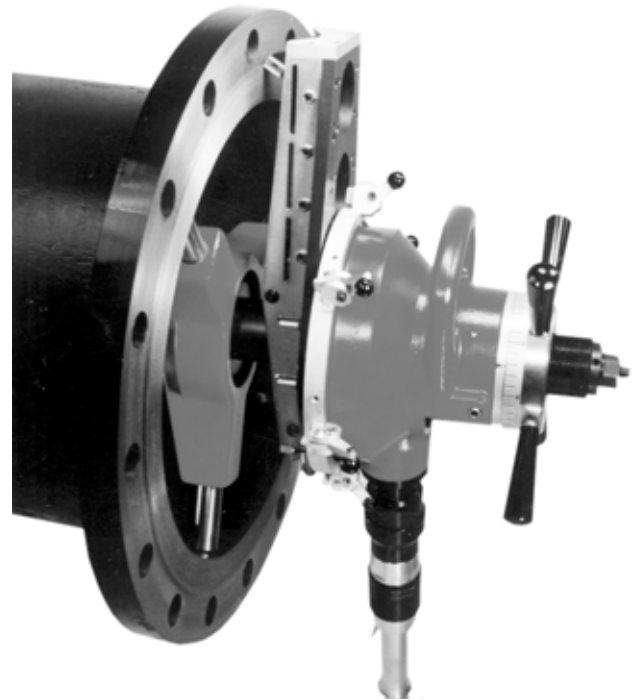




E.H. Wachs
600 Knightsbridge Parkway
Lincolnshire, IL 60069
www.ehwachs.com


SDB 412 and FF 424 User's Manual



E.H. Wachs Part No. 66-MAN-01
Rev. A, March 2013

Copyright © 2013 E.H. Wachs. All rights reserved.
This manual may not be reproduced in whole or in part
without the written consent of E.H. Wachs.

**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 60204-1:2006 (for electric machines) EN ISO 13857:2008 EN 982:1996 + A1:2008 (for hydraulic machines) EN 983:1996 (for pneumatic machines) EN 13732-1:2006 EN ISO 14121-1:2007 EN ISO 13850:2008 (for pneumatic machines)	
Provisions with which Conformity is Declared:	Essential Health and Safety Requirements of Annex 1 of the Machinery Directive	
We hereby certify that the machinery described above conforms to the provisions of Council Directive 2006/42/EC on the approximation of the laws of the Member States relating to the safety of machinery.		
Signed:		
Signatory:	Pete Mullally Quality Manager E.H. Wachs	

About This Manual

PURPOSE OF THIS MANUAL

This manual explains how to operate and maintain the SDB-412 small diameter beveler (SDB) and FF 424 flange facer. 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 machine, read through this manual and become familiar with all instructions.

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.

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

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

In This Chapter

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

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

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.



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**.



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**.



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.

NOTE

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



NOTE

A NOTE provides supplementary information or operating tips.

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.

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.

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



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 SDB 412/FF 424. It contains important safety instructions and recommendations.

OPERATOR SAFETY

Follow these guidelines for safe operation of the equipment.

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

In This Chapter

OPERATOR SAFETY

SAFETY LABELS



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

Always turn machine off before doing any adjustments or service.

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

Safety Symbols



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

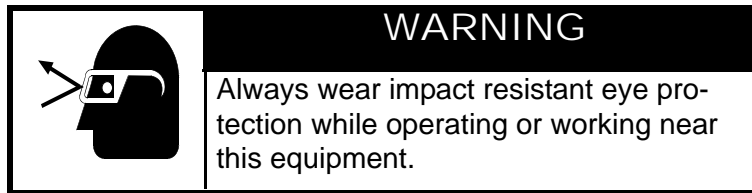
WARNING

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

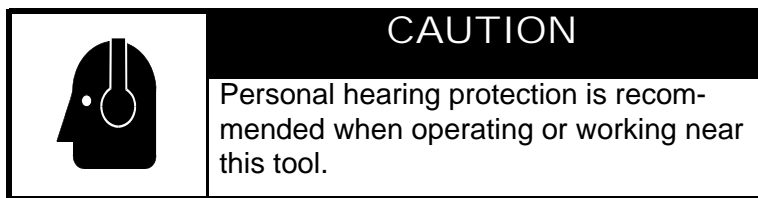
CAUTION

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

Protective Equipment Requirements



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



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

1. THIS MACHINE HAS BEEN DESIGNED WITH VIBRATIONAL CONCERNS IN MIND.
2. IF EXCESSIVE VIBRATIONS OCCUR, RATE MAY BE TOO FAST AND/OR NOT ENOUGH. THIS CAN USUALLY BE CORRECTED BY TAKING A DEEPER CUT.
3. CHECK THE POWER SUPPLY HOOKUP FOR ANY LOOSE CONNECTIONS.
4. MAKE SURE THE CUTTING TOOL IS SEATED PROPERLY AND TIGHTENED AS WELL.
5. BE SURE THAT THE WORKPIECE IS WITHIN THE MACHINES OPERATIONAL CAPACITY

MACHINE NOISE LEVELS:

NOTE: NOISE LEVELS HAVE BEEN MEASURED AT 1 METER HIGH AND 1.6 METERS AWAY.

CONTINUOUS W-WEIGHTED SOUND PRESSURE LEVEL AT WORK STATION 62 DB (A)

PEAK "C"-WEIGHTED MAXIMUM SOUND PRESSURE 95 DB (C)

SOUND POWER LEVEL EMMITED BY MACHINE 89 DB (A)

SAFETY LABELS

The following safety labels are on the SDB 412. If the stickers are damaged or missing, replace them immediately. See "Ordering Information" at the end of this manual.



Figure 2-1. The Warning sticker is on the SDB 412. Do not put your hands near the rotating head while the machine is running. (Part number 66-147-00.)

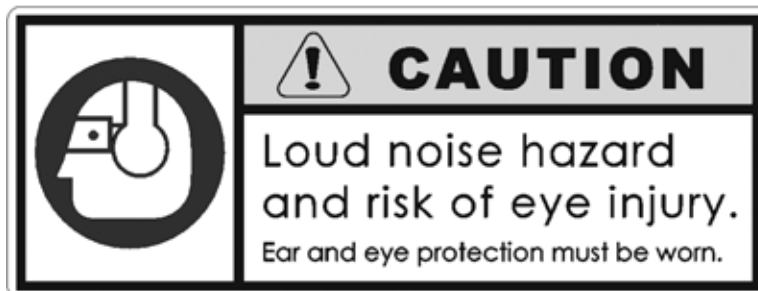


Figure 2-2. The Caution sticker is on the SDB 412 air motor. Wear ear and eye protection while operating the machine. (Part number 90-401-03.)

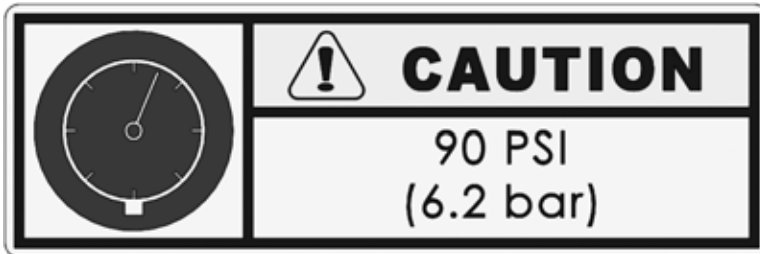


Figure 2-3. The air pressure limit label is on the air motor. (Part number 90-401-02.)



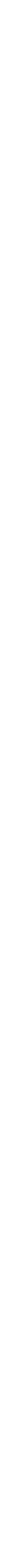
Figure 2-4. The eye injury warning label is on the hydraulic drive. (Part number 90-401-01.)



Figure 2-5. The hydraulic pressure limit label is on the hydraulic motor. (Part number 90-402-01.)

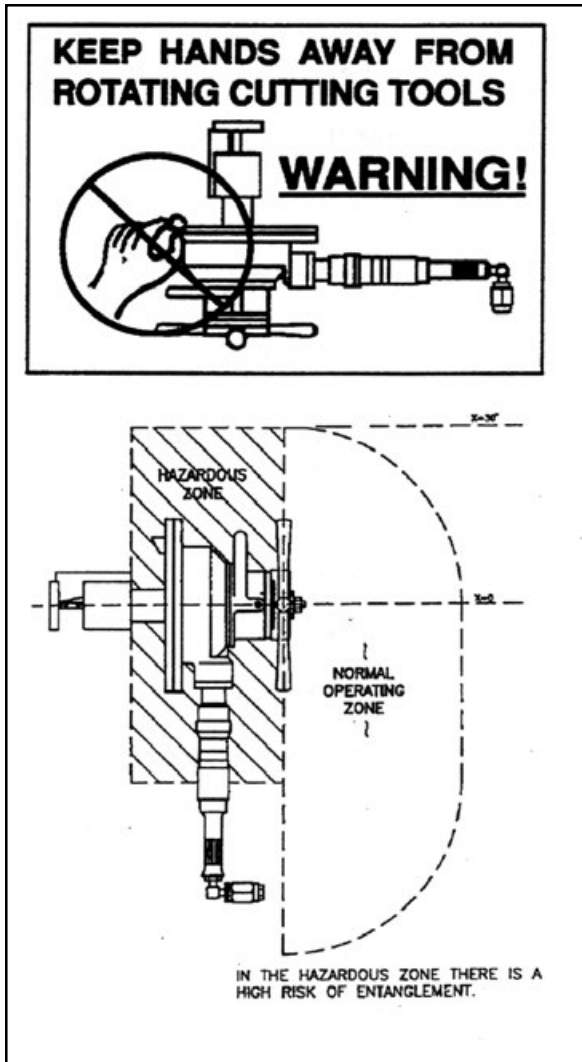


Figure 2-6. The hot surface warning label is on the hydraulic drive. (Part number 90-403-00.)



SDB 412/2 SMALL DIAMETER BEVELER

SECTION II B SAFETY INSTRUCTIONS



VIBRATION REDUCTION

1. THIS MACHINE HAS BEEN DESIGNED WITH VIBRATIONAL CONCERNS IN MIND.
2. IF EXCESSIVE VIBRATIONS OCCUR, RATE MAY BE TOO FAST AND/OR NOT ENOUGH. THIS CAN USUALLY BE CORRECTED BY TAKING A DEEPER CUT.
3. CHECK THE POWER SUPPLY HOOKUP FOR ANY LOOSE CONNECTIONS.
4. MAKE SURE THE CUTTING TOOL IS SEATED PROPERLY AND TIGHTENED AS WELL.
5. BE SURE THAT THE WORKPIECE IS WITHIN THE MACHINES OPERATIONAL CAPACITY.

MACHINE NOISE LEVELS:

NOTE: NOISE LEVELS HAVE BEEN MEASURED AT 1 METER HIGH AND 1.6 METERS AWAY.

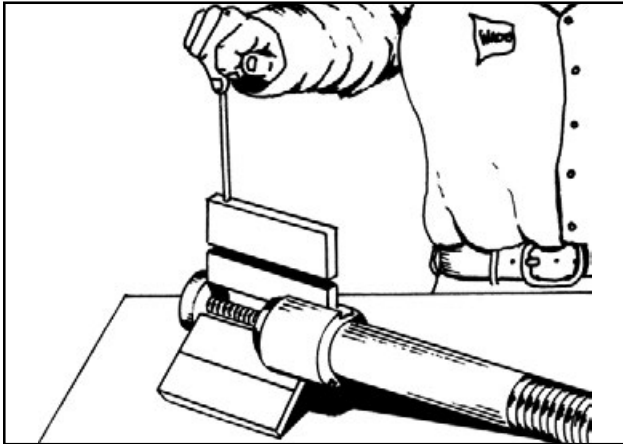
CONTINUOUS W-WEIGHTED SOUND PRESSURE LEVEL AT WORK STATION	62 DB (A)
PEAK "C"-WEIGHTED MAXIMUM SOUND PRESSURE	95 DB (C)
SOUND POWER LEVEL EMMITED BY MACHINE	89 DB (A)

IMPORTANT:

ALWAYS WEAR HEARING PROTECTION WHEN OPERATING THIS OR OTHER WACHS MACHINERY.

SDB 412/2 SMALL DIAMETER BEVELER

1. Select proper leg extension for pipe I.D. (use leg extension chart on pg 4). Secure legs to mandrel by tightening two captivated shcs, using provided hex key set.

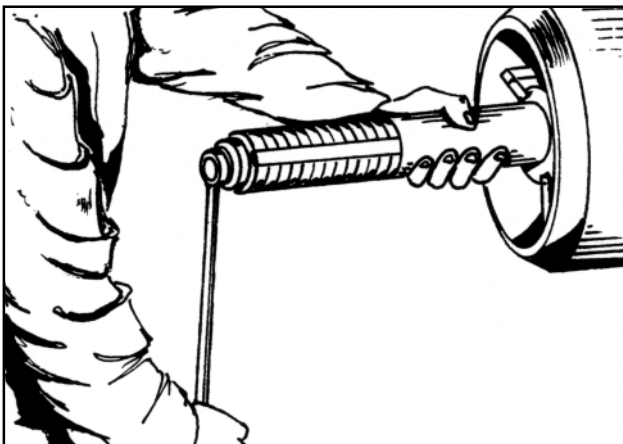


(Fig. 1)

NOTE: Each extension leg will be stamped with it's part number for easy identification.

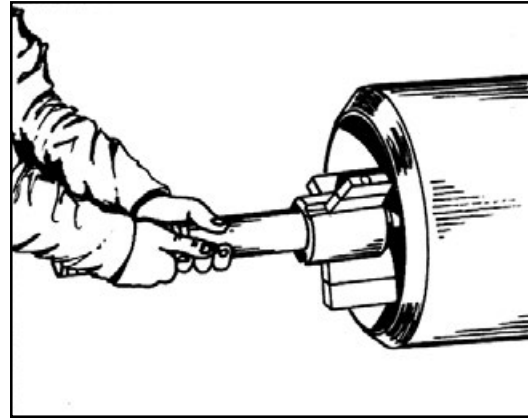
2. It is recommended to mount the mandrel by itself and then install the machine onto the mandrel to insure proper squaring of machine and avoid operator injury.
3. Insert the blade end of the mandrel into the pipe I.D.

NOTE: Keep the machine-ward end of the legs as close to the pipe edge as practical. Max depth of penetration into pipe should be 3/4" (19mm) from the machine-ward end of the legs to the edge of pipe.



(Fig. 2)

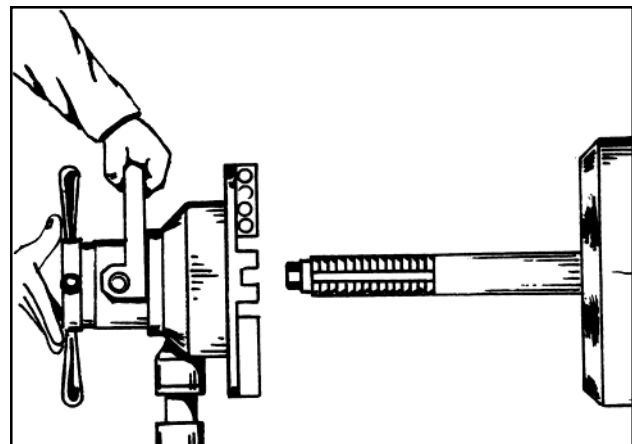
4. Mount the mandrel into the pipe by tightening the draw bar nut to 90 ft. lbs. Move the mandrel back and forth as well as up and down to help assure a proper fit. Securely snug the draw bar nut.



(Fig. 3)

NOTE: Place mandrel shaft keyways in relationship to keys located in machine sothat appropriate air motor location is achieved.

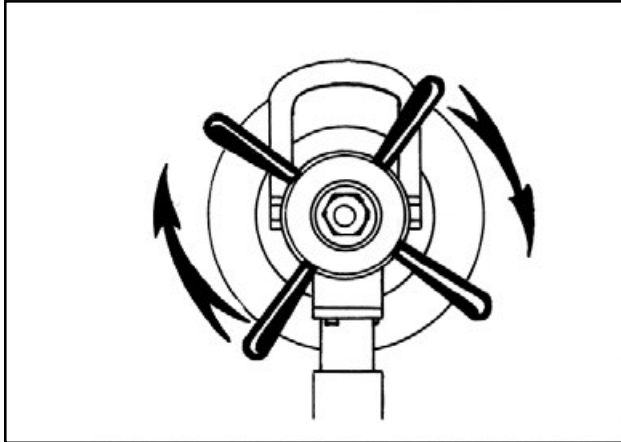
5. Prepare to mount beveling machine onto mandrel. Inspect the bore of the beveling head for dirt and metal chips. Clean the bore with compressed air or solvent as necessary.
6. Wipe mandrel clean and apply a light coating of oil.
7. Slide the machine body over the mandrel, being careful not to scrape the head bushing.



(Fig. 4)

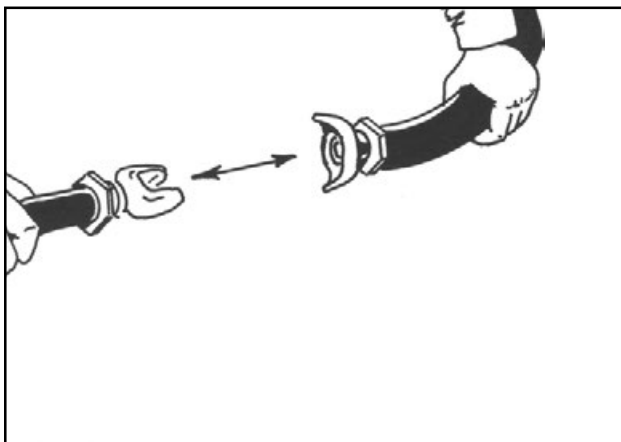
SDB 412/2 SMALL DIAMETER BEVELER

- Align the keys in the machine with the key-way slots in the mandrel. Push the machine forward until the feed nut and the threaded portion of the mandrel meet.
- Rotate the feed handle assembly clockwise to engage the feed nut and machine with the mandrel. (Figure 5).



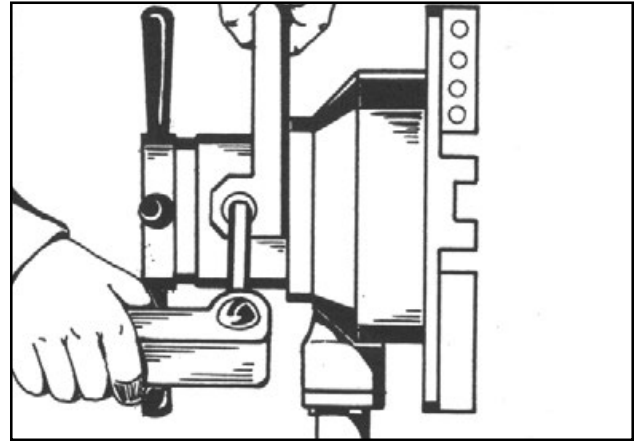
(Fig. 5)

- Tighten the machine/mandrel locking set screws located on either side of the machine body using the provided hex key set. Tighten both locking screws equally. Apply tension in order to pre-load the machine to the mast and remove any play. (Fig 6.)



(Fig. 6)

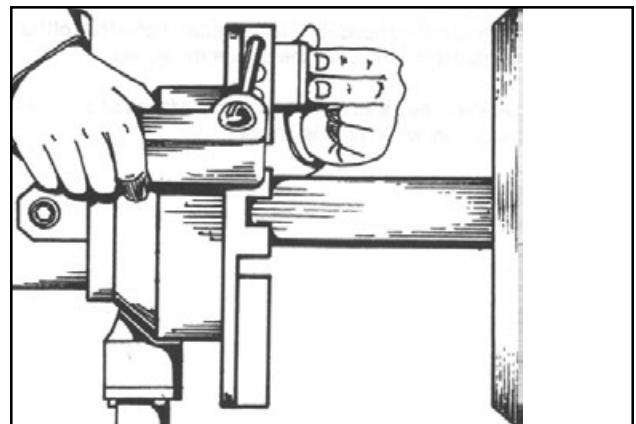
- Connect a clean, dry 90 psi air supply to the machine. It is recommended to use an Air Treatment Device in the air line to filter air and lubricate the motor. (Fig. 7)



(Fig. 7)

NOTE: Use 90 psi. max. air pressure. Higher air pressure increases the loads and stresses on parts and fasteners which may result in breakage. Higher air pressure also increases the sound level of the tool.

- Setup the form tools. (Refer to the tool selection chart on page 17). Install the facing tool in the beveling head. All tool bits must be installed so that the cutting edge will contact the pipe when rotating in a clockwise direction from the operators perspective. Tool bits are locked into place with set screws adjacent to the slot. (Fig. 8)



(Fig. 8)

CAUTION: Do not allow tool bit to come into contact with the mandrel or damage will result.

SDB 412/2 SMALL DIAMETER BEVELER

CAUTION: Disconnect the air supply whenever changing the form tools.

CAUTION: Be certain there is adequate clearance between the mandrel legs and the tooling

13. Start machine and turn feed nut in until the cutting tool contacts the pipe. Continue facing until pipe has a clean finish. Retract bevel head and insert the O.D. beveling tool
14. Feed beveling head into the pipe until the facing tool bit touches again. Adjust the O.D. beveling tool in or out radially depending upon the land thickness desired.
15. The last tool bit to install is the I.D. deburring tool. It should be placed into the slot opposite the beveling tool. This tool may also require some adjustment.

NOTE: If only two tools are to be used, place them in opposite slots to offset cutting load.

16. Once the cutting bits are in place, the machine can be moved from one pipe to another of the same size without resitting the tool bits.

Tips For Good Finish

1. Always place mandrel as close to pipe end as possible.
2. Use a cutting oil or coolant generously. This will also increase cutter life.
3. Adjust cutting head RPM for material. A good rule of thumb is the harder the material, the slower the speed.
4. Always keep a lot of pressure on the feed nut and pull out of cut quickly when prep is finished.

SDB 412/2 SMALL DIAMETER BEVELER

BEVELING MACHINE TO FLANGE FACER CONVERSION PROCEDURE

1. Remove the mandrel from the machine body. Next, loosen and remove the four 3/8-16 x 1-1/4" shcs securing the rotating tool holder plate (Fig. 1).

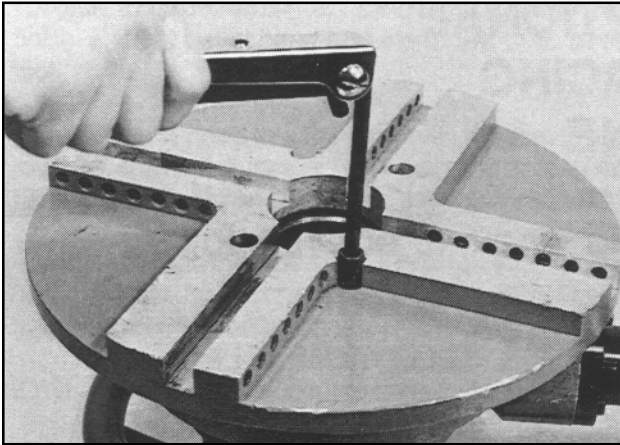


Fig. 1

2. Remove the rotating tool holder plate, (part # 66-005-00) from the machine body by lifting it from the two dowel pins pressed into the rotating head. (Fig. 2)

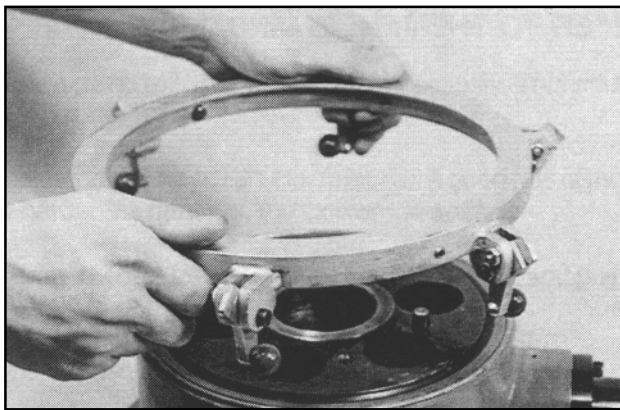


Fig. 2

3. Install the trip collar assembly onto the machine housing by tightening the six locking socket set screws located on the out diameter of the collar assembly (Fig. 2).

NOTE: When installing the trip ring assembly, center the cut out relief on trip ring over the air motor housing for proper trip lever location. Be sure that ring sits flush against housing all around.

