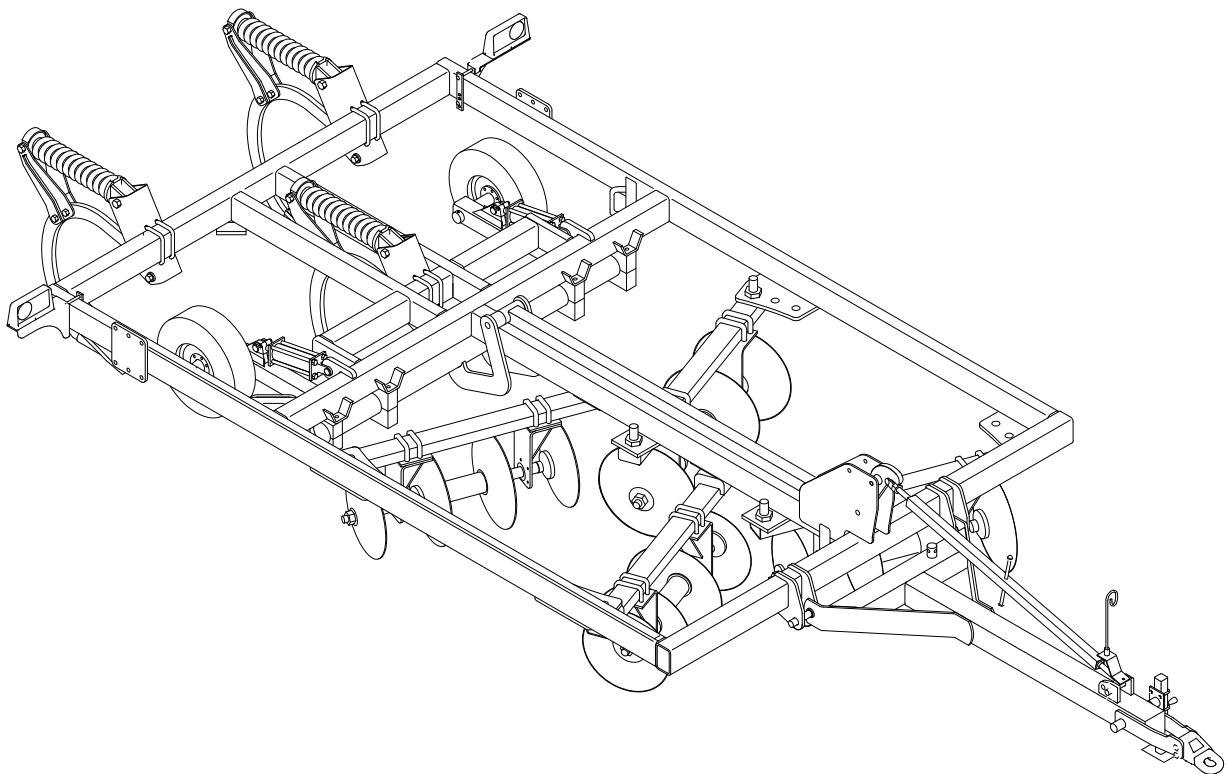




Model 2210 Series Weatherproofer I Operator's Manual



LANDOLL CORPORATION

1900 North Street
Marysville, Kansas 66508
(785) 562-5381

800-428-5655 ~ **WWW.LANDOLL.COM**

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Chapter 1

Introduction

The Landoll Model 2210 Series Weatherproofer I 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

CHAPTER 1	gives basic instructions on the use of this manual.
CHAPTER 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.
CHAPTER 3	contains assembly instructions for your Model 2210 Series Weatherproofer I . When these procedures are correctly followed, your equipment should provide you years of trouble-free operation and service.
CHAPTER 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: (888) 527-3909
CHAPTER 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. 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

INTRODUCTION

Understanding Safety Statements

You will find various types of safety information on the following pages and on the machine signs (decals) attached to the vehicle. This section explains their meaning.

The Safety Alert Symbol means ATTENTION! YOUR SAFETY IS INVOLVED!



DANGER

Danger means a life-threatening situation exists. Death can occur if safety measures or instructions on this label are not properly followed.



WARNING

Warning means serious injury or death can occur if safety measures or instructions on this label are not properly followed.



CAUTION

Caution means serious equipment or other property damage can occur if instructions on this label are not properly followed.

NOTE

Means that failure to follow these instructions could cause damage to the equipment or cause it to operate improperly.

NOTE

Make sure you read and understand the information contained in this manual and on the machine signs (decals) before you attempt to operate or maintain this vehicle.

The safety statements contained in this manual relate to the operation of the Model 2210 Series Weatherproofer I.

Chapter 2

Standard Specifications

2210 SERIES WEATHERPROOFER I W/ PARABOLIC SHANKS (1-1/8" X 3" x 37")					
MODEL NO.	WORKING WIDTH	NO. OF SHANKS	SHANK SPACING	NO. OF BLADES	ESTIMATED WEIGHT (LBS.)
2215-3-30	9'-0"	3	30"	16	5,399
2215-4-24	9'-0"	4	24"	16	5,638
2215-4-30	11'-4"	4	30"	20	5,842
2215-5-24	11'-4"	5	24"	20	6,081
2215-5-30	13'-8"	5	30"	24	6,685
2215-5-30D	13'-8"	5	30"	24	6,705
2215-6-30	16'-0"	6	30"	28	7,228
2217-5-30	14'-2"	5	30"	24	8,551
2217-6-30	16'-0"	6	30"	28	8,994
2217-7-24	16'-0"	7	24"	28	8,979
2217-7-30	18'-4"	7	30"	32	9,287
2217-9-24	18'-4"	9	24"	32	9,715
2217-8-30	20'-9"	8	30"	36	10,080

2210 SERIES WEATHERPROOFER I W/ STRAIGHT LEG SHANKS (1-1/4" X 3" x 37")					
MODEL NO.	WORKING WIDTH	NO. OF SHANKS	SHANK SPACING	NO. OF BLADES	ESTIMATED WEIGHT (LBS.)
2215-3-30	9'-0"	3	30"	16	5,700
2215-4-24	9'-0"	4	24"	16	6,038
2215-4-30	11'-4"	4	30"	20	6,242
2215-5-24	11'-4"	5	24"	20	6,581
2215-5-30	13'-8"	5	30"	24	7,185
2215-5-30D	13'-8"	5	30"	24	7,205
2215-6-30	16'-0"	6	30"	28	7,828
2217-5-30	14'-2"	5	30"	24	9,051
2217-6-30	16'-0"	6	30"	28	9,594
2217-7-24	16'-0"	7	24"	28	9,679
2217-7-30	18'-4"	7	30"	32	9,987
2217-9-24	18'-4"	9	24"	32	10,615
2217-8-30	20'-9"	8	30"	36	10,880

STANDARD SPECIFICATIONS

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]
1-3/4-5	736	[920]	1651	[2063]	2678	[3347]	1-3/4-12	920	[1150]	2063	[2579]	3347	[4183]

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

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.

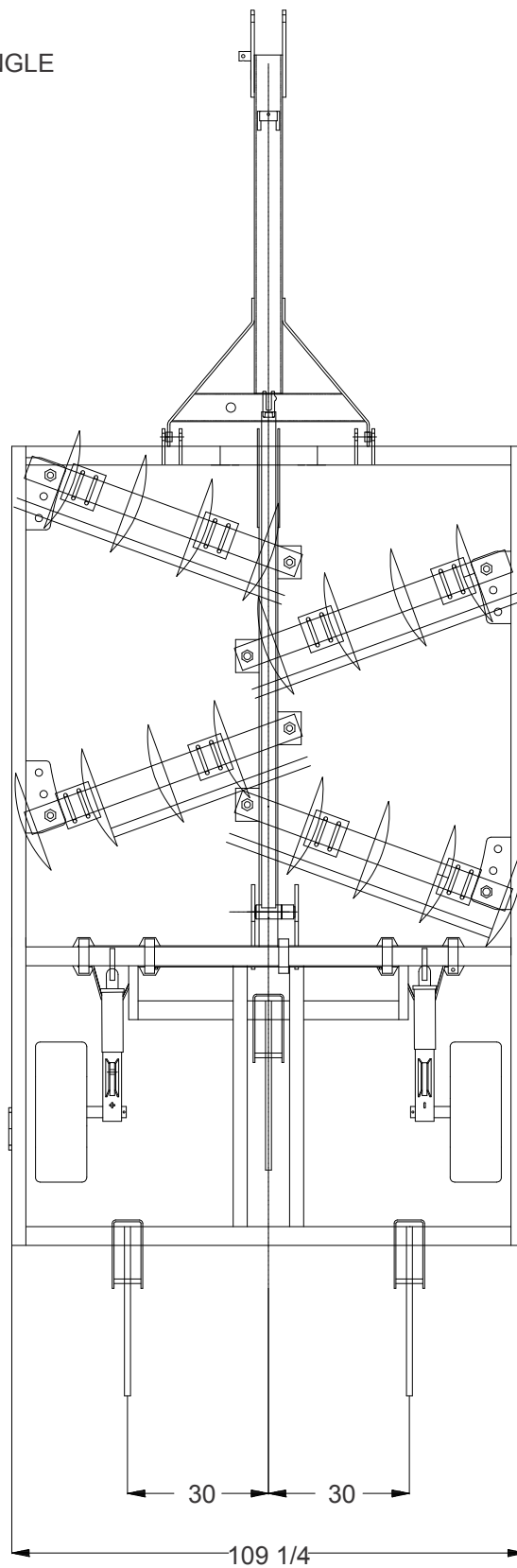
ASSEMBLY TORQUES APPLY TO PLATED CARBON STEEL AND STAINLESS STEEL FITTINGS ASSEMBLED WITHOUT SUPPLEMENTAL LUBRICATION (AS RECEIVED CONDITION). THEY DO NOT APPLY IF SPECIAL GRAPHITE MOLY-DISULFIDE OR OTHER EXTREME PRESSURE LUBRICANTS ARE USED. BRASS FITTINGS AND ADAPTERS - 65% OF THE TORQUE VALUE FOR 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
GATES BRAND FITTINGS			
Dash Size	37 Degree JIC	O-Ring (ORS)	O-Ring Boss (ORB)
-4	10-11	10-12	14-16
-5	13-15	—	—
-6	17-19	18-20	24-26
-8	34-38	32-40	37-44
-10	50-56	46-56	50-60
-12	70-78	65-80	75-83
-14	—	65-80	—
-16	94-104	92-105	111-125
-20	124-138	125-140	133-152
-24	156-173	150-180	156-184
-32	219-243	—	—
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

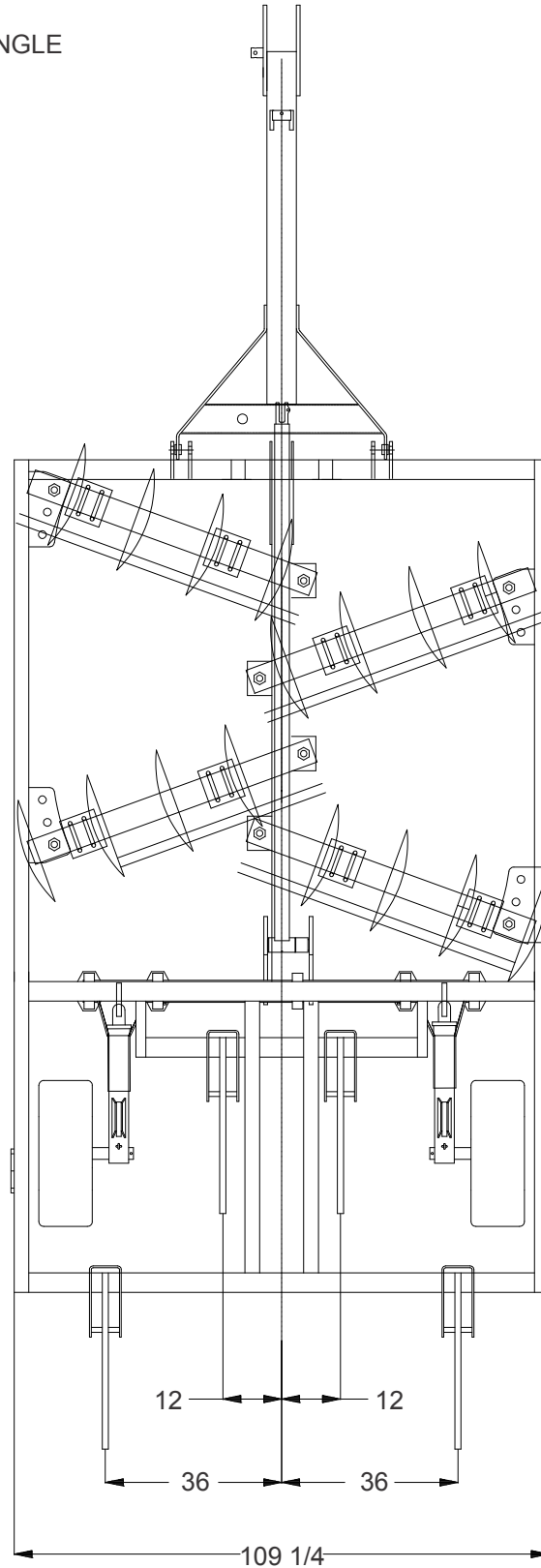
NOTE: DISC GANG ANGLE
SHOWN IS 20°.



2m410-010919

Figure 2-1: 2215-3-30 Shank Disc Spacing

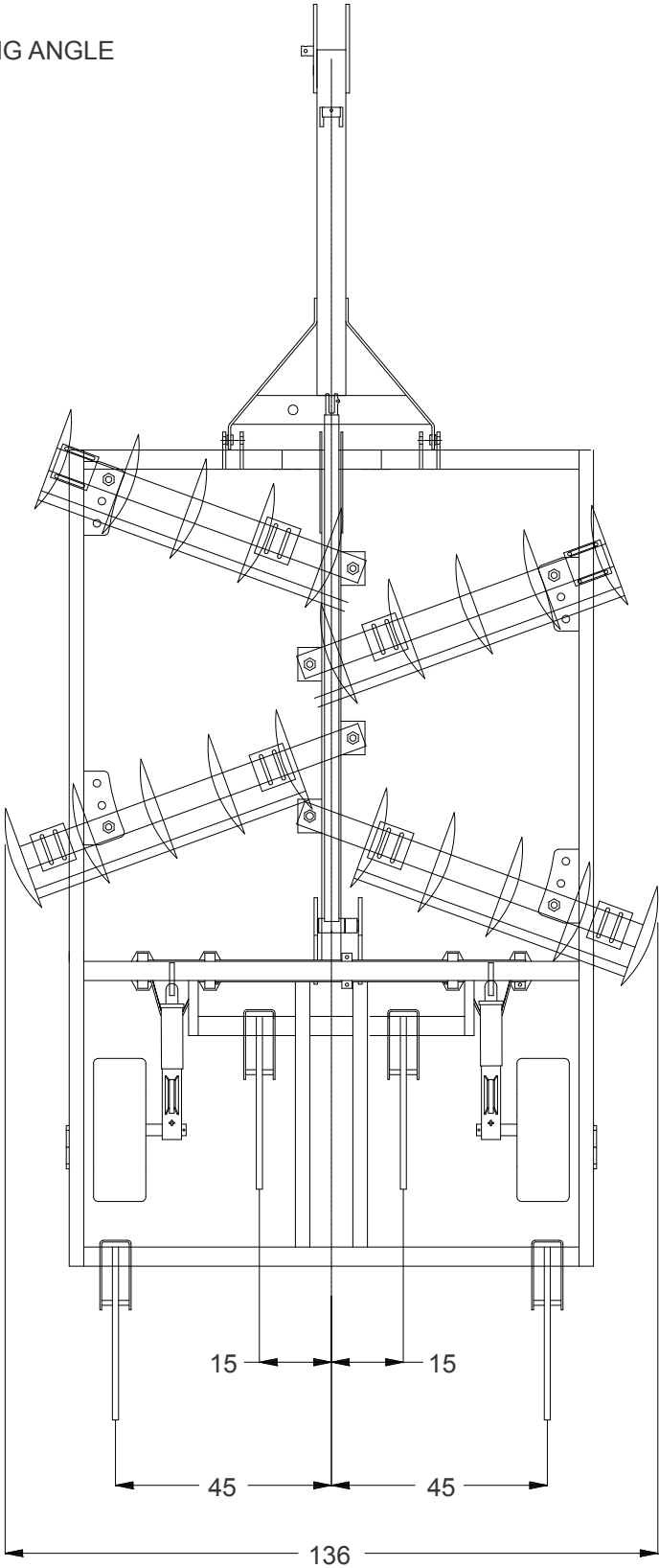
NOTE: DISC GANG ANGLE
SHOWN IS 20°.



