



Seedbed Tillage

Raptor® Strip-Tillage Tool with TerrainPro® Row Units

Pull-Type Models

Tillage Only: 2030ST, 2015ST

Liquid Tank: 2030LT, 2015LT


Dry Tank: 2030DT, 2015DT

Serial Number A62580100 & Higher

Part No. 603224

PULL-TYPE 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 tongue extension frame as shown below.

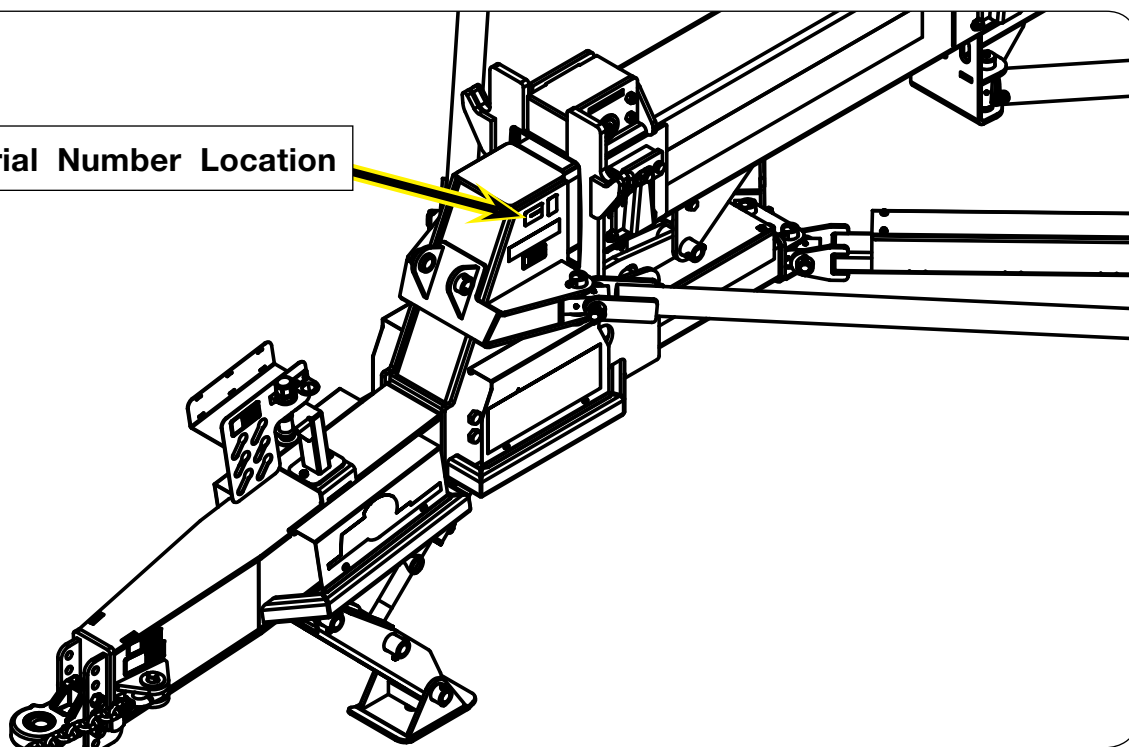
Purchase Date _____ Model _____ Serial No. _____

Dealer _____ City _____

Dealer Contact _____ Phone _____

FIG. 1

Serial Number Location



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.

Table Of Contents

Foreword2
Pre-Operation Checklist.....2
Product Information.....3

SECTION I
Safety

General Hazard Information 1-2
Safety Decals 1-3
Following Safety Instructions 1-4
Before Servicing or Operating 1-4
During Operation 1-5
Before Transporting 1-5
During Transport..... 1-5
Pressurized Oil 1-6
Preparing for Emergencies..... 1-7
Wearing Protective Equipment 1-7

SECTION II
Set Up

General Information..... 2-2
TerrainPro Row Units 2-3
Basic Set Up..... 2-6
 Hydraulic System..... 2-6
 Wheel/Tire Set Up 2-6
 Tire Pressure..... 2-6
 Wheel Nuts 2-6
 SMV Emblem & SIS Decal..... 2-6
 Transport Lighting and Markings 2-7
 Lamp Set Up 2-7
 Adjusting Cam Valves..... 2-8
Overhead Layouts..... 2-9

Table Of Contents

SECTION III
Operation

General Operation Information 3-2

Preparing Tractor..... 3-2

Preparing Raptor Tool 3-3

 Bolts And Nuts 3-3

 Pins..... 3-3

 Hydraulics 3-3

 Lubrication 3-3

 Tire Pressure 3-3

 Electrical Hook-Up 3-4

 Hydraulic Hook-Up..... 3-4

Transport Chain..... 3-5

Transporting..... 3-6

Unhitching From Tractor..... 3-7

Unfolding From Transport Position to Working Position 3-8

Folding From Working Position to Transport Position..... 3-9

Leveling Frame..... 3-10

 Side-To-Side Leveling 3-10

TerrainPro Row Unit..... 3-11

 Horizontal Adjustment (All Models)..... 3-11

 Shear-Bolt Replacement 3-12

 Lead Coulter 3-13

 Row Cleaners 3-14

 Depth Control Wheels..... 3-15

 Strip-Till Shank..... 3-16

 Closing Coulters..... 3-17

 Conditioners 3-19

Table Of Contents

SECTION IV
Maintenance

Lubrication Points..... 4-2
Purging Hydraulic System..... 4-7
Truss Rod Adjustment..... 4-8
Roller Assembly Replacement..... 4-9
TerrainPro Row Unit..... 4-14
 Point & Wear Plates Replacement..... 4-14
 Shear-Bolt Replacement 4-16
 Lead Coulter Spring Replacement..... 4-17
Hub Adjustment and Replacement
 For Lead Coulters and Closing Coulters..... 4-18
Replacing Bearings In Conditioner Rolling Harrow Baskets..... 4-22
Row Cleaner Wheel Hub Adjustment..... 4-23
Row Cleaner Wheel Replacement..... 4-25
Daily Service..... 4-26
 Beginning of Day 4-26
 End of Day..... 4-26
Annual Service..... 4-27
 Beginning of Season 4-27
 End of Season..... 4-27
Troubleshooting..... 4-28
 Poor Penetration 4-28
 Plugging..... 4-28
 Implement Running Crooked In Field..... 4-28
 Shanks Not Resetting Into Ground After Tripping 4-29
 Excessive Soil Disturbance..... 4-29
 Folding 4-29
Schematics - Electrical..... 4-30
Schematics - Hydraulic..... 4-31
Wheel, Hub and Spindle Disassembly and Assembly 4-40
Wheels and Tires..... 4-42
 Wheel Nut Torque..... 4-42
 Tire Pressure 4-42
 Tire Warranty 4-43
Complete Torque Chart..... 4-44
Hydraulic Fittings - Torque and Installation..... 4-46

Table Of Contents

SECTION V
Parts

Decals 5-2

Tongue, Hitches, Jack, & Hose Holder Components..... 5-4

Tongue Extension, Main Frame, Roller Assembly Components 5-6

Valve, Mounting Plate and Hardware Components 5-8

Latch Components 5-10

Parallel Components..... 5-12

Truss Components (Main Frame To Wings)..... 5-16

Inner Wing Components..... 5-18

Outer Wing Components 5-20

Inner Toolbar Components 5-22

Outer Toolbar Components..... 5-24

Toolbar Extension Components 5-26

Touch-Up Paint..... 5-27

Toolbar Fold and Latch Components..... 5-28

Gauge Wheel Components 5-30

Tillage Only Cart — Axle, Hubs & Wheel/Tire Components 5-32

Tillage Only Cart — Lighting and SMV Components..... 5-34

Tillage Only Cart — Frame and Toolbox Components..... 5-36

TerrainPro Row Unit — Lead Coulter & Row Cleaner Components..... 5-38

TerrainPro Row Unit — Row Cleaner Wheel Components..... 5-40

TerrainPro Row Unit — Depth Control Wheel Components 5-42

TerrainPro Row Unit — Parallel Arm Components..... 5-44

TerrainPro Row Unit — Shank Components..... 5-46

TerrainPro Row Unit — Closing Coulter Components 5-48

TerrainPro Row Unit — Conditioners & Extension Components 5-50

TerrainPro Row Unit — Press Wheel Conditioner Option..... 5-52

TerrainPro Row Unit — Rolling Harrow Basket Conditioner Option..... 5-54

Hydraulic Components — Jack..... 5-56

Hydraulic Components — Tractor To Supply Valve 5-57

Hydraulic Components — Supply Valve To Sequence Valves 5-59

Hydraulic Components — Supply Valve to Tongue Latch..... 5-61

Hydraulic Components — Supply Valve To Toolbar Latch 5-63

Hydraulic Components — Supply Valve To Toolbar Fold..... 5-65

Hydraulic Components — Supply Valve To Wings..... 5-67

Hydraulic Components — Supply Valve To Wing Tilt..... 5-68

Hydraulic Components — Supply Valve To Wing Tilt w/Counterbalance Kit..... 5-68

Hydraulic Components — Supply Valve To Gauge Wheels 5-70

Hydraulic Components — Supply Valve To Parallel Link/Main Lift-Lower 5-71

Electrical Components 5-73

Notes

SECTION I

Safety

General Hazard Information	1-2
Safety Decals	1-3
Following Safety Instructions	1-4
Before Servicing or Operating	1-4
During Operation	1-5
Before Transporting	1-5
During Transport.....	1-5
Pressurized Oil	1-6
Preparing for Emergencies.....	1-7
Wearing Protective Equipment.....	1-7

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.

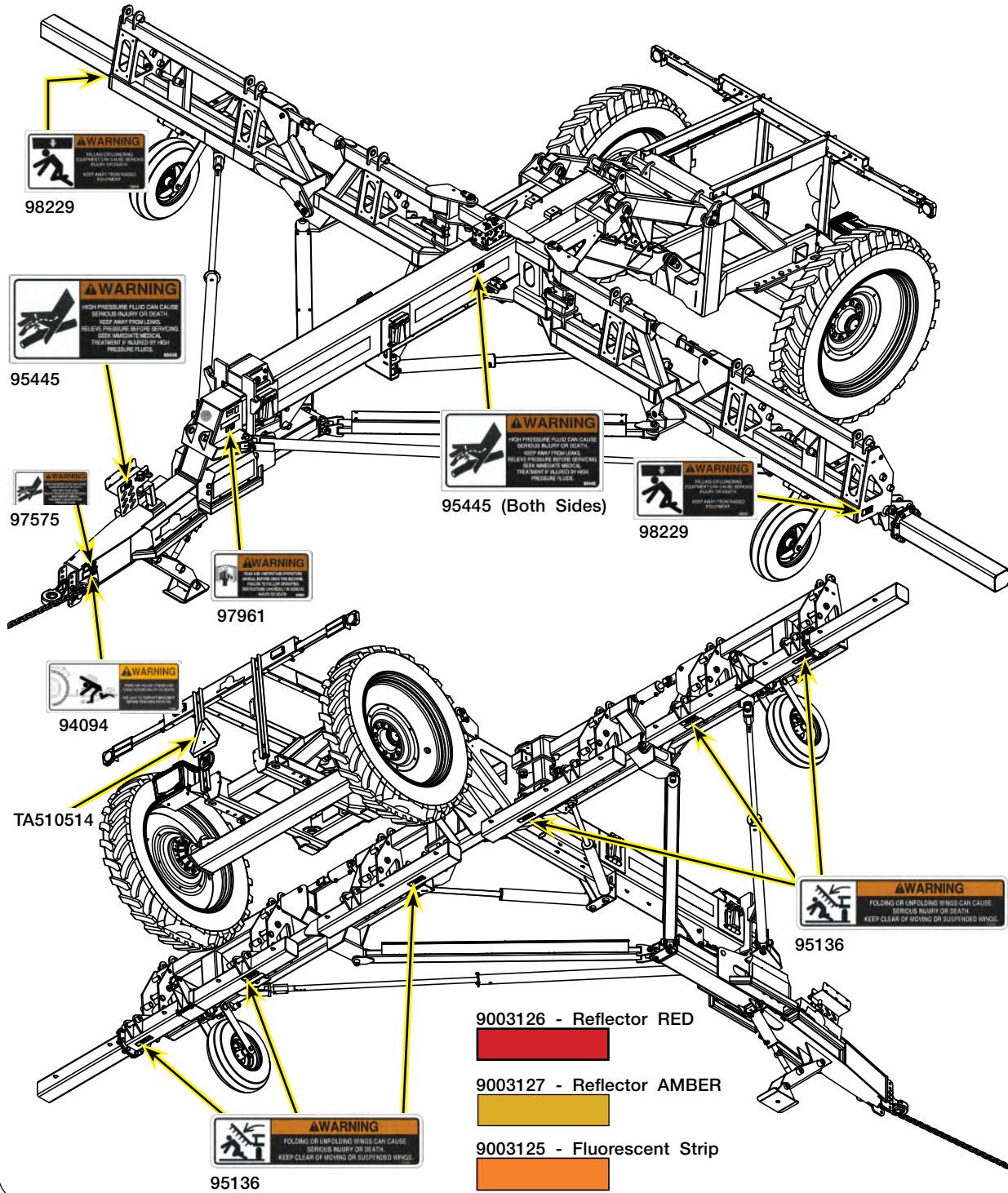


Is used for instruction on operating, adjusting, or servicing a machine.

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.



PULL-TYPE RAPTOR — Safety

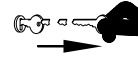
Following Safety Instructions

- 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.
- Hot parts can cause severe burns. Use caution when working around power system/ground engaging components. Allow parts to cool before servicing.

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


- Secure transport chains to towing vehicle before transporting. DO NOT transport without chains.
- 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. Make sure that the SMV emblem and SIS decal are visible to approaching traffic.

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.

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

SECTION II

Set Up

General Information.....	2-2
TerrainPro Row Units.....	2-3
Basic Set Up.....	2-6
Hydraulic System.....	2-6
Wheel/Tire Set Up.....	2-6
Tire Pressure.....	2-6
Wheel Nuts.....	2-6
SMV Emblem & SIS Decal.....	2-6
Transport Lighting and Markings.....	2-7
Lamp Set Up.....	2-7
Adjusting Cam Valves.....	2-8
Overhead Layouts.....	2-9

General Set Up Information

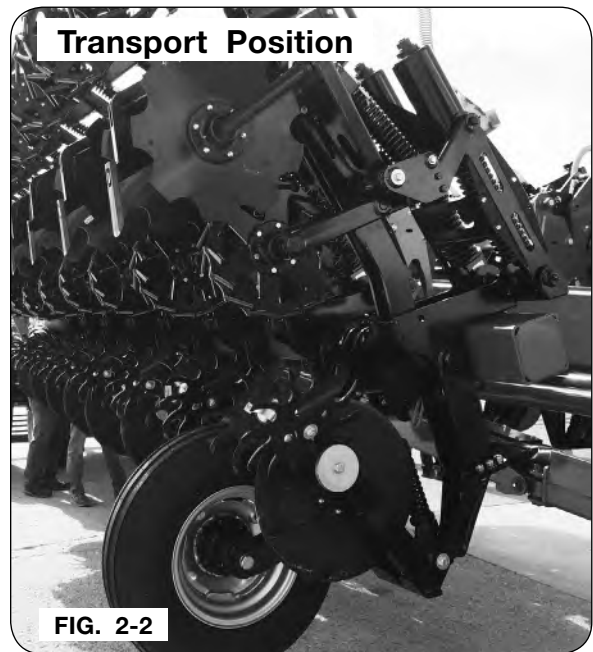
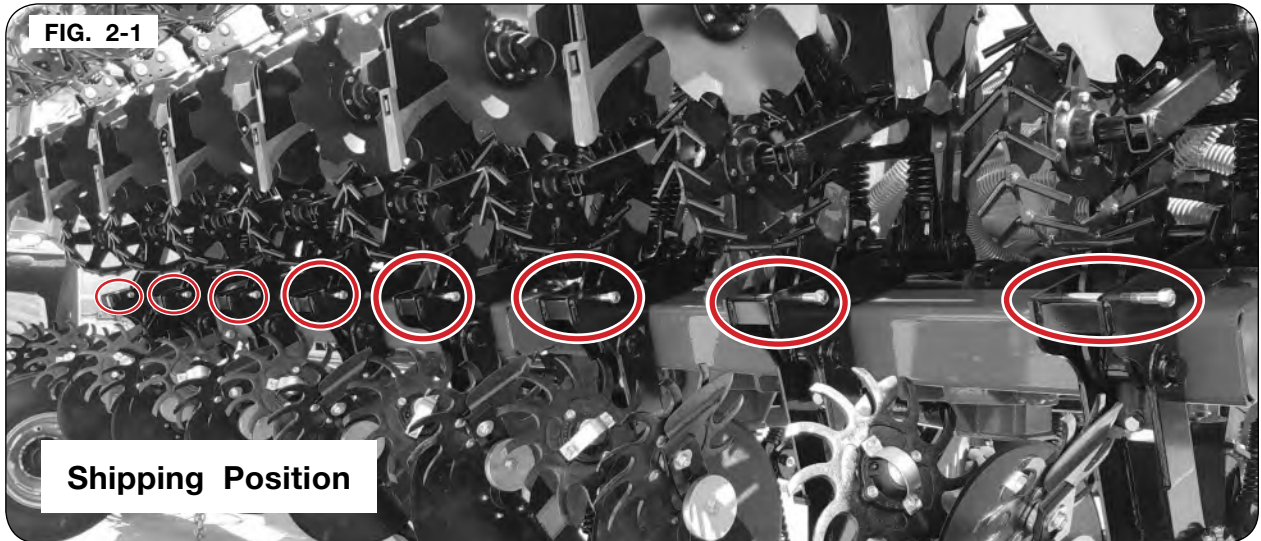
For your safety, and the safety of others, use proper tools and equipment and always use safe working procedures. Refer to these instructions before starting any work on your machine.

WARNING

- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW "SAFETY" SECTION IN THIS MANUAL IF NECESSARY.**
- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE THE MACHINE IS SECURELY BLOCKED.**
- **MOVING PARTS CAN CRUSH AND CUT. KEEP AWAY FROM MOVING PARTS.**
- **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 3,000 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 THE IMPLEMENT.**

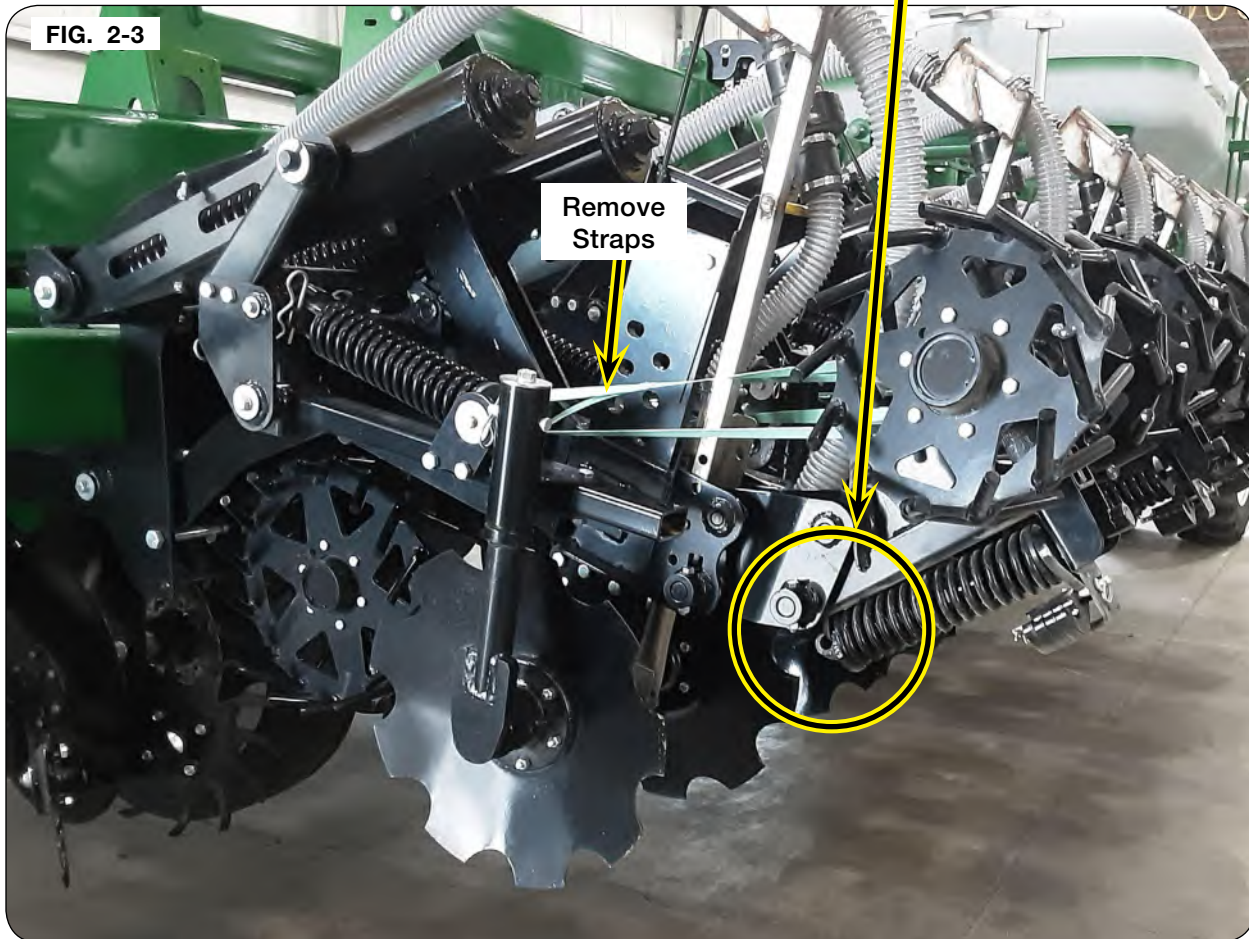
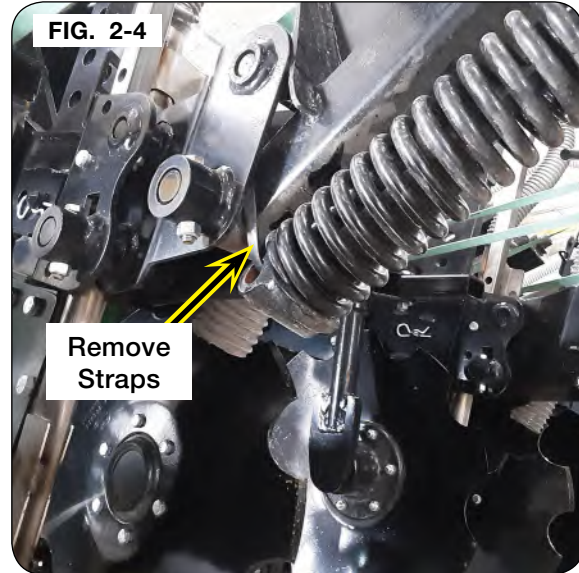
TerrainPro Row Units

1. Use a safe lifting device rated at a minimum of 1,000 lbs., hold a TerrainPro row unit in place.
2. Remove the shipping bolt and nut.
3. Pivot the TerrainPro Row Unit from shipping position to transport position.
4. Repeat steps 1 through 3 until all the TerrainPro Row Units are in transport position.



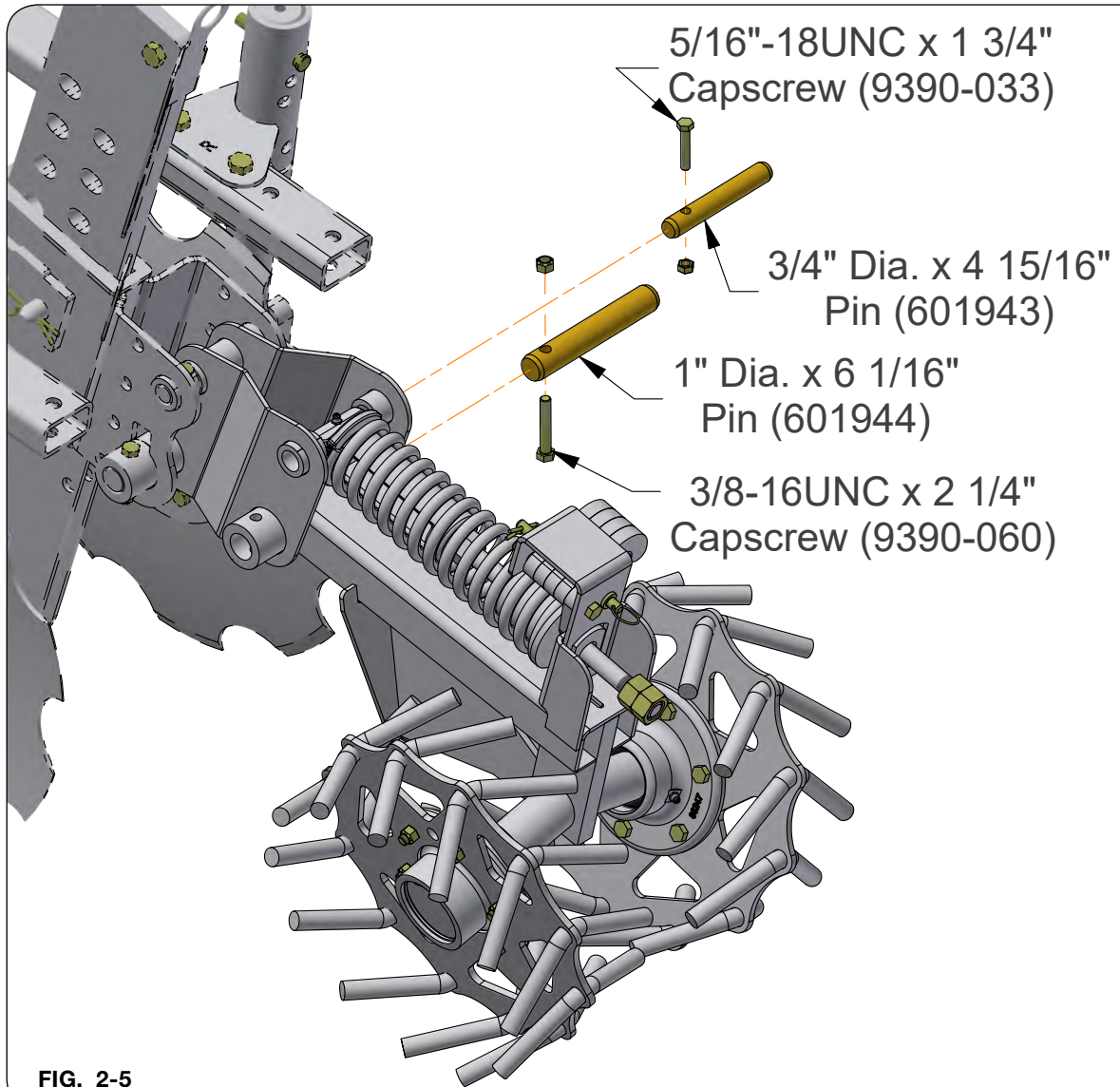
TerrainPro Row Units (continued)

5. Unfold the wings and toolbar. Refer to “Unfolding From Transport Position To Working Position” in OPERATIONS section.
6. Use a safe lifting device rated at a minimum of 100 lbs., support one of the TerrainPro conditioner attachment.
7. Remove the shipping straps (FIG. 2-3 & FIG. 2-4).



TerrainPro Row Units (continued)

8. Remove and reattach the conditioner attachment as shown in FIG. 2-5.



Basic Set Up

Due to shipping requirements and various dealer-installed options, some initial implement set up will be required after it arrives from the factory. Use the following procedures as needed for initial implement set up.

Hydraulic System

Check all hoses and cylinders for signs of leakage. Hoses should not be kinked, twisted or rubbing against sharp edges. Re-route or repair hoses as necessary. Refer to SAFETY section for additional information on safe repair and inspection of hydraulic components.

Wheel/Tire Set Up

Tire Pressure

Tire pressure must be verified before first use and adjusted as necessary. Refer to MAINTENANCE section of this manual for information on tire pressure.

Wheel Nuts

CAUTION

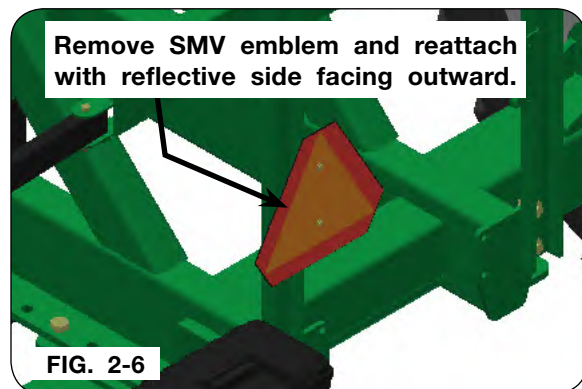
- IMPROPERLY TORQUED WHEEL NUTS/BOLTS CAN CAUSE A LOSS OF IMPLEMENT CONTROL AND MACHINE DAMAGE. WHEEL NUTS/BOLTS MUST BE CHECKED REGULARLY. SEE TORQUE PAGE IN THE "MAINTENANCE" SECTION FOR PROPER WHEEL NUT/BOLT SPECIFICATIONS. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.

SMV Emblem & SIS Decal

Before the implement is used the reflective surface of the SMV must face rearward. This may require removal of film protecting the reflective surface or removing and reinstallation of the SMV.

When reinstalling the SMV make sure that it is mounted with the wide part of the SMV at the bottom.

Ensure the SIS decals (one on the front and one on the rear of the implement) are clean and visible.



Basic Set Up (continued)

Transport Lighting and Markings

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.

Lamp Set Up

Pivot lamp extension arms into position at sides of implement. Be sure that the red reflector and orange fluorescent decal are facing the rear of the implement.

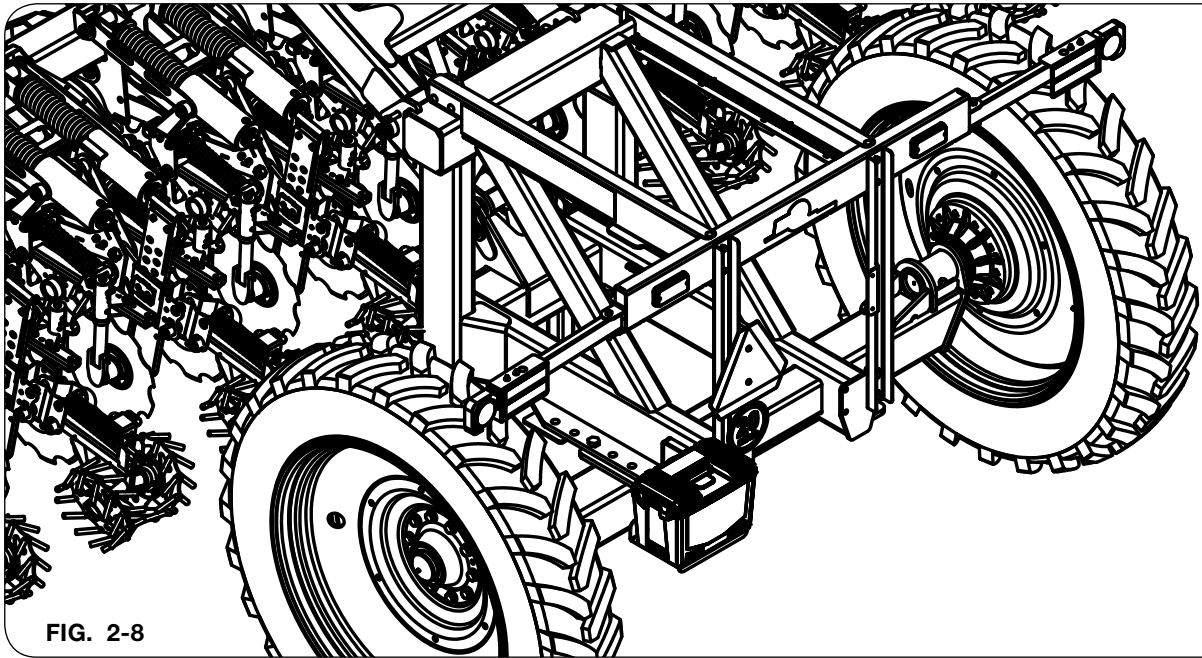


FIG. 2-8

Basic Set Up (continued)

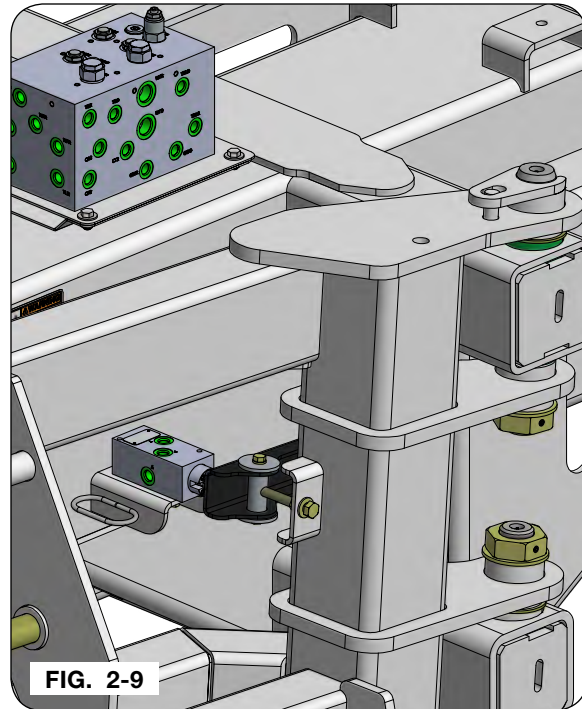
Adjusting Cam Valves

NOTE: CAM valves are set at the factory, but if needing adjusted use the following procedure.

IMPORTANT

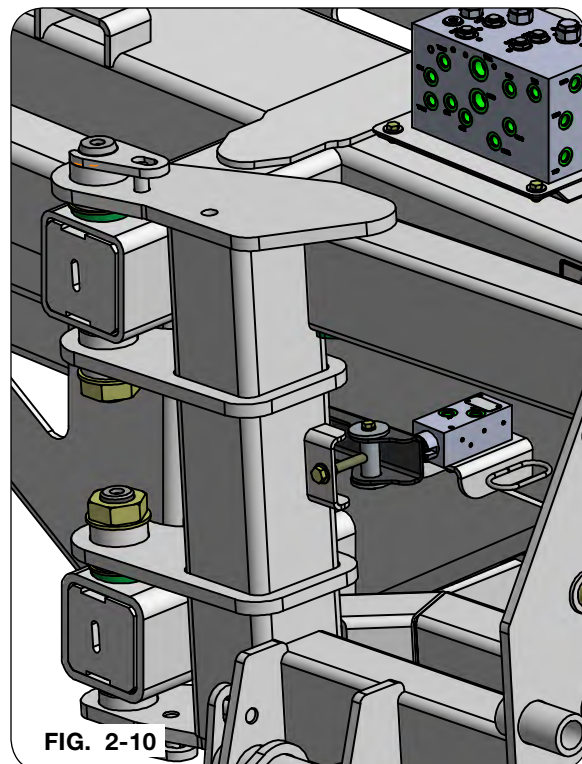
- Do not over adjust the strike plate toward the cam valve as it might over stroke the plunger.

Left-hand cam valve (9503379 - Normally Closed) folds the toolbars. With wings folded in, gradually adjust the strike plate by loosening the jam nut and adjust the capscrew until the cam valve operates properly. Once it does, turn the capscrew another round in and tighten the jam nut.



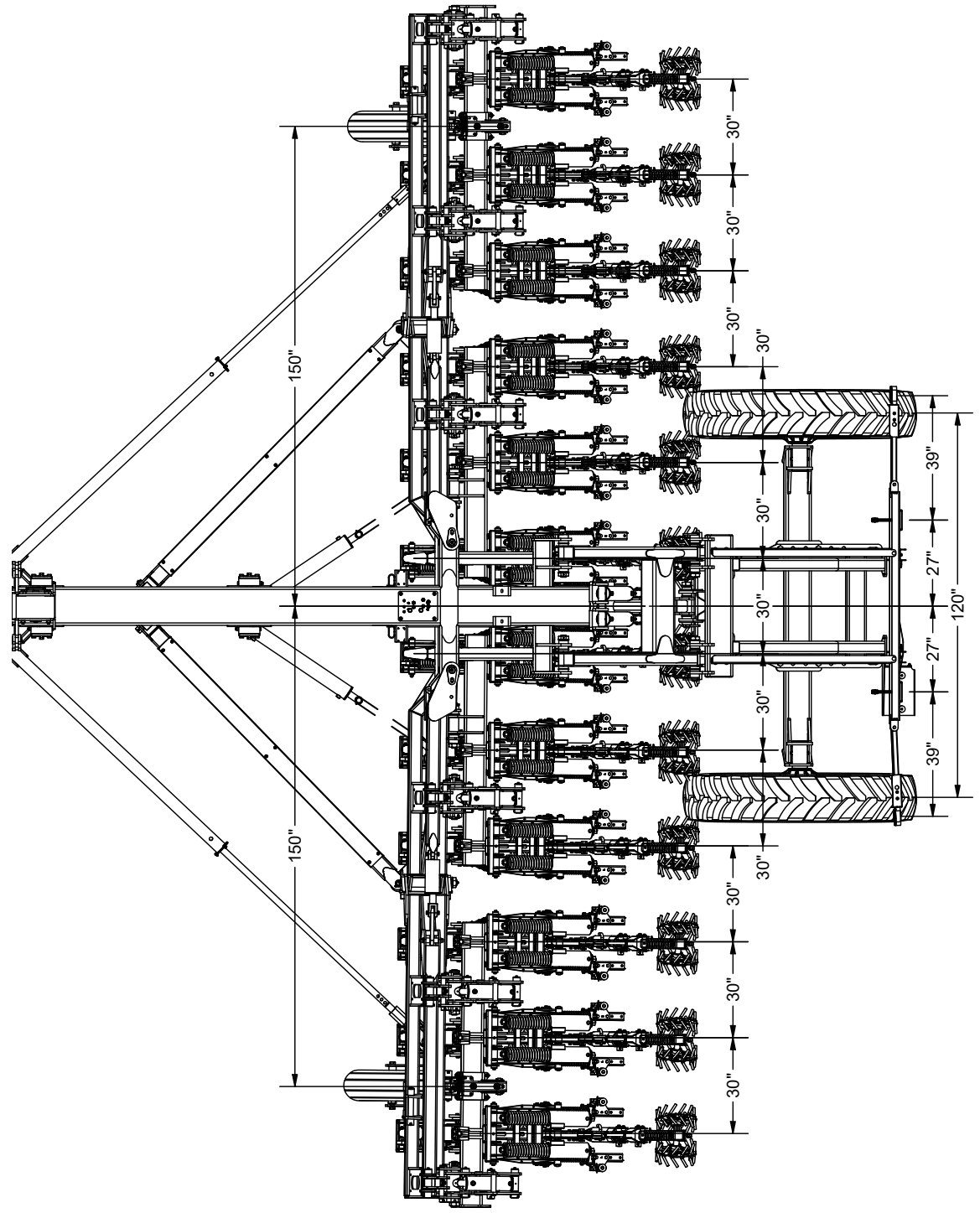
NOTE: Some trailers require an extra step to lower the toolbar during shipping. When this happens the Right-hand cam valve (9503380 - Normally Open) is unbolted from its bracket and requires remounting for proper machine function.

Right-hand cam valve (9503380 - Normally Open) is used to fold the wings into the cradles without lowering the lift cylinders. With wings folded in, gradually adjust the strike plate by loosening the jam nut and adjust the capscrew until the wings lower into cradles without the machine lowering. Once it does, turn the capscrew another round in and tighten the jam nut.



Overhead Layouts — Folding Units — 12 Shank 30" Spacing

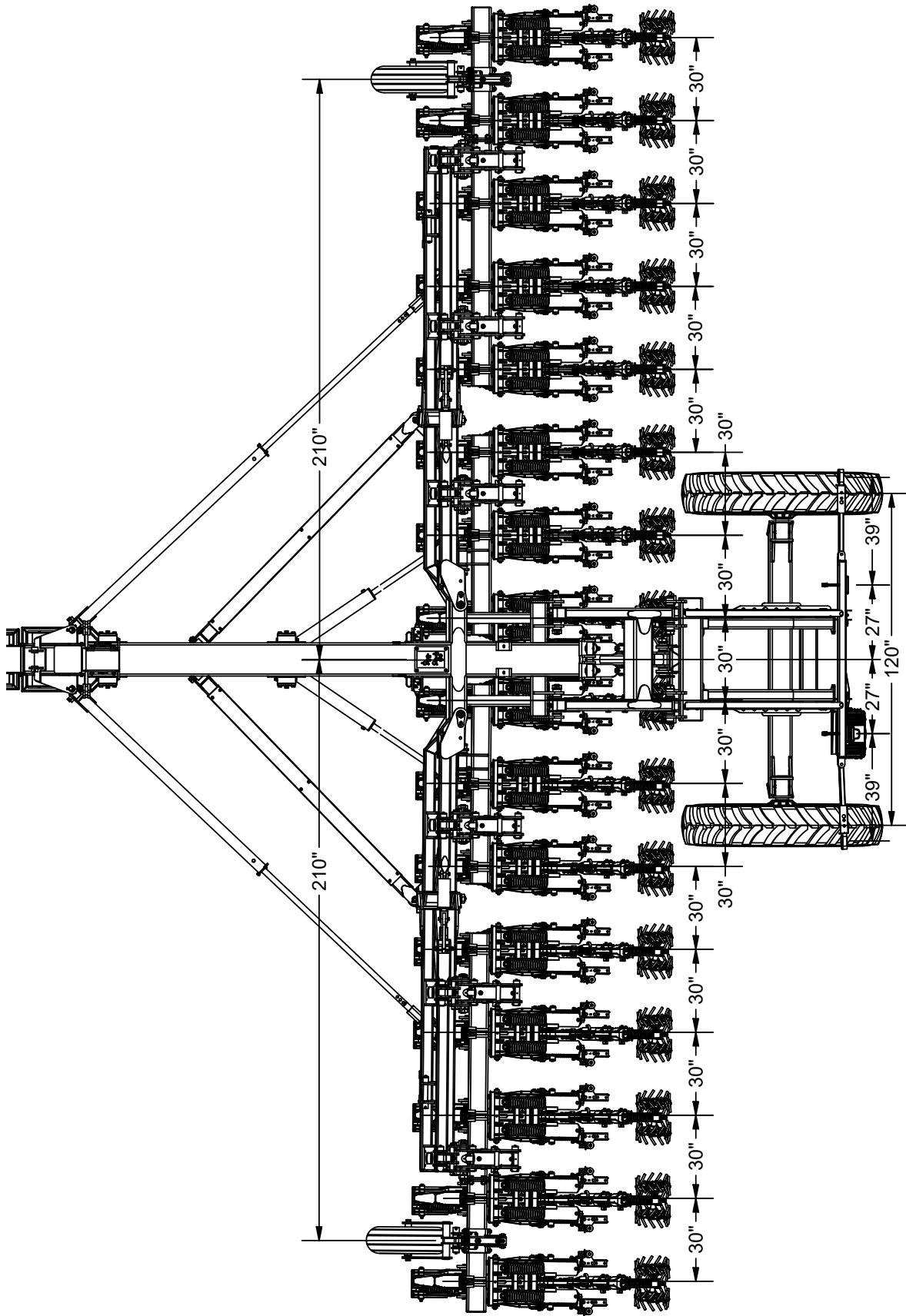
Auto Reset with Crow Foot Gauge Wheel



PULL-TYPE RAPTOR — Set Up

Overhead Layouts — Folding Units — 16 Shank 30" Spacing

Auto Reset with Crow Foot Conditioner Wheel Assembly



SECTION III

Operation

General Operation Information	3-2
Preparing Tractor	3-2
Preparing Raptor Tool.....	3-3
Bolts And Nuts	3-3
Pins.....	3-3
Hydraulics	3-3
Lubrication	3-3
Tire Pressure	3-3
Electrical Hook-Up.....	3-4
Hydraulic Hook-Up.....	3-4
Transport Chain.....	3-5
Transporting.....	3-6
Unhitching From Tractor.....	3-7
Unfolding From Transport Position to Working Position.....	3-8
Folding From Working Position to Transport Position	3-9
Leveling Frame.....	3-10
Side-To-Side Leveling	3-10
TerrainPro Row Unit.....	3-11
Horizontal Adjustment (All Models).....	3-11
Shear-Bolt Replacement	3-12
Lead Coulter.....	3-13
Row Cleaners	3-14
Depth Control Wheels	3-15
Strip-Till Shank.....	3-16
Closing Coulters.....	3-17
Conditioners.....	3-19

PULL-TYPE RAPTOR — Operation

General Operation Information

WARNING

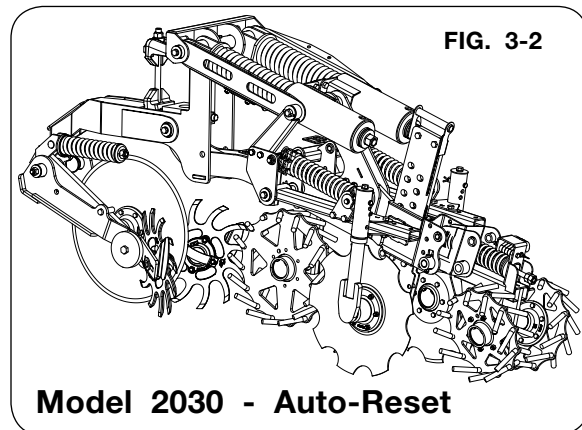
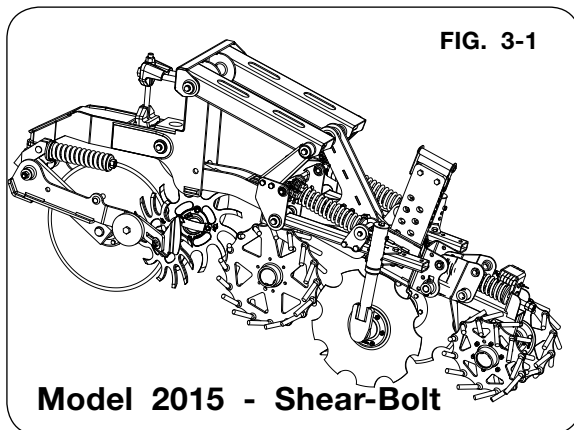
- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW "SAFETY" SECTION IN THIS MANUAL IF NECESSARY.**

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

The PULL-TYPE RAPTOR deep-tillage tool can be equipped with a variety of finishing attachments for optimum field performance.

The PULL-TYPE RAPTOR tool is available with two parallel arm options:

- The Model 2015 comes with the shear-bolt parallel arms (FIG. 3-1) and should be used in areas with few rocks or obstructions.
- The Model 2030 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 transport lights. Make sure they are in proper working order.

Check tractor hydraulic oil reservoir and add oil if needed.

Be sure tractor drawbar has sufficient capacity to operate the implement.

Secure the tractor 3-Point linkage so that it does not swing into the tractor tires or onto the hoses.

Preparing Raptor Tool

Perform the service checks as outlined below. Repair or replace any damaged or worn parts before operating.

Bolts And Nuts

Before going to the field, check all hardware for tightness. Recheck all bolts for tightness, after the unit has been operated for several hours.

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 "MAINTENANCE" SECTION FOR PROPER WHEEL NUT/BOLT SPECIFICATIONS. WARRANTY DOES NOT COVER FAILURES CAUSED BY IMPROPERLY TORQUED WHEEL NUTS/BOLTS.**

For questions regarding new tire warranty, please contact your local original equipment tire dealer. Used tires carry no warranty. Tire manufacturers' phone numbers and web sites are listed in the MAINTENANCE section of this manual for your convenience.

Pins

Before going to the field, check that all pins are in place and are in good condition. Replace any worn, damaged, or missing pins.

Check that locking hardware for pins are in place and tight.

Hydraulics

Check routing of all hydraulic hoses. Hoses should not be kinked, twisted, or rubbing against sharp edges. Hoses should be secure with tie straps.

Check hoses and fittings for hydraulic leaks. Tighten or replace as required.

Lubrication

Lubricate unit as outlined in MAINTENANCE section.

Tire Pressure

Check tire pressure, see MAINTENANCE section for recommended air pressure. Be sure tire pressure is equal in all tires.

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 MAINTENANCE section for purging process.

NOTE: Refer to MAINTENANCE section when checking hydraulic circuit operation.

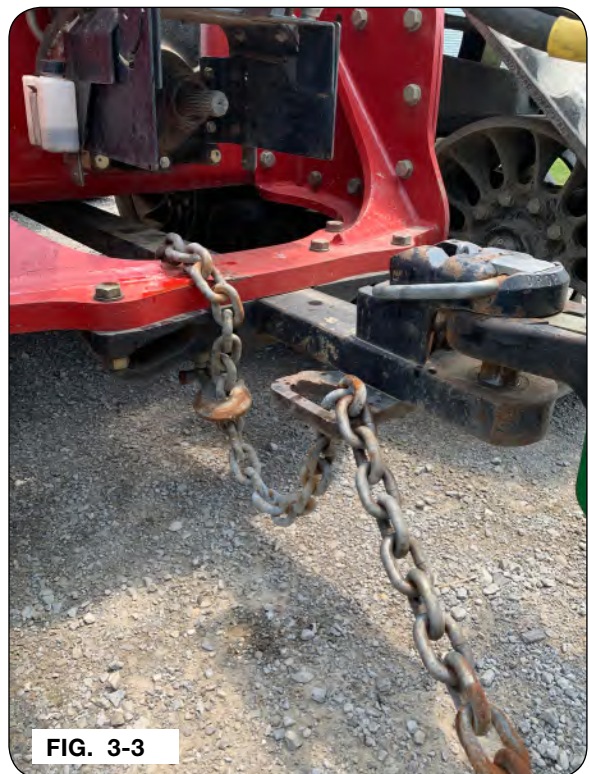
Transport Chain

CAUTION

- ALWAYS USE TRANSPORT CHAIN WHEN TRANSPORTING IMPLEMENTS. FAILURE TO USE CHAIN COULD CAUSE PERSONAL INJURY OR DAMAGE IF IMPLEMENTS BECOME DISENGAGED.
- REPLACE TRANSPORT CHAIN IF ANY LINK OR END FITTING IS BROKEN, STRETCHED, OR DAMAGED. DO NOT WELD TRANSPORT CHAIN.
- USE ONLY AN UNVERFERTH ASABE TRANSPORT CHAIN WITH A WEIGHT RATING EXCEEDING THE GROSS COMBINED WEIGHT OF ALL TOWED IMPLEMENTS. CONTACT YOUR UNVERFERTH DEALER FOR ADDITIONAL INFORMATION.

FIG. 3-3 shown with hook-up between tractor and implement. Always use intermediate support when connecting the implement directly to a tractor. DO NOT use the intermediate support as the chain attaching point.

Transport chain should have a minimum rating equal to the gross weight of implement and all attachments. Use only ASABE approved chains. Allow no more slack in chain than necessary to permit turning.



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

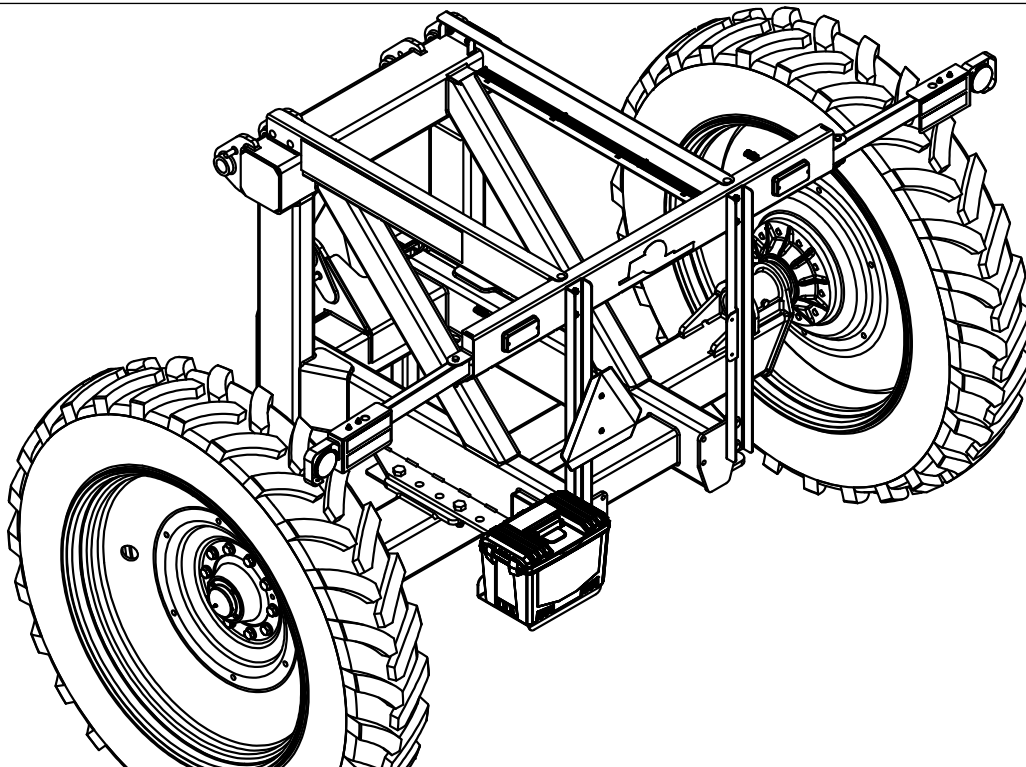
- **INADVERTENT LOWERING OF THE WINGS CAN CAUSE SERIOUS INJURY OR DEATH. INSURE WING TOOLBAR LATCHES ARE ENGAGED BEFORE TRANSPORTING**
- **USE TRANSPORT LIGHTS AS REQUIRED BY ALL LAWS TO ADEQUATELY WARN OPERATORS OF OTHER VEHICLES.**
- **ALWAYS TRAVEL AT A SPEED WHICH PERMITS COMPLETE CONTROL OF TRACTOR 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 approaching traffic.

FIG. 3-5



Unhitching From Tractor

⚠️ WARNING

- RISING OR FALLING TONGUE CAN CAUSE SERIOUS INJURY OR DEATH. USE JACK TO SUPPORT IMPLEMENT BEFORE REMOVING HITCH PIN.
- 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. 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.
- ALWAYS RELIEVE HYDRAULIC SYSTEM PRESSURE BEFORE DISCONNECTING HOSES FROM TRACTOR OR SERVICING HYDRAULIC SYSTEM. SEE TRACTOR OPERATOR'S MANUAL FOR PROPER PROCEDURES.

⚠️ CAUTION

- KEEP HANDS AND FEET AWAY FROM JACKSTAND WHEN LOWERING.

Place the tractor in “Neutral” before lowering jack stand.

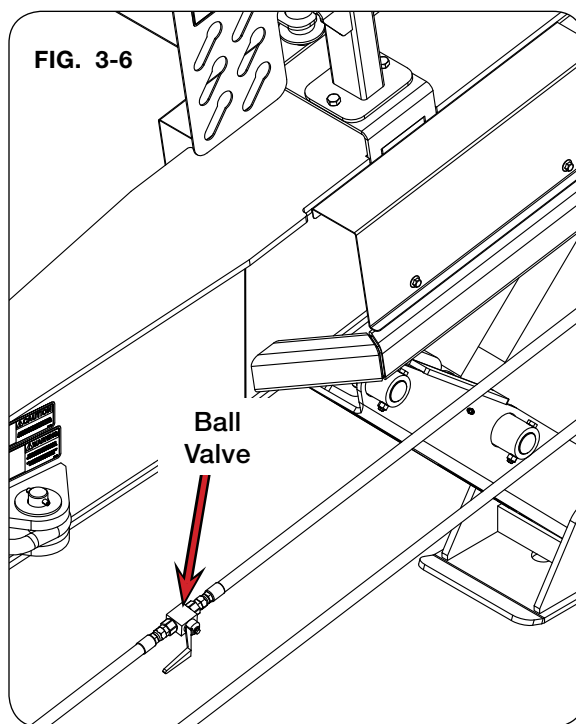
Lower hydraulic jack stand to the ground until the tongue is raised off drawbar.

Lockout the manual hydraulic ball valve (FIG. 3-6).

