MACTECH
WD CLAMSHELL PORTABLE LATHES

SETUP AND OPERATION MANUAL

Model	WD Clamshell Portable Lathes
Description	843WD, 848WD, and 860WD Clamshell Portable Lathe
Part Number	605-6896, 605-6899, 605-6902
Manual Document Number	900-0015
Manual Revision	Rev C

MACTECH INC.
4079 PEPIN AVE UNIT 4
RED WING MN 55066
800-328-1488
INFO@MACTECHONSITE.COM

MACTECH OFFSHORE
302 IDA ROAD
BROUSSARD LA 70518
337-839-2793
INFO@MACTECHOFFSHORE.COM

MACTECH KENTUCKY
3880 INDUSTRIAL DRIVE
PADUCAH KY 42001
270-442-1559
INFO@MACTECHONSITE.COM

MACTECH WISCONSIN
2515 CLEVELAND AVE
MARINETTE WI 54143
800-328-1488
INFO@MACTECHONSITE.COM

MACTECH INTERNATIONAL
CONTACT US FROM ANYWHERE
AROUND THE WORLD
337-839-2793
INFO@MACTECHOFFSHORE.COM

REVISIONS

NOTE: *Information contained within this manual is not to be used without the written consent of Mactech.*

Revision Level	ECO No.	Description	Date
A	445	Update drawing package	7/31/2018
B		Update drawing package, safety, cover	05/06/2019
C		Updated instructions, images, and information. Separated drawing package.	02/18/2022

SAFETY INSTRUCTIONS

The safety keywords DANGER, WARNING, and CAUTION used in this manual indicate the level of hazard that may be encountered by the user. These keywords appear in a box with the hazardous condition or operation throughout this manual. The definitions of these safety keywords are:

⚠	***DANGER**: Indicates death or serious injury will occur if precautions are not taken.*
⚠	***WARNING**: Indicates death, serious injury, or property damage can occur if precautions are not taken.*
⚠	***CAUTION**: Indicates injury or property damage may occur if precautions are not taken.*

Safety is an essential part of the operation of this equipment. Heed all warnings in this manual and markings on the machine to avoid hazardous and unsafe operation. Always observe site safety rules and safety information provided to the user of this equipment. Use personal protective equipment including gloves, safety glasses and steel-toe boots when using this equipment.

⚠	***DANGER**: This machine includes moving and rotating components. Keep clear of the machine while in operation. Failure to heed this warning can result in serious injury or death.*
⚠	***WARNING**: Perform a JSEA (Job Safety Environmental Analysis) before using this equipment. Always be aware of your surroundings. Failure to analyze site specific hazards can result in serious injury or death.*
⚠	***WARNING**: Users must read and understand these instructions before operating this equipment. Failure to comply with these instructions can result in death, serious injury, or damage to the equipment.*
⚠	***WARNING**: Do not exceed the maximum hydraulic flow or pressure specified for this equipment. Failure to heed this warning may result in serious injury.*
⚠	***WARNING**: Skin injection hazard. Do not check for hydraulic leaks with your hands. Do not hold hydraulic hose or connectors while the hydraulic system is pressurized. Always shut off and de-pressurize the hydraulic system before servicing the unit. Hydraulic fluid under pressure can easily puncture skin, causing serious injury or death*
⚠	***CAUTION**: Valves and other hydraulic components may be hot during and after operation. Allow the equipment to cool before handling, or use heat-resistant gloves. Hot surfaces may cause serious burns.*
⚠	***CAUTION**: This machine has clamping functions and moving components that create pinch points. Be aware of all pinch points, and hand and body position while setting up, rigging, and operating the machine.*

TABLE OF CONTENTS

SECTION 1 - DESCRIPTION

Mactech WD Clamshell Lathes are exceptionally lightweight, yet rigid, portable machines capable of precise pipe cutting and machining. Cold-cutting operation allows the clamshell lathe to be used in environments where sparking is not allowed. The clamshell is opened at the split in the frame and placed around the workpiece at the location of the cut. Multiple locators are used to center the machine on the workpiece. The drive system rotates the tool blocks with the feed pins advancing the tool bits into the workpiece. WD Clamshell Lathes also provide a platform for optional equipment, such as counter-bore and single point face machining attachments.

NOTE: *Before each use thoroughly inspect the machine. Check for loose or missing fasteners. Make sure all guards are in place and securely fastened. Make sure the tool bit is sharp and in good condition. Correct any problems that require maintenance or replacement before using the machine.*

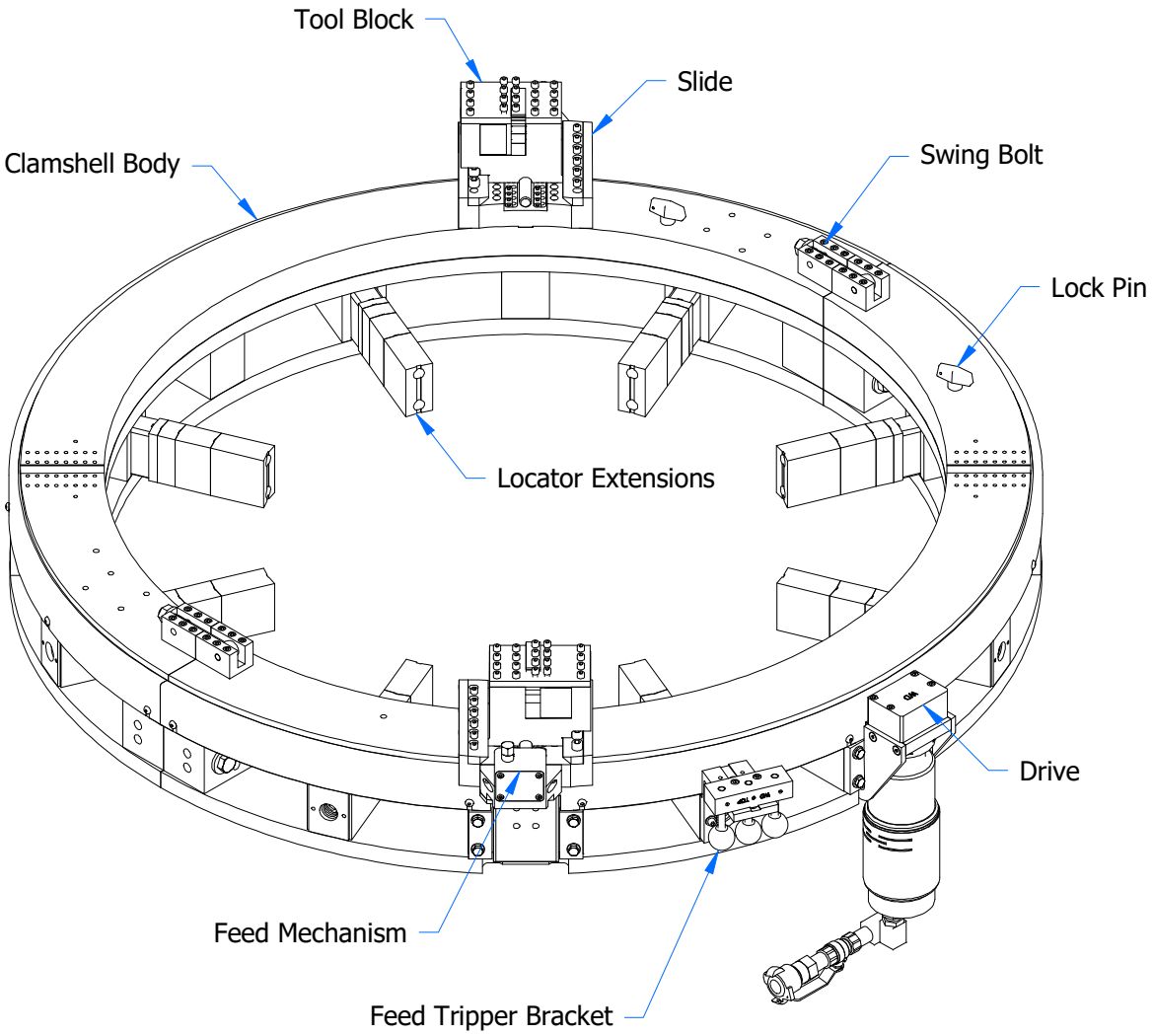
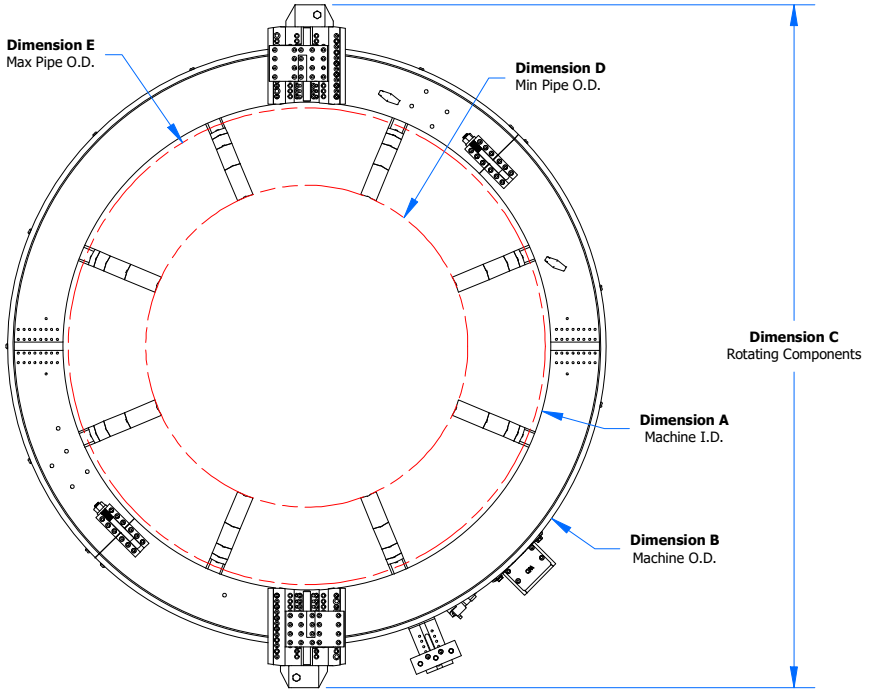
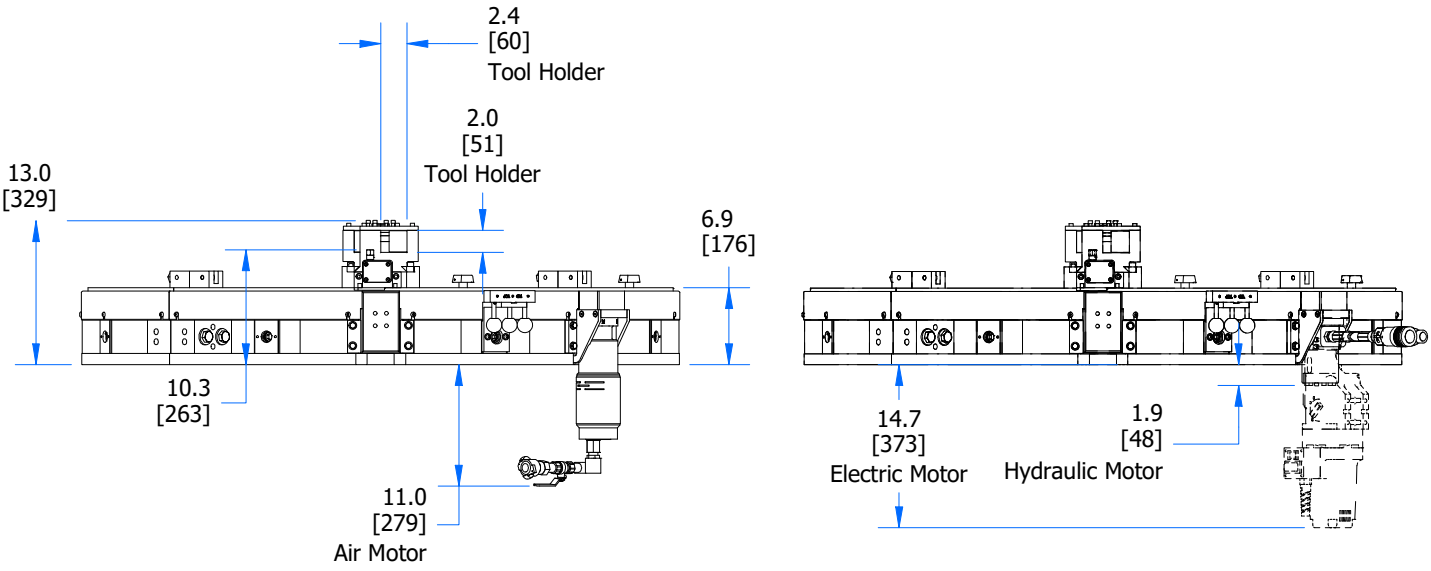


Figure 1-1 – WD Clamshell Portable Lathe Components

SECTION 1 - DESCRIPTION





WD Clamshell Portable Lathe Machine and Operating Dimensions			
Dimension	**843WD**	**848WD**	**860WD**
A - Machine I.D.	44.0 (1118 mm)	49.0 (1245 mm)	61.0 (1549 mm)
B - Machine O.D.	54.0 (1371 mm)	59.0 (1498 mm)	71.0 (1803 mm)
C - Rotating Components	61.6 (1565 mm)	66.6 (1692 mm)	78.6 (1997 mm)
D - Minimum Pipe O.D.	31.0 (787 mm)	36.0 (914 mm)	48.0 (1219 mm)
E - Maximum Pipe O.D.	43.0 (1092 mm)	48.0 (1219 mm)	60.0 (1524 mm)

SECTION 1 - DESCRIPTION

Capabilities

- Pipe Sever
- Pipe sever and bevel
- Pipe sever and double bevel
- Counterbore
- Outer Diameter (O.D.) Following

The WD series of Clamshell Lathes is capable of cold-cutting steel and steel-alloys, stainless steel, and most other metal alloys.

