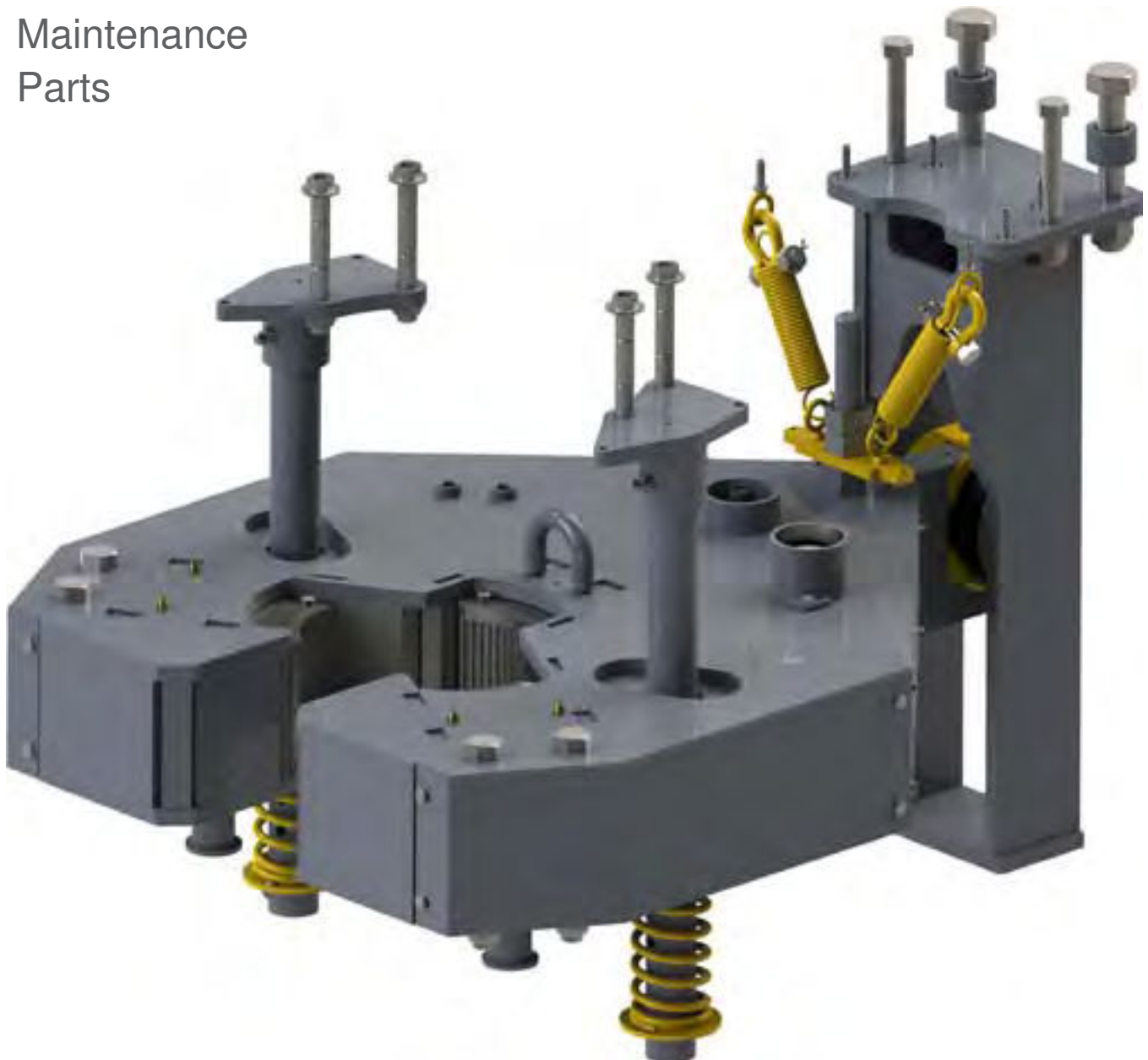


### 6-1/4" CLINCHER® Backup

- Conversion Instructions
- Installation
- Maintenance
- Parts





# ORIGINAL INSTRUCTIONS

| THIS TECHNICAL DOCUMENT APPLIES TO THE FOLLOWING MODELS: |     |  |
|--|-----|--|
| OVERALL MODEL  | REV | DESCRIPTION  |
| 85-0398-1  | 0   | 6-1/4" <b>CLINCHER</b> ® compression load cell-style backup (part # 85-0398) installation kit. See section 2 for complete list of parts included with the kit. |

McCoy has made an effort ensure that all illustrations are accurate, but please note that some illustrations used in this manual may not exactly visually match your equipment.

**PATENTED & PATENTS PENDING**



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# WARNINGS

A "LOAD-BEARING DEVICE" IS A CHAIN SLING, RIGID SLING, SPREADER BAR ASSEMBLY, FRAME, OR ANY OTHER DEVICE THAT BEARS THE PARTIAL OR TOTAL WEIGHT OF THE EQUIPMENT FOR WHICH THIS MANUAL HAS BEEN PRODUCED

THE LOAD-BEARING DEVICE SUPPLIED BY MCCOY DRILLING & COMPLETIONS IS DESIGNED TO SUPPORT THE EQUIPMENT DESCRIBED IN THIS MANUAL. MCCOY DRILLING & COMPLETIONS WILL NOT GUARANTEE THE ABILITY OF THE LOAD-BEARING DEVICE TO SUPPORT ANY OTHER PART, ASSEMBLY OR COMBINATION OF PARTS AND ASSEMBLIES. MCCOY DRILLING & COMPLETIONS WILL NOT GUARANTEE THE ABILITY OF THE LOAD-BEARING DEVICE TO LIFT OR SUPPORT THE EQUIPMENT DESCRIBED IN THIS MANUAL IF THERE ARE ANY MODIFICATIONS TO THE LOAD-BEARING DEVICE, OR ANY ADDITIONS TO THE EQUIPMENT DESCRIBED IN THIS MANUAL THAT ADD WEIGHT TO THE EQUIPMENT, UNLESS SUPPLIED BY MCCOY DRILLING & COMPLETIONS.

WHEN RE-ASSEMBLING LOAD-BEARING DEVICES (BACKUP LEGS, BACKUP LEG MOUNTS, ETC.) THE ASSOCIATED FASTENERS MUST BE TIGHTENED TO THE CORRECT TORQUE SPECIFIED FOR THAT SIZE OF FASTENER (SEE SECTION 3 - OVERHAUL). ANY THREADED FASTENER IN A LOAD-BEARING DEVICE MUST BE SECURED WITH RED OR BLUE LOCTITE™.

ANY REPLACEMENT FASTENER (BOLTS, NUTS, CAP SCREWS, MACHINE SCREWS, ETC.) USED DURING MAINTENANCE OR OVERHAUL MUST BE GRADE 8 OR EQUIVALENT UNLESS OTHERWISE SPECIFIED.



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McCoy has made every effort to ensure the information contained in this document is accurate and current. This manual is intended to provide equipment operation and safety instructions for your equipment. However, McCoy does not warrant or guarantee that the information is either complete or accurate in every respect and the user of the manual should consult with its McCoy sales representative for any clarifications and updates.

The user of the manual shall protect, indemnify, and hold harmless McCoy and its directors, officers, employees, and agents from and against all liability for personal injury, death, or property damage resulting directly or indirectly from the use of the information contained in this manual.

Observance of all descriptions, information and instructions set out in this manual is the full responsibility of the user. This manual is intended for guidance and informational purposes and must be used in association with adequate training and on-the-job supervision to provide safe and effective equipment use.

It is the responsibility of the user to conform to all regulations and requirements issued by an authority or agency which may affect the operation, safety or equipment integrity, that may overrule the content of this documentation.

The user will acknowledge and obey any general legal or other mandatory regulation in force relating to accident prevention, safety, and equipment integrity.

| Summary Of Revisions |         |      |                         |           |
|----------------------|---------|------|-------------------------|-----------|
| Date                 | Section | Page | Description Of Revision | Approved  |
| NOV 2013             | N/A     | N/A  | Initial Release - DRAFT | R. Rahman |



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The information presented in this document will provide installation, operating, and maintenance instructions for your 6-1/4" CLINCHER® backup. Due to the wide variety of operating conditions, these instructions must be considered guidelines rather than absolute operating procedures. It is the responsibility of the user to use these guidelines together with an experienced manager to develop operating procedures that conform to all policies set forth by the operating authority (ies).

#### IDENTIFICATION OF OF WARNINGS AND OTHER NOMENCLATURE OF IMPORTANCE USED IN THIS INSTALLATION GUIDE

McCoy Drilling & Completions uses three indicators to describe items of three degrees of importance.

A **HAZARD** to operators or equipment is represented by an exclamation point within a red triangle. identifies items of the highest importance. Failure to heed information identified by a **HAZARD** symbol may result in bodily injury, death, catastrophic equipment damage, or any combination of these. A **HAZARD** may also indicate the potential for dangerous environmental contamination.



**This identifies a HAZARD to operators or equipment**

A **WARNING** is represented by an exclamation point within an orange triangle, and contains information that will alert personnel to a potential safety hazard that is not life-threatening. A **WARNING** may also serve to alert the user to information critical to the correct assembly or operation of the equipment in use.



**This identifies a WARNING to users**

A **CAUTION** is represented by an exclamation point within a yellow triangle and highlights information that may aid the user during assembly or operation of your equipment. **CAUTIONS** are also used to ensure common errors are not made during assembly or operation of your equipment.



**This identifies a CAUTION to users**

**Observance of the following is the full responsibility of the user:**

- **all descriptions, information and instructions set out in this manual**
- **any regulation or requirement issued by an authority or agency which may influence operation, safety or integrity of the equipment that overrules the content of this document.**
- **any legal or other mandatory regulation in force governing accident prevention or environmental protection.**



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MOVING GLOBAL ENERGY FORWARD

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## Section 1: Introduction



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**1.A INTRODUCTION**

Congratulations on the purchase of your CLINCHER® backup installation kit. This unit will provide you with years of outstanding performance. Simple maintenance and care will extend its life and ensure years of excellent performance and reliability. The installation, operating, and maintenance instructions in this manual will assist you in giving your equipment the care it requires. Please carefully read the manual before installing and using your equipment. Replacement parts are readily available from McCoy Drilling & Completions | FARR in Edmonton, Alberta. Should you need replacement parts, or should you experience any difficulty not covered in this manual, please contact:

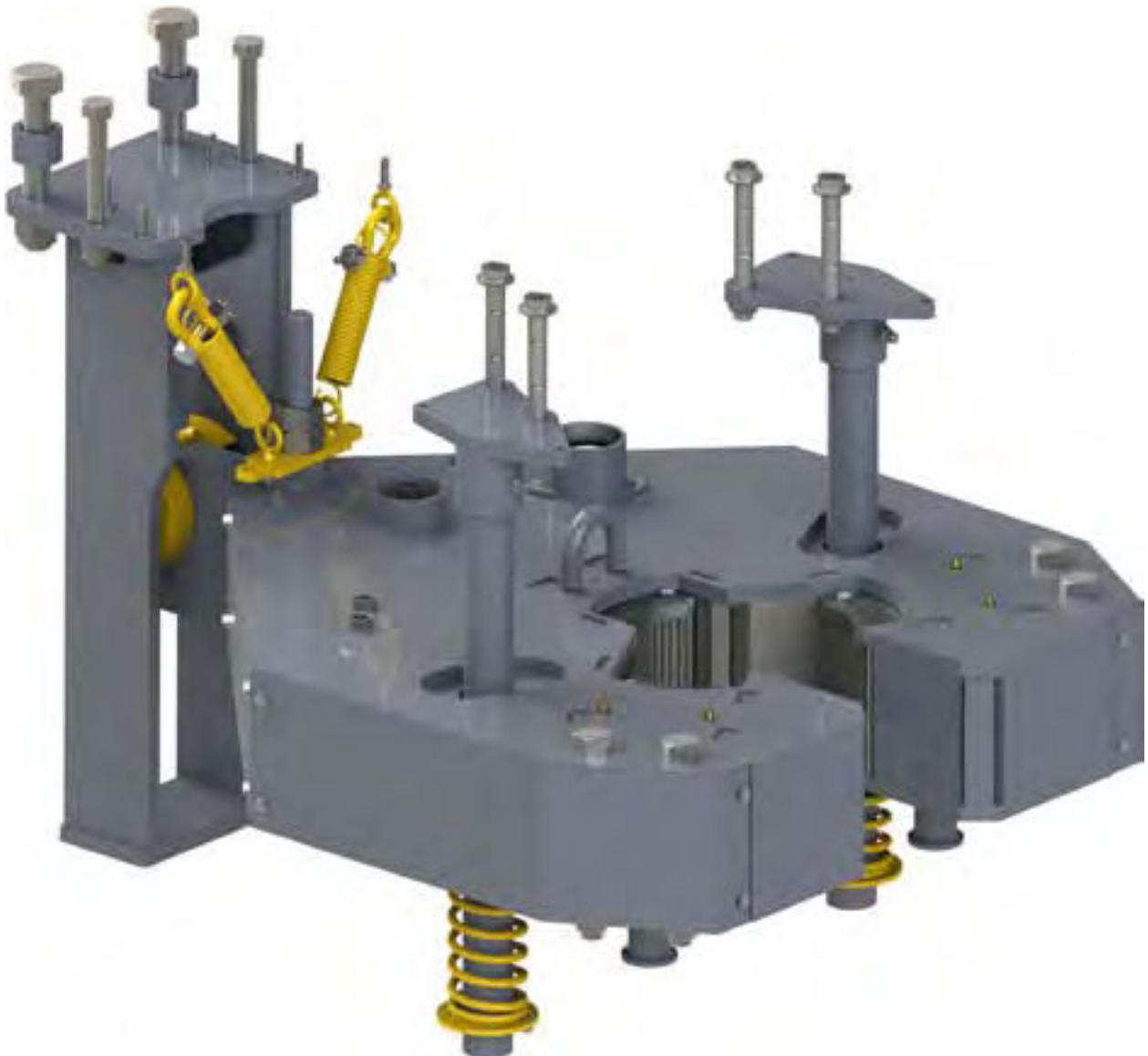
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**ILLUSTRATION 1.A.1: 85-0398-1 6-1/4" CLINCHER® BACKUP KIT**

## 1.B RECEIPT AND INSPECTION OF EQUIPMENT



**YOUR EQUIPMENT HAS BEEN THOROUGHLY TESTED AND INSPECTED AT THE FACTORY. HOWEVER, MCCOY ADVISES INSPECTING YOUR EQUIPMENT FOR SHIPPING DAMAGE UPON RECEIPT, AND TESTING YOUR EQUIPMENT BEFORE RELEASING TO AN OPERATIONAL ENVIRONMENT.**

Perform a visual inspection following removal of all packaging material. Immediately identify any shipping damage to the shipping company. Correct all damage before installing equipment and connecting to a hydraulic power source.

The following tables list the parts shipped with the installation kit of your choice. Ensure you have received all the necessary equipment. Do not start the installation procedure with an incomplete kit. Contact McCoy if you believe your installation kit is missing a required part.

| 85-0398-1 6-1/4" CLINCHER® Compression LC-Style Backup Conversion Kit |                |     |                               |
|---|----------------|-----|-------------------------------|
| Parts:  |                |     |                               |
| Decription  | Part Number    | QTY |                               |
| 6-1/4" compression LC-style CLINCHER® backup                          | 85-0398        | 1   |                               |
| Rear spring suspension bracket  | 1483-500-00-04 | 1   |                               |
| Threaded rod  | 101-1993       | 1   |                               |
| Backup suspension spring  | 1302-905-06    | 2   |                               |
| 1/2" shackles   | 02-9063        | 2   |                               |
| 3/8" UNC eye bolt   | 02-0262        | 4   |                               |
| LC holder weldment  | 01-9116D       | 1   |                               |
| Rear leg weldment   | 101-1547       | 1   |                               |
| Front leg tube  | 1364-909       | 2   |                               |
| Leg spring cap bottom   | 1302-905-03A   | 2   |                               |
| Front leg spring  | 1302-905-08    | 2   |                               |
| Leg spring cap top  | 101-4489       | 2   |                               |
| Rear spacer lug   | 101-1546       | 2   |                               |
| Front leg mount weldment LH   | 101-2152       | 1   |                               |
| Front leg mount weldment RH   | 101-2153       | 1   |                               |
| Support roller shaft  | 101-3944       | 4   |                               |
| Backup valve section  | 10-9019        | 1   |                               |
| Valve handle  | 01-0409        | 1   |                               |
| Hydraulic hose assembly - backup 55" "A" side                         | 02-1011        | 1   |                               |
| Hydraulic hose assembly - backup 52" "B" side                         | 02-1012        | 1   |                               |
| Fasteners:  |                |     |                               |
| Decription  | Part Number    | QTY | Where Used                    |
| 3/8" UNC x 2-1/4" hex bolt  | 09-1055        | 4   | Front leg mount weldments     |
| 3/8" lock washer  | 09-5106        | 4   | Front leg mount weldments     |
| 1/2" UNC x 4" hex bolt  | 09-1182        | 2   | Front leg mount               |
| 1/2" UNC Hex nylock nut   | 09-5610        | 2   | Front leg mount               |
| 1/2" UNC x 3" hex bolt  | 09-1178        | 2   | Bottom spring cap retainer    |
| 1/2" UNC Hex nylock nut   | 09-5610        | 2   | Bottom spring cap retainer    |
| 7/8" UNC x 7" UNC hex bolt  | 09-7777        | 2   | Rear leg mount                |
| 1-1/4" UNC x 7-1/2" UNC hex bolt                                      | 09-9164        | 2   | Rear leg mount                |
| 7/8" UNC hex nylock nut   | 09-9177        | 2   | Rear leg mount                |
| 1-1/4" UNC hex nylock nut   | 09-1484        | 2   | Rear leg mount                |
| 1/2" UNC x 8" hex bolt  | 09-1198        | 4   | Hydraulic control valve ass'y |
| 3/8" UNC hex nylock nut   | 09-5607        | 2   | Rear suspension spring ass'y  |

