CE

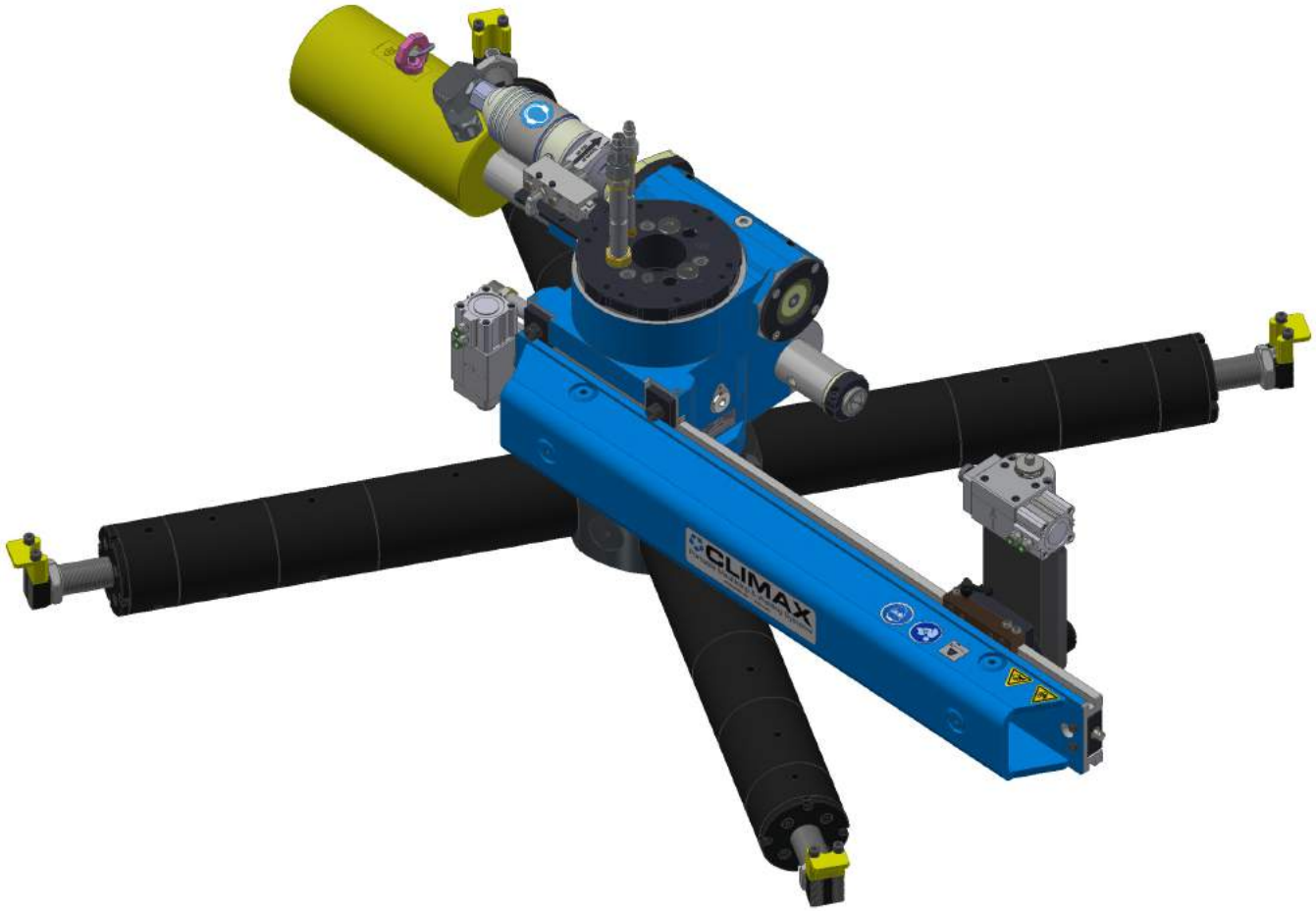
FF6300

FLANGE FACER

FF6300 OPERATING MANUAL

SERIAL NUMBER RANGE: 15000834–

ORIGINAL INSTRUCTIONS



CLIMAX

Portable Machining & Welding Systems

P/N 80679
July 2019
Revision 10

CLIMAX | BORTECH CALDER H&S TOOL

At CLIMAX, we value your opinion.

For comments or questions about this manual or other CLIMAX documentation, please e-mail documentation@cpmt.com.

For comments or questions about CLIMAX products or services, please call CLIMAX or e-mail info@cpmt.com. For quick and accurate service, please provide your representative with the following:

- Your name
- Shipping address
- Telephone number
- Machine model
- Serial number (if applicable)
- Date of purchase

CLIMAX World Headquarters

2712 East 2nd Street
Newberg, Oregon 97132 USA

Telephone (worldwide): +1-503-538-2815
Toll-free (North America): 1-800-333-8311
Fax: 503-538-7600

H&S Tool World Headquarters

715 Weber Dr.
Wadsworth, OH 44281 USA

Telephone: +1-330-336-4550
Fax: 1-330-336-9159
hstool.com

CLIMAX | H&S Tool (UK Headquarters)

Unit 7 Castlehill Industrial Estate
Bredbury Industrial Park
Horsfield Way
Stockport SK6 2SU, UK

Telephone: +44 (0) 161-406-1720

CLIMAX | H&S Tool (European Headquarters)

Am Langen Graben 8
52353 Düren, Germany

Telephone: +49 24-219-1770
E-mail: ClimaxEurope@cpmt.com

CLIMAX | H&S Tool (Asia Pacific Headquarters)

316 Tanglin Road #02-01
Singapore 247978

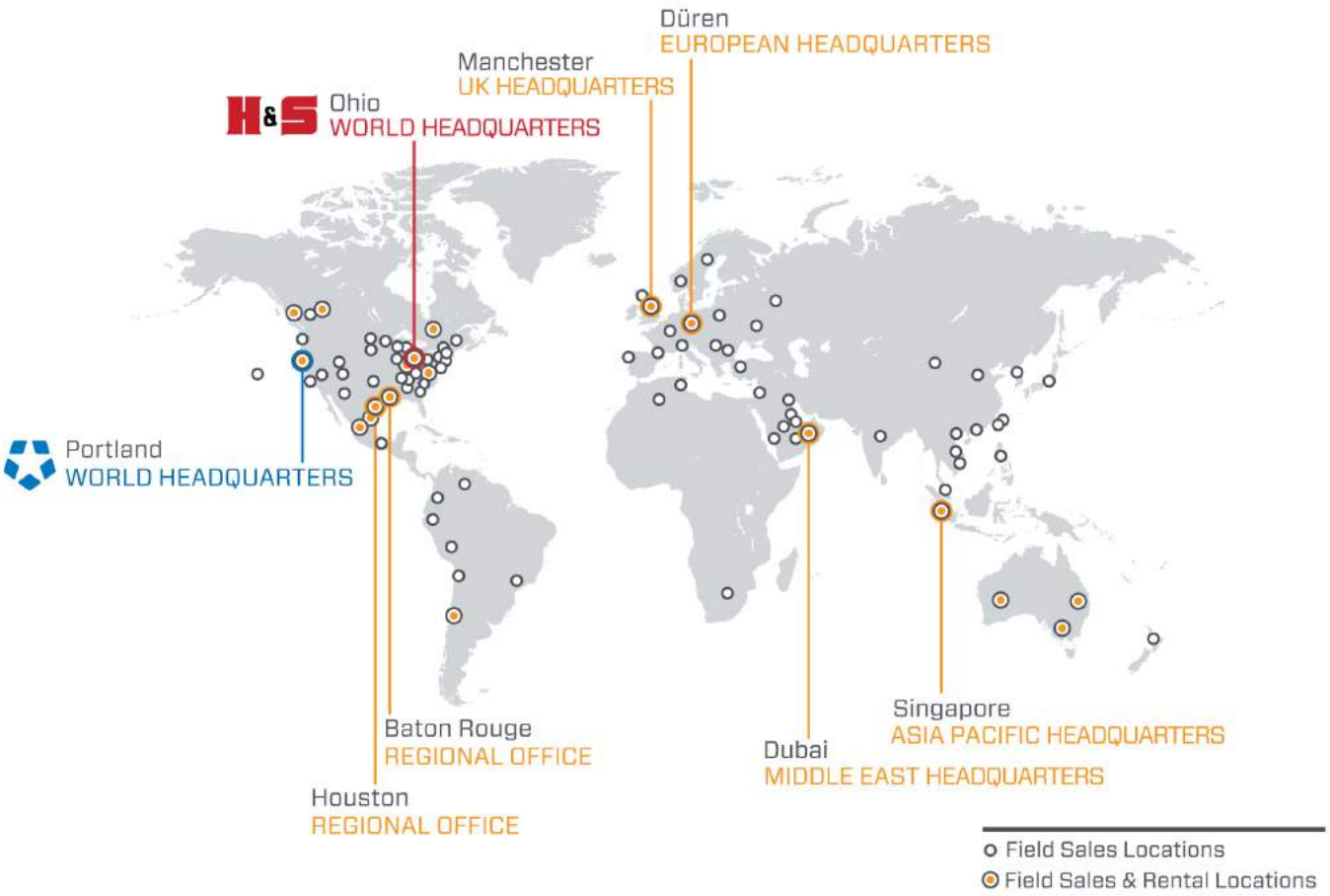
Telephone: +65-9647-2289
Fax: +65-6801-0699

CLIMAX | H&S Tool (Middle East Headquarters)

Warehouse #5, Plot: 369 272
Um Sequim Road
Al Quoz 4
PO Box 414 084
Dubai, UAE

Telephone: +971 04-321-0328

CLIMAX GLOBAL LOCATIONS



CE DOCUMENTATION

DECLARATION OF CONFORMITY

2006/42/EC Machinery Directive

Name of manufacturer or supplier
Climax Portable Machining And Welding Systems

Full postal address including country of origin
2712 E Second Street
Newberg, OR 97132
USA

Description of product
FF6300 Flange Facer 12-60" range

Name, type or model, batch or serial number
Model FF6300 Serial Number Range 15000733 - 20000000
Hydraulic Powered and Pneumatic Powered

Standards used, including number, title, issue date and other relative documents
EN 953, EN 3744, EN 4413, EN 4414, EN 11201, EN 12100, EN 13128, EN 13732, EN 13849, EN 13857

Name of Responsible Person within the EU Sebastian Dick

Full postal address if different from manufacturers
Climax GmBH
Am Langen Graben 8
52353 Duren, Germany

Declaration

I declare that as the Manufacturer, the above information in relation to the supply / manufacture of this product, is in conformity with the stated standards and other related documents following the provisions of the above Directives and their amendments.

Signature of Manufacturer: _____

Position Held: Director of Engineering

Date: 6-23-2015

CE

LIMITED WARRANTY

Climax Portable Machining & Welding Systems, Inc. (hereafter referred to as “CLIMAX”) warrants that all new machines are free from defects in materials and workmanship. This warranty is available to the original purchaser for a period of one year after delivery. If the original purchaser finds any defect in materials or workmanship within the warranty period, the original purchaser should contact its factory representative and return the entire machine, shipping prepaid, to the factory. CLIMAX will, at its option, either repair or replace the defective machine at no charge and will return the machine with shipping prepaid.

CLIMAX warrants that all parts are free from defects in materials and workmanship, and that all labor has been performed properly. This warranty is available to the customer purchasing parts or labor for a period of 90 days after delivery of the part or repaired machine or 180 days on used machines and components. If the customer purchasing parts or labor finds any defect in materials or workmanship within the warranty period, the purchaser should contact its factory representative and return the part or repaired machine, shipping prepaid, to the factory. CLIMAX will, at its option, either repair or replace the defective part and/or correct any defect in the labor performed, both at no charge, and return the part or repaired machine shipping prepaid.

These warranties do not apply to the following:

- Damage after the date of shipment not caused by defects in materials or workmanship
- Damage caused by improper or inadequate machine maintenance
- Damage caused by unauthorized machine modification or repair
- Damage caused by machine abuse
- Damage caused by using the machine beyond its rated capacity

All other warranties, express or implied, including without limitation the warranties of merchantability and fitness for a particular purpose are disclaimed and excluded.

Terms of sale

Be sure to review the terms of sale which appear on the reverse side of your invoice. These terms control and limit your rights with respect to the goods purchased from CLIMAX.

About this manual

CLIMAX provides the contents of this manual in good faith as a guideline to the operator. CLIMAX cannot guarantee that the information contained in this manual is correct for applications other than the application described in this manual. Product specifications are subject to change without notice.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

CHAPTER/SECTION **PAGE**

TABLE OF CONTENTS (CONTINUED)

CHAPTER/SECTION **PAGE**

This page intentionally left blank

LIST OF FIGURES

FIGURE **PAGE**

LIST OF FIGURES (CONTINUED)

FIGURE **PAGE**

LIST OF FIGURES (CONTINUED)

FIGURE **PAGE**

This page intentionally left blank

LIST OF TABLES

TABLE **PAGE**

This page intentionally left blank

1 INTRODUCTION

IN THIS CHAPTER:

1.1 How to use this manual

This manual describes the setup, operation, maintenance, storage, shipping, and decommissioning of the FF6300 Flange Facer Machine.

NOTICE

For maximum safety and performance, read this entire manual before attempting to set up or operate the machine.

The first page of each chapter includes a list of the chapter contents to help you locate specific information.

The appendices contain supplemental product information to aid in setup, operation, and maintenance tasks.

1.2 Safety alerts

Pay careful attention to the safety alerts in this manual. Safety alerts call your attention to dangerous situations that you may encounter when operating this machine. This manual uses the following types of safety alerts:[1]

⚠ DANGER

indicates a dangerous situation that, if not avoided, **WILL** result in death or serious injury.

1. For more information on safety alerts, see *ANSI/NEMA Z535.6-2011, Product safety Information in Product Manuals, Instructions, and Other Collateral Materials*.

⚠ WARNING

indicates a dangerous situation that, if not avoided, **COULD** result in death or serious injury.

⚠ CAUTION

indicates a dangerous situation that, if not avoided, could result in minor or moderate injury.

NOTICE

indicates a dangerous situation that, if not avoided, could result in property damage, equipment failure, or undesirable work results.

1.3 GENERAL SAFETY PRECAUTIONS

CLIMAX leads the way in promoting the safe use of portable machine tools. Safety is a joint effort. You must do your part by:

- Being aware of your work environment
- Closely following the operating procedures and safety precautions contained in this manual
- Closely following your employer's safety guidelines

When operating or working around the machine, observe the safety precautions below.

Training – Before operating this or any machine tool, you should receive instruction from a qualified trainer. Contact CLIMAX for machine-specific training information.

Risk assessment – Working with and around this machine poses risks to your safety. Conduct a risk assessment (Section 1.5 and Section 1.5 on page 6) of each job site before setting up and operating this machine.

Intended use – Use this machine in accordance with the instructions and precautions in this manual. Do not use this machine for any purpose other than its intended use as described in this manual.

Personal protective equipment – Always wear appropriate personal protective gear when operating this or any other machine tool. Wear flame-resistant clothing with long sleeves and legs when operating the machine, as hot flying chips from the workpiece may burn or cut bare skin.

Work area – Keep the work area around the machine clear of clutter. Restrain cords and hoses connected to the machine. Keep other cords and hoses away from the work area.

Danger zone – The danger zone of this machine is defined as being inside the turning radius of the machine, or as being outside the diameter of the

machine when using the OD mount assembly.

Lifting – Many CLIMAX machine components are very heavy. Whenever possible, use proper hoisting equipment and rigging to lift the machine or its components. Always use the lifting points designated on the machine. Follow the lifting instructions in Section 3.3 on page 27. Be cautious; never drop electrical equipment as this will damage the components.

Lock out/tag out – Lock out and tag out the machine before performing maintenance or entering the danger zone to adjust this machine.

Moving parts – CLIMAX machines have numerous exposed moving parts and interfaces that can cause severe impact, pinching, cutting, and other injuries.

During machine operation:

- Keep hands and tools away from moving parts.
- Remove gloves and secure hair, clothing, jewelry, and pocket items to prevent them from becoming entangled in moving parts.

Sharp edges – Cutting tools and workpieces have sharp edges that can easily cut skin. Wear protective gloves and exercise caution when handling a cutting tool or workpiece.

Hot surfaces – During operation, motors, pumps, HPUs, and cutting tools can generate enough heat to cause severe burns. Pay attention to hot-surface warning labels and avoid contact with bare skin until the machine has cooled.

1.4 MACHINE-SPECIFIC SAFETY PRECAUTIONS

Eye hazard – This machine produces metal chips during operation. Always wear eye protection when operating the machine.

Sound level – This machine produces potentially harmful sound levels. Always wear hearing protection when operating the machine or working around it. During testing, the machine produced the following sound levels.[1]

TABLE 1-1. SOUND LEVELS

	Pneumatic	Hydraulic
Sound power	87.3dBA	78.9dBA
Operator sound pressure	76dBA	65dBA
Bystander sound pressure	74dBA	68dBA

1. Machine sound testing was conducted in accordance with European Harmonized Standards EN ISO 3744:2010 and EN 11201:2010.

Hazardous environments – Do not operate the machine in environments where explosive materials, toxic chemicals, or radiation may be present. Do not expose the machine to rain or wet conditions.

Rotating machinery – Rotating machinery can cause serious injuries. Lock out all power sources before performing any adjustment, lubrication, or maintenance.

Secure loose clothing and long hair – Rotating machinery can cause serious injuries. Do not wear loose fitting clothing or jewelry. Tie back long hair or wear a hat.

Hoses, pendants, and electrical cables

- Do not abuse the pendant cable as this can damage the cable and pendant.
- Never use the cord for carrying, pulling, or unplugging.
- Remove any and all kinks before straightening the cable.
- Keep cords and hoses away from heat, oil, sharp edges, and moving parts.
- Plugs must match the outlet. Never modify the plugs in any way. Do not use an adapter plug with grounded power tools.
- Always examine hoses and cables for damage before use.

Adjustments and maintenance – Stop the machine and lock out all power sources before performing any adjustment, lubrication, or maintenance.

Controls – The machine controls are designed to withstand the rigors of normal use. The on/off switches are clearly visible and identifiable. When you leave the machine, disconnect all power sources to the machine:

- For the pneumatic machine (or portion of the machine), either disconnect the air hose or move the lock-out/tag-out valve to the lock position.
- For the hydraulic machine, turn off the power at the HPU.

This page intentionally left blank

1.5 RISK ASSESSMENT AND HAZARD MITIGATION

Machine Tools are specifically designed to perform precise material-removal operations.

Stationary Machine Tools include lathes and milling machines and are typically found in a machine shop. They are mounted in a fixed location during operation and are considered to be a complete, self-contained machine. Stationary Machine Tools achieve the rigidity needed to accomplish material-removal operations from the structure that is an integral part of the machine tool.

Portable Machine Tools are designed for on-site machining applications. They typically attach directly to the workpiece itself, or to an adjacent structure, and achieve their rigidity from the structure to which it is attached. The design intent is that the Portable Machine Tool and the structure to which it is attached become one complete machine during the material-removal process.

To achieve the intended results and to promote safety, the operator must understand and follow the design intent, set-up, and operation practices that are unique to Portable Machine Tools.

The operator must perform an overall review and on-site risk assessment of the intended application. Due to the unique nature of portable machining applications, identifying one or more hazards that must be addressed is typical.

When performing the on-site risk assessment, it is important to consider the Portable Machine Tool and the workpiece as a whole.

1.6 RISK ASSESSMENT CHECKLIST

The following checklist is not intended to be an all inclusive list of things to watch out for when setting up and operating this Portable Machine Tool. However these checklists are typical of the types of risks the assembler and operator should be considering. Use these checklists as part of your risk assessment:

TABLE 1-2. RISK ASSESSMENT CHECKLIST BEFORE SET-UP

	Before Set-up
☐	I took note of all the warning labels on the machine.
☐	I removed or mitigated all identified risks (such as tripping, cutting, crushing, entanglement, shearing, or falling objects).
☐	I considered the need for personnel safety guarding and installed any necessary guards.
☐	I read the Machine Assembly instructions (Section 3) and took inventory of all the items required but not supplied (Section 1.9)..
☐	I created a lift plan, including identifying the proper rigging, for each of the setup lifts required during the setup of the support structure and machine.
☐	I located the fall paths involved in lifting and rigging operations. I have taken precautions to keep workers away from the identified fall path.
☐	I considered how this machine operates and identified the best placement for the controls, cabling, and the operator.
☐	I evaluated and mitigated any other potential risks specific to my work area.

TABLE 1-3. RISK ASSESSMENT CHECKLIST AFTER SET-UP

	After Set-up
☐	I checked that the machine is safely installed (according to Section 3) and the potential fall path is clear. If the machine is installed at an elevated position, I checked that the machine is safeguarded against falling.
☐	I identified all possible pinch points, such as those caused by rotating parts, and informed the affected personnel.
☐	I planned for containment of any chips or swarf produced by the machine.
☐	I followed the required Maintenance Intervals (Section 5.2) with the recommended lubricants (Section 5.4).
☐	I checked that all affected personnel have the recommended personal protective equipment, as well as any site-required or regulatory equipment.
☐	I checked that all affected personnel understand the danger zone and are clear of it.
☐	I evaluated and mitigated any other potential risks specific to my work area.

1.7 LABELS

Table 1-4 shows the labels that should be on your machine. If any are defaced or missing, contact CLIMAX immediately for replacements.

TABLE 1-4. LABELS

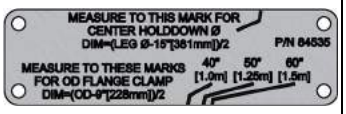
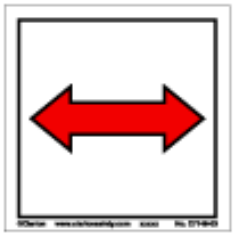
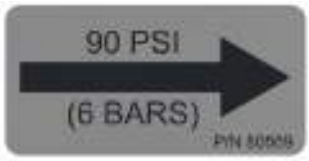
	P/N 29154, 35828 CLIMAX serial number, year, and model number plate		P/N 29152 Label mass tag
	PN 84019 CLIMAX logo		PN 84535 Plate OD alignment
	P/N 35772 Label ball valve operation direction		P/N 80569 Label OD mount centering hardware direction
	P/N 39546 Label oil bottle 76 Unax AW 32		P/N 80569 Label air motor direction and pressure
	P/N 59035 Label warning wear eye protection		P/N 59037 Label warning hearing protection required

TABLE 1-4. LABELS

	P/N 59044 Label warning consult operator's manual		P/N 46902 Label warning hot surface
	P/N 59042 Label warning hand crush/moving parts		P/N 79324 Label warning hand entanglement/rotating gears

1.8 LABEL LOCATIONS

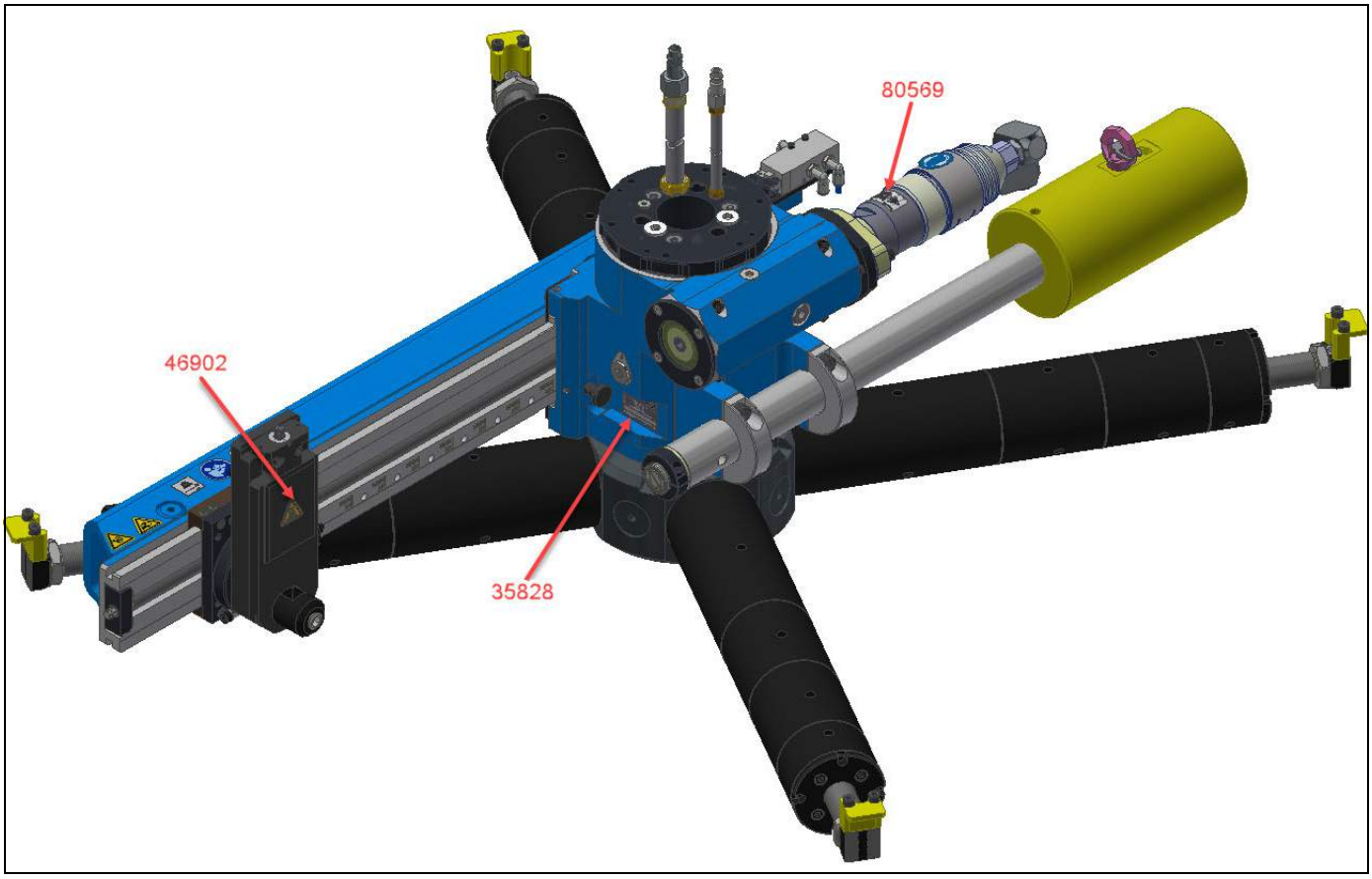


FIGURE 1-1. WARNING LABEL PLACEMENT FF6300 ID CHUCK

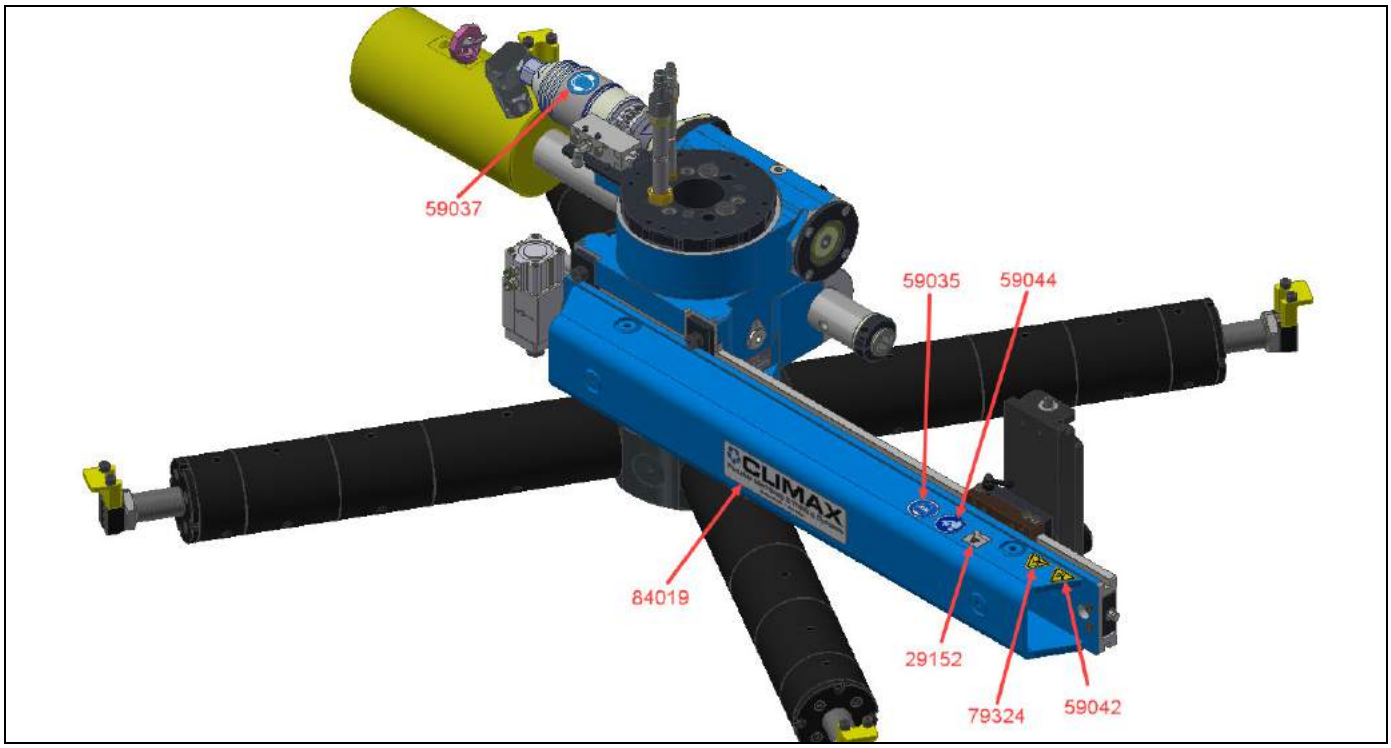


FIGURE 1-2. WARNING LABEL PLACEMENT FF6300 ID CHUCK (CONT.)

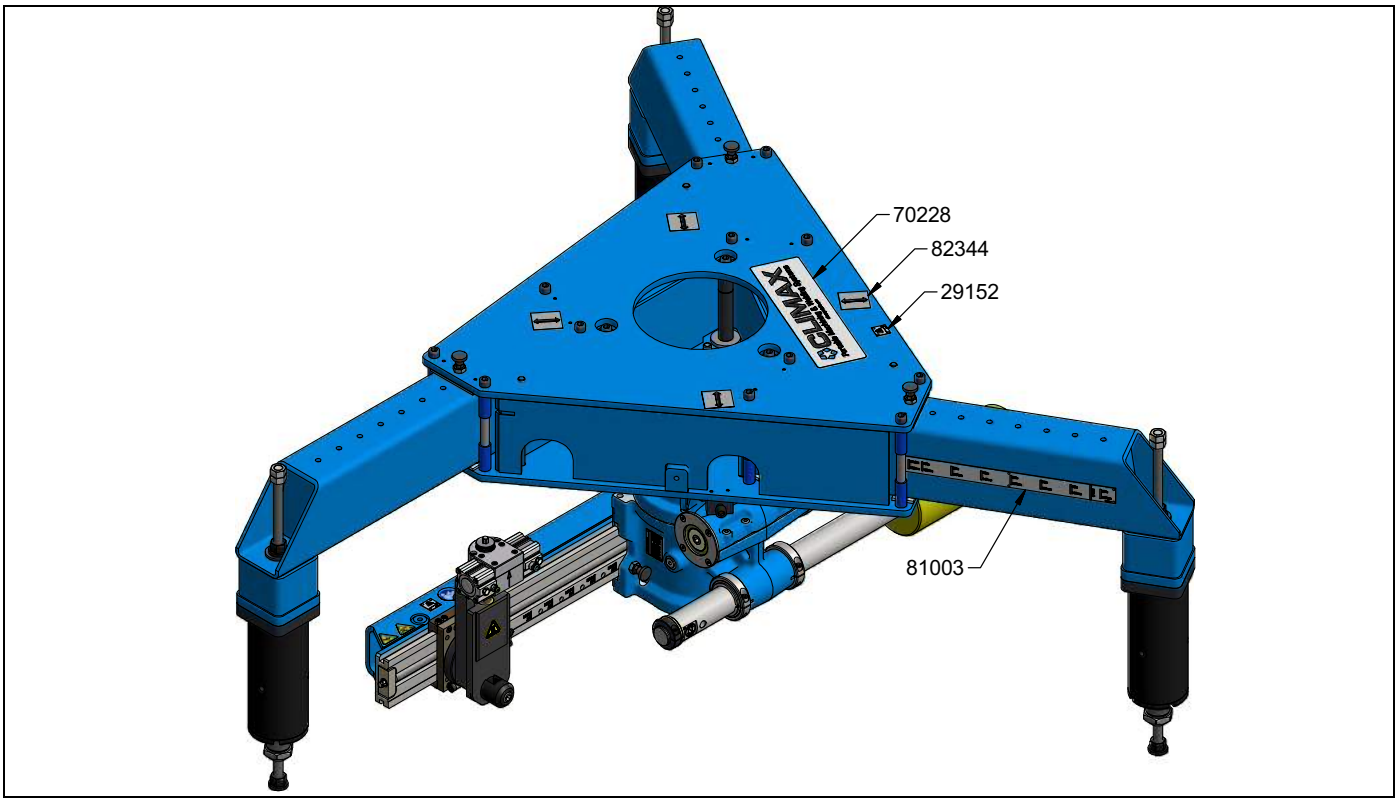


FIGURE 1-3. WARNING LABEL PLACEMENT FF6300 OD MOUNT

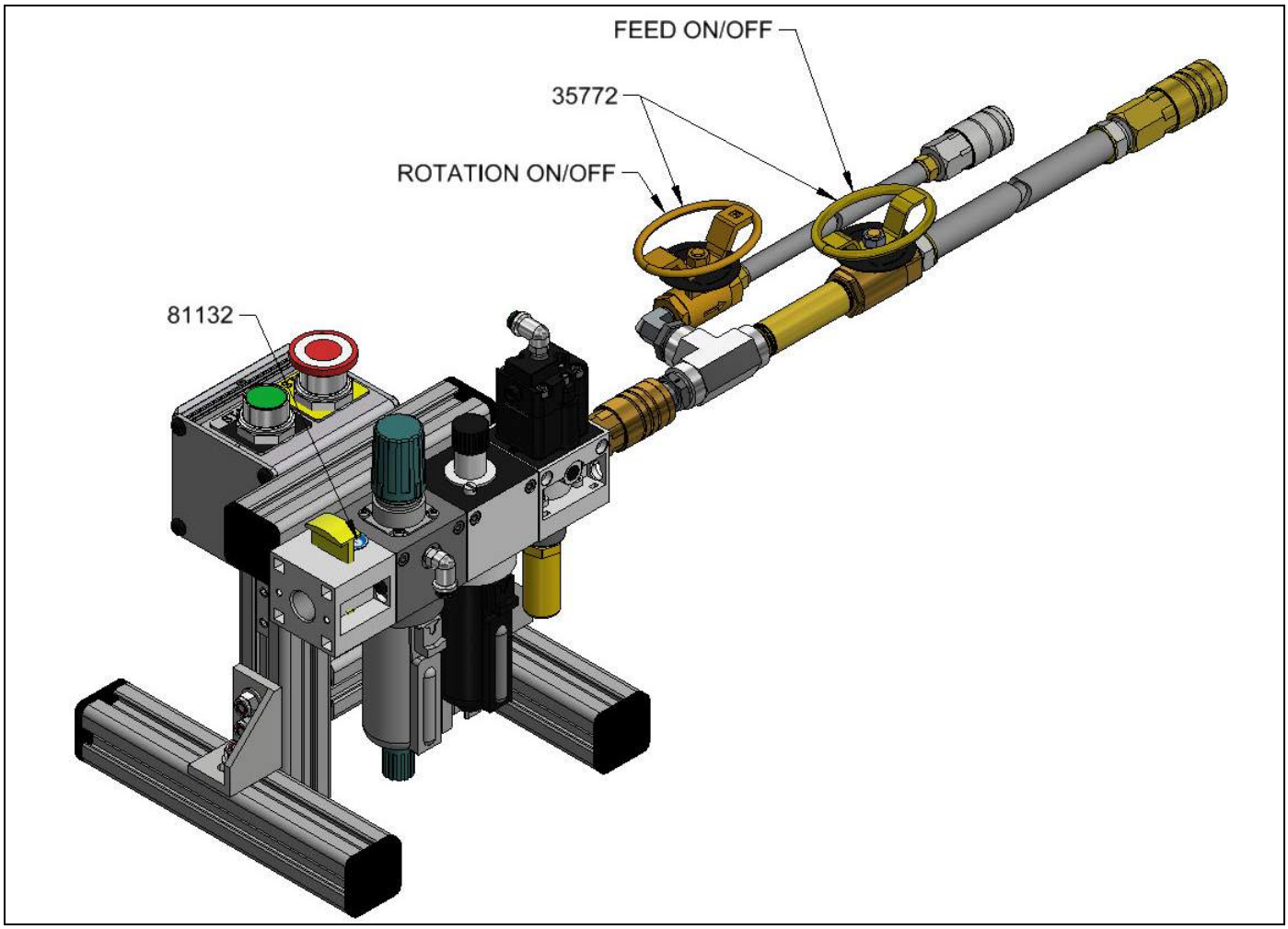


FIGURE 1-4. WARNING LABEL PLACEMENT FF6300 PNEUMATIC CONDITIONING UNIT

1.9 ITEMS REQUIRED BUT NOT SUPPLIED

During setup, you will need the following items that are not included with the product:

- Dial indicator
- Tape measure
- Rigging and lifting equipment as needed for machine setup
- Fittings required to connect to the pneumatic conditioning unit (PCU), or the plug for the hydraulic power unit (HPU)

CLIMAX offers a dial indicator kit for purchase; contact CLIMAX for more information.

This page intentionally left blank

2 OVERVIEW

IN THIS CHAPTER:

The FF6300 flange facing machine is designed for facing, beveling, and grooving operations. All parts meet CLIMAX's strict quality standards.

The FF6300 is highly configurable with a variety of options and accessories. The machine you purchased may not have all of these. If you require additional accessories, please contact CLIMAX for assistance.

2.1 FEATURES AND COMPONENTS

High precision in a compact design – The FF6300's precision rotating assembly incorporates two large tapered roller bearings on a spindle. All fluid rotary passages are located between these bearings to provide the maximum machine rigidity in a compact package.

Operator safety – Do not touch moving parts during machine operation. A pneumatic-powered reversible feed box controls both the radial and axial feeds. The feed box is not remotely adjustable and should only be adjusted at the feed box when the machine is not rotating. The feed rate is cam-controlled to match the machine RPM. Manual feeding for rapid positioning is also possible.

