CE

FF4000

FLANGE FACER

OPERATING MANUAL

SERIAL NUMBER RANGE: 11017900 - 15121870

ORIGINAL INSTRUCTIONS

FF4000 Flange Facer shown

CLIMAX
Portable Machining & Welding Systems

P/N 35425
May 2019
Revision 2

CLIMAX | BORTECH CALDER H&S TOOL

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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

AX | 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

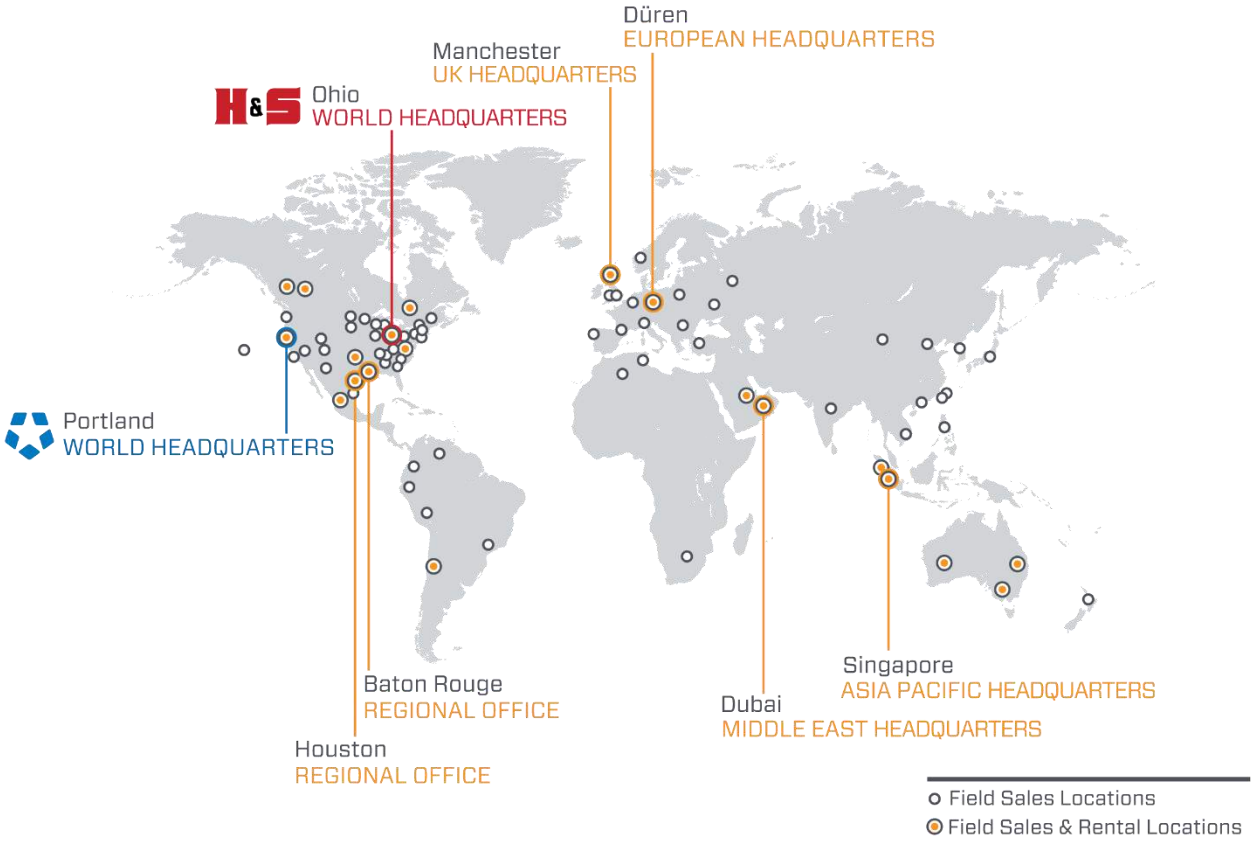
Telephone: +65 9647-2289
Fax: +65 6801-0699

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



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:

- 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.

CE DOCUMENTATION

Climax Portable Machine Tools, Inc. Effective Date: July 6, 2010

Declaration of Conformity

CE

CLIMAX®
Portable Machine Tools, Inc.

Manufacturer Address:
Climax Portable Machine Tools, Inc.
2712 E. Second St., P.O. Box 1210
Newberg, Oregon
USA 97132-8210
1-800-333-8311 - www.cpmt.com

EC Authorized Representative:
Climax GmbH
Am Langen Graben 11
52353 Düren / Germany
Tel.: (+49)(0) - 2421 / 9177 - 0

Climax GmbH is authorized to compile a technical file for this product.

We hereby declare that the machinery described:

Make:	Flange Facer - Pneumatic
Models:	FF4000
Serial Numbers:	10016661 - 10028700

Is in compliance with the following directives:

2006/42/EC - Machinery

Compliance with the relevant EHSR of the above directives is by application of the following referenced harmonized standards:

EN 349, EN 983 + A1, EN 3744, EN 11201, EN 12100-1, EN 12100-2, EN 12840, EN 13732-1, EN 13849-1, EN 14121-1

(Original Signed)
VP - Engineering
Climax Portable Machine Tools, Inc.
2712 E. Second St., Newberg, Oregon
USA 97132-8210

Signed in Newberg, Oregon 97132-8210 USA on: (Original Dated)
DATE

Contents

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Safety Guidelines

The primary challenge for most on-site maintenance is that repairs are often done under difficult conditions.

Climax Portable Machining & Welding Systems leads the way in promoting the safe use of portable machine tools. Safety is a joint effort. As the operator of this machine, you are expected to do your part by scrutinizing the job site and closely following the operating procedures outlined in this manual, your own company rules, and local regulations. Save all warnings and instructions for future reference.

WARNING

For maximum safety and performance, read and understand this entire manual and all other related warnings and safety instructions before using this equipment. Failure to follow the warnings, instructions and guidelines in this manual could cause personal injury, fatalities, electric shock, fire and/or property damage.

QUALIFIED PERSONNEL

Before operating this machine, you must receive training specific to this machine from a qualified trainer. If you are not familiar with the proper and safe operation, do not use the machine.

OBEY WARNING LABELS!

Obey all warnings and warning labels. Failure to follow instructions or heed warnings could result in injury, or even be fatal. Proper care is your responsibility. Contact Climax immediately for replacement of damaged or lost manuals or safety decals. 1-800-333-8311

INTENDED USE

Only use the machine according to the instructions in this operating manual. Do not use this machine for any purpose other than the intended use as described in this manual. When using the tools, machine, accessories and/or tool bits, you must determine the proper working conditions and the work to be performed.

STAY CLEAR OF MOVING PARTS

Keep clear of the machine during operation. Never lean toward or reach into the machine to remove chips or to adjust the machine while it is running. Keep bystanders away while operating this machinery.

ROTATING MACHINERY

Rotating machinery can seriously injure an operator. Lock out all power sources before you interact with the machine.

KEEP YOUR WORK AREA CLEAN AND TIDY

Keep all cords and hoses away from moving parts during operation. Do not clutter the area around the machine. Keep the work area clean and well lit.

AMBIENT LIGHTING

Do not operate this machine in ambient lighting that is less than normal intensity.

SECURE LOOSE CLOTHING AND LONG HAIR

Rotating machinery can seriously injure an operator as well as others close by. Don't wear loose fitting clothing or jewelry. Tie back long hair or wear a hat.

HAZARDOUS ENVIRONMENTS

Do not use the machine in a hazardous environment, such as near explosive chemicals, flammable liquids, gasses, toxic fumes, or inappropriate radiation hazards.

HOSES, PENDANT AND ELECTRICAL CABLES

Do not abuse the pendant cable as this can damage the cable and pedant. 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 or moving parts. Plugs must match the outlet. Never modify the plugs in any way. Do not use an adapter plug with grounded power tools. Do not expose the machine to rain or wet conditions. Always examine hoses and cables for damage before use. Be cautious and never drop electrical equipment, this will damage the components.

REPETITIVE MOTION

Individuals can be susceptible to disorders of the hands and arms when exposed to tasks that involve highly repetitive motions and/or vibration.