Tooling

1 inch tooling of various profiles. Reference page 2-9 in this manual.

Feed

Feed Mechanism: 4 point starwheel with 3-pin tripper feed.

Feed Rate: .002, .004 or .006 inches per revolution (0.05, 0.11 or 0.16 mm).

Drives

Air Drive

Air supply requirement: 100 cfm @ 100 psi (2.8 m^3/min @ 6.9 bar)

Hydraulic Drive

HPU requirement: 10-15 gpm @ 1000 psi continuous pressure (38-57 lpm @ 69 bar). Hydraulic motors include hose whips and quick-disconnects. Hydraulic power units are available from Mactech.

Electric Drives

In-Line Electric: 2200W, 0-570 RPM, 120 or 220 VAC
Reversible: 2200W, 93-665 RPM, 120 or 220 VAC
NOTE: *Electric drives may not be suitable for all tasks, please contact Mactech representative for advisement.*

Optional Equipment

Refer to the following page for a selection of optional equipment available for the WD series clamshell lathes.

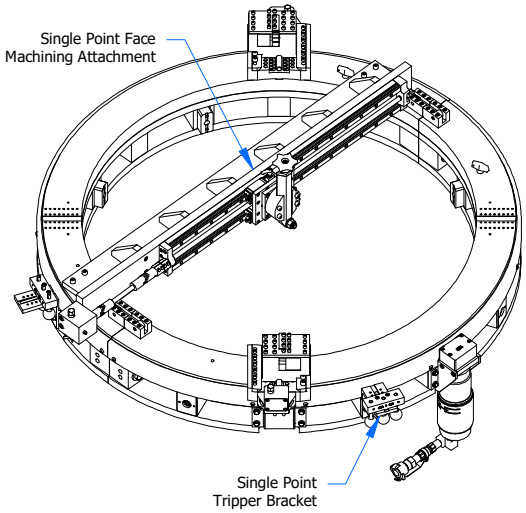
Operating Weights
843WD Air Drive: 929 lbs.(421 kg)
843WD Hydraulic Drive: 940 lbs.(426 kg)
843WD Electric Drive: 948 lbs.(430 kg)
Shipping Weights
843WD Air Drive: 1467 lbs.(665 kg)
843WD Hydraulic Drive: 1468 lbs.(666 kg)
843WD Hydraulic Drive: 1476 lbs.(670 kg)

Operating Weights
848WD Air Drive: 1003 lbs.(455 kg)
848WD Hydraulic Drive: 1014 lbs.(460 kg)
848WD Electric Drive: 1022 lbs.(464 kg)
Shipping Weights
848WD Air Drive: 1541 lbs.(699 kg)
848WD Hydraulic Drive: 1542 lbs.(699 kg)
848WD Electric Drive: 1550 lbs.(703 kg)

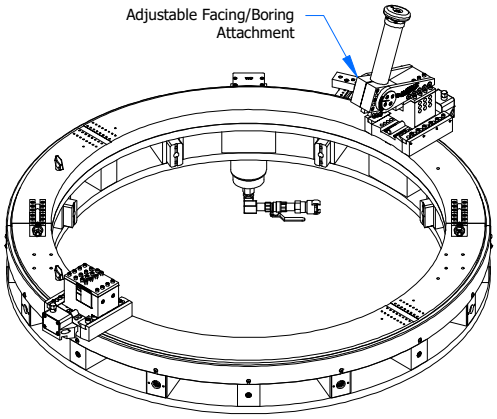
Operating Weights
860WD Air Drive: 1179 lbs.(535 kg)
860WD Hydraulic Drive: 1190 lbs.(540 kg)
860WD Electric Drive: 1198 lbs.(543 kg)
Shipping Weights
860WD Air Drive: 1788 lbs.(811 kg)
860WD Hydraulic Drive: 1789 lbs.(811 kg)
860WD Electric Drive: 1797 lbs.(815 kg)

SECTION 1 - DESCRIPTION

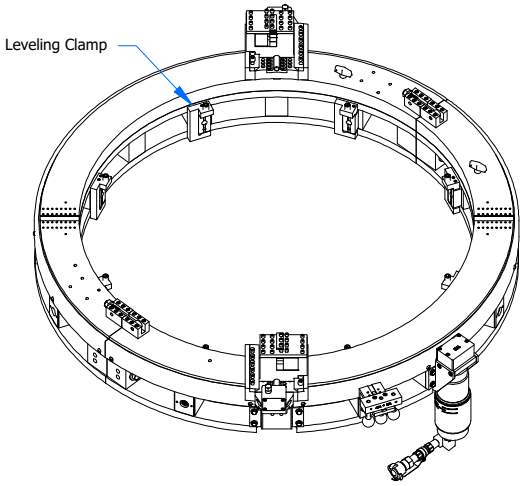
Single Point Attachment
Heavy-wall weld preps, Flange facing, O-ring grooves



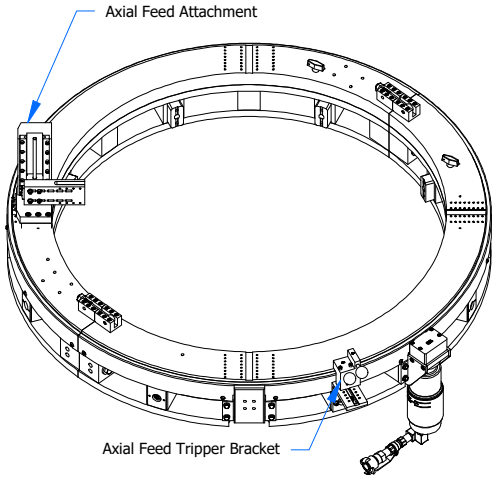
Adjustable Facing/Boring Attachment
Boring, Flange facing, RTJ grooves, O-ring grooves



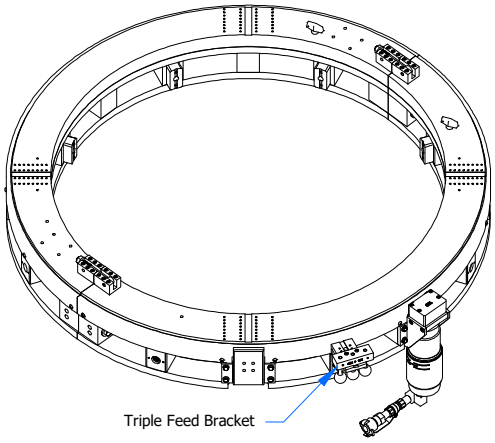
Leveling Clamps
Levels the clamshell with the workpiece face



Axial Feed Attachment
Axial machining (along length of pipe), Shaft and Groove machining



Triple Feed Bracket
Tool bit feed rate adjustment, Feed direction reversal



OD Following Tool Blocks
Tracks contour of the workpiece

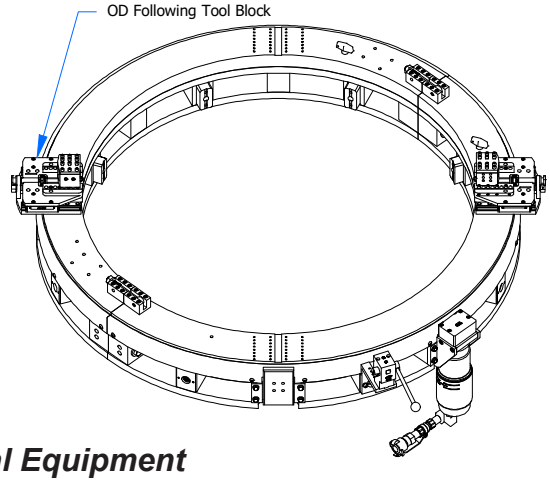
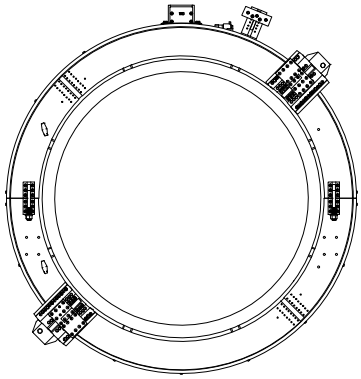
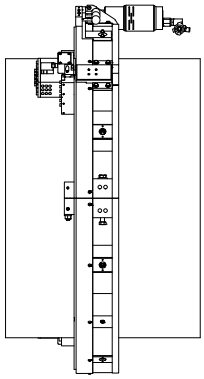


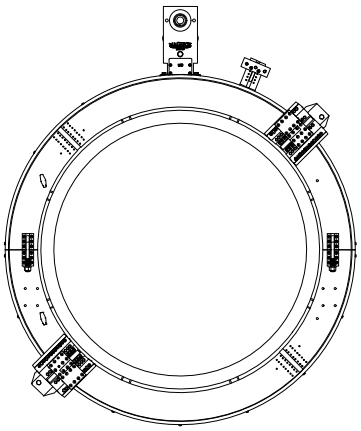
Figure 1-3 – Optional Equipment

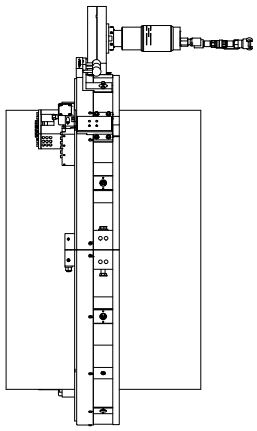
SECTION 1 - DESCRIPTION



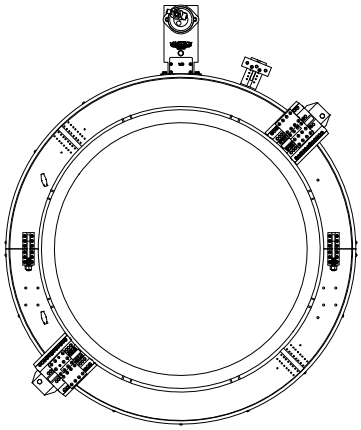


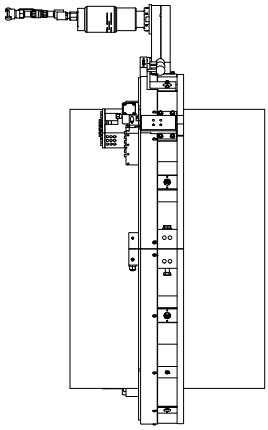
In-Line Drive





Reversible Drive, Motor Rear





Reversible Drive, Motor Front

Figure 1-4 – Drive Configurations

SECTION 2 - SETUP

Section 2 - Setup

This section describes the setup that is required of the WD Clamshell before operation. Refer to the assembly drawings in the provided Drawing Package (#920-0045) for more specific details.

