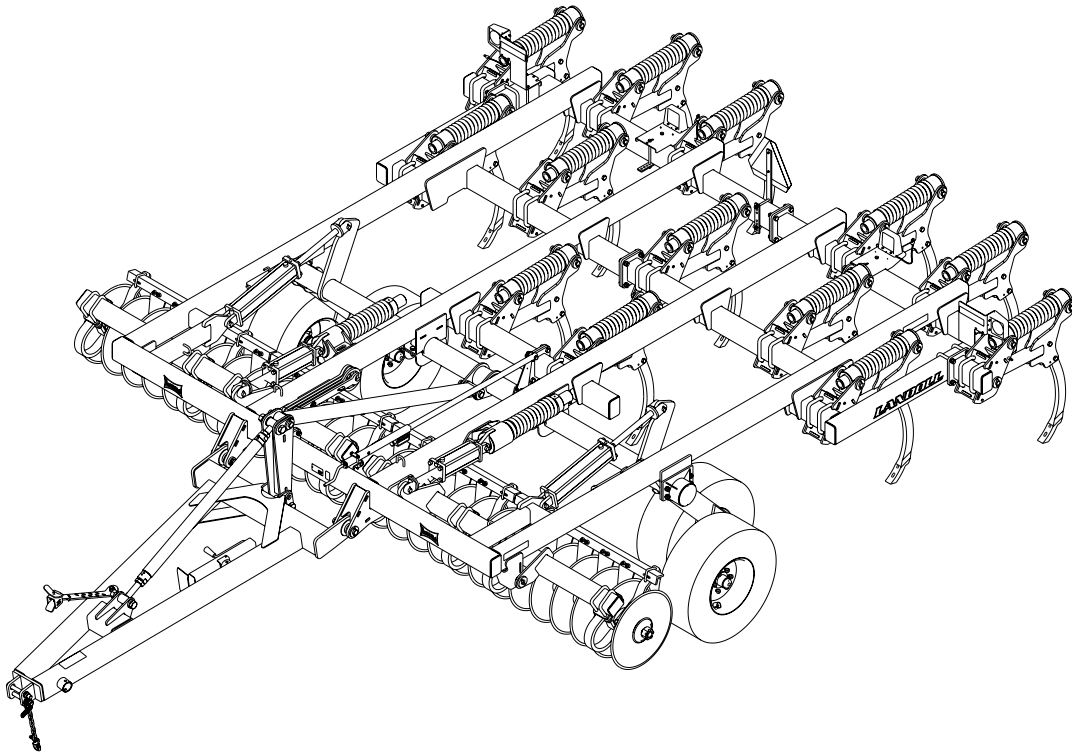




MODEL 2110 COULTER CHISEL OPERATOR'S MANUAL



**1900 NORTH STREET
MARYSVILLE, KANSAS 66508
(785) 562-5381**

TILLAGE PRODUCT THREE YEAR LIMITED WARRANTY

Landoll Corporation warrants each new serial numbered Whole Good Tillage product, when properly assembled, adjusted, serviced, and normally operated, to be free from defects in materials and workmanship for a period of three (3) years, unless otherwise noted, from the date of delivery. Date of delivery shall be the date the Dealer places the product in the possession of the original retail purchaser, and must be confirmed by the Dealer submitting a properly completed Landoll Corporation Warranty Registration Form to the Landoll Corporation Warranty Department. Warranty starts the day the product is rented or leased. This limited warranty shall be transferable until the expiration date.

Landoll Corporation shall repair, or at its option, replace any part(s) of the product determined, by Landoll Corporation, to be defective. Landoll Corporation may request the return of part(s), freight prepaid via a carrier approved by the Landoll Warranty Staff, to Landoll Corporation for further evaluation. If the part is determined to be defective, Landoll Corporation will refund the freight charges incurred in returning the defective part(s), and will prepay replacement part(s) freight charges.

This limited warranty requires pre-authorization by the Landoll Corporation Warranty Staff of any warranty related utilization of components or labor, and is subject to specific exclusions and does not apply to any product which has been: 1) subjected to or operated in a manner which, at any time, have exceeded the product design limits; 2) repaired or altered outside our factory in any way so as, in the judgment of Landoll Corporation, to affect its stability or reliability; 3) subject to misuse, negligence, accident, or has been operated in a manner expressly prohibited in the instructions; or not operated in accordance with practices approved by Landoll Corporation. Operating the product in soils containing rocks, stumps or obstructions may void the warranty in its entirety. Excessive acres, consistent with non-seasonal very large farming operations, and, non-agricultural activities, may further limit the terms of this warranty.

The sole obligation of Landoll Corporation under this warranty shall be limited to repairing or replacing, at its option, part(s) which shall be identified to Landoll Corporation by way of a pre-authorized Landoll Corporation e-mail Warranty Claim Form. Warranty, expressed or implied, will be denied on any product not properly registered with the Landoll Corporation Warranty Department within ten (10) days of the first retail sale. As stated above, Landoll Corporation Warranty Staff will identify components listed on a Warranty Claim required to be returned for further analysis. All parts returned to Landoll Corporation must be shipped with a Return Materials Authorization (RMA) provided by the Landoll Corporation Warranty Staff. Defective components must be returned by the purchaser to Landoll Corporation with transportation and freight charges prepaid within fifteen (15) days after receipt of the RMA. The examination conducted by Landoll Corporation of returned parts shall disclose to its satisfaction the extent the component may be defective.

All parts and labor warranty MUST be pre-authorized by Landoll Corporation Warranty Staff. Failure to do so may result in no warranty payment of any kind. Labor will be reimbursed in accordance with published shop rates pre-approved by the Landoll Corporation Warranty Staff. Time authorized for specific work will be limited, where appropriate, to the hours listed in the Landoll Corporation authorized Labor Rate Guide.

USER'S OBLIGATION:

1. Read the Operator's Manual.
2. Understand the safe and correct operating procedures pertaining to the operation of the product.
3. Lubricate and maintain the product according to the maintenance schedule in the Operator's Manual.
4. Inspect machine and have parts repaired or replaced when continued use of the produce would cause damage or excessive wear to other parts.
5. Contact the Landoll Corporation Dealer for repair or replacement of defective parts. Mileage incurred by the Landoll Corporation Dealer is the customer's responsibility.

This 3-Year Limited Warranty SHALL NOT APPLY TO: (See Warranty Procedure Manual for details.)

- Ground Engaging Tools
- Vendor Warranty Only Parts

WARRANTY LABOR:

- Considered during the first year of warranty only.
- During the second and third year:
Warranty labor is not covered.
Customer is responsible for removing, replacing and returning the defective part(s) to the Landoll Corporation Dealer.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES OF MATERIAL, WORKMANSHIP, DESIGN, APPLICATION OR OTHERWISE WITH RESPECT TO ANY EQUIPMENT, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND LANDOLL CORPORATION SHALL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND ON ACCOUNT OF ANY LANDOLL PRODUCT.

NO EMPLOYEE OR REPRESENTATIVE IS AUTHORIZED TO CHANGE THIS WARRANTY, VERBALLY OR IN WRITING, OR GRANT ANY OTHER WARRANTY.

LANDOLL CORPORATION, WHOSE POLICY IS ONE OF CONTINUOUS IMPROVEMENT, RESERVES THE RIGHT TO MAKE CHANGES WITHOUT OBLIGATION TO MODIFY PREVIOUSLY PRODUCED EQUIPMENT.

This warranty does not expand, enlarge upon or alter in any way, the warranties provided by the original manufacturers and suppliers of component parts and accessories. This warranty excludes such parts or accessories which are not defective, but may wear out and have to be replaced during the warranty period, including, but not limited to, light bulbs, paint, and the like. (Tire Warranties are expressly excluded from Landoll Corporation warranty herein.) Purchaser is expected to pay all repairs or replacement costs, in connection with this Agreement, including sales and other taxes immediately upon completion of work performed.

LIMITATION OF LIABILITY: Landoll Corporation shall not be liable to purchaser for any incidental or consequential damages suffered by the purchaser, including, but not limited to, any commercially reasonable charges, expenses or commissions incurred in connection with effecting cover or any other reasonable expense incident to the delay or other breach of warranty by Landoll Corporation, loss of anticipated profits, transportation expenses due to repairs, non-operation or increased expense of operation costs of purchased or replaced equipment, claim of customers, cost of money, any loss of use of capital or revenue, equipment rental, service trips, or for any special damage or loss of any nature arising at any time or from any cause whatsoever.

LIMITATION OF REMEDY: In the event of Landoll Corporation failure to repair the product subject to the warranty contained herein, the purchaser's sole and exclusive remedy against Landoll Corporation shall be for the repair or replacement of any defective part or parts of the product subject to work or repair within the time period and manner set forth herein. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as Landoll Corporation is willing and able to repair or replace defective parts in the prescribed manner.

MODEL 2110 COULTER CHISEL OPERATOR'S MANUAL

PURCHASED FROM: _____ **DATE** ____ / ____ / ____

ADDRESS: _____

PHONE NO.: _____ **SERIAL NO.:** _____

NOTES:

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SAFETY PRECAUTIONS



THIS IS THE SAFETY ALERT SYMBOL. IT IS USED TO ALERT YOU TO POTENTIAL INJURY HAZARDS. OBEY ALL SAFETY MESSAGES THAT FOLLOW THIS SYMBOL TO AVOID POSSIBLE INJURY OR DEATH.

DANGER

DANGER INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

WARNING

WARNING INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

CAUTION

CAUTION INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY.

CAUTION

CAUTION USED WITHOUT THE SAFETY ALERT SYMBOL INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN PROPERTY DAMAGE.

INTRODUCTION

1

The Landoll Model 2110 Coulter Chisel is a quality product designed to give years of trouble free performance. By following each section of this manual, your system will perform as designed for you and your operation.

SECTION 1 gives basic instructions on the use of this manual.

SECTION 2 gives product specifications. These specifications supply lengths and measures for your equipment. A Standard Bolt Torque Table is provided to give guidelines for bolt torques to be used when servicing this product.

SECTION 3 contains assembly instructions for your Model 2110 Coulter Chisel. When these procedures are correctly followed, your equipment should provide you years of trouble-free operation and service.

SECTION 4 instructs how to operate your equipment before using it, and describes adjustments needed. It also gives practical advice for the care and maintenance of your Landoll equipment. Drawings in this section locate adjustment points on the equipment.

NOTE: IF THE EQUIPMENT IS IMPROPERLY ASSEMBLED OR MAINTAINED, THE WARRANTY IS VOID. IF YOU HAVE ANY QUESTIONS CONTACT:

**LANDOLL CORPORATION
1900 NORTH STREET
MARYSVILLE, KANSAS 66508
or phone:
(785) 562-5381 or
(800) 428-5655
or FAX:
(785) 562-3240**

SECTION 5 is a troubleshooting guide to aid in diagnosing and solving problems with the equipment.

PARTS LIST is a separate manual showing the various assemblies, subassemblies, and systems. Refer to that manual when ordering Landoll replacement parts. Order parts from your Landoll dealer.

WARRANTY The Warranty Registration form is included with the product documents. Fill it out and mail it within 15 days of purchase. The Warranty is printed inside the front cover.

NOTE: IMPROPER ASSEMBLY, MODIFICATION, OR MAINTENANCE OF YOUR LANDOLL MACHINE CAN VOID YOUR WARRANTY.

COMMENTS Address comments or questions regarding this publication to:

**LANDOLL CORPORATION
1900 NORTH STREET
MARYSVILLE, KANSAS 66508
ATTENTION: PUBLICATIONS -DEPT. 55**

NOTES:

STANDARD SPECIFICATIONS

2

2110 SERIES COULTER CHISEL W/ AUTO RESET SHANKS							
MODEL NO.	WORKING WIDTH	TRANSPORT WIDTH	BLADE DIAMETER	NO. OF BLADES	NO. OF BEARINGS	TIRE AND WHEELS	ESTIMATED WEIGHT (LBS.)
2110-07	8'-9"	9'-10"	22"	15	4	(2) 12.5L x 15, 12 ply - 6 bolt	7,621
2110-09	11'-3"	11'-9"	22"	19	4	(4) 12.5L x 15, 12 ply - 6 bolt	10,258
2110-11	13'-9"	14'-4"	22"	23	6	(4) 12.5L x 15, 12 ply - 6 bolt	11,200
2110-13	16'-3"	16'-10"	22"	27	6	(4) 12.5L x 15, 12 ply - 6 bolt	12,142
2110-15	18'-9"	19'-4"	22"	31	8	(4) 12.5L x 15, 12 ply - 6 bolt	13,059

2110 SERIES COULTER CHISEL W/ RIGID SHEARBOLT SHANKS							
MODEL NO.	WORKING WIDTH	TRANSPORT WIDTH	BLADE DIAMETER	NO. OF BLADES	NO. OF BEARINGS	TIRE AND WHEELS	ESTIMATED WEIGHT (LBS.)
2110-07	8'-9"	9'-10"	22"	15	4	(2) 12.5L x 15, 12 ply - 6 bolt	6,403
2110-09	11'-3"	11'-9"	22"	19	4	(4) 12.5L x 15, 12 ply - 6 bolt	8,405
2110-11	13'-9"	14'-4"	22"	23	6	(4) 12.5L x 15, 12 ply - 6 bolt	9,347
2110-13	16'-3"	16'-10"	22"	27	6	(4) 12.5L x 15, 12 ply - 6 bolt	9,952
2110-15	18'-9"	19'-4"	22"	31	8	(4) 12.5L x 15, 12 ply - 6 bolt	10,532

Specifications are subject to change without prior notification.

TIRE INFLATION CHART			
TIRE SIZE	TIRE MANUFACTURER	PLY/LOAD RATING	INFLATION PRESSURE (psi) (max.)
12.5L x 15 Heavy Duty	Titan	20 Ply/4940 lbs.	80 psi
12.5L x 15 Farm Highway Service	Goodyear	F Load 4680 lbs.	90 psi
12.5L x 15	Goodyear	12 Ply/3860 lbs	52 psi

LANDOLL CORPORATION GENERAL TORQUE SPECIFICATIONS (REV. 4/97)

THIS CHART PROVIDES TIGHTENING TORQUES FOR GENERAL PURPOSE APPLICATIONS WHEN SPECIAL TORQUES ARE NOT SPECIFIED ON PROCESS OR DRAWING.

ASSEMBLY TORQUES APPLY TO PLATED NUTS AND CAPSCREWS ASSEMBLED WITHOUT SUPPLEMENTAL LUBRICATION (AS RECEIVED CONDITION). THEY DO NOT APPLY IF SPECIAL GRAPHITE MOLY-DISULFIDE OR OTHER EXTREME PRESSURE LUBRICANTS ARE USED.

WHEN FASTENERS ARE DRY (SOLVENT CLEANED), ADD 33% TO AS RECEIVED CONDITION TORQUE.

BOLT HEAD IDENTIFICATION MARKS INDICATE GRADE AND MAY VARY FROM MANUFACTURER TO MANUFACTURER.

THICK NUTS MUST BE USED ON GRADE 8 CAPSCREWS.

USE VALUE IN [] IF USING PREVAILING TORQUE NUTS.

TORQUE IS SPECIFIED IN FOOT POUNDS

UNC Size	SAE Grade 2		SAE Grade 5		SAE Grade 8		UNF Size	SAE Grade 2		SAE Grade 5		SAE Grade 8	
1/4-20	4	[5]	6	[7]	9	[11]	1/4-28	5	[6]	7	[9]	10	[12]
5/16-18	8	[10]	13	[16]	18	[22]	5/16-24	9	[11]	14	[17]	20	[25]
3/8-16	15	[19]	23	[29]	35	[43]	3/8-24	17	[21]	25	[31]	35	[44]
7/16-14	24	[30]	35	[43]	55	[62]	7/16-20	27	[34]	40	[50]	60	[75]
1/2-13	35	[43]	55	[62]	80	[100]	1/2-20	40	[50]	65	[81]	90	[112]
9/16-12	55	[62]	80	[100]	110	[137]	9/16-18	60	[75]	90	[112]	130	[162]
5/8-11	75	[94]	110	[137]	170	[212]	5/8-18	85	[106]	130	[162]	180	[225]
3/4-10	130	[162]	200	[250]	280	[350]	3/4-16	150	[188]	220	[275]	320	[400]
7/8-9	125	[156]	320	[400]	460	[575]	7/8-14	140	[175]	360	[450]	500	[625]
1-8	190	[237]	408	[506]	680	[850]	1-14	210	[263]	540	[675]	760	[950]
1-1/8-7	270	[337]	600	[750]	960	[1200]	1-1/8-12	300	[375]	660	[825]	1080	[1350]
1-1/4-7	380	[475]	840	[1050]	1426	[1782]	1-1/4-12	420	[525]	920	[1150]	1500	[1875]
1-3/8-6	490	[612]	110	[1375]	1780	[2225]	1-3/8-12	560	[700]	1260	[1575]	2010	[2512]
1/1-2-6	650	[812]	1460	[1825]	2360	[2950]	1/1-2-12	730	[912]	1640	[2050]	2660	[3325]

METRIC

COARSE THREAD METRIC CLASS 10.9 FASTENERS AND CLASS 10.0 NUTS AND THROUGH HARDENED FLAT WASHERS, PHOSPHATE COATED, ROCKWELL "C" 38-45.

USE VALUE IN [] IF USING PREVAILING TORQUE NUTS.

Nominal Thread Diameter mm	Standard Torque				Nominal Thread Diameter mm	Standard Torque			
	Newton-Meters		Foot-Pounds			Newton-Meters		Foot-Pounds	
6	10	[14]	7	[10]	20	385	[450]	290	[335]
7	16	[22]	12	[16]	24	670	[775]	500	[625]
8	23	[32]	17	[24]	27	980	[1105]	730	[825]
10	46	[60]	34	[47]	30	1330	[1470]	990	[1090]
12	80	[101]	60	[75]	33	1790	[1950]	1340	[1450]
14	125	[155]	90	[115]	36	2325	[2515]	1730	[1870]
16	200	[240]	150	[180]	39	3010	[3210]	2240	[2380]
18	275	[330]	205	[245]					

Table 2-1 General Torque Specifications

**LANDOLL CORPORATION
HYDRAULIC FITTING TORQUE SPECIFICATIONS
37° JIC, ORS, & ORB (REV. 10/97)**

THIS CHART PROVIDES TIGHTENING TORQUES FOR HYDRAULIC FITTING APPLICATIONS WHEN SPECIAL TORQUES ARE NOT SPECIFIED ON PROCESS OR DRAWING.

ASSEMBLY TORQUES APPLY TO PLATED CARBON STEEL AND STAINLESS STEEL FITTINGS ASSEMBLED WITHOUT SUPPLEMENTAL LUBRICATION (AS RECEIVED CONDITION). THEY DO NOT APPLY IF SPECIAL GRAPHITE MOLY-DISULFIDE OR OTHER EXTREME PRESSURE LUBRICANTS ARE USED.

BRASS FITTINGS AND ADAPTERS - 65% OF THE TORQUE VALUE FOR STEEL. STAINLESS STEEL, ALUMINUM AND MONEL - THREADS ARE TO BE LUBRICATED.

TORQUE IS SPECIFIED IN FOOT POUNDS

PARKER BRAND FITTINGS

Dash Size	37 Degree JIC	O-Ring (ORS)	O-Ring Boss (ORB)
-4	11-13	15-17	13-15
-5	14-16	—	21-23
-6	20-22	34-36	25-29
-8	43-47	58-62	40-44
-10	55-65	100-110	57.5-62.5
-12	80-90	134-146	75-85
-16	115-125	202-218	109-121
-20	160-180	248-272	213-237
-24	185-215	303-327	238-262
-32	250-290	—	310-340

**LANDOLL CORPORATION
HYDRAULIC FITTING TORQUE SPECIFICATIONS
37° JIC, ORS & ORB (REV. 10/97)**

THIS CHART PROVIDES TIGHTENING TORQUES FOR HYDRAULIC FITTING APPLICATIONS WHEN SPECIAL TORQUES ARE NOT SPECIFIED ON PROCESS OR DRAWING.

ASSEMBLY TORQUES APPLY TO PLATED CARBON STEEL AND STAINLESS STEEL FITTINGS ASSEMBLED WITHOUT SUPPLEMENTAL LUBRICATION (AS RECEIVED CONDITION). THEY DO NOT APPLY IF SPECIAL GRAPHITE MOLY-DISULFIDE OR OTHER EXTREME PRESSURE LUBRICANTS ARE USED.

BRASS FITTINGS AND ADAPTERS - 65% OF THE TORQUE VALUE FOR STEEL.

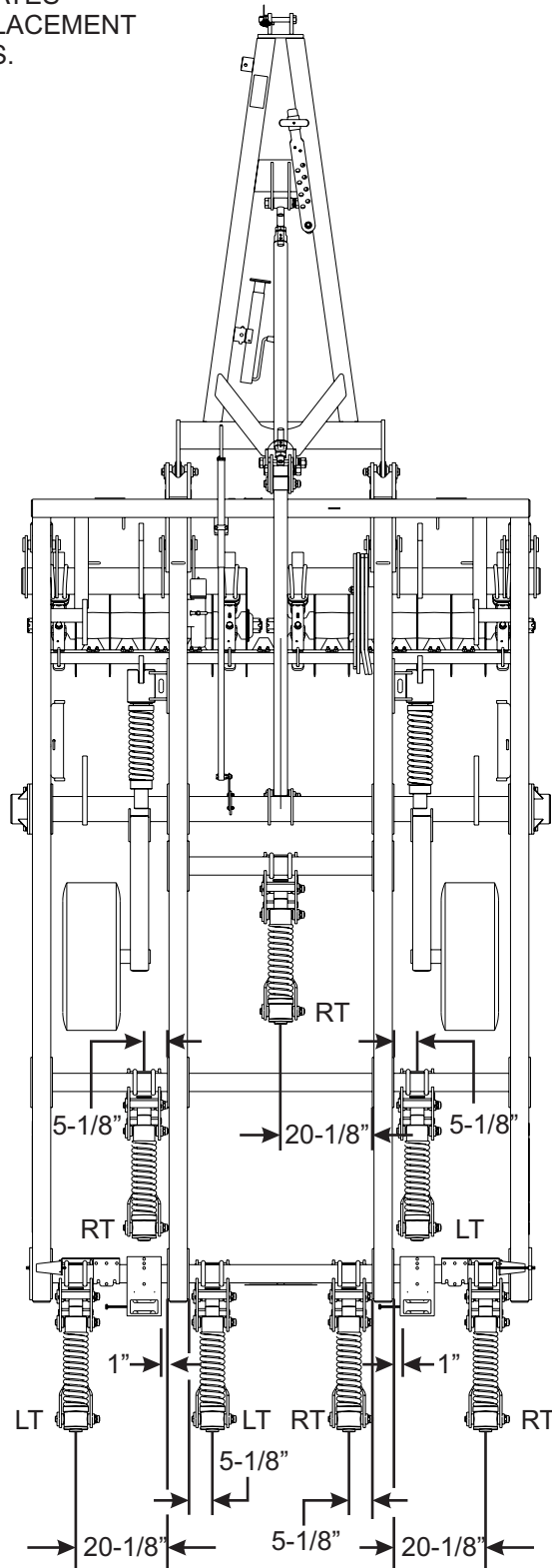
TORQUE IS SPECIFIED IN FOOT POUNDS.

