



61-SERIES

3003

PHILLIPS *ROTARY
HARROW*

SET UP INSTRUCTIONS

THIS MANUAL TO ACCOMPANY MACHINE TO DEALER

PART NO. 61-SU-01
PRINTING DATE: SEPT. 2008

WARRANTY POLICY

KELLEY MANUFACTURING COMPANY (KMC) warrants that all goods sold to the original purchaser of any KMC product shall be free of any defects in material and workmanship if used under normal operating conditions. The warranty period begins on the date of purchase by the retail customer and ends twelve (12) months thereafter. KMC's sole responsibility is to repair and/or replace the defective part or parts at no cost to purchaser. This remedy is the **SOLE AND EXCLUSIVE REMEDY** of purchaser.

The purchaser must fill out and return the warranty registration form found in the front of the operator's manual. Failure to return the warranty registration form within 30 days shall result in the goods being sold "AS IS", and all warranties shall be excluded.

This warranty shall not apply to those items that are by nature worn in normal service, including but not limited to belts, springs, teeth, chains, etc. Items such as tires, tubes, and gearboxes and all other items warranted by the original manufacturer are warranted only to the extent of their individual manufacturer warranty, and KMC is not warranting any of said items. All warranty claims must be made through a KMC licensed dealer, and a warranty form request must be submitted to KMC within 30 days of failure or the warranty provision shall be unenforceable against KMC.

No agent or person has authority to change or add to this warranty as written.

THE ABOVE IS THE ONLY WARRANTY MADE BY KMC AND IS MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. KMC MAKES NO WARRANTY OF MERCHANTABILITY AS TO ANY GOODS MANUFACTURED BY KMC AND FURTHER, KMC DOES NOT WARRANT ANY SUCH GOODS AS SUITABLE FOR ANY PARTICULAR PURPOSE TO THE RETAIL CUSTOMER. THE SUITABILITY OF GOODS FOR ANY PURPOSE PARTICULAR TO THE CUSTOMER IS FOR THE CUSTOMER, IN HIS SOLE JUDGEMENT, TO DETERMINE. KMC FURTHER MAKES NO WARRANTIES WITH RESPECT TO ITS MANUFACTURED GOODS THAT WOULD NORMALLY BE DISCLOSED BY AN EXAMINATION. THIS IS THE FULL AND FINAL EXPRESSION OF ALL WARRANTY LIABILITY OF KMC. NO OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, SHALL BE ENFORCEABLE AGAINST KMC.

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Tifton GA

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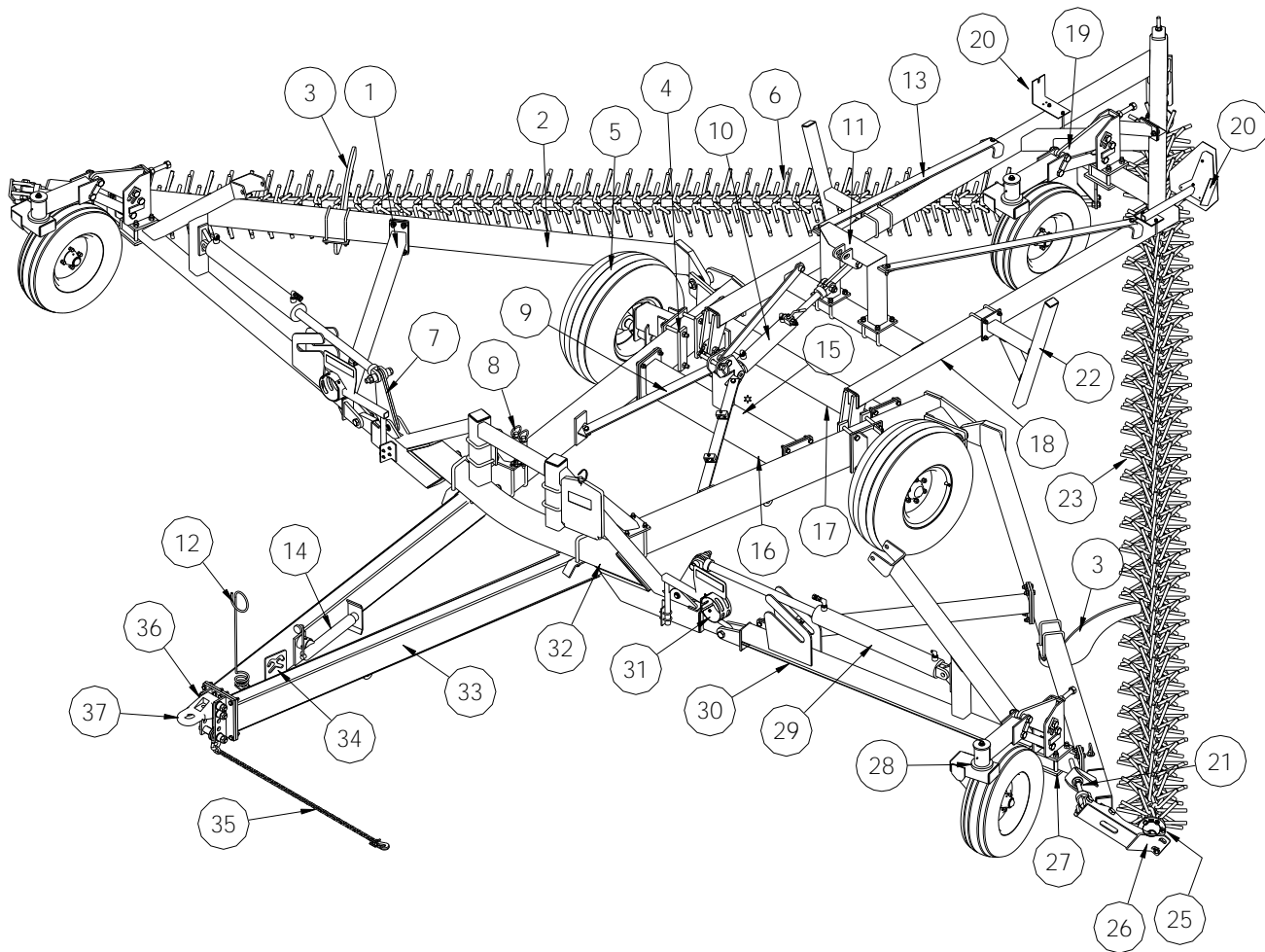
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30' Rotary Harrow

PHILLIPS 3003 ROTARY HARROW PART REFERENCE



- | | |
|-----------------------------|-----------------------------|
| 1. Wing Long Brace | 20. Tail Lights |
| 2. Wing Stiff Arm | 21. Spacer |
| 3. Wing Tool Catcher | 22. Tail Tool Catcher |
| 4. Main Wheel Back Plate | 23. LHS Tooling |
| 5. Main Frame Wheel | 24. Tool Tension Rod |
| 6. RHS Tooling | 25. Bearing Housing |
| 7. Lock Lever | 26. Tool Lever |
| 8. Hitch Pin | 27. Bottom Caster Plate |
| 9. Middle Beam Brace | 28. Wing Caster |
| 10. Tail Hydraulic Cylinder | 29. Wing Hydraulic Cylinder |
| 11. Tail Top Bridge | 30. Wing Front Beam |
| 12. Pig Tail Hose Holder | 31. Extremity Light |
| 13. Tail Long Brace | 32. Front Wing Mount |
| 14. Hitch Jack | 33. Main Beam |
| 15. Wrench | 34. Hose Holder |
| 16. Middle Beam | 35. Safety Chain |
| 17. Rear Beam | 36. Implement Hitch Casting |
| 18. Front Tail | 37. Implement Clevis |
| 19. Tail Caster | |

SECTION 1 - SAFETY

1.1 GENERAL SAFETY PRACTICES

- All operators are to be instructed in the safe and proper use of this machine and must understand all safety decals as well as instructions in this manual.
- Carefully read all safety message in this manual and on your machine.
- Keep all safety signs in good condition. Replace when necessary.
- Find a spacious, clear, and level surface to perform any maintenance or adjustments.
- Never work around running machinery.
- Never remove obstructions from machinery while still running.
- **DO NOT** walk under the tool assembly when the tools are elevated.
- **DO NOT** ride on harrow frame.
- Any damage/deterioration on any parts should be repaired/replaced immediately by the authorized personnel to reduce the risk of personal injury.
- Regularly check the condition of the U-Bolts and bearing assemblies. Replace any suspect parts to prevent accidents.

- Be sure that your tow vehicle is properly equipped and is capable of pulling the harrow.
- Always take precautions near overhead electrical wires.

B) Extremity/Tail Lights



Extremity Lighting (Wing)

1.2 SAFETY DURING TRANSPORT

A) General

- Use the safety pins provided for securing the wings and the tail during transport. See Safety locks in Section 1.4
- Check that local road regulations are adhered to when moving your harrow on public roads. Refer to Specifications section for dimensions and weight of harrow.
- Never transport the harrow over 80 km/hour (50 miles/hour).



Tail Lights

The harrow comes equipped with left, right and tail lights that work in conjunction with the flashing/signal tractor lights. Join the electrical connector to the tractor prior to use.

NOTE: Be sure to disconnect the lighting harness when disconnecting the harrow from the tractor.

1.3 SAFETY DURING SERVICING

A) General

- Never, under any conditions, service harrow while tractor is running. Shut off tractor, set parking brake, and remove key first.
- Engage the wing and/or tail locks or lower the wings, and/or tail completely before servicing. See Section 1.4 Harrow Safety Locks.
- Take extreme caution around escaping hydraulic fluid. Release all pressure in the system before servicing or inspecting leaking lines. Hydraulic fluid under high pressure can penetrate the skin and cause serious injury. Never use your hands to inspect lines. Seek immediate medical attention if fluid is injected into the skin.
- Familiarize yourself with proper servicing

procedures shown in this manual.

NOTE: When servicing, wear protective clothing and use personal safety devices when required.

B) Tire Safety

- A tire that explodes could cause serious injury. Have a qualified service technician service the tires.
- When inflating tires take extreme care. An over inflated tire can explode.
- Follow recommended tire pressures in Pre-Operational Set-Up section.
- Replace rim if overly rusted or cracks are noticed.
- Stand clear from tire when inflating. Use a clip-on air chuck and extension hose.

1.4 HARROW SAFETY LOCKS

The harrow is equipped with wing and tail section lock. These locks are to be used at all times when transporting the harrow. In addition, the harrow comes equipped with a safety chain which is also to be used in transport at all times.

These photos show the location of the safety devices on the harrow:



Safety Chain



LH/RH Wing Lock



Tail Lock & Pin

NOTE: Install the safety pins provided to secure the wings and tail locking bar. Failure to use the safety pins may cause damage to the frame and void your warranty.

1.5 SAFETY DECALS

The harrow comes with a complete set of safety decals which are to be read and thoroughly understood. Refer to Operators Manual for locations and additional information. In the event a decal is damaged during setup it should be replaced immedi-



Safety Pin

SECTION 2 - ASSEMBLY

The following instructions are a step-by-step method of assembling a 3003 Phillips Rotary Harrow. For most owners, the harrow will come completely pre-assembled. For these owners we urge you to have a look at these instructions so you can become more familiar with the machine, how it is put together, and how it works. This will help you understand the maintenance and operation of the harrow.

Before commencing assembly, you will require the following tools and equipment:

- Ø 6 (six) 10" x 10" x 2' long wooden blocks
- Ø Equipment capable of lifting 1000 lbs (i.e. crane hoist, forklift, etc.)
- Ø Wrenches ranging in size from 7/16" to 1 1/2". Air impact if possible.
- Ø Hammer and measuring equipment.
- Ø Hydraulic jack.
- Ø Pry bar
- Ø Pliers
- Ø Screw drivers

The instructions to follow will make several references to right/left/front/rear locations. For the purposes of this manual, left and right will refer to the direction viewed from behind the machine or from the tractor seat looking over your shoulder. Front will refer to the hitch end.

Throughout the instructions, detailed drawings and photos are included to show connection details, etc.



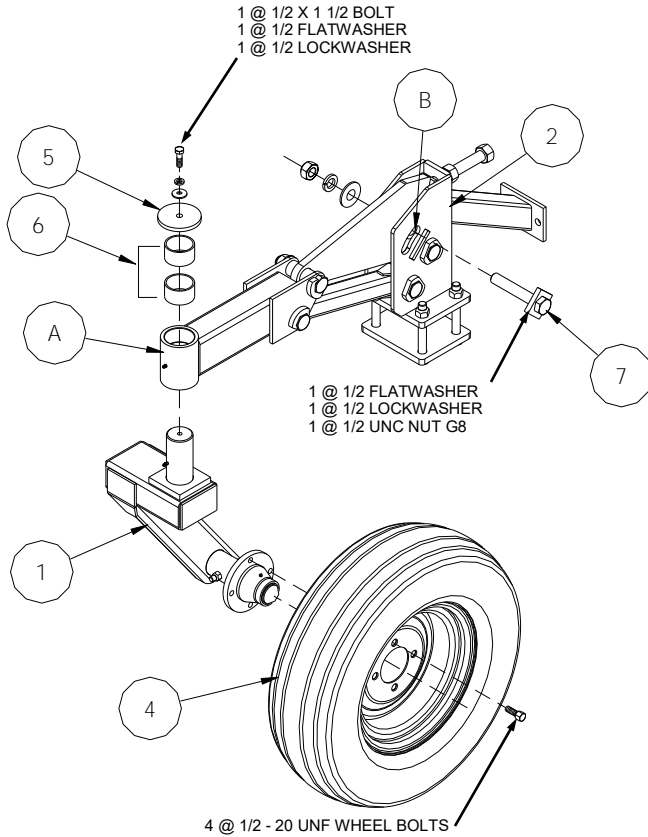
WARNING: Practice extreme caution when assembling the harrow. The harrow is made of large heavy sections that could injure or kill if dropped!

All bolts should be properly torque. Torque values are included with each step where appropriate. In some circumstances, the assembler should use his own judgment to prevent over-tightening certain joints. For example, hinged joints employing threaded fasteners should not be over-tightened.