Place the cylinder stop in after locking out the ball valve.

Remove hitch pin.

Disconnect hoses and wiring connections. Install dust covers over the hose plugs and outlets.



Unfolding From Transport Position to Working Position

DANGER

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

1. Activate the wing fold circuit to completely fold up the toolbars. This relieves any load on the latches from the unit settling.
2. Activate the raise circuit to lift up the wings out of the cradle, and release the toolbar latches.
3. Activate the unfold circuit to lower toolbars, raise gauge wheels, and unfold wings to working position. The tongue latch will automatically engage when the unit is completely unfolded. The lift system is now ready to operate as needed.

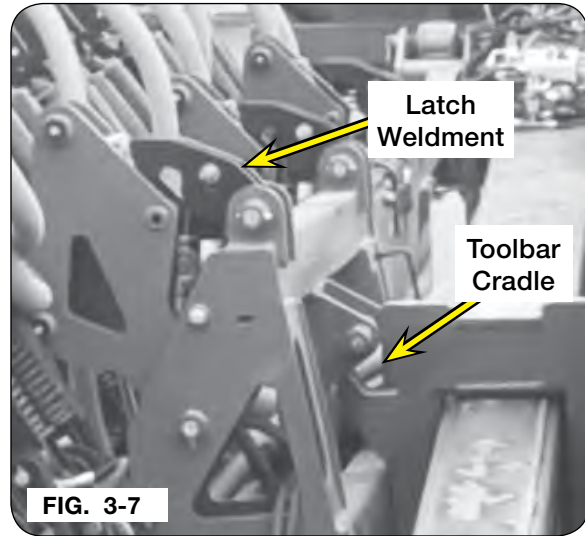


FIG. 3-7

Folding From Working Position to Transport Position

⚠ DANGER

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

1. Activate the lift circuit to fully raise the toolbar, and tilt the wings up.
2. Activate and hold the fold circuit to lower gauge wheels and fold the wings forward.

NOTE: The tongue latch will disengage automatically. If the tongue latch does not disengage, activate the unfold circuit to release residual latch load. Then reengage the fold circuit to fold the wings forward.

3. Once the wings are fully folded forward, activate the lift circuit to lower the wings into the cradles and lower toolbar latches.

NOTE: Hold the fold circuit until wing lift cylinders are completely stroked out.

4. Activate and hold the fold circuit to fold the toolbars up. The toolbar latches will automatically engage.

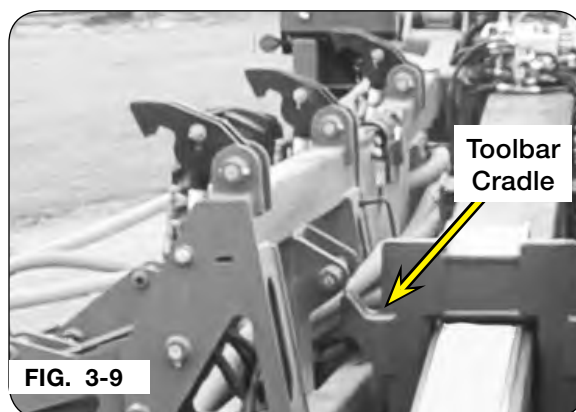


FIG. 3-9

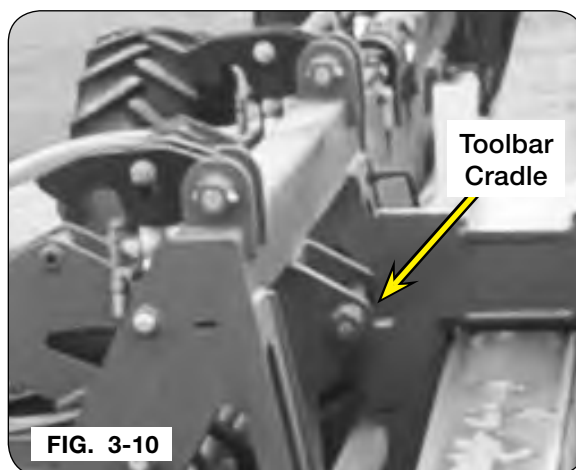


FIG. 3-10

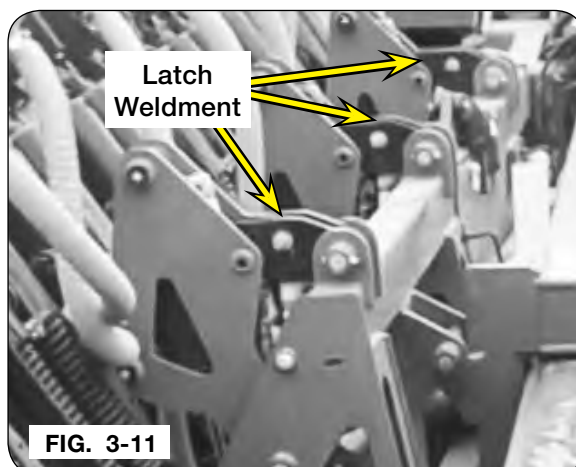


FIG. 3-11

Leveling Frame

For best results, when leveling the implement, position the tractor with implement on a level surface. 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, lower the implement to working position. Increase or decrease the gauge wheel cylinder stops until the toolbar is level.

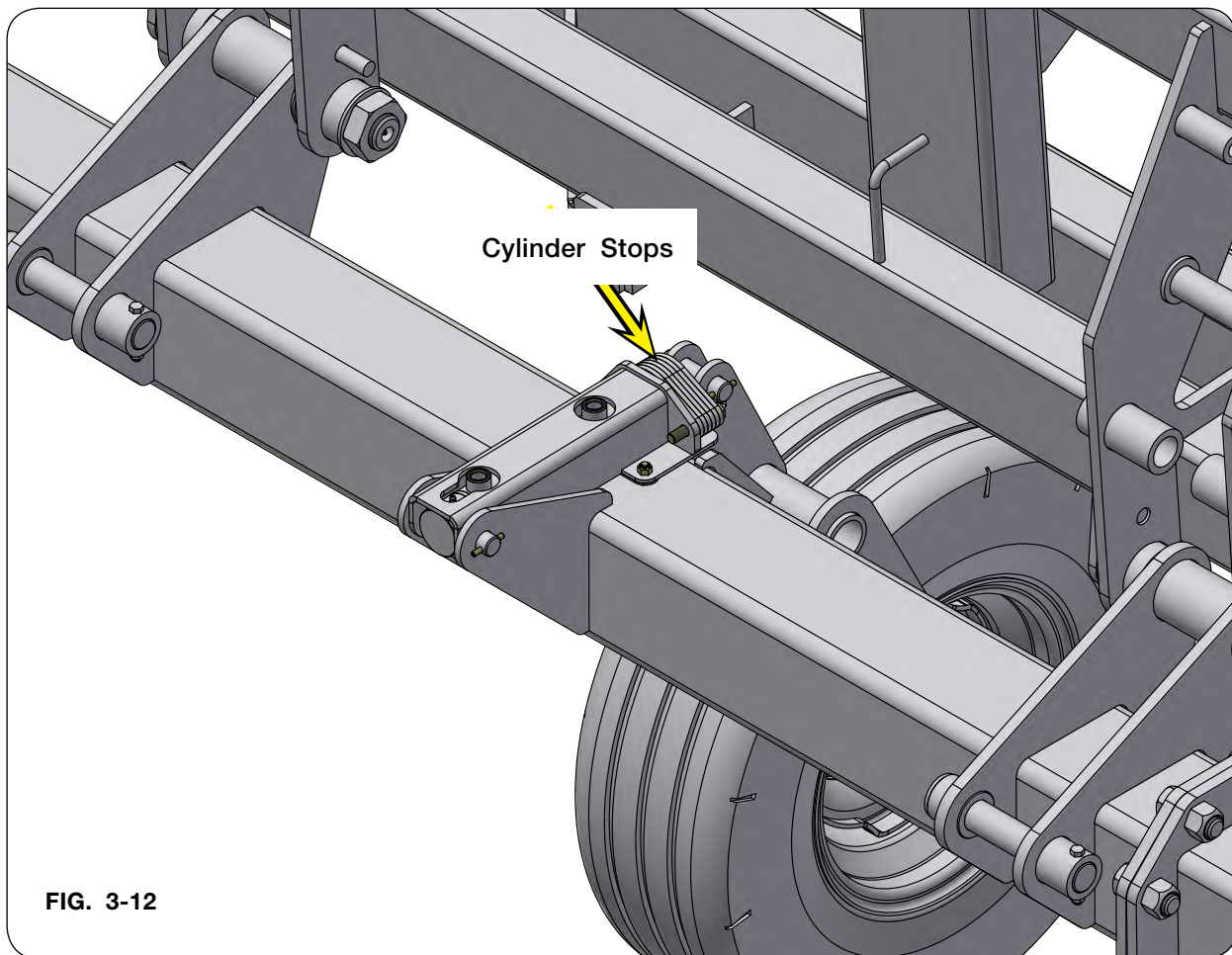


FIG. 3-12

TerrainPro Row Unit

Horizontal Adjustment (All Models)

CAUTION

- ENSURE ROW UNITS HAVE BEEN GREASED PRIOR TO INITIAL USE SEE LUBRICATION IN MAINTENANCE.
- SHARP EDGES ON THE MACHINE CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND THE MACHINE.

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

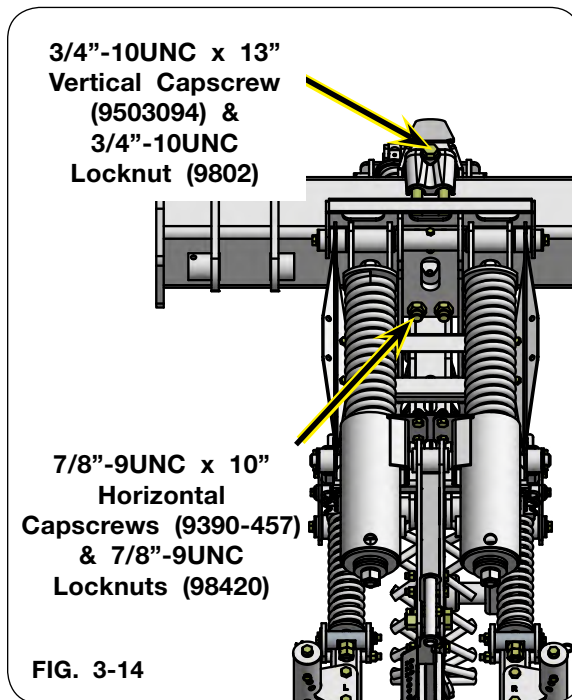
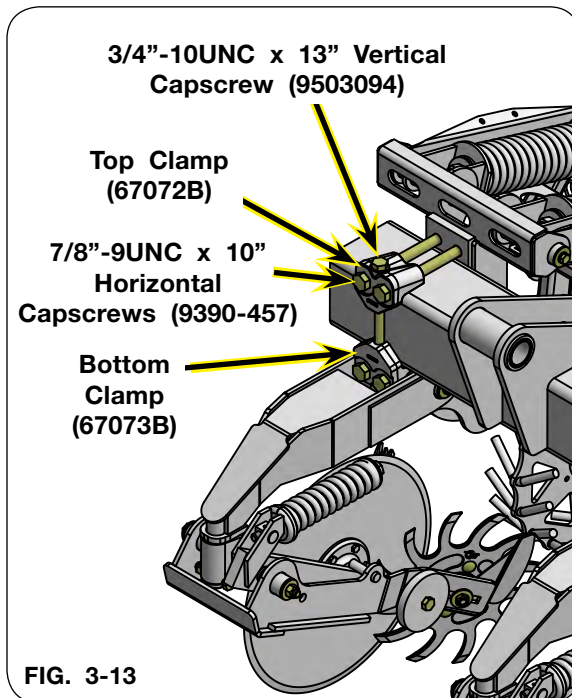
NOTE: For proper positioning, refer to layouts in SET UP section.

Loosely secure with top clamp (67072B), bottom clamp (67073B), 3/4"-10UNC x 13" vertical capscrew (9503094), 3/4"-10UNC locknut (9802), 7/8"-9UNC x 10" horizontal capscrews (9390-457), and 7/8"-9UNC locknuts (98420).

Tighten 3/4"-10UNC x 13" vertical capscrew (9503094) and 3/4"-10UNC locknut (9802) until cast clamps and spacer block weldment seat on top and bottom of the tube. DO NOT TORQUE.

Torque the 7/8"-9UNC hardware equally and evenly to torque value listed in the torque chart in MAINTENANCE section.

Torque 3/4"-10UNC vertical hardware to torque value listed in the torque chart in MAINTENANCE section.



TerrainPro Row Unit (continued)

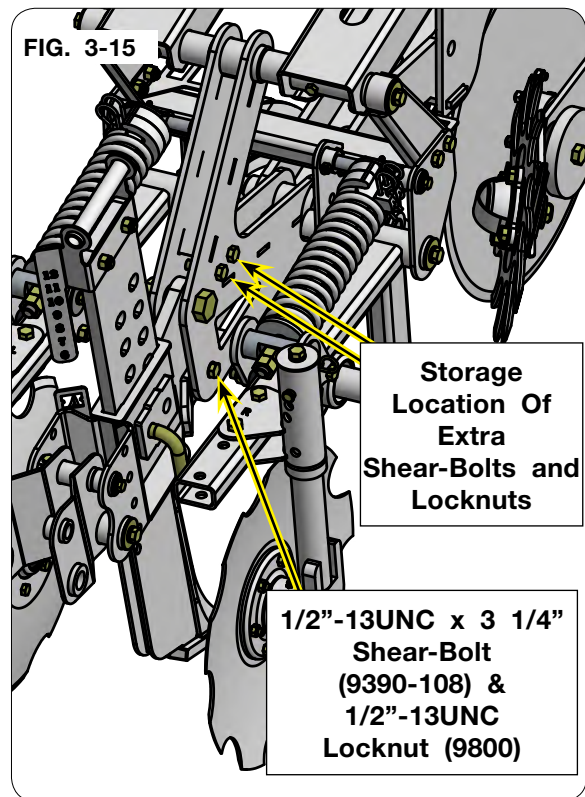
Shear-Bolt Replacement

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.**

1. With the Raptor implement attached to a tractor, on a firm, level surface, unfold the wings and lower the machine until the points are 1"-2" off 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.



TerrainPro Row Unit (continued)

Lead Coulter

Your heavy-duty lead coulter is designed to chop residue and to start an initial cut for the shank. If the toolbar depth is changed to allow more lead coulter 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.

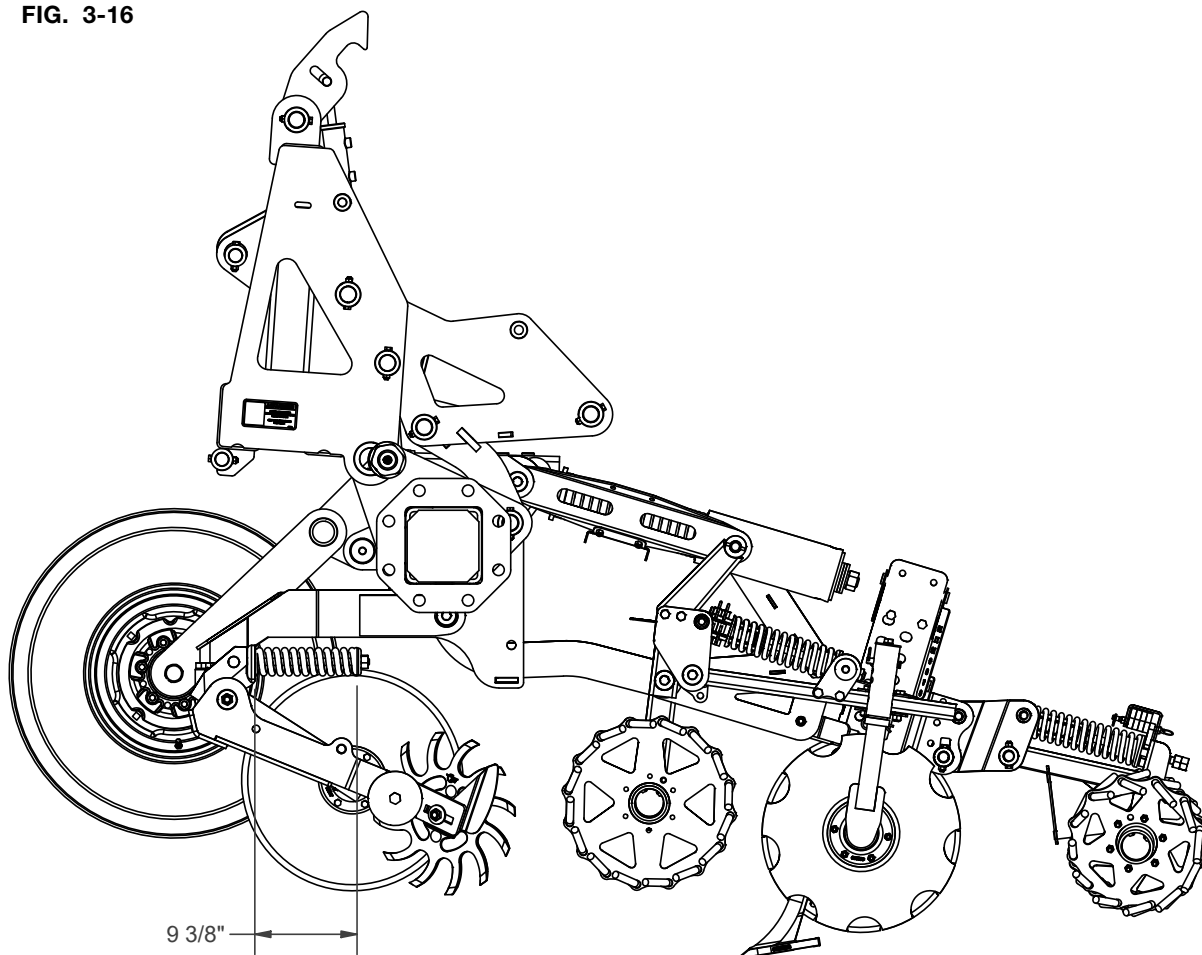
WARNING

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

The coulter 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.

FIG. 3-16



TerrainPro Row Unit (continued)

Row Cleaners

15" diameter row cleaners follow ground contours independently from the lead coulters and clear residue from the strip.

The curved finger design prevents trash from wrapping and width adjustment allows the operator to adapt the row cleaner to varying conditions.

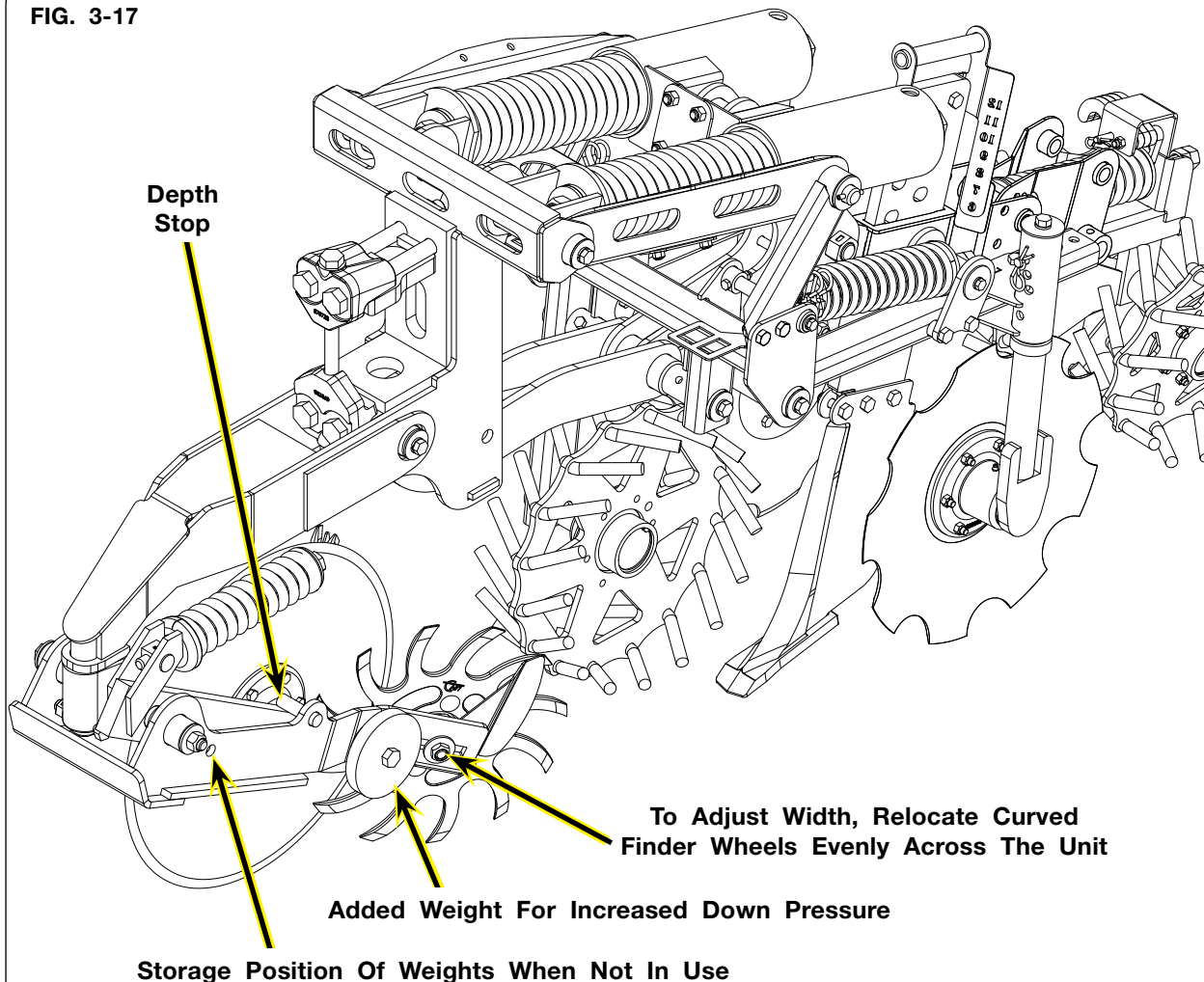
⚠ WARNING

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

The finger wheels may be slid further away from the coulters to increase the strip width.

Add-on weights allow the operator to increase the down pressure to remove more trash. The weights can be moved from the storage position to the coulters arm as desired (FIG. 3-17). If additional weight is desired, see your Unverferth dealer.

FIG. 3-17



TerrainPro Row Unit (continued)

Depth Control Wheels

WARNING

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

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.

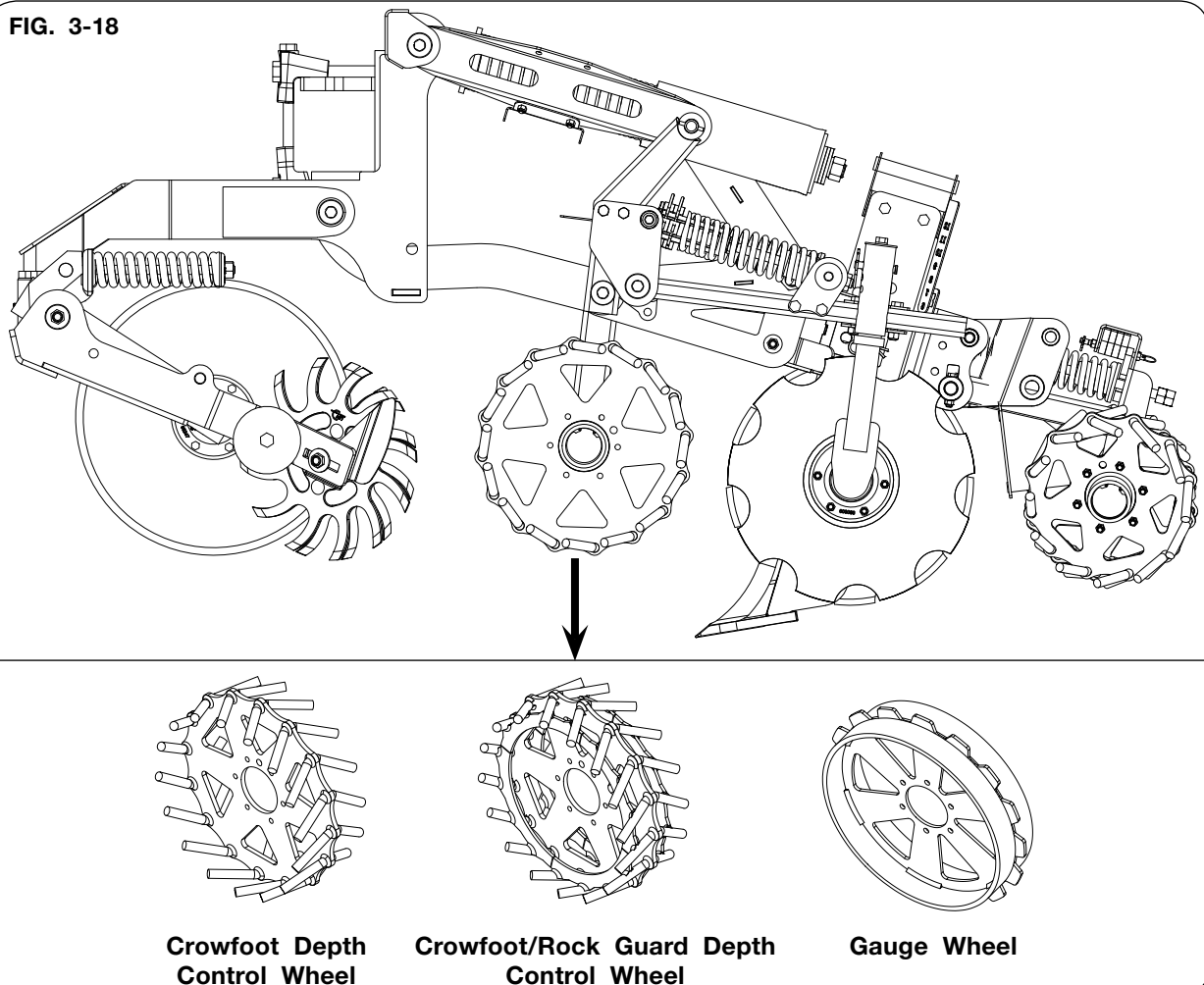
The depth wheel has no adjustment. Depth adjustments are made at the shank.

Standard crowfoot depth control wheel is designed to prevent mud, rocks and other debris from building up, allowing the operator to run in varying conditions.

Optional crowfoot/rock guard depth control wheel has reinforcing rings which adds strength in very rocky soils.

Optional steel depth control wheel with scraper is available for extremely rocky and tacky soil conditions.

FIG. 3-18



TerrainPro Row Unit (continued)

Strip-Till Shank

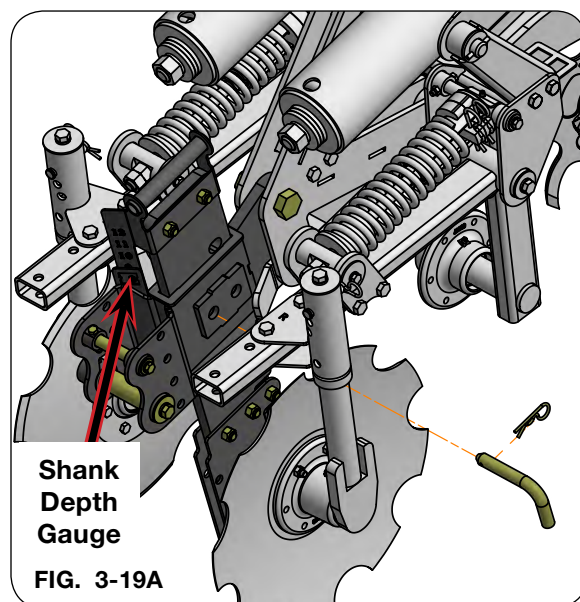
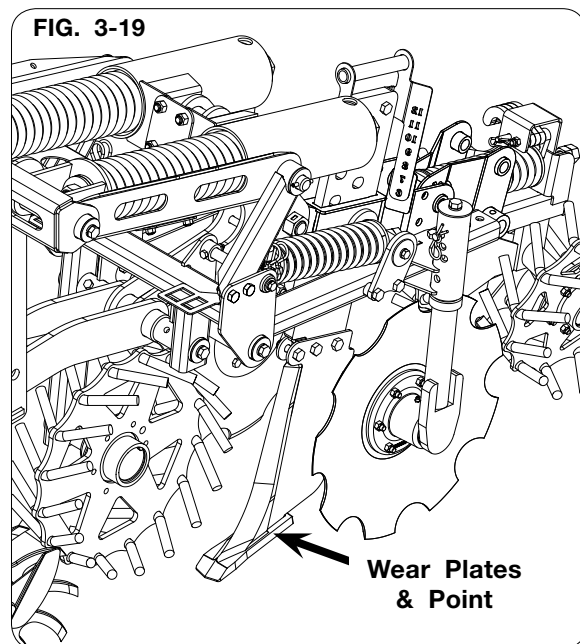
WARNING

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

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.

- Available with spring-cushioned auto-reset trip mechanism with 2,000 lbs. of point load force 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.

Adjust the shank height by removing hairpin cotter (95959) and bent pin (600323). Lift the shank to the desired depth and reinstall the bent pin and hairpin cotter. (FIG. 3-19A)



TerrainPro Row Unit (continued)

Closing Coulters

Closing coulters with 18" notched and concave blades keep the soil in the path of the trailing basket for enhanced soil conditioning.

Each coulters floats independently from the other to keep constant ground contact through uneven ground.

WARNING

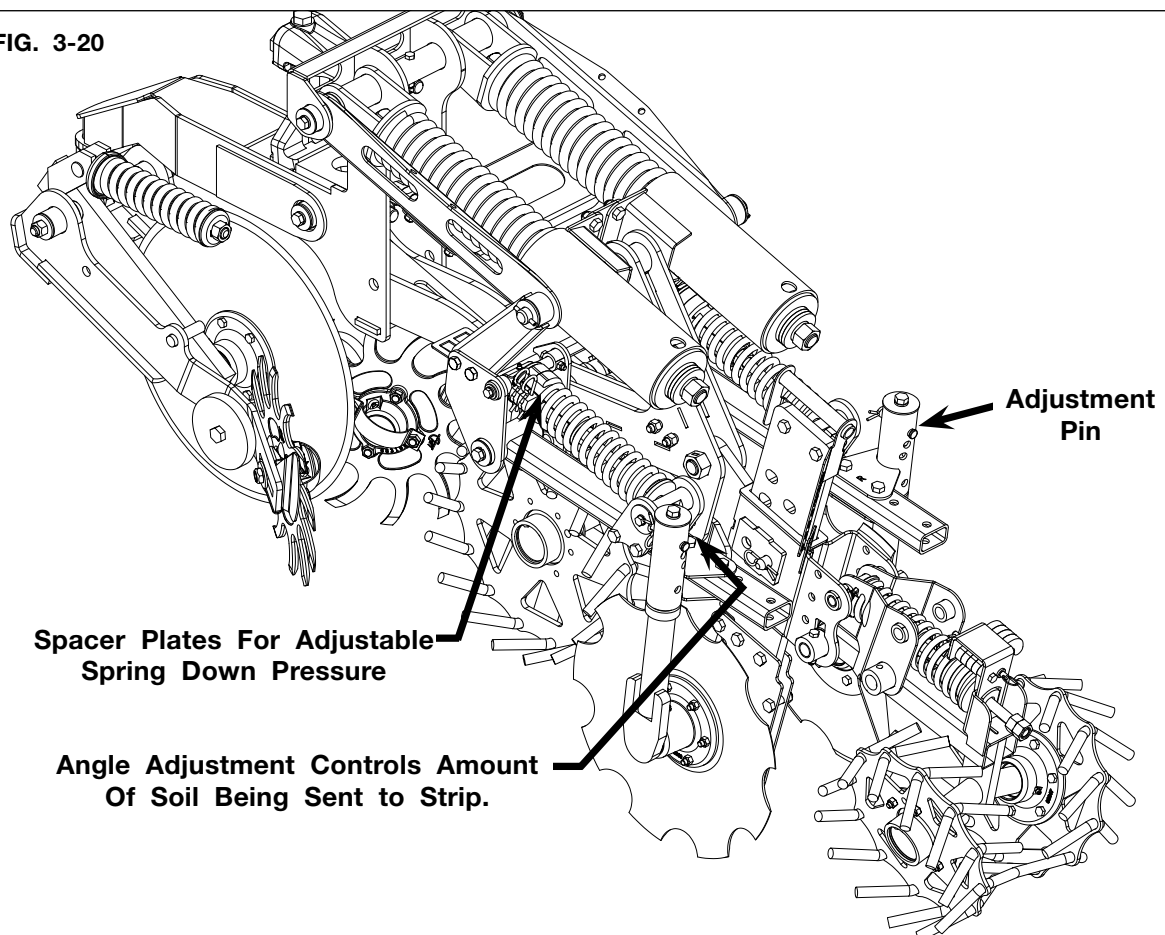
- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE THE MACHINE IS SECURELY BLOCKED.**

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. 3-20)

Tool-Free spring down pressure determines the amount of soil in the strip. With the machine at transport height, add additional spacer plates to increase the down pressure on each coulters. (FIG. 3-20)

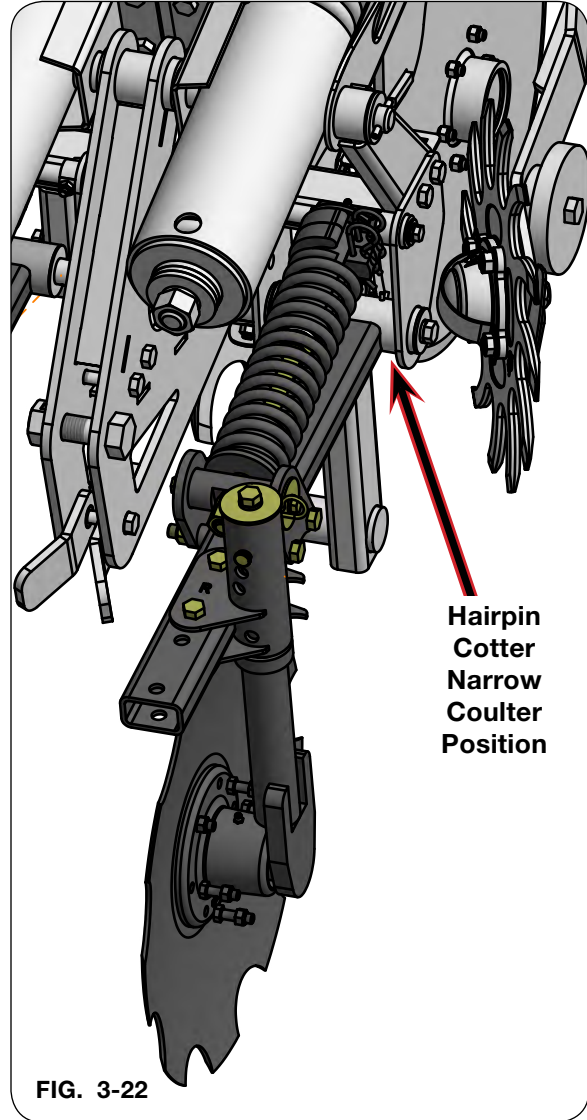
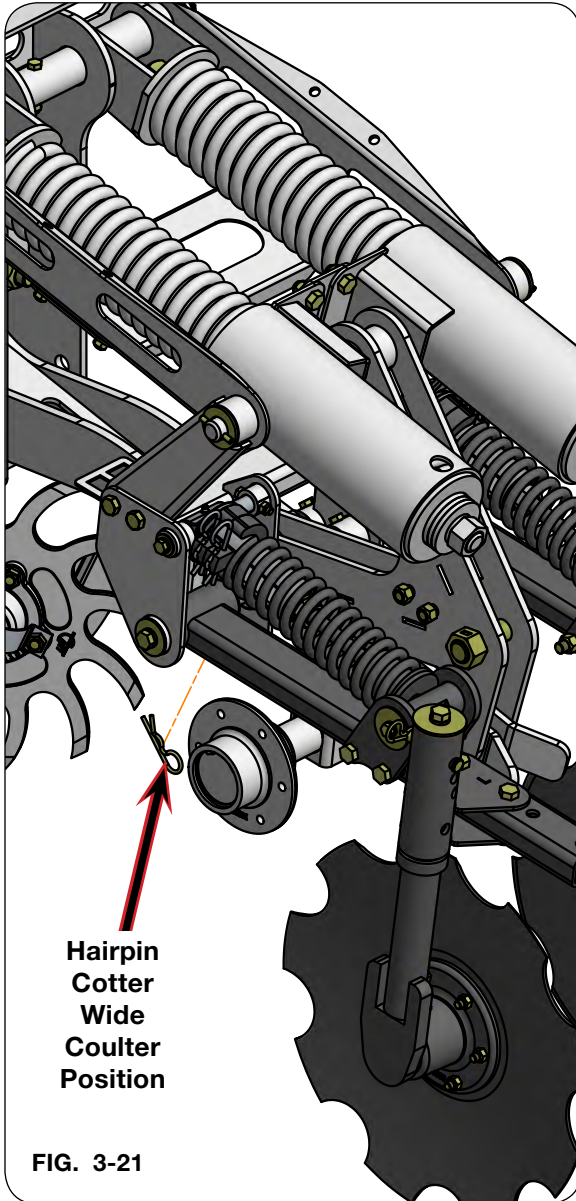
NOTE: The more the coulters are angled the taller and narrower the strips made will be.

FIG. 3-20



TerrainPro Row Unit (continued)

Tool-Free coulter width can be changed by removing the hairpin cotters from the inside of the closing coulter sealer mount assemblies, sliding the closing coulter sealer mount assemblies towards the center of the unit and reinstalling the hairpin cotters in the outer mounting holes. (FIG. 3-21 & FIG. 3-22)



TerrainPro Row Unit (continued)

Conditioners

WARNING

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

Crowfoot conditioning baskets break up clods, condition the strip and feature an angle to pinch the shank opening closed while shedding residue.

Optional 15" conventional Rolling Harrow baskets are used for increased tillage. The Rolling Harrow baskets can be reversed for more passive tillage if conditions warrant.

Optional 15" rubber press wheels are used to increase firming. These wheels have a scraper bar to prevent soil buildup. Adjust the scraper bar to maintain adequate clearance between tires and bar.

Adjust the conditioner down pressure by lifting the machine to transport height, and adding or removing spacer plates. More spacer plates increase conditioning action.

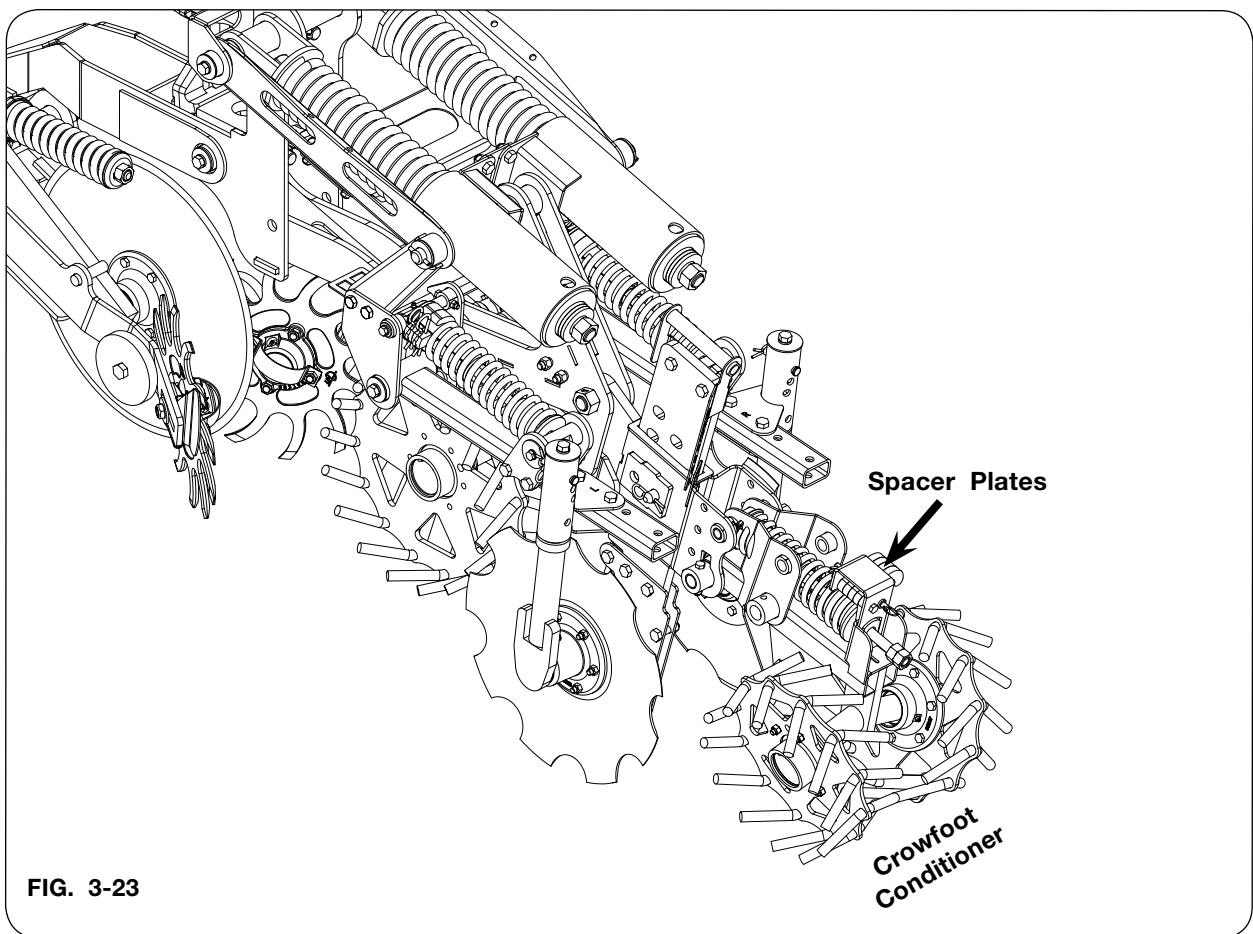


FIG. 3-23

Notes

SECTION IV

Maintenance

Lubrication Points.....	4-2
Purging Hydraulic System	4-7
Truss Rod Adjustment	4-8
Roller Assembly Replacement.....	4-9
TerrainPro Row Unit.....	4-14
Point & Wear Plates Replacement	4-14
Shear-Bolt Replacement.....	4-16
Lead Coulter Spring Replacement.....	4-17
Hub Adjustment and Replacement	
For Lead Coulters and Closing Coulters.....	4-18
Replacing Bearings In Conditioner Rolling Harrow Baskets.....	4-22
Row Cleaner Wheel Hub Adjustment	4-23
Row Cleaner Wheel Replacement	4-25
Daily Service	4-26
Beginning of Day.....	4-26
End of Day.....	4-26
Annual Service	4-27
Beginning of Season	4-27
End of Season	4-27
Troubleshooting	4-28
Poor Penetration	4-28
Plugging	4-28
Implement Running Crooked In Field	4-28
Shanks Not Resetting Into Ground After Tripping	4-29
Excessive Soil Disturbance.....	4-29
Folding.....	4-29
Schematics - Electrical.....	4-30
Schematics - Hydraulic.....	4-31
Wheel, Hub and Spindle Disassembly and Assembly.....	4-40
Wheels and Tires	4-42
Wheel Nut Torque.....	4-42
Tire Pressure	4-42
Tire Warranty	4-43
Complete Torque Chart.....	4-44
Hydraulic Fittings - Torque and Installation.....	4-46

PULL-TYPE RAPTOR — Maintenance

Lubrication Points

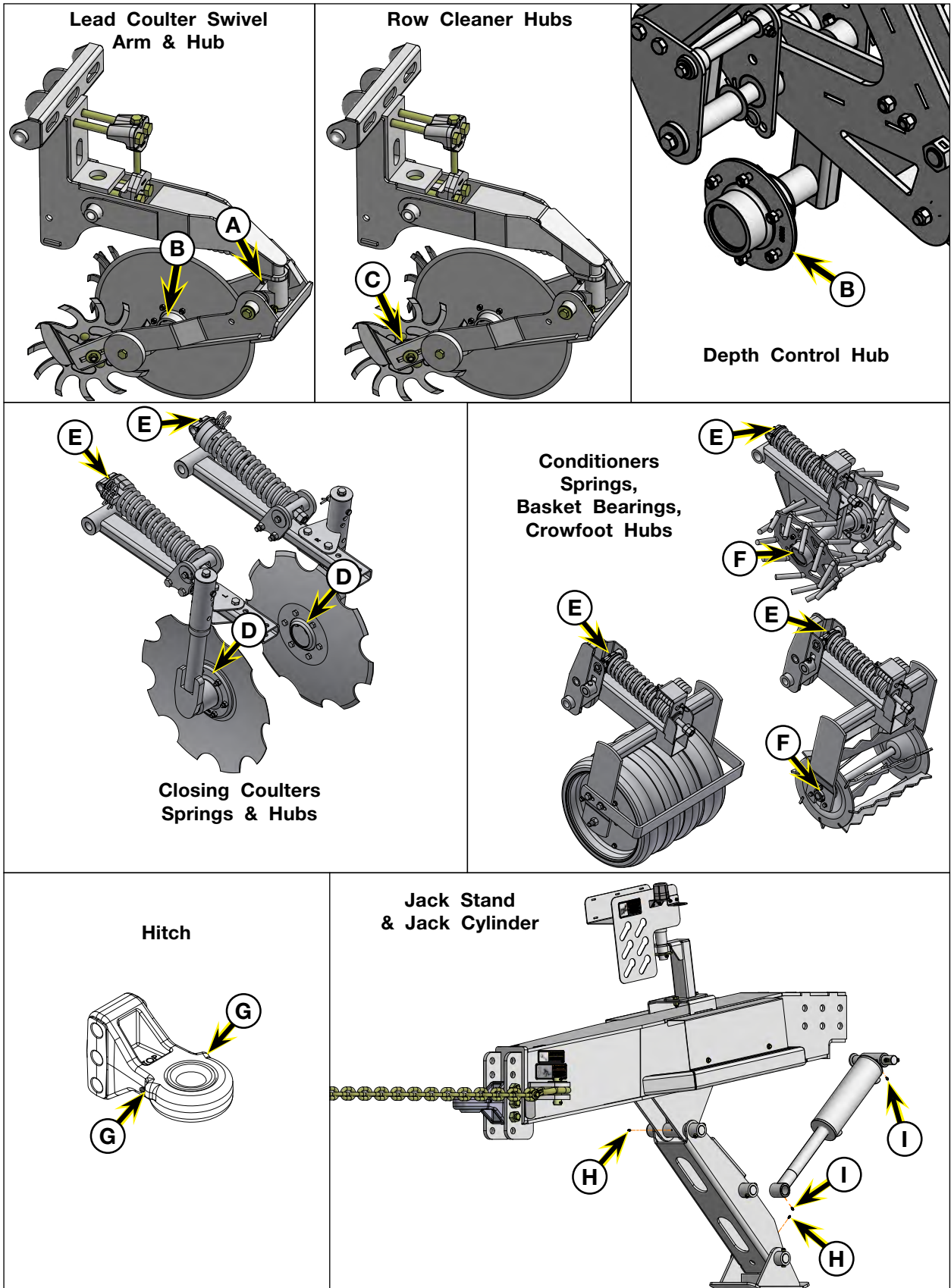
To keep your implement in top operating condition and to assure its proper performance and reliability for a long period of time, periodic inspection and lubrication is a must.

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	Lead Coulter Swivel Arms	1	1 Shot	100 Hours
B	Lead Coulter Hubs & Depth Control Hubs	1	2 Shots	200 Hours/Annually
C	Row Cleaner Hubs	1	2 Shots	200 Hours/Annually
D	Closing Coulter Hubs	1	2 Shots	200 Hours./Annually
E	Closing Coulter & Conditioner Springs	3	2 Shots	100 Hours
F	Conditioner Hubs/Bearings	1	2 Shots	200 Hours/Annually
G	Hitch	2	1 Shot	10 Hours
H	Jack Stand	2	2 Shots	200 Hours/Annually
I	Jack Cylinder	2	1 Shot	200 Hours/Annually

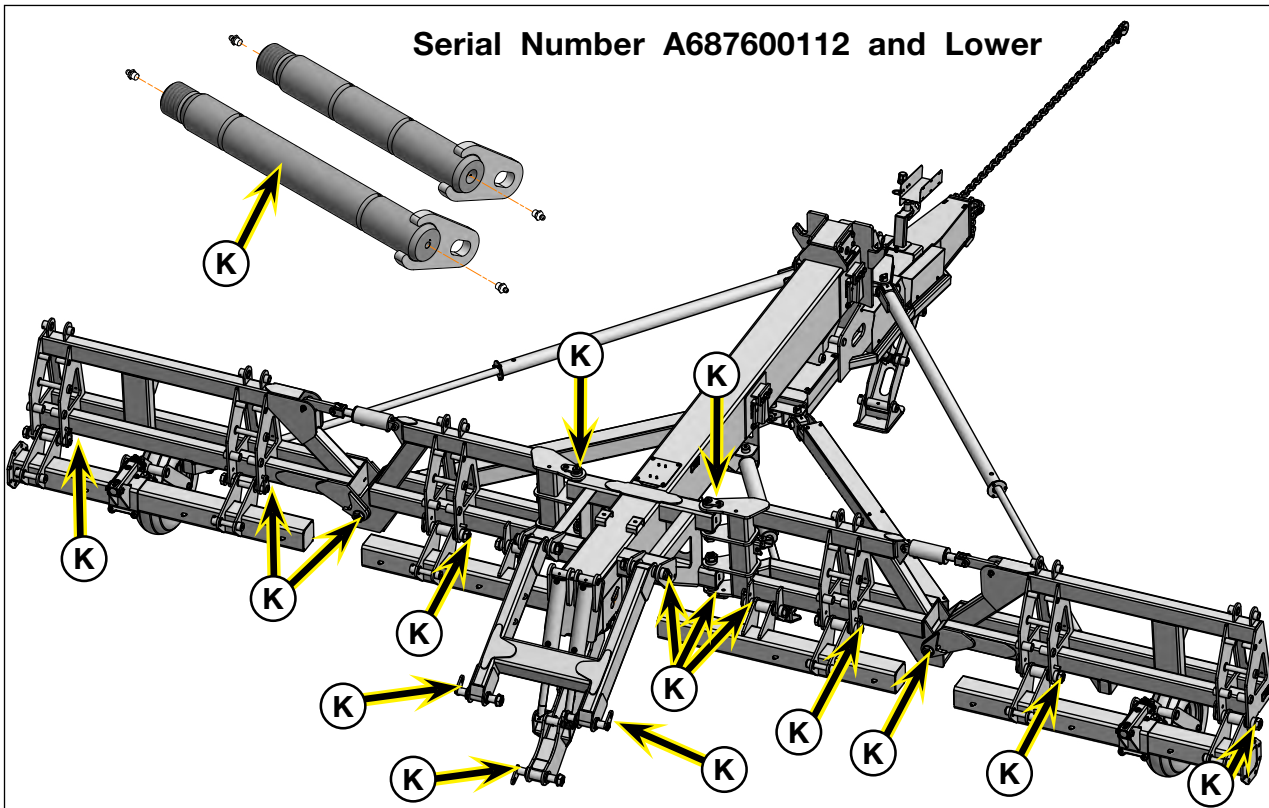
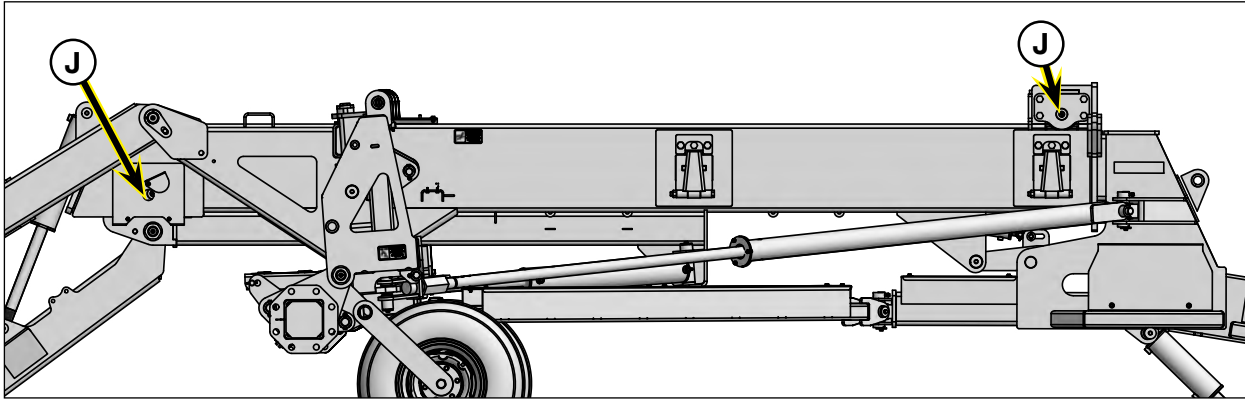
Lubrication Points (continued)



PULL-TYPE RAPTOR — Maintenance

Lubrication Points (continued)

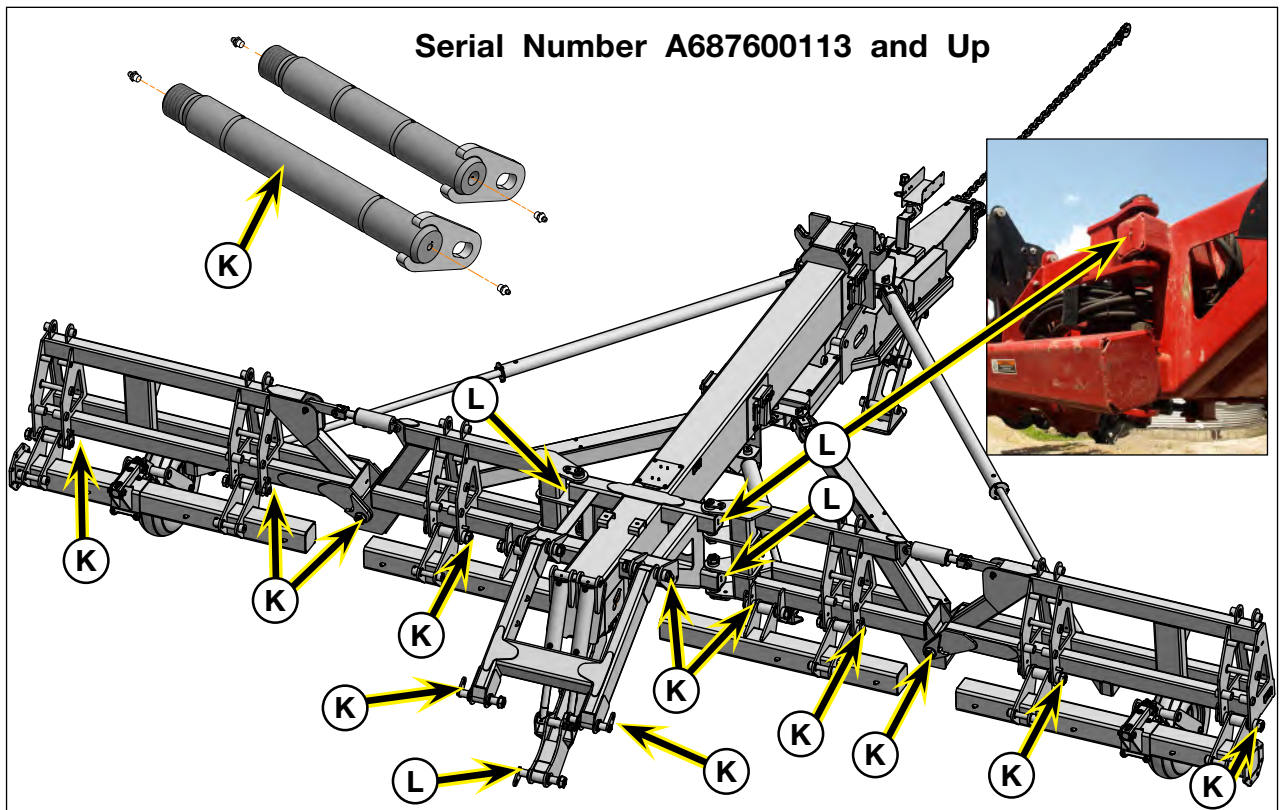
ITEM	DESCRIPTION	POINT	QTY	HOURS
J	Roller Assembly	2	1 Shot	50 Hours
K	Pin Weldments (Qty - 20; 2 Points Each) Parallel Arms, Inner Wings, & Outer Wings Serial Number A687600112 & Lower	40	2 Shots	10 Hours



PULL-TYPE RAPTOR — Maintenance

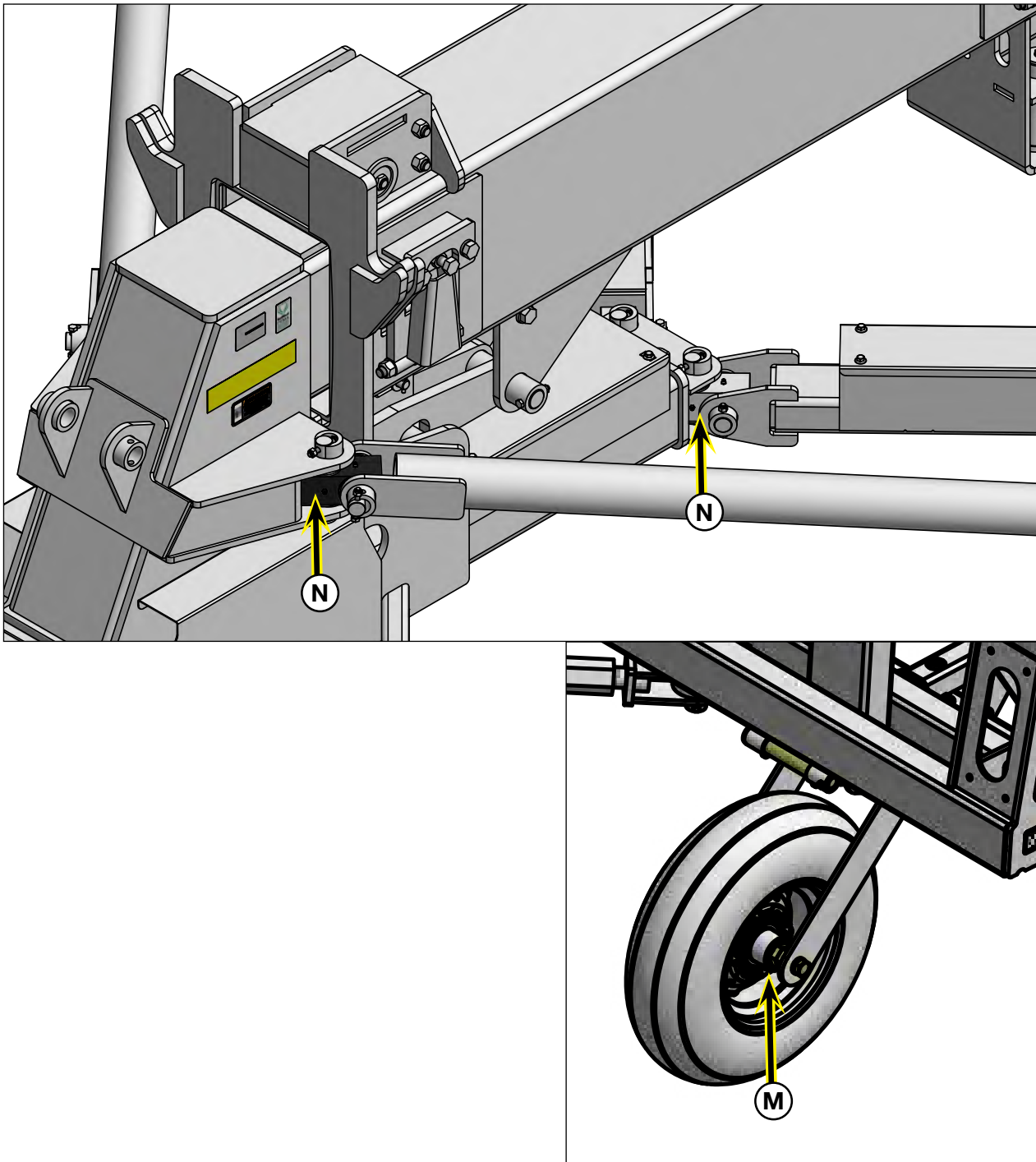
Lubrication Points (continued)

ITEM	DESCRIPTION	POINT	QTY	HOURS
K	Pin Weldments (Qty - 20; 2 Points Each) Parallel Arms, Inner Wings, & Outer Wings Serial Number A687600113 & Up	34	2 Shots	10 Hours
L	Inner Wing Hinge Greased through bushings Serial Number A687600113 & Up	4	2 Shots	10 Hours



Lubrication Points (continued)

ITEM	DESCRIPTION	POINT	QTY	HOURS
M	Gauge Wheel Hubs	2	1 Shots	200 Hours / Annually
N	Truss Blocks	4	2 Shots	2 zerks each block - 50 Hours



Purging Hydraulic System

WARNING

- RELIEVE THE HYDRAULIC SYSTEM OF ALL PRESSURE BEFORE ADJUSTING OR SERVICING. SEE THE HYDRAULIC POWER UNIT OPERATOR'S MANUAL FOR PROPER PROCEDURES.
- 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.