STAY ALERT

Stay alert, watch what you are doing and use common sense when operating machinery. Do not operate machinery while you are tired or under the influence of drugs, alcohol or medication

Machine Specific Safety Practices

This list includes safety practices applicable to Climax's Portable Machines.

All aspects of the machine have been designed with safety in mind. Warning signs are affixed to the machine to warn of residual hazards associated with machine relating to operation, setup, whether or not it is in use.

MACHINE SAFETY FEATURES

Never attempt to defeat or override the safety features designed into the machine.

SECURING THE MACHINE

Never attempt to run the machine without first securing it to a stable workpiece.

BODY PROTECTION

Wear safety glasses, earplugs, and safety shoes while operating the machine.

Gloves are not a form of protection and should not be worn while operating the machine. Metal chips and debris created by the machine should be disposed using a dust pan and broom.

KEEPING CLEAN

Maintain your machine according to the procedures described in this manual to maximize safety and machine longevity.

KEEP CLEAR

Keep clear of the machine during operation. Never lean or reach into the machine to remove chips or to adjust the machine while it is running. Doing so can cause serious injury or death.

CONTROLS

Operator controls are located outside the danger zone of the machine. All controls perform a one-to-one action.

The machine is not supplied with a power unit and, therefore, does not have an E-stop.

MACHINE SETUP AND DISASSEMBLY

With a modular design, the machine can be broken down into components to ease setup.

MACHINE GUARDS

There are no guards used on this machine.

ELECTRICAL EMISSIONS

There are no electrical components used on this machine.

OPERATOR STATION

Due to the nature of portable machinery, no designated operator's station exists.

MOVING PARTS

The operator is not exposed to the cutter head when the workpiece is being machined.

Keep all cords and hoses from moving parts during operation. If the cords become tangled in the machinery the operator could be seriously injured and the machine extensively damaged.

FLUIDS

Cutting fluids are required for machine operation. The machine itself does not emit any fluids.

LIFTING

When lifting the machine for setup or disassembly, a conventional sling-type lift is suggested for convenience and safety of the operator. Use designated lifting eyes. Do not lift the machine by the turning bar.

REPETITIVE MOTION

Individuals can be susceptible to disorders of the hands and arms when exposed to tasks that involve highly repetitive motions and/or vibration. To reduce the likelihood of these disorders, follow these guidelines:

- Use minimum hand grip force
- Keep wrists straight
- Avoid exposure to continue vibration
- Avoid repeated bending of wrists and hands
- Keep hands and arms warm and dry

Labeling Guidelines

The purpose of product safety signs and labels is to increase the level of awareness to possible dangers.

Safety Alert Symbols indicate DANGER, WARNING or CAUTION. These symbols may be used in conjunction with other symbols or pictographs. Failure to obey safety warnings can result in serious injury. Always follow safety precautions to reduce the risk of hazards and serious injury.

	**DANGER** **Indicates a hazardous situation that could be fatal or cause serious injury.**

	**WARNING** **Indicates a potentially hazardous situation that could be fatal or cause serious injury.**

	**CAUTION** **Indicates a potentially hazardous situation that could result in minor to moderate injury, damage to the machine or interruption of an important process.**

	**IMPORTANT** **Provides critical information for the completion of a task. There is no associated hazard to people or the machine.**

	**NOTE** **Provides important information regarding the machine.**

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 attached to it 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.

Risk assessment checklist

Use these checklists as part of your on-site risk assessment and include any additional considerations that may pertain to your specific application.

TABLE 1. 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 and took inventory of all the items required but not supplied.
☐	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 the best placement for the controls, cabling, and the operator.
☐	I evaluated and mitigated any other potential risks specific to my work area.

TABLE 2. RISK ASSESSMENT CHECKLIST AFTER SET-UP

After Set-up	
☐	I checked that the machine is safely installed and the potential fall path is clear. If the machine is elevated, 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 Maintenance Intervals with the recommended lubricants.
☐	I checked that all affected personnel have the recommended personal protective equipment, as well as any equipment required by the site or other regulations.
☐	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.

Introduction

The Model FF4000 is a compact, lightweight, portable flange-facing and pipe beveling machine notable for its 2-piece “Quick-Lock” ID-mount chuck. Its primary application is for restoration of flanges from 3” to 19” (76 to 483 mm) diameter. Secondary operations include beveling, squaring, counter boring and cutting weld-prep configurations on tube and pipe.

The basic machine configuration includes:

An air motor, pneumatic conditioner and facing head.

Sets of 15 clamp blades (3 blades/set) for bores 3.65" - 12.7" (93 – 323 mm) diameter. (3.0” – 3.65” without a chuck blade)

Tool kit with hexagon wrench set, Operating Manual, dead blow hammer, and spanner wrench.

Facing bits for roughing and finishing operations.

Heavy-duty plastic containers for storage and shipping.

For beveling operations, the following tool bits are added:

One facing bit, one beveling bit, and one counterbore bit.

About this manual

This manual describes the most effective setup and operation of your Model FF4000 Flange Facer. All parts meet Climax Portable Machining & Welding Systems' strict quality standards. For maximum safety and performance, read the entire manual before operating this machine.

Receiving Inspection

In accordance with normal practice, be sure to inspect the machine for any damage that may have occurred in shipping. Check parts received against the invoice or packing slip and promptly notify Climax should there be any discrepancies.

Recommended tools

Climax includes a general tool kit for use in operating the machine. Additionally, you may require other items of equipment specific to your job-site and particular setup.

Supplied with the machine:

Dead blow hammer

Spanner wrench

Hex key wrench set

Other tools you could have on hand:

Pliers for pulling chips away from the machine.

Chip brush

Cutting oil

File

Honing stone

Precision instruments

In most cases, this machine can be setup using basic measuring devices such as a steel rule or tape measure. Should greater precision be required, some or all of the following may be useful:

Dial or digital calipers

ID calipers

Machinist’s precision level

Micrometers

Dial indicator

Setup

CAUTION
Avoid bodily injury from moving machinery. Turn off and disconnect the air supply before machine setup.

Tool head installation

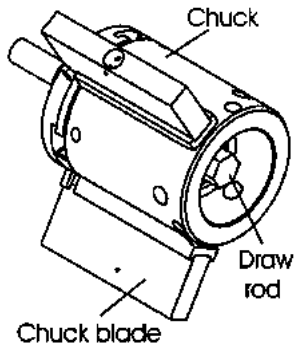
Install a tool head (beveling or facing), with the arrow side away from the main body. Align the bayonet pins in the tool head with the slots on the body. Push and turn to lock.

Setting clamp blades

Measure the inside diameter of the piece to be machined. This measurement is important with regard to correct sizing and selection of the clamping blades.

- Install a matched set of clamp blades on the ID clamping chuck; being sure all blades are secure and properly seated.
- Lightly oil the draw rod and ramps in the chuck.
- Install the chuck on the mandrel. Line up the hexagon in the chuck with the hexagon in the end of the draw rod. Align the bayonet pins in the chuck with the slots on the mandrel. Push and turn to lock.
- Use the spanner wrench provided in the tool kit to be sure the pins are seated correctly. The arrow indicates direction to loosen the chuck.

Clamp blades are marked with their size. Select the proper set of clamp blades from the following table:



Clamp blade set selection	
Bore diameter inches (mm)	Part number (set of 3)
3.0 – 3.65 (76 – 93)	No chuck blade
3.65 - 4.30 (93 - 109)	35525
4.25 - 4.90 (108 - 124)	35526
4.85 - 5.50 (123 - 140)	35527
5.45 - 6.10 (138 - 155)	35528
6.05 - 6.70 (154 - 170)	35529
6.65 - 7.30 (169 - 185)	35530
7.25 - 7.90 (184 - 201)	35531
7.85 - 8.50 (199 - 216)	35532
8.45 - 9.10 (215 - 231)	35533
9.05 - 9.70 (230 - 246)	35534
9.65 - 10.30 (245 - 262)	35535
10.25 - 10.90 (260 - 277)	35536
10.85 - 11.50 (276 - 292)	35537
11.45 - 12.10 (265 - 307)	35538
12.05 - 12.70 (306 - 323)	35539

	CAUTION
	Dirt or burrs in the bore may prevent the clamp blades from mounting properly.

