



**LW 9625**  
**9-5/8" Lightweight Tong**  
**& Backup**

**TECHNICAL MANUAL**

July 2005

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<b>Introduction</b> .....	<b>1.1</b>
<b>Dimensional Views &amp; Specifications</b> .....	<b>1.2</b>
<b>Tong Assembly</b> .....	<b>2.1</b>
<b>Maintenance</b> .....	<b>3.1</b>
Cleaning .....	3.1
Lubrication .....	3.1
Adjustments .....	3.7
Recommended Periodic Checks .....	3.8
Overhaul Procedures .....	3.9
<b>Operation</b> .....	<b>4.1</b>
Jaw Installation & Removal .....	4.1
Tong Rig-Up & Leveling .....	4.2
Hydraulic Hoses .....	4.4
Load Cell Configuration .....	4.4
Tong Operation .....	4.5
Extreme Cold Weather Operation Procedures .....	4.8
Making Up Joints .....	4.9
Breaking Out Joints .....	4.10
<b>Problem Diagnostics</b> .....	<b>5.1</b>
Pump Makes Excessive Noise .....	5.1
Hydraulic System Overheating .....	5.2
Excessive Wear Of Moving Parts .....	5.3
Tong Running Too Slowly .....	5.4
Tong Will Not Develop Sufficient Torque .....	5.5
Failure Of Jaws To Grip Pipe .....	5.6
Failure Or Difficulty Of Tong To Shift .....	5.7
General Comments .....	5.8
<b>Storage Recommendations</b> .....	<b>6.1</b>
<b>Assemblies And Parts</b> .....	<b>7.1</b>
Geartrain .....	7.2
Rotary Idler .....	7.4
Pinion Idler .....	7.6
Pinion Assembly .....	7.8
Clutch Assembly .....	7.10
Shifting Assembly .....	7.12
Tong Cageplate Assembly .....	7.14
Tong Body Assembly .....	7.16
AK12-000-REF Door Assembly .....	7.18
AK12-000B-REF Door Assembly .....	7.22
Rigid Sling Assembly .....	7.28
Backup Outer Body Assembly .....	7.30
Backup Cageplate Assembly .....	7.32
Backup Door Assembly .....	7.34
Rear Leg Assembly .....	7.36
Front Leg Assembly .....	7.38
<b>Torque Gauge Service Information</b> .....	<b>8.1</b>
<b>Hydraulic Component Information</b> .....	<b>9.1</b>

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## Introduction

## 9.625" Lightweight Tong

Congratulations on the purchase of your new FARR 9-5/8" LW (Lightweight) tong. This unit will provide you with years of outstanding performance. Simple maintenance and care will extend its life and ensure a continuing level of excellent performance and reliability.

This manual will assist you in giving your equipment the care it requires. Please read the manual and follow the enclosed maintenance instructions. Replacement parts are readily available from FARR Canada Ltd. in Edmonton Alberta. However, most of the parts that are subject to wear or damage are standard items likely to be found in supply stores or parts depots. Many parts are transferable between FARR tongs and backups.

Should you need replacement parts, or should you experience any difficulty not covered in this manual, please contact:

FARR CANADA  
14755-121A Avenue  
Edmonton, Alberta  
Canada T5L 2T2  
Phone: 780.453.3277  
Fax: 780.455.2432

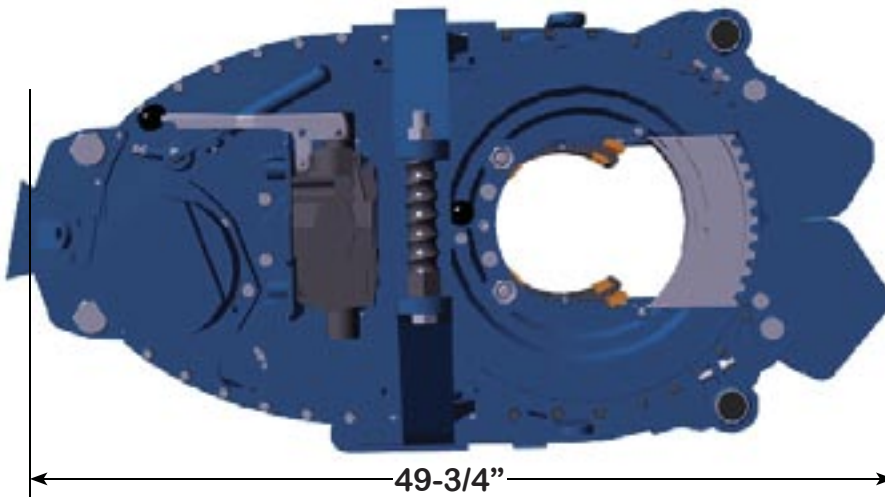
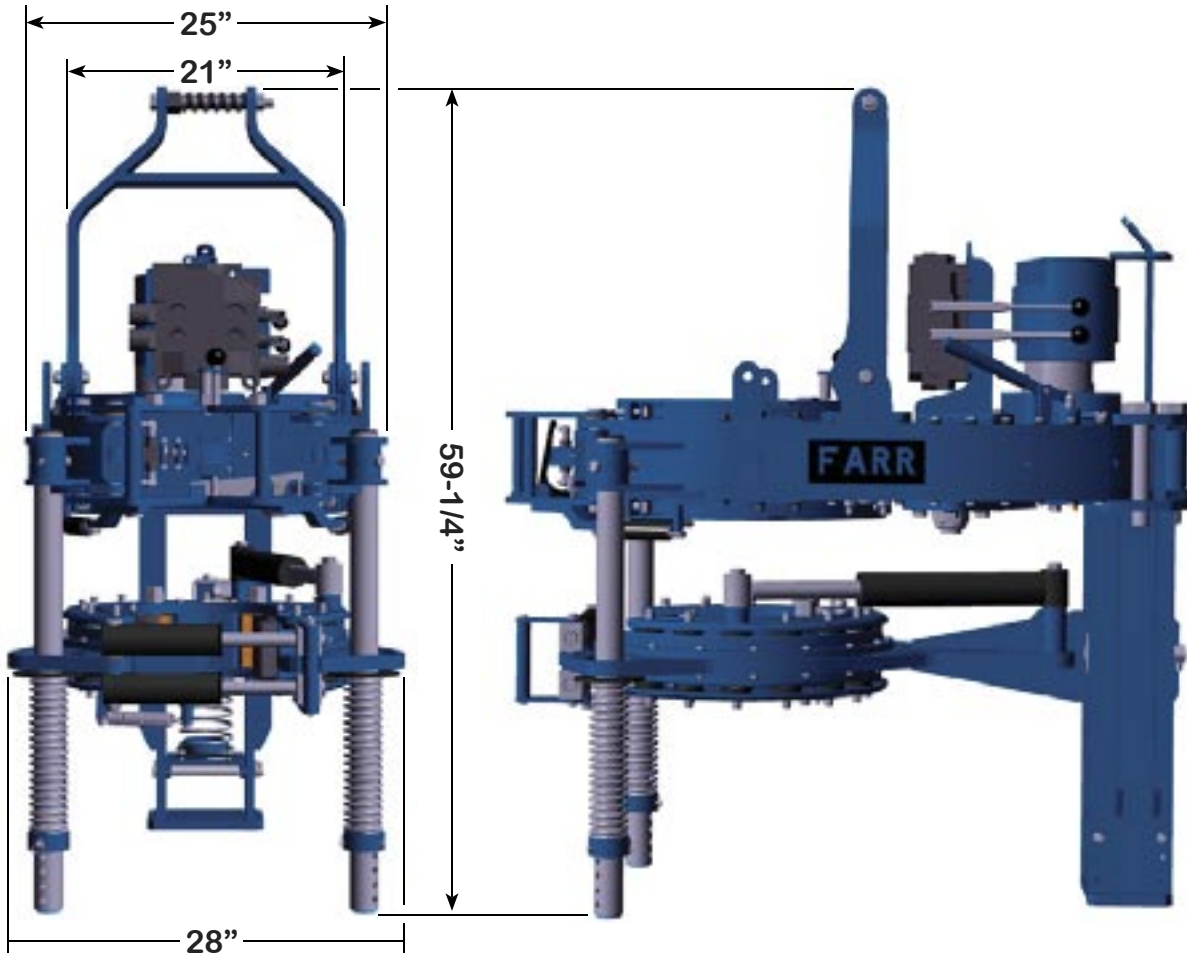
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# 9.625" Lightweight Tong

Dimensional Data



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## Specifications

## 9.625" Lightweight Tong

Torque Range @ 2,000 PSI:	High Gear: 2400 ft.-lb. / 3254 Nm Low Gear: 12000 ft.-lb. / 16270 Nm
Maximum RPM at 40 GPM / 151 LPM Commercial 2 inch motor	High: 84 RPM Low: 17 RPM
Hydraulic Requirements:	40 GPM @ 2000 psi / 151 LPM @ 13.8 MPa
Length:	49-3/4 inches / 1263.5 mm
Overall Width:	28 inches / 711 mm
Height:	59-1/4" / 1505 mm
Maximum Elevator Diameter:	Unlimited (tong comes off pipe)
Torque arm length:	27.5 inches / 699 mm Center Line of Pipe Center Line of Anchor Handle
Weight (Approximate):	1800lb. / 818 kg.
Jaws available (inches):	All standard sizes from 2-7/8" to 9-5/8"

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Assembly of Farr Hydraulic Power Tongs is simple, and can be accomplished without the use of special tools. The instructions on this page are presented as a guide only, and are similar to the assembly sequence our technician would use while assembling the tong in our plant. Use this assembly section to aid in familiarization with parts and their locations. The overhaul and maintenance section may also be used as a specific guide to assembly.

**ASSEMBLY SEQUENCE**

1. Position the tong body gear case on a suitable stationary support such that the bottom body plate is accessible.
2. Install bottom pinion bearing and bearing cap.
3. Install bottom clutch bearing and bearing cap.
4. Install rotary roller shafts, rollers, bearings and spacers. Door roller shafts need not be installed at this point. If applicable, position front tong legs such that the leg roller shafts can be installed.
5. Install rotary drive gear. (Limit grooves should be face side up).
6. Install rotary idler gears, bearings, shafts and spacers, making sure micro-grooves in gear are in upright and proper position. (Micro-groove gear should be located on the gear shift lever side of tong).
7. Install bottom pinion gear (shoulder side down).
8. Install pinion gear shaft into the spline of the bottom pinion gear.
9. Install clutch shaft, needle bearings, bottom clutch gear.
10. Install pinion idler gears, bearings and half shafts.
11. Install shifting collar which will slip over clutch shaft and mesh with low or high clutch gear.
12. At this point, the shifting shaft with shifting yoke attached . should be positioned on the shifting collar.
13. Install top pinion gear (shoulder side up).
14. Install top clutch gear.
15. Position the top plate in its proper location and insert dowel pins.



### ASSEMBLY SEQUENCE (continued...):

16. Align mounting holes of pinion idler half shafts with top plate, and install (half moon) pads and bolts.
17. Install top clutch bearing, retainer and bushing.
18. Install clutch drive gear and retainer.
19. Install motor mount.
20. Install shifting ball and spring.
21. Install shifting handle.
22. Install rotary idler pads and nuts, pinion idler shaft nuts, roller shaft nuts, and then secure the top plate in place with bolts around perimeter of tong.
23. Install top pinion bearing and bearing cap.
24. Install motor and valve assembly.
25. Install cam followers or poly-rings.
26. Install top cage plate.
27. Install bottom cage plate.
28. Install brake bands.
29. Install backing pin.
30. Install doors, door roller shafts, and nuts.
31. Install door stop piston and cylinder assembly.

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Regular maintenance programs are necessary, and must be established to assure dependable and lengthy operation of your FARR Hydraulic Tong. Use the following cleaning, lubrication, and adjustment recommendations to enhance the life expectancy of the tong and assure safety of operating personnel.

#### A. CLEANING

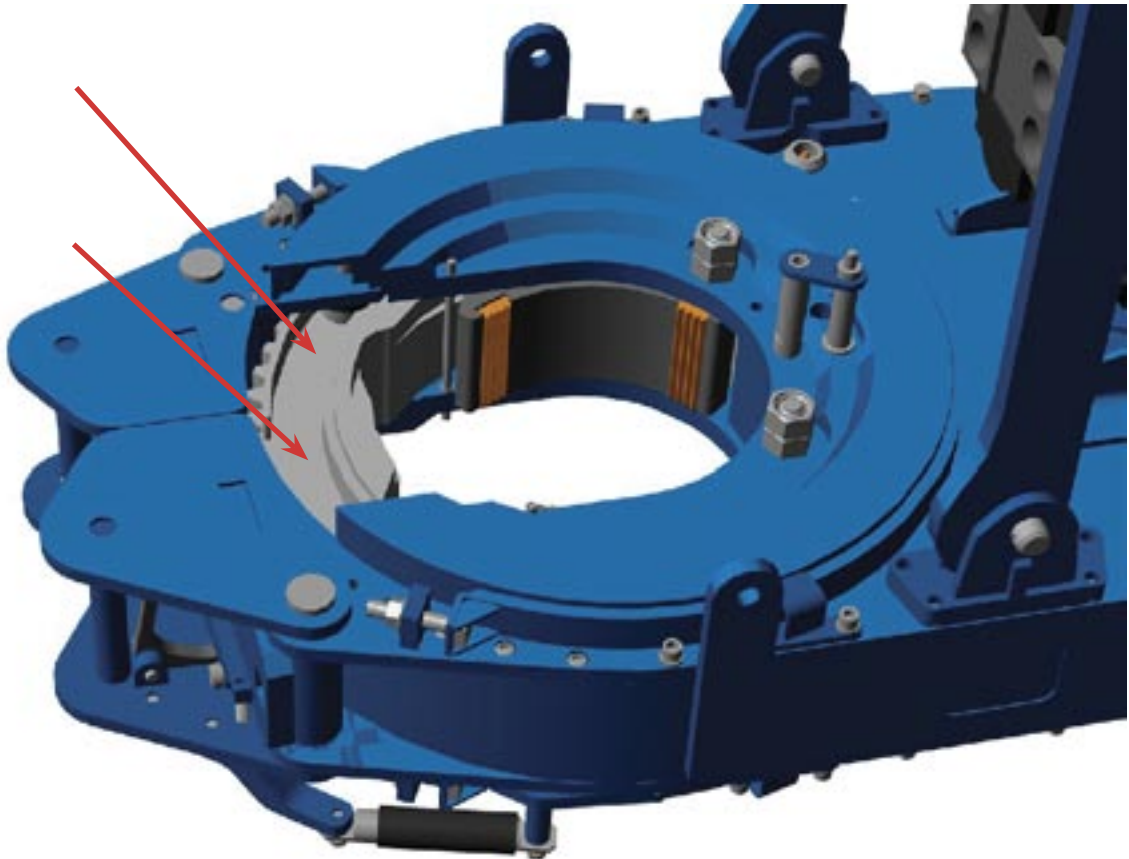
Clean tong thoroughly with a good petroleum-based cleaning agent after each job, and prior to storage. Farr recommends that the motor and valve assembly be periodically removed, along with the top tong plate, so that guides, rollers and gears can be properly cleaned and re-lubricated.

#### B. LUBRICATION

Use a quality multipurpose bearing lubricant that will remain within its viscosity range at expected operating temperatures. See the guide at the end of this section for detailed information on the amount of lubricant to apply at each location. In addition, Farr recommends the following lubrication procedure at the completion of each job prior to storage.

##### 1. CAGE PLATE GUIDE RINGS

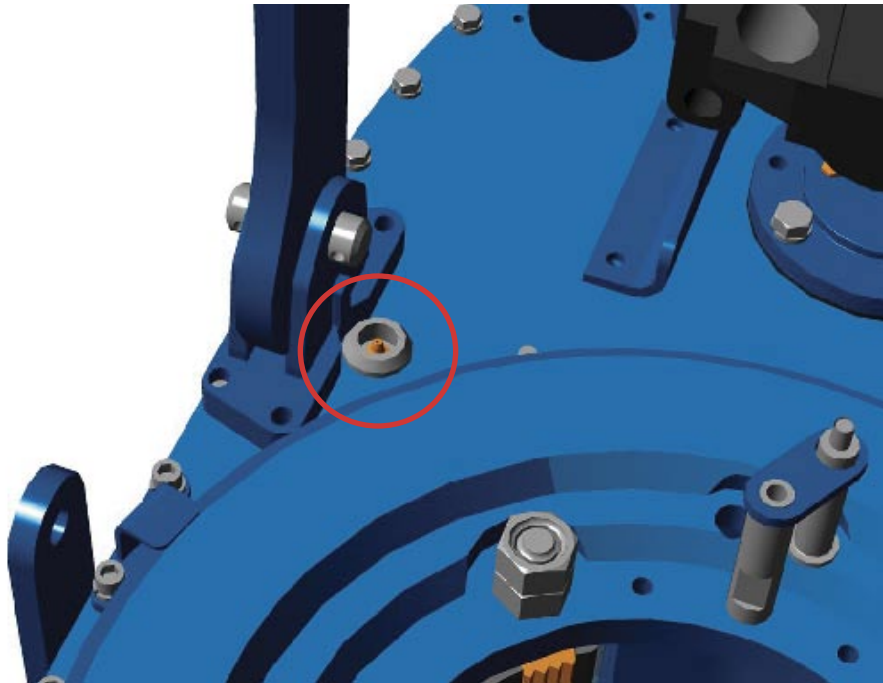
Apply grease to the upper and lower cam follower grooves on the rotary gear.



Cageplate Lubrication

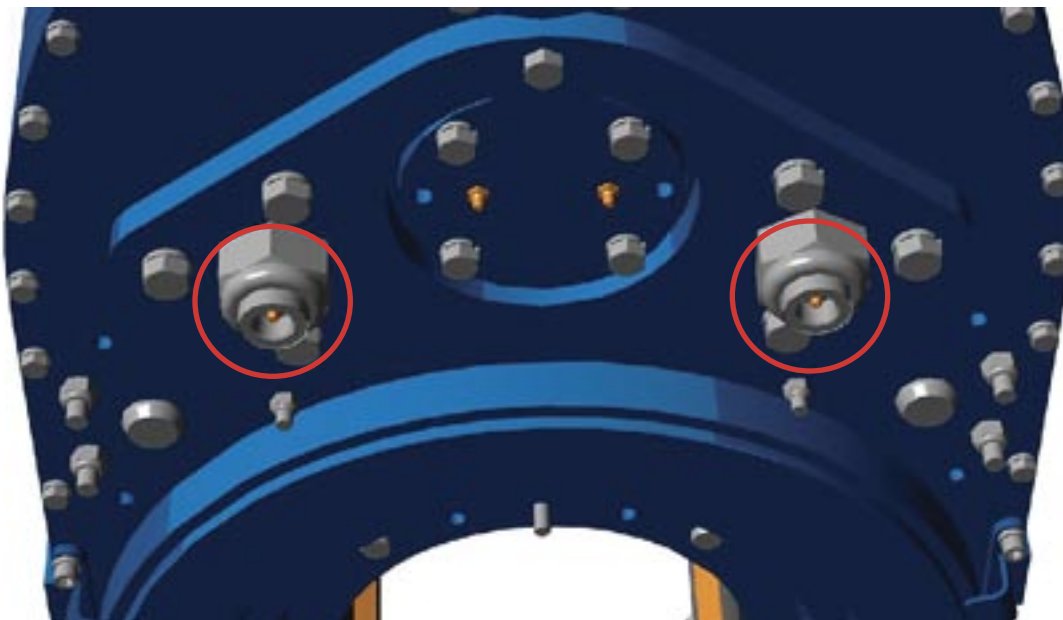
### 2. ROTARY IDLER BEARINGS

Apply grease to these bearings through the grease fittings in the ends of the rotary idler shafts, located on the top of the tong (2 locations total).



### 3. PINION IDLER BEARINGS

Apply grease to these bearings through the grease fittings in the ends of the pinion idler shafts, located on the bottom of the tong (2 locations total)

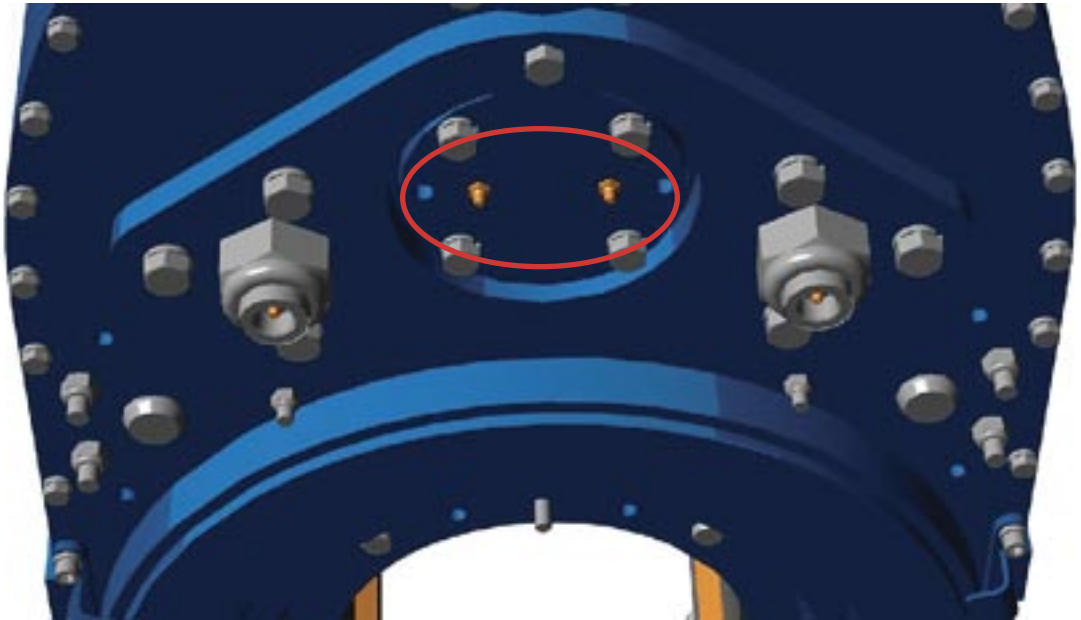
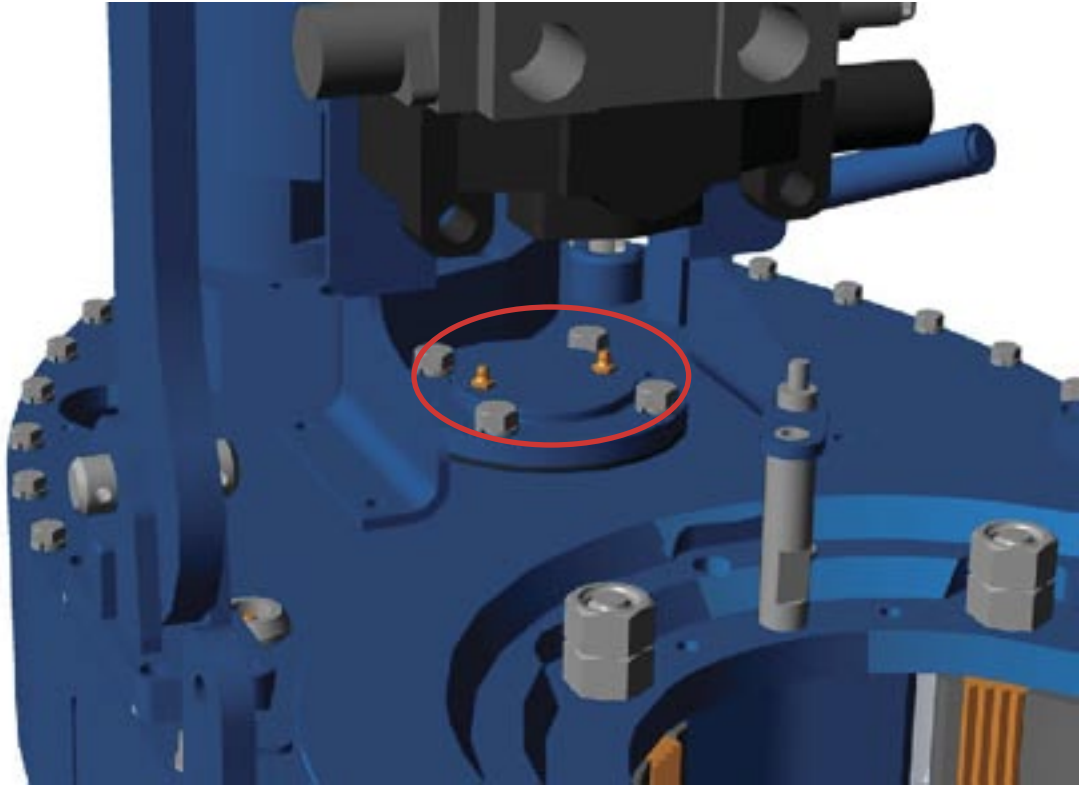


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5. PINION BEARINGS

Apply grease to these bearings through the grease fittings in the pinion bearing caps located on the top and bottom of the tong (total of four locations).

