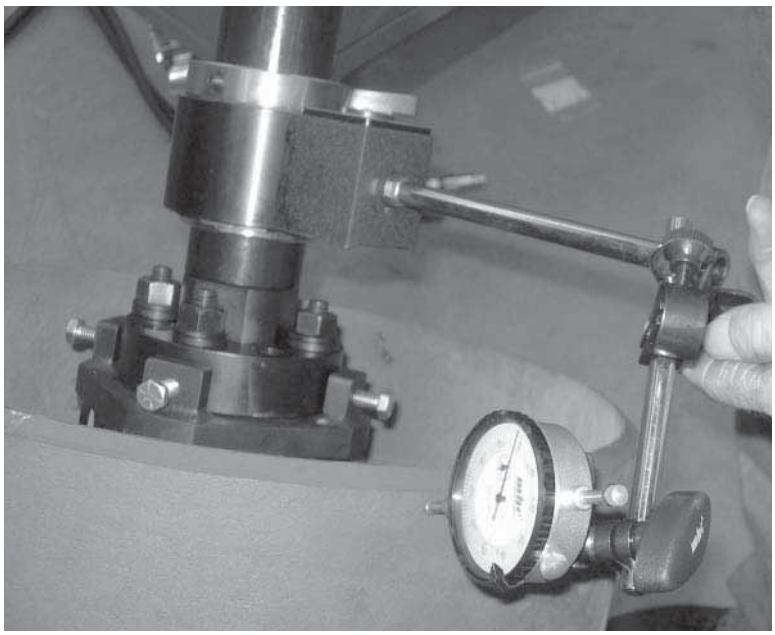


Figure 3-8. The dial indicator is provided for centering the independent chuck in the pipe.

Drive Motors

Two drive motors are available for the EP 424:

- a 3.5 HP air motor, part no. 81-311-00. The air motor requires 95 cfm air flow at 90 psi (2,700 l/min at 6.2 bar).

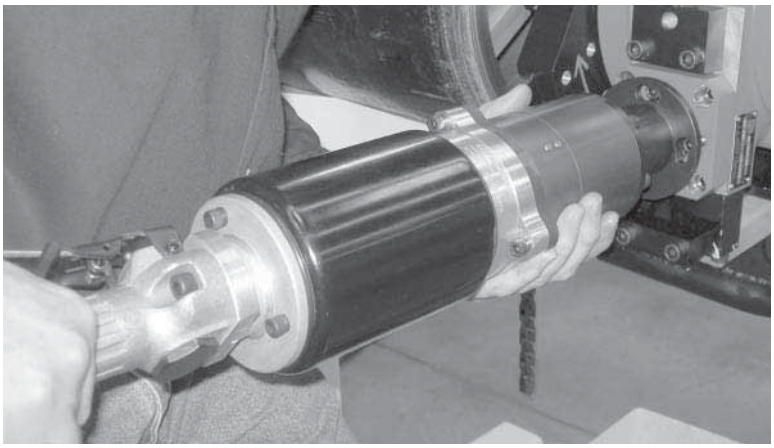


Figure 3-9. The photo shows the EP 424 air motor.

- a hydraulic motor, part no. 81-310-00. The hydraulic motor requires 10 gpm flow at 1500 psi (38 l/min @103 bar).

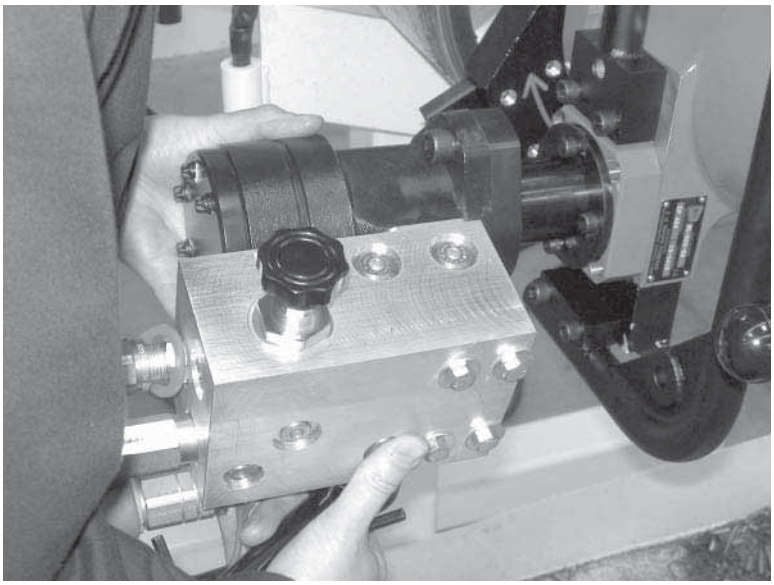


Figure 3-10. The hydraulic motor is interchangeable with the air motor.

Both motors include adapters for the EP 424. The motors are interchangeable, requiring no modifications to the EP 424 machine.

Accessories

The following accessories are available for the EP 424:

- Single-point upgrade kit, part no. 81-400-00 (for form-tool machine configuration); includes Speed Prep module, single-point slide, trip ring, and independent chuck.
- Extension leg kit for standard mandrel, part no. 81-303-01. Extends maximum clamping I.D. to 23.64” (600.5 mm).
- Independent chuck mandrel, part no. 81-305-00. (Provided with single-point machine or kit; available as option for form tool machine.)
- Short perch mandrel, part no. 81-315-00. Self-centering mandrel for pipes with bends or limited I.D. access.
- Air treatment module, part no. 26-407-00.

SPECIFICATIONS

Capacities

Table 1: EP 424 Operating Capacities

Air requirements	95 cfm at 90 psi (2690 l/min at 6.2 bar)
Hydraulic requirements	Min 10 gpm/max 15 gpm at 2000 psi (38/57 l/min at 138 bar)
Axial feed	0.071” per feed handle revolution
Single-point slide radial feed	0.0052” (0.132 mm) per engaged trip; 6.5” (165 mm) maximum feed
Max feed travel	3.50” (88.9 mm)
Max. rotating speed (no load)	20 rpm
Min. pipe wall thickness	Schedule 40
Max. pipe wall thickness (form tool)	1.6” (40.5 mm), depending on material
Max pipe wall thickness (single-point)	6.5” (165 mm)
Lift hook capacity	1000 lb (454 kg)

Dimensions and Weights

The envelope drawings in the following section include the dimensions for each machine configuration, and the weight for each subassembly. Table 2 below includes overall dimensions and weights for each configuration.

Table 2: Overall Dimensions and Weights

Configuration	Dimensions (L x W x H)	Weight (Std. Mandrel/ Ind. Chuck Mandrel)
81-000-01 (Form tool/air drive)	28.8" x 36.2" x 16.1" (732 x 919 x 408 mm)	154.5 lb (70.2 kg)/ 172 lb (78.2 kg)
81-000-02 (Form tool/hydraulic drive)	28.8" x 25.3" x 16.1" (732 x 643 x 408 mm)	162 lb (73.6 kg)/ 179.5 lb/81.6 kg
81-000-03 (Single-point/air drive)	25.5" x 42.3" x 21.2" (648 x 1075 x 539 mm)	176 lb (80 kg)/ 193.5 lb (88 kg)
81-000-04 (Single-point/hydraulic drive)	25.4" x 30.4" x 21.2" (645 x 772 x 539 mm)	183.5 lb (83.4 kg)/ 201 lb (91.4 kg)
Shipping/storage case	37" x 36.3" x 22.3" (940 x 922 x 566 mm)	

Operating Envelope

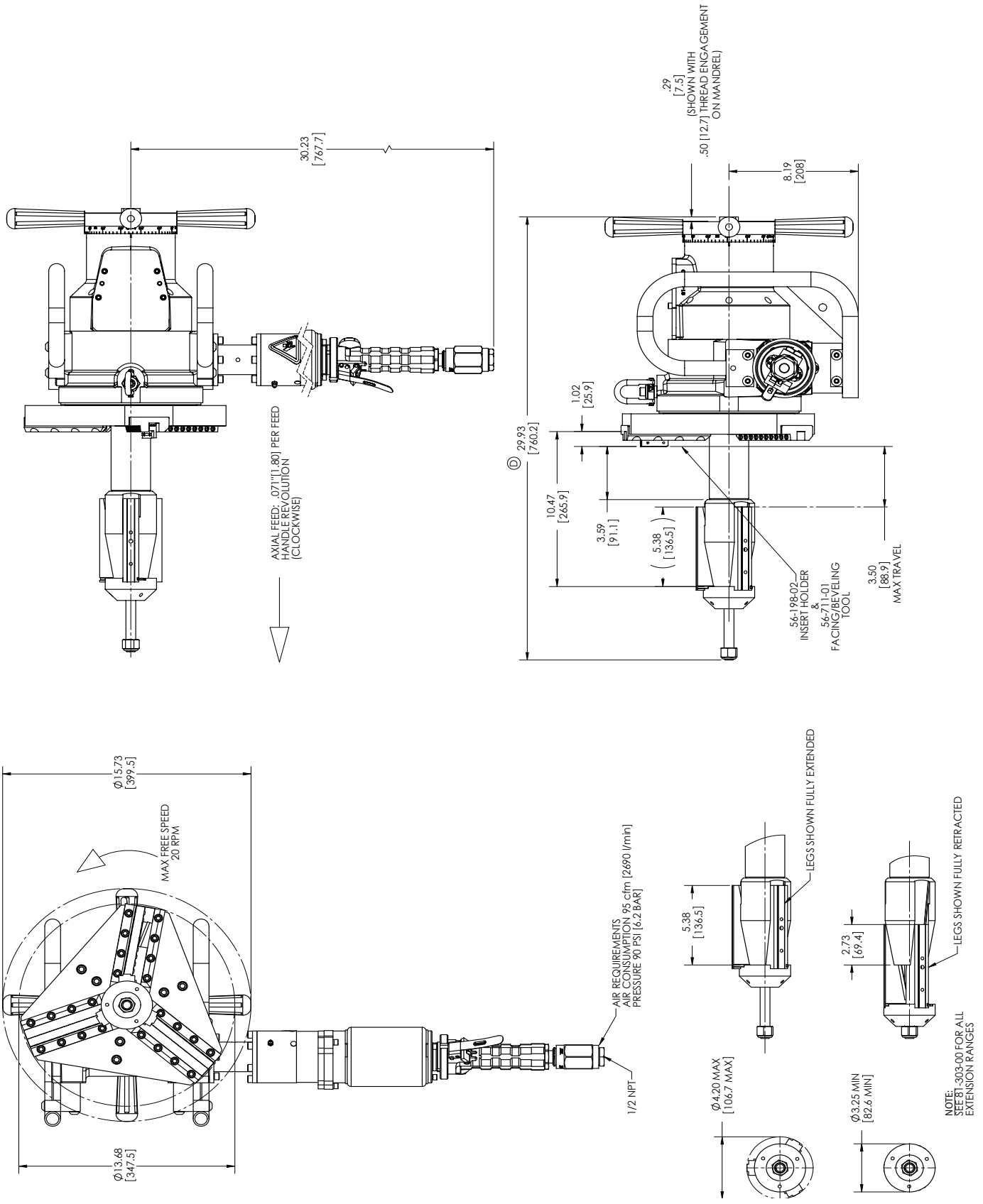
The drawings on the following pages illustrate the operating envelope for all configurations of the EP 424:

- Standard machine with air drive (81-000-01)
- Standard machine with hydraulic drive (81-000-02)
- Single-point machine with air drive (81-000-03)
- Single-point machine with hydraulic drive (81-000-04).

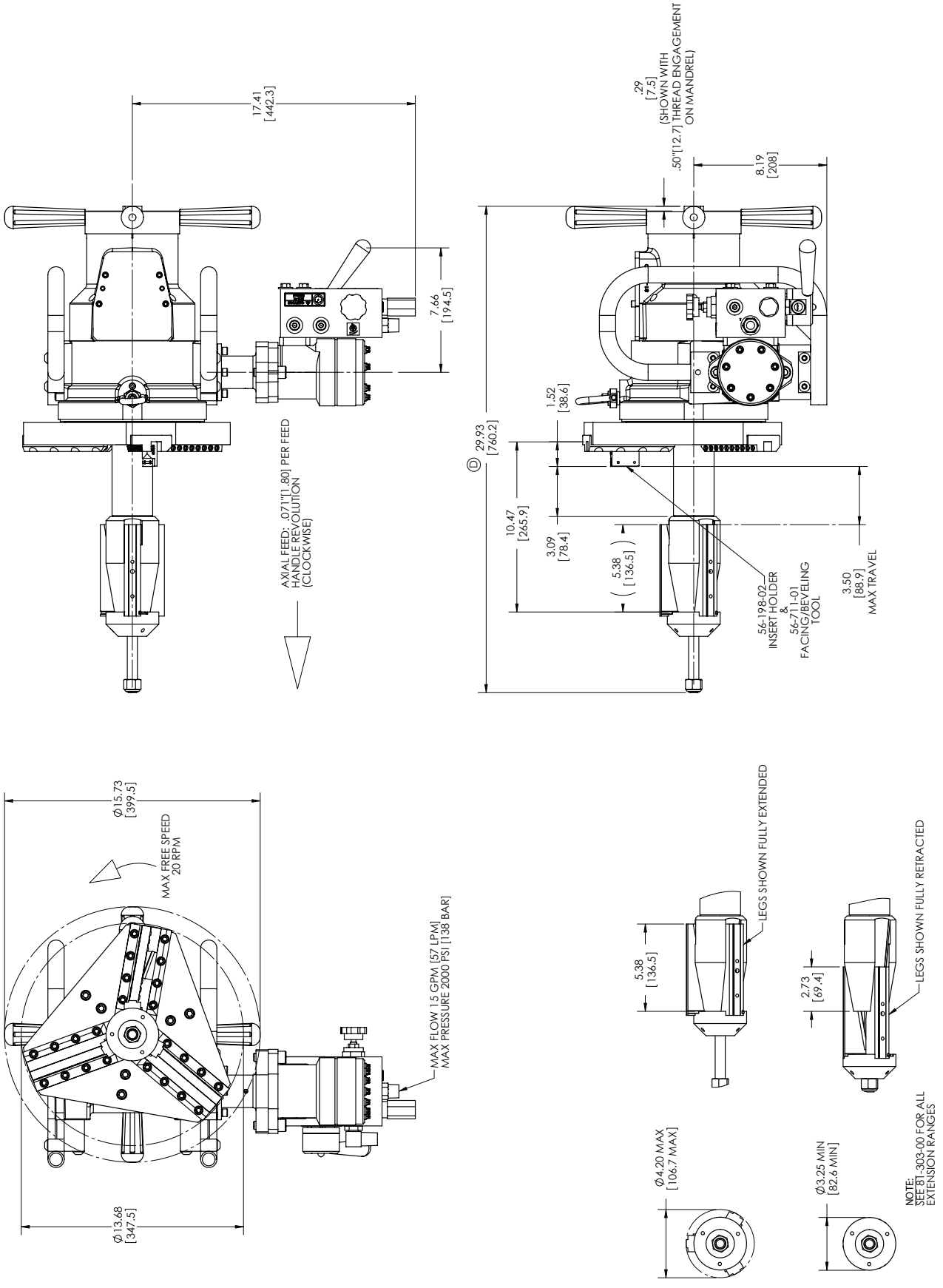
There are also dimensional drawings for the following components:

- Standard mandrel with extension legs
- Form tool rotating head
- Independent chuck mandrel with extension legs
- Single-point slide.

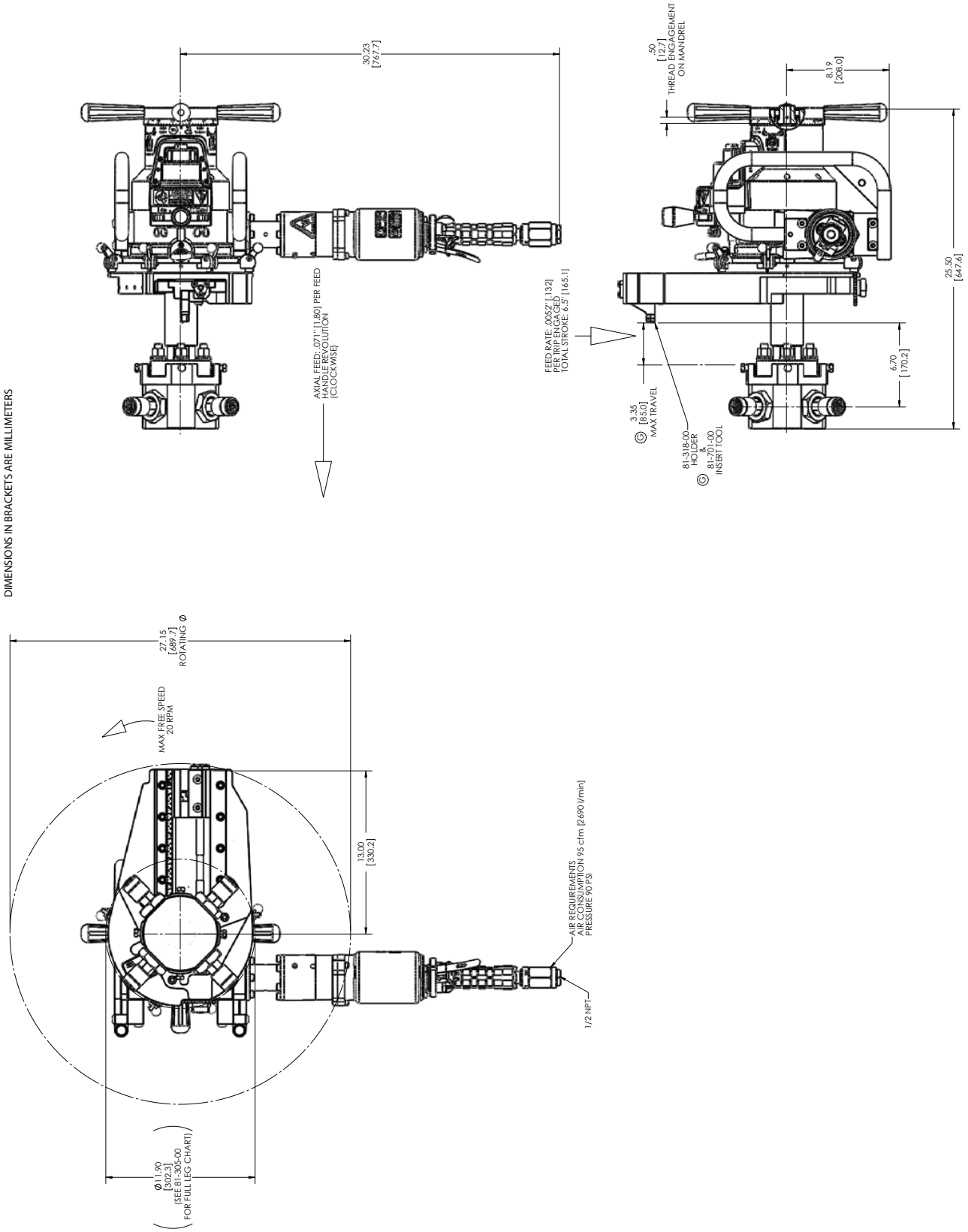
Standard Configuration with Air Drive (81-000-01)



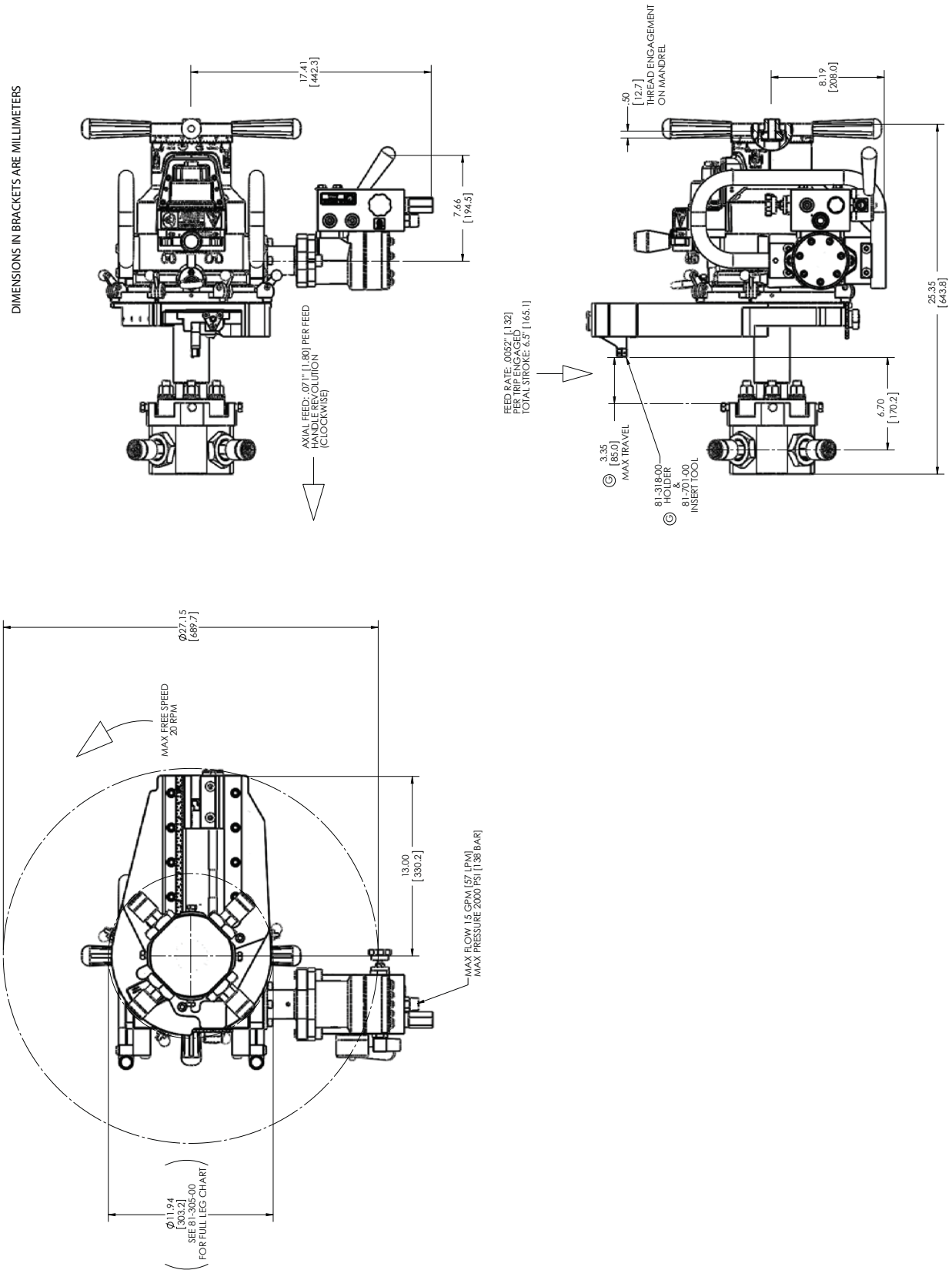
Standard Config. with Hydraulic Drive (81-000-02)



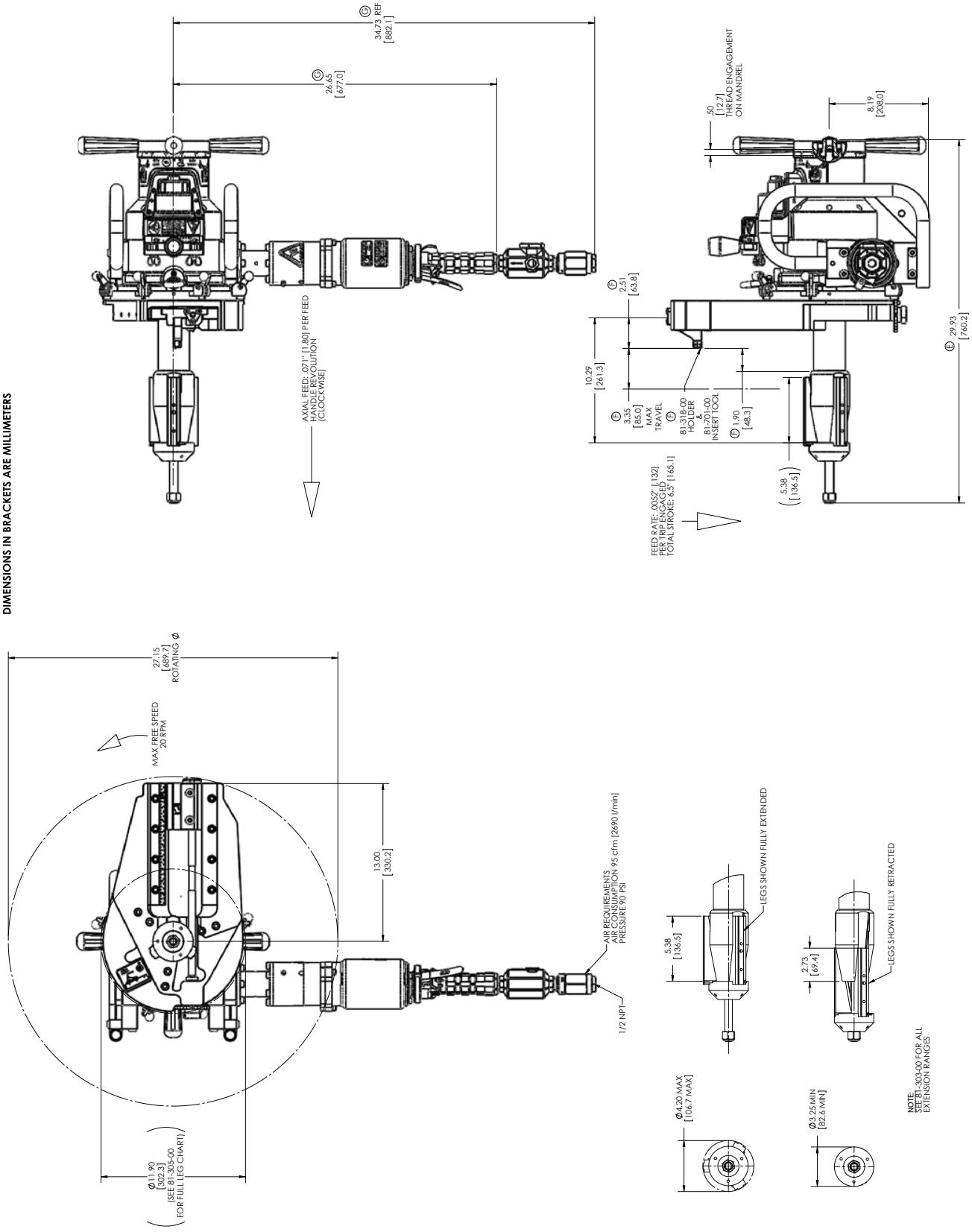
Single-Point Configuration with Air Drive (81-000-03)



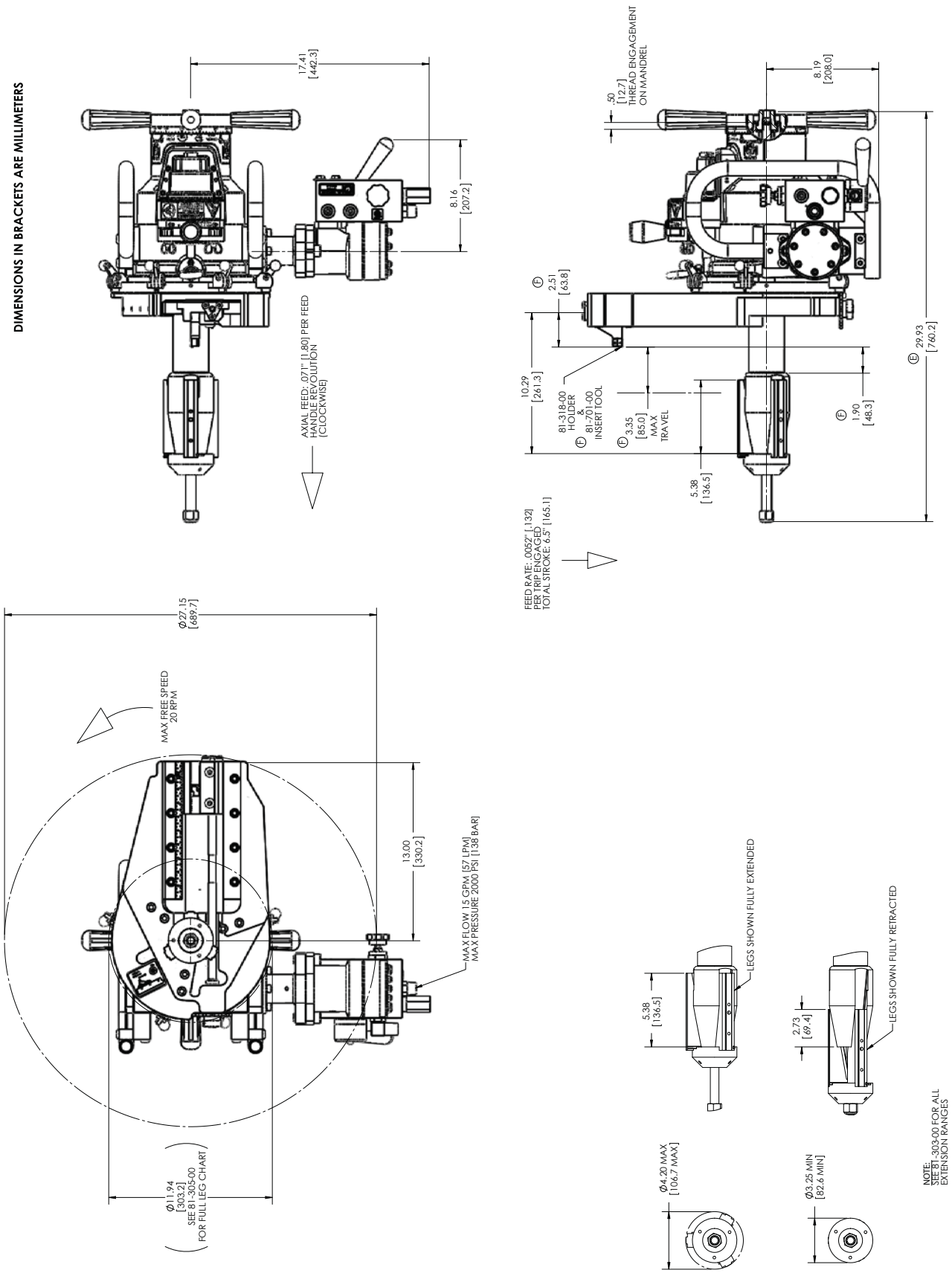
Single-Point Config. with Hydraulic Drive (81-000-04)



Single-Point with Speed Prep, Air Drive (81-000-05)

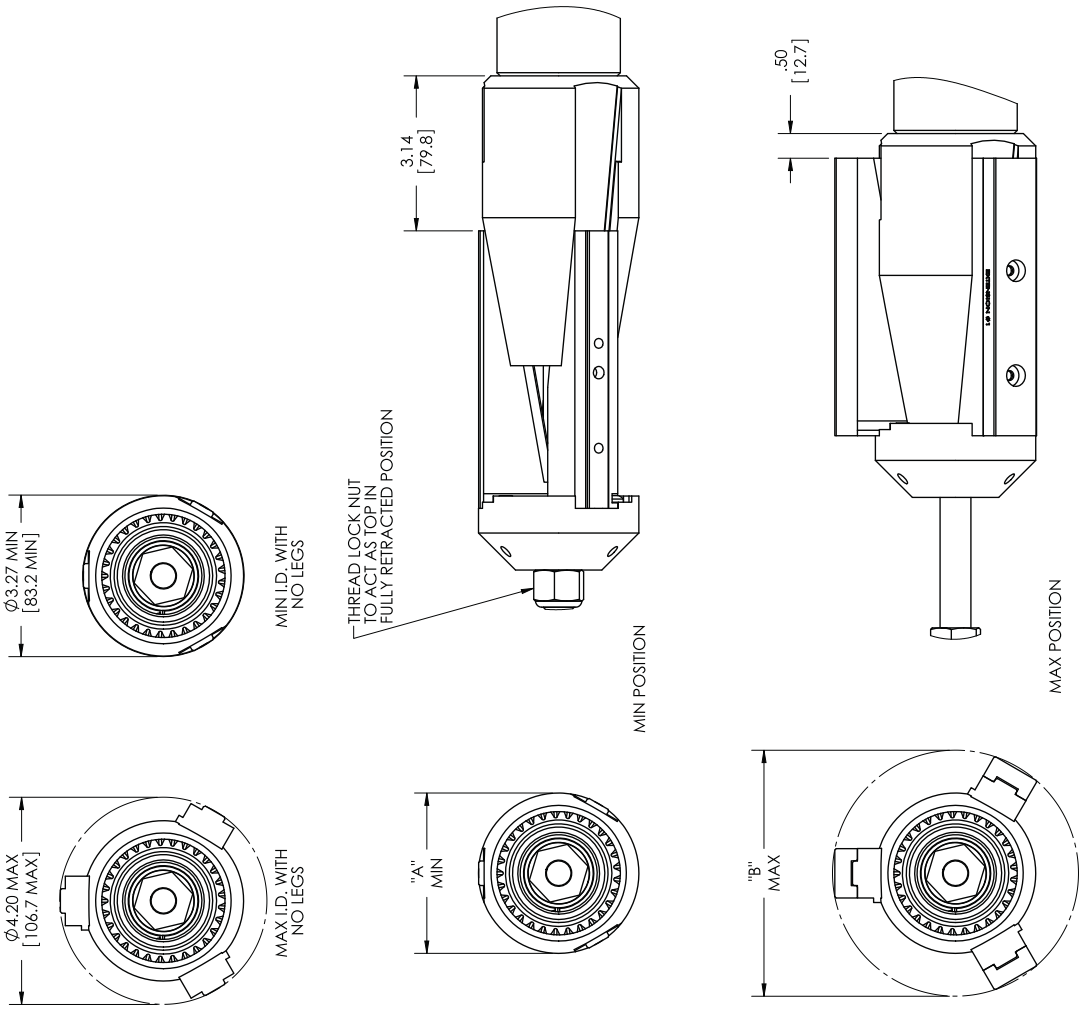


Single-Point with Speed Prep, Hyd. Drive (81-000-06)

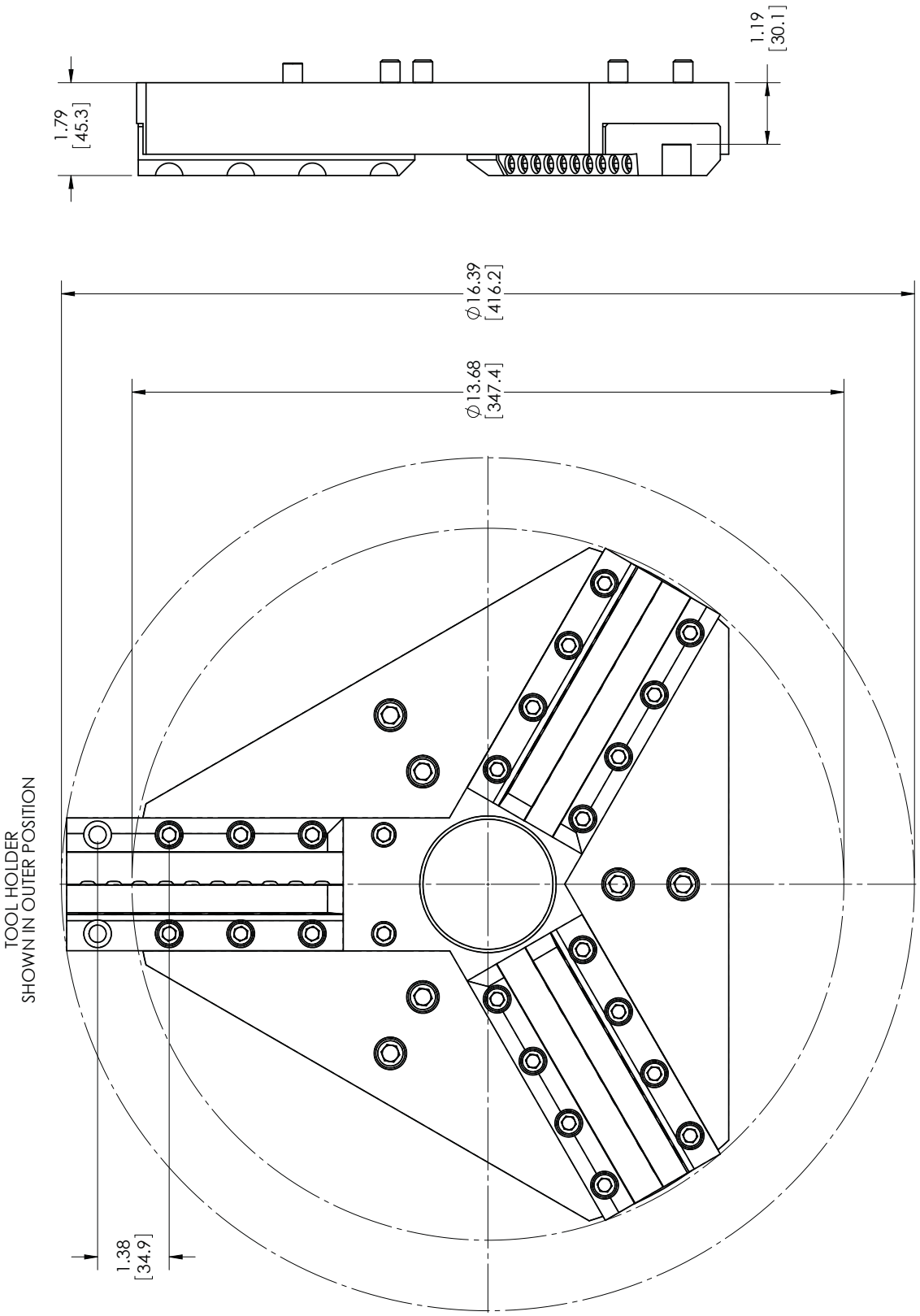


Standard Mandrel Dimensions/Leg Chart (81-303-00)