Setting tool bits

Facing head

- Select and install a suitable tool bit into the tool head.
- Tighten the setscrews.
- For production jobs, set and test the settings on a test work piece.

Beveling head

- Select the tool bit, or combination of bits, and slip them into the tool head.
- Position the tool bits to cut the entire area required.
- Tool bits are installed in a set order to achieve the required bevel configuration. Inside diameter bits are set first, facing or squaring bits next, and outside diameter or j-groove bits last.
- With each tool bit correctly in place, tighten the setscrews.
- When a land is required on the work piece, use a facing bit in combination with the beveling bit. The FF4000 beveling head can plunge cut, but does not feed in a radial direction. The width of the land is controlled by the position of the beveling bit or by selecting a bit with a greater or lesser overall height.
- If a specific ID bevel is called for, set and test the ID bit to ensure correct sizing. Cut the ID portion of the bevel first.
- For production jobs, set and test tool bit settings on a test piece of tube or pipe.

Mounting the machine

	CAUTION
	**To avoid damage to the clamp blades, be sure the machine is mounted far enough inside the work piece to clear the cutters.**

- Turn the star-shaped draw-rod knob counterclockwise to secure the blades inward.
- Install the machine in the pipe/tube end, and turn the draw rod knob clockwise to spread the clamp blades in the bore.
- To center and secure the machine, gently work the tool back and forth while tightening the draw rod knob (clockwise).
- For final tightening, push the draw rod knob into the feed handle and use the added leverage to tighten the chuck.

	CAUTION
	**Machine is NOT securely clamped until draw rod knob is pushed into the feed handle and turned for final tightening.**

Air line connection

NOTE
Use only nonrestrictive air line fittings and secure the machine to the work piece before connecting the air supply.

CAUTION
To prevent serious injury from moving machinery, use quick disconnect fittings provided between the air supply line and the ball valve. Close and lock out air valve before connecting the air supply line to the motor.

- Close and lock out the air supply.
- Connect the air supply to the pneumatic conditioning unit. Be sure the air supply line is at least 3/8".
- Make sure the ball valve is turned off. The ball valve is closed when the handle is perpendicular with the air line.
- Connect the air supply line from the pneumatic conditioning unit to the machine using quick disconnect fittings.

CAUTION
The air filter and lubricator supplied with the machine must be used or the warranty is void. Adjust the lubricator to deliver oil at a rate of 15-20 drops per minute.

Starting the machine

This label is attached to the handle of the FF4000. The cutting arm rotates directly below the handle. Do not hold on to this handle during operation!

	CAUTION
	SEVERING HAZARD: DO NOT HOLD THE HANDLE DURING OPERATION!

The FF4000 is equipped with a 1.45 hp (1.08 Kw) air motor and a ball-type shut off valve. Motor speed is controlled by adjusting the ball valve.

	CAUTION
	DO NOT attempt to control motor speed by adjusting the in-line air pressure from 90 psi (620 kPa).

- Slowly open the ball valve. The valve is fully open when the handle aligns with the air supply line. Adjust the ball valve to obtain an appropriate tool head speed.
- Stopping the machine
- Close the ball valve.
- Disconnect the air supply.

Feeding the machine

- This machine travels axially along its mandrel to engage the tool bit with the work piece.
- To move the tool head toward the work piece turn the feed handles clockwise.
- To feed away from the work piece turn the feed handles counterclockwise.

A notable feature of the Climax FF4000 Flange Facer includes a feed mechanism with both left-hand and right-hand screw threads. While providing a more compact feed system, this innovative design effectively doubles the length of travel for the tool head.

When feeding the tool head away from the work piece use caution to prevent the nut barrel from coming in contact with the main housing. The barrel has left hand threads.

To move the barrel away from the housing turn the feed handles in the direction of the arrows engraved on the side of the nut barrel (clockwise).

Operation

Pre-start checks

	**CAUTION** To prevent serious bodily injury from moving machinery, turn off and disconnect the air supply before performing pre-start checks.

- Be sure tool bits are sharp.
- Check that moving parts move freely.
- Fill the air lubricator with air oil that includes antioxidants and rust inhibitors such as Mobil ALMO525.
- Adjust the lubricator to deliver oil at a rate of 15-20 drops per minute.
- Drain all liquid and remove dirt from the air filter.
- Close the ball valve.
- Check that the in-line air pressure is 90 psi (620 kPa).

Facing

	**NOTE** For precision facing operations, it is good practice to lock the feed by tightening the set screws under the feed handle.

- Be sure the air supply is disconnected and turned off.
- Secure the tool bit in the facing head.
- Position the facing head cutting depth using the feed handle.
- Lightly tighten the 3 set screws under the feed handle to stabilize the mandrel and reduce the chance of chatter.

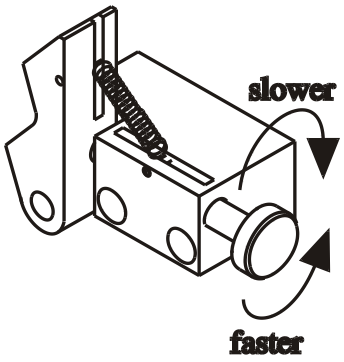
Feed direction

The facing head feeds automatically in either direction. Internal one-way clutches drive a pinion feed shaft along the rack. After pushing the feed shaft in on one side or the other, the cutting tool will feed in the direction indicated by the arrow on the side of the head. Be sure the feed shaft engagement pins are fully engaged.

- To feed away from the chuck, push the feed shaft on the side of the facing head with the arrow pointing out.
- To feed toward the chuck, push the feed shaft on the side of the facing head with the arrow pointing in.

	NOTE
	When both shaft pins are out of their detent slots, the feed system is in NEUTRAL and can be fed by hand in either direction.

Feed rate



- Adjust the feed rate using the small round knob located near the trip mechanism.
- Clockwise decreases the feed rate.
- Counterclockwise increases the feed rate.
- Continue feeding until cutting begins. Add a small amount of cutting oil.

	CAUTION
	Do not stop the air motor while the tool is cutting.

- Once you have the surface you want, back the tool away from the work piece, using the feed handles.
- Stop the machine by closing the ball valve.

Beveling

	CAUTION
	Prevent serious bodily injury from moving machinery by turning off and disconnecting the air supply before proceeding.

- Remove the chuck and facing head, if necessary. Remember, striking with a dead blow hammer in the direction of the engraved arrow loosens the bayonet lock. Twist and pull the part from the mandrel.
- Install the beveling head, arrow side away from the main body. Align the bayonet pins in the beveling head with the slots on the body. Push and turn to lock. A good whack with a dead blow hammer in the opposite direction of the arrow ensures proper seating of the tool head.
- Reinstall the chuck.
- Change the chuck blades if required.
- Mount the machine in the tube or pipe.
- Turn the draw rod knob counterclockwise, drawing the clamp blades back inward

	CAUTION
	To avoid damage to the clamp blades, be sure the machine is mounted far enough inside the work piece to clear the cutters.

- Install the machine in the pipe/tube end, and turn the draw rod knob clockwise to spread the clamp blades in the bore.
- To center and secure the machine in the tube/pipe, gently work the tool back and forth while tightening the draw rod knob (clockwise).

	CAUTION
	The machine is NOT securely clamped until the draw rod knob is pushed into the feed handle and turned for final tightening.

For final tightening, push the draw rod knob into the feed handle and use the extra leverage to tighten the chuck.

	NOTE
	During machining, set screws on the mandrel gib can be tightened moderately to minimize backlash. Do not over tighten. The gib screws are preset at the factory. Field adjustments may be required over time. When adjusting the gib, the screws should be snug, but not too tight. When adjusted properly, the tool head moves smoothly along the slide but does not feel loose. Check by manually feeding the tool head from end to end, looking for areas that are too loose, or too tight. Adjust accordingly.

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Disassembly

	CAUTION
	Prevent serious bodily injury from moving machinery by turning off and disconnecting the air supply before disassembly.