AEROQUIP BRAND FITTINGS

Dash Size	37 Degree JIC	O-Ring (ORS)	O-Ring Boss (ORB)
-4	11-12	10-12	14-16
-5	15-16	—	18-20
-6	18-20	18-20	24-26
-8	38-42	32-35	50-60
-10	57-62	46-50	72-80
-12	79-87	65-70	125-135
-14	—	—	160-180
-16	108-113	92-100	200-220
-20	127-133	125-140	210-280
-24	158-167	150-165	270-360
-32	245-258	—	—

Table 2-2 Hydraulic Fitting Torque Specifications

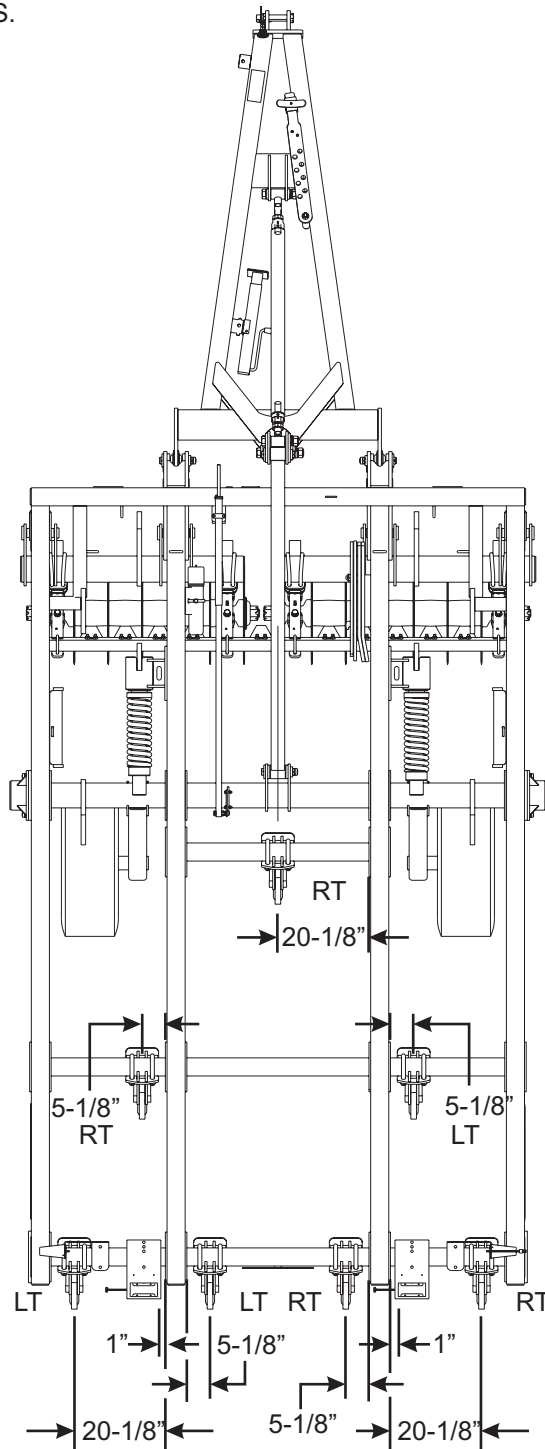
NOTE: LT AND RT INDICATES
THE RECOMMENDED PLACEMENT
FOR TWISTED SHOVELS.



2110-07 shank-light placement

Figure 2-1 Auto Reset Shank and Light Bracket Placement (2110-07)

NOTE: LT AND RT INDICATES
THE RECOMMENDED PLACEMENT
FOR TWISTED SHOVELS.



2110-07 rigid shear shank placement

Figure 2-2 Rigid Shear Shank and Light Bracket Placement (2110-07)

NOTE: LT AND RT INDICATES
THE RECOMMENDED PLACEMENT
FOR TWISTED SHOVELS.

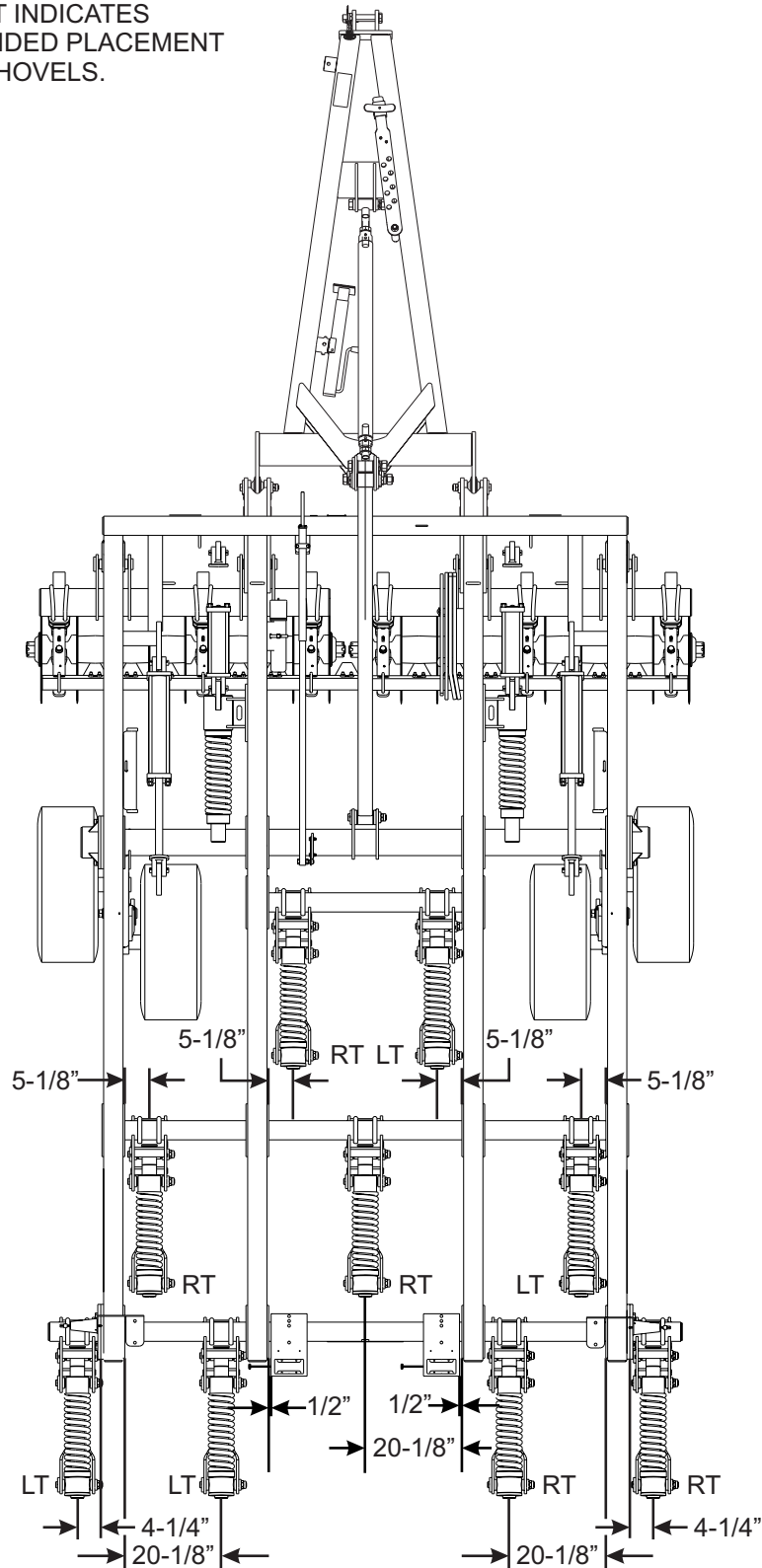
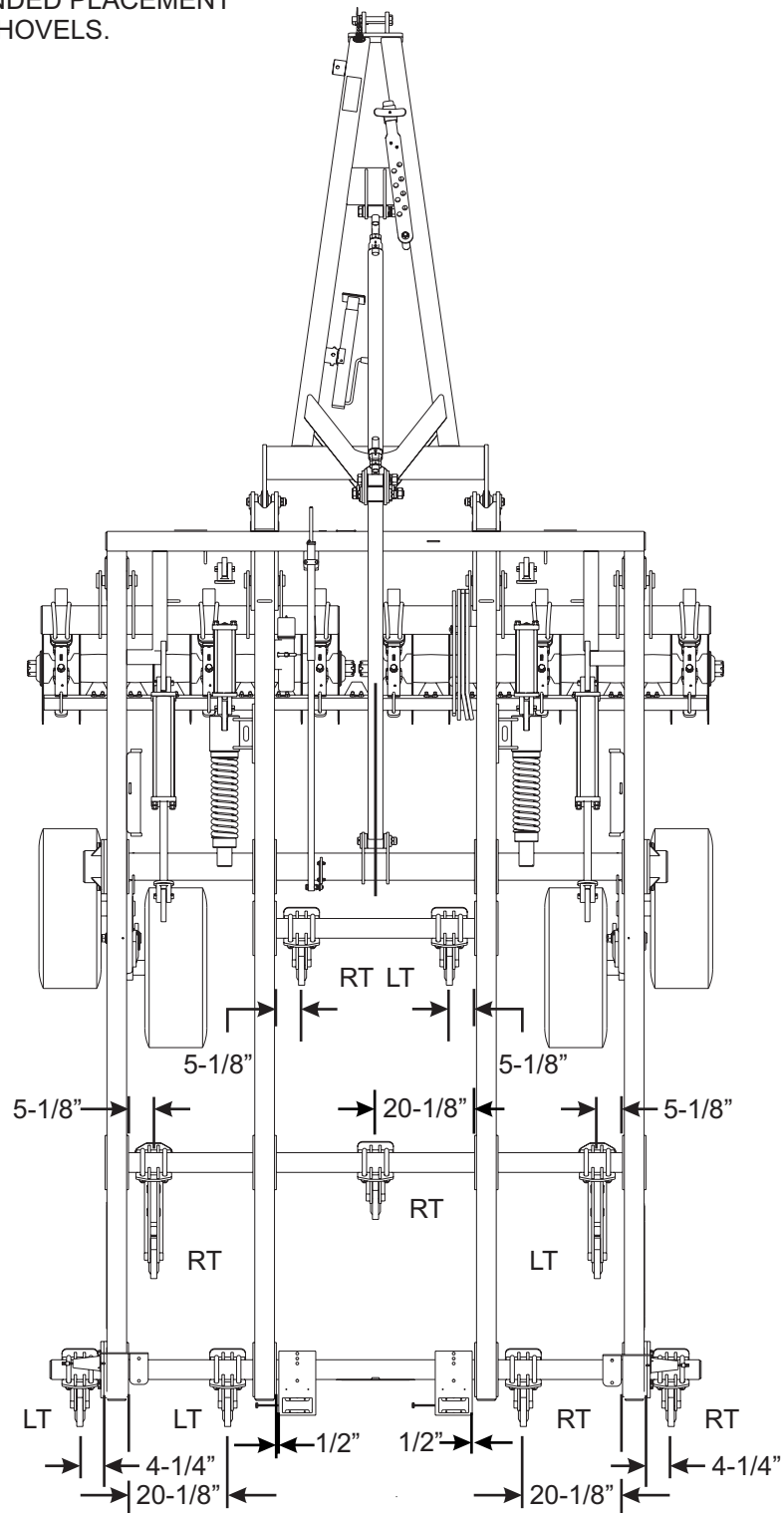


Figure 2-3 Auto Reset Shank and Light Bracket Placement (2110-09)

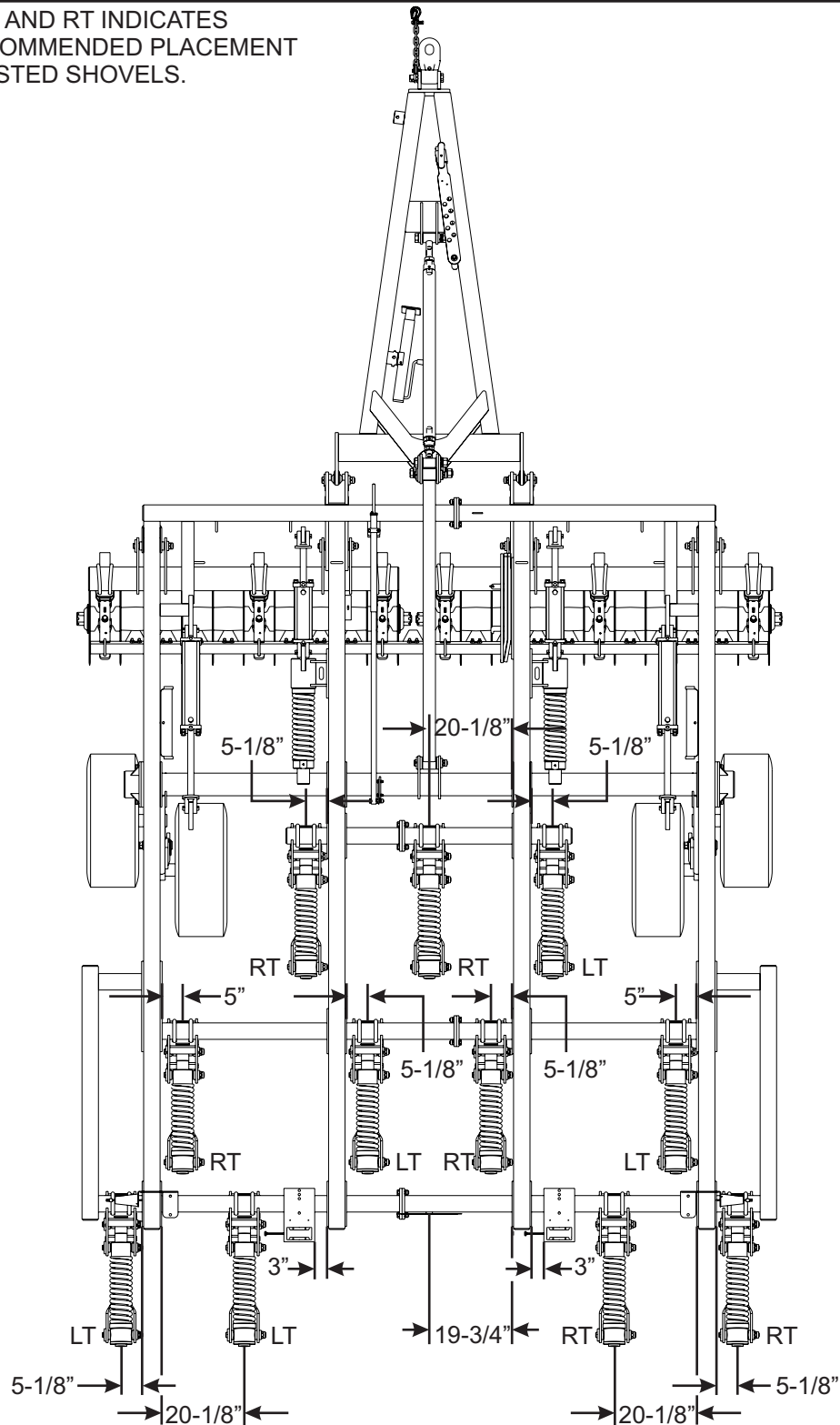
NOTE: LT AND RT INDICATES
THE RECOMMENDED PLACEMENT
FOR TWISTED SHOVELS.



2110-09 rigid shear shank placement

Figure 2-4 Rigid Shear Shank and Light Bracket Placement (2110-09)

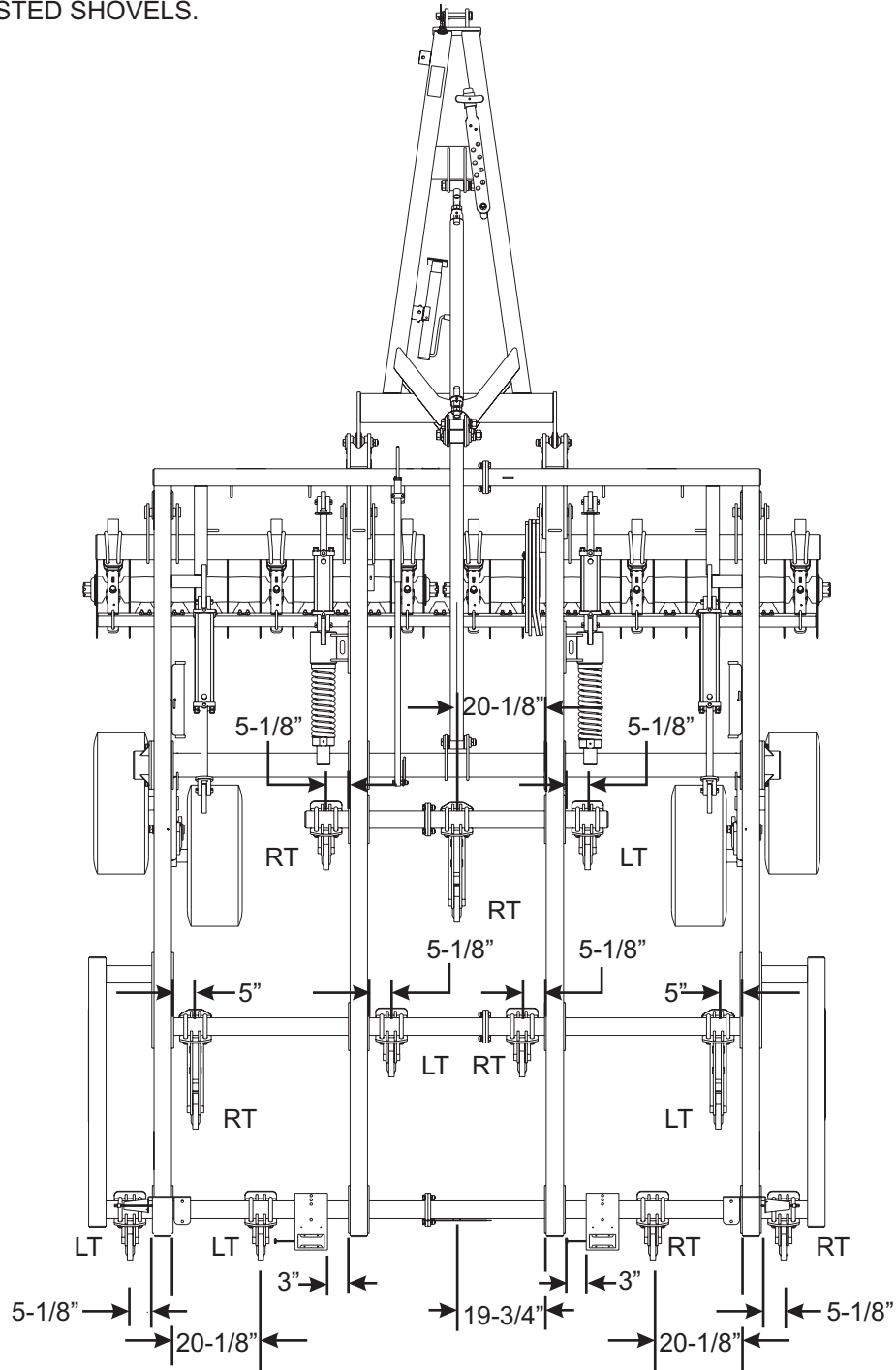
NOTE: LT AND RT INDICATES
THE RECOMMENDED PLACEMENT
FOR TWISTED SHOVELS.



2110-11 shank-light placement

Figure 2-5 Auto Reset Shank and Light Bracket Placement (2110-11)

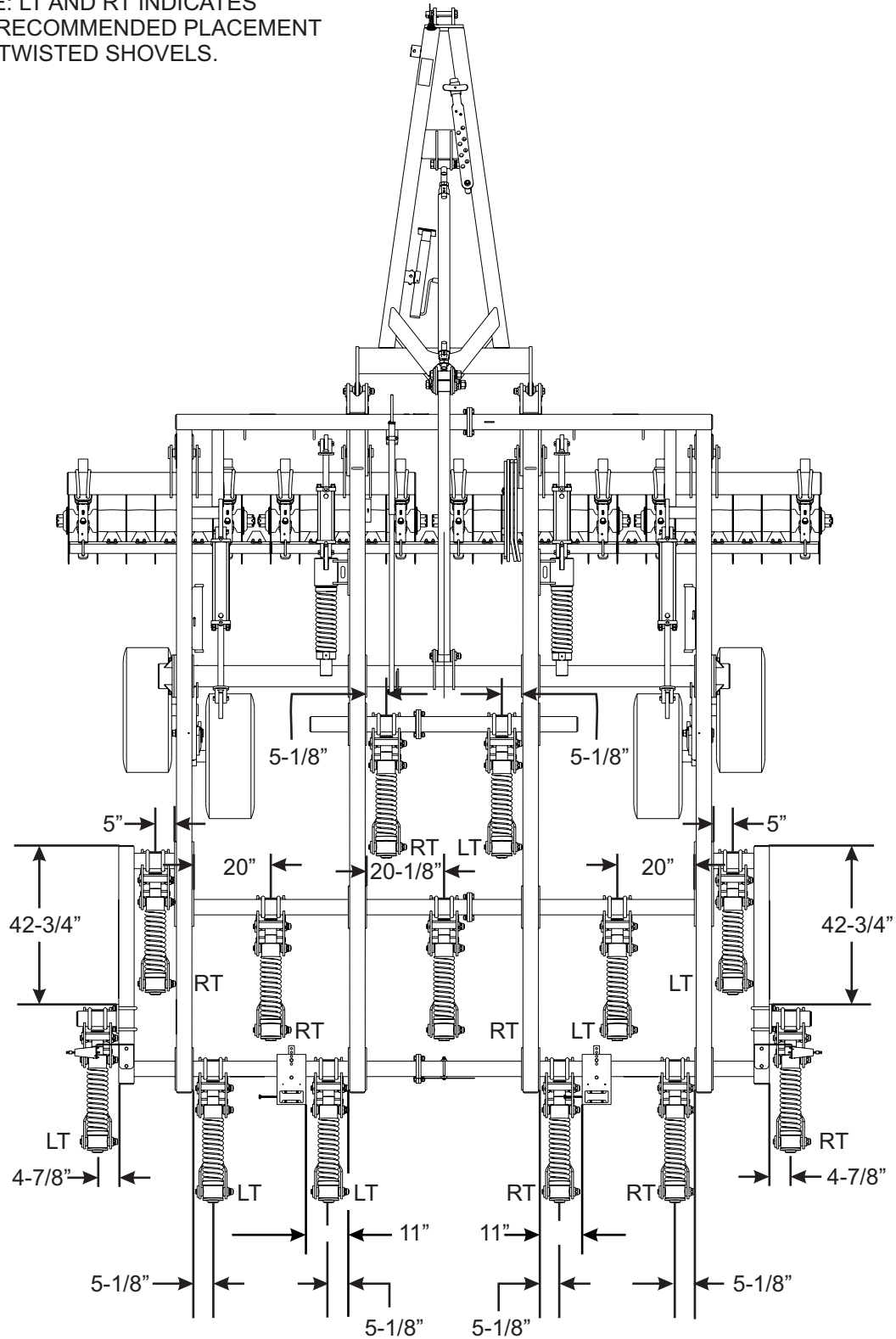
NOTE: LT AND RT INDICATES
THE RECOMMENDED PLACEMENT
FOR TWISTED SHOVELS.



