

CE

# BF-R

## FLANGE FACER OPERATING MANUAL

ORIGINAL INSTRUCTIONS



 **CLIMAX**  
Portable Machining & Welding Systems

P/N 102823  
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Revision 0

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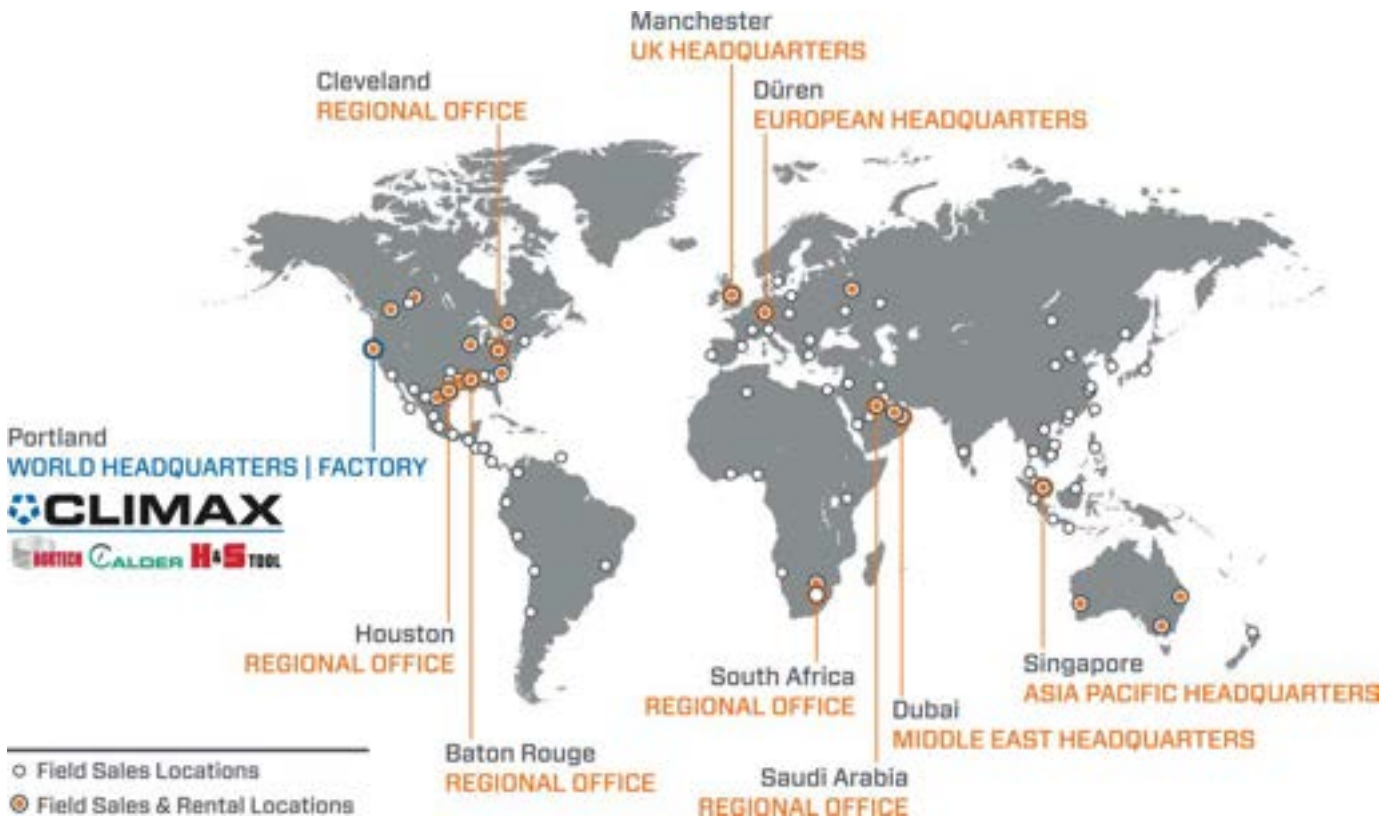
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# CE DOCUMENTATION

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# 1 INTRODUCTION

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## 1.1 HOW TO USE THIS MANUAL

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

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 BF-R 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<sup>1</sup>:



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



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<sup>1</sup> listed in Table 1-1.

TABLE 1-1. SOUND LEVELS

	Motor
Sound power	____ dBA
Operator sound pressure	____ dBA
Bystander sound pressure	____ 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.

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## 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**

<b>Before set-up</b>	
<input type="checkbox"/>	I took note of all the warning labels on the machine.
<input type="checkbox"/>	I removed or mitigated all identified risks (such as tripping, cutting, crushing, entanglement, shearing, or falling objects).
<input type="checkbox"/>	I considered the need for personnel safety guarding and installed any necessary guards.
<input type="checkbox"/>	I read the machine assembly instructions (Section 3.2) and took inventory of all the items required but not supplied (Section 2.5).
<input type="checkbox"/>	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.
<input type="checkbox"/>	I located the potential fall paths in lifting and rigging operations. I have taken precautions to keep workers away from the identified fall paths.
<input type="checkbox"/>	I considered how this machine operates and identified the best placement for the controls, cabling, and the operator.
<input type="checkbox"/>	I evaluated and mitigated any other potential risks specific to my work area.






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

<b>After set-up</b>	
<input type="checkbox"/>	I checked that the machine is safely installed (according to Section 3.2) 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.
<input type="checkbox"/>	I identified all possible pinch points, such as those caused by rotating parts, and informed the affected personnel.
<input type="checkbox"/>	I planned for containment of any chips or swarf produced by the machine.
<input type="checkbox"/>	I followed the required maintenance checklist (Section 5.1) with the recommended lubricants (Section 5.2).
<input type="checkbox"/>	I checked that all affected personnel have the recommended personal protective equipment, as well as any site-required or regulatory equipment.
<input type="checkbox"/>	I checked that all affected personnel understand and are clear of the danger zone. I understand that leaving the workspace with the machine running and unattended may cause personnel injury and machine or workpiece damage.
<input type="checkbox"/>	I evaluated and mitigated any other potential risks specific to my work area.

## 1.7 LABELS

The following warning and identification labels should be on your machine. If any are defaced or missing, contact CLIMAX immediately for replacements.

TABLE 1-4. BF-R LABELS

	<p>P/N 59042 Warning label: hand danger/ moving parts</p>		<p>P/N 78742 Warning label: rotat- ing parts hazard</p>
		<p>P/N 87271 Warning labels: wear eye and ear protection. Refer to the operating manual before operation and whenever needed</p>	
	<p>P/N 95056 Label:oil fluid</p>		<p>P/N 95087 Label: filter</p>

For identification of location placement, refer to Figure A-1 on page 88 and Figure A-2 on page 89.

## 2 OVERVIEW

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### 2.1 FEATURES AND COMPONENTS

The BF-R is a H&S flange facer model that includes premium flange facing conversion accessories. It is powered by reliable pneumatic motors to accurately meet your job site or shop requirements.

The BF-R is portable, making it ideal for use in the field. Setup and operation may be handled by a single worker. It weighs 25 lb (11.3 kg) with a 2" (51 mm) collet installed.

The machine uses collets or wedges to attach the machine to the workpiece by extending them in the inside diameter (ID) of the tube.

Standard wedge plates or the collet system can be used for internal locking.

Centering and squaring device, such as the alignment gauge, make accurate machining of gasket surfaces or bolt patterns simple and safe.

For detailed specifications, see Table 2-6 on page 15.

Figure 2-2 on page 8 shows major BF-R components.



FIGURE 2-1. BF-R  
MODEL

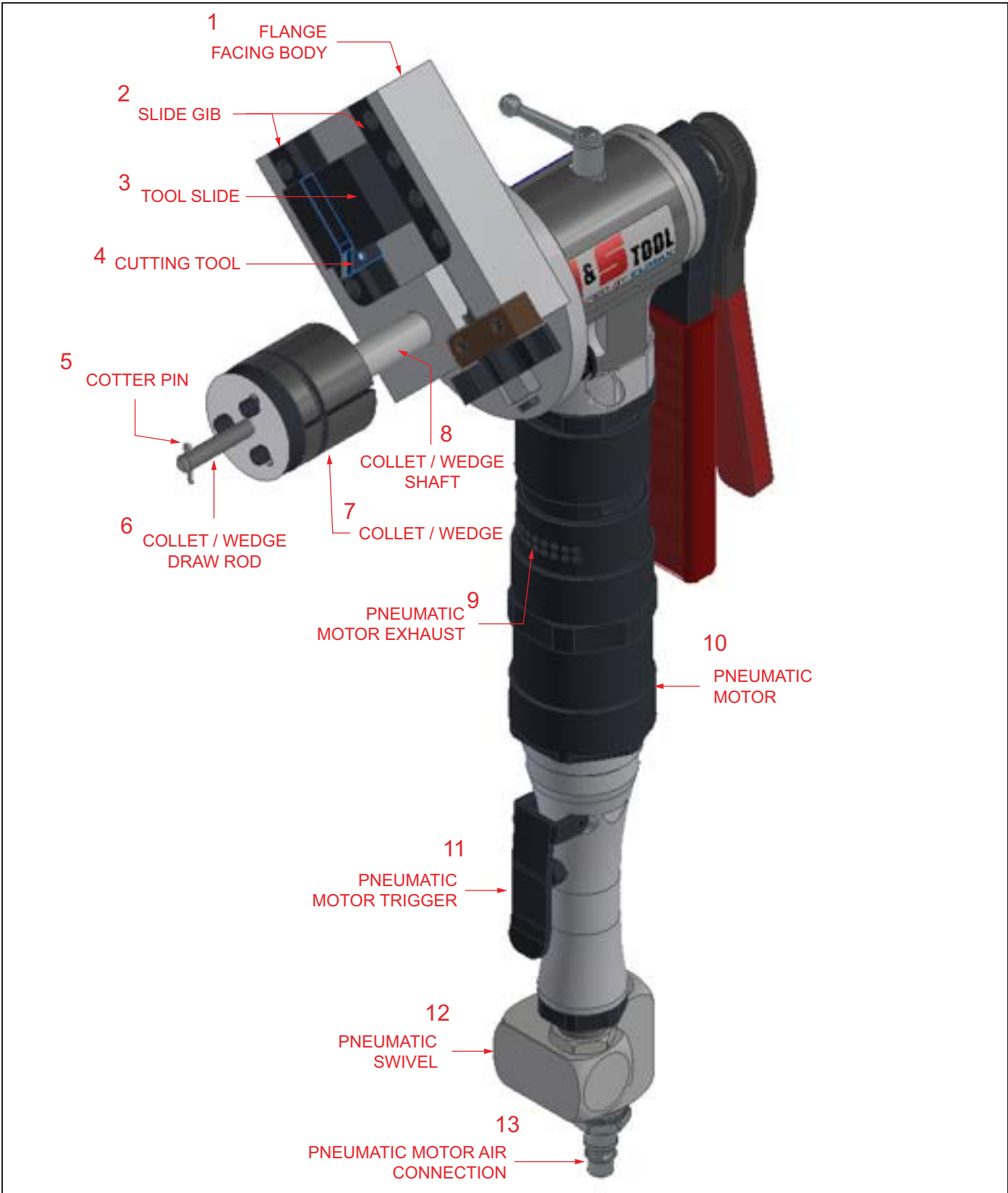


FIGURE 2-2. BF-R COMPONENTS 1

**TABLE 2-1. BF-R ID COMPONENTS 1 IDENTIFICATION**

<b>Number</b>	<b>Component</b>
1	Flange facing body
2	Slide gib
3	Tool slide
4	Cutting tool
5	Cotter pin
6	Collet/wedge draw rod
7	Collet/wedge shaft
8	Collet/wedge
9	Pneumatic motor exhaust
10	Pneumatic motor
11	Pneumatic motor trigger
12	Pneumatic swivel
13	Pneumatic motor air connection