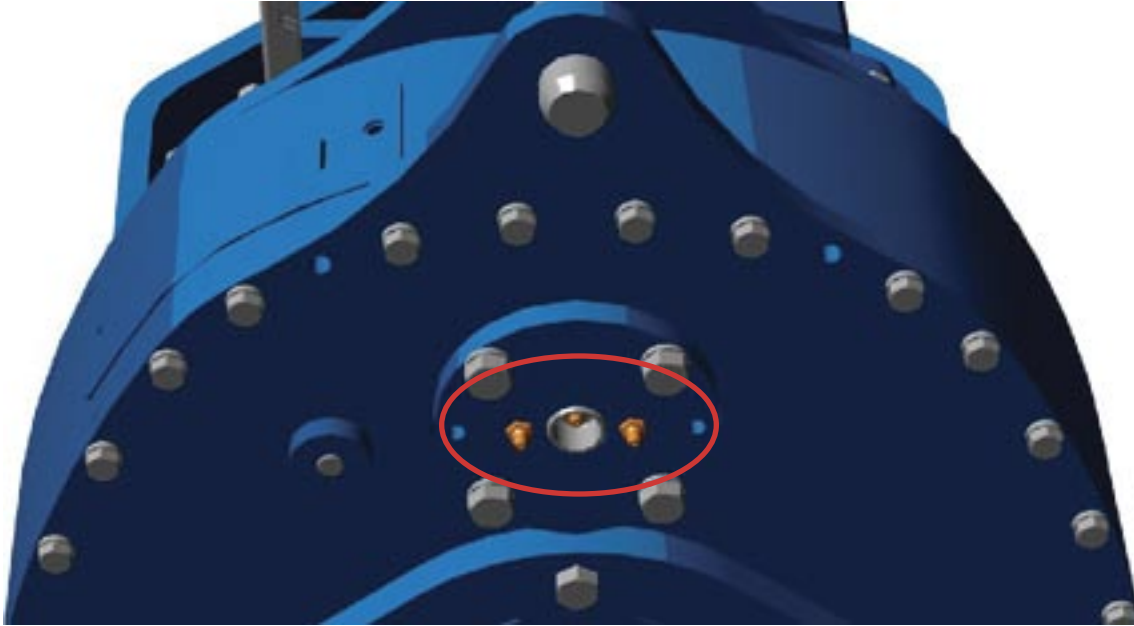


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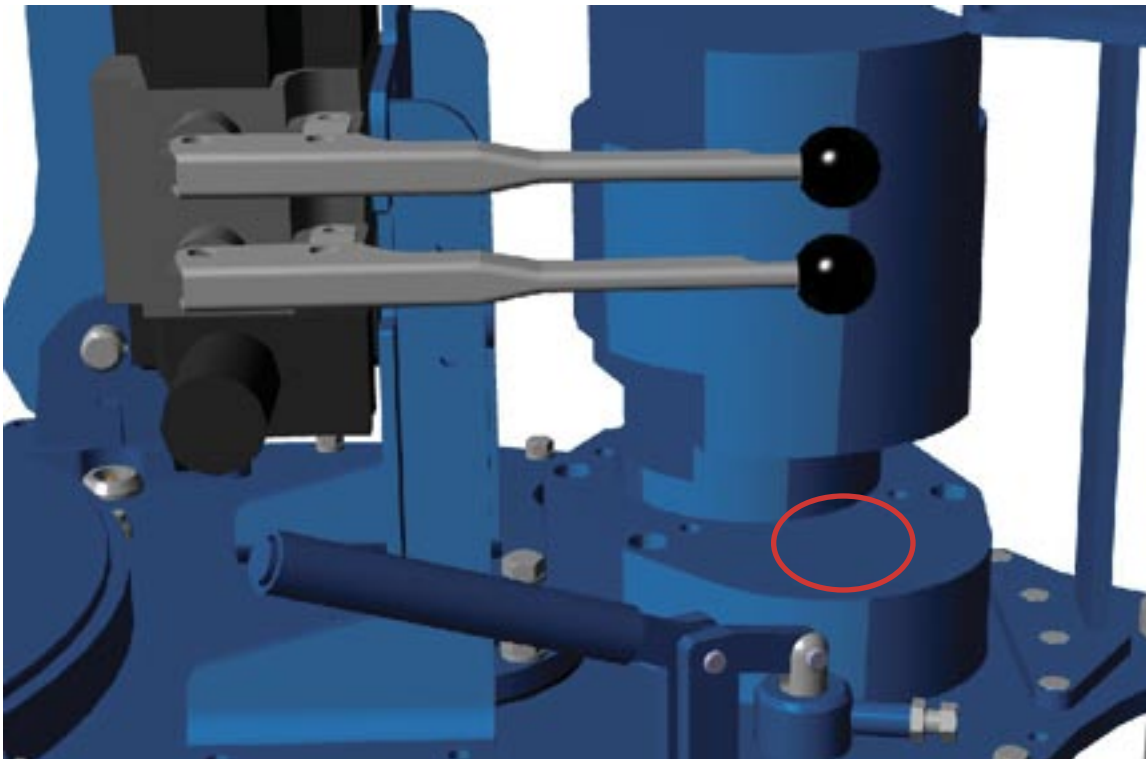
### 6. CLUTCH SHAFT BEARINGS

Apply grease to these bearings through three grease fittings in the clutch bearing cap, which is located on the bottom plate. Note that the centre grease fitting is recessed into the end of the clutch shaft.



### 7. MOTOR MOUNT HOUSING

Apply grease to the gears in this housing through the two grease fittings on the bearing cap on top of the motor mount, in the area indicated by the red circle.

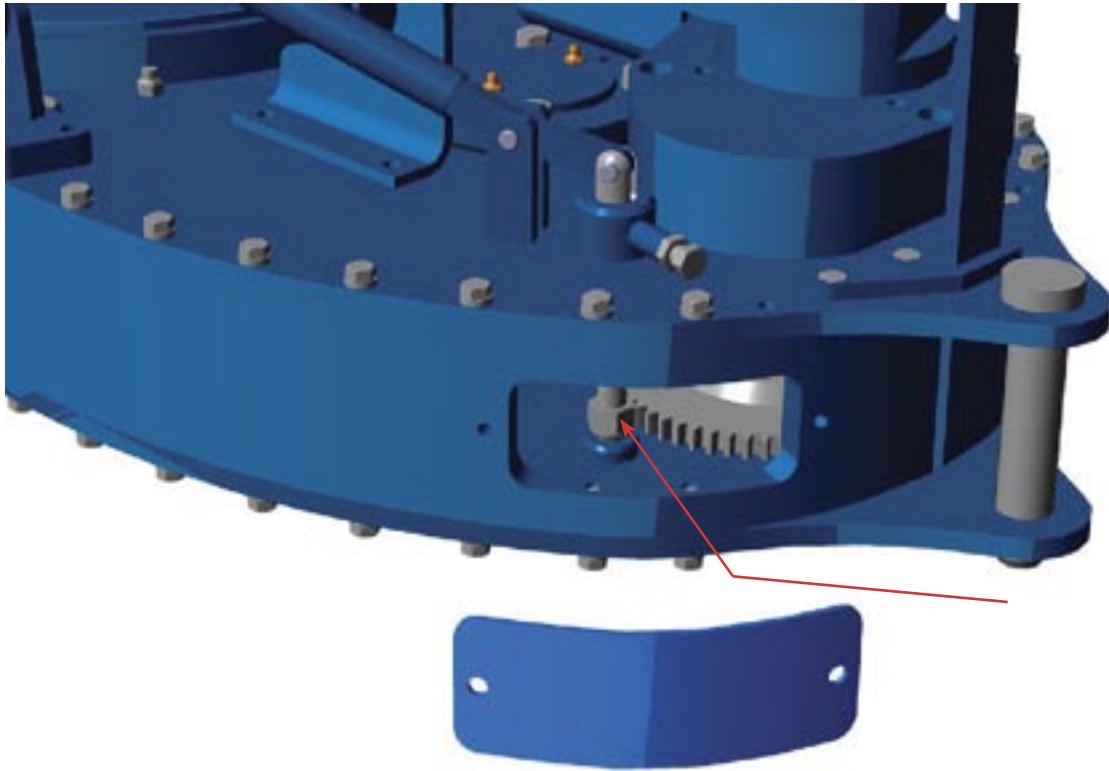


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**8. SHIFTING SHAFT**

Apply grease to the shifting shaft and shifting shaft bushings. These can be accessed through the cover plate on the side of the tong, near the rear.

**9. DOOR LATCH & DOOR STOPS**

Apply a small amount of grease to the door latch claws, post, and stops as necessary in order to maintain smooth operation.

**10. DOOR STOP ASSEMBLY (if equipped)**

At assembly the spring and cylinder should be coated with a general purpose lubricating oil.

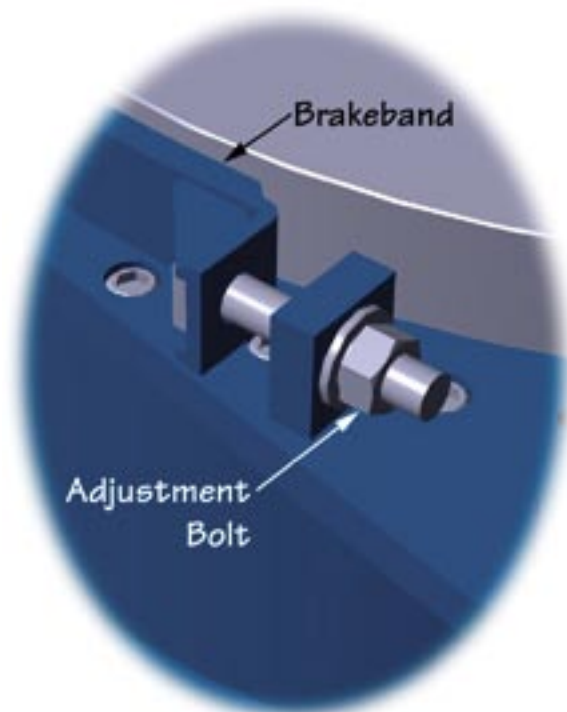
Recommended lubrication amount at the completion of each job:

1. Cage Plate Cam Followers	1 shot of grease
2. Roller Bearings (Upper and lower)	3 shots grease
3. Rotary Idler Bearings	4 shots grease
4. Pinion Idler Bearings	4 shots grease
5. Pinion Bearings (Upper and lower)	2 shots grease
6. Clutch Shaft Bearings	1 shot of grease
7. Motor Mount Housing	as required
8. Shifting Shaft	as required
9. Door Latch & Door Stops	as required

## C. ADJUSTMENTS

**BRAKE BAND ADJUSTMENT** (See illustration below):

The brake bands must be periodically adjusted to continue to provide smooth and efficient jaw cam action. If the cage plate turns with the rotary gear, the jaws will not cam properly and, therefore, will not bite on the tubing or casing. Tightening the brake band against the cage plates will increase frictional resistance, allowing jaws to cam properly and grip the casing. Adjust the brake band using the adjustment nut and bolt set as shown in the illustration below. Do not over tighten, as this causes excessive wear to the brake bands.

**Brakeband Adjustment**

## D. RECOMMENDED PERIODIC CHECKS

## 1. DOOR STOP SPRING

The spring inside the actuator cylinder must be of sufficient strength to enable the door latch mechanism to snap closed properly. Door stop spring fatigue will result in sluggish latch operation. Replace the latch spring inside the cylinder when this occurs.

## 2. BACKING PIN

Perform a visual inspection of the backing pin after each job. Replace the pin if stress cracks or excessive wear is found, or if either pin is bent.

## 3. SHIFTING SHAFT

The shifting yoke is secured to the shifting shaft by one hex jam nut above the shifting yoke, and one locknut on the bottom of the yoke. Check these nuts after each job. Do this by removing the clutch inspection plate and ensuring a snug fit prior to lubrication.

#### 4. TORQUE GAUGE ASSEMBLY

Periodic calibration of the torque gauge is recommended to assure accurate torque readings. When having the torque gauge serviced and calibrated, it is critical to note the arm length of the tong, as indicated in the "Specifications" section. Farr recommends that the torque gauge assembly be calibrated yearly.

#### E. OVERHAUL PROCEDURES

Once the tong has been removed from frame assembly, it may be overhauled using the disassembly instructions specified in the following procedure. Access to the gear train is possible by removal of the top plate of the tong.

**NOTE:** ALL MAINTENANCE AND OVERHAUL SHOULD BE PERFORMED FROM THE TOP. THEREFORE, THE BOTTOM PLATE OF THE TONG SHOULD NEVER BE REMOVED FROM THE GEAR CASE HOUSING.

1. Support tong from the bottom using a stable and secure platform.
2. Remove rigid sling shackle connector pins, and remove rigid sling.
3. Remove valve assembly, and valve mounting plate.
4. Remove rear hanger bracket.
5. Remove the four bolts which secure the motor to the motor mount, and lift motor off. The motor gear, located at the bottom of the motor shaft, should be inspected for gear clashing or tooth damage. Also, ensure that the motor gear is securely attached to the motor shaft.
6. Disconnect the linkage between the shifting handle and the shifting shaft by removing the cotter pin from the shifting shaft link, and removing the clevis pin.
7. Back off the shifting adjustment bolt about 1/2". This relieves compression on the spring and allows the ball to disengage from the slot in the shifting shaft. Remove the adjustment bolt and, using a pencil magnet, extract the ball and spring before the shifting shaft is removed in order to prevent loss of the ball inside the tong.
8. Remove the motor mount by removing the four socket head cap screws. Lift motor mount out of place.
9. Remove the snap ring which allows the disassembly of the top clutch gear.
10. Any of the three door option assemblies may be removed generally in the same fashion:
  - a. Remove the 1" bolts, washers, and door stop spacers, then remove the two door cylinders.

- b. Ensure the doors are not latched, and are well supported.
- c1. If equipped with original door, or first door upgrade, the door pins are secured with hex nuts. Remove the hex nuts, and gently tap out door pins.
- c2. If equipped with the final upgrade remove the snap rings from the door pins, and gently tap out the pins. The pins should be very carefully driven out with a soft alloy material (e.g. brass rod, etc.) to eliminate the possibility of damage to the pins or doors. This allows the doors to be removed.

**NOTE:** WHEN REMOVING THE DOOR, MAKE CAREFUL NOTE OF THE BEARING SHIMS WHICH ALIGN THE DOOR. IT WILL BE NECESSARY TO REASSEMBLE DOOR BEARING SHIMS IN THE SAME SEQUENCE AND POSITIONS TO ENSURE CORRECT DOOR ALIGNMENT.

11. Remove four brake restraints, and top and bottom brakeband assemblies. Do this by backing off the brake band adjustment bolts until the nut is flush with the end of the bolt.
12. Remove backing pin assembly.
13. Remove the top and bottom cage plates.
  - Remove two jaw pivot bolts and jaw assemblies
  - Remove the three cage plate support bolts. With these three bolts removed, the top cage plate can be lifted off.

**NOTE:** THE CAGE PLATE BOLTS ARE THE ONLY ITEMS FASTENING THE BOTTOM CAGE PLATE TO THE TONG. SUPPORT THE BOTTOM CAGE PLATE FROM BELOW PRIOR TO REMOVING CAGE PLATE BOLTS IN ORDER TO PREVENT DAMAGE TO THE BOTTOM CAGE PLATE OR PERSONAL INJURY TO THE MECHANIC.

14. Pull the top bearing cap and spacer for the pinion drive gear.

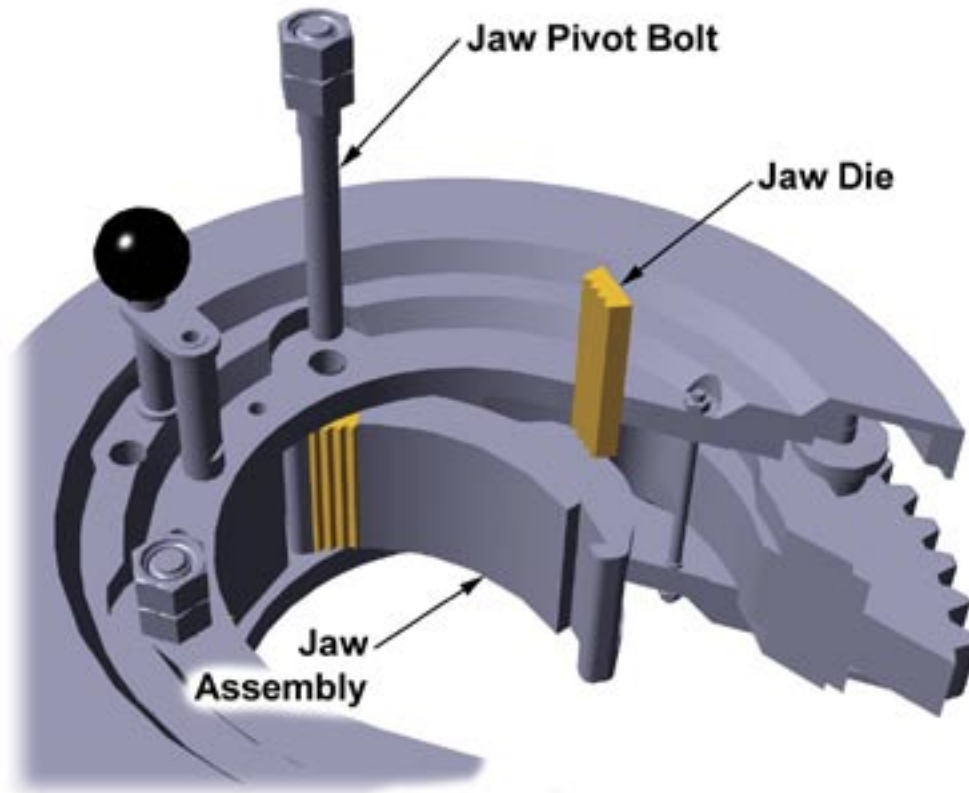
**NOTE:** IF THE BEARING REMAINS ATTACHED TO THE GEAR SHAFT AFTER THE BEARING CAP IS PULLED, IT IS RECOMMENDED TO LEAVE IT THERE UNTIL THE TOP TONG PLATE IS REMOVED.

15. Remove the top clutch bearing retainer which is secured by two or three counter-sunk socket head screws.
16. Remove remainder of hex bolts and socket head screws around the perimeter of the tong.
17. With all the above steps taken, the top tong plate can be lifted off providing access to the inside of the gear case. The cam follower array remains attached to the body plate, so lift the plate straight up so the cam followers clear the rotary gear.

Adequately strong suspension within the frame, and proper hydraulic connections are essential in ensuring reliable operation of your tong. The following section will enable you to safely start-up and operate your unit. Please follow all instructions carefully.

**A. TONG JAW REMOVAL/INSTALLATION**

- Carefully remove the Jaw Pivot Bolt
- Slide the Jaw Assembly out from inside the cageplate.
- Slide the inserts out of the jaw body - in many cases they may need to be driven out.
- Install the new insert set. In most cases they are press-fitted into place, and may have to be tapped in using a hammer.
- Re-install the jaw assembly, pivot bolt.



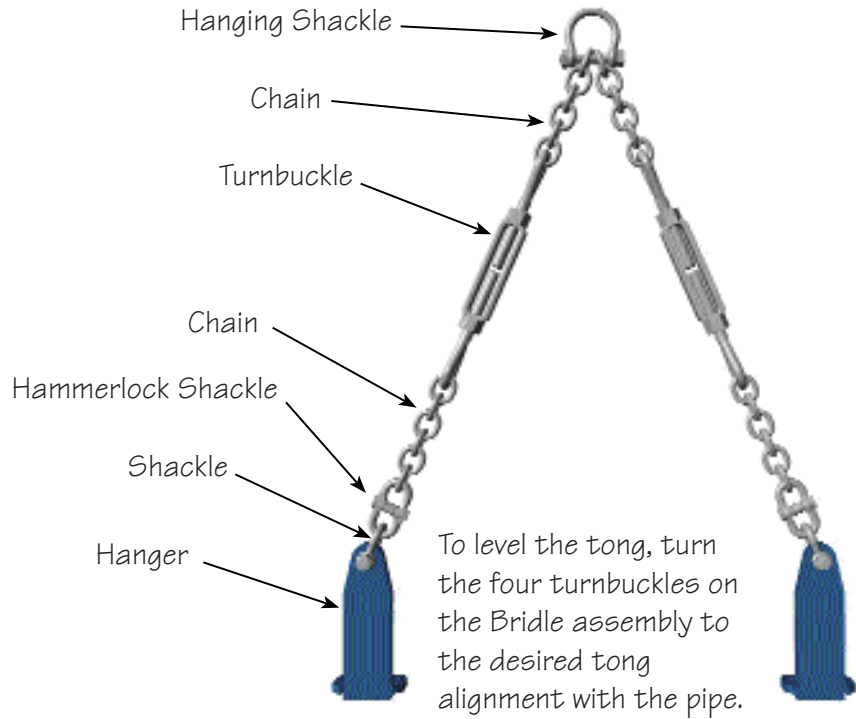
### B. TONG RIG-UP & LEVELING

The tong should be suspended by 5/8" diameter (minimum) wire rope, and from a location in the derrick high enough to assure easy handling and maneuvering of the tong. The hand line should be placed in a position as near the center of the rotary as possible without interfering with the movement of the hoisting equipment. This line may either be extended over a pulley and balanced by a counterweight equal to the weight of the tong (approximately 3000 - 3400 lbs.) or simply tied off in the derrick to form a dead line. In cases where the dead line arrangement is used, it is necessary to use a FARR spring hanger assembly. This spring hanger allows the tong to compensate for the downward movement of the casing as the thread made-up.

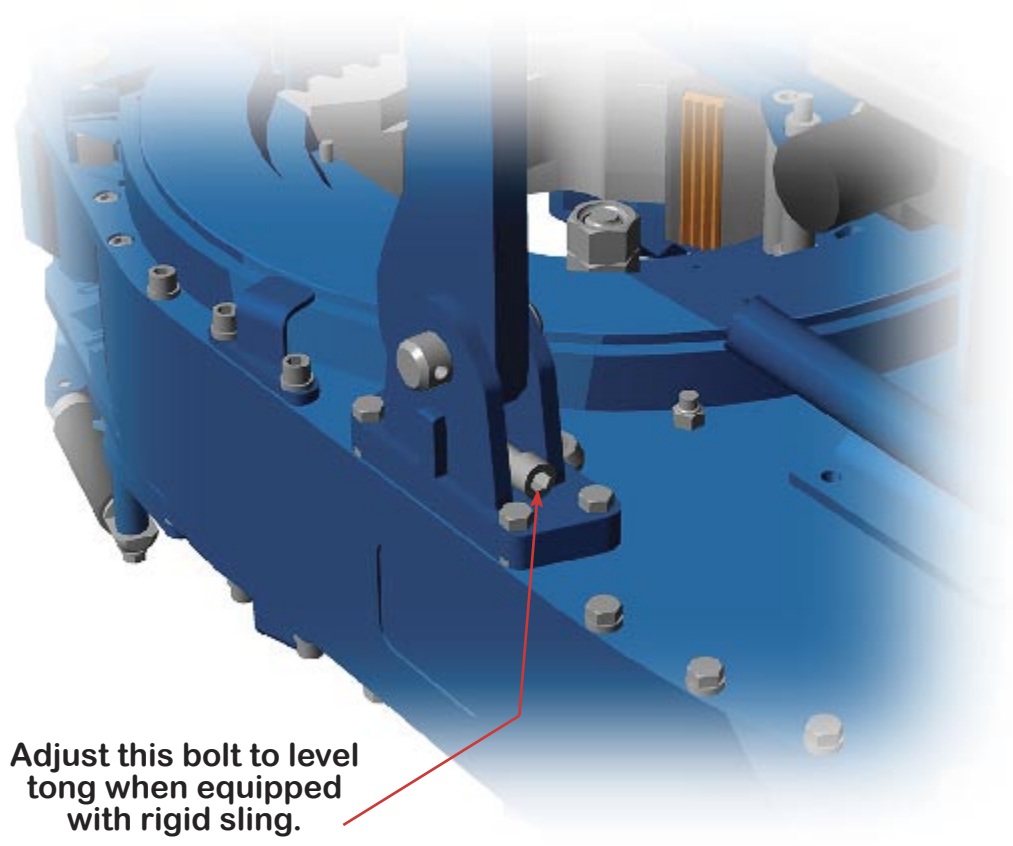


To insure even gripping action of the dies, and smooth running of the rotary gear, it is essential that the tong be hung level. The tong will have been supplied with either a chain sling or a rigid sling. In either case, leveling the tong can be accomplished by making a few simple adjustments once the tong is hung. (see next page)

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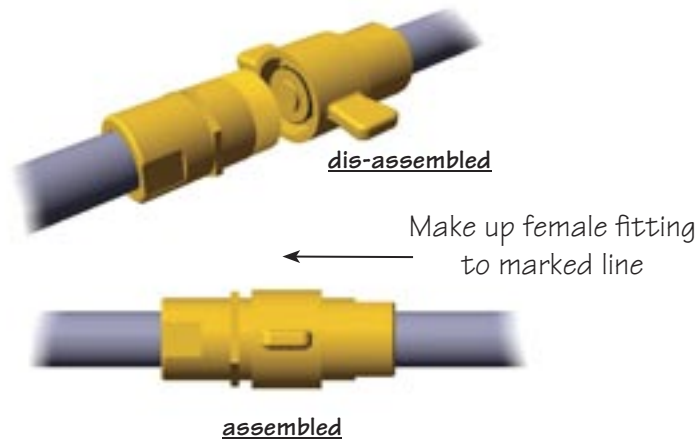
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### C. HYDRAULIC HOSES

Perform hydraulic connections when the power unit is not running, or when the hydraulic pump is disengaged. The possibility of error in inter-changing the high pressure supply hose and the low pressure return hose has been eliminated by using a 1" high pressure hose and a 1-1/4" return hose. These hose couplings are self-sealing, and care should be taken to ensure complete engagement to prevent partial closure of the check valve in the coupling. Ensure that the nut (female) side is completely made up onto the male connector - there is a line on the male fitting that indicates complete make-up. Snug the female fitting right up to the line.