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Figure 2-2: 2215-4-24 Shank Disc Spacing

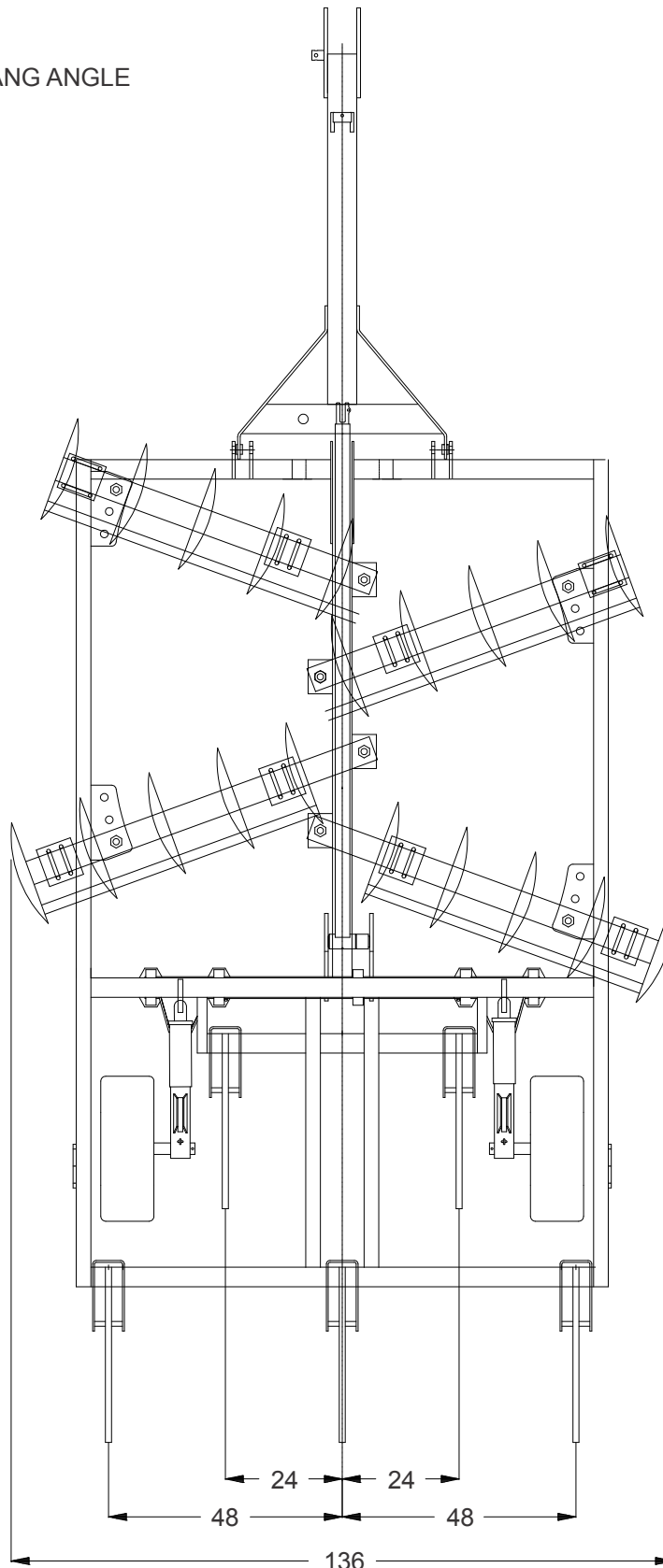
NOTE: DISC GANG ANGLE
SHOWN IS 20°.



2m410-010921

Figure 2-3: 2215-4-30 Shank Disc Spacing

NOTE: DISC GANG ANGLE
SHOWN IS 20°.



2m410-010922

Figure 2-4: 2215-5-24 Shank Disc Spacing

NOTE: DISC GANG ANGLE
SHOWN IS 20°.

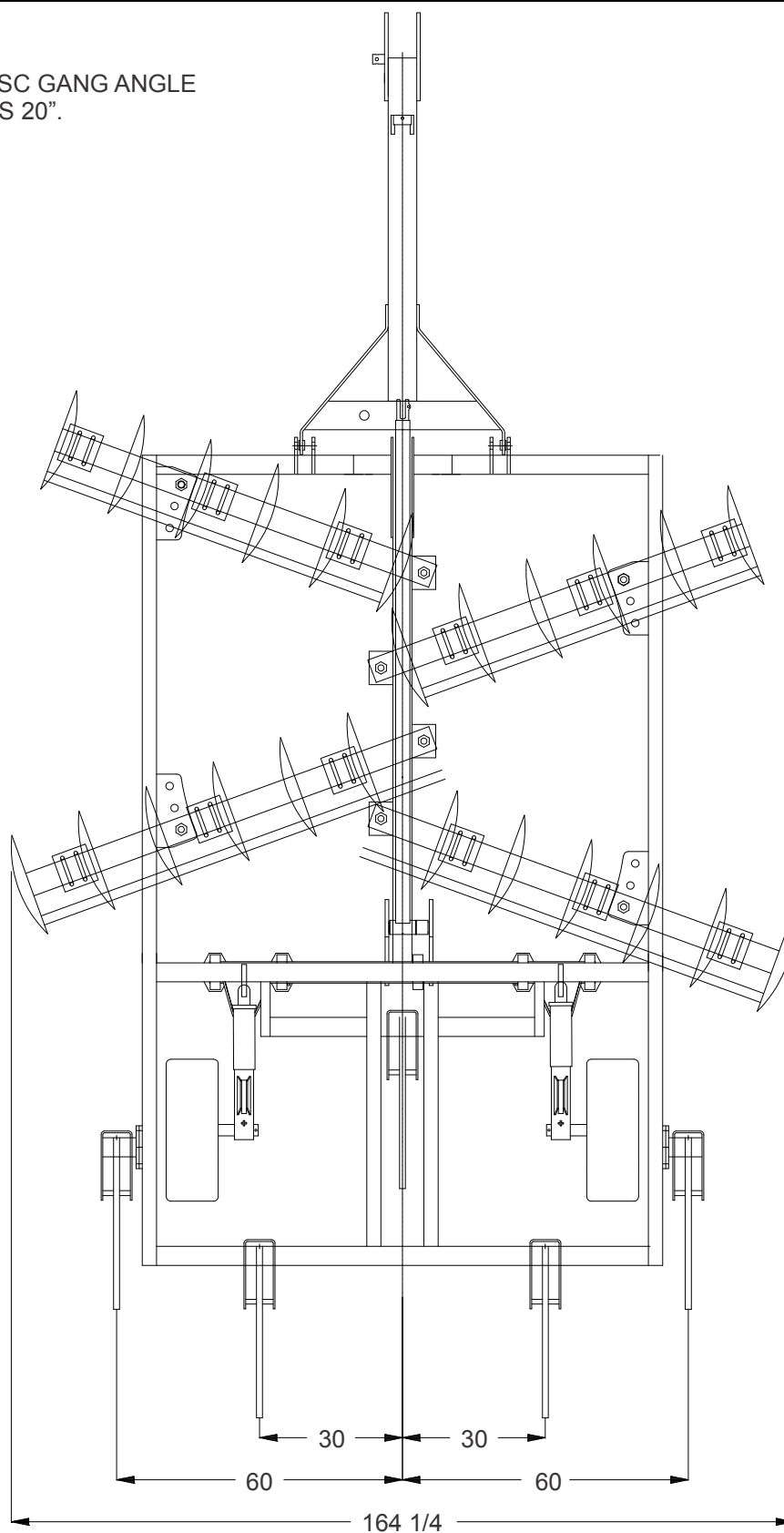
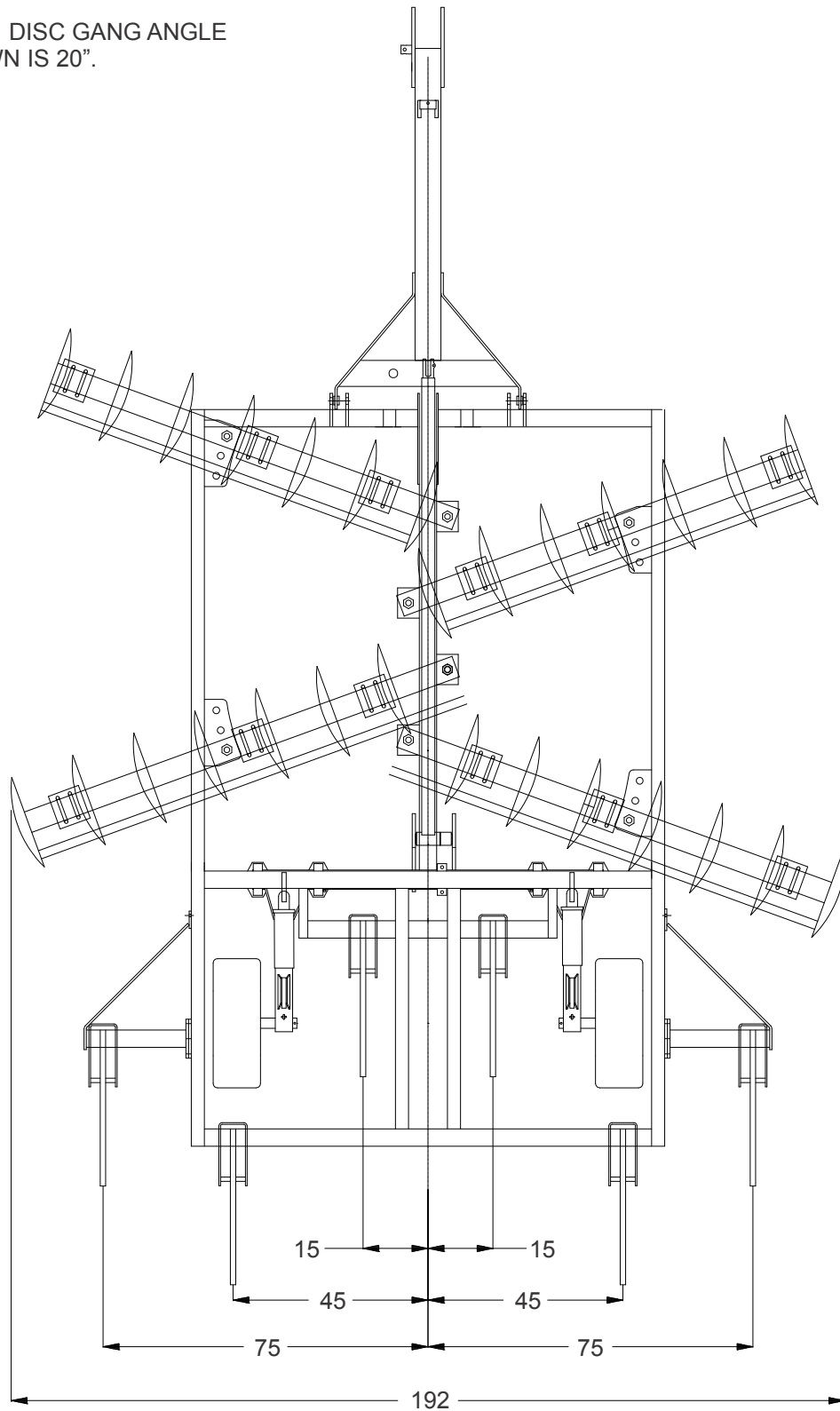


Figure 2-5: 2215-5-30 Shank Disc Spacing

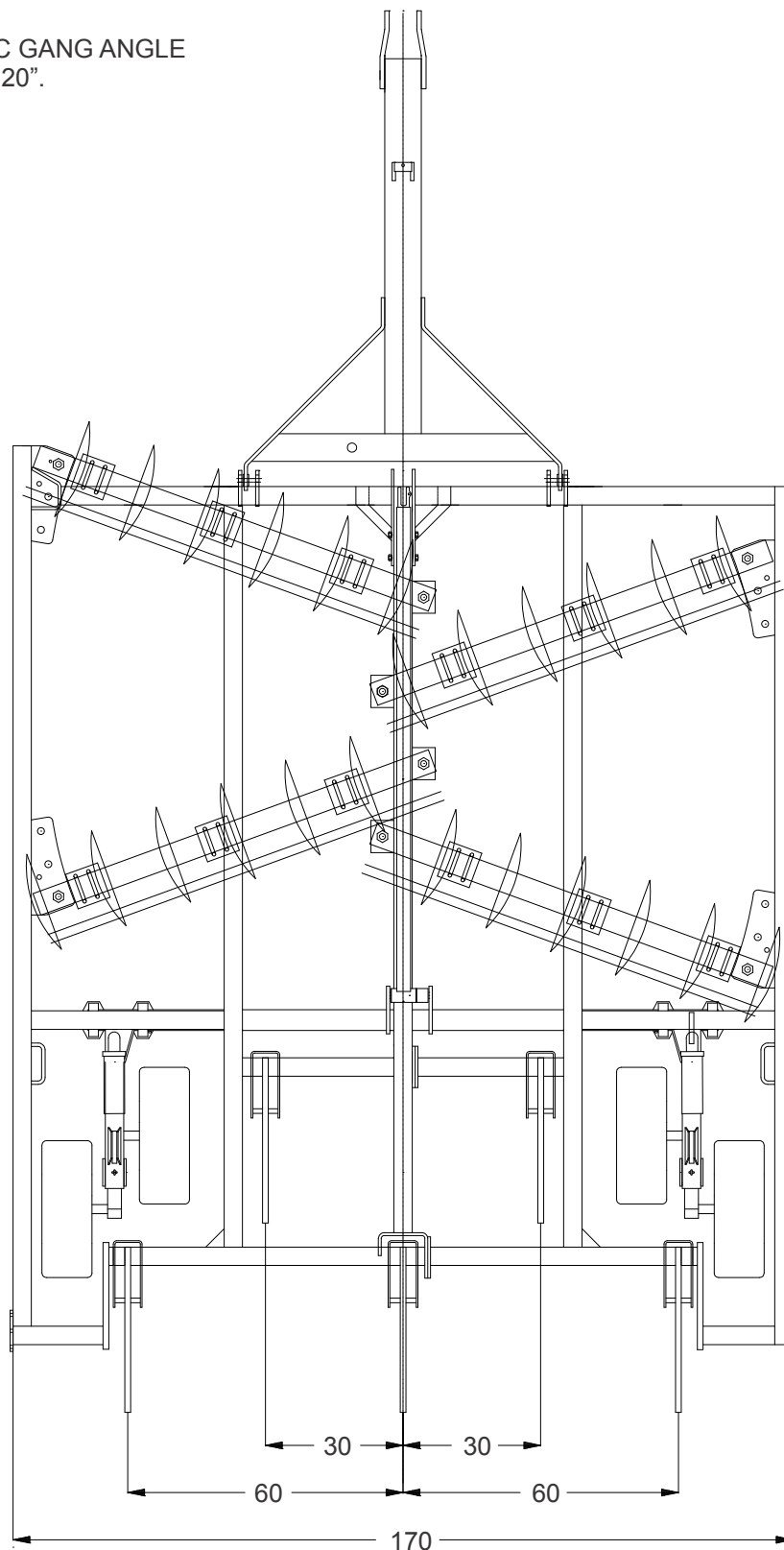
NOTE: DISC GANG ANGLE
SHOWN IS 20°.