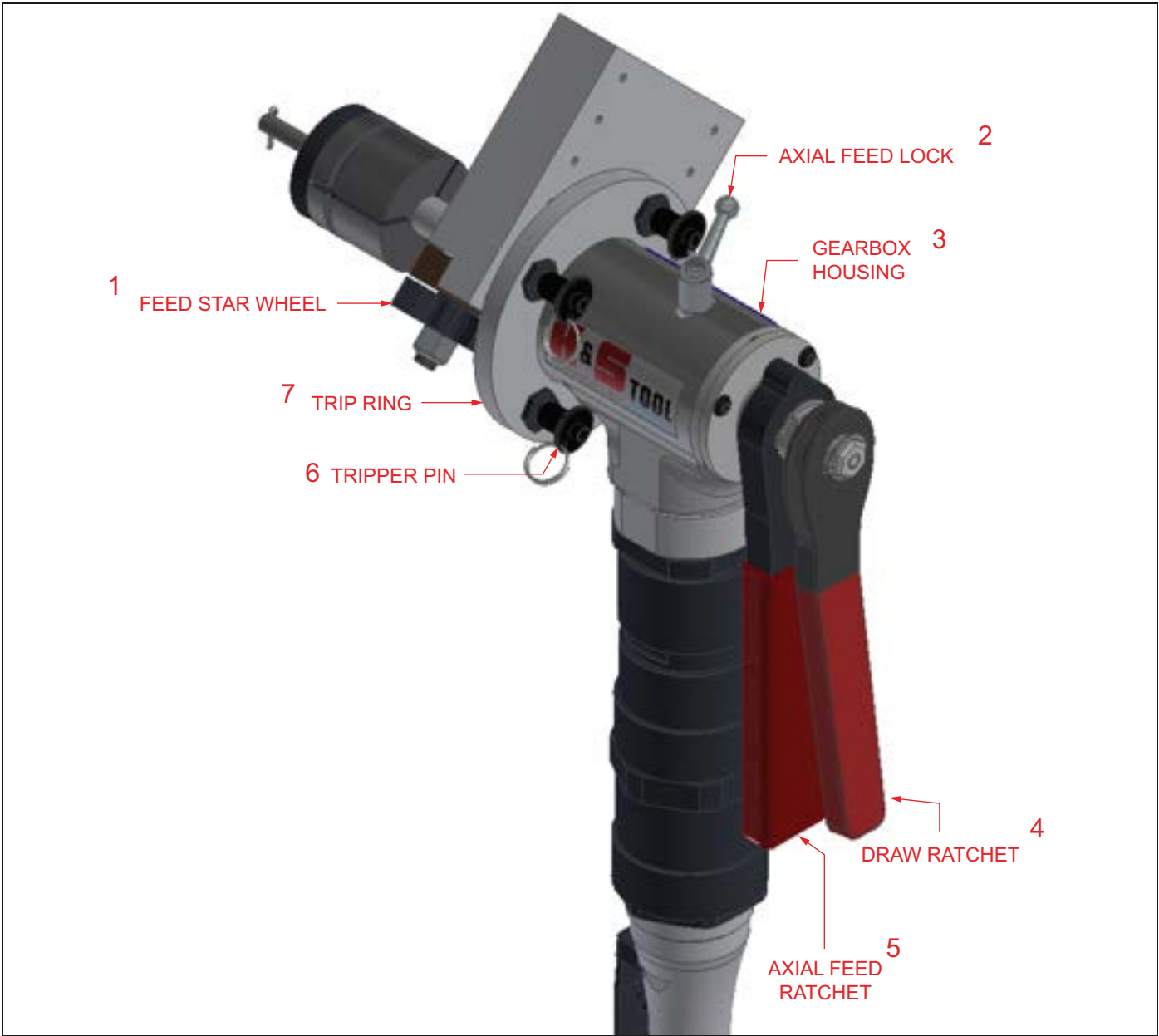


FIGURE 2-3. BF-R COMPONENTS 2

TABLE 2-2. BF-R ID COMPONENTS 2 IDENTIFICATION

Number	Component
1	Feed star wheel
2	Axial feed lock
3	Gearbox housing
4	Draw ratchet
5	Axial feet ratchet

TABLE 2-2. BF-R ID COMPONENTS 2 IDENTIFICATION

Number	Component
6	Tripper pin
7	Trip ring

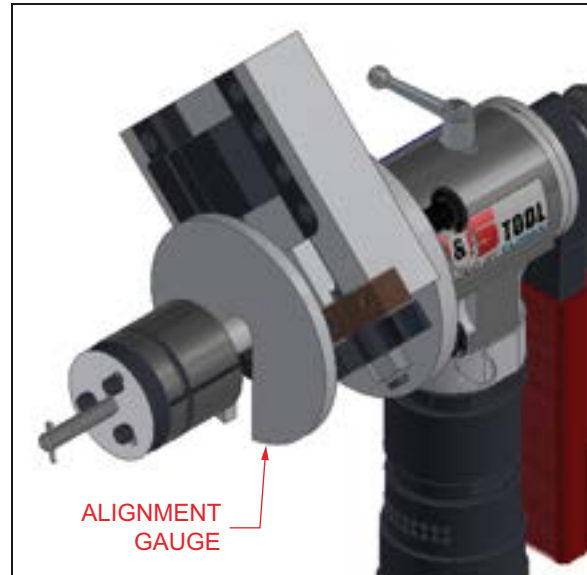


FIGURE 2-4. ALIGNMENT GAUGE LOCATION

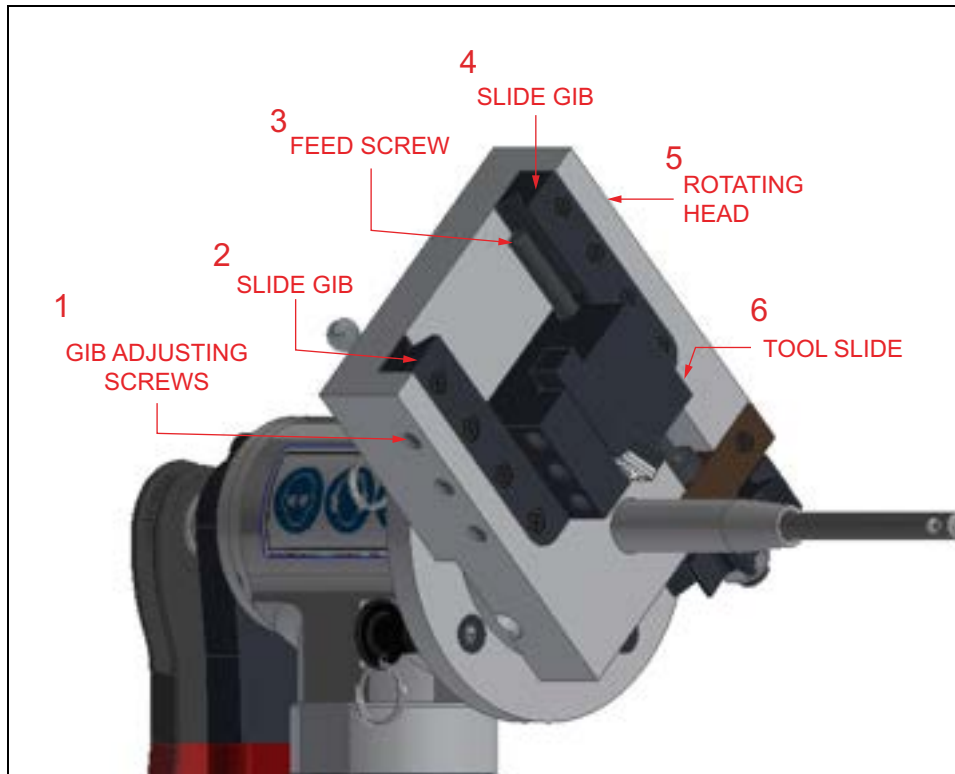


FIGURE 2-5. BF-R COMPONENTS 3

TABLE 2-3. BF-R ID COMPONENTS 3 IDENTIFICATION

Number	Component
1	Gib adjusting screws
2	Slide gib
3	Feed screw
4	Slide gib
5	Rotating head
6	Tool slide

## 2.2 CONTROLS

The BF-R is controlled by a simple trigger mechanism. To start the machine, squeeze the trigger. To stop the machine, release the trigger.



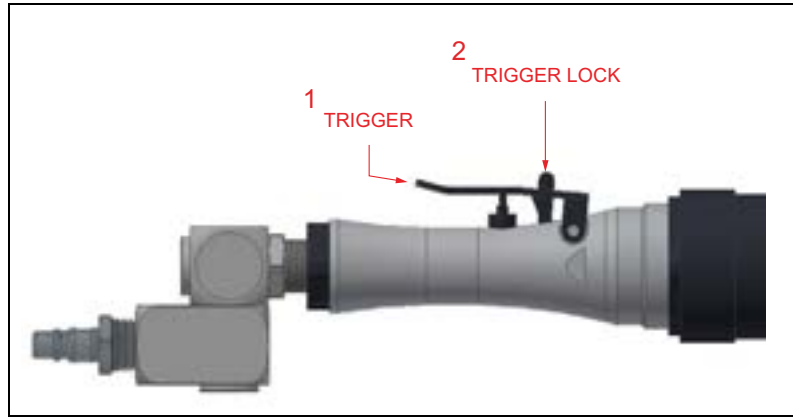


FIGURE 2-6. BF-R CONTROL TRIGGER AND TRIGGER LOCK

TABLE 2-4. BF-R ID CONTROLS IDENTIFICATION

Number	Component
1	Trigger
2	Trigger lock

**⚠ WARNING**

Always disconnect the air supply hose from the motor before making adjustments to the machine components. Failure to disconnect the air supply hose may result in severe injury.

***Emergency shutdown***

To immediately stop the machine, release the motor trigger on the machine.

## 2.3 DIMENSIONS

Figure 2-7 on page 14 shows the machine and operating dimensions.

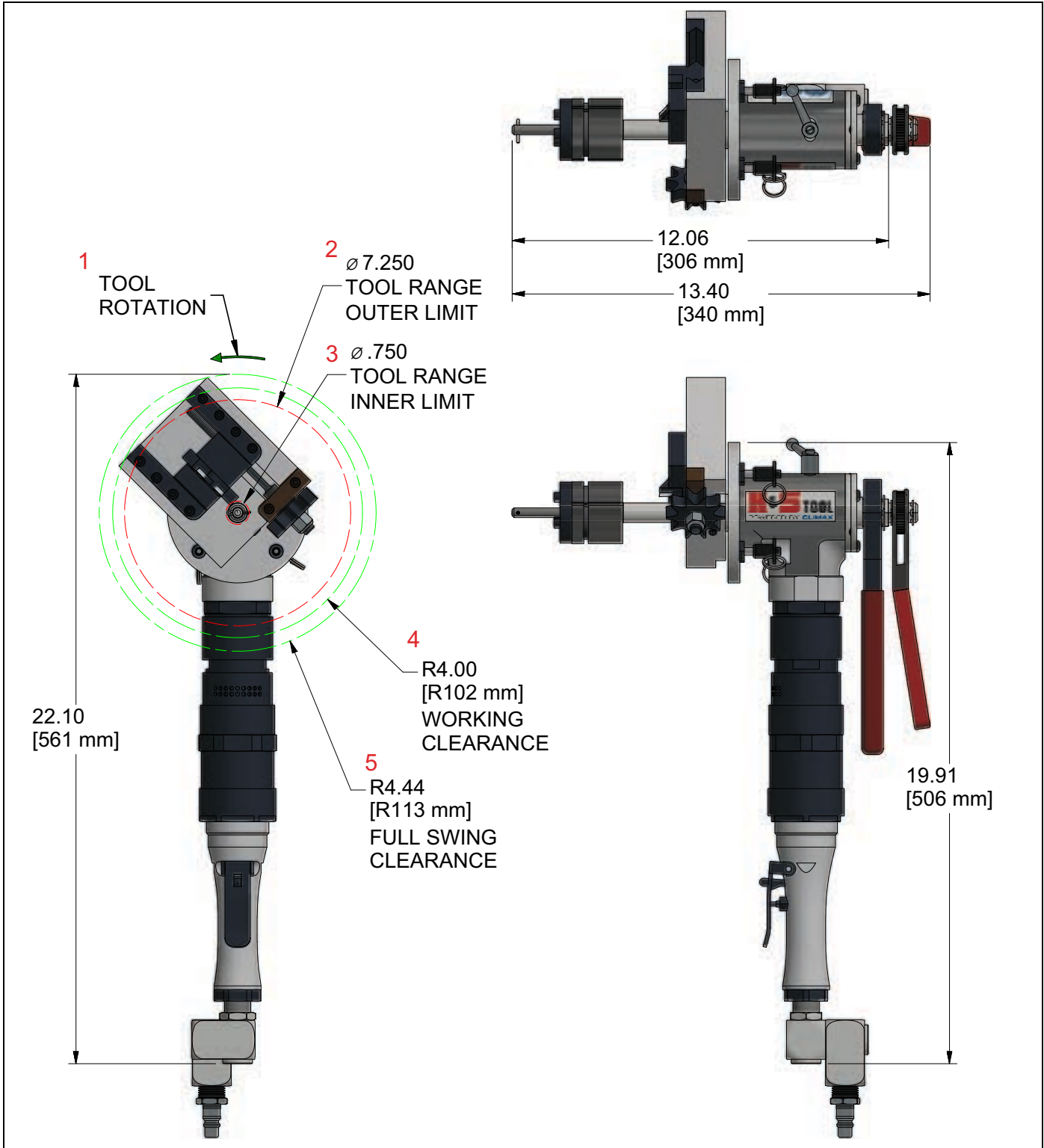


FIGURE 2-7. BF-R DIMENSIONS

**TABLE 2-5. BF-R ID DIMENSIONS IDENTIFICATION**

Number	Component
1	Tool rotation
2	Diameter 7.250" (184 mm) tool range outer limit
3	Diameter .0750" (19 mm) tool range inner limit
4	R4.00 (R102 mm) working clearance
5	R4.44 (R113 mm) full swing clearance

## 2.4 SPECIFICATIONS

**TABLE 2-6. SPECIFICATIONS**

<b>Working range<sup>1</sup>:</b>	0.750" inside diameter (ID) to 7.25" outside diameter (OD) (19–184 mm)
<b>Radial feed rate:</b>	0.005" (0.13mm) per pin; all 4 pins 0.020" (.51mm) per revolution
<b>Surface finish:</b>	63 to 250 RMS
<b>Approximate finish/pin:</b>	1 = 63 RMS 2= 125RMS 4 = 250 RMS
<b>Tool feed rate:</b>	0.005" (0.13 mm) per pin. Pins must be engaged at opposing positions for even resurfacing.
<b>Maximum tool travel*:</b>	1.500" (38.1 mm)
<b>Axial feed rate per full turn:</b>	0.062" (1.6 mm)
<b>Axial feed adjustments</b>	
<b>1/4 turn:</b>	0.015" (0.38mm)
<b>1/2 turn:</b>	0.031" (0.79 mm)
<b>3/4 turn:</b>	0.046" (1.2 mm)
<b>Internal locking/locating:</b>	Internal locking collet system or wedge plate system
<b>Alignment:</b>	Centering/squaring machined aluminum plate, spoked adapter and dial indicator attachment for use with elbow mandrels.
<b>Minimum mounting depth:</b>	0.750" (19.1 mm)
<b>Tooling:</b>	Single point replaceable carbide insert in steel tool holder, two machining points per insert.
<b>Weight</b>	

---

**TABLE 2-6. SPECIFICATIONS**

<b>Power unit:</b>	19.0 lb (8.6 kg)
<b>Mandrel:</b>	N/A
<b>BF-R weight (facing tool installed, without collet):</b>	23 lb (10.4 kg)
<b>BF-R weight with the collet installed:</b>	25 lb (11.3 kg)
<b>Dimensions</b>	
<b>Radial tool clearance*:</b>	4.000" (101.6 mm)*
<b>Pneumatic motor</b>	
<b>Air power:</b>	0.9 HP (0.66 kW)
<b>Air volume:</b>	38 CFM (1.1 M3/Min.)
<b>Air pressure:</b>	90.0 psi (6.1 bar) 90 RPM maximum

1. Model BF has a tight clearance option available. This option reduces the maximum working range to 2.500" (63.5 mm). Tool travel is limited to 1.000" (25.4 mm). Radial clearance is reduced to 2.750" (69.9 mm).