2110-11 rigid shear shank placement

Figure 2-6 Rigid Shear Shank and Light Bracket Placement (2110-11)

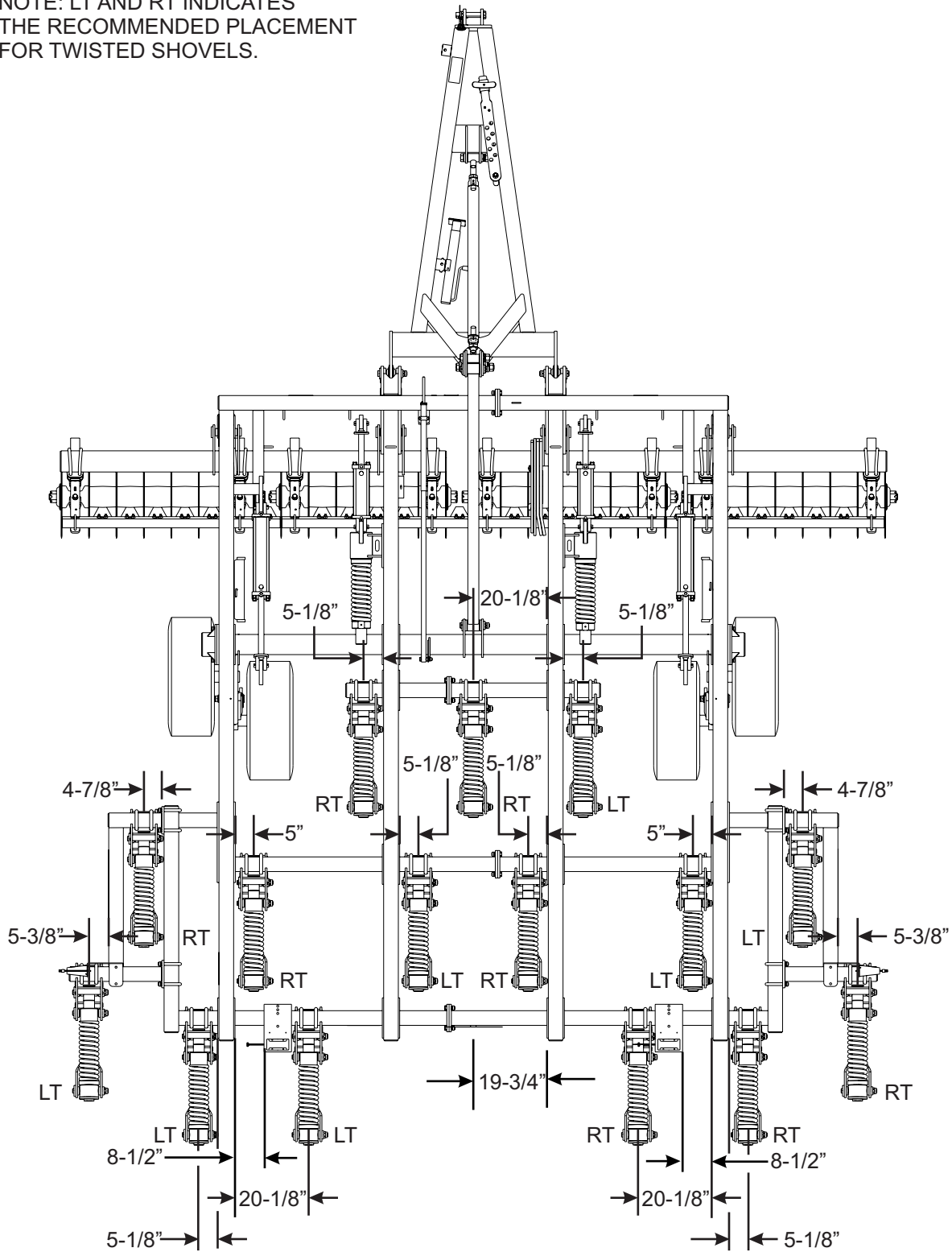
NOTE: LT AND RT INDICATES
THE RECOMMENDED PLACEMENT
FOR TWISTED SHOVELS.



2110-11 shank-light placement

Figure 2-7 Auto Reset Shank and Light Bracket Placement (2110-13)

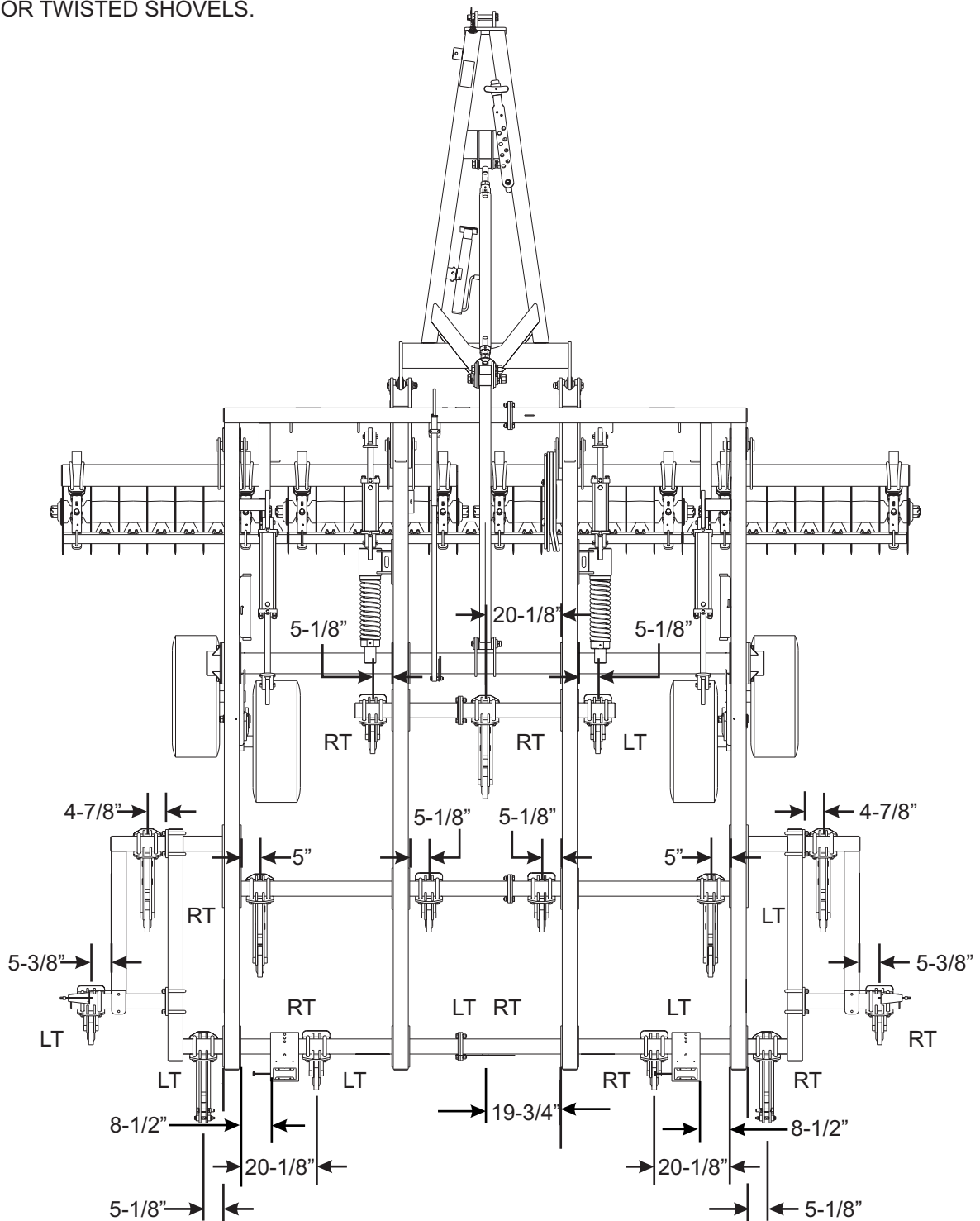
NOTE: LT AND RT INDICATES
THE RECOMMENDED PLACEMENT
FOR TWISTED SHOVELS.



2110-15 shank-light placement

Figure 2-9 Auto Reset Shank and Light Bracket Placement (2110-15)

NOTE: LT AND RT INDICATES
THE RECOMMENDED PLACEMENT
FOR TWISTED SHOVELS.



2110-15 rigid shear shank placement

Figure 2-10 Rigid Shear Shank and Light Bracket Placement (2110-15)

ASSEMBLY INSTRUCTIONS

3

It is very important that your new 2110 Coulter Chisel be properly assembled, adjusted and lubricated before use. Illustrations to assist with the assembly process are provided in **Section 2, "Standard Specifications"**. They show proper shank and light mounting bracket spacing. Illustrations in this section show proper assembly procedures. Remove paint from grease fittings. Replace any grease fittings that are damaged or missing. Be sure to return screws, clips, etc., to their original locations.

To insure alignment of assemblies, **leave the nuts loose until completion** of final assembly. Use lock washers or flat washers as specified. Spread all cotter pins.

After completion of final assembly, tighten all nuts evenly to prevent misalignment, distortion or binding. Tighten all screws and nuts to the recommended torques shown in **Table 2-1, "Standard Bolt Torques"**.

DANGER

COULTER BLADES ARE EXTREMELY SHARP. EXERCISE EXTREME CARE WHEN WORKING ON OR NEAR COULTER BLADES. DO NOT ALLOW COULTERS TO ROLL OVER OR FALL ONTO ANY BODY PART. DO NOT ALLOW WRENCHES TO SLIP WHEN WORKING NEAR COULTER BLADES. NEVER PUSH WRENCHES TOWARD COULTER BLADES. DO NOT CLIMB OVER MACHINE ABOVE COULTER BLADES. FAILURE TO STAY CLEAR OF COULTER BLADE EDGES CAN CAUSE SERIOUS PERSONAL INJURY OR DEATH.

WARNING

DO NOT ATTEMPT TO LIFT HEAVY PARTS (SUCH AS THE FRAME, COULTER GANGS, WHEEL LIFT, AND PULL HITCH) MANUALLY. USE A HOIST OR A FORKLIFT TO MOVE THESE PARTS INTO POSITION.

DANGER

TO PREVENT ACCIDENTAL LOWERING:

1. ALL HYDRAULICALLY ELEVATED EQUIPMENT MUST BE LOCKED OUT USING THE CYLINDER LOCKOUTS.
2. LOWER EQUIPMENT TO THE GROUND WHILE SERVICING OR WHEN IT IS IDLE.

FAILURE TO TAKE MEASURES TO PREVENT ACCIDENTAL LOWERING MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

CAUTION

BE SURE TO BLEED THE HYDRAULIC SYSTEM OF ALL AIR IN LINES AFTER INSTALLATION. FAILURE TO BLEED THE SYSTEM OF ALL AIR CAN RESULT IN IMPROPER MACHINE OPERATION.

CAUTION

INCORRECT ADJUSTMENT OF DISC ADJUST RODS WILL CAUSE PERMANENT EQUIPMENT DAMAGE.

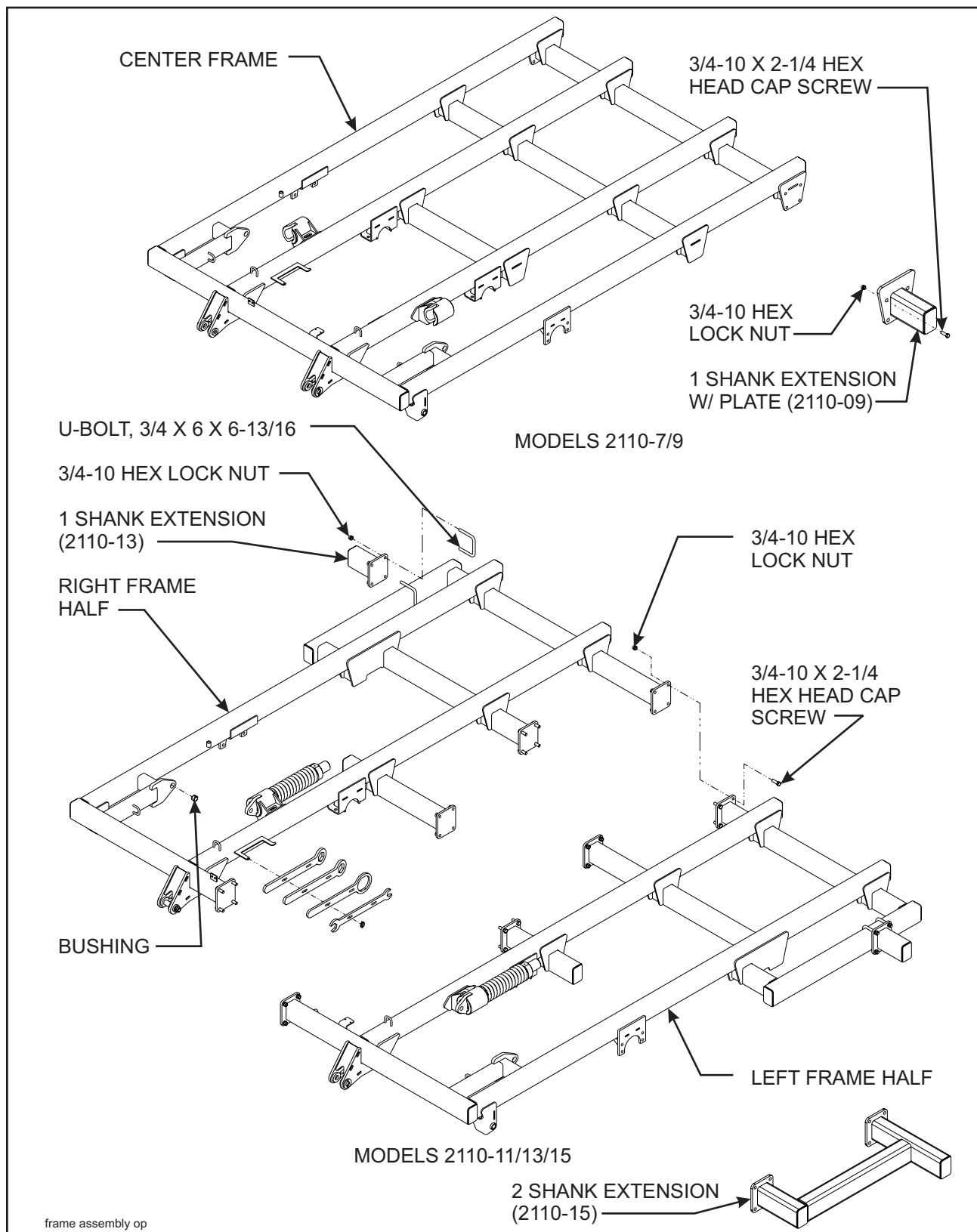


Figure 3-1 Frame and Extension Installation

3-1 2110-07/09 FRAME ASSEMBLY

3-1.1 No assembly is needed for the 2110-07 or 2110-09 frame. However, it needs to be placed on stands about 36" high in an open, level area.

3-1.2 If you have a 2110-09 Coulter Chisel, attach the 1 shank frame extensions using 3/4-10 x 2-1/4 hex head cap screws and hex lock nuts. **Refer to Figures 2-3 thru 2-4 for extension locations.**

3-2 2110-11/13/15 COULTER CHISEL FRAME ASSEMBLY

IMPORTANT

READ ALL SAFETY PRECAUTIONS AT THE FRONT OF THE SECTION BEFORE ATTEMPTING ANY OF THE FOLLOWING PROCEDURES.

WARNING

DO NOT ATTEMPT TO LIFT HEAVY PARTS (SUCH AS THE FRAME, COULTER GANGS, WHEEL LIFT, AND PULL HITCH) MANUALLY. USE A HOIST OR A FORKLIFT TO MOVE THESE PARTS INTO POSITION.

3-2.1 Place both frame halves on stands approximately 36" high. The assembly area should be a large level area of sufficient size to accommodate the Coulter Chisel when fully assembled.

3-2.2 Install bushings in the cylinder anchor plates on each frame half (**See Figure 3-1**).

3-2.3 Bolt frame halves together using 3/4-10 x 2-1/4 hex head cap screws and hex lock nuts. Leave all screws loose.

3-2.4 Level the frame halves.

3-2.5 Tighten all hardware to the recommended torques shown in **Table 2-1, "Standard Bolt Torques"**.

3-2.6 If your 2110 Coulter Chisel requires frame extensions, install the extensions by securing them to the tubes on the sides of the frame using 3/4-10 x 6 x 6-13/16 u-bolt and hex lock nuts. **Refer to Figures 2-5 thru 2-10 for extension locations and dimensions.**

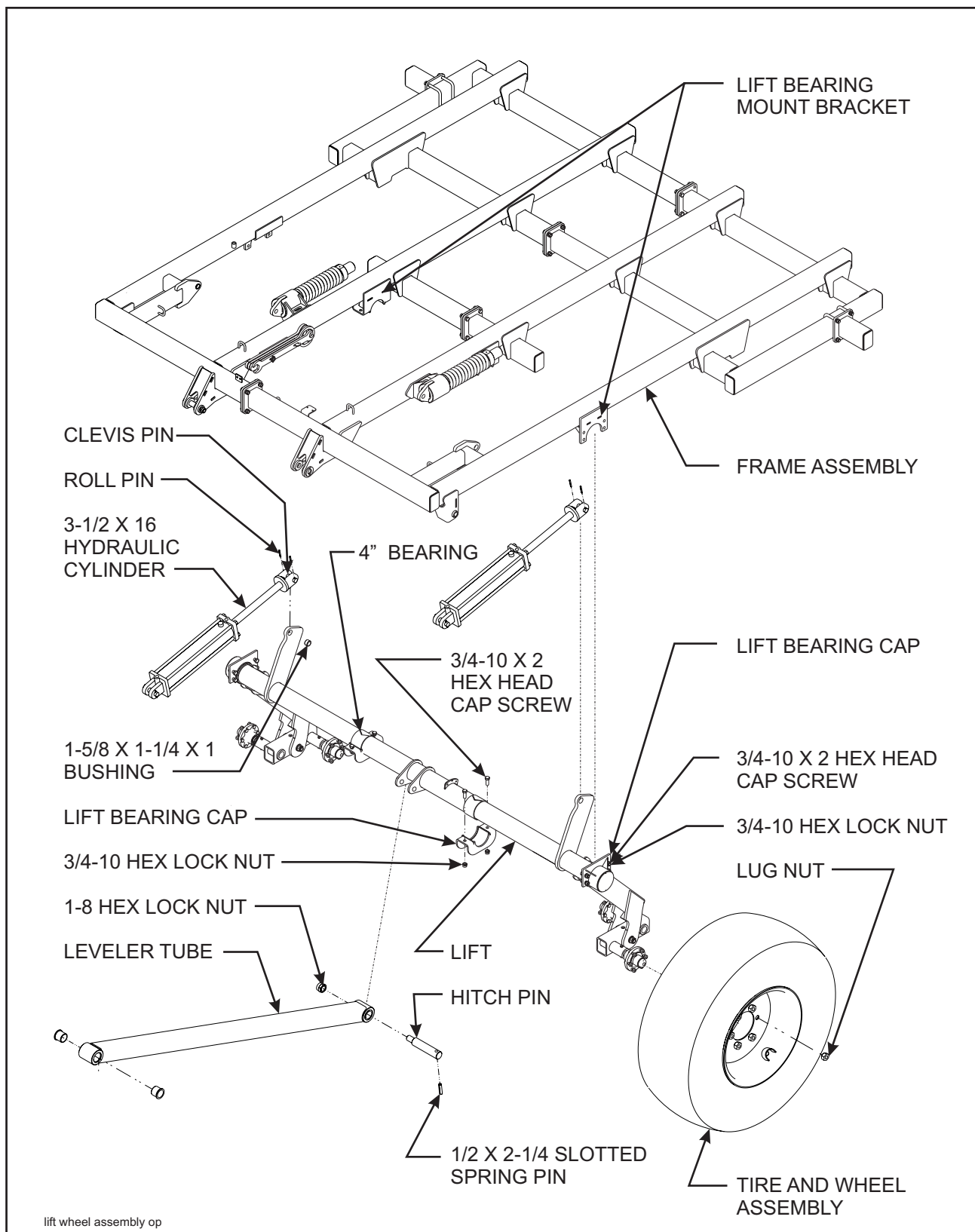


Figure 3-2 Wheel Lift Installation

3-3 WHEEL LIFT INSTALLATION

- 3-3.1** Position the lift under the lift bearing mount brackets on the frame assembly (**See Figure 3-2**).

IMPORTANT

THE WHEEL LIFT ARMS SHOULD POINT TOWARD THE REAR OF THE MACHINE WITH THE CYLINDER ANCHORS FACING UP.

- 3-3.2** Install the lift to the frame assembly using 3/4-10 x 2 hex head cap screws, lift bearing caps, 4" bearings, and hex lock nuts.
- 3-3.3** Insert 1-5/8 x 1-1/4 x 1 bushing into each cylinder mount plate of the shank lift.
- 3-3.4** Attach base end of the 3-1/2 x 16 hydraulic cylinder to the cylinder anchor plates of the frame assembly using roll pin and clevis pin supplied with the cylinder.
- 3-3.5** Attach rod end of each 3-1/2 x 16 hydraulic cylinder to the lift using roll pin and clevis pin supplied with the cylinder.

