

Seedbed Tillage

Raptor™ Strip-Tillage Tool with TerrainPro2 Row Units

3-Point Models: 2130MT & 2115MT

Beginning with Serial Number A70840106

Part No. 47945

3-POINT RAPTOR — Introduction

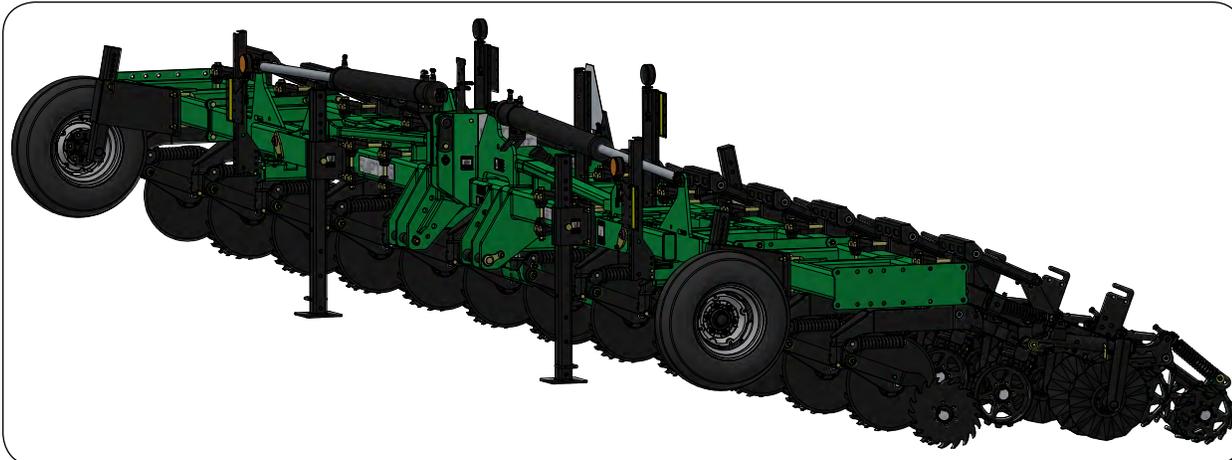
Foreword

 This symbol identifies important safety messages. When you see it, read the message that follows and be alert to the possibility of personal injury.

Remember, safety instructions stated in this manual are for your protection. Read them carefully and follow them closely when working around or using this machine.

Read and study this manual completely before attempting to operate this implement. Take this manual to the field for handy reference when operating, adjusting, or servicing your machine.

When referenced, “Right-Hand” (RH) and “Left-Hand” (LH) side of the machine are determined by standing behind the machine and facing in the direction of travel.



Pre-Operation Checklist

- Wheel bolts tightened (recheck after initial use)
- Tire pressures checked
- Hardware tightened
- Machine lubricated
- Safety and operating procedures reviewed
- Field adjustment information reviewed
- Warranty information reviewed
- Hydraulic hoses properly routed/fittings tight

Product Information

When ordering parts or when requesting further information or assistance, always give the following information:

- Machine name
- Serial number

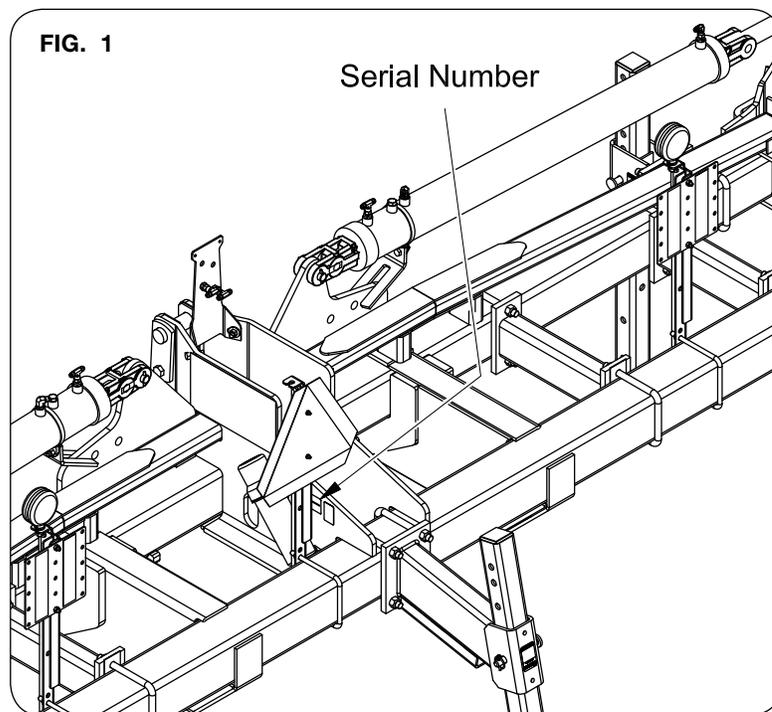
All products manufactured by Unverferth Mfg. Co., Inc. are warranted to be free from material and workmanship defects for one full year from time of consumer delivery. Your local dealer will gladly assist you with any warranty questions.

Please fill out and retain this portion for your records. The serial number plate is located on the frame as shown below.

Purchase Date _____ Model _____ Serial No. _____

Dealer _____ City _____

Dealer Contact _____ Phone _____



IMPORTANT

The information, specifications, and illustrations in the manual are on the basis of information available at the time it was written. Due to continuing improvements in the design and manufacture of Unverferth products, all specifications and information contained herein are subject to change without notice.

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Please refer to the Rear Hitch manual for additional information.

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General Hazard Information

No accident-prevention program can be successful without the wholehearted cooperation of the person who is directly responsible for the operation of the equipment.

A large number of accidents can be prevented only by the operator anticipating the result before the accident is caused and doing something about it. No power-driven equipment, whether it be transportation or processing, whether it be on the highway, in the field, or in the industrial plant, can be safer than the person who is at the controls. If accidents are to be prevented--and they can be prevented--it will be done by the operators who accept the full measure of their responsibility.

It is true that the designer, the manufacturer, and the safety engineer can help; and they will help, but their combined efforts can be wiped out by a single careless act of the operator.

It is said that, "the best kind of a safety device is a careful operator." We, at Unverferth Mfg. Co., Inc. ask that you be that kind of operator.



REMEMBER:
THINK SAFETY
A CAREFUL OPERATOR IS THE
BEST INSURANCE AGAINST AN
ACCIDENT!

SIGNAL WORDS



INDICATES AN EXTREMELY HAZARDOUS SITUATION OR ACTION THAT WILL RESULT IN SERIOUS INJURY OR DEATH.



INDICATES A HAZARDOUS SITUATION OR ACTION THAT COULD RESULT IN SERIOUS INJURY OR DEATH.



INDICATES AN UNSAFE SITUATION OR ACTION THAT MAY RESULT IN PERSONAL INJURY.



Is used for instruction on operating, adjusting, or servicing a machine.

Safety Decals

WARNING

- REPLACE LOST, DAMAGED, PAINTED, OR UNREADABLE DECALS IMMEDIATELY. IF PARTS THAT HAVE DECALS ARE REPLACED, ALSO MAKE SURE TO INSTALL NEW DECALS. THESE DECALS INFORM AND REMIND THE OPERATOR WITH OPERATIONAL INFORMATION AND SAFETY MESSAGES.



95445



99507



902221



97048



97337



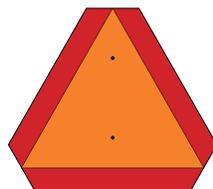
97973



97972



97961



9829



9003125 - Fluorescent Strip



9003126 - Reflector RED



9003127 - Reflector AMBER

Following Safety Instructions

- Read and understand this operator's manual before operating. 
- All machinery should be operated only by trained and authorized personnel.
- To prevent machine damage, use only attachments and service parts approved by the manufacturer.
- Always shut tractor engine off and remove key before servicing. 
- Avoid personal attire such as loose fitting clothing, shoestrings, drawstrings, pants cuffs, long hair, etc., that may become entangled in moving parts.
- Do not allow anyone to ride on the implement. Make sure everyone is clear before operating machine or towing vehicle. 
- Never attempt to operate implement unless you are in driver's seat.

Before Servicing or Operating

- Avoid working under an implement; however, if it becomes absolutely unavoidable, make sure the implement is safely blocked. 
- Ensure that all applicable safety decals are installed and legible.
- When working around the implement, be careful not to be cut by sharp edges.
- Explosive separation of a tire and rim can cause serious injury or death. Only properly trained personnel should attempt to service a tire and wheel assembly.
- Do not stand between towing vehicle and implement during hitching.
- Always make certain everyone and everything is clear of the machine before beginning operation.
- Verify that all safety shields are in place and properly secured.
- Add sufficient ballast to tractor to maintain steering and braking control at all times. Do not exceed tractor's lift capacity or ballast capacity.
- Inspect fields for buried utility lines (electric, natural gas, water, etc.). To find buried lines in the US or Canada contact 1-888-258-0808, in the US you may also contact 811.

During Operation

- Regulate speed to field conditions. Maintain complete control at all times.
- Never service or lubricate equipment when in operation.
- Keep away from overhead power lines. Electrical shock can cause serious injury or death.
- Use extreme care when operating close to ditches, fences, or on hillsides.
- Do not leave towing vehicle unattended with the engine running.

Before Transporting

- Install transport locks before transporting.
- Check for proper function of all available transport lights. Make sure that all reflectors are clean and in place on machine.

During Transport

- Comply with all laws governing highway safety when moving machinery.
- Use transport lights as required by all laws to adequately warn operators of other vehicles.
- Use good judgement when transporting equipment on highways. Regulate speed to road conditions and maintain complete control.
- Maximum transport speed of this implement should never exceed 20 mph as indicated on the machine. Maximum transport speed of any combination of implements must not exceed the lowest specified speed of the implements in combination. Do not exceed 10 mph during off-highway travel.
- Slow down before making sharp turns to avoid tipping. Drive slowly over rough ground and side slopes.
- It is probable that this implement is taller, wider and longer than the towing vehicle. Become aware of and avoid all obstacles and hazards in the travel path of the equipment, such as power lines, ditches, etc.

Pressurized Oil

- Relieve the hydraulic system of all pressure before adjusting or servicing. See hydraulic power unit manual for procedure to relieve pressure.

- High-pressure fluids can penetrate the skin and cause serious injury or death. Leaks of high-pressure fluids may not be visible. Use cardboard or wood to detect leaks in the hydraulic system. Seek medical treatment immediately if injured by high-pressure fluids.

- Hydraulic system must be purged of air before operating to prevent serious injury or death.

- Do not bend or strike high-pressure lines. Do not install bent or damaged tubes or hoses.

- Repair all oil leaks. Leaks can cause fires, personal injury, and environmental damage.

- Route hoses and lines carefully to prevent premature failure due to kinking and rubbing against other parts. Make sure that all clamps, guards and shields are installed correctly.

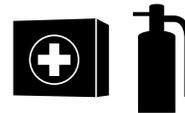
- Check hydraulic hoses and tubes carefully. Replace components as necessary if any of the following conditions are found:
 - End fittings damaged, displaced, or leaking.
 - Outer covering chafed/cut or wire reinforcing exposed.
 - Outer covering ballooning locally.
 - Evidence of kinking or crushing of the flexible part of a hose.



3-POINT RAPTOR — Safety

Preparing for Emergencies

- Keep a first aid kit and properly rated fire extinguisher nearby.



- Keep emergency numbers for fire, rescue, and poison control personnel near the phone.



Wearing Protective Equipment

- Wear clothing and personal protective equipment appropriate for the job.



- Wear steel-toed shoes when operating.



- Wear hearing protection when exposed to loud noises.



- Do not wear additional hearing impairing devices such as radio headphones, etc.



Notes

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Stabilizer Wheel Assembly

WARNING

- KEEP HANDS CLEAR OF PINCH POINT AREAS.
- FALLING OBJECTS CAN CAUSE SERIOUS INJURY OR DEATH. DO NOT WORK UNDER THE MACHINE AT ANY TIME WHILE BEING HOISTED. BE SURE ALL LIFTING DEVICES AND SUPPORTS ARE RATED FOR THE LOADS BEING HOISTED. THESE ASSEMBLY INSTRUCTIONS WILL REQUIRE SAFE LIFTING DEVICES UP TO 100 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT

CAUTION

- IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. WHEEL NUTS/BOLTS MUST BE CHECKED REGULARLY. SEE TORQUE PAGE IN THE [SERVICE, OR MAINTENANCE] SECTION FOR PROPER WHEEL NUT/BOLT SPECIFICATIONS. WARRANTY IS VOID ON ANY DAMAGE CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.

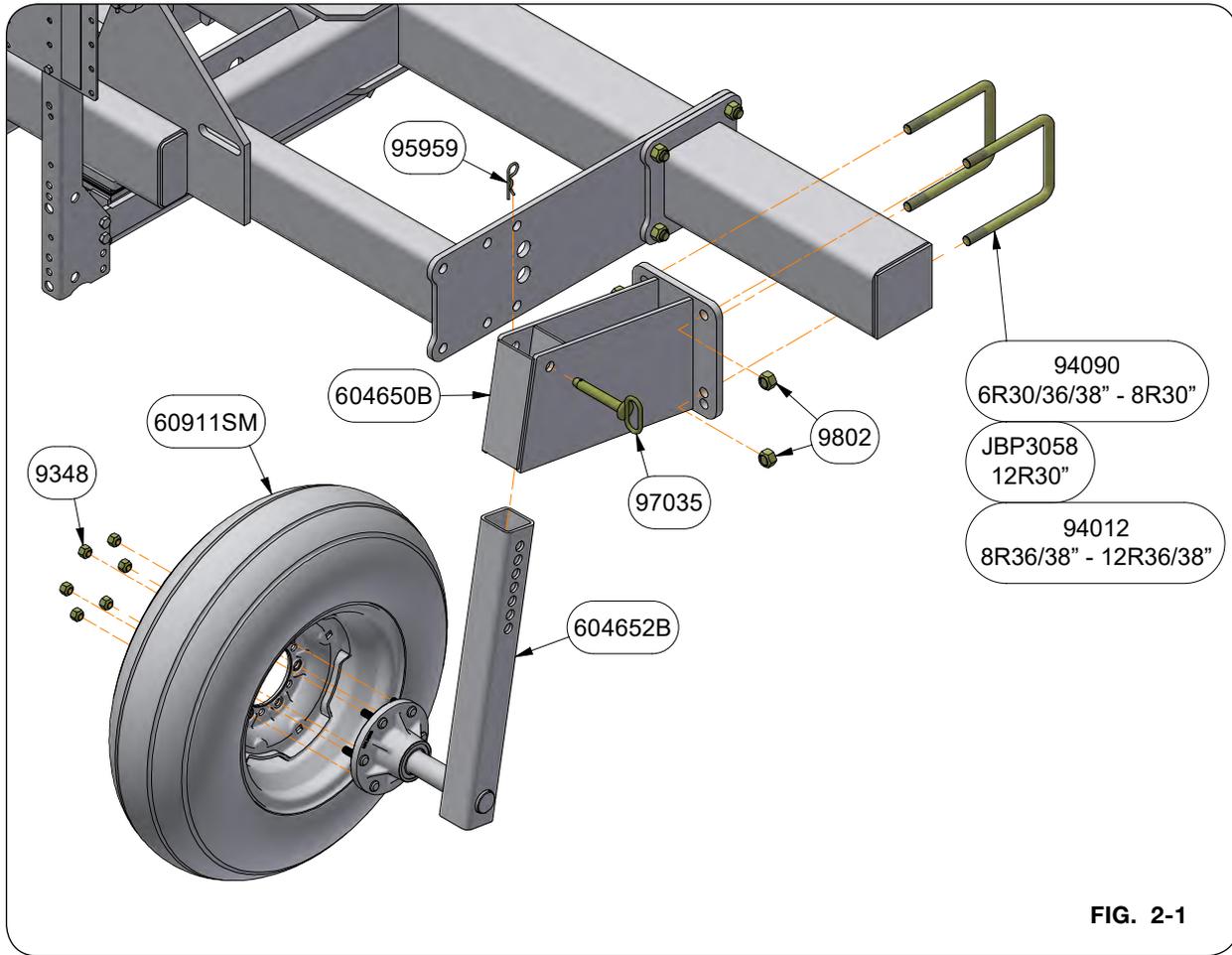
1. Using a safe lifting device rated for 100 lbs., support the wheel assembly and remove U-Bolts (94090, JBP3058 or 94012) and Locknuts (9802).
2. Locate wheel assembly into position on the extension. FIG. 2-1

NOTE: Refer to overhead layouts to verify wheel assembly position measurements.

3. Attach U-Bolts (94090, JBP3058 or 94012) to the bracket weldment (604650B) and secure with 3/4"-10UNC locknuts (9802). FIG. 2-1
4. Locate spindle arm weldment (604652B), at the desired height, in the bracket weldment (604650B) and secure in place with hitch pin (97035) and cotter pin (95959). FIG. 2-1
5. Attach the wheel assembly (60911SM) and secure with 1/2"-20UNF (9348) tapered nuts. FIG. 2-1
6. Tighten hardware to torque specs listed in "MAINTENANCE" section.

3-POINT RAPTOR — Set-Up

Stabilizer Wheel Assembly (continued)



3-POINT RAPTOR — Set-Up

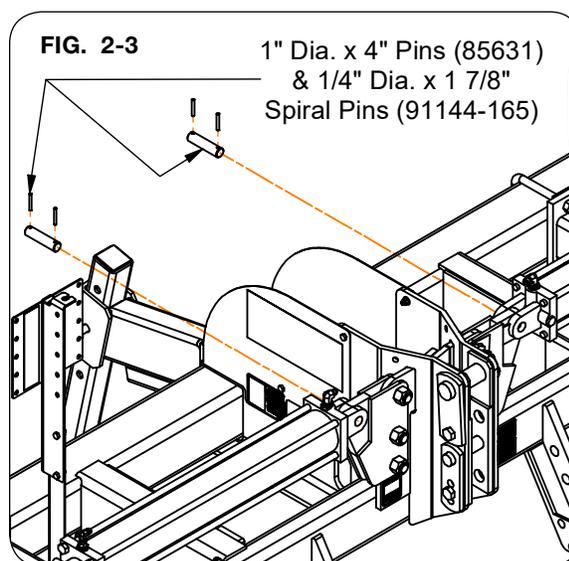
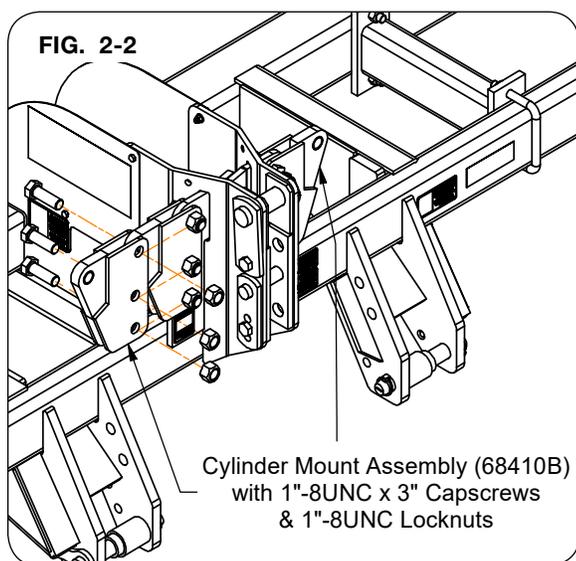
Hydraulic Set Up — Standard Folding 8 Shank

⚠ WARNING

- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.
- KEEP HANDS CLEAR OF PINCH POINT AREAS.
- HIGH-PRESSURE FLUIDS CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY OR DEATH. LEAKS OF HIGH-PRESSURE FLUIDS MAY NOT BE VISIBLE. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.
- RELIEVE HYDRAULIC SYSTEM OF ALL PRESSURE BEFORE ADJUSTING OR SERVICING. SEE “RELIEVING HYDRAULIC PRESSURE” IN “MAINTENANCE” SECTION OF THIS MANUAL.
- HYDRAULIC SYSTEM MUST BE PURGED OF AIR BEFORE OPERATING TO PREVENT SERIOUS INJURY OR DEATH.

30”, 36” & 38” Spacing

1. Attach the cylinder mount assemblies (68410B) to both sides of the main frame with the 1”-8UNC x 3” capscrews and 1”-8UNC locknuts (FIG. 2-2).
2. Using a safe lifting device rated at a minimum of 100 lbs., attach the base end of the hydraulic cylinders (901283) to the cylinder mount assemblies (68410B) with 1” Dia. x 4” pins (85631) and 1/4” Dia. x 1 7/8” spiral pins (91144-165) (FIG. 2-3).



3-POINT RAPTOR — Set-Up

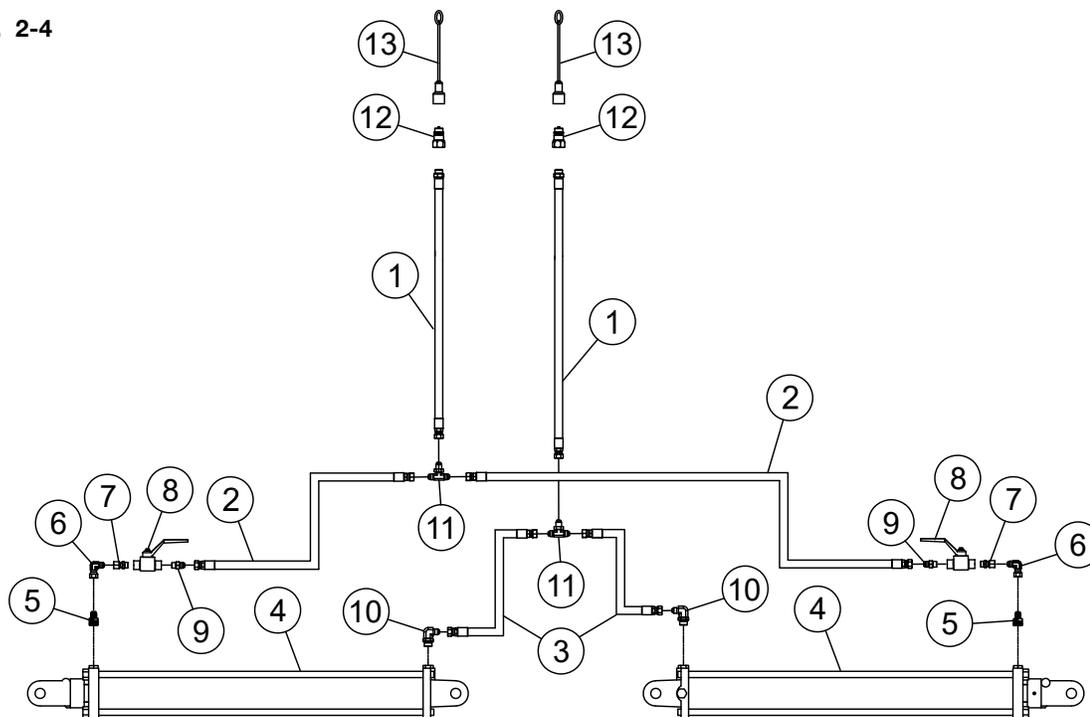
Hydraulic Set Up — Standard Folding 8 Shank (continued)

IMPORTANT

- *Do not use thread tape or sealant. All fittings have mechanical or O-ring seals. This seals and prevents contamination from entering the tractor's hydraulic system.*

3. Attach all hydraulic fittings, valves (if applicable), and hoses using the following hydraulic diagram. Tighten all fittings and hoses to specifications in "Hydraulic Fittings" in the MAINTENANCE section.

FIG. 2-4



ITEM	PART NUMBER	DESCRIPTION	QTY	NOTES
1	9502772	Hose 3/8" Dia. x 72"	2	
2	9002976	Hose 3/8" Dia. x 57"	2	
3	9502793	Hose 3/8" Dia. x 28"	2	
4	69056B	Cylinder Assembly (4"x30")	2	
5	91608	Adapter 9/16"-18 Male - 3/4"-16 O-Ring	2	
6	9876	90° Elbow 9/16"-18 F - 9/16"-18 O-Ring M	2	
	603844	Hydraulic Wing Lock Kit	2	Includes Items 7-9
7	9002446	Adapter 9/16"-18 F - 9/16"-18 O-Ring M	1	
8	9501014	Ball Valve		
9	9001495	Adapter 9/16"-18 Male - 9/16"-18 O-Ring		
10	9874	90° Elbow 9/16"-18 Male - 3/4"-16 O-Ring	2	
11	9875	Tee 9/16"-18 x 9/16"-18 x 9/16"-18 Male	2	
12	91383	Male Tip Coupling 3/4"-16	2	
13	91511	Dust Cap	2	

4. Purge the hydraulic system. Refer to "Purging Hydraulic System" in this section.

3-POINT RAPTOR — Set-Up

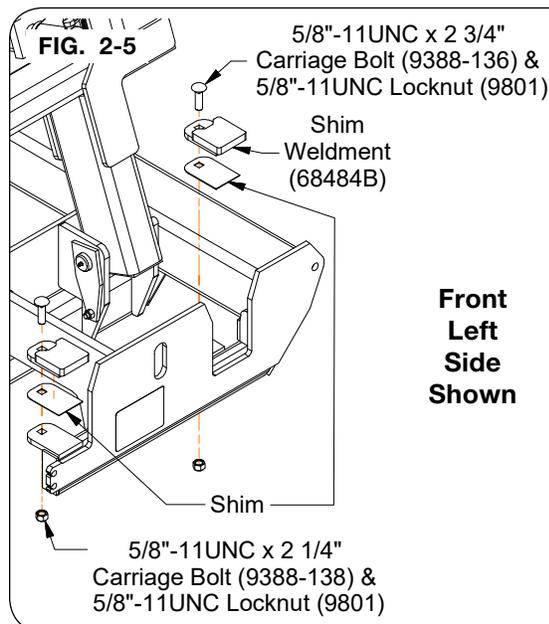
Hydraulic Set Up — Standard Folding 8 Shank (continued)

IMPORTANT

- Shim kit must NOT be installed when machine is equipped with optional flex valve. Frame or cylinder damage could occur if installed!!

5. Add shim weldments (68484B) along with the necessary shims to the front and rear wing hinge section on both sides of the main frame with 5/8"-11UNC x 2 1/4" carriage bolts (9388-136) in the rear position, 5/8"-11UNC x 2 1/2" carriage bolts (9388-138) in the front position and 5/8"-11UNC locknuts (9801) to adjust/level the wing height (FIG. 2-5).

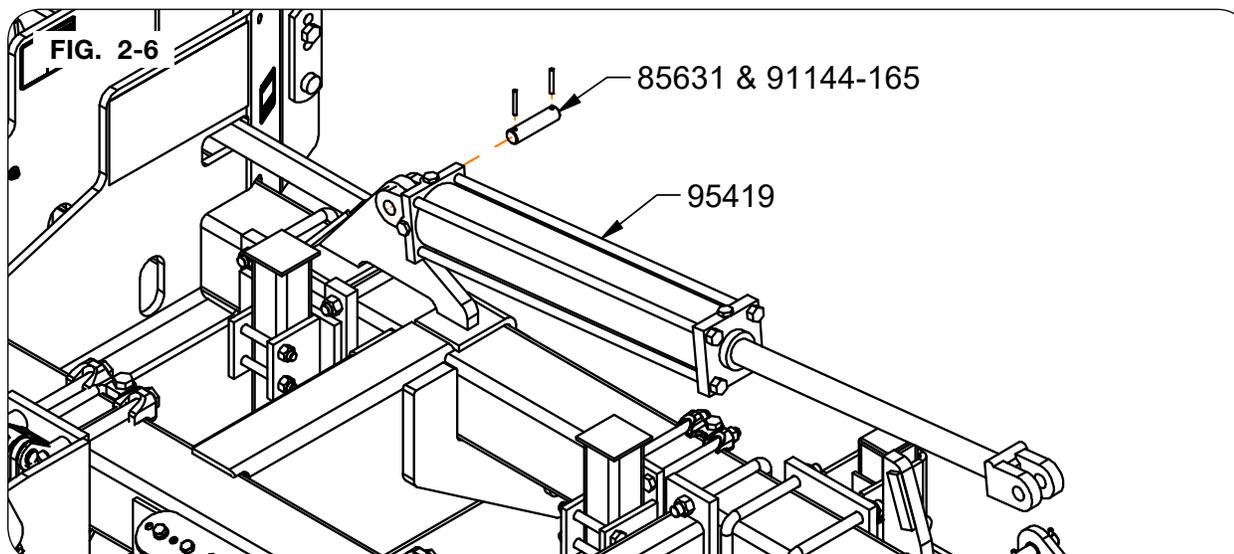
NOTE: Additional shims can be stored on bottom side of mounting plate.



Hydraulic Set Up — Standard Folding 12 Shank

30" Spacing

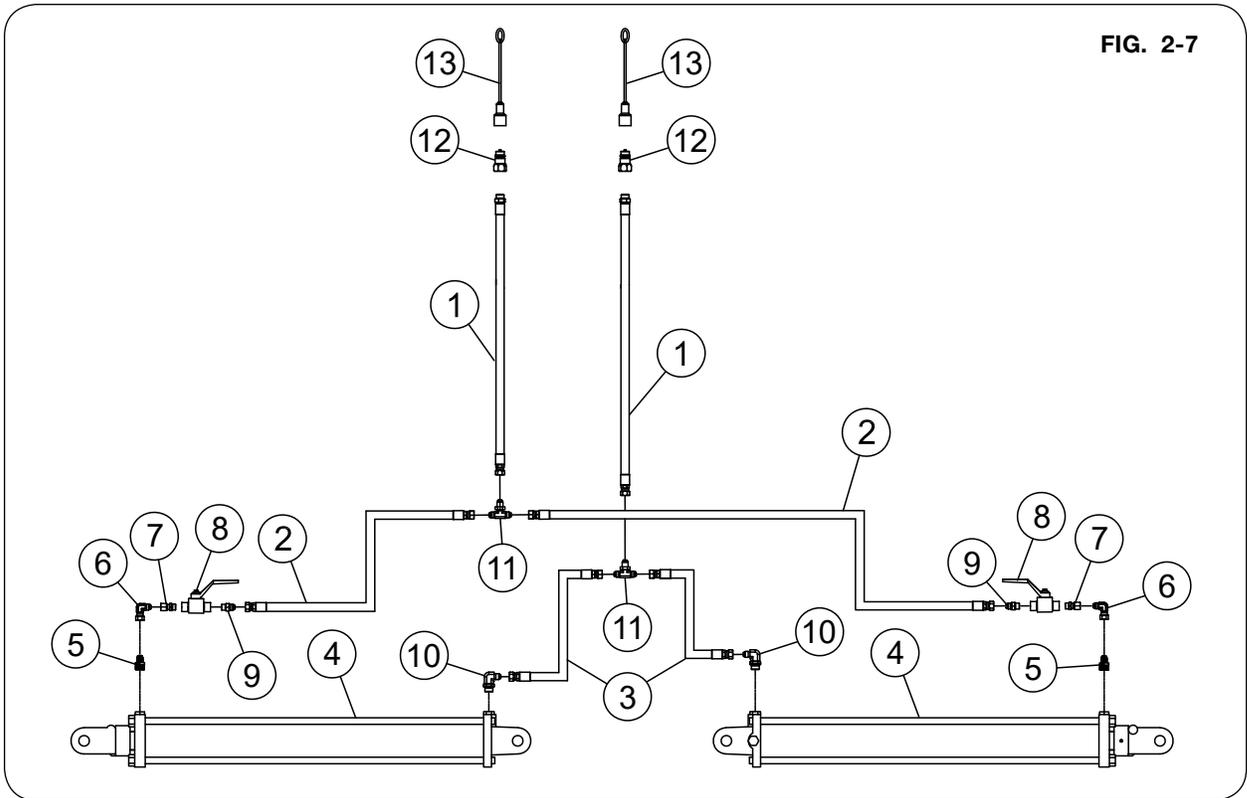
1. Using a safe lifting device rated at a minimum of 100 lbs., attach only the base end of the hydraulic cylinder to the cylinder lug using a 1" dia. x 4" long pin (85631) and two 1/4" dia. x 1 7/8" long spiral pins (91144-165) on each side. FIG. 2-6



3-POINT RAPTOR — Set-Up

Hydraulic Set Up — Standard Fold 12 Shank (continued)

- Attach all the hydraulic fittings, valves (if applicable), and hoses using the following hydraulic diagrams. Tighten all fittings and hoses to specifications in “Hydraulic Fittings” in the MAINTENANCE section.



ITEM	PART NUMBER	DESCRIPTION	QTY	NOTES
1	9502772	Hose 3/8" Dia. x 72"	2	
2	9502776	Hose 3/8" Dia. x 32"	2	
3	9501701	Hose 3/8" Dia. x 28"	2	
4	95415	Hydraulic Cylinder 4"x24"	2	
5	91608	Adapter 9/16"-18 Male - 3/4"-16 O-Ring	2	
6	9876	90° Elbow 9/16"-18 F - 9/16"-18 O-Ring M	2	
	603844	Hydraulic Wing Lock Kit	2	Includes Items 7-9
7	9002446	Adapter 9/16"-18 F - 9/16"-18 O-Ring M	1	
8	9501014	Ball Valve		
9	9001495	Adapter 9/16"-18 Male - 9/16"-18 O-Ring		
10	9874	90° Elbow 9/16"-18 Male - 3/4"-16 O-Ring	2	
11	9875	Tee 9/16"-18 x 9/16"-18 x 9/16"-18 Male	2	
12	91383	Male Tip Coupling 3/4"-16	2	
13	91511	Dust Cap	2	

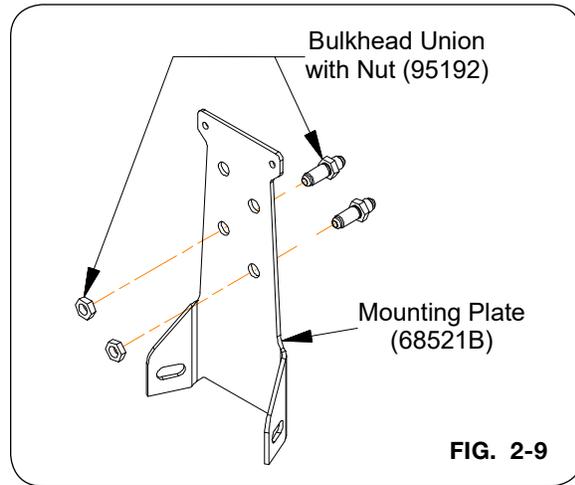
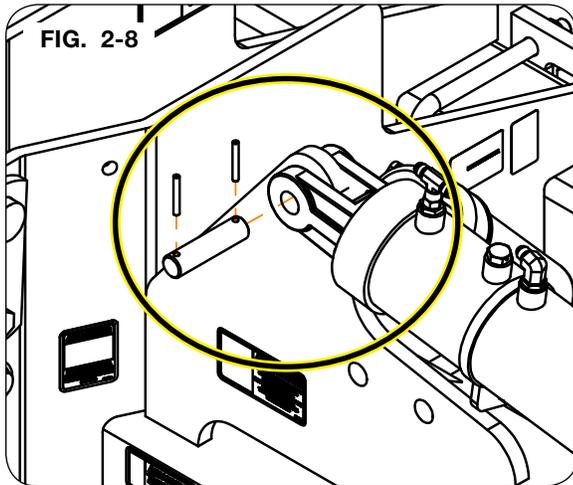
- Purge the hydraulic system. Refer to “Purging Hydraulic System” in this section.

3-POINT RAPTOR — Set-Up

Hydraulic Set Up — Standard Fold 12 Shank (continued)

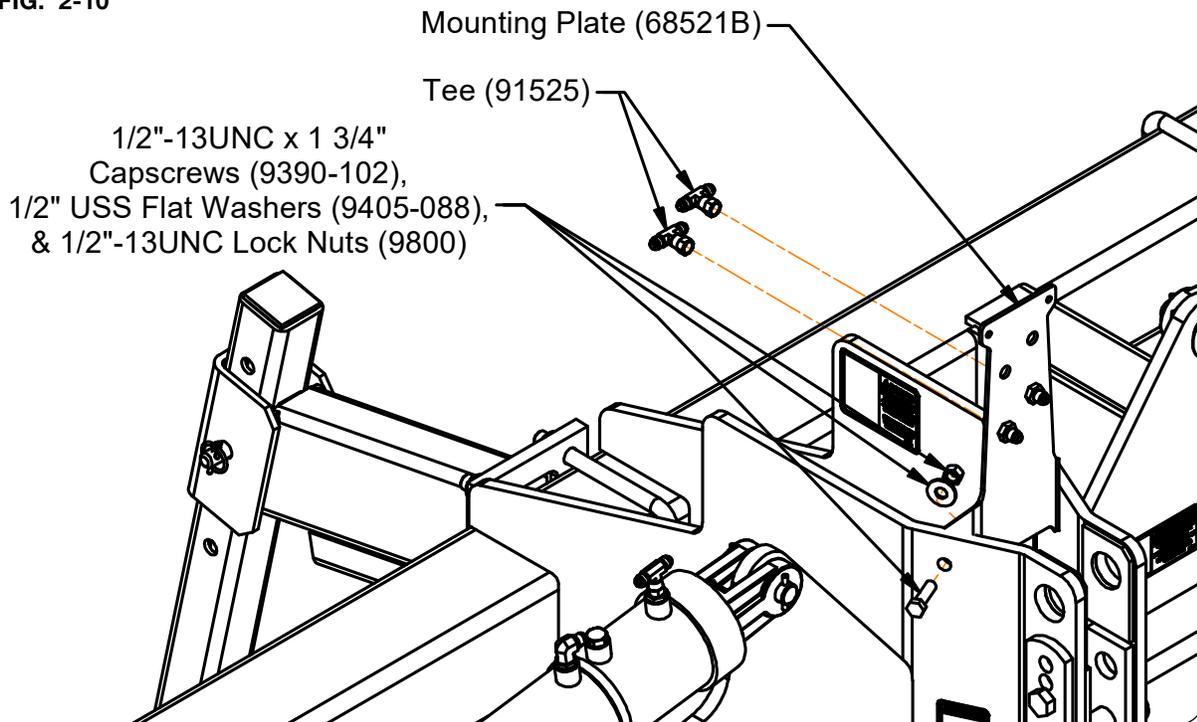
36" & 38" Spacing

1. Using a safe lifting device rated at 150 lbs., attach the cylinders to the main frame with 1" Dia. x 4" pins (85631) and 1/4" Dia. x 1 7/8" spiral pins (91144-165). FIG. 2-8



2. Attach the two bulkhead unions with nut (95192) to mounting plate (68521B). FIG. 2-9

FIG. 2-10

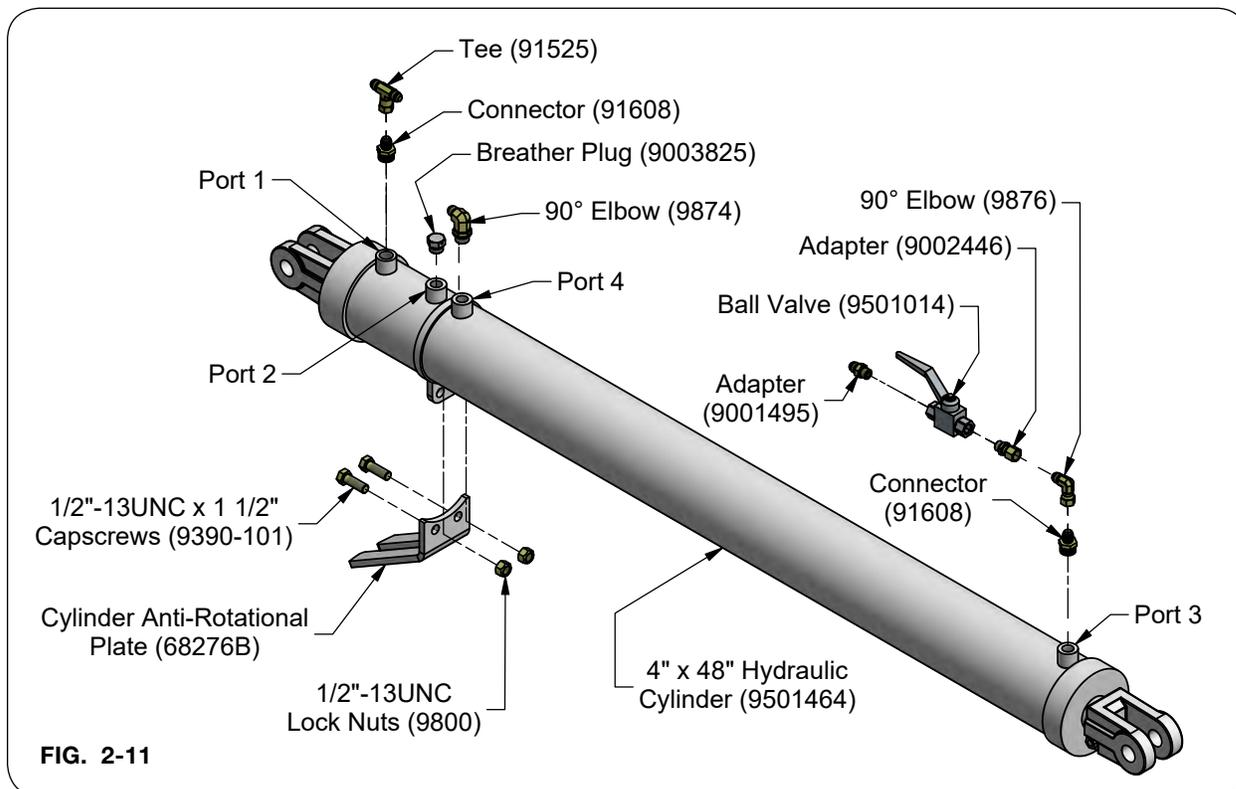


3. Secure mounting plate (68521B) to main frame with 1/2"-13 x 1 3/4" capscrews (9390-102), 1/2" flat washers (9405-088), and 1/2"-13 locknuts (9800) as shown in FIG. 2-10.
4. Assemble the tees (91525) to the mounting plate adapters. FIG. 2-10

3-POINT RAPTOR — Set-Up

Hydraulic Set Up — Standard Fold 12 Shank (continued)

5. Attach the cylinder anti-rotational plates (68276B) to the 4" x 48" cylinders (9501464) with 1/2"-13UNC x 1 1/2" capscrews (9390-101) and 1/2"-13UNC locknuts (9800). FIG. 2-39



6. Assemble adapter (9001495), ball valve (9501014), adapter (9002446), 90° elbow (9876) and connector (91608) to cylinder port 3. FIG. 2-11
7. Assemble tee (91525) and connector (91608) to cylinder port 1. FIG. 2-11
8. Assemble 90° elbows (9874) to cylinder port 4. FIG. 2-11
9. Assemble breather plug (9003825) to cylinder port 2. FIG. 2-11

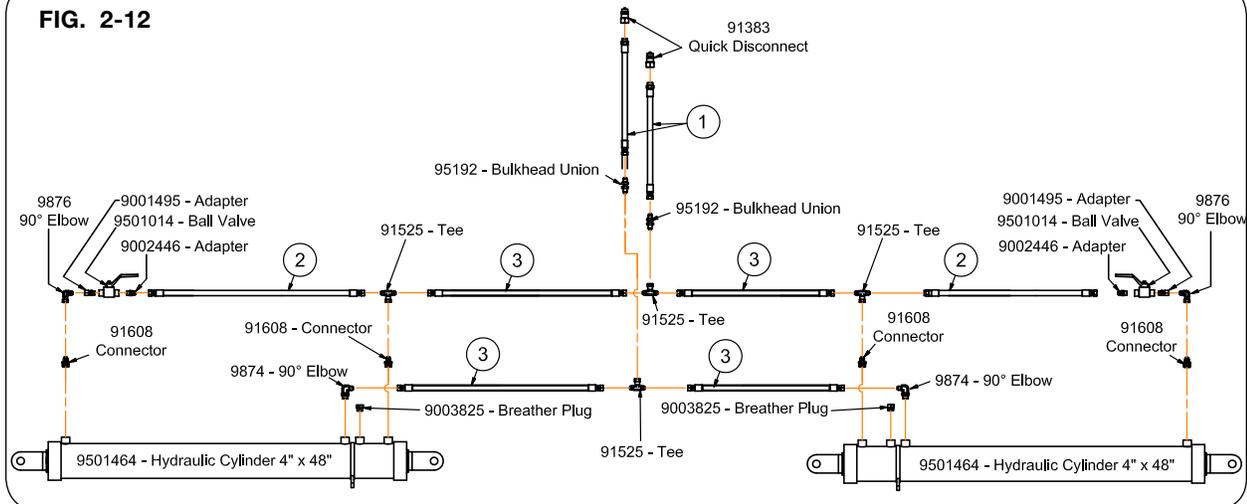
NOTE: Tighten all fittings and hoses to specifications in “Hydraulic Fittings” in the MAINTENANCE section.

3-POINT RAPTOR — Set-Up

Hydraulic Set Up — Standard Fold 12 Shank (continued)

10. Route hydraulic hoses as shown in FIG. 2-12. Tighten all fittings and hoses to specifications in “Hydraulic Fittings” in the MAINTENANCE section.

FIG. 2-12



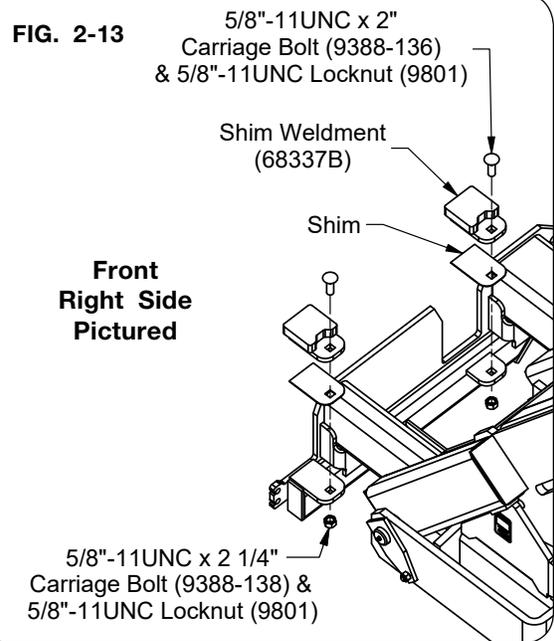
ITEM	PART NUMBER	DESCRIPTION	QTY	NOTES
1	9502772	Hose 3/8" Dia. x 72"	2	
2	9501677	Hose 3/8" Dia. x 54"	2	
3	9502793	Hose 3/8" Dia. x 28"	4	

11. Purge the hydraulic system. Refer to “Purging Hydraulic System” in this section.

12. Add stop block (68337B) along with the necessary shims to the front and rear wing hinge section on both sides of the main frame with 5/8"-11UNC x 2 1/4" carriage bolts (9388-136) in the rear position, 5/8"-11UNC x 2 1/2" carriage bolts (9388-138) in the front position and 5/8"-11UNC locknuts (9801) to adjust/level the wing height. FIG. 2-13

NOTE: There are 3 shims for each corner, you need to select the appropriate sizes as needed. Store unused shims on bottom side of mounting ear.