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## 2.5 ITEMS REQUIRED BUT NOT SUPPLIED

The following items are required but not supplied in your CLIMAX product kit:

- Lubricating oils
- Cutting oils

## 3 SETUP

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This section describes the setup and assembly procedures for the BF-R FLANGE FACER.

### 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.

Refer to applicable Safety Data Sheets for the LPS 3 coating and any cleaners used for proper personal protective equipment (PPE) and cleaning procedures.

### 3.2 MACHINE ASSEMBLY AND RIGGING

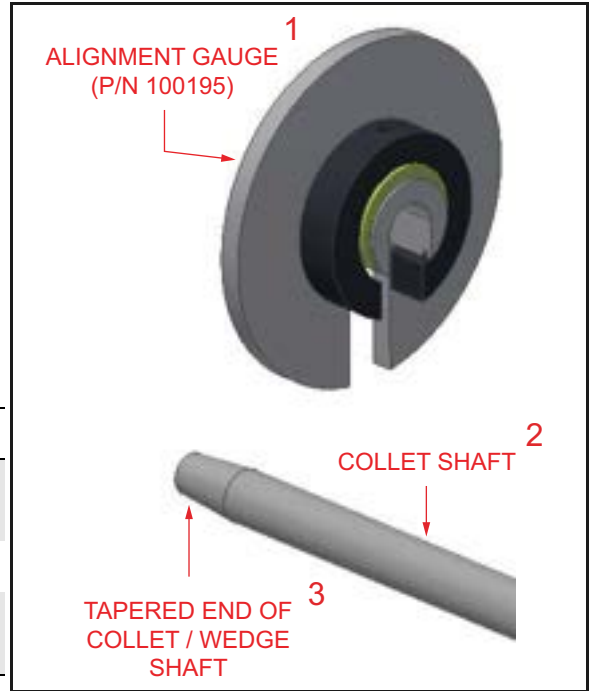
Do the following to assemble and rig the BF-R, referring to Figure 2-2 on page 8 as necessary:

1. Check that the air supply is not connected to the motor of the tool.

- If not already installed, select the collet/wedge shaft that will be used. Clean off any dirt or residue on the shaft. Slide the collet/wedge shaft into the tool gearbox housing (see Figure 3-1).

**TABLE 3-1. COLLET SHAFT AND ALIGNMENT GAUGE IDENTIFICATION**

Number	Component
1	Alignment gauge (P/N 100195)
2	Collet shaft
3	Tapered end of collet/wedge shaft

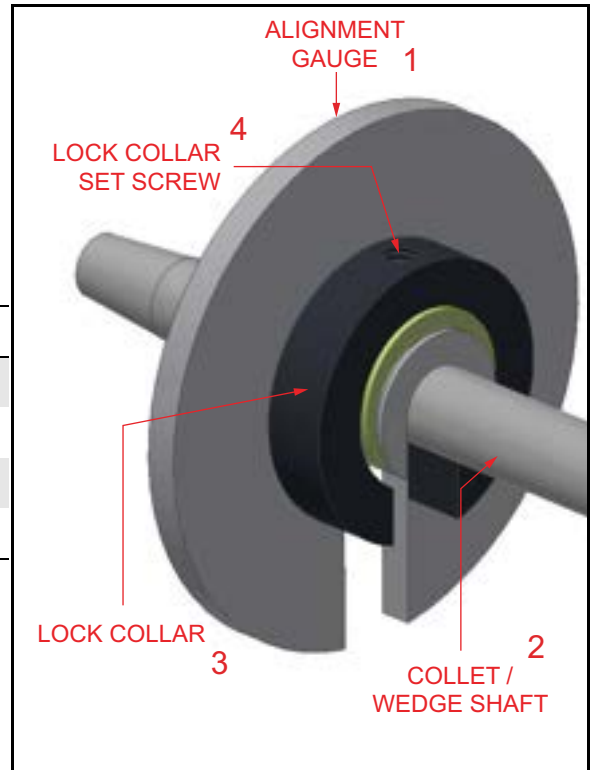


**FIGURE 3-1. COLLET SHAFT AND ALIGNMENT GAUGE**

- Align the lock collar slot with the gauge slot (see Figure 3-2).
- Slide the assembly onto the collet/wedge shaft.

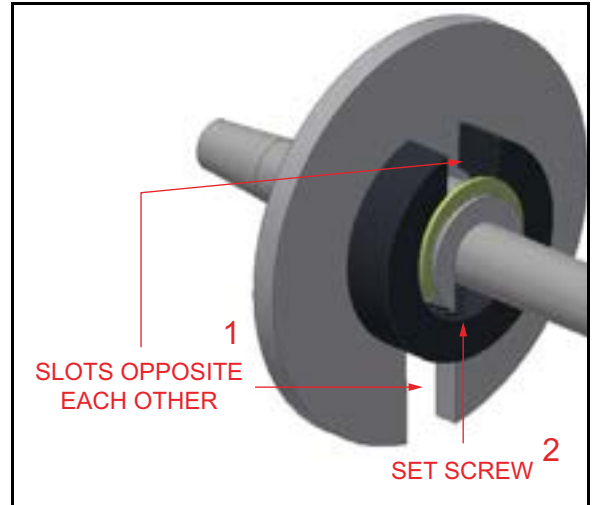
**TABLE 3-2. LOCK COLLAR COMPONENT IDENTIFICATION**

Number	Component
1	Alignment gauge
2	Collet/wedge shaft
3	Lock collar
4	Lock collar set screw



**FIGURE 3-2. LOCK COLLAR COMPONENTS**

5. Rotate the collar 180 degrees (see Figure 3-3).
6. Position the alignment guide on the collet/wedge shaft so that there is enough travel for the collet/wedges.
7. Lock the alignment gauge onto the collet/wedge shaft with the set screw on the lock collar.
8. Remove the cotter pin from the tip of the collet/wedge draw rod (see Figure 3-4).



**TABLE 3-3. COLLAR ROTATED AND SLOTS OPPOSITE IDENTIFICATION**

**FIGURE 3-3. COLLAR ROTATED AND SLOTS OPPOSITE EACH OTHER**

Number	Component
1	Slots opposite each other
2	Set screw

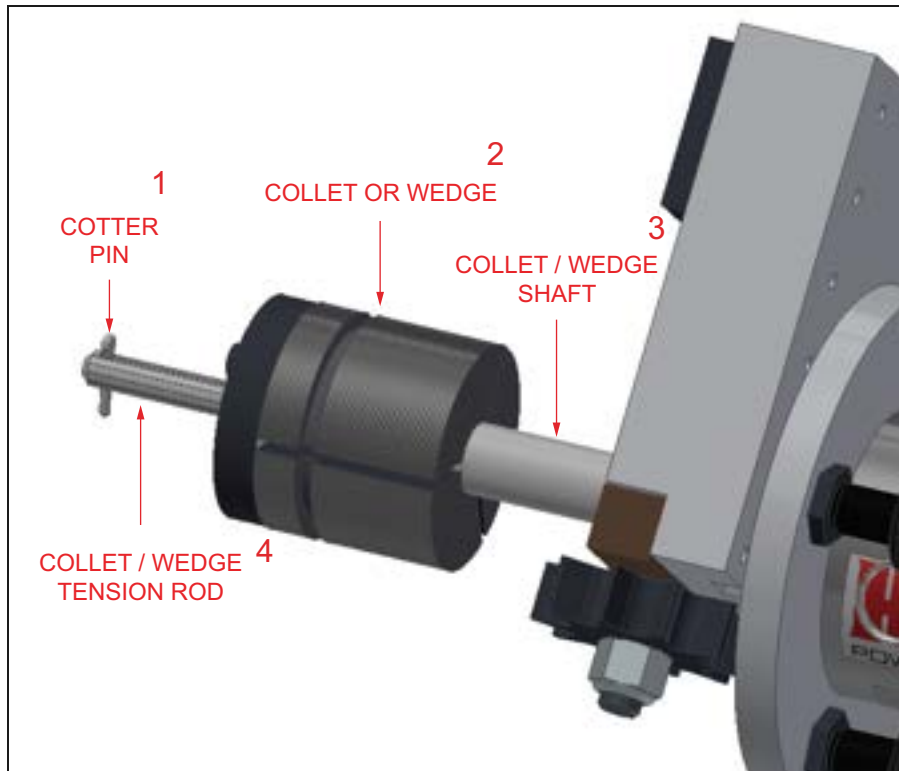


FIGURE 3-4. COTTER PIN AND OTHER COLLET/WEDGE COMPONENTS

TABLE 3-4. COTTER PIN AND OTHER COMPONENTS IDENTIFICATION

Number	Component
1	Cotter pin
2	Collet or wedge
3	Collet/wedge shaft
4	Collet/wedge tension rod

9. Measure the inside diameter (ID) of the flange that needs to be machined.
10. Select the collet/wedge that is slightly smaller than the flange ID.
11. Install the collet/wedge onto the shaft. See Section 3.2.1 if using the collet or Section 3.2.2 if using the wedge set.
12. Reinstall the cotter pin into the end of the collet/wedge draw rod.

See Table 2-6 on page 15 for exact specifications.

### 3.2.1 Assembling the collet/draw rod

Do the following to assemble the collet/draw rod:

1. Select the appropriate size of collet for the tube inside diameter (ID) to be beveled. The ID size is stamped on the collet.



2. Insert the collet rod through the centershaft from the rear of the tool.
3. Thread the collet onto the draw rod until it touches the end of the center shaft.
4. Insert the cotter pin into the draw rod end and open the ends. This assures that the collet will not be threaded off of the end of the rod.

### **3.2.2 Assembling the wedge set**

Do the following to assemble the wedge set:

1. Assemble the wedge sets by laying them on the flat side with the wedge guide grooves at the same ends.
2. Place the springs through the holes and connect the spring ends to form a circle.
3. Once both springs are properly connected, slide the assembly over the rod and hook the guide grooves into the cone slots.
4. Insert the rod into the center shaft from the front.
5. Thread on the draw nut/wrench assembly until it contacts the centershaft. The wedge ends are then aligned with the slots in the centershaft.
6. Thread the self-locking nut onto the rod until it is flush with the rod end.

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## 4 OPERATION

### IN THIS CHAPTER:

4.1 PRE-OPERATION CHECKS	-23
4.2 OPERATION CAUTIONS	-23
4.3 OPERATION	-24
4.4 ADJUSTING FOR ANOTHER AXIAL DEPTH OF CUT	-31
4.5 DISASSEMBLY	-31

### 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 that 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 inline lubricator, check that the oil drip rate is set to 6 drips per minute.
8. Check that all hand tools are removed from inside the machine and the work area.

#### CAUTION

Leaving the workspace with the machine running and unattended may cause personnel injury and machine or workpiece damage.

### 4.2 OPERATION CAUTIONS

Do not operate the tool if the throttle safety lock is not functioning properly. Push the lock forward to operate the throttle.

---

 **WARNING**

Never lock the throttle open. Do not put anything on the tool that will interfere with the operator squeezing the trigger that controls the BF-R (see Figure 2-6 on page 13). Failure to do so could cause severe personal injury and machine damage.

A hitch pin is provided on the coupling for the supply line. When the coupling is secure, always use this pin to lock the coupling from accidental release.

In most machining applications, it is necessary for the rotating blades and head to be exposed and unguarded. The blades and rotating head are sharp and can pose an injury hazard.

The exhaust ring on the air motor can be rotated 360 degrees. Check this position before starting the tool to avoid spraying oil and air borne contaminants around personnel.

Never pickup or lower the tool by the air hose. Always grasp it firmly around the barrel of the motor.

---

## 4.3 OPERATION

 **CAUTION**

When performing any of the following steps before starting the motor (step 1 through step 11), check that the hose is not connected to the motor. Inadvertent machine operations can cause personal injury or machine damage.

**NOTICE**

Each time you stop the flange facer and restart, always reset the timing with the trip wheel and trip pin.