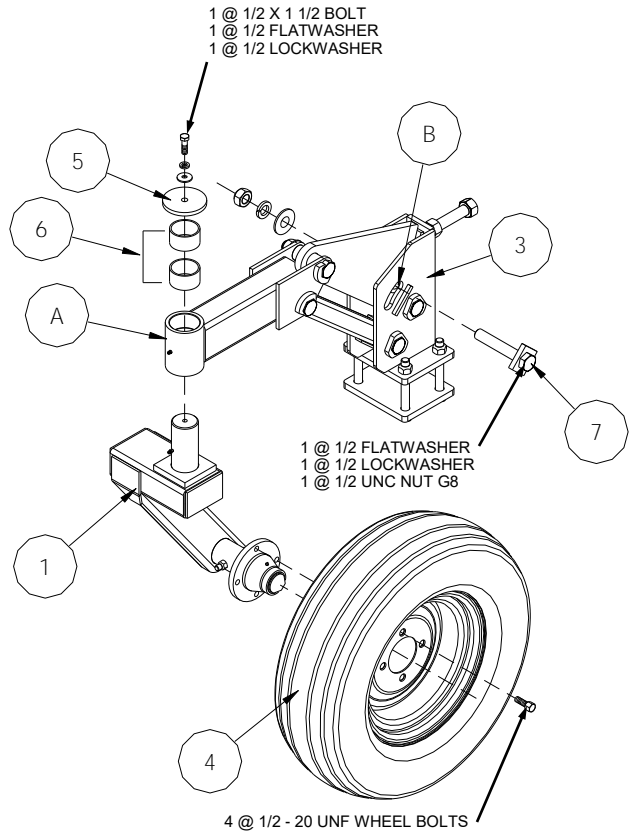
NOTE: LOCK-TITE SHOULD BE USED ON ALL NUTS

2.1 CASTER WHEEL ASSEMBLY - TAIL/WING

TAIL CASTER WHEEL ASSEMBLY - TAGGED (61-081-007)



WING CASTER WHEEL ASSEMBLY (61-081-006)



ITEM	PMF PART NO	KMC PART NO	DESCRIPTION	QTY
1	05-51040-01	61-080-023	CASTER WHEEL SWIVEL ASSY	1
2	05-51094-01	61-080-024	CASTER MOUNT BRKT ARM ASSY-TAIL	1
3	05-51054-01	61-080-030	C-ASTER MOUNT BRKT ARM ASSY-WING	1
4	05-51048-01	61-081-030	TIRE AND RIM ASSY	1
5	05-01142-01	61-027-035	SPRING CAP	1
6	05-01873-01	61-050-013	CASTER BUSHING	2
7	05-51044-01	61-080-028	LOCK BOLT	1

STEP 1

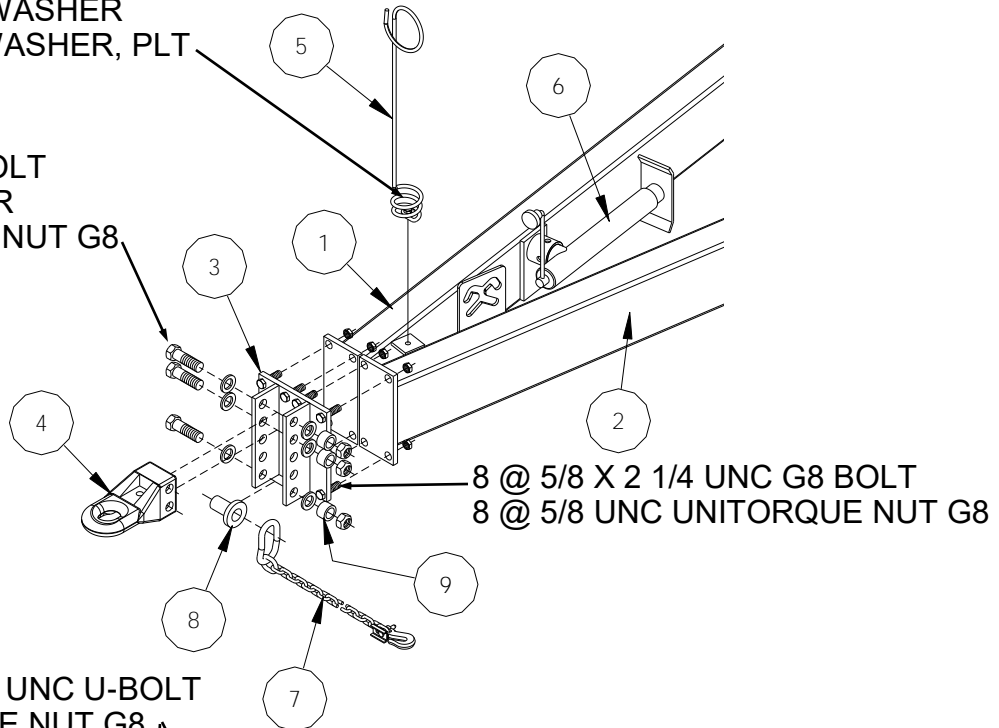
The lock bolt (#7), on the wing caster mount bracket arm assembly (#3) comes installed in the shipping configuration and must be removed and re-installed in its proper position. Remove the lock bolt, flatwasher, lockwasher, and nut from the caster mount bracket arm assembly (#2) (#3) and rotate the arm and upper triangular plate upward until the hole in the triangular plate lines up with the slot "B" as shown. Install the lock bolt, flatwasher, lockwasher, and nut. Torque to 200 ft lbs.

The caster wheel assembly comes pre-assembled from the factory. Verify 1/2 x 1 1/2 UNC bolt torque to 200 ft lbs.

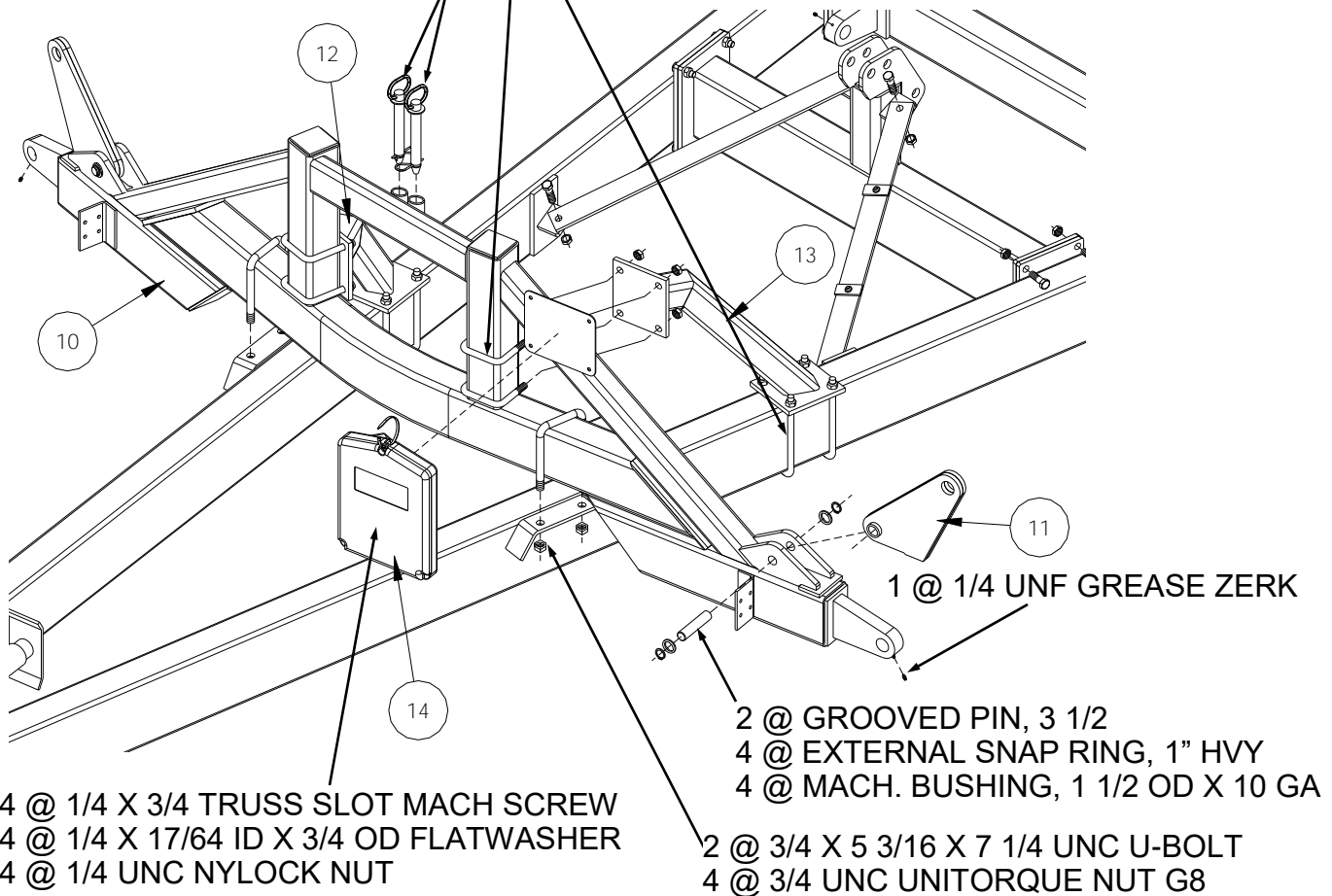
2.2 MAIN FRAME ASSEMBLY

- 1 @ 1/2 X 1 1/2 UNC G8 BOLT
- 1 @ 1/2 LOCKWASHER
- 1 @ 1/2 FLATWASHER, PLT

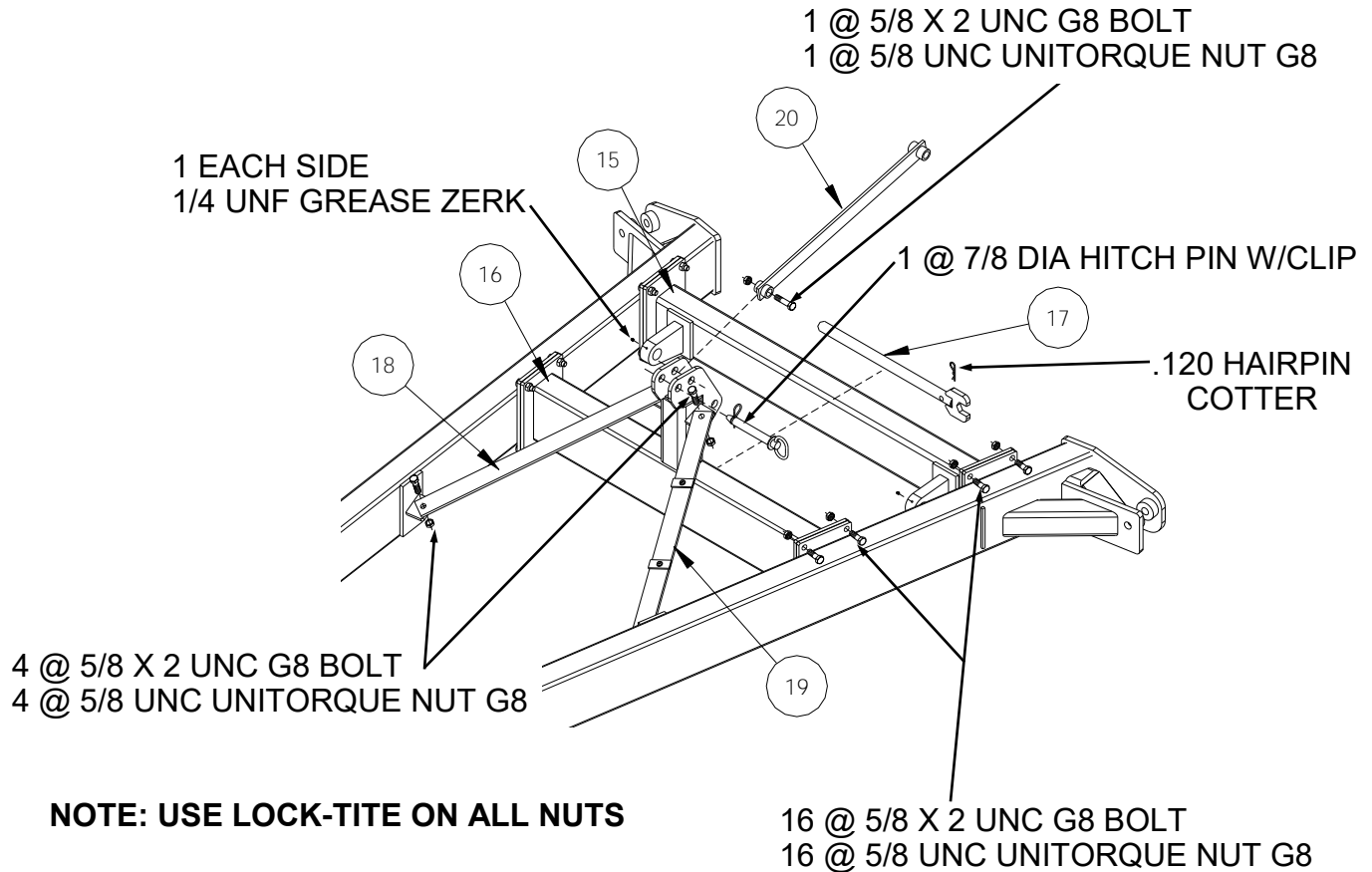
- 3 @ 1 X 7 1/2 UNC G8 BOLT
- 6 @ 1 SAE FLATWASHER
- 3 @ 1 UNC UNITORQUE NUT G8



- 2 @ 7/8 DIA HITCH PIN W/CLIP

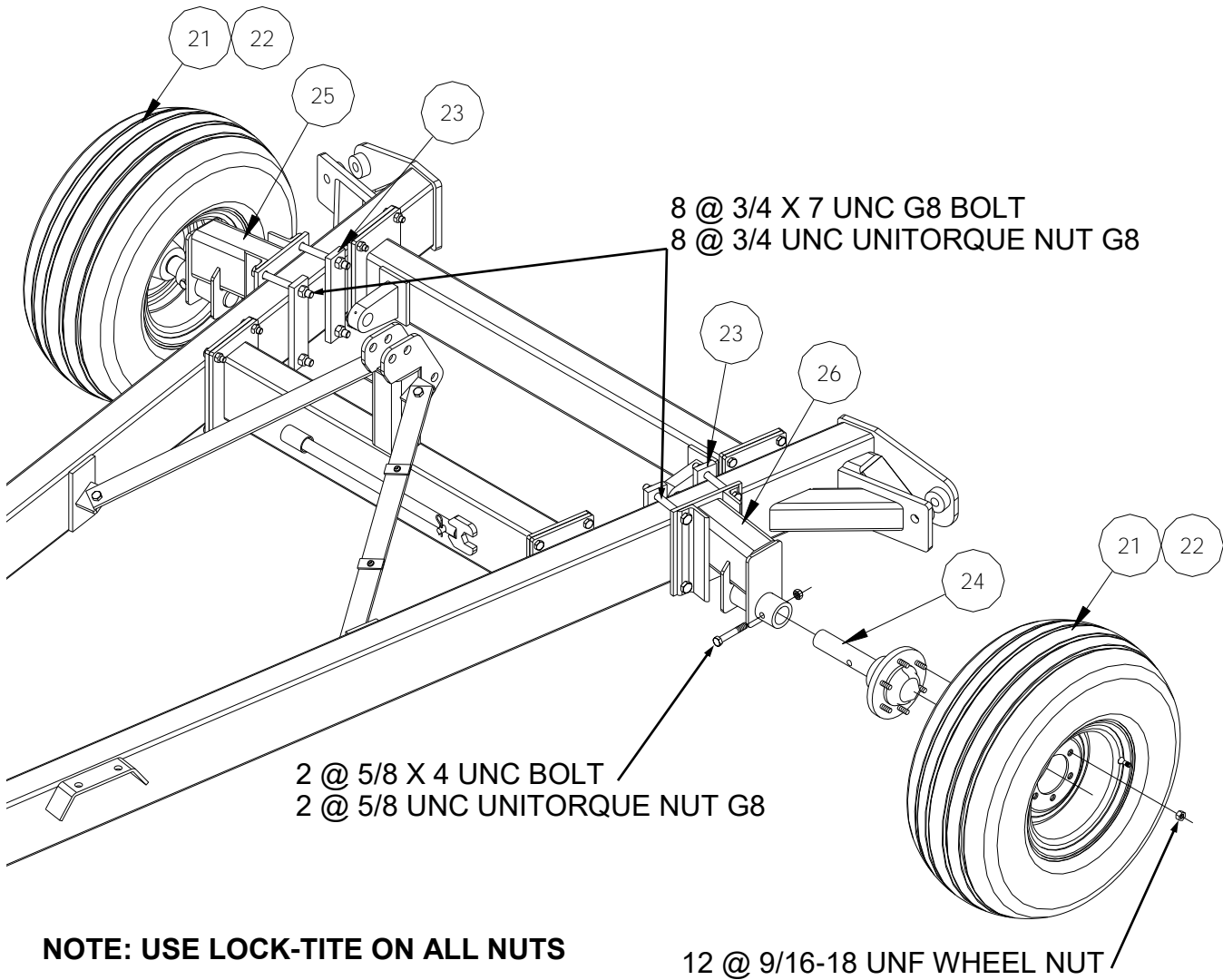


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ITEM	PMF PART NO	KMC PART NO	DESCRIPTION	QTY
1	05-55002-01	61-080-082	MAIN BEAM (RIGHT)	1
2	05-55002-02	61-080-021	MAIN BEAM (LEFT)	1
3	05-51062-01	61-080-020	HITCH PLATE	1
4	31-10951-03	61-057-003	HITCH CASTING (PP1-301V3)	1
5	31-10307-01	61-050-023	PID TAIL HOSE HOLDER	1
6	31-10950-04	61-050-033	HITCH JACK, 7000 LB	1
7	31-10959-01	61-050-034	SAFETY CHAIN	1
8	05-51063-01	61-080-063	SAFETY CHAIN BAR	1
9	05-51013-01	61-024-041	SPACER	3
10	05-55006-01	61-080-003	FRONT WING MOUNT	1
11	05-51022-01	61-080-040	LOCK LEVER	2
12	05-55007-01	61-080-086	FRONT WING MOUNT BRACE-RH	1
13	05-55007-02	61-080-087	FRONT WING MOUNT BRACE-LH	1
14	31-10965-01	61-050-035	BOX, DOCUMNET	1
15	05-55004-01	61-080-084	REAR BEAM	1
16	05-55005-01	61-080-085	MIDDLE BEAM	1
17	05-51038-01	61-080-049	1 1.2 WRENCH	1
18	05-55003-01	61-023-041	RIGHT MIDDLE BEAM BRACE	1
19	05-55003-02	61-080-083	LEFT MIDDLE BEAM BRACE	1
20	05-51007-01	61-080-017	TAIL LOCKING BAR	1

