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External-Internal Casing Cutter (EICC) User's Manual



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Chapter 1

About the EICC

PURPOSE OF THIS MANUAL

This manual explains how to operate and maintain the EICC. It includes instructions for set-up, operation, and maintenance. It also contains parts lists, diagrams, and service information to help you order replacement parts and perform user-serviceable repairs.

Before operating the EICC, you should read through this manual and become familiar with all instructions.

HOW TO USE THE MANUAL

This manual is organized to help you quickly find the information you need. Each chapter describes a specific topic on using or maintaining your equipment.

Each page is designed with two columns. This large column on the inside of the page contains instructions and illustrations. Use these instructions to operate and maintain the equipment.

The narrower column on the outside contains additional information such as warnings, special notes, and definitions. Refer to it for safety notes and other information.

In This Chapter

PURPOSE OF THIS MANUAL

HOW TO USE THE MANUAL

SYMBOLS AND WARNINGS

MANUAL UPDATES AND
REVISION TRACKING

EQUIPMENT DESCRIPTION

Throughout this manual, refer to this column for warnings, cautions, and notices with supplementary information.

SYMBOLS AND WARNINGS

The following symbols are used throughout this manual to indicate special notes and warnings. They appear in the outside column of the page, next to the section they refer to. Make sure you understand what each symbol means, and follow all instructions for cautions and warnings.



WARNING

A WARNING alert with the safety alert symbol indicates a potentially hazardous situation that **could** result in **serious injury or death**.



CAUTION

A CAUTION alert with the safety alert symbol indicates a potentially hazardous situation that **could** result in **minor or moderate injury**.



CAUTION

A CAUTION alert with the damage alert symbol indicates a situation that **will** result in **damage to the equipment**.



IMPORTANT

An IMPORTANT alert with the damage alert symbol indicates a situation that **may** result in **damage to the equipment**.



This is the **safety alert symbol**. It is used to alert you to **potential personal injury hazards**. Obey all safety messages that follow this symbol to avoid possible injury or death.



This is the **equipment damage alert symbol**. It is used to alert you to **potential equipment damage situations**. Obey all messages that follow this symbol to avoid damaging the equipment or workpiece on which it is operating.

NOTE

This symbol indicates a user note. **Notes** provide additional information to supplement the instructions, or tips for easier operation.



NOTE

A NOTE provides supplementary information or operating tips.

MANUAL UPDATES AND REVISION TRACKING

Occasionally, we will update manuals with improved operation or maintenance procedures, or with corrections if necessary. When a manual is revised, we will update the revision history on the title page.

You may have factory service or upgrades performed on the equipment. If this service changes any technical data or operation and maintenance procedures, we will include a revised manual when we return the equipment to you.

Revision History

- October 2007—Originally printed as Special Project 02-078-MAN.
- March 2009—Rev. 0.
- August 2011—Rev. 1.

EQUIPMENT DESCRIPTION

The EICC is an accessory kit to the Low Clearance Split Frame (LCSF) machine used to cut off and chamfer production pipe below a wellhead. The EICC internal attachment mounts on the LCSF with a bridge adapter. A graduated drive tube secured in the bridge adapter allows for precise positioning of the cutting tools mounted on the rotating chuck head. Three clamp legs clamp and secure the drive tube inside the casing.

Custom wellhead adapters are available as an option for the EICC. The custom wellhead adapters provide a more solid base upon which to make precise cuts.

Current versions of E.H. Wachs Company manuals are also available in PDF format. You can request an electronic copy of this manual by emailing customer service at sales@ehwachs.com.

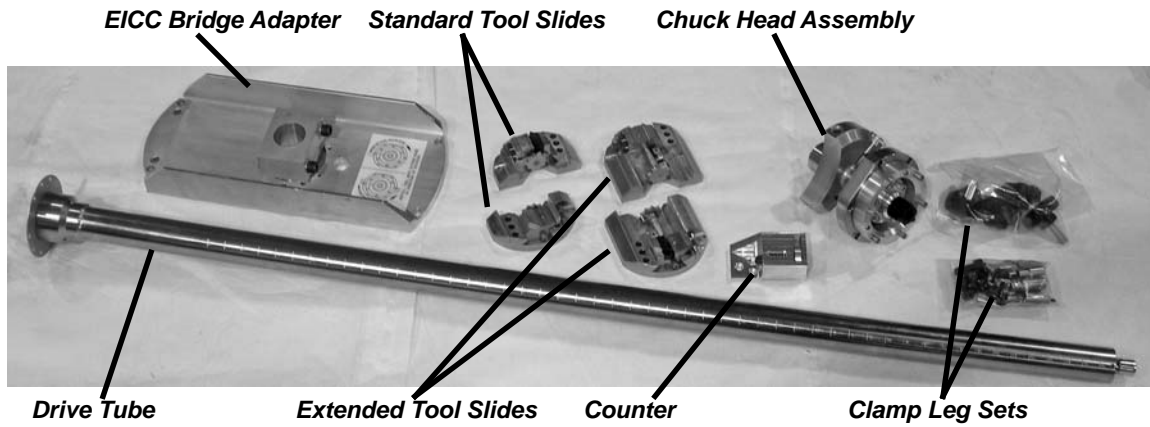


Figure 1-1. The EICC internal attachment kit is shown disassembled above. Note that the chuck head assembly is normally attached to the drive tube. This kit shows both the standard and extended slides.

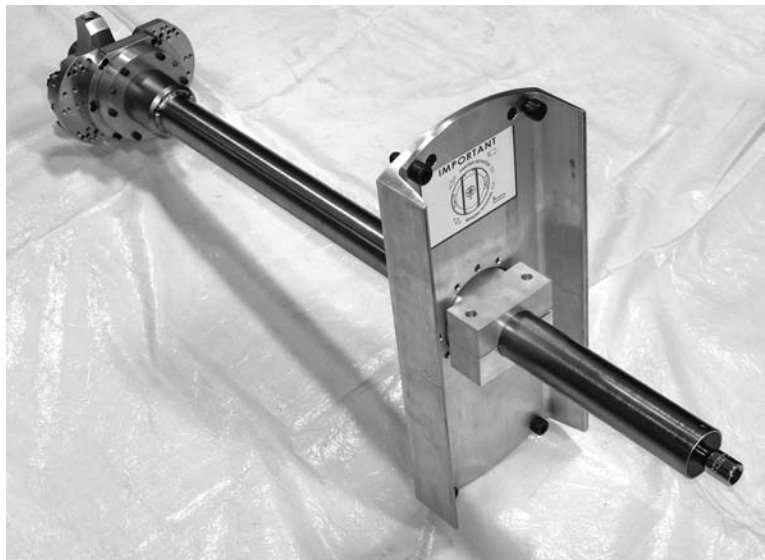


Figure 1-2. The EICC internal attachment is shown assembled above.



Figure 1-3. The EICC drive tube is graduated in inches to allow for quick, accurate setup. The numbers indicate how far the cut line is below the surface of the wellhead.



Cam Counter

Bridge Collar

Figure 1-4. The EICC bridge mounts on the LCSF rotating ring and secures the EICC drive tube in the bridge collar. Custom bridge sizes are available.

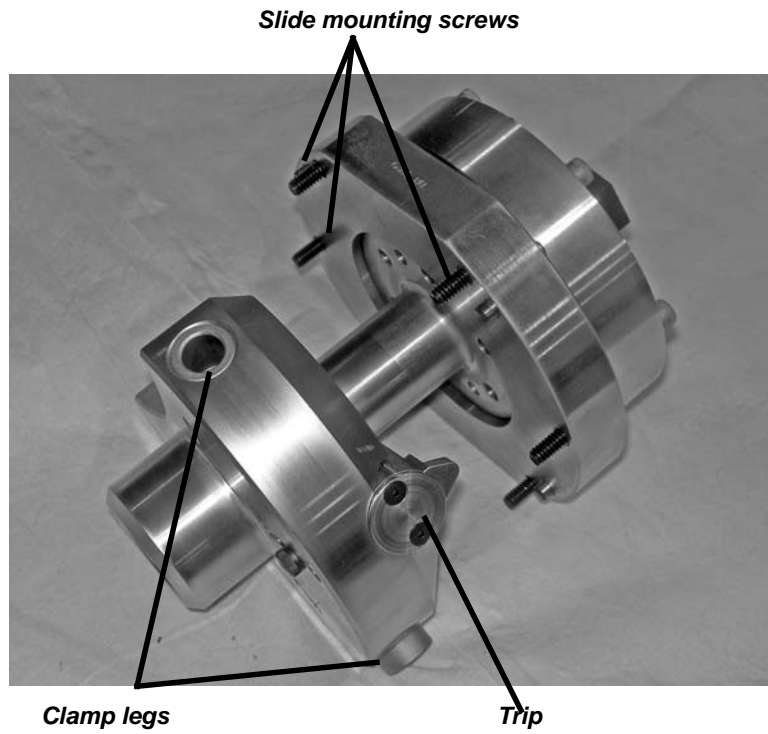


Figure 1-5. The clamp legs and tool slides mount on the EICC chuck head, shown above.

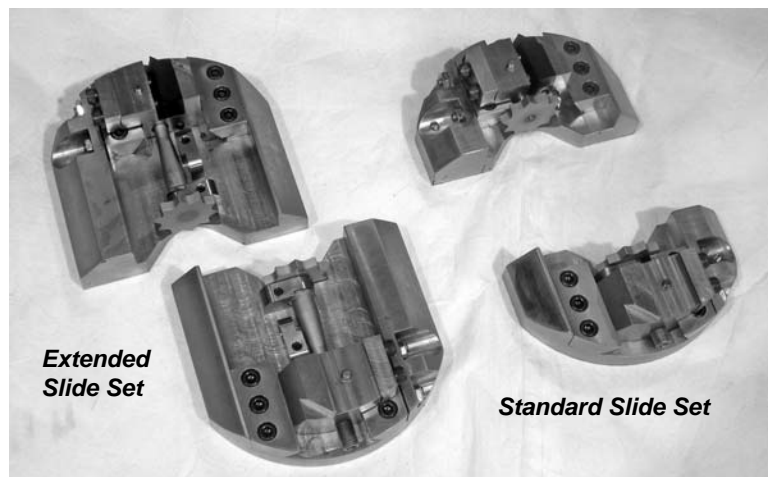


Figure 1-6. The tool slides secure the tooling used to cut the internal pipe.

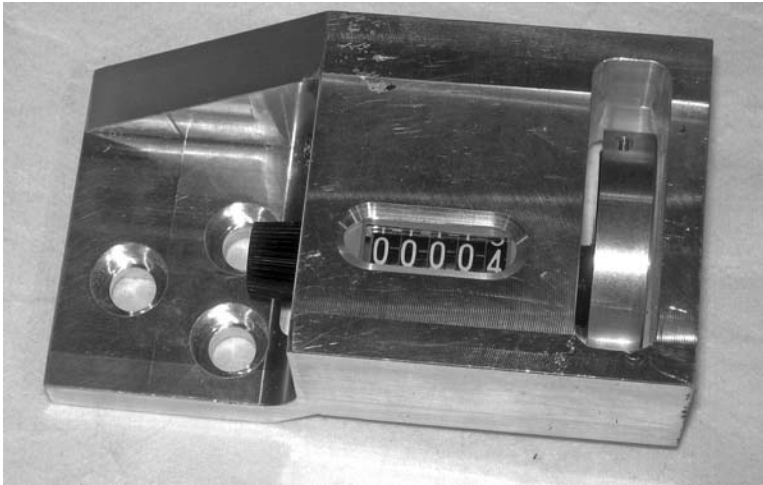


Figure 1-7. The counter mounts to the trip location on the LCSF and is used to track revolutions of the chuck head.



Figure 1-8. The EICC internal attachment comes in a durable carrying case.



Figure 1-9. The wellhead adapter holds the LCSF in the proper vertical position while the EICC is centered inside the production casing.



Figure 1-10. The EICC clamp leg sets are shown.

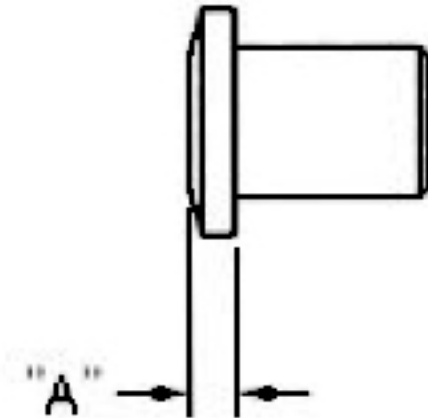


Figure 1-11. The table and figure show the size ranges for the standard range chuck legs.

Table 1: Standard Range Chuck Leg

Casing O.D.	Part Number	DIMA
7" (175 mm)	60-1066-00	.150" (3.8 mm)
7 5/8" (191 mm)	60-1066-01	.500" (12.7 mm)
8 5/8" (212 mm)	60-1066-02	.940" (23.9 mm)
9 5/8" (241 mm)	60-1066-03	1.450" (36.8 mm)

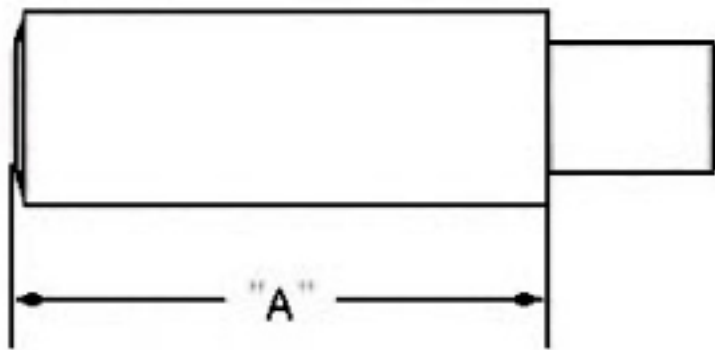


Figure 1-12. The table and figure show the size ranges for the extended range chuck legs.

Table 2: Extended Range Chuck Leg

Casing O.D.	Part Number	DIM A
10 3/4" (269 mm)	60-1066-04	2.050" (52.1 mm)
11 3/4" (294 mm)	60-1066-05	2.510" (63.8 mm)
13 3/8" (334 mm)	60-1066-06	3.320" (84.3 mm)

HAND TOOLS

Table 3: EICC Kit Hand Tools

Description	Part Number
1/8" T handle hex wrench	90-800-39
Hex wrench cluster	90-800-40
1/2" drive ratchet	90-800-63
7/16" bolt-through wrench	90-800-83

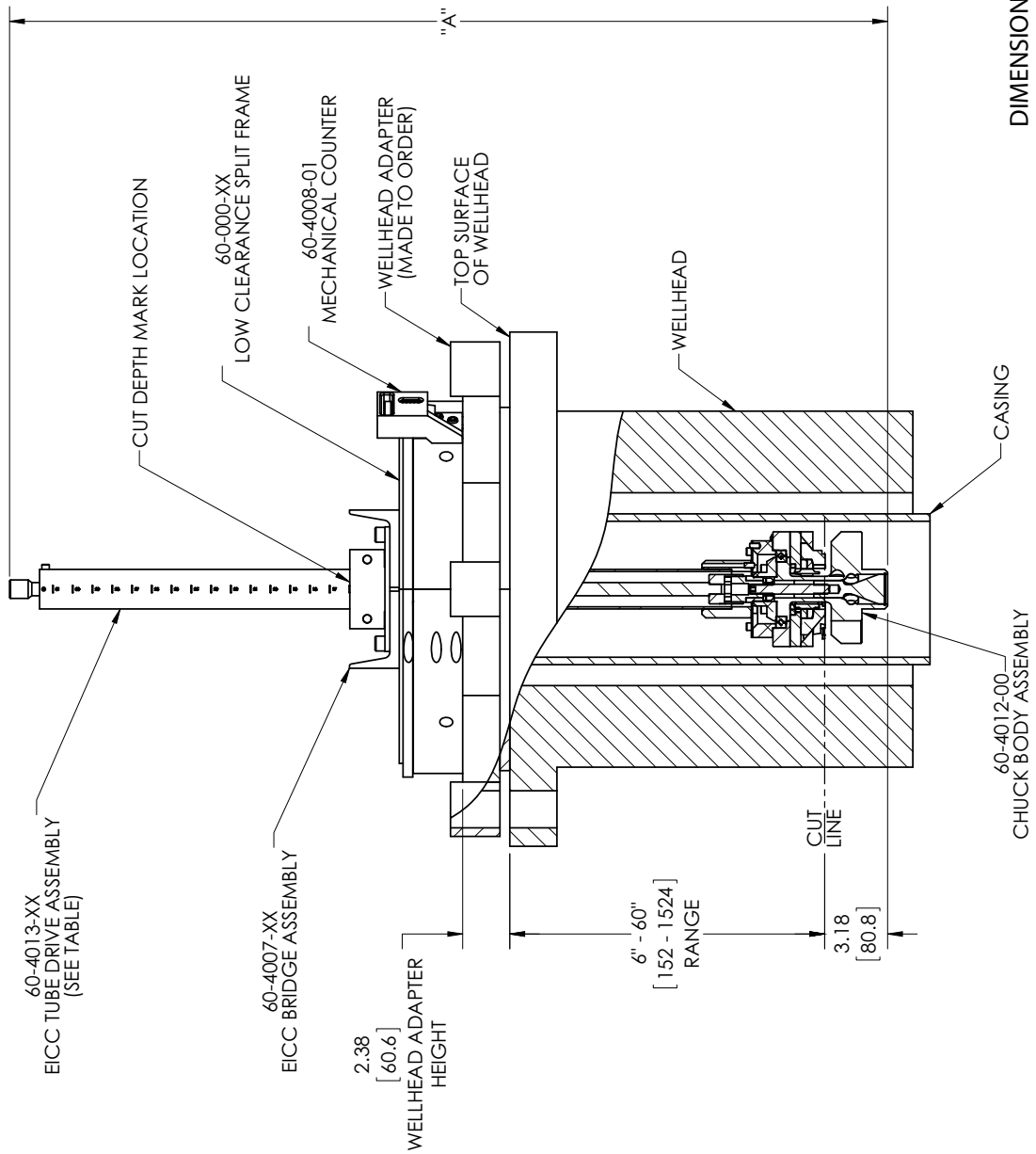
OPERATING ENVELOPE

The following drawings illustrate the dimensions and operating envelopes of the EICC.