NOTE: The supply and return lines from the power unit may need to be inspected to ensure they are configured the same way as the tong connections.



### D. LOAD CELL CONFIGURATION

The backup is directly coupled to the compression load cell via the backup body paddle. The load cell hanger is simply hung on the paddle and secured through the top of the "U" by a bolt and washer set, and in normal operation does not need to be adjusted or removed. The assembly in the first of the following two illustrations has been configured in the "make-up" configuration; to convert the assembly to the "break-out" configuration remove the bolt and washer set securing the load cell holder to the paddle, and move the entire assembly to the other side of the paddle.

(see illustrations following page)

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## E. TONG OPERATION

### 1. INITIAL START UP & BREAK-IN PROCEDURE

NOTE: Although your new equipment has been thoroughly tested at the FARR factory, we advise thorough testing of your new tong assembly after you have taken possession in case of shipping damage. Farr recommends that the following pre-operating tests be performed prior to releasing the tong assembly to an operational environment:

- 1.) Operate the tong at full speed and in high gear for a duration of one-half hour.
- 2.) Switch to low gear and operate for an additional one-half hour at full speed.
- 3.) Inspect all components and hydraulic fittings for possible defects following completion of the tests. All FARR Tongs have been thoroughly tested at the factory prior to shipping and any defects may be the result of shipping damage.

**NOTE:** DOOR MUST BE CLOSED AND SECURELY LATCHED BEFORE THE POWER UNIT IS STARTED TO ASSURE THE SAFETY OF OPERATING PERSONNEL.

Ensure adequate lube oil and hydraulic oil levels before starting engine. Use start up procedures as recommended by the power unit engine operator's manual. Open the Bypass Valve on the hydraulic system, and inspect all pressure and return line hose connections to ensure correct and secure installation.

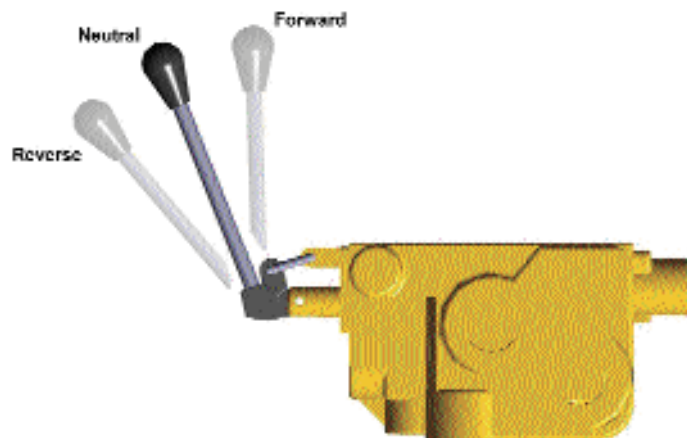
**NOTE: IMPROPERLY SECURED HYDRAULIC CONNECTIONS WILL INTERRUPT HYDRAULIC FLUID FLOW, AND COULD RESULT IN THE FOLLOWING FAILURES:**

- A restriction in the pressure supply hose will result in high pressure within the power unit hydraulic system, which will activate the hydraulic governor and increase the engine speed as high as maximum RPM.
- A restriction in the return line will result in high pressure within the power unit and the tong hydraulic system, causing engine speeds as high as maximum RPM, and possible failure of the motor seal.

After the hoses are checked, start the engine and allow it to idle until warm. Allow hydraulic fluid to circulate for approximately 10 minutes, then slowly close the Bypass Valve to allow hydraulic fluid to circulate through the hoses and to the tong (circulating pressure should not exceed 200 psi). Place the tong gear shifter in low gear and rotate the tong slowly forward and then reverse with the throttle valve control lever. Once this has been done and the proper size jaws have been installed, the tong is then ready to run pipe.

### 2. DIRECTION AND SPEED CONTROL

The 4-way valve assembly controls direction, speed of rotation, and torque output. For clockwise rotation, push the valve handle forward, and for reverse rotation, pull the valve handle in the opposite direction. Speed in either direction is proportional to the distance that the valve handle is moved from the center or neutral position. (see illustration below)

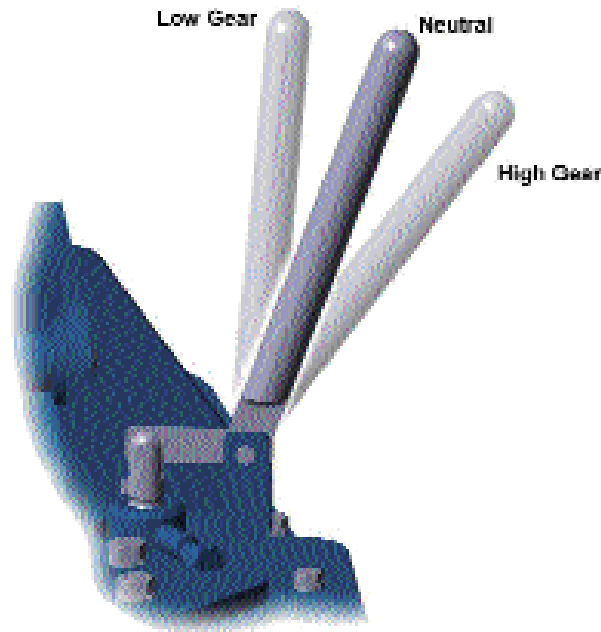


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### 3. HIGH AND LOW GEAR

The primary gear box provides for high and low gear operation. For high gear, the shifting shaft is simply moved upward from neutral position, and for low gear, the shifting shaft is moved down from neutral position.



### 4. GENERAL COMMENTS

- a) Position rotary gear in contact with both idler gears when breaking out joints or collars where high torques are required.

**NOTE: FOR SAFETY OF RIG PERSONNEL, MAKE SURE THE DOOR IS SECURELY CLOSED AND LATCHED AT ALL TIMES.**

- b) When making-up integral (shouldered) joints, it is essential to make up the last turn of the threads in low gear. This reduces the tendency of an instant stop or a sudden increase in torque, which induces extremely high stresses on the gear train.
- c) DO NOT employ the "snap break" method of breaking-out joints when pulling a string. By definition, the "snap break" method is a procedure used by some operators to break-out connections, accomplished by leaving slack in the "jaw-pipe" engagement, and then quickly pulling the throttle valve control lever allowing the tong to snap into its loaded or high torque condition. Although this method is very effective in breaking out joints, the extremely high stress placed on the gear train frequently causes gear breakage.

**NOTE: THIS METHOD IS ALSO DANGEROUS TO OPERATING PERSONNEL.**

### F. EXTREME COLD WEATHER OPERATION PROCEDURES

- 1) Consult the power unit engine operator's manual for all cold weather operating procedures and precautions.
- 2) Select gear and bearing lubricants that are compatible with expected climatic conditions.
- 3) Select hydraulic fluid that is compatible with expected climatic conditions.
- 4) Allow hydraulic fluid to circulate for approximately 20 minutes after starting the power unit, prior to activating the bypass valve to allow fluid to circulate to tong. If the power unit is equipped with an oil temperature gauge, ensure that the fluid has reached operating temperature as specified by hydraulic fluid data sheet.
- 5) Allow for adequate drying of moisture (prior to lubricating) when cleaning tong parts in cold weather.

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**G. "MAKE-UP" CASING**

USE THE FOLLOWING PROCEDURE TO PROPERLY MAKE UP A CASING JOINT:

**1. POSITION TONG ASSEMBLY OVER CASING.**

Open tong and backup doors, and move assembly into place over the protruding casing (the "stump"). Engage the clamping jaw of the back-up using the back-up clamp control on the operator control panel.

Note: Ensure clamping pressure is set within the range proscribed by the pipe size and wall thickness by adjusting the relief valve on the side of the back-up.

**2. ENGAGE CASING WITH TONG.**

Load fresh casing piece, and close tong door. Ensure backing pin is correctly set for making up a joint. Raise tong to the top of the float by pulling down on Tong Vertical position. Set tong rotation speed to the high range, and engage tong via the tong rotation control.

**3. MAKE UP JOINT**

- Run tong at high speed until joint begins to tighten (torque will begin to rapidly increase)
- Stop tong rotation by centering the Tong Rotation Joystick, switch to low gear, and push the tong rotation joystick up to "make-up". Continue to make-up casing to desired torque.

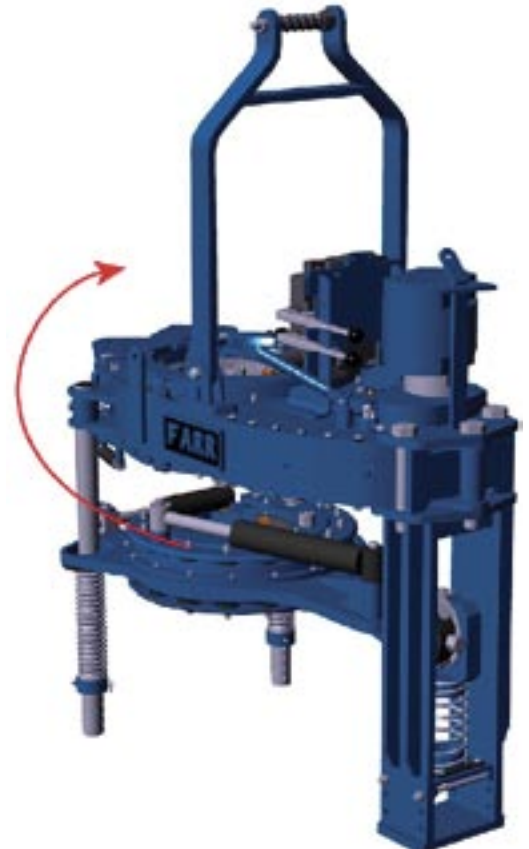
**NOTE:** Your tong will be equipped with either a torque gauge or a Wincatt torque measurement system. Stop applying torque when the torque measurement reaches the pre-determined value, or when the Wincatt system actuates the pressure dump valve.

**4. DISENGAGE JAWS.**

Rotate the rotary gear in the opposite direction until the jaws have disengaged from the pipe/casing, and the opening of the rotary gear aligns with the door opening. Disengage the back-up clamping jaw from pipe.

**5. OPEN DOORS.**

The tong can now be cleared from the pipe by opening both doors using the back-up control to open the front jaws, and the tong door control to open the tong door.



## 9.625" Lightweight Tong

### H. "BREAK OUT" OF CASING

USE THE FOLLOWING PROCEDURE TO PROPERLY BREAK OUT A CASING JOINT:

#### 1. POSITION TONG ASSEMBLY OVER CASING.

Open tong and backup doors, and move assembly into place over the protruding casing (the "stump"). Engage the clamping jaw of the back-up using the back-up clamp control on the operator control panel.

Note: Ensure clamping pressure is set within the range proscribed by the pipe size and wall thickness by adjusting the relief valve on the side of the back-up.

#### 2. ENGAGE CASING WITH TONG.

Ensure tong is in low gear. Lower tong to close proximity to back-up before engaging pipe in order to ensure the tong has enough travel to completely unthread connection. Close tong door and push the tong backing pin joystick up until the cams engage the jaws. Pull the tong rotation joystick down to the "break out" position, which will rotate the casing, causing the threads to begin to unthread.

#### 3. RELEASE THE THROTTLE.

Now that the connection has been broken, stop applying torque by centering the tong rotation joystick.

#### 4. TONG SPEED.

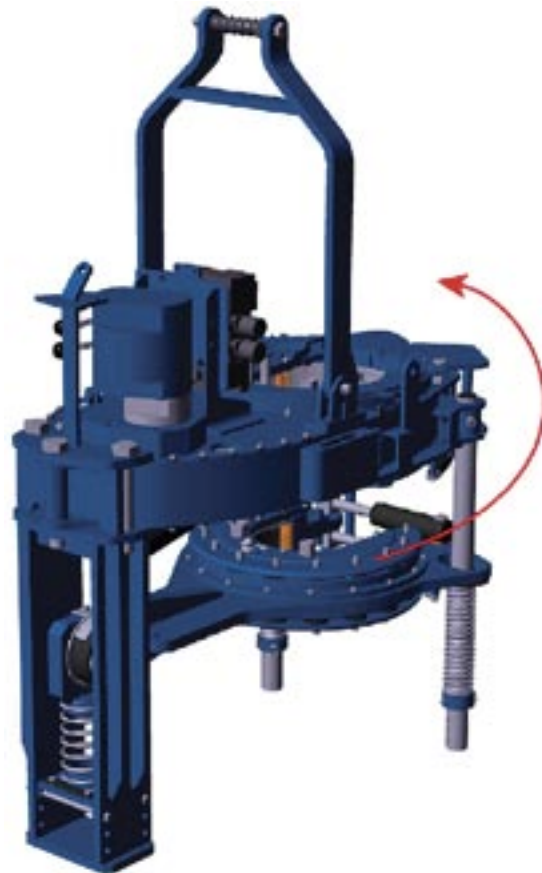
Set the tong rotational speed to high, and push the tong rotation joystick down to "break out". Continue to rotate the casing until free.

#### 5. DISENGAGE JAWS.

NOTE: Ensure that free section of pipe/casing is supported or otherwise restrained before disengaging jaws. Rotate the rotary gear in the opposite direction until the jaws have disengaged and the rotary gear aligns with the door opening.

#### 6. OPEN DOORS.

The tong can now be cleared from the pipe by opening the door using the back-up control to open the front jaws, and the tong door control to open the tong door.



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Adequate maintenance and proper fluid selection should keep hydraulic problems to a minimum. If troubleshooting is necessary, ensure that the technician is well-trained in hydraulic systems, and familiar with the equipment design, assembly and operation. Knowledge of hydraulic circuits and components is essential in isolating trouble areas and pinpointing particular faults.

The following troubleshooting guidelines are intended to be general in nature. Any faults not solved through the use of this guide should be referred to our engineering department for their evaluation and recommendations.

#### A. PUMP MAKES EXCESSIVE NOISE

1. POSSIBLE PROBLEM: Plugged or restricted intake line.  
SOLUTION: Clean intake line.
2. POSSIBLE PROBLEM: Plugged reservoir air vent.  
SOLUTION: Clean or replace.
3. POSSIBLE PROBLEM: Fluid viscosity too high due to ambient temperature.  
SOLUTION: Replace fluid with a type that maintains the proper viscosity range in the operating environment.
4. POSSIBLE PROBLEM: Air leaking into system.  
SOLUTION: Ensure oil pickup is well below oil surface level in reservoir. Check pump packing and line connections on intake side by pouring oil over the suspected leak. If the noise stops, the leak has been located. Tighten joints or change packing or gaskets where necessary.
5. POSSIBLE PROBLEM: Loose or worn parts.  
SOLUTION: Replace parts. NOTE: Improper selection of hydraulic fluid may result in premature wear.
6. POSSIBLE PROBLEM: Pump misalignment with motor.  
SOLUTION: Check alignment.
7. POSSIBLE PROBLEM: Pump running in excess of rated speed.  
SOLUTION: Check manufacturer's recommended speed. Check pulleys, gears, power takeoff, or drive motor.

**B. HYDRAULIC SYSTEM OVERHEATING**

1. *POSSIBLE PROBLEM: Excess discharge pressure (relief valve set too high).  
SOLUTION: Reset relief valve in accordance with maximum pressure required. Check manufacturer's recommendations.*
2. *POSSIBLE PROBLEM: Fluid viscosity too high or too low due to extreme ambient temperatures.  
SOLUTION: Replace fluid. (Check pump and motor manufacturer's recommendations.)*
3. *POSSIBLE PROBLEM: Excessive internal leakage.  
SOLUTION: Repair or replace any worn parts (loose packing, etc.)*
4. *POSSIBLE PROBLEM: Excessive friction.  
SOLUTION: Check pump for part interference. Pump may be assembled too tightly.*
5. *POSSIBLE PROBLEM: Leaks in pump check valve or relief valve.  
SOLUTION: Repair or replace.*
6. *POSSIBLE PROBLEM: Fluid level in reservoir too low for proper cooling.  
SOLUTION: Maintain proper oil level.*
7. *POSSIBLE PROBLEM: Pump discharge being restricted.  
SOLUTION: Check operation of throttle valve. Check relief valve. Do not allow larger pump volumes to remain at high pressure for long periods of time. Check all self-sealing hose connections for proper engagement.*
8. *POSSIBLE PROBLEM: Hydraulic system valves restricted.  
SOLUTION: Clean valves and piping.*
9. *POSSIBLE PROBLEM: Heat exchanger not cooling hydraulic fluid.  
SOLUTION:*
  - *Hydraulic circuit through heat exchanger is obstructed.*
  - *Cooling coils in heat exchanger may be coated with a layer of dust.*
  - *Airflow through heat exchanger may be obstructed.*
  - *Cooling fan may be malfunctioning*

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C. EXCESSIVE WEAR OF MOVING PARTS

1. POSSIBLE PROBLEM: Abrasive contaminants entrained in the fluid.  
SOLUTION: Change fluid more frequently. Replace filter element. Be sure filter is proper size.
2. POSSIBLE PROBLEM: Misalignment of moving parts.  
SOLUTION: Inspect and realign.
3. POSSIBLE PROBLEM: Operating pressure rises above manufacturer's recommendations.  
SOLUTION: Check relief valve and reset.
4. POSSIBLE PROBLEM: Viscosity of fluid too low at working temperature.  
SOLUTION: Ensure fluid is compatible with operating temperature.
5. POSSIBLE PROBLEM: Air in system.  
SOLUTION: Bleed air and check for leaks in system.
6. POSSIBLE PROBLEM: Excessive wear of bearings.  
SOLUTION: Inspect alignment of moving parts, vibration or excessive side thrusts on shafts.

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### D. TONG RUNNING TOO SLOWLY

1. POSSIBLE PROBLEM: Pump intake line plugged.  
SOLUTION: Clean intake line.
2. POSSIBLE PROBLEM: Reservoir oil level too low.  
SOLUTION: Add oil.
3. POSSIBLE PROBLEM: Air leak in pump intake line.  
SOLUTION: Repair leak.
4. POSSIBLE PROBLEM: Pump speed too slow.  
SOLUTION: Check manufacturer's speed recommendations.
5. POSSIBLE PROBLEM: Excessively worn or damaged pump or tong.  
SOLUTION: Replace worn parts by following manufacturer's recommendations.
6. POSSIBLE PROBLEM: Fluid viscosity too high.  
SOLUTION: Some pumps will not prime if the fluid is too heavy.

**NOTE: BYPASS ALL TONG CIRCUITRY TO TEST PRESSURE AND VOLUME. IF FLOW AND PRESSURE ARE TESTED OFTEN, FARR RECOMMENDS CONSTRUCTION OF A TEST RIG THAT CAN EASILY BE CONNECTED TO THE PUMP SUCTION AND DISCHARGE PORTS**

7. POSSIBLE PROBLEM: Restriction in line between power unit and tong.  
SOLUTION: Check self-sealing couplings to insure they are properly engaged.
8. POSSIBLE PROBLEM: By-pass valve not functioning.  
SOLUTION: Check and repair.

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E. TONG WILL NOT DEVELOP SUFFICIENT TORQUE

1. Malfunctioning relief valve on unit or tong.
  - a. POSSIBLE PROBLEM: Relief pressure set too low.  
SOLUTION: Increase setting. To check, block the oil line beyond the relief valve and determine pressure with a gauge.
  - b. POSSIBLE PROBLEM: Valve is stuck.  
SOLUTION: Check for contamination of oil that may inhibit the way the valve actuates. Remove valve and clean, ensuring that the valve spring operates smoothly.
  - c. POSSIBLE PROBLEM: Valve is leaking.  
SOLUTION: Check valve seat for scouring. Check oil seals. Check for particles stuck under the valve system.
2. POSSIBLE PROBLEM: Worn or damaged pump parts.  
SOLUTION: Inspect and clean, replace all worn or broken parts.
3. POSSIBLE PROBLEM: Pump speed too slow.  
SOLUTION: Check motor speed.
4. POSSIBLE PROBLEM: Fluid viscosity too high.  
SOLUTION: Pump may not prime if fluid is too heavy. Replace with proper viscosity fluid.
5. POSSIBLE PROBLEM: Viscosity of fluid too low.  
SOLUTION: System may overheat. Replace with proper viscosity fluid.
6. POSSIBLE PROBLEM: Fluid by-passed to reservoir.  
SOLUTION: Check relief valve for proper operation. Check directional valve. Neutral position should return fluid directly to the reservoir.
7. POSSIBLE PROBLEM: Worn or damaged tong motor causing slippage.  
SOLUTION: Replace or repair worn or damaged parts.
8. POSSIBLE PROBLEM: Damaged bearings or gears causing excessive drag.  
SOLUTION: Repair or replace worn parts.
9. POSSIBLE PROBLEM: Poor hydraulic pressure at the tong or excessive back pressure in the return line.  
SOLUTION: Restriction in line between power unit and tong. Inspect integrity of self-sealing couplings.
10. POSSIBLE PROBLEM: Defective torque gauge or load cell.  
SOLUTION: Replace defective components. Ensure dampening screw has been adjusted. Ensure gauge has been calibrated to proper torque arm length.

### F. FAILURE OF JAWS TO GRIP PIPE

1. POSSIBLE PROBLEM: Dies have become too dull.  
SOLUTION: Replace dies.
2. POSSIBLE PROBLEM: Brake band insufficiently adjusted, not allowing jaws to cam properly.  
SOLUTION: Adjust brake bands to give proper resistance to cage plates.
3. POSSIBLE PROBLEM: Jaw roller broken or worn.  
SOLUTION: Replace roller.

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G. FAILURE OR DIFFICULTY OF TONG TO SHIFT

1. POSSIBLE PROBLEM: Bent or broken shifter handle.  
SOLUTION: Replace shifter handle.
2. POSSIBLE PROBLEM: Bent or broken shifter yoke.  
SOLUTION: Inspect and replace shifter yoke.
3. POSSIBLE PROBLEM: "Frozen" or hard-to-move shifter handle.  
SOLUTION: Grease shifter shaft through grease zert.
4. POSSIBLE PROBLEM: Bent shifter shaft.  
SOLUTION: Replace.
5. POSSIBLE PROBLEM: Tong pops out of gear  
SOLUTION: Ensure that detent ball & spring assembly has been correctly set.

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### H. GENERAL COMMENTS

The following factors contribute highly to inefficient hydraulic operation:

1. Failure to change fluid frequently enough, or inadequate fluid filtration.
2. Unsuitable hydraulic fluid.
3. Defective packing or seals in components of the hydraulic system.
4. Poor or incomplete understanding of hydraulic system components and/or operation of the equipment.

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- A. Store tong in a clean, dry, ventilated area.
- B. Ensure adequate lubrication before placing in storage (See lubrication section of manual).
- C. Coat spare moving parts (gears, shafts, etc.) with a good corrosion inhibitor if required to remain in storage for long periods of time. Store parts in a clean, dry area.
- D. Store all o-rings, seals, packings, gaskets, etc. in strong moisture proof, airtight containers. Ensure that these items are not crushed, nicked, or otherwise damaged.
- E. Generously lubricate all spare bearings (cam followers, roller bearings, etc.) and store in a dust-free box or container, protected from moisture.