Purge air from system as follows:

- A. Clear all personnel and objects from the area, including where the machine will have full range of motion during the hydraulic movement. Remove transport locks from the machine.
- B. Pressurize the system and maintain the system at full pressure for at least 5 seconds after the cylinder rods stop moving. Check that all cylinders have fully extended or retracted.
- C. Check oil reservoir in the hydraulic power source and refill as needed.
- D. Pressurize the system again to reverse the motion of step B. Maintain pressure on the system for at least 5 seconds after the cylinder rods stop moving. Check that all cylinders have fully extended or retracted.
- E. Check for hydraulic oil leaks using cardboard or wood. Tighten connections according to directions in the Torque Specifications in the MAINTENANCE section.
- F. Repeat steps in B, C, D, and E 10-12 times.

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 "Torque Chart" in MAINTENANCE section.

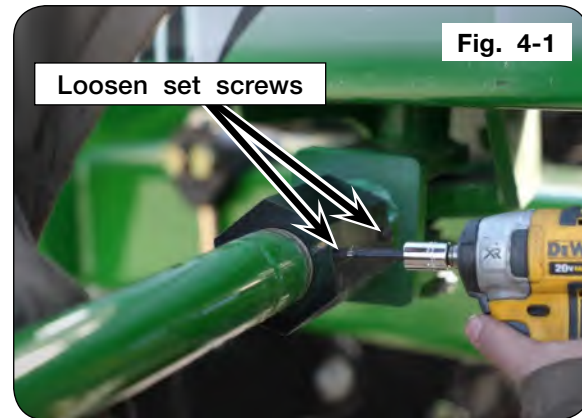
HOSES: Be sure hoses have room to "FLEX" (for folding) in hinge areas. Hoses must be secured with cable ties.

Truss Rod Adjustment

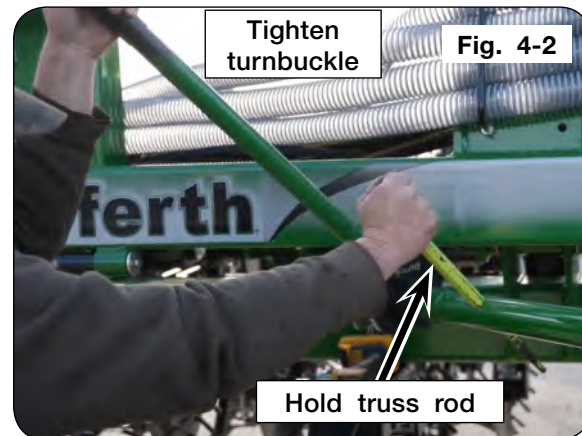
1. Park the empty Raptor on a firm, level surface. Completely unfold the wings. Block the tires on the unit to keep it from moving. Set the towing vehicle's parking brake, shut off the engine and remove the ignition key.



2. Using a 3/16" hex wrench, loosen the set screws securing the turnbuckles to the truss rod. There are two set screws per turnbuckle. (Fig. 4-1)

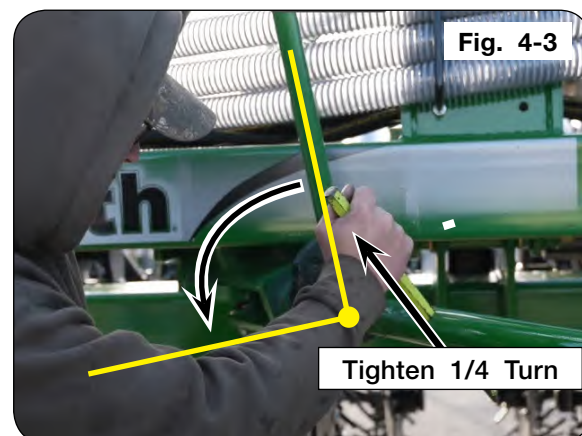


3. With the wings completely unfolded, attempt to tighten the turnbuckles while holding the truss rod stationary. (Fig. 4-2) If a turnbuckle is already tight, reinstall the set screws, torque the screws to 25-28 Ft.-Lbs. and no further action is required. If a turnbuckle is loose, tighten until it cannot be turned and continue to step 4.



4. With the turnbuckles tightened, fold in the wings of the machine slightly. Folding the wings in will release pressure from the wing truss rods. Turn off the tractor and remove the key from the ignition.

5. Tighten the turnbuckle(s) 1/4 of a turn. (Fig. 4-3)



6. Lock the turnbuckles by tightening all the set screws loosened in step 2. Torque the set screws to 25-28 Ft.-Lbs.

7. Fold and unfold the machine. As the machine locks into the fully unfolded position, watch the hitch. If the machine fully unfolds and the hitch does not shift to one side, no further action is required. If the hitch shifts to one side, perform this procedure again.

Roller Assembly Replacement

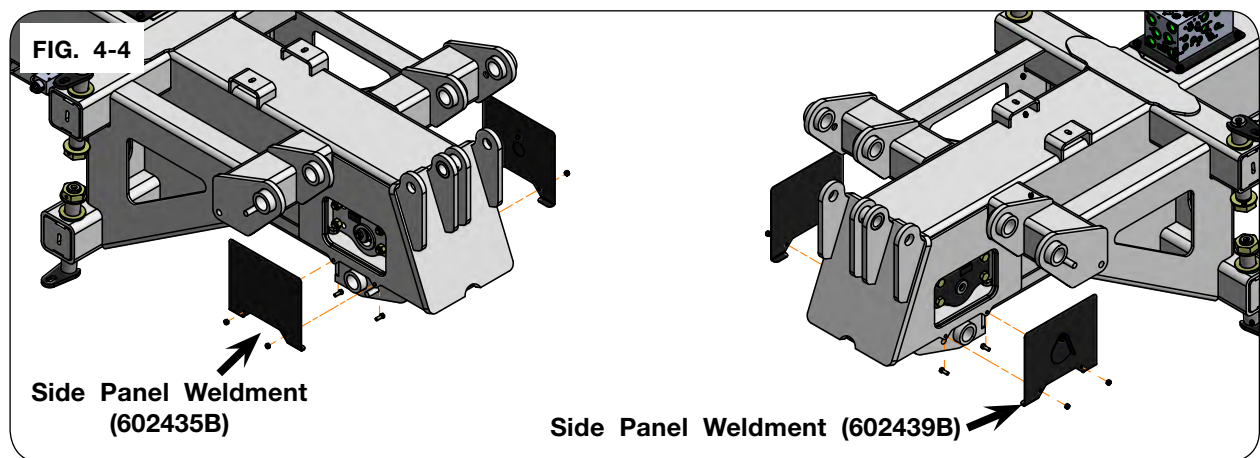
WARNING

- 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.
- 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 6,000 LBS. SPECIFIC LOAD RATINGS FOR INDIVIDUAL LOADS WILL BE GIVEN AT THE APPROPRIATE TIME IN THE INSTRUCTIONS.

With the Raptor implement attached to a tractor, find a firm, level surface and unfold the wings. Lower the machine completely. Shut off the tractor engine, set the parking brake, and remove the ignition key.

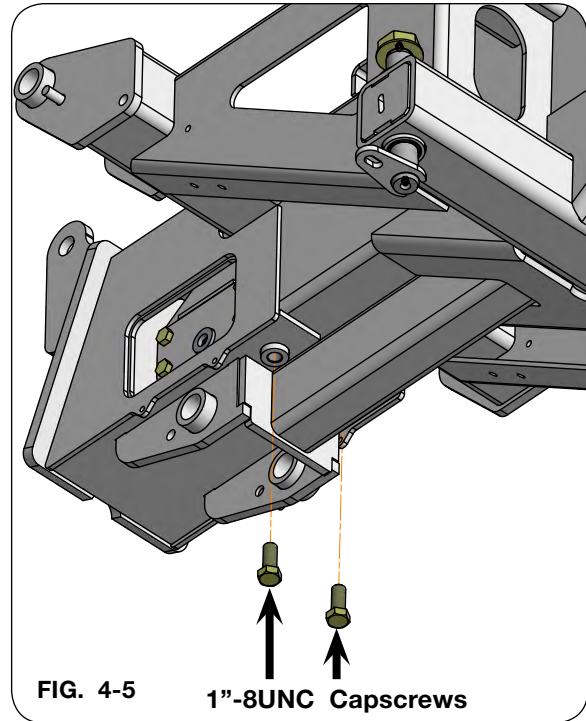
Rear Roller Assembly Replacement

1. Remove and save the 3/8"-16UNC x 1" capscrews (9390-055) and 3/8"-16UNC locknuts (9928) retaining the side panel weldments (602435B and 602439B). (FIG. 4-4)

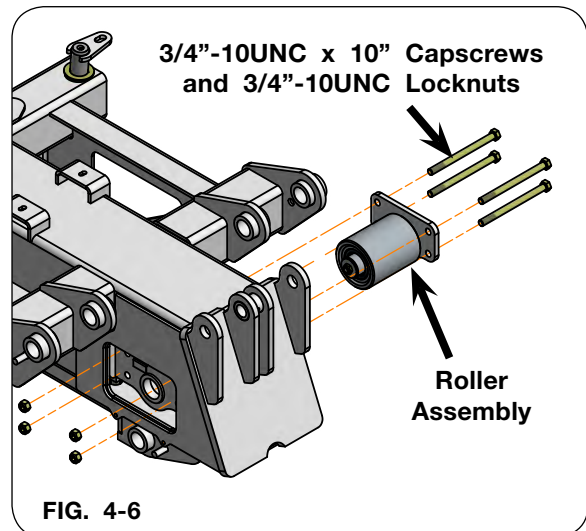


Roller Assembly Replacement (continued)

- Using two 1"-8UNC capscrews at least 2 1/2" long, insert them into the threaded bushings as shown in FIG. 4-5. Tighten capscrews equally and evenly to release the pressure on the roller assembly.

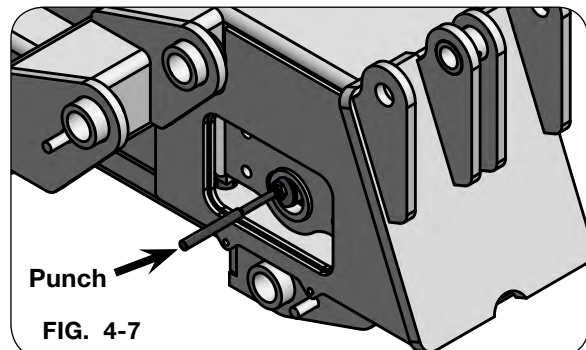


- Remove and save the 3/4"-10UNC x 10" capscrews (9390-450) and 3/4"-10UNC locknuts (9802) retaining the roller assembly (602186B). (FIG. 4-6)



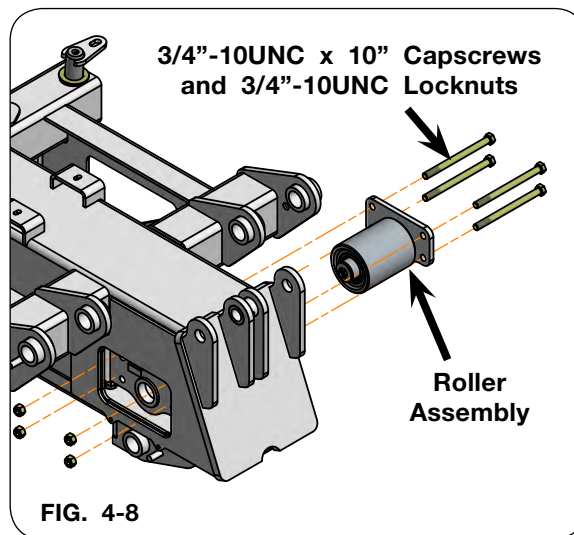
NOTE: If necessary, use a punch on the end of the spindle to help drive the assembly. (FIG. 4-7)

NOTE: If replacing roller assembly components, refer to "Roller Component Replacement".

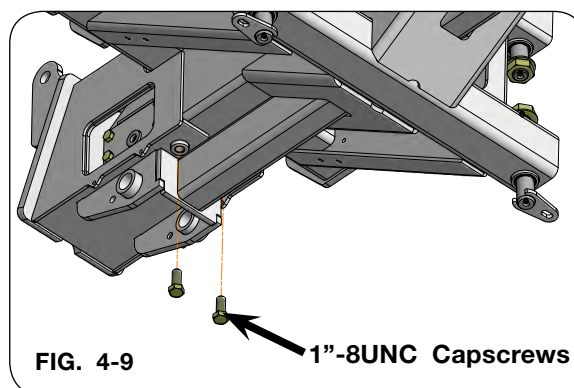


Roller Assembly Replacement (continued)

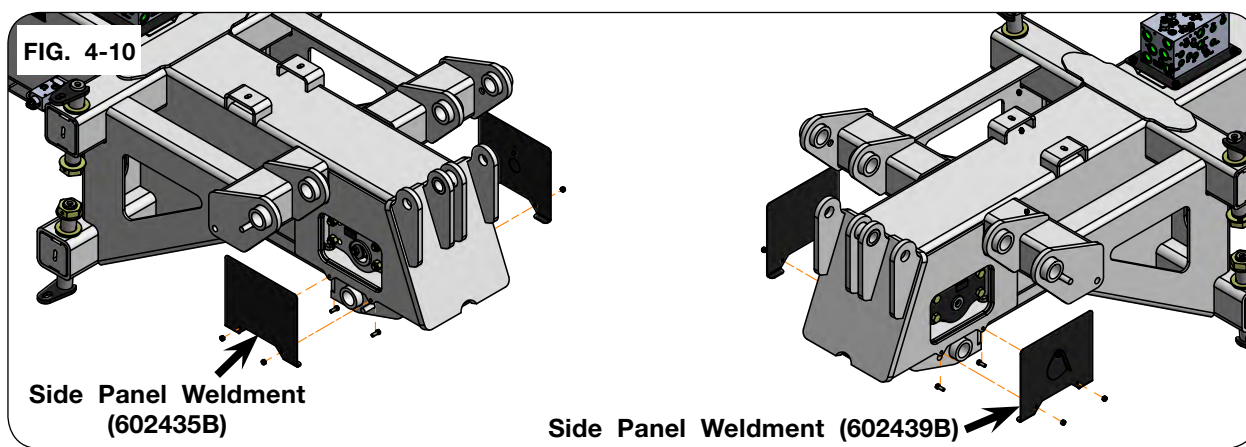
4. Replace roller assembly (602186B) and retain into position with the 3/4"-10UNC x 10" capscrews (9390-450) and 3/4"-10UNC locknuts (9802) previously removed. (FIG. 4-8)



5. Remove the two 1"-8UNC capscrews used to relieve the pressure on the roller assembly. (FIG. 4-9)



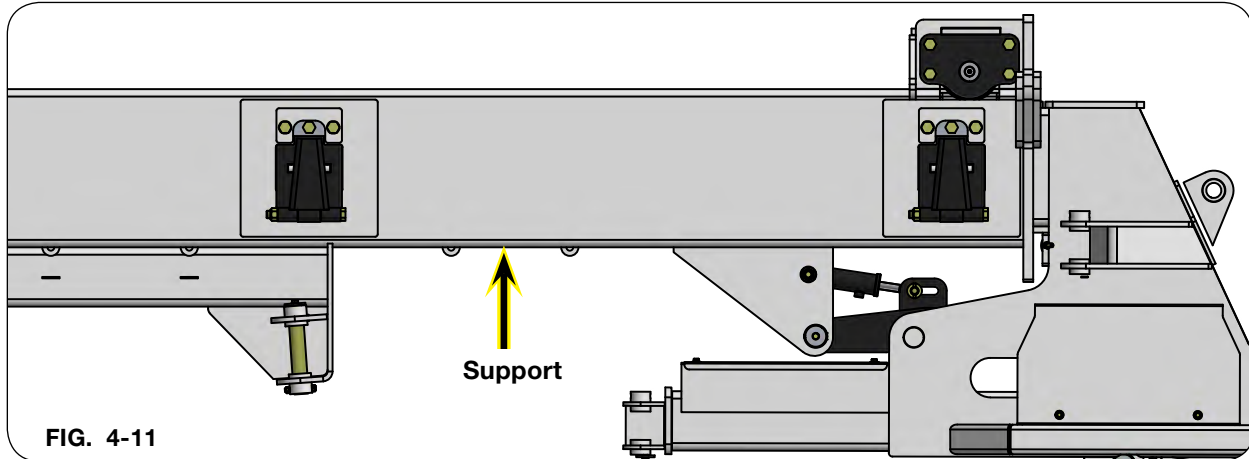
6. Reattach the side panel weldments (602435B and 602439B) with the 3/8"-16UNC x 1" capscrews (9390-055) and 3/8"-16UNC locknuts (9928) previously removed. (FIG. 4-10)



Roller Assembly Replacement (continued)

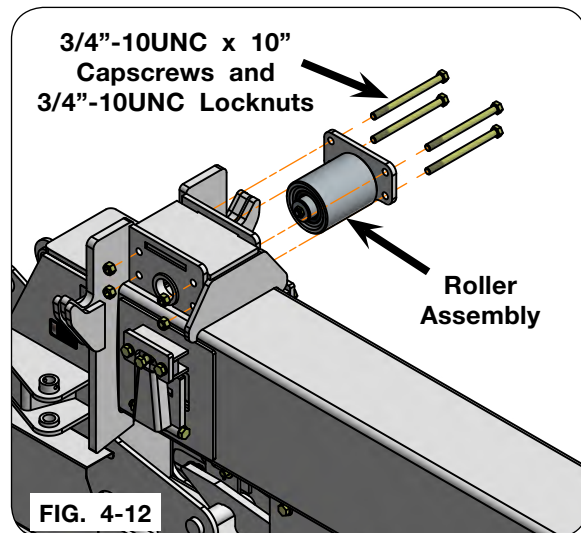
Front Roller Assembly Replacement

1. Using the hydraulic jack, raise the tongue a few inches off the tractor drawbar. Place a support stand rated at a minimum of 6,000 lbs. under the main frame weldment. Lower the hydraulic jack allowing the support stand to fully carry the main frame. Ensure there is no weight remaining on the roller. Shut off the tractor engine, set the parking brake, and remove the ignition key. (FIG. 4-11)



NOTE: Avoid pinching hydraulic hoses when adding support under main frame weldment.

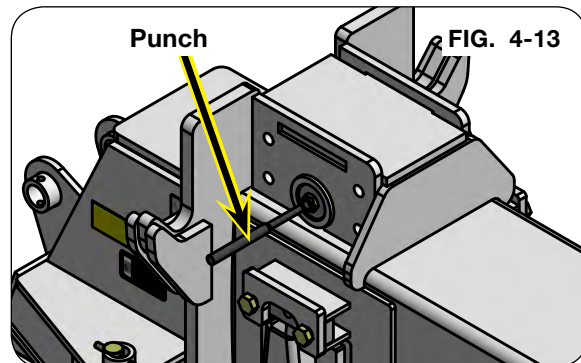
2. Remove and save the 3/4"-10UNC x 10" capscrows (9390-450) and 3/4"-10UNC locknuts (9802) retaining the roller assembly (602186B). (FIG. 4-12)



NOTE: If necessary, use a punch on the end of the spindle to help drive the assembly. (FIG. 4-13)

NOTE: If replacing roller assembly components, refer to "Roller Component Replacement".

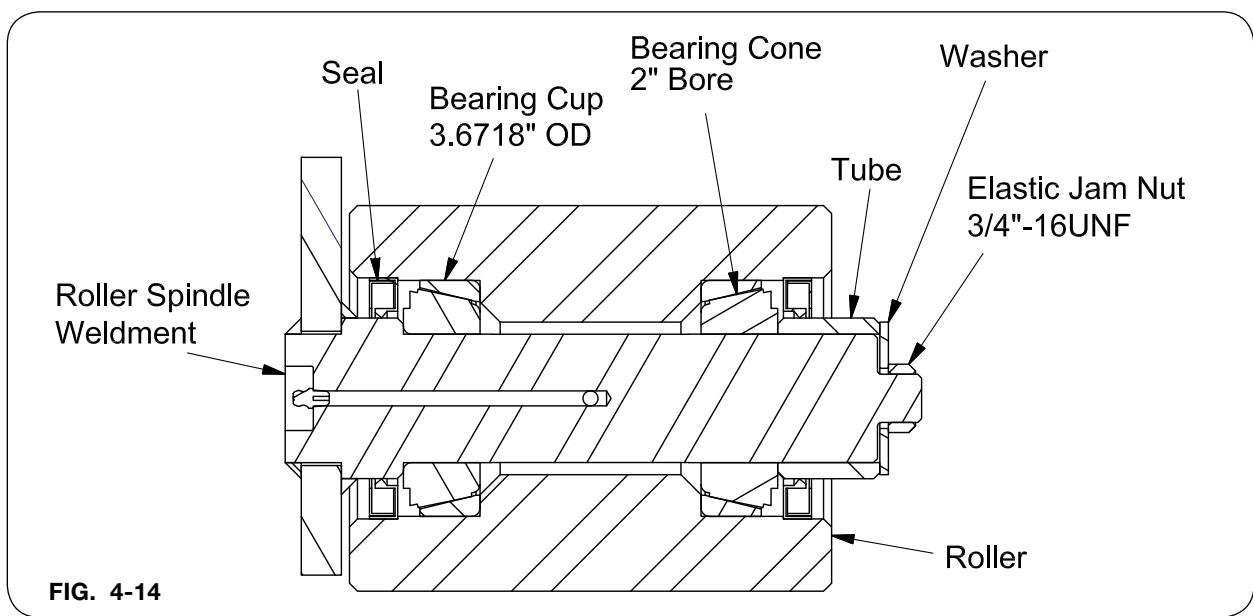
3. Replace roller assembly (602186B) and retain into position with the 3/4"-10UNC x 10" capscrows (9390-450) and 3/4"-10UNC locknuts (9802) previously removed. (FIG. 4-12)



Roller Assembly Replacement (continued)

Roller Component Replacement

1. Pack bearing and cavity. Fill with high quality extreme pressure grease (NLGI Grade 2).
2. Use grease to lubricate the seal lip. (FIG. 4-14)
3. Place the roller onto the roller spindle weldment. Rotate the roller while doing this so the seal lip does not fold under as the lip goes on the seal lip of the roller spindle weldment. (FIG. 4-14)
4. Be sure the outer bearing cone slides on the roller spindle weldment and into the bearing cup. (FIG. 4-14)
5. While rotating the roller, tighten the elastic jam nut to remove all play. (FIG. 4-14)
6. Turn the elastic jam nut 1/6" turn to seat. (FIG. 4-14)



TerrainPro Row Unit

⚠ 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.
- 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.

⚠ CAUTION

- SHARP EDGES ON THE MACHINE CAN CAUSE INJURY. BE CAREFUL WHEN WORKING AROUND THE MACHINE.

The shank has replaceable wear plates and point, which after a period of time will need to be replaced (FIG. 4-10). To replace these components on your machine, refer to the following guidelines:

Point & Wear Plates Replacement

1. With the Raptor implement attached to a tractor, find a firm, level surface and unfold the wings. Lower the machine until the points are 1"-2" off 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" capscrew (9390-102) and 1/2"-13UNC locknut (9800). (FIG. 4-15)
3. Loosen the center wear plates 1/2"-13UNC x 1 3/4" capscrews (9390-102) and 1/2"-13UNC locknuts (9800). (FIG. 4-15)
4. Remove and save the 1/2"-13UNC x 1 3/4" capscrew (9390-102) and 1/2"-13UNC locknut (9800). (FIG. 4-15)
5. Remove the point (601983B). (FIG. 4-15)

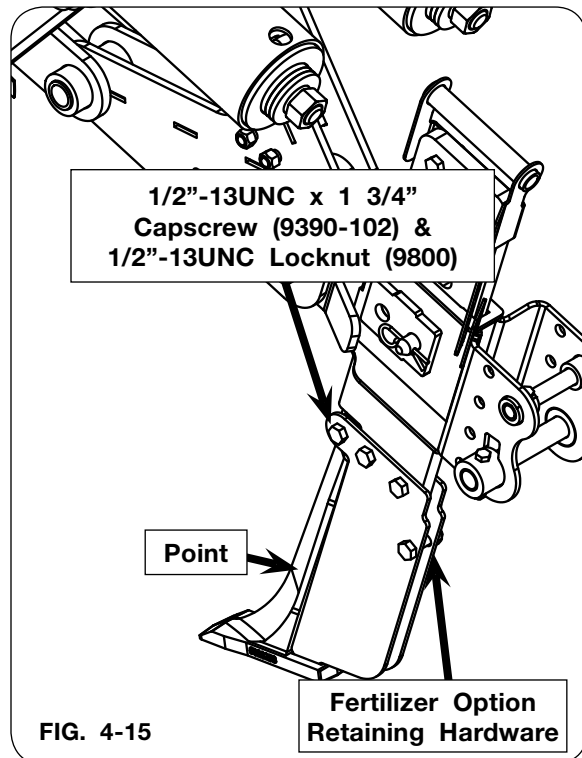


FIG. 4-15

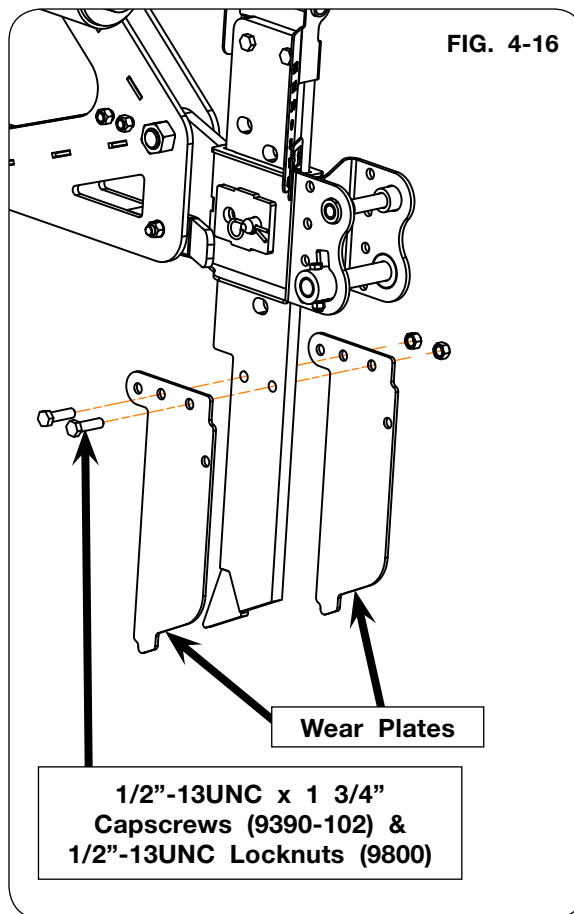
TerrainPro Row Unit (continued)

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

7. Remove the wear plate 1/2"-13UNC x 1 3/4" capscrews (9390-102) and 1/2"-13UNC locknuts (9800). (FIG. 4-16)

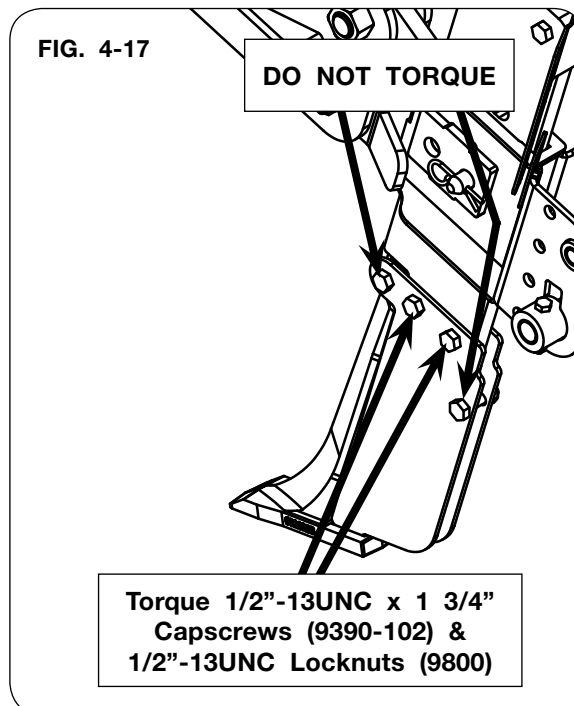
8. Replace wear plates (603758B) and loosely secure with previously removed 1/2"-13UNC x 1 3/4" capscrews (9390-102) and 1/2"-13UNC locknuts (9800). (FIG. 4-16)

9. Install point (601983B) and secure with previously removed 1/2"-13UNC x 1 3/4" capscrew (9390-102) and 1/2"-13UNC locknut (9800) (FIG. 4-16). **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 locknut (9800) (FIG. 4-17). **DO NOT TORQUE HARDWARE.**

11. Torque the center wear plates 1/2"-13UNC x 1 3/4" capscrews (9390-102) and 1/2"-13UNC locknuts (9800) according to "Torque Chart" in MAINTENANCE section. (FIG. 4-17)



TerrainPro Row Unit (continued)

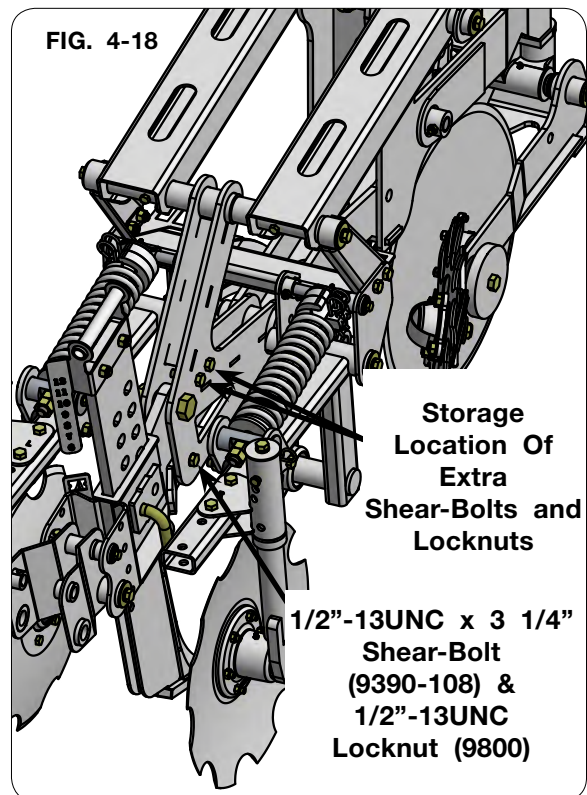
Shear-Bolt Replacement

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.

1. With the Raptor implement attached to a tractor, find a firm, level surface and unfold the wings. Lower the machine until the points are 1"-2" off 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. (FIG. 4-18)
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."



TerrainPro Row Unit (continued)

Lead Coultter Spring Replacement

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

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.

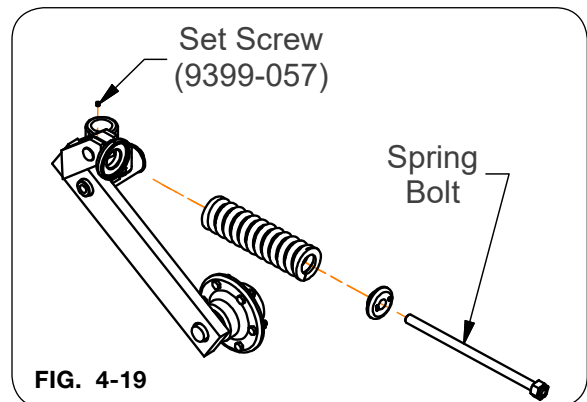
CAUTION

- 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 coultter arm (FIG. 4-19).
2. Slowly unscrew the spring bolt which will relieve spring pressure (FIG. 4-19).
3. Once the bolt is removed, replace with new spring and re-insert bolt.

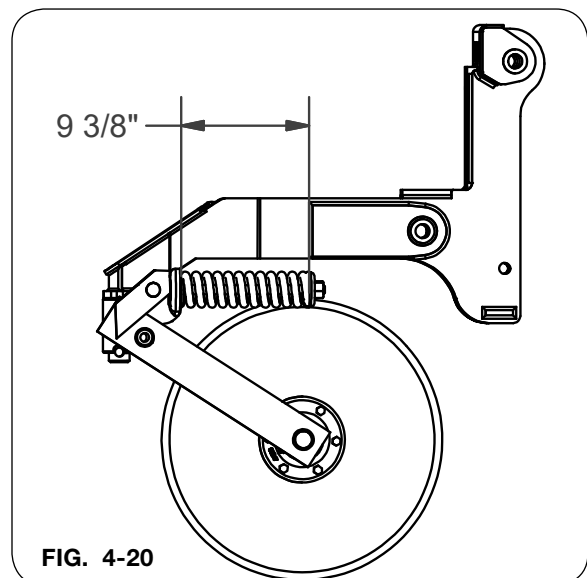


4. Tighten bolt until the spring is compressed to 9 3/8" (FIG. 4-20).

The coultter 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.



Hub Adjustment and Replacement For Lead Coulters and Closing Coulters

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.

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

⚠ 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 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.

1. Remove the blade.
2. Attach a C-clamp and apply pressure to both sides of the coultter hub (FIG. 4-21).



FIG. 4-21

3. Remove the retaining ring and hub cap. Refer to FIG. 4-22.

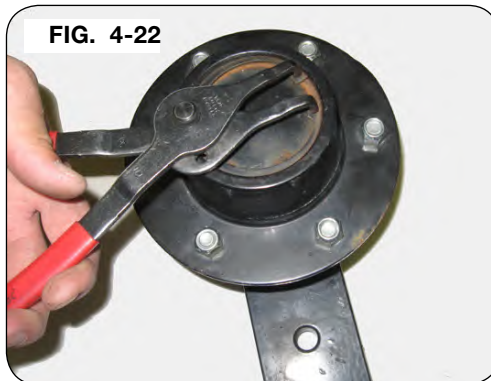


FIG. 4-22

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

4. Remove the retainer securing the slotted nut.

IMPORTANT

- Removal of the C-ring is best accomplished by using two screwdrivers or similar tools and prying on the outside ends to spread the ring. If the ring is damaged discard and replace.
- 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.

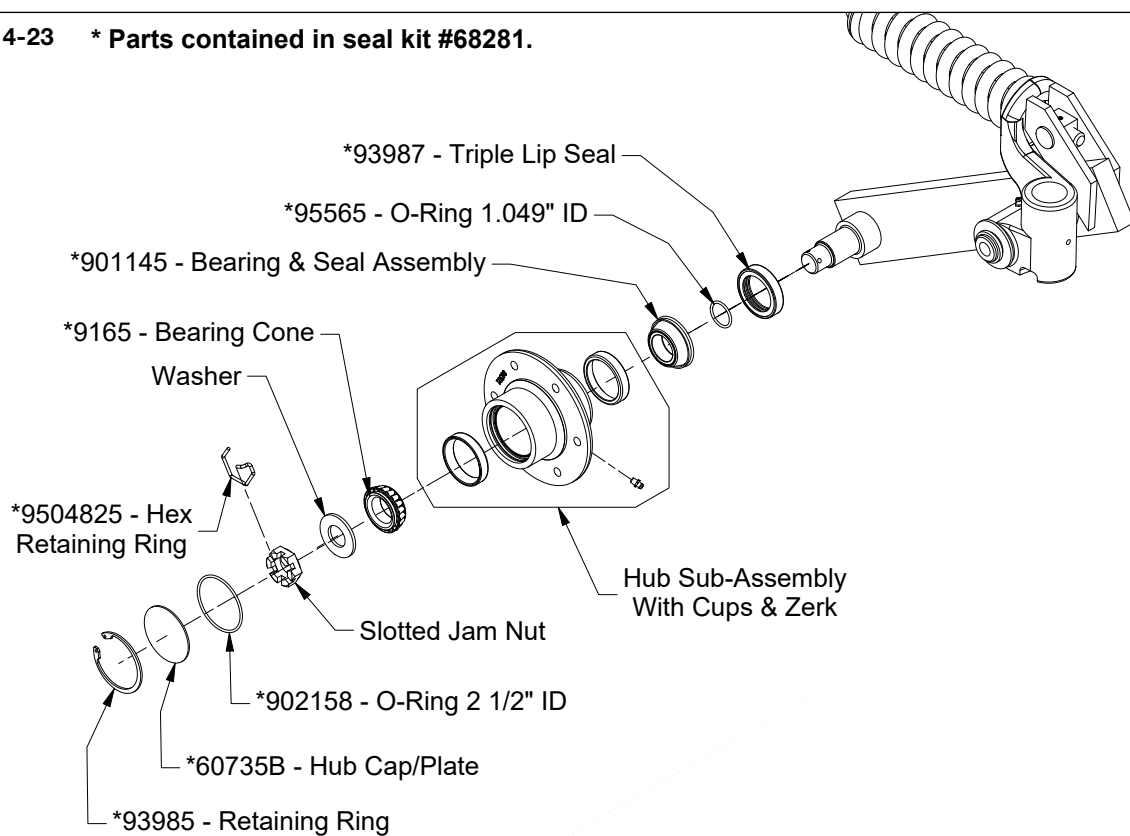
5. Unscrew the nut and carefully remove the hub from the spindle.

6. 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.

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.

FIG. 4-23 * Parts contained in seal kit #68281.



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

7. Replace any damaged parts before reassembling the components. Be sure to remove any debris or dirt and repack the bearings with an SAE approved hub grease.
8. Slide the O-ring onto the spindle first.
9. Use grease to lubricate seal.
10. 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.
11. Assemble nut to spindle. While rotating hub, tighten nut to 40 Ft.-Lbs. Do not rotate hub again until step 15.

IMPORTANT

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

12. Back off nut until it becomes loose without rotating hub.
13. Finger tighten nut without rotating hub.
14. Tighten nut to align the next notch with hole in the spindle.
15. Check for looseness in the hub. It should not wiggle. If it does, tighten the nut one more slot and repeat this step.
16. Check hub rotation for excessive drag. There should be slight resistance. If there is excessive drag, repeat procedure starting at step 11.
17. Install hex retaining ring and verify it has clearance to the hub cap. Ring should be tight to nut/spindle.

IMPORTANT

- *Assembly of the C-ring is best accomplished by the use of a hog ring type pliers or similar tool. After the installation be sure the C-ring will lay flat against the spindle retaining the nut to allow for proper installation of the hub cap.*
18. Add moly scent 2 grease through hub zerk until grease extends above the washer all around the cavity.
 19. Reinstall the hub cap and blade. Use a C-clamp to compress dust cap and then seat 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.

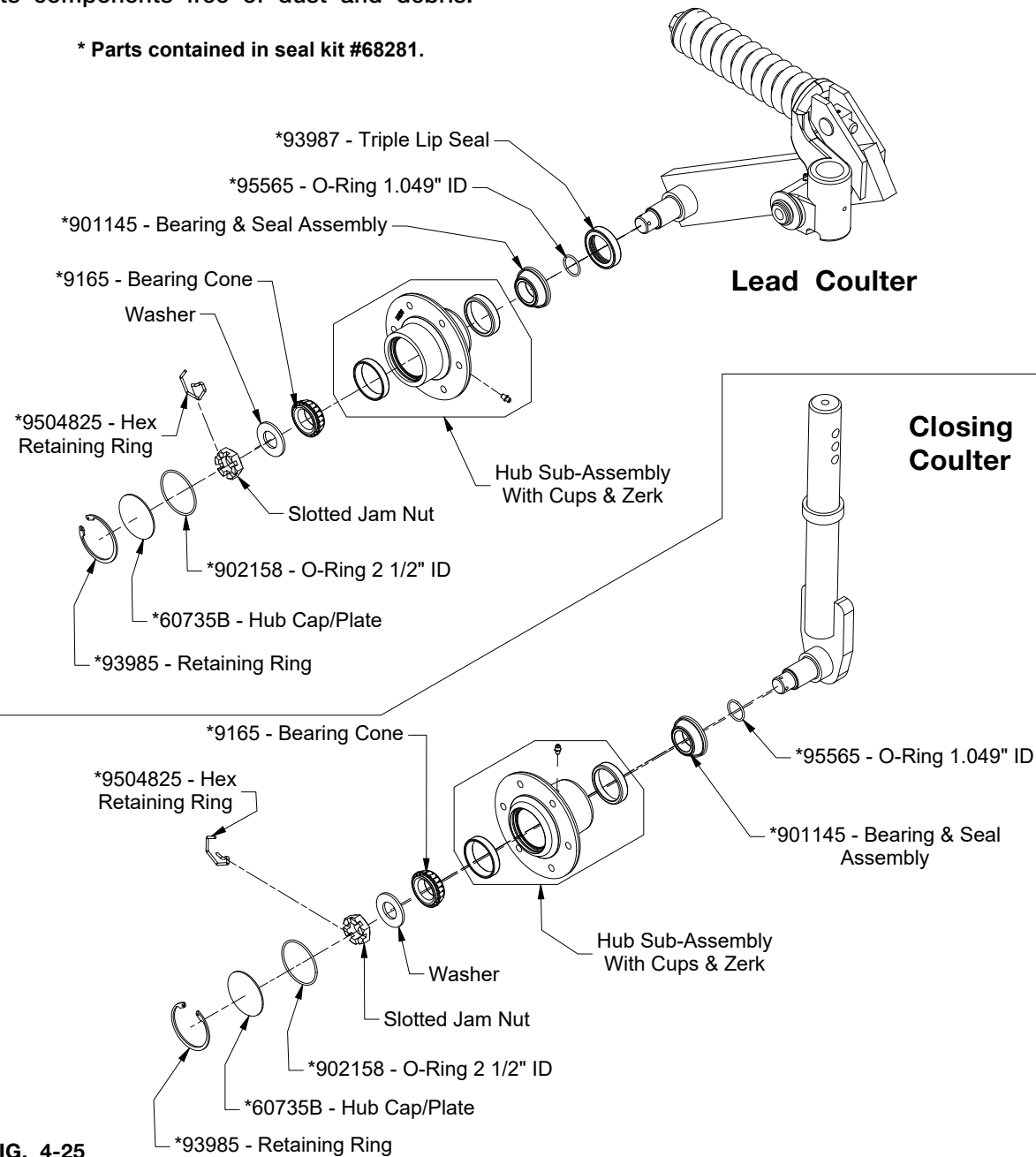


FIG. 4-25

Replacing Bearings In Conditioner Rolling Harrow Baskets

⚠ WARNING

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

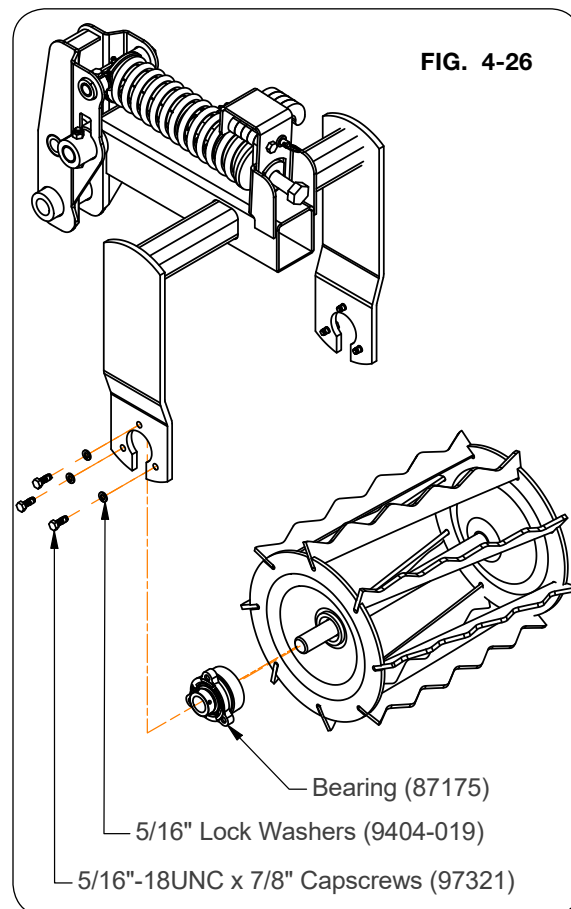
1. Lower support stand and implement to the ground and securely block to prevent tipping, or moving. Shut off tractor, set parking brake, and remove ignition key.
2. Install block under each basket to support weight of basket.
3. Remove the three 5/16"-18UNC carriage bolts which hold the bearing to the frame.
4. Use a crowbar or similar to pry the end of the basket out of the basket frame slot.
5. Loosen the set screw in the lock collar. Loosen lock collar by turning with punch in direction of basket travel.
6. Remove the bearing.
7. File off any burrs left on the shaft. Finish with a strip of emery cloth. Make sure bearing will slide on the shaft.
8. Slide a new bearing (87175) on the shaft with the lock collar on the outside (FIG. 4-26).
9. Pry the end of the basket into the slot of the frame (FIG. 4-26).
10. Assemble the new 5/16"-18UNC capscrews through the holes in the frame and into the bearing housing (FIG. 4-24). Tighten screws according to Torque Chart, in this section.

IMPORTANT

- *Tighten screws in bearing before tightening setscrew in lock collar.*

11. Tighten lock collar on shaft in direction of rotation.

Use UNVERFERTH bearing repair kit (87181) with triple lip seals for maximum life.



Row Cleaner Wheel Hub Adjustment

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

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.*
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 (9501381). Torque nut (9397-016) 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 strap, hub cap, jam nut, and washer from the spindle.

IMPORTANT

- b. Remove the bearing cones, hub with tooth wheel, O-ring and seals from the spindle.
- c. 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.

IMPORTANT

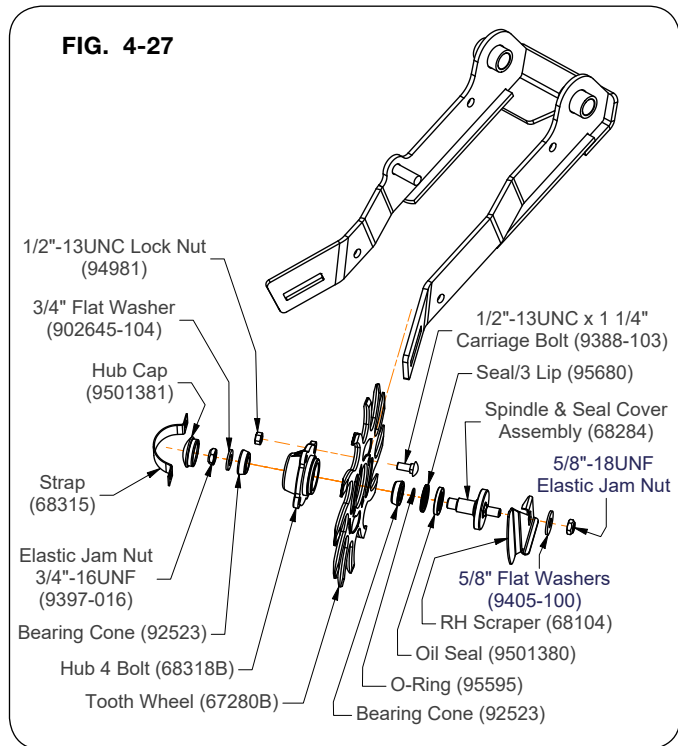
- d. Replace any damaged parts before reassembling the components. Be sure to remove any debris or dirt and repack bearings with an SAE approved hub grease.

Row Cleaner Wheel Hub Adjustment (continued)

- e. Assemble seal and bearings into hub and position onto spindle.
- f. Apply grease to the I.D. of the seal (95680). While rotating the hub, place the hub on the spindle and seal cover (68284) making sure not to damage the seal. Assemble the washer and nut. Torque the jam nut (9397-016) 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.

IMPORTANT

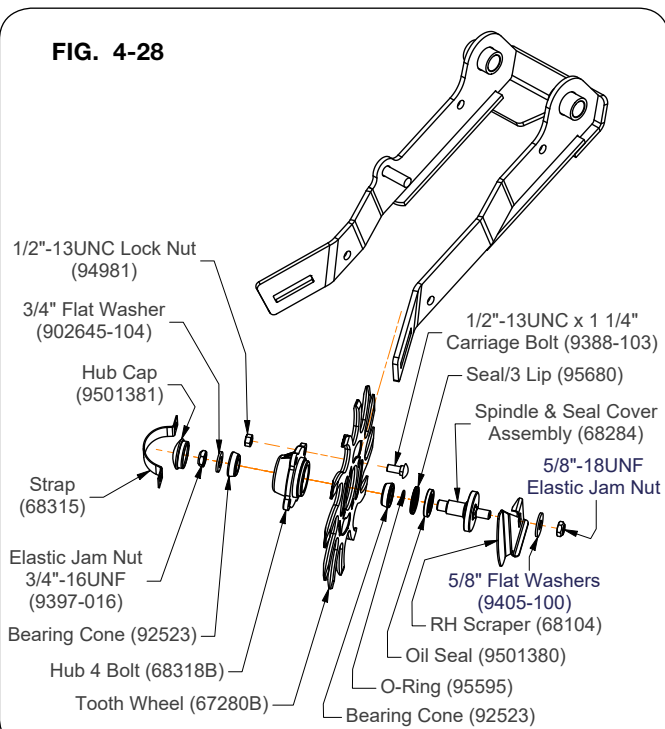
- Rotate coultter hub when torquing jam nut. Doing this will prevent flats from forming on bearings.



Row Cleaner Wheel Replacement

1. To replace a worn tooth wheel (67280B), remove and save the 5/8"-18UNF elastic jam nut (9397-015), 5/8" flat washer (9405-100), scraper and the hub/spindle assembly from the mounting arm. (FIG. 4-28)
2. Remove the four locknuts (94981) and carriage bolts (9388-103). Replace and reinstall tooth wheel (67280B) and hardware.
3. Reinstall the hub/spindle assembly onto the mounting plate and secure with scraper, 5/8" flat washer (9405-100), and 5/8"-18UNF elastic jam nut (9397-015). (FIG. 4-28)

FIG. 4-28



Daily Service

Beginning of Day

NOTE: Before initial use, ensure all lubrication points have been greased.

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

Perform any daily lubrication outlined in “Lubrication” in this section.

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

IMPORTANT

- *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.

Annual Service

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 “Daily Service” in this section).

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.