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ITEM	PMF PART NO	KMC PART NO	DESCRIPTION	QTY
21	31-10907-05	61-058-002	TIRE, 12.5L-15, 8-PLT	2
22	31-10907-06	61-058-001	RIM, 15 X 10 X 6 BOLT	2
23	05-51071-01	61-023-061	MAIN WHEEL PLATE	4
24	30-90544-01	61-058-007	H-614 HUB AND SPINDLE	2
25	05-51080-01	61-080-069	MAIN WHEEL (RIGHT)	1
26	05-51080-02	61-080-070	MAIN WHEEL (LEFT)	1

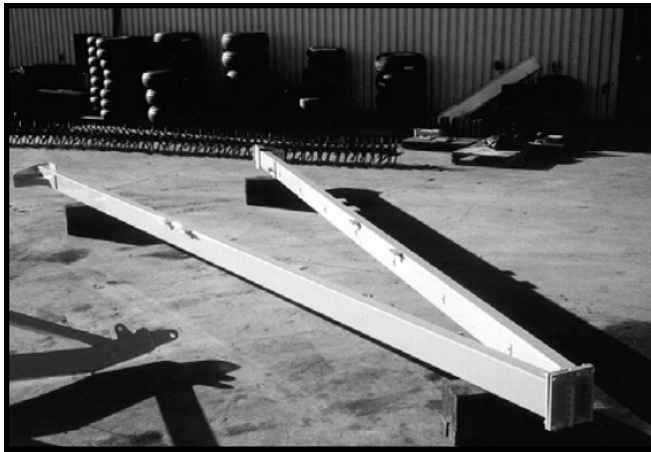
STEP 2

Place the right and left main frame (#1 & #2) onto wooden blocks supporting each end. Place the blocks so that the front ends of the main frames will be close together and the rears will be separated by 4' - 11". Using 8 (eight) 5/8" x 2 1/4" bolts, and unitorque nuts, attach the front hitch plate (#5) to the main beams, connecting them together. Leave nuts loose.

NOTE: Looking from the rear Item #2 is on the LHS and Item #1 is on the RHS.



WARNING: Practice extreme caution when assembling the harrow. The harrow is made of large heavy sections that could injure or kill if dropped!



Installing the Left and Right Main Frame Beams

STEP 3

Place the middle beam (#16) at the inner beam attachment point of the harrow. Connect the right and left ends to (#1 & #2) using 4 (four) 5/8" x 2" UNC bolts and unitorque nuts per side. Torque the 12 (twelve) nuts from Steps 2 and 3 to 100 ft lbs.



Attaching Middle Beam

STEP 4

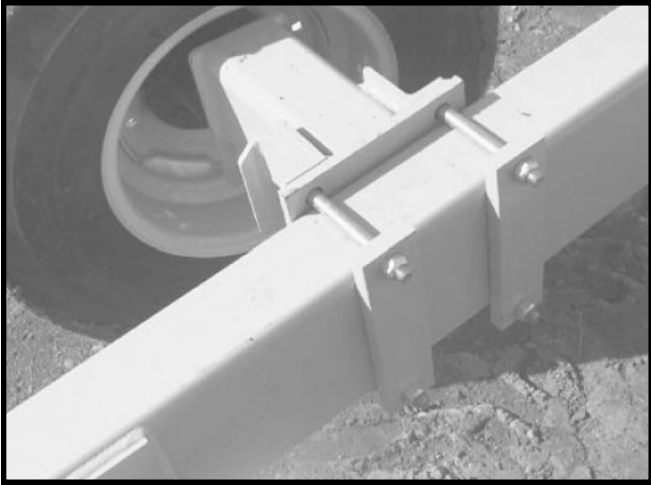
Place the rear beam (#15) at the rear of the harrow. Connect the right and left ends to (#1 & #2) using 4 (four) 5/8" x 2" UNC bolts and unitorque nuts per side. Torque to 100 ft lbs.



Attaching the Rear Beam

STEP 5

Connect the right wheel mount (#25) to the right main frame (#1) and the left wheel mount (#26) to the left main frame (#2) using 4 (four) 3/4" x 7" G8 bolts and 4 (four) G8 unitorque nuts per side. Two main wheel-backing plates per side are used to straddle and clamp the wheel mounts to the main frames. Use the locator tab welded to the main frames to butt the backside of the wheel mount to. Torque to 155 ft lbs.



Attaching the Right Wheel Mount

STEP 6

Place the front wing mount (#10) over top of the two-main frame beams (#1 & #2). The location of the front wing mount is very important. If it is misaligned, it will be very difficult to install the wings properly. The front wing mount beam is located near the middle of the mainframe beams where the 2-hole brackets located on the outside of either beam. The wing mount should be centered over the main beams.

Find the centerline of the front wing mount. Measure from the centerline to the angle brackets and move the front wing mount until the measurements are equal on each side. On each side, install a $\frac{3}{4}$ " x $5\frac{3}{16}$ " x $7\frac{1}{4}$ " long U-bolt over the wing mount beam and through the angle bracket.

This joint may have to be loosened off and the front wing mount moved to one side or the other side slightly. If you have problems with lining up the wings, etc., this is likely the problem.



Attaching the Front Wing Mount

STEP 7

Attach the left and right front wing mount braces (#12 & #13). These attach to the vertical tube on the front wing mount and then down to the left and right main beams.

Attach each brace to the front wing mount using 2 (two) $\frac{5}{8}$ " x $4\frac{11}{16}$ " x $5\frac{1}{4}$ " long U-bolts and 4 (four) $\frac{5}{8}$ " G8 unitorque nuts. The braces are each attached to the main frame using 2 (two) $\frac{5}{8}$ " x $4\frac{11}{16}$ " x $9\frac{1}{2}$ " long U-bolts and 4 (four) unitorque nuts.

Square the front wing mount to the main frame and then tighten all nuts down. Torque the $\frac{5}{8}$ " U-bolts to 60 ft lbs. Torque the $\frac{3}{4}$ " U-bolts from Step 6 to 75 ft lbs.



Attaching the Wing Mount Braces

STEP 8

Jack up the frame to allow installation of the tires (12.5L x 15) and rims. Attach the tire/rim to the spindle using the 9/16"-18 UNF wheel nuts located on the spindle studs. Torque to 90 ft lbs. Attach the spindle with 5/8 x 4 capscrew and locknut.



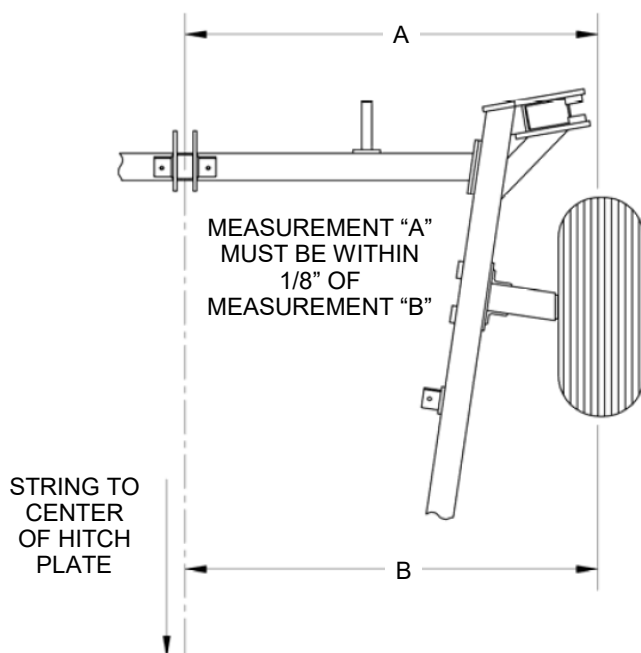
WARNING: Use caution when using a jack or other lifting device. Take measures to prevent slippage.

STEP 9

Attach the hitch jack (#6) to the boss near the front of the unit and raise until harrow is level.

STEP 10

Verify the alignment of the LH & RH wheels. Stretch a string between the center of the hitch plate (#3) to the center of the rear beam (#15). Measure the shortest distance from the string to a groove in the tire at the front and the rear of the tire as shown. Use the same groove in the tire for both measurements. These measurements must be within 1/8" of each other.



Wheel Toe Measurement

If the wheel need aligning, install the shim(s) between the wheel mount and the frame. Install the shim beneath the front pair of bolts to toe the wheel out or the rear bolts to toe it in. Notice the shim is designed to "hook" in place so it maintains proper placement while the mounting bolts are tightened.



Wheel Mount Shim
PMF P/N 30-90376-17
KMC P/N 61-027-091

STEP 11

Attach the 2 (two) rear beam braces (#18 & #19) between the middle beam and the main frames. Tabs are located on either side of the upright on the middle beam and on the inside faces of the main frames. Use a 5/8" x 2" bolt, and unitorque nut on each end. The left brace has two hose clamp tabs

STEP 12

Attach the tail-locking bar (#20) to the middle beam (#16) using the middle set of holes at the top of the middle beam. Use a 1" x 5" G8 bolt and a nylon-locking nut to form the hinge. Do not over-tighten the nut, allowing the bar to move freely. Insert one of the 7/8" diameter pins into the rear set of holes on the middle beam to lock the bar down. Secure with the hitch pin clip.

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STEP 13

The 1 1/2" wrench (#17) is attached to the middle beam (#16) using the clip provided. The holders on the main beam should face to the inside of the machine.

STEP 14

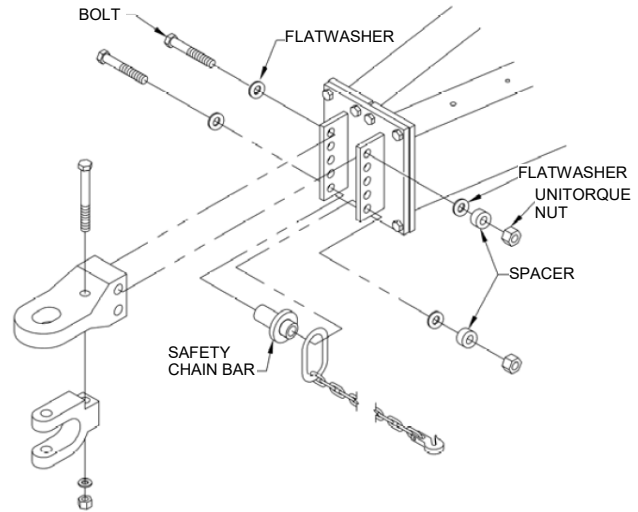
Attach the pigtail hydraulic hose holder (#5) to the front of the left mainframe beam using 1 (one) 1/2" x 1 1/2" bolt, flatwasher, and lockwasher, and hex nut.

STEP 15

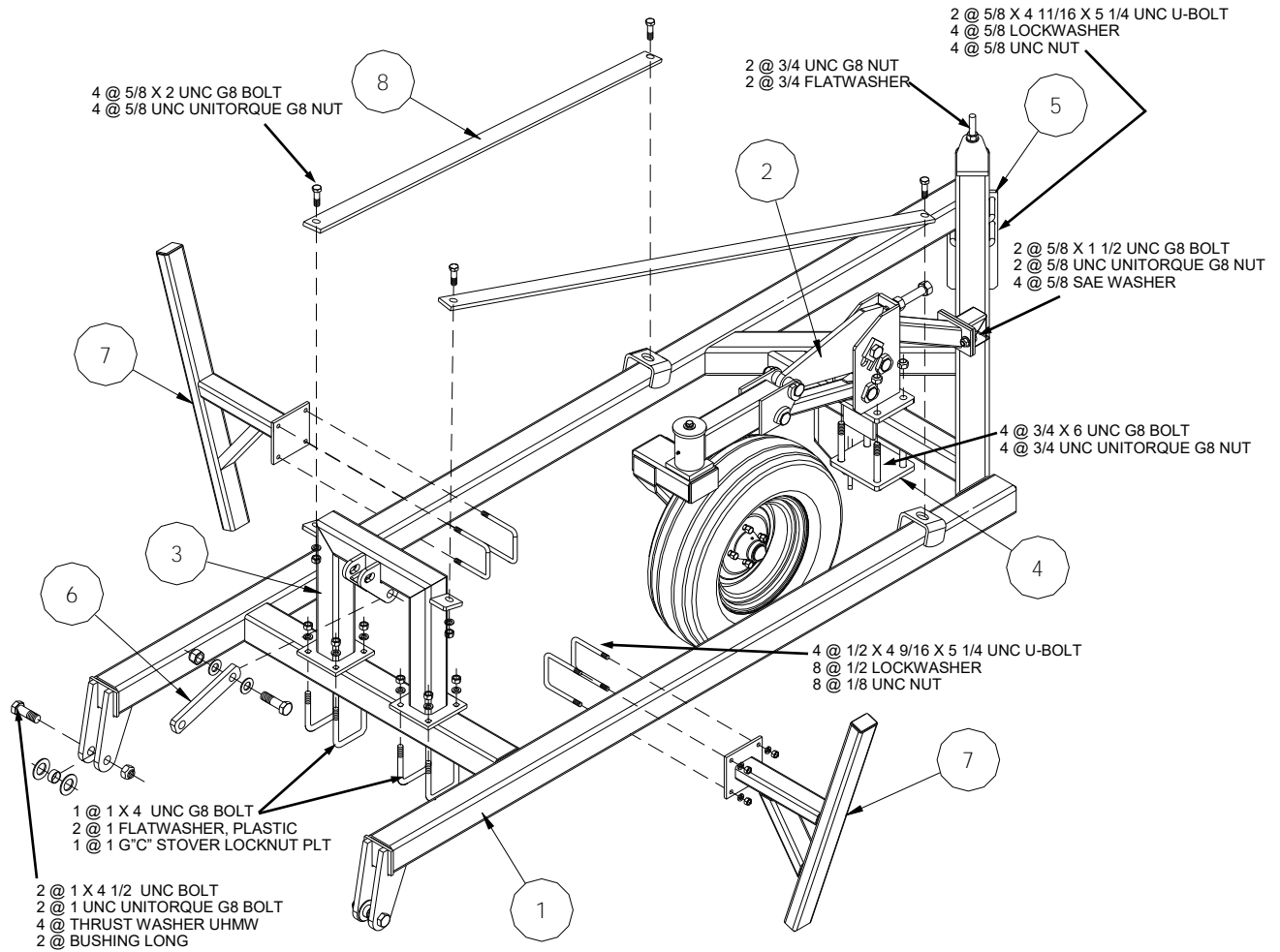
Depending on your tractor hitch, you may require the clevis attachment for your harrow. If your tractor has a double tongue, the single cast hitch is required. If your tractor has a single tongue, you will require the clevis option. For your reference the 1" x 7 1/2" G8 bolts securing the hitch cast (#4) to the hitch plate (#3) and safety chain bar are torqued to 350 ft lbs and the optional 3/4" x 5" UNC bolt securing the clevis is torqued to 175 ft lbs.