Face to swing diameter – Because the feed box mounts to the inboard end of the turning arm for facing, the machining diameter can exceed the swing diameter.

Simple rigging – An abundance of lifting points are provided to simplify balanced rigging for flanges in all orientations.

Easy setup – The turning and counterweight arms are adjustable for the desired swing clearance and machining range. The counterweight can be adjusted easily to achieve near-perfect rotational balance.

Ability to machine grooves and bevels – The swivel tool head rotates 360^{o} and has a tool holder that rotates 360^{o} independently. It accepts up to .75" (19 mm) square shank tools.

Smooth high-torque machining – The low-backlash cone worm gear drive allows smooth high-torque machining even during interrupted cuts.

Rigid chucking – The tubular chucking system with level-in-place adjusting feet allows for quick setup.

Modular design – Many of the machine components can be removed to make setup and storage easier. For example, you can set up the chuck independently and then add the main rotary housing.

Mounting options – With the optional CLIMAX OD mount kit, the machine can be mounted to the outside diameter of the flange, without welding. With the CLIMAX surface mounting kit, the machine can be face mounted.

Multiple drive choices – Hydraulic and pneumatic drives are available.

Machining accessories available – CLIMAX offers a backfacing attachment for tube sheet flanges. The main body has an extra rotary union port where you can add your own pneumatic-powered live tooling for grinding or other operations.

2.1.1 ID chuck assembly

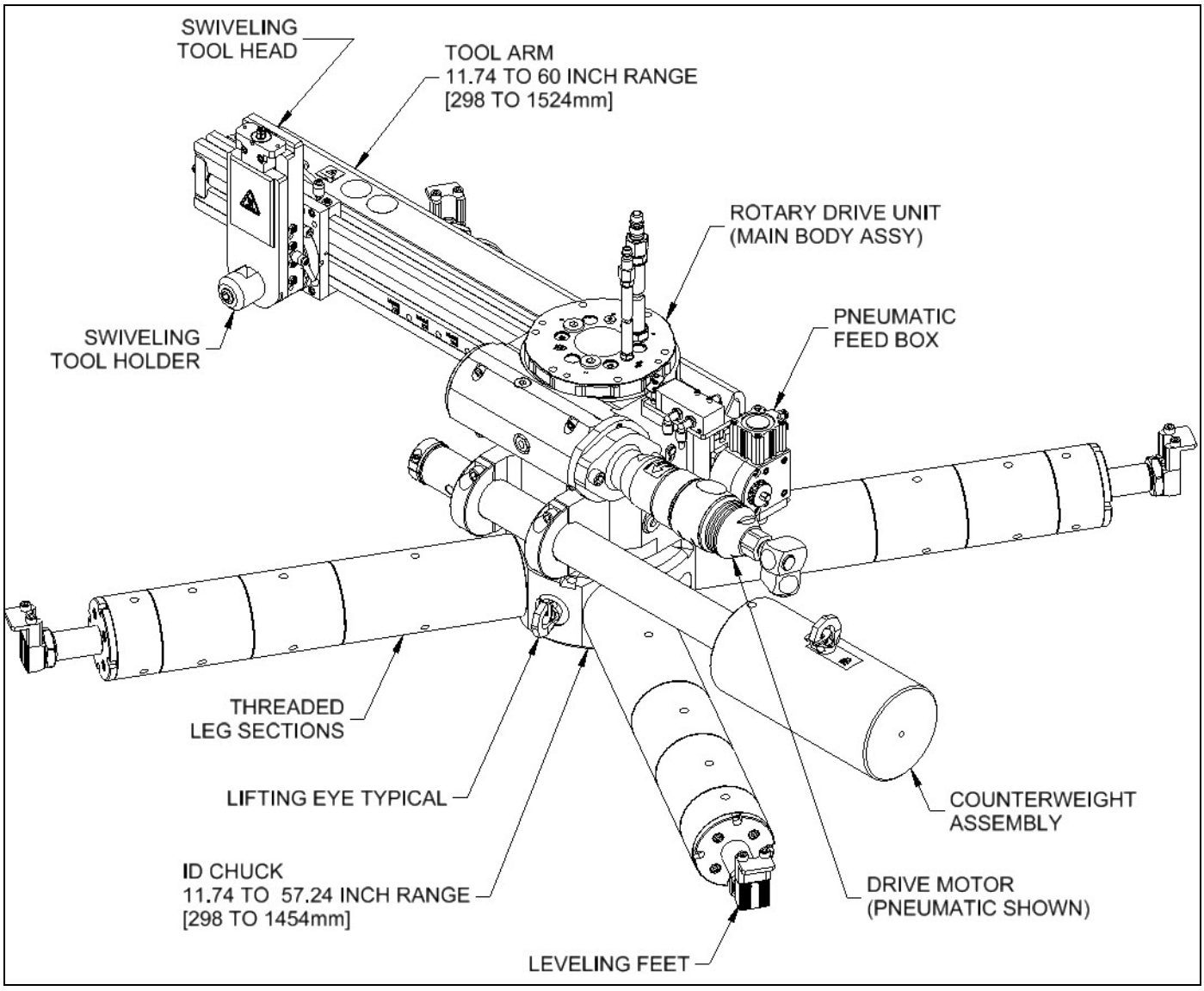


FIGURE 2-1. ID CHUCK ASSEMBLY

2.1.2 ID chuck assembly dimensions

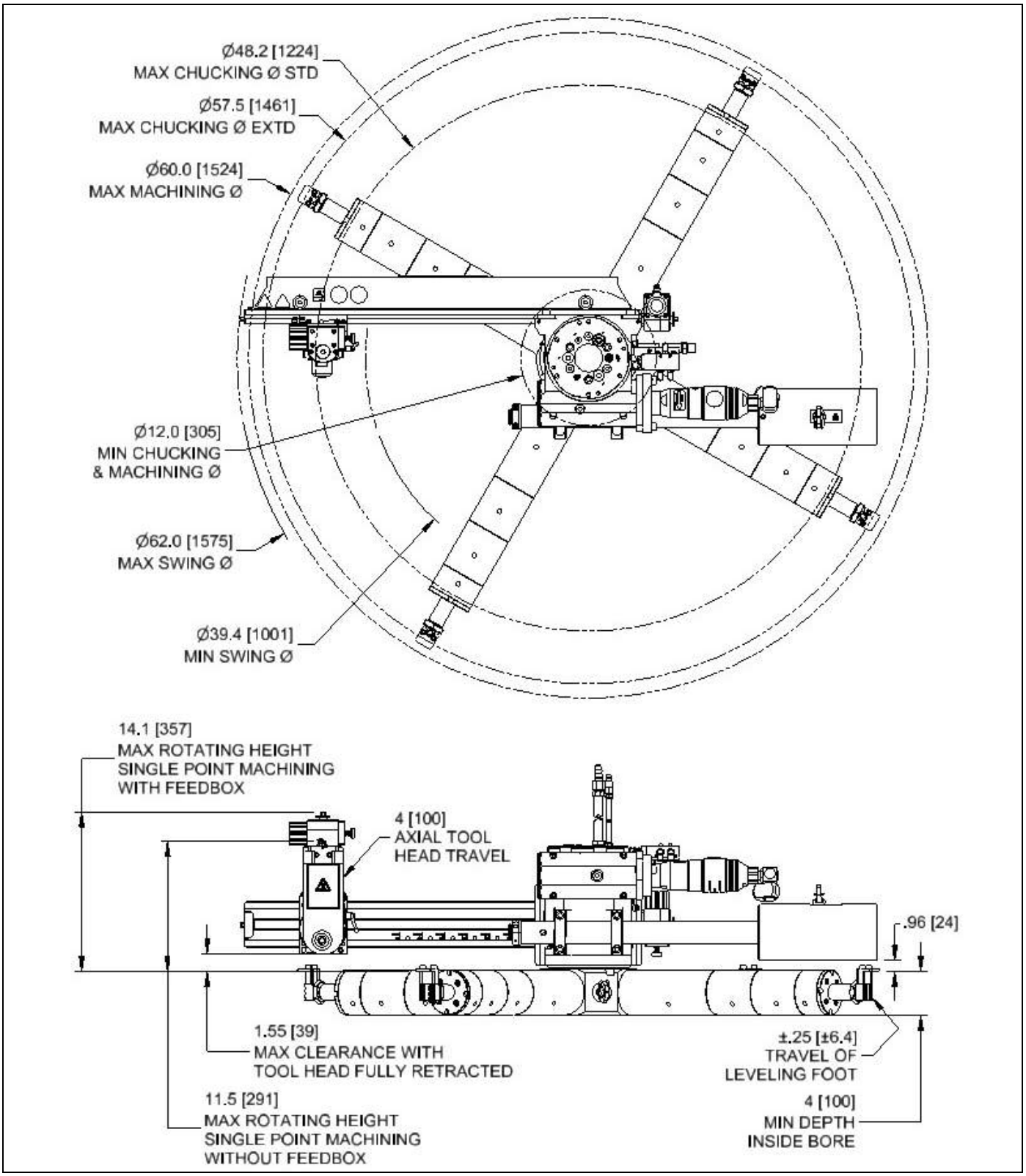


FIGURE 2-2. ID CHUCK ASSEMBLY DIMENSIONS

2.1.3 OD mount assembly

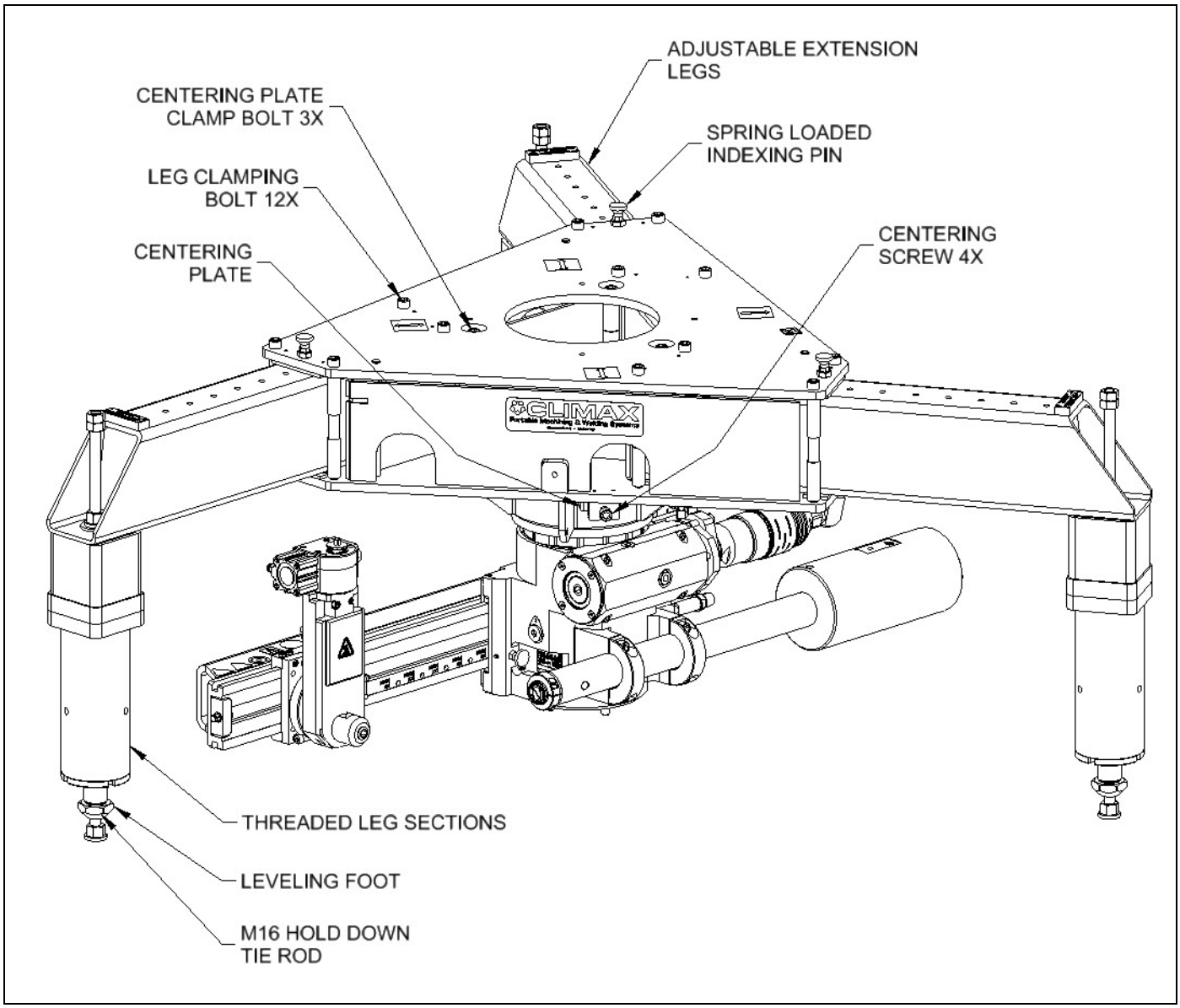


FIGURE 2-3. OD MOUNT ASSEMBLY

2.1.4 OD mount assembly dimensions

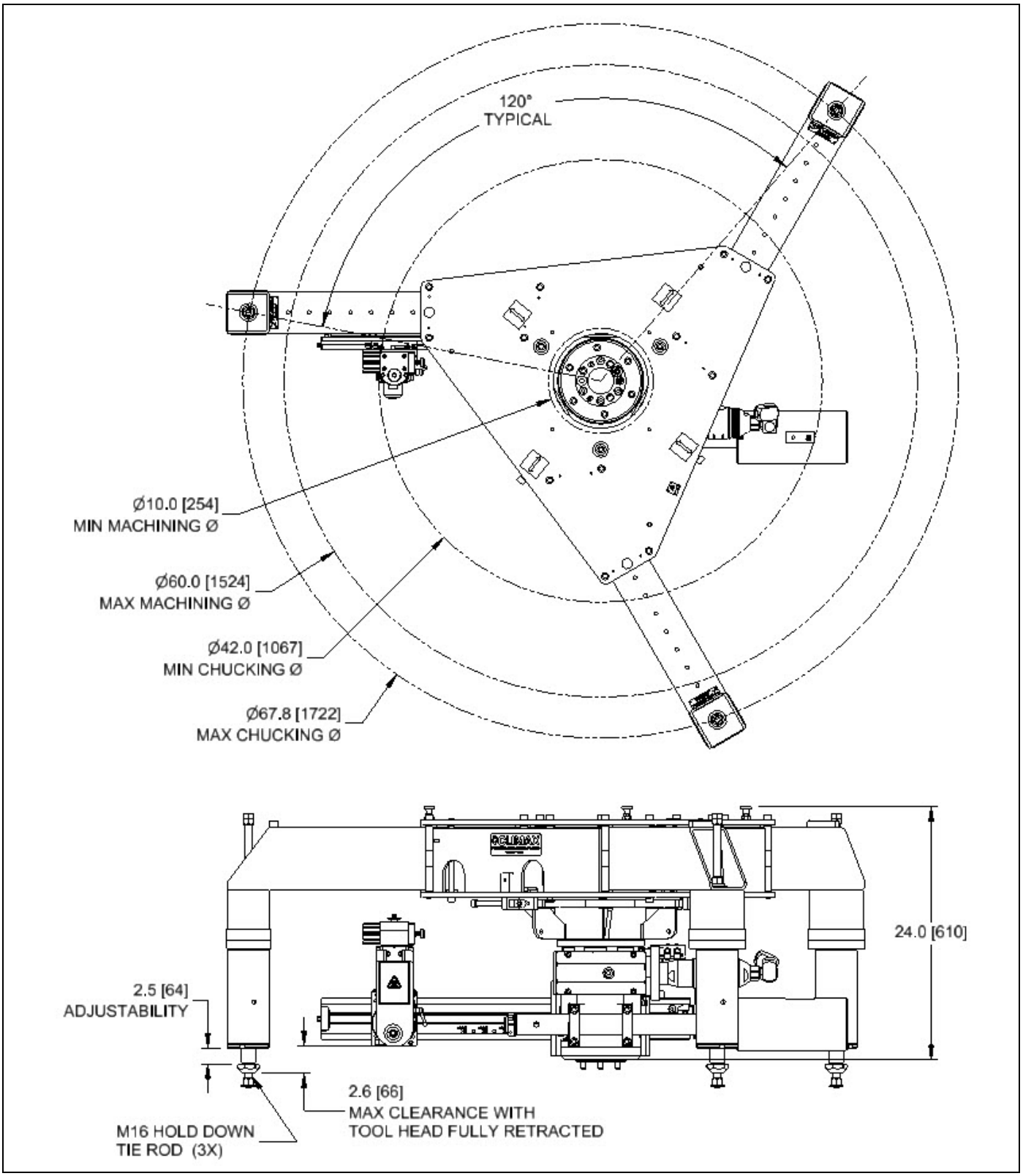


FIGURE 2-4. OD MOUNT ASSEMBLY DIMENSIONS

2.1.5 Surface mount assembly

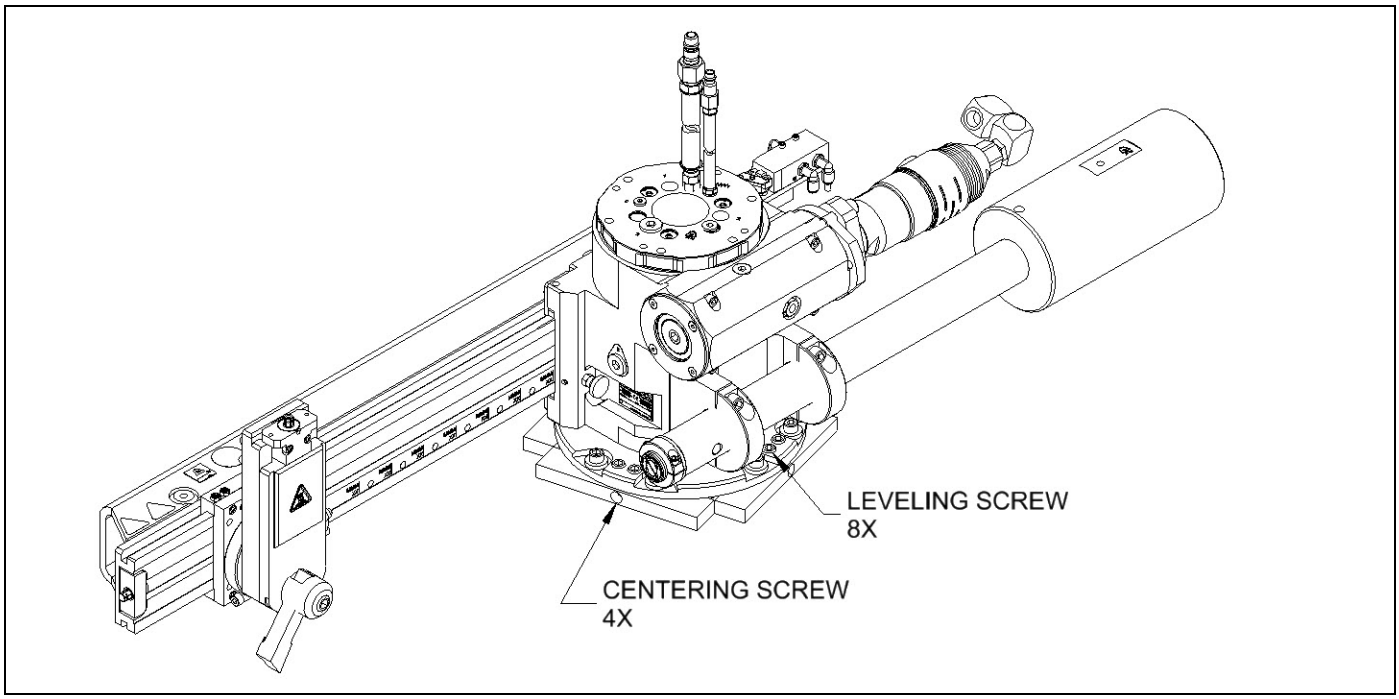


FIGURE 2-5. SURFACE MOUNT ASSEMBLY

2.1.6 Surface mount assembly dimensions

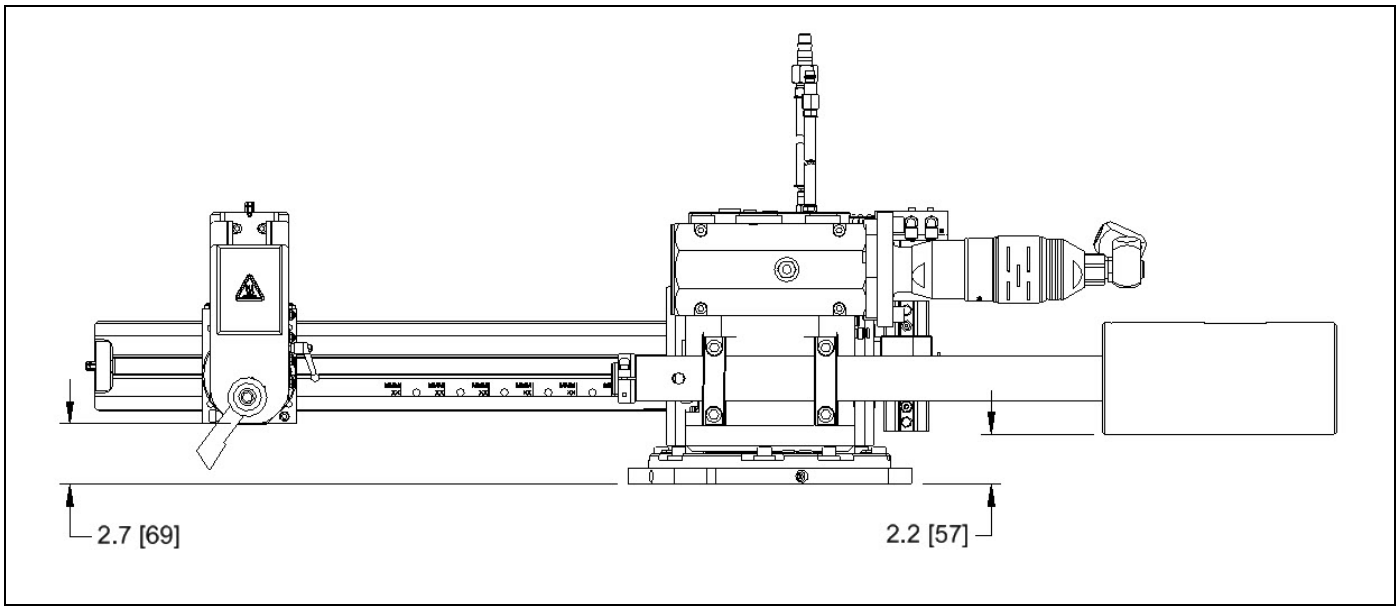


FIGURE 2-6. SURFACE MOUNT ASSEMBLY DIMENSIONS

2.2 RIGGING AND LIFTING INFORMATION

TABLE 2-1. WEIGHTS

	lbs	kg
Total machine weight ID chuck*	473	215
Total machine weight OD mount†	773	353
ID chuck	187	85
Main body assembly	103	47
Turning arm with feed box	101	46
Counterweight assembly	77	35
Pneumatic motor	10	5
Hydraulic motor	10	4.5
Wooden shipping crate	177	80
Metal shipping container	220	100
Accessories		
Backfacing attachment	37	17
OD mount	493	224
OD mount chain clamp	36	16
OD mount wooden shipping crate (no metal shipping container)	123	56

* Machine weights are operating weights.

† OD mount weights are for the complete machine.

TABLE 2-2. SHIPPING WEIGHTS

	lbs	kg
ID chuck in wooden crate	650	294
ID chuck in metal container	693	314
OD mount in wooden crate	616	280

TABLE 2-3. SHIPPING DIMENSIONS

	Width*	Depth	Height
Wooden crate	63.5" (1613 mm)	26" (660 mm)	25.75" (654 mm)
Metal container	60.16" (1528 mm)	24.16" (614 mm)	26.86" (682 mm)
OD mount wooden crate	47.25" (1200 mm)	42.25" (1073 mm)	19.75" (502 mm)

* All dimensions include handles and latches if applicable.

2.3 CONTROLS

This section explains control locations and functions.

2.3.1 Pneumatic conditioning unit controls

Figure 2-7 shows the controls on the pneumatic-powered version of the FF6300.

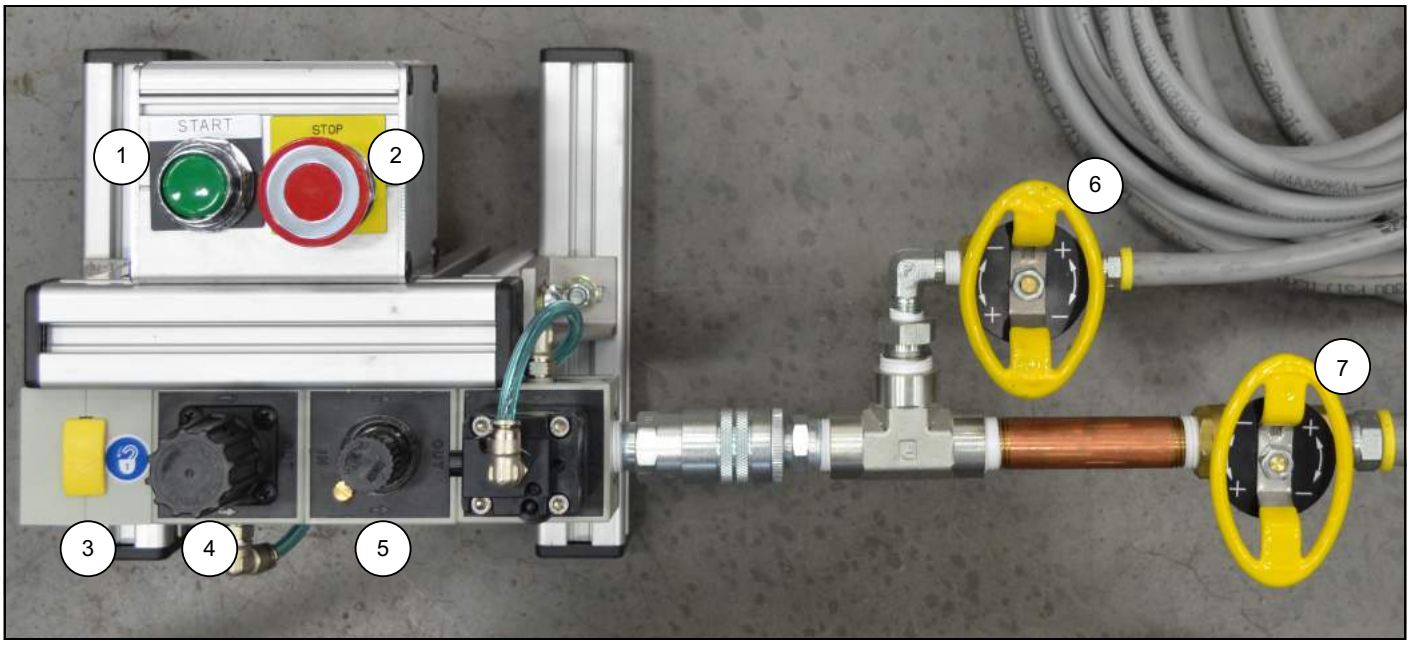


FIGURE 2-7. DETAIL OF PNEUMATIC CONDITIONING UNIT CONTROLS

1. START (system reset)—Resets the low-pressure drop-out.
2. Emergency STOP—Isolates the supply air and vents the downstream air. Press down to stop the machine; pull up to reset.
3. Lock-out/Tag-out valve—Isolates air pressure from the machine and provides the ability to lock the valve closed so that you can perform maintenance.
4. Air regulator—Controls the air pressure supplied to the machine. The regulator is preset at the factory, and does not require adjustment.
5. Oiler adjustment—Controls the air lubricator drip rate. For more information, see Section 5.3.1 on page 64.
6. Feed on/off valve—Turns the feed on or off. This valve has a vent port that stops the feed immediately when the valve is closed.
7. Speed adjustment valve—Controls the machine's rate of rotation.

2.3.2 Hydraulic power unit controls

Figure 2-8 on page 22 shows the controls on the hydraulic version of the FF6300.

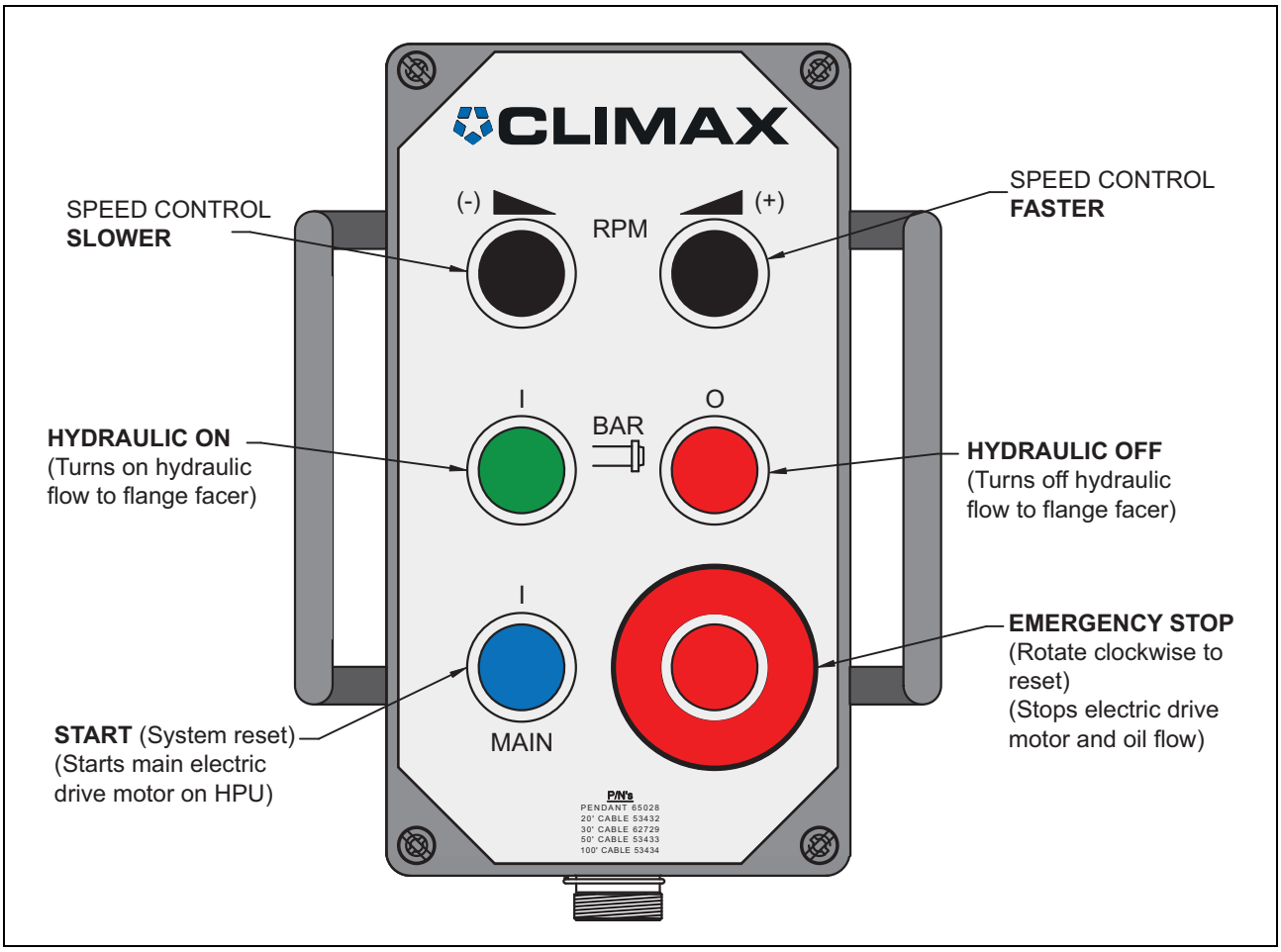


FIGURE 2-8. DETAIL OF HYDRAULIC POWER UNIT CONTROLLER

- Speed Control buttons—Control the machine's rate of rotation. Press to speed up or slow down machine rotation.
- Hydraulic On and Off buttons—Control the hydraulic flow to the flange facer. Press to start or stop machine rotation.
- Start button—Turns on the electric drive motor on the HPU. Press to start the HPU.
- Emergency Stop button—Press to stop the machine. Rotate clockwise to reset.

2.4 MACHINE SPECIFICATIONS

2.4.1 Temperature

The suggested machine operating temperature is -4–140 ^{o}F (-20–60 ^{o}C).

NOTICE

During operation, individual machine components will exceed these temperatures.

During normal use, the temperature of the machine housing normally increases to about 25 °F (14 °C) above the ambient temperature. It is good practice to make critical final machining cuts after the machine has been running continuously for at least 15 minutes.

⚠ CAUTION

Machining metal raises the temperature of machine components and can generate hot chips that burn. Use caution when changing inserts and handling or adjusting the cutting tool after use.

The suggested HPU oil temperature for AW32 is 27–155 °F (-3–68 °C).[1]

The suggested HPU oil temperature for AW46 is 39–172 °F (4–78 °C).

2.4.2 Pressure

For the pneumatic machine, the recommended air pressure is 90 psi (6.2 bar) at 65 CFM.

For the hydraulic machine:

- The flow rate should not exceed 10 gal/min (38 l/min).
- The pressure should not exceed 2,200 psi (152 bar).

2.4.3 Rotational speed

For the pneumatic machine, the operational rotating speed is 1–35 RPM.

For the hydraulic machine, the operational rotating speed is 3.5–37 RPM.

2.4.4 Feed rate

The feed is pneumatically powered and is controlled by the rotation of the machine. The feed rate is not remotely adjustable and should be adjusted at the feed box as described in Section 3.12.1 on page 49.

The allowable air pressure for the feed mechanism is 30–100 psi (2–6.9 bar).

1. For HPU oils not mentioned in this manual, refer to the lubricant manufacturer's recommendation for oil temperature.

This page intentionally left blank

3 SETUP

1IN THIS CHAPTER:

The FF6300 can machine a face, groove, or bevel on a flat flange. This chapter explains how to set up the machine for these operating modes. and rigging.

3.1 RECEIPT AND INSPECTION

Your CLIMAX product was inspected and tested before shipment and packaged for normal shipment conditions. CLIMAX does not guarantee the condition of your machine upon delivery.

When you receive your CLIMAX product:

1. Inspect the shipping container for damage.
2. Check the contents of the shipping container against the included invoice to check that all components have been shipped.
3. Inspect all components for damage.
4. Contact CLIMAX immediately to report damaged or missing components.

NOTICE

Keep the shipping container and all packing materials for future storage and shipping of the machine.

The machine ships from CLIMAX with a heavy coating of LPS 3. The recommended cleaner is LPS PreSolve Orange Degreaser.

3.2 PREPARING THE MACHINE FOR USE

3.2.1 Pre-setup check

The FF6300 can be set up and mounted in many ways. Before setting up the flange facer, check the following:

- The machine assemblies are positioned correctly.
- There is enough room to position the entire machine on or near the work piece.
- All connections are correctly attached.

3.2.2 Assessing the work area

The FF6300 often is used in dangerous locations (in elevated positions, near other operating equipment, overhead, etc.). CLIMAX cannot foresee where this machine will be used; therefore, you must perform a site-specific risk assessment (Section 1.5 on page 6 and Section 1.6 on page 7) for each job before starting work.

The FF6300 machine has remote operation features that enable you to choose the optimum location to work (Section 2.3 on page 21).

⚠ WARNING

Always follow safe work practices, including site-specific safety requirements. It is your responsibility to perform a risk assessment before you set up the machine and each time before you operate the machine.

3.3 LIFTING AND RIGGING

DANGER

The FF6300 can weigh 473 lbs (215 kg) when fully assembled in the ID configuration, and 773 lbs (353 kg) in the outside diameter (OD) configuration.

Use caution and follow all site rigging procedures such as a lift plan and never allowing anyone under the load. Falling or uncontrolled swinging of machinery can cause serious injury or death.

The FF6300 has two M10 lifting eyes rated for 8,81 lbs (400 kg). All M10 tapped holes on the exterior of the machine are suitable for lifting with these lifting eyes.

CAUTION

Lift the machine only by the hoist rings marked by Figure 3-1.

Connect the appropriate lifting equipment to the lifting eyes located on top of the main body, on the chuck assembly, or on the machining arm when lifting the entire assembly. Never lift the machine by the drive motors, pneumatic lines, or hoses.

FIGURE 3-1. M10 LIFTING EYE (P/N 70483)

DANGER

Do not lift the assembled machine by the lifting eyes or hoist rings on the counterweight or the machining arm. Only lift the assembled machine by the four hoist rings shown in Figure 3-1.

Lifting the assembled machine by other lifting points can cause the machine to fall from the rigging.

When lifting the machine, pay special attention to the location of the center of gravity when lifting. Always check that all machine parts are tightened properly to prevent hazards.

The machine can be broken down quickly into more manageable sections if needed.

3.4 SETUP OVERVIEW FOR THE ID CHUCK MACHINE

Inspect and perform necessary maintenance on the machine before mounting on a workpiece. The following steps are an overview of the processes involved with setting up the FF6300 in the ID mounting configuration. The OD mount setup is listed in Section 3.7 on page 36

To set up the FF6300 ID chuck, follow the process below. For details on these steps, see Section 3.6 on page 32 through Section 3.12 on page 48.

To mount the machine to the workpiece:

1. Check that power sources are disconnected.
2. Measure the bore diameter. Use the setup chart in Table 3-1 on page 33 to select leg sections of the correct length.

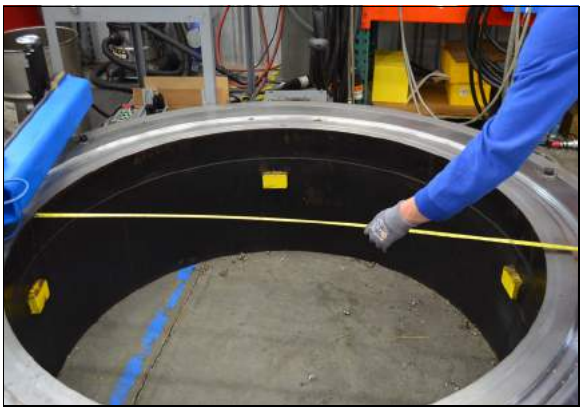


FIGURE 3-2. MEASURE THE FLANGE

3. Assemble the ID chuck (Figure 3-3).

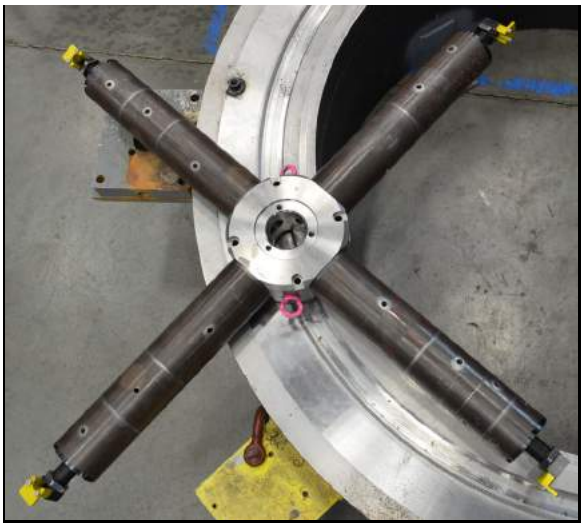


FIGURE 3-3. ASSEMBLE THE ID CHUCK

4. Adjust the turning arm and counterweight arm to the correct diameter (Figure 3-4). See Section 3.9 on page 44 and Section 3.10 on page 45 for information on adjusting the turning and counterweight arms.