PULL-TYPE RAPTOR — Maintenance

Troubleshooting

PROBABLE CAUSE

CORRECTION

Poor Penetration

Frame is not level

See the OPERATION section "Leveling Frame" for instructions

Ground is 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

Coulter blades not cutting residue

Wait until the field is dry enough to allow blades to cut through residue

Implement Running Crooked In Field

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"

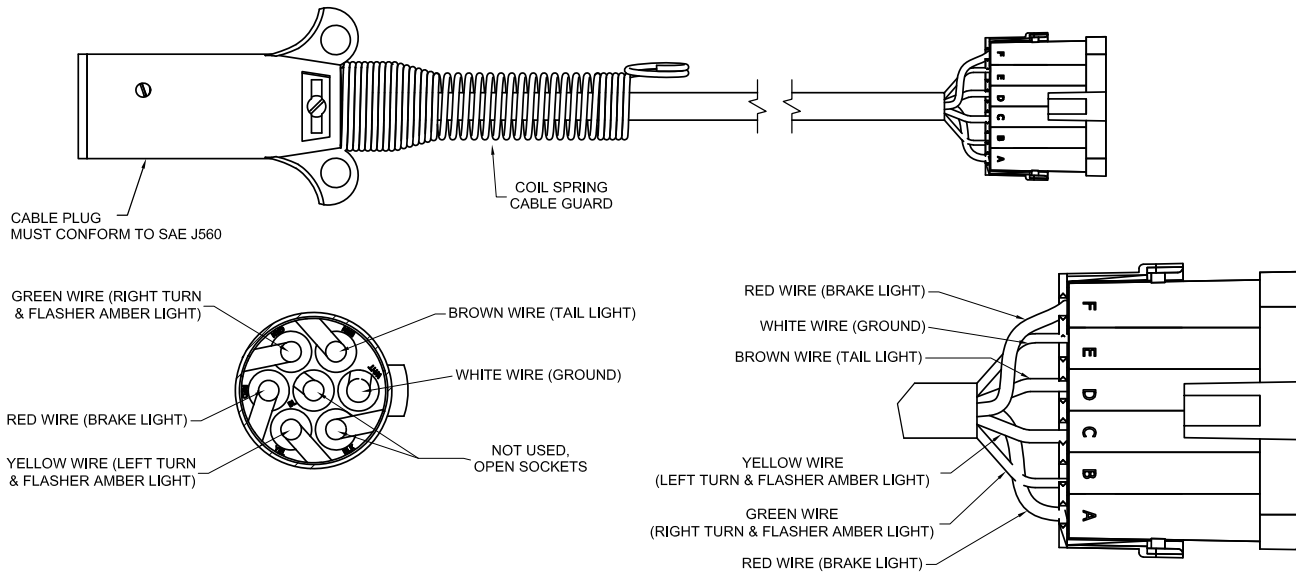
PULL-TYPE RAPTOR — Maintenance

Troubleshooting (continued)

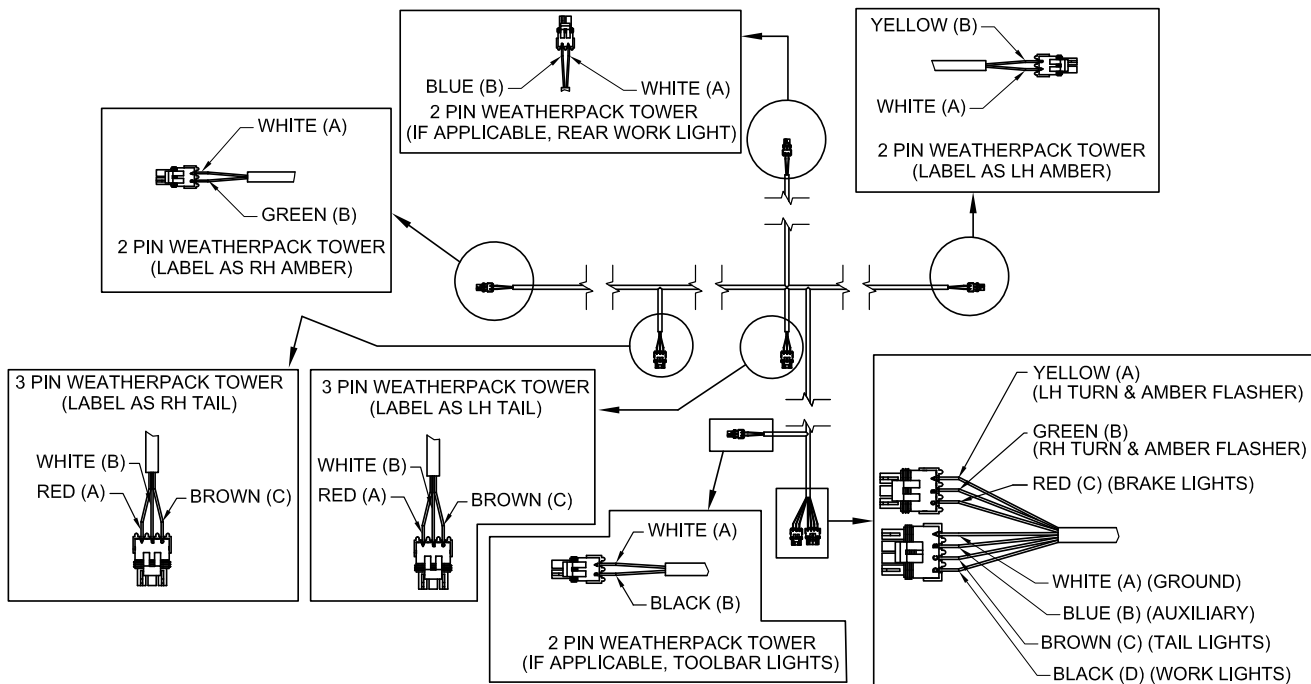
PROBABLE CAUSE	CORRECTION
Shanks Not Resetting Into Ground After Tripping	
Ground conditions hard or the unit is being operated very deep	While moving, raise Raptor slightly to reset, then lower and resume operation
Excessive Soil Disturbance	
Main frame not level, running downhill	Level main frame
Dry 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
Folding	
Toolbars will not fold up	Adjust cam valve (Normally Closed) striker plate/bracket
Toolbars will not fold down	Fold up then fold down
Wings will not fold to transport position	Completely unfold the unit and then fold
Lift cylinders lower when folding wings into cradle	Adjust cam valve (Normally Open) striker plate/bracket

Schematics - Electrical

Electrical Harness - Main 480" (45000)

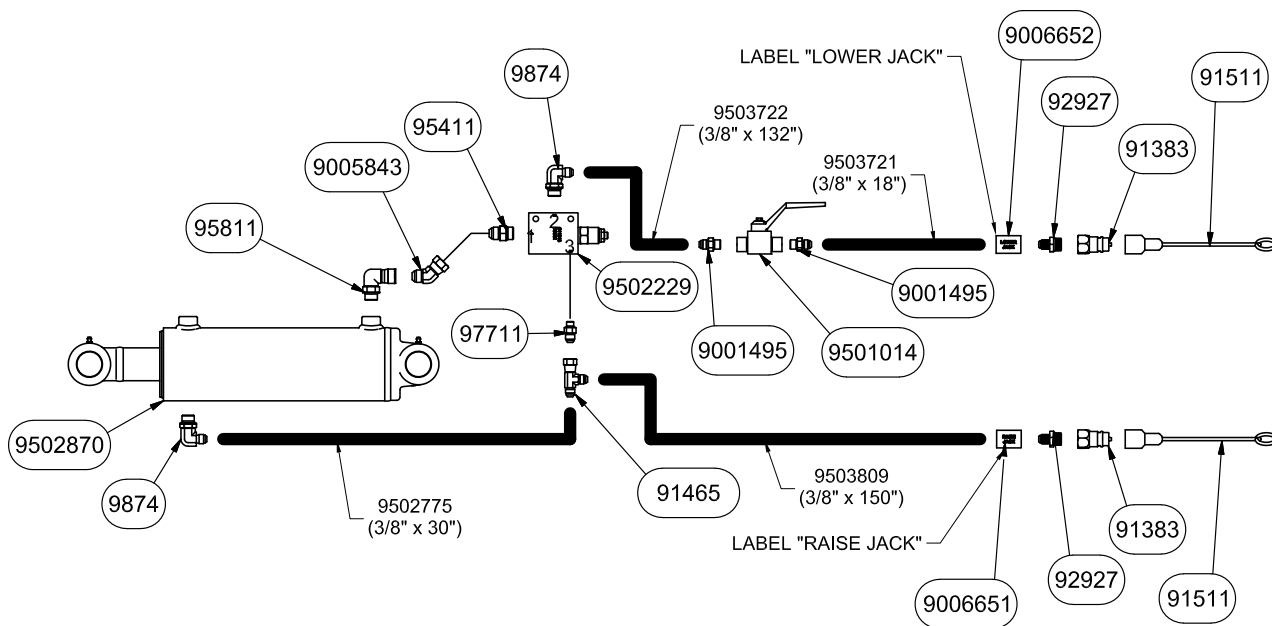


Electrical Harness - Light 418" (44999)

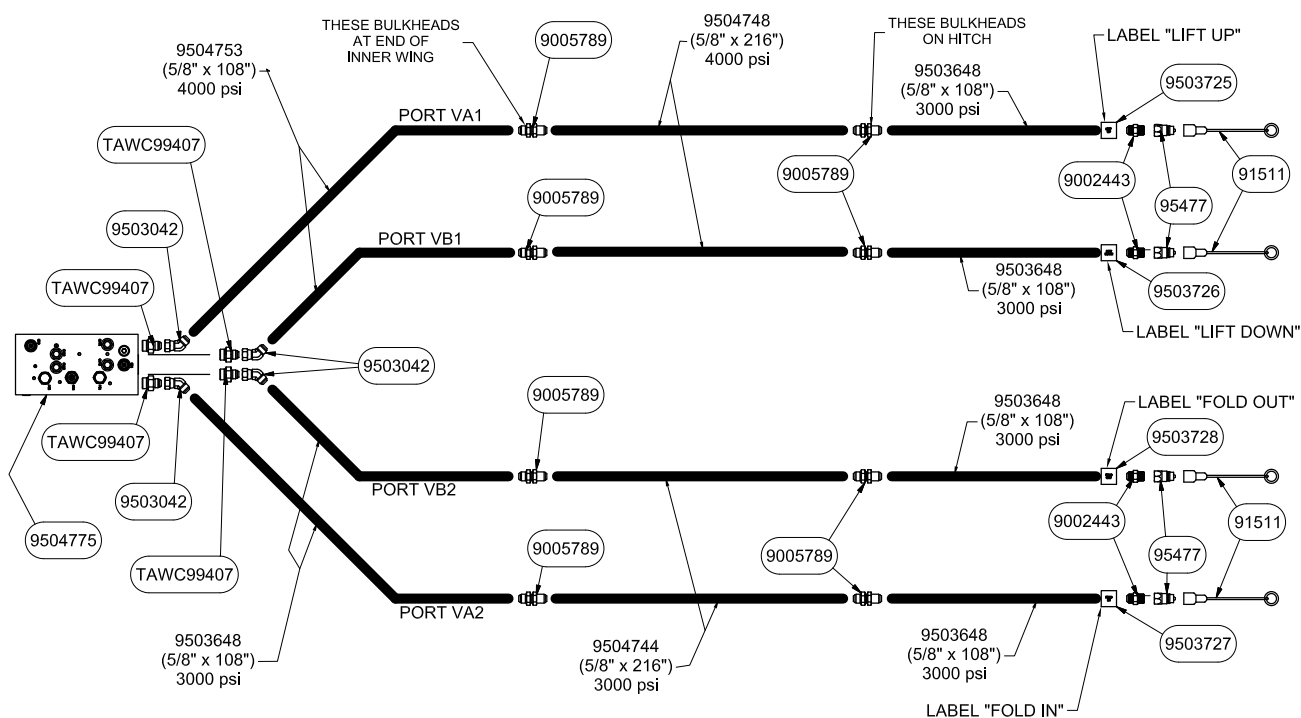


Schematics - Hydraulic

Tractor To Hydraulic Jack

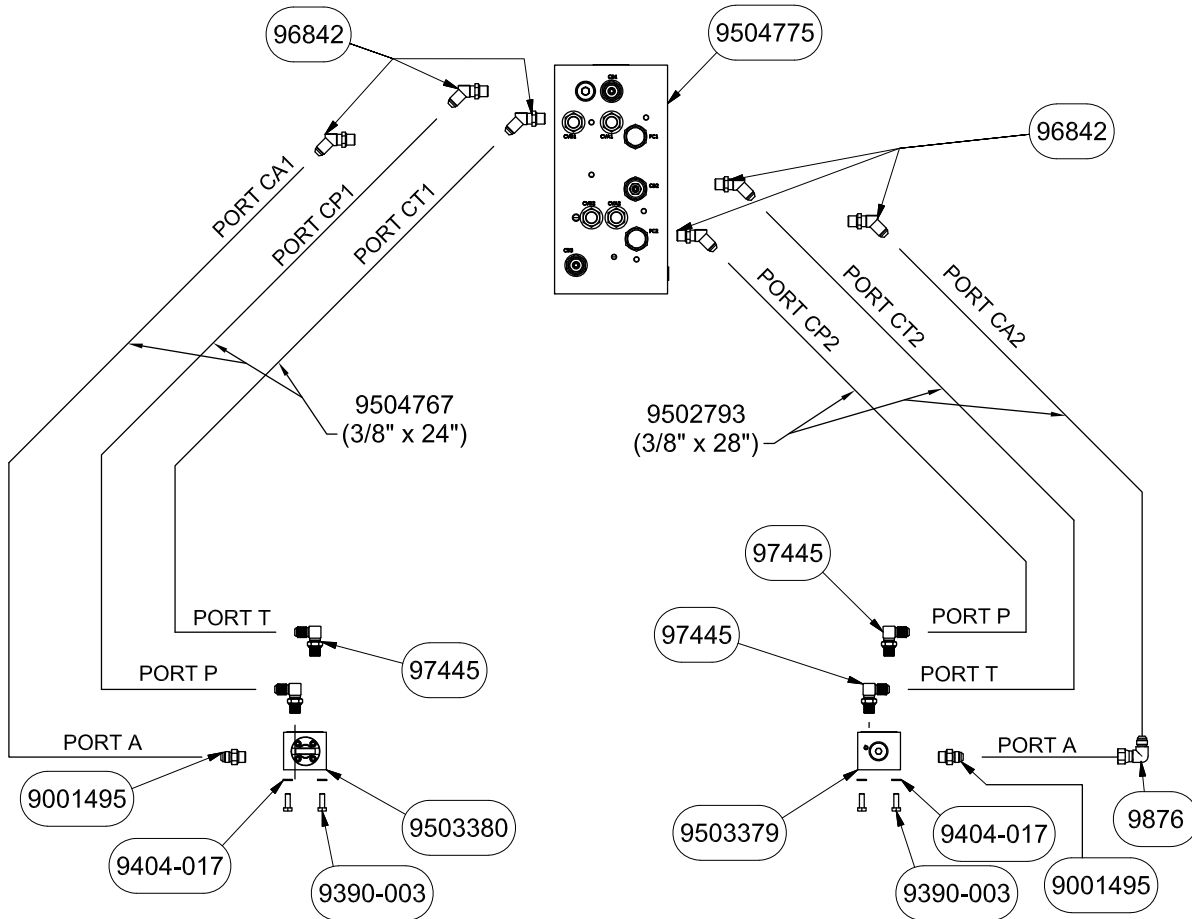


Tractor To Supply Valve - Serial Number A70040100 & Up



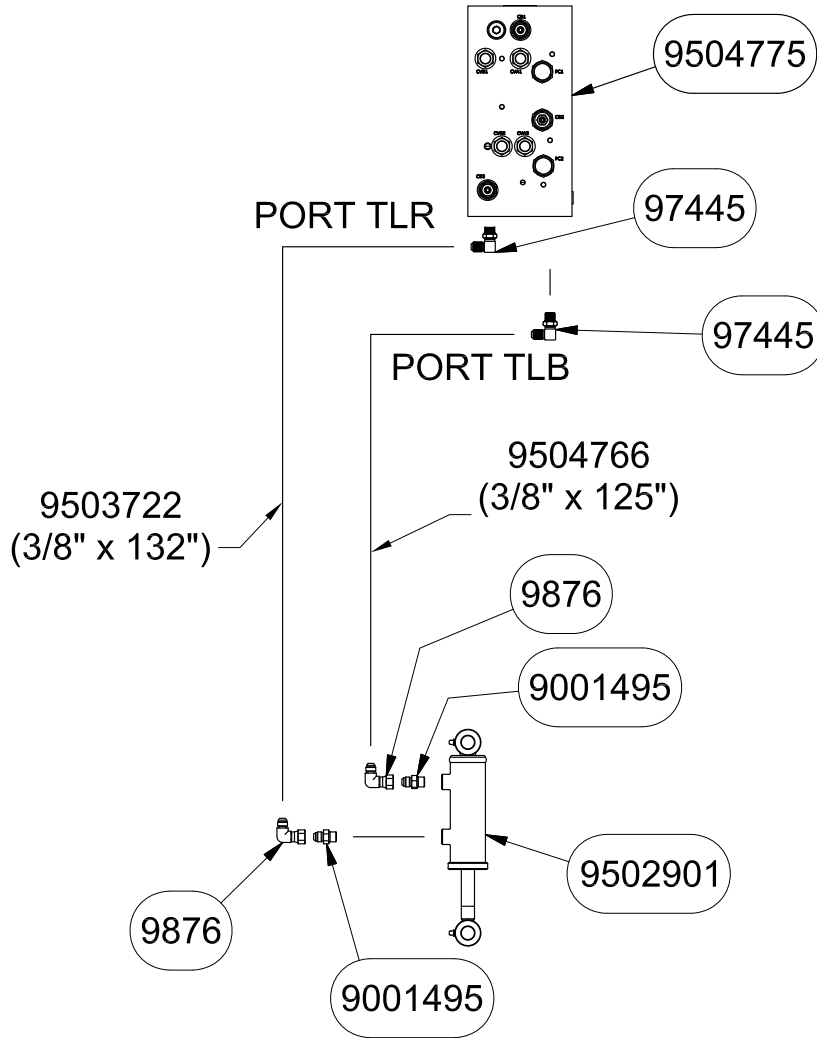
Schematics - Hydraulic (continued)

Supply Valve Assembly To Sequence Valves Serial Number A70040100 & Up



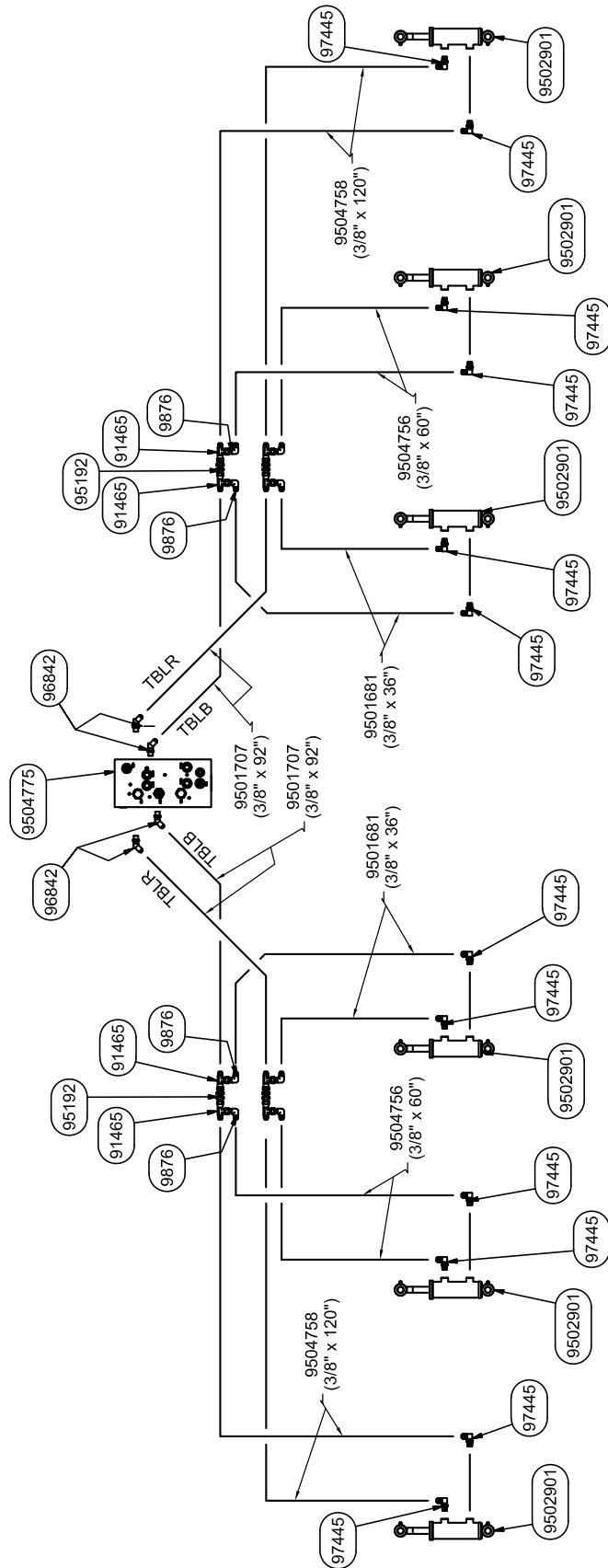
Schematics - Hydraulic (continued)

**Supply Valve Assembly to Tongue Latch
Serial Number A70040100 & Up**



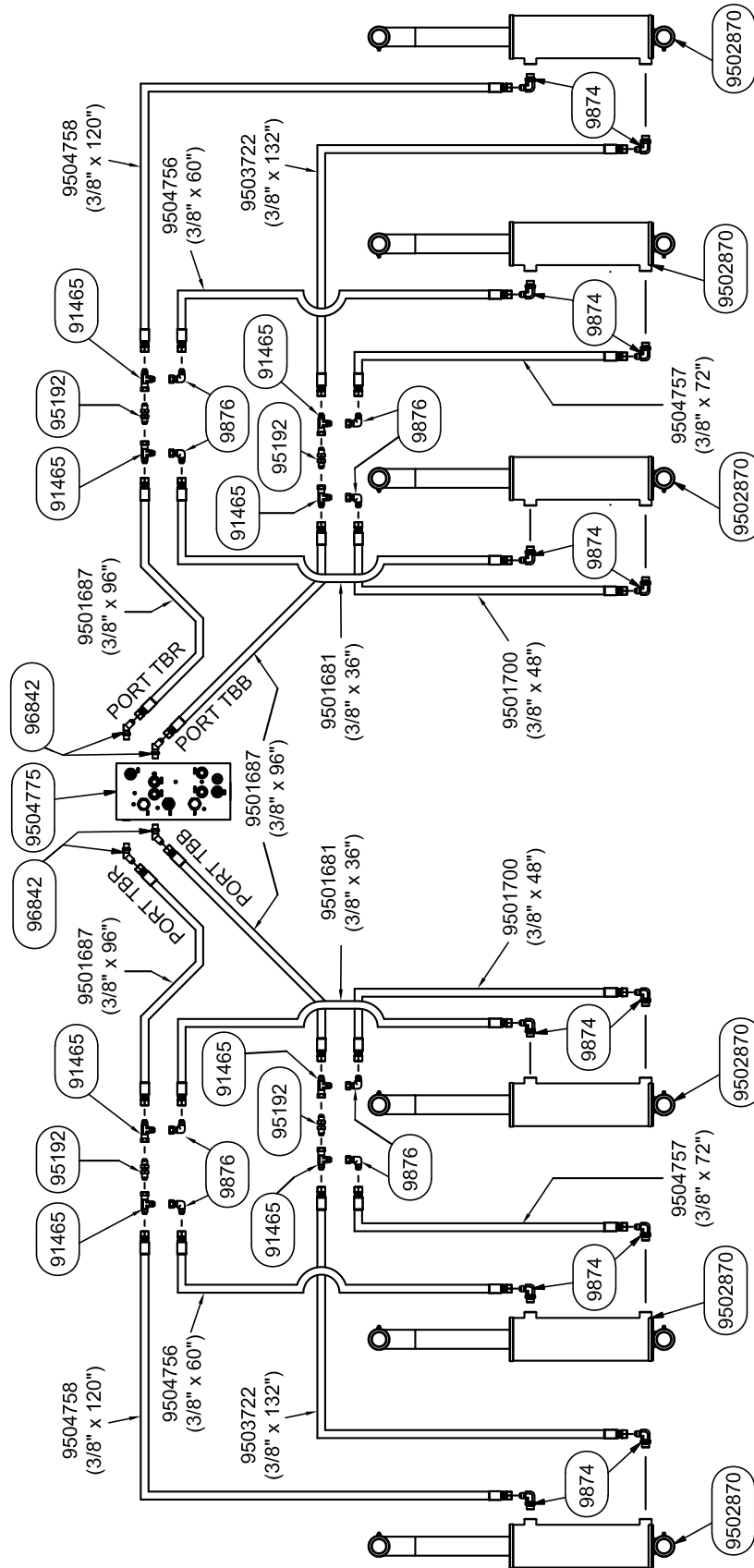
Schematics - Hydraulic (continued)

Supply Valve Assembly to Toolbar Latch - Serial Number A70040100 & Up



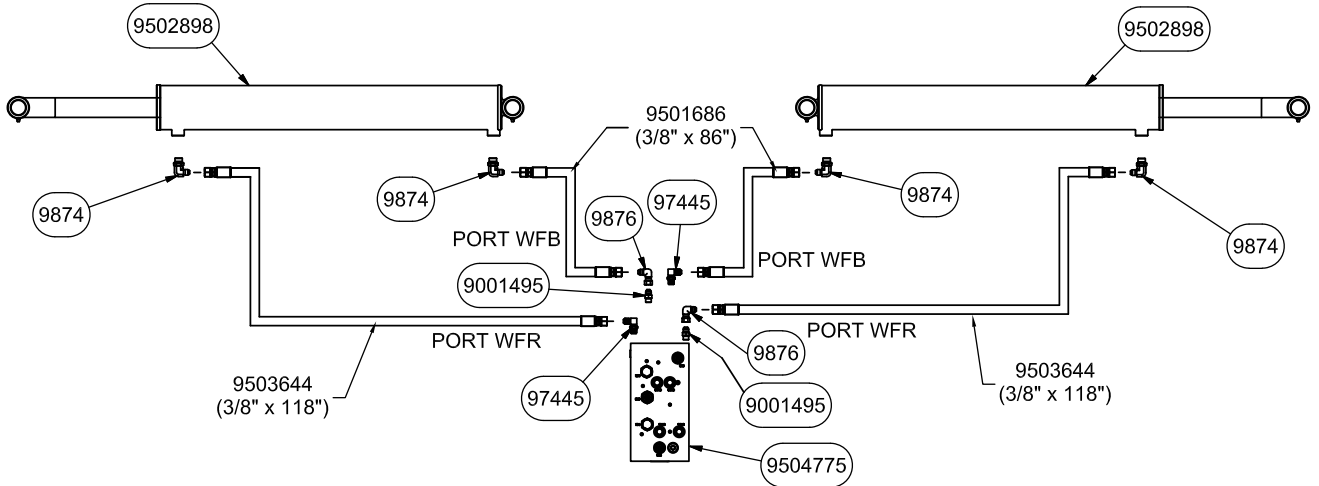
Schematics - Hydraulic (continued)

Supply Valve Assembly to Toolbar Fold - Serial Number A70040100 & Up



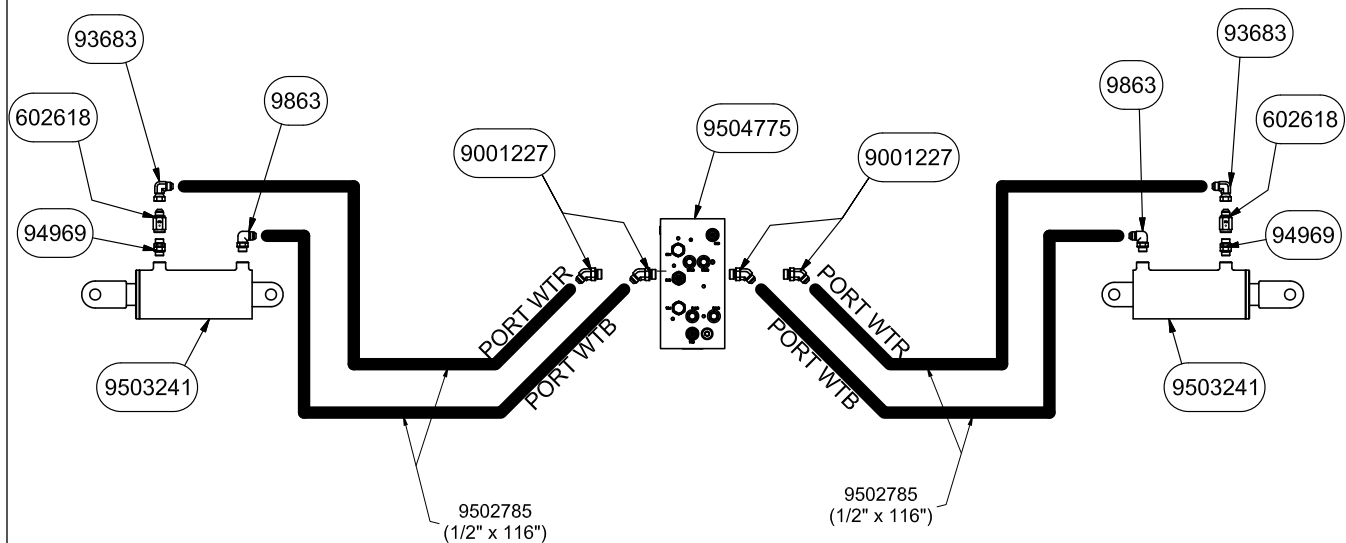
Schematics - Hydraulic (continued)

Supply Valve Assembly to Wings

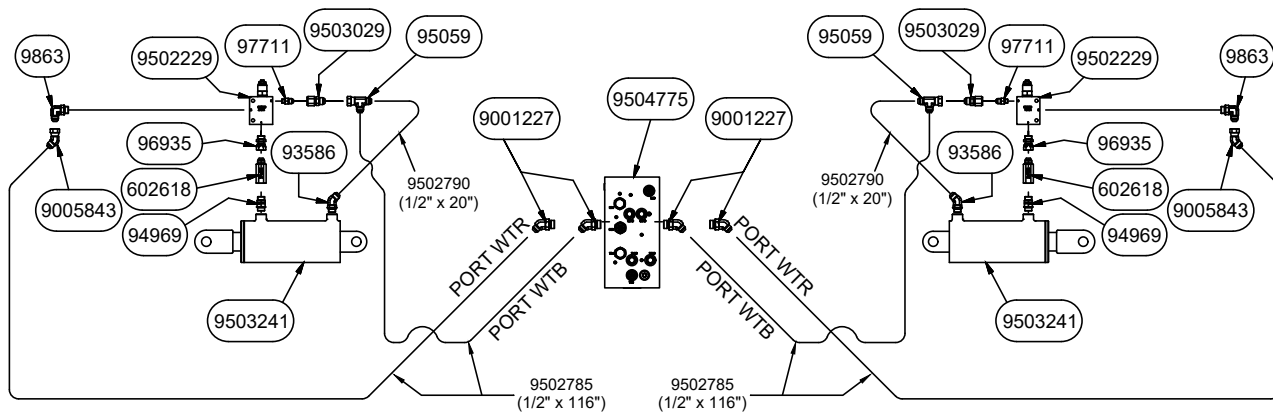


Schematics - Hydraulic (continued)

Supply Valve Assembly to Wing Tilt

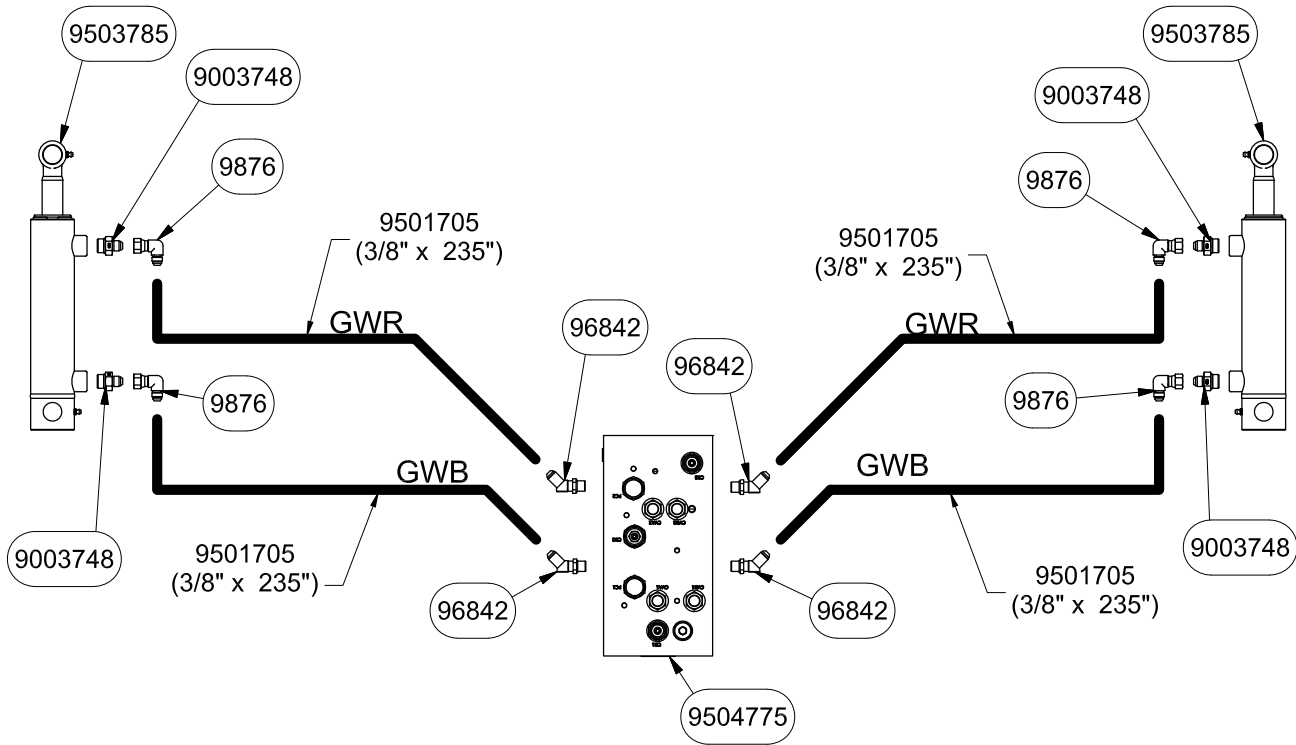


Supply Valve Assembly to Wing Tilt with Counterbalance Kit



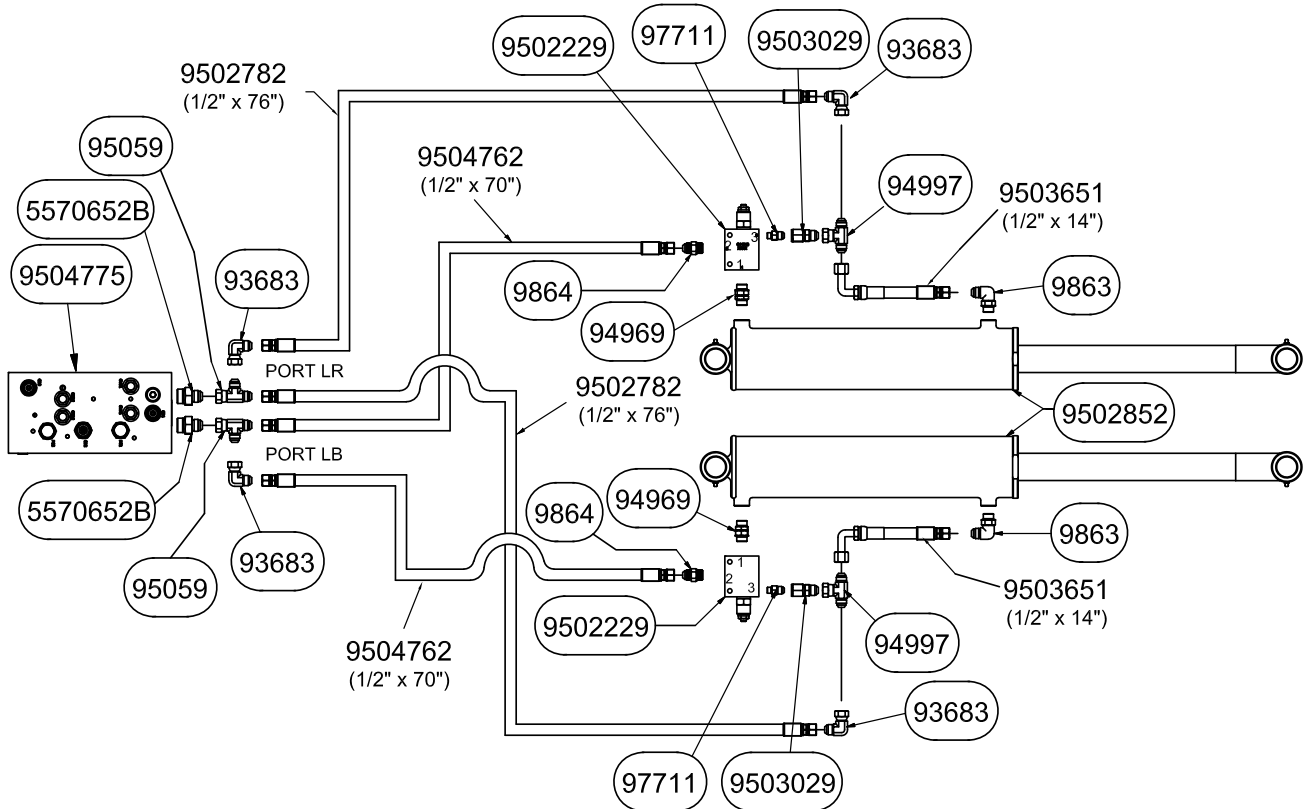
Schematics - Hydraulic (continued)

**Supply Valve Assembly to Gauge Wheels
Serial Number A70040100 & Up**



Schematics - Hydraulic (continued)

**Supply Valve Assembly to Parallel Link/Main Lift-Lower
Serial Number A70040100 & Up**



Wheel, Hub and Spindle Disassembly and Assembly

WARNING

- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE MACHINE IS SECURELY BLOCKED.**
- **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 30,000 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.**
- **KEEP HANDS CLEAR OF PINCH POINT AREAS.**

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 UNLOADED USE OR AFTER FIRST LOAD, AND EACH LOAD 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.**

IMPORTANT

- *Remove only one wheel and tire from a side at any given time in the following procedure.*
1. Hitch implement to tractor. Park on a firm, level surface. Set the tractor's parking brake, shut off engine and remove key.
 2. Use a safe lifting device rated at 30,000 lbs. to support the weight of your implement. Place the safe lifting device under the axle closest to the tire.
 3. Use a 300 lbs. safe lifting device to support the wheel and tire during removal.
 4. If only removing wheel and tire, skip to Step 8; otherwise continue with Step 4.



Remove the hardware retaining the hubcap. Next, remove the hubcap, gasket, cotter pin, castle nut and spindle washer. Remove hub with bearings from old spindle using a 200 lbs. lifting device.

Wheel, Hub and Spindle Disassembly and Assembly (continued)

5. Inspect the spindle and replace if necessary. If spindle does not need to be replaced, skip to Step 6; otherwise continue with Step 5.

Remove the bolt and lock nut that retain the spindle to the axle. Using a lifting device rated for 200 lbs., remove the old spindle. Coat spindle shaft with anti-seize lubricant prior to installation. Reuse bolt and lock nut to retain spindle to axle. Torque as outlined in Maintenance Section.

6. Remove seal and inspect bearings, spindle washer, castle nut and cotter pin. Replace if necessary. Pack both bearings with Extreme Pressure NLGI #2 grease and reinstall inner bearing. Install new seal in hub with garter spring facing inward to the hub by tapping on flat plate that completely covers seal while driving it square to hub. Install until flush with back face of hub. Using a 200 lb. rated lifting device, install hub assembly onto spindle. Install outer bearing, spindle washer and castle nut.

IMPORTANT

- *Do not use an impact wrench!*

7. Slowly tighten castle/slotted nut while spinning the hub until hub stops rotating. Turn castle nut counterclockwise until the hole in the spindle aligns with the next notch in castle nut. Hub should spin smoothly with minimal drag and no end play. If play exists, tighten to next notch of castle nut. If drag exists, then back castle nut to next notch. Spin and check again. Install cotter pin. Clean face for hub cap gasket and install gasket, grease- filled hub cap and retain hubcap with hardware removed. Tighten hubcap hardware in alternating pattern.
8. Attach the wheel(s) and tire(s) to the hub using the same rated safe lifting device for removal. Tighten wheel nuts to appropriate requirements and recheck as outlined in the Wheels and Tires section of this manual.
9. Raise implement, remove lifting device and lower tire to the ground.

Wheels and Tires

Wheel Nut Torque

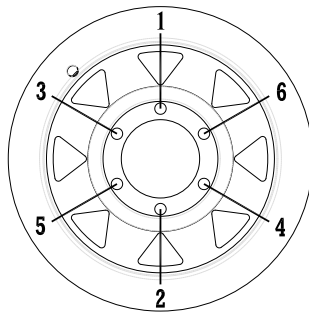
⚠ CAUTION

- 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.**

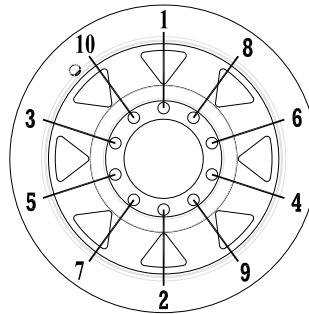
Failure to check torque before first use may damage wheel nut/bolt seats. Once seats are damaged, it will become impossible to keep nuts/bolts tight. Tighten nuts/bolts to applicable torque value shown in table. Start all nuts/bolts by hand to prevent cross threading. Torque nuts/bolts in the recommended sequence as shown in Diagram 4-1.

WHEEL HARDWARE	
SIZE	FOOT-POUNDS
9/16"-18 (UNF)	110 Ft.-Lbs.
7/8"-14 (UNF)	450 Ft.-Lbs.
M22-2.5P	450 Ft.-Lbs.

Diagram 4-1



6 Bolt



10 Bolt

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
240/80R15F - 121D	max. 46 PSI
380/90R46 R-1W - 159A8	max. 58 PSI

(All tire pressures in psi)

Wheels and Tires

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 www.titan-intl.com
or Phone 800-USA-BEAR
Goodyear 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 1/4-28	8-10 9-11	11-13 12-15
5/16-18 5/16-24	15-17 17-19	20-23 23-26
3/8-16 3/8-24	25-28 28-31	34-38 38-42
7/16-14 7/16-20	40-45 45-50	54-61 61-68
1/2-13 1/2-20	62-68 68-75	84-92 92-102
9/16-12 9/16-18	90-98 100-110	122-133 134-148
5/8-11 5/8-18	120-135 124-137	162-183 168-186
3/4-10 3/4-16	200-220 210-230	270-300 285-310
7/8-9 7/8-14	330-350 360-380	425-475 460-515
1-8 1-14	500-525 540-560	675-710 730-760
1 1/8-7 1 1/8-12	600-635 665-700	815-860 920-950
1 1/4-7 1 1/4-12	850-895 940-990	1150-1215 1275-1340
1 3/8-6 1 3/8-12	1125-1175 1280-1335	1525-1590 1735-1810
1 1/2-6 1 1/2-12	1500-1560 1685-1755	2035-2115 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.

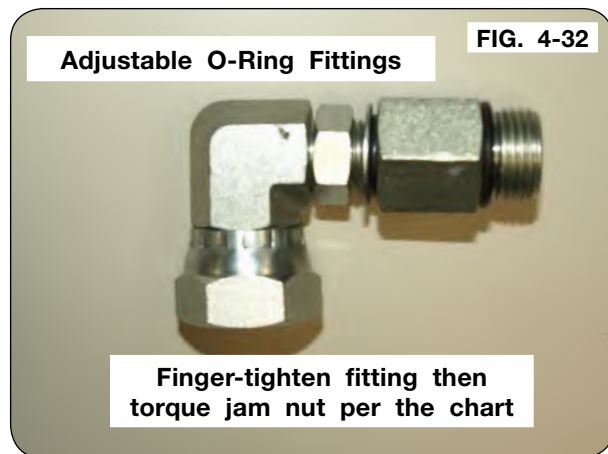
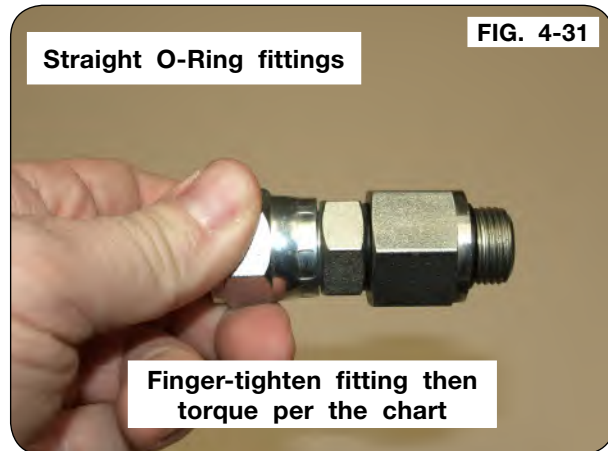
Hydraulic Fittings - Torque and Installation

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

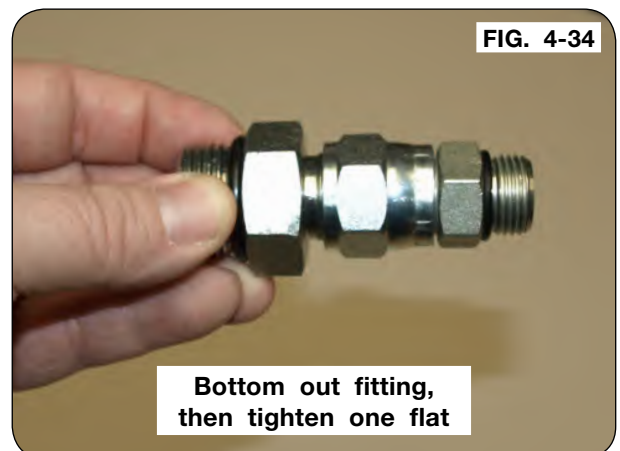
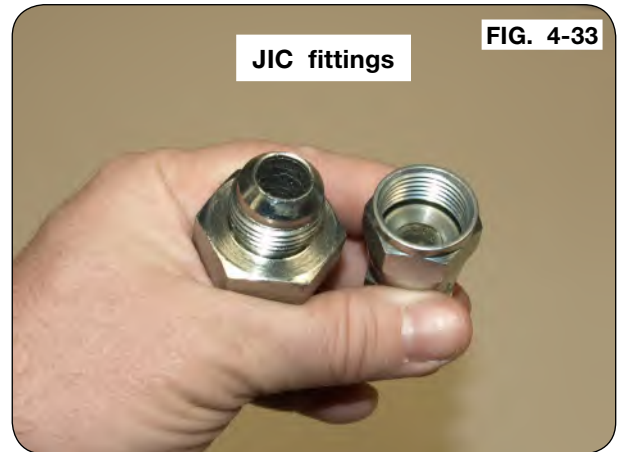


Hydraulic Fittings - Torque and Installation (continued)

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.



Notes

SECTION V

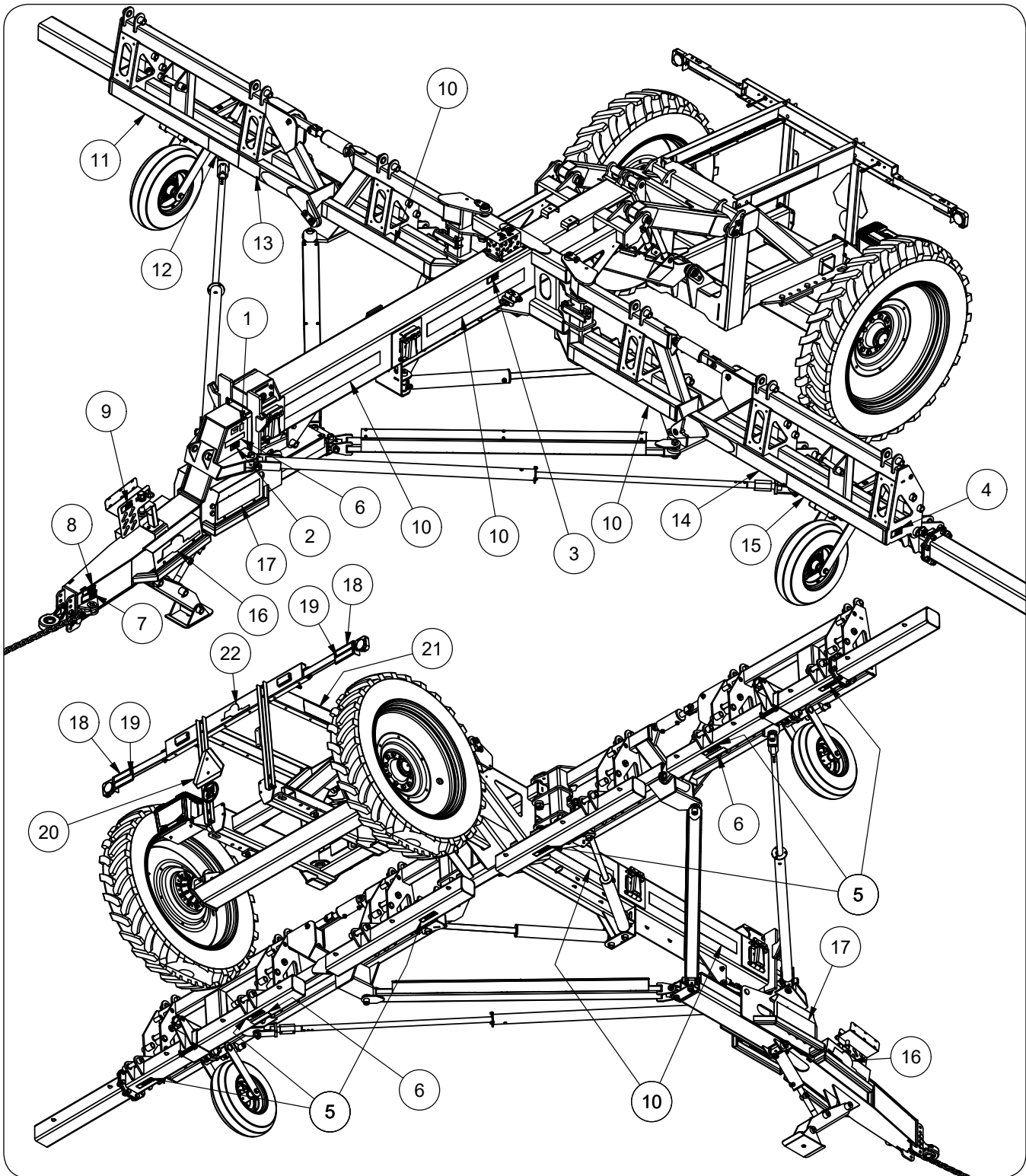
Parts

Decals.....	5-2
Tongue, Hitches, Jack, & Hose Holder Components.....	5-4
Tongue Extension, Main Frame, Roller Assembly Components.....	5-6
Valve, Mounting Plate and Hardware Components.....	5-8
Latch Components.....	5-10
Parallel Components.....	5-12
Truss Components (Main Frame To Wings).....	5-16
Inner Wing Components.....	5-18
Outer Wing Components.....	5-20
Inner Toolbar Components.....	5-22
Outer Toolbar Components.....	5-24
Toolbar Extension Components.....	5-26
Touch-Up Paint.....	5-27
Toolbar Fold and Latch Components.....	5-28
Gauge Wheel Components.....	5-30
Tillage Only Cart — Axle, Hubs & Wheel/Tire Components.....	5-32
Tillage Only Cart — Lighting and SMV Components.....	5-34
Tillage Only Cart — Frame and Toolbox Components.....	5-36
TerrainPro Row Unit — Lead Coulter & Row Cleaner Components.....	5-38
TerrainPro Row Unit — Row Cleaner Wheel Components.....	5-40
TerrainPro Row Unit — Depth Control Wheel Components.....	5-42
TerrainPro Row Unit — Parallel Arm Components.....	5-44
TerrainPro Row Unit — Shank Components.....	5-46
TerrainPro Row Unit — Closing Coulter Components.....	5-48
TerrainPro Row Unit — Conditioners & Extension Components.....	5-50
TerrainPro Row Unit — Press Wheel Conditioner Option.....	5-52
TerrainPro Row Unit — Rolling Harrow Basket Conditioner Option.....	5-54
Hydraulic Components — Jack.....	5-56
Hydraulic Components — Tractor To Supply Valve.....	5-57
Hydraulic Components — Supply Valve To Sequence Valves.....	5-59
Hydraulic Components — Supply Valve to Tongue Latch.....	5-61
Hydraulic Components — Supply Valve To Toolbar Latch.....	5-63
Hydraulic Components — Supply Valve To Toolbar Fold.....	5-65
Hydraulic Components — Supply Valve To Wings.....	5-67
Hydraulic Components — Supply Valve To Wing Tilt.....	5-68
Hydraulic Components — Supply Valve To Wing Tilt w/Counterbalance Kit.....	5-68
Hydraulic Components — Supply Valve To Gauge Wheels.....	5-70
Hydraulic Components — Supply Valve To Parallel Link/Main Lift-Lower.....	5-71
Electrical Components.....	5-73

PULL-TYPE RAPTOR — Parts

Decals

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



PULL-TYPE RAPTOR — Parts

Decals

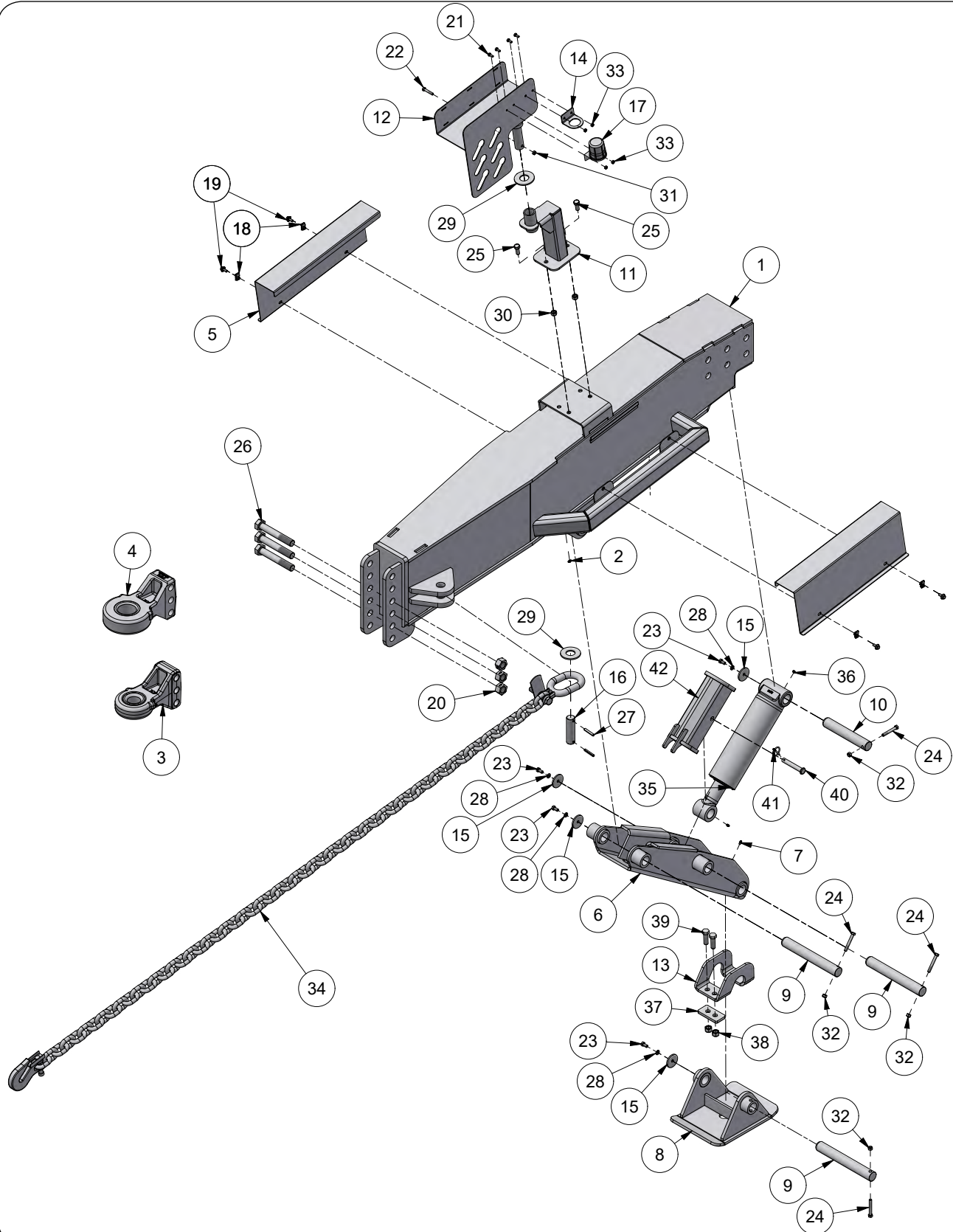
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	91605	Decal, FEMA	1	
2	97961	Decal, WARNING "Read and Understand Operator Manual"	1	
3	95445	Decal, WARNING "High-Pressure Fluid"	2	
4	98229	Decal, WARNING "Falling or Lowering Equipment"	2	
5	95136	Decal, WARNING "Folding or Unfolding Wings"	6	
6	9003127	Reflector =AMBER=	4	
7	94094	Decal, WARNING "Rising or Falling Tongue"	1	
8	97575	Decal, CAUTION "Transport Chain"	1	
9	95445	Decal, WARNING "High-Pressure Fluid"	1	
10	9004035	Decal, UM Stripe (5 1/4" x 46")	6	
11	9004298	Decal, UM Logo (5 1/4" x 45.75")	1	
12	9004213	Decal, UM Logo Tail (5 1/4" x 14 1/4")	1	
13	9503786	Decal, UM Stripe (5 1/4" x 10")	1	
14	9503787	Decal, UM Stripe (5 1/4" x 24")	1	
15	9503742	Decal, Model Raptor 2015 ST (5 1/4" x 46")	1	
	9503741	Decal, Model Raptor 2030 ST (5 1/4" x 46")		
	9503744	Decal, Model Raptor 2015 DT (5 1/4" x 46")		
	9503743	Decal, Model Raptor 2030 DT (5 1/4" x 46")		
	9503746	Decal, Model Raptor 2015 LT (5 1/4" x 46")		
	9503745	Decal, Model Raptor 2030 LT (5 1/4" x 46")		
16	9503731	Decal, UM Logo w/Text (6.2" x 20")	2	
17	9503735	Decal, Model Raptor 2015 ST (6.8" x 20")	2	
	9503734	Decal, Model Raptor 2030 ST (6.8" x 20")		
	9503737	Decal, Model Raptor 2015 DT (6.8" x 20")		
	9503736	Decal, Model Raptor 2030 DT (6.8" x 20")		
	9503739	Decal, Model Raptor 2015 LT (6.8" x 20")		
	9503738	Decal, Model Raptor 2030 LT (6.8" x 20")		
18	9003125	Fluorescent Strip =ORANGE=	2	
19	9003126	Reflector =RED=	2	
20	TA510514	SMV Emblem	1	
	79342B	Plate with SIS Decal	1	
	9008717	Decal, SIS 20MPH	1	
	9008720	Decal, SIS 30KPH		
21	9503757	Decal, Raptor ST (5 1/4" x 32")	2	
22	9503758	Decal, UM Logo w/Text (5" x 14.7")	1	