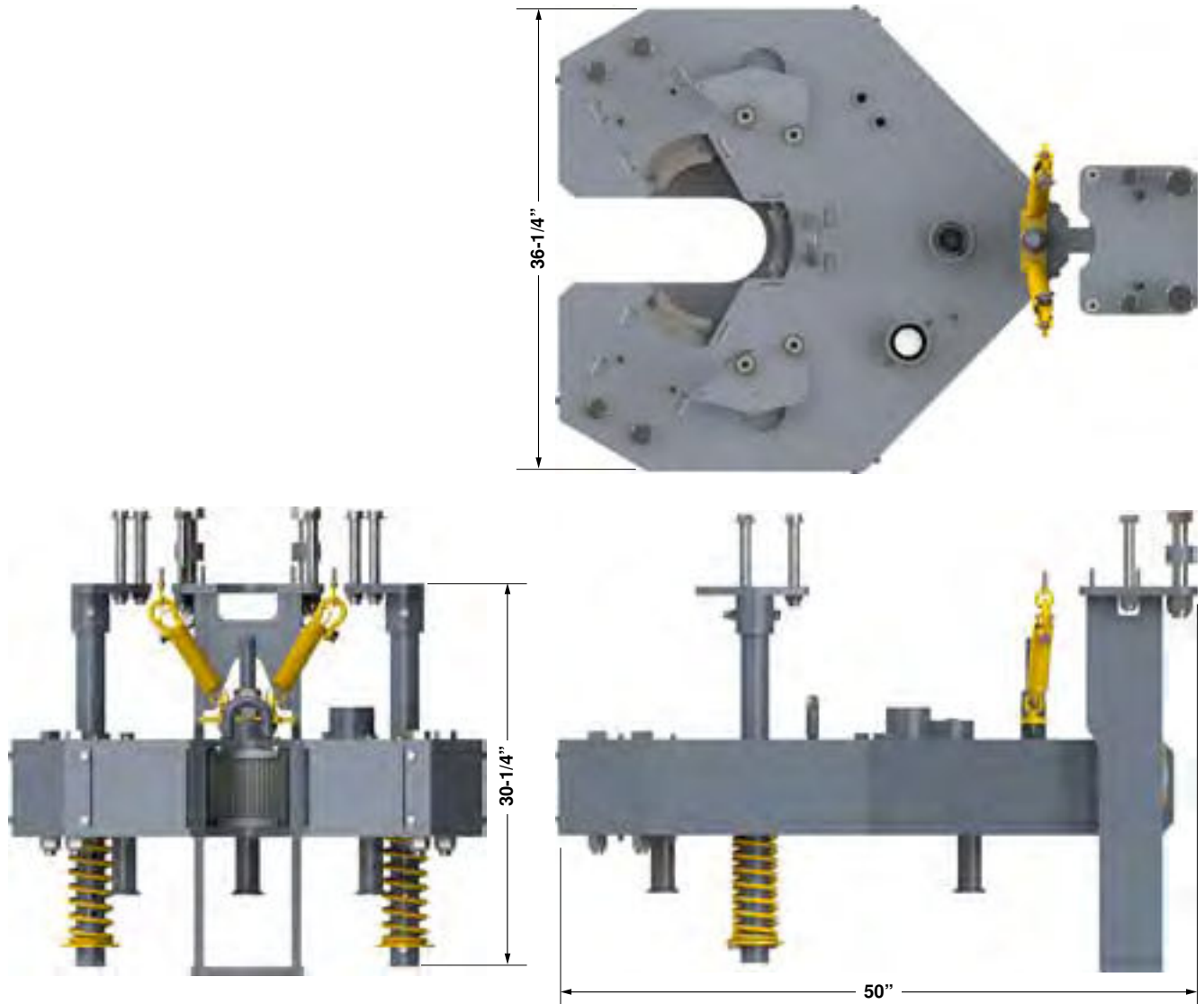


## 1.C SPECIFICATIONS

## Color Coding:

**Green** = Handle or control, safe to grasp or manipulate

**Yellow** = Active or potential hazard. Use caution not to contact area especially when tong is rotating.



**ILLUSTRATION 1.A.2: 85-0404-1 5-1/2" COMPRESSION LC-STYLE CLINCHER® BACKUP KIT DIMENSIONS**

|                                       |                       |
|---------------------------------------|-----------------------|
| <b>Maximum Hydraulic Requirements</b> | 60 GPM (227.1 LPM)    |
|                                       | 2500 PSI (17.237 MPa) |
| <b>Maximum Dimensions</b>             |                       |
| Assembled Length                      | 50" / 127 cm          |
| Length (Backup Only)                  | 48-1/4" / 122.6 cm    |
| Width                                 | 36-1/4" / 92 cm       |
| Height (Total)                        | 30-1/4" / 76.8 cm     |
| Height (Backup Only)                  | 15-1/2" / 39.4 cm     |
| Weight (Approximate, Backup Only)     | 925 lbs / 420.1 kg    |
| Torque Arm Length                     | 32" / 81.3 cm         |
| Available Jaw Sizes                   | See Page 3.8          |



**ALL REPLACEMENT FASTENER (BOLTS, NUTS, CAP SCREWS, MACHINE SCREWS, ETC.) USED DURING MAINTENANCE OR OVERHAUL MUST BE GRADE 8 OR EQUIVALENT UNLESS OTHERWISE SPECIFIED.**

Use an EP synthetic grease that meets or exceeds the following specifications:

|  |                     |
|--|---------------------|
| Thickener  | Lithium Complex     |
| NLGI consistency grade   | 2                   |
| NLGI performance grade   | GC-LB               |
| Penetration - ASTM D 217 (25°C [77°F] 0.1 mm) worked 60 strokes    | 265-295 minimum     |
| Dropping point, °F[°C] - ASTM D2265                                | 550 [288] minimum   |
| High temperature life, hours - ASTM D 3527                         | 160 minimum         |
| Oxidation stability, psi - ASTM D 942                              | (100 hr/300 hr) 0/3 |
| Water washout, percent - ASTM D 1264                               | 1.8 max             |
| Rust and corrosion - ASTM D 1743                                   | pass                |
| Oil separation, percent loss - ASTM D 1742 (24 hours, 25°C [77°F]) | 1.1 max             |
| Leakage, g lost - ASTM D 4290                                      | 1.0 max             |
| Four ball wear test, mm scar - ASTM D 2266                         | 0.40 max            |
| Fretting wear, mg - ASTM D 4170                                    | 3.4 max             |
| Four ball EP, kgf - ASTM D 2596                                    |                     |
| Weld point   | 400 minimum         |
| Load wear index  | 50 minimum          |
| Timken OK load test, lbs - ASTM D 2509                             | 50                  |
| Low temperature torque, N*m - ASTM D 4693 (-40°C [-40°F])          | 1.3 max             |
| LT-37 pumpability, g/min (60°F/0°F [16°C/-18°C])                   | 360/7               |
| Copper corrosion - ASTM D 4048                                     | 1B                  |
| Oil viscosity: 40°C [104°F], cSt                                   | 151                 |
| 100°C [212°F], cSt   | 19.2                |
| Flash point, °F[°C] - ASTM 92                                      | 450[232]            |



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## Section 2: Installation Procedures



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Installation of your backup kit is a simple procedure that 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.

NOTE ON INSTALLATION PRACTICES: Ensure all bearings are liberally greased before installing over a shaft or into gears or bearing caps. Ensure all metal-to-metal contact in the gear train is adequately greased. **When graphics are not used in the assembly process, please refer to the relevant exploded diagrams in Section 6.**



**ALL FASTENERS USED DURING REASSEMBLY OF LOAD-BEARING COMPONENTS (CHAIN SLINGS, RIGID SLINGS, BACKUP LEGS) MUST BE TIGHTENED TO THE CORRECT TORQUE. THREADED FASTENERS USED IN LOAD-BEARING DEVICES MUST BE SECURED WITH RED LOCTITE™.**

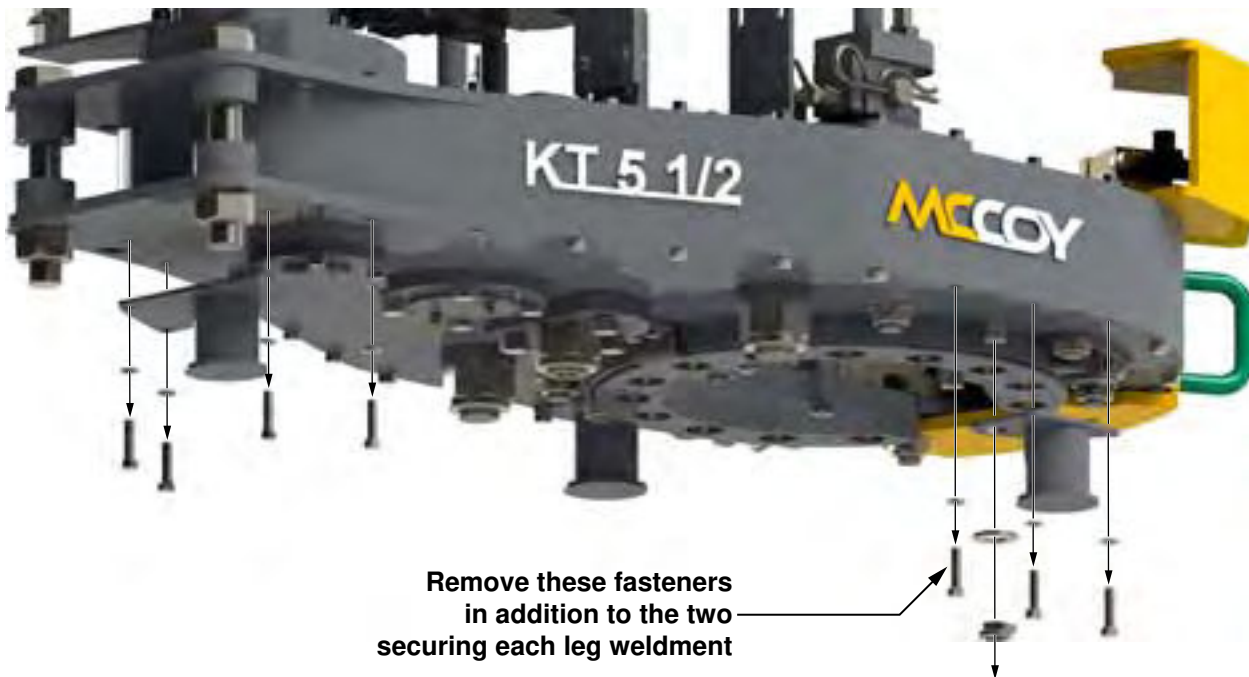
| TIGHTENING TORQUE GUIDE     |            |               |               |
|-----------------------------|------------|---------------|---------------|
| SAE GRADE 8 - FINE THREAD   |            |               |               |
| SIZE                        | CLAMP LOAD | PLAIN         | PLATED        |
| 1/4 - 28 (.250)             | 3,263      | 14 ft. lbs.   | 10 ft. lbs.   |
| 5/16 - 24 (.3125)           | 5,113      | 27 ft. lbs.   | 20 ft. lbs.   |
| 3/8 - 24 (.375)             | 7,875      | 49 ft. lbs.   | 37 ft. lbs.   |
| 7/16 - 20 (.4375)           | 10,650     | 78 ft. lbs.   | 58 ft. lbs.   |
| 1/2 - 20 (.500)             | 14,400     | 120 ft. lbs.  | 90 ft. lbs.   |
| 9/16 - 18 (.5625)           | 18,300     | 172 ft. lbs.  | 129 ft. lbs.  |
| 5/8" - 18 (.625)            | 23,025     | 240 ft. lbs.  | 180 ft. lbs.  |
| 3/4 - 16 (.750)             | 33,600     | 420 ft. lbs.  | 315 ft. lbs.  |
| 7/8" - 14 (.875)            | 45,825     | 668 ft. lbs.  | 501 ft. lbs.  |
| 1 - 12 (1.000)              | 59,700     | 995 ft. lbs.  | 746 ft. lbs.  |
| 1 - 14 (1.000)              | 61,125     | 1019 ft. lbs. | 764 ft. lbs.  |
| 1 1/8 - 12 (1.125)          | 77,025     | 1444 ft. lbs. | 1083 ft. lbs. |
| 1 1/4 - 12 (1.125)          | 96,600     | 2012 ft. lbs. | 1509 ft. lbs. |
| 1 3/8 - 12 (1.375)          | 118,350    | 2712 ft. lbs. | 2034 ft. lbs. |
| 1 1/2 - 12 (1.500)          | 142,275    | 3557 ft. lbs. | 2668 ft. lbs. |
| SAE GRADE 8 - COARSE THREAD |            |               |               |
| SIZE                        | CLAMP LOAD | PLAIN         | PLATED        |
| 1/4 - 20 (.250)             | 2,850      | 12 ft. lbs.   | 9 ft. lbs.    |
| 5/16 - 18 (.3125)           | 4,725      | 25 ft. lbs.   | 18 ft. lbs.   |
| 3/8 - 16 (.375)             | 6,975      | 44 ft. lbs.   | 33 ft. lbs.   |
| 7/16 - 14 (.4375)           | 9,600      | 70 ft. lbs.   | 52 ft. lbs.   |
| 1/2 - 13 (.500)             | 12,750     | 106 ft. lbs.  | 80 ft. lbs.   |
| 9/16 - 12 (.5625)           | 16,350     | 153 ft. lbs.  | 115 ft. lbs.  |
| 5/8" - 11 (.625)            | 20,325     | 212 ft. lbs.  | 159 ft. lbs.  |
| 3/4 - 10 (.750)             | 30,075     | 376 ft. lbs.  | 282 ft. lbs.  |
| 7/8" - 9 (.875)             | 41,550     | 606 ft. lbs.  | 454 ft. lbs.  |
| 1 - 8 (1.000)               | 54,525     | 909 ft. lbs.  | 682 ft. lbs.  |
| 1 1/8 - 7 (1.125)           | 68,700     | 1288 ft. lbs. | 966 ft. lbs.  |
| 1 1/4 - 7 (1.125)           | 87,225     | 1817 ft. lbs. | 1363 ft. lbs. |
| 1 3/8 - 6 (1.375)           | 103,950    | 2382 ft. lbs. | 1787 ft. lbs. |
| 1 1/2 - 6 (1.500)           | 126,450    | 3161 ft. lbs. | 2371 ft. lbs. |



**REPLACEMENT FASTENER (BOLTS, NUTS, CAP SCREWS, MACHINE SCREWS, ETC.) USED DURING MAINTENANCE OR OVERHAUL MUST BE GRADE 8 OR EQUIVALENT UNLESS OTHERWISE SPECIFIED.**

**2.A TONG PREPARATION & COMPONENT REMOVAL**

1. Construct a support structure that will support the tong at approximately waist level. A pair of sturdy metal horses works well for this application.
2. Use a crane to hoist your 5-1/2" tong on to the metal horses. Ensure the tong is supported and stable before removing the crane hook from the master lifting link.
3. Remove the clamps or restraints securing the hydraulic inlet and outlet lines to their respective supports.
4. Disconnect the hydraulic lines connecting the motor valve to the safety door block. Disconnect the motor case drain line from the 3/8" JIC flare fitting on the valve outlet section.
5. Use a crane and a temporary lifting sling to support the DVA valve assembly. Remove the two 1/2" x 4-1/2" hex bolts and 1/2" lock washers securing the valve assembly to the hydraulic supports. Set the valve assembly aside in a clean location.
6. Remove the safety door block and fittings by removing four 7/16" x 1-1/2" hex bolts securing each flange elbow from the motor. Store safety door block in a clean location until re-installation is required. Cover the hydraulic ports on the motor to prevent contamination.
7. Remove the two fasteners securing the left-hand side of the motor (as seen from the rear of the tong) to the motor mount, and remove the torque gauge holder weldment.
8. If not already done remove the two load cell tie-off bolts from the rear of the tong.
9. Remove the rear leg weldment by extracting the four 3/8" x 1-1/2" hex head bolts and 3/8" lock washers.
10. Following removal of the rear leg weldment replace the four 3/8" UNC x 1-1/2" hex head bolts and 3/8" lock washers.
11. Remove each front leg weldment by removing the 7/8" thin nylock nut, 7/8" narrow flat washer, and two each 3/8" x 1-3/4" hex bolts and 3/8" lock washers. Remove an additional 3/8" x 1-3/4" hex bolt and 3/8" lock washer from the bottom plate directly to the rear of each front leg weldment (see illustration 2.A.1).

**ILLUSTRATION 2.A.1: TONG PREPARATION 01 - REMOVAL OF LEG WELDMENTS**

13. Install 3/8" UNC x 1-1/2" hex head bolts and 3/8" lock washers into the bottom plate in the four locations where the hex bolts were extracted when removing the rear leg weldment (see Illustration 2.A.2).
14. Extract two further support roller shafts (one on each side of the tong) as indicated in Illustration 2.A.2. Following this step the two support roller shaft locations nearest to the rotary idlers on each side of the tong should be empty and ready to receive new shafts.

2.A TONG PREPARATION & COMPONENT REMOVAL (CONTINUED):



**ILLUSTRATION 2.A.2: TONG PREPARATION 02**

15. Install two 3/8" UNC eye bolts (PN 02-0262) to be used for backup suspension:
  - a. Remove two hex bolts and lock washers as shown in illustration 2.A.3.



**ILLUSTRATION 2.A.3: EXTRACTING FASTENERS FOR EYE BOLT INSTALLATION**

**2.A TONG PREPARATION & COMPONENT REMOVAL (CONTINUED):**

15. Install two 3/8" UNC eye bolts (continued):

- b. Install two 3/8" UNC eye bolts (PN 02-0262) and 3/8" lock washers into the locations where the bolts were extracted in the previous step as shown in illustration 2.A.4.



**ILLUSTRATION 2.A.4: EYE BOLT INSTALLATION**

Your tong is now ready for the installation of the backup and backup mounting kit.