- 3-3.6** Install 90° adapters in each port of both 3-1/2 x 16 cylinders.

IMPORTANT

DO NOT USE 90° ADAPTERS WITH RESTRICTORS IN PORTS OF 3-1/2 X 16 HYDRAULIC CYLINDERS.

- 3-3.7** Attach leveler tube to leveler mount plates on the lift using hitch pin, 1-8 hex lock nut, and 1/2 x 2-1/4 slotted spring pin.
- 3-3.8** Assemble the tires to the hubs. Tighten wheel bolts evenly to assure proper wheel alignment. Wheel bolts should be tightened to 90 ft-lbs of torque. The hoist can then be removed.
- 3-3.9** Inflate the tire as recommended by the manufacturer.

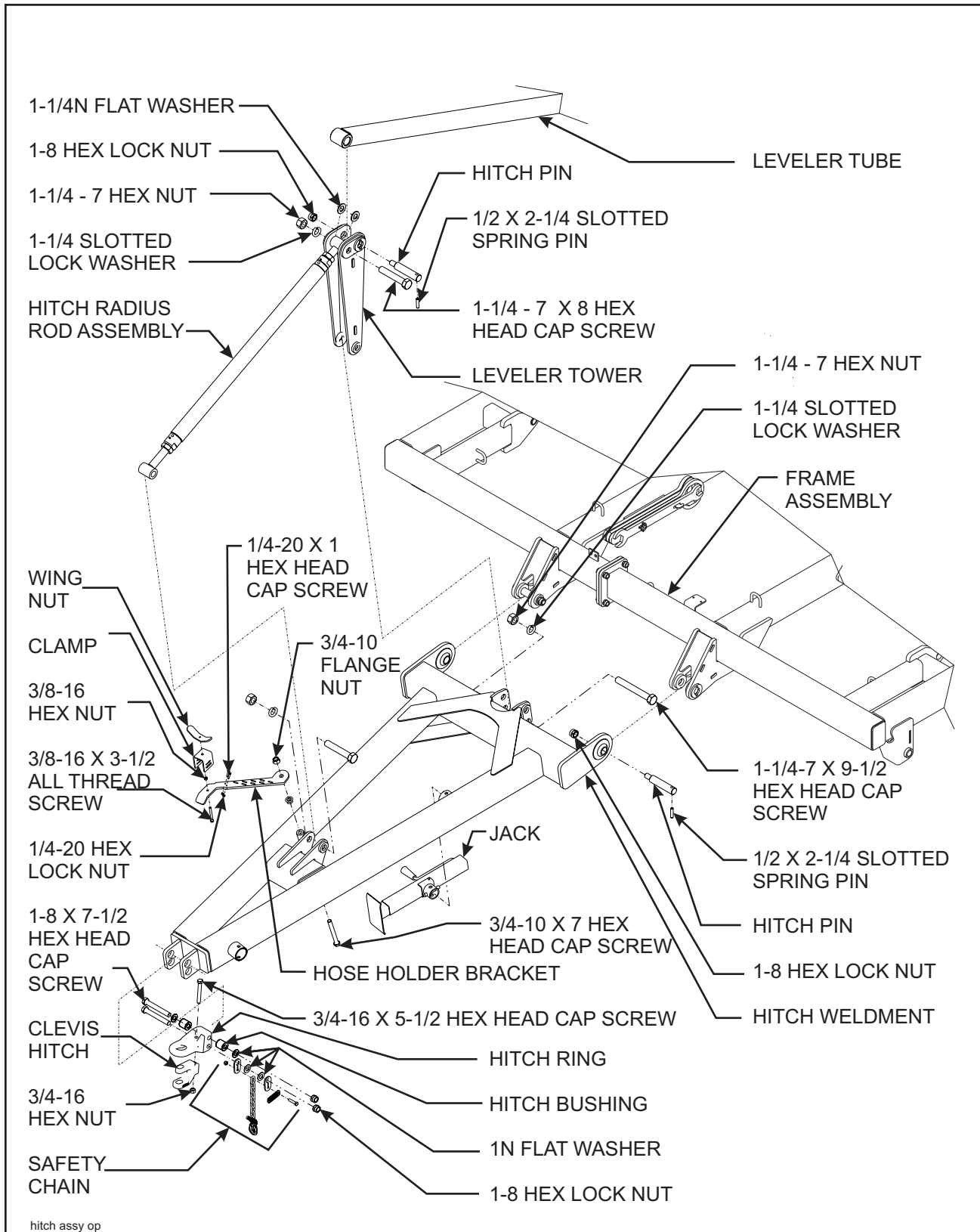


Figure 3-3 Hitch Installation

3-4 HITCH INSTALLATION

- 3-4.1** Attach the hitch weldment to the front of the frame using hitch pins, 1-8 hex lock nuts, and 1/2 x 2-1/4 slotted spring pins (**See Figure 3-3**).
- 3-4.2** Move the jack to the forward mounting tube and rotate to parking position to support the front of the hitch.
- 3-4.3** Insert a 3/4-10 x 7 hex head cap screw into the hose holder tube on the right side of the hitch from the bottom side so the threads point upward. Hold in place with a 3/4 prevailing torque flange nut with the flange pointing upward as well. Do not tighten this cap screw, so the hose holder bracket may pivot freely in this joint.
- 3-4.4** Slide the hose holder bracket over the screw and secure with another 3/4 prevailing torque flange nut.
- 3-4.5** Install a 3/8-16 x 3-1/2 all-thread screw in the front of the hose holder bracket and secure with a 3/8-16 hex nut.
- 3-4.6** Slide the hose holder clamp over the 3/8" screw and loosely start the wing nut on top of the clamp. Hydraulic hoses will be routed through the clamp after assembly.

IMPORTANT

THE CLAMP HAS TWO SIDES, SO THAT EXTEND HOSES CAN BE LOCATED ON ONE SIDE AND RETRACT HOSES CAN BE LOCATED ON THE OTHER SIDE FOR REFERENCE.

IMPORTANT

THE LEVELER TOWER MUST BE INSTALLED SO THAT THE NARROW END OF THE TOWER IS DOWN AND THE REINFORCED HOLES ARE TO THE REAR OF THE MACHINE.

- 3-4.7** Connect narrow end of the leveler tower to the bottom hole of the hitch weldment using 1-1/4-7 x 9-1/2 hex head cap screw, slotted lock washer, and hex nut.
- 3-4.8** Connect front end of leveler tube to the rear top hole of the leveler tower using hitch pin, 1-8 hex lock nut, and 1/2 x 2-1/4 slotted spring pin.
- 3-4.9** Attach the hitch rod radius assembly to the top front hole of the leveler tower using 1-1/4-7 x 7 hex head cap screw, slotted lock washer, and hex nut.
- 3-4.10** Connect the remaining end of the hitch rod radius assembly to the hitch weldment using 1-1/4-7 x 8 hex head cap screw, slotted lock washer, and hex nut.
- 3-4.11** Attach hitch ring to the clevis hitch using 3/4-16 x 5-1/2 hex head cap screw and hex nut (as required).
- 3-4.12** Assemble hitch clevis assembly to the hitch weldment using 1-8 x 7-1/2 hex head cap screws, hitch bushings, flat washers, and hex lock nuts through the top hole. Use 1-8 x 7-1/2 hex head cap screw, safety chain assembly, flat washer, and hex lock nut in the lower hole.

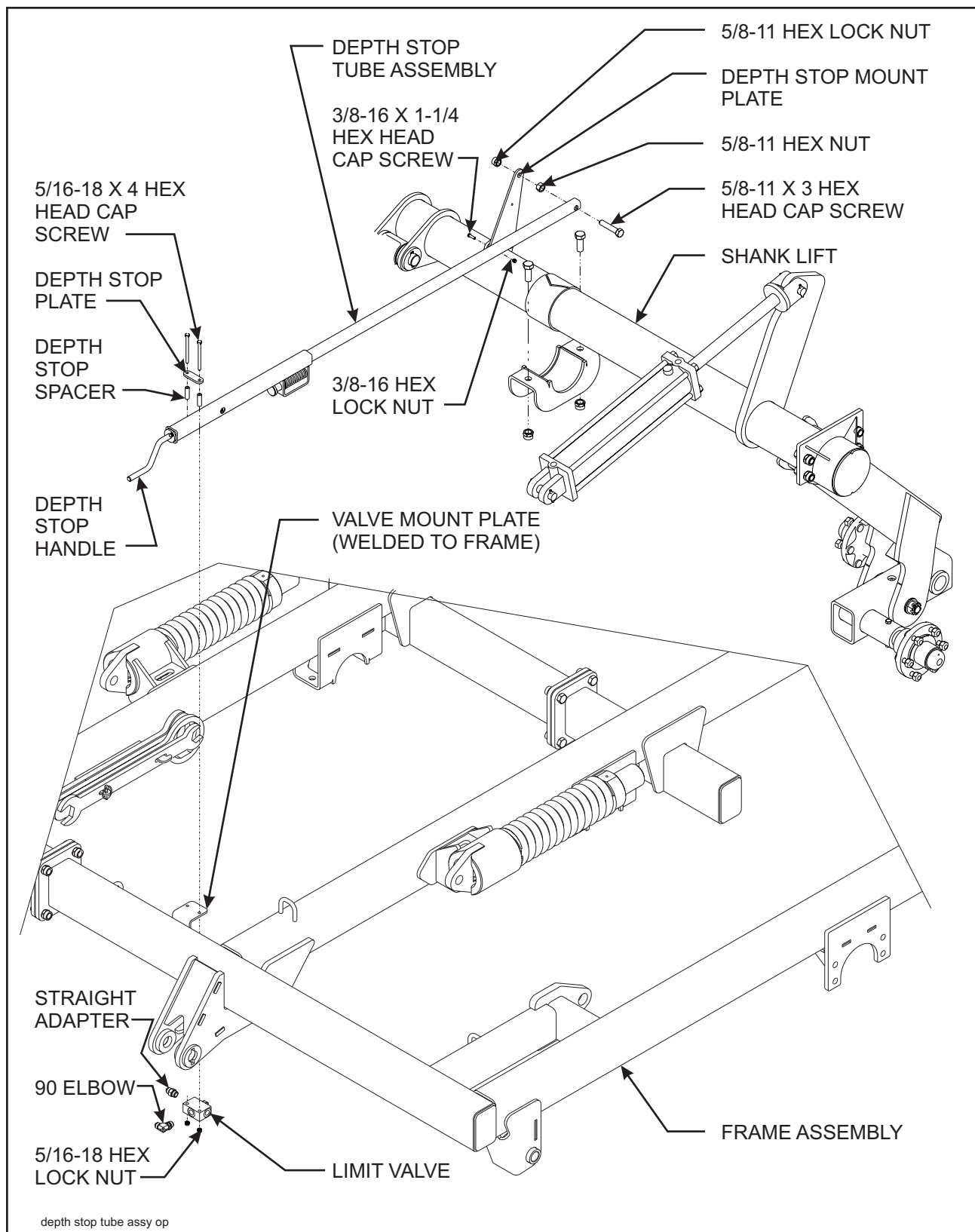


Figure 3-4 Depth Stop Assembly Installation

3-5 DEPTH STOP TUBE ASSEMBLY

- 3-5.1** Attach the depth stop mount plate to the lift using 3/8-16 x 1-1/4 hex head cap screws and hex lock nuts.
- 3-5.2** Lay the depth stop tube assembly on top of the center frame. Insert a 5/8-11 x 3 hex head cap screw in the rear hole of the tube assembly from the left side (**See Figure 3-4**). Install a 5/8-11 hex nut on the screw. Do not over tighten, as the depth stop must pivot on this screw. Insert the screw through the depth stop mounting plate on the center lift and secure with a 5/8-11 hex lock nut.
- 3-5.3** Insert 90° elbow fitting in the back of the limit valve and straight adapter in the side nearest the center of the machine.

- 3-5.4** Using 5/16-18 x 4 hex head cap screws secure the front end of the depth stop tube assembly to the top of the frame mount with the spacers, depth stop plate, and 5/16-18 hex lock nuts. Attach the limit valve to the bottom side of the center frame mount using these same screws.

IMPORTANT

IT MAY BE NECESSARY TO LEAVE THESE SCREWS LOOSE TO ATTACH THE VALVE HOSES LATER.

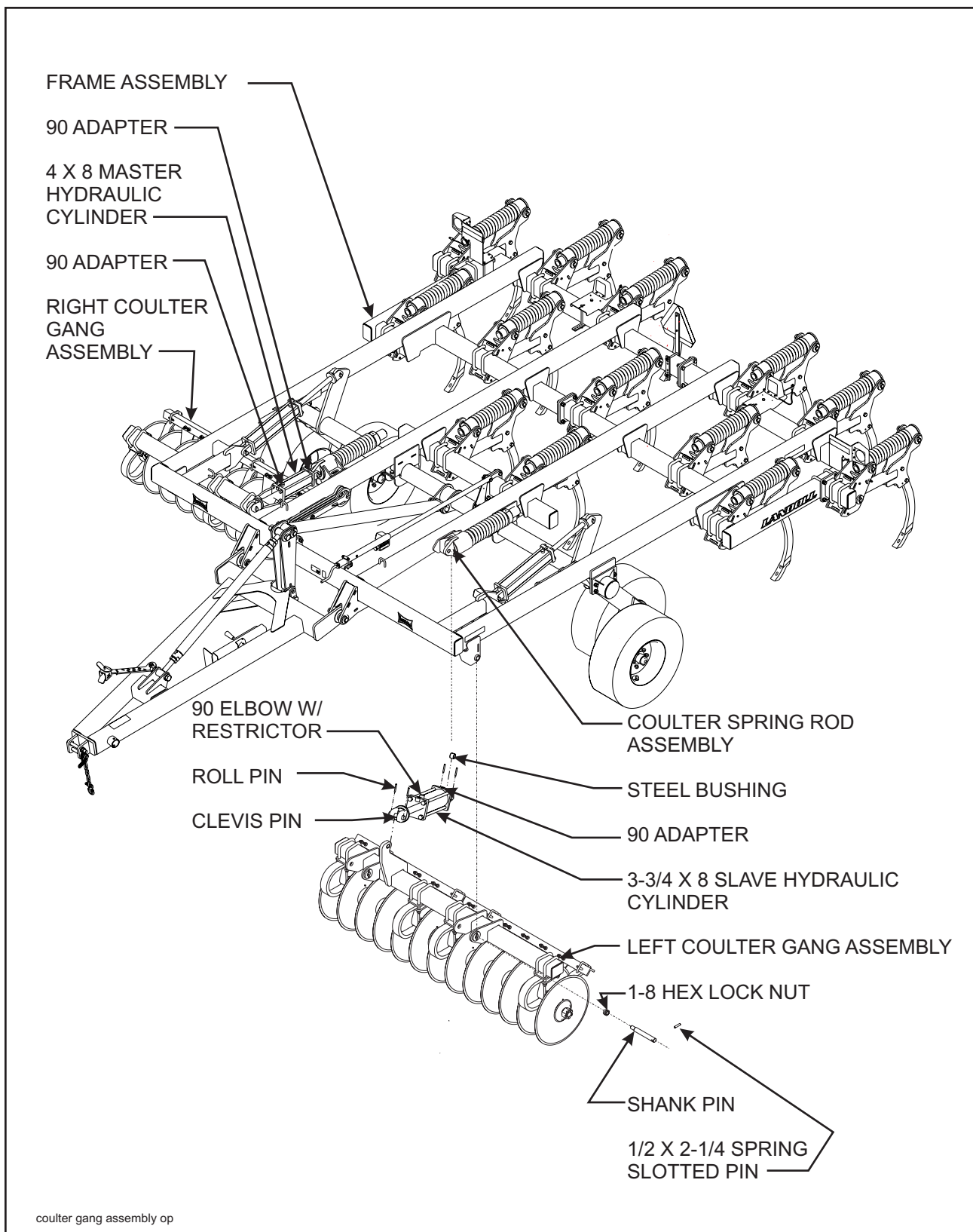


Figure 3-5 Coulter Gang Installation

3-6 COULTER GANG INSTALLATION

DANGER

COULTER BLADES ARE EXTREMELY SHARP. EXERCISE EXTREME CARE WHEN WORKING ON OR NEAR COULTER BLADES. DO NOT ALLOW COULTERS TO ROLL OVER OR FALL ONTO ANY BODY PART. DO NOT ALLOW WRENCHES TO SLIP WHEN WORKING NEAR COULTER BLADES. NEVER PUSH WRENCHES TOWARD COULTER BLADES. DO NOT CLIMB OVER MACHINE ABOVE COULTER BLADES. FAILURE TO STAY CLEAR OF COULTER BLADE EDGES CAN CAUSE SERIOUS PERSONAL INJURY OR DEATH.

- 3-6.1** Attach the coultter gang assemblies to the frame using shank pin, 1-8 hex lock nut, and 1/2 x 2-1/4 spring slotted pin (**See Figure 3-5**).
- 3-6.2** Attach the base ends of the 4 x 8 master and 3-3/4 x 8 slave hydraulic cylinders to the coultter spring rod assembly attached to the frame weldment using the clevis pins and roll pins which come with each cylinder.
- 3-6.3** Connect the rod ends of each cylinder to the gang bar cylinder anchor plate using the clevis pins and roll pins which come with each cylinder.
- 3-6.4** Install 90° adapters into both ports of the 4 x 8 master cylinder and the base end port of the 3-3/4 x 8 slave cylinder.
- 3-6.5** Install 90° elbow w/ restrictor into the rod end of the 3-3/4 x 8 slave cylinder. Note that this is the only location with a restrictor fitting used on the Coulter Chisel.

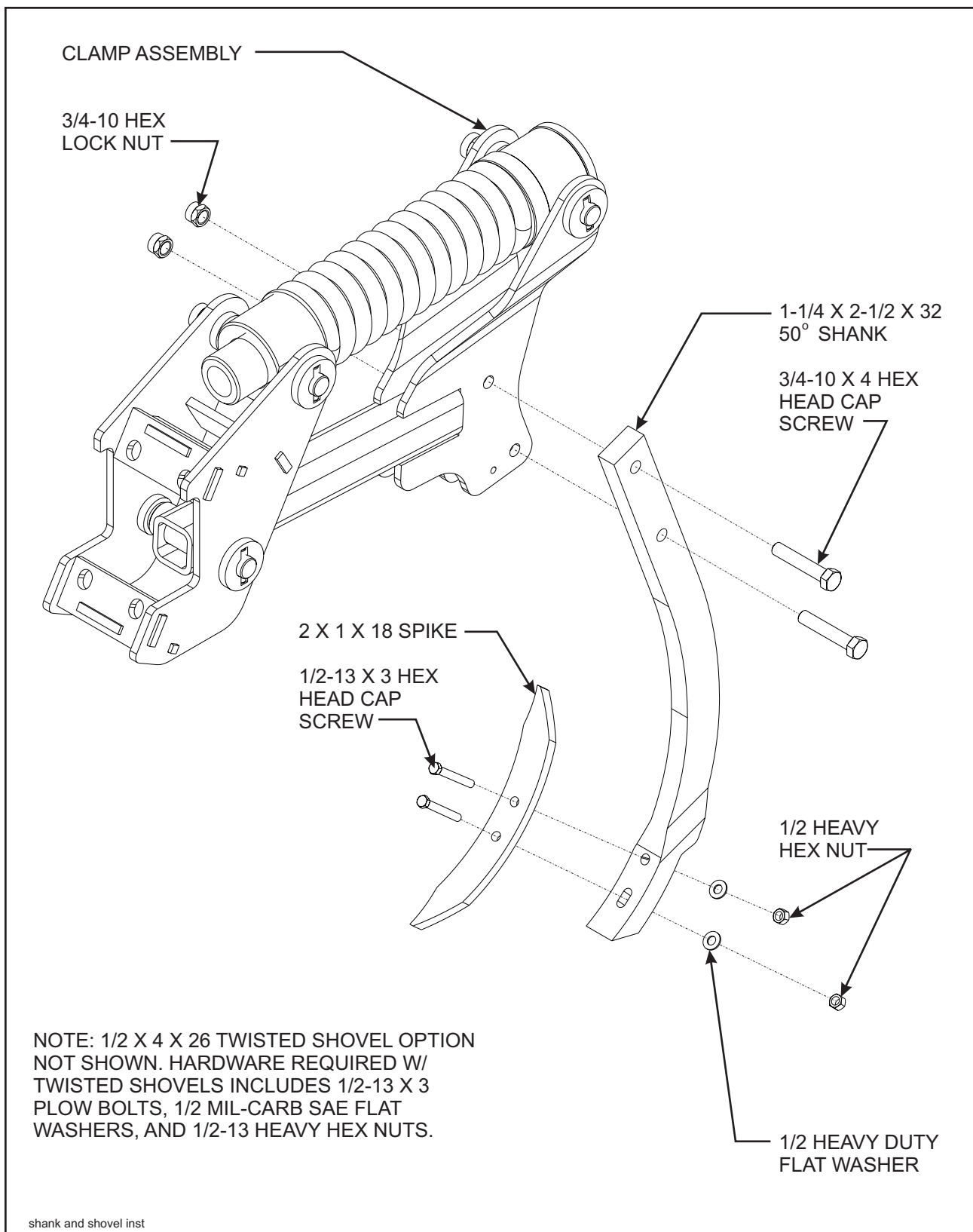


Figure 3-6 Auto Reset Shank and Shovel Installation

3-7 AUTO RESET SHANK AND SHOVEL INSTALLATION

- 3-7.1** Attach each shank assembly to each clamp assembly using 3/4-10 x 4 hex head cap screws and hex lock nuts.
- 3-7.2** Install 2 x 1 x 18 spikes or 1/2 x 4 x 26 twisted shovels onto shanks as follows:
- a.** Connect 2 x 1 x 18 spike to each shank using 1/2-13 x 3 hex head cap screws, flat washers, and heavy hex nuts (**See Figure 3-6**).
 - b.** Connect 1/2 x 4 x 26 twisted shovels to each shank using 1/2-13 x 3 plow bolts, flat washers, and heavy hex nuts. **See Figures 2-1 - 2-10 for recommended locations of right hand and left hand shovels.**

IMPORTANT

RIGHT AND LEFT TWISTED SHOVELS ARE DETERMINED BY DIRECTION OF DIRT FLOW WHEN FACING THE DIRECTION OF TRAVEL.