PULL-TYPE RAPTOR — Parts

Tongue, Hitches, Jack, & Hose Holder Components

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



PULL-TYPE RAPTOR — Parts

Tongue, Hitches, Jack, & Hose Holder Components

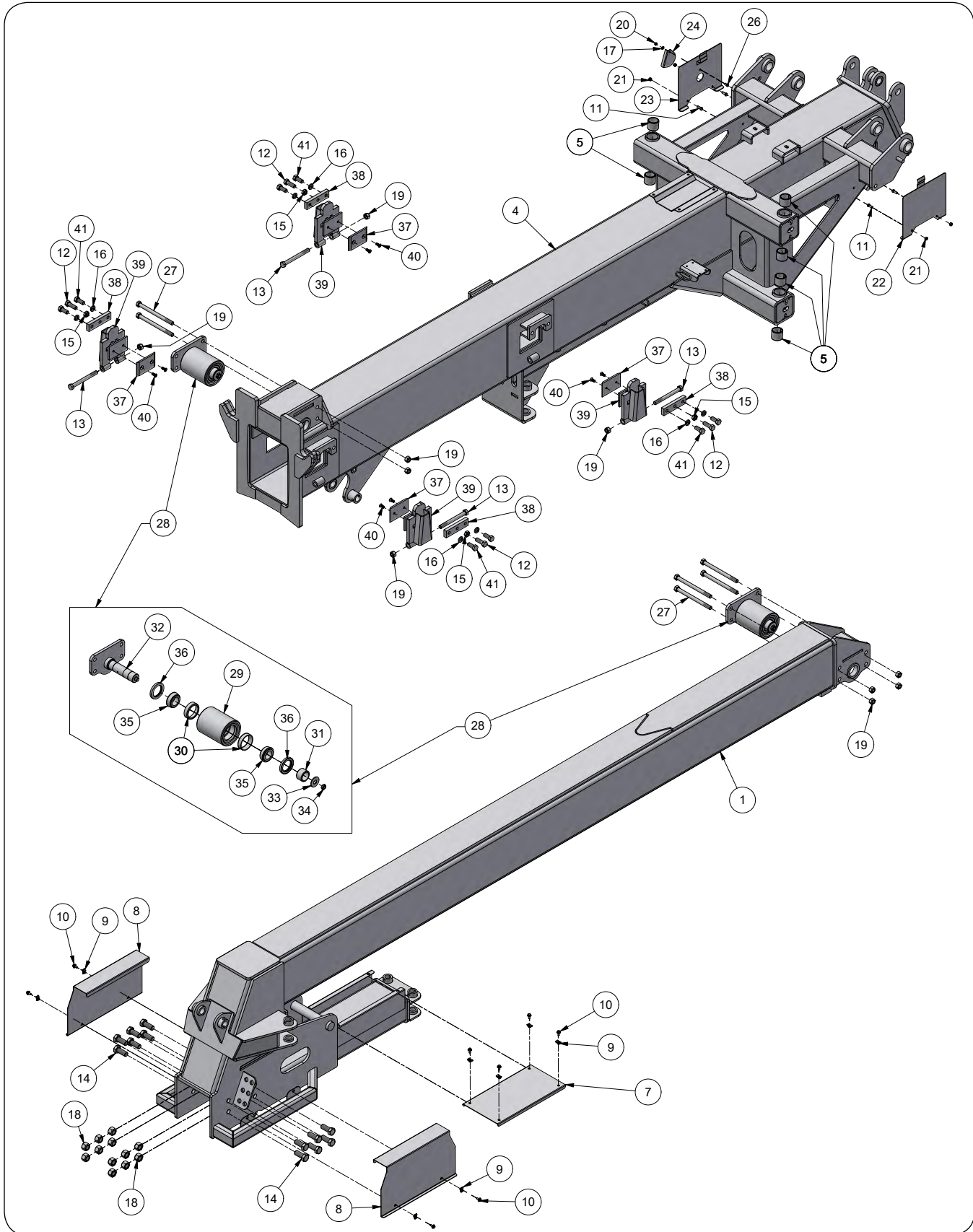
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	602251G	Toolbar Tongue Weldment (Green) w/Decals	1	Includes Item 2
	602251R	Toolbar Tongue Weldment (Red) w/Decals		
2	91160	Grease Zerk	1	
3	JAP3228	Ball Swivel Hitch, CAT4	1	
4	JAP3229	Ball Swivel Hitch, CAT5	1	
5	602471G	Side Panel Plate (Green)	2	
	602471R	Side Panel Plate (Red)		
6	602377B	Hydraulic Jack Arm Weldment (Black)	1	Includes Item 7
7	91160	Grease Zerk	1	
8	602380B	Jack Foot Weldment (Black)	1	
9	602597	Pin, 1 1/2" Dia. x 11 3/8"	3	
10	602598	Pin, 1 1/2" Dia. x 9"	1	
11	603002B	Hose Holder Stand Weldment (Black)	1	
12	603003B	Hose Holder Weldment (Black) w/Decal	1	
13	605019B	Jack Foot Stop Bracket Weldment =Black=	1	
14	281837B	Holder Plate =Black=	1	
15	602615	Washer, 2 1/8" OD x 0.44" ID (Stainless Steel)	4	
16	64395	Pin, 1 1/4" Dia. x 4 1/2"	1	
17	9001968	Connector Holder	1	
18	902626	U-Nut, 5/16"-18UNC	4	
19	91256	Flange Screw, 5/16"-18UNC x 3/4" G5	4	
20	92199	Locknut/Center, 1"-8UNC	3	
21	9390-002	Capscrew, 1/4"-20UNC x 5/8" G5	4	
22	9390-033	Capscrew, 5/16"-18UNC x 1 3/4" G5	1	
23	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	4	
24	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	4	
25	9390-100	Capscrew, 1/2"-13UNC x 1 1/4" G5	2	
26	9390-196	Capscrew, 1"-8UNC x 6 1/2" G5	3	
27	9392-159	Roll Pin, 5/16" Dia. x 2"	2	
28	9404-021	Lock Washer, 3/8"	4	
29	9405-130	Flat Washer, 1 1/4" USS	2	
30	9800	Locknut/Top, 1/2"-13UNC	2	
31	9807	Locknut/Top, 5/16"-18UNC	1	
32	9928	Locknut/Top, 3/8"-16UNC	4	
33	9936	Locknut/Top, 1/4"-20UNC	4	
34	9003269	Transport Chain (61,000#)	1	
35	9502870	Cylinder, 4" x 10" (3000 PSI)	1	Includes Item 36
36	91160	Grease Zerk	2	
37	605005B	Plate, 2" x 4" =Black=	1	
38	9801	Locknut/Top, 5/8"-11UNC	2	
39	9390-124	Capscrew, 5/8"-11UNC x 2" G5	2	
40	91523	Clevis Pin, 5/8" Dia. x 4" w/Grip	1	
41	9093	Klik Pin, 3/16" Dia. x 1 9/16"	1	
42	604995B	Cylinder Stop Weldment =Black=	1	

PULL-TYPE RAPTOR — Parts

Tongue Extension, Main Frame, Roller Assembly Components

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



PULL-TYPE RAPTOR — Parts

Tongue Extension, Main Frame, Roller Assembly Components

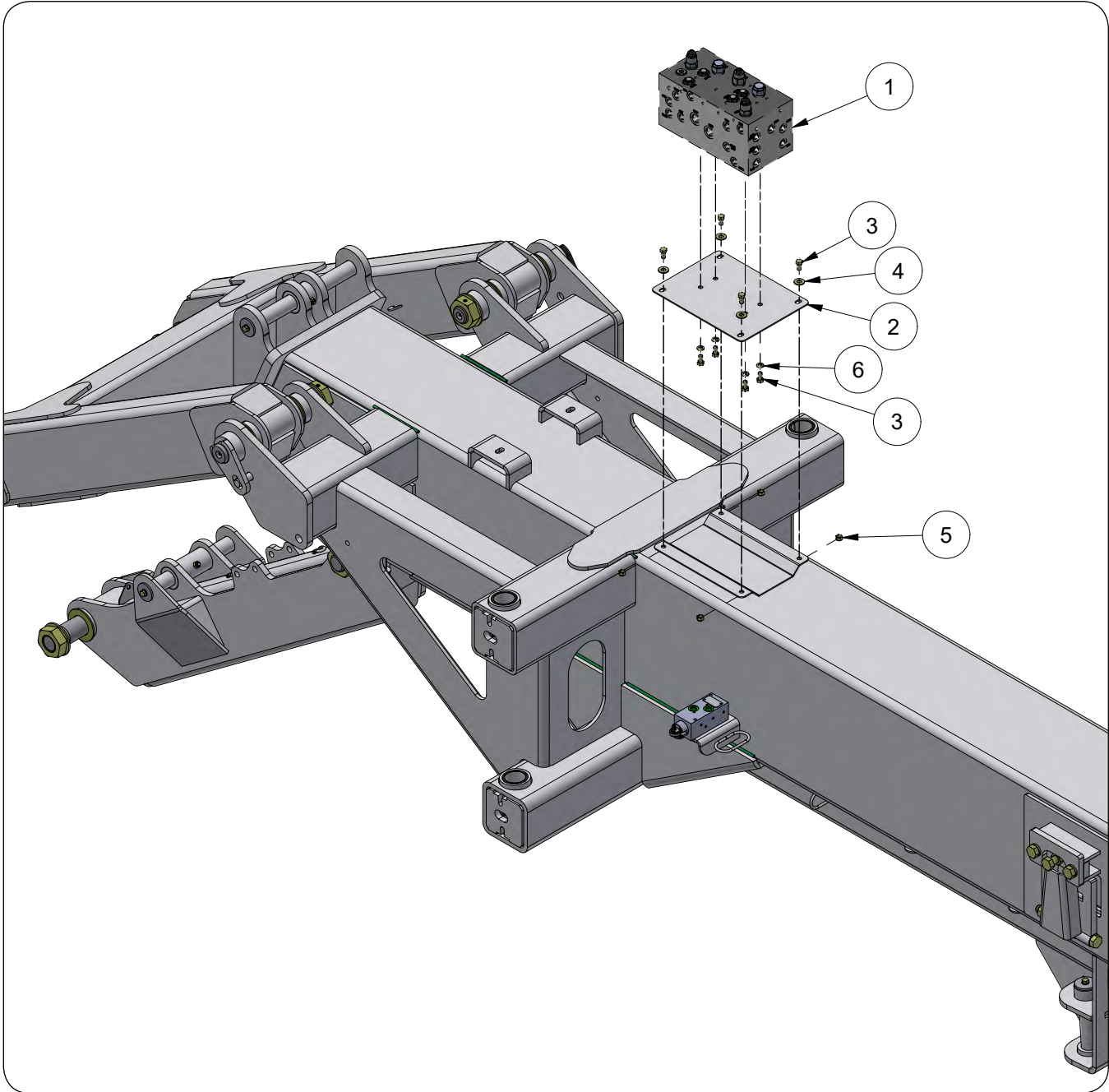
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	603459G	Tongue Extension Weldment (Green)	1	Includes Items 2, 3 & 25
	603459R	Tongue Extension Weldment (Red)		
2	9003127	Reflector, AMBER	2	
3	97961	Decal, WARNING "Read & Understand Manual..."	1	
4	603460G	Main Frame Weldment (Green)	1	Includes Items 5 & 6
	603460R	Main Frame Weldment (Red)		
5	9504245	Spring Tension Bushing, 2.383" OD x 2.030" ID x 2"	8	
6	95445	Decal, WARNING (High-Pressure Fluid...)	2	
7	602444G	Top Panel Plate (Green)	1	
	602444R	Top Panel Plate (Red)		
8	602978G	Side Panel Plate (Green)	2	
	602978R	Side Panel Plate (Red)		
9	902626	U-Nut, 5/16"-18UNC	14	
10	91256	Flange Screw, 5/16"-18UNC x 3/4" G5	20	
11	9390-055	Capscrew, 3/8"-16UNC x 1" G5	4	
12	9390-146	Capscrew, 3/4"-10UNC x 2 1/4" G5	4	
13	9390-160	Capscrew, 3/4"-10UNC x 7 1/2" G5	5	
14	9390-185	Capscrew, 1"-8UNC x 2 1/2" G5	12	
15	9395-016	Hex Jam Nut, 3/4"-10UNC	4	
16	9404-033	Lock Washer, 3/4"	8	
17	9405-068	Flat Washer, 5/16" SAE	1	
18	9663	Locknut/Top, 1"-8UNC	12	
19	9802	Locknut/Top, 3/4"-10UNC	13	
20	9807	Locknut/Top, 5/16"-18UNC	1	
21	9928	Locknut/Top, 3/8"-16UNC	45	
22	602435B	Panel Weldment (Black)	1	
23	602439B	Panel Weldment (Black)	1	
24	602441B	Access Cover Plate (Black)	1	
25	91605	Decal, FEMA	1	
26	9390-027	Capscrew, 5/16"-18UNC x 5/8" G5	1	
27	9390-450	Capscrew, 3/4"-10UNC x 10" G5	8	
28	602186B	Roller Assembly (Black)	2	Includes Items 29-36
29	602180	Roller, 6" OD	1	Includes Item 30
30	91151	Bearing Cup, 3.6718" OD	2	
31	602187	Tube, 2 1/2" OD x 2" ID	1	
32	602189B	Roller Spindle Weldment (Black)	1	
33	602190	Washer, 2 3/8" OD x 0.94" ID (Stainless Steel)	1	
34	9397-016	Elastic Jam Nut, 3/4"-16UNF	1	
35	91154	Bearing Cone, 2.000" Bore	2	
36	91157	Seal, 3.756" OD x 2.5" ID	2	
37	601138	Pad, 3/8" x 3 1/2" x 5 1/2"	4	
38	602280	Bar, 3/4" x 1 3/4" x 6 5/8"	4	
39	602349B	Tongue Extension Guide Weldment (Black)	4	
40	902703-040	Flat Head/Hex Socket Capscrew, 3/8"-16UNC x 1"	8	
41	9390-144	Capscrew, 3/4"-10UNC x 1 3/4" G5	8	

PULL-TYPE RAPTOR — Parts

Valve, Mounting Plate and Hardware Components

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



PULL-TYPE RAPTOR — Parts

Valve, Mounting Plate and Hardware Components

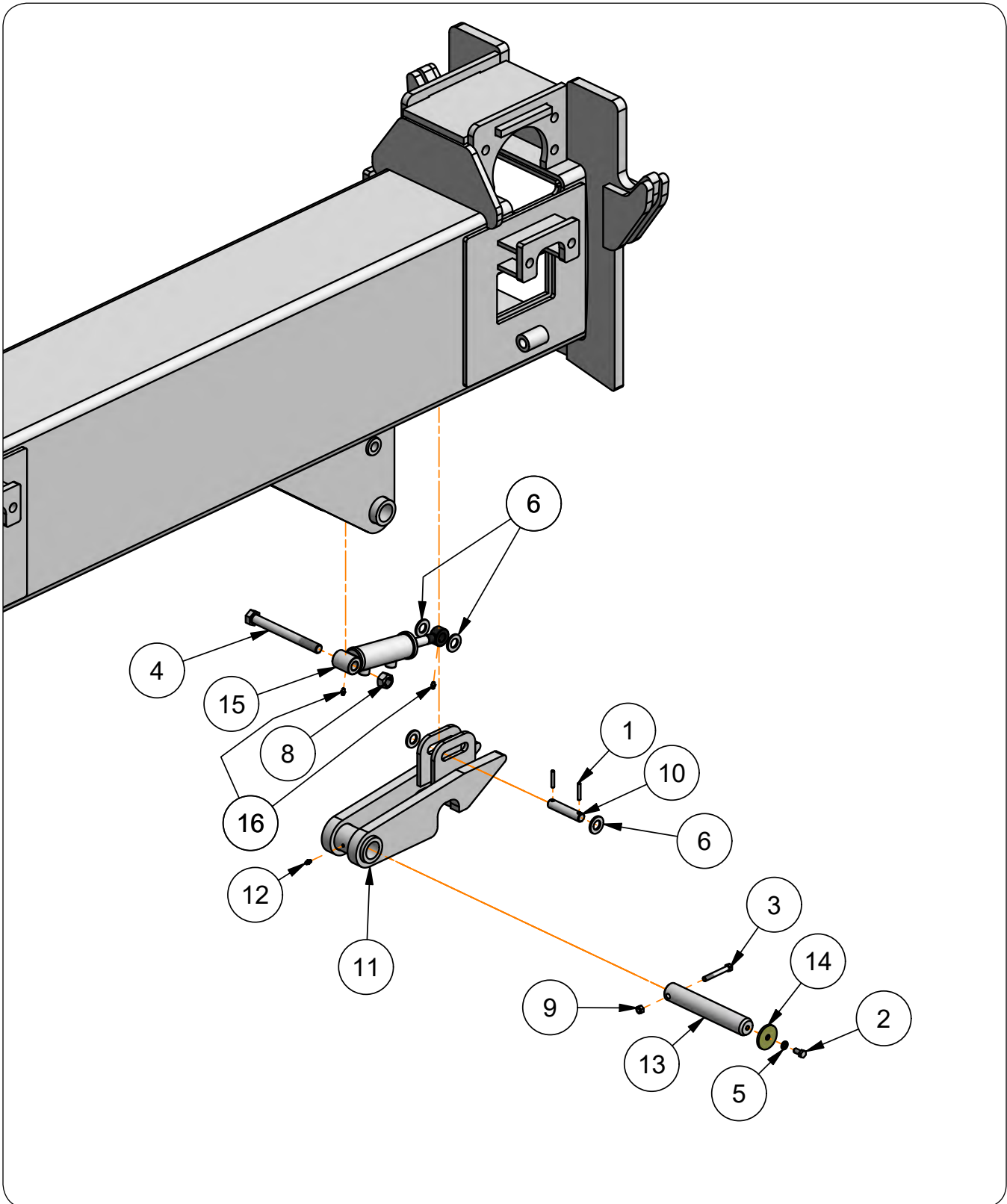
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	9504775	Valve Assembly	1	
2	602532B	Valve Mounting Plate =Black=	1	
3	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	8	
4	9405-076	Flat Washer, 3/8" USS	4	
5	9928	Locknut/Top, 3/8"-16UNC	4	
6	9404-021	Lock Washer, 3/8"	4	

PULL-TYPE RAPTOR — Parts

Latch Components

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



PULL-TYPE RAPTOR — Parts

Latch Components

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

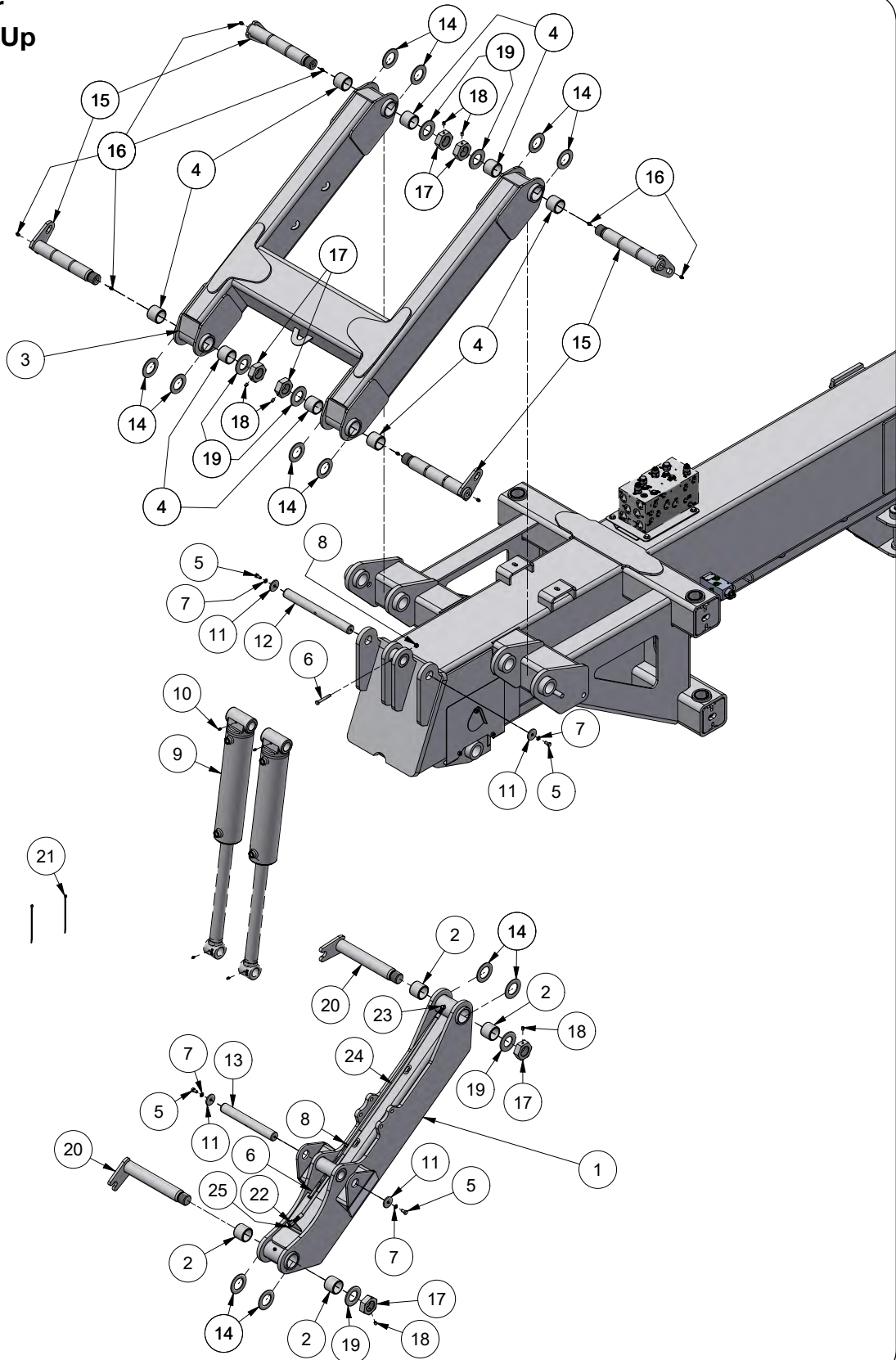
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	91144-162	Spiral Pin, 1/4" Dia. x 1 1/2"	2	
2	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	1	
3	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	1	
4	9390-160	Capscrew, 3/4"-10UNC x 7 1/2" G5	1	
5	9404-021	Lock Washer, 3/8"	1	
6	9405-104	Flat Washer, 3/4" SAE	4	
7	9800	Locknut/Top, 1/2"-13UNC	1	
8	9802	Locknut/Top, 3/4"-10UNC	1	
9	9928	Locknut/Top, 3/8"-16UNC	1	
10	601151	Pin, 3/4" Dia. x 3 5/8"	1	
11	602372B	Latch Weldment (Black) w/Grease Zerk	1	Includes Item 12
12	91160	Grease Zerk	1	
13	602598	Pin, 1 1/2" Dia. x 9"	1	
14	602615	Washer, 2 1/8" OD x 0.44" ID (Stainless Steel)	1	
15	9502901	Cylinder, 1 1/2" x 2" (3000 PSI)	1	Includes Item 16
16	91160	Grease Zerk	2	

PULL-TYPE RAPTOR — Parts

Parallel Components

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

Serial Number
A68760113 & Up



PULL-TYPE RAPTOR — Parts

Parallel Components

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

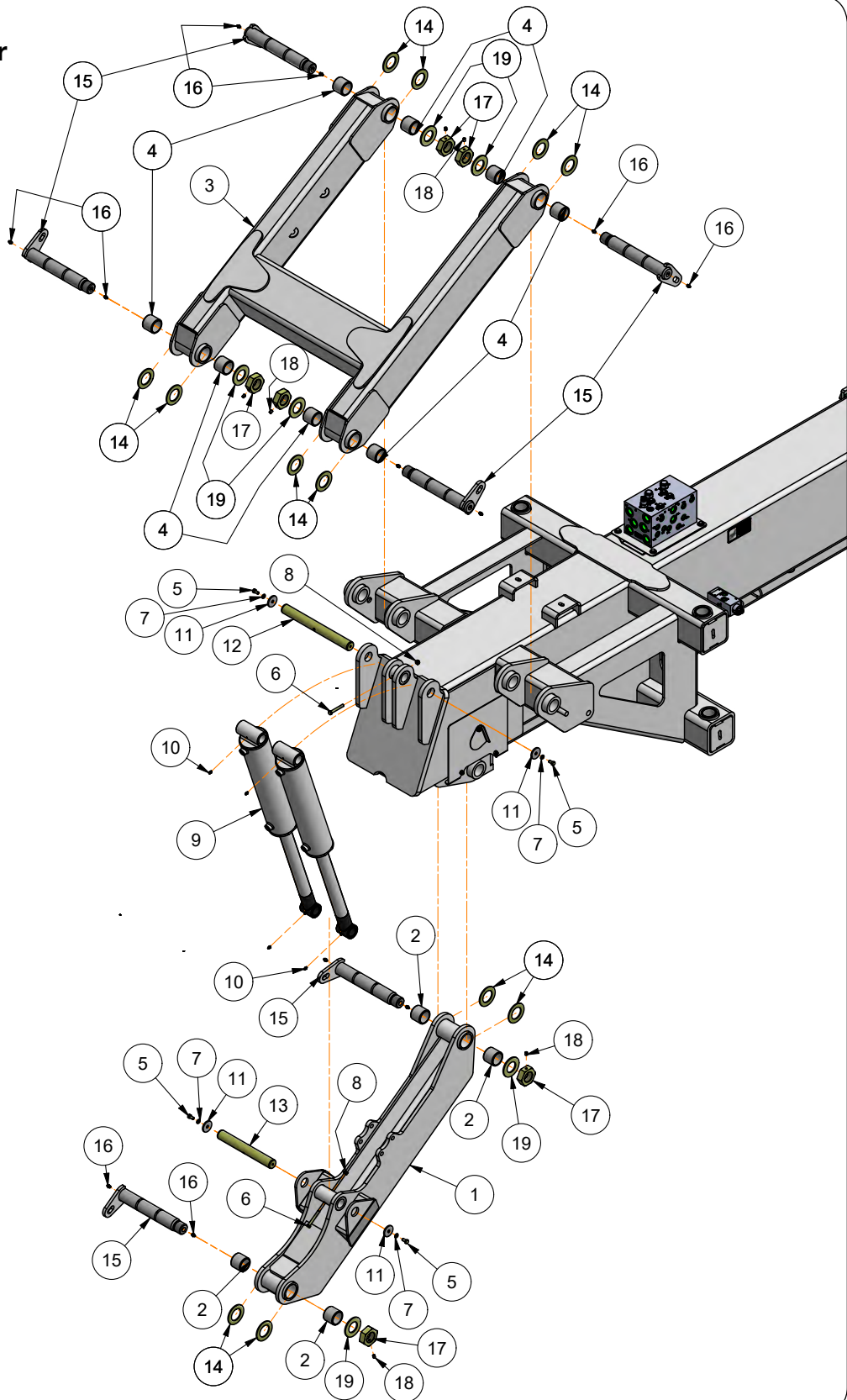
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	601971G	Lower Parallel Arm Weldment (Green)	1	Includes Item 2
	601971R	Lower Parallel Arm Weldment (Red)		
2	9504245	Spring Tension Bushing, 2.383" OD x 2.030" ID x 2"	4	
3	601977G	Upper Parallel H-Frame Weldment (Green)	1	Includes Item 4
	601977R	Upper Parallel H-Frame Weldment (Red)		
4	9504245	Spring Tension Bushing, 2.383" OD x 2.030" ID x 2"	8	
5	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	4	
6	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	2	
7	9404-021	Lock Washer, 3/8"	4	
8	9928	Locknut/Top, 3/8"-16UNC	2	
9	9502852	Cylinder, 4" x 16" (3000 PSI)	2	Includes Item 10
	9503982	Seal Kit	AR	
10	91160	Grease Zerk	4	
11	601264	Washer, 1 7/8" OD x 0.44" ID (Stainless Steel)	4	
12	602421	Pin, 1 1/2" Dia. X 14 9/16"	1	
13	602422	Pin, 1 1/2" Dia. X 11 9/16"	1	
14	412445	Washer, 3 3/8" OD x 2.063" ID	12	
15	600980B	Pin Weldment, 2" Dia. x 14 3/16" w/Grease Zerk	4	Serial Number A67590200 & Up
	603824B	Pin Weldment, 2" Dia. x 11 13/16" w/Grease Zerk	6	Serial Number A67590199 & Lower
16	93426	Grease Zerk	2	
17	9005290	Heavy Hex Jam Nut 1 3/4"-5UNC w/Set Screw	6	Includes Item 18
18	9005336	Set Screw, 3/8"-16UNC x 1/2"	1	
19	9405-152	Flat Washer, 1 3/4"	6	
20	604305B	Pin Weldment, 2" Dia. x 14 3/16" w/Grease Zerk	2	
21	9000106	Cable Tie 7 1/2"	2	
22	9003949	Coupling Pipe, 1/8" NPT Female x 1/8" NPT Female	1	
23	9006785	90° Adapter, 1/8" NPT	1	
24	9008960	Grease Hose, 3/16" Dia. x 44"	1	
25	93426	Grease Zerk	1	

PULL-TYPE RAPTOR — Parts

Parallel Components

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

Serial Number
A68760112 & Lower



PULL-TYPE RAPTOR — Parts

Parallel Components

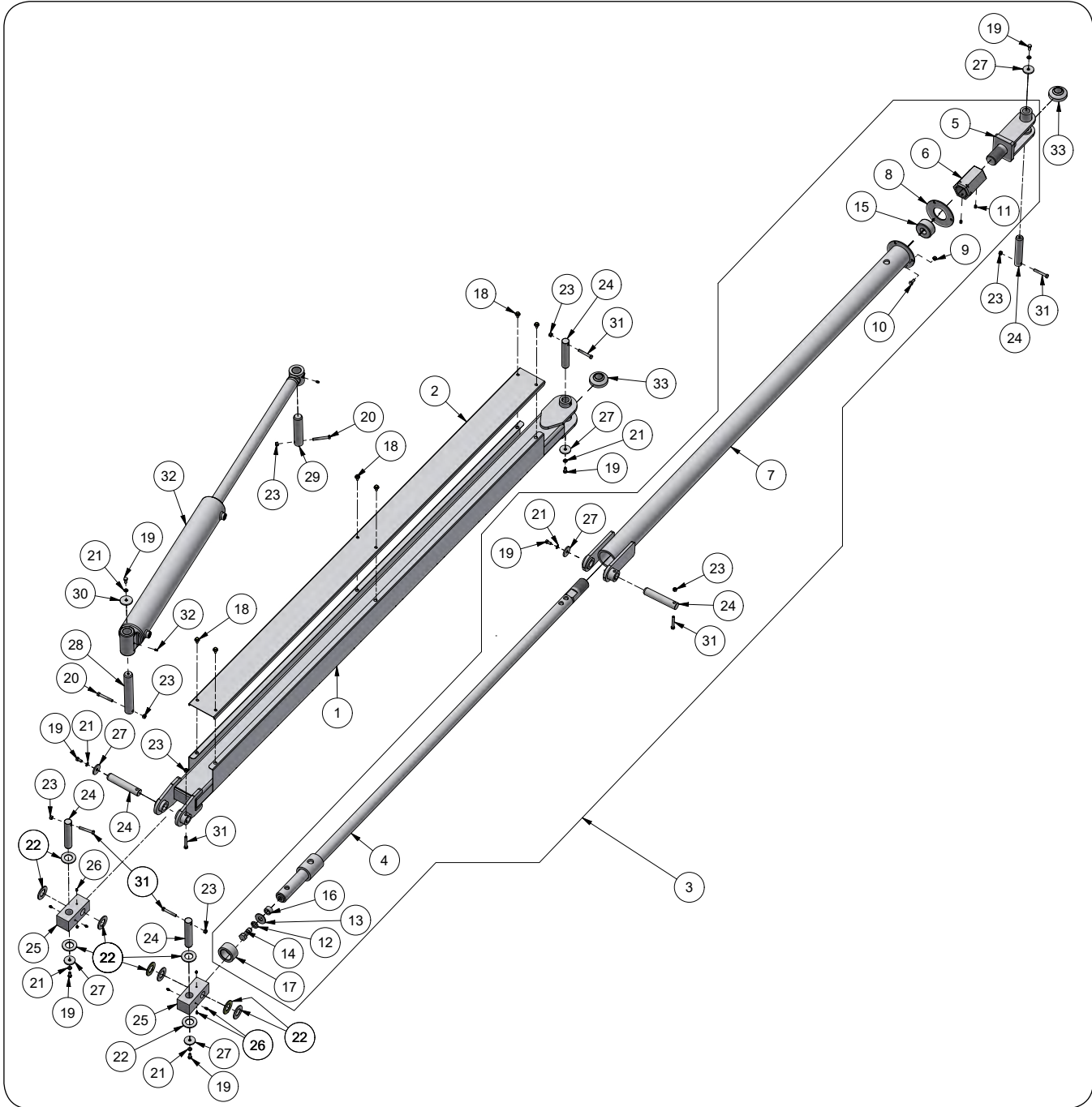
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	601971G	Lower Parallel Arm Weldment (Green)	1	Includes Item 2
	601971R	Lower Parallel Arm Weldment (Red)		
2	9504245	Spring Tension Bushing, 2.383" OD x 2.030" ID x 2"	4	
3	601977G	Upper Parallel H-Frame Weldment (Green)	1	Includes Item 4
	601977R	Upper Parallel H-Frame Weldment (Red)		
4	9504245	Spring Tension Bushing, 2.383" OD x 2.030" ID x 2"	8	
5	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	4	
6	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	2	
7	9404-021	Lock Washer, 3/8"	4	
8	9928	Locknut/Top, 3/8"-16UNC	2	
9	9502852	Cylinder, 4" x 16" (3000 PSI)	2	Includes Item 10
	9503982	Seal Kit	AR	
10	91160	Grease Zerk	4	
11	601264	Washer, 1 7/8" OD x 0.44" ID (Stainless Steel)	4	
12	602421	Pin, 1 1/2" Dia. X 14 9/16"	1	
13	602422	Pin, 1 1/2" Dia. X 11 9/16"	1	
14	412445	Washer, 3 3/8" OD x 2.063" ID	12	
15	600980B	Pin Weldment, 2" Dia. x 14 3/16" w/Grease Zerk	6	Serial Number A67590200 - A68760112
	603824B	Pin Weldment, 2" Dia. x 11 13/16" w/Grease Zerk		Serial Number A67590199 & Lower
16	93426	Grease Zerk	2	
17	9005290	Heavy Hex Jam Nut 1 3/4"-5UNC w/Set Screw	6	Includes Item 18
18	9005336	Set Screw, 3/8"-16UNC x 1/2"	1	
19	9405-152	Flat Washer, 1 3/4"	6	

PULL-TYPE RAPTOR — Parts

Truss Components (Main Frame To Wings)

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



PULL-TYPE RAPTOR — Parts

Truss Components (Main Frame To Wings)

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

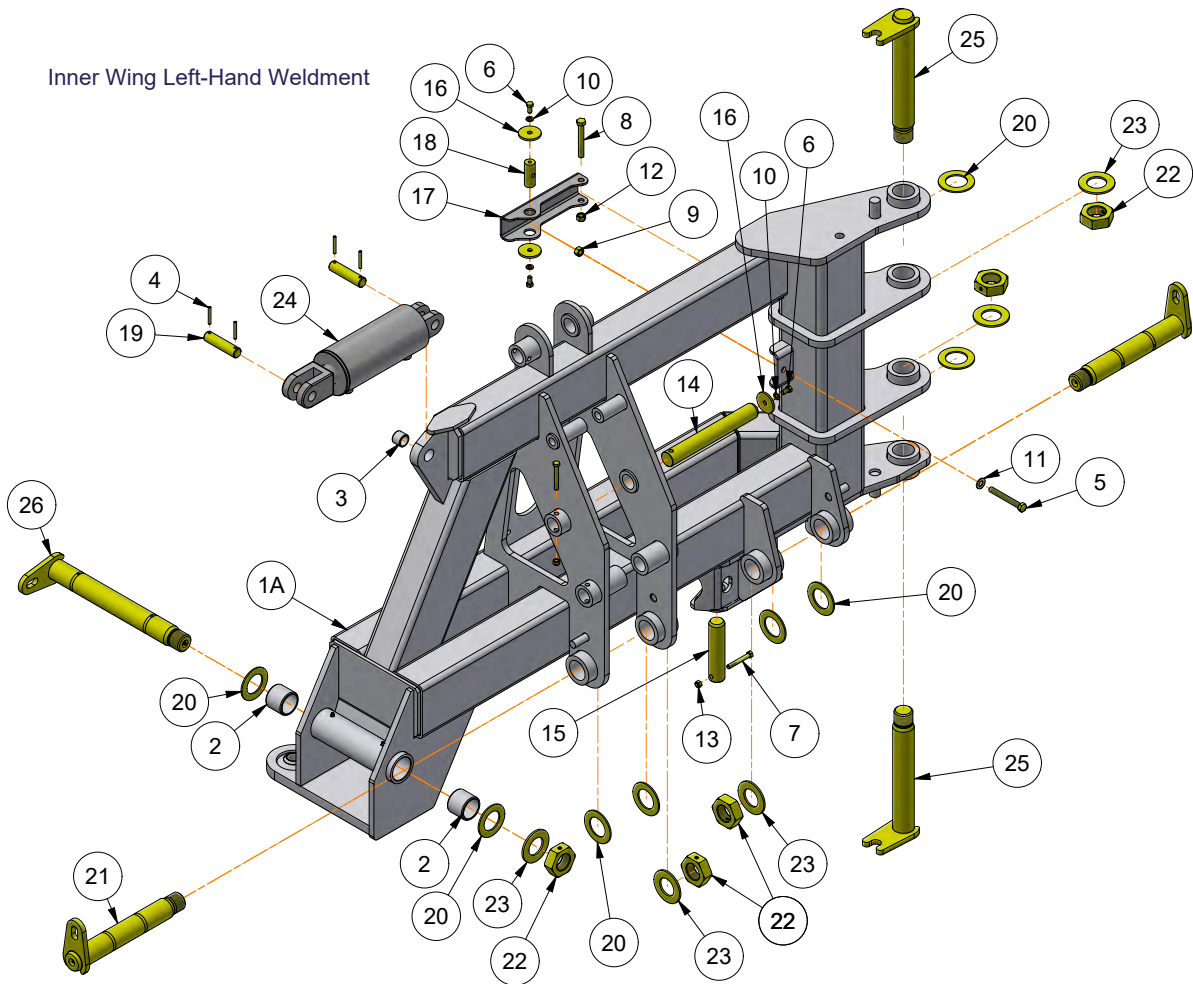
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	602220G	Truss Weldment (Green)	2	
	602220R	Truss Weldment (Red)		
2	602418G	Panel (Green)	2	
	602418R	Panel (Red)		
3	602750G	Truss Assembly (Green)	2	
	602750R	Truss Assembly (Red)		
4	602744G	Truss Weldment Inner (Green)	1	
	602744R	Truss Weldment Inner (Red)		
5	602742G	Adjusting Link Weldment (Green)	1	
	602742R	Adjusting Link Weldment (Red)		
6	602748	Hex Jam Nut 3" x 5 1/2"	1	
7	602655G	Strip Till Truss Weldment (Green)	1	
	602655R	Strip Till Truss Weldment (Red)		
8	602661G	Ring With Holes 5 1/2" Dia. (Green)	1	
	602661R	Ring With Holes 5 1/2" Dia. (Red)		
9	9928	Locknut/Top, 3/8"-16UNC	3	
10	9390-054	Capscrew, 3/8"-16UNC x 7/8" G5	3	
11	9005336	Set Screw, 3/8"-16UNC x 1/2"	2	
12	9404-033	Lock Washer, 3/4"	1	
13	9405-106	Flat Washer, 3/4" USS	1	
14	902369	Capscrew, 3/4"-10UNC x 2" G5 (Full Threaded)	1	
15	602640	UHMW, 3" OD. x 1.255" ID x 1 1/2" w/Internal Boss	1	
16	605006	Bushing, 1.250" OD x 0.812" ID x 0.75"	1	
17	602644	UHMW, 3" OD x 2.08" ID x 1 1/2"	1	
18	91256	Flange Screw, 5/16"-18UNC x 3/4" G5	12	
19	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	14	
20	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	2	
21	9404-021	Lock Washer, 3/8"	14	
22	9405-128	Flat Washer, 1 1/4" SAE	20	
23	9928	Locknut/Top, 3/8"-16UNC	14	
24	601224	Pin, 1 1/4" Dia. x 6 1/2"	12	
25	601240B	Block With Holes 2 1/2" x 2 1/2" x 6" Includes Grease Zerks	2	
26	91160	Grease Zerk	8	
27	601264	Washer, 1 7/8" OD x 0.44" ID (Stainless Steel)	10	
28	602598	Pin, 1 1/2" Dia. x 9"	2	
29	602599	Pin, 1 1/2" Dia. x 6 1/2"	2	
30	602615	Washer, 2 1/8" OD x 0.44" ID (Stainless Steel)	2	
31	9390-061	Capscrew, 3/8"-16UNC x 2 1/2" G5	12	
32	9502898	Cylinder, 4" x 30" (3000 PSI)	2	
	9503982	Seal Kit	AR	
	91160	Grease Zerk	4	
33	9502850	Ball Joint, 3 1/8" OD x 1 1/4" ID x 1 3/4"	2	

PULL-TYPE RAPTOR — Parts

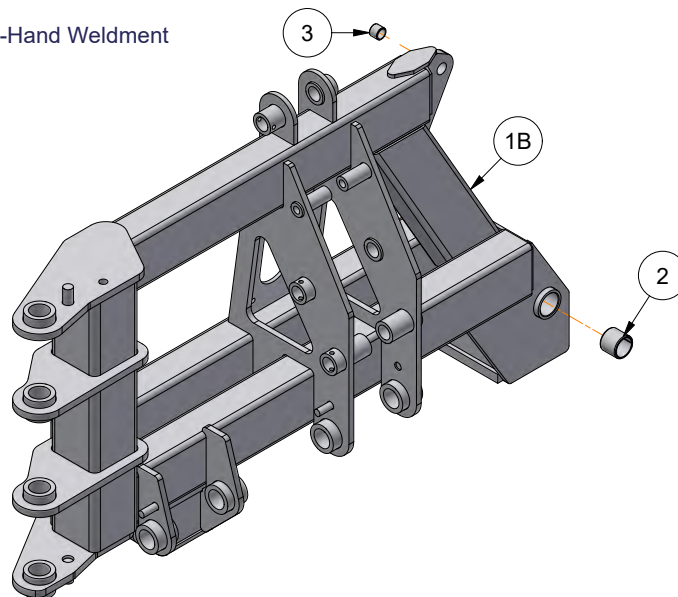
Inner Wing Components

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

Inner Wing Left-Hand Weldment



Inner Wing Right-Hand Weldment



PULL-TYPE RAPTOR — Parts

Inner Wing Components

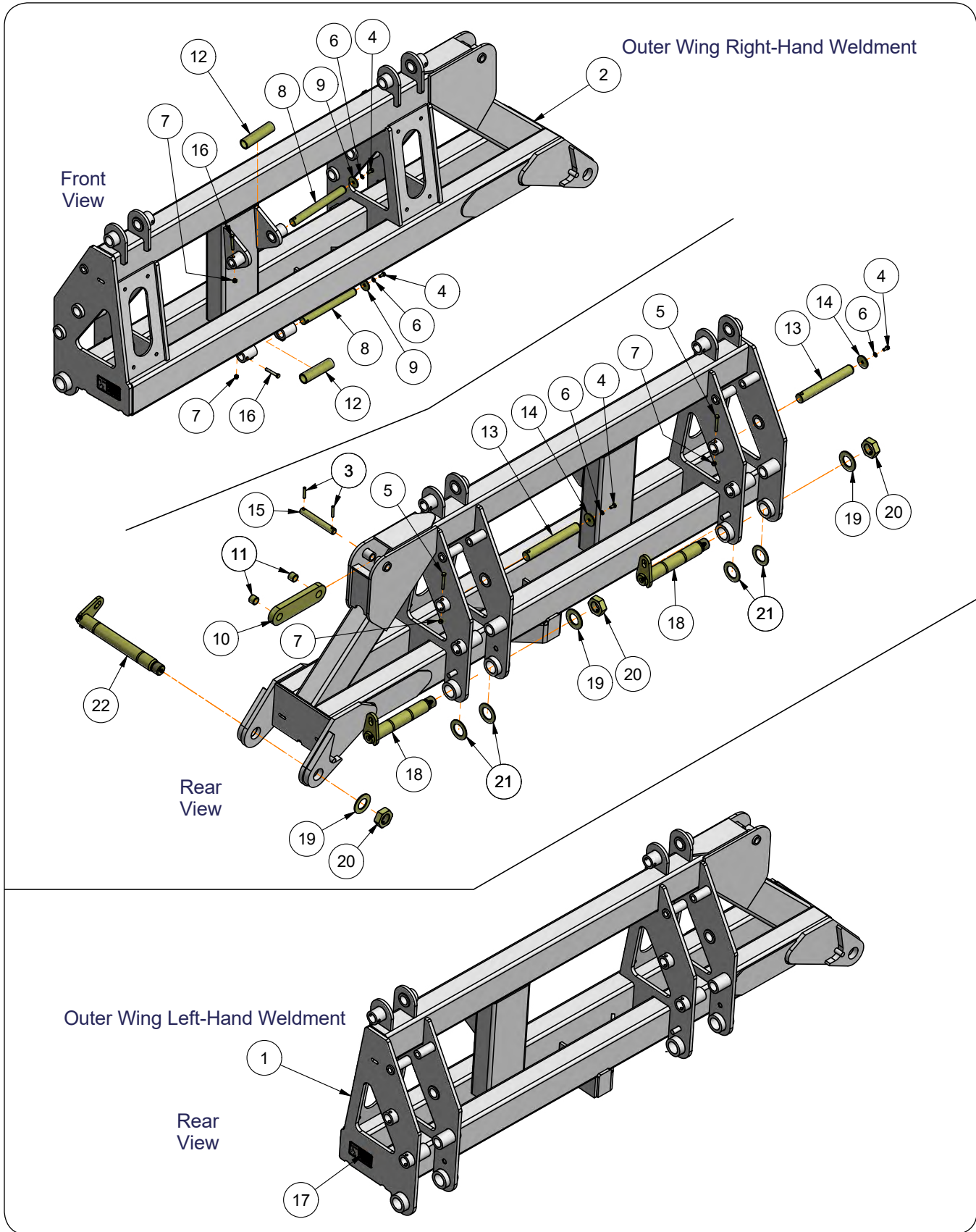
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES	
1A	601894G	Inner Wing Left-Hand Weldment =Green=	1	Includes Items 2 & 3	
	601894R	Inner Wing Left-Hand Weldment =Red=			
1B	601895G	Inner Wing Right-Hand Weldment =Green=	1	Includes Items 2 & 3	
	601895R	Inner Wing Right-Hand Weldment =Red=			
	2	9504245	Spring Tension Bushing, 2.383" OD x 2.030" ID x 2"	4	
	3	95892	Bushing, 1.25" OD x 1" ID x 1"	2	
4	91144-165	Spiral Pin, 1/4" Dia. x 1 7/8"	8		
5	91552	Capscrew, 1/2"-13UNC x 4" Full Threaded G5	2		
6	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	4		
7	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	4		
8	9390-110	Capscrew, 1/2"-13UNC x 3 3/4" G5	2		
9	9394-010	Hex Nut, 1/2"-13UNC	2		
10	9404-021	Lock Washer, 3/8"	4		
11	9405-086	Flat Washer, 1/2" SAE	2		
12	9800	Locknut/Top, 1/2"-13UNC	2		
13	9928	Locknut/Top, 3/8"-16UNC	4		
14	602597	Pin, 1 1/2" Dia. x 11 3/8"	2		
15	602599	Pin, 1 1/2" Dia. x 6 1/2"	2		
16	602615	Washer, 2 1/8" OD x 0.44" ID (Stainless Steel)	4		
17	602771B	Cam Valve Striker Plate/Bracket	2		
18	602773	Trunnion 1" Dia. x 2 9/16"	2		
19	85631	Pin, 1" Dia. x 4"	2		
20	412445	Washer, 3 3/8" OD x 2.063" ID	16		
21	600980B	Pin Weldment, 2" Dia. x 14 3/16"	4		
22	9005290	Heavy Hex Jam Nut 1 3/4"-5UNC w/Set Screw	8		
	9005336	Set Screw, 3/8"-16UNC x 1/2"	8		
23	9405-152	Flat Washer, 1 3/4"	8		
24	9503241	Cylinder, 4" x 6" (3000 PSI)	2		
25	604305B	Pin Weldment, 2" Dia. x 14 3/16"	4		
26	604328B	Pin Weldment, 2" Dia. x 17 13/16"	2		

PULL-TYPE RAPTOR — Parts

Outer Wing Components

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



PULL-TYPE RAPTOR — Parts

Outer Wing Components

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

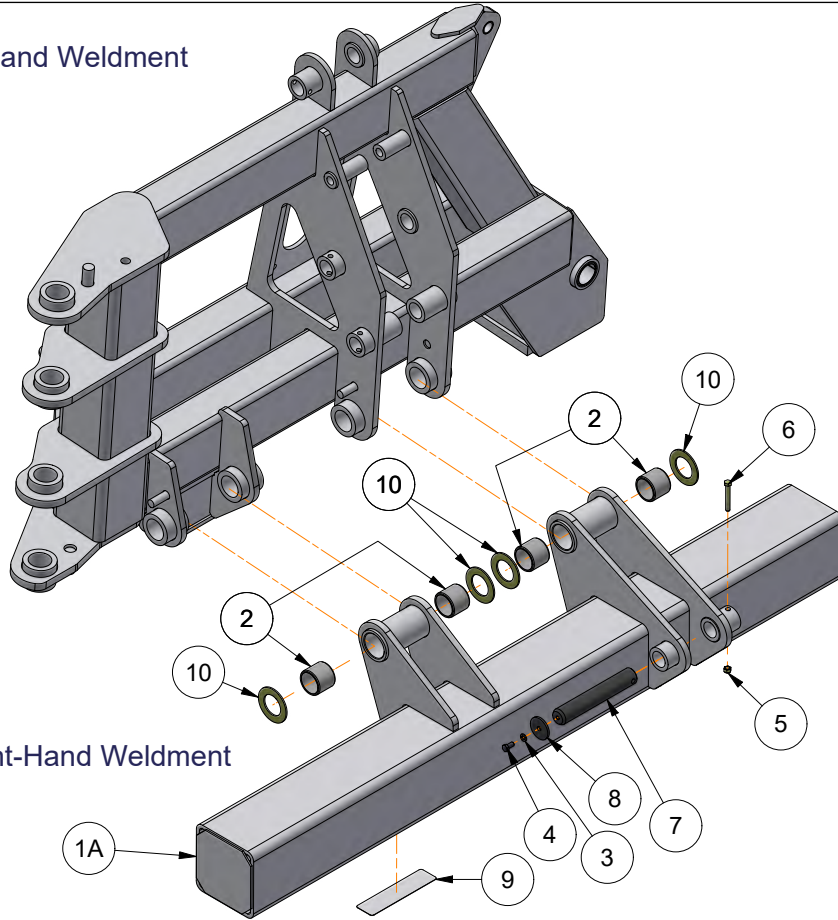
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	603461G	Outer Wing Left-Hand Weldment =Green=	1	Includes Item 17
	603461R	Outer Wing Left-Hand Weldment =Red=		
2	603462G	Outer Wing Right-Hand Weldment =Green=	1	Includes Item 17
	603462R	Outer Wing Right-Hand Weldment =Red=		
3	91144-207	Spiral Pin, 3/8" Dia. x 2"	4	
4	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	8	
5	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	4	
6	9404-021	Lock Washer, 3/8"	8	
7	9928	Locknut/Top, 3/8"-16UNC	8	
8	601181	Pin, 1 1/4" Dia. x 11 3/8"	4	
9	601264	Washer, 1 7/8" OD x 0.44" ID (Stainless Steel)	4	
10	602127B	Link with Bushings	2	Includes Item 11
11	95892	Bushing, 1.25" OD x 1" ID x 1"	4	
12	602211	Tube, 1 5/8" OD x 1.281" ID x 6"	4	
13	602597	Pin, 1 1/2" Dia. x 11 3/8"	4	
14	602615	Washer, 2 1/8" OD x 0.44" ID (Stainless Steel)	4	
15	63702	Pin, 1" Dia. x 7 1/4"	2	
16	9390-061	Capscrew, 3/8"-16UNC x 2 1/2" G5	4	
17	98229	Decal, WARNING (Falling or Lowering Equipment...)	2	
18	600980B	Pin Weldment, 2" Dia. x 14 3/16"	4	Serial Number A67590200 & Up
	603824B	Pin Weldment, 2" Dia. x 11 13/16"		Serial Number A67590199 & Lower
19	9405-152	Flat Washer, 1 3/4"	6	
20	9005290	Heavy Hex Jam Nut 1 3/4"-5UNC w/Set Screw	6	
	9005336	Set Screw, 3/8"-16UNC x 1/2"	6	
21	412445	Washer, 3 3/8" OD x 2.063" ID	8	
22	604328B	Pin Weldment, 2" Dia. x 17 13/16"	2	

