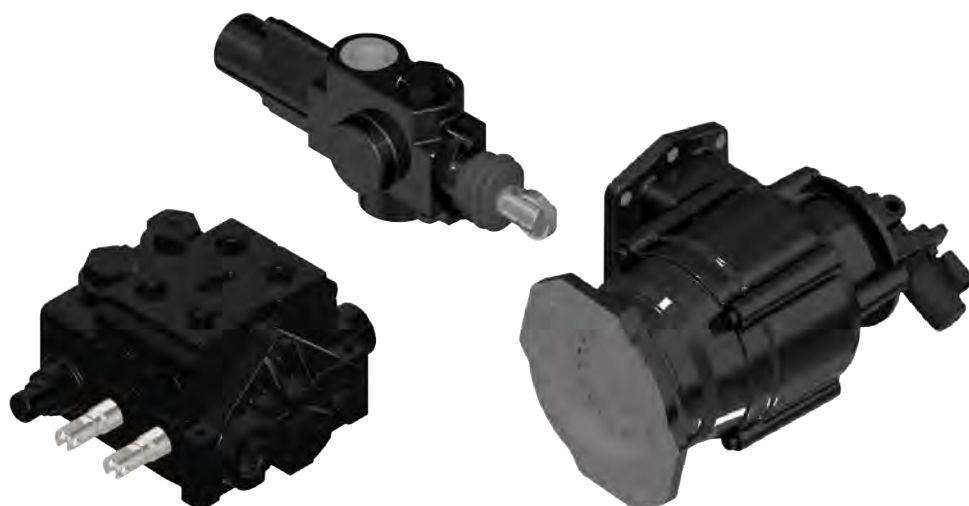
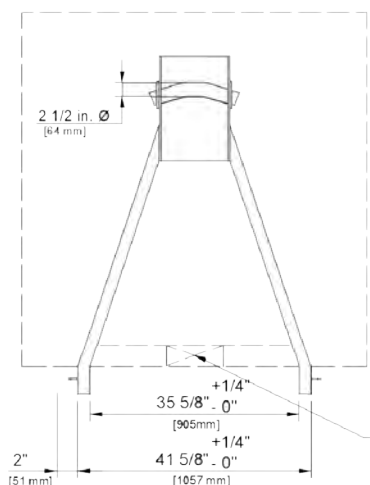


# ALL-MODEL TECHNICAL GUIDE





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**TO THE CUSTOMER:**

**YOUR NEW SWAPLOADER HOIST WAS CAREFULLY DESIGNED AND MANUFACTURED TO GIVE YEARS OF DEPENDABLE SERVICE. TO KEEP IT OPERATING EFFICIENTLY, READ THE INSTRUCTIONS IN THIS GUIDE THOROUGHLY. IT CONTAINS DETAILED DESCRIPTIONS AND INSTRUCTIONS FOR THE EFFICIENT OPERATION AND MAINTENANCE OF YOUR SWAPLOADER. THIS GUIDE ALSO INCLUDES TECHNICAL INFORMATION AND TROUBLESHOOTING SHOULD YOU REQUIRE SPECIFICATIONS AND/OR AID IN SERVICING YOUR HOIST. EACH SECTION IS CLEARLY IDENTIFIED SO YOU CAN EASILY FIND THE INFORMATION THAT YOU NEED. READ THE TABLE OF CONTENTS TO LEARN WHERE EACH SECTION IS LOCATED. ALL INSTRUCTIONS ARE RECOMMENDED PROCEDURES ONLY.**

For hoist installation instructions and service parts numbers, please refer to the Parts and Installation manual.



Throughout this manual you will come across "**Dangers**," "**Warnings**," or "**Cautions**" which will be carried out in bold type and preceded by the symbol as indicated to the left. Be certain to carefully read the message that follows to avoid the possibility of personal injury or machine damage.

Record your SwapLoader Hoist serial number in the appropriate space provided on the Parts and Installation Manual. Your SwapLoader dealer needs this information to give prompt, efficient service when ordering parts. It pays to rely on an authorized SwapLoader Distributor for your service needs. For the location of the Distributor nearest you, contact SwapLoader.

**NOTE:** It is SwapLoader's policy to constantly strive to improve SwapLoader products. The information, specifications, and illustrations in this publication are based on the information in effect at the time of approval for printing and publishing. SwapLoader therefore reserves the right to make changes in design and improvements whenever it is believed the efficiency of the unit will be improved without incurring any obligations to incorporate such improvements in any unit which has been shipped or is in service. It is recommended that users contact an authorized SwapLoader Distributor for the latest revisions.

# LIMITED WARRANTY STATEMENT

Effective August 1, 2023

SwapLoader U.S.A., Ltd., (SwapLoader), warrants to the original purchaser of any new SwapLoader product sold by an authorized SwapLoader distributor or service center, that such products are free of defects in material and workmanship. All SwapLoader products with an original factory in-service date of August 1, 2023, or later qualify for warranty as defined in this Limited Warranty Statement.

		1 YEAR	4 YEAR	5 YEAR
		Not to extend beyond 24 months from the original factory ship date	Not to extend beyond 60 months from the original factory ship date	Not to extend beyond 72 months from the original factory ship date
HOIST	<b>Manufactured Components</b>			
	SwapLoader Manufactured Parts (excludes replacement or service parts) includes but not limited to:			
	<ul style="list-style-type: none"> <li>Weldments</li> <li>Pins</li> <li>Hardware</li> <li>Piece Parts</li> </ul>			
	Repair Labor	✓		
	<b>Vendor Supplied Components</b>			
	Cylinders		✓	
	Hoses		✓	
	Fittings		✓	
	Jib Lockout Valve		✓	
	Hydraulic Body Lock Cylinder		✓	
	Repair Labor	✓		

		1 YEAR	4 YEAR	5 YEAR
		Not to extend beyond 24 months from the original factory ship date	Not to extend beyond 60 months from the original factory ship date	Not to extend beyond 72 months from the original factory ship date
OPTIONS & ACCESSORIES	<b>Manufactured Components</b>			
	SwapLoader Manufactured Parts (excludes replacement or service parts) includes but not limited to:			
	<ul style="list-style-type: none"> <li>Bumpers</li> <li>Sub-Frames</li> <li>Stabilizers (structural)</li> <li>Dual Rollers</li> </ul>			
	Repair Labor	✓		
	<b>Vendor Supplied Components</b>			
	Includes but not limited to:			
	<ul style="list-style-type: none"> <li>Pumps</li> <li>EHVs</li> <li>Valves</li> <li>Controls</li> <li>Sensors</li> <li>Tanks</li> <li>Toolboxes</li> <li>Tarps</li> <li>Lights</li> <li>Fenders</li> <li>PTOs</li> <li>All vendor replacement parts</li> </ul>			
	Repair Labor			

Reverts to Vendor Warranty

**Coverage Start Date:**

- Derived from the completed warranty registration at [www.swaploader.com/warranty-registration/](http://www.swaploader.com/warranty-registration/). In the event warranty registration is not completed, the factory ship date will be used.
- Items under “hoists” or “manufactured components” on page 1 are allowed a 12-month period between factory shipment and in service date to account for distributor stock.

**Warranty Process:**

- Unless otherwise stated the following warranty process must be followed for repairs and/or replacement parts to be covered:
  - Prior to any parts orders or repair work, contact SwapLoader at 888-767-8000 or [warranty@swaploader.net](mailto:warranty@swaploader.net) to initiate a claim and pre-authorize repairs.
  - Distributor will then order replacement parts and SwapLoader will invoice the distributor for the replacement parts and freight.
  - After authorized repair is completed the distributor must submit a fully completed warranty claim form.
  - If required by SwapLoader, defective parts will be assigned an RGA (return goods authorization) number, and those parts must be returned freight prepaid with a copy of the RGA form within 30 days of repair or credit consideration will not be given.
  - Upon evaluation of the returned parts if warranty is approved credit will be issued to the appropriate distributor account for the approved warranty costs which may include parts, labor, and/or freight.
  - SwapLoader will, at its discretion, adjust labor credit to pre-authorized or known repair times for covered repairs or service.

**Warranty Limitations & Responsibilities:**

- Warranty service must be performed by a distributor or service center authorized by SwapLoader to sell and/or service SwapLoader products. Distributors or service centers will use only new or remanufactured parts or components furnished by SwapLoader U.S.A. LTD.
- Defects in material and workmanship must be reported to SwapLoader immediately at time of discovery, subsequent damage caused by delay of defect reporting and repair will not be covered under warranty.
- Defects observed inside of the active warranty period and reported outside of the active warranty period will not be covered.
- Warranty service, repairs or returns must be pre-authorized by SwapLoader to be considered for credit.
- SwapLoader will, at its discretion, either repair defective parts or replace them with equivalent parts.
- SwapLoader will ship any replacement parts by the most economical, yet expedient means possible. Expedited freight delivery will be at the expense of the owner.
- Labor rates and credits are determined by the SwapLoader Distributor agreement.
- This warranty covers only defective material and workmanship. It does not cover depreciation or damage caused by normal wear and tear, accident, mishap, untrained operators, or improper or unintended use. The owner has the obligation of performing routine care and maintenance duties as stated in SwapLoader's written instructions, recommendations, and specifications. Any damage resulting from owner/operator failure to perform such duties shall void the coverage of this warranty. The cost of labor and supplies associated with routine maintenance will be paid by the owner.
- Warranty Registration must be submitted within 15 days of Retail Sale of SwapLoader hoist to [www.swaploader.com](http://www.swaploader.com). If unit has not been registered, then the warranty start date will revert to the original factory ship date. Warranty Registration is the ultimate responsibility of the owner. If the owner is unsure product registration has been completed, contact SwapLoader at 888-767-8000 or send email [sales@swaploader.net](mailto:sales@swaploader.net) to confirm.
- In no event will SwapLoader, the SwapLoader distributor or any company affiliated with SwapLoader be liable for business interruptions, costs of delay, or for any special, indirect, incidental, or consequential costs or damages. Such costs may include, but are not limited to:
 

• loss of time	• commissions	• travel
• loss of revenue	• lodging	• mileage
• loss of use	• meals	• any other incidental costs
• wages	• towing	
• salaries	• hydraulic fluid	
- Warranty shall not apply if the equipment is operated in abnormal conditions or operated at capacities more than factory ratings.
- Warranty is expressly void if the seal on the main relief control valve has been tampered with or broken.
- Warranty is expressly void if serial number plate or stamping is tampered with.
- Paint, plating, and coatings are not covered under this warranty policy.
- All products purchased by SwapLoader from outside vendors shall be covered by the warranty offered by that respective manufacturer unless defined otherwise on page 1.

**IT IS EXPRESSLY UNDERSTOOD AND AGREED THAT THERE ARE NO WARRANTIES MADE BY THE MANUFACTURER OR ITS AGENTS, REPRESENTATIVES OR DISTRIBUTORS, EITHER EXPRESSED, IMPLIED, OR IMPLIED BY LAW, EXCEPT THOSE EXPRESSLY STATED ABOVE IN THIS STANDARD LIMITED WARRANTY AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP. THE MANUFACTURER AND ITS AGENTS, REPRESENTATIVES AND DISTRIBUTORS SPECIFICALLY DISCLAIM ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.**



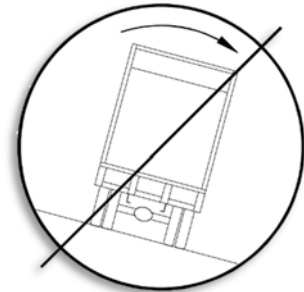
## **SAFETY SUGGESTIONS**



1. Do not operate or service this equipment until you have been properly trained and instructed in its use and have read the operation and service manual.



2. Do not operate this equipment on uneven ground.

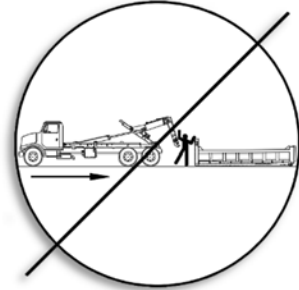


3. Do not drive with the hoist in the dump position or with the hook to the rear.



4. Do not exceed 1,500 Engine RPM when operating the Power Take Off (P.T.O.). Never leave the P.T.O. in gear while transporting.
5. The hoist must be used with containers that properly fit the hook and rear hold-downs. The container specifications must match the hoist specifications.
6. Keep the containers and hoist in good working order. **DO NOT** use if repairs are needed. Perform periodic inspections and maintenance as required by the maintenance section of the operator's manual.

7. Make sure work area is clear of people and obstacles prior to dumping or unloading containers. SwapLoader strongly recommends that a backup alarm be installed on the truck chassis. The operation of the hook hoist is that the truck is backed up to the body to pick it up and so there is a potential pinch point between the body and the hook.



8. Any container, which is on the hoist, **MUST** be unloaded prior to performing any repairs or maintenance to the hoist. Also, **DO NOT** allow any person to work on or be under the hoist in a raised position without first installing adequate safety blocks to eliminate all possibility of the hoist accidentally lowering. SwapLoader strongly recommends that, if possible, the container should be dismounted from the hoist prior to performing any maintenance to the hoist.



9. It is the responsibility of the owner and/or installer to ensure that any additional safety devices required by state or local codes are installed on the SwapLoader Hoist and/or Truck Chassis.

10. Keep away from overhead power lines. Serious injury or death can result from contact with electrical lines. Use care when operating hoist near electrical lines to avoid contact.

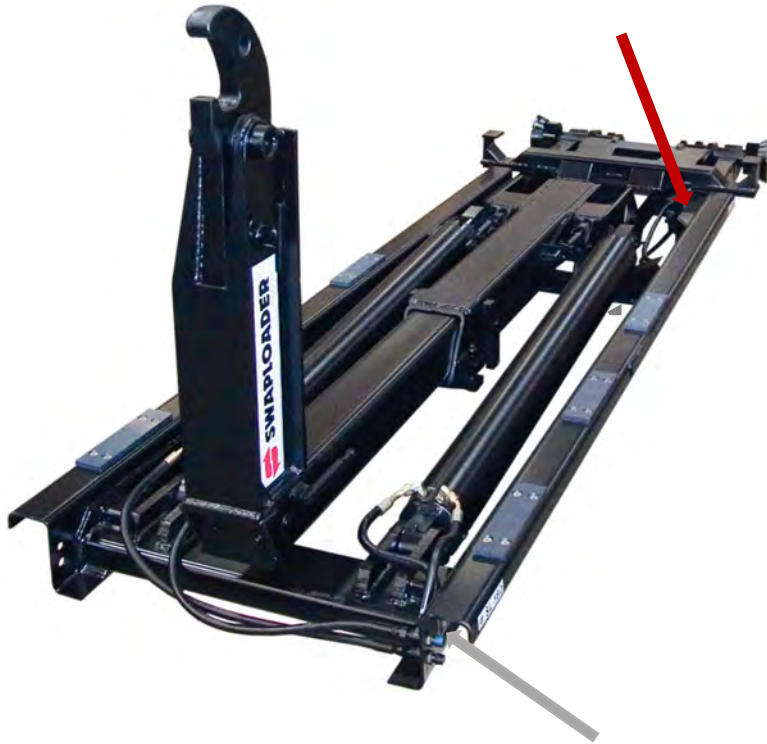


11. Avoid contact with high-pressure fluids. Escaping fluid under pressure can penetrate the skin causing serious injury. Avoid hazardous conditions by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard, while protecting hands and body from the high-pressure fluids.



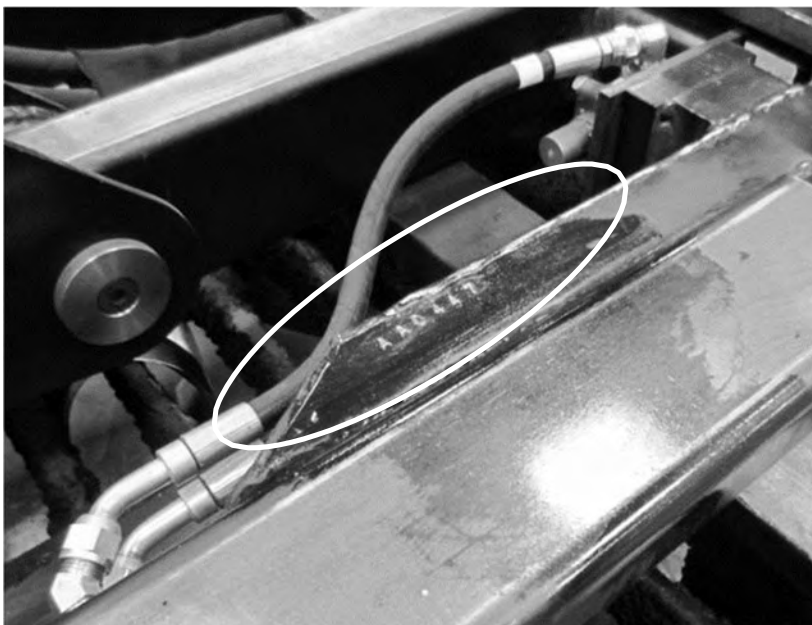
12. It is the responsibility of the owner to provide proper maintenance of the Safety Decals. Regular inspection and replacing of Safety Decals that have any fading or damage which would impair their function should be done (See the illustration on the following page for location of Safety Decals).

## **SERIAL NUMBER LOCATIONS ON A SWAPLOADER HOIST**



Serial Number Tag is located at the front driver side of the hoist (gray arrow on first picture).

The Serial Number is also stamped into the frame of the hoist on the top of the "inner rail" shown at the rear of the hoist (red arrow on first picture). An example of a 6-character serial number is shown in the second picture.



# TECHNICAL INFORMATION

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## P.T.O. SELECTION

Select and install a direct drive type P.T.O. to the transmission. Please contact your local truck equipment representative for the correct unit sized on the following criteria which is based on SwapLoader pump options:

<b>P.T.O. Torque Rating (See Note 1)</b>	
<b>SL-105:</b>	80 ft.-lbs.
<b>SL-160 / 212 / 214:</b>	125 ft.-lbs.
<b>SL-220 / 222 / 240 / 2418:</b>	200 ft.-lbs.
<b>SL-330 / 400 / 406 / 412:</b>	200 ft.-lbs.
<b>SL-418X / SL-518X / 520X:</b>	270 ft.-lbs.
<b>SL-650:</b>	270 ft.-lbs.

<b>Power at 1500 Pump RPM (See Notes 1 &amp; 2)</b>	
<b>SL-105:</b>	23 HP
<b>SL-160 / 212 / 214:</b>	36 HP
<b>SL-220 / 222 / 240 / 2418:</b>	47 HP
<b>SL-330 / 400 / 406 / 412:</b>	57 HP
<b>SL-418X / SL-518X / 520X:</b>	73 HP
<b>SL-650:</b>	73 HP

### **Notes**

**NOTE 1:**  
PTO TORQUE AND POWER REQUIREMENTS ARE BASED ON THE UNIT OPERATING AT MAIN RELIEF PRESSURE. NORMAL OPERATING PRESSURE WILL BE LESS.

**NOTE 2:**  
DO NOT OPERATE PUMP AT SPEEDS OVER 1500 RPM (PUMP RPM)

**NOTE 3:**  
ALWAYS DISENGAGE THE PTO AFTER EACH OPERATING CYCLE.

<b>Mount Flange (Direct Mount)</b>	<b>SAE A 2 Bolt</b>	<b>SAE B 2 Bolt</b>	<b>SAE B 4 Bolt</b>
<b>SL-105:</b>	✓	✓	
<b>SL-160 / 212 / 214:</b>	✓	✓	✓
<b>SL-220 / 222 / 240 / 2418:</b>			✓
<b>SL-330 / 400 / 406 / 412:</b>			✓
<b>SL-418X / SL-518X / 520X:</b>			✓
<b>SL-650:</b>			✓

<b>Hydraulic Pump Rotation</b>	<b>Right-Hand</b>	<b>Left-Hand</b>	<b>Bi-Rotation</b>
<b>SL-105:</b>	✓	✓	
<b>SL-160 / 212 / 214:</b>	✓	✓	✓
<b>SL-220 / 222 / 240 / 2418:</b>	✓	✓	✓
<b>SL-330 / 400 / 406 / 412:</b>	✓	✓	✓
<b>SL-418X / SL-518X / 520X:</b>			✓
<b>SL-650:</b>	✓	✓	✓

It is recommended to use the Power Pack with the SL-75.

## GENERAL PUMP SPECIFICATIONS

Below is a table that lists all pump models SwapLoader currently offers and general specifications of those pumps. For part numbers and rotation refer to Pump Number and Rotation Identification in the following section.

MODEL	TYPE	FLANGE Direct Mount	SHAFT	SUCTION PORT	PRESSURE PORT	CID
Parker-Chelsea 315	Gear	SAE B 2-Bolt	SAE B 7/8-13T Spline	SAE 16 ORB	SAE 12 ORB	1.86
Parker-Chelsea 330	Gear	SAE B 4-Bolt	SAE B 7/8-13T Spline	SAE 20 ORB	SAE 12 ORB	2.96
Parker-Chelsea 350	Gear	SAE B 4-Bolt	SAE B 7/8-13T Spline	SAE 20 ORB	SAE 12 ORB	3.83
				1-1/2 Pipe		4.46
						4.46
Hydro Leduc	Piston	SAE B 4-Bolt	SAE BB 1-15T Spine	1-1/2 Hose Barb	SAE 12 ORB	3.84
Bezares *	Gear	SAE B 4-Bolt	SAE B 7/8-13T Spline	SAE 16 ORB	SAE 16 ORB	2.50
				SAE 20 ORB	SAE 20 ORB	3.05
						3.66
						4.27
Muncie	Gear	SAE A 2-Bolt	SAE B 7/8-13T Spline	SAE 20 ORB	SAE 12 ORB	1.55
Parker-Chelsea 28	Gear	SAE A 2-Bolt	SAE B 7/8-13T Spline	1-1/4 Hose Barb	SAE 12 ORB	2.32

\* Bezares pumps may include additional adapters to match application changes.

## PUMP NUMBER & ROTATION IDENTIFICATION

### HOW TO IDENTIFY WHAT PUMP IS NEEDED

All SwapLoader hooklift hoists, except for the SL-75, come with the option of a single rotation (rotation specific) or bi-rotational pump. For most manual transmission applications, a CCW or left-hand rotation pump is required, while most automatic transmission applications require a CW or right-hand rotation pump. A bi-rotational pump can be used in either application.

#### NOTE:

CONSULT THE PTO SUPPLIER WHENEVER UNCERTAIN ABOUT THE CORRECT PUMP ROTATION OR DISPLACEMENT FOR A PARTICULAR APPLICATION.

The table below lists the SwapLoader pump part numbers by hoist model or series:

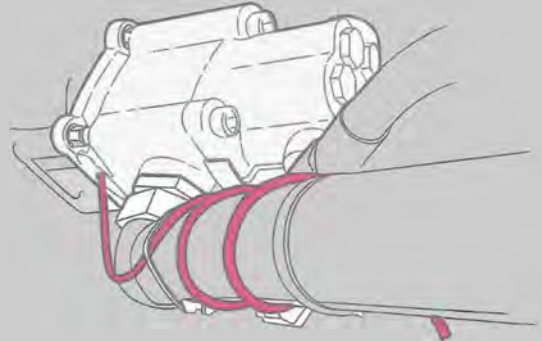
Bi-Rotational		L.H. Rotation		R.H. Rotation	
Pump Model	Part No.	Pump Model	Part No.	Pump Model	Part No.
		Muncie	23P55	Parker 315	21P02
Bezares	23P46	Parker 330	20P53	Parker 330	20P98
	23P59	Parker 28	23P54		
Bezares	23P45	Parker 350	20P24	Parker 350	20P43
	23P46				
	23P47				
Bezares	23P47	Parker 350	20P87	Parker 350	21P03
Bezares	23P45	Parker 350	22P44	Parker 350	22P45
Hydrocontrol	23P20				

**NOTE:**

THE SWAPLOADER X-HD SERIES PUMP COMES EQUIPPED WITH A PROTECTIVE TUBE WHICH AVOIDS ENTRY OF CONTAMINANTS AND ALLOWS FOR AIR VENTILATION.

**RECOMMENDATIONS FOR ATTACHING THE PROTECTIVE TUBE:**

- MAKE SIPHON WITH THE TUBE SO AS TO AVOID ANY INTRODUCTION OF DIRT FROM ROAD, AND WATER OR DAMP FROM HIGH PRESSURE WASHING OF VEHICLE.
- PUT THE END OF THE TUBE DOWNWARDS, OR IN A PLACE SHELTERED FROM ANY PROJECTIONS.
- FIX THE TUBE IN PLACE USING A COLLAR/CLIP
- AVOID ATTACHING THE TUBE TO ANY PARTS WHICH MAY MOVE, THIS COULD LEAD TO IT BEING DAMAGED.
- AVOID ANY PINCHING OR FOLDS IN THE TUBE WHEN FIXING IT IN PLACE.
- MAKE SURE THE END OF THE TUBE IS NOT BLOCKED.



### HOW TO IDENTIFY ROTATION

Oil enters the pump through the inlet(suction) port, travels around the outside of the gears, and is forced out through the outlet (exhaust) port. Oil enters and exits the pump in the direction of its rotation.

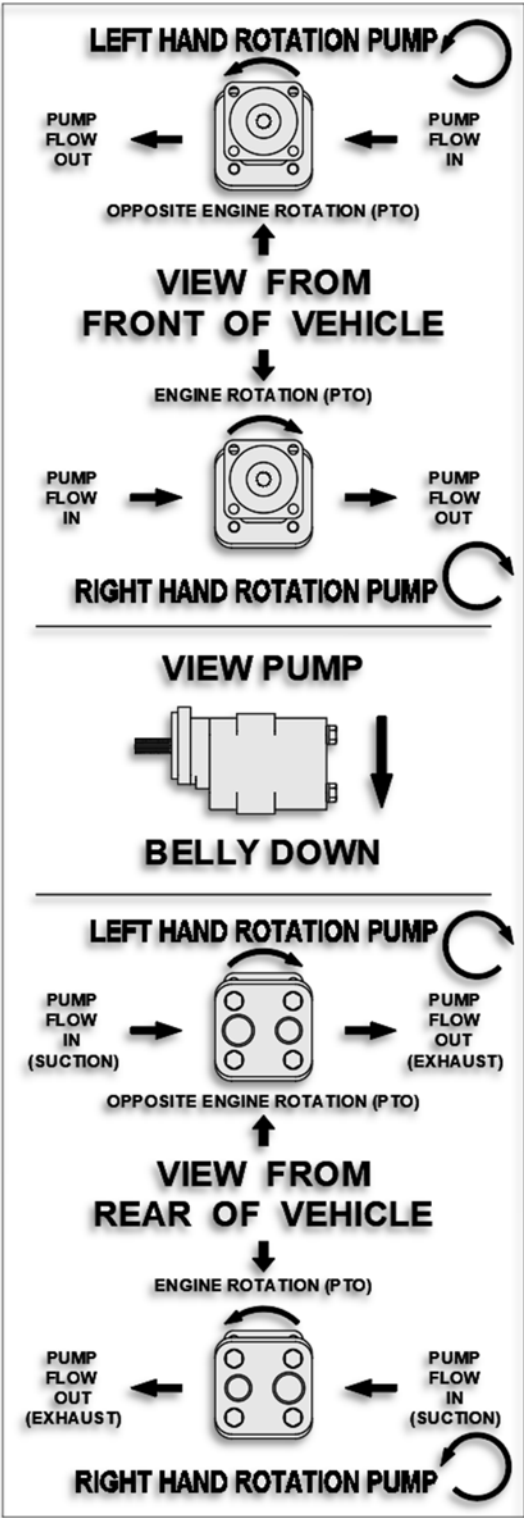
#### Single Rotation:

Determine pump rotation by positioning the pump belly down (see Fig. 1). Looking at the rear of the pump, if the suction (largest) is on the left side, then the pump is CCW (L.H. rotation). If the suction port is on the right side, the pump is CW (R.H. rotation).

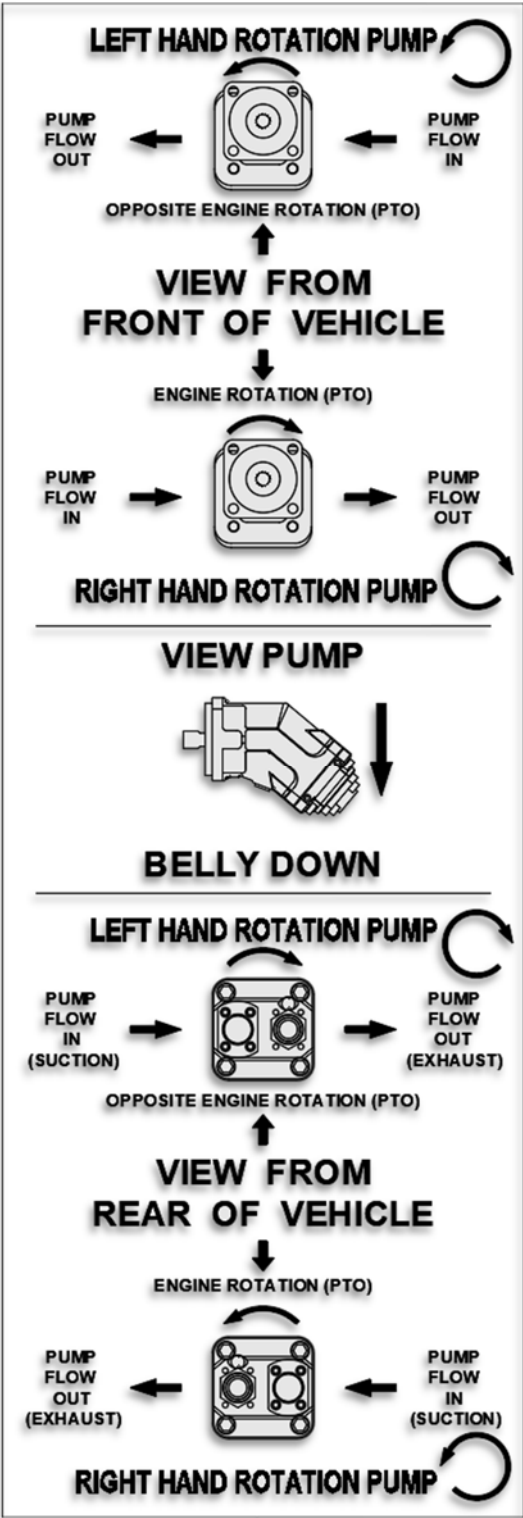
#### Bi-Rotation:

If the ports are the same size, then it is a bi-rotational pump. Bi-rotational pumps will change their inlet and outlet ports depending on which way the pump is spinning. When installing a bi-rotational pump make sure inlet and outlet ports are connected correctly. If the pump is spinning CW or left-hand rotation, make sure to connect the suction hose to the left side and if the pump is spinning CCW or right-hand rotation make sure to attach the suction hose to the right side (see Fig. 2). Incorrectly connecting hoses can cause premature pump failure because of oil starvation.

**FIG. 1: GEAR PUMP**



**FIG. 2: PISTON PUMP**



## **GENERAL HYDRAULIC CONTROL VALVE SPECIFICATIONS**

SwapLoader hoists come standard with a 2-section hydraulic control valve. Below are specifications for all standard valves currently offered by SwapLoader.

MODEL	TYPE	CIRCUIT TYPE	PRESSURE (MAX)	PORT SIZE	
				INLET OUTLET	WORK
Parker-Chelsea V20	Section	Open Center - Parallel	3,500	SAE 12	SAE 10
Parker-Chelsea VG20	Section	Open Center - Parallel	3,500	SAE 12/16	SAE 12
SwapLoader EHV	Section	Open Center - Parallel	3,250	SAE 12	SAE 10
Hydrocontrol D4	Section	Open Center - Parallel	4,650	SAE 12	SAE 10

Our standard 2-section control valves utilize a cylinder spool to operate the jib cylinder and a motor spool for the lift cylinders.

- The motor spool allows for free flow back to the tank when in the neutral position.
- The cylinder spool does **not** allow free flow back to the tank when in the neutral position.
- The main relief on the valve dictates the amount of pressure that can be into the cylinders.

The following table defines section and spool for our valves:

MODEL	CYLINDER	VALVE SECTION	SPOOL TYPE
Parker-Chelsea V20	Jib	#1	Cylinder Spool – 4-way, 3-Position (4)
	Lift/Dump	#2	Motor Spool – 4-way, 3-Position (F4)
Parker-Chelsea VG20	Jib	#1	Cylinder Spool – 4-way, 3-Position (HA755)
	Lift/Dump	#2	Motor Spool – 4-way, 3-Position (LA755)
SwapLoader	Jib	#1	Cylinder Spool – 4-way, 3-Position (HA755)
	Lift/Dump	#2	Motor Spool – 4-way, 3-Position (LA755)

The table below lists the SwapLoader valve part numbers and pressure relief setting by hoist model or series:

Hoist Model/Series	Valve Model	Part No.	Relief Setting (PSI)
<b>100 Series</b>	Parker-Chelsea V20	21P32	3,250
<b>200 Series</b>	Parker-Chelsea V20	20P39	2,800
<b>400 Series</b>	Parker-Chelsea V20	20P88	3,500
<b>HD Series</b>	Parker-Chelsea VG20	20P59	3,500
<b>X-HD Series</b>	Hydrocontrol	23P21 / 23P73	4,650 / 3,850



### V20 DIRECTIONAL CONTROL VALVES WITH POWER BEYOND (SWL PN 21P42)

When a power beyond circuit is required, the conversion plug in the outlet section of the V20 valve can be replaced with a power beyond sleeve (SwapLoader PN 21P42).



Once the power beyond sleeve is installed an unobstructed path back to tank will need to be plumbed to complete the circuit. Any secondary control valves plumbed into the circuit, between the V20 control valve and tank, will need to be open center and have its own built-in relief valve set at or below the pressure setting of the V20 control valve.

CONVERSION PLUG

### VG20 DIRECTIONAL CONTROL VALVES WITH POWER BEYOND (SWL PN 22P64)

When a power beyond circuit is required the standard end cover or outlet section (Parker-Commercial #TR88) of the VG20 valve can be replaced with an optional end cover or outlet section (SwapLoader PN 22P64) that has a power beyond port.



Once the valve outlet section is installed an unobstructed path back to tank will need to be plumbed to complete the circuit. Any secondary control valves plumbed into the circuit, between the VG20 control valve and tank, will need to be open center and have its own built-in relief valve set at or below the pressure setting of the VG20 control valve.

OUTLET SECTION

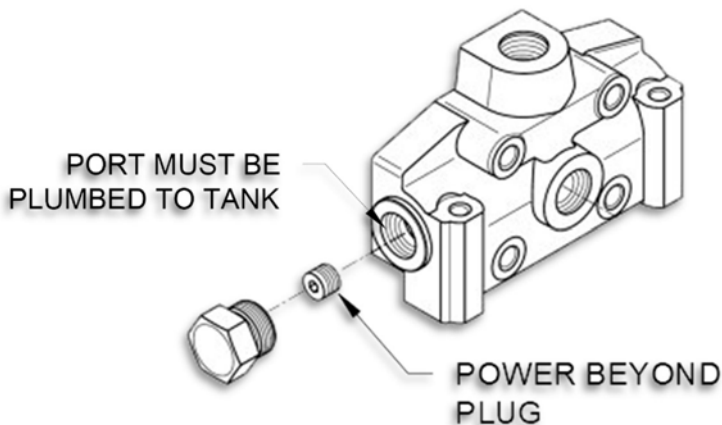
### HYDROCONTROL D4 VALVES WITH POWER BEYOND (SWL PN 23P58)

When a power beyond circuit is required, the conversion plug in the outlet section of the Hydrocontrol D4 valve can be replaced with a power beyond plug (SwapLoader PN 23P58).



Once the power beyond plug is installed inside the valve, an unobstructed path back to the tank will need to be plumbed from the port where the conical plug was installed to complete the circuit. Any secondary control valves plumbed into the circuit between the control valve and tank will need to be open center and have its own built-in relief valve set at or below the pressure setting of the main control valve.

OUTLET SECTION



## **HYDRAULIC OIL SPECIFICATION & INTERCHANGE CHART**

Select an ISO grade of Premium Anti-Wear Hydraulic Oil that is optimum for your location.

<b>HYDRAULIC OIL SELECTION CHART</b>			
<b>ISO Grade</b>	<b>Ambient Temperature Range</b>		<b>Viscosity</b>
	<b>F°</b>	<b>C°</b>	<b>SUS @ 100 °F</b>
32	-10 to 85	-23 to 29	150-170
46	10 to 110	-12 to 43	195-240

### **NOTE:**

1. ALWAYS CONSULT YOUR LOCAL HYDRAULIC OIL SUPPLIER FOR MORE INFORMATION.
2. USE CAUTION WHEN OPERATING AT OR BEYOND THE RECOMMENDED TEMPERATURE EXTREMES.
3. DO NOT OPERATE THE HOOKLIFT HOIST WHEN HYDRAULIC OIL TEMPERATURE ON TANK GAUGE EXCEEDS 160 °F (71 °C) AS DAMAGE TO HYDRAULIC COMPONENTS CAN OCCUR.