LEG SET #	ID RANGE						EXTENSION NUMBER
	DIM "A"		DIM "B"	DIM "A"		DIM"B"	
	INCHES			MM			
	3.27	- 4.20		83.06	- 106.68		NONE
1	4.07	- 4.99		103.38	- 126.75		#1
2	4.86	- 5.79		123.44	- 147.07		#2
3	5.64	- 6.56		143.26	- 166.62		#3 & #1
4	6.46	- 7.39		164.08	- 187.71		#3 & #2
5	7.22	- 8.15		183.39	- 207.01		#3, #2 & #1
6	7.94	- 8.87		201.68	- 225.30		#4 & #1
7	8.77	- 9.71		222.76	- 246.63		#4 & #2
8	9.53	- 10.46		242.06	- 265.68		#4, #3 & #1
9	10.24	- 11.18		260.10	- 283.97		#5 & #1
10	11.09	- 12.02		281.69	- 305.31		#5 & #2
11	11.84	- 12.77		300.74	- 324.36		#5, #3 & #1
12	12.69	- 13.62		322.33	- 345.95		#5, #3 & #2
13	12.58	- 13.51		319.53	- 343.15		#6 & #1
14	13.43	- 14.36		341.12	- 364.74		#6 & #2
15	14.17	- 15.11		359.92	- 383.79		#6, #3 & #1
16	15.03	- 15.96		381.76	- 405.38		#6, #3 & #2
LEG SET #17 THRU #28 PART OF 81-303-01 EXTENDED LEG KIT							
17	14.87	- 15.80		377.70	- 401.32		#7 & #1
18	15.73	- 16.66		399.54	- 423.16		#7 & #2
19	16.47	- 17.40		418.34	- 441.96		#7, #3 & #1
20	17.33	- 18.26		440.18	- 463.80		#7, #3 & #2
21	17.19	- 18.12		436.63	- 460.25		#8 & #1
22	18.05	- 18.98		458.47	- 482.09		#8 & #2
23	18.78	- 19.72		477.01	- 500.89		#8, #3 & #1
24	19.65	- 20.58		499.11	- 522.73		#8, #3 & #2
25	20.38	- 21.32		517.65	- 541.53		#8, #3, #2 & #1
26	21.10	- 22.04		535.94	- 559.82		#8, #4 & #1
27	21.97	- 22.90		558.04	- 581.66		#8, #4 & #2
28	22.70	- 23.64		576.58	- 600.46		#8, #4, #3 & #1

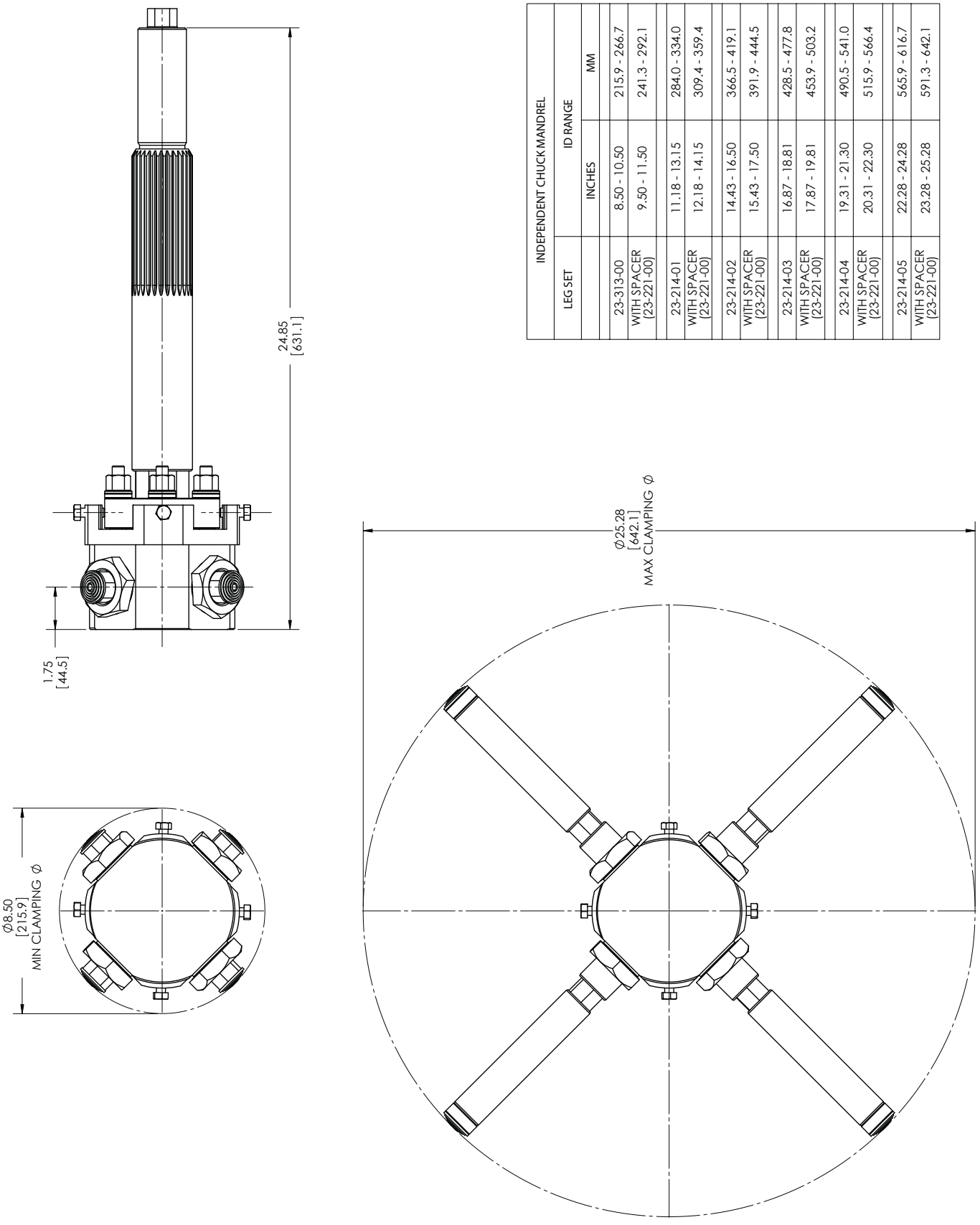


Rotating Head Assembly (81-304-00)

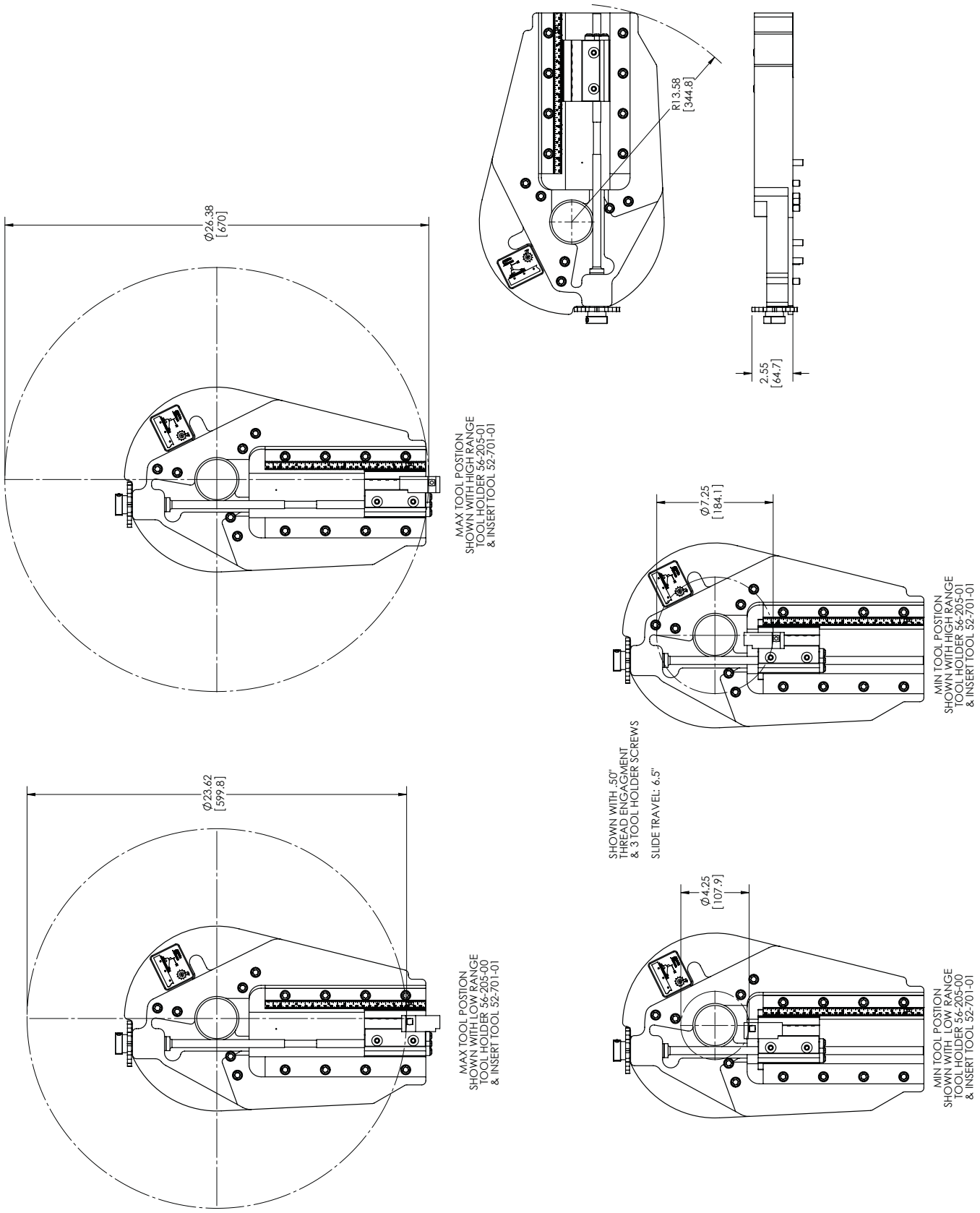


Independent Chuck Dims/Leg Chart (81-305-00)

INDEPENDENT CHUCK MANDREL		
LEG SET	ID RANGE	
	INCHES	MM
23-313-00	8.50 - 10.50	215.9 - 266.7
WITH SPACER (23-221-00)	9.50 - 11.50	241.3 - 292.1
23-214-01	11.18 - 13.15	284.0 - 334.0
WITH SPACER (23-221-00)	12.18 - 14.15	309.4 - 359.4
23-214-02	14.43 - 16.50	366.5 - 419.1
WITH SPACER (23-221-00)	15.43 - 17.50	391.9 - 444.5
23-214-03	16.87 - 18.81	428.5 - 477.8
WITH SPACER (23-221-00)	17.87 - 19.81	453.9 - 503.2
23-214-04	19.31 - 21.30	490.5 - 541.0
WITH SPACER (23-221-00)	20.31 - 22.30	515.9 - 566.4
23-214-05	22.28 - 24.28	565.9 - 616.7
WITH SPACER (23-221-00)	23.28 - 25.28	591.3 - 642.1



Single-Point Slide (81-306-00)



Chapter 4

Assembly, Disassembly, and Storage

PACKAGING

The EP 424 comes in a customized steel shipping/storage case. The case includes compartments for all standard and optional components, and is designed to hold all components securely to prevent damage in shipping.

Store the machine in its case at all times when it is not in use. Figure 4-1 shows the layout of the components in the case. There are lockdown pins for securing the EP 424 machine, as shown in Figure 4-2.

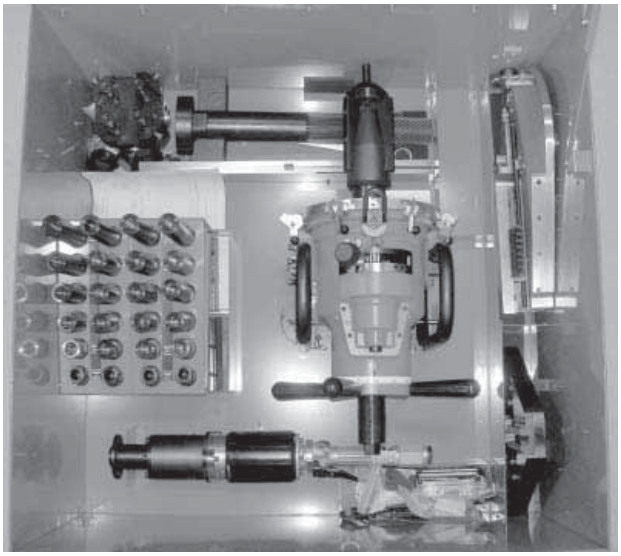


Figure 4-1. The photo shows the EP 424 in its case.

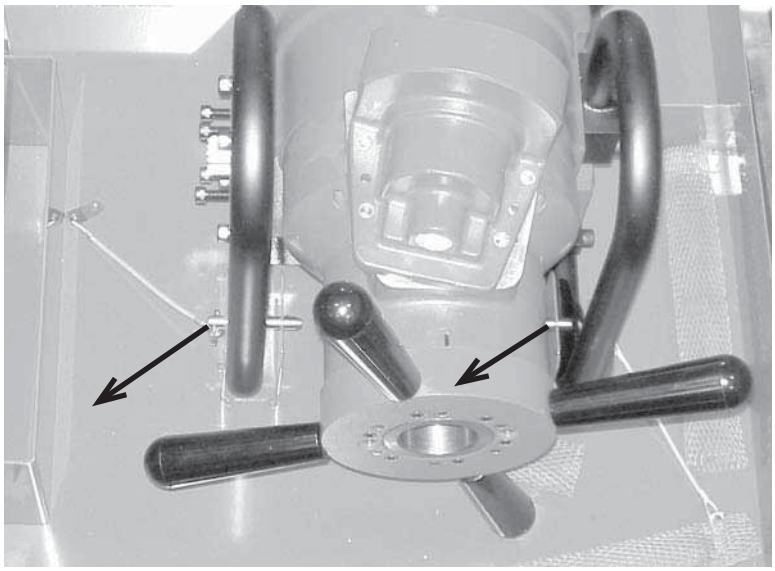


Figure 4-2. Two lockdown pins are provided to secure the machine in the storage case. Always insert the pins through the case brackets and the EP 424 handle when storing the machine.

Storage Checklist

Before storing the EP 424, perform the following maintenance steps. If you are using the machine in an especially dirty or corrosive environment, perform these steps frequently.

- Clean the machine by wiping off dirt, debris, and accumulated oil or grease.
- Put oil in the air motor oiler, and operate the motor for a few seconds to lubricate its internal components.
- Lubricate the machine according to the instructions in Chapter 6.
- Spray or wipe a light coating of anti-corrosion lubricant on non-finished, non-painted surfaces.
- Put the machine in its storage case, with all components stored in their compartments.
- If possible, keep the storage case indoors and away from moisture.
- If you will be storing the machine longer than 30 days, put desiccant packets in the case to prevent corrosion.

Chapter 5
Operating Instructions

Mounting the Mandrel on the Pipe

Typically, you will install the mandrel (either the standard or independent chuck mandrel) in the pipe before mounting the EP 424 machine. This makes it easier to align the mandrel and mount the machine.

The standard mandrel is recommended when it can be used on the pipe. It is self-centering, and is quicker and easier to mount than the independent chuck mandrel. The standard mandrel can be mounted in pipes with an I.D. range from 3.27” to 23.64” (83.1 to 600.5 mm).

The workpiece may not be suitable for the standard mandrel, such as in the following situations:

- the I.D. of the pipe is uneven or eroded
- the end of the pipe is on a bend
- the end surface of the pipe is not square
- you need to center the operation on the O.D. of the pipe.

In these cases, you will need to use the independent chuck mandrel. You can use the independent chuck mandrel for either form tool or single-point operation. The independent chuck mandrel can be mounted in pipes with an I.D. range from 8.50” to 25.28” (215.9 to 642.1 mm).

Mounting the Universal (Standard) Mandrel

1. Measure the I.D. of the pipe.

Figure 5-1. Measure the I.D. of the pipe to determine which leg set will be required.

NOTE

If the pipe I.D. is larger than 15.96” (405.4 mm), you will need the extended leg kit.

2. Refer to the clamp leg chart in Table 1 to select the correct combination of clamp legs. Find the I.D. you measured (inches or mm) in the appropriate column on the left, then select the leg extensions listed in the column on the right.

NOTE

See the envelope drawings in Chapter 3 for an illustration of the clamp leg configurations.

Table 1: Standard Mandrel Clamping Leg Chart

I.D. Inches		I.D. mm		Leg Extensions Used
Min	Max	Min	Max	
3.27	4.20	83.1	106.7	None
4.07	4.99	103.4	126.8	#1
4.86	5.79	123.4	147.1	#2
5.64	6.56	143.3	166.6	#3 & #1
6.46	7.39	164.1	187.7	#3 & #2
7.22	8.15	183.4	207.1	#3, #2, & #1
7.94	8.87	201.7	225.3	#4 & #1
8.77	9.71	222.8	246.6	#4 & #2
9.53	10.46	242.1	265.7	#4, #3, & #1
10.24	11.18	260.1	284.0	#5 & #1
11.09	12.02	281.7	305.3	#5 & #2
11.84	12.77	300.7	324.4	#5, #3, & #1
12.69	13.62	322.3	346.0	#5, #3, & #2
12.58	13.51	319.5	343.2	#6 & #1
13.43	14.36	341.1	364.7	#6 & #2
14.17	15.11	359.9	383.8	#6, #3, & #1
15.03	15.96	381.8	405.4	#6, #3, & #2
With 81-303-01 Extended Leg Kit				
14.87	15.80	377.7	401.3	#7 & #1
15.73	16.66	399.5	423.2	#7 & #2
16.47	17.40	418.3	442.0	#7, #3, & #1
17.33	18.26	440.2	463.8	#7, #3, & #2
17.19	18.12	436.6	460.3	#8 & #1
18.05	18.98	458.5	482.1	#8 & #2
18.78	19.72	477.0	500.9	#8, #3, & #1
19.65	20.58	499.1	522.7	#8, #3, & #2
20.38	21.32	517.7	541.5	#8, #3, #2, & #1
21.10	22.04	535.9	559.8	#8, #4, & #1
21.97	22.90	558.0	581.7	#8, #4, & #2
22.70	23.64	576.6	600.5	#8, #4, #3, & #1

3. Using a 3/16” hex wrench, attach the clamping legs to the mandrel chuck legs with the captivated screws. If you are using more than one leg set, install the largest leg first, then “stack” them in size order. Make sure the legs seat squarely, then securely tighten the screws.

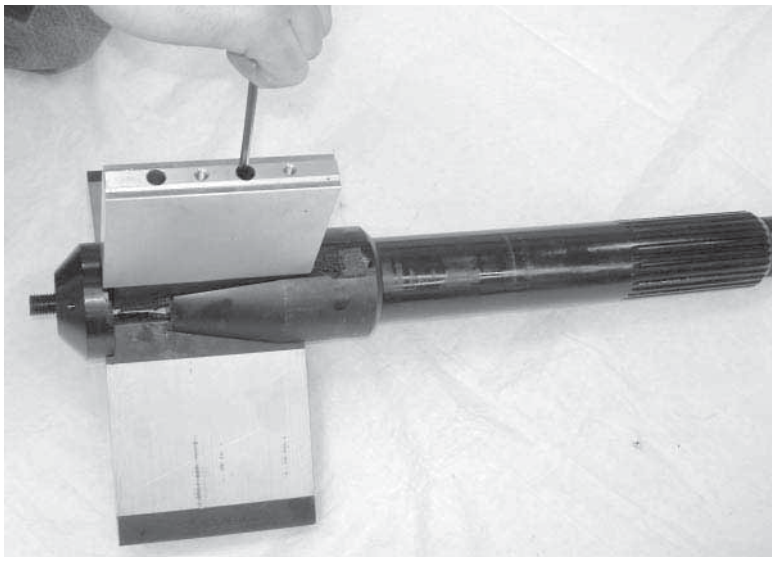


Figure 5-2. Screw the captivated screws into the mandrel to secure the legs.

NOTE

Extension leg #1 does not have threaded holes to install other legs on top of it.

4. Always install extension leg #1 or #2 last, on top of the others. These legs are steel for greater durability.

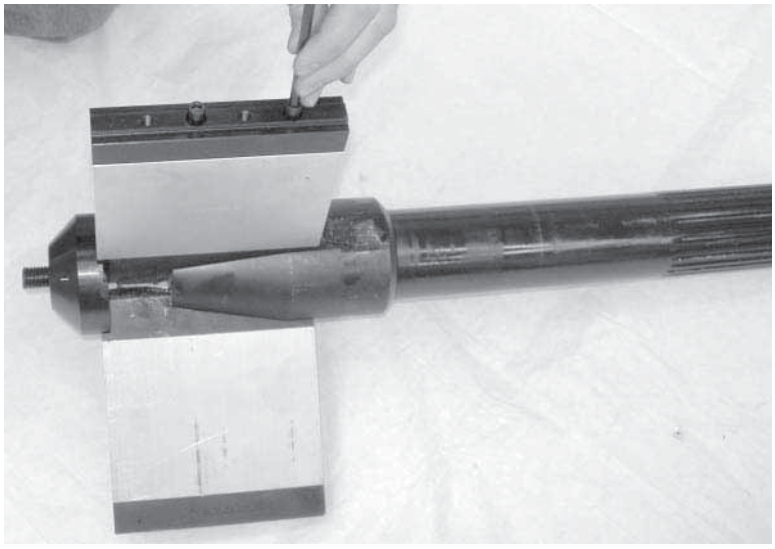


Figure 5-3. Use the steel extension legs (#1 or #2) on top when installing multiple legs.

5. Using a 1-1/16” wrench or socket, turn the drawbar nut counter-clockwise to retract the clamping legs.

NOTE

A socket wrench and 1-1/16” socket are provided with the EP 424.

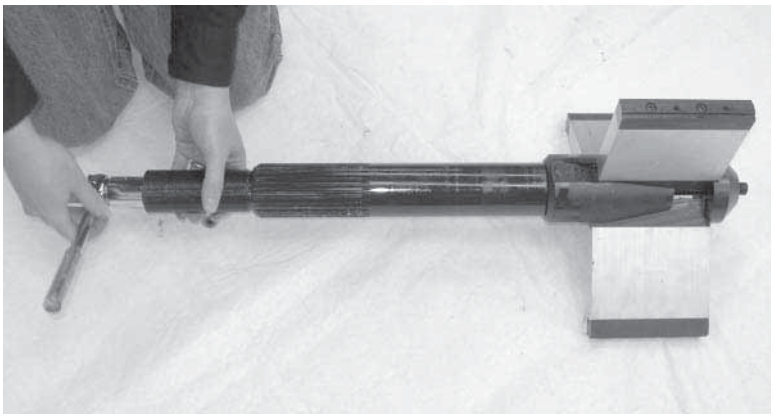


Figure 5-4. Turn the drawbar nut counter-clockwise to retract the clamping legs.

6. Insert the clamping legs into the I.D. of the pipe. Hold the mandrel so that the legs are far enough inside the end of the pipe to be out of the way of the machining operation.

NOTE

For stability, the clamp legs should be as close as possible to the end of the pipe. However, make sure they are far enough into the pipe to avoid being damaged during the operation. **This is especially critical if you are counterboring.**

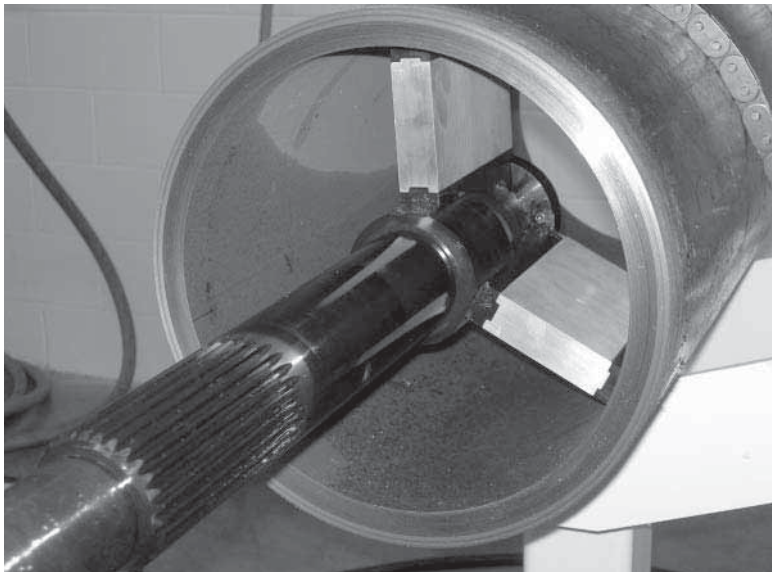


Figure 5-5. Insert the clamping legs into the pipe.

7. Turn the drawbar nut clockwise to clamp the legs inside the pipe until they are snug enough to hold the mandrel.

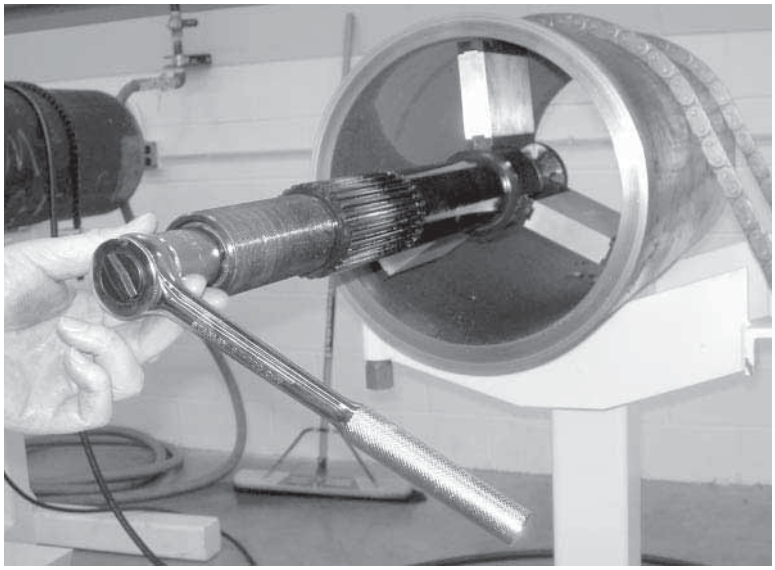


Figure 5-6. Turn the drawbar nut clockwise until the clamping legs are snug in the I.D. of the pipe.

8. Check that the legs are square on the pipe I.D., and are far enough from the pipe end for the operation.

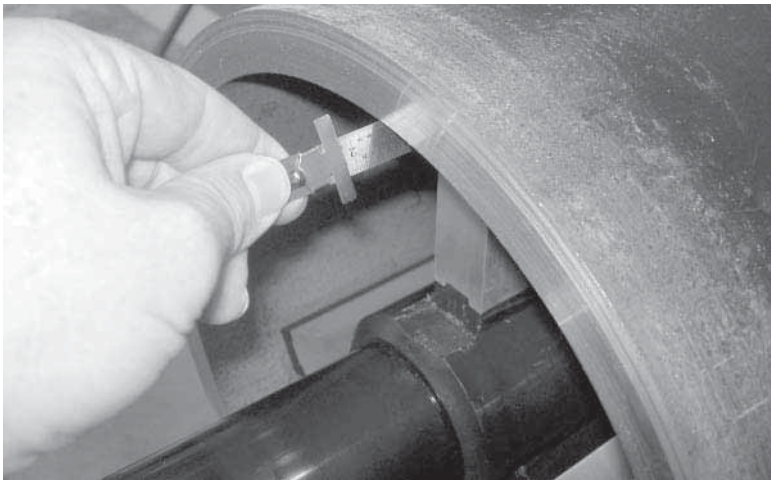


Figure 5-7. Measure the distance from the pipe end to the clamping legs to make sure there is enough clearance for the operation.

9. If necessary, adjust the position of the clamping legs. Then turn the drawbar nut clockwise to clamp the legs securely in the pipe.

Mounting the Independent Chuck Mandrel

Start with the chuck body separated from the mandrel.

1. Measure the I.D. of the pipe.

Figure 5-8. Measure the I.D. of the pipe to determine which leg set will be required.

2. Refer to the clamp leg chart in Table 2 to select the correct clamp legs. Find the I.D. you measured (inches or mm) in the appropriate column on the left, then select the leg set listed in the column on the right.

NOTE

See the envelope drawings in Chapter 3 for an illustration of the clamp leg configurations.

Table 2: Independent Chuck Clamping Leg Chart

I.D. Inches		I.D. mm		Leg Set Used	Spacer (23-221-00) Used
Min	Max	Min	Max		
8.50	10.50	215.9	266.7	23-213-00	No
9.50	11.50	241.3	292.1	23-213-00	Yes
11.18	13.15	284.0	334.0	23-214-01	No
12.18	14.15	309.4	359.4	23-214-01	Yes
14.43	16.50	366.5	419.1	23-214-02	No
15.43	17.50	391.9	444.5	23-214-02	Yes
16.87	18.81	428.5	477.8	23-214-03	No
17.87	19.81	453.9	503.2	23-214-03	Yes
19.31	21.30	490.5	541.0	23-214-04	No
20.31	22.30	515.9	566.4	23-214-04	Yes
22.28	24.28	565.9	616.7	23-214-05	No
23.28	25.28	591.3	642.1	23-214-05	Yes

3. Screw the 4 chuck legs into the chuck body. Leave about 1/2" of threads exposed for the jam nut.

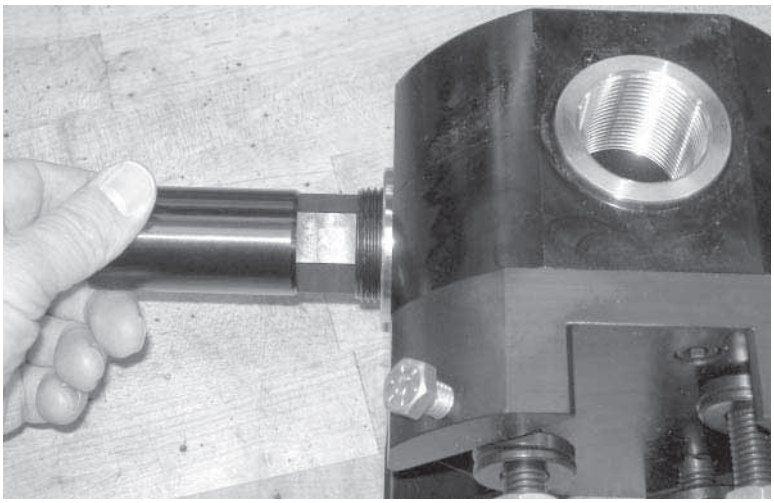


Figure 5-9. Screw the chuck legs into the chuck.

4. Put a jam nut over each leg, with the "shoulder" side of it toward the chuck body. Thread it a few turns onto the chuck leg.

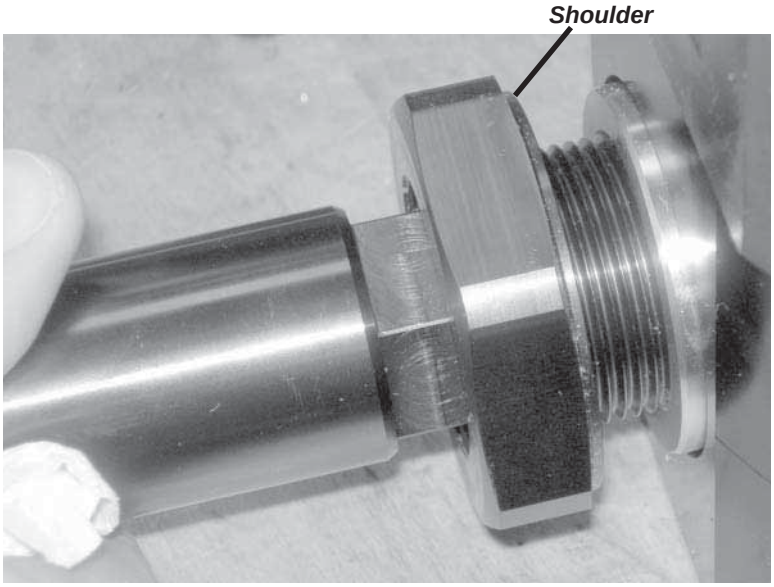


Figure 5-10. Put on the jam nut as shown, with the shoulder of the nut toward the chuck.

5. If chuck leg spacers (23-221-00) are required, install a spacer over each of the 4 independent chuck buttons.

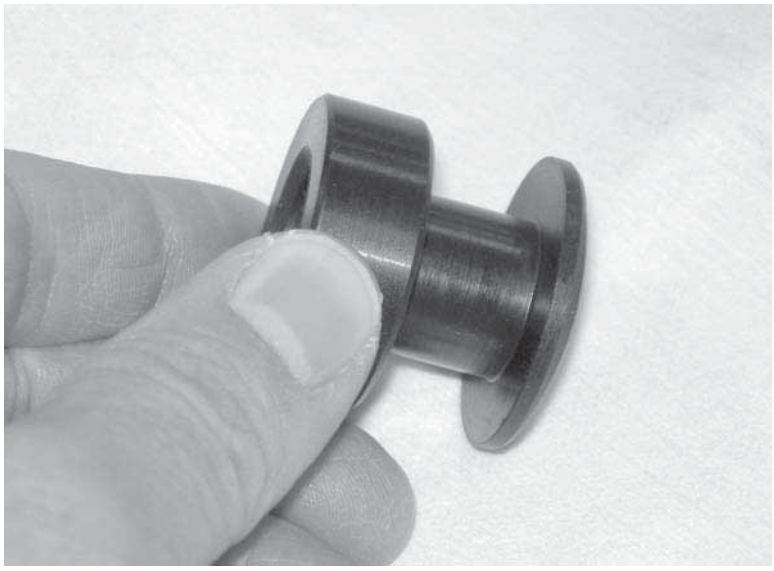


Figure 5-11. If required, put a chuck leg spacer on each chuck button end.

6. Insert a button into the end of each chuck leg. The buttons are fitted with o-rings to hold them in the leg.

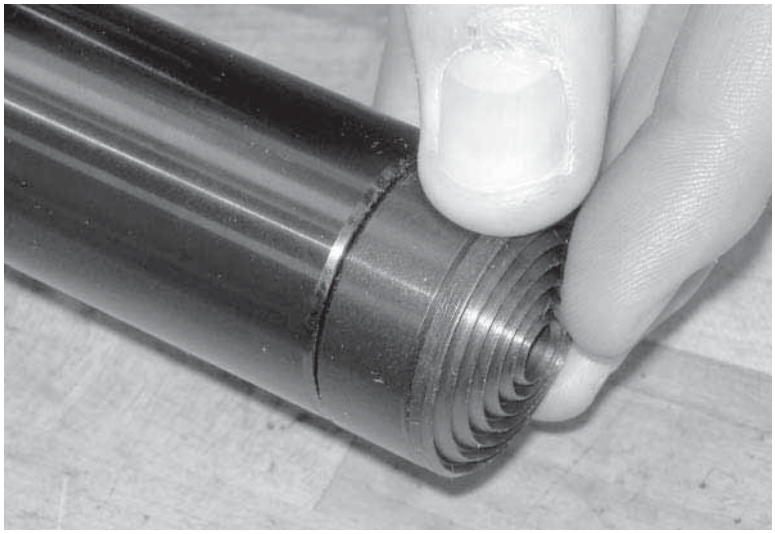


Figure 5-12. Put buttons on the end of each chuck leg.

7. Place the chuck body inside the I.D. of the pipe and screw the legs out to snug them against the I.D.

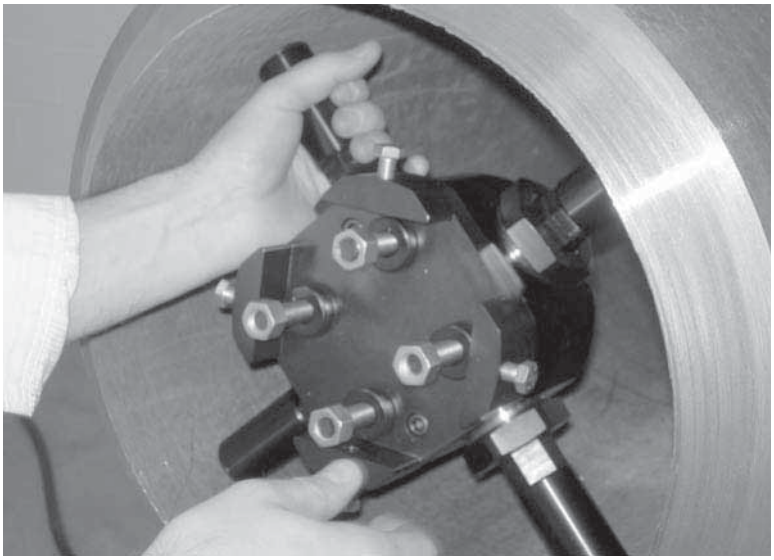


Figure 5-13. Screw the legs out to snug the chuck inside the pipe.

8. Remove the nuts from the 4 threaded studs, and put the interlocking pieces of the alignment gauge over the studs with the scale sides facing you.

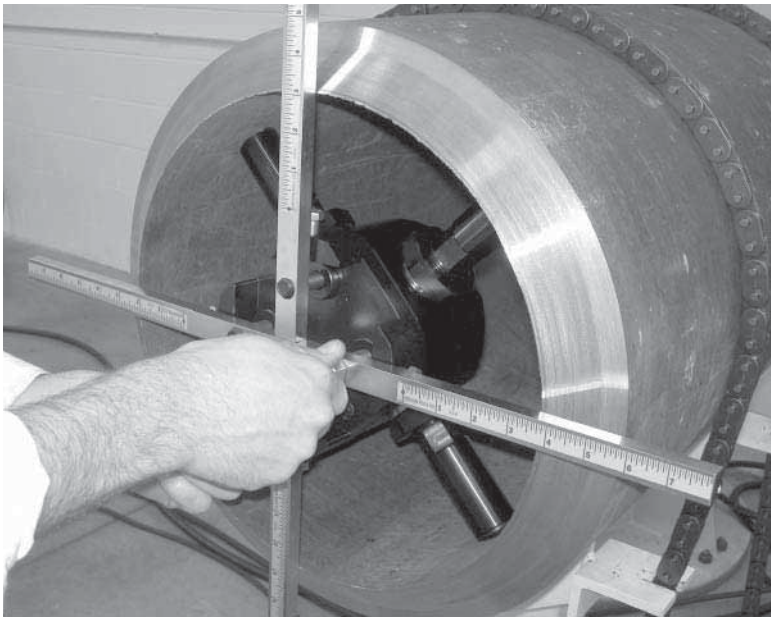


Figure 5-14. Mount the alignment gauge to the studs in the chuck.

9. Screw the nuts onto the studs to secure the alignment gauge. The gauge pieces should be tight against the face plate. You may have to move the chuck out to tighten the gauge against the face plate.