Operating Dimensions

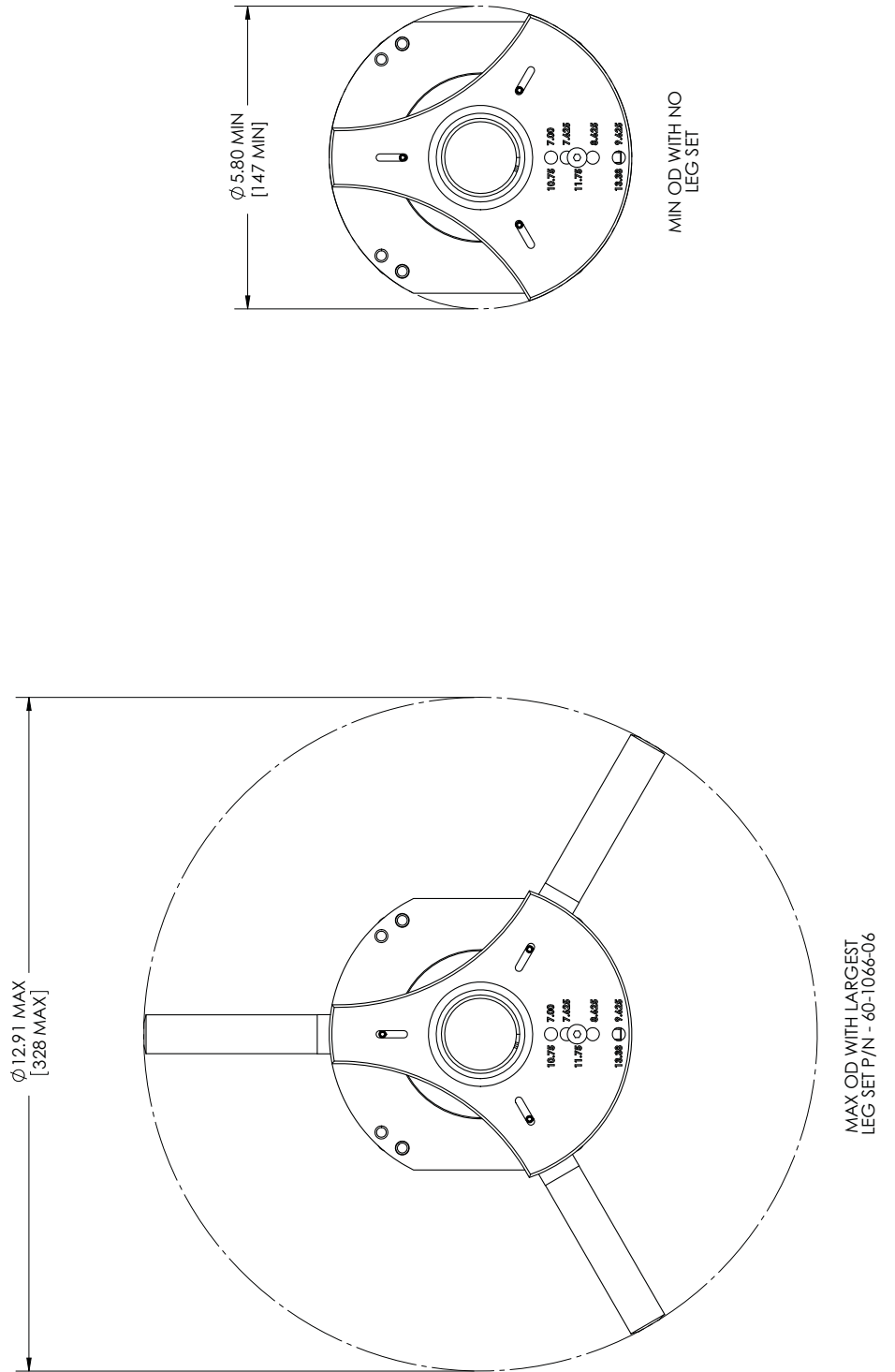
-TABLE-

PART NO.	DIM. "A"
60-4013-31	44.41 [1128.1]
60-4013-36	49.89 [1267.3]
60-4013-42	55.89 [1419.7]
60-4013-48	61.89 [1572.1]
60-4013-54	67.89 [1724.5]
60-4013-56	69.89 [1775.3]
60-4013-60	73.89 [1876.9]

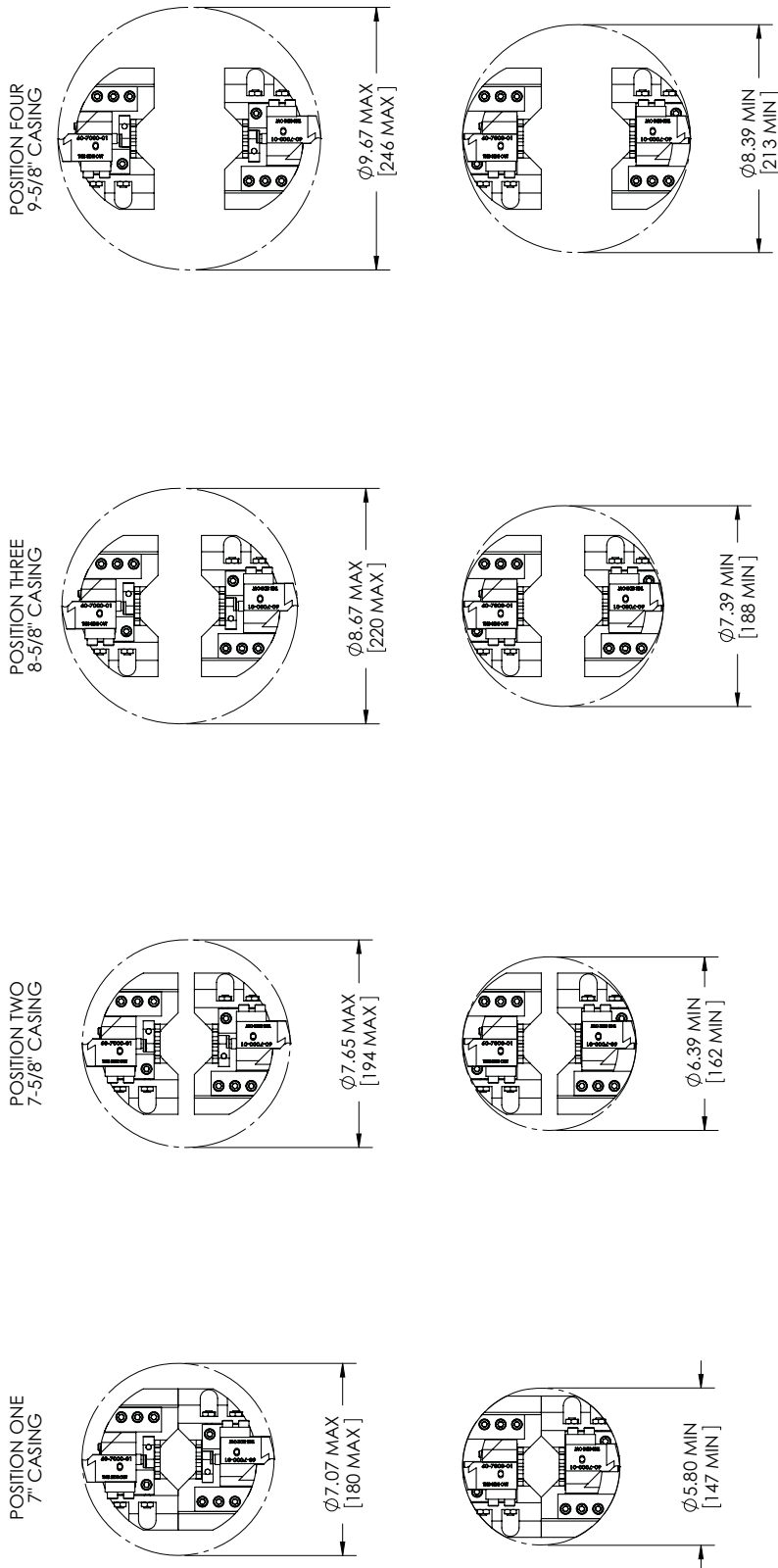


DIMENSIONS IN BRACKETS ARE MILLIMETERS

Clamp Head Envelope

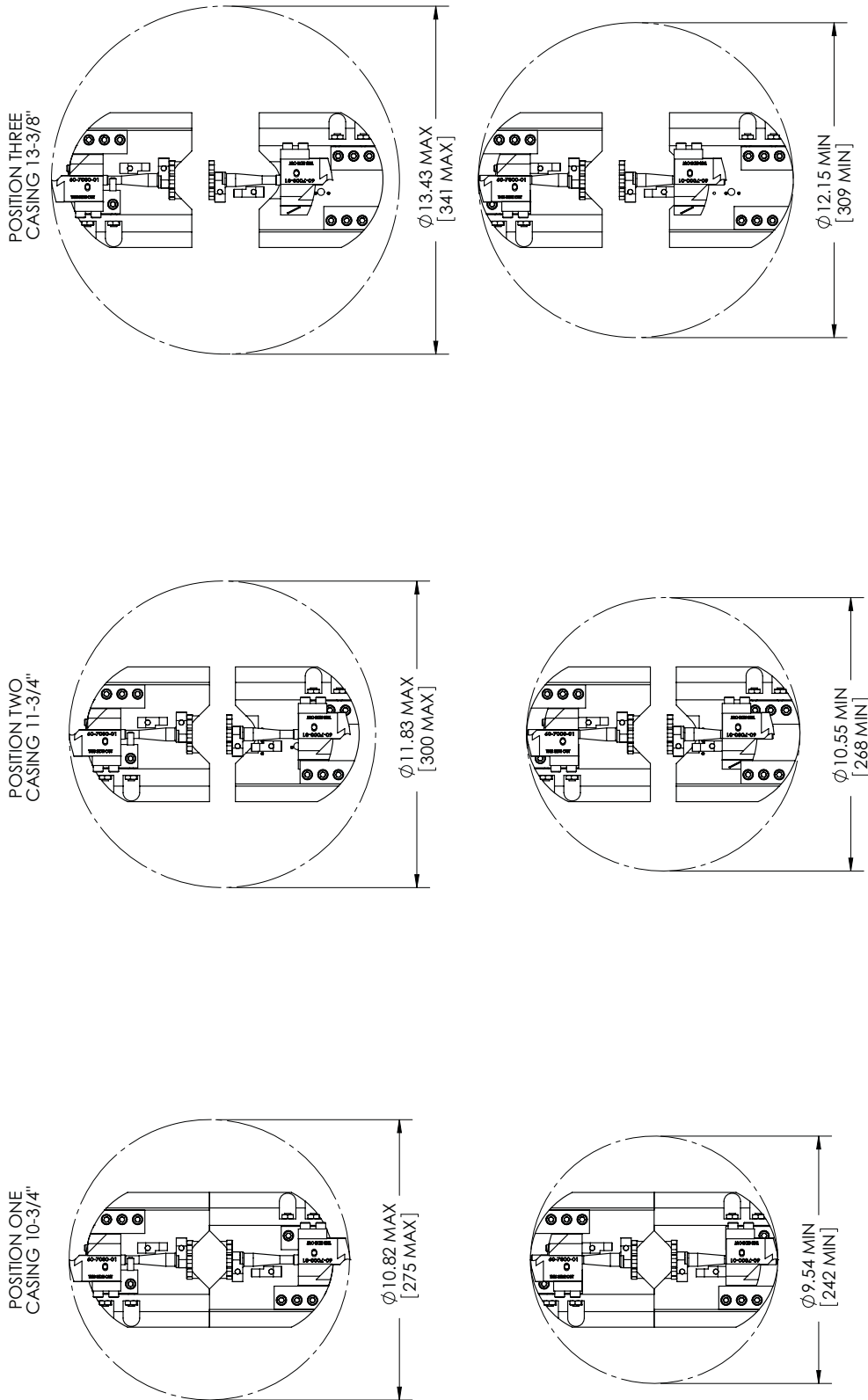


Standard Slide Operating Envelope



NOTE:
 1. $.63$ " [16 mm] RADIAL TRAVEL PER SLIDE - ($\phi 1.26$ [$\phi 32$ mm])
 2. FEED RATE: .00417"/REV [1.058mm/REV]

Extended Slide Operating Envelope



- NOTES:
1. .63" [16mm] RADIAL TRAVEL PER SLIDE - ($\phi 1.26$ [$\phi 32$ mm])
 2. FEED RATE: .0047"/REV [1.058MM/REV]

Chapter 2

Safety

.....

E.H. Wachs takes great pride in designing and manufacturing safe, high-quality products. We make user safety a top priority in the design of all our products.

Read this chapter carefully before operating the external-internal casing cutter. It contains important safety instructions and recommendations.

FULL SAFETY INSTRUCTIONS AND GUIDELINES ARE IN THE MANUAL FOR YOUR LOW CLEARANCE SPLIT FRAME MACHINE. Make sure you read and understand all safety information in the LCSF manual.

SAFE OPERATING GUIDELINES

Follow these guidelines for safe operation of all E.H. Wachs equipment.

- **READ THE OPERATING MANUAL.** Make sure you understand all setup and operating instructions before you begin. Keep this manual with the machine.
- **INSPECT MACHINE AND ACCESSORIES BEFORE USE.** Before starting the machine, look for loose bolts or nuts, leaking lubricant, rusted components, and any other physical conditions that may affect operation. Properly maintaining the machine can greatly decrease the chances for injury.
- **ALWAYS READ STICKERS AND LABELS.** Make sure all labels and stickers are in place, clearly legible, and in good

In This Chapter

SAFE OPERATING GUIDELINES
SAFE OPERATION OF THE EICC
SAFETY LABELS



Look for this symbol throughout the manual. It indicates a personal injury hazard.

condition. Refer to “Safety Labels” later in this chapter for label locations on the machine. Replace any damaged or missing safety labels; see the ordering information at the end of this manual.

- **KEEP CLEAR OF MOVING PARTS.** Keep hands, arms, and fingers clear of all rotating or moving parts. Always turn the machine off and disconnect the power source before doing any adjustments or service.
- **SECURE LOOSE CLOTHING AND JEWELRY.** Secure or remove loose-fitting clothing and jewelry, and securely bind long hair, to prevent them from getting caught in moving parts of the machine.
- **FOLLOW SAFE PROCEDURES FOR HANDLING LUBRICANTS.** Refer to the manufacturer’s instructions and the Material Safety Data Sheets.

Safe Operating Environment

- Do not use this equipment in a potentially explosive atmosphere. Fire or explosion could result, with the risk of serious injury or death.
- Provide adequate lighting to use the equipment, in accordance with worksite or local regulations.
- **KEEP WORK AREA CLEAR.** Keep all clutter and nonessential materials out of the work area. Only people directly involved with the work being performed should have access to the area.

Operating and Maintenance Safety

- This equipment is to be operated and maintained only by qualified, trained personnel.
- Make sure the equipment is stable when attached to the workpiece for the operation. Ensuring stability of the installed tool is the responsibility of the operator.
- Make sure the workpiece is supported adequately for installation of the equipment. This includes supporting any workpiece “fall-off” section when severing the workpiece. Ensuring support of the workpiece is the responsibility of the operator.
- Tooling on any cutting equipment—including lathe tools, saw blades, milling tools, etc.—may get very hot. Do not touch tooling until you have made sure it is cool enough to handle.

- Wear gloves when removing or cleaning up chips and cutting debris. Chips can be very sharp and cause cuts.
- Before performing any service on the equipment, disconnect the power source. Follow all lock-out/tag-out procedures required at the worksite.

Safety Alerts in This Manual

The following alerts are used throughout this manual to indicate operator safety hazards. In all cases, these alerts include a notice describing the hazard and the means to avoid or reduce risk. Carefully read all safety alerts.



This icon is displayed with any safety alert that indicates a personal injury hazard.

WARNING

This safety alert, with the personal injury hazard symbol, indicates a potentially hazardous situation that, if not avoided, **could** result in **death or serious injury**.

CAUTION

This safety alert, with the personal injury hazard symbol, indicates a potentially hazardous situation that, if not avoided, **could** result in **minor or moderate injury**.

Protective Equipment Requirements

Protective Clothing

Wear safety shoes when operating or servicing the equipment. Serious injury could result from dropping the machine or its components.



NOTE

Gloves should be worn when cleaning up chips and other cutting debris. Chips can be very sharp and can cause serious cuts. **Do not wear gloves when the machine is operating.**

Do not wear gloves while operating the machine. Gloves can become entangled in moving parts, resulting in serious injury. Gloves may be worn when setting up the machine or cleaning up after the operation, but take them off when operating the machine.

Eye Protection

Always wear impact-resistant eye protection while operating or working near this equipment.

For additional information on eye and face protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.133., Eye and Face Protection and American National Standards Institute, ANSI Z87.1, Occupational and Educational Eye and Face Protection.

Hearing Protection

This equipment can produce noise levels above 80 dB. Hearing protection is required when operating the equipment. The operation of other tools and equipment in the area, reflective surfaces, process noises, and resonant structures can increase the noise level in the area.

For additional information on hearing protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.95, Occupational Noise Exposure and ANSI S12.6 Hearing Protectors.

SAFE OPERATION OF THE EICC

Refer to “Safe Operation of the LCSF” in Chapter 2 of the *Low Clearance Split Frame User’s Manual* for full safety guidelines and instructions.

Intended Uses

The EICC is an accessory kit to the low clearance split frame (LCSF) machine used to cut off and chamfer production pipe below a wellhead. The EICC internal attachment mounts on the LCSF with a bridge adapter. A graduated drive tube secured in the bridge adapter allows for precise positioning of the cutting tools mounted on the rotating

chuck head. Three clamp legs clamp and secure the drive tube inside the casing.

Make sure to follow all safety guidelines and procedures required for machining operations at the work site, including personal protective equipment (PPE). Do not use the LCSF in a manner that violates these guidelines.

Proper Use of the EICC

- The LCSF and EICC should only be used by trained, qualified operators.
- The workpiece must be within the operating capacity of the EICC and LCSF model you are using. See operating envelope information and drawings in Chapter 1.
- Make sure the operating environment allows you to mount the machine securely and squarely on the workpiece.
- Make sure there is adequate clearance around workpiece and the LCSF/EICC combination to operate the machine controls as described in the operating instructions.

Misuse

- Do not attempt to mount or operate the LCSF and EICC on non-cylindrical workpieces.
- Do not attempt to mount or operate the LCSF and EICC on any workpiece to which the equipment cannot be securely mounted.
- Do not attempt to mount or operate the LCSF and EICC on any workpiece that is not stable enough to hold the equipment.
- Do not disable any safety feature of the EICC or LCSF, or remove any safety labeling. Replace worn or damaged safety labels immediately. (See “Safety Labels” later in this chapter.)

Potential Hazards

See the “Potential Hazards” section in Chapter 2 of the user’s manual for your low clearance split frame machine. Follow all guidelines for avoiding hazards associated with operating the machine.

Safe Lifting and Handling

- Machines or assemblies over 40 lb (18 kg) must be lifted by two people or a lifting device. Depending on size, some EICC models may weigh more than 40 lb.
- It is the responsibility of the end user to determine whether a machine or assembly can be lifted by two or more people. A lifting device is recommended for machines or assemblies that cannot be handled easily by two people.
- It is **not** recommended that you lift the LCSF with the EICC attached. The assembled combination may not be balanced to enable safe lifting.