<b>ISO Grade 32</b>	
<b>Company Name</b>	<b>Brand Name &amp; Grade</b>
Castrol (BP)	Paradene 32AW
CITGO	A/W 32
Exxon	Nuto H 32
Mobil	DTE 24 (DTE 13)
Shell	Tellus 32
SUNOCO	Sun Vis 706 (816 WR)

<b>ISO Grade 46</b>	
<b>Company Name</b>	<b>Brand Name &amp; Grade</b>
Castrol (BP)	Paradene 46AW
CITGO	A/W 46
Exxon	Nuto H 46
Mobil	DTE 25 (DTE 15)
Shell	Tellus 36
SUNOCO	Sun Vis 747 (821 WR)



**HYDRAULIC FILTER ELEMENT SPECIFICATION**

HOIST	ELEMENT SIZE	MOUNTING THREAD	FILTRATION RATING
100 Series	Ø3.66 x 8.6"	1-12 UNF	10 micron (Nominal)
200 Series	Ø3.66 x 8.6"	1-12 UNF	10 micron (Nominal)
400 Series	Ø5.10 x 10.9"	1 1/2-16 UN-2B	10 micron (Nominal)
HD Series	Ø5.10 x 10.9"	1 1/2-16 UN-2B	10 micron (Nominal)
X-HD Series			10 micron (Nominal)

Compatible Filter Elements for 100 Series & 200 Series	
Company Name	Filter Part Number
Baldwin	BT8443
Behringer	BSO92E10N25
Donaldson	P550255
Fleetguard	HF6511
Flow Ezy	FEEE30-10L
FPC	PFE40-10N
Hydac	0085MA010P
LHA	SPE25-10
Norman	410
PTI	F4E-040CCB
Purolator	20201
Zinga*	AE-10L

\* Brand of Element supplied from factory on hoist

Compatible Filter Elements for 400 Series & HD Series	
Company Name	Filter Part Number
Baldwin	BT-388-10
Can Flo	RSE60-10N
Case	D-130046
Donaldson	HSM6047
Fleetguard	R750-H-0825A
FPC	HF6711
Hydac	0180MA010P
LHA	SPE60-10
Norman	610
Parker	927736
Wix	51860
Zinga*	LE-10

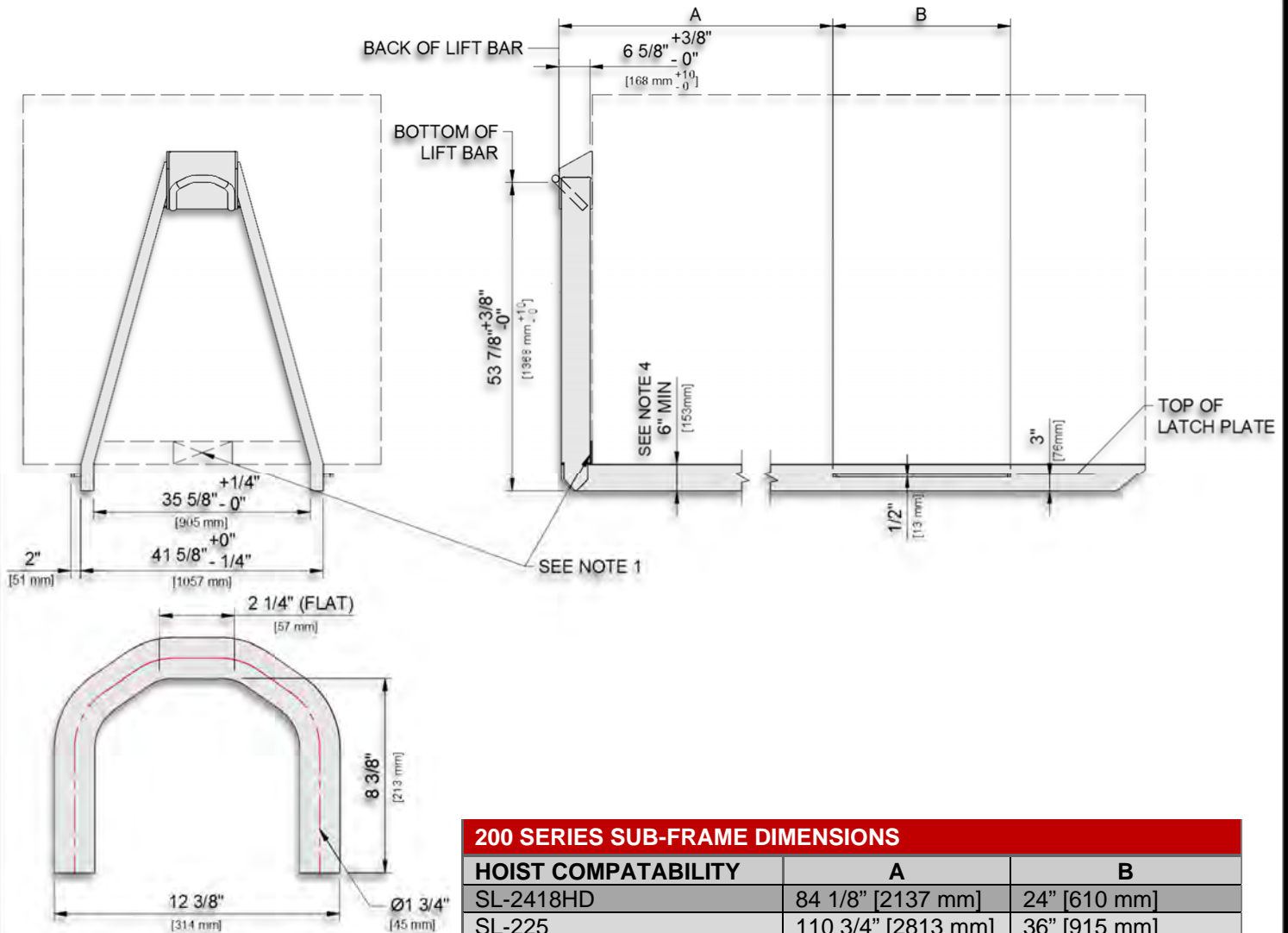
\* Brand of Element supplied from factory on hoist

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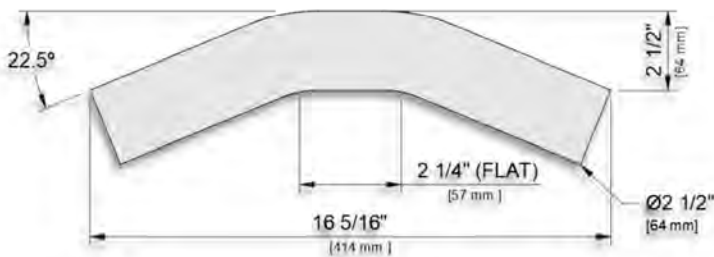
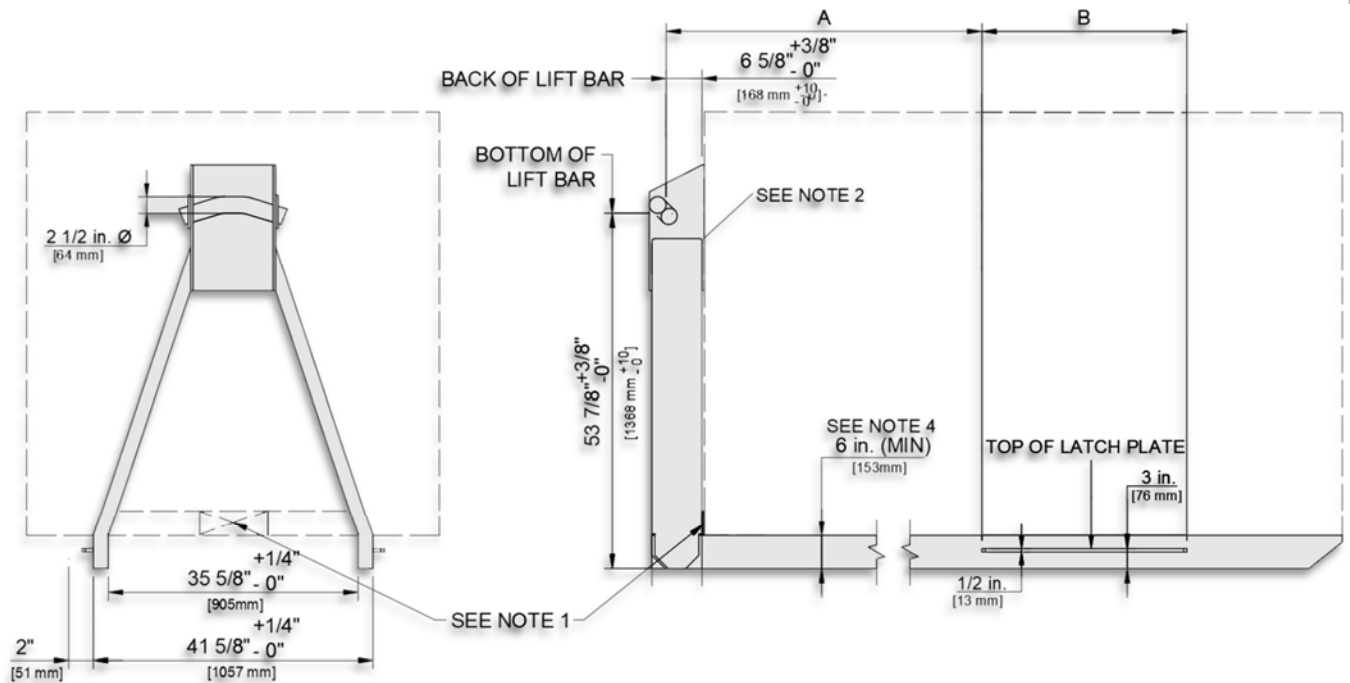
# TECHNICAL DRAWINGS

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**200 SERIES SUB-FRAME CRITICAL DIMENSIONS****LIFT BAR DETAIL****NOTE:**

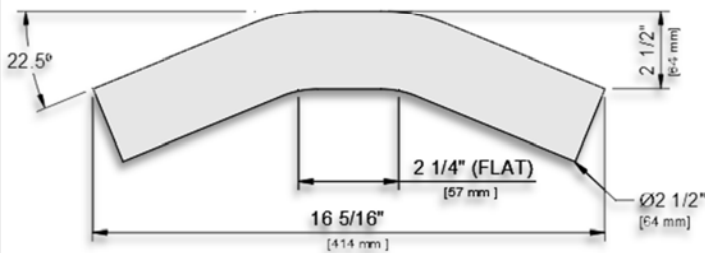
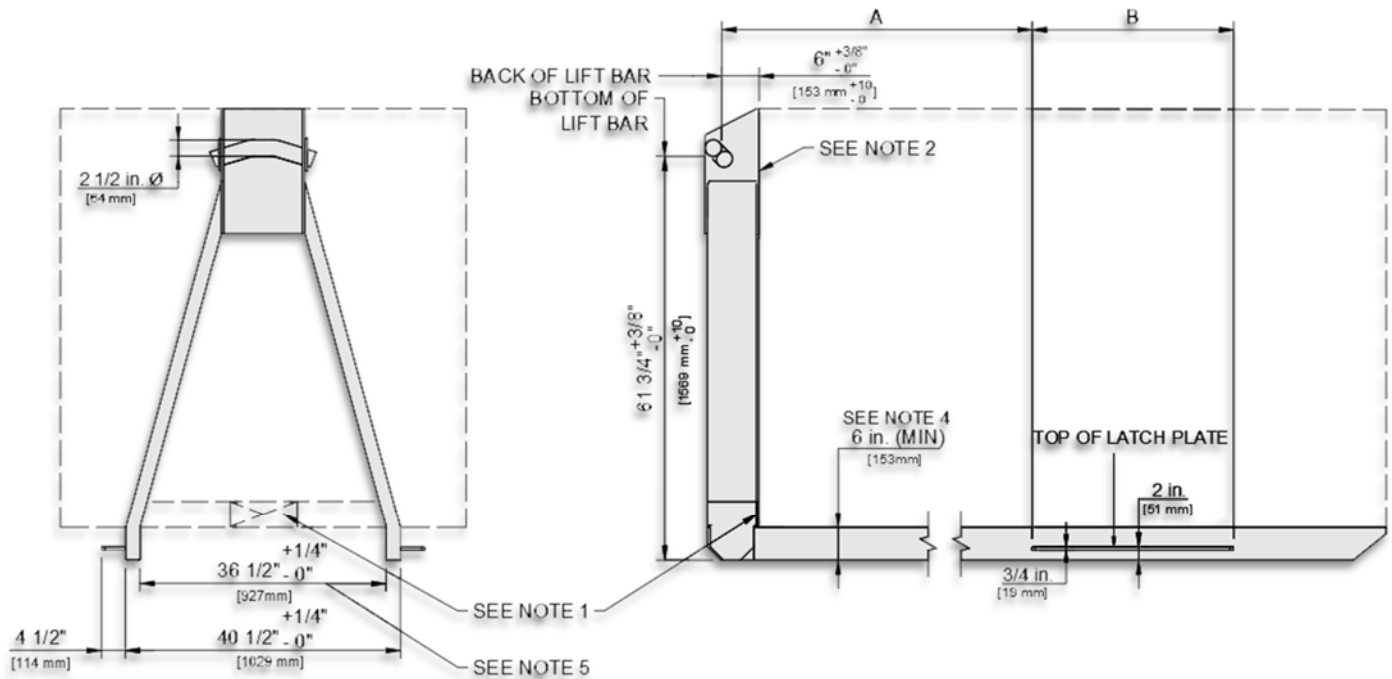
1. A STRUCTURAL JIB CONTACT POINT LOCATED AS LOW AS ALLOWABLE ON THE CONTAINER FRONT IS REQUIRED.
2. WELD HOOK GUARD TO BODY OR ADD STRUCTURAL SUPPORT AS NEEDED FOR THE APPLICATION.
3. THIS DRAWING PROVIDES THE CRITICAL SUB-FRAME DIMENSIONS FOR COMPATABILITY WITH THE SWAPLOADER HOOK LIFT HOIST. IT IS THE SUB-FRAME SUPPLIER'S RESPONSIBILITY TO PROVIDE A SUB-FRAME OF SUFFICIENT CAPACITY WHICH PROPERLY SUPPORTS THE BODY/CONTAINER WHEN USED WITH THE HOOK LIFT HOIST.
4. SWAPLOADER MANUFACTURED 200 SERIES A-FRAMES REQUIRE A 6 INCH LONGSILL HEIGHT.

**300 SERIES SUB-FRAME CRITICAL DIMENSIONS****LIFT BAR DETAIL****300 SERIES SUB-FRAME DIMENSIONS**

HOIST COMPATABILITY	A	B
SL-160/212/214/240/330/400/412/1614	111 3/4" [2839 mm]	36" [915 mm]
SL-220/222/418X/518X	123 3/4" [3143 mm]	48" [1220 mm]
SL-520X	154 1/2" [3925 mm]	48" [1220 mm]

**NOTE:**

1. A STRUCTURAL JIB CONTACT POINT LOCATED AS LOW AS ALLOWABLE ON THE CONTAINER FRONT IS REQUIRED.
2. WELD HOOK GUARD TO BODY OR ADD STRUCTURAL SUPPORT AS NEEDED FOR THE APPLICATION.
3. THIS DRAWING PROVIDES THE CRITICAL SUB-FRAME DIMENSIONS FOR COMPATABILITY WITH THE SWAPLOADER HOOK LIFT HOIST. IT IS THE SUB-FRAME SUPPLIER'S RESPONSIBILITY TO PROVIDE A SUB-FRAME OF SUFFICIENT CAPACITY WHICH PROPERLY SUPPORTS THE BODY/CONTAINER WHEN USED WITH THE HOOK LIFT HOIST.
4. SWAPLOADER MANUFACTURED 300 SERIES A-FRAMES REQUIRE A 6 INCH LONGSILL HEIGHT.

**400 SERIES SUB-FRAME CRITICAL DIMENSIONS****LIFT BAR DETAIL****400 SERIES SUB-FRAME DIMENSIONS**

HOIST COMPATABILITY	A	B
SL-412	111 3/4" [2839 mm]	36" [915 mm]
* SL-240/330/400	123 3/4" [3143 mm]	36" [1220 mm]
* SL-220/222/418X/518X	132 1/8" [3356 mm]	48" [1220 mm]
* SL-520/520X/650	154 1/2" [3925 mm]	48" [1220 mm]

\* May include body lock with shelf assembly. Refer to Note 5.

**NOTE:**

1. A STRUCTURAL JIB CONTACT POINT LOCATED AS LOW AS ALLOWABLE ON THE CONTAINER FRONT IS REQUIRED.
2. WELD HOOK GUARD TO BODY OR ADD STRUCTURAL SUPPORT AS NEEDED FOR THE APPLICATION.
3. THIS DRAWING PROVIDES THE CRITICAL SUB-FRAME DIMENSIONS FOR COMPATABILITY WITH THE SWAPLOADER HOOK LIFT HOIST. IT IS THE SUB-FRAME SUPPLIER'S RESPONSIBILITY TO PROVIDE A SUB-FRAME OF SUFFICIENT CAPACITY WHICH PROPERLY SUPPORTS THE BODY/CONTAINER WHEN USED WITH THE HOOK LIFT HOIST.
4. SWAPLOADER MANUFACTURED 400 SERIES A-FRAMES REQUIRE A 8 INCH LONGSILL HEIGHT.
5. MINIMUM DIMENSION ALLOWABLE FOR USE WITH INCLUDED BODY LOCK SHELF ASSEMBLY.



# OPERATION

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## OPERATING INSTRUCTIONS

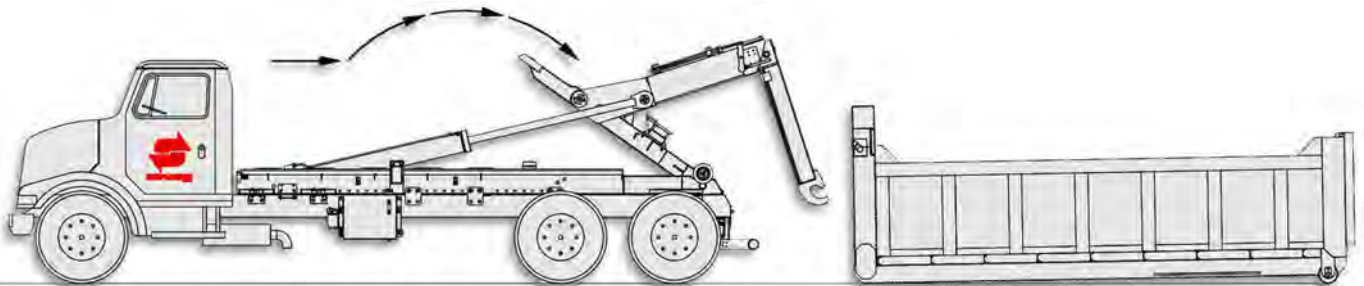
### LOADING A CONTAINER



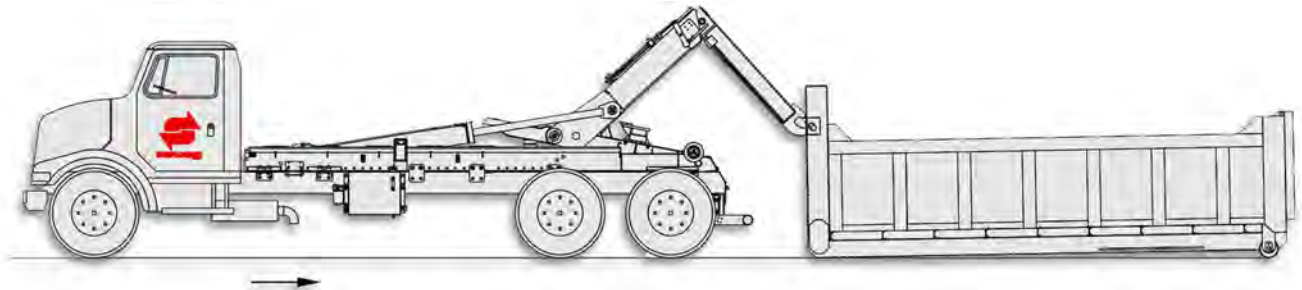
**CAUTION:**  
IF YOUR HOIST IS EQUIPPED WITH THE U-LOCK BODY LOCK SYSTEM, ENSURE IT IS DISENGAGED PRIOR TO EXTENDING OR RETRACTING THE JIB CYLINDER. WHEN LOADING OR UNLOADING A BODY, ENSURE THE U-LOCK IS DISENGAGE. WHEN TRANSPORTING OR DUMPING, THE U-LOCK MUST BE ENGAGED.



**STEP 1.** ENGAGE THE P.T.O. (REFER TO P.T.O. MANUAL FOR OPERATION).



**STEP 2.** DISENGAGE U-LOCK (IF INSTALLED). RETRACT THE JIB (RIGHT CONTROL LEVER BACKWARD). THEN, TILT THE ARM BACKWARD (LEFT CONTROL LEVER BACKWARD).

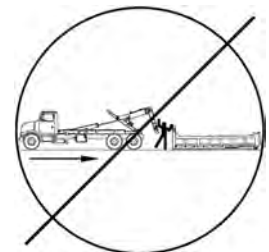


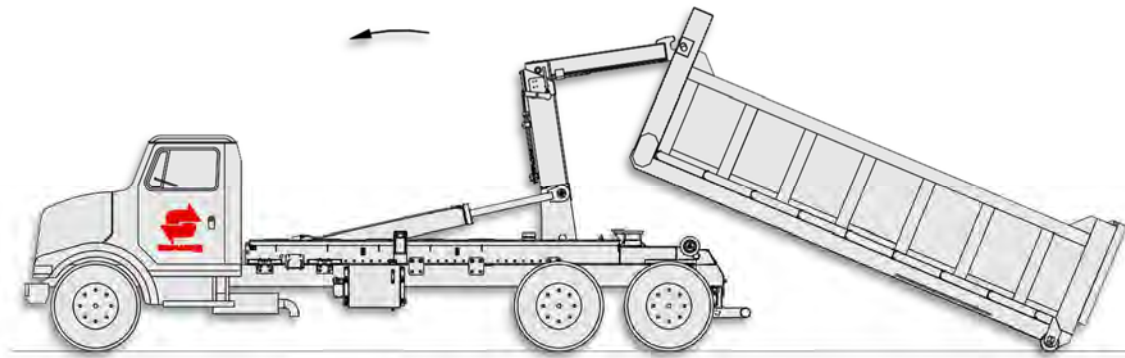
**STEP 3.** MAKE SURE THE WORK AREA IN FRONT OF THE CONTAINER IS CLEAR OF PEOPLE AND OBSTACLES. MOVE THE TRUCK BACKWARDS UNTIL THE HOOK ENGAGES THE CURVED LIFTING BAR OF THE CONTAINER. **NEVER EXTEND THE JIB** TO REACH THE PROPER CATCHING HEIGHT, RATHER TILT THE ARM.



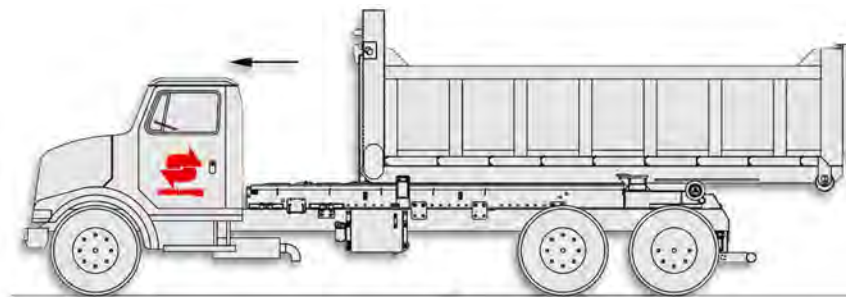
**WARNING:**

MAKE SURE WORK AREA IS CLEAR OF PEOPLE AND OBSTACLES PRIOR TO DUMPING OR UNLOADING CONTAINERS. SWAPLOADER STRONGLY RECOMMENDS THAT A BACKUP ALARM BE INSTALLED ON THE TRUCK CHASSIS. THE OPERATION OF THE HOOK HOIST IS THAT THE TRUCK IS BACKED UP TO THE BODY TO PICK IT UP AND SO THERE IS A POTENTIAL PINCH POINT BETWEEN THE BODY AND THE HOOK.



**LOADING A CONTAINER (cont'd)**

**STEP 4.** CYCLE THE ARM FORWARD (LEFT CONTROL LEVER FORWARD), MAKING SURE THE CURVED LIFTING BAR IS SECURELY ATTACHED TO THE HOOK. RELEASE THE BRAKES OF THE TRUCK AND STEER TO CORRECTLY ALIGN THE TRUCK WITH THE CONTAINER. WATCH THE CONTAINER RAILS TO SEE THAT THEY COME TO REST CENTERED ON THE REAR ROLLERS. DO NOT EXTEND THE JIB DURING LIFTING.



**STEP 5.** WHEN THE CONTAINER IS RESTING ON THE FRAME, MOVE THE JIB FORWARD ALL THE WAY TO ENSURE THE CONTAINER IS HELD IN THE BODY LOCKS (RIGHT CONTROL LEVER FORWARD). **ENGAGE U-LOCK (IF INSTALLED ON HOIST).** DISENGAGE THE P.T.O.

**DUMPING:**

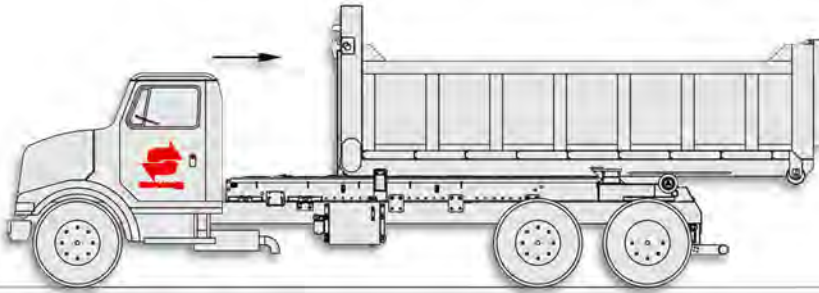
**STEP 1.** MOVE THE JIB FORWARD (RIGHT CONTROL FORWARD) TO ENSURE THAT THE CONTAINER IS LOCKED.

**STEP 2.** EXTEND THE MAIN LIFT CYLINDERS (LEFT CONTROL BACKWARD).

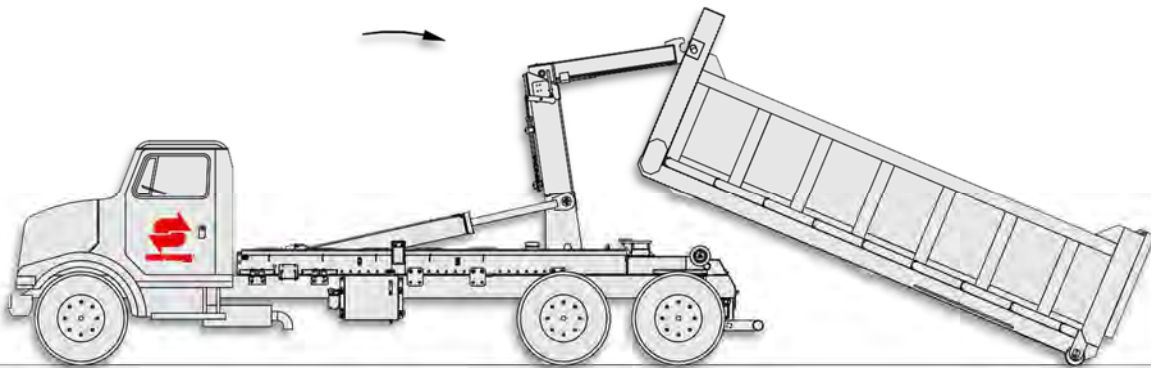
**CAUTION:**

**DO NOT RETRACT THE JIB WHILE DUMPING.** RETRACTING THE JIB DURING DUMPING MAY UNLOCK THE MECHANICAL JIB LATCHES WHICH COULD ALLOW THE CONTAINER TO CRASH DOWN ONTO THE HOIST AND/OR ABRUPTLY UNLOAD.

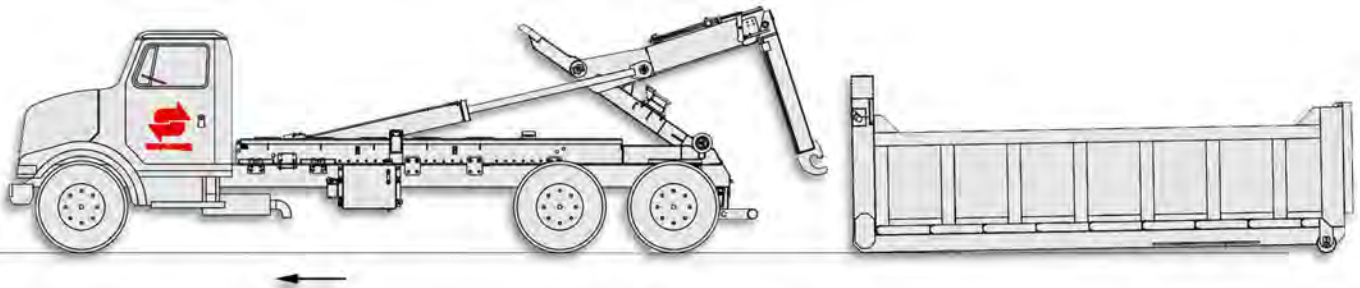
# PLACING A CONTAINER ON THE GROUND:



**STEP 1. DISENGAGE U-LOCK (IF INSTALLED ON HOIST). MOVE THE SLIDING JIB ALL THE WAY BACK (RIGHT CONTROL BACKWARD) UNTIL MECHANICAL JIB LATCHES UNLOCK.**



**STEP 2. TILT THE ARM BACKWARDS (LEFT CONTROL BACKWARD). WHEN THE CONTAINER TOUCHES THE GROUND, RELEASE THE BRAKES TO FREE THE TRUCK FOR FORWARD MOVEMENT CAUSED BY THE CONTAINER.**



**STEP 3. ROTATE JIB ALL THE WAY BACK UNTIL THE CONTAINER TOUCHES THE GROUND. PULL AWAY FROM CONTAINER AND ROTATE JIB BACK INTO THE TRANSPORT POSITION.**



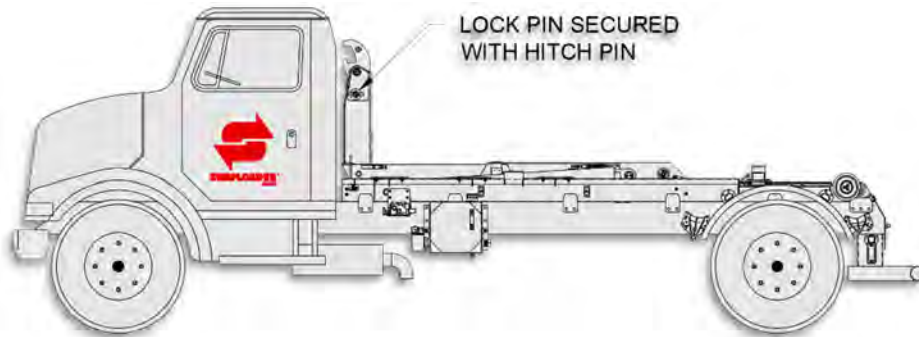
## WARNING:

1. **DON'T OVER SPEED THE PUMP 1,500 RPM MAXIMUM.**
2. **DON'T DUMP, MOUNT OR DISMOUNT BODIES ON UNEVEN GROUND.**
3. **DON'T DRIVE WITH THE HOIST IN THE DUMP POSITION OR WITH THE HOOK TILTED BACK.**

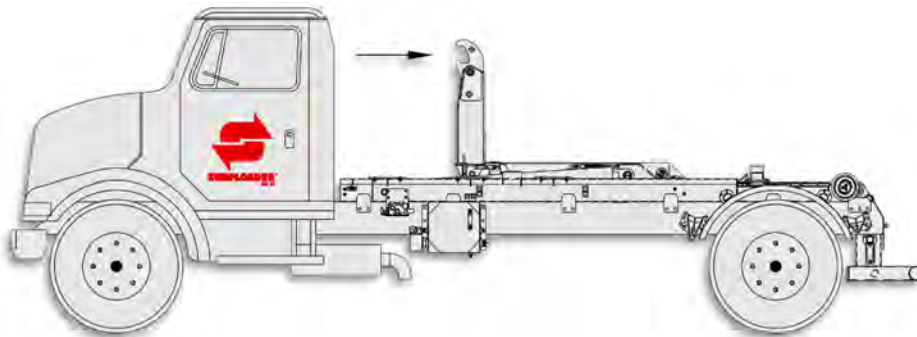


**CHANGING HOOK HEIGHT: 36" TO 54" (54" TO 62") JIB HT ADJUSTMENT PROCEDURE****CAUTION:**

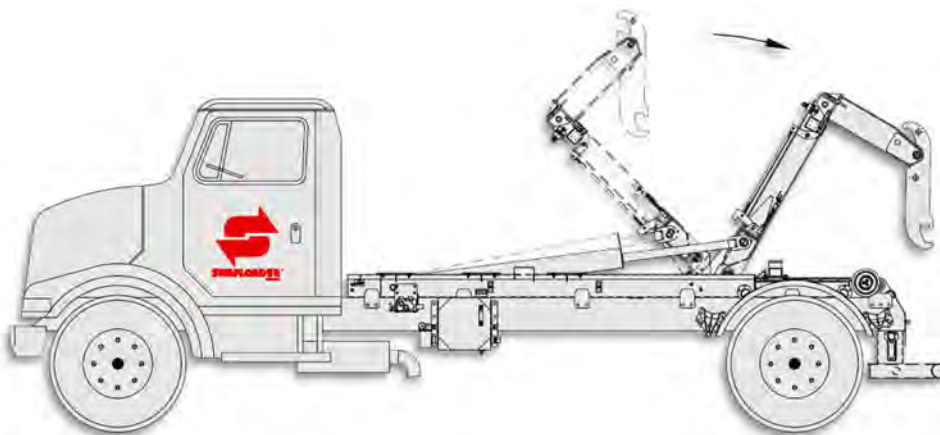
THE FOLLOWING IS THE RECOMMENDED PROCEDURE FOR CHANGING HOOK HEIGHTS ON THE ADJUSTABLE JIB FROM 36" TO 54" (54" TO 62") HEIGHTS. FAILURE TO FOLLOW AND ADHERE TO THIS PROCEDURE MAY RESULT IN POSSIBLE PROPERTY DAMAGE AND/OR PERSONAL INJURY. MAKE SURE WORK AREA IS CLEAR OF PEOPLE AND OBSTACLES PRIOR TO CHANGING THE HOOK HEIGHT ON THE ADJUSTABLE JIB.



**STEP 1.** WITH THE TELESCOPIC ARM IN THE TRANSPORT POSITION (AS SHOWN); REMOVE THE HITCH PIN FROM THE LOCK PIN. THEN PULL THE LOCK PIN LOOSE FROM THE JIB ARM.



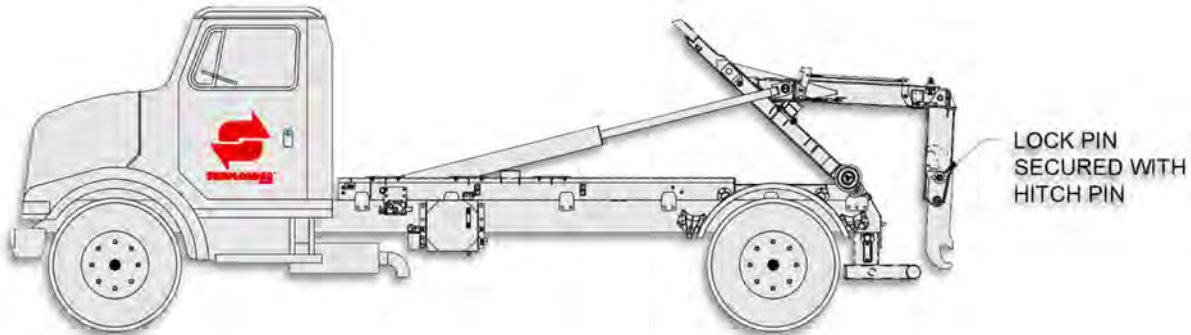
**STEP 2.** RETRACT THE JIB (RIGHT CONTROL LEVER BACKWARD).



**STEP 3.** TILT THE TELESCOPIC ARM REARWARD (LEFT CONTROL LEVER BACKWARD).



**CHANGING HOOK HEIGHT: 36" TO 54" (54" TO 62") JIB HT ADJUSTMENT PROCEDURE (cont'd)**

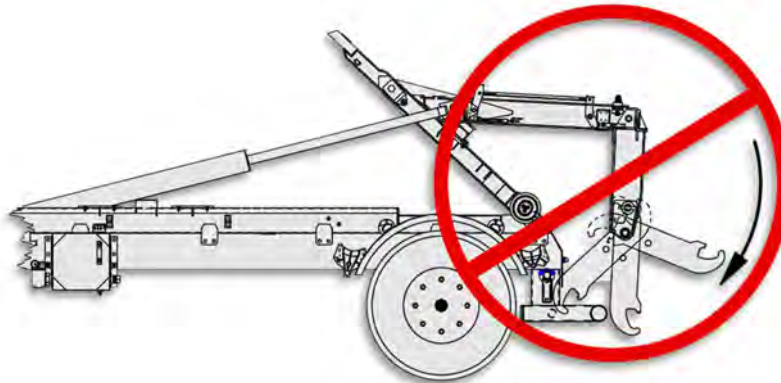


**STEP 4.** CONTINUE TO TILT TELESCOPIC ARM REARWARD UNTIL THE DUMP CYLINDERS ARE FULLY EXTENDED. REPLACE LOCK PIN AND SECURE WITH HITCH PIN.



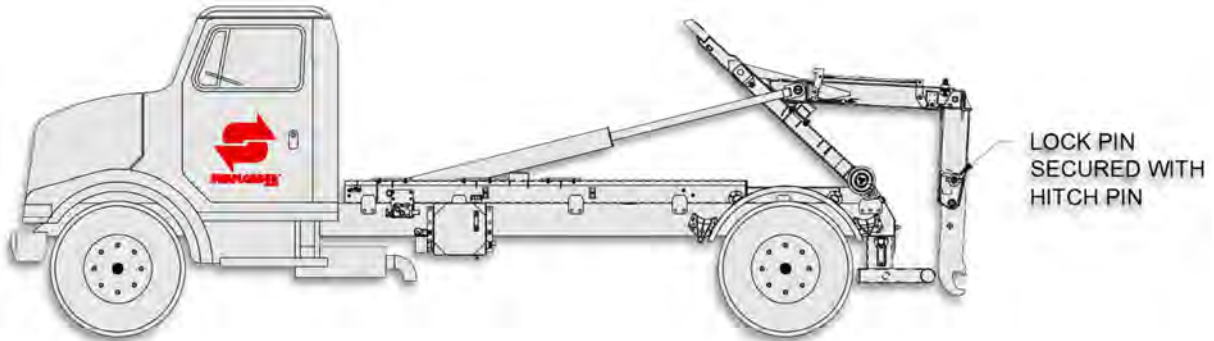
**WARNING:**

**DO NOT REMOVE LOCK PIN ON THE ADJUSTABLE JIB WHILE JIB IS IN THE 36" (54") HOOK POSITION AND THE TELESCOPIC ARM IS TILTED REARWARD (AS SHOWN). POSSIBLE PROPERTY DAMAGE AND/OR PERSONAL INJURY MAY RESULT.**

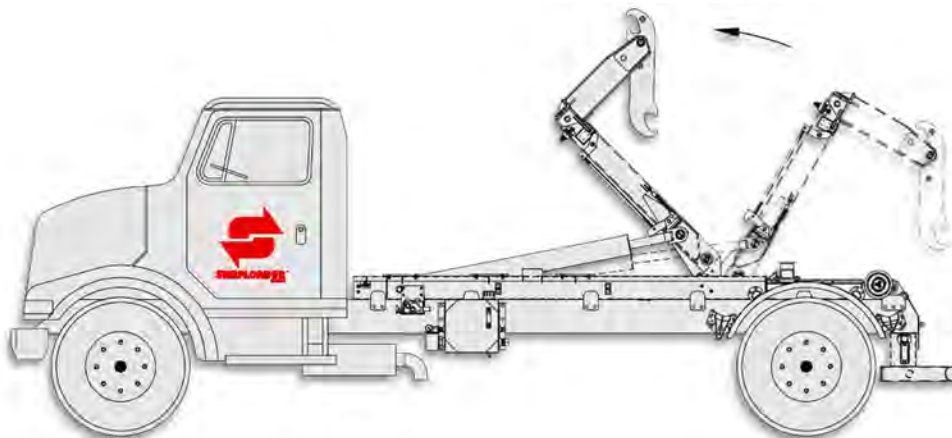


**CHANGING HOOK HEIGHT: 54" TO 36" (62" TO 54") JIB HT ADJUSTMENT PROCEDURE****CAUTION:**

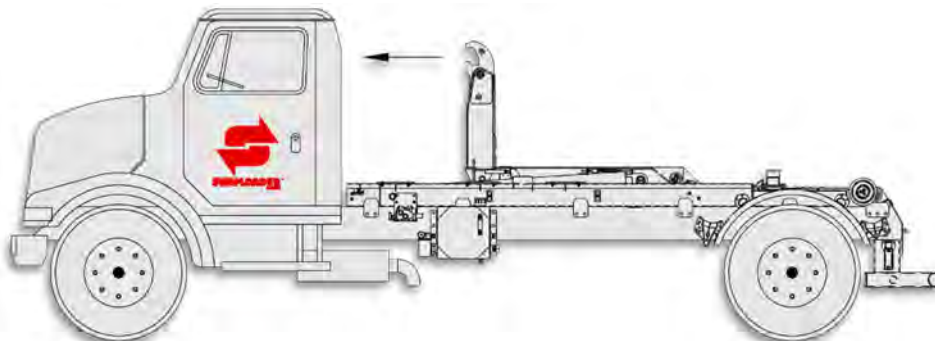
THE FOLLOWING IS THE RECOMMENDED PROCEDURE FOR CHANGING HOOK HEIGHTS ON THE ADJUSTABLE JIB FROM 54" TO 36" (62" TO 54") HEIGHTS. FAILURE TO FOLLOW AND ADHERE TO THIS PROCEDURE MAY RESULT IN POSSIBLE PROPERTY DAMAGE AND/OR PERSONAL INJURY. MAKE SURE WORK AREA IS CLEAR OF PEOPLE AND OBSTACLES PRIOR TO CHANGING THE HOOK HEIGHT ON THE ADJUSTABLE JIB.



**STEP 1.** WITH THE TELESCOPIC ARM IN FULL LOAD/UNLOAD POSITION (AS SHOWN); REMOVE THE HITCH PIN FROM THE LOCK PIN. THEN PULL THE LOCK PIN LOOSE FROM THE JIB ARM.



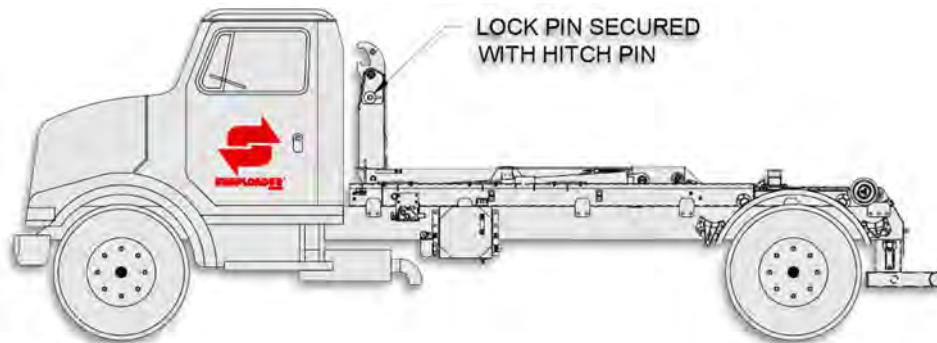
**STEP 2.** TILT THE TELESCOPIC ARM TOWARD THE CAB (LEFT CONTROL LEVER FORWARD).



**STEP 3.** EXTEND THE JIB TOWARD THE CAB (RIGHT CONTROL LEVER FORWARD).



**CHANGING HOOK HEIGHT: 54" TO 36" (62" TO 54") JIB HT ADJUSTMENT PROCEDURE (cont'd)**

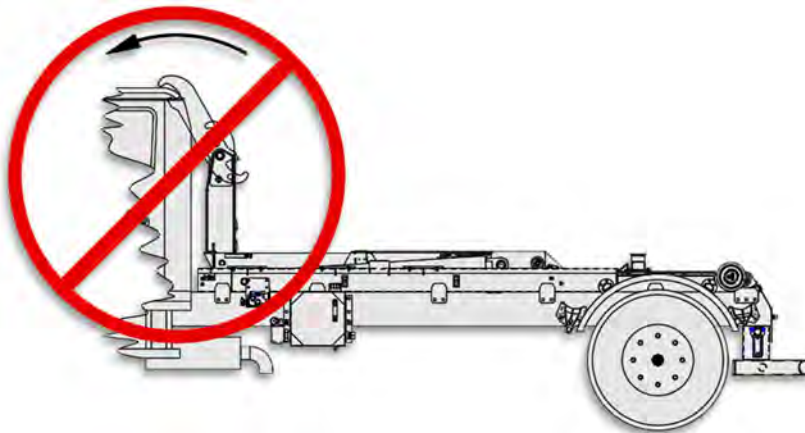


**STEP 4.** WITH THE TELESCOPIC JIB FULLY EXTENDED IN THE TRANSPORT POSITION (AS SHOWN); REPLACE THE LOCK PIN AND SECURE WITH HITCH PIN.