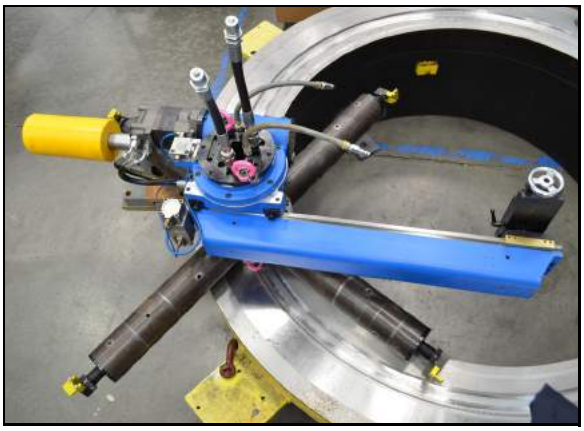


FIGURE 3-4. ADJUST THE TURNING ARM

5. Install the machine in the flange resting on the setup fingers (Figure 3-5).

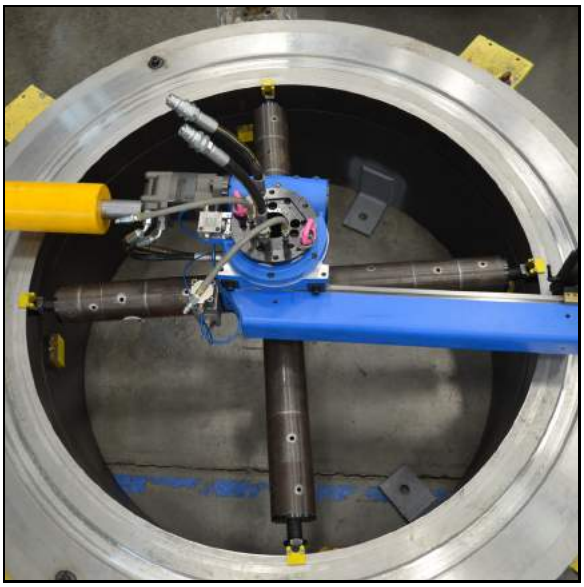


FIGURE 3-5. PLACE THE ID CHUCK IN THE FLANGE

6. Tighten the jacking feet, and adjust to level and center the machine (Figure 3-6). See Section 3.6 on page 32 for information on centering and leveling the ID chuck.

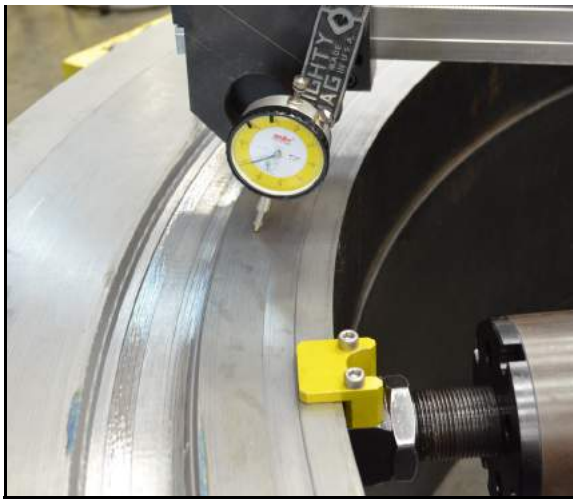


FIGURE 3-6. LEVEL AND CENTER THE ID CHUCK

7. Install a tool bit (Figure 3-7).

NOTICE

The FF6300 cutting tool is designed to trail behind the turning arm as it rotates around the workpiece surface. The turning arm moves in a clockwise direction. Keep these characteristics in mind when installing a new tool in the machine.

FIGURE 3-7. INSTALL A TOOL BIT

8. Connect the power and feed control hoses (Figure 3-8).

You are ready to begin machining.

FIGURE 3-8. CONNECT THE HOSES (HYDRAULIC VERSION)

3.5 INSTALLATION HAZARDS

The installation stage can be dangerous, as it relies on the operator and other personnel following the recommended safety precautions. Consider the following warnings carefully before undertaking the assembly process.

WARNING

Swinging or falling machinery could seriously injure or be fatal to personnel who are near the machine. Secure all components to the machine before lifting.

WARNING

If not properly secured, this machine can fall and cause fatal injuries to personnel. Pay special attention to vertical flange installations.

- Chucking feet must be secured to the workpiece.
- Setup fingers and safety weld plates should be utilized when possible.
- If not possible, contact CLIMAX to determine a custom solution.

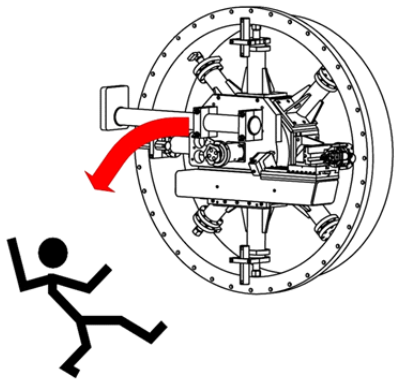


FIGURE 3-9. VERTICAL HAZARD WARNING

To avoid the risk of a falling machine, secure the machine by tack-welding safety blocks over the upper jaws or by using clamps bolted to the underside of the leveling feet (safety blocks and clamps not included with the machine).

WARNING

Do not remove the crane until at least one of the securing methods is in place and the jacking bolts are tightened to 60 ft-lb [149 Nm].

NOTICE

If the torque value cannot be achieved without acceptable workpiece deformation, the operator must apply their own secondary support and restraint devices.

WARNING

The jacking bolt must be inserted so that the full extension groove is inside the end cap.

Do not extend the jacking feet past the full-extension groove in the threaded screw (Figure 3-12), as that may cause the jacking screw to be overloaded and result in damage to the screw. If needed, add additional leg sections to minimize the length of the threaded jacking screw that is exposed.

3.6 INSTALLING THE ID CHUCK IN THE WORKPIECE

See Section Section 3.5 on page 30 for a full list of installation hazard warnings.

The machine ships with the main body mounted to the ID chuck. See Section 3.7 on page 36 for OD mounting or Section 3.8 on page 42 for surface mounting.

The FF6300 ID chuck can be removed from the main body rotating assembly. The chuck can be installed independently as a subassembly when there are access or rigging constraints. It can also remain attached to the main body during the machine installation.

⚠ WARNING

Use supplemental rigging when mounting the machine, in case it falls out or through the chucking diameter.

The ID chuck hub is attached to the main body by three M12 through-bolts that pass through the main machine spindle (Figure 3-10).

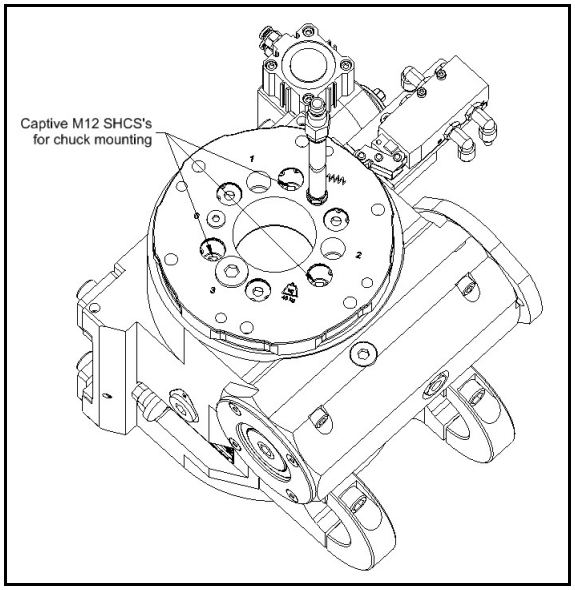


FIGURE 3-10. ATTACHING THE ID CHUCK TO THE MAIN BODY

Because the ID chuck secures the machine to the workpiece, it is very important that the chuck be securely clamped into position. Common applications include both flange faces that are horizontal (on the same plane as the floor or overhead) or vertical.

⚠ DANGER

Whenever there is a possibility of the machine falling out of or through the chucking diameter, take special care to check that the ID chuck is secure before releasing the rigging.

To install and align the ID chuck

⚠ DANGER

When installed vertically, if not secured properly, this machine can fall and cause serious injury or death to the operator and bystanders. To avoid this danger, secure the machine by tack-welding safety blocks over the upper jaws or by using clamps bolted to the underside of the leveling feet (safety blocks and clamps not included with the machine). Check that all chucks and clamps are tightened to a torque value of at least 60 ft-lbs (~27 Nm).

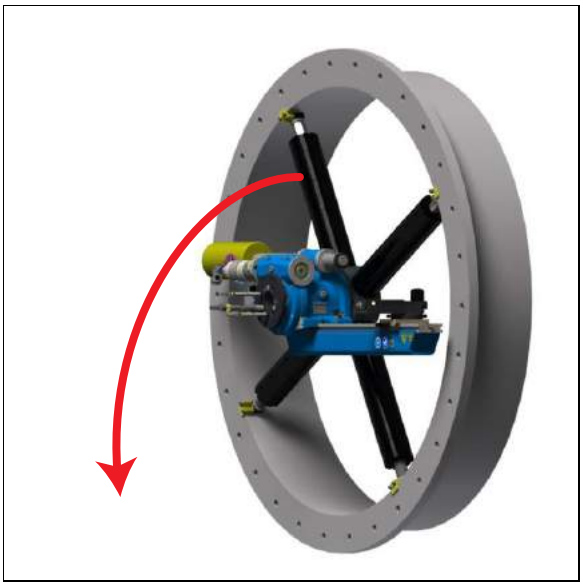


FIGURE 3-11. VERTICAL INSTALLATION FALL DANGER

1. Measure the bore diameter of the work piece.
2. Use Table 3-1 on page 33 to select the correct leg extensions to fit the bore diameter.

TABLE 3-1. ID CHUCK SETUP TABLE FOR STANDARD ID CHUCK HUB

Diameter Range		Diameter Range		Number of leg segments needed		
Min in	Max in	Min mm	Max mm	short leg	med leg	long leg
11.8	16.8	300	427	0	0	0
16.3	21.3	414	541	1	0	0
20.8	25.8	528	655	0	1	0
25.3	30.3	642	769	1	1	0
29.8	34.8	756	883	0	0	1
34.3	39.3	871	998	1	0	1
38.8	43.8	985	1112	0	1	1
43.3	48.3	1099	1226	1	1	1
47.8*	52.8	1213	1340	0	2	1
52.3*	57.3	1328	1455	1	2	1

* Extended range--light duty machining only.

3. Apply the anti-seize compound (provided in the tool kit) to the threads and contacting faces of each leg section.
4. Screw the leg sections together. Adjust the leveling jaws even with the base and check that the setup fingers are installed on the leveling jaw.

FIGURE 3-12. APPLYING ANTI-SEIZE COMPOUND

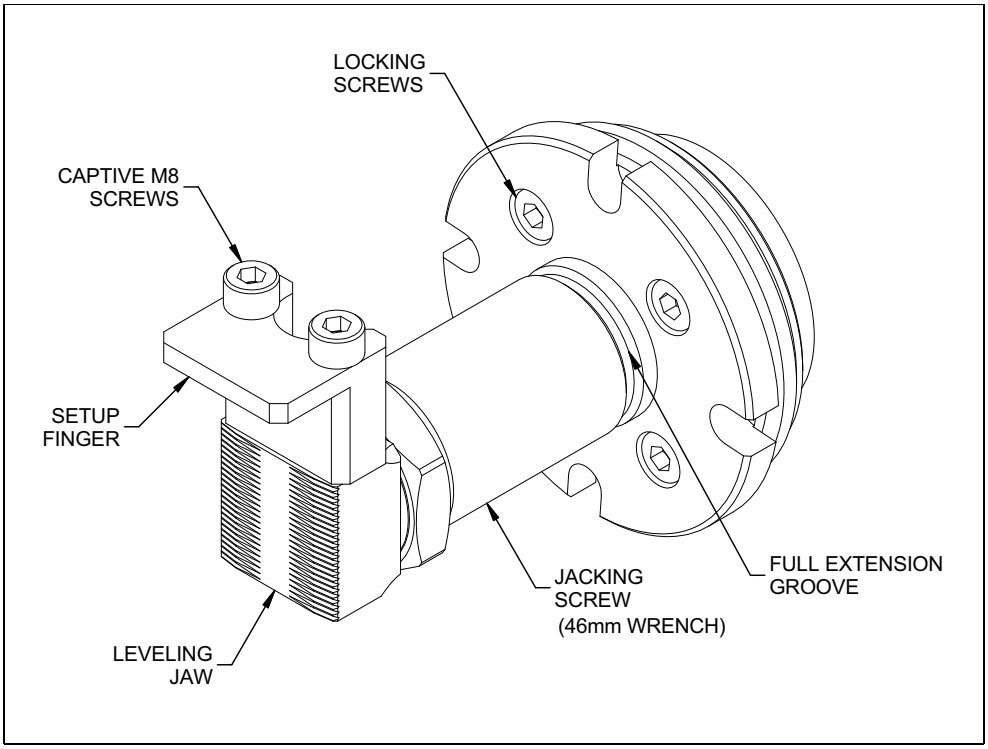


FIGURE 3-13. DETAIL OF ID CHUCK LEGS

5. Use a simple scale to roughly center the jacking screws. About 0.1" (2.5mm) clearance will allow insertion of the chuck while maintaining sufficient contact between the setup finger and the flange face.
6. Install the ID chuck into the bore of the flange.
7. Using the short-handled 46mm wrench provided in the tool kit, tighten the jacking screws evenly.

NOTICE

Do not over tighten, as this could bind the leveling feet during leveling. Check that the setup fingers are seated evenly.

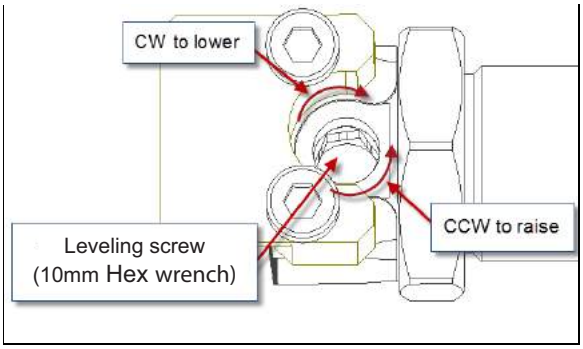


FIGURE 3-14. ADJUSTING THE SETUP FINGERS

⚠ WARNING

Do not extend the jacking feet past the full-extension groove in the threaded screw (Figure 3-13 on page 34). If needed, add additional leg sections to minimize the length of the threaded jacking screw that is exposed.

8. After securely attaching the machine to the flange, attach a dial indicator to the turning arm.
9. Check that power to the machine drive is isolated and locked out.
10. Using the dial indicator, indicate the workpiece surface for level while manually rotating the machine.
    - To manually rotate the pneumatic machine, insert a 10-mm hex wrench in the hex opposite the motor or push on the end of the turning arm.
    - To manually rotate the hydraulic machine, use the cross-connection hose supplied with the machine to connect the #1 and #2 port hoses. Insert a 10 mm hex wrench in the hex opposite the motor or push on the end of the turning arm.
11. Level the machine by turning the leveling screws in each of the leveling feet with the dial indicator close to leveling adjustment (Figure 3-6 on page 29).
12. Reposition the dial indicator to check machine centering.
13. Center the machine by adjusting opposing pairs of jacking feet.

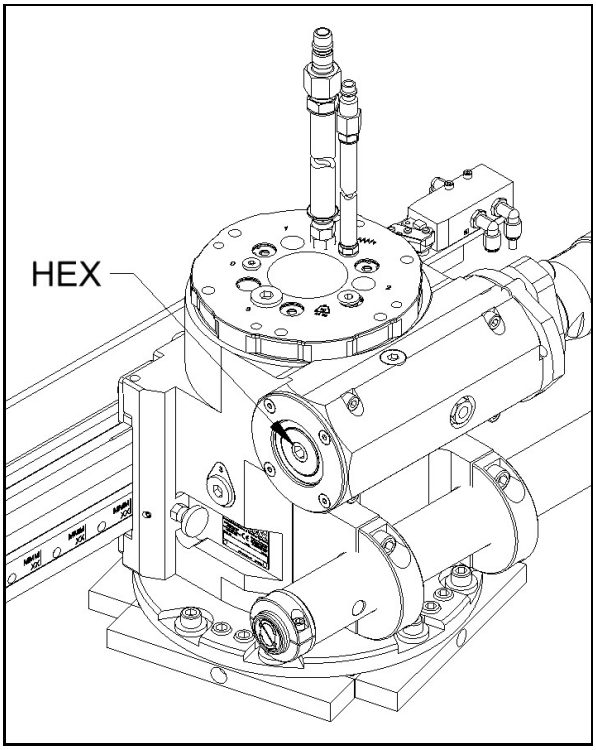


FIGURE 3-15. LOCATION OF THE 10-MM HEX FOR MANUAL ROTATION OF THE MACHINE

14. Check the machine for level and center again.
15. Repeat step 10 to step 14 until the machine is aligned.
16. Secure the chuck:
    a) Use a dead blow hammer on the short handled wrench to tighten the leveling feet to a torque value of 20 ft-lbs (27 Nm).
    b) Use a 6mm hex wrench to tighten the recessed M8 locking nuts. You need to tighten only two of these screws to lock the jacking screw.
17. Repeat step 10 to check for level, and step 11 to step 14 as needed to finalize leveling.

⚠ CAUTION

If you used the 10mm hex wrench, remove it from the hex opposite the motor. Otherwise, damage to the machine may occur.

3.7 OD MOUNTING

See Section 3.5 on page 30 for a full list of installation hazard warnings.

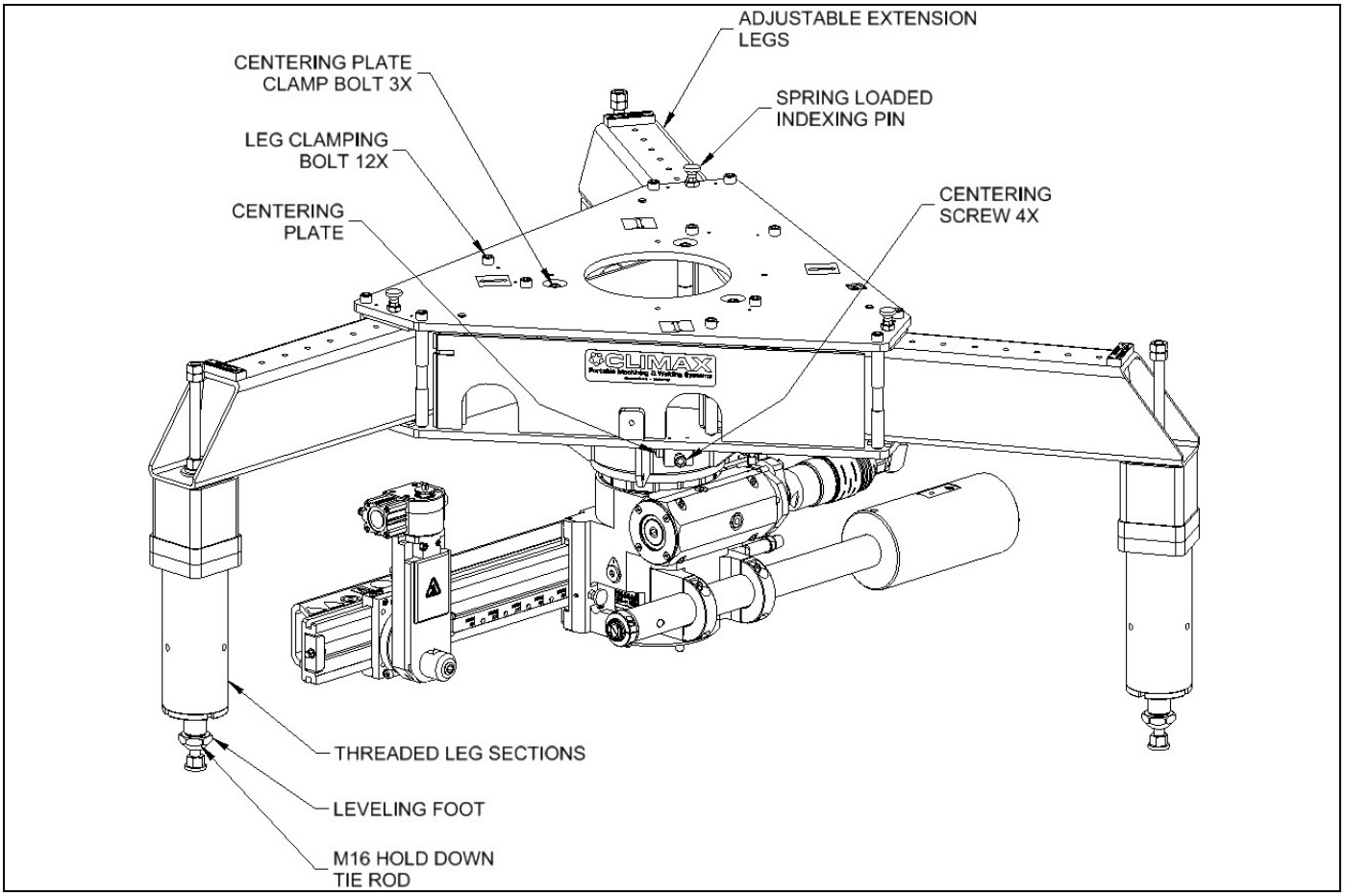


FIGURE 3-16. OD MOUNT

3.7.1 Setup overview for the OD mount machine

To set up the FF6300 OD mount, follow the process below. For details on these steps, see Section 3.7.2 on page 37 through Section 3.7.5 on page 41.

1. Remove the OD mount from its shipping/storage crate.
2. Position the turning and counterweight arms for the FF6300.
3. Set the OD mount on top of the FF6300 main body and secure it.
4. Set the legs of the OD mount to the approximate mounting dimension.
5. Attach the vertical legs and leveling feet.
6. Secure the OD mount to the workpiece.
7. Center and level the OD mount.

3.7.2 Assembling the OD mount

The FF6300 OD mount ships in a wooden crate separate from the base machine.

1. Using the three lifting eyes on the OD mount, remove the OD mount from the shipping crate.
2. Check that the centering plate is roughly centered to maximize the centering adjustment. To center the centering plate, adjust the centering screws until the gap marked in red in Figure 3-17 is equal for all four screws.
3. Apply any anti-seize compound (provided in the tool kit) to the threads and contacting faces of each leg section (Figure 3-12 on page 34).
4. Assemble the OD mount legs, end cap, and leveling foot.
5. Adjust the turning arm and counterweight arm on the main machine before installing the OD mount. See Section 3.9 on page 44 and Section 3.10 on page 45.
6. Remove the ID chuck.

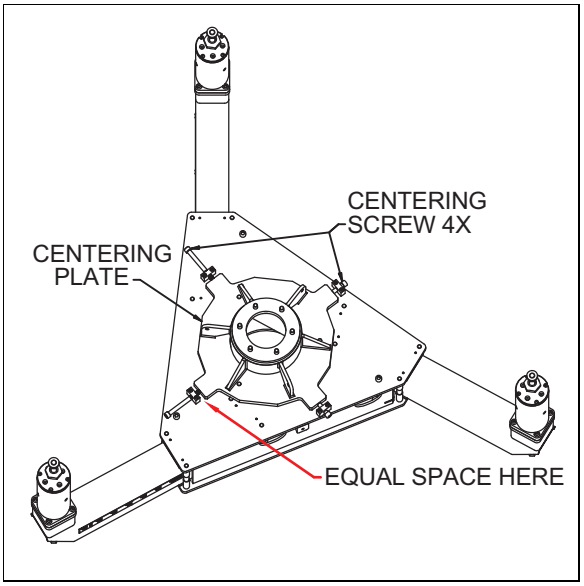


FIGURE 3-17. CENTERING PLATE

7. Install three M12 nuts on the captive chuck mounting bolts and tighten to 50 ft-lbs (68 N m).

NOTICE

Failure to install and torque these nuts may lead to poor machine performance.

8. Set the FF6300 machine on the ground on wooden blocks.
9. Remove any lifting eyes from the top of the main body assembly.

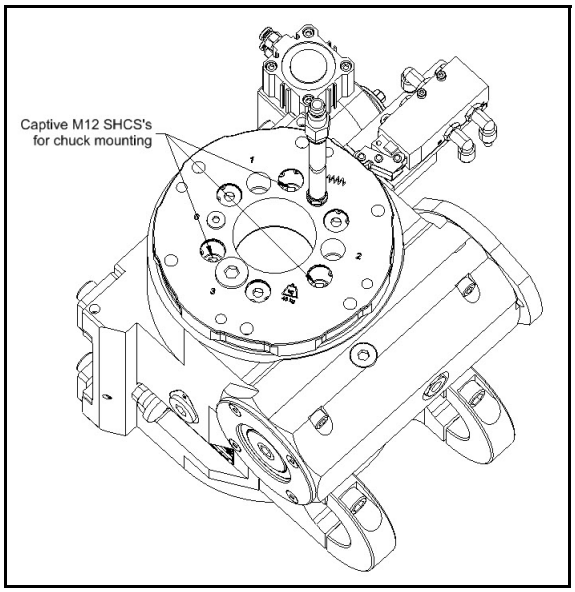


FIGURE 3-18. ATTACHING THE OD MOUNT ASSEMBLY TO THE MAIN BODY

10. Using the three lifting eyes on the OD mount, lift the OD mount into place on top of the machine. Use care when threading the hoses through the hole in the center of the OD mount so that the hoses are not ped or damaged.
11. Install the six M12 fasteners and tighten to approximately 50 ft-lbs (68 N m).

FIGURE 3-19. OD MOUNT ASSEMBLY

12. Screw the leg sections into the radial extension legs.
13. The radial legs are adjustable. Adjust the legs to the desired mounting diameter. See Section 3.7.3 on page 38 for available mounting arrangements.
14. Tighten the 12 leg clamping bolts to 35 ft-lbs (47 N m).

3.7.3 OD mounting arrangements

There are two mounting arrangements (described further in Section 3.7.4 on page 40):

- Arrangement A attaches the OD mount to the workpiece using the M16 threaded rod to either a tack-welded nut, holes in the workpiece, or other available feature. The key dimension is the diameter to the centerline of where the M16 rod will attach.
- Arrangement B attaches the OD mount to the OD chain clamps and clamps them to the OD of the workpiece. The key dimension is the outside dimension to which the clamps will attach.

Arrangement A

Do the following for arrangement A:

1. Subtract 15" (381 mm) from the key dimension. Divide the difference by two.
2. Hook the tape measure to the interior 9" (228 mm) diameter hole on the top plate of the OD mount (see Figure 3-20).
3. Adjust the leg until the dimension to the top of the end leg label equals the calculated result.

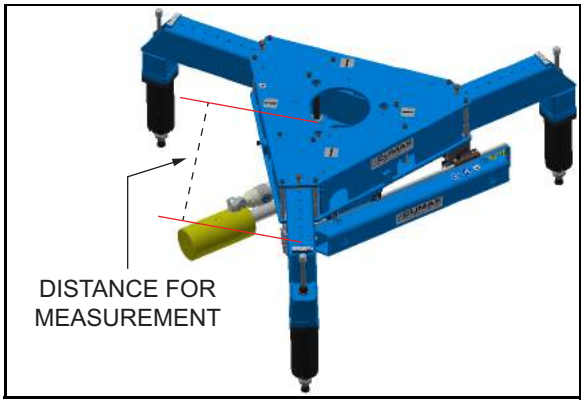


FIGURE 3-20. DISTANCE FOR OD MOUNT MEASUREMENT

Example for arrangement A: In order to mount the OD mount to the three existing M16 holes on the workpiece that are on a 60.5" (1,537 mm) bolting circle, calculate the following:

1. 60.5" – 15" = 45.5"
2. 45.5" / 2 = 22.75”
3. Adjust each leg so that the tape measure reads 22.75".

Arrangement B

Do the following for arrangement B:

1. Subtract 9" (228 mm) from the key dimension. Divide the difference by two.
2. Hook the tape measure to the interior 9" (228 mm) diameter hole on the top plate of the OD mount (see Figure 3-20).
3. Adjust two of the legs until the dimension to the top of the end leg label equals the calculated result.
4. Adjust the third leg so that it is .25" (6 mm) greater than the calculated dimension. This allows the OD mount to be installed with the chain clamp in place, and then for the clamp to be tightened up as the leg is moved back to the same position as the other two legs.

NOTICE

Referring to Figure 3-21: measure to the top point for the dimension to the center of the 16-mm rod.

Swing the tape measure to the appropriate bottom point to align with the actual OD for the chain clamp.

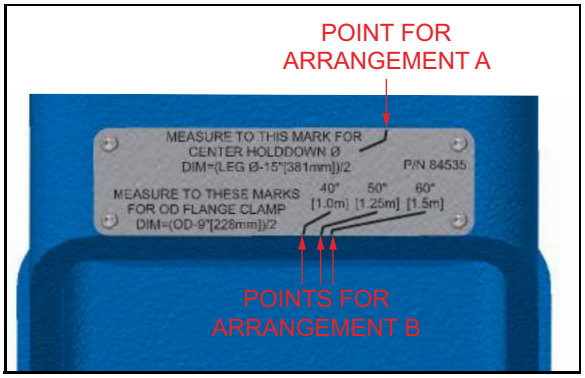


FIGURE 3-21. MEASUREMENT POINTS FOR EACH ARRANGEMENT

Example for arrangement B: In order to chain clamp to a flange that is 55" (1,397 mm), calculate the following:

1. 55" – 9" = 46"
2. 46" / 2 = 23"
3. Adjust two of the legs to 23".
4. Adjust the third leg to 23.25".

3.7.4 Attaching the OD mount assembly to the workpiece

The OD mount vertical legs attach to the workpiece with a single M16 x 2.0 all-thread rod at each leg. There are numerous ways to mount the machine to the workpiece. Three possible ways to attach the OD mount assembly to the workpiece are:

- Attach the vertical legs by tack-welding an M16 nut to the workpiece. Use a minimum of a 3/16" (4.76 mm) weld x 1" (25 mm) long (Figure 3-22).
- Attach the vertical legs by clamping a plate with an M16 threaded hole to the workpiece at each mounting point.

FIGURE 3-22. ATTACHING THE OD MOUNT WITH A TACK-WELD NUT

- Attach the vertical legs by using the CLIMAX OD Chain Clamp Kit (P/N 80622) (Figure 3-23). Tighten the chain evenly to 50 ft-lbs (68 N m).The chain clamp kit is an optional accessory; contact your CLIMAX representative for more information.

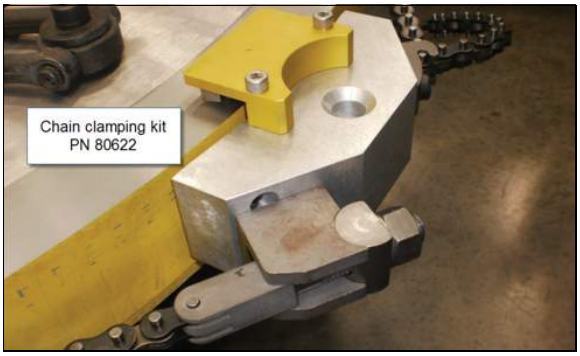


FIGURE 3-23. ATTACHING THE OD MOUNT USING THE CLIMAX CHAIN CLAMP KIT

3.7.5 Centering and leveling the OD mount assembly

1. Check that the centering plate spacer is approximately centered on the OD mount.
2. Mount a dial indicator on the turning arm.
3. Check that power to the machine drive is isolated and locked out.
4. Using the dial indicator, indicate the workpiece surface for level while manually rotating the machine.
   - To manually rotate the pneumatic machine, insert a 10-mm hex wrench in the hex opposite the motor or push on the end of the turning arm.
   - To manually rotate the hydraulic machine, use the cross-connection hose supplied with the machine to connect the #1 and #2 port hoses. Insert a 10-mm hex wrench in the hex opposite the motor or push on the end of the turning arm.
5. Level the machine by turning two of the three leveling screws at the end of the vertical legs, with the dial indicator close to leveling adjustment (Figure 3-6 on page 29, ID chuck shown).
6. Reposition the dial indicator to check machine centering.
7. Loosen the centering plate clamp screws and adjust the machine center using the four jacking screws as necessary (Figure 3-24).
8. Tighten the three centering plate clamp screws (Figure 3-24).
9. Check the machine for level and center again.
10. Repeat step 5 to step 9 until the machine is aligned.

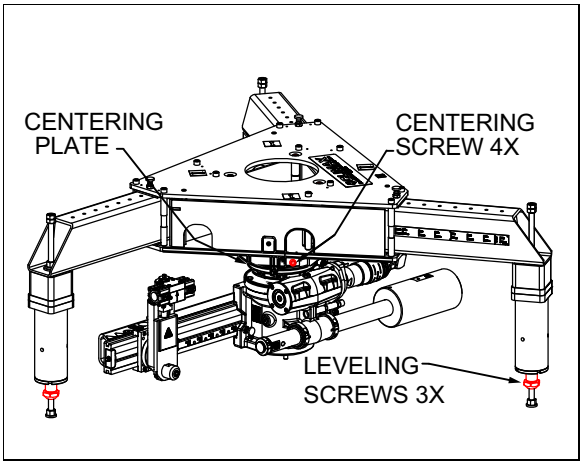


FIGURE 3-24. OD MOUNT ADJUSTMENT POINTS

11. Tighten the twelve M12 screws on top of the OD mount that clamp the radial leg section.
12. Repeat step 4 to check for level; repeat step 5 to step 9 as needed to finalize leveling.

⚠ CAUTION

If you used the 10-mm hex wrench, remove it from the hex opposite the motor. Otherwise, damage to the machine may occur.

3.8 SURFACE MOUNTING

See Section 3.5 on page 30 for a full list of installation hazard warnings.

3.8.1 Setup overview for the surface mount machine

To set up the FF6300 surface mount, follow the process below. For details on these steps, see Section 3.8.2 on page 42 and Section 3.8.3 on page 43.

1. Remove the ID chuck from the FF6300 main body.
2. Secure the surface mount plate to the workpiece by either tack-welding, bolting, or clamping.
3. Secure the FF6300 main body to the surface mount plate.
4. Center and level the machine.

3.8.2 Assembling the surface mount

The surface mount attaches to the main body with the same M12 fasteners as the ID chuck. The surface mount can be secured to the work piece first and then the machine bolted to the mount, or the machine can be mounted as a complete unit.

The surface mount consists of two primary parts:

- The circular mounting plate to which the machine is attached
- The four blocks secured to the workpiece, from which the mounting plate is centered and leveled

The four blocks can be drilled for mounting holes and clamped or tack-welded to the workpiece or other custom fixture determined by the operator.

- When the blocks are bolted, use a minimum of two M8 (5/16") bolts per block.
- When the blocks are tack-welded, use a minimum of 1" (25 mm) of 1/4" (6 mm) weld per block.

TIP:

The surface mount circular mounting plate can be used as a template to hold the four blocks in the correct orientation while attaching the blocks to the workpiece.

Check that the blocks are secured to the mounting plate with approximately 0.2" (5 mm) of adjustment range. Secure the blocks to the workpiece with the circular mounting plate centered to the area to be machined, within the same true position [0.2" (5 mm)].

3.8.3 Centering and leveling the surface mount assembly

Do the following to center and level the surface mount assembly:

1. After securely attaching the machine to the flange, mount a dial indicator on the turning arm.
2. Check that power to the machine drive is isolated and locked out.
3. Using the dial indicator, indicate the workpiece surface for level while manually rotating the machine.
   - To manually rotate the pneumatic machine, insert a 10-mm hex wrench in the hex opposite the motor or push on the end of the turning arm.
   - To manually rotate the hydraulic machine, use the cross-connection hose supplied with the machine to connect the #1 and #2 port hoses. Insert a 10-mm hex wrench in the hex opposite the motor or push on the end of the turning arm.

⚠ CAUTION

If you used the 10-mm hex wrench, remove it from the hex opposite the motor. Otherwise, damage to the machine may occur.

4. Adjust the level of the machine using the two M16 adjustment screws in each quadrant of the mounting plate (Figure 3-25).
5. Reposition the dial indicator to check machine centering.
6. Center the machine using the M16 set screw in the edge of each block.
7. Repeat step 3 to step 6 until the machine is aligned.
8. Secure the M10 screws to lock the position of the surface mount.