Machine Weights

Table 1 lists the weights for each EICC component.

Table 1: EICC Components Weights

Component	Weight
Drive tube with standard slides	35.8 lb (16.3 kg)
Drive tube with extended slides	39.8 lb (18.1 kg)
Bridge assembly—10” EICC	10 lb (4.5 kg)
Bridge assembly—10” EICC	11 lb (5.0 kg)
Bridge assembly—10” EICC	12 lb (5.5 kg)
Bridge assembly—10” EICC	13 lb (5.9 kg)
Bridge assembly—10” EICC	16lb (7.3 kg)

SAFETY LABELS

There are no safety labels on the EICC accessory components. Refer to the safety guidelines in the LCSF manual, and observe all safety labeling on the LCSF.

Chapter 3

Operating Instructions

.....

The EICC is an accessory to the Low Clearance Split Frame (LCSF) that allows the operator to cut and bevel pipe that is inside an external casing.

Read and familiarize yourself with the safety, setup, and operation procedures in the LCSF manual.

EXTERNAL CUTTING OF THE SURFACE CASING

When mounting the LCSF directly on a wellhead adapter, you must have a front drive pinion housing mounted on the LCSF. If necessary, refer to the LCSF user's manual.

Mounting the LCSF

1. Insert the frame locking detent pins into the LCSF. These pins prevent the machine halves from separating when the machine splits.

In This Chapter

EXTERNAL CUTTING OF THE SURFACE CASING

AFTER THE CUT

SEVERING THE PRODUCTION CASING

BEVEL TOOLING INSTALLATION AND ADJUSTMENT

CUTTING THE CHAMFER / BEVEL



NOTE

If you will not be able to lift the LCSF from the wellhead adapter to remove the pins, you may need to install it without the pins inserted.



NOTE

If the open end of the surface casing is accessible, you can install the LCSF over the end without splitting it.



CAUTION

Smaller LCSF machines may be lifted by hand by two people. Use of a lifting device is recommended, especially with larger LCSFs. Improper lifting may result in injury and/or equipment damage.



NOTE

Refer to the LCSF user manual for detailed instructions on mounting and centering the machine.

2. Install the clamp legs and clamp leg extensions appropriate for the casing being cut.
3. Loosen the frame locking screws and split the LCSF.
4. Place the halves of the machine around the casing to be cut.



Figure 3-1. Attach the LCSF around the pipe as shown.

5. Align the dowel pins with the dowel pin holes, and then press the halves of the LCSF together.
6. Partially tighten one of the frame locking screws to secure the machine, and then tighten all frame locking screws completely.
7. Lift the LCSF off the wellhead adapter a few inches and remove the frame locking detent pins.
8. Starting at one clamp leg location, tighten the clamp leg screw until the gap between the split frame ring and casing at the opposing clamp pad location is approximately equal to the adjusted one.
9. Snug the clamp leg opposite of the previously adjusted clamp leg.
10. Move to the other two clamp pads and snug them. At this point the machine should be fairly centered.
11. Measure the distance between the LCSF ring and casing at each clamp position using the provided square.

The four measurements should be approximately equal.

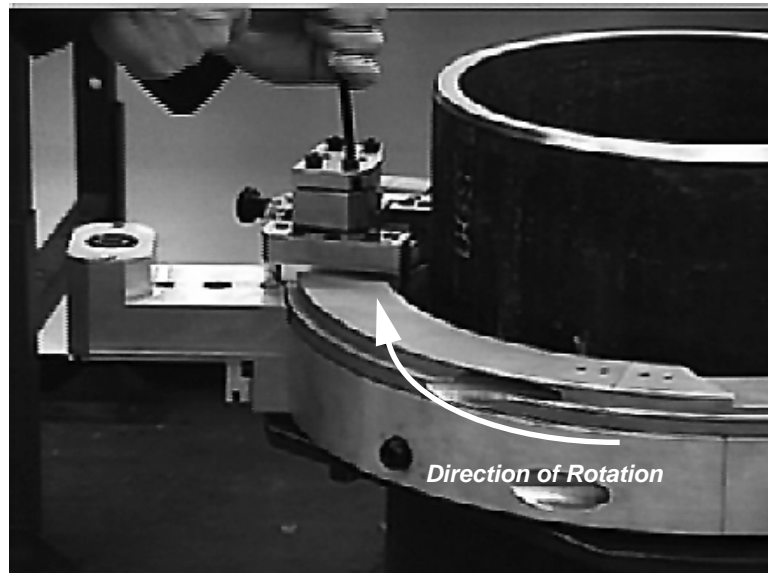


Figure 3-2. Square the LCSF on the casing before proceeding.

12. Once the machine is centered to the casing, tighten the four clamp pad locking screws completely.

Installing the Tooling

1. Insert the parting blade through the parting tool slide. The cutting edge must face clockwise.



2. Measure the casing wall thickness and add 1/8". Advance the tool slide until the measurement between the leading edge of the slide and the scribed red line is equal to your measurement.
3. Push the parting blade forward until it touches the casing wall. Tighten the four corner bolts on the tool slide plate to secure the blade.
4. Turn the starwheel clockwise three complete revolutions to retract the tool slide.
5. Repeat steps 1 - 4 for the second parting or beveling tool in the beveling tool slide.

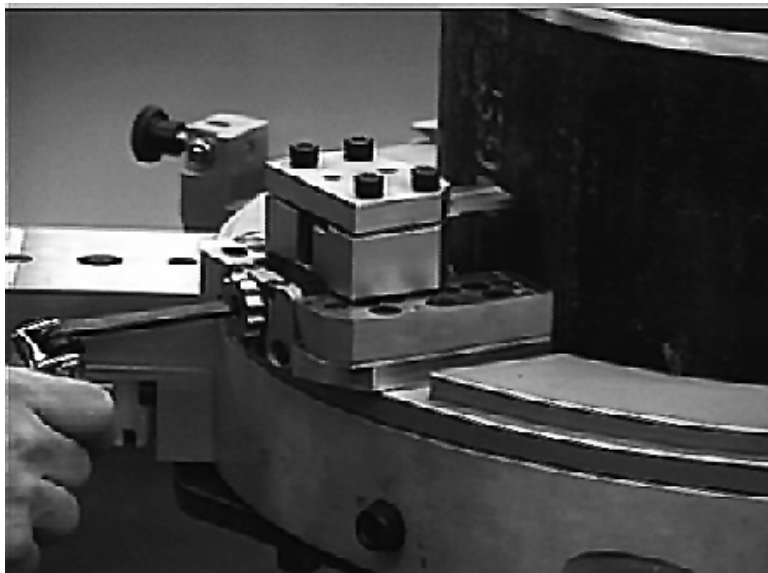


Figure 3-3. Adjust the starwheel as shown.

Time the Starwheels

1. Rotate the starwheel counterclockwise one half rotation to remove play and to align a point of the starwheel with the scribed red line.
2. Repeat this procedure for the second tool slide.

Mounting the Drive Motor

1. Install the drive motor using the captivated screws on motor mounting flange.
2. The drive hex on the drive motor must insert fully into the socket in the pinion housing. If necessary, turn the rotating frame slightly until the drive hex seats itself properly.
3. Tighten the two screws to secure the drive motor.



NOTE

Air motors can be installed in several different positions. Mount it in the most convenient position for operation.



Figure 3-4. Secure the air motor using the mounting screws as shown.

Cutting the Surface Casing

1. Connect the motor air line to a clean, dry air supply line, and adjust as needed.
2. Engage the starwheel trip by pushing the knob inward (older model LCSFs) or pulling the trip lever out (newer models).



NOTE

The LCSF can also use an electric or hydraulic drive. Connect appropriate power to the drive motor..

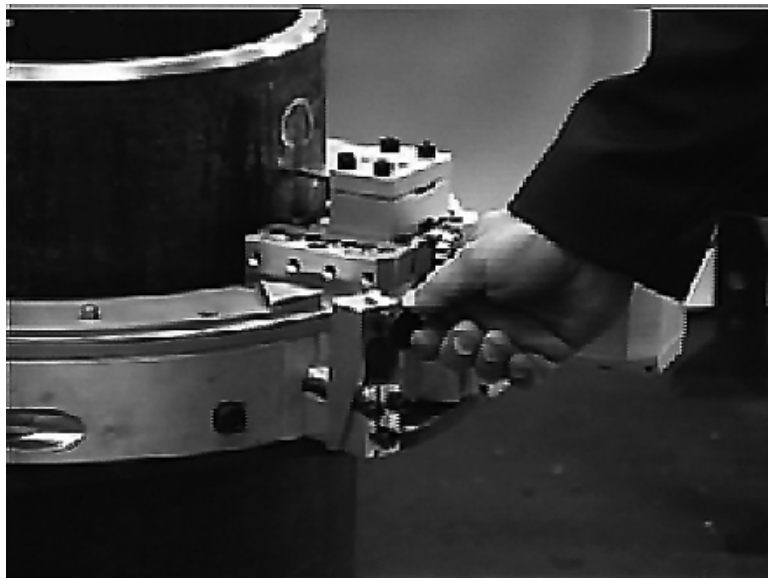


Figure 3-5. Begin the cut by engaging the starwheel trip.

3. Set the drive motor in the forward direction, and engage the air motor. Operate the machine slowly through one rotation to verify the trip advances both starwheels.
4. Increase machine speed to the desired operating speed.
5. Operate the machine until the casing is cut through. Apply liberal amounts of coolant for the duration of the machining process.

AFTER THE CUT

1. Remove the drive motor.
2. Remove the starwheel trip assembly.
3. Retract the tool slides by turning the starwheels clockwise.
4. Remove the tool slides from the LCSF.
5. Support the LCSF. Attach a lifting device if necessary.
6. Loosen the clamp pads.
7. Remove the split frame from the wellhead and casing by lifting it over the cut casing. Do not split the frame assembly.

SEVERING THE PRODUCTION CASING

Follow the steps below if you are doing an internal cutting operation with no surface or outer casing.

Preparing the Wellhead

The casing should be cleared of mud and debris before inserting the EICC internal attachment into the wellhead. Submerging the EICC internal attachment in mud can damage the machine.

Use a siphon hose to remove mud and sludge until the cut line is no longer submerged.



WARNING

Make sure the machine is supported before loosening the clamp pads.



CAUTION

Operating the EICC without clearing the wellhead can cause severe damage to the machine.



NOTE

The standard internal part / bevel module will sever casing with O.D. from 7" (175 mm) to 9-5/8" (241 mm). The extended range kit will part / bevel casing with O.D. between 10-3/4" (269 mm) and 13-3/8" (335 mm).

Mounting the Internal EICC Attachment

1. Install the supplied wellhead adapter over the wellhead and secure to the wellhead with four 1-1/2" (38 mm) threaded rods and eight 1-1/2" (38 mm) nuts and washers.



Figure 3-6. The wellhead adapter mounts on the wellhead as shown.

2. Install the four clamp leg extensions required to clamp on the O.D. of the wellhead.



Figure 3-7. Install the clamp legs on the LCSF.

3. Place the split frame over the wellhead adapter and set it on the four gusset pads. The LCSF must sit squarely on the four gusset pads on the wellhead adapter. It may be necessary to remove some of the plastic plugs on the lower face of the LCSF rotating ring for the frame to sit squarely on the gusset pads.

4. Remove the safety screw from the top of the drive tube. This screw prevents the module from falling into the casing.
5. Select the appropriate drive tube. The drive tube must be at least as long as the depth of cut. Any longer drive tube will work, but the shortest one appropriate for the required depth is recommended. The following drive tube lengths are available:

Table 1: Drive Tubes

Nominal Tube Length	Part No.
31"	60-4013-31
36	60-4013-36
42	60-4013-42
48	60-4013-48
54	60-4013-54
56	60-4013-56
60	60-4013-60

6. Insert the top of the drive tube up through the bottom of the bridge collar. Align the bridge collar at the desired depth mark.



Figure 3-8. Use the depth marks on the drive tube to align the internal cutting attachment.

**NOTE**

Depth of cut marks are stamped on the side of the drive tube. These measure the depth of the cut below the top surface of the wellhead.

7. Tighten the bridge collar clamp screws.



Figure 3-9. Align the bridge collar at the desired depth mark, and then tighten the bridge collar clamp screws.

8. Reinstall the safety screw into the top of the drive tube. This screw prevents the module from falling into the casing.

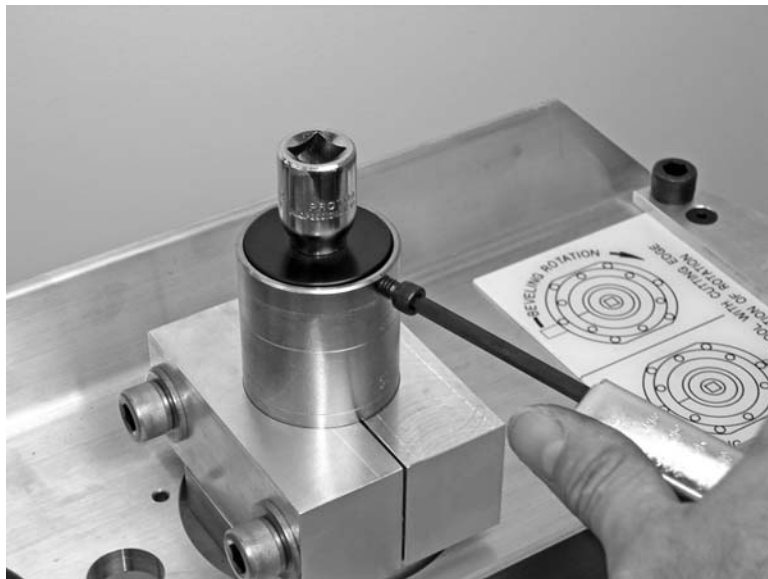


Figure 3-10. Reinstall the safety screw on the end of the drive tube.

Install the Tool Slides and Trip

1. Mount the tool slides in the proper locating dowel pin holes for casing O.D. being severed. Refer to Figure 3-12 for standard range slides and Figure 3-13 for extended range slides.

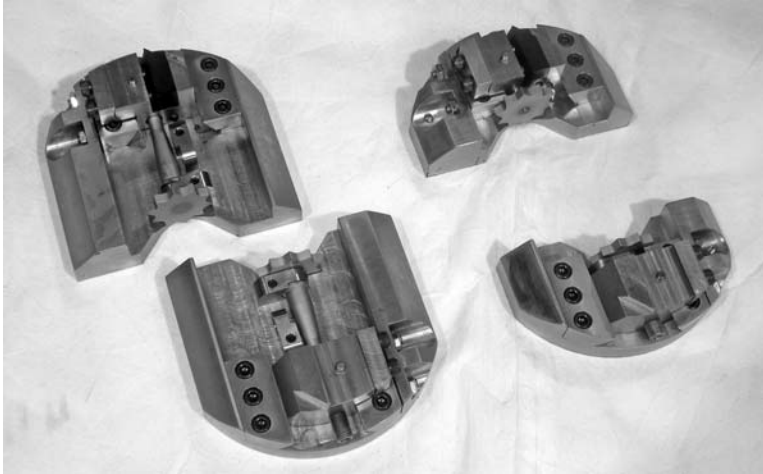


Figure 3-11. Shown are the extended tool slides (left), and the standard tool slides (right).



Figure 3-12. The standard tool slide mounting locations are shown above. Insert the mounting dowel pins into the holes corresponding to the production casing size (in inches) you are cutting.

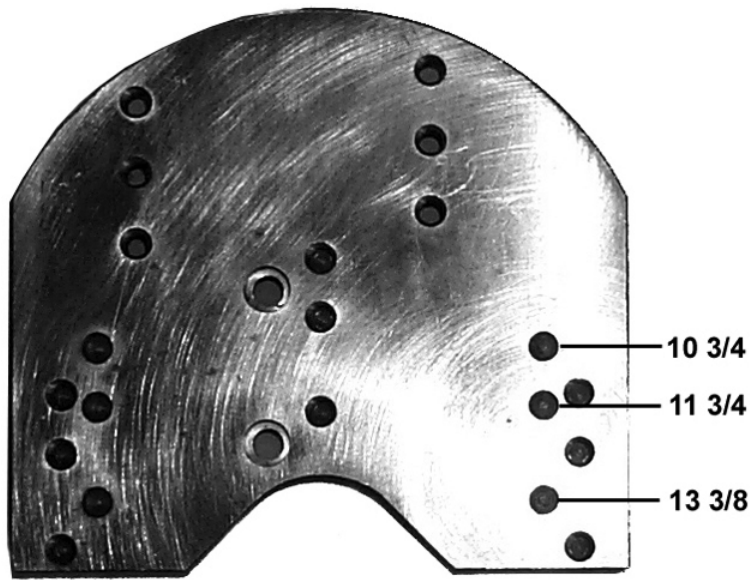


Figure 3-13. The extended tool slide mounting locations are shown above. Insert the mounting dowel pins into the holes corresponding to the production casing size (in inches) you are cutting.

2. Insert tool slides onto the rotating head tool slide dowel pins.

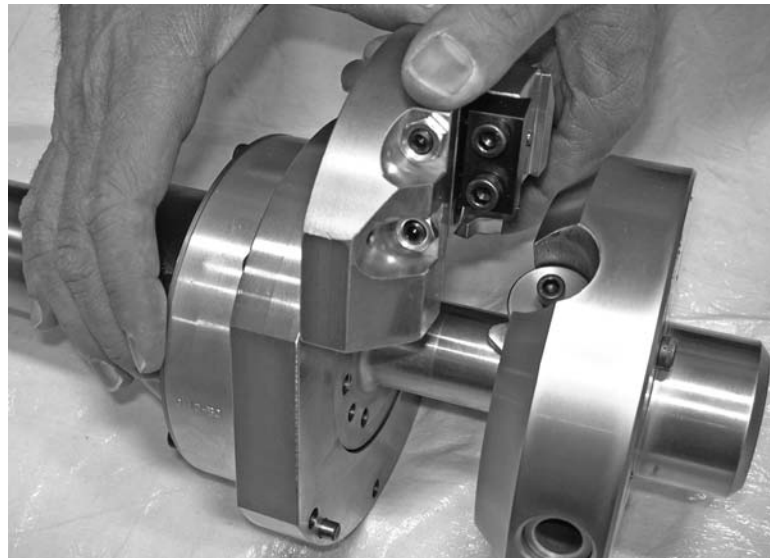


Figure 3-14. Mount the tool slides to the rotating head as shown.