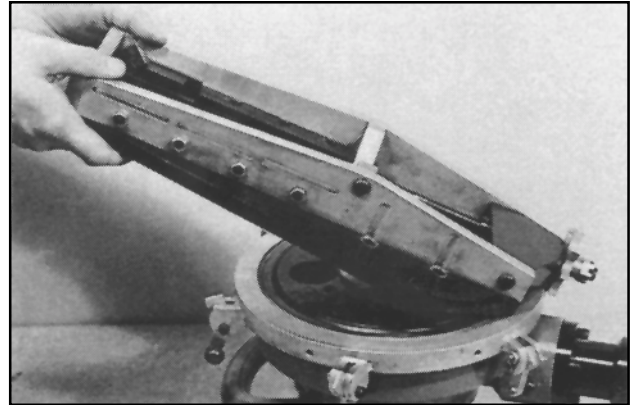


Fig. 3

4. Mount flange facing tool slide on macrone rotating head. Align dowel pin holes in flange facer with the dowel pins on the machine head. (FIG. 3)

NOTE: Be sure to install the felt washer. Coat the washer with a light amount of oil in the rear of the flange facing module.

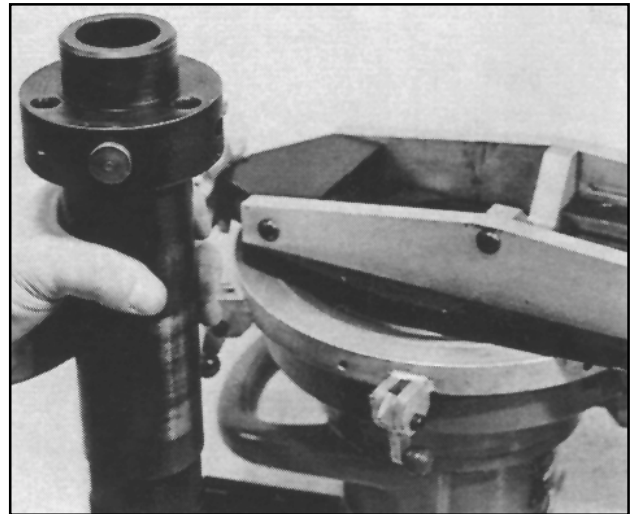


Fig. 4

5. Secure with four 3/8-16 x 1-1/4" shcs.

SDB 412/2 SMALL DIAMETER BEVELER

A. FLANGE SURFACE TRIP CHART

TRIP ENGAGEMENT	RMS FINISH
1 TRIP	63 RMS
2 TRIP	125 RMS
4 TRIP	250 RMS
6 TRIP	500 RMS

B. MANUAL BEVEL GENERATION USING SINGLE POINT MODULE:

A bevel can be generated by feeding the cutting tool into the work radially and axially simultaneously. As the radial feed advances the tool automatically, the operator must withdraw the tool by rotating the axial feed handle counter-clockwise. The correct amount of axial feed per machine revolution is given in the following chart.

For example, to generate a 30 degree bevel with 6 trips engaged (the fastest tool feed setting), the operator must withdraw the cutting tool .018" each time the cutting tool completes a revolution. This distance is represented by .018 (18 thousandths) increments on the calibrated feed dial located on the feed handle assembly.

MANUAL BEVEL GENERATION CHART

TRIPS	AXIAL FEED RATE REQUIRED PER MACHINE REVOLUTION				
	Engaged	10° Bevel	20° Bevel	30° Bevel	37-1/2° Bevel
6		.006"	.011"	.018"	.024"
4		.004"	.008"	.012"	.016"
2		.002"	.004"	.006"	.008"
1		.001"	.002"	.003"	.004"

C. TIPS FOR A GOOD FINISH: SINGLE POINT FLANGE FACING BEVELING MODULE

1. Always place mandrel as close to pipe end as possible.
2. Use the cutting coolant generously. This will also increase cutter life.
3. The feed rate for each trip is .005 per revolution.
4. CHATTER: Tool chatter occurs when the tool begins to vibrate during a cut. Excessive tool

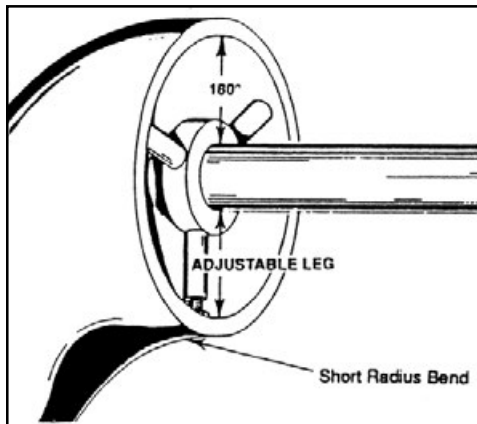
chatter can cause poor quality surface finishes. Chatter can be caused by any one of a number of variables inherent in a portable machine of this type. Check tooling: Too high of an operating speed or too great of a radial feed rate for the material being machined.

5. INTERMITTENT CUTS: When working on a rough cut end of a piece of pipe or a warped flange, the need to do an intermittent cut does exist. In order to prolong tool life and reduce shock loads on the machine and inserts, intermittent cuts should be done at a slower speed and feed rate. Once a full cut is achieved, operating speeds can be increased to normal machining procedures.
6. As you finish a pass, note your location on the indexed axial feed gauge. Then, to take your next pass, rotate the feed handle backwards 1 full turn to your noted location and retract your tool slide. Once retracted, rotate the feed handle in the amount you wish for the cut depth of your next pass. This will allow you to retract the slide without damaging the tooling, remove all backlash in the feed handle, and give you an exact depth of cut on your next pass.
7. To produce a 500 RMS or record groove finish, the best results are achieved with a finish cut depth of .007" to .008".

SDB 412/2 SMALL DIAMETER BEVELER

BEVELING AND FACING, USING THE FLANGE FACER MANDREL FOR CENTERING ON ELBOWS AND BENDS.

1. Measure the pipe I. D. Select the extension leg set required. Refer to flange facer mandrel leg extension chart.
NOTE: Set up the flange facing mandrel with machine body removed.
2. Insert the legs into the mandrel head.
NOTE: Adjustable leg adjustment screw must be completely tightened against leg face.
3. Place the mandrel assembly into pipe. Position the adjustable leg at the "short radius bend" portion of pipe, (FIG. 12) and snug the draw bar nut.
NOTE: Legs should be kept as close as possible to the pipe edge, yet back far enough to perform the desired operation.



(Fig. 12)

4. **CHECK MANDREL CENTERING!**
Measure the distance over the adjustable leg from the pipe I.D. to the mandrel shaft. Then measure the same distance 180° from the adjustable leg. When the mandrel is centered, these two measurements will be approximately equal.
NOTE: If additional centering is required and mandrel removal is necessary, utilize the alignment fixture to insure returning the legs to the original set up location. Place the alignment fixture on the mandrel shaft, push it forward to meet the pipe face, and snug the fixture in place. Remove the mandrel; make the leg adjustment needed. Re-insert the mandrel and alignment fixture. Make sure

the adjustable leg is located at the "short radius bend". Push the assembly tight against the pipe face and tighten the mandrel. The legs should be at the original set up location. If the pipe end is square the alignment fixture will square the mandrel shaft to the pipe.

5. If additional centering is required, loosen the mandrel and adjustable leg.
NOTE: One complete revolution of the adjustment screw is equal to 0.050 thousandths (1.19 mm) of travel on the small legs and .056 thousandths on the large leg sets.

EXAMPLE: If the distance over the adjustable leg, between the mandrel shaft and pipe I. D. is one inch (1") and the distance 180° from the adjustable leg, between the mandrel shaft and the pipe I. D., is 1-1/8" divide the difference in half.

$$1/8" (.125) + 2 = .0625 (1/16")$$

Rotate the adjustable leg out approximately one and 1/8 turns.

6. Re-insert the mandrel after making the centering adjustments, Measure for centering again. Repeat if necessary.
7. If the elbow or bend has a square end, utilize the alignment fixture to square the mandrel shaft. Place the fixture on the mandrel shaft and push it forward to meet the pipe face; snug the fixture in place. Loosen the mandrel assembly slightly push the fixture forward until it rests firmly against the pipe face, and retighten the mandrel.
8. If the elbow or bend has been cut and is not square, a reference point for squaring should be established.
9. Once established, install the alignment fixture on the mandrel, pushing it firmly against the pipe face. Position the three legs so that one of the three jacking set screws in each leg is positioned over the pipe face. Screw in the jacking set screws until the back side of the fixture plate is square to the reference point.

SDB 412/2 SMALL DIAMETER BEVELER

SECTION VI MAINTENANCE

Under normal operating conditions, the bevel gear sets and roller bearing should be inspected every 100 hours of operation and lubricated as needed. If exceptionally difficult work has been performed or if excessive coolant used, inspection and lubrication should be done much more frequently.

The bore of the cutting head, feed nut and mandrel must be kept cleaned and oiled.

After the first ten hours of operation, the mainshaft bearing preload should be checked. Remove the air motor. Remove the 6, 1/4-20x 7/8 SHCS to remove feed nut housing (66-002-00). Bend the lockwasher (66-034-00) tab clear from the locknut (66-033-00). Insert and tighten an old, used tool bit into one of the slots on the cutting head. Clamp machine into a bench vise. Using the lock nut tool and a torque wrench, tighten locknut to 150ft lbs. while rotating the main housing. Once tight, secure lock washer tang into the closest locknut slot. Replace feed nut housing and fasteners. Replace and secure air motor.

After every ten hours of operation, inspect the mandrel guide bushing for wear. Replace as necessary.

NOTE: Excessive chatter may indicate a worn mandrel guide bushing

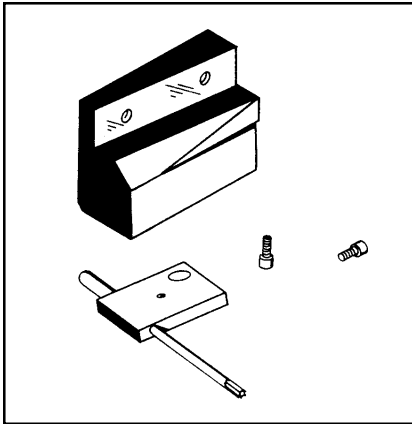
After 40 hours of operation, flush the air motor with a solution of three parts cleaning solvent and one part air motor oil. After flushing, add 1 oz. (30 cc) air motor oil into air line and run air motor for one minute. It is very important that the components of the mandrel assembly remain clean and free from corrosion. The legs and machine surfaces should be cleaned and oiled on a daily basis.

MANDREL STRESS INSPECTION PROCEDURE:

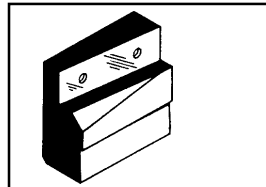
1. The mandrel should be removed from the machine body and inspected after every twenty hours of operation.
2. Remove the drawbar nut (#66-025-00) and the collar nut (# 66-024-00).
3. Remove the mandrel from the machine body by rotating the feed handles counter clockwise.
4. Physically examine the mandrel and threads, look for any signs of wear or damage.
5. Measure the length of the threaded drawbar. If the draw bar length is 21-1/2", the drawbar may remain in use. If the length of the drawbar is equal to or exceeds 22W in length the drawbar is no longer safe and should be replaced.

SDB 412/2 SMALL DIAMETER BEVELER

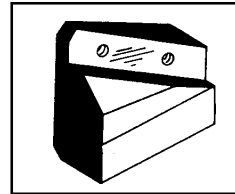
INSERT TOOLING CHART



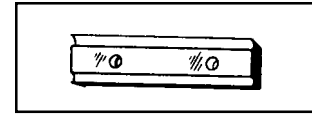
INSERT TOOL HOLDER KIT INCLUDES:
(2) SCREWS, (1) WRENCH, (1) HOLDER,
(LOW RANGE FACING HOLDER SHOWN)



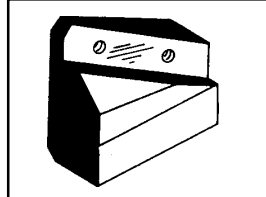
HIGH RANGE FACING HOLDER



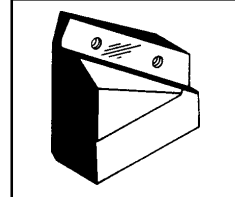
30° BEVEL HOLDER



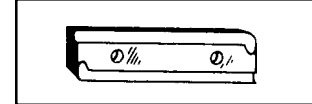
HSS OR CARBIDE FACE /
BEVEL INSERT



20° BEVEL HOLDER



37-1/2° BEVEL HOLDER



HSS OR CARBIDE
J PREP INSERT

CONVERSION CHART

ORIGINAL PART NO.	DESCRIPTION	REPLACEMENT TOOL HOLDER	REPLACEMENT TOOL INSERTS			
			STANDARD		J PREP	
			HSS	CARBIDE	HSS	CARBIDE
56-701-01	Facing - low range**	56-708-01	56-711-01	56-712-01	N/A	N/A
56-701-01	Facing- high range**	56-708-02				
56-703-00	20° beveling	56-709-01				
56-704-00	20° beveling					
56-706-00	30° beveling	56-709-02				
56-700-01	37-1/2° beveling	56-709-03				
56-700-02	37-1/2° beveling					
—	45° beveling	56-709-04			56-711-02	56-712-02

** LOW / HIGH RANGE FACING HOLDER USAGE CHART





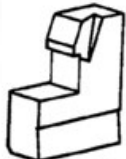
MACHINE	DESCRIPTION	FACING HOLDER	MIN I. D.	MAX I. D.
SDB 412/2	2-5/8" thru 13.3" (#66-005-00)	* low range #56-708-01 * low range #56-708-01	3.82" (97 mm) 4.80" (122 mm)	11.16" (283 mm) 12.14" (308 mm)

INSERT BEVELING HOLDERS ARE DESIGNED FOR USE WITH EITHER LOW RANGE OR HIGH RANGE FACING TOOLS ON ALL APPLICATIONS

* LOW RANGE FACING HOLDER #56-708-01 - HEIGHT: 1.25"

* HIGH RANGE FACING HOLDER #56-708-02 - HEIGHT: 1.50"

SDB 412/2 SMALL DIAMETER BEVELER

TOOL BELT				CUTTING RANGE	
	TYPE	PART NUMBER	T15* HSS* COATED*	DESCRIPTION see note	MAXIMUM WALL
	FACING	56-701-01	✓	For low range O. D. pipe or tube	1.50' (38.1 mm)
	FACING	56-701-01	✓	For high range O. D. pipe or tube	1.50' (38.1 mm)
	37.5° BEVELING	56-701-01	✓	For high range O. D. pipe or tube	1.50' (38.1 mm)
	37.5° BEVELING	56-700-02	✓	For low range O. D. pipe or tube	1.50' (38.1 mm)
	10° I. D. Deburring	56-702-01	✓	For low range O. D. pipe or tube	N/A
	10° I. D. Deburring	56-702-02	✓	For mid range O. D. pipe or tube	N/A
	10° I. D. Deburring	56-702-03	✓	For high range O. D. pipe or tube	N/A
	20° J Bevel	56-703-00	✓	For low range O. D. pipe or tube	1.50' (38.1 mm)
	20° J Bevel	56-704-00	✓	For high range O. D. pipe or tube	1.50' (38.1 mm)
	Small 4:1 Taper counterbore	56-705-01	✓	For low range O. D. pipe or tube	N/A
	Med 4:1 Taper counterbore	56-705-02	✓	For mid range O. D. pipe or tube	N/A
	Large 4:1 Taper counterbore	56-705-03	✓	For high range O. D. pipe or tube	N/A

NOTE: Tool bit ranges listed are to be used as guides when performing simultaneous prepping. Individual tool usage will expand the cutting range.

* T-15 HSS
coated
carbide

- A Tungsten type high speed steel, very high hardness, recommended for difficult to machine materials
- A layer of Titanium Nitride to increase cutting life and performance
- Super-hard composite steel material offering maximum edge strength

N/A = Not Applicable
✓ = Available

NOTICE:

Effective June 1995. Single piece tool bits shown on this page have been replaced by holder and insert combinations and are now available only by special order. contract manufacturer for pricing and availability.

SDB 412/2 SMALL DIAMETER BEVELER

SDB 412 EXTENSION LEG CHART Captivated Screw Keg Design

Extensions Required	Pipe I. D. Range
NONE	3.78 - 4.90
66-085-01	4.67 - 5.83
66-085-02	5.67 - 6.83
66-085-03	6.67 - 7.83
66-085-04	7.66 - 8.83
66-085-05	8.66 - 9.83
66-085-06	9.66 - 10.82
66-085-07	10.66 - 11.82
66-085-08	11.66 - 12.82

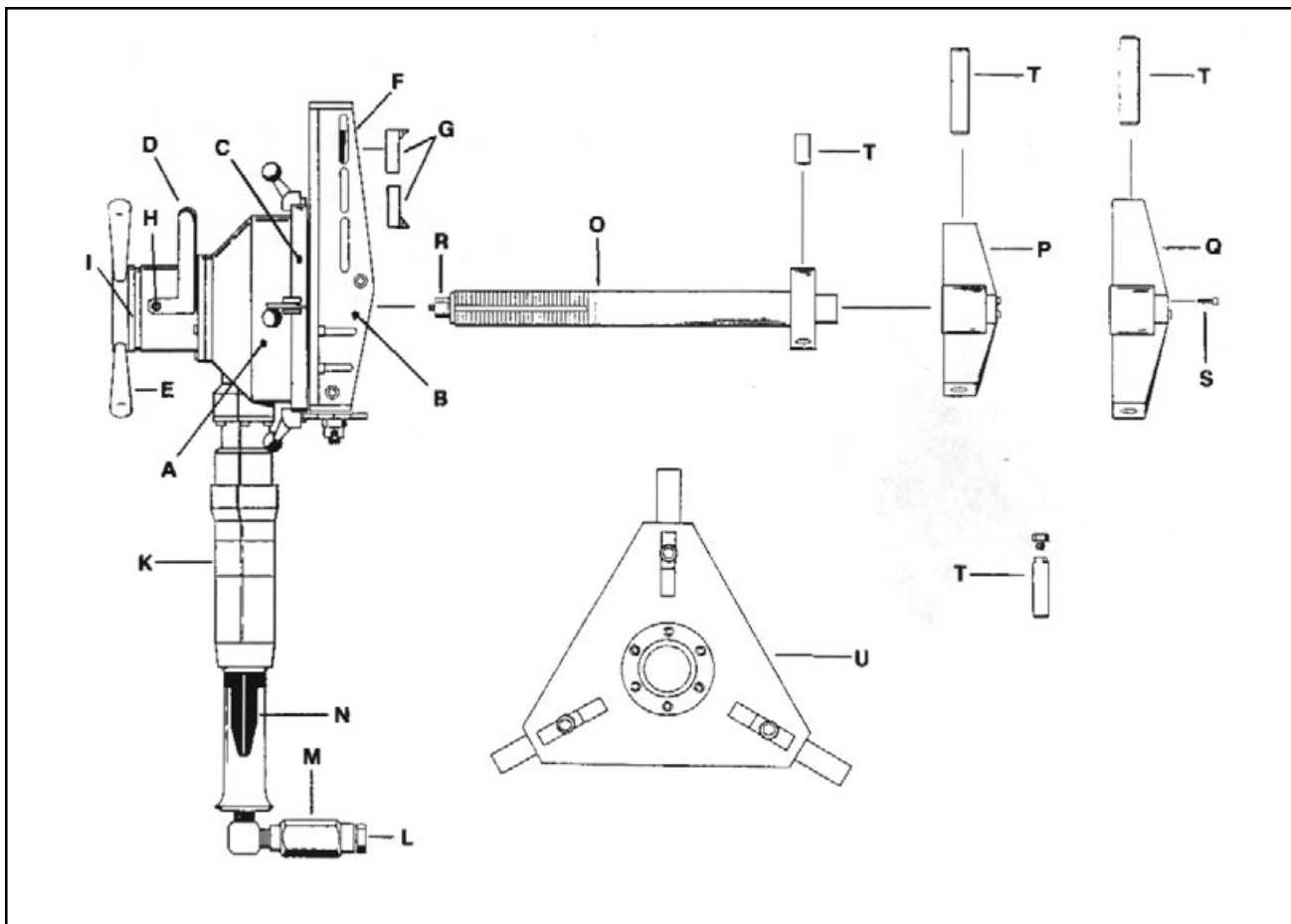
NEW LEG DESIGN - OCTOBER, 1992

FF 424 FLANGE FACING SYSTEM

SECTION I FF 424 INTRODUCTION

The following is a listing of individual controls and components that are important to the successful operation of the FF 424. Prior to attempting to set up and operate the FF424, it is recommended that you become familiar with these items:

- | | | | |
|----|-----------------------------|----|---|
| A. | POWER HEAD | K. | AIR MOTOR |
| B. | FLANGE FACING MODULE | L. | AIR INLET |
| C. | TRIP RING AND TRIPS | M. | ADJUSTABLE SPEED CONTROL |
| D. | LIFTING HANDLE | N. | ON-OFF LEVER |
| E. | AXIAL INFEED HANDLES | O. | MANDREL |
| F. | TOOL HOLDER SLOT | P. | MANDREL ADAPTOR CONE (8.5-12.8" RANGE) |
| G. | TOOL BIT (HIGH & LOW RANGE) | Q. | MANDREL ADAPTOR CONE (12.7-20.0" RANGE) |
| H. | MACHINE LOCKING SCREWS | R. | MANDREL EXPANSION NUT |
| I. | AXIAL INFEED INDICE DIAL | S. | ADAPTOR CONE MOUNTING SCREWS (3 EACH) |
| J. | STARWHEEL | T. | LEG SETS (3 PER SET WITH 1 ADJUSTABLE) |
| | | U. | ALIGNMENT FIXTURE |



FF 424 FLANGE FACING SYSTEM

SECTION VI FF 424 MAINTENANCE

Under normal operating conditions, the bevel gear sets and roller bearing should be inspected every 100 hours of operation and lubricated as needed. If exceptionally difficult work has been performed or if excessive coolant has contaminated the gear sets and roller bearings, inspection and lubrication should be done much more frequently.

The bore of the cutting head, feed nut and mandrel must be kept cleaned and oiled.

MAIN SHAFT BEARING PRE-LOAD

Lock nut tool required - **wachs part # 66-141-00**

After the first ten hours of operation, the mainshaft bearing preload should be checked. Remove the air motor. Remove the 6,1/4-20 x 7/8 SHCS to remove feed nut housing (66-002-00). Bend the lock washer (66-034-00) tab clear from the locknut (66-033-00). Insert and tighten an old, used tool bit into one of the slots on the cutting head. Clamp machine into a bench vise. Using the lock nut tool and a torque wrench, tighten locknut to 150 ft lbs. while rotating the main housing. Once tight, re-secure lock washer tang into the closest locknut slot. Replace feed nut housing and fasteners. Replace and secure air motor.

After every ten hours of operations, inspect the mandrel guide bushing for wear. Replace as necessary

NOTE: Excessive chatter may indicate a worn mandrel guide bushing

After 40 hours of operation, flush the air motor with a solution of three parts cleaning solvent and one part air motor oil. After flushing, add 1 oz. (30 cc) air motor oil into air line and run air motor for one minute. It is very important that the components of the mandrel assembly remain clean and free from corrosion. The legs and machine surfaces should be cleaned and oiled on a daily basis.

MANDREL STRESS INSPECTION PROCEDURE:

1. The mandrel should be removed from the machine body and inspected after every twenty hours of operation.
2. Remove the drawbar nut (# 66-025-00) and the collar nut (# 66-024-00).
3. Remove the mandrel from the machine body by rotating the feed handles counter clockwise.

4. Physically examine the mandrel and threads, look for any signs of wear or damage.

5. Measure the length of the threaded drawbar. If the drawbar length is 21-1/2", the drawbar may remain in use. If the length of the drawbar is equal to or exceeds 22" in length the drawbar is no longer safe and should be replaced.

FF 424 FLANGE FACING SYSTEM

SECTION VII FF 424 CHARTS AND GRAPHS

A. FLANGE SURFACE TRIP CHART

TRIP ENGAGEMENT	RMS FINISH
1TRIP	63RMS
2TRIP	125 RMS
4TRIP	250 RMS
6TRIP	500 RMS

B. MANUAL BEVEL GENERATION USING SINGLE POINT MODULE:

A bevel can be generated by feeding the cutting tool into the work radially and axially simultaneously. As the radial feed advances the tool automatically, the operator must withdraw the tool by rotating the axial feed handle counterclockwise. The correct amount of axial feed per machine revolution is given on the following chart.