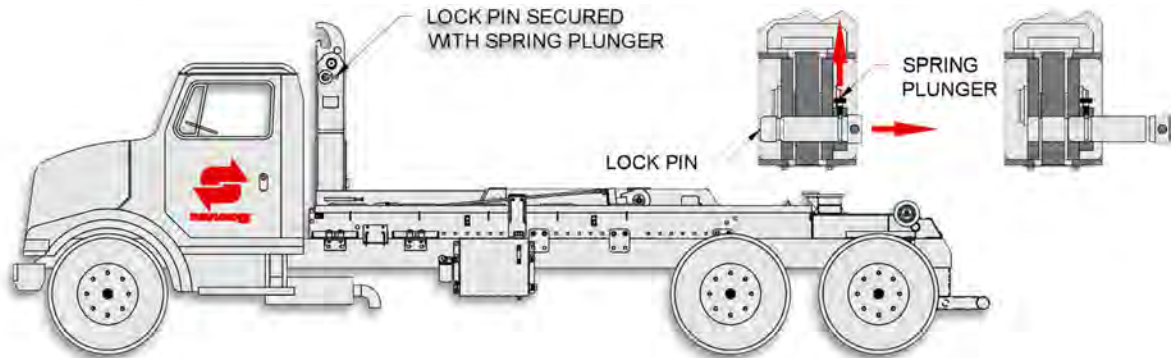
**WARNING:**

**DO NOT REMOVE LOCK PIN ON THE ADJUSTABLE JIB WHILE JIB IS IN THE 54" (62") HOOK POSITION AND THE TELESCOPIC ARM IN TRANSPORT POSITION (AS SHOWN). POSSIBLE PROPERTY DAMAGE AND/OR PERSONAL INJURY MAY RESULT.**

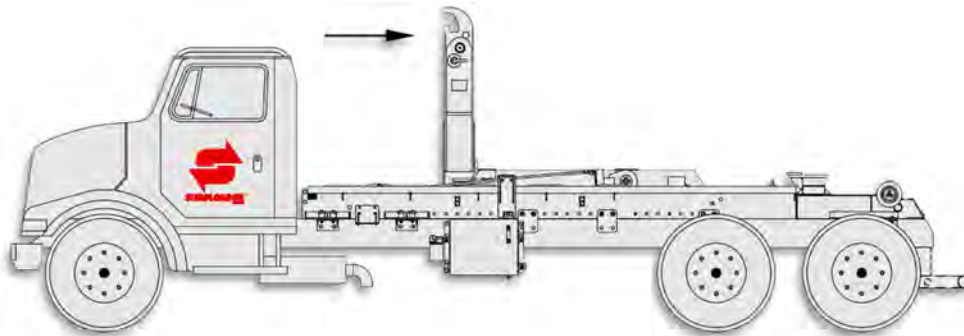


**CHANGING HOOK HEIGHT: 54" TO 62" JIB HT ADJUSTMENT PROCEDURE – X-HD SERIES****CAUTION:**

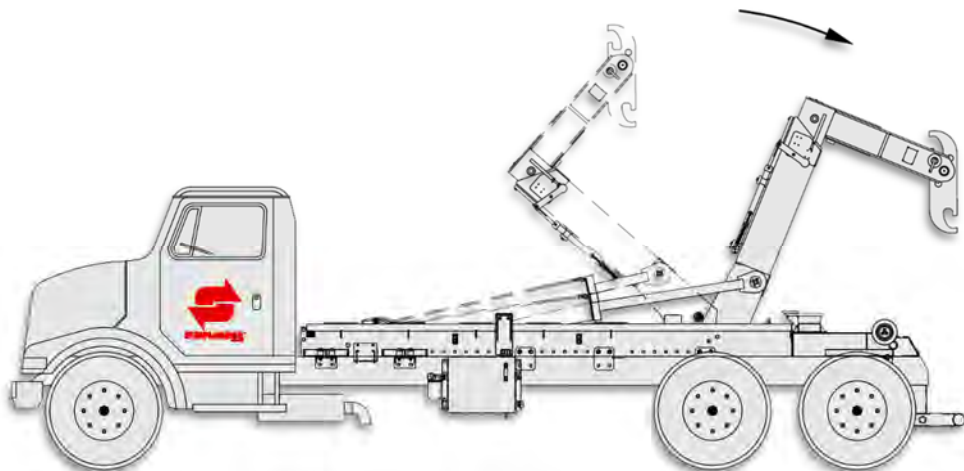
THE FOLLOWING IS THE RECOMMENDED PROCEDURE FOR CHANGING HOOK HEIGHTS ON THE ADJUSTABLE JIB FROM 54" TO 62" HEIGHTS. FAILURE TO FOLLOW AND ADHERE TO THIS PROCEDURE MAY RESULT IN POSSIBLE PROPERTY DAMAGE AND/OR PERSONAL INJURY. MAKE SURE WORK AREA IS CLEAR OF PEOPLE AND OBSTACLES PRIOR TO CHANGING THE HOOK HEIGHT ON THE ADJUSTABLE JIB.



**STEP 1.** WITH THE TELESCOPIC ARM IN THE TRANSPORT POSITION (AS SHOWN); PULL THE SPRING PLUNGER TO ALLOW THE LOCK PIN TO SLIDE. PULL THE LOCK PIN OUT UNTIL THE SPRING PLUNGER CATCHES IT.

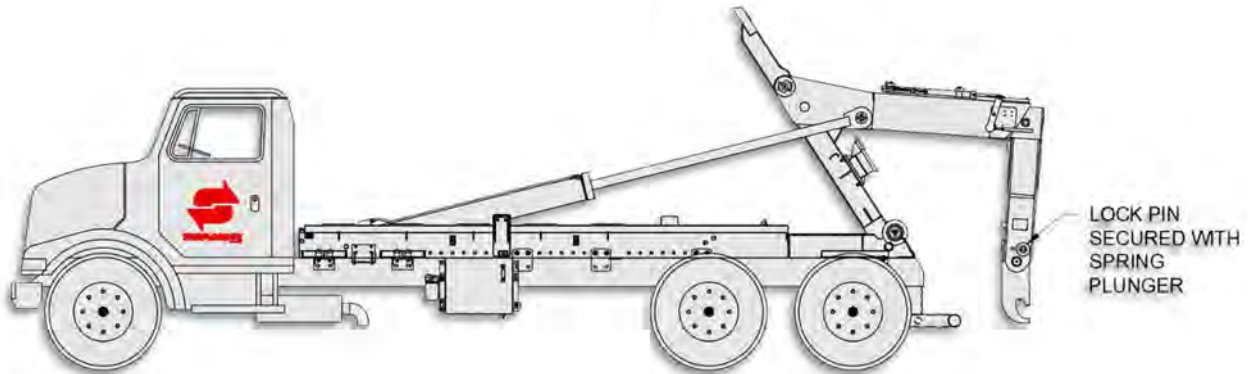


**STEP 2.** RETRACT THE JIB (RIGHT CONTROL LEVER BACKWARD).



**STEP 3.** TILT THE TELESCOPIC ARM REARWARD (LEFT CONTROL LEVER BACKWARD).

**CHANGING HOOK HEIGHT: 54" TO 62" JIB HT ADJUSTMENT PROCEDURE – X-HD SERIES (cont'd)**

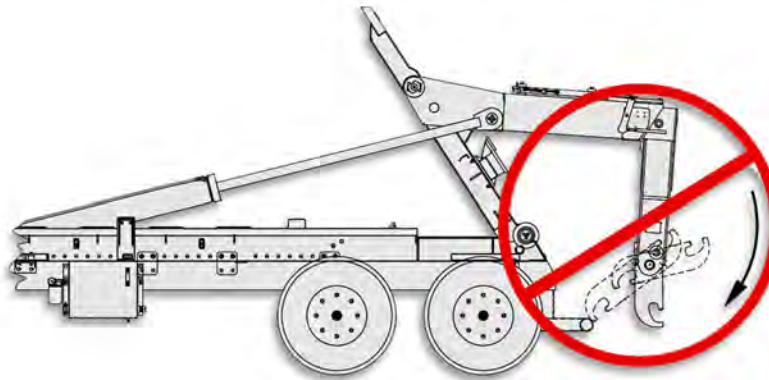


**STEP 4.** CONTINUE TO TILT TELESCOPIC ARM REARWARD UNTIL THE DUMP CYLINDERS ARE FULLY EXTENDED. PUSH LOCK PIN BACK IN UNTIL SPRING PLUNGER ENGAGES. ENSURE PIN IS LOCKED IN PLACE.



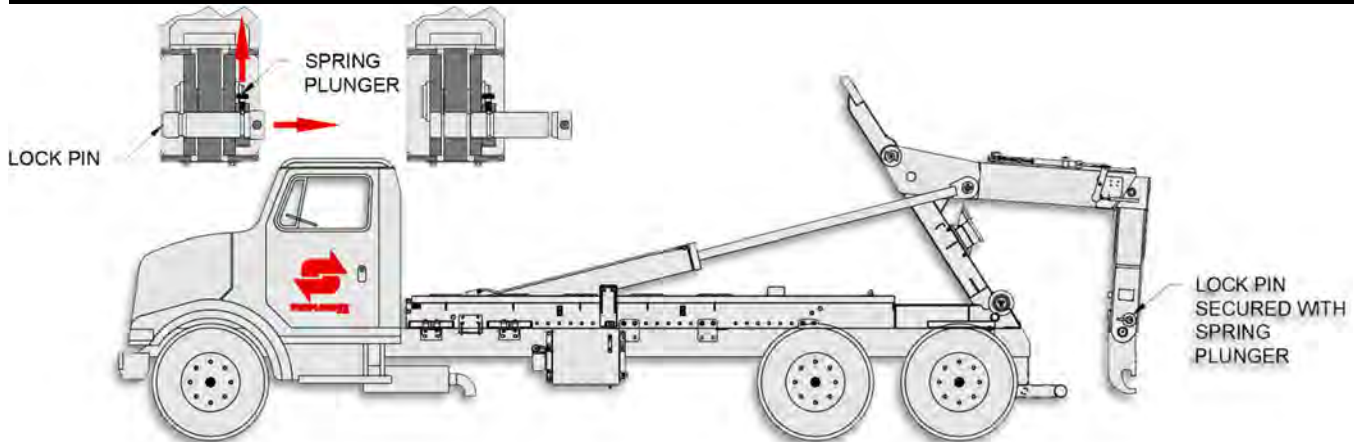
**WARNING:**

**DO NOT REMOVE LOCK PIN ON THE ADJUSTABLE JIB WHILE JIB IS IN THE 54" HOOK POSITION AND THE TELESCOPIC ARM IS TILTED REARWARD (AS SHOWN). POSSIBLE PROPERTY DAMAGE AND/OR PERSONAL INJURY MAY RESULT.**

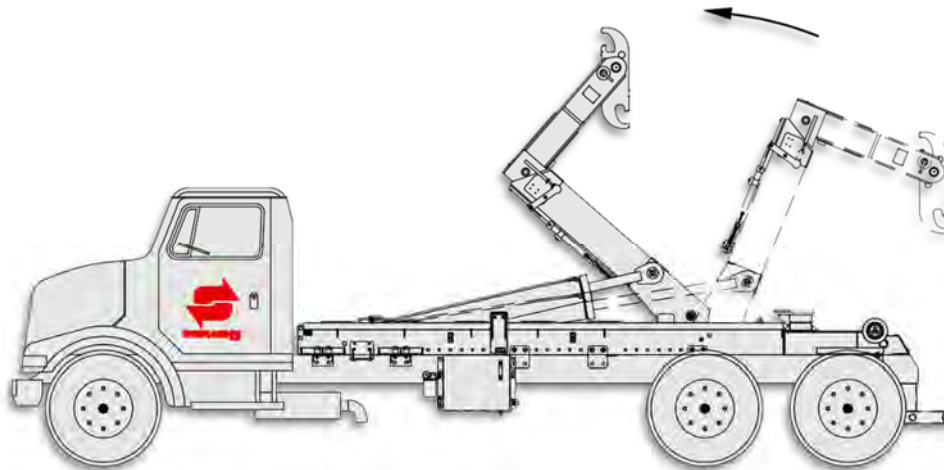


**CHANGING HOOK HEIGHT: 62" TO 54" JIB HT ADJUSTMENT PROCEDURE- X-HD SERIES****CAUTION:**

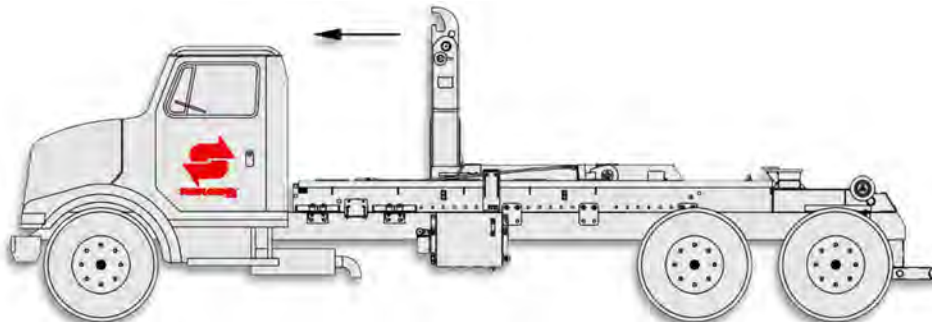
THE FOLLOWING IS THE RECOMMENDED PROCEDURE FOR CHANGING HOOK HEIGHTS ON THE ADJUSTABLE JIB FROM 62" TO 54" HEIGHTS. FAILURE TO FOLLOW AND ADHERE TO THIS PROCEDURE MAY RESULT IN POSSIBLE PROPERTY DAMAGE AND/OR PERSONAL INJURY. MAKE SURE WORK AREA IS CLEAR OF PEOPLE AND OBSTACLES PRIOR TO CHANGING THE HOOK HEIGHT ON THE ADJUSTABLE JIB.



**STEP 1.** WITH THE TELESCOPIC ARM IN FULL LOAD/UNLOAD POSITION (AS SHOWN); PULL THE SPRING PLUNGER TO ALLOW THE LOCK PIN TO SLIDE. PULL THE LOCK PIN OUT UNTIL THE SPRING PLUNGER CATCHES IT.

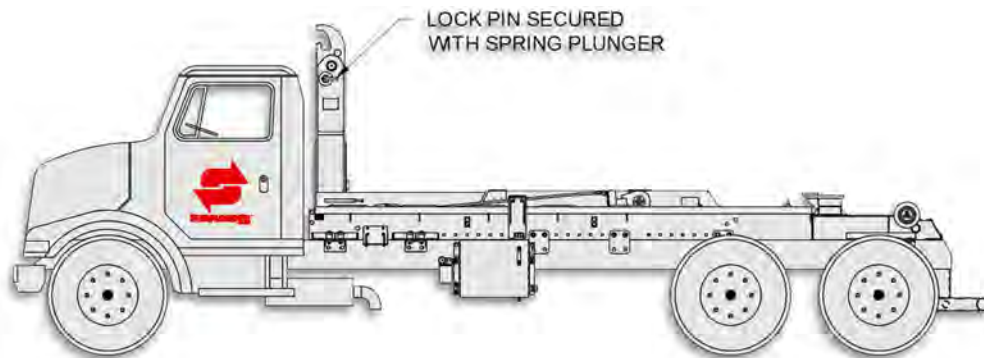


**STEP 2.** TILT THE TELESCOPIC ARM TOWARD THE CAB (LEFT CONTROL LEVER FORWARD).



**STEP 3.** EXTEND THE JIB TOWARD THE CAB (RIGHT CONTROL LEVER FORWARD).

**CHANGING HOOK HEIGHT: 62" TO 54" JIB HT ADJUSTMENT PROCEDURE- X-HD SERIES (cont'd)**

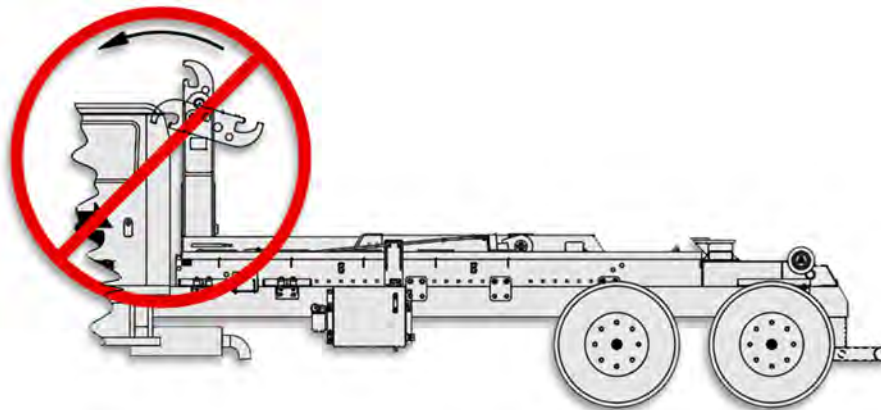


**STEP 5.** WITH THE TELESCOPIC JIB FULLY EXTENDED IN THE TRANSPORT POSITION (AS SHOWN); PUSH LOCK PIN BACK IN UNTIL SPRING PLUNGER ENGAGES.



**WARNING:**

**DO NOT REMOVE LOCK PIN ON THE ADJUSTABLE JIB WHILE JIB IS IN THE 62" HOOK POSITION AND THE TELESCOPIC ARM IN TRANSPORT POSITION (AS SHOWN). POSSIBLE PROPERTY DAMAGE AND/OR PERSONAL INJURY MAY RESULT.**

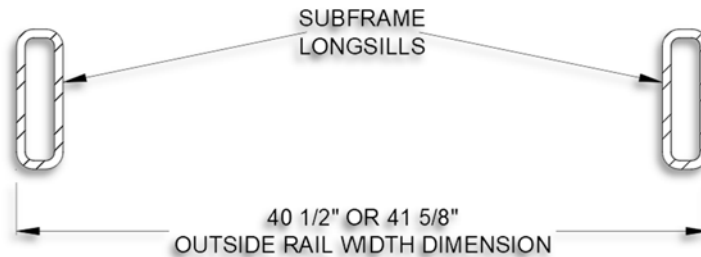




## **REAR ROLLER SPACING ADJUSTMENT INSTRUCTIONS**

Industry standard for the outside rail width dimension on subframe longsills is either 40 1/2" or 41-5/8" (see illustration below). For most 35 5/8" hook height (100 series) and 53 7/8" hook height (200/300 series) subframes the outside width dimension of the longsill rails is 41 5/8". For most 61 3/4" hook height (400 series) subframes the outside width dimension of the longsill rails is 40 1/2".

*From this point forward we will refer to the rear rollers' setup for 40 1/2" outside width as 'narrow spacing' and rear rollers setup for 41 5/8" outside width as 'wide spacing'.*



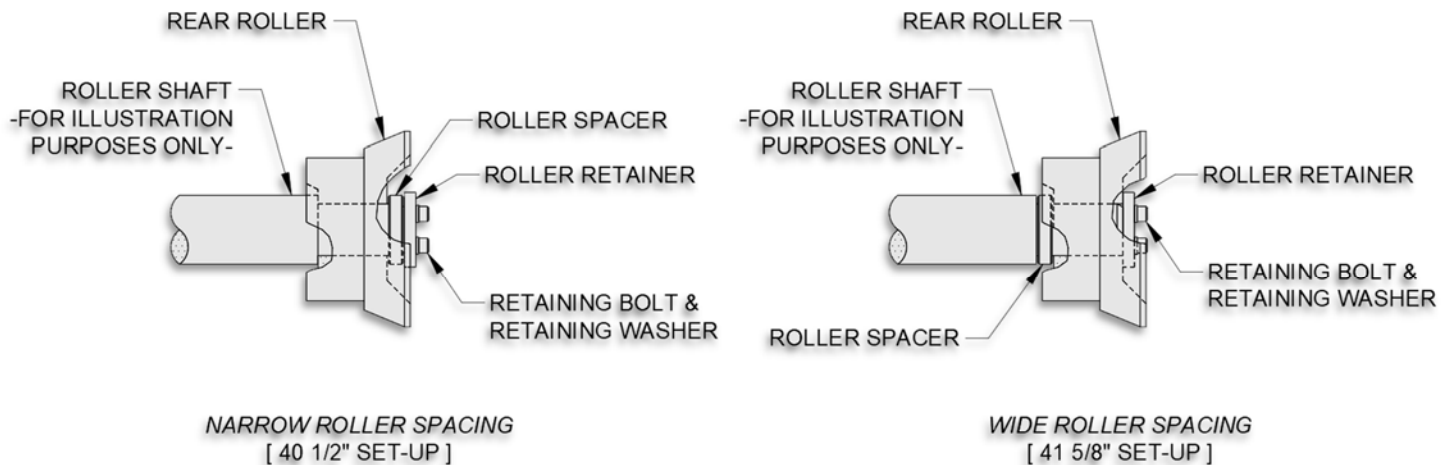
## **SUBFRAME STANDARD WIDTHS**

### **HOIST STANDARD:**

All SwapLoader hooklift hoists are made so that the rear rollers can be spaced at either the wide spacing or narrow spacing depending on the subframe design (the only exception is the SL-105 which can only accommodate a 'wide spacing' or 41 5/8" outside width). Unless instructed otherwise SwapLoader will ship hoists with the rear rollers setup per the previously discussed industry standard for a given hook height of subframe, or as detailed in the chart below.

<b>SUBFRAME HOOK HEIGHT (SERIES)</b>	<b>HOIST MODELS</b>	<b>STANDARD ROLLER SPACING</b>
35 5/8" (100 SERIES)	SL-75, SL-105, SL-145, SL-160, SL-180, SL-185, SL-212, SL-214	41 5/8" (WIDE WIDTH)
53 7/8" (200 & 300 SERIES)	SL-220, SL-222, SL-240, SL-2418	41 5/8" (WIDE WIDTH)
61 3/4" (400 SERIES)	SL-330, SL-400, SL-406, SL-412, SL-418X, SL-518, SL-518X, SL-520, SL-520X, SL-650	40 1/2" (NARROW WIDTH)

## REAR ROLLER SPACING ADJUSTMENT INSTRUCTIONS (cont'd)



## REAR ROLLER NARROW & WIDE SPACING ILLUSTRATION

### NARROW TO WIDE ROLLER SPACING ADJUSTMENT:

To change a hoist from the narrow roller spacing to a wide roller spacing follow these instructions:

1. Loosen and remove the retaining bolts, washers, and roller retainer.
2. Remove the roller spacer and rear roller from the hoist roller shaft.
3. Place the roller spacer on first; then place the rear roller back on the roller shaft.
4. Replace and tighten the retaining bolts, retaining washer and roller retainer.

### WIDE TO NARROW ROLLER SPACING ADJUSTMENT:

To change a hoist from the wide roller spacing to a narrow roller spacing follow these instructions:

1. Loosen and remove the retaining bolts, washers, and roller retainer.
2. Remove the rear roller and roller spacer from the hoist roller shaft.
3. Place the rear roller on first; then place the roller spacer back on the roller shaft.
4. Replace and tighten the retaining bolts, washers, and roller retainer.

#### NOTE:

SWAPLOADER ADVISES REPLACING NORD LOCK WASHERS WITH NEW. APPLY LOCTITE TO ALL BOLTS AND FOLLOW THE TORQUE SPECS PROVIDED.

#### HEX HEAD CAP SCREW TORQUE SPECS

BOLT SIZE	SAE GR 8 W/ LOCK WASHER (FT-LBS)
3/8	53
7/16	85
1/2	130
5/8	258
3/4	459
7/8	739
1	1108

Note: Apply Loctite 243 (Blue) to all bolts.

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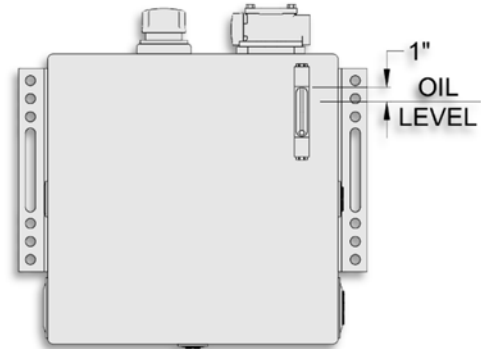


MAINTENANCE

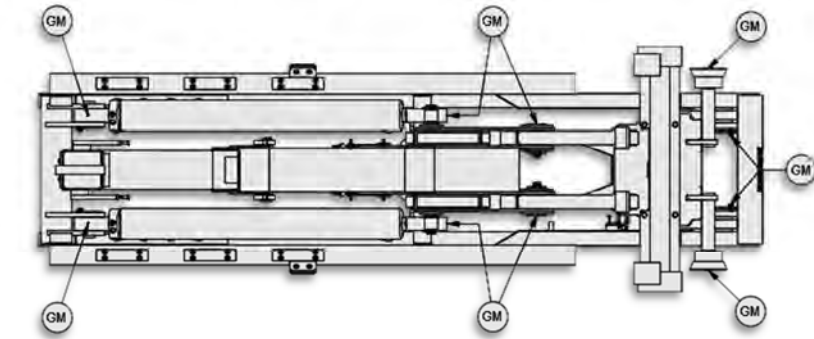
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## MAINTENANCE INSTRUCTIONS

<p style="text-align: center;"><b>WEEKLY SERVICE</b> <b>(50 OPERATIONS)</b></p>	<ol style="list-style-type: none"> <li>Lubricate with grease (refer to lubrication diagram). <ul style="list-style-type: none"> <li>Lifting hook on jib (if operating the adjustable jib be sure to rotate and grease hook).</li> <li>Jib slide - top, bottom, and side guides.</li> </ul> </li> <li>Check hydraulic oil level. with the hoist in the transport position (lift cylinders retracted and jib cylinder extended) the oil level in the tank should read approximately one inch below the top of the glass sight on the temperature/sight gauge (see diagram →).</li> <li>Check hydraulic hose and fittings for leaks. Also check hydraulic hose for wear. Repair and/or retighten as necessary.</li> </ol>
<p style="text-align: center;"><b>MONTHLY SERVICE</b> <b>(200 OPERATIONS)</b></p>	<ol style="list-style-type: none"> <li>Lubricate with grease (refer to lubrication diagram) <ul style="list-style-type: none"> <li>Fittings on lift cylinders (quantity: 4).</li> <li>Front pins on rear pivot joint weldment (quantity: 2).</li> <li>Fittings on rear pivot pins and rollers (quantity: 4).</li> </ul> </li> <li>Check all bolts and retighten as required.</li> <li>Check adjustments on mast lock (safety latch) mechanism. Refer to the <u>Mast Lock Inspection &amp; Adjustment Instructions</u>.</li> <li>Check adjustments on the jib lockout valve. Refer to the <u>Jib Lockout Valve Inspection &amp; Adjustment Instructions</u>.</li> </ol>
<p style="text-align: center;"><b>YEARLY SERVICE</b></p>	<ol style="list-style-type: none"> <li>Check for proper gapping on outer tube. Refer to the <u>Outer Tube and Jib Wear Pad Replacement Instructions</u>.</li> <li>Change hydraulic oil, replace hydraulic filter element, and wash out suction strainer.</li> <li>Check main relief valve setting. Refer to the <u>Pressure Check Instructions</u>.</li> </ol>



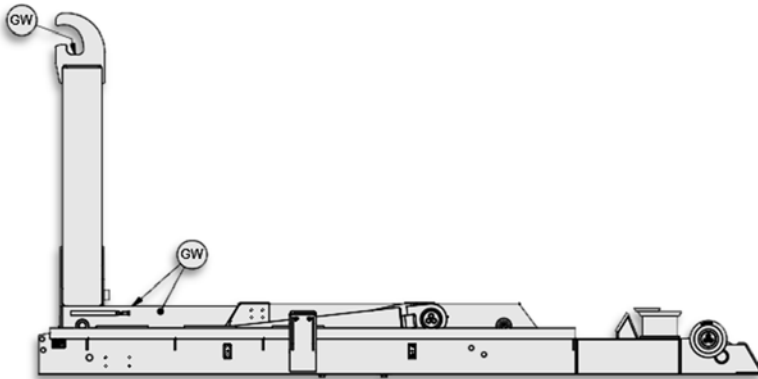
## LUBRICATION DIAGRAM



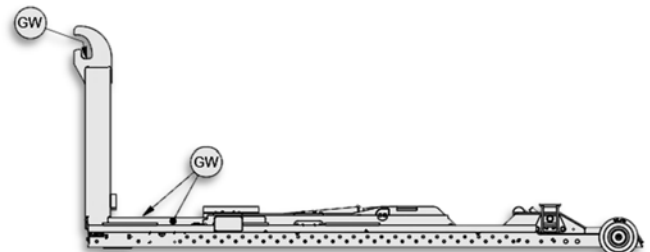
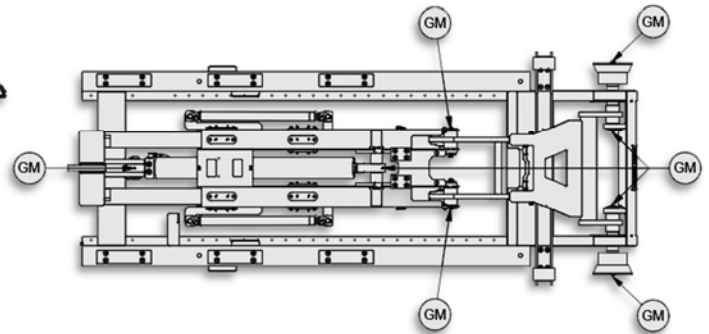
### LEGEND

GW = Grease Weekly

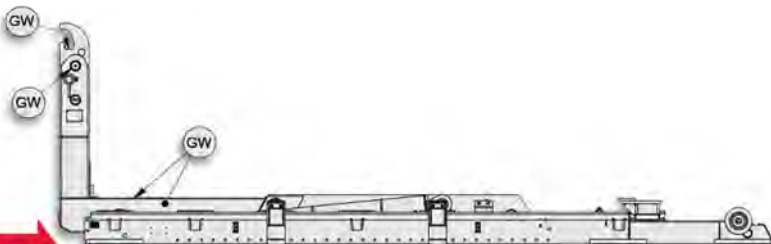
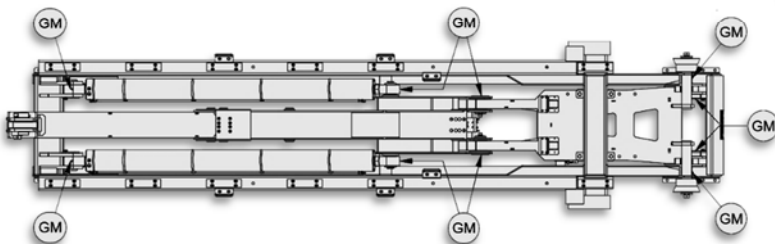
GM = Grease Monthly



100/200/400/HD SERIES



SL-75



X-HD SERIES

## **MAST LOCK INSPECTION & ADJUSTMENT INSTRUCTIONS**

All SwapLoader hook-lift hoists come with a Mast Lock (Pivot Lock) Assembly that is located on the bottom side of the outer tube. When the jib is extended the mast lock then engages the latch bar(s) on the pivot joint, making the jib, outer tube, and pivot joint into a continuous member for raising the container or body up into a dump mode.

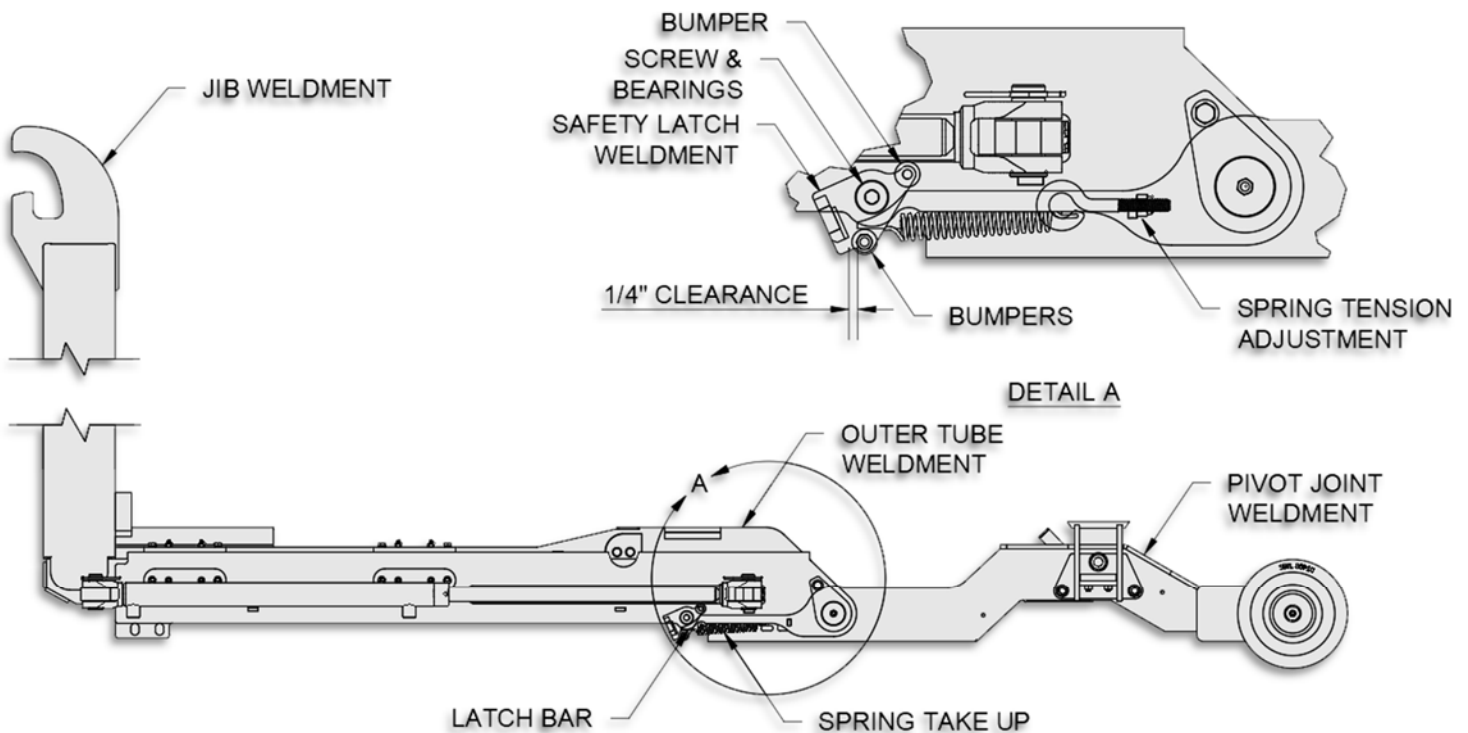
With the jib fully retracted the Mast Lock then disengages the latch bars on the Pivot Joint allowing the hook-lift to enter the mount-dismount cycle by pivoting around the front pins of the pivot joint. A properly adjusted Mast Lock will function smoothly and clear the latch bars on the pivot joint approximately a  $\frac{1}{4}$ " (see illustrations for the appropriate model or series).

### **INSPECTION**

The Mast Lock (Pivot Lock) Assembly comes adjusted from the factory and should provide years of trouble-free operation, however there may come a time when an adjustment may be required. Prior to making any adjustments, SwapLoader recommends that you begin with inspecting all mast lock components for damage or wear (see illustrations for the appropriate model or series).

### **SL-75**

Inspect the Mast Lock Assembly; look for any missing or bent components such as bumpers, bearings, ears, or screws. Repair or replace any missing or bent components prior to making



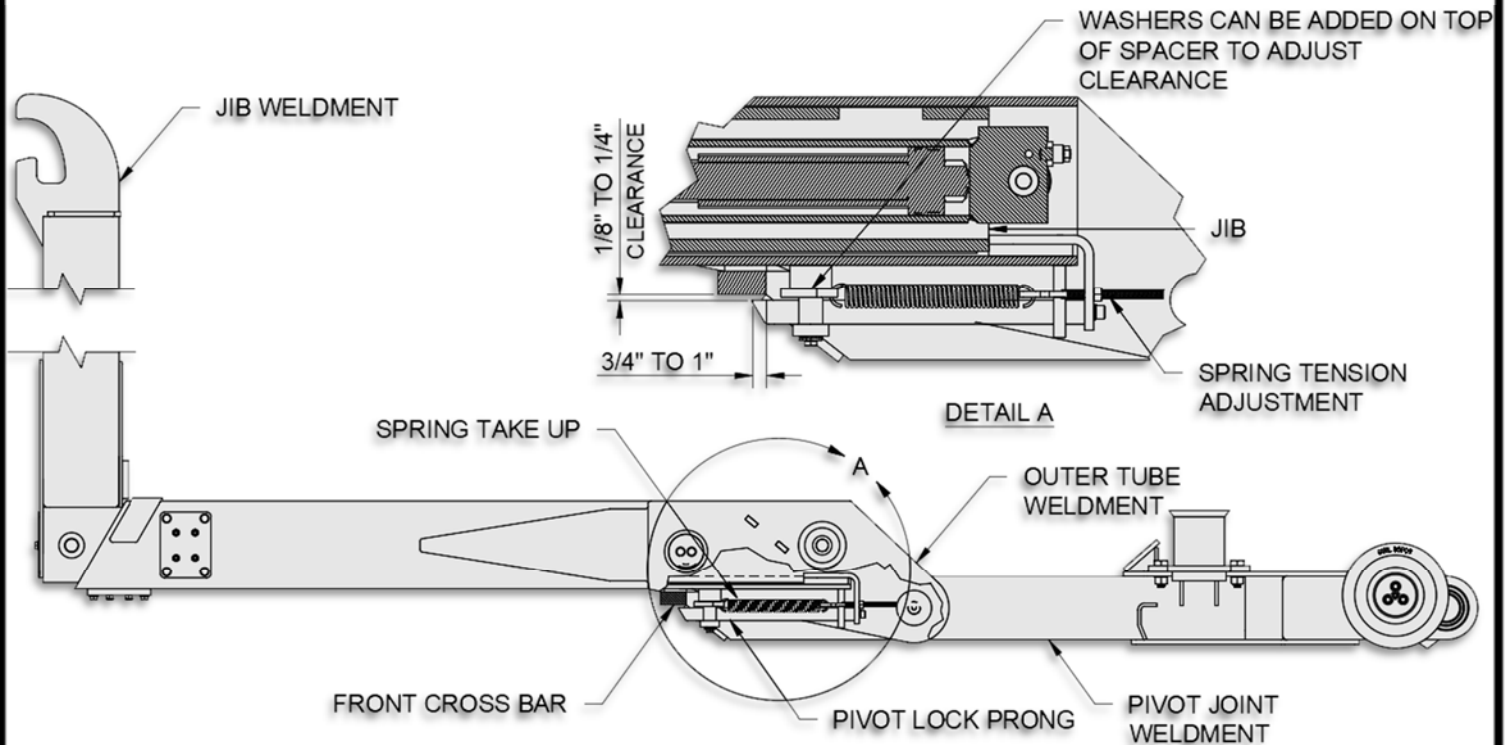
### **SL-75 MAST LOCK LOCATION AND ADJUSTMENT ILLUSTRATION**

(shown with the jib retracted)

any adjustment to the Mast Lock Assembly; refer to the Mast Lock (Pivot Lock) Assembly in the Parts & Installation manual for proper part numbers and identification of the components.

### 100 SERIES HOISTS

Inspect the Mast Lock; make sure the latch bar is not bent and there is no missing hardware. Repair or replace any missing or bent components; refer to the Mast Lock (Pivot Lock)



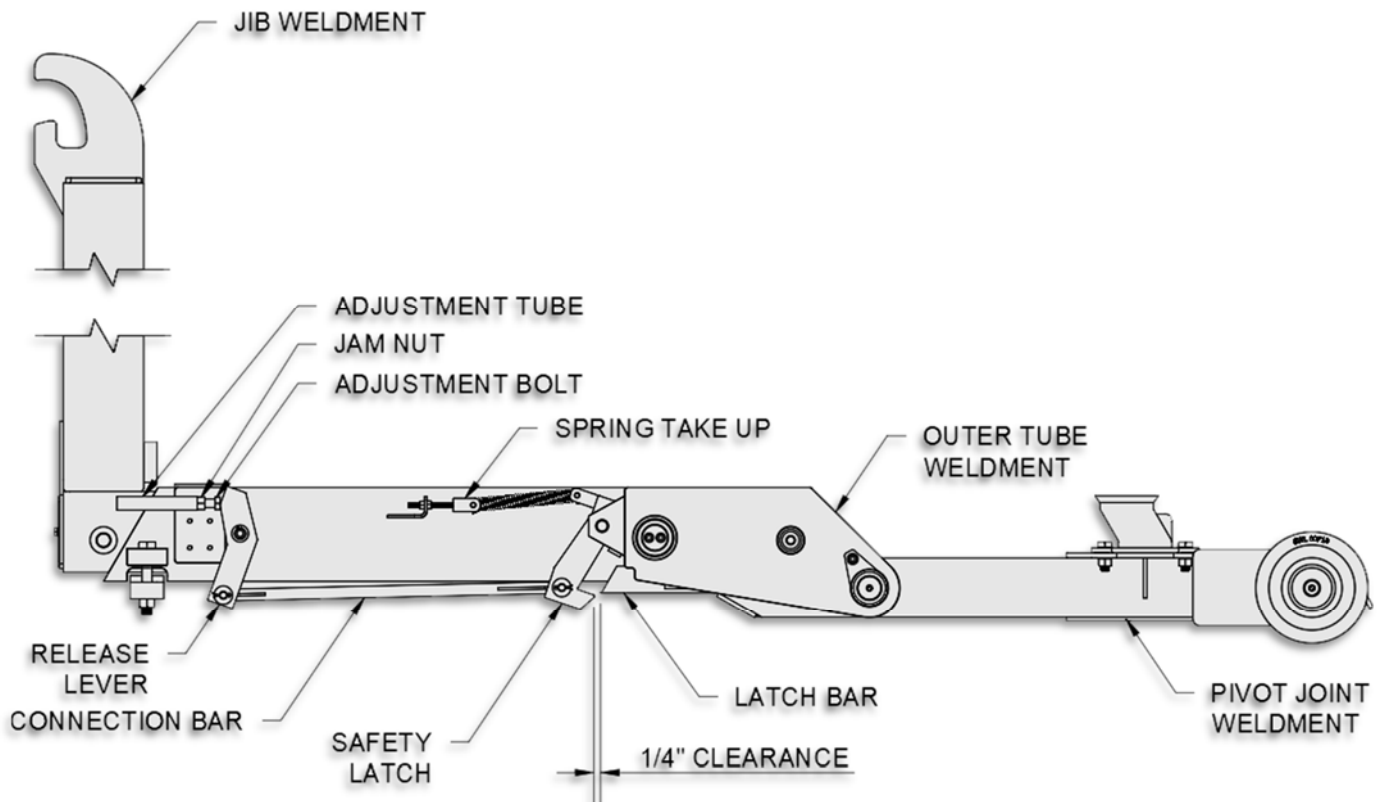
### 100 SERIES MAST LOCK LOCATION ILLUSTRATION

(shown with the jib retracted)

Assembly in the Parts & Installation manual for proper part numbers and identification of the components. Proper engagement of the Pivot Lock Prong under the Front Cross Bar is 3/4" to 1" when the jib is extended with 1/8" to 1/4" of clearance.