ATTENTION: Either the tractors hitch or the harrow **MUST** have a double clevis arrangement. During wing folding, there will temporarily be negative weight on the hitch.

The single cast hitch is standard. If you require the add on lower clevis, order KMC option, part number, (61-082-003).



Tow Chain/Hitch Connection

2.3 TAIL ASSEMBLY**NOTE: USE LOCK-TITE ON ALL NUTS**

ITEM	PMF PART NO	KMC PART NO	DESCRIPTION	QTY
1		61-080-015	TAIL WELDMENT, 30 FT REAR	1
2		61-081-007	TAIL CASTER SUB ASSEMBLY	1
3	05-51039-02	61-080-050	TAIL TOP BRIDGE	1
4	30-90376-09	61-023-023	BOTTOM PLATE, CASTER BRKT	1
5	05-51008-01	61-080-037	REAR HEIGHT ADJUSTER	1
6	05-51012-01	61-023-060	TAIL LEVER	1
7	05-51035-01	61-080-048	TAIL TOOL CATCHER	2
8		61-023-009	STRAP, 30 FT REAR	2

STEP 18

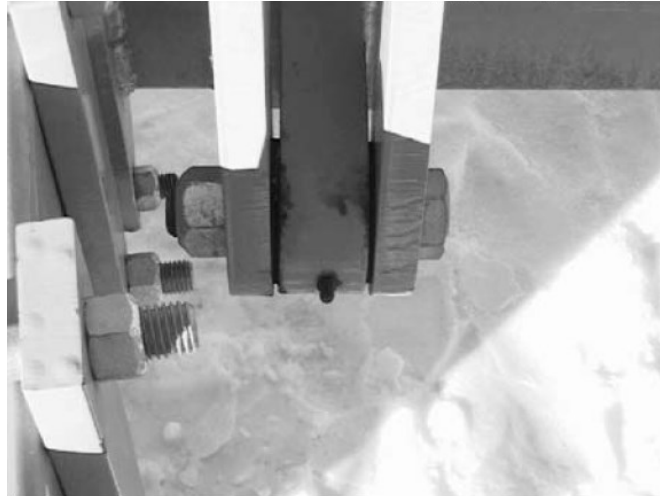
Position the rear tail (#1) onto the two spacers and fasten together using the (8) eight 5/8" x 2 1/4" bolts and unitorque nuts. Torque to 100 ft lbs.



Rear Tail Installation

STEP 19

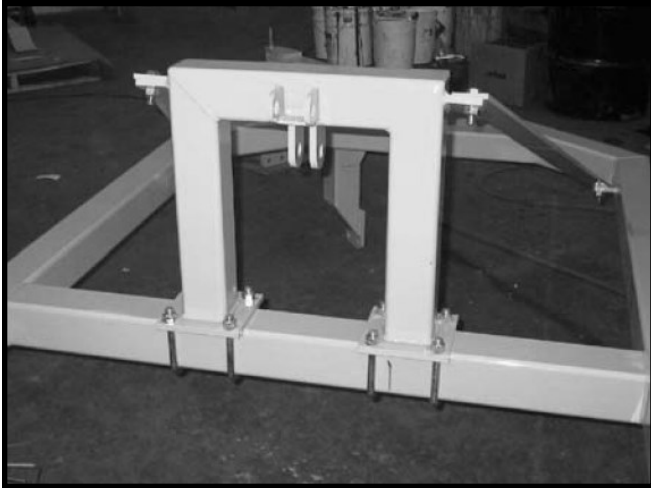
The fully assembled tail (#1) is now connected to the rear beam. A 1" x 4 1/2" G8 bolt, unitorque nut, a long grooved bushing and two plastic thrust washers are used for each connection. This connection forms the hinge that allows the tail to float up and down. The 1" bolts can be tightened as the bushing acts as a spacer between the lugs. Torque to 350 ft lbs.



Tail Hinge Connection Detail

STEP 20

Attach the tail top bridge (#3) to the front of tail section (#1) using 4 (four) 5/8" x 4 11/16" x 5 1/4" long U-bolts, 8 nuts and lockwashers. Torque to 60 ft lbs. The tail top bridge is located on the first lateral spreader beams on the tail section. Locate this on the center of this beam. Keep the top bridge square to the tail. The top lugs should point towards the rear beam.



Tail Top Bridge Connection

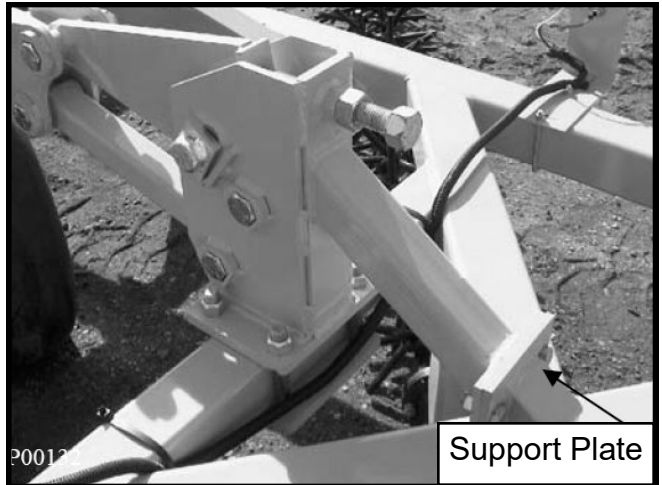
STEP 21

Attach the 2 rear straps (#8) between the tail top bridge (#4), and rear tail (#1) using 4 5/8" x 2" bolts, and unitorque nuts. Tabs are located on either side of the tail top bridge and on the top of the tail side beams. Torque to 100 ft lbs.

STEP 22

Jack and block the tail up and install the tail caster wheel assembly (#2). The tail caster is tagged and marked "Tail Caster". The tail caster wheel is attached to the tail on the 3 1/2" and 3 1/2" beam as shown. Align the caster wheel assembly so that the caster mount bracket support lines up with the support plate welded onto the tail frame.

Using the 2 (two) 5/8" x 1 1/2" G8 bolts, 4 (four) 5/8" SAE flatwashers, and unitorque nuts. Torque to 100 ft lbs. The caster wheel is then attached using a 4 hole backing plate (#4) and 4 (four) 3/4" x 6" G8 bolts, and unitorque nuts. Torque to 130 ft lbs. The backing plate is used to clamp the caster wheel around the 3 1/2" x 3 1/2" tubing. See following photo. When the installation is complete, the blocking can be removed.



Tail Caster Wheel Connection

STEP 23

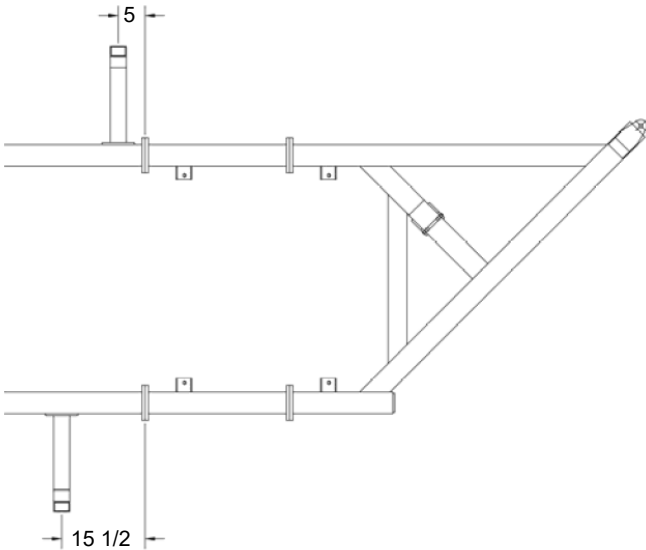
Install the tire and rim assembly to the hub on the caster wheel swivel. Secure into place using the 4 (four) 1/2-20 UNF wheel bolts. Torque to 65 ft lbs. See Caster Wheel Assembly.

NOTE: The caster assembly for the tail section is tagged with "Tail Caster" written on it.

STEP 24

The 2 (two) tail tool catchers (#7) can be installed to the tail using 2 (two) 1/2" x 4 9/16" x 5 1/4" long U-bolts, 4 nuts and lockwashers per side. Torque to 40 ft lbs,

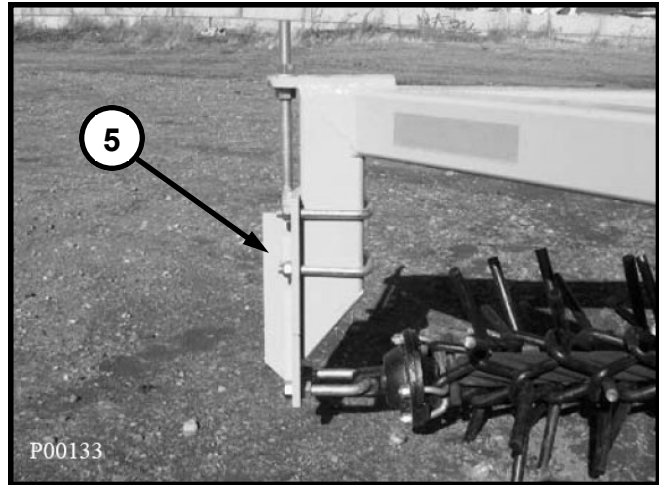
NOTE: The tool catchers can be removed around later to better keep the tooling away from the tail section.



Tool Catcher Location

STEP 25

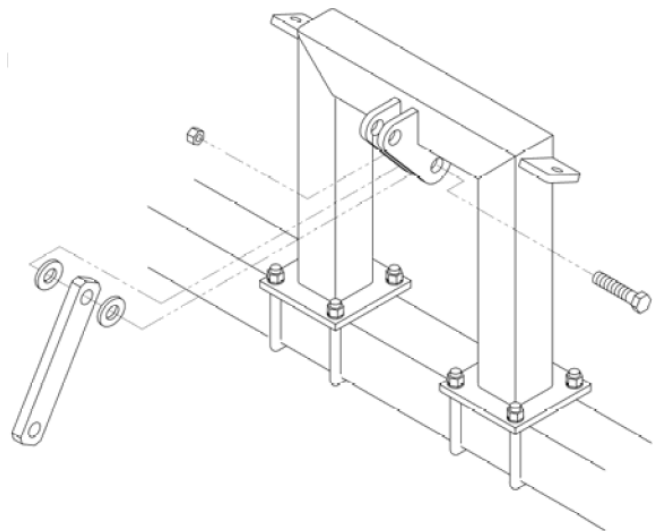
Attach the rear height adjusted (#5) to the back end of the tail. The threaded rod portion of the rear height adjusted slides through the hole in the tab at the rear of the harrow. A 3/4" nut and flatwasher are used on the top and bottom of the tab to secure the threaded rod to the tab and provide height adjustment. The rear height adjuster is then clamped to the rear down post on the tail using 2 (two) 5/8" x 4 11/16" x 5 1/4" long U-bolts, 4 nuts and lockwashers. Torque to 60 ft lbs.



Rear Height Adjust Connection

STEP 26

Ensure the 1" x 4" G8 bolt, 2 (two) 1" plastic washers and a 1" G"C" stover locknut are not over tightened for the bolt forms a hinge for the lever. Tighten only enough to be snug, but leave the joint with motion.



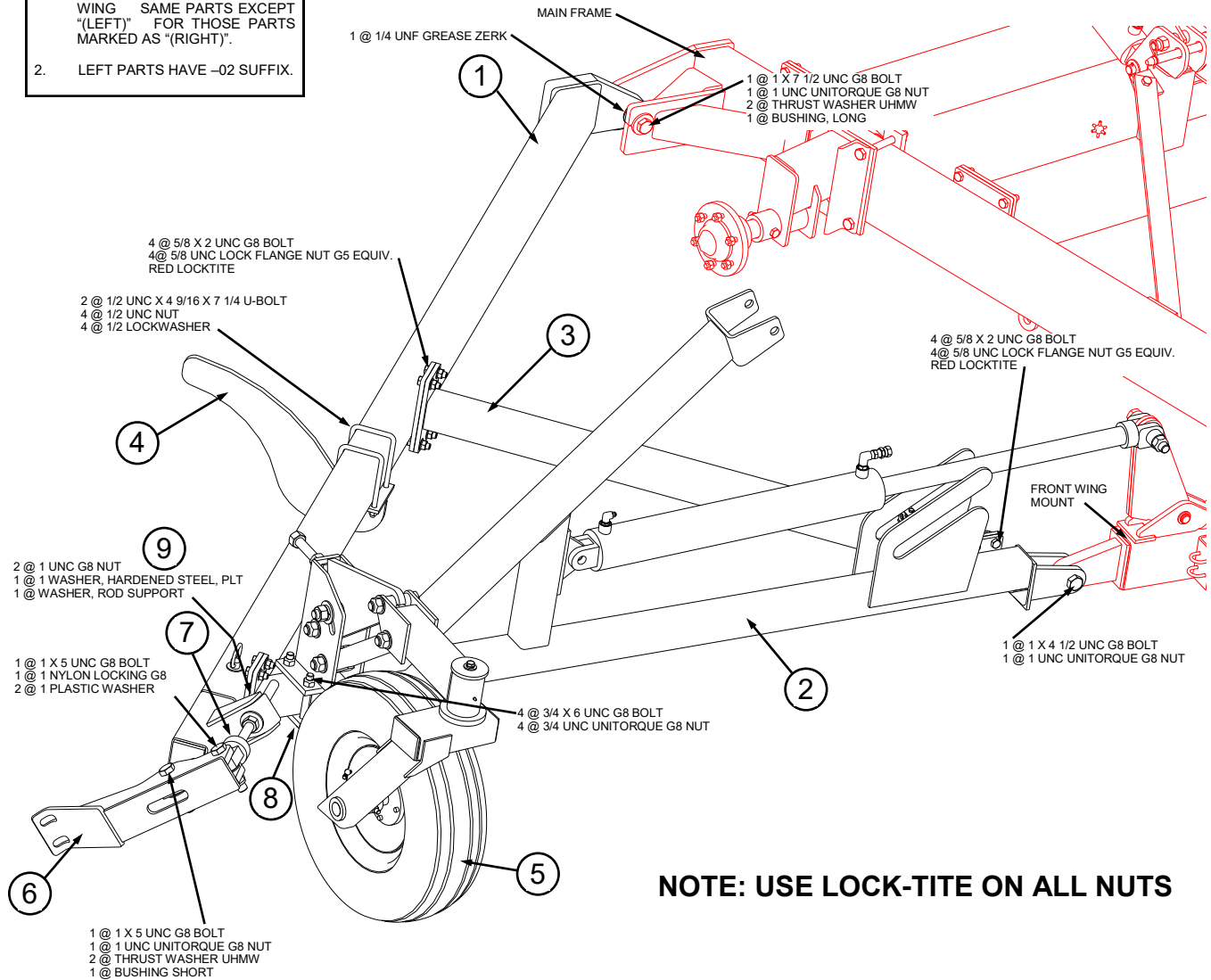
Tail Lever Installation

30' Rotary Harrow

2.4 WING ASSEMBLY

NOTE:

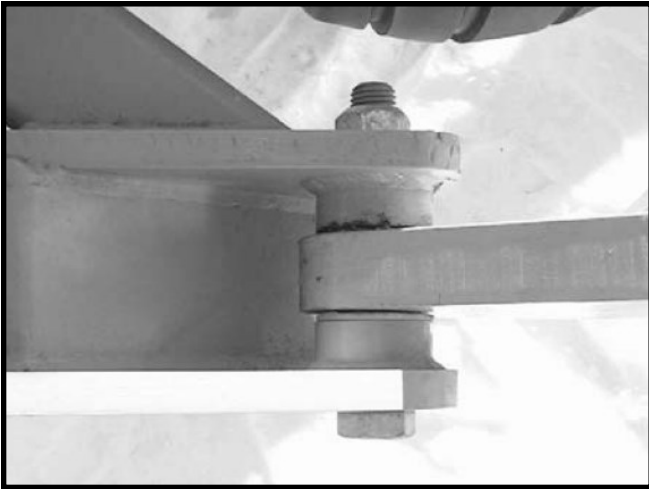
1. RIGHT WING SHOWN. LEFT WING SAME PARTS EXCEPT "(LEFT)" FOR THOSE PARTS MARKED AS "(RIGHT)".
2. LEFT PARTS HAVE -02 SUFFIX.