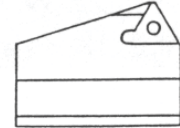
For example, to generate a 30° degree bevel with 6 trips engaged (the fastest tool feed setting), the operator must withdraw the cutting tool .0181 each time the cutting tool completes a revolution. This distance is represented by .018 (18 thousandths) increments on the calibrated feed dial located on the feed handle assembly.

MANUAL BEVEL GENERATION CHART

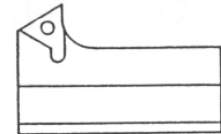
TRIPS Engaged	AXIAL FEED RATE REQUIRED PER MACHINE REVOLUTION			
	10° Bevel	20° Bevel	30° Bevel	37-1/2° Bevel
6	.006"	.011"	.018"	.024"
4	.004"	.008"	.012"	.016"
2	.002"	.004"	.006"	.008"
1	.001"	.002"	.003"	.004"

C. FLANGE FACING MODULE TOOL HOLDER TOOL BIT DIAGRAM

**LOW RANGE
TOOL HOLDER
PART # 56-193-00
RANGE: 4"
THROUGH 21.5"**



**HIGH RANGE
TOOL HOLDER
PART # 56-192-00
RANGE: 6.25"
THROUGH 24.0"**



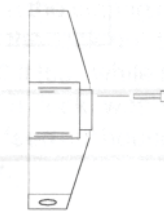


**TOOL HOLDER
TOOL BIT
PART # 56-709-00
RANGE: N/A**



FF 424 FLANGE FACING SYSTEM

SECTION VIII FF 424 CONSUMABLE SELECTION GRAPHS

ASSEMBLY #	SOLID LEG (2 PCS.)		ADJ. LEG (1 PC.)		CHUCKING RANGE/LEG SET	
	PART #	LENGTH	PART #	LENGTH	MIN. DIA.	MAX DIA.
 #66-414-00 manrel - no adapter (3.75" - 8.5" range)	66-077-01	1.625	use 3 solid legs	-----	3.75	4.55
	66-077-02	1.955	66-078-02	1.625	4.42	5.21
	66-077-03	2.285	66-078-03	1.955	5.08	5.87
	66-077-04	2.615	66-078-04	2.285	5.74	6.53
	66-077-05	2.945	66-078-05	2.615	6.40	7.19
	66-077-06	3.275	66-078-06	2.945	7.05	7.85
	66-077-07	3.605	66-078-07	3.275	7.71	8.51
#66-414-00 mandrel - #66-090-00 mandrel adaptor (8.4" - 12.8" range) 	66-093-01	2.340	66-094-01	1.980	8.40	9.20
	66-093-02	2.700	66-094-02	2.340	9.12	9.92
	66-093-03	3.060	66-094-03	2.700	9.84	10.64
	66-093-04	3.420	66-094-04	3.060	10.56	11.36
	66-093-05	3.780	66-094-05	3.420	11.28	12.08
	66-093-06	4.140	66-094-06	3.780	12.00	12.80
#66-414-00 mandrel - #66-092-00 mandrel adaptor(12.7" - 20.0" range) 	66-093-07	4.500	66-094-07	4.140	12.72	13.52
	66-093-08	4.860	66-094-08	4.500	13.44	14.24
	66-093-09	5.220	66-094-09	4.860	14.16	14.96
	66-093-10	5.580	66-094-10	5.220	14.96	15.68
	66-093-11	5.940	66-094-11	5.580	15.60	16.40
	66-093-12	6.300	66-094-12	5.940	16.32	17.12
	66-093-13	6.660	66-094-13	6.300	17.04	17.84
	66-093-14	7.020	66-094-14	6.660	17.76	18.56
	66-093-15	7.380	66-094-15	7.020	18.48	19.28
	66-093-16	7.740	66-094-16	7.380	19.20	20.00

****NOTE:**

SOLID LEGS (#66-077-01) MUST BE INSERTED INTO MANDREL (#66-414-00) PRIOR TO NUMBER 66-090-00 OR 66-092-00 MANDREL ADAPTOR. NIETHER MANDREL ADAPTOR THREE SOLID LEGS ARE NOT IN THE MANDREL BODY.

****NOTE:**

ALWAYS INSERT LEGS WITH POINTED END INTO MANDREL. DAMAGE WILL RESULT IF INCORRECTLY INSTALLED

FF 424 FLANGE FACING SYSTEM

SECTION VIII FF 424 CONSUMABLE SELECTION GRAPHS

BEVELING MACHINE LEG EXTENSION CHART

Captivated Screw Leg Design




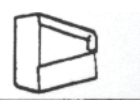
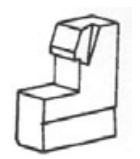
Extensions Required	Pipe I. D. Range
NONE	3.78 - 4.90
66-085-01	4.67 - 5.83
66-085-02	5.67 - 6.83
66-085-03	6.67 - 7.83
66-085-04	7.66 - 8.83
66-085-05	8.66 - 9.83
66-085-06	9.66 - 10.82
66-085-07	10.66 - 11.82
66-085-08	11.66 - 12.82

NEW LEG DESIGN - OCTOBER, 1992

FF 424 FLANGE FACING SYSTEM

SECTION VIII FF 424 CONSUMABLE SELECTION GRAPHS

BEVELING AND MACHINE TOOLING SELECTION CHART

TOOL BIT				CUTTING EDGE	
	TYPE	PART NO.	T-15* HSS* COATED*	DESCRIPTION	MAXIMUM WALL
	Facing	56-701-01	X	For low range O.D. pipe or tube	1.50" (38.1 mm)
	Facing	56-701-01	X	For high range O.D. pipe or tube	1.50" (38.1 mm)
	37.5° Beveling	56-700-01	X	For high range O.D. pipe or tube	1.50" (38.1 mm)
	37.5° Beveling	56-700-02	X	For low range O.D. pipe or tube	1.50" (38.1 mm)
	10° I.D. Deburring	56-702-01	X	For low range I.D. pipe or tube	N/A
	10° I.D. Deburring	56-702-02	X	For mid range I.D. pipe or tube	N/A
	10° I.D. Deburring	56-702-03	X	For high range I.D. pipe or tube	N/A
	20° J Bevel	56-703-00	X	For low range O.D. pipe or tube	1.50" (38.1 mm)
	20° J Bevel	56-702-02	X	For high range O.D. pipe or tube	1.50" (38.1 mm)
	Small 4:1 Taper Counterbore	56-705-01	X	For low range O.D. pipe or tube	N/A
	Medium 4:1 Taper Counterbore	56-705-02	X	For mid range O.D. pipe or tube	N/A
	Large 4:1 Taper Counterbore	56-705-03	X	For high range O.D. pipe or tube	N/A

* T-15 HSS
coated
carbide

- A Tungsten type high speed steel, very high hardness, recommended for difficult to machine materials
- A layer of Titanium Nitride to increase cutting life and performance
- Super-hard composite steel material offering maximum edge strength

N/A = Not Applicable
✓ = Available

NOTICE:

Effective June 1995. Single piece tool bits shown on this page have been replaced by holder and insert combinations and are now available only by special order. contract manufacturer for pricing and availability.

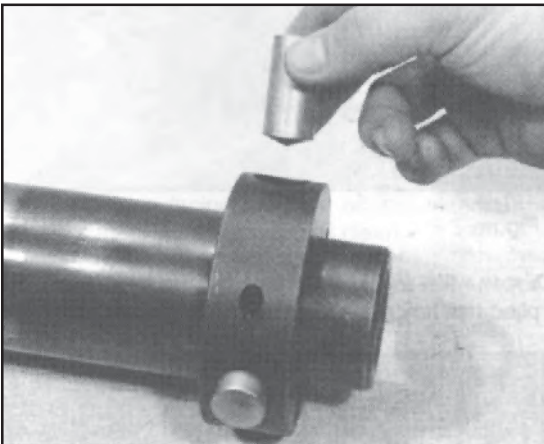
FF 424 FLANGE FACING SYSTEM

SECTION V FF 424 SET UP AND OPERATING PROCEDURES

A. FF 424 SET UP

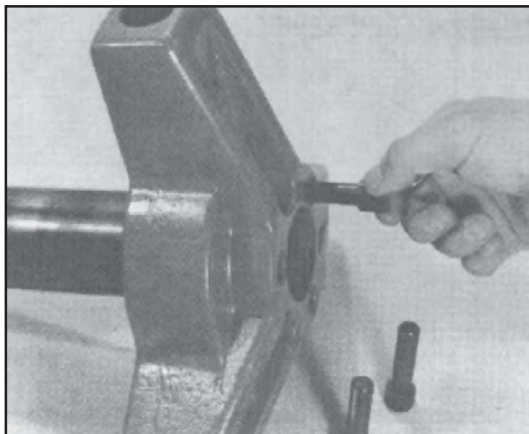
1. Measure the flange I.D.
Refer to mandrel leg extension chart (See page 13) To select the mandrel adaptor and leg Set required to mount in flange I.D.
2. Insert the solid leg set # 66-077-01 in the mandrel head "POINT SIDE DOWN" (Figure 1)

NOTE: 66-077-01 solid leg set is required when installing the 66-090-00 adaptor or the 66-092-00 adaptor onto the mandrel head.



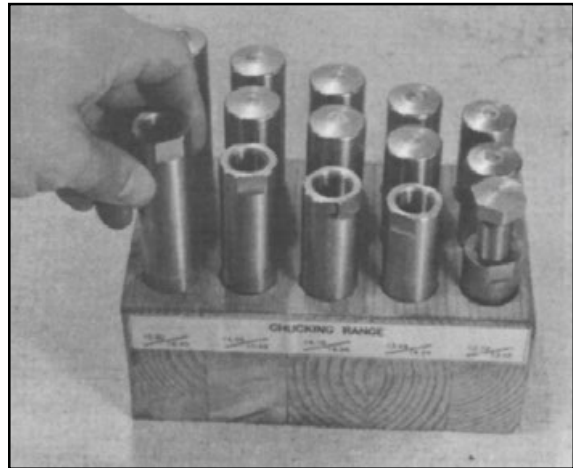
(Figure 1)

3. Mount the selected adaptor over the mandrel head and secure with the provided 3 SHCS (Figure 2)



(Figure 2)

4. Select extension leg set required. Refer to the I.D. range chart decal provided on the leg extension box, or on page 13 in this manual.

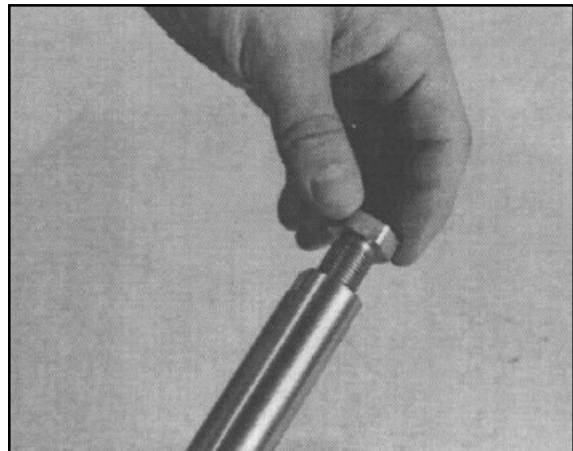


(Figure 3)

5. Install the adjustment screw into the adjustable leg and tighten completely. (Figure 4)

ABOUT THE ADJUSTABLE LEG:

An adjustable leg has been provided to compensated centering on slip over or butt welded flanges when mandrel placement must be inside the pipe I. D.

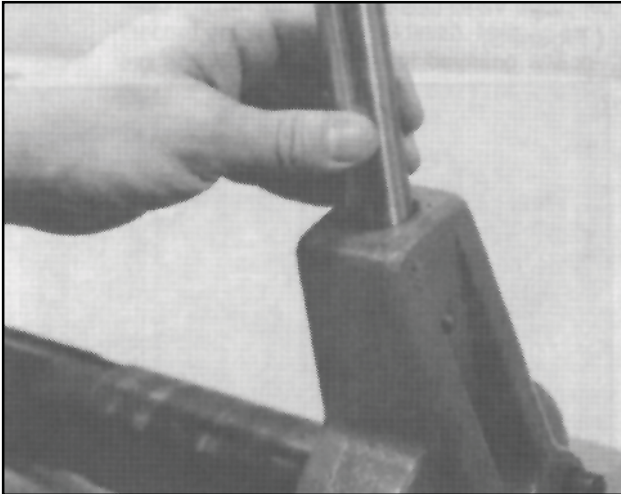


(Figure 4)

FF 424 FLANGE FACING SYSTEM

SECTION V FF 424 SET UP AND OPERATING PROCEDURES

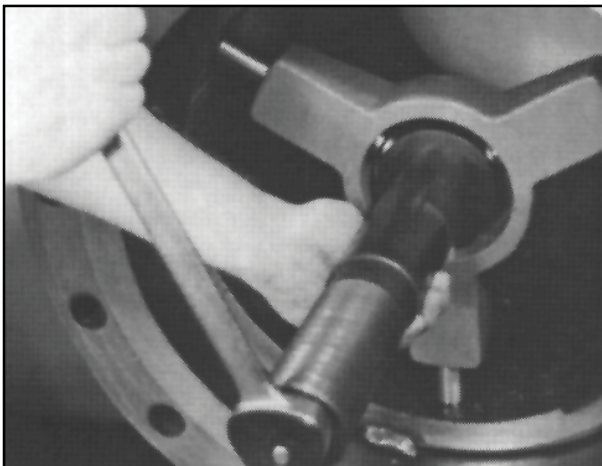
6. Insert the leg set into the adapter. (Figure 5)



(Figure 5)

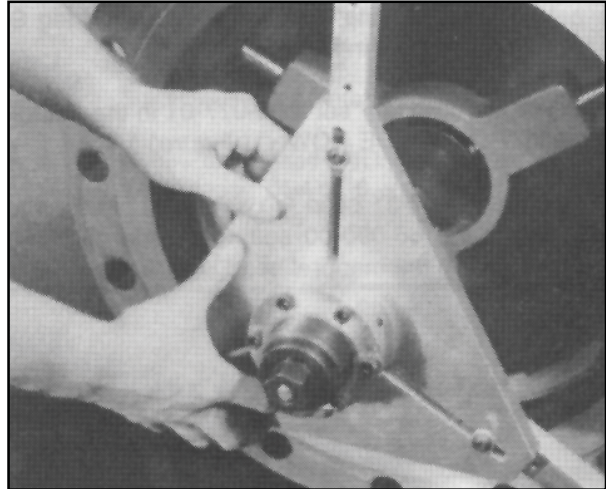
7. Place the mandrel assembly into the flange I. D. with one leg at the 6 o'clock position. The legs should be kept as close as possible to the flange I.D. edge, yet back far enough to perform the desired operation. Snug the mandrel into place by tightening the draw bar nut (Figure 6) with the supplied 1-1/8" wrench

NOTE: Observe the mandrel keyway slots. When the slots are at the nine o'clock and three o'clock position the flange facer motor position can be placed at the six o'clock or twelve o'clock location. Position the mandrel slots at the desired location for air motor clearance or operation.



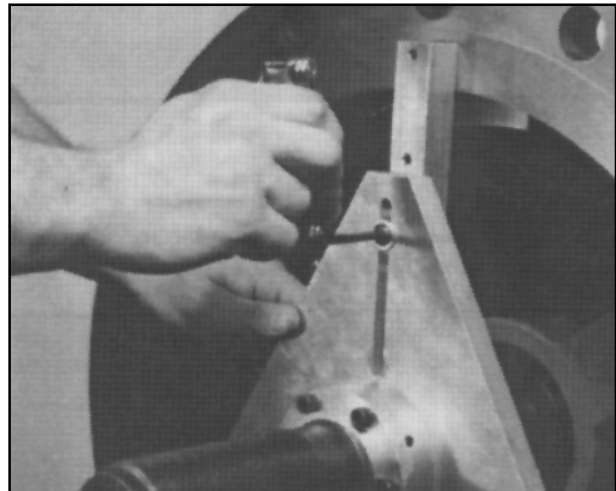
(Figure 6)

8. Slide the flange alignment fixture over the mandrel shaft. (Figure 7)



(Figure 7)

9. Extend the alignment arms, if necessary, with the supplied hex key set. (Figure 8)

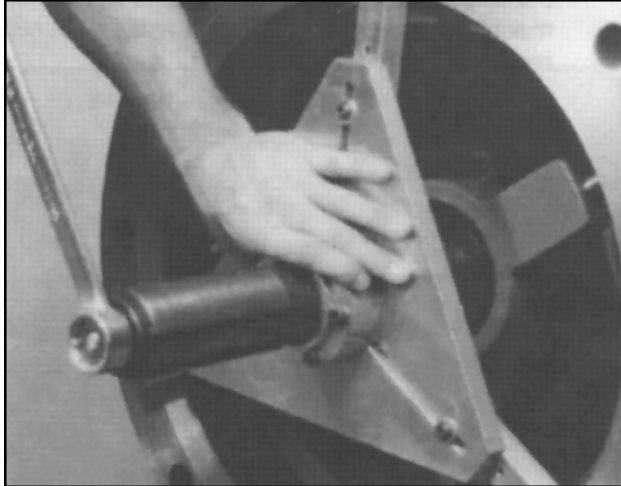


(Figure 8)

10. Loosen the mandrel assembly using the draw bar nut and push the alignment fixture firmly against the flange face. Retighten the draw bar nut with the supplied 1-1/8" wrench. (Figure 9)

FF 424 FLANGE FACING SYSTEM

SECTION V FF 424 SET UP AND OPERATING PROCEDURES

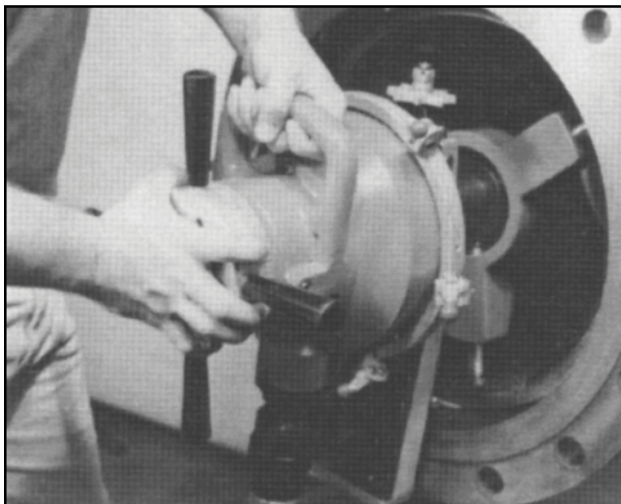


(Figure 9)

11. Install the flange facing machine on the mandrel shaft. Be sure to wipe the mandrel clean.

NOTE: Align the internal machine keys with the mandrel keyway slots.

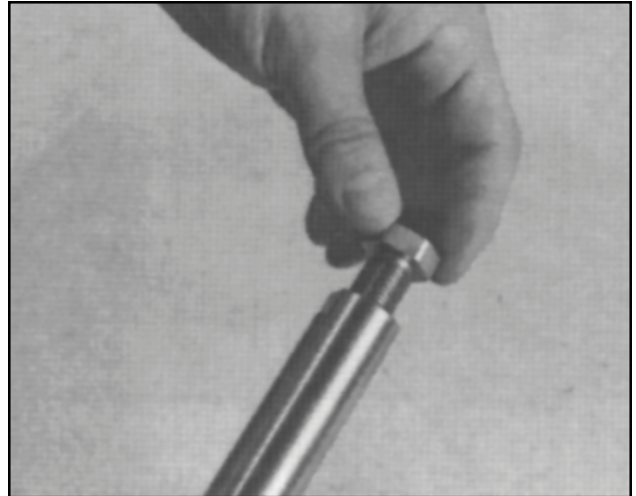
Engage the internal machine keys on the mandrel keyway slots. Push the machine forward. Rotate the handle assembly clockwise, engaging the machine feed nut into the threaded portion of the mandrel shaft. (Figure 10)



(Figure 10)

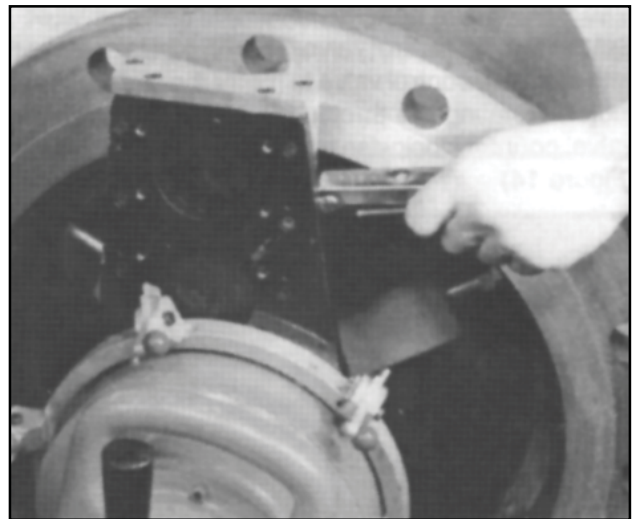
12. Install the tooling onto the flange facer tool slide slot. Refer to the tool holder/tool bit diagram. (Figure 11)

NOTE: Machine rotates clockwise as viewed from the rear of the machine. Cutting bit must face clockwise.



(Figure 11)

13. Tighten the tool bit locking set screws with the supplied hex key set. (Figure 12)



(Figure 12)

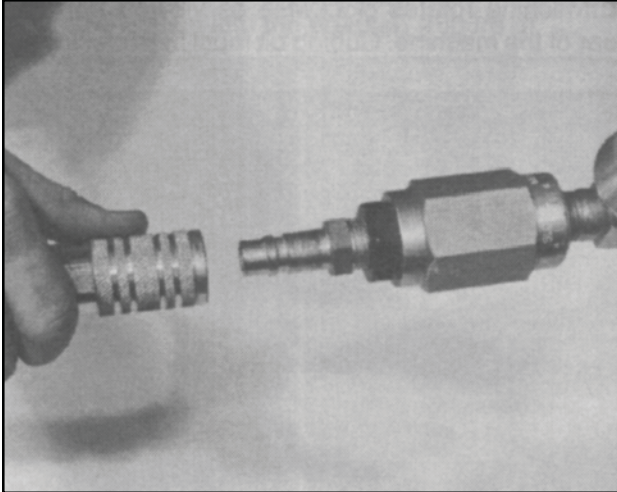
14. Attach the air supply. Press the air motor lever and rotate the machine slowly, to verify clearance. (Figure 13)

IMPORTANT:

E.H. Wachs Co. recommends the use of an ATM air treatment module (P.N.-26-407-00) to filter air and lubricate the air motor. The air motor warranty will be void if an ATM is not used.

FF 424 FLANGE FACING SYSTEM

SECTION V FF 424 SET UP AND OPERATING PROCEDURES

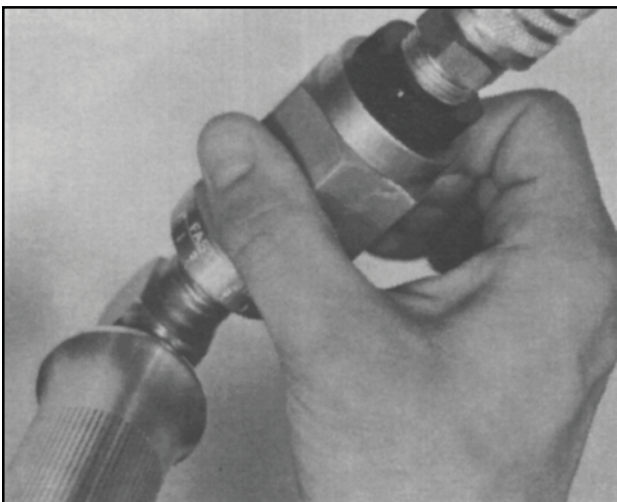


(Figure 13)

NOTE:

Use 90 psi max air pressure. Higher air pressure increases stresses and loads on the machine components and fasteners which may result in break age. Higher air pressure also increases the sound decibel level of the tool.

