# Operation Manual

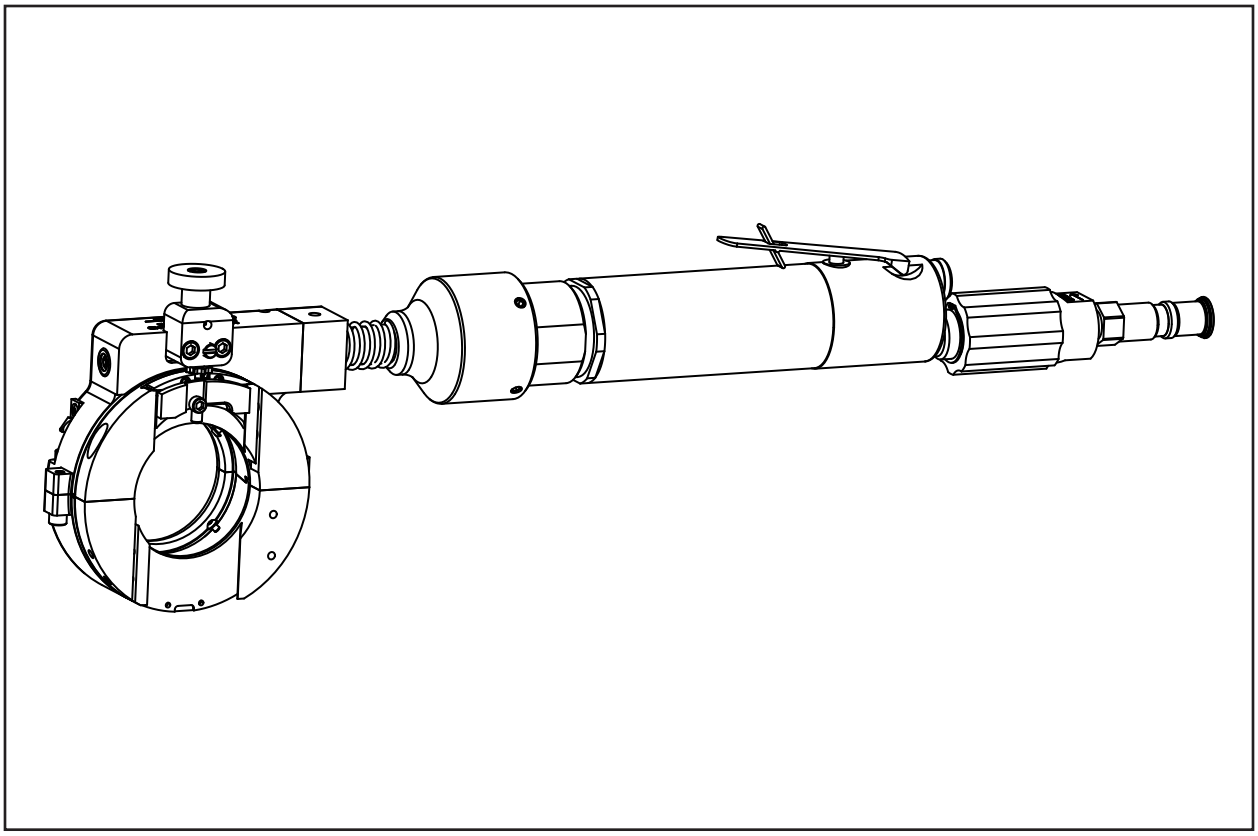
92-1208 Rev. 240924
Model 602SBCM Low Profile Clamshell

TRI TOOL TECHNOLOGIES

# ABOUT TRI TOOL TECHNOLOGIES

At Tri Tool Technologies, we are committed to your success through relentless innovation and powerful partnership. We insist on developing tools and equipment that exceed your expectations of performance, precision, safety, and durability. As a full-service engineering firm, we are here to support you every step of the way.

For more information on engineered solutions, products, and trainings, visit tritool.com or contact our engineers at +1 (916) 288-6100.



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# Tri Tool Technologies Warranty

LIMITED WARRANTY: All products manufactured by Seller are warranted to be free from defects in materials and workmanship under normal use. The period of this warranty shall be three years from the date of shipment for all products, except for welding and Non-Standard Products which shall be one year from the date of shipment. The Buyer shall bear all shipping, packing and insurance costs and all other costs to and from a designated repair service center. All return goods must be authorized in advance and communicated upon issuance of a Return Material Authorization (RMA) by Seller. The product will be returned to the Seller accompanied by a RMA number and associated paperwork, freight prepaid and billed to the Buyer. This warranty is not transferable and will not apply to tool bits or other consumables, or to any Goods to have been (i) mishandled, misused, abused or damaged by Buyer or any third party; (ii) altered without the express permission in writing by Seller, (iii) repaired by a party other than Seller without Seller's prior written approval; or (iv) improperly stored, installed, operated, or maintained in a manner inconsistent with Seller's instructions. This warranty does not apply to defects attributed to (i) normal wear and tear or (ii) failure to comply with Seller's safety warnings.

No warranty for any parts or other supplies provided to seller by buyer, whether or not they are incorporated into goods. Goods supplied by seller which are designed or manufactured by a third party are subject strictly to the third party's warranty for those goods. Seller makes no warranty and disclaims all statutory or implied warranties for these goods, including the implied warranties of merchantability, freedom from patent infringement and fitness for a particular purpose.

Neither this warranty nor any other warranty, expressed or implied, including implied warranties of mechanical ability, fitness for a particular use, or merchantability, shall extend beyond the warranty period. No responsibility is assumed for any incidental or consequential damages. Some states do not allow limitations on how long an implied warranty lasts and some states do not allow the exclusion or limitations incidental or consequential damages, so the above limitation of exclusion does not apply to all Buyers. This warranty gives the Buyer specific legal rights. Other rights vary from state to state.

# Warranty Claims and Remedies

Buyer must promptly notify Seller in writing during the applicable warranty period, of any defective Goods covered by Seller's warranties under the Limited Warranty section herein, and no later than fifteen (15) calendar days after discovery of the defect. Seller has no obligation to honor any warranty claim made after the expiration of the warranty period. However, despite the expiration of the warranty period, Seller, at its reasonable discretion, may accept warranty claims submitted up to fifteen (15) calendar days after the expiration of the warranty period provided that Buyer provides Seller with credible and persuasive documentary evidence that the defect was discovered during the warranty period. No warranty claims submitted after this fifteen (15) day calendar period will be considered by Seller.

Buyer's notice of a defective Goods must identify the specific Goods affected, and the nature of the defect. It is required when returning the defective Goods, that it is suitably packed, fully insured, and transportation and insurance prepaid in accordance with instructions issued by Seller. Seller, at its sole option, will either repair or replace any Goods authorized for return to Seller. Such repair, replacement, or credit shall be Buyer's sole remedy for defective Goods. Buyer must promptly provide Seller with all information requested regarding the identified defect.

If the defect claimed by Buyer cannot be reproduced or otherwise verified by Seller, the Goods will be returned to Buyer unmodified at Buyer's expense.

The warranty period for repaired or replaced Goods shall be (i) ninety (90) days or (ii) the unexpired portion of the original warranty period. Under no circumstances is Seller liable for recall, retrieval, removal, dismantling, re-installation, redeployment, or re-commissioning of any defective Goods or any costs associated therewith.

## Tool Bit Resharpening Policy

Buyer is required to check all tool bits prior to returning and ensure they are packaged well for shipment. The price structure is available from the Seller's sales coordinator. Seller cannot resharpen badly gouged, chipped, or broken tool bits. Seller will return tool bits that are not suitable for resharpening with the tool bits that were resharpened upon Buyer's request. Buyer is responsible for all shipping charges to and from Seller.

# 1. ABOUT THE MANUAL

## Copyright



## Disclaimer

The instructions and descriptions in this manual were accurate when the manual was written. However, the information in the manual is subject to change without notice. Check for updated information before you start any job. The Tri Tool Technologies web site has the most current information.

Do not operate or work on this equipment unless you have read and understood the instructions in this Manual. Failure to follow the instructions or follow the safety instructions could result in serious injury or death. This manual describes conditions and hazards that are common and anticipated during equipment operation. No manual can address all conditions which may occur.

## Safety Symbols

The manual may contain one or more safety symbols. These symbols and the associated text warn you of potentially hazardous conditions. Examples of the safety symbols and the associated text follow:

**DANGER**

**DANGER: Indicates a hazardous situation that, if not avoided, will result in serious injury or death.**

**WARNING**

**WARNING: Indicates a hazardous situation that, if not avoided, could result in serious injury or death.**

**CAUTION**

**CAUTION: Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury, or cause property damage.**

**GLASSES**

**SAFETY GLASSES: Indicates a hazardous situation that requires the use of safety glasses.**

**HOT SURFACE**

**HOT SURFACE: Indicates a hazardous situation that hot surfaces may be present.**

**GLOVES**

**GLOVES: Indicates a hazardous situation that requires gloves.**

**SHOCK HAZARD**

**ARC FLASH & SHOCK HAZARD: High voltage. Entry by authorized personnel only. Appropriate PPE and tools required when working on this equipment.**

**READ MANUAL**

**READ MANUAL: Read manual before use, refer to manual for Tri Tool Technologies machine being used.**

**DISCONNECT FROM POWER**

**DISCONNECT FROM POWER: Disconnect main plug from electrical outlet before performing all maintenance.**

# 2. SAFETY PRECAUTIONS

## In General

Use standard safety equipment such as: hard hats, safety shoes, safety harnesses, protective clothes, and other safety devices when appropriate.

Operate this tool only in accordance with specific operating instructions.


**WARNING: Do not override the deadman switch on the power unit. Locking down, obstructing, or in any way defeating the deadman switch on the power drive unit may result in serious injury.**

## Personal Protective Equipment

Use standard safety equipment such as: hard hats, safety shoes, safety harnesses, protective clothes, and other safety devices when appropriate.

Wear safety glasses.

Do not wear loose clothing or jewelry.

Wear nonskid footwear.

Put long hair in a cap or a net to make sure hair does not get tangled in equipment.

## Personnel

Only personnel who are trained or are being trained may operate the equipment.

Keep the operation manual available where the equipment is used.

The operator must read the operation manual before using the equipment.

The equipment must be operated in accordance with the manual information.

The operator must follow the safety precautions in this manual and good engineering practices to reduce the risk of injury.

Before using the equipment, the operator must ensure that all safety messages on the equipment are legible.

## Work Area

Keep the work area clean.

Keep the area well lit.

Keep items such as electrical cords, cables, rags, rigging straps, away from rotating equipment.

Do not use power-cutting tools in the presence of flammable liquids and gases.

Do not let visitors or untrained personnel near tools that are in use.

Ensure all observers wear eye protection.

Keep proper footing at all times.

## Area Equipment

Secure the pipe with clamps, vises, chains or straps.

Ensure that both sides of the pipe at the cut site are fully supported so that the pipe will not move after the cut is completed. Long lengths of pipe may be under load and the separation of the pipe can release pressure. This pressure can cause both sides of the pipe to move.

## Tool Care

Keep tools in good operating condition. Sharp tool bits perform better and are safer than dull tool bits.

Do not use damaged tools. Always check your tools for damage especially if a tool has malfunctioned, been dropped or hit, check it for damage.

Before you start operating the equipment, do no-load tests and feed function checks.

## Tool Use

Use the right tool and tool bit for the job. Contact Tri Tool Technologies to help with your application.

Keep the tool bits fully engaged in the tool bit holders. Loose bits are sharp and can cause cuts or punctures.

Disconnect power supply during setup and maintenance. Use all ‘Stop’ or Shut off’ features available when changing or adjusting tool bits, maintaining the tool, or when the tool is not in use.

Remove adjusting keys and wrenches before applying power to the equipment. Check the tool before turning it on to make sure that all keys and wrenches have been removed.

Do not force tools. Tools and tool bits function better and safer when used at the recommended speeds.

Do not reach into rotating equipment.

Do not reach into the rotating head stock to remove chips, to make adjustments, or to check the surface finish.

Handle chips with care. Chips have very sharp edges and are hot. Do not try to pull chips apart with bare hands.

Store tools properly. Disconnect tools from the power source, remove the tool bits, and store in a safe place.

# 3. GENERAL DESCRIPTION

The 602SBCM Low Profile Clamshell is a split-frame pipe lathe for severing and beveling inline pipe with a range of 1” through 2” pipe with minimal radial and axial clearances.

The easily adjustable precision bearing surfaces preload and stabilize the rotating head to provide long life, low maintenance, stability and precision.

The Clamshell splits into half for mounting on closed loop systems. All parts are secured to the two halves to avoid loss of parts and provide maximum ease of handling.

The machine is equipped with self-centering Collets.

Dual dovetail Tool Modules with auto-feed sprockets and adjustable gib provide maximum maintainability, life and operator safety with minimum operator training.

The auto-feed star sprockets provide .003” (.08 mm) of radial feed per revolution for a controlled depth of cut.

The drive worm, worm gears and bearing surfaces are covered for Operator safety.

The Operator controls are away from the rotating Headstock for safety.

The modular design concepts provide quick, easy maintenance and maximum versatility in drive and tooling options.

Detachable Bayonet type motor provides maximum handling ease and low axial clearance. A flexible Drive Shaft is also available to bring the motor away from the tool.