- Back off the tool bits 1/4" to 1/2" away from the work piece.
- Loosen the draw rod knob by turning it counterclockwise and gently rock the tool to loosen the clamping chuck.
- Remove the FF4000 from the work piece.

Maintenance

Lubricants

LUBRICANT	WHERE USED
Light oil	Unpainted surfaces
Cutting oil	Tool bits, work piece
Air tool oil	Air lubricator oil cup

Storage

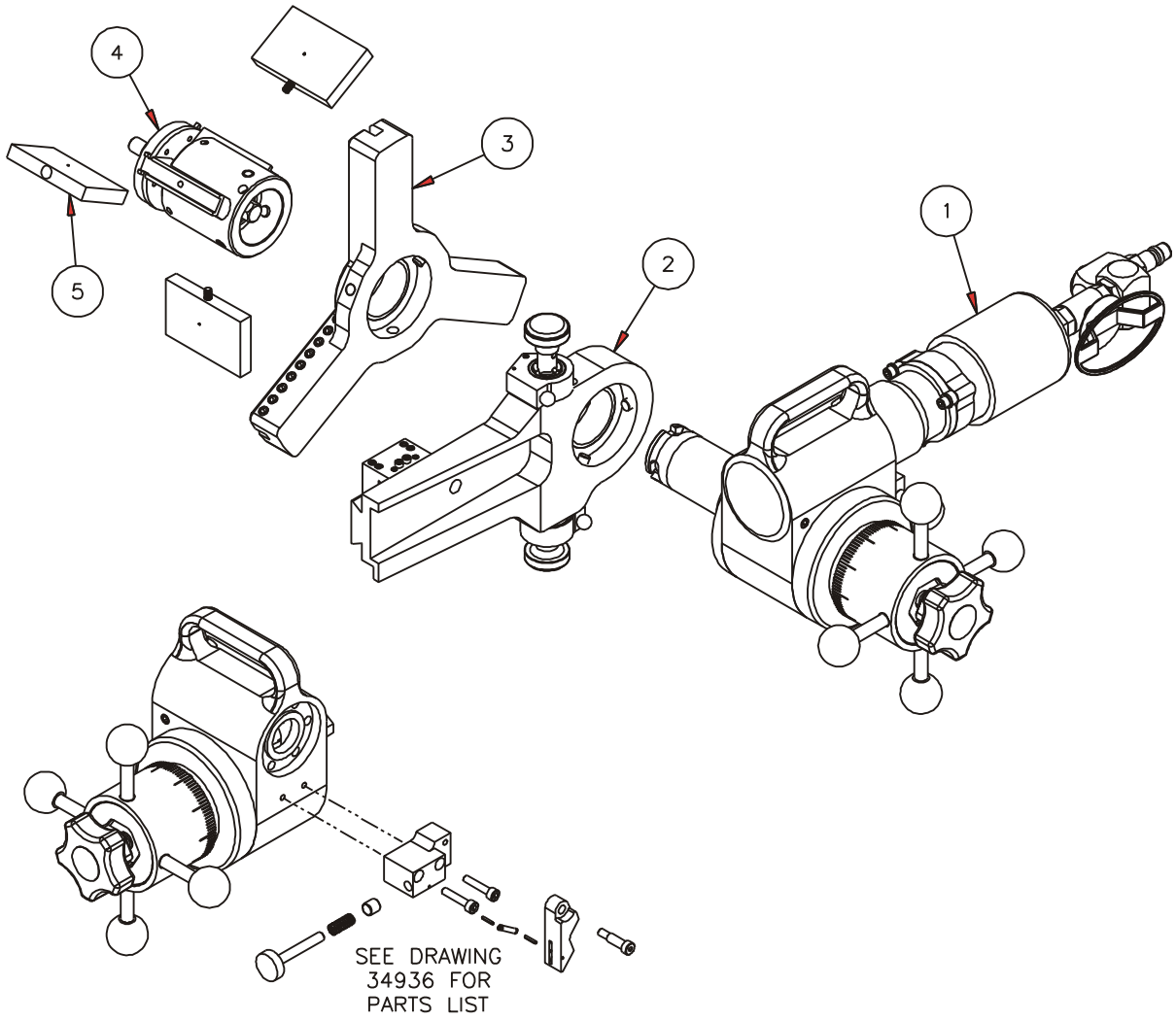
Proper storage of the FF4000 will protect the machine tool from undue wear and damage.

- Before storing, clean the machine with solvent to remove grease, metal chips, and moisture.
- To prevent corrosion, spray unpainted surfaces, using WD-40 for short-term storage, Cosmoline for long-term storage.
- Disassemble the Flange Facer and place it with any tools and accessories in the case provided.
- Include desiccant or vapor wrap to absorb moisture.

Exploded Views and Parts

The following diagrams and parts lists are for your reference purposes only. The machine Limited Warranty is void if the machine has been tampered with by anyone who has not been authorized in writing by Climax Portable Machining & Welding Systems to perform service on the machine.

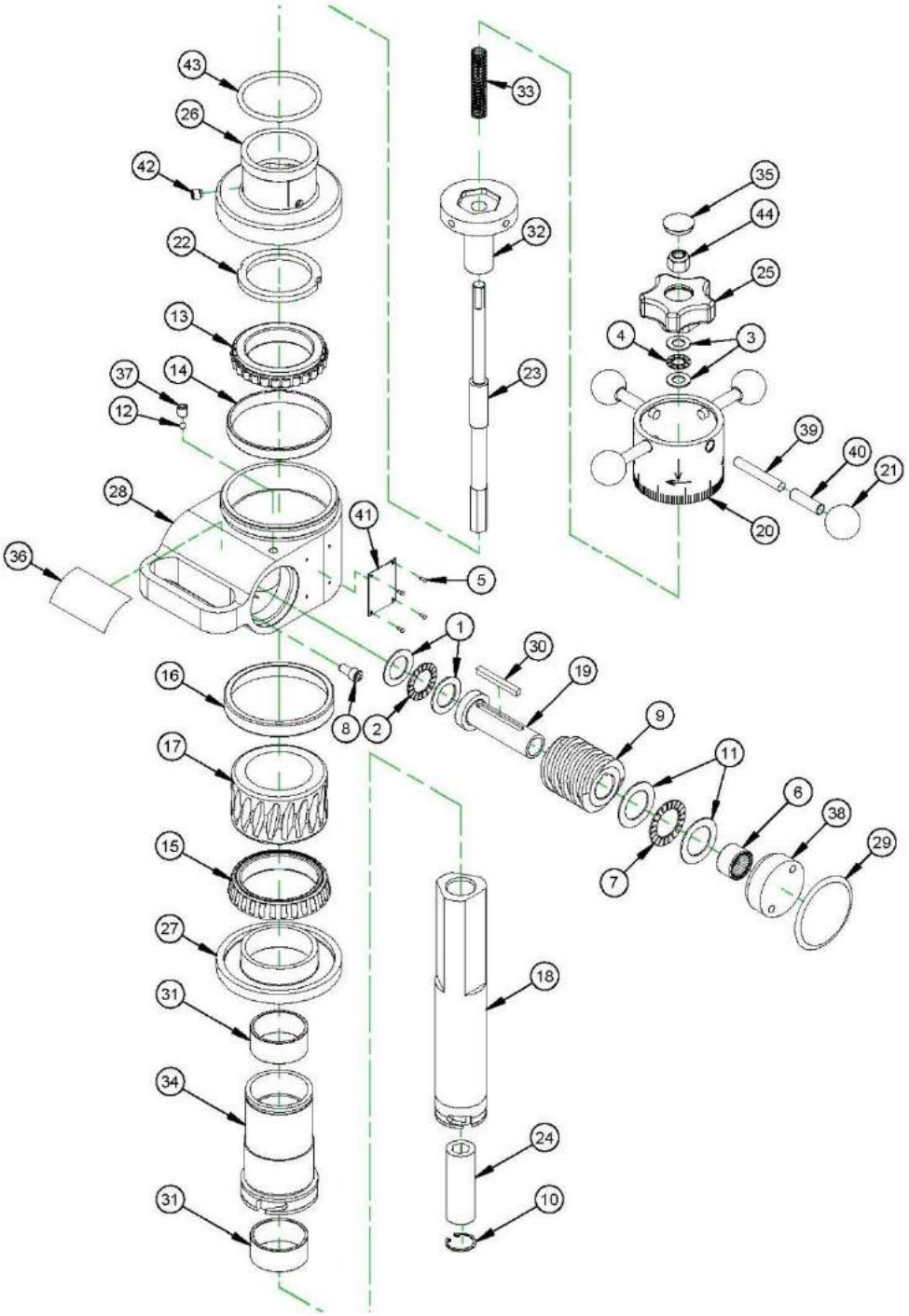
FF4000 MAIN ASSEMBLY			
BALLOON NO	QTY	PART	DESCRIPTION
1	1	49593	FF4000 BASE UNIT
2	1	34936	ASSY FACING HEAD 19" DIA
3	1	35439	ASSY HEAD BEVELING 2.00-12.75 DIA
4	1	35427	ASSY CHUCK HEAD FF4000