PULL-TYPE RAPTOR — Parts

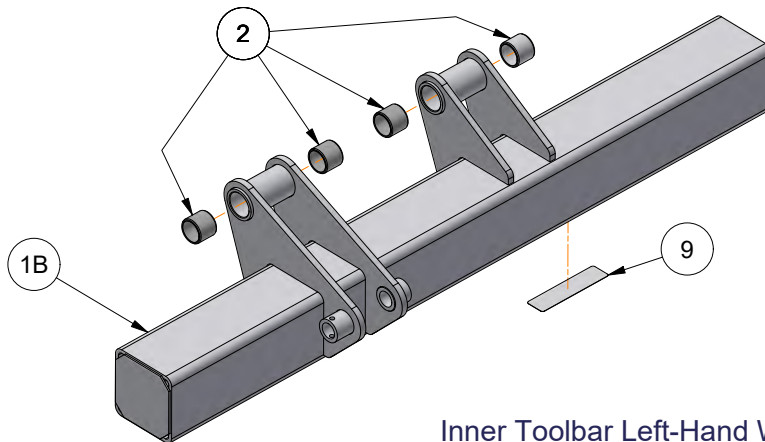
Inner Toolbar Components

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

Inner Wing Right-Hand Weldment



Inner Toolbar Right-Hand Weldment



Inner Toolbar Left-Hand Weldment

PULL-TYPE RAPTOR — Parts

Inner Toolbar Components

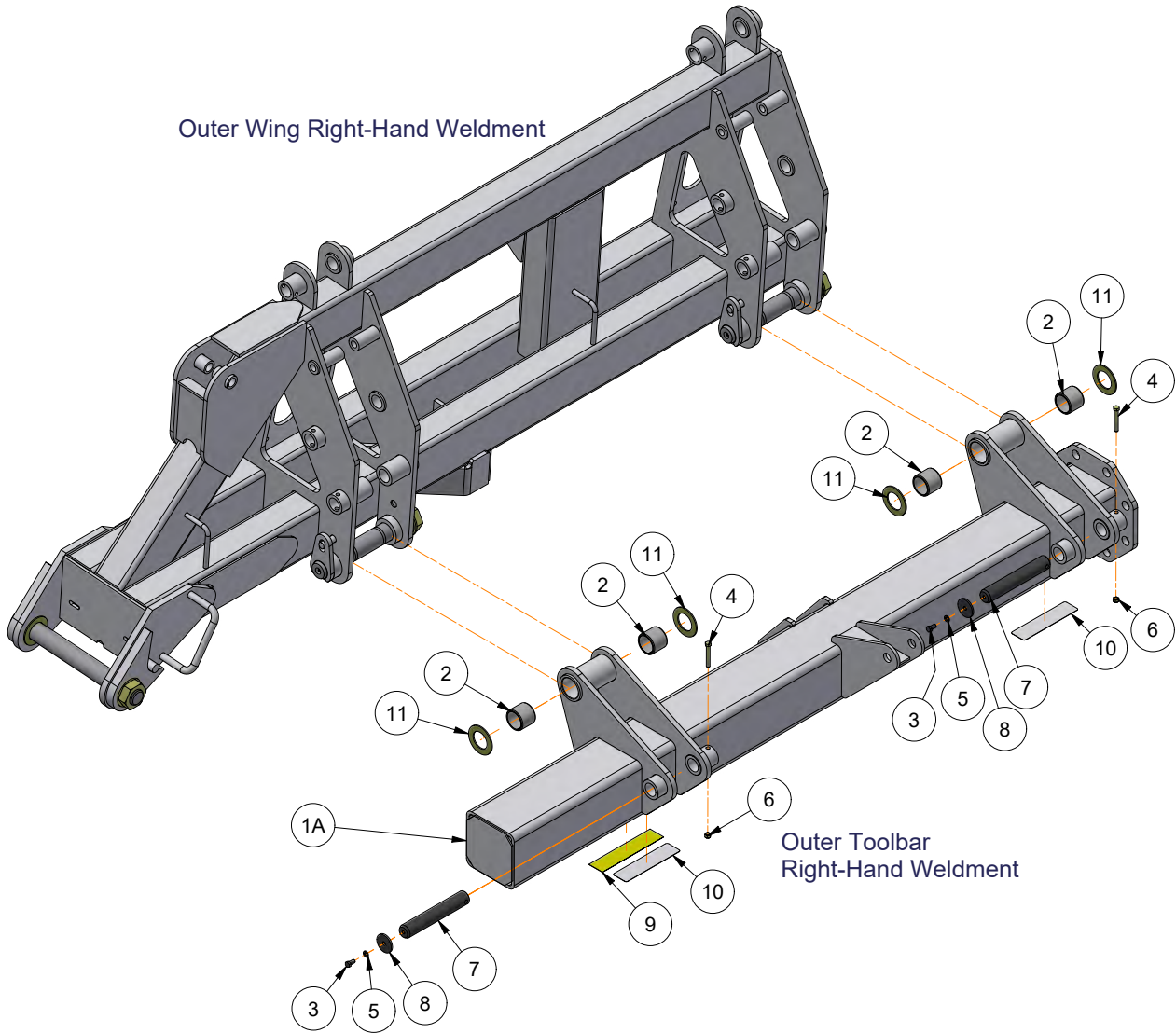
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1A	603466G	Inner Toolbar Right-Hand Weldment =Green=	1	Includes Items 2 & 9
	603466R	Inner Toolbar Right-Hand Weldment =Red=		
1B	603465G	Inner Toolbar Left-Hand Weldment =Green=	1	Includes Items 2 & 9
	603465R	Inner Toolbar Left-Hand Weldment =Red=		
2	9504245	Spring Tension Bushing, 2.383" OD x 2.030" ID x 2"	8	
3	9404-021	Lock Washer, 3/8"	2	
4	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	2	
5	9928	Locknut, 3/8"-16UNC	2	
6	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	2	
7	602598	Pin, 1 1/2" Dia. x 9"	2	
8	602615	Washer, 2 1/8" OD x 0.44" ID (Stainless Steel)	2	
9	95136	Decal, WARNING (Folding or Unfolding Wings...)	2	
10	412445	Washer, 3 3/8" OD x 2.063" ID	8	

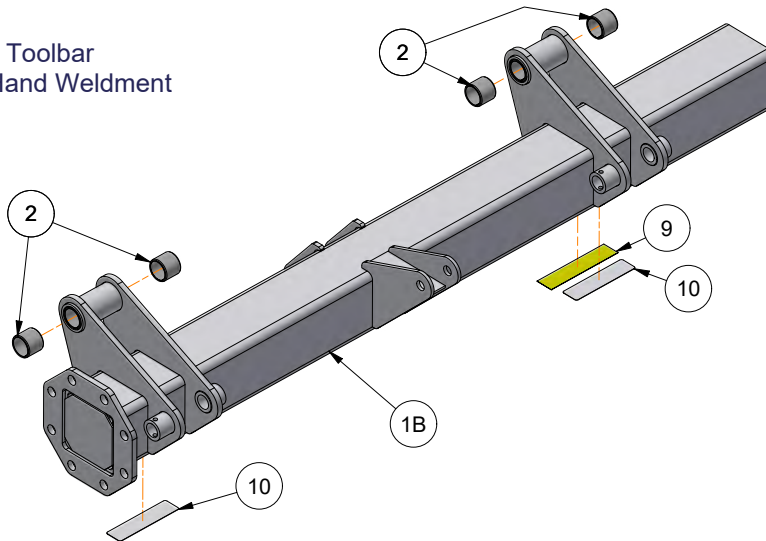
PULL-TYPE RAPTOR — Parts

Outer Toolbar Components

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



Outer Toolbar
Left-Hand Weldment



PULL-TYPE RAPTOR — Parts

Outer Toolbar Components

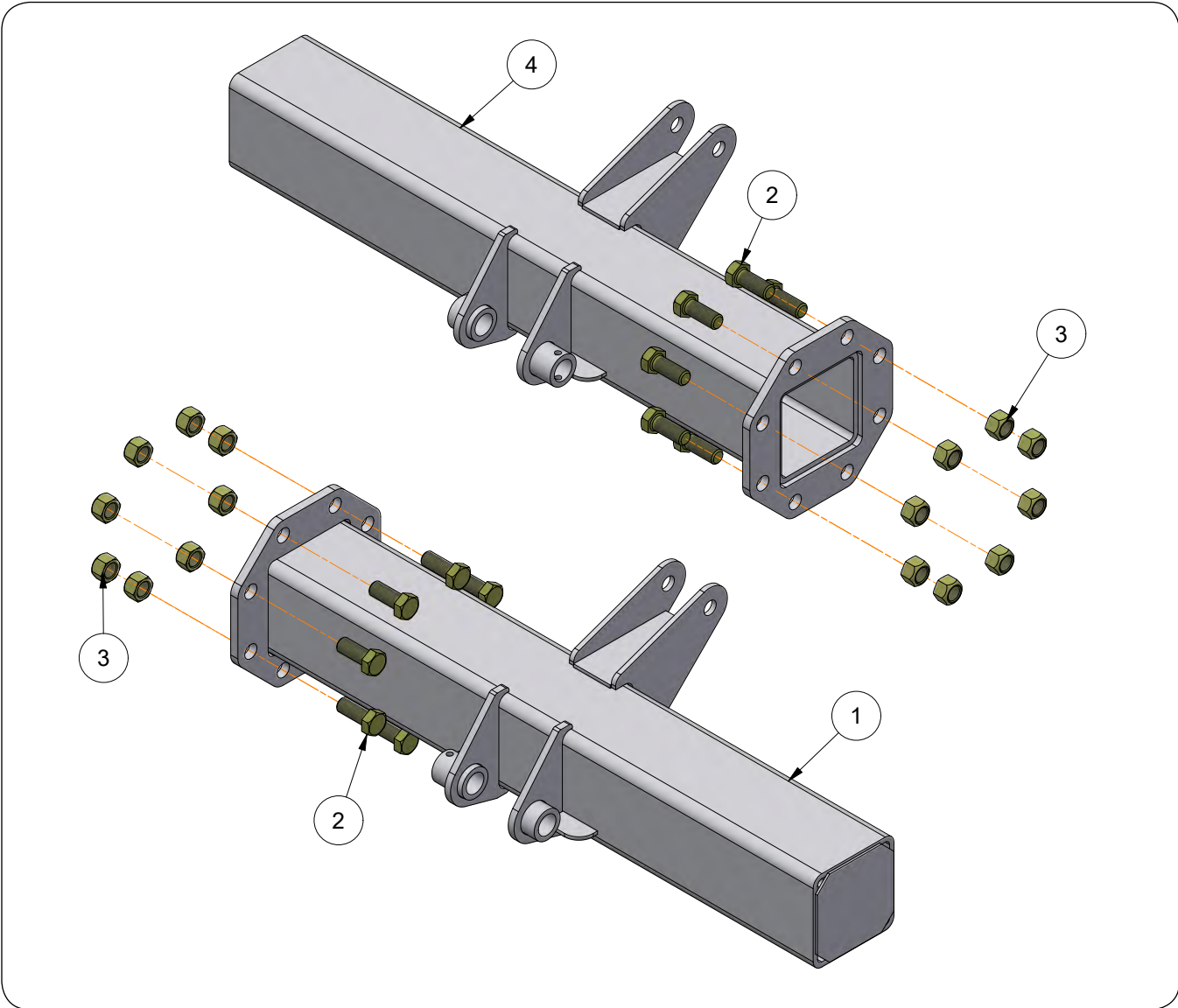
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1A	603464G	Outer Toolbar Right-Hand Weldment =Green=	1	Includes Items, 2, 9 & 10
	603464R	Outer Toolbar Right-Hand Weldment =Red=		
1B	603463G	Outer Toolbar Left-Hand Weldment =Green=	1	Includes Items, 2, 9 & 10
	603463R	Outer Toolbar Left-Hand Weldment =Red=		
2	9504245	Spring Tension Bushing, 2.383" OD x 2.030" ID x 2"	8	
3	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	4	
4	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	4	
5	9404-021	Lock Washer, 3/8"	4	
6	9928	Locknut, 3/8"-16UNC	4	
7	602598	Pin, 1 1/2" Dia. x 9"	4	
8	602615	Washer, 2 1/8" OD x 0.44" ID (Stainless Steel)	4	
9	9003127	Reflector 2"x9" =AMBER=	2	
10	95136	Decal, WARNING (Folding or Unfolding Wings...)	4	
11	412445	Washer, 3 3/8" OD x 2.063" ID	8	

PULL-TYPE RAPTOR — Parts

Toolbar Extension Components

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



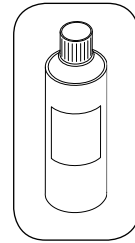
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	604389G	Toolbar Extension Assembly =Green=	1	Includes Items 1-3
	604389R	Toolbar Extension Assembly =Red=		
1	604387G	Toolbar Extension LH Weldment =Green=	1	
	604387R	Toolbar Extension LH Weldment =Red=		
2	9390-185	Capscrew, 1"-8UNC x 2 1/2" G5	16	
3	9663	Locknut, 1"-8UNC	16	
4	604388G	Toolbar Extension RH Weldment =Green=	1	
	604388R	Toolbar Extension RH Weldment =Red=		

PULL-TYPE RAPTOR — Parts

Touch-Up Paint

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

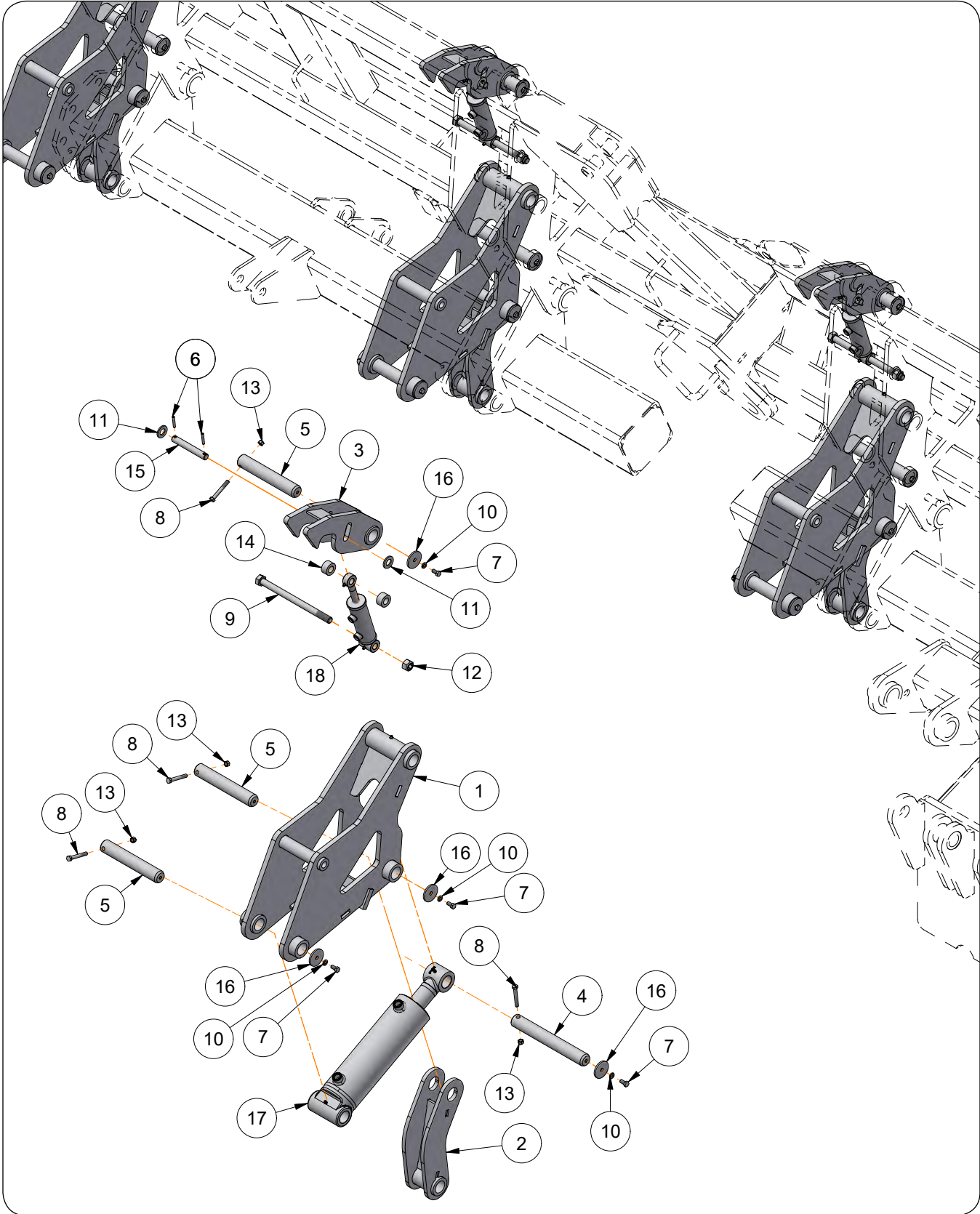
PAINT	SPRAY
Black	97013
Green	97015
Red	97301
Silver Mist	97012
Primer, Gray	9500082



PULL-TYPE RAPTOR — Parts

Toolbar Fold and Latch Components

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



PULL-TYPE RAPTOR — Parts

Toolbar Fold and Latch Components

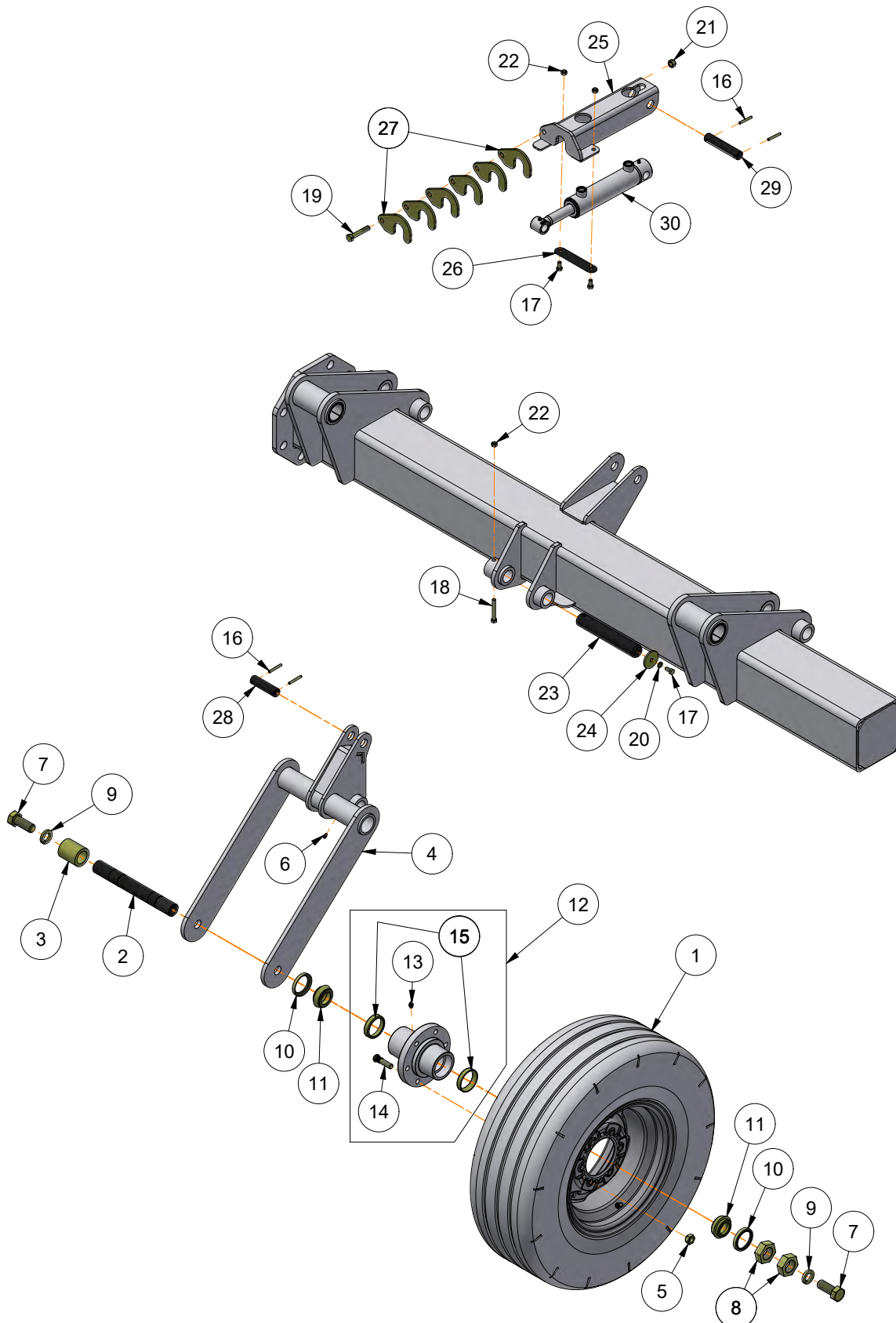
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	602106B	Fold Link Base Weldment w/Grease Zerk	6	
	91160	Grease Zerk	1	
2	602385B	Fold Link Weldment w/Grease Zerk	6	
	91160	Grease Zerk	1	
3	602460B	Latch Weldment w/Grease Zerk	6	
	91160	Grease Zerk	1	
4	602597	Pin, 1 1/2" Dia. x 11 3/8"	6	
5	602598	Pin, 1 1/2" Dia. x 9"	18	
6	91144-162	Spiral Pin, 1/4" Dia. x 1 1/2"	12	
7	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	24	
8	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	24	
9	9390-452	Capscrew, 3/4"-10UNC x 11" G5	6	
10	9404-021	Lock Washer, 3/8"	24	
11	9405-104	Flat Washer, 3/4" SAE	12	
12	9802	Locknut/Top, 3/4"-10UNC	6	
13	9928	Locknut/Top, 3/8"-16UNC	24	
14	602464	Spacer/Tube, 1 1/2" OD x 0.812" iD x 13/16"	12	
15	602465	Pin, 3/4" Dia. x 5 1/4"	6	
16	602615	Washer, 2 1/8" OD x 0.44" ID (Stainless Steel)	24	
17	9502870	Cylinder, 4" x 10" (3000 PSI) w/Grease Zerks	6	
	9503982	Seal Kit	AR	
18	9502901	Cylinder, 1 1/2" x 2" (3000 PSI) w/Grease Zerks	6	

PULL-TYPE RAPTOR — Parts

Gauge Wheel Components

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



PULL-TYPE RAPTOR — Parts

Gauge Wheel Components

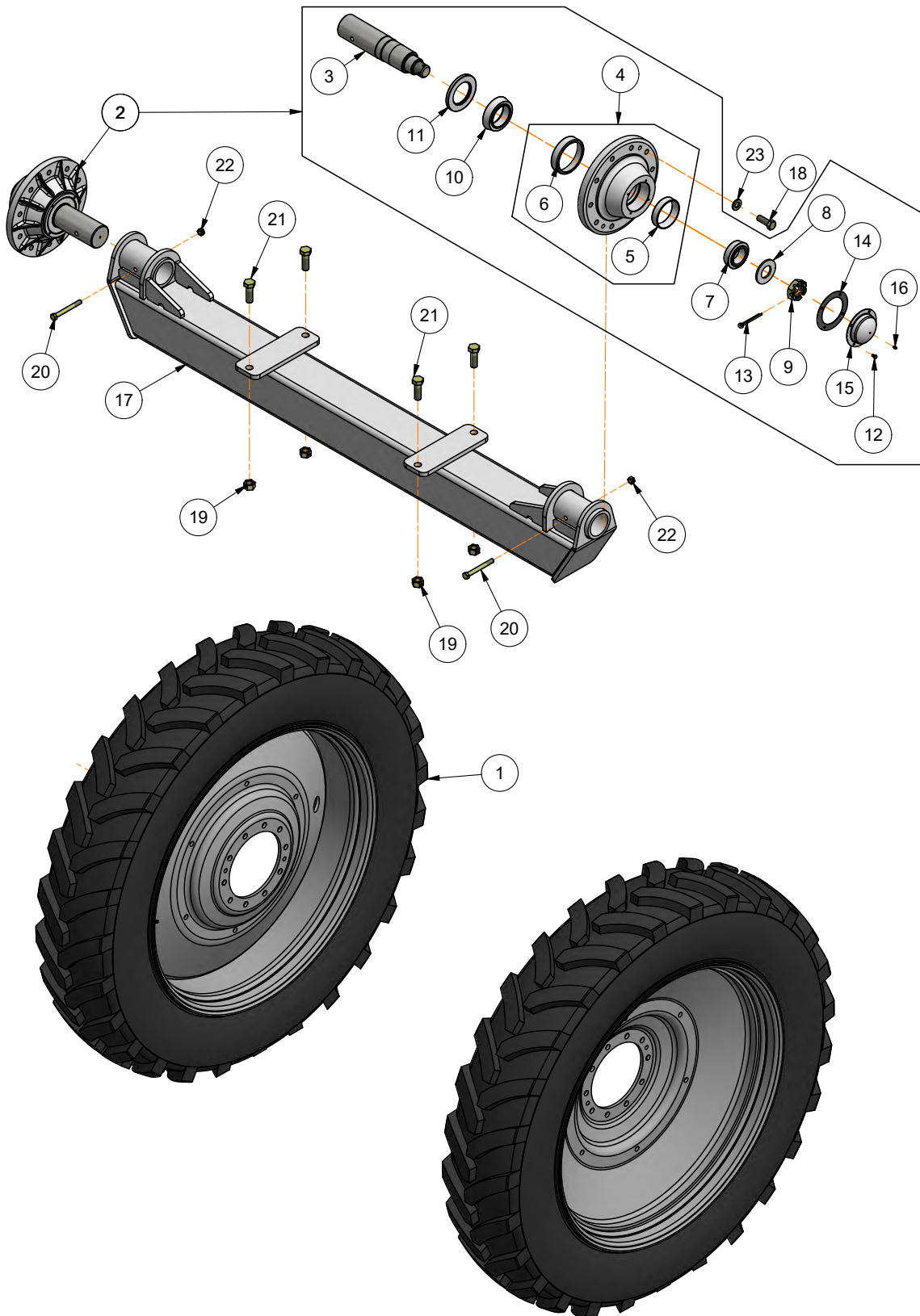
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	111522SM	Wheel & Tire Assembly (Tire IF240/80R15)	2	
	W815-6-08SM	8" x 15" Implement Wheel	2	
	9002500	Valve Stem With Cap	2	
2	602519	Spindle 1 1/2" NOM x 12" w/1 1/2"-12UNF Threaded	2	
3	602521B	Tube, 2 1/4" OD x 1.562" ID x 2 5/8"	2	
4	603112B	Gauge Wheel Arm Weldment (Black)	2	
5	91158	Wheel Nut, 9/16"-18UNF	12	
6	91160	Grease Zerk	2	
7	9390-185	Capscrew, 1"-8UNC x 2 1/2" G5	4	
8	9395-027	Hex Jam Nut, 1 1/2"-12UNF	4	
9	9404-041	Lock Washer, 1"	4	
10	96786	Seal, 2.718" OD	4	
11	96787	Bearing Cone, 1.500" Bore (#13686)	4	
12	96791	Hub Sub Assembly with Cups	2	
13	100028	Grease Zerk, 1/8" NPT	2	
14	96788	Stud Bolt, 9/16"-18UNF x 2 1/4" G8	12	
15	96790	Bearing Cup, 2.717" OD (#13621)	4	
16	91144-165	Spiral Pin, 1/4" Dia. x 1 7/8"	8	
17	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	6	
18	9390-062	Capscrew, 3/8"-16UNC x 2 3/4" G5	2	
19	9390-106	Capscrew, 1/2"-13UNC x 2 3/4" G5	2	
20	9404-021	Lock Washer, 3/8"	2	
21	9800	Locknut/Top, 1/2"-13UNC	2	
22	9928	Locknut/Top, 3/8"-16UNC	6	
23	602598	Pin, 1 1/2" Dia. x 9"	2	
24	602615	Washer, 2 1/8" OD x 0.44" ID (Stainless Steel)	2	
25	603156B	Cylinder Mount Weldment (Black)	2	
26	603159B	Plate, 1 1/4" x 6 1/8"	2	
27	603160	Plate, 2 15/16" x 5" (Height Control)	12	
28	85632	Pin, 1" Dia. x 3 3/4"	2	
29	88038	Pin, 1" Dia. x 5 1/8"	2	
30	9503785	Hydraulic Cylinder, 2" x 6" (3000 PSI) w/Grease Zerks	2	
	9503805	Seal Kit	AR	

PULL-TYPE RAPTOR — Parts

Tillage Only Cart — Axle, Hubs & Single Wheel/Tire Components

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



PULL-TYPE RAPTOR — Parts

Tillage Only Cart — Axle, Hubs & Single Wheel/Tire Components

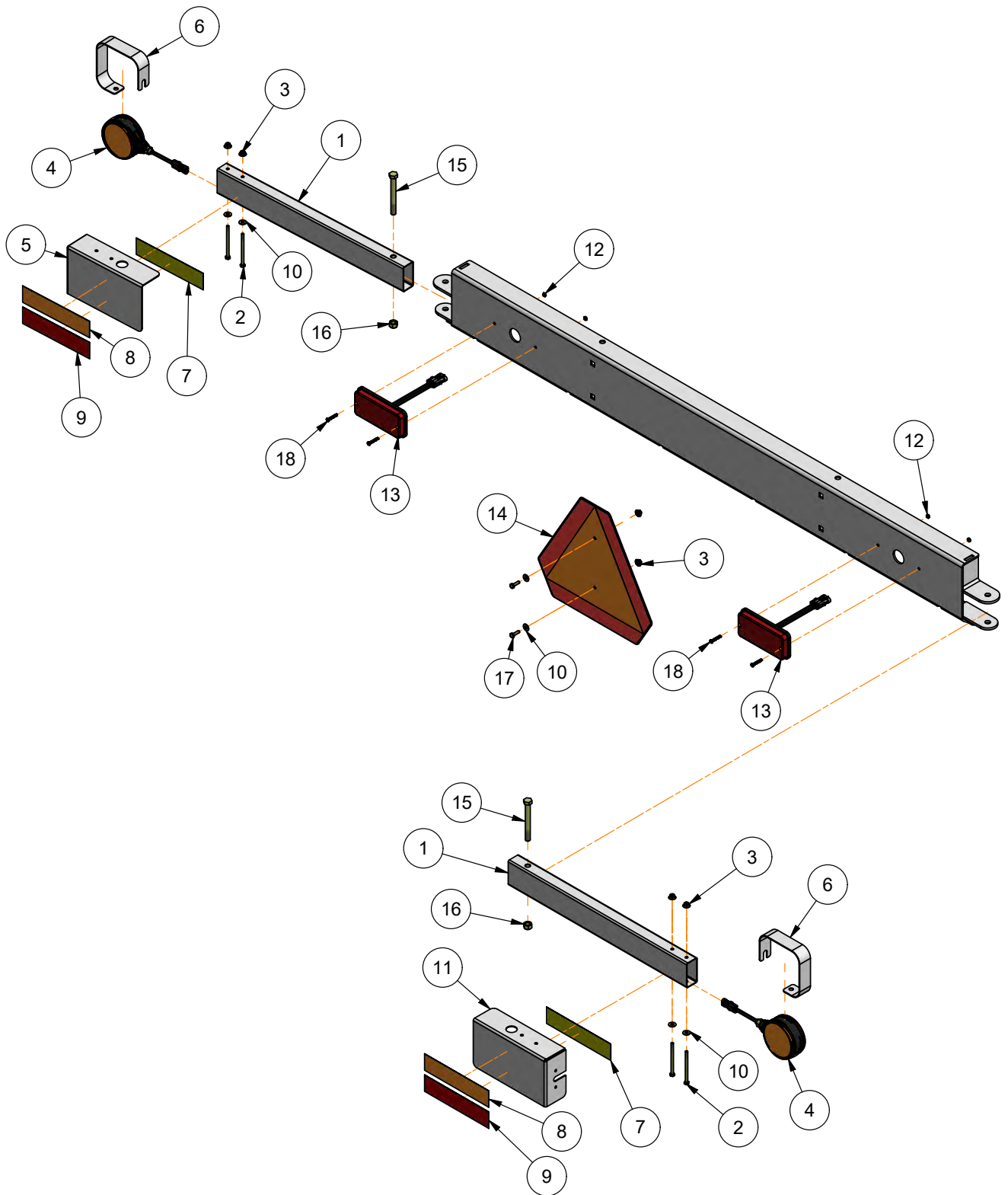
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	16477SM/902519	Wheel & Tire Assembly (Tire TL380/90R46MT)	2	
	16477SM	13" x 46" Formed Plate Wheel	2	
	93300	Valve Stem	2	
2	401593B	Hub & Spindle Assembly (Black)	2	
3	401580	Spindle	2	
4	401144B	Hub Sub Assembly (Black)	2	
5	92462	Bearing Cup	2	
6	92476	Bearing Cup	2	
7	92464	Bearing Cone	2	
8	92472	Spindle Washer	2	
9	92470	Slotted Hex Nut	2	
10	92545	Bearing Cone	2	
11	92565	Seal	2	
12	9390-026	Capscrew, 5/16"-18UNC x 1/2" G5	8	
13	9391-090	Cotter Pin, 3/8" Dia. x 4"	2	
14	284230	Hub Cap Gasket	2	
15	286171	Hub Cap w/Holes	2	
16	91160	Grease Zerk	2	
17	602906G	Axle Weldment (Green)	1	
	602906R	Axle Weldment (Red)		
18	9181	Capscrew, 7/8-14UNF x 2 3/8" G8	20	
19	92199	Locknut/Top, 1"-8UNC	4	
20	9390-135	Capscrew, 5/8"-11UNC x 5 1/2" G5	2	
21	9390-187	Capscrew, 1"-8UNC x 3" G5	4	
22	95905	Locknut/Center, 5/8"-11UNC	2	
23	97041	Flat Washer, 7/8"	20	

PULL-TYPE RAPTOR — Parts

Tillage Only Cart — Lighting and SMV Components

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



PULL-TYPE RAPTOR — Parts

Tillage Only Cart — Lighting and SMV Components

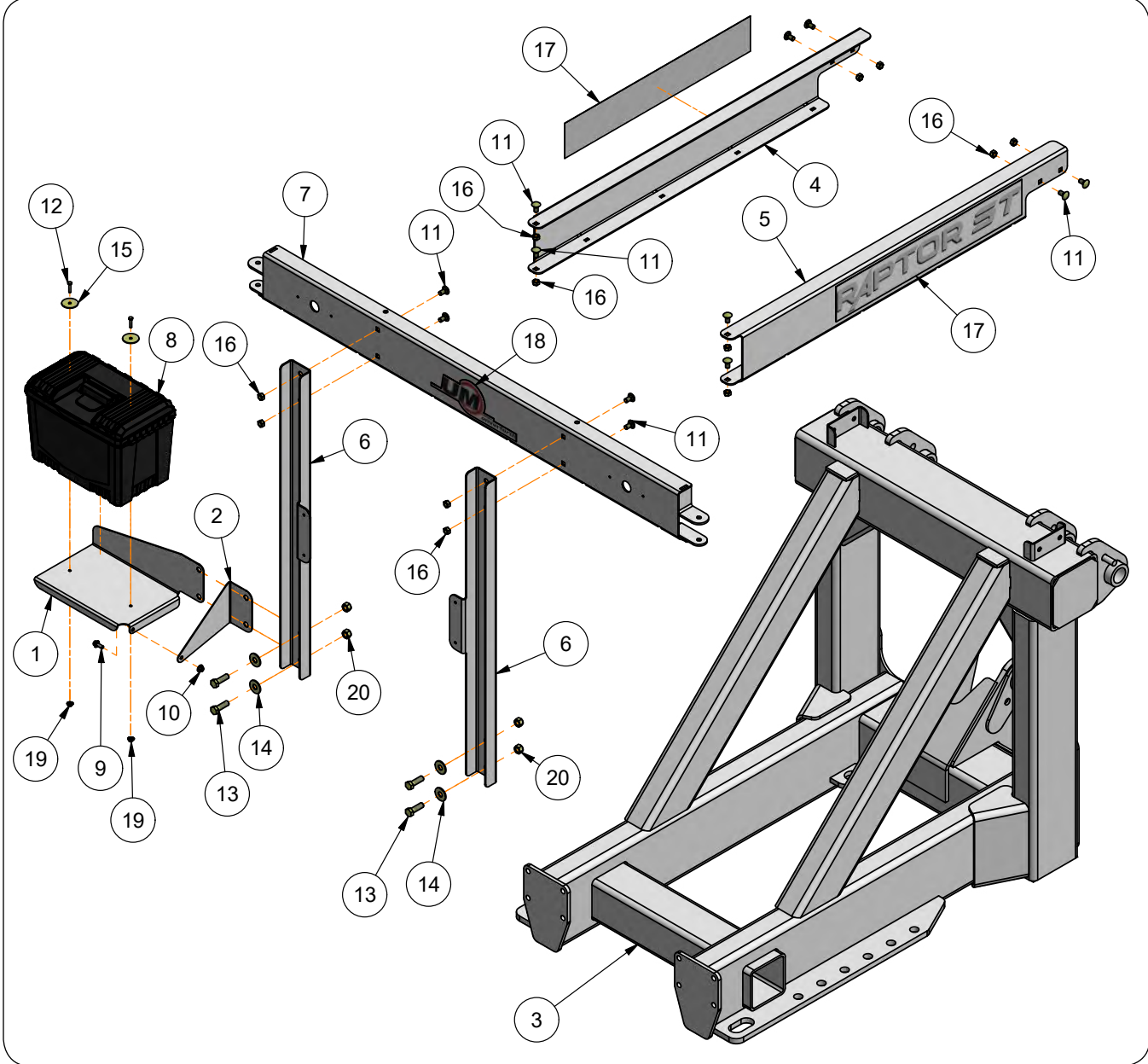
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	42936B	Light Tube, 3" x 1 1/2" x 25" (Black)	2	
2	9390-016	Capscrew, 1/4"-20UNC x 3 3/4" G5	4	
3	97189	Hex Nut/Large Flange, 1/4"-20UNC	6	
4	9005142	Lamp, AMBER, LED Double Faced	2	
5	252303B	Light Bracket Right-Hand (Black)	1	
6	268678B	Light Guard Bracket	2	
7	9003127	Reflector, AMBER	2	
8	9003125	Decal, Fluorescent Orange	2	
9	9003126	Reflector, RED	2	
10	9405-064	Flat Washer, 1/4" USS	6	
11	252304B	Light Bracket Left-Hand (Black)	1	
12	9830-016	Hex Nut, #10-32UNF	4	
13	9006282	Tail/Turn Light, RED, LED	2	
14	TA510514	SMV Emblem	1	
15	9390-112	Capscrew, 1/2"-13UNC x 4 1/2" G5	2	
16	9800	Locknut/Top, 1/2"-13UNC	2	
17	9390-004	Capscrew, 1/4"-20UNC x 7/8" G5	2	
18	903172-350	Pan Head Phillips Screw, #10-32UNF x 1 1/4"	4	

PULL-TYPE RAPTOR — Parts

Tillage Only Cart — Frame and Toolbox Components

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



PULL-TYPE RAPTOR — Parts

Tillage Only Cart — Frame and Toolbox Components

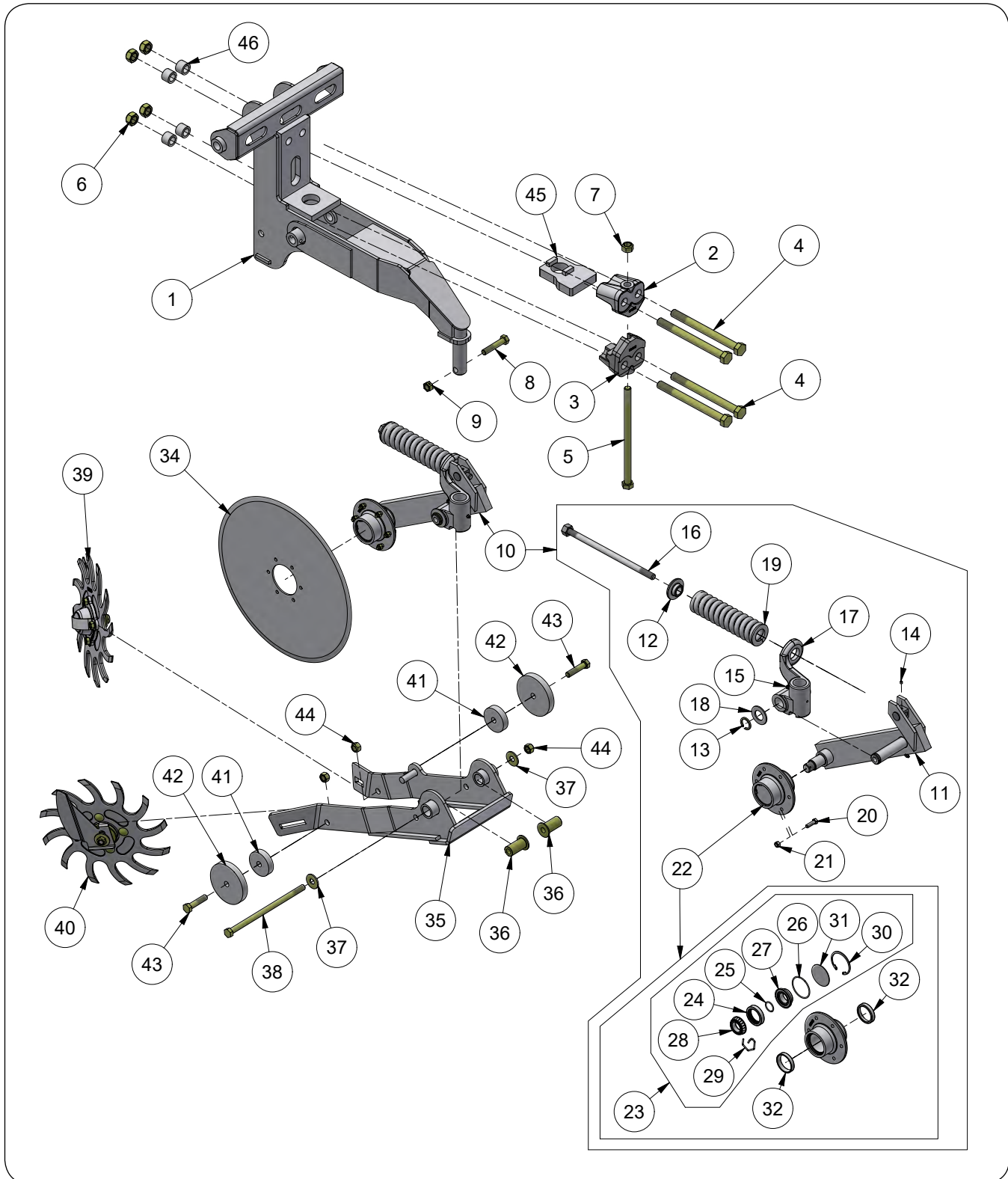
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	45678B	Toolbox Platform Bracket (Black)	1	
2	45679B	Toolbox Mounting Bracket (Black)	1	
3	602909G	Frame Weldment (Green)	1	
	602909R	Frame Weldment (Red)		
4	602947G	Upper Left-Hand Bracket (Green)	1	
	602947R	Upper Left-Hand Bracket (Red)		
5	602948G	Upper Right-Hand Bracket (Green)	1	
	602948R	Upper Right-Hand Bracket (Red)		
6	603014G	Light Stand Bracket (Green)	2	
	603014R	Light Stand Bracket (Red)		
7	603015G	Light Bracket Weldment (Green)	1	
	603015R	Light Bracket Weldment (Red)		
8	9005850	Toolbox	1	
9	91262	Flange Screw, 3/8"-16UNC x 1" G5	1	
10	91263	Nut/Large Flange, 3/8"-16UNC	1	
11	9388-102	Carriage Bolt, 1/2"-13UNC x 1" G5	12	
12	9390-006	Capscrew, 1/4"-20UNC x 1 1/4" G5	2	
13	9390-124	Capscrew, 5/8"-11UNC x 2" G5	4	
14	9405-100	Flat Washer, 5/8" USS	4	
15	94763	Fender Washer, 2" OD	2	
16	94981	Locknut/Center, 1/2"-13UNC	12	
17	9503757	Decal, "RAPTOR ST"	2	
18	9503758	Decal, UM Logo	1	
19	97189	Hex Nut/Large Flange, 1/4"-20UNC	2	
20	9801	Locknut/Top, 5/8"-11UNC	4	

PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Lead Coupler & Row Cleaner Components

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



PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Lead Coultter & Row Cleaner Components

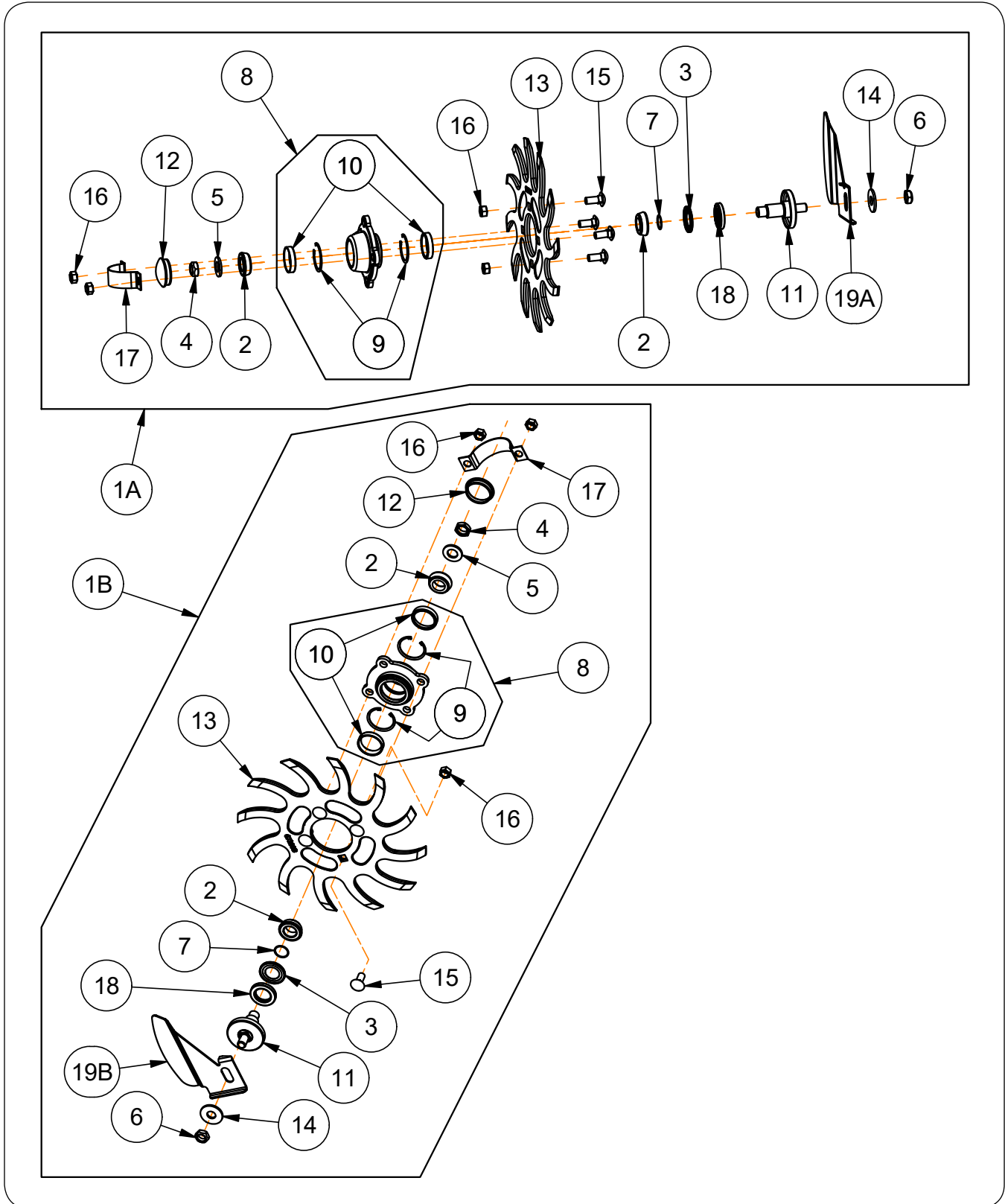
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	603043B	Row Unit Base Weldment =Black=	1	
2	67072B	Clamp, Top =Black=	1	
3	67073B	Clamp, Bottom =Black=	1	
4	9390-457	Capscrew, 7/8"-9UNC x 10" G5	4	
5	9503094	Capscrew, 3/4"-10UNC x 13" G5	1	
6	98420	Locknut/Top, 7/8"-9UNC	4	
7	9802	Locknut/Top, 3/4"-10UNC	1	
8	9390-129	Capscrew, 5/8"-11UNC x 3 1/4" G5	1	
9	95905	Locknut/Center, 5/8"-11UNC	1	
10	68114B	Coulter Combo LH Assembly =Black=	1	
11	68112B	Coulter Arm LH Weldment =Black=	1	Includes Items 11-33
12	82828B	Spring Washer =Black=	1	
13	94144	Retaining Ring, 1 1/4" Dia. Shaft	1	
14	9399-057	Set Screw, 1/4"-20UNC x 1/4 Cup Point/Hex Socket	1	
15	91160	Grease Zerk	1	
16	83371B	Spring Rod Weldment 3/4" Dia. =Black=	1	
17	82823B	Swivel LH Bracket =Black=	1	
18	92528	Bushing, 2 1/4" OD x 1 1/4" ID	1	
19	94756	Compression Spring, 2 5/8" Dia. x 10 5/8"	1	
20	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	6	
21	9928	Locknut/Top, 3/8"-16UNC	6	
22	64533	Hub 6 Bolt Assembly	1	Includes Items 23-33
23	68281	Bearing & Seal Kit	1	Includes Items 24-31
24	93987	Seal, Triple Lip For 1 3/4" Dia. Spindle	1	
25	95565	O-Ring, 1.049" ID	1	
26	902158	O-Ring, 2 1/2" ID	1	
27	901145	Bearing & Seal Assembly	1	
28	9165	Bearing Cone, 1.250" Bore (LM67048)	1	
29	9504825	Hex Retaining Ring 1/8" Dia. x 1 3/4"	1	
30	93985	Retaining Ring, 2 9/16" Dia.	1	
31	60735B	Hub Cap/Plate, 2.656" Dia. =Black=	1	
32	9345	Bearing Cup, 2.328" Dia. (LM67010)	2	
34	99986	Coulter Blade, 20 7/16" Dia. Smooth	1	
35	601742B	Frame Weldment, Row Cleaner LH =Black=	1	
36	67984	Bushing/Bar, 1 3/4" Dia. x 2 7/16"	2	
37	9405-100	Flat Washer, 5/8" USS	2	
38	9390-447	Capscrew, 5/8"-11UNC x 12" G5	1	
39	68317B	Hub/Spindle LH Assembly w/Row Cleaner Wheel & Scraper	1	See Row Cleaner Wheel
40	68323B	Hub/Spindle RH Assembly w/Row Cleaner Wheel & Scraper	1	See Row Cleaner Wheel
41	601912	Plate, 3/4" x 3" OD, 1.4 Lbs.	2	
42	601915	Plate, 3/4" x 5" OD, 4.1 Lbs.	2	
43	9390-127	Capscrew, 5/8"-11UNC x 2 3/4" G5	2	
44	9801	Locknut/Top, 5/8"-11UNC	3	
45	601919B	Spacer Block Weldment	1	
46	602987	Spacer	4	

PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Row Cleaner Wheel Components

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



PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Row Cleaner Wheel Components

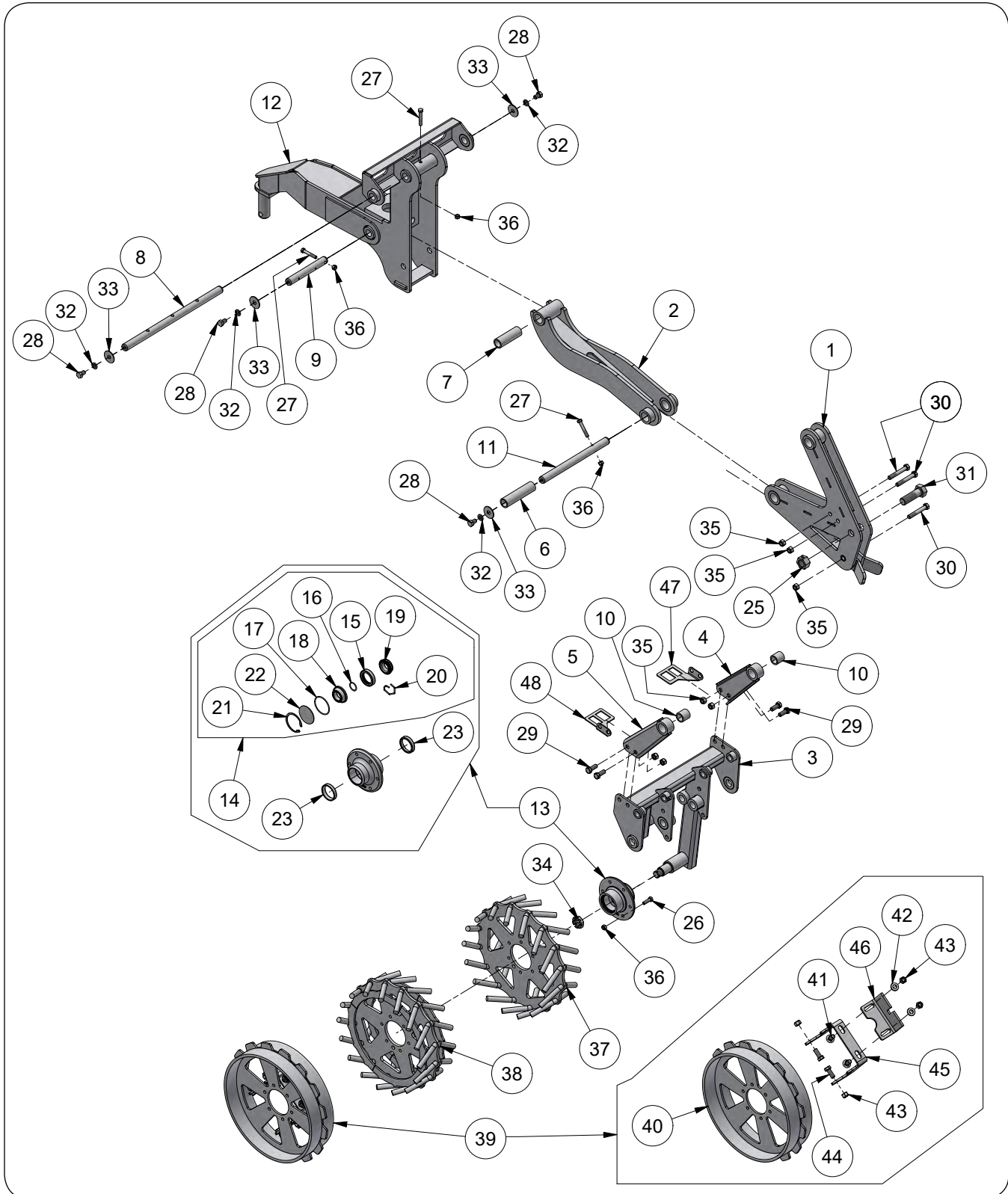
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1A	68317B	Hub/Spindle Asy Left-Hand w/Row Cleaner Wheel & Scraper	1	Includes Items 2-18 & 19A
1B	68323B	Hub/Spindle Asy Right-Hand w/Row Cleaner Wheel & Scraper	1	Includes Items 2-18 & 19B
2	92523	Bearing Cone 1" Dia. Bore (L44643)	2	
3	95680	Seal/3 Lip	1	
4	9397-016	Elastic Jam Nut 3/4-16UNF	1	
5	902645-104	Flat Washer 3/4" SAE	1	Grade 8
6	9397-015	Elastic Jam Nut 5/8-18UNF	1	
7	95595	O-Ring	1	
8	68318B	Coulter Hub 4-Bolt w/Bearing Cups	1	Includes Items 9 & 10
9	95233	Retaining Ring 2" Bore	2	
10	92522	Bearing Cup (L44610)	2	
11	68284	Spindle & Seal Cover Assembly	1	
12	9501381	Hub Cap	1	
13	67280B	Row Cleaner Wheel (12 Tooth Open Profile)	1	
14	9405-100	Flat Washer 5/8" USS	4	
15	9388-103	Carriage Bolt 1/2-13UNC x 1 1/4	4	Grade 5
16	94981	Locknut 1/2-13UNC	1	
17	68315	Strap	1	
18	9501380	Oil Seal	1	
19A	68103	Scraper Left-Hand	1	
19B	68104	Scraper Right-Hand	1	

PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Depth Control Wheel Components

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



PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Depth Control Wheel Components

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

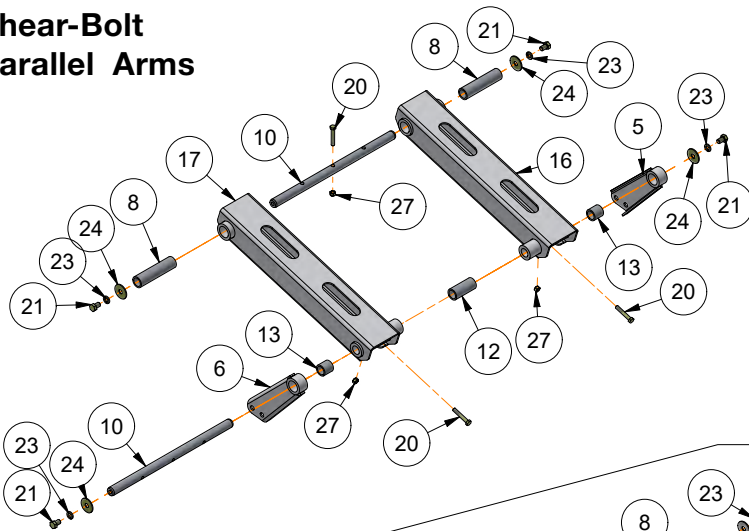
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	601733B	Shank Trip Bracket =Black=	1	
2	601751B	Pull Arm Weldment =Black=	1	
3	601785B	Depth Control Wheel Mount Weldment =Black=	1	
4	601804B	Parallel Link RH Arm Weldment =Black=	1	
5	601806B	Parallel Link LH Arm Weldment =Black=	1	
6	601924	Bushing, 1.343" OD x 1.031" ID x 5 7/16"	3	
7	601925	Bushing, 1.343" OD x 1.031" ID x 4"	4	
8	601932	Pin, 1" Dia. x 18 11/16"	1	
9	601933	Pin, 1" Dia. x 7 1/4"	3	
10	601936	Bushing, 1.343" OD x 1.031" ID x 1 5/16"	2	
11	601937	Pin, 1" Dia. x 12 3/4"	1	
12	603043B	Row Unit Base Weldment =Black=	1	
13	64533	Hub 6 Bolt Assembly	1	Includes Items 14-23
14	68281	Bearing & Seal Kit	1	Includes Items 15-22
15	93987	Seal, Triple Lip For 1 3/4" Dia. Spindle	1	
16	95565	O-Ring, 1.049" ID	1	
17	902158	O-Ring, 2 1/2" ID	1	
18	901145	Bearing & Seal Assembly	1	
19	9165	Bearing Cone, 1.250" Bore (LM67048)	1	
20	9504825	Hex Retaining Ring 1/8" Dia. x 1 3/4"	1	
21	93985	Retaining Ring, 2 9/16" Dia.	1	
22	60735B	Hub Cap/Plate, 2.656" Dia. =Black=	1	
23	9345	Bearing Cup, 2.328" Dia. (LM67010)	2	
25	92199	Locknut/Center, 1"-8UNC	1	
26	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	18	
27	9390-060	Capscrew, 3/8"-16UNC x 2 1/4" G5	6	
28	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	7	
29	9390-100	Capscrew, 1/2"-13UNC x 1 1/4" G5	4	
30	9390-108	Capscrew, 1/2"-13UNC x 3 1/4" G5	3	
31	9390-188	Capscrew, 1"-8UNC x 3 1/4" G5	1	
32	9404-025	Lock Washer, 1/2"	9	
33	9405-090	Flat Washer, 1/2"	7	
34	94795	Slotted Jam Nut, 1"-14UNS	1	
35	9800	Locknut/Top, 1/2"-13UNC	16	
36	9928	Locknut/Top, 3/8"-16UNC	30	
37	601876B	Crowfoot Gauge Wheel Weldment	1	
38	602716B	Crowfoot Gauge Wheel Weldment - Rock Guard Option	1	
39	604433B	Gauge Wheel Kit with Scraper	1	Includes Items 40-46
40	604302B	Gauge Wheel	2	
41	9388-103	Carriage Bolt, 1/2"-13UNC x 1 1/4" G5	2	
42	9405-086	Flat Washer, 1/2" SAE	2	
43	9800	Locknut/Top, 1/2"-13UNC	6	
44	9390-100	Capscrew, 1/2"-13UNC x 1 1/4" G5	4	
45	604315B	Scraper Bracket	1	
46	604303B	Scraper	1	
47	603837B	Spacer Storage Bracket Right-Hand =Black=	1	
48	603838B	Spacer Storage Bracket Left-Hand =Black=	1	

PULL-TYPE RAPTOR — Parts

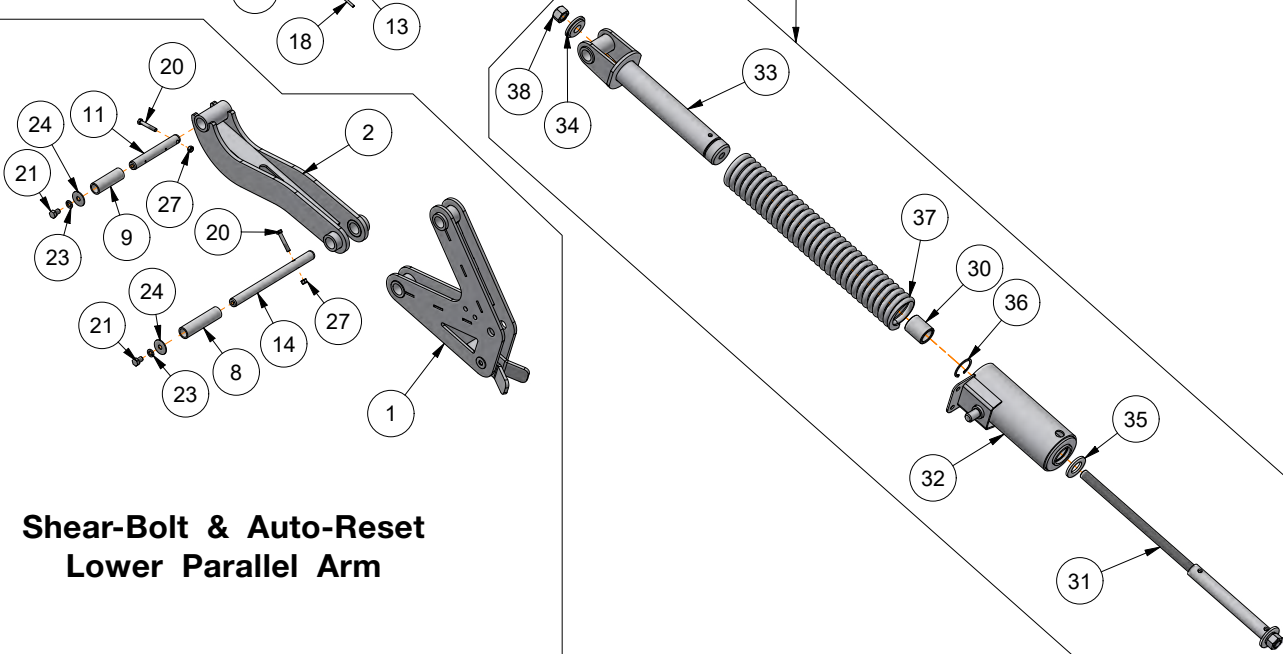
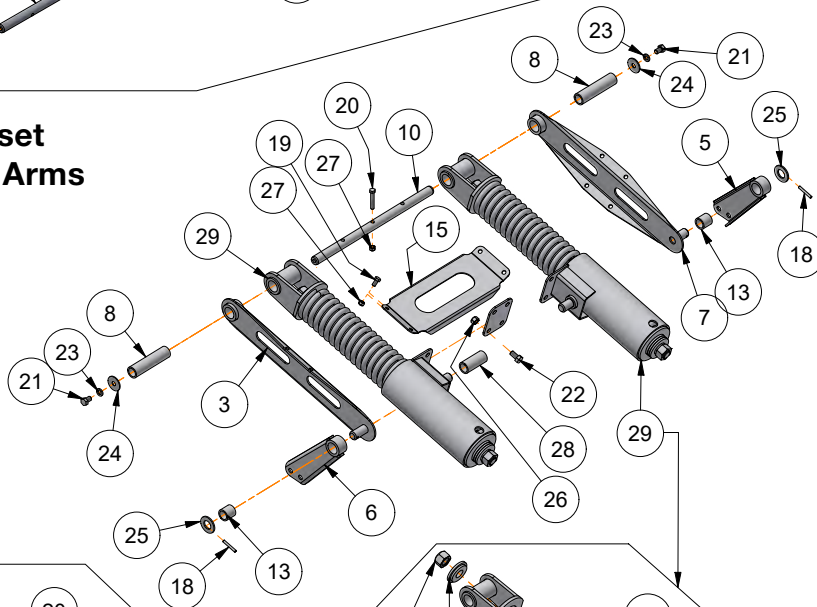
TerrainPro Row Unit — Parallel Arm Components

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

Shear-Bolt Parallel Arms



Auto-Reset Parallel Arms



Shear-Bolt & Auto-Reset Lower Parallel Arm

PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Parallel Arm Components

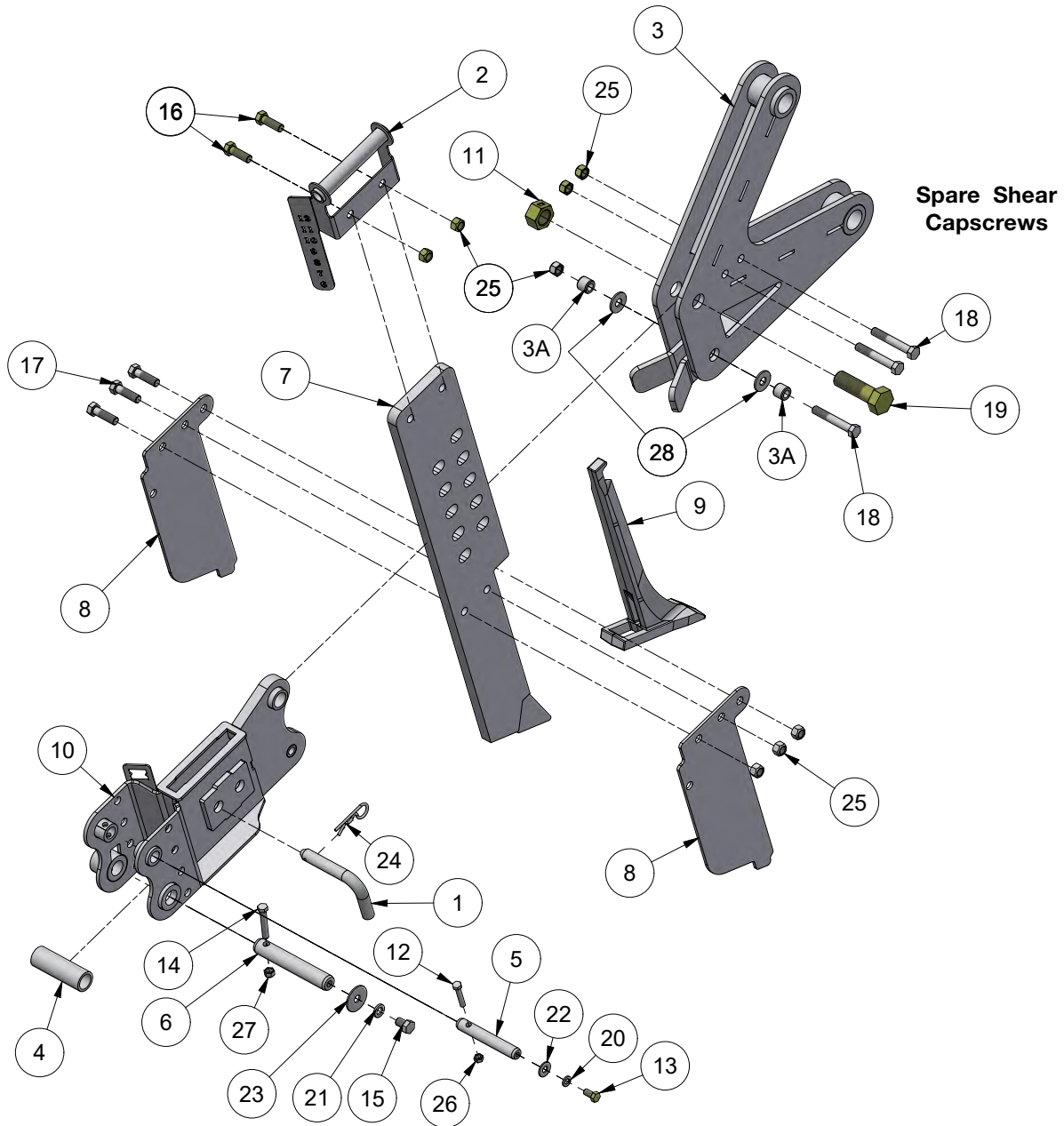
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	601733B	Shank Trip Bracket =Black=	1	
2	601751B	Pull Arm Weldment =Black=	1	
3	601770B	Upper Parallel Link LH Weldment =Black=	1	Used on Auto-Reset Shank
4	601777B	Plate 3 9/16" x 4 1/2"	1	
5	601804B	Parallel Link RH Arm Weldment =Black=	1	
6	601806B	Parallel Link LH Arm Weldment =Black=	1	
7	601914B	Upper Parallel Link RH Weldment =Black=	1	Used on Auto-Reset Shank
8	601924	Bushing, 1.343" OD x 1.031" ID x 5 7/16"	3	
9	601925	Bushing, 1.343" OD x 1.031" ID x 4"	4	
10	601932	Pin, 1" Dia. x 18 11/16"	2	
11	601933	Pin, 1" Dia. x 7 1/4"	3	
12	601935	Bushing, 1.343" OD x 1.031" ID x 3 1/16"	1	
13	601936	Bushing, 1.343" OD x 1.031" ID x 1 5/16"	2	
14	601937	Pin, 1" Dia. x 12 3/4"	1	
15	602501B	Formed Plate =Black=	1	
16	602631B	RH Shear Bolt Upper Arm Weldment =Black=	1	
17	602632B	LH Shear Bolt Upper ARm Weldment =Black=	1	
18	91144-165	Spiral Pin, 1/4" Dia. x 1 7/8"	2	
19	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	7	
20	9390-060	Capscrew, 3/8"-16UNC x 2 1/4" G5	8	
21	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	9	
22	9390-099	Capscrew, 1/2"-13UNC x 1" G5	6	
23	9404-025	Lock Washer, 1/2"	11	
24	9405-090	Flat Washer, 1/2"	9	
26	9405-116	Flat Washer, 1" SAE	2	
26	9800	Locknut/Top, 1/2"-13UNC	16	
27	9928	Locknut/Top, 3/8"-16UNC	30	
28	601935	Bushing, 1.343" OD x 1.031" ID x 3 1/16"	1	
29	601707B	Spring Assembly =Black=	2	Used on Auto-Reset Shank Includes Items 30-38
30	600767	Bushing Guide, 2.125" OD x 1.533" ID x 2.5"	1	
31	N/A	Spring Rod Weldment	1	
32	N/A	Spring Retainer Weldment	1	
33	N/A	Spring Guide Weldment	1	
34	N/A	Step Washer	1	
35	69741PL	Washer/Plate, 2 3/4" OD x 1.515" ID	1	
36	9006206	Retaining Ring, 2.49" Dia.	1	
37	N/A	Compression Spring	1	
38	9663	Locknut/Top, 1"-8UNC	1	

PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Shank Components

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



PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Shank Components

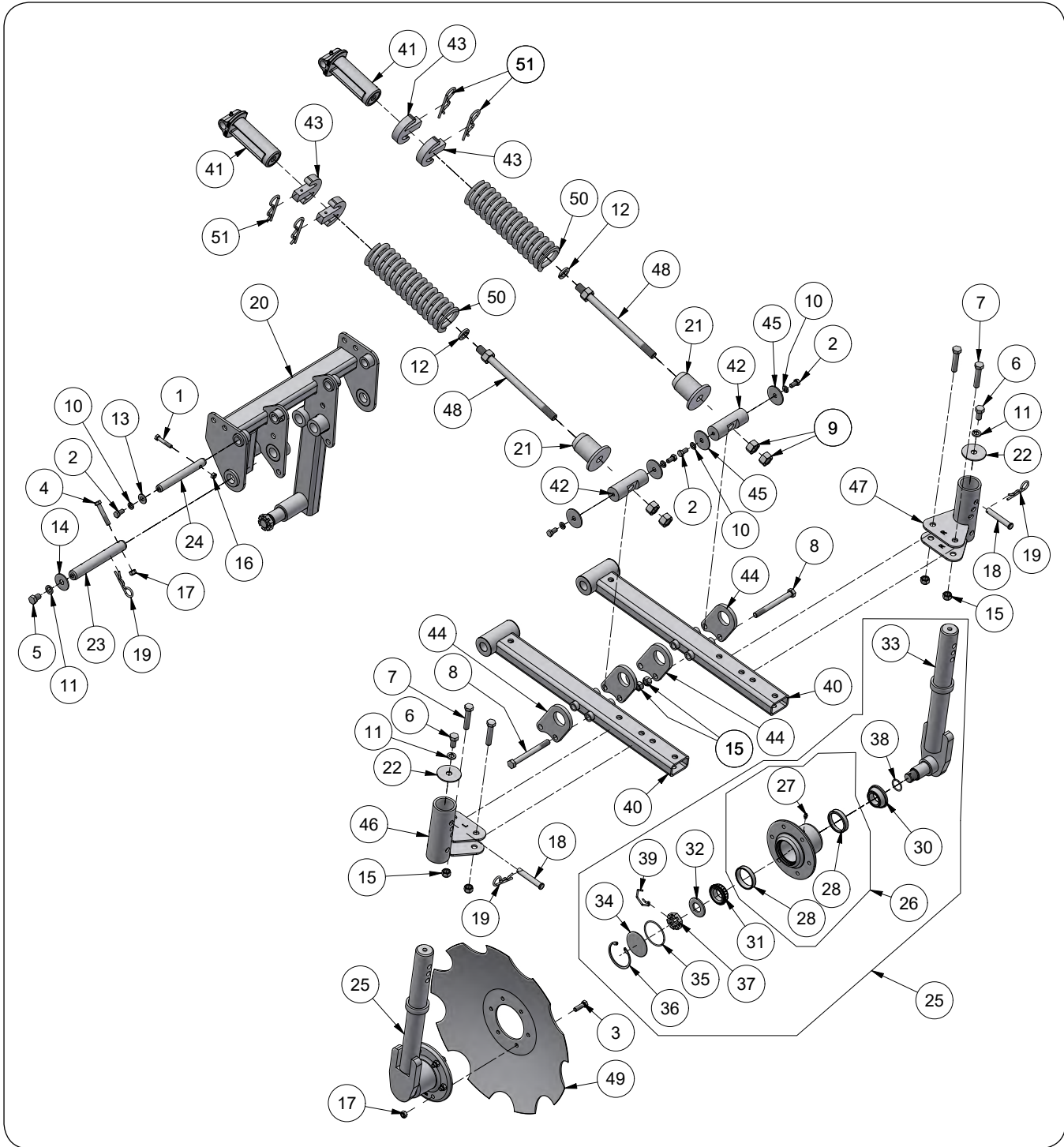
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	600323	Bent Pin, 3/4" Dia. x 7 1/8"	1	
2	600977B	Shank Adjustment Handle Weldment =Black=	1	
3	601733B	Shank Trip Bracket =Black=	1	Includes Item 3A
3A	601688	Bushing	2	
4	601925	Bushing, 1.343" OD x 1.031" ID x 4"	4	
5	601943	Pin, 3/4" Dia. x 4 15/16"	1	
6	601944	Pin, 1" Dia. x 6 1/16"	1	
7	603745B	Shank Weldment =Black=	1	
8	603758B	Wear Plate	2	
9	601983B	Point	1	
10	603242B	Shank Mount Bracket Weldment =Black=	1	
11	92199	Locknut/Center, 1"-8UNC	1	
12	9390-033	Capscrew, 5/16"-18UNC x 1 3/4" G5	3	
13	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	7	
14	9390-060	Capscrew, 3/8"-16UNC x 2 1/4" G5	6	
15	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	7	
16	9390-101	Capscrew, 1/2"-13UNC x 1 1/2" G5	2	
17	9390-102	Capscrew, 1/2"-13UNC x 1 3/4" G5	3	
18	9390-108	Capscrew, 1/2"-13UNC x 3 1/4" G5	3	Shear-Bolts
19	9390-188	Capscrew, 1"-8UNC x 3 1/4" G5	1	
20	9404-021	Lock Washer, 3/8"	3	
21	9404-025	Lock Washer, 1/2"	9	
22	9405-076	Flat Washer, 3/8" USS	3	
23	9405-090	Flat Washer, 1/2" (Type B - Wide)	7	
24	95959	Hairpin Cotter, 5/32" Dia. x 2 15/16"	5	
25	9800	Locknut/Top, 1/2"-13UNC	16	
26	9807	Locknut/Top, 5/16"-18UNC	3	
27	9928	Locknut/Top, 3/8"-16UNC	30	
28	9405-088	Flat Washer, 1/2" USS	2	

PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Closing Coupler Components

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



PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Closing Coultter Components

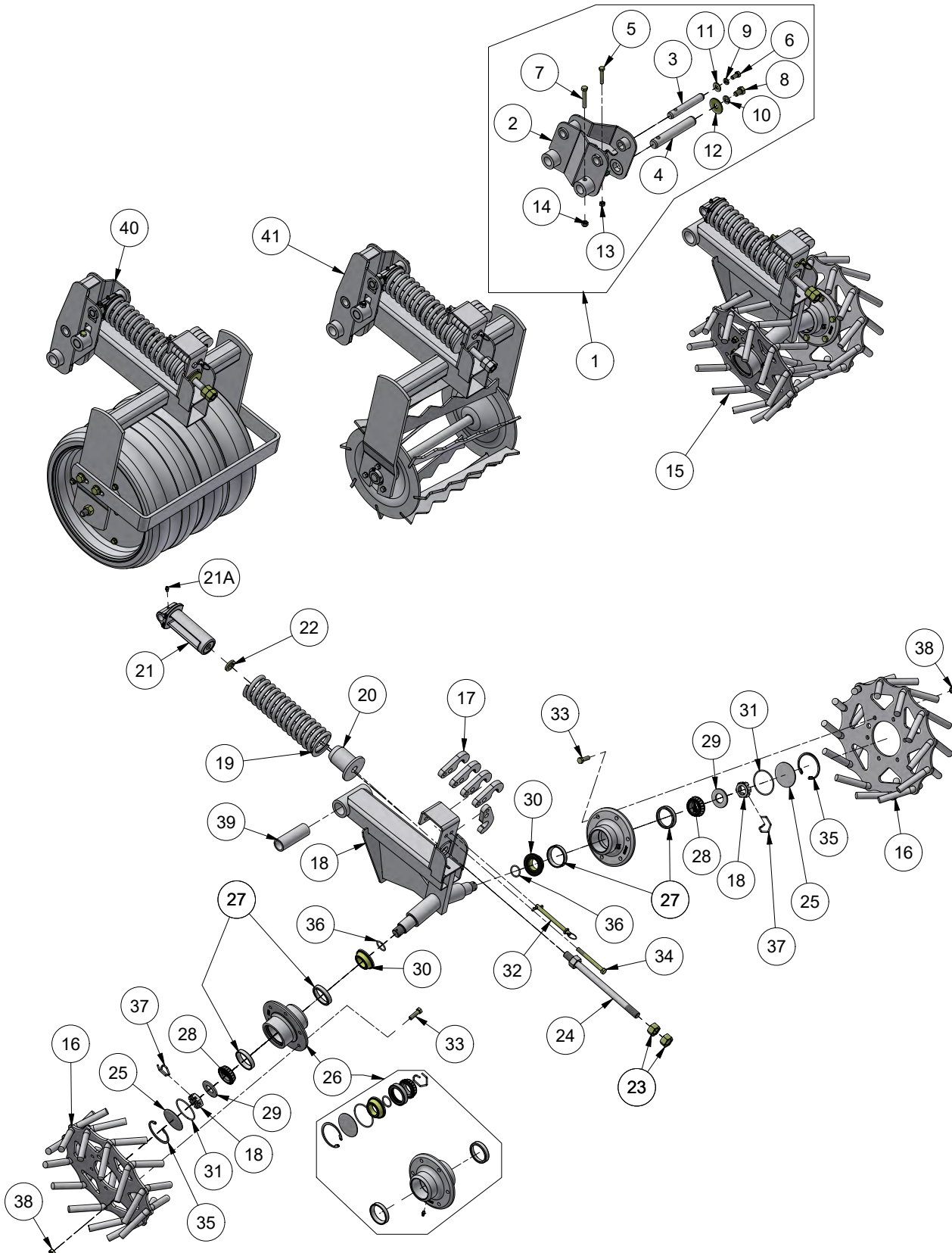
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	9390-033	Capscrew, 5/16"-18UNC x 1 3/4" G5	3	
2	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	11	
3	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	12	
4	9390-060	Capscrew, 3/8"-16UNC x 2 1/4" G5	6	
5	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	7	
6	9390-099	Capscrew, 1/2"-13UNC x 1" G5	6	
7	9390-105	Capscrew, 1/2"-13UNC x 2 1/2" G5	4	
8	9390-113	Capscrew, 1/2"-13UNC x 5" G5	4	
9	9394-016	Hex Nut, 3/4"-10UNC	4	
10	9404-021	Lock Washer, 3/8"	7	
11	9404-025	Lock Washer, 1/2"	9	
12	9404-033	Lock Washer, 3/4"	2	
13	9405-076	Flat Washer, 3/8" USS	3	
14	9405-090	Flat Washer, 1/2"	7	
15	9800	Locknut/Top, 1/2"-13UNC	24	
16	9807	Locknut/Top, 5/16"-18UNC	3	
17	9928	Locknut/Top, 3/8"-16UNC	22	
18	91362	Clevis Pin, 1/2" Dia. x 3"	2	
19	95959	Hairpin Cotter, .1562" Dia. x 3"	5	
20	601785B	Depth Control Wheel Mount Weldment =Black=	1	
21	601836	Guide Bar	2	
22	601853	Washer, 2 3/8" Dia.	2	
23	601933	Pin, 1" Dia. x 7 1/4"	3	
24	601939	Pin, 3/4" Dia. x 6 7/16"	2	
25	603180B	Post & Hub Assembly =Black=	2	Includes Items 26-39
26	603083B	Hub 6-Bolt Sub-Assembly =Black=	1	Includes Items 27-28
27	91160	Grease Zerk	1	
28	9345	Bearing Cup, 2.328" Dia. (LM67010)	2	
30	901145	Bearing & Seal Assembly	1	
31	9165	Bearing Cone, 1.250" Bore (LM67048)	1	
32	94800	Machinery Bushing, 2" OD x 1.01" ID	1	
33	603142B	Spindle Post Weldment =Black=	1	
34	60735B	Hub Cap/Plate, 2.656" Dia. =Black=	1	
35	902158	O-Ring, 2 1/2" ID	1	
36	93985	Retaining Ring, 2 9/16" Dia.	1	
37	94795	Slotted Jam Nut, 1"-14UNS	1	
38	95565	O-Ring, 1.049" ID	1	
39	9504825	Hex Retaining Ring 1/8" Dia. x 1 3/4"	1	
40	603749B	Sealer Arm Weldment =Black=	2	
41	603752B	Spring Insert =Black=	2	
42	603773	Trunnion =Black=	2	
43	603774	Spacer Block =Black=	4	
44	603780B	Pivot Lug =Black=	4	
45	603781	Washer, 2" OD x .44" ID (Stainless Steel)	4	
46	603785B	Sealer LH Mounting Post =Black=	1	
47	603786B	Sealer RH Mounting Post =Black=	1	
48	604035	Spring Rod Weldment =Black=	2	
49	900586	Concave/Notched Coultter Blade 18" Dia.	2	
50	9503079B	Compression Spring, 3" Dia. x 10.31"	2	
51	9504250	Hairpin Cotter, 3/16" Dia. x 4" (Stainless Steel)	4	

PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Conditioners & Extension Components

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



PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Conditioners & Extension Components

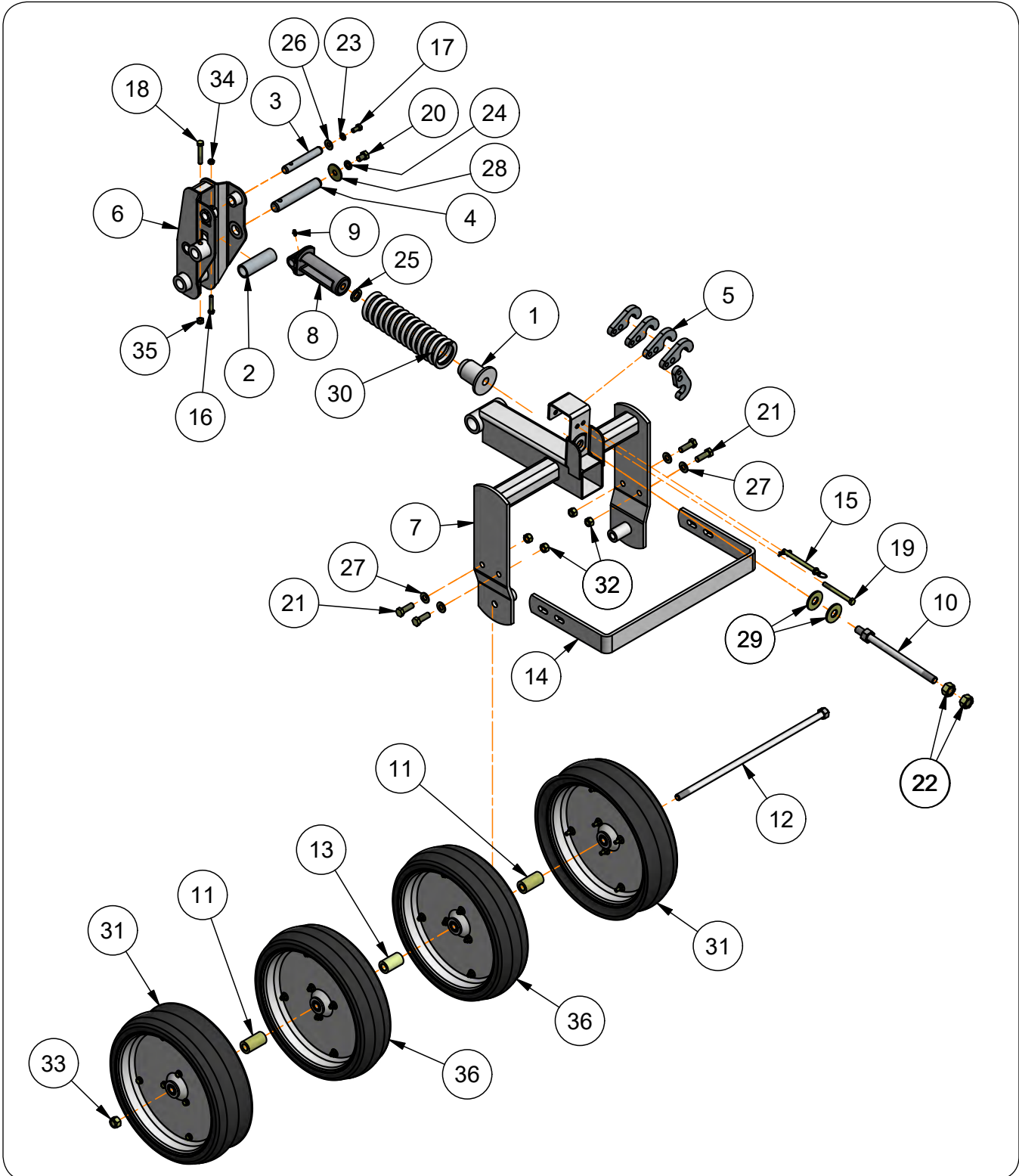
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	602507B	Basket Extension Bracket Assembly =Black=	1	Includes Items 2-14
2	604733B	6" Extension Bracket =Black=	1	
3	601943	Pin, 3/4" Dia. x 4 15/16"	1	
4	601944	Pin, 1" Dia. x 6 1/16"	1	
5	9390-033	Capscrew, 5/16"-18UNC x 1 3/4" G5	1	
6	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	1	
7	9390-060	Capscrew, 3/8"-16UNC x 2 1/4" G5	1	
8	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	1	
9	9404-021	Lock Washer, 3/8"	1	
10	9404-025	Lock Washer, 1/2"	1	
11	9405-076	Flat Washer, 3/8" USS	1	
12	9405-090	Flat Washer, 1/2"	1	
13	9807	Locknut/Top, 5/16"-18UNC	1	
14	9928	Locknut/Top, 3/8"-16UNC	1	
15	602704B	Crowfoot Conditioner Wheel Assembly =Black=	1	Includes Items 16-39
16	601874B	Crowfoot Conditioner Wheel =Black=	2	
17	602409	Spacer/Plate	5	
18	602708B	Conditioner Mount Assembly =Black=	1	
19	9503079B	Compression Spring, 3" Dia. x 10.31"	1	
20	601836	Guide/Bar 3" Dia. x 3"	1	
21	603752B	Spring Insert =Black=	1	Includes Item 21A
21A	91160	Grease Zerk	1	
22	9404-033	Lock Washer, 3/4"	1	
23	9394-016	Hex Nut, 3/4"-10UNC	2	
24	604035	Spring Rod Weldment =Black=	1	
25	60735B	Hub Cap/Plate, 2.656" Dia. =Black=	2	
26	64533	Hub 6 Bolt Assembly	2	Includes Items 25, 27, 28, 30, 31, 35, 36, 37
27	9345	Bearing Cup, 2.328" Dia. (LM67010)	2	
28	9165	Bearing Cone, 1.250" Bore (LM67048)	1	
29	94800	Machinery Bushing, 2" OD x 1.01" ID x .126"	1	
30	901145	Bearing & Seal Assembly	1	
31	902158	O-Ring, 2 1/2" ID	2	
32	91168	Hitch Pin, 3/8" Dia. x 4 3/8" w/Hairpin	1	
33	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	12	
34	9390-066	Capscrew, 3/8"-16UNC x 3 3/4" G5	1	
35	93985	Retaining Ring, 2 9/16" Dia.	2	
36	95565	O-Ring, 1.049" ID	2	
37	9504825	Hex Retaining Ring 1/8" Dia. x 1 3/4"	2	
38	9928	Locknut/Top, 3/8"-16UNC	13	
39	601925	Bushing, 1.343" OD x 1.031" ID x 4"	1	
40	602775B	Strip Till 16" Press Wheel Assembly Conditioner	1	Refer to Press Wheel Conditioner
41	602776B	Strip Till 15" Basket Assembly Conditioner	1	Refer to Basket Conditioner

PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Press Wheel Conditioner Option

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



PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Press Wheel Conditioner Option

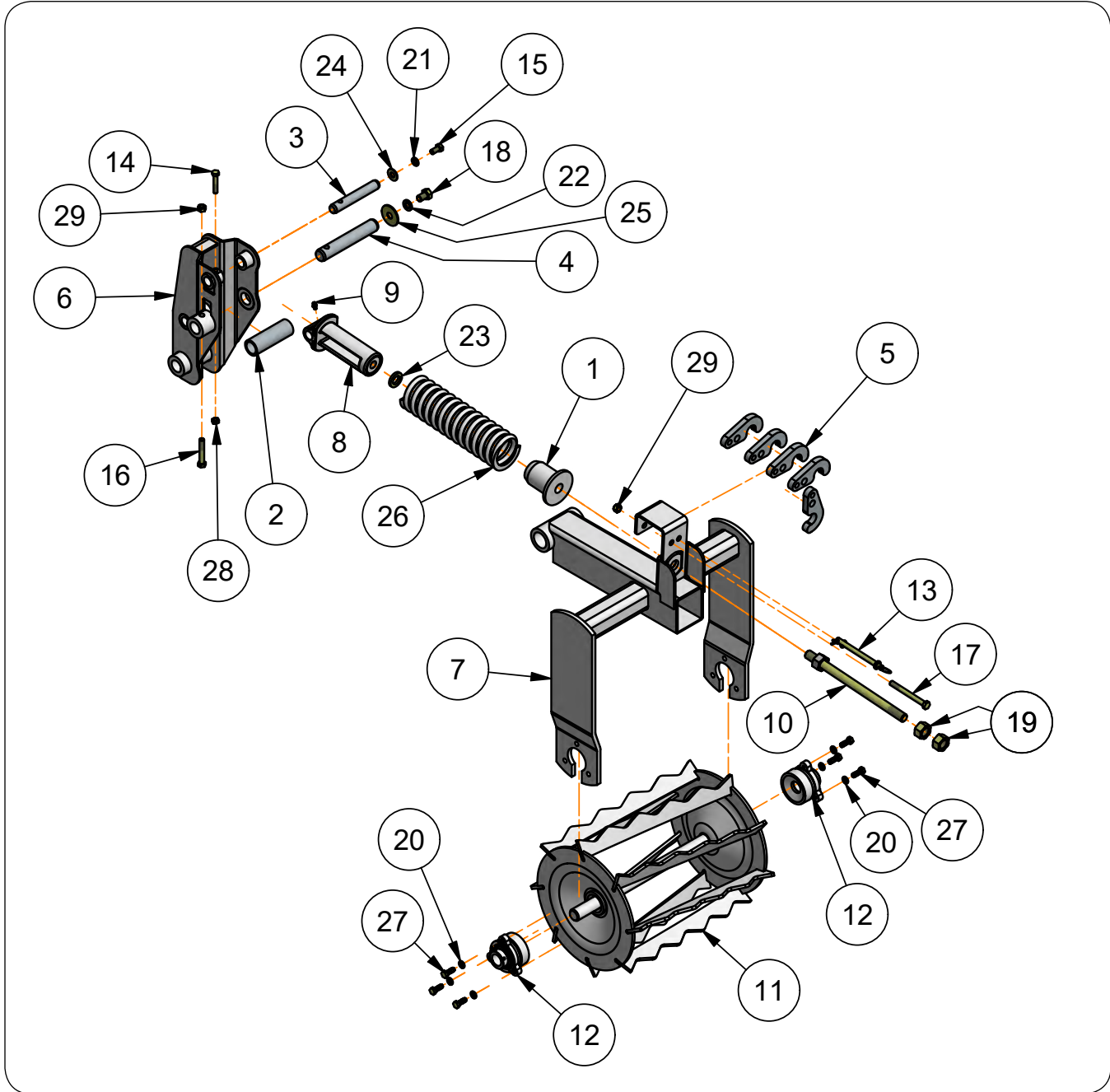
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	602775B	Strip Till 16" Press Wheel Assembly Conditioner	1	Includes Items 1-36
1	601836	Guide/Bar 3" Dia. x 3"	1	
2	601925	Bushing/Tube, 1.343" OD x 1.031" ID x 4"	1	
3	601943	Pin, 3/4" Dia. x 4 15/16"	1	
4	601944	Pin, 1" Dia. x 6 1/16"	1	
5	602409	Spacer/Plate	5	
6	602764B	Height Extension 6" Bracket Weldment =Black=	1	
7	602785B	Press Wheel 16" Frame Weldment =Black=	1	
8	603752B	Spring Insert =Black=	1	
9	91160	Grease Zerk	1	
10	604035	Spring Rod Weldment =Black=	1	
11	64598	Tube, 1 1/4" OD x .688" ID x 2.375"	2	
12	65248	Tie Rod Weldment, 5/8" Dia. x 20 5/8"	1	
13	65251	Tube, 1 1/4" OD x .688" ID x 2.125"	1	
14	65263B	Scraper Bar =Black=	1	
15	91168	Hitch Pin, 3/8" Dia. x 4 3/8" w/Hairpin	1	
16	9390-033	Capscrew, 5/16"-18UNC x 1 3/4" G5	1	
17	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	1	
18	9390-060	Capscrew, 3/8"-16UNC x 2 1/4" G5	1	
19	9390-066	Capscrew, 3/8"-16UNC x 3 3/4" G5	1	
20	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	1	
21	9390-101	Capscrew, 1/2"-13UNC x 1 1/2" G5	4	
22	9394-016	Hex Nut, 3/4"-10UNC	2	
23	9404-021	Lock Washer, 3/8"	1	
24	9404-025	Lock Washer, 1/2"	1	
25	9404-033	Lock Washer, 3/4"	1	
26	9405-076	Flat Washer, 3/8" USS	1	
27	9405-086	Flat Washer, 1/2" SAE	4	
28	9405-090	Flat Washer, 1/2"	1	
29	9405-106	Flat Washer, 3/4" USS	2	
30	9503079B	Compression Spring, 3" Dia. x 10.31"	1	
31	97520	Press Wheel Assembly, Offset (4 1/2" x 16")	2	
32	9800	Locknut/Top, 1/2"-13UNC	4	
33	9801	Locknut/Top, 5/8"-11UNC	1	
34	9807	Locknut/Top, 5/16"-18UNC	1	
35	9928	Locknut/Top, 3/8"-16UNC	2	
36	99712	Press Wheel Assembly, Smooth (4"x16")	2	

PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Rolling Harrow Basket Conditioner Option

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



PULL-TYPE RAPTOR — Parts

TerrainPro Row Unit — Rolling Harrow Basket Conditioner Option

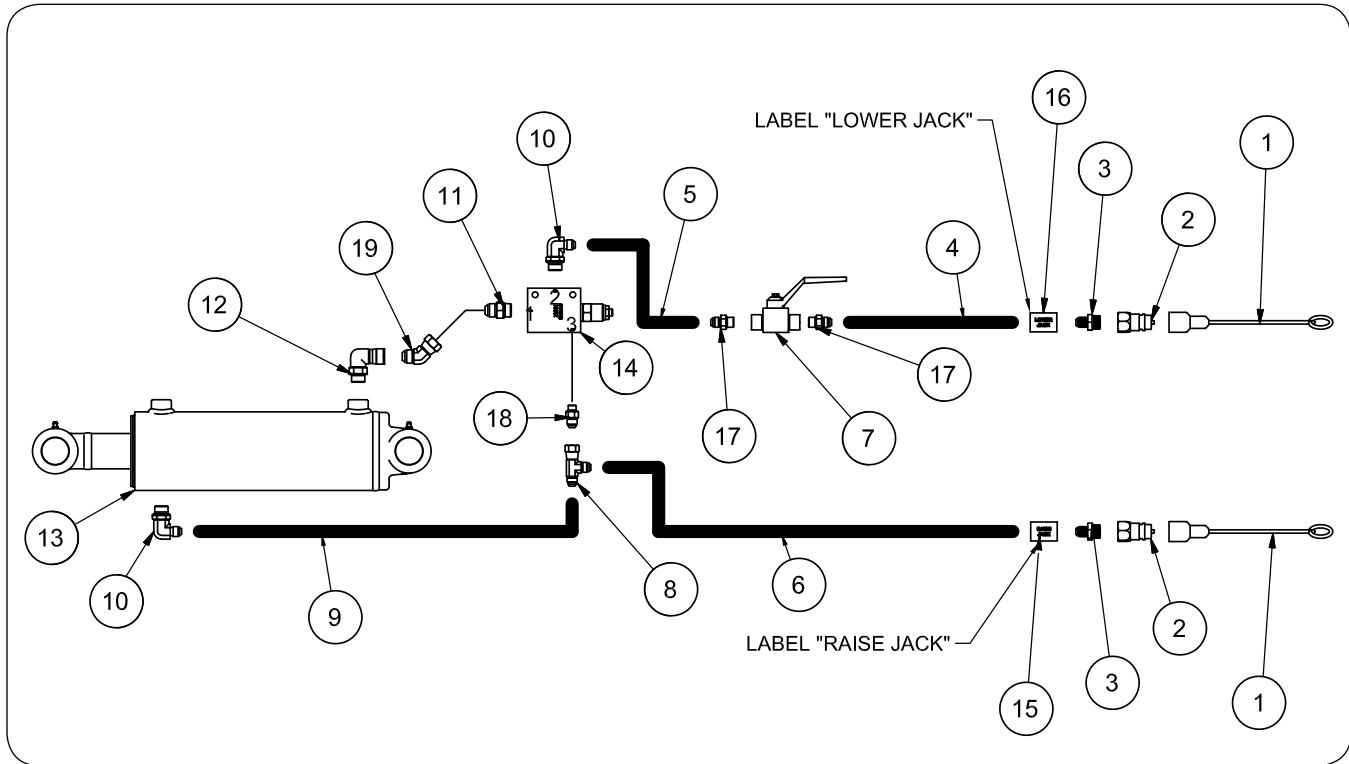
Please visit www.unverferth.com/parts/ for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	602776B	Strip Till 15" Basket Assembly Conditioner	1	Includes Items 1-29
1	601836	Guide/Bar 3" Dia. x 3"	1	
2	601925	Bushing/Tube, 1.343" OD x 1.031" ID x 4"	1	
3	601943	Pin, 3/4" Dia. x 4 15/16"	1	
4	601944	Pin, 1" Dia. x 6 1/16"	1	
5	602409	Spacer/Plate	5	
6	602764B	Height Extension 6" Bracket Weldment =Black=	1	
7	602789B	Basket 15" Frame Weldment =Black=	1	
8	603752B	Spring Insert =Black=	1	
9	91160	Grease Zerk	1	
10	604035	Spring Rod Weldment =Black=	1	
11	62800	Basket 15" Aggressive Weldment =Black=	1	
12	87181	Flange Bearing Assembly 3-Bolt	2	
13	91168	Hitch Pin, 3/8" Dia. x 4 3/8" w/Hairpin	1	
14	9390-033	Capscrew, 5/16"-18UNC x 1 3/4" G5	1	
15	9390-053	Capscrew, 3/8"-16UNC x 3/4" G5	1	
16	9390-060	Capscrew, 3/8"-16UNC x 2 1/4" G5	1	
17	9390-066	Capscrew, 3/8"-16UNC x 3 3/4" G5	1	
18	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	1	
19	9394-016	Hex Nut, 3/4"-10UNC	2	
20	9404-019	Lock Washer, 5/16"	6	
21	9404-021	Lock Washer, 3/8"	1	
22	9404-025	Lock Washer, 1/2"	1	
23	9404-033	Lock Washer, 3/4"	1	
24	9405-076	Flat Washer, 3/8" USS	1	
25	9405-090	Flat Washer, 1/2"	1	
26	9503079B	Compression Spring, 3" Dia. x 10.31"	1	
27	97321	Capscrew, 5/16"-18UNC x 7/8" G5	6	
28	9807	Locknut/Top, 5/16"-18UNC	1	
29	9928	Locknut/Top, 3/8"-16UNC	2	

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Jack

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



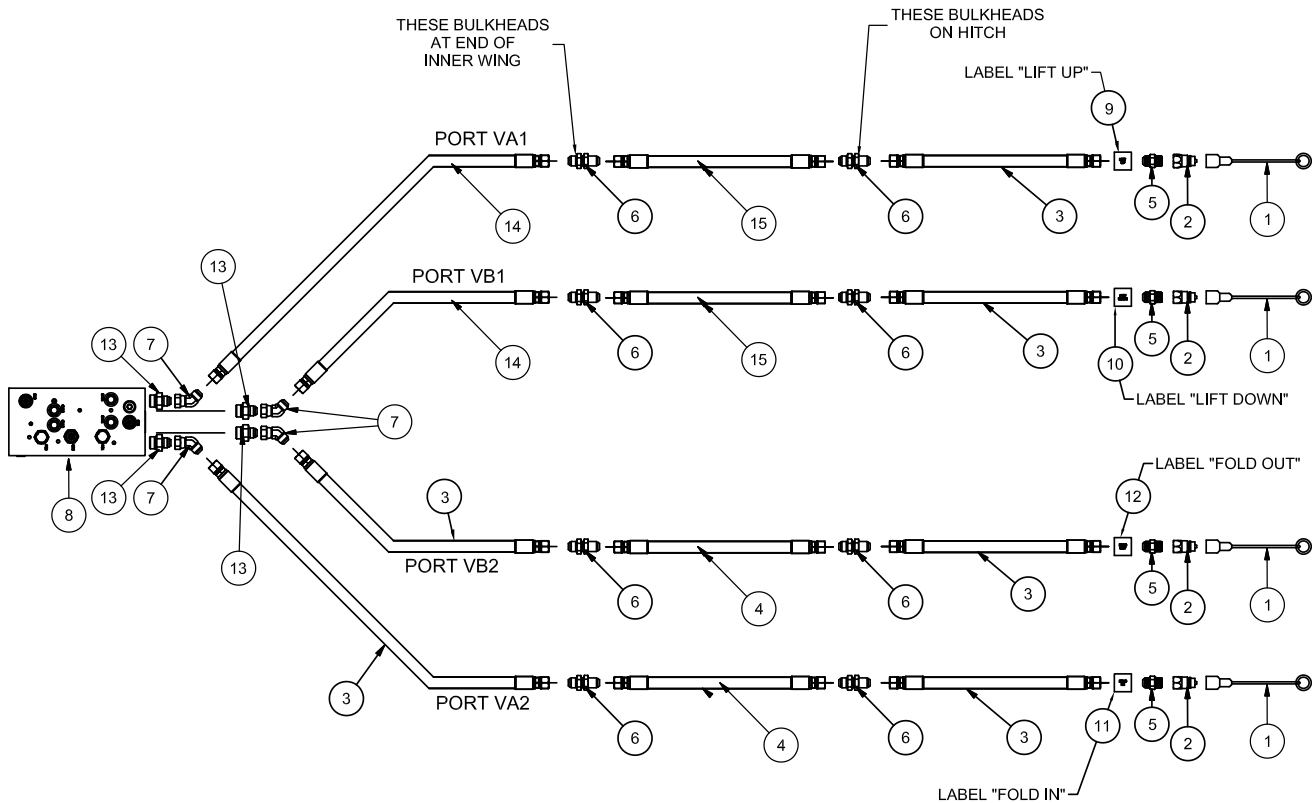
ITEM	PART NO.	DESCRIPTION	QTY
1	91511	Dust Cap	2
2	91383	Male Tip Coupling, 3/4"-16 Female O-Ring	2
3	92927	Adapter, 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	2
4	9503721	Hose, 3/8" x 18" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	1
5	9503722	Hose, 3/8" x 132" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	1
6	9503809	Hose, 3/8" x 150" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	1
7	9501014	Ball Valve, 9/16"-18 UNF Female O-Ring Threaded Ports	1
8	91465	Tee, 9/16"-18 JIC Male x 9/16"-18 JIC Female x 9/16"-18 JIC Male	1
9	9502775	Hose, 3/8" x 30" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	1
10	9874	90° Elbow, 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	2
11	95411	Adapter, 3/4"-16 JIC Male x 3/4"-16 O-Ring Male w/ 0.060 Restrictor	1
12	95811	90° Elbow, 3/4"-16 O-Ring Male x 3/4"-16 JIC Female	1
13	9502870	Cylinder, 4" x 10" (3000 PSI) w/Grease Zerks	1
	9503982	Seal Kit	-
14	9502229	Counterbalance Valve Assembly	1
15	9006651	Hose Marker, BLACK "Raise Jack"	1
16	9006652	Hose Marker, BLACK "Lower Jack"	1
17	9001495	Adapter, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
18	97711	Adpater, 9/16"-18 JIC Male x 7/16"-20 O-Ring Male	1
19	9005843	45° Elbow, 3/4"-16 JIC Female x 3/4"-16 JIC Male	1

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Tractor To Supply Valve

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

Serial Number A70040100 & Up



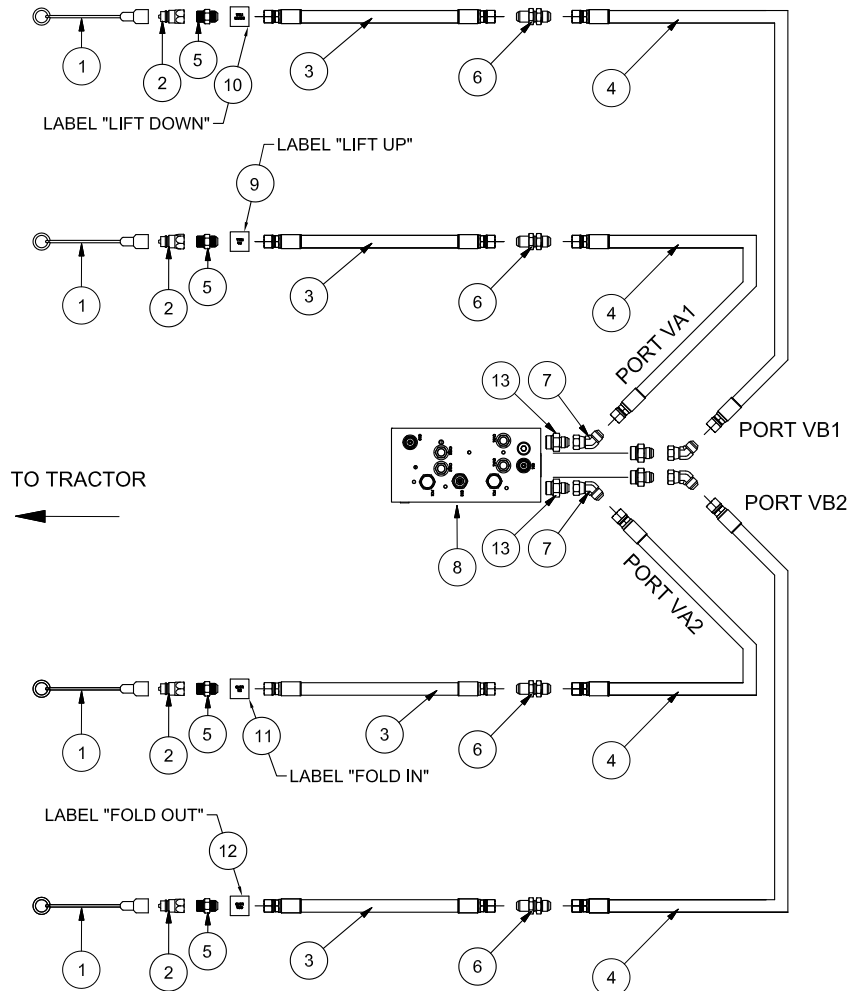
ITEM	PART NO.	DESCRIPTION	QTY
1	91511	Dust Cap	4
2	95477	Pioneer Male Tip 7/8"-14 Female O-Ring	4
3	9503648	Hose, 5/8" x 108" (7/8"-14 JIC Female x 7/8"-14 JIC Female)	6
4	9504744	Hose, 5/8" x 216" (7/8"-14 JIC Female x 7/8"-14 JIC Female)	2
5	9002443	Adapter, 7/8"-14 JIC Male x 7/8"-14 O-Ring Male	4
6	9005789	Union-Bulkhead, 7/8"-14UNF	8
7	9503042	45° Elbow, 7/8"-14 JIC Male x 7/8"-14 JIC Female	4
8	9504775	Valve Assembly - Multi Function Toolbar	1
9	9503725	Hose Marker, RED "Lift Up"	1
10	9503726	Hose Marker, RED "Lift Down"	1
11	9503727	Hose Marker, WHITE "Fold In"	1
12	9503728	Hose Marker, WHITE "Fold Out"	1
13	TAWC99407	Adapter, 7/8"-14 JIC Male x 1 1/16"-12 O-Ring Male	4
14	9504753	Hose, 5/8" x 108" (7/8"-14 JIC Female x 7/8"-14 JIC Female)	2
15	9504748	Hose, 5/8" x 216" (7/8"-14 JIC Female x 7/8"-14 JIC Female)	2