9. Repeat step 3 to check for level; repeat step 4 to step 6 as needed to finalize leveling.

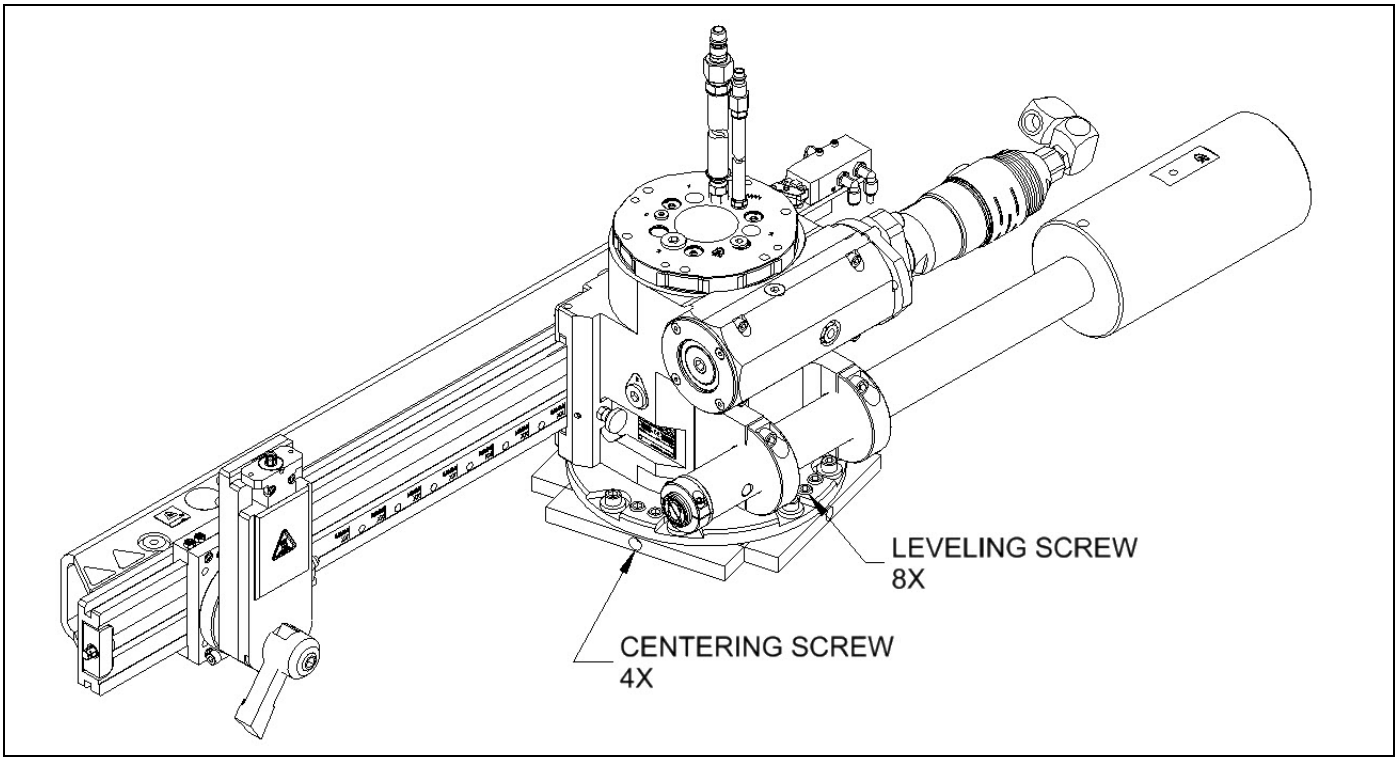


FIGURE 3-25. SURFACE MOUNT ASSEMBLY

3.9 POSITIONING THE MACHINING ARM

The machining arm is adjustable for versatile positioning and to clear obstructions.Loosen the four clamps that secure the arm to the main body (Figure 3-26).

1. Pull and hold the safety stop pin.

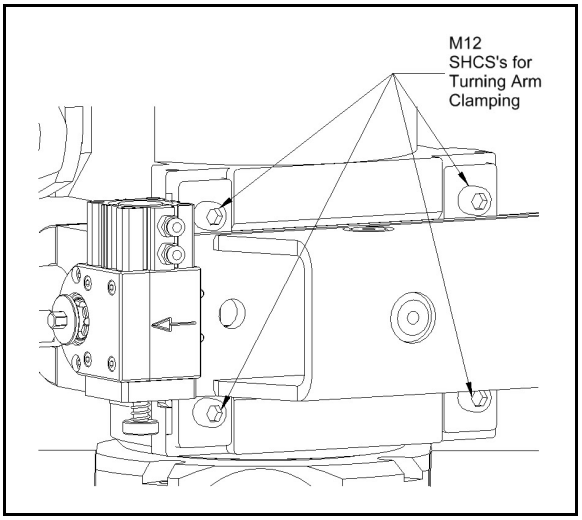


FIGURE 3-26. LOCATION OF SECURING CLAMPS

2. Slide the arm to the desired position.

   The machining arm is engraved with and centimeter markings on the face of the slide to help you set the position. Because the arm is moved radially from center, the scale shows es and centimeters in half increments, measured from the edge of the main housing (Figure 3-27).

3. Release the safety stop pin.

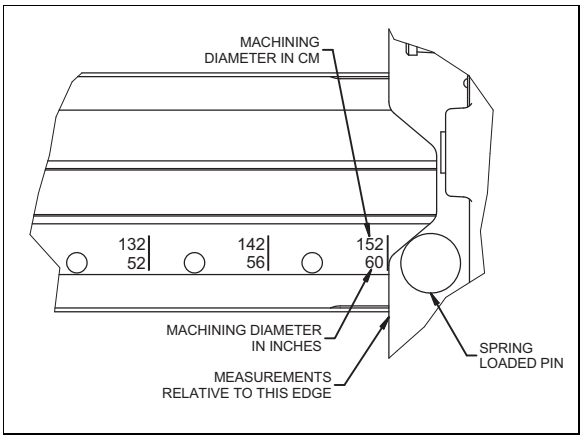


FIGURE 3-27. DETAIL OF MACHINING ARM

WARNING

Position the machining arm so that the safety stop pin engages the retention notch in the machining arm.

Do not disable the safety stop pin. The safety stop pin is intended to prevent unwanted shifting of the machining arm, which could result in serious injury or death.

4. Tighten the clamps to approximately 50 ft-lbs (68 Nm).

3.10 POSITIONING THE COUNTERWEIGHT

NOTICE

The counterweight must be installed when the machine is used in a vertical machining application. CLIMAX recommends that you always use the counterweight as it improves the performance of the machine and produces a flatter surface.

The counterweight arm can be adjusted to balance the machine.

CAUTION

For precise machining and to avoid damage to the machine, the counterweight and machining arm should always be equally spaced from the center of the machine.

After positioning the turning arm, do the following to adjust the counterweight to balance the machine:

1. Suspend the machine from the two lifting points on top of the main body.

2. Loosen the clamp collars that secure the counterweight arm (see Figure 3-28).
3. Adjust the counterweight arm until the machine hangs level within five degrees.
4. Tighten the counterweight arm screws to approximately 30 ft-lbs (40 Nm).

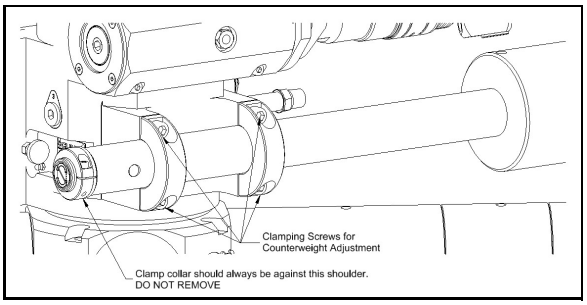


FIGURE 3-28. LOCATION OF CLAMPING SCREWS

WARNING

Check that all mounting hardware is secure. A loose counterweight can fall off during operation, seriously injuring the operator or bystanders.

If you need to remove the counterweight arm (to simplify rigging, for example), first do the following to remove the counterweight from the counterweight arm:

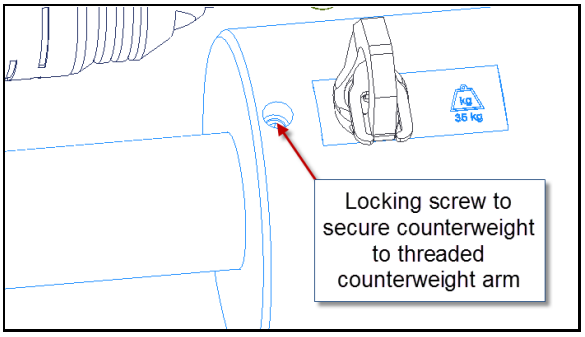


FIGURE 3-29. LOCATION OF LOCKING SCREWS

1. Attach the rigging to the lifting eye on the counterweight.
2. Loosen the locking screw adjacent to the lifting hole (see Figure 3-29).
3. Loosen the counterweight adjustment clamp screws (see Figure 3-28).
4. Use a 10-mm hex wrench inserted in the hole near the engraving at the end of the arm to rotate the counterweight arm out of the counterweight.
5. Slide the arm out of the main body.
6. Reinstall the counterweight by reversing this procedure.

A collar on the counterweight arm prevents the counterweight assembly from sliding free from the main housing assembly if the arm is not clamped securely (see Figure 3-28). This collar has a urethane face that must face towards the main body clamps. An o-ring between the collar and the shoulder at the end of the arm allows the collar to absorb the energy from a sliding impact. If you notice that the collar has been displaced or the o-ring is missing, correct this before you continue using the machine.

WARNING

Do not remove the stop collar on the counterweight arm. Serious injury or death can result if the arm is accidentally left unclamped and it slides out of the main body socket.

3.11 ROTATING THE TOOL HEAD

NOTICE

The FF6300 is designed to trail the cutting tool behind the turning arm. The turning arm moves in a clockwise direction. Keep these characteristics in mind when installing a new tool in the machine.

Do the following to rotate the tool head:

1. Loosen the circular clamp collar on the back of the tool head.

⚠ CAUTION

Do not loosen the tool head rapidly. Keep your hand on the tool head for stability. Quick disengagement of tool head can cause it to swing unexpectedly, and may result in personnel injury or machine damage.

2. Position the tool head.
3. Tighten the clamp collar.

Engraved markings on the clamp collar enable you to set angles within ± 0.5°.

FIGURE 3-30. DETAIL OF TOOL HOLDER

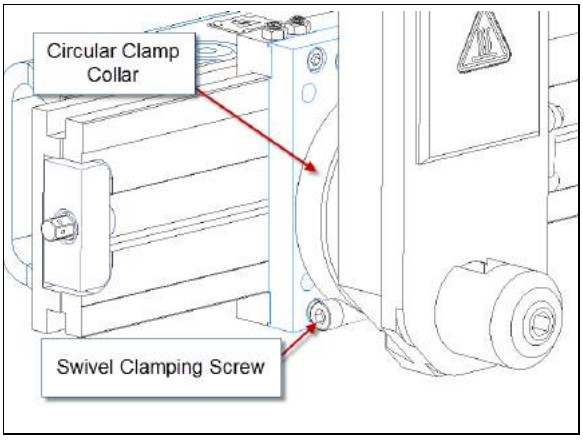


FIGURE 3-31. LOCATION OF SWIVEL CLAMPING SCREW

3.12 ADJUSTING THE FEED BOX

The machine includes a remote air shutoff valve (seen in Figure 2-7 on page 21).

The feed box (seen in Figure 3-32) is supplied with two 1/4" air supply tubes. The feed box will function even if the tubing connection points are swapped; the order of connection is not critical.

The hoses should have approximately 12" (305 mm) of extra length to allow the arm to move and still keep the hoses clear of snag hazards.

The feed box has two positions: disengaged and engaged (see Figure 3-33). Push the knob inward to engage the feed, and pull the knob out to disengage.

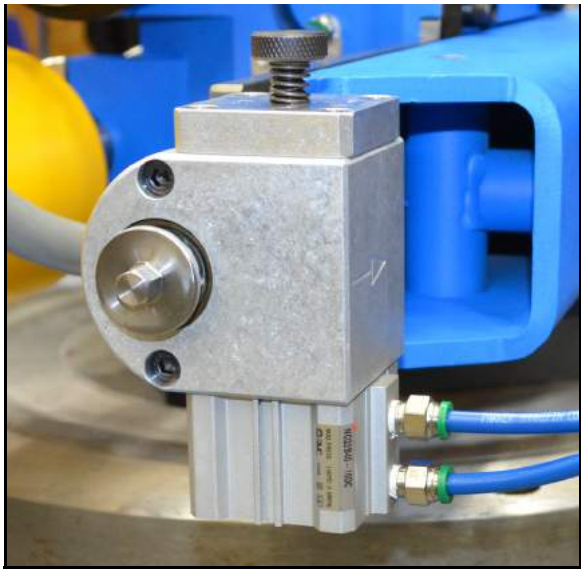


FIGURE 3-32. FEED BOX

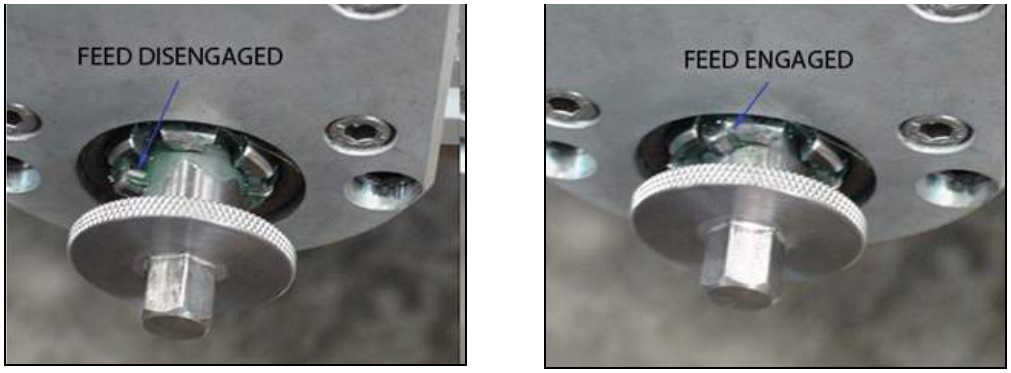


FIGURE 3-33. DETAIL OF FEED BOX POSITIONS

3.12.1 Adjusting the feed rate

WARNING

Do not adjust the feed rate while the machine is rotating, as rotating machinery can cause serious injuries. Stop the machine completely before adjusting the feed rate. Follow Section 3.12.2 on page 50 to conduct feed actuation measurement.

Each rotation of the feed rate adjustment knob (see Figure 3-35) increases the feed rate approximately 0.006" (0.15 mm). Table 3-2 provides a reference to quickly set the approximate feed rate.

TABLE 3-2. FEED RATE ADJUSTMENT KNOB

Approximate feed per revolution of the machining arm	Number of knob rotations
0" (0 mm)	0*
0.006" (0.15 mm)	1
0.012" (0.30 mm)	2
0.018" (0.43 mm)	3
0.024" (0.58 mm)	4
0.030" (0.76 mm)	5
0.036" (0.89 mm)	6

* Turn the knob clockwise until it stops to ensure zero feed.

NOTICE

The values in Table 3-2 are approximate. If a specific feed per revolution is required, place a dial indicator on the arm and measure the feed amount while the machine is manually rotated one revolution, then adjust as necessary.

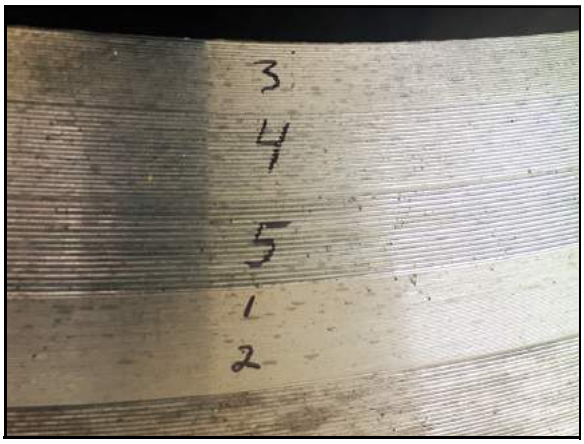


FIGURE 3-34. KNOB REVOLUTIONS MARKED ON THE MACHINED FLANGE

For example, if you are seeking .018" feed, do the following:

1. Turn the knob counter-clockwise until it stops to ensure zero feed.
2. Locate .018" in the first column of Table 3-2 on page 49.
3. Note the number 3 in the cell to the right in the same row.
4. Turn the knob counter-clockwise three full rotations.

TIP:

Scribe a reference mark on the feed rate adjustment knob of the feed box to track a full rotation, as shown in Figure 3-35.

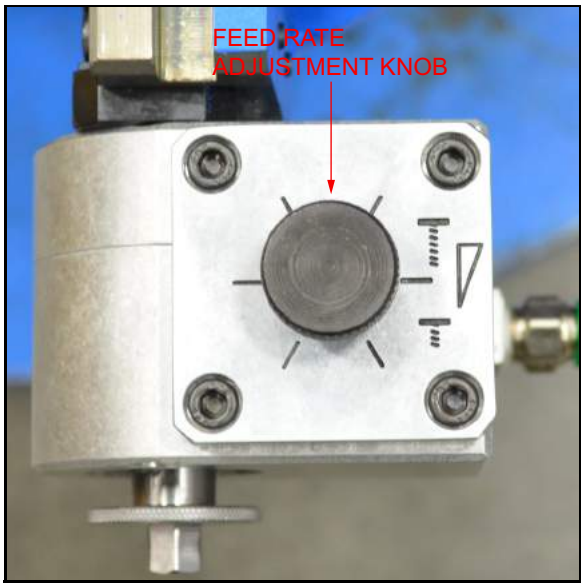


FIGURE 3-35. FEED RATE ADJUSTMENT KNOB AND FEED BOX

3.12.2 Conducting feed actuation measurement

The feed trips seven times per full rotation of the machining arm.

Use one of two ways to trip the feed to verify the feed rate:

- Manually rotate the machine arm 360°.
- Using a tool such as a screwdriver, manually press the roller lever actuator of the pneumatic valve (see Figure 3-36) near the top of the spindle. Seven cycles of the roller lever actuator correspond with a 360° rotation of the machining arm.

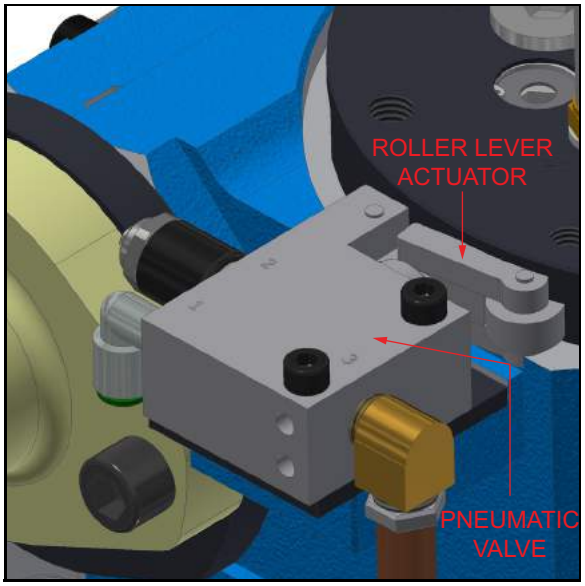


FIGURE 3-36. PNEUMATIC VALVE LOCATION

⚠ CAUTION

Use caution when manually cycling the roller lever actuator to avoid a potential pinch point.

Choose the method that is safest and most convenient for the setup.

After setting the approximate feed rate, if a more precise reading is helpful, measure the actual feed rate by using a dial indicator mounted as shown in Figure 3-37.

If the resulting feed rate is different than expected, adjust the feed rate adjustment knob (see Figure 3-35) by doing the following:

1. Turn the knob clockwise to increase the feed rate.
2. Turn the knob counter-clockwise to decrease the feed rate.

Repeat step 1 and step 2 until the desired feed rate is achieved.

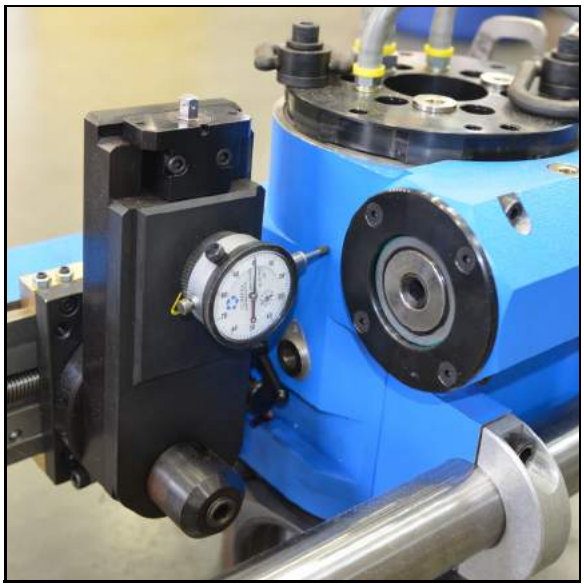


FIGURE 3-37. DIAL INDICATOR USED FOR PRECISE ADJUSTMENT

3.12.3 Reversing the feed direction

The feed box only feeds in one direction.

You do not need to disconnect the hoses to reverse the feed direction.

To reverse the feed direction:

1. Remove the feed shaft and two bolts (see Figure 3-38).

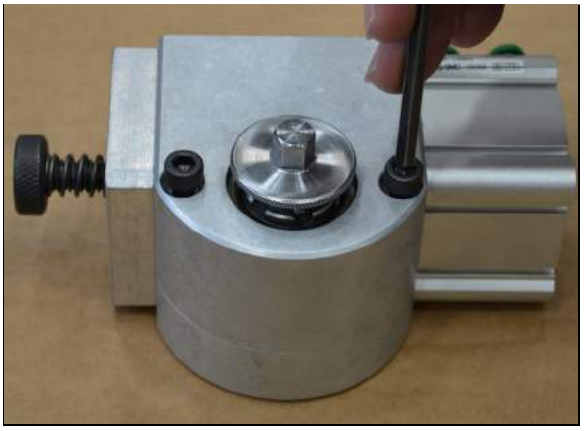


FIGURE 3-38. LOCATION OF FEED BOX BOLTS

2. Rotate the feed box until the arrow points in the desired feed direction (see Figure 3-41).
3. Reinstall the bolts and the feed shaft.

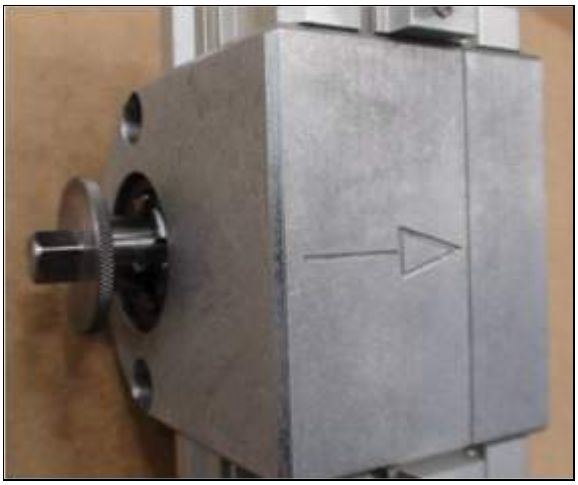


FIGURE 3-39. LOCATION OF FEED BOX DIRECTION ARROW

NOTICE

For some setup configurations, it may be required to orient the feed box so that the feed adjustment knob is facing downwards (see Figure 3-40).

This feed box orientation retains full functionality of the machine.

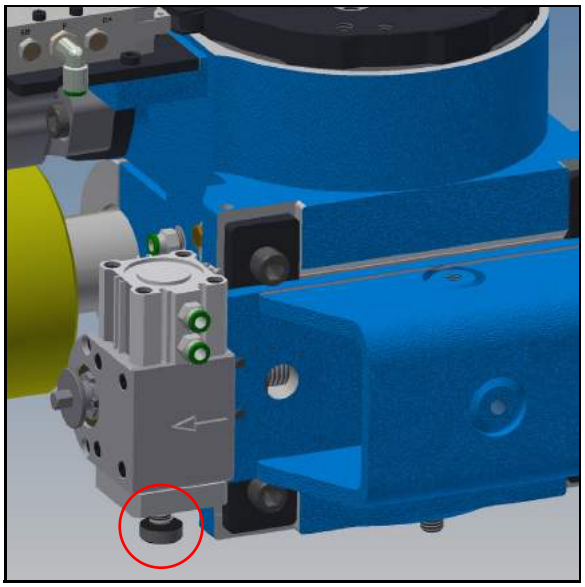


FIGURE 3-40. FEED ADJUSTMENT KNOB POSITIONED DOWN

3.12.4 Disconnecting feed hoses

Press down on the collar around the hose and pull the hoses out. (see Figure 3-41).

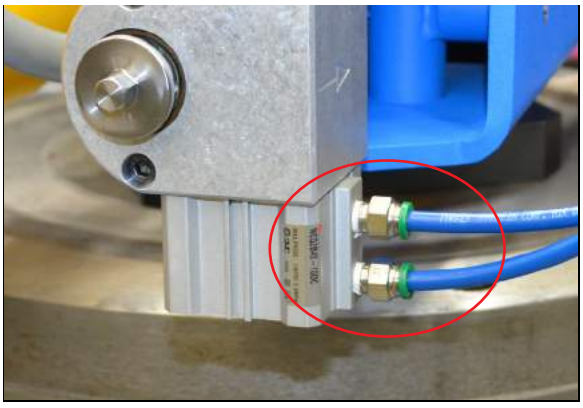


FIGURE 3-41. LOCATION OF FEED HOSES

3.13 BACKFACING ATTACHMENT

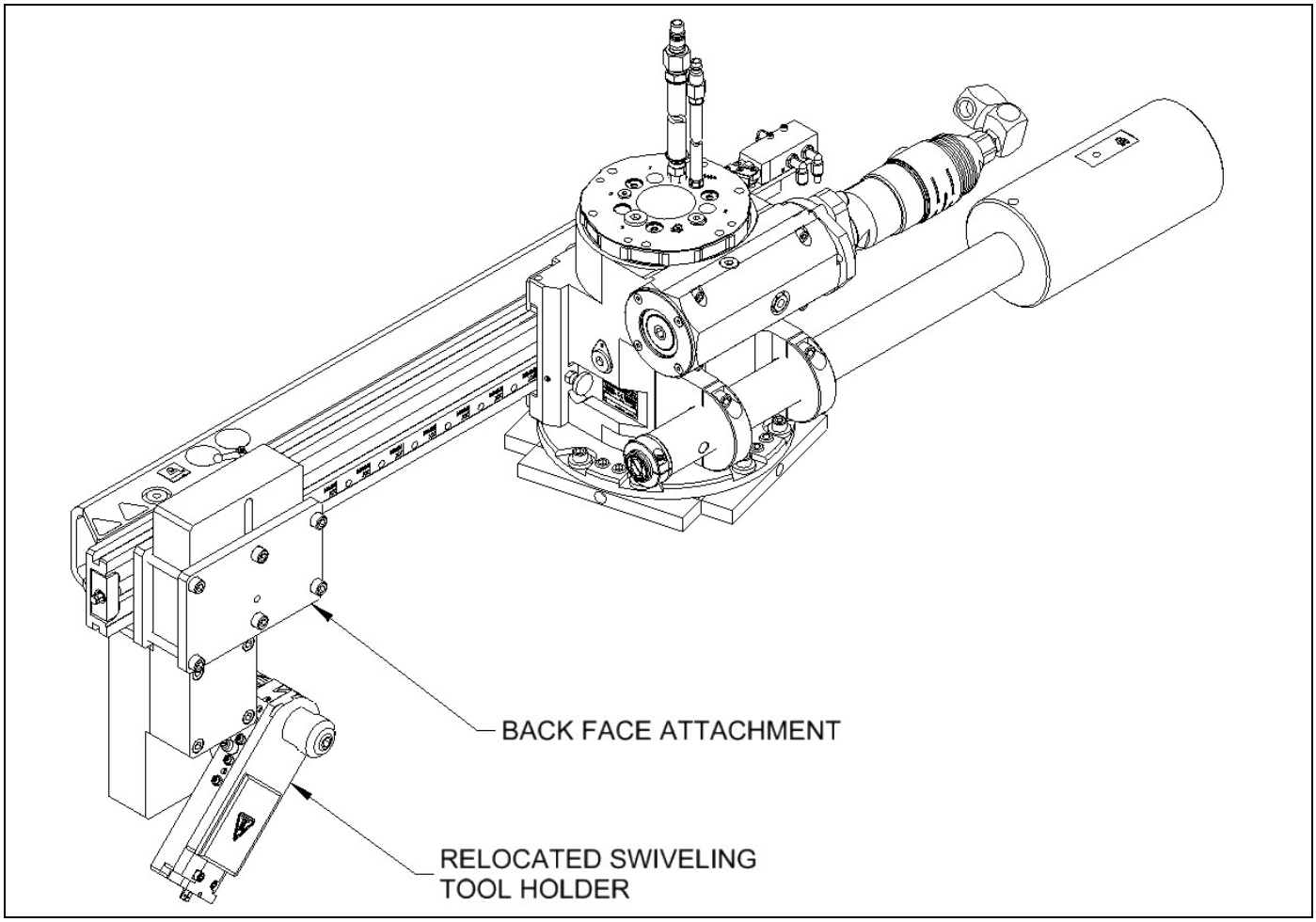


FIGURE 3-42. BACKFACING ATTACHMENT ON SURFACE MOUNT MACHINE

The optional backfacing attachment is used for surfacing the underside or backside of flanges, a typical application on heat exchanger tube sheets and some crane pedestals.

NOTICE

The backfacing attachment can only be used with either the ID chuck or the surface mount.

Assembling the backfacing attachment

Do the following to assemble the backfacing attachment:

1. Assemble the FF6300 machine using the ID chuck or surface mount.

2. Remove the tool head by completely removing the two M8 fasteners that hold the swivel clamp collar together.
3. Use the four M10 socket head cap screws to secure the backfacing attachment to the radial slide plate on the turning arm. Do not tighten the screws.
4. Adjust the height of the backfacing attachment relative to the flange.
5. Tighten the screws to approximately 35 ft-lbs (47 N m).
6. Reinstall the tool head to the circular dove on the bottom of the backfacing attachment (Figure 3-43).
7. Tighten the two M8 fasteners to secure the swivel clamp at the desired angle.

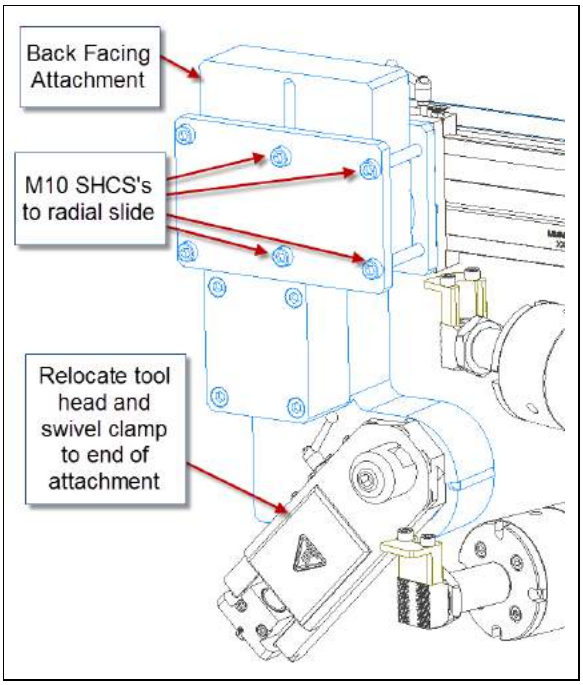


FIGURE 3-43. INSTALLING THE BACKFACING ATTACHMENT TO THE TURNING ARM

8. Manually rotate the turning arm one revolution to check for swing clearance.

The backfacing attachment can machine flanges to the thickness and diameter shown in Figure 3-44 on page 55.

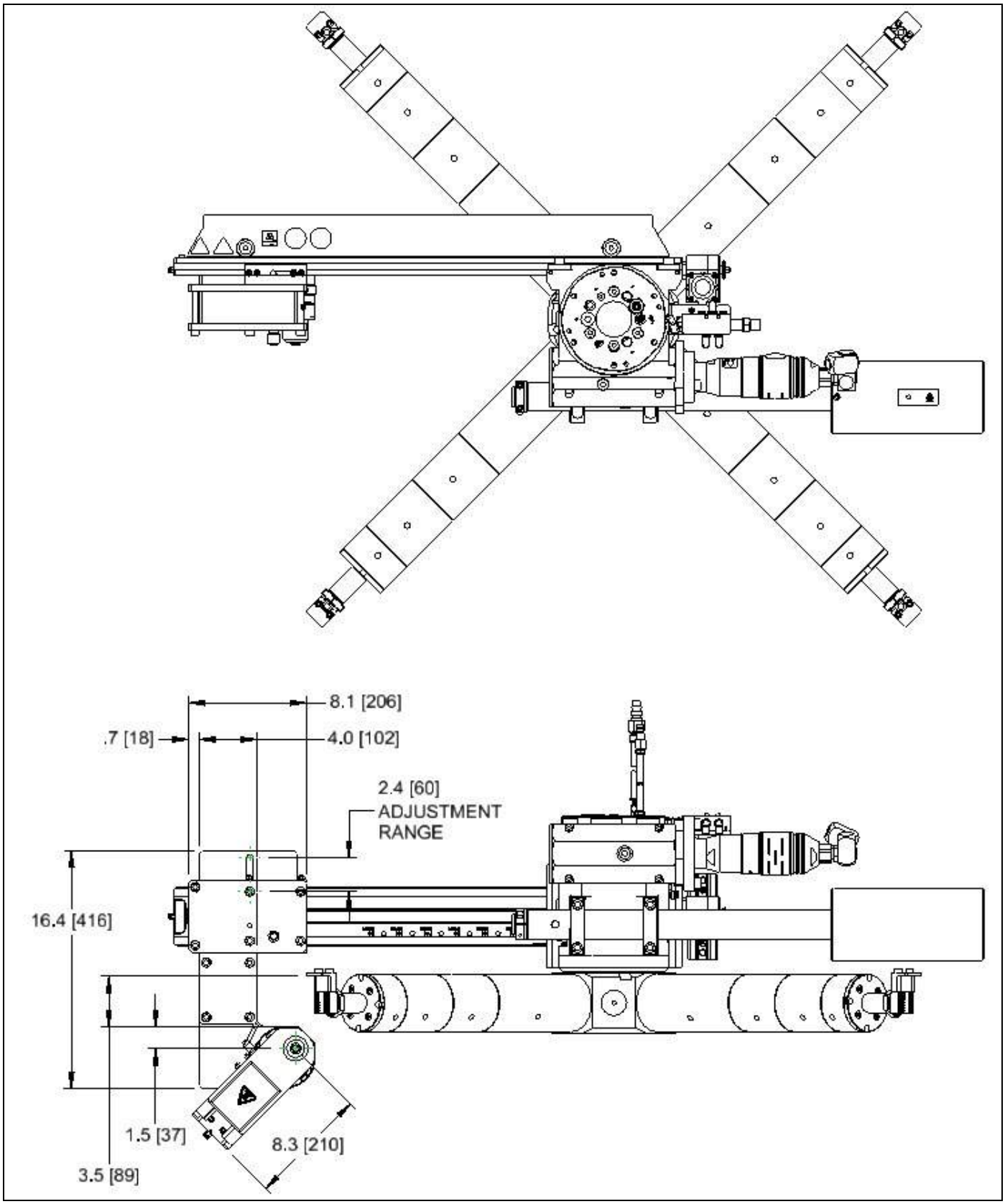


FIGURE 3-44. BACKFACING ATTACHMENT DIMENSIONS

This page intentionally left blank

4 OPERATION

IN THIS CHAPTER:

4.1 PRINCIPLES OF OPERATION

Do not operate this machine without adequate training to fully understand safe setup, operation, and maintenance.

⚠ CAUTION

To avoid serious personal injury, keep clear of moving machinery during operation. Always be aware of the location of all personnel near the machine.

The FF6300 often is used in dangerous locations (in elevated positions, near other operating equipment, overhead, etc.). CLIMAX cannot foresee where this machine will be used; therefore, you must perform a site-specific risk assessment (Section 1.5 on page 6) for each job before starting work.

The FF6300 machine has remote operation features that enable you to choose the optimum location to work from.

⚠ WARNING

Always follow safe work practices, including site-specific safety requirements. It is your responsibility to perform a risk assessment before you set up the machine and each time before you operate the machine.

4.2 PRE-START CHECKS

⚠ WARNING

Rotating machinery can cause serious injuries. Turn off and lock out the machine before making the pre-start checks.

Before starting the machine, always check the following:

- All energy supplies are OFF and the system reset button is released.
- Check that the machine is securely mounted to the work piece.
- Check that all the lines, cables, and hoses are properly connected and secured away from moving parts. A lightweight bracket is supplied in the tool kit for securing the hoses as shown in Figure 4-1.

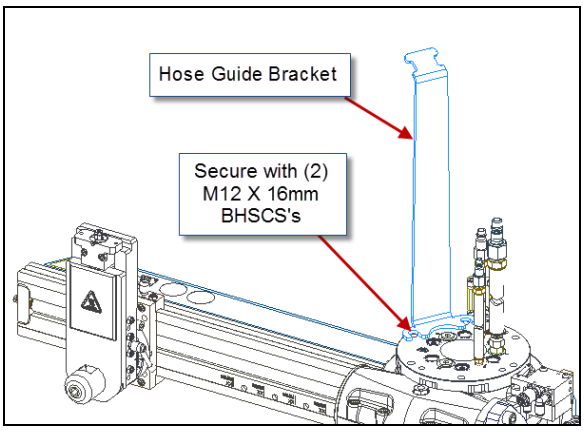


FIGURE 4-1. DETAIL OF HOSE GUIDE BRACKET

⚠ WARNING

Broken air or hydraulic lines can whip around, striking the operator or bystanders. Always check that the supply lines to the machine are secure and cannot be hit by moving parts.

- For hydraulically driven machines check that all hoses and fittings are leak free. Hydraulic oil leaks could contaminate the environment or cause a slipping hazard. Clean up any spills, and repair any leaks before operating this machine.
- Check that all the machine parts are secure, including the tool head, tool bit, chucks, and clamps.
- Check that the tool head is set at the desired angle and is tight.
- Check that the feed direction and rate are set correctly (Section 3.12 on page 48).

⚠ CAUTION

Check that the turning arm is securely clamped to the main body and that it will not hit any obstructions around the workpiece. Check that there is clearance by manually rotating the machine one full revolution.

- Check that all handles and tools are removed from the machine.
- Check that all preventative maintenance is complete (Section 5) and the drip rate is set correctly on the pneumatic conditioning unit (PCU). Refer to Section 5.3.1 on page 64.
- Check that the emergency stop button is reset.

⚠ CAUTION

Metal chips and other debris can damage the machine and degrade its performance. Ensure all metal chips and other debris are removed from the machine before and after each use.

4.3 MACHINING

See Section 2.3 on page 21 for information on the location and function of the controls. See Section 3.12 on page 48 for information on the feed box.

DANGER

To avoid serious injury to hands or arms, do not reach inside the swing of the turning arm during operation or while the machine is energized.

4.3.1 Pneumatic-powered machining

CAUTION

If the machine stops moving unexpectedly, de-pressurize and lock out the pneumatic safety valve located on the pneumatic conditioning unit before performing any troubleshooting.

Refer to the pneumatic conditioning unit (PCU) controls described in Section 2.3.1 on page 21 and shown in Figure 4-2.

Do the following to operate the machine:

1. Push the START button on the PCU.
2. Use the SPEED ADJUSTMENT VALVE to turn on the drive motor and to adjust the drive motor speed to achieve the desired rotation rate.
3. Turn on the FEED ON/OFF VALVE.
4. When the cut is complete, **first stop the feed** and then stop the machine rotation.