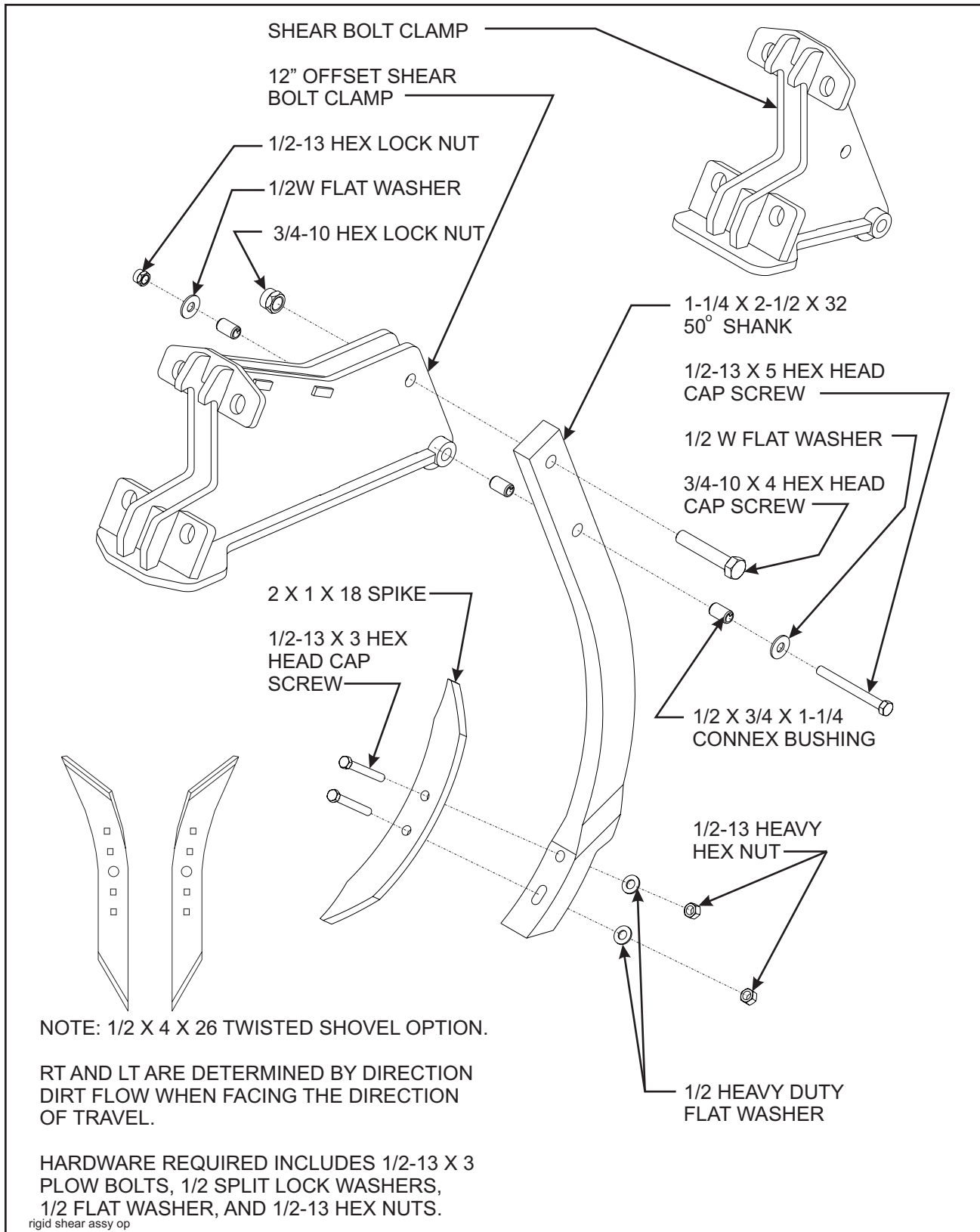


Figure 3-7 Rigid Shear Shank and Shovel Installation
(Prior to July, 2008)

3-8 RIGID SHEAR SHANK AND SHOVEL INSTALLATION (PRIOR TO JULY, 2008)

3-8.1 Attach each shank assembly to each clamp assembly using 3/4-10 x 4 hex head cap screws and hex lock nuts in the top hole and 1/2-13 x 5 hex head cap screw, flat washer, and hex lock nut in the lower hole (See Figure 3-7).

IMPORTANT

1/2 X 3/4 X 1-1/4 CONNEX BUSHINGS SHOWN IN THE DRAWING ARE INSTALLED AT THE LANDOLL CORPORATION.

3-8.2 Install 2 x 1 x 18 spikes or 1/2 x 4 x 26 twisted shovels onto shanks as follows:

- a. Connect 2 x 1 x 18 spike to each shank using 1/2-13 x 3 hex head cap screws, flat washers, and heavy hex nuts (See Figure 3-7).
- b. Connect 1/2 x 4 x 26 twisted shovels to each shank using 1/2-13 x 3 plow bolts, flat washers, and heavy hex nuts. See Figures 2-1 - 2-10 for recommended locations of right hand and left hand shovels.

IMPORTANT

RIGHT AND LEFT TWISTED SHOVELS ARE DETERMINED BY DIRECTION OF DIRT FLOW WHEN FACING THE DIRECTION OF TRAVEL.

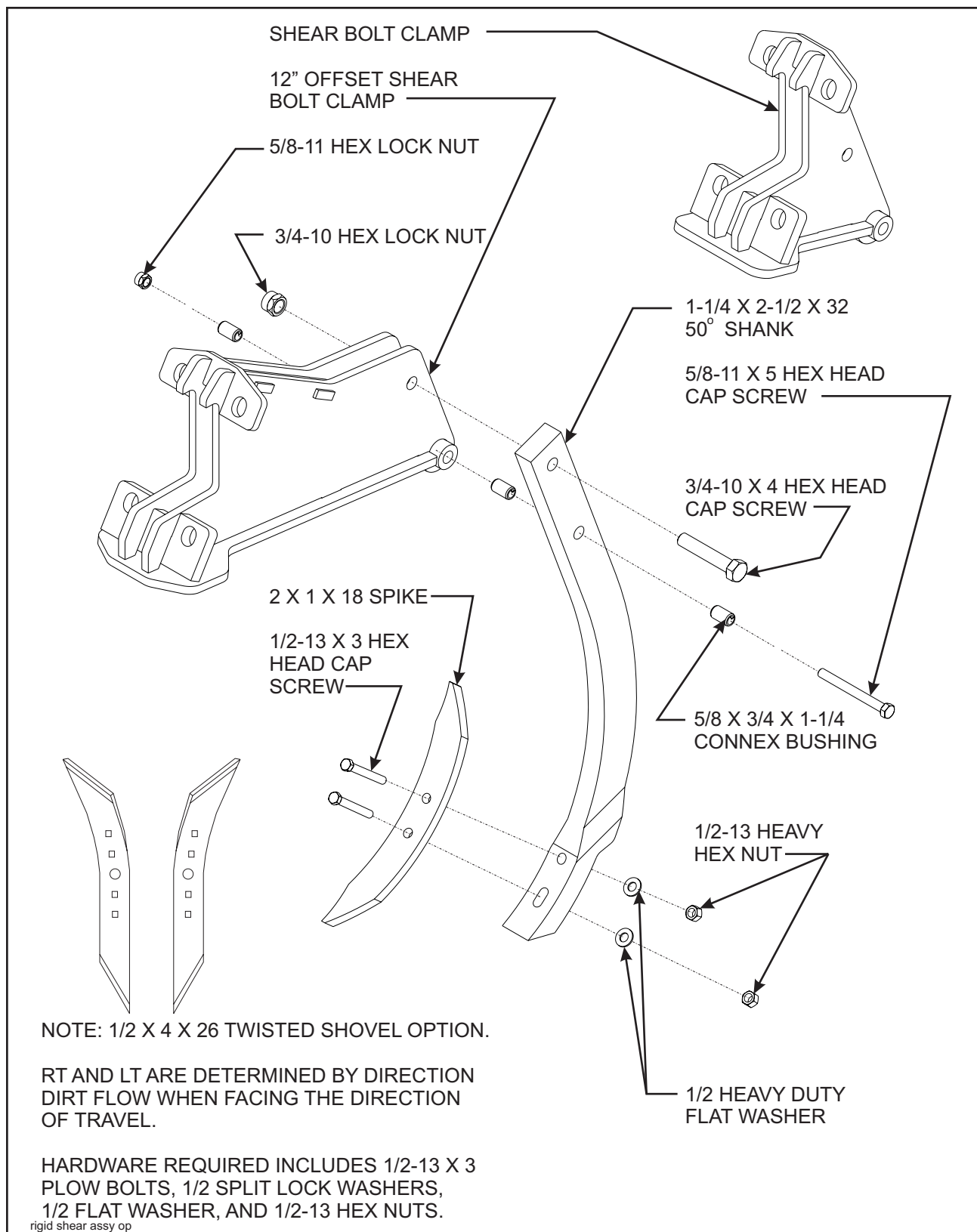


Figure 3-8 Rigid Shear Shank and Shovel Installation
(After July, 2008)

3-9 RIGID SHEAR SHANK AND SHOVEL INSTALLATION (AFTER JULY, 2008)

- 3-9.1** Attach each shank assembly to each clamp assembly using 3/4-10 x 4 hex head cap screws and hex lock nuts in the top hole and 5/8-11 x 5 hex head cap screw and hex lock nut in the lower hole (**See Figure 3-7**).

IMPORTANT

5/8 X 3/4 X 1-1/4 CONNEX BUSHINGS SHOWN IN THE DRAWING ARE INSTALLED AT THE LANDOLL CORPORATION.

- 3-9.2** Install 2 x 1 x 18 spikes or 1/2 x 4 x 26 twisted shovels onto shanks as follows:

- a. Connect 2 x 1 x 18 spike to each shank using 1/2-13 x 3 hex head cap screws, flat washers, and heavy hex nuts (**See Figure 3-7**).
- b. Connect 1/2 x 4 x 26 twisted shovels to each shank using 1/2-13 x 3 plow bolts, flat washers, and heavy hex nuts. **See Figures 2-1 - 2-10 for recommended locations of right hand and left hand shovels.**

IMPORTANT

RIGHT AND LEFT TWISTED SHOVELS ARE DETERMINED BY DIRECTION OF DIRT FLOW WHEN FACING THE DIRECTION OF TRAVEL.

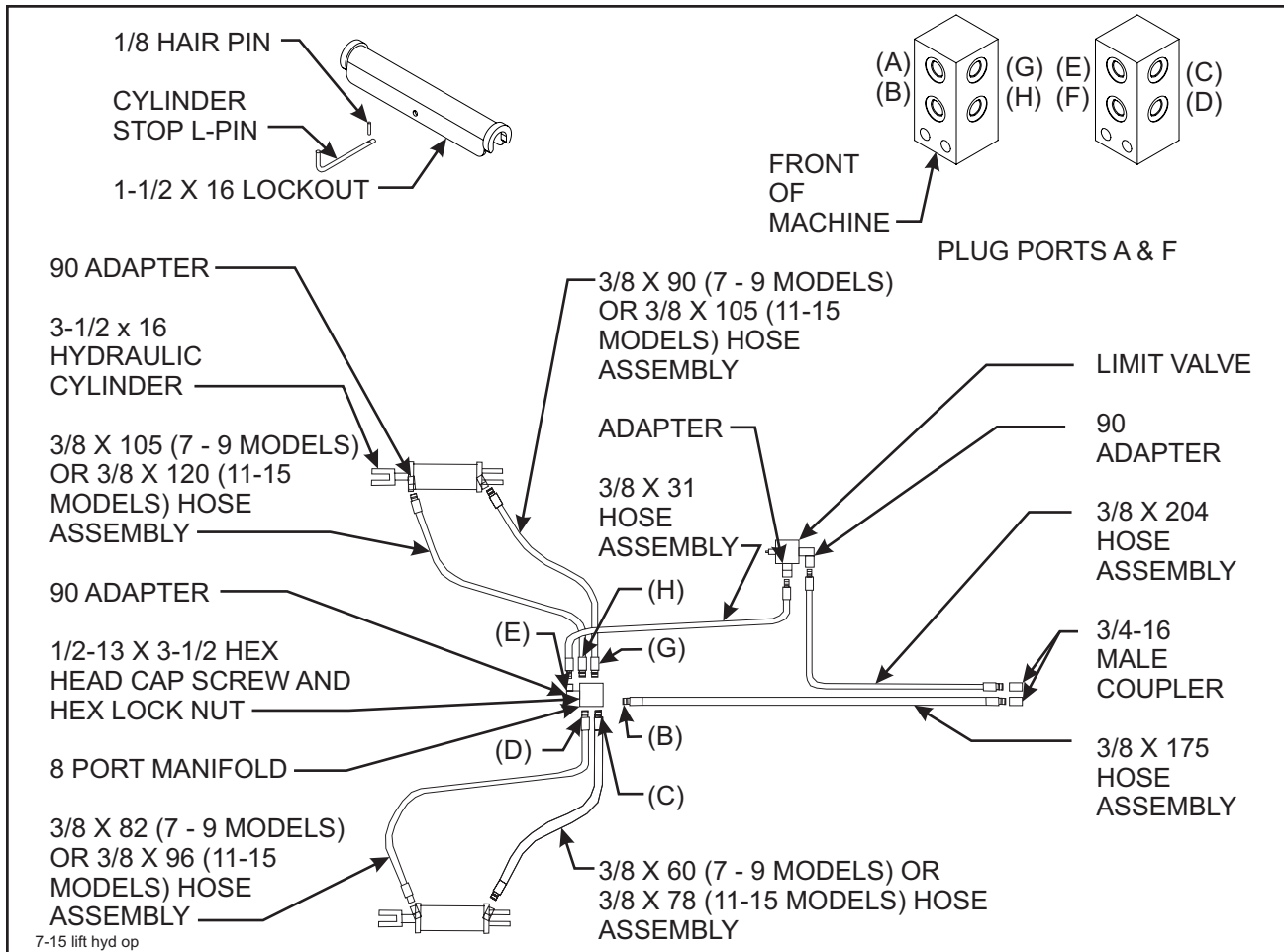


Figure 3-9 Wheel Lift Hydraulic Installation

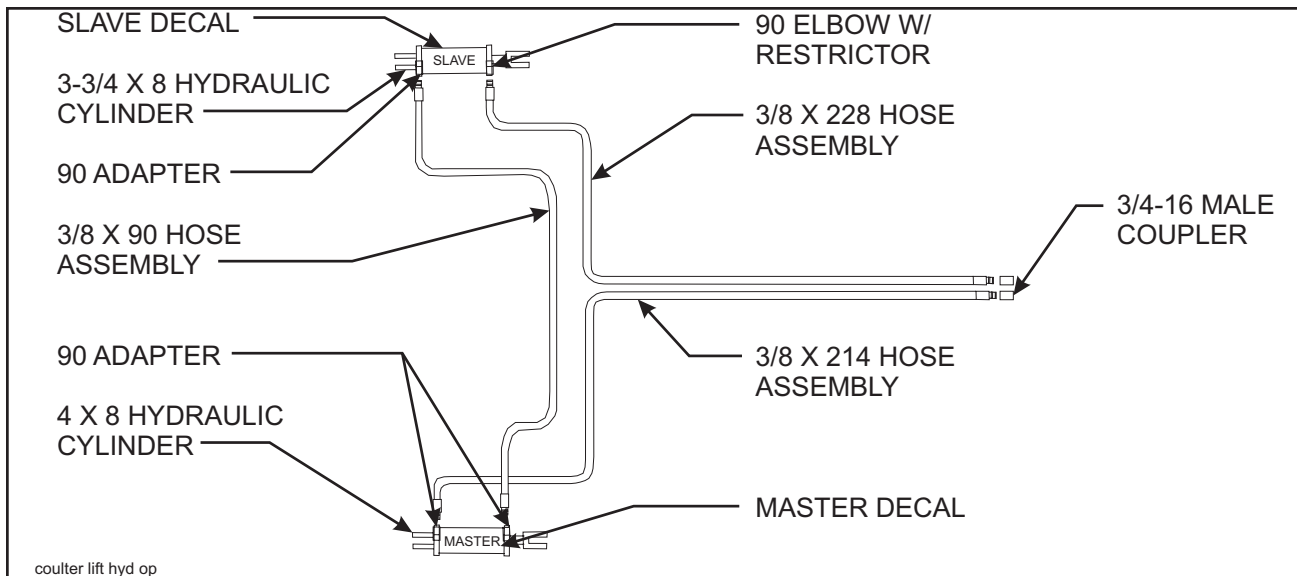


Figure 3-10 Coulter Lift Hydraulic Installation

3-10 HYDRAULIC INSTALLATION

Note: Refer to **Figures 3-9 and 3-10** for wheel lift and coulter lift hydraulic diagram.

3-10.1 Install the manifold to the manifold bracket on the frame using 1/2-13 x 3-1/2 hex head cap screws and hex lock nuts.

3-10.2 Install 90° adapter in port E in the rear of the manifold.

3-10.3 Install wheel lift and coulter lift system hoses per **Figures 3-9 and 3-10**.

3-10.4 Install steel plugs in any remaining open manifold or valve ports.

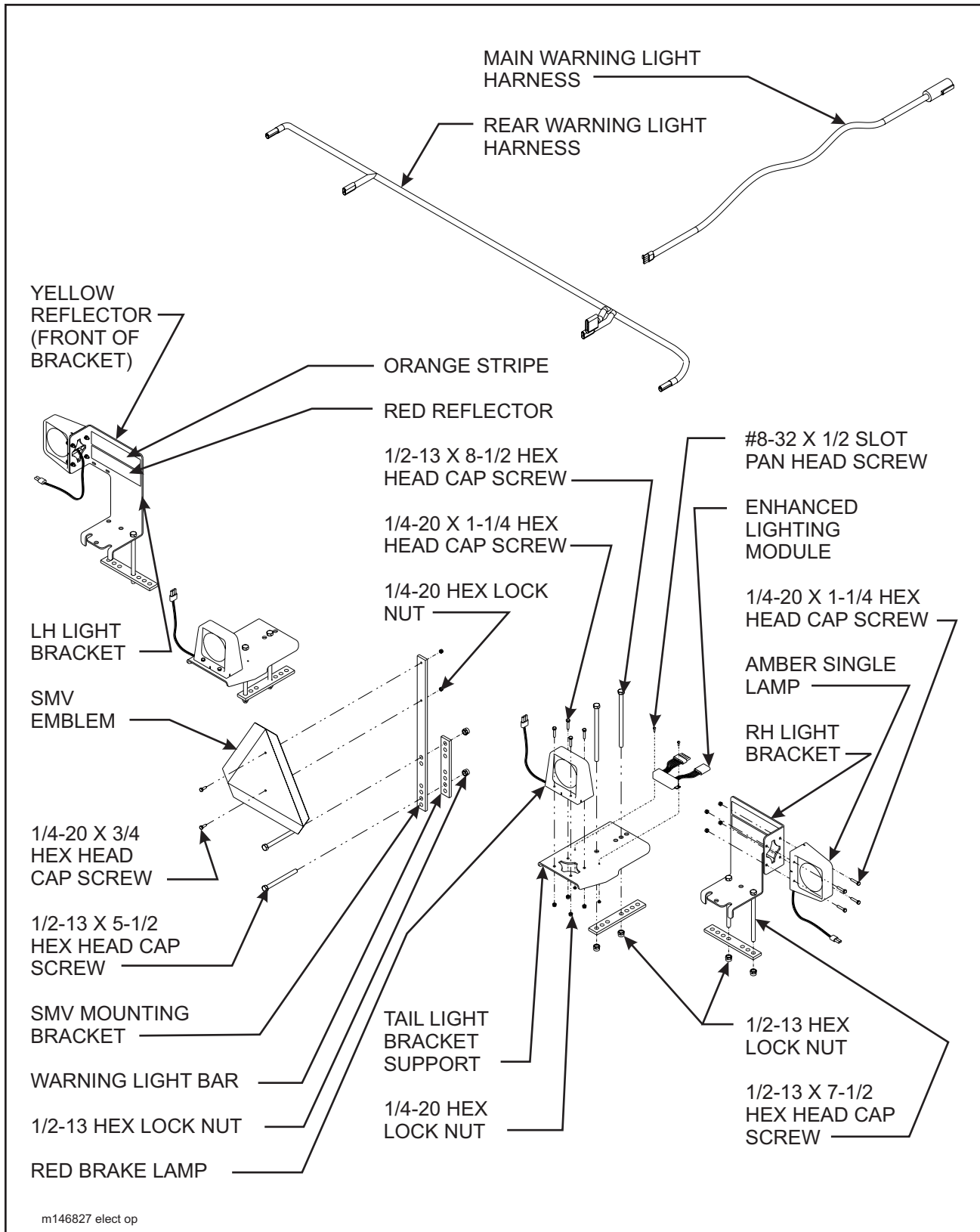


Figure 3-11 Light and SMV Bracket Installation

3-11 LIGHT INSTALLATION

Note: See Figures 2-1 - 2-10 for light bracket placement. If no dimension is given for a bracket, it should be located against frame member as shown in drawing.

- 3-11.1** Attach inner tail light mounting bracket supports to the center frames using 1/2-13 x 8-1/2 hex head cap screws, warning light bars, and hex lock nuts **(See Figure 3-11)**.
- 3-11.2** Attach outer lh and rh light brackets to frame weldment using 1/2-13 x 7-1/2 hex head cap screws, warning light bars, and hex lock nuts.
- 3-11.3** Attach red brake lamps to inner tail light mounting bracket supports and amber lamps to outer light brackets using 1/4-20 x 1-1/4 hex head cap screws and hex lock nuts.
- 3-11.4** Connect warning light harnesses to lights.
- 3-11.5** Attach SMV emblem and mounting bracket to rear center frame bar using 1/2-13 x 5-1/2 hex head cap screws, 1/4-20 x 3/4 hex head cap screws, and hex lock nuts. The SMV sign should be centered on the rear bar of the frame.

3-12 FINAL ASSEMBLY

- 3-12.1** Attach a tractor to the implement and charge the lift system hydraulics as described in **Section 4-4**.
- 3-12.2** Install the 1-1/2 x 16 lockouts on both 3-1/2 x 16 cylinders on the frame.
- 3-12.3** Connect lights to the tractor and verify operation.
- 3-12.4** Check tires for proper inflation
- 3-12.5** Level the Coulter Chisel from front to rear as described in **Section 4-8**.
- 3-12.6** Inspect the final implement assembly, and verify that all bolts have been tightened, cotter pins spread, and that there are no leaking hydraulic connections.

CAUTION

TIGHTEN ALL 1-3/4" NUTS TO 1,200 FOOT-POUNDS OF TORQUE (SEE FIGURE 3-12).

- 3-12.7** Rotate each disc gang to verify that each gang rotates freely. Adjust any scrapers that may have shifted during shipment or assembly.
- 3-12.8** Lubricate the Coulter Chisel at all locations (**See Section 4-15**).
- 3-12.9** Touch up with paint any areas that may have been scratched during moving, handling, or assembly.
- 3-12.10** Thoroughly read and understand the operating section before using the Coulter Chisel.