# 4. SPECIFICATIONS

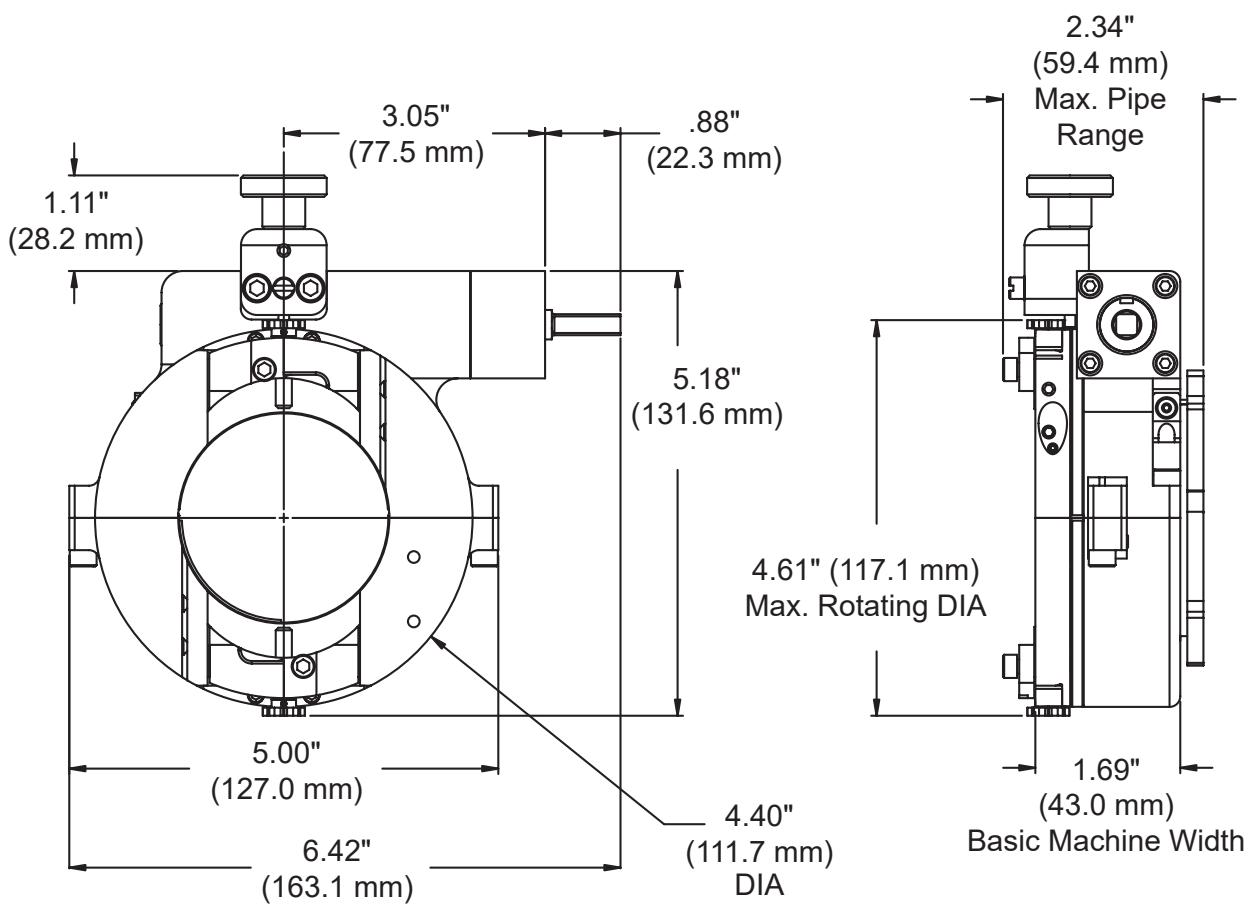



**Figure 1: Model 602SBCM Low Profile Clamshell Envelope Drawing**

| | |
|---|---|
| Weight (Basic Machine) | 6.0 lbs. (2.67 kg) |
| Weight (Motor) | 5.35 lbs. (1.68 kg) |
| Main Drive Gear | Worm Drive |
| Motor Mount | Bayonet Type |
| Clamping | Collet Type |
| Pipe Size Range | 1" through 2" Pipe |
| Tool Bit Feed Rate | .003" (.08 mm) per revolution |

# 5. COMPONENT OVERVIEW

## Clamshell

The Clamshell is the main part of the machine. The Clamshell has the Collet, which secures the Clamshell to the pipe, two tool bit Mounting Blocks and Feed Mechanisms, a Tripper Pin, which is engaged or disengaged to either feed or not feed the tool bits in to the pipe, and the Drive Shaft to rotate the Machining Head with mounting provisions for the Air Motor. When engaged, the Tripper Pin causes the tool bit to advance .003 inches every revolution of the machine.

## Air Motor

The Air Motor powers the rotation of the Machining Head. The Motor can either be directly attached to the Clamshell or connected to it through a flexible shaft. A spring-energized twist-lock coupling connects these components together. There is a twist-action throttle on the handle of the Air Motor for controlling its speed.

## Flexible Drive Shaft

Use the flexible Drive Shaft when space restrictions prevent the Air Motor to be directly attached to the Clamshell. The flexible Drive Shaft is 18” inches long and has a spring-energized twist-lock coupling at each end.

## Tool Bits

The rotating Head of the Clamshell has Tool Holders that allow two tool bits to be used simultaneously. There are several tool bits designed for use with this machine. Tool bit selection depends on what kind of cut is being made. Refer to TOOL BITS section for a list. Use a 8-32 hex-socket cap screw to secure a tool bit to the Tool Holder. Use a 9/64-inch hex wrench to remove the cap screw to replace tool bits.

## Tripper Pin

The Tripper Pin is engaged or disengaged to either feed or not feed the tool bits in to the pipe. When engaged, the Tripper Pin advances the tool bit .003 inches every revolution of the Machine Head.

## Collets

A set of four wedge-type Collet pieces secure the Clamshell to the pipe. A Collet Set is specially sized to match the size pipe being machined. Secure each Collet piece to the Clamshell with a 4-40 hex-socket button-head cap screw. Use a 1/16-inch hex wrench to remove the cap screw for Collet piece replacement.

# 6. SETUP AND INSTALLATION

## Hand Tools

- Feed Sprocket Driver
- 9/64” Hex Wrench for Tool Bit Screws
- 5/32” Hex Wrench for Clamshell Screws
- One Spanner Wrench and Torque Wrench for Collet Nut
- Ratchet Wrench and 1/4” Square Socket for Drive Shaft
- 1/16” Hex Wrench for Collets
- 3/32” Hex Wrench for Tool Modules Adjustment Screws
- 7/64” Hex Wrench for Bearing Locking Screws
- 5/64” Hex Wrench for Bearing Adjustment Screws
- 5/16” Hex Wrench for Pin Removal Tool

## Prepare the Clamshell

1. Before use, clean the equipment.
2. Lubricate the tool. Use EP grease on sliding surfaces and use oil, 10-weight or less, on other surfaces.

## Install the Collet Set

1. Determine the size of the pipe you are going to machine.
2. Refer to COLLETS section to determine which Collet set to use.
3. Determine the size of the Collet Set that may be in the Clamshell.

   **NOTE: If you need to replace the Collet Set, use a 1/16” hex wrench to remove the button head cap screw. This screw secures the Collet to the Clamshell. You may need to split the Clamshell.**

4. Attach the replacement Collet pieces to the Clamshell.
5. Adjust the Collet pieces so the thick side is toward the Collet net threads.
6. Tighten the button head cap screws until they retain the Collet but allow the Collet to move freely.

## Install the Tool Bit Set

1. Refer to TOOL BITS section and determine the tool bits you will need.
2. Use the #8-32 socket-head cap screws to install the tool bits on the Tool Blocks.
3. Use a 9/64” hex wrench to tighten the socket head cap screws.
4. Use the sprocket driver to retract the two Tool Blocks.
5. Make sure that the following are available:
   - Air Supply, 32 CFM at 90 PSI
   - Lube oil added at 2 to 4 drops per minute
   - Cutting fluid, if permitted. (Reduce cutting speeds if you do not use cutting fluid.)

## Install the Clamshell On the Pipe

1. Make sure that the Tool Blocks are fully retracted.

   **NOTE: If you can install the Clamshell over the end of the pipe, go to the “Secure the Clamshell On the Pipe” section. If not, then do the following:**

2. Remove the Collet Nut.
3. Use the ratchet wrench on the Drive Shaft to line up the two halves of the Rotating Gear with the Stationary Housing.
4. Ensure that the top of the cap screws are in line with each other.
5. Unscrew the four #10-24 cap screws that hold the Clamshell halves together.

   **NOTE: These screws are retained in the Clamshell halves so they will not fall out. The halves should easily separate.**

6. Loosen the gear splitline screws.

   **NOTE: When you reassemble the Clamshell, tighten the housing splitline screws first.**

7. Make sure that the mating surfaces of the Clamshell halves do not have dirt or debris.
8. Put the two Clamshell halves on the pipe and mate them.
9. Use a 5/32” hex wrench to tighten the four #10-24 cap screws.
10. Place two halves of the Collet Nut around the pipe and then, screw the nut into the Clamshell, but do not tighten it.

## Secure the Clamshell On the Pipe

1. Position the Clamshell on the pipe so the tool bits cut in the desired location and allow enough clearance for the Air Motor (use the flexible drive if there is not enough clearance).
2. Tighten the Collet Nut with the spanner wrench and hold the machine in place with the torque wrench.
3. Make sure that the Clamshell is securely clamped to the pipe.

## Set the Tool Bit Position

1. Use the Feed Sprocket wrench to lower the severing tool bit until it touches the pipe. The tool bit moves .025” for each full turn of the Feed Sprocket.
2. Turn the wrench in the opposite direction until the backlash in the Feed Screw is removed. (Although it takes more effort to turn the wrench, the tool bit will not move.)
3. Raise the severing tool bit three turns of the Feed Sprocket.

   **NOTE: When cutting 1” or oversized piping this may not be possible. Turn the wrench in the opposite direction until the backlash in the Feed Screw is removed.**

## Align the Feed Sprocket and Beveling Bit

1. Align the Feed Sprocket so opposing teeth are in line with the pipe.
2. Repeat these steps for the beveling bit, except raise it three and one-half turns off the surface of the pipe.
3. With the Tripper Pin disengaged, use the ratchet wrench to slowly rotate the head.
4. Verify that both tool bits can clear the diameter of the pipe without contacting anything. If it appears that either tool bit will contact the pipe surface, stop the head and make adjustments such as raising both tool bits by the same amount, removing the interference, and repositioning the machine.

5. With the Tripper Pin engaged, slowly rotate the head one revolution.
6. Make sure that the Tripper Pin moves each of the Feed Sprockets correctly.

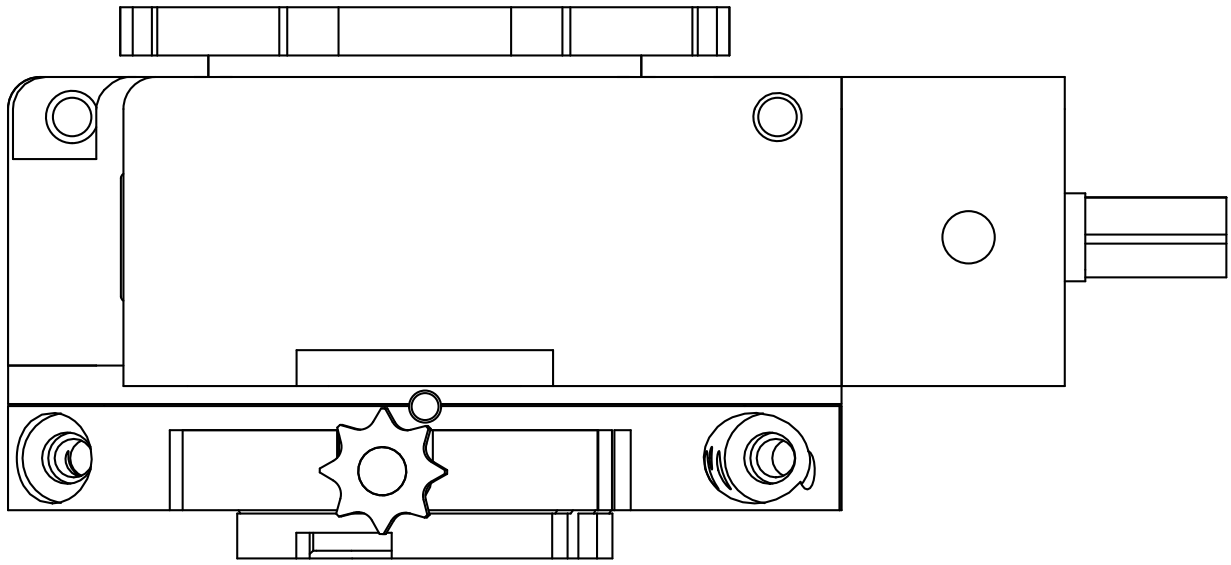


**Figure 2: Feed Sprocket Alignment**

## Attach the Air Motor

1. Attach the Air Motor to the Clamshell directly or with the flexible Drive Shaft.
2. Connect the air supply to the Air Motor.

# 7. OPERATION


**DANGER: Do not override the deadman switch on the power unit. Locking down, obstructing, or in any way defeating the deadman switch on the power drive unit may result in serious injury.**

## Cut the Pipe

**NOTE: Each tool bit is lowered into the cut .003 inches every time it passes the tripper pin, if the tripper pin is engaged.**

1. Verify that the Tool Block Feed Sprockets are correctly aligned to prevent damage during operation.
2. Engage the Tripper Pin to feed the tool bit into the pipe.
3. Slowly run the Tool Blocks around the pipe and verify tool bit positioning and clearance.
4. Increase the speed of the Air Motor to full speed.
5. Watch the cutting action as the tool bits begins to cut the pipe. If looseness or another problem is seen, stop the machine and fix the problem before continuing.
6. Apply cutting fluid, if applicable, to the application.
7. Monitor the temperature of the body of the tool. If it becomes excessively hot then the main bearing is too tight and requires adjustment. Refer to the “Adjust the Main Bearings” section on page 20.
8. If a chip tangles in the head, disengage the Tripper Pin for two or three revolutions.
9. Stop the machine and remove the chips.

## Remove the Clamshell

1. Use the Feed Sprocket driver to retract the tool bits until they clear the pipe.
2. Remove the Clamshell from the pipe.
3. If the Clamshell must be disassembled to remove it from the pipe, do the following:
   a. Remove the Air Motor and flexible Drive Shaft if present.
   b. Use the ratchet wrench to rotate the head until the split lines of the head and the Clamshell match.
   c. Retract the tool bits.
   d. Loosen the Collet Nut using the spanner wrench and the torque wrench.