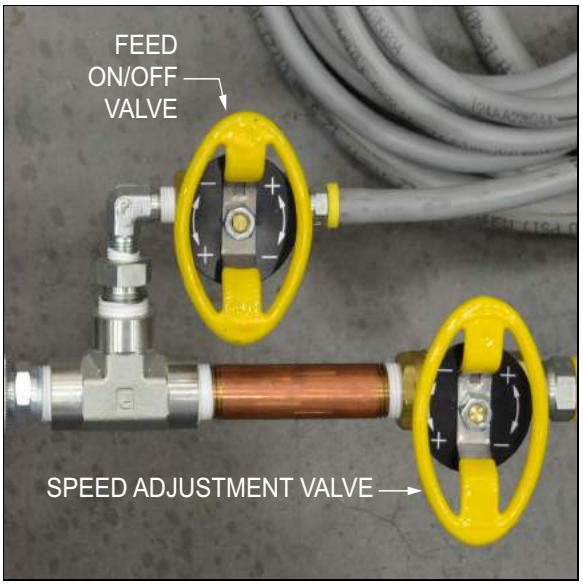


FIGURE 4-2. PNEUMATIC POWERED MACHINING VALVES

4.3.2 Hydraulic-powered machining

Refer to the hydraulic power unit (HPU) controls described in Section 2.3.2 on page 21.This type of machine has a hydraulic powered rotation with a pneumatic feed.

⚠ CAUTION

Using a different HPU than the one specified in this manual will require a separate evaluation.

Do the following to operate:

1. On the HPU controller, turn the emergency stop button clockwise to reset the emergency stop.

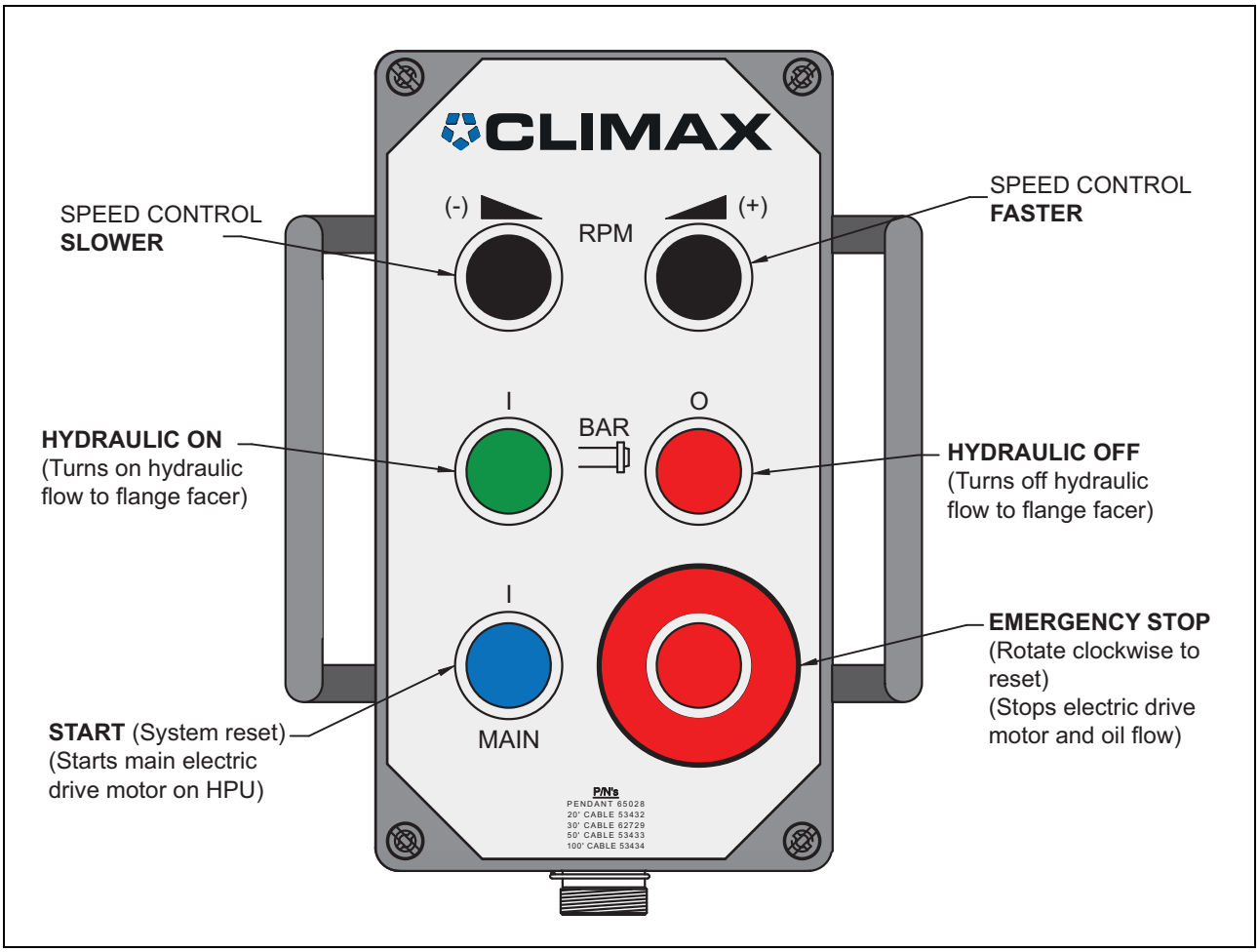


FIGURE 4-3. LOCATION OF HYDRAULIC POWERED ROTATION CONTROLS

2. Press the start button to start the HPU motor.
3. Press the speed control slower button until it is at the minimum.
4. Press the hydraulic on button.
5. Press the speed control faster button to reach the desired speed.
6. Turn the feed rate adjustment knob to the minimum feed or to the desired setting, if known (Figure 4-2 on page 59).
7. Turn on the feed and adjust the feed rate for the desired cut (Figure 4-2 on page 59).

8. Use the speed control buttons to adjust the drive motor to achieve the desired cut.
9. When the cut is complete, **first stop the feed** and then stop the machine rotation.

⚠ CAUTION

Recheck the chuck torque at intervals, including after environmental changes (such as between night and day) in case of thermal growth.

4.3.3 Adjusting the machine when the cut is completed

Do the following to adjust the machine when the cut is completed:

1. Check that all power sources to the machine drive are isolated and locked out.

⚠ CAUTION

The cutting tools can get hot during machining. Wear gloves or other protective personal protective equipment and be careful of hot surfaces to avoid burns.

2. Adjust the machine direction, depth of cut, or tool position as needed.
3. Start the machine and feed again to start a new cut.
4. Repeat until the desired surface is achieved.

4.4 DISASSEMBLY

⚠ WARNING

If not properly secured, this machine can fall and cause fatal injuries to personnel. Pay special attention to vertical flange installations.

The machine must be properly rigged and attached to a crane or other suitable lifting apparatus before beginning any disassembly steps. Use supplemental rigging as a precaution.

Do the following to remove the machine from the workpiece:

1. De-energize the machine.
2. De-pressurize the air system by disconnecting the air supply to the pneumatic conditioning unit (PCU).
3. If applicable, de-pressurize the hydraulic system by pulling the knob on the drain valve on the hydraulic power unit (HPU).
4. Disconnect the hydraulic and air hoses from the machine.
5. Retract the tool from the work piece.

6. Remove the tool bit, being careful of hot surfaces.
7. Using the supplied hoist rings, attach lifting equipment to the machine.
8. Install setup fingers to each leveling foot (for the ID chuck).
9. Loosen and retract the leveling feet (for the ID chuck).
10. Remove the machine from the work piece.

5 MAINTENANCE AND TROUBLESHOOTING

IN THIS CHAPTER:

5.1 OVERVIEW

This chapter explains periodic maintenance intervals and tasks and provides trouble-shooting guidance.

⚠ CAUTION

Failure to properly clean and maintain the machine can result in machine damage and void the warranty.
Always keep moving machine parts clear of metal chips.

Following the required maintenance schedule is critical to obtaining normal machine life.

Keep all machine components in clean, working condition.

Check that parts such as the mounting surfaces, hydraulic fittings, and the tools themselves are free of metal chips, nicks, and burrs.

To prevent corrosion, thoroughly rinse with fresh, clear water any machine parts that are exposed to salt water.

5.2 MAINTENANCE INTERVALS

Table 5-1 lists maintenance intervals and tasks, along with the section where each task is described.

TABLE 5-1. MAINTENANCE INTERVALS AND TASKS

Interval	Task	See section
Before each use	Check the pneumatic conditioning unit oil reservoir levels.	5.3.1
	Check the pneumatic lines for damage and wear.	--
	Perform a pneumatic conditioning unit emergency stop check.	5.3.3
	Perform a pneumatic conditioning unit drop-out circuit check.	5.3.4
	Perform hydraulic power unit maintenance.	5.3.5
Before and after each use	Remove debris, oil, and moisture from machine surfaces.	--
	Perform leadscrew maintenance.	5.3.7
After each use	Perform dovetail and square ways maintenance.	5.3.6
Periodically	Empty the air filter water trap.	5.3.2
As needed	Perform leadscrew maintenance.	5.3.7
	Adjust the dovetail and square ways gib screws.	5.3.8
	Adjust the radial slide lead nut.	5.3.9
	Tram the turning arm.	5.3.10

5.3 MAINTENANCE TASKS

5.3.1 Check the pneumatic conditioning unit oil reservoir levels

1. Check the pneumatic conditioning unit (PCU) oil reservoir levels.
2. Refill as necessary. See Table 5-2 on page 68 for information on recommended lubricants.
3. Check that the oil drip rate is set at six drops per minute (Figure 2-7 on page 21).

5.3.2 Empty the air filter water trap

Check and drain the water from the air filter water trap.

5.3.3 Pneumatic conditioning unit emergency stop check

1. With the machine running, press the emergency stop button (Figure 2-7 on page 21).
2. Check that the machine stops.

3. Reset the emergency stop by pulling the button up.
4. Check that the machine doesn't restart.

5.3.4 Pneumatic conditioning unit drop-out circuit check

The pneumatic conditioning unit drop-out circuit prevents the machine from restarting unexpectedly after air supply to the PCU is lost and restored.

To check the PCU drop-out circuit:

1. Check that the PCU is connected to an air supply and to the FF6300.
2. Check that the air-supply lock-out is open (pulled up).
3. Press the START button.
4. Slowly open the PCU speed adjustment valve until the rotary drive engages.
5. Close (press down) the lock-out valve.
6. Check that the FF6300 stops.
7. Open the lock-out valve.
8. Verify that the machine does not automatically restart when the lock-out valve is re-opened in step 7.

⚠ WARNING

Do not operate the machine if the pneumatic conditioning unit starts in step 8. Contact CLIMAX for service recommendations.

5.3.5 Hydraulic power unit maintenance

1. Refill the HPU oil reservoir before each use.
2. Replace the oil and filter every two years.

For more information on HPU maintenance, see the HPU operator's manual that was included with the FF6300.

5.3.6 Dovetail and square ways maintenance

Lightly lubricate the dovetail and square ways after cleaning and after each work session. This helps protect the machine precision surfaces from corrosion. See Figure A-6 on page 86 and Figure A-10 on page 90 for the locations of the dovetail and square ways.

5.3.7 Leadscrew maintenance

1. Lightly lubricate the leadscrew after cleaning, after each work session, and periodically during operation to ensure smooth travel. For leadscrew locations, see Figure A-6 on page 86 and Figure A-10 on page 90.
2. During operation, clean ball screws and ACME leadscrews frequently to prevent thread damage to nut and leadscrew.

5.3.8 Adjust the dovetail and square ways gib screws

Adjusting the dovetail slide on the tool head is done using five M6 x 1.0 gib screws. For screw locations, see Figure A-6 on page 86.

Adjusting the square ways on the turning arm is done using three M6 x 1.0 gib screws. For screw locations, see Figure A-10 on page 90.

The radial slide (square way gib screws) must be snug for the best cutting performance. Approximately 2–4 in-lbs (.3 Nm) of torque is necessary to turn the radial travel leadscrew.

Adjustment should be necessary only after many hours of use and only if the machine is no longer producing a good finish.

If a slide is visibly loose and causing machining problems, tighten the gib screws in small increments. There should be 2–4 in-lbs (.3 Nm) of drag on the radial leadscrew and a slight drag on the manual feed handle.

5.3.9 Adjust the radial slide lead nut

The radial slide lead nut is adjustable to provide reduced backlash. Adjusting the lead nut is done using two M10 x 1.50 set screws recessed in the swivel circular dove plate. Adjustment should be necessary only after many hours of use and only if the machine is no longer producing a good finish.

NOTICE

Only adjust the radial slide lead nut after adjusting the square way gibs, as described in Section 5.3.8.

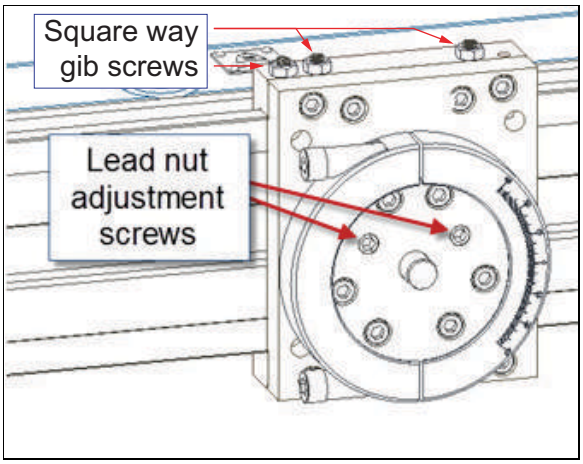


FIGURE 5-1. LOCATION OF LEAD NUT ADJUSTMENT SCREWS

If the slide is visibly loose and causing machining problems, tighten the two set screws by small increments until a slight drag is felt on the manual feed handle.

After adjustment, check travel over the full length of the leadscrew for tight spots.

5.3.10 Tram the turning arm

Do the following if the turning arm becomes misaligned:

1. The bottom surface of the main body assembly can be used as a datum (Figure 2-1 on page 15 and Figure A-8 on page 88).
2. Tighten the two M8 screws (number 49 in Figure A-8 on page 88) on the top of the main body assembly, and then back them off a little.

5.4 LUBRICATING THE MACHINE

Table 5-2 on page 68 provides information on recommended lubricants.

Change the oil in the main body drive gear and grease the lower spindle bearing after every 1000 hours of use, or yearly.

NOTICE

The more frequently oil is used to lubricate the leadscrew and nuts, the longer they will last.

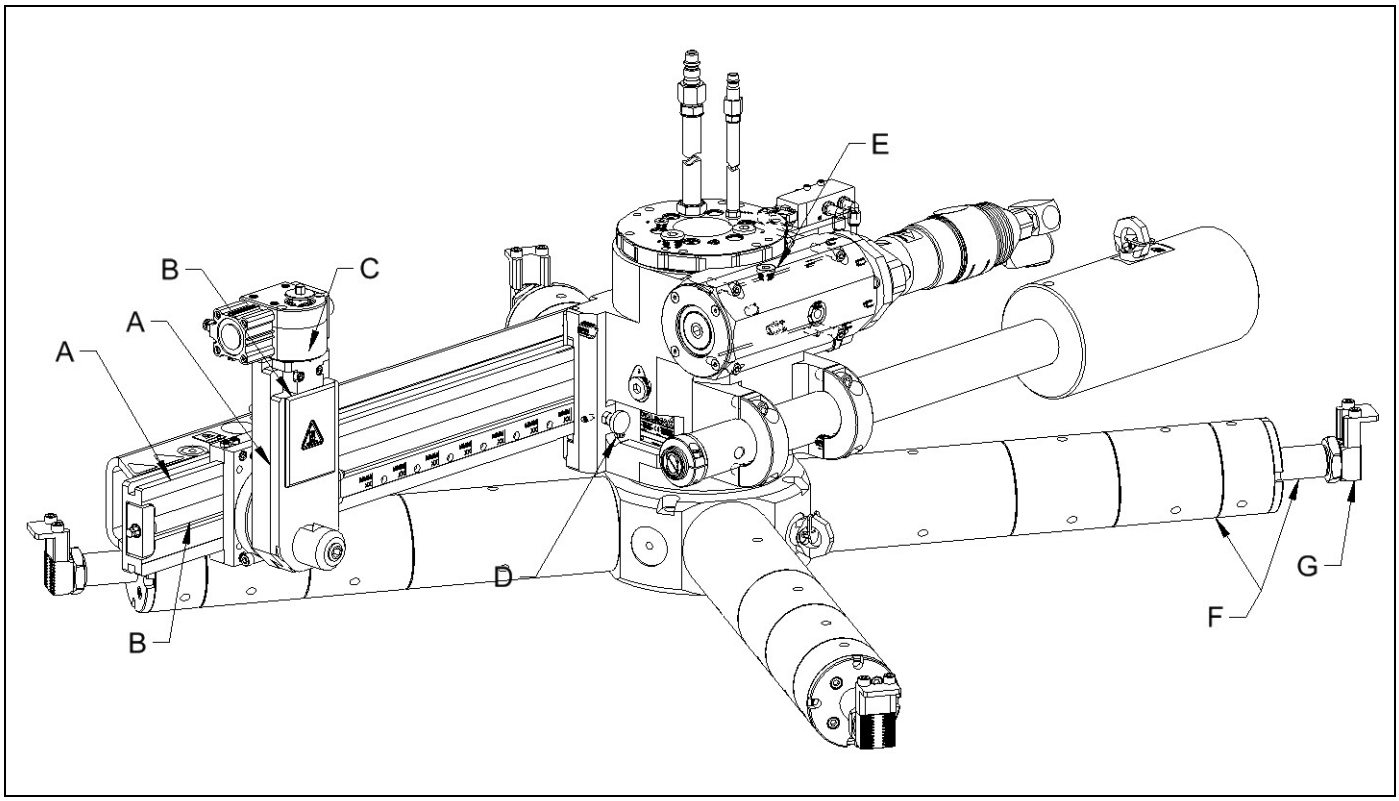


FIGURE 5-2. LUBRICATION LOCATIONS

A. Rectangle and dovetail ways—Lubricate the rectangle and dovetail ways daily during machine use, with AW 32 or equivalent.
B. Leadscrew—Lubricate the leadscrew weekly during machine use, with Nook E-100 spray lube or equivalent.
C. Thrust bearings—The thrust bearings are lubricated at the factory and should not need further lubrication.
D. Lower bearing—Lubricate the lower bearing yearly at the Zerk fitting, with Mobil SHC 460 or equivalent.
E. Main body gear drive—Lubricate the main body gear drive once per year, with Mobil 634 Gear Oil or equivalent.

F. Mount legs and jacking screws—Lubricate the mount legs and jacking screws weekly during machine use and before storage, with Moly Grade Anti-Seize or equivalent.

G. Leveling foot—Lubricate the leveling foot daily during machine use, with AW32 or equivalent.

Recommended lubricants

CLIMAX recommends the lubricants listed in Table 5-2. Listed alongside the regular lubricants are biodegradable alternatives. If these lubricants are not available in your area, contact CLIMAX for alternatives. See Appendix C for MSDS information.

⚠ CAUTION

To avoid damage and premature machine wear and to protect your warranty, use only recommended lubricants.

TABLE 5-2. RECOMMENDED LUBRICANTS

Application Area	Lubricant	Biodegradable Lubricant	Viscosity (cSt)	Quantity
Daily				
Dovetail and square-ways	AW 32 hydraulic oil	CONOCO Ecoterra 32 or Castrol BioBar 32	32 @ 40 °C 6 @ 100 °C	As required
Unpainted surfaces	LPS 2	N/A	38 @ 25 °C	As required
Each Use				
Hydraulic power unit	AWS-46 hydraulic oil (summer)	CONOCO Ecoterra 46 or Castrol BioBar 46	46 @ 40 °C 8 @ 100 °C	As required to fill reservoir to mid-sight glass level. Replace oil every two years.*
	AWS-32 hydraulic oil (winter)	CONOCO Ecoterra 32 or Castrol BioBar 32	32 @ 40 °C 6 @ 100 °C	
Weekly				
Pneumatic conditioning unit	AW 32 hydraulic oil	N/A	32 @ 40 °C 6 @ 100 °C	Refill oil lubricator
Leadscrew	Dry film graphite lubricant†	N/A	N/A	Light coating applied by hand
	AW 32 hydraulic oil	CONOCO Ecoterra 32 or Castrol BioBar 32	32 @ 40 °C 6 @ 100 °C	
Chuck jacking screws	Moly Grade Anti-Seize	N/A	N/A	1 cc per screw
Yearly				
Main body gear drive	Mobil SHC 634	N/A	460 @ 40 °C	As required

TABLE 5-2. RECOMMENDED LUBRICANTS

Application Area	Lubricant	Biodegradable Lubricant	Viscosity (cSt)	Quantity
Feed drive gearbox	Polytac EP 2	N/A	129 @ 40 °C	5 cc
Lower spindle bearing	Moblith SHC 460	N/A	414 @ 40 °C	As required
Storage				
Unpainted surfaces	LPS 2	N/A	7 @ 25 °C	As required
Unpainted surfaces	LPS 3	N/A	N/A	As required
Chuck jacking screws	Moly Grade Anti-Seize	N/A	N/A	1 cc per screw
Machine surfaces	LPS PreSolve Orange degreaser (cleaner to remove LPS 3)	N/A	N/A	As required

* Always replace hydraulic filters when replacing hydraulic oil. Never assume that oil in drums is clean. Always pump oil through a 5 micron hydraulic filter before/while filling reservoir.

† Dry film graphite lubricant is preferred on the leadscrew because wet lubricants can attract debris and particulates.

5.5 TROUBLESHOOTING

This section is intended to help you solve basic machine performance problems. For serious maintenance or if you have questions on the following procedures, contact CLIMAX.

5.5.1 The machine isn't turning

If the machine is not rotating, check the following:

1. The power source is connected and energized.
2. The emergency stop is reset (Section 5.3.3 on page 64 for PCU and Section 2.3.2 on page 21 for HPU).
3. The air regulator is open and not broken (Figure 2-7 on page 21).
4. There is air pressure entering and leaving the PCU. Check the air pressure by disconnecting the hose quick disconnects and checking for air bleed (Figure 2-7 on page 21).
5. All the valves are open (Figure 4-2 on page 59).
6. All the quick disconnects are fully engaged (Figure A-2 on page 81, Figure A-8 on page 88, Figure A-17 on page 97, Figure A-18 on page 98, Figure A-23 on page 103, and Figure A-24 on page 104).
7. Check machine movement by first making sure that the power to the machine drive is isolated and locked out, then by manually rotating the machine according to the machine power type:

- To manually rotate the pneumatic machine, insert a 10-mm hex wrench in the hex opposite the motor or push on the end of the turning arm.
- To manually rotate the hydraulic machine, use the cross-connection hose supplied with the machine to connect the #1 and #2 port hoses. Insert a 10-mm hex wrench in the hex opposite the motor or push on the end of the turning arm.

5.5.2 The machine isn't feeding

If the machine isn't feeding properly, check the following:

1. There is air pressure entering and leaving the PCU. Check the air pressure by disconnecting the hose quick disconnects and checking for air bleed (Figure 2-7 on page 21).
2. The emergency stop is reset (Section 5.3.3 on page 64 for PCU and Section 2.3.2 on page 21 for HPU).
3. The feed is engaged (Figure 3-33 on page 48).
4. The air valve assembly is assembled correctly (Figure A-8 on page 88, Figure A-19 on page 99, and Figure B-1 on page 111). Check that the 3/8" (9.5 mm) and 1/4" (6.4 mm) quick disconnects are connected to the correct hose connections on the spindle cap.
5. The leadscrew is free to turn in the desired direction. On the end of the turning arm, insert a 10-mm hex wrench to use as a crank handle and then turn it.

5.5.3 The feed is slow or unresponsive

If the feed is slow or unresponsive, the most likely cause is dirty air filters on the feed box.

NOTICE

Clean both filters at the same time.

Do the following to clean the feed box air filters:

1. Unscrew and remove the air filters on either end of the feed box (Figure 5-3).
2. Clean the filters with solvent.
3. Blow out the filters with compressed air.
4. Replace the filters in the feed box.

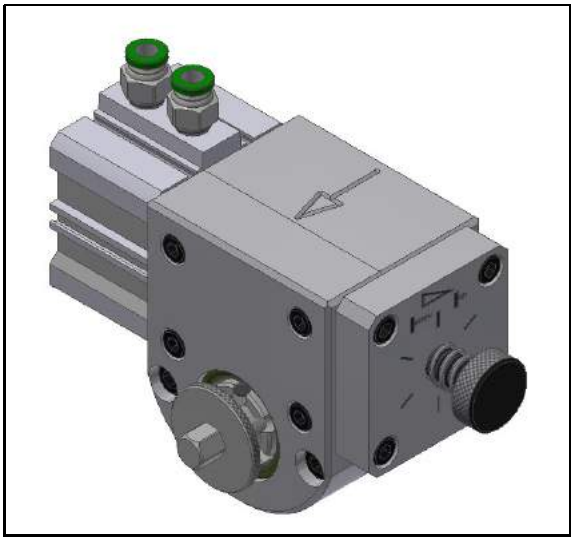


FIGURE 5-3. LOCATION OF FEED BOX FILTERS

5.5.4 The machine is performing poorly

If the machine is performing poorly, check the following:

1. The tool is installed correctly (Section 3.11 on page 47).
2. The machine is tight to the chuck and the mount (for ID chuck, see Section 3.6 on page 32; for OD mount, see Section 3.13 on page 53; for surface mount, see Section 3.13 on page 53).
3. The turning arm clamp screws are tight (Figure 3-26 on page 44).
4. The gib screws on the radial slide and the tool head are adjusted correctly (Section 5.3.8 on page 66) and the axis that is not being used is locked using the handle.
5. The tool head is tight and the adjustable clamp on the tool head (Figure A-6 on page 86) is locked on the axis that is not being used (Section 3.11 on page 47).
6. The tool head swivel is tight (Figure 3-30 on page 47).
7. The cutting tool or insert is sharp and has the correct geometry for the material and type of cut.
8. The speed and feed rates are set correctly. If necessary, experiment with different speeds and feed rates. Typically, slower speeds and shallower cuts produce less tool chatter.

5.5.5 The machine is not cutting flat

If the machine is not cutting flat, do the following:

1. Before making a critical finish pass, run the machine continuously for at least 15 minutes to check that the machine is warmed up to operating temperature.
2. Check the machine for level (for ID chuck, Section 3.6 on page 32; for OD mount, Section 3.7.5 on page 41; for surface mount, Section 3.8.3 on page 43).
3. Tram the turning arm as necessary (Section 5.3.10 on page 66).

5.6 DECOMMISSIONING

Do the following to decommission the FF6300 before disposal:

1. Remove the sight glass from the main body and drain the oil from the drive for disposal or recycling through appropriate channels and according to local regulations..
2. Remove the top plate from the main drive assembly (Figure A-8 on page 88).
3. Dispose of or recycle machine parts according to local regulations.

This page intentionally left blank

6 STORAGE AND SHIPPING

IN THIS CHAPTER:

6.1 STORAGE

Proper storage of the FF6300 will extend its usefulness and prevent undue damage.

Before storing do the following:

- Clean the machine with solvent to remove grease, metal chips, and moisture.
- Drain all liquids from the pneumatic conditioning unit.

Store the FF6300 in its original shipping container. Keep all packing materials for repackaging the machine.

6.1.1 Short-term storage

Short term storage is defined as less than or equal to three months. For short-term storage:

1. Spray all unpainted surfaces with LPS 2 to prevent corrosion.
2. Apply Moly Grade Anti-Seize to the chuck jacking screws (Figure 3-12 on page 34).
3. Package the machine in its shipping container as shown in Figure 6-2 on page 75 or Figure 6-3 on page 76.

6.1.2 Long-term storage

Long term storage is defined as longer than three months. For long-term storage:

1. Spray all unpainted machine surfaces with LPS 3 to prevent corrosion.
2. Package the machine in its shipping container as shown in Figure 6-2 on page 75 or Figure 6-3 on page 76.
3. Add a desiccant pouch to the shipping container. Replace the pouch according to the manufacturer's instructions.
4. Store the shipping container out of direct sunlight in an environment where the temperature is between -40 ºC and 70 ºC (-4 ºF to 160 ºF).

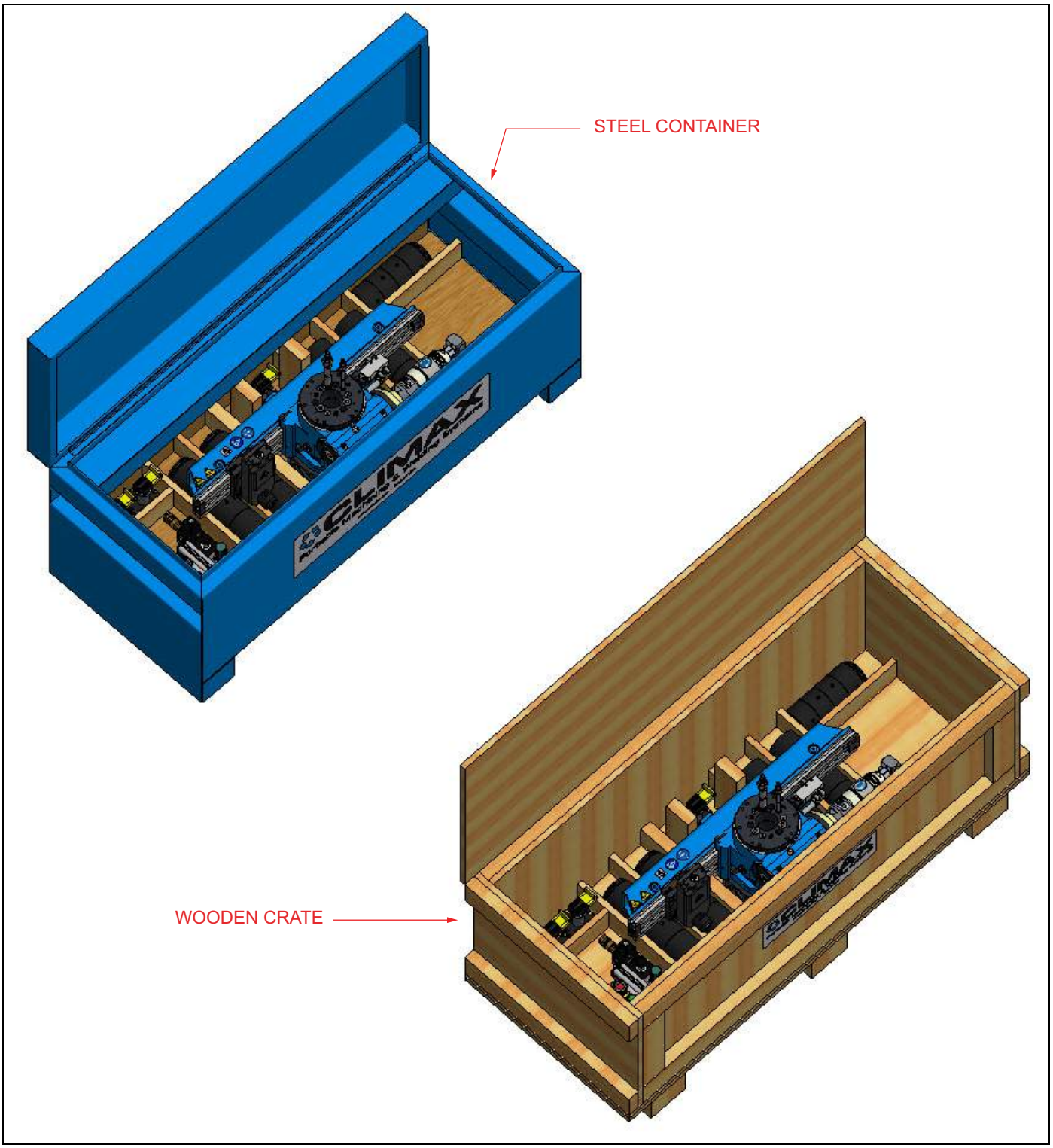


FIGURE 6-1. FF6300 IN CONTAINERS

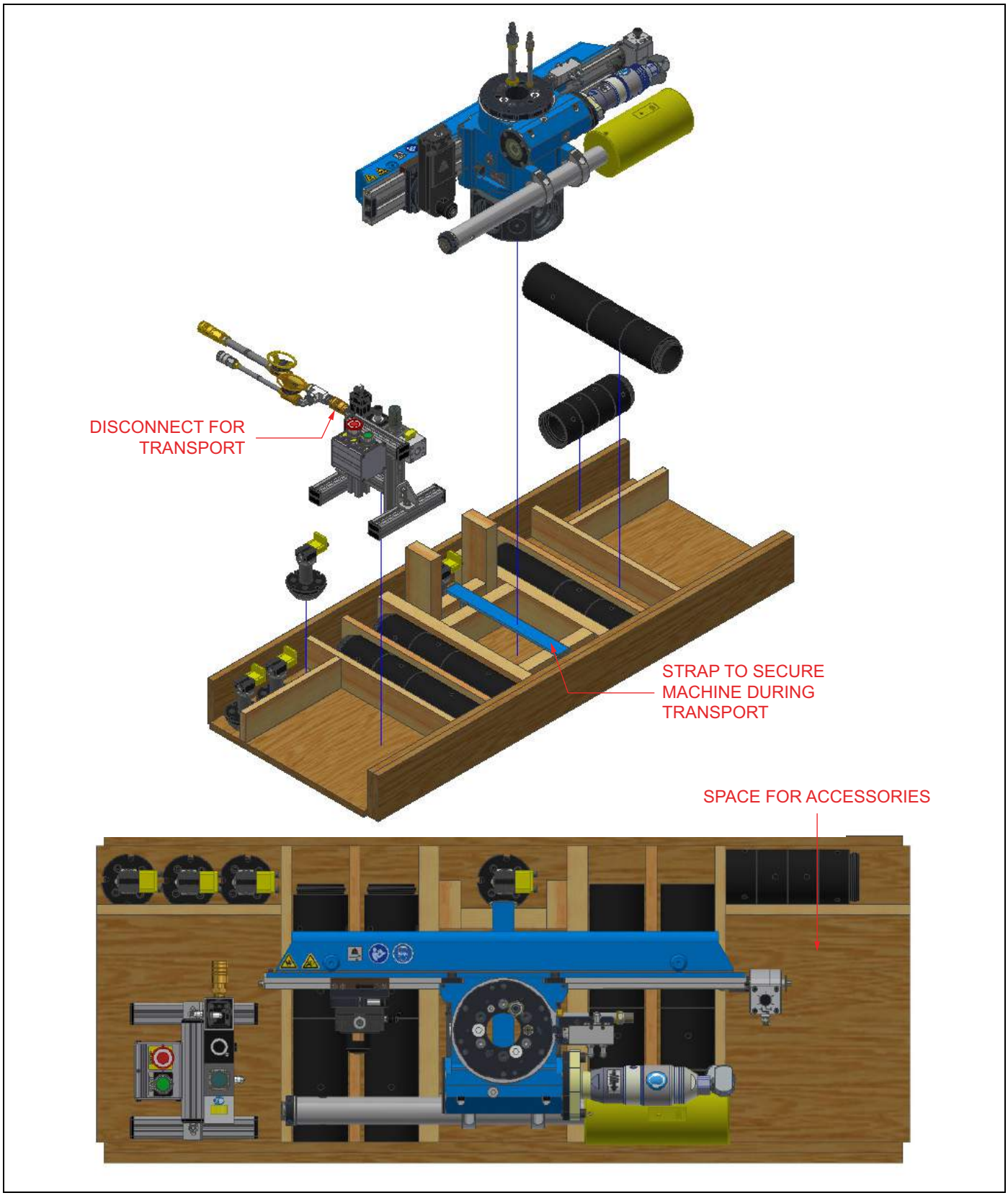


FIGURE 6-2. PACKING THE FF6300 WITH ID CHUCK

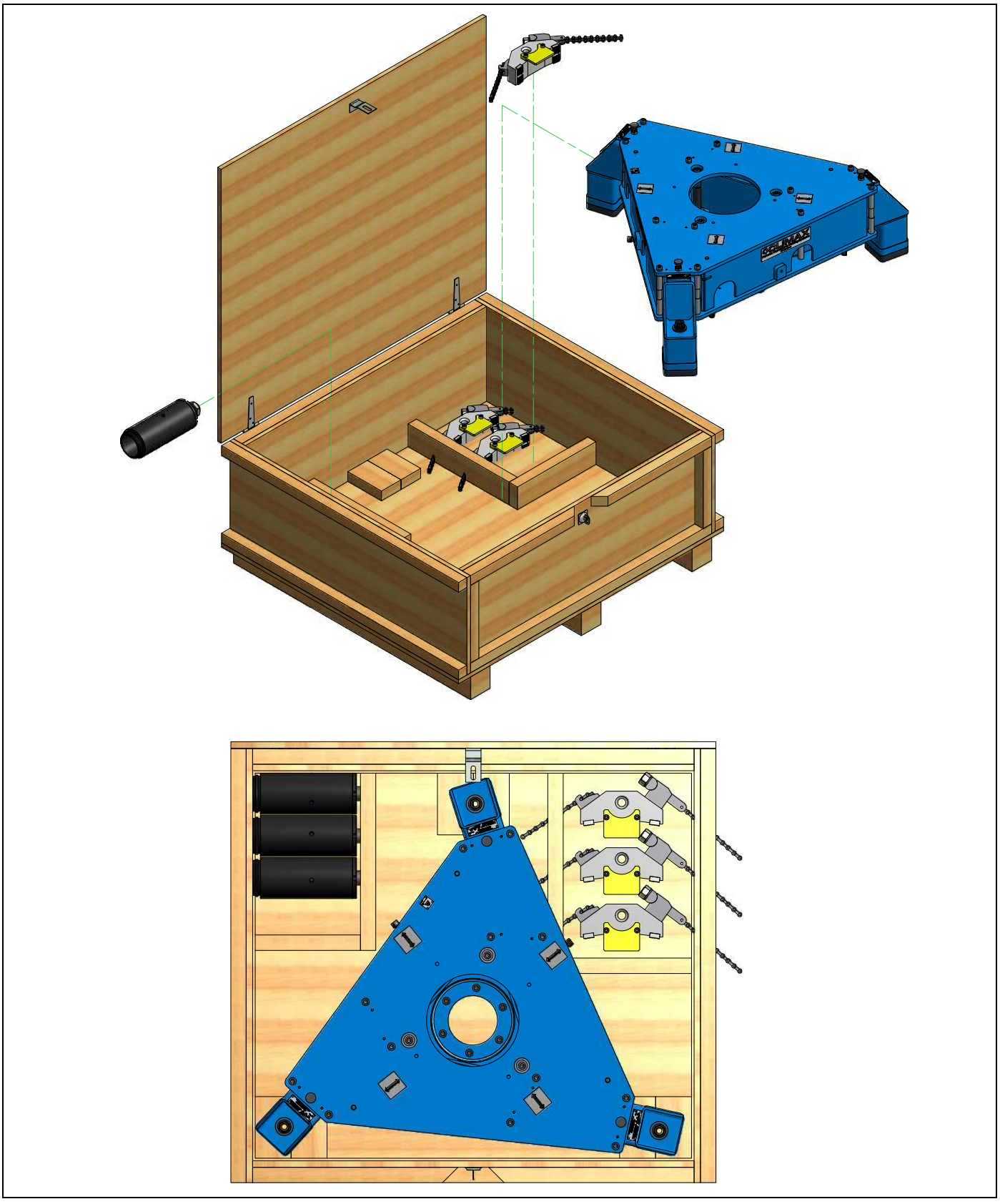


FIGURE 6-3. PACKING THE FF6300 WITH OD MOUNT

6.2 SHIPPING

The machine ships from CLIMAX with a heavy coating of LPS 3. The recommended cleaner is LPS PreSolve Orange Degreaser. During machine use, an alternate long-term corrosion preventative may have been used. Be sure to use the correct cleaner for the applied protective coating.