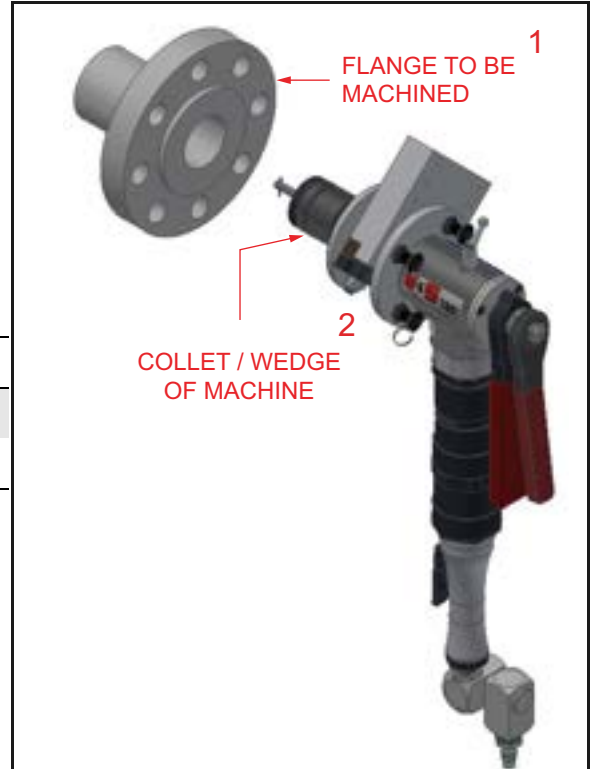
Do the following to operate the BF-R:

1. Rotate the motor muffler away from the operator.

2. Slide the collets or wedges into the inside diameter (ID) of the flange to be machined (see Figure 4-1).
3. Slide the machine into the ID of the workpiece.

**TABLE 4-1. FLANGE AND COLLET/WEDGE IDENTIFICATION**

Number	Component
1	Flange to be machined
2	Collet/wedge of machine

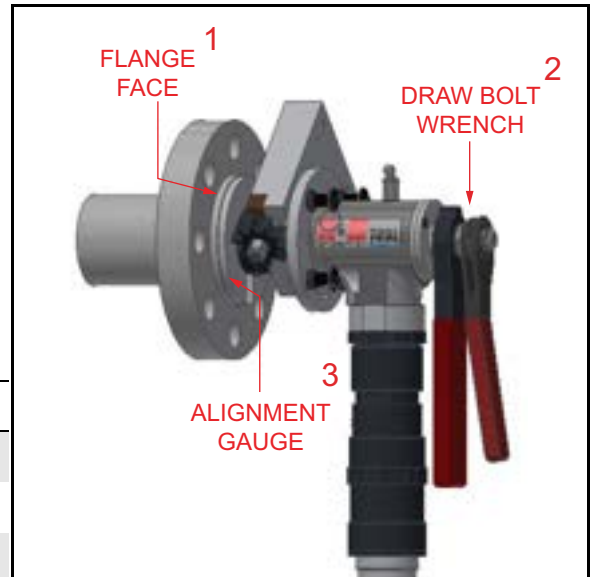


**FIGURE 4-1. FLANGE AND COLLET/WEDGE**

4. Press the gauge tightly against the flange surface and tighten it in place (see Figure 4-2).
5. Expand the collet or wedge in the flange ID by tightening the draw bolt clockwise.

**TABLE 4-2. DRAW BOLT WENCH LOCATION IDENTIFICATION**

Number	Component
1	Flange face
2	Draw bolt wrench
3	Alignment gauge

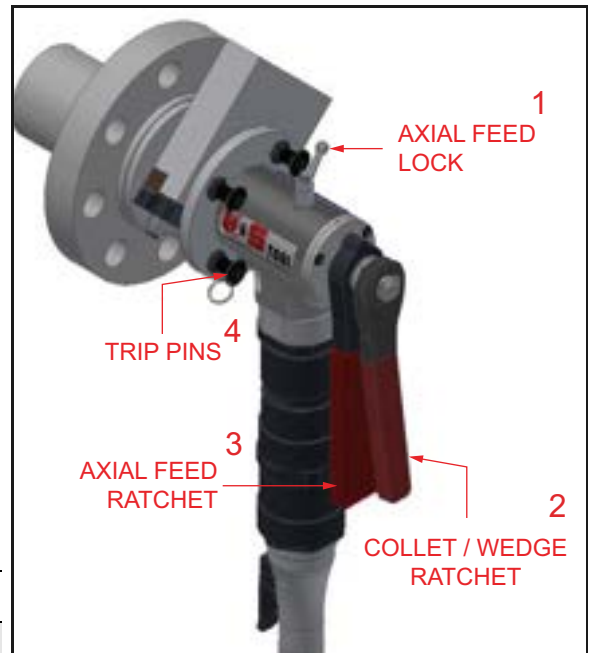


**FIGURE 4-2. DRAW BOLT WENCH LOCATION**

6. Remove the alignment gauge.
7. Install the cutting tool into the tool slide within the working range required.
8. Tighten the tool slide set screws to secure the tool holder in place.
9. Use the trip wheel socket and ratchet to move the tool and confirm that it will machine the area required.

**TABLE 4-3. AXIAL FEED LOCK AND RATCHET IDENTIFICATION**

Number	Component
1	Axial feed lock
2	Collet/wedge ratchet
3	Axial feed ratchet
4	Trip pins



**FIGURE 4-3. AXIAL FEED LOCK AND RATCHET**

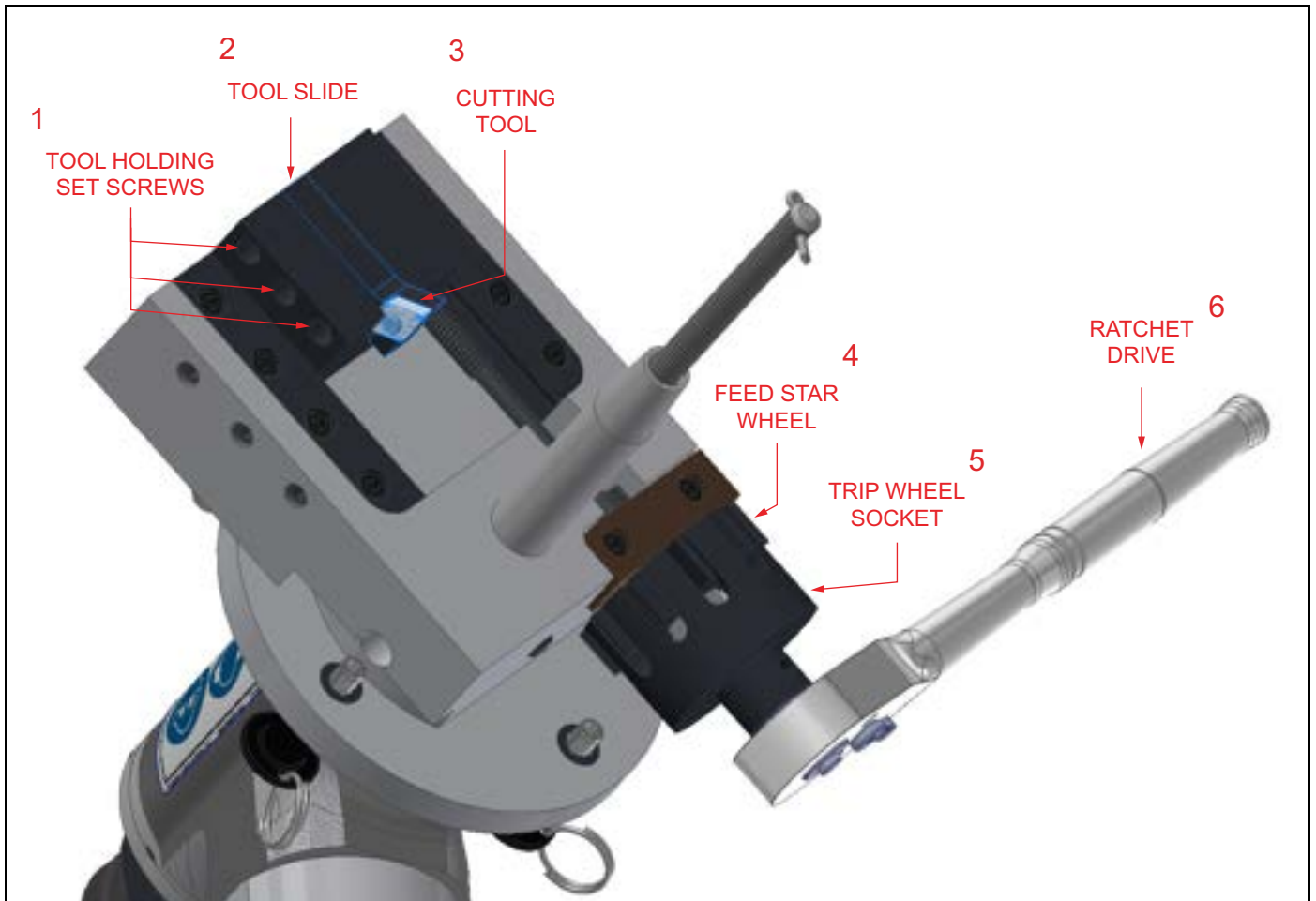


FIGURE 4-4. CUTTING TOOL INSTALLATION COMPONENTS

TABLE 4-4. CUTTING TOOL INSTALLATION IDENTIFICATION

Number	Component
1	Tool holding set screws
2	Tool slide
3	Cutting tool
4	Feed star wheel
5	Trip wheel socket
6	Ratchet drive

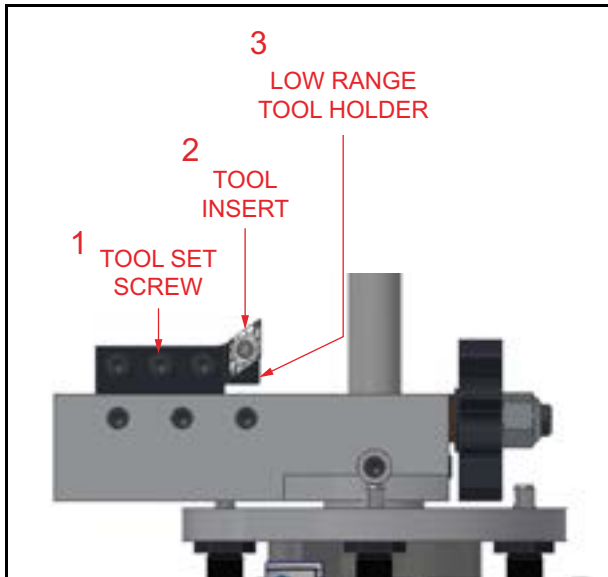


FIGURE 4-5. LOW RANGE TOOL

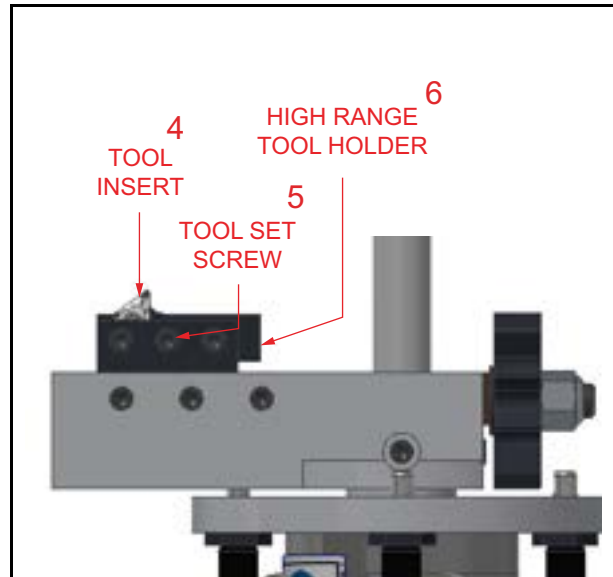


FIGURE 4-6. HIGH RANGE TOOL

TABLE 4-5. LOW AND HIGH RANGE TOOL IDENTIFICATION

Number	Component
1	Tool set screw
2	Tool insert
3	Low-range tool holder
4	Tool insert
5	Tool set screw
6	High-range tool holder

10. Check that the trip pins are retracted.
11. Using the trip wheel socket and ratchet, position the tool close to where it will contact the area to be machined.
12. Connect the air supply and start the tool motor.
13. Confirm the oil rate and proper lubrication by testing the exhaust ports with a piece of paper, as described in Section on page 34.
14. Advance the axial feed by rotating the axial feed ratchet clockwise until the tool touches the workpiece.