4. If the Clamshell must be split to remove the tool from the pipe, do the following:
    a. Remove the Collet Nut.
    b. Unscrew the four #10-24 cap screws holding the two halves of the Clamshell together using the 5/32” hex wrench.
    c. The cap screws will not fall out of the Clamshell when fully unscrewed.
    d. Remove the two halves of the tool from the pipe.
5. If the Clamshell will not be used soon, re-assemble the two halves and tighten the four screws between 5 to 7 ft-lbs.
6. Reinstall the Collet Nut.
7. Allow the Clamshell to cool before you use it again.

# 8. MAINTENANCE

## General Maintenance Information

This section describes maintenance procedures that an Operator can do. Procedures beyond the scope of this section must be done by a Tri Tool Technologies representative.

- Keep all equipment in good working condition and inspect it regularly. If equipment is not in good working condition, repair it.
- The air supply for the Model 602SBCM requires an adequate filter/lubricator (FRL).
- The motor warranty is void if damage occurs from contaminated air or lack of lubrication.
- Use only Tri Tool Technologies replacement parts.

## Service Intervals

**Daily/Start of Shift/Installation**

- Adjust tool module slides.
- If the Clamshell is collects debris while cutting, clean the Tool Block and the feed screws cleaned before each cutting operation.
- Inspect all parts for damage due to chips, impact or improper use.
- Wipe the machine to remove cutting fluids, dirt ,and grime. Coat it with a light film of oil.
- Repair or replace broken or damaged parts as necessary.
- Report defects.
- Coat it with a light film of oil.

**20 Hours of Operation**

- Check the adjustment of the Main Bearing pre-load. It should only take a light force to rotate the Drive Shaft with the ratchet wrench.
- Check the adjustment of the Tool Module slides and Gib Rails.
- Lubricate the male and female Tool Slides and the feed screw.

**40 Hours of Operation**

- Thoroughly clean and lubricate the Main Gear, Drive Gear, male and female Tool Slides, feed screws and Tripper Block Assembly.

## Remove the Tripper Pin

1. Loosen 33-0954 Half Dog Set Screw.
2. Loosen 30-0125 Ball Plunger.
3. Remove the Tripper Shaft Assembly (P/N 14-0097) from the Tripper Block Assembly (P/N 47-1521).
4. Remove the Cap Screw (P/N 33-2649) and the Knob (P/N 42-0217) from the Tripper Shaft (P/N 20-0803).

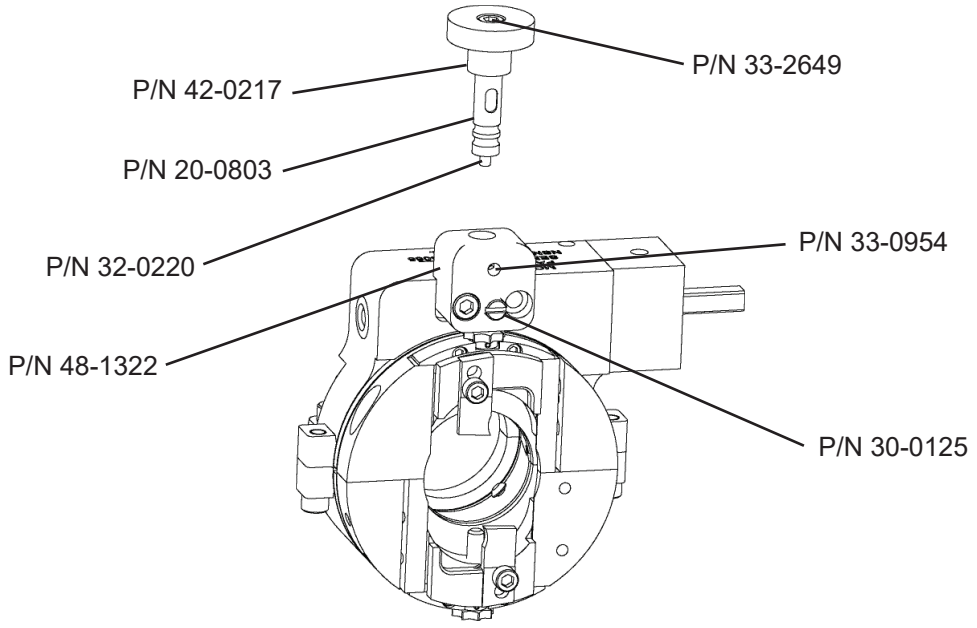



**Figure 3: Remove the Tripper Shaft Assembly**

5. Insert the Tripper Shaft into the Pin Removal Tool (P/N 08-0804).
6. Thread the Pin Removal Screw into the block, tighten with a 5/16” hex wrench (P/N 36-0011) until the pin is removed.

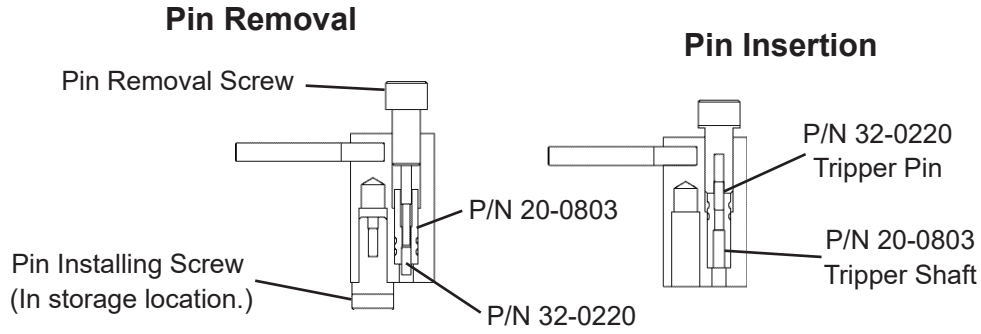



**Figure 4: Remove the Tripper Pin**

## New Tripper Pin Installation

1. Unscrew the Pin Removal Screw.
2. Remove the Tripper Shaft (P/N 20-0803) from the tool.
3. Start the Dowel Pin (P/N 32-0220) in the Tripper Shaft, insert tapered end.
4. Insert Tripper Shaft and Dwell Pin into the Tool.
5. Thread the Pin Installing Screw into Tool. Tighten screw until it stops, to set the pin to the proper depth.
6. Remove the Pin Installing Screw.
7. Remove the Tripper Shaft and Pin.
8. Reassemble the Tool with the Pin Removal and Installing Screws.

## Reassemble Tripper Shaft Assembly

1. Apply Locktite 242 to the Cap Screw (P/N 33-2649).
2. Insert the Tripper Shaft Assembly in the Tripper Block (P/N 48-1322).
3. Apply 242 Locktite to the Half Dog Set Screw (P/N 33-0954). Screw in all the way and back off 1/4 turn.
4. Apply 242 Locktite to Ball Plunger Screw (P/N 30-0125). Screw in all the way and back off 1/2 turn.

## Cleaning and Adjusting the Tool Block Slide

1. Loosen Tool Module adjustment screws.
2. Use a 3/32” wrench to remove the star wheel block screws.
3. Remove the Tool Module slide and unscrew the feed screw.
4. Clean and lubricate the male and female slide surfaces.
5. Clean and lubricate the feed screw.
6. Reinstall the feed screw into the Tool Module Slide then reinstall the Tool Module Slide.
7. Install the star wheel block screws and tighten them.
8. Move the Tool Bit Holder to the top of the Tool Module.
9. Use the 3/32” wrench to turn the top adjustment screw until it touches off.
10. Tighten the top adjustment screw.
11. Use the Feed Sprocket driver to turn the star wheel counter-clockwise. The tension should be light to firm.

12. Continue to lower the tool bit slide. Use the 3/32” wrench to turn the lower adjustment screw until it touches off.
13. Tighten the lower adjustment screw when the Tool Bit Holder is being turned down to its lower position.
14. Turn the star wheel clockwise to retract the Tool Bit Holder to the top position. The feed pressure of the feed screw should have a light to firm resistance and remain the same from the bottom to the top of the Tool Module block.

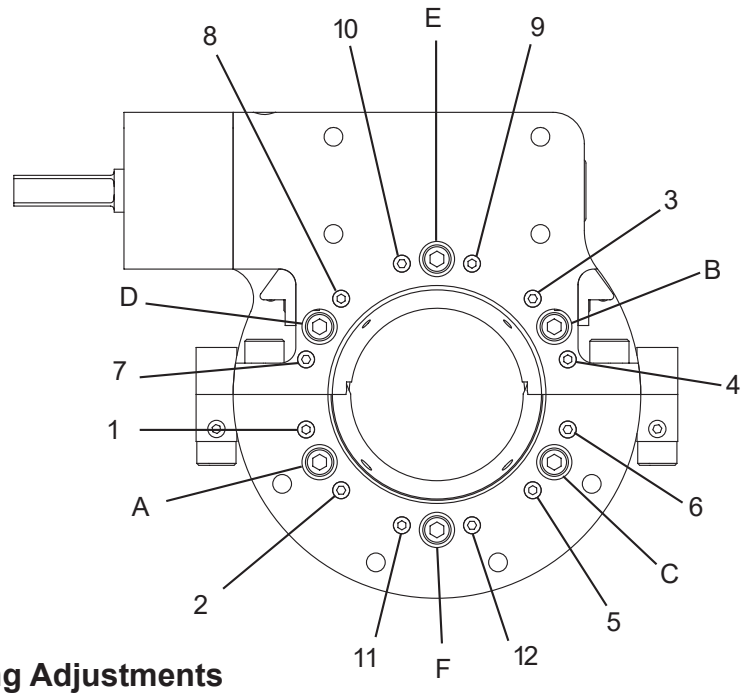



**Figure 5: Bearing Adjustments**

## Adjust the Main Bearings

1. Loosen the main bearing locking screws one full turn with the 7/64” wrench. The locking screws are labeled A through F. Refer to Fig.5.
2. Back off the Main Bearing adjustment screws 1/2 turn with the 5/64” wrench. The Main Bearing adjustment screws are labeled 1 through 12.
3. Lower adjustment screws 1 and 2 until they touch, then back them off 1/8 turn. Repeat this for screws 3 and 4, 5 and 6, 7 and 8, 9 and 10, and 11 and 12.
4. Turn the 1/4” square drive with the ratchet and make sure there are no tight areas in the Main Bearing. (It should turn without any resistance.) If there are spots of resistance, repeat steps 1 through 4.
5. Tighten the Main Bearing locking screws, start with A and go through to F.
6. Recheck the bearing adjustment using the 1/4” square drive. It should be a little looser.

# 9. STORAGE

## General Storage

1. Remove all chips and debris from the tool.
2. Remove tool bits with the 9/64” hex wrench and store them in their container.
3. Inspect the tool. Check for loose, worn, or damaged components and replace them.
4. Lubricate and spray the tool with a rust preventative before you store it.

## Long-Term Storage (30+ Days)

Do the general storage procedures and lubricate the Air Motor.

## Lubricate the Air Motor

1. Remove the air quick disconnect and spray it with a lightweight oil.
2. Squirt oil into the male quick disconnect.
3. Reconnect the air line and turn on the Air Motor for 1 or 2 seconds to coat the internal components.

# 10. CUTTING SPEEDS AND FEEDS

Use 200 surface inches per minute (5080 surface millimeters per minute) for:

- Stainless steels in general when no coolant is allowed, all heavy-wall tube and some chrome/molybdenum steels.

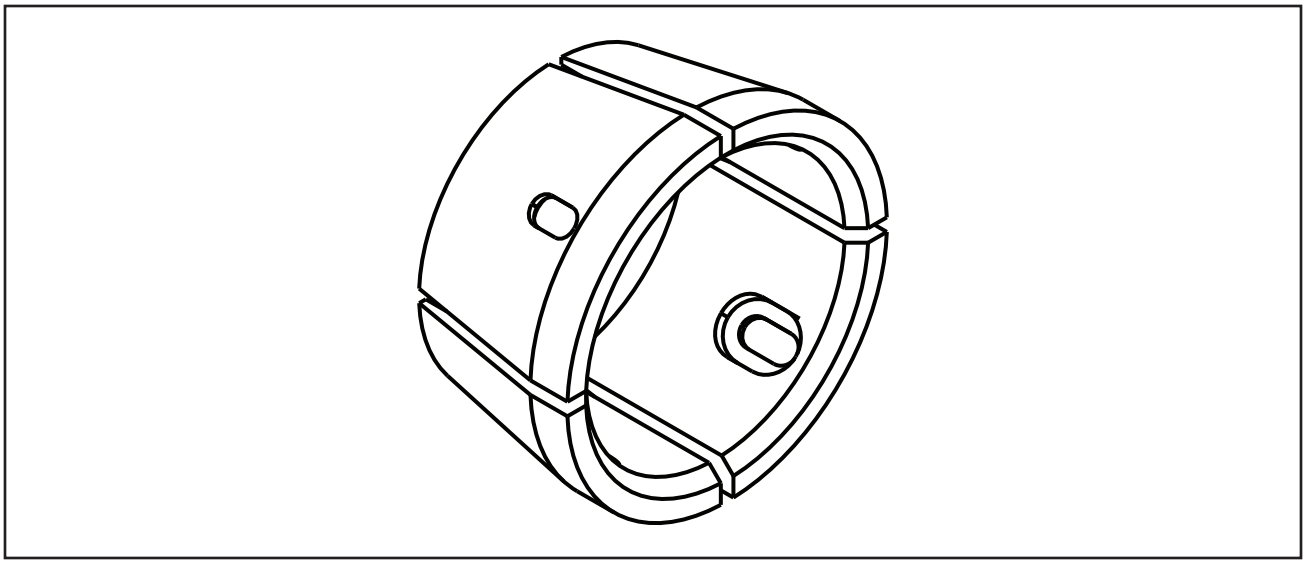
Use 250 surface inches per minute (6350 surface millimeters per minute) for:

- Mild steels and some thin-wall stainless steels when coolants are permitted and applied.

Use 300 surface inches per minuter (7620 surface millimeters per minute) for:

- Aluminum and some thin-wall mild steel and tube with coolants.