The FF6300 should be shipped in its original shipping container.

Package the machine as shown in Figure 6-2 on page 75 or Figure 6-3 on page 76.

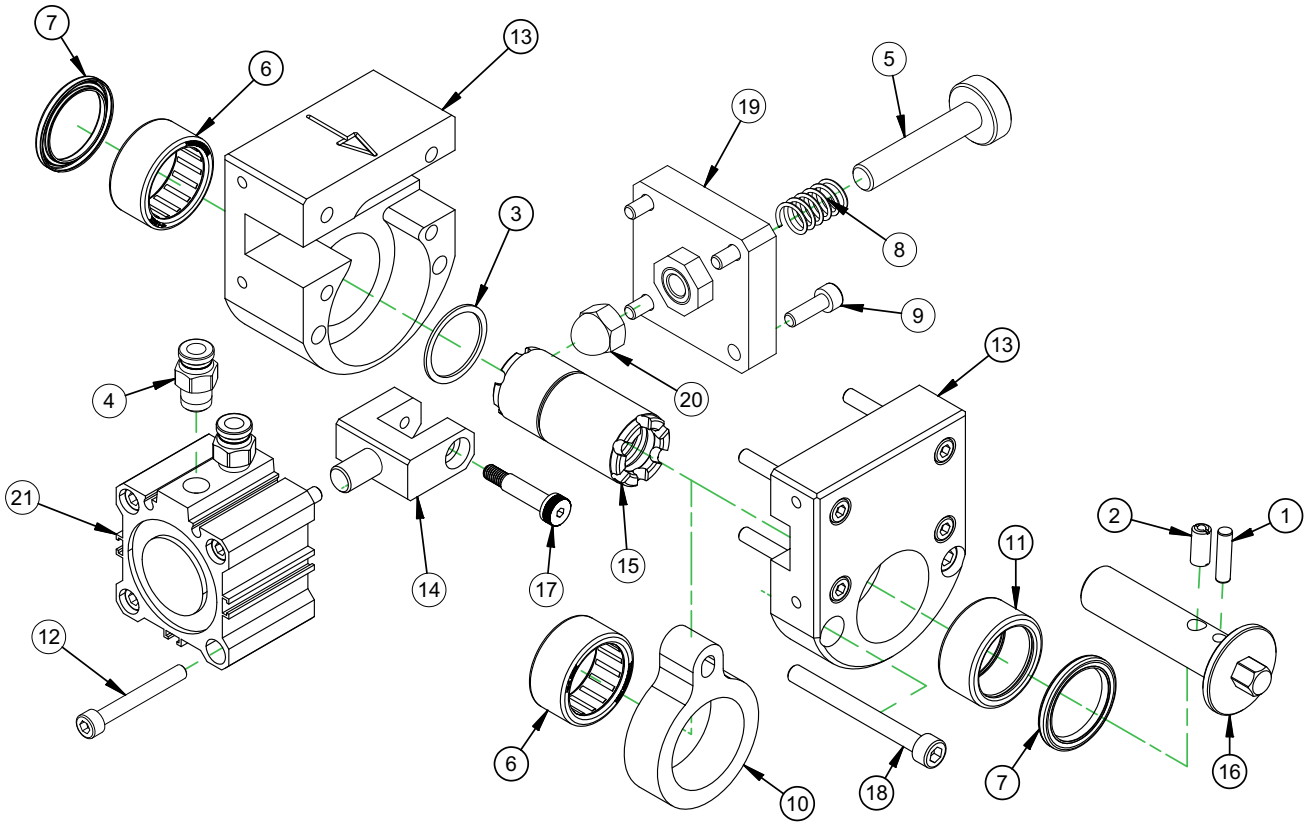
This page intentionally left blank

APPENDIX A EXPLODED VIEWS AND PARTS LISTS

IN THIS CHAPTER:

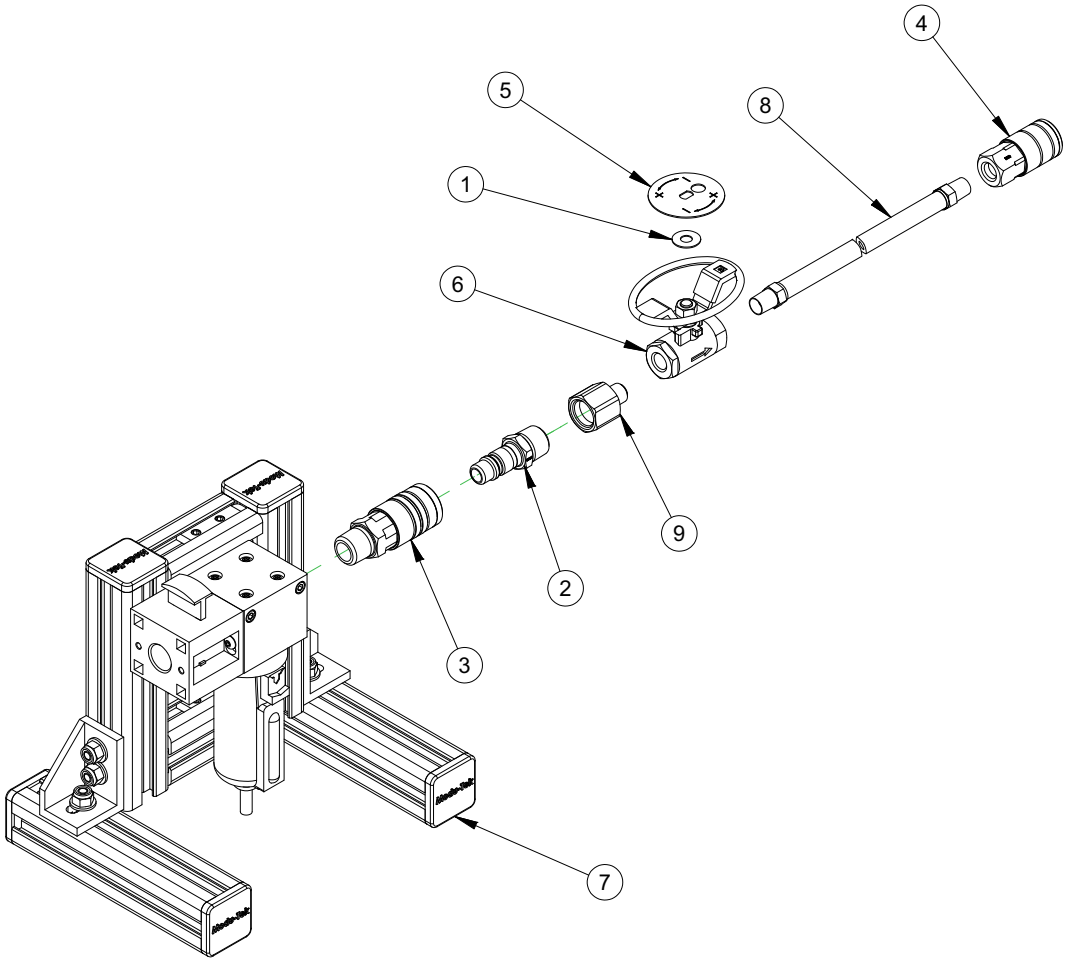
NOTICE

The following diagrams and parts lists are for your reference purposes only. The machine’s limited warranty is void if the machine has been tampered with by anyone who has not been authorized in writing by CLIMAX to perform service on the machine.



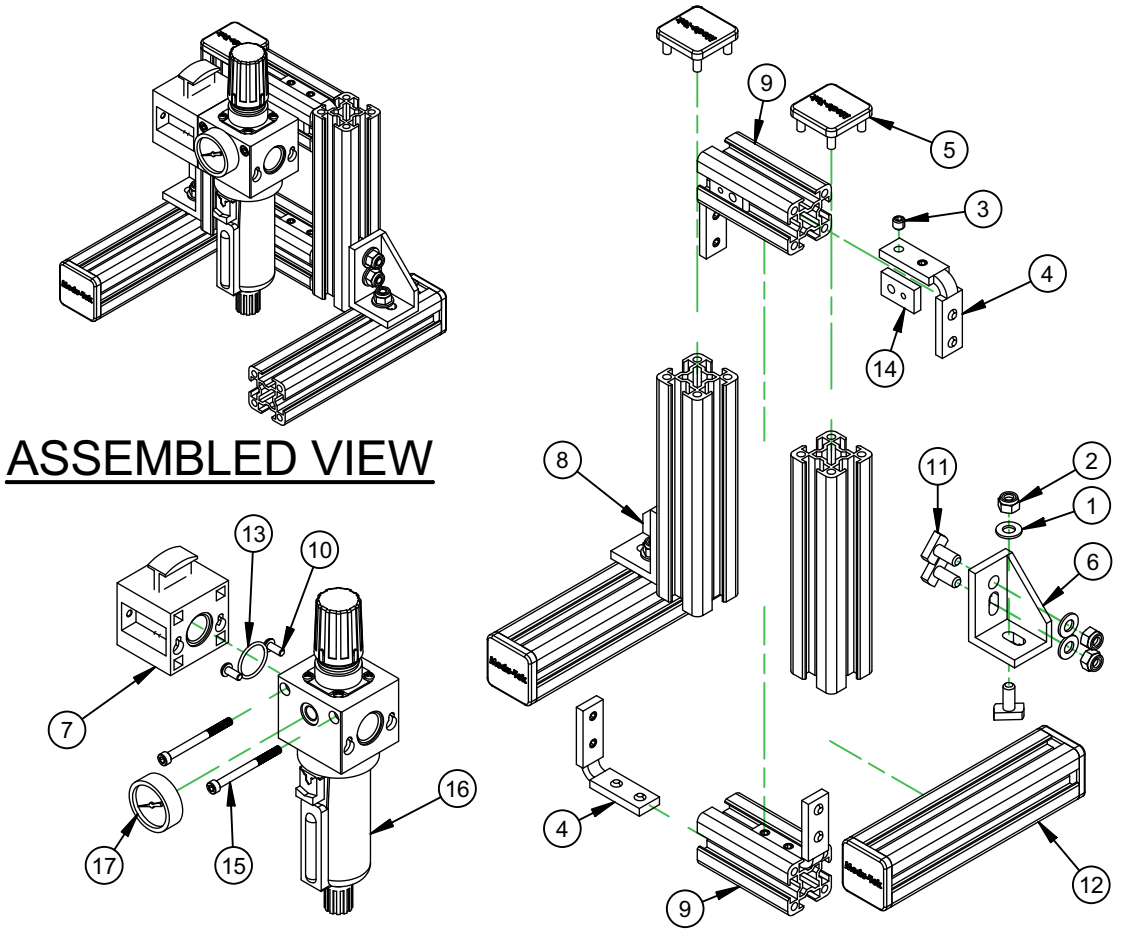
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	11763	PIN DOWEL 3/16 x 3/4
2	1	13061	DETENT PLUNGER BALL 1/4-20 X .531
3	1	14241	RING SNAP 1 OD SPIRAL HEAVY DUTY
4	2	18439	FTG ADAPTER 1/8 NPTM X 1/4 TUBE F PRESTOLOCK NICKEL PLATED
5	1	25953	SCREW 3/8-16 X 2 KHS (KNURLED HEAD)
6	2	25957	BRG ROLLER CLUTCH 1 X 1.312 X .625
7	2	25959	SEAL 1.000 ID X 1.312 OD X .125 HM14 LIP
8	1	28618	SPRING COMP .48 OD X .051 WIRE X .88
9	4	35113	SCREW M5 X .8 X 16 SHCS
10	1	57491	ARM RATCHET
11	1	57530	BRG NEEDLE 1.0 X 1-5/16 X .625
12	4	57541	SCREW M5 X .8 X 40mm SHCS
13	1	58435	HOUSING PNEUMATIC FEED BOX REMOTE ADJUSTABLE
14	1	58450	CLEVIS DOUBLE 6MM PIN 3/8-24 SHAFT
15	1	58451	BUSHING DRIVE DOUBLE ENDED
16	1	58519	SHAFT FEED
17	1	58588	SCREW 6MM DIA X 20MM X M5 X 0.8 SHLDCS
18	2	59156	SCREW M6 X 1.0 X 60mm SHCS
19	1	87322	PLATE FEED ADJUST
20	1	87411	NUT 3/8-16 ACON HS G8 ZINC
21	1	87842	CYLINDER AIR 40MM DIA 10MM STROKE DOUBLE ACTING

FIGURE A-1. FEED BOX PNEUMATIC MANUAL FEED ADJUST (P/N 87326)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	10770	WASHER THRUST .75 OD X .312 ID X .03
2	1	13209	FTG QD NIPPLE 1/2B 1/2 NPTM PNEUMATIC
3	1	16610	FTG QUICK COUPLER 1/2B 1/2 NPTM FEMALE AIR
4	1	35690	FTG QUICK COUPLER 3/8B 1/4 NPTF FEMALE AIR
5	1	35772	LABEL DIRECTION OVAL HANDLE BALL VALVE
6	1	59203	VALVE BALL 1/4 NPTF X 1/4 NPTF VENTED OVAL HANDLE
7	1	59329	ASSY PNEUMATIC FILTER & VALVE WITH STAND
8	1	59330	HOSE ASSY 801 1/4 X 1/4 NPTMS ENDS X 180
9	1	78025	FTG ADAPTER 1/2 NPTF X 1/4 NPTM

FIGURE A-2. AIR CONTROL ASSEMBLY FOR PNEUMATIC FEED (P/N 87941)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	6	13489	WASHER 5/16 FLTW SAE
2	6	19729	NUT 5/16-18 NYLON INSERT LOCKNUT
3	16	27895	SCREW 5/16-18 X 5/16 SSSFP
4	4	46761	BRACKET 90DEG JOINER MODU-TEK
5	6	46764	ENDCAP 1 X 1 FOR 1.63SQ MODU-TEK EXTRUSION
6	1	46765	BRACKET 1X2 SLOT HALF WEB LEFT MODU-TEK
7	1	46777	VALVE SHUT OFF VS22 SERIES
8	1	46783	BRACKET 1X2 SLOT HALF WEB RIGHT MODU-TEK
9	2	46802	1.63 X 1.63 X 3.375L MODU-TEK EXTRUSION
10	2	53617	SCREW M5 X 0.8 X 12MM BHCS BLACK FINISH
11	6	59436	SCREW 5/16-18 X 3/4 T-BOLT
12	4	59437	1.63 X 1.63 X 7.00L MODU-TEK EXTRUSION
13	1	59442	RING O 2mm X 23mm ID X 25mm OD
14	2	59705	NUT PLATE M5 X .08 AND 5/16-32 .75 X 1.25 X .25
15	2	59754	SCREW M5 X 0.8 X 40MM SHCS
16	1	78054	FILTER/REGULATOR PARTICULATE 1/2NPTF METAL BOWL GLASS
17	1	83486	PRESSURE GAUGE, 0-160 PSI, 1/8 NPT CENTER BACK MOUNT

FIGURE A-3. PNEUMATIC FILTER AND VALVE WITH STAND ASSEMBLY (P/N 59329)

This page intentionally left blank

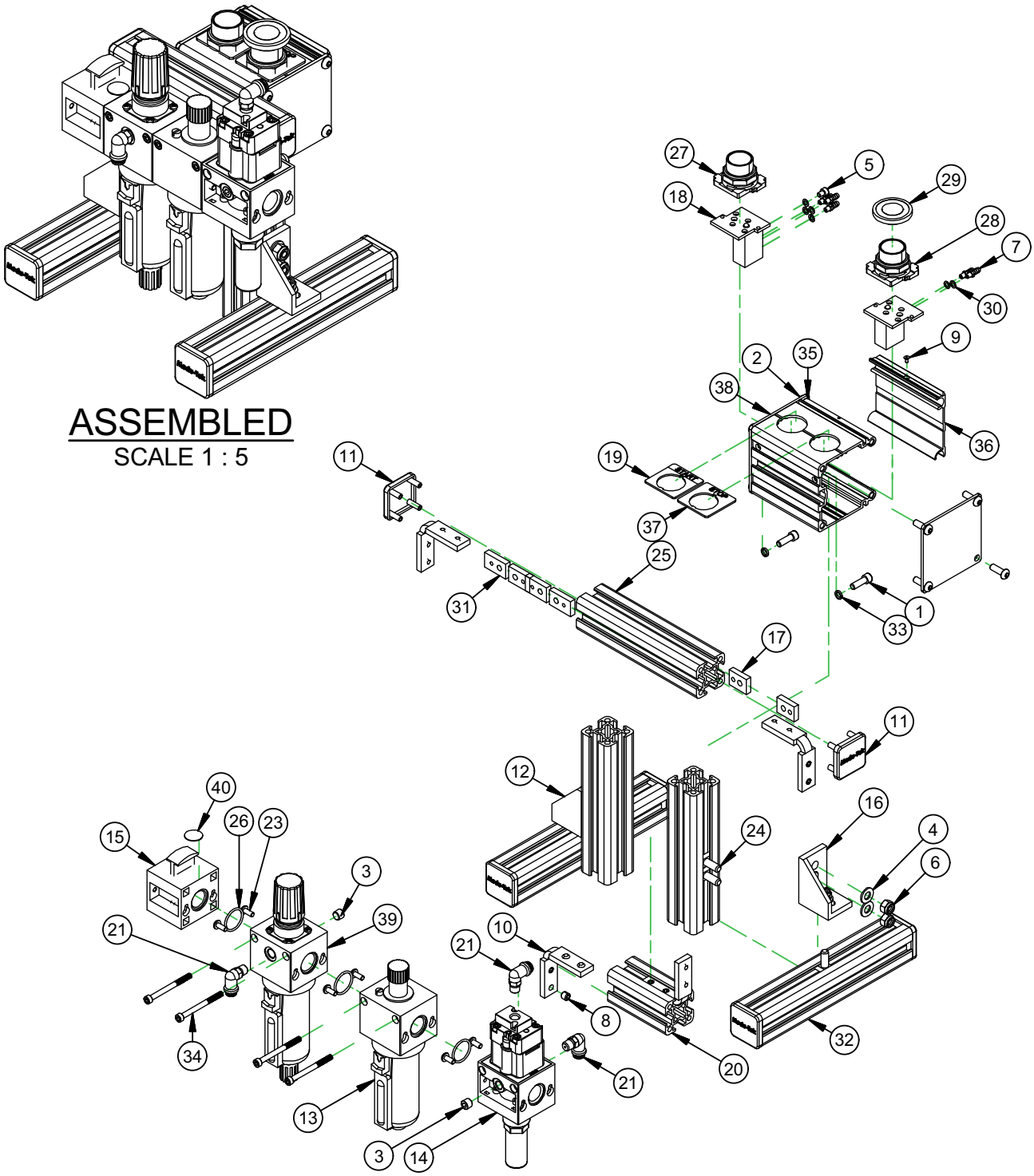


FIGURE A-4. PNEUMATIC CONDITIONING UNIT 1/2" (13 MM) LOW-PRESSURE DROP-OUT (P/N 78264)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	10160	SCREW 1/4-20 X 3/4 SHCS
2	8	11365	SCREW 1/4-20 X 3/4 BHSCS
3	2	12616	FTG PLUG 1/8 NPTM SOCKET
4	6	13489	WASHER 5/16 FLTW SAE
5	1	14726	SCREW 10-32 X 1/4 SHCS
6	6	19729	NUT 5/16-18 NYLON INSERT LOCKNUT
7	5	22235	FTG BARB #10-32 X 1/8 HOSE
8	16	27895	SCREW 5/16-18 X 5/16 SSSFP
9	1	35857	SCREW 4-40 X 1/4 FHSCS
10	4	46761	BRACKET 90DEG JOINER MODU-TEK
11	6	46764	ENDCAP 1 X 1 FOR 1.63SQ MODU-TEK EXTRUSION
12	1	46765	BRACKET 1X2 SLOT HALF WEB LEFT MODU-TEK
13	1	46768	LUBRICATOR AIR 1/2 NPTF 3.8oz BOWL W/SIGHT
14	1	46769	VALVE EXHAUST QUICK PILOT 1/2NPTF MUFFLER
15	1	46777	VALVE SHUT OFF VS22 SERIES
16	1	46783	BRACKET 1X2 SLOT HALF WEB RIGHT MODU-TEK
17	2	46784	NUT SQUARE 5/16-18 AND 1/4-20
18	2	46785	VALVE PUSHBUTTON 5 PORT PNEUMATIC
19	1	46797	LEGEND PLATE START 10250 SERIES
20	1	46802	1.63 X 1.63 X 3.375L MODU-TEK EXTRUSION
21	3	48648	FTG ELBOW 1/8 NPTM X 1/4 TUBE PRESTOLOK
22	60	48650	TUBING 1/4 OD POLYURETHANE (INCH) (NOT SHOWN)
23	6	53617	SCREW M5 X 0.8 X 12MM BHCS BLACK FINISH
24	6	59436	SCREW 5/16-18 X 3/4 T-BOLT
25	3	59437	1.63 X 1.63 X 7.00L MODU-TEK EXTRUSION
26	3	59442	O-RING 2mm X 23mm ID X 25mm OD
27	1	59458	PUSHBUTTON GREEN FLUSH
28	1	59459	PUSH BUTTON PUSH PULL MAINTAINED (M-M)
29	1	59462	PUSH BUTTON OPERATOR RED 1-5/8
30	6	59480	WASHER #10 FLTW PLASTIC .32 OD .025 THICK
31	4	59705	NUT PLATE M5 X .08 AND 5/16-32 .75 X 1.25 X .25
32	2	59739	EXTRUSION 1.63 X 1.63 X 8.75 MODU-TEK
33	2	59745	WASHER 1/4 LOCW .37 OD .07 THICK
34	4	59754	SCREW M5 X 0.8 X 40MM SHCS
35	1	59820	ENCLOSURE PNEUMATIC CONTROL VALVE 3.38 X 3.435 X 3.9
36	1	59821	COVER PNEUMATIC CONTROL VALVE ENCLOSURE 3.38 X 3.435 X 3.9
37	1	59825	LEGEND PLATE STOP 10250SERIES YELLOW BACKGROUND
38	2	68644	PLATE COVER EXTRUDED WIREWAY
39	1	78054	FILTER/REGULATOR PARTICULATE 1/2NPTF METAL BOWL GLASS
40	1	81132	LABEL WARNING - INSERT SAFETY LOCK

FIGURE A-5. PNEUMATIC CONDITIONING UNIT 1/2" (13 MM) LOW-PRESSURE DROP-OUT PARTS LIST (P/N 78264)

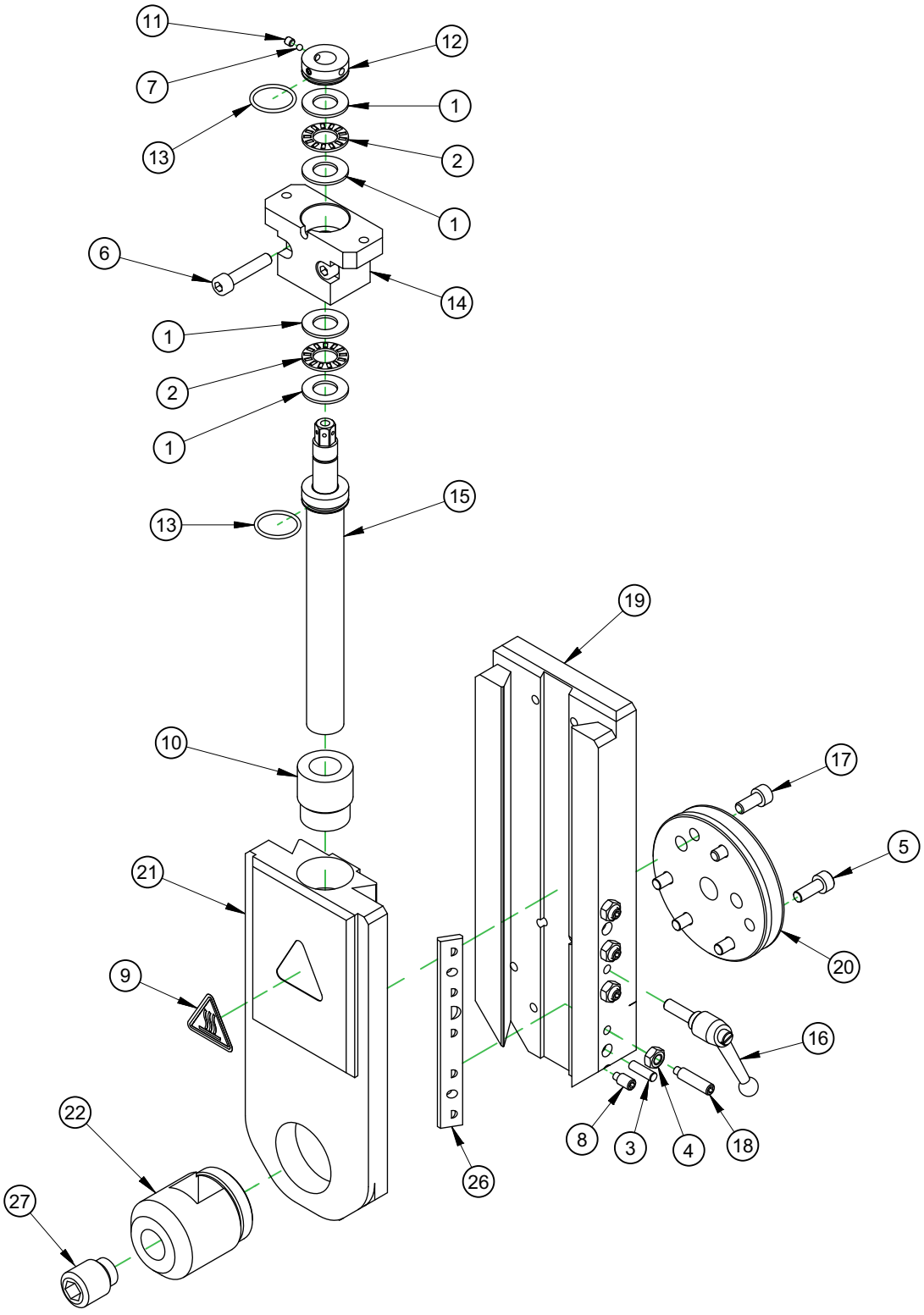


FIGURE A-6. SLIDE TOOL HOLDER ASSEMBLY (P/N 79790)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	10436	WASHER THRUST .500 ID X .937 OD X .060
2	2	10437	BRG THRUST .500 ID X .937 OD X .0781
3	2	16953	PIN DOWEL 3/16 DIA X 5/8
4	4	20772	NUT M6 X 1.0 STDN ZINC PLATED
5	4	35014	SCREW M6 X 1.0 X 16mm SHCS
6	2	35505	SCREW M6 X 1.0 X 30 SHCS
7	2	43489	BALL NYLON 1/8 DIA
8	1	45034	SCREW M6 X 1.0 X 12MM SSSDPPL
9	1	46902	LABEL WARNING HOT SURFACE GRAPHIC 1.13" TALL
10	1	48526	NUT LEADSCREW ACME 3/4-10 BRONZE LH
11	2	53365	SCREW M4 X 0.7 X 4 mm SSSFP
12	1	57214	BRG RETAINING NUT AXIAL FEED LEADSCREW
13	2	57320	RING O 1/16 X 13/16 ID X 15/16 OD
14	1	57793	BEARING BLOCK LEADSCREW
15	1	57912	LEAD SCREW AXIAL FEED FF LINE
16	1	58133	HANDLE ADJUSTABLE M6 X 1 X 20MM
17	2	59003	SCREW M6 X 1.0 X 14MM SHCS
18	4	74658	SCREW M6 X 1 X 25MM SSSDP
19	1	79548	BASE TOOL HOLDER
20	1	79826	PLATE DOVE CIRCULAR
21	1	80307	TOOL HEAD TOP SLIDE
22	1	80309	CLAMP TOOL BIT 3/4 SQ
23	AR	80419	(NOT SHOWN) SHIM 1.8 ID X 3.2 OD .001 THICK
24	AR	80420	(NOT SHOWN) SHIM 1.8 ID X 3.2 OD .002 THICK
25	AR	80421	(NOT SHOWN) SHIM 1.8 ID X 3.2 OD .005 THICK
26	1	82224	GIB TOOLHEAD
27	1	82280	SCREW M20 X 2.5 X 25MM SSSDP

FIGURE A-7. SLIDE TOOL HOLDER ASSEMBLY PARTS LIST (P/N 79790)

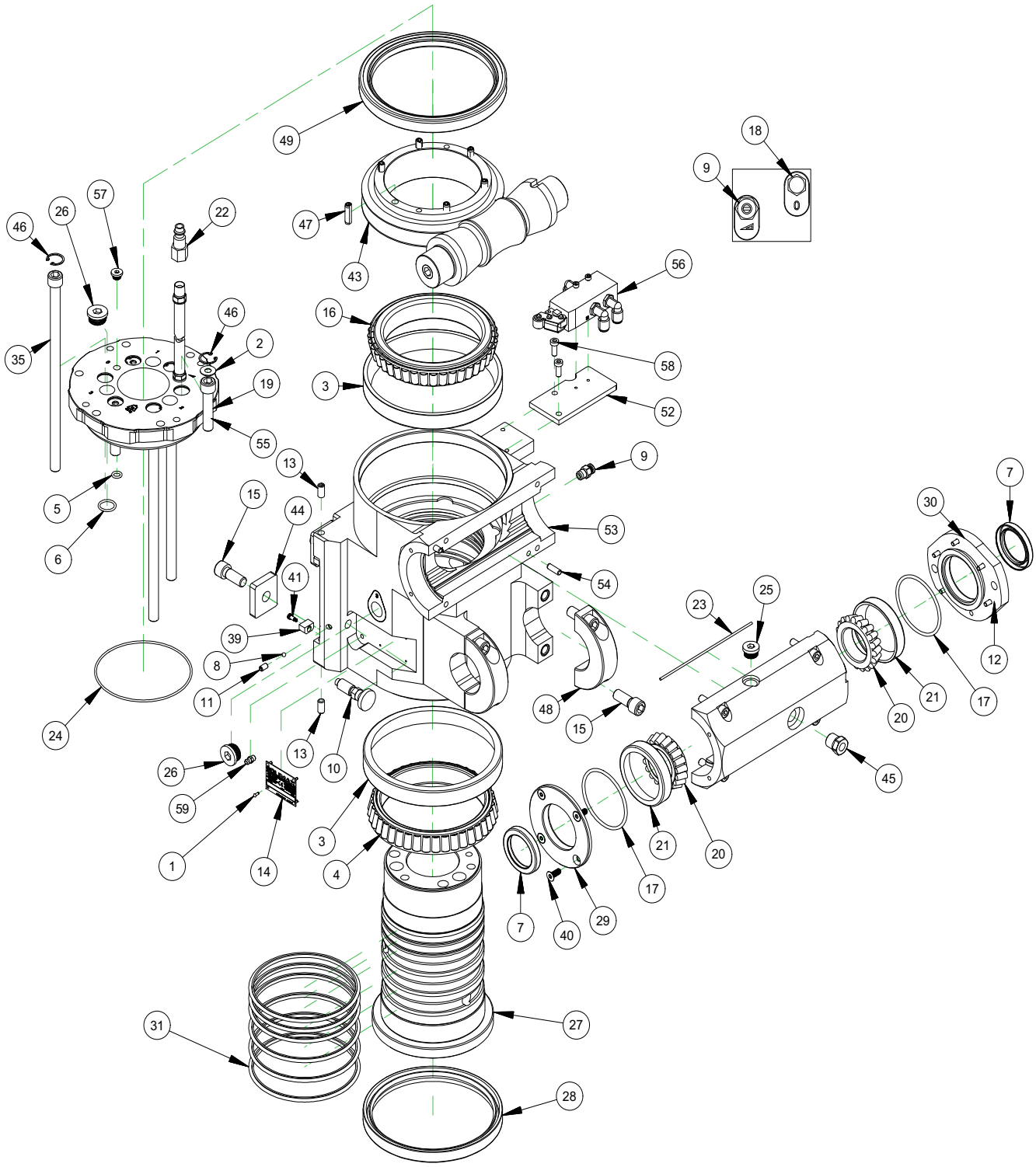


FIGURE A-8. MAIN BODY ASSEMBLY (P/N 87913)

PARTS LIST				PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION	ITEM	QTY	P/N:	DESCRIPTION
1	4	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089	30	1	79537	RETAINER BRG DRIVE END
2	3	10770	WASHER THRUST .75 OD X .312 ID X .03	31	6	79825	SEAL 125MM X 136MM X 4.2MM ROTARY
3	2	11162	BRG CUP 6.6875 OD X .8125 WIDE	32	AR	80413	(NOT SHOWN) SHIM 4.71 ID X 5.62 OD .001 THICK
4	1	11163	BRG CONE 5.0000 ID X 1.0313	33	AR	80416	(NOT SHOWN) SHIM 4.71 ID X 5.62 OD .002 THICK
5	2	13623	RING O 3/32 X 5/16 ID X 1/2 OD	34	AR	80417	(NOT SHOWN) SHIM 4.71 ID X 5.62 OD .005 THICK
6	3	14348	RING O 3/32 X 11/16 ID X 7/8 OD	35	3	80452	SCREW M12 X 1.75 X 260 SHCS
7	2	15768	SEAL 1.625 ID X 2.250 OD X .313	36	AR	80458	(NOT SHOWN) SHIM 2.46 ID X 2.96 OD .001 THICK
8	1	16594	BALL NYLON 3/16 DIA	37	AR	80459	(NOT SHOWN) SHIM 2.46 ID X 2.96 OD .002 THICK
9	1	18439	FTG ADAPTER 1/8 NPTM X 1/4 TUBE F PRESTOLOK NICKEL PLATED	38	AR	80460	(NOT SHOWN) SHIM 2.46 ID X 2.96 OD .005 THICK
				39	4	80465	BLOCK TRAMMING TURNING ARM
10	1	29207	SPRING PLUNGER HAND RETRACT 1/2 X 13	40	4	80467	SCREW M6 X 1.0 X 16MM FHSCS
11	1	29364	SCREW M6 X 1.0 X 10MM SSSFP GRADE 45	41	4	80561	SCREW 4MM DIA X 6MM X M3 X 0.5 SHLDCS
12	6	35113	SCREW M5 X .8 X 16 SHCS	42	AR	82232	(NOT SHOWN) SHIM 4.71 ID X 5.62 OD .010 THICK
13	4	35412	SCREW M8 X 1.25 X 16 SSSFP	43	1	82265	GEAR SET CONE DRIVE 10:1 SIZE 40 MODIFIED
14	1	35828	PLATE SERIAL YEAR MODEL CE 1.5 X 2.0	44	4	82276	CLAMP FB 38MM X 44MM X 9MM
15	8	40697	SCREW M12 X 1.75 X 30mm SHCS	45	1	82371	FTG PLUG 3/8 BSPP MALE LIQUID LEVEL SIGHT
16	1	41824	BRG CONE 4.75 ID X 1.000	46	6	84151	RING SNAP .777 OD X .042 TH
17	2	42031	O-RING 1/8 X 2-3/4 ID X 3 OD	47	6	84494	PIN ROLL 5/16 DIA X 1 COILED STANDARD STEEL
18	1	43804	FTG 1/8 NPT BREATHER VENT	48	2	84508	CLAMP CW MAIN HOUSING
19	3	46078	SCREW M12 X 1.75 X 55 SHCS	49	1	84647	SEAL 150MM ID X 180MM OD X 15MM
20	2	48715	BRG CONE 1.625 ID X 3.0 OD X .709 WIDE	50	1	84652	ASSY HOSE 801 1/4 ID X 1/8 BSPP X 1/4 NPTM X 12"
21	2	48716	BRG CUP 3.000 OD X .709 WIDE	51	1	84654	SEAL BONDED 1/8 BSPP
22	1	48843	FTG QUICK COUPLER 3/8B 1/4 NPTF MALE	52	1	87909	MOUNT VALVE PNEUMATIC FEED
23	15 IN	58858	O-RING CORD 3/32 DIA MED-HARD BLACK	53	1	87914	HOUSING MAIN BODY FF6300
24	1	63299	RING O 3/32 X 4-1/2 ID X 4-11/16 OD	54	2	11729	PIN DOWEL 1/4 DIA X 3/4
25	1	73302	PLUG G 3/8-19 BSPP HEX SOCKET	55	1	87915	PLATE SPINDLE CAP
26	2	77833	FTG PLUG 1/2 BSPP SOCKET	56	1	87916	ASSY AIR VALVE FEED SYSTEM
27	1	79399	SPINDLE MAIN BODY FF6300	57	1	87921	FTG PLUG 1/8 BSPP SOCKET
28	1	79403	SEAL 148MM ID X 170MM OD X 15MM	58	2	87924	SCREW M6 X 1.0 X 16MM LHSCS
29	1	79535	RETAINER BRG NON DRIVE END	59	1	90458	MODIFIED FTG GREASE M6 X 1.0 TAPER

FIGURE A-9. MAIN BODY ASSEMBLY PARTS LIST (P/N 87913)