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Figure 2-6: 2215-6-30 Shank Disc Spacing

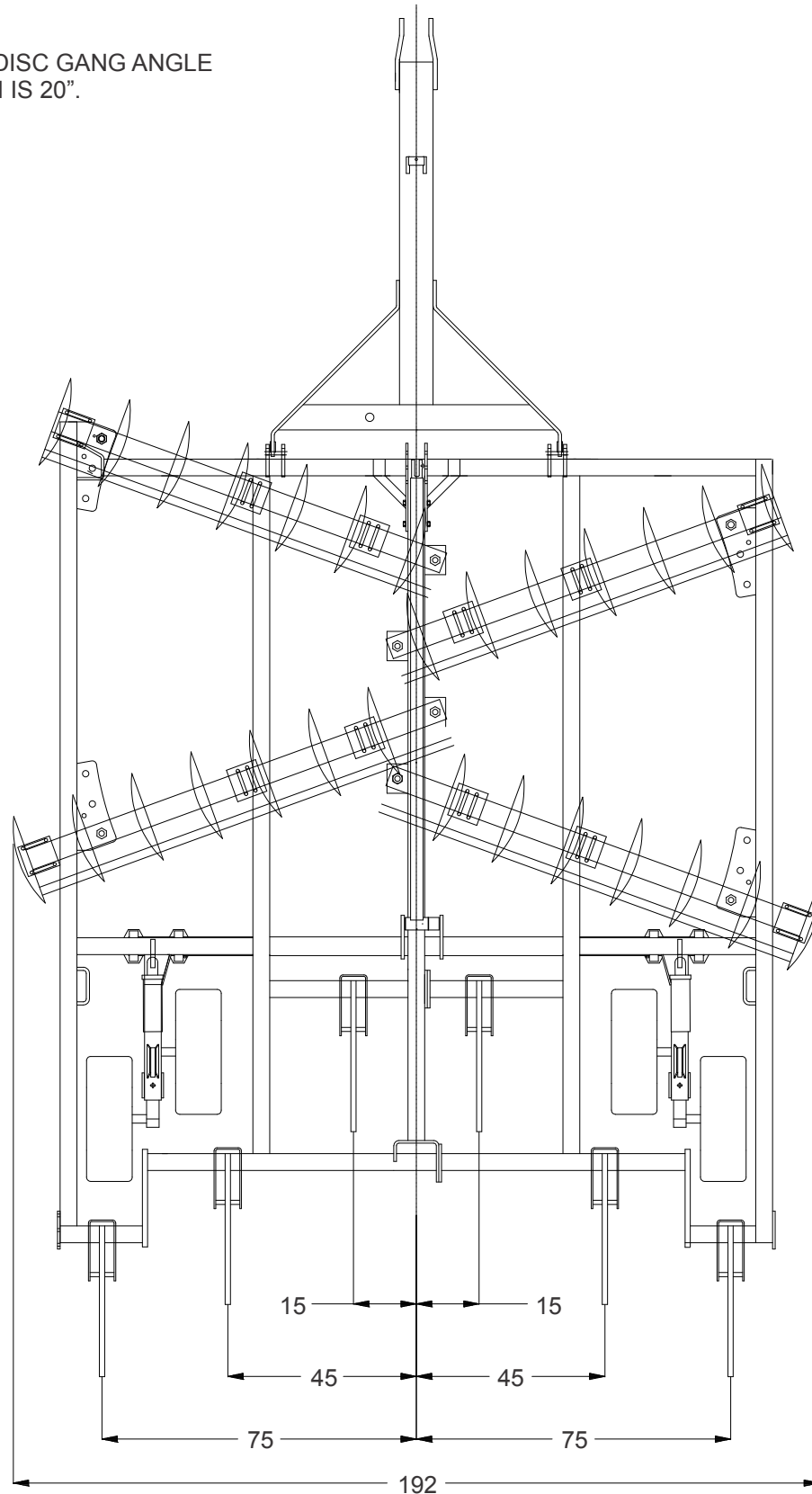
NOTE: DISC GANG ANGLE
SHOWN IS 20°.



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Figure 2-7: 2217-5-30 Shank Disc Spacing

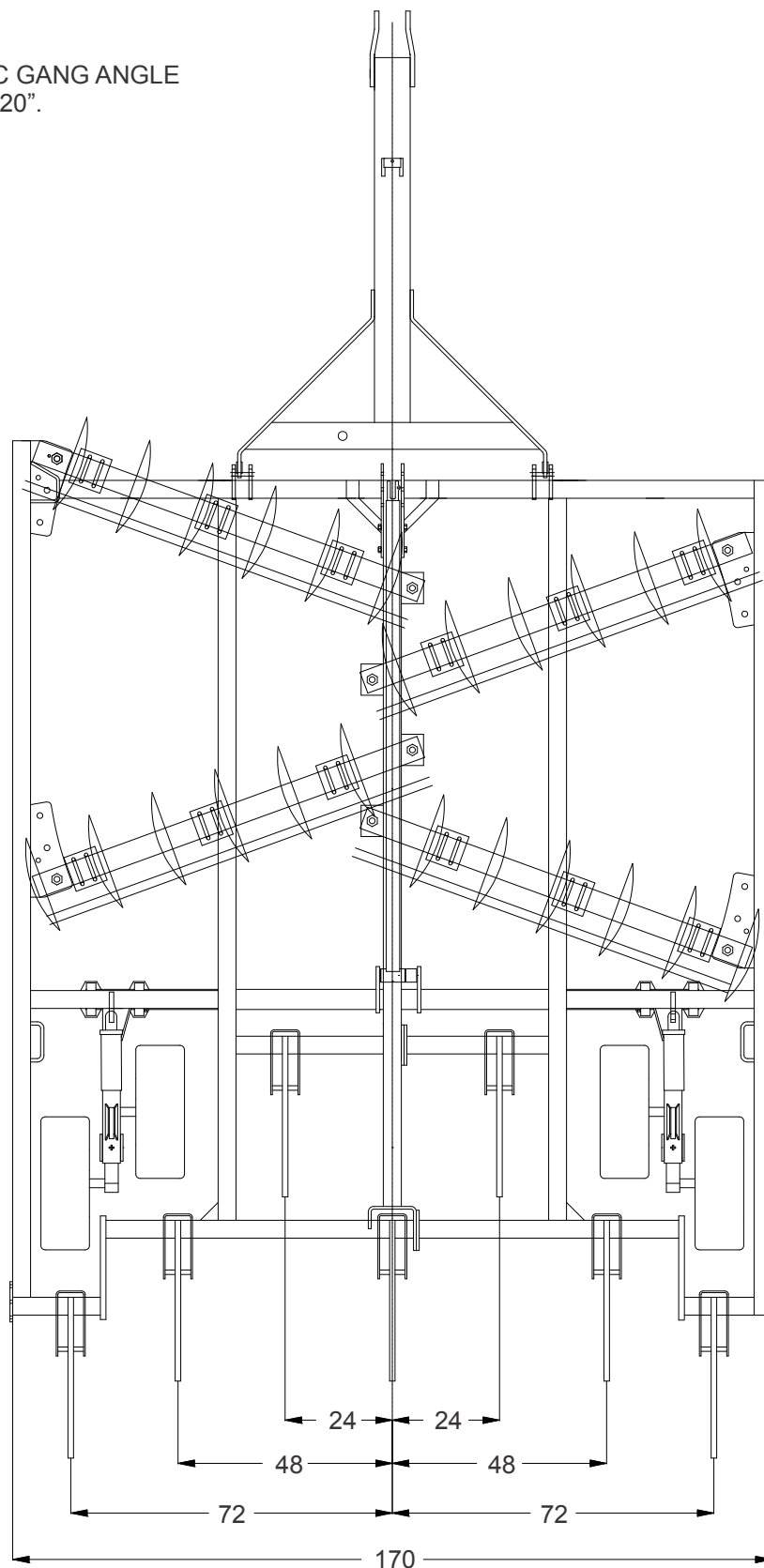
NOTE: DISC GANG ANGLE
SHOWN IS 20°.



2m410-010296

Figure 2-8: 2217-6-30 Shank Disc Spacing

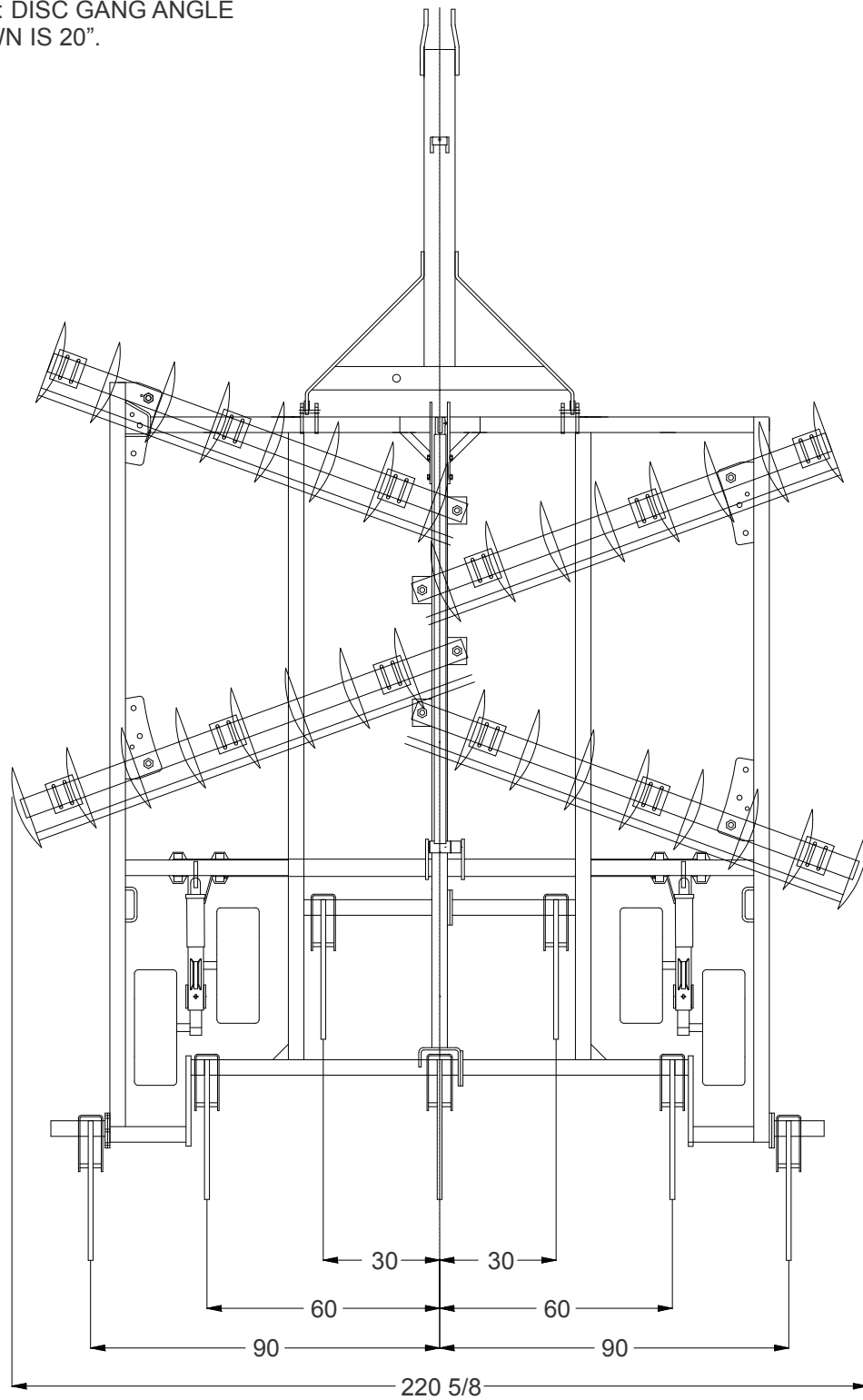
NOTE: DISC GANG ANGLE
SHOWN IS 20°.



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Figure 2-9: 2217-7-24 Shank Disc Spacing

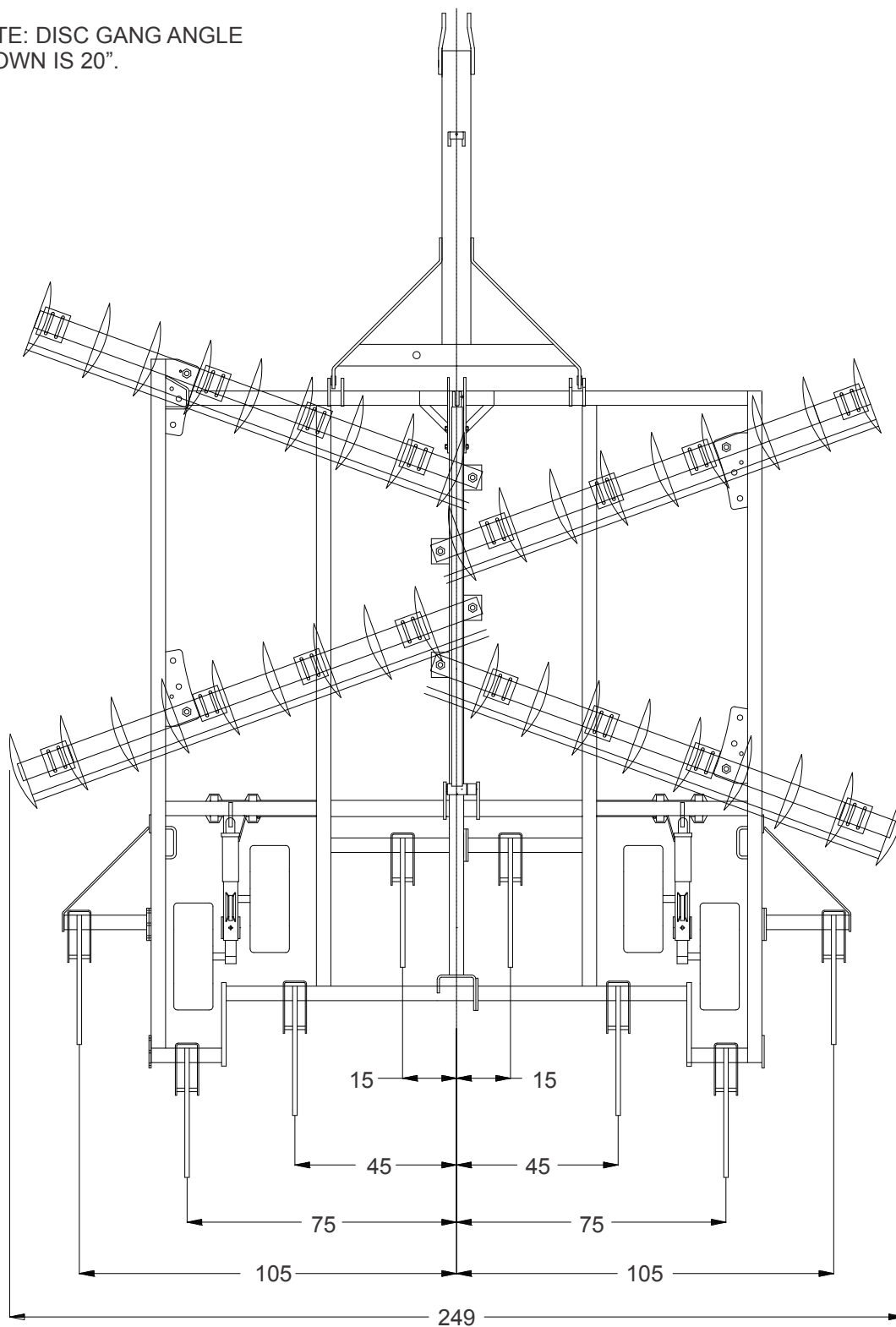
NOTE: DISC GANG ANGLE
SHOWN IS 20°.