ITEM	PMF PART NO	KMC PART NO	DESCRIPTION	QTY
1		16-080-002	WING STIFF ARM (RIGHT)	1
2	05-55014-01	61-080-088	WING FRONT BEAM (RIGHT)	1
3	05-55018-01	61-080-090	WING LONG BRACE	1
4		61-080-053	WING TOOL CATCHER	2
5		61-081-006	WING CASTER ASSEMBLY	1
6		61-081-003	TOOL LEVER, LONG STROKE	1
7	05-51098-00	61-080-072	TENSION ROD, LONG STROKE	1
8	30-90376-09	61-023-023	BOTTOM PLATE CASTER BRKT	1
9	71-51004-00	61-026-025	BUSHING, TENSION ROD	1

STEP 27

The wing is assembled by first forming the outer triangle of the wing. Attach the right wing stiff arm (#1) to the rear hinge clevis on the main frame of the harrow. This connections uses a 1" x 7 1/2" G8 bolt, unitorque nut, a long grooved bushing, and two plastic washers. Torque to 350 ft lbs. Block the other end of the beam up about one foot.



Hinge Detail



Stiff Arm Attachment

STEP 28

Attach the right wing front beam (#2) to the front wing mount using a 1" x 4 1/2" G8 bolt, unitorque nut and a long grooved bushing. Torque to 350 ft lbs. The front wing beam should be placed in-line with the arm on the front wing mount and blocked up about a foot on the opposite end. Connect the other end of the right wing front beam to the right wing stiff arm using the 5/8" x 2" G8 bolts and lock flange nut. **DO NOT torque bolt.**



Hinge Detail



Front Wing Beam

STEP 29

The wing brace (#3) is now connected to the wing. There is one plate on both the stiff arm and the front wing beam. The wing braces connect between these plates. The braces are interchangeable left and right. At each of the two connection points, 4 (four) 5/8" x 2" bolts, and lock flange nuts are used. Apply thread fastening compound (Loctite) to all of these 5/8" bolts. **Once the wing assembly has been loosely put together**, fold onto the front wing mount, to ensure proper alignment of the wing transport cradle. Adjust if necessary and then go around and torque all 5/8" bolts to 100 ft lbs. Then unfold.



**Tool Tension Lever and
Tool Tension Rod Connection**

STEP 30

The tool tension lever (#6) and the tool tension rod (#7) can now be attached to the wing. The tool lever is attached using the lug on the end of the wing. A 1" x 5" G8 bolt, unitorque nut, short grooved bushing, and two plastic washers are used to make the connection. Torque to 350 ft lbs. The holes near the middle of the tool lever are used for the connection.

The tool tension rod is first connected to the wing by threading a 1" G8 nut and rod support washer onto the threaded rod. The tension rod bushing is placed between the plates on the wing. Insert the 1" threaded rod through the corner plate and the tension rod bushing. Another 1" nut and a hardened washer are placed the other side of the plate. The other end of the tool tension rod is connected to the top of the tool lever using a 1" x 5" G8 bolt, two 1" plastic washers, and a 1" nylon-locking nut. Each of the plastic washers is placed between the tool tension rod and the tool tension lever. **DO NOT** over-tighten the nylon-locking nut. It is used to make a hinged connection.

STEP 31

The wing caster assembly (#5) is now attached to the wing. The wing caster wheels are attached in an identical manner as the tail caster wheel. Use 4 (four) 3/4" x 6" G8 bolts, unitorque nuts and a backing plate (#8) to clamp the caster wheel to the 3 1/2" x 3 1/2" tubing at the end of the front wing. Again the bolts should straddle the plate welded to the front of the tube. Torque to 130 ft lbs.

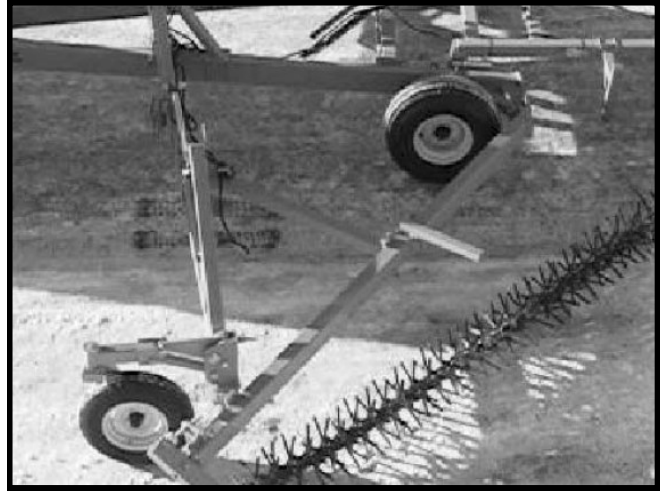


Wing Caster Assembly Installation

STEP 32

Install the tire and rim assembly to the hub on the caster wheel swivel. Secure into place using the 4 (four) 1/2-20 UNF wheel bolts. Torque to 65 ft lbs. See Caster Wheel Assembly.

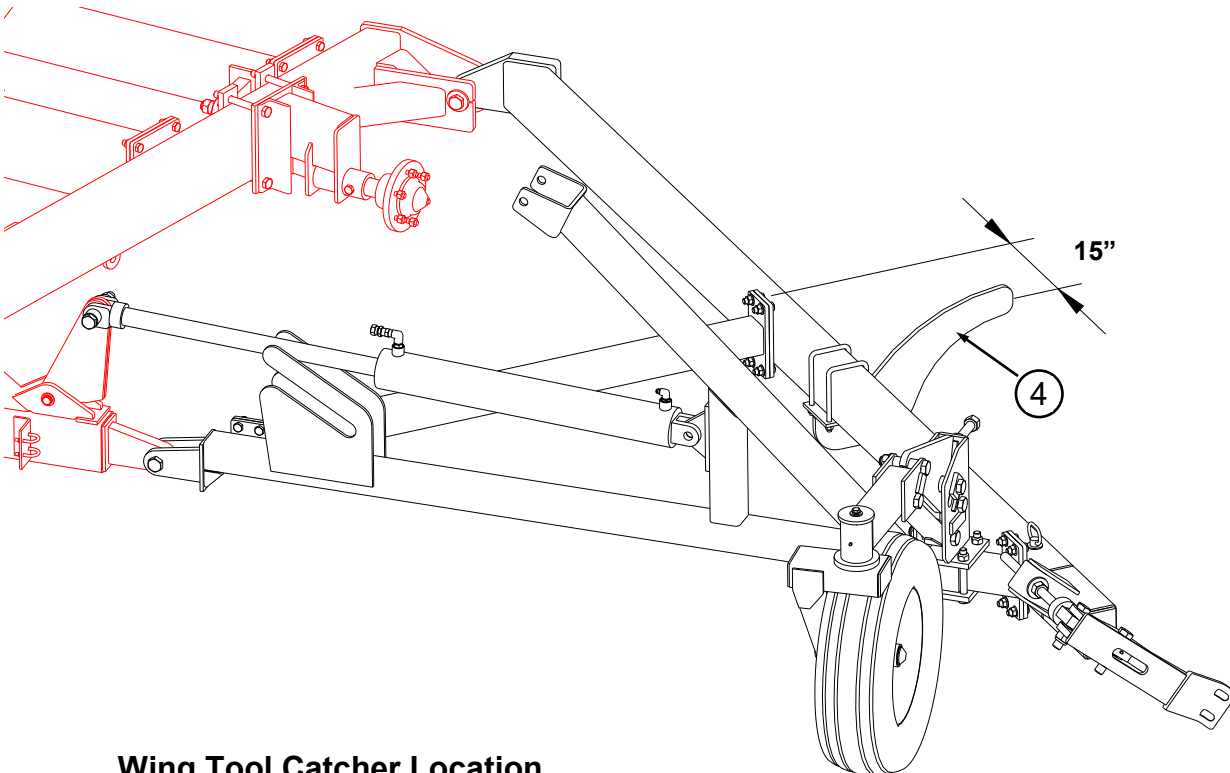
NOTE: The caster assembly for the tail section is tagged with "Tail Caster" written on it.



STEP 33

Wing Tool Catcher

The wing tool catcher (#4) can be attached to the wing. The wing tool catcher is installed using 2 (two) 1/2" x 4 9/16" x 7 1/4" long U-bolts and 4 (four) nuts and lockwashers. Torque to 40 ft lbs. It is placed on top of the 6" x 4" tubing on the wing stiff arm. The location is shown below.

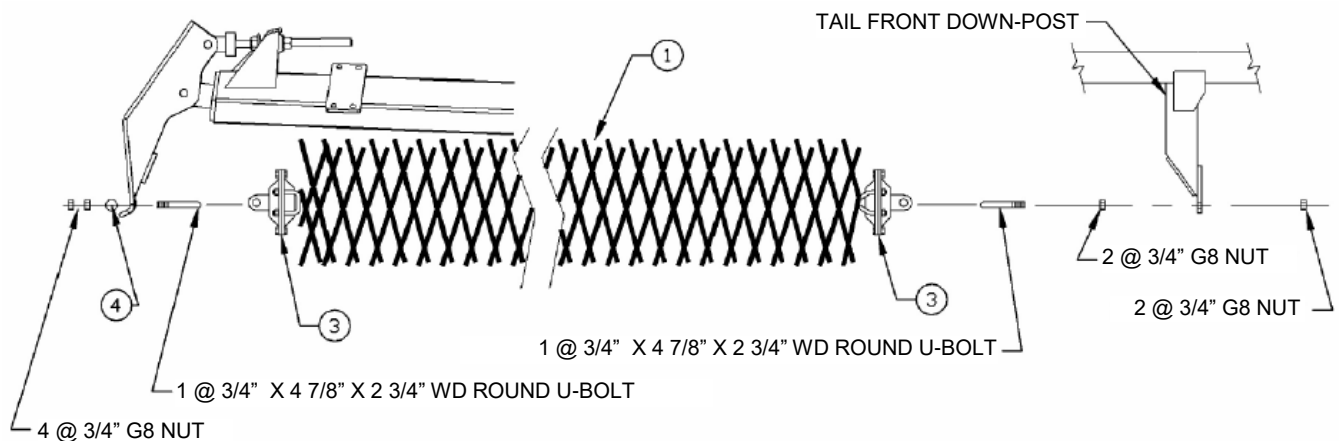


Wing Tool Catcher Location

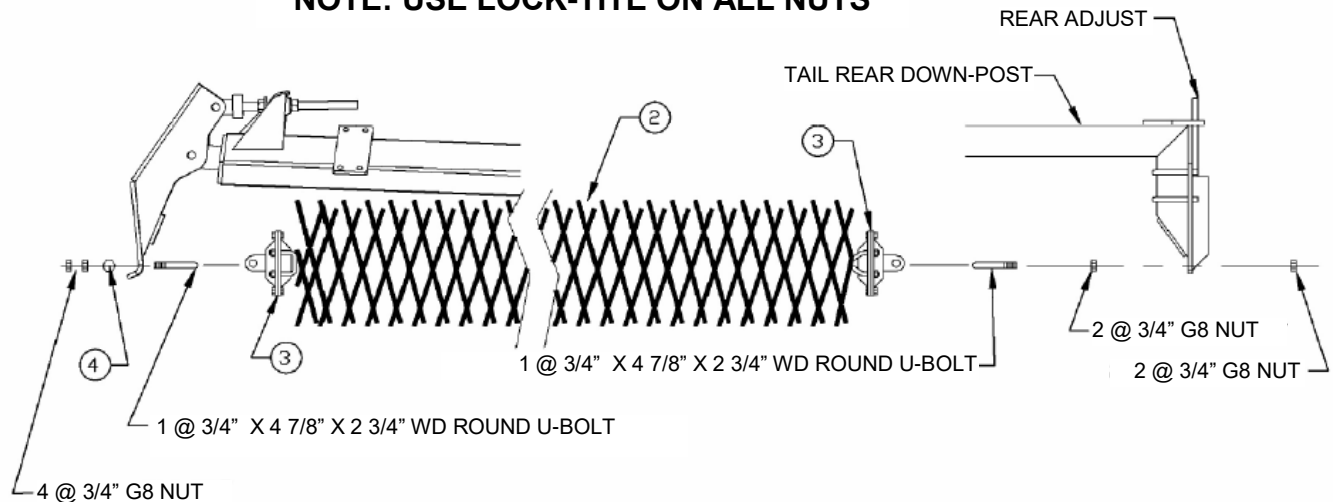
2.5 TOOLING INSTALLATION

The tooling assemblies can now be connected to the tail section and the tool tension lever. The tooling is pre-assembled to the bearing housings. The tooling should be aligned between the tail and the tool tension lever. The correct tooling assembly must be used on the correct side and these must be facing the correct direction. Keep these three things in mind;

1. The tooling section, which goes to the left side, is slightly longer than the right side section.
2. The tooling end at the tail is connected to the bearing housing using two U-bolts, which have a kink near the squared end.
3. The tines themselves should point slightly toward the rear.