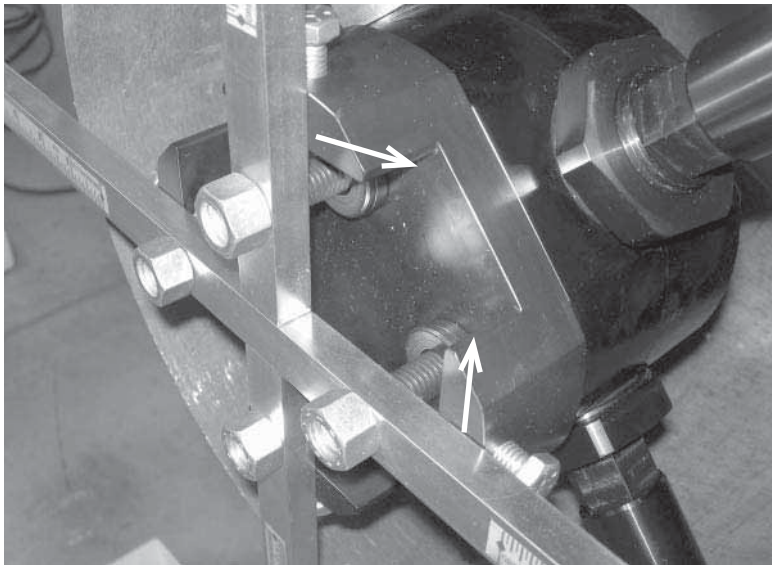


Figure 5-15. The alignment gauge must be flush against the face plate surface.

10. Loosen the clamp legs slightly, and push the chuck body into the pipe until all four ends of the alignment gauge are touching the end of the pipe. Re-tighten the legs to hold the chuck body in place.

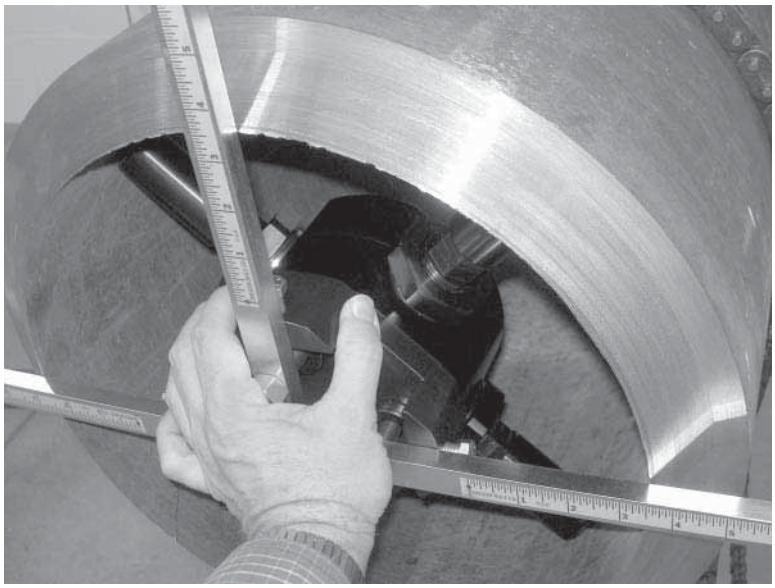


Figure 5-16. Push the chuck body into the pipe until all four arms of the alignment gauge are against the pipe surface.

NOTE

You will roughly center the chuck body in the pipe (to the precision of the alignment gauge scales). You will precisely center the mandrel later in this procedure.

11. To center the chuck body, refer to the scales on the alignment gauges. Using a 1-1/8” end wrench on the flats of the chuck legs, turn opposite legs in or out until the scale touches the pipe I.D. at the same distance on both sides.

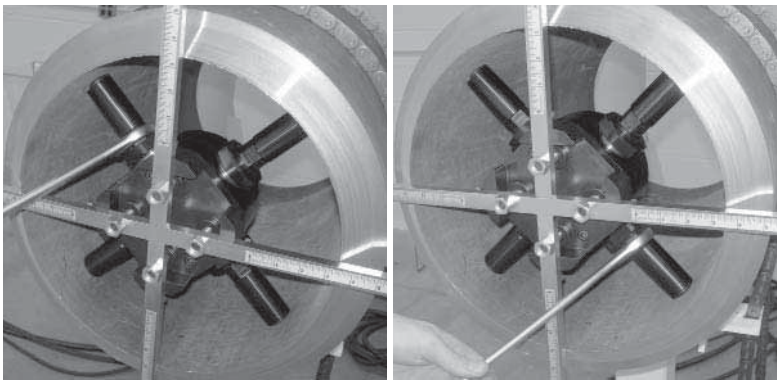


Figure 5-17. Alternately adjust opposite legs to center the chuck in the pipe.

12. When the chuck body is centered, use a 2-1/4” wrench to snug the jam nuts against the chuck body.

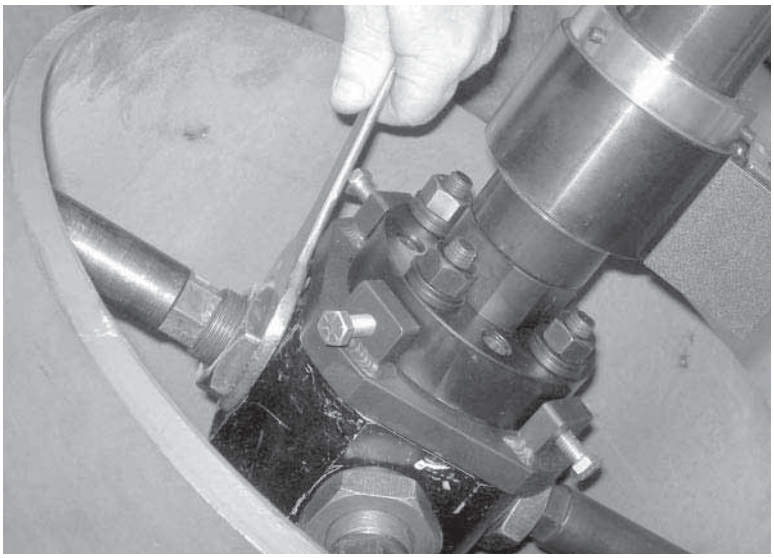


Figure 5-18. When the chuck is rough centered, snug the jam nuts to hold the clamping legs in place.

13. Remove the alignment gauge from the studs. Make sure you have the nut and both washers removed from each stud.

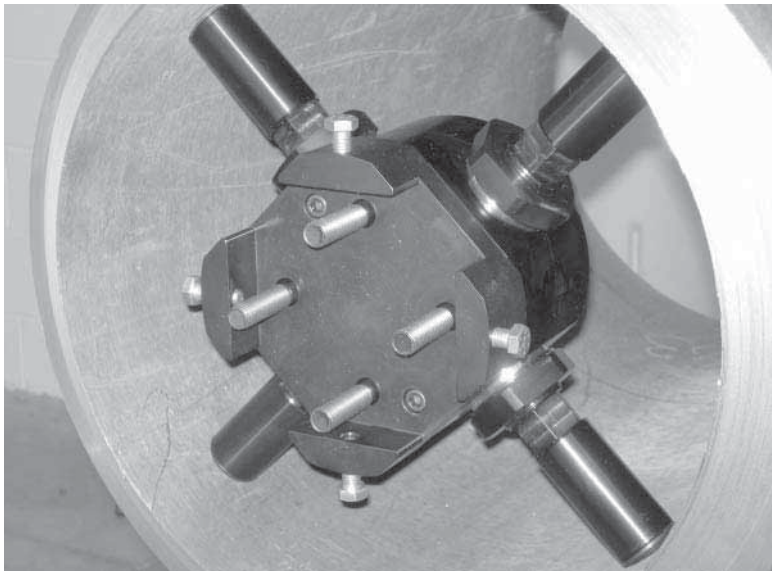


Figure 5-19. Remove the alignment gauge and the nuts and washers from the chuck studs.

14. Mount the mandrel onto the chuck.

NOTE

If the chuck does not need any further centering adjustment, install a spacer (23-203-00) over each stud before mounting the mandrel.

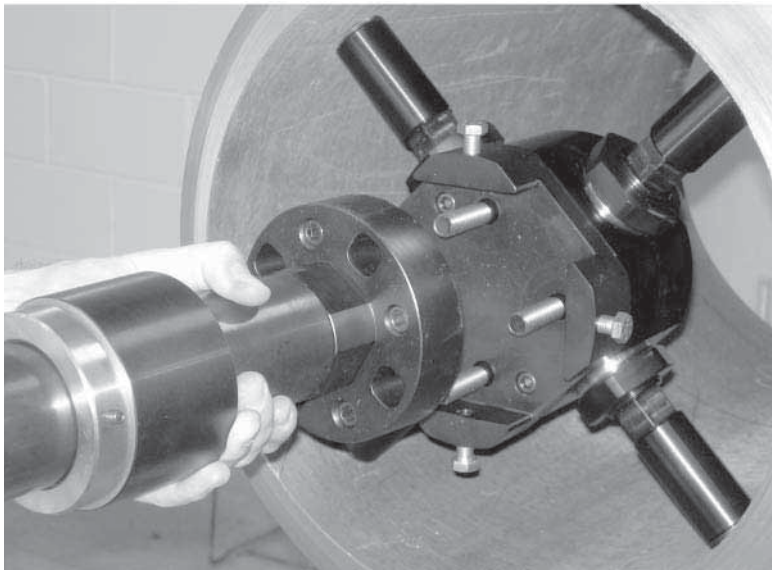


Figure 5-20. Mount the mandrel on the independent chuck.

15. Replace the 2 washers (female washer first) and the nut onto each stud to hold the mandrel in place. Snug the nuts to finger tightness.

16. Place the indicator mounting collar over the mandrel and slide it close to the pipe.

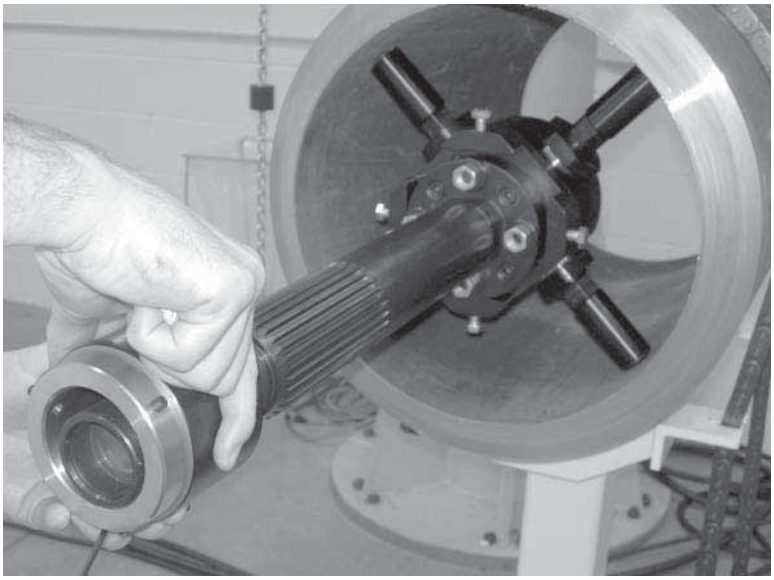


Figure 5-21. Slide the indicator collar over the end of the mandrel.

17. Tighten the set screws in the indicator collar to hold it in place on the mandrel.

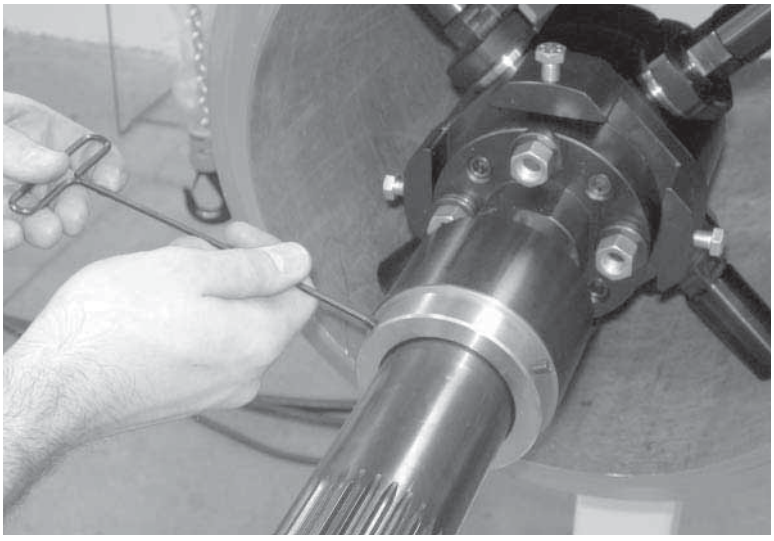


Figure 5-22. Position the collar near the pipe surface and tighten the set screws to hold it in place.

18. Assemble the indicator and set the magnetic mount onto the indicator mounting collar. Turn the magnet on to hold the indicator in place.

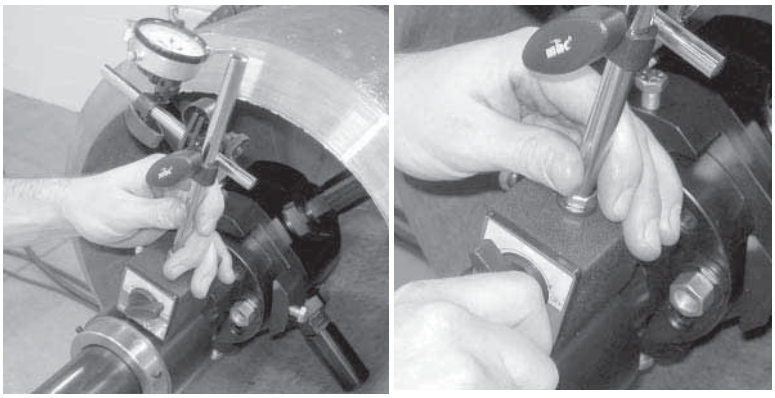


Figure 5-23. Set the magnetic base of the indicator on the collar, and turn the switch on to engage the magnet.

19. Position the tip of the indicator to touch the pipe surface. You can indicate on either the O.D. or the I.D. of the pipe, depending on where the operation needs to be centered.

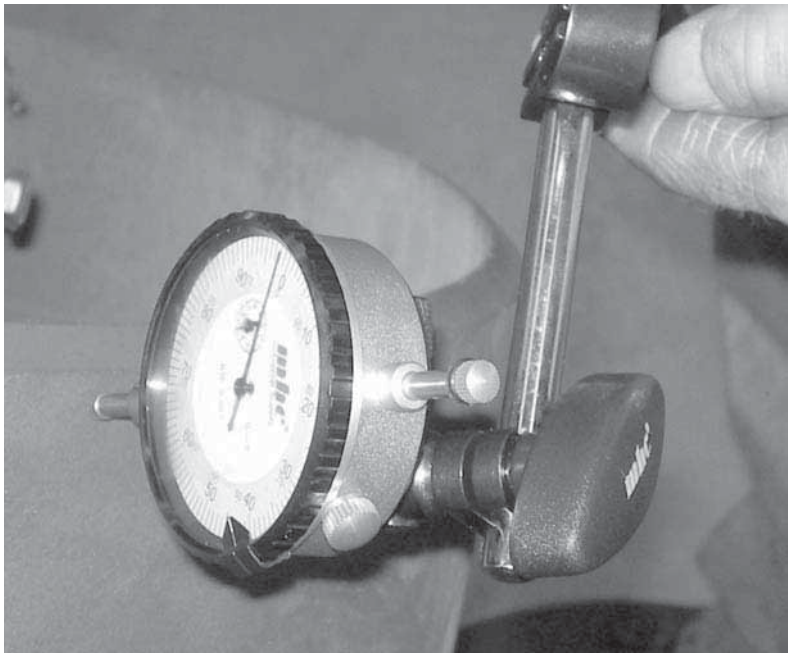


Figure 5-24. Set the tip of the indicator to touch the pipe, perpendicular to the surface.

20. Move the indicator around the pipe end by rotating the mounting collar. Check the reading on the indicator dial to measure how far the mandrel is off center.

NOTE

Do not adjust the mandrel centering screws if stud spacers (23-203-00) are installed. The mandrel position cannot be adjusted with the spacers.

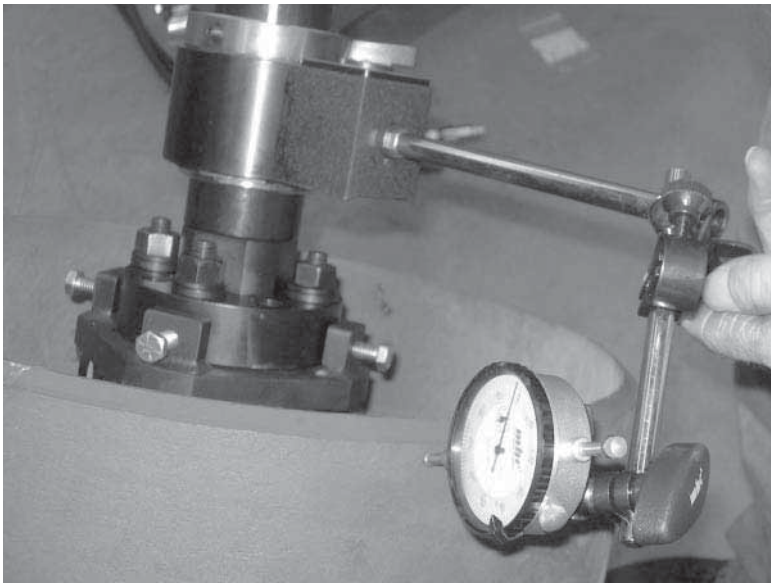


Figure 5-25. Sweep the indicator around the pipe surface to check centering of the mandrel. You can center on either the O.D. or the I.D. of the pipe, as required for the operation.

21. To center the mandrel, adjust the mandrel centering screws in the face plate.

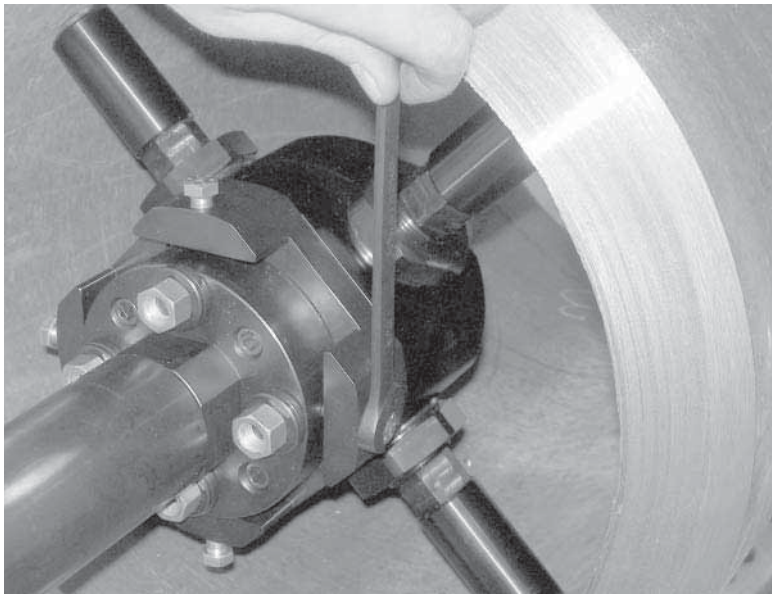


Figure 5-26. Turn the mandrel centering screws to adjust the position of the mandrel.

22. When you have the mandrel centered, tighten down the nuts on the mandrel mounting studs.

23. Remove the indicator and the indicator mounting collar.

Using the Drive Motors

Refer to the instructions in this section for the drive motor (air or hydraulic) provided with your EP 424 machine. The motors are installed and operated the same way for either form tool or single-point operation.

Mounting and Operating the Air Drive

1. To install the air motor, put the motor flange over the 4 motor mounting screws on the EP 424 motor adapter. You may have to rotate the motor slightly to engage the spline in the shaft.

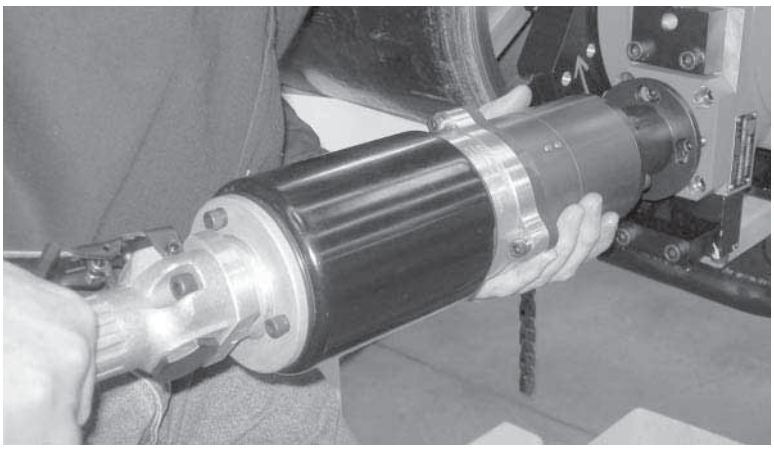


Figure 5-27. Put the air motor flange over the screws in the motor adapter.

2. Rotate the air motor to secure the screw heads in the slotted holes of the flange. Using a 1/4" hex wrench, tighten the screws securely.

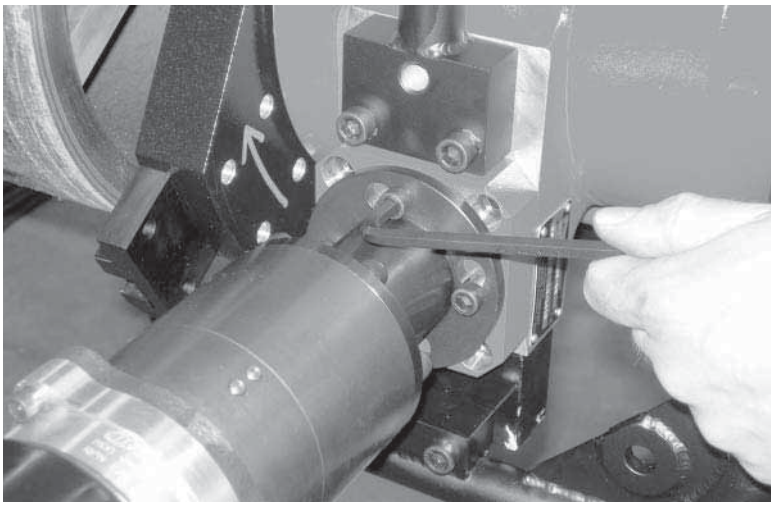


Figure 5-28. Turn the flange to seat the screws in the slots, then tighten the screws.

3. Make sure the air supply is turned off at the source. Connect the air line to the connector on the air motor.

4. Turn on the air supply at the source.

5. To operate the EP 424, squeeze the trigger on the air motor. The machine (form tool head or single-point slide) will start to rotate.

NOTE

The air supply must provide 95 cfm at 90 psi (2700 l/min at 6.2 bar).

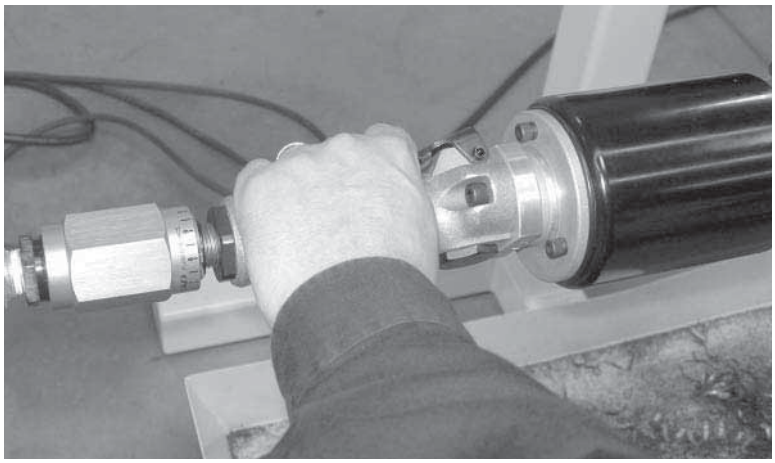


Figure 5-29. Squeeze the air motor trigger to start the machine.

6. Adjust the motor speed by turning the speed controller.

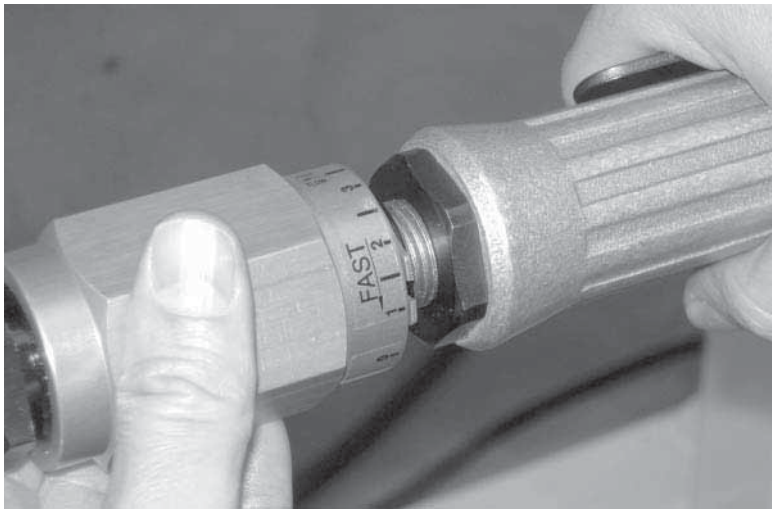


Figure 5-30. Turn the speed control collar to adjust the rotation speed of the machine.

7. While holding the air motor trigger, operate the machine as described in the appropriate section below (form tool or single-point operation).

8. As the machine cuts, adjust the air motor speed if necessary to reduce chatter and achieve the appropriate end prep finish.

9. When the prep is complete, release the air motor trigger to stop the machine.

NOTE

The use of coolant or cutting lubricant is recommended. This will improve the cutting performance and increase the life of the tooling.

Mounting and Operating the Hydraulic Drive

1. To install the hydraulic motor, put the motor flange over the 4 motor mounting screws on the EP 424 motor adapter. You may have to rotate the motor slightly to engage the spline in the shaft.

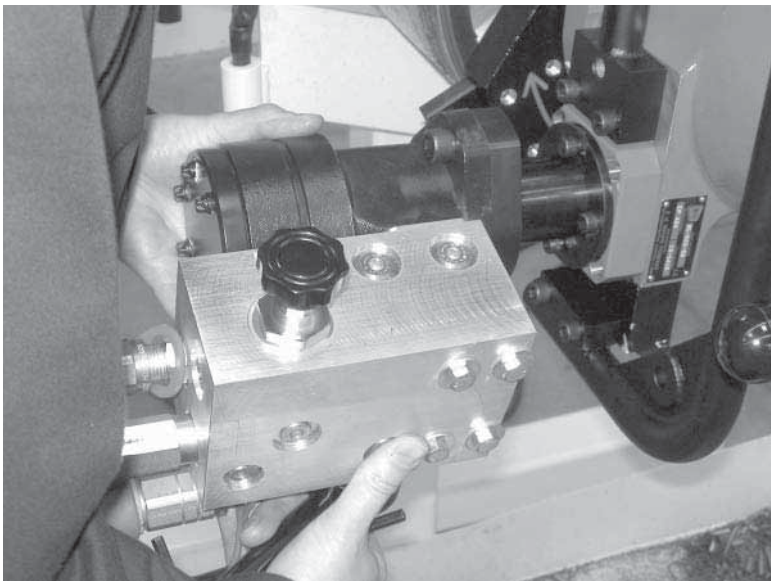


Figure 5-31. Mount the hydraulic motor flange onto the screws in the motor adapter.

2. Turn the flange to engage the screw heads in the slots, then tighten the screws using a 1/4" hex wrench.

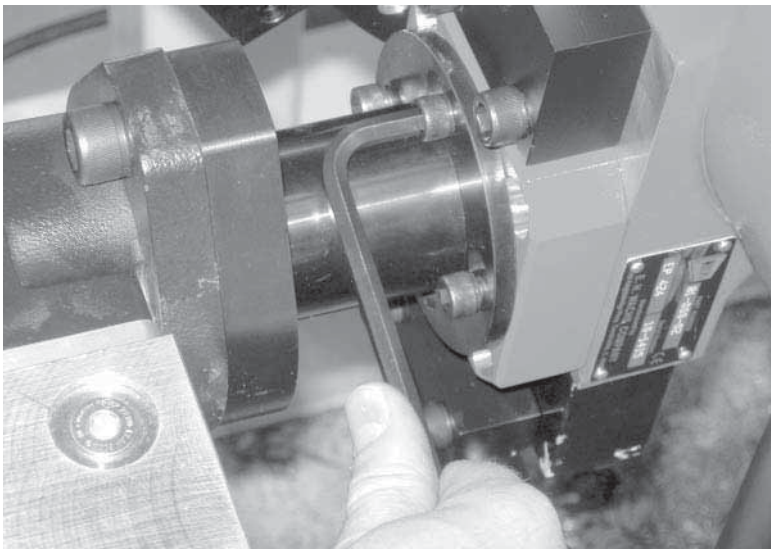


Figure 5-32. Turn the flange to seat the screws in the slots, then tighten the screws.

3. Connect the hydraulic hoses to the ports on the motor as described in Figure 5-33.

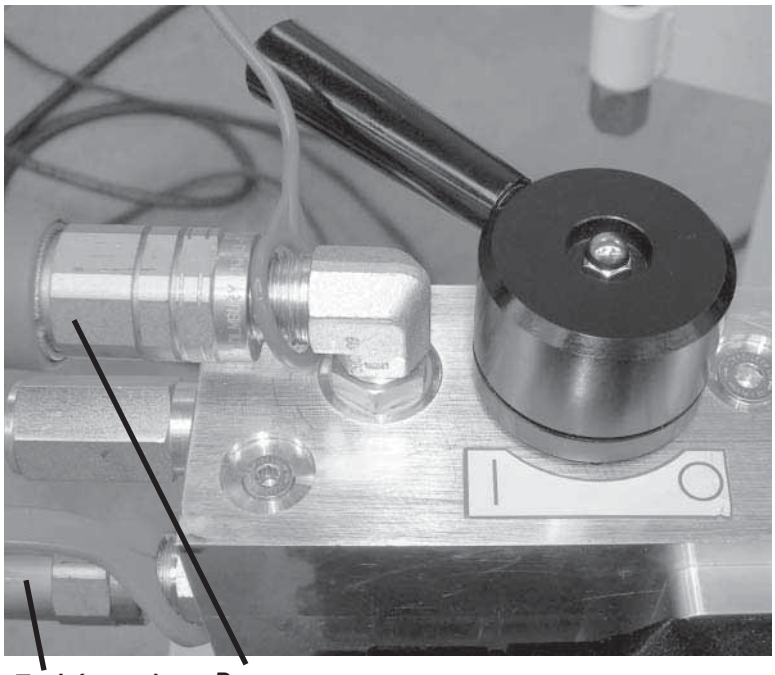


Figure 5-33. Connect the hydraulic hoses to the motor as shown.

4. Turn on the hydraulic power supply. Set it to 10 gpm at 1500 psi (38 l/min at 103 bar).

5. Push the hydraulic drive lever toward the main body of the machine. The machine will start to rotate.

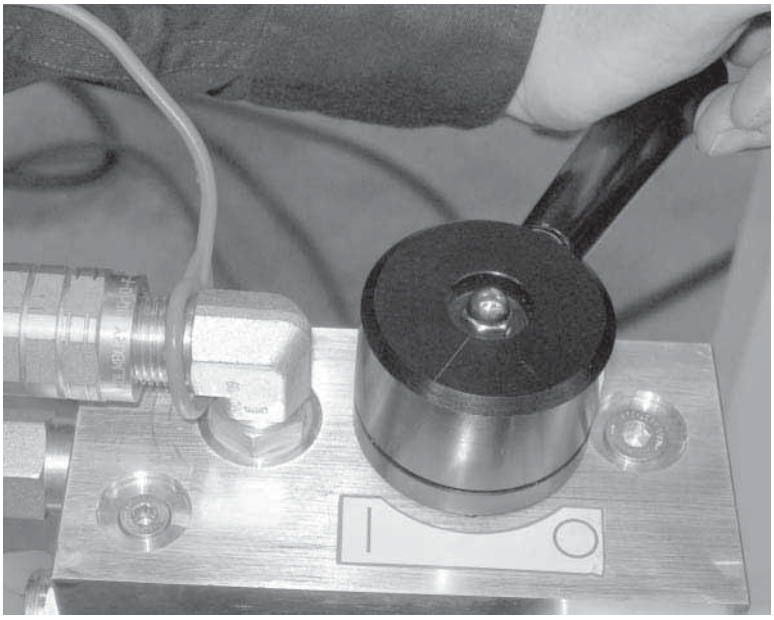


Figure 5-34. Turn the hydraulic lever to the ON position as shown.

6. Make sure the machine is turning clockwise. If it is turning the wrong way, the hydraulic hoses are reversed. Turn off the HPU and switch the hoses.

7. Adjust the drive motor speed by turning the speed dial on the hydraulic motor.

NOTE

The form tool head has arrows indicating the correct direction of rotation.

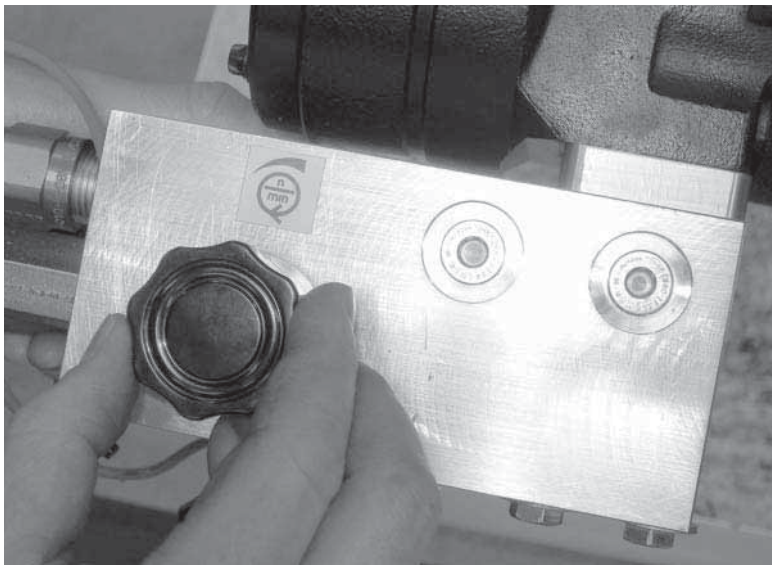


Figure 5-35. Use the speed dial on the hydraulic manifold to adjust the machine rotation speed.

8. While holding the hydraulic drive lever on, operate the machine as described in the appropriate section below (form tool or single-point operation).

9. As the machine cuts, adjust the hydraulic motor speed if necessary to reduce chatter and achieve the appropriate end prep finish.

10. When the prep is complete, release the hydraulic drive lever to stop the machine.

NOTE

The use of coolant or cutting lubricant is recommended. This will improve the cutting performance and increase the life of the tooling.

FORM TOOL OPERATION

The EP 424 has three tool holders, which can each hold a different tool. This allows you to perform any combination of facing, beveling, and counterboring simultaneously.

Make sure the EP 424 is set up as follows for form tool operation:

- Use the standard mandrel, if possible for the workpiece.
- Have the single-point slide removed and the rotating tool head installed. (See "Removing the Single-Point Kit" in the next section.)
- If your EP 424 is equipped with the Speed Prep autofeed module, set the axial feed selector to 0° when doing form tool operations.

NOTE

Setting the feed selector to 0° will reduce wear on the Speed Prep components when you are not using the autofeed.

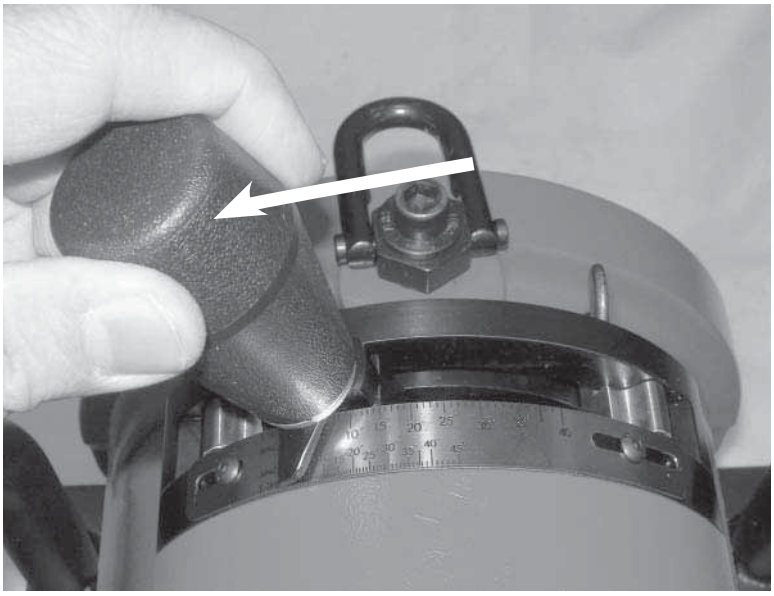


Figure 5-36. Set the Speed Prep selector to 0° before doing form tool operations.

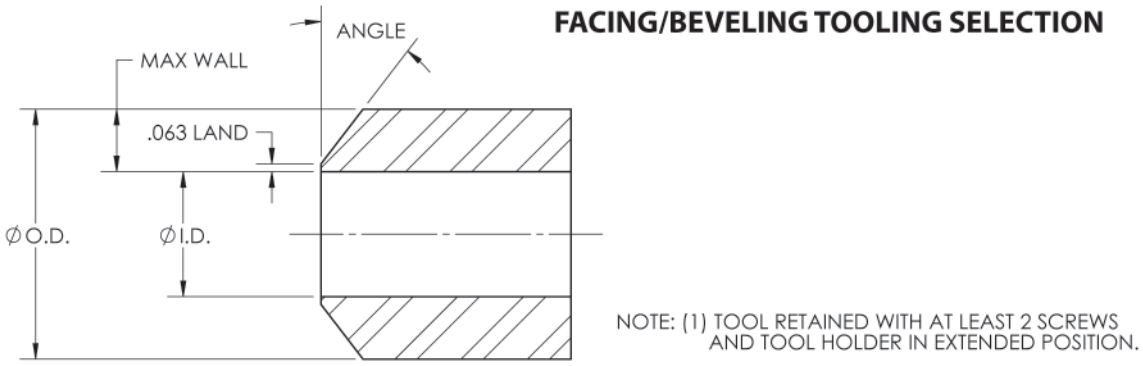
Planning the Operation

Operating Envelope

Make sure you have adequate clearance around the workpiece. See the operating envelope drawings in Chapter 3 for reference.

Selecting Tooling

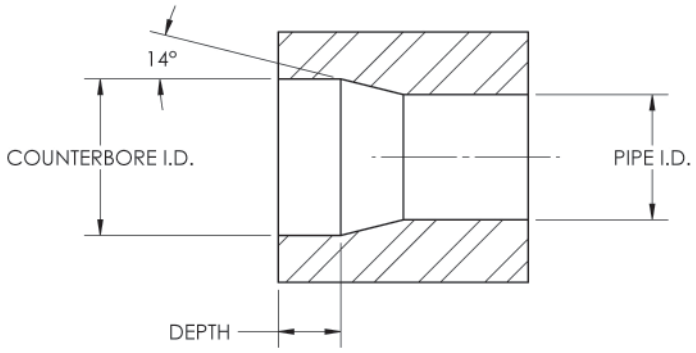
Use the following charts to select the appropriate tooling for the operation.