3. Tighten the three captivated screws for each tool slide to secure them to the rotating head.

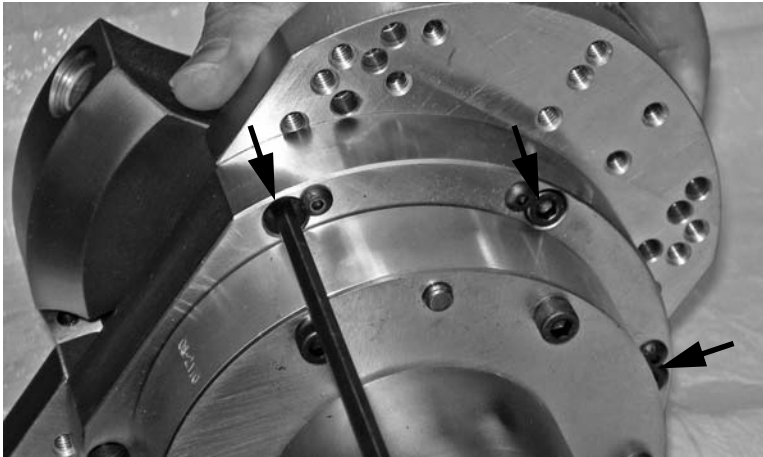


Figure 3-15. Tighten the tool slide screws as shown.

4. Mount the trip in the correct location for the casing size. Five trip location holes marked with casing O.D. size are located on the face of the chuck body.



Trip position screw

Figure 3-16. Mount the trip in the location appropriate for the casing size. Measurements shown are in inches.

5. To move the trip, loosen and remove the trip position screw.
6. To set the trip position, insert the trip position screw in the appropriate location hole, and align the trip so that you can insert the screw. Tighten the screw securely.

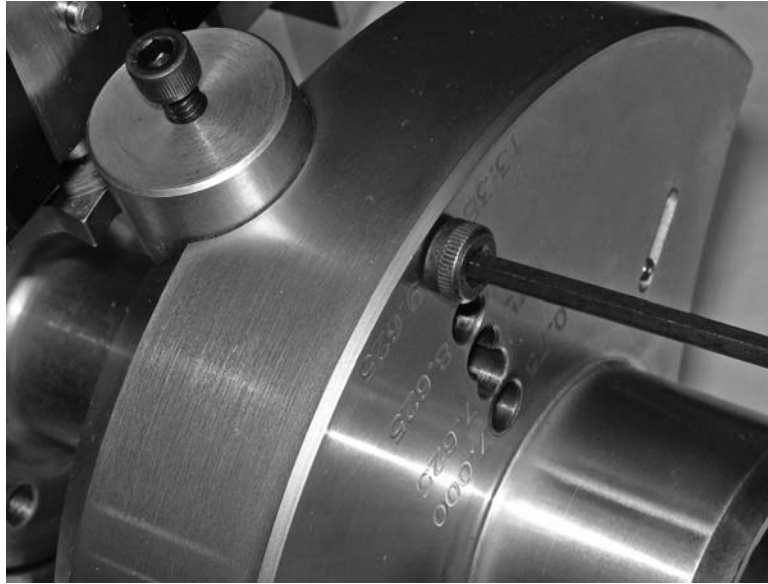


Figure 3-17. Securely tighten the trip position screw.



Figure 3-18. Verify that the trip pin contacts the star-wheel as shown.

7. Tighten the screws to secure the trip.

Installing Chuck Legs

1. Select the appropriate set of 3 chuck legs for the size of the casing you are cutting.
2. Insert the chuck legs in the chuck body housing.

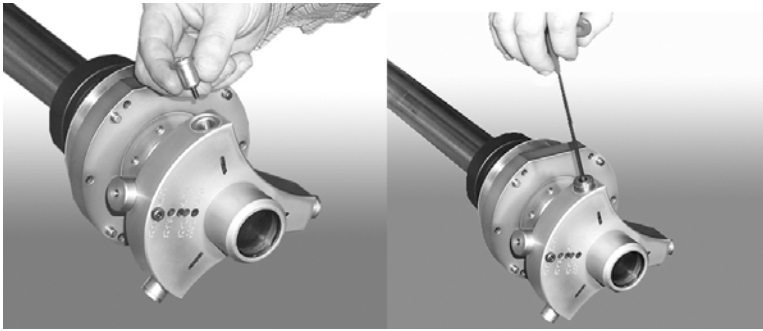


Figure 3-19. Insert the three chuck legs into the chuck body housing.

3. Tighten each chuck leg with supplied hex driver.

Installing Tooling

Combination Part / Bevel Tool Slide

Refer to the rotation direction label on the EICC bridge when installing tooling.

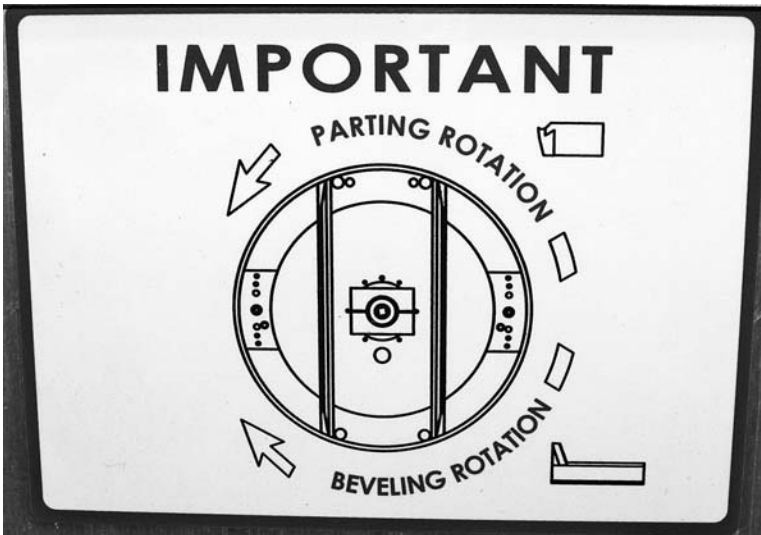


Figure 3-20. Check the rotation decal to verify proper tooling alignment.

1. Lay the module on its side to access the tool slide to install tooling.



NOTE

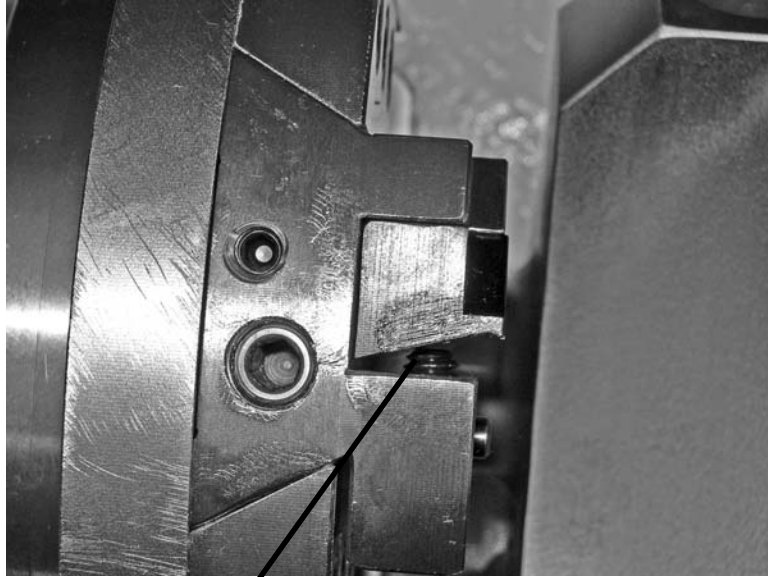
Take care to keep the extension leg screws clear of mud and debris. Place tape over the ends of the extension legs if necessary.



CAUTION

Make sure you install the same length chuck leg at each location. The EICC will not mount or cut properly if chuck legs are mismatched.

2. If the parting spacer is not already installed, place it in the bevel slot. The raised edge of the spacer should be flush with end of the male tool slide.
3. Gently secure the parting spacer by tightening the two setscrews. Do not over tighten.



Parting spacer screw

Figure 3-21. The parting spacer screw is shown above.

4. Install the tool blade with the cutting edge facing the direction of rotation.
5. Using the blade mounting clamp, tighten the two screws into the male tool slide to secure the tool blade.



Figure 3-22. Tighten the tool slide screws to secure the tooling.

6. Retract the tool slide to its innermost position by turning the starwheel counterclockwise, and then turn it one complete revolution clockwise.

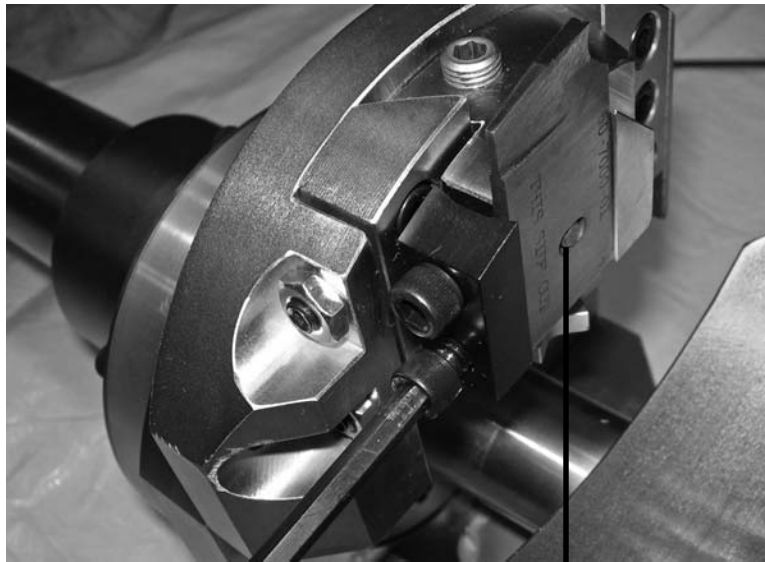


Figure 3-23. Retract the tool slide one complete revolution clockwise from its innermost position.

Parting Tool Slide

1. Install the parting tool in the parting tool slide. The cutting edge of the tool should face the direction of

rotation. Align the hole in the cutoff tool over the tool slide locating pin.



Tool locating pin

Figure 3-24. Secure the parting tool as shown.

2. Using the blade mounting clamp, tighten the screws on the male tool slide plate to secure the tool blade.

Install the EICC on the LCSF

1. Lift the internal cutting module onto the split frame ring and guide the internal attachment into the casing I.D. The module mounting plate will rest on the split frame ring.
2. Align the mounting holes in the bridge with the bridge slide holes in the LCSF rotating ring.
3. Secure the module to the split frame rotating ring using the four screws.



NOTE

Always retract the tool slide to its innermost position by turning the feed screw counterclockwise. When it is fully retracted, turn the screw one complete revolution clockwise.

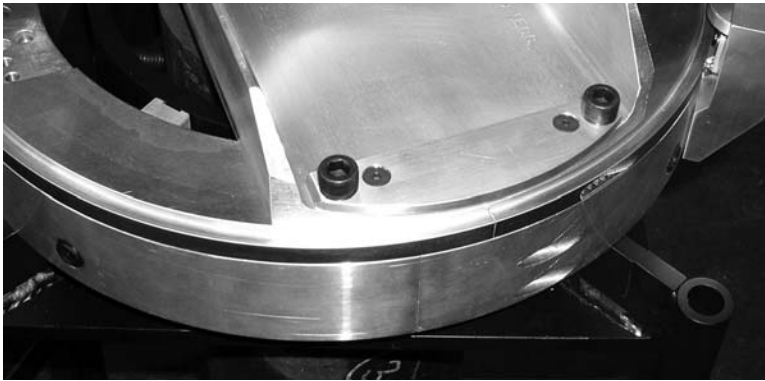


Figure 3-25. The bridge adapter mounts on the LCSF rotating ring.



Figure 3-26. Insert the internal cutting module into the casing.



Figure 3-27. Mount the bridge to the LCSF as shown.

4. Using the supplied ratchet and socket, turn the clamping rod clockwise to tighten the clamp legs inside the casing. This procedure centers the tool slides to the casing being cut.

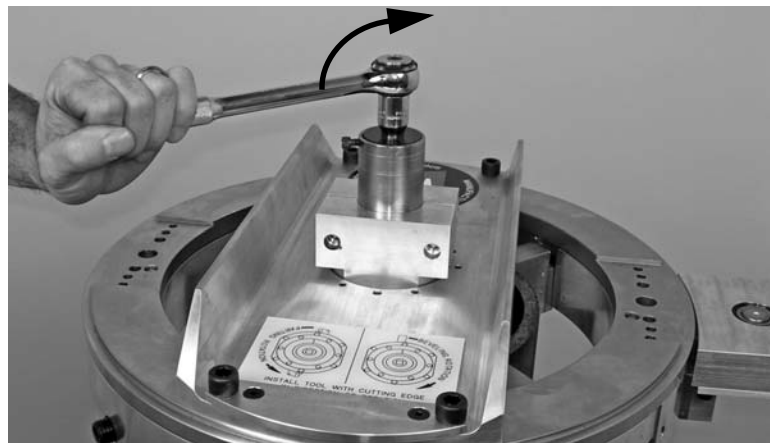


Figure 3-28. Tighten the clamp legs as shown.

5. Adjust each clamp leg on the LCSF until it just touches the wellhead adapter. Then tighten each leg to secure the LCSF.

Install the Counter

1. Install the counter using the three screws at the trip mount location on the LCSF stationary ring.



Figure 3-29. This photo shows the counter being mounted to the LCSF.

2. Zero the counter by turning the counter knob. One digit on the counter equals .0042" (.105 mm) of radial tool travel.

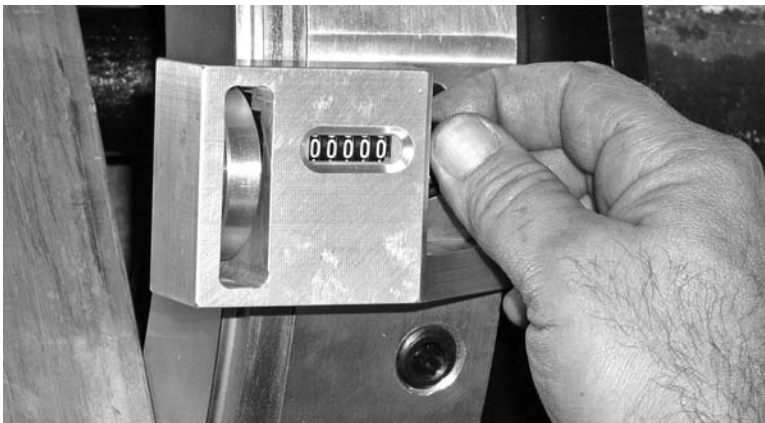


Figure 3-30. Reset the counter before cutting the internal pipe.

Cutting the Internal Pipe

1. Install the drive motor using the captivated screws on motor mounting flange.
2. The drive hex on the drive motor must insert fully into the socket in the pinion housing. If necessary, turn the rotating frame slightly until the drive hex seats itself properly.
3. Tighten the two screws to secure the drive motor.
4. Connect the motor to a clean, dry air supply line, (90 PSI / 6.2 bar), and adjust as needed.
5. Install the air motor using the screws provided with the motor mounting flange.



NOTE

The air motor can be mounted in several different positions. The air motor should be mounted in such a way as to allow the operator the easiest and safest access possible.

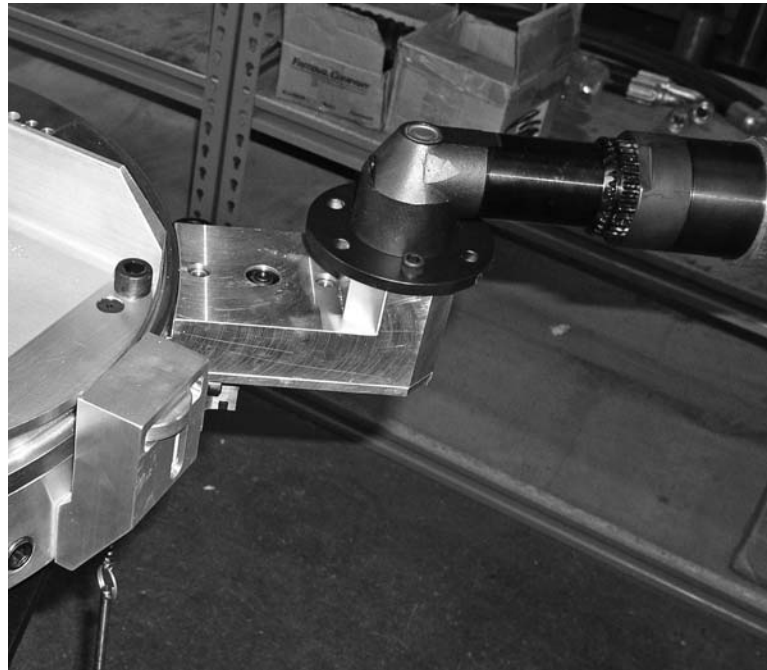


Figure 3-31. Mount the motor as shown.

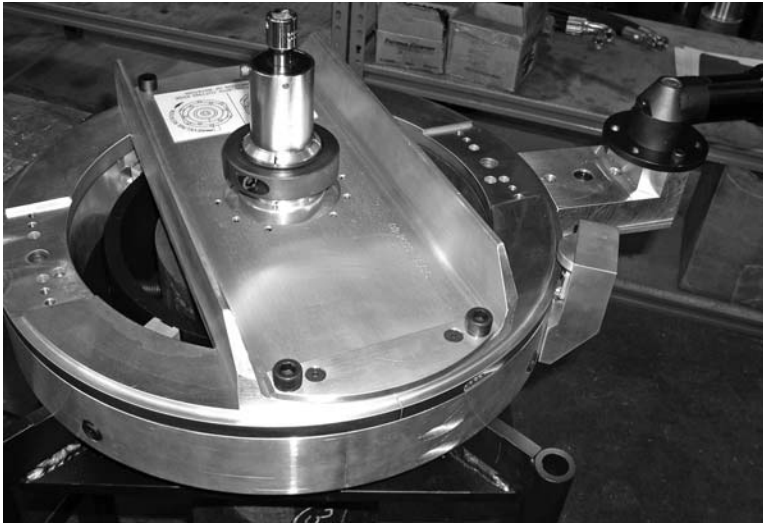


Figure 3-32. The EICC ready to cut.

6. To begin the cutting process, set the drive motor to reverse, and then engage the motor slowly to verify correct rotating direction. Refer to the rotation direction label on the bridge adapter.
7. As the machine rotates, make sure the counter marks each rotation.
8. Increase motor speed to the desired cutting speed.
9. 160 counter counts are required to cut all casing sizes once the tool contacts the I.D. When the counter reaches 160, stop the machine.
10. Reset the counter.
11. Set the drive motor direction to forward, and run the machine until the counter reaches 160 again. This retracts the tool slides to their start position.

Remove the Internal Attachment

1. Turn the clamping rod counterclockwise to release the clamp legs inside the casing.



NOTE

If the counter is not engaging, see “Adjusting the Counter” in Chapter 4.



NOTE

You will hear an increase in air motor RPM when the cut is being completed. Visually verify complete tool blade penetration.

