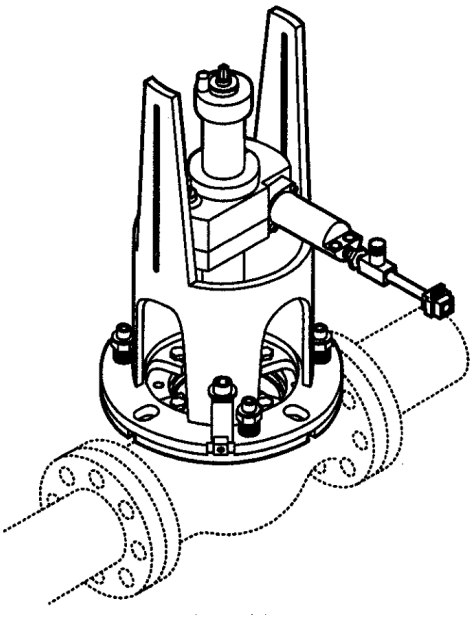
VM8000

VALVE RESEATING MACHINE

OPERATING MANUAL

ORIGINAL INSTRUCTIONS



CLIMAX
Portable Machining & Welding Systems

P/N 21433
May 2017
Revision 0

CLIMAX | BORTECH CALDER H&S TOOL

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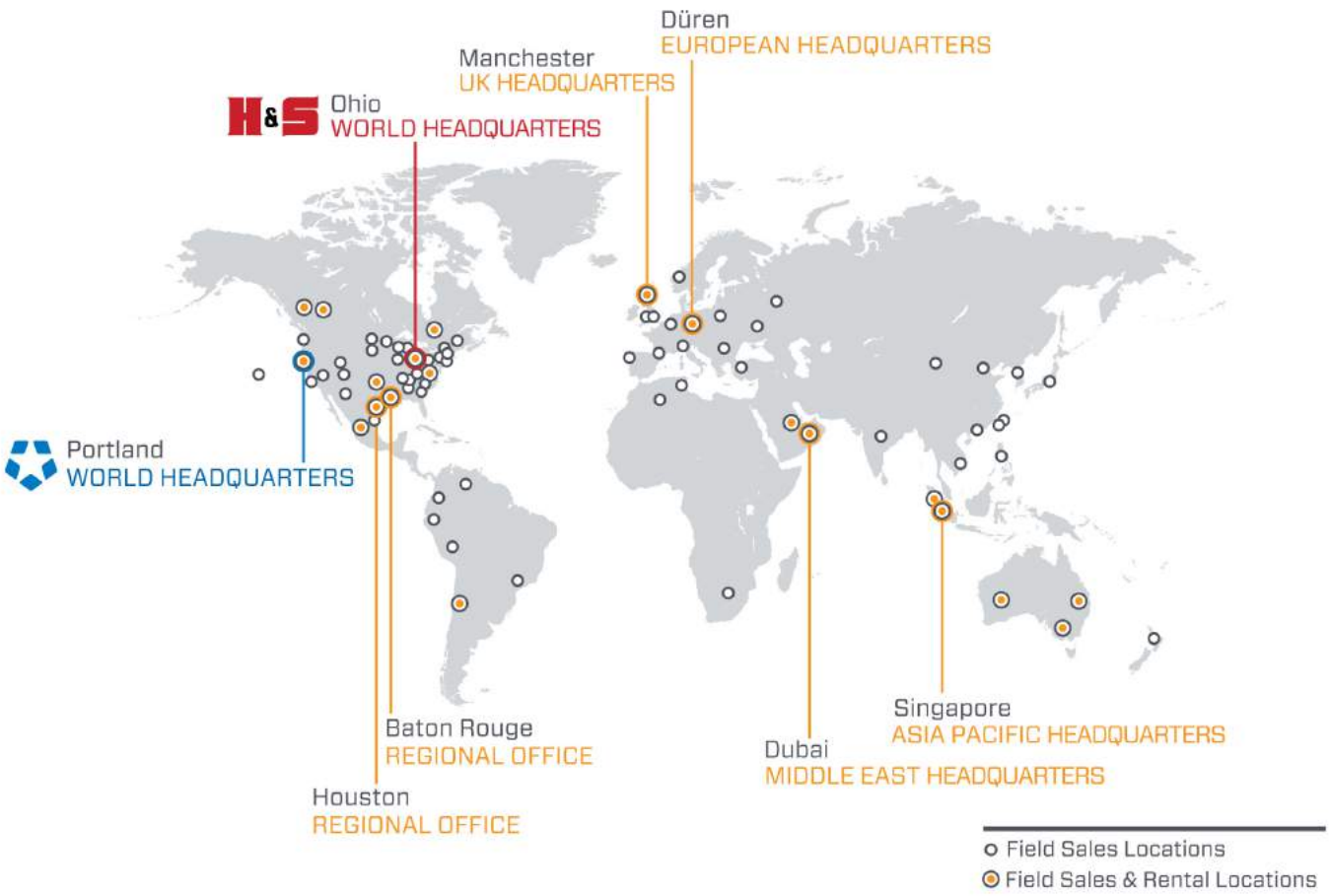

LIMITED WARRANTY

CLIMAX Portable Machine Tools, 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 pre-paid, 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:

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- 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

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Terms of sale

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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.

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1 INTRODUCTION

IN THIS CHAPTER:

1.1 How to use this manual

This manual describes information necessary for the setup, operation, maintenance, storage, shipping, and decommissioning of the VM8000.

The first page of each chapter includes a summary of the chapter contents to help you locate specific information. The appendices contain supplemental product information to aid in setup, operation, and maintenance tasks.

Read this entire manual to familiarize yourself with the VM8000 before attempting to set it up or operate it.

1.2 Safety alerts

Pay careful attention to the safety alerts printed throughout this manual. Safety alerts will call your attention to specific hazardous situations that may be encountered when operating this machine.

Examples of safety alerts used in this manual are defined here[1]:

DANGER

indicates a hazardous situation which, if not avoided, ***WILL*** result in death or severe injury.

WARNING

indicates a hazardous situation which, if not avoided, ***COULD*** result in death or severe injury.

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

⚠ CAUTION

indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

indicates a hazardous situation which, if not avoided, could result in property damage, equipment failure, or undesired work results.

1.3 GENERAL SAFETY PRECAUTIONS

CLIMAX leads the way in promoting the safe use of portable machine tools and valve testers. Safety is a joint effort. You, the end user, must do your part by being aware of your work environment and closely following the operating procedures and safety precautions contained in this manual, as well as your employer's safety guidelines.

Observe the following safety precautions when operating or working around the machine.

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. You, the end user, are responsible for conducting a risk assessment 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. Flame-resistant clothing with long sleeves and legs is recommended when operating the machine. Hot 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.

Lifting – Many CLIMAX machine components are very heavy. Whenever possible, lift the machine or its components using proper hoisting equipment and rigging. Always use designated lifting points on the machine. Follow lifting instructions in the setup procedures of this manual.

Lock-out/tag-out – Lock-out and tag-out the machine before performing maintenance.

Moving parts – CLIMAX machines have numerous exposed moving parts and interfaces that can cause severe impact, pinching, cutting, and other injuries. Except for stationary operating controls, avoid contact with moving parts by hands or tools during machine operation. 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 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. Hearing protection is required when operating this machine or working around it. During testing, the machine produced the sound levels[1] listed in Table 1-1.

TABLE 1-1. SOUND LEVELS

	Motor
Operator sound pressure	80 dBA

Hazardous environments – Do not operate the machine in environments where potentially explosive materials, toxic chemicals, or radiation may be present.

Machine mounting – Do not operate the machine unless mounted to a workpiece in accordance with this manual. If mounting the machine in an overhead or vertical position, do not remove hoist rigging until the machine is mounted to the workpiece in accordance with this manual.

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

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.

In contrast, 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 consider. 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 3.2).
☐	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 tasks (Section 5.2) with the recommended lubricants (Section 5.1).
☐	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 and are clear of the danger zone.
☐	I evaluated and mitigated any other potential risks specific to my work area.

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2 OVERVIEW

2.1 FEATURES AND COMPONENTS

The VM8000 is designed to machine to a depth of 16" (406 mm) with a 10" (254 mm) stroke. Maximum reach is 18" (457 mm). It can be powered either hydraulically or pneumatically. Three tool holders enable the Model VM8000 to face and turn diameters from 3.0" (76 mm) to 10" (254 mm).

The Model VM8000 Valve Reseating Machine consists of:

- Rotational drive
- Main body
- Turning bar
- Pneumatic conditioning unit

Exploded-view drawings and parts lists are in the back of this manual.