FIG. 2-13



IMPORTANT

- Shim kits must not be installed when machine is equipped with optional Flex Hydraulics, frame or cylinder damage could occur. The Flex Hydraulic option includes a separate shim package.

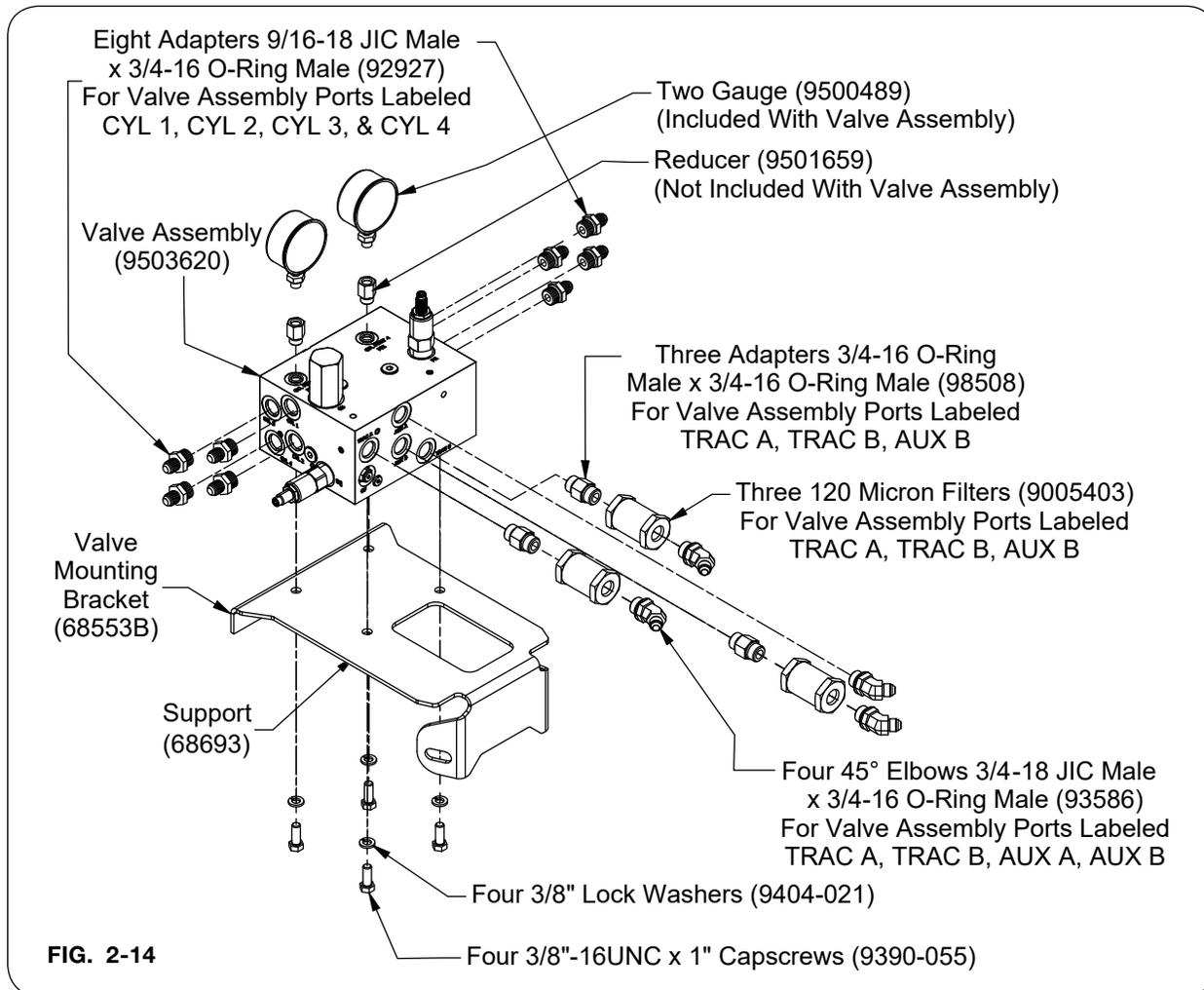
3-POINT RAPTOR — Set-Up

Notes

Hydraulic Set Up — Optional Flex Hydraulics

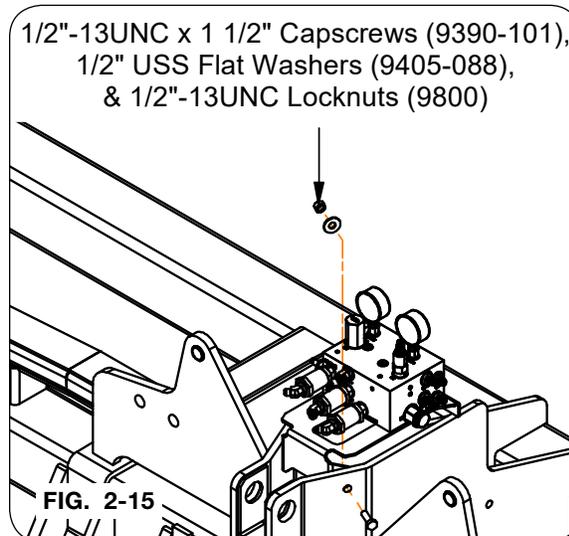
8 Row - 30", 36" & 38" — #68669

1. Attach the fittings to the valve assembly (9503620) as shown in FIG. 2-14.



2. Attach the valve assembly with fittings to the valve mounting bracket (68553B) with capscrews (9390-055) and lock washers (9404-021) FIG. 2-14.

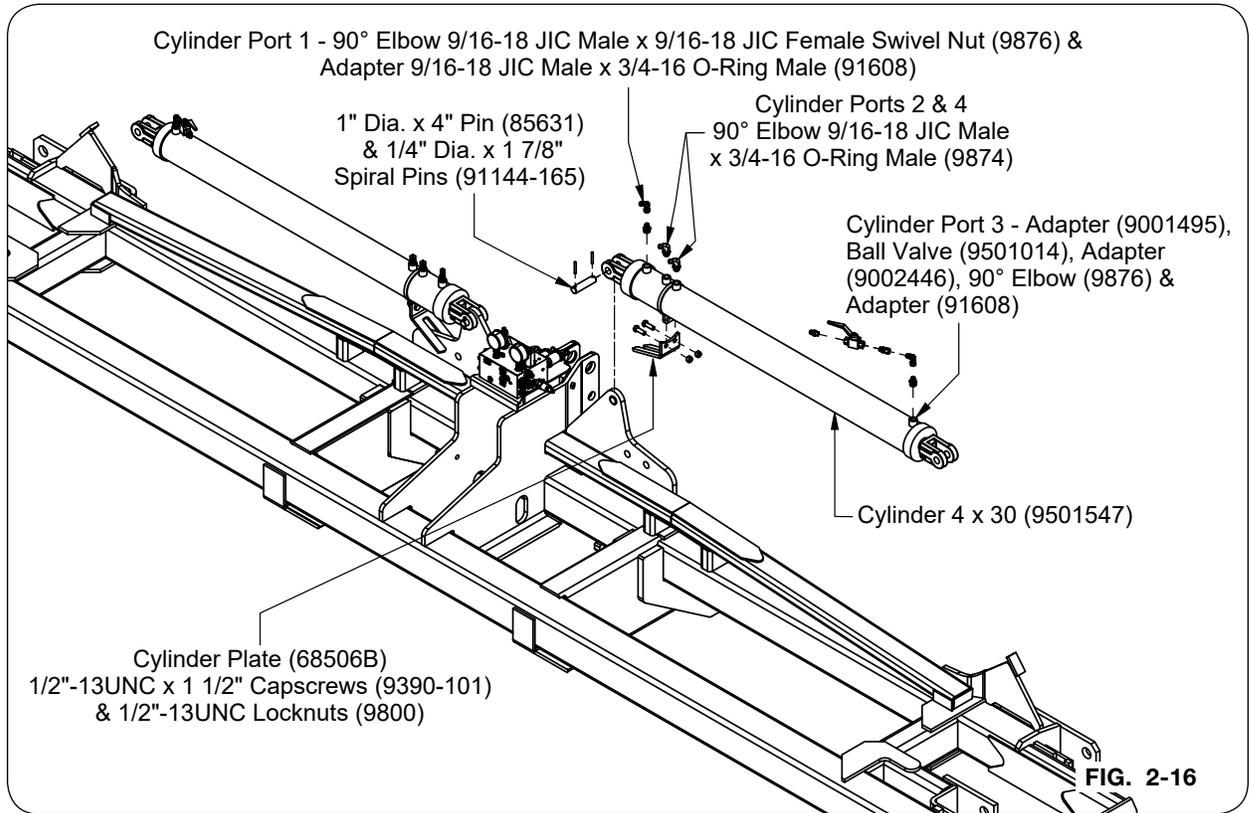
3. Secure the valve mounting bracket to the main frame with capscrews (9390-101), flat washers (9405-088), and locknuts (9800) as shown in FIG. 2-15.



3-POINT RAPTOR — Set-Up

Hydraulic Set Up — Optional Flex Hydraulics (continued)

4. Attach the cylinder plates to the cylinders with 1/2"-13UNC x 1 1/2" capscrews (9390-101) and 1/2"-13UNC locknuts (9800). FIG. 2-16



5. Assemble adapter (9001495), ball valve (9501014), adapter (9002446), 90° elbow (9876) and connector (91608) to cylinder port 3. FIG. 2-16
6. Assemble 90° elbows (9876) and adapters (91608) to cylinder port 1. FIG. 2-16
7. Assemble 90° elbows (9874) to cylinder ports 2 and 4. FIG. 2-16

NOTE: Tighten all fittings to specifications in "Hydraulic Fittings" in the MAINTENANCE section.

8. Using a safe lifting device rated at a minimum of 150 lbs., attach the cylinder to the main frame with 1" Dia. x 4" pins (85631) and 1/4" Dia. x 1 7/8" spiral pins (91144-165) as shown in FIG. 2-16.

3-POINT RAPTOR — Set-Up

Hydraulic Set Up — Optional Flex Hydraulics (continued)

9. Attach the hoses to the valve assembly and cylinders as shown in FIG. 2-17. Tighten hoses to specifications in “Hydraulic Fittings” in the MAINTENANCE section.

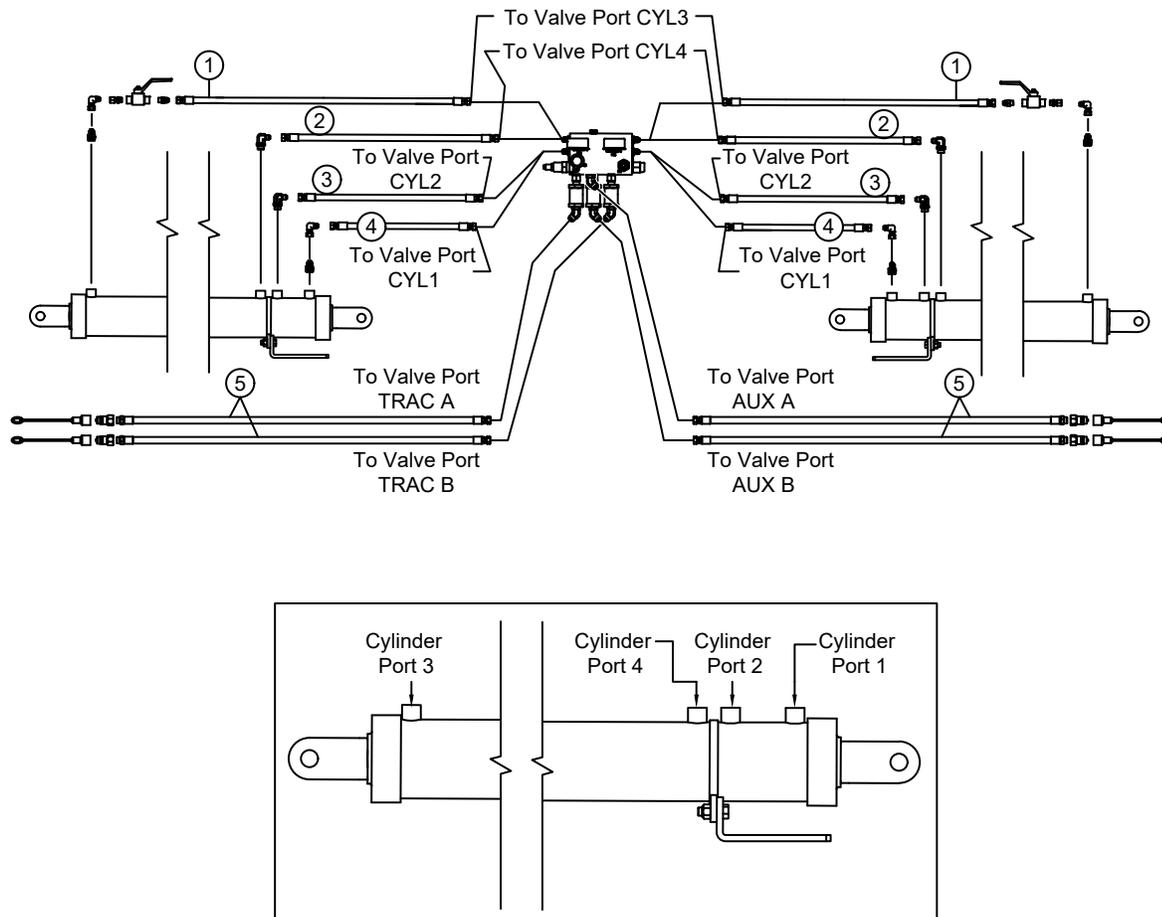
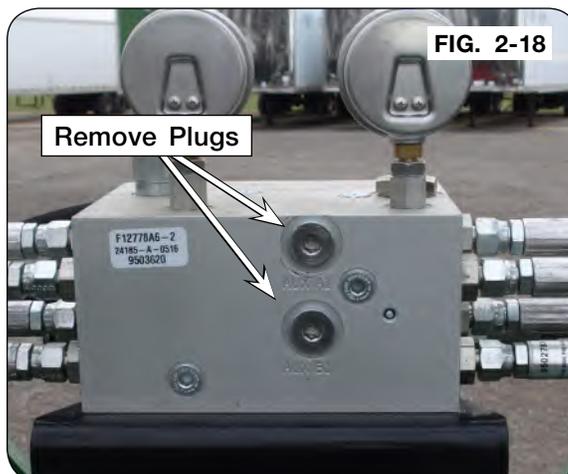


FIG. 2-17

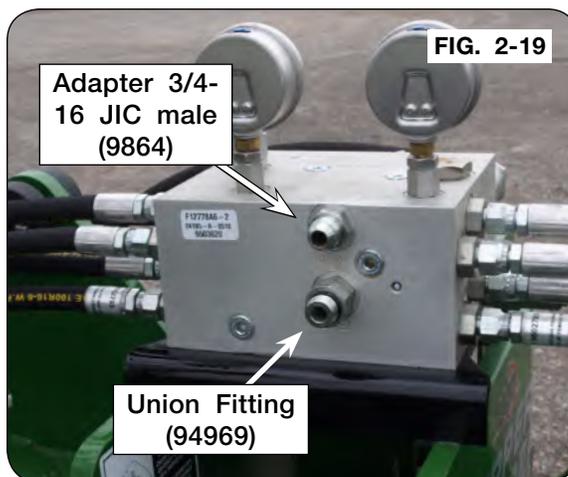
ITEM	PART #	DESCRIPTION	QTY	NOTES
1	9501700	3/8" Dia., 9/16" JICF x 9/16" JICF x 48"	2	Valve CYL 3 to Cylinder Port 3
2	9503641	3/8" Dia., 9/16" JICF x 9/16" JICF x 20"	2	Valve CYL 4 to Cylinder Port 4
3	9503721	3/8" Dia., 9/16" JICF x 9/16" JICF x 18"	2	Valve CYL 2 to Cylinder Port 2
4	9501699	3/8" Dia., 9/16" JICF x 9/16" JICF x 18"	2	Valve CYL 1 to Cylinder Port 1
5	98852	1/2" Dia., 3/4" JICF x 3/4" ORM x 72"	4	Valve TRAC A/B & AUX A/B to Tractor

Hydraulic Set Up — Optional Flex Hydraulics (continued)

10. Remove and discard the plugs in ports AUX A1 and AUX B1. FIG. 18

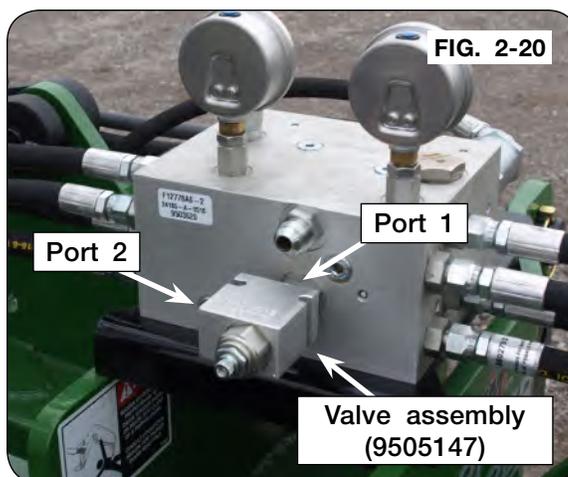


11. Install Adapter 3/4-16 JIC male (9864) into port AUX A1 and the non-adjustable end of union fitting 94969 into port AUX B1 and torque to 12 ft-lbs. FIG. 19



12. Thread Port 1 of the pressure relief valve assembly 9505147 onto the adjustable union fitting in port AUX B1 as shown in figure 2-20. Torque the adjustable fitting nut to 12 ft-lbs.

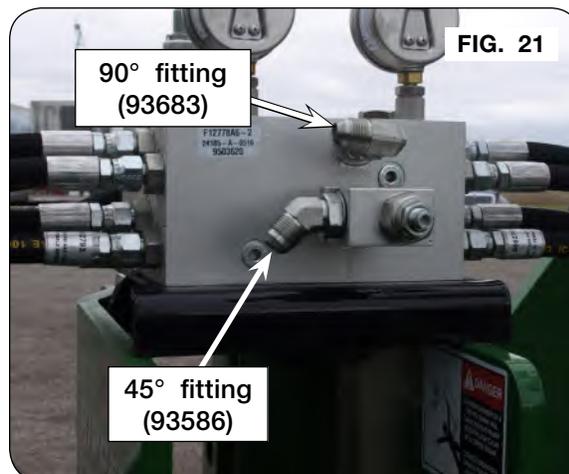
NOTE: Port 1 of the relief valve assembly will attach to the union fitting and port 2 will face the left-hand side of the machine.



Hydraulic Set Up — Optional Flex Hydraulics (continued)

13. Install 90° fitting 93683 onto the adapter in AUX A1. Point the JIC end toward the left-hand side of the machine as shown in figure 4. Hand tighten the JIC fittings until they are seated, then tighten an additional 1/6 turn.

14. Install 45° fitting 93586 into port 2 of the pressure relief valve block. Point the JIC end of the fitting downward and Torque the O-ring nut to 12 ft-lbs. FIG. 21



15. Connect the two new fittings installed in steps 6 & 7 with the new hose 9502790. Hand tighten the JIC fittings until they are seated, then tighten an additional 1/6 turn. Ensure the hose does not twist while tightening the fittings. FIG. 22



11. Remove all wing shims. Failure do to so can result in frame or cylinder damage.

NOTE: Tighten all fittings and hoses to specifications in “Hydraulic Fittings” in the MAINTENANCE section.

12. Purge the hydraulic system. Refer to “Purging Hydraulic System” in this section.

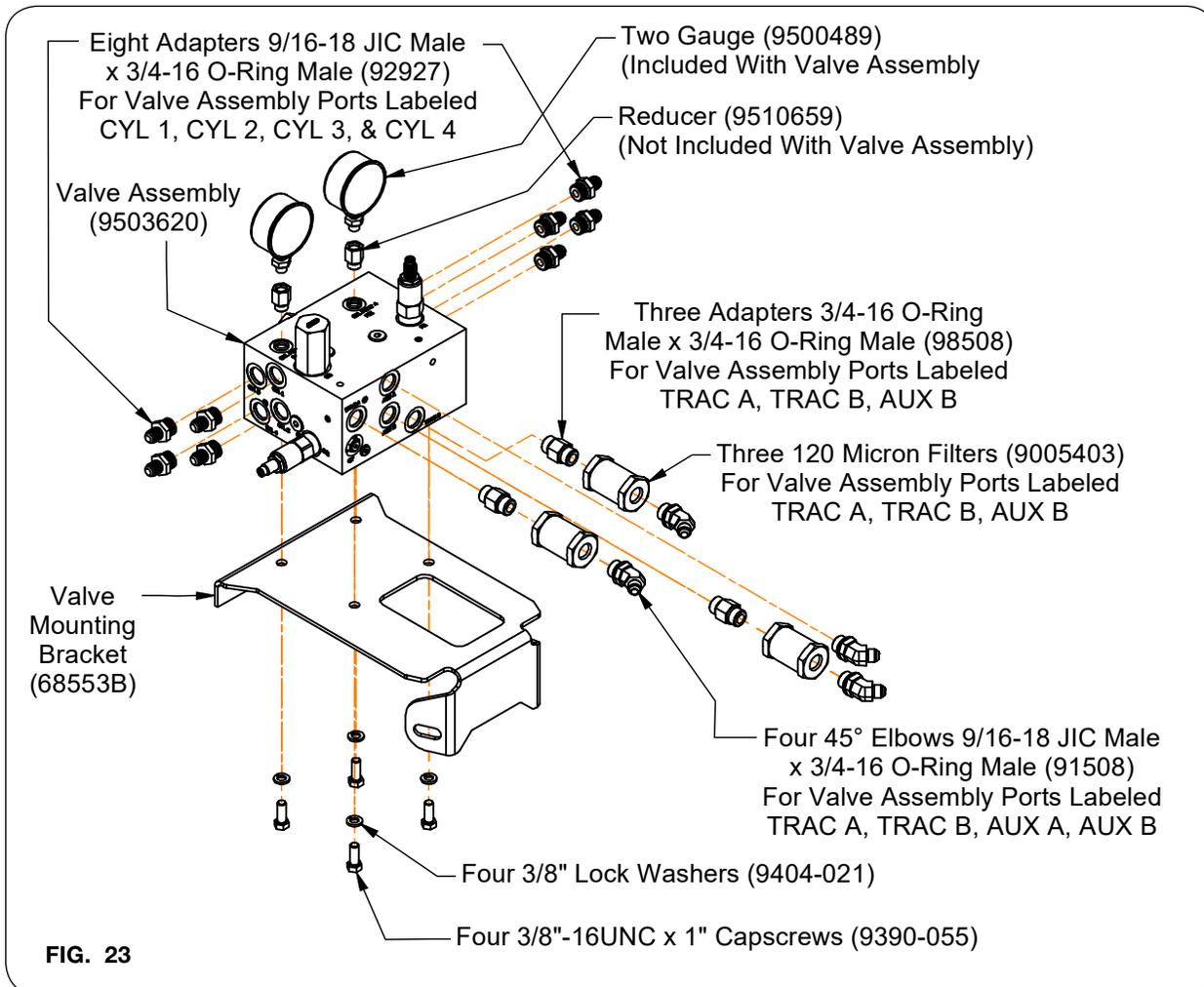
3-POINT RAPTOR — Set-Up

Notes

Hydraulic Set Up — Optional Flex Hydraulics

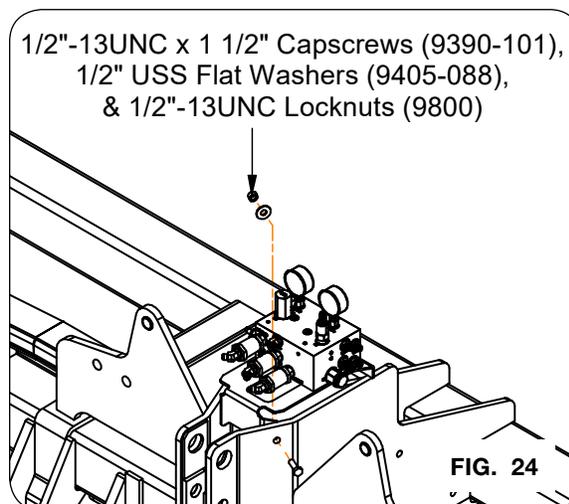
12 Row 30", 36" & 38" — #601778

1. Attach the fittings to the valve assembly (9503620) as shown in FIG. 2-60.



2. Attach the valve assembly with fittings to the valve mounting bracket (68553B) with capscrews (9390-055) and lock washers (9404-021) FIG. 23.

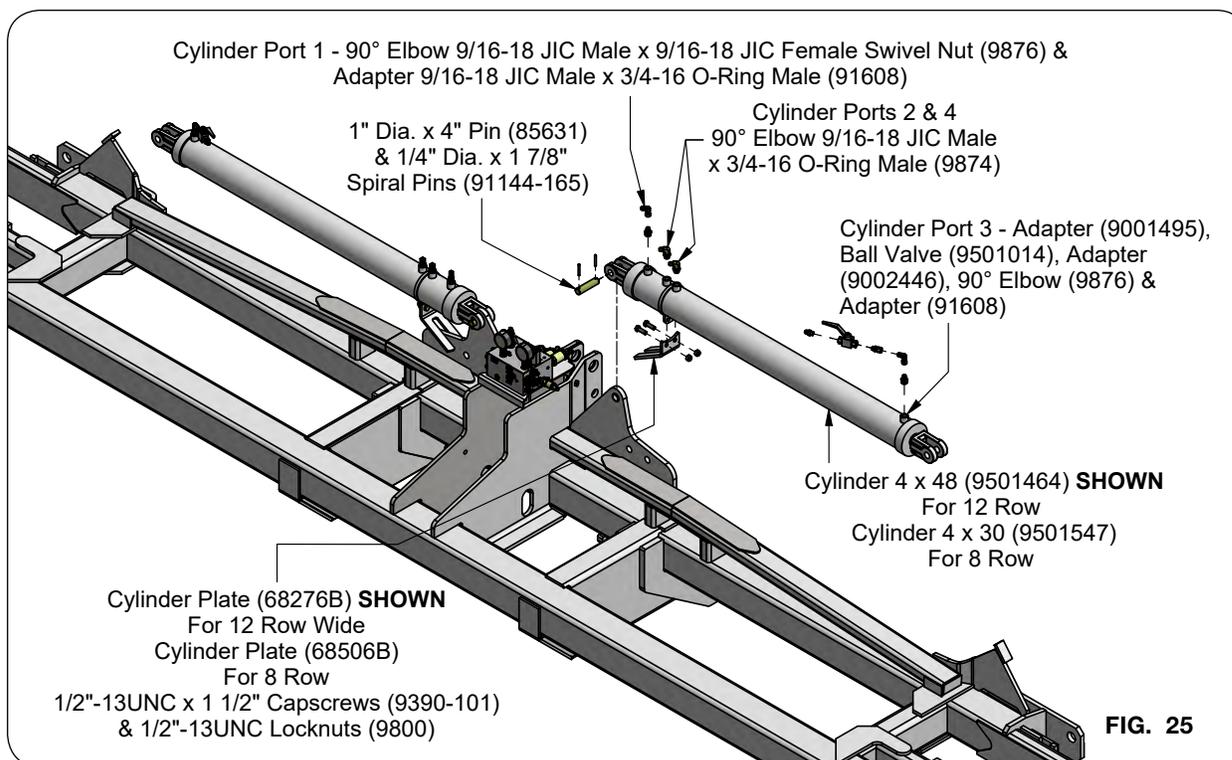
3. Secure the valve mounting bracket to the main frame with capscrews (9390-101), flat washers (9405-088), and locknuts (9800) as shown in FIG. 24.



3-POINT RAPTOR — Set-Up

Hydraulic Set Up — Optional Flex Hydraulics (continued)

4. Attach the cylinder plates to the cylinders with 1/2"-13UNC x 1 1/2" capscrews (9390-101) and 1/2"-13UNC locknuts (9800). (FIG. 25)
5. Assemble 90° elbows (9876) and adapters (91608) to cylinder ports 1 and 3. (FIG. 25)
6. Assemble 90° elbows (9874) to cylinder ports 2 and 4. (FIG. 25)
7. Attach the cylinder to the main frame with 1" Dia. x 4" pins (85631) and 1/4" Dia. x 1 7/8" spiral pins (91144-165) as shown in FIG. 25.



3-POINT RAPTOR — Set-Up

Hydraulic Set Up — Optional Flex Hydraulics (continued)

8. Attach the hoses to the cylinders and valve assembly as shown in FIG. 2-26.

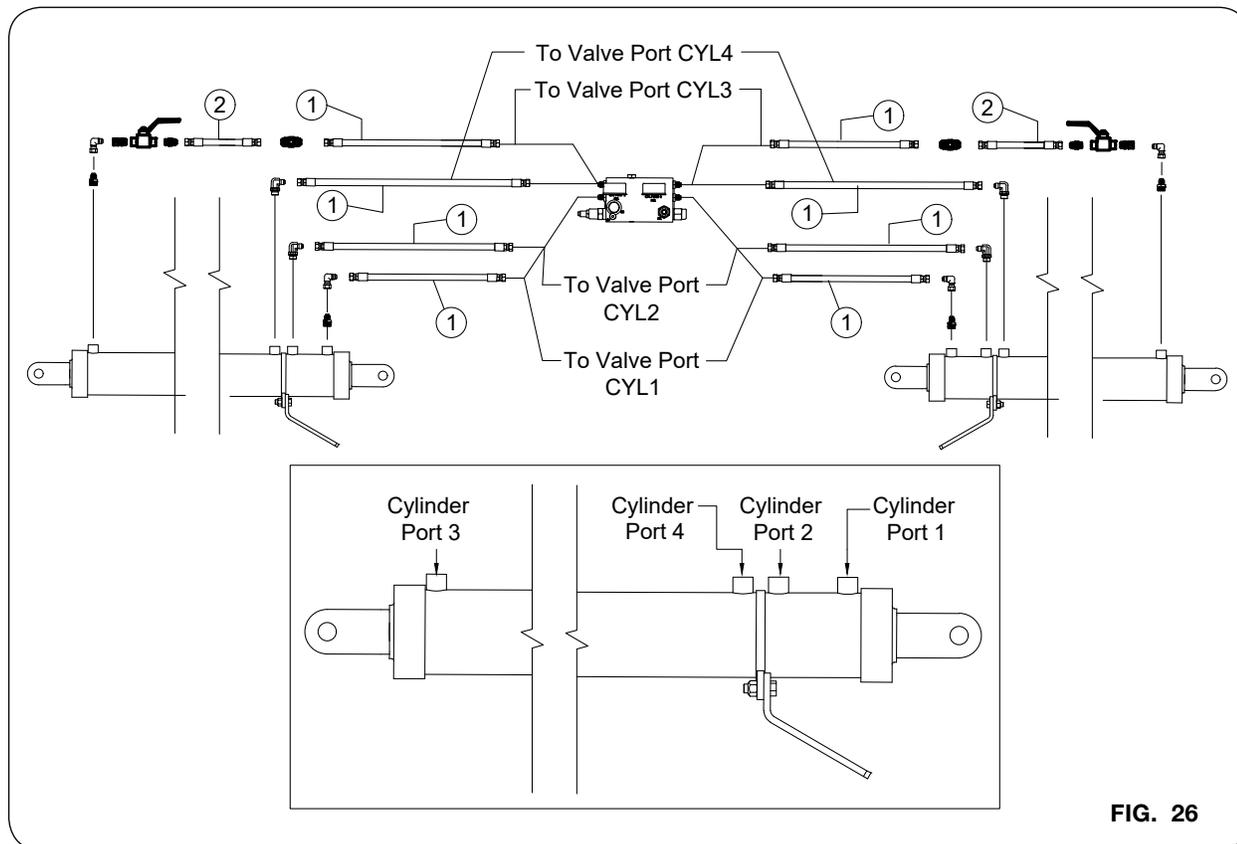
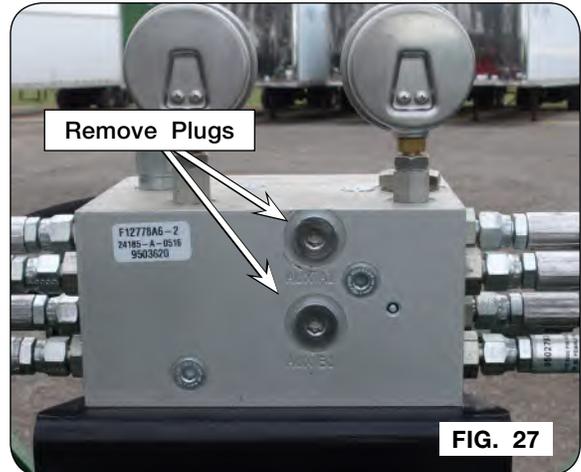


FIG. 26

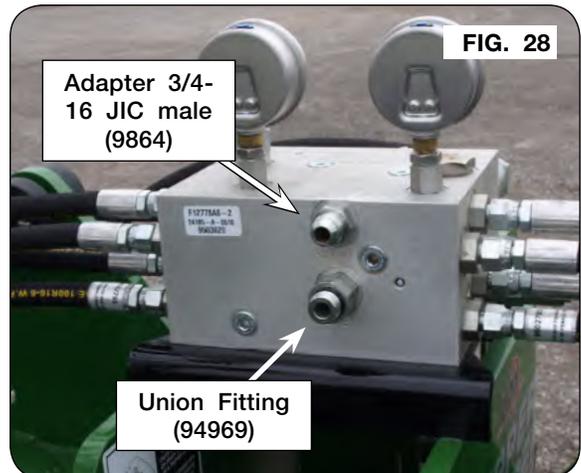
ITEM	PART NUMBER	DESCRIPTION	QTY	NOTES
1	9502793	Hose 3/8" Dia. x 28"	8	Cylinder Port 1 to Valve Port CYL1; Cylinder Port 2 to Valve Port CYL2; Cylinder Port 3 to Connector & Hose #2; Cylinder Port 4 to Valve Port CYL4
2	9501677	Hose 3/8" Dia. x 54"	2	Hose #1 & Connector to Valve Port CYL3

Hydraulic Set Up — Optional Flex Hydraulics (continued)

9. Remove and discard the plugs in ports AUX A1 and AUX B1. (FIG. 27)

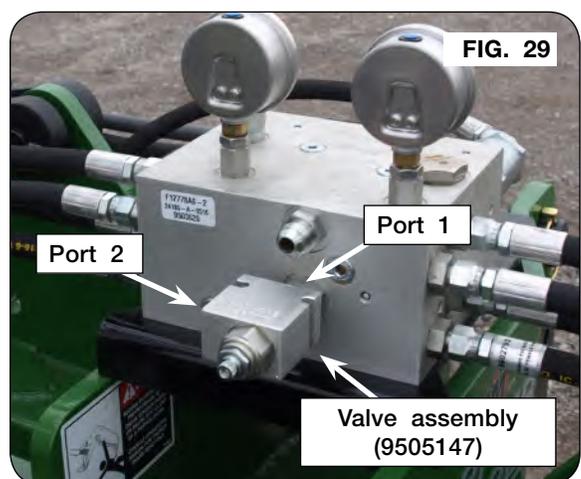


10. Install Adapter 3/4-16 JIC male (9864) into port AUX A1 and the non-adjustable end of union fitting 94969 into port AUX B1 and torque to 12 ft-lbs. (FIG. 28)



11. Thread Port 1 of the pressure relief valve assembly 9505147 onto the adjustable union fitting in port AUX B1 as shown in figure 29. Torque the adjustable fitting nut to 12 ft-lbs.

NOTE: Port 1 of the relief valve assembly will attach to the union fitting and port 2 will face the left-hand side of the machine.



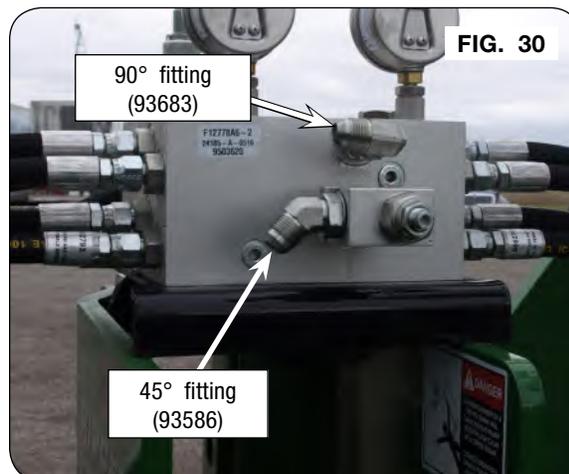
3-POINT RAPTOR — Set-Up

Hydraulic Set Up — Optional Flex Hydraulics (continued)

12. Install 90-degree fitting 93683 onto the adapter in AUX A1. Point the JIC end toward the left-hand side of the machine as shown in figure 4. Hand tighten the JIC fittings until they are seated, then tighten an additional 1/6 turn.

13. Install 45-degree fitting 93586 into port 2 of the pressure relief valve block. Point the JIC end of the fitting downward and Torque the O-ring nut to 12 ft-lbs. (FIG. 30)

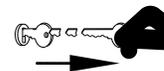
14. Connect the two new fittings installed in steps 6 & 7 with the new hose 9502790. Hand tighten the JIC fittings until they are seated, then tighten an additional 1/6 turn. Ensure the hose does not twist while tightening the fittings. (FIG. 31)



Hydraulic Set Up — Optional Flex Hydraulics (continued)

Flex Frame Shim Kit

1. Attach an appropriately rated tractor to the machine. Lower the storage stands and park the machine on a firm, level surface. Completely fold the wings to the transport position and relieve all hydraulic pressure from system. See your tractor operator's manual for the proper procedure. Block the machine to keep it from moving.



NOTE: Any previously installed shims or blocks **MUST BE** removed prior to installation of the Flex Frame Shim Kit.

2. At the rear wing cutout on the outside of the main frame, attach a base shim, 605805B, using the provided 5/8" carriage bolt, 9388-135, and locknut, 9801. (Fig. 32) Torque the hardware to 120–135 ft-lbs.



NOTE: The 90 degree bend of the shim will point down and be toward the outside of the machine.

3. At the front wing support on the outside of the main frame, attach a base shim, 605805B, and loosely secure it using the provided 5/8" carriage bolt, 9388-135, and locknut, 9801. (Fig. 33)



4. Repeat steps 2–3 for the other side of the machine.

5. Completely unfold the wings and place the SCV in FLOAT. Fully extend the tip-up cylinders. Inspect the front shims to see if an additional shim, part 98815B, will fit between the base shim and the wing. (Fig. 34) When complete, completely fold the machine and shut off the tractor.



6. If no shims will fit, continue to step 7. If a shim will fit, remove the front base shim. Reinstall the base shim with shim 68815B underneath it and secure with the 5/8" hardware. Repeat steps 5–6.

7. Torque the front shim hardware to 120–135 ft-lbs.

Wing Flex Valve Operating Instructions

This page contains updated operating procedures for using the flex wing option. Keep these instructions with your owner's manual for future reference.

The flex wing option features dual function cylinders that are designed with two separate chambers in one cylinder body. The longer 48" cylinder end folds the wings and allows wing flex. The shorter cylinder end activates wing tip-up for turning around on the ends.

The flex wing option allows wings to flex 5 degrees below center and 15 degrees above center. Relief valve cartridges inside the valve block assembly work with tractor hydraulics to allow the wings to float up or down in the field. Wing down-pressure can be added in difficult soil conditions where wing shank depth is not consistent.

IMPORTANT

- *If the Flex Frame Hydraulics are installed on the machine, the hydraulic valve operating the long end of the cylinder must run in FLOAT (no down pressure) or CONTINUOUS (down pressure active) to prevent potential cylinder damage. DO NOT operate the long end of the flex wing cylinder in NEUTRAL.*

Tractor SCV Settings

The implement flex frame option requires 2 sets of tractor SCV outlets.

Aux A and B Ports on Valve

The short end of the cylinder tilts the wings to level when turning on the ends of the field. This outlet is engaged at the same time as the machine raise to allow the wings to tilt up while the machine is raised and turning on the ends. This outlet also tilts the wings down when the machine is lowered. After the machine is fully lowered, the SCV for this function should be OFF. Set hydraulic flow to 6–10 GPM. Do not plumb this function into the lift/lower hydraulic circuit on the tractor.

Trac A and B Ports on Valve

The long end of the cylinder folds and unfolds the wings between transport position to field working position. During field operation, tractor hydraulics must be operated in FLOAT or CONTINUOUS (for down pressure) so the 48" cylinder rod can piston in/out when wings raise/lower with field contours.. Set hydraulic flow to 6–10 GPM.

Purging Hydraulic System

WARNING

- RELIEVE HYDRAULIC SYSTEM OF ALL PRESSURE BEFORE ADJUSTING OR SERVICING. SEE TRACTOR OPERATOR'S MANUAL FOR PROPER PROCEDURES.
- HIGH-PRESSURE FLUIDS CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY OR DEATH. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.

IMPORTANT

- *Flex frame configuration, wings will go below center when BOTH pistons are fully extended on each cylinder. IF Machine is not raised into transport OR system is not properly operated (hyd. valve shifts to pressure reducing mode), damage could occur.*

Purge air from system as follows:

- A. Disconnect the rod end of all cylinders in a circuit and block up cylinders so the rod can completely extend and retract without contacting any other component.
- B. Pressurize the system and maintain system at full pressure for at least 5 seconds after cylinder rods stop moving. Check that all cylinders have fully extended or retracted.
- C. Check oil reservoir in hydraulic power source and re-fill as needed.
- D. Pressurize system again to reverse the motion of step B. Maintain pressure on system for at least 5 seconds after cylinder rods stop moving. Check that cylinders have fully extended or retracted.
- E. Check for hydraulic leaks using cardboard or wood. Tighten connections according to directions in Torque Specifications in MAINTENANCE section.
- F. Repeat steps B, C, D, and E 3-4 times.
- G. De-pressurize hydraulic system and connect cylinder rods clevises to their mating lugs.

HYDRAULIC SYSTEM CHECKS ON ALL UNITS -- CHECK THE FOLLOWING:

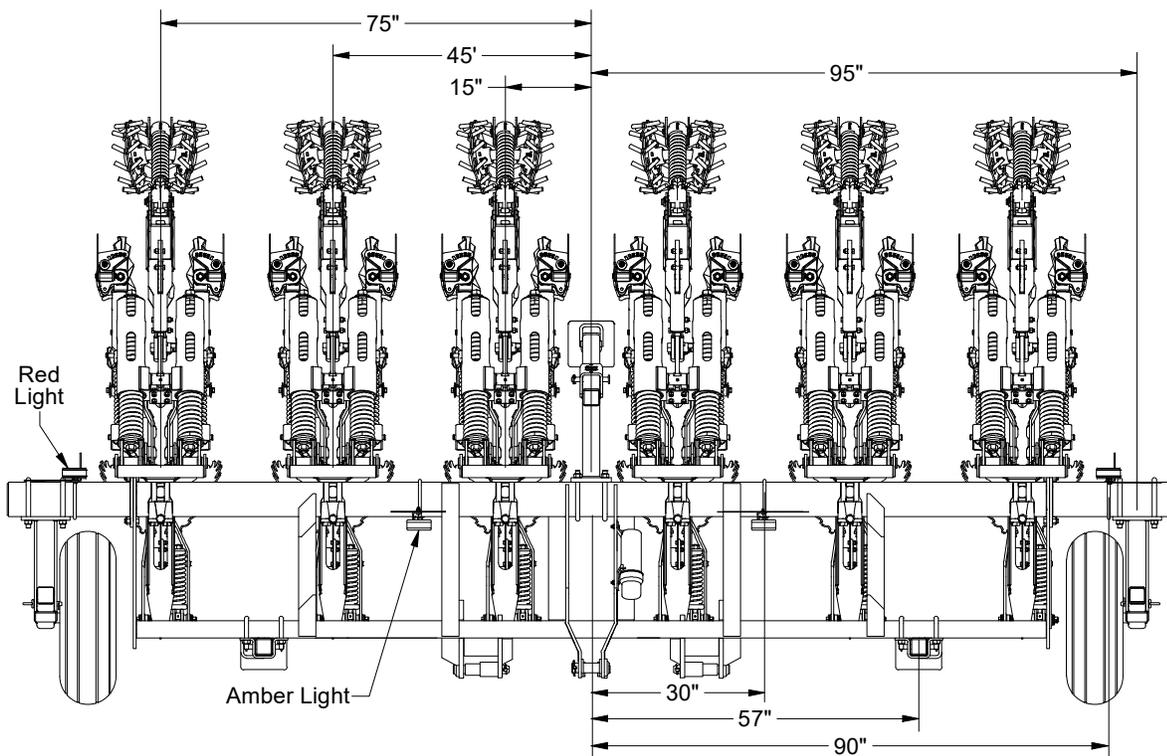
ROUTING OF ALL HYDRAULIC HOSES: Hoses should not be kinked, twisted, or rubbing against sharp edges.

FITTINGS AND CONNECTIONS: Check for leaks. Refer to "Hydraulic Fittings" in MAINTENANCE section.