## 200 SERIES HOISTS

Inspect the adjustment tube and bolt on the jib; make sure nothing is missing or bent. Inspect the release lever and connection bar on; look for any missing or bent components such as ears or pins. Repair or replace any missing or bent components prior to making any adjustment to the mast lock assembly; refer to the Mast Lock (Pivot Lock) Assembly in the Parts & Installation manual for proper part numbers and identification of the components.

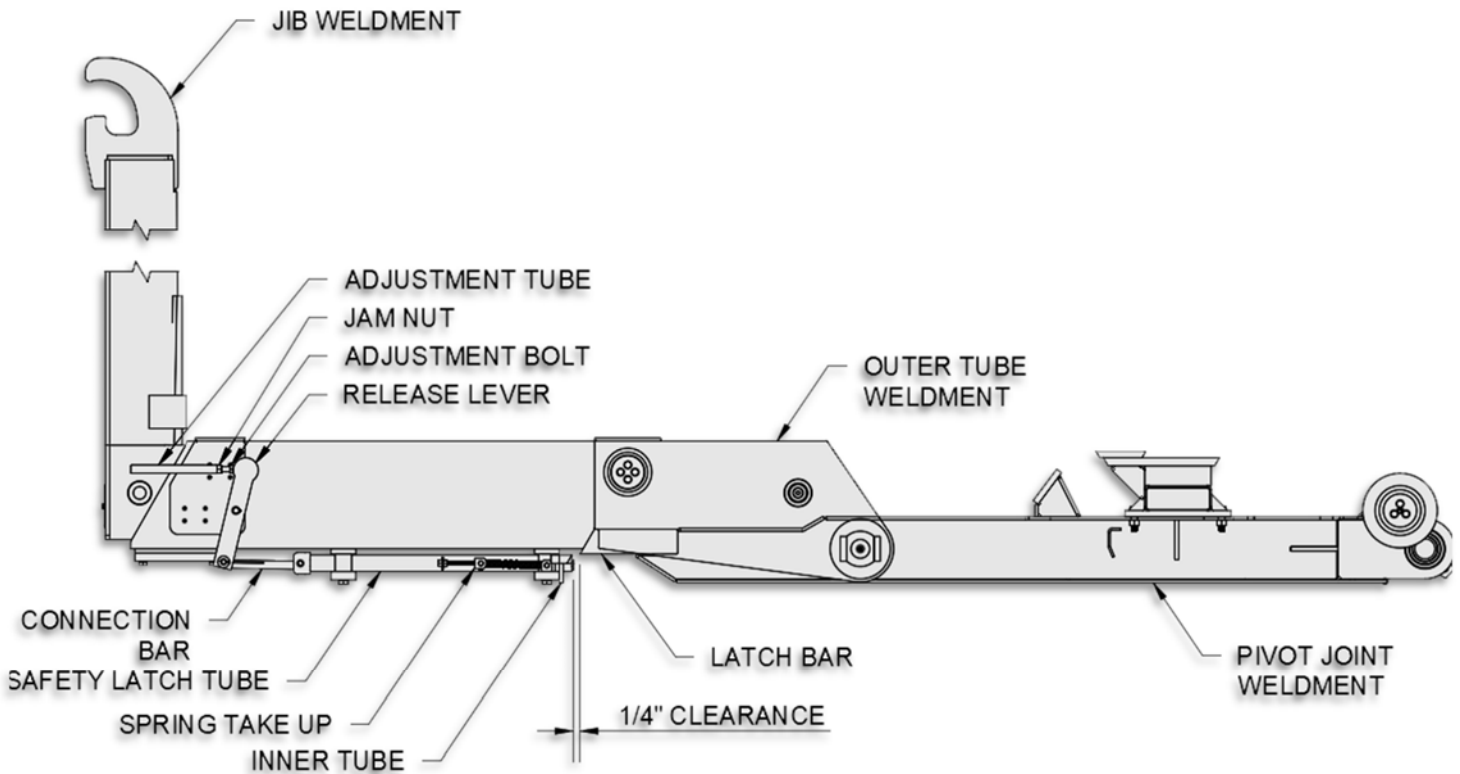


**200 SERIES MAST LOCK LOCATION AND ADJUSTMENT ILLUSTRATION**

(shown with the jib retracted)

### 400 & HD SERIES HOISTS

Inspect the adjustment tube and bolt on the jib; make sure nothing is missing or bent. Inspect the release lever and connection bar on; look for any missing or bent components such as ears or pins. Inspect the Mast Lock; again, make sure there are no missing or bent components. Repair or replace any missing or bent components prior to making any adjustment to the mast lock assembly; refer to the Mast Lock (Pivot Lock) Assembly in the Parts & Installation manual for proper part numbers and identification of the components.



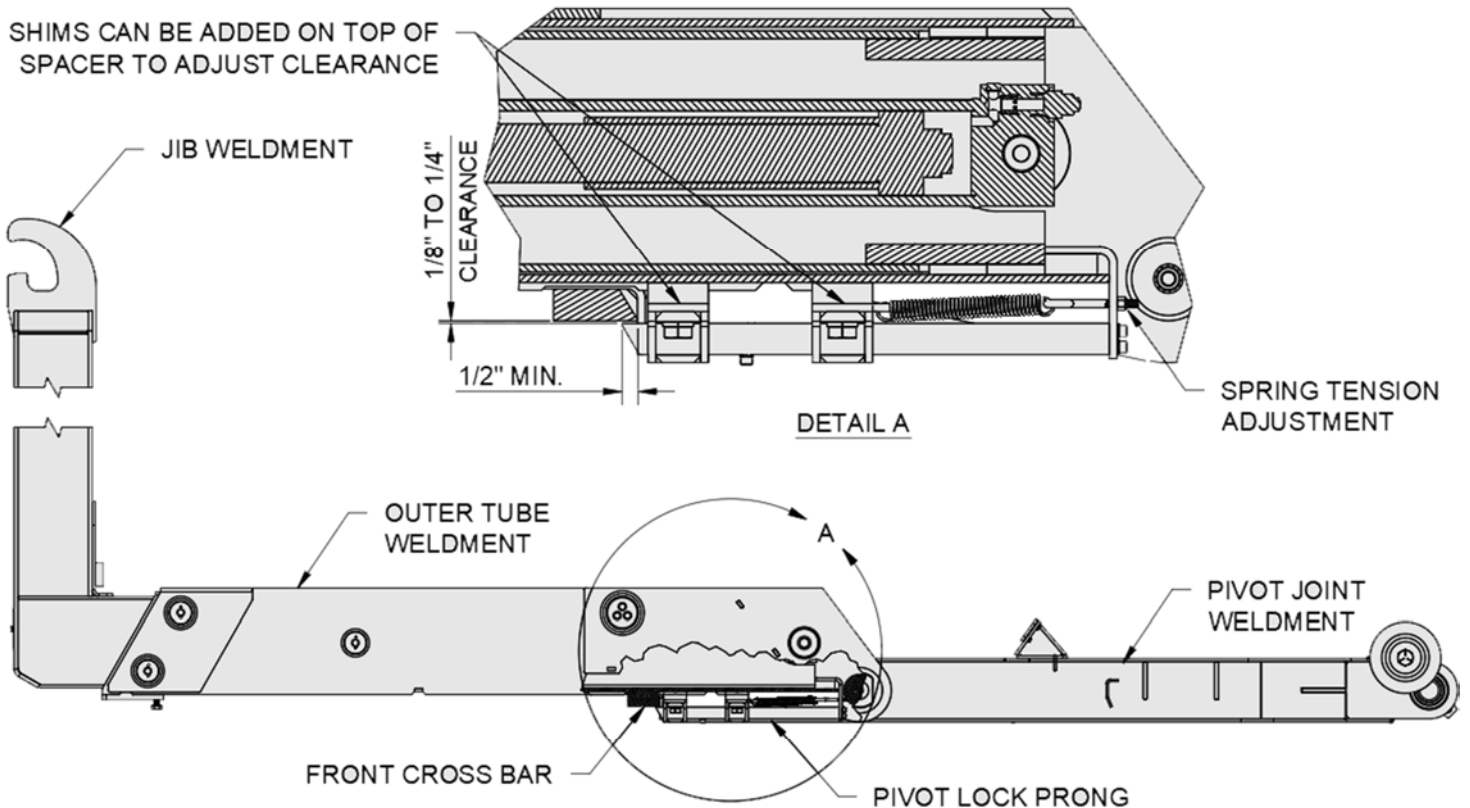
#### **400 & HD SERIES MAST LOCK LOCATION AND ADJUSTMENT ILLUSTRATION**

(shown with the jib retracted)



## X-HD SERIES HOISTS

Inspect the mast lock (see illustration below); again, make sure the pivot lock prong is not bent and there is no missing hardware. Repair or replace any missing or bent components; refer to the Mast Lock (Pivot Lock) Assembly in the Parts & Installation manual for proper part numbers and identification of the components. Proper engagement of the Pivot Lock Prong under the Front Cross Bar is  $1/2"$  to  $3/4"$  when the jib is extended with  $1/8"$  to  $1/4"$  of clearance.



### X-HD SERIES MAST LOCK LOCATION AND ADJUSTMENT ILLUSTRATION

(shown with the jib retracted)

#### ADJUSTMENT

If after inspecting all Mast Lock components and making any necessary repairs the gap between the mast lock and latch bars on the pivot joint is still incorrect, then an adjustment will need to be made. Please complete the following steps:

1. Retract the jib until the cylinder completely bottoms out (fully retracted).
2. Inspect gap between mast lock latch and the latch bar on the pivot joint. Check for the correct clearances (if incorrect proceed to steps 3-5).
3. Loosen jam nut on the adjustment bolt.
4. Turn adjustment bolt; counterclockwise to increase gap or clockwise to decrease the gap.
5. Once the  $1/4"$  clearance is achieved, tighten the jam nut. Make sure to hold the adjustment bolt from turning when tightening the jam nut.

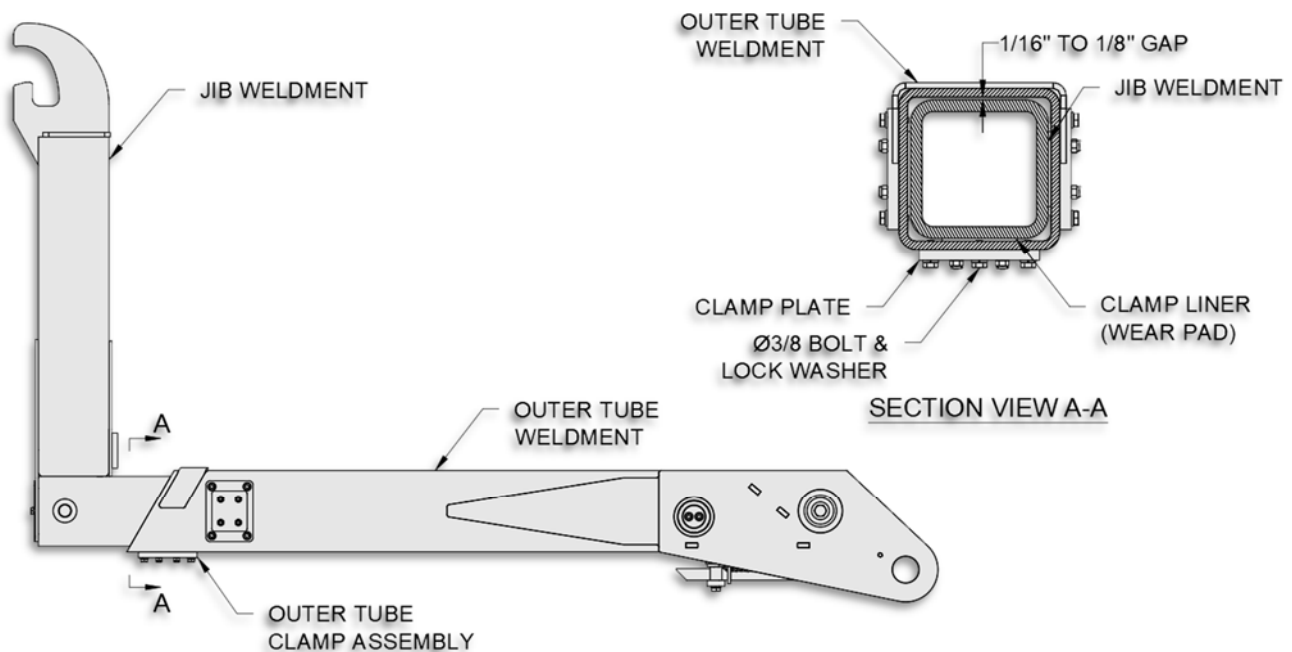
## **OUTER TUBE CLAMP ASSEMBLY INSPECTION INSTRUCTIONS**

SwapLoader hooklift hoists come equipped with an outer tube clamp assembly located on the bottom of the outer tube at the opening where the jib telescopes in and out and can be either fixed or adjustable. Check the table below for your hoist model or series.

<b>Clamp Assembly</b>	
<b>SL-75</b>	Not Applicable
<b>100 Series</b>	Fixed Height
<b>200 Series</b>	Adjustable Height
<b>400 Series</b>	Fixed Height
<b>HD Series</b>	Fixed Height
<b>X-HD Series</b>	See Outer Tube & Jib Wear Pad Replacement Instructions

### **INSPECTION – FIXED HEIGHT**

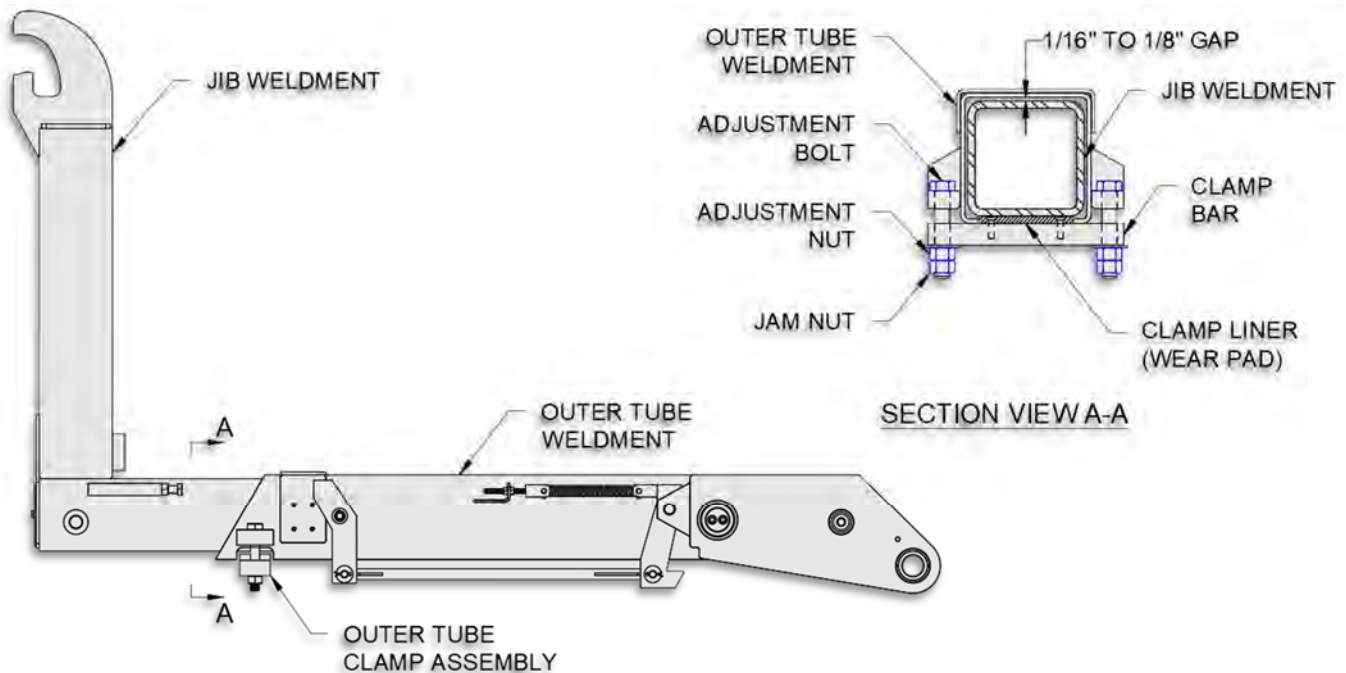
The illustration below is a typical hoist clamp assembly for 100 Series models. For optimum performance, the gap between the top of the jib horizontal tube and the top inside surface of the outer tube should be kept between 1/16" to 1/8" (see Section View A-A below). When a gap greater than 1/8" exists, since the clamp assembly has a fixed elevation, inspect the clamp liner, clamp plate, and fasteners for excessive wear or damage (see Section View A-A below). Replace parts as needed to bring the outer tube clamp assembly back to recommended specifications (see Outer Tube Assembly in the Parts & Installation manual).



**FIXED CLAMP ASSEMBLY ILLUSTRATION**

## INSPECTION – ADJUSTABLE HEIGHT

The illustration below is a typical hoist clamp assembly for 200 Series hoist models. For optimum performance, the gap between the top of the jib horizontal tube and the top inside surface of the outer tube should be kept between 1/16" to 1/8" (see Section View A-A below). When a gap greater than 1/8" exists, since the clamp assembly has a fixed elevation, inspect the clamp liner, clamp plate, and fasteners for excessive wear or damage (see Section View A-A below). Replace parts as needed to bring the outer tube clamp assembly back to recommended specifications (see Outer Tube Assembly in the Parts & Installation manual). If the clamp liner and other components are found to be or have been brought up to satisfactory condition, but a gap greater than 1/8" exists between the inner and outer tubes; then proceed to the outer tube clamp adjustment steps below.



## ADJUSTABLE CLAMP ASSEMBLY ILLUSTRATION

### ADJUSTMENT

Refer to the Adjustable Clamp Assembly Illustration for the following adjustment steps:

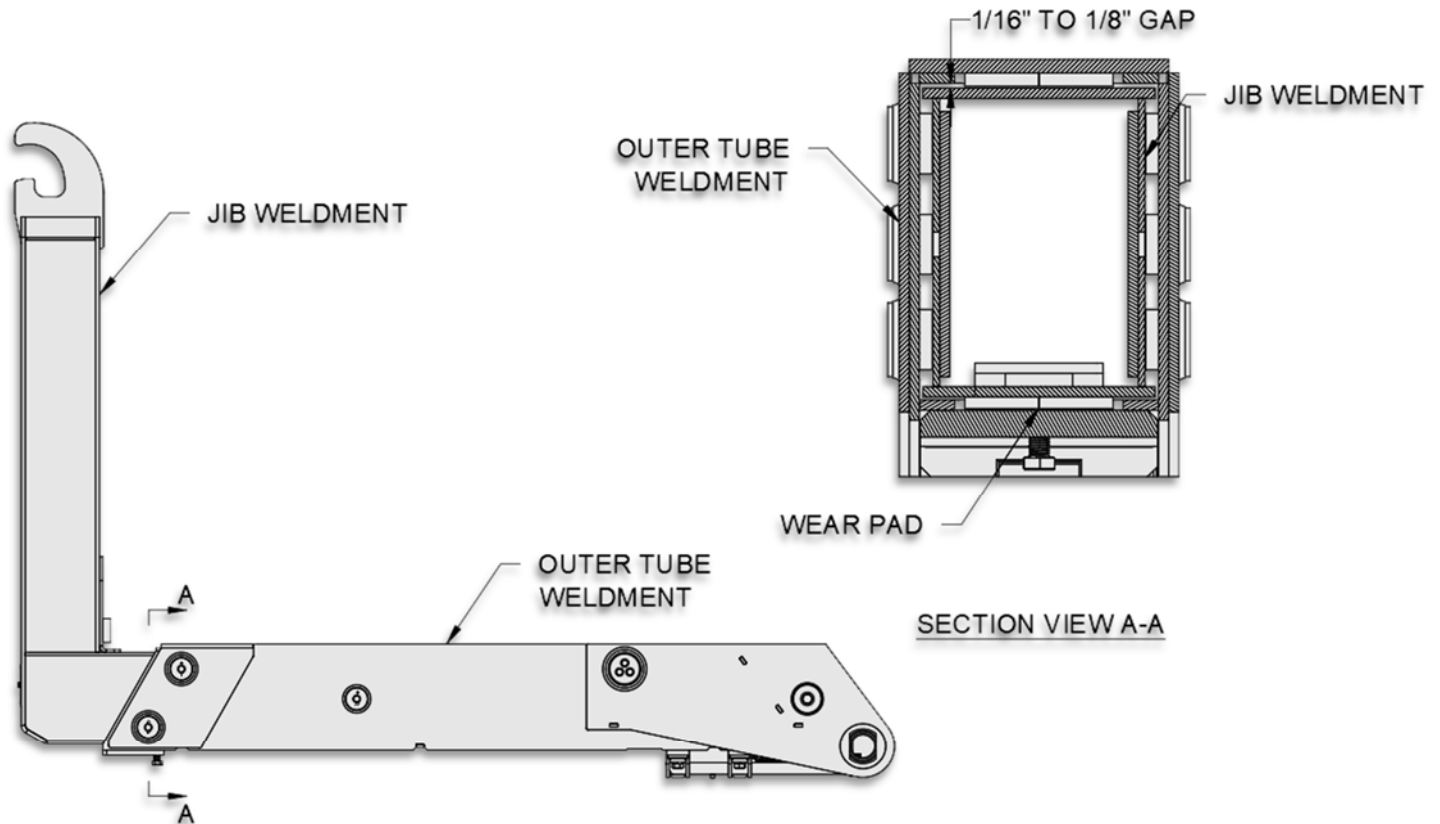
1. Loosen the jam nuts on the clamp bar adjustment bolt.
2. Tighten the adjustment nuts equally so that the clamp bar is drawn up evenly. Be sure to keep the jib horizontal tube level; make sure the gap is even between the inner and outer tubes from left to right.
3. Once the gap between the top of the jib horizontal tube and the top inside surface of the outer tube is between 1/16" to 1/8" the jam nuts can be tightened up.

## **OUTER TUBE & JIB WEAR PAD REPLACEMENT INSTRUCTIONS**

The SwapLoader X-HD series comes equipped with several wear pads throughout the outer tube and jib assemblies that are conveniently accessible and makes replacement easy for an end user.

### **WEAR PAD INSPECTION**

The illustration below is a typical outer tube-jib assembly for the SwapLoader X-HD hoist models. For optimum performance out of your SwapLoader X-HD Series hooklift the gap between the top of the jib horizontal tube and the top inside surface of the outer tube should be kept between 1/16" to 1/8" (see Section View A-A below). When a gap greater than 1/8" exists, inspect the upper and lower wear pads on the jib and outer tube as well as the fasteners for excessive wear or damage (see Section View A-A below). Replace parts as needed to bring the outer tube-jib assembly back to recommended specifications (see Outer Tube Assembly in the Parts & Installation manual).

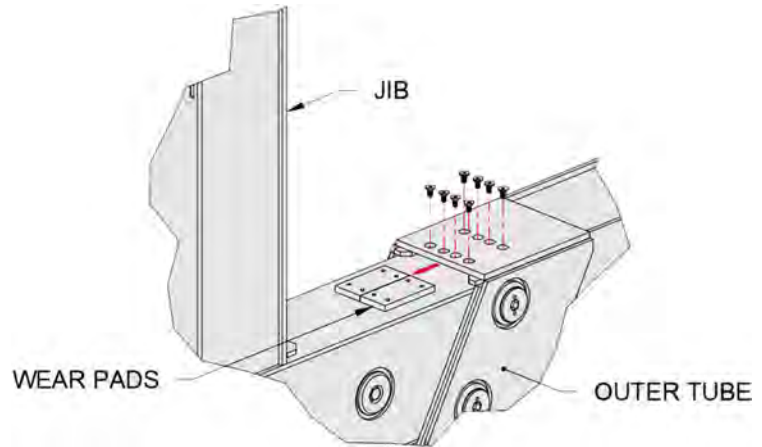


**X-HD SERIES OUTER TUBE & JIB ASSEMBLY ILLUSTRATION**  
(shown with the jib retracted)

## WEAR PAD REPLACEMENT

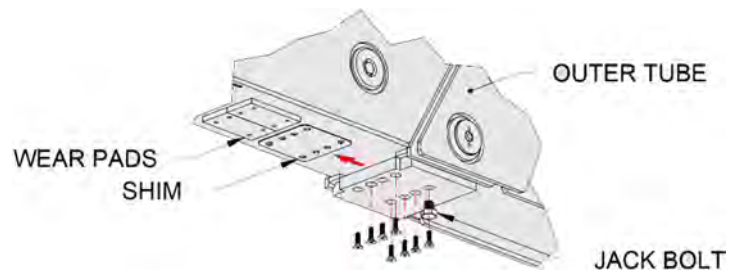
### Outer Tube – Upper Wear Pads

- Remove the bolts and slide the wear pads out the front.
- Insert new wear pads in the same orientation, making sure the larger holes are facing the jib. If shims were installed on top of the old wear pads, reinsert them in the same position.
- Bolt wear pads back in (see Thread Lock Application instructions)..



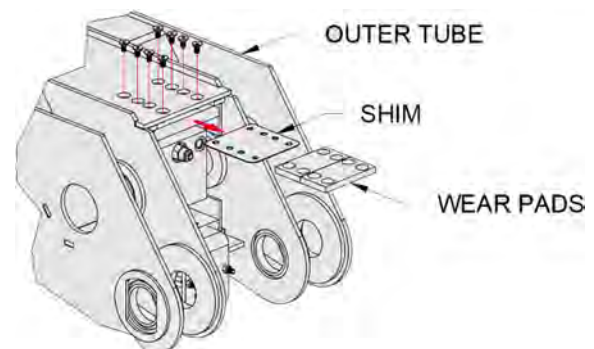
### Outer Tube – Lower Wear Pads

- There is a threaded hole in the bottom of the outer tube used to jack the jib up for wear pad replacement. Insert a 3/4-10 bolt into this hole and raise the jib until weight is taken off the wear pads.
- Remove the bolts and slide out the wear pads.
- Insert new wear pads in the same orientation, making sure the larger holes are facing the jib. If shims were installed beneath the old wear pads, reinsert them in the same position.
- Bolt wear pads back in (see Thread Lock Application instructions). Back out the jack bolt so it is no longer contacting the jib.



### Jib – Upper Wear Pads

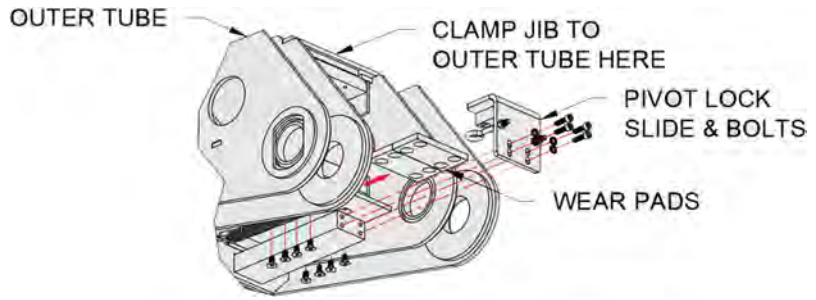
- Fully retract the jib, then remove the bolts using the access holes on the top of the outer tube (see illustration →).
- Slide the wear pads out the back.
- Insert new wear pads in the same orientation, making sure the countersink is facing away from the jib. If shims were installed beneath the old wear pads, reinsert them in the same position.
- Bolt wear pads back in (see Thread Lock Application instructions).





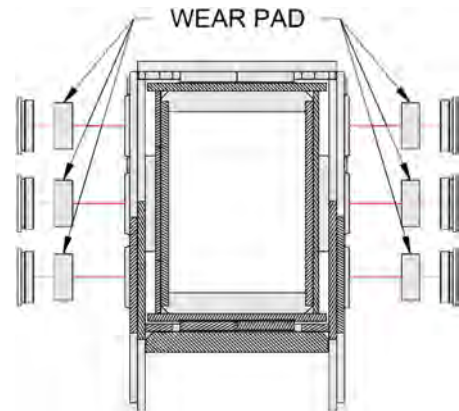
## Jib – Lower Wear Pads

- Disconnect the springs and remove the four bolts to take off the pivot lock slide (see illustration →).
- With the jib fully retracted, clamp together the top of the jib and outer tube to remove the weight from the lower wear pads.
- Remove the bolts using the access holes on the bottom of the outer tube.
- Slide the wear pads out the back.
- Insert new wear pads in the same orientation, making sure the countersink is facing away from the jib. If shims were installed on top of the old wear pads, reinsert them in the same position.
- Bolt wear pads back in (see Thread Lock Application instructions)..



## Outer Tube – Side Wear Pads

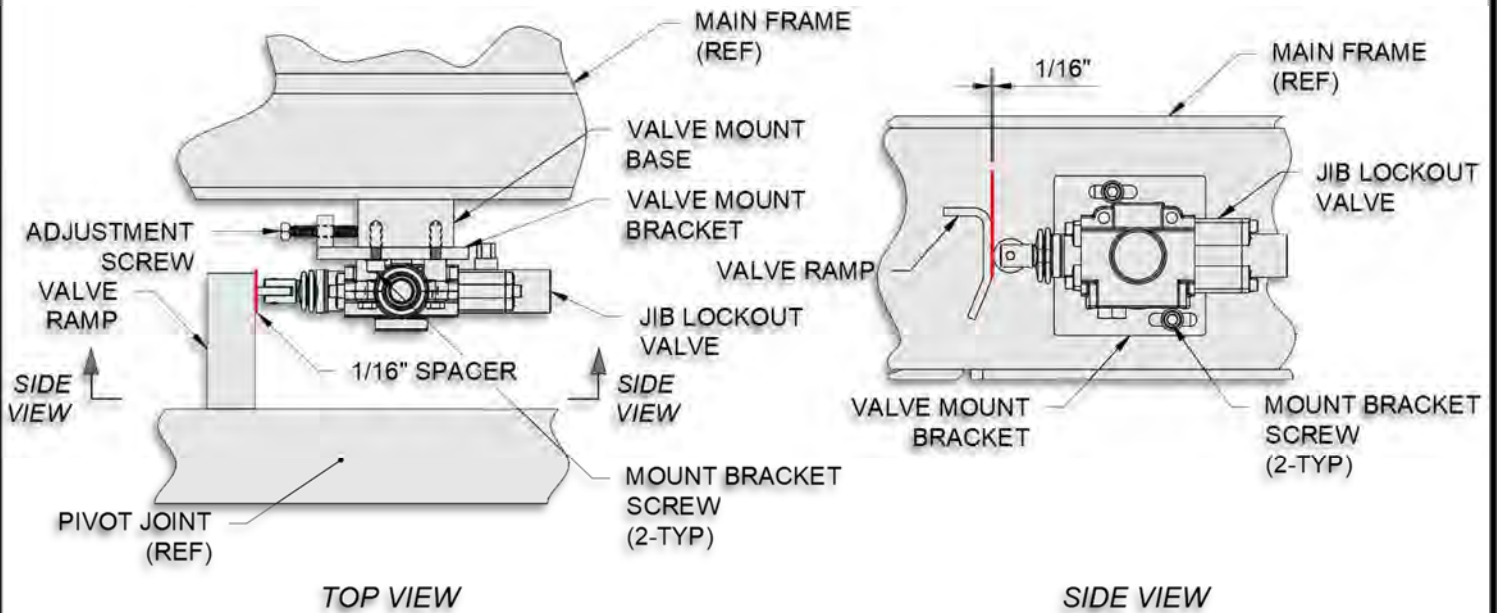
- If you are noticing your jib sitting to one side or moving excessively from side to side, inspect the side wear pads on the outer tube (see illustration →).
- Each of the six round wear pads should be just contacting the sides of the jib.
- It is possible to tighten the wear pad mount in the hole, but with excessive wear will require replacement wear pads (see Outer Tube Assembly in the Parts & Installation manual).
- When adjusting or replacing the wear pad mount, apply thread locker (Vibra-Tite VC-3 or equivalent) to the threads.
- As part of weekly equipment inspection, it is recommended to apply a paint mark line between the wear pad threaded plug and wear pad mount to visually inspect for movement or loosening.

**THREAD LOCK APPLICATION:**

**IF WEAR PADS CEASE TO HOLD THE JIB TIGHTLY OR UNTHREAD FROM THEIR HOLES, REMOVE THE PLUG AND CLEAN OFF ANY OLD THREAD LOCKER FROM THE INTERNAL AND EXTERNAL THREADS. ADD A NEW LAYER OF THREADLOCKER TO THE STEEL PLUG PER THE FOLLOWING INSTRUCTIONS.**

**IF THREAD LOCKER IS WORN OR NO LONGER PRESENT, REAPPLY PER THE FOLLOWING INSTRUCTIONS.**

- PRODUCT SHOULD BE VIBRA-TITE VC3 OR COMPARABLE ANAEROBIC THREAD LOCKER AND SEALANT, NO SUBSTITUTIONS WITHOUT PRIOR APPROVAL.
- ENSURE THAT THE THREADS ON THE PLUG ARE CLEAN AND FREE OF GREASE, OIL, AND OTHER CONTAMINANTS.
- SHAKE THE CONTAINER WELL BEFORE USE TO ENSURE PROPER MIXING.
- ENSURE THAT THE FULL LENGTH OF THE THREADS ARE COVERED AROUND THE FULL DIAMETER, FILLING THREADS 30-50%.
- ALTHOUGH MATERIAL WILL BE DRY TO TOUCH WITHIN MINUTES, ALLOW THREAD LOCKER TO DRY FOR AT LEAST 30 MINUTES BEFORE HANDLING OR STORING.



**JIB LOCKOUT VALVE ADJUSTMENT ILLUSTRATION**

### ADJUSTMENT

Should the jib lockout valve need adjustment follow the steps below (refer to the illustration on the previous page).

1. Loosen the mount bracket screws enough that the mount bracket can slide.
2. Place a 1/16" spacer between the roller and the ramp.
3. Tighten the adjustment bolt until the roller is completely or near completely compressed.
4. Tighten the mount bracket screws.
5. Remove the spacer.
6. Test function.

### PART NUMBER & SPECIFICATION

SwapLoader Pt. No.	Work Port Size	Spool Type
23P04	3/4-16 ORB (SAE 8)	2-Way, 2-Position N.C.
23P05	7/8-14 ORB (SAE 10)	2-Way, 2-Position N.C.

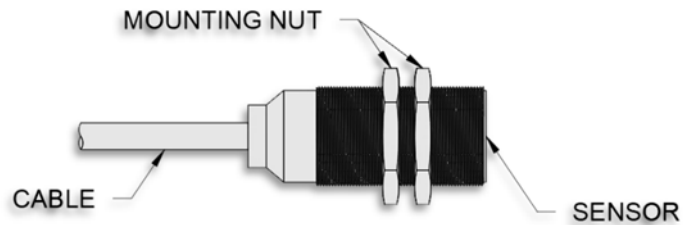


## **JIB PROXIMITY SENSOR INSPECTION & ADJUSTMENT INSTRUCTIONS**

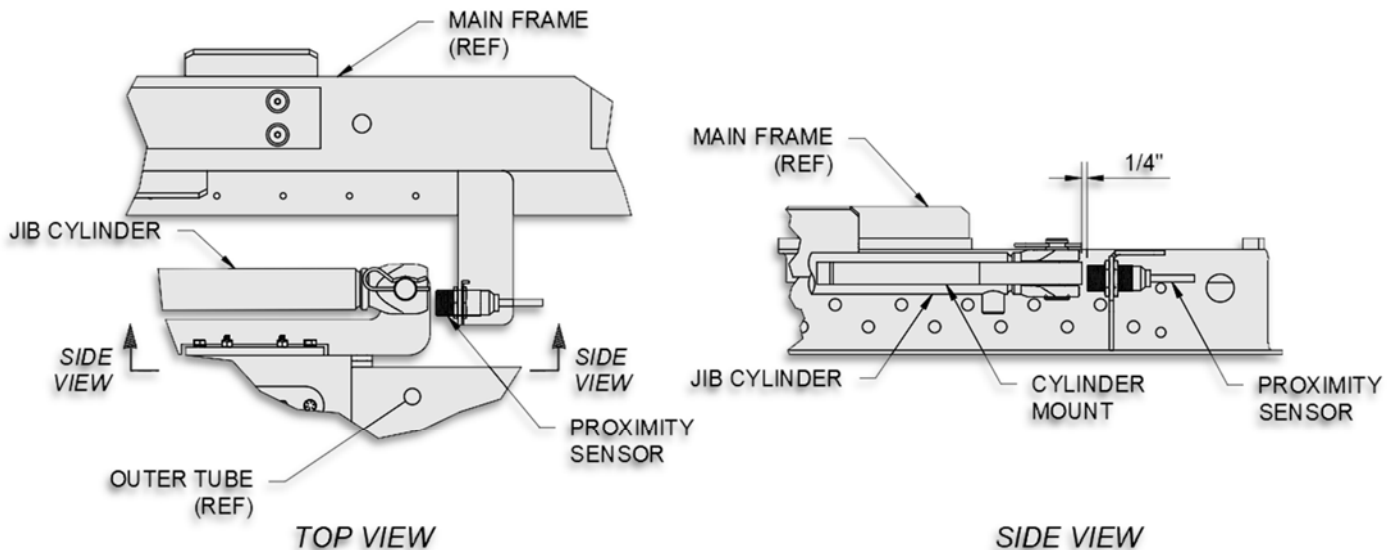
The SL-75 hoist has a proximity sensor to prevent accidental operation of the telescopic jib, while the hoist is up in a dump mode. If the jib is operational while using the lift cylinders, then an adjustment will need to be made to the jib proximity switch.

### **ADJUSTMENT**

Should the jib proximity switch need adjustment the first step will be to loosen the mounting nuts (see illustration below). Reposition the jib proximity switch with respect to the cylinder mount making sure to leave a gap of 1/4". The jib proximity switch should not contact the cylinder mount. Retighten the mounting nuts.



### **PROXIMITY SENSOR ILLUSTRATION**

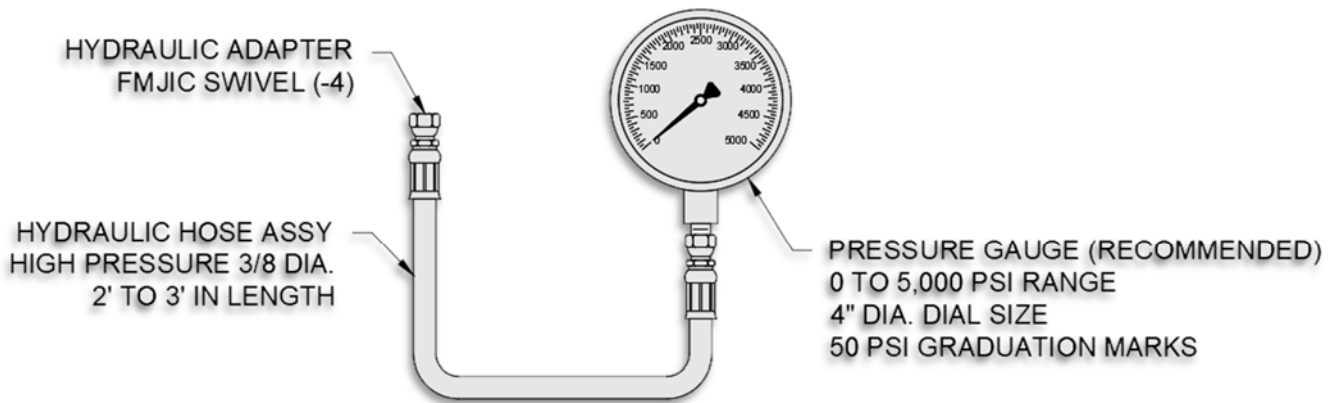


### **PROXIMITY SENSOR ADJUSTMENT ILLUSTRATION**

Please contact your SwapLoader Distributor or SwapLoader USA should you have any questions regarding either of these procedures.

## **HOW TO PERFORM A PRESSURE CHECK**

When performing a pressure check on a SwapLoader hook-lift hoist, we recommend that you use a calibrated pressure gauge that reads pressures up to 3,500 PSI (a 0 to 5,000 PSI range gauge is recommended). As a minimum, the gauge should have 100 PSI graduation marks (50 PSI is preferred), and a 3-inch diameter dial size (4-inch dial is preferred). The pressure gauge should be outfitted with a female JIC #4 hydraulic adapter; preferably located at the end of a 3/8-inch diameter high pressure hydraulic hose that is 2 to 3 foot in length (see illustration below).