BEVEL TOOL	FACING TOOL	ANGLE	MAX WALL W/ 1/16" LAND	MIN I.D. W/ 1/16" LAND	MAX I.D. (1) W/1/16" LAND	MAX O.D. (1)
56-709-03	56-708-01	37-1/2°	1.38" (35.1mm)	3.27" (83.1mm)	13.88" (352.6mm)	16.63" (422.4mm)
56-709-03	56-708-02	37-1/2°	0.73" (18.5mm)	3.88" (98.6mm)	15.19" (385.8mm)	16.63" (422.4mm)
56-709-02	56-708-01	30°	1.50" (38.1mm)	3.27" (83.1mm)	13.88" (352.6mm)	16.88" (428.8mm)
56-709-02	56-708-02	30°	0.53" (13.5mm)	4.28" (108.7mm)	15.63" (397.0mm)	16.88" (428.8mm)

Figure 5-37. The chart describes the tooling used for facing/beveling operations.

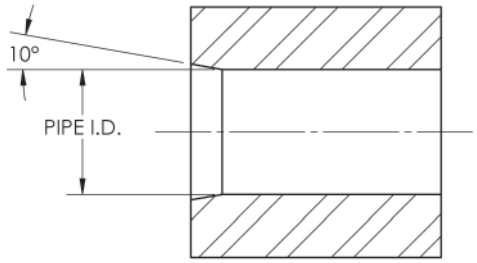
COUNTERBORE TOOLING SELECTION



C'BORE TOOL	MIN PIPE I.D.	MIN C'BORE I.D.	MAX C'BORE I.D.	MAX DEPTH	MAX DEPTH W/56-708-01 FACING TOOL
56-705-01	3.27" (83.1mm)	3.38" (85.9mm)	12.0" (304.8mm)	0.63" (16.0mm)	0.48" (12.2mm)
56-705-02	4.25" (108.0mm)	4.50" (114.3mm)	13.25" (336.6mm)	0.63" (16.0mm)	0.48" (12.2mm)
56-705-03	5.25" (133.4mm)	5.50" (139.7mm)	14.25" (362.0mm)	0.63" (16.0mm)	0.48" (12.2mm)

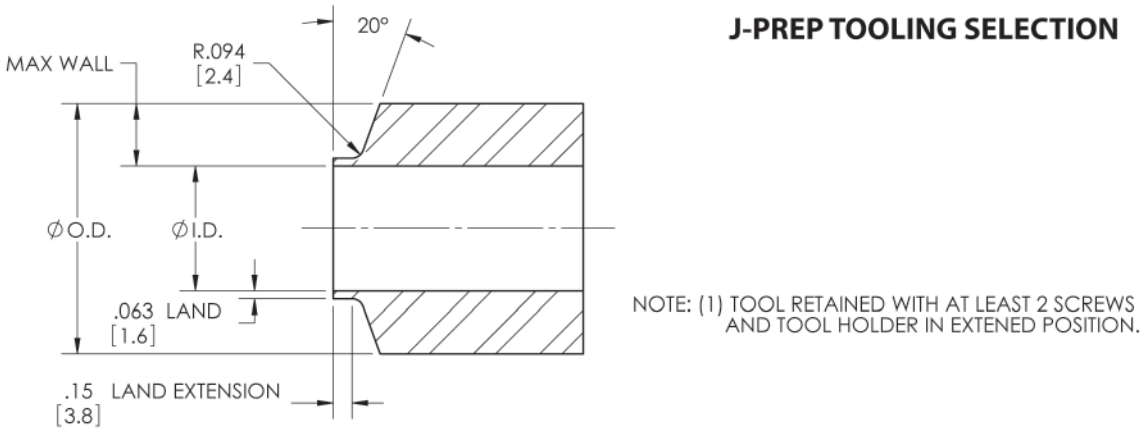
Figure 5-38. The chart describes the tooling used for counterboring.

DEBURRING TOOLING SELECTION



DEBURRING TOOL	MIN PIPE I.D.	MAX PIPE I.D.
56-702-01	3.27" (83.1mm)	11.86" (301.2mm)
56-702-02	3.44" (87.4mm)	12.53" (318.3mm)
56-702-03	4.0" (101.6mm)	13.13" (333.5mm)

Figure 5-39. The chart describes the tooling used for deburring.



BEVEL TOOL	FACING TOOL	MAX WALL W/ 1/16" LAND	MIN I.D. W/ 1/16" LAND	MAX I.D. (1) W/1/16" LAND	MAX O.D. (1)
56-709-01	56-708-01	1.68" (42.7mm)	3.27" (83.1mm)	13.78" (350.0mm)	17.0" (431.8mm)
56-709-05	56-708-01	1.68" (42.7mm)	3.27" (83.1mm)	15.3" (388.6mm)	18.63" (473.0mm)

Figure 5-40. The chart describes the tooling used for J-prep operations.

Adjusting the Tool Holder Positions

You may need to change the positions of the tool holders in the rotating head, depending on the pipe diameter. Each tool holder can be set to an “inner” (small diameter) or “outer” (large diameter) position.

1. Using a 1/4” hex wrench, remove the 8 screws holding the tool holder to the rotating head. (Note: if the tool holder is already in the outer position, it will have 6 screws holding it.)

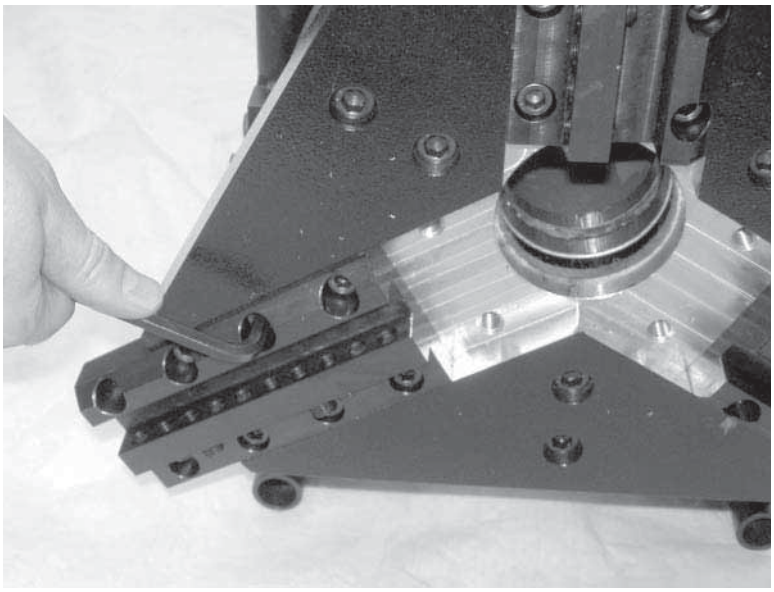


Figure 5-41. The photo shows the tool holder moved to the "outer" position for larger diameter pipes.

2. Move the tool holder to the other position. Line up the holes and re-insert the screws. Use 6 screws if setting the holder to the outer position.

Setting Up and Mounting the EP 424

You will probably find it easiest to assemble the main components of the EP 424 as you install the machine. The following is the recommended sequence for installation:

- Configure and mount the mandrel in the workpiece, as described at the beginning of this chapter.
- Install the machine body onto the mandrel.
- Install the tooling in the rotating tool head.
- Install the drive motor.

If desired, you can assemble the machine and then mount it on the workpiece. You will need a lifting device to support the machine as you mount it.

Assembling the Machine Components

The following procedure assumes that the mandrel has been mounted in the pipe, as described earlier in this chapter.

1. Attach a crane or other lifting device to the lift hook on the machine body.

NOTE

It is recommended that you use a lifting device to pick up the EP 424. If you are lifting it manually, have two operators lift it.

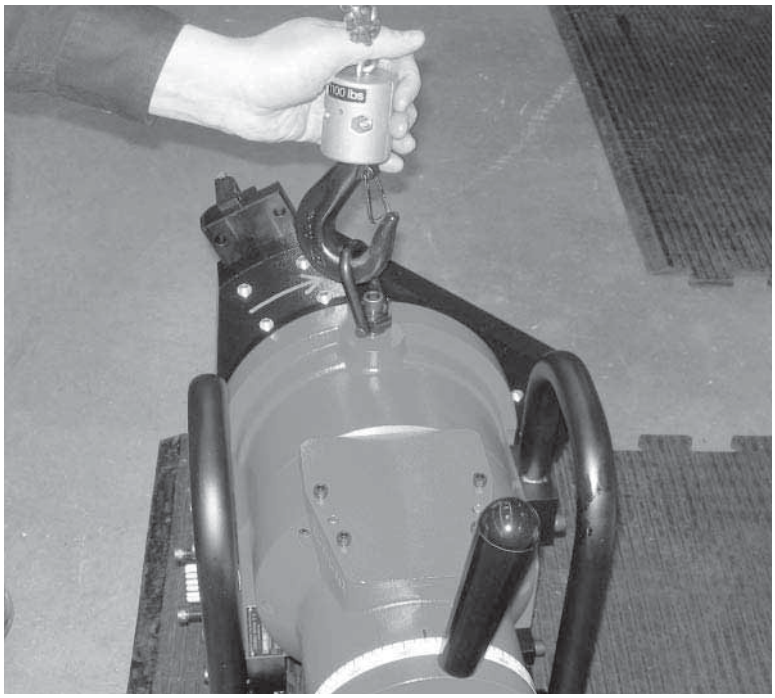


Figure 5-42. Attach the lifting device to the lift hook.

2. Use the lifting device to pick up the EP 424 and position it for mounting on the mandrel. If you do not have a lifting device, two people can lift the machine into place using the handles.

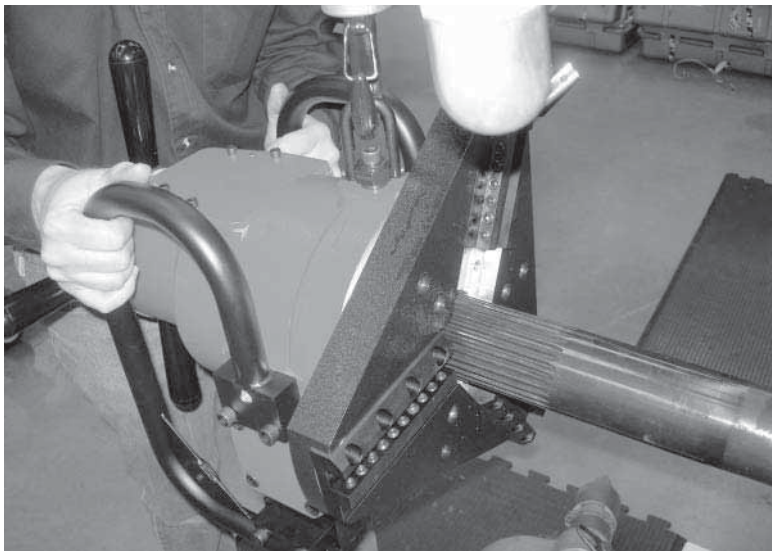


Figure 5-43. Position the machine to mount it on the mandrel.

3. Slide the machine forward on the mandrel. Turn the machine back and forth while pushing to engage it all the way onto the spline.

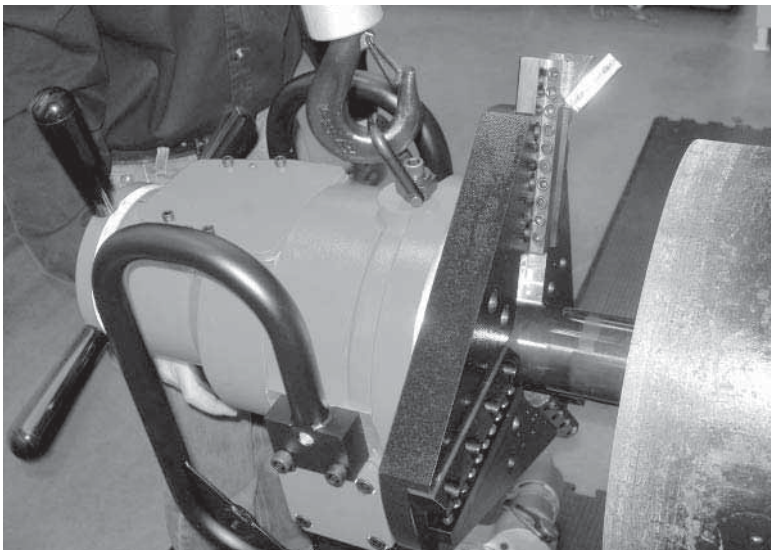


Figure 5-44. Push the machine forward onto the mandrel.

4. When the machine is fully engaged on the spline, lower the lifting device slightly to take the tension off it.

5. Turn the feed handle clockwise to engage the mandrel threads in the feed nut.

NOTE

Push the machine forward while turning the feed handle to start the threads.

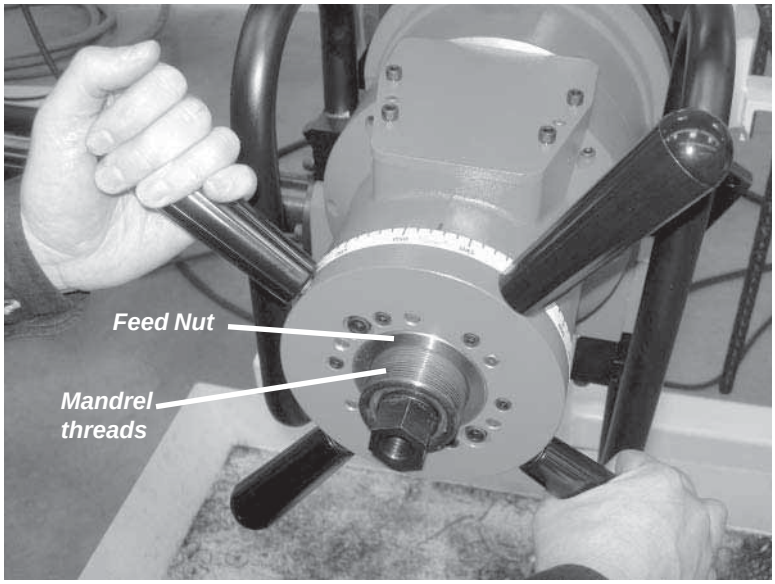


Figure 5-45. Turn the feed handle clockwise to engage the mandrel threads in the feed nut.

6. Turn the feed handle clockwise until the drawbar nut emerges from the back of the machine.

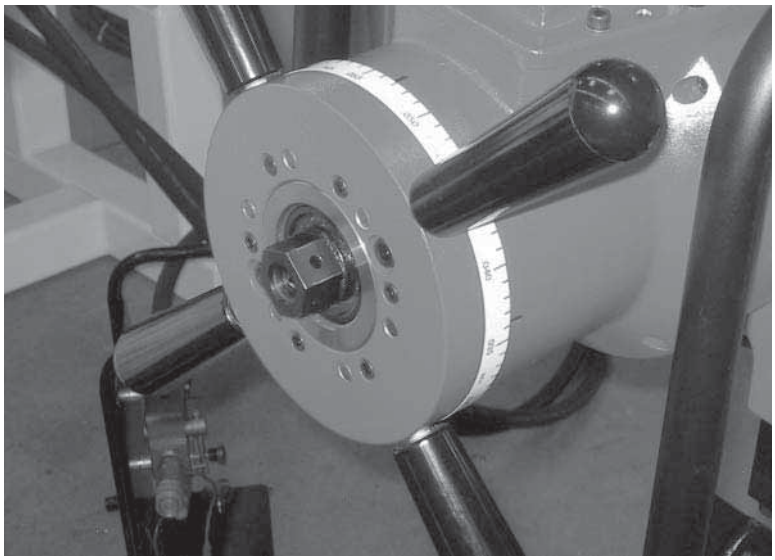


Figure 5-46. Engage the mandrel threads fully in the feed nut for stable operation.

7. Using a 3/16” hex wrench, loosen the tooling set screws in the tool holder and put the tool in the holder. Tighten the set screws.

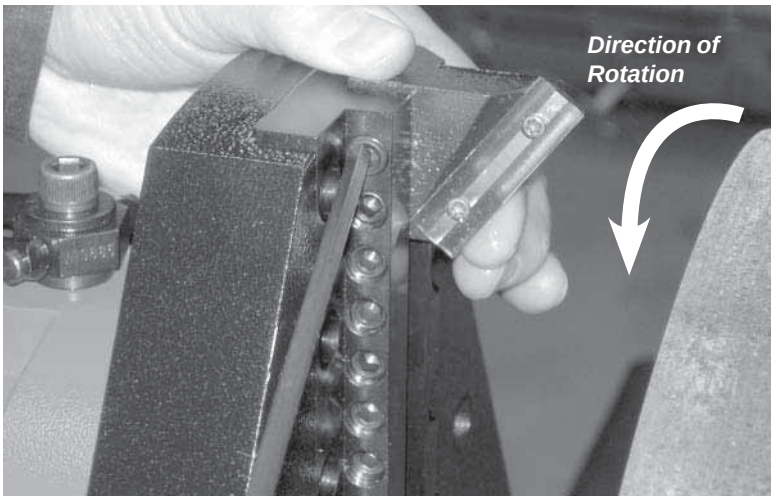


Figure 5-47. Insert the tool in the tool holder and tighten the set screws holding it. Make sure the cutting edge of the tool is toward the direction of rotation, as shown.

8. Install any other tools required for the operation in the other tool holders. You can perform up to 3 operations simultaneously—for example, facing, beveling, and counterboring.

9. Turn the feed handle clockwise until the tools are close to the pipe end. If necessary, loosen the set screws and adjust the tool positions for the required operation.

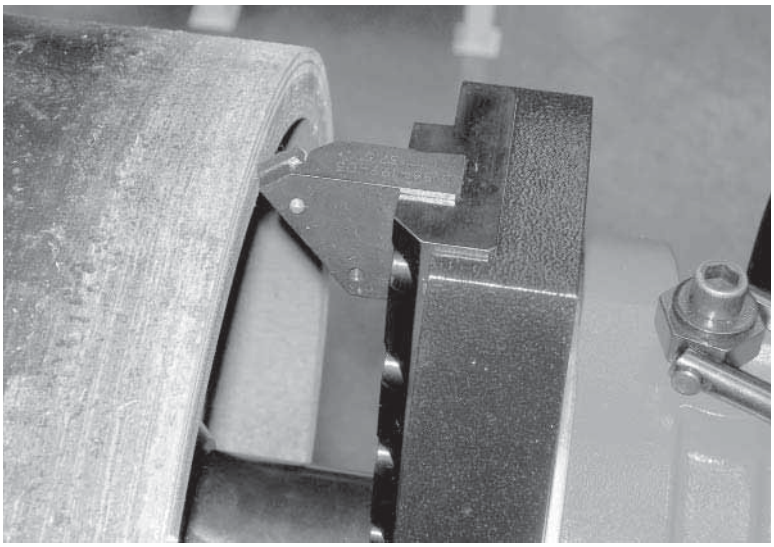


Figure 5-48. Turn the feed handle to position the tools near the cutting surface. Adjust the tool position if necessary.

10. Install and connect the drive motor as described earlier in this chapter.

11. Turn on the power source (air or hydraulic).

12. Turn on the drive motor. The machine will start to rotate. Adjust the motor speed using the speed controller on the drive.

WARNING

Keep hands clear of the rotating head while the machine is operating. Contact with the head or tooling could result in serious injury.

NOTE

The use of coolant or cutting lubricant is recommended. This will improve the cutting performance and increase the life of the tooling.

13. Turn the feed handle clockwise to feed the tooling into the pipe face. Check the radial position of the tooling. Stop the machine if you need to adjust the tool position.

14. Continue feeding the tooling into the pipe. Adjust the drive motor speed if necessary to reduce chatter and achieve the appropriate end prep finish.

15. You can use the scale on the feed housing to measure the axial depth of cut. Each line on the the scale is 0.001” (0.025 mm) of feed.

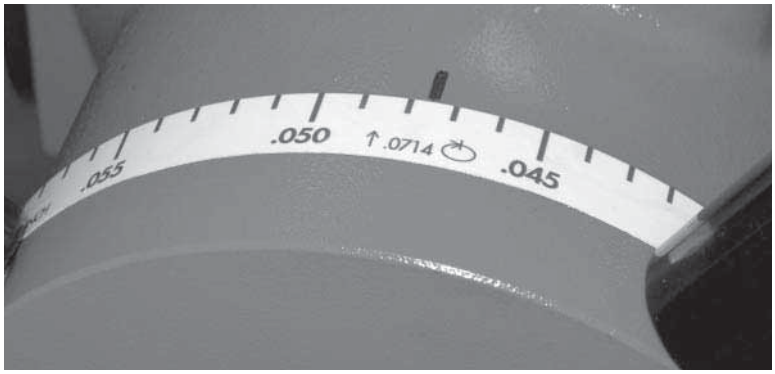


Figure 5-49. Use the scale on the feed housing to measure axial feed distance.

16. When the prep is complete, turn the feed handle counter-clockwise to retract the tooling from the pipe end. Release the air motor trigger to stop the machine.

Removing the Machine from the Workpiece

1. Turn the feed handle counter-clockwise to retract the tooling away from the pipe end.

2. It is recommended that you remove the tooling from the tool holders before removing the machine. This prevents accidental damage to the tooling, or damage or injury caused by the tooling in case of a collision while moving the machine.

3. Disconnect the power source (air or hydraulic) from the drive motor.

4. Loosen the 4 motor mounting screws and remove the drive motor.

5. Connect the lifting device to the lifting eye on the machine. Raise the lift enough to put slight tension on the chain or strap.

6. Turn the feed handle counter-clockwise until the threads on the mandrel disengage from the feed nut.

7. Make sure the lift is supporting the machine. Pull the machine back off the mandrel, and set it on the floor or a stable work surface.

8. If the standard mandrel is installed, use a 1-1/16” wrench or socket to turn the drawbar nut counter-clockwise to loosen the clamp legs.

9. If the independent chuck mandrel is installed, loosen the jam nuts and then loosen the clamp legs. Pull the mandrel out of the pipe.

10. If you are finished with the machine, or are going to work on a different sized pipe, remove the clamp leg extensions from the mandrel.

Single Point Operation

Installing the Single-Point Kit

If your EP 424 machine is equipped with the single-point option kit, it will include the single-point slide, trip ring, and independent chuck as additional components. Set up the machine as described below for single-point operation.

1. Set the machine on a stable work surface that can support its weight. Use a lifting device to lift the EP 424.

2. If the mandrel is installed, remove it by turning the feed handle counter-clockwise until the mandrel is threaded out of the feed nut.

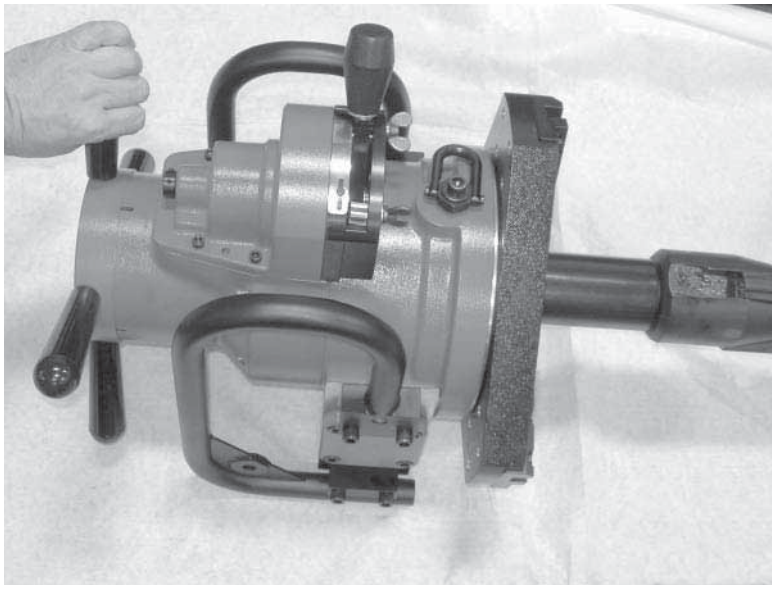


Figure 5-50. Turn the feed handle counter-clockwise to thread the mandrel out of the feed nut.

3. Pull the mandrel out through the front of the machine.

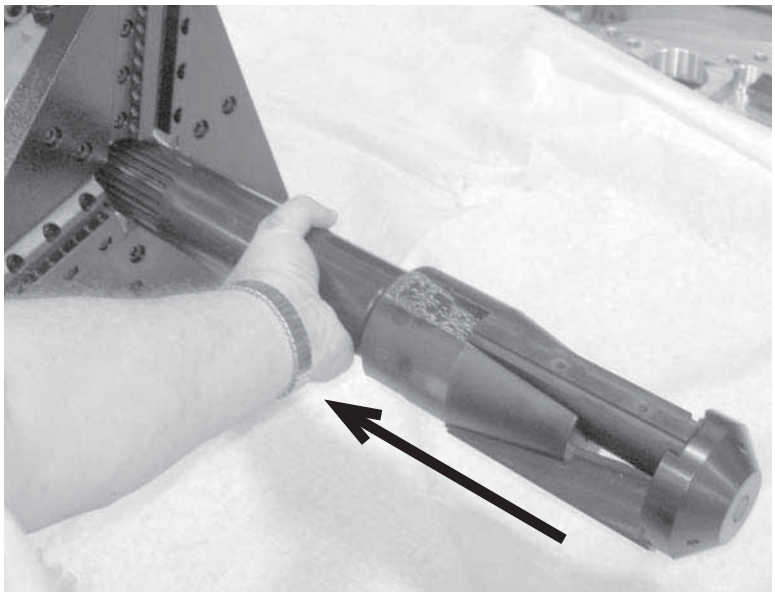


Figure 5-51. Pull the mandrel out of the machine.

4. Using a 5/16” hex wrench, remove the 6 screws holding the rotating head to the main shaft.

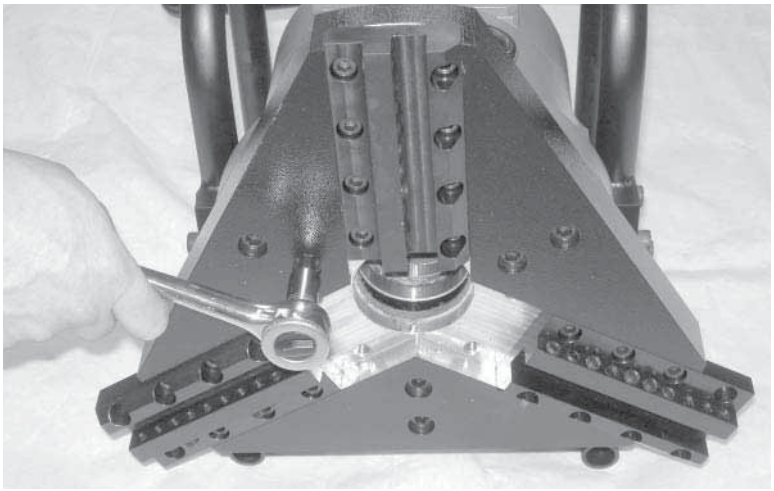


Figure 5-52. Remove the 6 screws holding the rotating head to the main shaft.

5. Remove the rotating head from the main shaft.

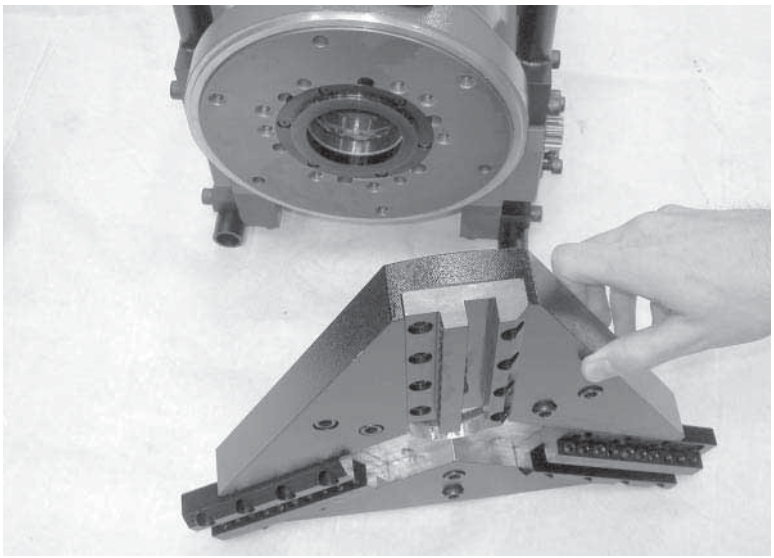


Figure 5-53. Remove the rotating head.

6. Install the trip assembly onto the front of the machine, with the trip knobs toward the feed handle side. Fit the ring of the trip assembly around the the rim of the main housing, with the set screws aligned with the flats in the housing.

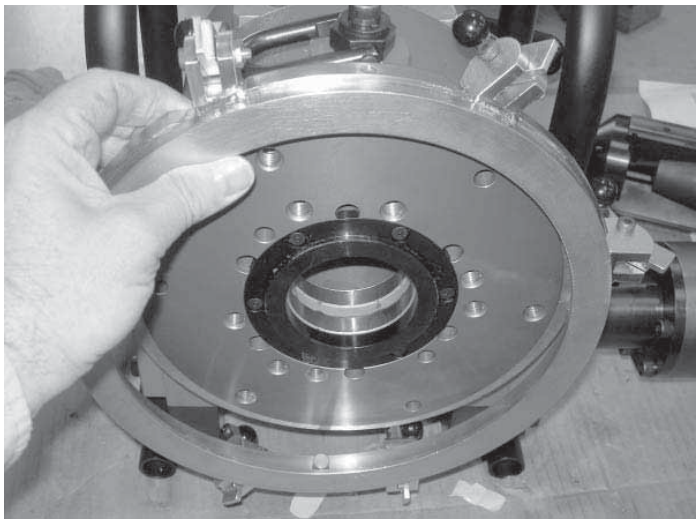
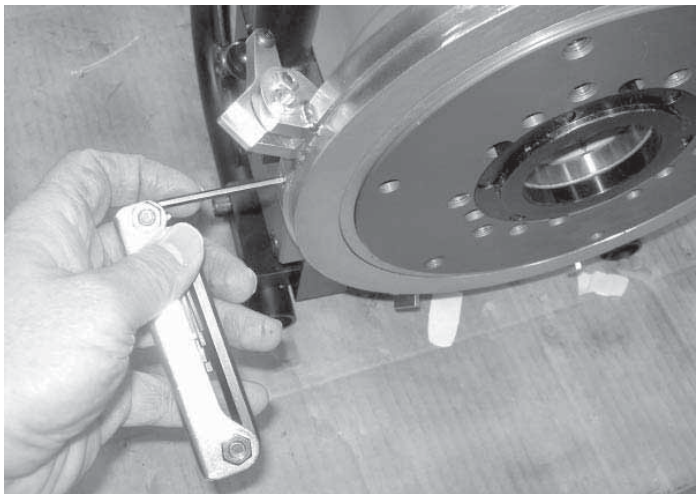


Figure 5-54. Mount the trip assembly on the housing.

7. Using a 1/8” hex wrench, tighten the 4 set screws in the trip assembly.



NOTE

The trip assembly screws are on the back of the ring.

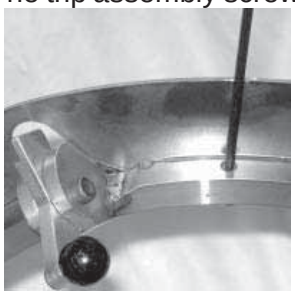
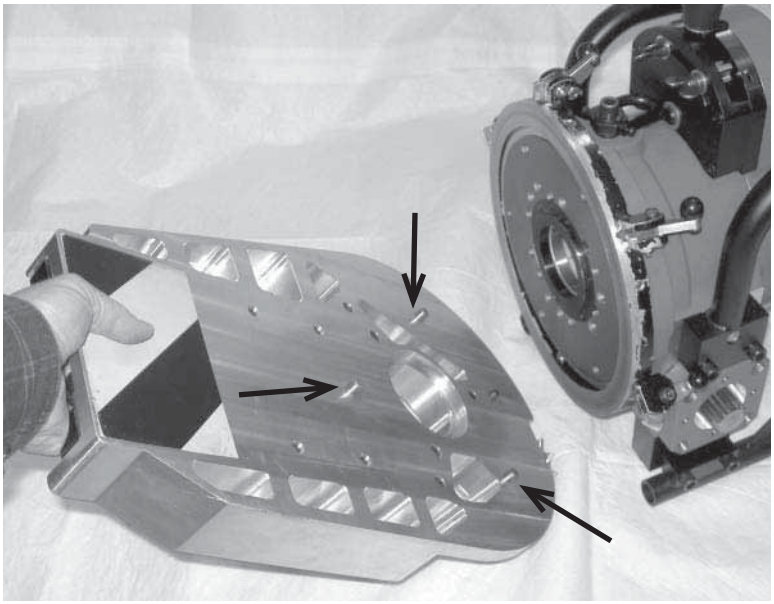


Figure 5-55. Tighten down the 4 set screws while holding the trip ring assembly in place.

8. Put the single-point slide into place on the main shaft. Align the 3 dowel pins in the slide with the holes in the shaft, and press the slide into place.



NOTE

Make sure the felt wiper is in place on the back of the single-point slide.

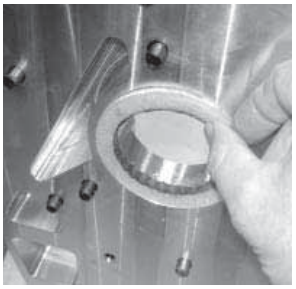


Figure 5-56. There are three dowel pins in the back of the single-point slide to mount it to the main shaft.

9. Using a 5/16” hex wrench, tighten the 6 captivated screws in the single-point slide to secure it to the main shaft.

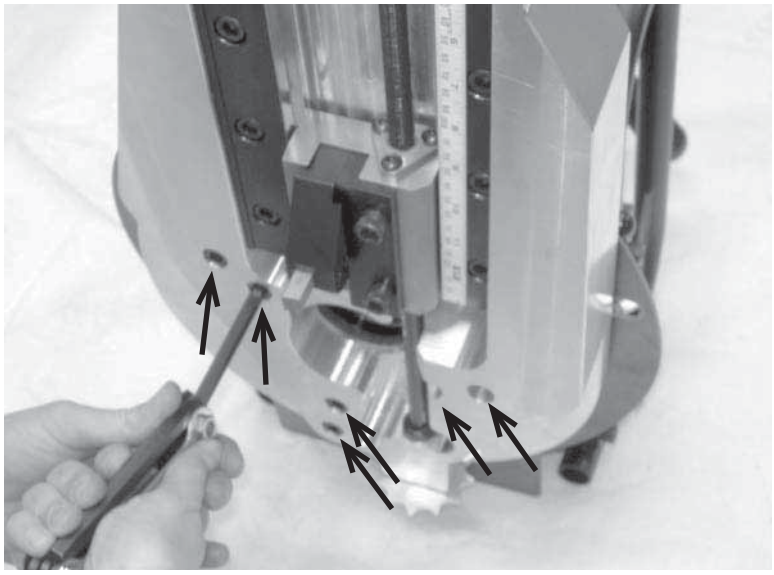


Figure 5-57. Tighten the captivated screws in the 6 holes to attach the single-point slide to the main shaft.

10. If you want to install the mandrel before mounting the machine on the workpiece, insert the threaded end of the mandrel through the single-point slide. You may have to turn the mandrel slightly while pushing it to engage the spline.

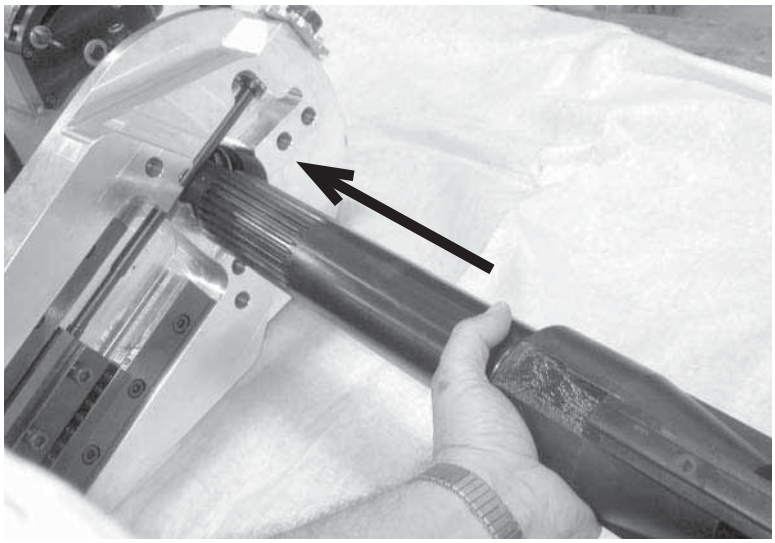


Figure 5-58. Insert the mandrel through the single-point slide.

11. Turn the feed handle clockwise to engage the threads of the mandrel into the feed nut. Turn the handle until the threads emerge through the back of the rear feed assembly.

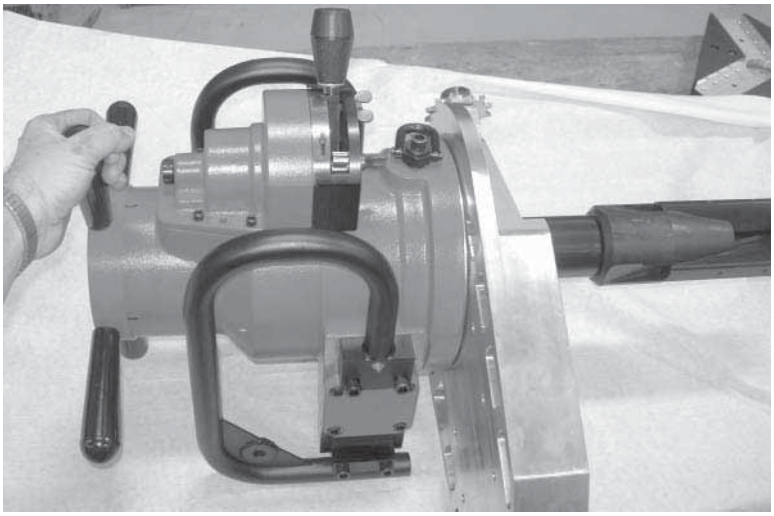


Figure 5-59. Turn the feed handle clockwise to engage the mandrel threads in the feed nut.