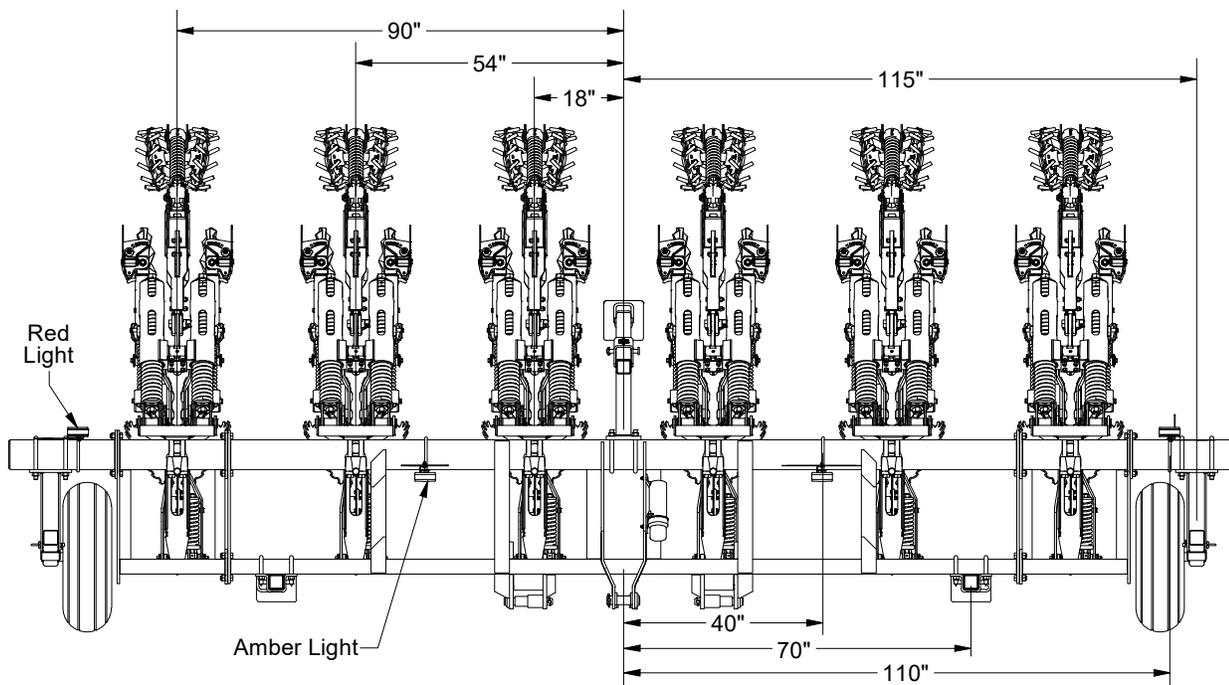
HOSES: Be sure hoses have room to "FLEX" (for folding) in hinge areas. Hoses must be secured with cable ties.

3-POINT RAPTOR — Set-Up

Overhead Layouts — Rigid Units — 6 Shank 30" Spacing

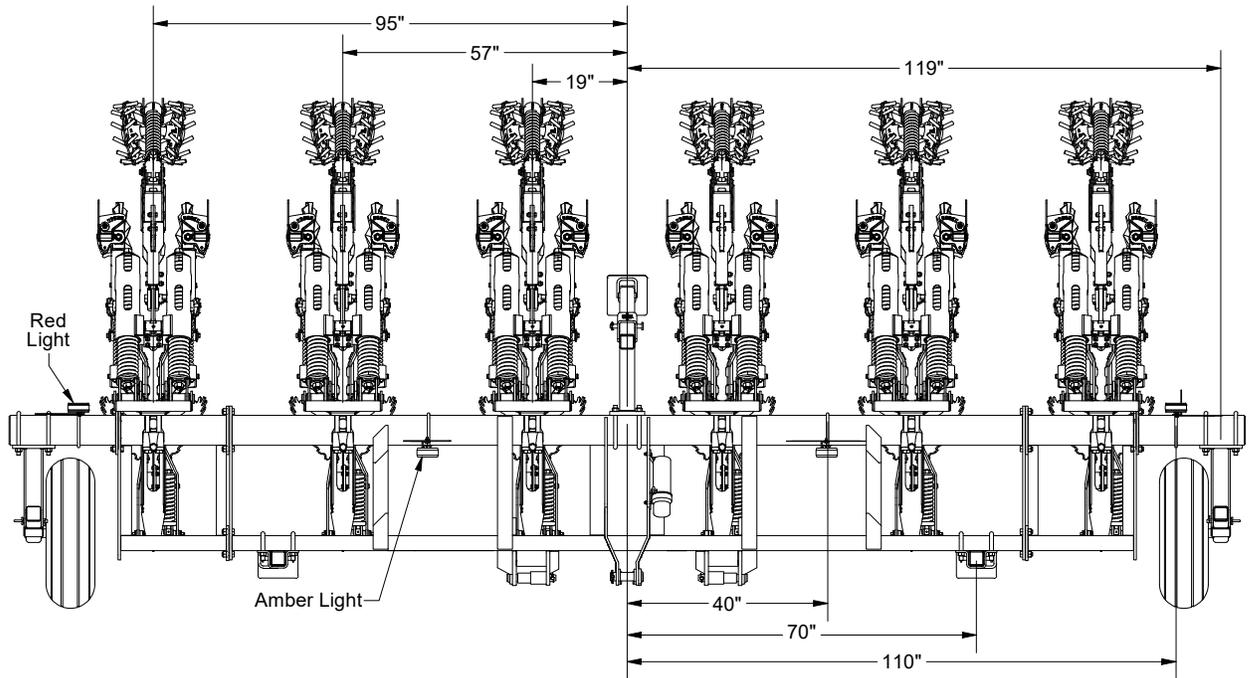


Overhead Layouts — Rigid Units — 6 Shank 36" Spacing



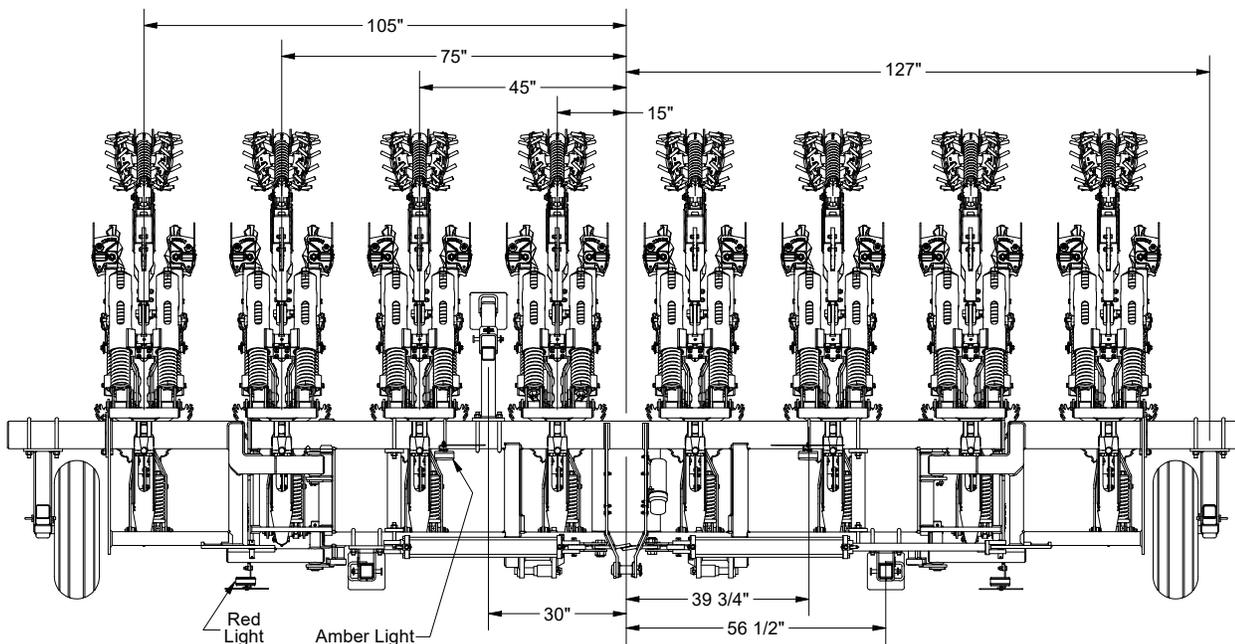
3-POINT RAPTOR — Set-Up

Overhead Layouts — Rigid Units — 6 Shank 38" Spacing

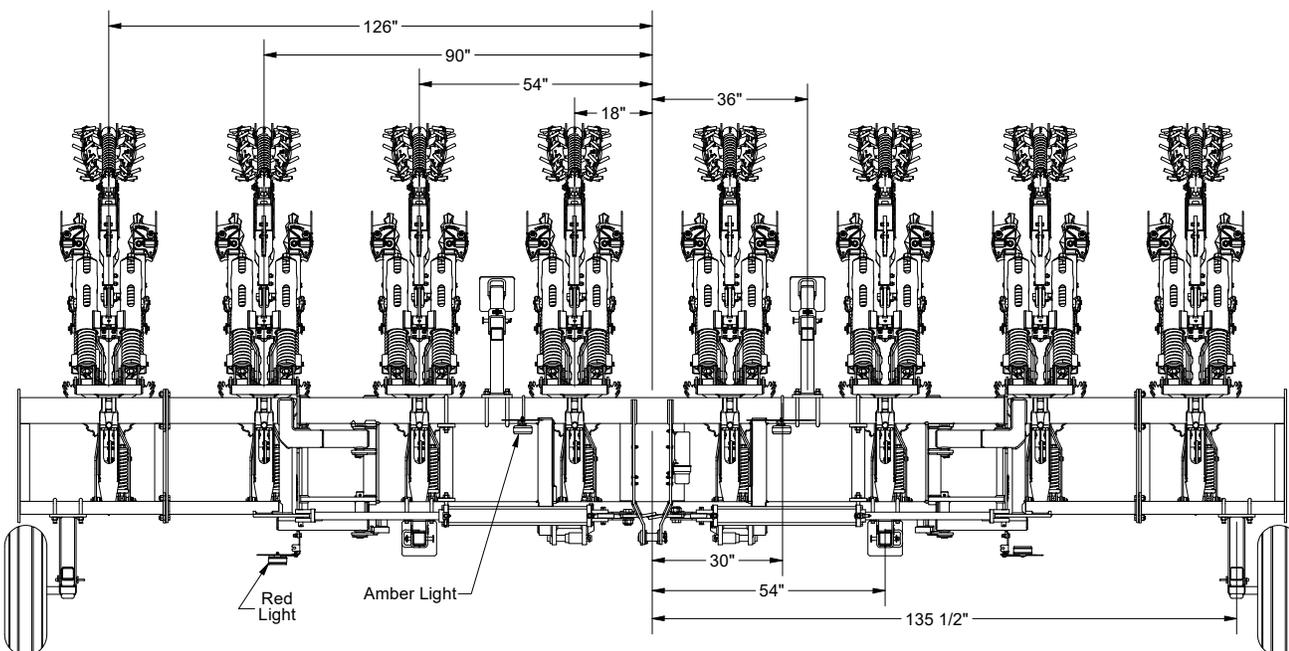


3-POINT RAPTOR — Set-Up

Overhead Layouts — Folding Units — 8 Shank 30" Spacing

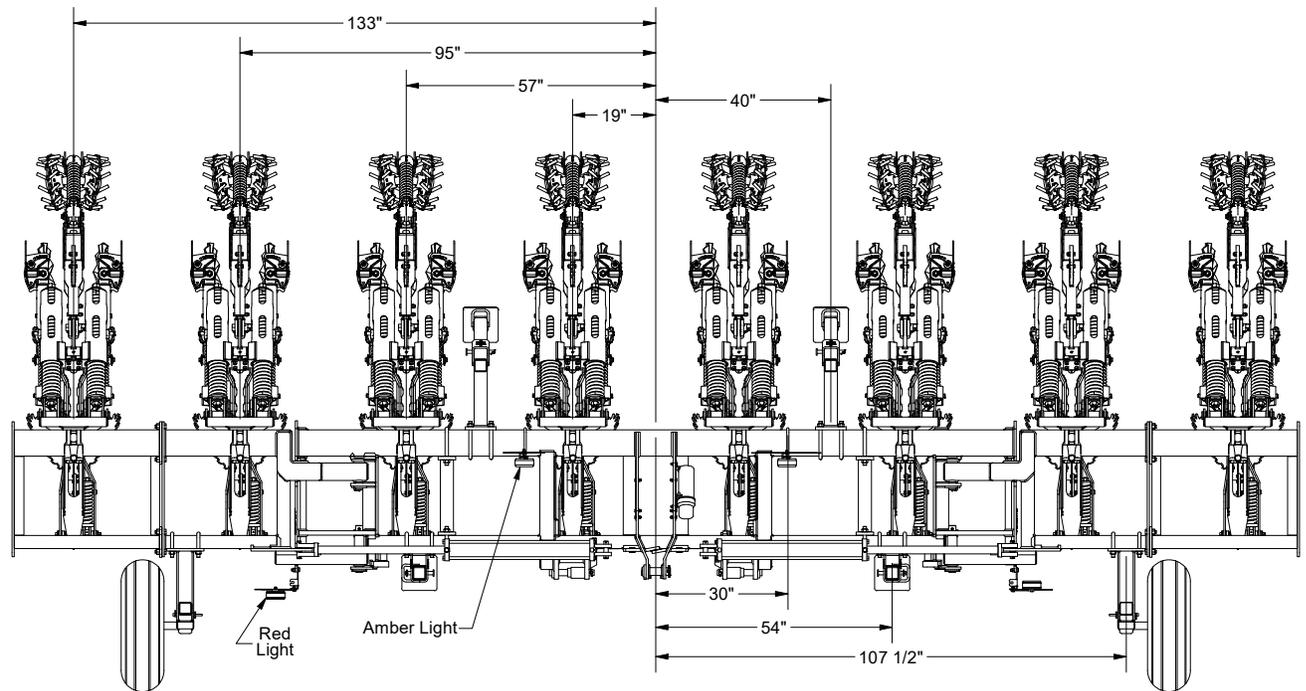


Overhead Layouts — Folding Units — 8 Shank 36" Spacing



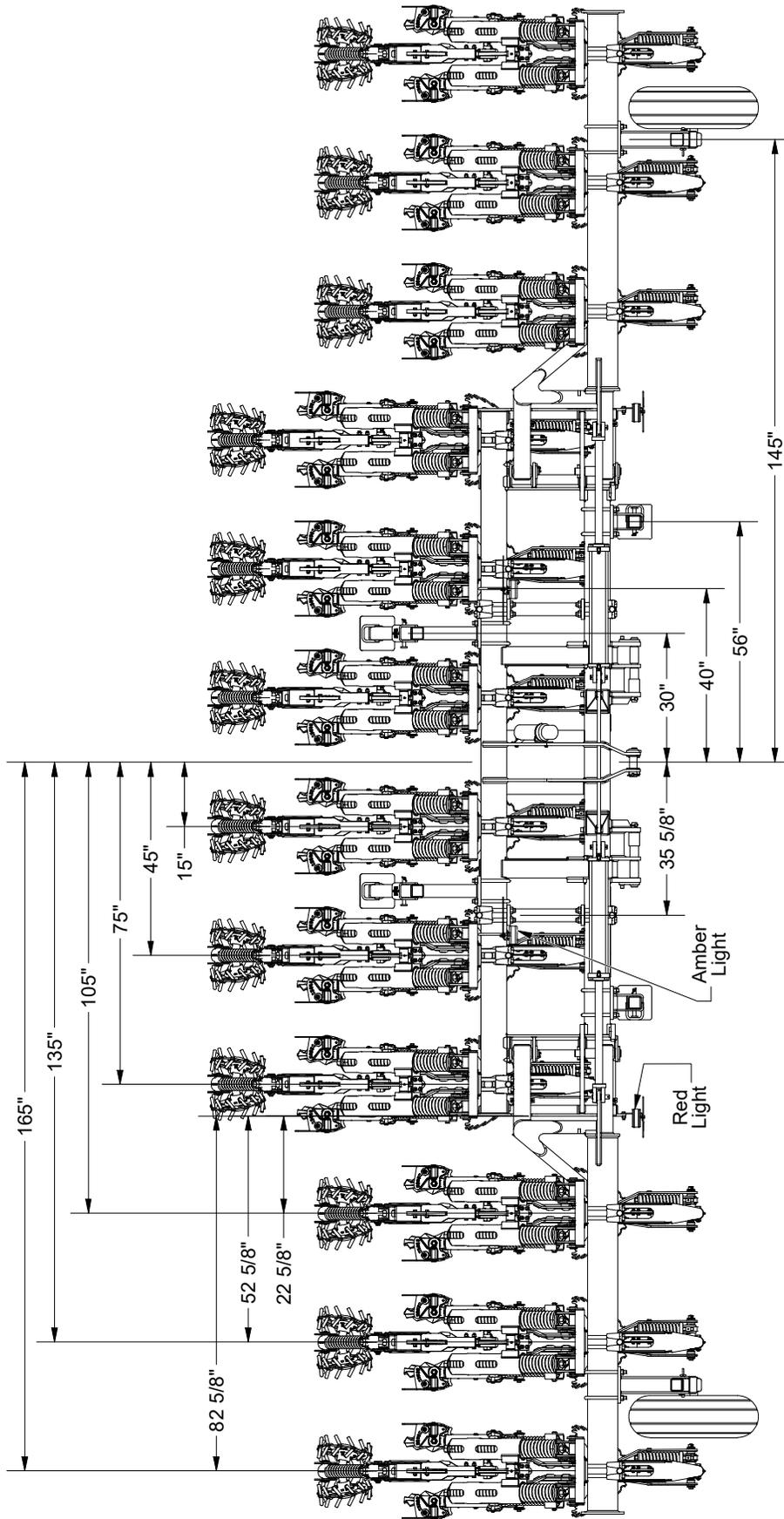
3-POINT RAPTOR — Set-Up

Overhead Layouts — Folding Units — 8 Shank 38" Spacing



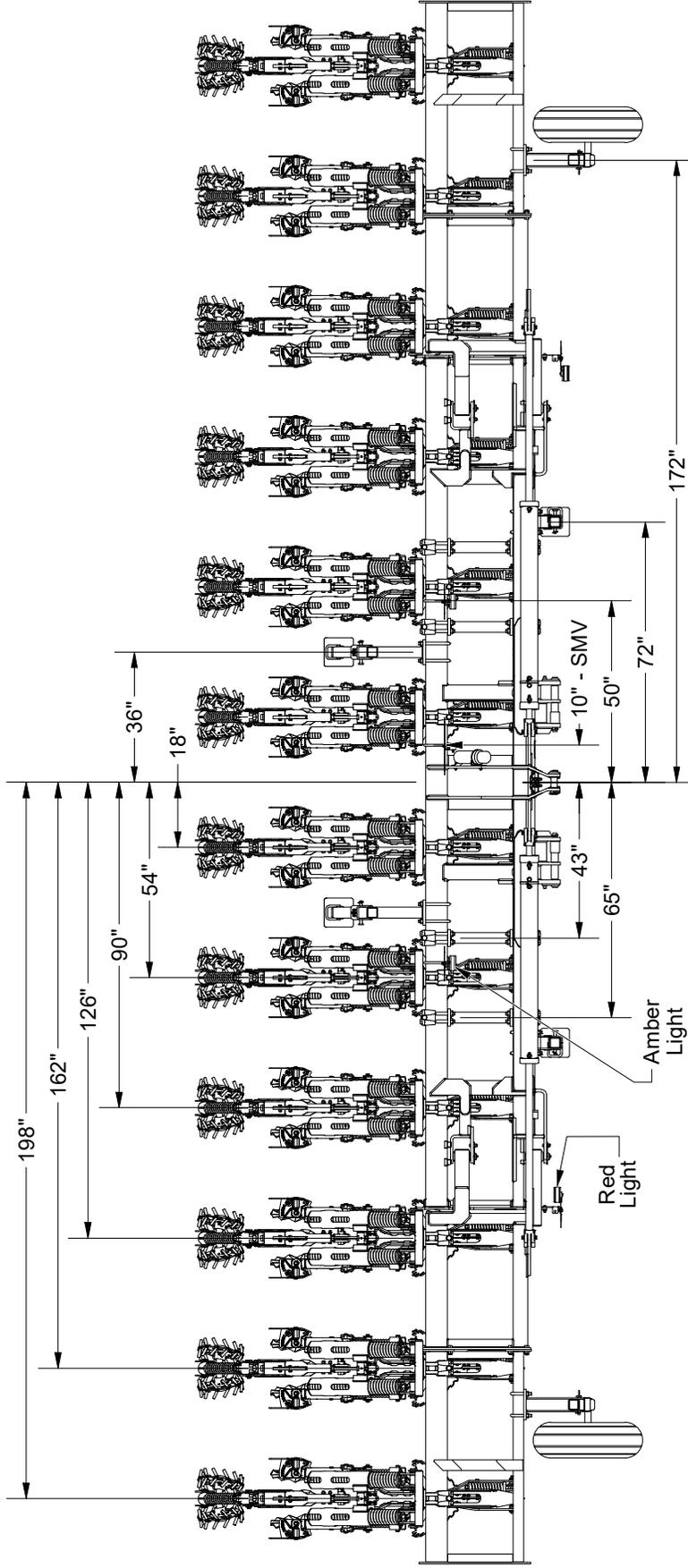
3-POINT RAPTOR — Set-Up

Overhead Layouts — Folding Units — 12 Shank 30" Spacing



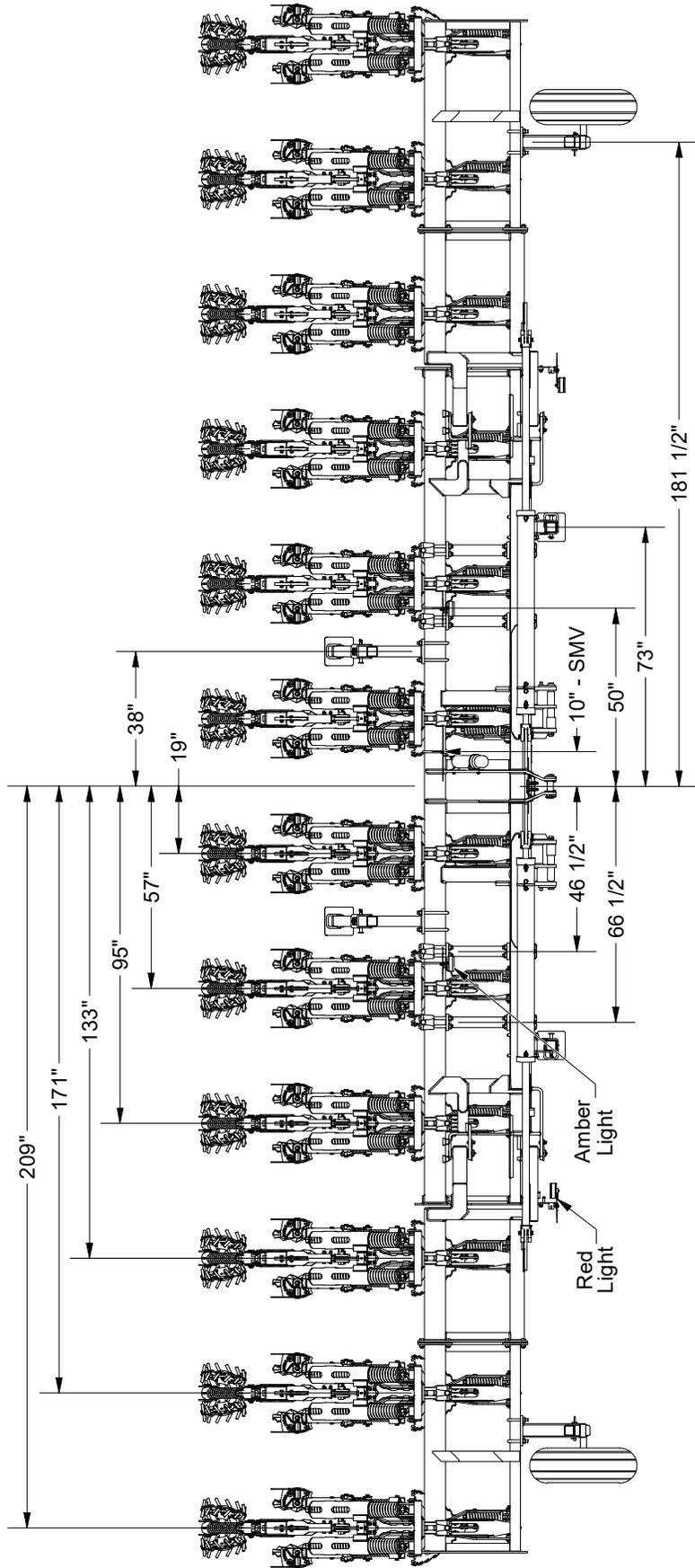
3-POINT RAPTOR — Set-Up

Overhead Layouts — Folding Units — 12 Shank 36" Spacing



3-POINT RAPTOR — Set-Up

Overhead Layouts — Folding Units — 12 Shank 38" Spacing



3-POINT RAPTOR — Set-Up

Notes

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General Operation Information

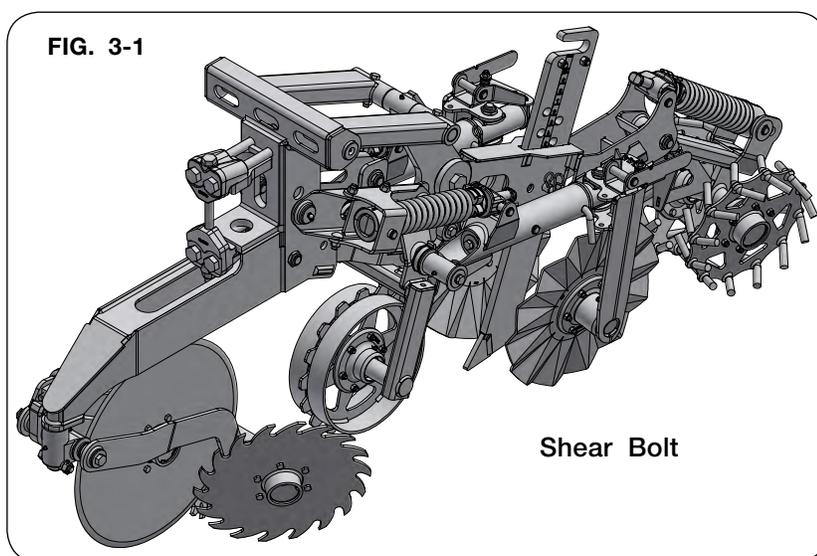
⚠ WARNING

- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW “SAFETY” SECTION IN THIS MANUAL IF NECESSARY.**

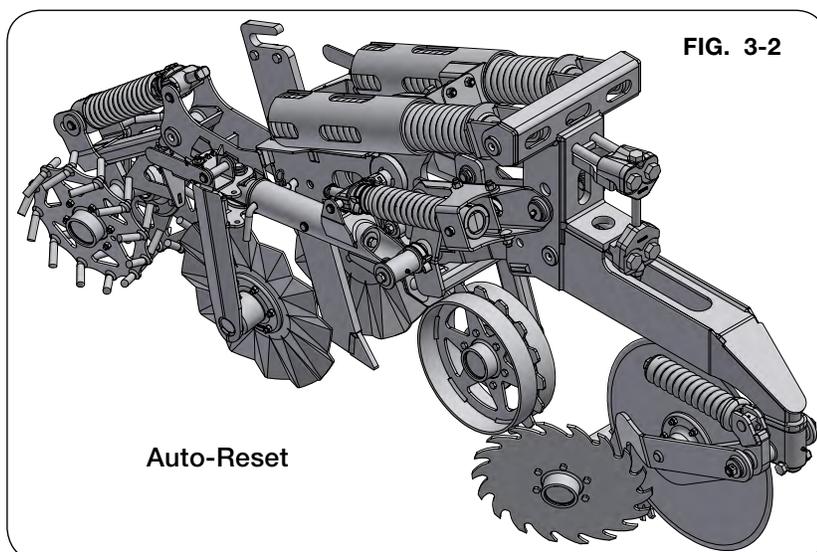
Read this operation section thoroughly. Acquaint yourself with the adjustments required to obtain efficient and trouble-free operations.

The 3-POINT RAPTOR tool is available with two parallel arm options:

- The Model 2115MT comes with the shear bolt parallel arms (FIG. 3-1) and should be used in areas with few rocks or obstructions.



- The Model 2130MT is equipped with the auto-reset parallel arms (FIG. 3-2) and is intended for use with moderate levels of rocks and obstructions.



Preparing Tractor

Before operating implement refer to tractor operator's manual for information concerning safe methods of operation, hydraulics, hitch adjustment, tire inflation, wheel adjustments, and tractor weights.

Check tractor brakes and warning lights. Make sure they are in proper working order.

Check tractor hydraulic oil reservoir and add oil if needed.

WARNING

- **TRANSPORTING THE IMPLEMENT SIGNIFICANTLY CHANGES THE WEIGHT AND BALANCE OF YOUR TRACTOR. MAKE SURE THE TRACTOR IS PROPERLY BALLASTED.**

Front-End Weights

Use front-end weights as needed to provide effective steering control and front-end stability. See your tractor operator's manual for recommendations on ballasting procedures.

WARNING

- **DO NOT EXCEED THE TRACTOR'S LIFT CAPACITY OR BALLAST RECOMMENDATIONS.**

Note: Warranty consideration will only be given on items manufactured by Unverferth Mfg. Co., Inc.

Horsepower Requirements

The power requirement for this unit is 20-40 hp. per shank, depending on the depth of penetration and ground conditions. Select a tractor with sufficient power to operate this machine.

Sway Blocks

Sway blocks should be used and adjusted to limit movement in operating position. Your implement should be permitted to sway very little while operating and should be held rigid while transporting. See your tractor operator's manual.

Wheel Spacing

Set tractor wheels so they are equally spaced from center of tractor. If using the tool to penetrate in fields of row crops, set tractor wheels so they are centered between the rows.

See your tractor operator's manual for correct tire inflation pressure.

Attaching To Tractor

IMPORTANT

- Operating a 3-point implement with an articulated four-wheel drive or track tractor requires the operator to drive straight to prevent damage to the implement. Sudden turns or steering corrections when the implement is in the ground can exert extreme forces through the implement's frame and/or shank components. Improper operation can void the implement's warranty. For these applications, customers are recommended to order an optional caddy.

Mast And Hitch

The 3-POINT RAPTOR implement should be used on a tractor with the appropriate hitch connection (see table below).

NOTE: N QC refers to Narrow Quick Attach Coupler. QC refers to Quick Attach Coupler.

Hitch Type	Machine Type		
	Rigid 6 Shank	Folding 8 Shank	Folding 12 Shank
CAT3 - 3PT	X	X	X
CAT3 - QC	X	X	X
CAT3 - N QC	X	X	X
CAT4 - N	X	X	X
CAT4 - N QC	X	X	X
CAT4			X
CAT4 - QC			X

Bolts And Nuts

Before operating, check all hardware for tightness. Re-check all bolts for tightness after the unit has been operated for several hours.

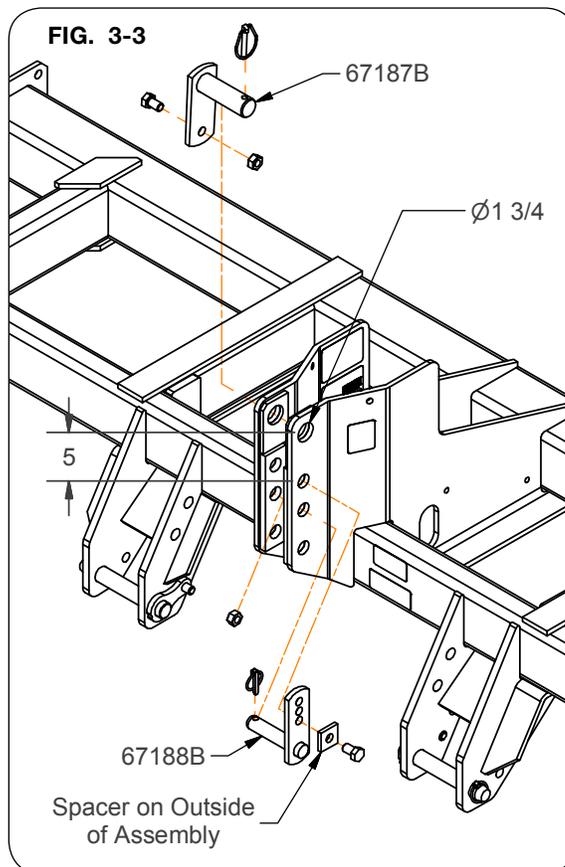
Pins And Retaining Ring

Before operating, check that all pins and retaining rings are in place and in good condition. Replace any worn, damaged, or missing pins, and retaining rings.

Attaching To Tractor (continued)

Center Pins For Quick Attach Couplers

The spacer should be placed on the outside when used on all current style folding units with a 1 3/4" top hole on the main frame. Pin assembly (67187B) is used for CAT4 hitches and in the 1 3/4" top hole. Pin assembly (67188B) is used for CAT3 hitches and in the upper 1 1/4" hole. See FIG. 3-3.



Attaching To Tractor (continued)

Tractor Without Quick Attach Coupler

WARNING

- **DO NOT STAND BETWEEN TRACTOR AND IMPLEMENT DURING HITCHING.**
-

IMPORTANT

- *Before attaching tractor to implement, check mast pins for any wear or damage. Replace any worn or damaged pins.*

Attach the unit to the tractor as specified in the tractor's operator's manual. Use the appropriate size hitch pins and lock in place.

Back the tractor up to the front of the implement and position the draft links in front of, and in line with, the lower hitch pins (FIG. 3-5).

Set parking brake, shut-off the engine and remove key from ignition before dismounting from tractor.

Attaching To Tractor (continued)

CAT-III, CAT-III-N, CAT-IV CAT-IV-N:

1. Connect the draft links to the front of the machine. Install pins and secure with klik-pins.
2. Position hitch bushings to match the tractor's lower link spacing.
3. Adjust tractor's sway blocks as required. See tractor operator's manual. FIG. 3-4, FIG. 3-5, and FIG. 3-6

FIG. 3-4

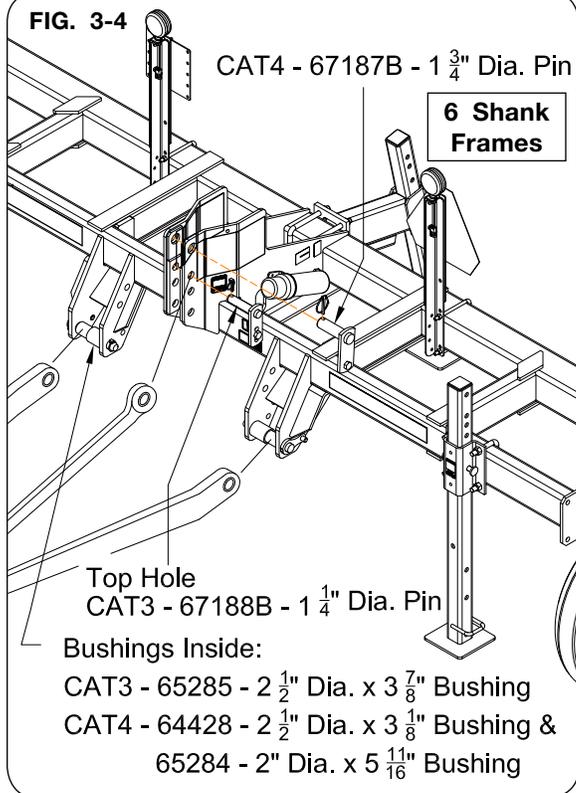


FIG. 3-5

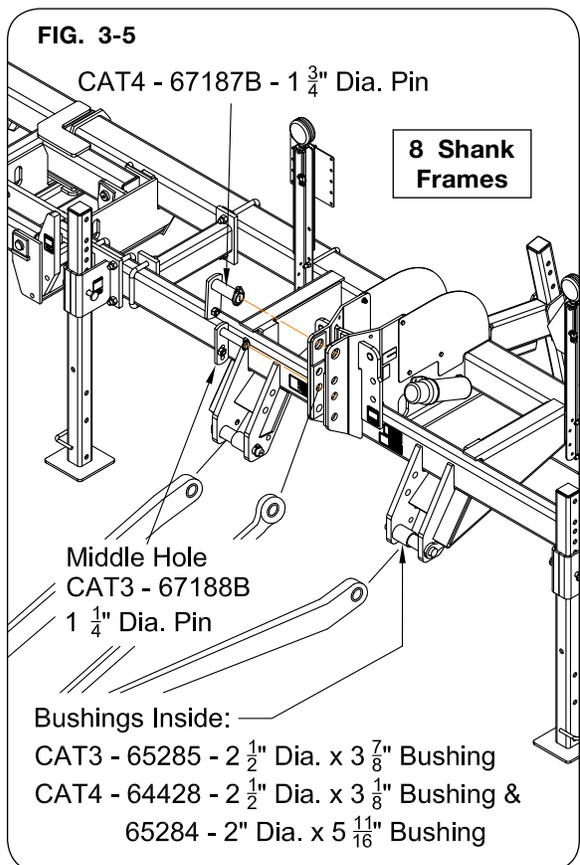
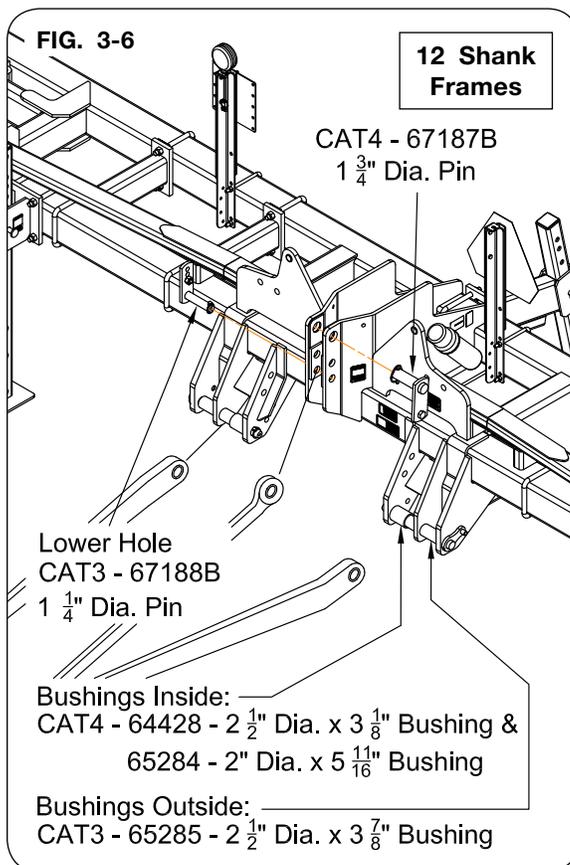


FIG. 3-6



Attaching To Tractor (continued)

Tractor With Quick Attach Coupler

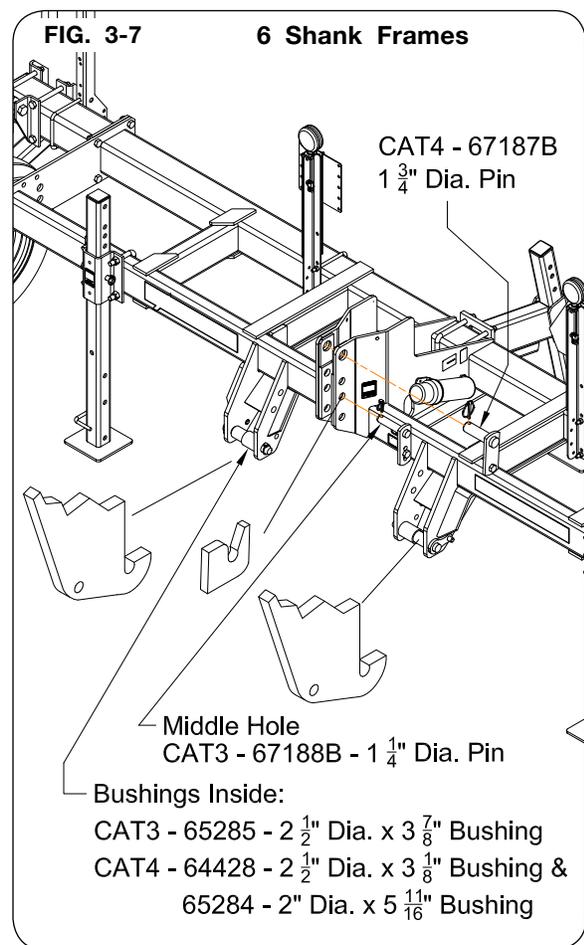
⚠ WARNING

- DO NOT STAND BETWEEN TRACTOR AND IMPLEMENT DURING HITCHING.

IMPORTANT

- Before attaching tractor to implement, check mast pins for any wear or damage. Replace any worn or damaged pins.

1. Position bushings as shown in FIG 3-7, FIG. 3-8, or FIG. 3-9.
2. Lower the coupler to allow jaws to pass under mast and hitch pins.
3. Back the tractor to front of the implement until the jaws are under their respective hitch pins.
4. Lift quick coupler so jaws are firmly seated.
5. Set parking brake, shut-off engine and remove key from ignition before dismounting from tractor.
- 6) Lock the jaw latches into place (see tractor operator's manual).



Attaching To Tractor (continued)

FIG. 3-8 8 Shank Frames

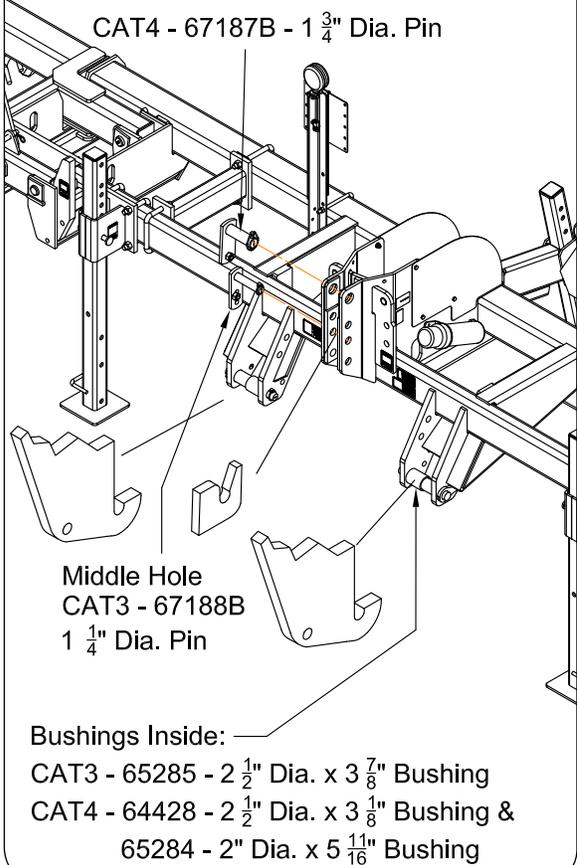
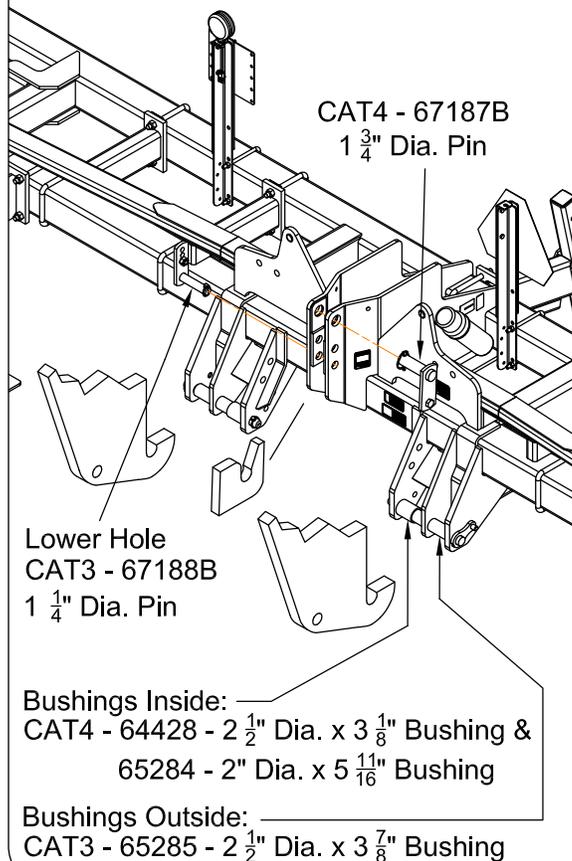


FIG. 3-9 12 Shank Frames



Attaching To Tractor (continued)

Electrical Hook-Up

NOTE: Unverferth Manufacturing has designed the transport lighting and marking kit to meet United States federal law and ASABE standards at the time of manufacture. Machine modifications, including additional features or changes to the intended configurations, may require updates to the lighting and marking as well.

Compliance with all lighting and marking laws is the responsibility of the operator at the time of travel.

See federal regulation 49 CFR 562; available at www.govinfo.gov for US federal law requirements.

See your Unverferth dealer for additional brackets, reflectors, or lights to meet your requirements.

Connect the main harness to the tractor.

Hydraulic Hook-Up

WARNING

- **ALWAYS RELIEVE HYDRAULIC SYSTEM PRESSURE BEFORE DISCONNECTING HOSES FROM TRACTOR OR SERVICING HYDRAULIC SYSTEM. SEE TRACTOR OPERATOR'S MANUAL FOR PROPER PROCEDURES.**

- **HYDRAULIC CYLINDERS MUST BE PURGED BEFORE HYDRAULIC SYSTEMS MAY BE USED. FAILURE TO DO THIS COULD RESULT IN SERIOUS INJURY.**

NOTE: Refer to SET UP section for purging process.

Folding Wings

WARNING

- **MOVING WINGS CAN CAUSE SERIOUS INJURY OR DEATH. KEEP AWAY FROM FOLDING AND UNFOLDING WINGS.**

On shear bolt machines (Model MT3015) replace any shear bolts that have sheared on any of the shanks located on the wings before folding wings.

Place the wing ball valves (9501014) in the “OPEN/WORKING POSITION” FIG. 3-10.

Raise unit to transport position. Fold wings so that the hydraulic cylinders are fully retracted.

Place the wing ball valves (9501014) in the “CLOSED/STORAGE POSITION” FIG. 3-11.

FIG. 3-10

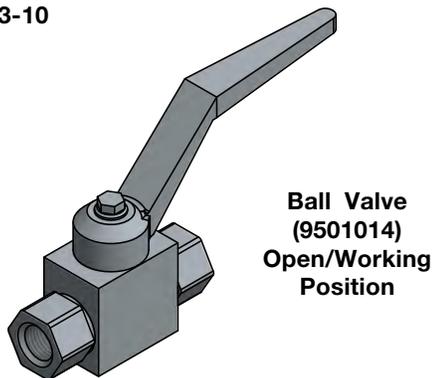
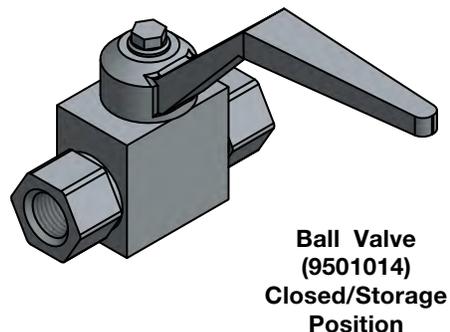


FIG. 3-11



Transporting

DANGER

- **ELECTROCUTION WILL CAUSE SERIOUS INJURY OR DEATH. THE IMPLEMENT IS NOT INSULATED. KEEP AWAY FROM ALL ELECTRICAL LINES AND DEVICES. ELECTROCUTION CAN OCCUR WITHOUT DIRECT CONTACT.**

WARNING

- **INADVERTENT LOWERING OF THE WINGS CAN CAUSE SERIOUS INJURY OR DEATH. ENGAGE WING TRANSPORT LOCKS BEFORE TRANSPORTING.**
- **USE TRANSPORT LIGHTS AS REQUIRED BY ALL LAWS TO ADEQUATELY WARN OPERATORS OF OTHER VEHICLES.**
- **ALWAYS TRAVEL AT A SPEED WHICH PERMITS COMPLETE CONTROL OF TRACTOR AND IMPLEMENT.**

For safe transporting of this implement, the transport speed should never exceed 10 m.p.h. in the field or over rough terrain. Reduce transport speed to maintain full control of the implement and tractor at all times. Do not exceed 20 m.p.h. when transporting the implement on the highway.