3-13 OFFSET SHANK MOUNT INSTALLATION (OPTION)

If back row of shanks continually plug with residue, offset shank mounts are available for the back row of shanks. Contact the Landoll Corporation Service department for more information.

- 3-13.1** If offset shank mounts are used, bolt to the rear frame using u-bolts, and 3/4-10 hex lock nuts (**See Figure 3-13**).

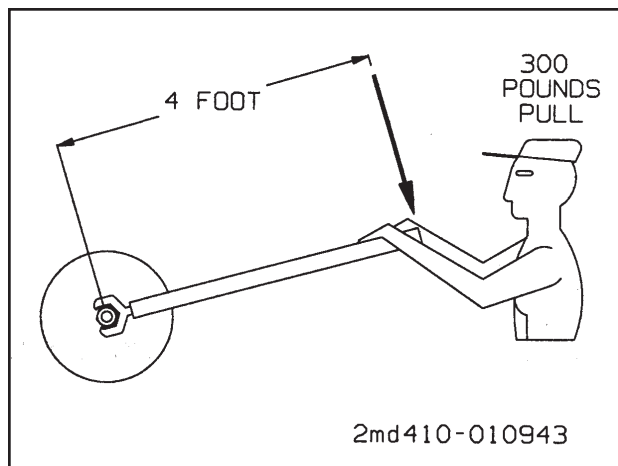


Figure 3-12 1,200 Foot-Pounds of Torque

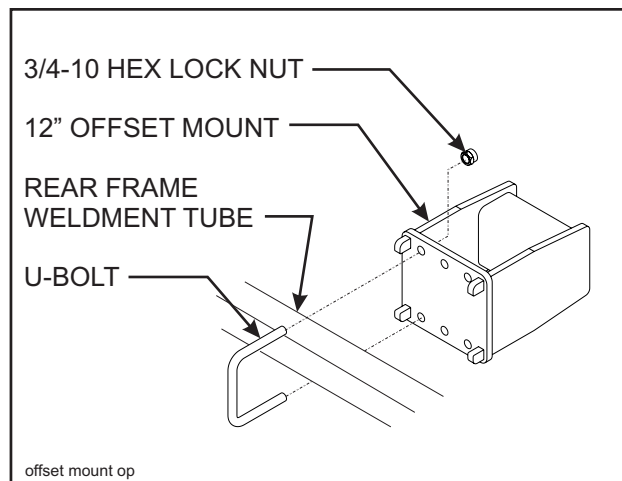


Figure 3-13 Offset Shank Mount Installation

3-14 REAR JACK INSTALLATION (OPTION)

A rear jack assembly is available for use on the rear of the Coulter Chisel. This is extremely helpful if an attachment has been added to the rear of the machine for stability.

3-14.1 Attach rear jack mount and rear jack mount plate weldment to the rear frame of the Coulter Chisel using 5/8-11 x 6 hex head cap screws and hex lock nuts (**See Figure 3-14**).

IMPORTANT

THE REAR JACK TUBE SHOULD BE LOCATED TO THE REAR OF THE COULTER CHISEL NEAR THE CENTER OF THE FRAME.

3-14.2 Slide rear jack tube into rear jack mount plate from the bottom and hold in desired location with 5/8 detent pin with chain and 3/16 x 1-1/2 cotter pin.

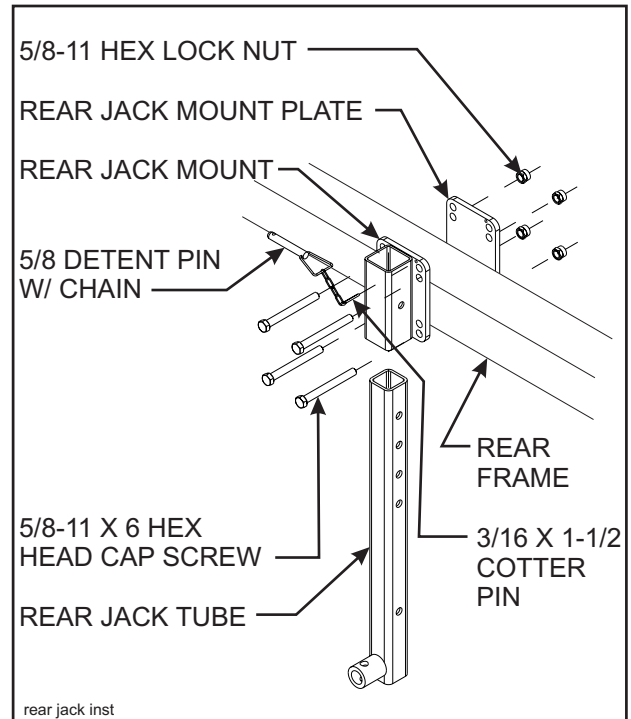
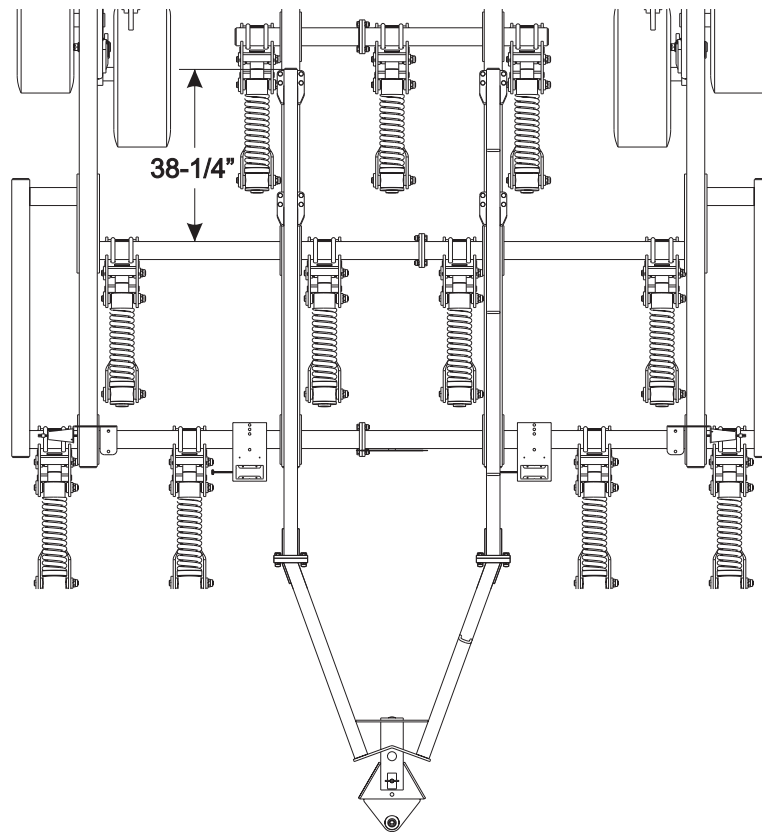


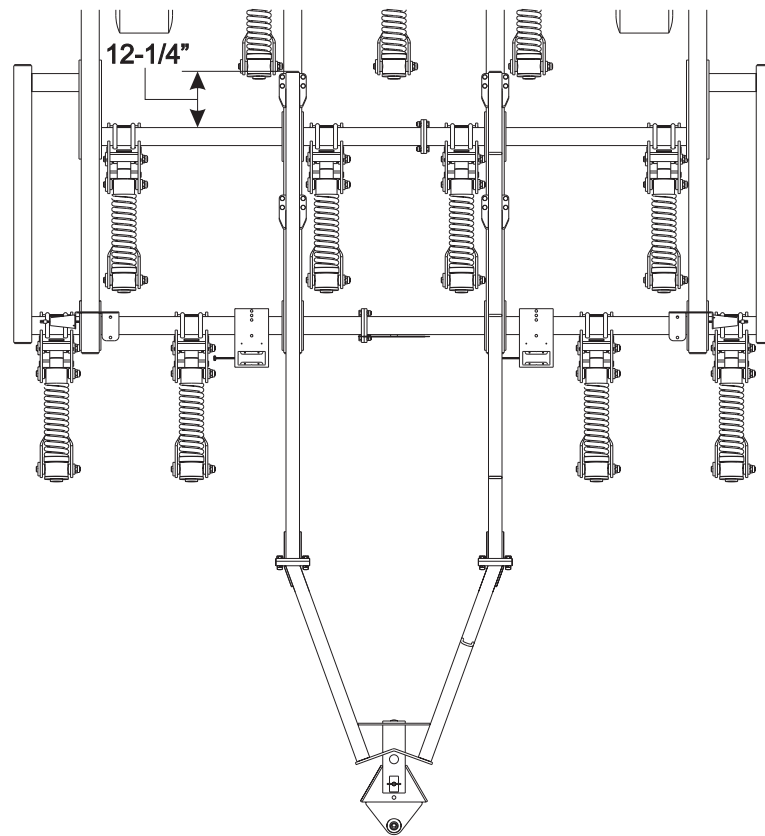
Figure 3-14 Rear Jack Installation



REAR TOW HITCH - SHORT ARM

2110 rear tow hitch placement

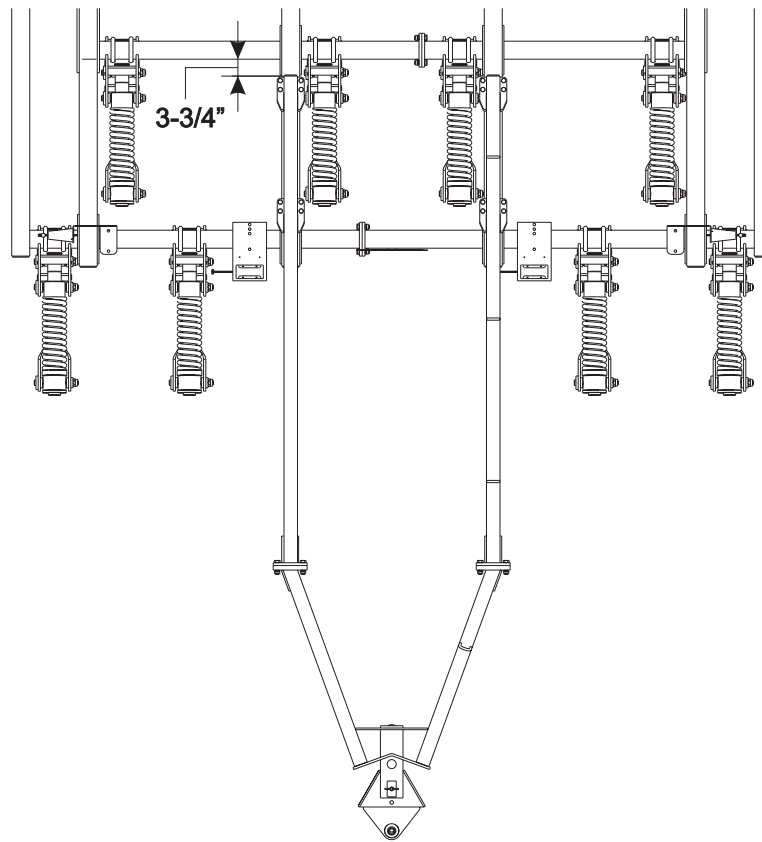
Figure 3-15 Rear Tow Hitch Placement - Short (Option)



REAR TOW HITCH - MEDIUM ARM

2110 rear tow hitch placement

Figure 3-16 Rear Tow Hitch Placement - Medium (Option)



REAR TOW HITCH - LONG ARM

2110 rear tow hitch placement

Figure 3-17 Rear Tow Hitch Placement - Long (Option)

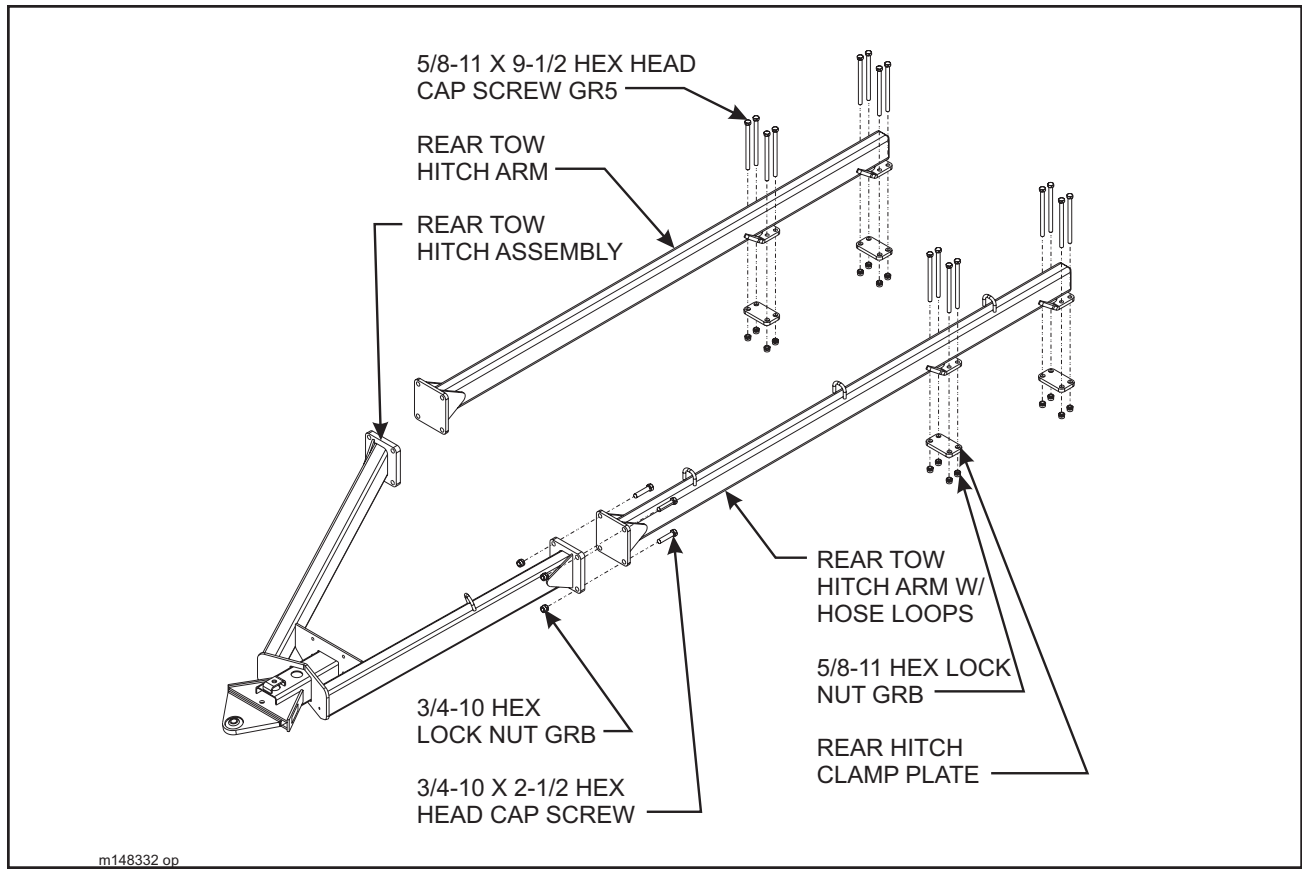


Figure 3-18 Rear Tow Hitch Installation (Option)

3-15 REAR TOW HITCH INSTALLATION (OPTION)

3-15.1 Attach rear tow hitch to the rear tow hitch arms using 3/4-10 x 2-1/2 hex head cap screws and hex lock nuts.

3-15.2 Attach the rear tow hitch assembly to the rear bars of the center frame using rear tow hitch clamp plates, 5/8-11 x 9-1/2 hex head cap screws, and hex lock nuts (**See Figure 3-18**). The rear tow hitch assembly should be centered on the back bars of the center frame (**See Figures 3-15, 3-16, and 3-17**).

3-15.3 Slide rear tow hitch bar into mouth of rear tow hitch and attach with 3/4-10 x 2 hex head cap screw and hex lock nut through hole closest to the rest of the machine. Use hitch pin, compression spring, 1/4 x 1 slotted pin, and 1/4 x 3 slotted roll pin in hole closest to the front of the machine.

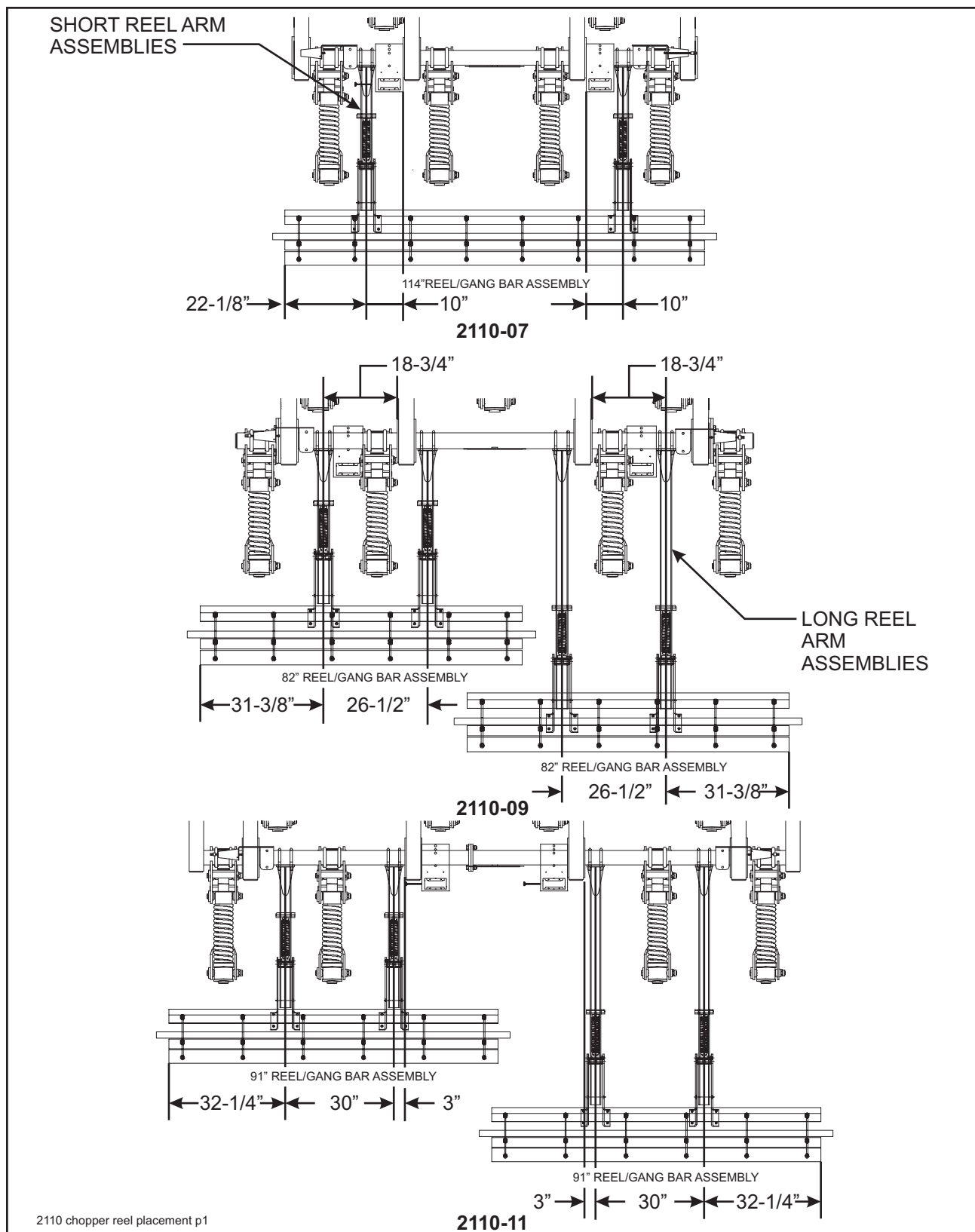


Figure 3-19 Chopper Reel Placement (Option) (1 of 2)

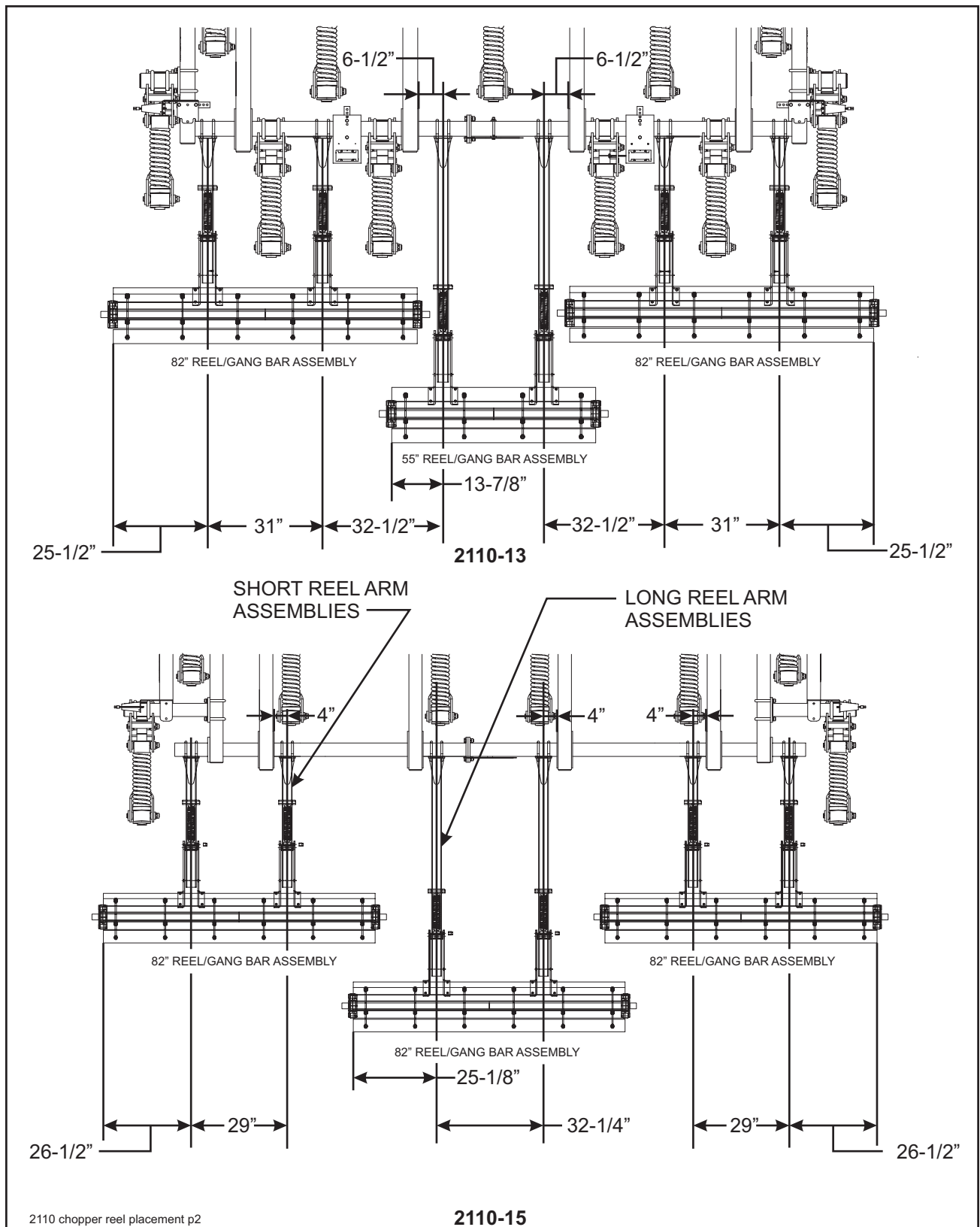


Figure 3-20 Chopper Reel Placement (Option) (2 of 2)