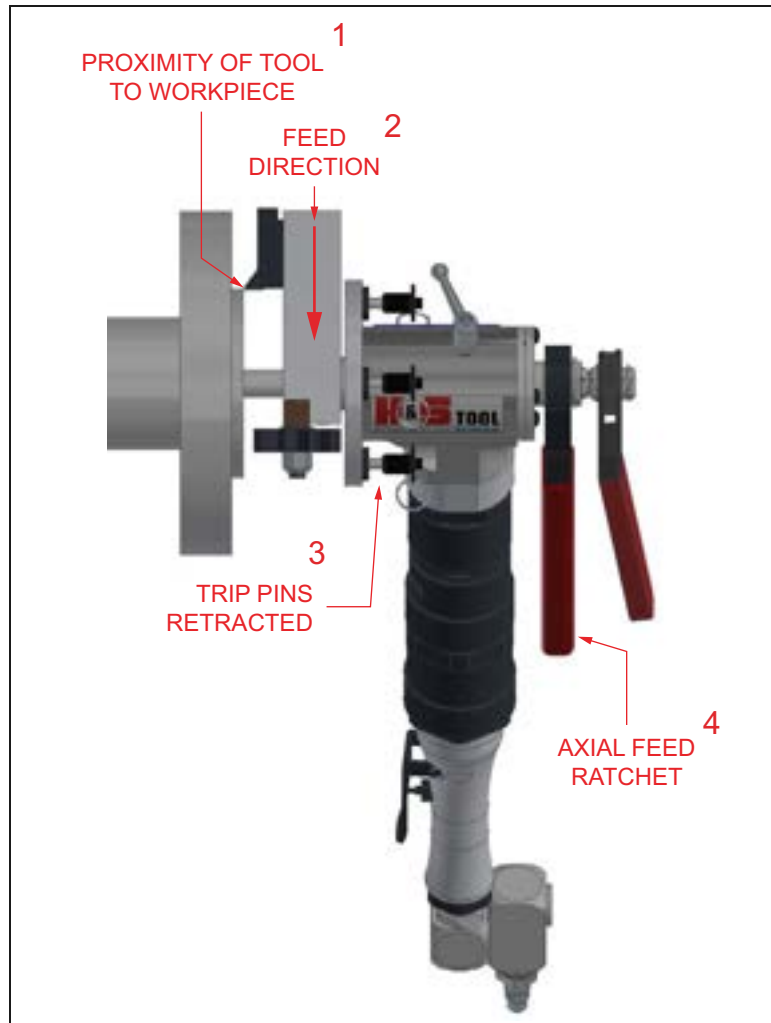


FIGURE 4-7. AXIAL FEED ADVANCED AND TOOL TOUCHING THE WORKPIECE

TABLE 4-6. AXIAL FEED ADVANCED IDENTIFICATION

Number	Component
1	Proximity of tool to workpiece
2	Feed direction
3	Trip pins retracted
4	Axial feed ratchet

15. Stop the tool motor.
16. Retract the tool radially away from the workpiece using the trip wheel socket and ratchet and by rotating the start trip wheel counter-clockwise three turns.

17. To remove the backlash and to time the star trip wheel, rotate the star trip wheel one full turn with the trip wheel socket and ratchet.
18. Adjust the star trip wheel so that it has a tooth point towards the trip ring.

## NOTICE

Failure to set the backlash and timing of the star trip wheel will damage the trip pins.

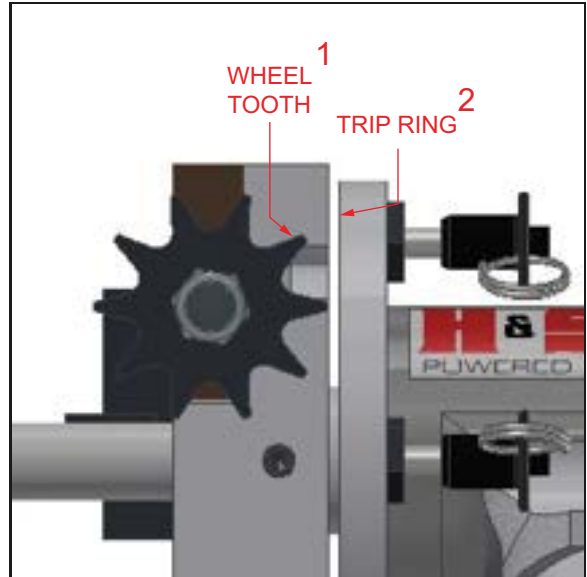


FIGURE 4-8. STAR TRIP WHEEL TOOTH AND TRIP RING

TABLE 4-7. WHEEL TOOTH AND TRIP RING IDENTIFICATION

Number	Component
1	Wheel tooth
2	Trip ring

## TIP:

It is important to maintain the proper adjustment of the gibs onto the tool slide. Correct adjustment maintains proper timing between the star trip wheel and trip pins.

The gibs are properly adjusted when the gib adjusting screws are tightened evenly and sufficiently to apply enough force onto the tool slide that it is difficult to turn the trip wheel by hand.

19. Engage the number of trip pins required to achieve the desired surface finish (see Table 4-8).

TABLE 4-8. NUMBER OF PINS FOR THE FEED RATE PER REVOLUTION

Number of pins	Feed rate per revolution
1	0.005" (0.127 mm)
2	0.010" (0.254 mm)
3	0.015" (0.381 mm)
4	0.020" (0.508 mm)

20. Axially adjust the machine tool to the depth of cut that is desire for the surface being machined (see Table 4-9).

**TABLE 4-9. FEED NUT ROTATION AND FEED DEPTH**

<b>Feed nut rotation</b>	<b>Feed depth</b>
1/6 rotation (1 flat)	0.013 (0.330 mm)
1/3 rotation (2 flats)	0.025 (0.635 mm)
1/2 rotation (3 flats)	0.038 (0.965 mm)
2/3 rotation (4 flats)	0.050 (1.27 mm)
1 rotation (5 flats)	0.063 (1.60 mm)

21. Lock the axial position with the axial feed lock.  
22. Press the trigger lock to start the tool.

 **WARNING**

Keep clear of rotation parts and keep objects out of the tool path. Failure to do so could cause serious personal injury or machine damage.

23. Once the area is machined, release the trigger to stop machine tool.

## 4.4 ADJUSTING FOR ANOTHER AXIAL DEPTH OF CUT

Do the following to adjust for another axial depth of cut:

1. Disconnect the air supply from the motor.
2. Release the axial feed lock and adjust the axial feed counter clockwise 1 turn.
3. Using the feed wheel socket and ratchet, return the tool slide to the feed start area.
4. Adjust the axial feed one turn plus the additional depth required for the cut.
5. Continue with the operations instruction step 6 to set timing and backlash.

## 4.5 DISASSEMBLY

Do the following to remove the tool from the flange, referring to Figure 2-2 on page 8 as necessary:

1. Disconnect the air supply hose from the motor.
2. Release the axial feed lock.

- 
3. Feed the tool away from the workpiece by rotating the axial feed ratchet counter-clockwise.
  4. Reverse the collet/wedge draw rod by rotating the draw rod ratchet counter-clockwise until the machine is moving freely in the ID.

**TIP:**

If the collet does not release, use palm of hand or a rubber mallet to strike the side of the tool gearbox housing, or the draw bolt, to release the collet/wedges.

**NOTICE**

Do not use a hard tool or hammer to pound on the side of the housing or the draw bolt. Using a hard tool or hammer may damage the machine tool.

5. Remove the machine from the flange ID.
6. Remove the draw rod cotter pin and removed the collet/wedge when finished.

# 5 MAINTENANCE

IN THIS CHAPTER:

5.1 MAINTENANCE CHECKLIST ..... -33  
 5.2 APPROVED LUBRICANTS ..... -33  
 5.3 MAINTENANCE TASKS ..... -34  
 5.4 TROUBLESHOOTING ..... -34

## 5.1 MAINTENANCE CHECKLIST

Table 5-1 lists maintenance intervals and tasks.

TABLE 5-1. MAINTENANCE INTERVALS AND TASKS

Interval	Task
<b>Before each use</b>	Check the quality of the inserts installed on the tool holder. Replace as necessary.
	Check the inline lubricator for the oil level, using the sight gauge.
	Check that the inline lubricator is properly oiling the supply air.
	Remove oil and grime from the collet/wedge shaft and motor.
<b>Before and after each use</b>	Check adjustment of the tool slide gibs.
<b>Before and after each use</b>	Remove debris, oil, and moisture from machine surfaces.
<b>During use</b>	Maintain oil level in inline lubricator.
	Wipe off chip and lubrication as necessary.
	Wipe off all lubrication from the motor.
<b>After each use</b>	Wipe off all lubrication from the cutting head and collet/wedge shaft.
	Disconnect the air supply hose from the motor.
	Remove the collet/wedge from the draw bolt.

## 5.2 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 5-2. APPROVED LUBRICANTS**

Application area	Lubricant	Quantity	Frequency
Draw bolt	Antisieve	As required	Per use by hand on thread area of collet / wedge
Collets / wedges	WD 40	As required	Per use by hand
Feed lead screw	WD 40	As required	Per use by hand
Cutting tool	CONOCO AW 32	As required	Continued use while cutting
Rectangular & Dovetail Ways	Mobil Vactra Oil	As required	Daily during machine use
Inline lubricator	Unax AW 32	Refill oil lubricator	Each use
Unpainted surfaces	LPS1 or LPS2	As required	Each use, and before storage

---

## 5.3 MAINTENANCE TASKS

### *Adjustment of inline lubricator*

An in-line oiler is provided with each tool. To assure proper lubrication, start the machine and hold a sheet of paper up to the exhaust ports. There should be a mist of oil on the paper. If there is enough that the oil runs on the paper, it is too much. If there is no mist, it is not enough.

To adjust the lubrication amount, remove the cover from the oiler body. The adjusting screw is in the center. With a straight blade screwdriver, turn the screw clockwise to reduce the amount or counter clockwise to increase the oil feed.

---

## 5.4 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.

**TABLE 5-3. TROUBLESHOOTING**

Problem	Remedy
Axial feed unit does not advance the bar	Check that the trip pins are engaged.

**TABLE 5-3. TROUBLESHOOTING**

<b>Problem</b>	<b>Remedy</b>
<b>Tool chatter</b>	Replace the insert.
	Decrease the nose radius on the tool bit.
	Increase the feed rate.
	Change the depth of cut.
<b>Machine is unstable</b>	Tighten all clamps and hardware. Provide additional support.
<b>Flange facing body will not rotate</b>	Decrease the cutting depth of cut.
	Check that the supply hose is connected to the motor.

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## 6 STORAGE AND SHIPPING

### IN THIS CHAPTER:

6.1 STORAGE	-37
6.1.1 SHORT-TERM STORAGE	-37
6.1.2 LONG-TERM STORAGE	-37
6.2 SHIPPING	-38
6.3 DECOMMISSIONING	-38

### 6.1 STORAGE

Proper storage of the BF-R 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 BF-R 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 the collet/wedges from the machine.
4. Remove hoses.
5. Remove the machine from the workpiece.
6. Clean the machine to remove dirt, grease, metal chips, and moisture.
7. Spray all unpainted surfaces with LPS-2 to prevent corrosion.
8. Store the BF-R 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 < 70°F (21°C) and humidity < 50%.

---

## **6.2 SHIPPING**

The BF-R can be shipped in its original shipping container.

---

## **6.3 DECOMMISSIONING**

To decommission the BF-R 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. BF-R ASSEMBLY - - - - -40

FIGURE A-2. BF-R BOILER GUN BASE UNIT ASSEMBLY 1 (P/N 98894) - - - - -41

FIGURE A-3. BF-R BOILER GUN BASE UNIT ASSEMBLY 2 (P/N 98894) - - - - -42

FIGURE A-4. BF-R BOILER GUN BASE UNIT ASSEMBLY PARTS LIST (P/N 98894) - - - - -43

FIGURE A-5. BF-R FLANGE FACER ATTACHMENT ASSEMBLY 1 (P/N 100237) - - - - -44

FIGURE A-6. BF-R FLANGE FACER ATTACHMENT ASSEMBLY 2 (P/N 100237) - - - - -45

FIGURE A-7. BF-R FLANGE FACER ATTACHMENT ASSEMBLY PARTS LIST (P/N 100237) - - - - -46

FIGURE A-8. BF-R ALIGNMENT GAUGE ASSEMBLY (P/N 100195) - - - - -47

FIGURE A-9. BF-R COLLET RANGE ASSEMBLY (P/N BG38CP) - - - - -48

FIGURE A-10. IN-LINE OILER PRESSURE FEED AND HOSE ASSEMBLY (P/N HS50509) - - - - -49

FIGURE A-11. BF-R BOILER GUN PNEUMATIC DRIVE ASSEMBLY (P/N 98866) - - - - -50

FIGURE A-12. BF-R BOILER GUN COLLET SYSTEM TOOL KIT ASSEMBLY (P/N BGTK) - - - - -51

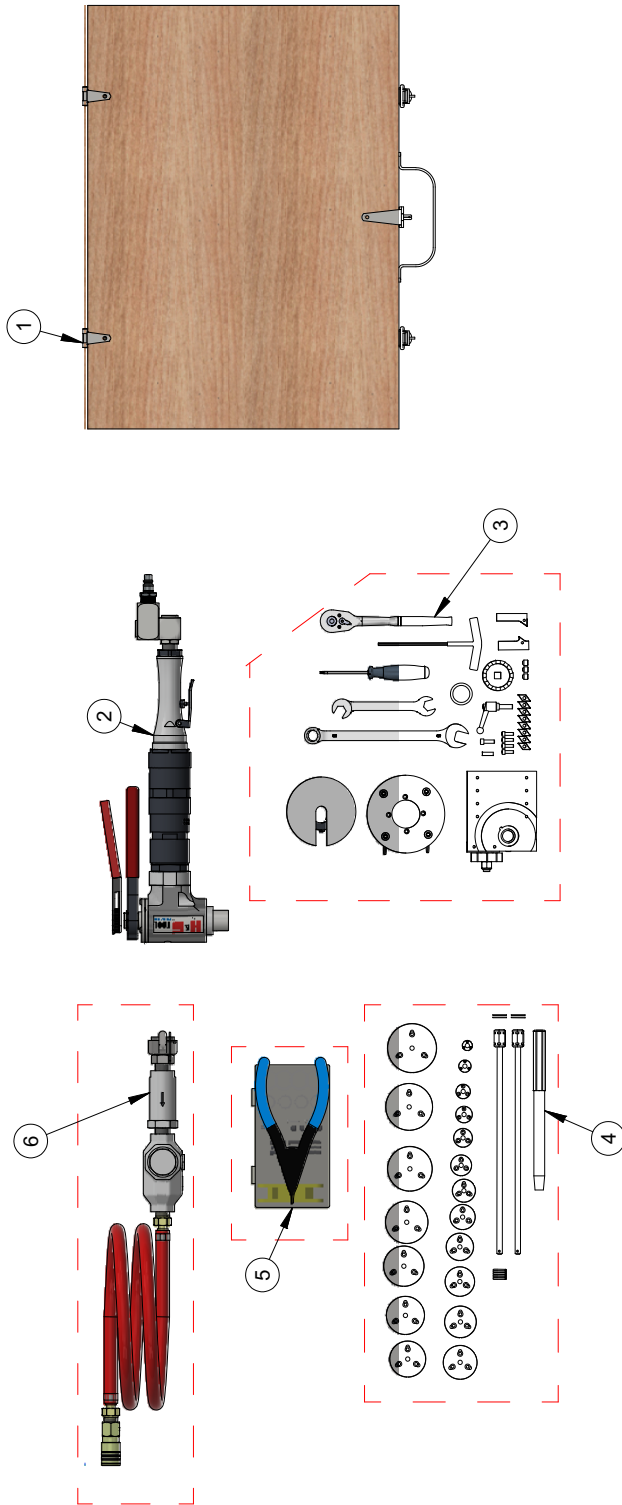


FIGURE A-1. BF-R ASSEMBLY

PARTS LIST		DESCRIPTION
ITEM	QTY	P/N:
1	1	94900
TOOL BOX #22 - 24.5 X 18.0 X 9.0 - MS & BG50 & BF		
2	1	98866
ASSY BF BOILER GUN PNUMATIC DRIVE FLANGE FACING		
3	1	100237
ASSY BF FLANGE FACER ATTACHMENT		
4	1	BG38CP
BG38 FULL RANGE OF COLLETS 5/8".3"		
5	1	BGTK
ASSY TOOLKIT BOILER GUN COLLET SYSTEM		
6	1	HS50509
ASSY 1/2" HOSE/IN-LINE OILER PRESSURE FEED		