# 11. COLLETS

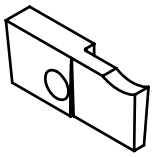
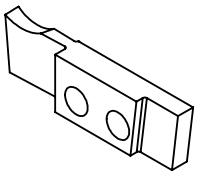
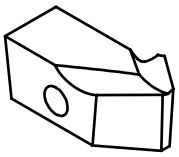
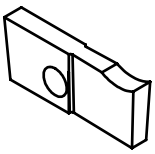


## Collets for 602SBCM Clamshell

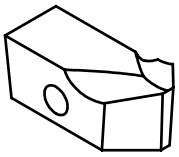
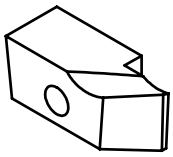
| Pipe Size | DIA Decimal | DIA Metric | Collet P/N |
|---|---|---|---|
| 1” | 1.315” | 33.40mm | 30-2897 |
| | 1.440” | 36.58mm | 30-3218 |
| 1-1/4” | 1.660” | 42.16mm | 30-2898 |
| 1-1/2” | 1.900” | 48.26mm | 30-2899 |
| 2” | 2.375” | 60.33mm | 30-2900 |

# 12. TOOL BITS

## Standard Tool Bits

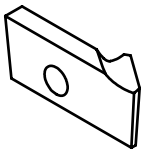
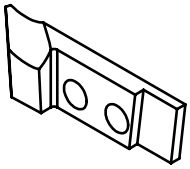
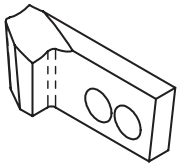
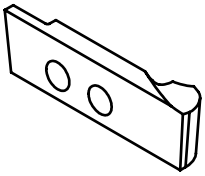
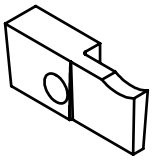
| | | | |
|---|---|---|---|
| Sever Lead | 99-5941C4 | |  |
| Sever Lead | 99-7140C4<br>(1” Sch 80) | |  |
| Double Bevel<br>Use with 99-5941 | 99-5942C4* | 37 1/2° |  |
| Sever Trail<br>Use with 99-5941 | 99-5943C4 | |  |

## Accessory Tool Bits

| | | | |
|---|---|---|---|
| Double Bevel<br>Use with 99-5941 | 99-6003C4*<br>99-7008C4*<br>99-6004C4* | 42 1/2°<br>45°<br>47 1/2° |  |
| LH Single Bevel<br>Use with 99-5941 | 99-5999C4*<br>99-7010C4*<br>99-6000C4* | 42 1/2°<br>45°<br>47 1/2° |  |

**Requires 33-2930 SCREW, CAP, #8-32 X 5/8 SS*

## Accessory Tool Bits *(continued)*

| | | | |
|---|---|---|---|
| RH Single Bevel<br>Use with 99-5941C4 | 99-6337C4<br>99-5990C4<br>99-6001C4<br>99-7009C4<br>99-6002C4 | 33 1/2°<br>37 1/2°<br>42 1/2°<br>45°<br>47 1/2° |  |
| RH Single Bevel<br>Use with 99-7140C4 | 99-7141C4<br>(1” Sch 80) | 42 1/2° |  |
| RH ‘J’ Bevel<br>Use with 99-5941C4 | 99-6338C4 | 30° |  |
| RH ‘J’ Bevel<br>Use with 99-7140C4 | 99-7074C4<br>(1” Sch 80) | 27 1/2° |  |
| Sever Trail<br>Use with 99-5941C4 | 99-6357C4 | |  |

**NOTE: A ‘Right Hand Bevel’ is on the same side of the cut as the 602SBCM.**
**A ‘Left Hand Bevel’ is on the opposite side of the cut from the 602SBCM.**

# 13. TROUBLESHOOTING

## Problem: Tool Bit Chatters

The tool bit is loose or overextended.

The tool bit is damaged.

The tool holder is too loose in the slides.

The cutting speed is too fast.

The clamping pads are loose on the pipe or tube.

Cutting fluid is required.

The main bearing pre-load is loose.

## Problem: Excessive Tool Bit Wear

The pipe or tube material is too hard or abrasive.

The cutting speed is too fast.

Cutting fluid is required.

A dull Tool Bit is causing surface hardening conditions (Stainless pipe or tubing).

There is scale or other foreign matter on the pipe or tube, which is dulling the tool bit at the start of the cut.

The tool bit is incorrect for the material being cut.

## Problem: Rough Surface Finish

The tool bit is dull, chipped, etc.

Metal build-up on the cutting edge of the tool bit is creating a false cutting edge.

Cutting fluid is required.

The cutting speed is incorrect.

## Problem: Tool Holder Is Not Feeding

The feed pin is broken or out of position.

The feed sprocket shear pin is broken.

The feed screw is stripped.

The feed nut is stripped.

The slide rails are too tight.

## Problem: Loss Of Air Power

The air supply pressure is too low.

The air filter is plugged.

The air line size is insufficient.

The air line is too long.

## Problem: Loss Of Hydraulic Power

The hydraulic supply pressure is too low.

The hydraulic filter is plugged.

The hydraulic line size is insufficient.

The hydraulic line is too long.

## Problem: Tool Bit Does Not Reach Work

Incorrect tool blocks are installed for the size of the pipe or tube being worked on.

Incorrect tool bit is installed.

## Problem: Air Motor Does Not Start

The air power supply is shut off.

The air motor is damaged and will not run free.

The air motor needs lubrication. Add lubrication and do not run the air motor for a few minutes, then try running the motor.

Sand or other foreign material may be in the vanes of the air motor. Tap on the side of the air motor casing lightly with a piece of wood or with a soft rubber mallet just in case the vanes may be sticking.

## Problem: Hydraulic Motor Does Not Start

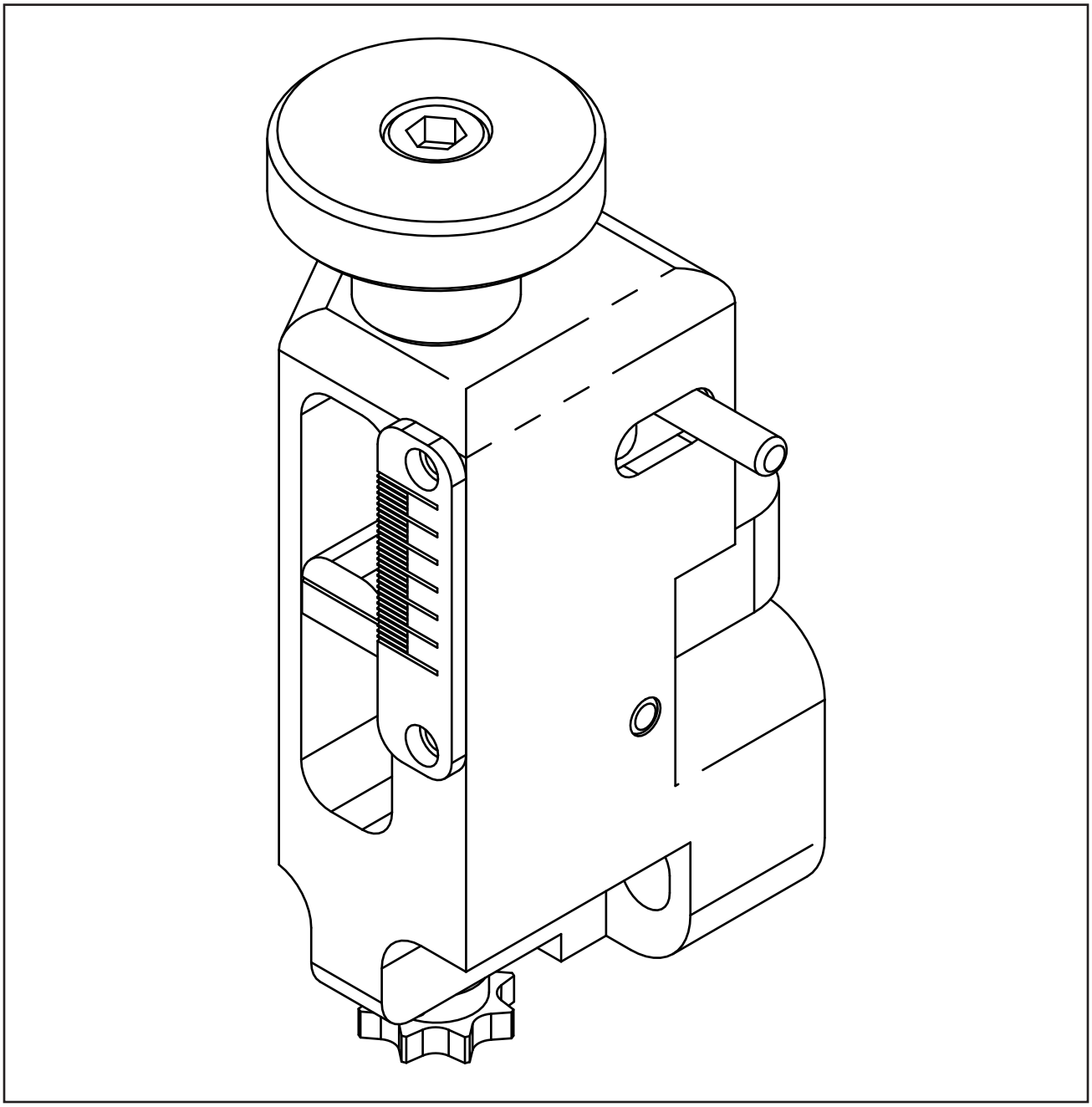
The hydraulic power supply is shut off.

The hydraulic motor is damaged and will not run free.

# 14. ACCESSORIES

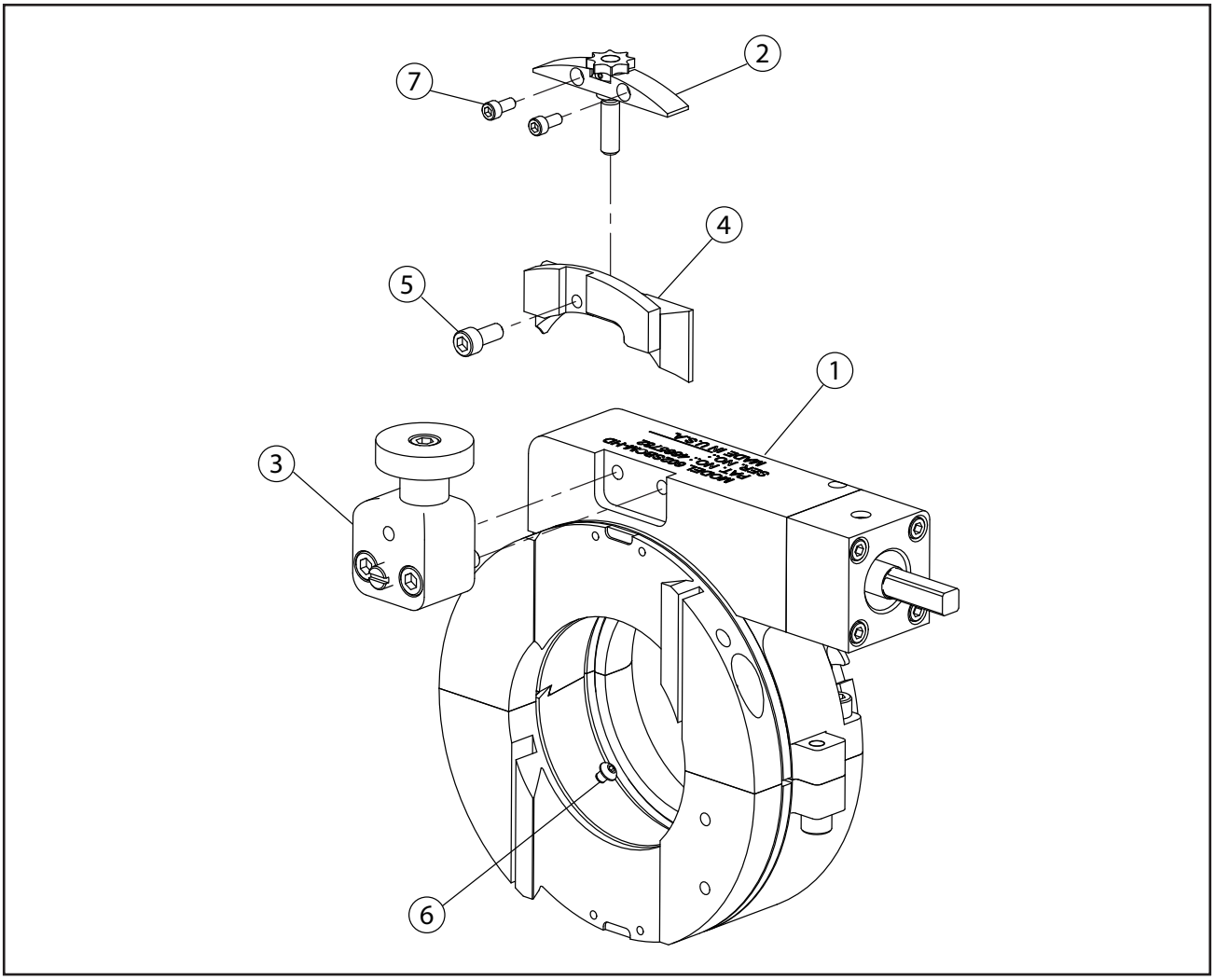
Accessories for the Model 602SBCM Clamshell are available from Tri Tool Technologies.

| Part No. | Description | Qty |
|---|---|---|
| 05-0686 | KIT, AUTO-DISENGAGE TRIPPER | 1 |