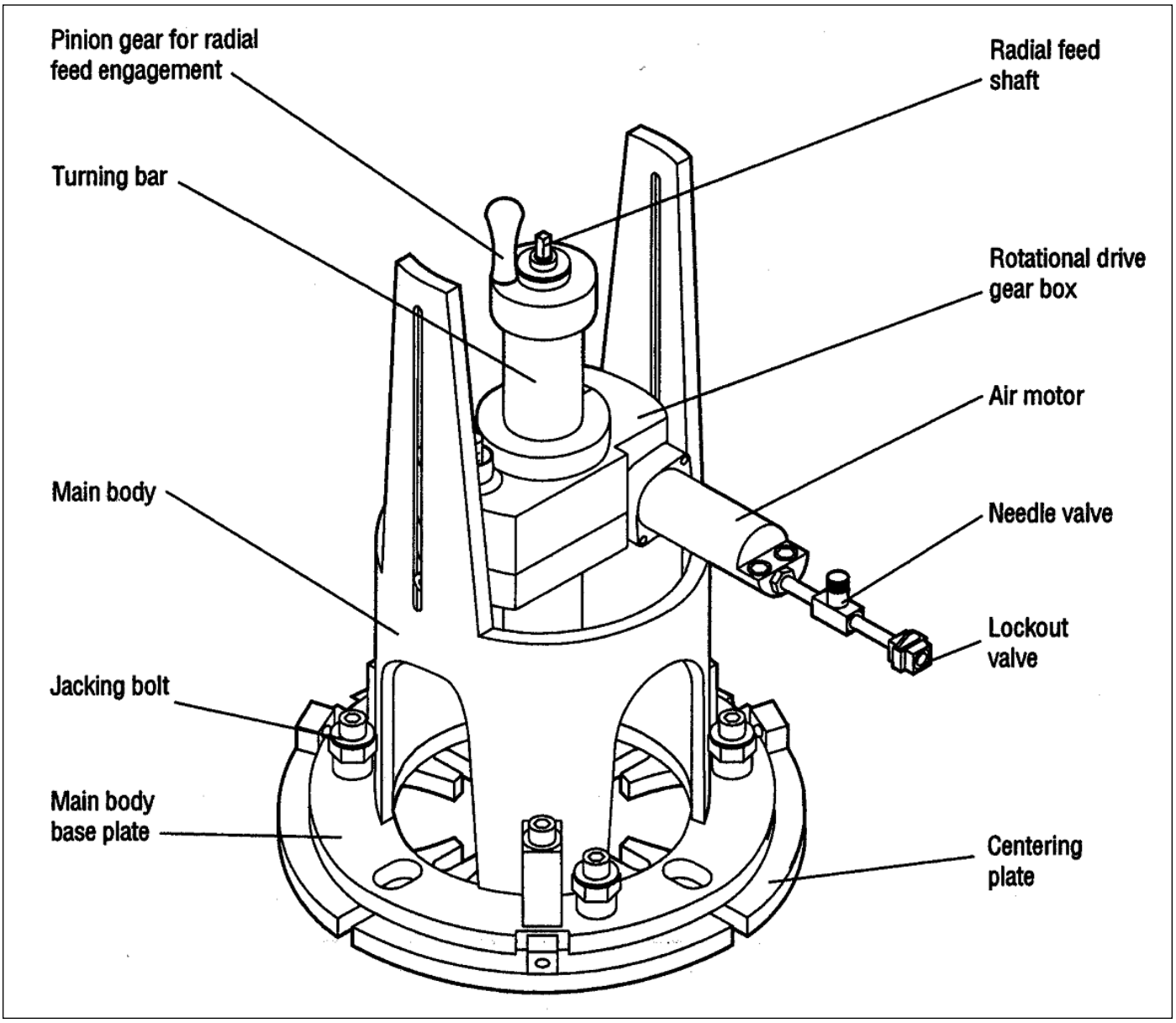


FIGURE 2-1. COMPONENTS

3 SETUP

IN THIS CHAPTER:

This section describes the setup and assembly procedures for the VM8000 valve reseating machine.

3.1 RECEIPT AND INSPECTION

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

When you receive your CLIMAX product, perform the following receipt checks:

1. Inspect the shipping containers for damage.
2. Check the contents of the shipping containers against the included invoice to make sure that all components have been shipped.
3. Inspect all components for damage.

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. All parts must be cleaned before use.

3.2 MACHINE ASSEMBLY

⚠ CAUTION

Working machinery can cause serious injury. Turn off and lock out the power supply lines before setting up the machine.

Do the following to set up the machine:

1. Mount the centering plate to the valve. Center the plate to within .125" (3 mm). Standoffs may be required on smaller valves to aid in setup and allow visibility.

NOTICE

If the top seat is to be machined, make and install 0.5" (13 mm) spacers to provide sufficient tool clearance.

2. Clamp the base plate to the centering plate using the three mounting screws and washers.

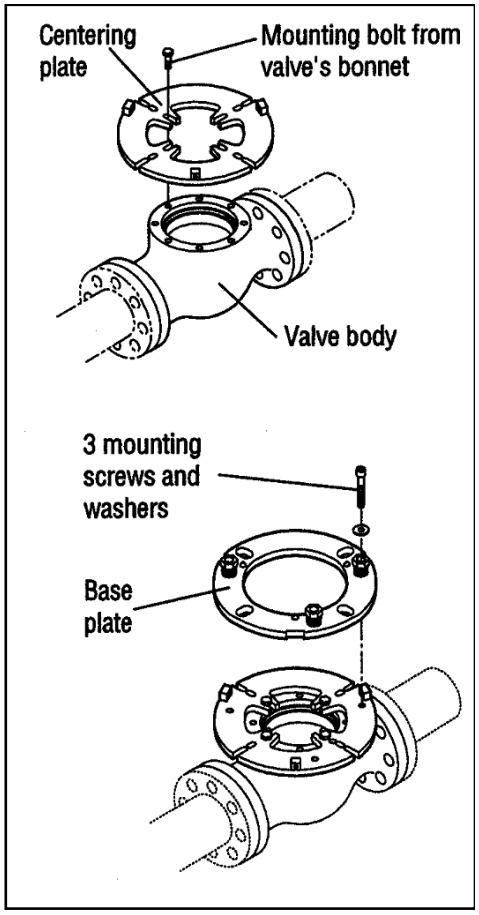


FIGURE 3-1. ASSEMBLY COMPONENTS

3. Select the appropriate tool holder. Remove the end cap, insert the tool holder and reattach the cap.
4. Position the sharpened tool bit in the tool holder. Tighten the set screws. Sharpen tool bits to the geometry shown in Figure 3-3.

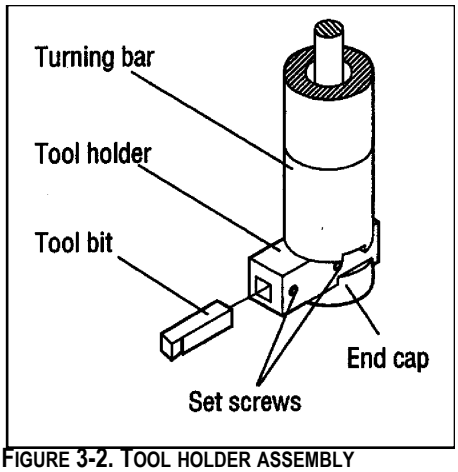


FIGURE 3-2. TOOL HOLDER ASSEMBLY

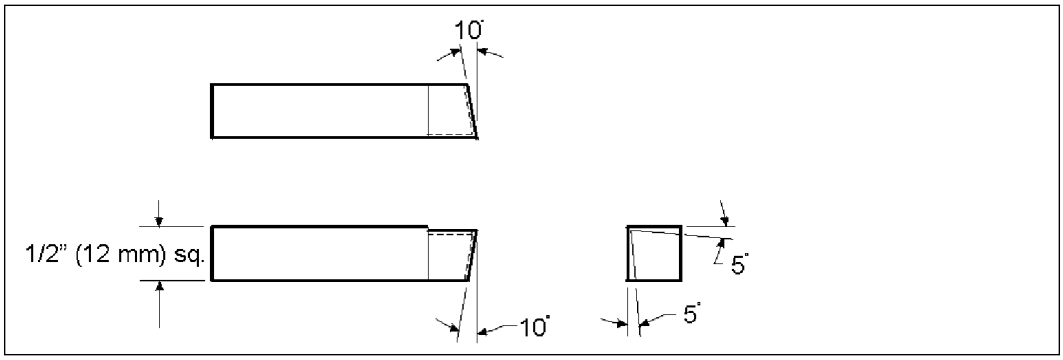
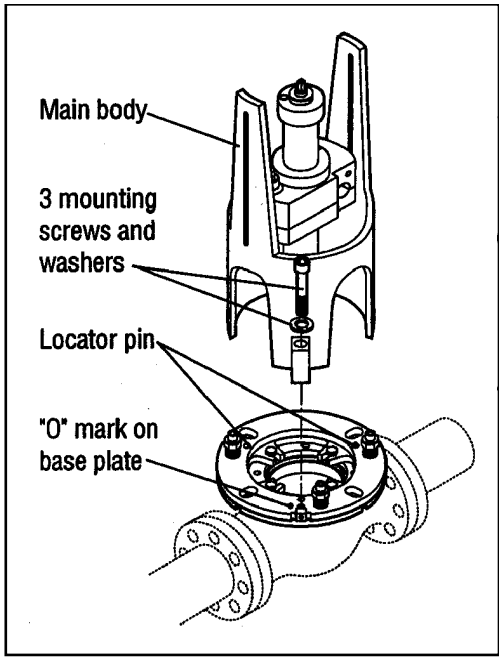
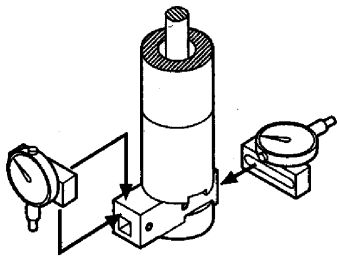