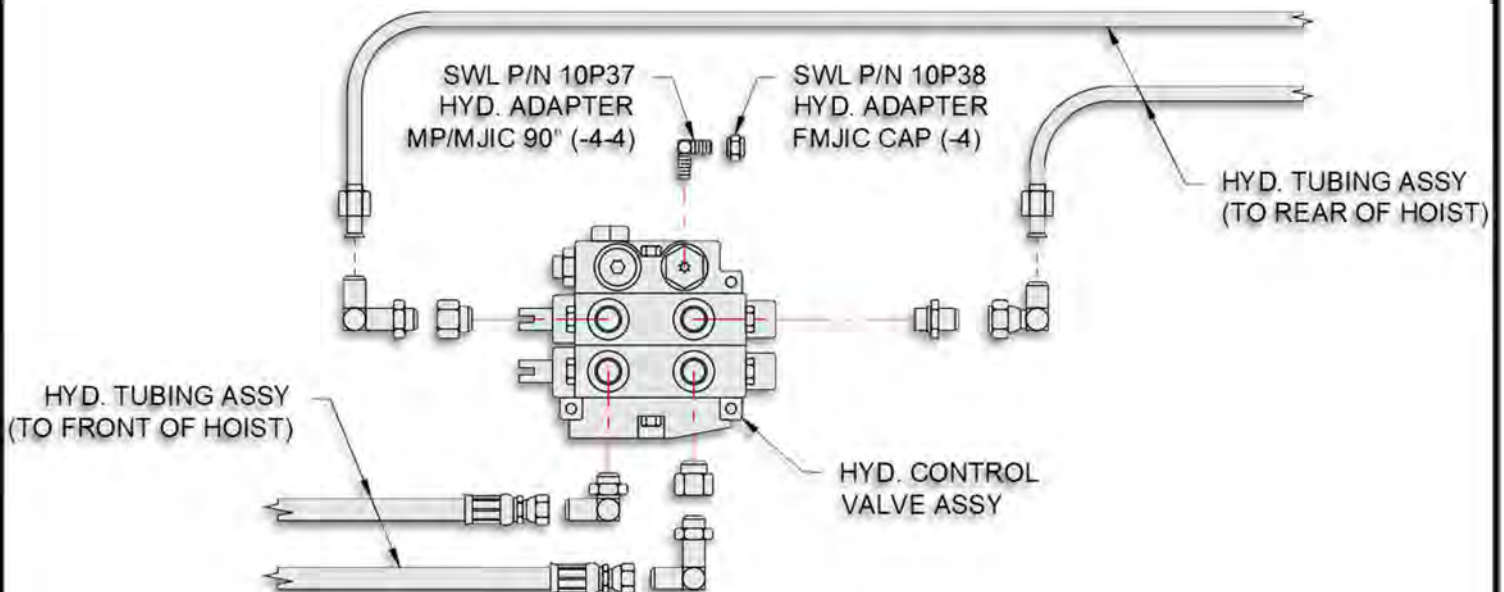


### **RECOMMENDED PRESSURE GAUGE ILLUSTRATION**

Should you not be able to source a hydraulic gauge locally, SwapLoader can provide one at a reasonable cost (Hyd. Pressure Gauge & Hose Assembly – *Pt. No. 22P10*).

### **PRESSURE CHECK STEPS**

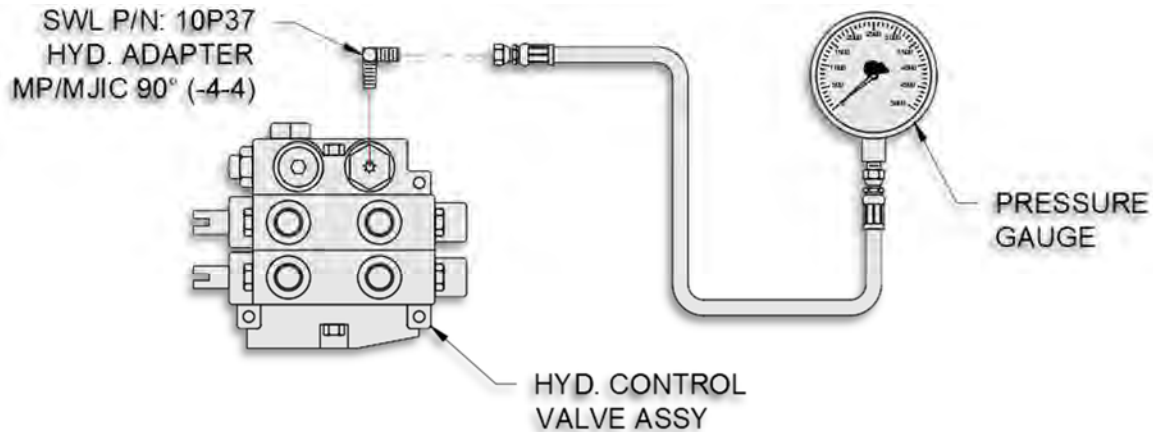
1. Locate the 90° male JIC #4 hydraulic adapter (SWL #10P37) found on the top of the hoist hydraulic control valve (see illustration below).



### **PRESSURE CHECK HYDRAULIC ADAPTER LOCATION ILLUSTRATION**

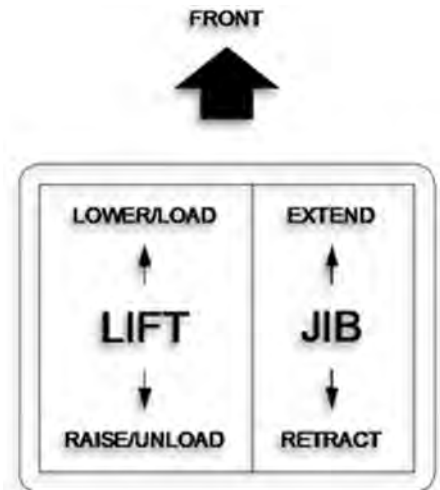
This 90° male #4 JIC hydraulic adapter is supplied by SwapLoader and should be installed in the hydraulic control valve at the time of the hoist installation).

2. Remove the female JIC #4 cap from the male JIC #4 adapter and attach the pressure gauge to the hydraulic control valve (see illustration below).



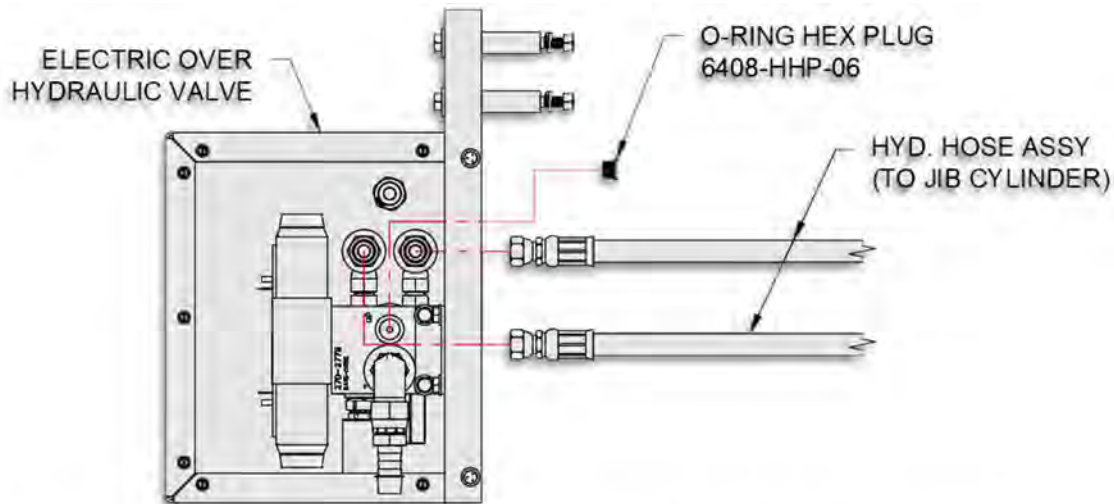
### **PRESSURE GAUGE TO HYDRAULIC ADAPTER ILLUSTRATION**

3. Start the truck and engage the P.T.O.
4. Push the lift (dump) circuit lever forward until the lift (dump) cylinders bottom out. Continue to push the lever forward until steps 5-6 are complete.
5. Check the gauge for the maximum developed system pressure.
6. With the pressure check complete; release all functions and disengage the P.T.O.

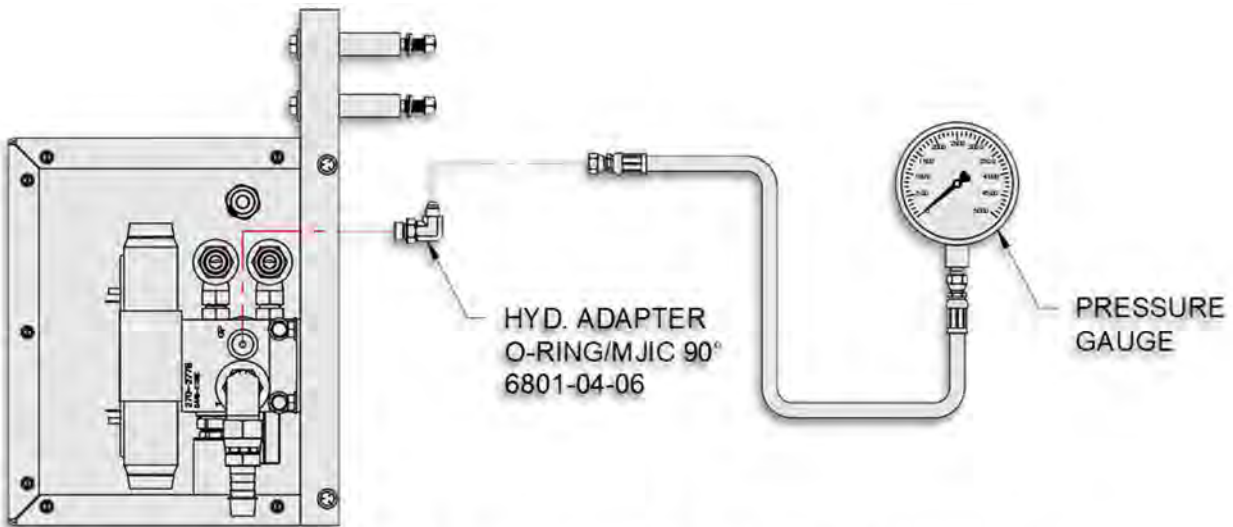


**PRESSURE CHECK STEPS (EHV)**

1. Locate the female O-Ring Hex Plug found on the top of the hoist electric over hydraulic control valve (see illustration below).

**PRESSURE CHECK HYDRAULIC ADAPTER LOCATION ILLUSTRATION**

2. Remove the O-Ring Hex Plug and attach the pressure gauge to the hydraulic control valve (see illustration below).

**PRESSURE GAUGE TO HYDRAULIC ADAPTER ILLUSTRATION**

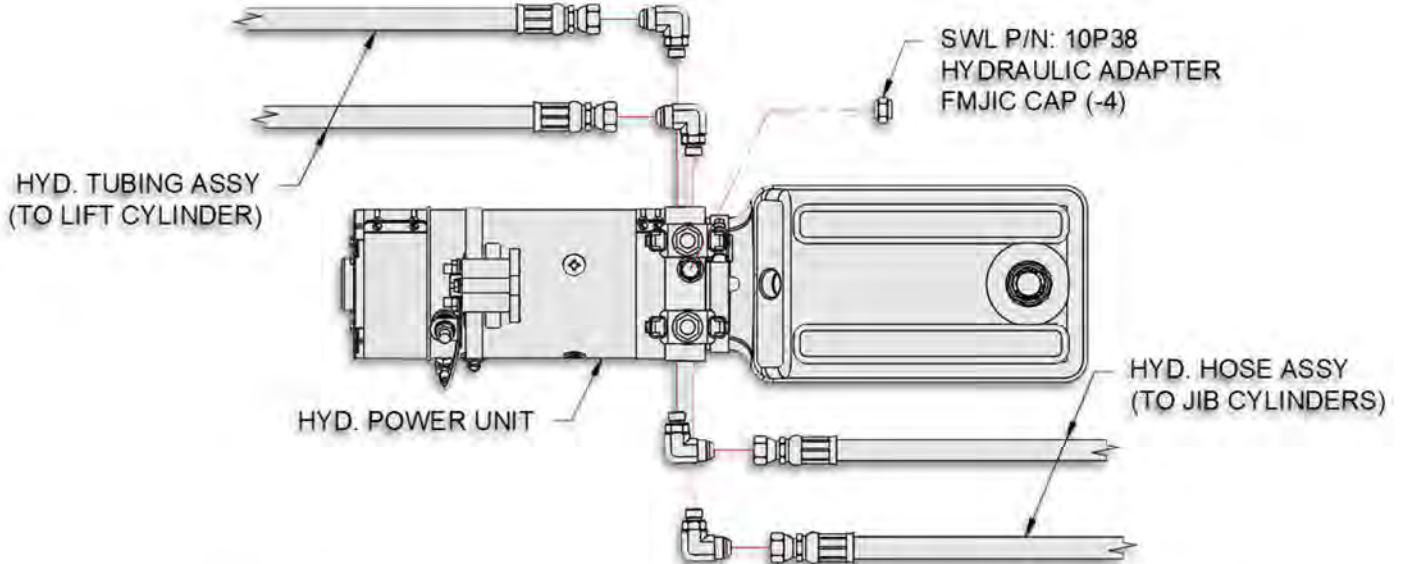
3. Start the truck.
4. Push the lift (dump) circuit lever left until the lift (dump) cylinder bottoms out. Continue to push the lever forward until steps 5-6 are complete.
5. Check the gauge for the maximum developed system pressure.
6. With the pressure check complete; release all functions.



**PRESSURE CHECK STEPS (POWER PACK)**

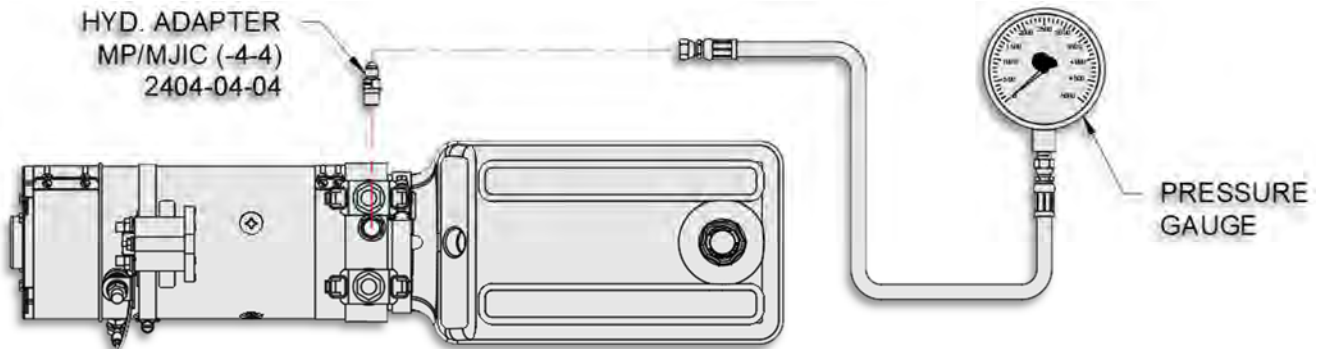
1. Locate the female JIC #4 hydraulic cap (SWL #10P38) found on the top of the hoist hydraulic control valve (see illustration below).

This male #4 JIC hydraulic adapter is supplied by SwapLoader and is already installed in the

**PRESSURE CHECK HYDRAULIC ADAPTER LOCATION ILLUSTRATION**

hydraulic control valve at the time of the hoist installation.

2. Remove the female JIC #4 cap and attach the pressure gauge to the hydraulic control valve (see illustration below).

**PRESSURE GAUGE TO HYDRAULIC ADAPTER ILLUSTRATION**

3. Start the truck.
4. Turn power switch on. Push the lift (dump) circuit lever left until the lift (dump) cylinder bottoms out. Continue to push the lever forward until steps 5-6 are complete.
5. Check the gauge for the maximum developed system pressure.
6. With the pressure check complete; release all functions.

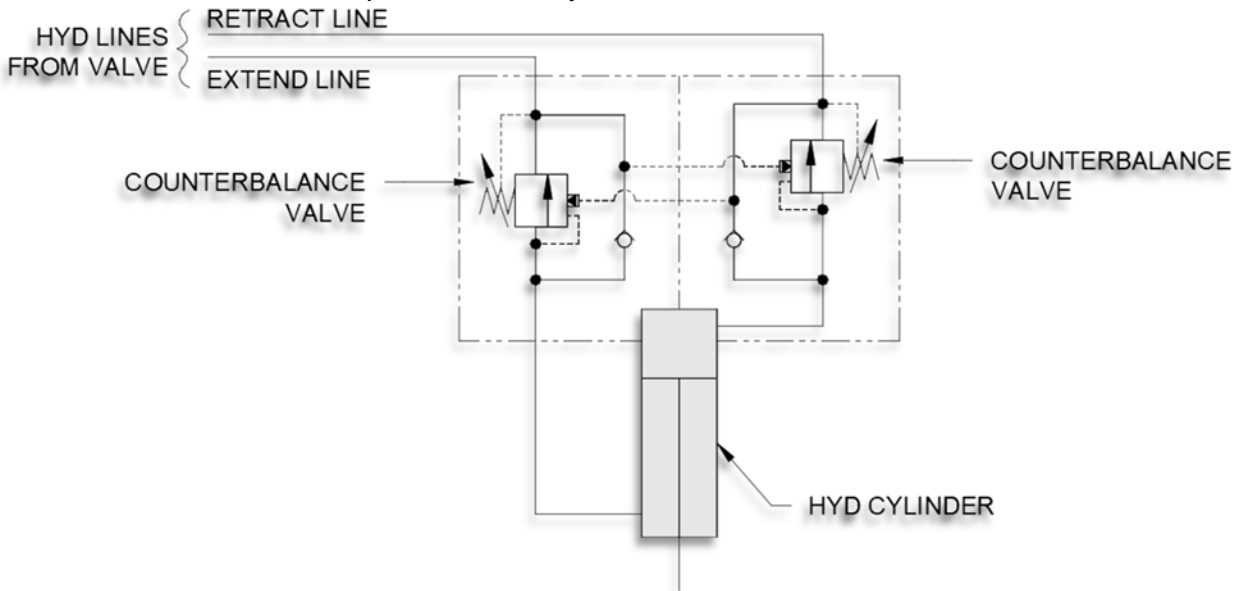




## **COUNTERBALANCE VALVE ADJUSTMENT INSTRUCTIONS**

### **PURPOSE:**

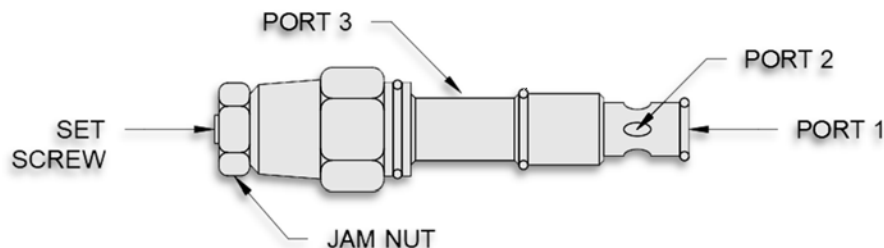
All SwapLoader hook-lift hoists contain dual counterbalance valve cartridges in each of their lift cylinders. Each counterbalance valve cartridge meters the flow of exiting hydraulic oil from either the rod or the blind end of the cylinder as the oil exits (see illustration below). Because of their function, the counterbalance valve serves to provide both a load check and adjustment of the rod extension/retraction speed for each cylinder.



## **HYDRAULIC SCHEMATIC OF A DUAL COUNTERBALANCE VALVE SYSTEM**

### **OPERATION:**

The counterbalance valve used by SwapLoader is a three-port cartridge. The cartridge allows for free flow of hydraulic oil from port 2 (inlet) to Port 1 (load) through an internal check valve (see illustration below), while blocking all reverse flow until such time when the internal relief is opened via an inversely proportionate pilot pressure at port 3 (typically 3:1). The relief pressure is determined by adjustment of a set screw at the head of the cartridge.



## **ILLUSTRATION OF A TYPICAL COUNTERBALANCE VALVE**

### **ADJUSTMENT PROCEDURE:**

Adjustment of the counterbalance valve cartridge begins with holding the adjustment screw from moving (3/16" hex key), while loosening the jam nut (9/16" wrench or open center socket). The

relief valve cracking pressure is then increased or decreased by turning the set screw counterclockwise or clockwise, respectively. Once the proper adjustment has been made, the jam nut must be tightened, while the adjustment screw is kept from moving.

To determine whether a hoist needs to have its counterbalance valves adjusted for the extend function, start by extending the lift cylinders until they reach full stroke (jib cylinder should be fully retracted). Verify that both cylinders bottom out at the same time. If they do not, adjust the appropriate inside counterbalance valve cartridge as follows:

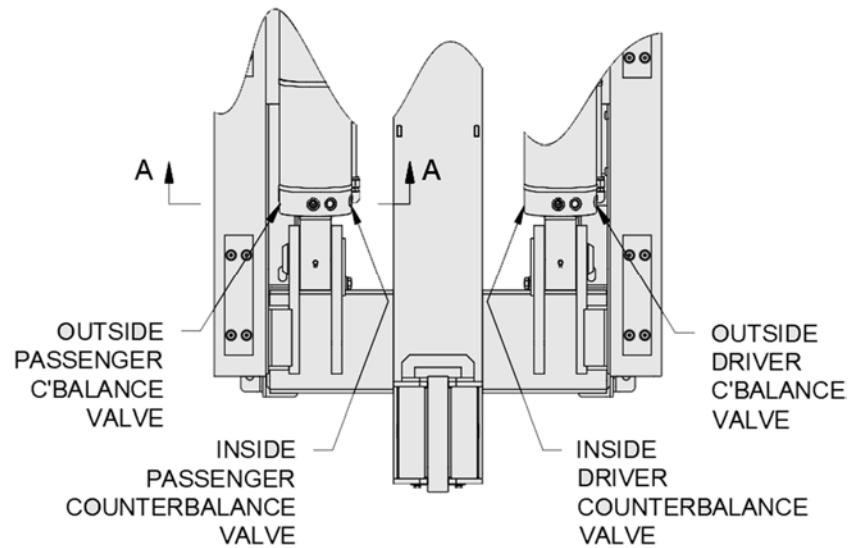
<b>Clockwise Adjustment</b>	Increases cylinder travel speed
<b>Counterclockwise Adjustment</b>	Reduces cylinder travel speed

To determine whether a hoist needs to have its counterbalance valves adjusted for the retract function, start by retracting the lift cylinders so that the Pivot Joint contacts the crossbeam on the Main Frame. Both arms/forks on the Pivot Joint should contact the crossbeam at the same time, and they should be relatively centered. If they do not, adjust the appropriate inside counterbalance valve cartridge as follows to correct misalignment:

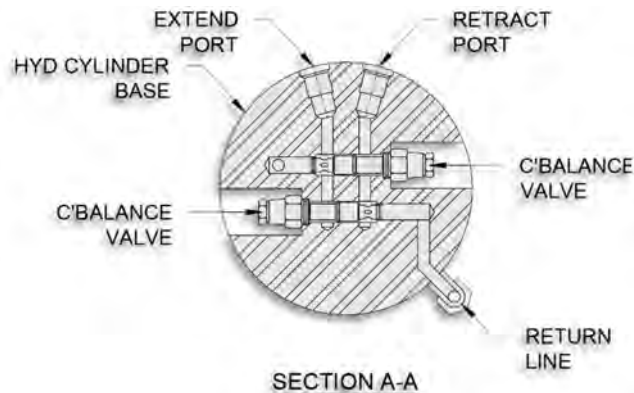
<b>Clockwise Adjustment</b>	Increases cylinder travel speed
<b>Counterclockwise Adjustment</b>	Reduces cylinder travel speed



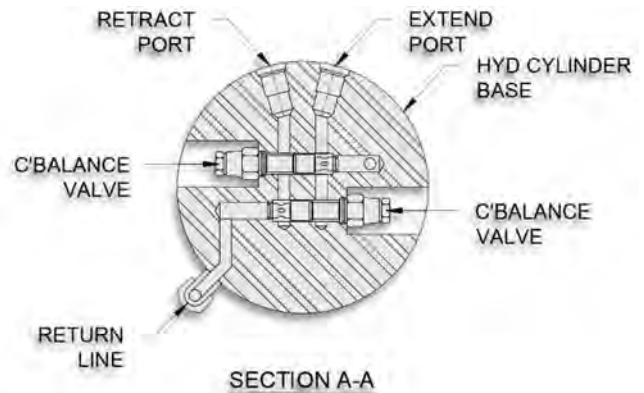
### ILLUSTRATION OF TYPICAL HYDRAULIC CYLINDER END CAP



**SL-220, SL-222, SL-240, SL-330, SL-400, SL-412, SL-418X, SL-518X, SL-520X, SL-650**



**SL-75, SL-105, SL-160, SL-212, SL-214, SL-2418**



Note: The counterbalance valve opposite the hydraulic tube (return line) affects the extend rate on the cylinder, while the counterbalance valve on the same side as the hydraulic tube affects the retract rate.

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# TROUBLESHOOTING

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## TROUBLESHOOTING

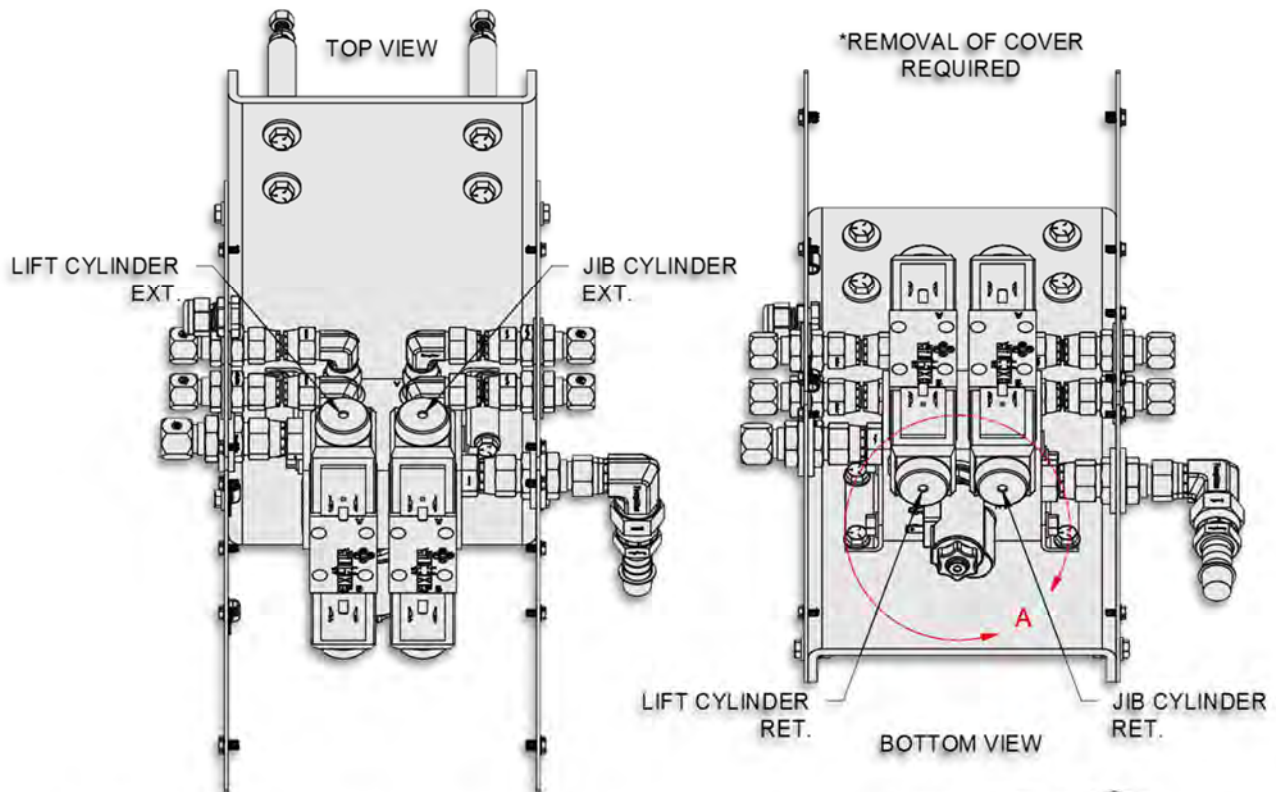
Prior approval from the SwapLoader Warranty Department is required before any repair is made to qualify for reimbursement under the hoist parts or labor warranty.

CONDITION	LIKELY CAUSE	CORRECTION
<b>Hoist will not lift, or dump rated capacity</b>	Too much payload (overload condition)	Remove material from container until the hoist can lift or dump the load.  Make sure payload is evenly distributed in container.  See hoist specifications for correct capacity ratings
	Hydraulic system malfunction	See 'Hydraulic system will not build/hold pressure'
<b>Hoist operating slow.</b>  (See 'Jib operating slow' if only the jib circuit is affected)	Pump worn or damaged	Repair or replace pump
	Incorrect bonnet kit adjustment	See hoist parts & installation manual for correct setting
	Hydraulic oil is cold	Allow hydraulic oil to warm up.  Consider a different weight of oil; see SwapLoader 'Hydraulic Oil Specs' sheet
<b>Hoist will not operate.</b>	PTO will not come on and/or engage	See PTO supplier and/or installer
	Pump worn or damaged	Repair or replace pump
	Relief valve stuck open	Remove, clean & reset to specifications
	Dump valve stuck open (EHV application)	
<b>Hydraulic system will not build/hold pressure.</b> (A pressure check of the system will need to be performed to verify. See SwapLoader 'How to Perform a Pressure Check' sheet)	Pump worn or damaged	Repair or replace pump
	Relief valve improperly set	Contact SwapLoader for adjustment instructions
	Relief valve stuck open	Remove, clean, and re-set to specification
<b>Excessive wearing away of the main frame wear pads.</b>	Rough or damaged sub-frame longsills	Repair or replace longsills on container; grind off any weld burrs.
<b>Excessive jib hook or container lift bar wear</b>	Lack of lubrication	Grease jib hook
	Container lift bar fabricated incorrectly	See proper hoist series sub-frame specifications drawing
<b>Excessive container movement on hoist during transport</b>	Container A-frame fabricated incorrectly; excess space between lift bar and front of container	See proper hoist series sub-frame specifications drawing for spacing dimensions
	Incorrect positioning of hoist rear rollers	Rear rollers on SwapLoader hoists can be positioned at 40-1/2" or 41-5/8".  See SwapLoader 'Rear Roller Spacing' in the Operation section of this guide.
	Incorrect longsill outside width dimension	See proper hoist series sub-frame specifications drawing for dimensions
<b>Container lift bar rides high or loose in jib hook</b>	Container A-frame fabricated incorrectly; lift bar positioned too high	See proper hoist series sub-frame specifications drawing for dimension
	Clamp bar adjustment on outer tube is too loose	See SwapLoader 'Outer Tube Clamp Adjustment' sheet
<b>Jib operating slow.</b>  (see 'Hoist operating slow' if both jib and lift/dump circuits are affected)	Incorrect jib lockout valve adjustment	See SwapLoader 'Jib Lockout Valve Adjustment' sheet
	Incorrect bonnet kit adjustment	See hoist parts & installation manual for correct setting
	Pump malfunction	See 'Pump will not build/hold pressure'

CONDITION	LIKELY CAUSE	CORRECTION
<b>Jib squeaks/chatters during operation</b>  (See 'Hoist operating slow' if both jib and lift/dump circuits are affected)	Incorrect jib lockout valve adjustment	See SwapLoader 'Jib Lockout Valve Adjustment' sheet
	Incorrect bonnet kit adjustment	See hoist parts & installation manual for correct setting
	Pump malfunction	See 'Pump will not build/hold pressure'
<b>Rear roller not turning.</b>	Lack of proper lubrication	Grease roller pin
	Contamination	Remove and clean pin; then grease
<b>Seizing pins</b>	Lack of proper lubrication at pinned connection	Grease pin
	Contamination	Remove and clean pin, then grease Replace pin and bushing if needed.
<b>Loose pins/bolts</b>	Not tightened properly	Tighten to SwapLoader specifications; see hoist parts & installation manual
	Lack of proper lubrication	Grease all lubrication points per the hoist parts & installation manual
<b>Hydraulic filter indicator gauge needle is in the red zone</b>	Filter element is dirty or damaged	Replace oil and filter element
<b>Oil foaming</b>	Loose pump or tank inlet fitting	Tighten fitting
	Leak in inlet hose	Replace hose
	Damaged pump shaft seal	Replace seal
	Water in hydraulic oil	Replace oil and filter element
<b>Interference/misalignment of sub-frame latch plates with hoist body lock</b>	Incorrect placement of latch plates	See proper hoist series sub-frame specifications drawing for dimensions
	Incorrect position of body lock on hoist (for hoists with the bolt-on body lock option)	Move body lock to the correct bolt hole position on hoist pivot joint
<b>Pump or control valve is hot</b>	Low oil levels	Fill reservoir tank to the proper level
	Dirty Oil	Replace oil and filter element
	Relief valve stuck open	Remove, clean, and reset
	Relief valve improperly set	Adjust relief valve to SwapLoader specifications
	Improperly sized system component (pump, valve, hose, fitting, etc.)	Review application: replace with factory supplied or SwapLoader approved substitute
	Improper weight oil	Replace with correct oil; see SwapLoader 'Hydraulic Oil' specifications sheet
<b>Hoist operates in "False Dump" mode.</b> (This happens when the hoist attempts a dismount and the jib fails to pivot around the front pins of the pivot joint, causing the hoist to go up into a dump instead of unloading the container)	Jib is not fully retracted	Retract jib cylinder completely
	Incorrect mast/safety latch assembly adjustment	See SwapLoader 'Mast Lock Adjustment' sheet
	Mast/safety latch assembly is binding	Repair/replace any damaged components. See SwapLoader 'Mast Lock Adjustment' sheet
	Sub-frame latch plates are still engaged in the hoist body locks	Retract jib cylinder completely
<b>Container comes loose during hoist dismount.</b>	A-frame fabricated incorrectly; excess space between lift bar and container wall	See hoist sub-frame specifications drawing
	Incorrect operation of hoist	See Operation section of this guide.
	Truck does not move freely	Release the truck brakes. See Operation section of this guide. Operate truck on harder surface.
	Container does not move freely	Grease and/or repair container rollers. See Operation section of this guide. Dismount container on harder surface.
<b>Hoist not loading the container straight.</b>	A-frame is not fabricated correctly	See proper hoist series sub-frame specifications drawing for dimensions
	Sub-frame is not attached square to container	Remove sub-frame and reinstall square to container
	Hoist rear roller is dragging	See 'Rear roller not turning'
	Hydraulic cylinders are out of sequence	Contact SwapLoader for steps to take

## EHV MANUAL OVER-RIDE INSTRUCTIONS

In a situation where the hoist will not move from simply toggling the control handles, the hoist cylinders can still be moved manually using the manual over-ride button and valve spool.



- Determine which function is wished to be performed. The cables are marked showing which spool corresponds to which function. Alternatively, the figure above is labeled showing which spool performs which function.
- Press the button on the spool (hold) and then press the manual over-ride button on the bottom of the valve shown in the figure to the right.

### NOTE 1:

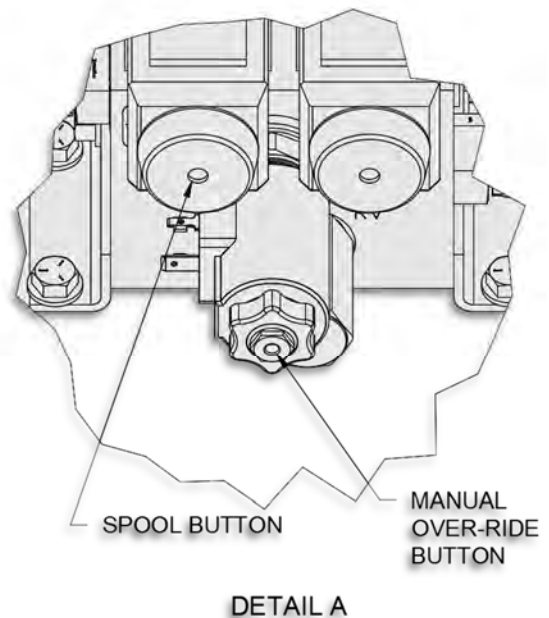
**MAKE SURE TO PRESS THE VALVE SPOOL BUTTON AND MANUAL OVER-RIDE BUTTON SIMULTANEOUSLY.**

### NOTE 2:

**A PHILLIPS SCREWDRIVER IS RECOMMENDED TO BE USED TO ASSIST IN PRESSING IN THE VALVE SPOOL BUTTON.**

### NOTE 3:

**PROPERLY WORKING PUMP & PTO IS REQUIRED TO MOVE CYLINDERS.**



### CAUTION!

**BE CAREFUL OF YOUR SURROUNDINGS AND ANY BODIES LOADED ON HOIST WHEN MANUALLY ACTUATING CYLINDERS!**



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# ACCESSORY INSTALLATION

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## INSTALLATION INSTRUCTIONS – REAR BUMPER ASSEMBLY

- Review all directions and diagrams provided before starting bumper installation.
- Trim truck frame to indicated dimensions (see *Fig. A*). These dimensions will facilitate the mounting of the rear light assembly if it is also being mounted.
- Measure the distance from the top of the truck frame to the ground (**NOTE: This should be performed on a level surface**). Based on this measurement and the dimensions in *Fig. A*, the vertical channel (*Pt. No. 63H94*) may need to be modified in length to meet the Office of Motor Carrier Safety (OMCS) regulations. Regulation 393.86 requires that no bumper be located more than 30" off the ground when the truck is empty, and the end of the bumper should not be located more than 24" from the extreme rear of the vehicle, including truck bodies (see *Fig. B*). Once the length has been determined for the vertical channels, weld them to the bottom of the truck frame (see additional notes on next page).
- Center the bumper weldment (*Pt. No. 52H12*) on the vertical channels (*Pt. No. 63H94*). Position rear of bumper from rear of the hoist as indicated by the bumper location chart. This is crucial to ensure that the container longsills do not contact the bumper during the dump cycle (see *Fig. A & B*).
- Weld the bumper weldment to the vertical channels (see *Fig. A & C*).

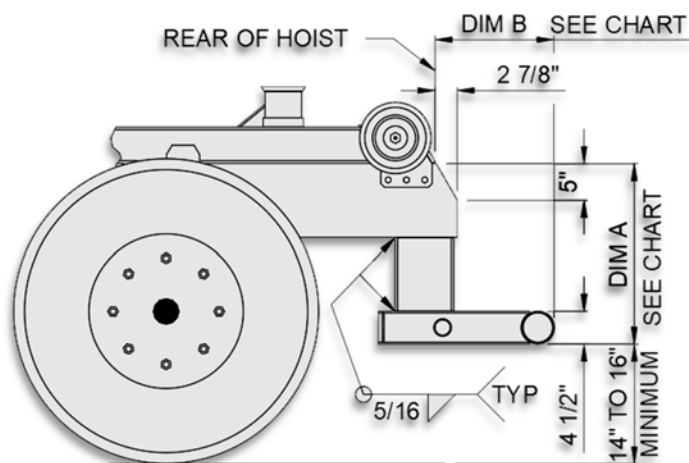


Figure A

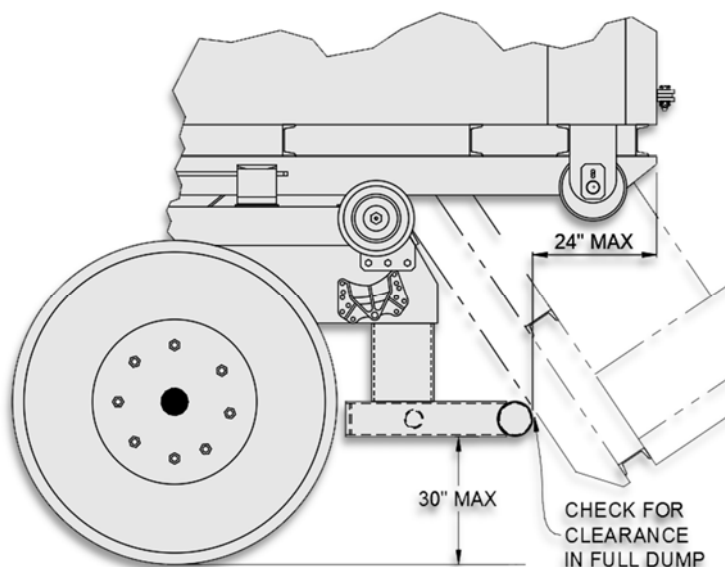


Figure B

**BUMPER LOCATION CHART**

DIM. A	DIMENSION B (MAX)								
	SL-105	SL-160	SL-212 SL-214	SL-220 SL-222 SL-240	SL-2418	SL-330 SL-400	SL-412	SL-418X SL-518X SL-520X	SL-650
24 5/8"	13 1/2"	15 3/4"	15 1/4"	17"	14 1/4"	14"	13 1/2"	16 1/2"	18"
22 5/8"	12 1/4"	14 1/2"	14"	15 3/4"	13"	12 3/4"	12"	15"	
20 5/8"	11"	13"	12 3/4"	14 1/4"	11 3/4"				
18 5/8"	9 3/4"	11 3/4"	11 1/2"						

**MATERIAL LIST FOR 52H11**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	52H12	1	Bumper Wdmt, STD	96.53
2	63H94	2	Vertical Channel, Bumper STD	9.58

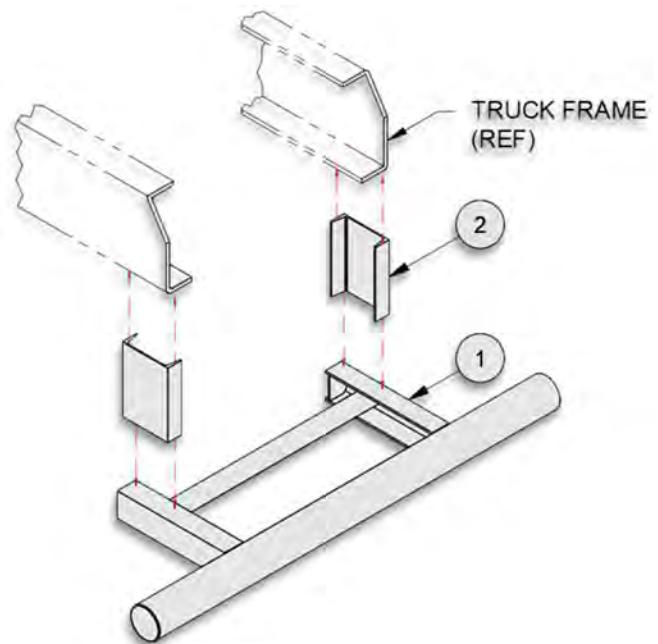


Figure C

**NOTE:**

- PRIOR TO ANY WELDING, CONSULT THE TRUCK MANUFACTURE FOR ANY SPECIAL PRECAUTIONS THAT MAY NEED TO BE TAKEN. TYPICALLY, THE BATTERIES MUST BE DISCONNECTED AND THE GROUND LEAD FROM THE WELDER SHOULD BE AS CLOSE TO THE PART BEING WELDED TO AVOID THE POSSIBILITY OF ARCING ACROSS BEARINGS, GEARS, ETC.
- ALL WELDS SHOULD BE DONE UTILIZING A LOW HYDROGEN WELDING PROCESS.