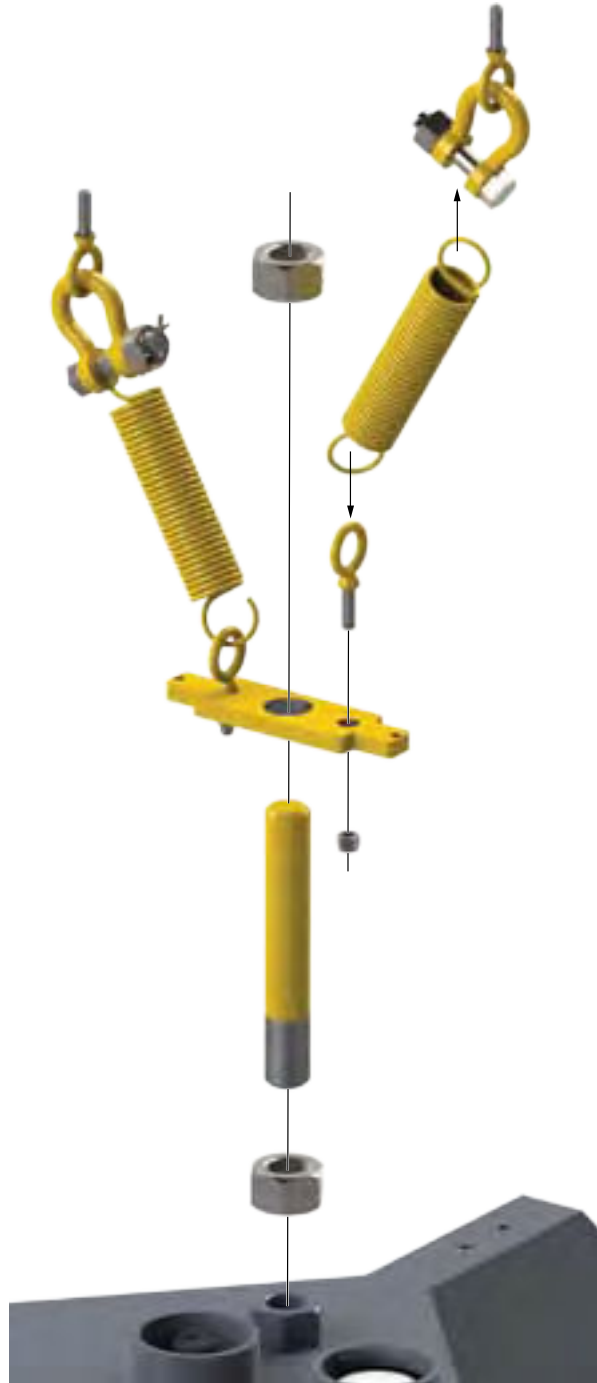
**2.B FRONT LEG MOUNT INSTALLATION**

1. Slide a 7/8" narrow flat washer over the end of the four long support roller shafts included in the installation kit (PN 101-3944).
2. Insert each support roller shaft into the four locations where the short support roller shafts were removed.
3. Install the LH front leg mount weldment (PN 101-2152) and the RH front leg mount weldment (PN 101-2153). Secure each leg mount weldment to the bottom plate of the tong using a 7/8" narrow flat washer and 7/8" UNF thin nylock nut on each support roller shaft, and two 3/8" UNC x 2-1/4" hex bolts and 3/8" lock washers per weldment as shown in illustration 2.B.1.

**ILLUSTRATION 2.B.1: SECURING FRONT LEG MOUNT WELDMENTS**

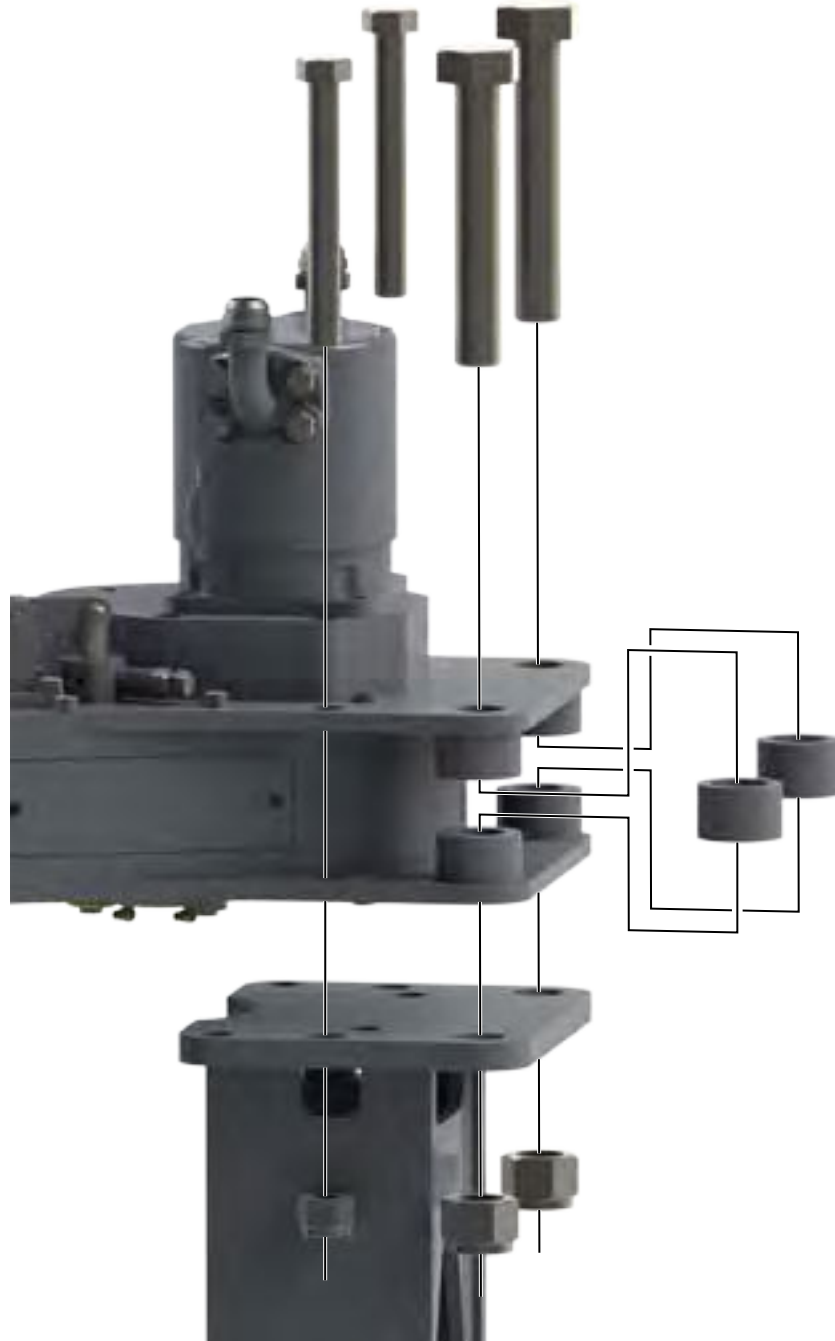
**2.C BACKUP SUSPENSION SPRING ASSEMBLY**

1. Thread a 1-1/4" UNC heavy hex nut on to the 1-1/4" UNC x 8" threaded rod (PN 997-500-03).
2. Coat approximately 2" of thread on the bottom of the threaded rod with blue Loctite®. Screw the coated part of the threaded rod into the heavy hex bolt welded to the top plate of the backup until the rod bottoms out. Lock the threaded rod in place using the heavy hex nut threaded on to the rod in the previous step.
3. Attach two 3/8" UNC eye bolts to the suspension spring bracket (1483-500-00-04) using 3/8" UNC hex nylock nuts. Slide the suspension spring bracket on to the 1-1/4" threaded rod.
4. Coat approximately 4" of thread at the top of the threaded rod with blue Loctite®. Thread a 1-1/4" UNC heavy hex nut on to the threaded rod.
5. Attach one end of each suspension spring (PN 1302-905-06) to each eye bolt on the suspension spring bracket.

**ILLUSTRATION 2.C.1: BACKUP SUSPENSION SPRING ASSEMBLY**

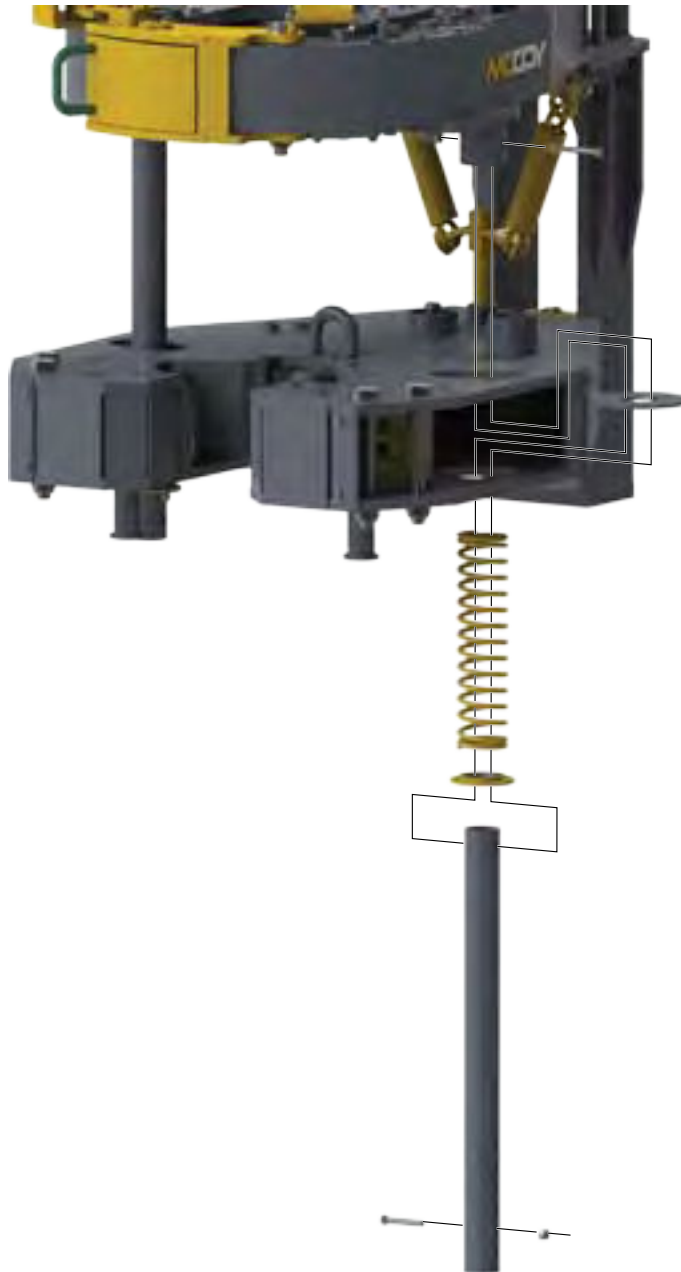
**2.D REAR LEG INSTALLATION**

1. Position rear leg weldment (101-1457) on a flat surface near the tong assembly location.
2. Use a crane to hoist the tong assembly off the assembly surface using the rigid sling and master lifting link. Bring the tong into contact with the rear leg, ensuring the crane continues to support the entire weight of the tong.
3. Insert two spacers (PN 101-1546) between the bosses on the top and bottom plates at the rear of the tong.
4. Insert two 1-1/4" UNC x 8" heavy hex bolts and two 7/8" UNC x 7" heavy hex bolts through the top plate. Secure the heavy hex bolts using two 1-1/4" UNC hex nylock nuts and two 7/8" UNC hex nylock nuts. See page 2.3 for tightening torque.
5. Move the tong and rear leg assembly back on to the assembly horses.

**ILLUSTRATION 2.D.1: REAR LEG INSTALLATION**

**2.E BACKUP INSTALLATION**

1. Remove the side panels from the backup.
2. Use a crane and temporary sling to hoist the backup assembly (weight = 734 lbs / 334 kg) on to a suitable support structure next to the assembly location of the tong. Minimum height for the backup supports must be 36" in order to allow clearance for installing the front legs.
3. Use a crane to hoist the tong and rear leg assembly and place in position over the backup. Lower the tong until it is approximately 18 to 24 inches from the backup. **ASSEMBLY NOTE:** The rear leg must be guided so that the "paddle" on the backup sits between the vertical plates of the rear leg as the tong and rear leg assembly are lowered over the backup
4. Hold a top spring cap (PN 101-4489) under the top plate of the backup, and insert a front leg tube (PN 1364-909) from the bottom of the backup, through the spring cap, and in to the leg mount weldment on the tong. Secure the leg tube with a 1/2" UNC x 3-1/2" hex bolt, 1/2" narrow flat washer, and a 1/2" UNC nylock nut. Repeat for the other leg tube.
5. Slide a leg spring (PN 1302-905-08) over the bottom of each leg tube, followed by a bottom spring cap (PN 1302-905-03A). Secure each leg spring and bottom spring cap to the leg tube using a 1/2" UNC x 3" hex bolt, 1/2" narrow flat washer, and a 1/2" UNC nylock nut.

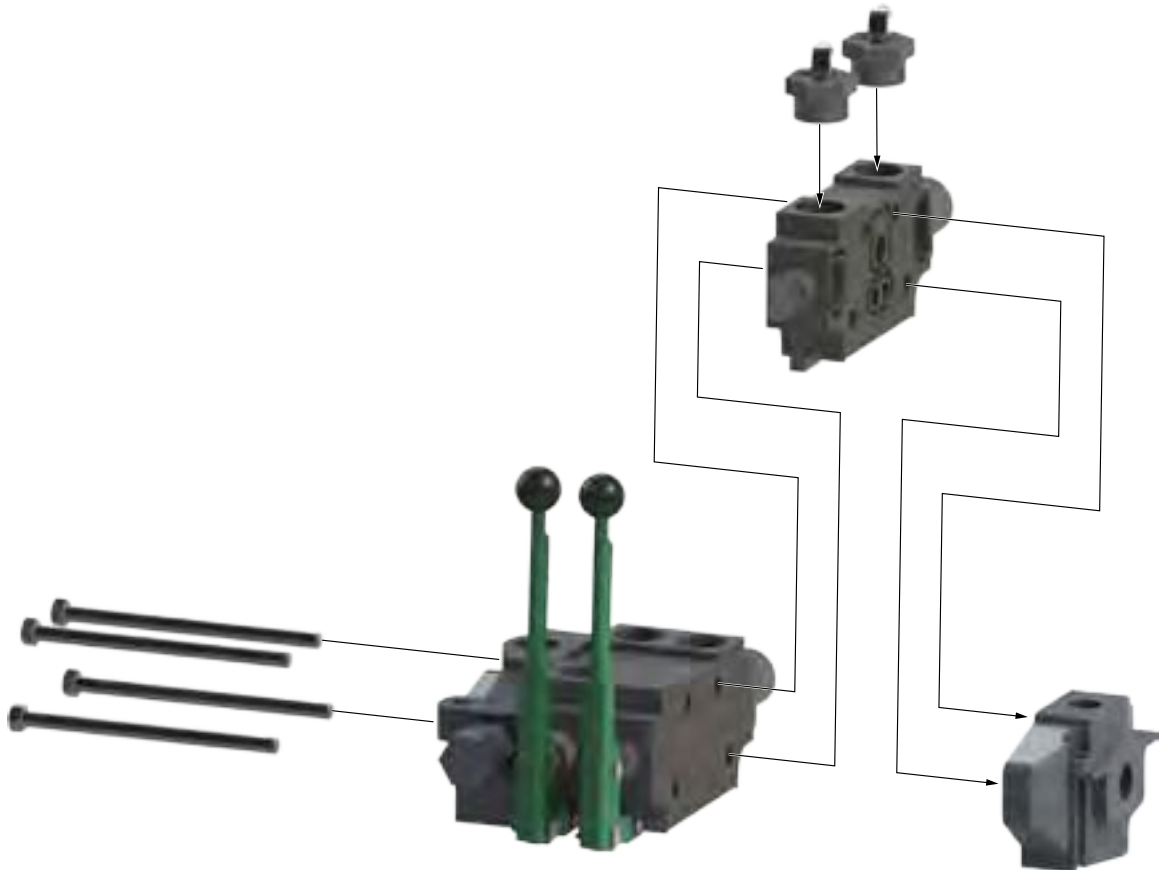
**ILLUSTRATION 2.E.1: FRONT LEG INSTALLATION**

**2.E BACKUP INSTALLATION (CONTINUED):**

6. Connect one end of each backup rear suspension spring (PN 1302-905-06) to the eye bolts on the bottom of the tong using 1/2" shackles (PN 02-9063).
7. Connect the other end of each rear backup support spring to the v-bracket installed in step 2.C.5. Secure the end of the spring to the v-bracket using a spring retainer (PN 1480-500-00-04B) and a cotter pin. Repeat for the second spring.
8. Hoist tong and backup assembly off the backup supports, and lower assembly so that it sits on its legs.
9. Replace the backup side panels.

**2.F BACKUP CONTROL VALVE INSTALLATION**

1. Place the DVA valve assembly on a clean workbench.
2. Extract the four 1/2" x 6" tie bolts holding the valve assembly together.
3. Remove the outlet section.
4. Insert the backup control valve (PN 10-9019) between the lift control valve and the outlet section.
5. Secure the expanded valve assembly using the four 1/2" UNC x 8" tie bolts included in the conversion kit.
6. Install the valve handle (PN 01-0409) included in the conversion kit. Refer to the existing valve handles for a guideline to properly install the handle.

**ILLUSTRATION 2.F.1: HYDRAULIC VALVE SECTION INSTALLATION**

7. Use a crane and temporary lifting sling to lift the hydraulic valve assembly on to the tong. Secure to the valve supports using 1/2" UNC x 4-1/2" hex bolts and 1/2" lock washers.
8. Reinstall the hydraulic plumbing in the reverse order it was removed in Section 2.A.
9. Install the hydraulic hoses included in the conversion kit. Secure one end to the fittings on the hydraulic valve section, and the other end to the quick-connect fittings on the backup.



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DRILLING &  
COMPLETIONS

FARR

## Section 3: Setup & Operation



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## 3.A SLING / LOAD BEARING DEVICE SAFETY



THE SUPPLIED LOAD-BEARING DEVICE (CHAIN SLING, RIGID SLING, SPREADER BAR ASSEMBLY, FRAME, OR ANY OTHER DEVICE THAT BEARS THE PARTIAL OR TOTAL WEIGHT OF THE EQUIPMENT DESCRIBED IN THIS MANUAL) HAS BEEN SPECIFIED OR DESIGNED TO SUPPORT THE EQUIPMENT DESCRIBED IN THIS DOCUMENT. FARR WILL NOT GUARANTEE THE ABILITY OF THE LOAD-BEARING DEVICE TO SUPPORT ANY OTHER PART, ASSEMBLY OR COMBINATION OF PARTS AND ASSEMBLIES, OR ANY ADDITIONS TO THE EQUIPMENT DESCRIBED IN THIS MANUAL THAT ADD WEIGHT TO THE EQUIPMENT, UNLESS SUPPLIED BY MCCOY DRILLING & COMPLETIONS.