FIGURE 3-3. GEOMETRY

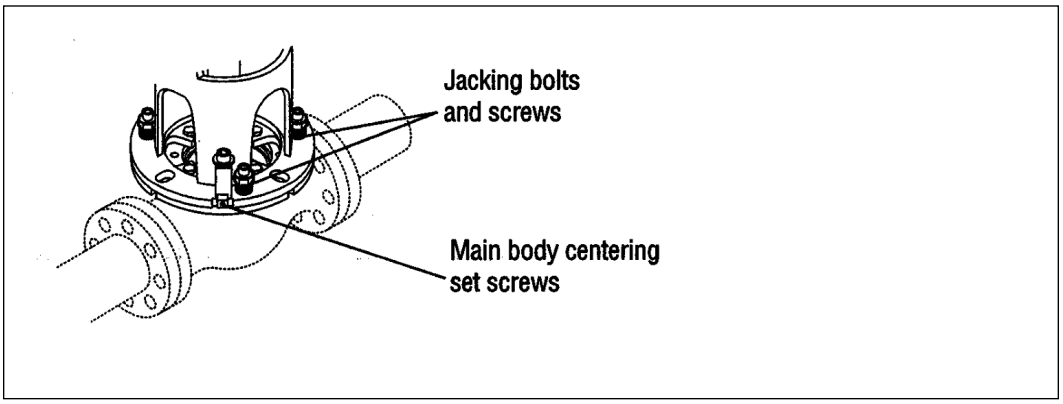
5. Determine the placement and travel distance of the tool. Position the turning bar accordingly. Tighten the locking collar on the rotational drive gear box.
6. Mount the main body onto the base plate, matching the "O" marks on both the main body and the base plate. Locator pins on the base plate ensure proper alignment during reassembly. Tighten the hex-head screws.
7. Align the machine:



a) Attach a dial indicator to the tool head.
b) Center the main body using socket set screws
c) Level the machine using the jacking bolts and screws.



Mount a mag-base dial indicator to the tool holder to sweep in the center of the bar touching the indicator stylus to the machined surfaces inside the valve body.



8. Proceed to Section 3.3 for hydraulic power or Section 3.4 on page 13 for air power.

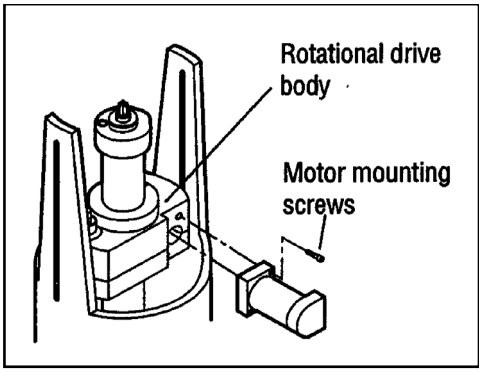
3.3 HYDRAULIC POWER CONNECTION

⚠ CAUTION

Working machinery can cause serious injury. Securely mount the machine to the work piece before connecting the hydraulic hoses.

To mount the hydraulic motor:

1. Be sure the hydraulic hoses are disconnected from the motor.
2. Place the motor drive key in the key seat, then slide the shaft into the rotational drive body.
3. Mount the motor and flange to the rotational drive body using the two socket-head cap screws.



To connect the motor to the hydraulic power unit:

1. Be sure the hydraulic power unit is OFF and the power is locked out.
2. Clean all fittings.

⚠ CAUTION

To prevent serious damage to the hydraulic power unit, be sure the hydraulic motor is connected to the hydraulic power supply before turning it on.

3. Connect the hydraulic lines between the power unit and the hydraulic motor.
4. The hydraulic power unit is delivered complete with the manufacturer's operating instructions. Read and understand all safety, set up, and operating instructions before using the machine.
5. Use the hydraulic power unit to jog the motor to see which direction the bar is rotating. If the bar is rotating in the wrong direction, turn off the motor and switch the hose ends at the hydraulic motor or the power unit.

3.4 AIR POWER CONNECTION

⚠ CAUTION

Working machinery can cause seriously injury. Securely mount the machine to the work piece before connecting the air lines.

Always use the filter and lubricator supplied with the machine. The lubricator should be set to deliver oil at a rate of 15-20 drops per minute.

The valve reseating machine can be powered by either an air motor or a hydraulic motor.

To mount the air motor:

1. Begin with the air hose disconnected from the motor.
2. Mount the air motor mounting flange to the motor. Be sure the key is properly seated.
3. Mount the motor and flange to the rotational drive body. Tighten the socket-head cap screws.

To start the machine:

1. Push the lockout slide down until the word CLOSED and the lockout hole can be seen from the bottom of the valve. Be sure the slide is pushed in all the way.
2. Turn the needle valve clockwise all the way. No colored bands will be visible when the valve is completely closed.

3. Connect the air supply line to the pneumatic conditioning unit and then connect the line from the pneumatic conditioning unit to the safety lockout valve.
4. Push the safety lockout slide up until the word OPEN can be seen from the top of the valve. Be sure the slide is pushed up all the way.

NOTICE

In an emergency, push down on the safety lockout slide.

5. Slowly turn the needle valve counterclockwise until the machine rotates at the desired speed. The more colored bands you see, the faster the machine rotation.

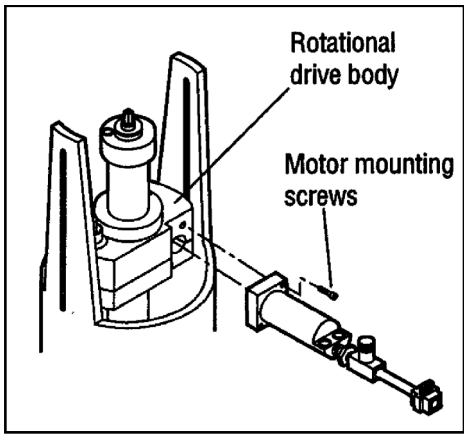
To stop the machine:

1. Turn the needle valve clockwise all the way. No colored bands will be visible when the valve is completely closed.
2. Push the lockout valve slide down until the word CLOSED and the lockout hole can be seen underneath. Be sure the slide is pushed down all the way. Lock out the machine with a padlock.
3. Disconnect the air supply line.

3.5 MACHINE FEEDS

3.5.1 Vertical feed

The vertical feed shaft is located on the side rotational drive box opposite the motor. One full turn of the crank handle will feed the bar .020" (.50 mm).



3.5.2 Radial feed

Radial feed can be either manual or automatic. For manual feed, remove the pinion gear from the radial feed end cap. Place a crank handle on the spur gear drive shaft. One full turn moves the tool holder radially .025" (.63 mm)

For automatic feed, insert the pinion gear into the radial feed end cap. When automatic radial feed is engaged, the tool holders will feed radially .003" (.08 mm) per turn.

3.6 MEASURING

⚠ CAUTION

Working machinery can cause serious injury. Make sure the machine is turned off and air supply locked out before taking measurements.

3.6.1 Vertical measurements

Vertical dimensions are obtained by inserting a depth gage through the main body.

3.6.2 Diametric measurements

Diameters are measured by moving the main body from the base plate. Locator cones in the base plate ensure proper alignment during reassembly.

3.7 CHANGING TOOL BITS

⚠ CAUTION

Working machinery can cause serious injury. Make sure the machine is turned off and power is locked out before changing the tool bit.

To change tool bits:

1. Remove the main body form the base plate.
2. Loosen the tool bit set screws. Replace the tool bit.
3. Replace the main body on to the base plate, matching the “Ò” marks on the main body and the base plate. Locator cones in the base plate ensure proper alignment during reassembly.

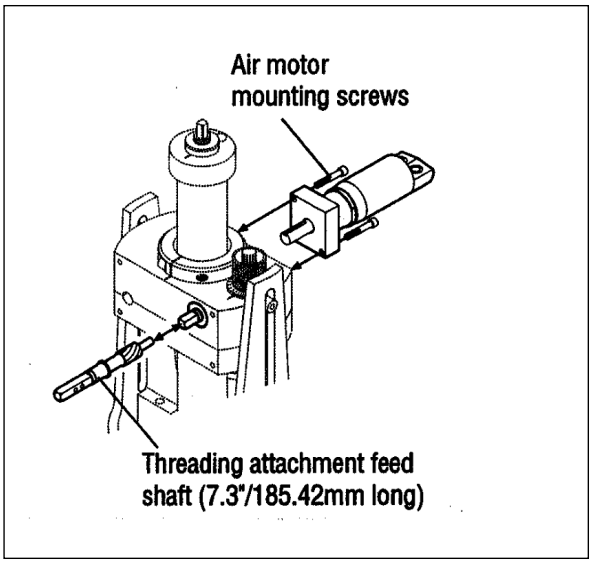
3.8 OPTIONAL THREADING ATTACHMENT

The Model VM8000 Threading Attachment is designed for on-site maintenance of Fisher type control valves. The attachment cuts threads from 8 to 20 threads per inch in bores ranging from 3.0" (76.2 mm) to 10.0" (254 mm) diameter.

3.8.1 Mounting to the machine

The rotational drive unit is drilled and tapped to accept the threading attachment.

The threading attachment feed box assembled to the rotational drive unit can stay with the machine. There is no need to remove it as the feed box can be turned on and off with one knob.