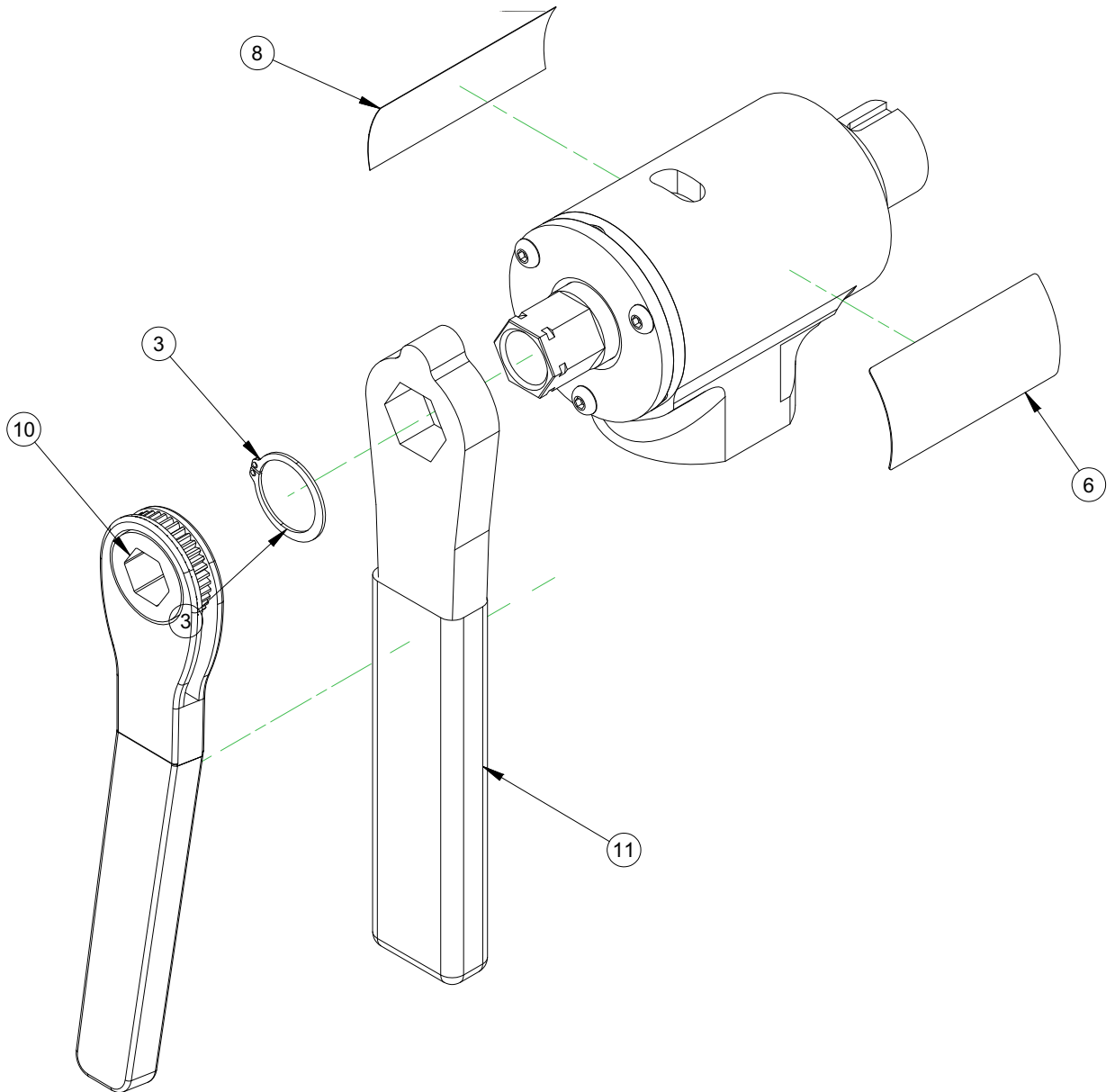


FIGURE A-2. BF-R BOILER GUN BASE UNIT ASSEMBLY 1 (P/N 98894)

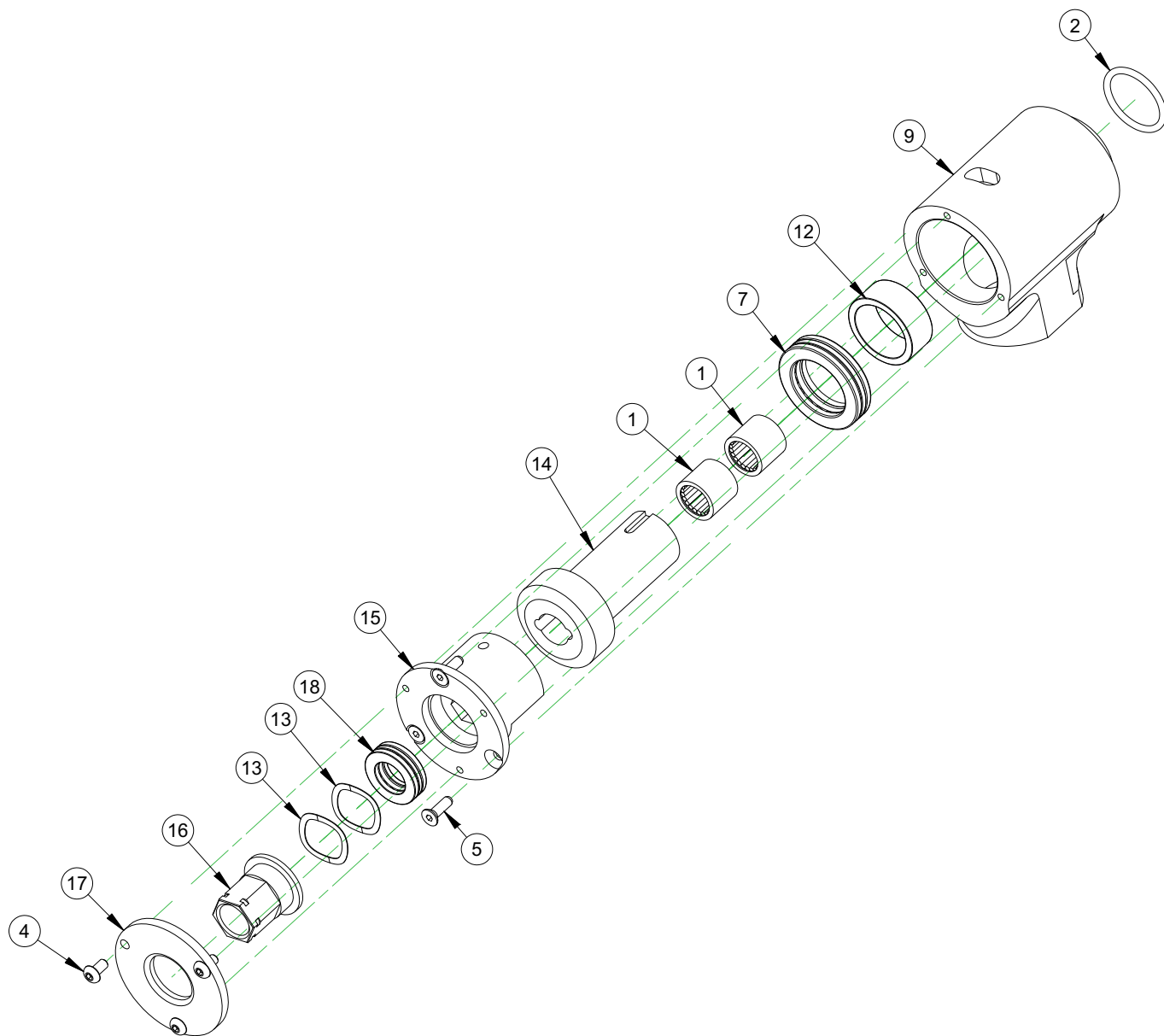


FIGURE A-3. BF-R BOILER GUN BASE UNIT ASSEMBLY 2 (P/N 98894)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	915-0005	BEARING NEEDLE 7/8 OD X 5/8 ID X .75 W
2	1	10466	RING O 1/8 X 1-3/16 ID X 1-7/16 OD
3	1	10534	RING SNAP 1 OD
4	3	23361	SCREW 10-24 X 3/8 BHSCS
5	3	26395	SCREW 10-24 X 5/8 FHSCS
6	1	87271	LABEL WARNING - EYE EAR MANUAL PROTECTION 1-3/8 X 2-3/4
7	1	94883	BEARING THRUST MODIFIED 31MM X 47MM X 11MM
8	1	100199	LABEL H&S LOGO 1.875 X 1.000
9	1	100336	HOUSING BF
10	1	23081119900	WRENCH 5/8" HEX
11	1	23259119900	WRENCH 7/8" HEX
12	1	B001910	NEEDLE BEARING 1.188 ID X 1.500 OD X .625 W
13	2	B002519	WASHER SPRING WAVE .901 ID X 1.159 OD X .013 THICK
14	1	B002524	GEAR BEVEL 18 TOOTH 10 PITCH 20 DEG FORM CUSTOM
15	1	B002525	CENTERSHAFT LOCK
16	1	B002526	FEEDNUT
17	1	B002527	RETAINER PLATE
18	1	B051103	THRUST BEARING 17MM X 30MM X 9MM