## INSTALLATION INSTRUCTIONS – REAR BUMPER ASSEMBLY w/ EXTENSIONS

- Review all directions and diagrams provided before starting bumper installation.
- Trim truck frame to indicated dimensions (see *Fig. A*). These dimensions will facilitate the mounting of the rear light assembly if it is also being mounted.
- Measure the distance from the bottom of the truck frame to the ground (**NOTE: This should be performed on a level surface**). Based on this measurement and the dimensions in *Fig. A*, the vertical channel [Pt. No. 63H94] may need to be modified in length to meet the Office of Motor Carrier Safety (OMCS) regulations. Regulation 393.86 requires that no bumper be located more than 30" off the ground when the truck is empty, and the end of the bumper should not be located more than 24" from the extreme rear of the vehicle, including truck bodies (see *Fig. B*). Once the length has been determined for the vertical channels, weld them to the truck frame (see *additional notes on the next page*).

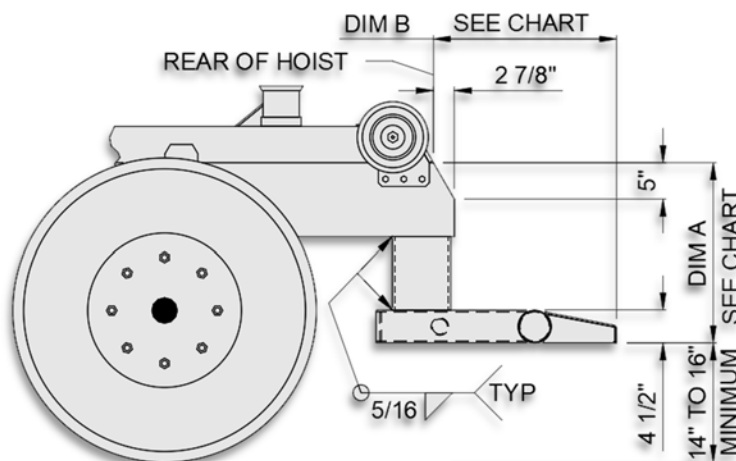


Figure A

- Center the bumper weldment [Pt. No. 52H12] with factory installed extensions [Pt. No. 52H13] on the vertical channels [Pt. No. 63H94]. Position rear of bumper from rear of the hoist as indicated by the bumper location chart. This is crucial to ensure that the container longills do not contact the bumper during the dump cycle (see *Fig. A & B*).
- Weld the bumper weldment to the vertical channels (see *Fig. A & C*).

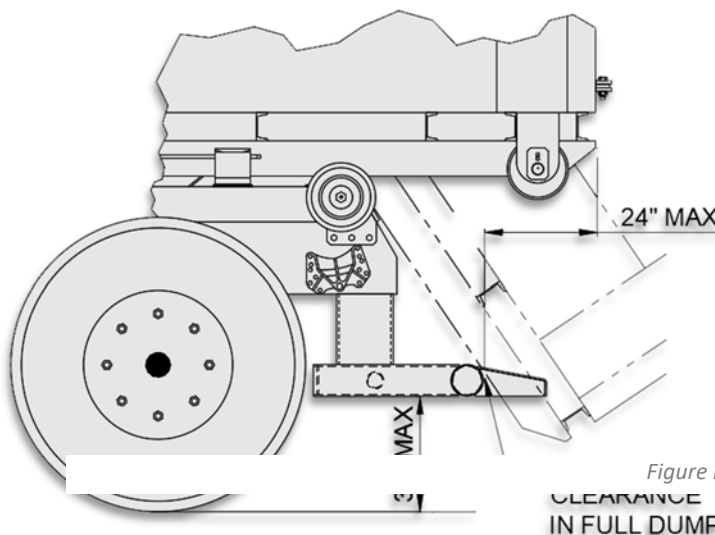


Figure B

**BUMPER LOCATION CHART**

DIM. A	DIMENSION B (MAX)								
	SL-105	SL-160	SL-212 SL-214	SL-220 SL-222 SL-240	SL-2418	SL-330 SL-400	SL-412	SL-418X SL-518X SL-520X	SL-650
24 5/8"	1 3/4"	22 1/2"	21 3/4"	25 1/4"	21 3/4"	* 21 1/2"	* 21 1/4"	* 24 1/4"	27"
22 5/8"	18 1/2"	21"	20 1/2"	23 3/4"	20 1/2"	* 20"	* 19 3/4"	* 22 3/4"	
20 5/8"	17 1/4"	19 1/2"	1 1/4"	22 1/4"	19 1/4"				
18 5/8"	16"	18 1/4"	18"						

- Dimensions assume 6" tall longsills. For 8" tall longsills add 2 1/4" to the dimension shown

**MATERIAL LIST FOR 52H13**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	52H12	1	Bumper Wdmt, STD	96.53
2	52H13	1	Bumper Assy, Std w/ Ext	65.82
3	63H94	2	Vertical Channel, Bumper STD	9.58

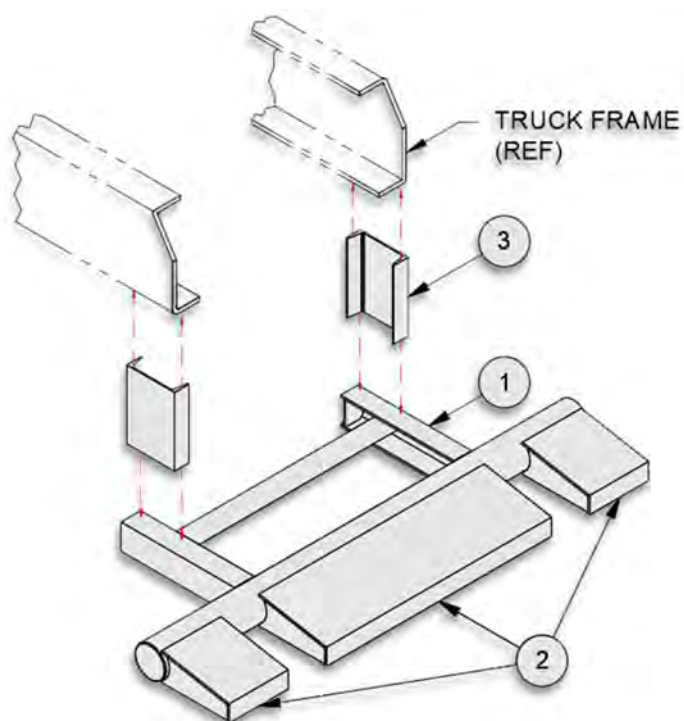


Figure C

**NOTE:**

1. PRIOR TO ANY WELDING, CONSULT THE TRUCK MANUFACTURE FOR ANY SPECIAL PRECAUTIONS THAT MAY NEED TO BE TAKEN. TYPICALLY, THE BATTERIES MUST BE DISCONNECTED AND THE GROUND LEAD FROM THE WELDER SHOULD BE AS CLOSE TO THE PART BEING WELDED TO AVOID THE POSSIBILITY OF ARCING ACROSS BEARINGS, GEARS, ETC.
2. ALL WELDS SHOULD BE DONE UTILIZING A LOW HYDROGEN WELDING PROCESS.



## INSTALLATION INSTRUCTIONS – FOLDING BUMPER ASSEMBLY

1. Review all directions and diagrams provided before starting bumper installation. Typically, a folding bumper is needed when the rear of the container extends beyond the back of the truck such that the distance between the truck bumper and container rear exceeds 24" (see *Fig. A*). Office of Motor Carrier Safety (OMCS) Regulation 393.86 requires that no bumper be located more than 30" off the ground when the truck is empty, and the end of the bumper should not be located more than 24" from the extreme rear of the vehicle, including truck bodies (see *Fig. A*). The folding bumper will need to be used in conjunction with the Roller Assembly (*Pt. No. 10H90*) and Roller Mount Brackets Assembly (*Pt. No. 10H91*) for the container to function properly.

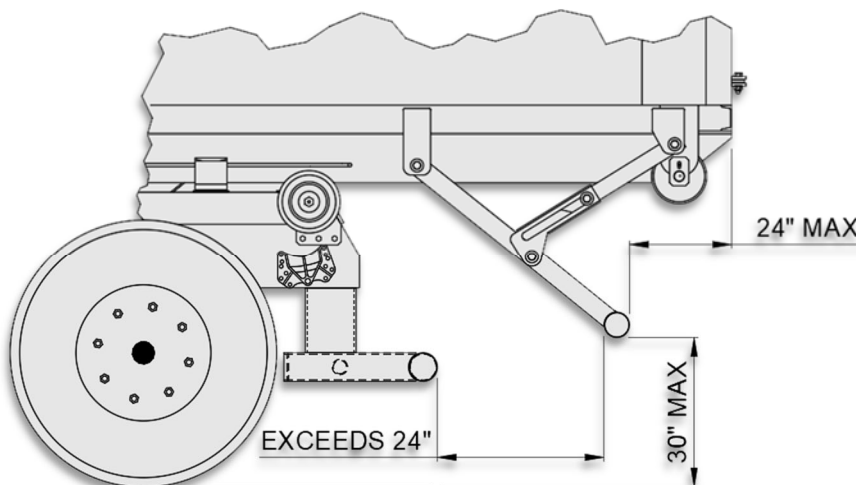


Figure A

2. Locate the best position for the support bars between the cross members. Fabricate four support bars out of 4" x 1" bar cut to the length needed to fit between the cross members (see *Fig. C*). *Fig. C* shows a width dimension of 56 1/2". This width can be adjusted if interference occurs with other items on the container but cannot exceed the width of the bumper tube. Weld the four bars between the cross members.

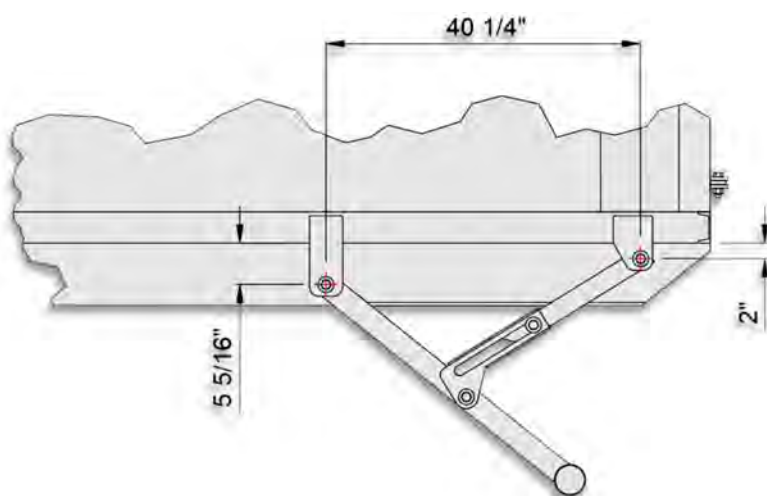


Figure B

3. Weld the front (*Pt. No. 62H87*) and rear (*Pt. No. 62H88*) brackets to the support bars. Be sure to maintain the dimensions as indicated so that the bumper folds properly (see *Fig. B & C*).
4. Weld the Pivot Arms (*Pt. No. 62H84*) to the Bumper Tube Weldment (*Pt. No. 51H46*). Be sure to maintain the width dimension that was used to locate the support bars in Step 2.

5. Assemble the Bumper Assembly to the Front and Rear Brackets (see Fig. C). Refer to the Typical Bolt Connection (see Fig. C) for all connections.
6. Raise the bumper into the folded position several times to ensure the mechanism works smoothly and freely.

**MATERIAL LIST FOR 51H44**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	51H45	2	Slip Bkt, Folding Bumper	9.18
2	51H46	1	Bumper Wdmt, Folding	47.9
3	62H84	2	Pivot Arm, Folding Bumper	24.58
4	62H85	2	Slide Arm, Folding Bumper	10.66
5	62H86	8	Bushing, Folding Bumper	0.4
6	62H87	4	Front Bkt, Folding Bumper	4.45
7	62H88	4	Rear Bkt, Folding Bumper	3.17
8	00774	16	Washer, Flat 3/4	0.11
9	00P72	8	Nut, Lock 3/4-10 UNC Gr8	0.22
10	01P15	8	HHCS 3/4-10 UNC x 3 Gr8	0.56

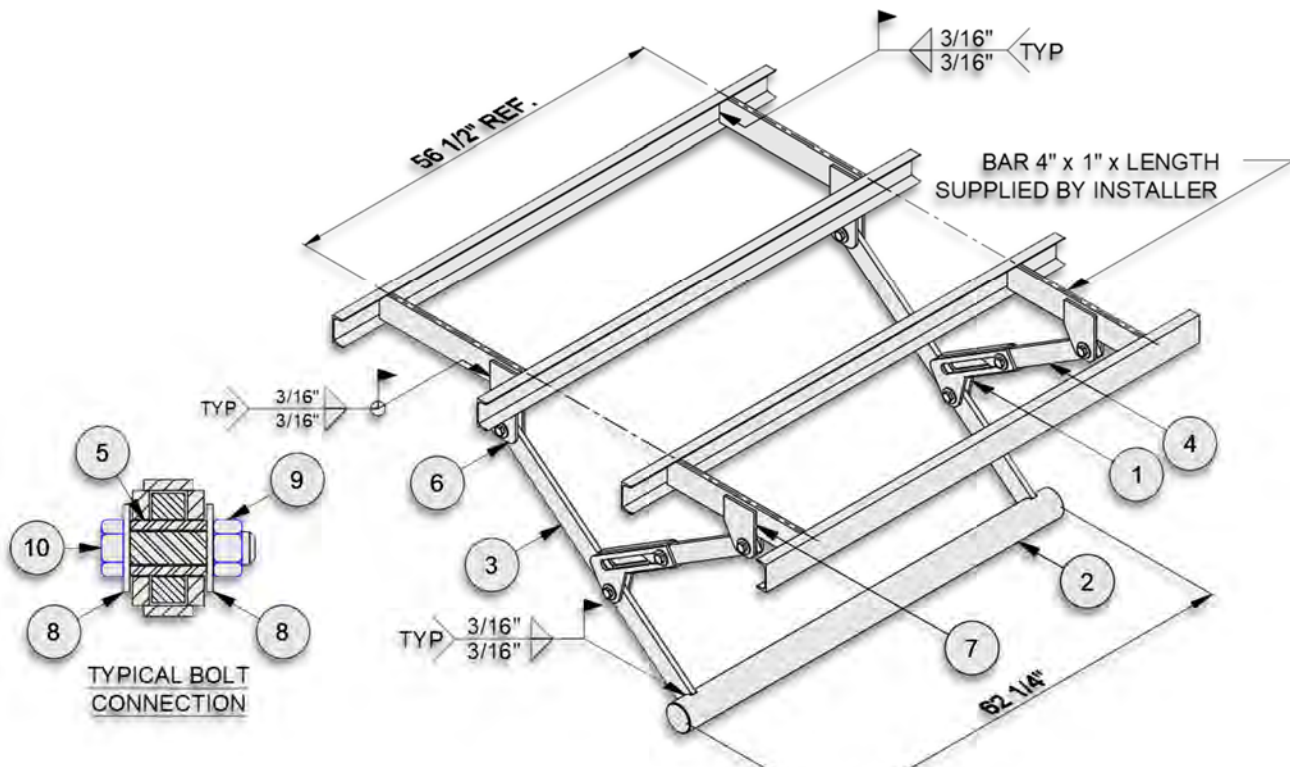


Figure C

**NOTE:**

- \* PRIOR TO ANY WELDING, CONSULT THE TRUCK MANUFACTURE FOR ANY SPECIAL PRECAUTIONS THAT MAY NEED TO BE TAKEN. TYPICALLY, THE BATTERIES MUST BE DISCONNECTED AND THE GROUND LEAD FROM THE WELDER SHOULD BE AS CLOSE TO THE PART BEING WELDED TO AVOID THE POSSIBILITY OF ARCING ACROSS BEARINGS, GEARS, ETC.
- \* DURING INSTALLATION OF THE BUMPER, CHECK TO MAKE SURE THAT THE POSITION OF THE BUMPER DOES NOT INTERFERE WITH THE LOADING AND UNLOADING OF TRUCK BODIES.

## INSTALLATION INSTRUCTIONS – DROP DOWN BUMPER ASSEMBLY

1. Review all directions and diagrams provided before starting bumper installation. Typically, a drop down bumper is needed when the rear of the container extends beyond the back of the truck such that the distance between the truck bumper and container rear exceeds 24" (see *Fig. A*). Office of Motor Carrier Safety (OMCS) Regulation 393.86 requires that no bumper be located more than 30" off the ground when the truck is empty, and the

end of the bumper should not be located more than 24" from the extreme rear of the vehicle, including truck bodies (see *Fig. A*).

2. Position the drop down bumper on the longsills of the sub-frame (see *Fig. B & C*). The mount brackets (*Pt. No. 51H17*) need to be positioned correctly to allow for sufficient room for bumper cradles (*Pt. No. 51H19*) (see *Fig. B*). Weld mount brackets onto the longsills of the sub-frame.

3. Position bumper cradles (*Pt. No. 51H19*) on the longsills of the sub-frame. Check bumper cradles for squareness with respect to each other. The bumper tube (*Pt. No. 51H16*) should come to rest within the bumper cradles when the container rests on the ground (see *Fig. B & C*). Weld bumper cradles into place on longsills.

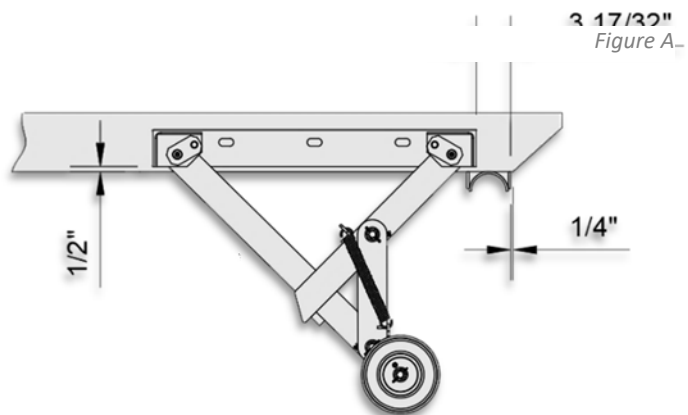
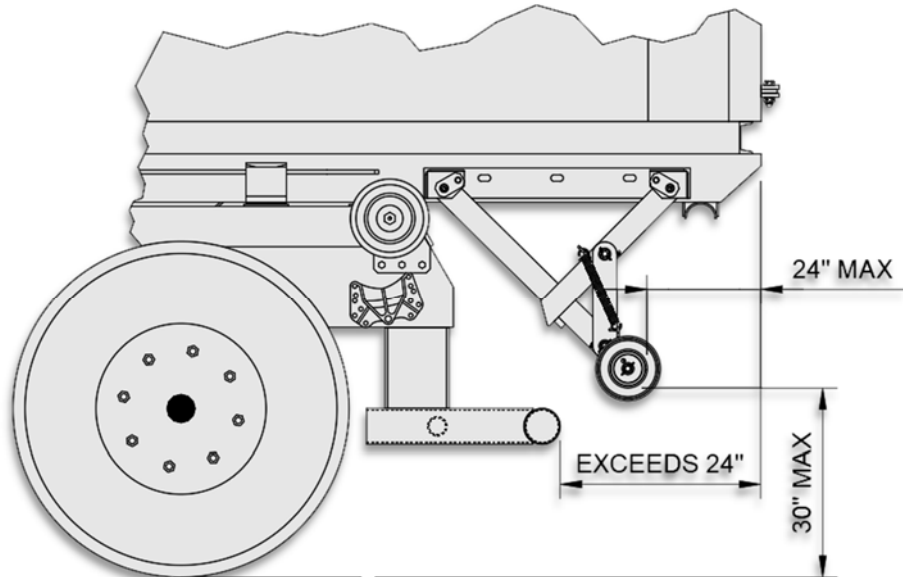
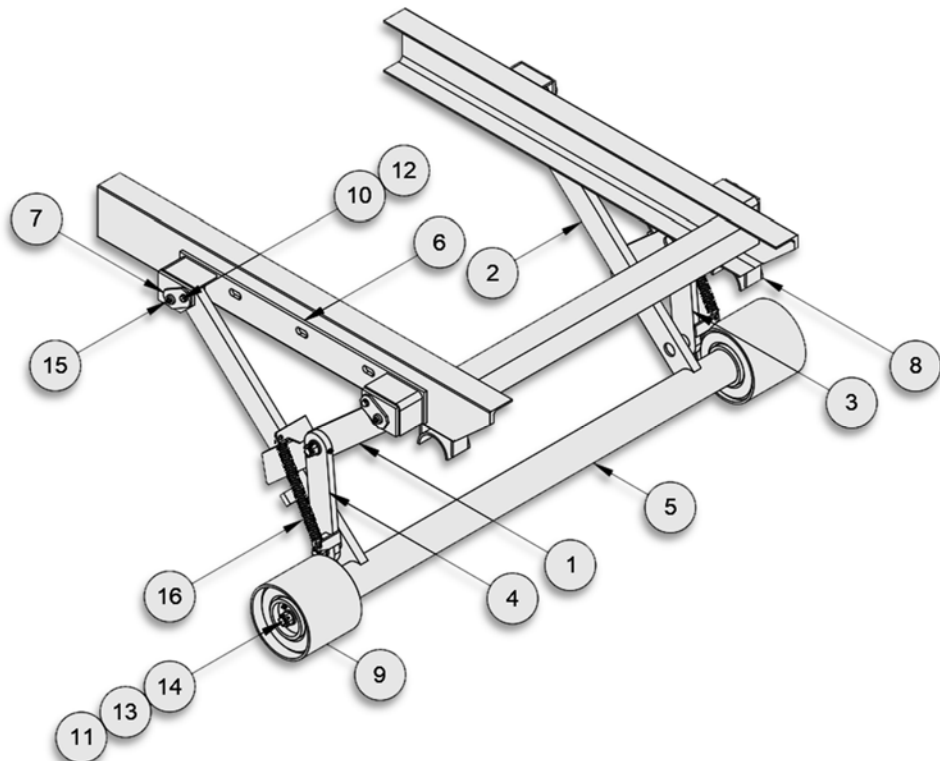


Figure B

MATERIAL LIST FOR 51H11				
ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	51H12	1	Pivot Arm, Long RH	16.01
2	51H13	1	Pivot Arm, Long LH	16.01
3	51H14	1	Pivot Arm, Short RH	8.79
4	51H15	1	Pivot Arm, Short LH	8.79
5	51H16	1	Bumper Wdmt, Drop Down	113.01
6	51H17	2	Mnt Bkt, Drop Down Bumper	19.96
7	51H18	4	Pin, Bumper 7/8 x 3-5/8	1.09
8	51H19	2	Bumper Cradle	1.64
9	51H20	2	Roller, Drop Down Bumper	26.91
10	00755	4	Washer, Lock 3/8	0.03
11	00786	6	Washer, Flat 3/4 HT	0.11
12	00P03	4	HHCS 3/8-16 UNC x 3/4 Gr8	0.04
13	00P98	6	Pin, Cotter 5/32 x 1-1/2	0.01
14	01P06	6	Nut, Slotted Hex 3/4-10 UNC	0.22
15	90P20	10	Grease Zerk, 1/4-28 NPT Str	0.01



NOTE: IF WIDTH OF THE LONGSILLS IS UNDER 41-5/8", ADD SHIMS UNDER THE 51H17 BRACKETS TO GET THE DIMENSION.

Figure C

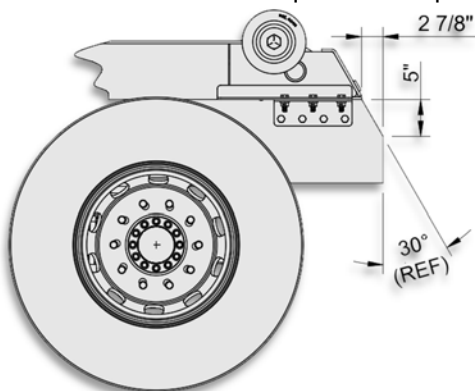
**NOTE:**

1. PRIOR TO ANY WELDING, CONSULT THE TRUCK MANUFACTURE FOR ANY SPECIAL PRECAUTIONS THAT MAY NEED TO BE TAKEN. TYPICALLY, THE BATTERIES MUST BE DISCONNECTED AND THE GROUND LEAD FROM THE WELDER SHOULD BE AS CLOSE TO THE PART BEING WELDED TO AVOID THE POSSIBILITY OF ARCING ACROSS BEARINGS, GEARS, ETC.
2. DURING INSTALLATION OF THE BUMPER, CHECK TO MAKE SURE THAT THE POSITION OF THE BUMPER DOES NOT INTERFERE WITH THE LOADING AND UNLOADING OF TRUCK BODIES.

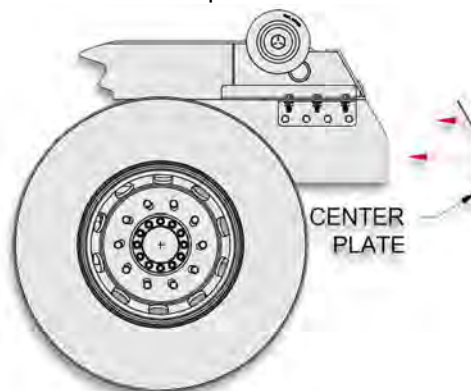
## INSTALLATION INSTRUCTIONS – LIGHT KIT ASSEMBLY

Review all directions and diagrams provided before starting rear light bar installation.

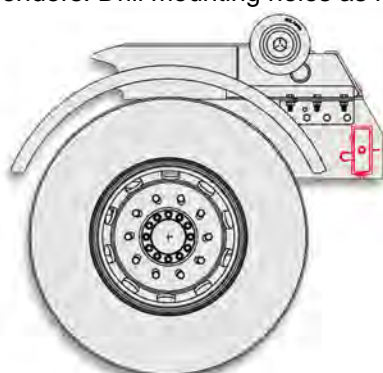
1. Trim truck frame to indicated dimensions. Smaller chassis do not require this step.



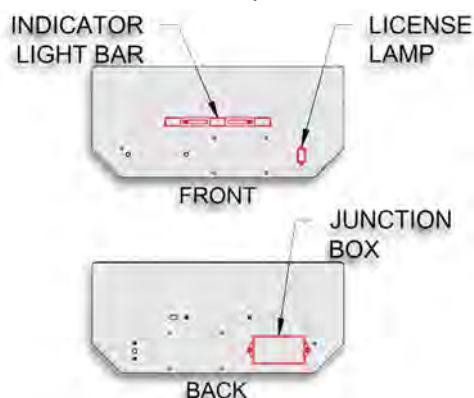
2. Position center plate on the rear of the main frame. Weld center plate to truck frame.



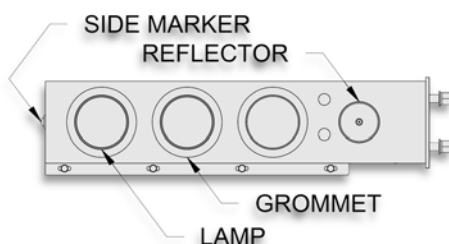
3. Position taillight module as far back as possible to avoid interference with bumper and fenders. Drill mounting holes as required.



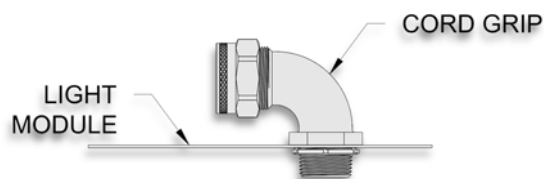
3. Install light bar, license lamp, and junction box with the hardware provided.



5. Install all lamps, grommets, reflectors and side markers to taillight modules.



6. Mount all wire harnesses into the junction box. Wire harnesses must enter the junction box through the cord grips provided. Make wiring connections in junction box with wire harness from truck cab as indicated on wiring diagram (see schematic drawing).



### NOTE:

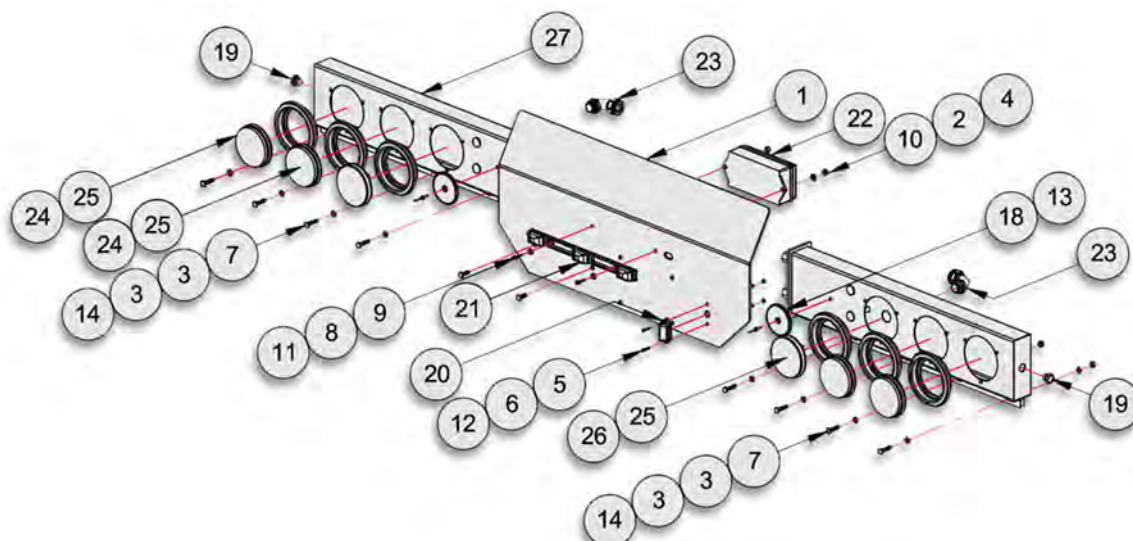
1. PRIOR TO ANY WELDING, CONSULT THE TRUCK MANUFACTURE FOR ANY SPECIAL PRECAUTIONS THAT MAY NEED TO BE TAKEN. TYPICALLY, THE BATTERIES MUST BE DISCONNECTED AND THE GROUND LEAD FROM THE WELDER SHOULD BE AS CLOSE TO THE PART BEING WELDED TO AVOID THE POSSIBILITY OF ARCING ACROSS BEARINGS, GEARS, ETC.



**53H20 – LIGHT KIT ASSEMBLY, STAINLESS STEEL**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea
1	64H87	1	Center Plate	27.34
2	00752	2	Washer, Lock 5/16	0.03
3	00770	16	Washer, Flat 1/4	0.01
4	00P20	2	Nut, Hex 5/16-18 UNC Gr8	0.01
5	00P82	2	Nut, Hex #8-32 UNC Gr8	0.02
6	00P83	2	Washer, Lock #8	0.02
7	00P84	8	Nut, Lock 5/16-18 UNC Gr8	0.09
8	01P03	2	Washer, Flat #10	0.01
9	01P04	2	Nut, NyLock #10-24	0.01
10	01P60	2	HHCS 5/16-18 UNC x 7/8 Gr8	0.03
11	02P19	2	HHCS 10-24 x 3/4	0.01
12	02P23	2	FHCS 8-32 UNC x 1 ZP	0.01
13	02P38	2	Rivet, 3/16	0.01
14	10P28	8	HHCS 5-16-18 UNC x 1-1/4 ZP	0.03
* 15	40P61	1	Wire Harness, Taillight LH	2.00
* 16	40P62	1	Wire Harness, Taillight RH	2.00
* 17	40P63	1	Wire Harness, Taillight CEN	1.00
18	40P67	2	Reflector, 3-3/16 Dia	0.01
19	40P68	2	Side Marker, LED	0.05
20	40P69	1	License Lamp, LED	0.07
21	40P70	1	ID Light Bar, LED	0.33
22	40P71	1	Junction Box Assy	0.74
23	40P72	2	Wire Harness, Cord Grip	0.21
24	40P74	4	Stop/Turn/Tail Lamp, LED	0.61
25	40P75	6	Taillight Grommet, 4 in.	0.16
26	40P76	2	Backup Lamp, LED	0.65
27	40P79	1	Taillight Module, Pair SS	20.50

\* Indicates item not shown.



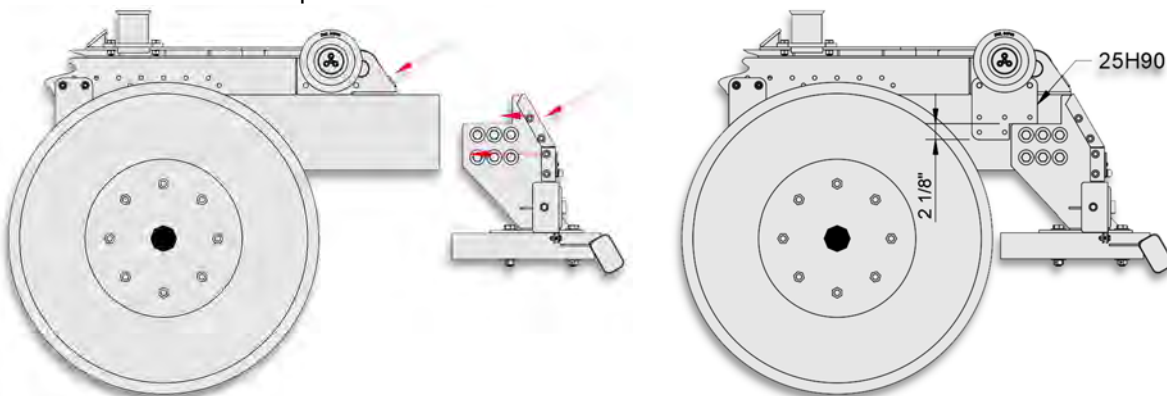




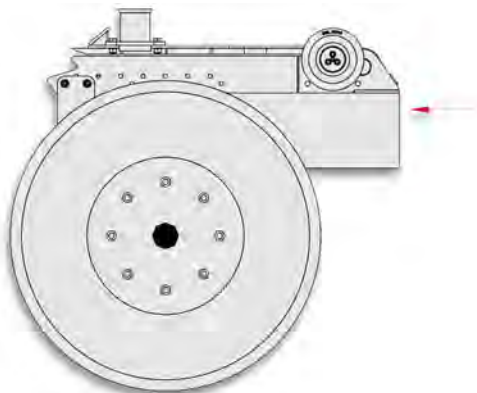
## **INSTALLATION INSTRUCTIONS – BUMPER & LIGHT ASSEMBLY**

Review all directions and diagrams provided before starting bumper & light installation.

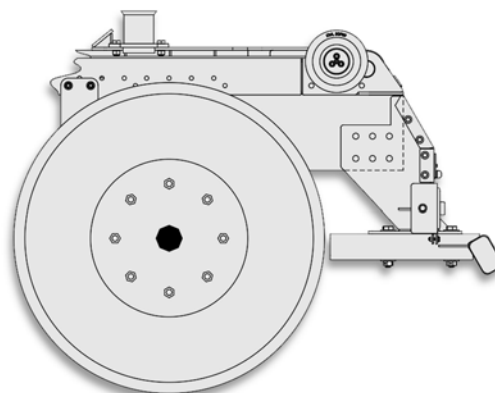
1. Before starting bumper & light assembly installation, place the hoist in position on the truck frame. Having the correct hoist position is critical to bumper placement. The center plate on the bumper is designed to follow the same angle as the back of the hoist.
  - a. For 100 Series hoists with 25H90 rear brackets, the bracket will need to be cut 2-1/8" from the bottom for the bumper and bracket to fit at the same time.



2. Cut the frame flush with the end of the hoist.

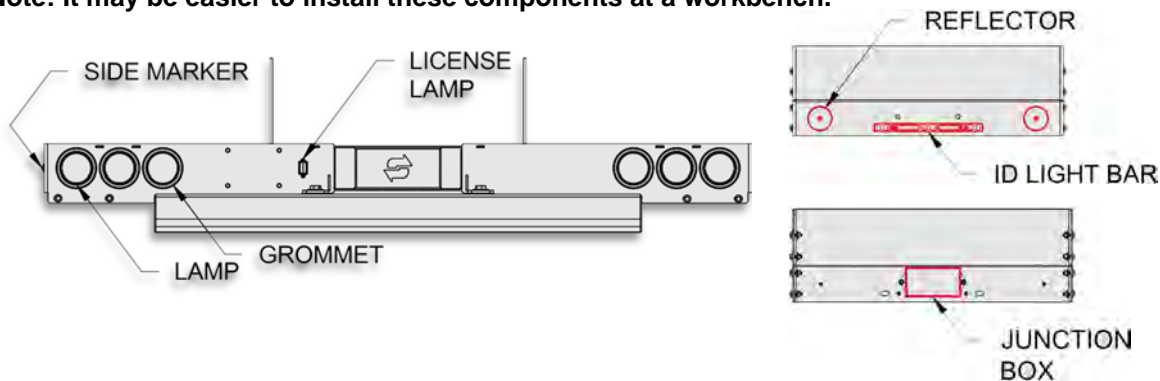


3. Test fit the bumper in place. Mark and drill 13/16" mount holes as required. Test fit center plate on bumper for correct placement.

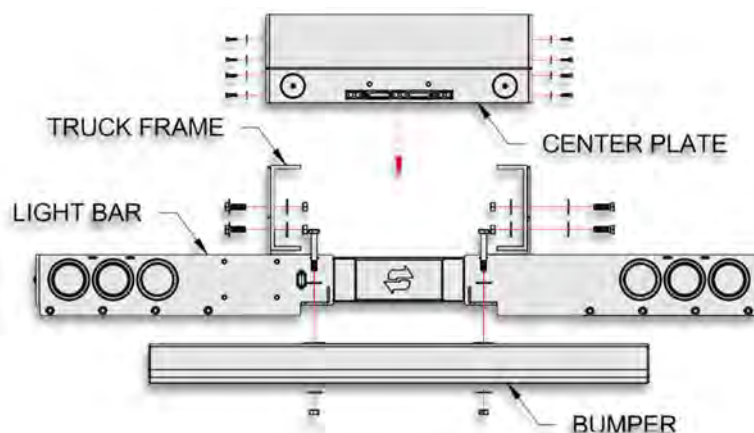


4. Install the wiring harnesses, grommets, lamps, license lamp and side markers to bumper. Install ID light bar, reflectors and junction box to center plate.