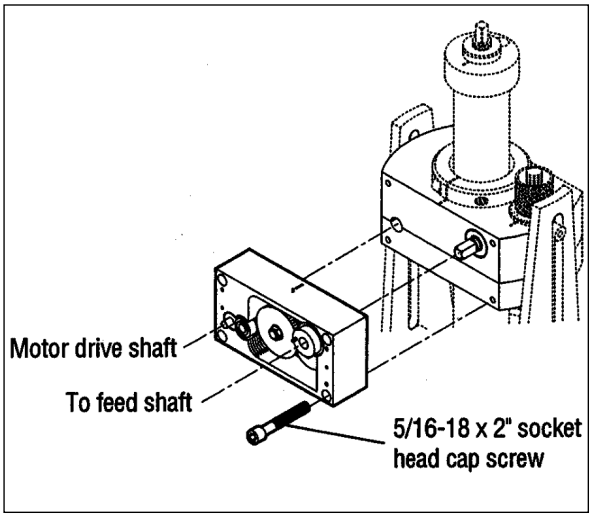


3.8.1.1 Remove air motor and replace feed shaft

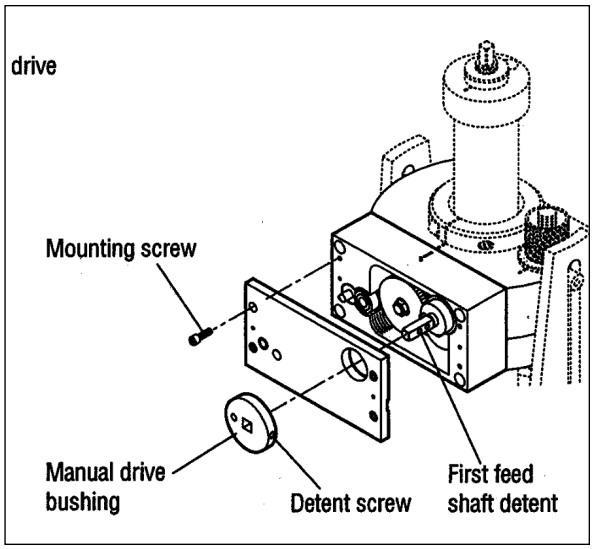
1. Remove two socket head cap screws holding the air motor to the side of the rotational drive. Do not attach the new air motor to the machine yet.
2. Remove two feed shaft snap rings and twist the feed shaft out of the rotational drive.
3. Install the new 7.3" (185.42 mm) long feed shaft into the rotational drive and replace snap rings to hold it in place.

3.8.1.2 Mount the feed box to the rotational drive

1. Remove four socket head cap screws securing the lid to the feed box.
2. Use a flat tip screw driver to carefully pry the lid from the feed box. Screw driver access slots are on each side of the lid.
3. Align the feed shaft and the motor drive shaft, and slide the feed box against the rotational drive unit.
4. Use the four 5/16-18 x 2" long socket head cap screw to attach the feed box to the rotational drive.



5. Through the motor side of the rotational drive, install the feed box drive key into the rotational drive unit worm gear. It may be necessary to rotate the worm gear or motor drive shaft to align the keyways.
6. On the feed box side, align the dowel pins and reattach the lid with the four 10-32 x 1/2" socket head cap screws.
7. Push the manual drive bushing onto the feed shaft, stopping at the first detent.



8. Mount the new longer (slower speed) air motor to the rotational drive unit using screws from the other motor.

3.8.2 Preparation, set up, and operation

Machine setup and operation with the threading attachment is the same as the standard Model VM8000. See Section 3.2 on page 10 through Section 3.7 on page 15.

Before starting the threading operation, have a good supply of sharp tool bits on hand. Use only machine ground threading cutters that have been cut on center. Should the tool bit break or wear out in the cut, a precisely ground tool will make replacement and alignment easy and more accurate.

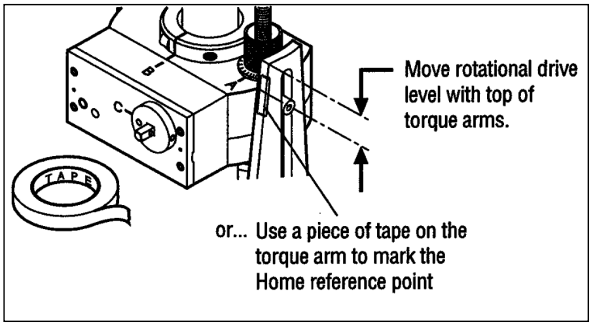
3.9 THREADING

3.9.1 Setup

1. Position the top of the rotational drive body with the top of the torque arms of the main body.

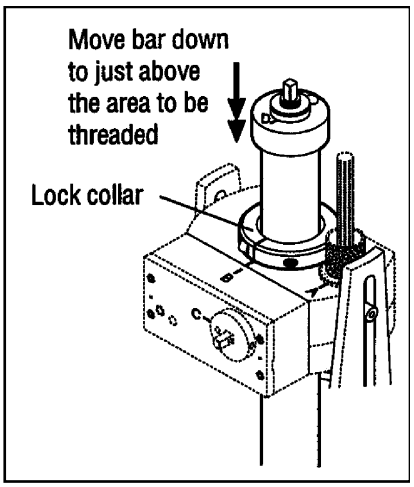
TIP:

If unable to reach the bottom of the threading stroke with the body in this position, set the body to obtain the best range.



With an ink marker or tape, place a reference point on the side of the torque arm. This mark shows the start of the cut and the home position. Use the top of the rotational drive as the travel indicator.

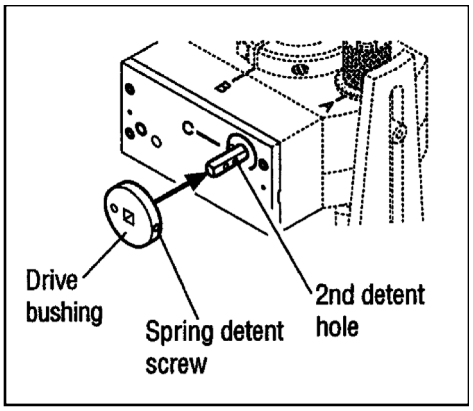
2. Zero the dial at position A. The machine is now at home position.
3. Loosen the locking collar. Using a soft mallet, set the boring bar to the desired depth.
4. Install the M40-5 Stanley air motor (the long motor).



⚠ CAUTION

Working machinery can cause serious injury. Stay clear of the machine when it is running.

5. Using the air motor, slowly turn the bar until the pin in the gear aligns with “C” on the lid of the threading attachment gear box.
6. Align the split in the locking collar with “B” on the rotational drive body. Tighten the collar.



3.9.2 Cutting new threads

NOTICE

The .001" (.025 mm) increments indicated by the dial at “D” measure radius, not diameter.

1. Radially advance the tool bit to the desired diameter. Zero out the “D” dial on top of the turning bar.
2. Place the drive bushing onto the feed shaft until the small hole goes onto the drive gear pin and the detent screw snaps into the second hole.

⚠ CAUTION

To prevent serious machine damage, do not feed the tool holder into the bottom of the bore or against a land. Press down the safety lockout valve to stop the machine.

3. Using the air motor, cut threads downward until the tool bit enters the thread relief. Stop the air motor.
4. Make note of the dial reading at “D” on top of the bar. Retract the tool bit by turning the crank handle at “D” counterclockwise ten full turns, stopping at the same number you noted.

   Example: If dial “D” is on the .015" mark, turn the crank handle ten rotations counterclockwise and stop on the .015" mark
5. Pull the drive bushing back to the first detent hole. Hand crank the rotational drive assembly back up to home position. The dial at “A” will be zeroed.

NOTICE

Depending upon the gear set in the gear box, you may need to turn the bar as many as 19 revolutions to get all marks to align. Do not stop the bar rotation at the clamp collar split and adjust the other dials. This will cancel all the settings and you will have to start over.

6. Using the air motor, slowly turn the bar assembly until the pin in the threading gear box aligns with “C” at the same time as the split in the locking collar lines up with “B”. This may require as many as 19 turns for odd-pitched gears.

7. Reset the tool bit by turning the dial at “D” clockwise to the original position, plus the cutting depth.

   Example: If the dial was at .015" when backed counterclockwise ten turns, turn it clockwise ten turns to the .015" mark. Now turn the crank .005" to the .020" mark. This puts the cutter in the position of the last cut, plus and additional .005" deep cut.
8. Push the drive bushing into the second detent hole. The pin must enter the bushing’s small hole to push the bushing into the detent slot.

⚠ CAUTION

Working machinery can cause serious injury. Stay well clear of the machine when it is running.

9. Start the machine by opening the air motor valve. Continue cutting until the tool bit enters the thread relief. Stop the machine by shutting the air motor valve.
10. Repeat steps 2 through 9 until the desired thread depth is achieved.

3.9.3 Cutting existing threads

For best results cutting new threads or chasing existing threads, always use machine ground, center-cut threading tools. The closer the cutter point is to center, the more precise the cut on following passes.

Keep plenty of sharp replacement tool bits on hand in case the cutter point breaks or becomes worn.