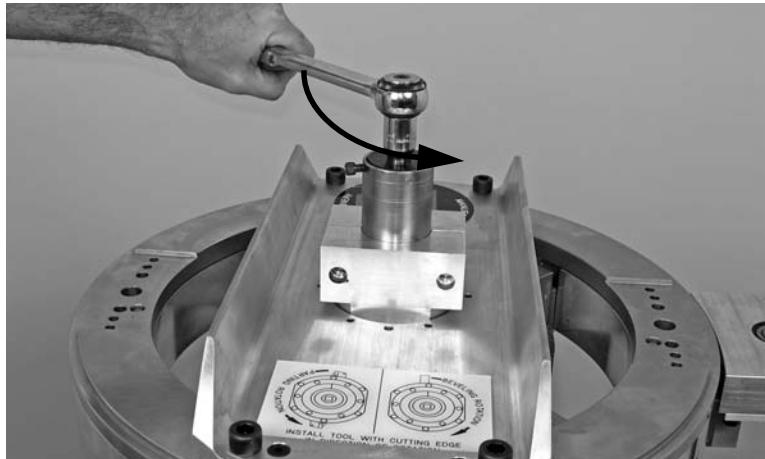


Figure 3-33. Loosen the clamp legs as shown.

2. Remove the four screws holding the bridge to the LCSF. Lift and remove the internal attachment from the split frame ring.
3. Loosen the four screws located on the sides of the wellhead adapter which secure the casing cutoff piece during the cut.
4. Remove the cut-off piece of the production casing.



NOTE

It may be necessary to remove the bridge adapter before removing the cut-off piece of the production casing.

BEVEL TOOLING INSTALLATION AND ADJUSTMENT

1. Advance the tool slides outward for working clearance and remove the tool blades, spacer and mounting clamps on the internal part / bevel module.
2. Advance the part/bevel tool slide outward by turning the feed screw clockwise until the edge of the male tool slide is flush with the outer edge of the tool slide housing.
3. Insert the bevel tool into the tool slide slot so the back end of the tool is flush with the back edge of the male tool slide. Tighten the two tool retaining set screws.

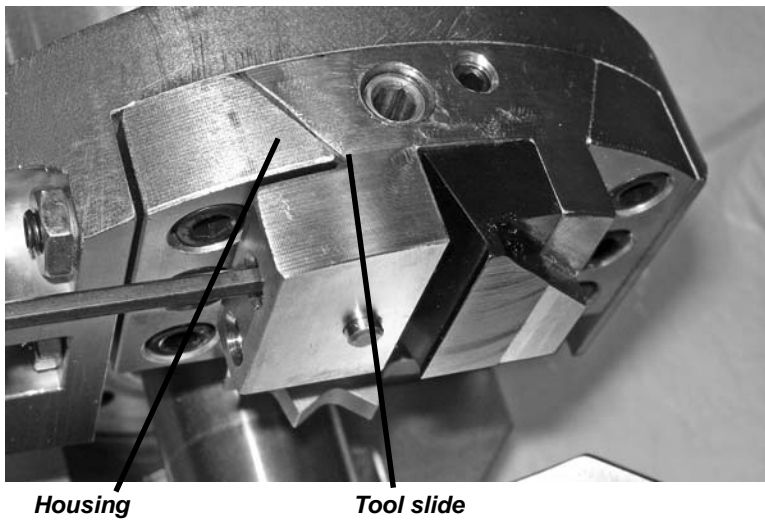


Figure 3-34. The tool slide should be flush with the housing.

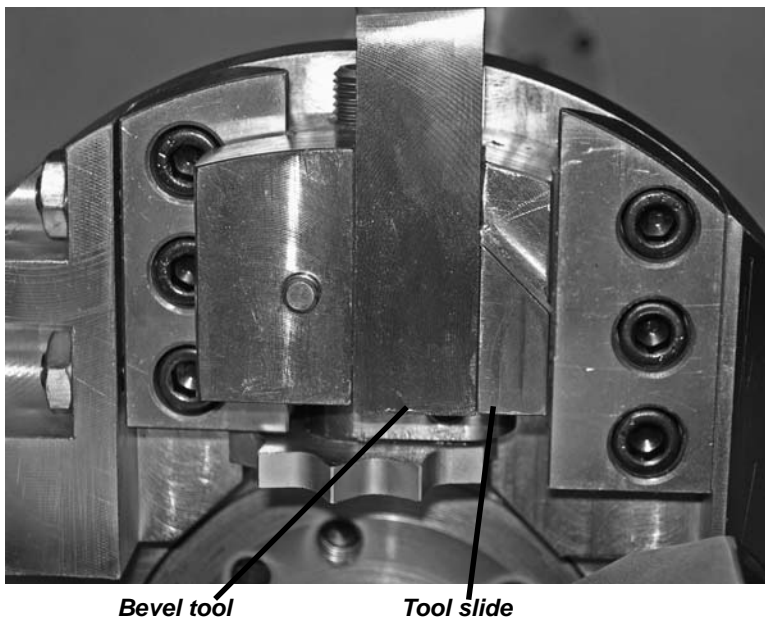


Figure 3-35. The bevel tool should be flush with the back edge of the slide.

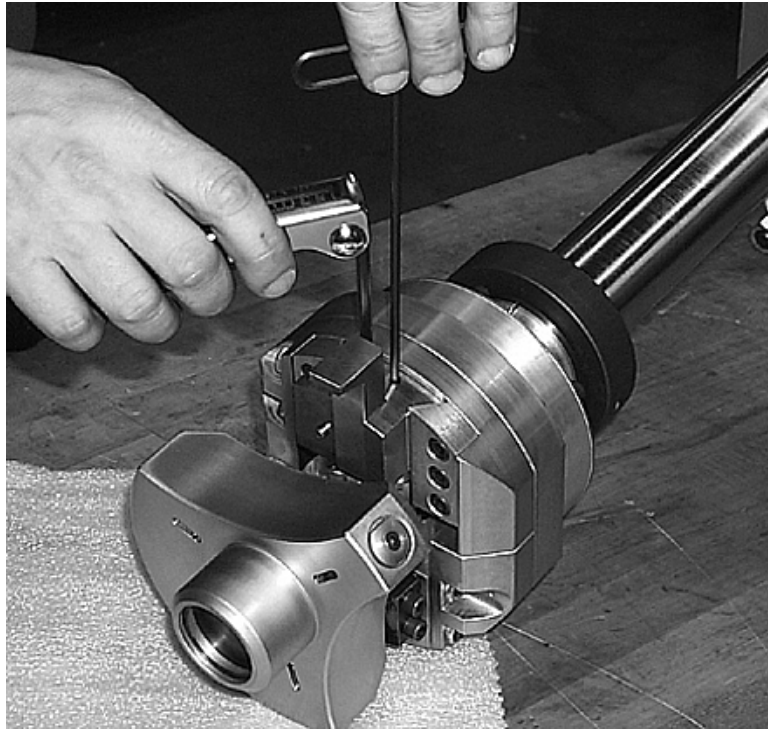


Figure 3-36. Tighten the tool retaining screws securely.

4. Set the bevel stop position of the tool slide by retracting the tool slide four full counterclockwise revolutions of the feed screw.
5. Tighten the chamfer / bevel stop screw in the male tool slide completely.
6. Advance the male tool slide outward by turning the feed screw clockwise approximately 4 complete revolutions back to its flush location.



Figure 3-37. Adjust the tool slide as noted.

7. Lift the module onto the split frame ring, and guide the internal attachment into the casing I.D. The module mounting plate will rest on the split frame ring.
8. Secure the bridge to the LCSF using the four screws.

CUTTING THE CHAMFER / BEVEL

1. Use the supplied ratchet and socket to tighten the internal clamping rod clockwise. This procedure centers the tool slides to the casing being cut.
2. To begin the cutting process, set the drive motor direction to forward. Engage the motor slowly to verify correct rotating direction. Refer to the cutting direction label on the bridge.
3. Once the tool begins cutting, apply liberal amounts of coolant for the duration of the machining process.
4. Continue to chamfer / bevel until the tool slide stops feeding. Allow the EICC machine to continue running for 3 to 6 more revolutions to clear burrs or metal chips.

Remove the Drive Motor Assembly

1. Remove the drive motor from the LCSF.
2. Loosen the clamp legs by turning the clamping rod counterclockwise.
3. Remove the four screws holding the bridge to the LCSF.
4. Lift and remove the internal attachment from the split frame ring.
5. Remove the LCSF from the surface casing.
6. Remove the wellhead adapter.

Chapter 4

Maintenance

LUBRICATION

LCSF

Lubricate the LCSF according to the guidelines in the LCSF manual.

Slides

Clean and grease the threads on the tool block and slide block each time you use the machine. Apply lubricant to the starwheel feed screw as well. Lubricate using way oil.

TOOL SLIDE TENSION ADJUSTMENTS

The tool slide starwheel tension can be increased or decreased as desired by tightening and loosening the gib screws.

Tool slide tension is critical for correct operation. The slide should be as loose as possible while still having enough gib pressure to remove all play from the male tool slide. Check the tension each time you use the EICC, and adjust if necessary.

1. Remove the tool slide from the EICC by loosening the tool slide mounting screws.

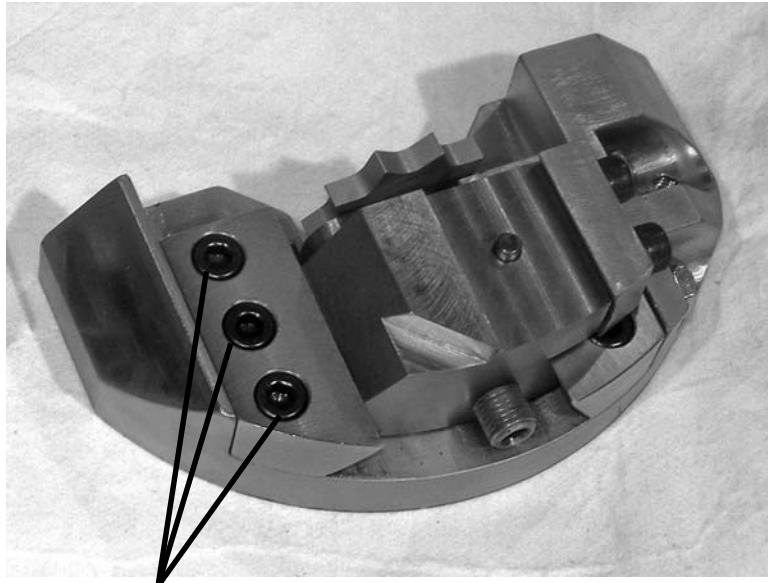
In This Chapter

LUBRICATION

TOOL SLIDE TENSION
ADJUSTMENTS

ADJUSTING THE COUNTER

2. Turn all gib screws counterclockwise to loosen them completely, but do not remove the gib screws.



Gib Screws

Figure 4-1. Loosen the gib screws shown to adjust the slide tension.

3. Gently turn the top screw on the left gib clockwise to tighten it.
4. Gently tighten the top screw on the right gib.
5. Tighten all gib screws evenly until the male tool slide cannot wobble.
6. Test the tool slide tension. The slide should be as loose as possible while still having enough gib pressure to remove all play from the male tool slide.
7. Repeat steps 2-5 if necessary.

ADJUSTING THE COUNTER

The edge of the counter wheel should be 0.540" (13.7 mm) from the edge of the counter housing to ensure the counter marks each revolution of the EICC. Refer to the exploded view drawing in Chapter 5. If the counter is not properly functioning, the counter wheel must be adjusted.

1. Measure the distance between the edge of the counter wheel and the counter housing.

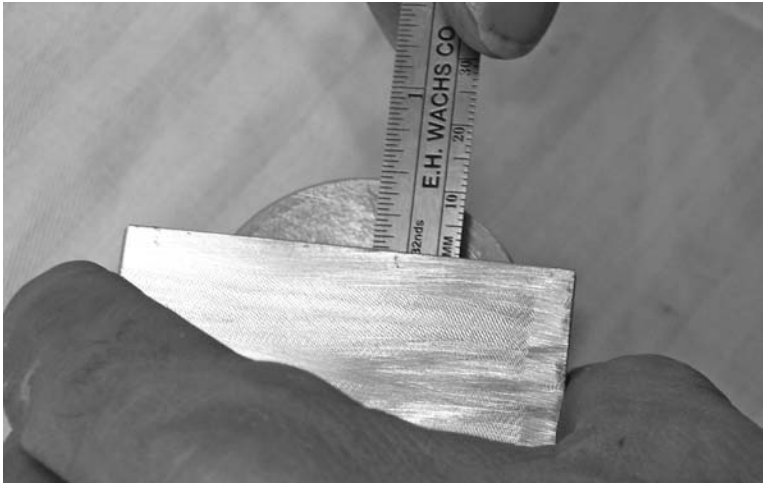


Figure 4-2. Measure the counter wheel distance from the counter base.

2. Turn the counter wheel until one of the hex screws is visible through the counter wheel notch.



Figure 4-3. The hex screw is accessible through the counter wheel notch.

3. Loosen the hex screw with a 5/64" hex wrench.



NOTE

Loosen only one of the hex screws on the counter wheel. Loosening both set screws will misalign the counter.

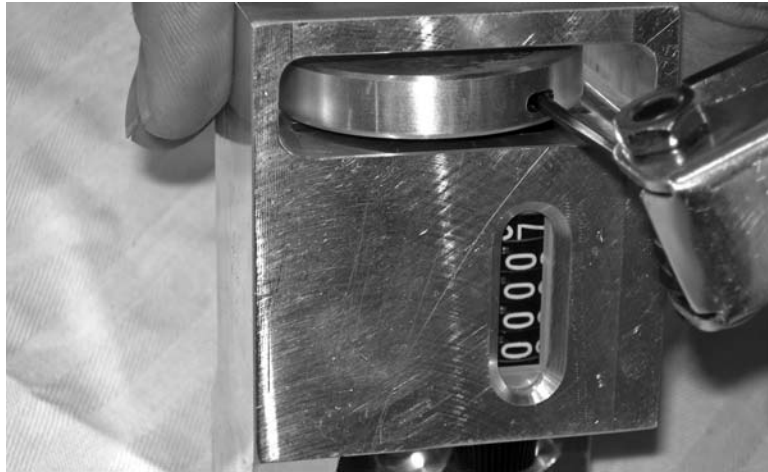


Figure 4-4. Loosen the hex screw until the counter wheel is floating.

4. Adjust the counter wheel to the needed depth.



Figure 4-5. Use a scale to accurately adjust the counter wheel.

5. Securely tighten the counter wheel screw.
6. Test the counter to make sure it counts properly. Readjust as needed. It may be necessary to adjust the counter depth to more or less than 0.540" (13.7 mm).
7. Mount the counter on the LCSF stationary ring.
8. Operate the EICC for one rotation to test the counter.

Chapter 5

Parts List and Ordering Information

ORDERING INFORMATION

To place an order, request service, or get more detailed information on any E.H. Wachs products, call us at one of the following numbers:

U.S. 800-323-8185
International: 847-537-8800

You can also visit our Web site at:

www.ehwachs.com

Ordering Replacement Parts

When ordering parts, refer to the parts lists in this chapter. Please provide the part description and part number for all parts you are ordering.

Repair Information

Please call us for an authorization number before returning any equipment for repair or factory service. We will advise you of shipping and handling. When you send the equipment, please include the following information:

- Your name/company name
- Your address
- Your phone number

In This Chapter

ORDERING INFORMATION

DRAWINGS AND PART LISTS

- A description of the problem or the work to be done.

Before we perform any repair, we will estimate the work and inform you of the cost and the time to complete it.

Warranty Information

Enclosed with the manual is a warranty card. Please fill out the registration card and return to E.H. Wachs. Retain the owner's registration record and warranty card for your information.

Return Goods Address

Return equipment for repair to the following address.

E.H. Wachs
600 Knightsbridge Parkway
Lincolnshire, Illinois 60069 USA

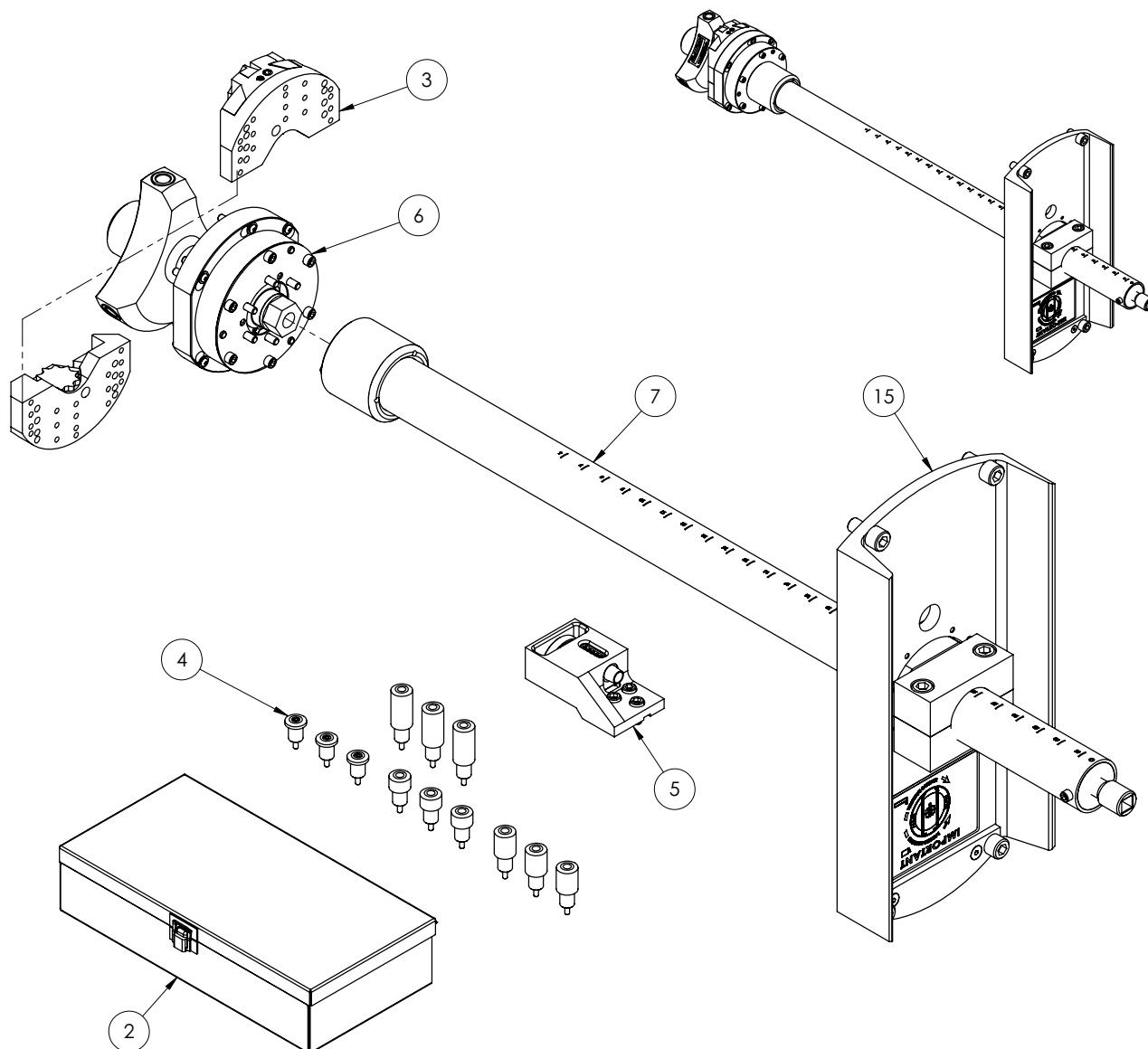
DRAWINGS AND PART LISTS

The drawings on the following pages illustrate the components of the EICC, and include parts lists with part numbers.