Comply with all laws governing highway safety and regulation when moving machinery on public roads.

Be sure SMV Emblem, lights and reflectors are in place and clearly visible to traffic.

Unhitching from Tractor

WARNING

- **FALLING OR LOWERING EQUIPMENT CAN CAUSE SERIOUS INJURY OR DEATH. KEEP EVERYONE AWAY FROM EQUIPMENT WHEN RAISING OR LOWERING.**
- **HIGH-PRESSURE FLUIDS CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY OR DEATH. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.**

Select a firm, level surface for parking the machine. Lower all support stands to the same height. Lower unit with tractor's 3-point hitch until stands and shank points contact the ground.

Set parking brake and remove key from ignition before dismounting from tractor.

Place the wing ball valves (9501014) in the "CLOSED/STORAGE POSITION" on winged machines. Depressurize the hydraulic system according to tractor operator's manual.

1. Disconnect hydraulic hoses and electrical harnesses (if applicable).
2. Release latches or remove pins.
3. Lower 3-point and drive away slowly.

3-POINT RAPTOR — Operation

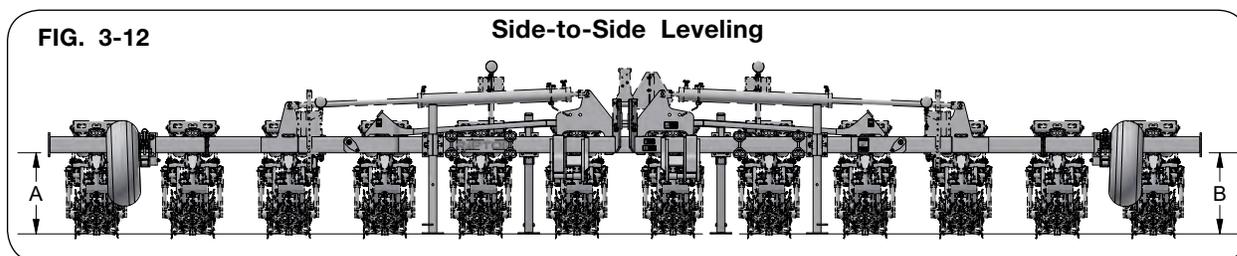
Leveling Frame

For best results, when leveling the implement, position the tractor with implement on a level floor. Check tractor tire pressure and inflate equally from side-to-side. See your tractor operator's manual for correct tire inflation pressure.

Side-to-Side Leveling

With the implement attached to tractor, raise the unit 1 to 2 inches off the floor. Shut-off engine and lock brakes on tractor. Measure to the bottom edge of the rear frame tube on each side of the machine. Frame will be level when dimension "A" is the same as dimension "B", FIG. 3-12. Level frame from side to side by adjusting the lift links on tractor 3-point hitch.

Before adjusting 3-point links, see your tractor operator's manual for correct adjustment procedures and safety requirements.

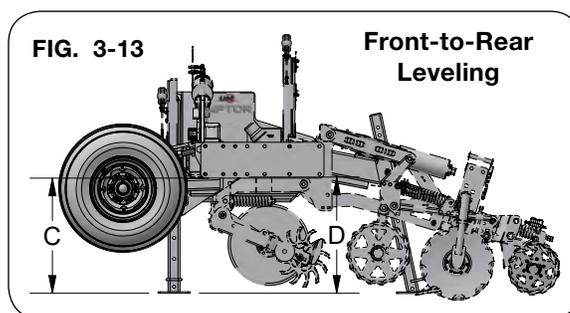


Front-to-Rear Leveling

Before setting the coulter and stabilizer wheels, it is necessary to level the frame from the front to the rear.

For initial adjustment keep the machine raised off the ground 1 to 2 inches (being sure bottom of shanks clear floor). Measure to the bottom of the front frame tube and the rear frame tube.

If frame is not level from front to rear with ground, extend or retract the tractor top link until frame is parallel (or level) to the ground. Frame will be level when dimension "C" is the same as dimension "D". (FIG. 3-13)



Before adjusting 3-point links see your tractor operator's manual for correct adjustment procedures and safety requirements.

Further front-to-back adjustment will be required once machine is operated in the field. When properly leveled, all shanks will enter the ground to a uniform depth.

Toolbar Height

Bottom of toolbar should be set 20"-22" from the ground when in the working position.

Leveling Wings

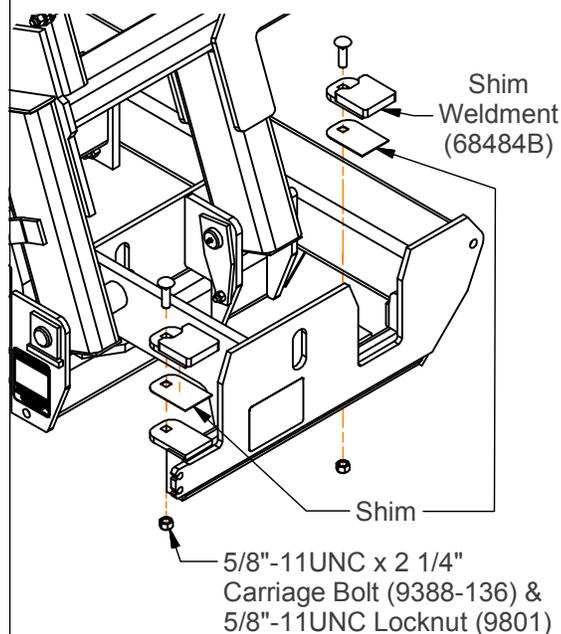
Adjustment Procedures

Check for levelness of machine in the field. The wing tips should be operating at the same working depth as the center section of the machine. If the wing tips are running deeper than the center section, shims may be needed. Shims are provided for adjusting/leveling wing height in the field. The cylinder rod end must also be adjusted.

NOTE: There are 3 shims for each corner, select the appropriate sizes as follows:

Wing Tip Distance Below Level	Approximate Shim Thickness Required
1/2"	1/16"
1"	1/8"
1 1/2"	1/16" & 1/8"
2"	1/4"
2 1/2"	1/16" & 1/4"

Hydraulic — Standard Folding 8 Shank 30", 36", & 38" Spacing; Folding 12 Shank 30" Spacing



Front, Left-Hand Side Shown

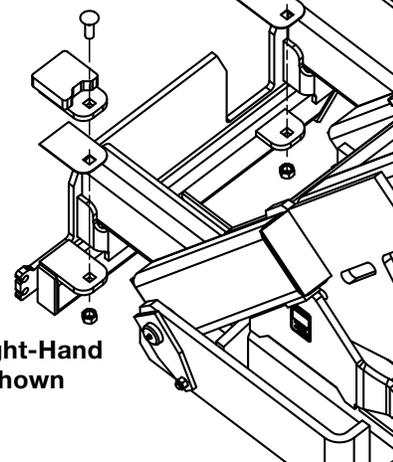
FIG. 3-14

Hydraulic — Standard Folding 12 Shank 36" & 38" Spacing

5/8"-11UNC x 2"
Carriage Bolt (9388-135)
& 5/8"-11UNC Locknut (9801)

Shim Weldment
(68337B)

Shim



Front, Right-Hand Side Shown

FIG. 3-15

Leveling Wings (continued)

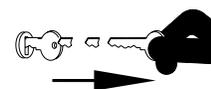
Adjusting Cylinder Clevis End

⚠ WARNING

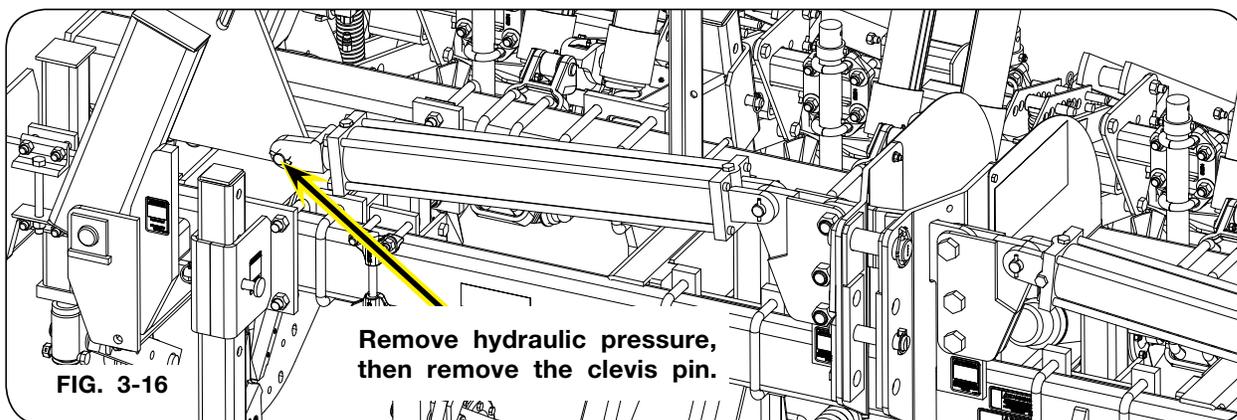
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.
- KEEP HANDS CLEAR OF PINCH POINT AREAS.

Adjust the cylinder clevis end when installing the shims as follows:

1. Lower machine completely to the ground with the wings in the transport position and block securely. Set parking brake on tractor, release any pressure in hydraulic system. Shut tractor engine off and remove the ignition key.

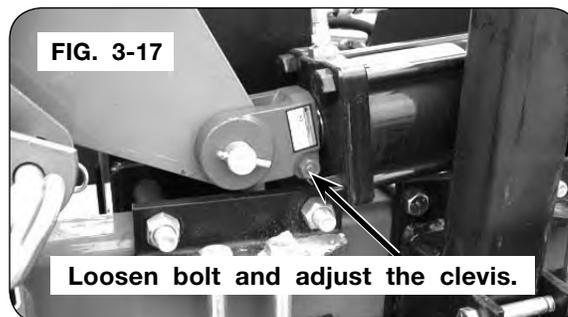


2. Relieve the cylinder pressure and remove the clevis pin (FIG. 3-16).



3. Swing cylinder up and block.
4. Loosen bolt and adjust clevis (Fig. 3-17).

NOTE: The clevis DOES NOT need to be removed, only adjusted.



5. Adjust the clevis accordingly:

- FOR 8-30",36",38" & 12-30" — 4"x30" Cylinder Retracted Length - 41 1/4"
- FOR 12-36",38" — 4"x48" Cylinder Retracted Length - 59 11/16"

Wing Tip Sag Up To 1" - adjust clevis 1/16" in from nominal

Wing Tip Sag More Than 1" - adjust clevis 1/8" in from nominal

Unfolding Wings

To unfold the wings, place ball valve to OPEN/WORKING (handle in-line) position.

WARNING

- **FALLING OR LOWERING EQUIPMENT CAN CAUSE SERIOUS INJURY OR DEATH. KEEP EVERYONE AWAY FROM EQUIPMENT WHEN SUSPENDED, RAISING, OR LOWERING.**

Raise unit to transport position. Unfold wings so that the hydraulic cylinders are fully extended.

FIG. 3-18

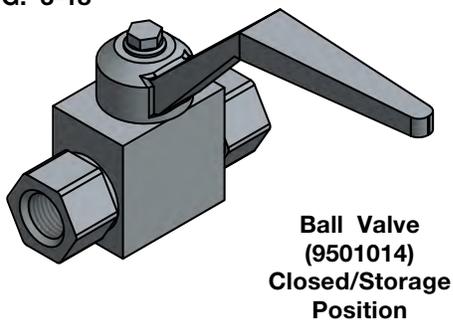
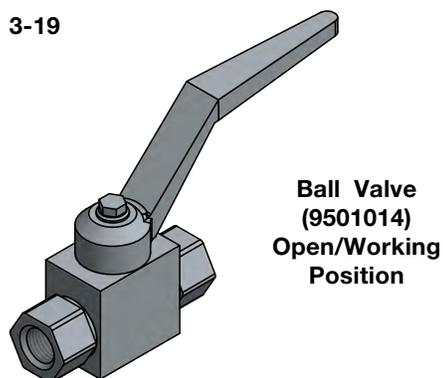


FIG. 3-19



3-POINT RAPTOR — Operation

Flex Hydraulic (Optional) — Field Operation

Your Raptor implement may feature dual function cylinders that are designed with 2 separate chambers in the one cylinder body. The longer cylinder folds the wings between transport and working positions. In field operation, tractor hydraulics allow the longer cylinder rods to adjust in or out as the wings follow field contours. Flex option allows wings to flex 5 degrees below center and 15 degrees above center. Wing down-pressure can be added with the flex valve kit.

The flex frame option requires 2 sets of tractor SCV outlets:

SCV#1 (short end of cylinder) should be attached to valve ports AUX A and B

SCV#2 (long end of cylinder) should be attached to valve ports TRAC A and B

Hydraulic flow should be between 6-10 gpm.

Tractor SCV#1 (“Aux A and B” Ports on Valve)

Adjust wing level when turning on the ends of the field.

This outlet is typically engaged at the same time as the tractor 3-point to allow the Raptor wings to tilt up while the machine is raised. This outlet also tilts down the wings when the machine is lowered by the tractor 3-point hitch.

Tractor SCV#2 (“Aux A and B” Ports on Valve)

Long end of the cylinder folds and unfolds the wings from transport position to field working position. In working position, tractor hydraulics must be operated in float, or in continuous flow so the 48” cylinder rod can piston in/out when wings raise/lower with field contours.

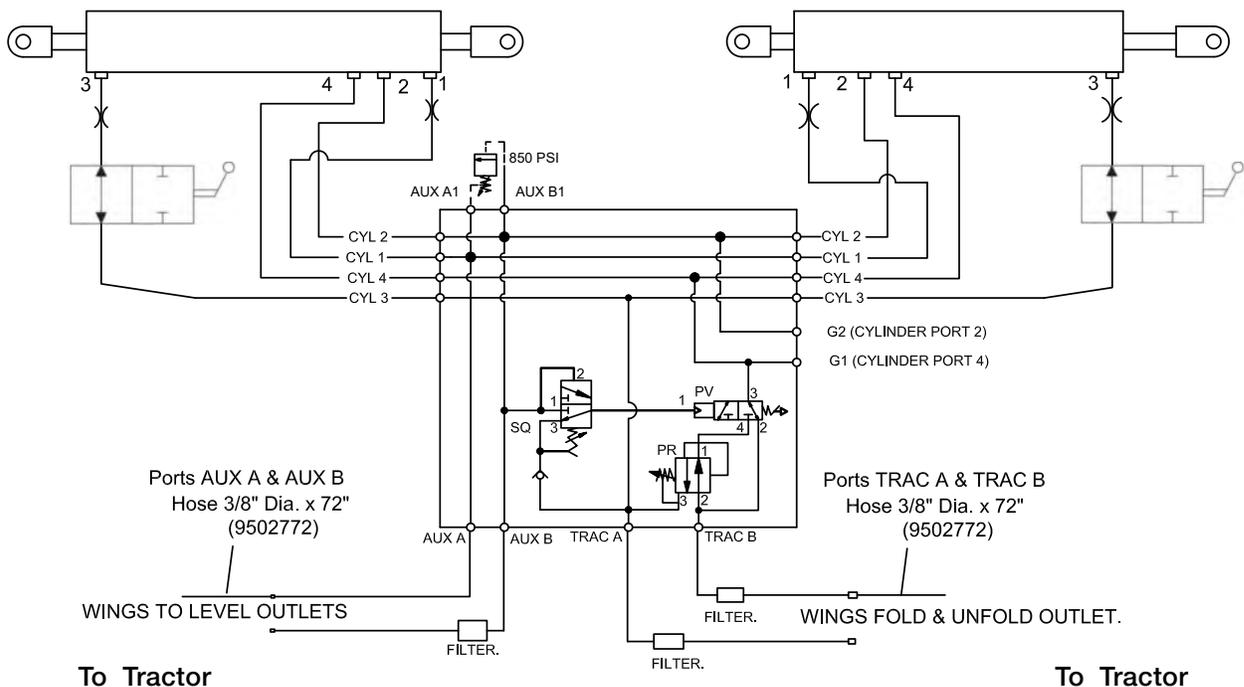


FIG. 3-20

Flex Hydraulic (Optional) — Field Operation (continued)

Folding The Wings

Raise 3-point until unit is completely raised. Activate SCV#1 to pull wings up level (short end of cylinders). Activate SCV#2 to fold the wings (long end of cylinders).

NOTE: If SCV#1 is not done before activating SCV#2, unit may not fold.

Unfolding The Wings

While unfolding the unit, the 3-point must be placed in the raised position.

Raise 3-point unit. Activate SCV#2 to unfold the wings (long end of cylinders). These will need to be extended completely before SCV#1 (short end of cylinders) can be used.

Lowering Subsoiler Into The Ground

Before lowering unit to the ground, it is recommended to have SCV#2 in float or detent depending on how the unit is run.

Pressure Gauges

Float position during field operation allows the wings to follow soil contours. Continuous flow applies controlled down pressure to the wings to float up or down in the field.

While lowering the tractor 3-point to the desired working depth, simultaneously activate tractor SCV#1 to tilt down the wings until the short end of the cylinder is completely extended. Shut off the remote, but do not place it in float position. SCV#1 (long end of cylinders) must maintain pressure. (Timer can be set to 4-5 seconds) SCV#2 should be in float or continuous flow. (Timer can be set to continuous.)

CAUTION

- TO PREVENT MACHINE DAMAGE, PLACE TRACTOR SCV #2 IN DETENT POSITION, SET TRACTOR FLOW TO 6-10 GPM CONTINUOUS WHILE THE RAPTOR IS IN WORKING POSITION.

Two pressure gauges monitor wing hydraulic down pressures during field operation:

CYLINDER PORT 2 Gauge:

- (A) System pressure when implement is lowered to field position.
- (B) Reduced pressure when implement is raised, turning on field ends.

CYLINDER PORT 4 Gauge.

- (A) System pressure when unfolding the wings to field working position.
- (B) Controlled system pressure with implement in working position. This gauge maintains 175 to 200 PSI Pressure. The number of shanks, shank attachments, working depth, and soil type, can affect hydraulic system pressure displayed.
- (C) Minimal system pressure as wings are folded into transport.

Flex Hydraulic (Optional) — Field Operation (continued)

Raising Subsoiler On Field Ends

Raise tractor 3-point on the end, and simultaneously activate SCV#1 to retract the short end of the cylinders to tilt wings to approximate level with main frame. (Timer may need to be adjusted from 4-5 seconds to match tractor 3-point speed.) Extend short cylinders when lowering machine back down to working position.

Primary Operating Procedure

CAUTION

- Hydraulic valve must run in float or detent to prevent potential cylinder damage.

Normally the tractor hydraulics for SCV#2 are set to float position during field operations to allow the wings to follow soil contours.

Alternate Operating Procedure

In difficult soil conditions where wing down pressure is required. Place tractor hydraulics at 8 GPM in constant flow to apply controlled down pressure to the wings. Relief valve cartridges inside the valve block assembly allow the wings to float up or down in the field.

When raising/turning on field ends, simply retract the short cylinder chamber (SCV#1) to raise the wings to level.

Valve Down Pressure Adjustment

Refer to MAINTENANCE section “Adjusting Wing Down Pressure In The Field”.

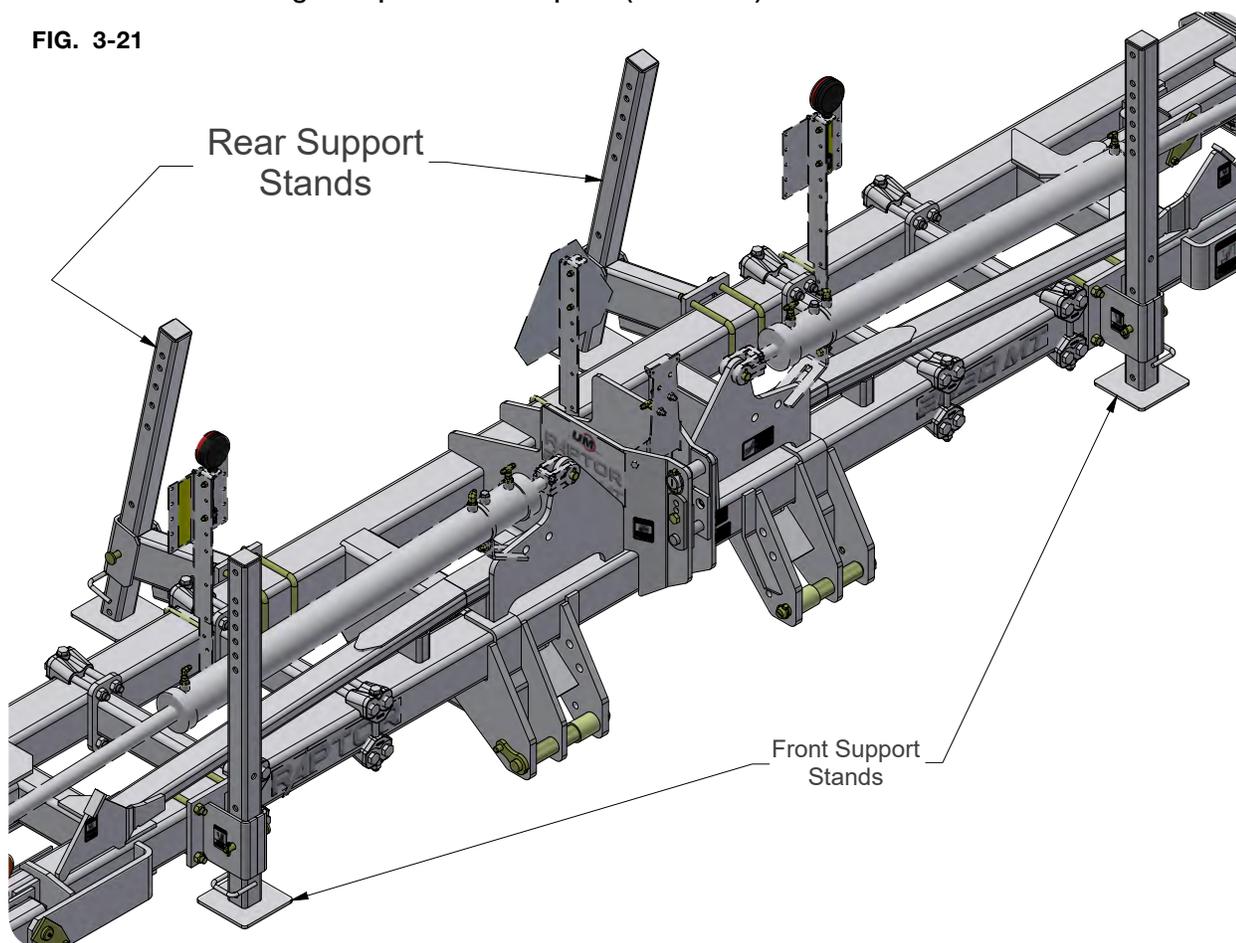
Support Stands

WARNING

- **FALLING OR LOWERING EQUIPMENT CAN CAUSE SERIOUS INJURY OR DEATH. KEEP EVERYONE AWAY FROM EQUIPMENT WHEN SUSPENDED, RAISING, OR LOWERING.**

Before field operation can begin, support stands must be raised and locked into position. Raise unit into transport position. Lift support stands by removing pins, raising the support stands and reinstalling the pins and keepers (FIG. 3-21).

FIG. 3-21



3-POINT RAPTOR — Operation

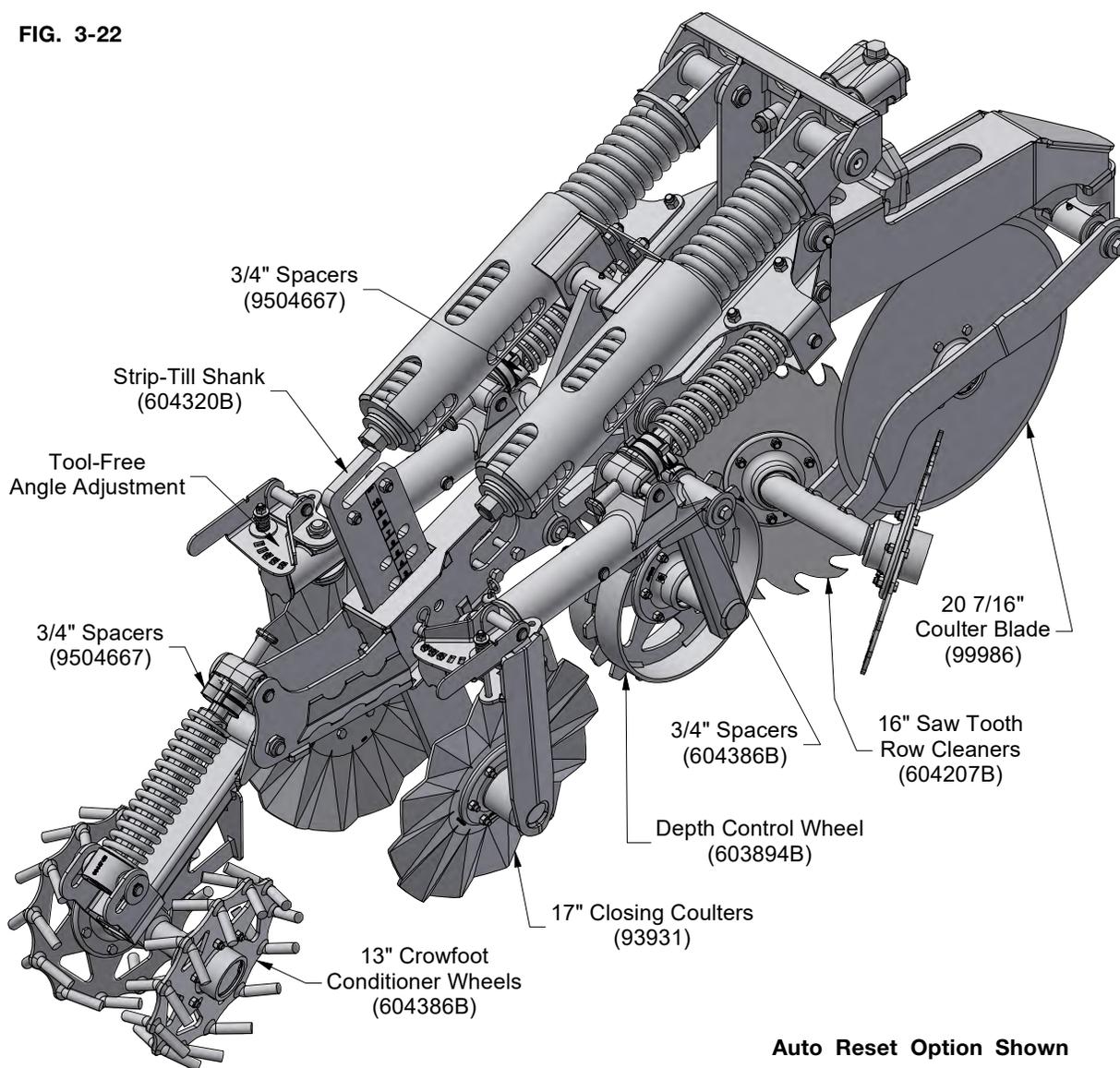
Notes

TerrainPro2 Row Unit

⚠ WARNING

- KEEP HANDS CLEAR OF PINCH POINT AREAS.
- FALLING OR LOWERING EQUIPMENT CAN CAUSE SERIOUS INJURY OR DEATH. KEEP EVERYONE AWAY FROM EQUIPMENT WHEN SUSPENDED, RAISING, OR LOWERING.

FIG. 3-22



TerrainPro2 Row Unit (continued)

Row Cleaners

16" Saw tooth row cleaners follow ground contours independently from the lead coulter and clear residue from the strip. The Saw tooth finger design prevents trash from tangling and allows the row cleaner to adapt to varying conditions. FIG 3-22

Depth Control Wheels

These wheels allow the row unit to free float 7" upward and 4" downward to follow uneven terrain which ensures that each shank runs at the same depth for consistent tillage and fertilizer placement. The depth wheel has no adjustment. Depth adjustments are made at the shank. FIG 3-22

Strip-Till Shank

The shank features tool-free height adjustment from 3" to 12" deep to alleviate compaction. Convenient depth gauge on each row allows the operator to quickly and easily adjust each shank to the same depth by removing the locking pin, adjust the depth of the shank and reinstall the locking pin. FIG 3-22

- Available with spring-cushioned auto-reset trip mechanism with 2,000 lbs. of point load pressure or shear-bolt protected shank with 5,000 lbs. of shear pressure.
- Replaceable 2 1/4" cast point and 1 1/2" wide integrated wear plates provides long-term, trouble-free use.
- Replaceable shank wear plates are standard to protect the shank from abrasive soil.

Closing Coulters

Closing coulters keep the soil in the path of the conditioning wheels for enhanced soil conditioning. Each coulter floats independently from the other to keep constant ground contact through uneven ground.

Tool-Free angle adjustment allows the operator to easily change the width of the strip and height of the berm. Raise the machine to transport height and use the adjustment pins to rotate the closing coulters. FIG 3-22

Tool-Free spring down pressure determines the amount of soil in the strip. With the machine at transport height, add additional 3/4" spacers to increase the down pressure on each coulter.

NOTE: The more the coulters are angled the taller and narrower the strips made will be.

Crowfoot Conditioners

Crowfoot conditioning wheels break up clods, condition the strip and feature an angle to pinch the shank opening closed while shedding residue. Adjust the conditioners down pressure by lifting the machine to transport height and adding or removing the 3/4" spacers. More spacers. increase conditioning action. FIG 3-22

TerrainPro2 Row Unit (continued)

Horizontal Adjustment (All Models)

CAUTION

- BE SURE ROW UNITS HAVE BEEN GREASED PRIOR TO INITIAL USE. SEE LUBRICATION IN MAINTENANCE SECTION.

When positioning row units from side-to-side, loosen hardware so that the row units can be moved.

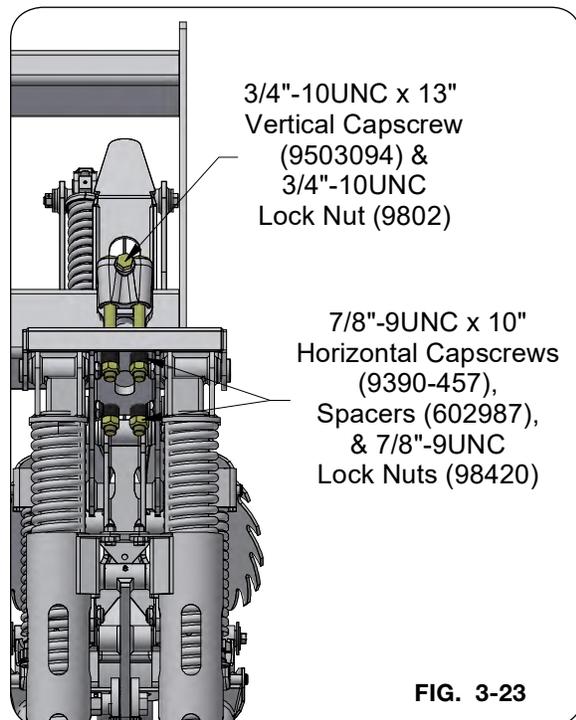
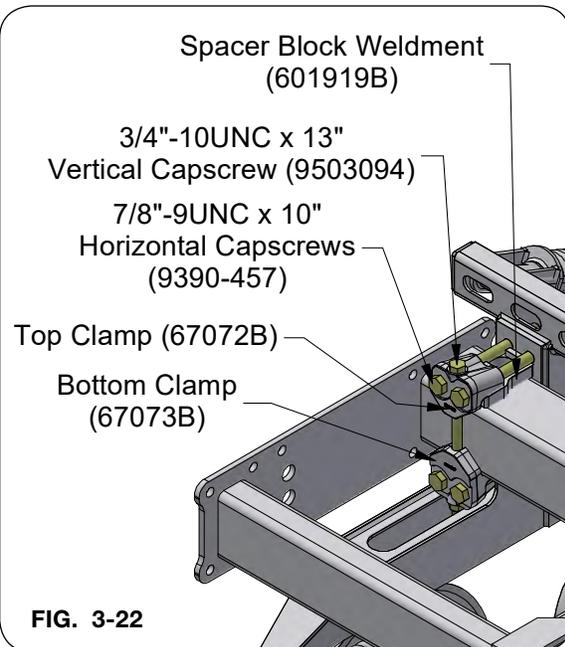
NOTE: For proper positioning, refer to layouts in SET UP section.

Secure with top clamp (67072B), spacer block weldment (601919B), bottom clamp (67073B), 3/4"-10UNC x 13" vertical capscrew (9503094), 3/4"-10UNC lock nut (9802), 7/8"-9UNC x 10" horizontal capscrews (9390-459), spacers (602987), and 7/8"-9UNC lock nuts (98420).

Loosely tighten 3/4"-10UNC x 13" vertical capscrew (9503094) and 3/4"-10UNC lock nut (9802) until cast clamps and spacer block weldment seat on top and bottom of the tube.

Loosely tighten the 7/8"-9UNC x 10" horizontal capscrews (9390-459), spacers (602987), and 7/8"-9UNC lock nuts (98420).

Torque hardware to torque value listed in the torque chart in MAINTENANCE section.



TerrainPro2 Row Unit (continued)

Shear Bolt Replacement

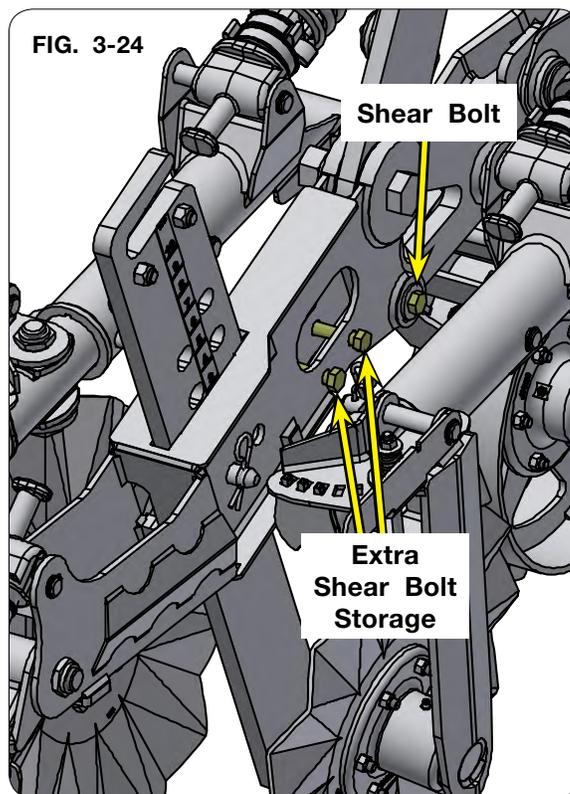
The shear bolt, 1/2"-13UNC x 3" (9390-107) & 1/2"-13UNC Lock Nut (9800) should shear only when the shank encounters an obstacle.

WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**

IMPORTANT

- *On the wing fold units, be sure to replace the shear bolt on the shanks on the wing before folding the wings. Damage to the equipment could occur.*
1. With the Raptor implement attached to a tractor, find a firm, level surface and unfold the wings, if applicable. Lower the unit's support stands until they are 1-2 inches below the points, and lower the machine to the ground so that the stands support the entire implement and all points are off the ground. Shut off the tractor engine, set the parking brake, and remove the ignition key.
 2. Remove any remaining portions of the shear bolt from the assembly. Inspect shear bolt holes. Severely distorted holes will result in shorter shear bolt life and should be repaired or replaced.
 3. Remove a new shear bolt from the storage location.
 4. Align the hole in the shank mount bracket to the hole in the shank trip bracket.
 5. Insert the new shear bolt. Tighten nut on the shear bolt until snug. Do not torque to specification. Tightening the shear bolt will prevent proper trip function."



TerrainPro2 Row Unit (continued)

Lead Coultter

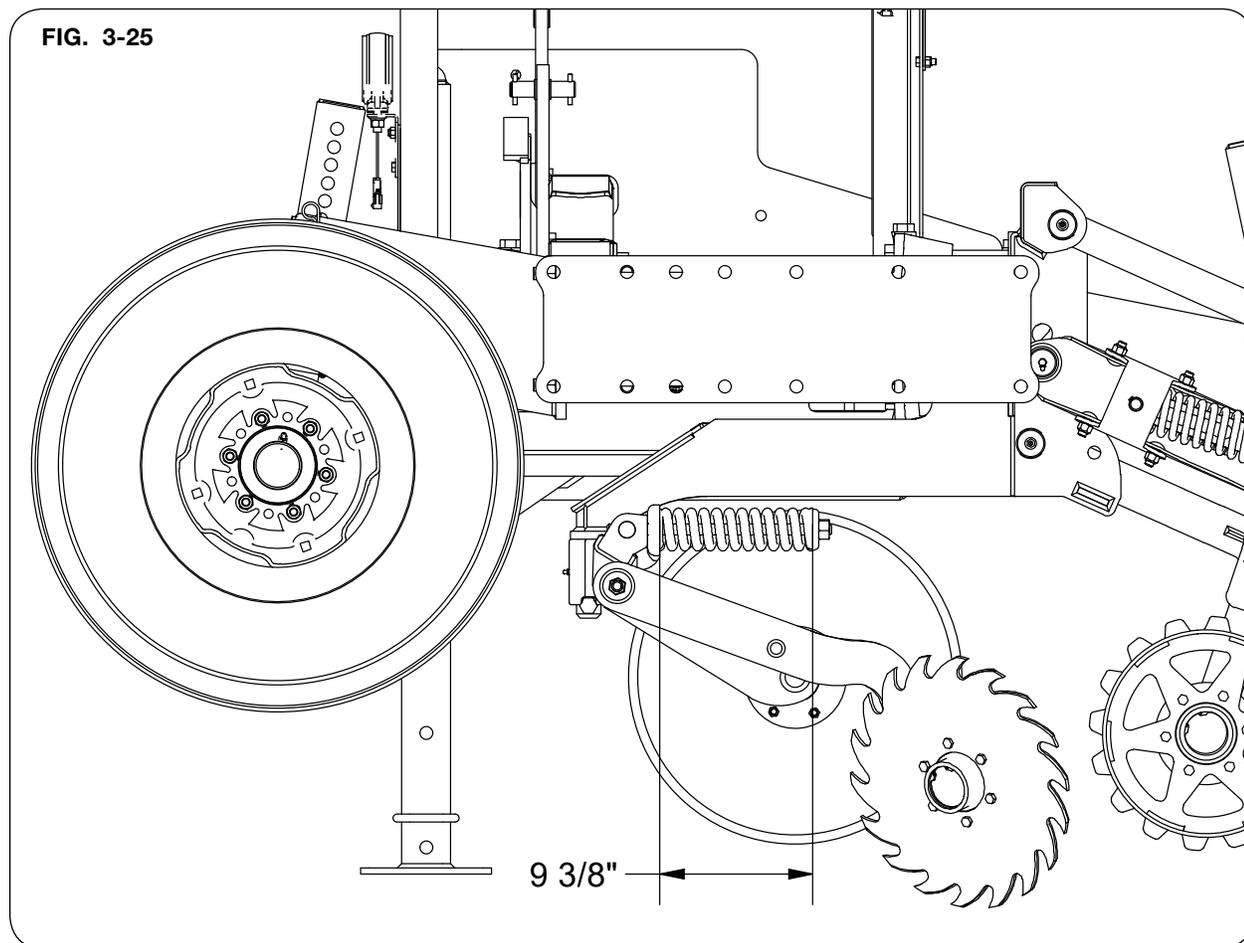
Your heavy-duty lead coultter is designed to chop residue and to start an initial cut for the shank. If the toolbar depth is changed to allow more lead coultter penetration, the row units do not need adjusting. They are on floating parallel links. The row unit is designed to operate the toolbar so the gauge wheel brings the row unit up 4" from hanging height. This allows 7" of upward and 4" of downward travel in the free floating parallel links. If the toolbar is lowered, the amount of upward and downward travel varies with it. The systems can affect each other, but operate independently.

WARNING

- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE THE MACHINE IS SECURELY BLOCKED.**

The coultter springs are preset at the factory at 9 3/8" compression. This measurement is the total amount of exposed spring.

NOTE: Adjusting the spring below 9 3/8" could cause premature part failure and void any warranty considerations.



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Maintenance

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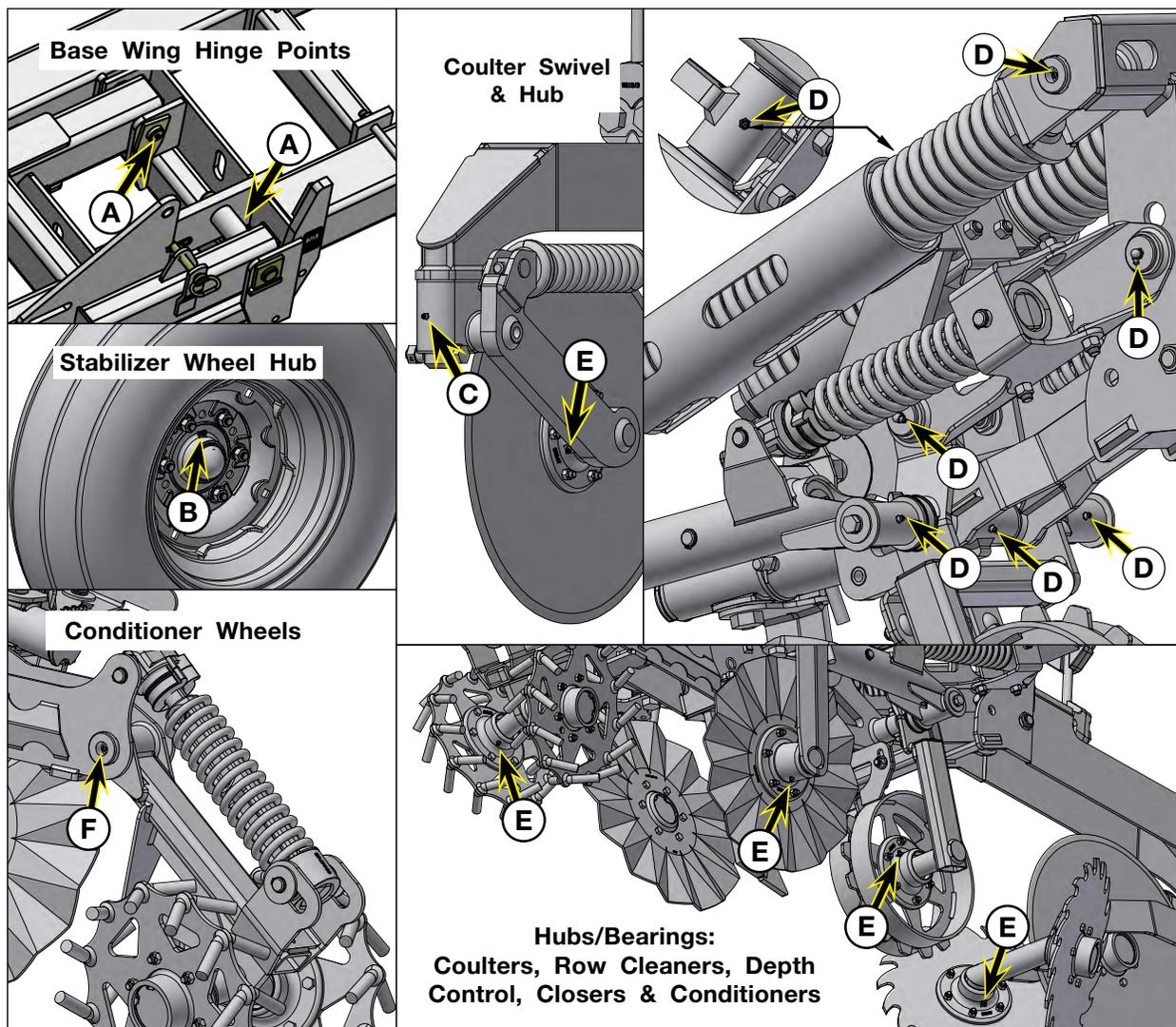
Lubrication

To keep your implement in top operating condition and to assure its proper performance and reliability for a long period of time, periodic inspection and lubrication is a must.

Use EP-2 lubricant at the locations described in the chart. All exposed cylinder rods should be coated with grease before seasonal storage to prevent rusting. After seasonal storage, check wing latch for freedom of movement.

The lubrication locations and recommended schedule are as follows:

ITEM	DESCRIPTION	POINT	QTY	HOURS
A	Base Wing Hinge Points	4	2 Shots	Weekly
B	Stabilizer Wheel Hubs	1	2 Shots	Weekly
C	Lead Coulter Swivel	1	1 Shot	Weekly
D	Depth Control & Parallel Arms	10	2 Shots	Weekly
E	Hubs/Bearings	8	2 Shots	Weekly
F	Conditioner Wheels	1	2 Shots	Weekly



Service Schedule

Beginning of Day

NOTE: Before initial use, ensure all lubrication points have been greased, outlined in “Lubrication” in this section.

Check all U-bolts and bolts for tightness. This is especially important during the first days of operation. See “Torque Chart” in this section.

Check stabilizer tire air pressure and inflate to correct pressure if necessary.

IMPORTANT

- *Inspect mast pins for any wear or damage. Replace any worn or damaged pins.*
- *To assure level penetration of shanks, both tires must be inflated to the same pressure.*

End of Day

Clean off dirt and residue which may have accumulated on implement during operation.

Check implement for damage which could have occurred during operation, and repair.

Beginning of Season

WARNING

- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW “SAFETY” SECTION IN THIS MANUAL IF NECESSARY.**

Check all bolts, U-bolts, and wheel bolts for tightness. Refer to “Torque Chart” in this section.