Planning the Operation

Operating Envelope

Make sure you have adequate clearance around the workpiece. See the operating envelope drawings in Chapter 3 for reference.

Selecting Tool Holder

Two tool holders are provided with the single-point slide:

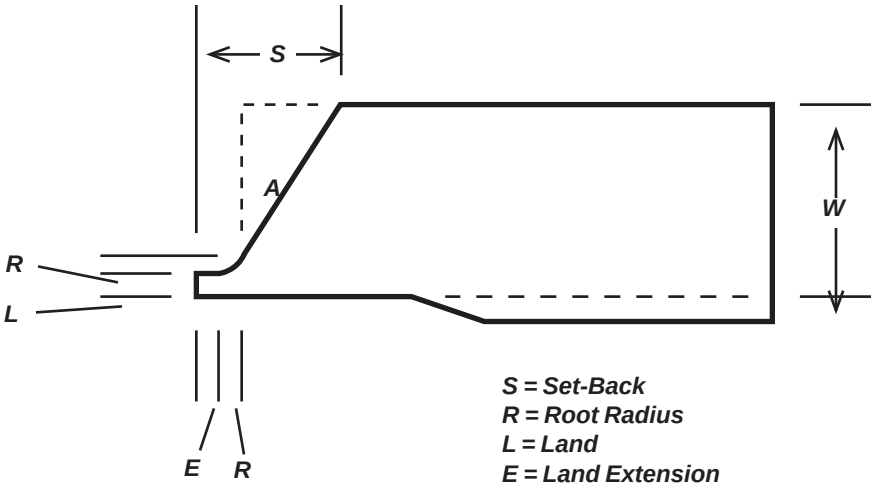
- low-range (part no. 56-424-00), for pipe O.D. range 4.24”-23.62” (108-600 mm)
- high-range (part no. 56-424-01), for pipe O.D. range 7.25”-24” (184-610 mm).

For most applications, you can use either tool holder. Make sure you select one with a range that includes the O.D. of the pipe you are machining.

Beveling O.D. Set-Back

The O.D. set-back is the distance from the end of the pipe where you will start the beveling operation. It is determined by the angle(s) of the bevel, the pipe wall thickness, the land thickness, the land root radius, and the land extension.

For a single-angle bevel, compute the set-back using the following formula:



S = R + E + [tan(A) x (W - L - R)]

S = Set-Back
R = Root Radius
L = Land
E = Land Extension
A = Bevel Angle
W = Wall Thickness (After Counterbore)

Figure 5-60. The diagram illustrates how to compute the O.D. set-back when performing a single-angle bevel.

SINGLE-ANGLE BEVEL EXAMPLE:

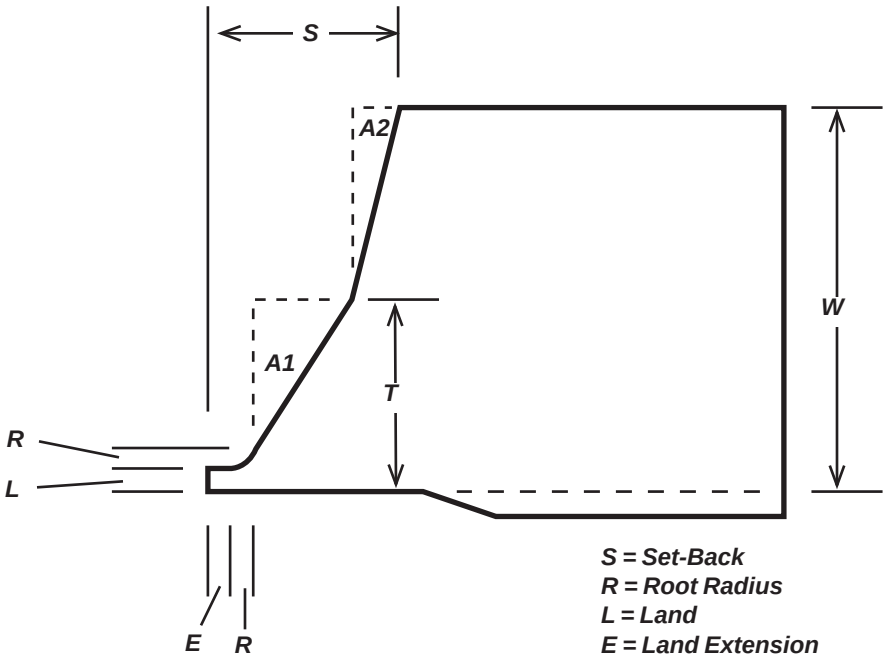
R = 0.125”
L = 0.100”
E = 0.125”
A = 20°
W = 0.800”

S = 0.125” + 0.125” + [tan(20°) x (0.800” - 0.100” - 0.125”]

= 0.250” + [0.364 x 0.575”]

= 0.459”

For a compound bevel, use the following formula:



S = R + E + [tan(A2) x (W - T)] + [tan(A1) x (T - L - R)]

S = Set-Back
R = Root Radius
L = Land
E = Land Extension
A1 = Inner Bevel Angle
A2 = Outer Bevel Angle
T = Transition (from I.D.)
W = Wall Thickness (After Counterbore)

Figure 5-61. The diagram illustrates how to compute the O.D. set-back when performing a compound bevel.

COMPOUND BEVEL EXAMPLE:

R = 0.125”
L = 0.100”
E = 0.125”
A1 = 30°
A2 = 10°
T = 0.750”
W = 1.875”

S = 0.125” + 0.125” + [tan(10°) x (1.875” - 0.750”]
+ [tan(30°) x (0.750” - 0.125” - 0.125”]

= 0.250” + [0.176 x 1.125”] + [0.577 x 0.500]

= 0.250” + 0.198 + 0.289”

= 0.737”

Setting Up and Mounting the EP 424

You will probably find it easiest to assemble the main components of the EP 424 as you install the machine. The following is the recommended sequence for installation:

- Configure and mount the mandrel in the workpiece, as described in the previous section.
- Install the machine body onto the mandrel.
- Install the tool holder and tooling in the single-point slide.
- Install the drive motor.

If desired, you can assemble the machine and then mount it on the workpiece. You will need a lifting device to support the machine as you mount it.

Assembling the Machine Components

The following procedure assumes that the mandrel has been mounted in the pipe, as described earlier in this chapter.

1. Attach a crane or other lifting device to the lift hook on the machine body.

NOTE

It is recommended that you using a lifting device to pick up the EP 424. If you are lifting it manually, have two operators lift it.

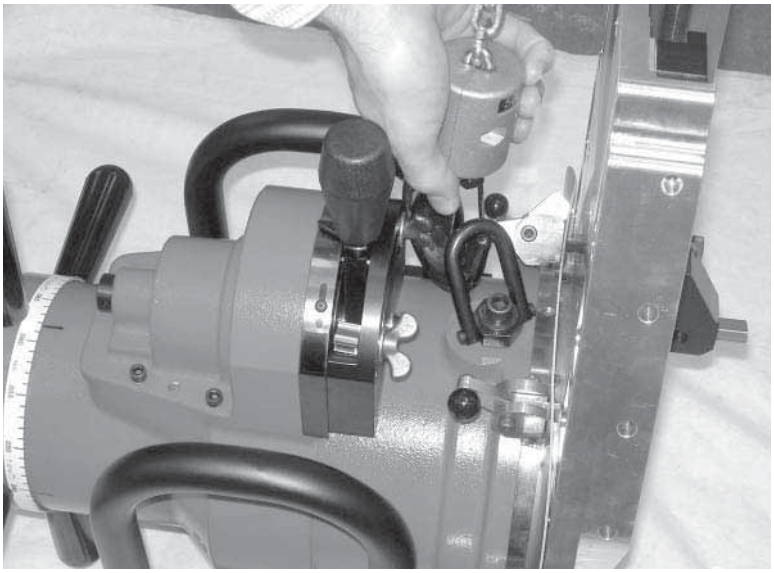


Figure 5-62. Attach the lifting device to the lift ring.

2. Use the lifting device to pick up the EP 424 and position it for mounting on the mandrel. If you do not have a lifting device, two people can lift the machine into place using the handles.

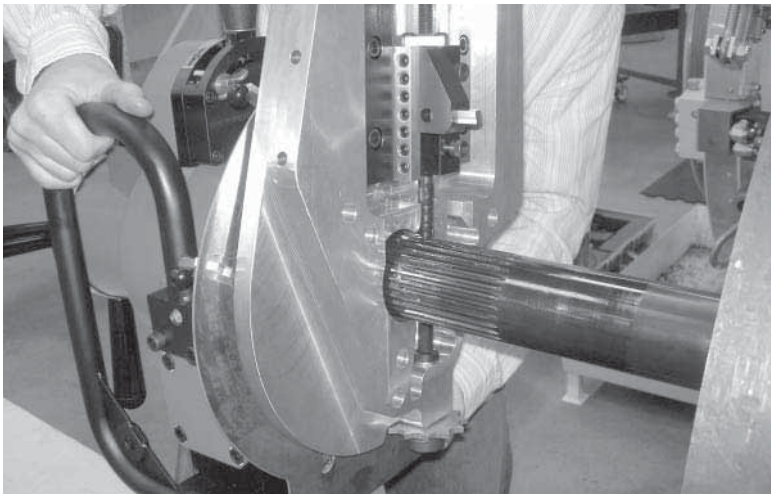


Figure 5-63. Position the EP 424 to mount it on the mandrel.

3. Slide the machine forward on the mandrel. Turn the machine back and forth while pushing to engage it all the way onto the spline.

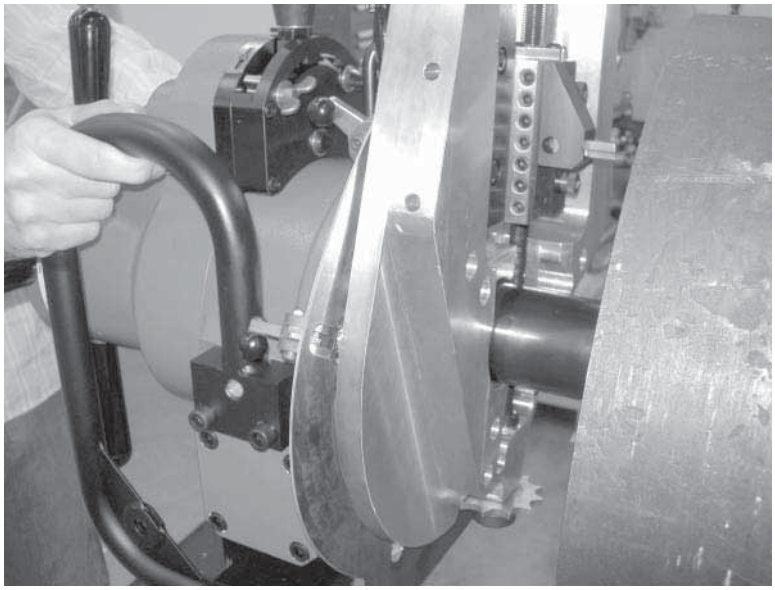


Figure 5-64. Push the machine forward on the mandrel until you can engage the mandrel threads in the feed nut.

4. When the machine is fully engaged on the spline, lower the lifting device slightly to take the tension off it.

NOTE

Push the machine forward while turning the feed handle to start the threads.

5. When the machine is as far forward as it will go, turn the feed handle clockwise to engage the mandrel threads in the feed nut.

6. Turn the feed handle clockwise until the end of the mandrel emerges from the back of the machine. Feed the machine until at least 1/2” (13 mm) of threads on the mandrel are visible.

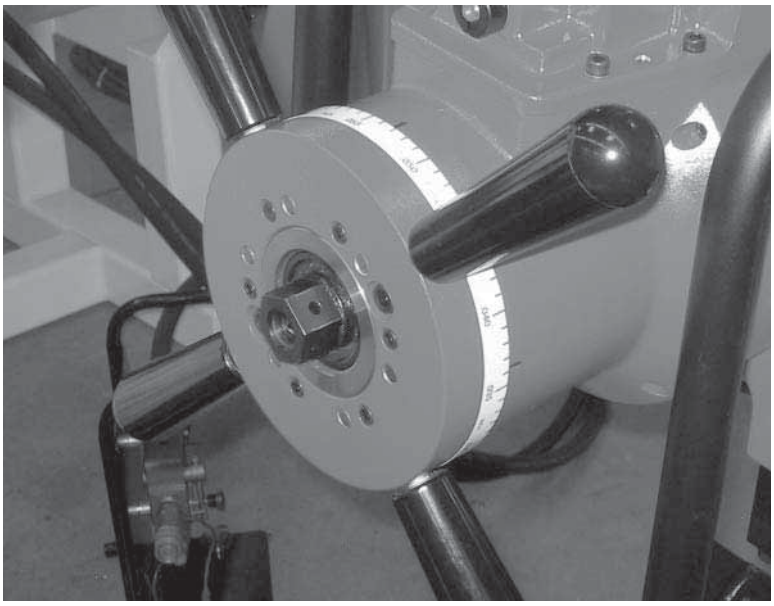


Figure 5-65. Engage the mandrel threads fully in the feed nut for stable operation.

7. Install the autofeed stop plate on the end of the mandrel. The stop plate prevents the machine from autofeeding all the way off the mandrel.

8. Using a 3/16” hex wrench, loosen the tooling set screws in the male slide and put the tool holder with the tool in the slide. Tighten the set screws.

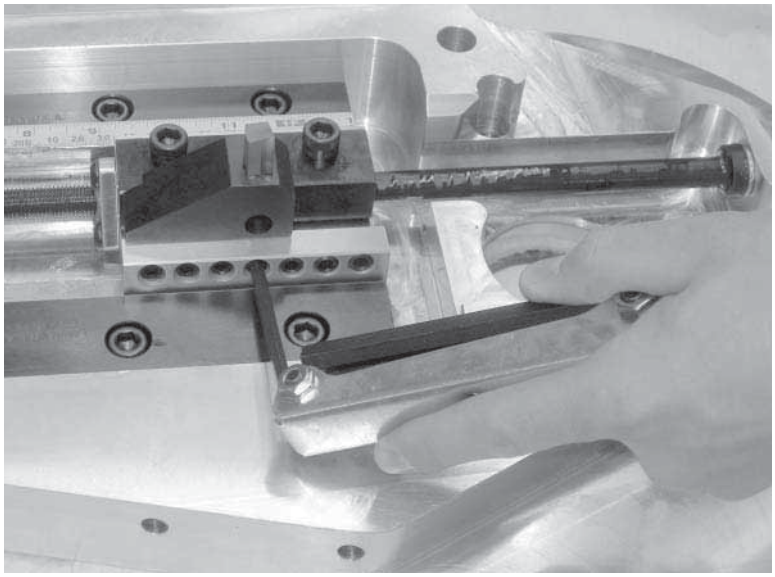


Figure 5-66. Install the tool holder in the slide.

9. Using a 5/16” hex wrench, turn the starwheel on the slide to position the tool just beyond the O.D. of the pipe.

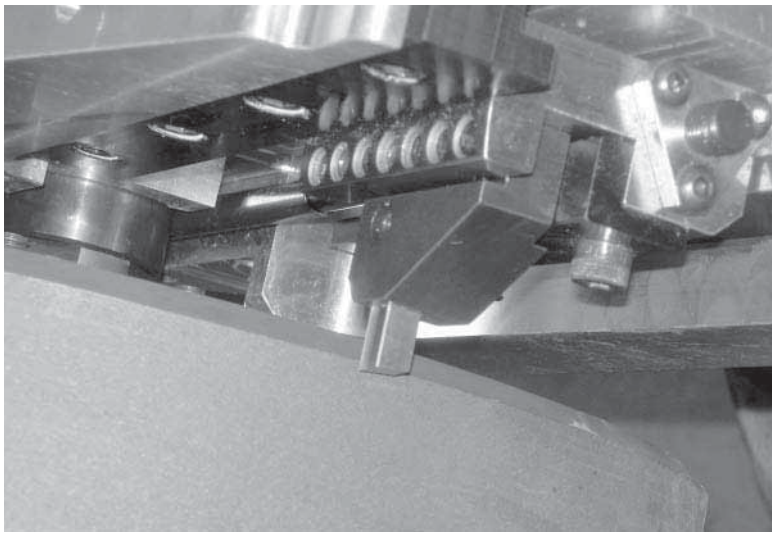


Figure 5-67. Turn the starwheel until the tool bit is positioned at the required start point.

10. Turn the feed handle clockwise to advance the tool to the starting position above the O.D. of the pipe.

Using the Speed Prep Autofeed

NOTE

The Speed Prep system should be calibrated periodically to make sure the angle setting is accurate. See “Calibrating the Speed Prep Scale” in Chapter 7.

1. Loosen the knob on the Speed Prep module, and slide the gauge to the desired angle on the scale. Refer to the appropriate scale for using 1 trip or 2 trips. Tighten the knob.

WARNING

The Speed Prep autofeed can feed the machine until it comes off the mandrel. Crushing or other serious injuries could occur. Use the autofeed stop plate (81-316-00) to keep the machine from feeding too far.

2. Engage the required number of trips. For multiple trips, engage them on opposite sides of the trip assembly.
3. Start the drive motor to operate the machine. Ensure that the starwheel is turning when it strikes the engaged trips.
4. To engage the Speed Prep autofeed, pull the feed handle back toward you. You will feel it “snap” into place. Immediately let go of the feed handle.
5. As the machine rotates, the autofeed will turn the feed handle counter-clockwise.
6. To disengage the autofeed, push the feed handle in.

Compound Bevel

Use the knob stops to set the angles.

1. Set the Speed Prep knob to the location for the starting angle (the angle at the O.D. of the pipe). Lock the knob in place.
2. Move the left knob stop up against the knob and tighten it.

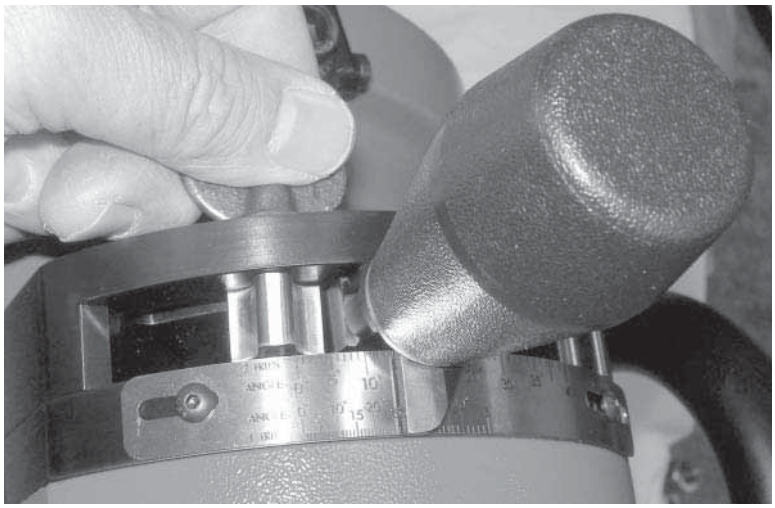


Figure 5-68. Set the left knob stop against the Speed Prep knob.

3. Loosen the Speed Prep knob and set it to the location of the transition angle. Lock the knob in place.

4. Move the right knob stop up against the knob and tighten it.

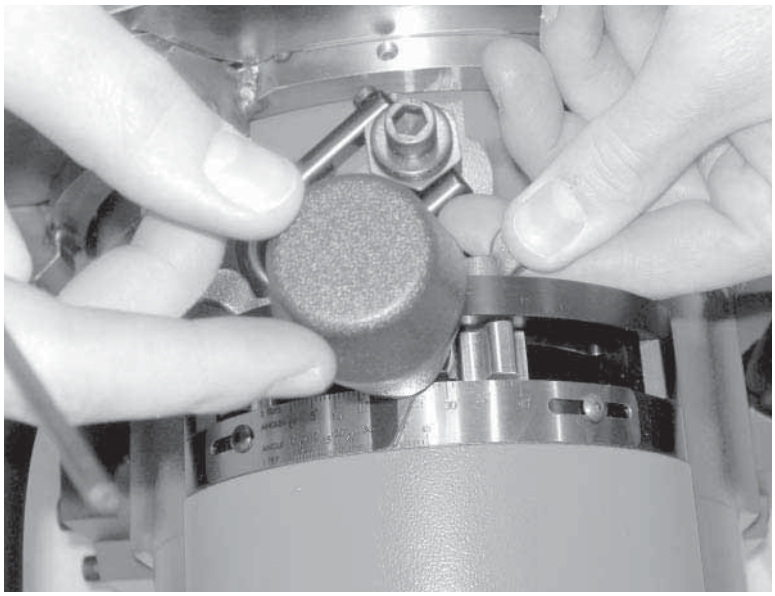


Figure 5-69. Set the right knob stop.

5. Set the Speed Prep knob back to the starting angle position and lock it in place.

6. Measure and mark the transition point on the pipe face surface.

7. Start the cutting operation on the O.D. of the pipe. Pull the feed handle to engage the autofeed when the tool begins to cut the pipe.

8. When the tool reaches the transition point, loosen the Speed Prep knob and move it over against the right knob stop. Tighten the knob.

9. Continue until the bevel is complete.

Removing the Machine from the Workpiece

1. Using a 5/16” hex wrench, turn the starwheel on the slide clockwise to retract the tool away from the pipe.
2. Turn the feed handle counter-clockwise to retract the single-point slide away from the pipe end.
3. It is recommended that you remove the tool holder from the slide before removing the machine. This prevents accidental damage to the tooling, or damage or injury caused by the tooling in case of a collision while moving the machine.
4. Disconnect the power source (air or hydraulic) from the drive motor.
5. Loosen the 4 motor mounting screws and remove the drive motor.
6. Connect the lifting device to the lifting eye on the machine. Raise the lift enough to put slight tension on the chain or strap.
7. Turn the feed handle counter-clockwise until the threads on the mandrel disengage from the feed nut.
8. Make sure the lift is supporting the machine. Pull the machine back off the mandrel, and set it on the floor or a stable work surface.
9. If the standard mandrel is installed, use a 1-1/16” wrench or socket to turn the drawbar nut counter-clockwise to loosen the clamp legs.
10. If the independent chuck mandrel is installed, loosen the jam nuts and then loosen the clamp legs.
11. Pull the mandrel out of the pipe.
12. If you are finished with the machine, or are going to work on a different sized pipe, remove the clamp leg extensions from the mandrel.

Removing the Single-Point Kit

1. Set the machine on a stable work surface that can support its weight. Use a lifting device to lift the EP 424.
2. If the mandrel is installed, remove it by turning the feed handle counter-clockwise until the mandrel is threaded out of the feed nut.

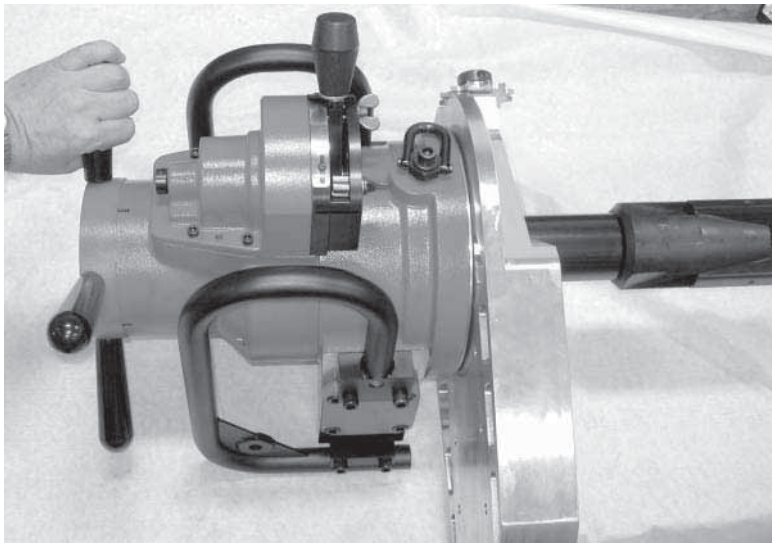


Figure 5-70. Turn the feed handle counter-clockwise until the mandrel is threaded out of the feed nut.

3. Pull the mandrel out through the front of the machine.

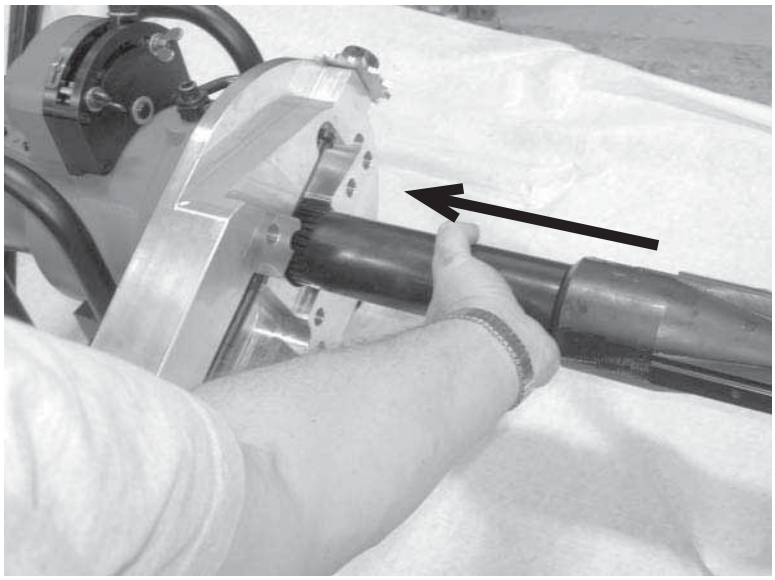


Figure 5-71. Pull the mandrel out of the machine.

4. Using a 5/16” hex wrench, completely loosen the 6 captivated screws holding the single-point slide to the main drive assembly.

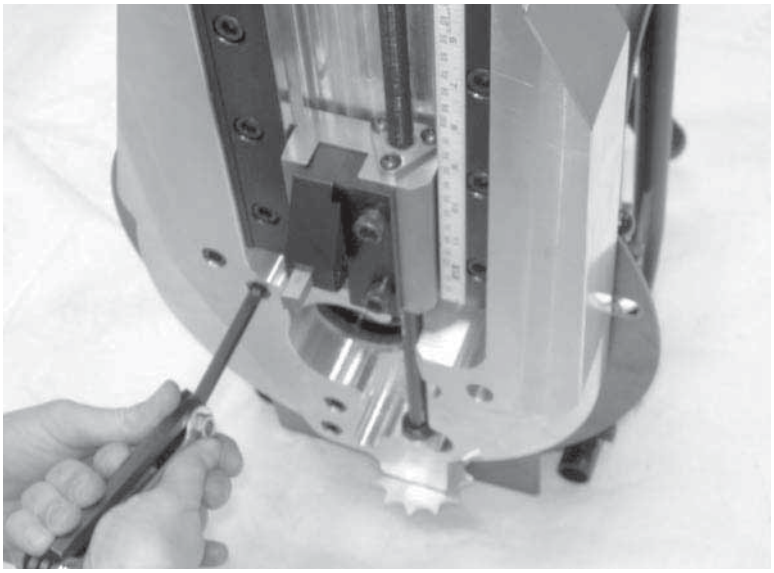


Figure 5-72. Loosen the 6 screws holding the single-point slide.

5. Remove the single-point slide from the main shaft.

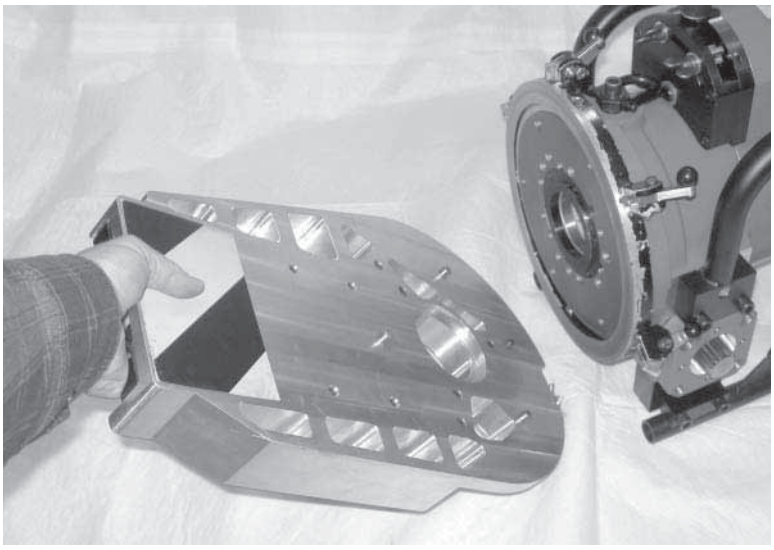


Figure 5-73. Remove the single-point slide.

6. Using a 1/8” hex wrench, loosen the 4 set screws in the trip assembly.

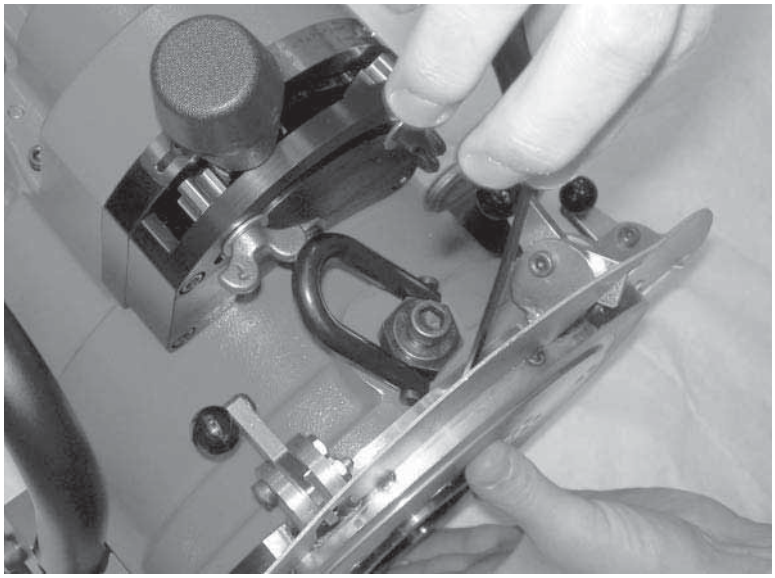


Figure 5-74. Loosen the set screws holding the trip assembly to the housing.

7. Remove the trip assembly from the main housing.

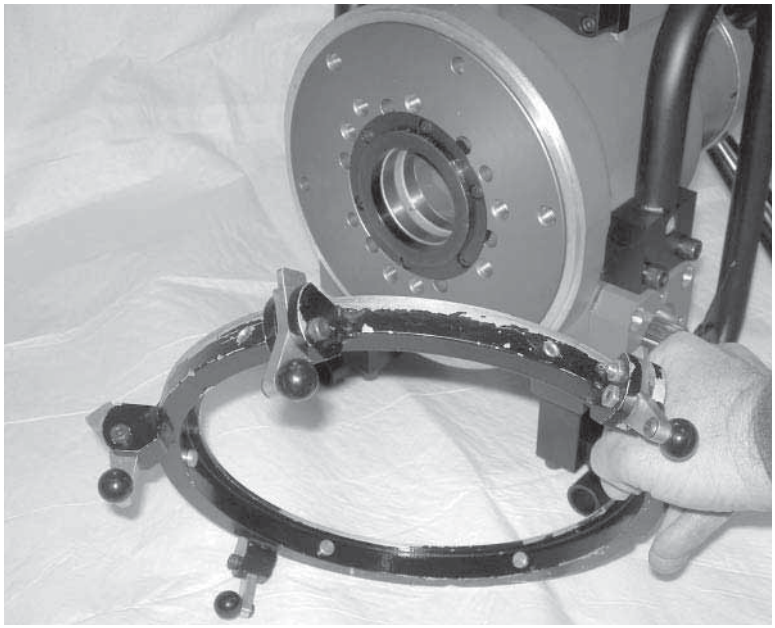


Figure 5-75. Remove the trip assembly.

8. Replace the rotating tool head on the main shaft. Align the 3 dowel pins in the head with the holes in the shaft, and press the head into place.

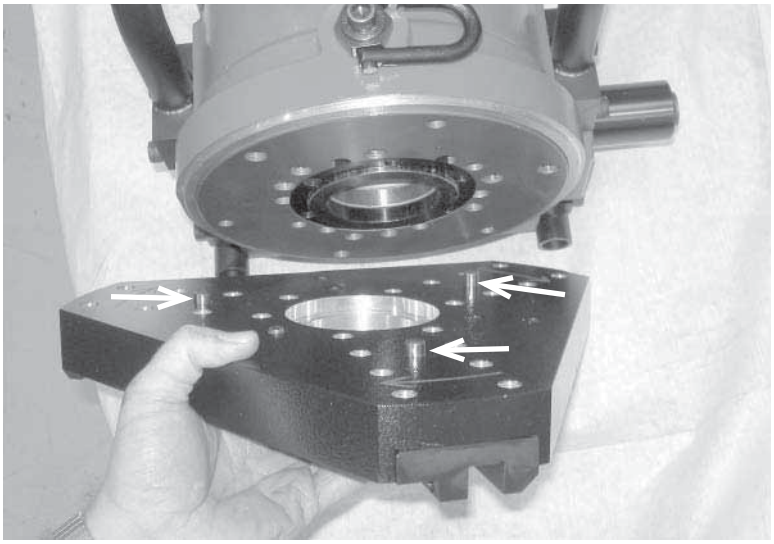


Figure 5-76. Align the dowel pins in the rotating head (indicated by arrows) with the holes in the main shaft, and press the head onto the shaft.

9. Using a 5/16” hex wrench, tighten the 6 captivated screws in the rotating head to secure it to the main shaft.

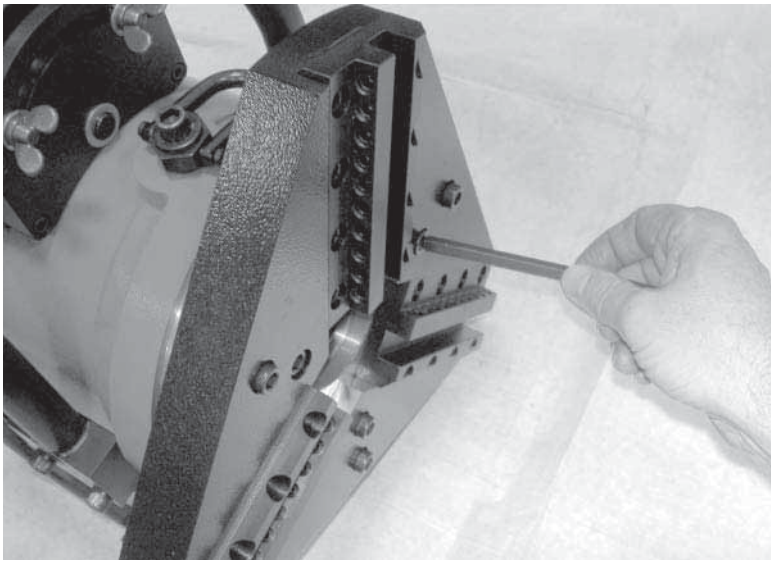


Figure 5-77. Tighten the 6 screws holding on the rotating head.

Chapter 6
Routine Maintenance

LUBRICATION

Main Drive Assembly

There is one grease fitting on the main drive assembly.

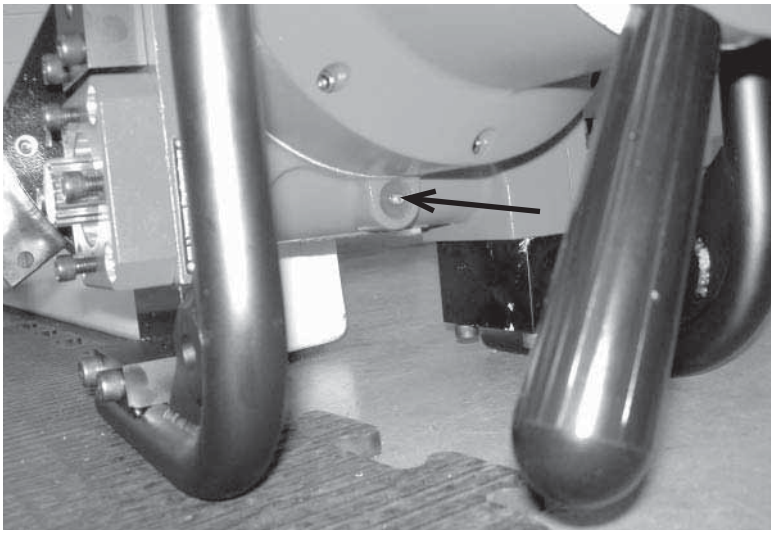


Figure 6-1. The grease fitting is at the bottom of the main drive assembly housing.

Every 30 days (more often with heavy use), apply grease through the fitting.

1. Using a 3/16” hex wrench, remove the plug in the top of the main drive housing.

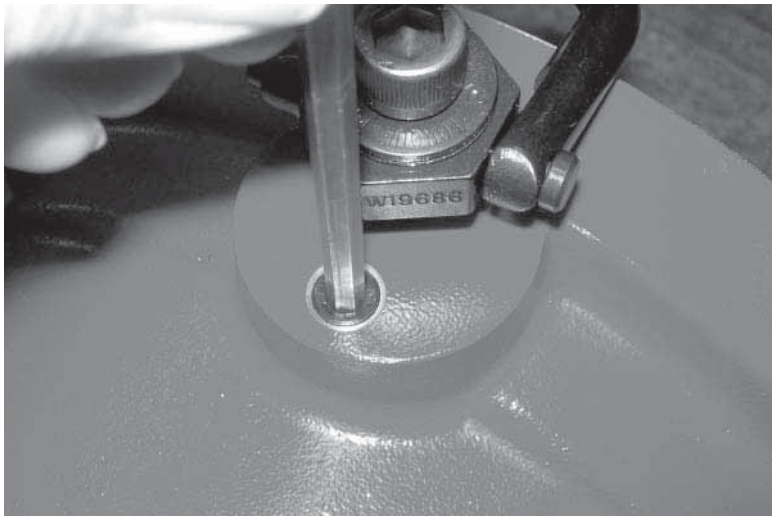


Figure 6-2. Remove the grease plug before putting grease into the main drive assembly.