**IF PROTECTED STORAGE OF THE TONG IS NOT AVAILABLE (FOR EXAMPLE, FORCED STORAGE OUTSIDE ON A DRILL SITE IN DUSTY CONDITIONS) THE FOLLOWING STEPS ARE RECOMMENDED:**

1. Generously apply grease to all fittings so that excess grease pumped through bearings acts as a seal against dust.
2. Cover or wrap tong with tarp or plastic to prevent wind-blown dust from getting into gears. If a tong has been exposed to extreme dust conditions, the following procedures are recommended before use:
  1. Suspend tong by body lug, remove clutch inspection plate and thoroughly wash & flush interior with solvent, diesel fuel or equivalent.
  2. Attach hydraulic hose and slowly rotate rotary gear, washing teeth of rotary and idler gears as they become exposed.
  3. Wash all sand and grit from cam follower grooves in rotary and cage plates.
  4. Wash and lubricate exposed end of shifting shaft.
  5. Wash and lightly grease cam surfaces of rotary gear.
  6. Grease teeth of rotary gear.
  7. Give every grease nipple a few shots of grease to displace any grit or sand which may have remained in bearings.

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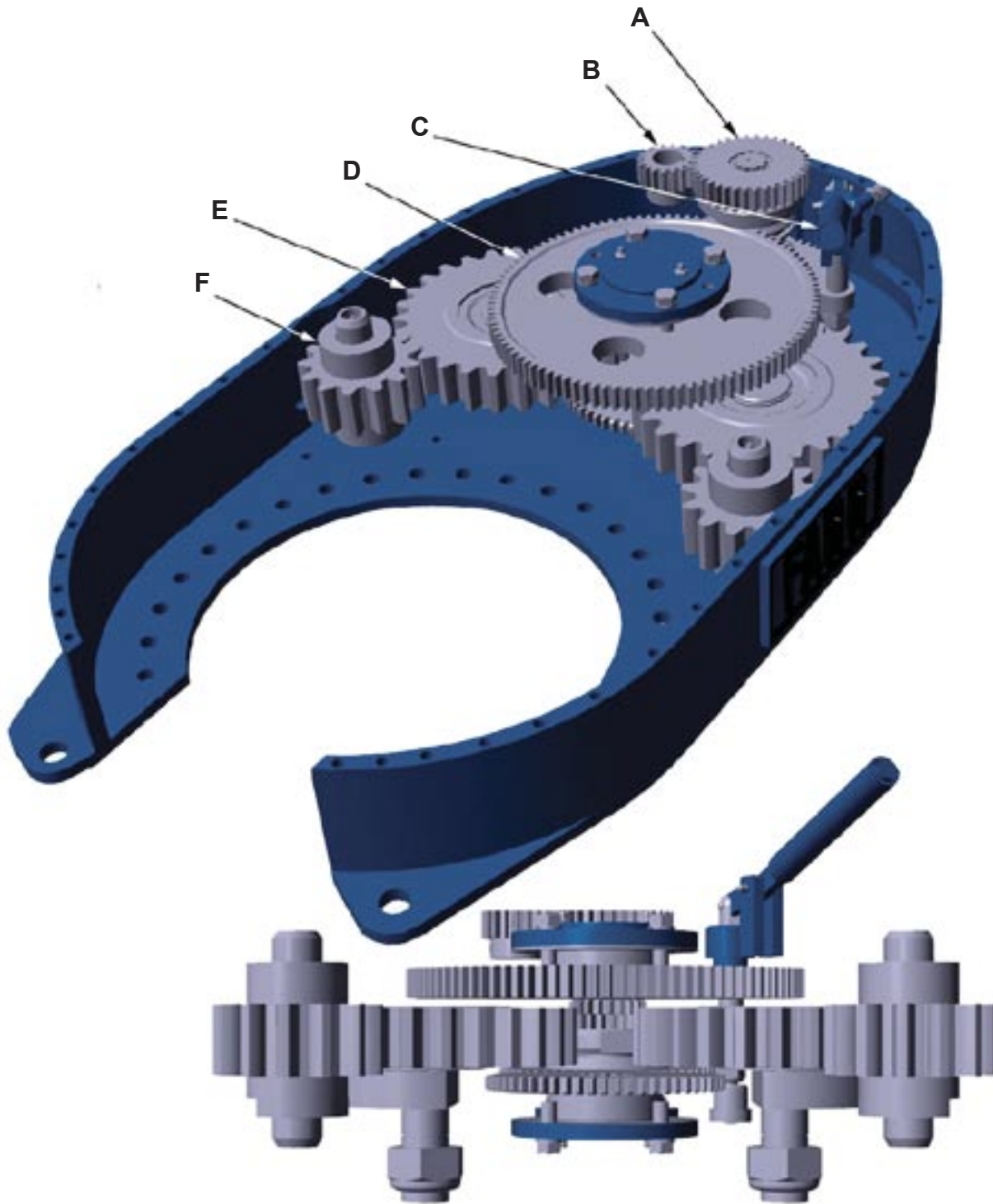


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# Parts and Assemblies



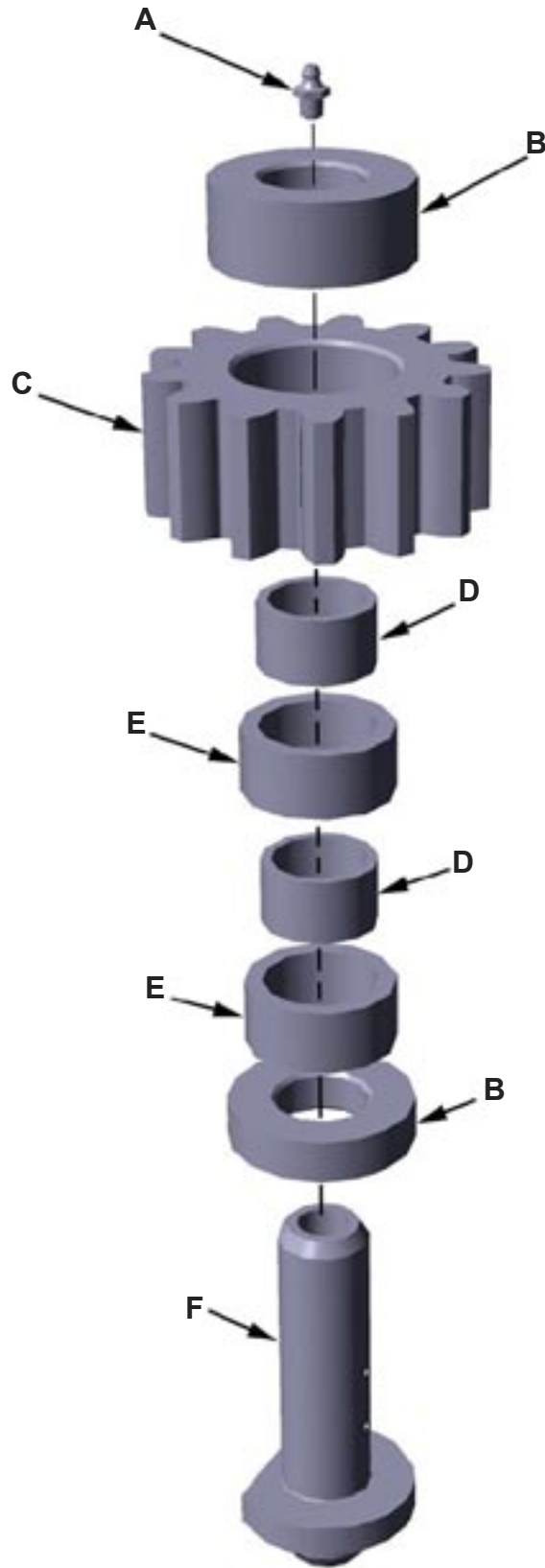
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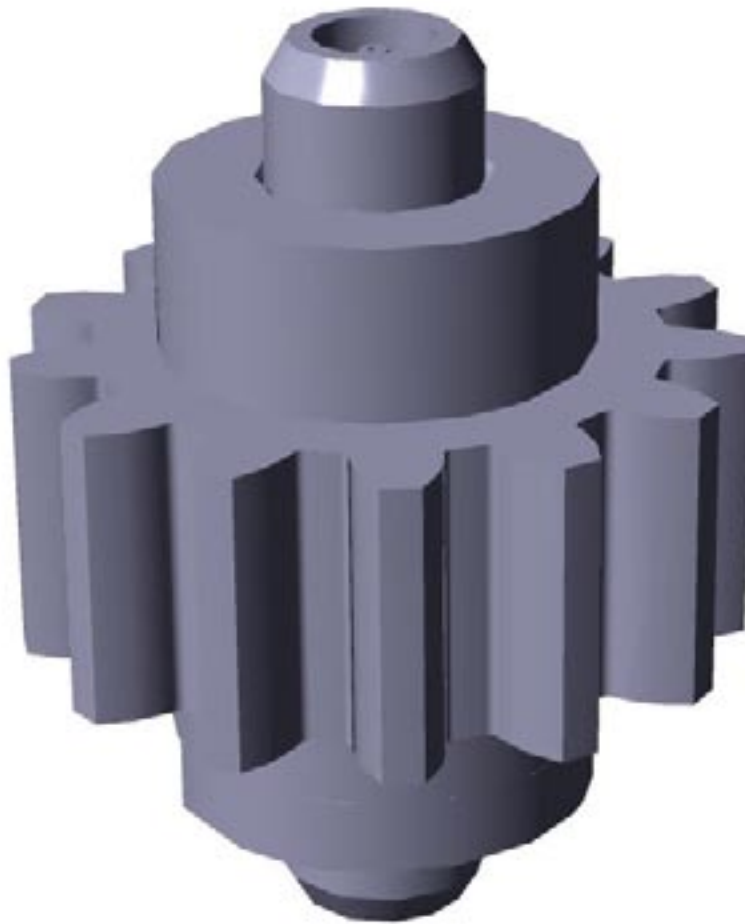
Item	Type	Description	Qty	Part Number
A	Assembly	Clutch Assembly (See PP 7.10 - 7.11)	1	
B	Part	Motor Gear	1	997-A10-149
C	Assembly	Shifter Assembly (See Pp. 7.12 - 7.13)	1	
D	Assembly	Pinion Gear Assembly (See Pp. 7.8 - 7.9)	1	
E	Assembly	Pinion Idler Assembly (See Pp. 7.6 - 7.7)	2	
F	Assembly	Rotary Idler Assembly (See Pp. 7.4 - 7.5)	2	



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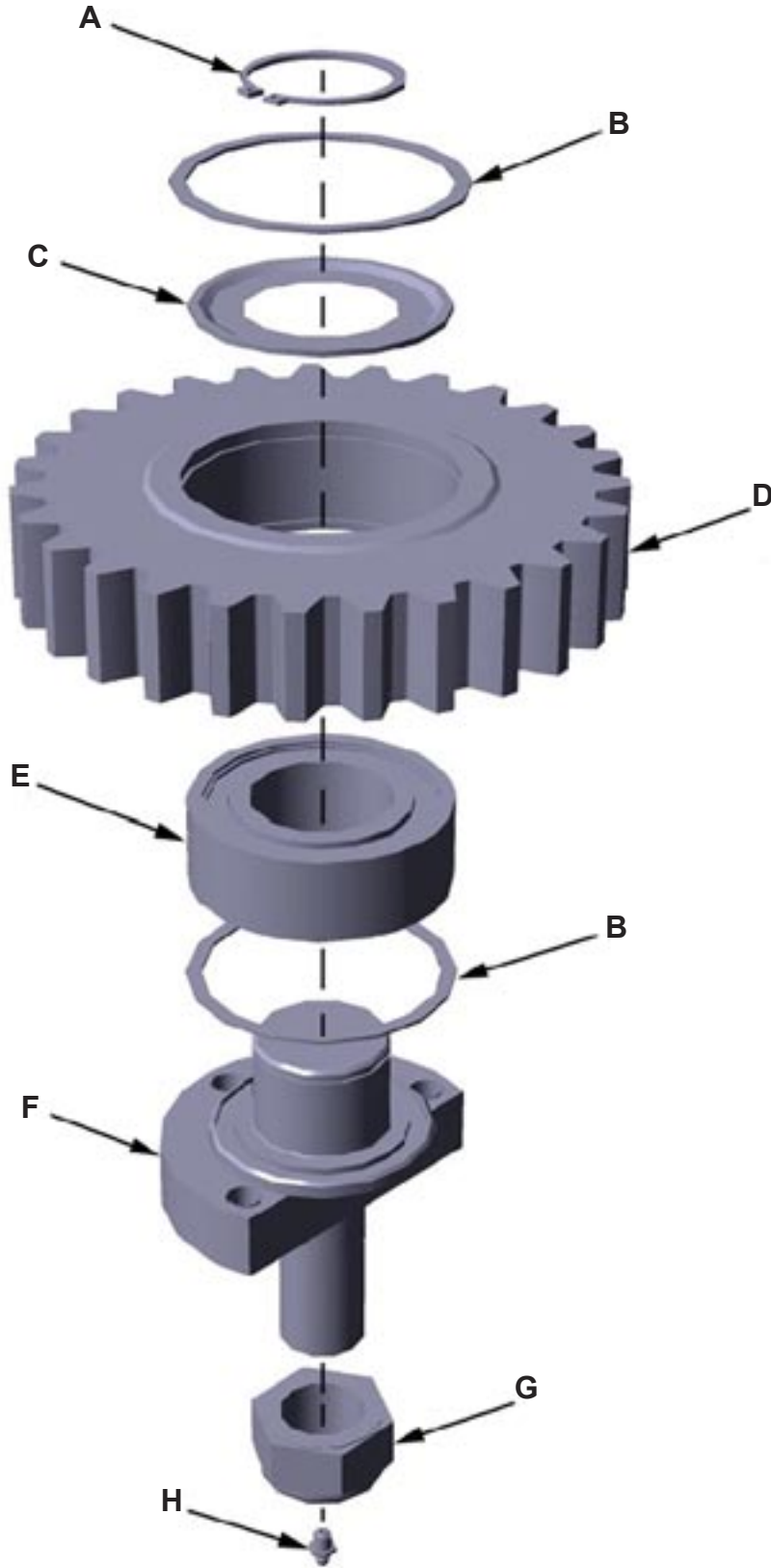


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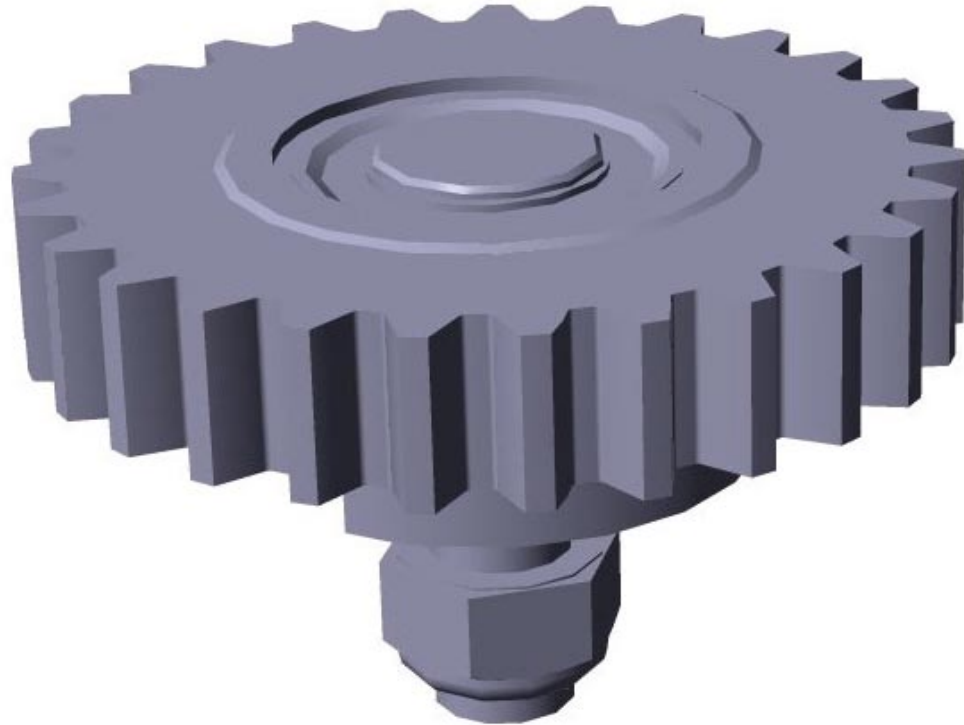
Item	Type	Description	Qty	Part Number
	Assembly	Rotary Idler Assembly	2	
A	Part	Grease Fitting, 1/8" NPT	1	02-0005
B	Part	Thrust Pad	2	AK01-104
C	Part	Rotary Idler Gear	1	AK01-102
D	Part	Inner Ring	2	02-0358
E	Part	Bearing	2	02-0361
F	Part	Rotary Idler Shaft	1	AK01-101



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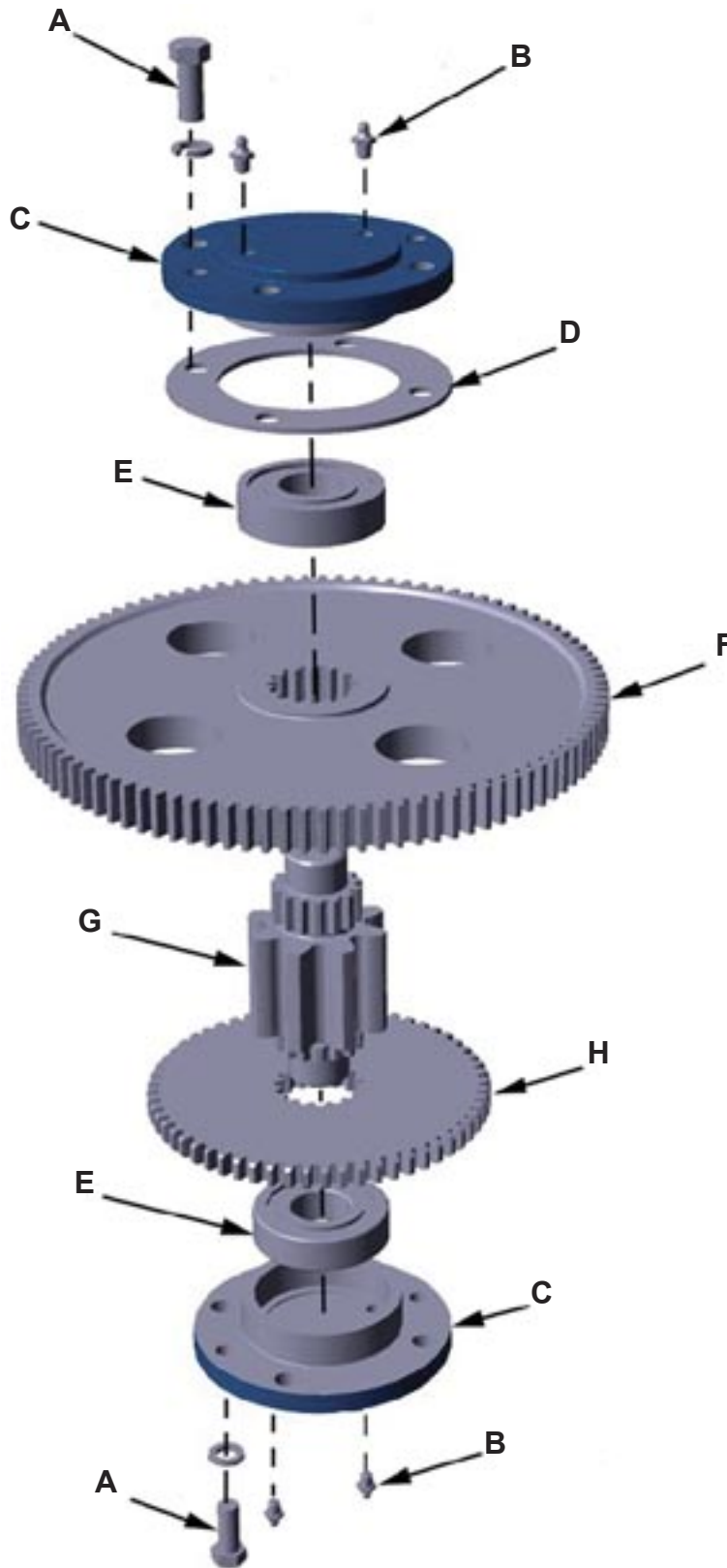


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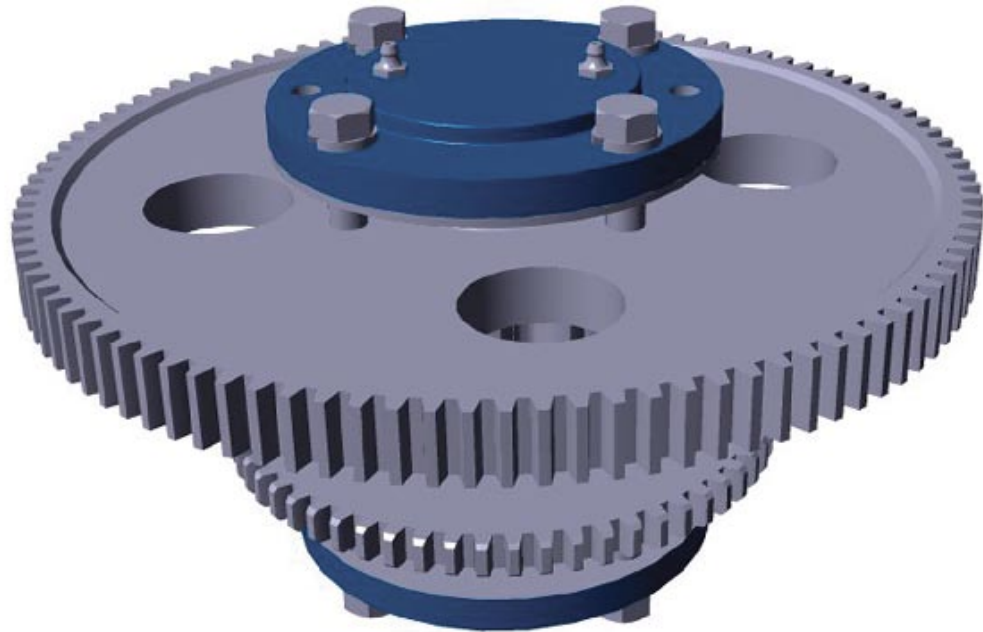
Item	Type	Description	Qty	Part Number
	Assembly	Pinion Idler Assembly	2	
A	Part	Bearing Retainer	1	02-0008
B	Part	Gear Retainer	2	02-0009
C	Part	Bearing Seal	1	02-0010
D	Part	Pinion Idler Gear	1	AK01-122
E	Part	Bearing MU5212TM	1	02-0075
F	Part	Pinion Idler Half Shaft	1	AK01-121
G	Part	1-1/2" NC LockNut	1	09-5739
H	Part	Grease Fitting, 1/8" NPT	1	02-0005



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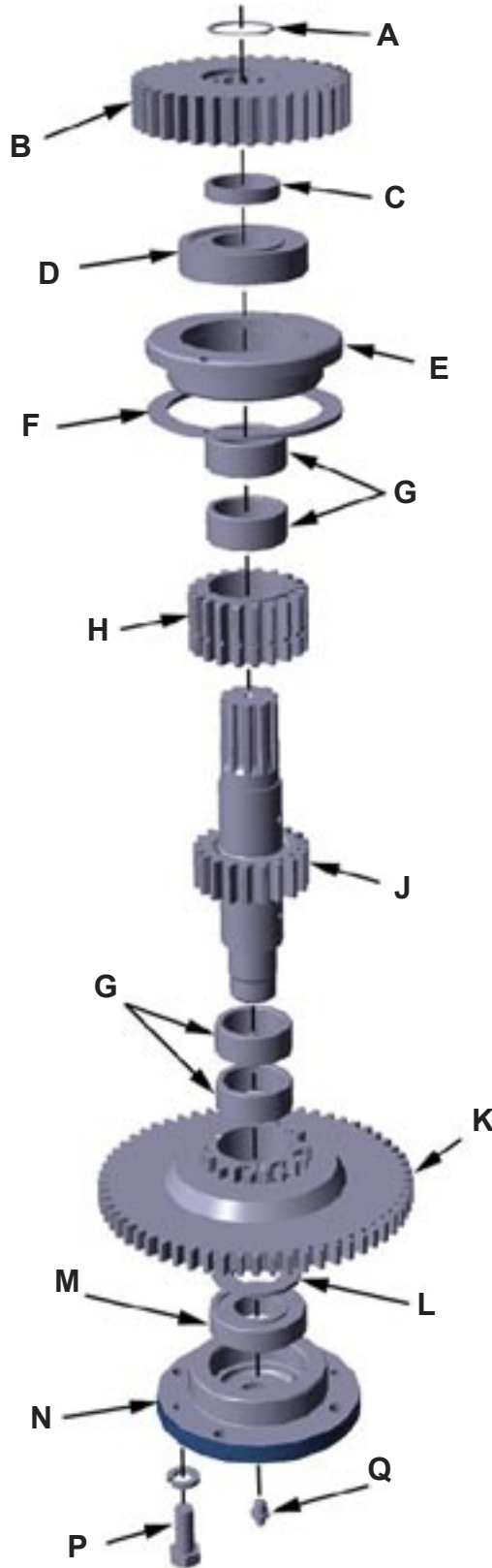