CAUTION: *The lock pins must be installed in the clamshell frame while performing the setup procedure. The lock pins prevent the gears from rolling out of the frame when the clamshell is separated. The clamshell gears are heavy, and can cause serious injury to the user or damage to the equipment if rolled out of the frame.*

1. Rotate the clamshell gear to align the gear and frame split lines. Lock the gear and housing in place by inserting two lock pins through holes on the face of the clamshell. If the gear holes do not line up with housing holes, rotate gear 180°. See Figure 2-1.

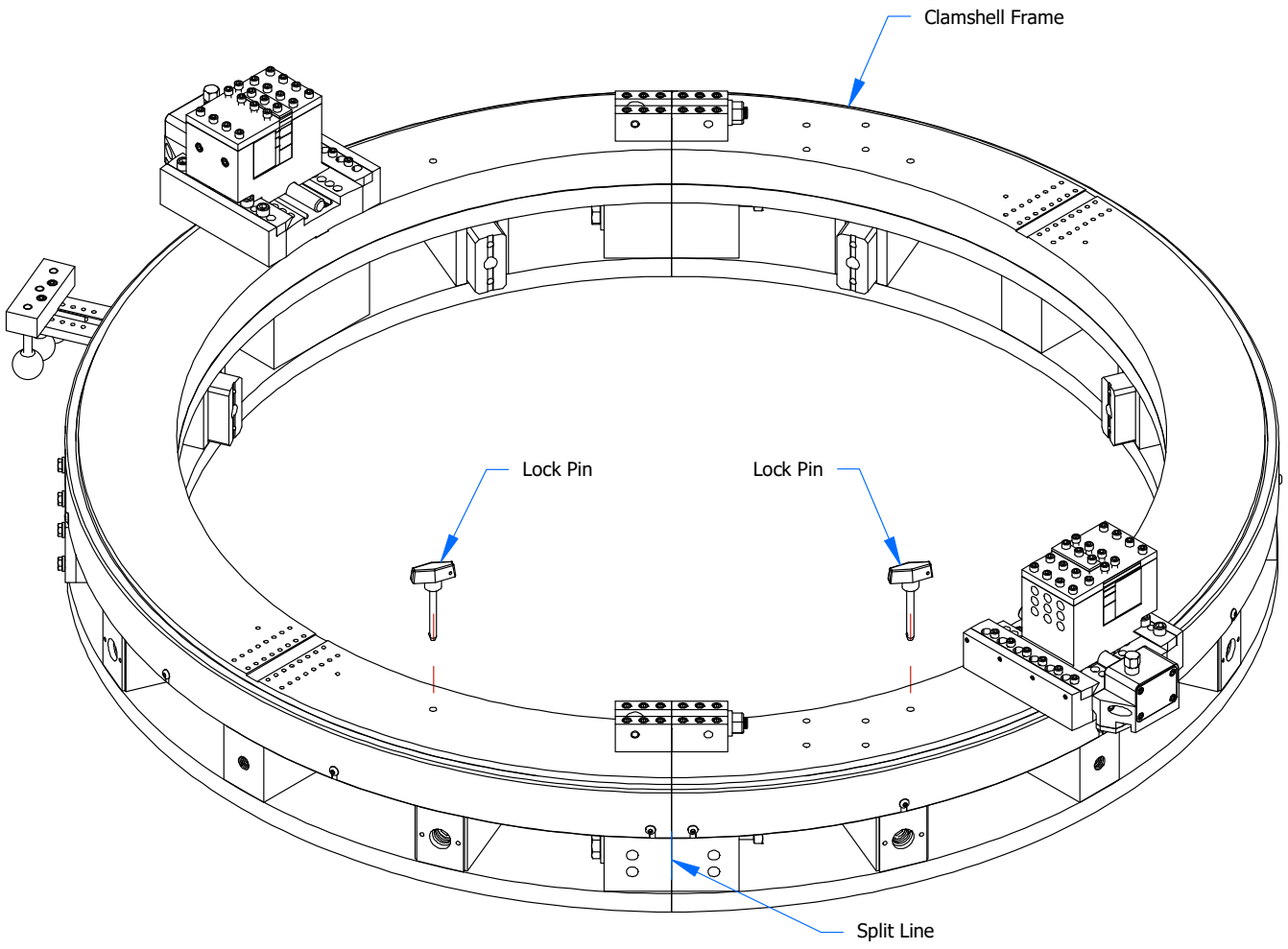


Figure 2-1 – Install Lock Pins

SECTION 2 - SETUP

Separate Clamshell Halves

2. Remove the nut holding the swing bolts and the two hex cap screws on each side of the clamshell. Separate the two clamshell frame halves by pulling straight apart. Do not pry or force open with tools; the Tap Bolts are there to push the two halves apart if need be. See Figure 2-2.

> ***NOTE:*** *Do not use tools to open the clamshell halves. Do not pry or force the halves open. Any attempt to do so may damage the equipment.*

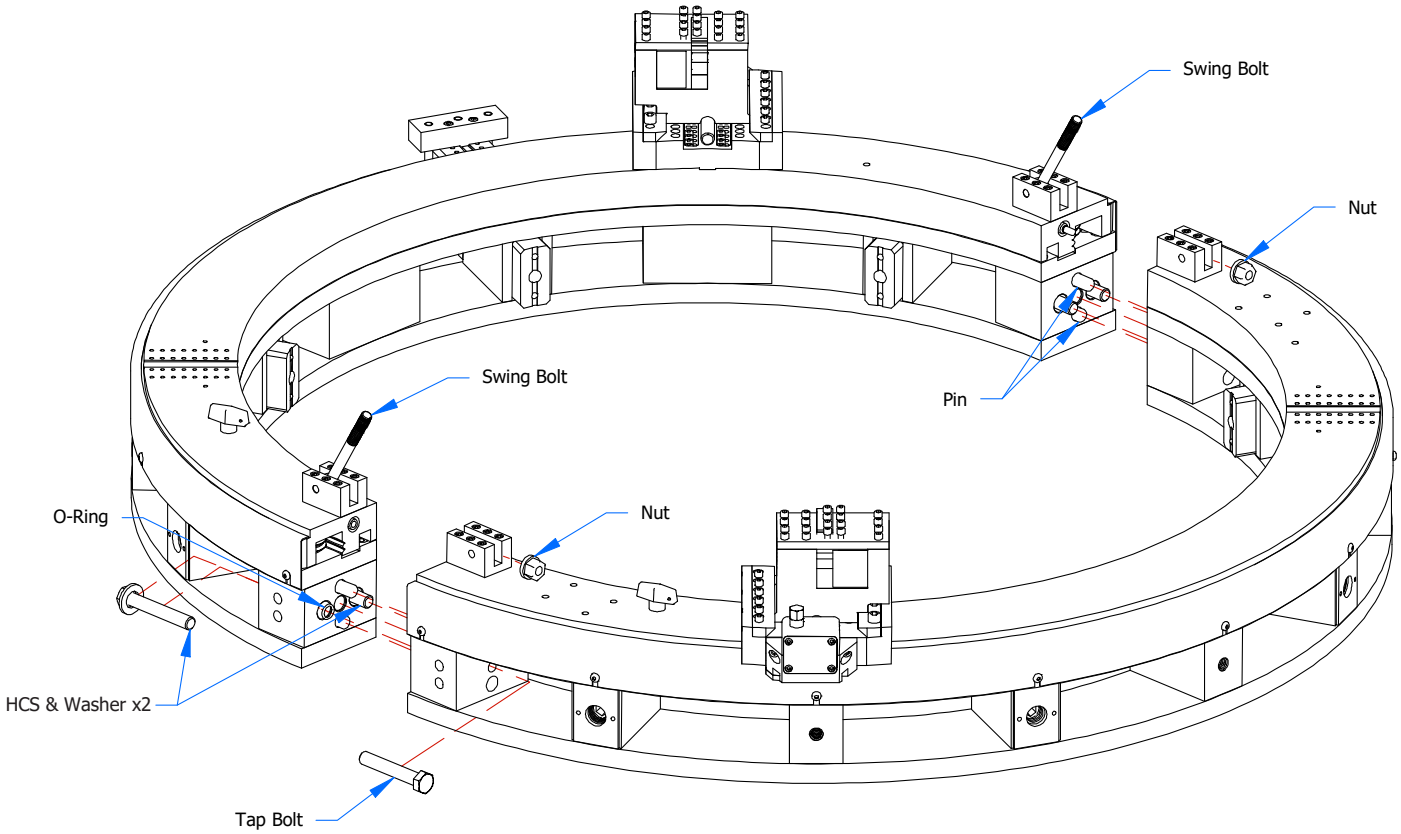


Figure 2-2 – Separate Clamshell Halves

SECTION 2 - SETUP

Install Locator Extensions

3. Determine the pipe or workpiece diameter. Select the size and combination of locator extensions required to fit around the diameter of the workpiece. Locator adjustment is done by turning the set screws on the outside of the clamshell housing. Back the locators out slightly so they will clear the workpiece diameter when the clamshell is placed around the workpiece. See Figure 2-3.

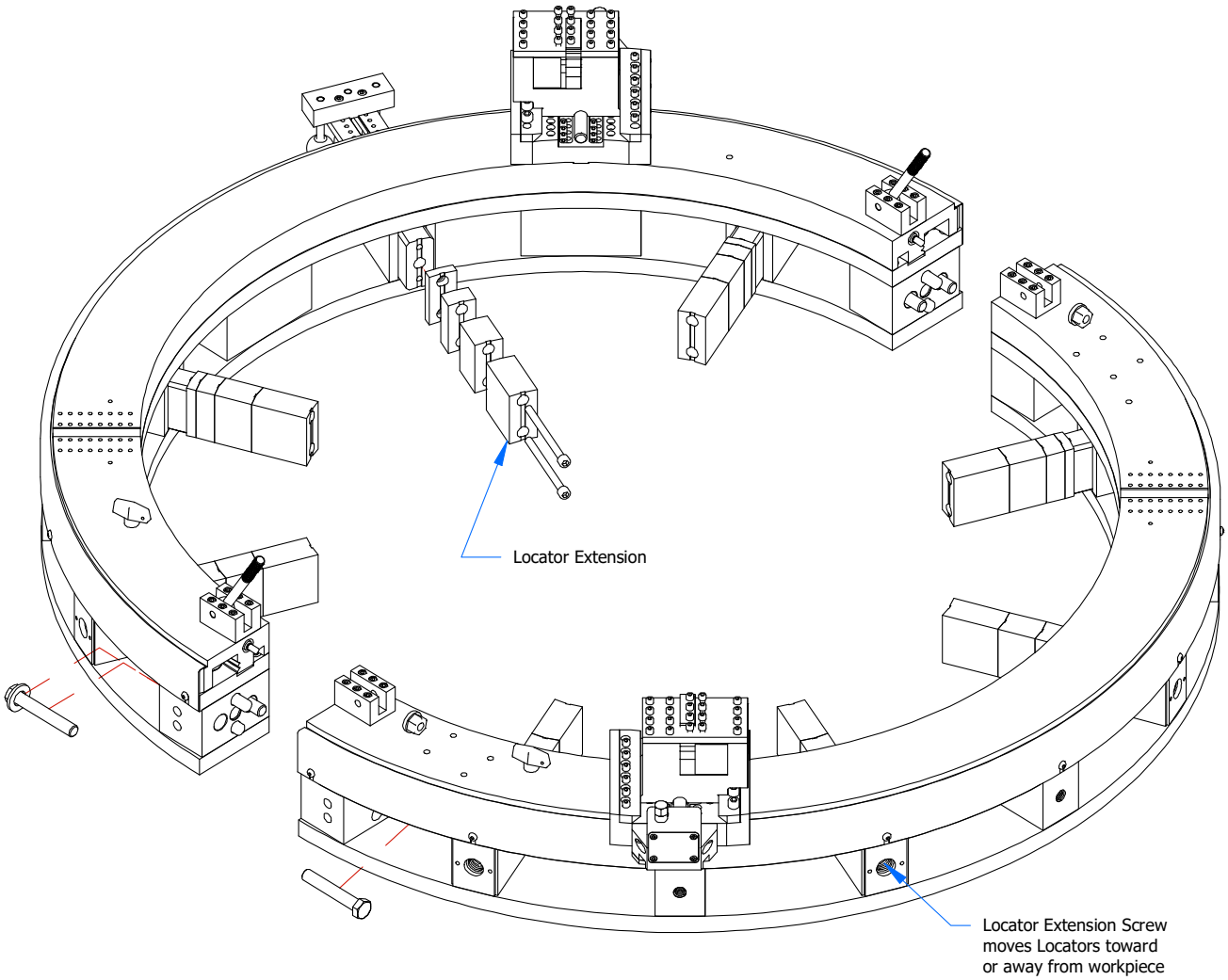


Figure 2-3 – Install Locator Extensions

SECTION 2 - SETUP

Lifting

4. Lifting the clamshell halves can be done in several ways and should be planned for by a qualified rigging expert. The clamshell halves do have several rigging hole positions that can accept a 5/8-11 swivel eye bolt / hoist rings that are provided with the clamshell.
See Figure 2-4 below for locations:

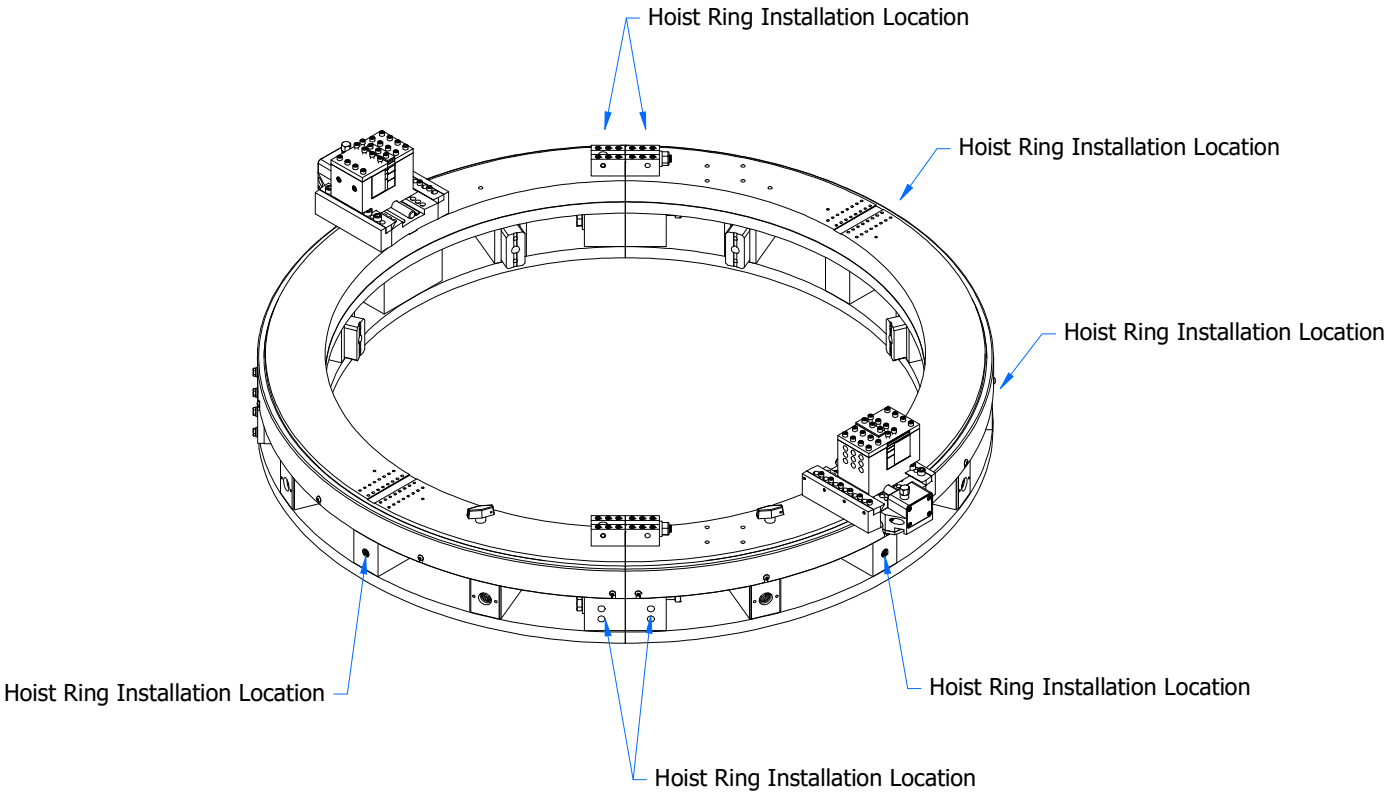


Figure 2-4 – Hoist Ring Locations

SECTION 2 - SETUP

Install Clamshell on Workpiece

5. Place the clamshell halves around the workpiece. Close the clamshell by first screwing in the two hex cap screws on each side of the clamshell split until tight. Close the swing bolt and fasten with the swing bolt nut on each side of the clamshell. Tighten the locators against the workpiece. Final tightening will be completed after the clamshell is centered and squared to the workpiece. See Figure 2-5.

> ***NOTE:*** *Do not force the clamshell halves together. Ensure the tap bolts on each split have been retracted. If the clamshell does not completely close around the workpiece, check the locators and extensions for proper size. It may be necessary to back the locators further away from the workpiece.*

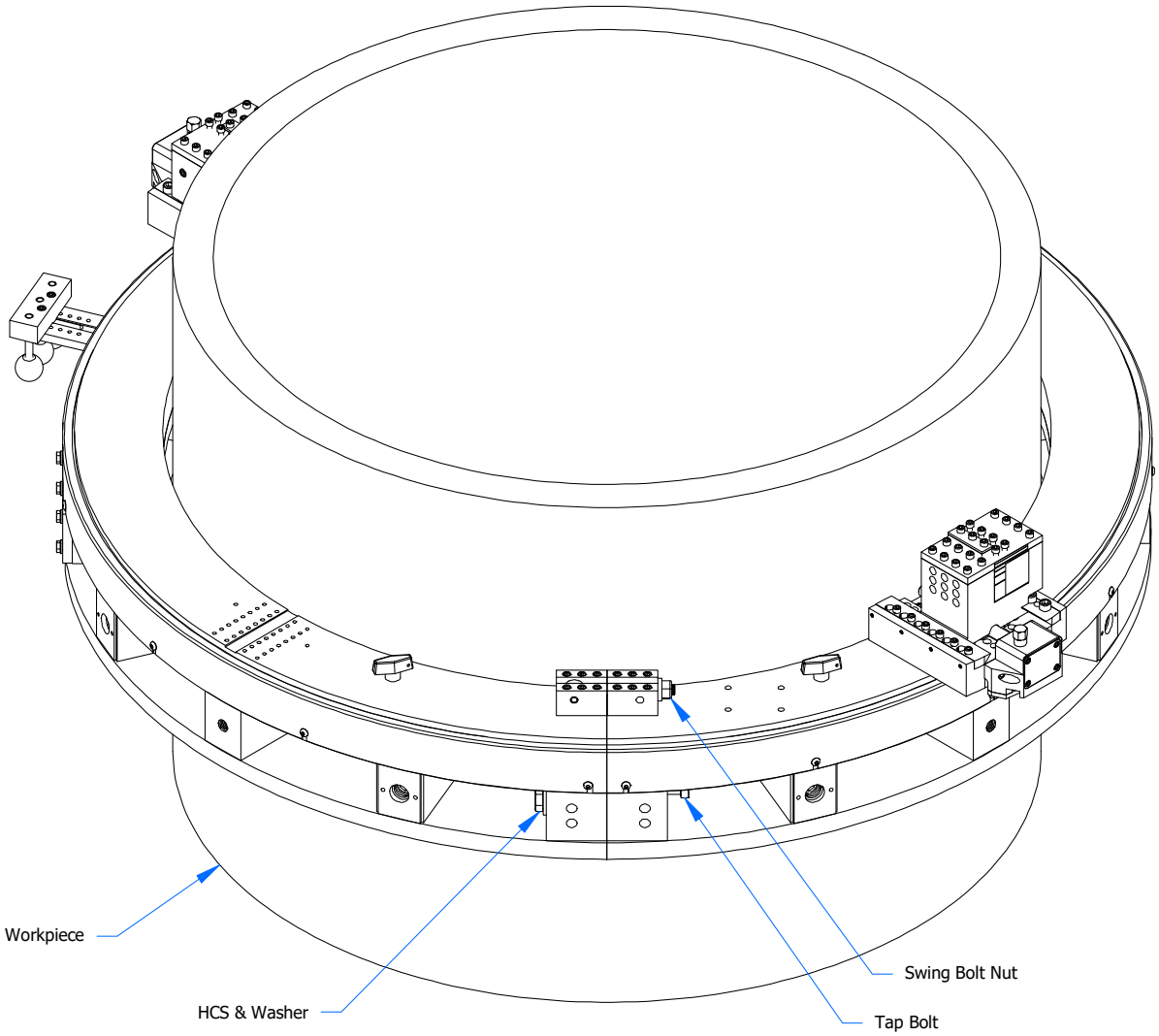


Figure 2-5 – Install Clamshell on Workpiece

SECTION 2 - SETUP

Square and Center the Clamshell

6. Square the clamshell to the workpiece. Place a square against the back face of the clamshell and along the length of the workpiece. If a horizontal setup, ensure a locator is at the 12 o'clock position. Adjust locators 1, 5 and 3, 7 until the clamshell is square to the workpiece. Always make adjustments in a cross-pattern sequence. See Figure 2-6.

> ***NOTE:*** *Always leave two locators, opposite of each other, tightened against the workpiece. This holds the clamshell and allows adjustment of the remaining locators. Always use a cross-pattern sequence when adjusting the locators.*

7. Measure the distance from the workpiece outside diameter to the clamshell inside diameter at locator positions 1, 5 and 3, 7. Adjust the locators so that they are at the same dimension, while maintaining squareness and a secure fit on the workpiece. Once centered based on 1,5 and 3,7: touch off and tighten 2,6 and 4,8. When the clamshell is centered and squared on the workpiece, tighten locators against the workpiece. For fine centering, attach a dial indicator to the tool slide and manually rotate it while measuring the workpiece (lock pins need to be removed). Make sure all locators are firmly tightened against the workpiece once centered. See Figure 2-6.

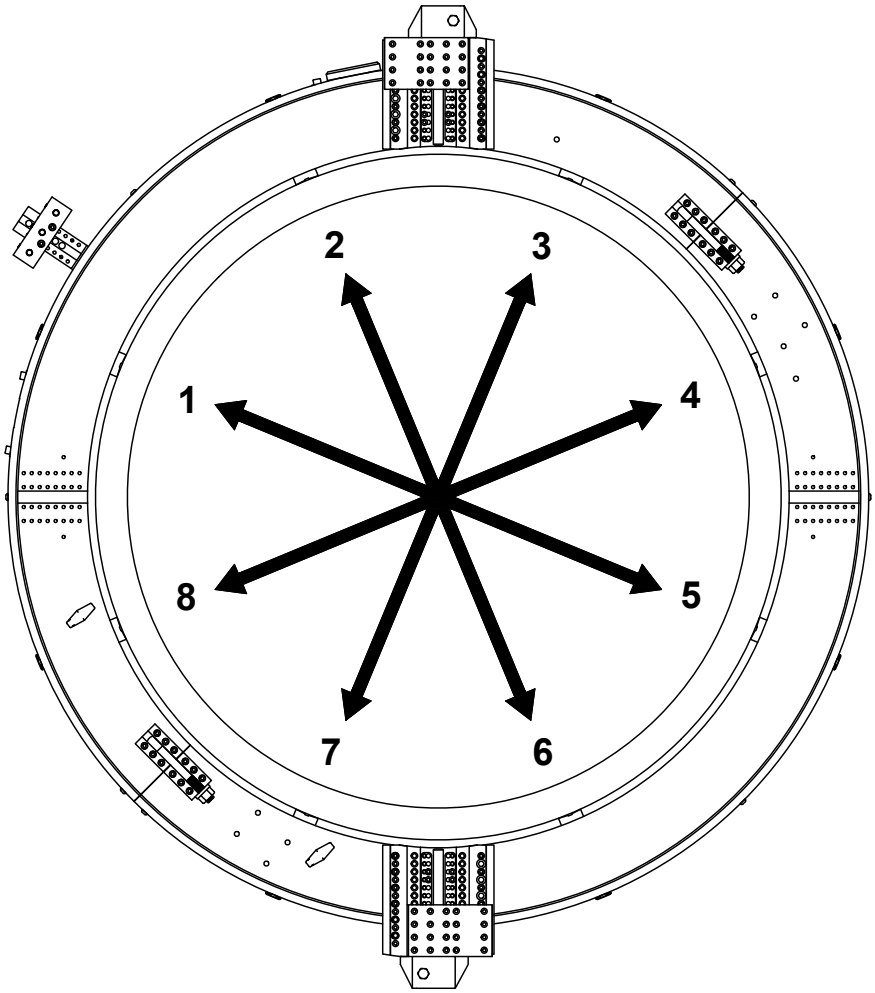


Figure 2-6 – Square and Center Clamshell

SECTION 2 - SETUP

Adjust Feed Mechanism

8. Remove two lock pins. Manually rotate the clamshell gear to check for smooth operation. Make sure the feed pin properly engages the starwheel on each of the two tool blocks. Adjust the feed tripper bracket axial and radial positions to engage the feed pin. See Figure 2-7.