15. Set the throttle control valve. The FF424 is equipped with a throttle control valve to meter the airflow to the motor. Rotating the throttle clockwise will open the valve, counter clockwise rotation will close the valve. (Figure 14)

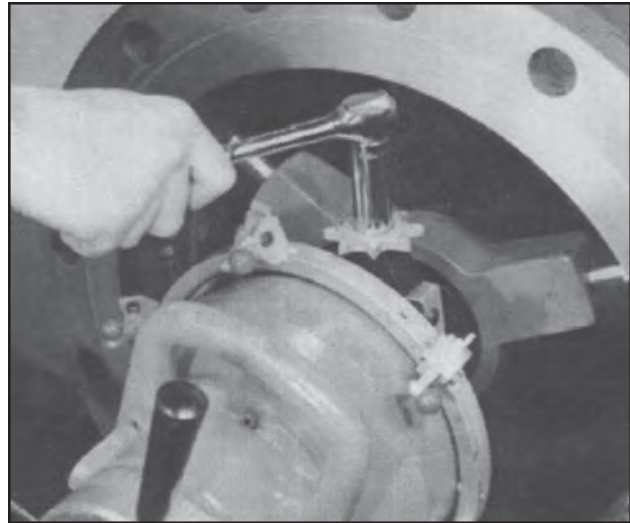


(Figure 14)

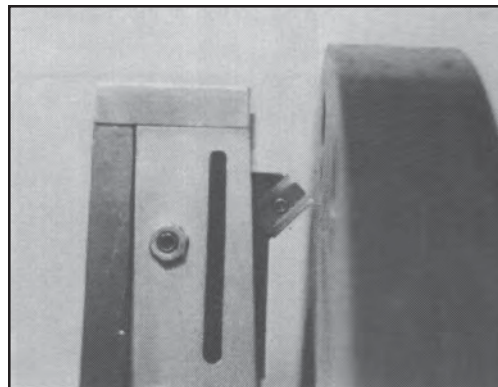
NOTE:

Adjust the cutting head RPM with the throttle control for flange size being machined. Rule of thumb: 3 to 4 RPM 's recommended for 20" to 24" flange O.D. . Increase RPM's as flange sizes become smaller

16. Rotate the starwheel nut with the supplied 3/4" socket and ratchet, (Figure 15) until the tool bit tip is flush with the desired surface to be faced. (Figure 16)



(Figure 15)



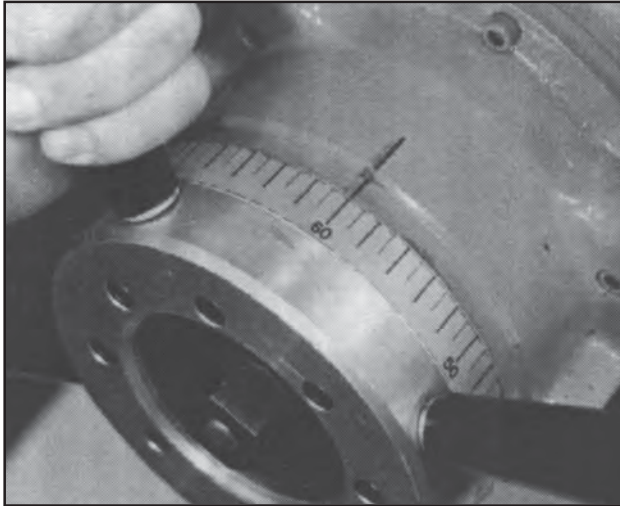
(Figure 16)

17. Rotate the axial feed handle assembly clockwise until the tool bit just touches the desired surface to be faced.
18. Again rotate the tool slide starwheel nut, raising the bit just above the surface to be faced.

FF 424 FLANGE FACING SYSTEM

SECTION V FF 424 SET UP AND OPERATING PROCEDURES

19. Using the infeed indice guage, rotate the axial feed handles clockwise until the desired depth of cut is attained. (Figure 17)



(Figure 17)

20. Tighten the machine /mandrel locking set screws with the provided hex key set. (Figure 18)

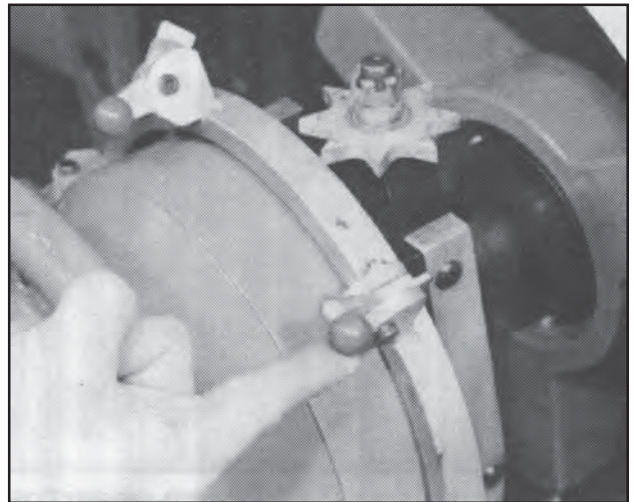


(Figure 18)

21. Engage the desired number of trips on the trip collar assembly to achieve the surface finish required. (Figure 19) (Refer to flange surface trip chart.)

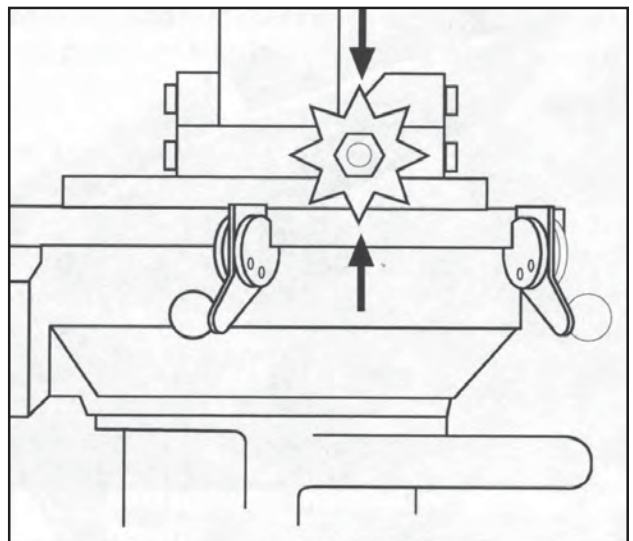
NOTE:

A general rule of thumb is to take light cuts to clean up the flange face. To produce a 500 RMS or record groove finish, best results are achieved with a finish cut depth of .007" to .008"



(Figure 19)

22. Now, time the starwheel. In order to prevent damage to machine, the star wheel must be timed prior to engaging any trips. (Figure 20)



(Figure 20)

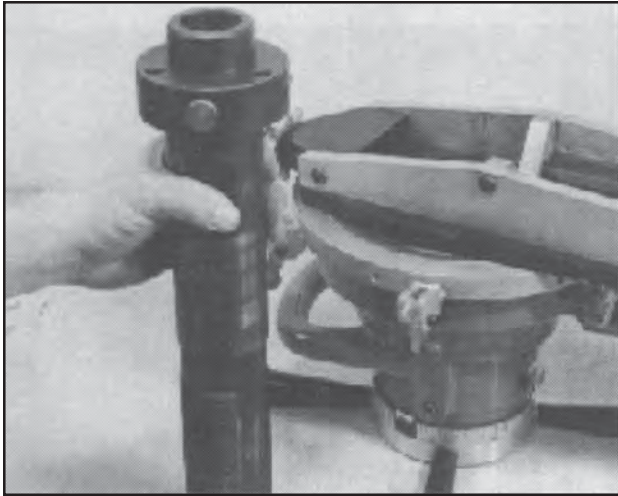
23. The machine is now ready to cut. Press the air motor lever to begin cutting.

FF 424 FLANGE FACING SYSTEM

SECTION V FF 424 SET UP AND OPERATING PROCEDURES

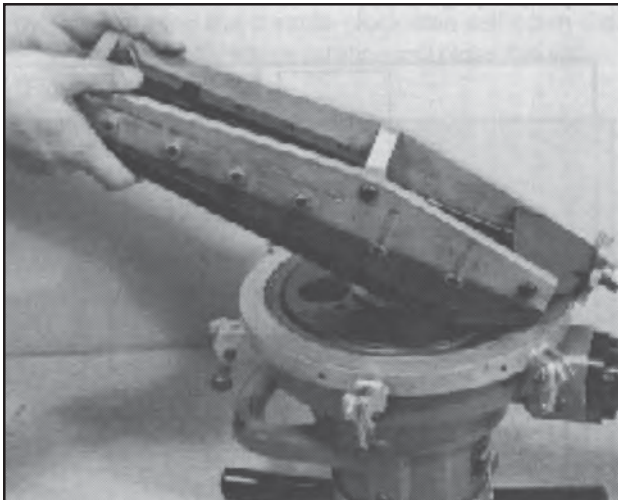
B. FLANGE FACER TO BEVELING MACHINE CONVERSION PROCEDURE

1. Remove the flange facer mandrel from the machine body. (Figure 1)



(Figure 1)

2. Remove the flange facer tool slide module, by removing the four 3/8-16 x 1 -1/4" SHCS using the provided hex key set. (Figure 2)



(Figure 2)

3. Remove the trip collar assembly from the flange facer machine housing by loosening the six locking socket set screws. (Figure 3)

NOTE: When reinstalling the trip ring assembly, center cut out relief on trip ring over the air motor housing for proper trip lever location. Be sure that ring sits flush against housing all around.

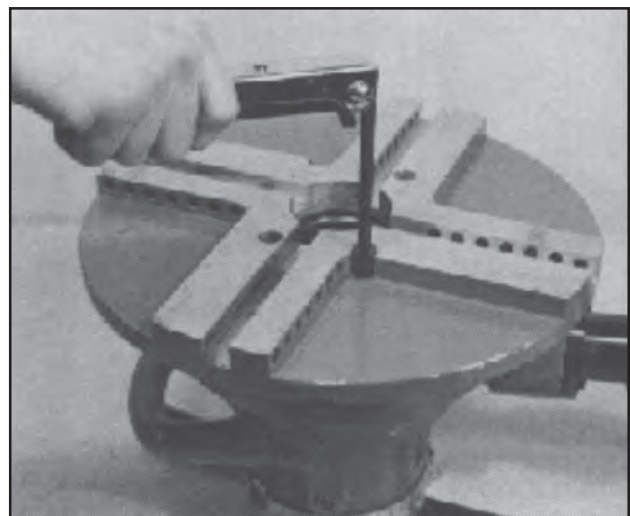


(Figure 3)

4. Mount rotating tool holder plate on machine rotating

NOTE: Be sure to install the felt washer. Coat the washer with light oil. Place into recessed hole in rear of tool holder plate.

Align dowel pin holes in plate with the dowel pins on the machine head and insert plate.



(Figure 4)

FF 424 FLANGE FACING SYSTEM

SECTION V FF 424 SET UP AND OPERATING PROCEDURES

C. BEVELING MACHINE OPTION SET-UP AND OPERATION INSTRUCTIONS

Extension Leg Selection

1. The FF 424 BEVELER uses one mandrel assembly with the addition of eight leg extension sets to cover its entire operating range (3.780" to 12.82" I. D.).
2. The mandrel itself has three permanently mounted chuck legs which expand or contract to the inside wall of the pipe with or without extension legs when the draw bar nut is rotated.
3. To determine which extension leg set is required, measure the work piece pipe I.D. (**Refer to the extension leg selection chart.**)

Each extension leg will be stamped with its part number for easy identification.

4. Select the required extension leg set. The extension legs fasten to the permanently mounted chuck legs with two captivated socket head cap screws in each leg.

Mounting the Mandrel Assembly Into the Pipe

NOTE: It is recommended to mount the mandrel by itself and then install the machine onto the mandrel to insure proper squaring of machine and avoid operator injury.

1. Insert the blade end of mandrel into the pipe. For best results keep the end of the blades as close to the pipe edge as practical. The maximum depth of penetration into the pipe should be 3/4" (19mm) from the tapered ends of the leg to the end of the pipe. Be certain that there is adequate clearance between the blades and the 1.0. tooling. This will allow for a normal prep and still keep the beveling head rigid.
2. Move the mandrel back and forth and up and down while tightening the draw bar nut. The chuck legs will automatically help center the machine. **Torque the draw bar nut to 90 ft. lbs.**

Important: Place mandrel shaft keyways in relationship to locating keys in machine to select air motor operating location.

D. Mounting Machine Assembly On Mandrel

1. Inspect the bore of the beveling head for dirt and metal chips. Clean the bore with compressed air or solvent as necessary.
2. Wipe the mandrel clean and apply a light coating of oil.
3. Insert the machine body over the mandrel being careful not to scrape the head bushing.
4. Align the keys in the machine with the keyway slots in the mandrel. Push the machine forward until the feed nut and threaded portion of mandrel shaft meet.
5. Rotate feed handle assembly clockwise engaging feed nut and machine with mandrel.
6. Next, tighten the machine / mandrel locking set screws located on either side of the machine body using the provided hex key set. Tighten both locking screws equally. Apply tension in order to pre-load the machine to the mast and remove any play.
7. Connect a clean, dry 90 PSI air supply to machine. It is recommended to use an ATM air treatment module in the air line to filter the air and lubricate the air motor.

NOTE: Use 90 PSI maximum air pressure. Higher air pressure increases the loads and stresses on the tool parts, sockets, and fasteners and may result in breakage. Higher air pressure also increases the sound level of the tool.

E. Form Tool Installation Procedure

Setting Up The Form Tools: (Refer to tool selection chart.) Install the facing tool in beveling head. All tool bits must be installed so the cutting edge will contact the pipe when rotating in a clockwise direction, as seen from rear of machine. The tool bits are locked into place with the set screws adjacent to the slot.



CAUTION: Do not allow tool to come in with mandrel or damage will

CAUTION: Disconnect the air supply when ever changing or adjusting the form tool.

FF 424 FLANGE FACING SYSTEM

SECTION V FF 424 SET UP AND OPERATING PROCEDURES

2. Start machine and turn feed nut in until cutting tool contacts the pipe. Continue facing until pipe has a clean finish. Retract the beveling head. Turn off machine and insert O.D. beveling tool.
3. Start machine again and feed beveling tool into the pipe until facing tool touches again. Adjust O.D. beveling tool in or out radially depending on the land thickness desired.
4. The last tool bit to install is the I.D. deburring tool. It should be placed in the slot opposite the beveling tool. It may also require adjustment, in or out, to produce the desired height and depth.

NOTE: If only two tools are to be used, place them in opposite slots to offset cutting load.

Continuous Operation: Once the cutting tools are in place, the machine can be moved from one pipe to another of the same size without resetting the tool bits.

F. Tips For a Good Finish

1. Always place mandrel as close to pipe end as possible.
2. Use a cutting oil or other coolant generously. This will also increase cutter life.
3. Adjust cutting head RPM for material. A good rule of thumb is the harder the material, the slower the speed.
4. Always keep a lot of pressure on the feed nut and pull out of cut quickly when prep is finished.

Tips for a good finish: SINGLE POINT FLANGE FACING BEVELING MODULE

1. Always place mandrel as close to pipe end as possible.
2. Use a cutting coolant generously. This will also increase cutter life.
3. The feed rate for each trip is .005 per revolution.
4. CHATTER: Tool chatter occurs when the tool begins to vibrate during a cut. Excessive tool chatter can cause poor quality surface finishes. Chatter can be caused by any one of a number

of variables inherent in a portable machine of this type. Check tooling:

- To high of an operating speed or to great of a radial feed rate for the material being machined.
5. INTERMITTENT CUTS: When working on a rough cut end of a piece of pipe or a warped flange, the need to do an intermittent cut does exist. In order to prolong tool life and reduce shock loads on the machine and inserts, intermittent cuts should be done at a slower speed and feed rate. Once a full cut is achieved, operating speeds can be increased to normal machining procedures.
 6. As you finish a pass, note your location on the indexed axial feed gauge. Then, to take your next pass, rotate the feed handle backwards 1 full turn to your noted location and retract your tool slide. Once retracted, rotate the feed handle in the amount you wish for the cut depth of your next pass. This will allow you to retract the slide without damaging the tooling, remove all back lash in the feed handle, and give you an exact depth of cut on your next pass.
 7. To produce a 500 RMS or record groove finish, the best results are achieved with a finish cut depth of .007" to .008".

Operating Envelopes

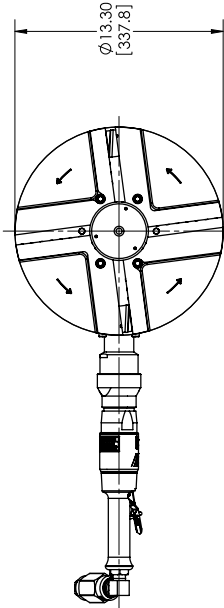
.....

The following pages illustrate the dimensions and operating envelopes for all configurations of the SDB 412 and FF 424.

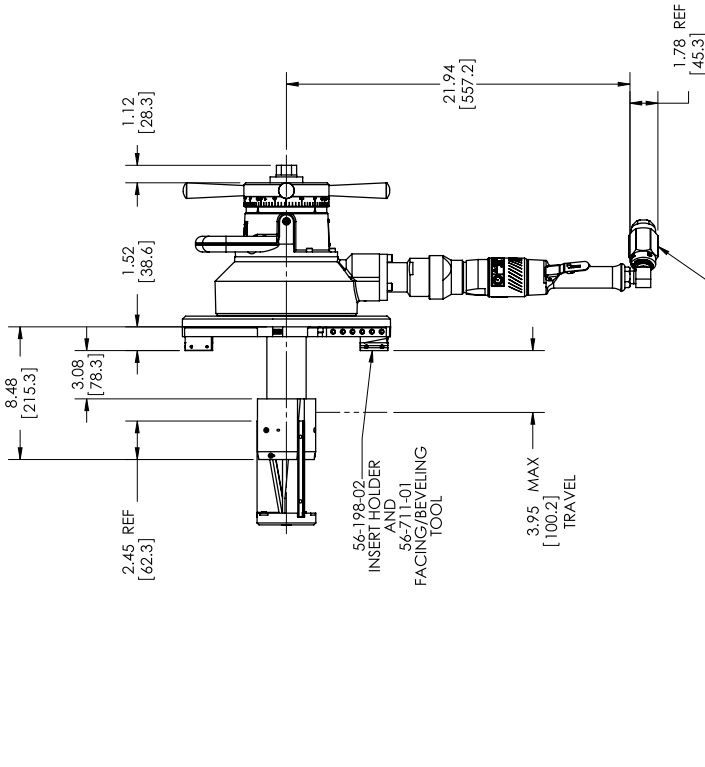
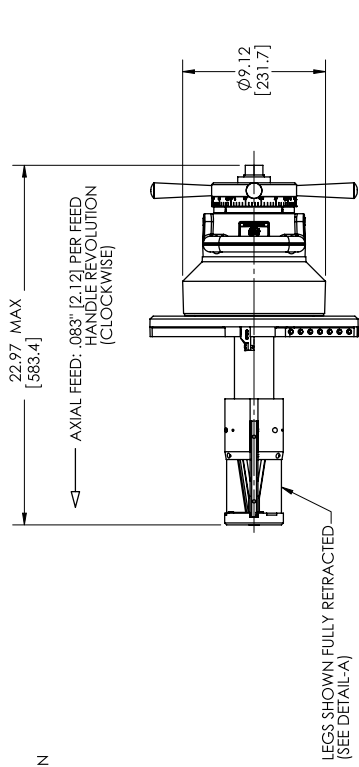
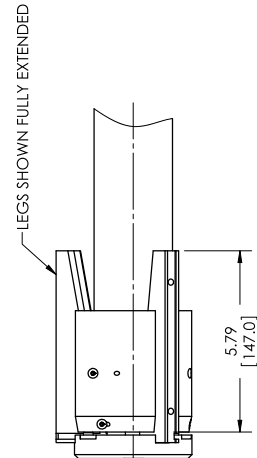
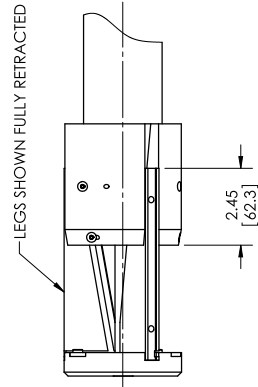
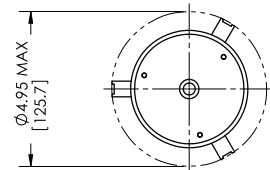
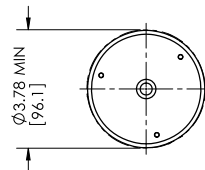
SDB 412 Air Drive (66-000-01)

NOTE:
SEE 66-407-01 FOR EXTENSION
LEG CLAMPING RANGES

DIMENSIONS IN BRACKETS ARE MILLIMETERS



20 RPM
(MAX FREE SPEED)

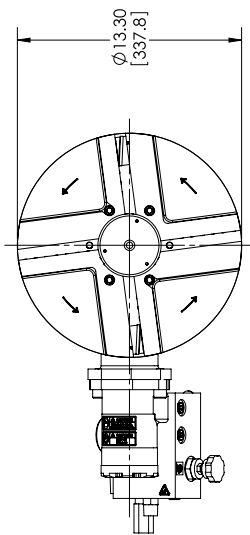
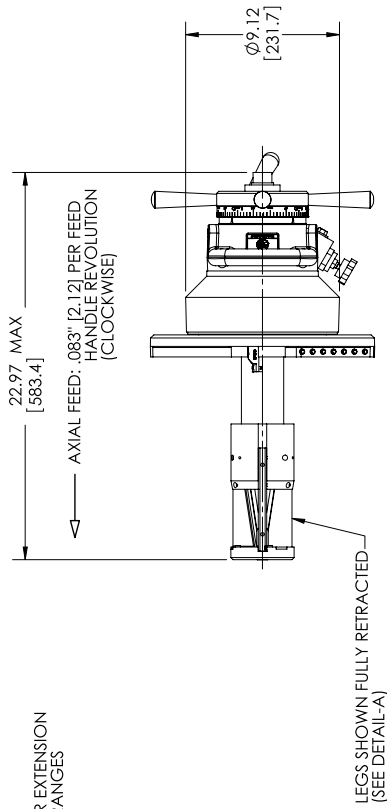


AIR REQUIREMENTS:
AIR CONSUMPTION: 55 cfm [1,553 l/min]
PRESSURE: 90 PSI [6.2 bar]

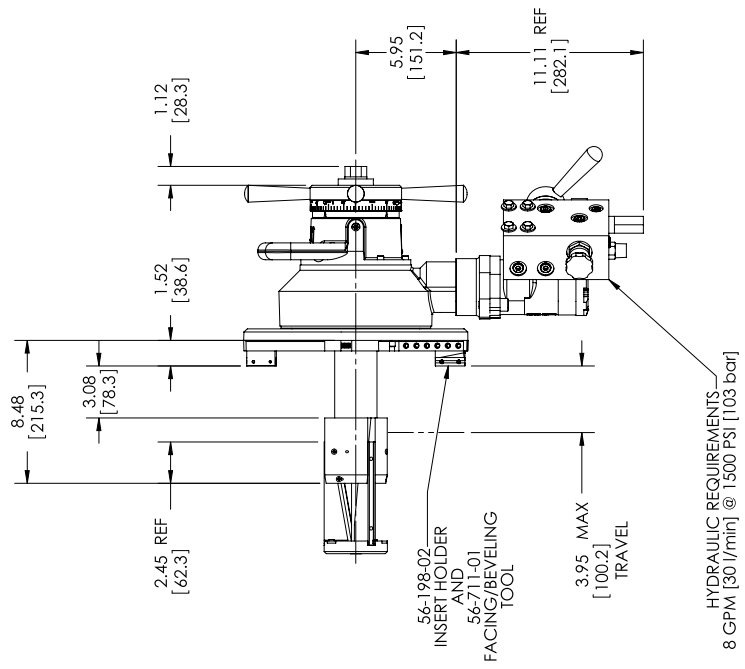
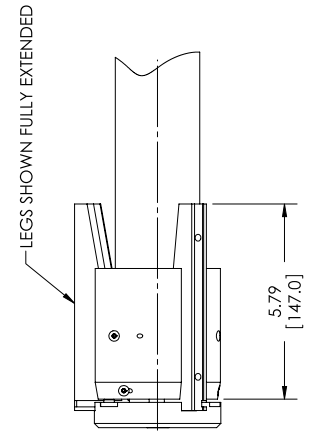
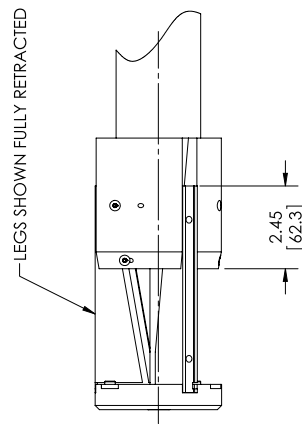
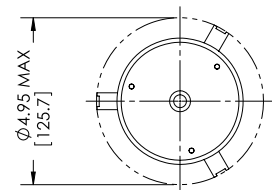
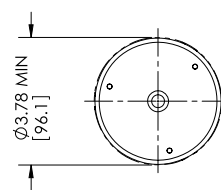
SDB 412 Hydraulic Drive (66-000-03)