Lubricate implement (see “Lubrication” in this section).

Check air pressure in tires and inflate to correct pressure if necessary (see Wheels and Tires).

End of Season

Your implement is an important investment. Spend a little time to protect it from destructive rust and corrosion. You will be repaid in longer service life and better performance.

Perform the following before placing the implement in storage:

1. Remove dirt and residue which could cause rusting.
2. Repaint any chipped or scraped areas.
3. Lubricate implement (see “Lubrication” in this section).
4. Coat all earth moving surfaces with grease or suitable rust preventatives.
5. Inspect for damaged parts. Replace before next season.
6. Store implement inside, away from livestock.
7. Use support stands to keep implement tires and points up off bare ground.
8. Replace all worn, torn or faded decals and reflectors.

TerrainPro2 Row Unit

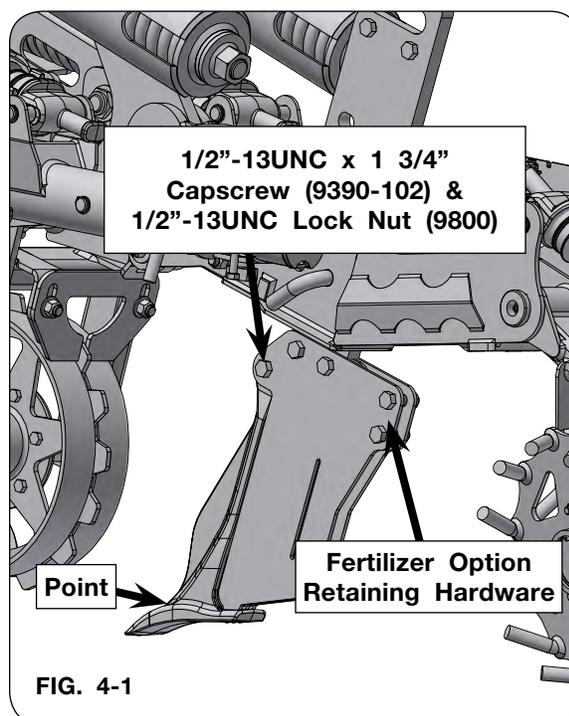
⚠ WARNING

- BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.
- CHANGE ONLY ONE SHANK AT A TIME. IF PRESSURE IS RELIEVED ON ALL SHANKS, THE UNIT COULD TIP OVER BACKWARDS.
- KEEP HANDS CLEAR OF PINCH POINT AREAS.
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.
- FALLING OBJECTS CAN CAUSE SERIOUS INJURY OR DEATH. DO NOT WORK UNDER THE MACHINE AT ANY TIME WHILE BEING HOISTED. BE SURE ALL LIFTING DEVICES AND SUPPORTS ARE RATED FOR THE LOADS BEING HOISTED. THESE ASSEMBLY INSTRUCTIONS WILL REQUIRE SAFE LIFTING DEVICES UP TO 100 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.

Point & Wear Plates Replacement

The shank has replaceable wear plates and points which, after a period of time, will need to be replaced (FIG. 4-1). To replace these components on your machine, refer to the following guidelines:

1. With the implement attached to a tractor, find a firm, level surface and unfold the wings, if applicable. Lower the unit's jack stands until they are 1-2 inches below the points, and lower the machine to the ground so that the stands support the entire implement and all points are off the ground. Shut off the tractor engine, set the parking brake, and remove the ignition key.
2. If applicable, remove and save the fertilizer option 1/2"-13UNC x 1 3/4" cap screw (9390-102) and 1/2"-13UNC lock nut (9800). (FIG. 4-1)
3. Loosen the center wear plates 1/2"-13UNC x 1 3/4" cap screws (9390-102) and 1/2"-13UNC lock nuts (9800). (FIG. 4-1)
4. Remove the point 1/2"-13UNC x 1 3/4" cap screw (9390-102) and 1/2"-13UNC lock nut (9800). (FIG. 4-1)
5. Remove the point. (FIG. 4-1)



TerrainPro2 Row Unit (continued)

6. If replacing wear plates, continue with step 7 otherwise skip to step 9.

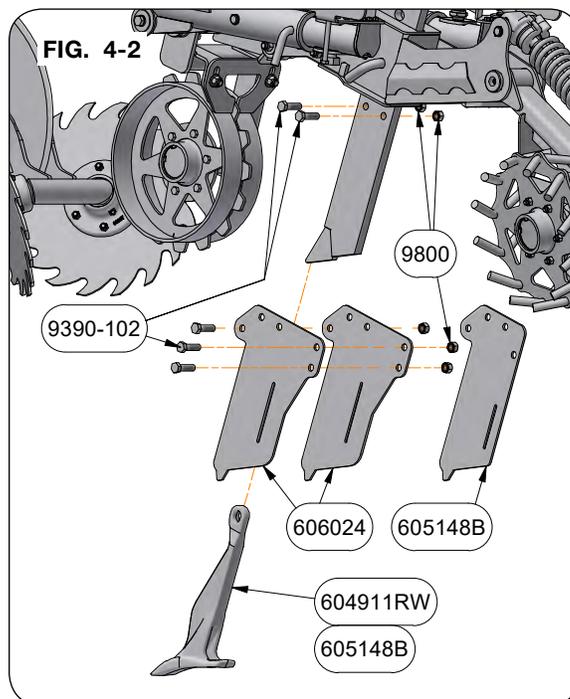
7. Remove the 1/2"-13UNC x 1 3/4" capscrews (9390-102) and 1/2"-13UNC lock nuts (9800) securing the wear plates. (FIG. 4-2)

8. Replace wear plates (606024 or 605148B) and loosely secure with provided 1/2"-13UNC x 1 3/4" capscrews (9390-102) and 1/2"-13UNC lock nuts (9800). (FIG. 4-2)

9. Install new point and secure with provided 1/2"-13UNC x 1 3/4" capscrew (9390-102) and 1/2"-13UNC lock nut (9800) (FIG. 4-2). DO NOT TORQUE HARDWARE.

10. If applicable, install the fertilizer option and secure with 1/2"-13UNC x 1 3/4" capscrew (9390-102) and 1/2"-13UNC lock nut (9800) (FIG. 4-2). DO NOT TORQUE HARDWARE.

11. Torque the 1/2"-13UNC x 1 3/4" capscrews (9390-102) and 1/2"-13UNC lock nuts (9800) to 62-68 Ft.-Lbs as shown in (FIG. 4-2).



TerrainPro2 Row Unit (continued)

Shear bolt Replacement

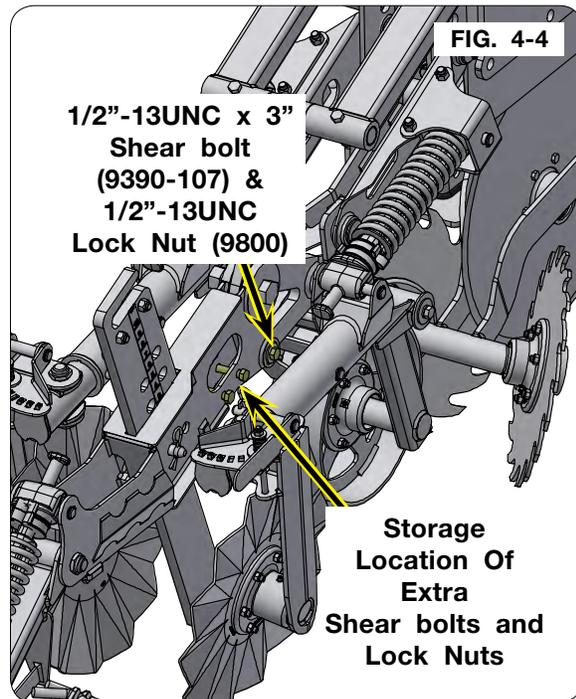
The shear bolt should shear only when the shank encounters an obstacle.

WARNING

- **BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**
- **EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.**

IMPORTANT

- *On the wing fold units, be sure to replace the shear bolt on the shanks on the wing before folding the wings. Damage to the equipment could occur.*
1. With the Raptor implement attached to a tractor, find a firm, level surface and unfold the wings, if applicable. Lower the unit's support stands until they are 1-2 inches below the points, and lower the machine to the ground so that the stands support the entire implement and all points are off the ground. Shut off the tractor engine, set the parking brake, and remove the ignition key.
 2. Remove any remaining portions of the shear bolt from the assembly. Inspect shear bolt holes. Severely distorted holes will result in shorter shear bolt life and should be repaired or replaced.
 3. Remove a new shear bolt from the storage location.
 4. Align the hole in the shank mount bracket to the hole in the shank trip bracket.
 5. Insert the new shear bolt. Tighten nut on the shear bolt until snug. Do not overtighten or torque to specification. Tightening the shear bolt will prevent proper trip function."



TerrainPro2 Row Unit (continued)

Lead Coulter Spring Replacement

The following guidelines are for replacing the spring on the coulters.

⚠ WARNING

- BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.
- KEEP HANDS CLEAR OF PINCH POINT AREAS.

⚠ CAUTION

- SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.

IMPORTANT

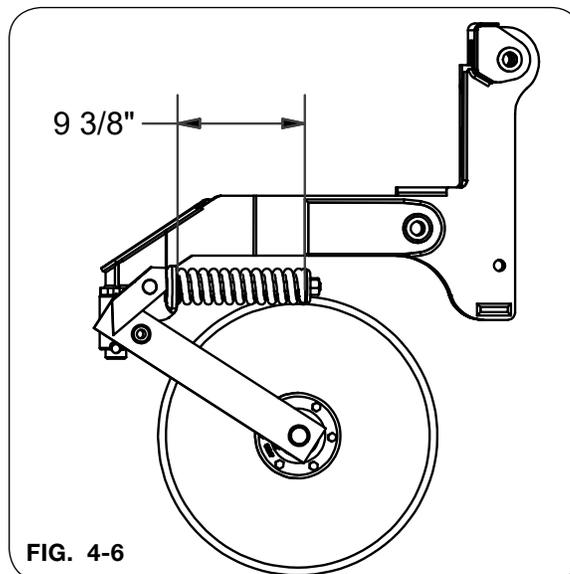
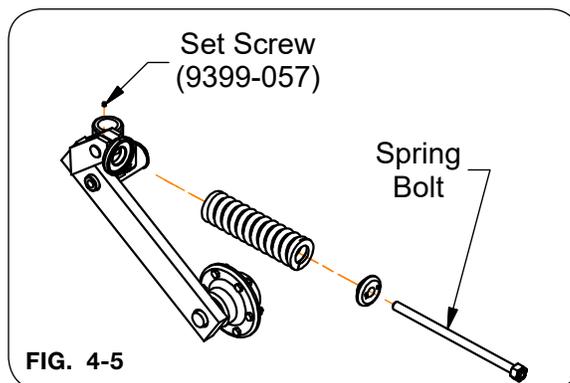
- *The spring should only be adjusted when repairs are being made. The springs have been preset before leaving the factory.*

1. Loosen the set screw retaining the spring bolt on the coulters arm (FIG. 4-5).
2. Slowly unscrew the spring bolt which will relieve spring pressure (FIG. 4-5).
3. Once the bolt is removed, replace with new spring and re-insert bolt.
4. Tighten bolt until the spring is compressed to 9 3/8" (FIG. 4-6).

The coulters springs are preset at the factory to 9 3/8". This measurement is the total amount of exposed spring.

NOTE: Adjusting the spring below 9 3/8" could cause premature part failure and void any warranty considerations.

5. Tighten set screw to secure bolt.



Flex Hydraulics — Adjusting Wing Down Pressure

⚠ WARNING

- RELIEVE HYDRAULIC SYSTEM OF ALL PRESSURE BEFORE ADJUSTING OR SERVICING. SEE TRACTOR OPERATOR'S MANUAL FOR PROPER PROCEDURES.
- HIGH-PRESSURE FLUIDS CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY OR DEATH. USE CARDBOARD OR WOOD TO DETECT LEAKS IN THE HYDRAULIC SYSTEM. SEEK MEDICAL TREATMENT IMMEDIATELY IF INJURED BY HIGH-PRESSURE FLUIDS.
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING THE IMPLEMENT.
- KEEP HANDS CLEAR OF PINCH POINT AREAS.

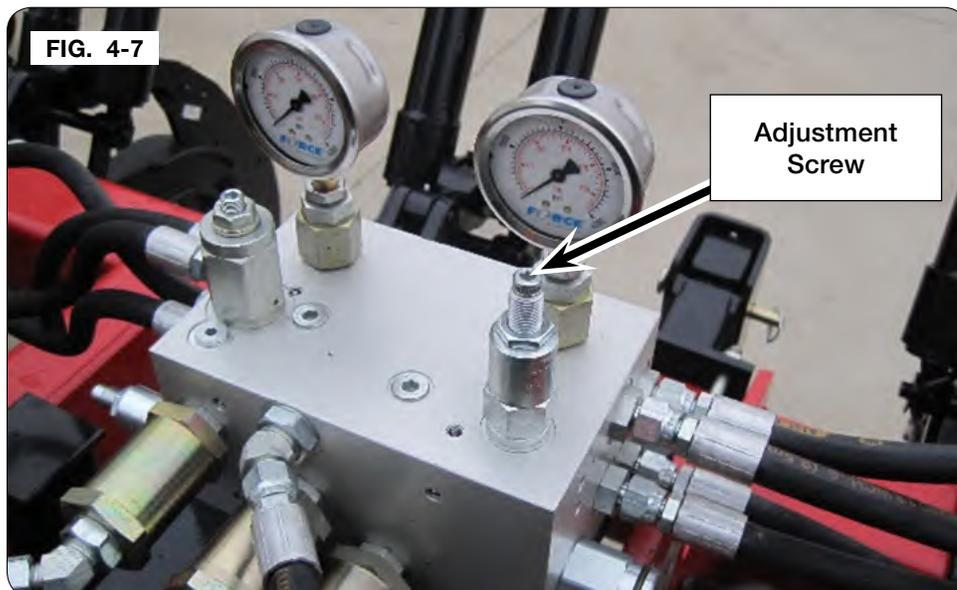
Due to many field factors, it may be necessary to adjust wing down pressure.

The adjustment Allen screw is located on top of pressure cartridge in valve PR port, can increase or decrease pressure as needed (FIG. 4-7). Set tractor SCV #2 to continuous flow.

IF WINGS DO NOT MAINTAIN SHANK DEPTH-INCREASE HYDRAULIC OPERATING PRESSURE. (tighten screw 1/4 turn clockwise).

IF CENTER SECTION RAISES OUT OF THE GROUND, OR WINGS DO NOT FLOAT IN FIELD, DECREASE HYDRAULIC OPERATING PRESSURE. (loosen screw 1/4 turn counter-clockwise).

Pressure setting can be increased (screw turned in) or decreased (screw turned out) at a rate of 125 PSI -PER QUARTER TURN. Only adjust the screw 1/4 turn each time. Check machine in field performance after each adjustment/repeat if necessary.



Notes

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters

WARNING

- BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING IMPLEMENT.
- KEEP HANDS CLEAR OF PINCH POINT AREAS.

CAUTION

- SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND THEM.

IMPORTANT

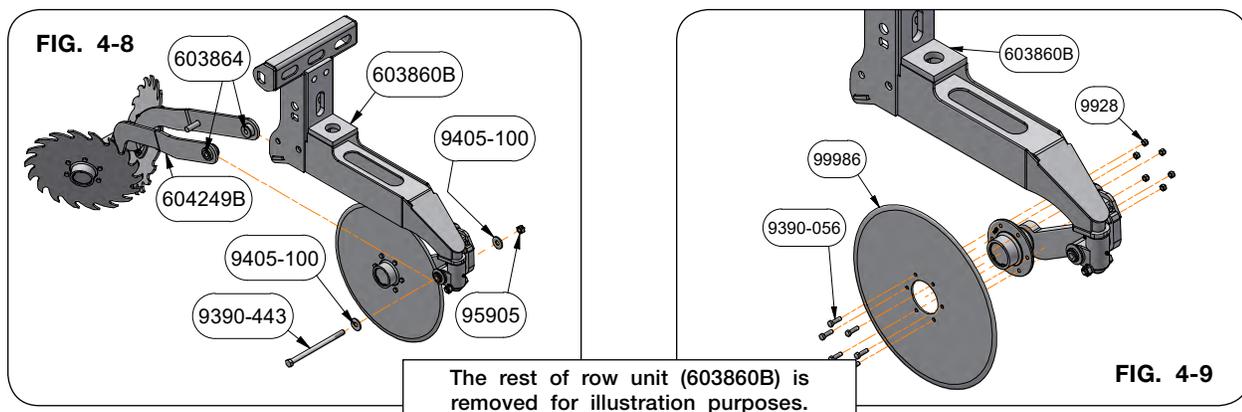
- Do not allow dirt and debris to contaminate the hub and its internal components. Neglecting to do so could result in failure of the hub and its components due to excessive wear.

NOTE: After the first 100 acres, the hubs should be checked for tightness and wear.

1. Park the unit on a firm, level surface. Block the wheels on the machine to keep it from moving. Set the vehicle parking brake, lower parking stands, shut-off the engine, and remove the ignition key.
2. Using a safe lifting device rated for 50 lbs, remove the 5/8"-11UNCx10 Capscrew (9390-443), 5/8" flat washers (9405-100) and 5/8"-11UNC locknut (95905) and remove the Row Cleaner (604249).

NOTE: DO NOT LOSE the flanged bushings (603964) located in the mounting arms of the Row Cleaner (604249).

3. Remove the six 3/8"-16UNCx1 1/4" capscrews (9390-056) and 3/8"-16UNC Locknuts (9938) and remove the blade (9986).



Hub Adjustment and Replacement For Lead Coulters and Closing Coulters (continued)

4. Attach a C-clamp and apply pressure to both sides of the coulters hub (Fig. 4-10).

NOTE: Early production coulters with domed hub caps are not equipped with a snap ring. Use a pry bar or screwdriver to remove the hub cap and proceed to step 4.



Fig. 4-10

5. Remove the retaining ring and hub cap. Refer to Fig. 4-11.



Fig. 4-11

6. Remove the cotter pin securing the slotted nut.

IMPORTANT

- When removing the hub and its components, be sure to keep them free of debris and dirt. Failure to do so will result in contamination of the hub and bearing failure.

7. Unscrew the nut and carefully remove the hub from the spindle.
8. Remove the components, clean and inspect for any damage or wear. If even the slightest imperfection exists, replace the component(s). Once the hub is dismantled, always replace the bearing and seal assembly, O-ring, and triple lip seal.

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters (continued)

IMPORTANT

- Always replace the O-rings and seals if dismantling the hub. Failure to do so could result in premature failure of the hub and its components.

9. Replace any damaged parts before reassembling the components. Remove all grease and dirt from spindle and assemble O-ring (95565) to spindle.
10. Lubricate seal with grease.

IMPORTANT

- Rotate the coulters when torquing the slotted nut. Doing this will prevent flats from forming on the bearings.

11. While rotating hub, slide the hub, seal, and bearing onto spindle. Make sure not to damage seal. Be sure outer bearing and washer slide on the spindle and bearing seats in the cup.

NOTE: Press seal into hub with metal side of seal facing out on hub.

12. Assemble nut to spindle. While rotating hub, tighten nut to 40 Ft.-Lbs. DO NOT rotate hub again until step 14.
13. Back off nut until it becomes loose without rotating the hub.
14. Finger tighten nut without rotating the hub.
15. Tighten nut to align the next notch with hole in the spindle.
16. Check for looseness in the hub. It should not wiggle. If it does, tighten the nut one more slot and repeat this step.
17. Check hub rotation for excessive drag. There should be slight resistance. If there is excessive drag, repeat procedure starting at step 10.
18. Install Cotter Pin.
19. Add moly scent 2 grease through hub zerk until grease extends above the washer all around cavity. Also add grease to pivot arm zerk.
20. Install O-ring. Reinstall the hub cap, retaining ring, and blade.
21. Paint hub cap and retaining ring.

Hub Adjustment and Replacement For Lead Coulters and Closing Coulters (continued)

NOTE: Be sure to re-pack bearings with an SAE approved grease and keep it and its components free of dust and debris.

* Parts contained in seal kit #68281.

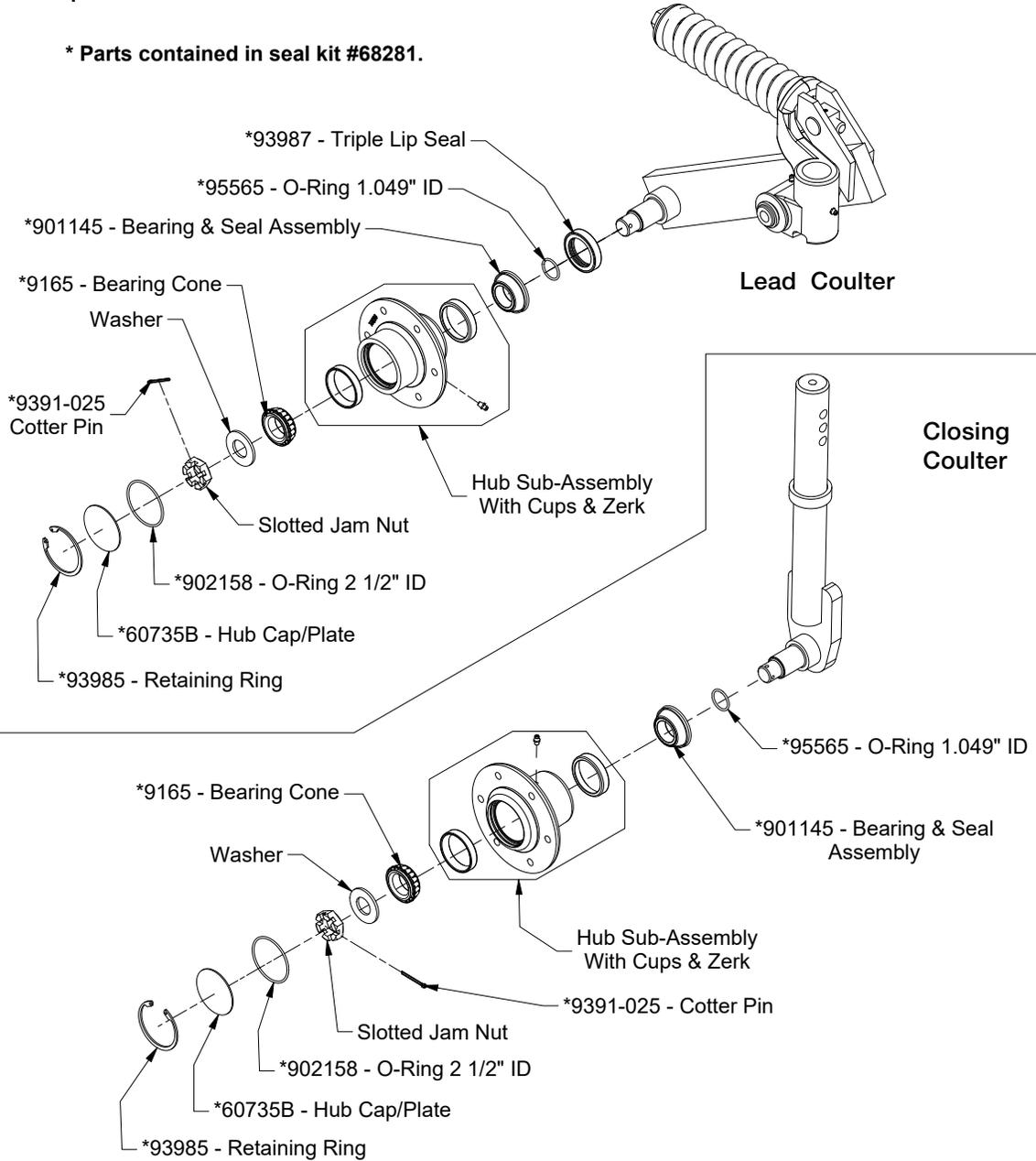


FIG. 4-12

Row Cleaner Wheel Hub Adjustment

WARNING

- TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE MACHINE IS SECURELY BLOCKED.
- EYE PROTECTION AND OTHER APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT MUST BE WORN WHILE SERVICING THE IMPLEMENT.
- KEEP HANDS CLEAR OF PINCH POINT AREAS.

CAUTION

- SHARP EDGES ON COULTER BLADES CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND COULTER BLADES.

IMPORTANT

- *Do not allow dirt and debris to contaminate the hub and its internal components. Neglecting to do so could result in failure of the hub and its components due to excessive wear.*

NOTE: After the first 100 acres, the hubs should be checked for tightness and wear.

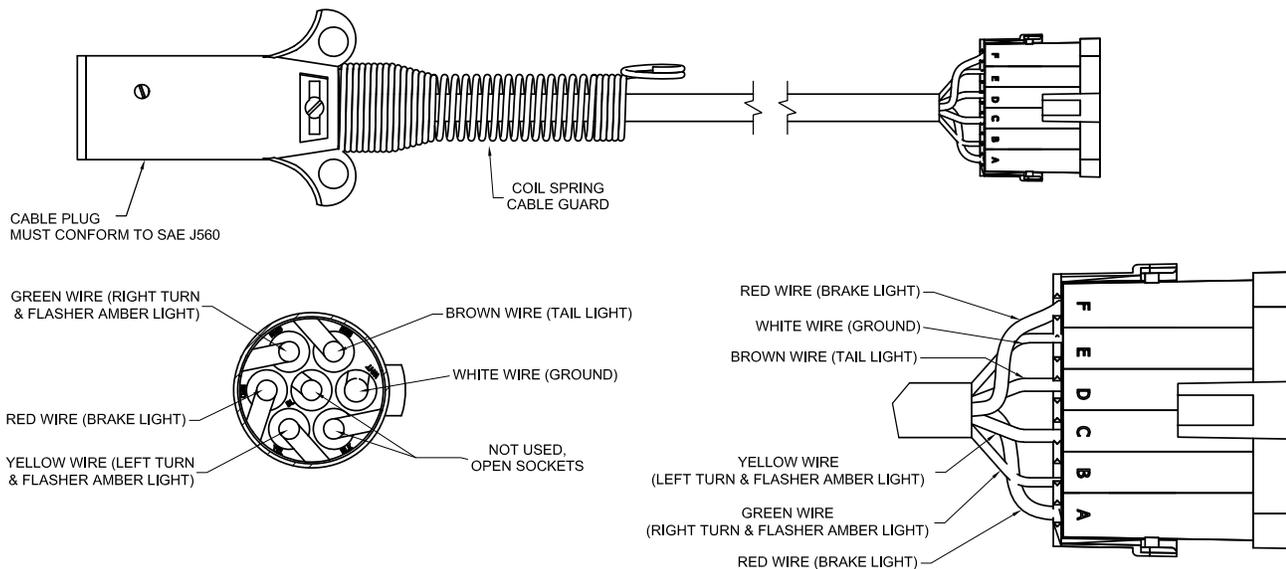
1. Check the row cleaner wheel hub and bearing for looseness or wobble. Rotate and laterally push and pull on the row cleaner wheel. A tight hub will have no wobble and will rotate smoothly with a slight resistance.
2. If there is wobble in the hub, the hub must be tightened to the spindle. To do this, remove hub cap (60735) with a 3/16" adjustable spanner wrench. Torque jam nut (94725) to 20 ft.-lbs. and back off 1/4 of a turn. Apply a light coating of thread sealant to the O.D. of the hub cap and tighten onto the hub.
3. After tightening, retest the hub for wobble by repeating Step #1. If wobble still exists, continue with the following steps.
 - a. Remove the Row Cleaner Blade (604207B) and hub from the spindle.

IMPORTANT

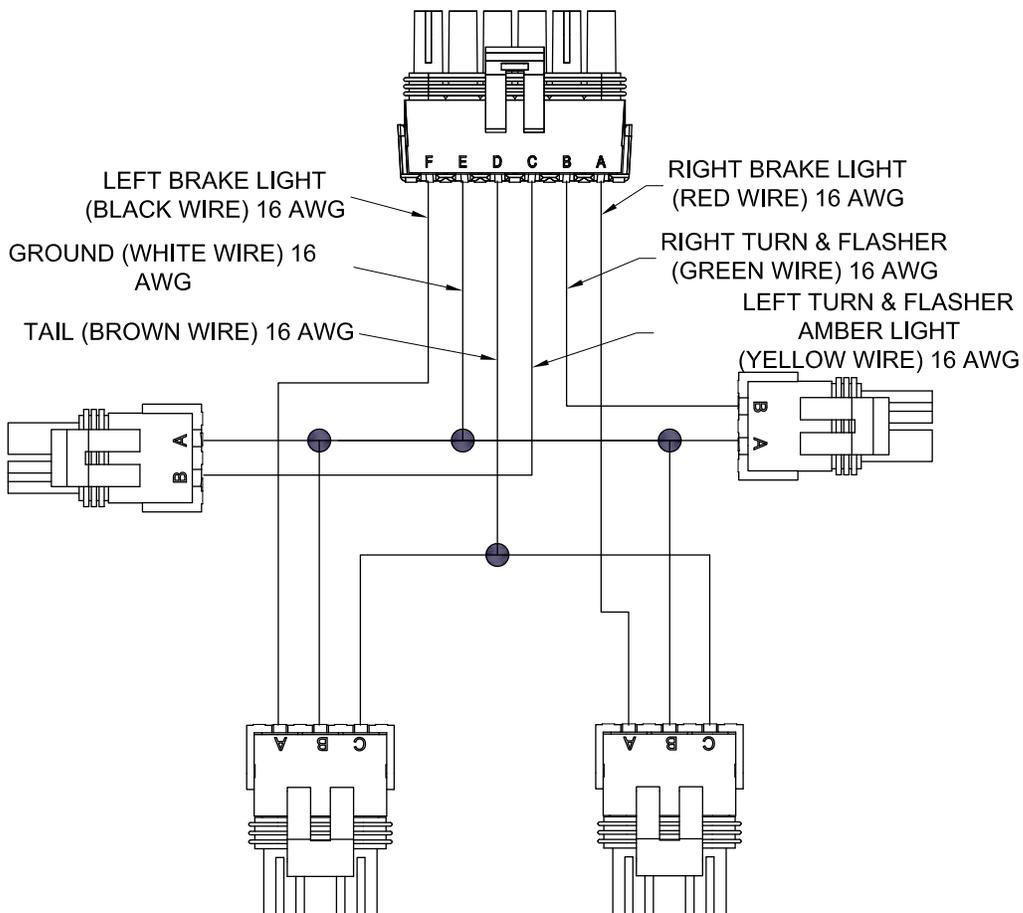
- *When removing the hub, be sure to keep it free of debris and dirt. Failure to do so will result in contamination of hub and bearing failure.*
 - *Always replace the seal if dismantling the hub. Failure to do so could result in premature failure of hub and its components.*
- b. Clean and inspect all parts for any damage or wear. If even the slightest imperfection exists, replace the component(s). Once the hub is dismantled, always replace the bearing and seal assembly, o-ring, and seal.
 - d. Replace any damaged parts before reassembling the components. Be sure to remove any debris or dirt and repack bearings with an SAE approved hub grease.
 - e. Assemble seal and bearings into hub and position onto spindle.

3-POINT RAPTOR — Maintenance

Schematic - Electrical Harness - Main 114" (86466)

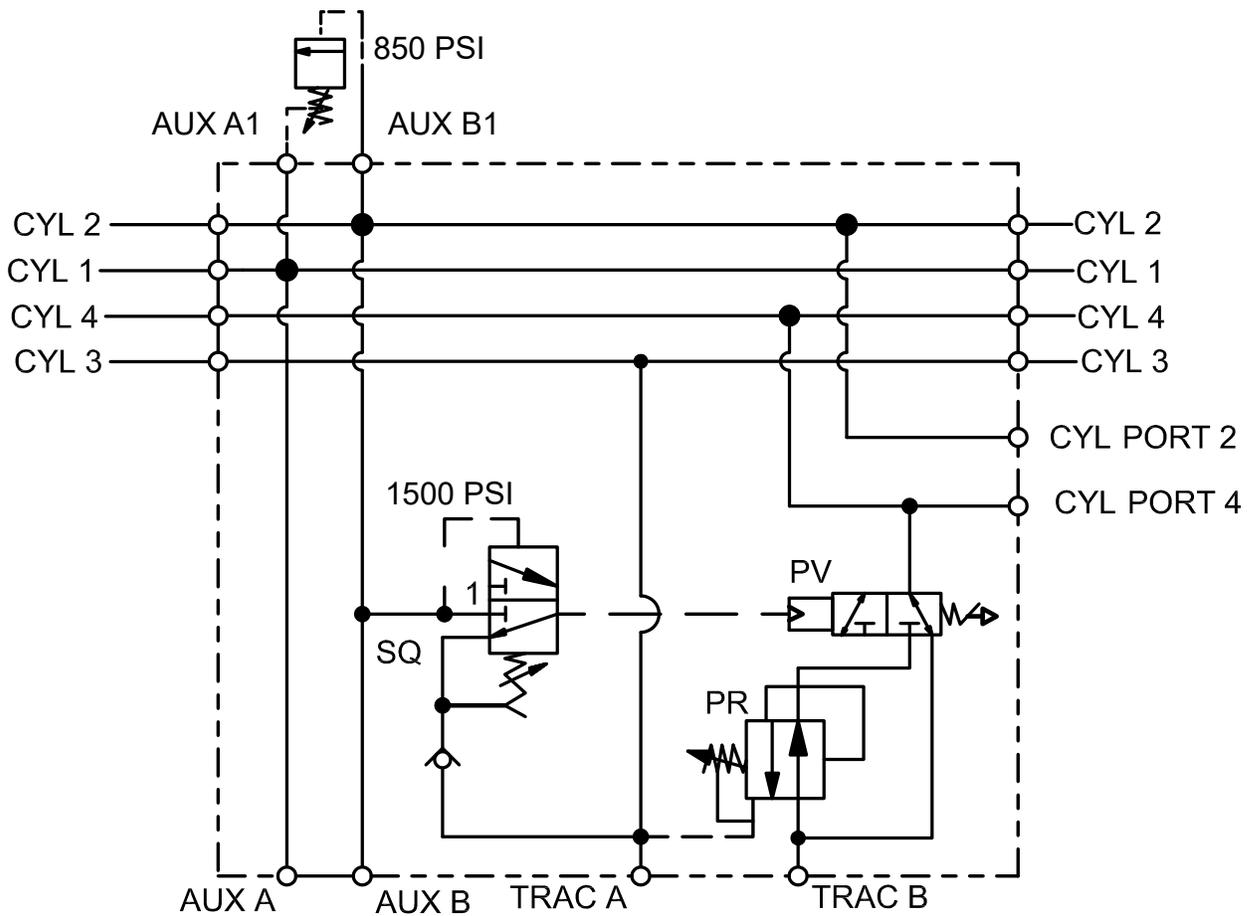


Schematic - Electrical Harness - Rear 422" (69407)



3-POINT RAPTOR — Maintenance

Schematic - Hydraulic Valve Block (9503620)



Troubleshooting

PROBABLE CAUSE	CORRECTION
Poor Penetration	
Frame is not level	See the OPERATION section “Leveling Frame” for instructions
Ground too hard for hitch control setting	Adjust the hitch control position. See the OPERATION section “Load and Depth control”
Worn or dull tool points	Replace with new tool points
Plugging	
Poor field conditions	Wait until the field is dry enough to till properly without excessive slippage
Machine not level	Level Machine
Implement Running Crooked In Field	
Coulter blades not cutting residue	Wait until the field is dry enough to allow blades to cut through residue
Shanks are not spaced correctly	See “Overhead Layouts” for correct spacing of the shanks
Stabilizer wheels are not adjusted equally from side-to-side	Check the side-to-side adjustment and tire pressure
Tractor tires are not properly spaced or equally inflated	Find the cause and correct. See OPERATION section “Wheel Spacing”
Tractor 3-point lift linkage is not adjusted for level operation	Re-level Raptor frame. See OPERATION section “Leveling Frame”
Tractor 3-point lift linkage lateral float pin are not set properly	Check the position of the lateral float pins. See OPERATION section “Left Link Lateral Float”

3-POINT RAPTOR — Maintenance

Troubleshooting (continued)

PROBABLE CAUSE	CORRECTION
Shanks Not Resetting Into Ground After Tripping	
Ground conditions hard or the unit is being operated very deep	While moving, raise Raptor slightly to reset, then lower and resume operation
Excessive Soil Disturbance	
Main frame not level, running downhill	Level main frame
Dry soil conditions	Wait for additional rain
Running implement too fast	Slower speeds create less disturbances
Too much sealing	Decrease closing down pressure, decrease coulter angle or move coulters apart
Not enough sealing	Increase closing down pressure, increase coulter angle or move coulters closer

Storage

Your tool is an important investment. Spend a little time to protect it from destructive rust and corrosion, You will be repaid in longer service life and better performance.

Do the following before placing the cart in storage:

1. Remove dirt and trash which could cause rust.
2. Repaint any chipped or scraped areas.
3. Lubricate points as shown on previous page.
4. Inspect for damage or worn parts, replace before next season.
5. Store inside, away from livestock.
6. Replace all worn, torn or faded decals and reflectors.

Wheels and Tires

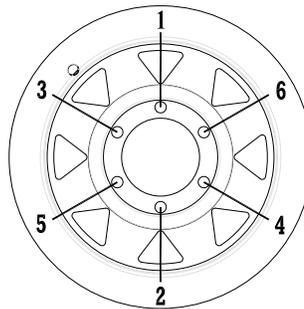
Wheel Nut Torque

CAUTION

- IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. TORQUE WHEEL NUTS/BOLTS TO VALUES IN TABLE. CHECK TORQUE BEFORE USE, AFTER ONE HOUR OF USE, AND EACH HOUR UNTIL WHEEL NUTS/BOLTS MAINTAIN TORQUE VALUE. CHECK TORQUE EVERY 10 HOURS OF USE THERE-AFTER. AFTER EACH WHEEL REMOVAL START TORQUE PROCESS FROM BEGINNING. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.

Failure to check torque before first use may damage wheel nut/bolt seats. Once seats are damaged, it will become impossible to keep nuts/bolts tight. Tighten nuts/bolts to applicable torque value shown in table. Start all nuts/bolts by hand to prevent cross threading. Torque nuts/bolts in the recommended sequence as shown in Diagram 1.

WHEEL HARDWARE	
SIZE	FOOT-POUNDS
1/2"-20 (UNF)	75 Ft.-Lbs.



6 Bolt
Diagram 1

Wheels and Tires (continued)

Tire Pressure

- The following is to be used as a general guide for tire inflation and figures can vary depending on specific brand of tire used. **It is important that tires are inspected after unit is loaded.** Start with minimum pressure indicated. The tire should stand up with no side-wall buckling or distress as tire rolls. Record the pressure needed to support the full load and maintain this pressure to achieve proper tire life.

Do not exceed maximum recommended tire pressure.

TIRE	INFLATION
7.60 x 15 - 8 Ply	max. 52 PSI
9.5 x 15 - 6 Ply	max. 32 PSI
12.5 x 15 - 10 Ply	max. 44 PSI

Tire Warranty

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Following are phone numbers and Websites for your convenience:

Firestone

www.firestoneag.com
Phone 800-847-3364

Titan / Goodyear

www.titan-intl.com
Phone 800-USA-BEAR
Fax 515-265-9301

Carlisle

www.carlisletire.com
Phone 800-260-7959
Fax 800-352-0075

Greenball

www.greenball.com
Phone nearest location:
California 800-937-5204
Georgia 800-283-4569
Florida 800-935-0200
Indiana 800-426-4068
Tennessee 800-946-9412
Ohio 800-840-7295
Pennsylvania 800-869-6787

Complete Torque Chart

Capscrews - Grade 5

NOTE:

- Grade 5 capscrews can be identified by three radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.



SIZE	FOOT POUNDS	NEWTON METERS
1/4-20	8-10	11-13
1/4-28	9-11	12-15
5/16-18	15-17	20-23
5/16-24	17-19	23-26
3/8-16	25-28	34-38
3/8-24	28-31	38-42
7/16-14	40-45	54-61
7/16-20	45-50	61-68
1/2-13	62-68	84-92
1/2-20	68-75	92-102
9/16-12	90-98	122-133
9/16-18	100-110	134-148
5/8-11	120-135	162-183
5/8-18	124-137	168-186
3/4-10	200-220	270-300
3/4-16	210-230	285-310
7/8-9	330-350	425-475
7/8-14	360-380	460-515
1-8	500-525	675-710
1-14	540-560	730-760
1 1/8-7	600-635	815-860
1 1/8-12	665-700	920-950
1 1/4-7	850-895	1150-1215
1 1/4-12	940-990	1275-1340
1 3/8-6	1125-1175	1525-1590
1 3/8-12	1280-1335	1735-1810
1 1/2-6	1500-1560	2035-2115
1 1/2-12	1685-1755	2285-2380

IMPORTANT

- Follow these torque recommendations except when specified in text.

Complete Torque Chart

Capscrews - Grade 8

NOTE:

- Grade 8 capscrews can be identified by six radial dashes on the head.
- For wheel torque requirements, refer to Wheels and Tires.
- Tighten U-bolts evenly and equally to have the same number of threads exposed on each end.



SIZE	FOOT POUNDS	NEWTON METERS
5/16-18	20-22	27-30
5/16-24	21-23	28-31
3/8-16	35-39	47-53
3/8-24	36-41	49-55
7/16-14	54-58	73-78
7/16-20	55-60	75-80
1/2-13	82-88	110-120
1/2-20	94-99	125-135
9/16-12	127-134	170-180
9/16-18	147-155	199-210
5/8-11	160-170	215-230
5/8-18	165-175	225-235
3/4-10	280-295	380-400
3/4-16	330-365	445-495
7/8-9	410-430	555-580
7/8-14	420-440	570-595
1-8	630-650	850-880
1-14	680-700	920-950
1 1/8-7	900-930	1220-1260
1 1/8-12	930-950	1260-1290
1 1/4-7	1250-1300	1695-1760
1 1/4-12	1280-1320	1735-1790

IMPORTANT

- Follow these torque recommendations except when specified in text.

Hydraulic Fittings

Tightening O-Ring Fittings

1. Inspect components for damage or contamination. Do not connect any other type of fitting to an O-ring fitting.
2. For adjustable fittings, insure the jam nut and washer are fully backed up.
3. Lubricate the O-ring and threads on the fitting.
4. Turn the fitting into the port until it is finger tight.
5. For adjustable fittings, set in the desired position.
6. Using a wrench, torque the fitting to the value in the below table. For adjustable fittings the jam nut will be tightened.

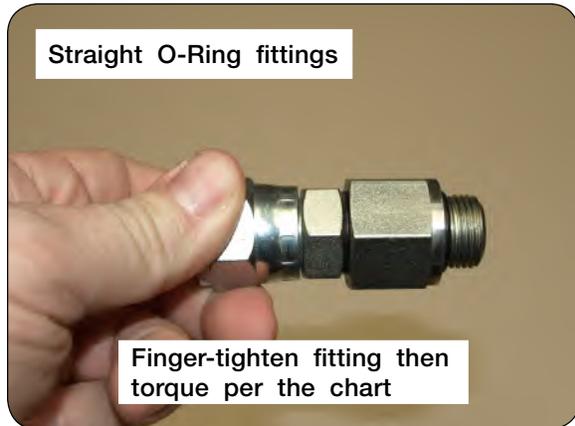
Note: Never use a power tool to install a fitting.

Dash Size	Thread Size	Straight Stud Torque (Ft-Lbs)	Adjustable Stud Torque (Ft-Lbs)
-5	1/2-20	14-19	10-14
-6	9/16-18	18-24	12-16
-8	3/4-16	27-43	20-30
-10	7/8-14	36-48	30-36
-12	1-1/16-12	65-75	44-54
-14	1-3/16-12	75-99	53-70
-16	1-5/16-12	85-123	59-80
-20	1-5/8"-12	115-161	75-100
-24	1-7/8"-12	125-170	105-125

O-Ring fittings

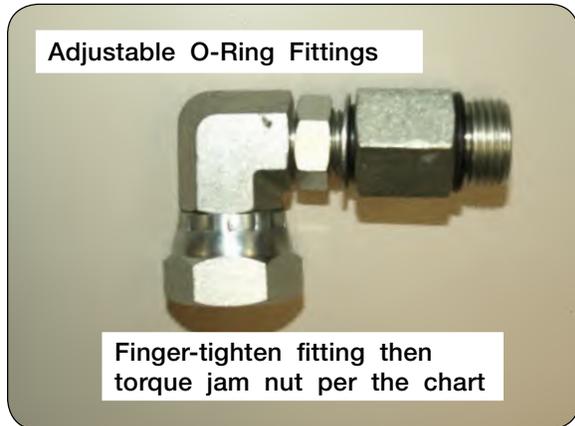


Straight O-Ring fittings



Finger-tighten fitting then torque per the chart

Adjustable O-Ring Fittings



Finger-tighten fitting then torque jam nut per the chart

Hydraulic Fittings

Tightening JIC Fittings

1. Inspect all components for damage or contamination. Do not connect any other type of fitting to a JIC fitting.
2. Lubricate the threads.
3. Turn the fitting into the port until it bottoms out.
4. Use one wrench on the fixed hex on the hose to prevent twisting and a second on the swivel. Tighten the fitting another 60 degrees (or one flat).

Note: Never use a power tool to install a fitting.