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Figure 2-10: 2217-7-30 Shank Disc Spacing

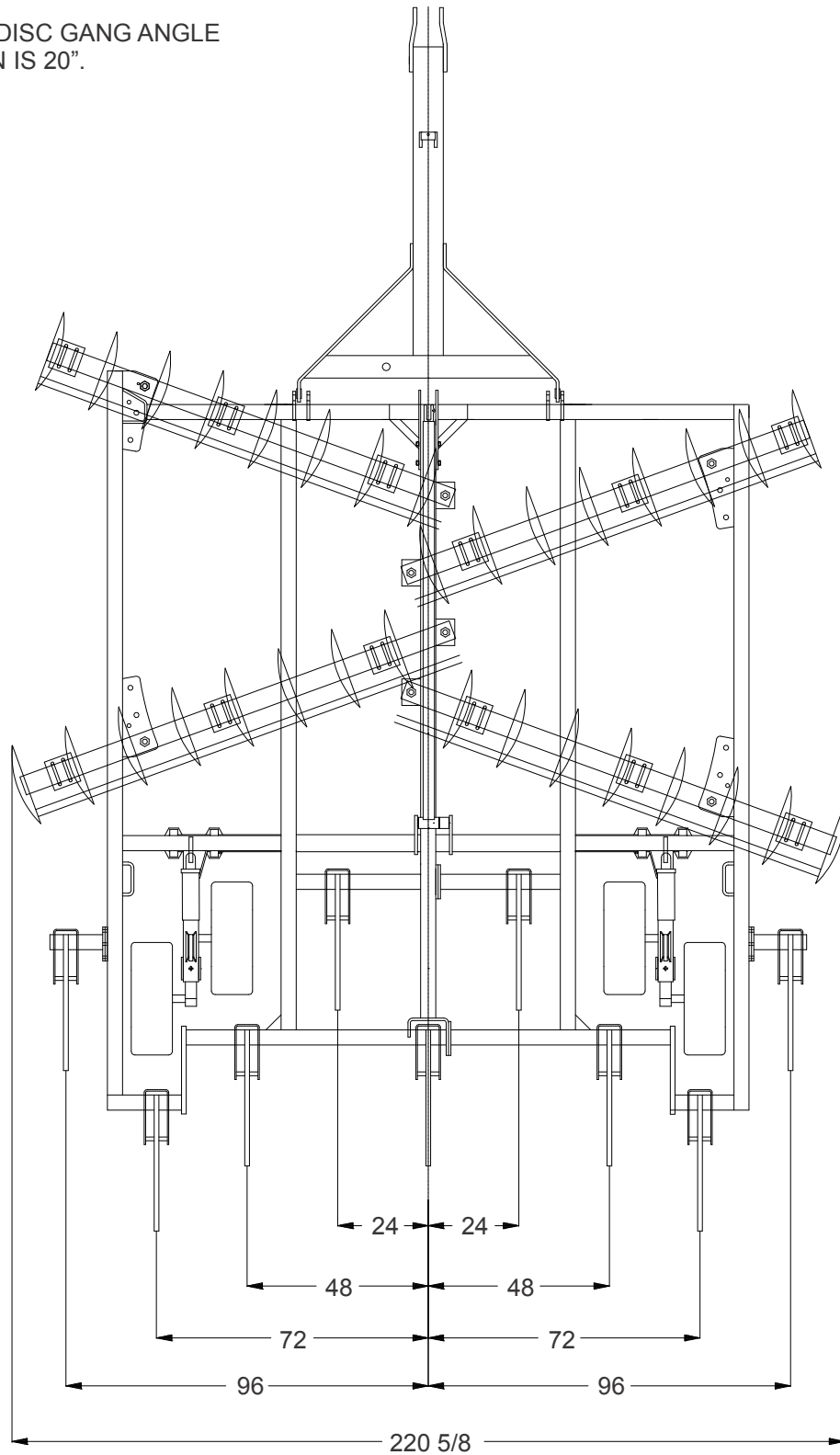
NOTE: DISC GANG ANGLE
SHOWN IS 20°.



2m410-010930

Figure 2-11: 2217-8-30 Shank Disc Spacing

NOTE: DISC GANG ANGLE
SHOWN IS 20°.



2m410-010929

Figure 2-12: 2217-9-24 Shank Disc Spacing

Notes:

Chapter 3

Assembly Procedures

It is very important that your new 2210 Series Weatherproofer be properly assembled, adjusted, and lubricated before use. Illustrations to assist with the assembly process are provided in “**Standard Specifications**” on page 2-1. Illustrations are provided in this section to show proper shank, disc gang, and mounting bracket spacings. Remove paint from grease fittings and replace any that are damaged or missing. Be sure to replace bolts, clips, etc. in the same place from where they were removed.

To insure assemblies are aligned, **insert all bolts and leave the nuts loose until completion of final assembly.** Use lockwashers or flat washers where called for. Spread all cotter pins.

After completion of final assembly, tighten all nuts **evenly** to prevent misalignment, distortion, or binding. Tighten all bolts and nuts to the recommended torques shown in “**General Torque Specifications**” on page 2-2.



DANGER

Disc blades are extremely sharp. Exercise extreme care when working on or near disc blades. Do not allow discs to roll over or fall onto any bodily part. Do not allow wrenches to slip when working near disc blades. Never push wrenches toward disc blades. Do not climb over machine above disc blades. Failure to stay clear of disc blade edges can cause serious personal injury or death.



WARNING

Do not attempt to lift heavy parts (such as the frame, disc gangs, rock shaft, and pull hitch) manually. Use a hoist or a fork lift 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 depth stops are equal lengths on all cylinders. Using unequal depth stop lengths can cause permanent equipment damage.



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.

ASSEMBLY PROCEDURES

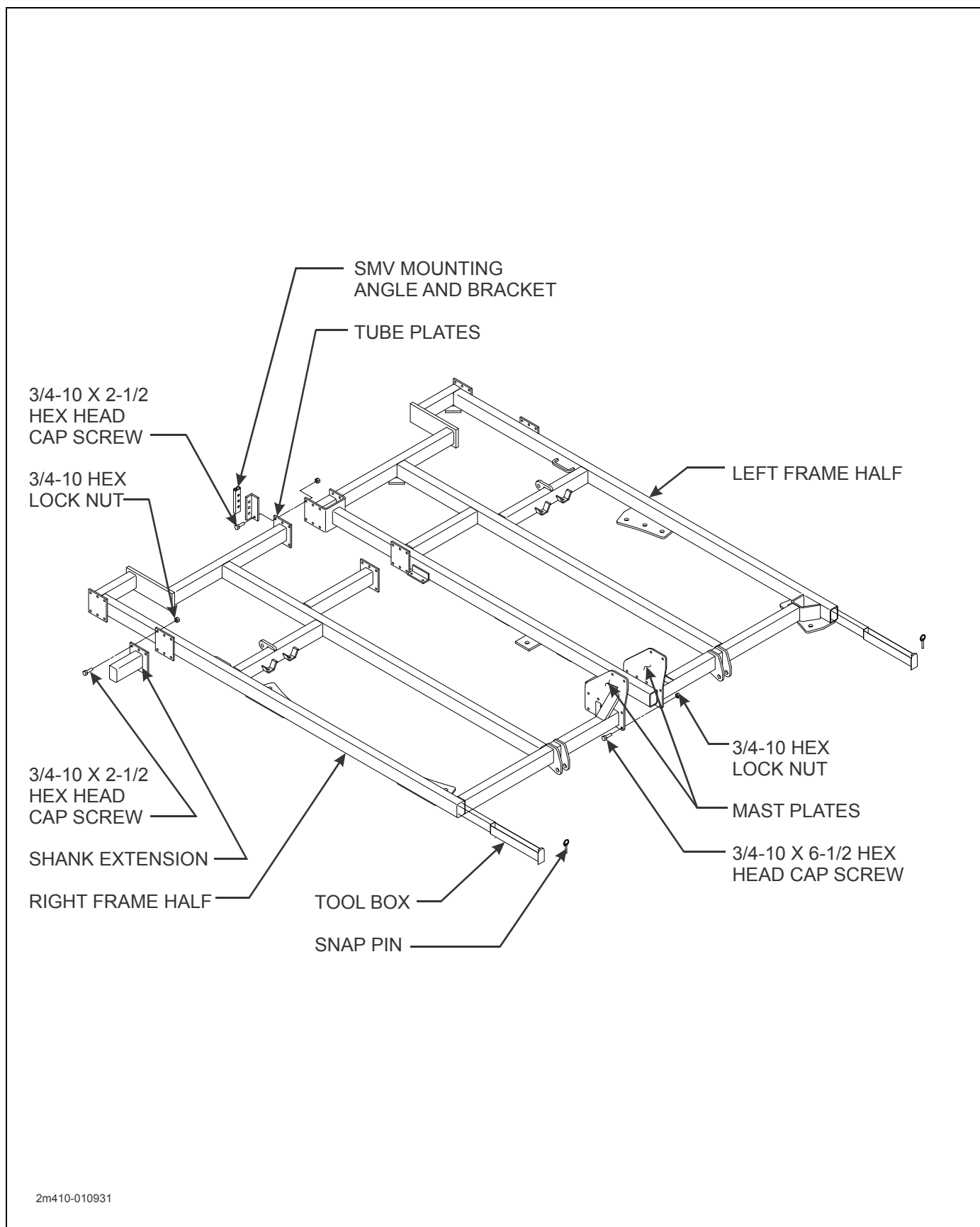


Figure 3-1: 2217 Frame Assembly

2215 Frame Assembly

No assembly is needed for the 2215 frame. However, it needs to be placed on stands about 36" high in an open, level area. If your 2210 Series Weatherproofer is equipped with frame extensions, see **steps 4 and 5** on this page for their proper installation procedures. **Step 6** describes proper installation of tool boxes.

2217 Frame Assembly

IMPORTANT

Read all safety precautions at the front of this section before attempting any of the following procedures.

IMPORTANT

See Figure 3-1 for part names.

1. Place both frame halves on stands about 36" high in an open, level area.
 - a. Use 3/4-10 x 2-1/2 hex head cap screws and 3/4-10 hex lock nuts in the tube plates.
 - b. Use 3/4-10 x 6-1/2 hex head cap screws with hex lock nuts in the mast plates.
 - c. Install bushing on rear top mast cap screw and bushing with front leveler link on front top cap screw.

IMPORTANT

Long arm of leveler should be down with grease zerk facing forward (See Figure 3-7.)



CAUTION

Front leveling linkage must be installed on front mast plate bolt or damage will occur during operation.

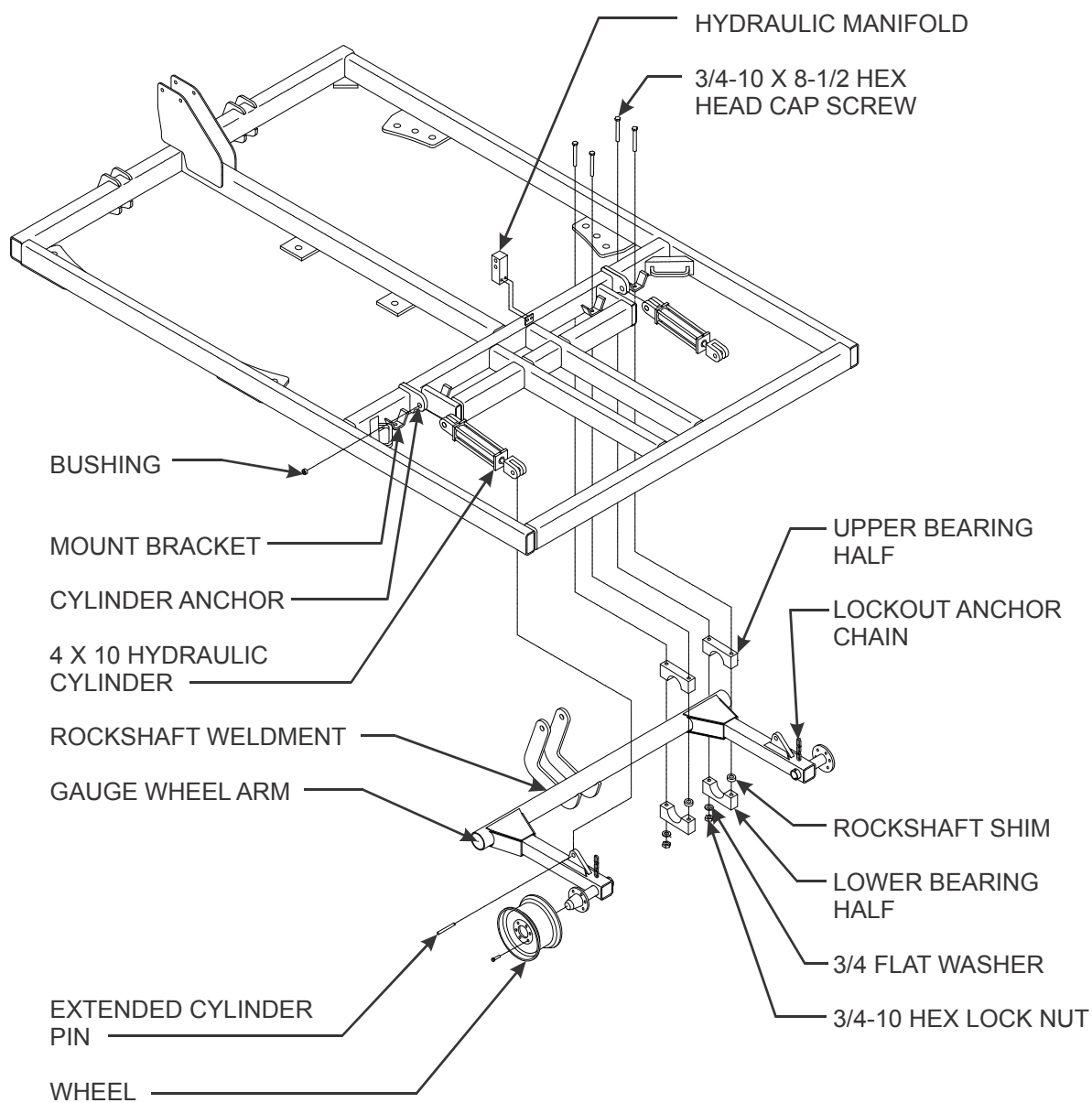
- d. Bolt the two halves together. Leave all bolts loose, initially.

2. Level the frame halves.
3. Tighten all connecting bolts to the torques listed in **Table 2-1**.

IMPORTANT

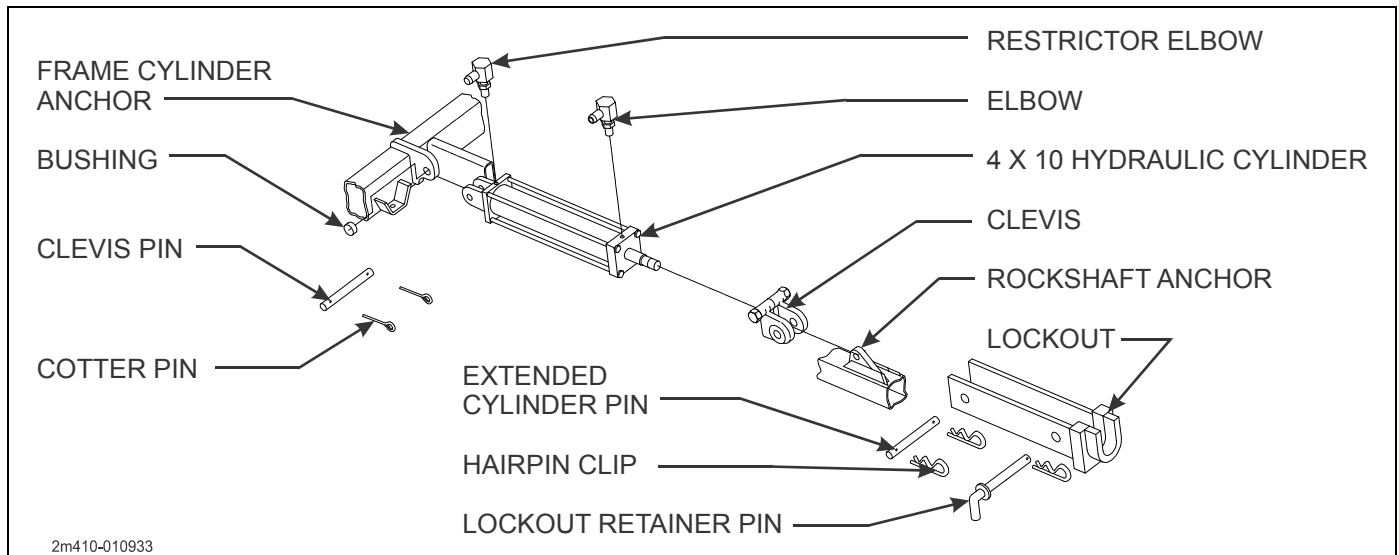
Be sure to tighten the top and bottom bolts equally.