# 15. ILLUSTRATED PARTS BREAKDOWN

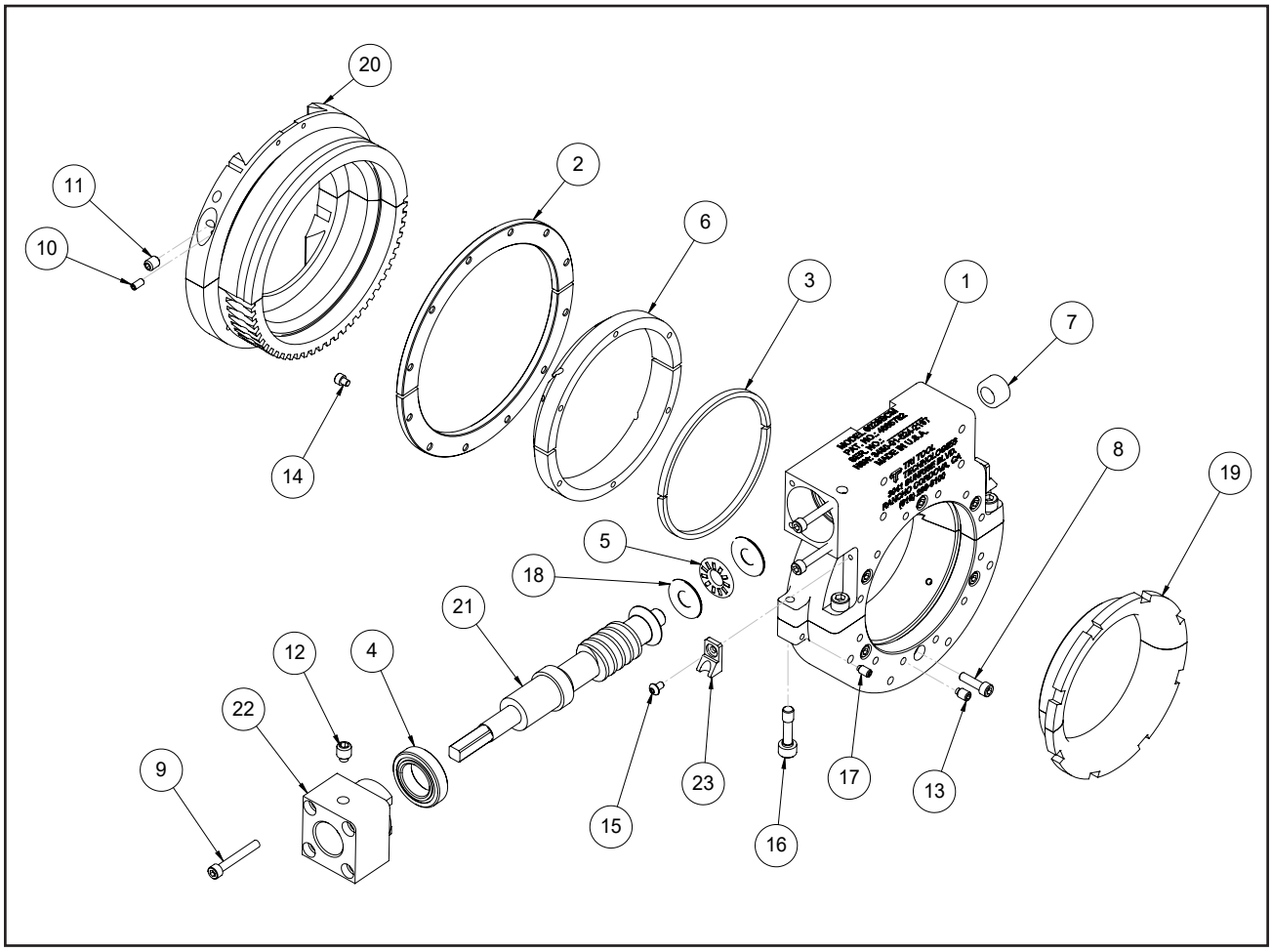
## MODEL 602SBCM CLAMSHELL (P/N 01-1819)




Parts List, Model 602SBCM Clamshell (P/N 01-1819)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 02-2422 | 602SBCM SUB-ASSEMBLY | 1 |
| 2 | 38-0170 | SPROCKET ASSEMBLY, FEED | 2 |
| 3 | 47-1521 | BLOCK ASSEMBLY, TRIPPER | 1 |
| 4 | 49-0413 | HOLDER, TOOL | 2 |
| 5 | 33-2647 | SCREW, CAP #8-32 x 3/8", SST | 2 |
| | 33-2930 | SCREW, CAP #8-32 X 5/8", SS | 2 |
| 6 | 33-2531 | SCREW, BUTTON #4-40 X 3/16" | 4 |
| 7 | 33-2644 | SCREW, CAP, #4-40 X 1/4", SST | 4 |

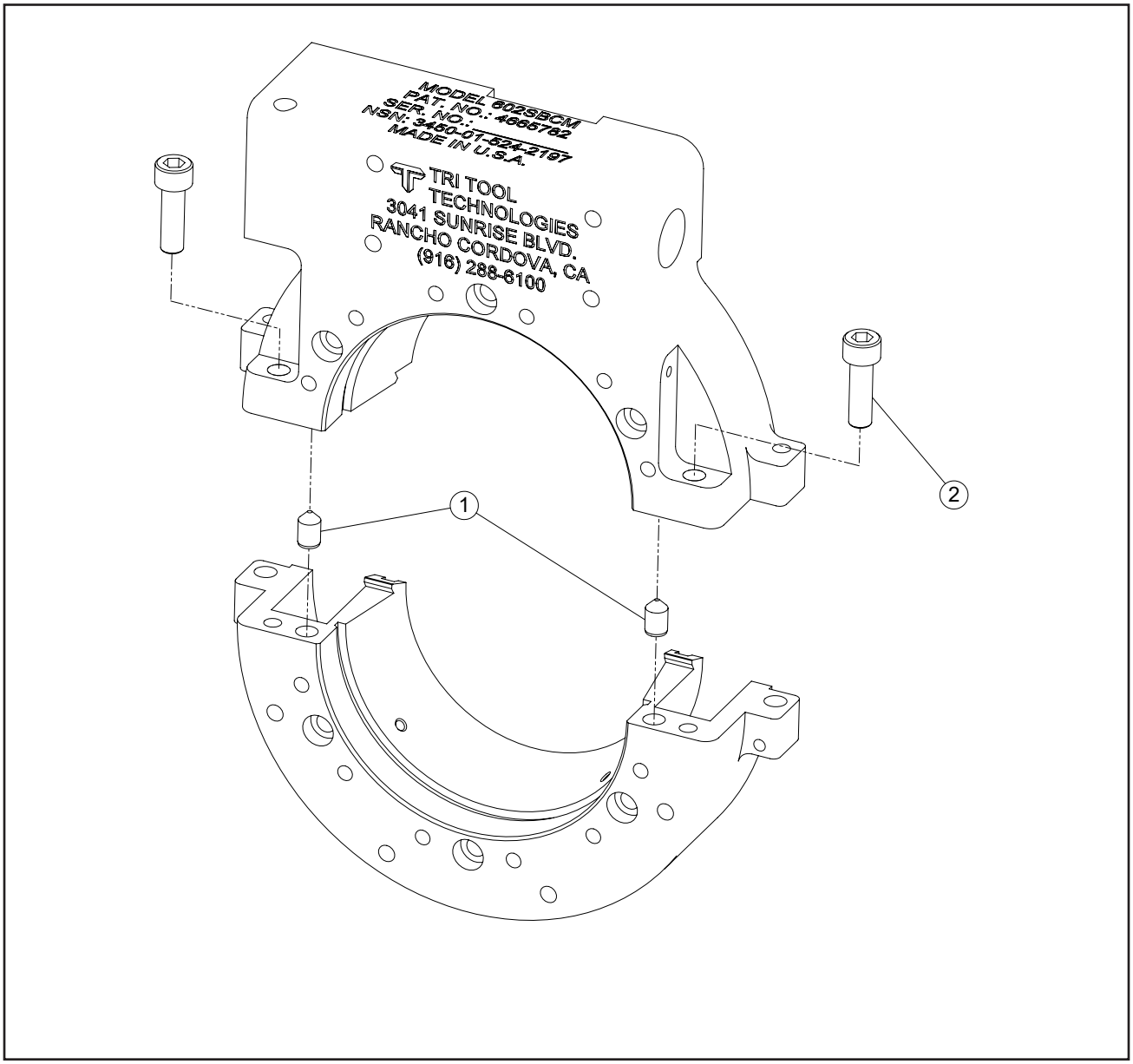
# MODEL 602SBCM SUB-ASSEMBLY (P/N 02-2422)



Parts List, Model 602SBCM Sub-Assembly (P/N 02-2422)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 19-1087 | HOUSING, MAIN | 1 |
| 2 | 24-2369 | PLATE,THRUST, 602SBCM | 1 |
| 3 | 28-0367 | SEAL, FELT, 3/32 X 1/8 X BULK | 8.75 |
| 4 | 29-0064 | BEARING, BALL, 5/8" X 1-1/16" X 9/32" | 1 |
| 5 | 29-0190 | BEARING, THRUST, 5/16 X 3/4 X 5/64 | 1 |
| 6 | 29-0476 | BEARING, MAIN | 1 |
| 7 | 29-0404 | BEARING, NEEDLE, .3125" I.D. | 1 |
| 8 | 33-2645 | SCREW, CAP, #6-32 X 1/2, SST | 6 |
| 9 | 33-2646 | SCREW, CAP, #6-32 X 1, SST | 2 |
| 10 | 33-0450 | SCREW, SET 4-40 X 1/4, CUP PT | 2 |
| 11 | 33-0488 | SCREW, SET, 10-24 X 1/4 CUP PT | 4 |
| 12 | 33-0903 | SCREW, SET, 1/4-20 X 5/16, HALF DOG | 1 |
| 13 | 33-1605 | SCREW, SET, 8-32 X 1/4, HALF DOG | 12 |
| 14 | 33-2266 | SCREW, CAP, #4-40 X 1/8 | 12 |
| 15 | 33-2531 | SCREW, BUTTON, #4-40 X 3/16 | 2 |
| 16 | 33-2501 | SCREW, SPLITLINE | 2 |
| 17 | 33-2502 | SCREW, SET, #6-32 X 1/4 HALF DOG | 2 |
| 18 | 34-0202 | WASHER, THRUST, 5/16 X 3/4 X 1/32 | 2 |
| 19 | 35-0592 | NUT, CLAMP | 1 |
| 20 | 39-0915 | GEAR, MAIN, 602SBCM | 1 |
| 21 | 39-0916 | GEAR, WORM | 1 |
| 22 | 43-0577 | COVER, WORM | 1 |
| 23 | 48-2076 | BLOCK, RETAINING | 2 |
| 24 | 33-2648 | SCREW, CAP, #10 - 24 X 1/2", SS | 2 |
| 25 | 33-2649 | SCREW, CAP, 10-24 X 5/8, SS | 2 |
| 26 | 33-3152 | SCREW, CAP, #6-32 X 7/8, SS | 2 |

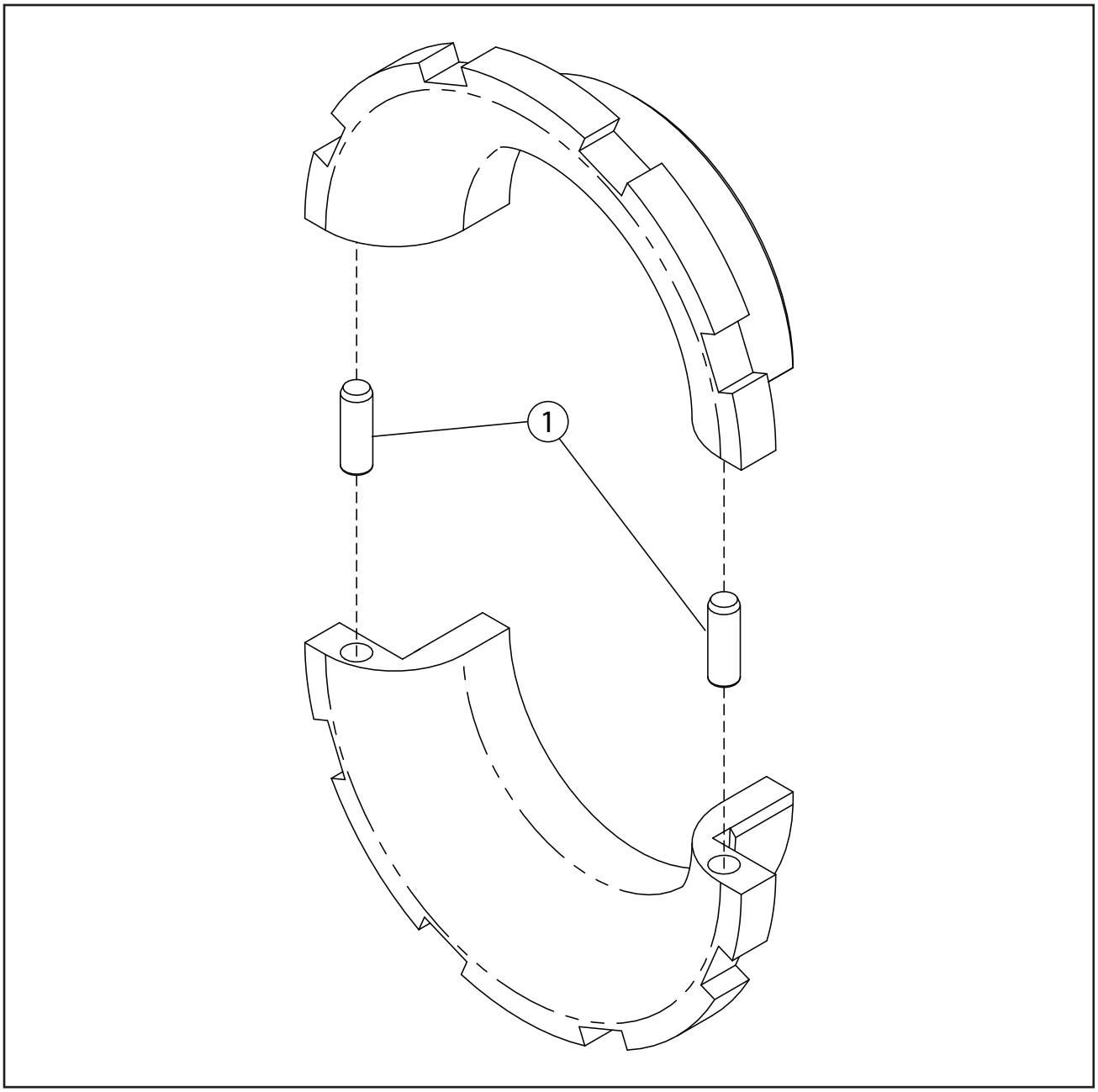
# HOUSING, MAIN, HEAVY DUTY (P/N 19-1087)