FF4000 MAIN ASSEMBLY

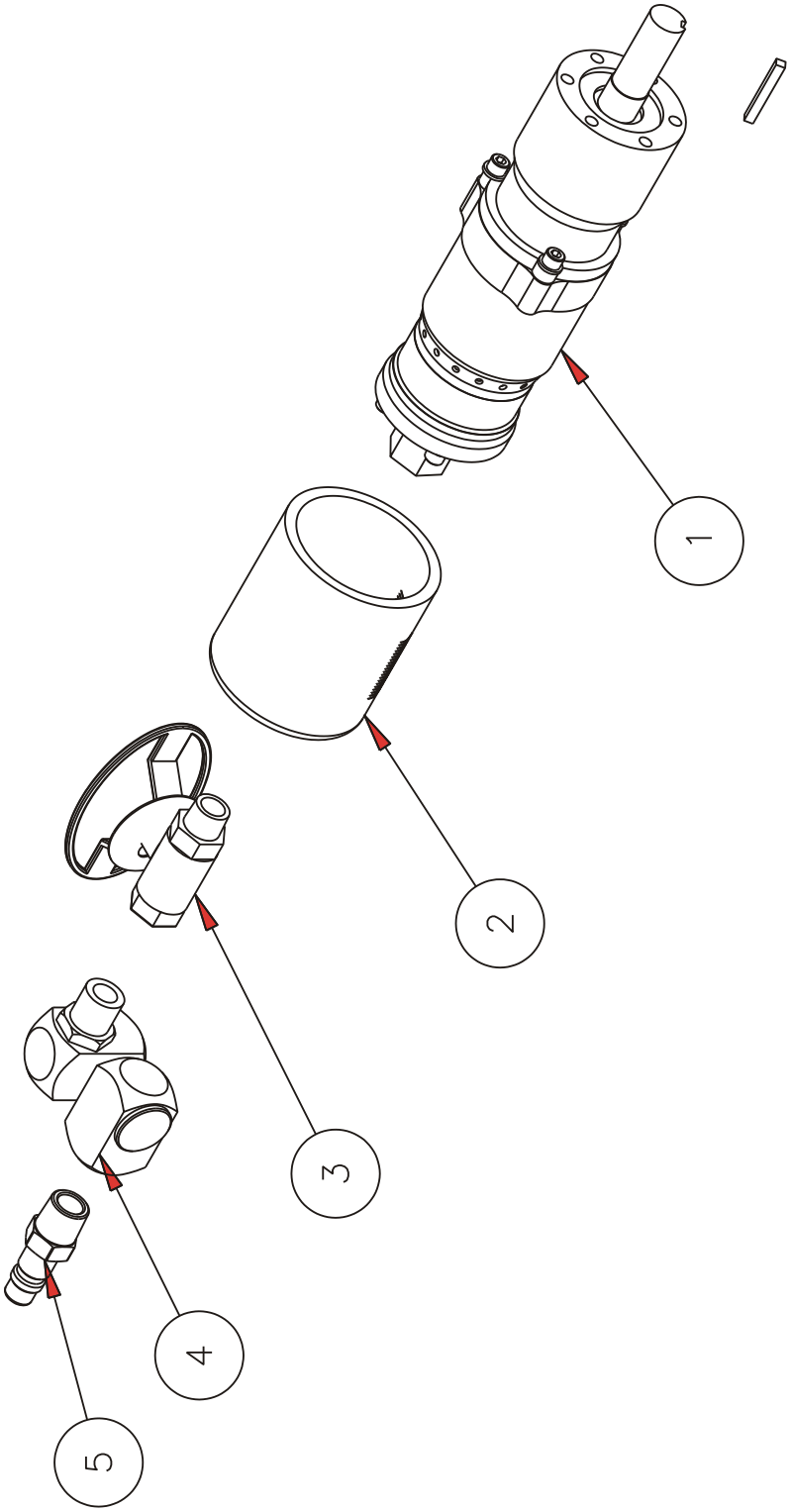
PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	2	10144	WASHER THRUST 1 ID X 1.562 OD X .060
2	1	10145	BRG THRUST 1 ID X 1.562 OD X .0781
3	2	10436	WASHER THRUST .500 ID X .937 OD X .060
4	1	10437	BRG THRUST .500 ID X .937 OD X .0781
5	4	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
6	1	11180	BRG NEEDLE 1 ID X 1-1/4 OD X .750 OPEN
7	1	12387	BRG THRUST 1.259 ID X 1.937 OD X .0781
8	6	12432	SCREW 5/16-18 X 5/8 SHCS
9	1	13035	WORM 6DP DOUBLE RH 2.5 14.5PA STEEL HARDENED
10	1	14980	RING SNAP 1-1/8 ID
11	2	16666	WASHER THRUST 1.250 ID X 1.937 OD X .060
12	1	19225	BALL NYLON 1/4 DIA
13	1	33515	BRG CONE 2.6250 ID X .6900 WIDE
14	1	33516	BRG CUP 4.0640 OD X .4720 WIDE
15	1	33517	BRG CONE 3.0000 ID X .7500 WIDE
16	1	33518	BRG CUP 4.3130 OD X .5940 WIDE
17	1	33520	WORM GEAR 6DP 20T DBL RH 2.25 14.5PA BRONZE
18	1	33521	MANDREL FF4000
19	1	33523	BUSHING MOTOR FF4000
20	1	33524	NUT BARREL
21	4	33526	KNOB BALL 1-3/8 DIA 3/8-16 THD
22	1	33533	NUT RETAINER BEARING
23	1	33534	BOLT CLUTCH FF4000
24	1	33536	SLEEVE 5/8 HEX X 1-1/8 OD X 3.25 LONG (STEEL 1144)
25	1	33537	KNOB MANDREL
26	1	33538	TORQUE PLATE FF4000
27	1	33539	PLATE BEARING BACKING
28	1	33540	HOUSING FF4000
29	1	33561	PLUG FINISHING FITS 2-5/8 ID BLACK
30	1	33562	KEY MODIFIED FF4000
31	2	33563	BUSHING OILITE 2 ID X 2-1/4 OD X 1
32	1	33595	NUT CORE FF4000
33	1	33596	SPRING COMP .625 OD X .054 WIRE X 6 LONG
34	1	34405	SPINDLE MAIN DRIVE FF4000
35	1	34436	PLUG FINISHING 1-3/32 ID X 1-7/32 HEAD BLACK NYLON
36	1	34736	LABEL WARNING 1-7/8 X 3
37	1	35368	SCREW M10 X 1.5 X 12mm SSSCP
38	1	35418	NUT PRELOAD MOTOR
39	4	35507	STUD HANDLE
40	4	35508	FERRULE HANDLE
41	1	35828	NAMEPLATE SERIAL NUMBER CE 1.5 X 2.0
42	3	35915	SCREW M10 X 1.5 X 10MM SSS SOFT TIPPED BRASS
43	1	38974	RING O 3/16 X 2-7/8 ID X 3-1/4 OD
44	1	68976	NUT 1/2-13 NYLON INSERT ZINC PLATED GRADE 5