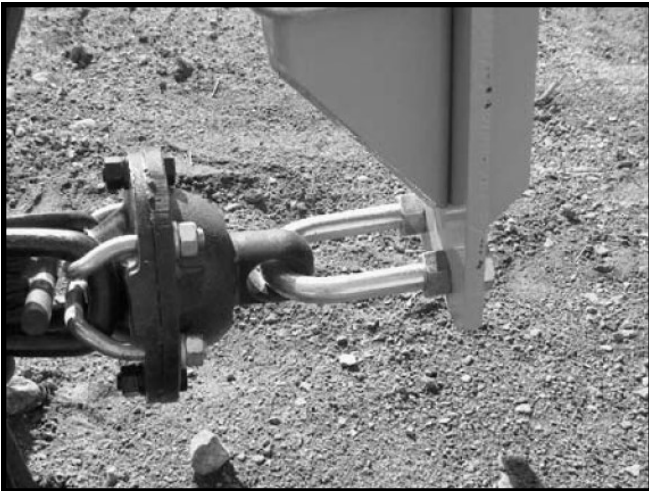
NOTE: USE LOCK-TITE ON ALL NUTS



ITEM	PMF PART NO	KMC PART NO	DESCRIPTION	QTY
1	05-51089-01	61-081-038	TOOLING ASSEMBLY, RIGHT SIDE (SHORT)	1
2	05-51088-01	61-081-037	TOOLING ASSEMBLY, LEFT SIDE (LONG)	1
3	05-02000-02	61-081-032	BEARING ASSEMBLY	4
4	71-41500-00	61-026-022	BRG HSG MNT SHAFT	2

STEP 34

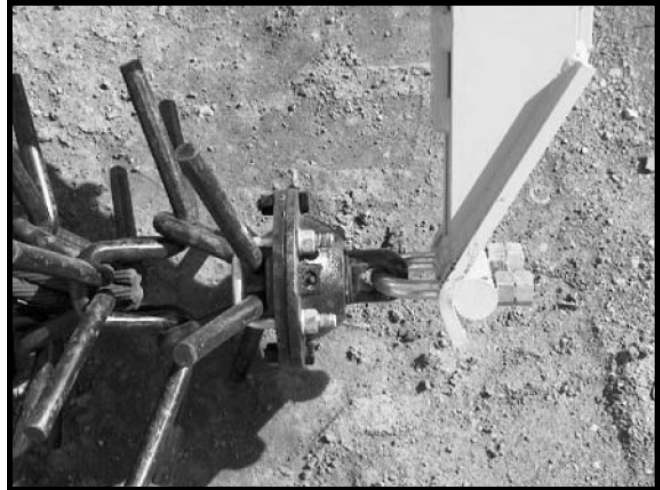
Connect to the tail section first. The left side tooling assembly (#2) attaches to the rear adjust plate. See Tail Assembly. The right side tooling assembly (#1) attaches to the solid plate just behind the tail caster wheel. At each connection, use a 3/4" x 2 3/4" x 4 7/8" long round U-bolt. Thread the U-bolt through the hole in the bearing assembly shaft. A 3/4" nut is placed on both ends of the U-bolt runs down to the ends of the threads. The U-bolt is then placed through the connection plates, another 3/4" nut is applied to each end of the U-bolt, and the two nuts are used to jam the U-bolt in place. **Use permanent thread locking compound on all nuts to keep them tight.**



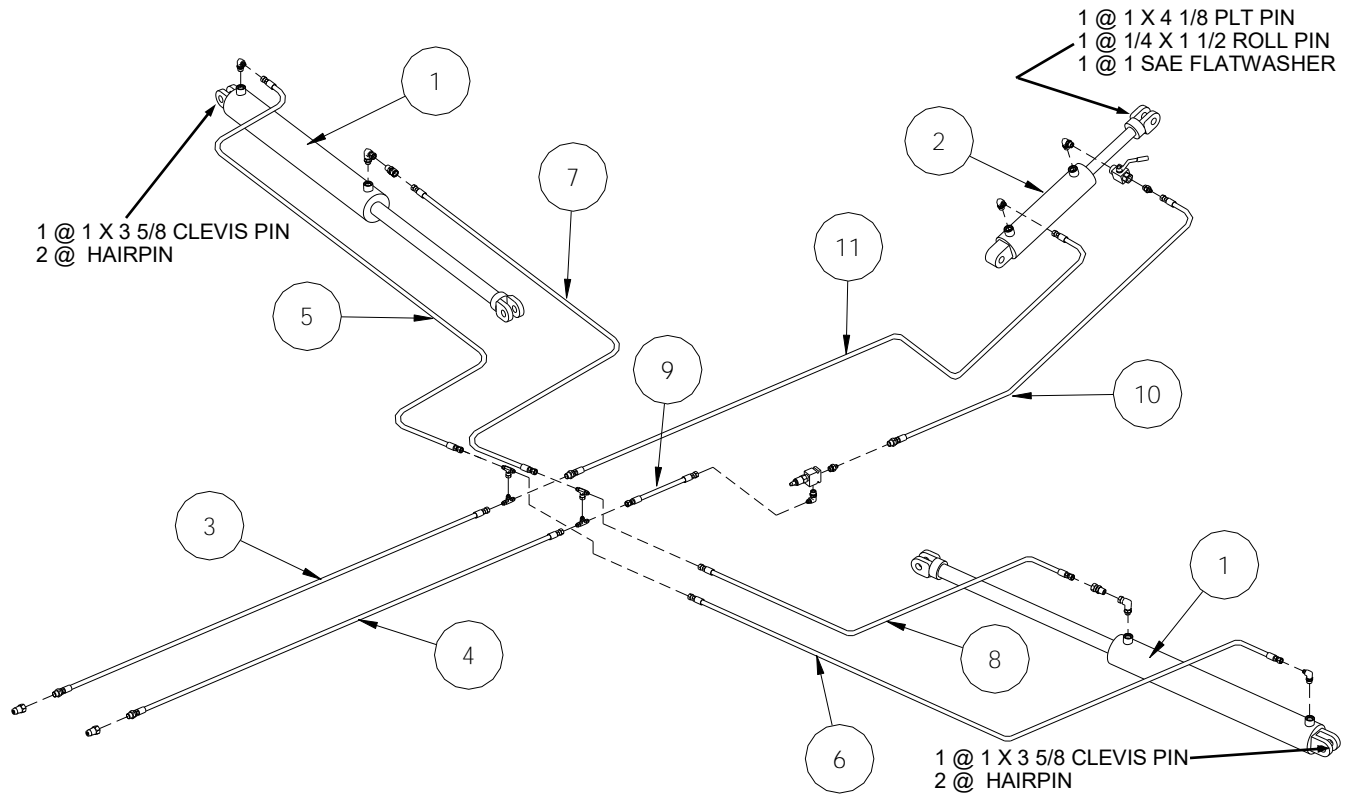
Tooling Connection at the Tail

STEP 35

Connection to the tool tension lever is slightly different. Place the U-bolt through the tool levers connection plate and the bearing housing mount shaft (#4) that sits in the curved part of the connection plate. Two 3/4" nuts are applied to the outside of the mount shaft. **Tighten the nuts and secure with permanent thread locking compound.** This allows the connection to tilt.

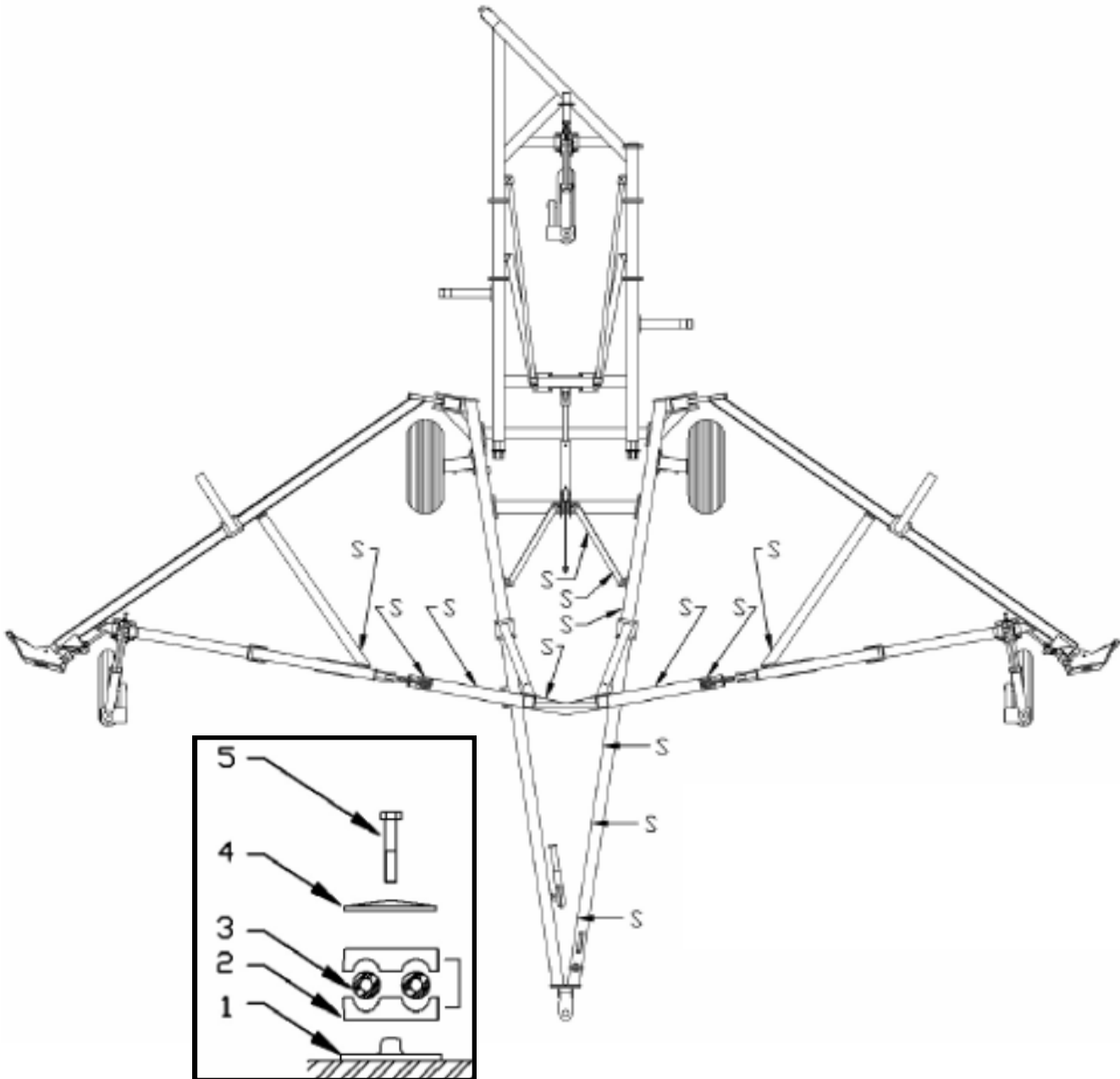


Front Tooling Connection

2.6 HYDRAULIC INSTALLATION**HOSE INSTALLATION**

ITEM	PMF PART NO	KMC PART NO	DESCRIPTION	QTY
1	31-10517-04	61-061-014	4 BORE X 30 STROKE CYL (WING LIFTING)	2
2	31-10520-01	61-061-015	3 1/2 BORE X 12 STROKE CYL (TAIL LIFTING)	1
3	05-55001-01	61-059-015	HOSE, 3/8" X 165 1/2 MNPTF-6JICX	1
4	05-55001-01	61-059-015	HOSE, 3/8" X 165 1/2 MNPTF-6JICX	1
5	05-55001-04	61-059-018	HOSE, 3/8" X 153 6FJICX -6FJICX	1
6	05-55001-05	61-059-019	HOSE, 3/8" X 124.5 6FJICX -6FJICX	1
7	05-55001-07	61-059-021	HOSE, 3/8" X 122 6FJICX -.5MNPTF	1
8	05-55001-06	61-059-020	HOSE, 3/8" X 93 6FJICX -.5MNPTF	1
9	05-55001-02	61-059-016	HOSE, 3/8" X 13.25 6FJICX -6FJICX	1
10	05-55001-03	61-059-017	HOSE, 3/8" X 80 6FJICX -6FJICX	1
11	05-55001-03	61-059-017	HOSE, 3/8" X 80 6FJICX -6FJICX	1

30' Rotary Harrow



HOSE CLAMP ARRANGEMENT
("S" ABOVE)
13 PER HARROW

CLAMP LAYOUT

ITEM	PART NUMBER	DESCRIPTION	QTY
1	48-050-022	WELD PLATE, HYD TUBING CLAMP	22
2	33-050-158	HOSE CLAMP (SET)	31
3	-	HYDRAULIC HOSES	-
4	33-050-160	COVER PLATE	20
5	48-090033	CAPSCREW, 5/16 X 1 3/4 G5 PLT	20

STEP 36

First, attach the tail-lifting cylinder (#2). A 3 1/2" bore x 12" stroke cylinder is used. Attach the butt end of the cylinder to the lower pair of holes on the rear beam upright post. A 1" diameter x 4 1/8" long plated pin, 1" SAE flatwasher and a 1/4" x 1 1/2" roll pin are used to attach the butt. Do not attach the rod end of the cylinder at this time.



Tail Cylinder Attachment

STEP 37

Attach the main wing lift cylinder (#1). This is a 4" x 30" stroke cylinder. Attach the butt end of the cylinder to the front wing using a 1" x 3 5/8" clevis pin and 2 hairpin clips.



Main Cylinder Attachment

Begin attaching the hydraulic hoses. The hoses have been pre-assembled and only require attaching to the cylinders and to the frame of the machine. Each hose end is numbered for reference with its part number. The diagram at the start of this section shows the relationship between the hose ends and the location.

STEP 38

Arrange the hoses underneath the machine so that the branches in the hoses are just behind the front wing mount. There should be two hoses (#3 & #4) going towards the hitch, two hoses (#5 & #7) going towards the right wing, two hoses (#8 & #6) towards the left wing and two hoses (#10 & #11) towards the tail section.



Branches Located at the Front Wing Mount

STEP 39

Attach the hoses to the main frame using a single clamp arrangement as depicted below. Follow along the main frame, underneath the front wing mount attaching the four hoses until you reach the hitch. Leave the clamps somewhat loose so that the hoses can be adjusted later.



Clamp Arrangement Toward Hitch

STEP 40

Using a single clamp arrangement attach the hoses along the main frame and up the rear beam brace to the tail cylinder. There should be about 1 1/2 to 2 feet of slack on each line.



Clamp Arrangement Toward Tail

STEP 41

Using single clamps run the two lines along the front wing mount and on to the long wing brace. There should be downward sag of about 5" as the four hoses go past the wing hinge point.



Hoses Passing the Hinge Point

STEP 42

Attach the hoses to the appropriate ports using the numbers on the hoses and the drawing at the start of this section.

STEP 43

WARNING: Hydraulic fittings are hand tightened only. Ensure all hydraulic fittings are tightened before charging system

Go over the system adjusting the hoses for slack and securing the hose clamps when the hoses seem to fit properly. Re-check the connections on all the cylinders.

STEP 44

Block all the cylinders up so the shafts will not interfere with anything as they are extended. Make sure **none** of the rod ends are attached at this time.

STEP 45

The hydraulic system must now be charged and the air purged from the system. Connect the 2 (two) hoses at the hitch to your tractor.

ATTENTION: Ensure that the tractor's hydraulic system is full at this time. Check regularly during the charging process so that the level does not drop too low.

Begin forcing hydraulic oil into the lines. You will need to extend and retract the cylinders several times to purge all the air from the system. Repeat the process with the three cylinders on the main wings and tail. The last cylinder to go out should be the tail cylinder as it is controlled by a valve. Make sure it is fully extending before you finish charging the system. Leave all the cylinders fully extended at this time so that they can be connected.

STEP 46

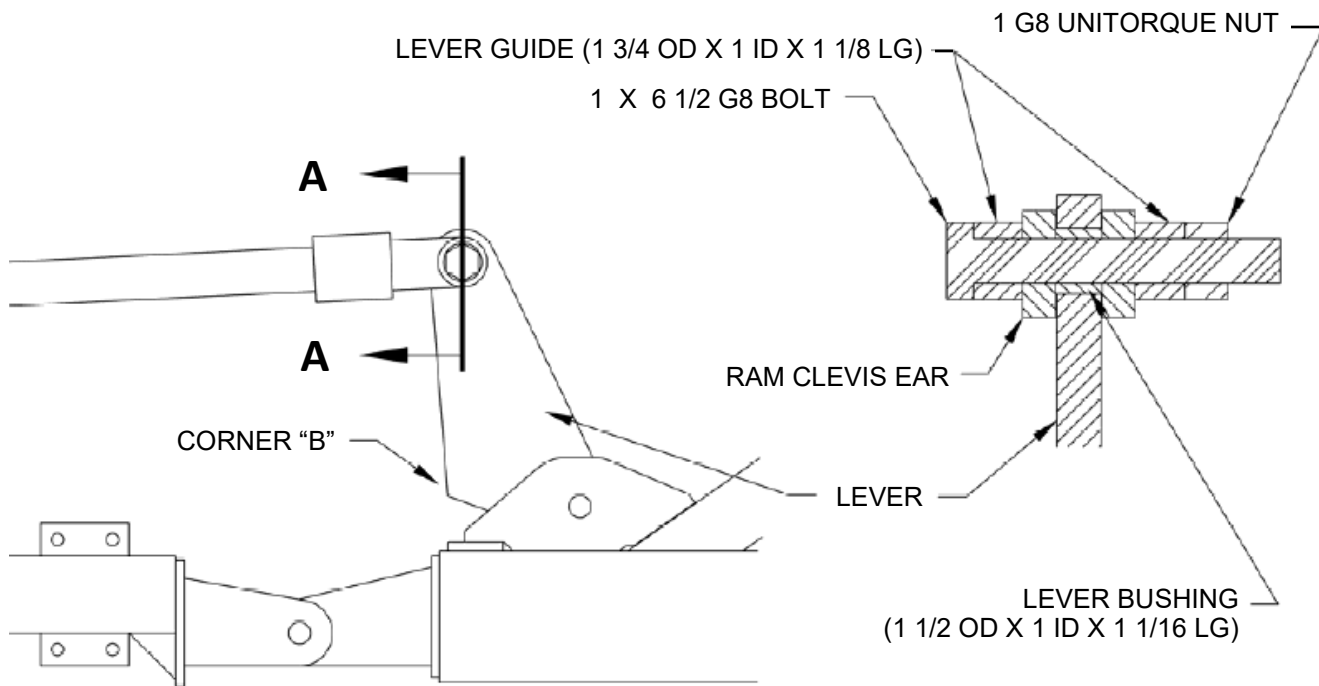
Attach the rod end of the tail cylinder to the tail lever hanging from the tail top bridge. Use a 1" x 4", 2 (two) 1" plastic washers, and a nylock nut. Again, do not over-tighten the jam nut, as this must be a free moving hinged connection.