Parts List, Housing, Main, Heavy Duty (P/N 19-1087)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 32-0598 | PIN, ALIGN, 3/16" DIA X 5/16" | 2 |
| 2 | 33-2649 | SCREW, CAP, #10-24 X 5/8", SST | 2 |

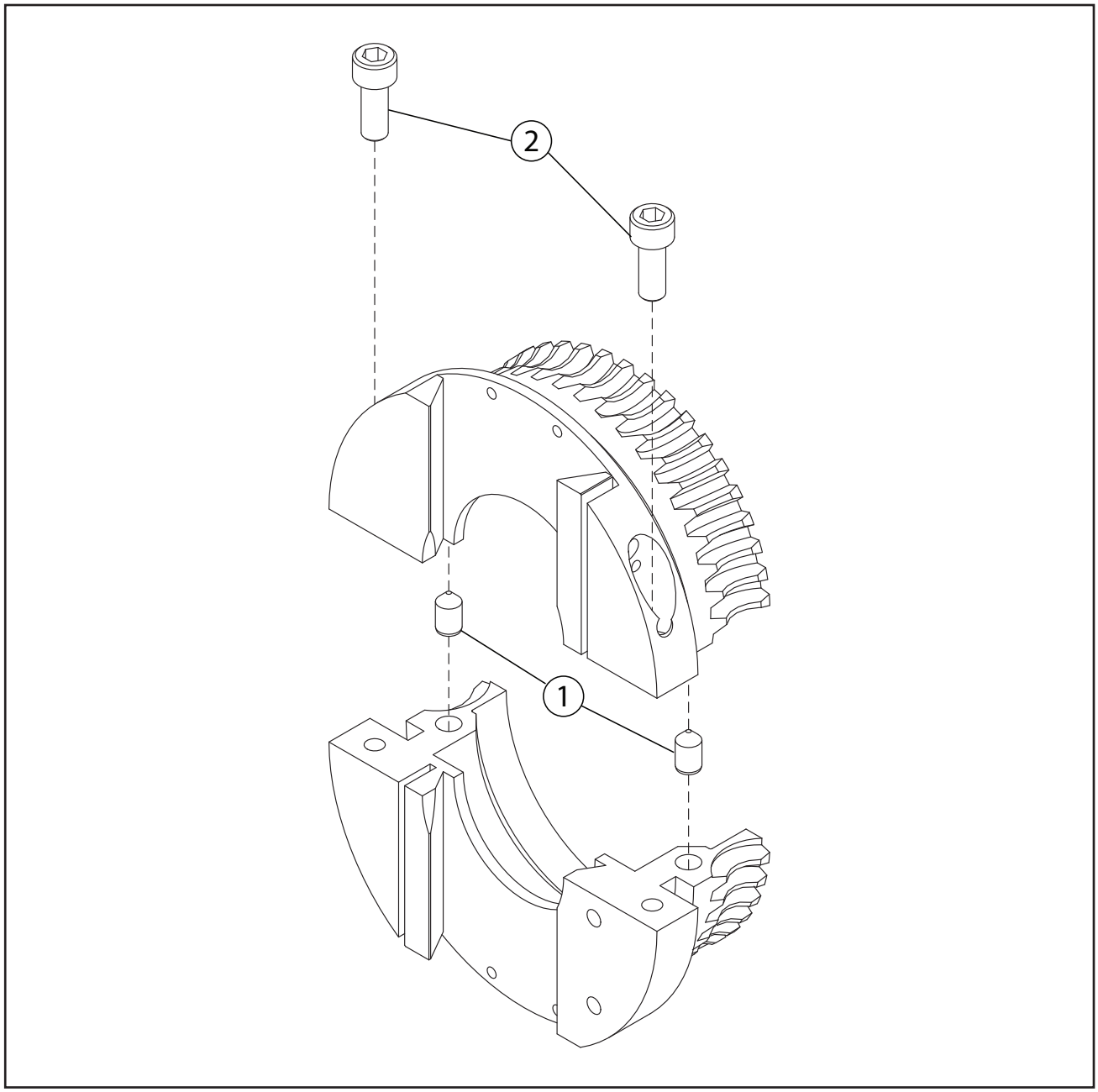
## NUT, CLAMP (P/N 35-0592)




Parts List, Nut, Clamp (P/N 35-0592)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 32-0220 | PIN, DOWEL, 1/8” DIA X 3/8” | 2 |

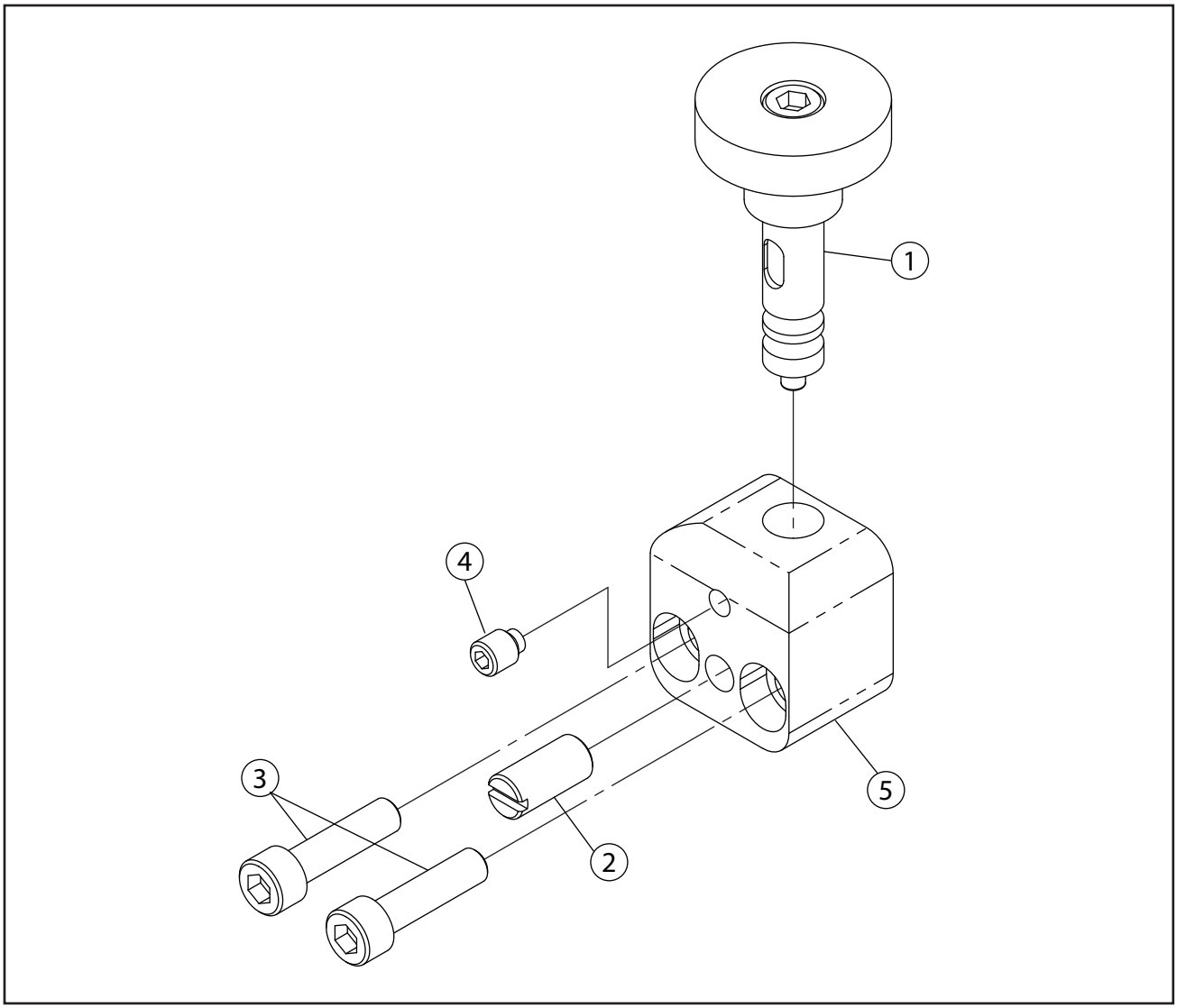
# GEAR, MAIN (P/N 39-0915)




Parts List, Gear, Main (P/N 39-0915)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 32-0598 | PIN, ALIGN, 3/16" DIA X 5/16" | 2 |
| 2 | 33-2648 | SCREW, CAP, #10-24 X 1/2", SST | 2 |

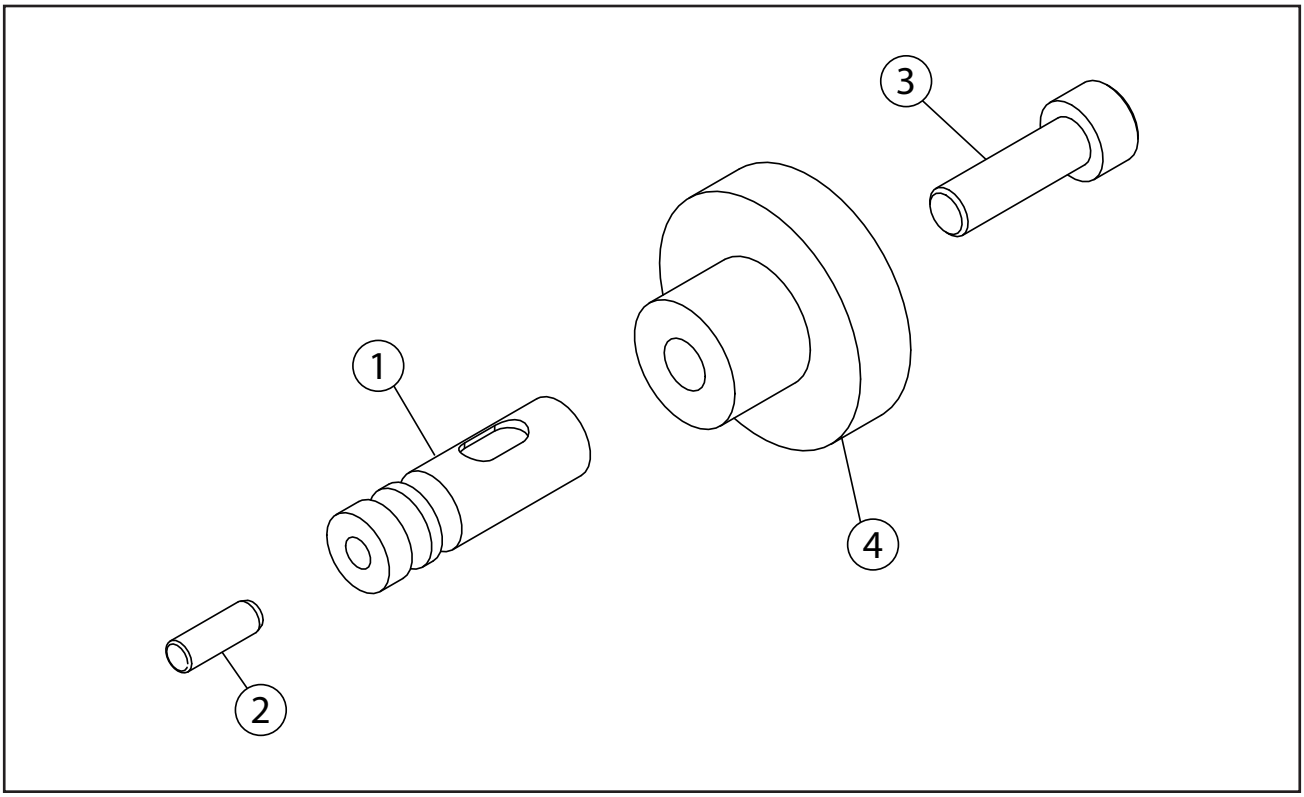
## BLOCK ASSEMBLY, TRIPPER (P/N 47-1521)




Parts List, Block Assembly, Tripper (P/N 47-1521)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 14-0097 | SHAFT ASSEMBLY, TRIPPER | 1 |
| 2 | 30-0125 | PLUNGER, BALL, 1/4-20 X 17/32" | 1 |
| 3 | 33-2650 | SCREW, CAP, #10-24 X 3/4", SST | 2 |
| 4 | 33-0954 | SCREW, SET, #10-24 X 1/4", HALF DOG | 1 |
| 5 | 48-1322 | BLOCK, TRIPPER | 1 |