2. Re-install the plug in the top of the house. Screw the plug in until it is flush; do not screw it in all the way.

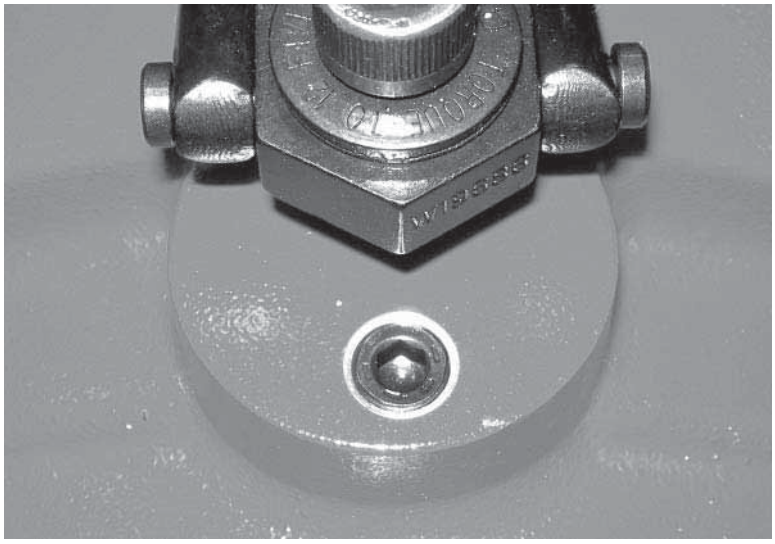


Figure 6-3. Insert the plug and screw it in until it is flush with the top of the housing.

Felt Wipers

Both the rotating head and single-point slide have a felt wiper to lubricate the mandrel. Apply oil directly to the wiper each time you disassemble the machine. If you see the mandrel getting dry, remove the rotating head or single-point slide to lubricate the wiper.

Inspect the condition of the wiper. Replace it if it is damaged, deformed from wear, or very dirty.

Figure 6-4. Apply oil to the felt wiper in the rotating head.

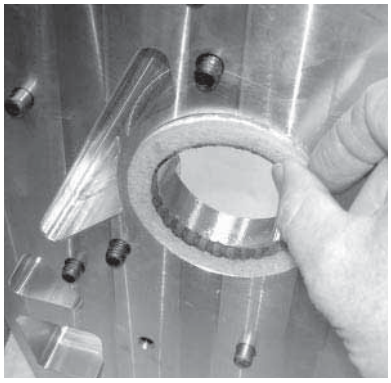


Figure 6-5. Replace felt wipers when they become worn or dirty.

Single-Point Slide

Each time you use the single-point slide, oil the feed screw. Apply a light coating of oil.

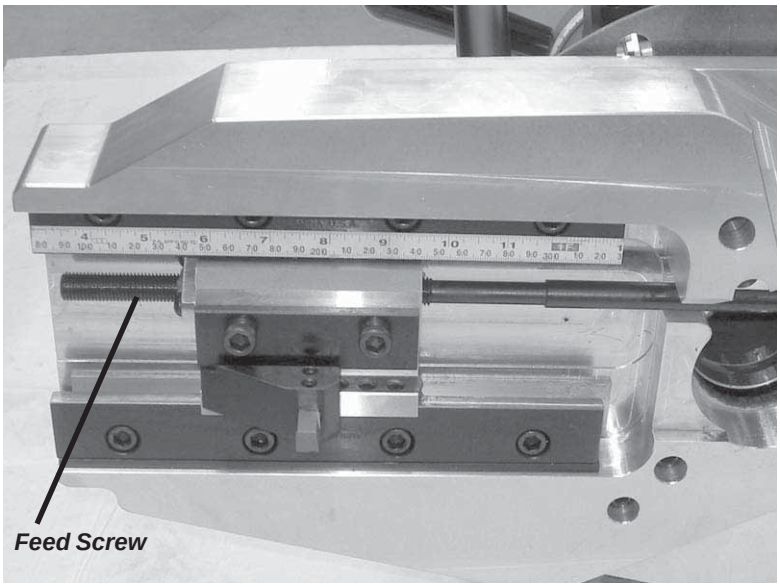


Figure 6-6. Lubricate the feed screw with a light coating of oil.

Mandrel

3. Oil the spline on the mandrel (standard or independent chuck) each time you use it. Apply a light coating of oil.

4. Each time you use the standard mandrel, oil the chuck legs where they engage in the mandrel slots. Apply a light coating of oil.

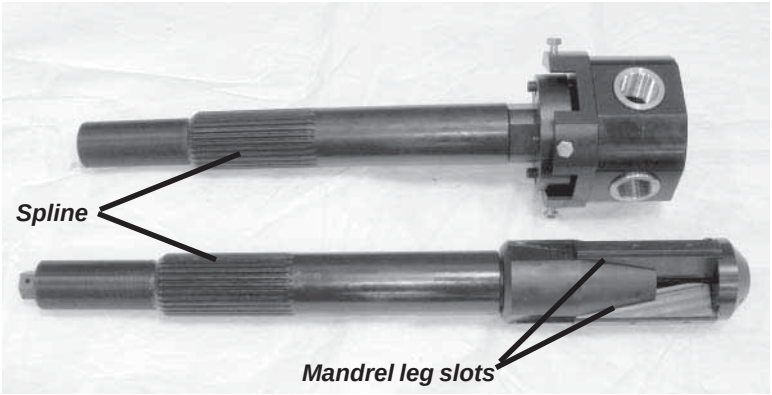


Figure 6-7. Lubricate the mandrels at the points shown. Wipe on a light coating of oil.

Drive Motor Lubrication

The **hydraulic motor** is self-lubricating and requires no routine maintenance.

See the **air motor** manufacturer's manual for full maintenance information. The manual is included at the end of Chapter 7 of this manual. Air motor lubrication guidelines are the following:

- An air line lubricator is recommended with the air motor. Use Ingersoll-Rand No. 50 air motor oil or equivalent.
- Every month, grease the air motor through the grease fitting on the motor. Use Ingersoll-Rand No. 28 grease or equivalent. Inject 1.5 cc of grease.

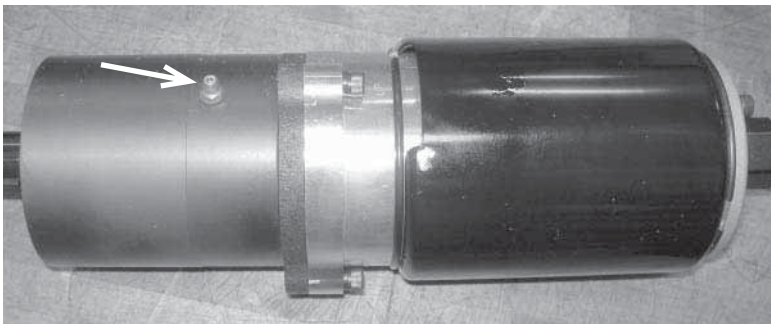


Figure 6-8. Grease the air motor fitting once a month.

Chapter 7
Service and Repair

ADJUSTMENTS

Adjusting the Single-Point Slide

You can adjust the feed tension on the single-point slide. The slide should be adjusted so that you can turn the starwheel by hand using a tight grip. The starwheel should not wobble or turn easily.

If the starwheel is loose or turns too easily, use the following procedure to adjust the tension on the slide.

Tighten the Starwheel Stop Collar

1. Using a 5/32” hex wrench, loosen the screw in the stop collar adjacent to the starwheel.
2. Using the hex wrench in the head of the screw, rotate the stop collar so that it is tight against the starwheel.
3. Re-tighten the screw to secure the stop collar.
4. Check the tension on the starwheel. If it is acceptable, no further adjustment is necessary.

Adding/Removing Gib Shims

Shims are used under the gibs to set the vertical tension on the male slide. Shims are “stacked” to achieve the desired tension.

- Adding shims will loosen the tension on the slide.
- Removing shims will tighten the tension on the slide.

There should always be the same number of shims under both gibs.

As the slide wears, you may have to remove a shim to reset the tension. Check the male slide to see if there is any vertical wobble. If you can move the slide, you will need to remove a shim on each side.

1. Using a 5/16” hex wrench, securely tighten down all 4 screws holding each gib. Check the male slide for vertical wobble. Move the slide to both ends of travel, checking it as you go.

NOTE

If the slide is too tight, you may need to add a shim. The procedure for adding shims is the same.

2. If you can move the slide vertically at any position, remove all 4 screws from each gib and take the gibs off.
3. Remove one shim from each side. Stack the remaining shim(s) and the wear plate to line up the holes in the base plate.
4. Replace the gibs and the screws. Tighten the screws down securely.
5. Move the slide through the full range of travel, checking the tension as you go.

NOTE

If the slide is too tight after you remove a shim, replace the shim and then adjust the tension using the push plate set screws. See instructions in the next section.

Adjust the Push Plate Set Screws

Set the final tension of the slide using the set screws on the side push plate.

There are four set screw holes in the side of the slide. Each hole has a screw for adjusting the push plate, and a second screw inserted as a jam screw.

1. Using a 5/16” hex wrench in the end of the feed screw, turn the screw until the male slide is all the way to the inner end of the screw.
2. Using the 5/16” hex wrench, crack loose the 4 screws on each gib.
3. Using a 5/32” hex wrench, remove the jam screws from all 4 set screw holes.
4. With the 5/32” hex wrench, snug down the 2 set screws on the ends. Slightly loosen the 2 set screws in the middle.

5. Turn the feed screw to move the male slide through the full range of travel. Check for appropriate resistance as you turn the screw, and loosen or tighten the 2 end screws as necessary to adjust the tightness.

6. When the tension is equal along the full length of travel, snug down the 2 middle set screws.

7. Move the slide along the length of travel and adjust the screws as necessary.

8. Replace and tighten the jam screws on all 4 set screws.

Calibrating the Speed Prep Scale

If necessary, you can move the Speed Prep scale to make sure the bevel angle settings are accurate. You should periodically check the calibration, especially if your beveling operation requires very accurate angles.

Use the following procedure to check the calibration and adjust the scale. The procedure includes performing the beveling operation on an actual workpiece, since the calibration depends on a realistic cutting process. See the detailed instructions in Chapter 5 for setting up and performing a single-point bevel.

1. Configure the EP 424 for single-point operation.

2. Mount the machine on a pipe or sample workpiece suitable for single-point beveling.

3. Install a single-point tool in the slide and configure the machine to start the beveling operation.

4. Attach power to the drive motor and operate the machine until it starts to cut the workpiece.

5. Turn off the drive motor.

6. Engage one trip on the trip assembly.

7. Loosen the Speed Prep knob and set it so that the gauge is at 30°. Tighten the knob to lock it in place.

8. Turn the feed handle to set the axial feed scale to 0 (or to any reference reading). Make a note of the reading on the axial feed scale.

9. Start the drive motor. The single-point slide will start to rotate.

10. When the slide reaches the top of rotation, pull out the feed handle to start the autofeed.

11. Count the rotations as the machine operates. When it reaches 10 rotations, push in the feed handle to stop the autofeed. Turn off the drive motor.

12. Note the reading on the axial feed scale. Subtract the original reading at the start from the current reading to determine the measured axial feed.

13. Find the measured axial feed in Table 1 below, and read across for the actual bevel angle. Make a note of the angle.

Table 1: Speed Prep Calibration

Measured Axial Feed*	Actual Bevel Angle (rounded to 0.5°)
.027”	26.5°
.028”	27.5°
.029”	29°
.030”	30°
.031”	31°
.032”	32.5°
.033”	33.5°

* 10 rotations, 1 trip engaged, Speed Prep set to 30°.

14. Using a 5/64” hex wrench, loosen the 2 button head cap screws on the Speed Prep scale, and slide the scale so that the angle you found in the previous step is aligned with the gauge on the Speed Prep knob.
EXAMPLE: If you set the axial feed scale to 0 at the start, and it was at .029” after 10 rotations, you will set the Speed Prep gauge to 29°.

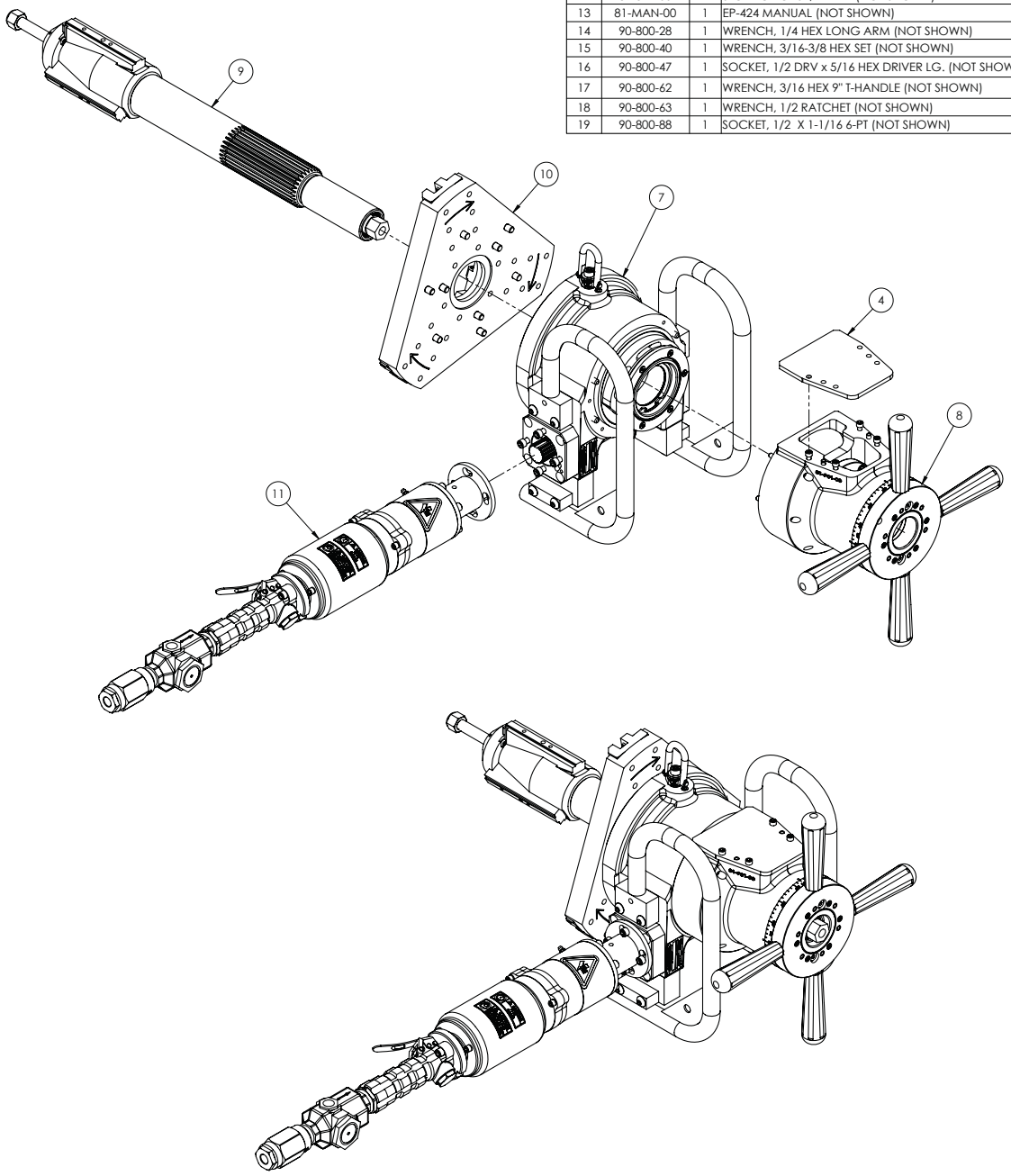
15. Re-tighten the button head cap screws on the scale.

Chapter 8
Parts Lists and Drawings

Refer to the following drawings for parts identification and ordering. Each drawing includes a parts list for the assembly.

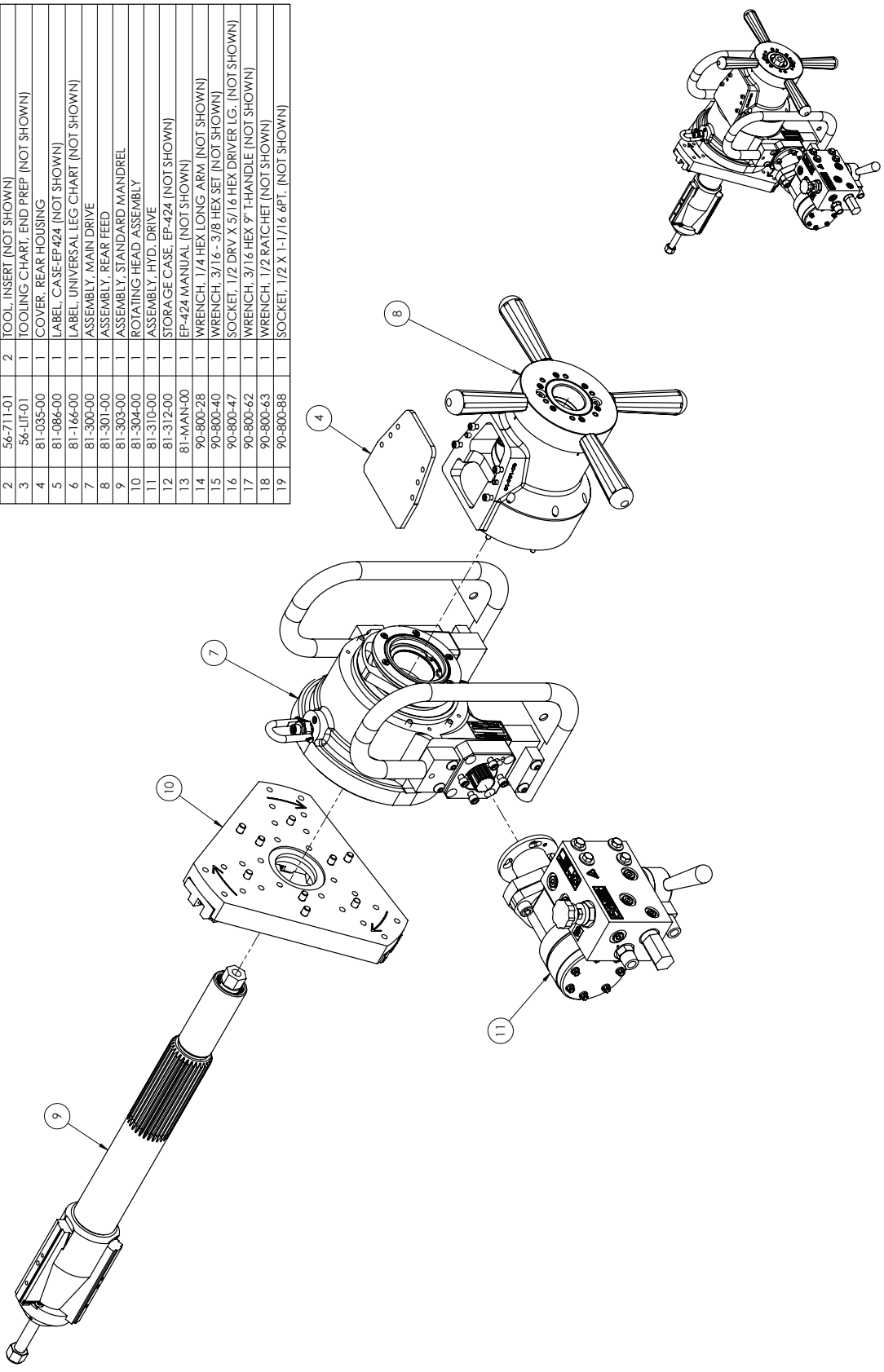
Standard Config., Air Drive (81-000-01)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-710-01	1	SDB INSERT HOLDER KIT (NOT SHOWN)
2	56-711-01	2	TOOL, INSERT (NOT SHOWN)
3	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
4	81-035-00	1	COVER, REAR HOUSING
5	81-086-00	1	LABEL, CASE-EP424 (NOT SHOWN)
6	81-166-00	1	LABEL, UNIVERSAL LEG CHART (NOT SHOWN)
7	81-300-00	1	ASSEMBLY, MAIN DRIVE
8	81-301-00	1	ASSEMBLY, REAR FEED
9	81-303-00	1	ASSEMBLY, STANDARD MANDREL
10	81-304-00	1	ROTATING HEAD ASSEMBLY
11	81-311-00	1	ASSEMBLY, AIR DRIVE
12	81-312-00	1	STORAGE CASE, EP-424 (NOT SHOWN)
13	81-MAN-00	1	EP-424 MANUAL (NOT SHOWN)
14	90-800-28	1	WRENCH, 1/4 HEX LONG ARM (NOT SHOWN)
15	90-800-40	1	WRENCH, 3/16-3/8 HEX SET (NOT SHOWN)
16	90-800-47	1	SOCKET, 1/2 DRV x 5/16 HEX DRIVER LG. (NOT SHOWN)
17	90-800-62	1	WRENCH, 3/16 HEX 9" T-HANDLE (NOT SHOWN)
18	90-800-63	1	WRENCH, 1/2 RATCHET (NOT SHOWN)
19	90-800-88	1	SOCKET, 1/2 X 1-1/16 6-PT (NOT SHOWN)



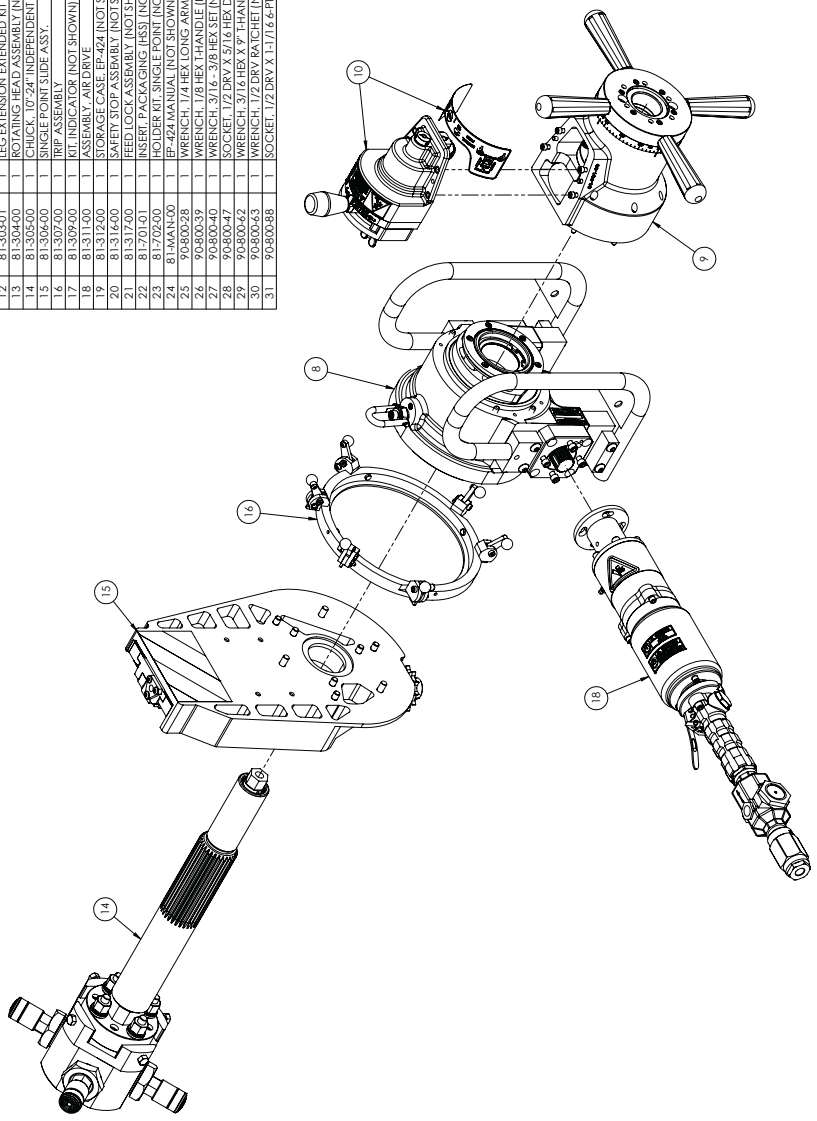
Standard Config., Hydraulic Drive (81-000-02)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-710-01	1	SDB INSERT HOLDER KIT (NOT SHOWN)
2	56-711-01	2	TOOL, INSERT (NOT SHOWN)
3	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
4	81-035-00	1	COVER, REAR HOUSING
5	81-086-00	1	LABEL, CASE-EP424 (NOT SHOWN)
6	81-166-00	1	LABEL, UNIVERSAL LEG CHART (NOT SHOWN)
7	81-300-00	1	ASSEMBLY, MAIN DRIVE
8	81-301-00	1	ASSEMBLY, REAR FEED
9	81-303-00	1	ASSEMBLY, STANDARD MANDREL
10	81-304-00	1	ROTATING HEAD ASSEMBLY
11	81-310-00	1	ASSEMBLY, HYD. DRIVE
12	81-312-00	1	STORAGE CASE, EP-424 (NOT SHOWN)
13	81-MAN-00	1	EP-424 MANUAL (NOT SHOWN)
14	90-800-28	1	WRENCH, 1/4 HEX LONG ARM (NOT SHOWN)
15	90-800-40	1	WRENCH, 3/16 - 3/8 HEX SET (NOT SHOWN)
16	90-800-47	1	SOCKET, 1/2 DRV X 5/16 HEX DRIVER LG. (NOT SHOWN)
17	90-800-62	1	WRENCH, 3/16 HEX 9" T-HANDLE (NOT SHOWN)
18	90-800-63	1	WRENCH, 1/2 RATCHET (NOT SHOWN)
19	90-800-88	1	SOCKET, 1/2 X 1-1/16 6PT. (NOT SHOWN)

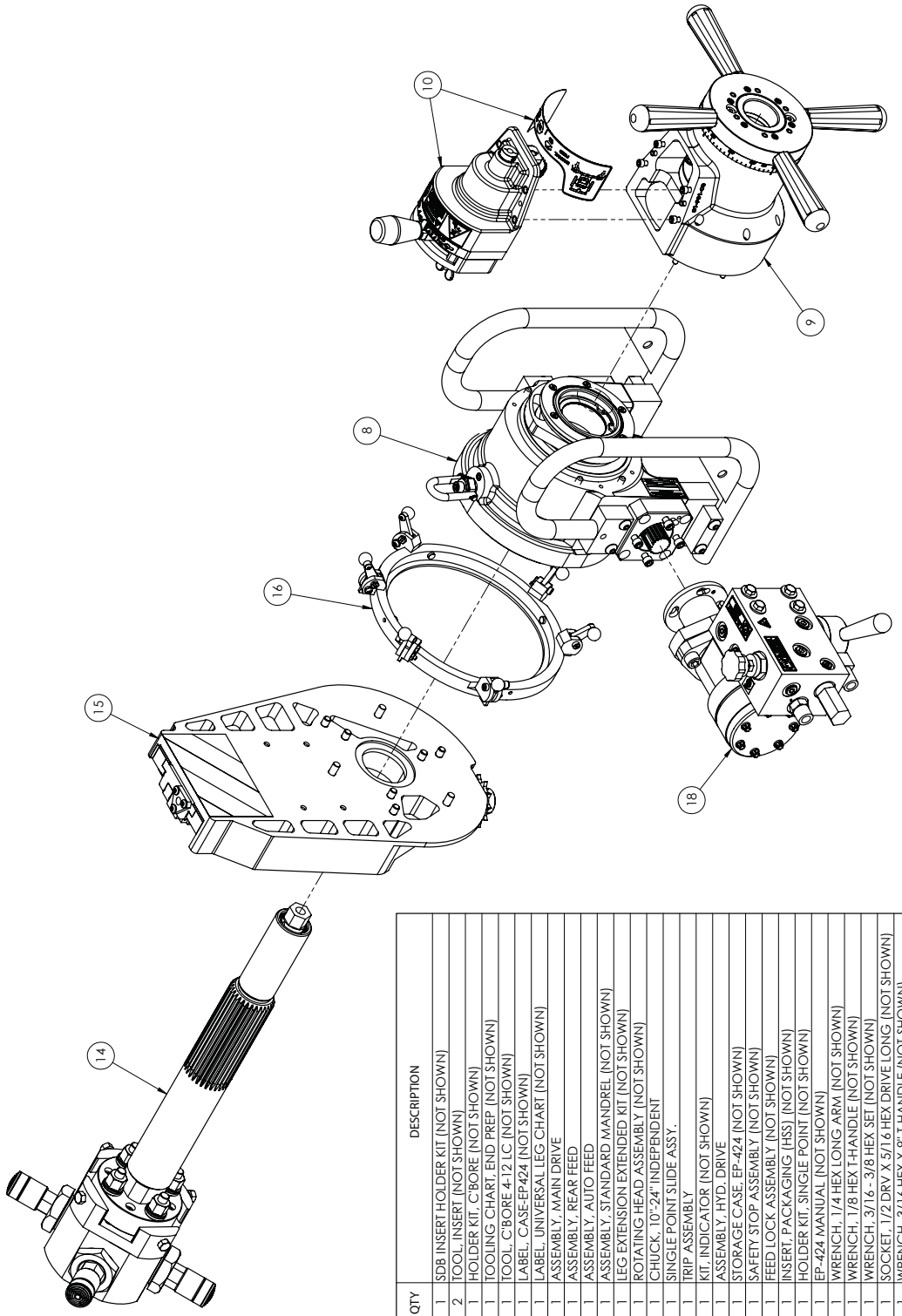


Single-Point with Independent Chuck, Air Drive (81-000-03)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-710-01	1	SDB INSERT HOLDER KIT (NOT SHOWN)
2	56-711-01	2	TOOL, INSERT (NOT SHOWN)
3	56-715-00	1	HOLDER KIT, C'BORE (NOT SHOWN)
4	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
5	60-700-04	1	TOOL, C'BORE 4-12 LC (NOT SHOWN)
6	81-086-00	1	LABEL, CASE-EP424 (NOT SHOWN)
7	81-166-00	1	LABEL, UNIVERSAL LEG CHART (NOT SHOWN)
8	81-300-00	1	ASSEMBLY, MAIN DRIVE
9	81-301-00	1	ASSEMBLY, REAR FEED
10	81-302-00	1	ASSEMBLY, AUTO FEED
11	81-303-00	1	ASSEMBLY, STANDARD MANDREL (NOT SHOWN)
12	81-303-01	1	LEG EXTENSION EXTENDED KIT (NOT SHOWN)
13	81-304-00	1	ROTATING HEAD ASSEMBLY (NOT SHOWN)
14	81-305-00	1	CHUCK, 10"-24" INDEPENDENT
15	81-306-00	1	SINGLE POINT SLIDE ASSY.
16	81-307-00	1	TRIP ASSEMBLY
17	81-309-00	1	KIT, INDICATOR (NOT SHOWN)
18	81-311-00	1	ASSEMBLY, AIR DRIVE
19	81-312-00	1	STORAGE CASE, EP-424 (NOT SHOWN)
20	81-316-00	1	SAFETY STOP ASSEMBLY (NOT SHOWN)
21	81-317-00	1	FEED LOCK ASSEMBLY (NOT SHOWN)
22	81-701-01	1	INSERT, PACKAGING (HSS) (NOT SHOWN)
23	81-702-00	1	HOLDER KIT, SINGLE POINT (NOT SHOWN)
24	81-MAN-00	1	EP-424 MANUAL (NOT SHOWN)
25	90-800-28	1	WRENCH, 1/4 HEX LONG ARM (NOT SHOWN)
26	90-800-39	1	WRENCH, 1/8 HEX T-HANDLE (NOT SHOWN)
27	90-800-40	1	WRENCH, 3/16 - 3/8 HEX SET (NOT SHOWN)
28	90-800-47	1	SOCKET, 1/2 DRV X 5/16 HEX DRIVE LONG (NOT SHOWN)
29	90-800-62	1	WRENCH, 3/16 HEX X 9" T-HANDLE (NOT SHOWN)
30	90-800-63	1	WRENCH, 1/2 DRV RATCHET (NOT SHOWN)
31	90-800-88	1	SOCKET, 1/2 DRV X 1-1/16 6-PT. (NOT SHOWN)



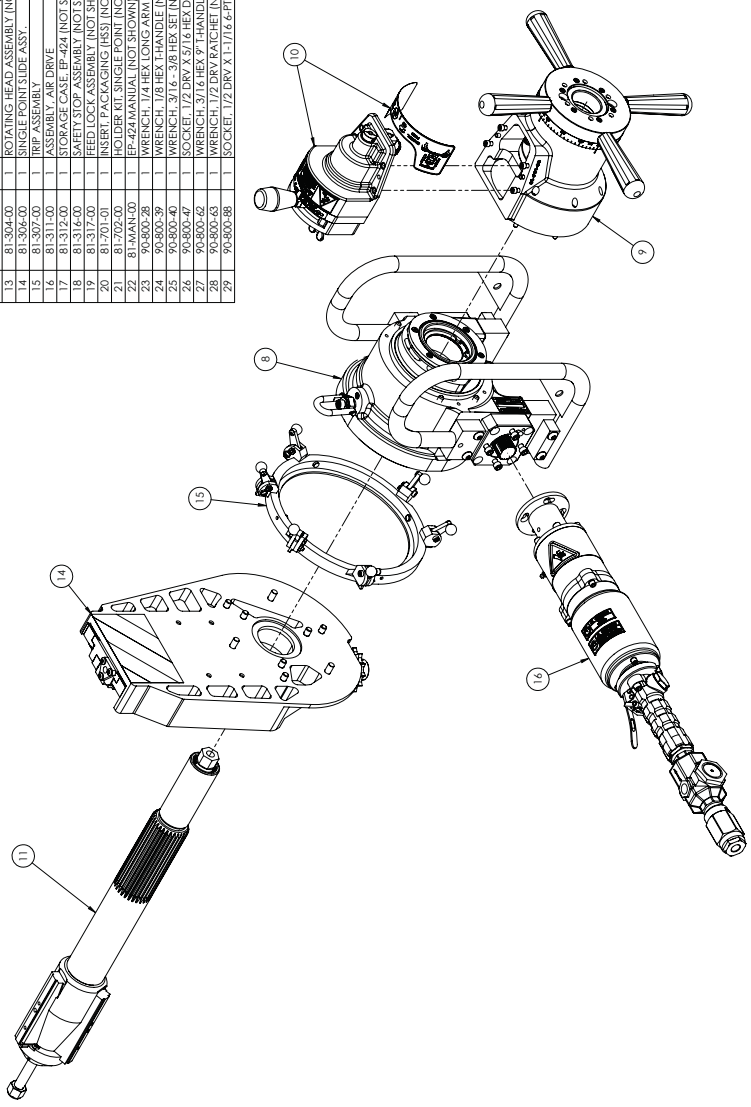
Single-Point with Independent Chuck, Hydraulic Drive (81-000-04)



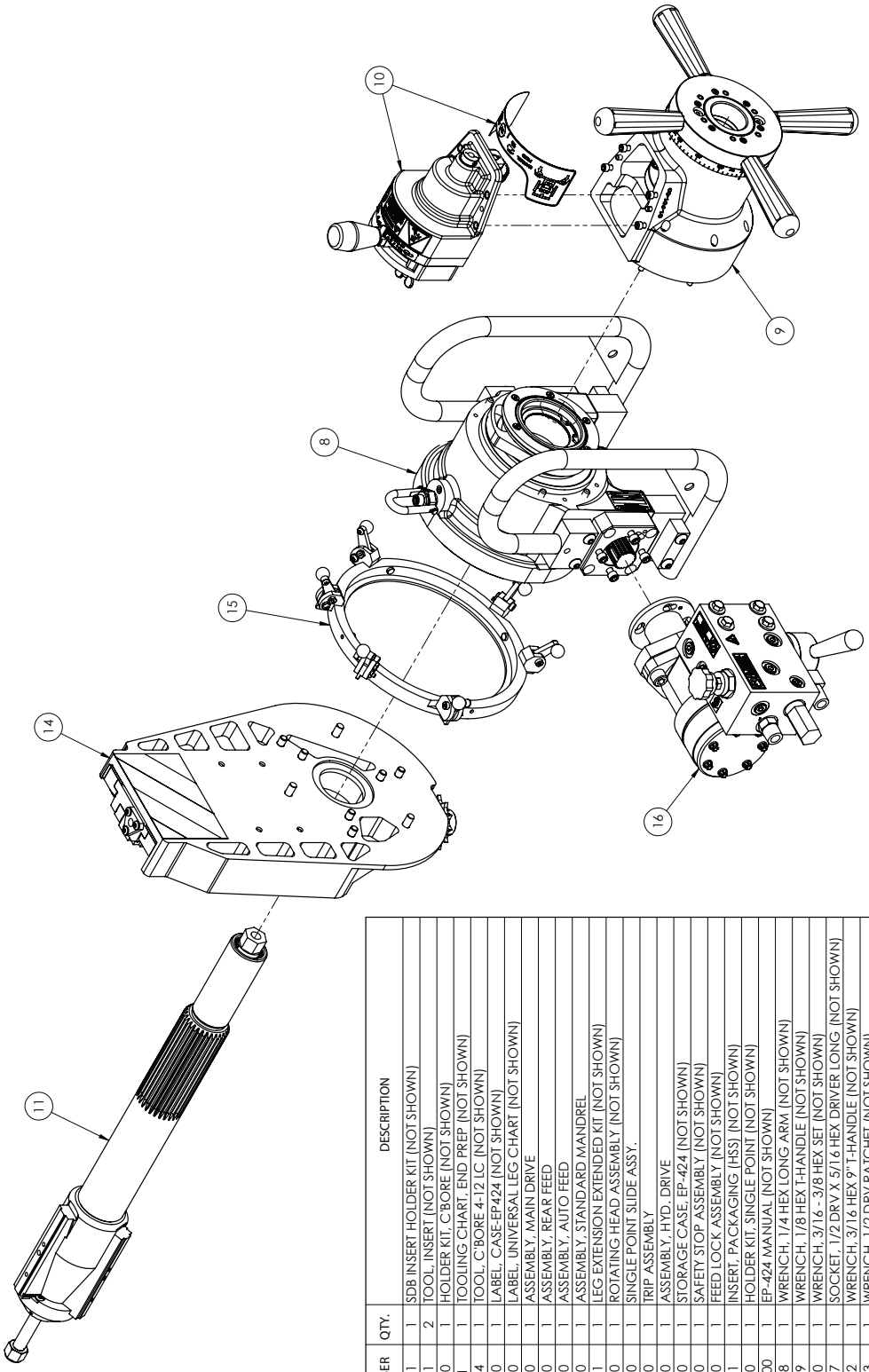
ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-710-01	1	SDB INSERT HOLDER KIT (NOT SHOWN)
2	56-711-01	2	TOOL, INSERT (NOT SHOWN)
3	56-715-00	1	HOLDER KIT, C'BORE (NOT SHOWN)
4	56-UT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
5	60-700-04	1	TOOL, C'BORE 4-12 LC (NOT SHOWN)
6	81-086-00	1	LABEL, CASE-EP 424 (NOT SHOWN)
7	81-166-00	1	LABEL, UNIVERSAL LEG CHART (NOT SHOWN)
8	81-300-00	1	ASSEMBLY, MAIN DRIVE
9	81-301-00	1	ASSEMBLY, REAR FEED
10	81-302-00	1	ASSEMBLY, AUTO FEED
11	81-303-00	1	ASSEMBLY, STANDARD MANDREL (NOT SHOWN)
12	81-303-01	1	LEG EXTENSION EXTENDED KIT (NOT SHOWN)
13	81-304-00	1	ROTATING HEAD ASSEMBLY (NOT SHOWN)
14	81-305-00	1	CHUCK, 10"-24" INDEPENDENT
15	81-306-00	1	SINGLE POINT SLIDE ASSY.
16	81-307-00	1	TRIP ASSEMBLY
17	81-309-00	1	KIT, INDICATOR (NOT SHOWN)
18	81-310-00	1	ASSEMBLY, HYD. DRIVE
19	81-312-00	1	STORAGE CASE, EP-424 (NOT SHOWN)
20	81-316-00	1	SAFETY STOP ASSEMBLY (NOT SHOWN)
21	81-317-00	1	FEED LOCK ASSEMBLY (NOT SHOWN)
22	81-701-01	1	INSERT, PACKAGING (HSS) (NOT SHOWN)
23	81-702-00	1	HOLDER KIT, SINGLE POINT (NOT SHOWN)
24	81-MAN-00	1	EP-424 MANUAL (NOT SHOWN)
25	90-800-28	1	WRENCH, 1/4 HEX LONG ARM (NOT SHOWN)
26	90-800-39	1	WRENCH, 1/8 HEX T-HANDLE (NOT SHOWN)
27	90-800-40	1	WRENCH, 3/16 - 3/8 HEX SET (NOT SHOWN)
28	90-800-47	1	SOCKET, 1/2 DRV X 5/16 HEX DRIVE LONG (NOT SHOWN)
29	90-800-62	1	WRENCH, 3/16 HEX X 9" T-HANDLE (NOT SHOWN)
30	90-800-63	1	WRENCH, 1/2 DRV RATCHET (NOT SHOWN)
31	90-800-88	1	SOCKET, 1/2 DRV X 1-1/16 6-PT. (NOT SHOWN)