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Item	Type	Description	Qty	Part Number
	Assembly	Pinion Assembly	1	
A	Part	1/2" NC x 1-1/2" Hex Bolt c/w lockwashers	8	09-1170
B	Part	Grease Fittings, 1/8" NPT	4	02-0005
C	Part	Pinion Bearing Cap	2	997-89
D	Part	Spacer	1	1400-89A
E	Part	Bearing	2	1234-08-01B
F	Part	Low Pinion Gear	1	997-A5-88
G	Part	Pinion Gear	1	997-A7-86A
H	Part	High Pinion Gear	1	997-A4-87B

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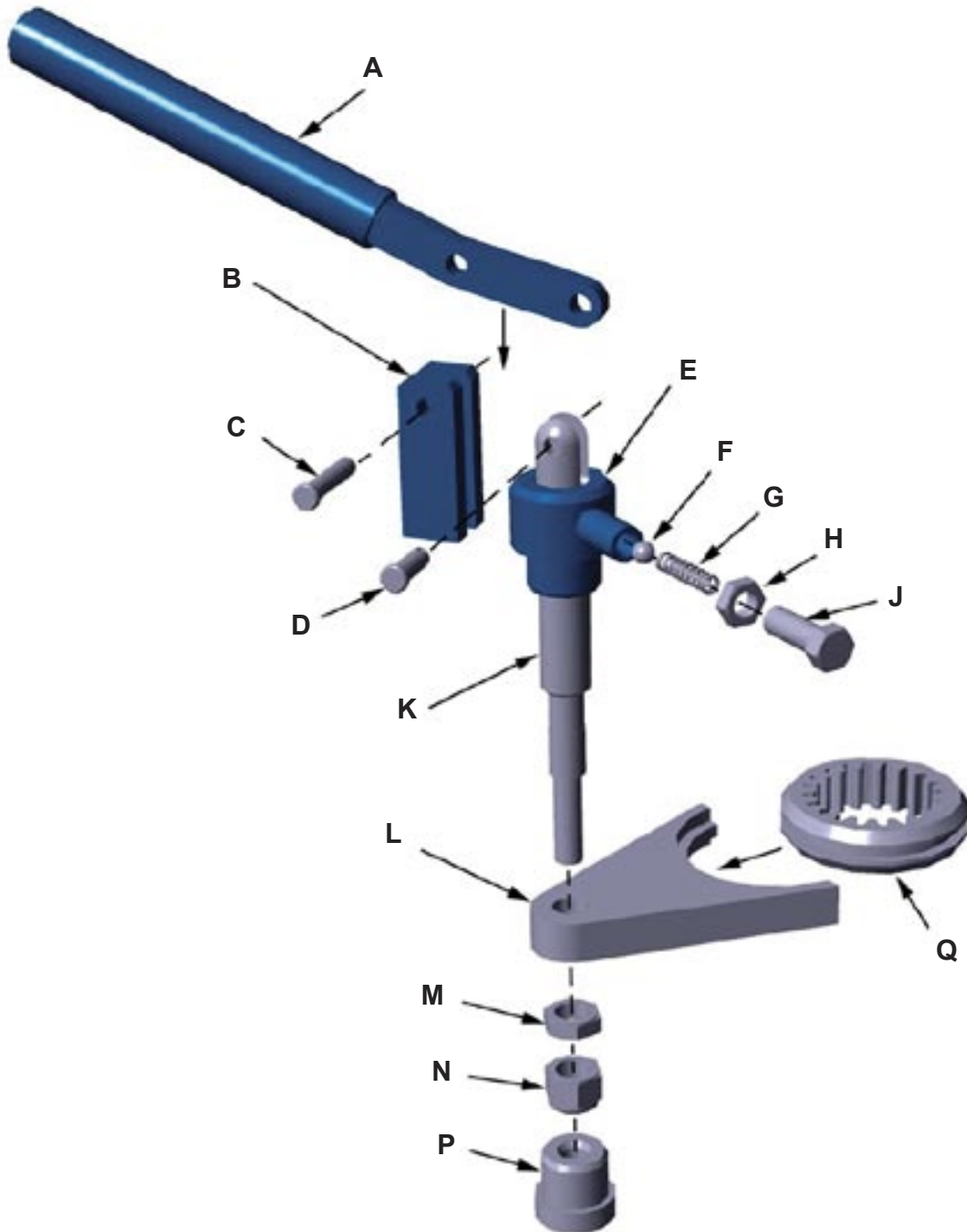
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Item	Type	Description	Qty	Part Number
	Assembly	Clutch Assembly	1	
A	Part	Retaining Ring	1	02-1463
B	Part	Shaft Drive Gear	1	997-HT-61
C	Part	Bushing	1	997-HT-60
D	Part	Top Clutch Bearing	1	02-0077
E	Part	Clutch Shaft Bearing Retainer	1	997-HT-59
F	Part	Spacer	1	1400-59A
G	Part	Needle Bearing	4	02-1404
H	Part	Low Clutch Gear	1	997-HT-52
J	Part	Splined Shaft	1	AK01-202
K	Part	High Clutch Gear	1	997-HT-51B
L	Part	Spacer	1	997-99
M	Part	Bottom Clutch Bearing	1	02-0076
N	Part	Bottom Clutch Bearing Cap	1	AK01-201
P	Part	3/8" NC x 1-1/2" SHCS	4	09-2050
Q	Part	Grease Fitting, 1/8" NPT	3	02-0005

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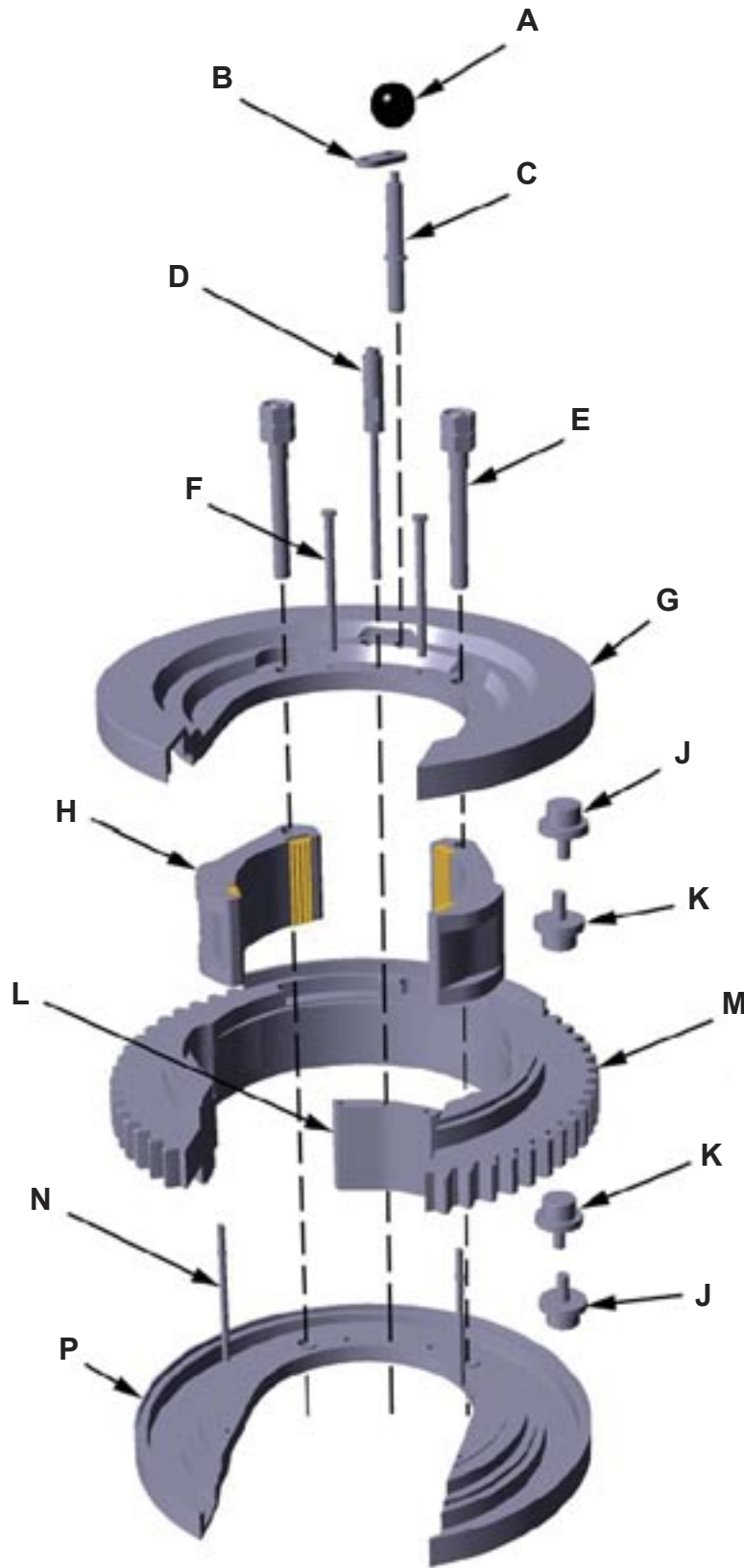
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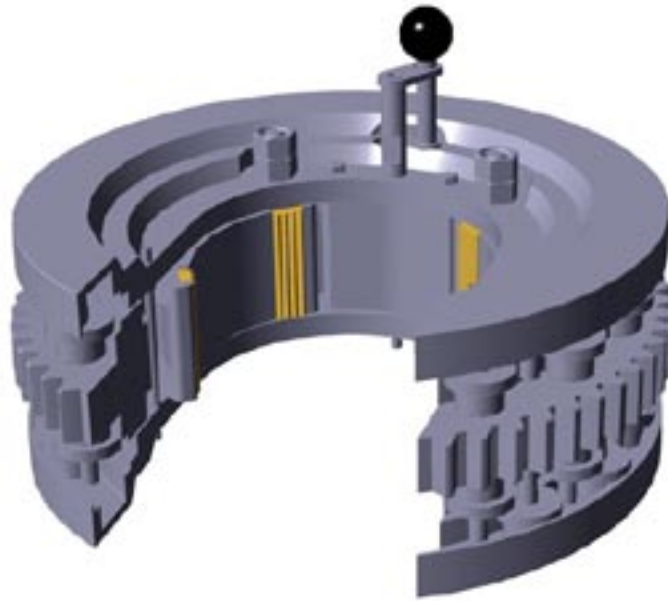
Item	Type	Description	Qty	Part Number
	Assembly	Shifting Assembly	1	
A	Part	Shifting Lever	1	AK00-092
B	Part	Pivot Arm	2	1064-A1-76
C	Part	5/16" x 1-1/2" Clevis Pin	1	02-0021
D	Part	5/16" x 1" Clevis Pin	1	02-0020
E	Part	Top Shifter Bushing	1	1064-B1-94
F	Part	Detent Ball	2	02-0018
G	Part	Detent Spring	2	01-0040
H	Part	7/16" NC Jam Nut	2	09-5508
J	Part	7/16" NC x 1-1/4" Hex Bolt	2	09-1608
K	Part	Shifting Shaft	1	1400-71
L	Part	Shifting Yoke	1	997-HT-72
M	Part	5/8" Jam Nut	1	09-5514
N	Part	5/8" Nylock Nut	1	09-5714
P	Part	Lower Shifter Bushing	1	AK01-091
Q	Part	Shifting COLLar	1	997-HT-62



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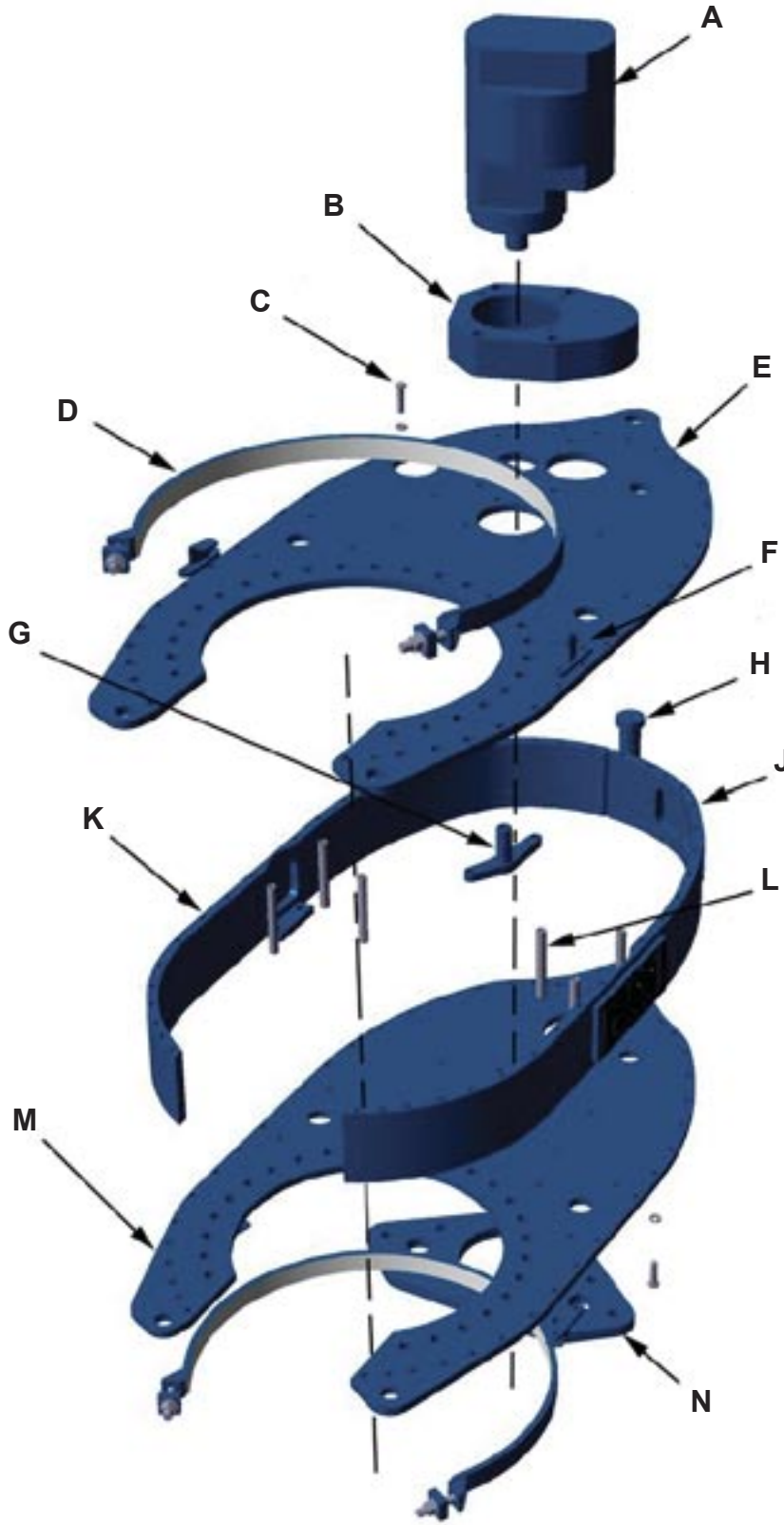
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Item	Type	Description	Qty	Part Number
A	Part	Knob	1	02-0017
B	Part	Retainer	1	AK20-034
C	Part	Backing Pin	1	AK20-036
D	Part	Spacer Bolt	1	AK20-033
E	Part	Jaw Pivot Bolt	2	AK21-010
F	Part	3/8" NC x 6-1/2" Hex Bolt	2	09-1252
G	Part	Cageplate - TOP	1	AK20-010
H	Part	9-5/8" Jaw c/w two standard 4" dies	2	AK21-J-9625
J	Part	Cam Follower	24	AK03-570
K	Part	Cam Follower	26	AK03-560
L	Part	Rear Cageplate Spacer	1	AK20-032
M	Part	Rotary Gear	1	AK01-001
N	Part	Front Cageplate Spacer	2	AK20-031
P	Part	Cageplate - BOTTOM	1	1410A-22A

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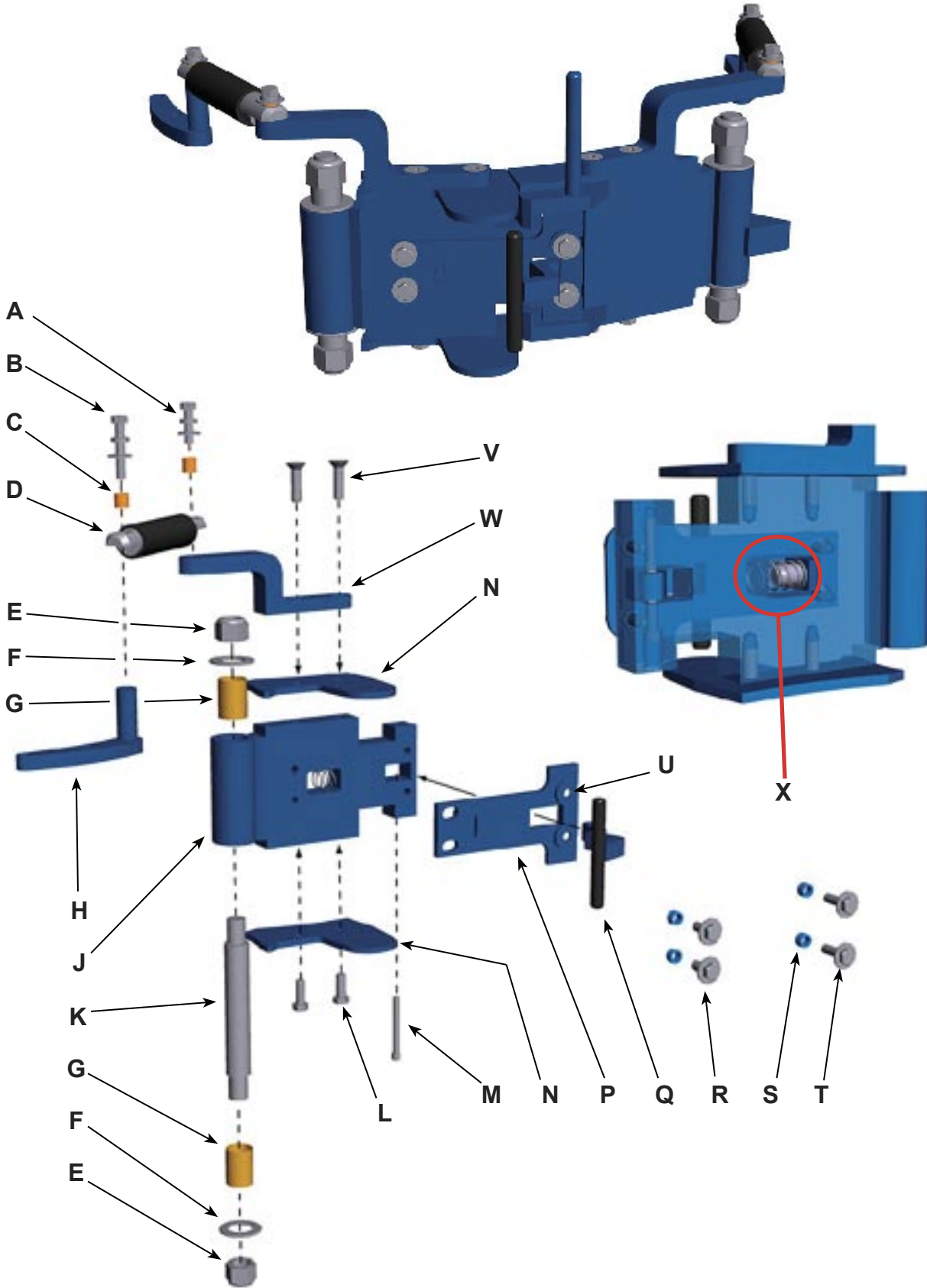
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Item	Type	Description	Qty	Part Number
A	Part	Hydraulic Motor, Commercial	1	87-0070
B	Part	Motor Mount	1	1064-C8-150
C	Part	3/8" NC x 1-1/2" Body Plate Bolt	14	09-1050
	Part	3/8" NC x 1-1/2" Body Plate SHCS	10	09-2050
D	Assembly	Brakeband Assembly	2	AK29-000
E	Part	Body Plate - TOP	1	AK07-002
F	Part	Brake Restraint	4	AK00-100
G	Part	Cylinder Mount	1	AK12-030
H	Part	Anchor Pin	1	AK00-004
J	Part	Clutch Access Plate	1	AK00-006
K	Part	Body Side Wall	1	AK07-050
L	Part	Body Spacer	6	AK00-002
M	Part	Bottom Body Plate	1	AK07-001
N	Part	Body Plate Stiffener	1	AK07-010

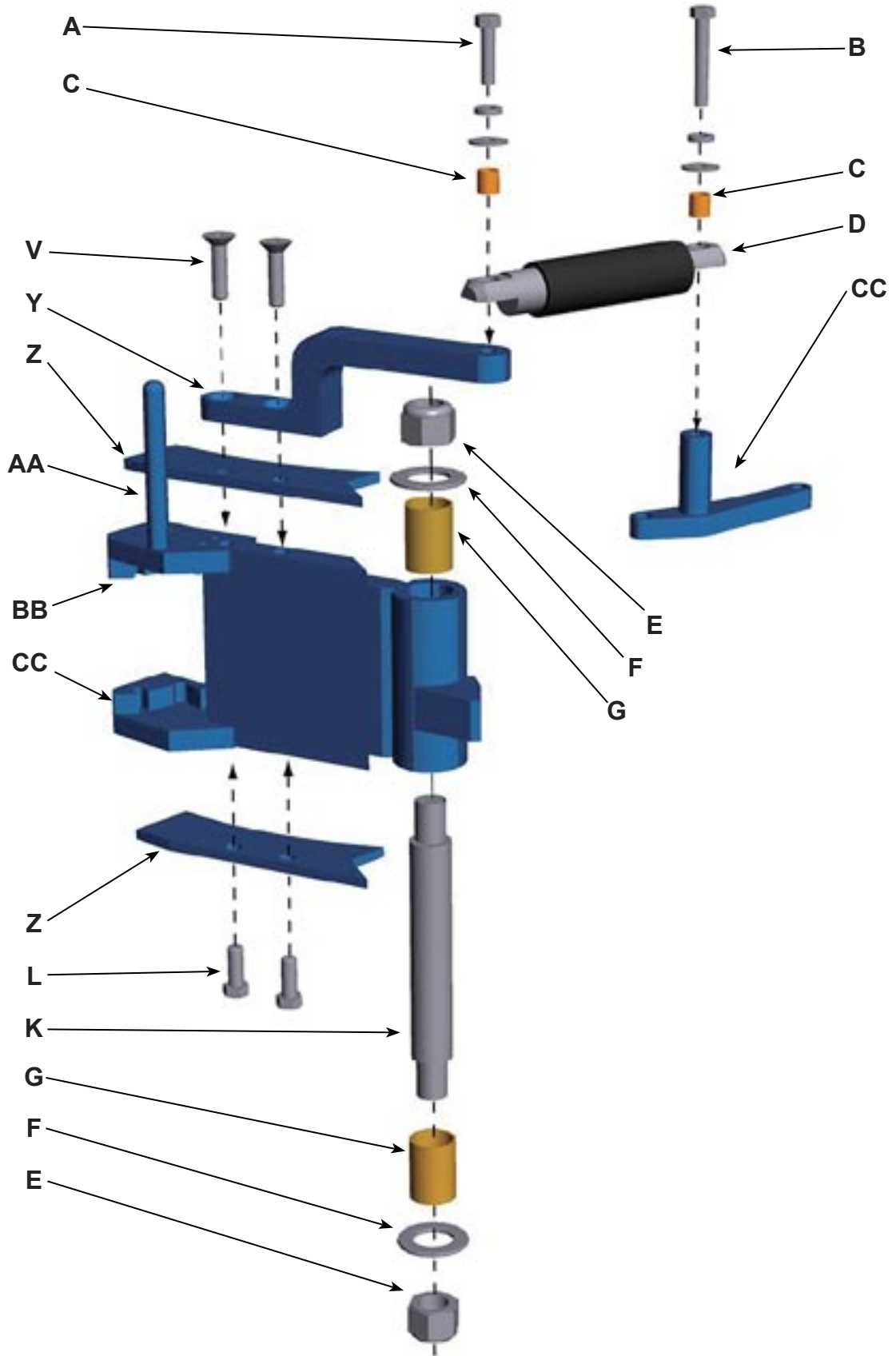


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Item	Type	Description	Qty	Part Number
A	Part	5/16" NC x 1-1/4" Hex Bolt c/w washers	2	09-1030
B	Part	5/16" NC x 2" Hex Bolt c/w washers	2	09-1034
C	Part	Door Stop Spacer	4	997-13B
D	Assembly	Door Spring Assembly	2	997-12-00
E	Part	3/4" NC Nylock Nut	4	1429-39-02
F	Part	Door Thrust Bushing	2	AK12-001
G	Part	Daemar Bushing	4	02-0085
H	Part	RH Door Cylinder Mount	1	AK12-030-RH
J	Part	RH Door Weldment	1	AK12-660
K	Part	Door Pin (Double Door)	2	AK12-606
L	Part	3/8" NC x 1" Hex Bolt	4	09-1046
M	Part	1/4" NC x 2-1/2" SHCS (Latch Handle Pin)	1	
N	Part	Cover Plate (RH)	2	AK12-664
P	Part	Lock Plate	1	AK12-657
Q	Part	Door Latch Actuator	1	AK12-659
R	Part	5/16" NC x 3/4" Shoulder Bolt c/w washer	2	09-0227
S	Part	Retainer Spacer	4	AK12-654
T	Part	5/16" NC x 1" Shoulder Bolt c/w washer	2	09-0228
U	Part	Latch AFD Plate	1	AK12-665
V	Part	3/8" NC x 1-1/2" FHCS	4	09-4050
W	Part	Cylinder Anchor Front RH	1	AK12-653
X	Part	Door Spring	1	AK12-658
	Part	Spring Mount Tab	1	AK12-661
	Part	Spring Guide Pin	1	AK12-662
Y	Part	Cylinder Anchor Front LH	1	AK12-602
Z	Part	Cover Plate (LH)	2	AK12-604
AA	Part	LH Handle	1	AK12-609
BB	Part	LH Door Plate (Top)	1	AK12-601
CC	Part	LH Door Plate (Bottom)	1	AK12-601B
DD	Part	LH Door Cylinder Mount	1	AK12-031