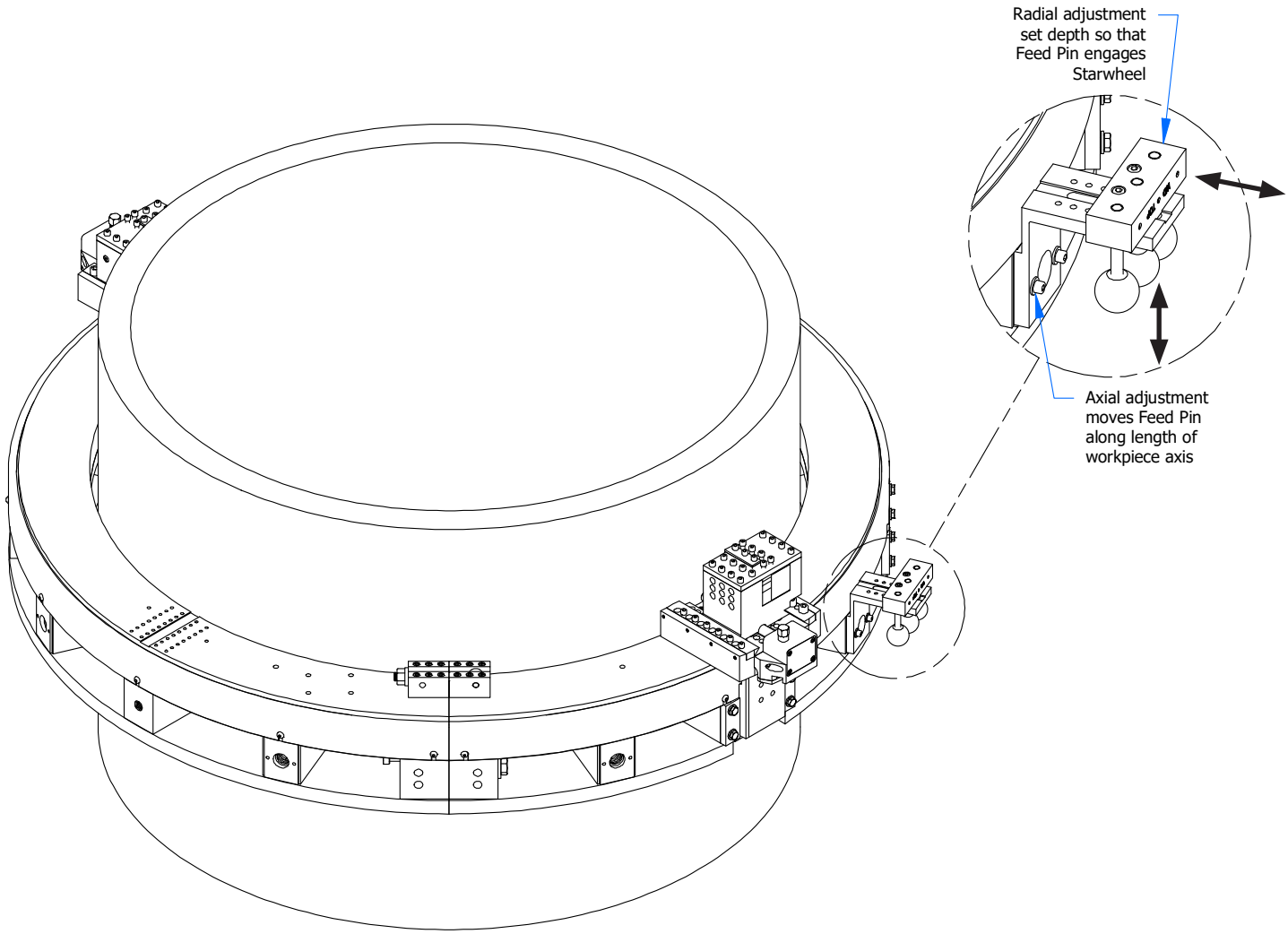


Figure 2-7 – Set Feed Pin Axial and Radial Positions

SECTION 2 - SETUP

9. Adjust the tool block starwheel to remove feed screw backlash. Using a 5/8 hex socket, turn the starwheel knob counter-clockwise until the block begins to move. Set the bottom lobe of the starwheel a few degrees to the left of the vertical centerline. This is the optimal position for indexing the feed pin. Figure 2-8 shows proper feed pin engagement with the starwheel.

> ***NOTE:*** *The figure below (2-8) is showing how the starwheel will spin as the tripper pin(s) passes by making contact. The tripper feed pin(s) stays stationary in the feed tripper bracket.*

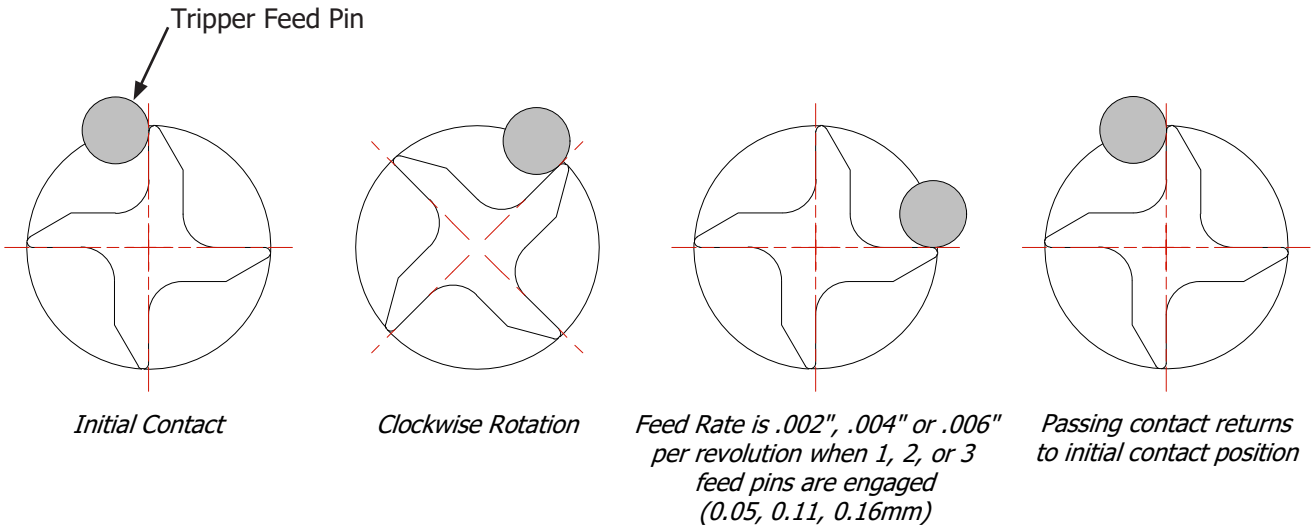


Figure 2-8 – Feed Screw Backlash

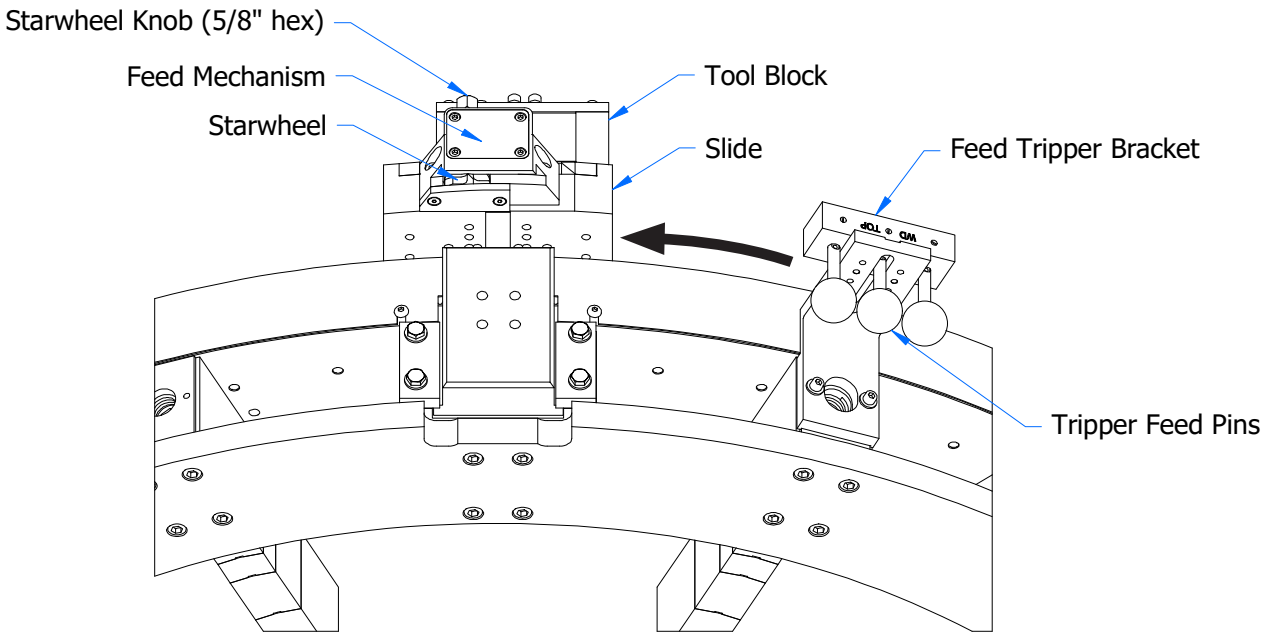


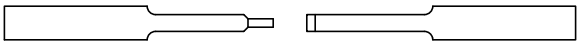
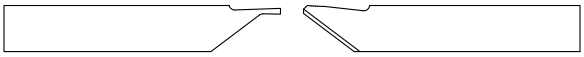
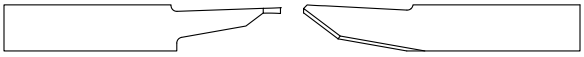
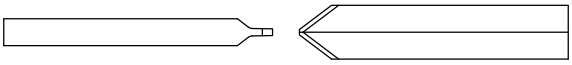
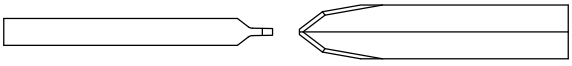
Figure 2-9 – Feed Mechanism

SECTION 2 - SETUP

Install Tool Bits

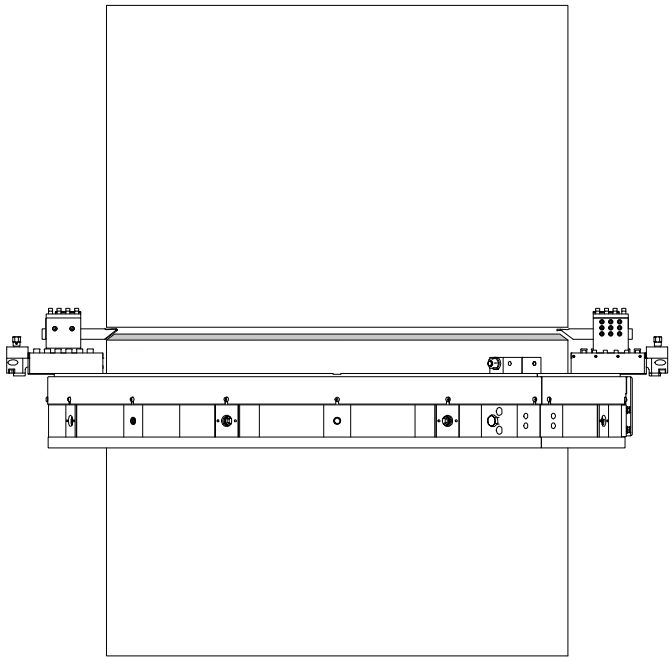
10. Select the tool bit or tool bit set for your machining operation. Other tool bits are available. Contact Mactech for a full list of tool bits available for your machine.