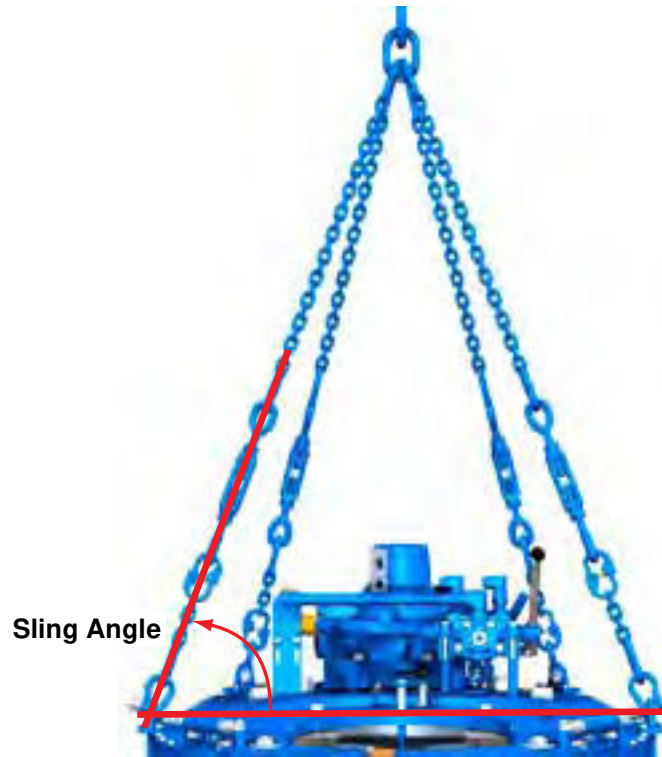
**MCCOY DRILLING & COMPLETIONS DOES NOT GUARANTEE THE INTEGRITY OF MODIFIED OR DAMAGED LOAD-BEARING DEVICES, UNLESS THOSE MODIFICATIONS ARE PERFORMED BY MCCOY DRILLING & COMPLETIONS.**

McCoy Drilling & Completions recommends following an industry-accepted standard such as OSHA, ASME B30.9-2006, or manufacturer's guidelines when performing any rigging and overhead lifting. Use by untrained persons is hazardous. Improper use will result in serious injury or death. Do not exceed rated capacity. Slings will fail if damaged, abused, misused, overused, or improperly maintained.

- Only grade 80 or grade 100 alloy chain should be used for overhead lifting applications.
- Working Load Limit (WLL) is the maximum allowable load in pounds which may be applied to the load-bearing device, when the device is new or in "as new" condition, and when the load is uniformly and directly applied. The WLL must never be exceeded.
- Working Load Limit (WLL) is the maximum working load for a specific minimum sling angle, measured from the horizontal plane. The Working Load Limit is identified on the sling.
- The Working Load Limit or Design factor may be affected by wear, misuse, overloading, corrosion, deformation, intentional alterations, sharp corner cutting action and other use conditions.
- Shock loading and extraordinary conditions must be taken into account when selecting alloy chain slings.
- See OSHA Regulation for Slings 1910.184, ANSI/ASME B30.9-"SLINGS", ANSI/ASME B30.10-"HOOKS" and ANSI/AMSE B30.26 "RIGGING HARDWARE" for additional information.



**THE MINIMUM SLING ANGLE (THE ANGLE OF THE LEG OF THE SLING MEASURED FROM THE HORIZONTAL) MUST NEVER FALL LOWER THAN THE ANGLE SPECIFIED FOR THE SLING IN USE**



**ILLUSTRATION 3.A.1: SLING ANGLE**

3.A.1 Inspection Of Slings

McCoy strongly recommends the following practices:

A complete inspection of new load-bearing devices and attachments shall be performed by a qualified, designated person prior to initial use. Each link and component shall be examined individually, taking care to expose and examine all surfaces including the inner link surface. The sling shall be examined for conditions such as those listed in the removal criteria below. In addition, daily inspection of slings, fastenings and attachments shall be performed by a designated person. If damage or defects are found at either inspection, the damaged or defective component shall be quarantined from service until it can be properly repaired or replaced.

Removal Criteria:

A load-bearing device shall be removed from service if conditions such as the following are present:

- Missing or illegible sling identification.
- Cracks or breaks
- Evidence of tampering is seen - sling tag has been modified or obscured, or tamper-proof nuts are missing.
- Signs of impact on load-bearing components, including spreader bars, lifting lugs, rigid slings & rigid sling weldments, and legs & leg mounts.
- Broken or damaged welds.
- Excessive wear, nicks, or gouges. Refer to the chart below to ensure minimum thickness on chain links supplied is not below the values listed:

| Minimum Allowable Chain Link Thickness at Any Point |     |                   |       |
|---|-----|-------------------|-------|
| Nominal Chain Size                                  |     | Minimum Thickness |       |
| Inches  | MM  | Inches            | MM    |
| 7/32  | 5.5 | 0.189             | 4.80  |
| 9/32  | 7   | 0.239             | 6.07  |
| 5/16  | 8   | 0.273             | 6.93  |
| 3/8   | 10  | 0.342             | 8.69  |
| 1/2   | 13  | 0.443             | 11.26 |
| 5/8   | 16  | 0.546             | 13.87 |
| 3/4   | 20  | 0.687             | 17.45 |
| 7/8   | 22  | 0.750             | 19.05 |
| 1   | 26  | 0.887             | 22.53 |
| 1-1/4   | 32  | 1.091             | 27.71 |
| <b>Refer To ASME B30.9</b>                          |     |                   |       |

- Stretched, bent, twisted, or deformed chain links or components.
  - Evidence of heat damage.
  - Excessive pitting or corrosion.
  - Lack of ability of chain or components to hinge (articulate) freely.
  - Weld splatter.
  - For hooks, removal criteria as stated in ASME B30.10
  - Other conditions, including visible damage, that cause doubt as to the continued use of the sling.
- Inspect all lugs and fixing points for signs of elongation and/or bending, or for material build-up around the hole. Repair or replace components that appear distorted. Ensure all hardware is tight and in good condition. Replace missing hardware if necessary. All hardware must be free of rust and corrosion.

Additional inspections shall be performed during sling use where service conditions warrant. Periodic inspection intervals shall not exceed one year. The frequency of periodic inspections should be based on:

- Frequency of use of the load-bearing device.
- Severity of service conditions
- Nature of lifts being made
- Experience gained on the service life of load-bearing devices used in similar circumstances.

Guidelines for the interval are:

- Normal Service - yearly
- Severe Service - monthly to quarterly
- Special Service - as recommended by a qualified person

**3.A.1 Inspection Of Slings (Continued):**

Units designed and manufactured in accordance with EN 12079 and DNV 2.7-1 should be tested and examined in accordance with the following schedule of examination and test. The user of the load-bearing device shall place a permanent placard or plate upon which the type and date of the last test shall be recorded. To avoid confusion, the plate shall not carry the date of the next test or examination, only the most recent.

| Test / Examination                         |                                      |   |                             |   |
|--|--------------------------------------|---|-----------------------------|---|
| TIME / INTERVAL                            | LIFTING TESTS <sup>1</sup>           | NON-DESTRUCTIVE EXAMINATION (NDE) OF LIFTING POINTS | THOROUGH VISUAL EXAMINATION | SUFFIX TO BE MARKED ON PLATE ATTACHED TO UNIT |
| Initial Certification By Farr / Superior   | YES                                  | YES   | YES                         | T   |
| Interval Not Exceeding 12 Months           | At the discretion of inspection body | At the discretion of inspection body                | YES                         | T or VN <sup>3</sup>                          |
| Interval Not Exceeding 60 Months           | At the discretion of inspection body | YES   | YES                         | T or VN                                       |
| Following Substantial Repair or Alteration | YES                                  | YES   | YES                         | T   |

1. Lifting test as per S 7.3 BS EN 12079 or DNV 2.7-1 May 1995  
 2. T = Proof Test, non-destructive examination; VN = non destructive examination and visual examination; V = visual examination.  
 3. Dependant upon whether non-destructive examination has been carried out.  
 4. For the purposes of this standard, a substantial repair or modification is defined as any repair and/or modification that has been carried out which may, in the opinion of the inspection body, affect the load-bearing elements of the container or lifting device, or elements that contribute directly to its structural integrity.



**IF MECHANICAL DAMAGE IS SEEN OR SUSPECTED ON A LOAD-BEARING DEVICE, OR IF THE LOAD-BEARING DEVICE HAS BEEN OVERLOADED, IT MUST BE REMOVED FROM SERVICE AND QUARANTINED UNTIL RECERTIFIED**

Written records of the most recent periodic inspection shall be maintained, and shall include the condition of the sling.

**3.A.2 Proper Use Of Load-Bearing Devices**

Whenever any load-bearing device is used, the following practices shall be observed.

- Load-bearing devices that are damaged or defective shall not be used.
- Slings shall not be shortened with knots or bolts or other makeshift devices.
- Sling legs shall not be kinked.
- Load-bearing devices shall not be loaded in excess of their rated capacities.
- Slings shall be securely attached to their load.
- Load-bearing devices shall be protected from snagging, and shall not be further obstructed by any object.
- Suspended loads shall be kept clear of all obstruction.
- All employees shall be kept clear of loads about to be lifted and of suspended loads.
- Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.
- Shock loading is prohibited.
- Do not stand directly under a load during lifting.

**3.A.3 Storage Of Load-Bearing Devices**

Proper storage of out-of-service load bearing devices is important to ensure full integrity of the device once it is returned to service. McCoy recommends observing the following practices.

- Wipe off all excess grease. Use a solvent-based cleaner on rags to wipe all external surfaces to remove residual grease or hydraulic fluid. Once the outside surfaces have been de-greased, wipe all external surfaces with clean water to remove residual solvent.
- McCoy recommends that an anti-corrosive agent such as Tectyl® 506 be applied to all external surfaces. Refer to manufacturer data sheets for proper application and safety information. Allow the anti-corrosive coating ample time to dry - refer to manufacturer data sheets for drying times at room temperature.
- Store in a clean, dry location. When returning to service, note that a full inspection of the device must be performed.

3.B HYDRAULIC SCHEMATIC / COMPONENT IDENTIFICATION

Illustration 3.B.1 shows the hydraulic schematic of your system following installation of the backup conversion kit. Items outlined in red indicate newly installed components, which are identified in Illustrations 3.B.2 and 3.B.3 (with the exception of the hydraulic control valve).

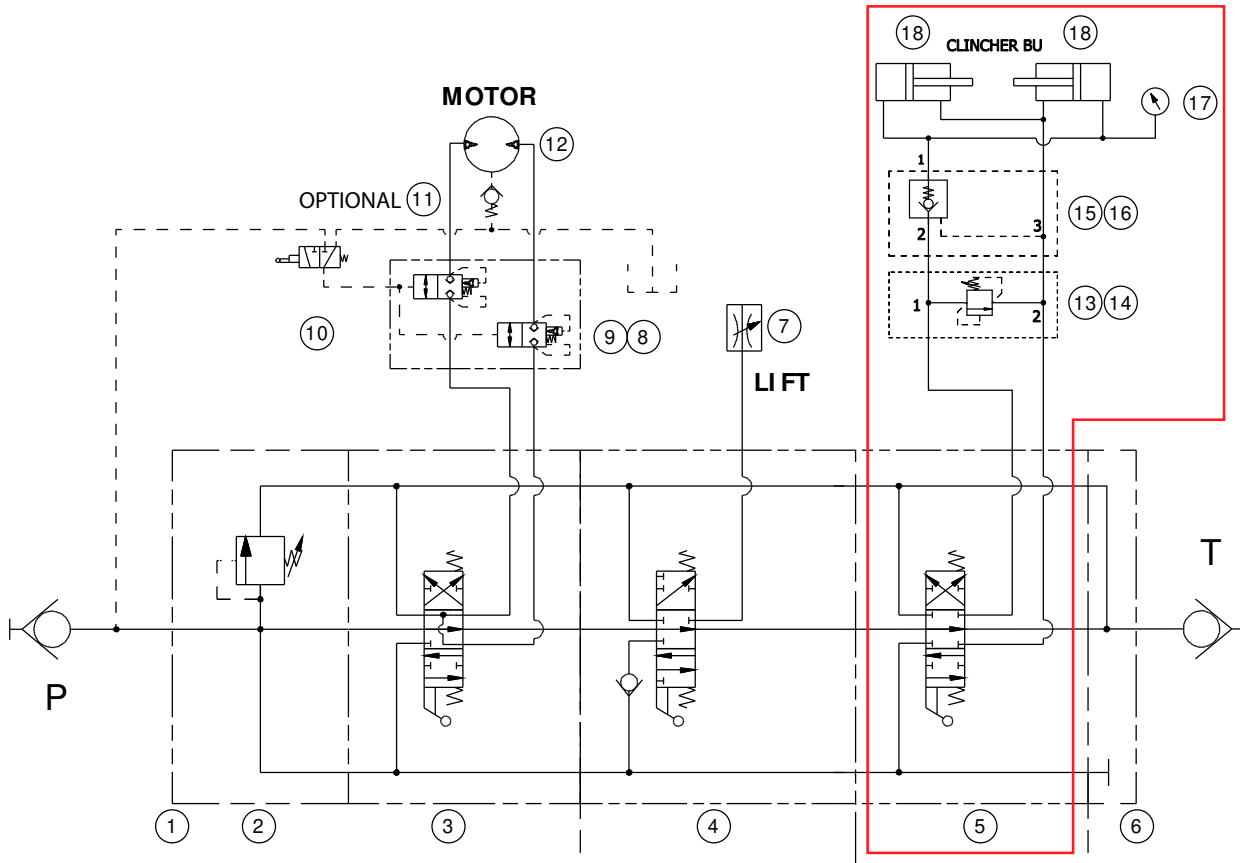
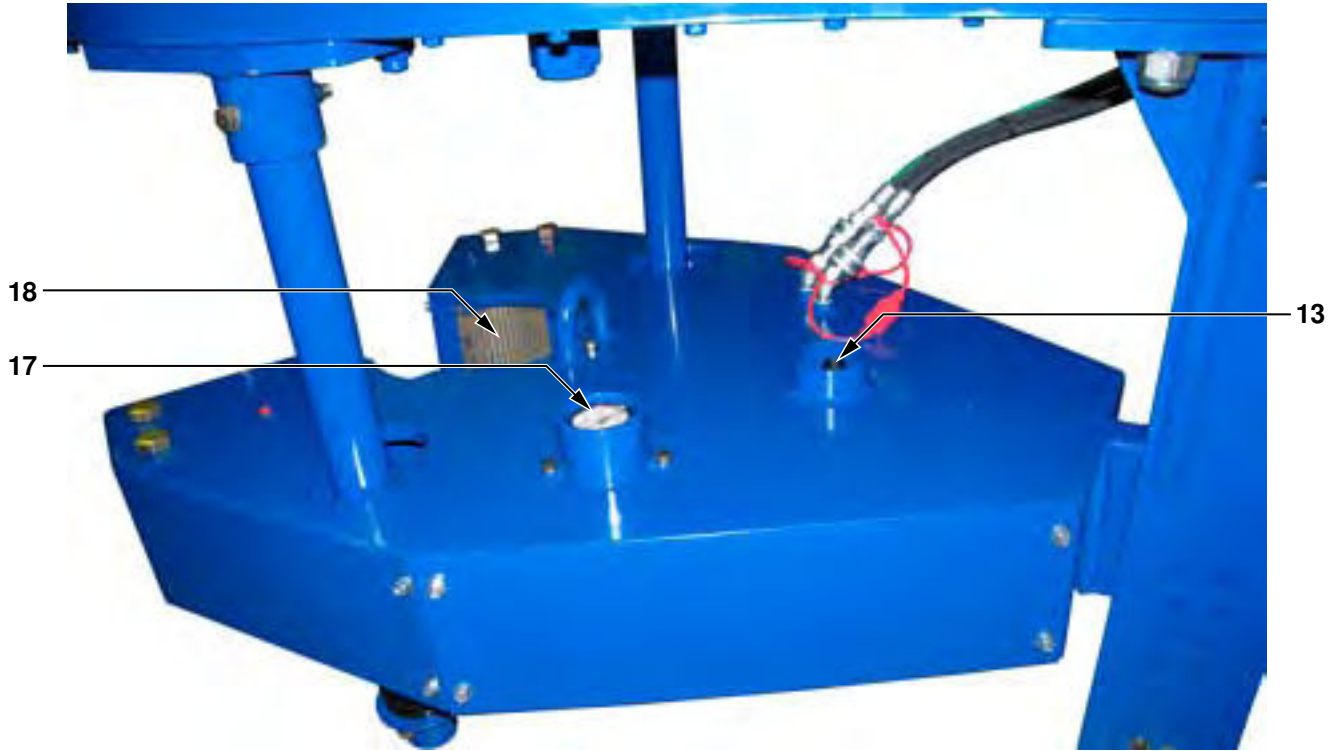


ILLUSTRATION 3.B.1: HYDRAULIC SCHEMATIC

| Item | Description                     | Part Number |
|------|---------------------------------|-------------|
| 1    | Inlet Valve                     | 10-9016     |
| 2    | Relief Valve                    | 10-0010R    |
| 3    | Motor Section, 4WAY SAE PORTS   | 10-9014     |
| 4    | Lift Section, 1" ORB PORT       | 10-9015     |
| 5    | Backup Section, 4WAY SAE PORTS  | 10-9019     |
| 6    | Outlet Section, SAE PORT        | 10-0086     |
| 7    | Flow Control Valve              | 08-9062     |
| 8    | Pilot-To-Open Safety Door Valve | 08-1625     |
| 9    | Safety Door Block               | 101-0727    |
| 10   | Safety Door Switch              | 08-0337     |
| 11   | Hydraulic Motor                 | 87-0112     |
| 12   | Check Valve (Optional)          | 02-9022     |
| 13   | Relief Valve                    | 08-1180     |
| 14   | Relief Valve Manifold (Backup)  | 08-1839     |
| 15   | Check Valve                     | 08-0481     |
| 16   | Check Valve Body (Backup)       | 08-1327     |
| 17   | 3000 psi Pressure Gauge         | 02-0245     |
| 18   | CLINCHER® Backup Cylinder       | 1401-00-00B |

3.B HYDRAULIC SCHEMATIC / COMPONENT IDENTIFICATION (CONTINUED):



**ILLUSTRATION 3.B.2: HYDRAULIC COMPONENT ID 01**



**ILLUSTRATION 3.B.3: HYDRAULIC COMPONENT ID 02**

3.C BACKUP JAW AVAILABILITY & INSTALLATION



**ENSURE JAWS TO BE INSTALLED ARE THE CORRECT SIZE. USE OF JAWS NOT SUPPLIED BY MCCOY MAY CAUSE JAW SLIPPAGE OR FAILURE, AND MAY RESULT IN DAMAGE TO THE TONG. THE USE OF REDUCER DIES IS NOT RECOMMENDED.**

3.C.1 Backup Jaw Availability

The following table lists all inserts that are available as standard sizes for the 6-1/4" **CLINCHER®** backup. If your desired size is not listed, please note that McCoy can custom-engineer and manufacture any size of jaw within the range of the backup. Call our sales office for information on jaw and die systems designed for higher or lower grip, or non-marking applications.