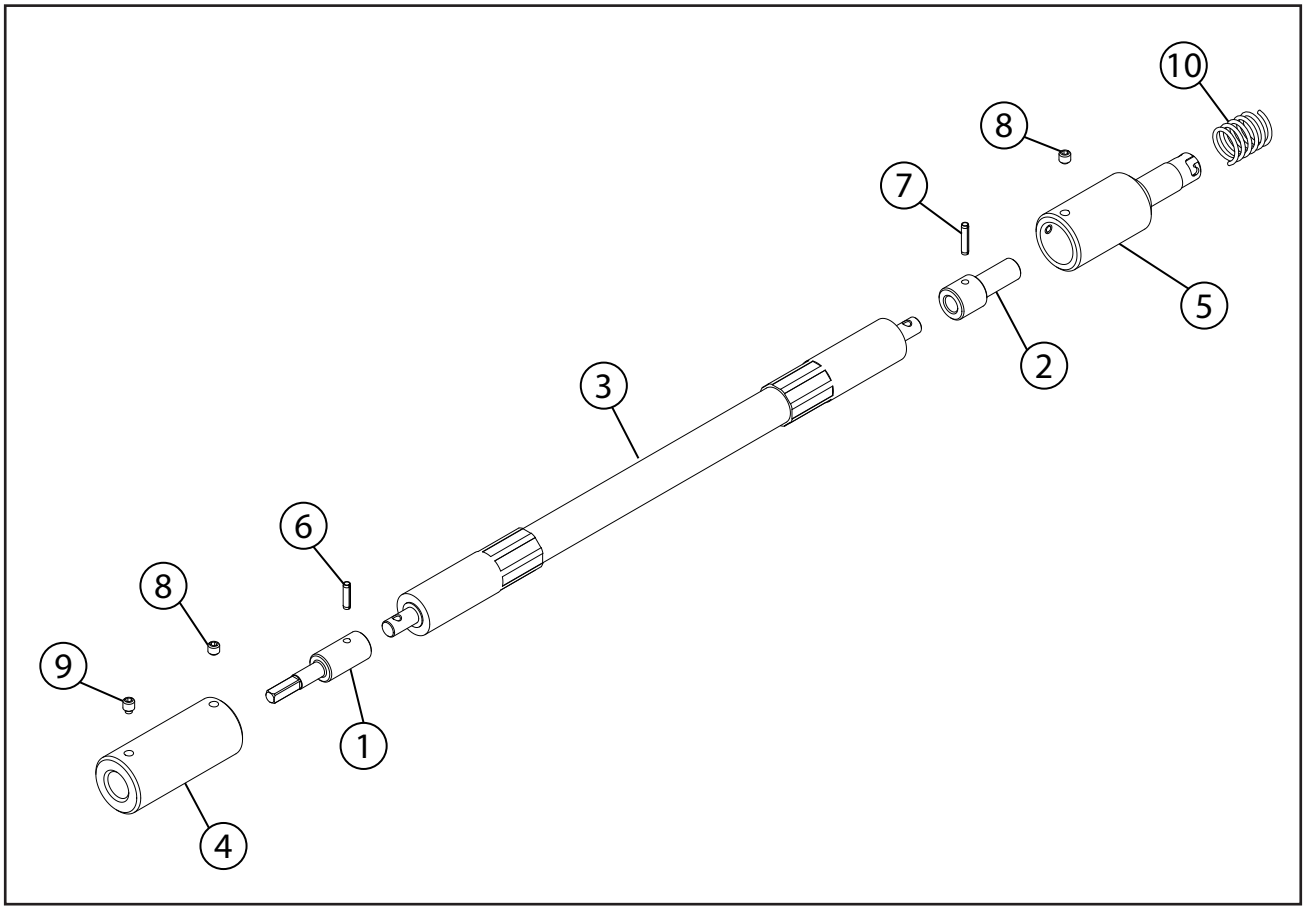
## SHAFT ASSEMBLY, TRIPPER (P/N 14-0097)




Parts List, Shaft Assembly, Tripper (P/N 14-0097)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 20-0803 | SHAFT, TRIPPER | 1 |
| 2 | 32-0220 | PIN, DOWEL, 1/8" DIA X 3/8" | 1 |
| 3 | 33-2649 | SCREW, CAP, #10-24 X 5/8", SST | 1 |
| 4 | 42-0217 | KNOB | 1 |

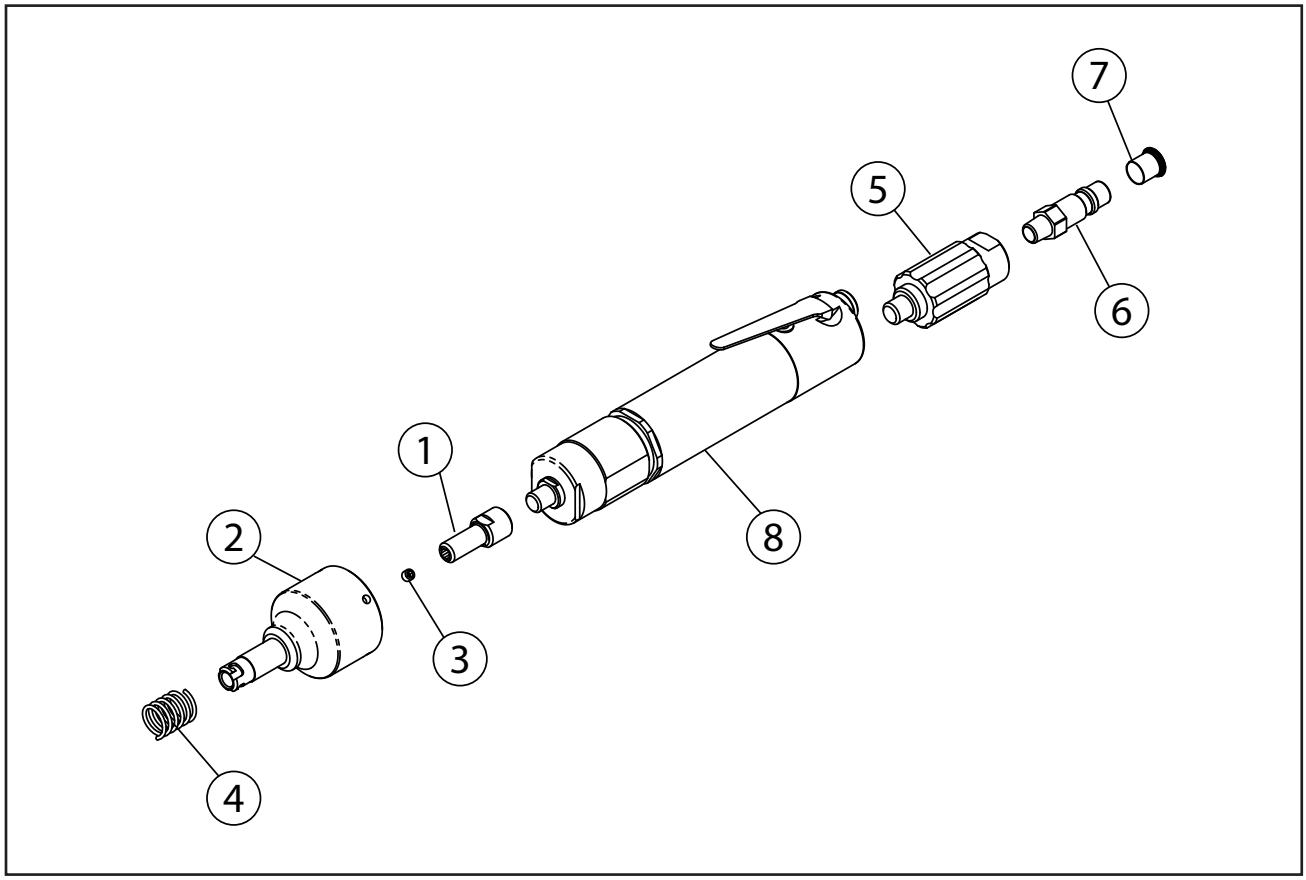
## SHAFT ASSEMBLY, FLEXIBLE HD (P/N 14-0091)




Parts List, Shaft Assembly, Flexible HD (P/N 14-0091)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 20-0844 | SHAFT, DRIVE, FLEX | 1 |
| 2 | 20-0845 | SHAFT, ADAPTER, FLEX | 1 |
| 3 | 20-0904 | SHAFT, FLEXIBLE, 18" HEAVY DUTY | 1 |
| 4 | 27-0726 | ADAPTER, SQUARE, FLEX SHAFT | 1 |
| 5 | 27-0727 | ADAPTER, BAYONET, FLEX SHAFT | 1 |
| 6 | 32-0034 | PIN, ROLL, 5/32" DIA X 5/8" | 1 |
| 7 | 32-0035 | PIN, ROLL, 5/32" DIA X 3/4" | 1 |
| 8 | 33-0498 | SCREW, SET, 1/4-20 X 3/16", CUP PT | 4 |
| 9 | 33-0903 | SCREW, SET, 1/4-20 X 5/16", HALF DOG | 1 |
| 10 | 40-0143 | SPRING, MUSIC WIRE, LC-085K-3 | 1 |

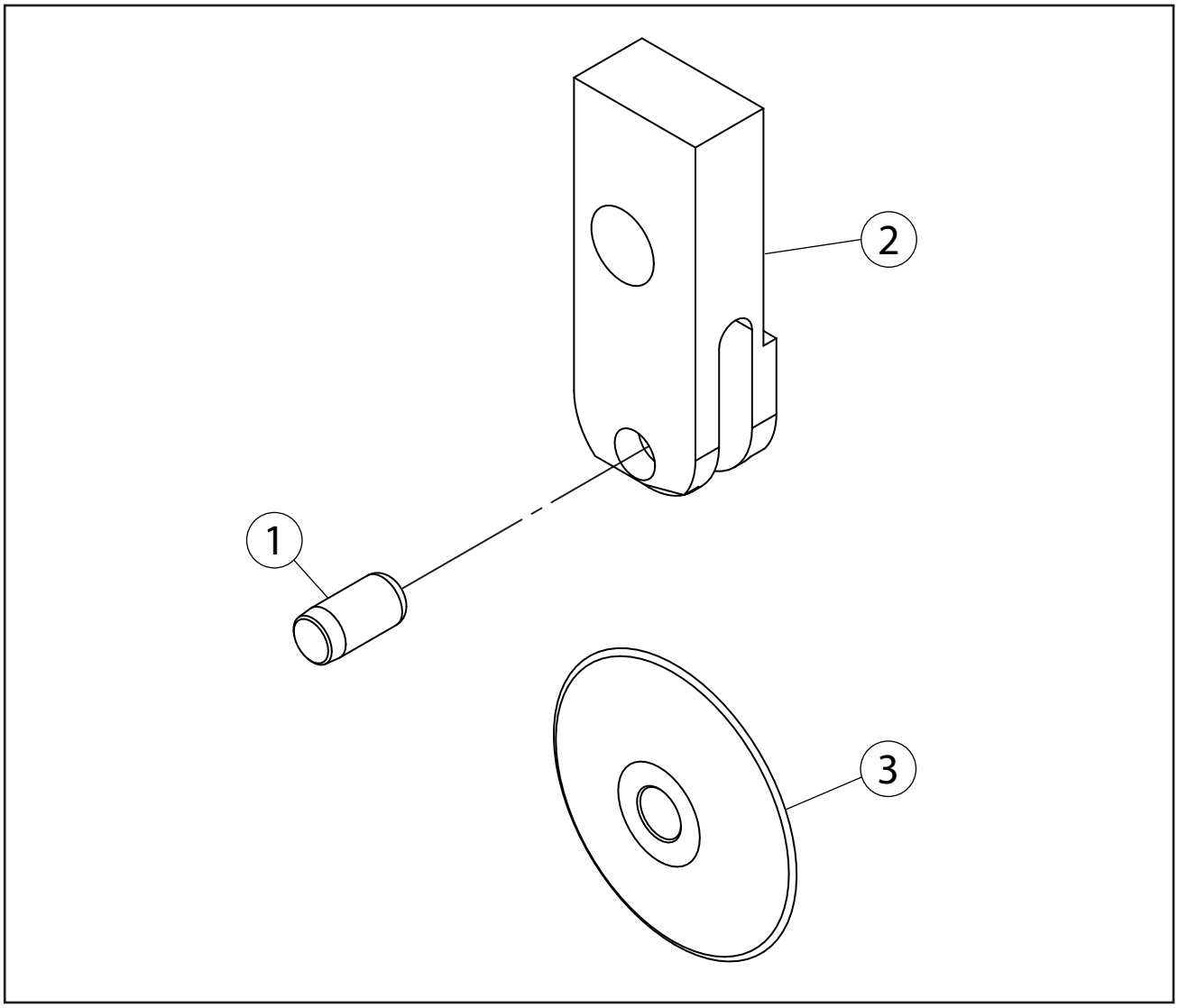
# MOTOR ASSEMBLY, BAYONET (P/N 57-0269)




Parts List, Motor Assembly, Bayonet (P/N 57-0269)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 20-0806 | SHAFT, DRIVE | 1 |
| 2 | 27-0703 | ADAPTER, BAYONET | 1 |
| 3 | 33-0498 | SCREW, SET, 1/4-20 X 3/16", CUP PT | 4 |
| 4 | 40-0143 | SPRING, MUSIC WIRE, LC-085K-3 | 1 |
| 5 | 53-0045 | VALVE, FLOW CONTROL, 1/4" NPT | 1 |
| 6 | 54-0149 | COUPLING, MAIL, QD, HOSE TO PIPE | 1 |
| 7 | 54-0201 | CAP, YELLOW | 1 |
| 8 | 57-0257 | MOTOR, AIR | 1 |

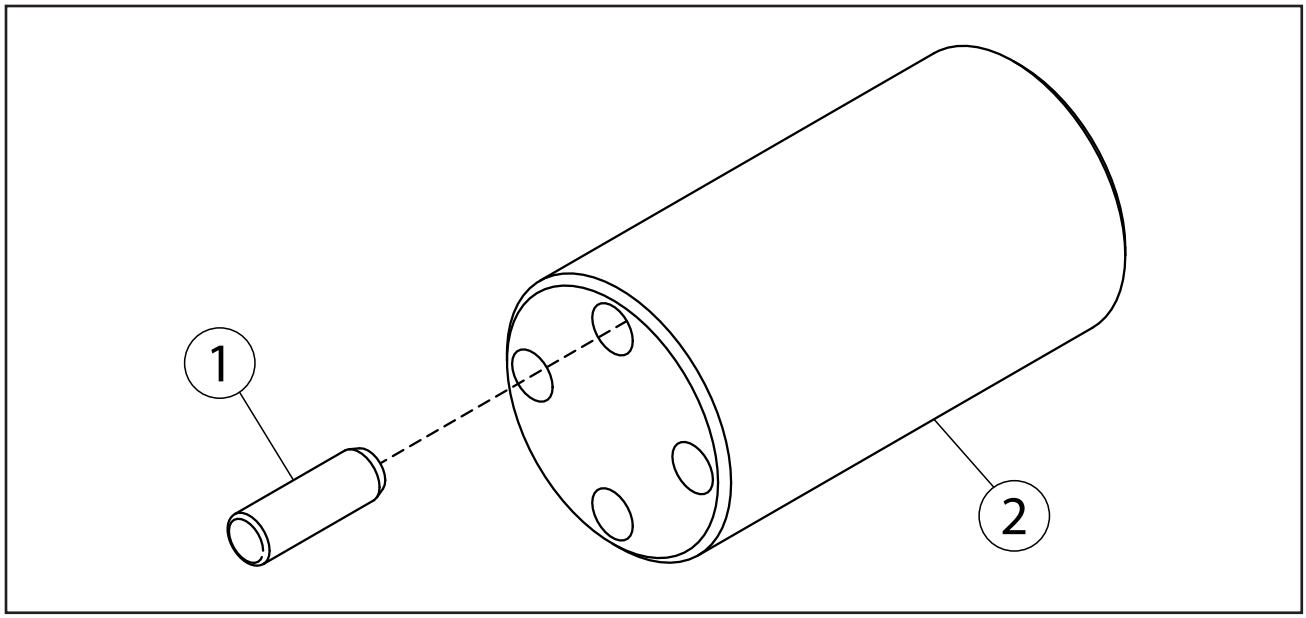
## WHEEL ASSEMBLY, ROLLER CUTTER (P/N 61-0159)