ASSY MAIN BODY FF4000 35435



ASSY MAIN BODY FF4000 35435

35542 ASSY DRIVE PNEUMATIC FF4000		
BALLOON No	PART	DESCRIPTION
1	18468	MOTOR AIR INGERSOLL 1.45HP 120 RPM @ MAX HP
2	33691	MUFFLER FF4000
3	36825	VALVE BALL 1/2 OVAL HANDLE ASSY W/ LABEL
4	35670	FTG SWIVEL 1/2 NPTM X 1/2 NPTF
5	13209	FTG QUICK COUPLER 1/2B 1/2 NPTM MALE AIR
NOT SHOWN	34866	AIRTOOL OIL COMPLETE
NOT SHOWN	13208	FTG QUICK COUPLER 1/2B 1/2 NPTF FEMALE AIR
NOT SHOWN	28826	PNEUMATIC CONDITIONING UNIT 1/2 IN


1
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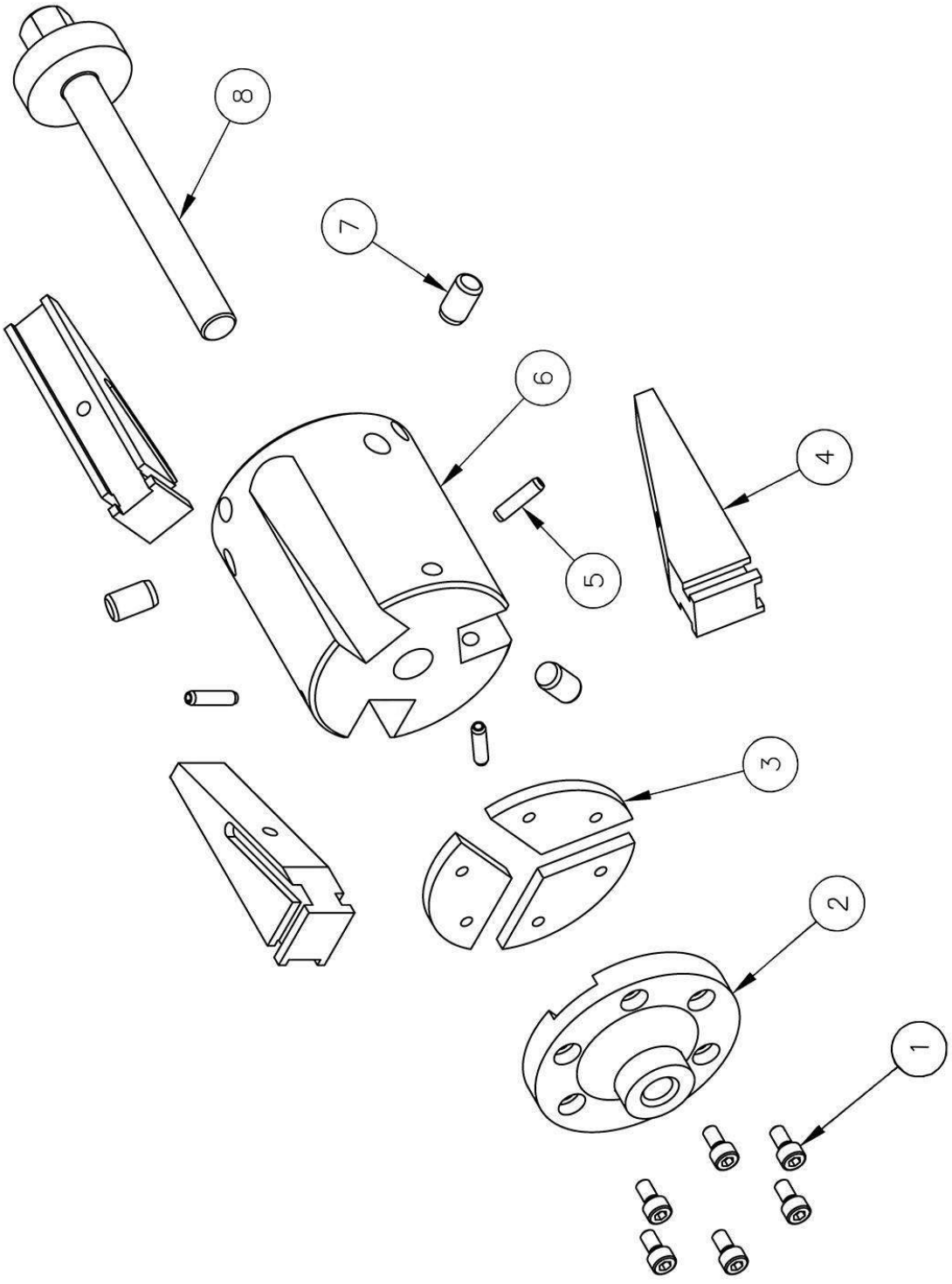
35427 ASSY CHUCK HEAD FF4000		
BALLOON No	PART	DESCRIPTION
1	35916	SCREW M5 X 0.8 X 10 SHCS
2	33530	RETAINER CHUCK
3	33531	PLATE RETAINER
4	33529	JAW CHUCK
5	10850	PIN ROLL 3/16 DIA X 3/4
6	33528	CHUCK HEAD
7	15174	PIN DOWEL 3/8 DIA X 5/8
8	33532	BOLT CHUCK