Rod End Connection of Tail Cylinder

STEP 47

Attach the rod end of the main lift cylinder to the front lock lever. This connection is depicted below. Ensure the corner "B" of the lock lever is oriented toward the cylinder as shown. Tighten the bolt securely at the connection. Torque to 350 ft lbs.



Main Cylinder Rod End Connection

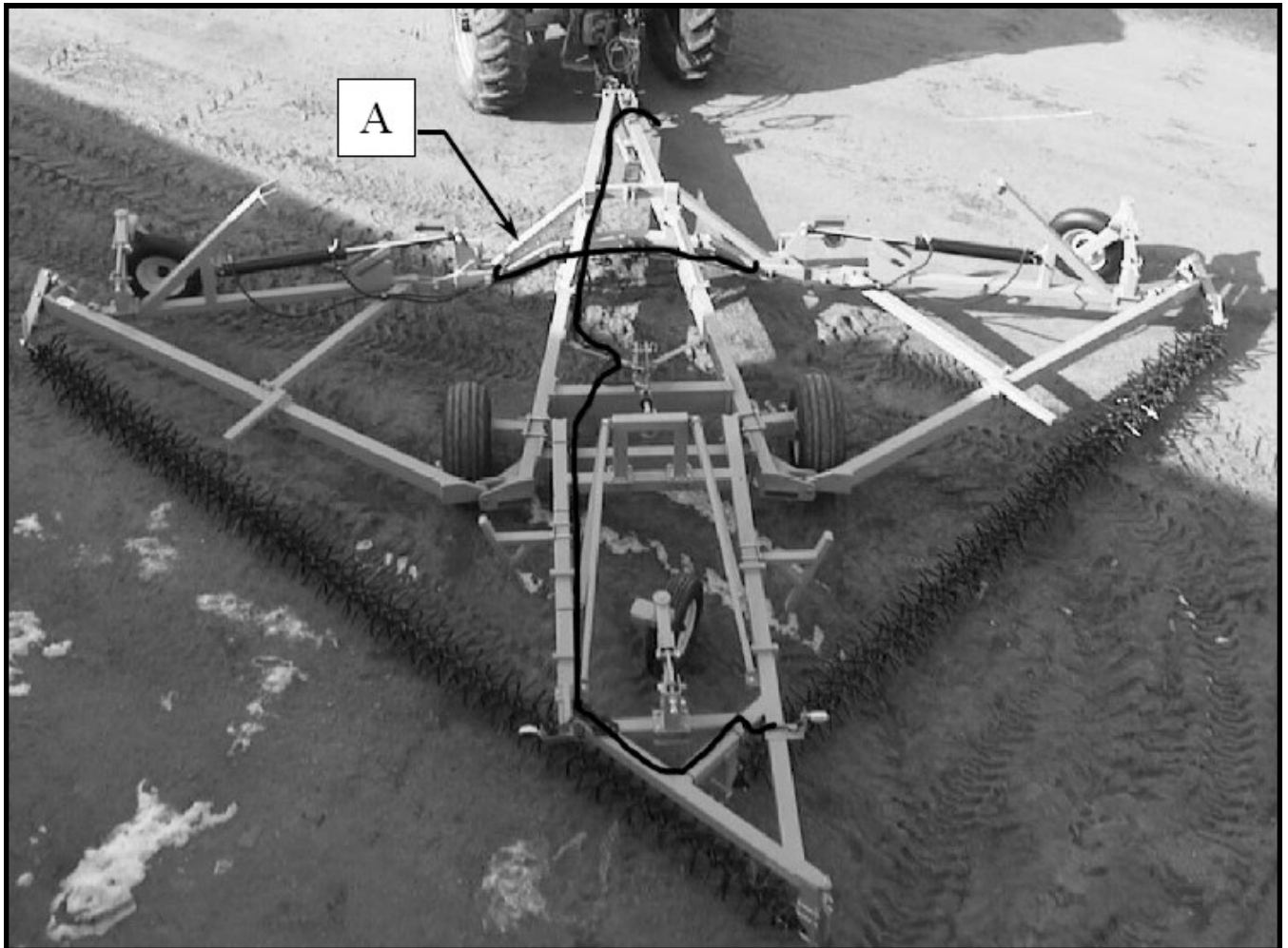
ATTENTION: Ensure that corner "B" of lever is facing toward the cylinder as shown above. Incorrect orientation will result in machine damage.

2.7 WIRING HARNESS

WARNING: Place harrow into field position before laying out wiring harness. Failure to do so could result in injury or death.

STEP 48

The electrical wiring harness (#1) installed onto the harrow is shown in black. The majority of the wiring harness is installed along side of the hydraulic hoses. Where possible, tuck the wiring in behind the hoses. Start by roughly laying out the wiring harness as shown in photo. The harness is strapped to the harrow using the supplied black nylon tie straps (#2) at approximately the same locations as the hydraulic hose clamps. There are some specific instructions on routing the harness through particular areas, which will be explained, in the next few steps.



Wiring Harness Routing

ITEM	PMF PART NO	KMC PART NO	DESCRIPTION	QTY
1	05-55021-01	61-062-003	WIRING HARNESS	1
2		02-050-088	BLACK NYLON TIE STRAP	30

STEP 49

Start strapping the wiring harness to the harrow at point (A) shown in photo. Starting at this point will ensure that the harness will reach all the required areas of the harrow. The section of the harness that goes toward the hitch of the harrow is to be routed under the front wing mount. The two other sections of the harness are to be routed above the left and right main beams following the hydraulic hoses toward the two extremity lights, which will be installed in later steps. The remaining section of the harness is to run along side the hydraulic hose going to the tail section of the harrow.



Harness Routed Under Front Wing Mount

STEP 50

The sections of the harness that go to the extremity lights are routed along the hydraulic hoses to the location of the extremity lights and through the front wing mount. Left and right routings are the same. The harness and extremity light electrical connectors can now be connected. Be sure to lock the connector in place to ensure a seal.



Extremity Light Harness Routing

STEP 51

The section of the harness that continues to the rear taillights is to run across the rear left beam brace and along the left side of the tail frame. The harness is run over the top of all tail section members.



Routing on Tail Frame

Before laying out the harness, ensure that the tail section is in field position. Leave a small amount of slack in the harness at the pivot point of the main beam and tail frame. This is to prevent stretching of the wiring harness when the tail section is put in and taken out of field position.



Slack in Wiring Harness

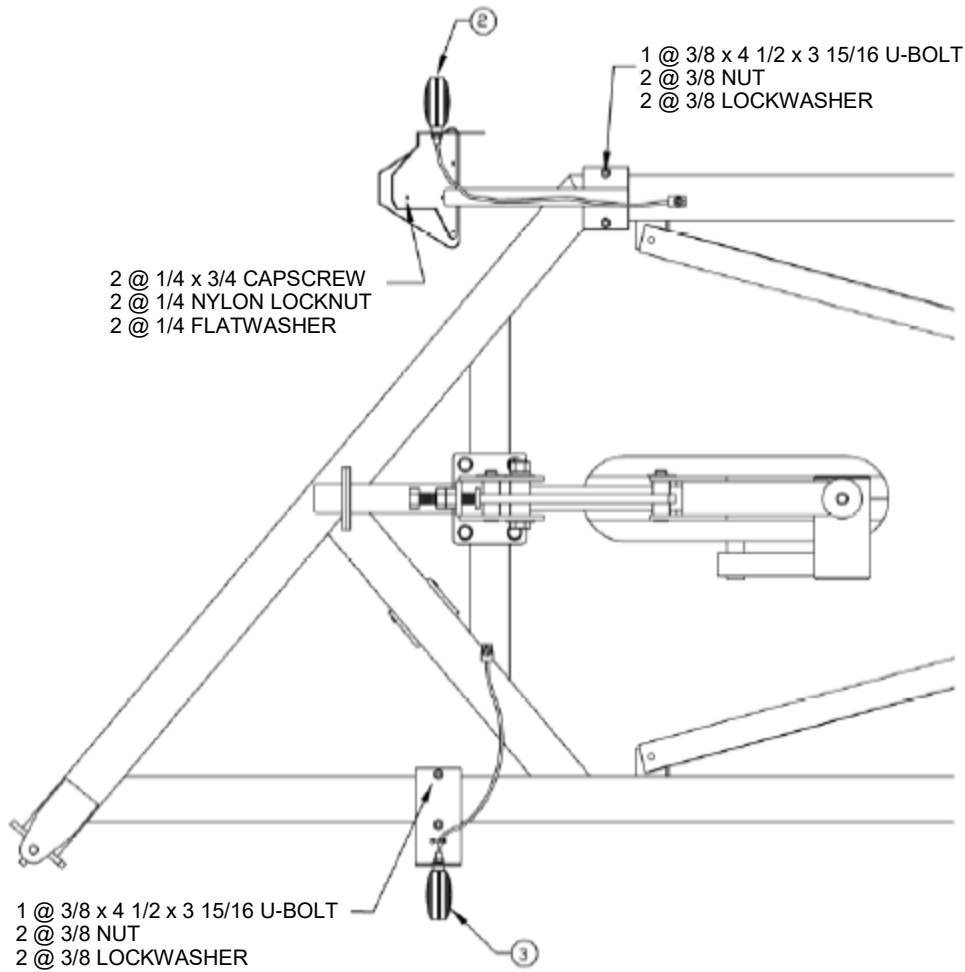
Run the longer section of the wiring harness between the wing caster wheel assembly and the wing caster wheel assembly support brace to the right taillights as shown in photo, "Routing On Tail Frame".

STEP 52

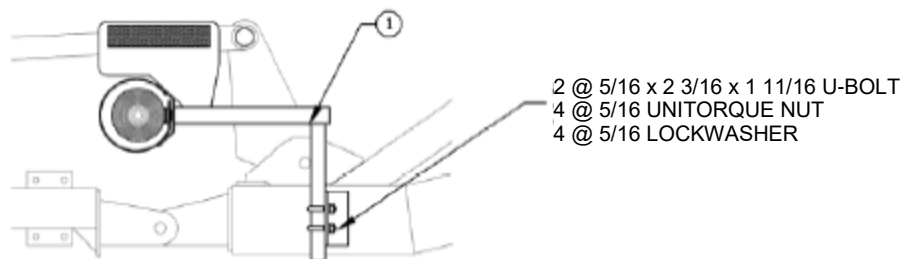
Now that the wiring harness is laid out as explained above, the supplied tie straps can be attached. The straps are to be positioned approximately at the same locations as the hydraulic hose clamps and as seen fit. There is to be no sag or slack in the harness except for the main beam and tail frame pivot frame point.

2.8 LIGHTS

Tail Lights



Extremity Lights



ITEM	PMF PART NO	KMC PART NO	DESCRIPTION	QTY
1	05-51072-01	61-080-067	EXTREMITY LIGHT - WING	2
2	05-51064-01	61-062-001	RED TAIL LIGHT ASSY	1
3	05-51064-01	61-062-001	RED TAIL LIGHT ASSY	1

STEP 53

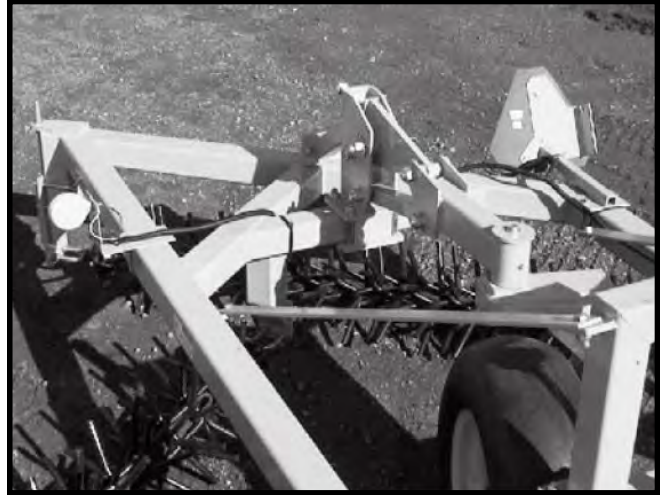
The extremity lights (#1) are now to be installed. Attach the extremity lights with the supplied $5/16"$ x $1\ 11/16"$ x $2\ 3/16"$ U-bolts, and nuts. The extremity light is to extend outward. See photo for proper orientation.



Extremity Light

STEP 54

Install the left taillight (#2) using the $3/8"$ x $4\ 7/16"$ x $4\ 3/4"$ U-bolt, lockwashers and nuts. Position and fasten the light approximately as shown in photo. Orient the light so that when the tail is lifted it will be square to the rear.



Tail Lights

STEP 55

Install the right taillight (#3) using the $3/8"$ x $4\ 7/16"$ x $4\ 3/4"$ U-bolt, lockwashers, and nuts. Position the right tail light in line with the left taillight and fasten.

SECTION 3 - OPERATIONS

3.1 TOOLING TENSIONING

It is impossible to keep the harrow tool assemblies perfectly straight during field use. In fact, over-tightening the tools may cause premature bearing failure or damage the frame. However, if left too loose the tool assembly will not do its job properly and the individual tools may rub against each other and wear out prematurely.

The recommended tool tension guideline is:

- When the machine is stationary, take the 1 1/2" wrench that's supplied with the unit and hook it onto the middle of the tooling assembly. Using the wrench as a lever, pull the tooling rearward approximately 4" and, if it springs back to the original centerline, the tools are tensioned correctly.
- During operation, rearward sag of no more than 12" from the original centerline should be observed.

The tension is adjusted using the tool tension lever and the tool tension rod. These are located at the end of the wing. A 1 1/2" wrench has been supplied which will perform most of the adjustments on the machine. It is located on the inside of the middle frame beam.

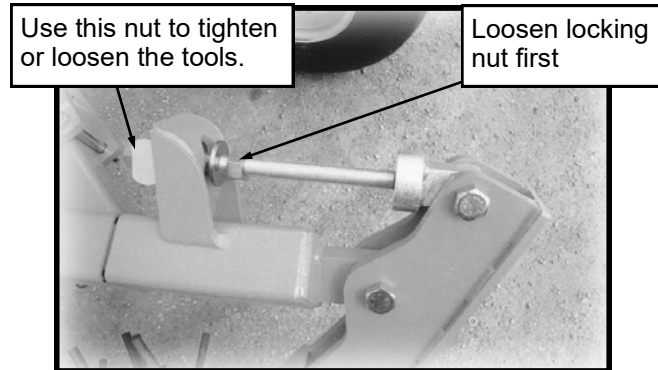
NOTE: It is expected that, under normal operating conditions, the tooling assemblies will stretch. If the tool tension rod does not allow for any further adjustment, the operator can remove tools to achieve the desired tension. Tools must be removed in pairs (2 tools). Each pair will reduce the length of the tool assembly by approximately 2".