Standard Slide Configuration (60-4001-XX)

WHERE USED		
ITEM	PART NUMBER	ASSEMBLY USED
15	60-4007-10	60-4001-1031
	60-4007-12	60-4001-1231
	60-4007-14	60-4001-1431
	60-4007-16	60-4001-1631
	60-4007-20	60-4001-2031

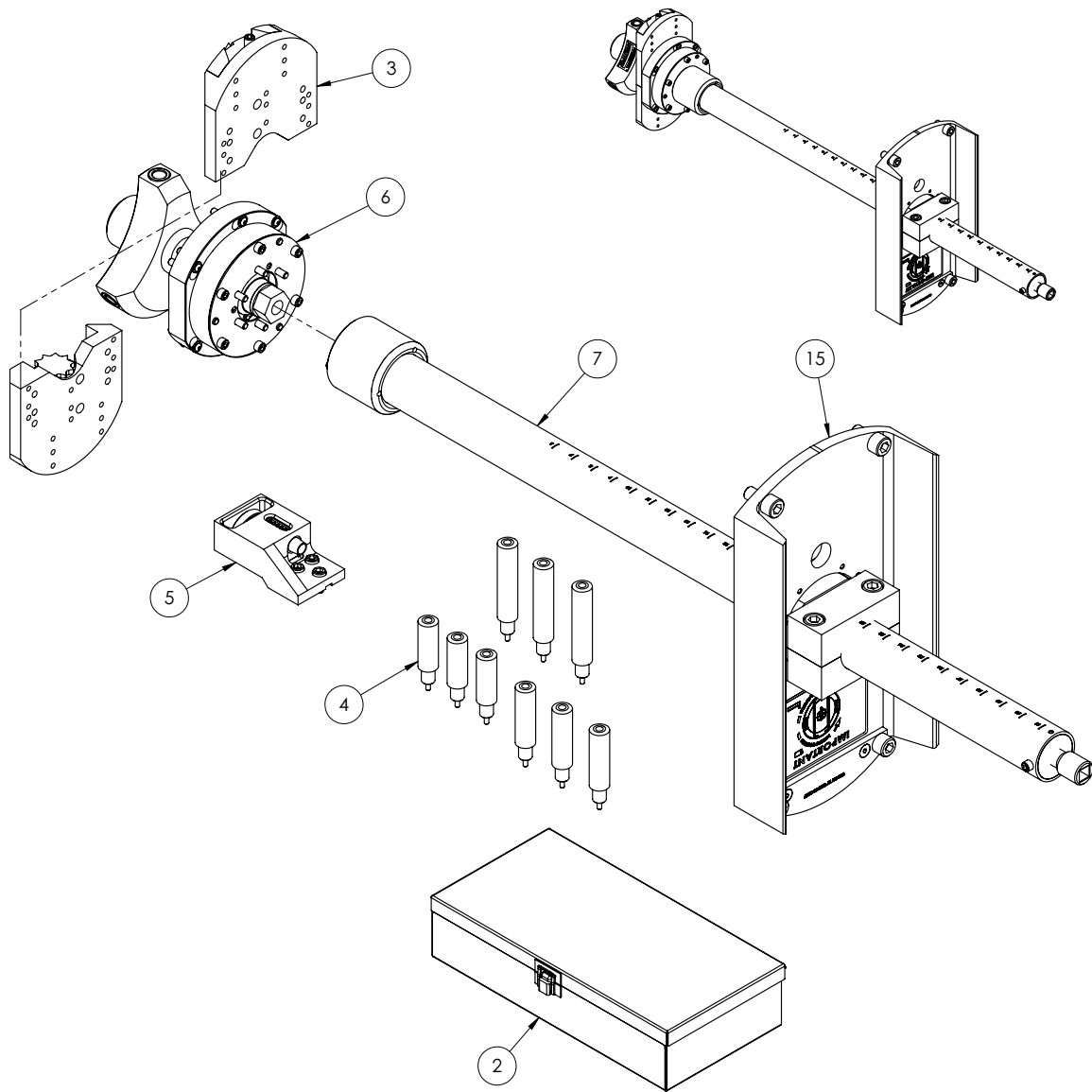
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	60-1100-00	1	EICC CASE ASSEMBLY (NOT SHOWN)
2	60-227-00	1	TOOL BOX
3	60-4005-01	1	7" THROUGH 9 - 5/8" SLIDE ASSEMBLY
4	60-4006-01	1	LEG SET 7" THROUGH 9-5/8"
5	60-4008-01	1	MECHANICAL COUNTER ASSEMBLY
6	60-4012-00	1	CHUCK BODY ASSEMBLY, EICC
7	60-4013-31	1	31" DRIVE TUBE ASSEMBLY, EICC
8	60-7000-01	2	PARTING TOOL (NOT SHOWN)
9	60-7001-30	1	30° BEVEL TOOL (NOT SHOWN)
10	60-MAN-05	1	MANUAL, EICC FOR LCSF (NOT SHOWN)
11	90-800-39	1	WRENCH, 1/8" HEX TEE HANDLE (NOT SHOWN)
12	90-800-40	1	WRENCH, 3/16" - 3/8" HEX SET (NOT SHOWN)
13	90-800-63	1	WRENCH, 1/2" DRV RATCHET (NOT SHOWN)
14	90-800-83	1	7/16" BLOT THROUGH WRENCH (NOT SHOWN)
15	WHERE USED	1	EICC BRIDGE ASSEMBLY



Extended Slide Configuration (60- 4002-XX)

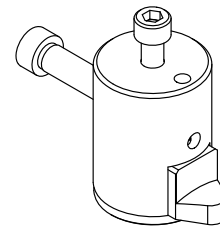
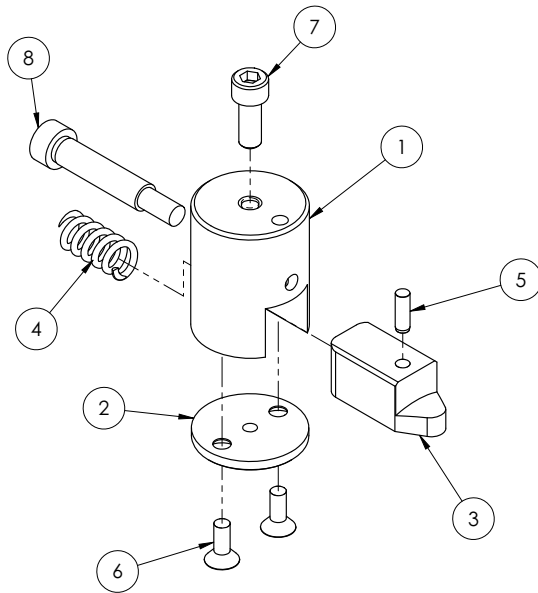
WHERE USED		
ITEM	PART NUMBER	ASSEMBLY USED
15	60-4007-10	60-4002-1031
	60-4007-12	60-4002-1231
	60-4007-14	60-4002-1431
	60-4007-16	60-4002-1631
	60-4007-20	60-4002-2031

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	60-1100-00	1	EICC CASE ASSEMBLY (NOT SHOWN)
2	60-227-00	1	TOOL BOX
3	60-4005-02	1	9-5/8" THROUGH 13-3/8" SLIDE ASSEMBLY
4	60-4006-02	1	10-3/4" THROUGH 13-3/8" LEG SET
5	60-4008-01	1	MECHANICAL COUNTER ASSEMBLY
6	60-4012-00	1	CHUCK BODY ASSEMBLY, EICC
7	60-4013-31	1	31" DRIVE TUBE ASSEMBLY, EICC
8	60-7000-01	2	PARTING TOOL (NOT SHOWN)
9	60-7001-30	1	30° BEVEL TOOL (NOT SHOWN)
10	60-MAN-05	1	MANUAL, EICC FOR LCSF (NOT SHOWN)
11	90-800-39	1	WRENCH, 1/8" HEX TEE HANDLE (NOT SHOWN)
12	90-800-40	1	WRENCH, 3/16" - 3/8" HEX SET (NOT SHOWN)
13	90-800-63	1	WRENCH, 1/2" DRV RATCHET (NOT SHOWN)
14	90-800-83	1	7/16" BLOT THROUGH WRENCH (NOT SHOWN)
15	WHERE USED	1	EICC ROTATING BRIDGE

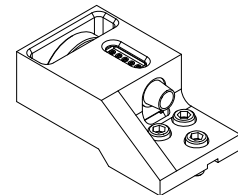
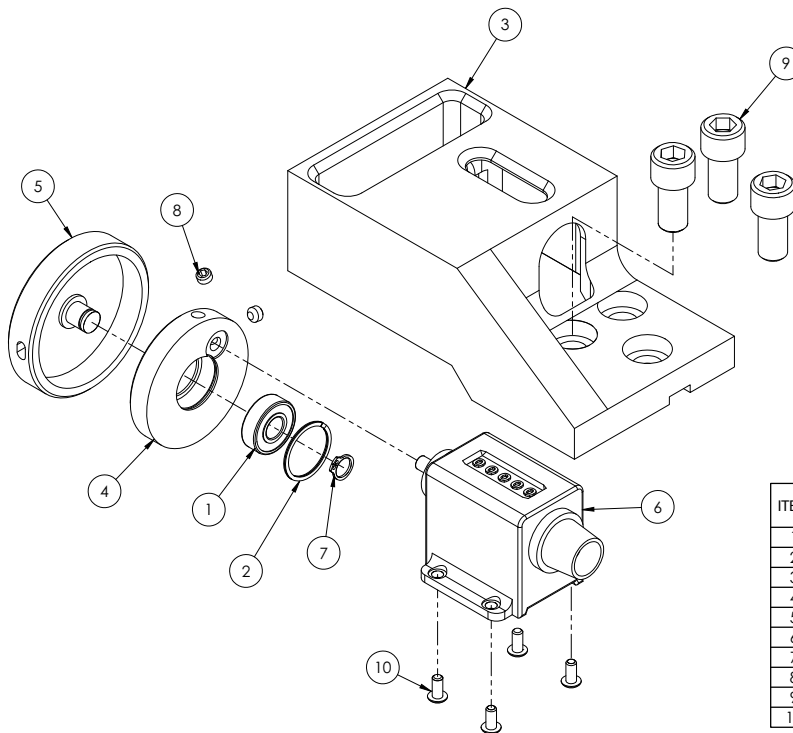


Trip Assembly (60-4003-00)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	60-1080-00	1	TRIP HOUSING
2	60-1081-00	1	TRIP HOUSING PLATE
3	60-1083-00	1	TRIP PIN SLIDE
4	60-1084-00	1	TRIP SPRING
5	90-026-03	1	PIN, .125 x .375; DOWEL
6	90-033-03	2	FHCS #6-32 x .375
7	90-040-05	1	SHCS, 10-24 X 1/2
8	90-097-56	1	SHOULDER SCREW, 1/4" X 1"



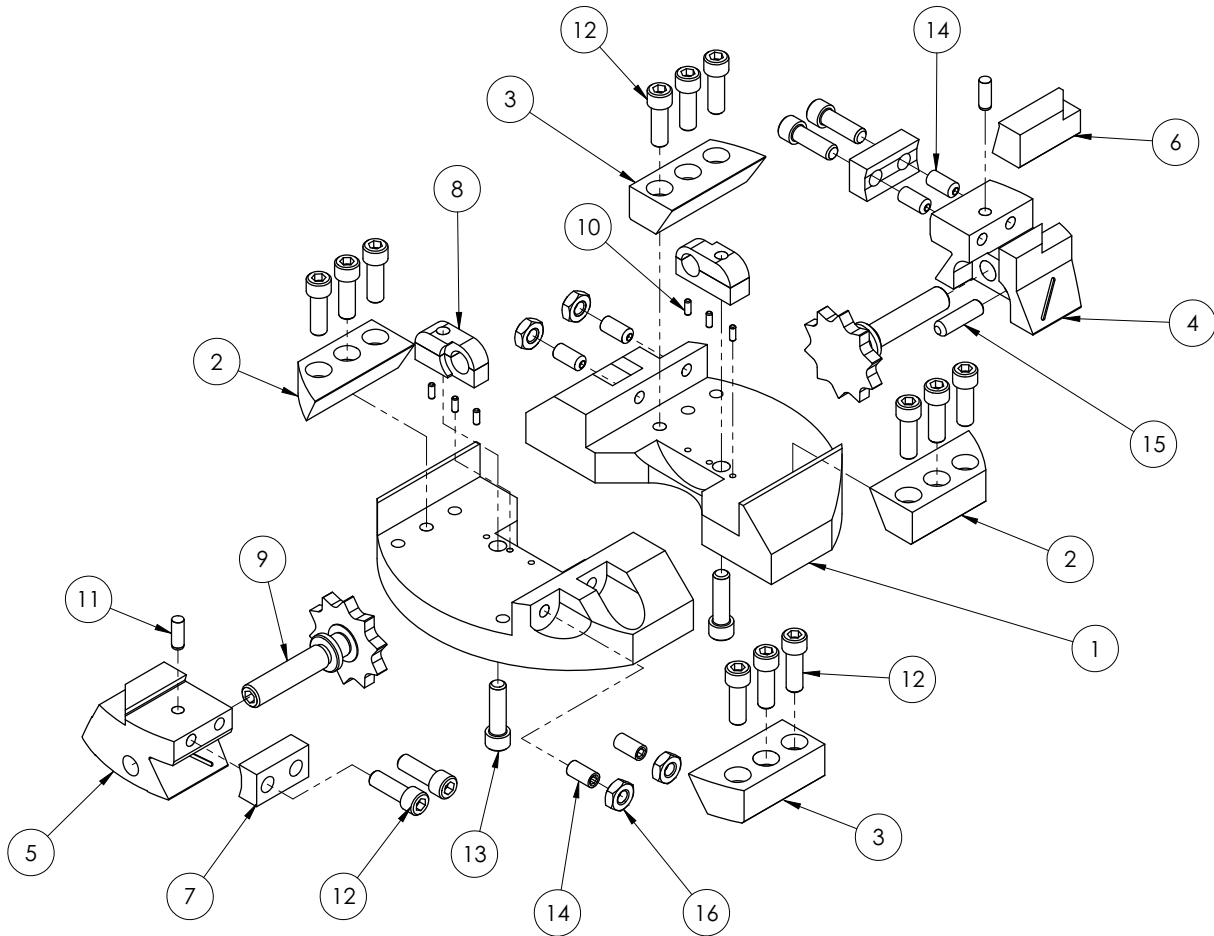
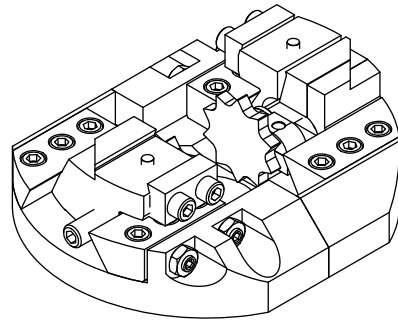
Counter Assembly (60-4008-01)



ITEM	PART NUMBER	QTY.	DESCRIPTION
1	14-096-00	1	COUNTER BEARING
2	60-1071-00	1	INTERNAL RETAINING RING
3	60-1074-00	1	HOUSING COUNTER
4	60-1075-00	1	COUNTER HUB
5	60-1076-00	1	COUNTER WHEEL
6	60-1077-00	1	COUNTER
7	60-1078-00	1	EXTERNAL RETAINING RING
8	90-024-04	2	SSS, 8-32 X 1/8
9	90-060-06	3	SHCS, 5/16-18 X 5/8
10	90-102-03	4	BHCS #4-40 x .250