Parts List, Wheel Assembly, Roller Cutter (P/N 61-0159)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 32-0256 | PIN, DOWEL, 1/8" DIA X 1/4" | 1 |
| 2 | 49-0556 | HOLDER, TOOL, CUTTER WHEEL | 1 |
| 3 | 61-0158 | WHEEL, CUTTER, 3/4" | 1 |

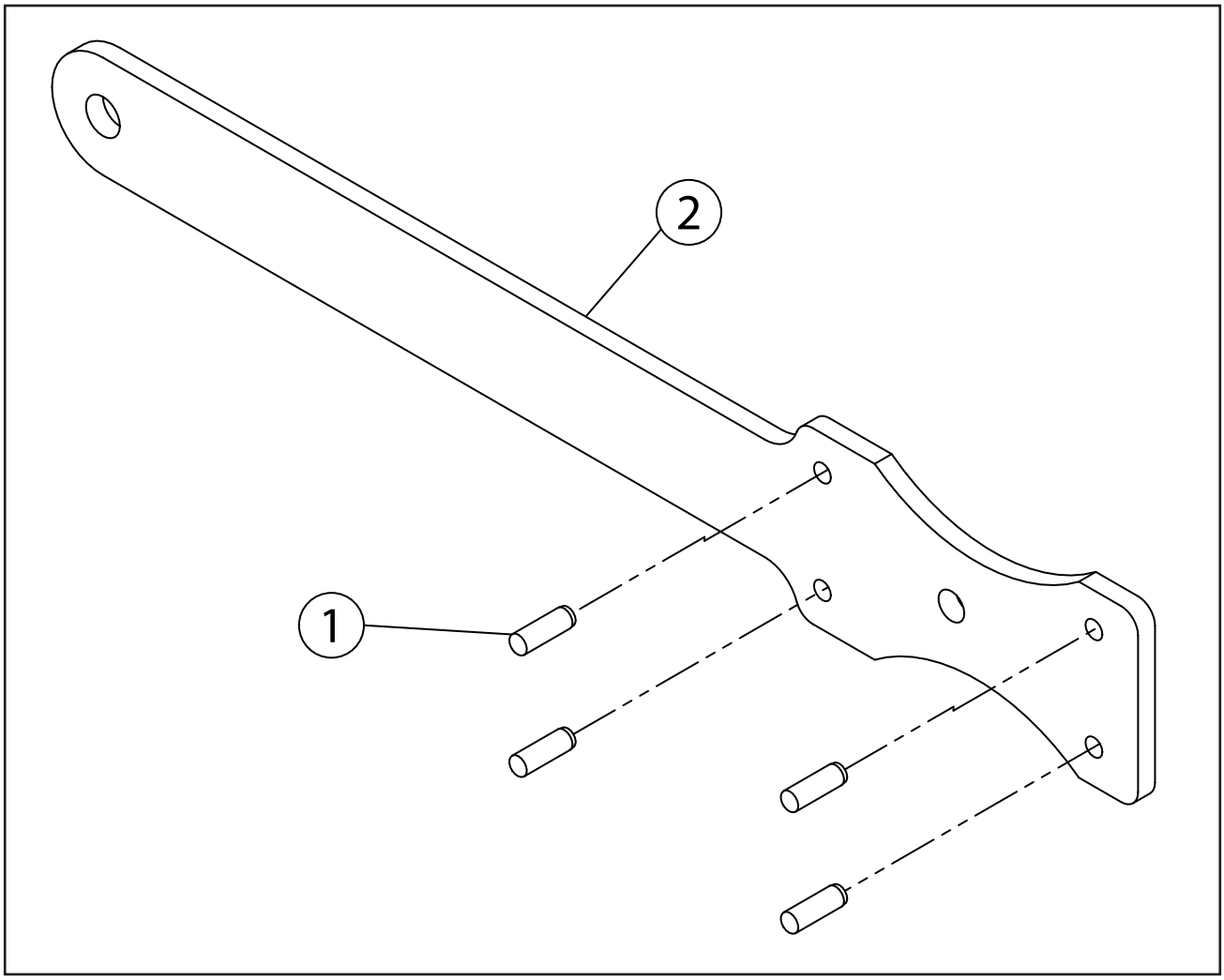
# WRENCH ASSEMBLY, SPROCKET (P/N 36-0314)




Parts List, Wrench Assembly, Sprocket (P/N 36-0314)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 32-0220 | PIN, DOWEL, 1/8" DIA X 3/8" | 4 |
| 2 | 36-0315 | WRENCH, SPROCKET | 1 |

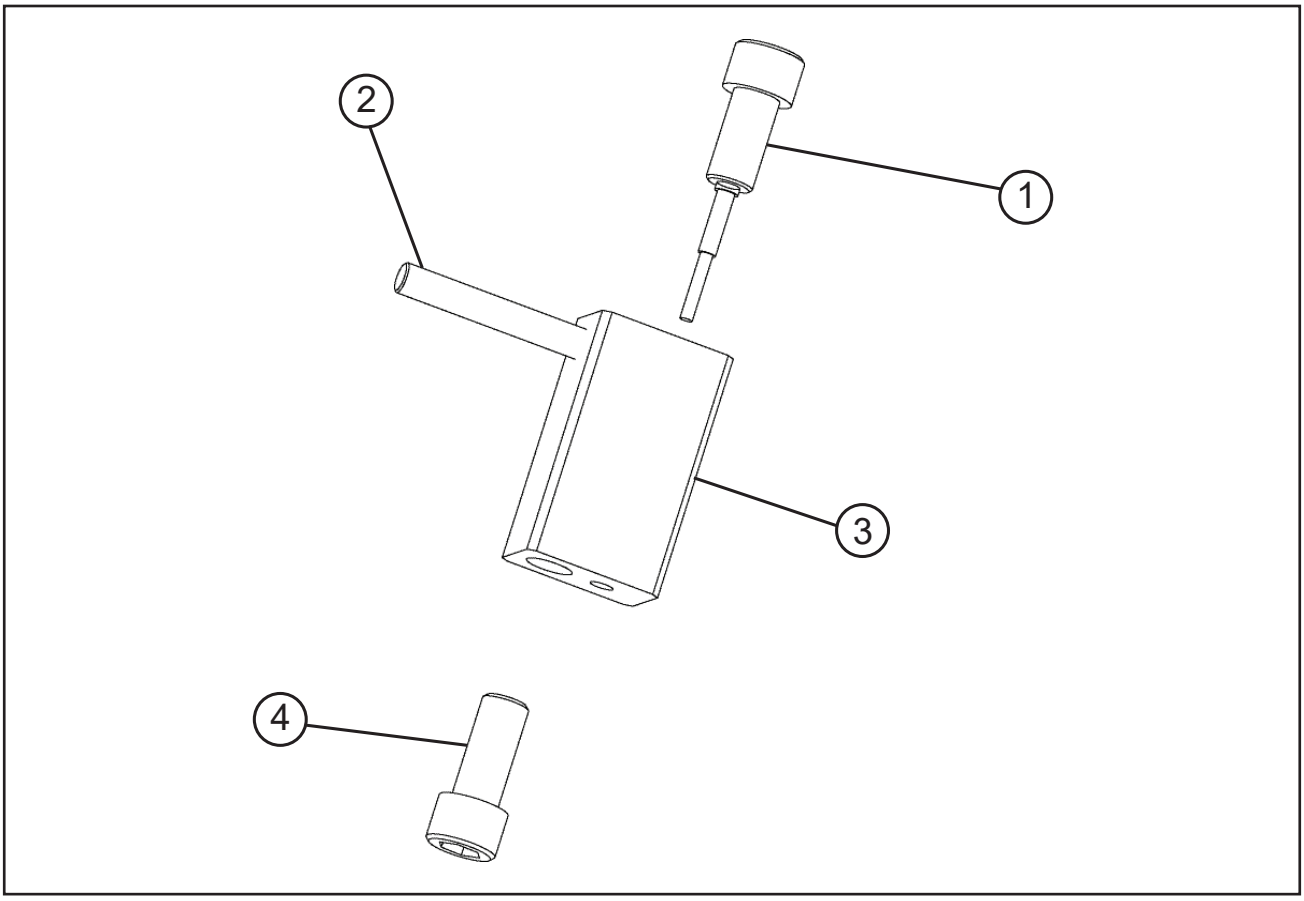
## WRENCH ASSEMBLY, TORQUE BAR (P/N 36-0344)




Parts List, Wrench Assembly, Torque Bar (P/N 36-0344)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 32-0220 | PIN, DOWEL, 1/8" DIA X 3/8" | 4 |
| 2 | 63-0215 | BAR, TORQUE | 1 |

# BLOCK ASSEMBLY, TRIPPER PIN REMOVAL/INSTALL (P/N 08-0804)




Parts List, Block Assembly, Tripper Pin Removal/Install (P/N 08-0804)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 33-2503 | SCREW ASSEMBLY, PIN REMOVAL | 1 |
| 2 | 32-0210 | PIN, DOWEL, 1/4" DIA X 2" | 1 |
| 3 | 48-1882 | BLOCK, TRIPPER PIN REMOVAL | 1 |
| 4 | 33-2490 | SCREW ASSEMBLY, PIN INSTALLATION | 1 |
| | NOT SHOWN | | |
| | 36-0011 | WRENCH , L, 5/16" HEX | 1 |

Parts List, Model 602SBCM Tool Kit (P/N 05-0429)

| Item No. | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 01-1819 | MODEL 602SBCM CLAMSHELL | 1 |
| 2 | 08-0804 | BLOCK ASSEMBLY, PIN REMOVAL/INSTALL | 1 |
| 3 | 14-0091 | SHAFT ASSEMBLY, FLEXIBLE | 1 |
| 4 | 30-2897 | COLLET, SS, 1.315/33.4 MM | 1 |
| 5 | 30-2899 | COLLET, SS, 1.900/48.2 MM | 1 |
| 6 | 30-2900 | COLLET, SS, 2.375/60.3 MM | 1 |
| 7 | 57-0269 | MOTOR ASSEMBLY, BAYONET | 1 |
| 8 | 61-0159 | WHEEL ASSEMBLY, ROLLER CUTTER | 1 |
| 9 | 81-0508 | VIDEO TRAINING TAPE | 1 |
| 10 | 86-0158 | CONTAINER | 2 |
| 11 | 86-0251 | CASE, 602SBCM KIT | 1 |
| 12 | 99-5941 | TOOL BIT, SEVER | 1 |
| 13 | 99-5942 | TOOL BIT, DOUBLE BEVEL, 37.5 DEG | 1 |
| 14 | 99-5943 | TOOL BIT, SEVER | 1 |
| 15 | 99-7140 | SEVER, LEAD | 1 |
| 16 | 86-0256 | CONTAINER, COLLET | 3 |

Parts List, Model 602SBCM Clamshell Wrench Kit (P/N 05-0398)

| Part No. | Description | Qty |
|---|---|---|
| 36-0314 | WRENCH ASSEMBLY, SPROCKET | 1 |
| 36-0344 | WRENCH ASSEMBLY, TORQUE BAR | 1 |
| 36-0003 | WRENCH, L, 3/32" HEX | 1 |
| 36-0006 | WRENCH, L, 9/64" HEX | 1 |
| 36-0020 | WRENCH, T, 5/32" HEX | 1 |
| 36-0091 | WRENCH, RATCHET, 1/4" DRIVE | 1 |
| 36-0261 | WRENCH, DRIVE, 1/4" | 1 |
| 36-0262 | SOCKET, 1/4" | 1 |
| 36-0001 | WRENCH, L, 1/16" HEX | 1 |
| 36-0335 | WRENCH, SPANNER | 1 |

# WARNING

Read the manual and be familiar with all safety precautions before operating equipment. The following are general warnings for industrial equipment with moving parts. Refer to the manual for specific warnings applicable to your equipment.

**EYE HAZARD** - Always wear appropriate eye protection while operating the equipment.

**PINCH HAZARD** - Keep your hands and clothing away from moving parts.

**CRUSH HAZARD** - The machinery, pipe, or work piece can shift, separate, lurch, or fall.

**CHIP HAZARD** - Metal chips may be hot and sharp. Be careful when you clear the tooling path or clean up chips.

**TIE DOWN HAZARD** - Deliberate overriding of safety triggers can result in serious injury. Never lock or tie down any safety triggers.

**SHOCK HAZARD** - Ensure that the equipment is properly installed and grounded. Ensure that the equipment is not damaged and that the power cord is intact.

## OTHER HAZARDS

**• Tool bits are sharp and can cause serious injury.**
**• Do not defate or modify safety features.**
**• Disconnect power sources before servicing or moving the equipment.**
**• Remove all loose articles of clothing and jewelry before operating the equipment.**

## *Be Safety Conscious!*

TRI TOOL TECHNOLOGIES

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