4. Mark the spacing for shank mounts on the tool bars. **See Figures 2-1 through 2-12** for their proper locations.
5. **FRAME EXTENSIONS:** If your 2210 Series Weatherproofer needs frame extensions to add extra shanks:
 - a. Install the extensions by securing them to the plates provided on the sides of the frames. Use 3/4-10 x 2-1/2 hex head cap screws and hex lock nuts to secure the plates.
 - b. Secure the braces on the long frame extensions to the frame with U-bolts and hex lock nuts.
6. **TOOL BOXES:** Insert tool boxes into the exposed front corners of the frame tubing. Secure them in a closed position using a snap pin.



2m410-010932

Figure 3-2: 2215 Rockshaft Installation

**Figure 3-3: 2215 Gauge Wheel Cylinder Installation**

2215 Rockshaft Installation

IMPORTANT

1. Read all safety precautions at the front of the section before attempting any of the following procedures.
2. See Figures 3-2 and 3-3 for part names.
1. Position the rockshaft under the gauge wheel mounting brackets.

IMPORTANT

The gauge wheel arms should point to the rear of the machine with the cylinder anchors facing up.

2. Install the upper bearings.
 - a. Slip the 3/4-10 X 8-1/2 hex head cap screws through the holes provided for them in the mounting brackets.
 - b. Place the upper bearing halves (with the grease zerk in the side) on top of the rockshaft. There are five bearing assemblies on the rockshaft.

IMPORTANT

Be sure to install the fifth bearing in the center, to its proper mounting bracket.

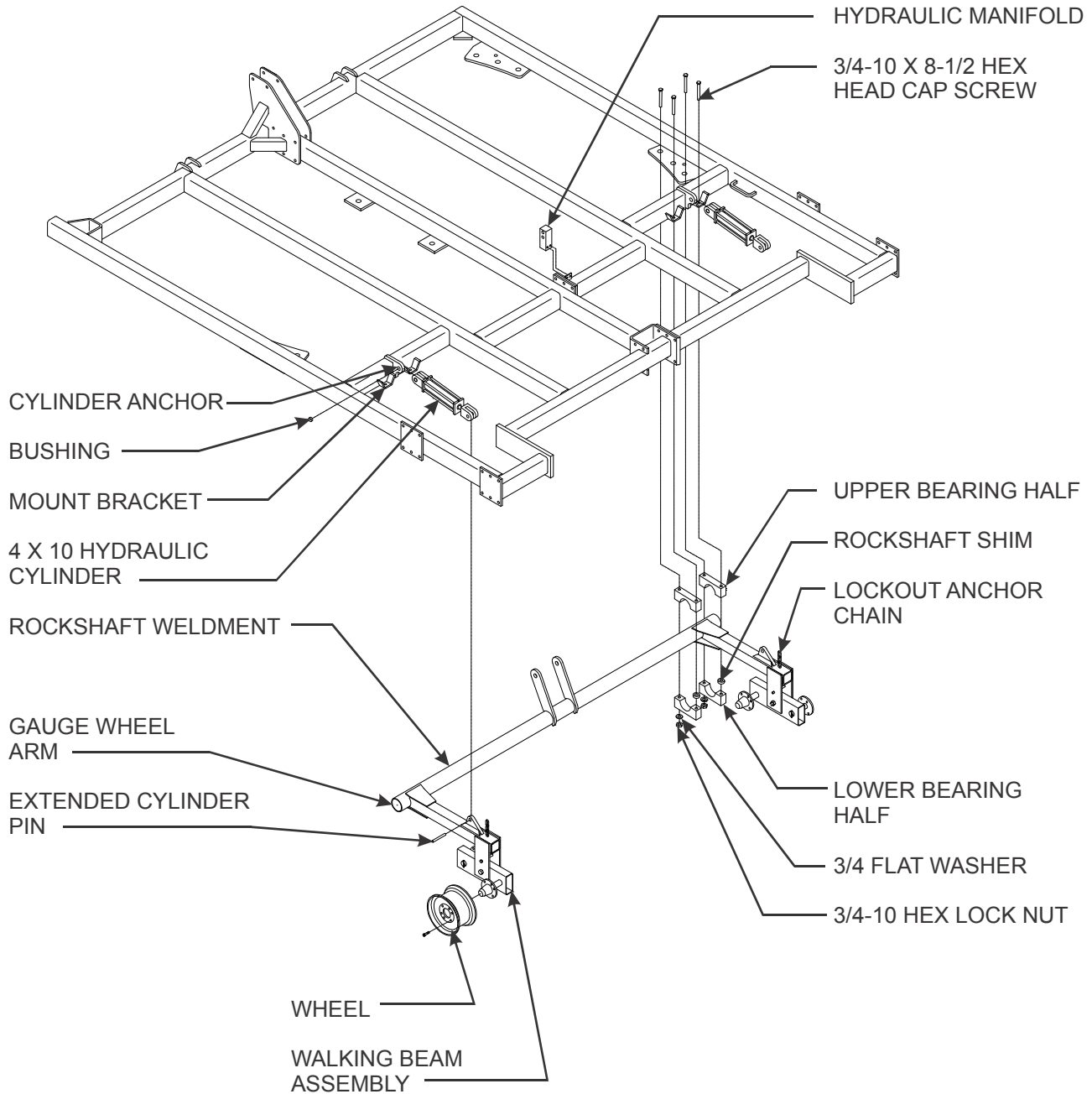
- c. Use a hoist or forklift to raise the rockshaft. Use the hex head cap screws to guide the rockshaft and top bearing halves into place.
3. Set a lower bearing half (with a grease zerk between the bolt holes) under the rockshaft and through the hanging ends of the hex head cap screws.

4. Secure each set of bearings tight enough to the rockshaft to hold the assembly together. Use the washers and hex lock nuts provided.
5. Insert the rockshaft shims, as needed, between each set of bearings. Use the shims to allow the rockshaft to rotate freely, yet not loosely, in the bearing halves. Repeat this step for each set of bearings. Then tighten the hex head cap screws.
6. Mount the tires on the wheel rims and assemble 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.

IMPORTANT

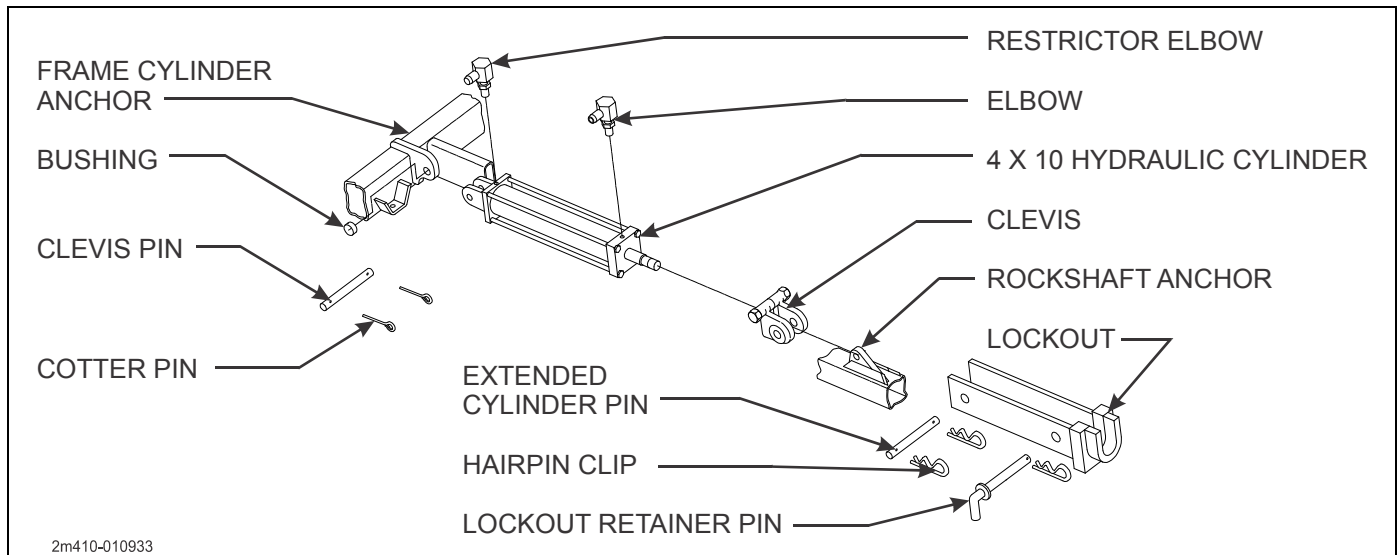
An 11L X 15" farm service tire should be used on the 15" x 8" rim. Inflate the tire to its manufacturer's recommended pressure.

7. Install the base end of the gauge wheel cylinders on the frame cylinder anchors. Face the rod end down, towards the gauge wheel, and face the ports upwards (**See Figure 3-3.**) Secure each cylinder to the cylinder anchor with the clevis pins and cotter pins supplied with the cylinder.
8. Position the lockout assemblies above the gauge wheel arms and the rod ends of the cylinders (**See Figures 3-2 and 3-3.**) The open end of the lockouts should be over the gauge wheel arms with the U-shaped cutout on the opposite end facing upwards.
9. Insert the extended cylinder pin through the lockout assembly, the cylinder clevis and the gauge wheel arm bracket (**See Figure 3-3.**) Secure with hairpin clips.



2m410-010934

Figure 3-4: 2217 Rockshaft Installation

**Figure 3-5: 2217 Gauge Wheel Cylinder Installation**

2217 Rockshaft Installation

IMPORTANT

1. Read all safety precautions at the front of the section before attempting any of the following procedures.
2. See Figures 3-4 and 3-5 for part names.

1. Position the rockshaft under the gauge wheel mounting brackets.

IMPORTANT

The gauge wheel arms should point to the rear of the machine with the cylinder anchors facing up.

2. Install the upper bearings.
 - a. Slip the 3/4-10 X 8-1/2 hex head cap screws through the holes provided for them in the mounting brackets.
 - b. Place the upper bearing halves (with the grease zerk in the side) on top of the rockshaft. There are five bearing assemblies on the rockshaft.
 - c. Use a hoist or forklift to raise the rockshaft. Use the hex head cap screws to guide the rockshaft and top bearing halves into place.
3. Set a lower bearing half (with a grease zerk between the bolt holes) under the rockshaft and through the hanging ends of the hex head cap screws.
4. Secure each set of bearings tight enough to the rockshaft to hold the assembly together. Use the washers and hex lock nuts provided.

5. Insert the rockshaft shims, as needed, between each set of bearings. Use the shims to allow the rockshaft to rotate freely, yet not loosely, in the bearing halves. Repeat this step for each set of bearings. Then tighten the hex head cap screws.
6. Mount the tires on the wheel rims and assemble 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.

IMPORTANT

An 11L X 15" farm service tire should be used on the 15" x 8" rim. Inflate the tire to its manufacturer's recommended pressure.

7. Install the base end of the gauge wheel cylinders on the frame cylinder anchors. Face the rod end down, towards the gauge wheel, and face the ports upwards (**See Figure 3-5.**) Secure each cylinder to the cylinder anchor with the clevis pins and cotter pins supplied with the cylinder.
8. Position the lockout assemblies above the gauge wheel arms and the rod ends of the cylinders (**See Figures 3-4 and 3-5.**) The open end of the lockouts should be over the gauge wheel arms with the U-shaped cutout on the opposite end facing upwards.
9. Insert the extended cylinder pin through the lockout assembly, the cylinder clevis and the gauge wheel arm bracket (**See Figure 3-5.**) Secure with hairpin clips.

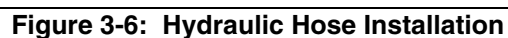


Table 3-1: Model 2215/2217 Gauge Wheel Hydraulic Part Numbers

Gauge Wheel Hydraulic Plumbing Installation

IMPORTANT

1. Pipe sealant is not required to install hoses to manifold and cylinders equipped with hydraulic O-ring fittings.
2. In the following procedure, left- and right-hand are determined standing at the back of the machine, looking toward the front.
3. In the steps below, refer to Table 3-1 for hose part numbers and to Figure 3-6 to insure proper location of each hose during installation.
4. Owner of tractor is required to supply some of the parts in this procedure for its proper completion. Please read through this procedure before installing hoses.
1. Install the hydraulic manifold on the frame and secure with 1/2-13 x 3-1/2 hex head cap screws and hex lock nuts. The manifold mount is at the center of the frame above the rockshaft (**See Figures 3-2 and 3-4.**)
2. Install a 90° elbow to both rear ports on the hydraulic manifold.
3. Install a 90° unrestricted fitting to the **rod end** ports of both gauge wheel cylinders.

4. Install a 90° restrictor fitting to the **base end** ports of both cylinders.



CAUTION

Improper installation of restrictor fittings will cause failure of rockshaft.

5. Install the hoses to the cylinders and manifolds as shown in **Figure 3-6 and Table 3-1.**
6. Couplers for the 1/2" coupling hoses on the tractor end must be supplied by the owner to match the tractor.



CAUTION

Improper restraint of cylinder hoses can cause them to get tangled in the machine during operation.