DIMENSIONS IN BRACKETS ARE MILLIMETERS

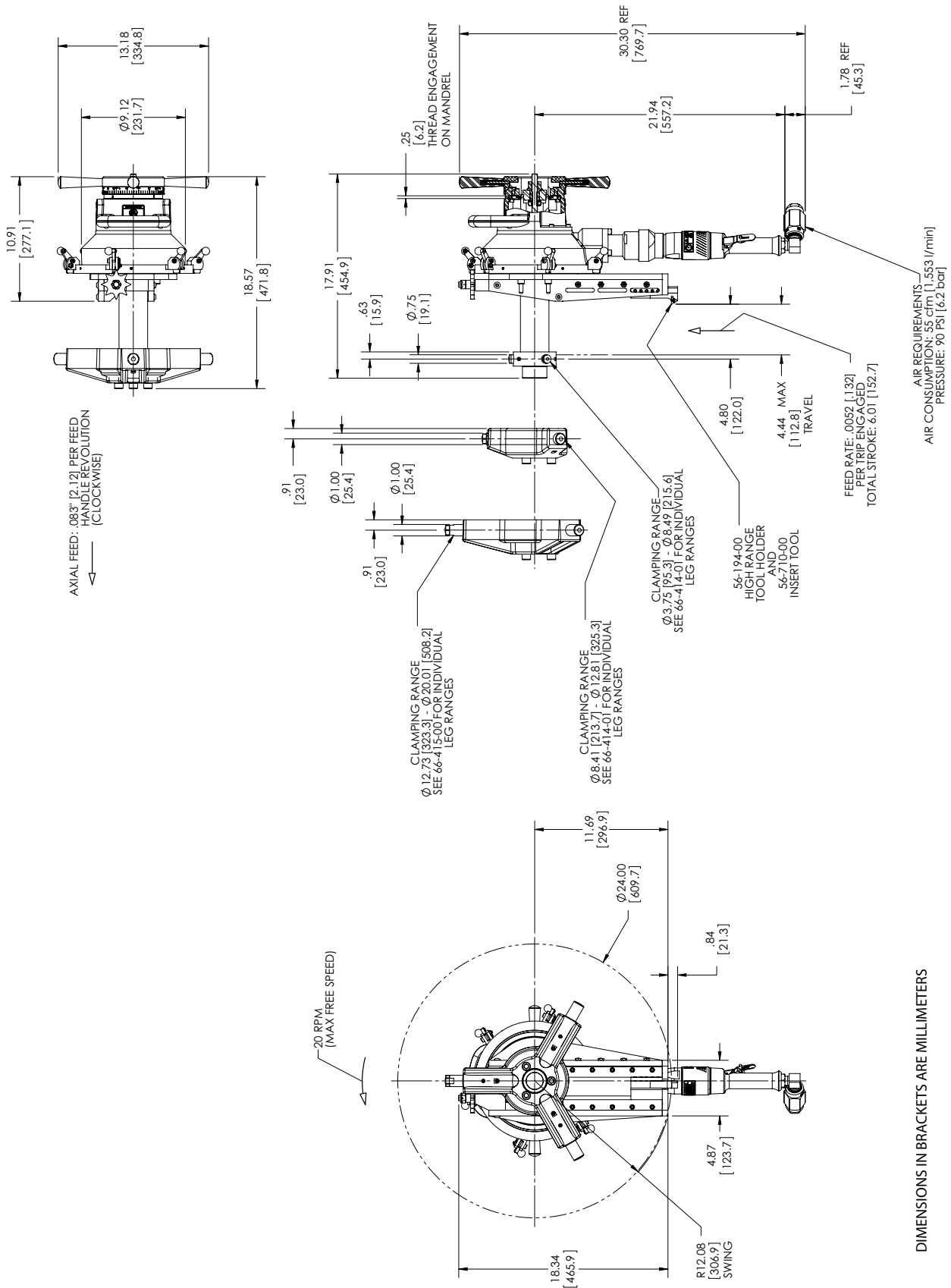
NOTE:
SEE 66-407-01 FOR EXTENSION
LEG CLAMPING RANGES



23 RPM @ 8 GPM [30 l/min]
(MAX FREE SPEED)

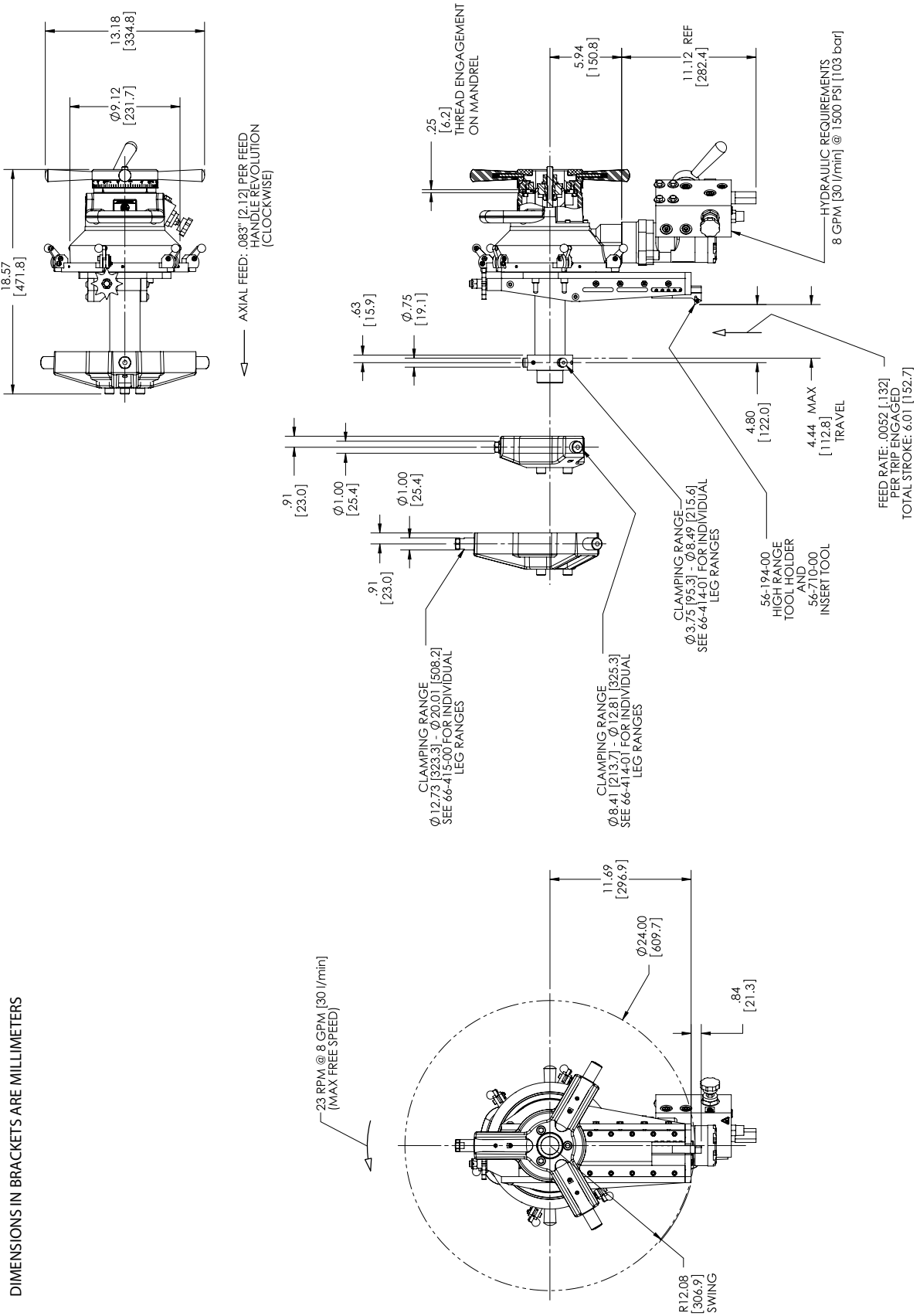


FF 424 Flange Facer Air Drive (66-000-FF)



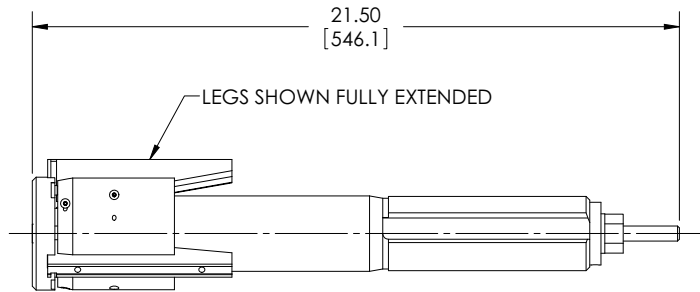
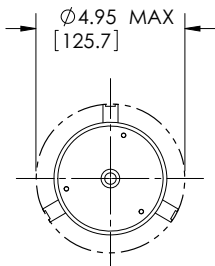
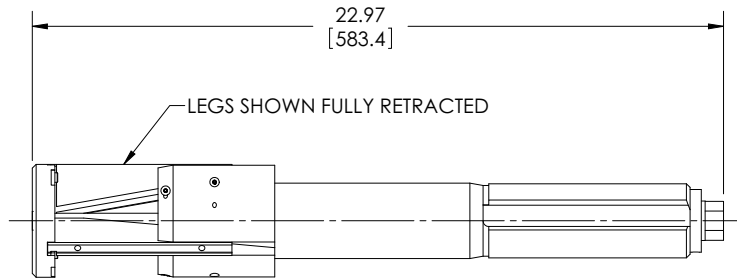
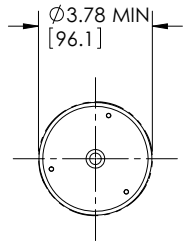
DIMENSIONS IN BRACKETS ARE MILLIMETERS

FF 424 Flange Facer Hydraulic Drive (66-000-FH)



Standard Mandrel Assembly (66-301-01)

DIMENSIONS IN BRACKETS ARE MILLIMETERS

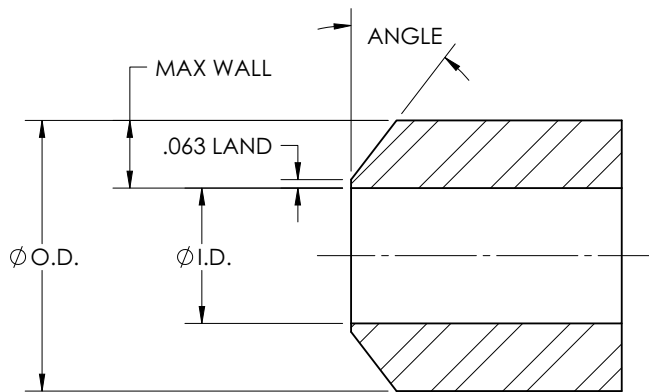


SDB 412 Tooling Charts

.....

The following charts and diagrams specify tooling for beveling, deburring, J-prep, and counterboring with the SDB 412.

Beveling

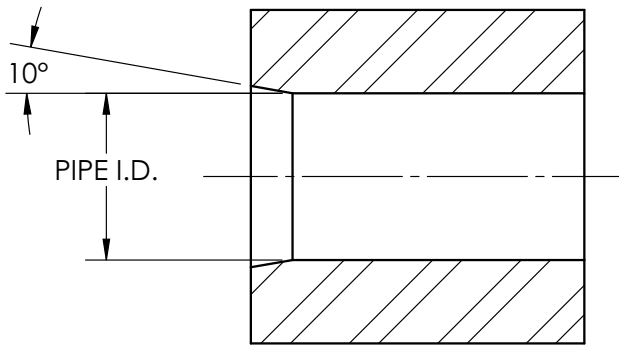


Bevel Tool Chart

NOTE: (1) TOOL RETAINED WITH AT LEAST 2 SCREWS

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)	3.78" (96.0mm)	10.83" (275.1mm)	13.56" (344.4mm)
56-709-03	56-708-02	37-1/2°	0.73" (18.5mm)	4.09" (103.9mm)	12.13" (308.1mm)	13.56" (344.4mm)
56-709-02	56-708-01	30°	1.50" (38.1mm)	3.78" (96.0mm)	10.83" (275.1mm)	13.81" (350.8mm)
56-709-02	56-708-02	30°	0.53" (13.5mm)	4.52" (114.8mm)	12.67" (321.8mm)	13.81" (350.8mm)

Deburring

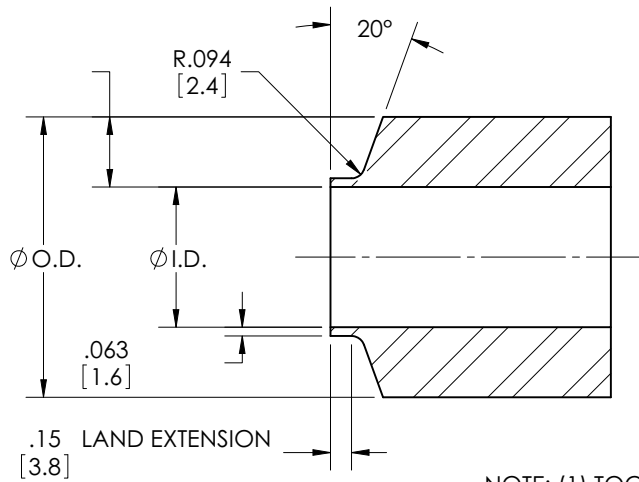


Deburring Tool Chart

DEBURRING TOOL	MIN PIPE I.D.	MAX PIPE I.D.
56-702-01	3.78" (96.0mm)	11.25" (285.7mm)
56-702-02	3.78" (96.0mm)	11.84" (300.1mm)
56-702-03	4.03" (102.4mm)	12.47" (316.7mm)

J-Prep

J-Prep Tool Chart

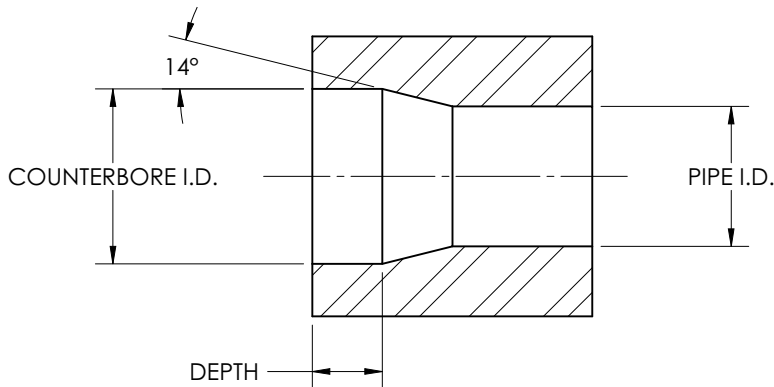


NOTE: (1) TOOL RETAINED WITH AT LEAST 2 SCREWS

BEVEL TOOL	FACING TOOL	W/ 1/16" LAND	W/ 1/16" LAND	W/1/16" LAND ⁽¹⁾	(1)
56-709-01	56-708-01	1.68" (42.7mm)	3.78" (96.0mm)	10.72" (272.3mm)	14.03" (356.4mm)
56-709-05	56-708-01	1.68" (42.7mm)	3.78" (96.0mm)	12.23" (310.6mm)	15.56" (395.2mm)

Counterbore

Counterbore Tool Chart



NOTE: (1) TOOL RETAINED WITH AT LEAST 2 SCREWS

C'BORE TOOL	MIN PIPE I.D.	MIN C'BORE I.D.	MAX C'BORE I.D. ⁽¹⁾	MAX DEPTH	MAX DEPTH W/56-708-01 FACING TOOL
56-705-01	3.78" (96.0mm)	3.78" (96.0mm)	11.83" (300.5mm)	0.63" (16.0mm)	0.48" (12.2mm)
56-705-02	4.27" (108.5mm)	4.52" (114.8mm)	12.95" (328.9mm)	0.63" (16.0mm)	0.48" (12.2mm)
56-705-03	5.27" (133.9mm)	5.52" (140.2mm)	13.95" (354.3mm)	0.63" (16.0mm)	0.48" (12.2mm)

Parts Lists and Drawings

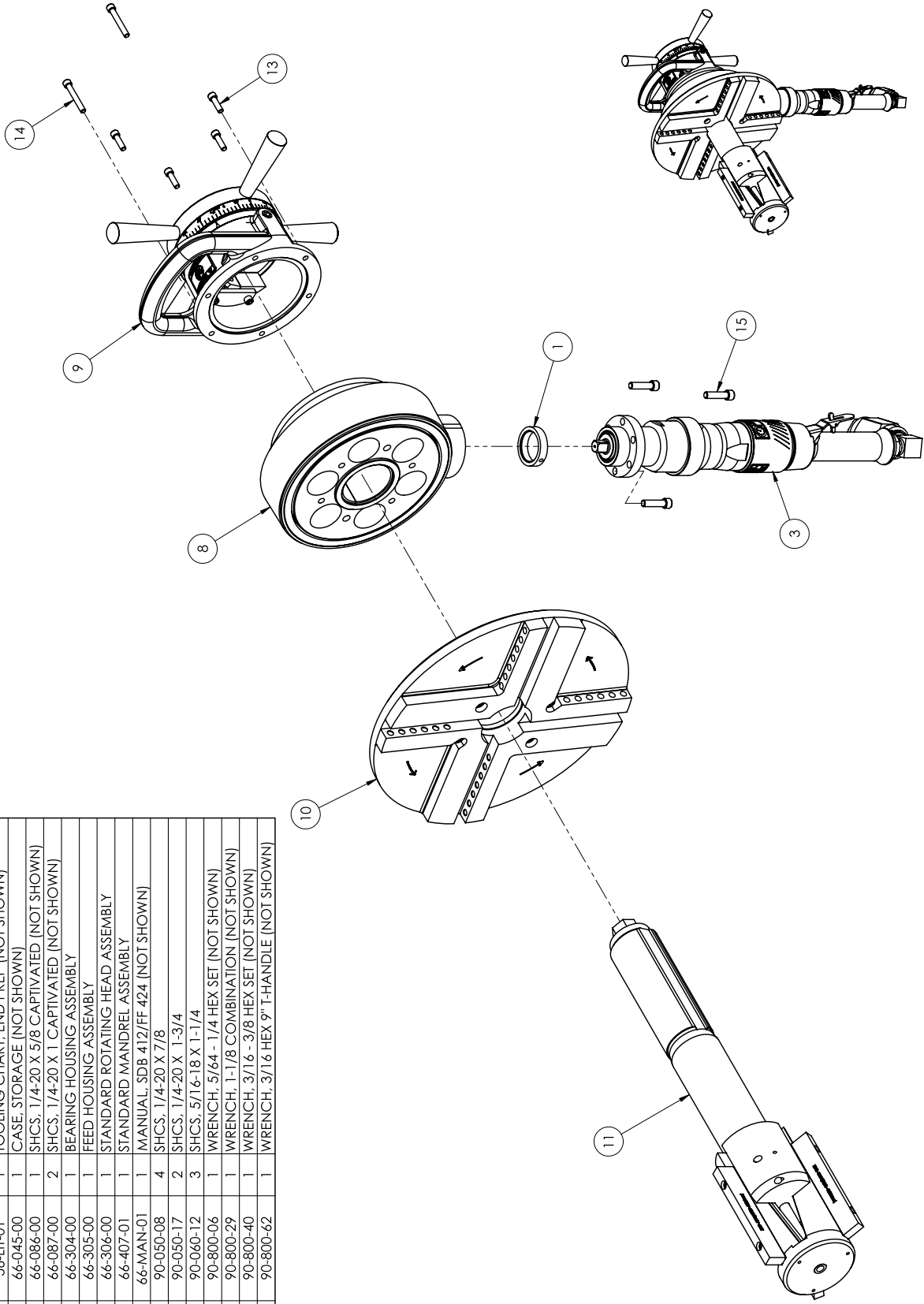
.....

The following pages illustrate the components for the SDB 412 and FF 424. Use the parts list on each drawing to order replacement parts.

SDB 412 Air Drive (66-000-01)

- NOTES:
 1. SHIPPED LOOSE WITH MACHINE:
 (1) 66-086-00 SHCS, 1/4-20 X 5/8 CAPTIVATED
 (2) 66-087-00 SHCS, 1/4-20 X 1 CAPTIVATED
 2. SHIPPING DIMENSIONS: 47" [1194mm] LENGTH X 25" [635mm] WIDTH X 18" [457mm] HEIGHT

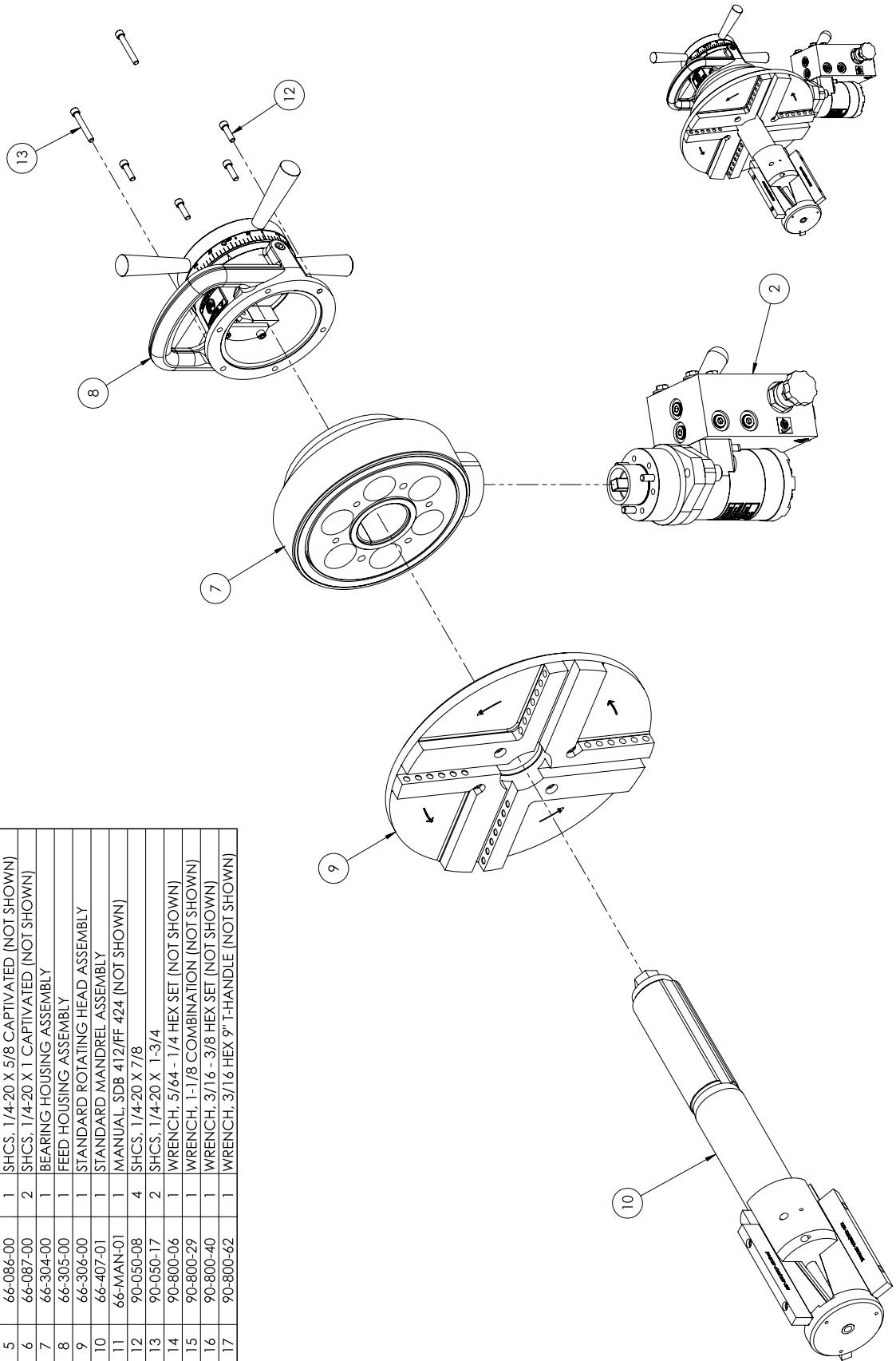
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-010-00	1	RING, SPACER
2	56-099-00	1	LABEL (NOT SHOWN)
3	56-302-00	1	AIR MOTOR ASSEMBLY
4	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
5	66-045-00	1	CASE, STORAGE (NOT SHOWN)
6	66-086-00	1	SHCS, 1/4-20 X 5/8 CAPTIVATED (NOT SHOWN)
7	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED (NOT SHOWN)
8	66-304-00	1	BEARING HOUSING ASSEMBLY
9	66-305-00	1	FEED HOUSING ASSEMBLY
10	66-306-00	1	STANDARD ROTATING HEAD ASSEMBLY
11	66-407-01	1	STANDARD MANDREL ASSEMBLY
12	66-MAN-01	1	MANUAL, SDB 412/FF 424 (NOT SHOWN)
13	90-050-08	4	SHCS, 1/4-20 X 7/8
14	90-050-17	2	SHCS, 1/4-20 X 1-3/4
15	90-060-12	3	SHCS, 5/16-18 X 1-1/4
16	90-800-06	1	WRENCH, 5/64 - 1/4 HEX SET (NOT SHOWN)
17	90-800-29	1	WRENCH, 1-1/8 COMBINATION (NOT SHOWN)
18	90-800-40	1	WRENCH, 3/16 - 3/8 HEX SET (NOT SHOWN)
19	90-800-62	1	WRENCH, 3/16 HEX 9" T-HANDLE (NOT SHOWN)