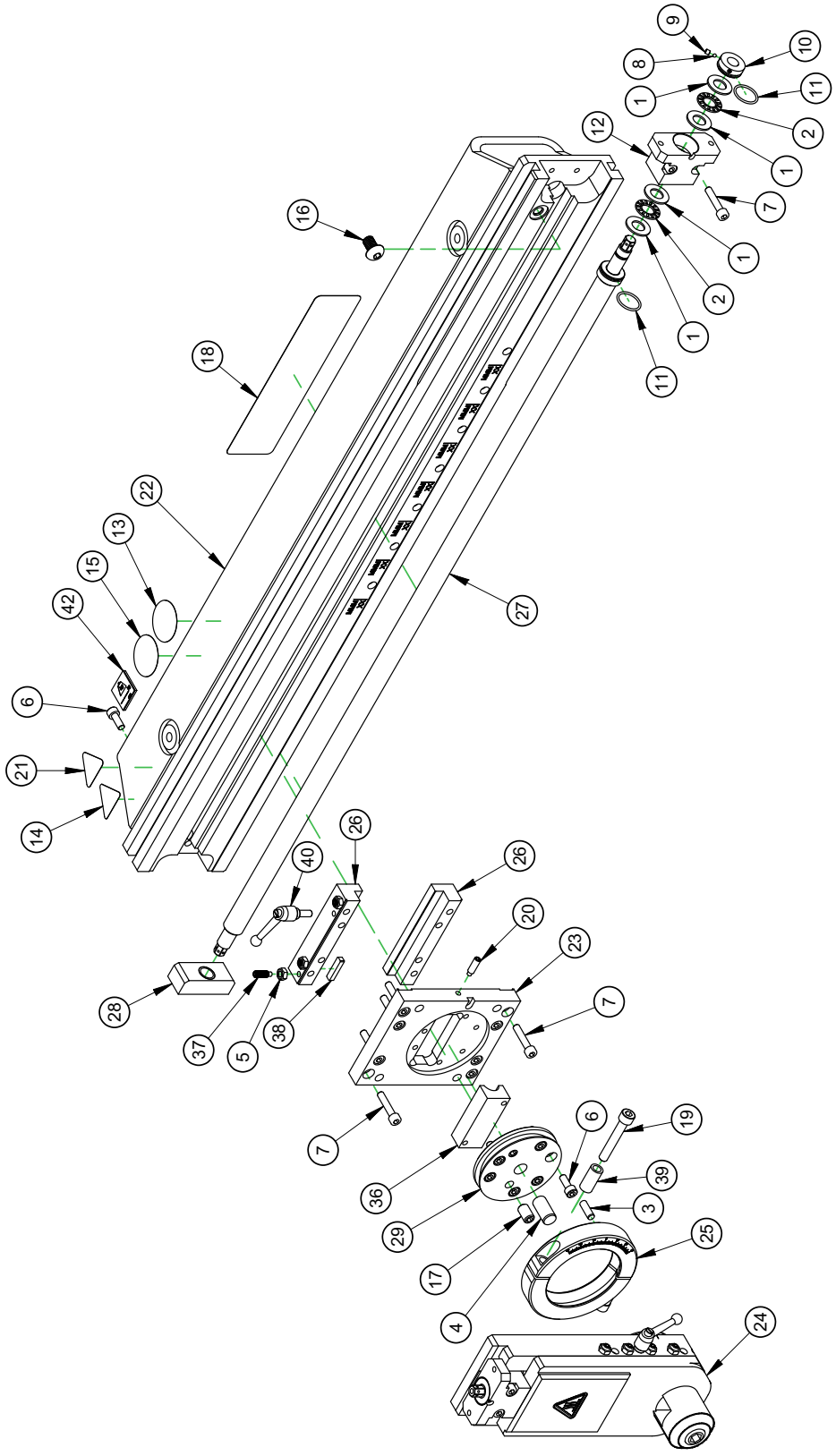
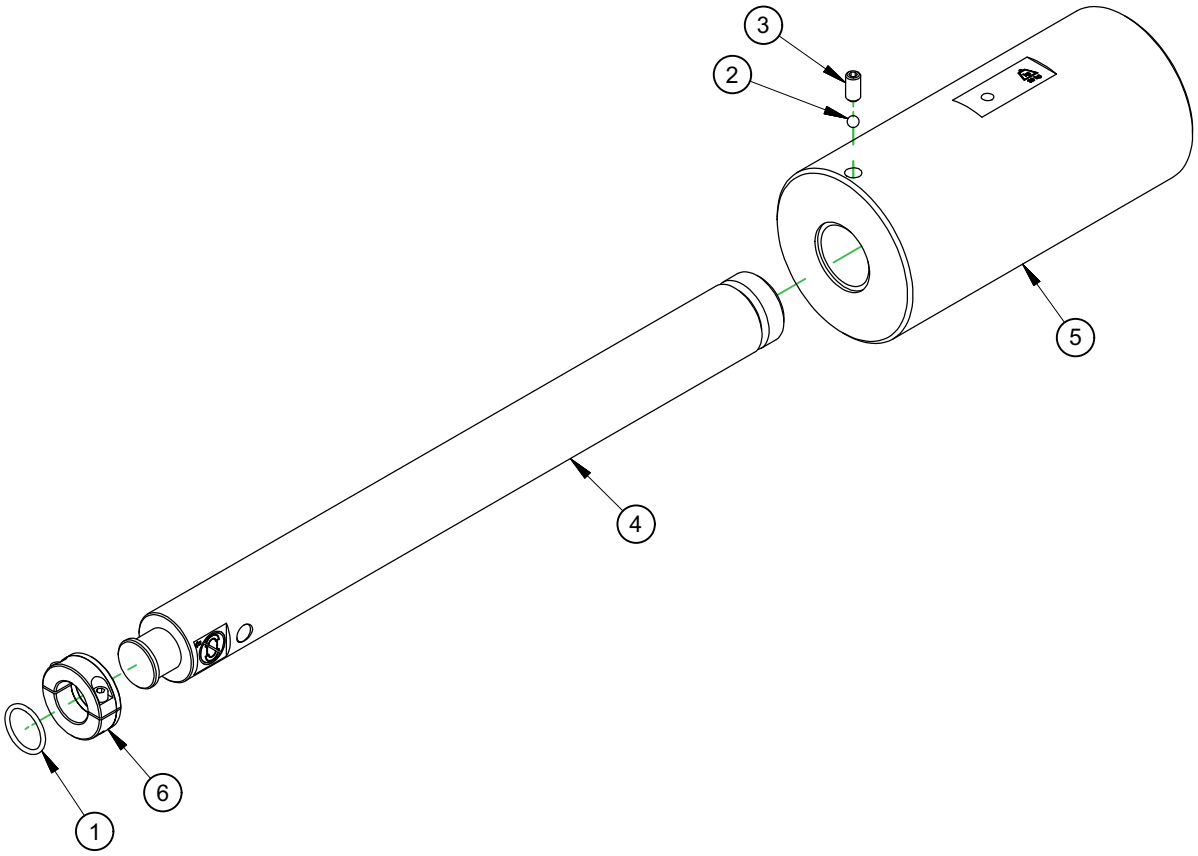


FIGURE A-10. TURNING ARM ASSEMBLY 38" (965 MM) (P/N 80304)

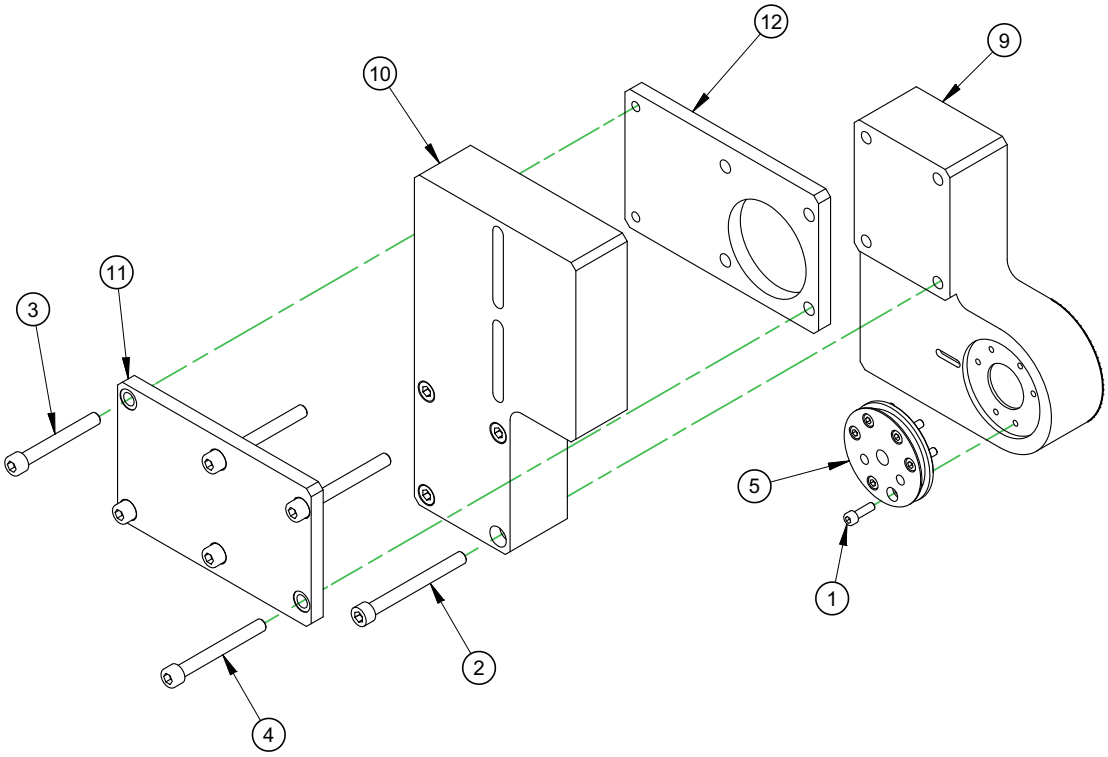
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	10436	WASHER THRUST .500 ID X .937 OD X .060
2	2	10437	BRG THRUST .500 ID X .937 OD X .0781
3	1	11729	PIN DOWEL 1/4 DIA X 3/4
4	1	20398	PIN DOWEL 1/2 DIA X 1
5	3	20772	NUT M6 X 1.0 STDN ZINC PLATED
6	8	35014	SCREW M6 X 1.0 X 16mm SHCS
7	10	35505	SCREW M6 X 1.0 X 30 SHCS
8	2	43489	BALL NYLON 1/8 DIA
9	2	53365	SCREW M4 X 0.7 X 4 mm SSSFP
10	1	57214	BRG RETAINING NUT AXIAL FEED LEADSCREW
11	2	57320	RING O 1/16 X 13/16 ID X 15/16 OD
12	1	57793	BEARING BLOCK LEADSCREW
13	1	59035	LABEL WARNING - WEAR EYE PROTECTION
14	1	59042	LABEL WARNING - HAND CRUSH/MOVING PARTS
15	1	59044	LABEL WARNING - CONSULT OPERATOR'S MANUAL 1.5 DIA
16	1	67837	SCREW M10 X 1.5 X 16MM BHSCS
17	2	68513	SCREW M10 X 1.5 X 16MM SSSFP
18	1	70227	LABEL CLIMAX LOGO 2 X 8
19	2	72753	SCREW M8 X 1.25 X 50MM SHCS
20	1	74296	SCREW M6 X 1.0 X 20MM SSSHDP
21	1	79324	LABEL WARNING - HAND ENTANGLEMENT/ROTATING GEARS
22	1	79391	ARM TURNING FF6300
23	1	79547	PLATE RADIAL SLIDE
24	1	79790	ASSY SLIDE TOOL HOLDER
25	1	79793	CLAMP COLLAR CIRCULAR DOVE
26	1	79796	KEEPER SET
27	1	79798	LEADSCREW 35 IN ARM
28	1	79822	PLATE TOOL ARM LEADSCREW SUPPORT
29	1	79826	PLATE DOVE CIRCULAR
30	AR	80419	(NOT SHOWN) SHIM 1.8 ID X 3.2 OD .001 THICK
31	AR	80420	(NOT SHOWN) SHIM 1.8 ID X 3.2 OD .002 THICK
32	AR	80421	(NOT SHOWN) SHIM 1.8 ID X 3.2 OD .005 THICK
33	AR	80423	(NOT SHOWN) SHIM .55 X 4.20 .001 THICK
34	AR	80424	(NOT SHOWN) SHIM .55 X 4.20 .002 THICK
35	AR	80425	(NOT SHOWN) SHIM .55 X 4.20 .005 THICK
36	1	80534	HALFNUT 3/4-10 ACME LH
37	3	80886	SCREW M6 X 1.0 X 18MM SSSDP
38	2	82201	GIB CLAMP TOOL HEAD
39	2	82226	COLLAR 8MM ID X 12MM OD X 25MM
40	1	82333	HANDLE ADJUSTABLE M6 X 1.0 X 15MM
41	AR	85727	(NOT SHOWN) SHIM .55 X 4.20 .0015 THICK
42	1	91217	PLATE MASS CE 1.0 X 1.0 KG ADHESIVE BACKED

FIGURE A-11. TURNING ARM ASSEMBLY 38" (965 MM) PARTS LIST (P/N 80304)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	10466	RING O 1/8 X 1-3/16 ID X 1-7/16 OD
2	1	26506	BALL NYLON 5/16 DIA
3	1	49679	SCREW M10 X 1.5 X 20MM SSSCP
4	1	79791	BAR COUNTERWEIGHT 23 IN
5	1	79792	COUNTERWEIGHT
6	1	82218	CLAMP COLLAR 30mm ID X 55mm OD X 20mm 2 PIECE WITH DAMPER

FIGURE A-12. COUNTERWEIGHT ARM ASSEMBLY (P/N 80324)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	6	35009	SCREW M6 X 1.0 X 20 SHCS
2	4	37262	SCREW M10 X 1.5 X 100 SHCS CLASS 12
3	2	58985	SCREW M10 X 1.5 X 80mm SHCS
4	4	60031	SCREW M10 X 1.5 X 90MM SHCS
5	1	79826	PLATE DOVE CIRCULAR
6	AR	80419	(NOT SHOWN) SHIM 1.8 ID X 3.2 OD .001 THICK
7	AR	80420	(NOT SHOWN) SHIM 1.8 ID X 3.2 OD .002 THICK
8	AR	80421	(NOT SHOWN) SHIM 1.8 ID X 3.2 OD .005 THICK
9	1	80492	PLATE LOWER BF ATTACHMENT
10	1	80493	PLATE UPPER BF ATTACHMENT
11	1	80494	PLATE CLAMP BF ATTACHMENT
12	1	80495	PLATE CLAMP THREADED BF ATTACHMENT

FIGURE A-13. BACKFACE ATTACHMENT ASSEMBLY (P/N 80362)

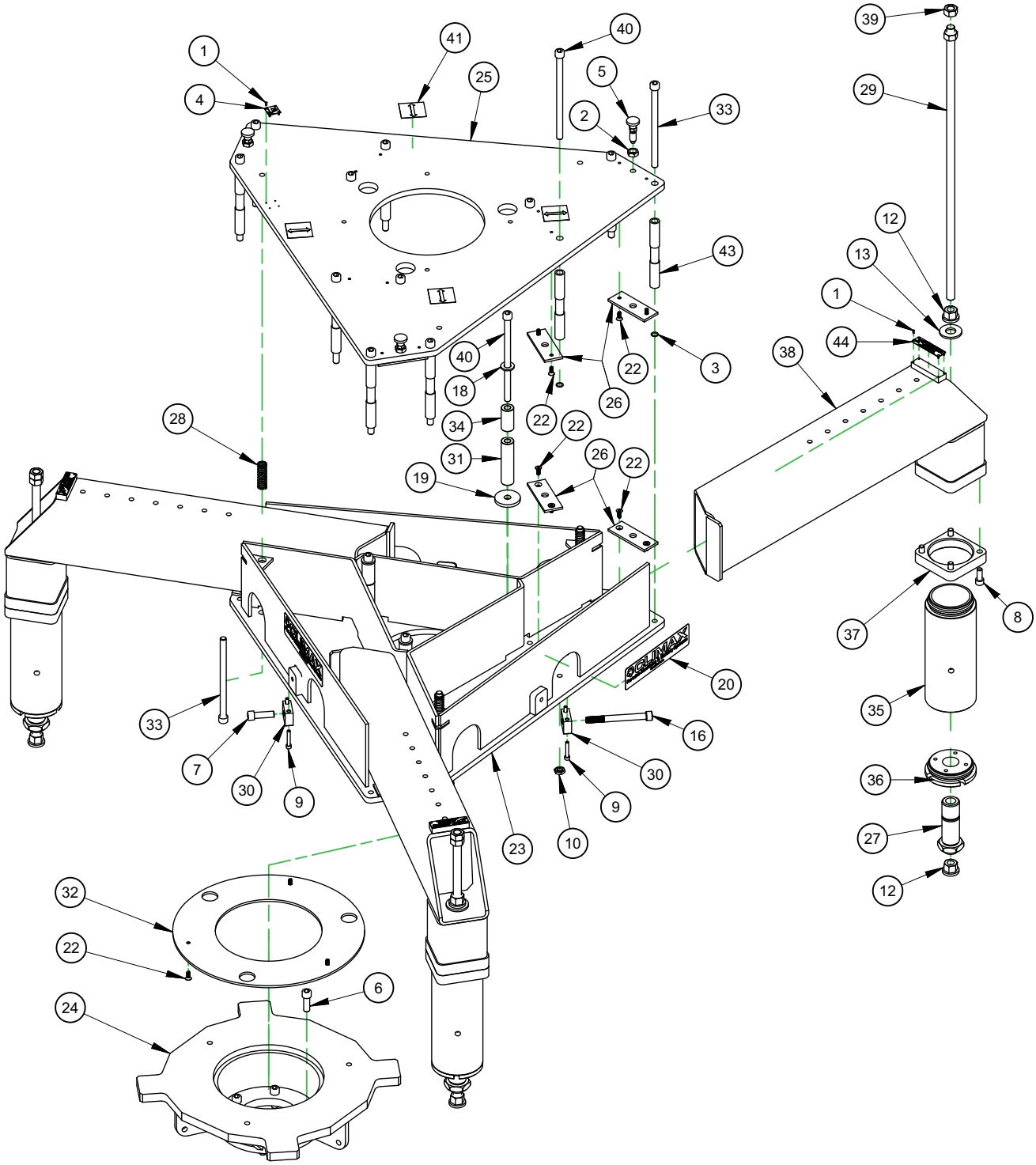
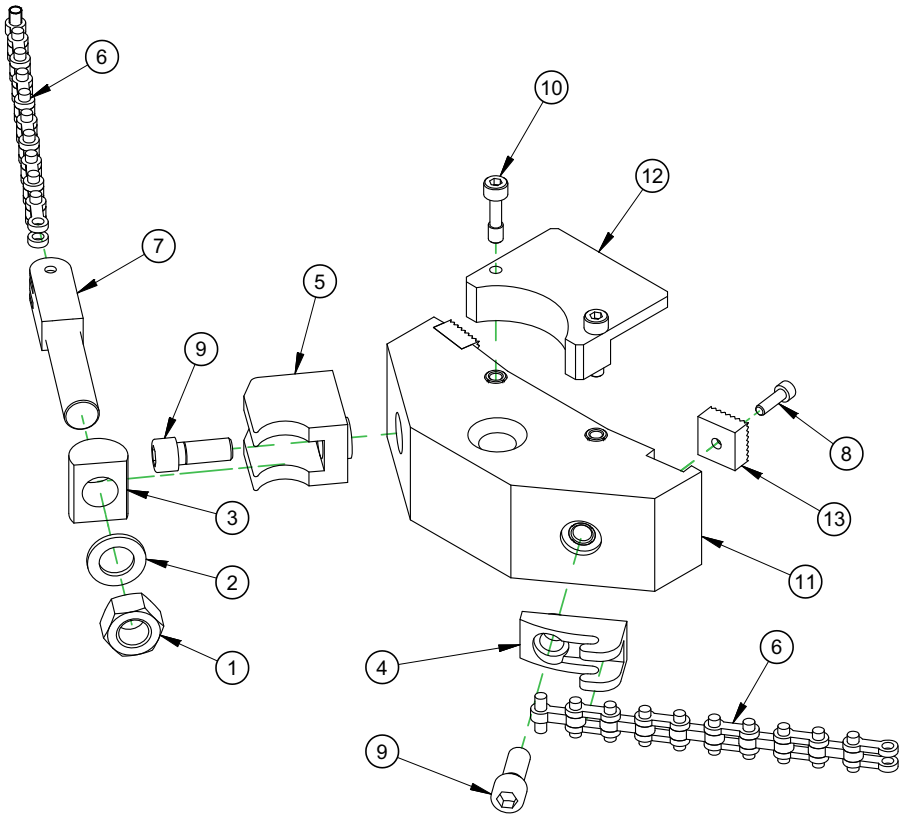


FIGURE A-14. OD MOUNT ASSEMBLY 38–63" (965–1,600 MM) (P/N 80477)

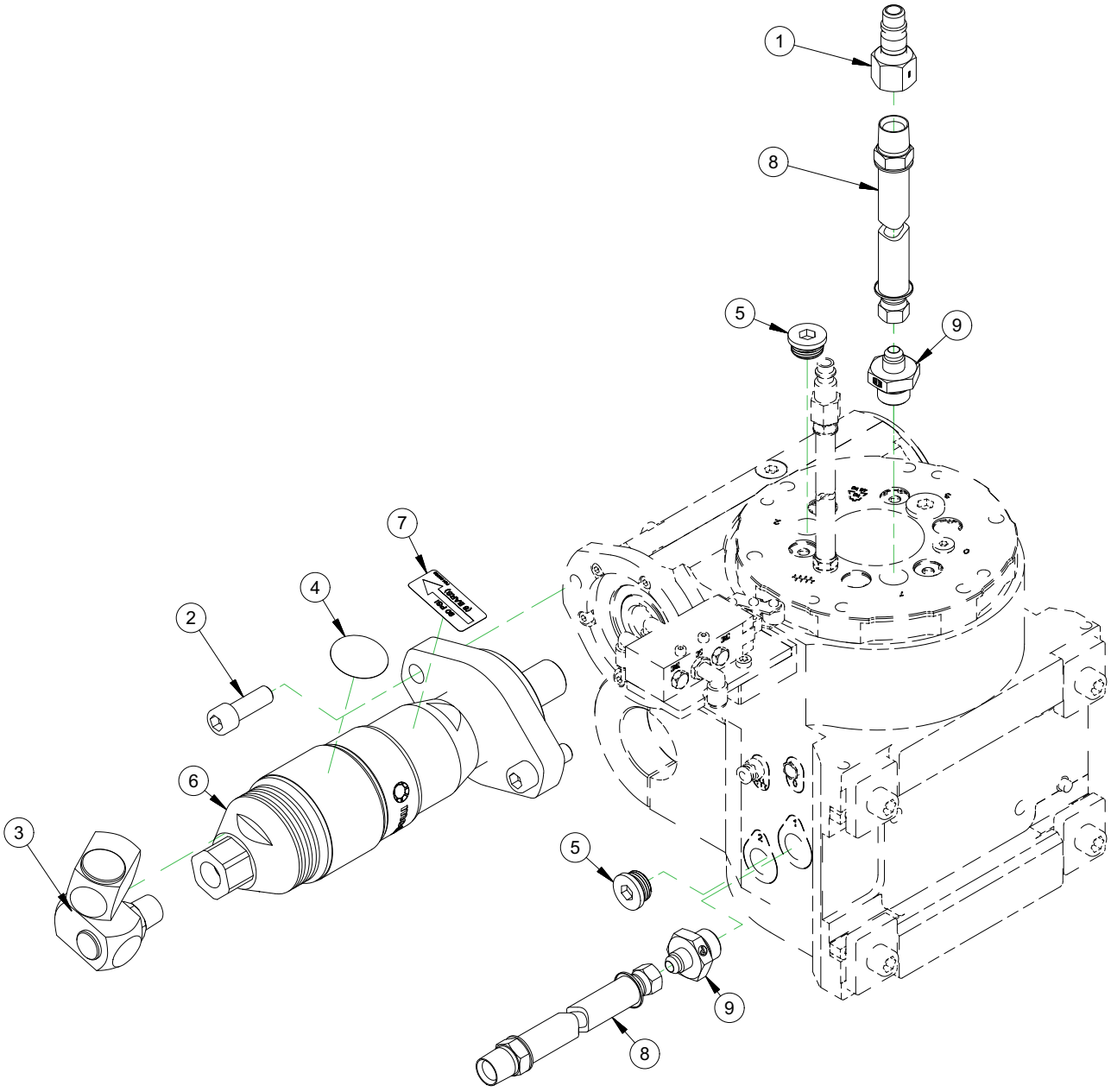
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	16	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
2	3	11218	NUT 1/2-13 JAMN
3	12	16599	RING O 1/16 X 7/16 ID X9/16 OD
4	1	29152	PLATE MASS CE
5	3	29207	SPRING PLUNGER HAND RETRACT 1/2 X 13
6	6	30207	SCREW M12 X 1.75 X 35mm SHCS
7	2	35215	SCREW M12 X 1.75 X 40mm SHCS
8	12	35339	SCREW M10 X 1.5 X 25mm SHCS
9	8	35504	SCREW M6 X 1.0 X 35mm SHCS
10	3	43121	NUT M12 X 1.75 STAINLESS STEEL
11	1	53197	(NOT SHOWN) WRENCH COMBINATION 24mm 12PT 338mm LG SATIN FINISH
12	6	57215	NUT M16 X 2.0 FLANGED
13	3	57606	WASHER 5/8 ID X 1.75 OD X . 156 THICK
14	1	58311	(NOT SHOWN) HOIST RING M10 X 1.5 X 16MM 32 ID 54 OD 98 OAL 990 LBS 450 KG SWIVEL
15	3	60688	(NOT SHOWN) NUT M12 X 1.75 HEAVY DUTY FLANGE
16	2	60689	SCREW M12 X 1.75 X 120MM SHCS
17	1	62704	(NOT SHOWN) WRENCH SOCKET 24mm 12 PT 1/2 DRIVE
18	3	62978	WASHER M12 FLTW 27MM OD 3.1 MM THICK
19	3	63707	WASHER 1/2 FLTW 2 OD X 1/4 THICK
20	3	70227	LABEL CLIMAX LOGO 2 X 8
21	1	78775	(NOT SHOWN) WRENCH COMBINATION 18mm SATIN
22	27	80467	SCREW M6 X 1.0 X 16MM FHSCS
23	1	80478	WELDMENT CHUCK OD HUB BOTTOM
24	1	80481	WELDMENT CHUCK OD SPACER
25	1	80482	PLATE CHUCK OD HUB TOP
26	12	80483	PLATE CHUCK OD WEAR STRIP
27	3	80499	FOOT CHUCK OD JACKING 1-3/8-12
28	3	80501	SPRING COMP .72 OD X .085 WIRE X 2.25 LONG
29	3	80560	ROD THREADED M16 X 2.0 X 660mm
30	4	80565	BLOCK STOPPER THREADED M12 T X 15mm H
31	3	80613	COLLAR 12mm ID X 25mm OD X 100mm BLACK
32	1	80616	PLATE SPACER 3/16 IN
33	12	80684	SCREW M12 X 1.75 X 190MM SHCS
34	3	80686	COLLAR 12mm ID X 25mm OD X 50mm BLACK
35	3	81975	LEG CHUCK 4.00 DIA X 9.00 IN
36	3	81978	CAP END 4.00 DIA THREADED
37	3	81981	PLATE THREADED OD MOUNT LEG
38	3	82002	WELDMENT CHUCK OD LEG
39	6	82295	NUT M16 X 2.0 STDN DIN 934 PLAIN
40	6	82342	SCREW M12 X 1.75 X 200MM SHCS
41	4	82344	LABEL ARROW MOVEMENT RED / WHITE
42	1	82356	(NOT SHOWN) CRATE SHIPPING WOOD FF6300 OD MOUNT WITH INSERT FF6300
43	12	83345	COLLAR .50 ID X .75 OD X 6.2 LONG DELRIN
44	3	84535	PLATE OD ALIGNMENT

FIGURE A-15. OD MOUNT ASSEMBLY 38–63" (965–1,600 MM) PARTS LIST (P/N 80477)



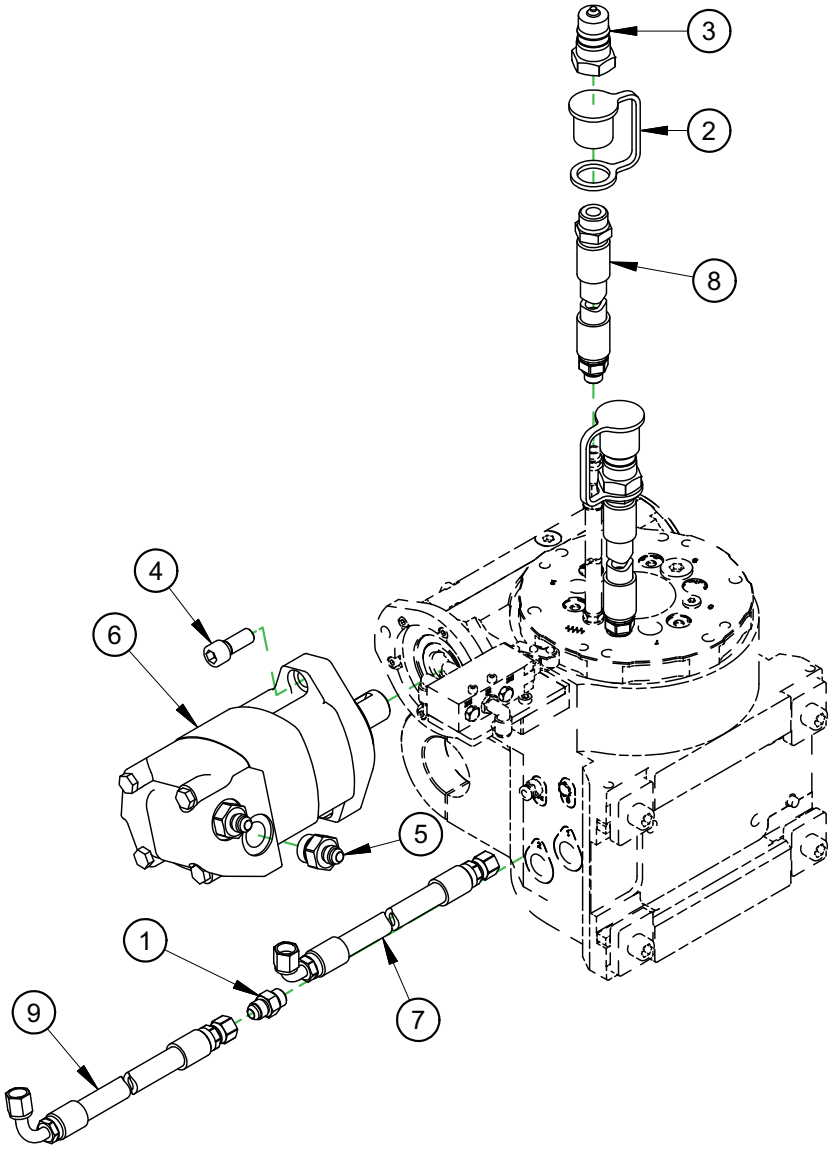
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	3	10197	NUT 3/4-10 STDN ZINC PLATED
2	3	10198	WASHER THRUST .750 ID X 1.250 OD X .123
3	3	10206	ROCKER CHAIN CLAMP
4	3	15504	CASTING BLOCK CLAMP SMALL
5	3	15835	CASTING -BLOCK CLAMP
6	171	27366	CHAIN WRENCH 3/4 PITCH .240 DIA PIN (3 LENGTHS AT 57")
7	3	27385	BOLT - CHAIN CLAMP
8	12	35009	SCREW M6 X 1.0 X 20 SHCS
9	6	40697	SCREW M12 X 1.75 X 30mm SHCS
10	6	74632	SCREW M8 X 1.25 X 30 OAL X 10 THD L STAINLESS
11	3	80623	FOOT OD CLAMP MOUNT
12	3	80624	SETUP FINGER OD MOUNT
13	12	82315	GRIPPER HSS 25mm SQ M6

FIGURE A-16. OD MOUNT CLAMP KIT (P/N 80622)



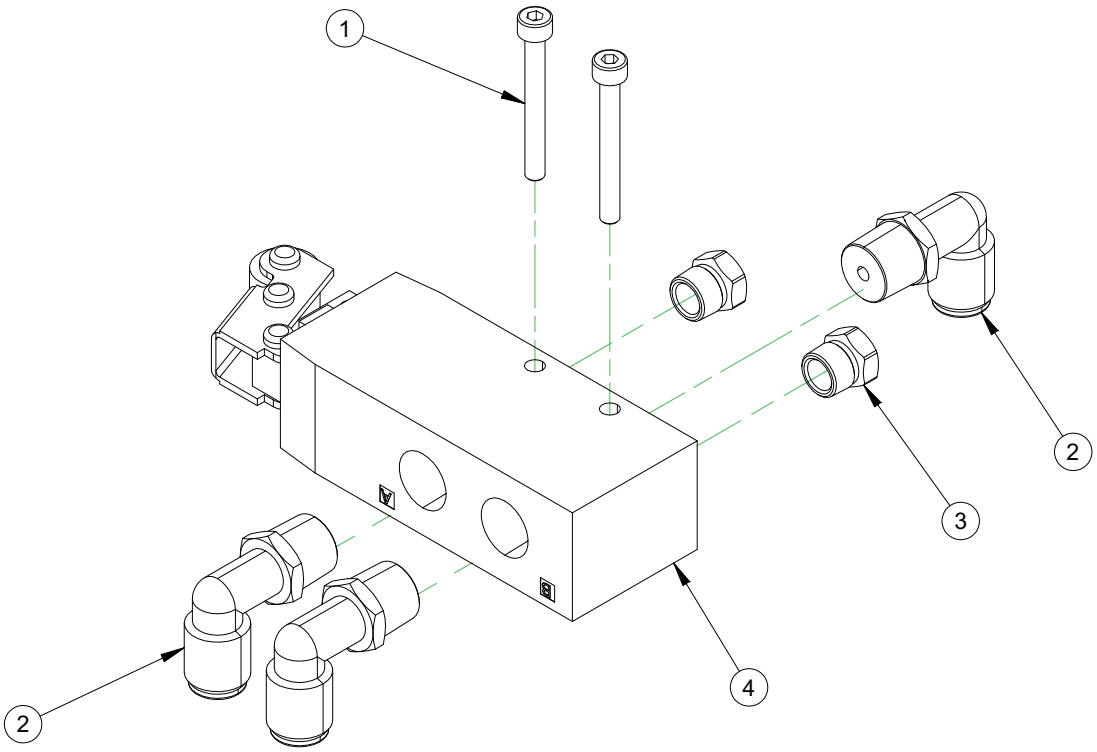
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	24851	FTG QUICK COUPLER 1/2B 1/2 NPTF MALE AIR
2	2	30207	SCREW M12 X 1.75 X 35mm SHCS
3	1	35670	FTG SWIVEL AIR 1/2 NPTM X 1/2 NPTF
4	1	59037	LABEL WARNING - WEAR EAR PROTECTION
5	2	77833	FTG PLUG 1/2 BSPP SOCKET
6	1	80323	MOTOR AIR 486 RPM FS 208 RPM MAX 160 NM TQ
7	1	80569	LABEL AIR MOTOR DIRECTION AND PRESSURE
8	2	82133	ASSY HOSE 801 1/2 ID JIC-6F X NPTM-1/2 SWIVEL X 12" PNEUMATIC
9	2	95890	FTG ADAPTER 1/2 BSPP MALE X JIC-6M

FIGURE A-17. FF6300 PNEUMATIC KIT (P/N 80969)



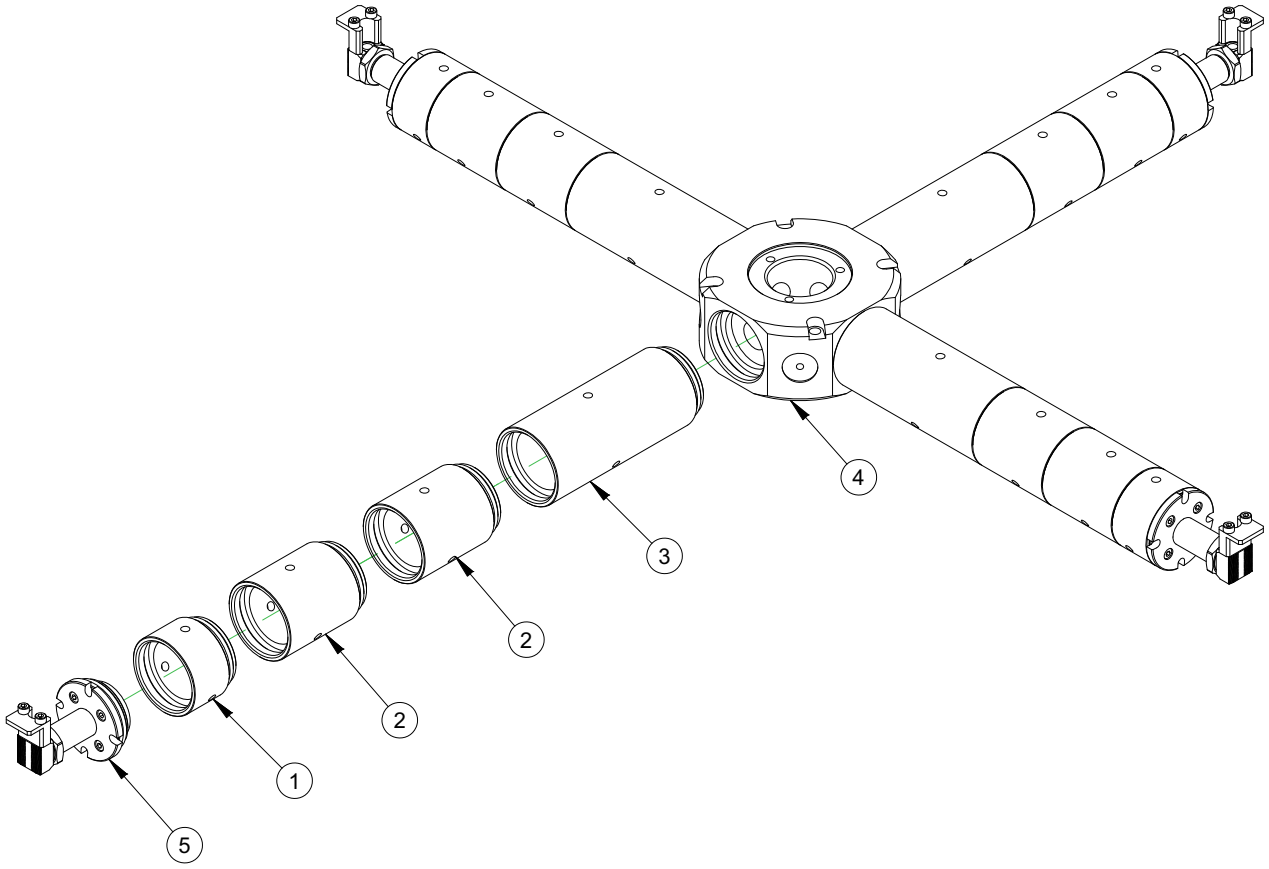
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	20700	FTG ADAPTER SAE-6M X JIC-6M
2	2	27978	FTG DUST CAP 1/2 MALE QUICK COUPLING
3	2	40614	FTG QUICK COUPLER MALE 1/2B X SAE-10F
4	2	40697	SCREW M12 X 1.75 X 30mm SHCS
5	2	55054	FTG ADAPTER SAE-10 MALE X JIC-6 MALE
6	1	63163	MOTOR HYD 6.2 CU IN KEYED SAE O-RING 2000
7	1	82136	HOSE ASSY 3/8" 451 JIC-6F 90 DEG X JIC-6F X 11"
8	2	82162	HOSE ASSY 451 1/2 X SAE-10M TO SAE-6M X 12 STRAIGHT FITTINGS
9	1	82188	HOSE ASSY 3/8" 451 JIC-6F 90 DEG X JIC-6F X 13"
10	1	83154	(NOT SHOWN) ASSY BYPASS HYD FOR SETUP