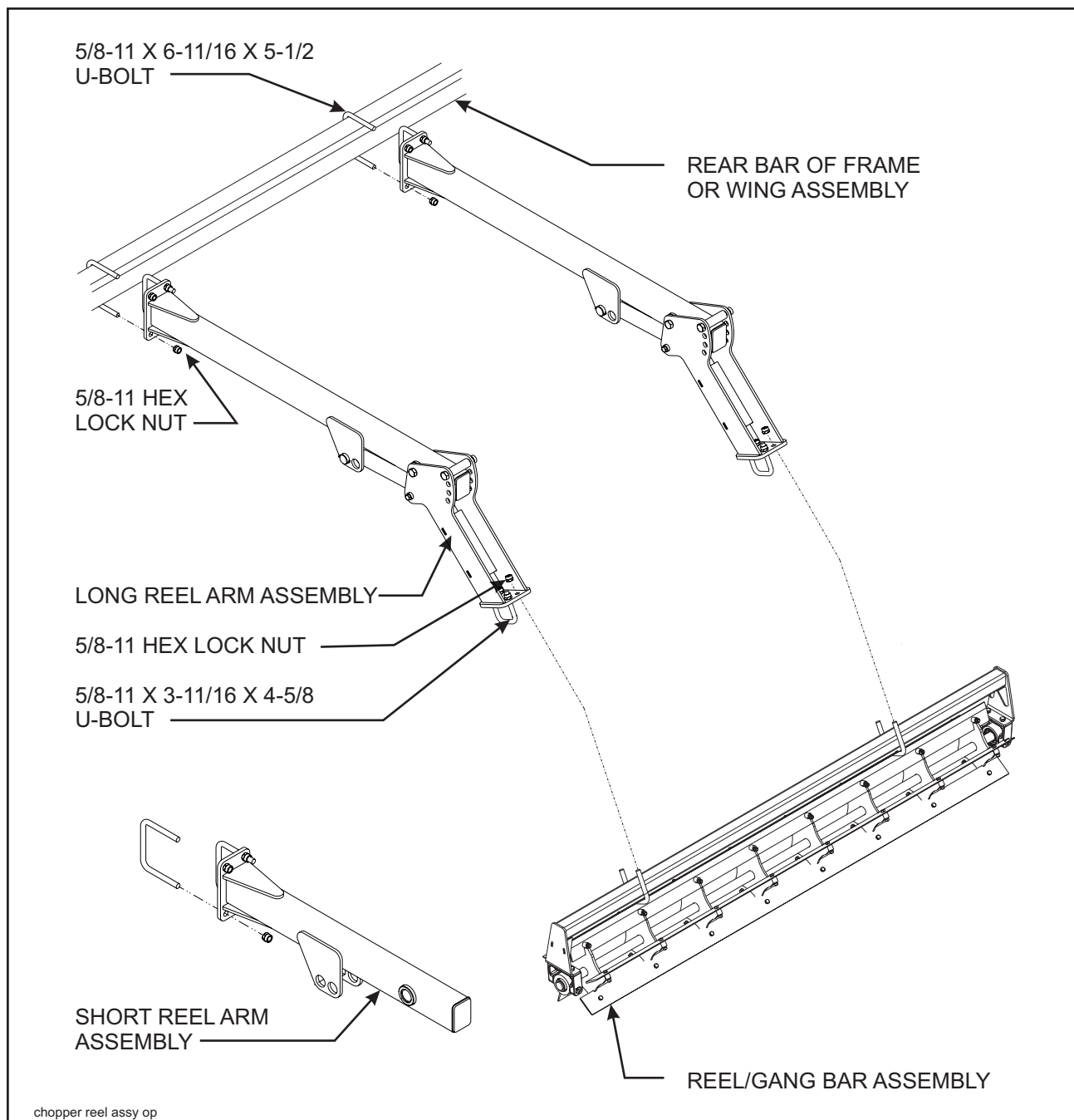


Figure 3-21 Chopper Reel Installation (Option)

3-16 CHOPPER REEL INSTALLATION (OPTION)

3-16.1 Attach long or short reel arm assemblies to the frame using 5/8-11 x 6-11/16 x 5-1/2 u-bolts and hex lock nuts (Figures 3-19, 3-20, and 3-21).

3-16.2 Attach reel/gang bar assemblies to chopper reel arm assemblies using 5/8-11 x 3-11/16 x 4-5/8 u-bolts and hex lock nuts.

NOTES:

OPERATION AND MAINTENANCE

4

DANGER

NEVER ALLOW ANYONE TO RIDE ON THE 2110 COULTER CHISEL AT ANY TIME. ALLOWING A PERSON TO RIDE ON THE MACHINE CAN INFLICT SERIOUS PERSONAL INJURY OR DEATH TO THAT PERSON.

DANGER

COULTER BLADES ARE EXTREMELY SHARP. EXERCISE EXTREME CARE WHEN WORKING ON OR NEAR COULTER BLADES. DO NOT ALLOW COULTERS TO ROLL OVER OR FALL ONTO ANY BODY PART. DO NOT ALLOW WRENCHES TO SLIP WHEN WORKING NEAR COULTER BLADES. NEVER PUSH WRENCHES TOWARD COULTER BLADES. DO NOT CLIMB OVER MACHINE ABOVE COULTER BLADES. FAILURE TO STAY CLEAR OF COULTER BLADE EDGES CAN CAUSE SERIOUS PERSONAL INJURY OR DEATH.

WARNING

ALL HYDRAULICALLY ELEVATED EQUIPMENT MUST HAVE CYLINDER LOCKOUTS INSTALLED OR BE LOWERED TO THE GROUND WHEN SERVICING OR WHEN EQUIPMENT IS IDLE. FAILURE TO TAKE PREVENTIVE MEASURES AGAINST ACCIDENTAL LOWERING CAN RESULT IN SERIOUS PERSONAL INJURY.

DANGER

ALWAYS LOCK THE TRACTOR DRAWBAR IN THE CENTER POSITION WHEN TRANSPORTING THE UNIT. FAILURE TO DO SO CAN RESULT IN SERIOUS INJURY OR DEATH AND CAUSE DAMAGE TO THE EQUIPMENT.

DANGER

WHEN TRANSPORTING THE UNIT, PLACE CYLINDER LOCKOUTS IN THE TRANSPORT LOCK POSITION AFTER FULLY EXTENDING THE CYLINDERS. INSERT THE LOCKOUT PINS TO SECURE THE CYLINDER LOCKOUTS. FAILURE TO LOCKOUT THE CYLINDERS CAN CAUSE THE UNIT TO SETTLE DURING TRANSPORT, WHICH CAN RESULT IN SERIOUS INJURY OR DEATH AND CAUSE DAMAGE TO THE EQUIPMENT.

CAUTION

WHEN TRANSPORTING FARM IMPLEMENTS ON PUBLIC ROADS, IT IS THE RESPONSIBILITY OF THE OPERATOR TO ABIDE BY STATE AND LOCAL LAWS CONCERNING WIDE LOADS, SPEED, SAFETY EMBLEMS AND SAFETY LIGHTING EQUIPMENT. DRIVE AT SAFE SPEEDS, PARTICULARLY WHEN ROUNDING CORNERS, CROSSING ROUGH GROUND OR DRIVING ON HILLSIDES, TO PREVENT TIPPING THE TRACTOR.

4-1 TRACTOR PREPARATION

The Landoll 2110 Coulter Chisel is designed to be pulled by tractor equipped with a double lip or clevis type hitch. If your tractor is not equipped as such, you need to purchase the hitch from your local tractor dealer. If your Coulter Chisel is equipped with the clevis option, this should be removed. The clevis option is only for transport use.

Before attaching the Coulter Chisel, prepare the tractor as follows:

- 4-1.1** Inflate the rear tractor tires equally and add ballast according to the tractor operator's manual.
- 4-1.2** Lock the tractor drawbar in the center position.

4-2 COULTER CHISEL PREPARATION

- 4-2.1** Prior to operating the 2110 Coulter Chisel, inspect it thoroughly for good operating condition.
- 4-2.2** Replace worn or missing parts.

- 4-2.3** When the machine is new, check the bolt tightness after a few hours of operation. Tighten any loose nuts or bolts. Check the lift wheel lug bolts daily.
- 4-2.4** Check the lift wheel tire inflation. Inflate all tires equally to avoid side draft. Follow the tire manufacturer's recommended pressures listed on the sidewall of the tires.
- 4-2.5** Lubricate the machine as shown in **Section 4-15 (See Figure 4-10)**.

4-3 ATTACHING TO THE TRACTOR

- 4-3.1** Align the tractor drawbar with the machine. Raise or lower the Coulter Chisel ring hitch, as needed, using the swivel jack. Attach the unit with proper size hitch pin.
- 4-3.2** Always place the swivel jack on the interior mount before setting the machine in motion.

- 4-3.3** Clean all hydraulic couplings and attach to the tractor.
- 4-3.4** Fully extend the hydraulic lift wheel cylinders, and place the cylinder lockouts in the transport lock position over the cylinder rods. Secure the lockouts with the lockout pins.

4-4 HYDRAULIC LIFT SYSTEM

The Coulter Chisel is equipped with a hydraulic lift system to raise and lower the unit in the field.

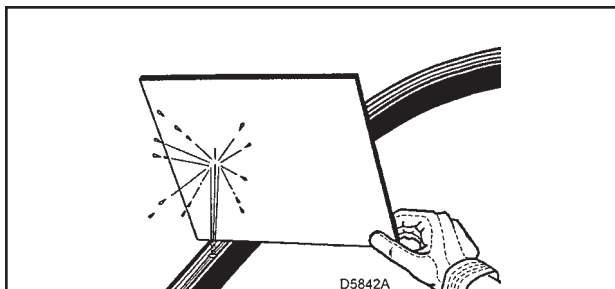


Figure 4-1 Hydraulic Leak Detection

WARNING

ESCAPING HYDRAULIC FLUID CAN CAUSE SERIOUS PERSONNEL INJURY. RELIEVE SYSTEM PRESSURE BEFORE REPAIRING, ADJUSTING, OR DISCONNECTING. WEAR PROPER HAND AND EYE PROTECTION WHEN SEARCHING FOR LEAKS. USE CARDBOARD INSTEAD OF HANDS (SEE FIGURE 4-1). KEEP ALL COMPONENTS (CYLINDERS, HOSES, FITTINGS, ETC.) IN GOOD REPAIR.

4-4.1 The hydraulic lift system contains cylinders plumbed together. It is important that the cylinders be connected in the proper series for the lift system to operate correctly.

4-4.2 The hydraulic system is not filled with oil and should be purged of air before transporting and field operations. Carefully hitch the Coulter Chisel to the tractor and connect the hydraulic lift hoses. Check to make sure the tractor hydraulic reservoir is full of the manufacturer's recommended oil. Slowly raise the machine. With all cylinders fully extended remove the 1-1/2 X 16 transport lockouts (**See Figure 4-2**). Store transport lockouts as shown in **Figure 4-3**. Lower and raise the unit to verify that cylinders are working simultaneously throughout the stroke. Do not loosen any hoses or fittings. Recheck tractor reservoir to make sure it is within operating limits.

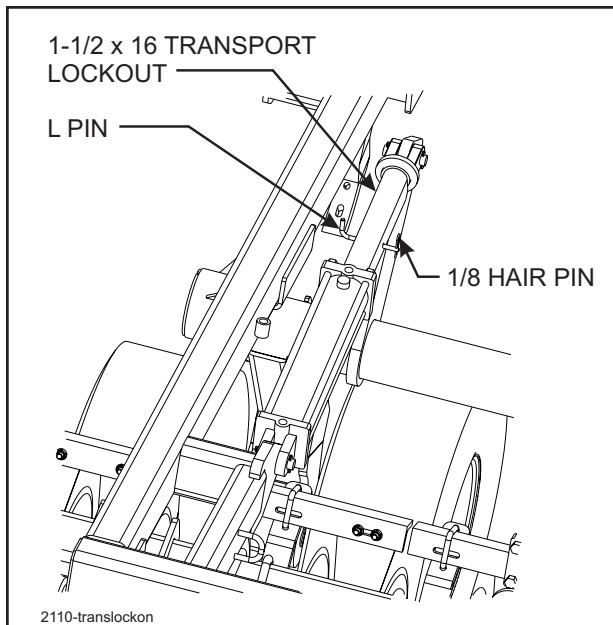


Figure 4-2 Installed Transport Locks

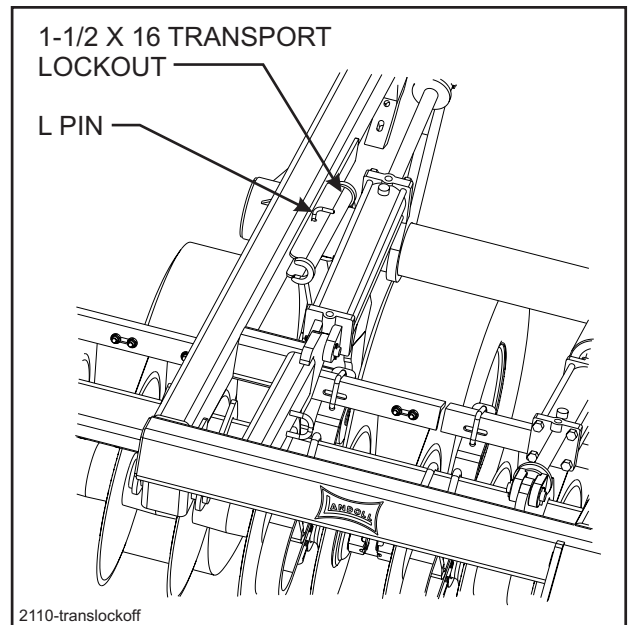


Figure 4-3 Stored Transport Locks

4-5 HYDRAULIC COULTER GANG LIFT SYSTEM

The rephasing coultter gang lift system must be purged of air before beginning field operation.

- 4-5.1** Make sure the tractor's hydraulic reservoir is full of the manufacturer's recommended oil.
- 4-5.2** Extend the lift cylinder and raise the machine.
- 4-5.3** Fully extend the coultter gang cylinders and hold the tractor lever to allow oil to bypass and fill each coultter gang cylinder.

IMPORTANT

WHEN INITIALLY FILLING THE CYLINDERS WITH OIL OR AFTER EXTENDED PERIODS OF STORAGE, HOLD THE TRACTOR VALVE APPROXIMATELY 1 MINUTE. IF THE COULTER CHISEL HAS RECENTLY BEEN USED, HOLD THE TRACTOR VALVE APPROXIMATELY 10 SECONDS.

- 4-5.4** Raise and lower the coultter gangs making sure the cylinders actuate simultaneously throughout the stroke.

- 4-5.5** If the coultter gang cylinders are not in unison, continue holding and cycling the cylinders to purge any remaining air.

- 4-5.6** This rephasing process may need to be repeated periodically during operation to assure even penetration of coultter gangs. DO NOT loosen any hydraulic fittings.

IMPORTANT

RETRACTING THE CYLINDERS DURING PERIODS OF STORAGE WILL PREVENT RUSTING OF SHAFTS AND SUBSEQUENT DAMAGE TO SEALS.

4-6 GENERAL OPERATION

- 4-6.1** The horsepower requirements are typically 20-25 horsepower per shank. This will vary widely due to speed, depth, moisture, residue and types of soils. Local dealers can help in making recommendations for your areas.
- 4-6.2** Operating speed is typically 4.5-6 mph. Excessive speed can cause the unit to bounce, uneven depth, and create undesirable ridges.

- 4-6.3** Lift wheels must always be in contact with the ground and carrying some implement weight. Lift wheels are used to gauge the depth and to control the leveling feature.

- 4-6.4** Do not turn with the Coultter Chisel in the ground. This can put excessive side load on the gangs and hitch. Raise the unit fully when making turns to prevent gouging and pushing a ridge.

4-7 FIELD OPERATION

- 4-7.1** Raise the unit to take the weight off of the transport locks. Remove the transport locks from the lift cylinders. Store the transport locks on the retainers above the main lift (See Figure 4-4).

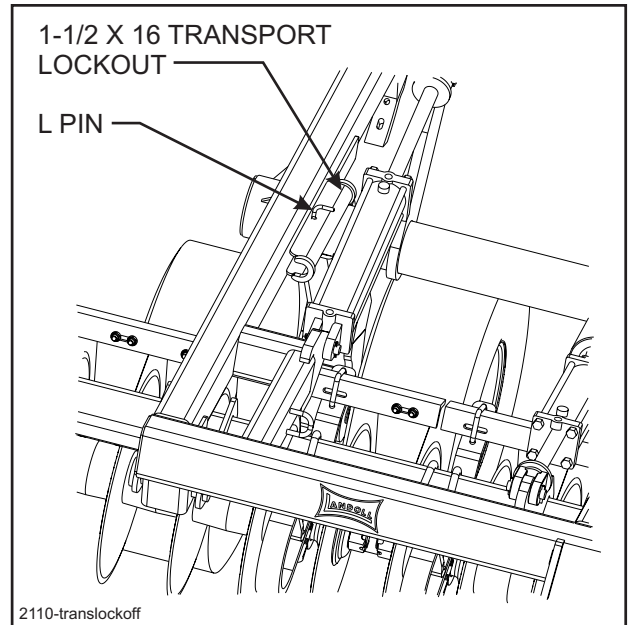


Figure 4-4 Stored Transport Locks

4-8 LEVELING (FRONT-TO-REAR)

- 4-8.1** The leveling feature on the Coulter Chisel is used to keep the machine level when raising the unit from a working position to a transport position. The leveling feature is also used to level the unit from front-to-rear to perform a level operation in the field.
- 4-8.2** The unit should be level from front to rear. This will reduce horsepower requirements, allow a more uniform tillage operation, and reduce unnecessary point wear.
- 4-8.3** To adjust the leveling feature, loosen jam nuts at each end of the radius rod using the adjustment wrenches (See Figure 4-5). To raise the front of the Coulter Chisel, lengthen the radius rod assembly. To lower the front of the Coulter Chisel, shorten the radius rod assembly. After adjusting, retighten jam nuts at each end. Adjustments should be made in small increments.

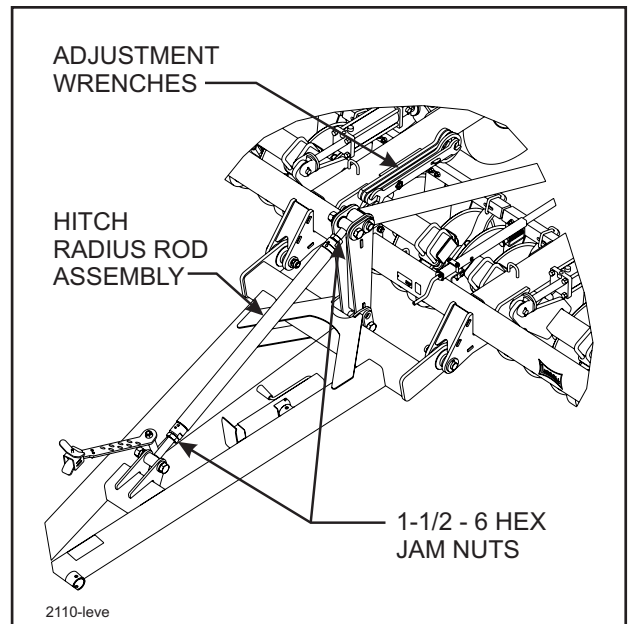


Figure 4-5 Radius Rod Leveling Adjustment

4-9 VARIABLE RATIO ADJUSTMENT

The leveler is equipped with a variable ratio adjustment. This is located at the rear of the hitch and at the center of the wheel lift where the leveler tube attaches. Connect the leveler tube to the top hole in the center lift and the bottom hole in the tongue for normal operation. This will cause the rear of the machine to raise higher than the front increasing transport height. The lower hole on the center lift provides an increased leveler ratio, which will cause the Coulter Chisel to become more level in transport. The lower hole should be used when a rear tow hitch is needed to reduce the height of the rear tow hitch during transport.

The adjustments can be set as follows:

Top hole in center lift, top hole in tongue - this will raise the rear of the machine the highest.

Top hole in center lift, bottom hole in tongue - normal operation.

Bottom hole in center lift, top hole in tongue - normal operation with a tow hitch

Bottom hole in center lift, bottom hole in tongue - to lower rear tow hitch if needed.

4-9.1 To change the variable ratio adjustment, lower the implement to the ground and relieve the load on the lift system.

4-9.2 Extend or retract the radius rod, until the load is removed from the leveler tower.

4-9.3 Remove the 1-1/4-7 x 9-1/2 hex head cap screw, slotted lock washer, and hex nut through the leveler tower and hitch (**See Figure 4-6**).

4-9.4 Reinstall the 1-1/4-7 x 9-1/2 hex head cap screw, slotted lock washer, hex nut, and leveler tower in the desired position. The radius rod will require some adjustment to connect to the new position.

4-9.5 To adjust the leveler tube at the center lift, remove the hitch pin, 1/2 x 2-1/4 slotted spring pin, and 1-8 hex lock nut.

4-9.6 Reinstall the hitch pin, 1/2 x 2-1/4 slotted spring pin, 1-8 hex lock nut in the leveler tube at the center lift in the desired position.