8
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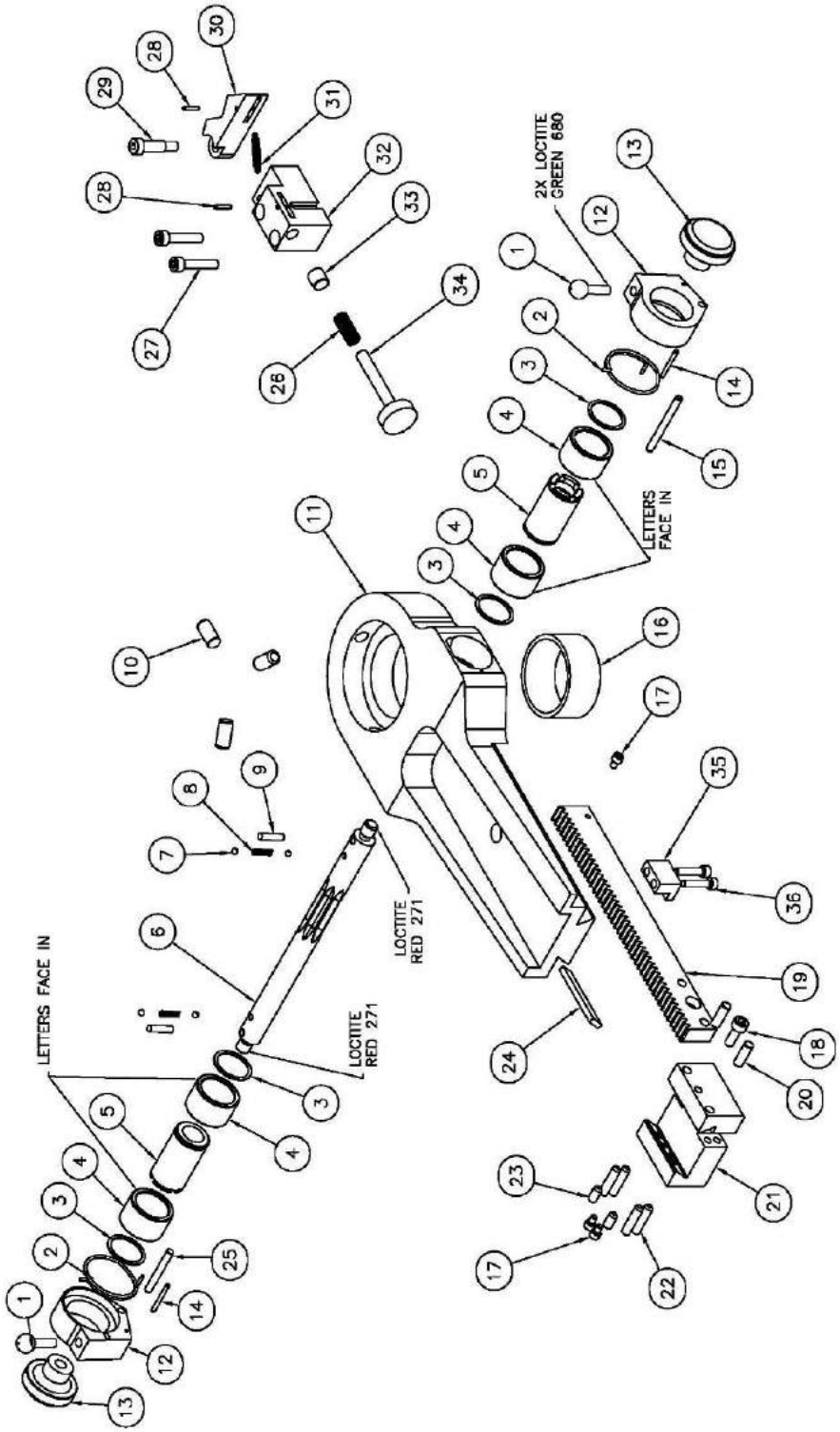
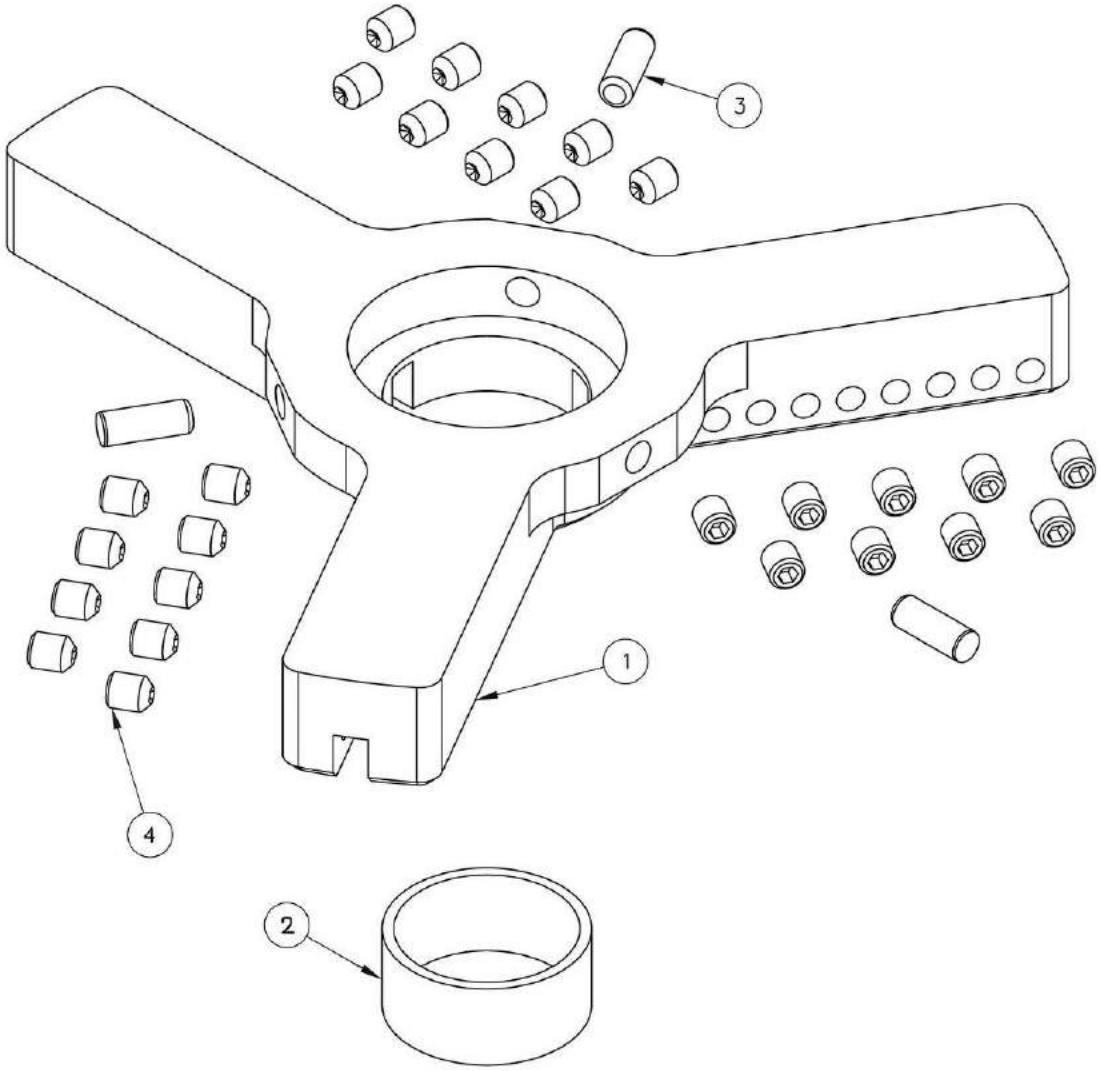
34936 ASSY HEAD FACING 19 DIA FF4000		
BALLOON No	PART	DESCRIPTION
1	35196	BALL TOOLING 1/2 DIA (KB)
2	35374	SPRING TRIP RETURN (KB)
3	14241	RING SNAP 1 OD SPIRAL HEAVY DUTY (KB)
4	19307	BRG ROLLER CLUTCH .984 ID 1.26 OD X .787 (KB)
5	19334	BUSHING FEED DIRECTION (KB)
6	35382	SHAFT PINION AXIAL FEED
7	19562	BALL STEEL 5/32 DIA (KB)
8	39872	SPRING COMP .148 OD X .023 WIRE X .44 LONG (KB)
9	11763	PIN DOWEL 3/16 DIA X 3/4
10	16407	PIN DOWEL 3/8 DIA X 3/4
11	35036	ARM FLANGE FACER 19 DIA
12	34992	LEVER FEED (KB)
13	35595	KNOB KNURLED DOMED 1-1/2 OD 3/8-16 TAP STEEL (KB)
14	18689	PIN ROLL 3/32 DIA X 1
15	35599	PIN DOWEL 3/16 DIA X 2
16	33563	BUSHING OILITE 2 ID X 2-1/4 OD X 1
17	36152	SCREW M4 X 0.7 X 6MM SHCS
18	35014	SCREW M6 X 1.0 X 16MM SHCS
19	41288	RACK RADIAL FEED 19 DIA (KB)

20	11729	PIN DOWEL 1/4 DIA X 3/4
21	41299	CARRIAGE TOOL HOLDER FF3000/FF4000
22	35911	SCREW M6 X 1.0 X 25MM SSSCP
23	45034	SCREW M6 X 1.0 X 12MM SSSDPPL
24	35005	GIB .47 X .15 X 2.0 1018 2 SS X 1.0 (KB)
25	35600	PIN DOWEL 3/16 DIA X 1-1/2
35	41290	SUPPORT RACK RADIAL FEED FACING HEAD (KB)
36	11846	SCREW 10-32 X 7/8 SHCS
1	35196	BALL TOOLING 1/2 DIA (KB)