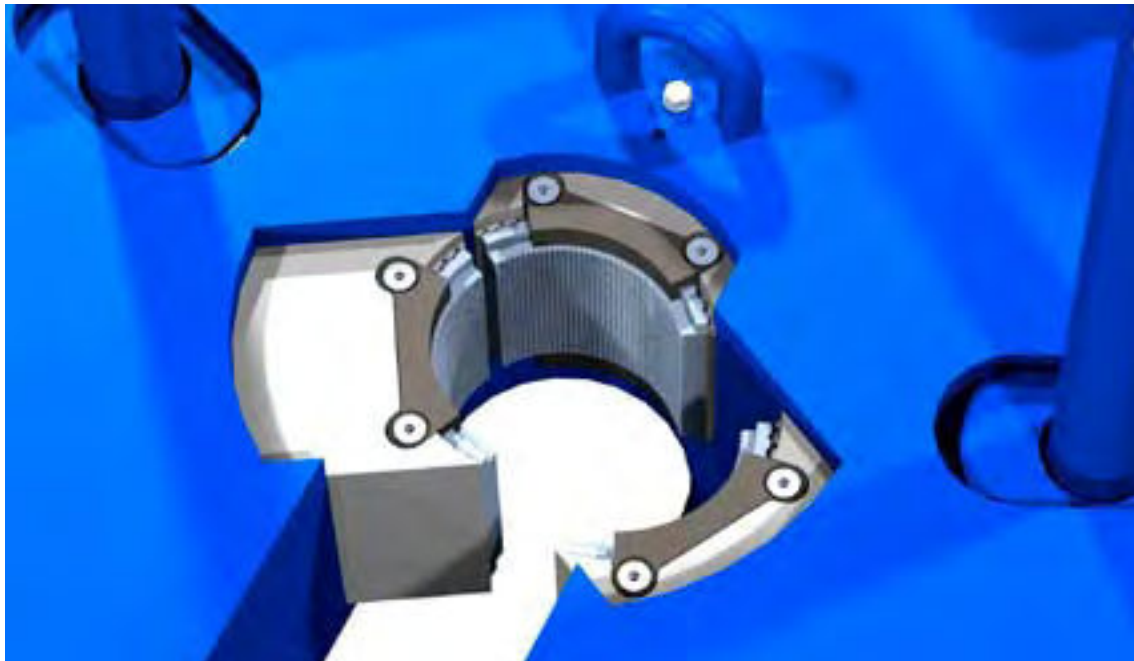
The table lists standard wraparound die inserts that are available as spare parts. However, a wide variety of diamond-tooth, GRITFACE®, and wrap-around fine-tooth dies are available for specialized applications. Please refer to our website for complete information:

<http://www.mccoysglobal.com/dies-inserts>

| Description                    | Part Number | Description                    | Part Number |
|--------------------------------|-------------|--------------------------------|-------------|
| 2.375" CLINCHER® Backup Insert | BUC76252375 | 4.75" CLINCHER® Backup Insert  | BUC76254750 |
| 2.707" CLINCHER® Backup Insert | BUC76252707 | 5" CLINCHER® Backup Insert     | BUC76255000 |
| 2.875" CLINCHER® Backup Insert | BUC76252875 | 5.25" CLINCHER® Backup Insert  | BUC76255250 |
| 3.375" CLINCHER® Backup Insert | BUC76253375 | 5.5" CLINCHER® Backup Insert   | BUC76255500 |
| 3.50" CLINCHER® Backup Insert  | BUC76253500 | 6" CLINCHER® Backup Insert     | BUC76256000 |
| 4" CLINCHER® Backup Insert     | BUC76254000 | 6.075" CLINCHER® Backup Insert | BUC76256075 |
| 4.50" CLINCHER® Backup Insert  | BUC76254500 | 6.25" CLINCHER® Backup Insert  | BUC76256250 |

3.C.2 CLINCHER® Backup Jaw Removal/Installation

1. Extend **CLINCHER®** cylinders enough so that the fasteners securing the top and bottom die retainers are well exposed. Turn off hydraulic power.

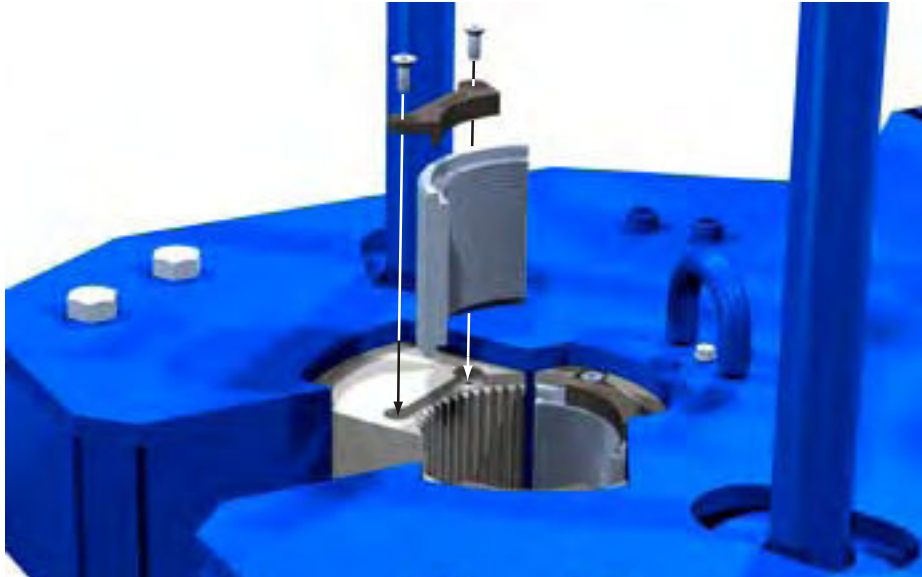


**ILLUSTRATION 3.C.1: BACKUP JAW EXTENSION**



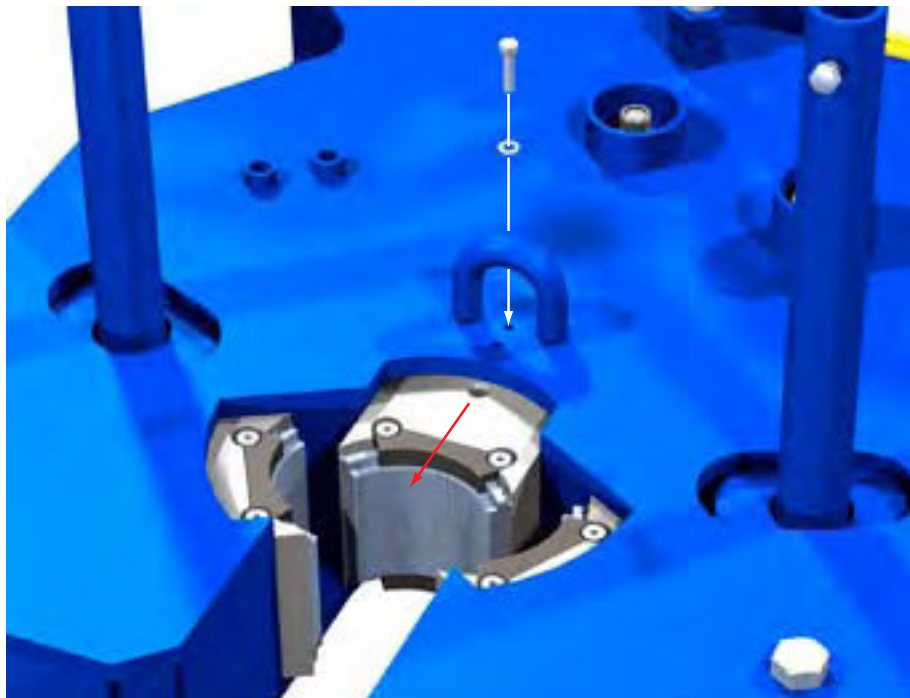
**3.C.2 CLINCHER® Backup Jaw Removal/Installation (Continued):**

2. Remove the cap screws securing the top die retainer. Loosen the fasteners securing the bottom die retainer.
3. Remove the top die retainer tab and slide the die straight up and out.



**ILLUSTRATION 3.C.2: BACKUP JAW DIE REMOVAL**

To remove the die from the rear jaw, ensure both cylinders are retracted. Remove the hex bolt securing the rear jaw assembly, then slide rear jaw forward enough so that the flat-head cap screws securing the die retainer tab is well exposed. Remove the die following the same procedures as for the CLINCHER® cylinders.

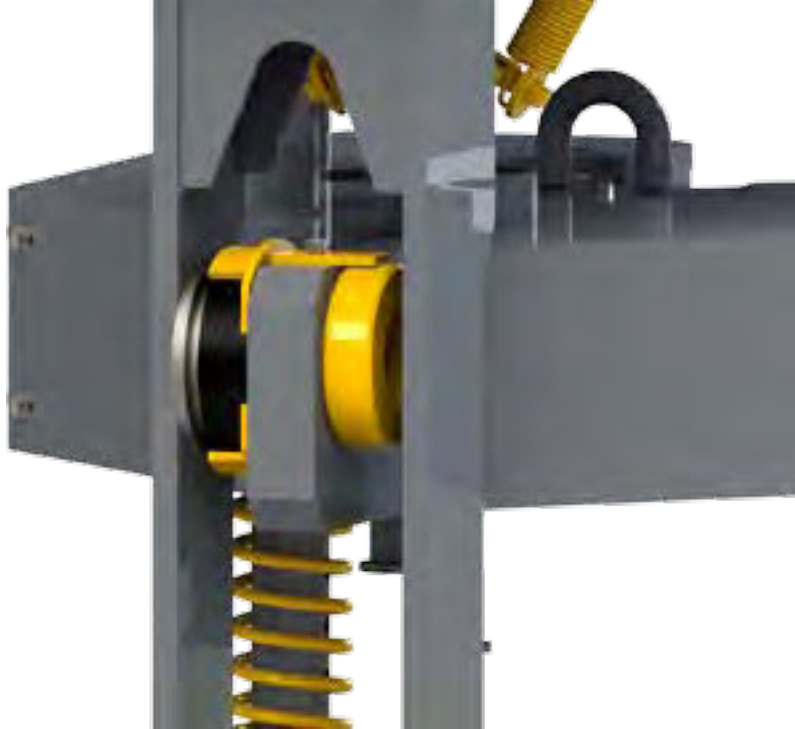


**ILLUSTRATION 3.C.3: BACKUP REAR JAW REMOVAL**

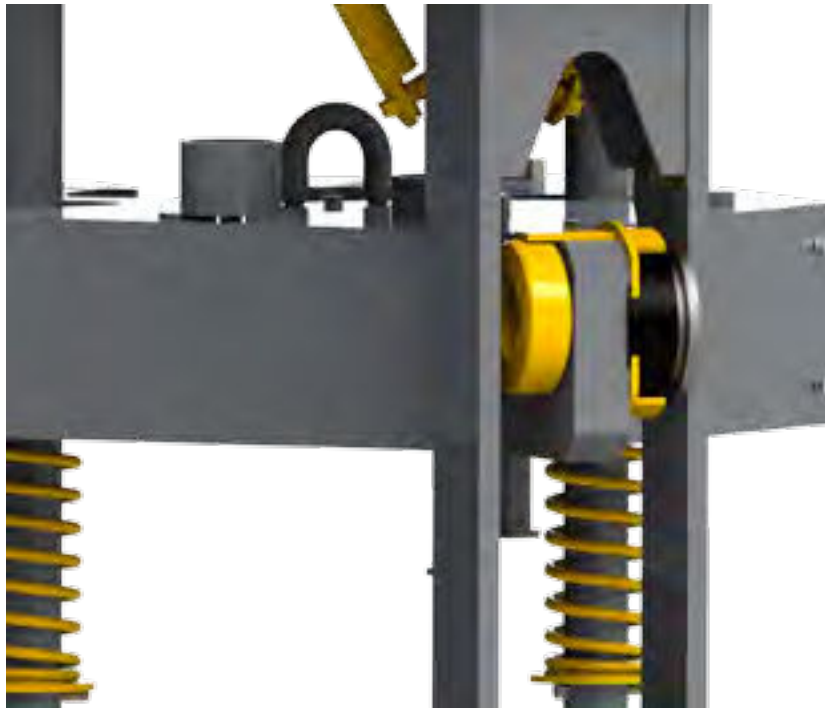
Reverse procedures to install new die. If the bottom die retainer tab on CLINCHER® cylinders or rear jaw require servicing, the assemblies must be completely removed.

**3.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. When installing compression load cell ensure the hydraulic line and hydraulic fitting are not in contact with any components of the paddle or load cell holder.



**ILLUSTRATION 3.D.1: COMPRESSION LOAD CELL CONFIGURATION - MAKE UP**



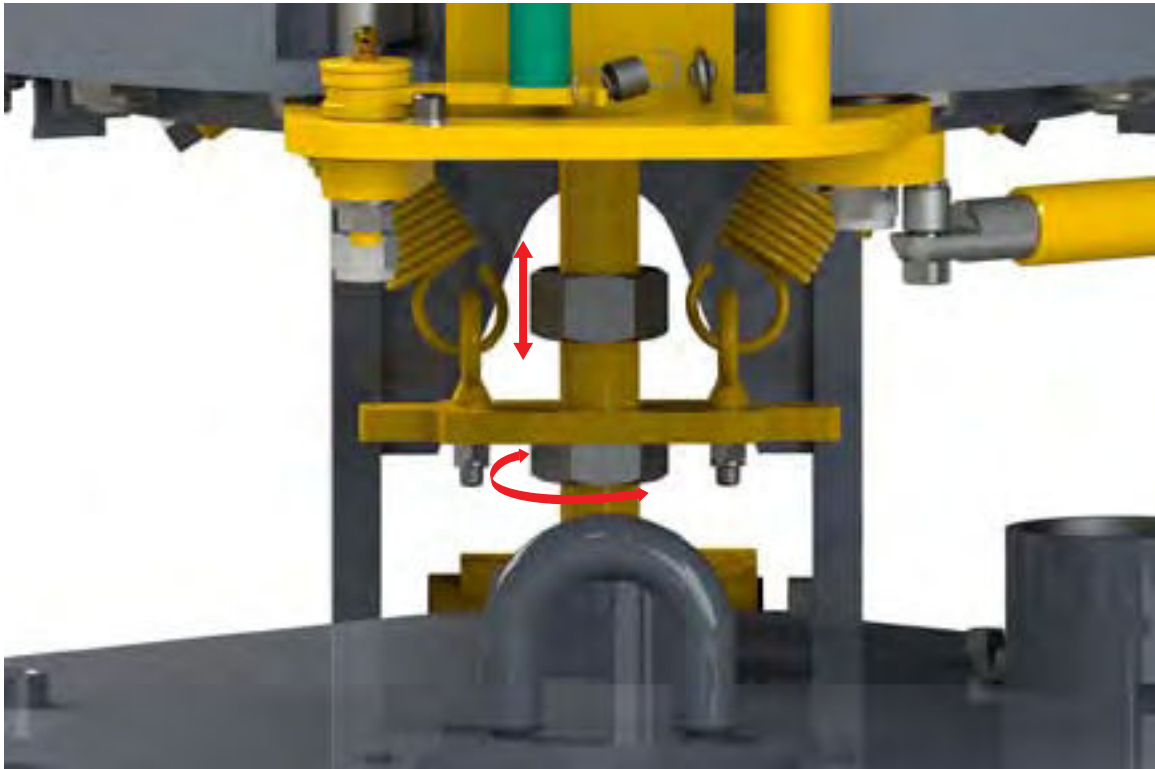
**ILLUSTRATION 3.D.2: COMPRESSION LOAD CELL CONFIGURATION - BREAK OUT**



**3.E ADJUSTING BACKUP HEIGHT**

Occasionally the height of the CLINCHER® backup requires adjustment. This is a simple procedure that is accomplished without special tools.

1. Determine the distance the backup requires raising or lowering.
2. Identify the holes (one per leg) in the front leg to which the support bolt must be moved to accommodate the distance determined in Step 1.
3. Construct a sturdy structure that will support the entire weight of the backup (weight = 734 lbs / 334 kg). The height of the structure must be high enough to remove all compression from the front leg springs, but not too high that the structure on top of the backup will impact the bottom of the tong.
4. Use a crane to hoist the tong and backup. Lower on to the support structure constructed in Step 3 until the legs of the tong are on the work surface and the backup is fully supported.
5. Support the front leg springs (weight = 5.5 lbs / 2.5 kg) and bottom spring support plate, then remove the bottom support bolt and nut set from each front leg.
6. Slide the bottom spring support washers and the leg springs so they are just above the hole identified in Step 2, and insert the support bolts through the new holes. Ensure the bolt is inserted beneath the spring support plate. Secure with the nylock nuts.
7. Adjust the rear height of the backup:
  - a. use a crane to hoist the tong and backup assembly straight up and off the support constructed in Step 3, and place on the work surface next to the support.
  - b. Loosen the heavy hex locking nut at the top of the suspension spring support rod and un-thread at least one inch from the suspension spring bracket.
  - c. To raise the rear of the backup rotate the 1-1/4" heavy hex directly below the suspension spring bracket counter-clockwise. Continue to rotate until the backup is level, then lock the bracket in place with the top heavy hex locking nut.
  - d. To lower the rear of the backup rotate the 1-1/4" heavy hex directly below the suspension spring bracket clockwise. Continue to rotate until the backup is level, then lock the bracket in place with the top heavy hex locking nut.



**ILLUSTRATION 3.E.1: ADJUSTING REAR BACKUP HEIGHT**



**BACKUP MUST BE LEVEL BEFORE RUNNING PIPE**

### 3.F ADJUSTING BACKUP CLAMPING PRESSURE

The clamping pressure of the backup requires occasional adjustment to compensate for wear of the backup jaw die inserts and for re-setting the backup pressure to factory specification when new die inserts are installed. Occasional lowering of the backup clamping pressure may be required for thin-walled pipe or tubing, or if you are using the backup in non-marking applications.