SECTION V

Parts

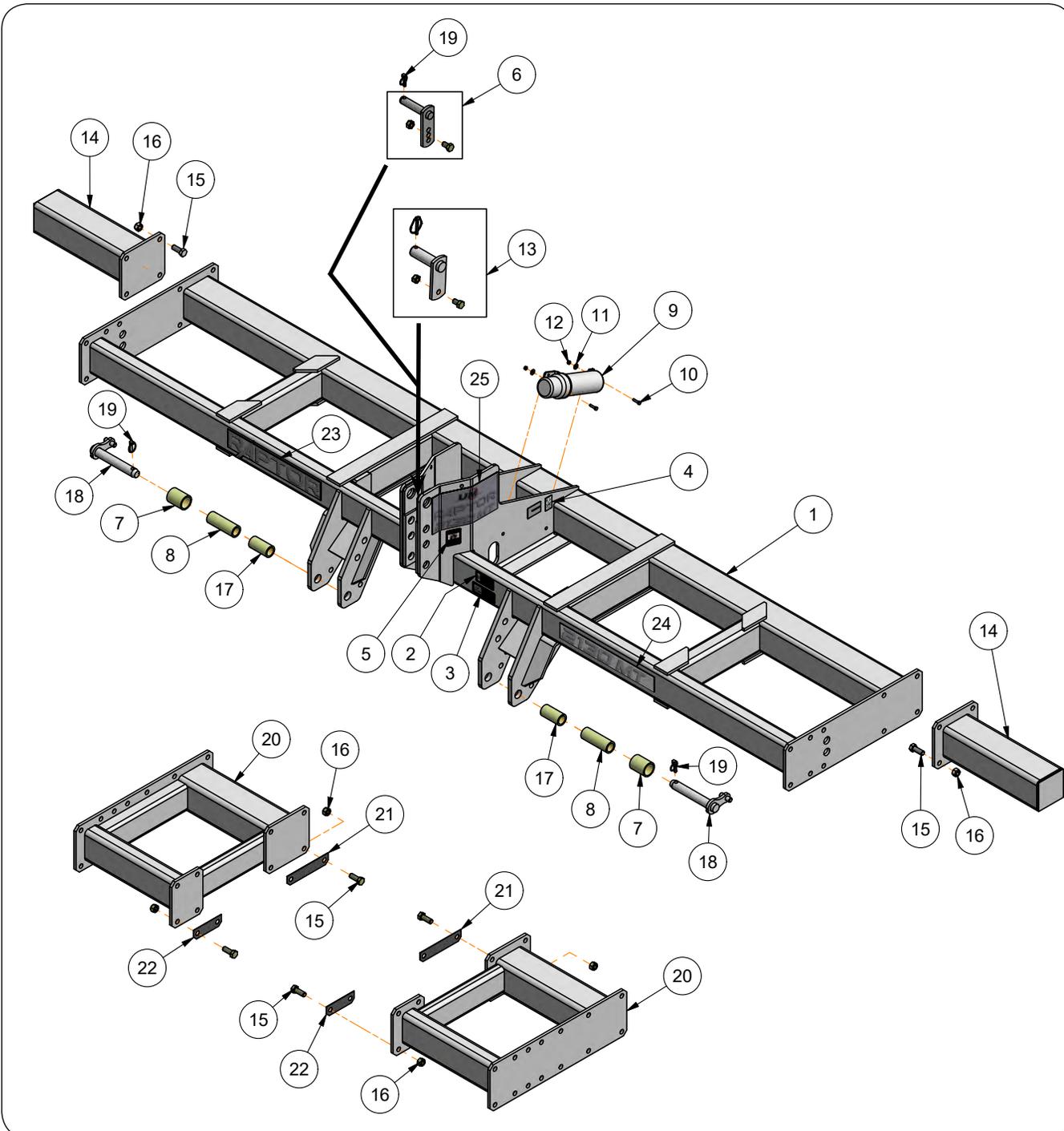
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TerrainPro2 Row Unit - Closing Coulter Components.....	5-26
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Please refer to the Rear Hitch manual for additional information.

3-POINT RAPTOR — Parts

Rigid Main Frame — 6 Shank

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Rigid Main Frame — 6 Shank

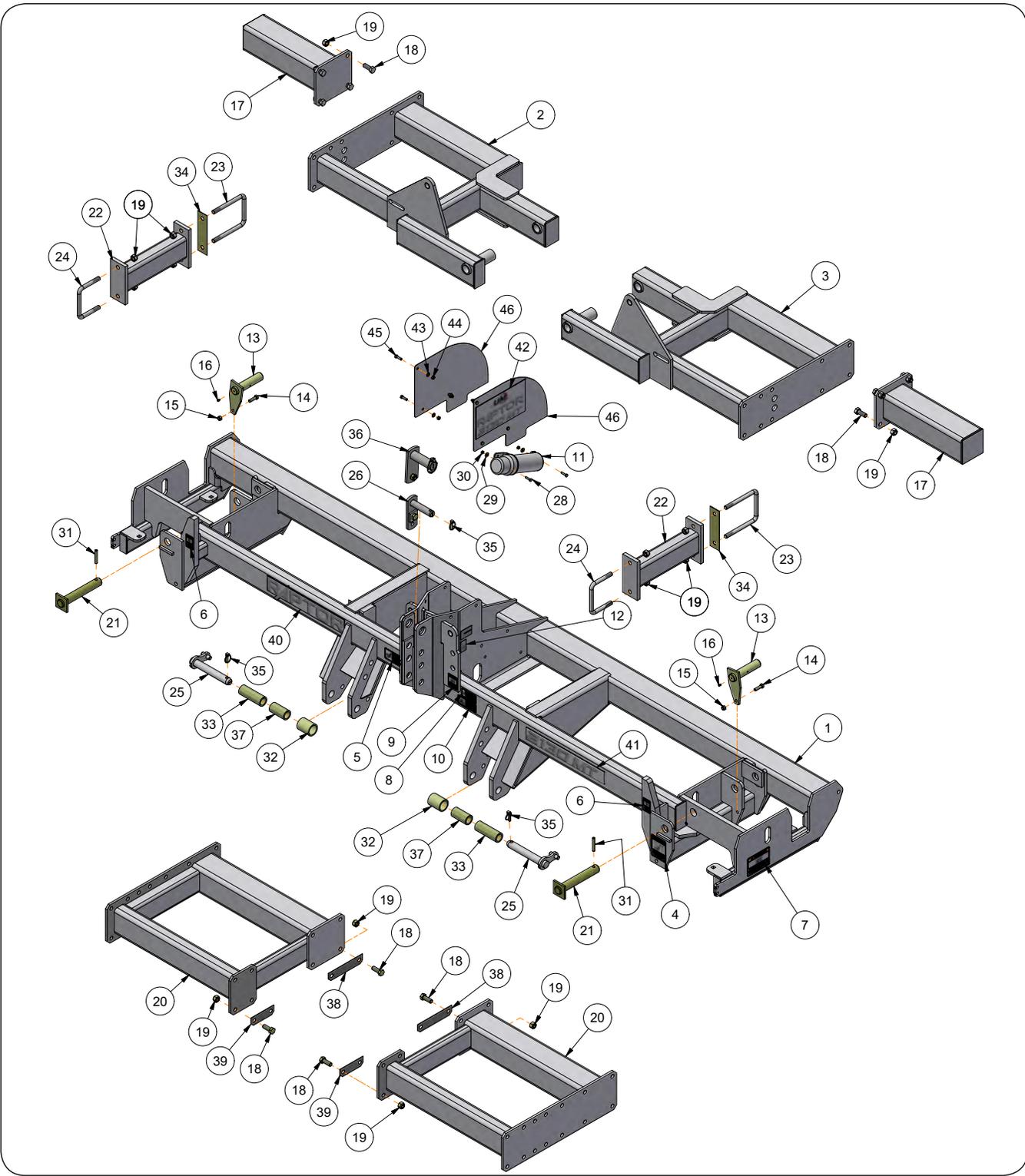
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	30"	36"	38"	NOTES
1	67437G	Main Frame (w/Decals & Mast Pins) =Green=	1	1	1	
	67437R	Main Frame (w/Decals & Mast Pins) =Red=				
2	97961	Decal, WARNING (Read & Understand)	1	1	1	
3	99507	Decal, WARNING (Falling Equipment)	1	1	1	
4	91605	Decal, FEMA	1	1	1	
5	97972	Decal, WARNING (Crush Hazard)	2	2	2	
6	67188B	Mast Pin Assembly 1 1/4" Dia.	1	1	1	
7	64428	Bushing, 2 1/2"x3 1/8"/Lower Spacer CAT IV	2	2	2	
8	65284	Bushing, 2" x 5 11/16"/Lower Spacer CAT IV	2	2	2	
9	900552	Manual Holder	1	1	1	
10	9390-031	Capscrew, 5/16"-18UNC x 1 1/4"	2	2	2	
11	9405-070	Flat Washer, 5/16" USS	2	2	2	
12	9397-008	Elastic Jam Nut, 5/16"-18UNC	2	2	2	
13	67187B	Mast Pin Assembly 1 3/4" Dia.	1	1	1	
14	65623G	Extension Tube 22" Weldment =Green=	2	2	2	
	65623R	Extension Tube 22" Weldment =Red=				
15	9390-145	Capscrew, 3/4"-10UNC x 2" (Grade 5)	-	16	16	
16	9802	Locknut, 3/4"-10UNC	-	16	16	
17	65285	Bushing, 2" x 3 7/8"/Lower Spacer CAT III	2	2	2	
18	69695	Pin Weldment/Anti-Rotational Pin	2	2	2	
19	9951	Klik-Pin 7/16" Dia. x 1 3/4"	3	3	3	
20	64032G	Extension Frame 19" Weldment =Green=	-	2	2	
	64032R	Extension Frame 19" Weldment =Red=				
21	67868	Shim 2" x 9 1/4"	-	2	2	
22	67869	Shim 2" x 6 1/4"	-	2	2	
23	9503753	Decal, RAPTOR	1	1	1	
24	9505050	Decal, MODEL 2115MT	1	1	1	
	9505051	Decal, MODEL 2130MT				
25	9505048	Mast Decal, MODEL RAPTOR 2115MT	2	2	2	
	9505049	Mast Decal, MODEL RAPTOR 2130MT				

3-POINT RAPTOR — Parts

Folding Main Frame — 8 Shank

Please visit www.unverferth.com/parts/ for the most current parts listing.



ITEM	PART NO.	DESCRIPTION	30"	36"	38"	NOTES
1	69222G	Main Frame, Flex w/Decals =Green=	1	1	1	2
	69222R	Main Frame, Flex w/Decals =Red=				

3-POINT RAPTOR — Parts

Folding Main Frame — 8 Shank

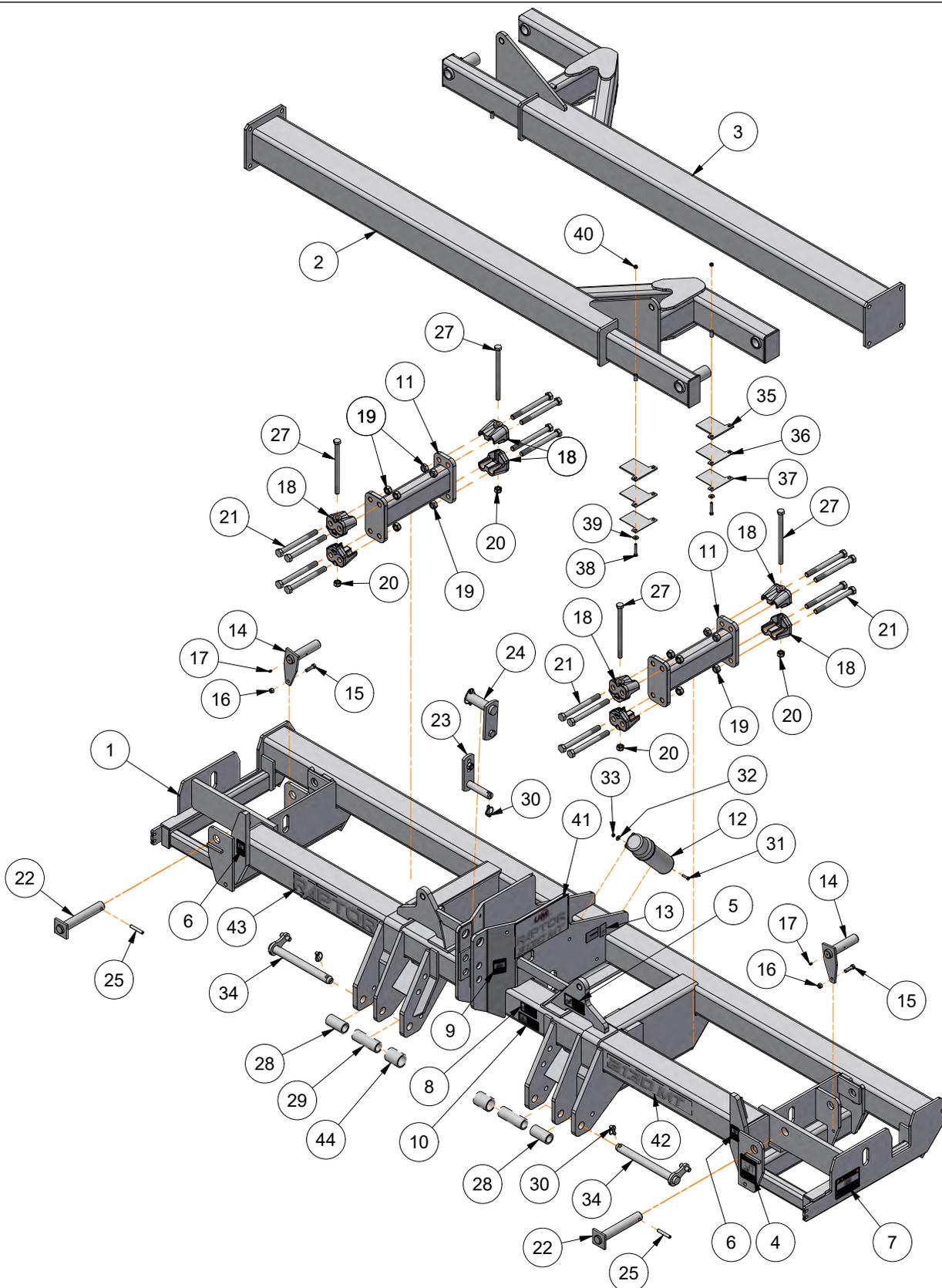
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	30"	36"	38"	NOTES
2	68404G	Wing Base 45" (Right-Hand) =Green=	1	1	1	
	68404R	Wing Base 45" (Right-Hand) =Red=				
3	68405G	Wing Base 45" (Left-Hand) =Green=	1	1	1	
	68405R	Wing Base 45" (Left-Hand) =Red=				
4	902221	Decal, DANGER "Electrocution Hazard"	1	1	1	
5	95445	Decal, WARNING! "Do not use hands..."	1	1	1	
6	97048	Decal, WARNING! "Pinch Points..."	2	2	2	
7	97337	Decal, WARNING! "Never Stand..."	2	2	2	
8	97961	Decal, WARNING! "Read & Understand..."	1	1	1	
9	97972	Decal, WARNING! "Crushing Hazard..."	2	2	2	
10	99507	Decal, WARNING! "Falling Equipment..."	1	1	1	
11	900552	Manual Holder	1	1	1	
12	91605	Decal, FEMA	1	1	1	
13	63223	Pin Weldment 1 5/8" Dia. x 7 1/4"	2	2	2	
14	9390-102	Capscrew 1/2"-13UNC x 1 3/4"	2	2	2	
15	9800	Locknut 1/2"-13UNC	2	2	2	
16	91160	Grease Zerk	2	2	2	
17	65623G	Extension Tube 22" Weldment =Green=	2	-	-	
	65623R	Extension Tube 22" Weldment =Red=				
18	9390-145	Capscrew 3/4"-10UNC x 2"	24	24	24	
19	9802	Locknut 3/4"-10UNC	32	32	32	
20	63345G	Extension Frame 31" =Green=	-	2	2	
	63345R	Extension Frame 31" =Red=				
21	63220	Pin Weldment 1 5/8" Dia. x 10 3/4"	2	2	2	
22	61303G	Support Tube 18" =Green=	2	2	2	
	61303R	Support Tube 18" =Red=				
23	94090	U-Bolt 3/4"-10UNC x 8"	2	2	2	
24	94012	U-Bolt 3/4"-10UNC x 5"	2	2	2	
25	68108	Pin Weldment 1 7/16" Dia. x 10 3/8"	2	2	2	
26	67188B	Mast Pin Assembly 1 1/4" Dia. x 7 1/2"	1	1	1	
28	9390-031	Capscrew 5/16"-18UNC x 1 1/4"	2	2	2	
29	9405-070	Flat Washer 5/16"	2	2	2	
30	9397-008	Elastic Nut 5/16"-18UNC	2	2	2	
31	91144-239	Spiral Pin 1/2" Dia. x 3"	2	2	2	
32	64428	Bushing 2 1/2" OD x 3 1/8"	2	2	2	
33	65284	Bushing 2" OD x 5 11/16" (Lower CAT IV)	2	2	2	
34	62643	Shim	2	2	2	
35	9951	Lynch/Klik Pin 7/16 x 1 3/4"	3	3	3	
36	67187B	Mast Pin 1 3/4" Dia. w/Lynch Pin	1	1	1	
	9501028	Lynch Pin				
37	65285	Lower Bushing 2" OD x 3 7/8"	2	2	2	
38	67868	Shim 2" x 9 1/4"	-	2	2	
39	67869	Shim 2" x 6 1/4"	-	2	2	
40	9503753	Decal, RAPTOR	1	1	1	
41	9505050	Decal, MODEL 2115MT	1	1	1	
	9505051	Decal, MODEL 2130MT				
42	9505048	Mast Decal, MODEL RAPTOR 2115MT	2	2	2	
	9505049	Mast Decal, MODEL RAPTOR 2130MT				
43	9405-074	Flat Washer, 3/8" SAE	6	6	6	
44	9928	Lock Nut/TOP, 3/8"-16UNC	16	16	16	
45	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	6	6	6	
46	68926G	Decal Panel =Green=	2	2	2	
	68926R	Decal Panel =Red=				

3-POINT RAPTOR — Parts

Folding Main Frame — 12 Shank 30" Spacing

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Folding Main Frame — 12 Shank 30” Spacing

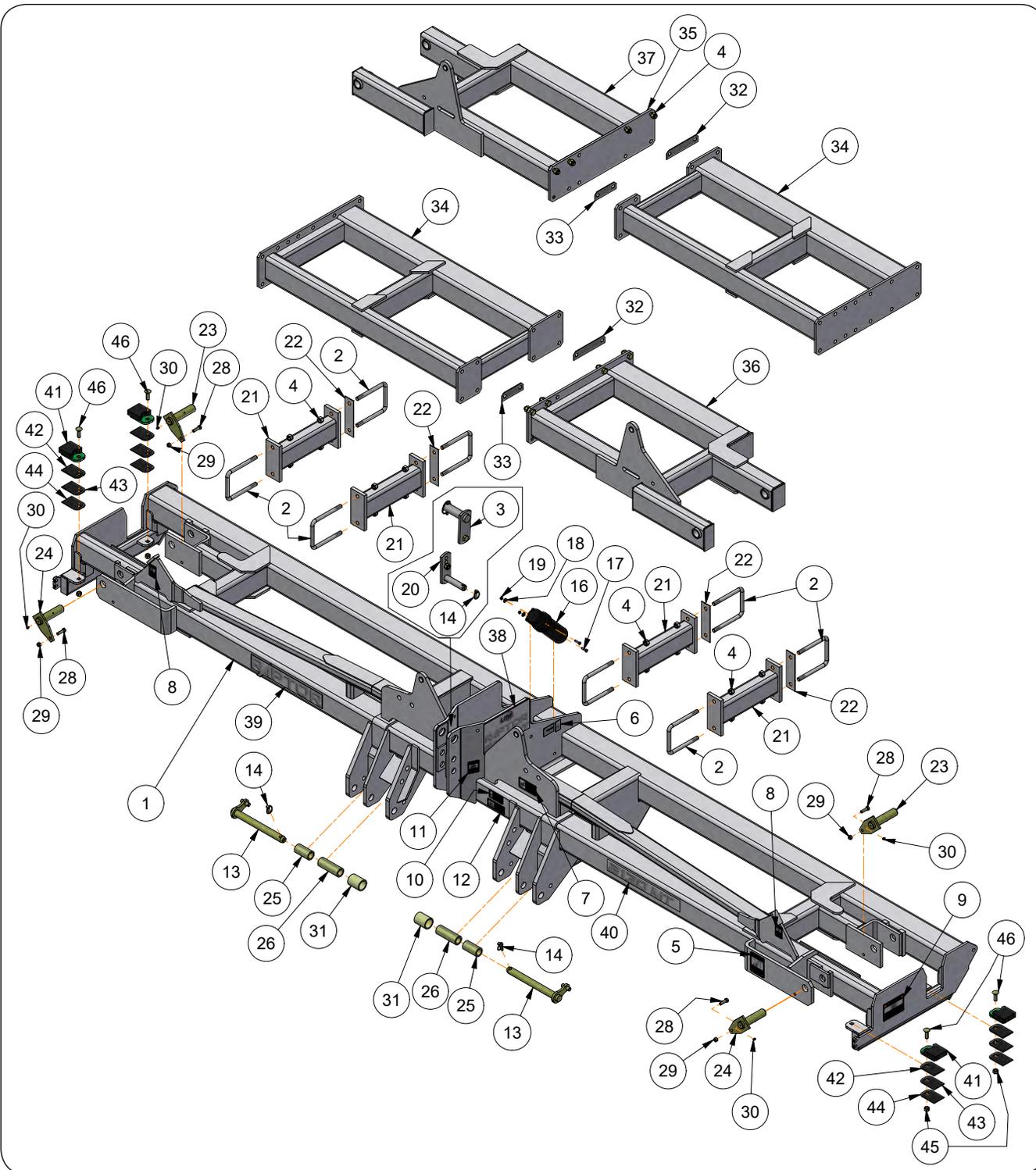
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY.	NOTES
1	67432G	Main Frame w/Decals =Green=	1	
	67432R	Main Frame w/Decals =Red=		
2	67427G	Wing Base (Right-Hand) =Green=	1	
	67427R	Wing Base (Right-Hand) =Red=		
3	67428G	Wing Base (Left-Hand) =Green=	1	
	67428R	Wing Base (Left-Hand) =Red=		
4	902221	Decal, DANGER	1	
5	95445	Decal, WARNING! Do not use hands...	1	
6	97048	Decal, WARNING! Pinch Points...	1	
7	97337	Decal, WARNING! Never Stand...	2	
8	97961	Decal, WARNING! Read & Understand...	1	
9	97972	Decal, WARNING! Crushing Hazard...	1	
10	99507	Decal, WARNING! Falling Equipment...	1	
11	604426G	Bolt-In Brace Weldment =Green=	2	
	604426R	Bolt-In Brace Weldment =Red=		
12	900552	Manual Holder	1	
13	91605	Decal, FEMA	1	
14	63223	Pin Weldment 1 5/8” Dia. x 7 1/4”	2	
15	9390-102	Capscrew (Grade 5) 1/2-13UNC x 1 3/4”	2	
16	9800	Locknut 1/2-13UNC	2	
17	91160	Grease Zerk	2	
18	67072B	Clamp-Top	8	
19	98420	Locknut/Top, 7/8-9UNC	16	
20	9802	Locknut 3/4-10UNC	20	
21	9390-456	Capscrew, 7/8”-9UNC x 9” G5	16	
22	63220	Pin Weldment 1 5/8” Dia. x 10 3/4”	2	
23	67188B	Mast Pin Assembly 1 1/4” Dia. x 7 1/2”	1	
24	67187B	Mast Pin 1 3/4” Dia.	1	
25	91144-239	Spiral Pin 1/2 x 3” Lg.	2	
27	9390-452	Capscrew, 3/4”-10UNC x 11” G5	4	
28	65285	Lower Bushing 2” Dia. x 3 7/8 (CAT IV)	2	
29	65284	Bushing 2 x 5 11/16” (Lower CAT IV)	2	
30	9951	Lynch/Klik Pin 7/16” Dia. x 1 3/4”	3	
31	9390-031	Capscrew (Grade 5) 5/16-18UNC x 1 1/4”	2	
32	9405-070	Flat Washer 5/16	2	
33	9397-008	Elastic Nut 5/16-18UNC	2	
34	69657	Pin 1 7/16” Dia. x 15 7/16”	2	
35	65896B	Shim .25” Thick	2	
36	65897B	Shim .140” Thick	2	
37	65898B	Shim 14 Ga. Thick	2	
38	9390-060	Capscrew 3/8-16UNC x 2 1/4	4	
39	9405-076	Flat Washer 3/8” USS	4	
40	9928	Locknut 3/8”	4	
41	9505050	Decal, MODEL 2115MT	2	
	9503751	Decal, MODEL 2130MT		
42	9505048	Mast Decal, MODEL RAPTOR 2115MT	1	
	9505049	Mast Decal, MODEL RAPTOR 2130MT		
43	9503753	Decal, RAPTOR	1	
44	64428	Bushing 2 1/2” OD x 3 1/8”	2	

3-POINT RAPTOR — Parts

Folding Main Frame — 12 Shank (36/38" Spacing)

Please visit www.unverferth.com/parts/ for the most current parts listing.



ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	68532G	Main Frame, Flex w/Decals =Green=	1	
	68532R	Main Frame, Flex w/Decals =Red=		

3-POINT RAPTOR — Parts

Folding Main Frame — 12 Shank (36/38" Spacing)

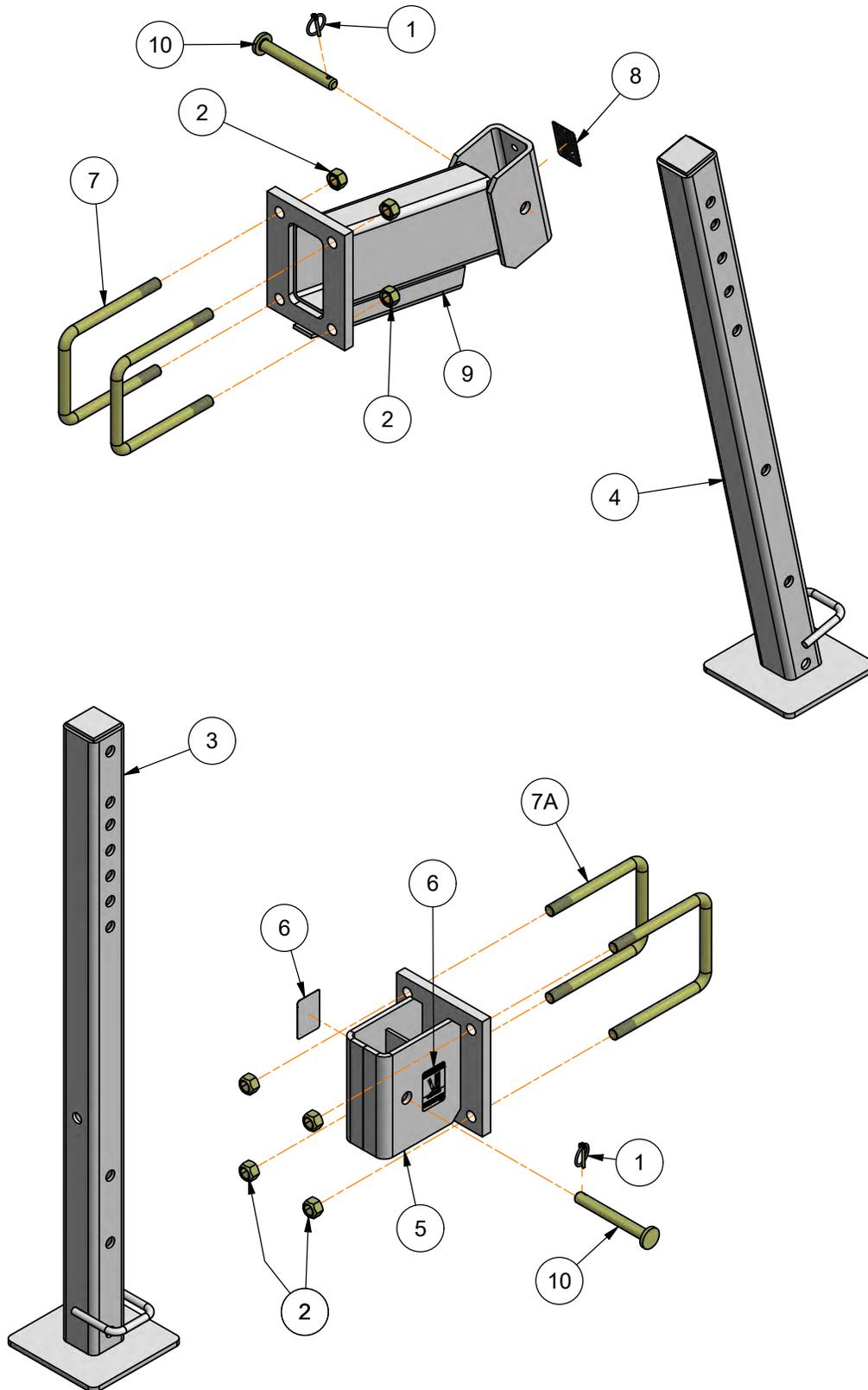
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
2	94090	U-Bolt, 3/4"-10UNC x 8"	4	
3	67187B	Mast Pin, 1 3/4" Dia. w/Lynch Pin	1	
4	9802	Lock Nut/Top, 3/4"-10UNC	32	
5	902221	Decal, DANGER! "Electrocution Hazard..."	2	
6	91605	Decal, FEMA	1	
7	95445	Decal, WARNING! "Do not use hands..."	2	
8	97048	Decal, WARNING! "Pinch Points..."	2	
9	97337	Decal, WARNING! "Never Stand..."	2	
10	97961	Decal, WARNING! "Read & Understand..."	1	
11	97972	Decal, WARNING! "Crushing Hazard..."	2	
12	99507	Decal, WARNING! "Falling Equipment..."	1	
13	69657	Pin, 1 7/16" Dia. x 15 1/8"	2	
14	9951	Lynch/Klik Pin, 7/16" Dia. x 1 3/4"	3	
16	900552	Manual Holder	1	
17	9390-031	Capscrew, 5/16"-18UNC x 1 1/4" G5	2	
18	9405-070	Flat Washer, 5/16"	2	
19	9397-008	Elastic Nut, 5/16"-18UNC	2	
20	67188B	Mast Pin Assembly, 1 1/4" Dia. x 7 1/2"	1	
21	61303G	Support Tube 18" =Green=	4	
	61303R	Support Tube 18" =Red=		
22	62643	Shim, 2 1/2" x 9 5/16"	2	
23	64277	Pin Lock Weldment (Rear)	2	
24	64279	Pin Lock Weldment (Front)	2	
25	65285	Bushing, 2" OD x 3 7/8"	2	
26	65284	Bushing, 2" OD x 5 11/16" (Lower CAT IV)	2	
28	9390-102	Capscrew, 1/2"-13UNC x 1 3/4" G5	4	
29	9800	Lock Nut/Top, 1/2"-13UNC	4	
30	91160	Grease Zerk	4	
31	64428	Bushing, 2 1/2" OD x 3 1/8"	2	
32	67868	Shim, 2" x 9 1/4"	4	
33	67869	Shim, 2" x 6 1/4"	4	
34	63245G	Extension Frame 57" =Green=	2	
	63245R	Extension Frame 57" =Red=		
35	9390-145	Capscrew, 3/4"-10UNC x 2" G5	16	
36	68389G	Wing Base (Right-Hand) =Green=	1	
	68389R	Wing Base (Right-Hand) =Red=		
37	68390G	Wing Base (Left-Hand) =Green=	1	
	68390R	Wing Base (Left-Hand) =Red=		
38	9505048	Decal, MODEL RAPTOR 2115MT	2	
	9505049	Decal, MODEL RAPTOR 2130MT		
39	9503753	Decal, RAPTOR	1	
40	9505050	Decal, MODEL 2115MT	1	
	9505051	Decal, MODEL 2130MT		
41	68337B	Shim Weldment	4	
42	68817B	Shim, 7 GA. x 3" x 4 1/2"	4	
43	68816B	Shim, 12 GA. x 3" x 4 1/2"	4	
44	68815B	Shim, 14 GA. x 3" x 4 1/2"	4	
45	9801	Lock Nut/Top, 5/8"-11UNC	4	
46	9388-135	Carriage Bolt 5/8"-11UNC x 2" G5	4	

3-POINT RAPTOR — Parts

Storage Stand

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Storage Stand

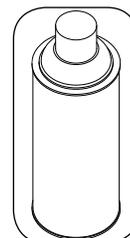
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	6 Row	8 Row	12 Row	NOTES
1	9093	Klik-Pin	3	4	4	
2	9802	Locknut, 3/4"-10UNC	12	16	16	
3	63529	Straight Storage Stand (Front)	2			
4	63571	Angled Storage Stand (Rear)	1	2	2	
5	77341B	Straight Mounting Bracket	2			
6	97973	Decal, WARNING	4			
7	94090	U-Bolt, 3/4"-10UNC x 8"	1	4	8	
7A	94012	U-Bolt, 3/4"-10UNC x 5"	2	4	-	
8	97973	Decal, WARNING	1	2	2	
9	601996B	Angled Mounting Bracket Weldment	1	2	2	
10	9500153	Pin	3	4	4	

Touch-Up Paint

Please visit www.unverferth.com/parts/ for the most current parts listing.

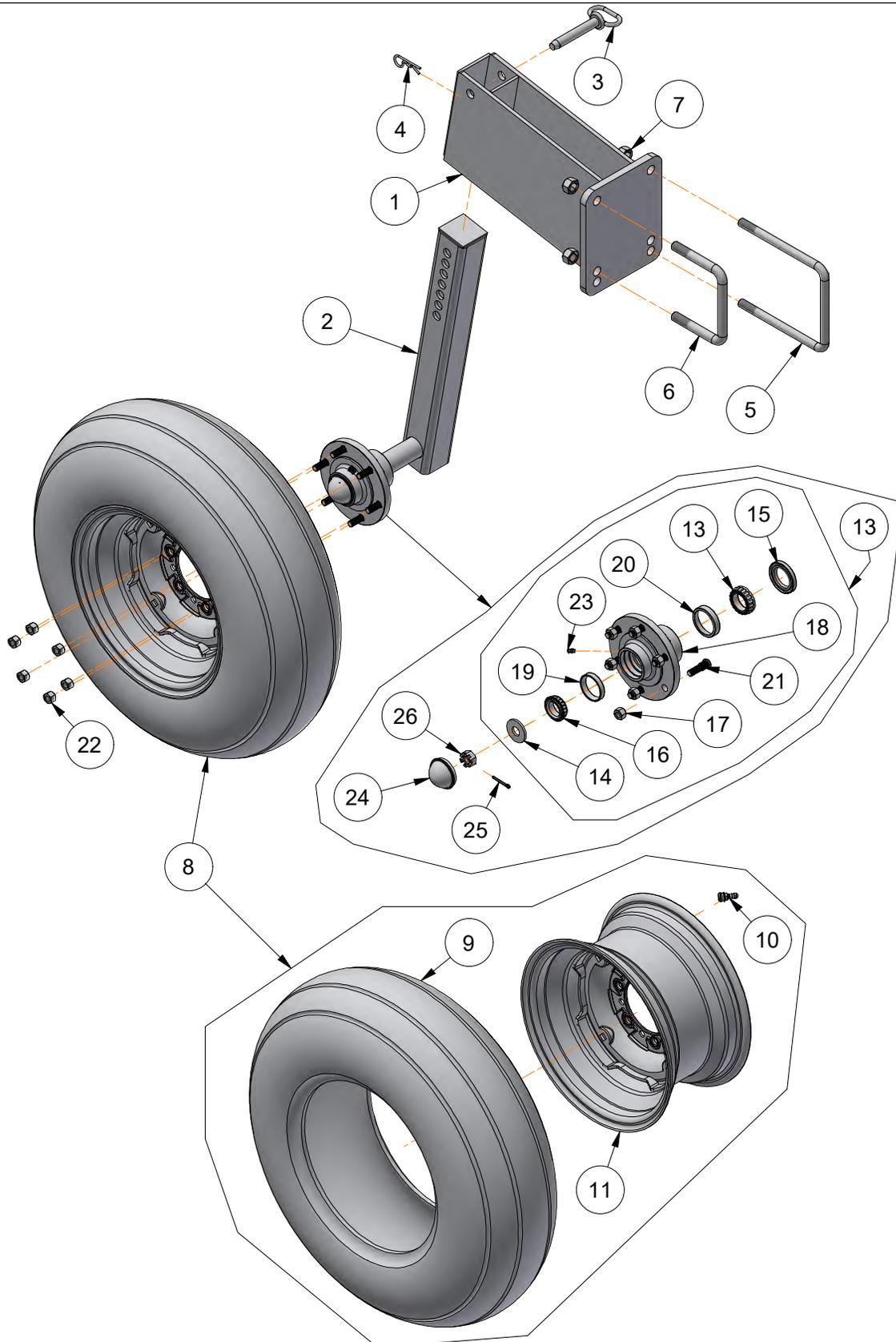
PAINT	SPRAY
Black	97013
Green	97015
Red	97301
Primer, Gray	9500082



3-POINT RAPTOR — Parts

Stabilizer Wheel

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Stabilizer Wheel

Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTE
	604655	Stabilizer Wheel RH Assembly	1	
	604653	Stabilizer Wheel LH Assembly		
1	604650B	Bracket Weldment	1	
2	604654	Spindle Arm Weldment / Hub Assy	1	Includes Items 2, 13-26
	604652B	Spindle Arm Weldment	1	
3	97035	Hitch Pin 3/4"Dx4 1/4" Grip	1	
4	95959	Hairpin Cotter 5/32"x2 15/16"	1	
5	94090	U-Bolt, 3/4"-10UNCx8"x6 13/16"	2	6R/30", 6R/36", 6R/38", 8R/30"
	JBP3058	U-Bolt, 3/4"-10UNCx9"x7 13/16"	2	12R/30"
6	94012	U-Bolt, 3/4"-10UNCx5"x6 13/16	2	8R/36", 8R/38", 12R/36", 12R/38"
7	9802	Locknut/Top 3/4"-10UNC	4	
8	60911SM	Ag Tire - WH/TI 8"x15" / TL9.5LB15	1	Includes Items 9-11
9	96182	TL9.5LB15 - 8 Ply Tire	1	
10	9002500	Valve Stem - Stainless Steel	1	
11	W815-6-08SM	8"x15" Implement Wheel	1	=Silver Mist=
12	9500002B	Hub Assembly	1	
13	9166	Bearing Cone	1	
14	9234	Flat Washer 13/16"x2 "ODx7GA	1	
15	9168	Seal	1	
16	9165	Bearing Cone #LM67048	1	
17	9348	Beveled Nut, 1/2"-UNF	6	
18	9625	Hub 6 Bolt Machined Casting	1	
19	9345	Bearing Cup #LM67010	1	
20	9346	Bearing Cup - Inner #LM67010	1	
21	9347	Stud Bolt 1/2"-20UNFx1 7/8"	6	
22	9348	Wheel Nut 1/2"-20UNF	6	
23	9504710	Grease Zerk	1	
24	9162	Hub Cap	1	
25	9391-035	Cotter Pin 5/32"x1 1/2"	1	
26	9393-016	Slotted Nut 3/4 UNF G2	1	

3-POINT RAPTOR — Parts

Lead Coulter Components

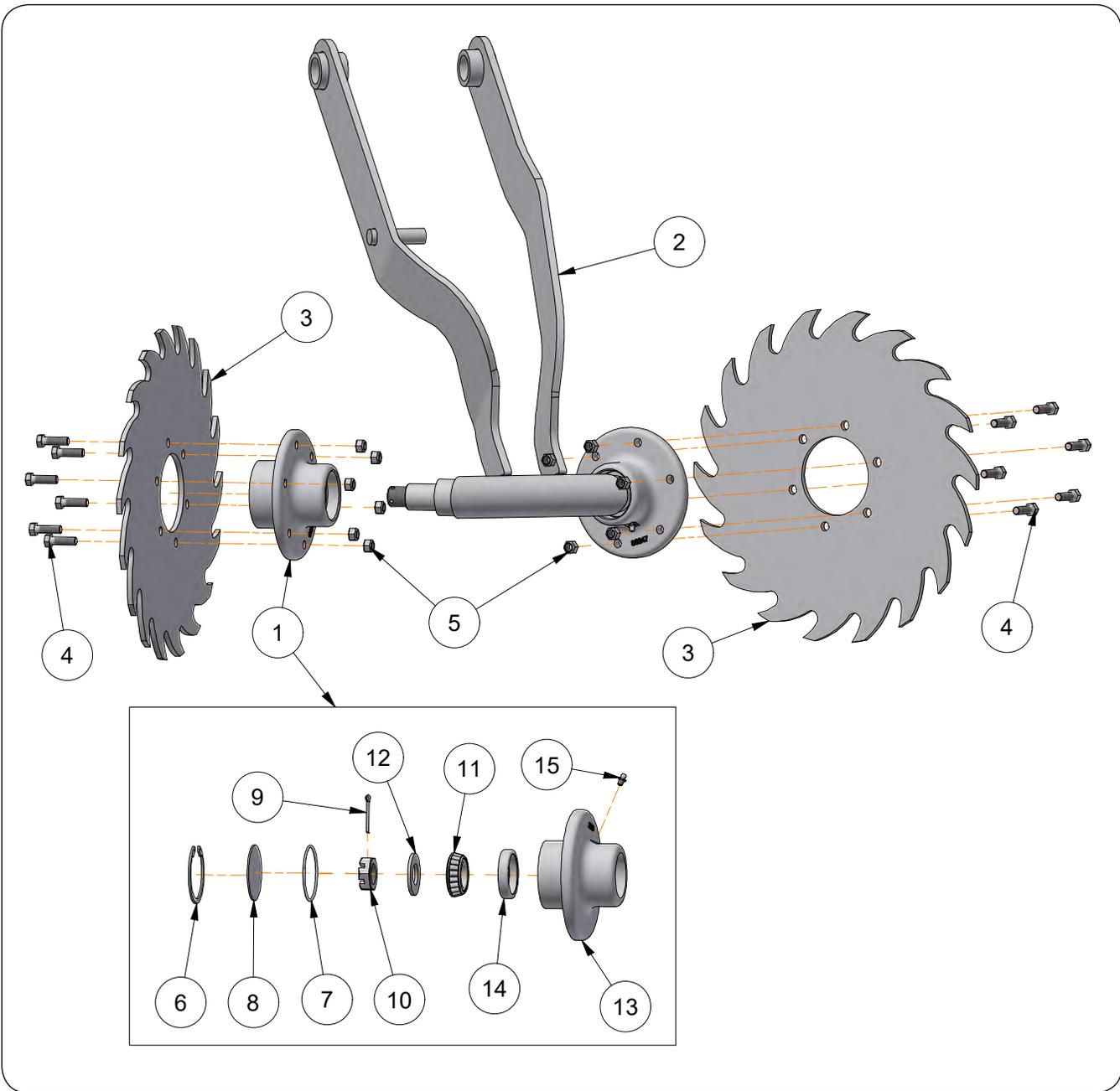
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	603847B	Combo Coulter ASM Terrain Pro	2	Includes Items 2-18 & 35-40
2	603846	Coulter Arm Weldment	1	
3	94795	Slotted Jam Nut 1-14UNS	1	
4	82823	Swivel LH Bracket	1	
5	82826	Spring Washer Casting	1	
6	83371B	Spring Rod Weldment	1	
7	91160	Grease Zerk	2	
8	92528B	Bushing 2 1/4"Dx1 1/4"Dx10GA	1	
9	9399-057	Set Screw 1/4"x1/4" UNC	1	
10	94144	Retaining Ring 1 1/4" Shaft	1	
11	94756B	Spring/Comp 2 5/8"Dx10 5/8"	1	
12	60735	Hub Cap	1	
13	64828	Hub 6 Bolt Assembly	1	Includes Items 35-40
14	902158	O-Ring 2.487" Id	1	
15	93985	Retaining Ring 2 9/16"	1	
16	93987	Triple Lip Seal	1	
17	95565	O-Ring 1.049" ID	1	
18	9391-025	Cotter Pin 1/8"x1 1/2"	1	
19	603860B	Row Unit Base Weldment	1	
20	604841	Bushing	2	
21	9390-056	Capscrew 3/8"x1 1/4" UNC GR5	6	
22	9390-129	Capscrew 5/8"x3 1/4" UNC GR5	1	
23	95905	Locknut/Ctr 5/8"-11 UNC	1	
24	9928	Top Lock 3/8"	6	
25	99986	Coulter Blade 20 7/16"Dia Smooth	1	
26	67072B	Clamp-Top Painted	1	
27	67073B	Clamp -Bottom Painted	1	
28	9503094	Capscrew 3/4"x13" UNC GR5	1	
29	9802	Locknut/Top 3/4"-10UNC GB	1	
30	9390-457	Capscrew 7/8"-9x10" UNC GR5	4	
31	98420	Locknut/Top 7/8"-9UNC	4	
32	602721B	Mounting Spacer Kit	1	Includes Items 33-34
33	602987	Spacer	4	
34	601919B	Spacer Block Weldment	1	
35	9165	Bearing Cone #LM67048	1	
36	94800	Bushing	1	
37	901145	Bearing And Seal Assembly	1	
38	91160	Grease Zerk	1	
39	9345	Bearing Cup #LM67010	2	
40	86247	Hub 6 Bolt (Machined) Casting	1	

3-POINT RAPTOR — Parts

Row Cleaner Components

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Row Cleaner Components

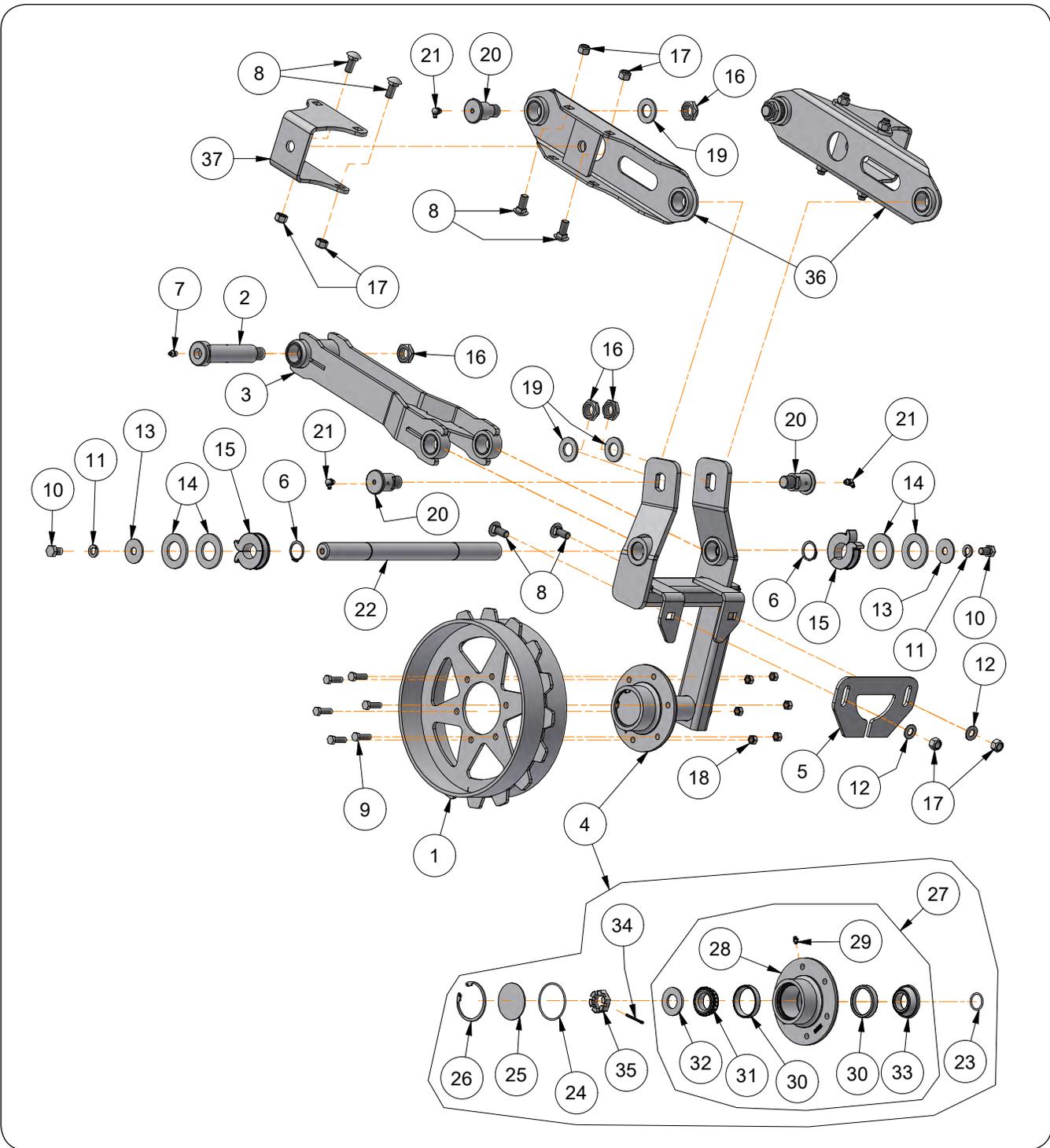
Please visit www.unverferth.com/parts/ for the most current parts listing.