> ***NOTE:*** *Ensure tooling is long enough for the setup with extensions.*

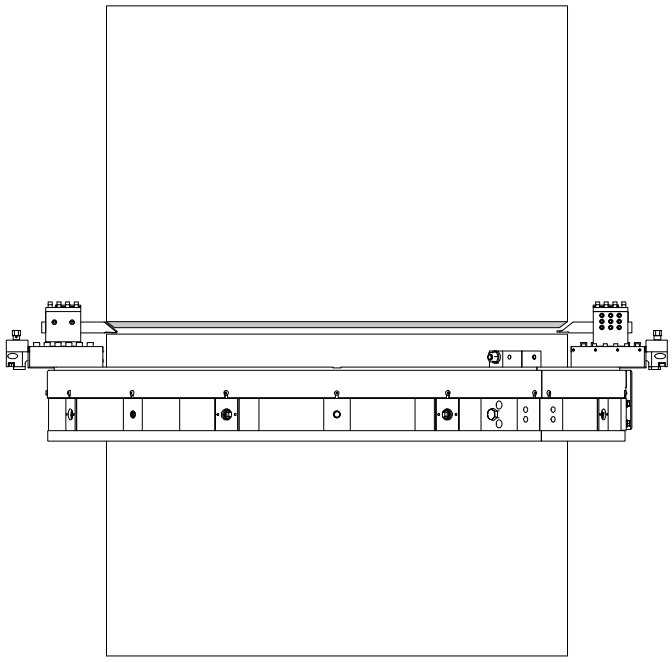
Tool Set	Description	Max Cut Depth
 Narrow Sever - Leads Wide Sever - Follows	**Sever Set** - uses one narrow sever and one wide sever tool bit. 440-0168 - Narrow Sever, 6” long 440-0169 - Wide Sever, 6” long	**2.5 inch**
 37° Sever- Leads 37° Bevel - Follows	**Sever/Bevel 37°, LH Set** - uses one sever and one bevel tool bit. 440-0237 - Sever, 5” long, left-hand 440-0238 - Bevel, 5” long, left-hand	**1.5 inch**
	Sever/Bevel 37°, RH Set - uses one sever and one bevel tool bit. 440-0235 - Sever, 5” long, right-hand 440-0236 - Bevel, 5” long, right-hand	**1.5 inch**
 37°-10° Sever- Leads 37°-10° Bevel - Follows	**Sever/Compound Bevel 37°-10°, LH Set** - uses one sever and one bevel tool bit. 440-0256 - Sever, 5” long, left-hand 440-0255 - Bevel, 5” long, left-hand	**2.25 inch**
	Sever/Compound Bevel 37°-10°, RH Set - uses one sever and one bevel tool bit. 440-0254 - Sever, 5” long, right-hand 440-0253 - Bevel, 5” long, right-hand	**2.25 inch**
 Sever - Leads 37° Double Bevel - Follows	**Sever/Double Bevel 37°, Set** - uses one sever and two bevel tool bits. 440-0299 - Sever, 5” long 440-0301 - Double Bevel, 5” long, right-hand 440-0300 - Double Bevel, 5” long, left-hand	**1.25 inch**
 Sever - Leads 37°-10° Double Bevel - Follows	**Sever/Double Bevel 37°-10°, Set** - uses one sever and two bevel tool bits. 440-0304 - Sever, 5” long 440-0307 - Double Bevel, 5” long, left-hand 440-0308 - Double Bevel, 5” long, right-hand	**3 inch**
**** All Tooling fits in a 1 inch Tool Holder***		

SECTION 2 - SETUP

NOTE: *The clamshell rotates clockwise when viewed toward the tool block face. Bevel tools are available in left-hand and right-hand versions. Right-hand tools bevel on the side of the cut which the clamshell is mounted. Left-hand tools bevel on the opposite side of the cut. See Figures 2-10.*



Right-hand Sever - Sever Bevel



Left-hand Sever - Sever Bevel

Figure 2-10 – Right-hand and Left-hand Tool Bits

SECTION 2 - SETUP

11. Use a 5/8 hex socket to retract both tool blocks away from the workpiece. Disengage the feed pin. See Figure 2-11.

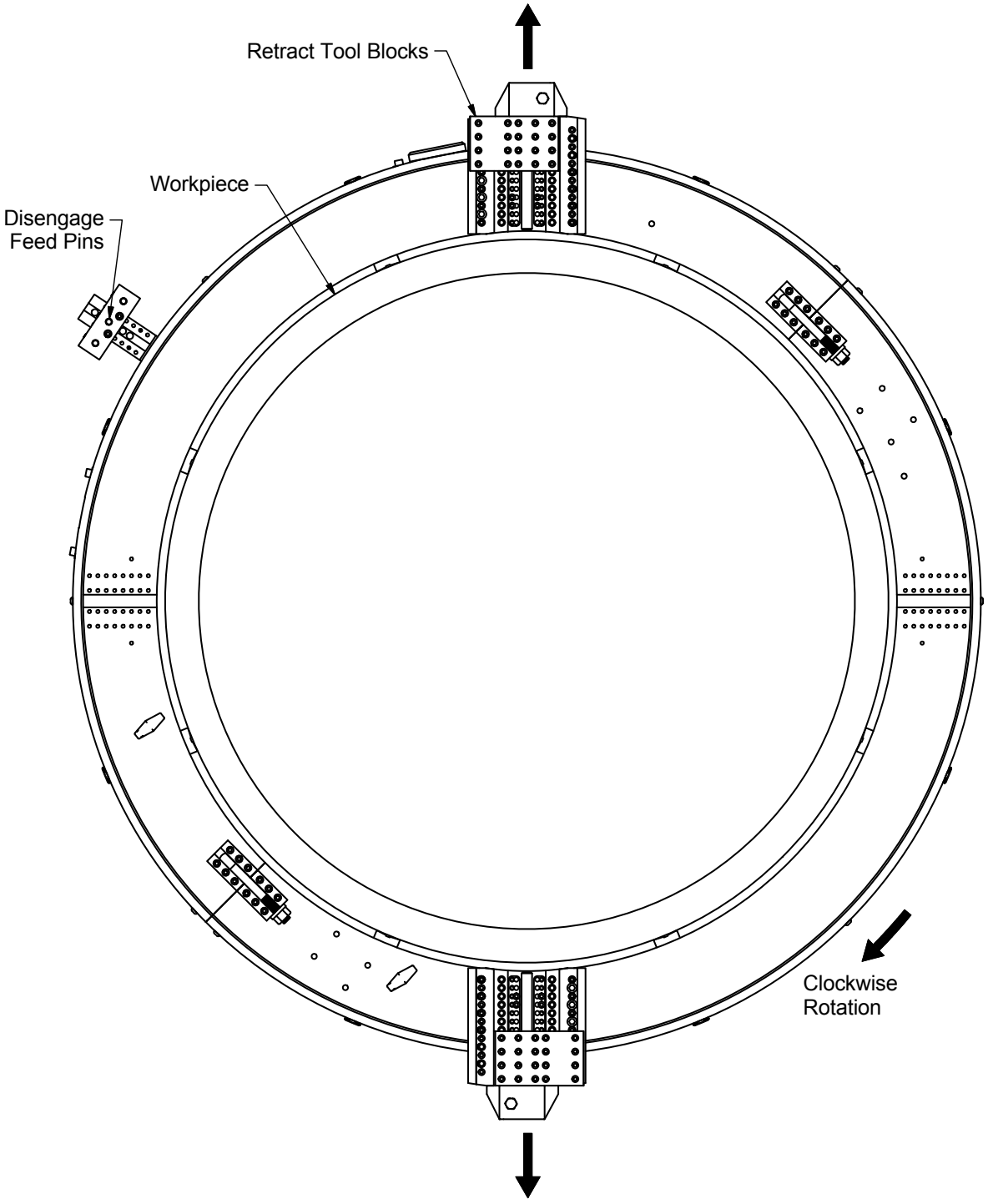


Figure 2-11 – Retract Tool Blocks, Disengage Feed Pin

SECTION 2 - SETUP

12. Insert a tool bit into each tool block. Use shims to position the tool bit as necessary. Each tool block must use the same thickness of shims. Limit the distance the tool bit extends out of the too block for greatest rigidity. A rigid setup will help achieve the best performance, accuracy and quality of cut. See Figure 2-12.

> ***NOTE:*** *Plan ahead when plotting the cutting position for where the following bevel cut will need to end. Mark on the workpiece where the following bevel cut will need to end so you can properly position where to start. Ensure that the leading sever cut will leave enough material for the following bevel blade to cut its full angle.*

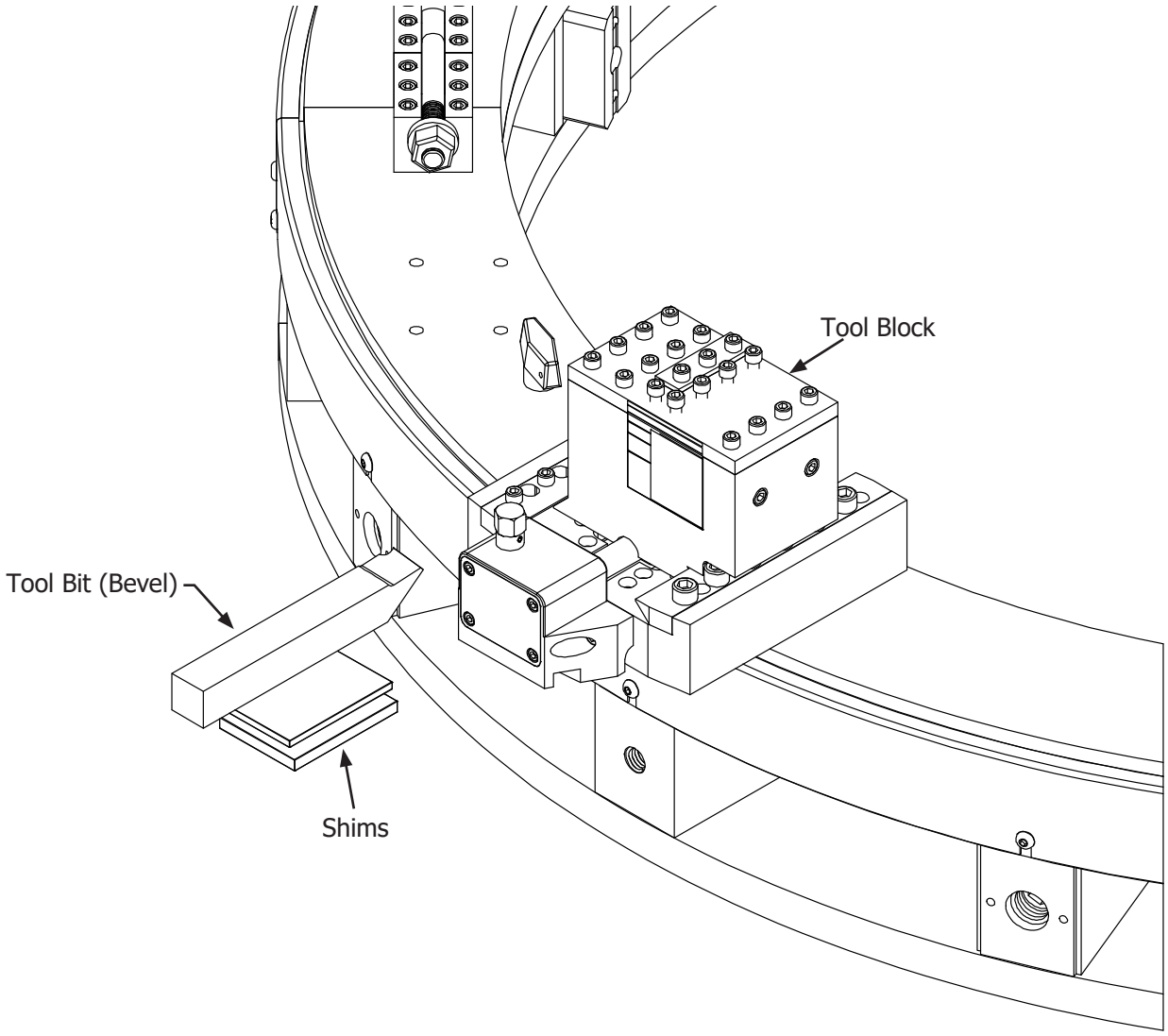


Figure 2-12 – Install Tool Bits and Shims

SECTION 2 - SETUP

13. The tool bit cutting tip must lie on the centerline of the workpiece. Position each tool bit so that it touches the workpiece. Lightly tighten set screws on top of each tool block to hold the tool bits in position but allows some movement for finding the high-point on the work piece in the next step . See Figure 2-13.