A wide variety of operating conditions prevents McCoy from recommending an ideal backup pressure for any one type of pipe or joint; rather, the ideal pressure is only identified through a combination of "trial and error" and the operating manager's best estimate based on their own experience.

Use this procedure to check and adjust the backup pressure:

1. The assembly must be connected to an active hydraulic fluid power source to perform this procedure.
2. Use the backup control valve to fully extend the backup clamp cylinders (see section 3.I for valve operating procedures). When the cylinders are fully extended **do not** release the valve handle - maintain hydraulic pressure on the cylinders.
3. Backup clamping pressure is displayed on the backup pressure indicator (see Pp. 6.6 - 6.7). Rotating the relief valve clockwise will increase the backup pressure, and rotating the relief valve counter-clockwise will decrease the backup pressure. Maximum backup pressure is the system pressure (as displayed on the system pressure indicator on the tong), or 2500 PSI (17.232 MPa), whichever is **lower**. Never exceed a clamping pressure of 2500 PSI (17.232 MPa).



**BACKUP CLAMPING PRESSURE MUST NEVER EXCEED 2500 PSI (17.237 MPA)**

4. When the desired pressure has been set release the pressure to the backup cylinders, and use the backup clamping valve to retract the cylinders.
5. Perform enough test connections to determine that the backup pressure is adequate for making up and breaking out joints within the current application. If pipe slippage or crushing is observed repeat the backup pressure adjustment procedure.

### 3.G BACKUP OPERATION

#### 3.G.1 Operator Training

Many companies set qualification standards that must be met before equipment may be operated without supervision. McCoy Drilling & Completions recommends operator training, which typically consists of operation of the equipment under the supervision of a trained equipment operator until a satisfactory level of competence is achieved. Typical operator training should include:

- Introduction to and general description of equipment
- Technical specifications and performance data
- Operating instructions
- Control systems and interlocks
- Operating hazards
- Checks and inspections
- Hoisting and lifting device training

#### 3.G.2 Operator Safety

McCoy recommends that a hazard assessment of the work area be performed by a designated safety representative before commencing operations. A designated safety representative is responsible for verifying that all operators have adequate equipment and safety training.

The safety door system is the primary device protecting the tong operator and nearby personnel from the rotary gear. Confirm the correct operation of the safety door before every job. Never disable the safety door device.

The area surrounding the tong operating area must be clutter-free and free from tripping hazards, or protruding objects that may snag hydraulic hoses on the tong, backup, lift cylinder, or torque measurement system. Operating surface or drill floor must be kept free of slipping hazards like grease, oil, water, etc.

Adequate lighting of the work area is required. All warnings, labels, gauges, and signs must be clearly visible

The components of the tong commonly manipulated or requiring control input are painted green, and are safe for continuous handling. Areas painted yellow are designated as hazardous areas, and contact with those areas must be avoided during operation. Always wear all personal protective equipment (PPE) specified by your company's HSE policy, and follow all of your company's safety guidelines.



**ALWAYS WEAR APPROVED PERSONAL PROTECTIVE EQUIPMENT (PPE) WHEN OPERATING HYDRAULICALLY-POWERED EQUIPMENT.**

**3.G.2 Operator Safety (Continued):**

Ensure hydraulic power is deactivated and tong hydraulics are de-pressurized before disconnecting the main hydraulic lines. McCoy recommends depressurizing the tong hydraulic system before connecting or disconnecting quick-connect fittings.



**DEPRESSURIZE EQUIPMENT BEFORE DISCONNECTING MAIN HYDRAULIC LINES.**

**3.G.3 Backup Valve Operation**

Pushing this valve forward will extend the **CLINCHER®** cylinders toward pipe center. Pulling backward, towards the operator, will retract the cylinders.



**ILLUSTRATION 2.G.1: HYDRAULIC CONTROL - BACKUP**



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## Section 4: Maintenance



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McCoy recognizes that minor on-site repairs and modifications are required to maintain peak operating condition of your equipment, or to match your equipment with the operating environment. Examples of minor repairs are

- replacement of damaged hydraulic hoses and fittings.
- replacement of malfunctioning pressure gauges and valves.
- replacement of fasteners

Any replaced component must be an identical component supplied by McCoy Drilling & Completions. Replaced fasteners must be Grade 8 or equivalent, or whatever fastener is specified by McCoy.

#### 4.A GENERAL MAINTENANCE SAFETY PRACTICES

The practices identified here are intended as a guideline. All personnel are responsible for performing their tasks in a manner that ensures worker, equipment, and environmental safety, and may require taking additional steps that are not identified in this section.

Equipment maintenance shall be performed only by designated qualified maintenance personnel. Wear all personal protective equipment (PPE) specified by your company's HSE policy, and follow all of your company's safety guidelines. Do not begin a maintenance task without the proper tools or materials on hand, or the proper drawings and documentation necessary.

Schedule planned maintenance with operators to avoid conflicts, unnecessary downtime, and the danger of accidental equipment activation. Notify operations when maintenance procedures are complete and equipment functionality is restored and tested.

If on-site maintenance must be performed (in other words, if equipment cannot be transported to a controlled maintenance facility) isolate the location of the maintenance to prevent unaware personnel from inadvertently exposing themselves to a hazard. Use tape, rope, or signage to clearly indicate "off-limits" area.

Replacement of large, heavy individual parts and/or heavy structural components must be performed using an approved lifting device of sufficient lifting capacity. Use care when attaching the lifting device, and safeguard area to avoid endangering personnel or equipment.

All spare parts, especially protective equipment, must meet or exceed OEM specifications in order to maintain equipment integrity.



**DO NOT PERFORM MAINTENANCE UNTIL TUBULAR CONNECTION EQUIPMENT HAS BEEN COMPLETELY ISOLATED FROM HYDRAULIC POWER**

Your equipment uses materials that may be harmful to the environment if improperly disposed of (hydraulic fluid, grease, etc.). Dispose of all materials according to your company's proscribed environmental protection regulations.

#### 4.B CLEANING

Clean backup thoroughly with a good petroleum-based cleaning agent after each job, prior to storage. Ensure that cleaning solvents and chemicals are captured to prevent environmental contamination, and dispose of all materials according to your company's proscribed environmental protection regulations.

#### 4.C PREVENTIVE MAINTENANCE PRACTICES

Regular maintenance programs are necessary, and must be established to assure safe, dependable operation of your Hydraulic Tubular Connection System and to avoid costly breakdown maintenance. The following maintenance procedures provides information required to properly maintain your equipment. Your equipment may require more or less maintenance depending upon the frequency of use and the field conditions under which your equipment operates. These maintenance procedures are designed for equipment operating at 10°C to 35°C ambient temperature for 10 hours per day. McCoy recommends that the inspection and maintenance procedures in this section be performed as recommended in the maintenance checklists or in conjunction with your maintenance foreman's experience and best estimate of when your equipment is due for this maintenance.

Manufacturers of purchased components included with your hydraulic tubular connection equipment (for example: motors, valves, etc.) may specify maintenance tasks and intervals over and above what McCoy recommends as part of their recommended procedures. Users of this equipment may choose to perform or ignore these additional tasks at their discretion.

Filtration of the hydraulic fluid must be 10 microns or better. Premature fouling of particulate filters within your prime mover or ancillary hydraulic power unit requires immediate hydraulic fluid laboratory analysis to prevent premature wear of hydraulic system due to high levels of wear metals in the fluid.

McCoy Drilling & Completions recommends tracking all maintenance activity including the lubrication schedule and replacement of hydraulic hoses. This may be as simple as keeping a paper log, or using a software-based maintenance tracking utility. A maintenance log is a valuable tool that can be used for easily retrieving maintenance history or identifying trends that require correction.

**4.D HYDRAULIC SYSTEM DE-PRESSURIZATION**

McCoy Drilling & Completions recommends that the hydraulic system be de-pressurized prior to maintenance on any hydraulic component. Perform the following steps to ensure the dangers posed by hydraulic fluid under pressure are minimized.



**ENSURE ADEQUATE CONTAINMENT IS IN PLACE TO PREVENT ENVIRONMENTAL CONTAMINATION FROM RESIDUAL HYDRAULIC FLUID**

1. Rotate the tong to the "open throat" position. Ensure tong and backup doors (if equipped) are closed. Fully extend the lift cylinder.
2. De-energize the power unit.
3. Repeatedly actuate the tong motor control valve lever IN BOTH DIRECTIONS to dissipate any residual pressure in the valve and motor.
4. Remove the hydraulic SUPPLY line from the equipment.
5. Repeatedly actuate the remaining control valve levers IN BOTH DIRECTIONS to dissipate any residual pressure in the remainder of the hydraulic control system.
7. Disconnect the hydraulic RETURN line from the equipment.
8. Disconnect remaining hoses such as case drains, or lines connected to the turns counter.



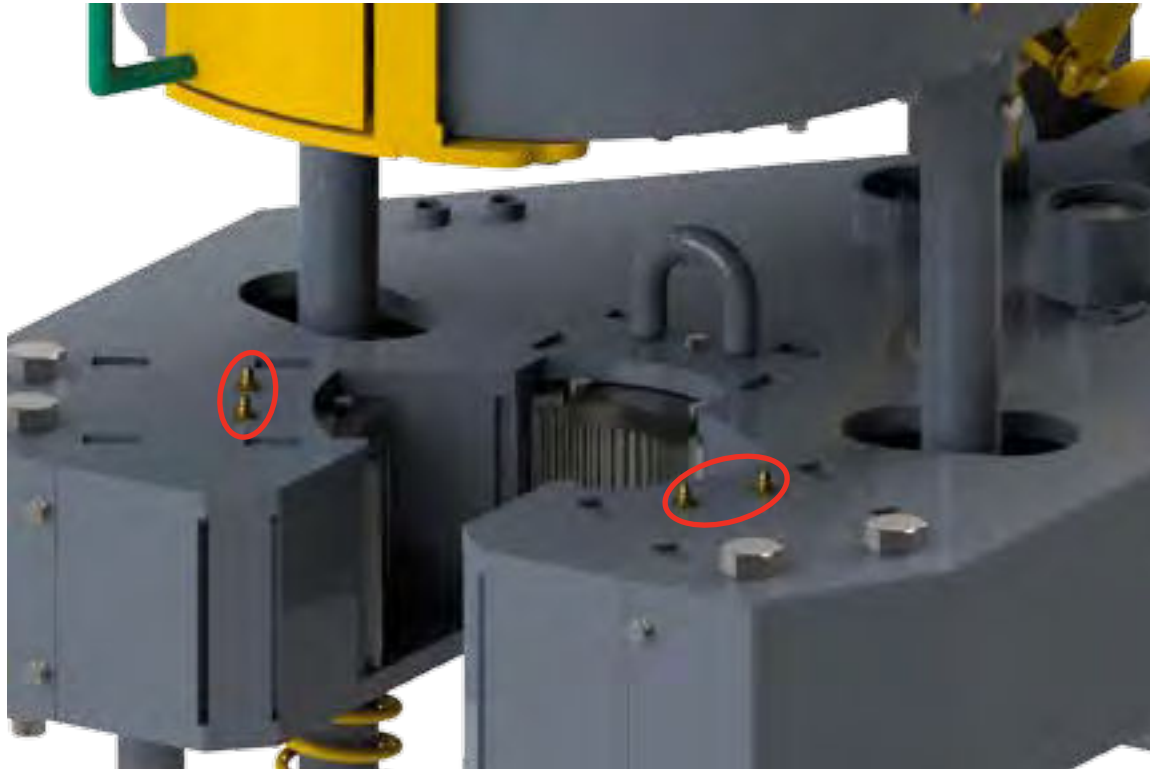
**HYDRAULIC PRESSURES AS HIGH AS OPERATING PRESSURE MAY REMAIN TRAPPED IN SMALL AREAS OF THE EQUIPMENT. ENSURE ALL MAINTENANCE IS CARRIED OUT BY A QUALIFIED SERVICE TECHNICIAN, AND THAT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT IS USED TO GUARD AGAINST PRESSURE INJURIES**

**4.E LUBRICATION INSTRUCTIONS**

Use a quality multipurpose bearing lubricant that will remain within its viscosity range at expected operating temperatures. In addition, Farr recommends the following lubrication procedures at the completion of each job prior to storage.

**4.E.1 CLINCHER® Cylinders**

Apply grease to the external surfaces of the clincher cylinders through the grease fittings in the top and bottom body plates (eight locations total).

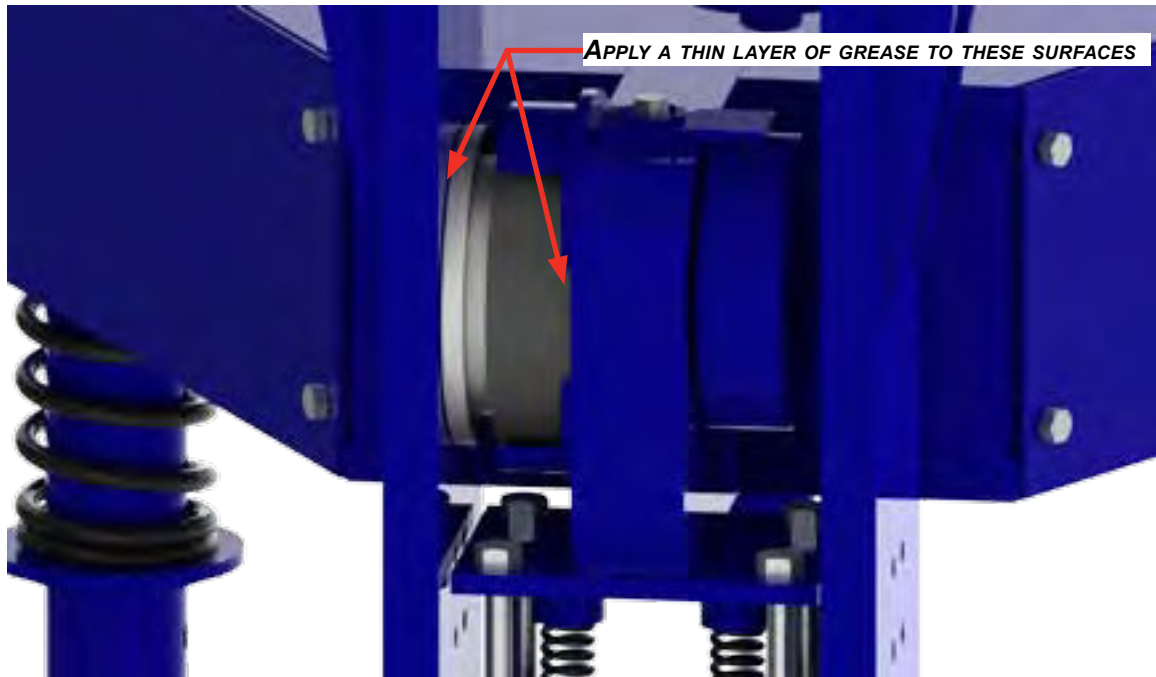


**ILLUSTRATION 4.E.1: BACKUP CLAMP CYLINDER LUBRICATION POINTS**



**4.E.2 Compression Load Cell**

Apply grease to the flat surfaces of the compression load cell where contact is made with the rear leg and the paddle of the backup.



**ILLUSTRATION 4.E.2: COMPRESSION LOAD CELL LUBRICATION**

**4.F DAILY INSPECTION & MAINTENANCE CHECKLIST (CLINCHER® BACKUPS)**

Farr Canada recommends that the following inspection and maintenance procedures be performed before each use, and at least once per day when the backup is in steady use, in the order in which they are listed.

Do not perform any maintenance while the backup assembly is connected to any hydraulic power supply. Farr Canada recommends that all hydraulic lines are fully disconnected, and residual hydraulic pressure is bled off. Ensure adequate containment is in place to prevent environmental contamination from residual hydraulic fluid.

1.  Perform an initial wash of the backup in order to remove the majority of dirt and grease build-up.
2.  Perform an external inspection. Check to ensure there are no loose or missing fasteners - replace if necessary.
3.  Check to see if backup is parallel to the tong - if the backup is resting at an angle, one of the front leg springs is likely broken or fatigued to the point it must be replaced.
4.  Use a flashlight to perform a visual inspection of the interior of the backup - remove one side panel if necessary. Premature wear where there are moving parts (bare metal where there used to be paint, and metal shavings in the grease are good indicators) may show where a component needs to be adjusted, or if necessary replaced. Replace any removed panels when inspection is complete.
5.  Grease clincher cylinder guides using the grease fittings on the top body plate.
6.  Ensure the splines on the clincher cylinder faces, and on the rear of the die are clean and free of debris before inserting clincher die. If die are already installed, ensure fasteners in the die retainers are tightly secured.
7.  Inspect rear spring hanger assembly. Ensure all eye bolts, shackles, and cotter pins are in place and in good condition.
8.  Inspect clincher cylinders for hydraulic fluid leaks once the system pressure has been restored.
9.  Perform a visual inspection of pressurized hydraulic lines - document and correct any hydraulic fluid leaks.
10.  Perform a full functional test of the backup. Document and correct hydraulic leaks from the hydraulic valve bank, or from any hydraulic cylinders that are in use on the backup.

**4.G BACKUP DE-COMMISSIONING & SHIPPING**

Perform the following decommissioning procedures in addition to the decommissioning steps identified in the power tong manual. These procedures are essential for ensuring proper protection of the equipment from environmental attack, and to aid in the quick turnaround when returning the equipment to service.

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.

Do not perform any further actions or maintenance while the equipment is connected to any hydraulic power supply. Farr recommends that all hydraulic lines are fully disconnected, and residual hydraulic pressure is bled off. Ensure adequate containment is in place to prevent environmental contamination from residual hydraulic fluid.



**IN ORDER TO MAINTAIN THE INTEGRITY OF INSTALLED SEALS, MCCOY RECOMMENDS THAT THE MAXIMUM STORAGE INTERVAL NOT EXCEED ONE YEAR. AT LEAST ONCE PER YEAR ALL TUBULAR CONNECTION EQUIPMENT IN LONG-TERM STORAGE SHOULD BE RECOMMISSIONED AS PER SECTION 3.M. IF FURTHER STORAGE IS REQUIRED, THE EQUIPMENT SHOULD THEN BE PUT THROUGH ANOTHER DE-COMMISSIONING PROCEDURE.**

**Depressurization Procedure In Preparation For Storage:**

1. Rotate the tong so that the opening in the rotary gear faces the gear train (towards the rear of the tong). Ensure tong and backup doors (if equipped) are closed. Fully extend the lift cylinder (if equipped). If mounted in a frame, retract the float cylinders (if equipped).
2. De-energize the power unit.
3. Repeatedly actuate the tong motor control valve lever IN BOTH DIRECTIONS to dissipate any residual pressure in the valve and motor.
4. Remove the hydraulic SUPPLY line from the equipment.
5. Repeatedly actuate the remaining control valve levers IN BOTH DIRECTIONS to dissipate any residual pressure in the remainder of the hydraulic control system.
6. Disconnect the hydraulic RETURN line from the equipment.
7. Disconnect remaining hoses such as case drains, or lines connected to the turns counter.