FIGURE A-18. FF6300 HYDRAULIC KIT (6.2 CU.IN. MOTOR WITH QD FTG) (P/N 80970)



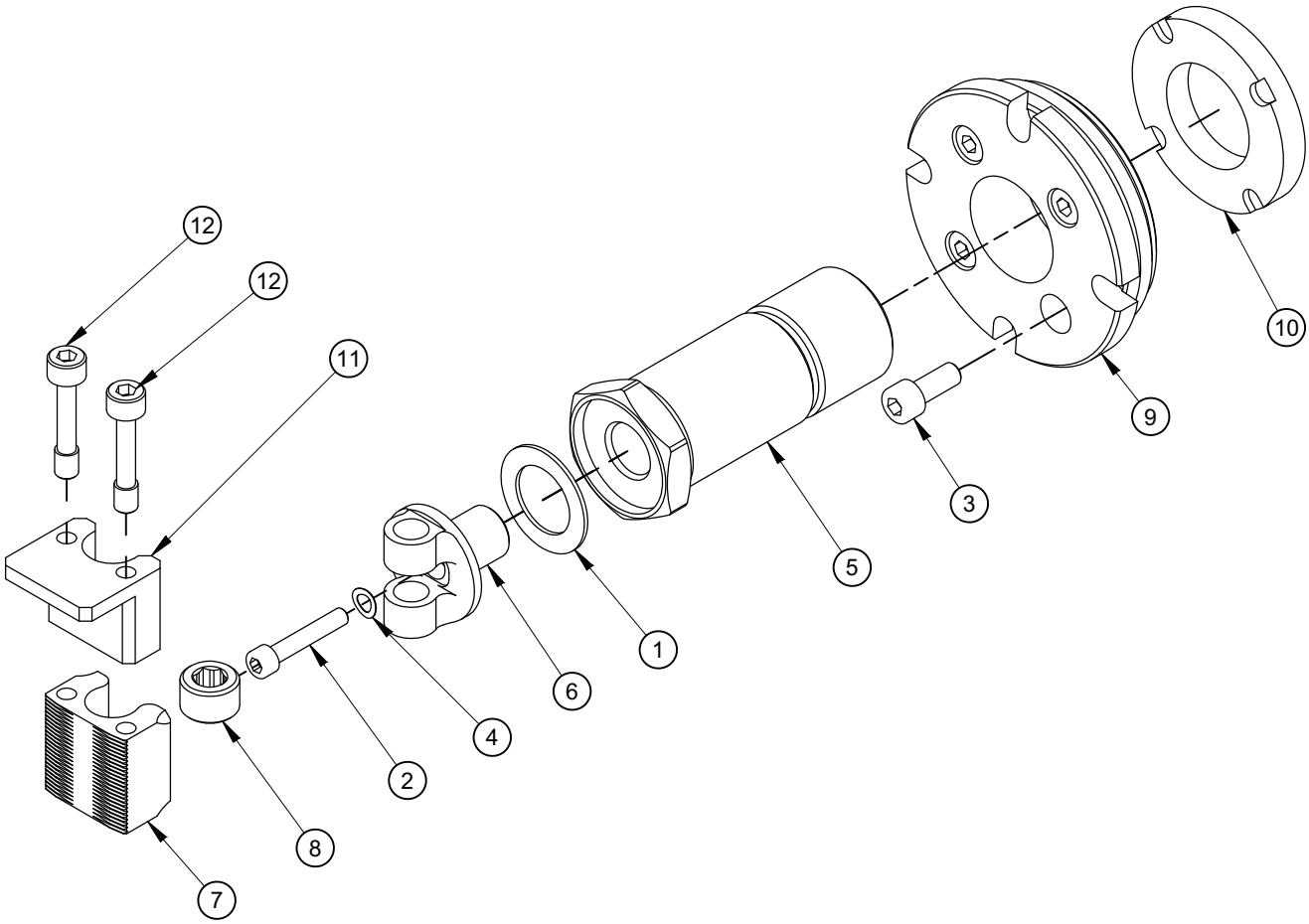
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	44682	SCREW M4 X 0.7 X 35mm SHCS
2	3	59342	FTG ELBOW 1/4 NPTMS X 1/4 TUBE F PRESTOLOCK NICKEL PLATED
3	2	82880	FTG MUFFLER 1/8 NPTM BRONZE AND STEEL
4	1	87329	VALVE 5 PORT ROLLER LEVER

FIGURE A-19. AIR VALVE ASSEMBLY (P/N 87916)



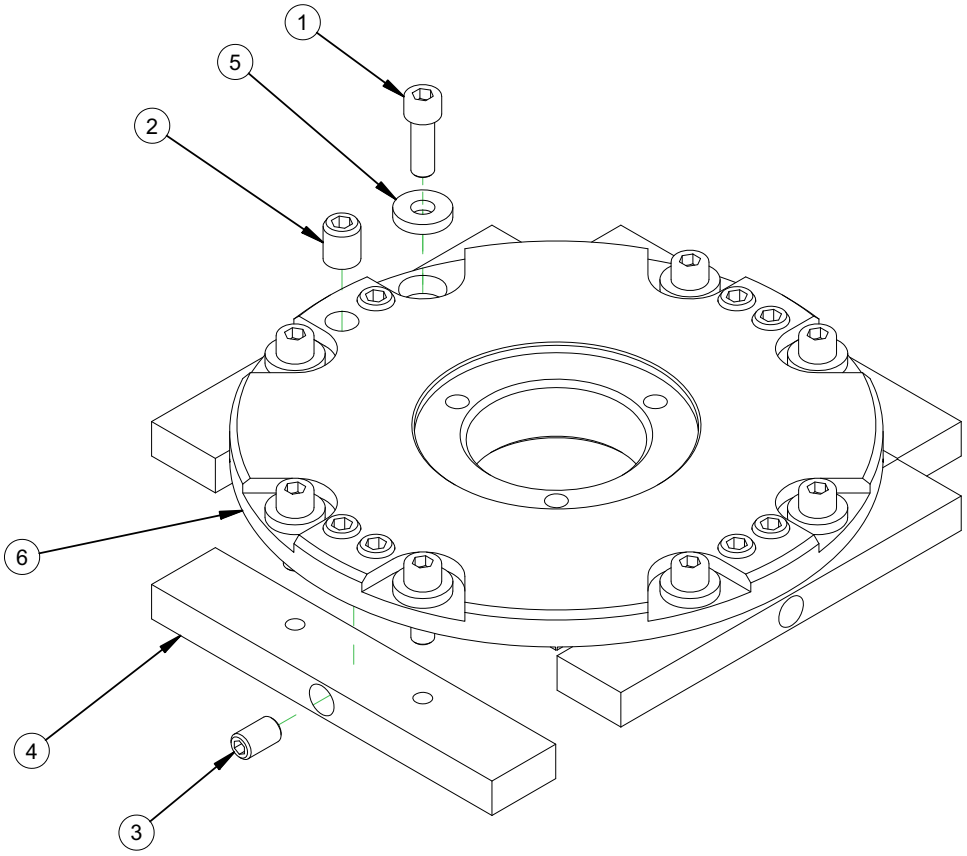
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	81973	LEG CHUCK 4.00 DIA X 2.25 IN
2	8	81974	LEG CHUCK 4.00 DIA X 4.50 IN
3	4	81975	LEG CHUCK 4.00 DIA X 9.00 IN
4	1	81976	CHUCK HUB FF6300 4IN LEGS
5	4	81977	ASSY LEVELING FOOT 4IN

FIGURE A-20. ID CHUCK ASSEMBLY 4 LEG 12–57" (305–1,448 MM) (P/N 81971)



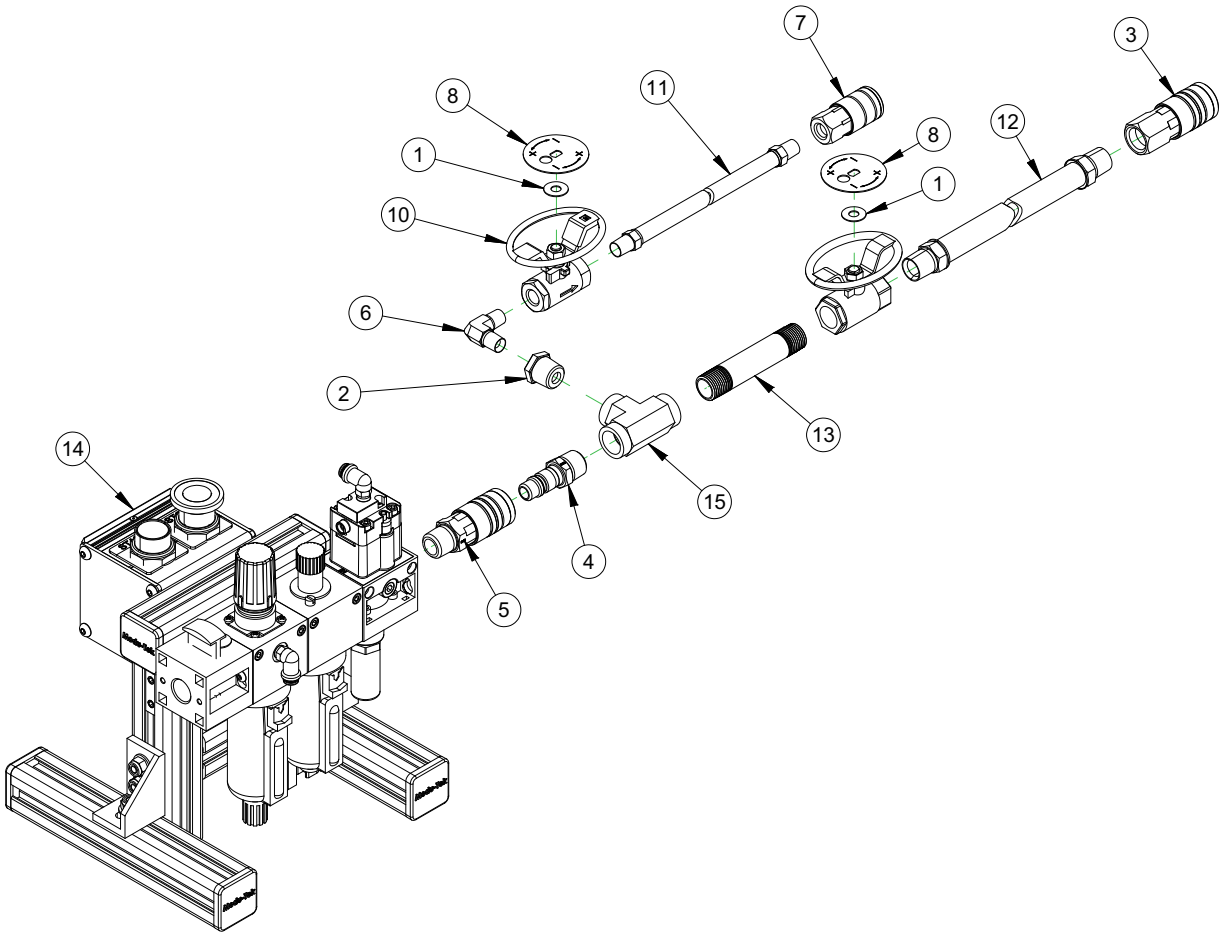
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	10144	WASHER THRUST 1 ID X 1.562 OD X .060
2	1	35504	SCREW M6 X 1.0 X 35mm SHCS
3	4	50458	SCREW M8 X 1.25 X 20mm SHCS
4	1	72361	WASHER SPRING WAVE .26 ID X .43 OD
5	1	79829	SCREW JACKING LEVELING 1-5/8-12
6	1	80427	BASE ADJUSTER
7	1	80428	JAW LEVELING
8	1	80430	SCREW MODIFIED M20 X 1.5 X 12.7MM HOLLOW LOCK
9	1	81978	CAP END 4.00 DIA THREADED
10	1	81979	NUT JACKING LOCK 1-5/8-12
11	1	81980	SETUP FINGER
12	2	82196	SCREW M8 X 1.25 X 40MM SHCS CAPTIVE 10 THD STAINLESS

FIGURE A-21. LEVELING FOOT 4" (102 MM) ASSEMBLY (P/N 81977)



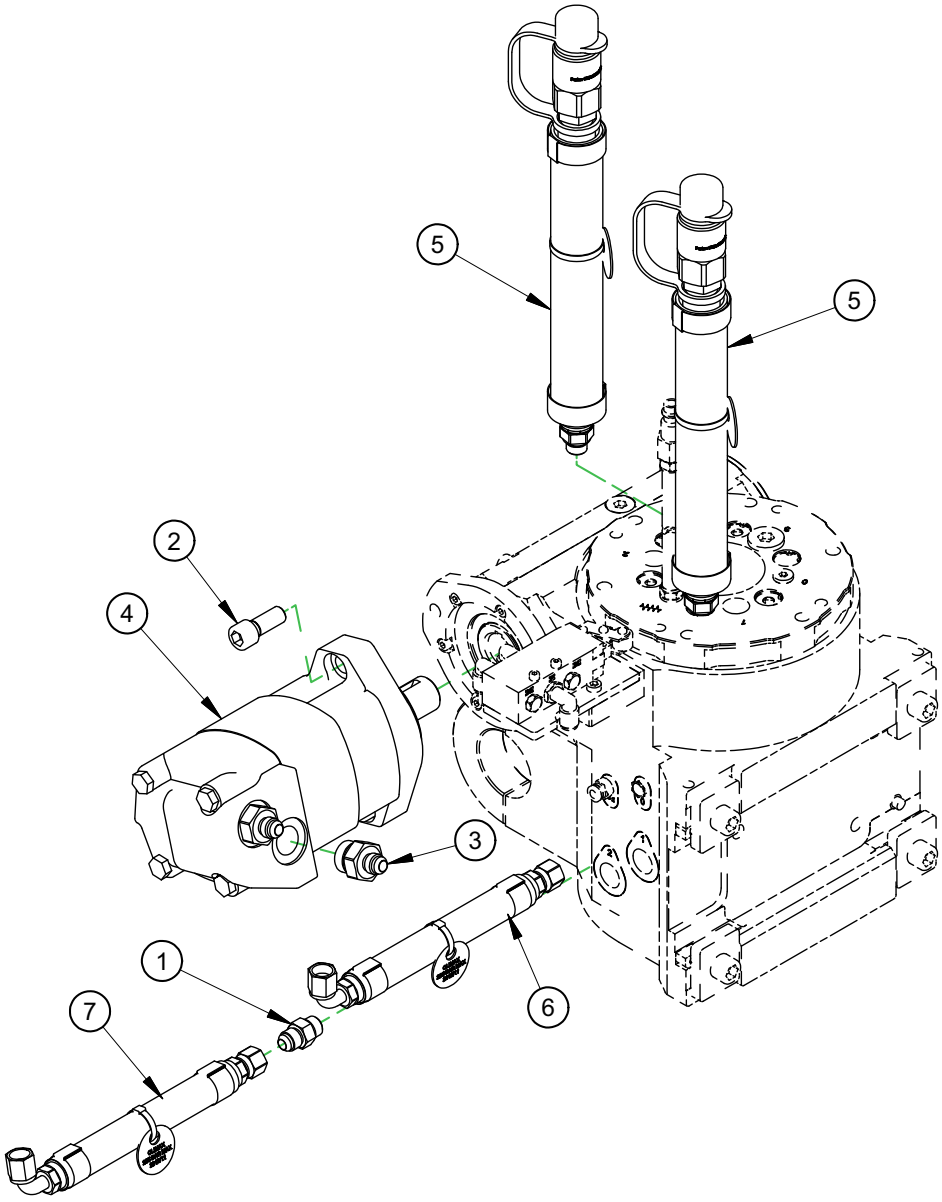
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	8	18214	SCREW M10 X 1.5 X 30mm SHCS
2	8	34643	SCREW M16 X 1.5 X 20mm SSSFP
3	4	43186	SCREW M12 X 1.75 X 20mm SSSFP
4	4	79545	BLOCK TACK WELD
5	8	79927	WASHER 3/8 FLTW HARDENED 1 OD X .2 THK BLACK OXIDE FINISH
6	1	80647	PLATE SURFACE MOUNT FF6300

FIGURE A-22. SURFACE MOUNT ASSEMBLY (P/N 82309)



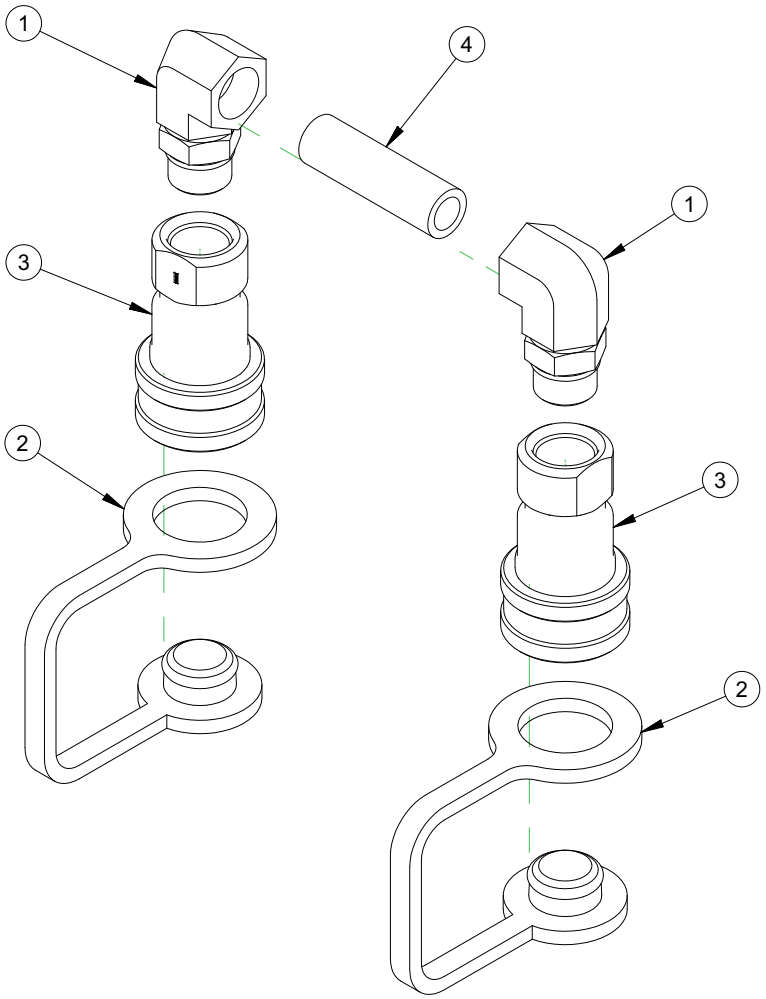
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	10770	WASHER THRUST .75 OD X .312 ID X .03
2	1	12920	FTG REDUCER BUSHING 1/2 NPTM X 1/4 NPTF
3	1	13208	FTG QD COUPLER 1/2B 1/2 NPTF PNEUMATIC
4	1	13209	FTG QD NIPPLE 1/2B 1/2 NPTM PNEUMATIC
5	1	16610	FTG QUICK COUPLER 1/2B 1/2 NPTM FEMALE AIR
6	1	30502	FTG ELBOW 1/4 NPTM X 1/4 NPTM 90 DEG
7	1	35690	FTG QUICK COUPLER 3/8B 1/4 NPTF FEMALE AIR
8	2	35772	LABEL DIRECTION OVAL HANDLE BALL VALVE
9	1	36328	VALVE BALL 1/2NPTF OVAL HANDLE
10	1	59203	VALVE BALL 1/4 NPTF X 1/4 NPTF VENTED OVAL HANDLE
11	1	59330	HOSE ASSY 801 1/4 X 1/4 NPTMS ENDS X 180
12	1	59376	HOSE ASSY 801 1/2 X 1/2 NPTMS ENDS X 180
13	1	59694	FTG NIPPLE 1/2 NPTM X 4 BRASS
14	1	78264	PNEUMATIC CONDITIONING UNIT 1/2 IN LOW PRES. DROPOUT
15	1	82316	FTG TEE 1/2 NPTF (3)

FIGURE A-23. AIR CONTROL ASSEMBLY FOR PNEUMATIC FEED AND 1/2" (13 MM) DRIVE SUPPLY (P/N 87917)



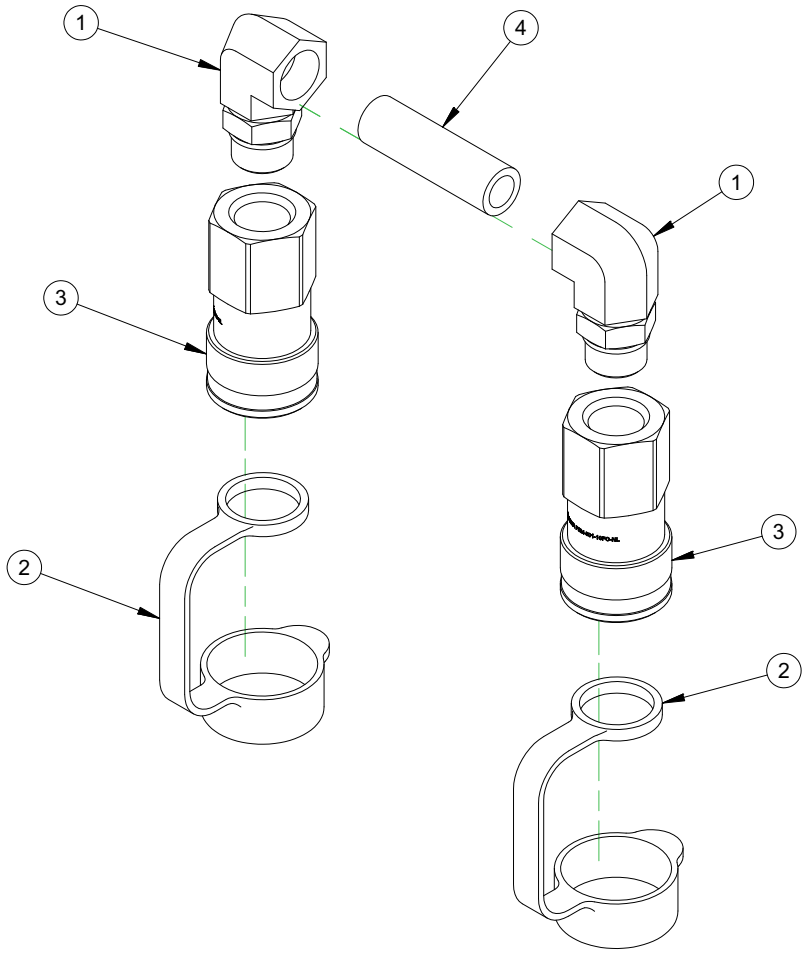
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	20700	FTG ADAPTER SAE-6M X JIC-6M
2	2	40697	SCREW M12 X 1.75 X 30mm SHCS
3	2	55054	FTG ADAPTER SAE-10 MALE X JIC-6 MALE
4	1	63163	MOTOR HYD 6.2 CU IN KEYED SAE O-RING 2000
5	1	82557	HYD HOSES PAIR 1/2 X 12 IN W/ FTG QD NIPPLE ISO 16028 TO SAE-6M & PROT SLV (CE)
6	1	82558	HOSE ASSY 3/8" 451 JIC-6F 90 DEG X JIC-6F X 11" CE
7	1	82559	HOSE ASSY 3/8" 451 JIC-6F 90 DEG X JIC-6F X 13" CE
8	1	83166	(NOT SHOWN) ASSY BYPASS HYD FOR SETUP ISO 16028 CE

FIGURE A-24. HYDRAULIC KIT 6.2 CUBIC MOTOR (P/N 82555)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	20411	FTG ELBOW 7/8 SAEM ORING X 1/2 NPTF 90 DEG
2	2	27977	FTG DUST PLUG 1/2 QD COUPLER
3	2	40615	FTG QUICK COUPLER FEMALE 60 SERIES 1/2B X SAE-10F
4	1	83153	FTG NIPPLE 1/2 NPTM X 2-1/2 STEEL BLACK

FIGURE A-25. BYPASS ASSEMBLY FOR SET UP OF HYDRAULIC MACHINE (P/N 83154)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	20411	FTG ELBOW 7/8 SAEM ORING X 1/2 NPTF 90 DEG
2	2	39241	DUST CAP QD NIPPLE 1/2B FEM STYLE RUBBER
3	2	69486	QD COUPLER HYDRAULIC 1/2 BODY FEM STYLE SAE-10F
4	1	83153	FTG NIPPLE 1/2 NPTM X 2-1/2 STEEL BLACK

FIGURE A-26. BYPASS ASSEMBLY FOR SET UP OF HYDRAULIC MACHINE (P/N 83166)

TABLE A-1. TOOL KIT (P/N 80327)

Item ID	Name	Quantity Per	UOM
10466	RING O 1/8 X 1-3/16 ID X 1-7/16 OD	1	Piece
14735	WRENCH EXTENSION 1/2 DRIVE X 10	1	Piece
14818	WRENCH RATCHET 1/2 DRIVE	1	Piece
34866	OIL AIRTOOL COMPLETE	1	Piece
35516	HAMMER DEAD BLOW 1-3/4 DIA HEAD (KB)	1	Piece
35821	WRENCH HEX 6MM X 6 T-HANDLE	1	Piece
35823	WRENCH HEX 10MM X 6 T-HANDLE	1	Piece
37749	WIRE TIE VELCRO 11 LONG (KB)	2	Piece
38678	WRENCH HEX SET 1.5 - 10MM BONDHUS BALL END (KB)	1	Piece
46250	WRENCH HEX BIT SOCKET 10MM X 1/2	1	Piece
50985	TUBING 1/4 OD X .040 WALL DOT 150 PSI NYLON BLUE	120	Inch
58107	SCREW M12 X 1.75 16MM BHSCS	2	Piece
58311	HOIST RING M10 X 1.5 X 16MM 32 ID 54 OD 98 OAL 990 LBS 450 KG SWIVEL	2	Piece
58350	WRENCH END 46mm X 8-9/16 LONG TIGHT ACCESS	1	Piece
59151	TUBING 1/8 OD X .023 WALL DOT 1000 PSI NYLON BLUE	120	Inch
60033	HOLDER INSERT 3/4 SQ SHANK LEFT HAND W/ 10 INSERTS SECO TRIGON	1	Piece
60034	HOLDER INSERT 3/4 SQ SHANK RIGHT HAND W/ 10 INSERTS SECO TRIGON	1	Piece
62382	WRENCH SPANNER 4 DIA FIXED PIN	1	Piece
65183	LUBRICANT ANTI SEIZE MOLY GRAPHITE EXTREME PRESSURE 10 OZ CAN	1	Piece
80671	BRACKET HOSE GUIDE	1	Piece
80679	MANUAL INSTRUCTION MODEL FF6300	1	Piece
82493	HANDWHEEL 4 IN. DIA 3/8" HEX CAST IRON DISHED W/ REVOLVING HANDLE MODIFIED (KB)	1	Piece

Table A-2 lists items most frequently replaced due to wear, loss, or damage. Avoid downtime by maintaining a small inventory of these critical parts.

TABLE A-2. RECOMMENDED SPARE PARTS

Qty	P/N	Description
		FF6300 Main body assembly
6	79825	SEAL 125MM X 136MM X 4.2MM ROTARY (Rotary union seals)
2	15768	SEAL 1.625 ID X 2.250 OD X 0.313 (Worm drive seals)
2	79403	SEAL 148MM ID X 170MM OD X 15MM (Main spindle seals)
1	87329	VALVE 5 PORT ROLLER LEVER
		FF6300 Turning arm
1	80534	HALFNUT 3/4-10 ACME LH (Radial slide leadnut)
4	10436	WASHER THRUST.500 ID X 0.937 OD X 0.060 (Leadscrew thrust washer)
2	10437	BRG THRUST 500 ID X 937 OD X 0.0781 (Leadscrew thrust bearing)
2	57320	O-RING 1/16 X 13/16 ID X 15/16 OD (Leadscrew thrust seals)
1	82333	HANDLE ADJUSTABLE M6 X 1 X 15MM
1	58133	HANDLE ADJUSTABLE M6 X 1 X 20MM
1	48526	NUT LEADSCREW ACME 3/4-10 BRONZE LH (Tool holder leadnut)
		FF6300 Feed system
1	87326	ASSY FEED BOX PNEUMATIC MANUAL FEED ADJUST
120 in	50985	TUBING 1/4 OD X 040 WALL DOT 1200 PSI NYLON BLUE
120 in	59151	TUBING 1/8 OD X 023 WALL DOT 1000 PSI NYLON BLUE
1	58519	SHAFT FEED REMOVABLE FEEDBOX SHAFT
2	87842	CYLINDER AIR 40MM DIA 10MM STROKE DOUBLE ACTING
1	57530	BRG NEEDLE 1 ID X 1-5/16 OD X 0.625 OPEN
2	25957	BRG ROLLER CLUTCH 1 ID X 1.312 OD X 0.625 (KB)
2	25959	SEAL 1.000 ID X 1.312 OD X 0.125 (KB)
2	59156	SCREW M6 X 1.0 X 60MM SHCS
		FF6300 ID chuck system
3	81980	SETUP FINGER 6300
8	82196	SCREW M8 X 1.25 X 40MM SHCS CAPTIVE (Setup finger screws)
1	81977	ASSY FOOT LEVELING FF6300
2	81973	LEG CHUCK 4 DIA X 2.25 THREADED
2	81974	LEG CHUCK 4 DIA X 4.5 THREADED
2	81975	LEG CHUCK 4 DIA X 9 THREADED

TABLE A-2. RECOMMENDED SPARE PARTS

Qty	P/N	Description
		FF6300 Drive/feed control system
1	71420	REGULATOR BEXEL DIAL SET ¼ NPT (Feed control regulator)
1	80323	MOTOR AIR 486 RPM FS 208 RPM MAX 160 N m TQ (Pneumatic drive machines)
2	30207	SCREW M12 X 1.75 X 35MM SHCS GRADE 8.8
1	63163	MOTOR HYD 6.2 CU IN STRAIGHT KEYED SAE O-RING (Hydraulic drive machines)
		FF6300 OD mount system
6	30207	SCREW M12 X 1.75 X 35MM SHCS GRADE 8.8
3	57215	NUT M16 X 2.0 FLANGED (HOLD DOWN NUT FOR TACK-WELDING)
3	60688	NUT M12 X 1.75 FLANGED
1	70483	LIFTING EYE SWIVEL M10 X 1.5 X 15MM 25MM ID 881 LBS 400 KG
1	81975	LEG CHUCK 4 DIA X 9 THREADED

This page intentionally left blank

APPENDIX B SCHEMATICS

Schematics

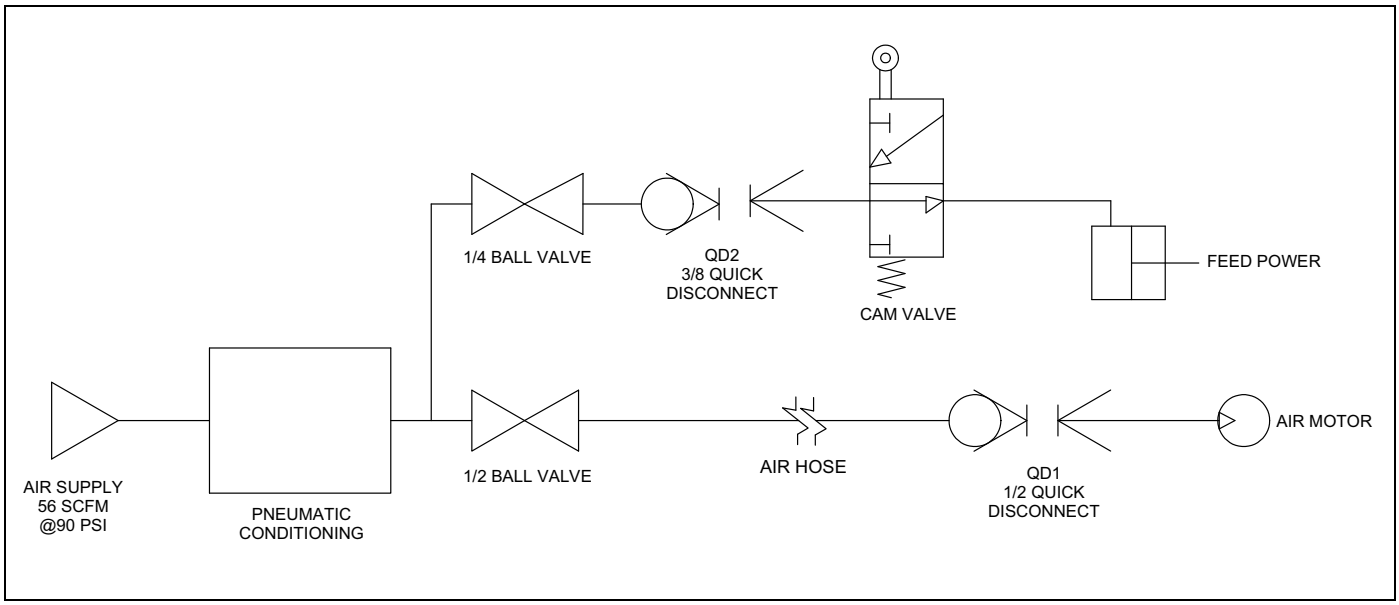


FIGURE B-1. PNEUMATIC SCHEMATIC (P/N 87917)

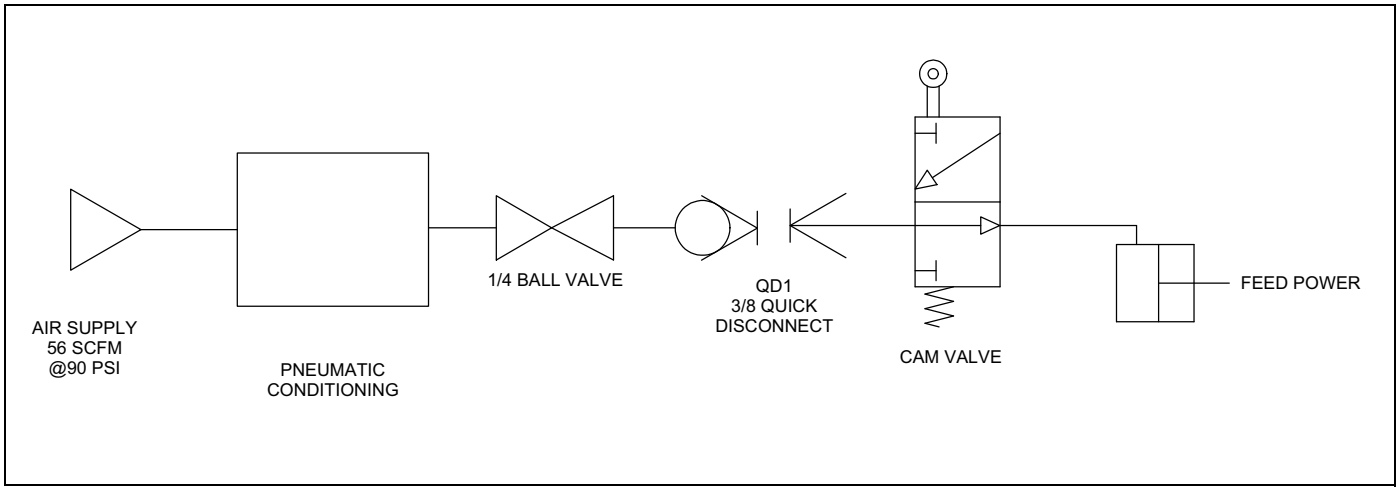


FIGURE B-2. ASSEMBLY SCHEMATIC FOR PNEUMATIC FEED ONLY (USED WITH HYDRAULIC MACHINES) (P/N 87941)

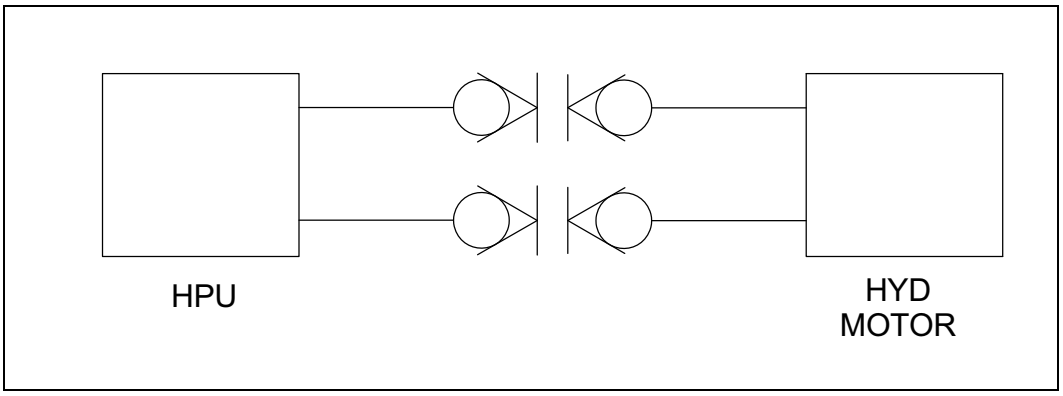


FIGURE B-3. HYDRAULIC KIT 6.2 CUBIC IN MOTOR WITH QD FTG FF6300 (P/N 80970)

APPENDIX C SDS

Contact CLIMAX for the current Safety Data Sheets.

This page intentionally left blank


CLIMAX
BORTECH
CALDER
H&S TOOL