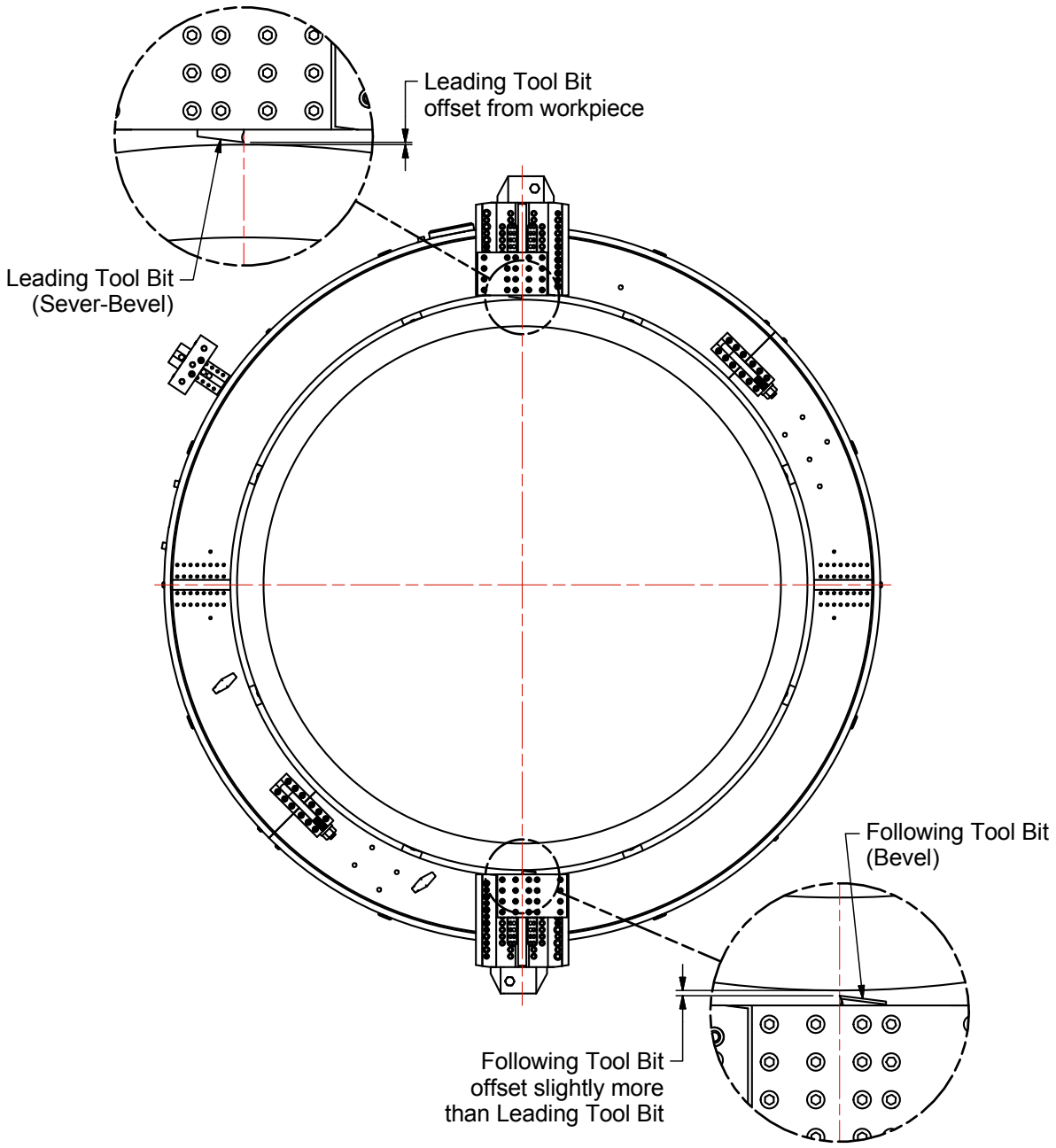


Figure 2-13 – Position Tool Bits

SECTION 2 - SETUP

14. Find the high-point on the work surface: Manually rotate the clamshell counter-clockwise one revolution. This will push the loose tool bits away from the work surface high-point to ensure when the cutting starts the bits wont gouge too deep into the work surface. Firmly tighten set screws on side of tool block, and cap screws on top of tool block to hold the tool bits.

Set Leading/Following Tool Bits

15. Sever-bevel and narrow-wide sever bit combinations require a lead and follow tool bit setup. Sever bits must lead bevel bits, and narrow-sever bits must lead wide-sever bits. Follow the previous steps for installing a tool bit. This sets the position for the leading tool bit.

16. Back the following tool bit away from the workpiece slightly more than the leading tool bit. This will allow the leading tool bit to the cut before the following tool bit. As the cut is made further, tool bit adjustment may be required. See Figure 2-14.

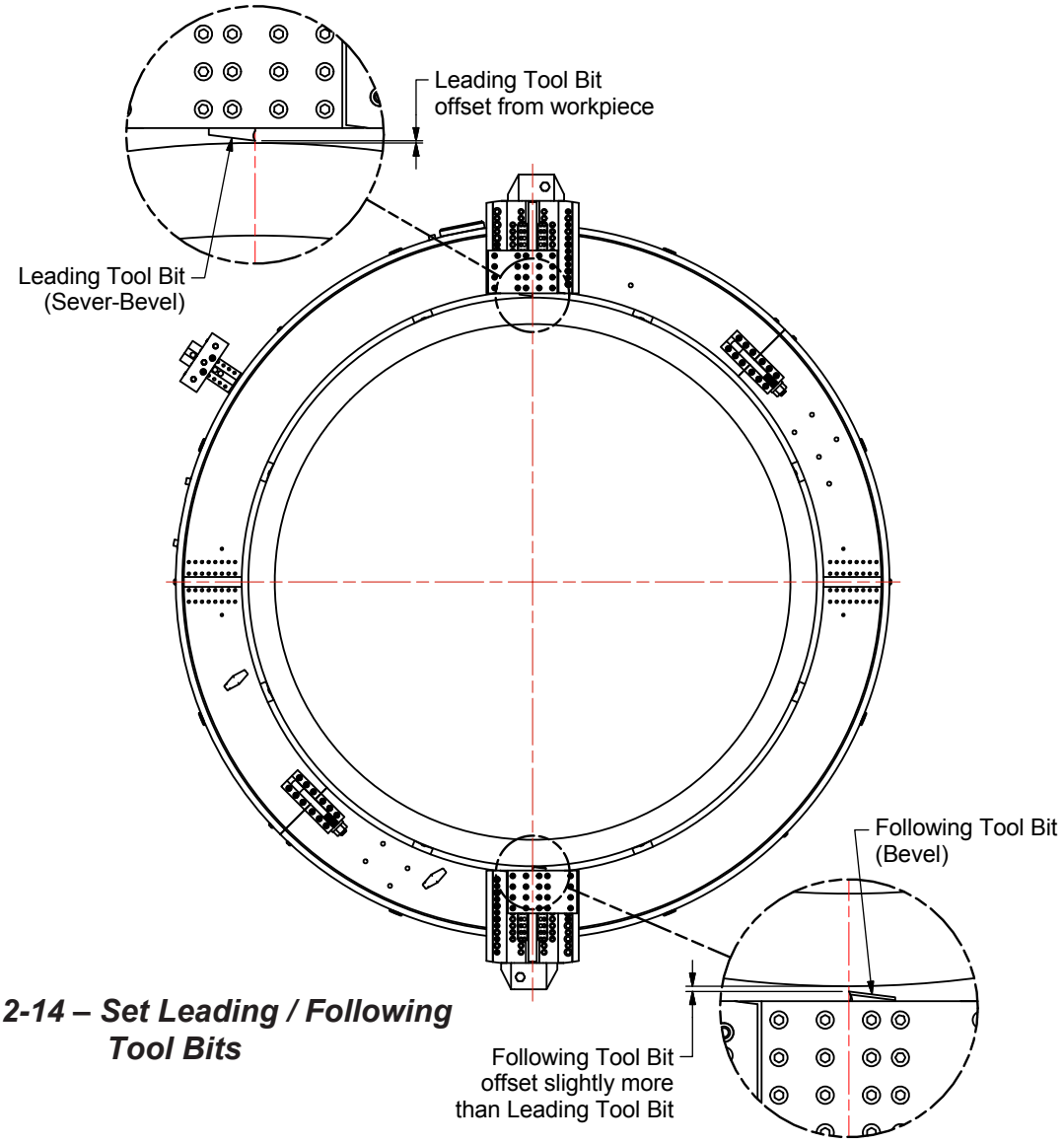


Figure 2-14 – Set Leading / Following Tool Bits

SECTION 2 - SETUP

Install Drive Motor

17. Install the drive motor assembly onto the clamshell. Slide the drive slot over the mounting brackets on the clamshell. Tighten the mounting bracket fasteners to secure the drive. Mesh the drive gear with the clamshell gear. Push the drive assembly up until it stops. Secure the drive to the clamshell by tightening four mounting bracket screws. See Figure 2-15.

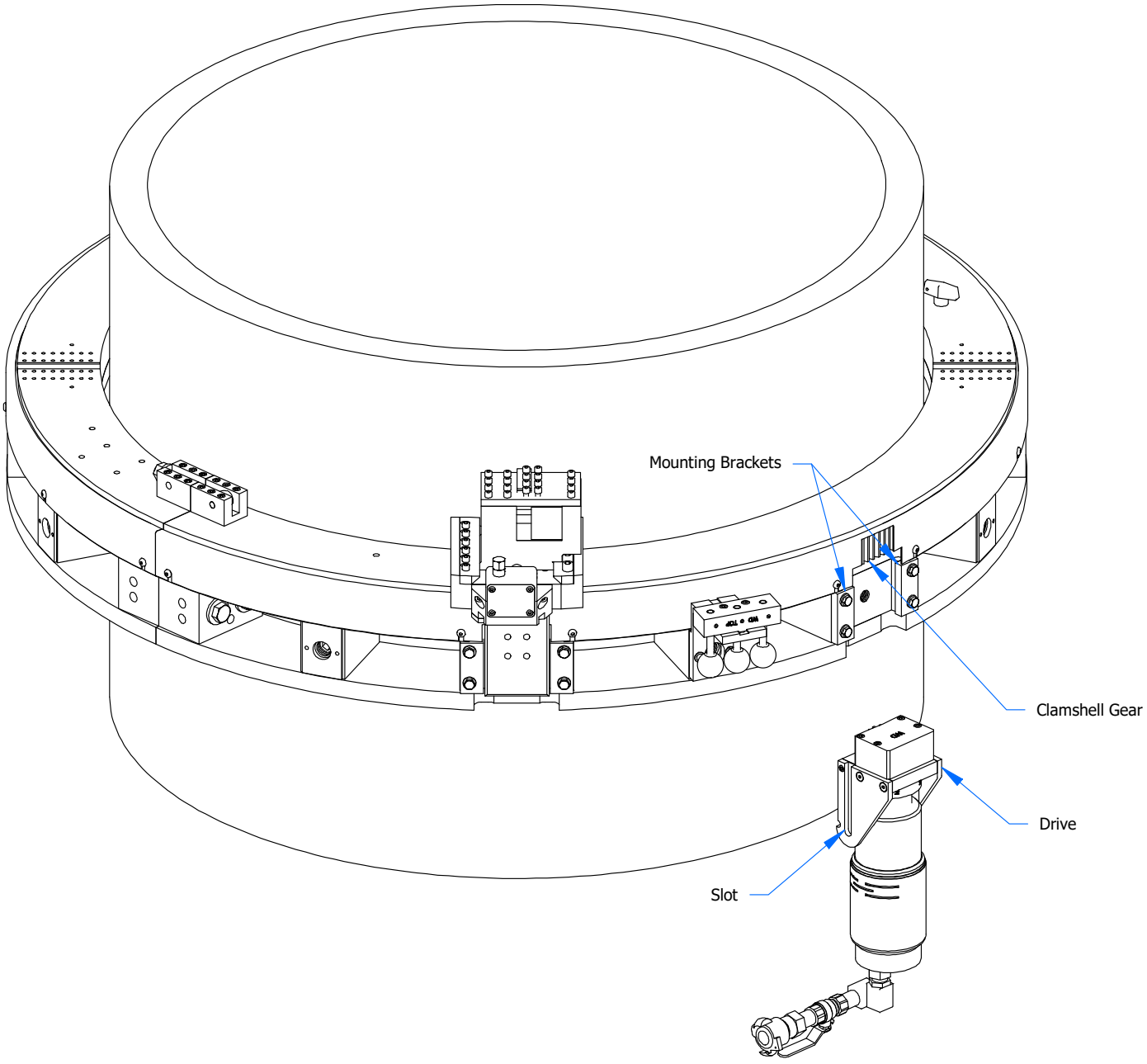


Figure 2-15 – Install Drive Motor

SECTION 3 - OPERATION

Section 3 - Operation

Sever In-line Pipe

1. Install two sever bits. With the tool bits touched off the workpiece high-point, turn the starwheel one revolution to back the tool bits slightly away from the workpiece. Make sure the starwheel is set at the initial contact position, as shown in Figure 2-8. Make sure the power supply is off. Connect the power supply to the drive motor. Disengage the feed pin and slowly apply power to check the function and speed of the clamshell.