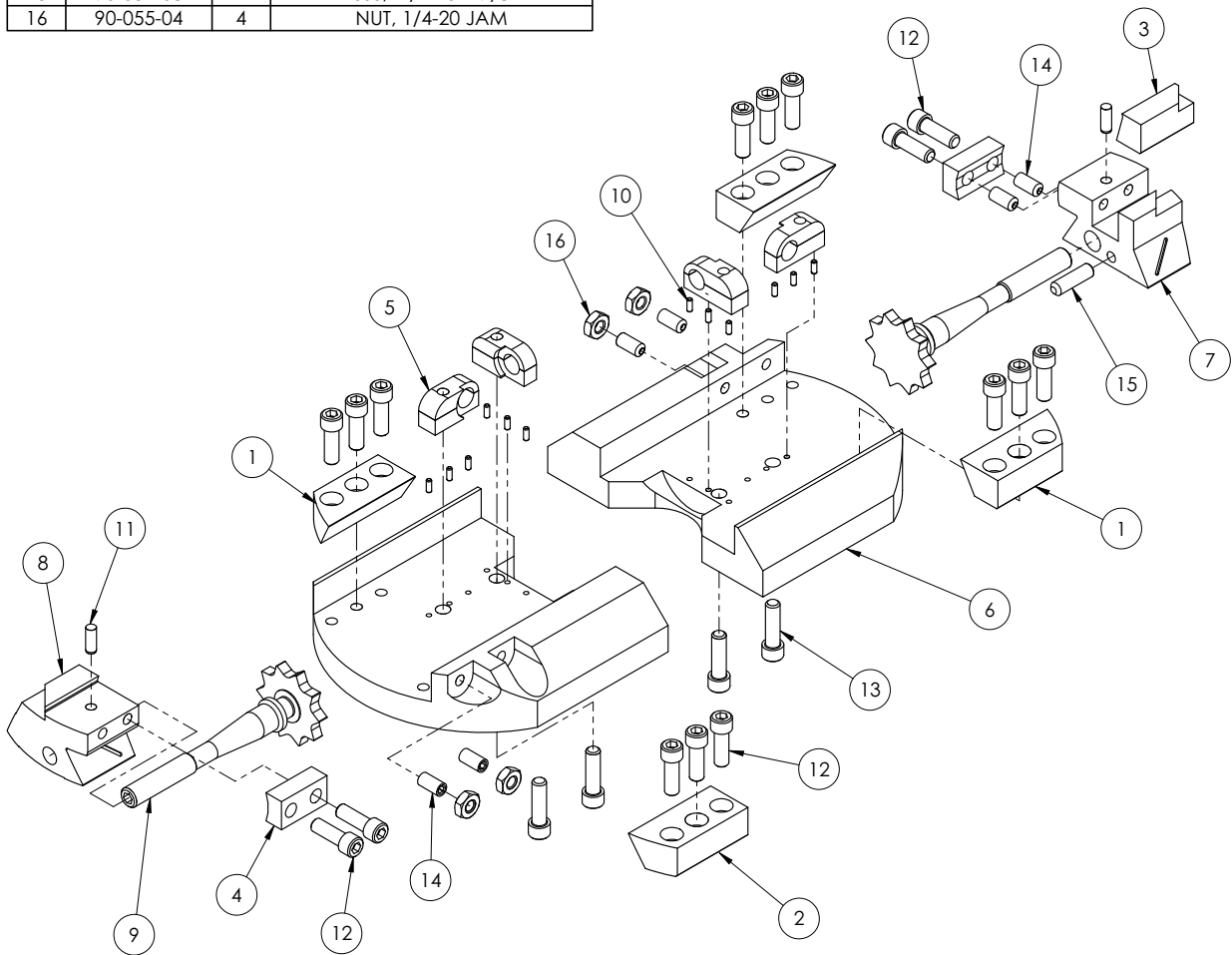
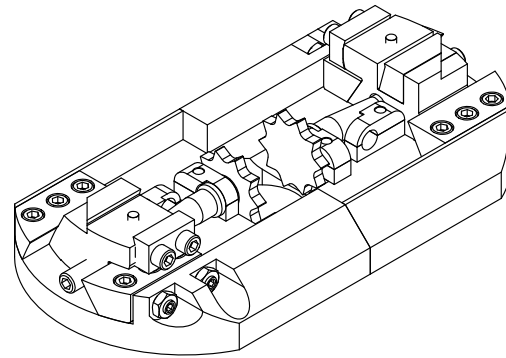
Standard Slides (60-4005-01)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	60-1053-00	2	SLIDE PLATE
2	60-1054-00	2	RIGHT GIB
3	60-1055-00	2	LEFT GIB
4	60-1056-00	1	MALE COMBINATION SLIDE
5	60-1057-00	1	SLIDE, MALE PARTING
6	60-1058-00	1	SPACER, PARTING TOOL
7	60-1059-00	2	PARTING TOOL CLAMP
8	60-1060-00	2	FEED SCREW BLOCK ASSY.
9	60-1061-00	2	SLIDE SCREW SCREW</td
10	90-016-02	6	PIN, 3/32 X 1/4 DOWEL
11	90-046-05	2	PIN, .1875 x .500; DOWEL
12	90-050-07	16	SHCS, 1/4-20 X 3/4
13	90-050-08	2	SHCS, 1/4-20 X 7/8
14	90-054-05	6	SSS, 1/4-20 X 1/2
15	90-054-08	1	SSS, 1/4-20 X 7/8
16	90-055-04	4	NUT, 1/4-20 JAM



Extended Slides (60-4005-02)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	60-1054-00	2	RIGHT GIB
2	60-1055-00	2	LEFT GIB
3	60-1058-00	1	SPACER, PARTING TOOL
4	60-1059-00	2	PARTING TOOL CLAMP
5	60-1060-00	4	FEED SCREW BLOCK ASSY.
6	60-1062-00	2	SLIDE PLATE
7	60-1063-00	1	MALE COMBINATION SLIDE
8	60-1064-00	1	MALE PARTING SLIDE
9	60-1065-00	2	SLIDE SCREW
10	90-016-02	12	PIN, 3/32 X 1/4 DOWEL
11	90-046-05	2	PIN, .1875 x .500; DOWEL
12	90-050-07	16	SHCS, 1/4-20 X 3/4
13	90-050-08	4	SHCS, 1/4-20 X 7/8 </td
14	90-054-05	6	SSS, 1/4-20 X 1/2
15	90-054-08	1	SSS, 1/4-20 X 7/8
16	90-055-04	4	NUT, 1/4-20 JAM

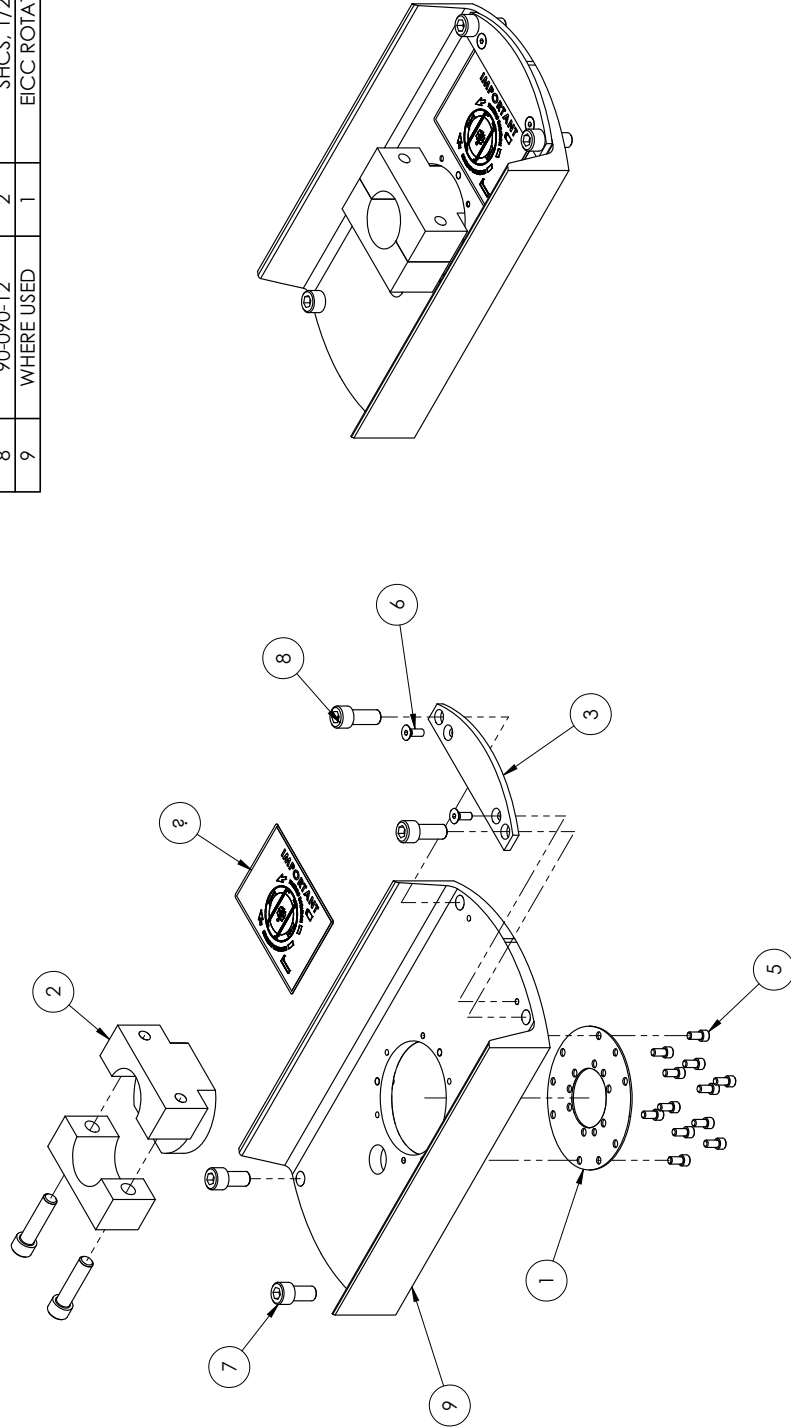


Rotating Bridge Assembly (60-4007-XX)

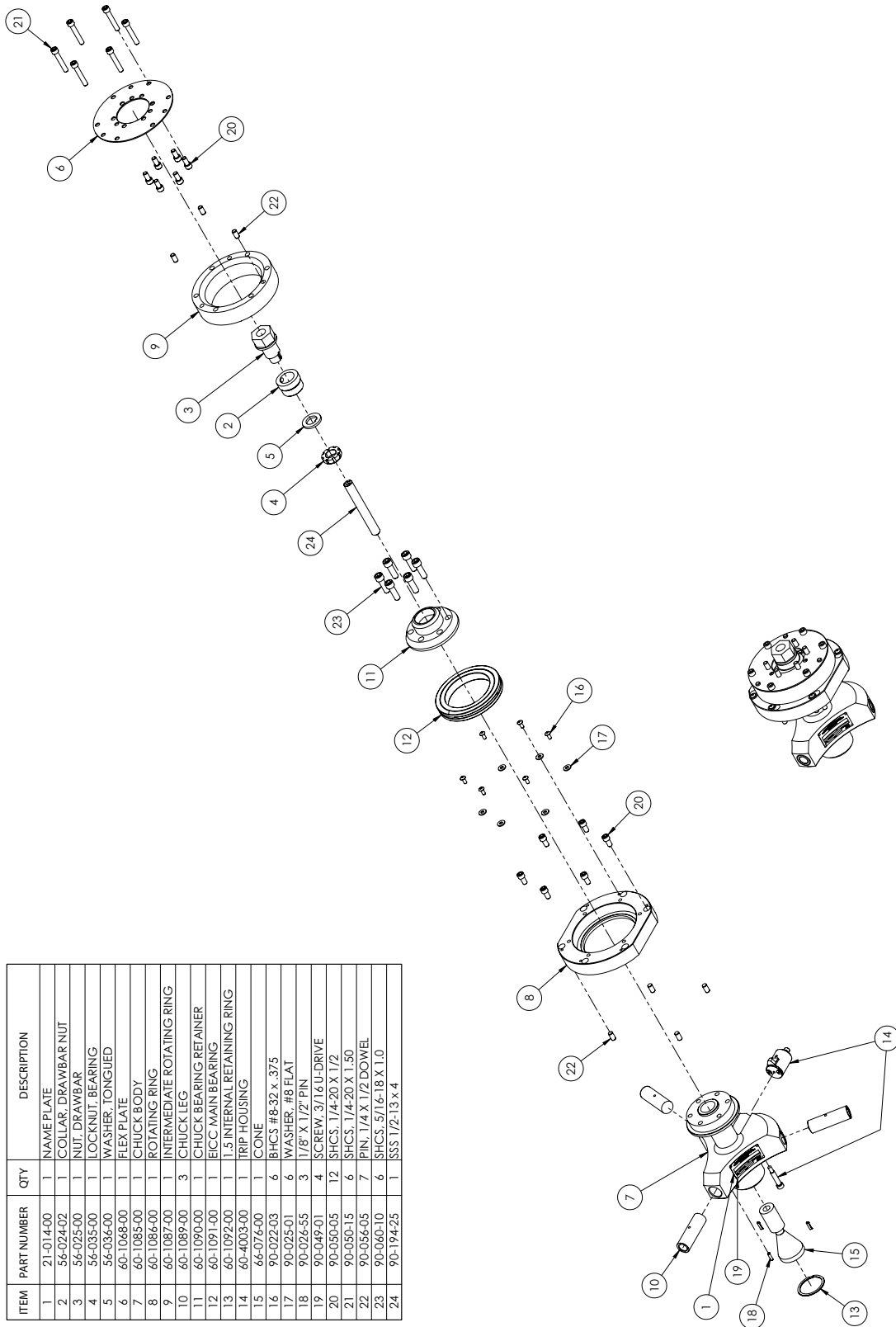
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	60-1068-00	1	FLEX PLATE
2	60-1069-00	1	TOP DRIVE TUBE CLAMP ASSY.
3	WHERE USED	1	CAM COUNTER
4	60-1100-04	1	EICC BRIDGE LABEL
5	90-050-05	12	SHCS. 1/4-20 X 1/2
6	90-053-05	2	FHCS 1/4-20 X 1/2
7	90-090-10	2	SHCS .500-13 X 1.000
8	90-090-12	2	SHCS. 1/2-13 X 1-1/4
9	WHERE USED	1	EICC ROTATING BRIDGE

WHERE USED		ASSEMBLY USED
ITEM	PART NUMBER	
9	60-1173-00	60-4007-10
	60-1173-01	60-4007-12
	60-1173-02	60-4007-14
	60-1173-03	60-4007-16
	60-1173-04	60-4007-20

WHERE USED		ASSEMBLY USED
ITEM	PART NUMBER	
3	60-1070-01	60-4007-10
	60-1070-00	60-4007-12
	60-1070-00	60-4007-14
	60-1070-00	60-4007-16
	60-1070-00	60-4007-20

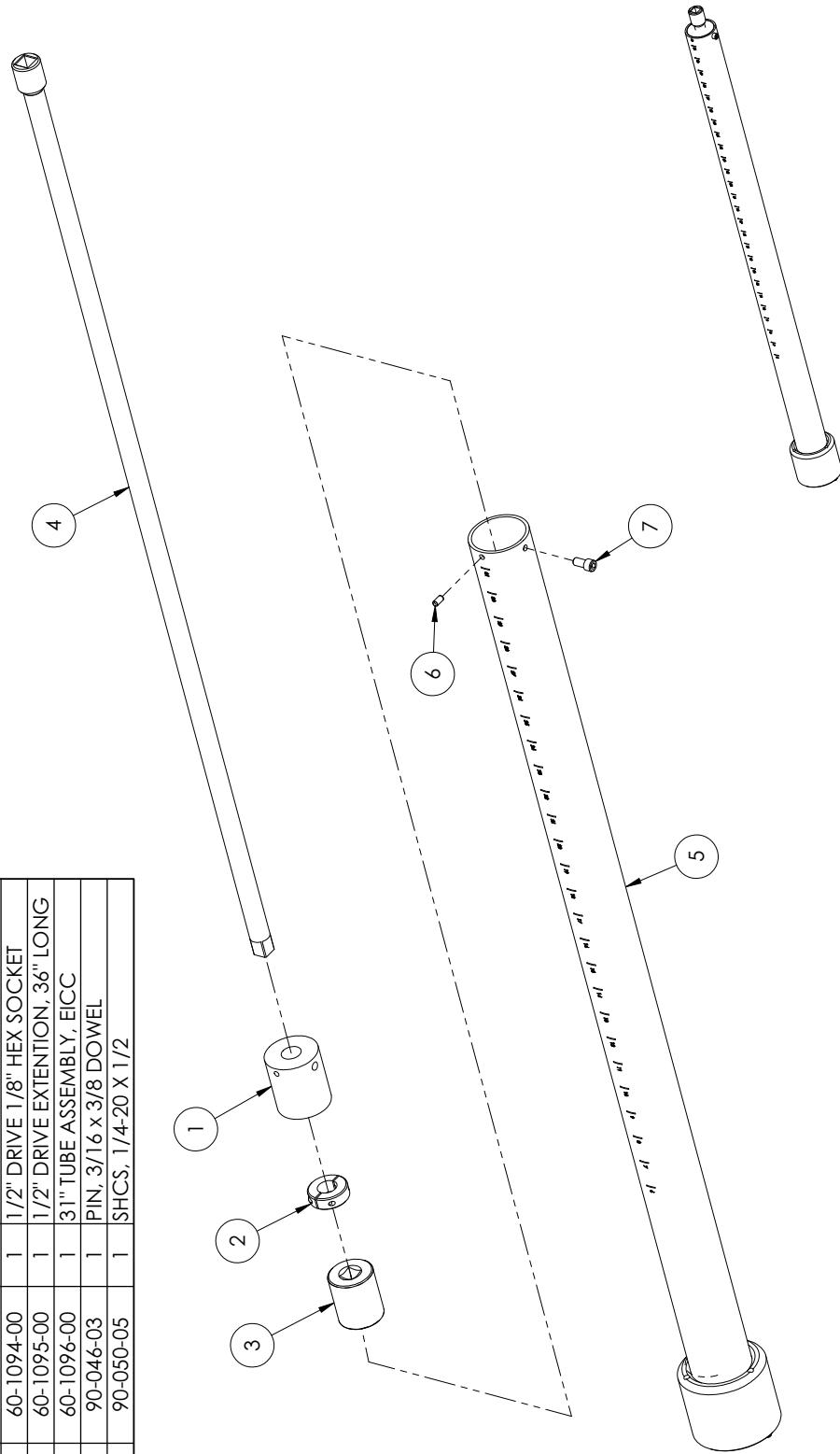


Chuck Body Assembly (60-4012-00)



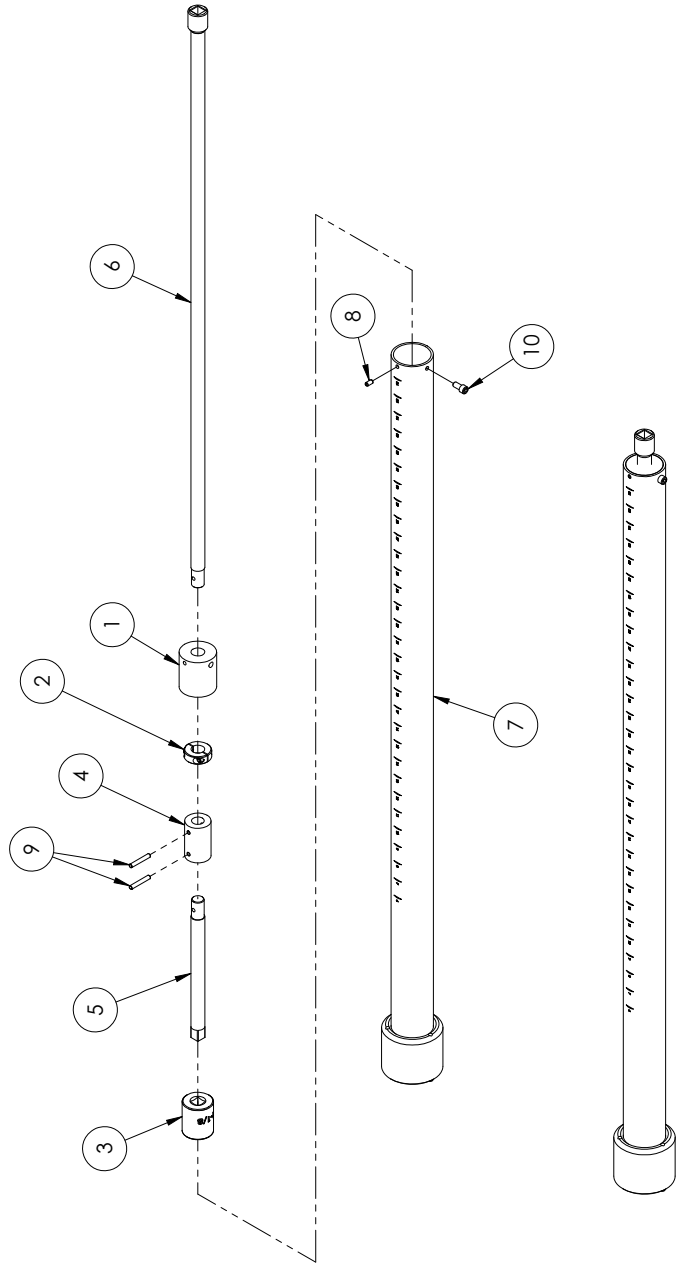
31" Drive Tube Assembly (60-4013-31)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	60-1088-00	1	TUBE END BUSHING
2	60-1093-01	1	5/8" COLLAR, MODIFIED
3	60-1094-00	1	1/2" DRIVE 1/8" HEX SOCKET
4	60-1095-00	1	1/2" DRIVE EXTENSION, 36" LONG
5	60-1096-00	1	31" TUBE ASSEMBLY, EICC
6	90-046-03	1	PIN, 3/16 x 3/8 DOWEL
7	90-050-05	1	SHCS, 1/4-20 X 1/2