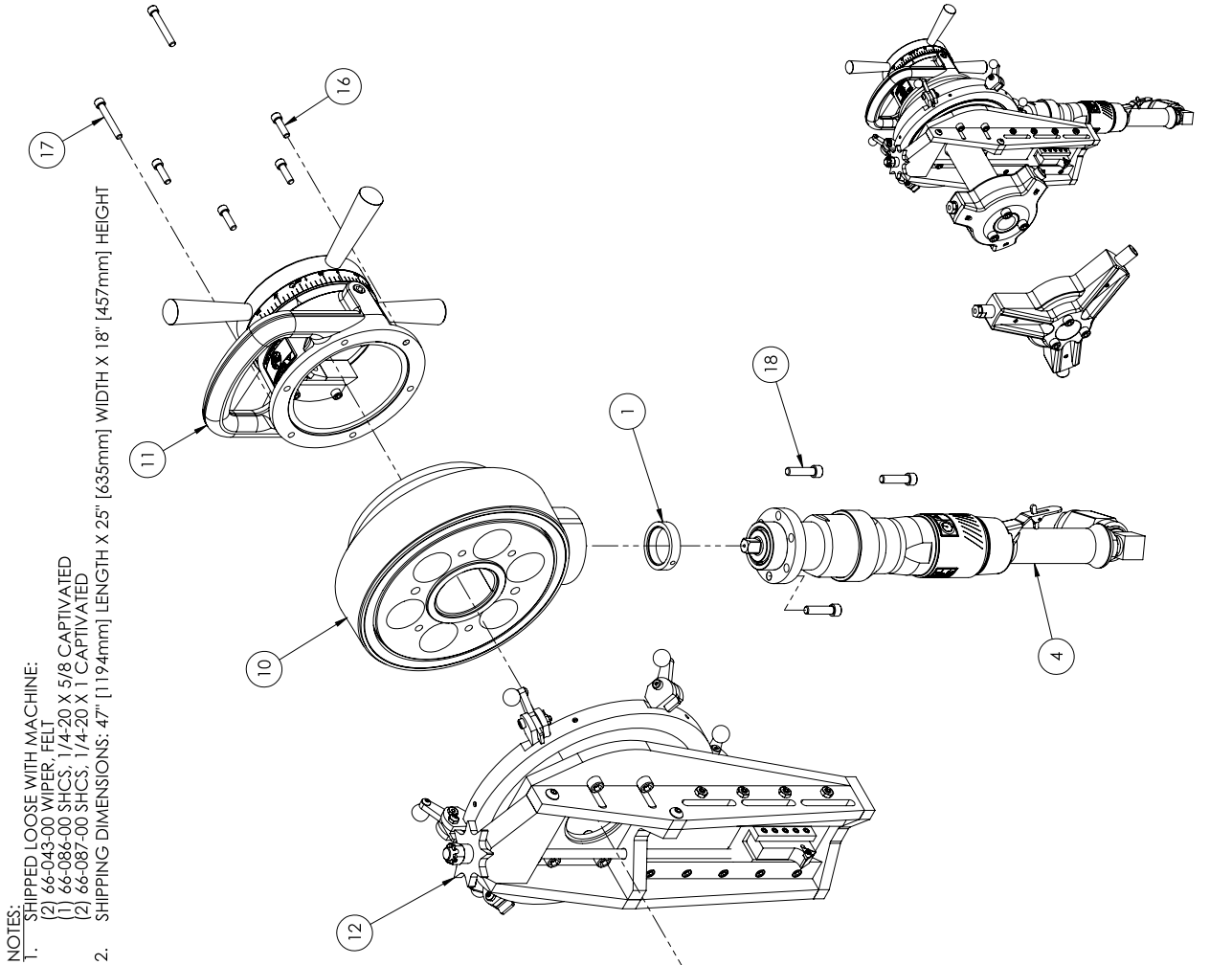
SDB 412 Hydraulic Drive (66-000-03)

- NOTES:
 1. SHIPPED LOOSE WITH MACHINE:
 (1) 66-086-00 SHCS, 1/4-20 X 5/8 CAPTIVATED
 (2) 66-087-00 SHCS, 1/4-20 X 1 CAPTIVATED
 2. SHIPPING DIMENSIONS: 47" [1194mm] LENGTH X 25" [635mm] WIDTH X 18" [457mm] HEIGHT

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-099-00	1	LABEL (NOT SHOWN)
2	56-413-03	1	HYDRAULIC DRIVE ASSEMBLY
3	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
4	66-045-00	1	CASE, STORAGE (NOT SHOWN)
5	66-086-00	1	SHCS, 1/4-20 X 5/8 CAPTIVATED (NOT SHOWN)
6	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED (NOT SHOWN)
7	66-304-00	1	BEARING HOUSING ASSEMBLY
8	66-305-00	1	FEED HOUSING ASSEMBLY
9	66-306-00	1	STANDARD ROTATING HEAD ASSEMBLY
10	66-407-01	1	STANDARD MANDREL ASSEMBLY
11	66-MAN-01	1	MANUAL, SDB 412/FF 424 (NOT SHOWN)
12	90-050-08	4	SHCS, 1/4-20 X 7/8
13	90-050-17	2	SHCS, 1/4-20 X 1-3/4
14	90-800-06	1	WRENCH, 5/64 - 1/4 HEX SET (NOT SHOWN)
15	90-800-29	1	WRENCH, 1-1/8 COMBINATION (NOT SHOWN)
16	90-800-40	1	WRENCH, 3/16 - 3/8 HEX SET (NOT SHOWN)
17	90-800-62	1	WRENCH, 3/16 HEX 9" T-HANDLE (NOT SHOWN)



FF 424 Flange Facer Air Drive (66-000-FF)



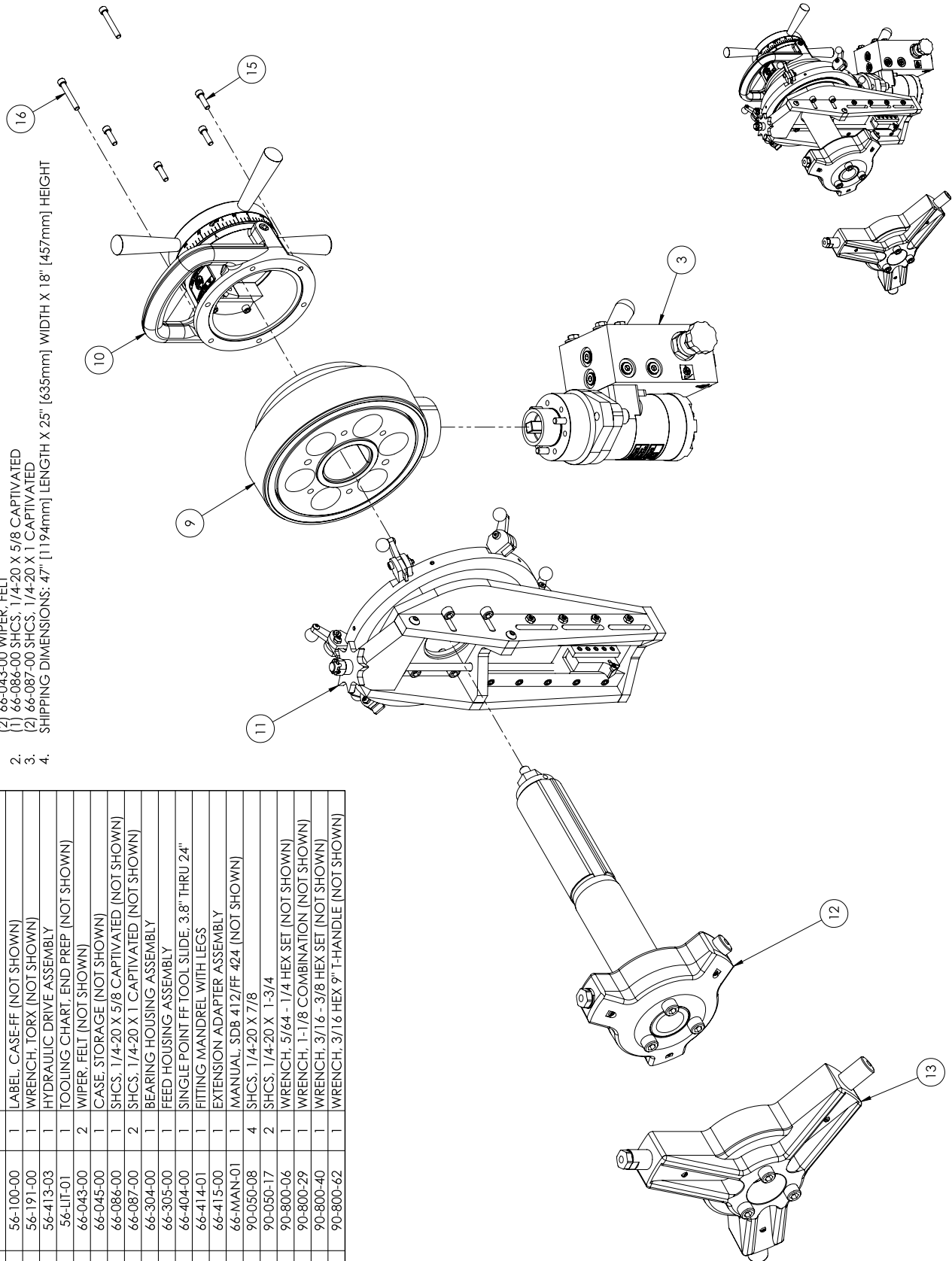
NOTES:
 1. SHIPPED LOOSE WITH MACHINE:
 (1) 66-043-00 WIPER, FELT
 (2) 66-086-00 SHCS, 1/4-20 X 5/8 CAPTIVATED
 (2) 66-087-00 SHCS, 1/4-20 X 1 CAPTIVATED
 2. SHIPPING DIMENSIONS: 47" [1194mm] LENGTH X 25" [635mm] WIDTH X 18" [457mm] HEIGHT

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-010-00	1	RING, SPACER
2	56-100-00	1	LABEL, CASE-FF (NOT SHOWN)
3	56-191-00	1	WRENCH, TORX (NOT SHOWN)
4	56-302-00	1	AIR MOTOR ASSEMBLY
5	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
6	66-043-00	2	WIPER, FELT (NOT SHOWN)
7	66-045-00	1	CASE, STORAGE (NOT SHOWN)
8	66-086-00	1	SHCS, 1/4-20 X 5/8 CAPTIVATED (NOT SHOWN)
9	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED (NOT SHOWN)
10	66-304-00	1	BEARING HOUSING ASSEMBLY
11	66-305-00	1	FEED HOUSING ASSEMBLY
12	66-404-00	1	SINGLE POINT FF TOOL SLIDE, 3.8" THRU 24"
13	66-414-01	1	FITTING MANDREL WITH LEGS
14	66-415-00	1	EXTENSION ADAPTER ASSEMBLY
15	66-MAN-01	1	MANUAL, SDB 412/FF 424 (NOT SHOWN)
16	90-050-08	4	SHCS, 1/4-20 X 7/8
17	90-050-17	2	SHCS, 1/4-20 X 1-3/4
18	90-060-12	3	SHCS, 5/16-18 X 1-1/4
19	90-800-06	1	WRENCH, 5/64 - 1/4 HEX SET (NOT SHOWN)
20	90-800-29	1	WRENCH, 1-1/8 COMBINATION (NOT SHOWN)
21	90-800-40	1	WRENCH, 3/16 - 3/8 HEX SET (NOT SHOWN)
22	90-800-62	1	WRENCH, 3/16 HEX 9" HANDLE (NOT SHOWN)

FF 424 Flange Facer Hydraulic Drive (66-000-FH)

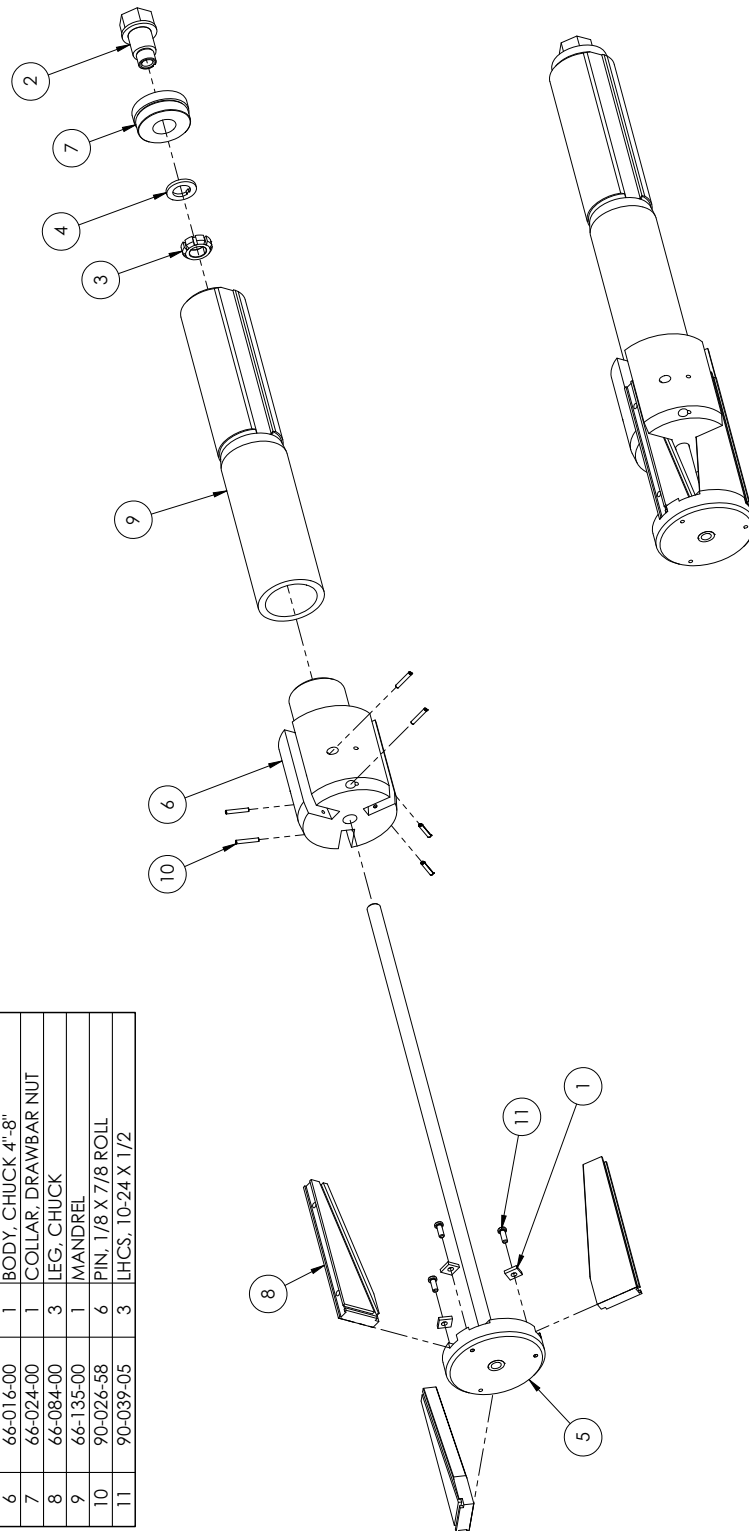
- NOTES:
 1. SHIPPED LOOSE WITH MACHINE:
 2. 66-043-00 WIPER, FELT
 3. 66-086-00 SHCS, 1/4-20 X 5/8 CAPTIVATED
 4. 66-087-00 SHCS, 1/4-20 X 1 CAPTIVATED
 5. SHIPPING DIMENSIONS: 47" [1194mm] LENGTH X 25" [635mm] WIDTH X 18" [457mm] HEIGHT

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-100-00	1	LABEL, CASE-FF (NOT SHOWN)
2	56-191-00	1	WRENCH, TORX (NOT SHOWN)
3	56-413-03	1	HYDRAULIC DRIVE ASSEMBLY
4	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
5	66-043-00	2	WIPER, FELT (NOT SHOWN)
6	66-045-00	1	CASE, STORAGE (NOT SHOWN)
7	66-086-00	1	SHCS, 1/4-20 X 5/8 CAPTIVATED (NOT SHOWN)
8	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED (NOT SHOWN)
9	66-304-00	1	BEARING HOUSING ASSEMBLY
10	66-305-00	1	FEED HOUSING ASSEMBLY
11	66-404-00	1	SINGLE POINT FF TOOL SLIDE, 3.8" THRU 24"
12	66-414-01	1	FITTING, MANDREL WITH LEGS
13	66-415-00	1	EXTENSION ADAPTER ASSEMBLY
14	66-MAN-01	1	MANUAL, SDB 412/FF 424 (NOT SHOWN)
15	90-050-08	4	SHCS, 1/4-20 X 7/8
16	90-050-17	2	SHCS, 1/4-20 X 1-3/4
17	90-800-06	1	WRENCH, 5/64 - 1/4 HEX SET (NOT SHOWN)
18	90-800-29	1	WRENCH, 1-1/8 COMBINATION (NOT SHOWN)
19	90-800-40	1	WRENCH, 3/16 - 3/8 HEX SET (NOT SHOWN)
20	90-800-62	1	WRENCH, 3/16 HEX 9" T-HANDLE (NOT SHOWN)



Standard Mandrel Assembly (66-301-01)

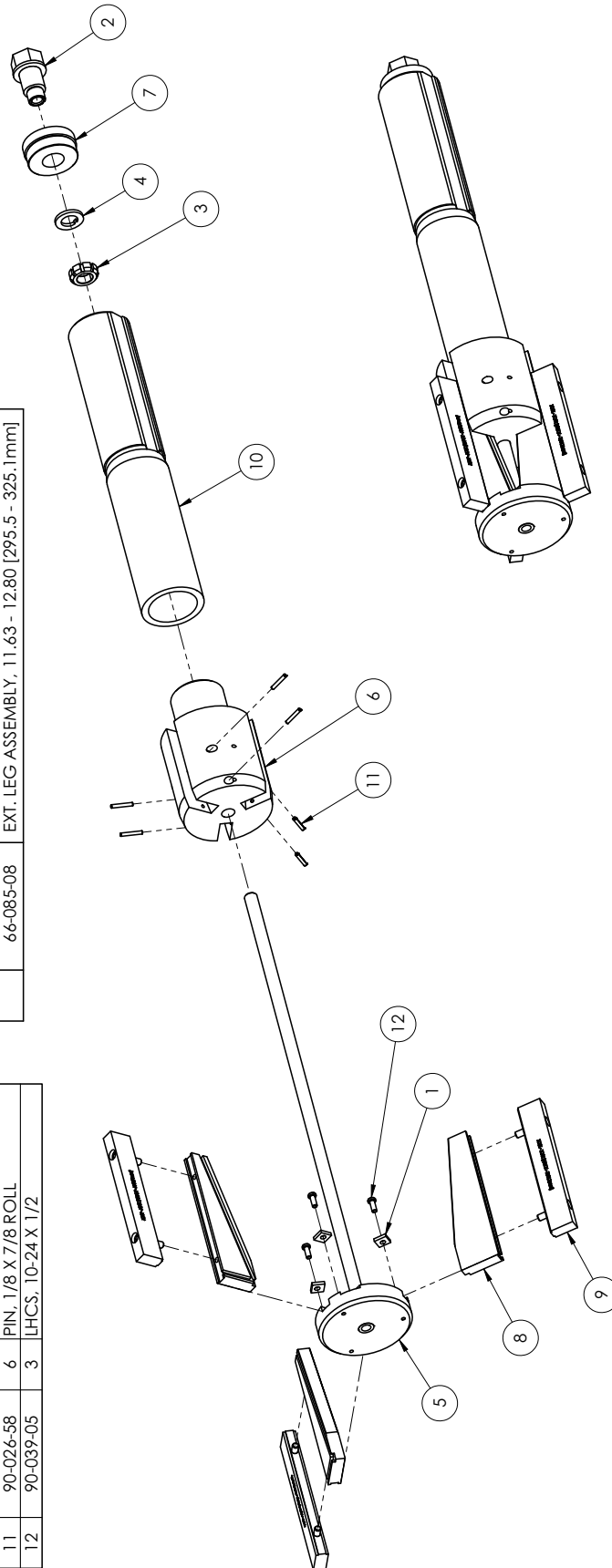
ITEM	PARTNUMBER	QTY.	DESCRIPTION
1	56-019-00	3	TAB, LOCKING
2	56-025-00	1	NUT, DRAWBAR
3	56-035-00	1	LOCKNUT, BEARING
4	56-036-00	1	WASHER, TONGUED
5	66-012-00	1	WELDMENT, DRAW PLATE
6	66-016-00	1	BODY, CHUCK 4"-8"
7	66-024-00	1	COLLAR, DRAWBAR NUT
8	66-084-00	3	LEG, CHUCK
9	66-135-00	1	MANDREL
10	90-026-58	6	PIN, 1/8 X 7/8 ROLL
11	90-039-05	3	LHCS, 10-24 X 1/2



Standard Mandrel Assembly with Legs (66-407-01)

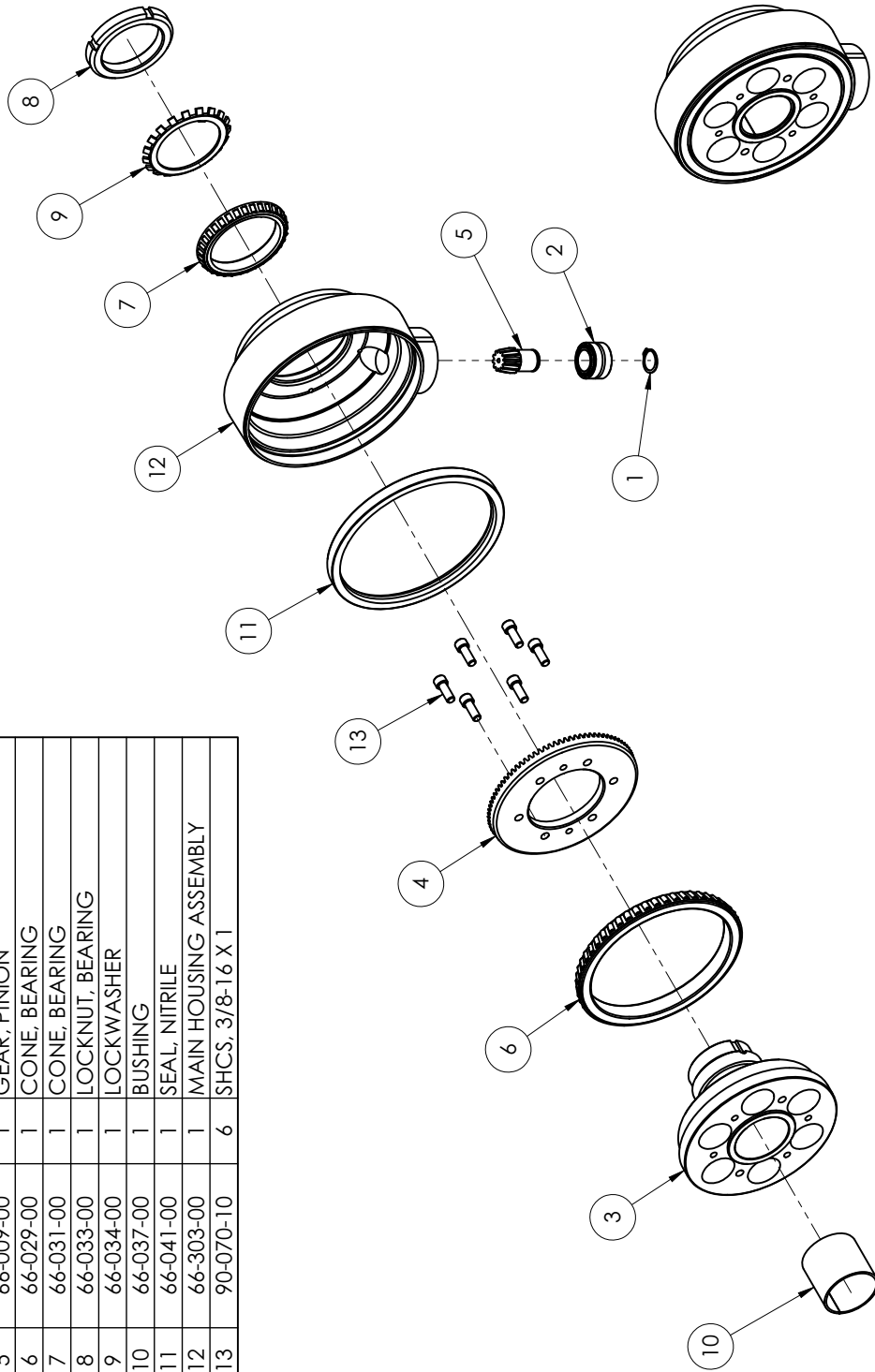
-WHERE USED-		DESCRIPTION
ITEM	PART NO.	
9	66-085-01	EXT. LEG ASSEMBLY, 4.65 - 5.81 [118.1 - 147.6mm]
	66-085-02	EXT. LEG ASSEMBLY, 5.65 - 6.81 [143.4 - 173.0mm]
	66-085-03	EXT. LEG ASSEMBLY, 6.64 - 7.81 [168.7 - 198.3mm]
	66-085-04	EXT. LEG ASSEMBLY, 7.64 - 8.81 [194.1 - 223.7mm]
	66-085-05	EXT. LEG ASSEMBLY, 8.64 - 9.80 [219.4 - 249.0mm]
	66-085-06	EXT. LEG ASSEMBLY, 9.64 - 10.80 [244.8 - 274.4mm]
	66-085-07	EXT. LEG ASSEMBLY, 10.64 - 11.80 [270.1 - 299.8mm]
	66-085-08	EXT. LEG ASSEMBLY, 11.63 - 12.80 [295.5 - 325.1mm]