34936 FACING HEAD ASSEMBLY



35439 ASSY HEAD BEVELING 2.00-12.75 DIA		
BALLOON No	PART	DESCRIPTION
1	33619	HEAD BEVELING 2-12.75 IN
2	33563	BUSHING OILITE 2 ID X 2-1/4 OD X 1
3	11027	PIN DOWEL 3/8 DIA X 1
4	35368	SCREW M10 X 1.5 X 12 SSSCP
5	35541	SET STARTER FORM TOOLS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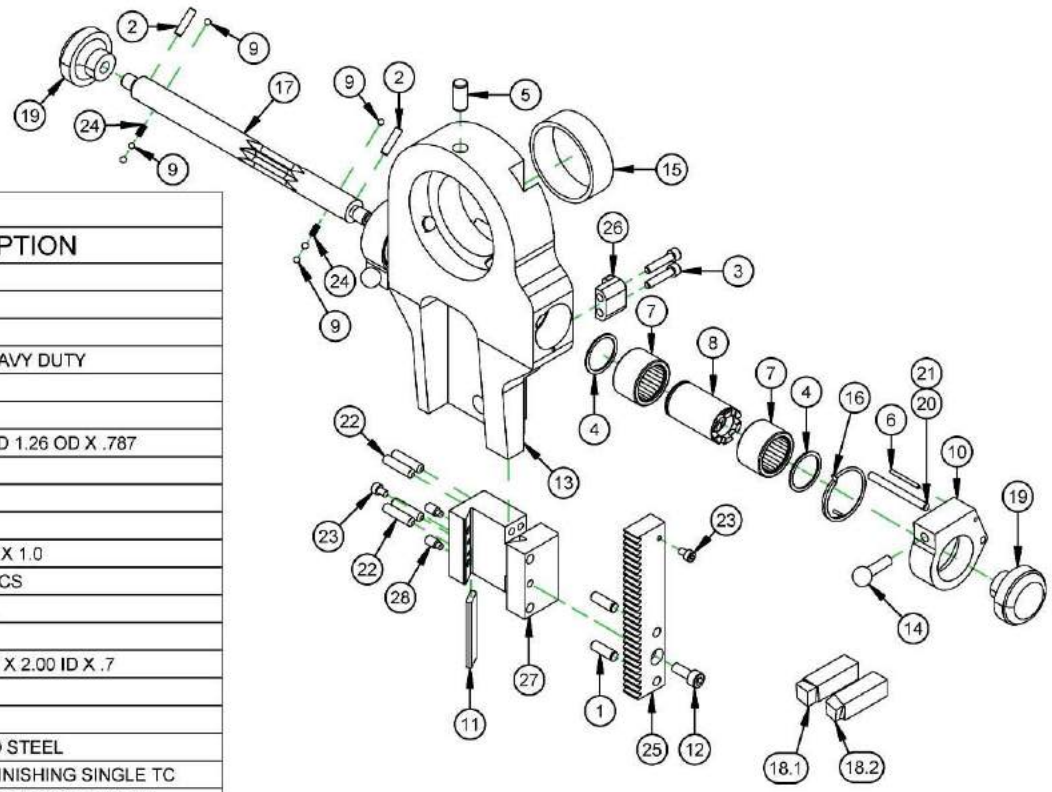
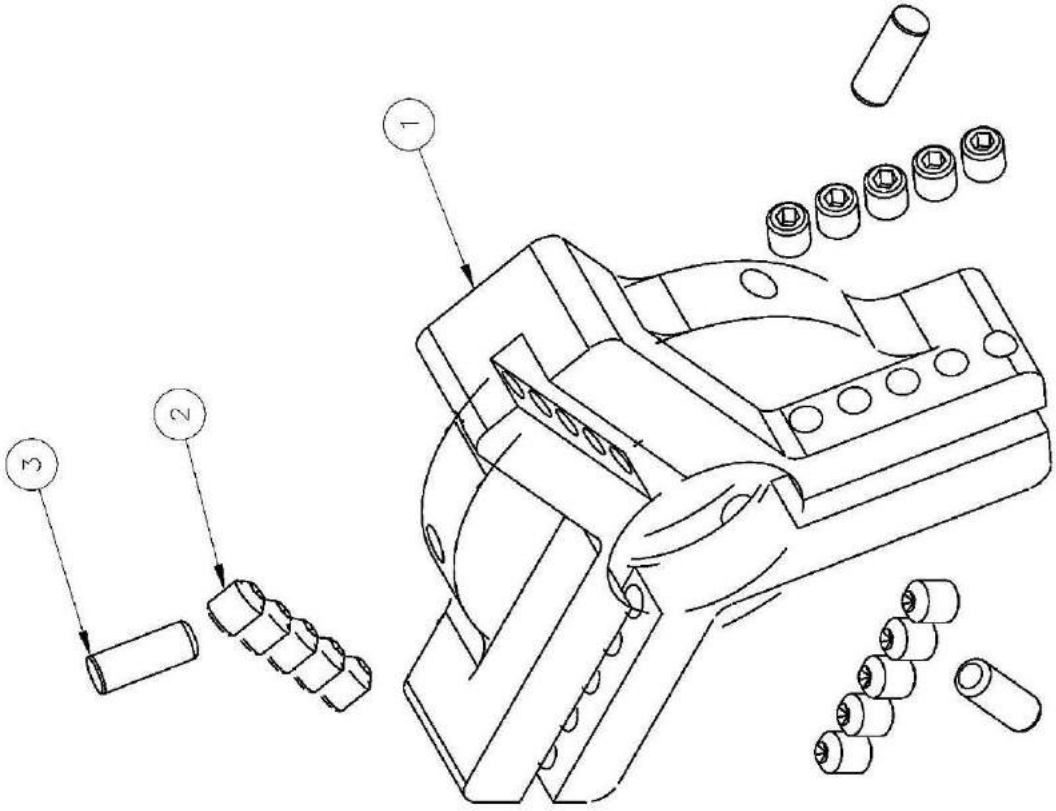


PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	2	11729	PIN DOWEL 1/4 DIA X 3/4
2	2	11763	PIN DOWEL 3/16 x 3/4
3	2	11846	SCREW 10-32 X 7/8 SHCS
4	4	14241	RING SNAP 1 OD SPIRAL HEAVY DUTY
5	3	16407	DOWEL PIN 3/8 DIA X 3/4
6	2	18689	PIN ROLL Ø3/32 X 1
7	4	19307	BRG ROLLER CLUTCH .984 ID 1.26 OD X .787
8	2	19334	BUSHING FEED DIRECTION
9	6	19562	BALL STEEL 5/32 DIA
10	2	34992	LEVER FEED
11	1	35005	GIB .47 X .15 X 2.0 1018 2 SS X 1.0
12	1	35014	SCREW M6 X 1.0 X 16mm SHCS
13	1	35037	ARM FLANGE FACER 12 DIA
14	2	35196	BALL TOOLING 1/2 DIA
15	1	35252	BUSHING MODIFIED 2.25 OD X 2.00 ID X .7
16	2	35374	SPRING TRIP RETURN
17	1	35382	SHAFT PINION AXIAL FEED
18	1	35553	SET TOOL BITS HIGH SPEED STEEL
18.1	1	31858	BIT TOOL HSS 1/2 X 1.8 LH FINISHING SINGLE TC
18.2	1	31867	BIT TOOL HSS 1/2 X 1.8 LH ROUGHING SINGLE
19	2	35595	KNOB KNURLED DOMED 1-1/2 OD 3/8-16 TAP STEEL
20	1	35599	PIN DOWEL 3/16 DIA X 2
21	1	35600	PIN DOWEL 3/16 DIA X 1-1/2
22	4	35911	SCREW M6 X 1.0 X 25MM SSSCP
23	2	36152	SCREW M4 X 0.7 X 6mm SHCS
24	2	39872	SPRING COMP .148 OD X .023 WIRE X .440 LG
25	1	41289	RACK RADIAL FEED 12 DIA
26	1	41290	SUPPORT RACK RADIAL FEED FACING HEAD
27	1	41299	CARRIAGE TOOL HOLDER FF3000/FF4000
28	2	45034	SCREW M6 X 1.0 X 12MM SSSDPPL

ASSY HEAD FACING / GROOVING 12 DIA BB5000

35222

34980 ASSY HEAD BEVELING 1.25-6.63 DIA		
BALLOON No	PART	DESCRIPTION
1	35557	HEAD BEVELING 1.25-7.00 DIA
2	35368	SCREW M10 X 1.5 X 12 SSSCP
3	11027	PIN DOWEL 3/8 DIA X 1
NOT SHOWN	35541	SET STARTER FORM TOOLS



35424 KIT TOOL FF4000	
PART	DESCRIPTION
35516	HAMMER DEAD BLOW 1-3/4 DIA HEAD
34181	WRENCH HEX SET FOLD UP 5/64 TO 1/4 9 PIECES
34482	WRENCH SPANNER 3" FIXED HEAD PIN STYLE


CLIMAX
BORTECH
CALDER
H&S TOOL