**HYDRAULIC PRESSURES AS HIGH AS OPERATING PRESSURE MAY REMAIN TRAPPED IN SMALL AREAS OF THE EQUIPMENT. ENSURE ALL MAINTENANCE IS CARRIED OUT BY A QUALIFIED SERVICE TECHNICIAN, AND THAT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT IS USED TO GUARD AGAINST PRESSURE-INDUCED INJURIES**

1.  Perform an initial wash of the backup in order to remove the majority of dirt and grease build-up. Ensure adequate containment is in place to prevent environmental contamination from residual hydraulic fluid and dirty grease.
2.  Clean the exterior of the backup thoroughly, using either water (do not use a pressure washer), or an appropriate solvent-based grease-cutting cleaner such as Varsol. Ensure adequate containment is in place to prevent environmental contamination from residual hydraulic fluid, dirty grease, and cleaning agents.
3.  Inspect all fasteners and fastener safety wires. Replace any missing fasteners - use Grade 8 bolts only. Re-torque all external fasteners to SAE specifications.
4.  Repair or replace any damaged or missing external body parts, such as torque gauge mounts, hydraulic supports, safety door protectors, etc.
5.  Inspect all paint - locations in which the paint has been damaged must be repaired prior to storage. Prepare areas to be painted to ensure they are free of grease, dirt, or solvent. Touch up using a solvent-based acrylic paint - "McCoy Grey" is paint number RAL7015. Allow sufficient time for paint to dry before proceeding.
6.  Perform a liberal lubrication of the backup - refer to Maintenance section of manual to determine lubrication points.
7.  Connect the equipment to a hydraulic power unit. Ensure all lines are fully made up to prevent equipment damage from excessive back pressure. Do not neglect to connect the motor drain.
8.  Extend all hydraulic cylinders, and inspect cylinder rods for signs of mechanical damage, flaking, or rust. Farr recommends that damaged cylinders be replaced prior to storage.

**Depressurization Procedure For Storage:**

1. Rotate the tong to the "open throat" position.
  2. Exercise each hydraulic cylinder several times - open the tong and backup doors (if equipped), retract and extend the remote backing pin ramp (if equipped), retract and extend the float cylinders. Leave all cylinders except for the door cylinders in their fully retracted position. The general idea is to have as little of the chrome cylinder rods exposed as possible.
  3. De-energize the power unit.
  4. Repeatedly actuate the tong motor control valve lever IN BOTH DIRECTIONS to dissipate any residual pressure in the valve and motor.
  5. Remove the hydraulic SUPPLY line from the equipment.
  6. Repeatedly actuate the remaining control valve levers IN BOTH DIRECTIONS to dissipate any residual pressure in the remainder of the hydraulic control system.
  7. Connect a low-pressure air supply line (10 PSI or less) to the hydraulic supply line, and force a small amount of the remaining hydraulic fluid from the valve assembly - this will allow for thermal expansion of the hydraulic fluid if the equipment is stored or transported in high ambient temperatures. Failure to do this may result in damaged or destroyed seals in the equipment.
  8. Disconnect the hydraulic RETURN line from the equipment.
  9. Disconnect remaining hoses such as case drains, or lines connected to the turns counter.
9.  Leaking hydraulic hoses or fittings must be repaired or replaced before proceeding.
10.  Wipe all excess grease from outside of equipment. Use a solvent-based cleaner on rags to wipe all external surfaces to remove residual grease or hydraulic fluid. Once the outside surfaces have been de-greased, wipe all external surfaces with clean water to remove residual solvent.
11.  Apply grease or heavy oil to all exposed cylinder rods.
12.  Farr recommends that an anti-corrosive agent such as Tectyl® 506 be applied to all external surfaces EXCEPT cylinder rods (including chain slings). Refer to manufacturer data sheets for proper application and safety information.



**DO NOT ALLOW ANTI-CORROSIVE AGENTS TO CONTACT CYLINDER RODS. CYLINDER ROD DAMAGE WILL OCCUR.**

13.  Allow the anti-corrosive coating ample time to dry - refer to manufacturer data sheets for drying times at room temperature.
14.  Wrap entire assembly in 100 gauge (1 mil) corrosion-inhibiting wrap, at least 3 layers thick. Attempt to ensure that the tool is well-sealed within the wrapping, including the bottom.

If possible, store in a sealed, climate controlled environment. If isolated storage is not available, Farr recommends storing your wrapped equipment in a secure, out-of-the-way location, using silica gel desiccant to reduce the humidity within the wrapping. As a guideline, use 125 g. of desiccant for each cubic metre of space, or 3.5 g. per cubic foot.

**Calculation Of Required Desiccant**

1. Calculate the trapped air volume by measuring the outside dimensions of the tool to be stored, and treat that as the volume to be stored. For example, the external dimensions of a KT20000 20" power tong are 80.25" x 50.5" x 28", which calculates to an approximate volume of 113500 in<sup>3</sup>, or 66 ft<sup>3</sup> (1.87 m<sup>3</sup>).
2. Multiply the calculated air volume, in cubic feet, by the recommended amount of desiccant per cubic foot. Carrying forth the example used in the previous step, the required desiccant charge would be 3.5 g. x 66 ft<sup>3</sup>, equaling 231 g. Several manufacturers offer silica gel desiccant in packaged quantities of 125 grams per bag, so two packages of desiccant would be required. Please keep in mind that this is a guideline only - more or less desiccant may be required in extreme environmental conditions.

For best corrosion resistance the equipment should be removed from storage and exercised on a regular basis, depending on the storage environment. Farr recommends that for equipment stored in a salt-water maritime or exposed dusty environment, repeat steps 5 through 14 monthly. For equipment stored in isolated storage in a non-maritime environment, repeat steps 5 through 14 quarterly. Replace desiccant packs at this time - depleted desiccant packs may be treated as regular dunnage.

**Shipping Instructions**

The following procedure lists the steps to be followed to prepare your backup for shipping.

1. Do not allow the backup (if equipped) to "float" on its support springs during shipping. Build a sturdy wooden support structure under the front and back of the backup to support the weight of the backup and release the compression on the springs. Strap the backup to the support blocks and pallet independent of the tong, using minimum 3/4" x 0.029" metal strapping in at least two locations. Place strapping as close to the backup supports as possible, and use caution not to entrap any flexible hydraulic hoses beneath the strapping. Before tightening strapping, place strapping protectors wherever the metal strapping comes into contact with the equipment.



**ILLUSTRATION 4.G.1: SHIPPING INSTRUCTIONS - BACKUP SUPPORT**

2. Securely strap the equipment in place using metal strapping. Place strapping as close to the cross-members under the equipment legs as possible, and use caution not to entrap any flexible hydraulic hoses beneath the strapping (guide strapping through beneath the hydraulic hoses). Use the following guidelines to determine the strapping requirements:

Assemblies weighing 1000 lbs. (454 kg.) or less:

3/4" x 0.029" metal strapping, 3320 lbs. (1509 kg.) tensile strength  
Minimum two straps

Assemblies weighing more than 1000 lbs. (454 kg.):

1-1/4" x 0.031" metal strapping, 5500 lbs. (2500 kg.) tensile strength  
Minimum two straps for assemblies weighing less than 5000 lbs. (2273 kg.)  
Minimum three straps for assemblies weighing more than 5000 lbs. (2273 kg.)

Before tightening strapping, place strapping protectors wherever the metal strapping comes into contact with the equipment.

Place the wooden crate containing the tong accessories on the crate next to the equipment. Strap the crate to the pallet using 3/4" x 0.029" metal strapping (see Illustration 4.G.2 next page).

**Shipping Instructions (Continued):**

**ILLUSTRATION 4.G.2: SHIPPING INSTRUCTIONS - STRAPPING EQUIPMENT TO PALLET**

If it is not practical to place larger loose items in a wooden crate, ensure they are also securely strapped to the pallet using 3/4" x 0.029" metal strapping.

3. Use a large polyethylene shipping bag (sometimes called a pallet cover) to completely enclose the equipment. Seal polyethylene bag to the pallet using 1 mil polyethylene wrap. Use the wrap to conform the plastic cover to the general shape of the equipment, but do not wrap so tight that sharp edges on the equipment perforate the cover.
4. McCoy recommends enclosing the equipment in a sturdy shipping crate which is securely fastened to the pallet.

**4.H BACKUP RE-COMMISSIONING PROCEDURE**

Perform the following recommissioning procedures in addition to the steps outlined in the power tong manual when removing your backup from short or long-term storage back into regular service. These procedures are essential for ensuring proper equipment preparation and operation. The following procedures also assume that the decommissioning and storage procedures recommended by Farr have been strictly observed.

1.  Remove all protective plastic wrapping. If there are desiccant packs with the assembly, they may be disposed of with the regular garbage.
2.  Wipe excess grease or heavy oil from exposed cylinder rods.
3.  Perform a liberal lubrication of the equipment - refer to Maintenance section of manual to determine lubrication points. Generously fill the gear train housing with grease through the access panel, and also through the opening in the rotary gear.
4.  Connect the equipment to a hydraulic power unit. Ensure all lines are fully made up to prevent equipment damage from excessive back pressure. Do not neglect to connect the motor drain.



**FAILURE TO ENSURE THAT THE SELF-SEALING SUPPLY AND RETURN LINES ARE FULLY MADE UP MAY RESULT IN CATASTROPHIC EQUIPMENT FAILURE.**

5.  Energize power unit.
6.  Ensure that supply pressure is at or above the tong's specified operating pressure, and that the return pressure is less than 350 psi.
7.  Perform a thorough inspection of pressurized hydraulic lines and fittings. Any leaking hydraulic fluid lines or fittings must be replaced before the equipment is returned to service. Inspect all flexible hydraulic lines for signs of wear, blistering, or any other signs of potential failure - replace if signs of potential failure are identified
8.  Perform a thorough inspection of all seals. Any seal that is leaking or "weeping" must be replaced before the equipment is returned to service.
9.  Install load cell. If using a tension load cell, perform a visual inspection and replace any cracked, broken, or distorted components including links and chains. If using a compression load cell, replace any component that has been crushed or otherwise distorted through compression.
10.  Perform a full functional test of the backup components. Report and correct any hydraulic leaks from the hydraulic valve bank, or from any hydraulic cylinders that are used.
11.  When all of the previous steps are completed, you may return your re-commissioned equipment to service.





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## Section 5: Troubleshooting



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Your CLINCHER® backup has been designed to deliver years of dependable performance. However, occasionally a fault will hinder production. Most problems with the CLINCHER® backup arise from failure to adequately grip a tubular. This section describes potential failure scenarios and the steps to be taken to restore your backup to active service.



### DEPRESSURIZE EQUIPMENT BEFORE DISCONNECTING MAIN HYDRAULIC LINES.

#### 5.A MAIN SYMPTOM: CLINCHER® CYLINDERS DO NOT EXTEND TO GRIP TUBULAR

|   | POSSIBLE PROBLEM   | SOLUTION(S)   |
|---|--|---|
| 1 | No hydraulic pressure to cylinders (no reading on pressure gauge)              | Inspect self-sealing quick-connect couplings to ensure they are properly engaged  |
|   |  | Check main tong pressure gauge. Tong supplies backup pressure - no tong pressure, no backup pressure. Ensure tong is connected to a hydraulic power source and that the power unit has not been deactivated or placed in standby. |
|   |  | Backup control valve failure - rebuild or replace   |
|   |  | Blockage in hydraulic line between control valve and backup. Check lines to ensure they are free of obstructions.   |
| 2 | No hydraulic pressure to cylinders (very low reading on backup pressure gauge) | Backup clamping pressure has been set very low by a previous user. Adjust backup pressure following the procedure in section 3.F.   |
|   |  | Relief valve has failed. Rebuild or replace.  |
| 3 | CLINCHER® cylinder has failed  | Rebuild or replace cylinder   |

#### 5.B MAIN SYMPTOM: CLINCHER® CYLINDERS EXTEND BUT BACKUP DOES NOT GRIP TUBULAR

|   | POSSIBLE PROBLEM   | SOLUTION(S)  |
|---|--|--|
| 1 | Inadequate cylinder pressure   | Backup clamping pressure has been set very low by a previous user. Adjust backup pressure following the procedure in section 3.F.          |
| 2 | Backup is not level  | Level backup using the procedure in section 3.E  |
| 3 | Wrong dies are being used  | Check the part number stamped on the die against the list of jaws in section 3.C to ensure dies are proper size for the tubular being run. |
| 4 | Backup dies are worn or contaminated                                 | Clean dies using a stiff wire brush. If jaws still do not adequately grip then they must be replaced.                                      |
| 5 | Check valve (Item 15 on hydraulic schematic) is not holding pressure | Remove check valve for bench testing. Replace if necessary   |
| 6 | CLINCHER® cylinder is leaking internally                             | Rebuild or replace cylinder  |

#### 5.C MAIN SYMPTOM: CLINCHER® CYLINDERS EXTEND WHEN CONTROL VALVE IS IN NEUTRAL POSITION

|   | POSSIBLE PROBLEM                       | SOLUTION(S)   |
|---|--|---|
| 1 | Wrong valve section has been installed | Refer to hydraulic schematic and B.O.M. to determine the correct part number for the backup valve section, and compare to the valve section that has been installed. Replace if the wrong valve section has been installed. |
| 2 | Seals in valve section have failed     | Rebuild or replace valve section  |

#### 5.D MAIN SYMPTOM: CLINCHER® CYLINDERS WILL NOT RETRACT

|   | POSSIBLE PROBLEM   | SOLUTION(S)   |
|---|--|---|
| 1 | Check valve not getting pilot pressure (blockage in pilot line). | Remove and clean pilot line                             |
| 2 | Obstruction in a hydraulic line quick-connect                    | Remove hydraulic lines and clean quick-connect fittings |

**5.E GENERAL COMMENTS**

The following factors generally contribute to poor hydraulic operation and premature wear of equipment:

1. Contaminated hydraulic fluid due to overuse, overheating, or inadequate fluid filtration.
2. Unsuitable hydraulic fluid, especially in extreme climatic conditions.
3. Defective packing or seals in components of the hydraulic system.
4. Poor or incomplete hydraulic system training. Users must be fully qualified to operate the equipment, and have complete understanding of the hydraulic system.



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## Section 6: Parts & Assemblies



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The following table lists parts that McCoy Drilling & Completions | FARR has identified as critical spare parts for your backup. McCoy recommends that the specified quantity of each part be on hand at all times.

| <b>MISC BACKUP PARTS</b>                                    |                    |                      |
|---|--------------------|----------------------|
| <b>Description</b>  | <b>Part Number</b> | <b>Qty. Required</b> |
| V-Bracket Suspension Spring Hanger                          | 1483-500-00-04     | 1                    |
| Rear Jaw  | 1403-08            | 1                    |
| <b>FASTENERS &amp; FITTINGS</b>                             |                    |                      |
| <b>Description</b>  | <b>Part Number</b> | <b>Qty. Required</b> |
| Hex Bolt 1/2" UNC X 3-1/2" (Front Leg Mount Weldments)      | 09-1177            | 2                    |
| Hex Bolt 1/2" UNC X 3" (Front Leg Bottom Spring Retainers)  | 09-1178            | 2                    |
| 3/8" UNC Eye Bolt   | 02-0262            | 2                    |
| 3/8" UNC Hex Nylock Nut                                     | 09-5607            | 2                    |
| 1/2" UNC Nylock Nut   | 09-5707            | 4                    |
| 3/16" x 2" Cotter Pin (Suspension Spring Retainer Fastener) | 02-9127            | 2                    |
| <b>HYDRAULIC COMPONENTS</b>                                 |                    |                      |
| <b>Description</b>  | <b>Part Number</b> | <b>Qty. Required</b> |
| Relief Valve (Backup)                                       | 08-1180            | 1                    |
| Check Valve (Backup)  | 08-0481            | 1                    |
| CLINCHER® Cylinder  | 1401-00-00B        | 1                    |
| Clincher Cylinder Seal Kit                                  | 1401-00-00-SK      | 1                    |
| Hydraulic Hose Assembly - Backup 55" "A" Side               | 02-1011            | 1                    |
| Hydraulic Hose Assembly - Backup 52" "B" Side               | 02-1012            | 1                    |
| High-Visibility Protective Wrap, Backup Hydraulic Hose      | 02-E0204           | 1                    |
| <b>JAW COMPONENTS</b>                                       |                    |                      |
| <b>Description</b>  | <b>Part Number</b> | <b>Qty. Required</b> |
| Wrap-around Jaw Retainer (Top)                              | 101-2982           | 3                    |
| Wrap-around Jaw Retainer (Bottom)                           | 101-2291           | 3                    |