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Tractor To Supply Valve

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

Serial Number A70040099 & Lower



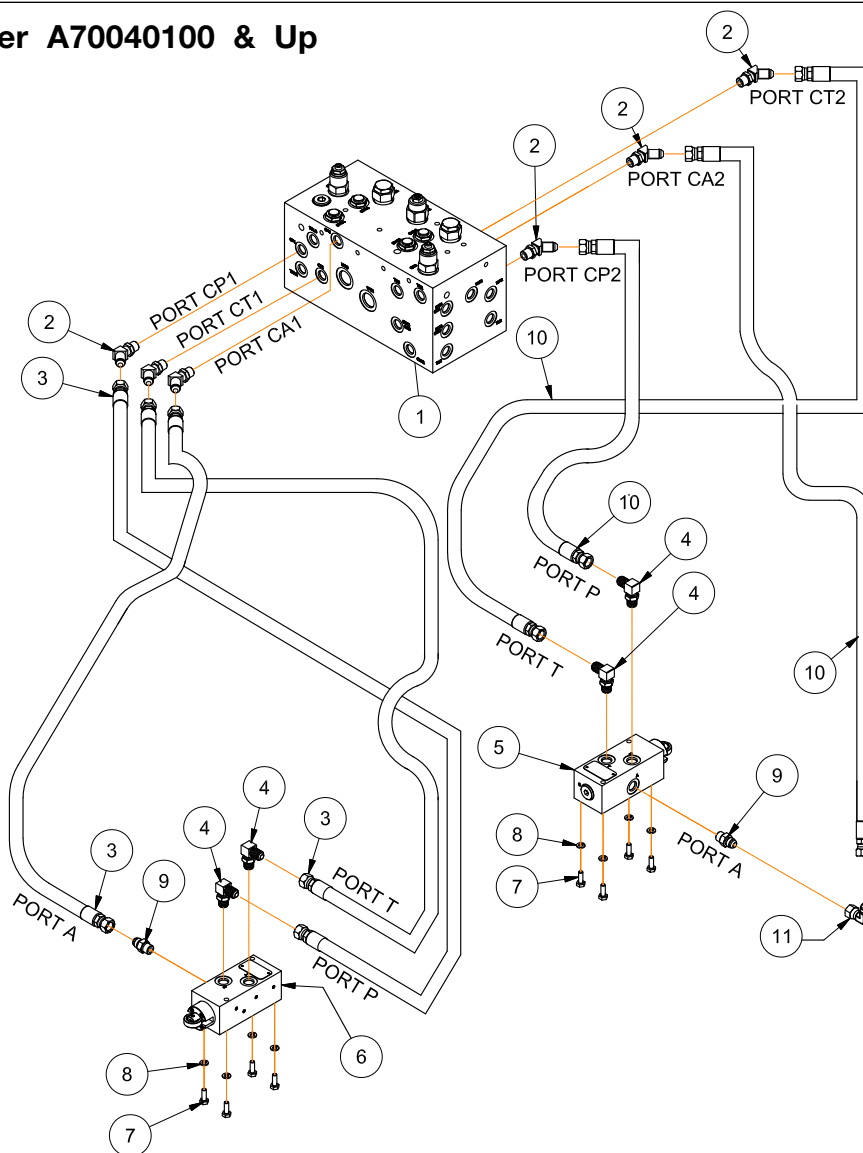
ITEM	PART NO.	DESCRIPTION	QTY
1	91511	Dust Cap	4
2	95477	Pioneer Male Tip 7/8"-14 Female O-Ring	4
3	9503648	Hose, 5/8" x 108" (7/8"-14 JIC Female x 7/8"-14 JIC Female)	2
4	9503647	Hose, 5/8" x 300" (7/8"-14 JIC Female x 7/8"-14 JIC Female)	2
5	9002443	Adapter, 7/8"-14 JIC Male x 7/8"-14 O-Ring Male	4
6	9005789	Union-Bulkhead, 7/8"-14UNF	4
7	9503042	45° Elbow, 7/8"-14 JIC Male x 7/8"-14 JIC Female	4
8	9504775	Valve Assembly - Multi Function Toolbar	1
9	9503725	Hose Marker, RED "Lift Up"	1
10	9503726	Hose Marker, RED "Lift Down"	1
11	9503727	Hose Marker, WHITE "Fold In"	1
12	9503728	Hose Marker, WHITE "Fold Out"	1
13	TAWC99407	Adapter, 7/8"-14 JIC Male x 1 1/16"-12 O-Ring Male	4

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Sequence Valves

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

Serial Number A70040100 & Up



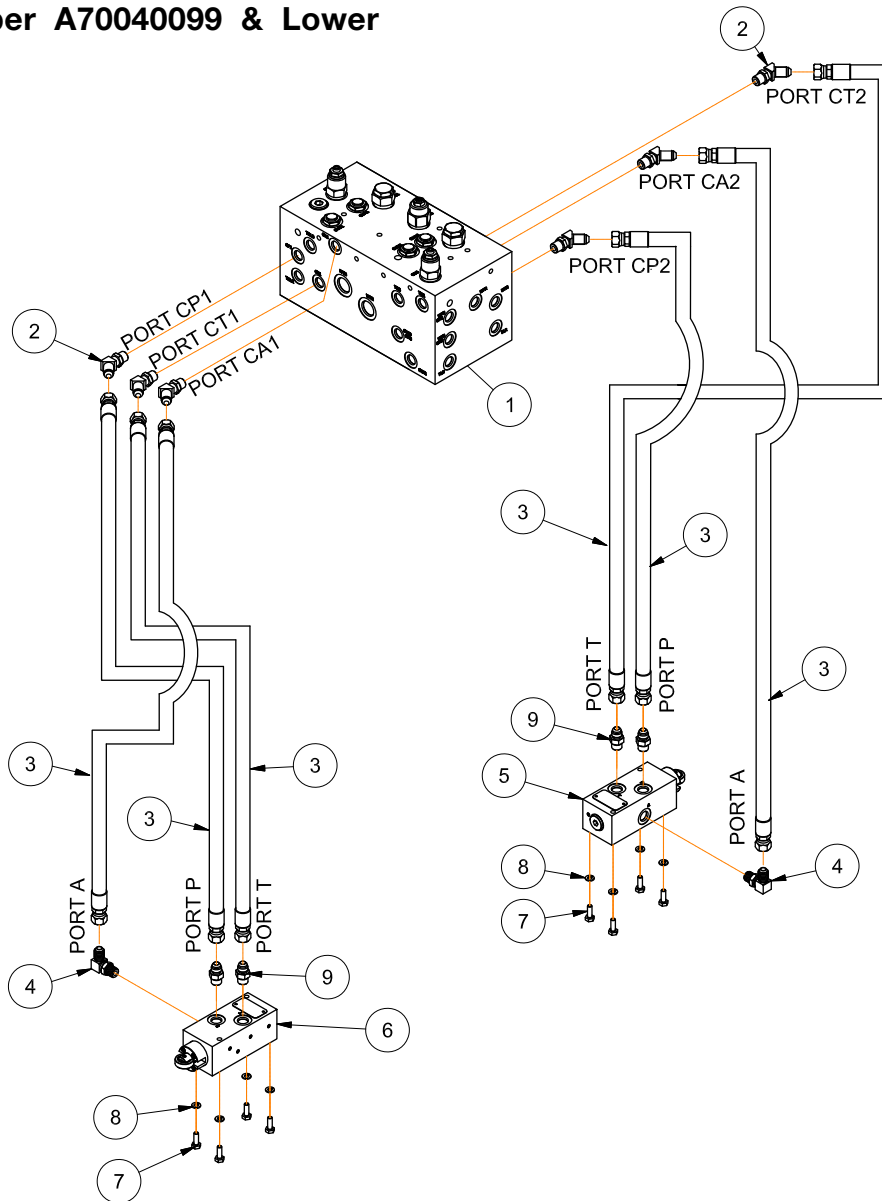
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	6
3	9504767	Hose, 3/8" x 24" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	3
4	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
5	9503379	Hydraulic Cam Valve (Normally Closed)	1
6	9503380	Hydraulic Cam Valve (Normally Open)	1
7	9390-003	Capscrew, 1/4"-20UNC x 3/4" G5	8
8	9404-017	Lock Washer, 1/4"	8
9	9001495	Adapter, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
10	9502793	Hose, 3/8" x 28" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	3
11	9876	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 JIC Female	CO

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Sequence Valves

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

Serial Number A70040099 & Lower



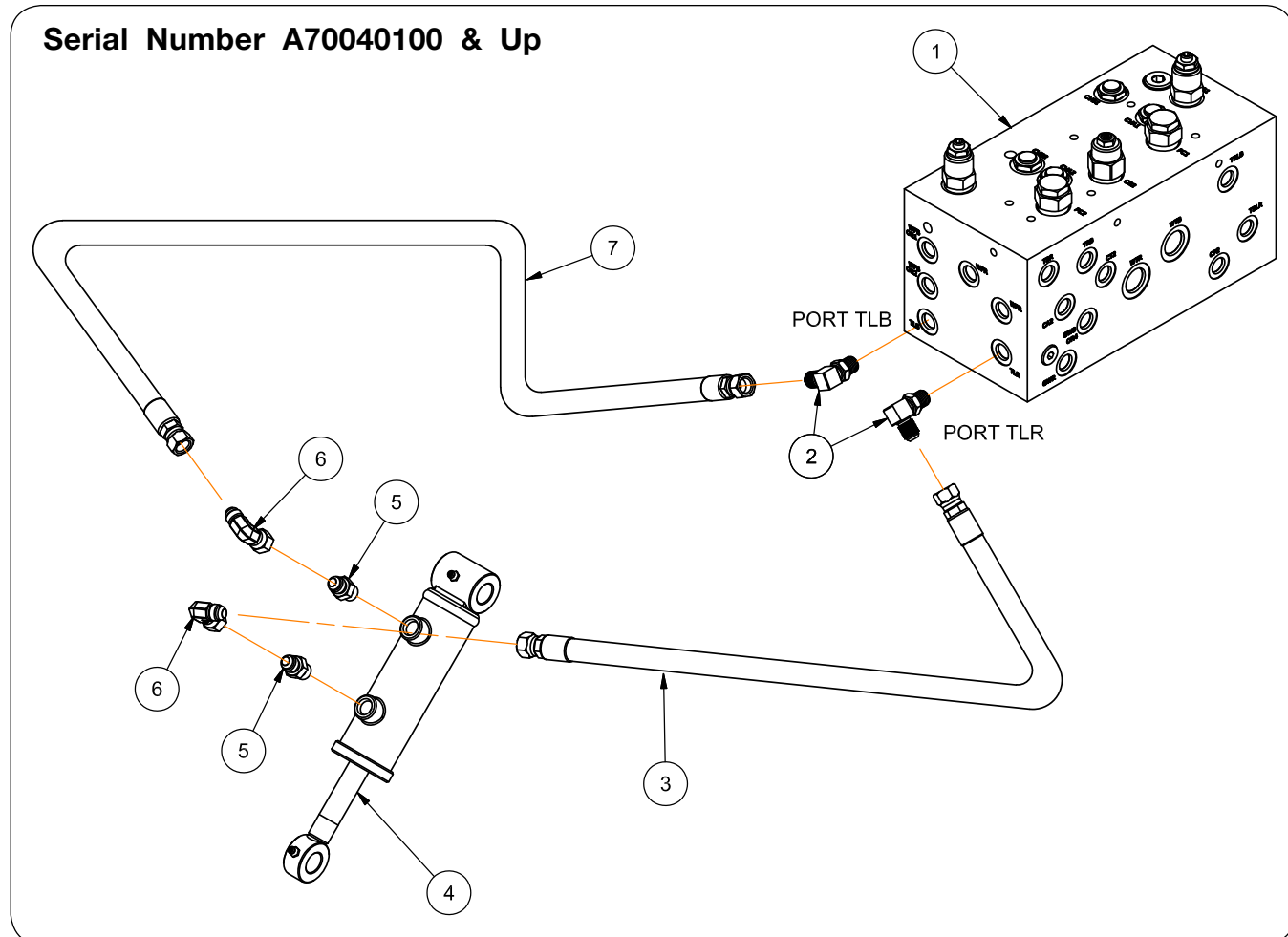
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	6
3	9503641	Hose, 3/8" x 20" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	6
4	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
5	9503379	Hydraulic Cam Valve (Normally Closed)	1
6	9503380	Hydraulic Cam Valve (Normally Open)	1
7	9390-003	Capscrew, 1/4"-20UNC x 3/4" G5	8
8	9404-017	Lock Washer, 1/4"	8
9	9001495	Adapter, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve to Tongue Latch

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

Serial Number A70040100 & Up



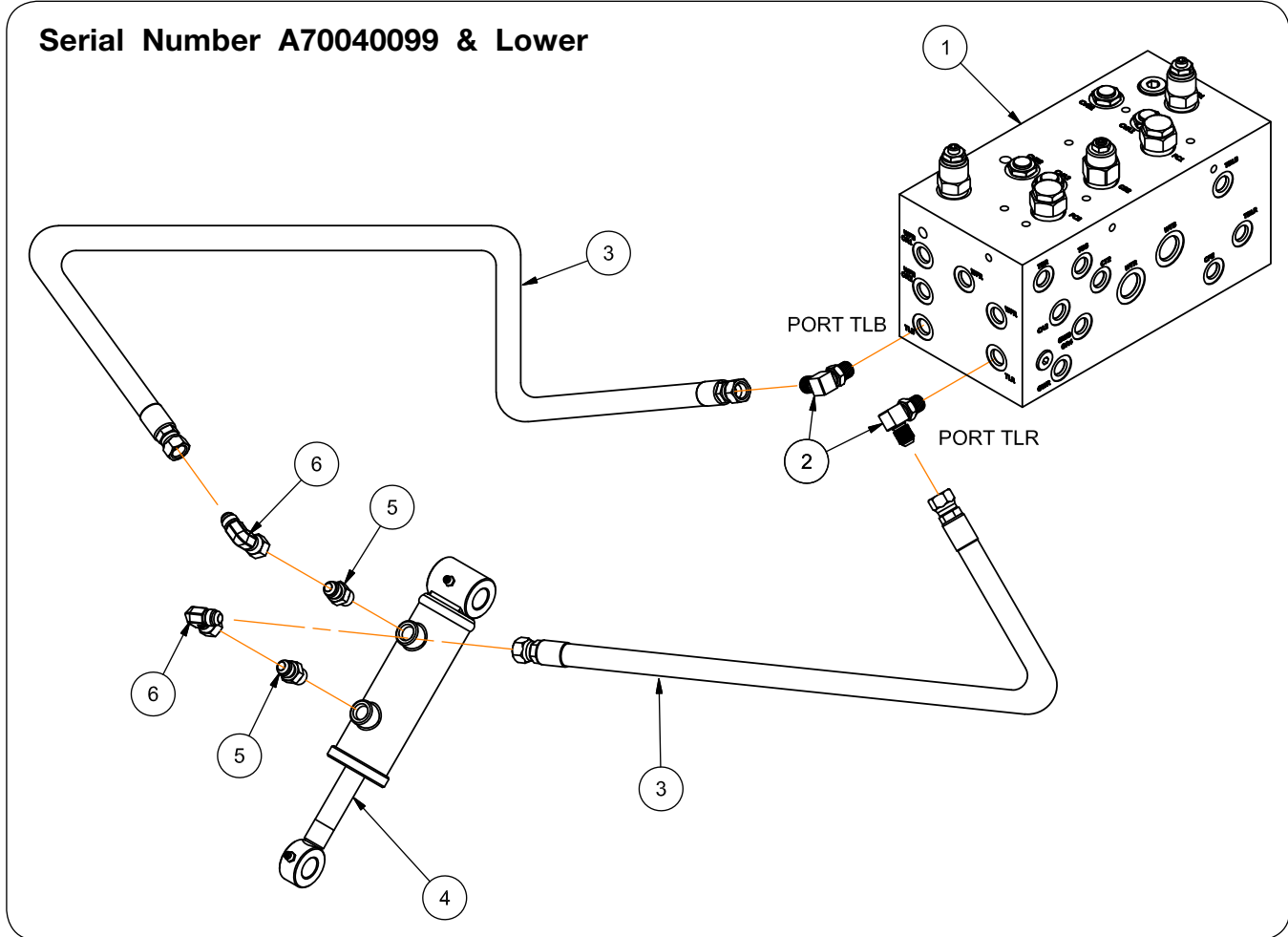
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
3	9503722	Hose, 3/8" x 132" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	1
4	9502901	Cylinder, 1 1/2" x 2" (3000 PSI) w/Grease Zerks	1
5	9001495	Adapter, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
6	9876	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 JIC Female	2
7	9504766	Hose, 3/8" x 125" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	1

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve to Tongue Latch

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

Serial Number A70040099 & Lower



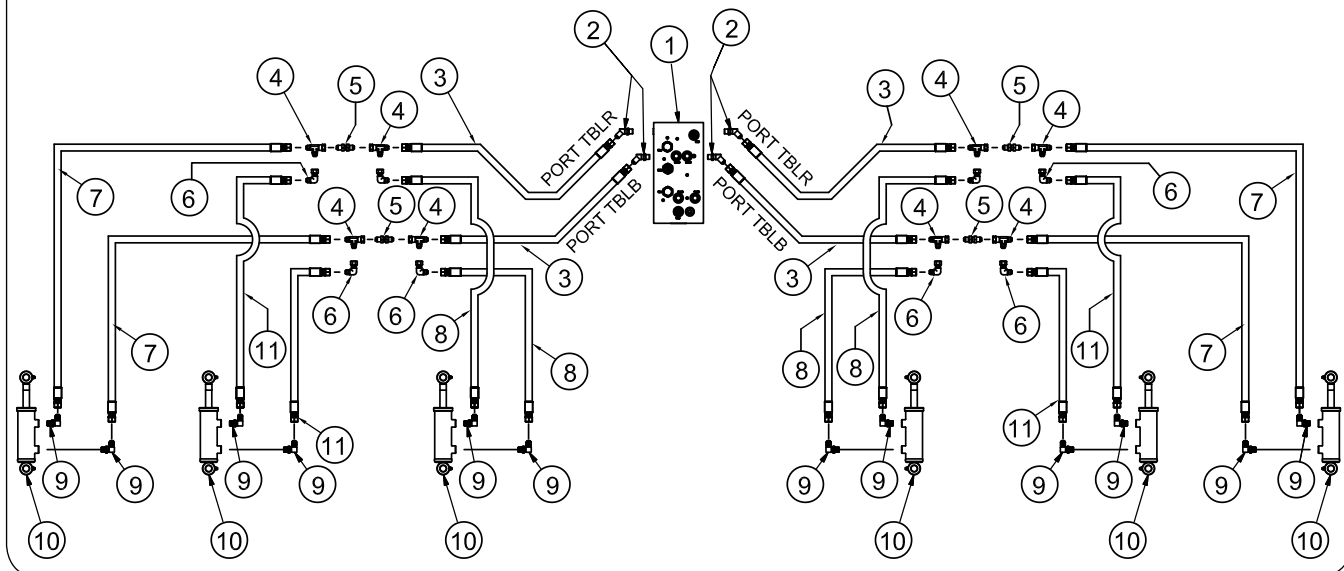
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
3	9503722	Hose, 3/8" x 132" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
4	9502901	Cylinder, 1 1/2" x 2" (3000 PSI) w/Grease Zerks	1
5	9001495	Adapter, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
6	9876	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 JIC Female	2

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Toolbar Latch

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

Serial Number A70040100 & Up



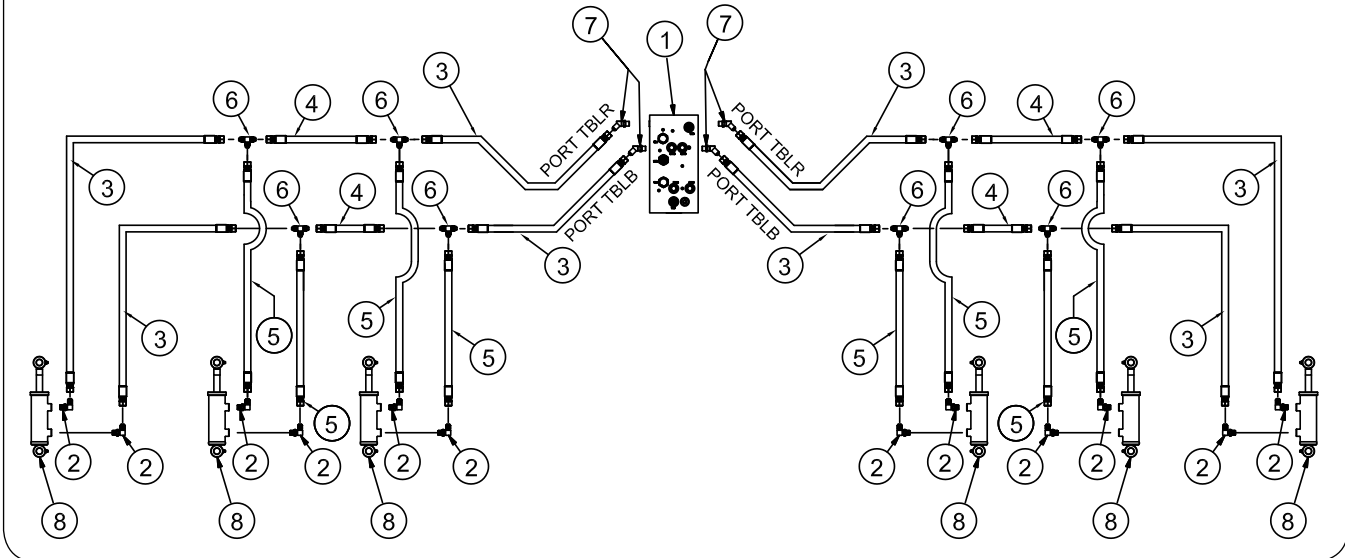
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
3	9501707	Hose, 3/8" x 92" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
4	91465	Tee, 9/16"-18 JIC Male x 9/16"-18 JIC Female x 9/16"-18 JIC Male	8
5	95192	Bulkhead Union, 9/16"-18 JIC Male x 9/16"-18 JIC Male	4
6	9876	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 JIC Female	8
7	9504758	Hose, 3/8" x 120" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
8	9501681	Hose, 3/8" x 36" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
9	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	12
10	9502901	Cylinder, 1 1/2" x 2" (3000 PSI) w/Grease Zerks	6
11	9504756	Hose, 3/8" x 60" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Toolbar Latch

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

Serial Number A70040099 & Lower



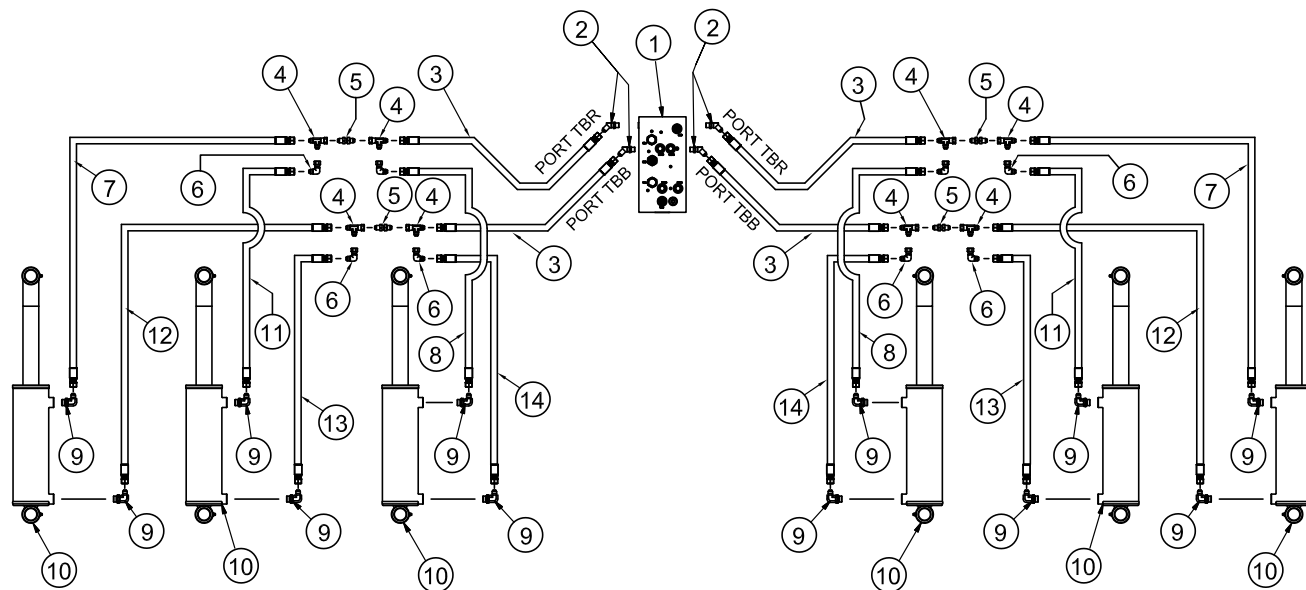
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	12
3	9501685	Hose, 3/8" x 80" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	8
4	9501706	Hose, 3/8" x 64" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
5	9501679	Hose, 3/8" x 22" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	8
6	9875	Tee, 9/16"-18 JIC Male x 9/16"-18 JIC Male x 9/16"-18 JIC Male	8
7	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
8	9502901	Cylinder, 1 1/2" x 2" (3000 PSI) w/Grease Zerks	6

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Toolbar Fold

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

Serial Number A70040100 & Up



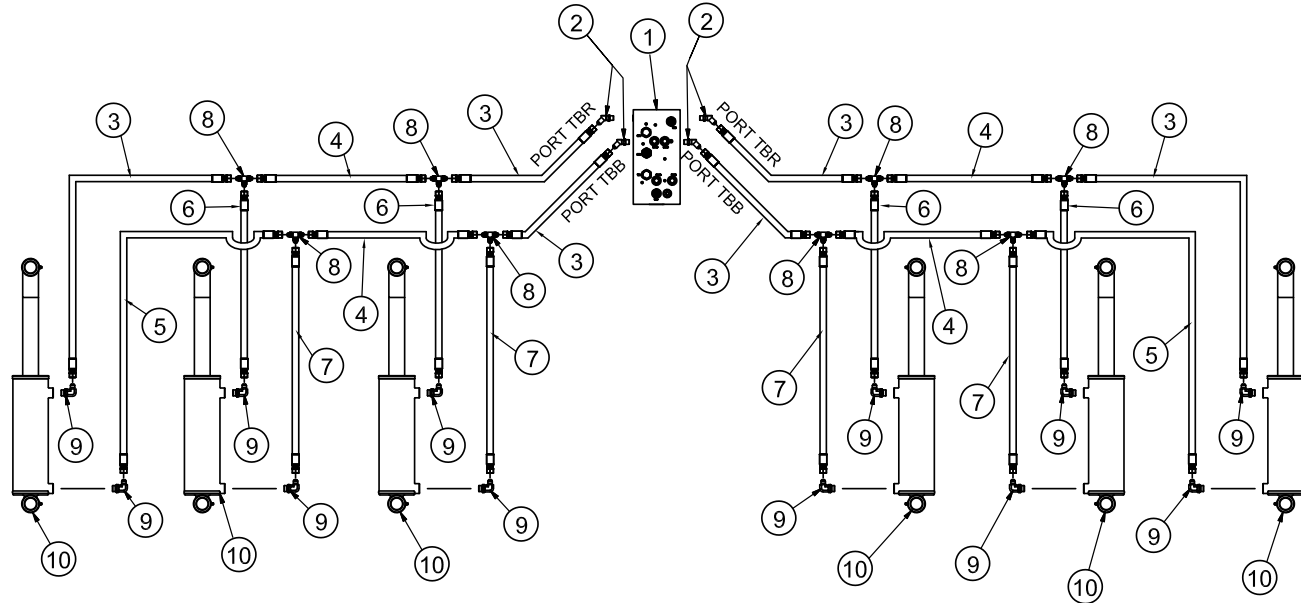
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
3	9501687	Hose, 3/8" x 96" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
4	91465	Tee, 9/16"-18 JIC Male x 9/16"-18 JIC Female x 9/16"-18 JIC Male	8
5	95192	Bulkhead Union, 9/16"-18 JIC Male x 9/16"-18 JIC Male	4
6	9876	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 JIC Female	8
7	9504758	Hose, 3/8" x 120" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
8	9501681	Hose, 3/8" x 36" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
9	9874	90° Elbow, 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	12
10	9502870	Cylinder, 4" x 10" (3000 PSI) w/Grease Zerks	6
	9503982	Seal Kit	AR
11	9504756	Hose, 3/8" x 60" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
12	9503722	Hose, 3/8" x 132" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
13	9504757	Hose, 3/8" x 72" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
14	9501700	Hose, 3/8" x 48" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Toolbar Fold

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

Serial Number A70040099 & Lower

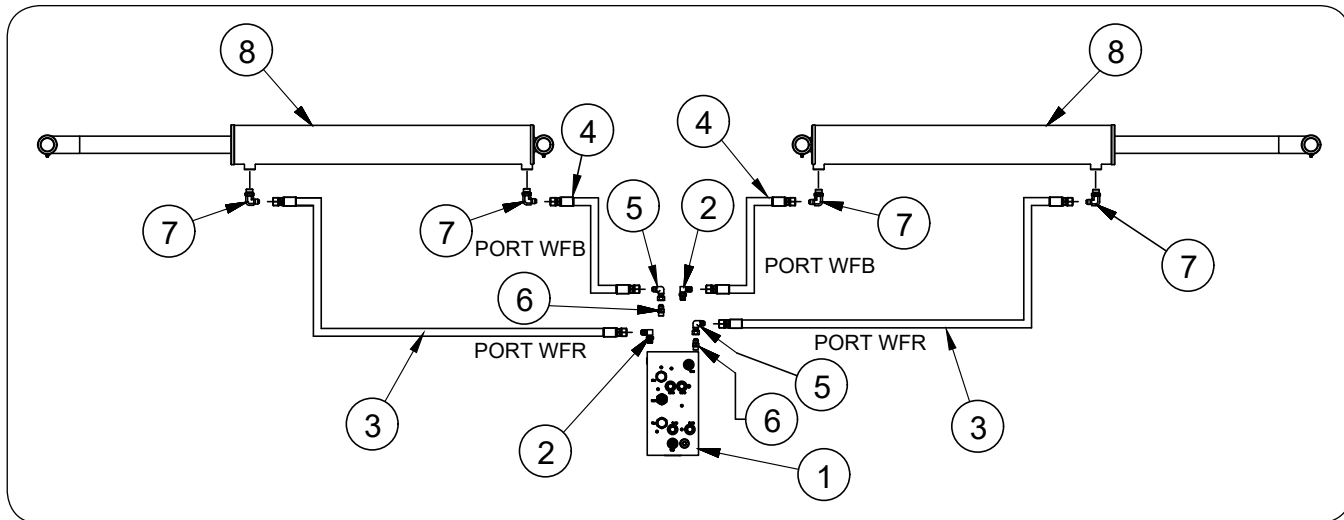


ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
3	9501685	Hose, 3/8" x 80" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	6
4	9501706	Hose, 3/8" x 64" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
5	9501707	Hose, 3/8" x 92" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
6	9501679	Hose, 3/8" x 22" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
7	9501694	Hose, 3/8" x 34" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
8	9875	Tee, 9/16"-18 JIC Male x 9/16"-18 JIC Male x 9/16"-18 JIC Male	8
9	9874	90° Elbow, 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	12
10	9502870	Cylinder, 4" x 10" (3000 PSI) w/Grease Zerk	6
	9503982	Seal Kit	AR

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Wings

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

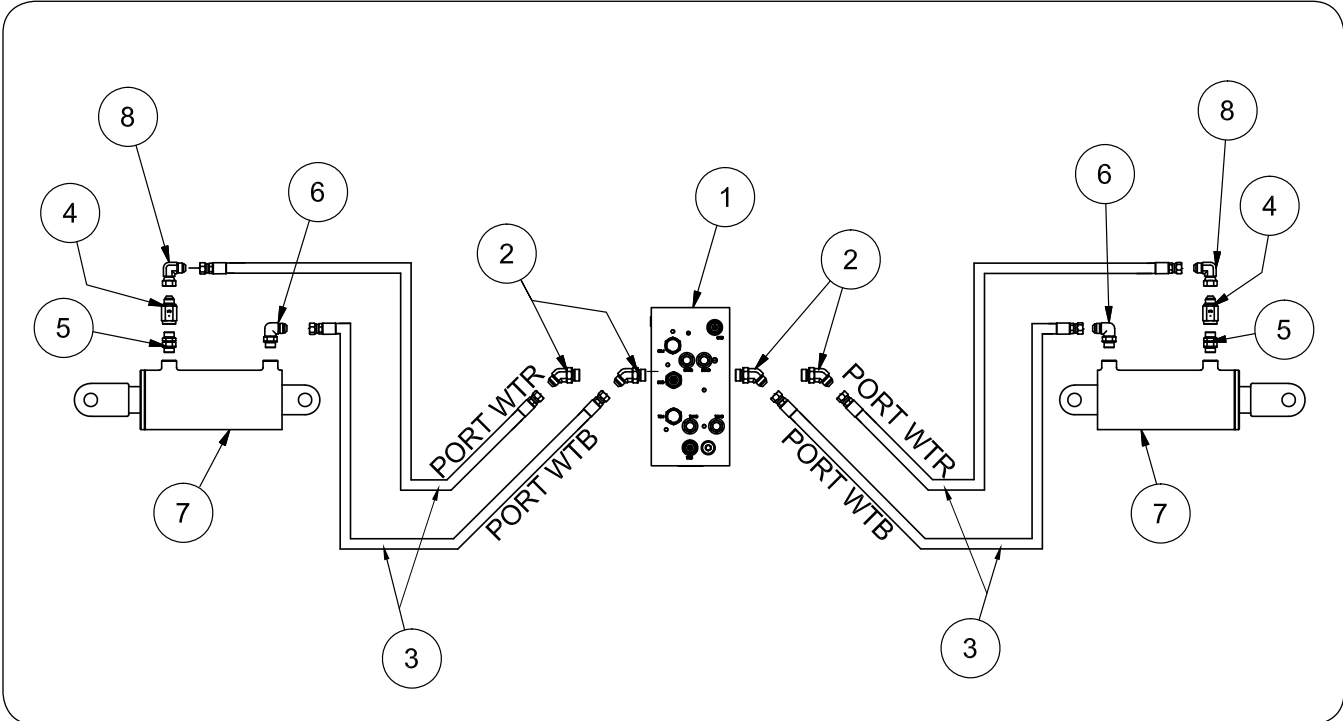


ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
3	9503644	Hose, 3/8" x 118" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
4	9501686	Hose, 3/8" x 86" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
5	9876	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 JIC Female	2
6	9001495	Adapter, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
7	9874	90° Elbow, 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	4
8	9502898	Cylinder, 4" x 30" (3000 PSI) w/Grease Zerks	2
	9503982	Seal Kit	AR

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Wing Tilt

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



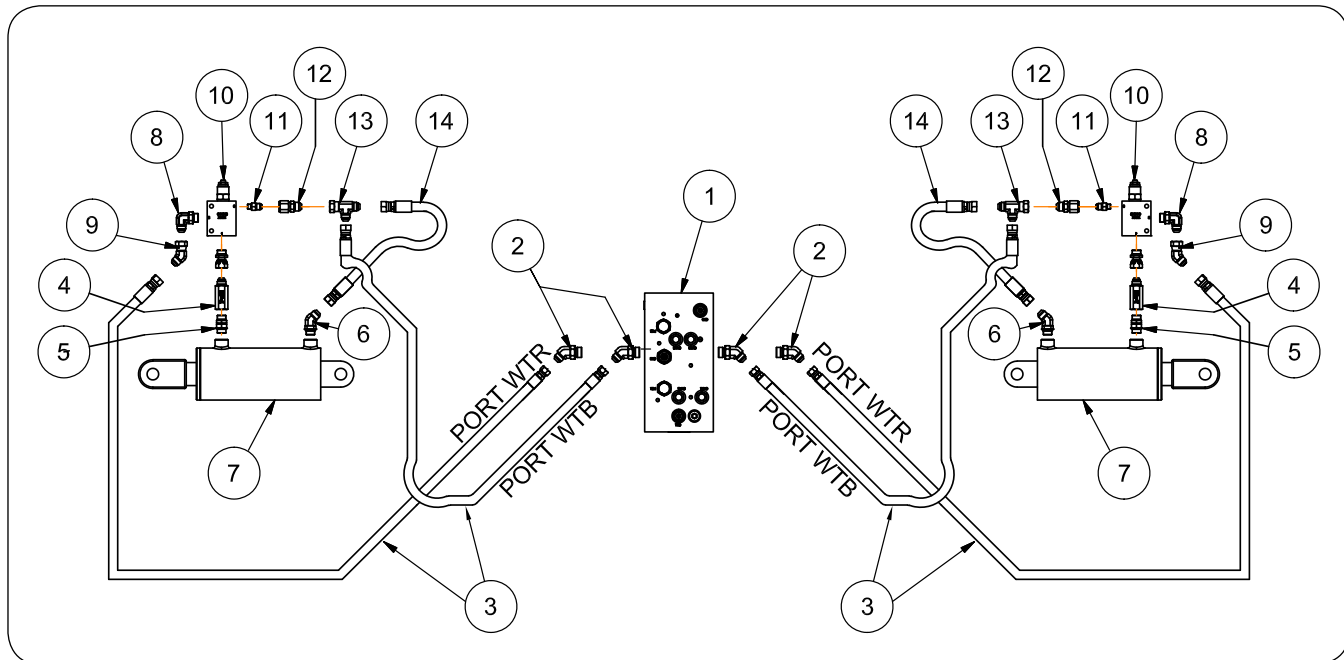
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	9504775	Valve Assembly - Multi Function Toolbar	1	
2	9001227	45° Elbow, 3/4"-16 JIC Male x 7/8"-14 O-Ring Male	4	
3	9502785	Hose, 1/2" x 116" (3/4"-16 JIC Female x 3/4"-16 JIC Female)	4	
4	602618	In-Line Check Valve w/0.031 Restrictor (3/4-16UNF O-Ring Male/Female Orifice)	2	
5	94969	Adapter, 3/4"-16 O-Ring Male x 3/4"-16 O-Ring Male	2	
6	9863	90° Elbow, 3/4"-16 JIC Male x 3/4"-16 O-Ring Male	2	
7	9503241	Cylinder, 4" x 6" (3000 PSI)	2	
8	93683	90° Elbow, 3/4"-16 JIC Male x 3/4"-16 JIC Female	2	

PULL-TYPE RAPTOR — Parts

Hydraulic Components

Supply Valve To Wing Tilt with Counterbalance Kit

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

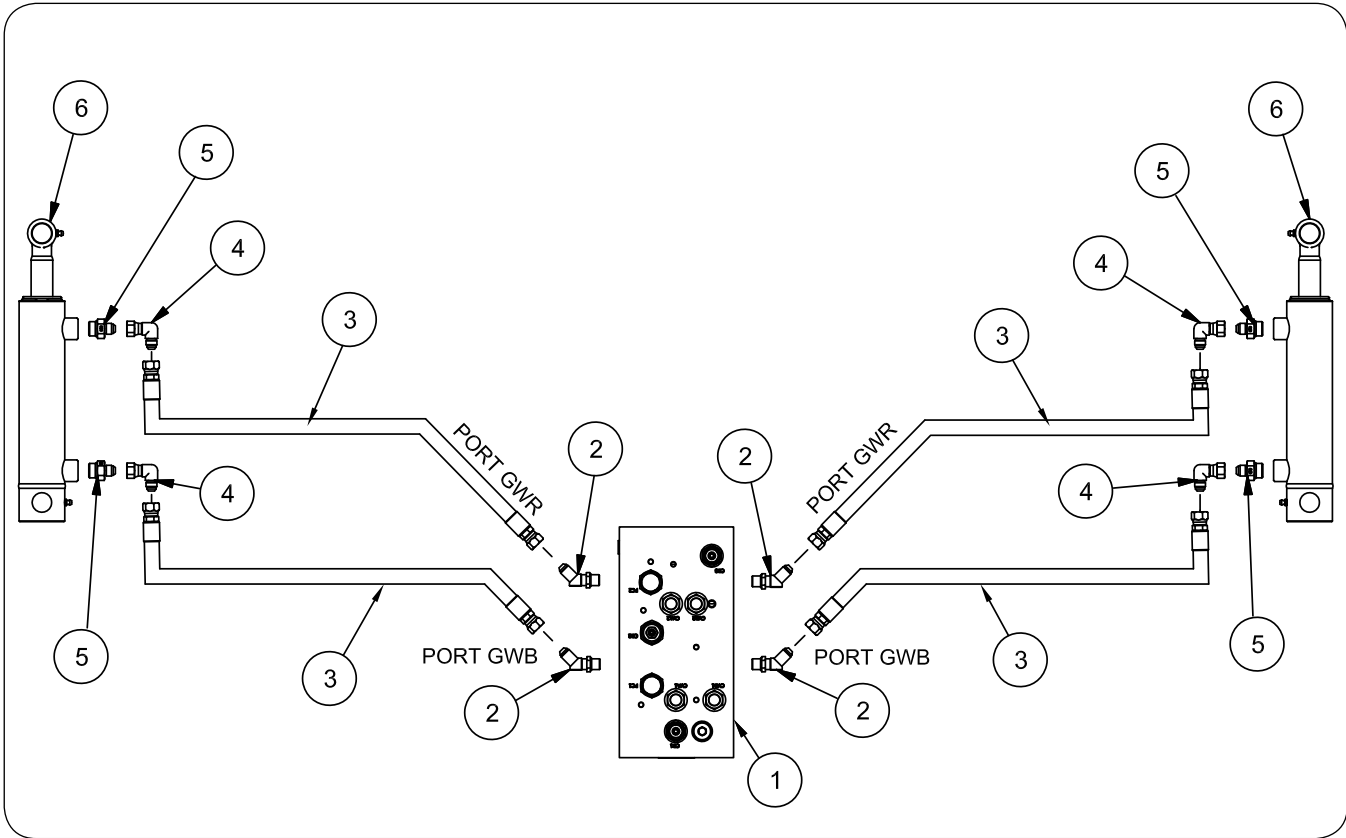


ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	9504775	Valve Assembly - Multi Function Toolbar	1	
2	9001227	45° Elbow, 3/4"-16 JIC Male x 7/8"-14 O-Ring Male	4	
3	9502785	Hose, 1/2" x 116" (3/4"-16 JIC Female x 3/4"-16 JIC Female)	4	
4	602618	In-Line Check Valve w/0.031 Restrictor (3/4-16UNF O-Ring Male/Female Orifice)	2	
5	94969	Adapter, 3/4"-16 O-Ring Male x 3/4"-16 O-Ring Male	2	
6	93586	45° Elbow, 3/4"-16 JIC Male x 3/4"-16 O-Ring Male	2	
7	9503241	Cylinder, 4" x 6" (3000 PSI)	2	
8	9863	90° Elbow, 3/4"-16 JIC Male x 3/4"-16 O-Ring Male	2	
9	9005843	45° Elbow, 3/4-16 JIC Female x 3/4"-16 JIC Male	2	
10	9502229	Counterbalance Valve Assembly	2	
11	97711	Adapter, 9/16"-18 JIC Male x 7/16"-20 O-Ring Male	2	
12	9503029	Reducer Adapter, 9/16"-18 JIC Female x 3/4"-16 JIC Male	2	
13	95059	Tee, 3/4"-16 JIC Male x 3/4"-16 JIC Female x 3/4"-16 JIC Male	2	
14	9502790	Hose, 1/2" x 20" (3/4"-16 JIC Female x 3/4"-16 JIC Female)	2	

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Gauge Wheels

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



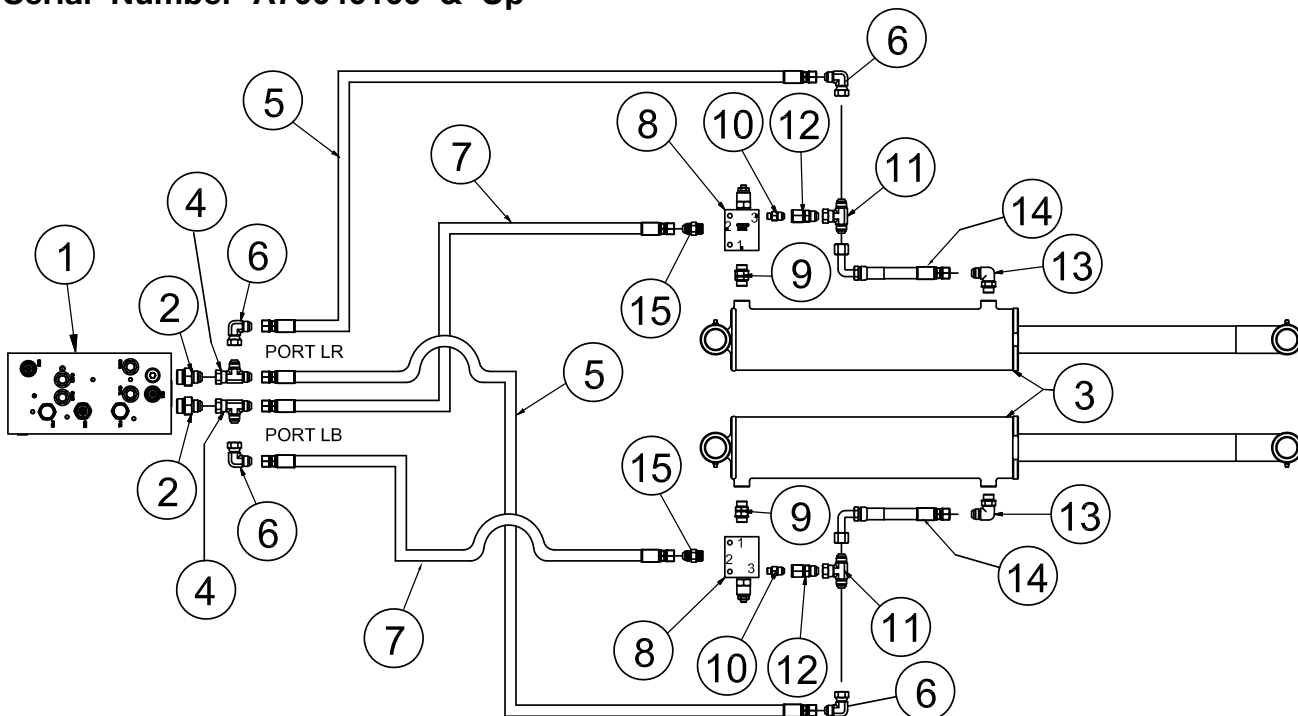
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
3	9501705	Hose, 3/8" x 235" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
4	9876	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 JIC Female	4
5	9003748	Adapter, 9/16"-18 JIC Male x 3/4"-16 O-Ring Male w/0.030 Restrictor	4
6	9503785	Cylinder, 2" x 6" (3000 PSI) w/Grease Zerks	2
	9503805	Seal Kit	AR

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Parallel Link/Main Lift-Lower

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

Serial Number A70040100 & Up



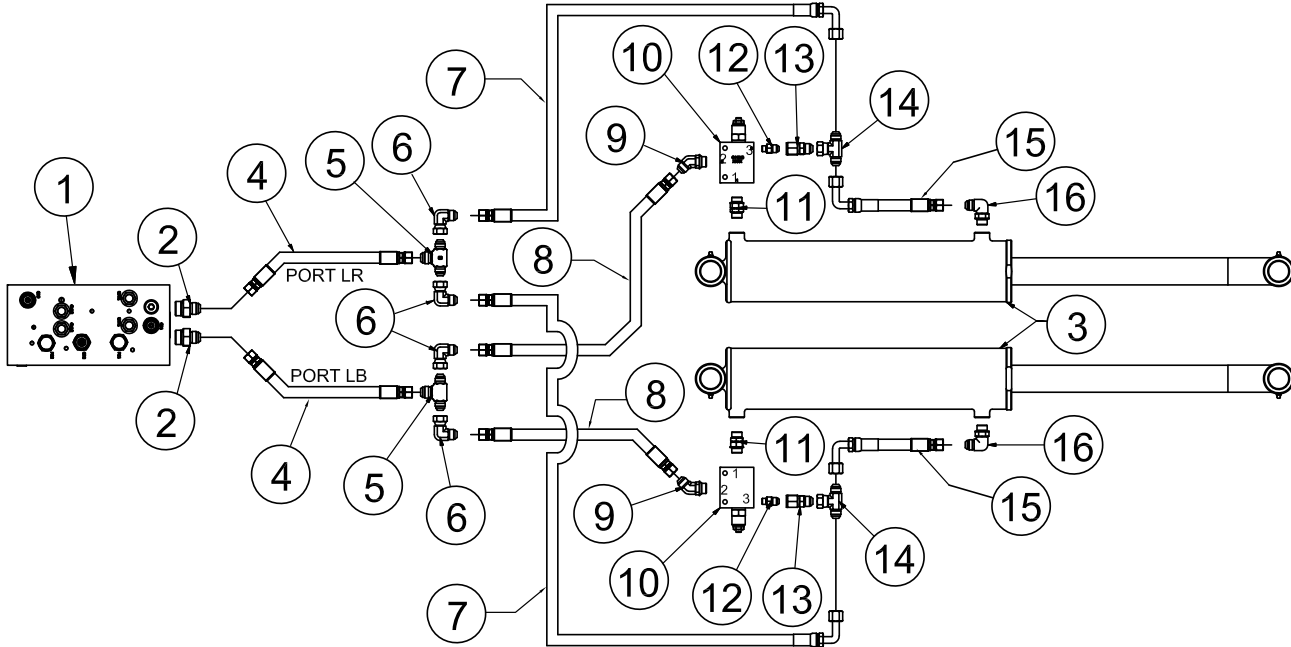
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	5570652B	Adapter, 3/4"-16 JIC Male x 1 1/16"-12 O-Ring Male	2
3	9502852	Cylinder, 4" x 16" (3000 PSI) w/Grease Zerks	2
	9503982	Seal Kit	AR
4	95059	Tee, 3/4"-16 JIC Male x 3/4"-16 JIC Female x 3/4"-16 JIC Male	2
5	9502782	Hose, 1/2" x 76" (3/4"-16 JIC Female x 3/4"-16 JIC Female)	2
6	93683	90° Elbow, 3/4"-16 JIC Male x 3/4"-16 JIC Female	4
7	9504762	Hose, 1/2" x 70" (3/4"-16 JIC Female x 3/4"-16 JIC Female)	2
8	9502229	Counterbalance Valve Assembly (3000 PSI)	2
9	94969	Adapter, 3/4"-16 O-Ring Male x 3/4"-16 O-Ring Male	2
10	97711	Adapter, 9/16"-18 JIC Male x 7/16"-20 O-Ring Male	2
11	94997	Tee, 3/4"-16 JIC Male x 3/4"-16 JIC Male x 3/4"-16 JIC Female	2
12	9503029	Adapter, 9/16"-18 JIC Female x 3/4"-16 JIC Male	2
13	9863	90° Elbow, 3/4"-16 JIC Male x 3/4"-16 O-Ring Male	2
14	9503651	Hose, 1/2" x 14" (3/4"-16 JIC Female x 3/4"-16 JIC Female 90° Elbow Medium Drop)	2
15	9864	Adapter, 3/4"-16 JIC Male x 3/4"-16 O-Ring Male	2

PULL-TYPE RAPTOR — Parts

Hydraulic Components — Supply Valve To Parallel Link/Main Lift-Lower

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

Serial Number A70040099 & Lower

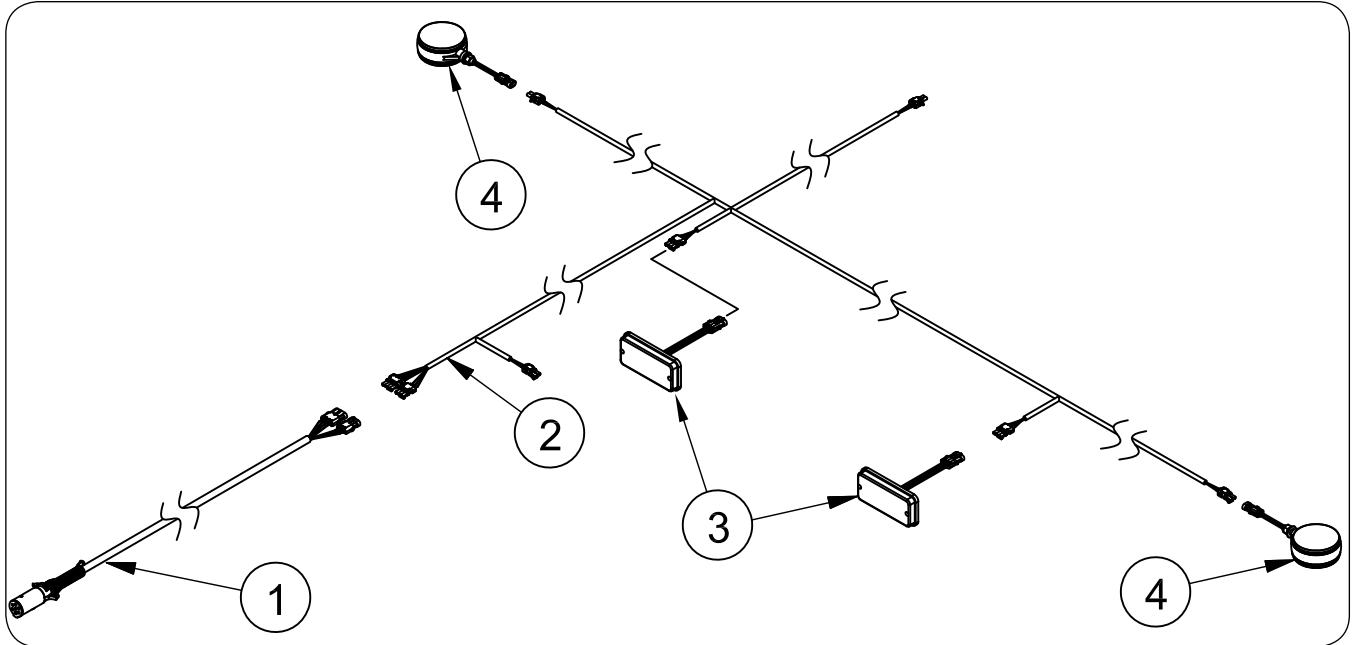


ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	TAWC99407	Adapter, 7/8"-14 JIC Male x 1 1/16"-12 O-Ring Male	2
3	9502852	Cylinder, 4" x 16" (3000 PSI) w/Grease Zerks	2
	9503982	Seal Kit	AR
4	9503649	Hose, 5/8" x 37" (7/8"-14 JIC Female x 7/8"-14 JIC Female)	2
5	9503035	Tee, 3/4"-16 JIC Male x 3/4"-16 JIC Male x 7/8"-14 JIC Male	2
6	93683	90° Elbow, 3/4"-16 JIC Male x 3/4"-16 JIC Female	4
7	9503650	Hose, 1/2" x 26" (3/4"-16 JIC Female x 3/4"-16 JIC Female 90° Elbow Medium Drop)	2
8	9502789	Hose, 1/2" x 17 1/2" (3/4"-16 JIC Female x 3/4"-16 JIC Female)	2
9	93586	45° Elbow, 3/4"-16 JIC Male x 3/4"-16 O-Ring Male	2
10	9502229	Counterbalance Valve Assembly (3000 PSI)	2
11	94969	Adapter, 3/4"-16 Male O-Ring x 3/4"-16 Male O-Ring	2
12	97711	Adapter, 9/16"-18 JIC Male x 7/16"-20 O-Ring Male	2
13	9503029	Adapter, 9/16"-18 JIC Female x 3/4"-16 JIC Male	2
14	94997	Tee, 3/4"-16 JIC Male x 3/4"-16 JIC Male x 3/4"-16 JIC Female	2
15	9503651	Hose, 1/2" x 14" (3/4"-16 JIC Female x 3/4"-16 JIC Female 90° Elbow Medium Drop)	2
16	9863	90° Elbow, 3/4"-16 JIC Male x 3/4"-16 O-Ring Male	2

PULL-TYPE RAPTOR — Parts

Electrical Components

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



ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	45000	Main Wiring Harness, 480"	1	
2	44999	Light Wiring Harness, 418"	1	
3	9006282	RED Light, Tail/Turn	2	
4	9005142	AMBER Lamp, LED Double Face	2	



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