7. Secure all four cylinder hoses to the frame, using the plastic tie wraps, sufficient enough to eliminate slack.

ASSEMBLY PROCEDURES

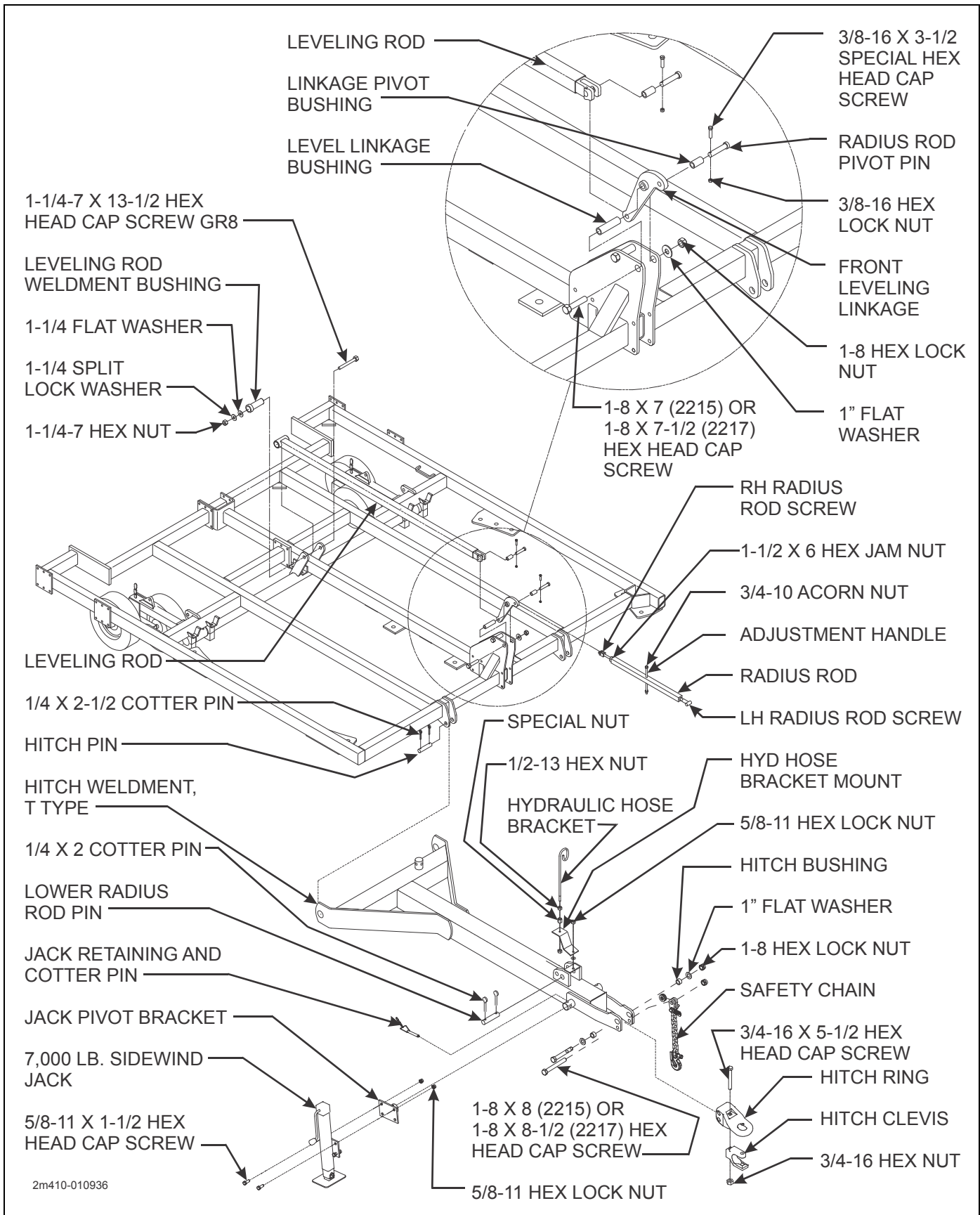


Figure 3-7: Pull Hitch Installation

Pull Hitch Installation

IMPORTANT

Read all safety precautions at the front of this section before attempting any of the following procedures.

IMPORTANT

1. See Figure 3-7 for part names.
2. In the following procedure, left- and right-hand are determined standing at the back of the machine, looking toward the front.
1. Use the pivot pin to attach the clevis end of the leveling rod to the long end of the front leveling linkage. Secure this with a 3/8-16 x 3-1/2 special hex head cap screw and hex lock nut.

IMPORTANT

The front leveling linkage should also have its long end facing down and angled back.

2. Slide the pivot bushing into the sleeve end of the leveling rod. Place the pivot bushing and leveling rod between the leveling arms on the rockshaft and secure with the 1-1/4-7 x 13-1/2 hex head cap screw (insert through the left side on the 2215 and the right side on the 2217), flat washer, split lock washer, and hex nut. Install a grease zerk in the sleeve end of the leveling rod and grease.

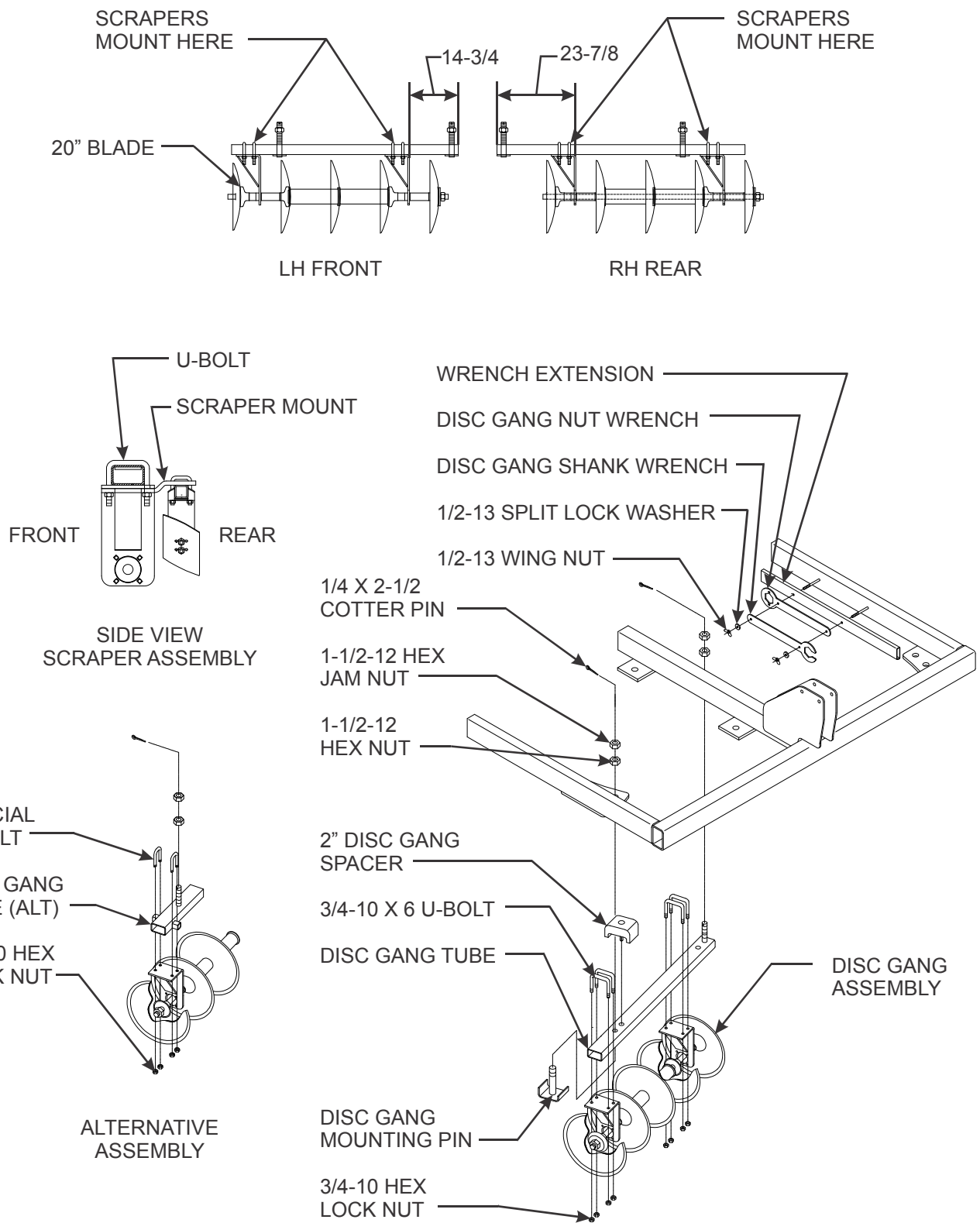


CAUTION

Install leveling rod so that keeper hole on clevis is on right side of machine. This gives the most clearance between the mast and clevis.

3. Install the pull hitch to the mainframe mounting brackets. Use two hitch pins and secure with 1/4 x 2-1/2 cotter pins.
4. Attach the clevis end of the radius rod to the top hole of the leveler linkage (short end). Secure the radius rod with the radius rod pin and 3/8-16 x 3-1/2 special hex head cap screw and hex lock nut.
5. Attach the sleeve end of the radius rod to the lower radius rod pin hitch with the front hitch pin and 1/4 x 2-1/2 cotter pins.
6. Hook up the coupling hoses to a tractor. Bleed the hydraulic system of all air in the lines or cylinders, as follows:
 - a. Disconnect the rod ends of the gauge wheel cylinders from the anchors on the rockshaft. Raise the ends until they are higher than the base end of the cylinders.
 - b. Fully extend and retract the cylinders at least twice to work the air out of the system.
 - c. Reinstall the rod ends of the gauge wheel cylinders. Cycle the cylinders at least twice to work the air out of the pressure side of the system.
7. Raise the machine to fully extend the cylinders, and to lock the cylinders on with the cylinder lockouts. Secure the lockouts with the lockout pins (**See Figure 3-3.**)

ASSEMBLY PROCEDURES



2m410-010937

Figure 3-8: Rigid Riser Disc Gang Installation

Standard Rigid Riser Disc Gang Installation



DANGER

Disc blades are extremely sharp. Exercise extreme care when working on or near disc blades. Do not allow discs to roll over or fall onto any bodily part. Do not allow wrenches to slip when working near disc blades. Never push wrenches toward disc blades. Do not climb over machine above disc blades. Failure to stay clear of disc blade edges can cause serious personal injury or death.

IMPORTANT

1. Read all safety precautions at the front of this section before attempting any of the following procedures.
2. See Figure 3-8 for part names.
1. Disc gangs are partly assembled at the factory. Some assembly is needed before installing on the frame. A special wrench is used to tighten 1-1/2-12 nuts on the disc gangs.
2. Insert the disc gang mounting pins into the disc gang tubes (2 per tube). Secure each disc gang mounting pin with a hex nut to the disc gang tube.
3. Assemble the disc gang tubes to the disc gang using two u-bolts, and nuts at each disc bearing mount.
 - a. The two shorter tubes are for the front disc gangs.
 - b. The two longer tubes are for the rear disc gangs.

IMPORTANT

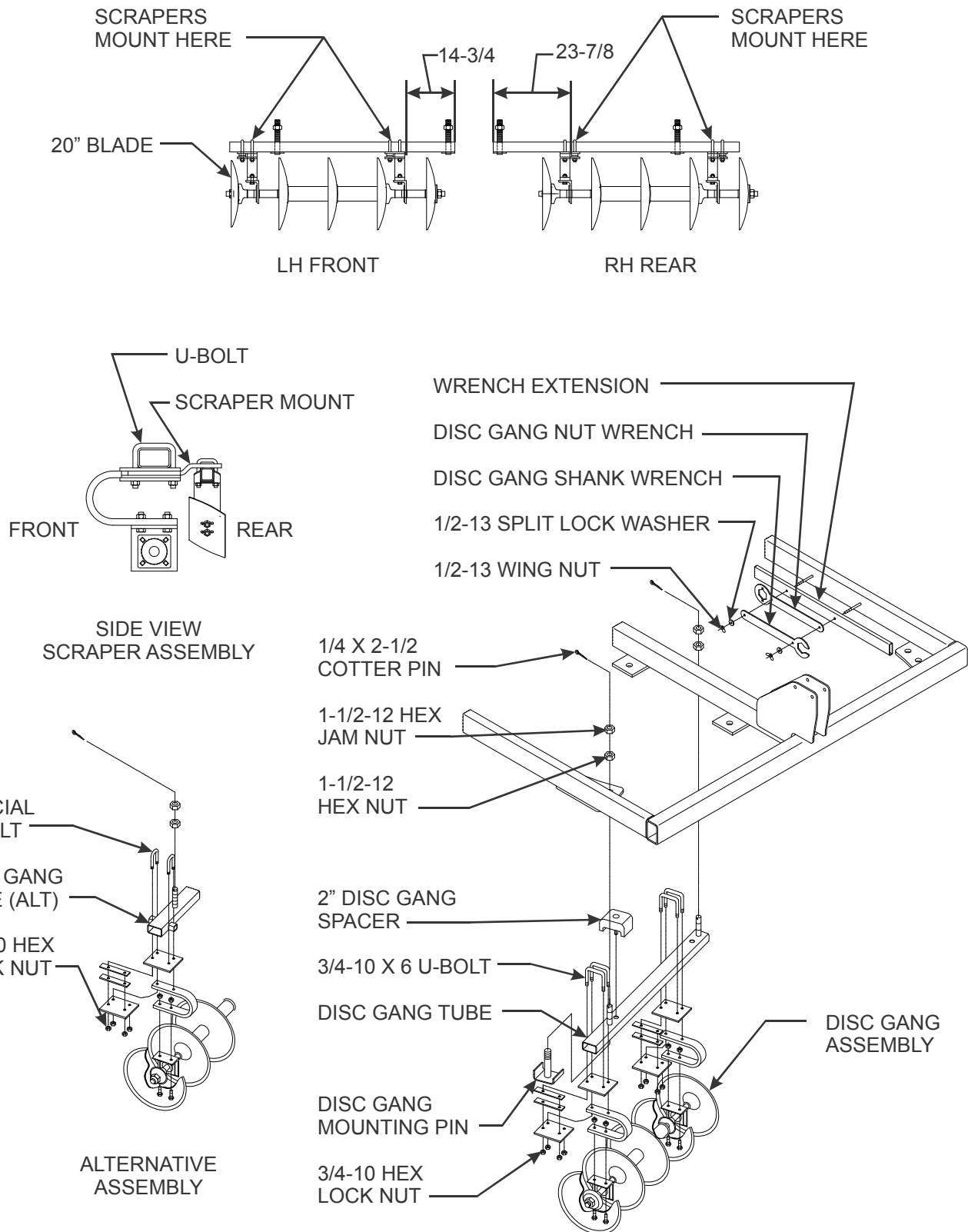
The front and rear disc gang tubes are the same length for the 4-blade disc gangs on the 2215's and for the 6-blade disc gangs on the 2217's.

4. Position the disc gang on the tubes per the dimensions in **Figure 3-8** for front and rear. Grease zerks on disc bearings should point to the rear.
5. Find your model of the Weatherproofer in **Figures 2-1 through 2-12**. Study the diagram to assist you in properly placing the disc gangs for your machine type. Decide at this time which disc gang angle you will be using (10°, 15°, or 20°).
6. Use a hoist or forklift combination to position the disc gangs under the front of the frame (**See Figure 3-8.**)
7. Carefully, lower the jackstands and release the cylinder lockouts from the gauge wheel cylinders to lower the machine onto the disc gangs.
8. Secure the disc gangs to the frame with the disc gang pins and 1-1/2-12 hex nut and hex jam nut. Place the outer pins in the proper holes to achieve the desired disc gang angle (10°, 15°, or 20°). Tighten 1-1/2" nuts to 1200 ft-lbs of torque. (**See Figure 4-4 for an example of torque.**)
9. After disc gang installation is done, place an amber reflective tape square on the front outer end of the front disc gang tubes, and a red reflective tape square on the rear outer end of the rear disc gang tubes.
10. Insert cotter pins through the top of the disc gang mounting pins.
11. Install scrapers per **Figure 3-8**. Adjust according to instructions in **step 5 on page 4-3**.

IMPORTANT

Scrapers are not used on the outside discs on front gangs or the inside discs on rear gangs.

ASSEMBLY PROCEDURES



2m410-010938

Figure 3-9: Flex Disc Gang Installation

Flex Disc Gang Installation



DANGER

Disc blades are extremely sharp. Exercise extreme care when working on or near disc blades. Do not allow discs to roll over or fall onto any bodily part. Do not allow wrenches to slip when working near disc blades. Never push wrenches toward disc blades. Do not climb over machine above disc blades. Failure to stay clear of disc blade edges can cause serious personal injury or death.

IMPORTANT

1. Read all safety precautions at the front of this section before attempting any of the following procedures.
2. See Figure 3-9 for part names.
 1. Disc gangs are partly assembled at the factory. Some assembly is needed before installing on the frame. A special wrench is used to tighten 1-1/2" nuts on the disc gangs.
 2. Assemble the flex mount shanks to the disc bearing mounts using 3/4-10 x 2-1/2 hex head cap screws. Be sure the open end of the flex shank is facing the rear of the disc gang.
 3. Insert the disc gang mounting pins into the disc gang tubes (2 per tube). Assemble the disc gang tubes to the flex shanks using u-bolts, mounting plates, spacer plates, and nuts. The two shorter tubes are for the front disc gangs. The two longer tubes are for the rear disc gangs.