Single-Point with Standard Mandrel, Air Drive (81-000-05)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-710-01	1	SDB INSERT HOLDER KIT (NOT SHOWN)
2	56-711-01	2	TOOL, INSERT (NOT SHOWN)
3	56-715-00	1	HOLDER KIT, C'BORE (NOT SHOWN)
4	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
5	60-700-04	1	TOOL, C'BORE 4-12 I.C. (NOT SHOWN)
6	81-086-00	1	LABEL, CASE-EP424 (NOT SHOWN)
7	81-166-00	1	LABEL, UNIVERSAL LEG CHART (NOT SHOWN)
8	81-300-00	1	ASSEMBLY, MAIN DRIVE
9	81-301-00	1	ASSEMBLY, REAR FEED
10	81-302-00	1	ASSEMBLY, AUTO FEED
11	81-303-00	1	ASSEMBLY, STANDARD MANDREL
12	81-303-01	1	LEG EXTENSION EXTENDED KIT (NOT SHOWN)
13	81-304-00	1	ROTATING HEAD ASSEMBLY (NOT SHOWN)
14	81-306-00	1	SINGLE POINT SLIDE ASSY.
15	81-307-00	1	TRIP ASSEMBLY
16	81-311-00	1	ASSEMBLY, AIR DRIVE
17	81-312-00	1	STORAGE CASE, EP-424 (NOT SHOWN)
18	81-316-00	1	SAFETY STOP ASSEMBLY (NOT SHOWN)
19	81-317-00	1	FEED LOCK ASSEMBLY (NOT SHOWN)
20	81-701-01	1	INSERT, PACKAGING (HSS) (NOT SHOWN)
21	81-702-00	1	HOLDER KIT, SINGLE POINT (NOT SHOWN)
22	81-MAN-00	1	EP-424 MANUAL (NOT SHOWN)
23	90-800-28	1	WRENCH, 1/4 HEX LONG ARM (NOT SHOWN)
24	90-800-39	1	WRENCH, 1/8 HEX T-HANDLE (NOT SHOWN)
25	90-800-40	1	WRENCH, 3/16 - 3/8 HEX SET (NOT SHOWN)
26	90-800-47	1	SOCKET, 1/2 DRV X 5/16 HEX DRIVER LONG (NOT SHOWN)
27	90-800-62	1	WRENCH, 3/16 HEX 9" T-HANDLE (NOT SHOWN)
28	90-800-63	1	WRENCH, 1/2 DRV RATCHET (NOT SHOWN)
29	90-800-88	1	SOCKET, 1/2 DRV X 1-1/16 6-PT. (NOT SHOWN)



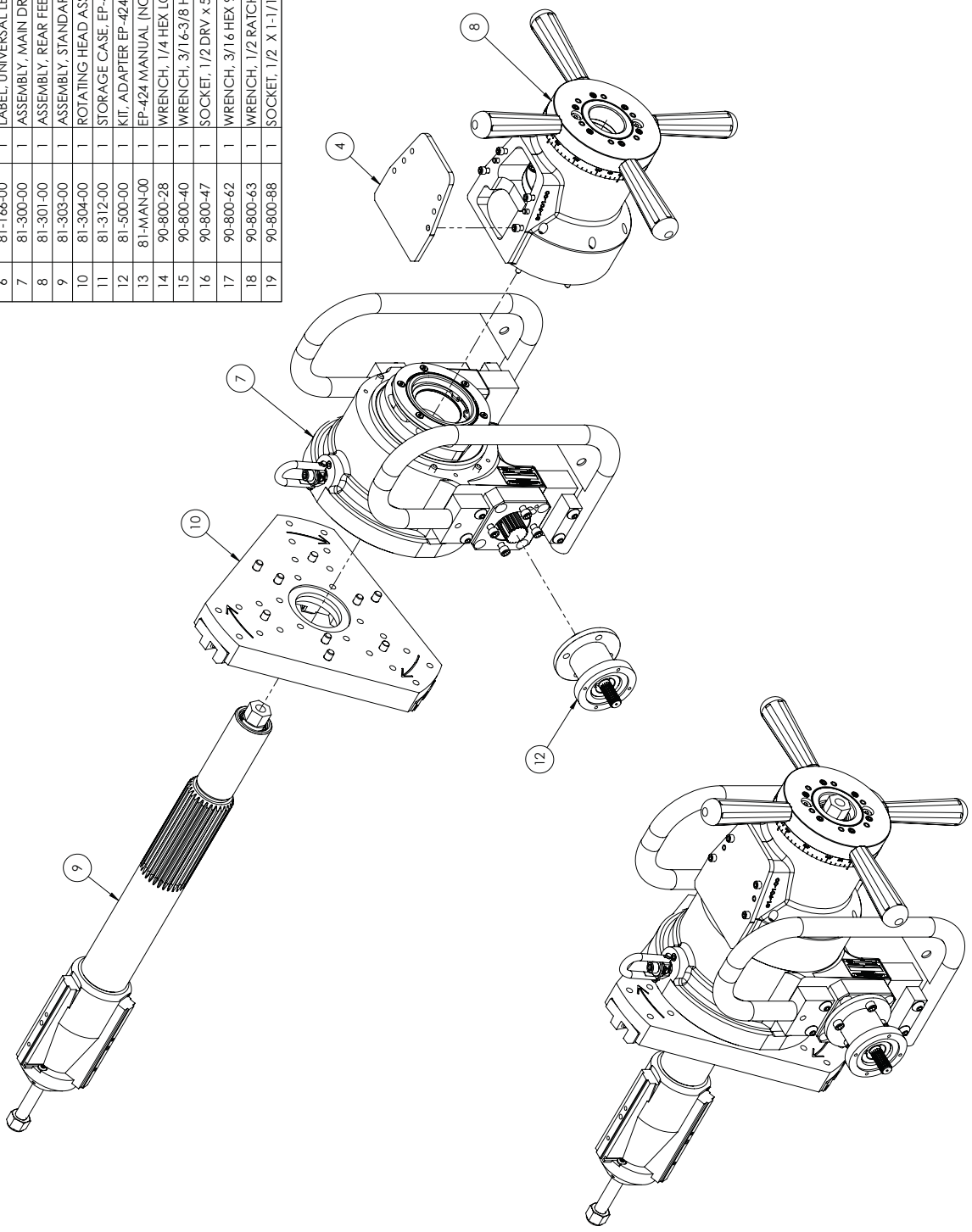
Single-Point with Standard Mandrel, Air Drive (81-000-06)



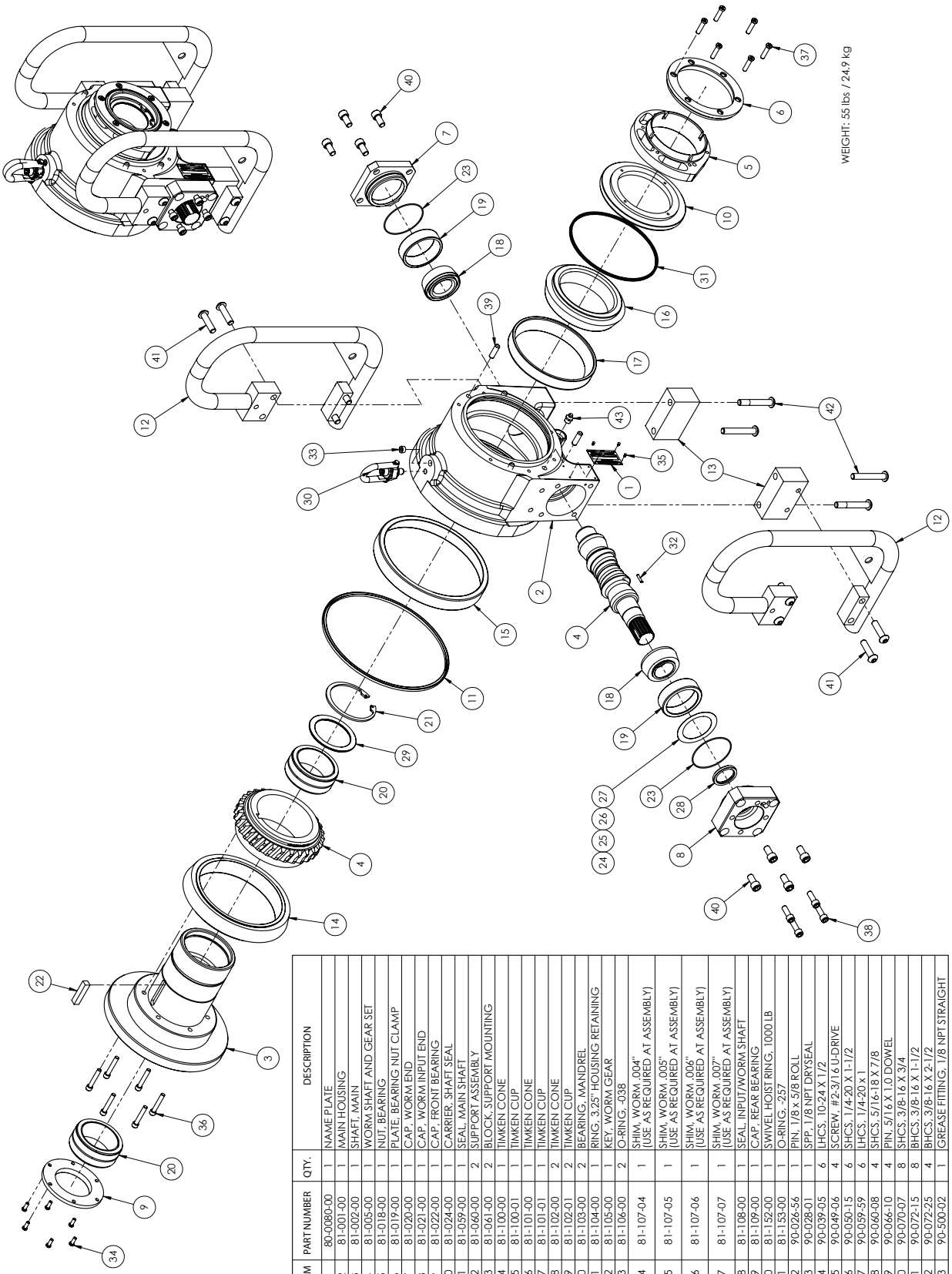
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-710-01	1	SDB INSERT HOLDER KIT (NOT SHOWN)
2	56-711-01	2	TOOL, INSERT (NOT SHOWN)
3	56-715-00	1	HOLDER KIT, C'BORE (NOT SHOWN)
4	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
5	60-700-04	1	TOOL, C'BORE 4-12 LIC (NOT SHOWN)
6	81-086-00	1	LABEL, CASE-EP424 (NOT SHOWN)
7	81-166-00	1	LABEL, UNIVERSAL LEG CHART (NOT SHOWN)
8	81-300-00	1	ASSEMBLY, MAIN DRIVE
9	81-301-00	1	ASSEMBLY, REAR FEED
10	81-302-00	1	ASSEMBLY, AUTO FEED
11	81-303-00	1	ASSEMBLY, STANDARD MANDREL
12	81-303-01	1	LEG EXTENSION EXTENDED KIT (NOT SHOWN)
13	81-304-00	1	ROTATING HEAD ASSEMBLY (NOT SHOWN)
14	81-306-00	1	SINGLE POINT SLIDE ASSY.
15	81-307-00	1	TRIP ASSEMBLY
16	81-310-00	1	ASSEMBLY, HYD. DRIVE
17	81-312-00	1	STORAGE CASE, EP-424 (NOT SHOWN)
18	81-316-00	1	SAFETY STOP ASSEMBLY (NOT SHOWN)
19	81-317-00	1	FEED LOCK ASSEMBLY (NOT SHOWN)
20	81-701-01	1	INSERT, PACKAGING (HSS) (NOT SHOWN)
21	81-702-00	1	HOLDER KIT, SINGLE POINT (NOT SHOWN)
22	81-MAN-00	1	EP-424 MANUAL (NOT SHOWN)
23	90-800-28	1	WRENCH, 1/4 HEX LONG ARM (NOT SHOWN)
24	90-800-39	1	WRENCH, 1/8 HEX T-HANDLE (NOT SHOWN)
25	90-800-40	1	WRENCH, 3/16 - 3/8 HEX SET (NOT SHOWN)
26	90-800-47	1	SOCKET, 1/2 DRV X 5/16 HEX DRIVER LONG (NOT SHOWN)
27	90-800-62	1	WRENCH, 3/16 HEX 9" T-HANDLE (NOT SHOWN)
28	90-800-63	1	WRENCH, 1/2 DRV RATCHET (NOT SHOWN)
29	90-800-88	1	SOCKET, 1/2 DRV X 1-1/16 6 PT. (NOT SHOWN)

Standard Config. with Electric Drive Adapter (81-000-07)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-710-01	1	SDB INSERT HOLDER KIT (NOT SHOWN)
2	56-711-01	2	TOOL, INSERT (NOT SHOWN)
3	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
4	81-035-00	1	COVER, REAR HOUSING
5	81-086-00	1	LABEL, CASE-EP424 (NOT SHOWN)
6	81-166-00	1	LABEL, UNIVERSAL LEG CHART (NOT SHOWN)
7	81-300-00	1	ASSEMBLY, MAIN DRIVE
8	81-301-00	1	ASSEMBLY, REAR FEED
9	81-303-00	1	ASSEMBLY, STANDARD MANDREL
10	81-304-00	1	ROTATING HEAD ASSEMBLY
11	81-312-00	1	STORAGE CASE, EP-424 (NOT SHOWN)
12	81-500-00	1	KIT, ADAPTER EP-424 TO EPD
13	81-MAN-00	1	EP-424 MANUAL (NOT SHOWN)
14	90-800-28	1	WRENCH, 1/4 HEX LONG ARM (NOT SHOWN)
15	90-800-40	1	WRENCH, 3/16-3/8 HEX SET (NOT SHOWN)
16	90-800-47	1	SOCKET, 1/2 DRV x 5/16 HEX DRIVER LG. (NOT SHOWN)
17	90-800-62	1	WRENCH, 3/16 HEX 9" T-HANDLE (NOT SHOWN)
18	90-800-63	1	WRENCH, 1/2 RATCHET (NOT SHOWN)
19	90-800-88	1	SOCKET, 1/2 X 1-1/16 6-PT (NOT SHOWN)



Main Drive Assembly (81-300-00)

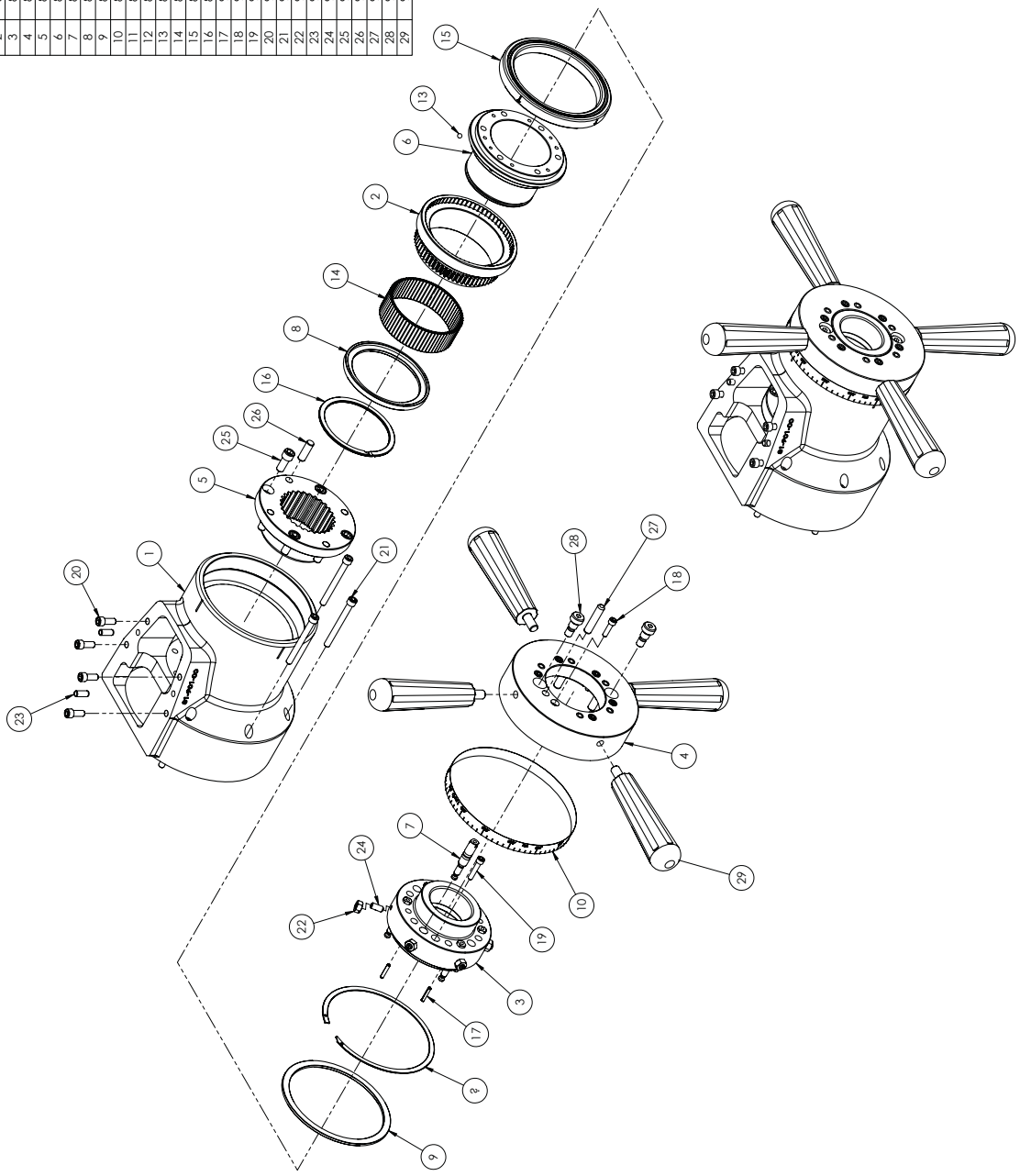


ITEM	PART NUMBER	QTY.	DESCRIPTION
1	80-0080-00	1	NAME PLATE
2	81-001-00	1	MAIN HOUSING
3	81-002-00	1	SHAFT, MAIN
4	81-005-00	1	WORM SHAFT AND GEAR SET
5	81-018-00	1	NUT, BEARING
6	81-019-00	1	PLATE, BEARING NUT CLAMP
7	81-020-00	1	CAP , WORM END
8	81-021-00	1	CAP , WORM INPUT END
9	81-022-00	1	CAP , FRONT BEARING
10	81-024-00	1	CARRIER, SHAFT SEAL
11	81-059-00	1	SEAL, MAIN SHAFT
12	81-060-00	2	SUPPORT ASSEMBLY
13	81-061-00	2	BLOCK, SUPPORT MOUNTING
14	81-100-00	1	TIMKEN CONE
15	81-100-01	1	TIMKEN CUP
16	81-101-00	1	TIMKEN CONE
17	81-101-01	1	TIMKEN CUP
18	81-102-00	2	TIMKEN CONE
19	81-102-01	2	TIMKEN CUP
20	81-103-00	2	BEARING, MANDREL
21	81-104-00	1	RING, 3.25" HOUSING RETAINING
22	81-105-00	1	KEY , WORM GEAR
23	81-106-00	2	O-RING, -038
24	81-107-04	1	SHIM, WORM .004" (USE AS REQUIRED AT ASSEMBLY)
25	81-107-05	1	SHIM, WORM .005" (USE AS REQUIRED AT ASSEMBLY)
26	81-107-06	1	SHIM, WORM .006" (USE AS REQUIRED AT ASSEMBLY)
27	81-107-07	1	SHIM, WORM .007" (USE AS REQUIRED AT ASSEMBLY)
28	81-108-00	1	SEAL, INPUT/WORM SHAFT
29	81-109-00	1	CAP , REAR BEARING
30	81-152-00	1	SWIVEL HOIST RING, 1000 LB
31	81-153-00	1	O-RING, -257
32	90-026-56	1	PIN, 1/8 x 5/8 ROLL
33	90-028-01	1	SPP, 1/8 NPT DRYSEAL
34	90-039-05	6	LHCS, 10-24 X 1/2
35	90-049-06	4	SCREW, #2-3/16 U-DRIVE
36	90-050-15	6	SHCS, 1/4-20 X 1-1/2
37	90-059-59	6	LHCS, 1/4-20 x 1
38	90-060-08	4	SHCS, 5/16-18 X 7/8
39	90-066-10	4	PIN, 5/16 X 1.0 DOWEL
40	90-070-07	8	SHCS, 3/8-16 X 3/4
41	90-072-15	8	BHCS, 3/8-16 X 1-1/2
42	90-072-25	4	BHCS, 3/8-16 X 2-1/2
43	90-500-02	1	GREASE FITTING, 1/8 NPT STRAIGHT

Rear Feed Assembly (81-301-00)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	81-012-00	1	HOUSING, REAR
2	81-013-00	1	GEAR, 61T FEED NUT DRIVE
3	81-014-00	1	NUT, FEED
4	81-015-00	1	HANDLE, FEED
5	81-016-00	1	COUPLING, SPLINED
6	81-041-00	1	ADAPTER, FEED NUT DRIVE
7	81-042-00	6	PIN, SHIFTER
8	81-110-00	1	SHIELD
9	81-111-00	1	SHEILD, REAR BEARING
10	81-112-00	1	TAPER MEASURE
11	81-112-01	1	SCALE, AXIAL FEED (MM) (NOT SHOWN)
12	81-113-00	1	MODIFIED RING, SPIRAL RETAINING
13	81-114-00	6	DETENT, BALL
14	81-115-00	1	BEARING, DRIVE GEAR
15	81-116-00	1	BEARING, FEED NUT
16	81-117-00	1	RING, SPIRAL RETAINING
17	90-026-57	2	PIN, 1/8 X 3/4 ROLL
18	90-040-07	6	SHCS, 10-24 X 3/4
19	90-040-10	4	SHCS, 10-24 X 1
20	90-050-06	4	SHCS, 1/4-20 X 5/8
21	90-050-25	7	SHCS 1/4-20 X 2.5
22	90-055-01	6	NUT, 1/4-20 HEX
23	90-056-06	2	PIN, 1/4 X 5/8 DOWEL
24	90-059-18	6	PLUNGER, 1/4-20 x 1/2 HVY SPRNG BALL
25	90-060-07	4	SHCS, 5/16-18 X 3/4
26	90-066-10	4	PIN, 5/16 X 1.0 DOWEL
27	90-066-15	6	PIN, 5/16 X 1-1/2 DOWEL
28	90-077-53	2	SHSB, 3/8 X 3/8
29	90-900-67	4	HANDLE, FEED

WEIGHT: 22.5 lbs / 10.2 kg



Speed Prep Auto Feed (81-302-00)

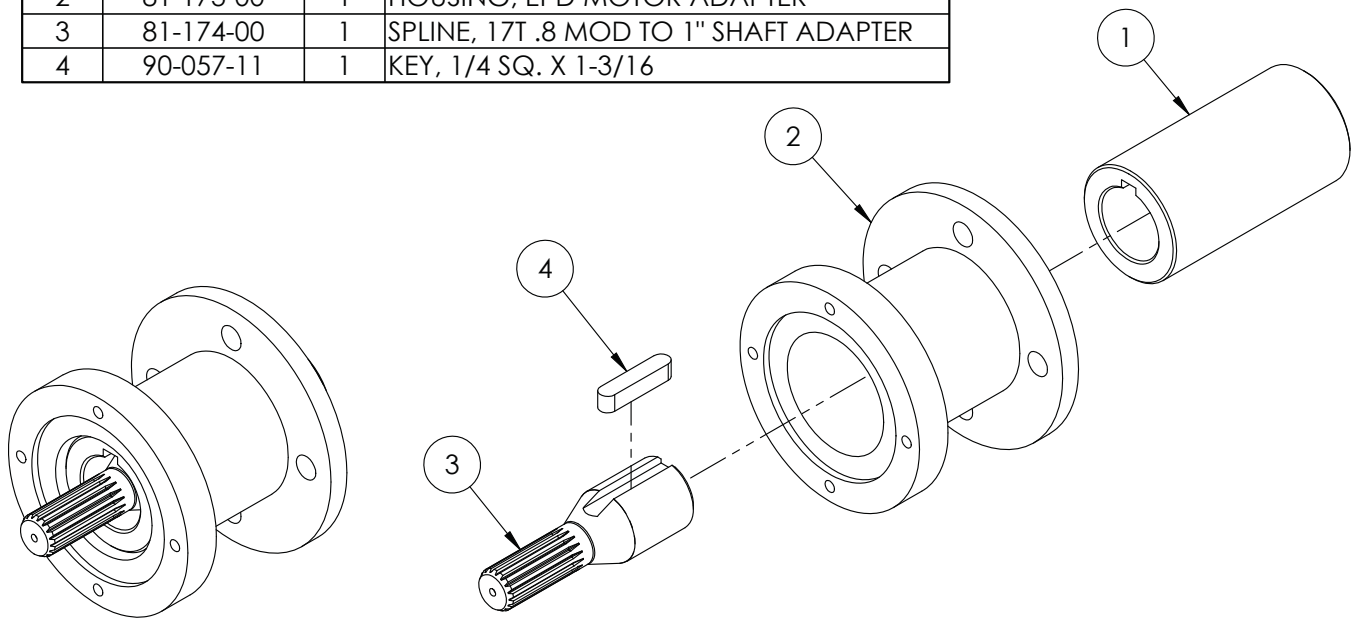
WEIGHT: 7.5 lbs / 3.4 kg

EP 424 Auto Feed Assembly
81-302-00

Contact E.H. Wachs for repair part information.

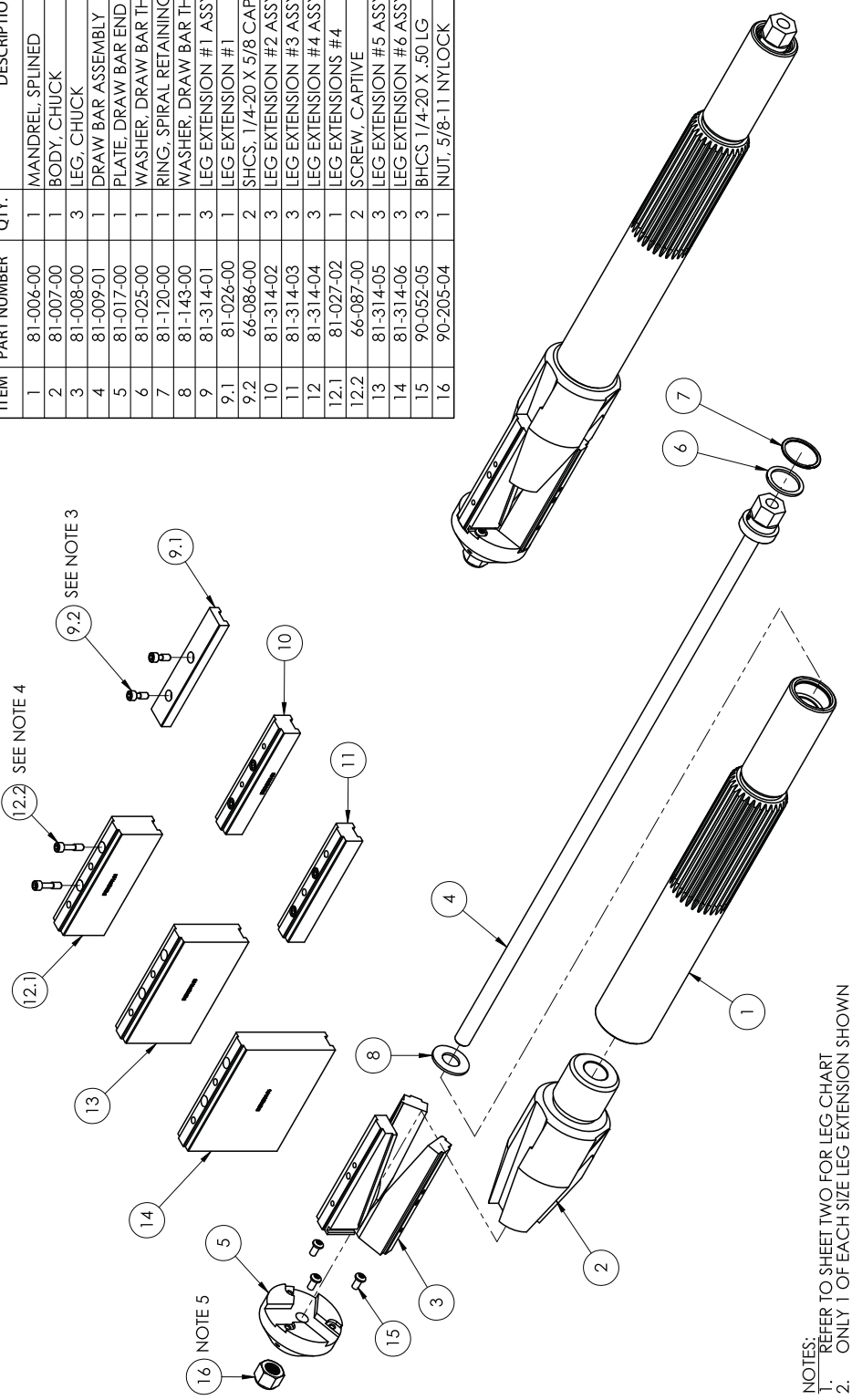
EPD Electric Drive Adapter Kit (81-500-00)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	81-032-00	1	COUPLING, MOTOR ADAPTER
2	81-173-00	1	HOUSING, EPD MOTOR ADAPTER
3	81-174-00	1	SPLINE, 17T .8 MOD TO 1" SHAFT ADAPTER
4	90-057-11	1	KEY, 1/4 SQ. X 1-3/16



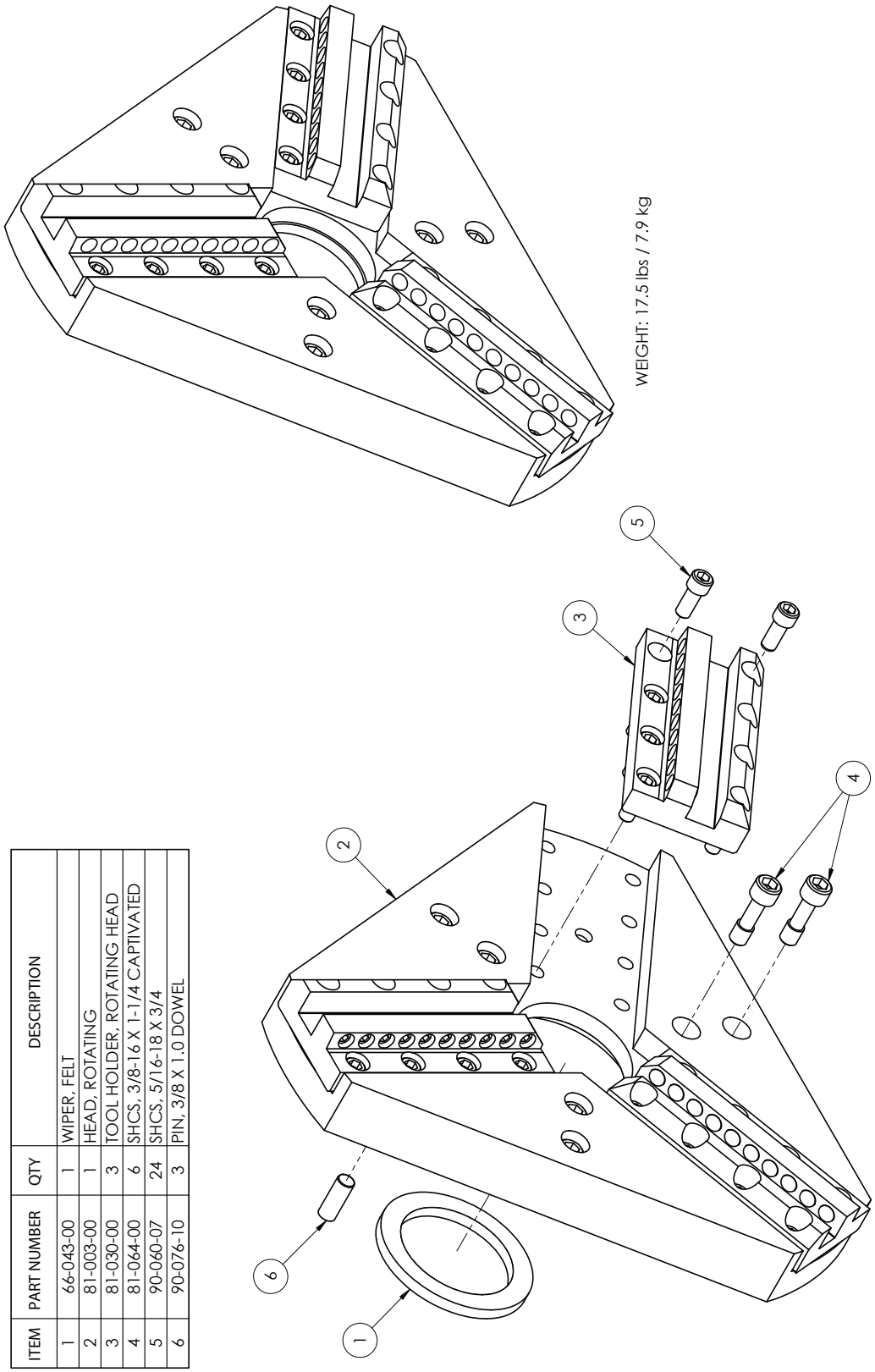
Standard Mandrel Assembly (81-303-00)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	81-006-00	1	MANDREL, SPLINED
2	81-007-00	1	BODY, CHUCK
3	81-008-00	3	LEG, CHUCK
4	81-009-01	1	DRAW BAR ASSEMBLY
5	81-017-00	1	PLATE, DRAW BAR END
6	81-025-00	1	WASHER, DRAW BAR THRUST
7	81-120-00	1	RING, SPIRAL RETAINING
8	81-143-00	1	WASHER, DRAW BAR THRUST
9	81-314-01	3	LEG EXTENSION #1 ASSY.
9.1	81-026-00	1	LEG EXTENSION #1
9.2	66-086-00	2	SHCS, 1/4-20 X 5/8 CAPTIVATED
10	81-314-02	3	LEG EXTENSION #2 ASSY.
11	81-314-03	3	LEG EXTENSION #3 ASSY.
12	81-314-04	3	LEG EXTENSION #4 ASSY.
12.1	81-027-02	1	LEG EXTENSIONS #4
12.2	66-087-00	2	SCREW, CAPTIVE
13	81-314-05	3	LEG EXTENSION #5 ASSY.
14	81-314-06	3	LEG EXTENSION #6 ASSY.
15	90-052-05	3	BHCS 1/4-20 X .50 LG
16	90-205-04	1	NUT, 5/8-11 NYLOCK