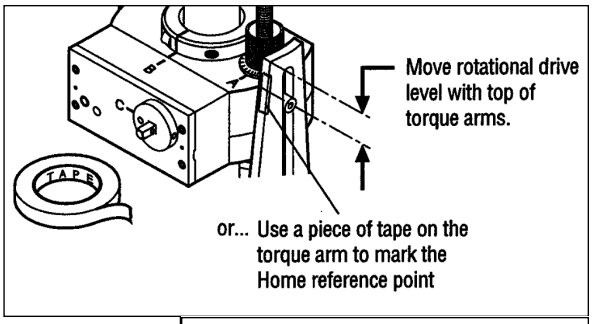
1. Ideally, position the top of the rotational drive body with the top to the torque arms of the main body.

TIP:

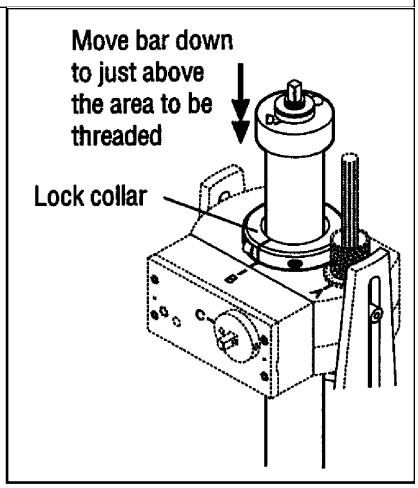
If unable to reach the bottom of the threading stroke with the body in this location, reposition the body to obtain the best range.

With an ink marker or tape, place a reference point on the side of the torque arm. This mark shows the start of the cut and the home position. Use the top of the rotational drive as the travel indicator.

2. Zero the dial at position “A”. The machine is now at home position.



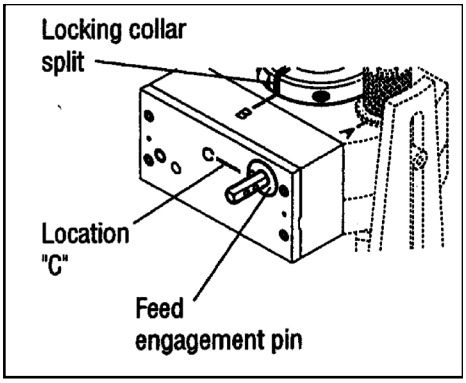
3. Loosen the locking collar. Using a soft mallet, move the boring bar to just above the area to be threaded.
4. Install the M40-5 Stanley air motor (the longer motor).



⚠ CAUTION

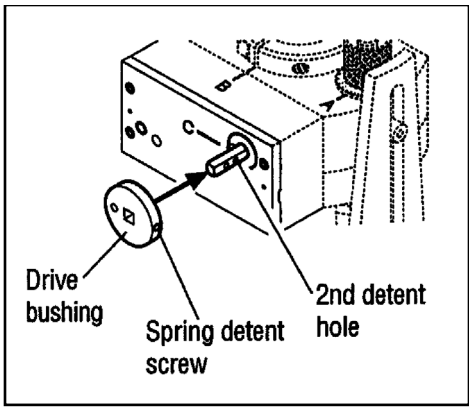
Working machinery can cause serious injury. Stay well clear of the machine when it is running.

5. Using the air motor, slowly turn the bar until the pin in the gear aligns with “C” on the lid of the threading attachment gear box.
6. Align the split in the locking collar with “B” on the rotational drive body.
7. Manually slide the bar vertically until the tool bit point matches the first full thread.



8. Feed the tool bit inward until the point is fully seated on both sides of the cutter. Tighten the locking collar with the split aligned with “B”.Zero the “D” dial and retract the tool bit by turning the crank handle at dial “D” counterclockwise ten full turns stopping at zero.
9. With the crank handle at location “C”, move the rotational drive assembly back to the home position. The dial at “A” will be at zero.
10. Reset the tool bit by turning the dial at “D” clockwise ten turns to zero, plus the desired cutting depth.

11. Push the drive bushing into the second detent hole.



⚠ CAUTION

Working machinery can cause serious injury. Stay clear of the machine while it is running.

NOTICE

To prevent machine damage, avoid feeding the tool holder into the bottom of the bore or against a land. In an emergency, press down the safety lockout valve to stop the machine.

12. Start the machine by opening the air motor valve. Continue cutting until the tool bit enters the thread relief. Stop the machine by shutting the air motor valve.
13. Repeat steps 2 through 12 until all threads are sufficiently cleaned up.

4 OPERATION

IN THIS CHAPTER:

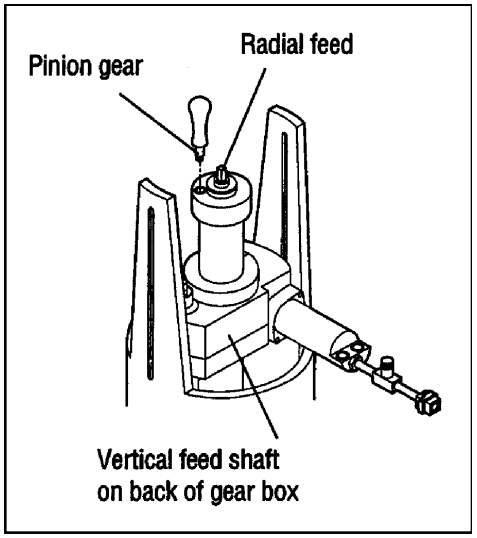
4.1 PRE-OPERATION CHECKS

Do the following checks before operating the machine:

1. Complete the risk assessment checklist in Table 1-3 on page 5.
2. Check that the work area is clear of non-essential personnel and equipment.
3. Check that the machine control/observation area will not be in the path of hot flying chips during machine operation.
4. Check the machine is securely mounted to the workpiece.
5. Check that air hoses are routed and secured to avoid tripping, entanglement, damage from hot chips, or other damage should an air hose or connection fail.
6. Check the tool condition and sharpness.
7. On the PCU, check that the oil drip rate is set to 6 drips per minute.
8. Check all hand tools are removed from inside the machine and the work area.

4.2 OPERATION

1. Be sure power is OFF.
2. Check that the tool bit is facing the correct direction.
3. Manually feed the tool into position using the handcrank provided; remove the crank. To accomplish radial feed during operation, install the pinion gear as shown, and hold it from rotating while the machine is operating. Releasing the pinion will stop the machine from feeding radially.



4. Plug in the power and start the machine. As the tool bit engages with the work, set the speed to the desired rpm.
5. Allow the machine to completely cut the surface.
6. Stop the machine and lock it out.
7. Measure the vertical dimension by inserting a depth gage through the main body.
8. Measure the work diameter:
    a) Remove the main body from the base plate.
    b) Measure the work diameter.
    c) Reassembly the main body on the base plate. Locator cones on the base plate ensure proper alignment.
9. Manually retract the tool bit vertically and radially.
10. If necessary, replace the tool bit. See section 3.6 “Changing tool bits”.
11. Repeat steps 1 through 6 as necessary to machine the valve.

4.3 DISASSEMBLY

⚠ CAUTION

Working machinery can cause serious injury. Turn off and lock out the power supply lines before disassembling the machine.

1. Disconnect the power lines.
2. Loosen the hex-head screws holding the main body to the base plate.
3. Remove the main body from the base plate.
4. Unclamp the base plate from the centering plate.
5. Remove any standoffs, if necessary.
6. Remove the centering plate from the work piece.
7. Store the machine as described in Section 6.

5 MAINTENANCE

IN THIS CHAPTER:

5.1 APPROVED LUBRICANTS

CLIMAX recommends using the following lubricants at the locations indicated. Failure to use the appropriate lubricants can result in damage and premature machine wear.

CAUTION

Avoid damage, premature machine wear, and protect your warranty by using only approved lubricants.

TABLE 5-1. APPROVED LUBRICANTS

Lubricant	Brand	Application Area
Gear grease	UNOBA EP #2	Gear box gears, thrust bearings
Light oil	WD-40	Unpainted surfaces
Cutting oil	UNOCAL KOOLKUT	Tool bits, work piece
Air oil	Marvel Air Tool oil	Lubricator oil cup
Hydraulic fluid	Mobil DTE-24 Anti-wear hydraulic fluid	Hydraulic system

5.2 MAINTENANCE TASKS

Maintenance tasks are described in the following sections.

5.2.1 Rotational drive assembly

Lubricate the rotational drive body with multipurpose grease every 10 hours of operation. Use the grease fitting in the top of the body.

5.2.2 Main body assembly

The main body assembly is lubricated for the life of the machine.

5.2.3 Turning bar assembly

Though the turning bar assembly is maintenance free, periodically clean and lightly oil the rack and the tool holder.

5.2.4 Hydraulic power

The hydraulic motor is maintenance-free. Fluid passing through the motor lubricates internal moving parts. To ensure long life and dependable operation, use Mobil DTE-24 anti wear hydraulic oil.

5.2.5 Air motor and pneumatic conditioning unit

To increase the life of the air motor:

- Route the air supply through a lubricator and air filter.

⚠ CAUTION

To avoid damaging the air motor and voiding the warranty, route incoming air through the air filter and lubricator.

- Use non-restrictive air lines and fittings. Check the air system periodically to be sure air pressure is 90 psi (620 kPa).
- Set the air motor torque by adjusting the needle valve.

To avoid damage to the motor, do not adjust speed by changing the in-line air pressure.