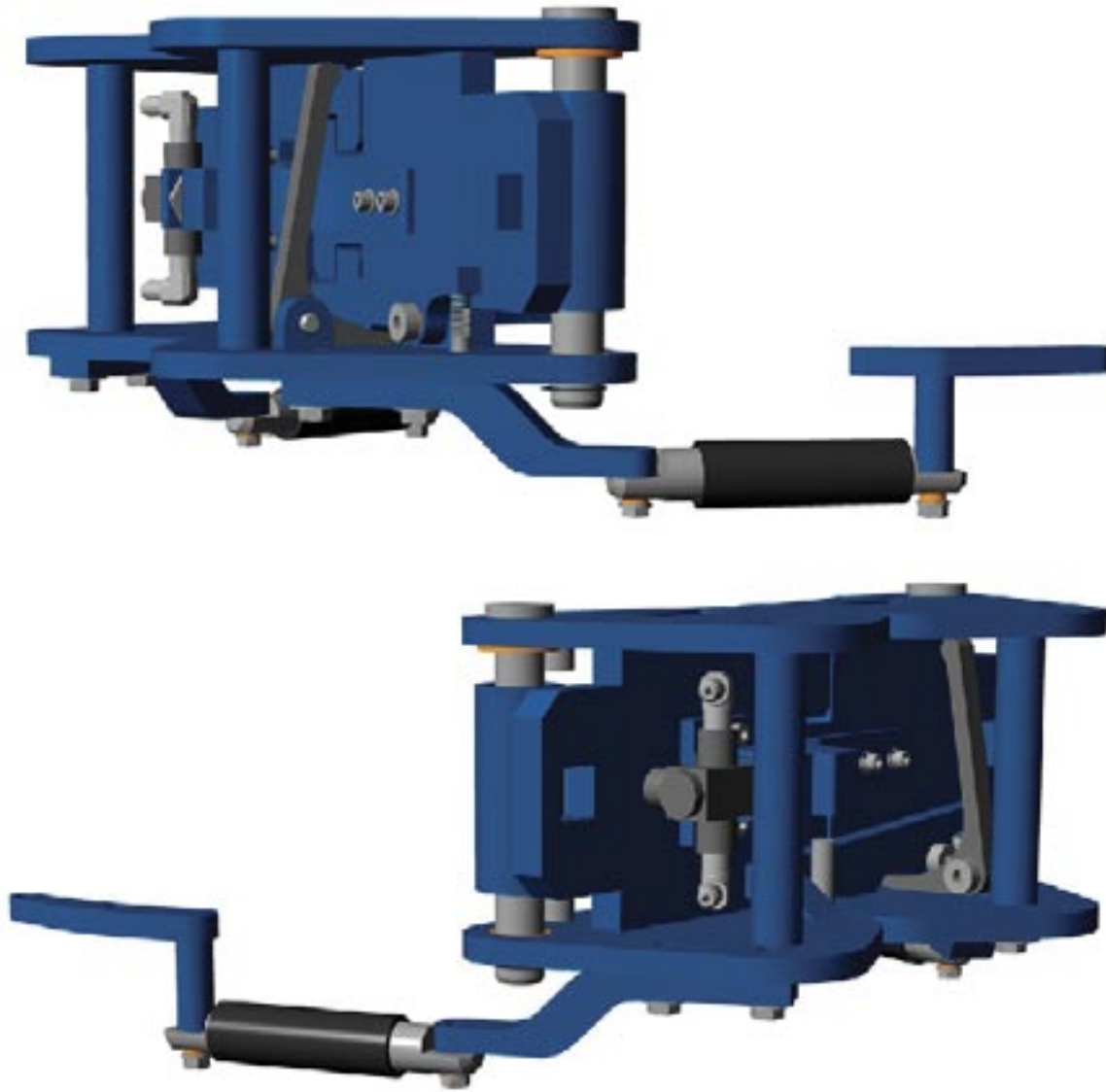
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**9.625" Lightweight Tong**

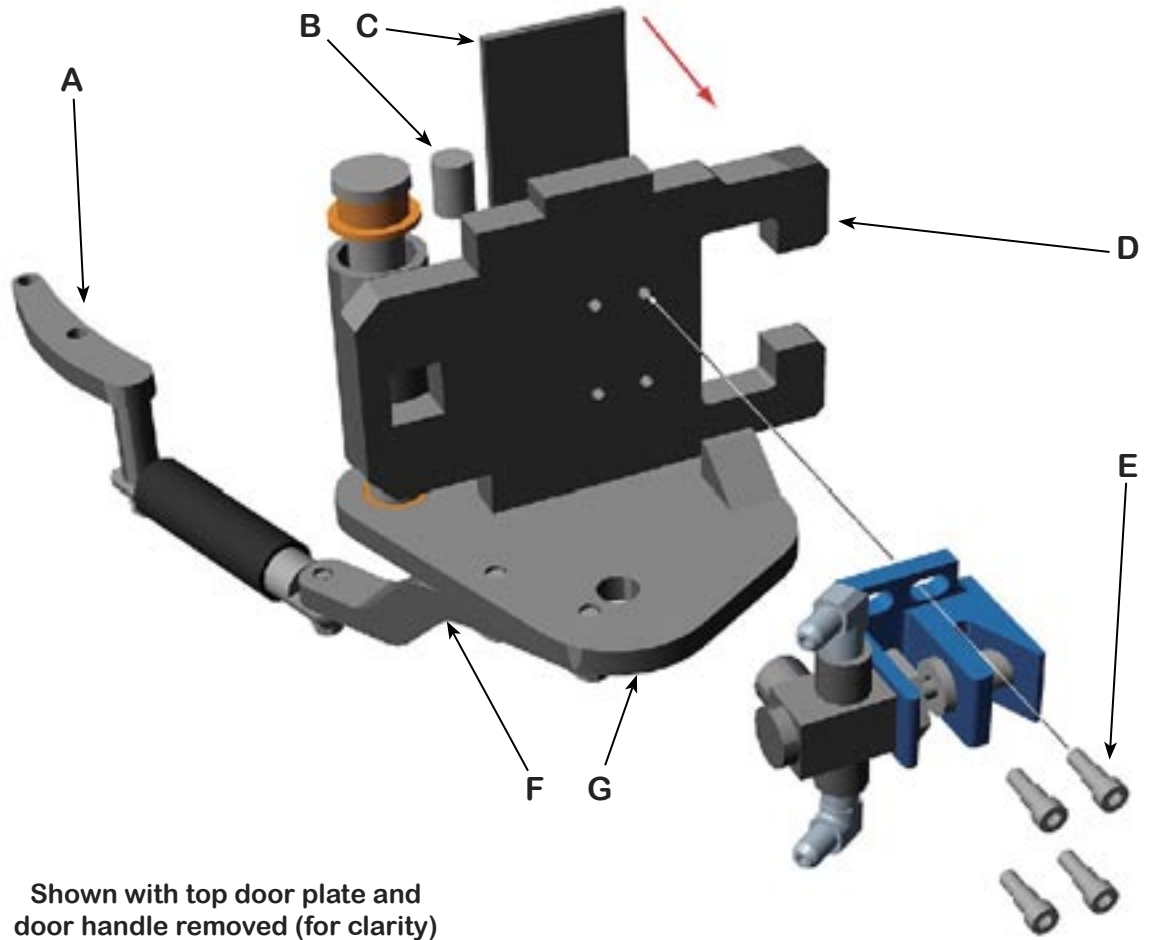
*Door Assembly - AK12-000B-REF (2ND Upgrade)*



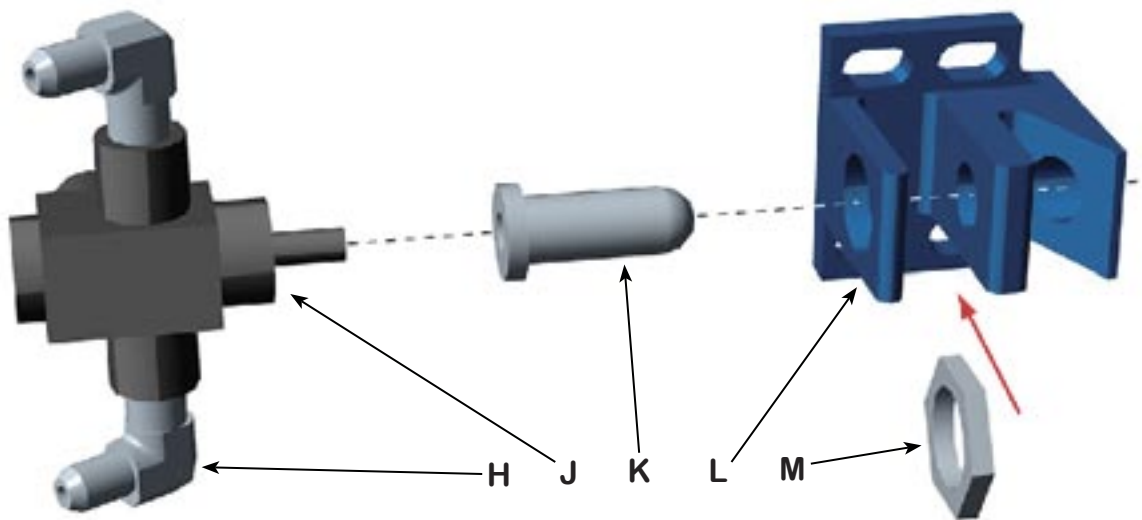
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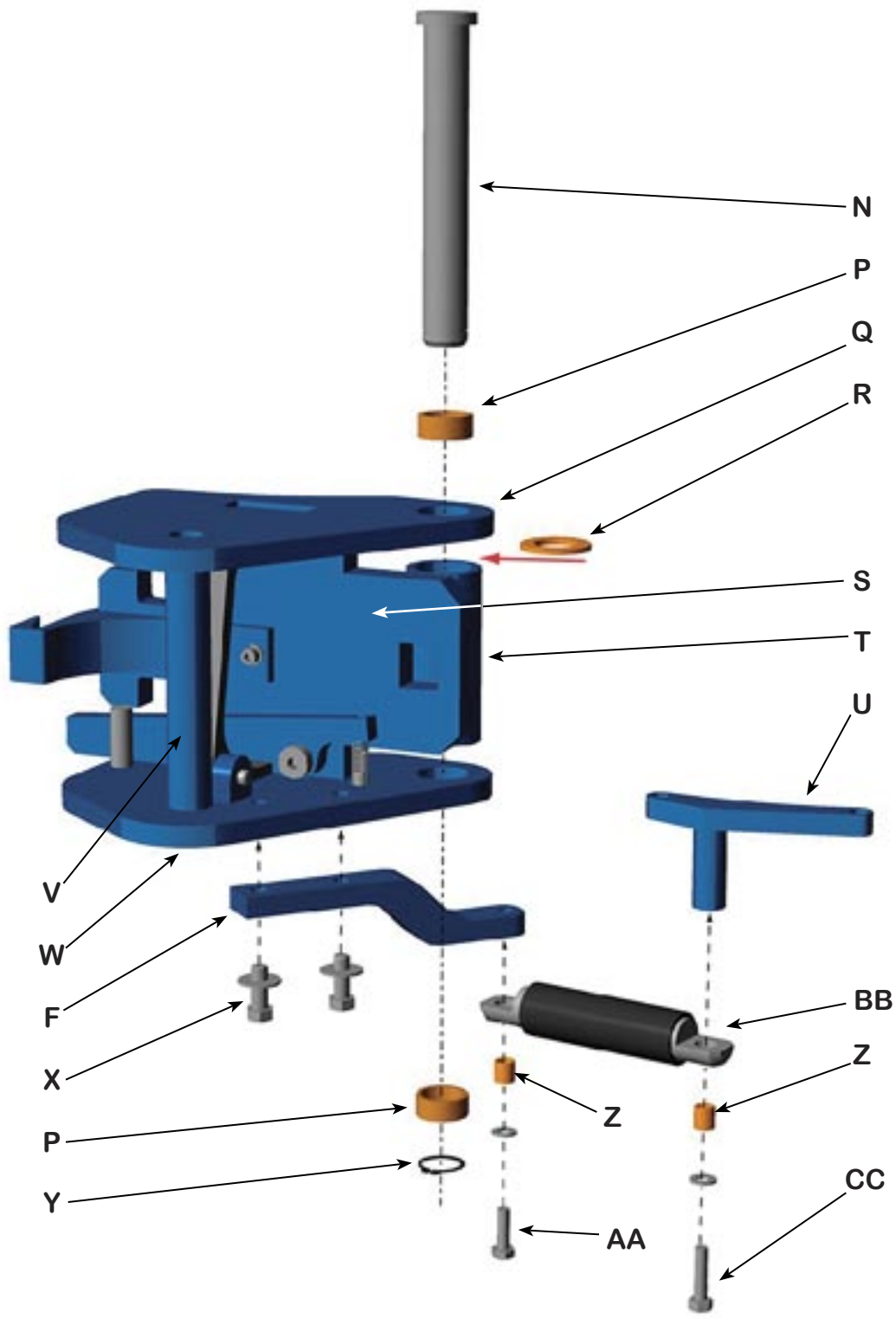
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Shown with top door plate and door handle removed (for clarity)

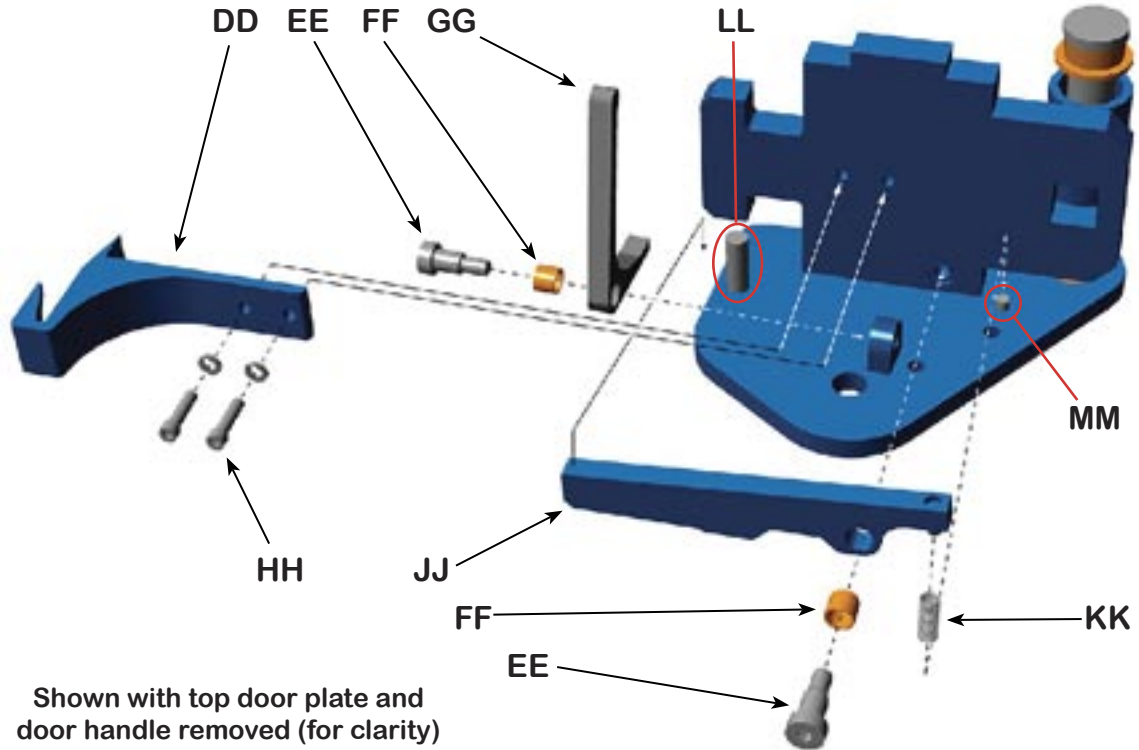


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Item	Type	Description	Qty	Part Number
A	Part	Rear Door Cylinder Mount (RH)	1	AK12-030B-RH
B	Part	3/4" x 1" Pin	2	
C	Part	1/4" Door Plate	1	AK12-709
D	Part	Vertical Door Plate (RH)	1	AK12-704
E	Part	5/16" NC x 3/8" Shoulder Bolt	4	09-0226
F	Part	Door Cylinder Bracket	2	AK12-706
	Part	Upper Horizontal Door Plate (RH) (Not Shown)	1	AK12-702
G	Part	Lower Horizontal Door Plate (RH)	1	AK12-701
H	Part	1/4" NPT - JIC 90 Degree ELL (2024-4-4)	2	08-0284
J	Part	Detrol Gauge Isolator Valve	1	08-0037
K	Part	Safety Door Valve Mounting Block	1	AE13-301
L	Part	Safety Door Side Load Plunger	1	AE12-306
M	Part	15/16" Valve Lock Nut	1	
N	Part	Door Pin	2	AK12-706
P	Part	Ollite Bearing	4	AA-1213-4
Q	Part	Upper Horizontal Door Plate (LH)	1	AK12-752
R	Part	Ollite Bearing	2	02-0496
S	Part	Vertical Door Plate (LH)	1	AK12-753
T	Part	Door Round	2	AK12-705
Cont'd on Page 7.28				

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**9.625" Lightweight Tong**

Door Assembly - AK12-000B-REF (2ND Upgrade)

Item	Type	Description	Qty	Part Number
U	Part	Rear Door Cylinder Mount (LH)	1	AK12-030
V	Part	Door Handle	2	AK12-703
W	Part	Lower Horizontal Door Plate (LH)	1	AK12-751
X	Part	3/8" NC x 1" Hex Bolt c/w washers	4	09-1046
Y	Part	1" Outer Snap Ring (SH-100)	2	02-0697
Z	Part	Door Stop Spacer	4	997-13B
AA	Part	5/16" NC x 1-1/4" Hex Bolt c/w narrow washers	2	09-1028
BB	Assembly	Door Spring Assembly	2	997-12-00
CC	Part	5/16" NC x 2" Hex Bolt c/w narrow washers	2	09-1034
DD	Part	Safety Door Latch	1	AE13-302
EE	Part	1/2" x 5/8" Shoulder Bolt	2	09-0123
FF	Part	Daemar Bearing 08TH08	2	02-0238
GG	Part	Door Latch Trigger	1	AK12-755
HH	Part	1/4" NC x 1" SCHS c/w Lockwasher	2	09-2007
JJ	Part	Door Latch Bar	1	AK12-756
KK	Part	Door Latch Spring	1	AH12-757
LL	Part	1/2" x 1-3/4" Pin	1	
MM	Part	5/16" x 5/8" Pin	1	

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# 9.625" Lightweight Tong

Rigid Sling Assembly



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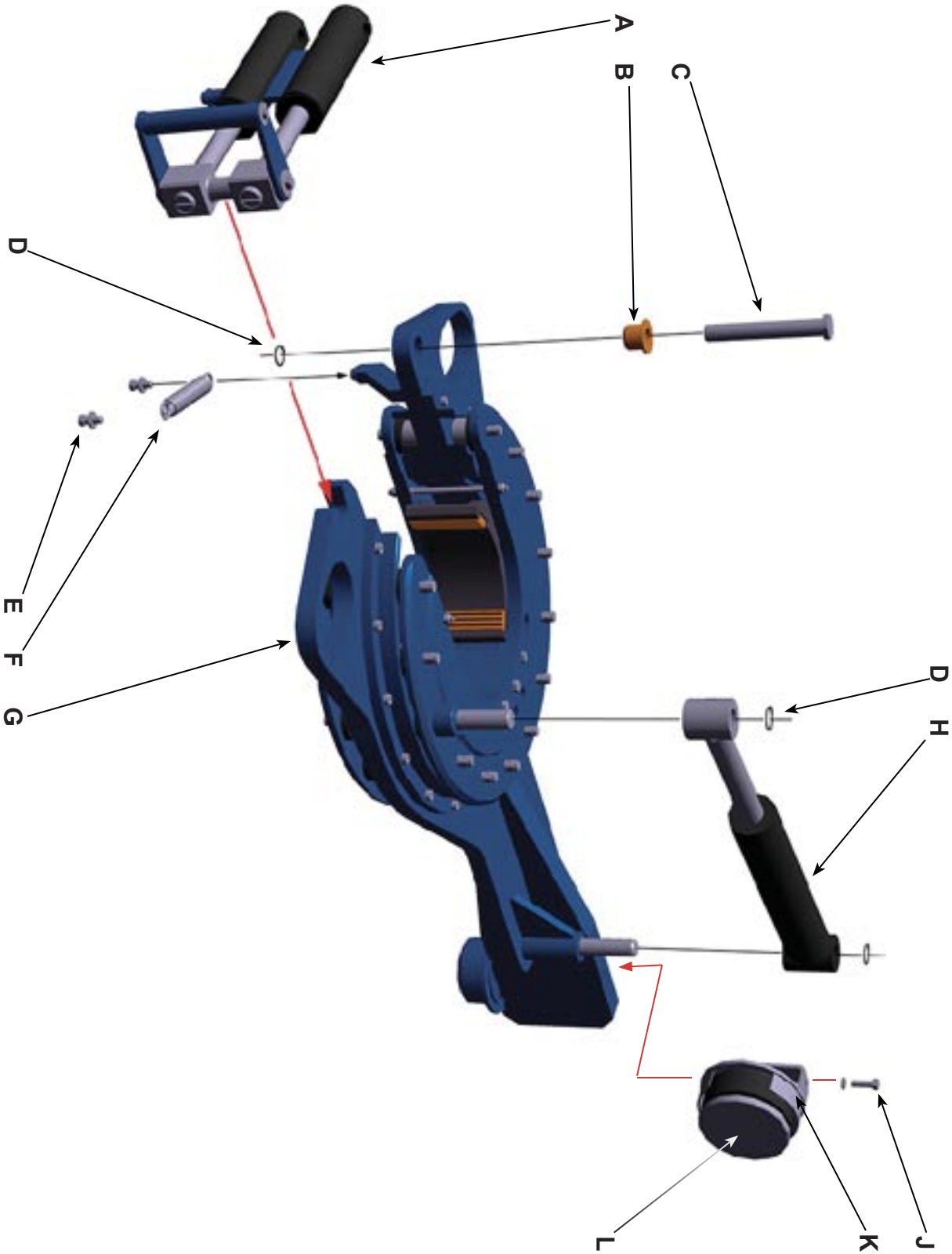


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Item	Type	Description	Qty	Part Number
A	Part	Rigid Sling Adjustment Helix	1	1053C-1H
B	Part	3/4" NC x 9" Hex Bolt	1	09-1322
C	Part	Rigid Sling Weldment	1	AK06-000B
D	Part	3/8" NC x 2-1/2" Hex Bolt (Rigid Sling Bracket)	8	09-1056
E	Part	Rigid Sling Shackle Connector Pin	2	AK00-056
	Part	3/16" Hitch Pin (Not Shown)	2	02-0028
F	Part	Rigid Sling Bracket	2	AK00-050
G	Part	3/4" NC Hex Nut	1	09-5818