A feature on 2007 and newer models is a telescoping tool lever. This will reduce the need to remove tooling pairs as described in this section.

Adjustment Procedures:

- Using the 1 1/2" wrench, loosen the 1" locking nut located on the tool tension rod. The locking nut will be the nut closest to the tool lever.

- Tighten or loosen the other 1" nut to apply more or less tension to the tools. Use the guide above for tool tension.
- Re-tighten the 1" locking nut.



Tool Removal

NOTE: There are Left Hand (LH) and Right Hand (RH) tools. For the harrow tool assemblies to function properly, the tools must be installed correctly. The repeating pattern of 4 LH tools followed by 4 RH tools must be maintained.

NOTE: Prior to tool removal, it is recommended to wire together the last pair of tools that are NOT being removed. This will assist in maintaining the required tooling pattern.

- Loosen the 1" locking nut located on the tool tension rod. The locking nut will be the nut closest to the tool lever.
- Loosen the other nut to reduce tool tension.
- Remove the set aside the U-bolt and 3/4" nuts holding the tool bearing housing to the tool lever.
- Remove the 5/8" unitorque nuts on the 2 U-bolts. This will free the tools from the bearing housing.
- Remove and separate the left and right tools until the damaged tools are reached, or the desired length is achieved.

Tool Installation

- Re-install the length of tools, maintaining the pattern as outlined above.
- Using the 2 U-bolts and unitorque nuts, attach the last set of tooling to the bearing housing.
- Using the U-bolt and 3/4" nuts, attach the shaft of the bearing housing to the tool lever.
- Loosen the 1" locking nut located on the tool tension rod.
- Tighten or loosen the other 1" nut to apply more or less tension to the tools.
- Re-tighten the 1" locking nut.

3.2 CONNECTING THE HARROW TO THE TRACTOR

A clevis style bolt-on cast hitch is standard equipment on the harrow. The clevis portion can be removed only if your tractor is equipped with a double tongue on the drawbar. If your tractor has a single tongue, you will need the clevis style double tongue arrangement.

ATTENTION: Either the tractor hitch or the harrow **MUST** have a double clevis arrangement. During wing folding, there will temporarily be negative weight on the hitch!

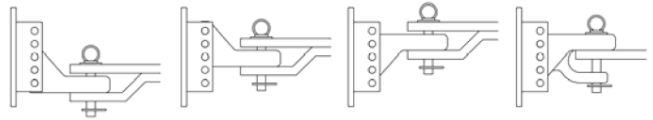
The cast hitch is held on using two (2) 1" G8 bolts. The cast hitch can be adjusted so that the harrow frame will be level. **It is important to get the harrow frame as level as possible so that proper depth control can be achieved.**

To adjust height:

- Remove the 1" bolts holding the cast to the hitch plate.
- Move the cast hitch up or down to a location on the hitch plate where the frame will be level.
- Re-bolt the cast hitch in place.

With a single tongue cast hitch, the hitch can also be inverted to achieve more height combinations. With the double clevis arrangement, the large part of the casting must be on top and sit on top of the tractor drawbar.

Some examples of correct and incorrect hitching are shown below:



CORRECT HITCHING METHODS



INCORRECT HITCHING METHODS

3.3 HYDRAULIC FUNCTION TESTING

There are two hydraulic lines on the harrow that must be connected to your tractor hydraulics. These lines are for activating the main wings and tail.

Connect the pair of hoses to the hydraulic hookups on your tractor (you will require 1 hydraulic control to operate the cylinders for the harrow). Make sure that the quick coupler ends are clean to prevent contamination of your hydraulic system.

When storing the hydraulic lines, there is a keyhole hose holder on the left main frame. A decal on the hose holder allows you to keep track of the hoses.

ATTENTION: Before activating any of the hydraulics, ensure that all locking devices have been removed and placed in the storage position.

The harrow has three folding sections and three cylinders controlling them. One circuit is used to move the unit in and out of transport.

30' Rotary Harrow

NOTE: At times the tail and wing will go up together.

NOTE: The tooling chain should be lying completely to the outside of the machine.

The correct sequence of events is as follows:

WING UP

1. Using the hydraulic control for the wings and tail, the tail section goes up completely and comes to a stop.
2. Using the same hydraulic control, the right and left wings raise together and come to rest on the transport locks.

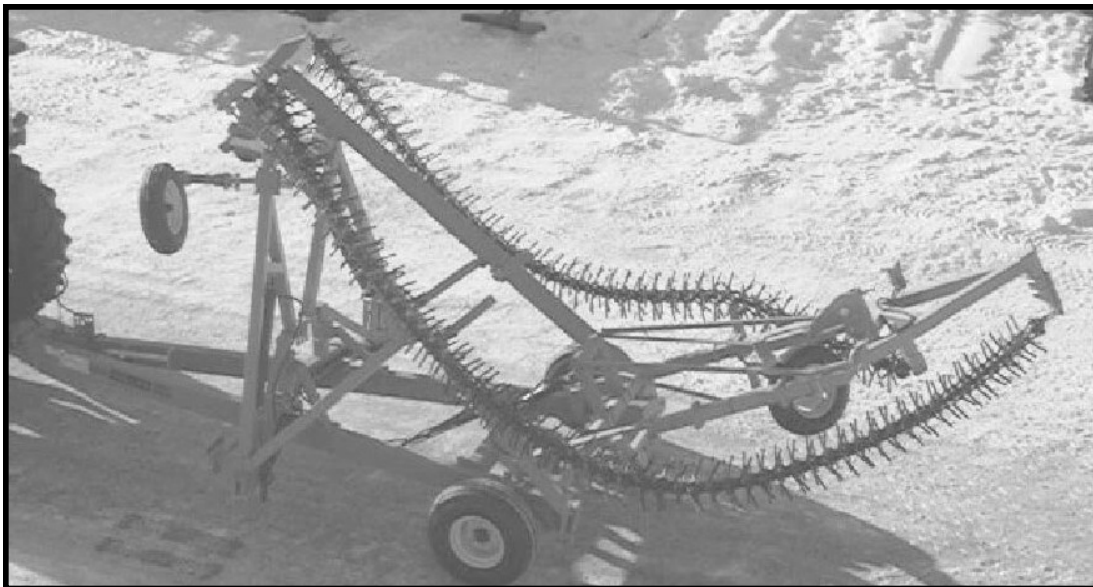
WING DOWN

1. Using the main wings/tail hydraulic control, the right and left wings go down together.
2. Using the same hydraulic control, the tail section goes down last. The sequencing valve will allow the wings to go down first.

The photos below illustrate the folding/unfolding of the harrow wings. The figure are placed in order for folding up but can be used in reverse for folding down.



Tail Goes Up/Down



Main Wings Go Up/Down Together (Slowly)

If these functions do not happen in the prescribed order, it is possible to damage your harrow. Two likely things could cause this sequence to not operate in the correct order;

1. Sequence valve setting is not correct.
2. Restrictor not performing.

It may be necessary to adjust the hydraulic valves or check the orifices. Some common problems and their solutions follow.

PROBLEM 1: Tail Goes Down Before Wing

The most common occurrence is for the tail section to go down before the wings are down. This is usually a problem with the setting or installation of the sequence valve. The sequence valve is marked with model number RV2-10-5-8T-35 and is located on the left main frame beam, behind the front wing mount. This valve has an adjustable pressure activation setting, which will hold the weight of the tail until the system pressure overcomes the setting.

- a) Check that the port on the valve opposite to the stem is connected to the hose going to the tail cylinder.
- b) If the valve is improperly installed, lower the unit as well as possible to the ground, make sure all the pressure is off the hydraulics and re-install the valve in the correct position.

To increase the holding power of this valve:

- a) First, loosen the locking nut on the top of the valve.
- b) Next, take a hex socket wrench and tighten the stem of the valve, in, a revolution or so.
- c) Re-tighten the locking nut and try the hydraulics again.

PROBLEM 2: The Tail and/or Wings Will Not Go Down

Another common problem is when the tail or the wings will not go down. There are two possible causes. The first and most obvious is that the locking mechanisms have not been removed.

- a) Check the tail and make sure that the bar that locks the tail section to the rear beam has been disconnected from the tail and has been swung all the way forward and locked down with the locking pin. If you cannot remove the pin easily, activate the hydraulics to take any weight off the bar.
- b) Check the pin locks at the top of the front wing mount. Make sure that they are not pinning the wing down and that they have been placed in their storage pipes.

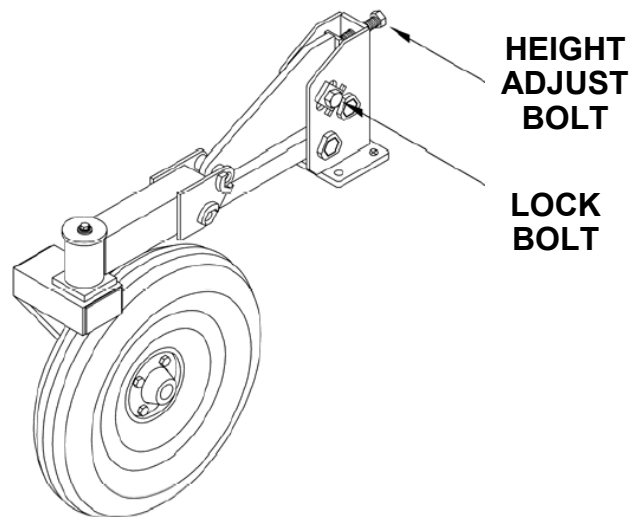
The other possibility is that the sequence valve was over tightened either at the factory or by trying to correct Problem 1.

- a) First, loose the locking nut on the top of the valve.
- b) Next, take a hex socket wrench and loosen the stem of the valve, out, a revolution or so.
- c) Re-tighten the locking nut and try the hydraulics again.
- d) Repeat as required.

If neither of these solutions help, check for any other obstructions, which could be binding the sections. Check the tools to make sure they have not become bound. Check the tractor hydraulic pressure. You will require about 2000 PSI to fully put the unit from transport to field position.

PROBLEM 3: The Main Wings Do Not Go Up and Down Together/Descend Too Fast

The harrow uses a pair of matching orifices on the main lift cylinders to cause the main wings to go up and down together and to slow the descent of the wings. If these have been inadvertently removed or not installed, the wings will not go up and down together and will descend rapidly. Check the parts manual at the back of the book for location of these orifices. If you do not have them, obtain them from your dealer.



PROBLEM 4: The Harrow Tooling Seems To Bind or Go Over onto the Wings.

Four tool catchers on the machine keep tools to the outside of the machine and prevent serious damage to the tool and the frame. These only work if the hydraulics activate correctly. If you feel that the hydraulics activated correctly and the problem persists, check the location of the tool catchers as outlined in the assembly instruction section and the parts manual. In some instances, the tail and main wings go up together rather than the tail first. This does not ordinarily cause problems. However adjusting the tool catchers can deviate any problems that may occur.

Wing Caster Height Adjustment

The caster wheel height is adjusted as follows:

- Using the 1 1/2" wrench loosen the locking bolt on the side of the caster wheel.
- Using the 1 1/2" wrench turn the height adjust bolt so that the wheel moves up or down as desired.
- Re-tighten the locking bolt.

B) Tail Bearing Assembly Height Adjustment

The rear bearing assemblies have two means of height adjustment. The entire tail section can be adjusted up or down to change the height of both bearing assemblies and the rear most bearing can be further adjusted. The height of both bearings should be adjusted so that their centers are on the natural centerline of the tool assemblies.

It is recommended that the height of the front most of the rear bearings be adjusted first with the tail caster wheel. The rear most bearing is then given its final adjustment using the rear adjust assembly at the rear of the tail.

3.4 TOOL ASSEMBLY BEARING HEIGHT

There is provision to adjust the height of each tool assembly bearing.

A) Wing Caster Adjustment for Front of Tooling Assembly

It is desirable to slightly raise the front bearings above the natural centerline of the tool assemblies. This will feather out any ridge that would normally be caused by tool action. Ideally, you would like the first couple of tines just into the ground depending on field conditions. The adjustment is made by adjusting the height of the caster wheels.

30' Rotary Harrow

The tail section can be adjusted as follows:

- a) Adjust the tail caster wheel so that the forward most of the bearing housings is on its natural center-line. Use the same procedure for adjustment as the wing caster wheel.
- b) The rear bearing height is adjusted using the rear adjust. Using a 15/16" wrench, loosen the two U-bolts, attach the rear adjust to the rear of the tail.
- c) Using 1 1/8" wrench, loosen one of the nuts securing the threaded rod portion of the rear adjust to the tail. If you want to move the bearing housing up, loosen the lower nut and if you want to lower the bearing housing, loosen the top nut.
- d) Turn the remaining nut to either raise or lower the tool section.
- e) Re-tighten all the nuts.



Rear Bearing Housing Height Adjustment

3.5 LUBRICATION

There are 15 grease points on the harrow. Before initial use, make sure these points are supplied with grease. The points are as follows:

- Left Wing Hinge (2)
- Right Wing Hinge (2)
- Tail Section Hinge (2)
- Tool Tightening Levers (2)
- Caster Wheels (3)
- Tool Bearing Housings (4)

Refer to the Maintenance/Lubrication section for the grease schedule and additional information for these grease points.

3.6 TIRE INFLATION

It is important that the inflation of all tires be set properly for maximum safety and performance. Use the following guide to adjust the inflation pressure in the tires to match the application of the machine.

COLD INFLATION PRESSURE VALVES IN PSI

TIRE SIZE	TRANSPORT	FIELD USE	FIELD USE WITH GRANULAR APPLICATOR	TRANSPORT WITH GRANULAR APPLICATOR
12.5L X 15 (F-PLY) (Main Wheels)	40 PSI MIN.	25 PSI MIN.	30 PSI MIN.	55 PSI MIN.
7.5 x 14 (Caster Wheels)	N/A	20 PSI MIN. 22 PSI MAX.	20 PSI MIN. 22 PSI MAX.	N/A

3.7 FINAL INSPECTION

Before operating the machine or testing the wing up of the machine, you should run through the Pre-Operating Set-up in the Operators Manual. You should also:

1. Go over all the connections on the machine and make sure that they are tightened as required.
2. Check that there is not interference or potential interference between any moving parts.
3. Ensure that all grease fittings have been lubricated (See the Maintenance/Lubrication Section of the Operators Manual).
4. Ensure that there are no leaks in any of the hydraulic fittings.
5. Ensure that the tooling is tightened as required. (See "Tool Tensioning" in this manual).
6. Ensure that the tires are inflated as required. (See "Tire Inflation" in this manual).
7. Ensure that the hitch connection is the proper one for your tractor hitch (single or double). There will be negative load on the tractor hitch briefly as it is being winged up. There must be a clevis arrangement either on the tractor hitch or on the harrow hitch. Use a hitch pin appropriate to the tractor.
8. Before operating the hydraulics, make sure that all the locking pins holding the wings and the tail are removed from the locking positions.

NOTES

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NOTES

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The following is a list of serial numbers issued to our machines at the beginning of each year. To determine when a unit was made, find the range within which the particular serial number falls. It would have been produced between January 1 to Decem-

YEAR	SERIAL NUMBERS
2007	76369-77883
2008	77884-79891
2009	79892-80944
2010	80945-81775
2011	81776-83453
2012	83454-85092
2013	85093-86418
2014	86419-87790
2015	87791-89096
2016	89097-90089
2017	90090-



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