- Fill the lubricator oil cup with oil before using the machine. Use only high-quality oil with rust inhibitors and emulsifiers such as Marvel¨ air tool oil or equivalent. Set the lubricator to deliver oil at a rate of 15-20 drops per minute.
- Drain the air filter periodically or when dirty.

5.2.6 Threading attachment

Though internal components of the threading attachment gear box are maintenance-free, repack with grease each time the gears are changed.

5.2.7 Proper storage

Proper storage of Model VM8000 Valve Reseating Machine will prevent undue deterioration or damage. Before storing, clean the machine with solvent to remove grease, metal chips, and moisture. Spray the machine with a moisture-protective material (WD-40 for short-term storage, Cosmoline for long-term storage) to prevent rusting. Store the Valve Reseating Machine in the box provided. Place desiccant bags or vapor wrap around the machine to absorb moisture.

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6 STORAGE AND SHIPPING

IN THIS CHAPTER:

6.1 Storage

Proper storage of the valve reseating machine will extend its usefulness and prevent undue damage.

Before storing, do the following:

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

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

6.1.1 Short-term storage

Do the following for short-term storage (three months or less):

1. Retract the tool head from the workpiece.
2. Remove the tooling.
3. Remove hoses.
4. Remove the machine from the workpiece.
5. Clean the machine to remove dirt, grease, metal chips, and moisture.
6. Spray all unpainted surfaces with LPS-2 to prevent corrosion.
7. Store the valve reseating machine in its original shipping box.

6.1.2 Long-term storage

Do the following for long-term storage (longer than three months):

1. Follow the short-term storage instructions, but use LPS-3 instead of LPS-2.
2. Add a desiccant pouch to the shipping container. Replace according to manufacturer instructions.
3. Store the shipping container in an environment out of direct sunlight with temperature < 70ºF (21ºC) and humidity < 50%.

6.2 SHIPPING

The valve reseating machine can be shipped in its original shipping container.

6.3 DECOMMISSIONING

To decommission the valve reseating machine prior to disposal, remove the drive assembly from the RDU and dispose of the drive assembly separately from the rest of the machine components. Refer to Appendix A for component assembly information.

APPENDIX A ASSEMBLY DRAWINGS

Drawing list

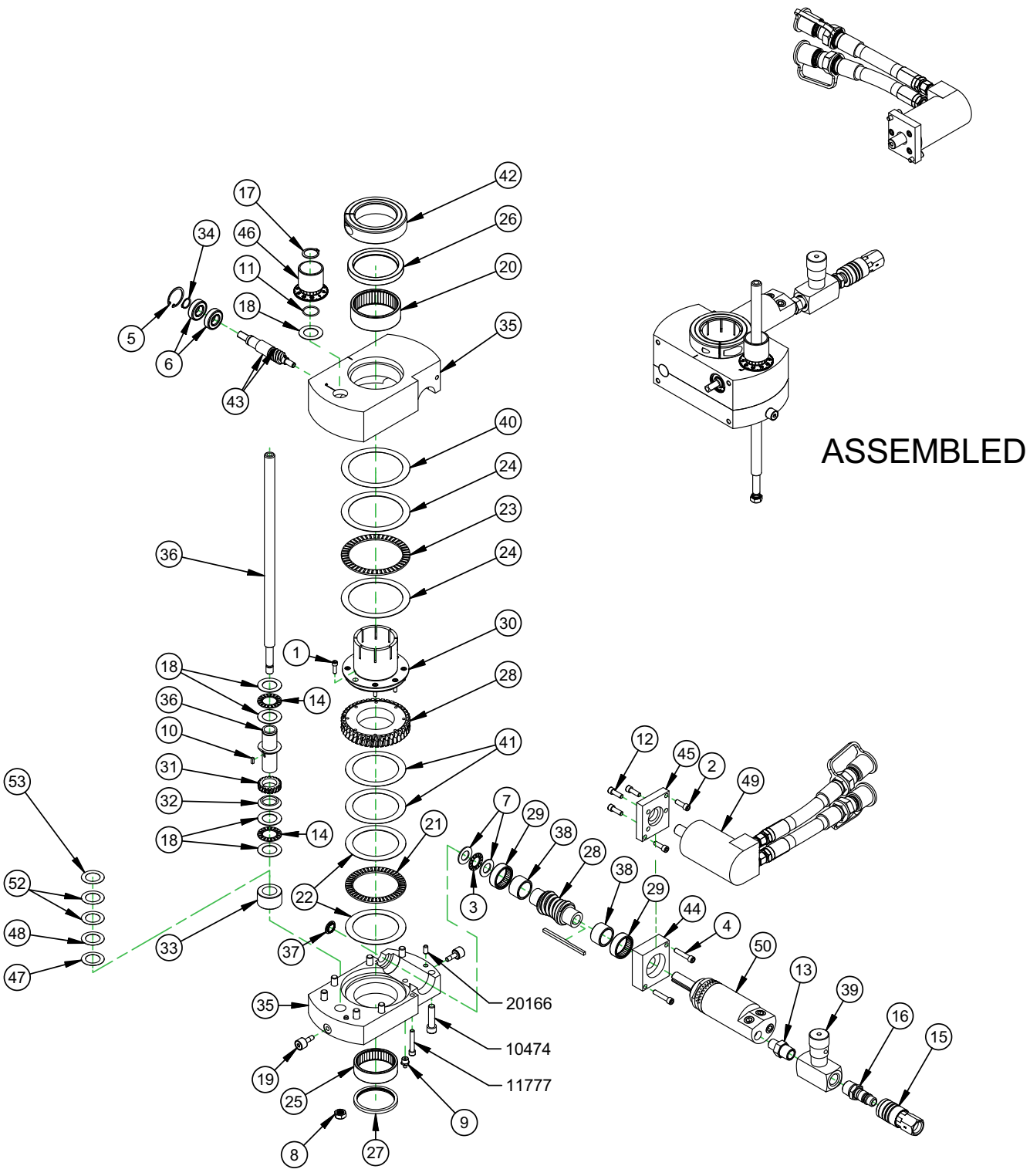

FIGURE A-1. ROTATIONAL DRIVE ASEMBLY (P/N 31024)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	8	10157	SCREW 10-32 X 5/8 SHCS
2	2	10160	SCREW 1/4-20 X 3/4 SHCS
3	1	10538	BRG THRUST .625 ID X 1.125 OD X .0781
4	2	10671	SCREW 1/4-20 X 1-1/4 SHCS
5	1	10813	RING SNAP 1-1/4 ID BEVELED
6	2	10820	BRG BALL .5906 ID X 1.2598 OD X .3543 W/SEALS
7	2	11165	WASHER THRUST .625 ID X 1.125 OD X .060
8	1	11883	NUT 7/16-20 NYLON INSERT
9	1	11898	FTG GREASE 1/8 NPTM
10	1	12360	KEY 1/8 SQ X .37
11	1	12447	RING O 1/16 X 7/8 ID X 1 OD
12	3	12647	SCREW 1/4-28 X .75 SHCS
13	1	12918	FTG NIPPLE 3/8 NPTM X 1/2 NPTM
14	2	13174	BRG THRUST .875 ID X 1.437 OD X .0781
15	1	13208	FTG QD COUPLER 1/2B 1/2 NPTF PNEUMATIC
16	1	13209	FTG QD NIPPLE 1/2B 1/2 NPTM PNEUMATIC
17	1	14035	RING SNAP 7/8 OD
18	5	14274	WASHER THRUST .875 ID X 1.437 OD X .030
19	2	14275	BRG CAM FOLLOWER .625 OD X .438 WIDE W/ STUD
20	1	14276	BRG NEEDLE 2-5/8 ID X 3 OD X 1.000 OPEN
21	1	14339	BRG THRUST 2.750 ID X 3.625 OD X .1250
22	2	14340	WASHER THRUST 2.750 ID X 3.625 OD X .030
23	1	14341	BRG THRUST 3.250 ID X 4.125 OD X .1250
24	2	14342	WASHER THRUST 3.250 ID X 4.125 OD X .030
25	1	14343	BRG NEEDLE 2-1/4 ID X 2-5/8 OD X .750 OPEN
26	1	14344	SEAL 2.625 ID X 3.350 OD X .375
27	1	14714	SEAL 2.250 ID X 2.625 OD X .188
28	1	14803	CONE DRIVE MODIFIED 20:1 SIZE 25
29	2	14804	BRG NEEDLE 1-1/4 ID X 1-1/2 OD X .500 OPEN
30	1	14807	COLLET VM8000
31	1	14810	GEAR WORM MODIFIED
32	1	14811	SPACER BRASS
33	1	14812	BUSHING 1.469 OD X .876 ID X .866
34	1	14814	RING SNAP 19/32 OD X .039 TH
35	1	14817	HOUSING ROTATIONAL DRIVE VM8000
36	1	16207	LEADSCREW & NUT ASSY VM8000
37	1	20746	PLUG HOLE 5/8 ID
38	2	20972	BRG RACE 1.000 ID X 1.250 OD X .765
39	1	22229	VALVE NEEDLE 1/2 IN.
40	1	25138	SHIM SET 3.25 ID X 4.12 OD
41	1	25139	SHIM SET 2.75 IS X 3.62 OD
42	1	30984	LOCKING COLLAR MODIFIED
43	1	30985	SHAFT ASSY VM8000 ROTATIONAL DRIVE
44	1	30986	MOUNT - AIR MOTOR VM8000
45	1	30987	MOUNT-HYDRAULIC MOTOR VM8000