IMPORTANT

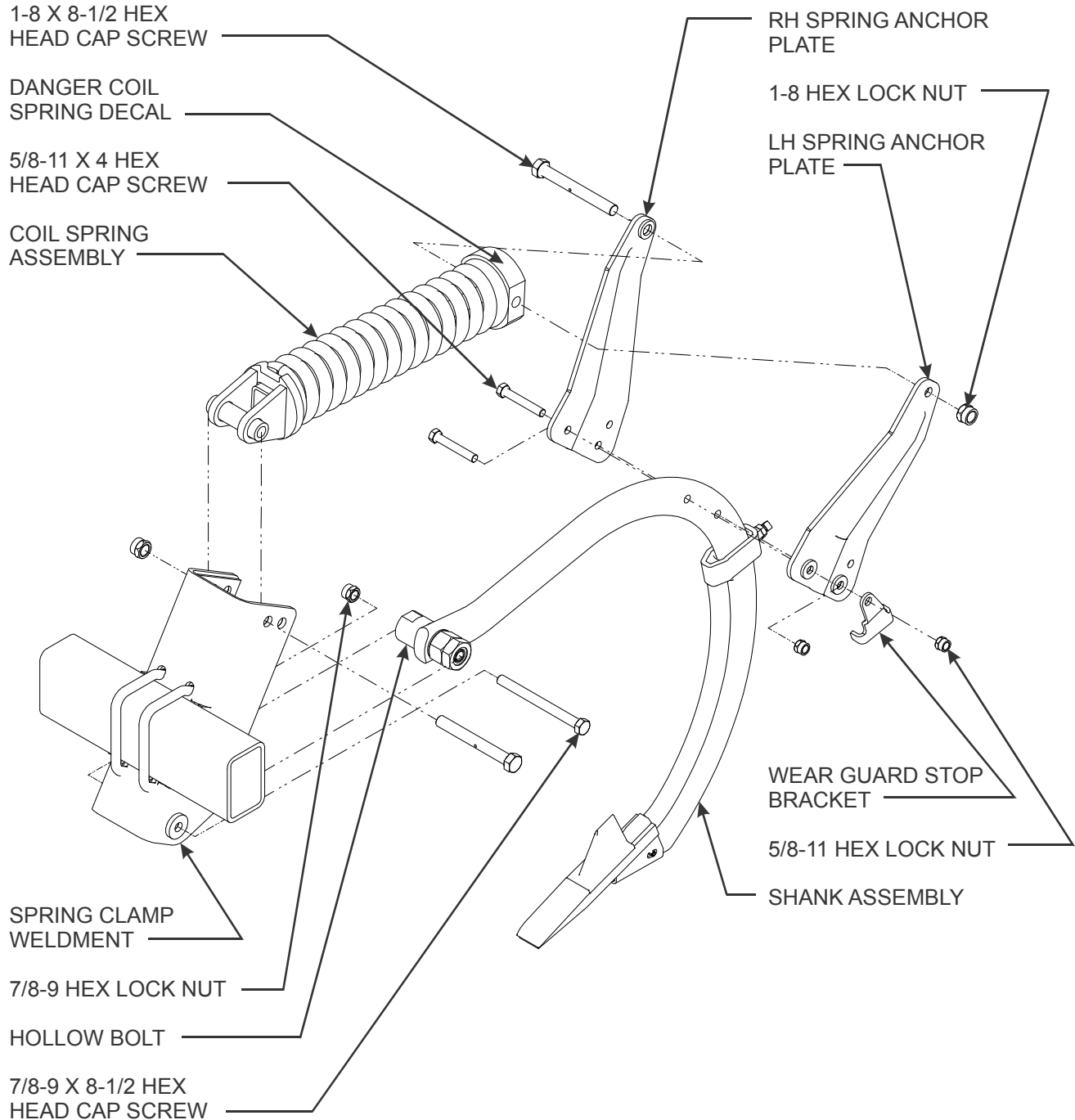
The front and rear disc gang tubes are the same length for 4-blade disc gangs (on 2215's) and 6-blade disc gangs (on the 2217's).

4. Set the disc gang tubes each with one right (R) and one left (L) disc gang. Disc gangs are to be assembled left and right as shown in **Figure 3-9**.
5. Find your model of the Weatherproofer in **Figures 2-1 through 2-12**. Study the diagram to assist you in properly placing the disc gangs for your machine type. Decide at this time which disc gang angle you will be using (10°, 15°, or 20°).
6. Use a hoist or forklift combination to position the disc gangs under the front of the frame (**See Figure 3-9**).
7. Carefully, lower the jackstands and release the cylinder lockouts from the gauge wheel cylinders to lower the machine onto the disc gangs.
8. Secure the disc gangs to the frame. Use the disc gang pins and one each 1-1/2-12 hex nut and hex jam nut. Set the outer pins in the proper holes to achieve the desired disc gang angle (10°, 15°, or 20°). Tighten 1-1/2 nuts to 1200 ft-lbs of torque. (**See Figure 4-4 for an example of torque**).
9. After disc gang installation is done, place an amber reflective tape square on the front outer end of the front disc gang tubes, and a red reflective tape square on the rear outer end of the rear disc gang tubes.
10. Insert cotter pins through the top of the disc gang mounting pins.
11. Install scrapers per **Figure 3-9**. Adjust according to instructions in **step 5 on page 4-3**.

IMPORTANT

Scrapers are not used on the outside discs on front gangs or the inside discs on rear gangs.

ASSEMBLY PROCEDURES



m2210-shanks-2

Figure 3-10: Parabolic Shank Installation

Parabolic Shank Assembly

1. The spring clamp weldments are already located on the frame at the proper spacing.
2. Attach shank assembly to lower hole of spring clamp using 7/8-9 x 8-1/2 hex head cap screw and hex lock nut. Tighten the nut on the hex head cap screw to 200 ft.-lbs. Grease hollow bolt **(See Figure 3-10.)**
3. Assemble spring anchor plates to shank assembly using 5/8-11 x 4 hex head cap screws and hex lock nuts. The bottom edge of stop bracket should be just above the wear guard clamp. Leave screws loose until springs have been installed.

IMPORTANT

Plate with tapped hole for spring pivot bolt should be on left side of shank. If reversed, shank will be at improper angle!

IMPORTANT

1-8 x 8-1/2 hex head cap screw located in spring anchor plates should be installed in opposite direction to 1-8 x 8-1/2 hex head cap screw in spring clamp weldment.

4. Install coil spring assembly between the spring clamp weldment and the rear spring anchor plates. Secure with 1-8 x 8-1/2 hex head cap screw and hex lock nuts.

IMPORTANT

Do not overtighten bolts as the springs must be free to pivot.

5. Tighten 5/8-11 x 4 hex head cap screws in spring anchor plates to correct torque.
6. Adjustment holes are provided at the top of the spring clamp weldment to compensate for varying ground conditions.

ASSEMBLY PROCEDURES

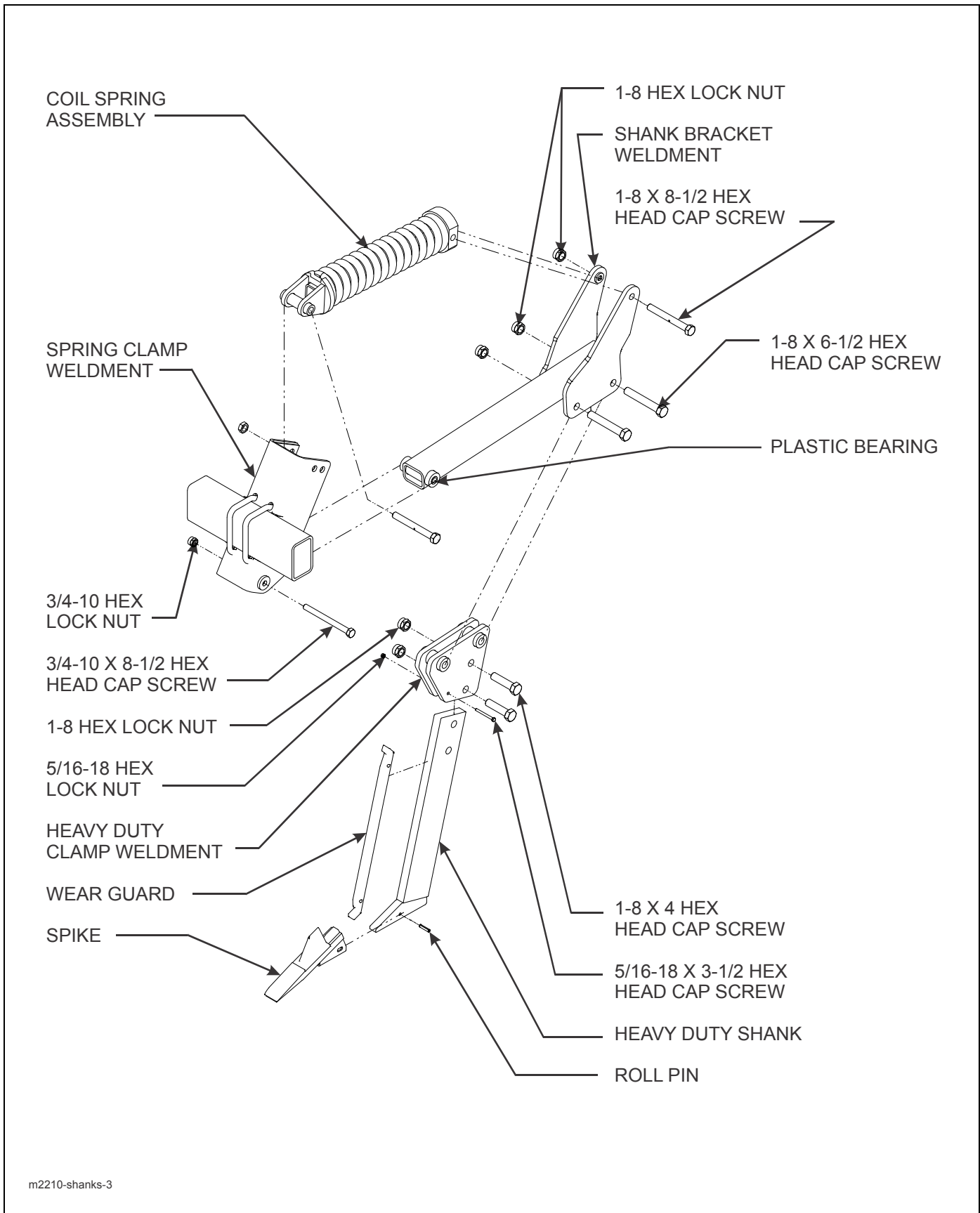


Figure 3-11: Straight Shank Installation

Straight Shank Assembly

1. The spring clamp weldments are already located on the frame at the proper spacing.
2. Attach shank bracket weldment to the spring clamp weldment using plastic bearings, 3/4-10 x 8-1/2 hex head cap screw, and 3/4-10 hex lock nut.
3. Install coil spring assembly between top hole of bracket weldment and top hole of spring clamp weldment. Secure with 1-8 x 8-1/2 hex head cap screw and hex lock nut.

IMPORTANT

Do not overtighten bolts as the springs must be free to pivot.

4. Install clamp weldment to bottom holes of bracket weldment using 1-8 x 6-1/2 hex head cap screws and hex lock nuts.
5. Assemble shank to clamp weldment using 1-8 x 4 hex head cap screws and hex lock nuts.
6. If installing wear guards (used on straight heavy duty), install wearguard into clamp weldment and secure in place with 5/16-18 x 3-1/2 hex head cap screw and hex lock nut (**See Figure 3-11.**) Install the spikes on the shanks using the roll pin provided.

Lubrication

The 2210 Series Weatherproofer must be lubricated before using it for the first time, and at regular intervals thereafter. Use a standard multi-purpose grease to lubricate the 2210 Series Weatherproofer (**See “Lubrication” on page 4-6 and Figure 4-1.**)

Notes:

Chapter 4

Operation and Maintenance



DANGER

Disc blades are extremely sharp. Exercise extreme care when working on or near disc blades. Do not allow discs to roll over or fall on any bodily part. Do not allow wrenches to slip when working near disc blades and never push wrenches towards disc blades. Do not climb over machine above disc blades. Failure to stay clear of disc blade edges may result in serious personal injury or death.



DANGER

Never allow anyone to ride on the Weatherproofer at any time. Allowing a person to ride on the machine may result in serious personal injury or death of that person.



WARNING

When transporting the unit, fully extend the cylinders and place cylinder lockouts in the transport lock position. Insert the lockout pins to secure the cylinder lockouts. Failure to lockout the cylinders may cause the unit to settle during transport, resulting in serious personal injury or death, and damage to the equipment.



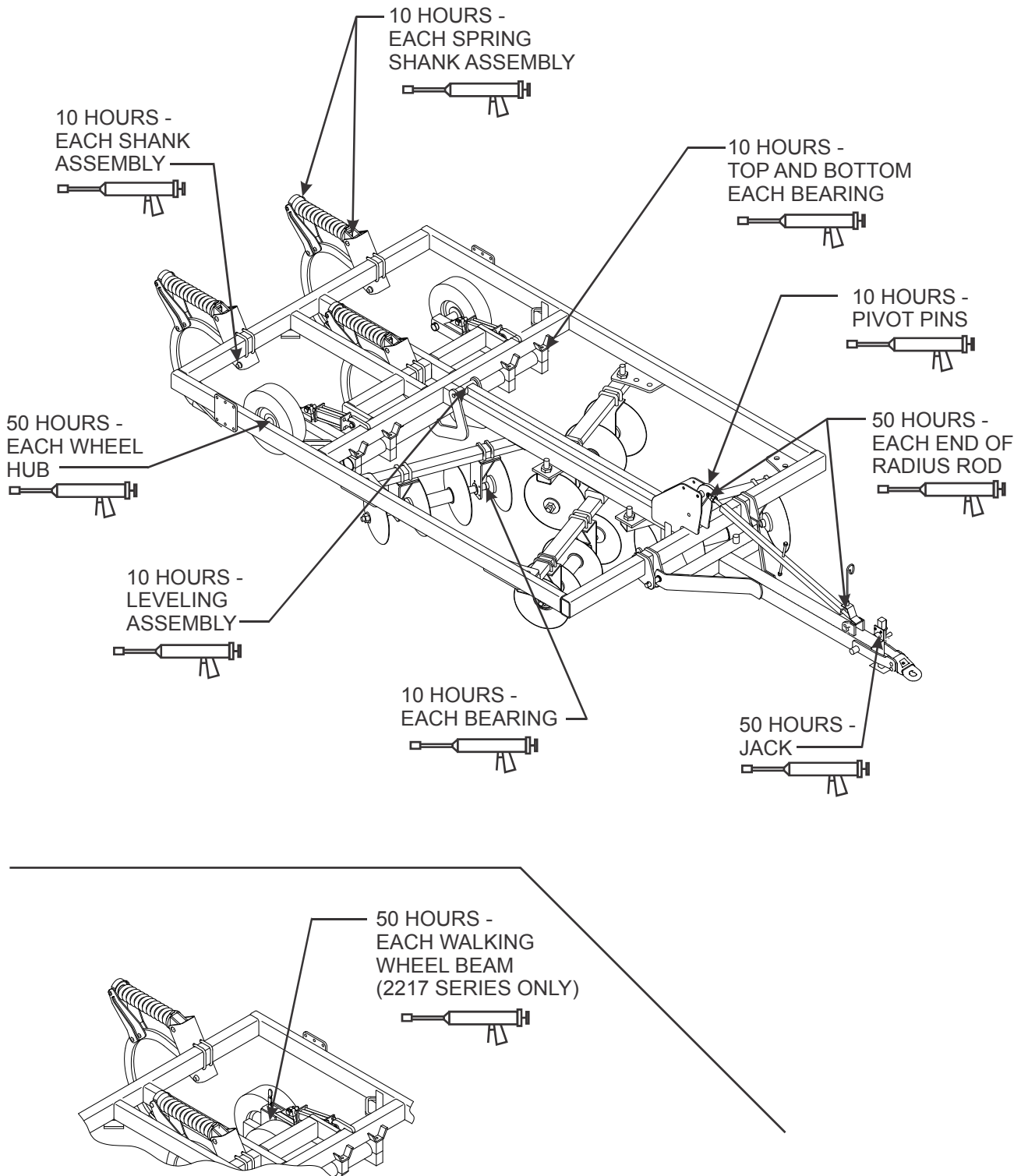
WARNING

To prevent accidental lowering, all hydraulically elevated equipment must be locked out using the cylinder lockouts or 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.