	PART NO.	DESCRIPTION	QTY	NOTES
1	64828	Hub, 6 Bolt Assembly	2	
2	604250B	Row Cleaner Frame	1	
3	604207B	16" Saw Tooth Row Cleaner Blade	2	
4	9390-056	Capscrew 3/8"x1 1/4" UNC GR5	12	
5	9928	Top Lock 3/8"	12	
6	93985	Retaining Ring 2 9/16"	1	
7	902158	O-Ring 2.487"	1	
8	60735	Hub Cap	1	
9	9391-025	Cotter Pin 1/8"x1 1/2"	1	
10	94795	Slotted Jam Nut 1"-14UNS	1	
11	9165	Bearing Cone #LM67048	1	
12	94800	Bushing	1	
13	86301	Hub 6 Bolt Casting	1	
14	9345	Bearing Cup #LM67010	2	
15	91160	Grease Zerk	1	

3-POINT RAPTOR — Parts

Depth Control Wheel Components

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Depth Control Wheel Components

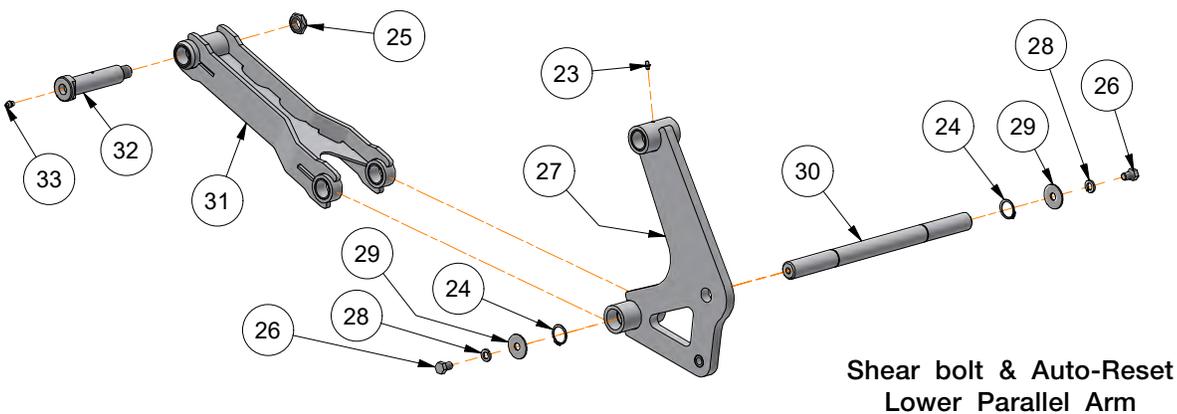
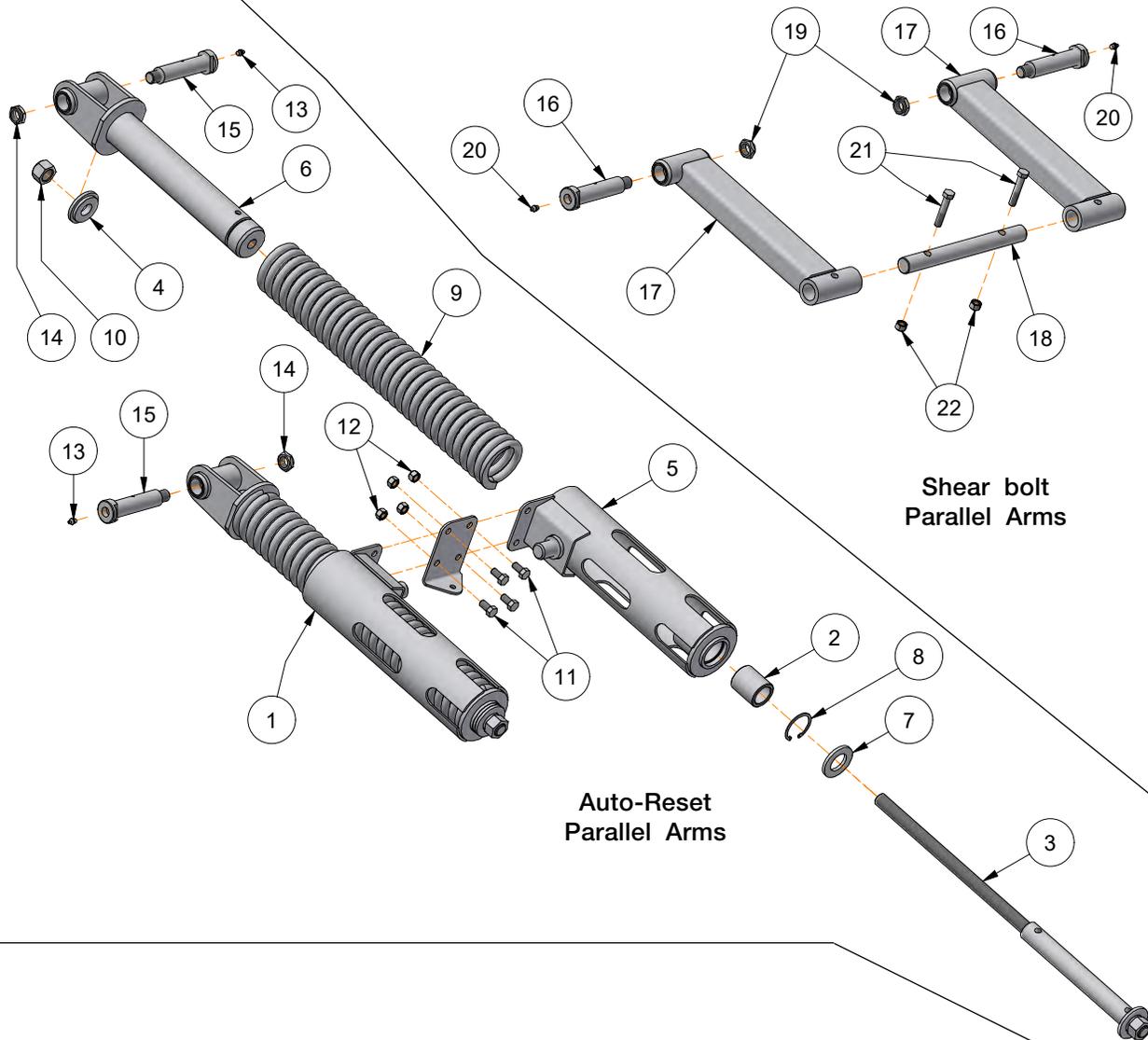
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	603894B	Gauge Wheel Weldment	1	
2	603948	Pin 1.75"x6.44"	1	
3	604221B	Lower Pull Arm Weldment	1	
4	604253	Pin 1.25"x17 5/8"	1	
5	604825B	Scraper	1	
6	9006084	Retaining Ring 1 1/4"	2	
7	93426	Grease Zerk	1	
8	9388-103	Carriage 1/2"x1 1/4" UNC GR5	2	
9	9390-056	Capscrew 3/8"x1 1/4" UNC GR5	6	
10	9390-097	Capscrew 1/2"x3/4" UNC GR5	2	
11	9404-025	Lock Washer 1/2"	2	
12	9405-086	Flat Washer 1/2" SAE	2	
13	9405-090	Flat Washer 1/2" Type B (Wide)	2	
14	9405-128	Flat Washer 1 1/4" SAE	4	
15	9504667	3/4" Stroke Control	2	
16	96976-034	Locknut/Thin 7/8"-9 UNC	3	
17	9800	Locknut 1/2"	2	
18	9928	Locknut 3/8"	6	
19	9405-110	Flat Washer 7/8" SAE	2	
20	603946	Pin	2	
21	9000875	Zerk 90°	2	
22	604254B	Gauge Wheel Mount Arm Assembly	1	Includes Items 23-35
23	95565	O-Ring 1.049"	1	
24	902158	O-Ring 2.487"	1	
25	60735	Hub Cap	1	
26	93985	Retaining Ring 2 9/16"	1	
27	64828	Hub 6 Bolt Assembly	1	Includes Items 28-33
28	86247RW	Hub 6 Bolt (Raw) Casting	1	
29	91160	Grease Zerk	1	
30	9345	Bearing Cup #LM67010	2	
31	9165	Bearing Cone #LM67048	1	
32	94800	Bushing 2"x1.01"x.126"	1	
33	901145	Bearing And Seal Assembly	1	
34	9391-025	Cotter Pin 1/8"x1 1/2"	1	
35	94795	Slotted Jam Nut 1"-14UNS	1	
36	604333@	Parallel Link	2	
37	604334@	Trunnion Mount Plate	2	

3-POINT RAPTOR — Parts

Parallel Arm Components

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Parallel Arm Components

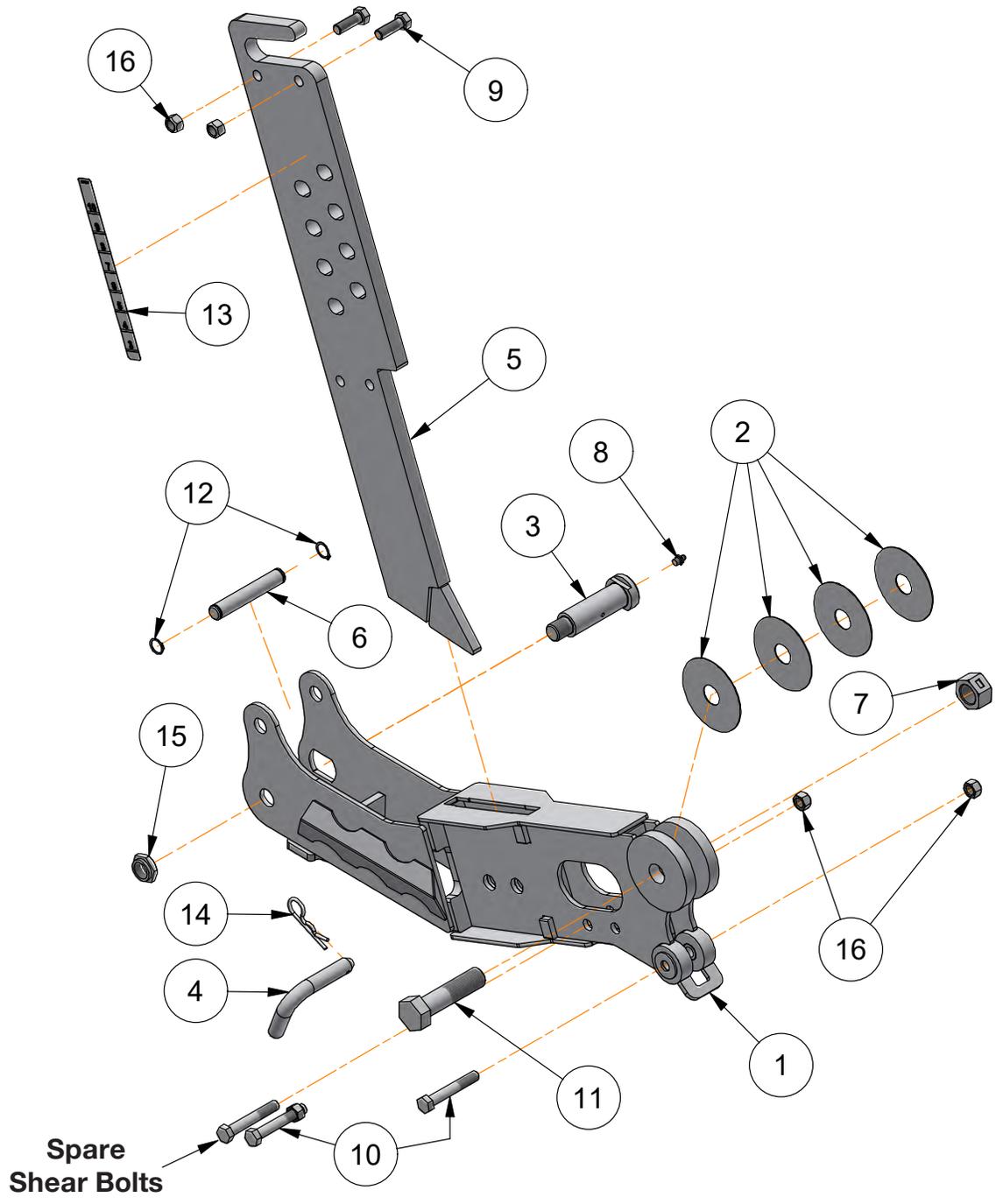
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
Auto-Reset Parallel Arms				
1	603895	Spring Assembly	2	
2	600767	Bushing-Guide 2.125"Dx1.533"Dx2.5"	1	
3	600771B	Spring Rod Weldment	1	
4	601728	Step Washer	1	
5	603896	Spring Retainer Weldment	1	
6	603951	Spring Guide Weldment	1	
7	69741PL	Washer, 2 3/4"x1 9/16"x1/4"	1	
8	9006206	Internal Retaining Ring, 2.49"x.203"x.078"	1	
9	9502536	Compression Spring	1	
10	9663	Top L-Nut 1"-8 UNC GR8	1	
11	9390-099	Capscrew 1/2"x1" UNC GR5	4	
12	9800	Top Lock 1/2"	4	
13	93426	Grease Zerk, 1/8"-27 NPT	1	
14	96976-034	Locknut/Thin 7/8"-9 UNC	1	
15	603948	Pin 1.75"Dx6.44" (Machined)	1	
Shear Bolt Parallel Arms				
16	603948	Pin 1.75"Dx6.44" (Machined)	2	
17	604008B	Shear bolt Link	2	
18	604011	Pin 1.25"Dx12 1/2"	1	
19	96976-034	Locknut/Thin 7/8-9 UNC	1	
20	93426	Grease Zerk, 1/8"-27 NPT	2	
21	9390-106	Capscrew 1/2X2 3/4 UNC GR5	2	
22	9800	Top Lock 1/2	2	
Shear bolt & Auto-Reset Lower Parallel Arm				
23	91160	Grease Zerk, 1/8"-28 NPT	1	
24	9006084	Retaining Ring	2	
25	96976-034	Locknut/Thin 7/8-9 UNC	1	
26	9390-097	Capscrew 1/2X3/4 UNC GR5	2	
27	604221B	Lower Pull Arm	1	
28	9404-025	Lock Washer 1/2	2	
29	9405-090	Flat Washer 1/2 Type B (Wide)	2	
30	604253	Pin 1.25"Dx17 5/8"	1	
31	604259	Plate	1	
32	603948	Pin 1.75"Dx6.44" (Machined)	1	
33	93426	Grease Zerk, 1/8"-27 NPT	1	

3-POINT RAPTOR — Parts

Strip-Till Shank Components

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Shank Components

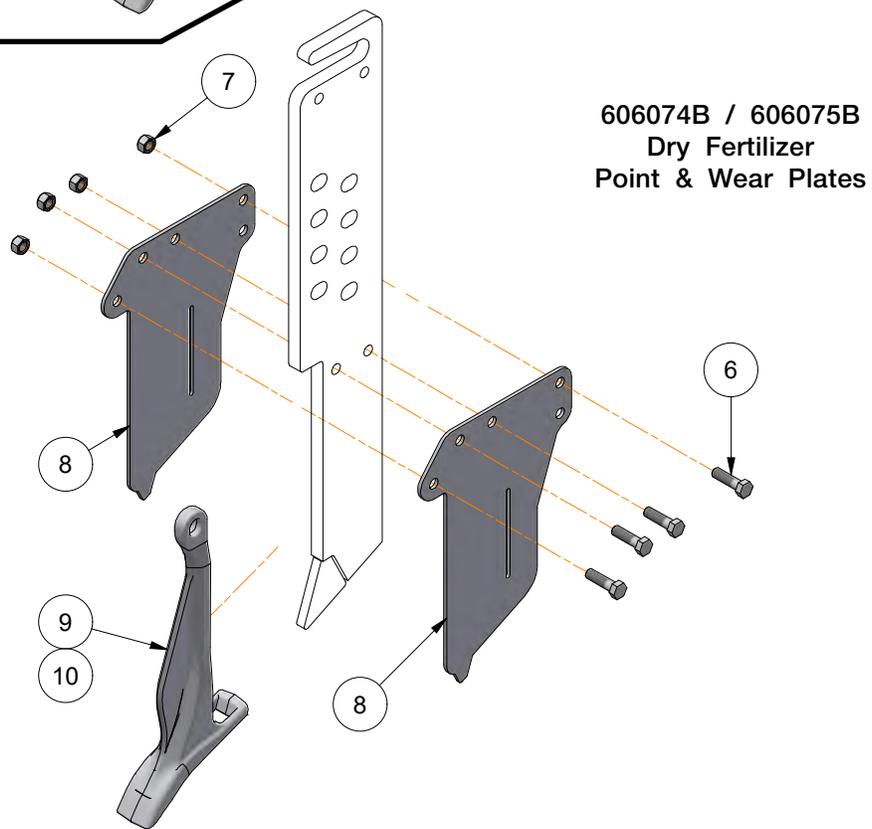
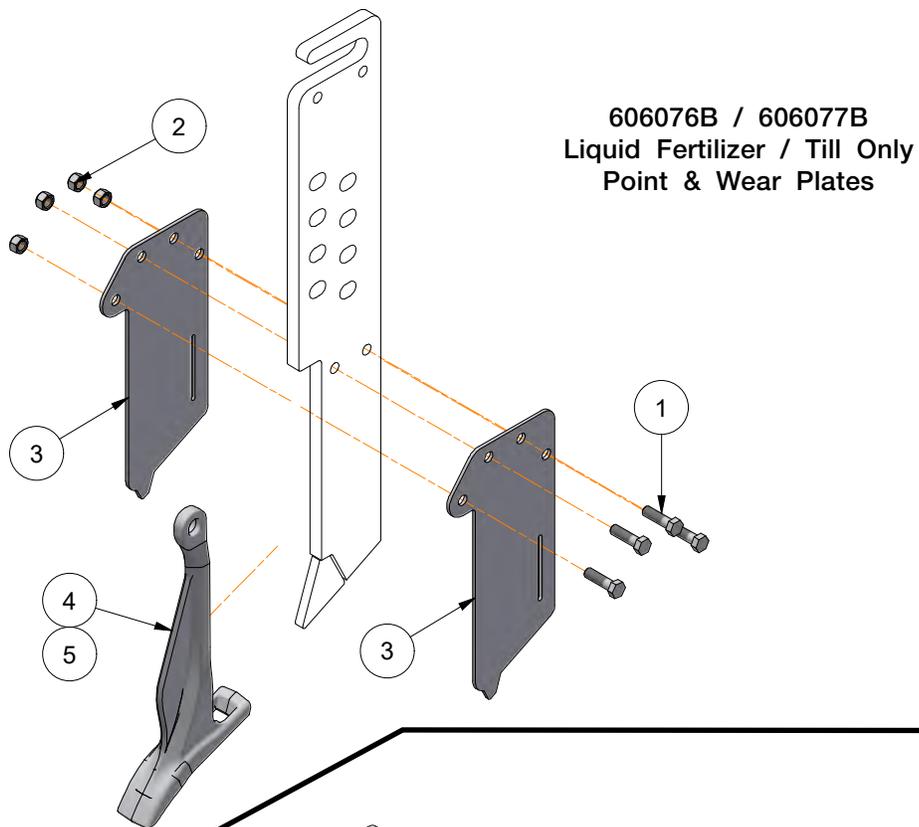
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	604265B	Shank Mount Bracket	1	
2	604266	Washer, 18GAx3 7/8"Dx1.06"D (Stainless Steel)	4	
3	604273	Pin 1.75"Dx5.06" (Machined)	1	
4	604282	Bent Pin 3/4"Dx6 5/16"	1	
5	604320B	Shank	1	
6	604829	Pin .75"Dx4 1/2"	1	
7	92199	Lock Nut 1"-8 UNC	1	
8	93426	Grease Zerk	1	
9	9390-101	Capscrew 1/2-13x1 1/2" UNC GR5	2	
10	9390-108	Capscrew 1/2-13x3 1/4" UNC GR5	3	
11	9390-191	Capscrew 1"-13x4" UNC GR5	1	
12	9503560	Retaining Ring 3/4" (Stainless Steel)	2	
13	9504571	Decal - Shank Depth	1	
14	95959	Hairpin Cotter 5/32"x2 15/16"	1	
15	96976-034	Locknut/Thin 7/8"-9 UNC	1	
16	9800	Locknut, Top 1/2"-13 UNC	5	

3-POINT RAPTOR — Parts

Point / Wear Plate Kits

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Point / Wear Plate Kits

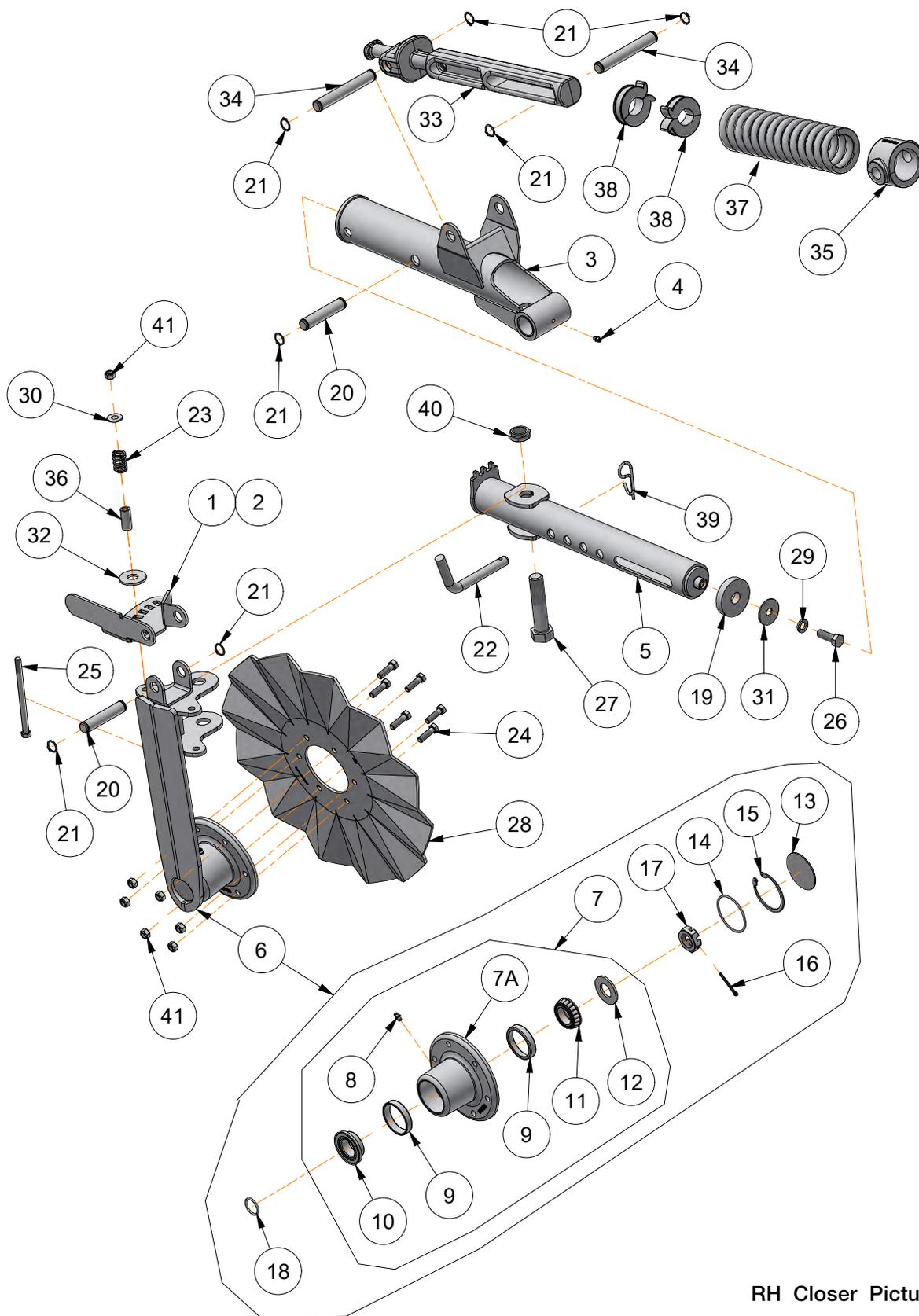
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	606076B	Liquid Fertilizer / Till Only Point & Wear Plates	1	Items 1-4
	606077B	Liquid Fertilizer / Till Only Point & Wear Plates		Items 6-8 & 10
1	9390-102	Capscrew 1/2"x1 3/4" UNC GR5	4	
2	9800	Locknut, Top 1/2"	4	
3	606024B	Terrain Pro 2 Wear Plate (DT)	2	
4	604911SM	Terrain Pro 2 Strip-Till Point Casting (ADI)	1	Silver Mist
5	605148B	Terrain Pro 2 Strip-Till Point Casting (White Chrome)	1	Black
	606074B	Dry Fertilizer Point & Wear Plates	1	Items 6-9
	606075B	Dry Fertilizer Point & Wear Plates		Items 6-8 & 10
6	9390-102	Capscrew 1/2"x1 3/4" UNC GR5	5	
7	9800	Locknut, Top 1/2"	5	
8	606068B	Terrain Pro 2 Wear Plate (LT/ST)	2	
9	604911SM	Terrain Pro 2 Strip-Till Point Casting (ADI)	1	Silver Mist
10	605148B	Terrain Pro 2 Strip-Till Point Casting (White Chrome)	1	Black

3-POINT RAPTOR — Parts

Closing Coupler Components

Please visit www.unverferth.com/parts/ for the most current parts listing.



RH Closer Pictured

3-POINT RAPTOR — Parts

Closing Coultter Components

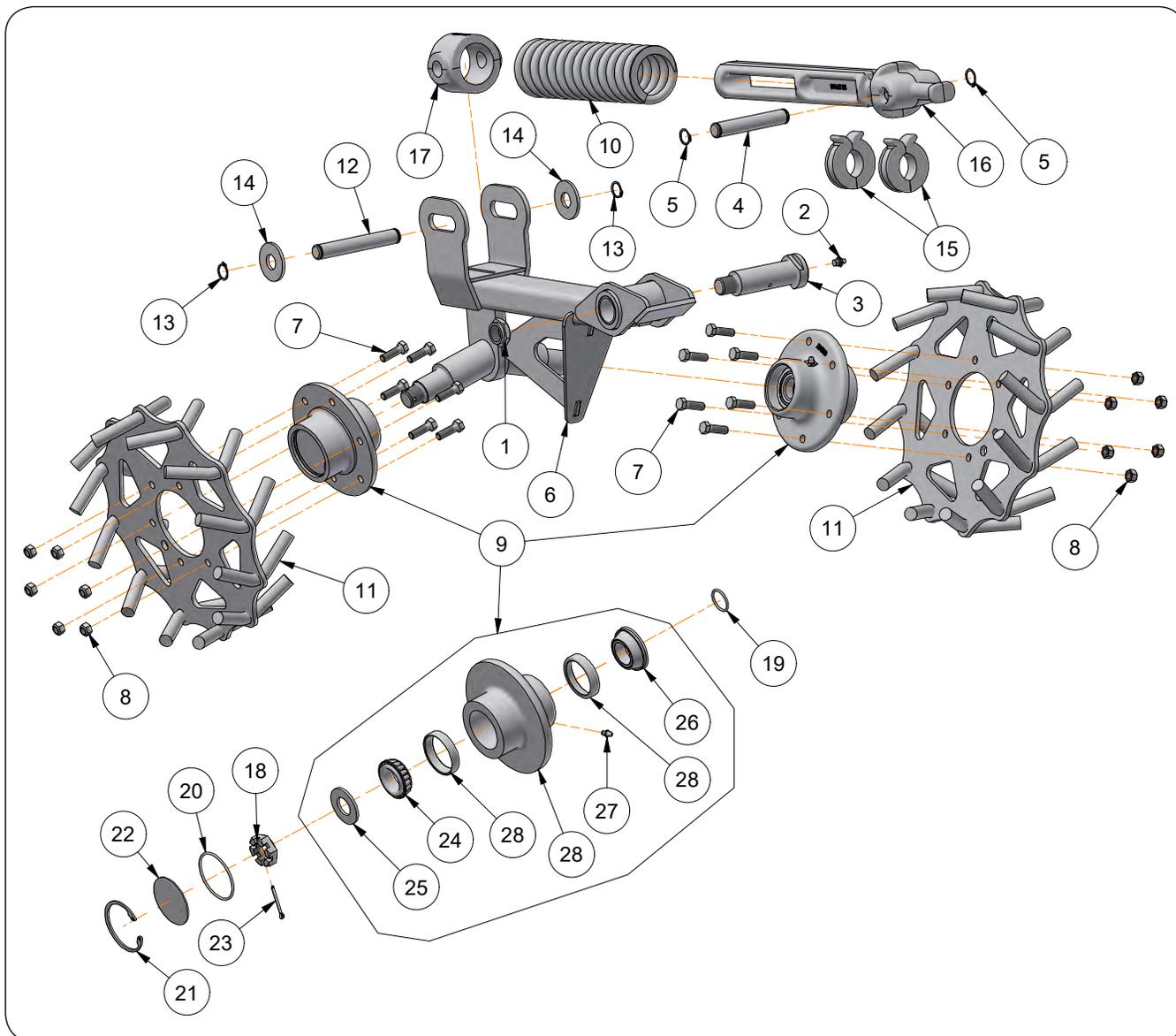
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	604002B	RH Sealer Angle Bracket	1	
2	604003B	LH Sealer Angle Bracket	1	Not Pictured
3	604280B	Sealer Arm Housing	1	
4	91160	Grease Zerk	1	
5	604285B	Sealer Arm Slider	1	
6	604294B	Sealer Post Weldment	1	Includes Items 7-18
7	603081B	Hub 6 Bolt Assembly	1	Includes Items 7A-12
7A	603083	Hub 6 Bolt (Machined) Casting	1	
8	91160	Grease Zerk	1	
9	9345	Bearing Cup #LM67010	2	
10	901145	Bearing And Seal Assembly	1	
11	9165	Bearing Cone #LM67048	1	
12	94800	Bushing	1	
13	60735	Hub Cap	1	
14	902158	O-Ring 2.487" Id	1	
15	93985	Retaining Ring 2 9/16	1	
16	9391-025	Cotter Pin 1/8"x1 1/2"	1	
17	94795	Slotted Jam Nut 1"-14UNS	1	
18	95565	O-Ring 1.049" ID	1	
19	604290	UHMW Guide 2.5"Dx1/2"	1	
20	604600	Pin 3/4"Dx3 5/8"	1	
21	9503560	Stainless Retaining Ring	6	
22	84979	Bent Pin 5"x8"Dx4" Grip	1	
23	9504248	Compression Spring	1	
24	9390-056	Capscrew 3/8"x1 1/4" UNC GR5	6	
25	9390-070	Capscrew 3/8"x5 1/2" UNC GR5	1	
26	9390-101	Capscrew 1/2"x1 1/2" UNC GR5	1	
27	9390-172	Capscrew 7/8"x4" UNC GR5	1	
28	93931	Coulter Blade, 17"D 13 Wave	1	
29	9404-025	Lock Washer 1/2"	1	
30	9405-076	Flat Washer 3/8" USS	1	
31	9405-090	Flat Washer 1/2" Type B (Wide)	1	
32	9405-100	Flat Washer 5/8" Uss	1	
33	604473B	Spring Guide Casting	1	
34	604345	Pin 3/4"Dx5 1/8"	2	
35	604474B	U-Joint Casting	1	
36	604606B	Tube 5/8"Dx.407"Dx1 7/16"	1	
37	9503079B	Compression Spring 3"x10.31"	1	
38	9504667	3/4" Stroke Control	2	
39	9504901	Twist Clip	1	
40	96976-034	Locknut/Thin 7/8"-9 UNC	1	
41	9928	Lock Nut, Top 3/8"-16 UNC	7	

3-POINT RAPTOR — Parts

Crowfoot Conditioner Wheel

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Crowfoot Conditioner Wheel

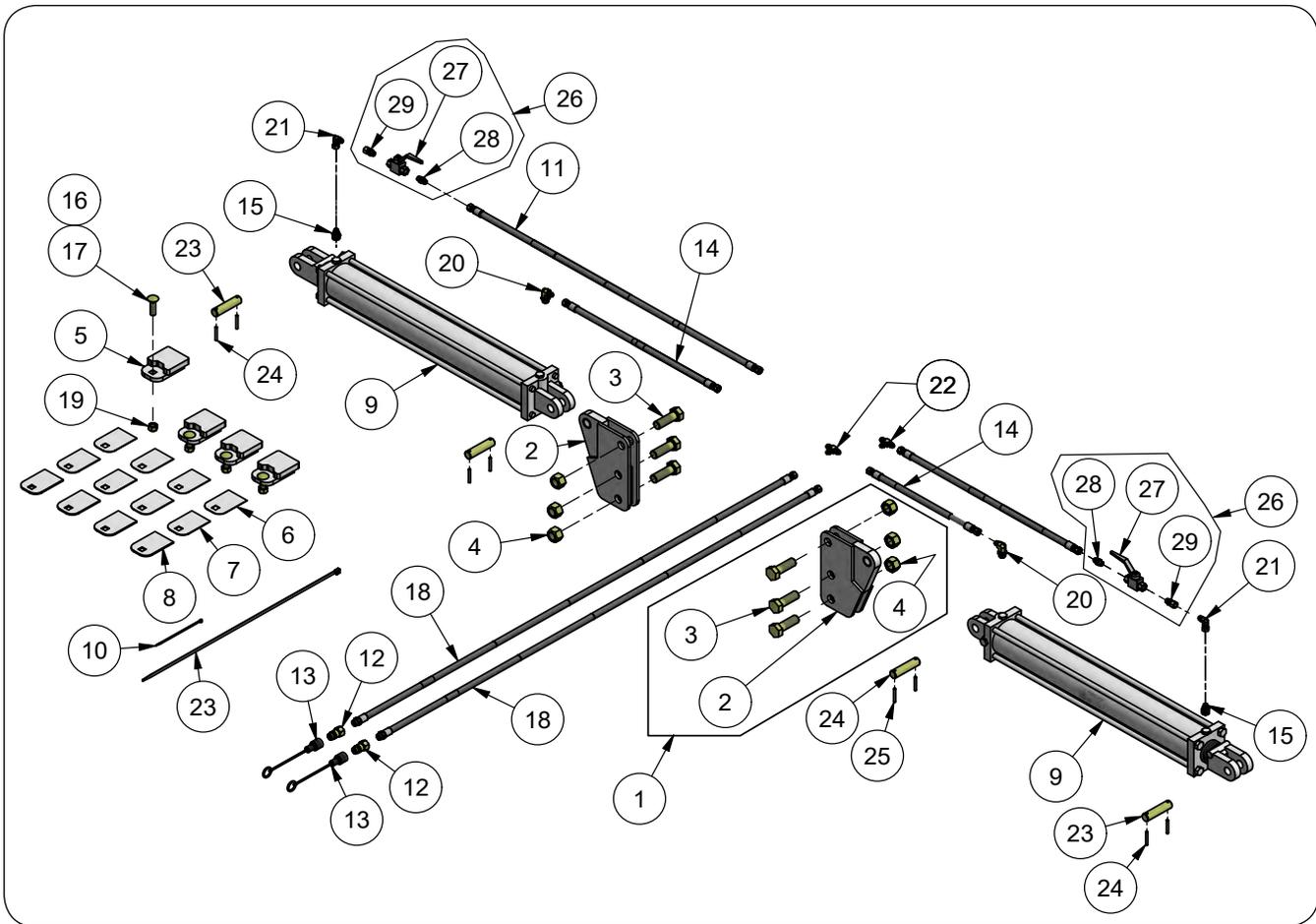
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	96976-034	Locknut, Thin 7/8"-9 UNC	1	
2	93426	Grease Zerk	1	
3	604273	Pin 1 3/4"Dx5.06" (MACHINED)	1	
4	604829	Pin 3/4"Dx4 1/2"	1	
5	9503560	Stainless Retaining Ring	2	
6	604386B	Crowfoot Conditioner Wheel Assembly	1	Includes Items 7-28
7	9390-056	Capscrew 3/8"x1 1/4" UNC GR5	12	
8	9928	Top Lock 3/8"	12	
9	64828	Hub 6 Bolt Assembly	2	Includes Items 24-28
10	9503079B	Spring	1	
11	604270B	Crowfoot Conditioning Wheel	2	
12	604345	Pin 3/4"Dx5 1/8"	1	
13	903145-018	Retaining Ring	2	
14	9405-106	Flat Washer 3/4" USS	2	
15	9504667	3/4" Stroke Control	2	
16	604473B	Spring Guide Casting	1	
17	604474B	U-Joint Casting	1	
18	94795	Slotted Jam Nut 1"-14 UNS	2	
19	95565	O-Ring 1.049" Id	2	
20	902158	O-Ring 2.487" Id	2	
21	93985	Retaining Ring 2 9/16"	2	
22	60735	Hub Cap	2	
23	9391-025	Cotter Pin 1/8"x1 1/2"	2	
24	9165	Bearing Cone #LM67048	1	
25	94800	Bushing	1	
26	901145	Bearing And Seal Assembly	1	
27	91160	Grease Zerk	1	
28	9345	Bearing Cup #LM67010	2	

3-POINT RAPTOR — Parts

Folding Hydraulic Components — 8 Shank

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Folding Hydraulic Components — 8 Shank

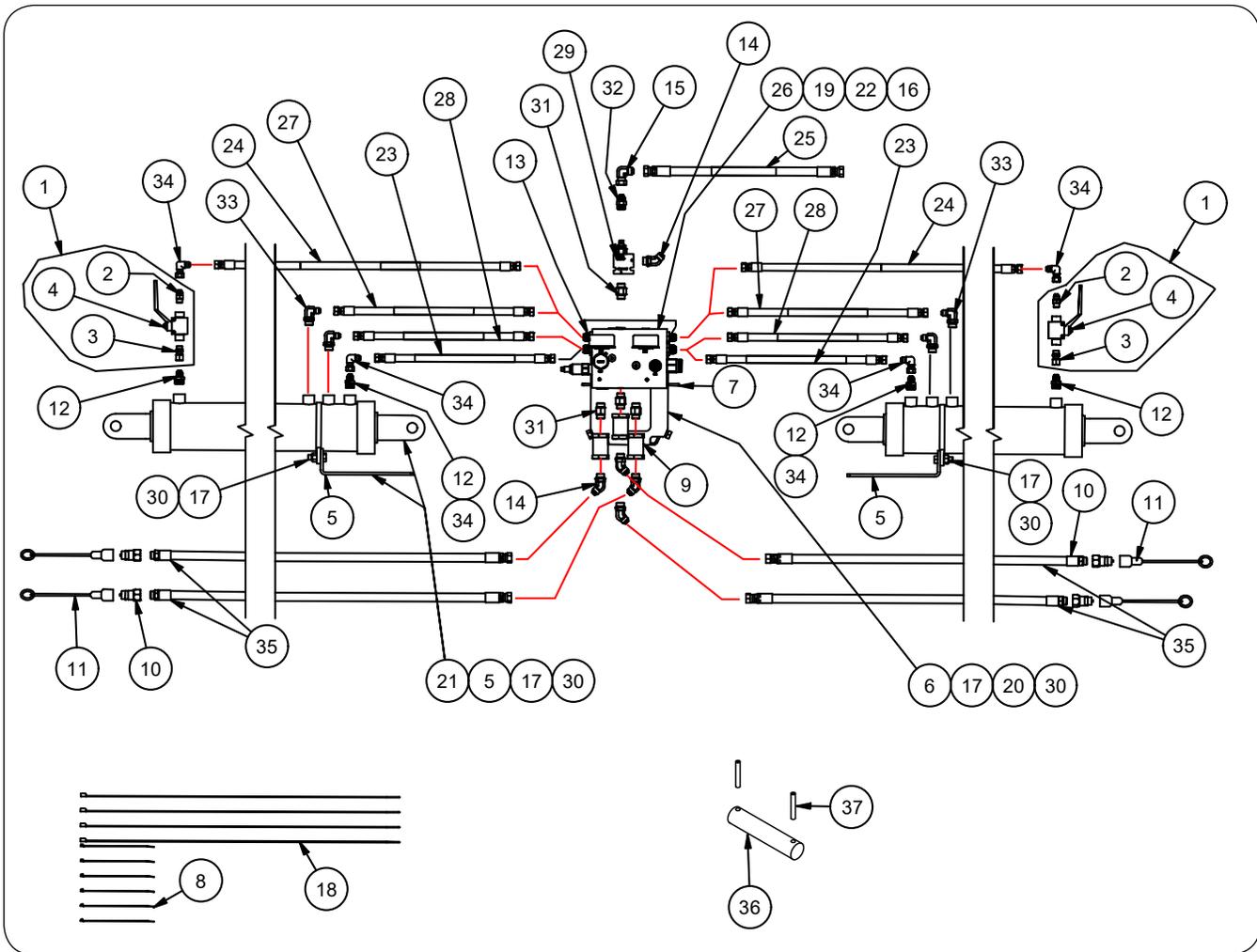
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	69055B	Hydraulic Rigid Wing Fold Package	-	Includes Items 1-23
1	68410B	Cylinder Mount Assembly (Not Shown)	2	Includes items 2-4
2	68408B	Cylinder Mount Weldment	1	
3	9390-187	Capscrew 1"-8UNC x 3" GR5	3	
4	9663	Top/Locknut 1"-8UNC	3	
5	68484B	Shim Weldment =Black=	4	
6	68815B	Shim 14Ga. x 3" x 4 1/2"	4	
7	68816B	Shim 12Ga. x 3" x 4 1/2"	4	
8	68817B	Shim 7Ga. x 3" x 4 1/2"	4	
9	69056B	Cylinder Assembly (4"x30")	2	
	73759B	Cylinder Stop	-	
	9399-057	Set Screw 1/4"-20UNC x 1/4" Cup Point	-	
10	9000106	Cable Tie 7 1/2"	4	
11	9002976	Hose 3/8" x 57" (9/16"-18 JIC Female Swivel x 9/16"-18 JIC Female Swivel)	2	
12	91383	Male Tip Coupling 3/4"-16	2	
13	91511	Dust Cap/ISO Coupler	2	
14	9502793	Hose 3/8" x 28" (9/16"-18 JIC Female Swivel x 9/16"-18 JIC Female Swivel)	2	
15	91608	Adapter 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	2	.060 "Restrictor
16	9388-136	Carriage Bolt 5/8"-11UNC x 2 1/4" GR5	2	
17	9388-138	Carriage Bolt 5/8"-11UNC x 2 3/4" GR5	2	
18	9502772	Hose 3/8" x 72" (9/16"-18 JIC Female Swivel x 3/4"-16 O-Ring Male)	2	
19	9801	Top Locknut 5/8"-11UNC	4	
20	9874	90° Elbow 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	2	
21	9876	90° Elbow 9/16"-18 JIC Male x 9/16"-18 JIC Female Swivel Nut	2	
22	9875	Tee 9/16"-18 JIC Male x 9/16"-18 JIC Male x 9/16"-18 JIC Male	2	
23	94038	Cable Tie 32"	4	
24	85631	Pin 1" Dia. x 4"	4	
25	91144-165	Spiral Pin 1/4" Dia. x 1 7/8"	8	
26	603844	Hydraulic Wing Lockout Kit	1	Includes items 26-28
27	9501014	Ball Valve	2	
28	9001495	Adapter, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2	
29	9002446	Adapter, 9/16"-18 O-Ring Male x 9/16"-18 JIC Female	2	

3-POINT RAPTOR — Parts

Folding Hydraulic (Option) — 8 Shank — with Optional Flex Folding Hydraulic Kit

Please visit www.unverferth.com/parts/ for the most current parts listing.