FIGURE A-2. ROTATIONAL DRIVE ASEMBLY PARTS LIST 1 (P/N 31024)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
46	1	30988	DIAL INCH VM8000
47	1	52546	SHIM 7/8 ID X 1-3/8 OD X .001 STEEL
48	1	71119	SHIM 7/8 ID X 1-3/8 OD X .001 STEEL
49	1	76698	ASSY MOTOR .79 CU IN 5/8 SHAFT W/HOSES
50	1	76744	MOTOR AIR MODIFIED STANLEY
51	1	76812	KEY 3/16 SQ X 3.45 STEPPED .155
52	2	81358	SHIM 7/8 ID X 1-3/8 OD X .001 STEEL
53	1	81359	SHIM 7/8 ID X 1-3/8 OD X .001 STEEL
N/S	1	34864	BOTTLE 4 OZ W/WHT FLIP LID
N/S	1	39546	LABEL OIL BOTTLE 76 UNAX AW 32

FIGURE A-3. ROTATIONAL DRIVE ASEMBLY PARTS LIST 2 (P/N 31024)

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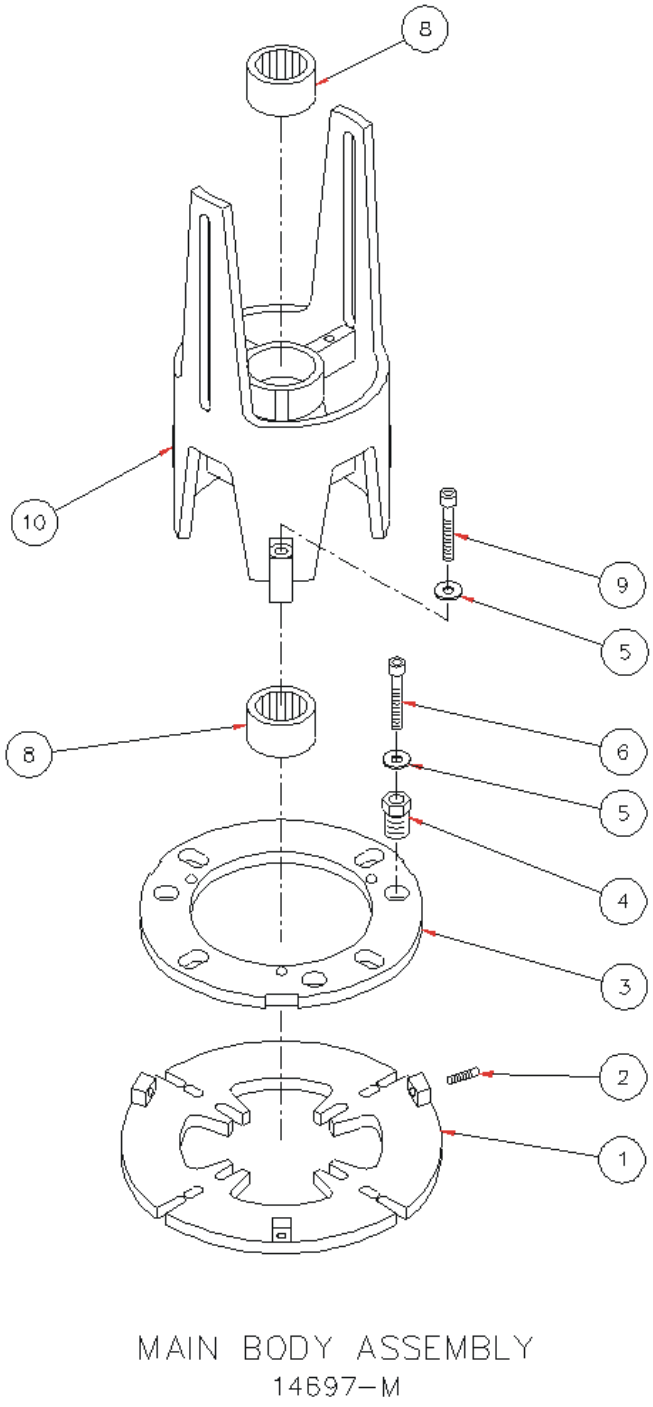

FIGURE A-4. MAIN BODY ASSEMBLY (P/N 14697-M)

14697 BODY MAIN ASSY		
BALLOON No	PART	DESCRIPTION
1	14705	PLATE CENTERING
2	13484	SCREW 3/8-16 X 1-1/2 SSSFP
3	14695	PLATE BASE MAIN BODY
4	13307	BOLT JACKING FOR 1-1/8 IN. FLANGE
5	22662	WASHER ½ ID X 1/8 HARDENED FINISH
6	11694	SCREW 1/2-13 X 2-1/2 SHCS
8	22312	BRG ROLLER 2.250 ID X 3.000 OD X 1.750 2 SEALS
9	14701	SCREW 1/2 - 13 X 3 HHCS
10	14698	BODY MAIN MACHINING

FIGURE A-5. MAIN BODY ASSEMBLY PARTS LIST (P/N 14697-M)

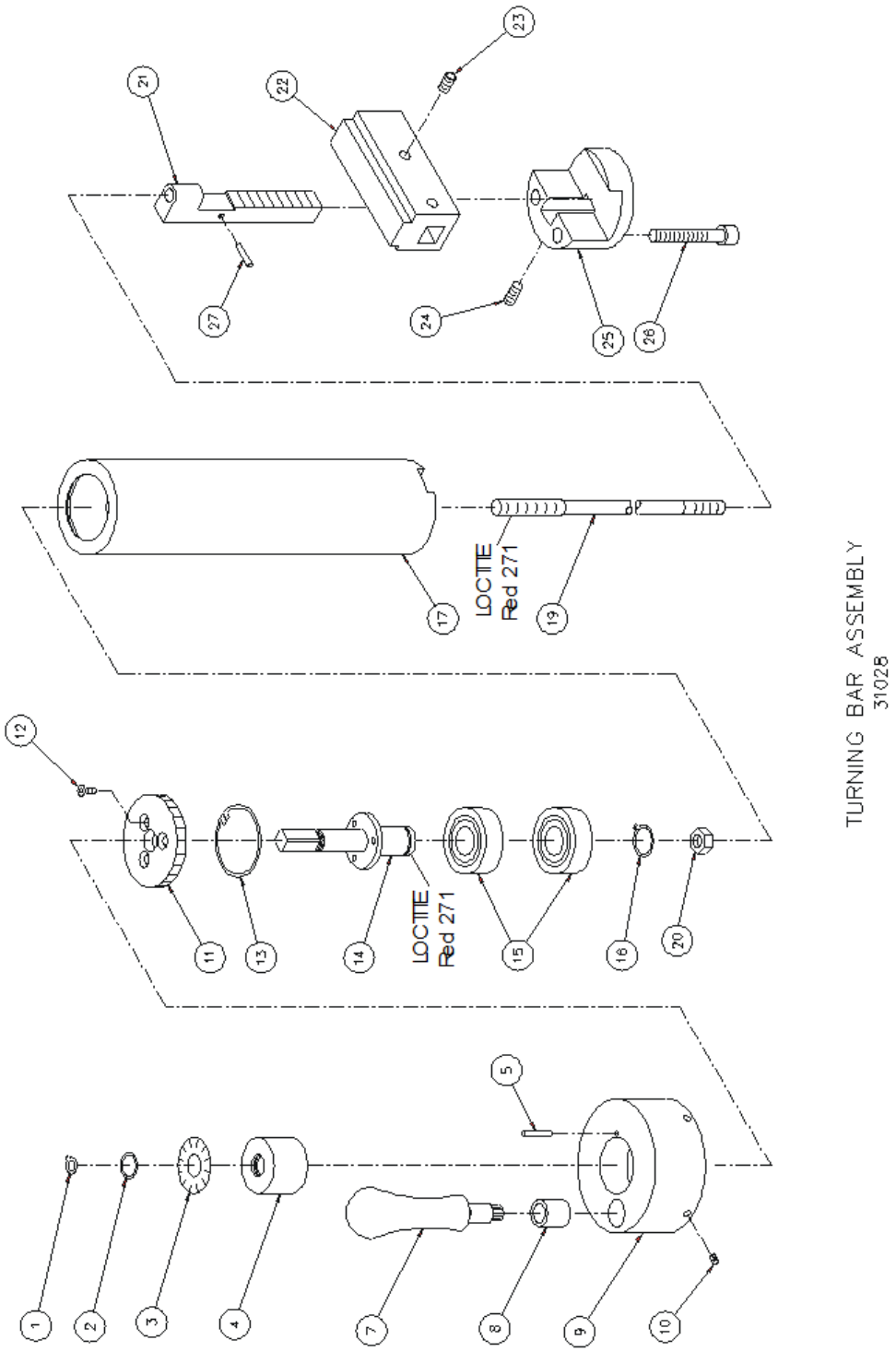

FIGURE A-6. TURNING BAR ASSEMBLY (P/N 31028)