CAUTION

Whenever 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, on hillsides, to prevent tipping.



2m410-010942

Figure 4-1: 2210 Series Lubrication Schedule

Tractor Preparation

The 2210 Series Weatherproofer 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 Weatherproofer is equipped with the clevis option, this should be removed. The clevis option is only for transport use. Before attaching the Weatherproofer, prepare the tractor as follows:

1. Inflate the rear tractor tires equally and add ballast according to the tractor operator's manual.
2. Lock the tractor drawbar in the center position.

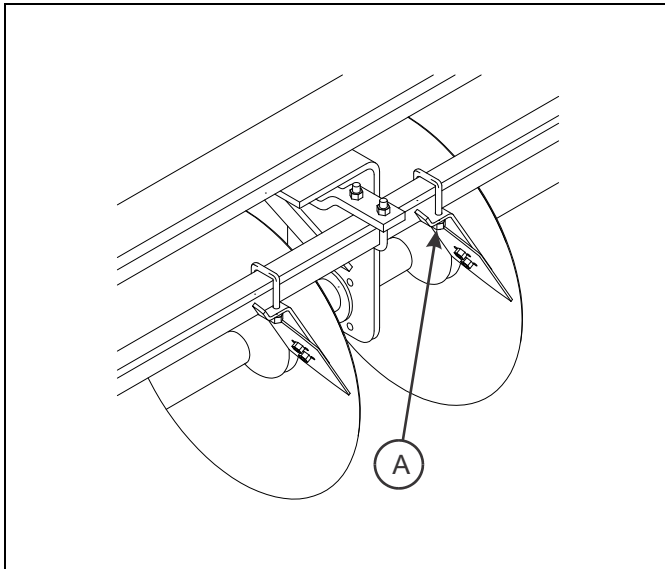


Figure 4-2: Disc Scraper Contact Against Disc Blade

Model 2210 Series Weatherproofer Preparation

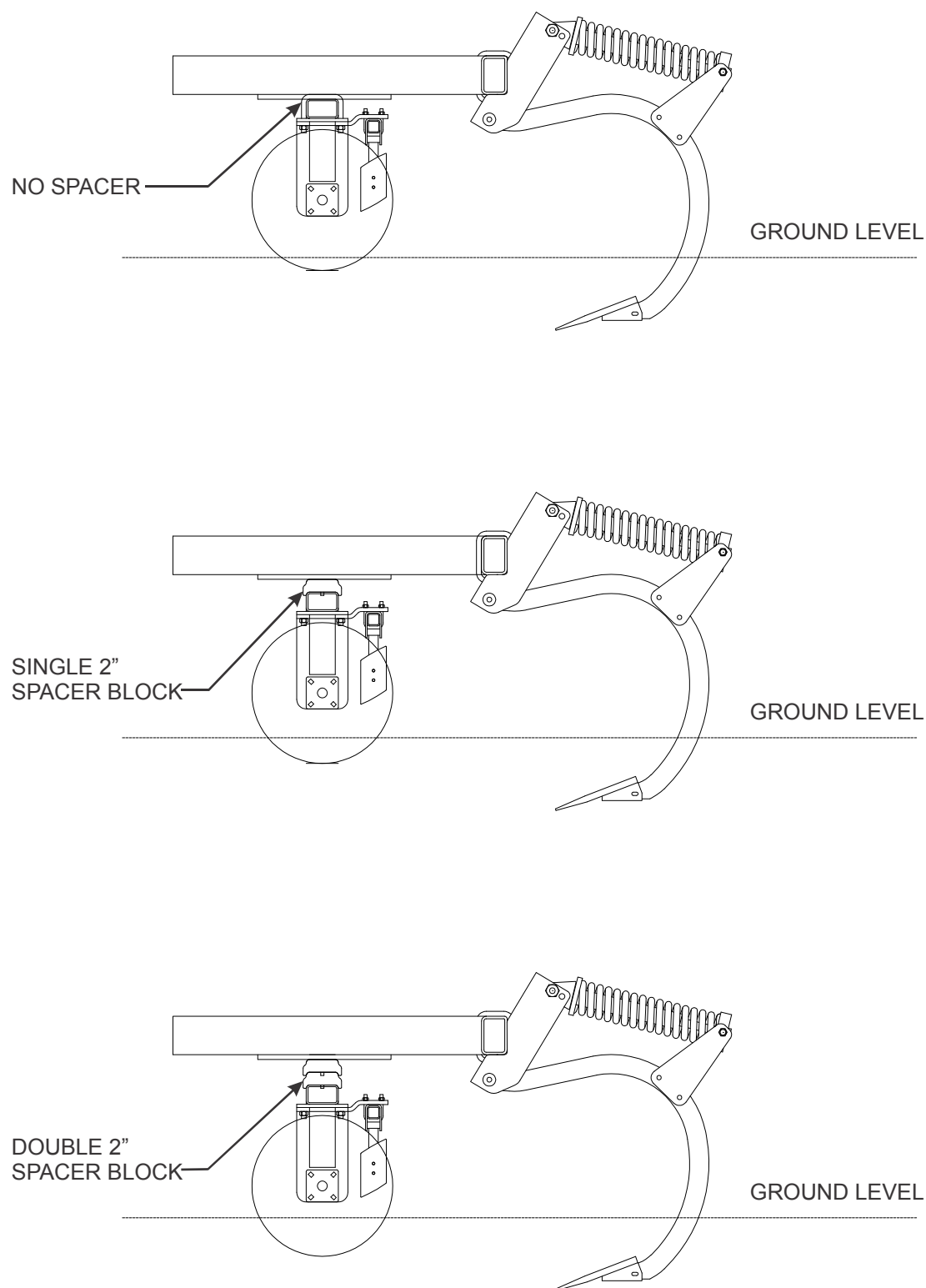
1. Prior to operating the Model 2210 Series Weatherproofer, inspect it thoroughly for good operating condition.
2. Replace worn or missing parts.
3. When the machine is new, check the bolt tightness after a few hours of operation. Tighten any loose nuts or bolts. Check the gauge wheel lug bolts daily.
4. Check the gauge 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.



CAUTION

When adjusting disc scraper, avoid bodily contact with disc blades. Scrapers must be properly adjusted to prevent damage to machine.

5. Check disc scrapers for proper pressure and contact against the disc blade in normal conditions (**See Figure 4-2.**) Loosen u-bolt A as shown in **Figure 4-2** and slide scraper until it contacts disc blade lightly. Tighten u-bolt. For wet soils or in heavy stubble, adjust scrapers 1/16" to 3/16" away from blade. This does not clean blade as well, but keeps residue from pinching between blades and stopping disc gang rotation.
6. Lubricate the machine as shown in "Lubrication" on page 4-6 (**See Figure 4-1.**)



2m410-010944

Figure 4-3: 2210 Series Spacer Block Placement

Attaching to the Tractor

1. Align the tractor drawbar with the machine. Raise or lower the Model 2210 Series Weatherproofer clevis, as needed, using the swivel jack. Attach the unit with proper size hitch pin.
2. Clean all hydraulic couplings and attach to the tractor. When properly attached, the hydraulic control lever should cause the Model 2210 Series Weatherproofer to:
 - a. Lower to the ground when the control lever is moved forward or downward, and
 - b. Raise when the control lever is moved backward or upward.
3. Fully extend the hydraulic gauge wheel cylinders, and place the cylinder lockouts in the transport lock position over the cylinder rods. Secure the lockouts with the lockout pins.
4. Always place the swivel jack on the interior mount before setting the machine in motion.

Field Operation

1. Remove the transport lock pins from the cylinder lockouts. Flip lockouts over as shown in **Figures 3-3 and 3-5**. Use lock pins to hook the lockouts to the lockout anchor chains. Lower the Model 2210 Series Weatherproofer until the points run at the desired depth.
2. Check the front-to-rear leveling of the frame. Level the machine by adjusting the hitch radius rod. Set the frame level to its working depth.
3. Set the depth by changing the stroke control blocks on the gauge wheel cylinders. For stability, it is important that the gauge wheels always apply slight pressure against the soil.
4. Always lift the Weatherproofer completely out of the ground before turning or backing. This prevents shank or disc damage or damage to their respective mounting brackets.



CAUTION

Reduce speed at field ends, and lift the Weatherproofer completely out of the ground before turning.

5. After a few hours of operation, check all bolts for tightness, especially the shank u-bolts and pivot bolts. Tighten wheel lug bolts to 90 ft.-lbs. of torque. Tighten any loose bolts to the torques shown in **Table 2-1**.



DANGER

Failure to keep roll pins and nuts in place in the disc gang pins, can result in serious injury or death to people near the disc gangs.

6. Adjust the disc gangs to operate to a desired depth. Use the following procedure to adjust the disc gangs.
 - a. Loosen the disc gang pins.
 - b. Install or remove the spacer blocks between the frame and the disc gang tubes. Adjustments can be made in 2" increments. The spacer blocks should be stored in the storage drawers, located in the front corner of the frame, when not in use.
 - c. **See Figure 4-3** for spacer block placement on the equipment.
 - d. Tighten disc gang pins to 1200 ft.-lbs., minimum torque.

IMPORTANT

A torque of 1200 ft.-lbs. is equal to a 300 lb. force at the end of a 4-foot wrench (See Figure 4-4.)

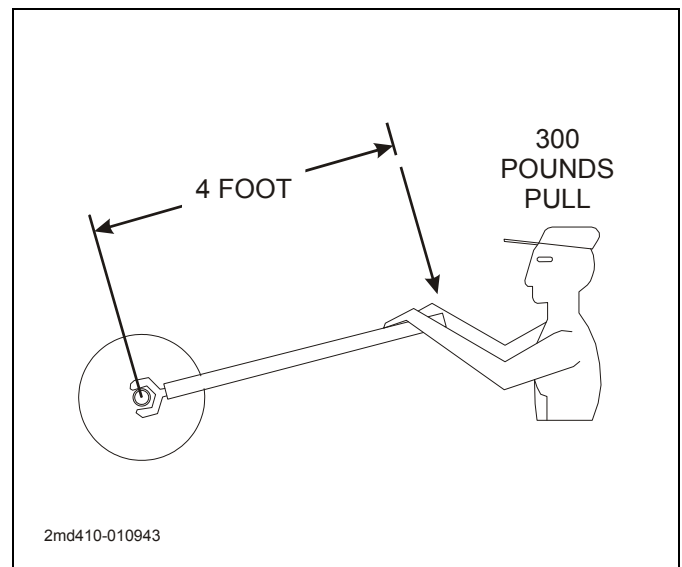


Figure 4-4: Example of 1200 Foot-Pounds of Torque

**CAUTION**

Tighten all 1-1/2" nuts to 1200 foot-pounds of torque.

7. To change disc gang angles, lower the machine until the disc gangs rest on the ground.
 - a. Loosen the center disc gang pins without removing the nuts.
 - b. Loosen the outer disc gang pins and remove the nuts.
 - c. Raise the machine just enough to free the disc gangs from the frame without leaving the ground.
 - d. Swing the outer end of the disc gangs to the desired angle and lower the machine back onto the disc gangs.
 - e. Reinstall the disc gang pins and tighten all nuts. Tighten the disc gang pins to 1200 ft.-lbs. minimum torque (**See IMPORTANT note page 4-5 regarding torque**).
 - f. Reinstall all cotter pins that were removed from the disc gang pins.
8. Check disc scrapers for proper pressure and contact against disc blades (**See step 5 on page 4-3 to adjust**.)

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:

1. Place the frame on blocks or stands sufficient to lift the tire clear of the ground.
2. Remove the hub cap, cotter pin, slotted nut and washer.
3. Remove the hub. Clean and inspect the bearings and hub cavity. Replace any worn or defective parts.
4. Repack the bearings using a high-quality wheel bearing grease.
5. Replace the hub with a new seal and the inner bearing in place.
6. Install the outer bearing cone, washer, and slotted nut.
7. 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.
8. Install a new cotter pin and replace the hub cap.

Lubrication

Several parts of the Model 2210 Series Weatherproofer need periodic lubrication. Use of a high grade multi-purpose is recommended. Refer to the Weatherproofer Lubrication Chart to locate lubrication points and for a recommended maintenance schedule (**See Figure 4-1.**)

Hydraulic Maintenance

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.
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.
3. Check all hydraulic hoses weekly. Look for binding or cracking. Replace all worn or defective parts immediately.

Storage

1. The service life of the 2210 Series Weatherproofer 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 film is worn off.
 - d. Grease or coat all exposed metal surfaces of shanks, points, and coulters.
 - e. Lubricate each point of the machine as stated in **"Lubrication" on page 4-6 (See Figure 4-1.)**
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:

Chapter 5

Troubleshooting Guide

The Troubleshooting Guide, shown below, is included to help you quickly locate problems that can happen using your 2210 Series Weatherproofer I. Follow all safety precautions stated in the previous sections when making any adjustments to your machine.

PROBLEM	PROBABLE CAUSE	SOLUTION
FIELD NOT LEVEL BEHIND WEATHERPROOFER. RIDGE AT CENTER OF SWATH	Frame not level front to rear:	Lower machine to working depth and drive a short distance. Stop and check if frame is level. Adjust radius rod as required to level machine.
	Rear disc gangs at too aggressive angle:	Adjust rear disc gangs to a lesser angle.
	Rear disc gangs operating too deep:	Raise rear discs to desired depth (3" to 6")
	Rear disc gangs too close together:	Loosen u-bolts holding disc gang shanks to 5 X 3 tube and slide disc gangs out.
FIELD NOT LEVEL, RIDGE AT OUTSIDE OF SWATH	Frame not level front to rear:	Lower machine to working depth and drive a short distance. Stop and check if frame is level. Adjust radius rod as required to level machine.
	Front disc gangs too aggressive an angle	Adjust front gangs to a less aggressive angle.
	Disc gangs operating deeper than necessary:	Raise front disc gang to operate at desired depth (3" to 6").
	Speed too fast front discs throw soil beyond reach of rear discs:	Change to slower gear or change front disc gangs to a lesser angle.
STRIPS OF UNTILLED SOIL NEAR CENTER OF SWATH	Frame not level front to rear:	Lower machine to working depth and drive a short distance. Stop and check if frame is level. Adjust radius rod as required to level machine.
	Disc gangs operating too shallow:	Lower disc gangs to operate at deeper depth.

PROBLEM	PROBABLE CAUSE	SOLUTION
DISC GANGS STOP TURNING AND PLUG	Discs set too shallow:	Lower disc gangs.
	Scrapers set too tight:	Adjust scrapers to touch disc blades lightly. You should be able to turn disc gang by hand. In wet soil or heavy residue, adjust scrapers 1/16" to 3/16" away from disc blades.
	Disc blades worn:	New blades are 22" dia. Replace when necessary.
SHANKS PLUG	Front discs set too shallow:	Lower discs to get better cutting action
	Shanks not spaced correctly:	See shank placement diagrams (See Figures 2-1 - 2-12.) Adjust if necessary.
SCRAPERS BEND OR PLUG	Scrapers not adjusted correctly:	Adjust scrapers to touch disc blades lightly. You should be able to turn disc gang by hand. In wet soil or heavy residue, adjust scrapers 1/16" to 3/16" away from disc blades.
	Scrapers not assembled correctly:	Check set up instructions.

Notes:

Notes:



Intertek

Equipment from Landoll Corporation is built to exacting standards ensured by ISO 9001 registration at all Landoll manufacturing facilities.

Model 2210
Weatherproofer I
Operator's Manual

Re-Order Part Number F-227-1011

LANDOLL CORPORATION

1900 North Street
Marysville, Kansas 66508
(785) 562-5381
800-428-5655 ~ WWW.LANDOLL.COM



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