# 9.625" Lightweight Tong

Backup Assembly



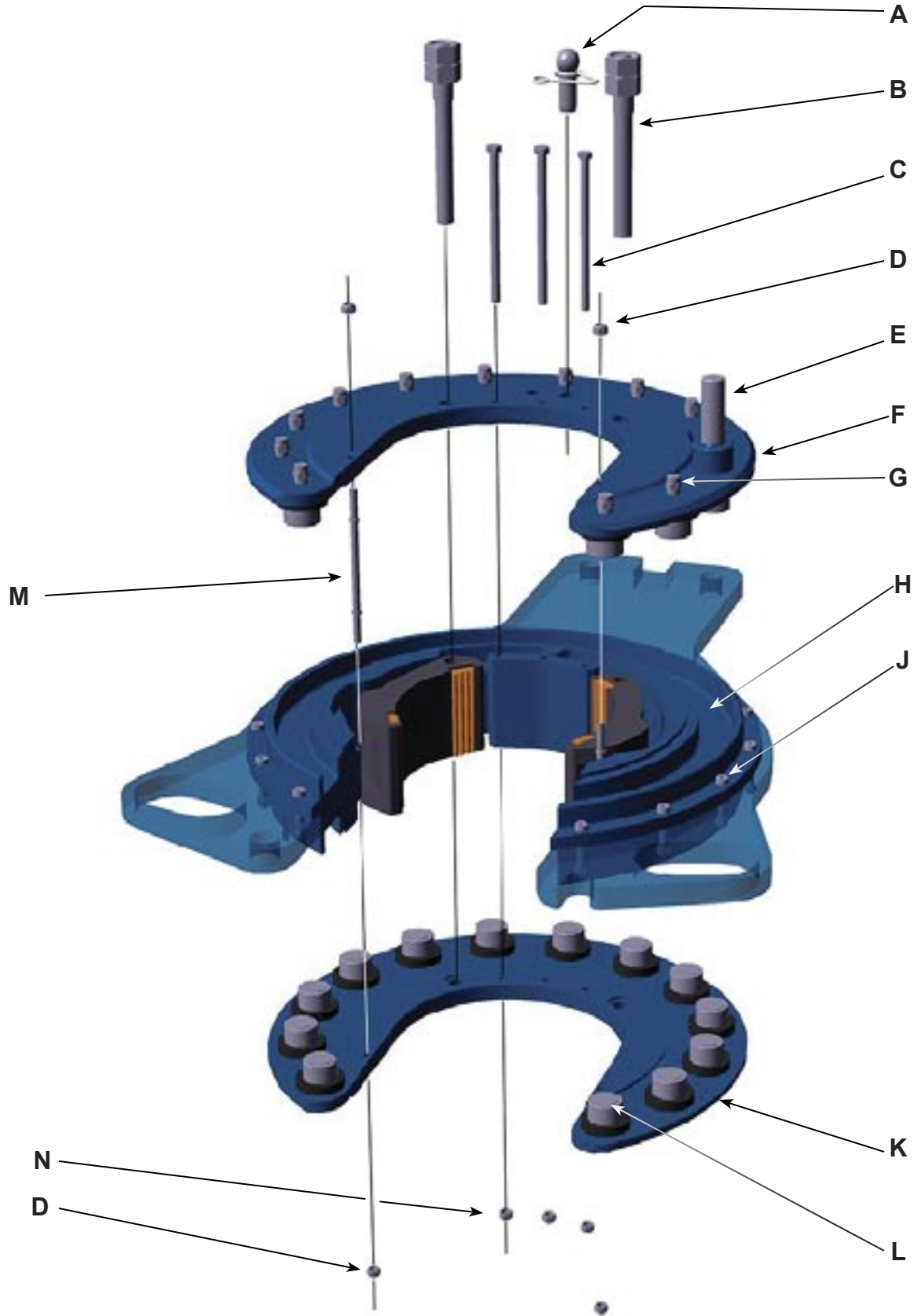
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**9.625" Lightweight Tong**

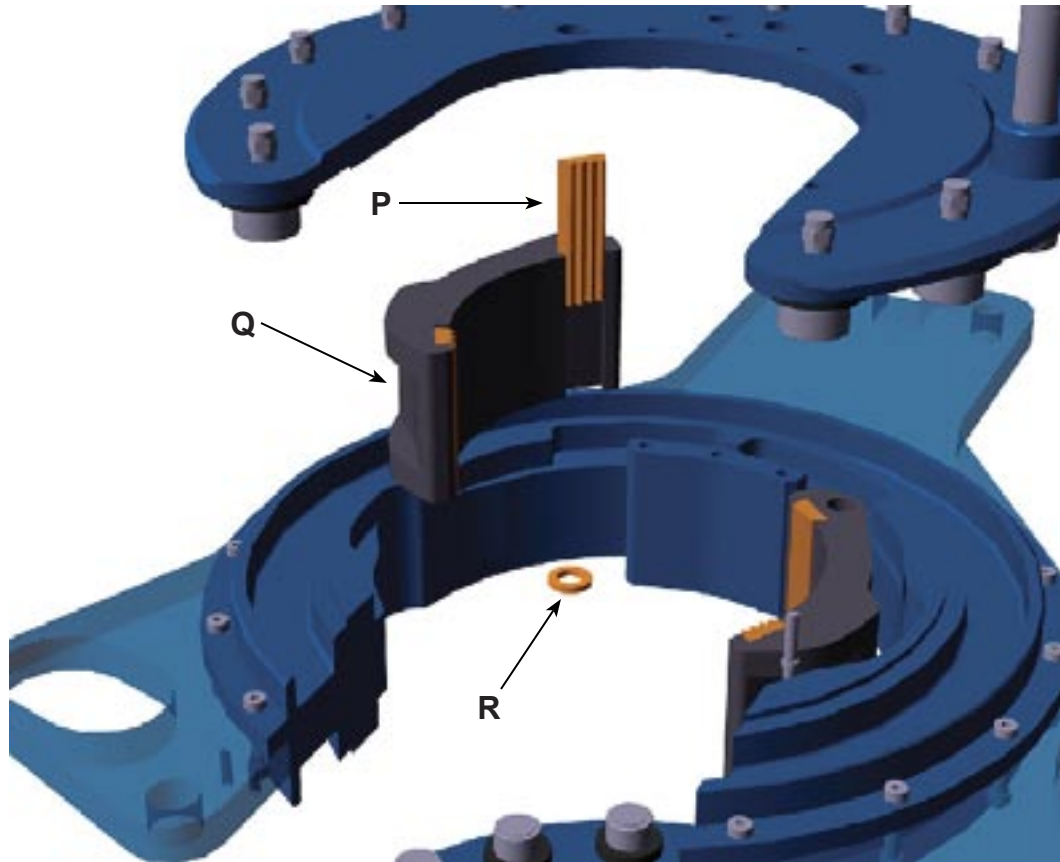
*Backup Cageplate Assembly*



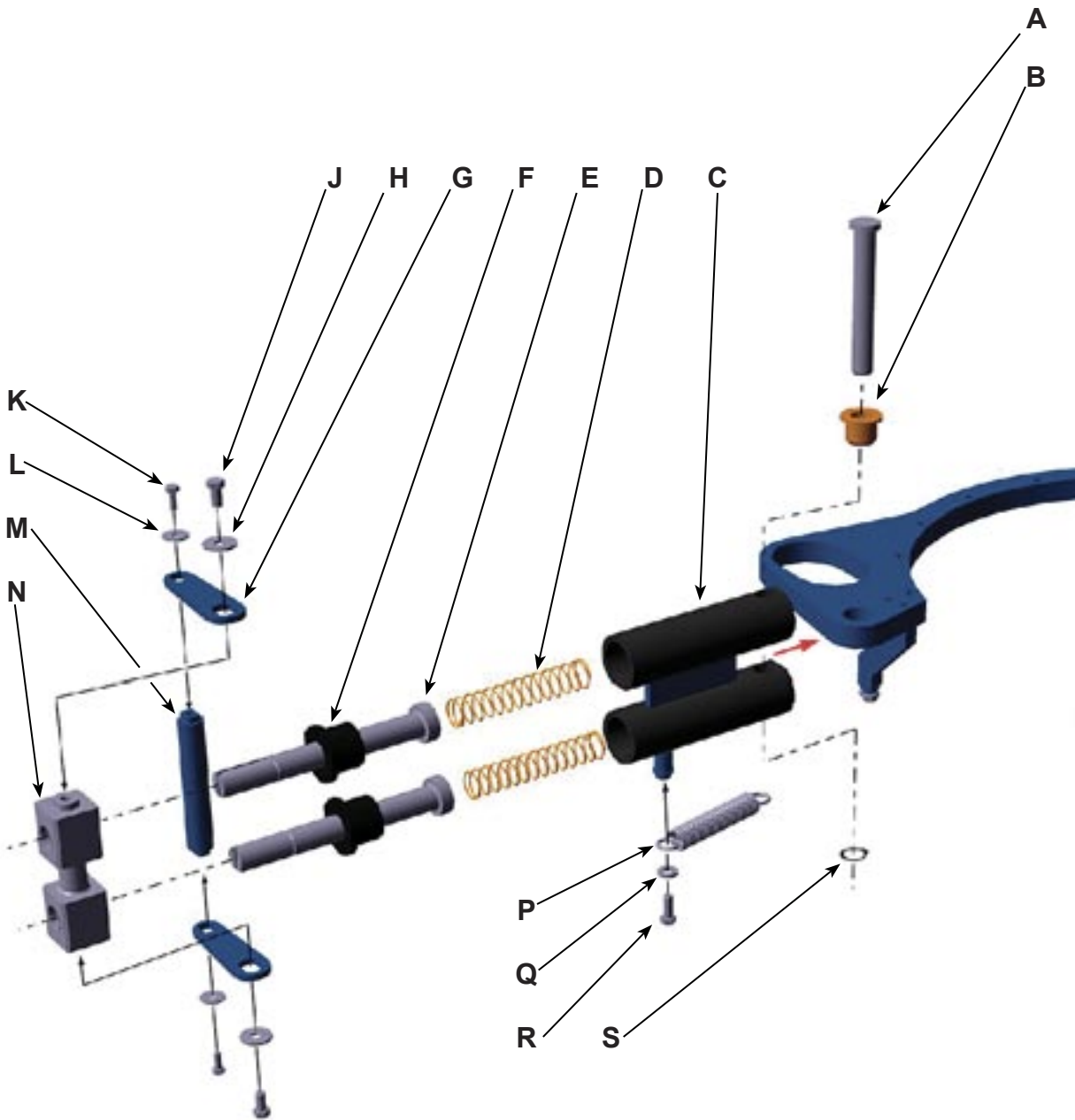
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Item	Type	Description	Qty	Part Number
A	Part	Cage Plate Direction Pin c/w Lanyard	1	AK10-055
B	Part	Jaw Pivot Bolt	2	AK10-056
C	Part	3/8" NC x 6-1/2" Hex Bolt	3	09-1071
D	Part	5/16" NC Nylock Nut	4	09-5703
E	Part	Cage Plate Cylinder Pin	1	AK10-053
F	Part	Backup Cageplate - Top	1	AK10-051
G	Part	5/8" NF Nylock Nut	26	09-5714
H	Part	Cam Ring	1	AK10-001
J1	Part	5/16" NC x 2-1/4" Shoulder Bolt	15	09-1636
J2	Part	5/16" Nylock Nut	15	09-5703
K	Part	Backup Cageplate - Lower	1	AK10-052
L	Part	Cam Follower	26	AK03-560
M	Part	Front Cage Plate Spacer	2	AK20-031
N	Part	3/8" NC Nylock Nut	3	09-5607
P	Part	Standard 3-7/8" Die	4	12-1004
Q	Part	9-5/8" Jaw	2	AK21-J-09625
R	Part	Cage Plate Washer	2	AK10-054



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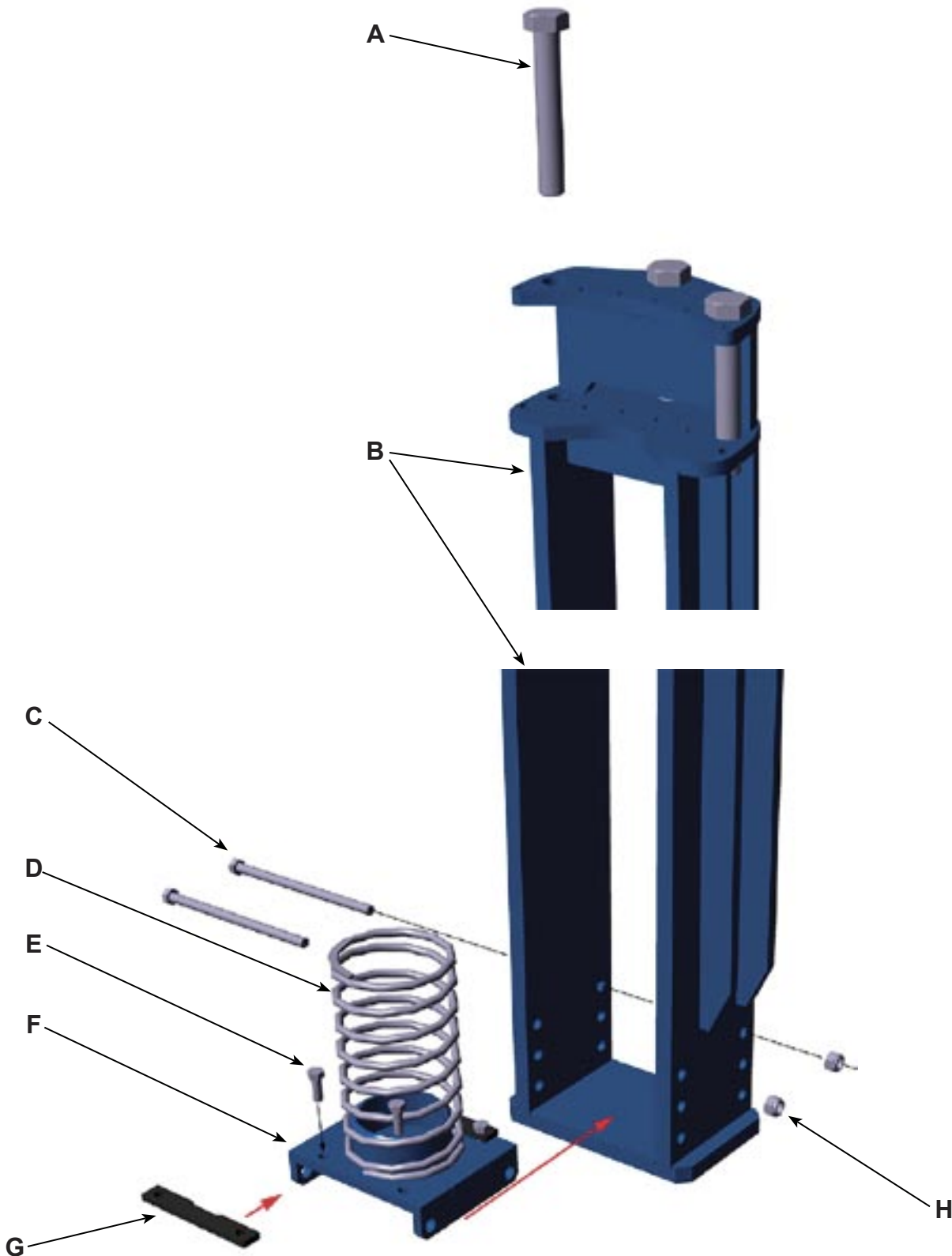
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Item	Type	Description	Qty	Part Number
A	Part	Backup Door Pin	1	AK10-201
B	Part	Door Bushing	1	AK10-003
C	Part	Door Cylinder Weldment	1	AK10-202
D	Part	Door Cylinder Spring (C1160-0072-6250)	2	AK10-209
E	Part	Door Cylinder Piston	2	AK10-203
F	Part	Door Cylinder Barrel Cap	2	AK10-204
G	Part	Backup Door Handle Plate	2	AK10-207
H	Part	3/8" Wide Washer	2	09-5006W
J	Part	3/8" NC x 3/4" Hex Bolt	2	09-1044
K	Part	1/4" NC x 3/4" Hex Bolt	2	09-1005
L	Part	1/4" Wide Washer	2	09-5002W
M	Part	Backup Door Handle Shaft	1	AK10-208
N	Part	Backup Door Lock Pin	1	AK10-205
P	Part	Spring, E1000-0156-5910	1	AK10-002
Q	Part	3/8" NC x 1" Hex Bolt	2	09-1046
R	Part	3/8" Flatwasher	2	09-5006
S	Part	Snap Ring SH-100	1	02-0697

**9.625" Lightweight Tong**

*Rear Leg Assembly*



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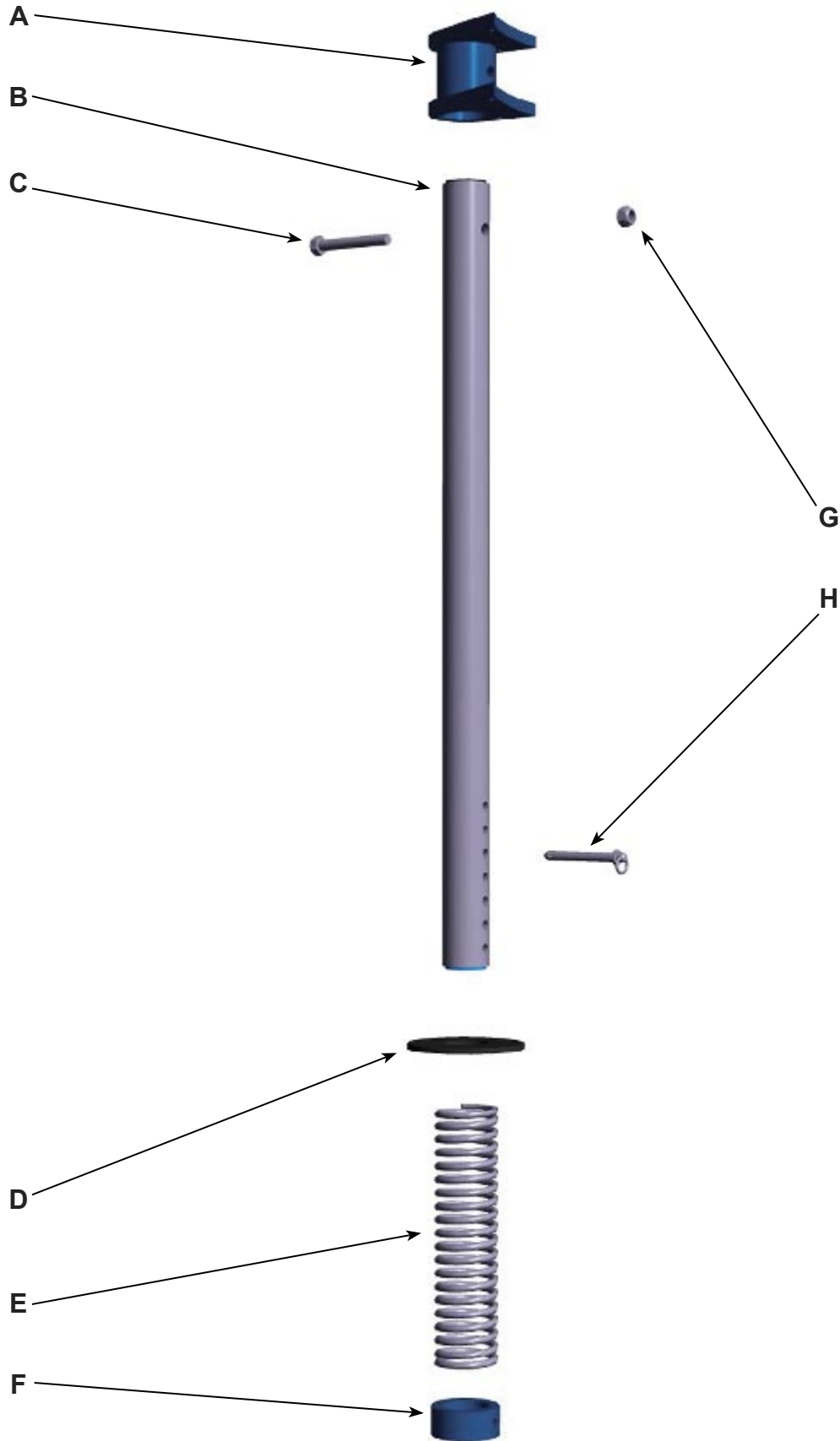


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Item	Type	Description	Qty	Part Number
A	Part	1-1/4" NC x 8" Hex Bolt	3	09-0222
B	Part	Rear Leg Weldment	1	AK06-5002
C	Part	1/2" NC x 9" Hex Bolt	2	09-1202
D	Part	Rear Leg Spring (C4625-0313-12625)	1	AK06-502
E	Part	3/8" NC x 1" Hex Bolt	4	09-1046
F	Part	Rear Leg Spring Mount	2	AK06-550
G	Part	Rear Leg Plate Clamp	1	AK06-504
H	Part	1/2" NC Nylock Nut	2	09-5610

**9.625" Lightweight Tong**

*Front Leg Assembly*



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Item	Type	Description	Qty	Part Number
A	Part	Tong Front Leg Plate Weldment	1	AK06-601
B	Part	Front Leg Pipe	1	AK06-605
C	Part	1/2" NC x 3-1/2" Hex Bolt	1	09-1177
D	Part	Front Leg Backup Washer	1	AK06-603
E	Part	Front Leg Spring (C2563-0281-14062)	1	AK06-606
F	Part	Front Leg Bottom Pipe Cap	1	AK06-608
G	Part	1/2" NC Nylock Nut	1	09-5610
H	Part	Hitch Pin, Spaenaur 233-245	1	09-0268

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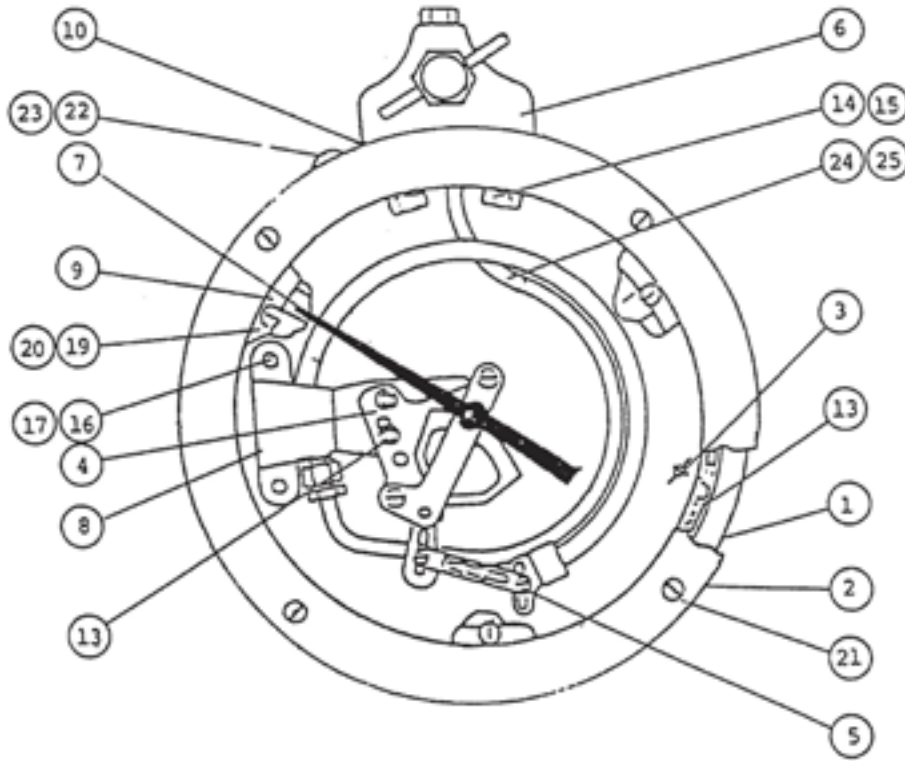


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Item	Type	Description	Qty	Part Number
	Assembly	Compression Load Cell and Gauge	1	10-0017C
A	Part	Compression Load Cell, Wagner 8 inch	1	10-0008C
B	Part	Torque Gauge (See Pp 8. 2- 8.3)	1	10-0017GC
C	Part	Hydraulic Hose	1	02-0069