31028 BAR TURNING ASSY		
BALLOON No	PART	DESCRIPTION
1	10829	RING SNAP 1/2 OD
2	10840	RING O 1/16 X 1/2 ID X 5/8 OD
3	30999	LABEL - DIAL
4	31000	DIAL - RADIAL FEED
5	10861	PIN DOWEL 1/8 DIA X 3/4
7	31001	GEAR - PINION
8	22312	BRG ROLLER 2.250 ID X 3.000 OD X 1.750 2 SEALS
8	31002	BUSHING OILITE 7/16 ID X 5/8 OD X 5/8
9	31003	END CAP
10	11672	SCREW 10-32 X 1/4 SSSCP
11	31004	GEAR - MODIFIED
12	11259	SCREW 8-32 X 3/8 FHSCS
13	28821	RING SNAP 1-9/16 ID SPIRAL MEDIUM HEAVY DUTY
14	31005	SHAFT - RADIAL FEED
15	10365	BRG BALL .6693 ID X 1.5748 OD X .4724
16	11019	RING SNAP 5/8 OD
17	31171	BODY MAIN AND BAR ASSY
19	31008	SUCKER ROD
20	11876	NUT 5/16-18 STDN
21	30989	RACK
22	14710	HOLDER TOOL 2.25
22	14711	HOLDER TOOL 3.25
22	14712	HOLDER TOOL 5.50
23	31016	SCREW 5/16-18 X 1/2 SSSCPNI
24	18231	SCREW 1/4-20 X 3/8 SSSCPNI
25	14708	CAP END
26	10684	SCREW 5/16-18 X 1-3/4 SHCS
27	12207	PIN DOWEL 1/8 DIA X 5/8
NOT SHOWN	25710	BIT TOOL 1/2 HSS X 4 IN. LONG GROUND
NOT-SHOWN	11020	HANDLE CRANK

FIGURE A-7. TURNING BAR ASSEMBLY PARTS LIST (P/N 31028)

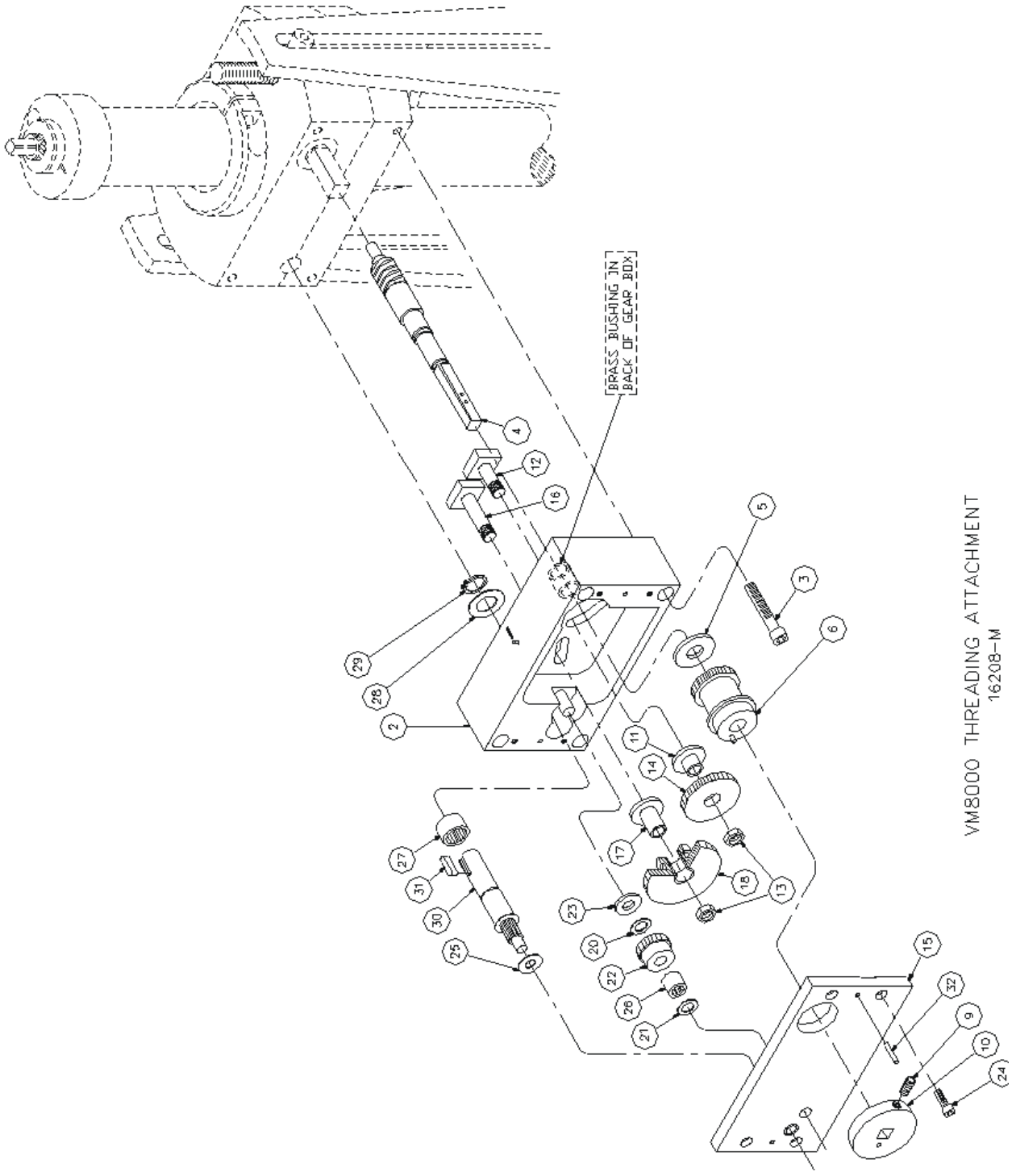

FIGURE A-8. THREADING ATTACHMENT (P/N 16208)

16208 ATTACHMENT THREADING VM8000		
BALLOON No	PART	DESCRIPTION
2	16223	BOX THREADING ATTACHMENT
3	10911	SCREW 5/16-18 X 2 SHCS
4	31076	SHAFT ASSY VM8000 ROTATIONAL DRIVE
5	16298	SPACER
6	16216	GEAR 32T 14-1/2 PA
9	13061	DETENT PLUNGER BALL 1/4-20 X .531
10	16258	BUSHING MANUAL DRIVE
11	16233	BUSHING IDLER
12	16234	BOLT IDLER
13	16301	NUT JAM
14	16218	GEAR SPUR
15	16225	LID THREADING ATTACHMENT
16	16231	BOLT CLUSTER GEAR
17	16232	BUSHING CLUSTER
18	16211	GEAR CHANGE 10 TPI
18	16212	GEAR CHANGE 12 TPI
18	20047	GEAR CHANGE 14 TPI
18	16213	GEAR CHANGE 16 TPI
18	16214	GEAR CHANGE 18 TPI
18	16215	GEAR CHANGE 20 TPI
18	16210	GEAR CHANGE 8 TPI
20	10058	WASHER THRUST .375 ID X .812 OD X .030
21	28832	WASHER MODIFIED
22	16302	GEAR MODIFIED
23	16310	SPACER
24	10877	SCREW 10-32 X 1/2 SHCS
25	10770	WASHER THRUST .312 ID X .750 OD X .030
26	11021	BRG NEEDLE 3/8 ID X 9/16 OD X .500 OPEN
27	11026	BRG NEEDLE 5/8 ID X 13/16 OD X .500 OPEN
28	11823	WASHER THRUST .625 ID X 1.125 OD X .030
29	11019	RING SNAP 5/8 OD
30	16265	SHAFT DRIVE
31	10216	KEY 3/16 SQ X .62 RADIUS BOTH ENDS
32	12207	PIN DOWEL 1/8 DIA X 5/8
NOT SHOWN	22007	KEY 3/16 X .135 X .56 SQ BOTH ENDS
NOT SHOWN	10111	MOTOR AIR STANLEY 500 RPM FS 265 RPM LS
NOT SHOWN	30986	MOUNT-AIR MOTOR
NOT SHOWN	16478	WRENCH 9/16 COMBINATION MODIFICATION

FIGURE A-9. THREADING ATTACHMENT (P/N 16208-M)

TABLE A-1. SPARE PARTS KIT

Where used	Part number	Description	Quantity
Turning bar assembly	11019	Snap ring	2
	30989	Rack	1
	14710	2.25" tool holder	1
	14711	3.25" tool holder	1
	14712	5.50" tool holder	1
	31001	Pinion gear	1
	31016	Screw 5/16-18 x 1/2 SSSCPNI	4
	25710	Tool bit 1/2" HSS x 4" pre-ground	1
Main body assembly	14701	Screw 1/2-13 x 3 HHCS	3
	11694	Screw 1/2-13 x 2 SHCS	3
Rotational drive	16207	Lead screw and nut assembly	1
	14275	Cam follower bearing	1
Tool kit	21433	Operating Manual	1

TABLE A-2. TOOL KIT P/N 16477

Part number	Description
10874	WRENCH END ¾
10199	WRENCH HEX ¼ SHORT ARM
10200	WRENCH HEX 1/8 SHORT ARM
11082	WRENCH HEX 3/16 SHORT ARM
11919	WRENCH HEX 3/8 SHORT ARM
10600	WRENCH HEX 5/32 SHORT ARM


CLIMAX
BORTECH
CALDER
H&S TOOL