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-019-00	3	TAB, LOCKING
2	56-025-00	1	NUT, DRAWBAR
3	56-035-00	1	LOCKNUT, BEARING
4	56-036-00	1	WASHER, TONGUED
5	66-012-00	1	WELDMENT, DRAW PLATE
6	66-016-00	1	BODY, CHUCK 4"-8"
7	66-024-00	1	COLLAR, DRAWBAR NUT
8	66-084-00	3	LEG, CHUCK
9	WHERE USED	3	AS NOTED
10	66-135-00	1	MANDREL
11	90-026-58	6	PIN, 1/8 X 7/8 ROLL
12	90-039-05	3	LHCS, 10-24 X 1/2



Bearing Housing Assembly (66-304-00)

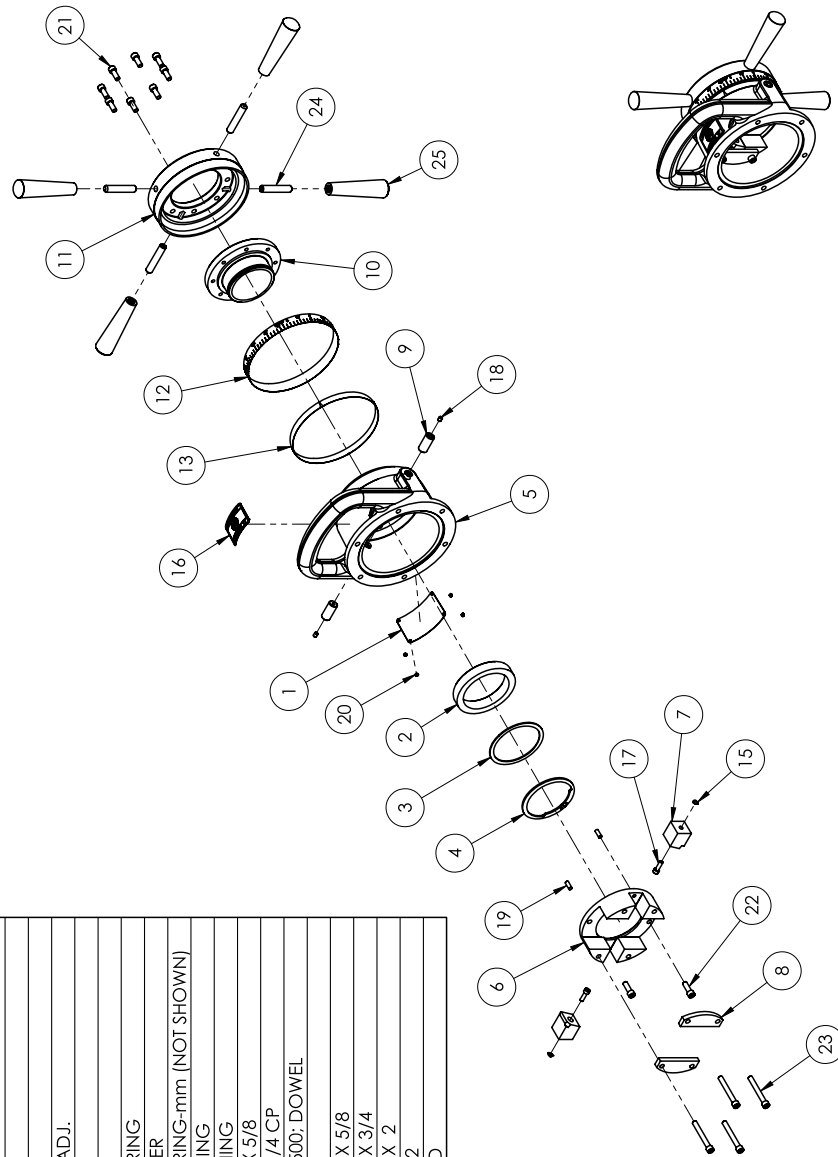
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-039-00	1	RING, SNAP
2	56-040-00	1	BEARING
3	66-003-00	1	SHAFT, ROTATING
4	66-008-00	1	GEAR, RING
5	66-009-00	1	GEAR, PINION
6	66-029-00	1	CONE, BEARING
7	66-031-00	1	CONE, BEARING
8	66-033-00	1	LOCKNUT, BEARING
9	66-034-00	1	LOCKWASHER
10	66-037-00	1	BUSHING
11	66-041-00	1	SEAL, NITRILE
12	66-303-00	1	MAIN HOUSING ASSEMBLY
13	90-070-10	6	SHCS, 3/8-16 X 1



Feed Housing Assembly (66-305-00)

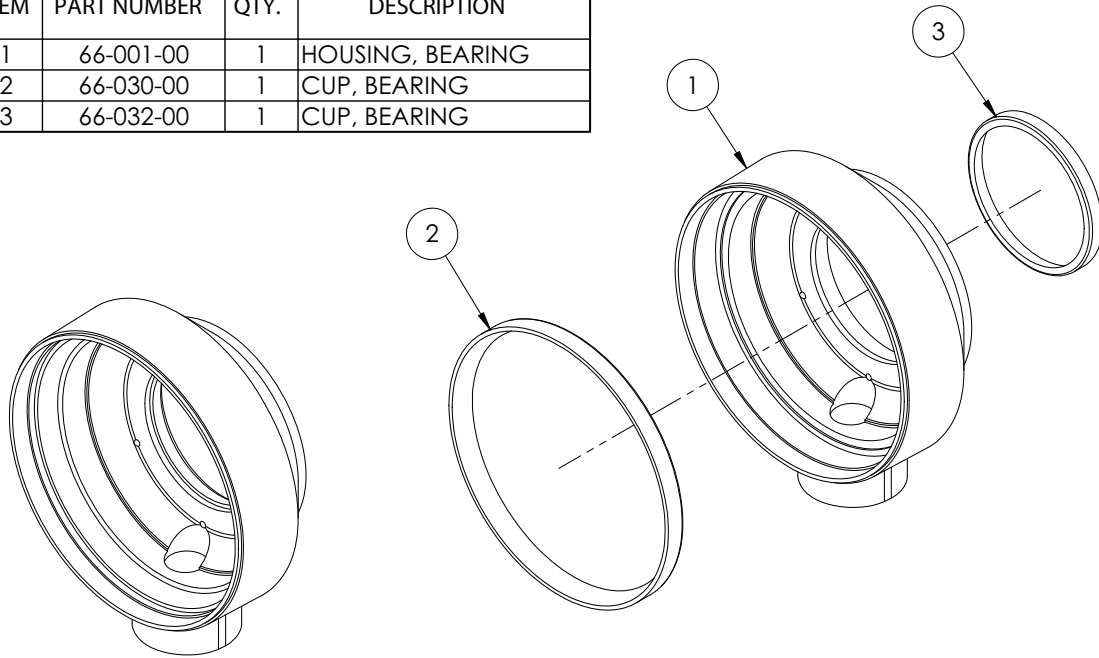
NOTES:
 1. LABEL, FEED RING-mm (66-138-02) SHIPPED LOOSE WITH ASSEMBLY.

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	26-047-00	1	NAME PLATE
2	66-013-00	1	BEARING, FEED NUT
3	66-027-00	1	WASHER
4	66-038-10	1	RETAINING RING, GROUND
5	66-130-00	1	HOUSING, FEED NUT
6	66-131-00	1	COLLAR, KEY
7	66-132-00	2	KEY
8	66-133-00	2	STRAP
9	66-134-00	2	SCREW, KEY ADJ.
10	66-136-00	1	NUT, FEED
11	66-137-00	1	RING, FEED
12	66-138-00	1	LABEL, FEED RING
13	66-138-01	1	LABEL, POINTER
14	66-138-02	1	LABEL, FEED RING-mm (NOT SHOWN)
15	66-140-00	2	WASHER, SPRING
16	66-147-00	1	LABEL, WARNING
17	90-040-56	2	SHCS, 10-32 X 5/8
18	90-044-52	2	SSS, 10-32 X 1/4 CP
19	90-046-05	2	PIN, .1875 x .500; DOWEL
20	90-049-05	4	METAL-TACK
21	90-050-06	8	SHCS, 1/4-20 X 5/8
22	90-050-07	2	SHCS, 1/4-20 X 3/4
23	90-050-20	4	SHCS, 1/4-20 X 2
24	90-074-20	4	SSS, 3/8-16 X 2
25	90-900-58	4	HANDLE, FEED



Main Housing Assembly (66-303-00)

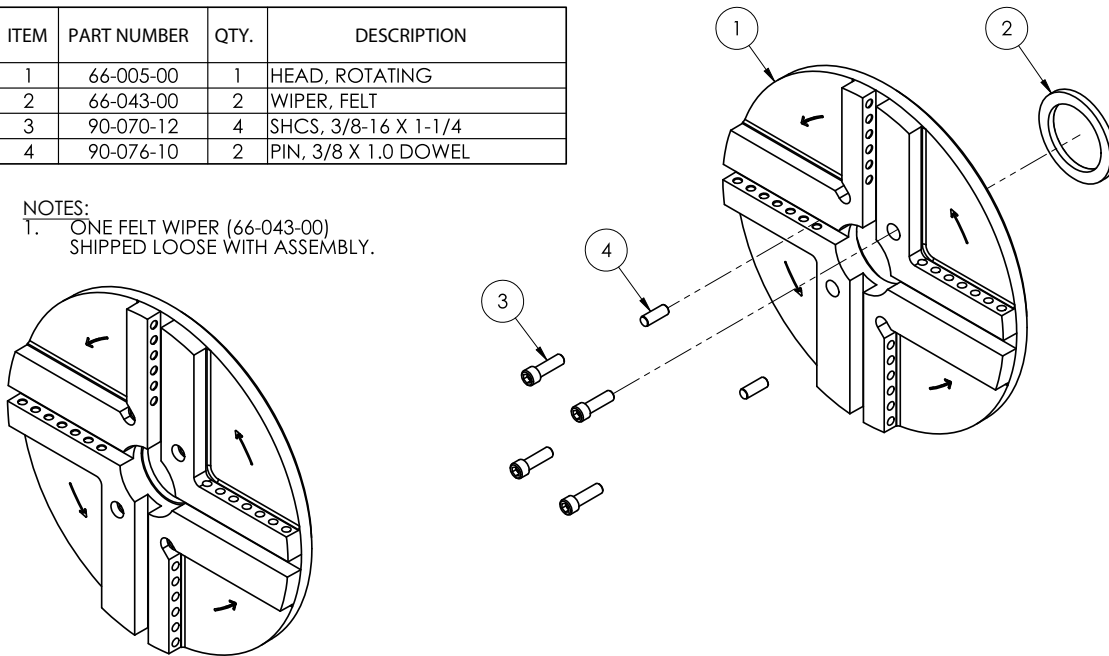
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	66-001-00	1	HOUSING, BEARING
2	66-030-00	1	CUP, BEARING
3	66-032-00	1	CUP, BEARING



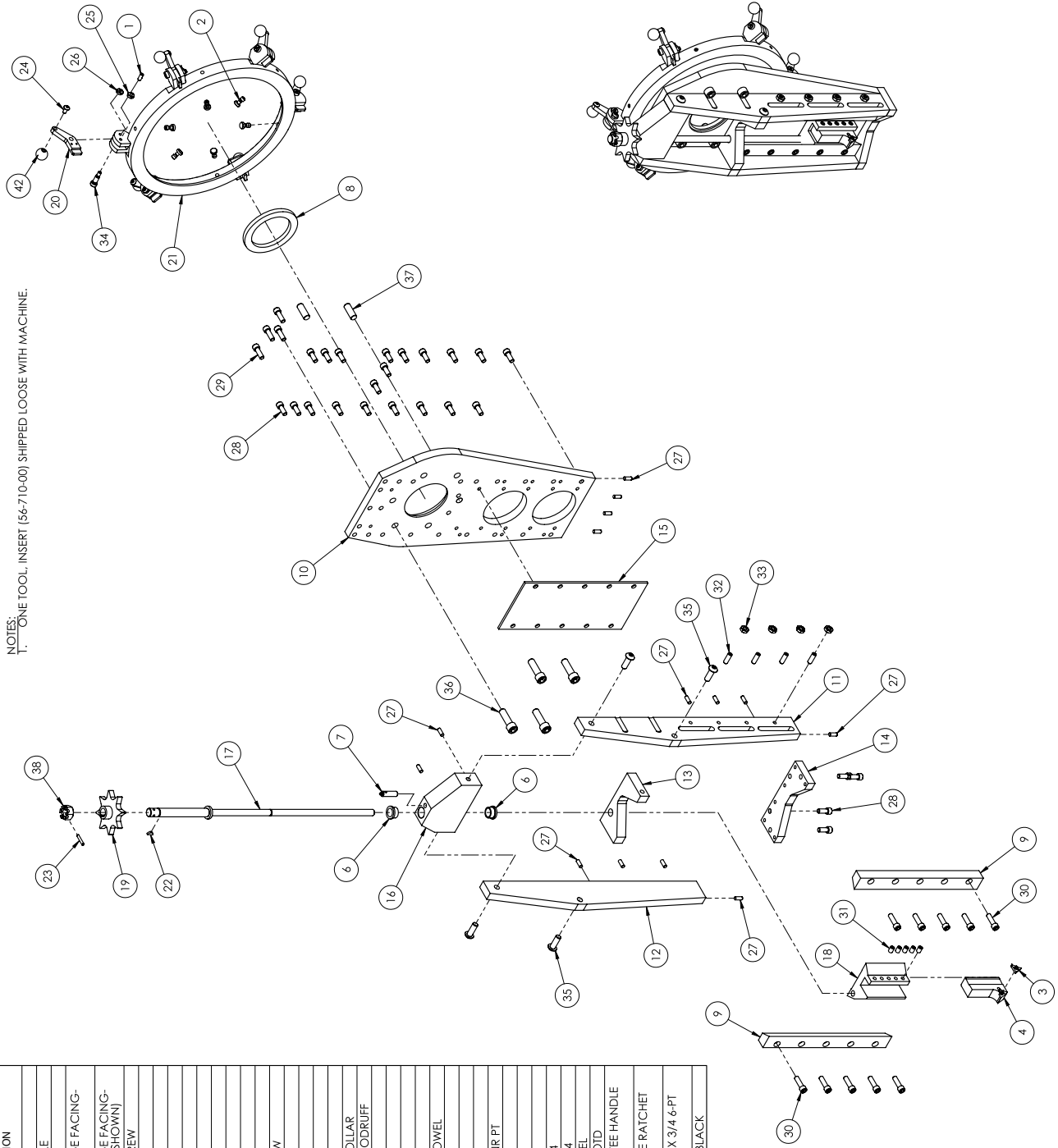
Standard Rotating Head (66-306-00)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	66-005-00	1	HEAD, ROTATING
2	66-043-00	2	WIPER, FELT
3	90-070-12	4	SHCS, 3/8-16 X 1-1/4
4	90-076-10	2	PIN, 3/8 X 1.0 DOWEL

NOTES:
 1. ONE FELT WIPER (66-043-00)
 SHIPPED LOOSE WITH ASSEMBLY.

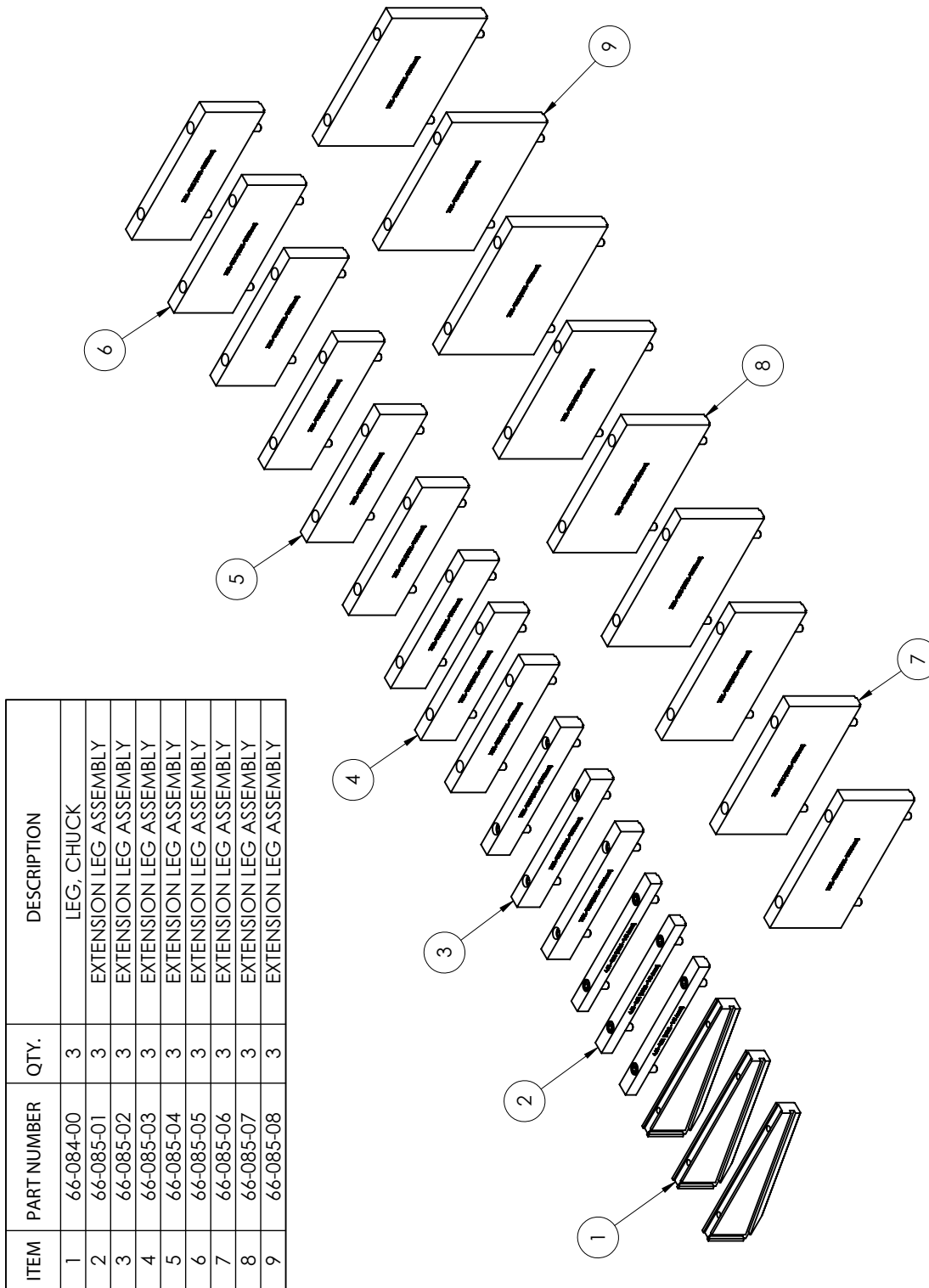


Flange Facer Slide (66-404-00)



ITEM	PART NUMBER	QTY.	DESCRIPTION
1	52-140-00	6	PLUNGER, BALL
2	56-073-00	6	SCREW, 1/4 TOGGLE
3	56-710-00	2	TOOL INSERT
4	56-714-02	1	HOLDER KIT, FLANGE FACING-HIGH RANGE
5	56-714-03	1	HOLDER KIT, FLANGE FACING-LOW RANGE (NOT SHOWN)
6	66-015-00	2	BEARING, FEED SCREW
7	66-019-00	1	PLUNGER, SPRING
8	66-043-00	1	WIPER, FELT
9	66-066-00	2	GIB
10	66-105-00	1	PLATE, BASE
11	66-106-00	1	STIFFENER, LEFT
12	66-107-00	1	STIFFENER, RIGHT
13	66-108-00	1	SUPPORT, BRIDGE
14	66-109-00	1	SUPPORT, END
15	66-110-00	1	PLATE, SLIDE
16	66-111-00	1	BLOCK, FEED SCREW
17	66-112-00	1	SCREW, FEED
18	66-113-00	1	SLIDE, MALE
19	66-114-00	1	WHEEL, STAR
20	66-117-00	6	LEVER, TRIP
21	66-118-00	1	WELDMENT, TRIP COLLAR
22	90-019-43	1	KEY, 3/32 X 3/8 WOODRUFF
23	90-026-57	1	PIN, 1/8 X 3/4 ROLL
24	90-042-04	6	BHCS, 10-32 X 3/8
25	90-045-01	6	NUT, 10-32 JAM
26	90-045-02	6	NUT, 10-24 JAM
27	90-046-05	14	PIN, .1875 X .500; DOWEL
28	90-050-06	24	SHCS, 1/4-20 X 5/8
29	90-050-07	4	SHCS, 1/4-20 X 3/4
30	90-050-08	10	SHCS, 1/4-20 X 7/8
31	90-054-04	5	SSS, 1/4-20 X 3/8 KNR PT
32	90-054-07	4	SSS, 1/4-20 X 3/4
33	90-055-04	4	NUT, 1/4-20 JAM
34	90-057-55	6	SHSB, 1/4 X 1/2
35	90-062-08	4	BHCS, 5/16-18 X 3/4
36	90-070-12	4	SHCS, 3/8-18 X 1-1/4
37	90-076-10	2	PIN, 3/8 X 1.0 DOWEL
38	90-095-10	1	NUT, 1/2-20 HEX SLOTD (NOT SHOWN)
39	90-800-39	1	WRENCH, 1/8 HEX TEE HANDLE (NOT SHOWN)
40	90-800-45	1	WRENCH, 3/8 DRIVE RATCHET (NOT SHOWN)
41	90-800-58	1	SOCKET, 3/8 DRIVE X 3/4 6-PT (NOT SHOWN)
42	90-900-62	6	KNOB, 10-32 X 3/4 BLACK

Leg Replacement Set (66-411-00)