**FIGURE A-4. BF-R BOILER GUN BASE UNIT ASSEMBLY PARTS LIST (P/N 98894)**

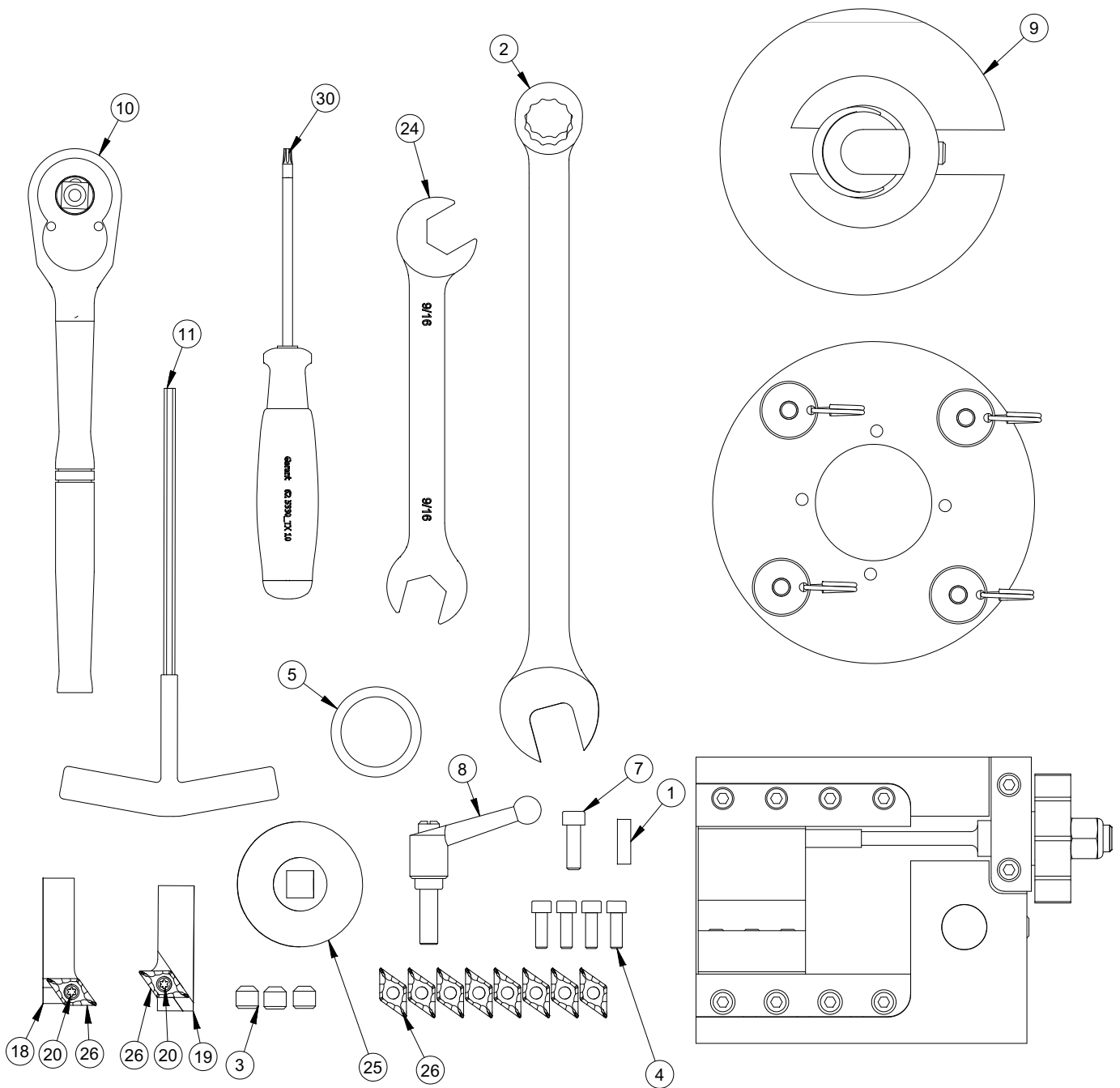
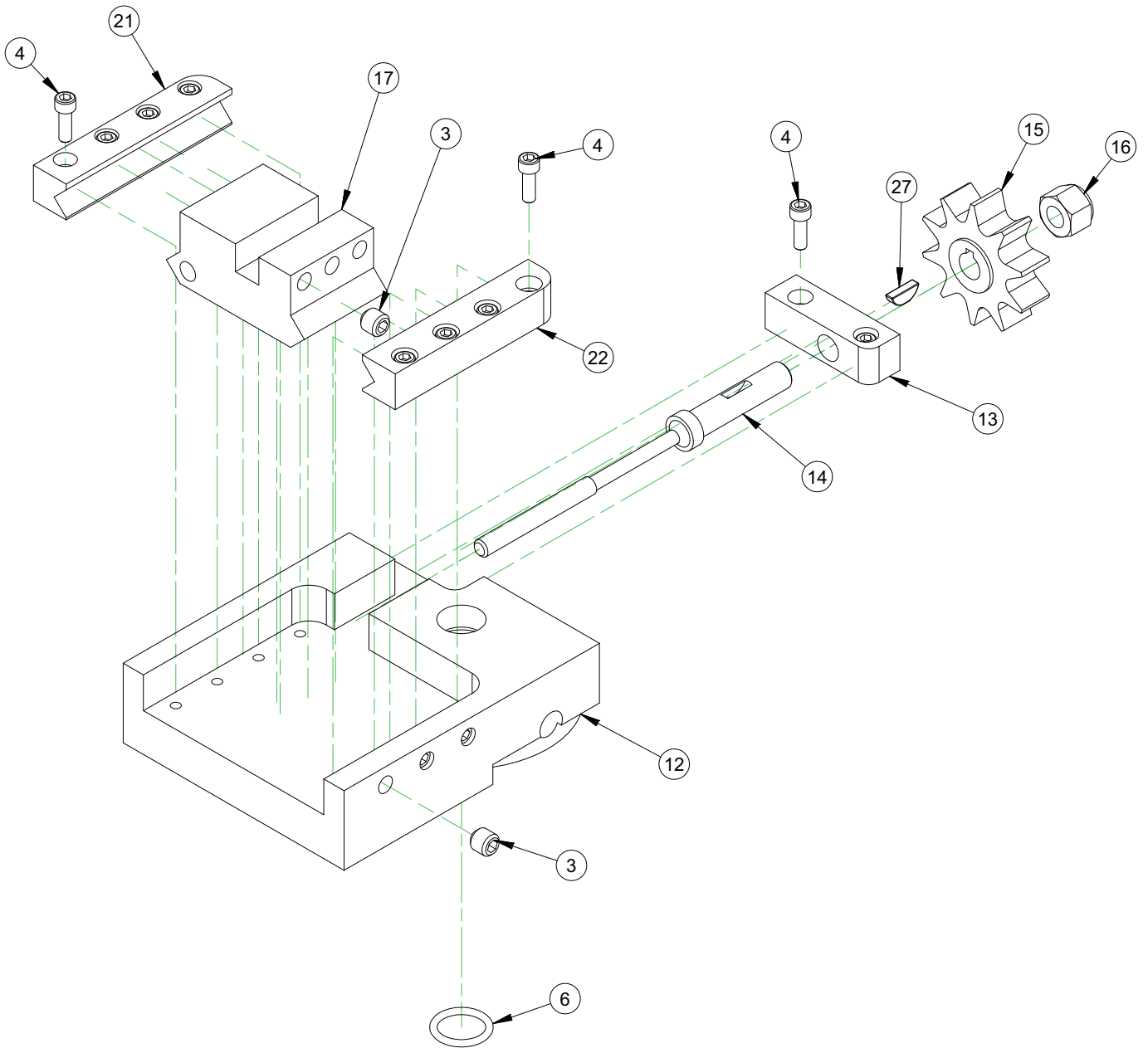


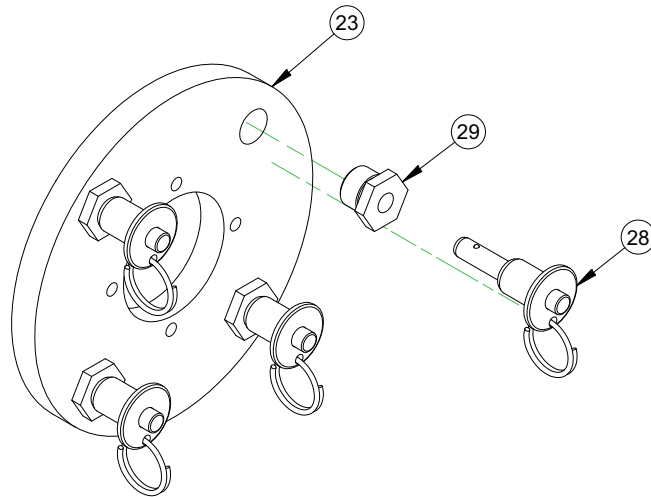
FIGURE A-5. BF-R FLANGE FACER ATTACHMENT ASSEMBLY 1 (P/N 100237)





**HEAD ASSY**  
SCALE 1/2

FIGURE A-6. BF-R FLANGE FACER ATTACHMENT ASSEMBLY 2 (P/N 100237)

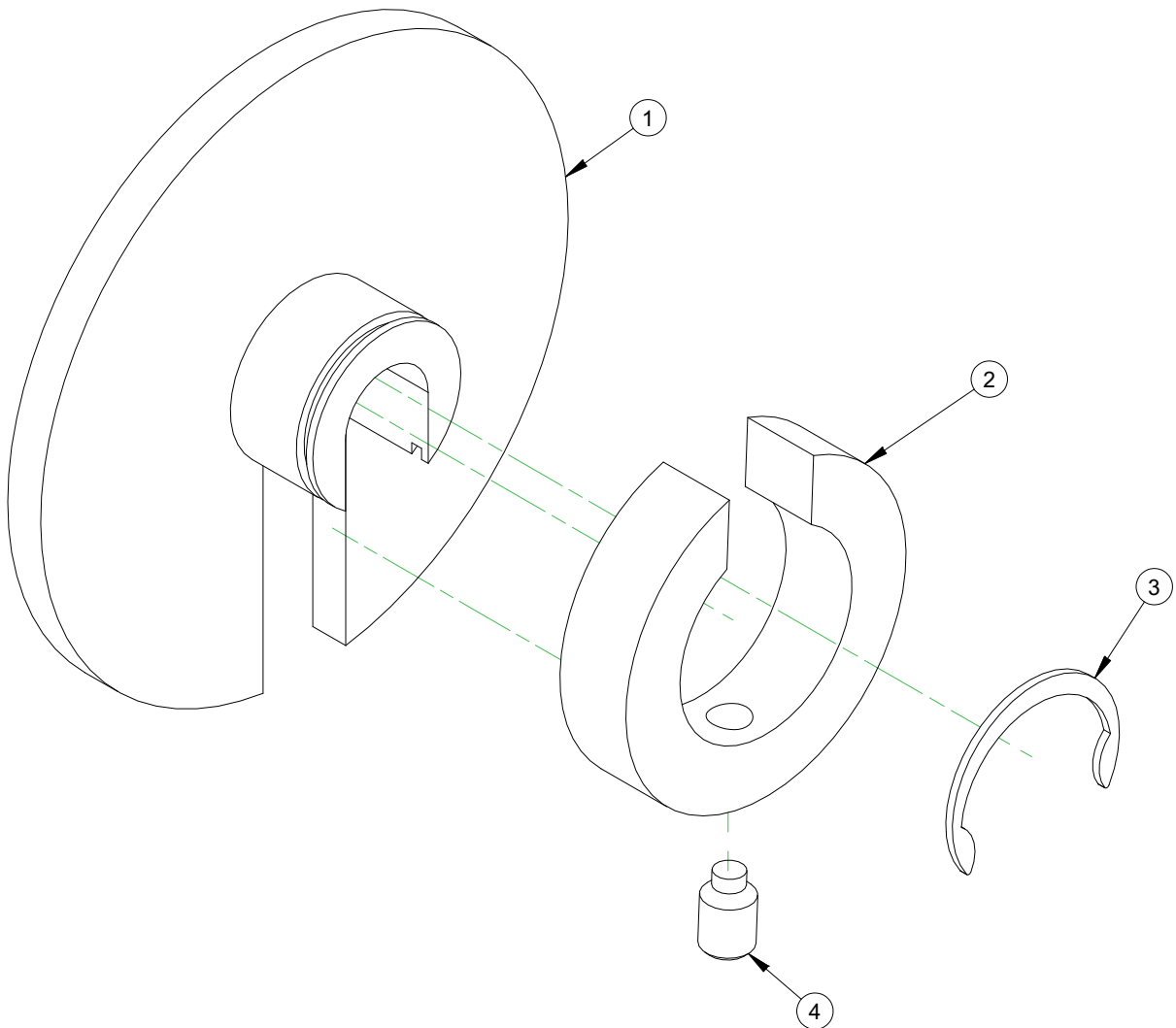


## TRIP PIN ASSY

SCALE 1/2

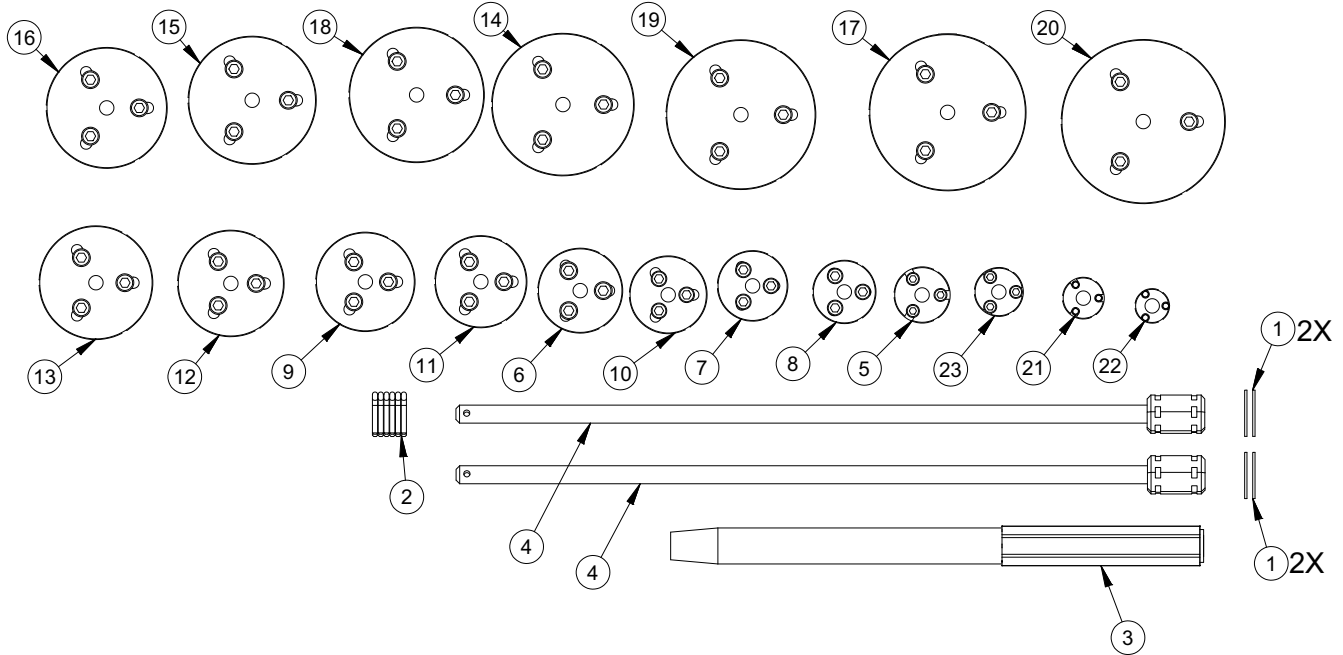
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	911-0005	KEY 3/16 RADIUS ONE SIDE X 5/8 SQ BOTH ENDS
2	1	930-0001	WRENCH COMBINATION 5/8 12PT
3	11	11206	SCREW 5/16-18 X 5/16 SSSCP
4	14	11845	SCREW 8-32 x 1/2 SHCS
5	1	15509	O-RING 1/8 X 1 ID X 1-1/4 OD 70 DURO
6	1	20812	RING O 3/32 X 5/8 ID X 13/16 OD
7	1	41472	SCREW 10 - 24 X 5/8 SHCS
8	1	94871	LOCKING HANDLE WITH SCREW
9	1	100195	ASSY BF ALIGNMENT GAUGE
10	1	4001012	WRENCH RATCHET 3/8 DRIVE
11	1	4001019	WRENCH HEX 5/32 X 6 T-HANDLE
12	1	BF005210	BF FLANGE FACER BODY ONLY
13	1	BF005214	FEED SCREW BRACKET (BF005214)
14	1	BF005216	BFF FEED SCREW 5.5" L
15	1	BF005218	TRIP WHEEL
16	1	BF005219	NUT 3/8-16 HEX NYLOCK GRADE 2 ZINC
17	1	BF005220	BFF TOOL SLIDE
18	1	BF005221	LOW RANGE HOLDER
19	1	BF005222	HIGH RANGE HOLDER
20	2	BF005224	SCREW INSERT HOLDER TS43
21	1	BF005225	LEFT GIB
22	1	BF005226	RIGHT GIB
23	1	BF005227	TRIP RING
24	1	BF005233	WRENCH DOUBLE END 60DEG 9/16
25	1	BF005241	BF TRIP WHEEL SOCKET
26	10	INSFF	INSERT CARBIDE 55 DEG DIAMOND 3/8 IC
27	1	MFTFF160330	KEY WOODRUFF 1/8 X 1/2
28	4	MSF004541	PIN QUICK RELEASE 1/4 DIA X 1/2 PUSH BUTTON
29	4	MSF004542	TRIP RECEPTACLE
30	1	T15	DRIVE TORX T15