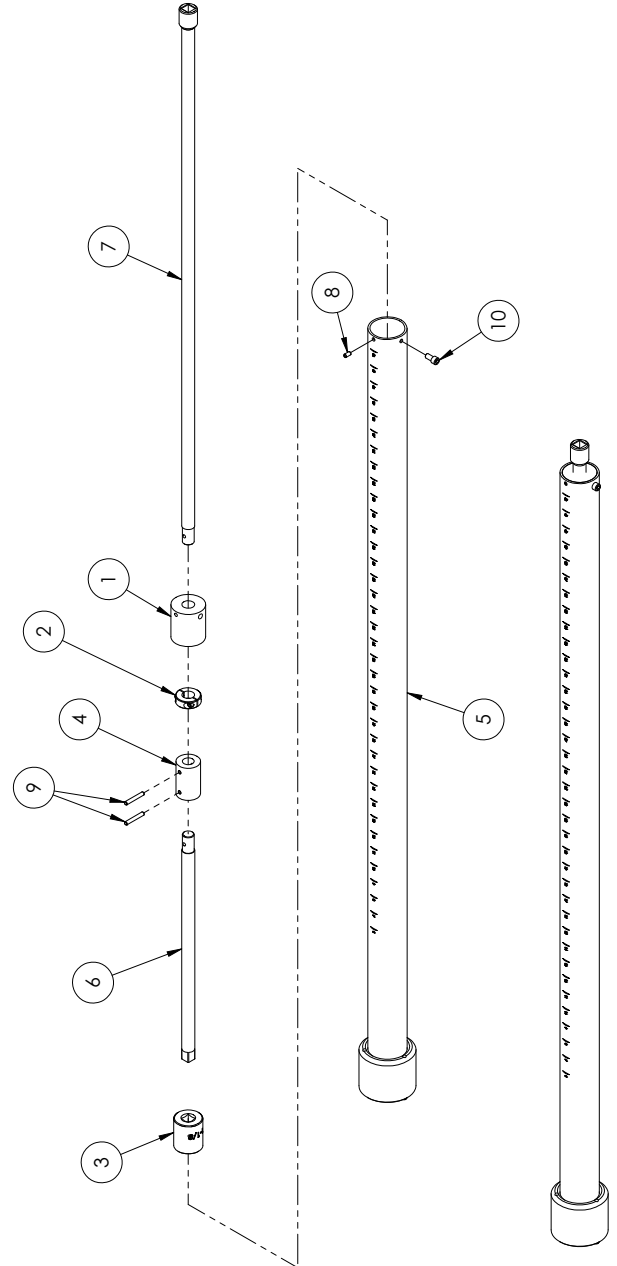
36" Drive Tube Assembly (60-4013-36)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	60-1088-00	1	TUBE END BUSHING
2	60-1093-01	1	5/8" COLLAR, MODIFIED
3	60-1094-00	1	1/2" DRIVE 1/8" HEX SOCKET
4	60-1316-00	1	COUPLING, DRIVE SHAFT
5	60-1323-04	1	DRIVE SHAFT, LOWER 36"
6	60-1324-00	1	1/2" DRIVE EXTENTION, 36" LONG (MODIFIED)
7	60-1328-00	1	36" TUBE ASSEMBLY, EICC
8	90-046-03	1	PIN, 3/16 x 3/8 DOWEL
9	90-046-12	2	PIN, 3/16 X 1-1/4 DOWEL
10	90-050-05	1	SHCS, 1/4-20 X 1/2



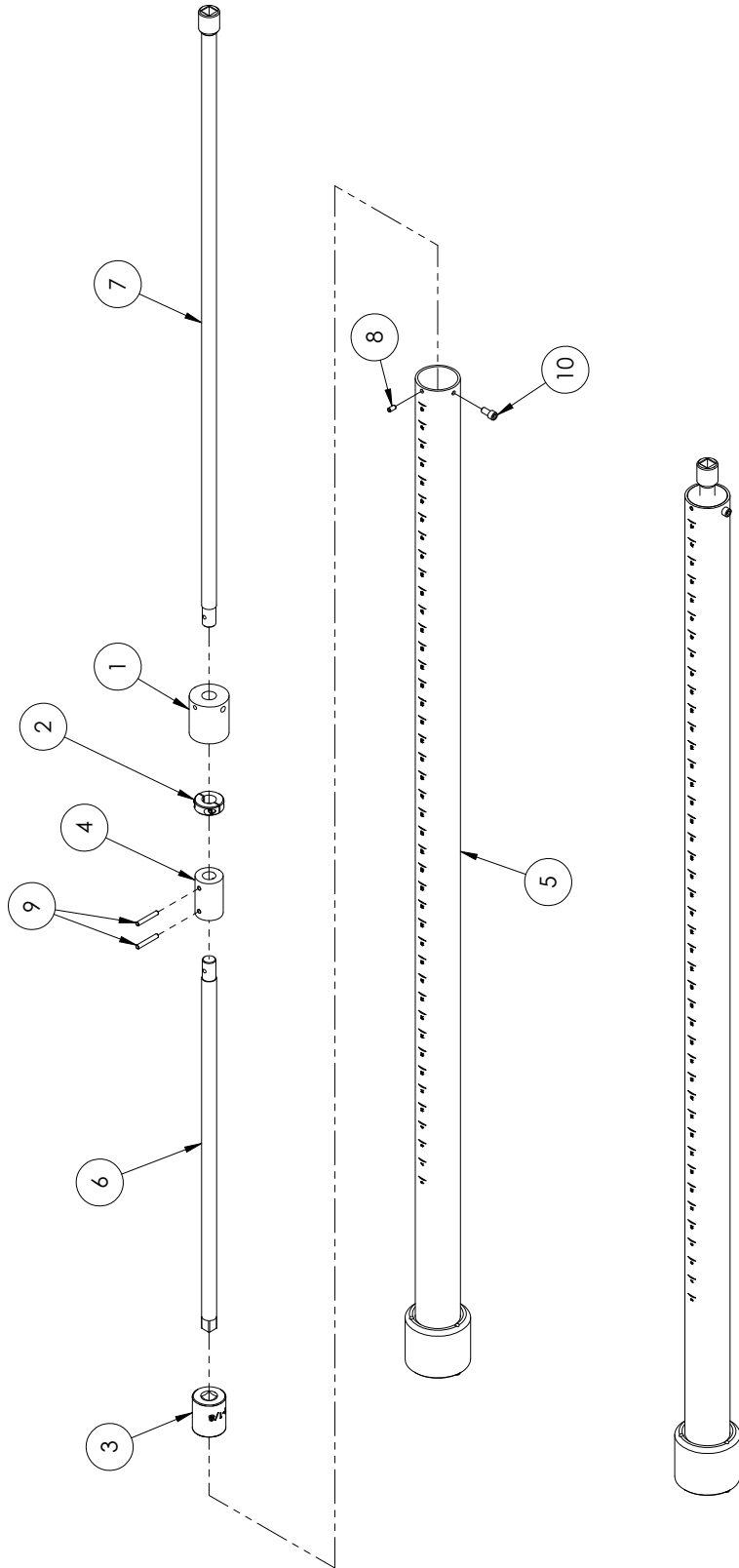
42" Drive Tube Assembly (60-4013-42)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	60-1088-00	1	TUBE END BUSHING
2	60-1093-01	1	5/8" COLLAR, MODIFIED
3	60-1094-00	1	1/2" DRIVE 1/8" HEX SOCKET
4	60-1316-00	1	COUPLING, DRIVE SHAFT
5	60-1320-00	1	42" TUBE ASSEMBLY, EICC
6	60-1323-01	1	DRIVE SHAFT, LOWER 42"
7	60-1324-00	1	1/2" DRIVE EXTENSION, 36" LONG (MODIFIED)
8	90-046-03	1	PIN, 3/16 x 3/8 DOWEL
9	90-046-12	2	PIN, 3/16 X 1-1/4 DOWEL
10	90-050-05	1	SHCS, 1/4-20 X 1/2



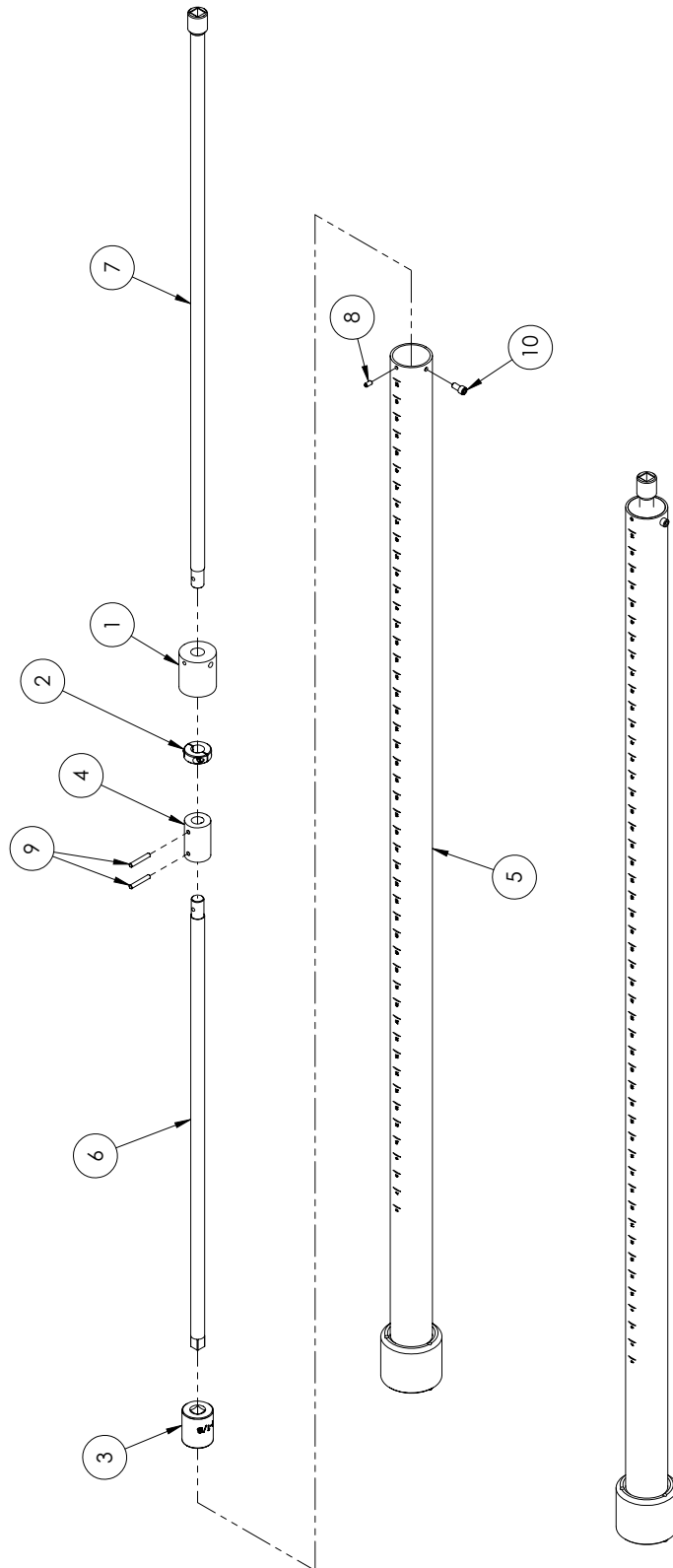
48" Drive Tube Assembly (60-4013-48)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	60-1088-00	1	TUBE END BUSHING
2	60-1093-01	1	5/8" COLLAR, MODIFIED
3	60-1094-00	1	1/2" DRIVE 1/8" HEX SOCKET
4	60-1316-00	1	COUPLING, DRIVE SHAFT
5	60-1321-00	1	48" TUBE ASSEMBLY, EICC
6	60-1323-02	1	DRIVE SHAFT, LOWER 48"
7	60-1324-00	1	1/2" DRIVE EXTENSION, 36" LONG (MODIFIED)
8	90-046-03	1	PIN, 3/16 x 3/8 DOWEL
9	90-046-12	2	PIN, 3/16 X 1-1/4 DOWEL
10	90-050-05	1	SHCS, 1/4-20 X 1/2



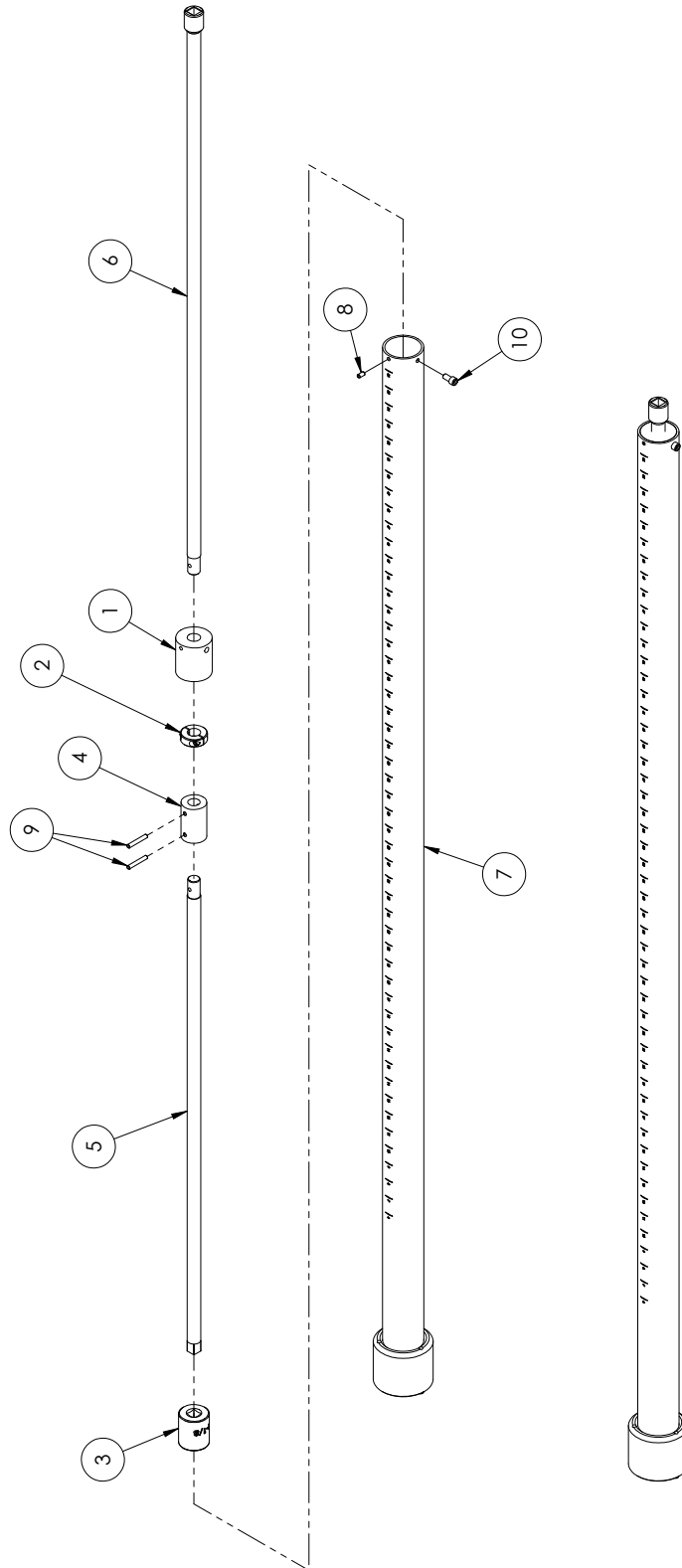
54" Drive Tube Assembly (60-4013-54)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	60-1088-00	1	TUBE END BUSHING
2	60-1093-01	1	5/8" COLLAR, MODIFIED
3	60-1094-00	1	1/2" DRIVE 1/8" HEX SOCKET
4	60-1316-00	1	COUPLING, DRIVE SHAFT
5	60-1322-00	1	54" TUBE ASSEMBLY, EICC
6	60-1323-03	1	DRIVE SHAFT, LOWER 54"
7	60-1324-00	1	1/2" DRIVE EXTENSION, 36" LONG (MODIFIED)
8	90-046-03	1	PIN, 3/16 x 3/8 DOWEL
9	90-046-12	2	PIN, 3/16 X 1-1/4 DOWEL
10	90-050-05	1	SHCS, 1/4-20 X 1/2



56" Drive Tube Assembly (60-4013-56)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	60-1088-00	1	TUBE END BUSHING
2	60-1093-01	1	5/8" COLLAR, MODIFIED
3	60-1094-00	1	1/2" DRIVE 1/8" HEX SOCKET
4	60-1316-00	1	COUPLING, DRIVE SHAFT
5	60-1323-05	1	DRIVE SHAFT, LOWER 56"
6	60-1324-00	1	1/2" DRIVE EXTENSION, 36" LONG (MODIFIED)
7	60-1329-00	1	56" TUBE ASSEMBLY, EICC
8	90-046-03	1	PIN, 3/16 x 3/8 DOWEL
9	90-046-12	2	PIN, 3/16 X 1-1/4 DOWEL
10	90-050-05	1	SHCS, 1/4-20 X 1/2



60" Drive Tube Assembly (60-4013-60)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	60-1088-00	1	TUBE END BUSHING
2	60-1093-01	1	5/8" COLLAR, MODIFIED
3	60-1094-00	1	1/2" DRIVE 1/8" HEX SOCKET
4	60-1316-00	1	COUPLING, DRIVE SHAFT
5	60-1323-06	1	DRIVE SHAFT, LOWER 60"
6	60-1324-00	1	1/2" DRIVE EXTENTION, 36" LONG (MODIFIED)
7	60-1330-00	1	60" TUBE ASSEMBLY, EICC
8	90-046-03	1	PIN, 3/16 X 3/8 DOWEL
9	90-046-12	2	PIN, 3/16 X 1-1/4 DOWEL
10	90-050-05	1	SHCS, 1/4-20 X 1/2