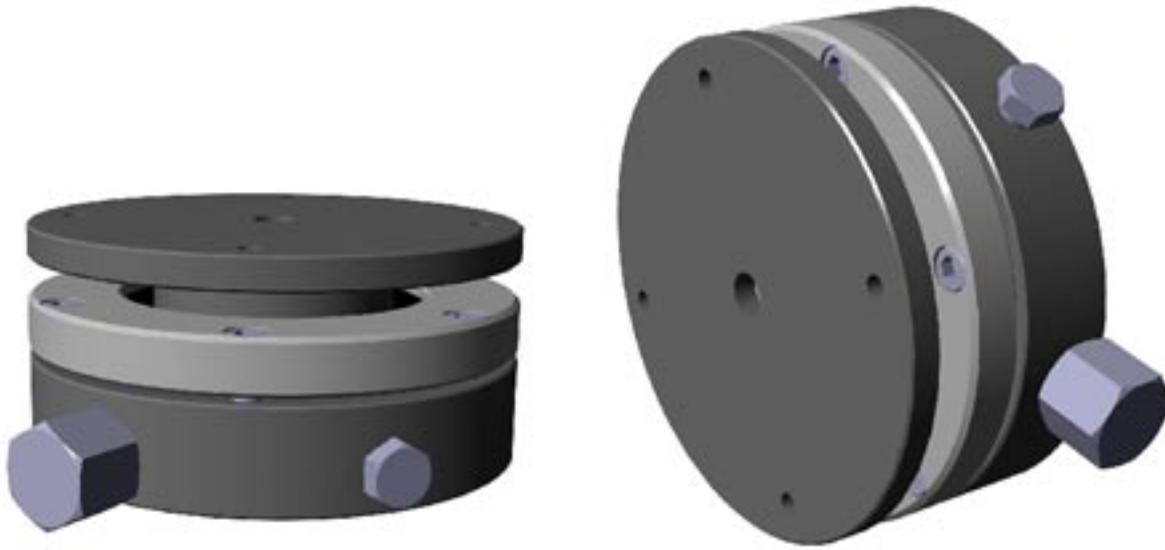
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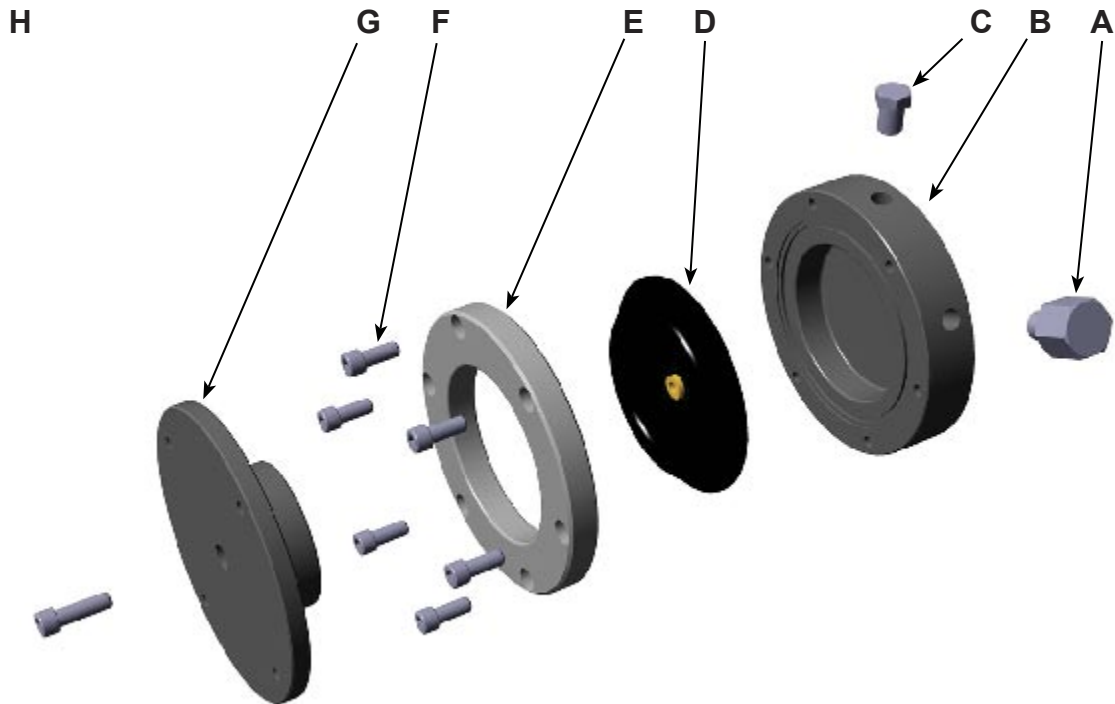
Item	Type	Description	Qty	Part Number
1	Part	6" Gauge Case	1	02-0053
2	Part	Case Ring	1	02-0054
3	Part	Flex Cover with Red Pointer	1	02-0055
4	Part	Movement	1	02-0056
5	Part	Linkage	1	02-0057
6	Part	Damper Assembly	1	02-0058
7	Part	Pointer, 6" Black	1	02-0059
8	Part	Bourdon Tube	1	02-0060
9	Part	Dial Face, 15,000	1	10-0030A
10	Part	Gasket	1	02-0062
13	Part	Case O-Ring	1	02-0063
14	Part	1/4-20 x 1-1/4" Screw	2	09-0036
15	Part	1/4" Nom. Lock Washer	2	09-0037
16	Part	Tube Mount Screws	3	09-0038
17	Part	O-Ring	3	02-0064
18	Part	Movement Mount Screws	2	09-0039
19	Part	Dial Screws	5	09-0040A
20	Part	3/4" Lockwashers	5	09-0041
21	Part	Case Ring Pins	4	09-0042
22	Part	3/4" NC x 7-1/2" Hex Cap Screws	1	09-0043
23	Part	3/16" Tubing Kit	1	02-0066
24	Part	Tee	1	08-0022
25	Part	1/4 - 18 NPT Elbow	1	08-0023
26	Part	Nipple	2	08-0027
27	Part	3/8" Female Coupling	1	08-0025
28	Part	Gauge Face Oil	1 Qt	02-0067
29	Part	Plug	1	08-0021
30	Part	O-Ring	1	02-0068

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Load Cell  
assembled



Load Cell  
exploded

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Item	Type	Description	Qty	Part Number
	Assembly	Compression Loadcell, Wagner 8 inch	1	10-0008C
A	Part	Street Elbow	1	N/A
B	Part	Diaphragm Casing	1	E360-C
C	Part	1/4" NPT Brass Plug	1	N/A
D	Part	Diaphragm	1	E358-2
E	Part	Retainer Ring	1	E360-8
F	Part	5/16 - 18 x 3/4" SHCS	6	09-2024
G	Part	Load Plate	1	E360-A
H	Part	5/16 - 18 x 1" SHCS	1	09-2026

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A Division of M&C Safety Tools Inc.

## TROUBLESHOOTING

Under normal operating conditions, and with proper maintenance, the torque gauge and load cell system are designed to give lasting trouble-free performance. Faulty indication on the gauge will very often define a fault within the gauge.

**NOTE:** If troubleshooting reveals that there is insufficient fluid in the system, before recharging, check that all system components are free from damage. This will ensure that fluid loss will not continue after reloading.

1. **PROBLEM:** *No indication on gauge.*  
**POSSIBLE SOLUTIONS:** Obstruction in hose.  
 Loss of hydraulic fluid.  
 Gauge internal mechanism damaged.
2. **PROBLEM:** *Gauge indication too high.*  
**POSSIBLE SOLUTIONS:** Excessive hydraulic fluid.  
 Internal mechanism of gauge is damaged.
3. **PROBLEM:** *Gauge indication too low.*  
**POSSIBLE SOLUTIONS:** Insufficient hydraulic fluid.  
 Snub line not at right-angle to tong handle.  
 Gauge internal mechanism damaged.
4. **PROBLEM:** *Erratic or sluggish gauge indication.*  
**POSSIBLE SOLUTIONS:** Pointer rubbing glass or dial.  
 Insufficient hydraulic fluid.  
 Dirty gauge movement.  
 Improper pointer damper adjustment.  
 Gauge internal mechanism damaged.

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## PERIODIC INSPECTION AND MAINTENANCE

### 1. MAINTENANCE

- A. Tong Torque Systems are built to give years of trouble-free service with minimum maintenance. Periodic inspections of the load cell, and hydraulic lines and fittings, are recommended in order to keep the system in top operating condition. A thorough inspection should be made at each rig-up.
- B. Recharge hydraulic system with W15/16 fluid via the filling connection at the top of the indicating gauge. Recharging must only be performed when there is no load on the load cell.

Procedure:

1. Connect hand pump to filling connection on gauge.
2. Fill hand pump bowl with W15/16 hydraulic fluid and pump fluid into the system until the piston rod on the load cell extends no more than 1/2" from the body.
3. Loosen vent screw on load cell body to permit trapped air to escape during loading.

**NOTE:** MAINTAIN GREATER-THAN HALF FULL FLUID LEVEL IN THE HAND PUMP BOWL TO AVOID PUMPING AIR INTO THE SYSTEM. DO NOT ALLOW THE LEVEL TO FALL BELOW ONE-HALF FULL.

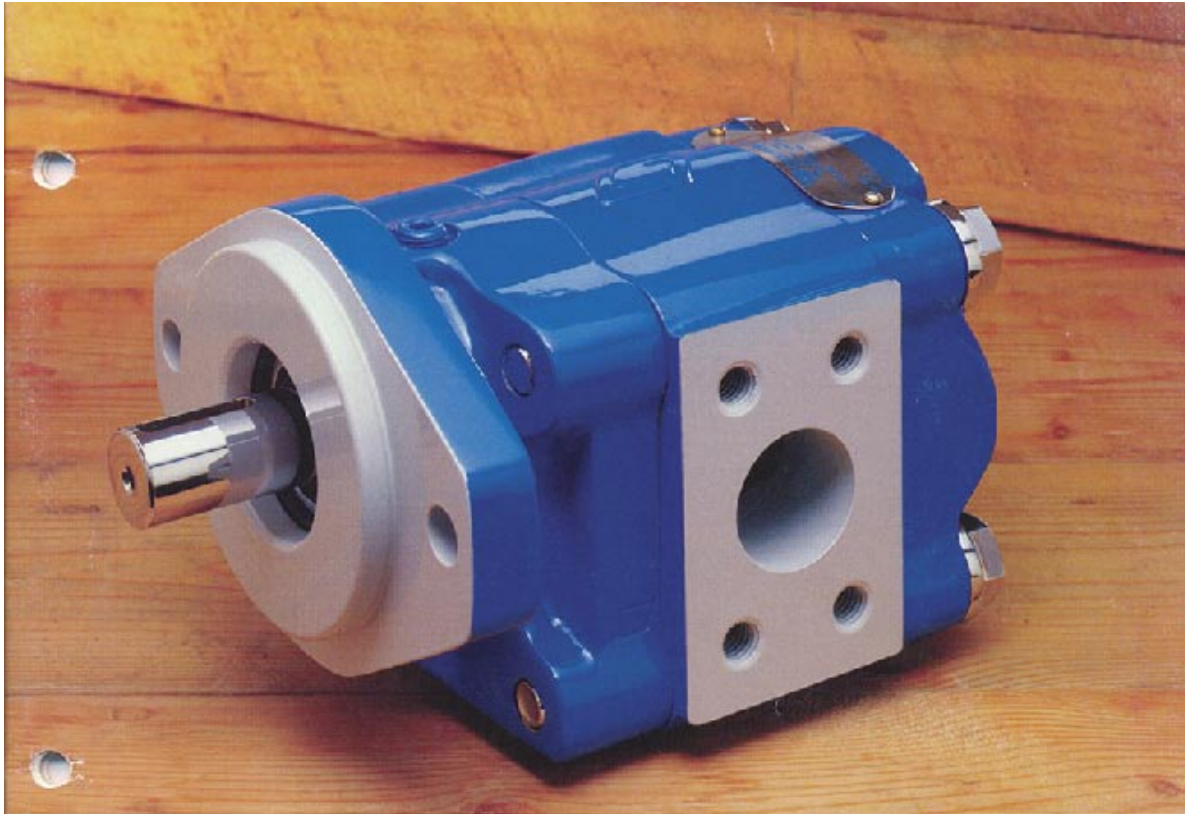
4. Retighten load cell vent screw when the system has been adequately recharged
- C. Load cell and indicator gauge should be returned to authorized repair facility for any repairs or calibration required.

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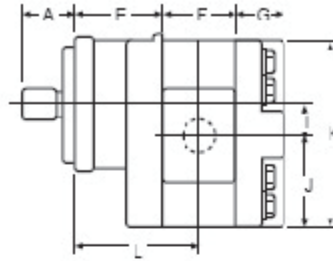
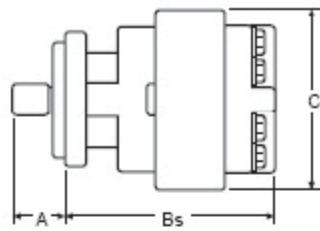
## P30/31, P50/51, P75/76™ Single & Multiple Pumps & Motors

- Pressures to 3000 psi/175 bar
- Output to 120 gpm/454 lpm
- Motors up to 135 hp

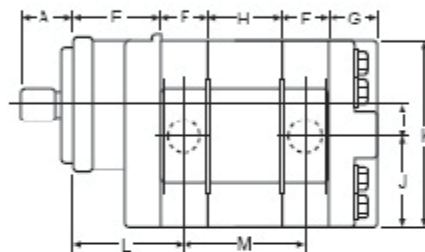
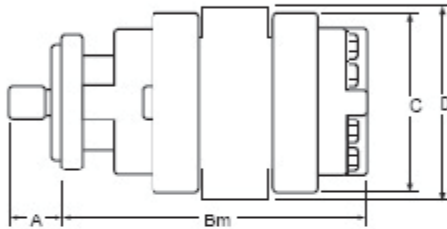


**FARR CANADA**  
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Single Unit - P75/76



Multiple Unit - P75/76



Dimensional Data

Model		A <sup>(1)</sup>	Es <sup>(2)(3)</sup>	Bm <sup>(3)(4)</sup>	C <sup>(5)(6)</sup>	D <sup>(5)(7)</sup>	E <sup>(8)</sup>	F <sup>(2)</sup>	G	H	I	J	K
P30/31	in.	1.62	5.44	8.69	5.44	5.88	2.94	0.75	1.75	2.50	0.88	2.69	5.38
	mm.	41.3	138.1	220.7	138.1	149.2	74.6	19.1	44.5	63.5	22.2	68.3	136.5
P50/51	in.	2.19	5.88	9.50	5.44	5.88	3.38	0.75	1.75	2.88	1.00	3.00	6.00
	mm.	55.6	149.2	241.3	138.1	149.2	85.7	19.1	44.5	73.0	25.4	76.2	152.4
P75/76	in.	2.19	6.75	10.75	7.75	7.94	3.75	1.00	2.00	3.00	1.25	3.94	7.88
	mm.	55.6	171.5	273.1	196.9	201.6	95.3	25.4	50.8	76.2	31.8	100.0	200.0

U.S./Metric

NOTES

1. Dimension will vary with shaft type
2. Dimension = gear width
3. Dimension is for Type 1 SEC. For Type 2: subtract 1.12" (28.4 mm) for 30/31; subtract 1.00" (25.4 mm) for 50/51.
4. Dimension = total gear width
5. Dimension will vary with port type. Subtract 0.25" (6.4 mm) for G.F. ports.
6. For 2.25" and 1.50" gear width in 50/51 series, dimension is 6.75" (171.5 mm).
7. Dimension is for wide B-C. Narrow B-C dimensions: 5.00" (127 mm) for 30/31 and 50/51; 7.15" (182.6 mm) for 75/76.
8. Dimension = 1/2 front section gear width

Model		L <sup>(9)(8)</sup>	M <sup>(9)</sup>
P30/31	in.	3.31	3.25
	mm.	84.1	82.6
P50/51	in.	3.75	3.62
	mm.	95.3	92.1
P75/76	in.	4.75	4.00
	mm.	120.7	101.6

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**Approximate Weight  
Single Unit**

Model	Unit Weight	1"	1 1/4"	1 1/2"	1 3/4"	2"	2 1/4"	2 1/2"	2 3/4"	3"
P30/31	Pounds	33	34	35	36	37	-	-	-	-
	KG	15	15.5	16	16.5	17	-	-	-	-
P50/51	Pounds	37	38.5	40	41.5	43	43.5	50	-	-
	KG	17	17.5	18	19	19.5	22	22.5	-	-
P75/76	Pounds	72	75	77	80	82	85	87	90	92
	KG	33	34	35	36	37	39	40	41	42

**Approximate Weight  
Multiple Unit\***

Model	Add per gear section	1"	1 1/4"	1 1/2"	1 3/4"	2"	2 1/4"	2 1/2"	2 3/4"	3"
P30/31	Pounds	27	20	29	31	32	-	-	-	-
	KG	12	12.5	13	14	14.5	-	-	-	-
P50/51	Pounds	31	32.5	34	35.5	37	42.5	44	-	-
	KG	14	15	15.5	16	17	19	20	-	-
P75/76	Pounds	59	62	64	67	69	72	74	77	79
	KG	27	28	29	31	32	33	34	35	36

\*Determine the approximate weight from Single Unit chart and add weight of each additional assembly from this chart.

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**M75**

Speed RPM	1" Gear			1 1/2" Gear			2" Gear		
	Output		Input	Output		Input	Output		Input
	Torque	Power	Flow	Torque	Power	Flow	Torque	Power	Flow
800	1050	13.5	20.5	1650	21	28	2200	28	35.5
	118.5	10	77.5	186.5	15.5	106	248.5	21	134
1200	1025	19.5	27.5	1600	30.5	38	2200	42	49.5
	118	14.5	104	181	22.5	144	248.5	31.5	187
1600	1000	25.5	34	1575	40	49	2175	55	64
	113	19	129	178	30	185	245.5	41	242
2000	950	30	41.5	1550	49	59	2175	67.5	78
	107.5	22.5	157	175	36.5	223	245.5	50.5	295

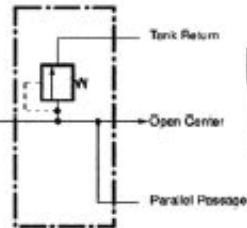
U.S./Metric Torque: in.-lbs. Flow: GPM Power: HP  
Nm LPM kW

**DVA35**  
Section **D1**

**Inlets (2500 psi)**  
**End Inlet**

Code	End Port	Top Port
DVA35-A440	1" NPT	1" NPT
DVA35-A880	SAE-16	SAE-16
DVA35-A980	SAE-20	SAE-16
DVA35-A000	NON-PORTED HOUSING	

NOTE: Inlets are machined for a main R/V or R/V plug and are furnished with plastic closures. See Section G, Page 32 for inlet port plugs

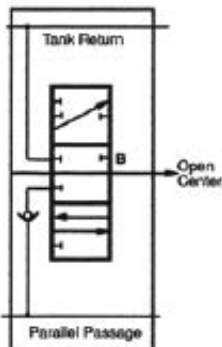


Note: For inlets with solenoid section pilot supply machining, see DVG35 inlet section E1

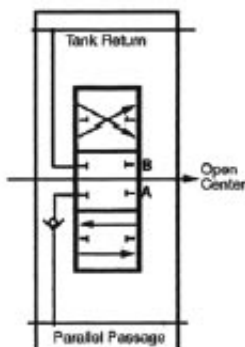
**Outlets**  
**Tank Return Type**

Code	End Port	Top Port
DVA35-TR55	1 1/4" NPT	1 1/4" NPT
DVA35-TR99	SAE-20	SAE-20
DVA35-TR00	NON-PORTED HOUSING	

NOTE: See Section G, Page 32 for Port Plugs



**SA8**  
Single-Acting Section  
3-Way, 3-Position, Hold in Neutral  
Cylinder Spool



**DA8**  
Double-Acting Section  
4-Way, 3-Position, Hold in Neutral  
Cylinder Spool



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### Typical Valve Section

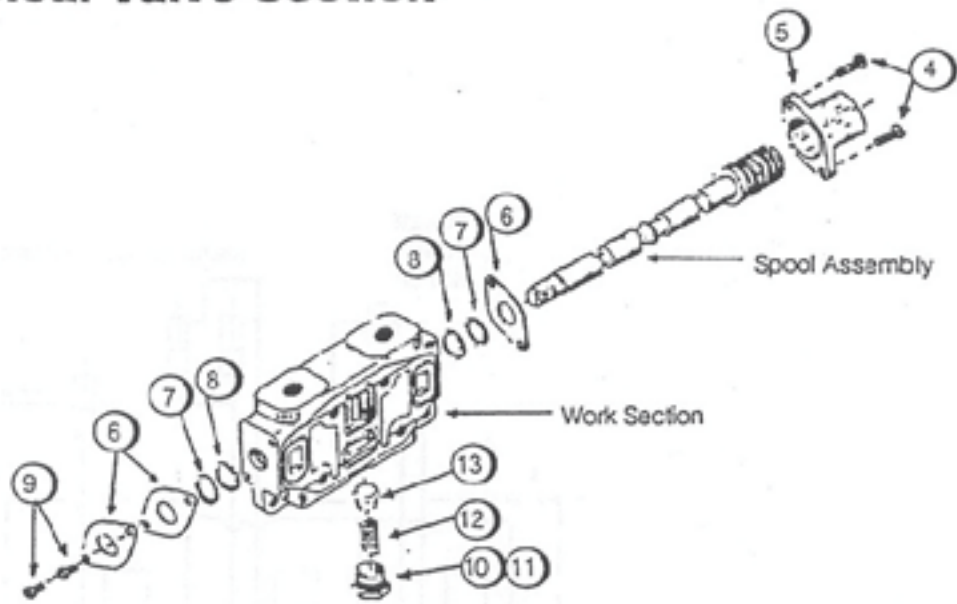
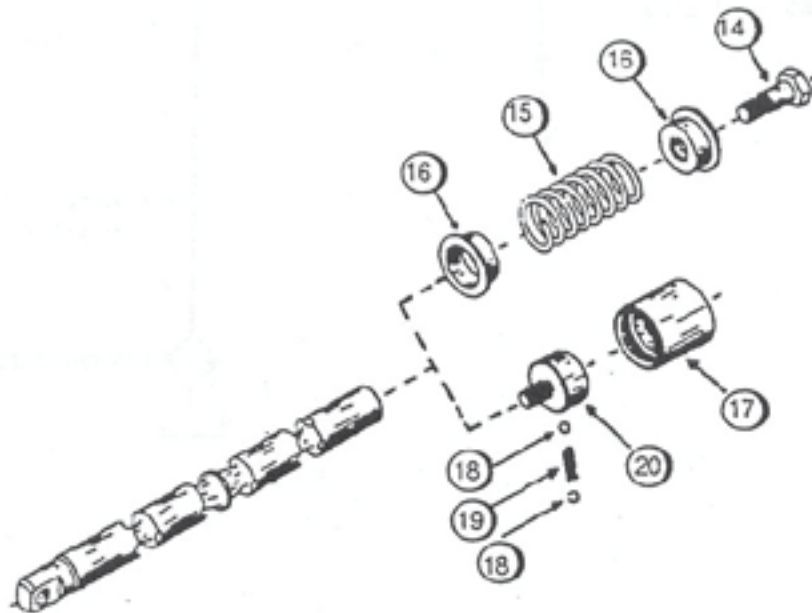


Figure 3



FARR CANADA  
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A. VALVE PARTS LIST

<u>ITEM</u>	<u>PART NO.</u>	<u>QTY.</u>	<u>DESCRIPTION</u>
	10-0010	1	Inlet Section Assembly
	10-0010R	1	Inlet Section Relief Valve
	08-0020	1	Pipe Plug, 1" Socket Head
	10-0011	1	Motor Valve Assembly * for motor or FARR back-up
	10-0013	1	Lift Cylinder Valve Assembly
	10-0014	1	Back-up Valve Assembly * for integral style back-up
	10-0012	1	Outlet Section Assembly
	08-0026	1	Pipe Plug, 1-1/4" Socket Head
	08-9036	1	Plastic Closure

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ITEM	PART NO.	QTY.	DESCRIPTION
PARALLEL SECTION SEALS			
1	02-0080	3	Square Seal For Parallel Lo-Boy Valve Section
2	02-0081	1	Square Seal For Parallel Lo-Boy Valve Section
PARALLEL SECTION COMPONENT PARTS - See figures 3 & 4			
4	02-0084s	2	Back Cap Screw
5	02-0084	1	Back Cap
6	02-0086	3	Retainer Plate
7	02-0087	2	Back-Up Ring
8	02-0088	2	Spool Seal
9	02-0086s	2	Retainer Plate Screw
10	*****	1	Check Valve Cap
11	*****	1	Check Valve O Ring Seal
12	*****	1	Check Spring
13	*****	1	Check Valve Poppet
***** DENOTES PARTS NO LONGER AVAILABLE *****			
** COMPLETE VALVE SECTION MUST BE REPLACED. **			
	02-0090K	1	Spring Return Kit:
14		1	Stripper Bolt
15		1	Centering Spring
16		2	Spring Guide
17		1	Detent Sleeve
18		2	Detent Ball
19		1	Detent Spring
20		1	Detent Poppet Retainer