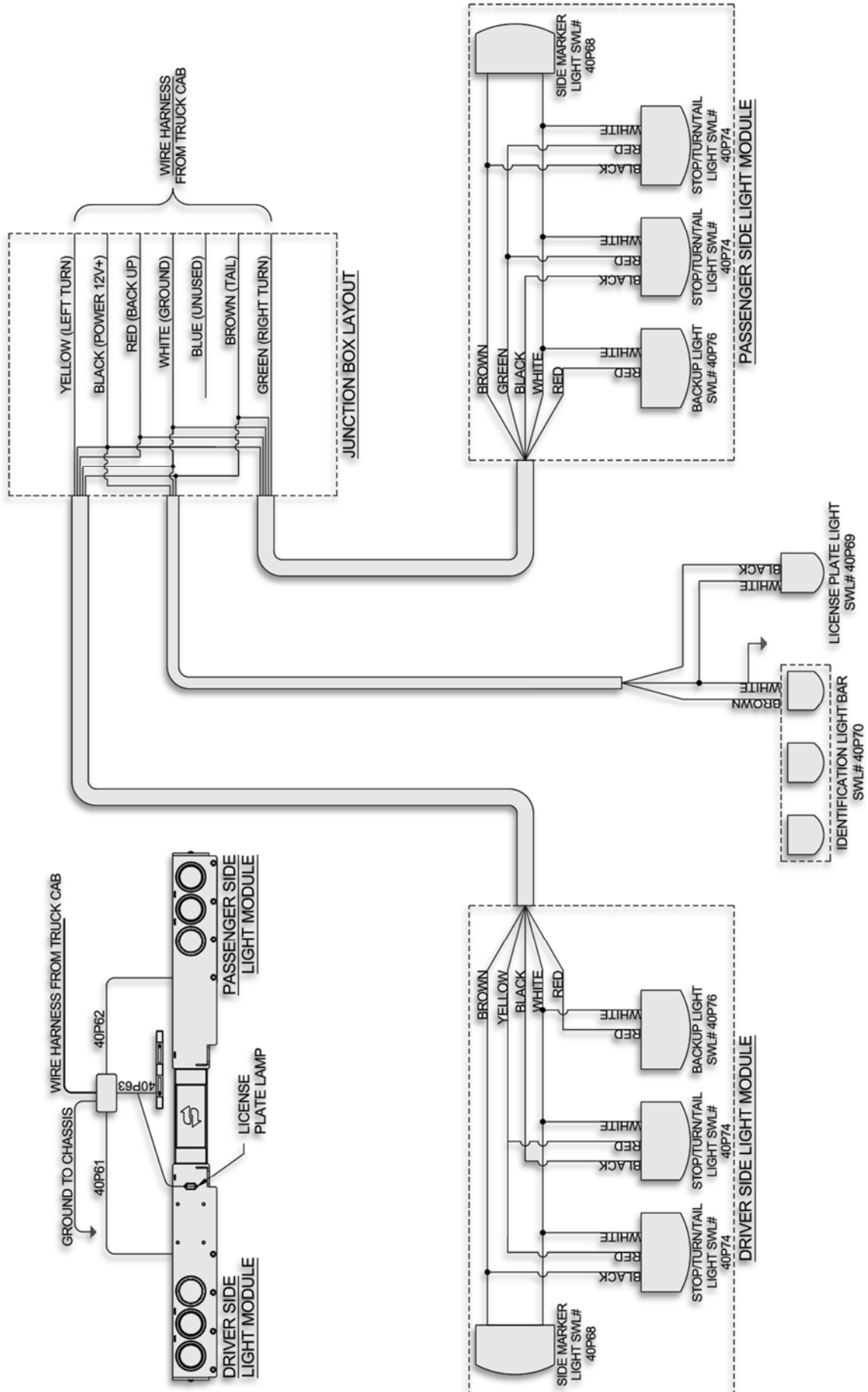
**Note: It may be easier to install these components at a workbench.**



5. Install light bar to truck frame with the supplied hardware. Attach the corresponding wires from the chassis to the junction box and install center plate to light bar. Test all light functions. Finally, install bumper to light bar.

**NOTE:**

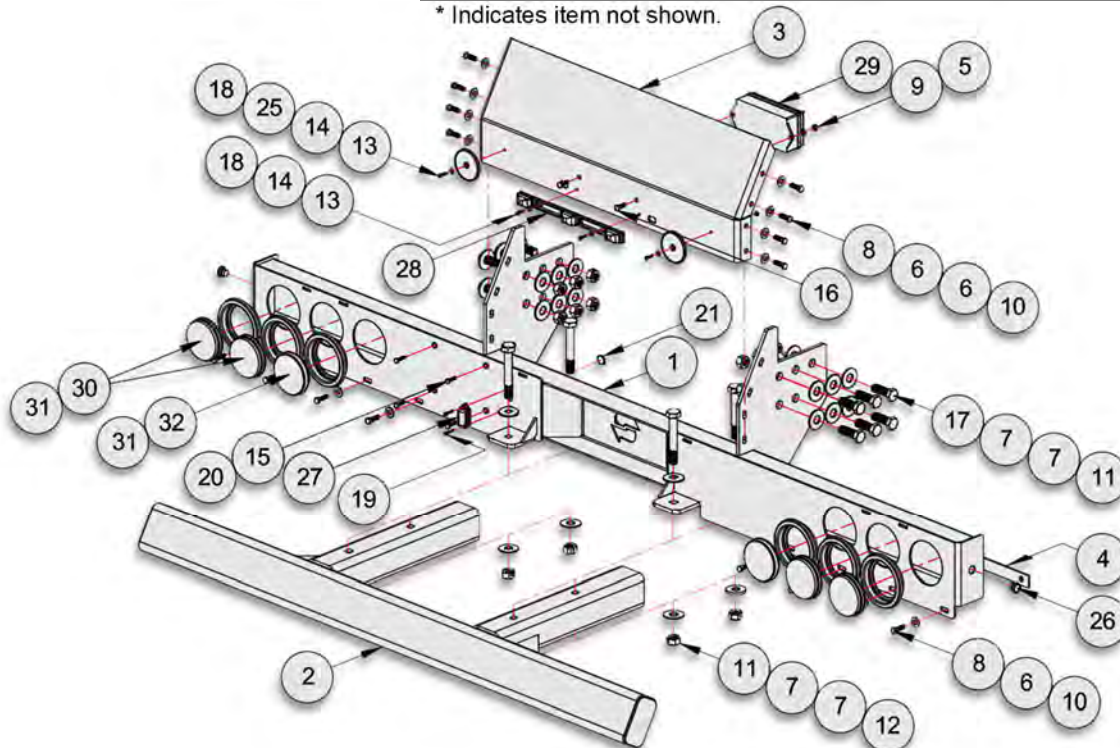
1. THIS BUMPER IS NOT RATED TO TOW.
2. THIS BUMPER IS NOT RATED FOR VEHICLE RECOVERY OR SIMILAR TASKS.
3. THE COMPLETE BUMPER & LIGHT ASSEMBLY IS OVER 300 LB AND IS NOT RECOMMENDED TO CARRY BY HAND. USE A LIFTING TABLE CART OR EQUIVALENT TO LIFT THE ASSEMBLY.



**45H62 – BUMPER & LIGHT ASSEMBLY**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea
1	53H07	1	Light Bar Wdmt	123.50
2	53H16	1	Bumper Wdmt	105.00
3	64H77	1	Center Plate	25.65
4	64H90	2	Mudflap Backer Bar	1.50
5	00752	2	Washer, Lock 5/16	0.03
6	00771	24	Washer, Flat 3/8	0.01
7	00774	32	Washer, Flat 3/4	0.11
8	00P13	16	HHCS 3/8-16 UNC x 1-1/4 Gr8	0.10
9	00P20	2	Nut, Hex 5/16-18 UNC Gr8	0.01
10	00P34	16	Nut, Lock 3/8-16 UNC GrC	0.02
11	00P72	16	Nut, Lock 3/4-10 UNC Gr8	0.22
12	00P80	4	HHCS 3/4-10 UNC x 5 Gr8	0.80
13	01P03	4	Washer, Flat #10	0.01
14	01P04	4	Nut, NyLock #10-24	0.01
15	01P56	4	HHCS 1/4-20 UNC x 1 Gr8	0.02
16	01P60	2	HHCS 5/16-18 UNC x 7/8 Gr8	0.03
17	01P70	12	HHCS 3/4-10 UNC x 2-1/4 Gr8	0.39
18	02P19	4	HHCS 10-24 x 3/4	0.01
19	02P23	2	FHCS 8-32 UNC x 1 ZP	0.01
20	02P43	4	Nut, Rivet 1/4-20 UNC	0.00
21	02P57	1	Grommet, 1-1/16 in.	0.01
* 22	40P61	1	Wire Harness, Taillight LH	2.00
* 23	40P62	1	Wire Harness, Taillight RH	2.00
* 24	40P63	1	Wire Harness, Taillight CEN	1.00
25	40P67	2	Reflector, 3-3/16 Dia	0.01
26	40P68	2	Side Marker, LED	0.05
27	40P69	1	License Lamp, LED	0.07
28	40P70	1	ID Light Bar, LED	0.33
29	40P71	1	Junction Box Assy	0.74
30	40P74	4	Stop/Turn/Tail Lamp, LED	0.61
31	40P75	6	Taillight Grommet, 4 in.	0.16
32	40P76	2	Backup Lamp, LED	0.65

\* Indicates item not shown.



## INSTALLATION INSTRUCTIONS – ROLLER & ROLLER MOUNT ASSEMBLY

1. Review all directions and diagrams provided before starting roller and roller mount installation.
2. Locate position for roller mount brackets (*Pt. No. 32H03*) between cross sills of the container. Rollers should be positioned as far back and as wide as possible for stability. For hoist and folding bumper clearance, do not place brackets any closer than 11" to the subframe longsill (see *Fig. A*). Also, the roller axle center line should be approximately 1-11/16" below the bottom of the subframe longsill for roller clearance (see *Fig. A*).

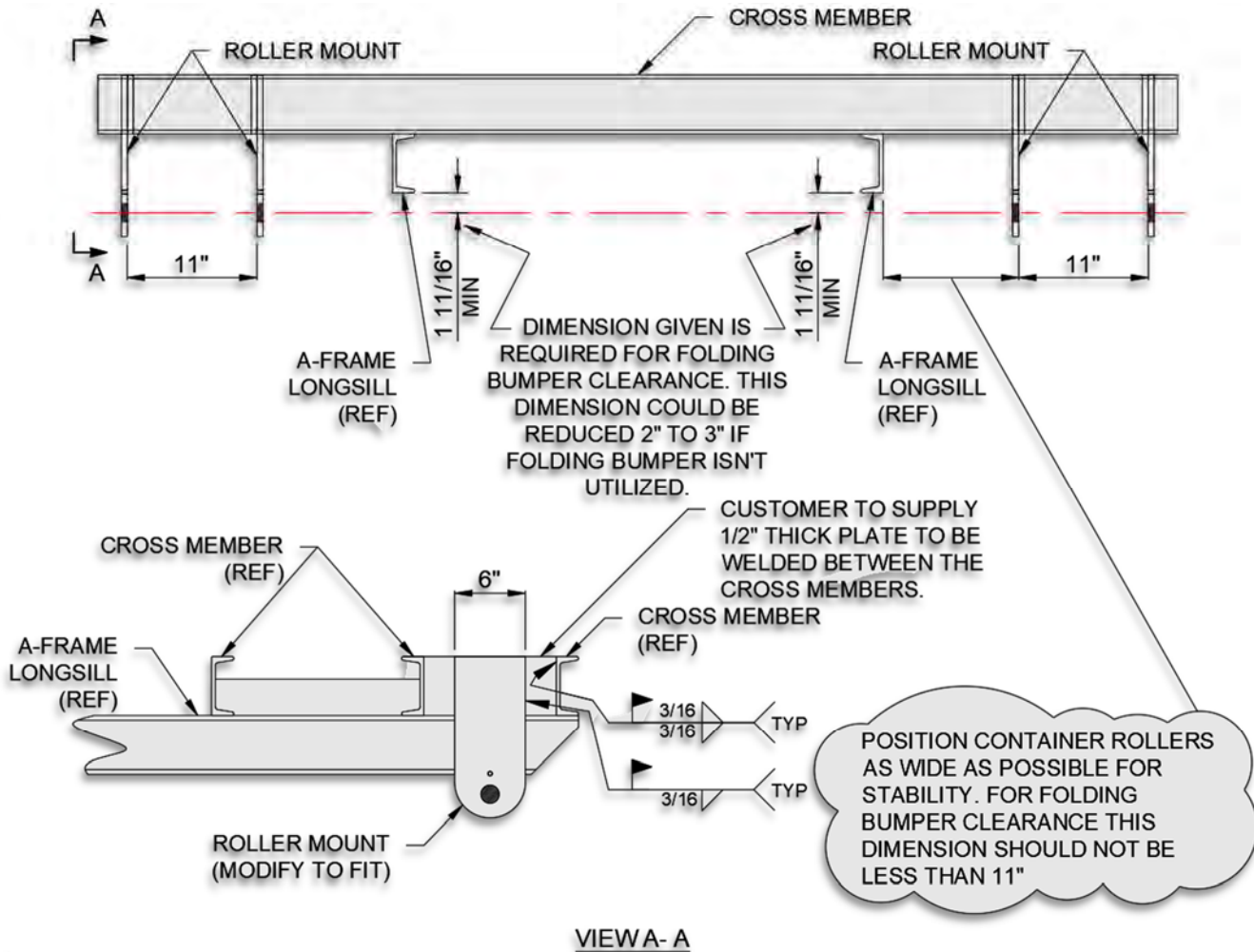


Figure A

3. Some modification to the roller mount bracket may be required for the roller mount to fit properly. If the existing container cross members are wider than 6", a fabricated support member of 1/2" plate or thicker will need to be added (see *Fig. B*).



4. Once the mount brackets are located on the container, weld the roller mount brackets in place (see Fig. A).
5. Install the roller (Pt. No. 10H12) between the brackets with the roller axle (Pt. No. 10H31) and the fasteners provided (see Fig. C). Grease the rollers before use.

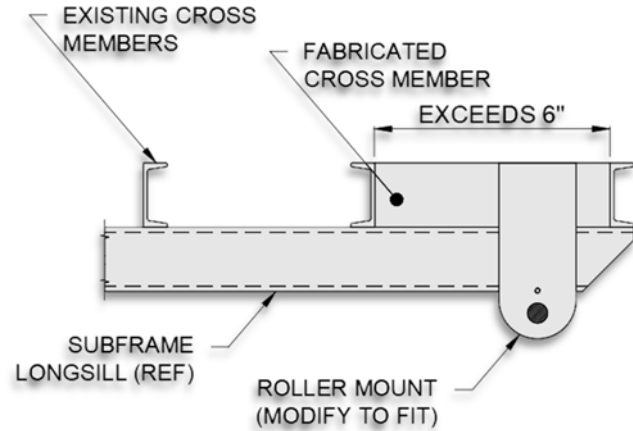


Figure B

MATERIAL LIST FOR 10H90 AND 10H91					
ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.	
1	32H03	4	Roller Ear	11.95	
2	10H12	2	Roller Wdmt.	39.76	
3	10H31	2	Roller Axle Wdmt.	7.28	
4	00P62	2	3/8-16 UNC x 1 Bolt	.05	
5	90P03	2	1/8 NPT Grease Zerk	.01	
6	00755	2	3/8 Dia. Lock Washer	.01	
7	00P36	2	3/8 Dia. Washer H.T.	.10	

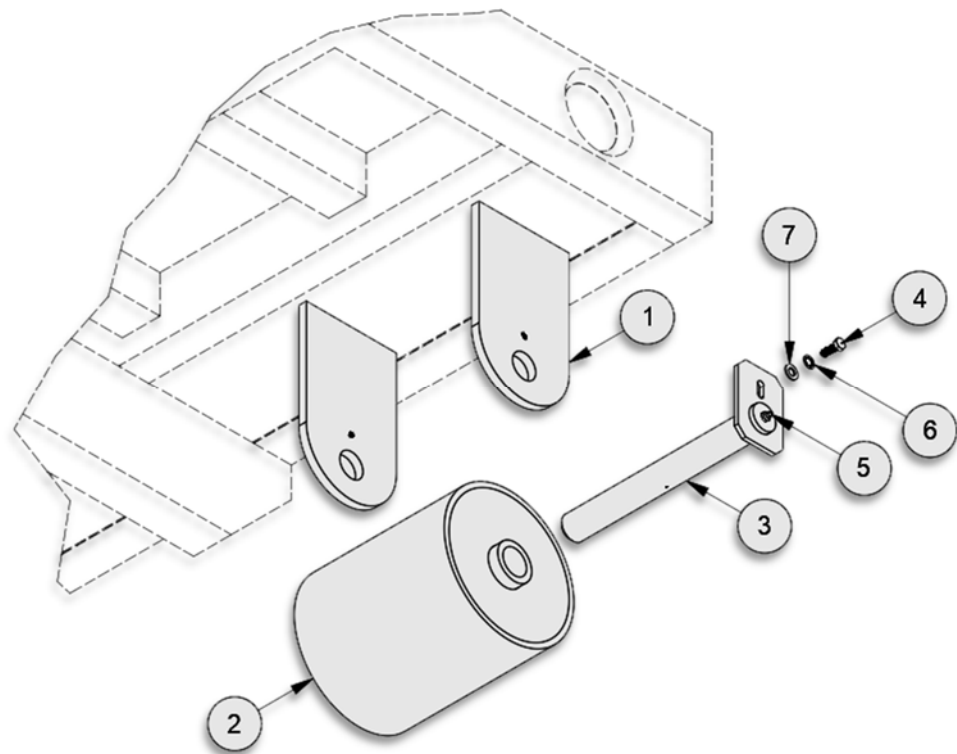


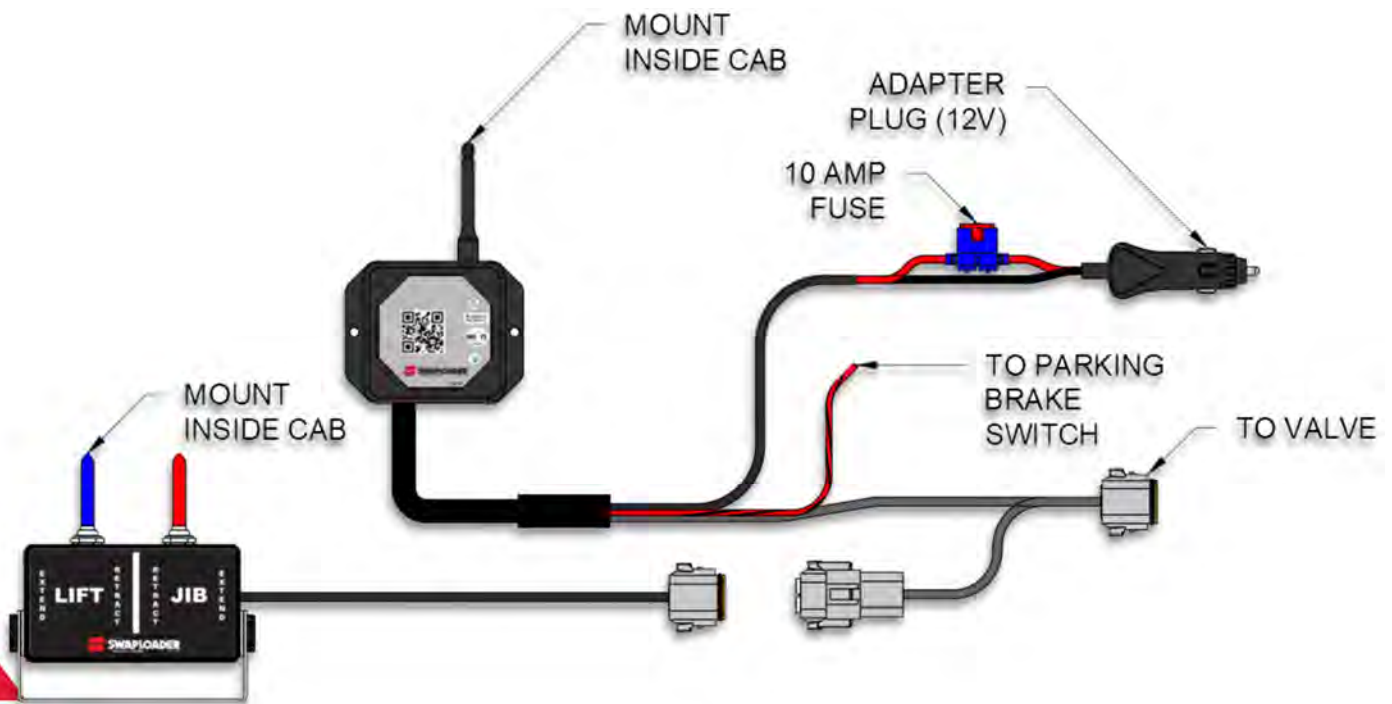
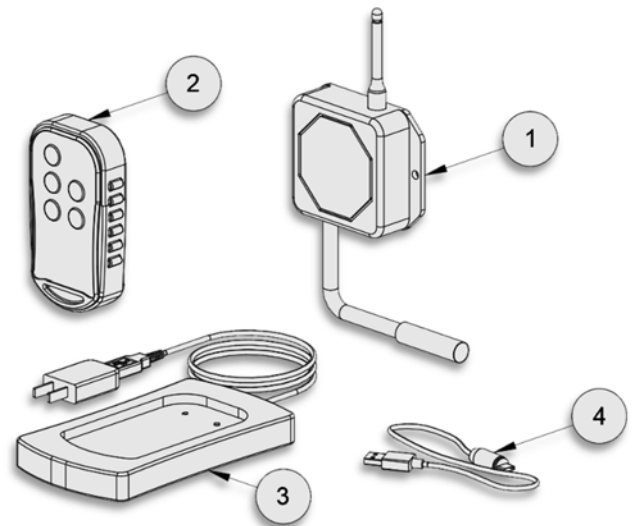
Figure C

**INSTALLATION INSTRUCTIONS – WIRELESS REMOTE, 2-SECTION**

1. Review all directions and diagrams provided before starting installation.
2. Install the receiver in the cab. Optimum mounting is with the antenna pointing upwards.
3. Route the wiring harness to the valve connector.
4. Connect toggle switch box if applicable.
5. Connect parking brake wire to parking brake switch. To operate the hoist this wire must see 12V from the parking brake being engaged.
6. Hardwire or plug in the 12V power adapter. If hardwired, keep the inline fuse intact.

**40P80 – REMOTE & RECEIVER, 2-SECT EHV**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	40P83	1	Remote Receiver, 2 Circuit	1.80
2	40P84	1	Transmitter, 5 Button	0.45
3	40P86	1	Charger Pad, Transmitter	1.42
4	40P91	1	Charger Cable, Transmitter	0.02



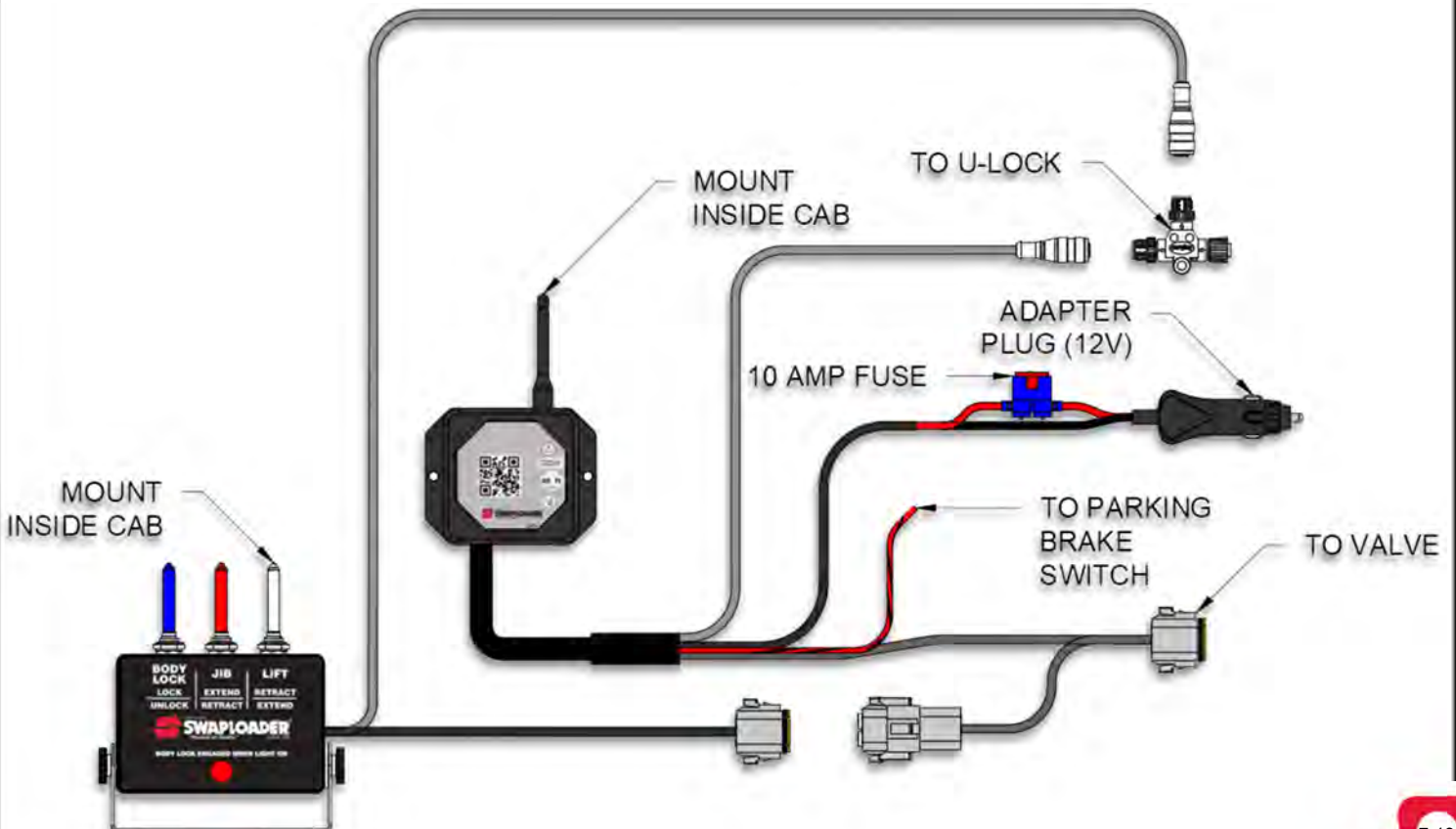
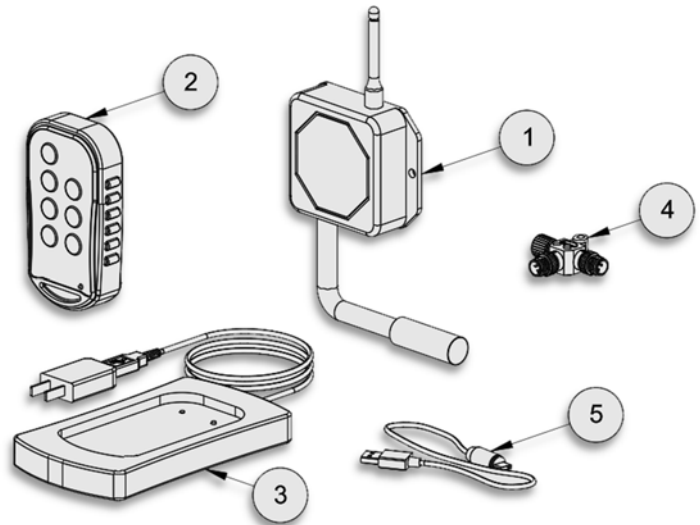


**INSTALLATION INSTRUCTIONS – WIRELESS REMOTE, 3-SECTION**

1. Review all directions and diagrams provided before starting installation.
2. Install the receiver in the cab. Optimum mounting is with the antenna pointing upwards.
2. Route the wiring harness to the valve connector.
4. Connect toggle switch box if applicable.
5. Connect parking brake wire to parking brake switch. To operate the hoist this wire must see 12V from the parking brake being engaged.
6. Hardwire or plug in the 12V power adapter. If hardwired, keep the inline fuse intact.

**40P81 – REMOTE & RECEIVER, 3-SECT EHV**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	40P82	1	Remote Receiver, 3 Circuit	1.80
2	40P85	1	Transmitter, 7 Button	0.45
3	40P86	1	Charger Pad, Transmitter	1.42
4	40P90	1	Splitter, Indicator Light	0.03
5	40P91	1	Charger Cable, Transmitter	0.02

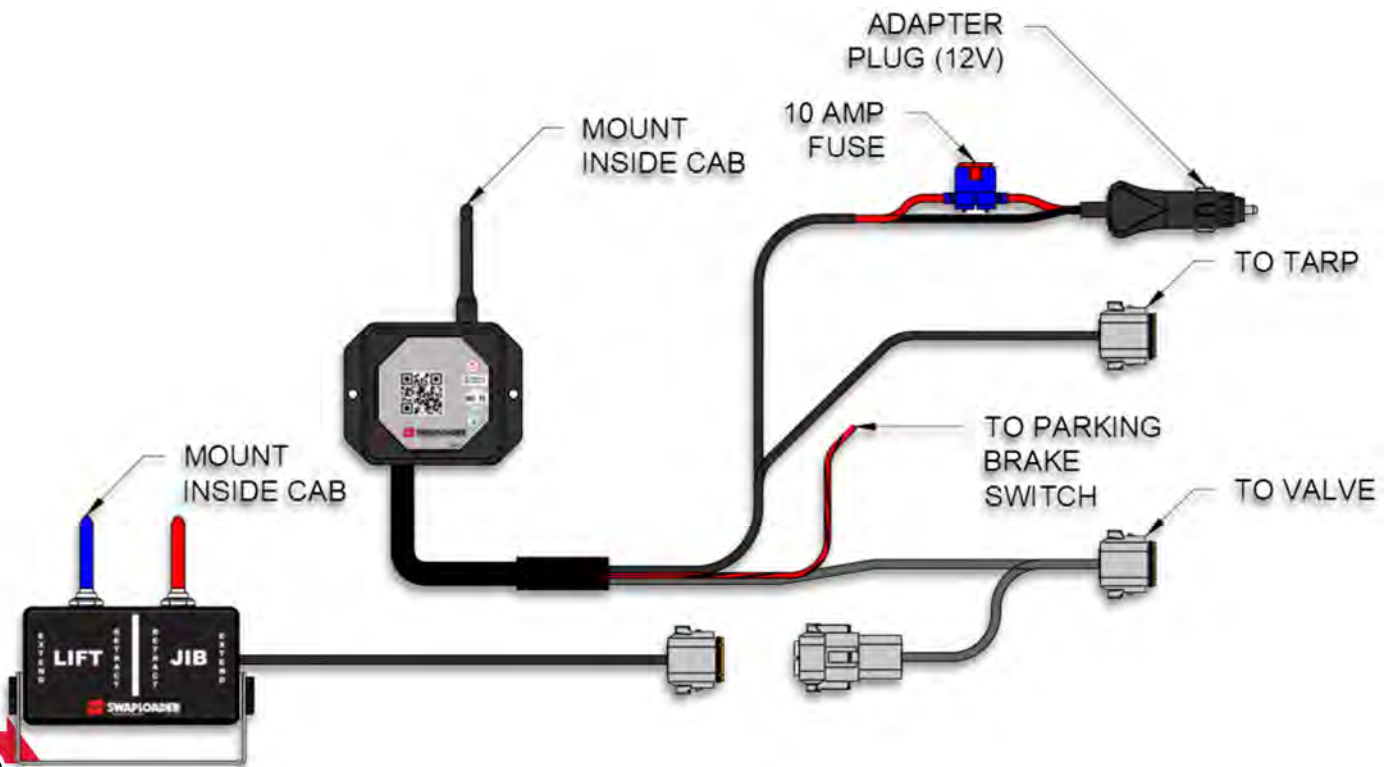
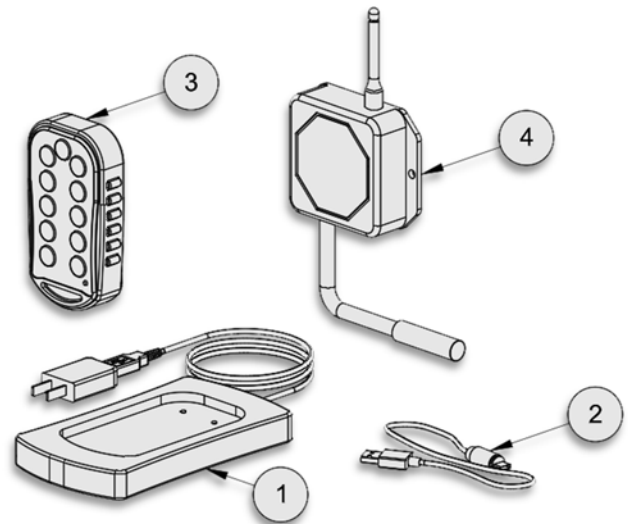


**INSTALLATION INSTRUCTIONS – WIRELESS REMOTE, 2-SECTION W/ US TARP**

1. Review all directions and diagrams provided before starting installation.
2. Install the receiver in the cab. Optimum mounting is with the antenna pointing upwards.
3. Route the wiring harness to the valve connector.
4. Connect toggle switch box if applicable.
5. Connect parking brake wire to parking brake switch. To operate the hoist this wire must see 12V from the parking brake being engaged.
6. Hardwire or plug in the 12V power adapter. If hardwired, keep the inline fuse intact.

**40P87 – REMOTE & RECEIVER, 2-SECT UST**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	40P86	1	Charger Pad, Transmitter	0.20
2	40P91	1	Charger Cable, Transmitter	0.03
3	41P04	1	Transmitter, 11 Button	0.45
4	41P16	1	Remote Rec, 2 Circuit UST	2.25

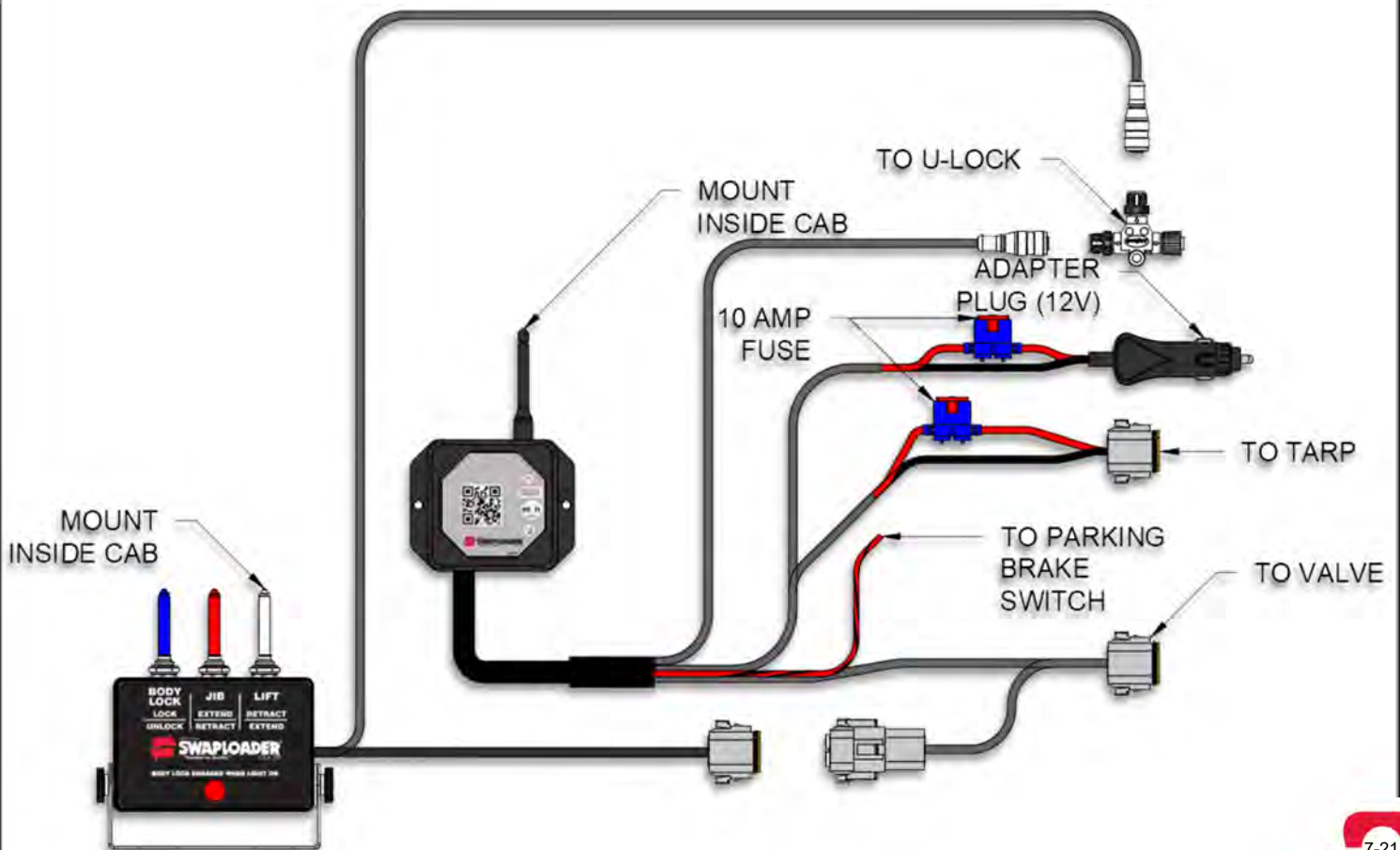
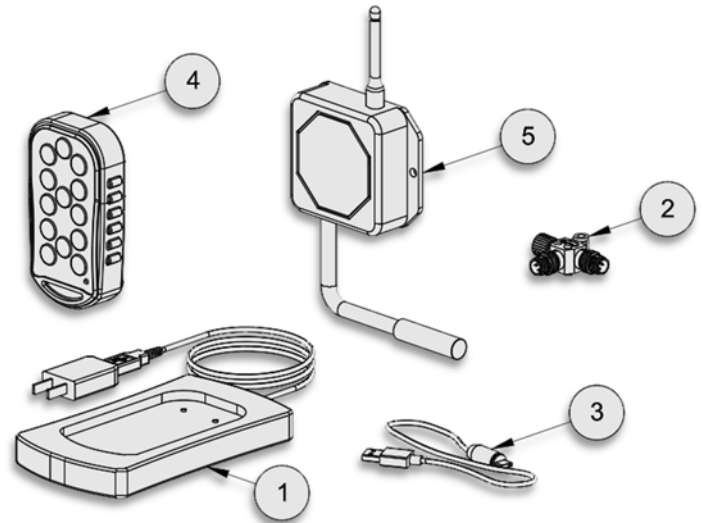


**INSTALLATION INSTRUCTIONS – WIRELESS REMOTE, 3-SECTION W/ US TARP**

1. Review all directions and diagrams provided before starting installation.
2. Install the receiver in the cab. Optimum mounting is with the antenna pointing upwards.
3. Route the wiring harness to the valve connector.
4. Connect toggle switch box if applicable.
5. Connect parking brake wire to parking brake switch. To operate the hoist this wire must see 12V from the parking brake being engaged.
6. Hardwire or plug in the 12V power adapter. If hardwired, keep the inline fuse intact.

**40P87 – REMOTE & RECEIVER, 2-SECT UST**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	40P86	1	Charger Pad, Transmitter	0.20
2	40P90	1	Splitter, Indicator Light	0.03
3	40P91	1	Charger Cable, Transmitter	0.03
4	41P05	1	Transmitter, 13 Button	0.45
5	41P15	1	Remote Rec, 3 Circuit UST	2.25



## WIRELESS REMOTE OPERATION

Power must be applied to the receiver module for the system to work.

### REMOTE ON/OFF

1. Press and hold the POWER button until the red and green LEDs appear.
2. Press and hold the POWER button until the LEDs stop toggling.

#### **NOTE:**

##### **WHEN POWER IS ON:**

3. **PRESSING THE POWER BUTTON WILL TURN OFF ALL FUNCTIONS AS A SAFETY MEASURE.**
4. **IF THE TRANSMITTER (REMOTE) GOES OUT OF RANGE FOR MORE THAN 2 SECONDS, ALL FUNCTIONS WILL TURN OFF AS A SAFETY MEASURE.**
5. **TO SAVE BATTERY LIFE, THE TRANSMITTER WILL TURN OFF AFTER 15 MINUTES IF RECEIVER IS OFF.**

**PRESS POWER BUTTON TO RESTORE OPERATION.**

### INDICATOR LEDs

1. Transmitter Indicator - blinks rapidly whenever there is communication between the transmitter and the receiver. It will double-blink when no functions are used.
2. Battery Indicator - blinks once every second when the battery voltage is low and requires charging.
3. U-Lock Indicator (if applicable) - LED light will turn on when the U-Lock is engaged.

### PARKING BRAKE

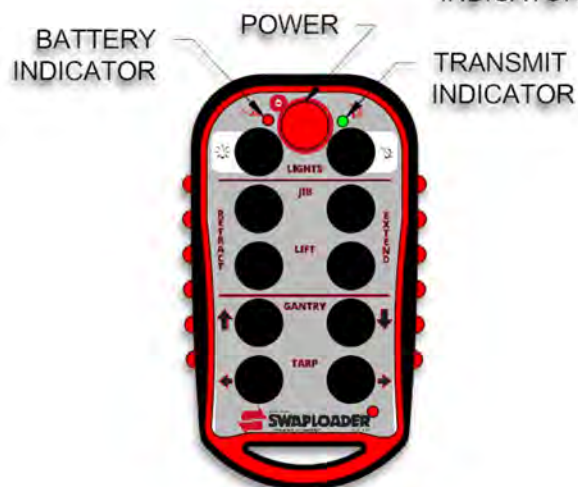
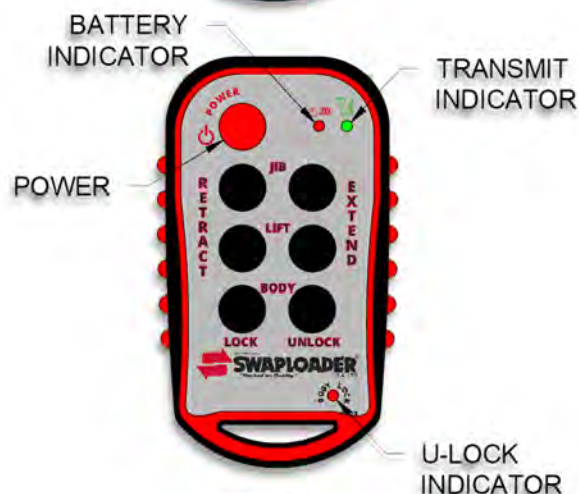
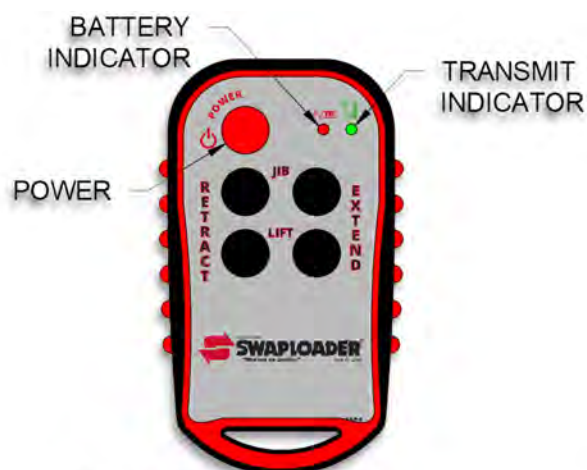
As a safety feature, the parking brake must be engaged when operating the hoist using the remote.