2. Engage the feed pin to begin cutting. Use the power supply to control rotation speed. If chattering or vibration occurs, reduce the rotation speed. Use coolant to reduce friction. Replace dull tool bits as required.

3. Disengage the feed pin. Allow the machine to rotate at least two times without the feed activated to clear the cut of any burrs or hanging metal. Cut power from the power supply to stop cutting. Disconnect hoses. Back each tool block away from the clamshell as far back as possible.

Sever/Bevel In-line Pipe

1. Install two left or right-hand sever/bevel bits. With the tool bits touched off the workpiece high-point, turn the starwheel one revolution to back the tool bits slightly away from the workpiece. Make sure the starwheel is set at the initial contact position, as shown in Figure 2-8. Make sure the power supply is off. Connect the power supply to the drive motor. Disengage the feed pin and slowly apply power to check the function and speed of the clamshell.

2. Engage the feed pin to begin cutting. Use the power supply to control rotation speed. Machine the bevel to a sharp edge. If pipe is out of round, re-center the clamshell to the pipe and complete the bevel operation. If chattering or vibration occurs, reduce the rotation speed. Use coolant to reduce friction. Replace dull tool bits as required.

3. Disengage the feed pin. Allow the machine to rotate at least two times without the feed activated to clear the cut of any burrs or hanging metal. Cut power from the power supply to stop cutting. Disconnect hoses. Back each tool block away from the clamshell as far back as possible.

> ***NOTE:*** *Use the emergency-stop button on the hydraulic pendant control to immediately cut power to the machine.*

SECTION 3 - OPERATION

Gibs Adjustment

The tool blocks must move smoothly along the slides. The gibs may require adjustment due to wear or heavy use. Ensure that the gibs mare parallel to the slide for proper feed function.

> ***NOTE:*** *Disconnect the power supply before adjusting the gibs.*

1. Remove the two screws which holds the feed screw assembly to the slide. Pull the tool block and feed screw assembly out of the slide. See Figure 3-1.

> ***NOTE:*** *Inspect the gibs for burrs, sharp edges, or other damage that may prevent the tool block from sliding freely along the gibs. Replace gibs as necessary. Lubricate the gibs with a light coat of machine oil.*

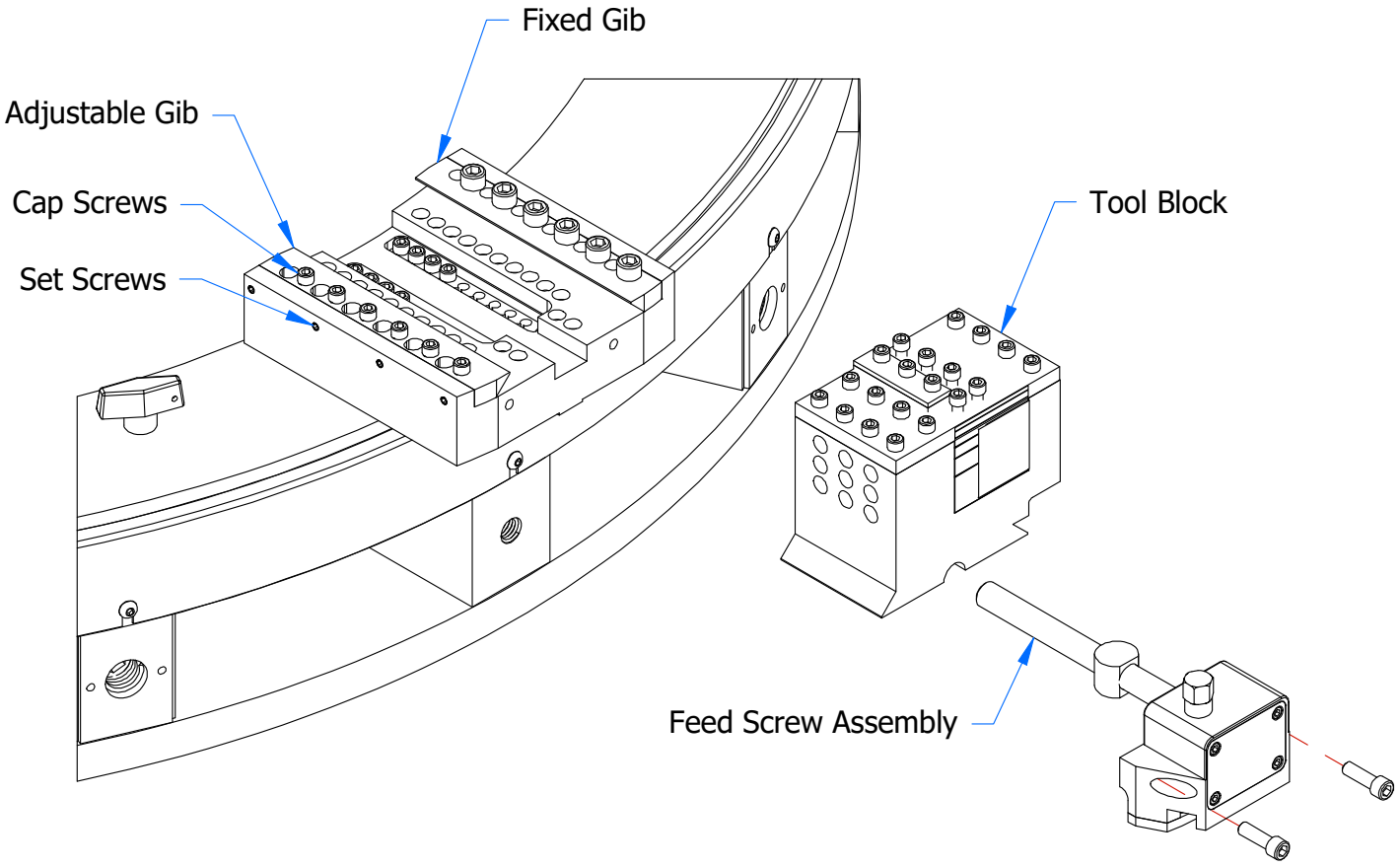


Figure 3-1 - Remove Feed Screw and Tool Block

SECTION 3 - OPERATION

2. Place the tool block only (without feed screw assembly) into the slide. Loosen cap screws on top of the adjustable gib. Turn the four set screws to move the adjustable gib. Move the tool block in the slide. There should be no slop and no binding. Continue to adjust set screws as necessary so that the tool block slides smoothly. The tool block must move easily with slight resistance and it must be the same along the entire length of the slide. It may be necessary to move the tool block by tapping with a deadblow hammer (included in the hand tool kit). Adjust set screws as necessary. When satisfied, tighten the cap screws on top of the adjustable gib. See Figure 3-2.

> ***NOTE:*** *If the tool block is too loose in the slide the cutting can chatter, if the block is too tight in the slide it will put excess wear on the feed screw assembly.*

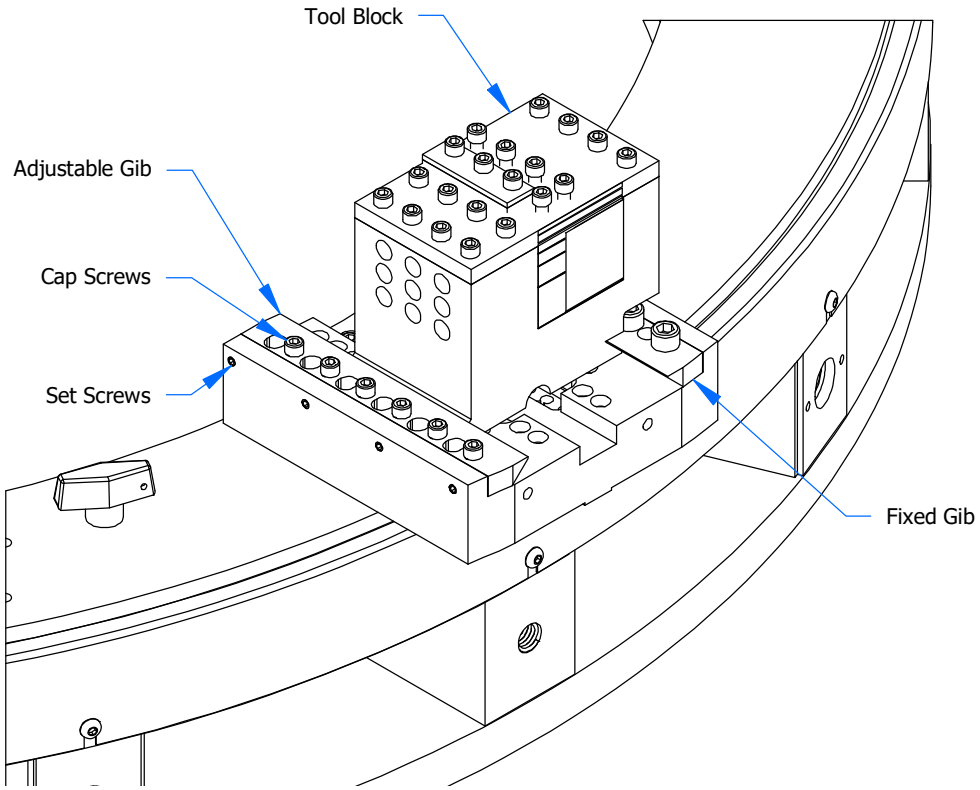


Figure 3-2 - Adjust Gibs

3. Remove the tool block from the slide. Reassemble the feed screw assembly with the tool block and return it to the slide; the reverse of removing it as seen in fig. 3-1. Use a 5/8 hex socket to move the tool block with the starwheel knob to check that the slide adjustment is smooth.

SECTION 4 - MAINTENANCE

Section 4 - Cleaning, Inspection and Maintenance

CAUTION: *The lock pins must be in place before disassembly of the clamshell at the split line. The ring gear may roll out of the clamshell body if the lock pins are not in place. This may result in damage to the machine or serious injury to the user.*

NOTE: *Cleaning and maintenance must be performed after each use to maintain the operation and life of the machine.*

1. After each use wipe down the entire machine with a clean rag. Remove metal shavings, oil, dirt and debris from the machine.
2. If the machine has been exposed to saltwater or used in other corrosive environments, rinse off the entire machine with freshwater immediately after use. Dry the machine as thoroughly as possible. It is important to remove all saltwater to prevent corrosion. The machine may require disassembly and thorough drying and lubrication of all components to remove all saltwater.
3. Check the machine for damage, loose or missing parts and excessive wear to components.
4. Inspect the tool blocks and feed pins. Make sure that all metal shavings, dirt and debris are removed. Make sure there is no damage to components and all parts are functional. Lubricate the feed screw with machine oil.
5. Check the locators and extensions for damage or wear. Make sure all fasteners are present and in good condition.