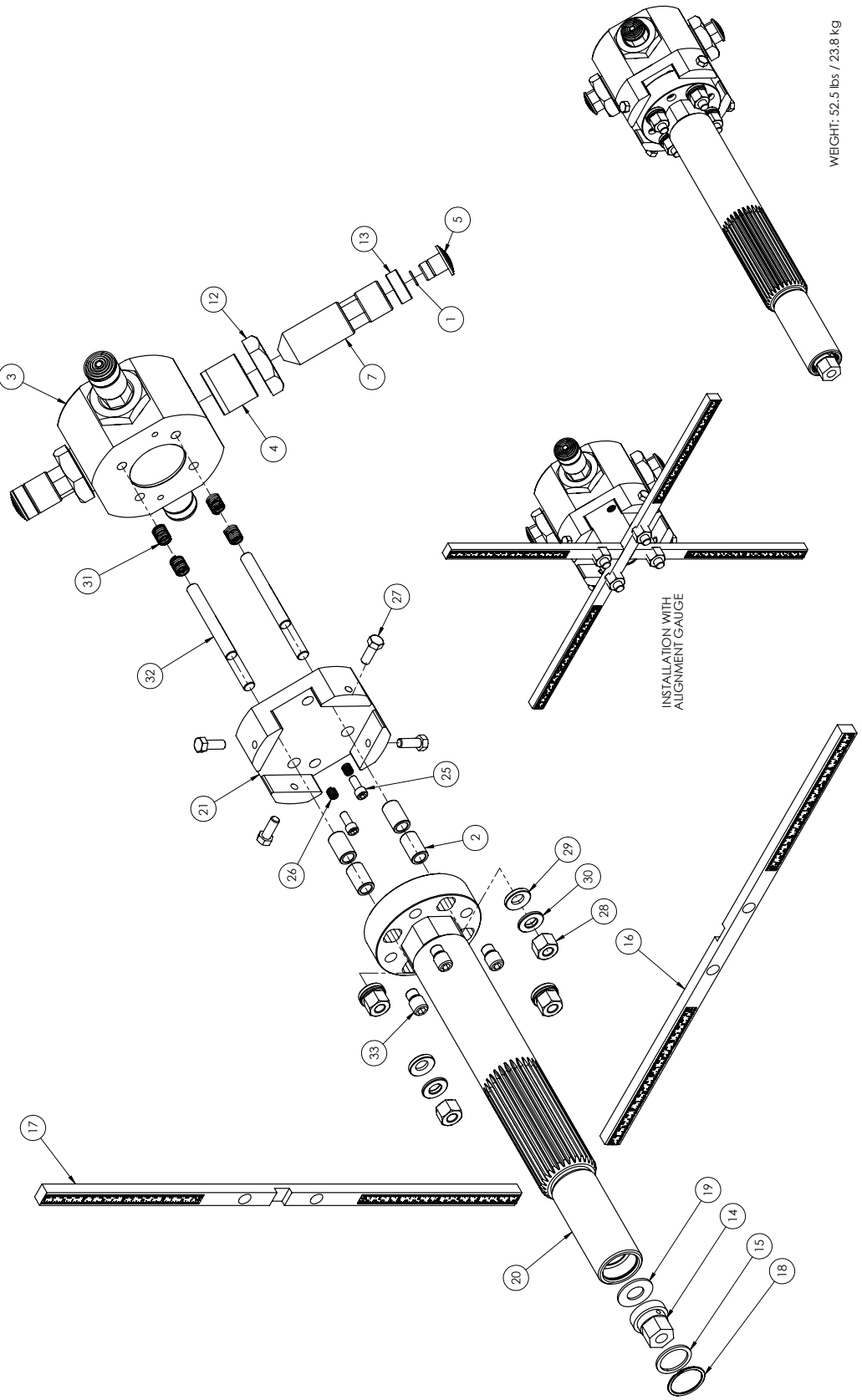
NOTES:
1. REFER TO SHEET TWO FOR LEG CHART
2. ONLY 1 OF EACH SIZE LEG EXTENSION SHOWN
3. 66-086-00 (ITEM 8.2) ONLY USED WITH LEG EXTENSIONS #1
4. 66-087-00 (ITEM 11.2) USED WITH LEG EXTENSIONS #2 THRU #6
5. POSITION AND THREAD LOCK NUT TO ACT AS STOP (FULLY RETRACTED) WILL REQUIRE ADJUSTMENT AS DRAWBAR STRETCHES
6. TOTAL WEIGHT WITH OUT LEGS - 35lbs [15.8kg]
7. TOTAL WEIGHT WITH LEG SET #28 - 51.2lbs [23.2kg]

Rotating Head Assembly (81-304-00)



ITEM	PART NUMBER	QTY	DESCRIPTION
1	66-043-00	1	WIPER, FELT
2	81-003-00	1	HEAD, ROTATING
3	81-030-00	3	TOOL HOLDER, ROTATING HEAD
4	81-064-00	6	SHCS, 3/8-16 X 1-1/4 CAPTIVATED
5	90-060-07	24	SHCS, 5/16-18 X 3/4
6	90-076-10	3	PIN, 3/8 X 1.0 DOWEL

Independent Chuck Assembly (81-305-00)



ITEM	PART NUMBER	QTY.	DESCRIPTION
1	19-087-00	4	O-RING -015
2	23-203-00	4	SPACER
3	23-209-00	1	BODY, INDEPENDANT CHUCK
4	23-211-01	4	BUSHING, CHUCK BODY
5	23-212-00	4	BUTTON, INDEPENDANT CHUCK
6	23-213-00	4	LEG, INDEPENDANT CHUCK (NOT SHOWN)
7	23-214-01	4	LEG, 11.18 - 13.15
8	23-214-02	4	LEG, 14.43 -16.50 (NOT SHOWN)
9	23-214-03	4	LEG, 16.87 -18.81 (NOT SHOWN)
10	23-214-04	4	LEG, 19.31 -21.30 (NOT SHOWN)
11	23-214-05	4	LEG, 22.28 -24.28 (NOT SHOWN)
12	23-215-00	4	JAM NUT, MODIFIED
13	23-221-00	4	SPACER, CHUCK LEG

ITEM	PART NUMBER	QTY.	DESCRIPTION
14	81-010-00	1	NUT, DRAW BAR
15	81-025-00	1	WASHER, DRAW BAR THRUST
16	81-079-01	1	LEG, FRONT GAUGE
17	81-079-02	1	LEG, BACK GAUGE
18	81-120-00	1	RING, SPIRAL RETAINING
19	81-143-00	1	WASHER, DRAW BAR THRUST
20	81-149-00	1	MANDREL, INDEPENDENT CHUCK
21	81-151-00	1	FACE PLATE
22	81-162-00	1	LABEL, IND. LEG CHART (NOT SHOWN)
23	81-167-00	2	LABEL, LEG HOLDER CHART (NOT SHOWN)
24	81-313-00	2	CHUCK LEG TRAY (NOT SHOWN)
25	90-060-07	2	SHCS, 5/16-18 X 3/4
26	90-069-12	2	INSERT, 5/16-18 X 1.5 D [.47 LG] HELICAL

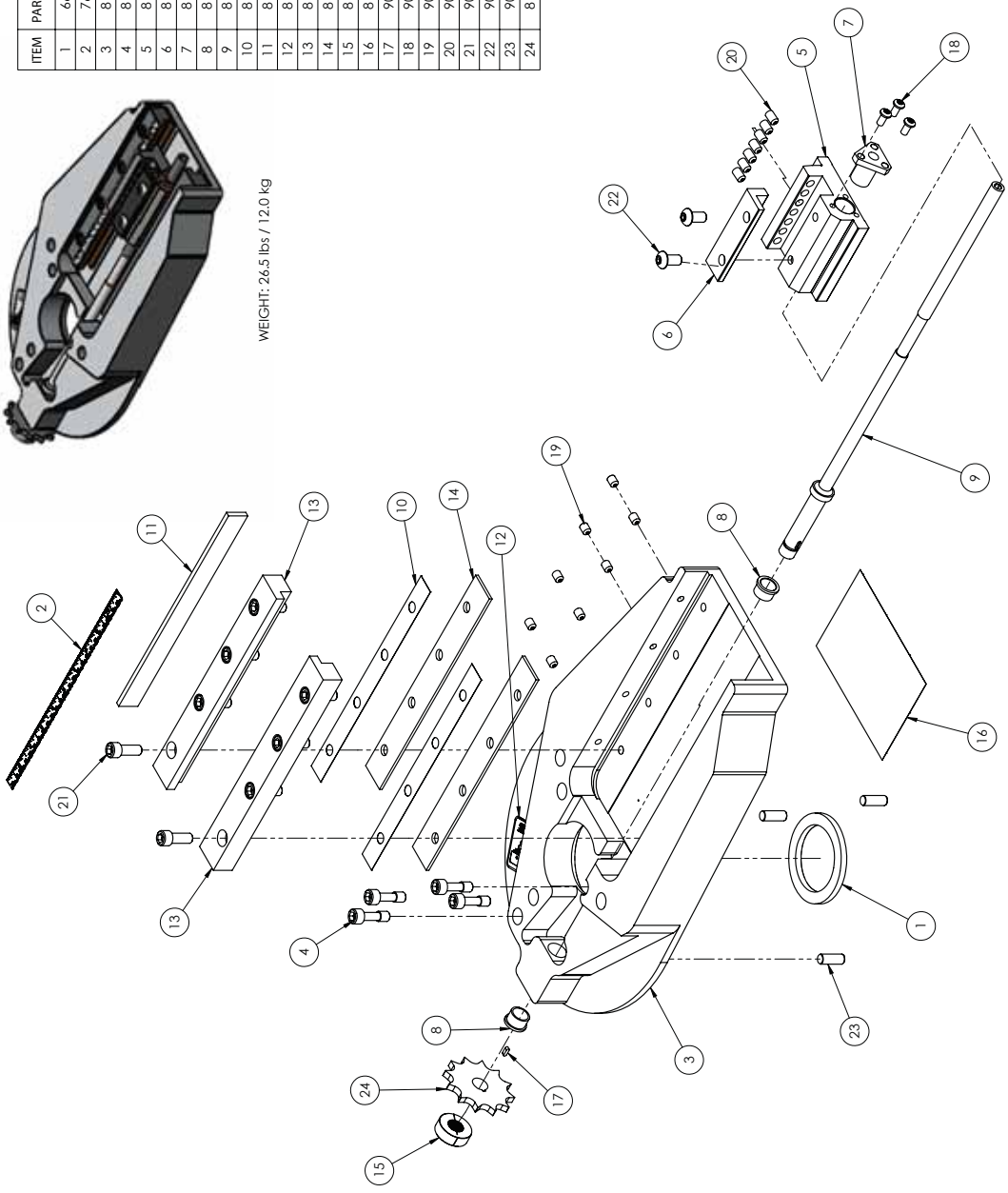
ITEM	PART NUMBER	QTY.	DESCRIPTION
27	90-071-11	4	HHCS, 3/8-16 X 1 INCH GRADE 8
28	90-095-05	4	NUT, 1/2-13 HARDENED
29	90-095-56	4	WASHER, 1/2 SELF ALIGN FEMALE
30	90-095-57	4	WASHER, 1/2 SELF ALIGN MALE
31	90-099-13	4	INSERT, 1/2-13 X 1.5D [.75 LG.] HELICAL
32	90-099-30	4	STUD, 1/2-13 x 4
33	90-209-01	4	SSS, 5/8-11 x 1 SWIVEL PAD
34	90-800-25	1	WRENCH, 2-1/4 PUMP (NOT SHOWN)
35	90-800-26	1	WRENCH, 7/8 COMB. (NOT SHOWN)
36	90-800-29	1	WRENCH, 1-1/8 COMB. (NOT SHOWN)
37	90-800-31	1	WRENCH, 9/16 COMB. (NOT SHOWN)

Single-Point Slide Assembly (81-306-00)

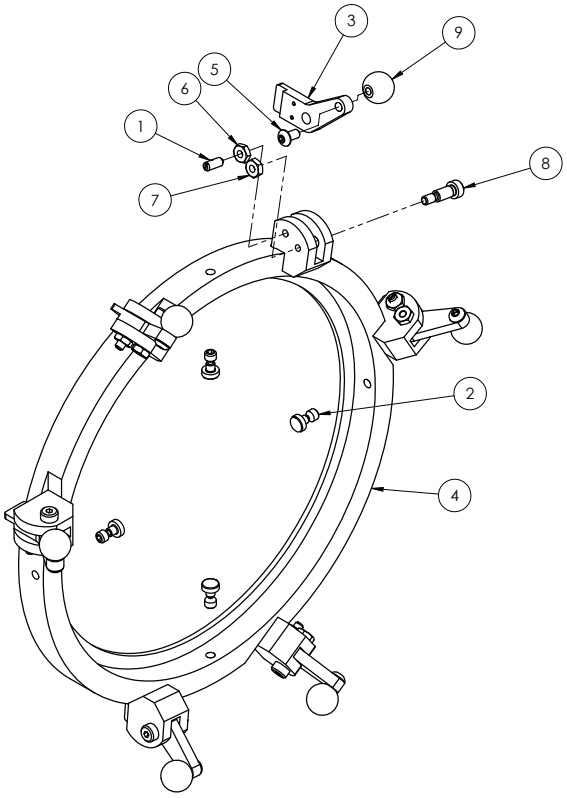
ITEM	PART NUMBER	QTY	DESCRIPTION
1	66-043-00	1	WIPER, FELT
2	76-170-00	1	RULER LABEL
3	81-062-00	1	BASE PLATE
4	81-064-00	6	SHCS, 3/8-16 X 1-1/4 CAPTIVATED
5	81-065-00	1	MALE SLIDE
6	81-066-00	1	TOOL SLIDE SPACER
7	81-067-00	1	FEED NUT
8	81-068-00	2	BUSHING
9	81-069-00	1	FEED SCREW
10	81-071-00	AS REQ'D	SHIM
11	81-072-00	1	PUSH PLATE
12	81-084-00	1	LABEL, RADIAL TRAVEL
13	81-154-00	2	GIB
14	81-155-00	2	PLATE, WEAR
15	81-156-00	1	CLAMP, 5/8-18 COLLAR
16	81-157-00	1	CAUTION TAPE
17	90-027-03	1	KEY, 1/8 SQ X 3/8
18	90-052-05	3	BHCS 1/4-20 X .50 LG
19	90-064-03	8	SSS, 5/16-18 X 3/8
20	90-064-05	7	SSS, 5/16-18 X 1/2
21	90-070-10	8	SHCS, 3/8-16 X 1
22	90-072-07	2	BHCS, 3/8-16 X 3/4
23	90-076-10	3	PIN, 3/8 X 1.0 DOWEL
24	81-070-00	1	STAR WHEEL

SHOWN FOR REF OF LOCATION OF ITEM #16

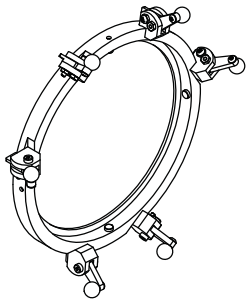
WEIGHT: 26.5 lbs / 12.0 kg



Trip Assembly (81-307-00)

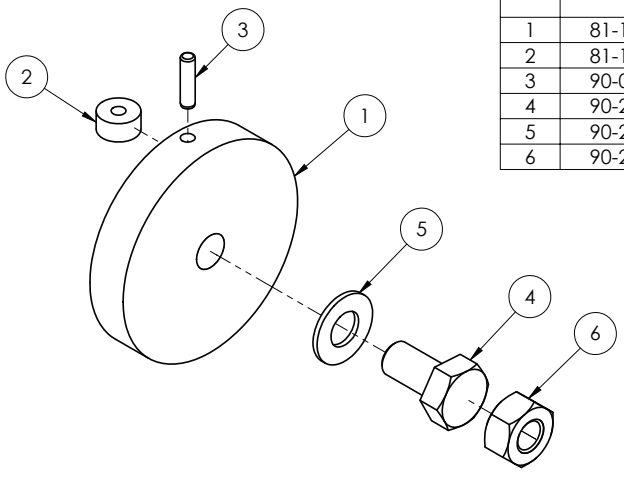


ITEM	PART NUMBER	QTY.	DESCRIPTION
1	52-140-00	6	PLUNGER, BALL
2	56-073-00	4	SCREW, 1/4 TOGGLE
3	66-117-00	6	LEVER, TRIP
4	81-074-00	1	TRIP COLLAR WELDMENT
5	90-042-04	6	BHCS, 10-32 X 3/8
6	90-045-01	6	NUT, 10-32 JAM
7	90-045-02	6	NUT, 10-24 JAM
8	90-057-55	6	SHSB, 1/4 X 1/2
9	90-900-62	6	KNOB, 10-32 X 3/4 BLACK

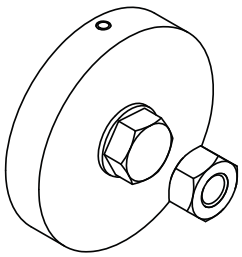


WEIGHT: 5 lbs / 2.2 kg

Safety Stop Assembly (81-316-00)



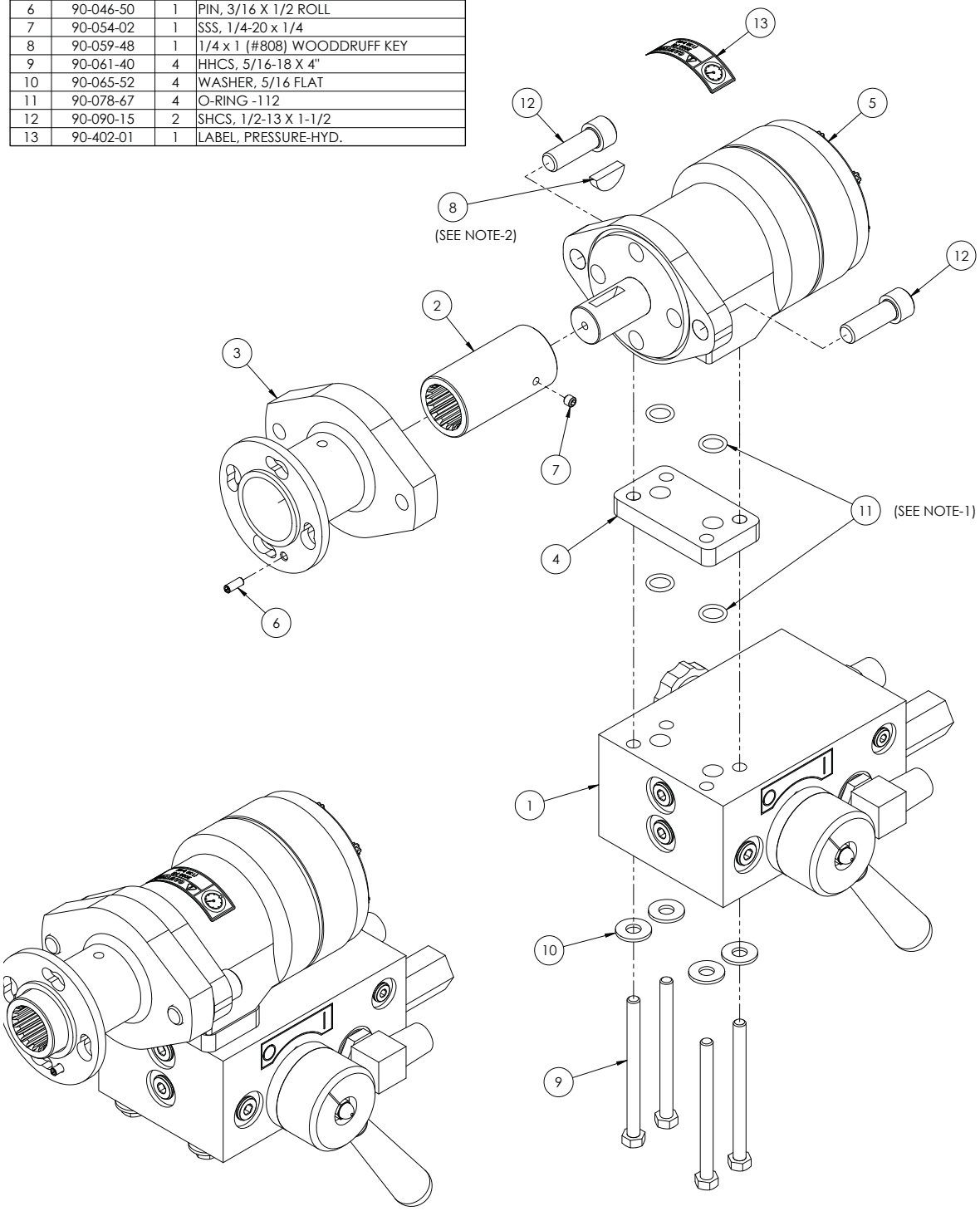
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	81-160-00	1	STOP, AXIAL FEED
2	81-161-00	2	ROLLER
3	90-056-10	2	PIN, 1/4 X 1.00 DOWEL
4	90-201-11	1	HXCS, 5/8-11 X 1-1/4
5	90-205-59	1	WASHER, 5/8 FLAT
6	90-205-03	1	NUT, 5/8-11 HEAVY HEX



Hydraulic Drive Assembly (81-310-00)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	69-3026-00	1	HYDRAULIC MANIFOLD SUB-ASSEMBLY
2	81-032-00	1	COUPLING, MOTOR ADAPTER
3	81-058-00	1	ADAPTER, HYDRAULIC MOTOR
4	81-063-00	1	SPACER, MANIFOLD
5	81-146-00	1	HYDRAULIC MOTOR
6	90-046-50	1	PIN, 3/16 X 1/2 ROLL
7	90-054-02	1	SSS, 1/4-20 x 1/4
8	90-059-48	1	1/4 x 1 (#808) WOODDRUFF KEY
9	90-061-40	4	HHCS, 5/16-18 X 4"
10	90-065-52	4	WASHER, 5/16 FLAT
11	90-078-67	4	O-RING -112
12	90-090-15	2	SHCS, 1/2-13 X 1-1/2
13	90-402-01	1	LABEL, PRESSURE-HYD.

NOTE:
1. -112 (BUNA-N) O-RING COMES WITH HYDRAULIC MOTOR FOR REPLACEMENTS CONTACT E.H. WACHS PART NUMBER #90-078-67
2. WOODRUFF KEY SUPPLIED WITH MOTOR E.H. WACHS PART MUMBER #90-059-48



Optional Remote-Operated Hydraulic Drive Assembly (81-310-01)

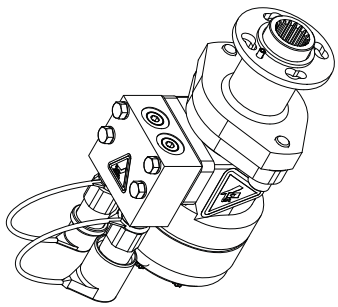
ITEM	PART NUMBER	QTY	DESCRIPTION
1	09-025-00	1	QUICK DISCONNECT, FEMALE
2	09-026-00	1	QUICK DICONNECT-MALE
3	09-027-00	1	DUST CAP, MALE QUICK-DISCONNECT
4	09-028-00	1	DUST CAP, FEMALE QUICK-DISCONNECT
5	60-199-02	1	MANIFOLD
6	81-032-00	1	COUPLING, MOTOR ADAPTER
7	81-058-00	1	ADAPTER, HYDRAULIC MOTOR
8	81-063-00	1	SPACER, MANIFOLD
9	81-146-00	1	HYDRAULIC MOTOR
10	90-046-50	1	PIN, 3/16 X 1/2 ROLL
11	90-054-02	1	SSS, 1/4-20 x 1/4
12	90-059-48	1	1/4 x 1 (#808) WOODDRUFF KEY
13	90-061-20	4	HHCS 5/16-18 X 2
14	90-065-53	4	WASHER, 5/16 AN
15	90-078-67	4	O-RING - 112
16	90-088-86	2	PLUG, -06 ZERO-LEAK ORB
17	90-090-15	2	SHCS, 1/2-13 X 1-1/2
18	90-098-79	2	ADAPTER, 1/2 NPT M X 1/2 ORB M - STRAIGHT
19	90-401-01	1	LABEL, EYE PROTECTION
20	90-401-04	1	LABEL, CRUSH AND CUT
21	90-402-01	1	LABEL, PRESSURE-HYD.
22	90-403-02	1	LABEL, BURN HAZARD/HOT SURFACE

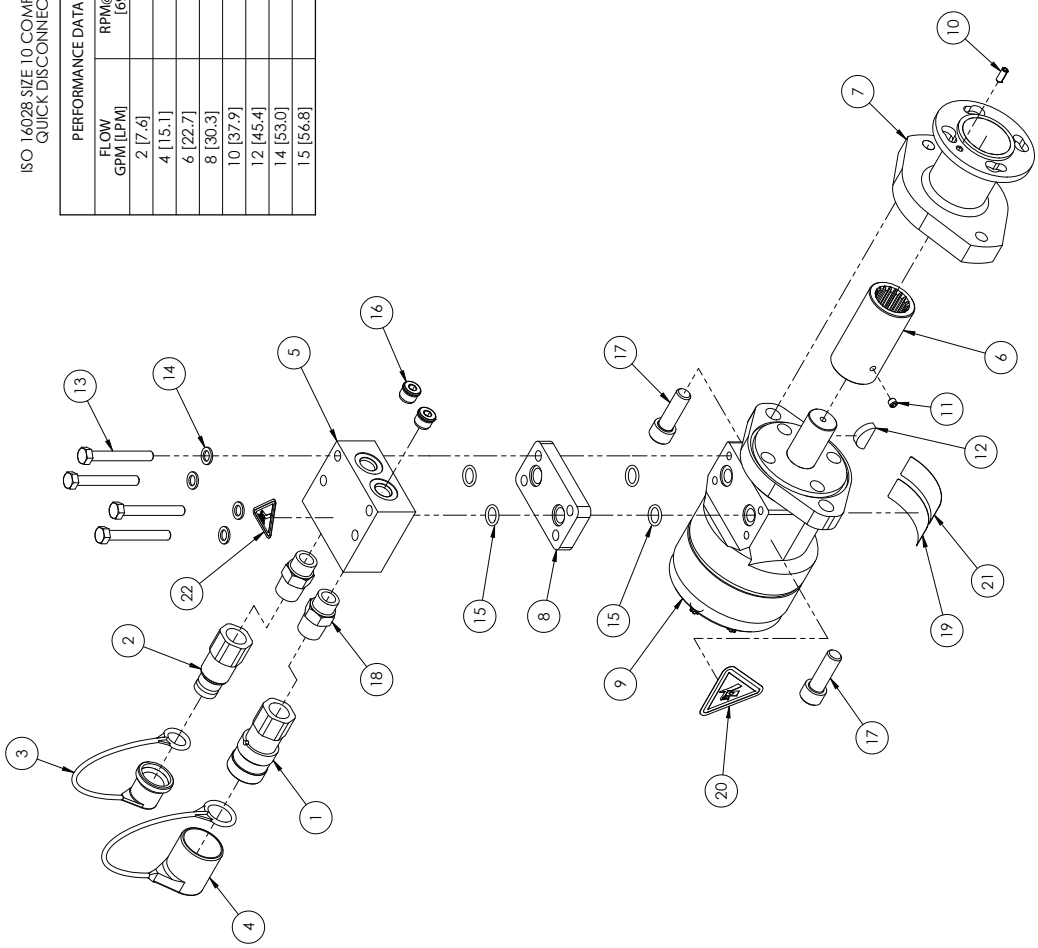
NOTES:

1. WARNING! - ASSEMBLY REQUIRES APPROVED HYDRAULIC POWER UNIT OR CONTROLS FOR SAFE EP-424 OPERATION. SYSTEM INTEGRATOR RESPONSIBILITY
2. WEIGHT: 33 LB [15 KG]
3. MAX CONTINUOS FLOW: 15 GPM [57 LPM]
4. MAX INTERMITTENT FLOW (10% OF EVERY MINUTE): 20 GPM [76 LPM]
5. MAX CONTINUOUS PRESSURE: 1700 PSI [117 BAR]
6. MAX INTERMITTENT PRESSURE (10% OF EVERY MINUTE): 2050 PSI [141 BAR]
7. (2) -112 O-RINGS (BUNA-N) INCLUDED WITH HYDRAULIC MOTOR
8. 1/4 x 1 #808 WOODRUFF KEY INCLUDED WITH MOTOR

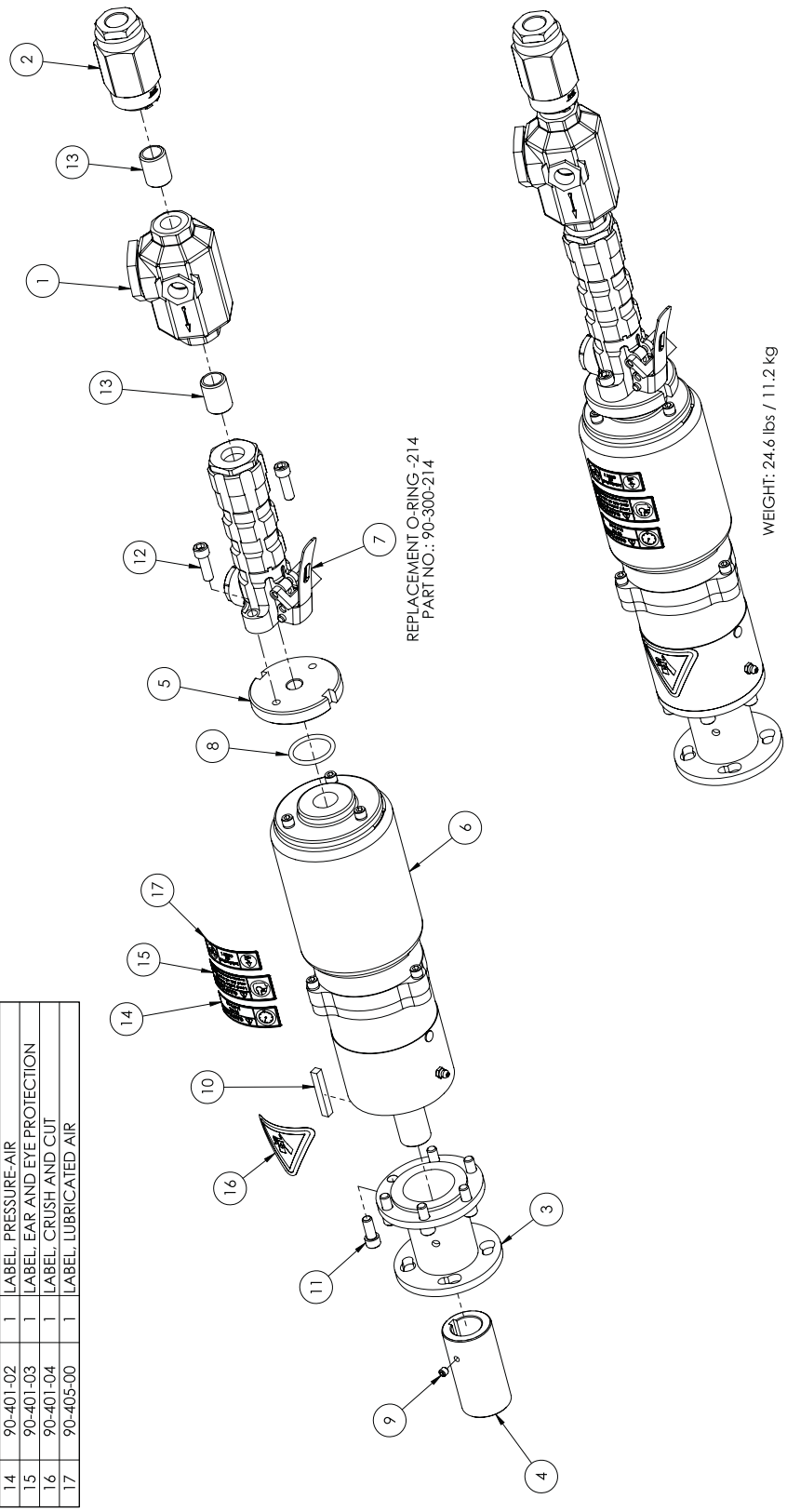
ISO 16028 SIZE 10 COMPLIANT QUICK DISCONNECTS

PERFORMANCE DATA	
FLOW GPM [LPM]	RPM@1000PSI [69 BAR]
2 [7.6]	20
4 [15.1]	50
6 [22.7]	82
8 [30.3]	117
10 [37.9]	152
12 [45.4]	186
14 [53.0]	219
15 [56.8]	237





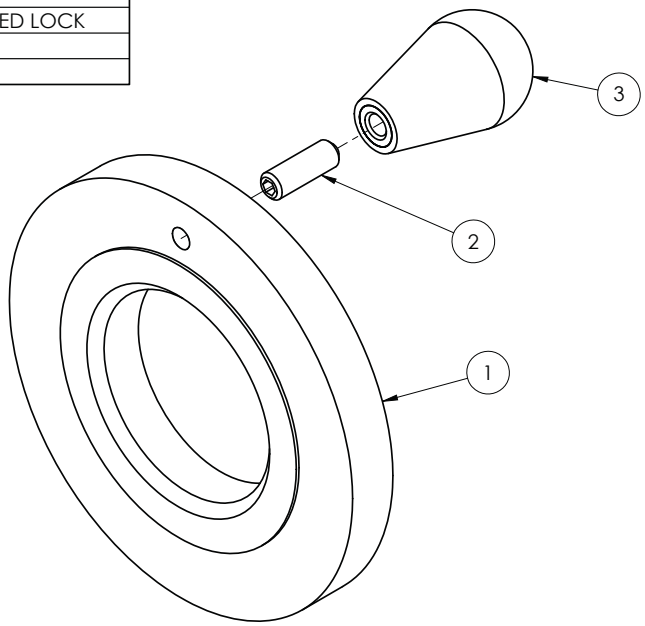
Air Drive Assembly (81-311-00)



ITEM	PART NUMBER	QTY.	DESCRIPTION
1	05-082-00	1	OILER, AIR LINE
2	66-100-00	1	VALVE, FLOW CONTROL
3	81-031-00	1	HOUSING, AIR MOTOR ADAPTER
4	81-032-00	1	COUPLING, MOTOR ADAPTER
5	81-073-01	1	ADAPTER, THROTTLE LEVER
6	81-141-00	1	AIR MOTOR
7	81-158-01	1	THROTTLE
8	81-159-00	1	O-RING, -218
9	90-054-02	1	SSS, 1/4-20 x 1/4
10	90-057-16	1	SQUARE KEY, 1/4 x 1-3/4
11	90-060-07	6	SHCS, 5/16-18 X 3/4
12	90-060-10	2	SHCS, 5/16-18 X 1.0
13	90-098-01	2	NIPPLE, 1/2 X CLOSE
14	90-401-02	1	LABEL, PRESSURE-AIR
15	90-401-03	1	LABEL, EAR AND EYE PROTECTION
16	90-401-04	1	LABEL, CRUSH AND CUT
17	90-405-00	1	LABEL, LUBRICATED AIR

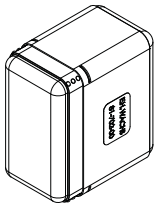
Feed Lock (81-317-00)

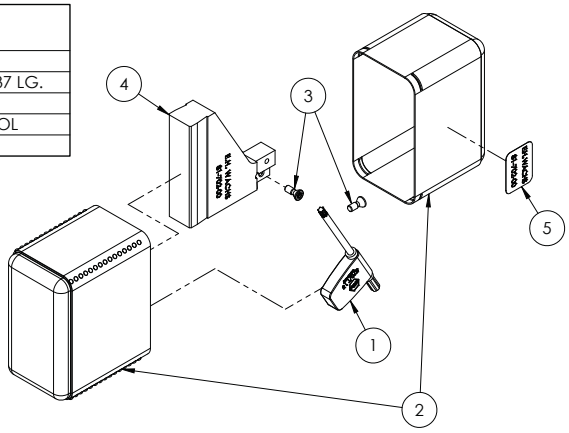
ITEM	PART NUMBER	QTY	DESCRIPTION
1	81-083-00	1	NUT,THREADED FEED LOCK
2	90-054-07	1	SSS, 1/4-20 X 3/4
3	90-900-64	1	KNOB



Single-Point Holder Kit (81-702-00)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-191-00	1	WRENCH, TORX
2	81-168-00	1	CONTAINER, 1.575 X 2.953 X 2.756-3.937 LG.
3	81-169-00	2	SCREW, INSERT
4	81-318-00	1	HOLDER, UNIVERSAL SINGLE POINT TOOL
5	81-319-00	1	LABEL





Chapter 9
Accessories and Spare Parts

ACCESSORIES

The following accessories and options are available for the EP 424:

Table 1: EP 424 Accessories and Options

Part Number	Description
81-400-00	Single-point upgrade kit for form tool EP-424 configurations (81-000-01/81-000-02)
81-303-01	Extension leg kit for standard mandrel
81-305-00	Independent chuck mandrel
81-315-00	Short perch centering mandrel
81-310-00	Hydraulic drive assembly
81-311-00	Air drive assembly
26-407-00	Air treatment module

TOOLING

The following tooling is available for the EP-424.

Table 2: EP 424 Facing Tooling

Part Number	Description
56-708-01	Low-range facing tool insert holder kit, including holder, insert screws, and wrench
56-708-02	High-range facing tool insert holder kit, including holder, insert screws, and wrench
56-711-01	Premium grade HSS 2 sided insert for facing and beveling.
56-712-01	Carbide 2 sided insert for facing and beveling.
56-710-01	Insert holder kit. Includes low-range holder kit (56-708-01), high-range holder kit (56-708-02), and 37.5° bevel insert holder (56-709-03).
56-SPT-02	Custom HSS facing tool bit, ground to customer specification. (Specific part no. assigned on order.)
56-SPT-10	Custom form tool or single-point insert holder, ground to customer specification. (Specific part no. assigned on order.)

Table 3: EP 424 Beveling Tooling

Part Number	Description
56-709-02	30° bevel tool insert holder kit, including holder, insert screws, and wrench
56-709-03	37.5° bevel tool insert holder kit, including holder, insert screws, and wrench
56-709-01	20° J bevel low-range insert holder kit, including holder, insert screws, and wrench. Use with 56-708-01 facing insert holder for 0.040” land extension.
56-709-05	20° J bevel high-range insert holder kit, including holder, insert screws, and wrench. Use with 56-708-01 facing insert holder for 0.040” land extension.
56-711-01	Premium grade HSS 2 sided insert for facing and beveling.
56-712-01	Carbide 2 sided insert for facing and beveling.
56-711-02	Premium grade HSS 2 sided 3/32” J bevel insert. Used with 56-709-01 and 56-709-05 holders.
56-712-02	Carbide 2 sided 3/32” J bevel insert. Used with 56-709-01 and 56-709-05 holders.
56-707-00	10° x 37.5° compound bevel form tool.
56-710-01	Insert holder kit. Includes low-range holder kit (56-708-01), high-range holder kit (56-708-02), and 37.5° bevel insert holder (56-709-03).

Table 3: EP 424 Beveling Tooling

Part Number	Description
56-SPT-01	Custom HSS single angle bevel tool bit, ground to customer specification. (Specific part no. assigned on order.)
56-SPT-03	Custom HSS compound angle bevel tool bit, ground to customer specification. (Specific part no. assigned on order.)
56-SPT-04	Custom HSS single angle J bevel tool bit, ground to customer specification. (Specific part no. assigned on order.)
56-SPT-05	Custom HSS compound angle J bevel tool bit, ground to customer specification. (Specific part no. assigned on order.)

Table 4: EP 424 Counterbore and I.D. Tooling

Part Number	Description
56-702-01	10° I.D. deburring tool (0.150” required between mandrel and I.D.)
56-702-02	10° I.D. deburring tool (0.449” required between mandrel and I.D.)
56-702-03	10° I.D. deburring tool (0.762” required between mandrel and I.D.)
56-705-01	4:1 taper counterbore tool (0.315 required between mandrel and I.D.)
56-705-02	4:1 taper counterbore tool (0.875 required between mandrel and I.D.)
56-705-03	4:1 taper counterbore tool (1.375 required between mandrel and I.D.)
56-SPT-06	Custom HSS I.D. deburring tool bit, ground to customer specification. (Specific part no. assigned on order.)
56-SPT-07	Custom HSS counterbore tool bit, ground to customer specification. (Specific part no. assigned on order.)

Table 5: EP 424 Tooling Accessories

Part Number	Description
56-190-00	Insert screw, used with all EP 424 insert holders.
56-191-00	Insert screw Torx wrench.

Chapter 10
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

600 Knightsbridge Parkway • Lincolnshire, IL 60069
847-537-8800 • www.ehwachs.com