ITEM	PART NO.	DESCRIPTION	FLEX HYD	NOTES
	68669B	Hydraulic Flex Wing Fold Package	1	Includes items 5-35
1	603844	Hydraulic Wing Lockout Kit	1	Includes items 2-4
	2	9001495 Adapter, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2	
	3	9002446 Adapter, 9/16"-18 O-Ring Male x 9/16"-18 JICF		
	4	9501014 Ball Valve		
5	68506B	Cylinder Anti-Rotational Plate	2	
6	68553B	Valve Mount Plate	1	
7	68693B	Support Bracket	1	
8	9000106	Cable Tie 7 1/2"	6	
9	9005403	120 Micron Hydraulic Filter	4	

3-POINT RAPTOR — Parts

Folding Hydraulic (Option) — 8 Shank — with Optional Flex Folding Hydraulic Kit

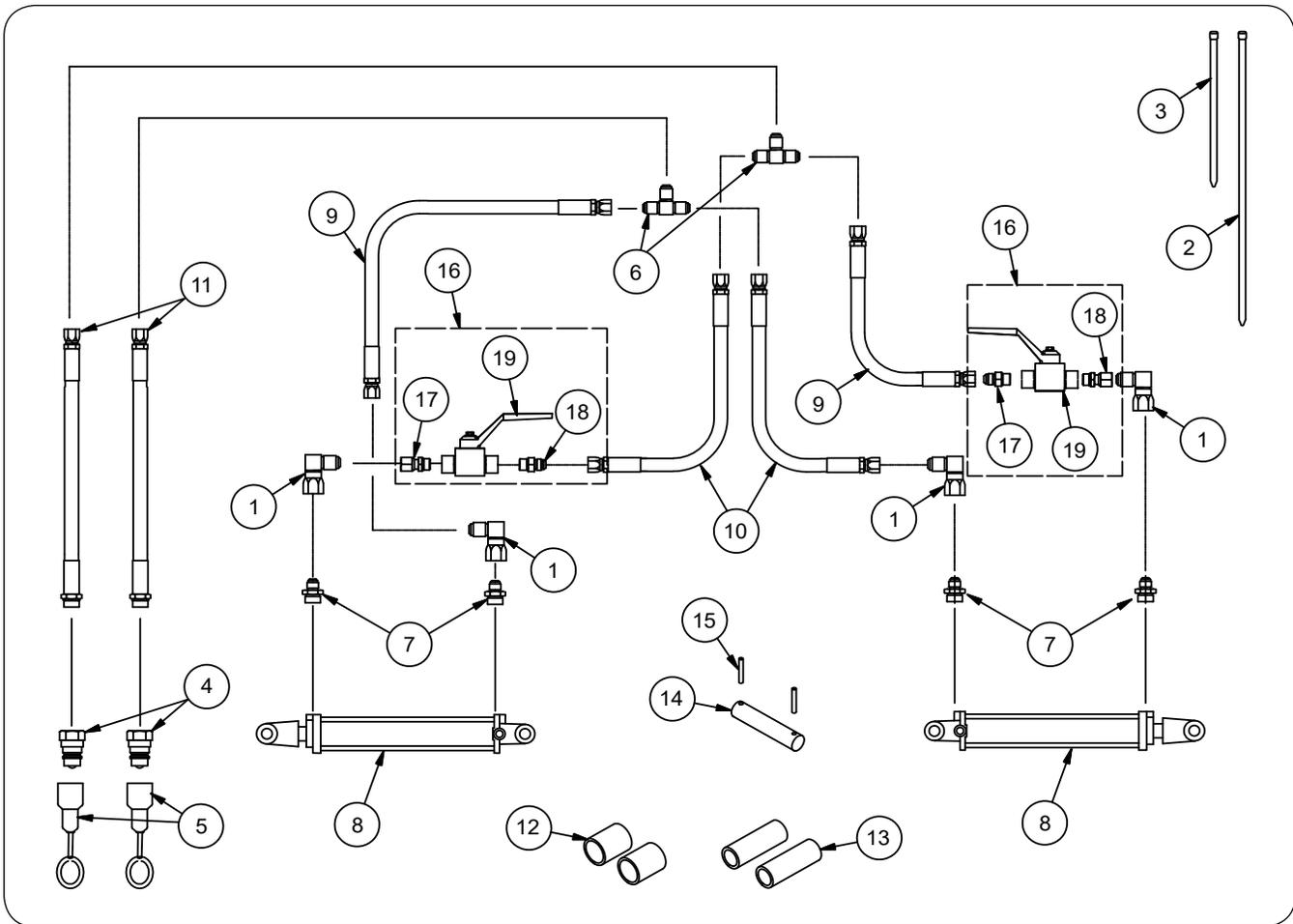
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	FLEX HYD	NOTES
10	91383	Male Tip Coupling	4	
11	91511	Dust Cap	4	
12	91608	Adapter 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	4	.060" Restrictor
13	92927	Adapter 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	4	
14	93586	45° Elbow 3/4"-16 JIC Male x 3/4"-16 O-Ring Male	5	
15	93683	Elbow 90°	1	
16	9390-055	Capscrew 3/8"-16UNC x 1" Gr5	4	
17	9390-101	Capscrew 1/2"-13UNC x 1 1/2" Gr5	6	
18	94038	Cable Tie 32"	4	
19	9404-021	Lock Washer 3/8"	4	
20	9405-088	Flat Washer 1/2" USS	2	
21	9501547	Hydraulic Cylinder 4" x 30" (Twin)	2	
22	9501659	Hydraulic Reducer 9/16"-18 Male O-Ring x 7/16"-20 Female O-Ring	2	
23	9501699	Hydraulic Hose 3/8" Dia. x 18" 9/16"-18 JCIF Swivel	2	
24	9501700	Hydraulic Hose 3/8" x 48" 9/16"-18 JCIF Swivel	2	
25	9502790	Hydraulic Hose 1/2"x20" 3/4"JICF Swivel	1	
26	9503620	Valve Assembly	1	
27	9503641	Hydraulic Hose 3/8" x 20" 9/16"-18 JCIF Swivel	2	
28	9503721	Hydraulic Hose 3/8" x 18" 9/16"-18 JCIF Swivel	2	
29	9505147	Valve Assembly - Relief, Preset To 850 Psi	1	
30	9800	Top Locknut 1/2"-13UNC	6	
31	98508	Adapter/Union	4	
32	9864	Adapter 3/4"-16 JICM	1	
33	9874	90° Elbow 9/16"-18 JICM x 3/4"-16 O-Ring Male	4	
34	9876	90° Elbow 9/16"-18 JICM x 9/16"-18 JICF Swivel	4	
35	98852	Hydraulic Hose 1/2"x72" 3/4"-16 JICF Swivel x 3/4"-16 O-Ring Male	4	
37	85631	Pin 1" Dia. x 4"	4	
39	91144-165	Spiral Pin 1/4" Dia. x 1 7/8"	8	

3-POINT RAPTOR — Parts

Folding Hydraulic Components — 12 Shank 30" Spacing

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Folding Hydraulic Components — 12 Shank 30" Spacing

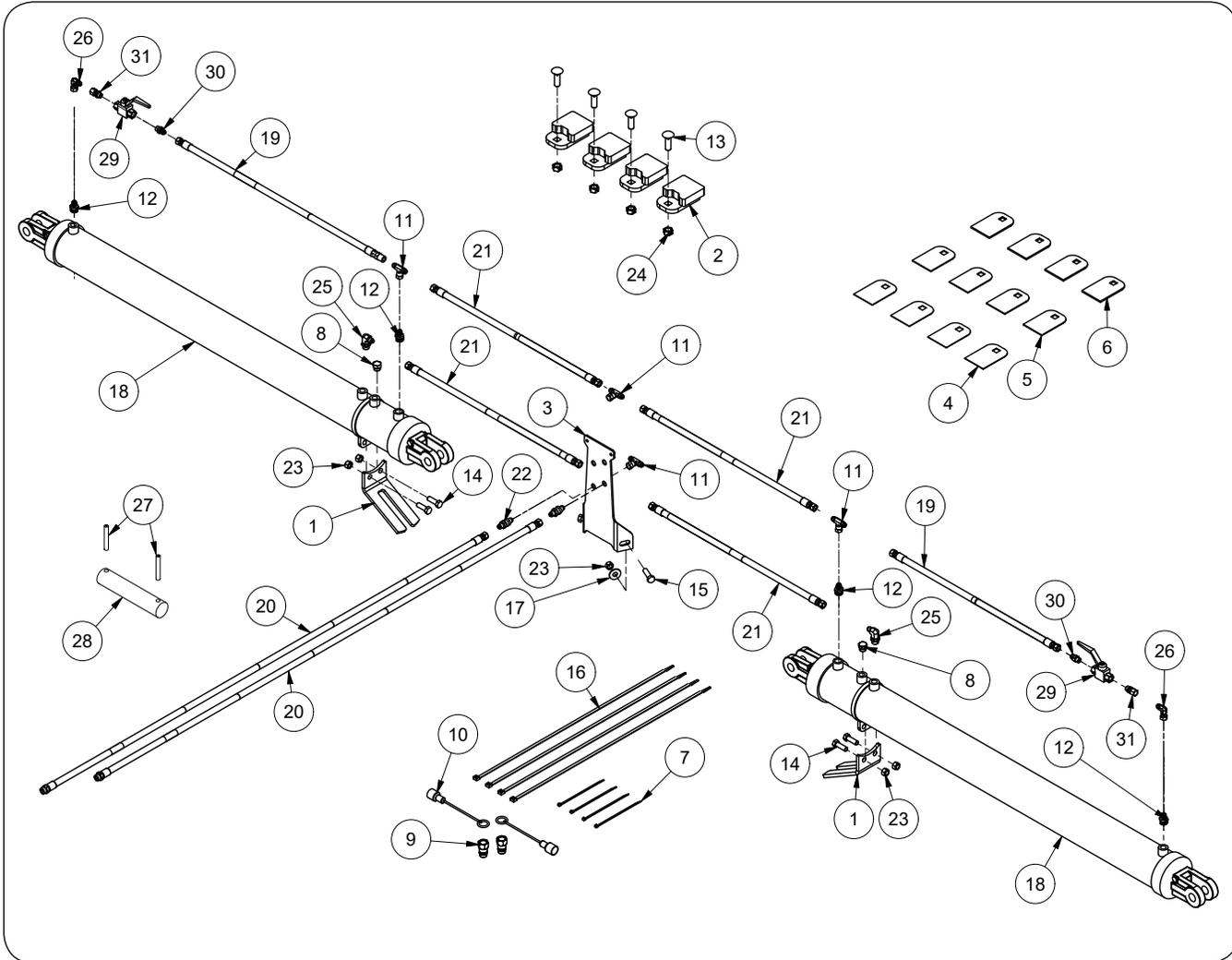
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY.	NOTES	
	63267	Hydraulic Parts Bundle		Includes Items 1-14	
1	9876	90° Swivel Elbow (9/16"-18 JIC Male x 9/16"-18 JIC Female)	4		
2	94038	Cable Tie 32" Long	4		
3	9000106	Cable Tie 6" Long	4		
4	91383	Male Tip Coupling 3/4"-16	2		
5	91511	Dust Cap	2		
6	9875	Tee (9/16"-18 JIC Male x 9/16"-18 JIC Male x 9/16"-18 JIC Male)	2		
7	91608	Orifice Connector (9/16"-18 JIC Male x 3/4"-16 Male)	4	.060 Restrictor	
8	95419	Hydraulic Cylinder 4" x 24"	2		
9	9502776	Hydraulic Hose 3/8"D x 32" Long (9/16"-18 JIC Female x 9/16-18 JIC Female)	2		
10	9501701	Hydraulic Hose 3/8"D x 63" Long (9/16-18 JIC Female x 9/16-18 JIC Female)	2		
11	9502772	Hydraulic Hose 3/8"D x 72" Long (9/16-18 JIC Female x 3/4-16 Male)	2		
12	64428	Bushing - Spacer	2		
13	65284	Bushing	2		
14	91144-165	Spiral Pin 1/4" Dia. x 1 7/8" Long	8		
15	85631	Pin 1" Dia. x 4" Long	4		
16	603844	Hydraulic Wing Lockout Kit	1	Includes Items 17-19	
	17	9001495	Adapter, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2	
	18	9002446	Adapter, 9/16"-18 O-Ring Male x 9/16"-18 JIC Female	2	
	19	9501014	Ball Valve	2	

3-POINT RAPTOR — Parts

Folding Hydraulic Components — 12 Shank 36 & 38" Spacing

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Folding Hydraulic Components — 12 Shank 36 & 38” Spacing

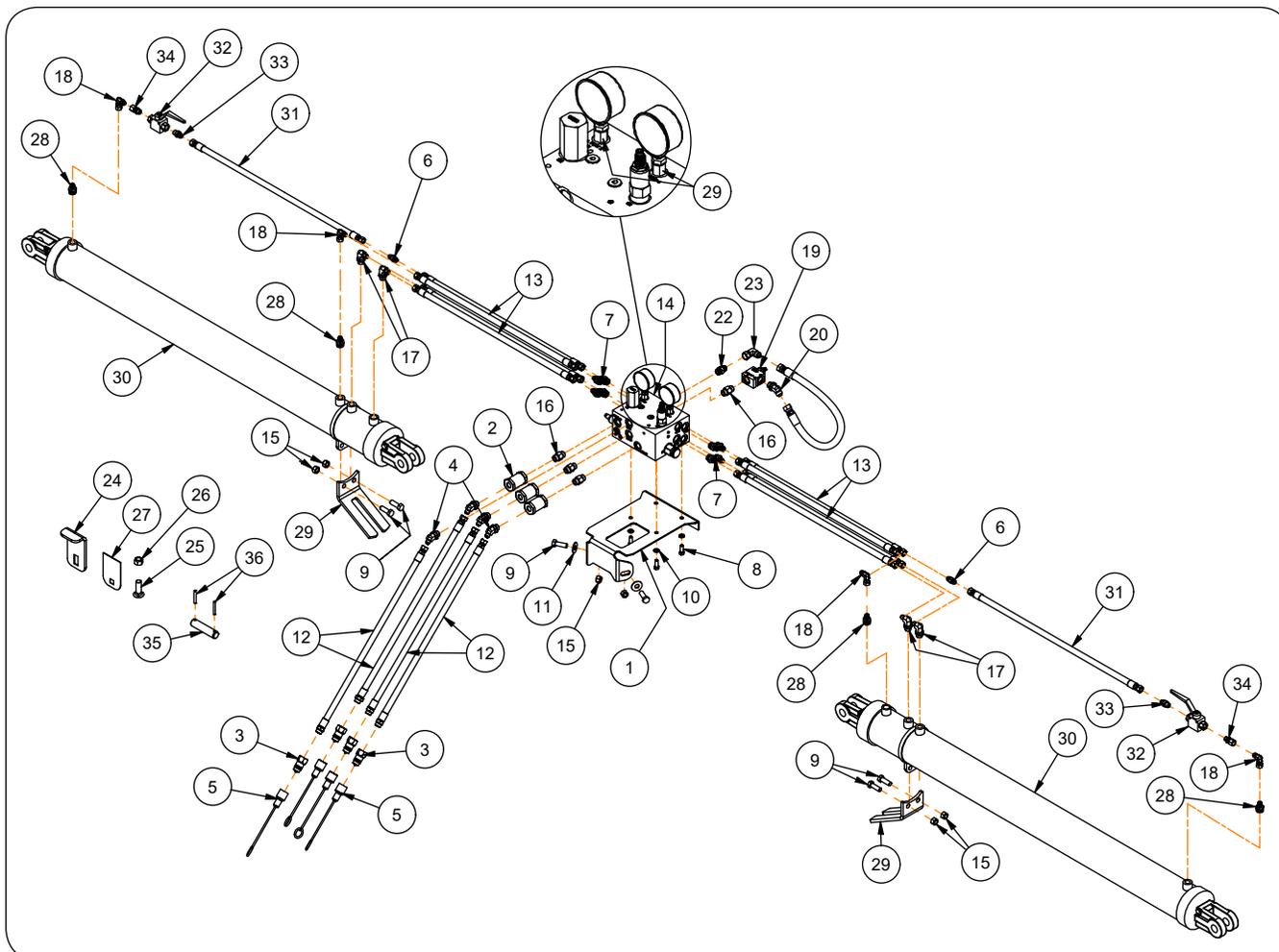
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	602007B	Hydraulic Parts Bundle		Includes Items 1-27
1	68276B	Cylinder Anti-Rotational Plate	2	
2	68337B	Stop Block	4	
3	68521B	Mounting Plate	1	
4	68815B	Shim 14 GA.	4	
5	68816B	Shim 12 GA.	4	
6	68817B	Shim 7 GA.	4	
7	9000106	Cable Tie 6” Long	4	
8	9003825	Breather Plug	2	
9	91383	Quick Disconnect	2	
10	91511	Dust Cap	2	
11	91525	Tee	4	
12	91608	Orifice Connector	2	
13	9388-135	Carriage Bolt 5/8”-11UNC x 2” GR5	4	
14	9390-101	Capscrew 1/2”-13UNC x 1 1/2” GR5	4	
15	9390-102	Capscrew 1/2”-13UNC x 1 3/4” Long	2	
16	94038	Cable Tie 32” Long	4	
17	9405-088	Flat Washer 1/2”	2	
18	9501464	Hydraulic Cylinder 4 x 48 (Twin)	2	
19	9501677	Hydraulic Hose 3/8” Dia. x 54” (9/16-18 JIC Female x 9/16-18 JIC Female)	2	
20	9502772	Hydraulic Hose 3/8”D x 72” (9/16-18 JIC Female x 3/4-16 O-Ring Male)	2	
21	9502793	Hydraulic Hose 3/8”D x 28” (9/16-18 JIC Female x 9/16-18 JIC Female)	4	
22	95192	Bulkhead Union 9/16-18 JIC Male x 9/16-18 JIC Male (with Nut)	2	
23	9800	Locknut 1/2”-13UNC	6	
24	95905	Locknut/Center 5/8”-11UNC	4	
25	9874	90° Elbow 9/16-18 JIC Male x 3/4-16 O-Ring Male	2	
26	9876	90° Swivel Elbow	2	
27	91144-165	Spiral Pin 1/4” Dia. x 1 7/8”	8	
28	85631	Pin 1” Dia. x 4”	4	
	603844	Hydraulic Wing Lockout Kit	1	Includes Items 30-32
29	9501014	Ball Valve	2	
30	9001495	Adapter, 9/16-18 JIC Male x 9/16-18 O-Ring Male	2	
31	9002446	Adapter, 9/16-18 O-Ring Male x 9/16-18 JIC Female	2	

3-POINT RAPTOR — Parts

Folding Hydraulic Components — 12 Shank 36 & 38" Spacing
— with Optional Flex Folding Hydraulic Kit (#601778B)

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Folding Hydraulic Components — 12 Shank 36 & 38" Spacing — with Optional Flex Folding Hydraulic Kit (#601778B)

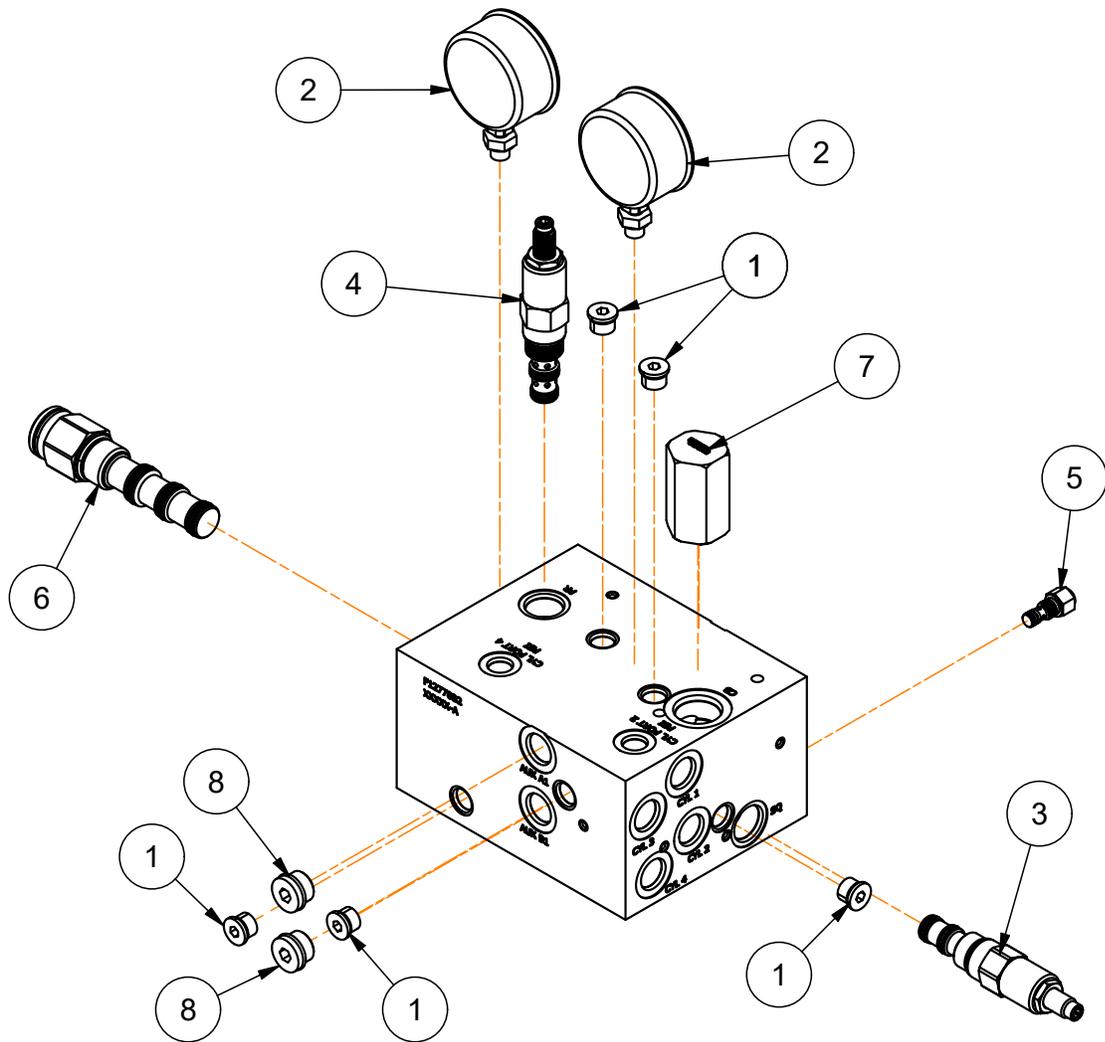
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	FLEX HYD	STD HYD	NOTES
1	68553B	Plate -Valve Mount	1		
2	9005403	120 Micron Hyd Filter	3		
3	91383	Male Tip Coupling 3/4"-16	2	2	
4	91508	Elbow - 45°	4		
5	91511	Dust Cap / ISO Coupler	2	2	
6	92295	Connector	2		
7	92927	Adapter 9/16"-18 JIC Male x 3/4"-16 ORB	8		
8	9390-055	Capscrew 3/8" x 1" UNC GR5	4		
9	9390-101	Capscrew 1/2" x 1 1/2" UNC GR5	2	4	
10	9404-021	Lock Washer 3/8"	4		
11	9405-088	Flat Washer 1/2" USS	2	2	
12	9502772	Hyd Hose 3/8" (9/16"JICF x 3/4"ORM x 72")	2	2	
13	9502793	Hyd Hose 3/8" (9/16"JICF x 9/16"JICF x 28")	4	4	
14	9503620	Valve Assembly - Floating Wing	1		
15	9800	Top Lock 1/2"	2	6	
16	98508	Fitting-Union Or 3/4"-16	3		
17	9874	Elbow 90° 9/16"-18 JIC	2	2	
18	9876	Elbow 9/16"-18 JIC M/F	2	2	
19	9505147	Valve Assembly - P.O. Relief, Preset To 850 Psi	1		
20	93586	Elbow 45°	1		
21	9502790	Hydraulic Hose 1/2" (3/4" JICF x 3/4" JICF x 20")	1		
22	9864	Adapter 3/4"-16 Jic Male	1		
23	93683	Elbow 90°	1		
24	605805B	Flex Frame Base Shim	4		
25	9388-135	Carriage 5/8" x 2" UNC GR5	4	4	
26	9801	Locknut/Top 5/8"-11UNC	4		
27	68815B	Shim	4	4	
28	94969	Adaptor 3/4"-16	1		
29	9501659	O-Ring Port Adaptor	2		
28	91608	Adapter 9/16"-18 JICM x 3/4"-16 W/.060 Restrictor		4	
29	68276B	Plate		2	
30	9501464	Hydraulic Cylinder 4" x 48" Twin		2	
31	9501677	Hydraulic Hose 3/8" (9/16" JICF x 9/16" JICF x 54")		2	
	603844	Hydraulic Wing Lockout Kit		2	
32	9501014	Ball Valve (SAE-6)		1	
33	9001495	Adapter 9/16"-18 JIC Male X 9/16"-18 ORB			
34	9002446	Adapter			
35	85631	Pin		4	
36	91144-165	Spiral Pin 1/4"D x 1 7/8"		8	

3-POINT RAPTOR — Parts

Valve Block Assembly Components

Please visit www.unverferth.com/parts/ for the most current parts listing.

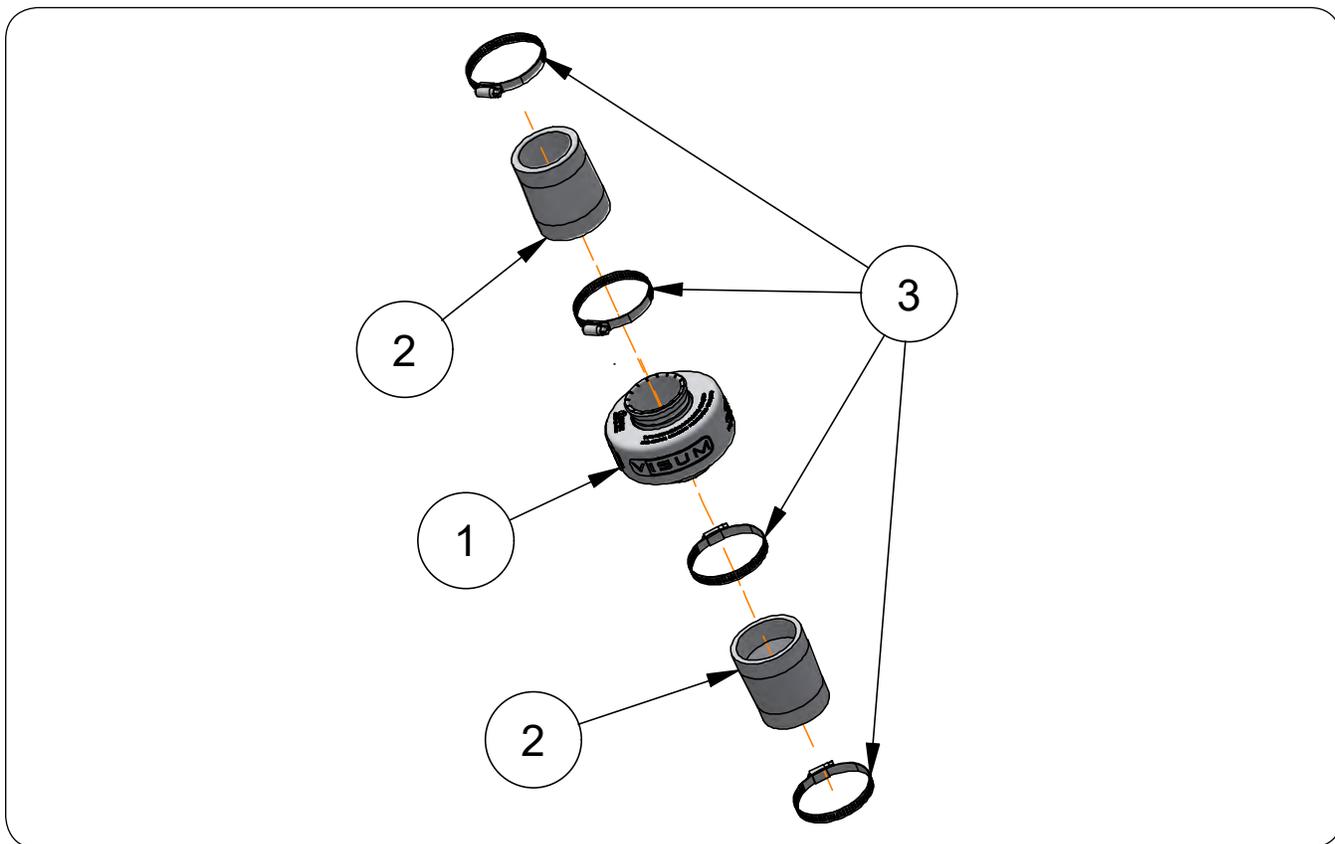


ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	9503620	Valve Block Assembly	-	
1	9003423	Plug, 9/16-18 O-Ring Male w/Hollow Hex Socket	5	
2	9500489	Pressure Gauge 2 1/2" Dia. (4000 PSI)	2	
3	9503654	Cartridge Valve - Sequence	1	
	9503660	Seal Kit for Cartridge Valve	-	
4	9503655	Cartridge Valve - Pressure Reduced Relief	1	
	9500116	Seal Kit for Cartridge Valve	-	
5	9503656	Cartridge Valve - Check Poppet	1	
	9503663	Seal Kit for Cartridge Valve	-	
6	9503661	Cartridge Valve - Piloted 3-Way Spool	1	
	9503662	Seal Kit for Cartridge Valve	-	
7	9503672	Cavity Plug	1	
8	98048	Plug, 3/4-16 O-Ring Male	2	

3-POINT RAPTOR — Parts

Row Blockage Sensor

Please visit www.unverferth.com/parts/ for the most current parts listing.

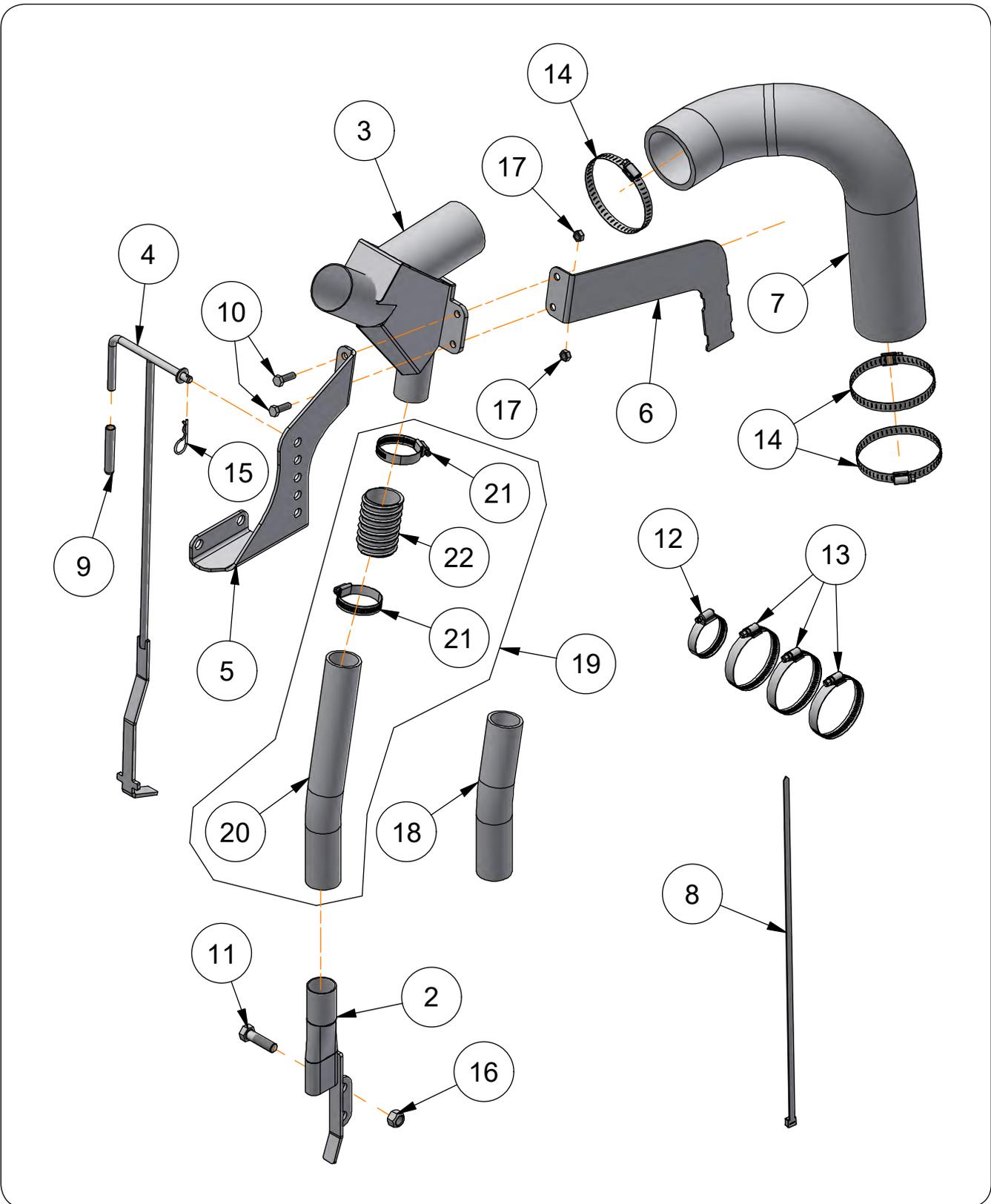


ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	9503825	Row Blockage System	1	
1	9003822	Fertilizer Sensor	1	
2	9503824	Coupler, 1.75"	2	
3	9503826	Hose Clamp (SS)	4	

3-POINT RAPTOR — Parts

Dry Fertilizer Kit Option

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Dry Fertilizer Kit Option

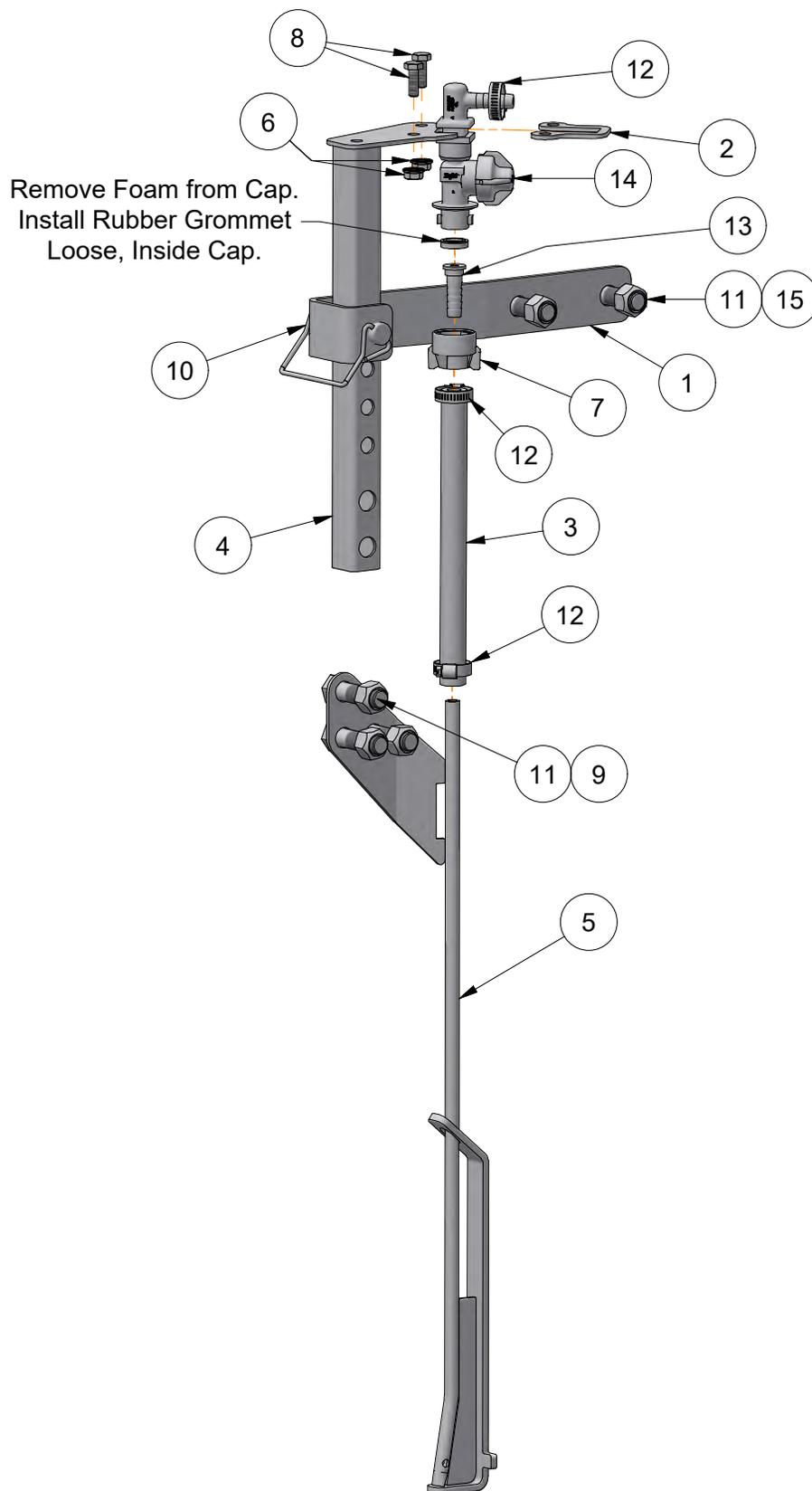
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	NOTES	47769B FOR USE WITH ROW BLOCKAGE SYSTEM	47770B FOR USE WITHOUT ROW BLOCKAGE SYSTEM
1	47751B	Dry Fertilizer Drop Kit	Includes Items 1-17	1	1
2	47709	Fertilizer Drop Tube Weldment		1	1
3	47718	Air Diffuser-Dry Fertilizer		1	1
4	47721	Fertilizer Height Deflector		1	1
5	47722B	Diffuser Mount Bracket		1	1
6	47741B	Exhaust Hose Bracket		1	1
7	47854	Air Seeder Hose 3" ID		1	1
8	9000104	Cable Tie 5/16" x 21 1/2" Or Similar		1	1
9	9003869	Hand Grip 3/8" x 2 3/4"		1	1
10	9390-030	Capscrew 5/16" x 1" UNC GR5		2	2
11	9390-102	Capscrew 1/2" x 1 3/4" UNC GR5		1	1
12	TA800920	2.5" Hose Clamp		1	1
13	9504974	Hose Clamp - 2 5/16"- 3 1/4"		3	3
14	9504977	Hose Clamp (SS) - 3 5/16"- 4 1/4"		3	3
15	9514	Hairpin Cotter .092"D x 1 7/8"		1	1
16	9800	Top Lock 1/2"		1	1
17	9807	Locknut Top 5/16"-18 GB		2	2
18	47716	Hose 1 1/2" Pvc Suction Hose		1	
19	47759	Hose Kit - Dry Fertilizer	Includes Items 20-22		1
20	47750	Hose 1 1/2" PVC Suction Hose			1
21	TA800920	2.5" Hose Clamp			2
22	47104	Flexible Pvc Hose 1 3/4"ID x 3"			1

3-POINT RAPTOR — Parts

Liquid Fertilizer Kit Option

Please visit www.unverferth.com/parts/ for the most current parts listing.



3-POINT RAPTOR — Parts

Liquid Fertilizer Kit Option

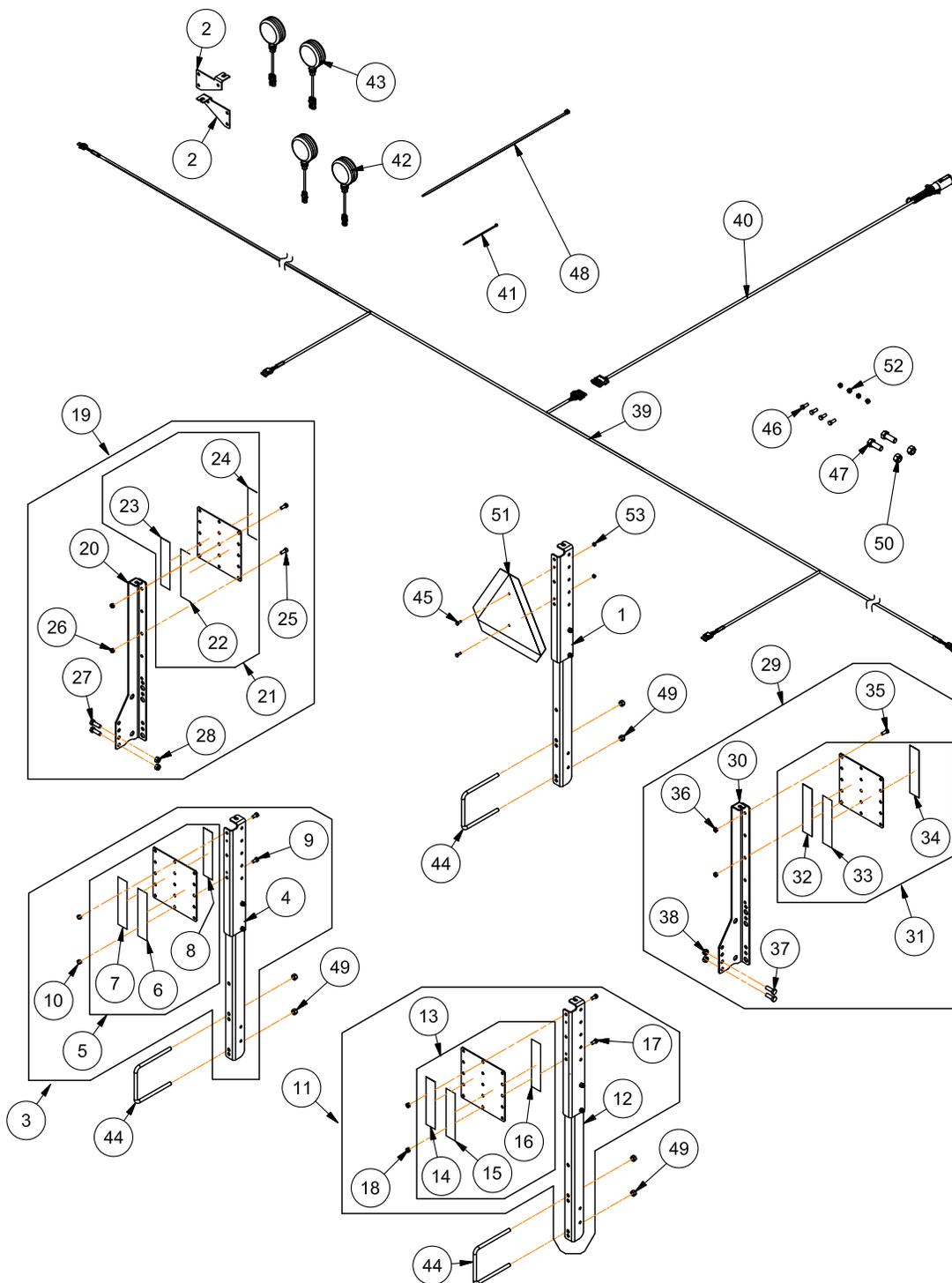
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	604856B	Liquid Fertilizer Kit		Includes Items 1-15
1	47252B	Fertilizer Mount Bracket	1	
2	603146	Plate	1	
3	604373	Hose 3/8" X 8" EPDM	1	
4	604378B	Liquid Fertilizer Adjustment Bracket	1	
5	604843	Liquid Fertilizer Tube Weldment	1	
6	9004720	Serrated Hex Flange Nut 1/4"-20 UNC (SS)	2	
7	9007736	Quick Nozzle Cap Assembly	1	
8	900900-003	Capscrew 1/4" x 3/4" UNC (SS)	2	
9	9390-102	Capscrew 1/2" x 1 3/4" UNC GR5	3	
10	96571	Lynch Pin 3/8"D x 2 1/2" Grip	1	
11	9800	Top Lock 1/2"	5	
12	TA800902	Hose Clamp - 7/8"	3	
13	TA865665	Shank - Hose	1	
14	TA880149	Nozzle Body-Single, 3/8" Elbow	1	
15	9390-101	Capscrew 1/2" x 1 1/2" UNC GR5	2	

3-POINT RAPTOR — Parts

Reflector & Lighting Components

Please visit www.unverferth.com/parts/ for the most current parts listing.



ITEM	PART NO.	DESCRIPTION	12W Shank 68963B	6/8/12N Shank 69054B
1	69664B	Formed Angle	1	2
2	68960B	Light Bracket	2	2

3-POINT RAPTOR — Parts

Reflector & Lighting Components

Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	12W Shank 68963B	6/8/12N Shank 69054B
3	N/A	Left-Hand Center Reflector Assembly	1	-
4	69664B	Formed Angle	1	-
5	68958B	Reflector Bracket	1	-
6	9003125	Decal, Fluorescent Orange	1	-
7	9003126	Red Reflector	1	-
8	9003127	Amber Reflector	1	-
9	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	2	-
10	9928	Lock Nut, 3/8"-16UNC	2	-
11	N/A	Right-Hand Center Reflector Assembly	1	1
12	69664B	Formed Angle	1	1
13	68958B	Reflector Bracket	1	1
14	9003125	Decal, Fluorescent Orange	1	1
15	9003126	Red Reflector	1	1
16	9003127	Amber Reflector	1	1
17	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	2	2
18	9928	Lock Nut, 3/8"-16UNC	2	2
19	N/A	Left-Hand Outer Reflector Assembly	1	1
20	68959B	Formed Angle	1	1
21	68958B	Reflector Bracket	1	1
22	9003125	Decal, Fluorescent Orange	1	1
23	9003126	Red Reflector	1	1
24	9003127	Amber Reflector	1	1
25	9390-055	Capscrew, 3/8"-16UNC x 1" G5	2	2
26	9928	Lock Nut, 3/8"-16UNC	2	2
27	9390-101	Capscrew, 1/2"-13UNC x 1-1/2" G5	2	2
28	9800	Lock Nut, 1/2"-13UNC	2	2
29	N/A	Right-Hand Outer Reflector Assembly	1	1
30	68959B	Formed Angle	1	1
31	68958B	Reflector Bracket	1	1
32	9003125	Decal, Fluorescent Orange	1	1
33	9003126	Red Reflector	1	1
34	9003127	Amber Reflector	1	1
35	9390-055	Capscrew, 3/8"-16UNC x 1" G5	2	2
36	9928	Lock Nut, 3/8"-16UNC	2	2
37	9390-101	Capscrew, 1/2"-13UNC x 1-1/2" G5	2	2
38	9800	Lock Nut, 1/2"-13UNC	2	2
39	69407	Wiring Harness	1	1
40	86466	Main Wiring Harness	1	1
41	9000106	Cable Tie 7 1/2"	8	8
42	9003876	Amber Round Light	2	2
43	9003877	Red Round Light	2	2
44	9005460	U-Bolt	3	4
45	9390-003	Capscrew, 1/4"-20UNC x 3/4" G5	2	2
46	9390-055	Capscrew, 3/8"-16UNC x 1" G5	4	4
47	9390-145	Capscrew, 3/4"-10UNC x 2" G5	4	4
48	94038	Cable Tie 32"	12	12
49	9800	Lock Nut, 1/2"-13UNC	6	8
50	9802	Lock Nut, 3/4"-10UNC	4	4
51	9829	SMV Emblem	1	1
52	9928	Lock Nut, 3/8"-16UNC	4	4
53	9936	Lock Nut, 1/4"-20UNC	2	2



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