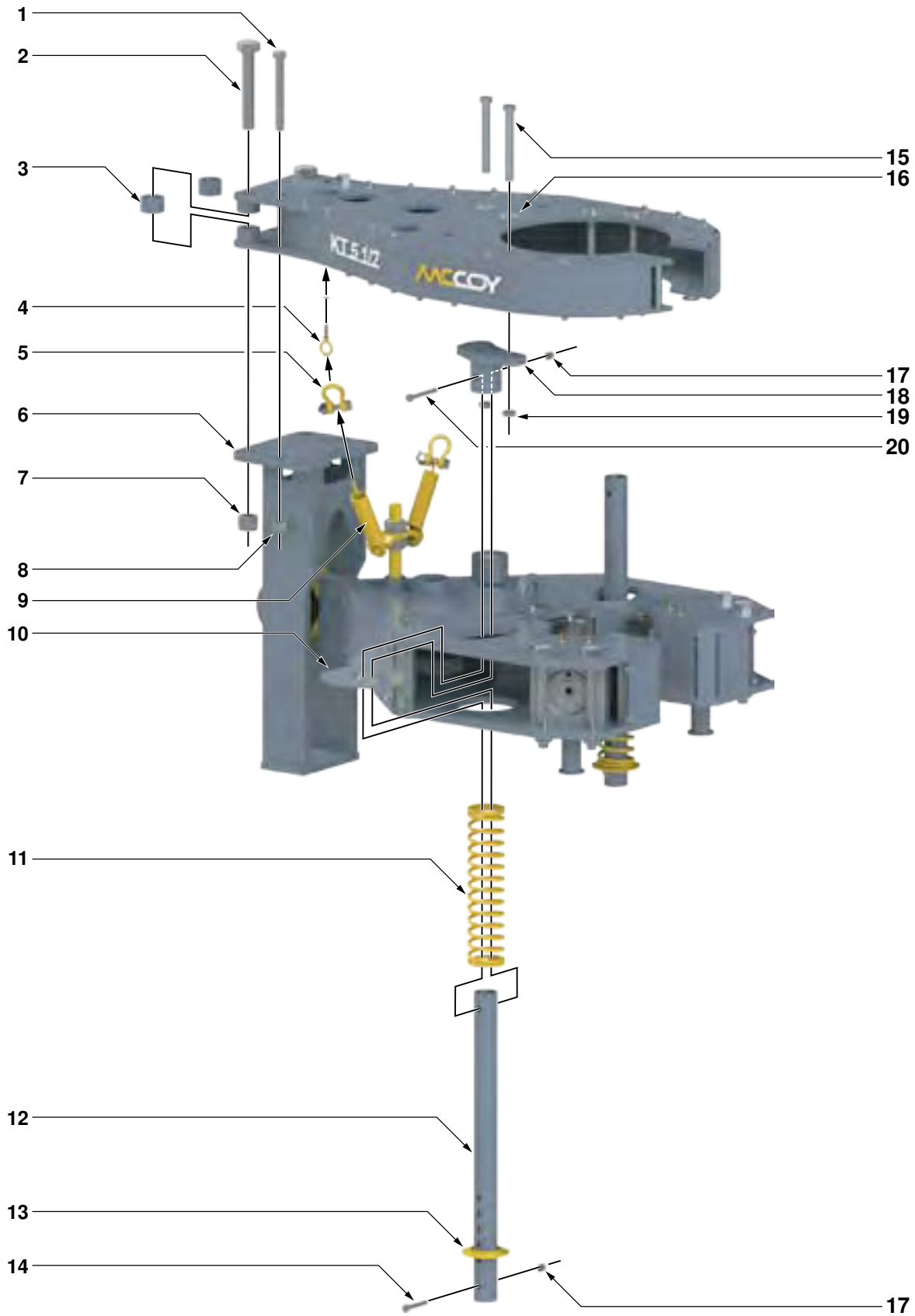
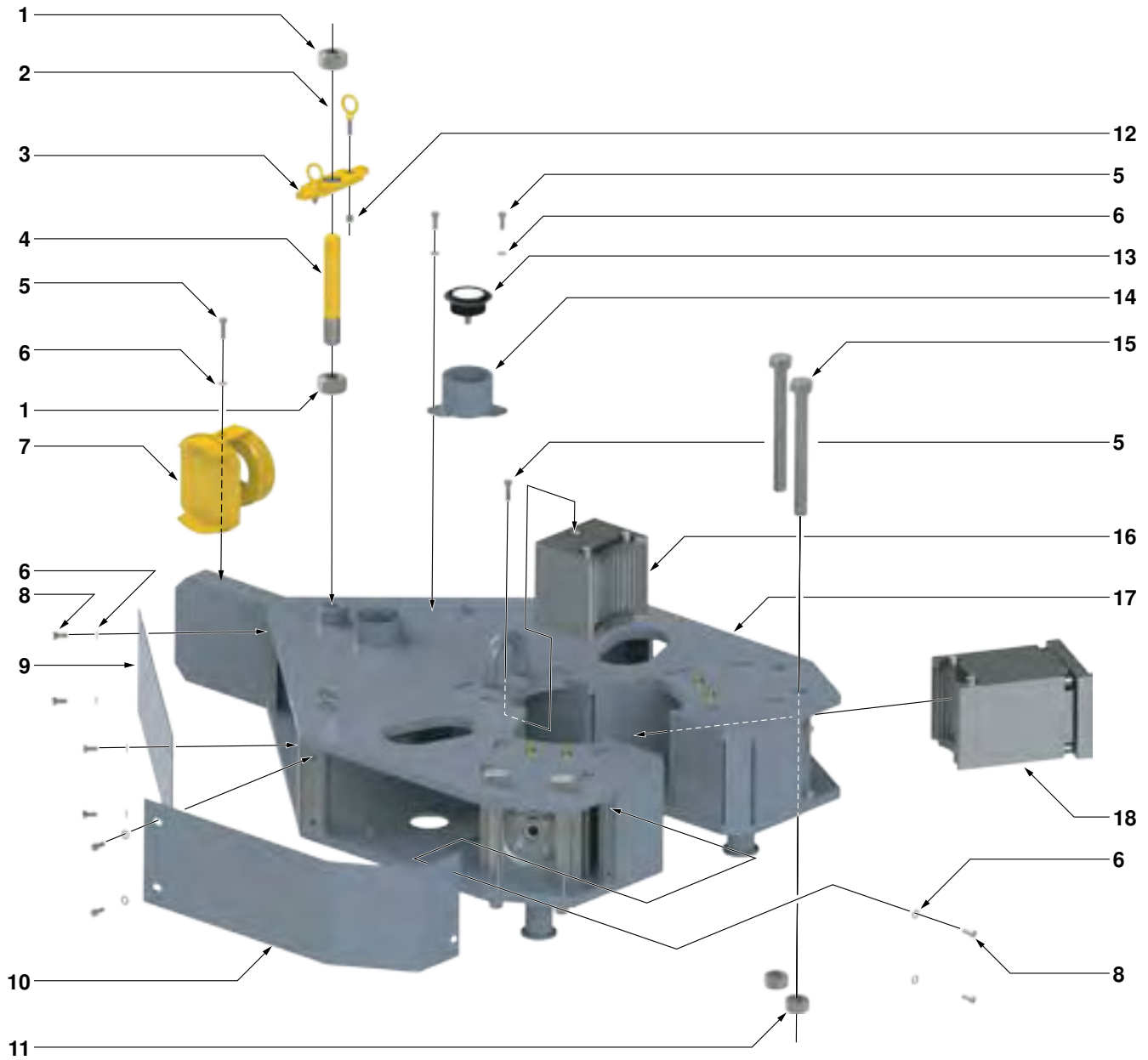


ILLUSTRATION 6.1: LEG ASSEMBLIES EXPLODED



**ILLUSTRATION 6.2: FRONT LEG WELDMENT INSTALLATION**

| Item | Type     | Description  | Qty | Part Number  |
|------|----------|--|-----|--------------|
| 1    | Part     | 7/8" UNC x 7" heavy hex bolt                                     | 2   | 09-7777      |
| 2    | Part     | 1-1/4" UNC x 7-1/2" heavy hex bolt                               | 2   | 09-9164      |
| 3    | Part     | Spacer   | 2   | 101-1546     |
| 4    | Part     | 3/8" UNC shoulder pattern 2-A eye bolt                           | 2   | 02-0262      |
| 5    | Assembly | Shackle assembly   | 2   | 02-9063      |
| 6    | Weldment | Rear leg weldment  | 2   | 101-1547     |
| 7    | Part     | 1-1/4" UNC hex nylock nut  | 2   | 09-1484      |
| 8    | Part     | 7/8" UNC hex nylock nut  | 2   | 09-9177      |
| 9    | Part     | Rear backup suspension spring                                    | 2   | 1302-905-06  |
| 10   | Part     | Top leg spring cap   | 2   | 101-4489     |
| 11   | Part     | Front leg spring   | 2   | 1302-905-08  |
| 12   | Part     | Front leg tube   | 2   | 1364-909     |
| 13   | Part     | Bottom leg spring cap  | 2   | 1302-905-03A |
| 14   | Part     | 1/2" UNC x 3" hex bolt   | 2   | 09-1178      |
| 15   | Part     | Support roller shaft (support roller assembly component)         | 4   | 101-3944     |
| 16   | Part     | 7/8" narrow flat washer (support roller assembly component)      | 4   | 09-5123      |
| 17   | Part     | 1/2" UNC hex nylock nut  | 4   | 09-5610      |
| 18   | Weldment | RH front leg mount weldment                                      | 1   | 101-2153     |
| 19   | Part     | 7/8" UNF hex thin nylock nut (support roller assembly component) | 4   | 09-5722      |
| 20   | Part     | 1/2" UNC x 4" hex bolt   | 2   | 09-1182      |
| 21   | Weldment | LH front leg mount weldment                                      | 1   | 101-2152     |
| 22   | Part     | 3/8" UNC x 2-1/4" hex bolt                                       | 4   | 09-1055      |
| 23   | Part     | 3/8" lock washer   | 4   | 09-5106      |



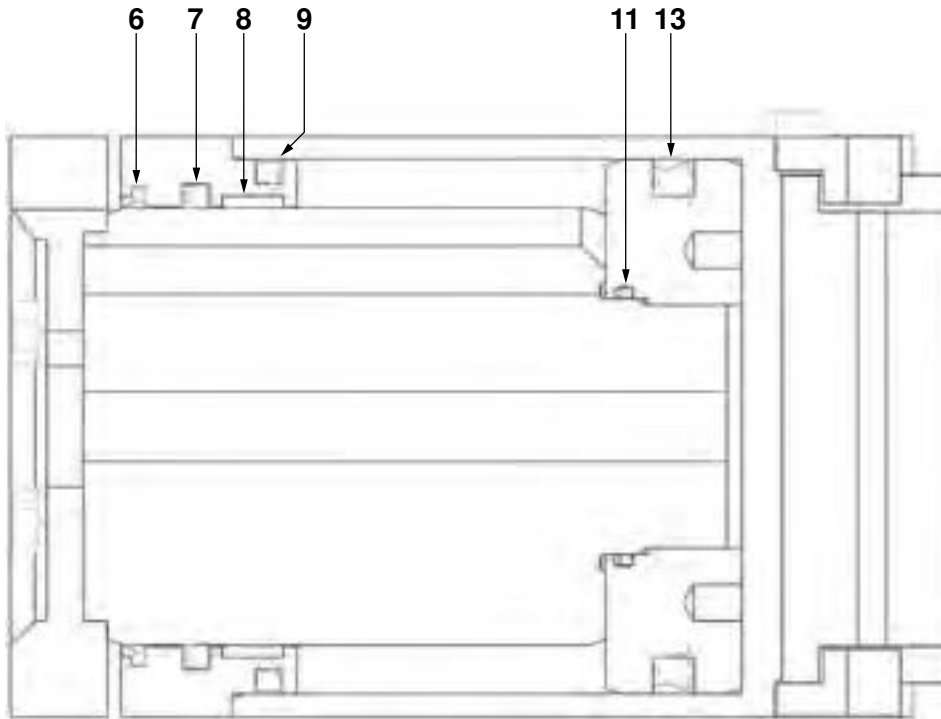
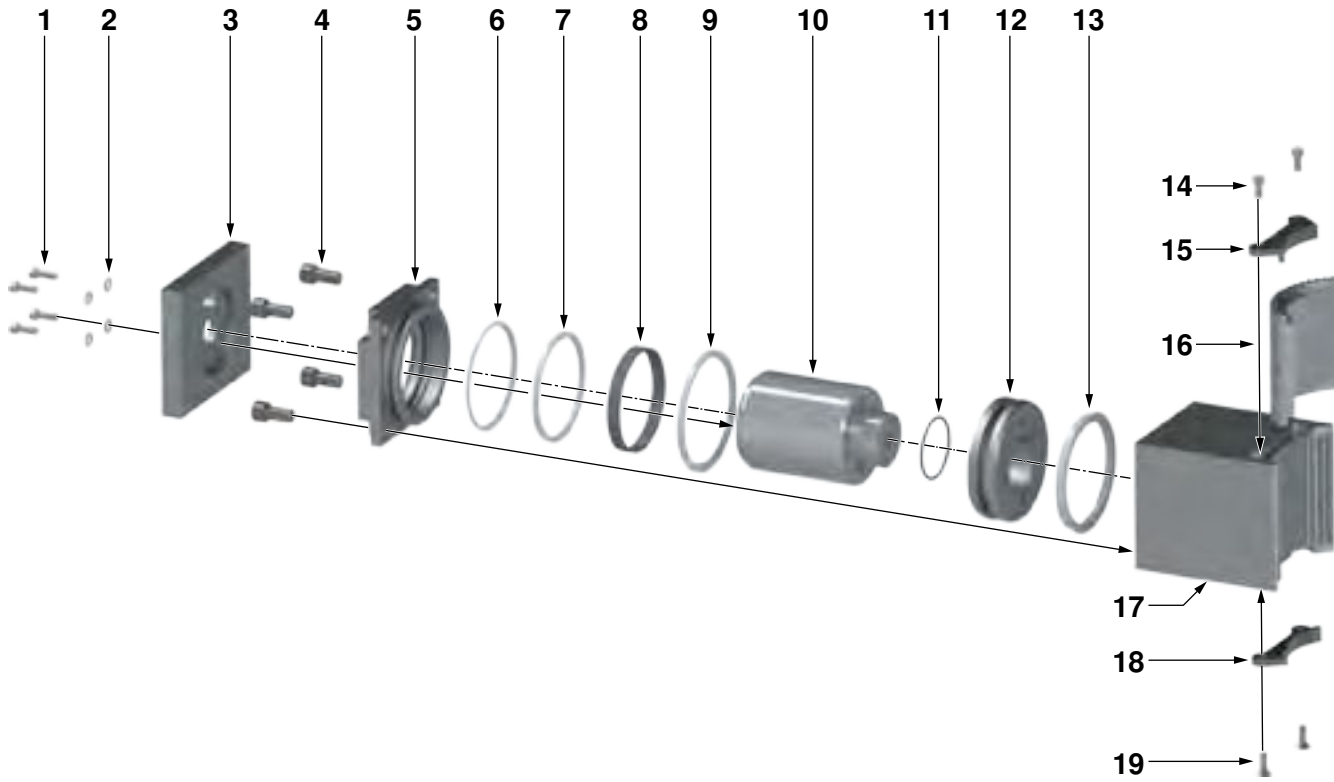
**ILLUSTRATION 6.3: 6-1/4" BACKUP EXPLODED**





**ILLUSTRATION 6.4: 6-1/4" BACKUP**

| Item | Type     | Description                       | Qty | Part Number    |
|------|----------|-----------------------------------|-----|----------------|
| 1    | Part     | 1-1/4" UNC Heavy Hex Nut          | 2   | 09-5832        |
| 2    | Part     | 3/8" UNC Eye Bolt                 | 2   | 02-0262        |
| 3    | Part     | Suspension Spring Bracket         | 1   | 1483-500-00-04 |
| 4    | Part     | 1-1/4" UNC x 8" Threaded Rod      | 1   | 101-1993       |
| 5    | Part     | 3/8" UNC x 1-1/4" Hex Bolt        | 4   | 09-1048        |
| 6    | Part     | 3/8" Lock Washer                  | 20  | 09-5106        |
| 7    | Weldment | Load Cell Holder Weldment         | 1   | 01-9116B       |
| 8    | Part     | 3/8" UNC x 3/4" Hex Bolt          | 16  | 09-1044        |
| 9    | Part     | Side Panel 1                      | 2   | 1421-500-11B   |
| 10   | Part     | Side Panel 2                      | 2   | 1483-500-00-01 |
| 11   | Part     | 1" UNC Nylock Nut                 | 4   | 09-5725        |
| 12   | Part     | 3/8" UNC Hex Nylock Nut           | 2   | 09-5607        |
| 13   | Part     | 0-3000 PSI 1/4" NPT Gauge         | 1   | 02-0245        |
| 14   | Weldment | Gauge Protector Weldment          | 1   | 1483-500-18    |
| 15   | Part     | 1" UNC x 8-1/2" Hex Bolt          | 4   | 09-0287        |
| 16   | Part     | Rear Jaw                          | 1   | 1401-08        |
| 17   | Weldment | Backup Body Weldment              | 1   | 101-5273       |
| 18   | Assembly | CLINCHER® Cylinder Assembly       | 2   | 1401-00-00B    |
| 19   | Part     | Relief Valve                      | 1   | 08-1180        |
| 20   | Part     | Relief Valve Manifold (Not Shown) | 1   | 08-1839        |
| 21   | Part     | Check Valve (Not Shown)           | 1   | 08-0481        |
| 22   | Part     | Check Valve Body (Not Shown)      | 1   | 08-1327        |



**ILLUSTRATION 6.5: 6-1/4" CLINCHER CYLINDER EXPLODED**



**ILLUSTRATION 6.6: 6-1/4" CLINCHER CYLINDER**

| Item | Type       | Description                                  | Qty | Part Number          |
|------|------------|--|-----|----------------------|
| 1    | Part       | 3/8" UNC x 1" Hex Bolt                       | 4   | 09-1170              |
| 2    | Part       | 3/8" Carbon Steel Lock Washer                | 4   | 09-5106              |
| 3    | Part       | Backing Plate                                | 1   | 1401-03B             |
| 4    | Part       | 5/8" UNC x 1-1/4" Hex Socket Head Cap Screw  | 4   | 09-0240              |
| 5    | Part       | Cylinder Gland                               | 1   | 1401-06B             |
| 10   | Part       | Cylinder Rod                                 | 1   | 1401-04B             |
| 12   | Part       | Cylinder Piston                              | 1   | 1401-05B             |
| 14   | Part       | 3/8" UNC x 3/4" Hex Bolt                     | 2   | 09-1044              |
| 15   | Part       | Die Retainer (Top)                           | 2   | 101-2982             |
| 16   | Part       | Wraparound Insert (See Pp. 3.8)              | 1   |                      |
| 17   | Part       | Cylinder Housing                             | 1   | 1401-01B             |
| 18   | Part       | Die Retainer (Bottom)                        | 2   | 101-2291             |
| 19   | Part       | 3/8" UNF x 1" Hex Socket Flat Head Cap Screw | 2   | 09-4046              |
|      | <b>Kit</b> | <b>CLINCHER® Cylinder Seal Kit</b>           |     | <b>1401-00-00-SK</b> |
| 6    | Seal       | SH940-41 Wiper                               | 1   |                      |
| 7    | Seal       | Polypak 25004500                             | 1   |                      |
| 8    | Seal       | W2-4750-625 Wear Ring                        | 1   |                      |
| 9    | Seal       | Polypak 25005000                             | 1   |                      |
| 11   | Seal       | 2-231 O-Ring                                 | 1   |                      |
| 13   | Seal       | Polypak 37504750                             | 1   |                      |