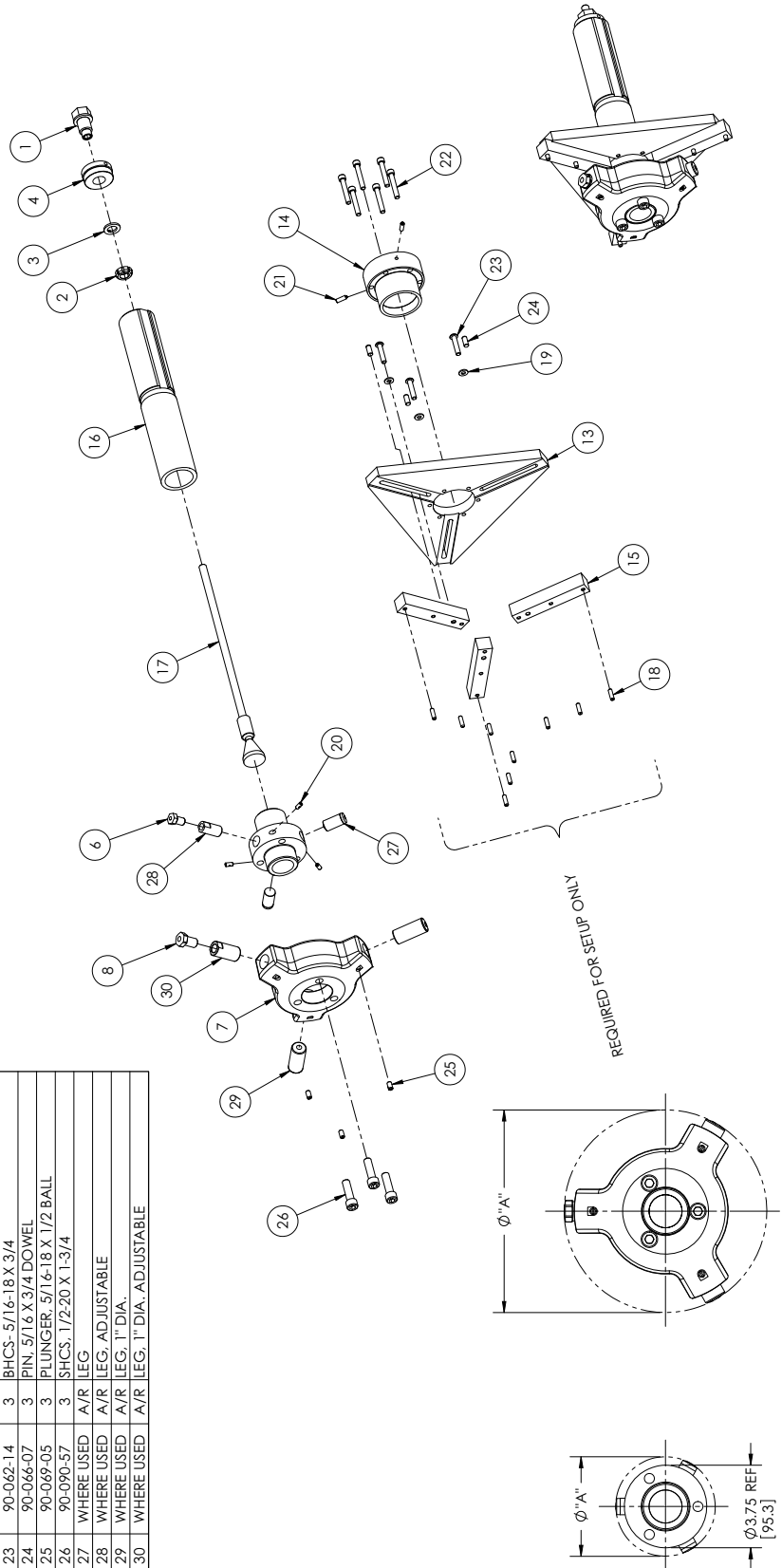
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	66-084-00	3	LEG, CHUCK
2	66-085-01	3	EXTENSION LEG ASSEMBLY
3	66-085-02	3	EXTENSION LEG ASSEMBLY
4	66-085-03	3	EXTENSION LEG ASSEMBLY
5	66-085-04	3	EXTENSION LEG ASSEMBLY
6	66-085-05	3	EXTENSION LEG ASSEMBLY
7	66-085-06	3	EXTENSION LEG ASSEMBLY
8	66-085-07	3	EXTENSION LEG ASSEMBLY
9	66-085-08	3	EXTENSION LEG ASSEMBLY

Fitting Mandrel (66-414-01)

-WHERE USED-								
ITEM	PART NO.	QTY.	DESCRIPTION	ITEM	PART NO.	QTY.	DIMENSION "A" DIA.	
							MIN.	MAX.
	66-077-01	3	LEG				3.75 [95.3]	4.53 [115.1]
	66-077-02				66-078-02		4.39 [111.6]	5.19 [131.8]
	66-077-03				66-078-03		5.05 [128.3]	5.85 [148.6]
27	66-077-04	2	LEG	28	66-078-05	1	5.71 [145.0]	6.51 [165.3]
	66-077-05				66-078-06		6.37 [161.8]	7.17 [182.1]
	66-077-06				66-078-07		7.03 [178.5]	7.83 [198.8]
	66-077-07				66-094-01		8.41 [213.9]	9.21 [233.9]
	66-093-01				66-094-02		9.13 [231.9]	9.93 [252.2]
29	66-093-03	2	LEG, 1"	30	66-094-03	1	9.85 [250.2]	10.65 [270.5]
	66-093-04				66-094-04		10.57 [268.5]	11.37 [288.8]
	66-093-05				66-094-05		11.29 [286.8]	12.09 [307.1]
	66-093-06				66-094-06		12.01 [305.1]	12.81 [325.3]

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-025-00	1	NUT, DRAWBAR
2	56-035-00	1	LOCKNUT, BEARING
3	56-036-00	1	WASHER, TONGUED
4	66-024-00	1	COLLAR, DRAWBAR NUT
5	66-075-00	1	BODY, CHUCK
6	66-079-00	1	SCREW, ADJUSTABLE
7	66-090-00	1	ADAPTER, 8.5" - 12.8" ELBOW MANDREL
8	66-096-00	1	SCREW, 1" DIA. ADJUSTABLE
9	66-097-00	1	BLOCK, LEG STORAGE (NOT SHOWN)
10	66-098-00	1	BLOCK, LEG STORAGE (NOT SHOWN)
11	66-099-01	1	LABEL, LEG RANGE (NOT SHOWN)
12	66-099-01	1	LABEL, LEG RANGE (NOT SHOWN)
13	66-125-00	1	PLATE, FACE
14	66-126-00	1	COLLAR
15	66-127-00	3	LEG
16	66-135-00	1	MANDREL
17	66-186-00	1	DRAW ROD ASSEMBLY
18	90-054-08	9	SSS, 1/4-20 X 7/8
19	90-055-53	3	WASHER, 1/4 FLAT
20	90-059-28	3	PLUNGER, 1/4-20 x 1/2 HYY-SPRING BALL
21	90-059-28	2	SSS, 1/4-20 X 3/4 BRASS TIP
22	90-060-20	6	SHCS, 5/16-18 X 2
23	90-062-14	3	BHCS, 5/16-18 X 3/4
24	90-066-07	3	PIN, 5/16 X 3/4 DOWEL
25	90-069-05	3	PLUNGER, 5/16-18 X 1/2 BALL
26	90-090-57	3	SHCS, 1/2-20 X 1-3/4
27	WHERE USED	A/R	LEG
28	WHERE USED	A/R	LEG, ADJUSTABLE
29	WHERE USED	A/R	LEG, 1" DIA.
30	WHERE USED	A/R	LEG, 1" DIA., ADJUSTABLE

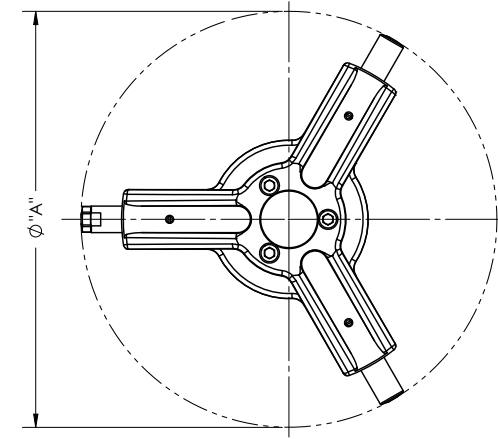
DIMENSIONS IN BRACKETS ARE MILLIMETERS



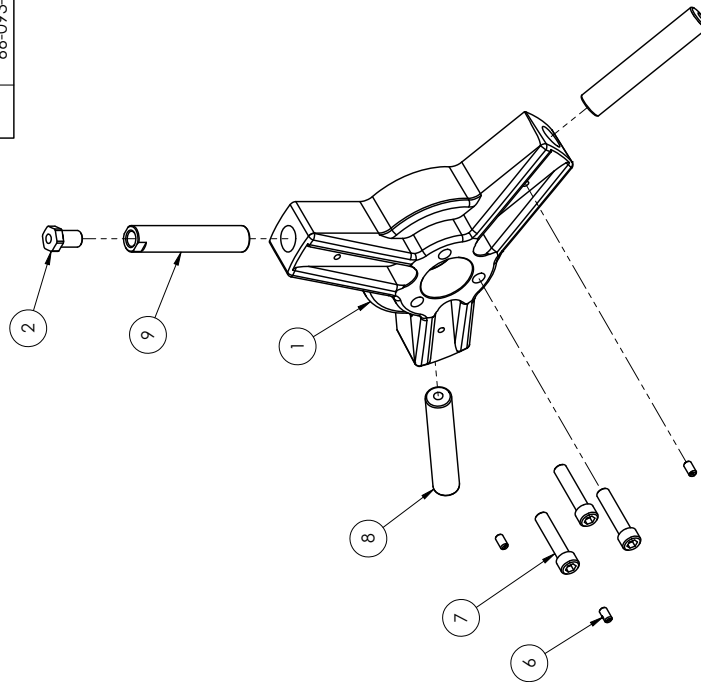
Leg Extension Adapter (66-415-00)

-WHERE USED-			
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	66-092-00	1	ADAPTER, 12.8" - 20" MANDREL
2	66-096-00	1	SCREW, 1" DIA., ADJUSTABLE
3	66-101-00	2	BLOCK, LEG STORAGE (NOT SHOWN)
4	66-102-00	1	LABEL, LEG RANGE (NOT SHOWN)
5	66-102-01	1	LABEL, LEG RANGE (NOT SHOWN)
6	90-069-05	3	PLUNGER, 5/16-18 X 1/2 BALL
7	90-090-52	3	SHCS, 1/2-20 X 2-1/4
8	WHERE USED	A/R	LEG, 1" DIA.
9	WHERE USED	A/R	LEG, 1" DIA., ADJUSTABLE

ITEM	PART NO.	QTY.	DESCRIPTION	ITEM	PART NO.	QTY.	DESCRIPTION
8	66-093-07	2	LEG, 1"	9	66-094-07	1	LEG, 1" ADJUSTABLE
	66-093-08				66-094-08		
	66-093-09				66-094-09		
	66-093-10				66-094-10		
	66-093-11				66-094-11		
	66-093-12				66-094-12		
	66-093-13				66-094-13		
	66-093-14				66-094-14		
	66-093-15				66-094-15		
66-093-16	66-094-16						

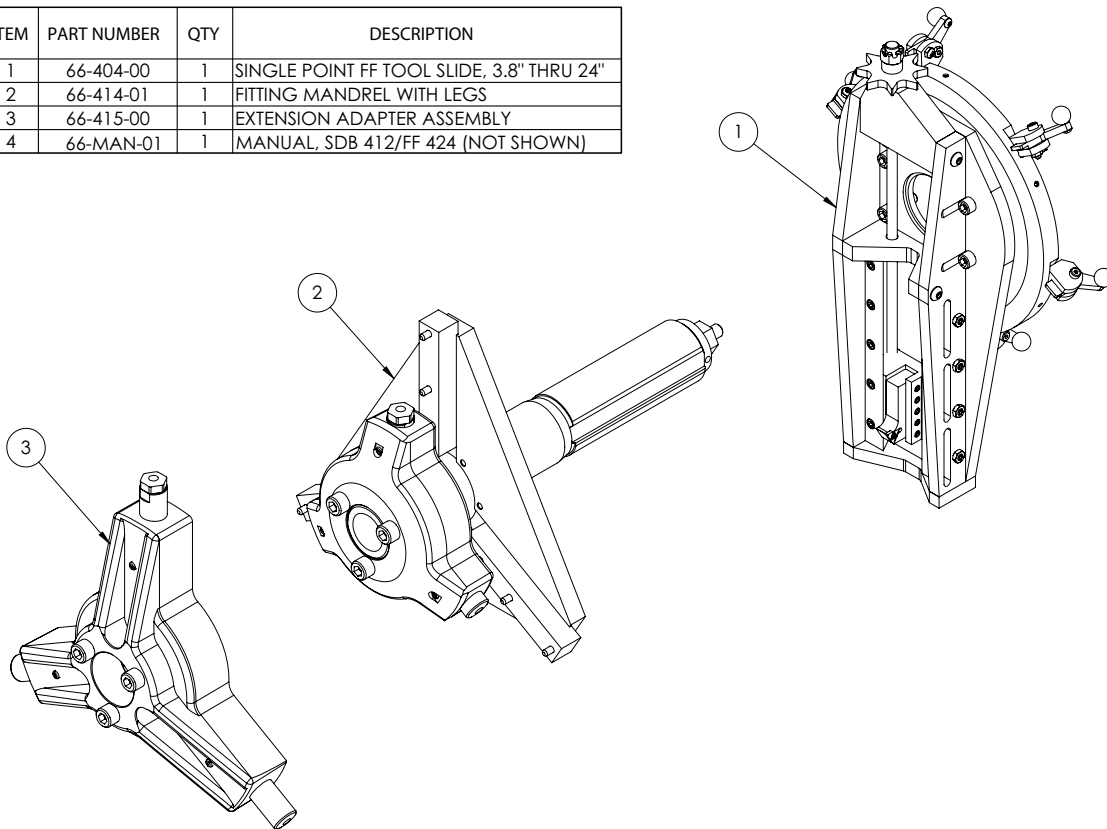


DIMENSIONS IN BRACKETS ARE MILLIMETERS



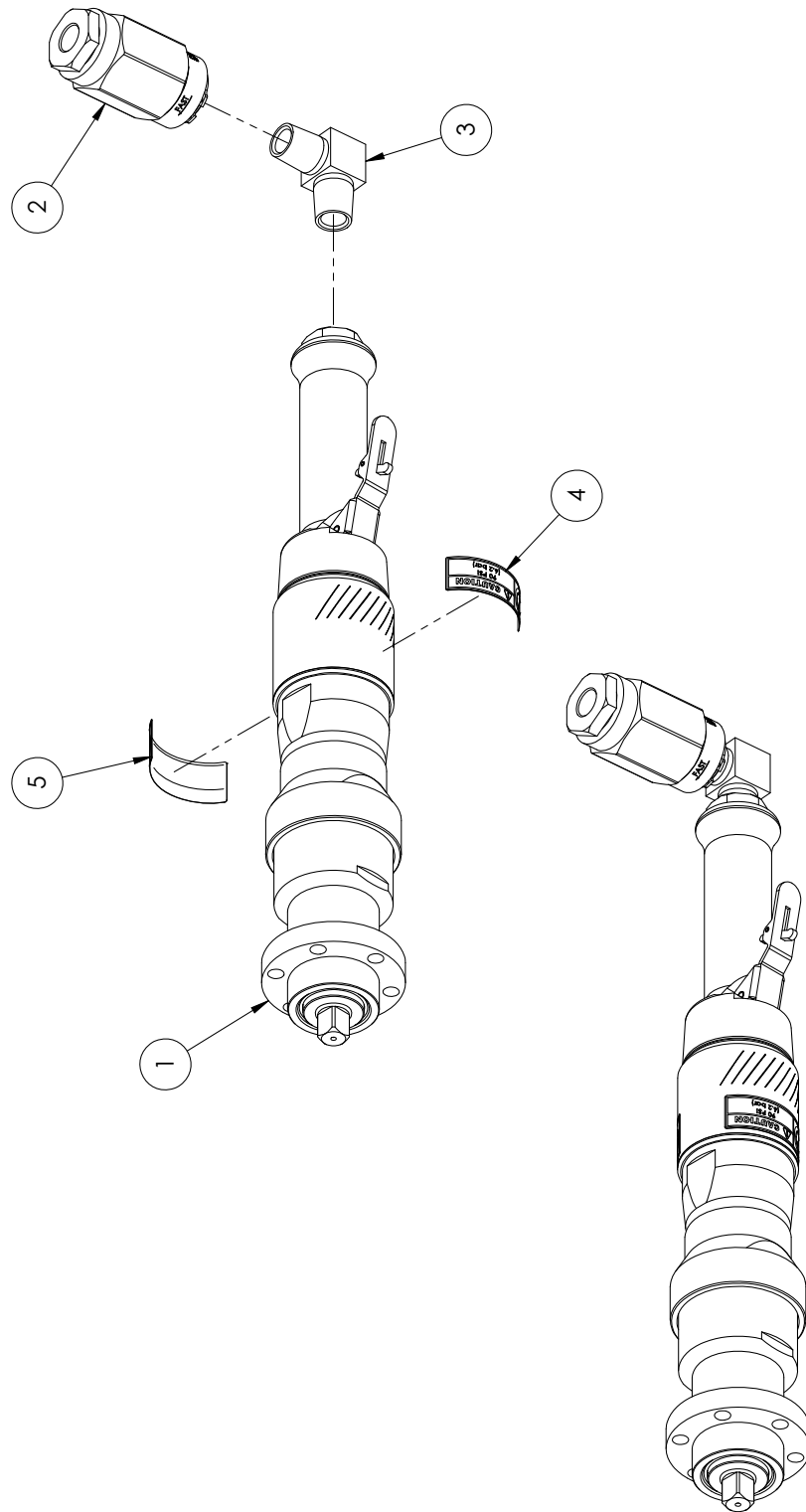
Flange Facer Conversion Kit (66-421-00)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	66-404-00	1	SINGLE POINT FF TOOL SLIDE, 3.8" THRU 24"
2	66-414-01	1	FITTING MANDREL WITH LEGS
3	66-415-00	1	EXTENSION ADAPTER ASSEMBLY
4	66-MAN-01	1	MANUAL, SDB 412/FF 424 (NOT SHOWN)



Pneumatic Drive (56-302-00)

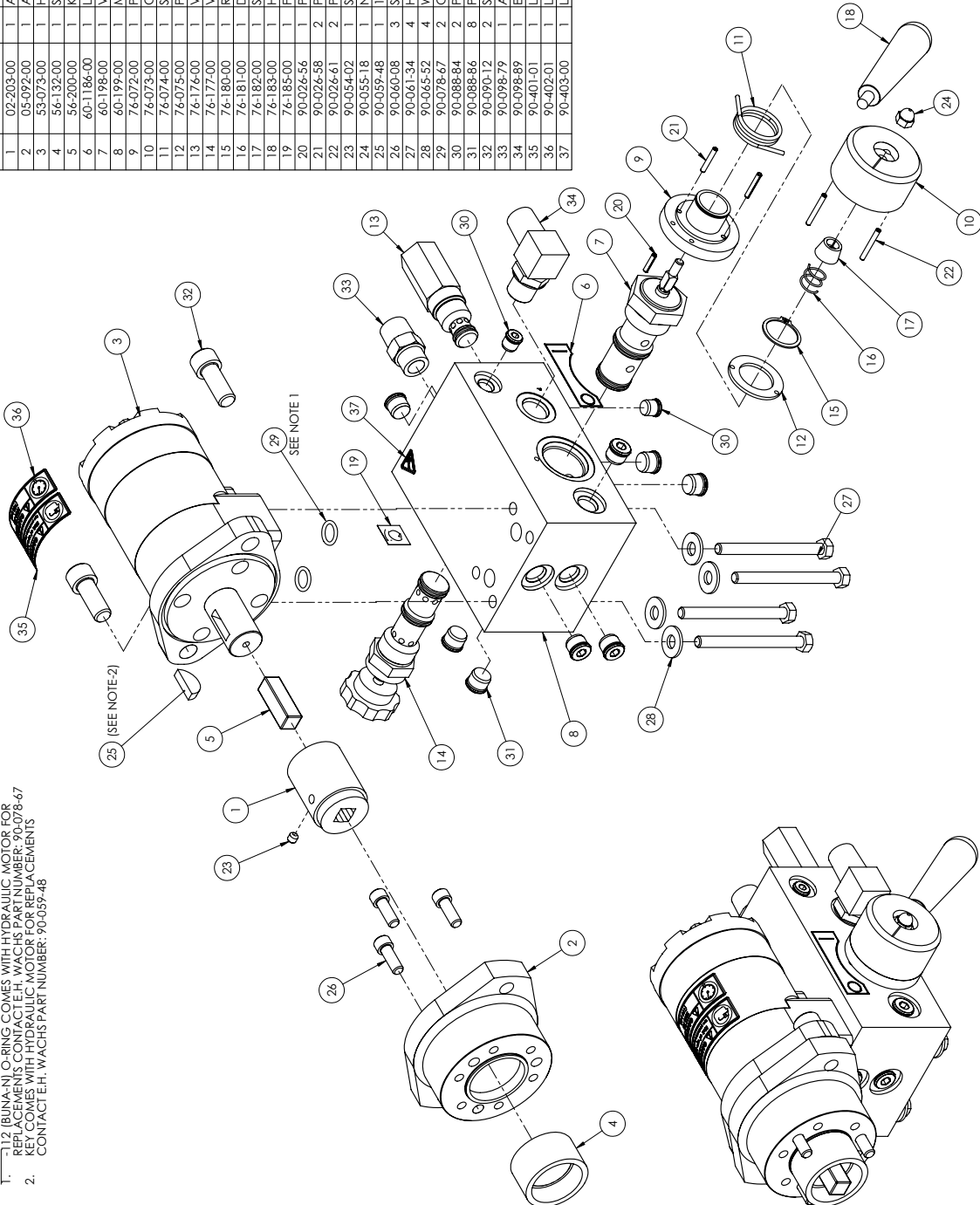
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-044-01	1	AIR MOTOR (HIGH TORQUE/LOW SPEED)
2	66-100-00	1	VALVE, FLOW CONTROL
3	90-098-65	1	1/2 NPT M X 1/2 NPT M HP - 90 ADAPTER
4	90-401-02	1	LABEL, PRESSURE-AIR
5	90-401-03	1	LABEL, EAR AND EYE PROTECTION



Hydraulic Drive (56-413-00)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-203-00	1	ADAPTOR, DRIVE MOTOR
2	05-092-00	1	ADAPTOR, MOTOR (HYD.)
3	53-073-00	1	HYDRAULIC MOTOR
4	56-132-00	1	SPACER
5	56-200-00	1	KEY
6	60-1186-00	1	LCSE FLOW DIRECTION LABEL
7	60-1198-00	1	VALVE, MRY DIRECTIONAL CONTROL
8	60-199-00	1	MANIFOLD, SDB HYDRAULIC
9	76-072-00	1	PLATE, MRY ANTI-ROTATION
10	76-073-00	1	CAP, MRY OPERATOR
11	76-074-00	1	SPRING, TORSION
12	76-075-00	1	PLATE, SPRING COVER
13	76-176-00	1	VALVE, PRESSURE RELIEF
14	76-177-00	1	VALVE, PRESSURE COMPENSATED FLOW CONTROL
15	76-180-00	1	RING, 26MM EXT RETAINING
16	76-181-00	1	DEFENT SPRING
17	76-182-00	1	SPACER
18	76-183-00	1	HANDLE, 5/16" 18
19	76-185-00	1	FLOW CONTROL LABEL
20	90-026-56	1	PIN, 1/8 x 5/8 ROLL
21	90-026-58	2	PIN, 1/8 x 7/8 ROLL
22	90-026-61	2	PIN, 1/8 x 1.125 ROLL
23	90-054-02	1	SSS, 1/4-20 x 1/4
24	90-059-48	1	NUT, 1/4-20 ACORN
25	90-060-08	3	SHCS, 5/16-18 X 7/8
26	90-061-34	4	SHCS, 5/16-18 X 3-1/2"
27	90-065-52	4	WASHER, 5/16 FLAT
28	90-076-67	2	O-RING, 1-1/2
29	90-088-84	2	PLUG, -04 ZERO-LEAK ORB
30	90-090-12	2	SHCS, 1/2-13 X 1-1/4
31	90-098-79	1	ADAPTER, 1/2 NPT M X 1/2 ORB M - STRAIGHT
32	90-098-89	1	ELBOW, 1/2 ORB M X 1/2 NPT M - 90
33	90-401-01	1	LABEL, EYE PROTECTION
34	90-402-01	1	LABEL, PRESSURE-HYD
35	90-403-00	1	LABEL, BURN HAZARD/HOT SURFACE

NOTE:
 1. 1-1/2" BUNA-NI O-RING COMES WITH HYDRAULIC MOTOR FOR REPLACEMENTS CONTACT E.H. WACHS PART NUMBER: 90-078-67
 2. KEY COMES WITH HYDRAULIC MOTOR FOR REPLACEMENTS CONTACT E.H. WACHS PART NUMBER: 90-059-48





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 drawings and parts lists. 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.

In This Chapter

ORDERING REPLACEMENT PARTS

REPAIR INFORMATION

WARRANTY INFORMATION

RETURN GOODS ADDRESS

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