**FIGURE A-7. BF-R FLANGE FACER ATTACHMENT ASSEMBLY PARTS LIST (P/N 100237)**



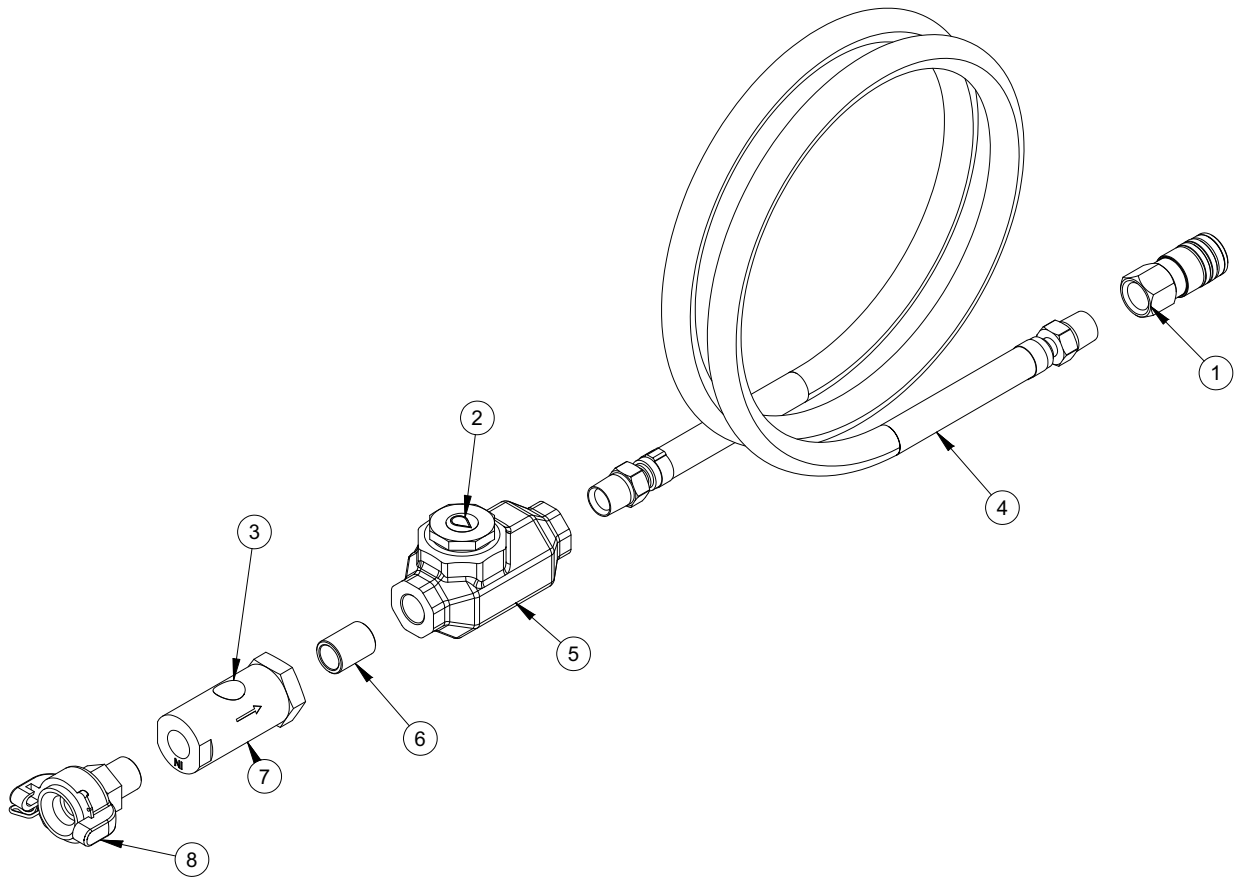
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	BF005237	ALIGNMENT GAGE
2	1	BF005238	ALIGNMENT GAGE COLLAR
3	1	BF005239	CRESENT RING 1.125
4	1	BF005277T	SCREW 5/16-18 X 1/2 SSS BRASS TIPPED

FIGURE A-8. BF-R ALIGNMENT GAUGE ASSEMBLY (P/N 100195)



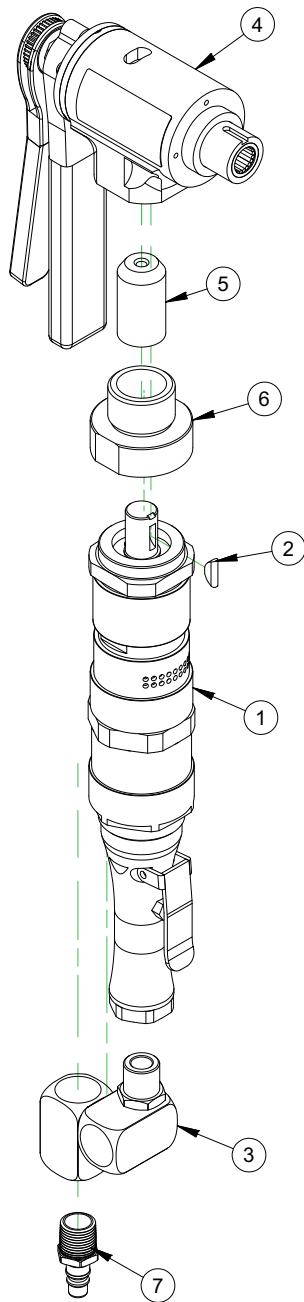
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	921-1001	SNAP RING 11/16 ID X .042 TH
2	6	923-1001	COTTER PIN 3/32" X 1/2"
3	1	B002520	COLLET CENTERSHAFT
4	2	B002550	COLLET ROD
5	1	BC1	ASSY B COLLET 1" 5 DEGREE
6	1	BC1-12	ASSY B COLLET 1-1/2" 5 DEGREE
7	1	BC1-14	ASSY B COLLET 1-1/4" 5 DEGREE
8	1	BC1-18	ASSY B COLLET 1-1/8" 5 DEGREE
9	1	BC1-34	ASSY B COLLET 1-3/4" 5 DEGREE
10	1	BC1-38	ASSY B COLLET 1-3/8" 5 DEGREE
11	1	BC1-58	ASSY B COLLET 1-5/8" 5 DEGREE
12	1	BC1-78	ASSY B COLLET 1-7/8" 5 DEGREE
13	1	BC2	ASSY B COLLET 2" 5 DEGREE
14	1	BC2-12	ASSY B COLLET 2-1/2" 5 DEGREE
15	1	BC2-14	ASSY B COLLET 2-1/4" 5 DEGREE
16	1	BC2-18	ASSY B COLLET 2-1/8" 5 DEGREE
17	1	BC2-34	ASSY B COLLET 2-3/4" 5 DEGREE
18	1	BC2-38	ASSY B COLLET 2-3/8" 5 DEGREE
19	1	BC2-58	ASSY B COLLET 2-5/8" 5 DEGREE
20	1	BC2-78	ASSY B COLLET 2-7/8" 5 DEGREE
21	1	BC34	ASSY B COLLET 3/4" 5 DEGREE
22	1	BC58	ASSY B COLLET 5/8" 5 DEGREE
23	1	BC78	ASSY B COLLET 7/8" 5 DEGREE

FIGURE A-9. BF-R COLLET RANGE ASSEMBLY (P/N BG38CP)



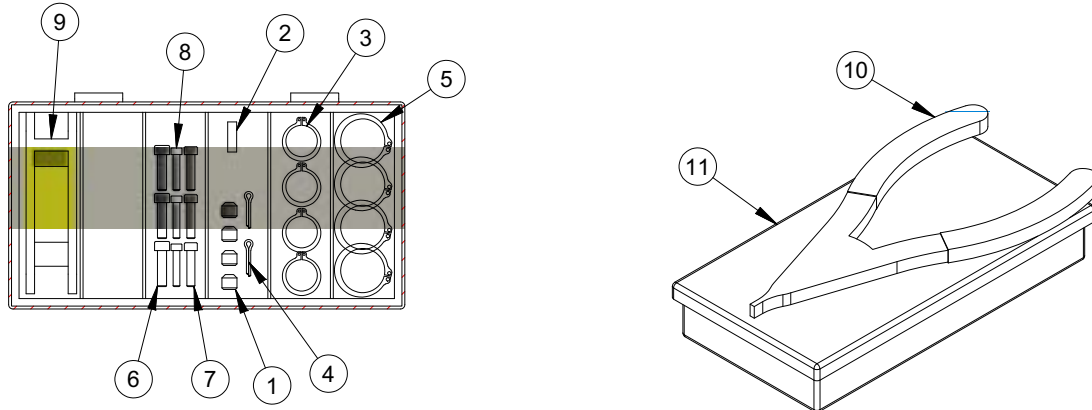
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	19297	FTG QUICK COUPLER 3/8B 1/2 NPTF FEMALE AIR
2	1	95056	LABEL ROUND 3/4" OIL FLUID
3	1	95087	LABEL ROUND 3/4" FILTER
4	1	2152030	ASSY HOSE 7094 1/2 ID X 1/2 NPTM X 1/2 NPTM X 72"
5	1	HS50512	LUBRICATOR INLINE 1/2 NPTF X 1/2 NPTF
6	1	HS50517	FTG NIPPLE CLOSE 1/2 NPTM SCH 40
7	1	HS50518	SCREEN INLINE 40 MICRON 1/2 NPTF X 1/2 NPTF
8	1	HS50524	FTG COUPLER 1/2 NPTM X CHICAGO W/ SAFETY PIN & LANYARD

FIGURE A-10. IN-LINE OILER PRESSURE FEED AND HOSE ASSEMBLY (P/N HS50509)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	93084	MOTOR AIR MODIFIED CML3460 FOR BF-R
2	1	94902	KEY WOODRUFF MODIFIED 3/16 X .740
3	1	98855	SWIVEL DOUBLE AIR 1/2 NPTM X 1/2 NPTF
4	1	98894	ASSY BASE UNIT BF BOILER GUN TUBE BEVELER FLANGE FACING
5	1	B002529	GEAR BEVEL 9 TOOTH 10 PITCH 20 DEG FORM CUSTOM
6	1	B002531	MOTOR ADAPTER - B002531
7	1	DCP2504	FTG QUICK COUPLER 3/8B x 1/2 NPTM MALE AIR

FIGURE A-11. BF-R BOILER GUN PNEUMATIC DRIVE ASSEMBLY (P/N 98866)



**INSIDE OF CASE**

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	903-0003	SCREW 5/16-18 X 5/16 SSS
2	1	911-0005	KEY 3/16 RADIUS ONE SIDE X 5/8 SQ BOTH ENDS
3	4	921-1001	SNAP RING 11/16 ID X .042 TH
4	2	923-1001	COTTER PIN 3/32" X 1/2"
5	4	10534	RING SNAP 1 OD
6	3	11676	SCREW 10-32 X 3/4 SHCS
7	3	12438	SCREW 8-32 X 3/4 SHCS
8	3	59449	SCREW 6-32 X 3/4 SHCS
9	1	AWTORX	WRENCH HEX/TORX SET 1/8, 9/64, 5/32, T9, T15 H&S LOGO
10	1	SNAP	PLIER SNAP RING FLAT TIPPED 11/16 - 7/8
11	1	TK	CASE COMPARTMENT 8 X 4-1/8 X 1-3/16

**FIGURE A-12. BF-R BOILER GUN COLLET SYSTEM TOOL KIT ASSEMBLY (P/N BGTK)**

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## APPENDIX B SDS

Contact CLIMAX for the current Safety Data Sheets.

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 **BORTECH**  **CALDER** **H&S** **TOOL**