#### **CAUTION:**

**DO NOT OPERATE THE HOIST WHILE OUTSIDE OF THE CAB UNLESS THE PARKING BRAKE IS ENGAGED OR THE TRUCK MAY MOVE POSITION.**

**MAINTAIN A SAFE DISTANCE AND STAY CLEAR OF MOVING OBJECTS WHEN OUTSIDE OF THE CAB.**





## ON-BOARD GATE

The GATE creates a Wi-Fi access point which allows you to connect to any device with Wi-Fi and web browser such as smart phones, pads, or computers and allows users to configure, diagnose, and troubleshoot the system.

## ACCESSING THE CONTROL PANEL

1. Turn on the power to the receiver. The GATE will remain active for up to 5 minutes of wi-fi activity, after which it will turn off to conserve power.
2. Use your device and look for the available Wi-Fi networks. A network under the name of "SWAPLOADER3A5893", "SWAPLOADER3A589B", "SWAPLOADER3A589F", or "SWAPLOADER3A589L" should be available at this point. Connect to the network, the password is:
  - 3A5893X1 for 3A5893A receiver modules
  - 3A589BX1 for 3A589BA receiver modules
  - 3A589FX1 for 3A589FB receiver modules
  - 3A589LX1 for 3A589LA receiver modules.
3. Once the connection is established, open a web browser on your device. Kar-Tech recommends using Chrome browser.
4. Enter the address <http://192.168.4.1> in the address bar
5. The following options are available from the main screen. Note: some of these options require a password: 1262.
  - Diagnostics - shows the present state of remote communications.
  - Histogram - shows which error codes are active and how many times a specific error code has been active.
  - Wi-Fi Remote - in the event the transmitter is lost, the receiver can be operated here.
  - Software Update – to install new software updates.
  - Wi-Fi Configuration – allows you to change the name of the Wi-Fi network you're connecting to.



## ROUTINE MAINTENANCE

Clean transmitter regularly with a damp cloth and mild detergent.

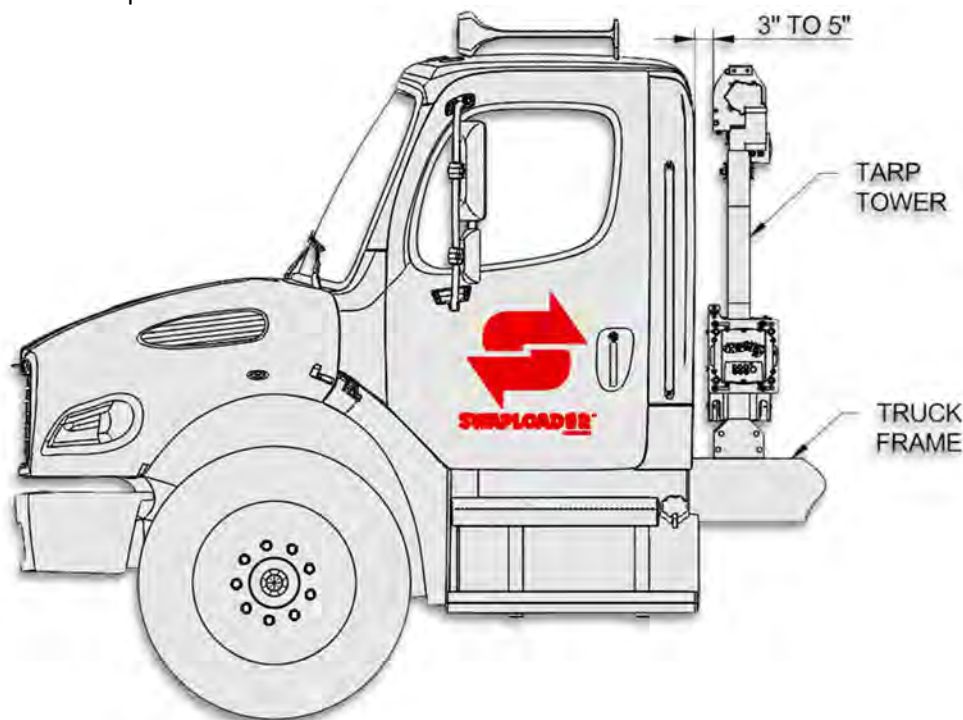
Inspect electrical wiring for wear points or other damage. Repair as required.

Inspect all connections for looseness or corrosion. Tighten and/or "seal" as necessary.

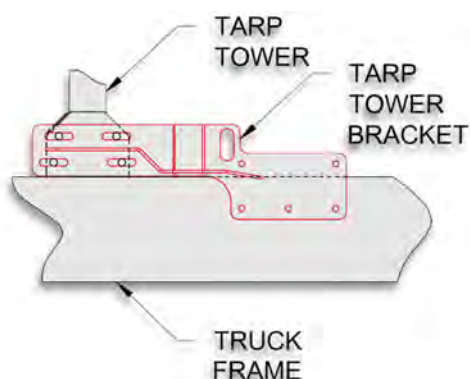
## **TARP & BRACKET INSTALLATION INSTRUCTIONS**

Review all directions and diagrams provided with hoist and tarp system before installation.

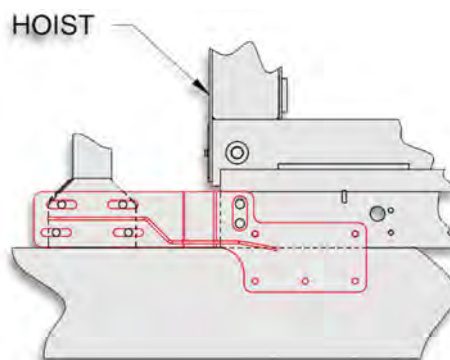
1. Position tarp tower on truck frame. Allow for sufficient clearance between cab and tower.



2. Position tarp tower bracket over tarp tower.



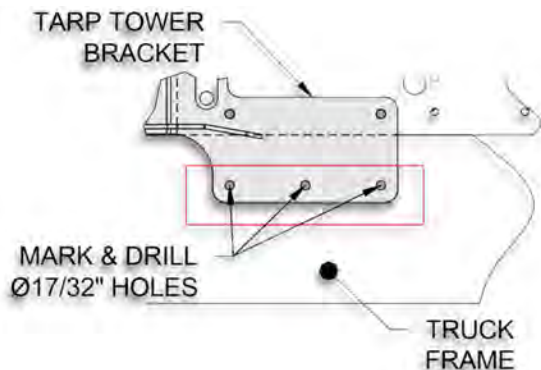
3. And place hoist, lining up the holes in the main frame to the holes in the tarp tower bracket.



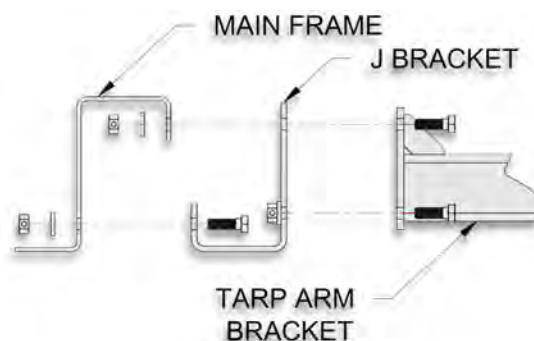
### **NOTE:**

1. PRIOR TO ANY DRILLING IN THE MAIN FRAME OR TRUCK FRAME, TEST FIT ALL PARTS.
2. NOT ALL TARP PACKAGES WILL INCLUDE CUSTOM TARP TOWER BRACKETS DUE TO JIB EXTENDING PASSED THE MAIN FRAME. IN THIS CASE, ALLOW A MINIMUM OF 18 INCHES OF TRUCK FRAME BETWEEN CAB AND HOIST, FOR THE TARP TOWER.

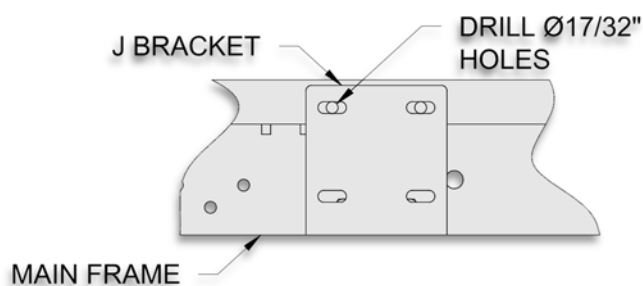
4. Using the tower bracket as a template, mark the location and drill  $\frac{17}{32}$ " diameter holes into the truck frame.



5. With the tarp tower positioned and hoist in place, determine the location of J bracket and tarp arm bracket.



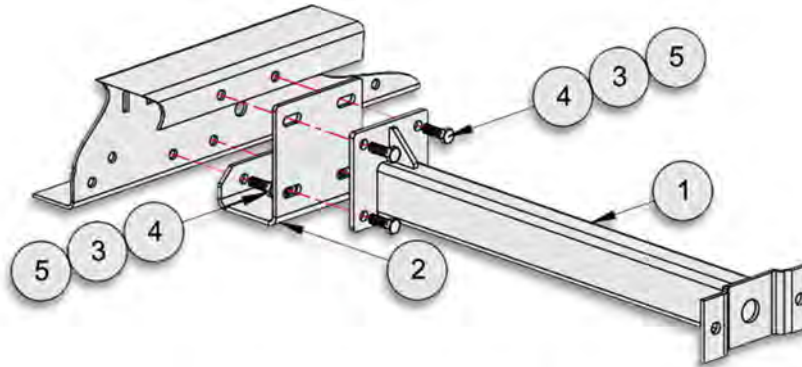
6. Using the J Bracket as a template mark and drill  $\frac{17}{32}$ " holes into the lip of the main frame.



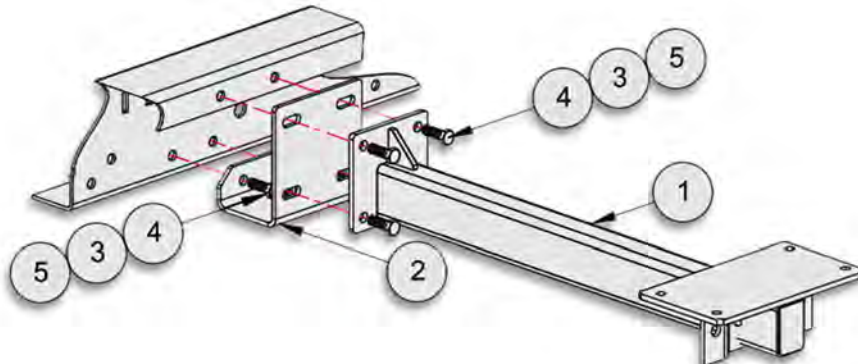


**160-UST, 160-DC203, 160-DC204**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	14H70	2	Tarp Arm Wdmt, DC203	17.03
2	28H32	2	J Bracket, 160/212/214	5.31
3	00784	12	Washer, Flat 1/2 ZP	0.01
4	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
5	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05

**TARP ARM BRACKET DETAIL****160-DC400**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	55H75	2	Tarp Arm Wdmt, DC400	23.31
2	28H32	2	J Bracket, 160/212/214	5.31
3	00784	12	Washer, Flat 1/2 ZP	0.01
4	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
5	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05

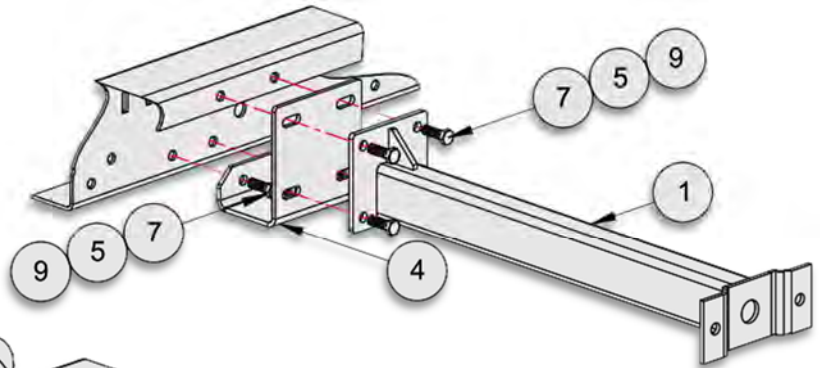
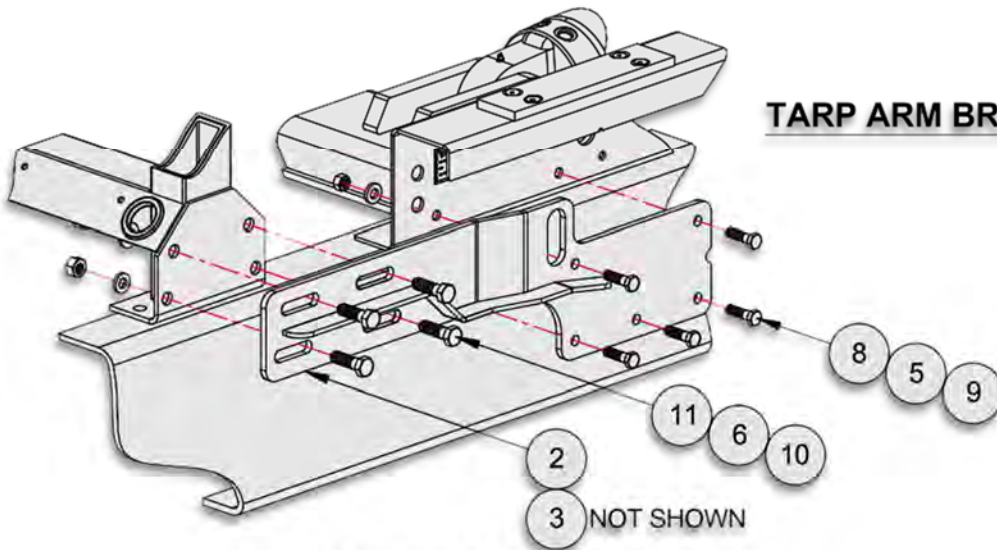
**TARP ARM BRACKET DETAIL**

**212-DC203**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	14H70	2	Tarp Arm Wdmt, DC203	17.03
2	14H73	1	Tarp Tower Mnt, LH 110/212	19.61
3	14H74	1	Tarp Tower Mnt, RH 110/212	19.61
4	28H32	2	J Bracket, 160/212/214	5.31
5	00784	22	Washer, Flat 1/2 ZP	0.01
6	00785	16	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P15	10	HHCS 1/2-13 UNC x 1-3/4 Gr8	0.20
9	00P35	22	Nut, Lock 1/2-13 UNC GrC	0.05
10	00P55	8	Nut, Lock 5/8-11 UNC Gr8	0.13
11	00P69	8	HHCS 5/8-11 UNC x 2 Gr8	0.33

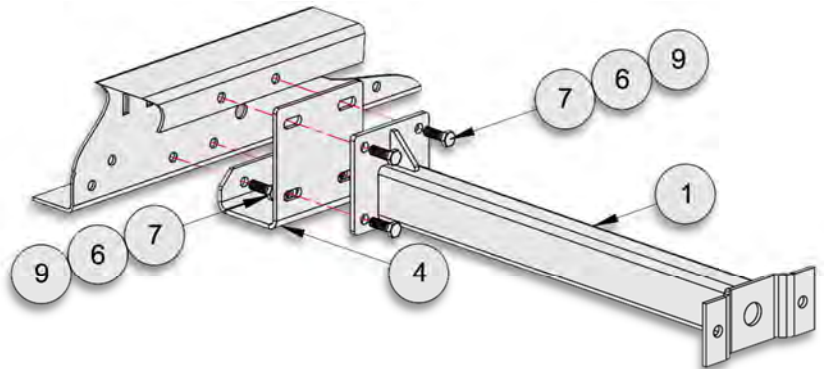
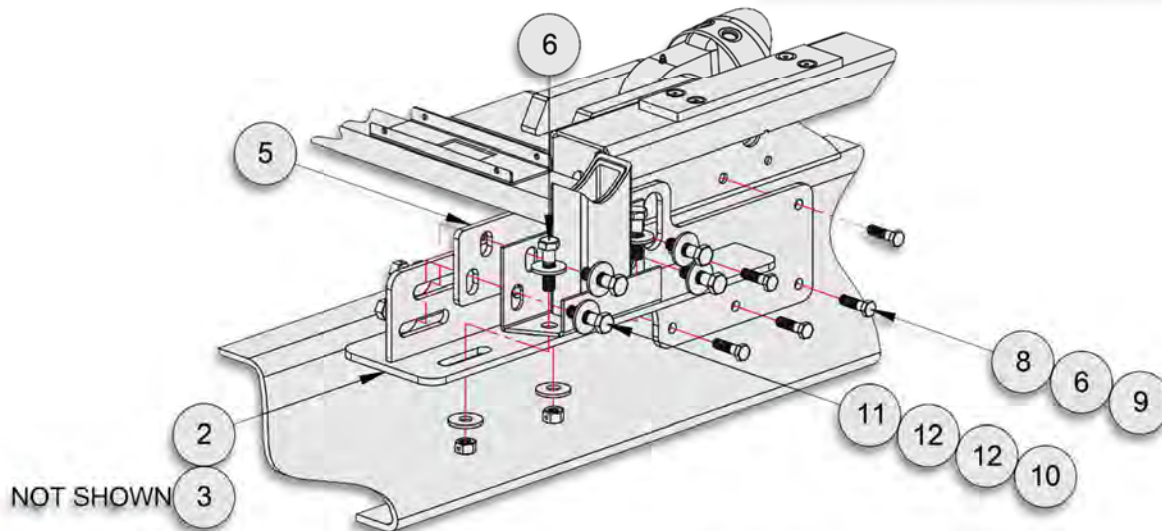
**212-DC400**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	55H75	2	Tarp Arm Wdmt, DC400	23.31
2	14H73	1	Tarp Tower Mnt, LH 110/212	19.61
3	14H74	1	Tarp Tower Mnt, RH 110/212	19.61
4	28H32	2	J Bracket, 160/212/214	5.31
5	00784	22	Washer, Flat 1/2 ZP	0.01
6	00785	16	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P15	10	HHCS 1/2-13 UNC x 1-3/4 Gr8	0.20
9	00P35	22	Nut, Lock 1/2-13 UNC GrC	0.05
10	00P55	8	Nut, Lock 5/8-11 UNC Gr8	0.13
11	00P69	8	HHCS 5/8-11 UNC x 2 Gr8	0.33

**TARP ARM BRACKET DETAIL****TARP TOWER BRACKET DETAIL**

**212-UST, 214-UST**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	14H70	2	Tarp Arm Wdmt, DC203	17.03
2	14H71	1	Tarp Tower Mnt, LH 214 UST	30.52
3	14H72	1	Tarp Tower Mnt, RH 214 UST	30.52
4	28H32	2	J Bracket, 160/212/214	5.31
5	28H37	2	Shim, Tarp Tower Mnt UST	3.85
6	00784	22	Washer, Flat 1/2 ZP	0.01
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P15	10	HHCS 1/2-13 UNC x 1-3/4 Gr8	0.20
9	00P35	22	Nut, Lock 1/2-13 UNC GrC	0.05
10	00P55	12	Nut, Lock 5/8-11 UNC Gr8	0.13
11	01P17	12	HHCS 5/8-11 UNC x 2-1/4 Gr8	0.30
12	02P11	24	Washer, Flat 5/8 USS	0.09

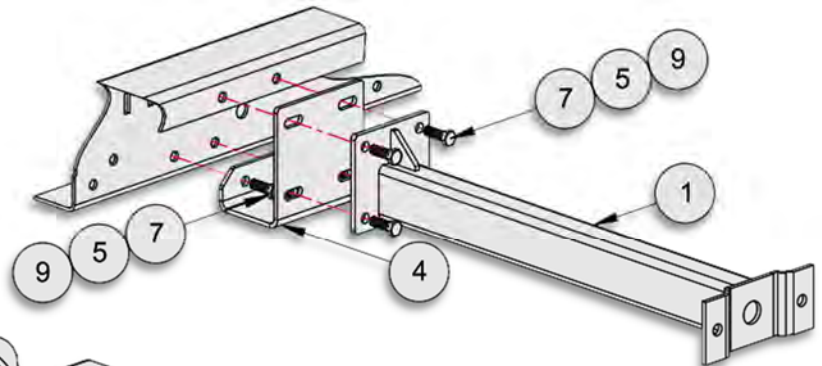
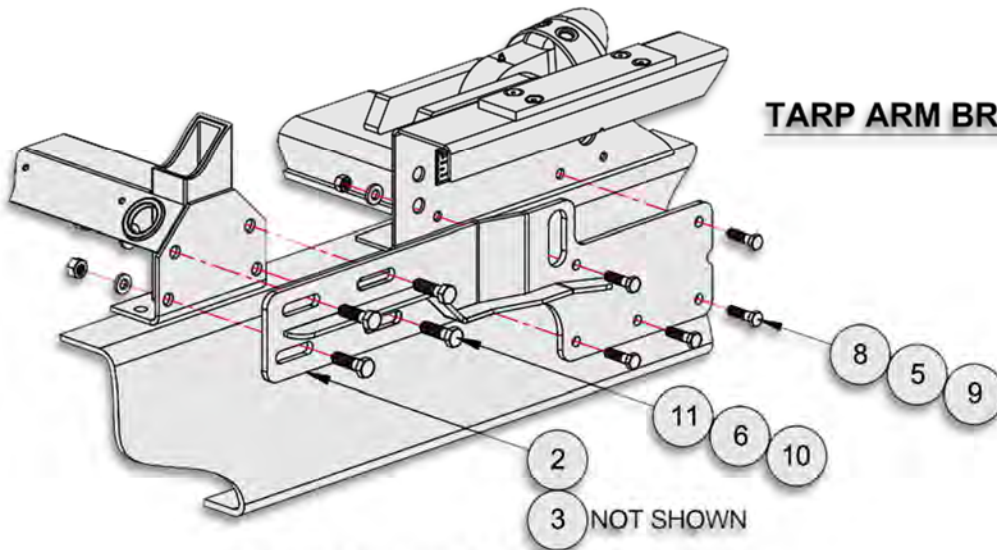
**TARP ARM BRACKET DETAIL****TARP TOWER BRACKET DETAIL**

**214-DC203**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	14H70	2	Tarp Arm Wdmt, DC203	17.03
2	14H77	1	Tarp Tower Mnt, LH 214	18.38
3	14H78	1	Tarp Tower Mnt, RH 214	18.38
4	28H32	2	J Bracket, 160/212/214	5.31
5	00784	22	Washer, Flat 1/2 ZP	0.01
6	00785	16	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P15	10	HHCS 1/2-13 UNC x 1-3/4 Gr8	0.20
9	00P35	22	Nut, Lock 1/2-13 UNC GrC	0.05
10	00P55	8	Nut, Lock 5/8-11 UNC Gr8	0.13
11	00P69	8	HHCS 5/8-11 UNC x 2 Gr8	0.33

**214-DC400**

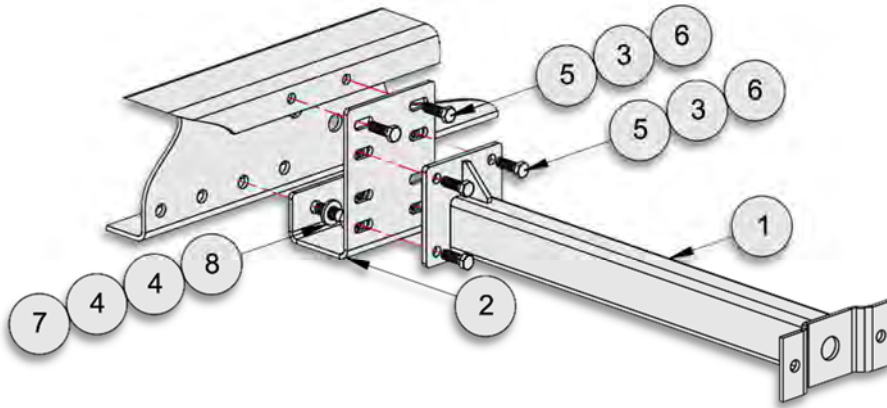
ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	55H75	2	Tarp Arm Wdmt, DC400	23.31
2	14H77	1	Tarp Tower Mnt, LH 214	18.38
3	14H78	1	Tarp Tower Mnt, RH 214	18.38
4	28H32	2	J Bracket, 160/212/214	5.31
5	00784	22	Washer, Flat 1/2 ZP	0.01
6	00785	16	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P15	10	HHCS 1/2-13 UNC x 1-3/4 Gr8	0.20
9	00P35	22	Nut, Lock 1/2-13 UNC GrC	0.05
10	00P55	8	Nut, Lock 5/8-11 UNC Gr8	0.13
11	00P69	8	HHCS 5/8-11 UNC x 2 Gr8	0.33

**TARP ARM BRACKET DETAIL****TARP TOWER BRACKET DETAIL**

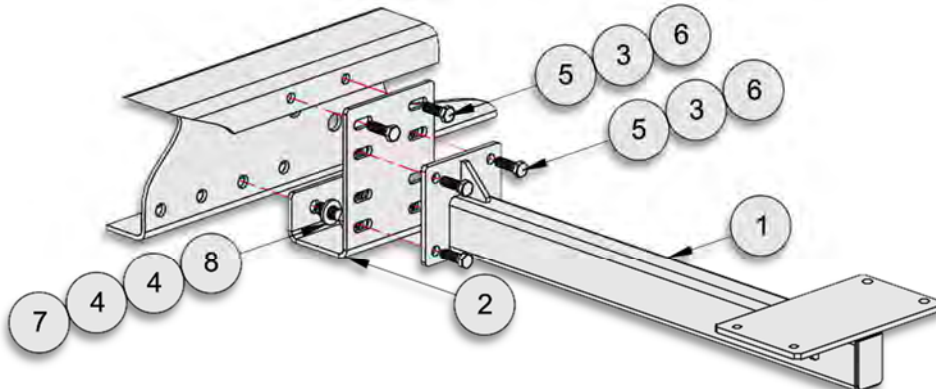


**220-UST, 222-UST, 220-DC203, 240-UST**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	14H70	2	Tarp Arm Wdmt, DC203	17.03
2	66H38	2	J Bracket, 200S	6.03
3	00784	12	Washer, Flat 1/2 ZP	0.01
4	00785	8	Washer, Flat 5/8 ZP	0.07
5	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
6	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05
7	00P55	4	Nut, Lock 5/8-11 UNC Gr8	0.13
8	00P69	4	HHCS 5/8-11 UNC x 2 Gr8	0.33

**TARP ARM BRACKET DETAIL****220-DC400**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	55H75	2	Tarp Arm Wdmt, DC400	23.31
2	66H38	2	J Bracket, 200S	6.03
3	00784	12	Washer, Flat 1/2 ZP	0.01
4	00785	8	Washer, Flat 5/8 ZP	0.07
5	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
6	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05
7	00P55	4	Nut, Lock 5/8-11 UNC Gr8	0.13
8	00P69	4	HHCS 5/8-11 UNC x 2 Gr8	0.33

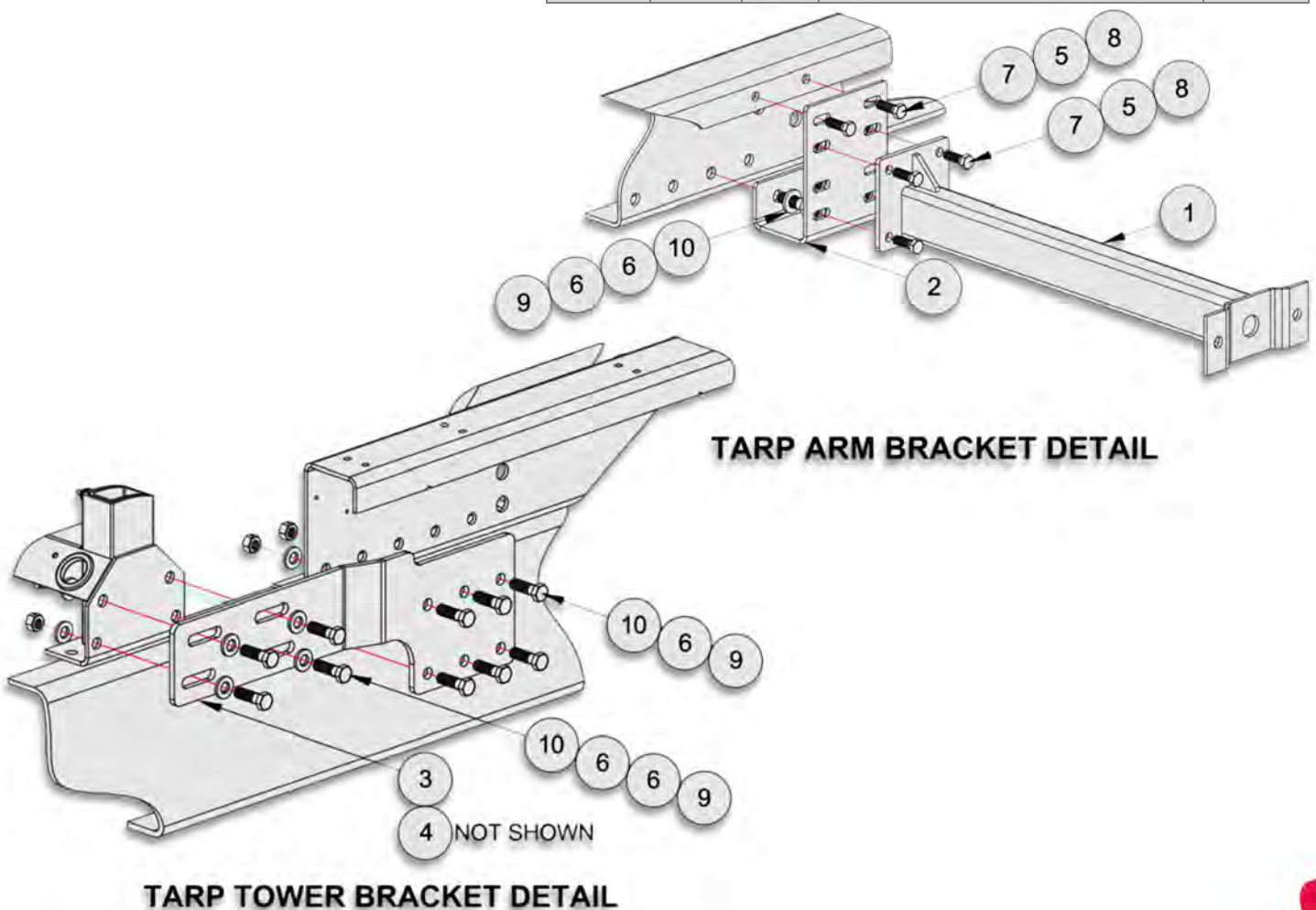
**TARP ARM BRACKET DETAIL**

**222-DC203**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	14H70	2	Tarp Arm Wdmt, DC203	17.03
2	66H38	2	J Bracket, 200S	6.03
3	66H44	1	Tarp Tower Mnt, LH 240	20.40
4	66H45	1	Tarp Tower Mnt, RH 240	20.40
5	00784	12	Washer, Flat 1/2 ZP	0.01
6	00785	24	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05
9	00P55	12	Nut, Lock 5/8-11 UNC Gr8	0.13
10	00P69	12	HHCS 5/8-11 UNC x 2 Gr8	0.33

**222-DC400**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	55H75	2	Tarp Arm Wdmt, DC400	23.31
2	66H38	2	J Bracket, 200S	6.03
3	66H40	1	Tarp Tower Mnt, LH 222	16.31
4	66H41	1	Tarp Tower Mnt, RH 222	16.31
5	00784	12	Washer, Flat 1/2 ZP	0.01
6	00785	24	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05
9	00P55	12	Nut, Lock 5/8-11 UNC Gr8	0.13
10	00P69	12	HHCS 5/8-11 UNC x 2 Gr8	0.33

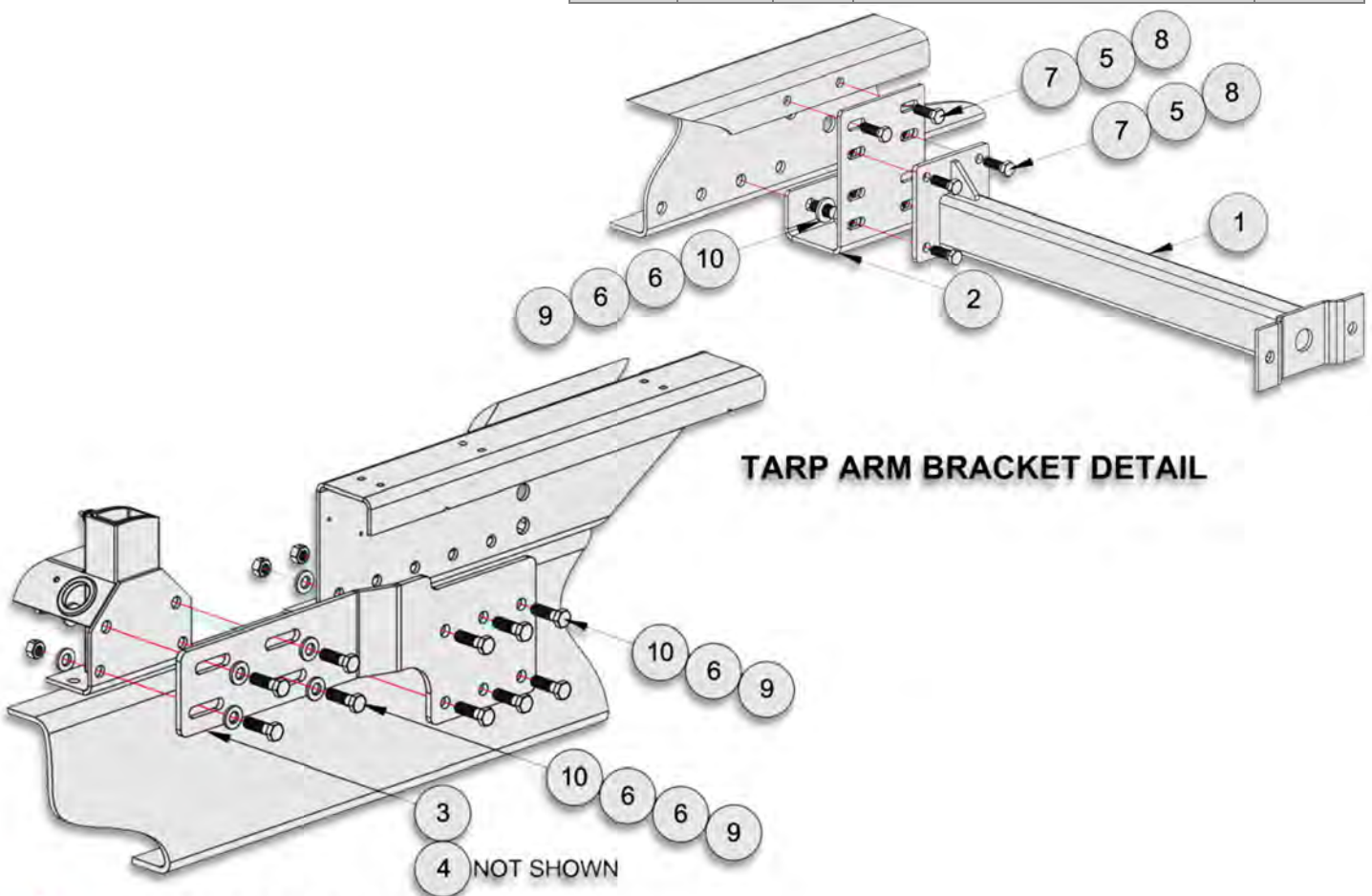


**240-DC203**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	14H70	2	Tarp Arm Wdmt, DC203	17.03
2	66H38	2	J Bracket, 200S	6.03
3	66H40	1	Tarp Tower Mnt, LH 222	16.31
4	66H41	1	Tarp Tower Mnt, RH 222	16.31
5	00784	12	Washer, Flat 1/2 ZP	0.01
6	00785	24	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05
9	00P55	12	Nut, Lock 5/8-11 UNC Gr8	0.13
10	00P69	12	HHCS 5/8-11 UNC x 2 Gr8	0.33

**240-DC400**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	55H75	2	Tarp Arm Wdmt, DC400	23.31
2	66H38	2	J Bracket, 200S	6.03
3	66H40	1	Tarp Tower Mnt, LH 222	16.31
4	66H41	1	Tarp Tower Mnt, RH 222	16.31
5	00784	12	Washer, Flat 1/2 ZP	0.01
6	00785	24	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05
9	00P55	12	Nut, Lock 5/8-11 UNC Gr8	0.13
10	00P69	12	HHCS 5/8-11 UNC x 2 Gr8	0.33

**TARP ARM BRACKET DETAIL****TARP TOWER BRACKET DETAIL**

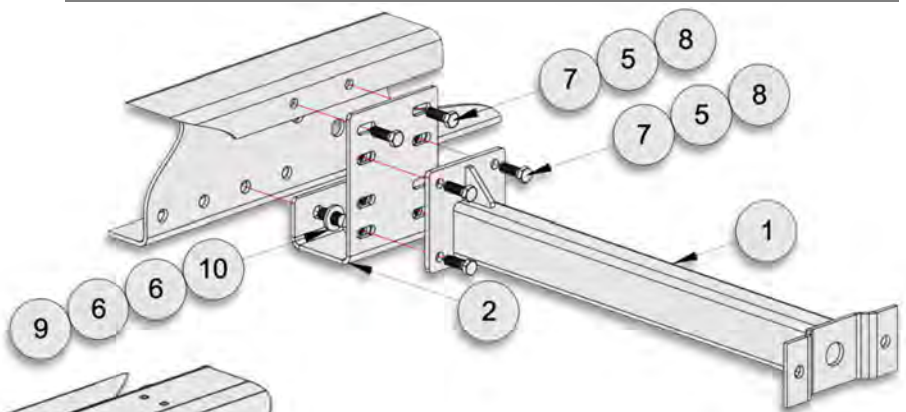
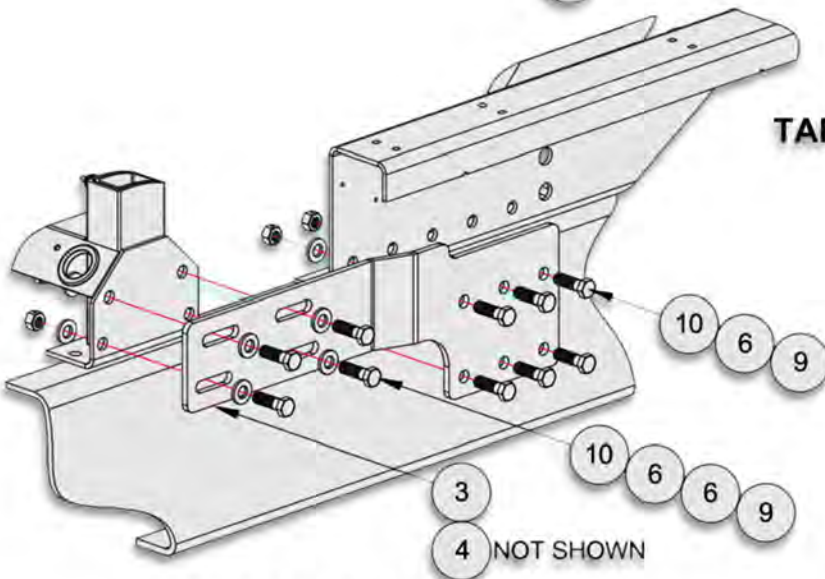


**2418-DC203**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	14H70	2	Tarp Arm Wdmt, DC203	17.03
2	66H38	2	J Bracket, 200S	6.03
3	66H48	1	Tarp Tower Mnt, LH 2418	16.60
4	66H49	1	Tarp Tower Mnt, RH 2418	16.60
5	00784	12	Washer, Flat 1/2 ZP	0.01
6	00785	24	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05
9	00P55	12	Nut, Lock 5/8-11 UNC Gr8	0.13
10	00P69	12	HHCS 5/8-11 UNC x 2 Gr8	0.33

**2418-DC400**

ITEM	PART #	QTY	DESCRIPTION	WT-lb/ea.
1	55H75	2	Tarp Arm Wdmt, DC400	23.31
2	66H38	2	J Bracket, 200S	6.03
3	66H48	1	Tarp Tower Mnt, LH 2418	16.60
4	66H49	1	Tarp Tower Mnt, RH 2418	16.60
5	00784	12	Washer, Flat 1/2 ZP	0.01
6	00785	24	Washer, Flat 5/8 ZP	0.07
7	00P01	12	HHCS 1/2-13 UNC x 1-1/2 Gr8	0.21
8	00P35	12	Nut, Lock 1/2-13 UNC GrC	0.05
9	00P55	12	Nut, Lock 5/8-11 UNC Gr8	0.13
10	00P69	12	HHCS 5/8-11 UNC x 2 Gr8	0.33

**TARP ARM BRACKET DETAIL****TARP TOWER BRACKET DETAIL**





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