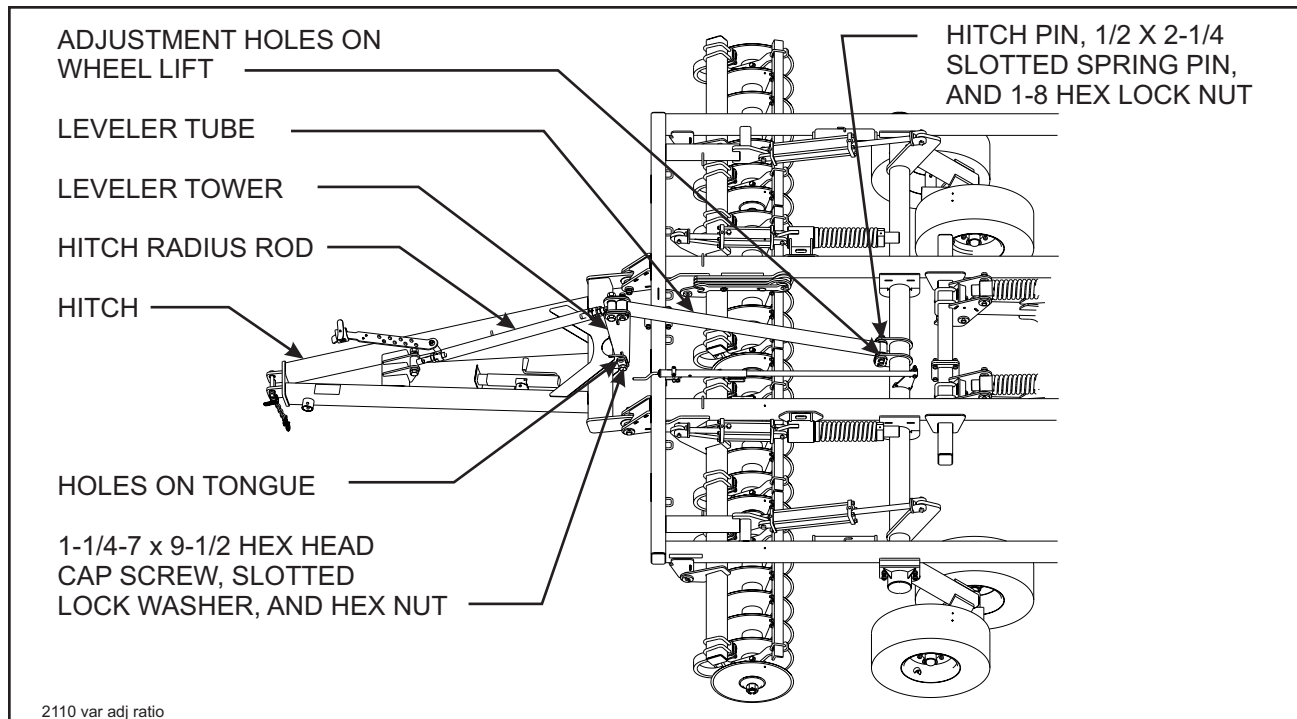


Figure 4-6 Variable Ratio Leveler Adjustment

4-10 COULTER BLADES

- 4-10.1** The 2110 Coulter Chisel is equipped with 22" coultter blades.
- 4-10.2** The 22" diameter blades are flat with a thickness of 4 ga (.256") and are standard for the 2110 Coulter Chisel.
- 4-10.3** Sharpening – In some cases there is a desire to sharpen coultter blades for improved cutting. There are several people who roll-sharpen coultter blades. Most coultter blades used today are made of chrome-boron steel. The chrome-boron steel has a higher hardness than traditional carbon-steel blades for increased wear. Higher hardness makes roll sharpening more difficult often with mixed results, and is not covered by warranty. Coulter blade manufacturers will not cover any alterations to blades other than the place of manufacture. Results from roll-sharpening damage may not be immediate, and may take more than a season to be noticeable. If you choose to sharpen coultter blades, check with local dealers for reputable experienced sharpeners that will stand behind their work.

DANGER

COULTER BLADES ARE EXTREMELY SHARP. EXERCISE EXTREME CARE WHEN WORKING ON OR NEAR COULTER BLADES. DO NOT ALLOW COULTERS TO ROLL OVER OR FALL ONTO ANY BODY PART. DO NOT ALLOW WRENCHES TO SLIP WHEN WORKING NEAR COULTER BLADES. NEVER PUSH WRENCHES TOWARD COULTER BLADES. DO NOT CLIMB OVER MACHINE ABOVE COULTER BLADES. FAILURE TO STAY CLEAR OF COULTER BLADE EDGES CAN CAUSE SERIOUS PERSONAL INJURY OR DEATH.

4-11 DEPTH STOP ADJUSTMENT (MANUAL)

The operating depth of the Coulter Chisel is controlled by a single-point depth stop. The stop is located at the center front of the machine.

4-11.1 Adjust the depth stop by turning the handle in (clockwise) to increase operating depth (**See Figure 4-7**). Turn the handle out (counter-clockwise) to decrease operating depth. One turn will equal approximately 3/16" adjustment in depth.

4-11.2 The gauge on the side of the depth stop tube gives a reference for depth setting. The "A" setting refers to maximum operating depth.

IMPORTANT

FOR MAXIMUM OPERATING DEPTH, THE LIFT WHEELS MUST BE IN CONTACT WITH THE GROUND AND CARRY SOME OF THE MACHINE WEIGHT. RAISING THE LIFT WHEELS OFF THE GROUND PERMITS UNCONTROLLED DEPTH AND DOES NOT ALLOW THE LEVELER TO FUNCTION PROPERLY.

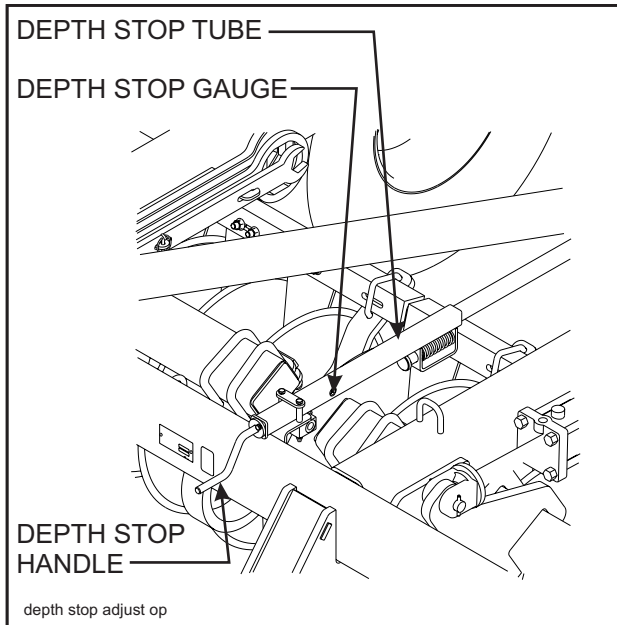


Figure 4-7 Depth Stop Adjustment (Manual)

4-12 WHEEL BEARING MAINTENANCE

Wheel bearing maintenance should be performed at the beginning of every season of use. Check the wheel bearings periodically for excessive end play. If needed, adjust or replace them using the following procedure:

4-12.1 Place the frame on blocks or stands sufficient to lift the tire clear of the ground.

4-12.2 Remove the tire.

4-12.3 Remove the hub cap, cotter pin, slotted nut and washer.

4-12.4 Remove the hub. Clean and inspect the bearings and hub cavity. Replace any worn or defective parts.

4-12.5 Repack the bearings using a high-quality wheel bearing grease.

4-12.6 Slide the triple-lip seal onto the spindle. Do not install the seal into the hub.

4-12.7 Slide the inner bearing cone and hub onto the spindle.

4-12.8 Install the outer bearing cone, washer and slotted nut.

4-12.9 Tighten the slotted nut while rotating the hub until there is a slight resistance to wheel rotation. Then, back the slotted nut off one notch, until the wheel rotates freely without end play.

4-12.10 Slide the triple-lip seal to the hub and install the seal in the hub.

Note: The triple-lip seals should point away from the hub to keep contaminants out and allow grease to pass.

4-12.11 Install a new cotter pin and replace the hub cap.

4-13 HYDRAULIC MAINTENANCE

- 4-13.1** Check the tractor hydraulic fluid level per tractor owners manual and after any leakage. Check fluid level with the cylinders in the retracted position.
- 4-13.2** If a cylinder or valve leaks, disassemble the parts to determine the cause of the leak. Any time a cylinder is opened up, or whenever any seal replacement is necessary, it is advisable to clean all parts and replace all seals. Seal kits are available from your Landoll dealer.
- 4-13.3** Check all hydraulic hoses weekly. Look for binding or cracking. Replace all worn or defective parts immediately.

IMPORTANT

LOWER THE UNIT TO THE GROUND, AND RELIEVE HYDRAULIC PRESSURE BEFORE ATTEMPTING TO SERVICE ANY HYDRAULIC COMPONENT.

- 4-13.4** Transport locks are provided to hold the implement in a raised position. Do not attempt to perform any service work under the implement without first installing the transport locks. Before servicing any hydraulic component, lower the implement to the ground and relieve all system pressure. If a hydraulic component is disconnected, repaired, or replaced, it will be necessary to purge the system of air before operation. **See Sections 4-4 and 4-5** on how to purge the hydraulic systems.

4-14 TRANSPORT

- 4-14.1** Check and follow all federal, state, and local requirements before transporting the Coulter Chisel.
- 4-14.2** The Coulter Chisel should be transported only by a tractor required for field operation. The implement weight should not exceed more than 1.5 times the tractor weight. Unless noted on the implement, maximum transport speed is 20 mph for the implement. Slow down when driving on rough roads. Reduce speed when turning, or on curves and slopes to avoid tipping.
- 4-14.3** A safety chain is provided with the implement to insure safe transport.
- The safety chain should have a tensile strength equal to or greater than the gross weight of the implement. The chain is attached to the lower hitch clevis hole with two flat washers between the clamp plates to assure a tight connection. Always use a 1" diameter Grade 8 bolt for this connection.
 - Attach the safety chain to the tractor drawbar (**See Figure 4-8**). Provide only enough slack in the chain for turning. Do not use an intermediate chain support as the attaching point for the chain on the tractor. Do not pull the implement by the safety chain.

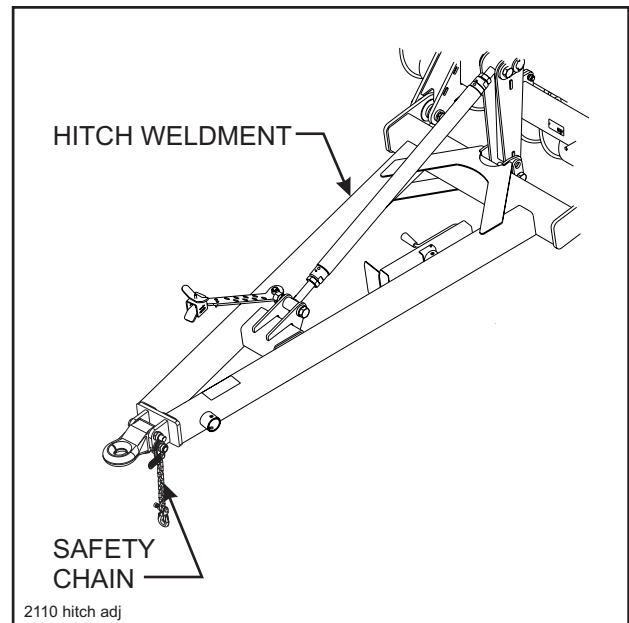


Figure 4-8 Hitch and Safety Chain

- c. When unhitching from the tractor attach the hook end of the chain to a free link close to the hitch clevis for storage. This will keep the hook off the ground, reducing corrosion and keep the hook functioning properly.
- d. Regularly inspect the safety chain for worn, stretched, or broken links and ends. Replace the safety chain if it is damaged or deformed in any way.

4-14.4 Check that tires are of proper size, load rating, and inflated to manufacture specifications before transporting. Check wheel lug bolts to insure tightness.

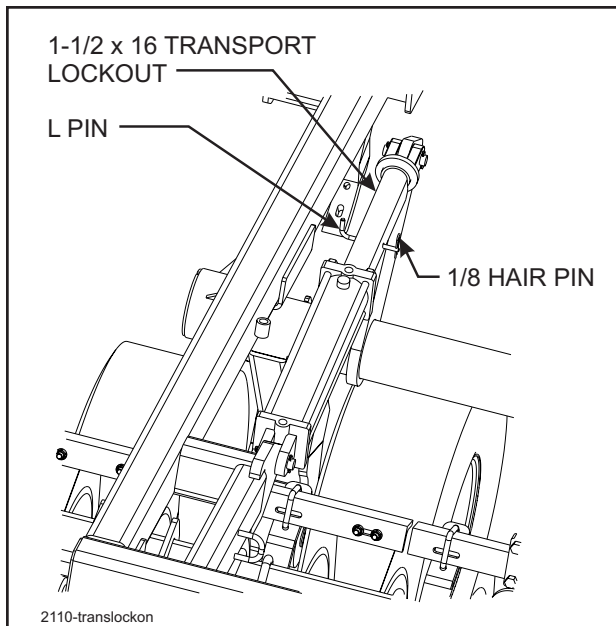


Figure 4-9 Installed Transport Locks

4-14.5 Know the transport heights and widths of the unit before transporting. Attachments can increase the transport dimensions of the implement. Use caution when transporting near bridges and power lines.

⚠ WARNING

ELECTROCUTION CAN OCCUR WITHOUT DIRECT CONTACT.

4-14.6 Raise the unit to full transport height.

4-14.7 Install transport locks on both lift cylinders. Do not depend solely on implement hydraulics for transport. (See Figure 4-9).

⚠ WARNING

FAILURE TO USE TRANSPORT LOCK PINS DURING TRANSPORT MAY RESULT IN PERMANENT EQUIPMENT DAMAGE, SERIOUS INJURY, OR DEATH.

4-14.8 Transport during daylight hours whenever possible. Always use flashing warning lights, except where such use is prohibited by law. Make sure lights, reflectors and SMV emblem are clearly visible and operating. Remove any obstructions such as dirt, mud, stalks or residue that restricts view before transporting.

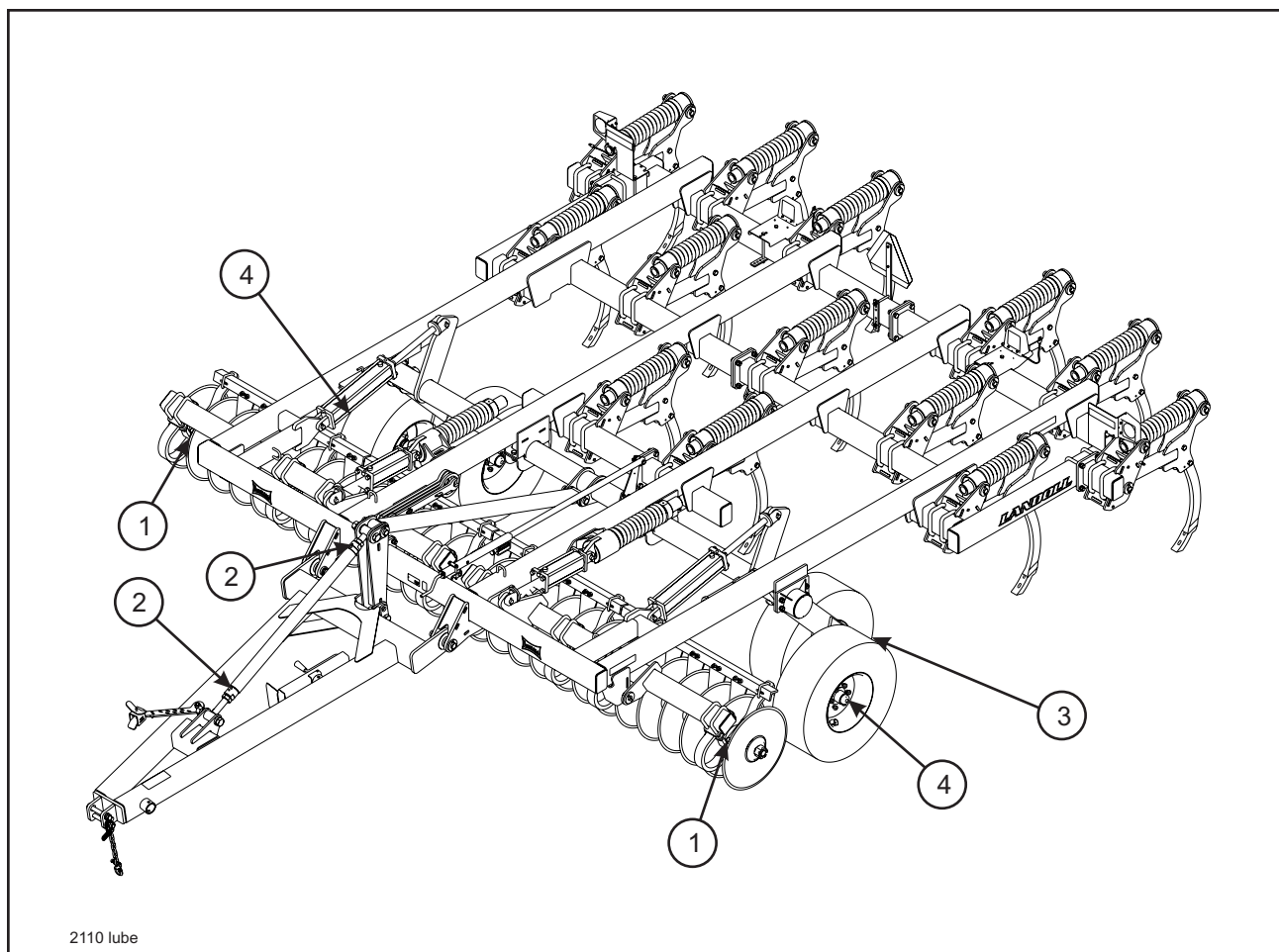


Figure 4-10 Lubrication Schedule

LUBRICATION TABLE			
ITEM	DESCRIPTION	NO. OF LUBE POINTS	INTERVAL (Hours unless stated)
1	Disc Gang Bearings	1 each	10
2	Radius Rod	2	50
3	Walking Tandem Hubs	1 each	50
4	Wheel Hubs	1 each	50

Table 4-3 Lubrication Table

4-15 LUBRICATION MAINTENANCE

4-15.1 Table 4-3 specifies the lubrication points and intervals on the 2110 Coulter Chisel. Proper maintenance of your machine will, under normal operating conditions, help to keep it operating at or near its peak performance for an extended period of time. Proper maintenance is also a condition of keeping your warranty in good status (See Figure 4-10).

4-15.2 When lubricating the Coulter Chisel, SAE multi-purpose EP grease, or EP grease with 3-5% molybdenum sulfide is recommended. Wipe soil from fittings before greasing. Replace any lost or broken fittings immediately.

4-15.3 Disc gang bearings are equipped with triple-lip seals that will let grease pass and not harm the seal. Regular lubrication will maintain a full grease cavity and help purge any contaminants. Grease the bearings before long periods of storage to prevent moisture buildup within the bearing cavity.

4-15.4 Wheel seals and walking tandem seals, when properly installed, will allow grease to pass without harm to seals. Regular lubrication will extend service life, particularly in severe operating conditions.

4-15.5 The Coulter Chisel is equipped with maintenance-free bearings in the lifts and leveler. These areas require no lubrication.

4-16 STORAGE

4-16.1 The service life of the Coulter Chisel will be extended by proper off-season storage practices. Prior to storing the unit, complete the following procedures:

- a. Completely clean the unit.
- b. Inspect the machine for worn or defective parts. Replace as needed.
- c. Repaint all areas where the original paint is worn off.
- d. Grease all exposed metal surfaces of shanks, points and coulters.

e. Apply a light coating of oil or grease to exposed cylinder rods to prevent them from rusting.

f. Lubricate each point of the machine as stated in **Section 4-15**.

4-16.2 Store the unit in a shed or under a tarpaulin to protect it from the weather. The ground tools and tires should rest on boards, or some other object, to keep them out of the soil.

NOTES

TROUBLESHOOTING GUIDE

5

The Troubleshooting Guide, shown below, is included to help you quickly locate problems that can happen using your 2110 Coulter Chisel. Follow all safety precautions stated in the previous sections when making any adjustments to your machine.

PROBLEM	PROBABLE CAUSE:SOLUTION
UNIT NOT PULLING EVEN	Coulter gangs uneven depth: adjust depth/rephase coulter gang cylinders. See "Hydraulic Coulter Gang Lift System" on page 4-4 .
UNEVEN DEPTH	Unit not level when under power in the field: level unit front to rear. See "Leveling (Front To Rear)" on page 4-5 . Excessive coulter gang depth or down pressure: reduce coulter depth. Tire pressure too low: check inflation. Unit not level front to rear: adjust unit to be level.
UNIT SIDE DRAFTS OR MOVES SIDE TO SIDE	Lift wheels not carrying enough weight: adjust depth stop and raise implement. Unit not level front to rear: adjust unit to be level.
SHANKS PLUGGING WITH RESIDUE	Unit not level: level machine. See "Leveling (Front To Rear)" on page 4-5 . Coulters not cutting residue: adjust coulter depth. Twisted shovels throwing soil wrong direction: Install shovels as shown in Figures 2-1 - 2-10 .
BACK ROW OF SHANKS PLUGGING WITH RESIDUE	Heavy residue: install optional offset shank mounts to stagger back row of shanks. See "Offset Shank Mount Installation" on page 3-22 .
SHANKS NOT PENETRATING	Unit not level: level unit front to rear. See "Leveling (Front To Rear)" on page 4-5 . Excessive coulter depth: reduce depth Points worn: install new points.
WHEEL BEARING FAILURE	Triple-lip seals not installed correctly: install seals with the lips pointing outward away from the hub.
HYDRAULIC - COULTER LIFT CYLINDERS NOT FULLY EXTENDING	Lift cylinders not in phase: fully extend cylinders and hold hydraulic lever until all cylinders are fully extended. Cylinders not installed in proper series: Wing cylinders are smaller diameter than center cylinders. Reinstall cylinders properly. Hoses not properly connected: check hose routing

HYDRAULIC - ENTIRE UNIT SETTLING

Depth stop valve not working: repair valve

COULTER GANG PLUGGING

Operating depth too deep: raise unit.

Conditions too wet: wait until conditions more favorable.

COULTER GANG WILL NOT TURN OR PUSHES SOIL

Depth set too deep for loose or wet conditions: raise implement or wait until conditions are more favorable.

Gang bearing failure: replace bearing

COULTER BLADES LOOSE AND/OR SHEARING ROLL PIN

Gang not tightened properly: retighten gang shafts to 1200-1500 ft-lbs. If gangs have ran loose, gangs may require disassembly to remove soil to properly torque gang shafts. Replace any worn components, shafts/spools, etc.

NOTES:
