



## Seedbed Tillage

### Raptor® Strip-Tillage Tool with TerrainPro™ Row Units

#### Pull-Type Models

Tillage Only: 2130ST, 2115ST

Liquid Tank: 2130LT, 2115LT


Dry Tank: 2130DT, 2115DT

Serial Number A70820100 & Higher

Part No. 47978

# 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



# PULL-TYPE RAPTOR — Introduction

## 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.

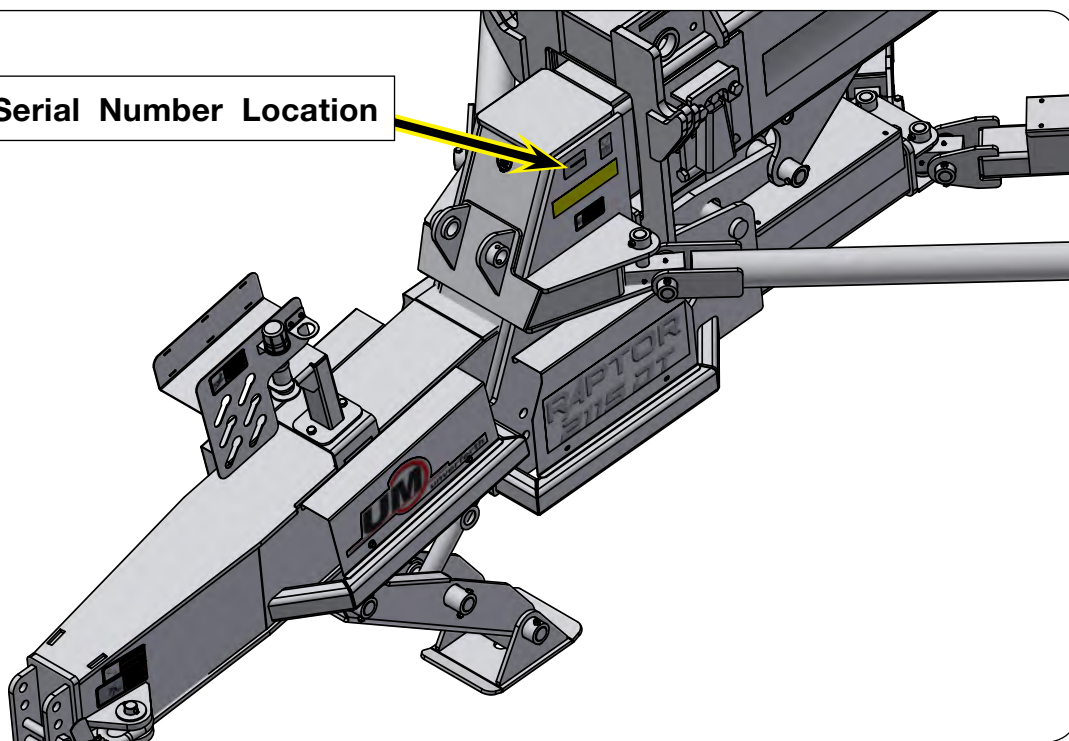
Purchase Date \_\_\_\_\_ Model \_\_\_\_\_ Serial No. \_\_\_\_\_

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.*

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## General Hazard Information

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

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

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

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



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

### SIGNAL WORDS



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



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



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

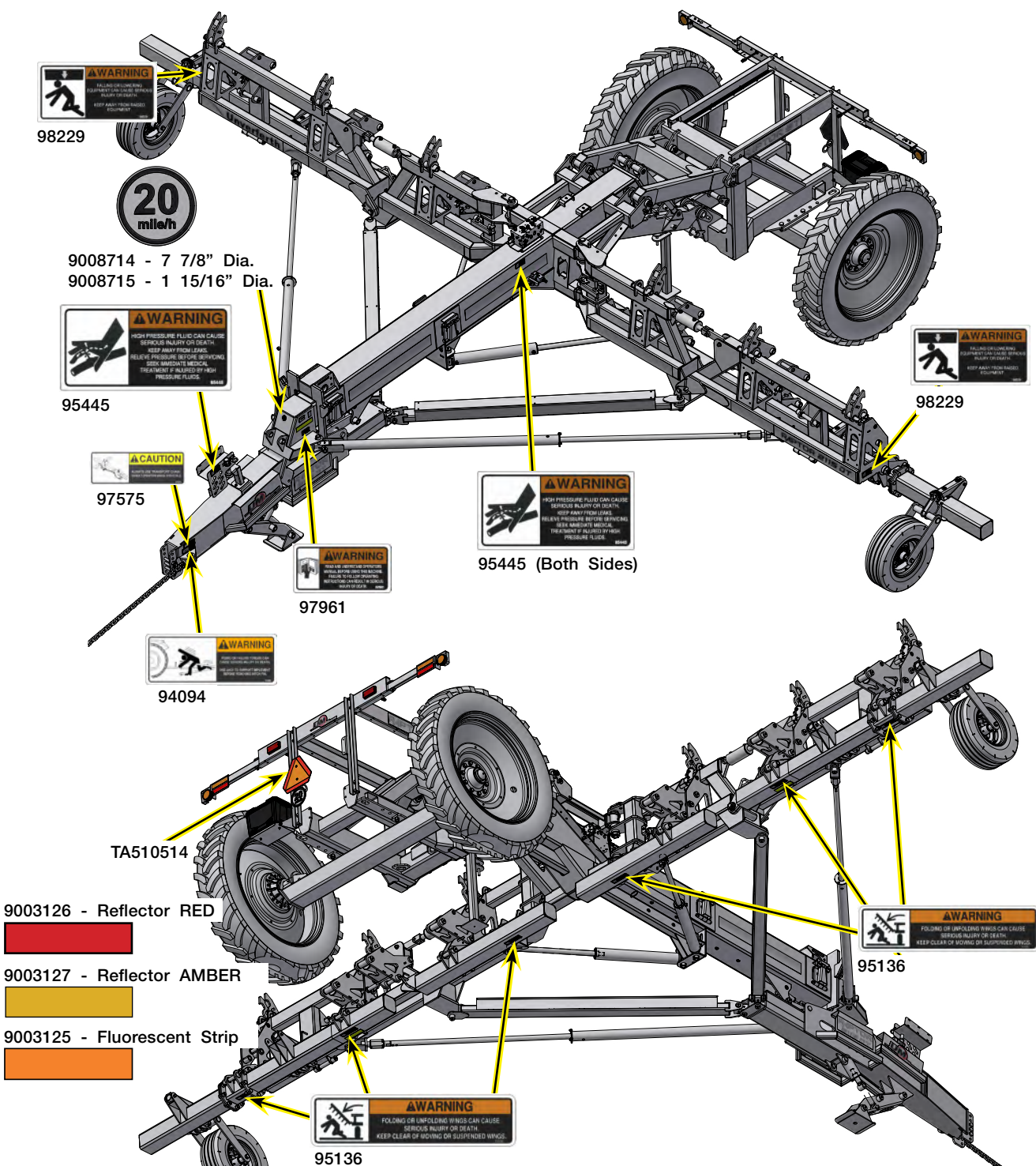


*Is used for instruction on operating, adjusting, or servicing a machine.*




## Safety Decals

### **WARNING**


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



## 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.
- Follow all federal, state and local regulations governing highway safety and transporting chemicals.

## 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:
  - o End fittings damaged, displaced, or leaking.
  - o Outer covering chafed/cut or wire reinforcing exposed.
  - o Outer covering ballooning locally.
  - o 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**

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### General Set Up Information

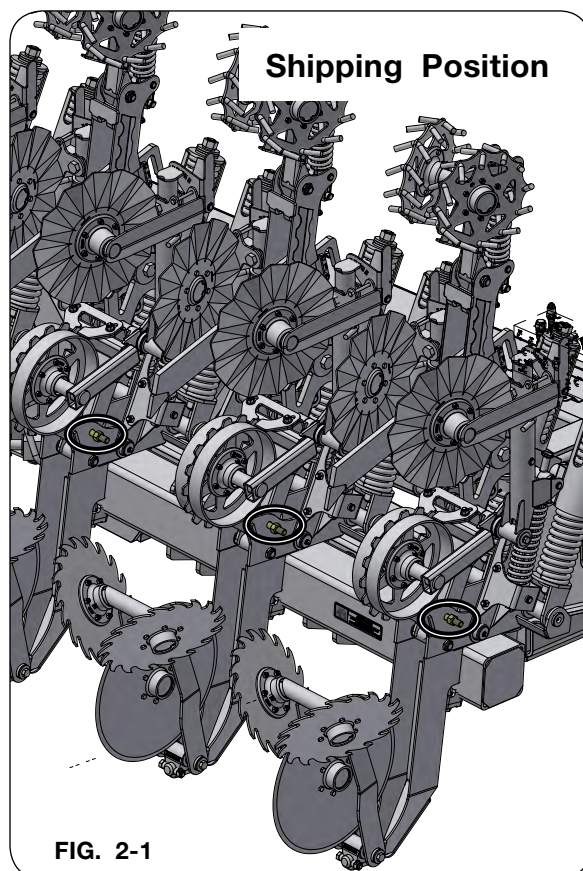
For your safety, and the safety of others, use proper tools and equipment and always use safe working procedures. Refer to these instructions before starting any work on your machine.

#### **WARNING**

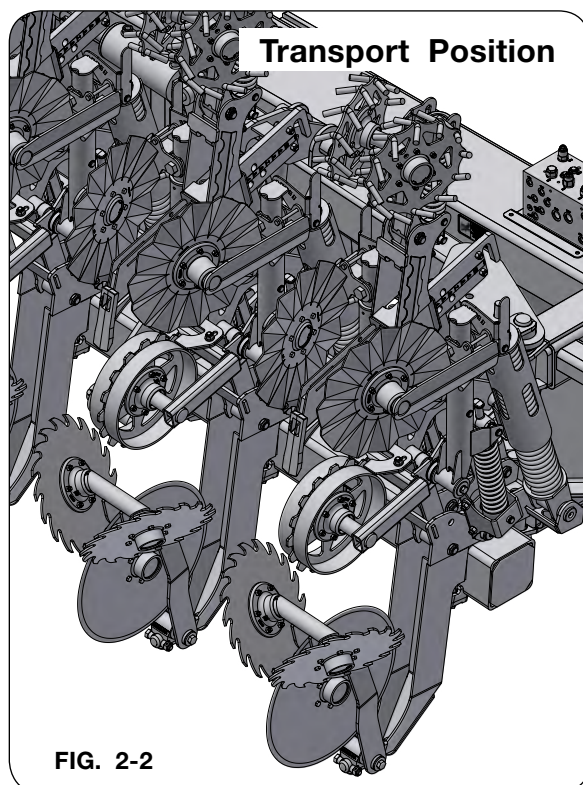
- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW "SAFETY" SECTION IN THIS MANUAL IF NECESSARY.**
- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE THE MACHINE IS SECURELY BLOCKED.**
- **MOVING PARTS CAN CRUSH AND CUT. KEEP AWAY FROM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

## TerrainPro2 Row Units

1. Use a safe lifting device rated at a minimum of 1,000 lbs., hold a TerrainPro2 row unit in place.
2. Remove the shipping bolt and nut.
3. Pivot the TerrainPro2 Row Unit from shipping position to transport position.



4. Repeat steps 1 through 3 until all the TerrainPro2 Row Units are in transport position.
5. Unfold the wings and toolbar. Refer to "Unfolding From Transport Position To Working Position" in OPERATIONS section.



### TerrainPro2 Row Units (continued)

5. Remove cable tie holding the diffuser to the conditioner basket and shank. (FIG. 2-3)



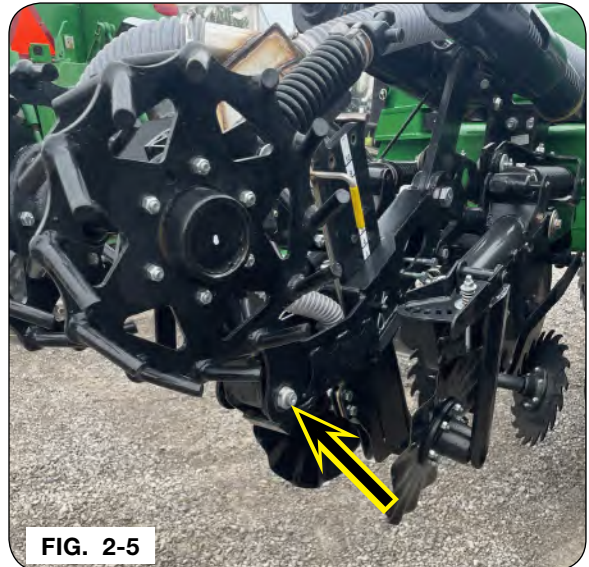
6. Reposition the diffuser to the left-hand side of the unit. (FIG. 2-4)



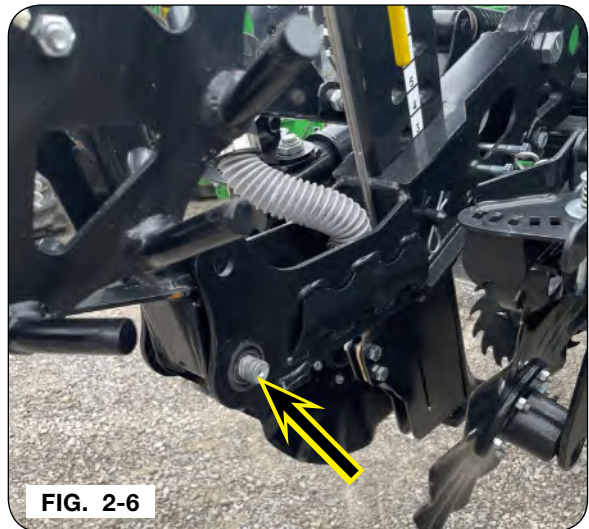


### TerrainPro2 Row Units (continued)

7. Remove the nut attaching conditioner to row unit. (FIG. 2-5)



8. Remove the large bottom bolt (FIG. 2-6). Rotate the conditioner assembly so the metal tab goes from underneath the bracket to on top (FIG. 2-7). Secure with the bolt just removed.



### TerrainPro2 Row Units (continued)

9. Remove the retaining ring and pin from the conditioner basket spring assembly. (FIG. 2-8)



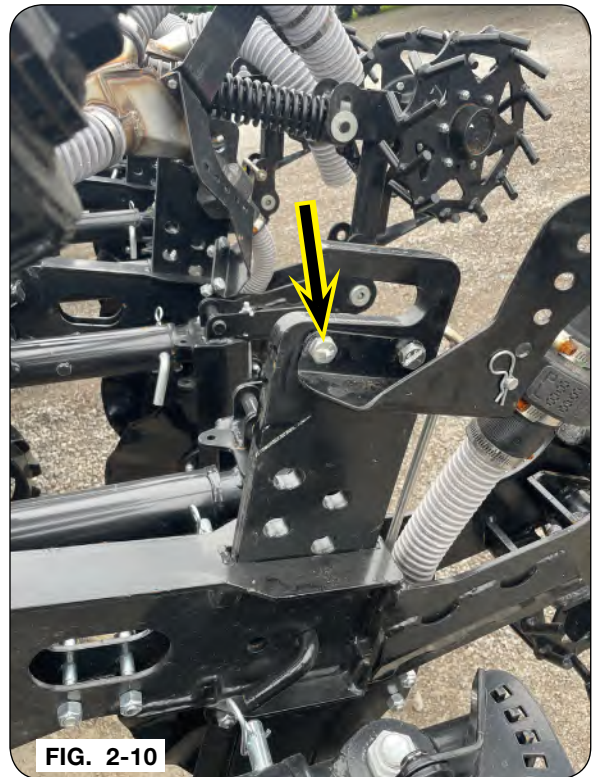
10. Attach the spring assembly to the top hole using the pin and retaining ring. (FIG. 2-9)





### TerrainPro2 Row Units (continued)

11. Attach diffuser to the shank. (FIG. 2-10)



12. Attach the hose holder to the row unit. (FIG. 2-11)



# PULL-TYPE RAPTOR — Set Up

## 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.

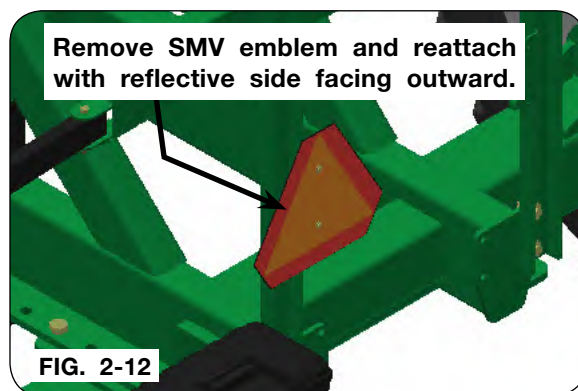


FIG. 2-13

# PULL-TYPE RAPTOR — Set Up

## 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](http://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.

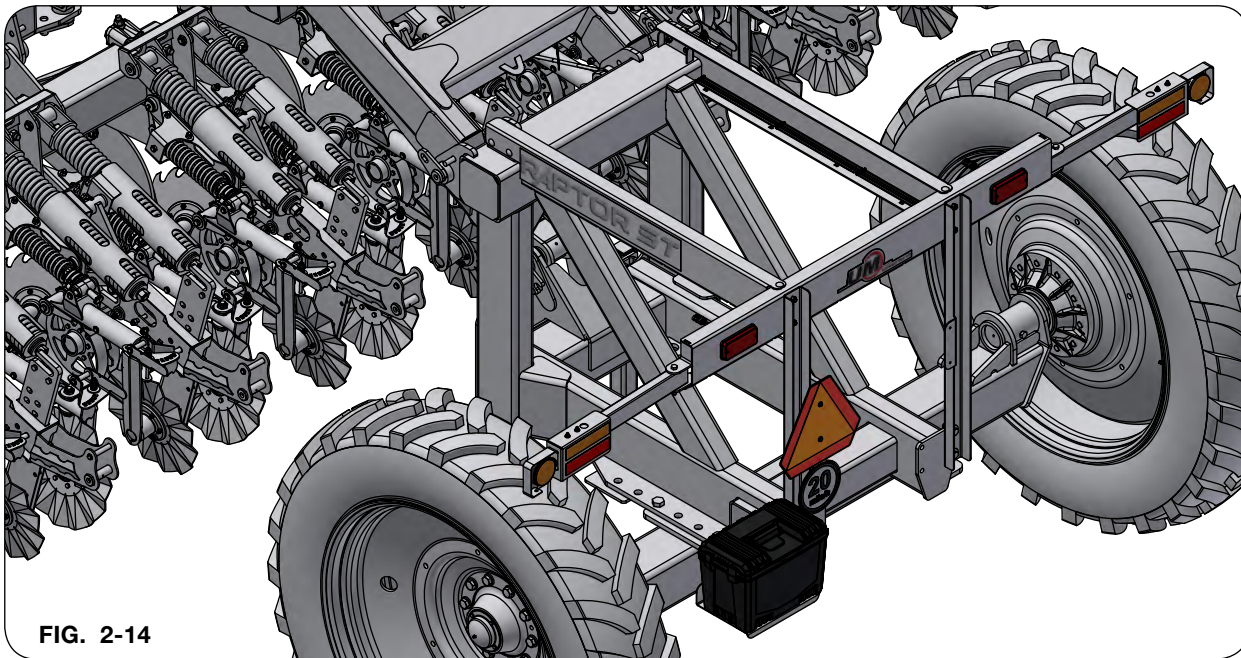


FIG. 2-14



## Basic Set Up (continued)

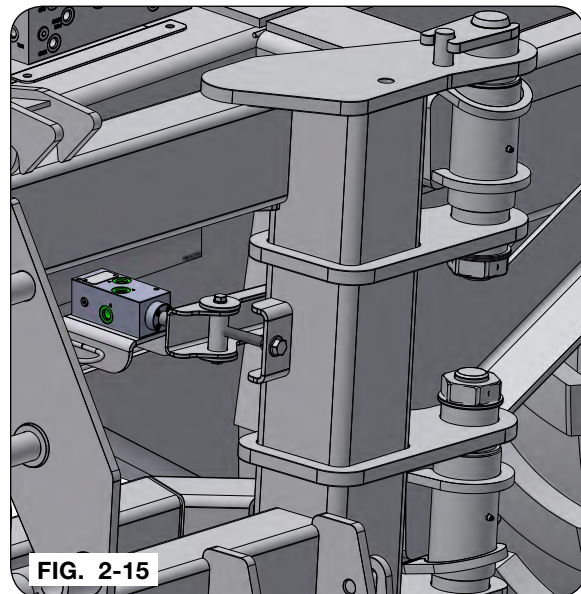
### Adjusting Cam Valves

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

#### IMPORTANT

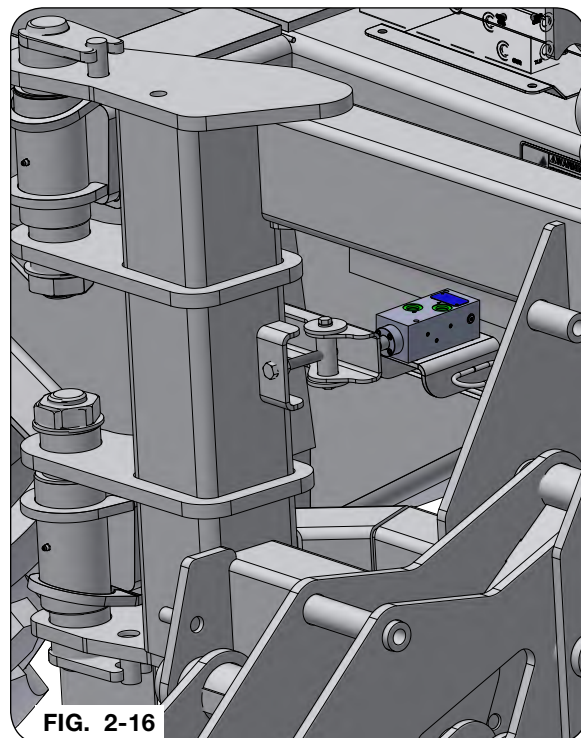
- Do not over adjust the strike plate toward the cam valve as it might over stroke the plunger.

Left-hand cam valve (9504584 - 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 truck trailers require an extra step to lower the toolbar during shipping. When this happens the Right-hand cam valve (9504585 - Normally Open) is unbolted from its bracket and requires remounting for proper machine function.

Right-hand cam valve (9504585 - 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.

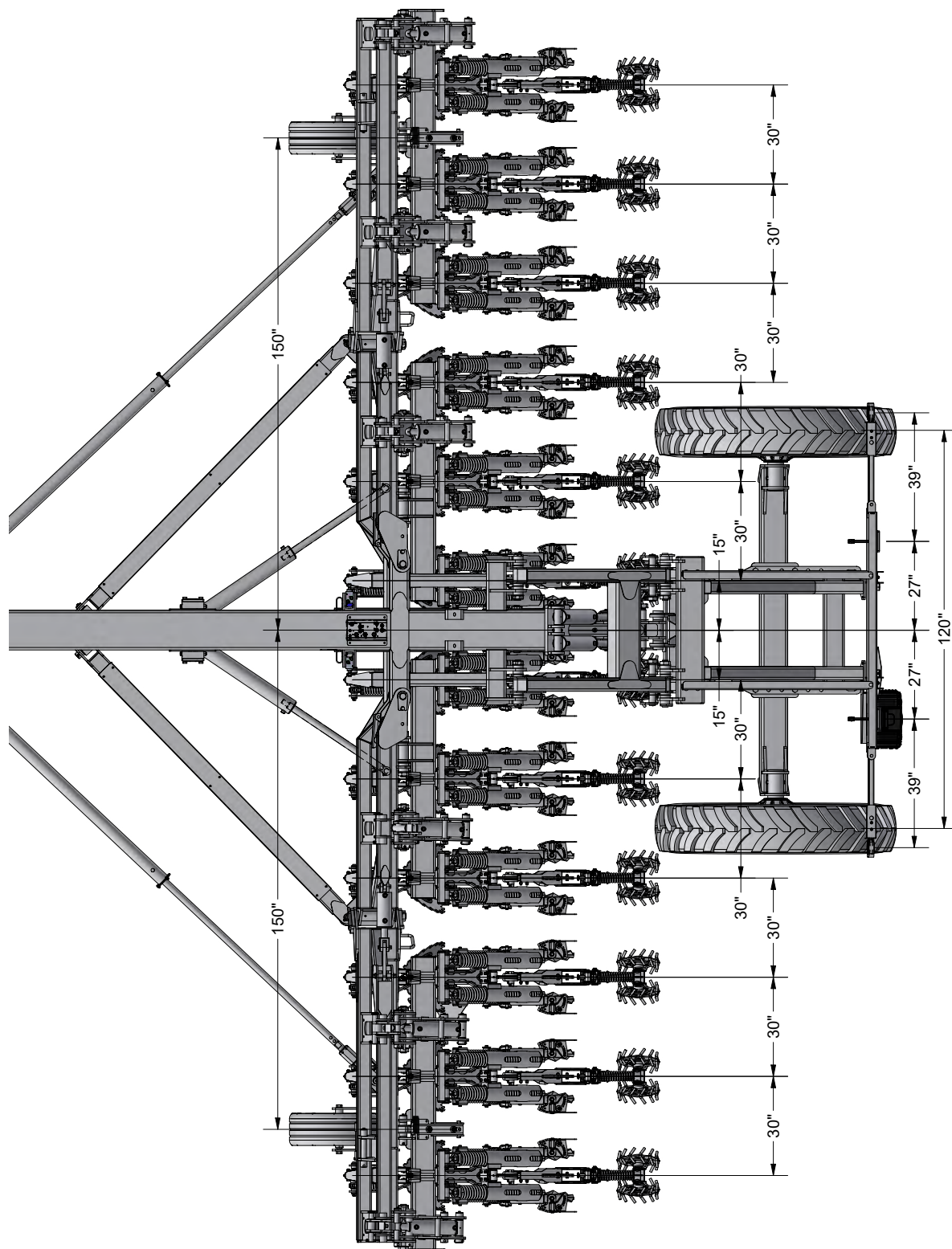




## PULL-TYPE RAPTOR — Set Up

## Overhead Layouts — Folding Units — 12 Shank 30" Spacing

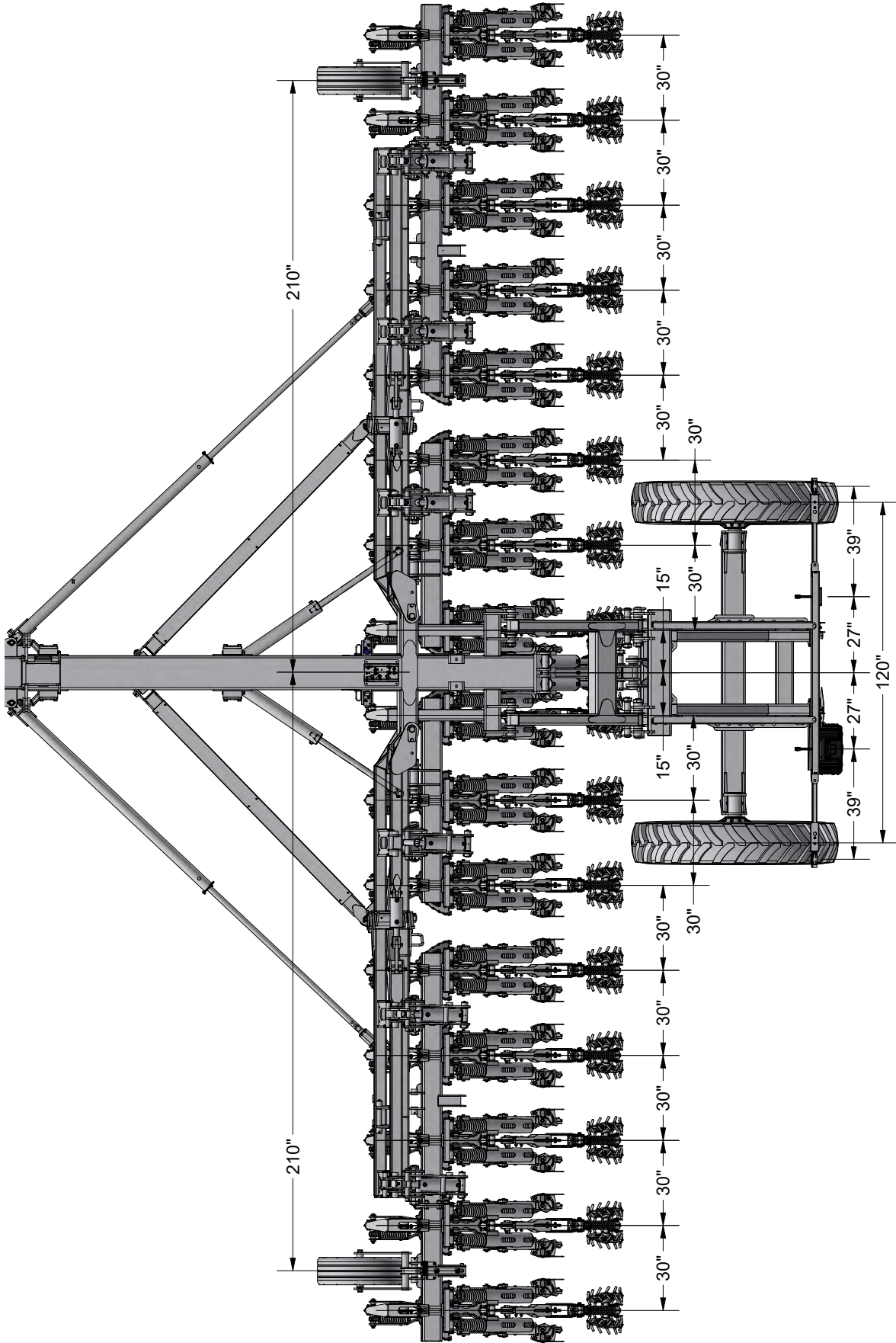
**Auto Reset with Crow Foot Gauge Wheel**



# PULL-TYPE RAPTOR — Set Up

## Overhead Layouts — Folding Units — 16 Shank 30" Spacing

### Auto Reset with Crow Foot Conditioner Wheel Assembly



## **SECTION III**

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# PULL-TYPE RAPTOR — Operation

## General Operation Information

### **WARNING**

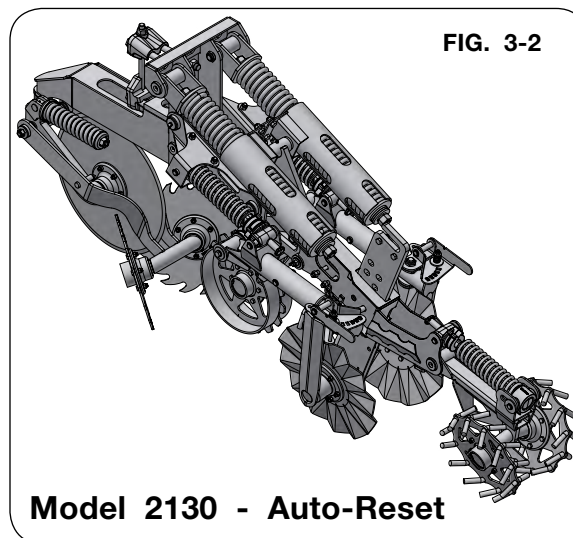
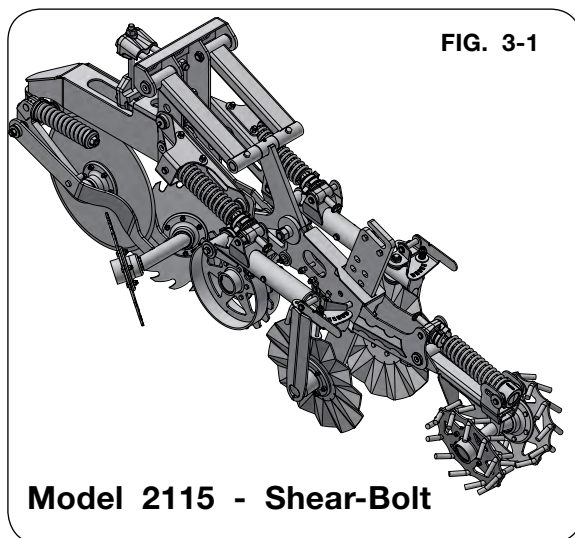
- **READ AND UNDERSTAND SAFETY RULES BEFORE OPERATING OR SERVICING THIS MACHINE. REVIEW "SAFETY" SECTION IN THIS MANUAL IF NECESSARY.**

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 2115 comes with the shear-bolt parallel arms (FIG. 3-1) and should be used in areas with few rocks or obstructions.
- The Model 2130 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](http://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



- 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.



FIG. 3-3

### 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

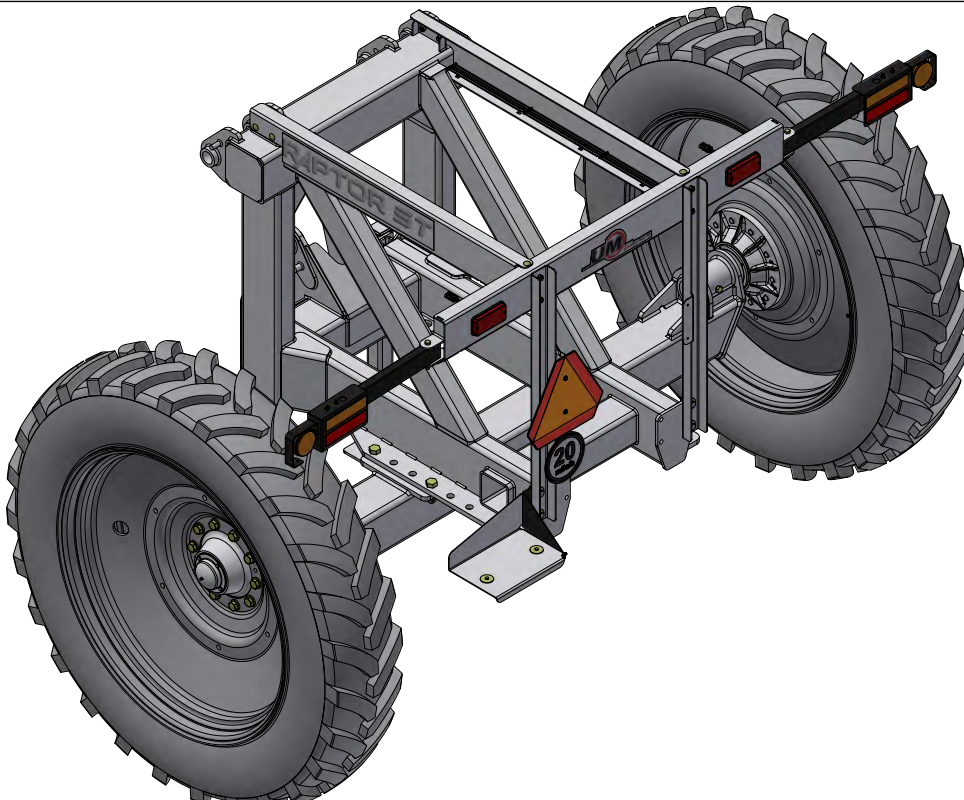
- **INADVERTENT LOWERING OF THE WINGS CAN CAUSE SERIOUS INJURY OR DEATH. INSURE WING TOOLBAR LATCHES ARE ENGAGED BEFORE TRANSPORTING**
- **USE TRANSPORT LIGHTS AS REQUIRED BY ALL LAWS TO ADEQUATELY WARN OPERATORS OF OTHER VEHICLES.**
- **ALWAYS TRAVEL AT A SPEED WHICH PERMITS COMPLETE CONTROL OF TRACTOR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

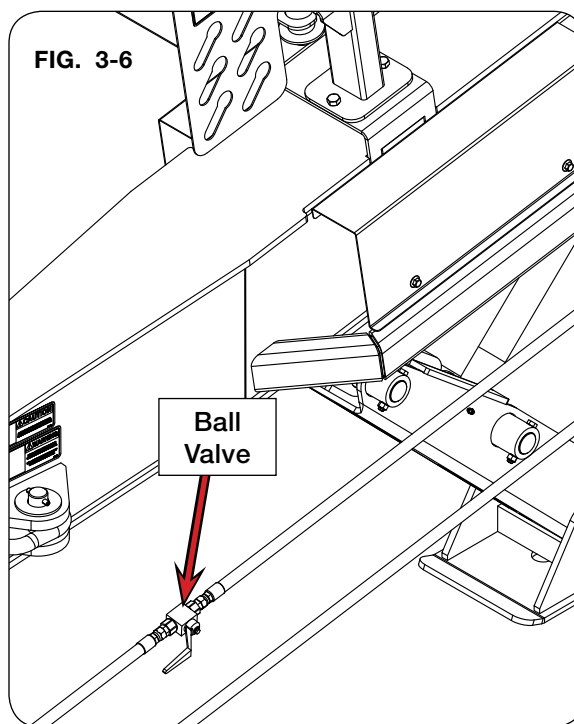
Lower hydraulic jack stand to the ground until the tongue is raised off drawbar.

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



- **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.

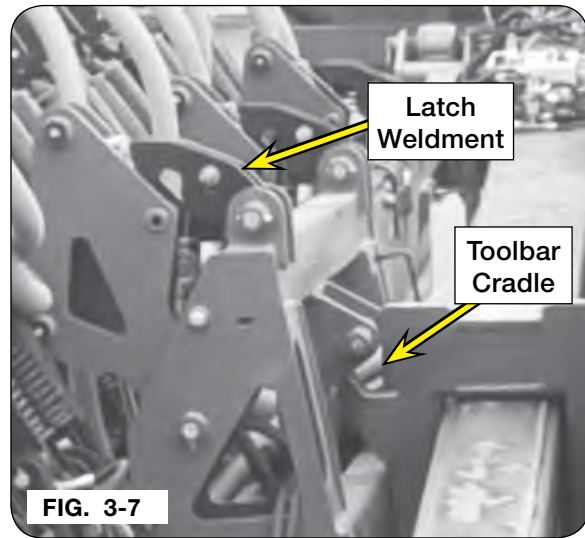


FIG. 3-7

## Folding From Working Position to Transport Position



- **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.

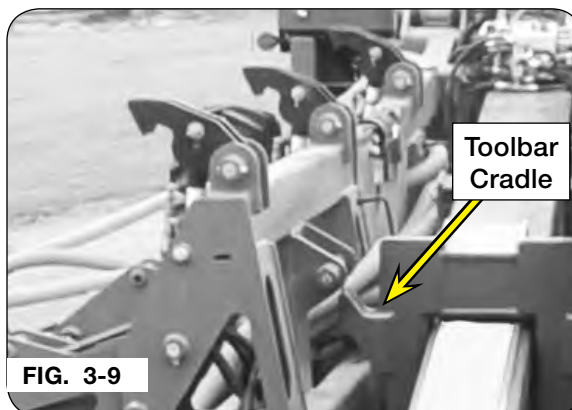


FIG. 3-9

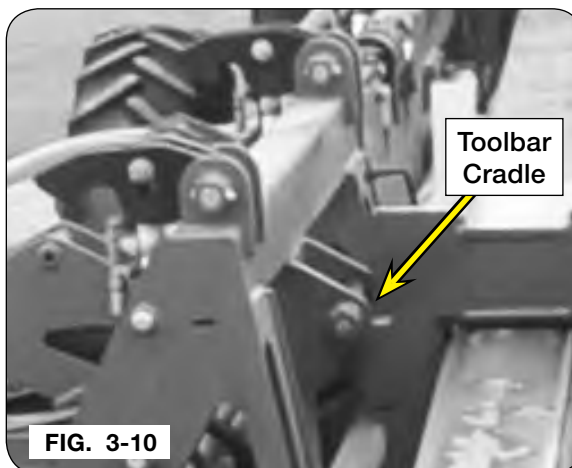


FIG. 3-10

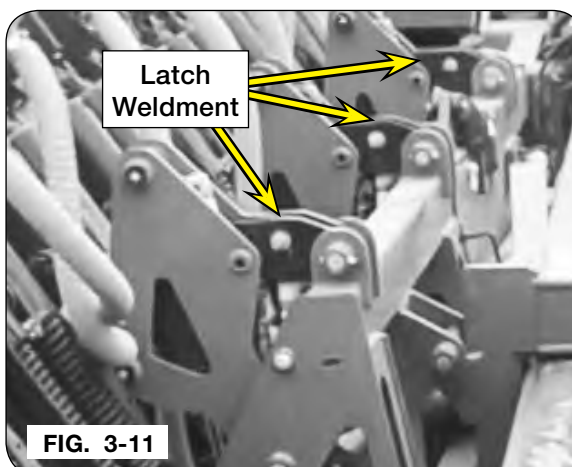


FIG. 3-11



### 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.

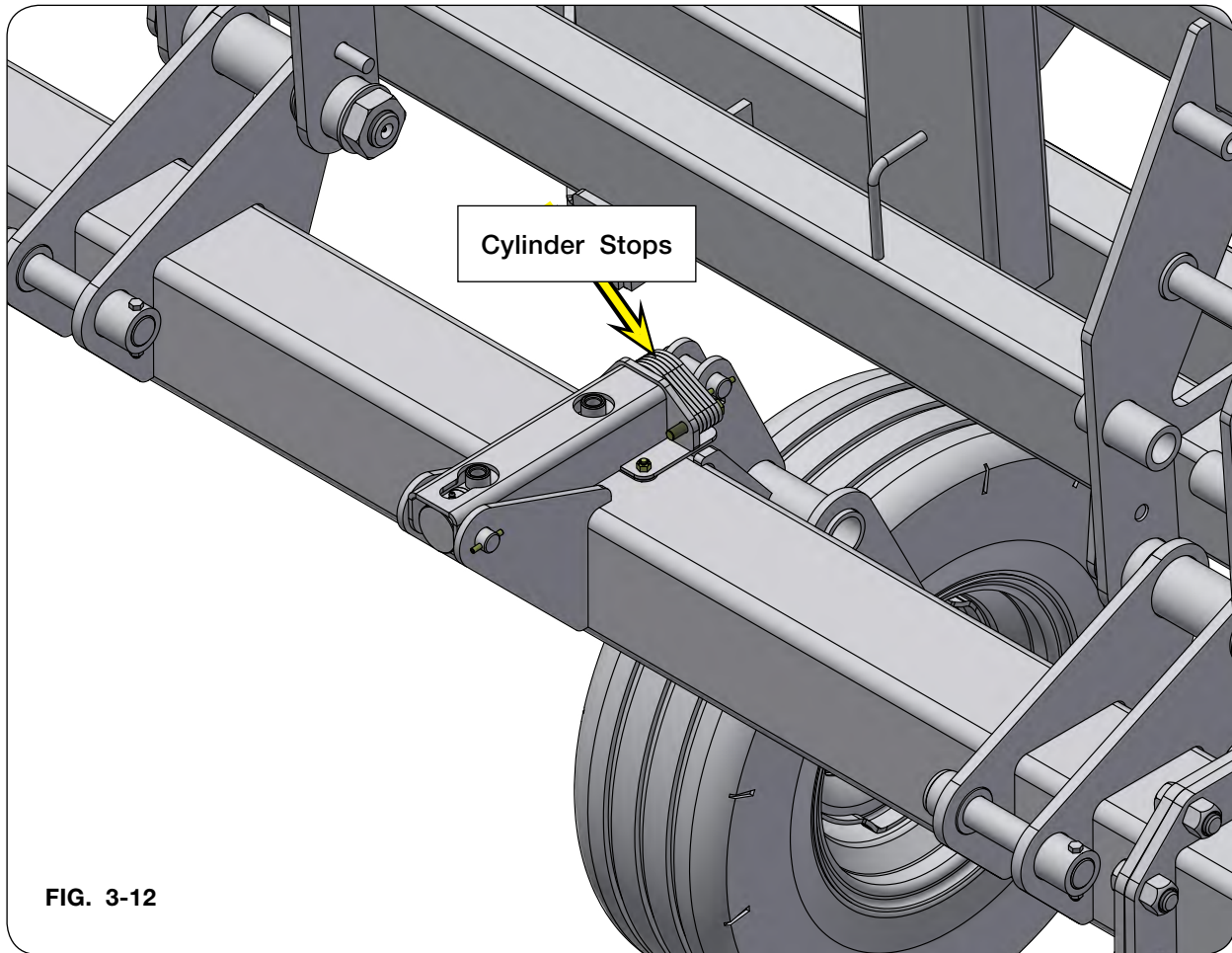


FIG. 3-12



## TerrainPro2 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.

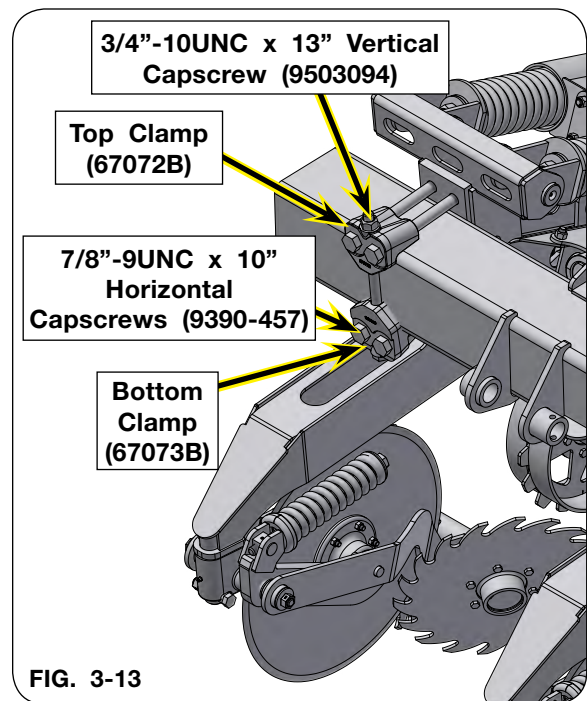
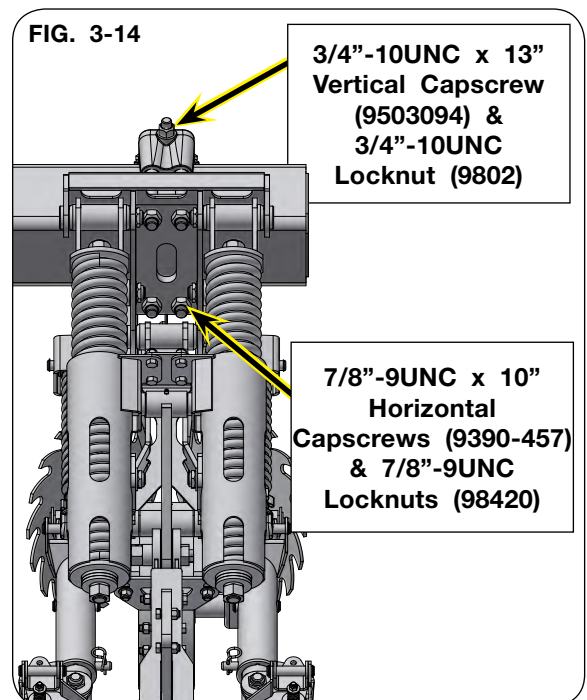


FIG. 3-13



### TerrainPro2 Row Unit (continued)

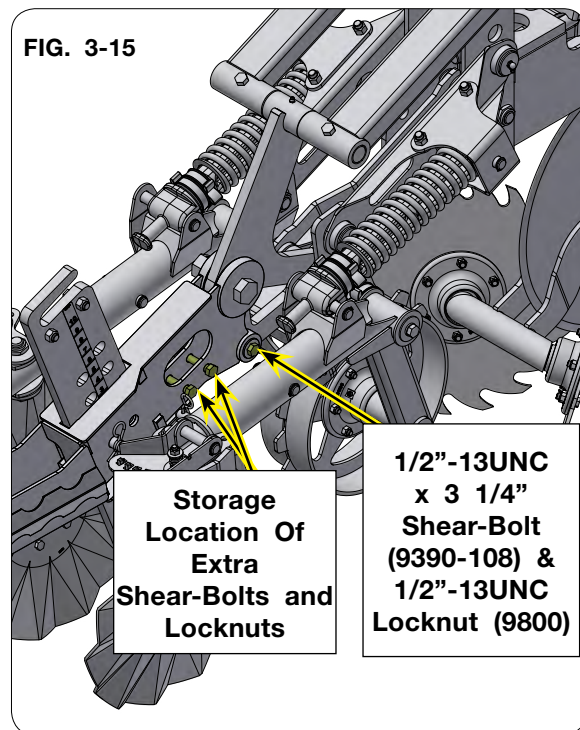
#### Shear-Bolt Replacement

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

#### **WARNING**

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

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.



### TerrainPro2 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.

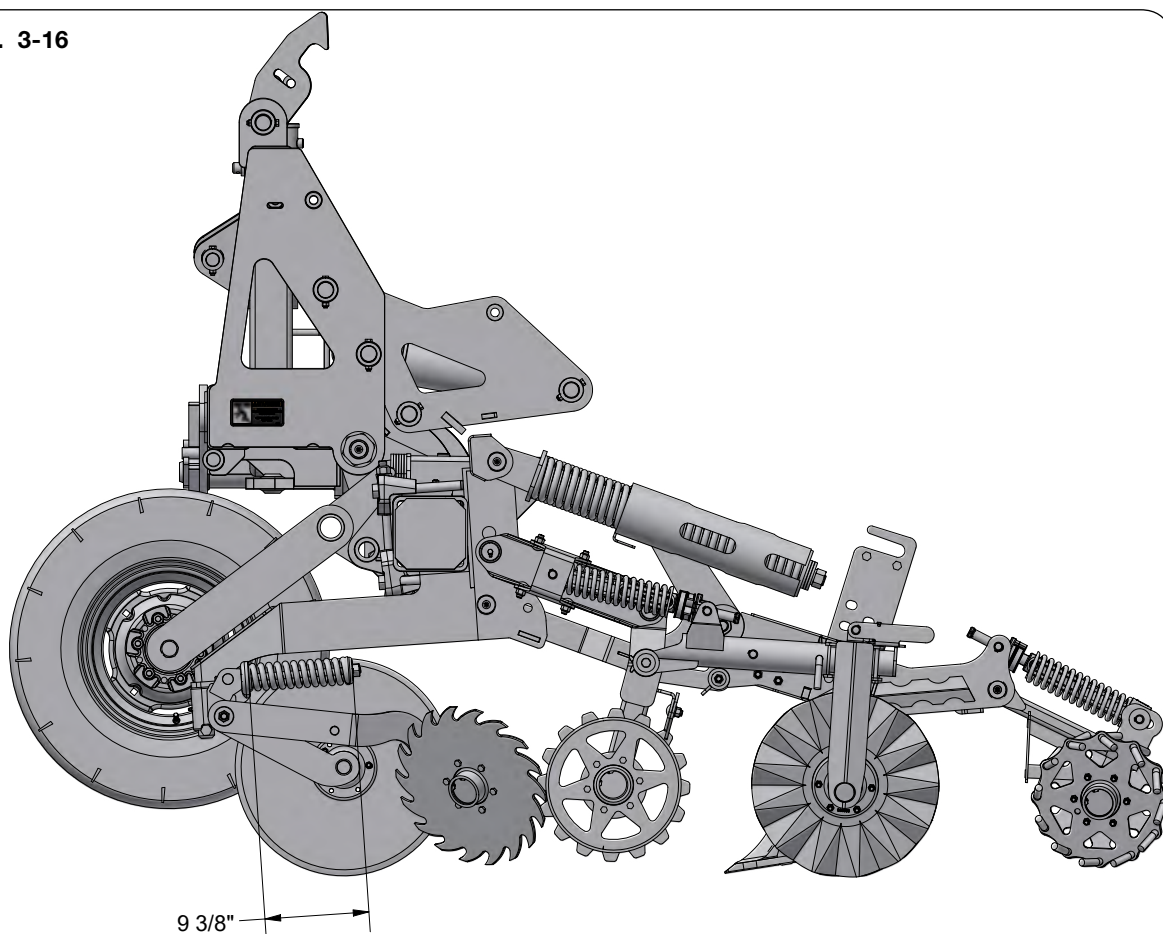
#### **WARNING**

- **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



### TerrainPro2 Row Unit (continued)

#### Row Cleaners

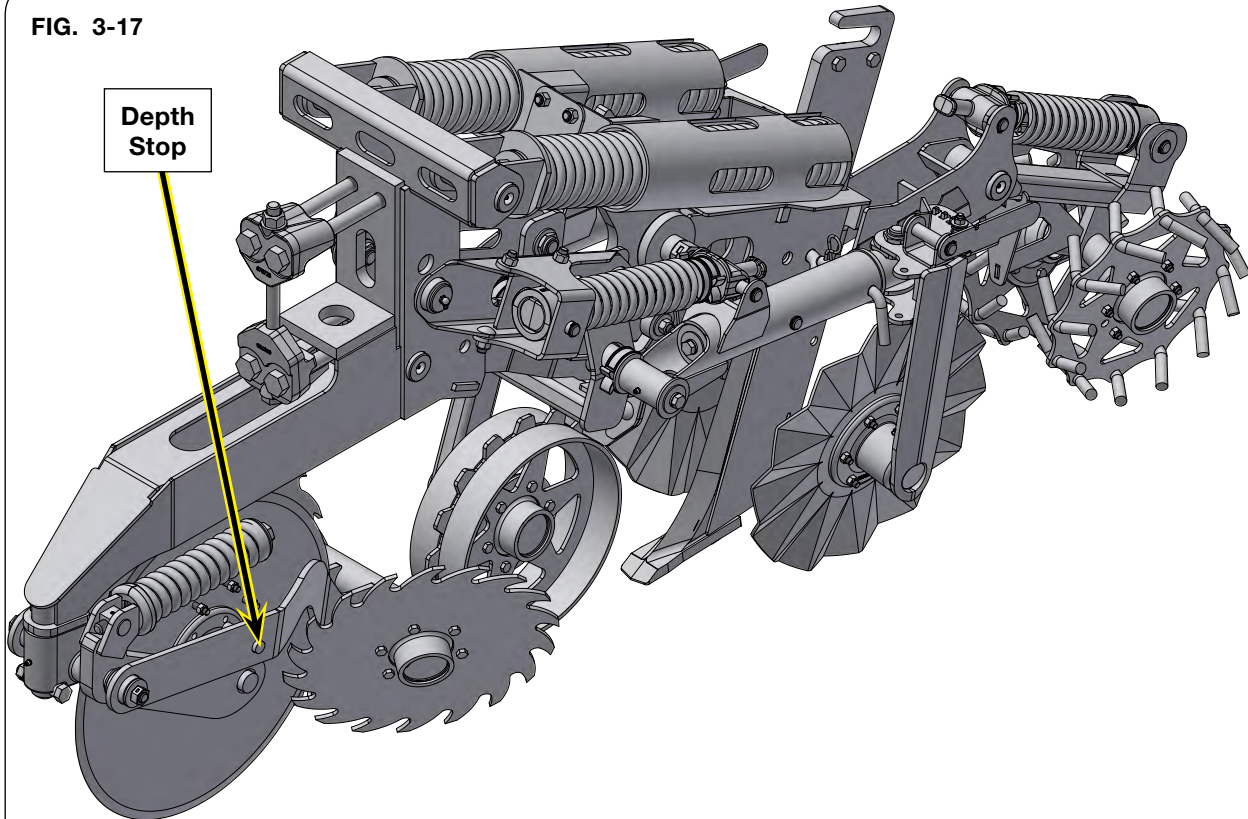
#### **WARNING**

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

16" diameter row cleaners (604207B) follow ground contours independently from the lead coulter and clear residue from the strip.

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

FIG. 3-17





### TerrainPro2 Row Unit (continued)

#### Depth Control Wheels

#### **WARNING**

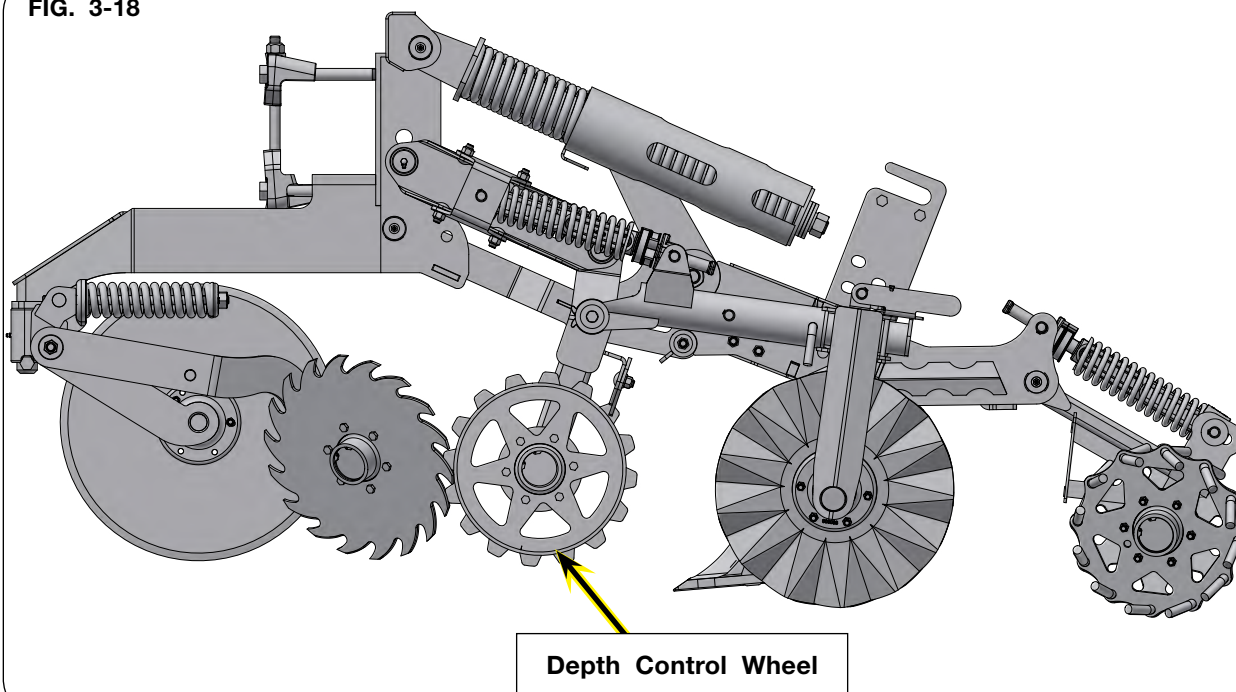
- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE THE MACHINE IS SECURELY BLOCKED.**

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

FIG. 3-18



## TerrainPro2 Row Unit (continued)

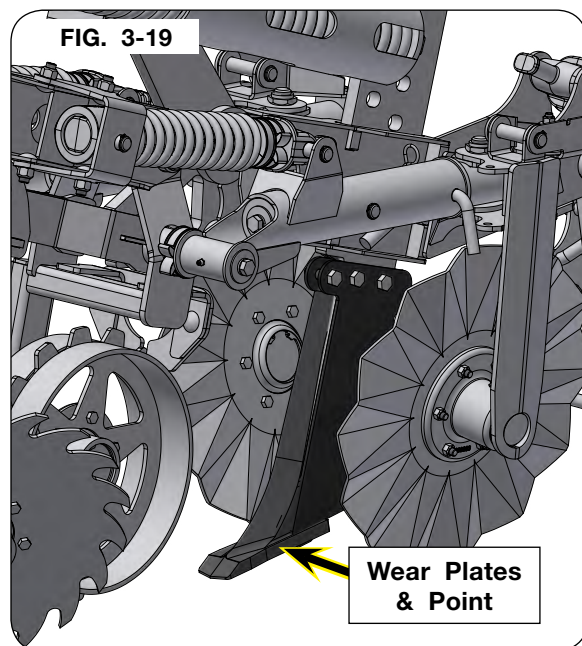
### Strip-Till Shank

#### **WARNING**

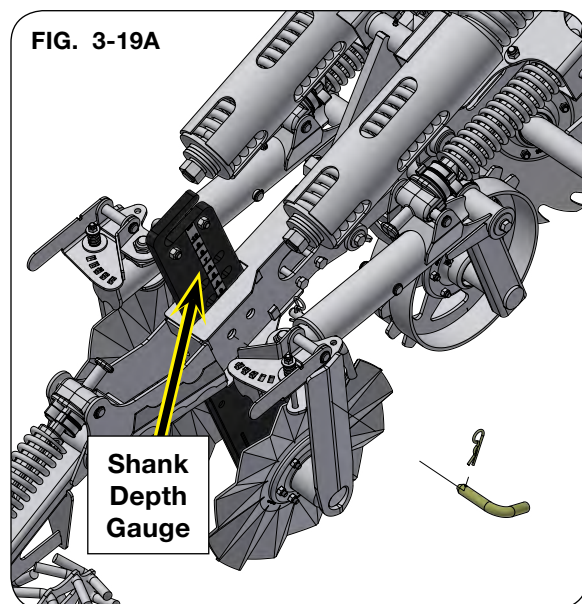
- **TIPPING OR MOVEMENT OF THE MACHINE CAN CAUSE SERIOUS INJURY OR DEATH. BE SURE THE MACHINE IS SECURELY BLOCKED.**

The shank features tool-free height adjustment from 4" to 10" 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 3/16" 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)



## TerrainPro2 Row Unit (continued)

### Closing Coulters

#### **WARNING**

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

Closing coulters with 17" wavy closing disc 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.

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 lift the sealer angle bracket weldments (left-hand & right-hand) to rotate the closing coulters (FIG. 3-20). Remove or add spacers to change the width of 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, remove the bent pin, adjust the sealer arm slider weldment and reinstall the bent pin to adjust 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.

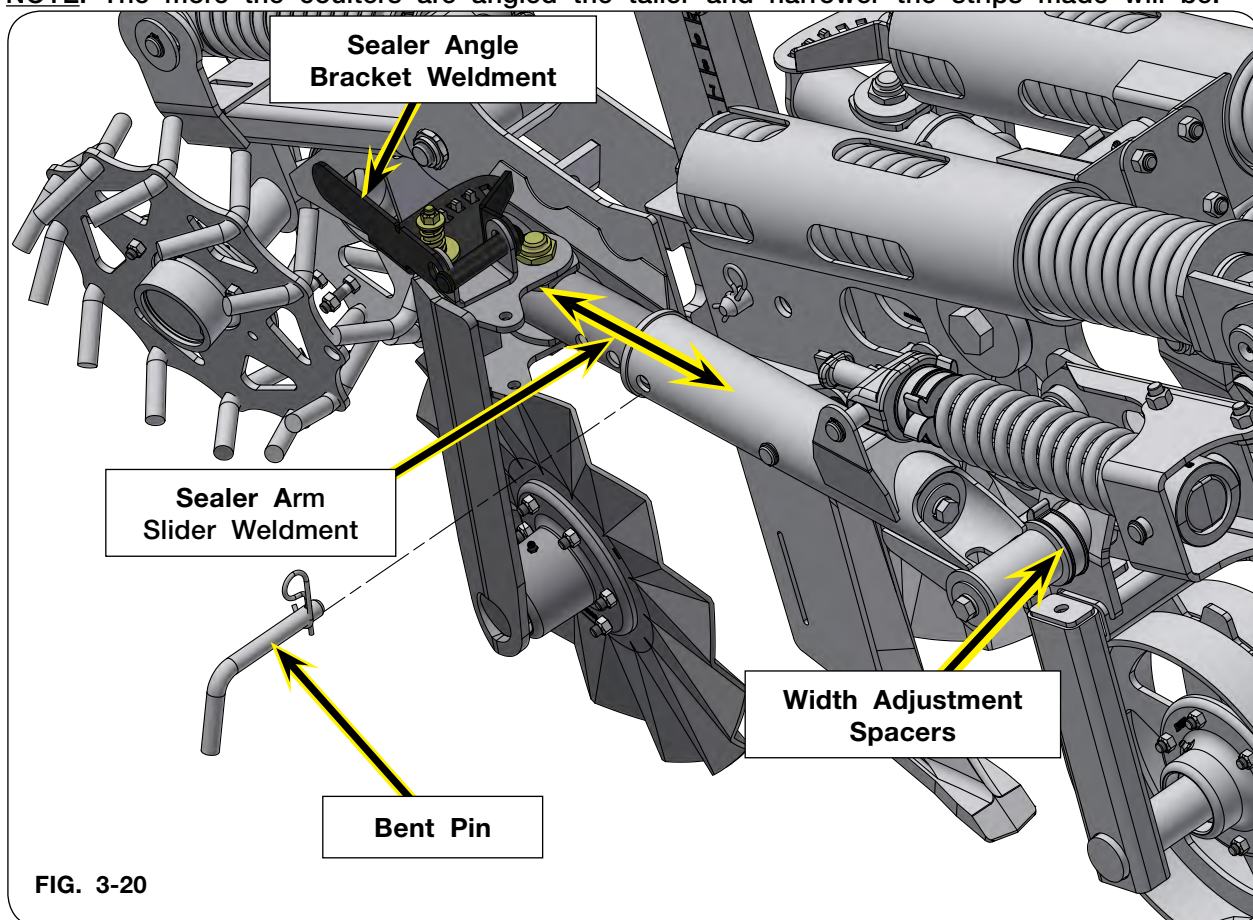


FIG. 3-20



### TerrainPro2 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 baskets break up clods, condition the strip and feature an angle to pinch the shank opening closed while shedding residue.

Adjust the conditioner down pressure by lifting the machine to transport height, and adding or removing stroke control spring spacers. More spring spacers increase conditioning action.

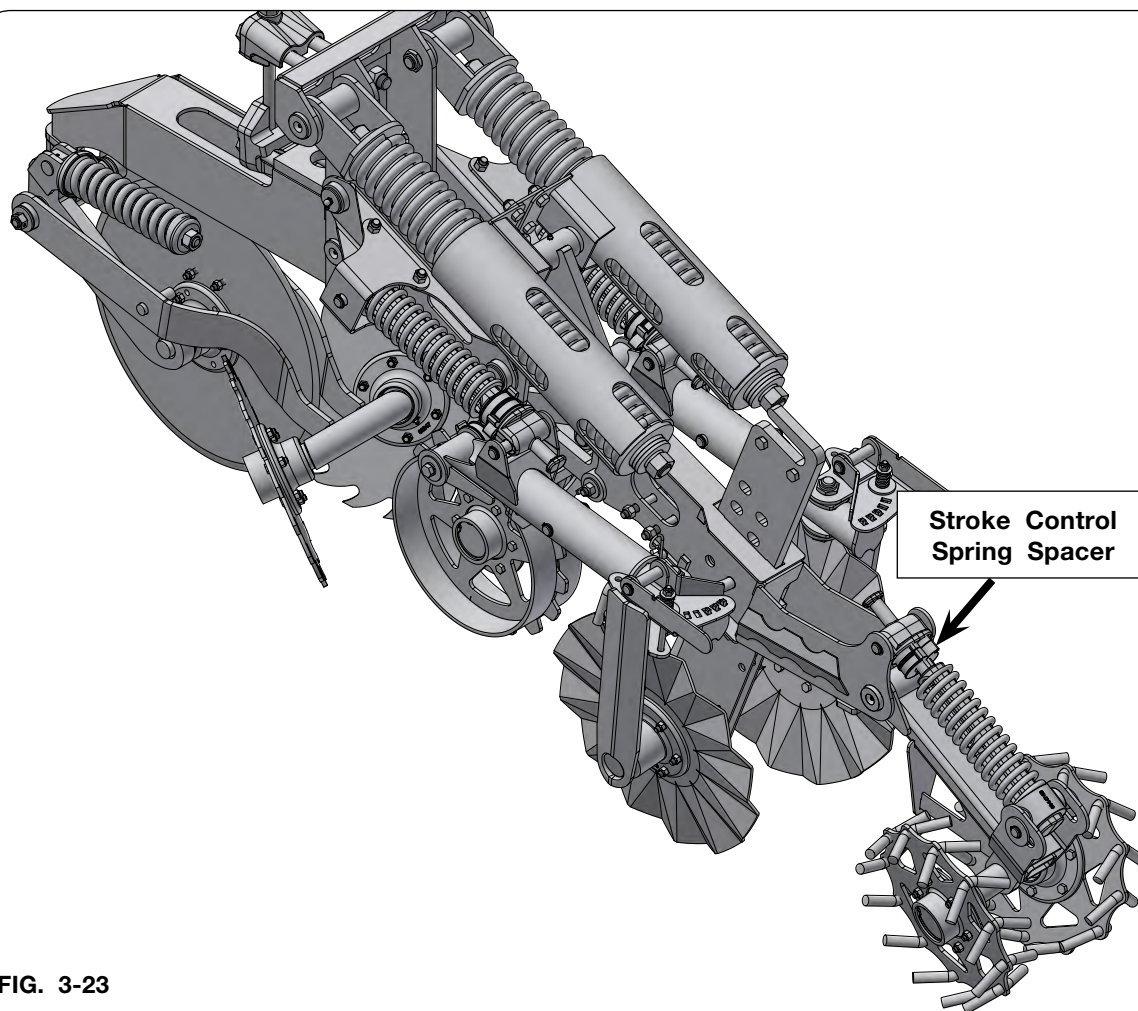


FIG. 3-23

## **SECTION IV**

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## 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.

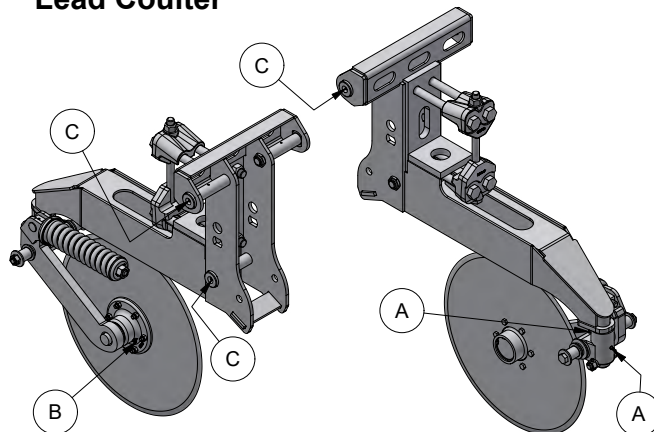
Use EP-2 lubricant at the locations described in the chart. All exposed cylinder rods should be coated with grease before seasonal storage to prevent rusting. After seasonal storage, check wing latch for freedom of movement.

The lubrication locations and recommended schedule are as follows:

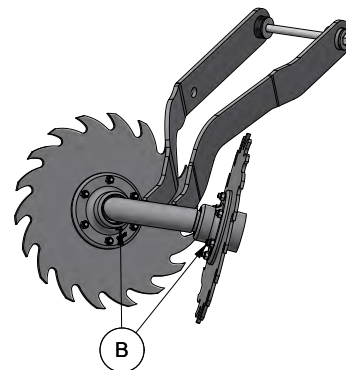
ITEM	DESCRIPTION	POINT	QTY	HOURS
A	Lead Coulter Swivel Arms	2	1 Shot	100 Hours
B	All Hubs	8	2 Shots	200 Hours/Annually
C	Lead Coulter Pivots	3	2 Shots	200 Hours/Annually
D	Depth Control Pivots	2	2 Shots	200 Hours./Annually
E	Closing Coulter Pivots	2	2 Shots	100 Hours
F	Conditioner Pivot	1	2 Shots	200 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)

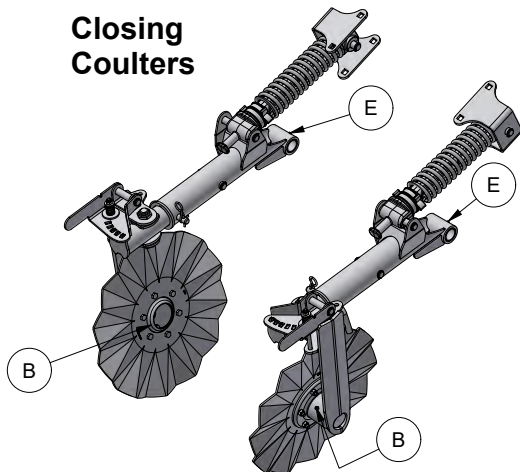
**Lead Coulter**



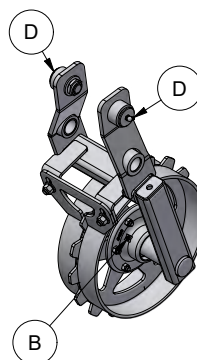
**Row Cleaner**



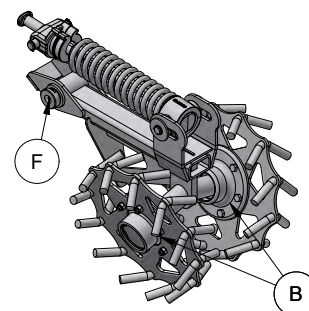
**Closing Coulters**



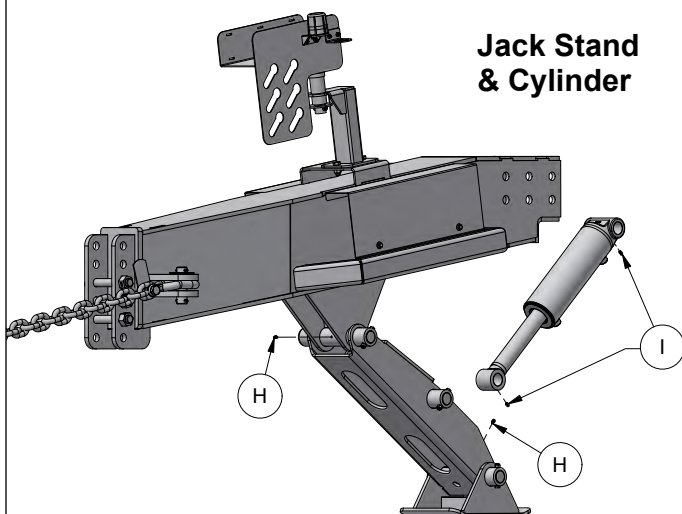
**Depth Control**



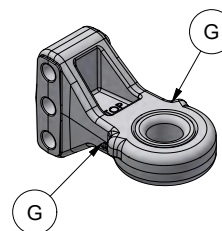
**Conditioner**



**Jack Stand & Cylinder**

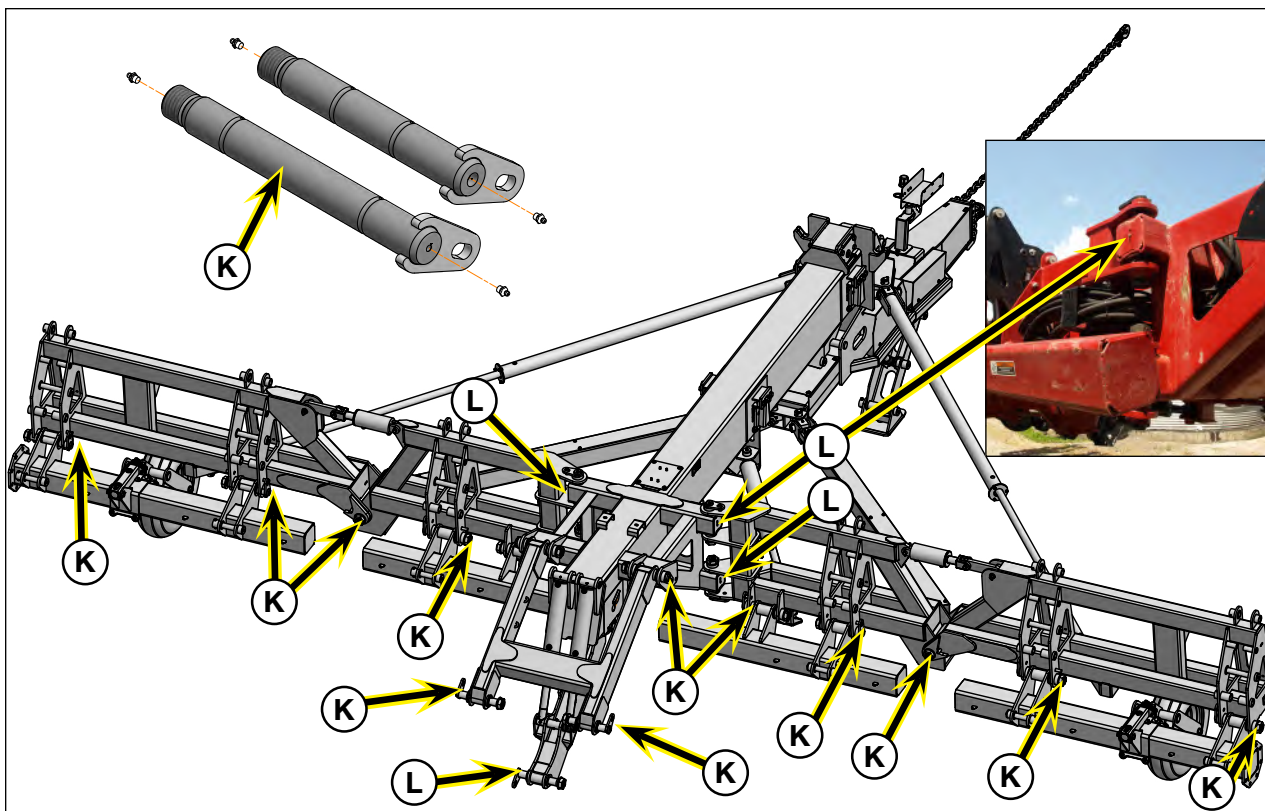
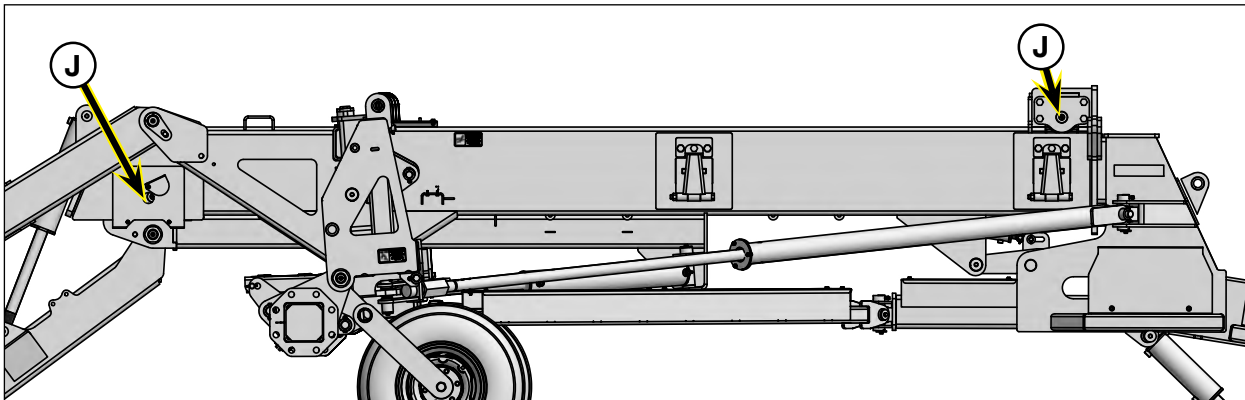


**Hitch**



## Lubrication Points (continued)

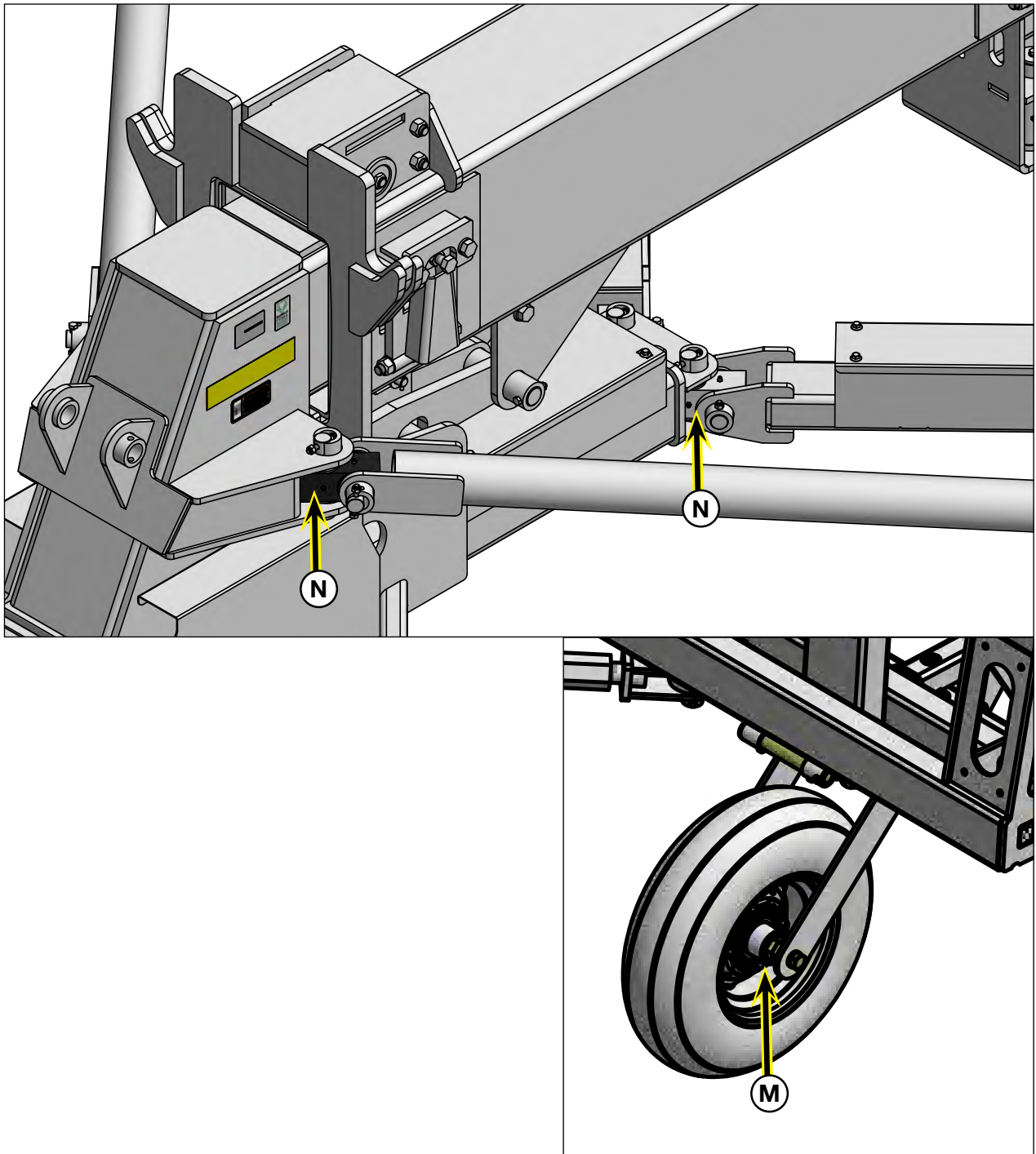
ITEM	DESCRIPTION	POINT	QTY	HOURS
J	Roller Assembly	2	1 Shot	50 Hours
K	Pin Weldments (Qty - 20; 2 Points Each) Parallel Arms, Inner Wings, & Outer Wings	34	2 Shots	10 Hours
L	Inner Wing Hinge Greased through bushings	4	2 Shots	10 Hours





## 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:

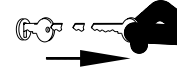
**ROUTING OF ALL HYDRAULIC HOSES:** Hoses should not be kinked, twisted, or rubbing against sharp edges.

**FITTINGS AND CONNECTIONS:** Check for leaks. Refer to "Torque Chart" in MAINTENANCE section.

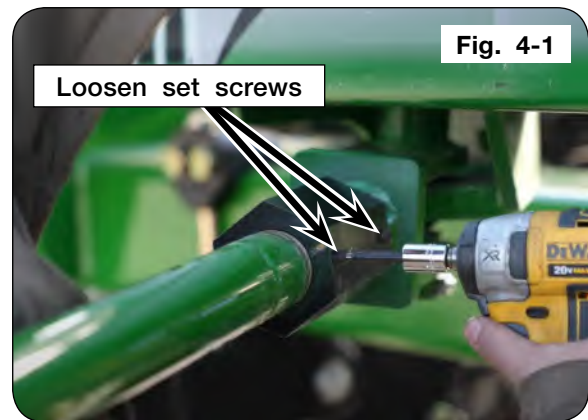
**HOSES:** Be sure hoses have room to "FLEX" (for folding) in hinge areas. Hoses must be secured with cable ties.

## Truss Rod Adjustment

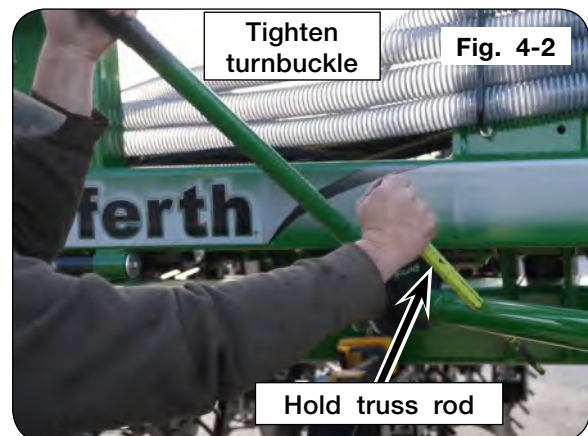
1. Park the empty Raptor machine on a firm, level surface. Completely unfold the wings. Block the tires on the unit to keep it from moving. Set the towing vehicle's parking brake, shut off the engine and remove the ignition key.



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)

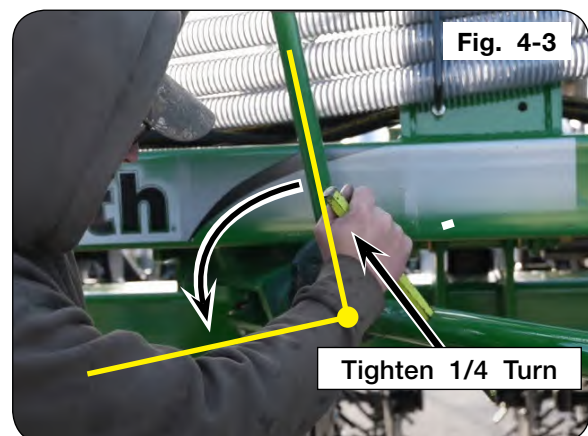


3. With the wings completely unfolded, attempt to tighten the turnbuckles while holding the truss rod stationary. (Fig. 4-2) If a turnbuckle is already tight, reinstall the set screws, torque the screws to 25-28 Ft.-Lbs. and no further action is required. If a turnbuckle is loose, tighten until it cannot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

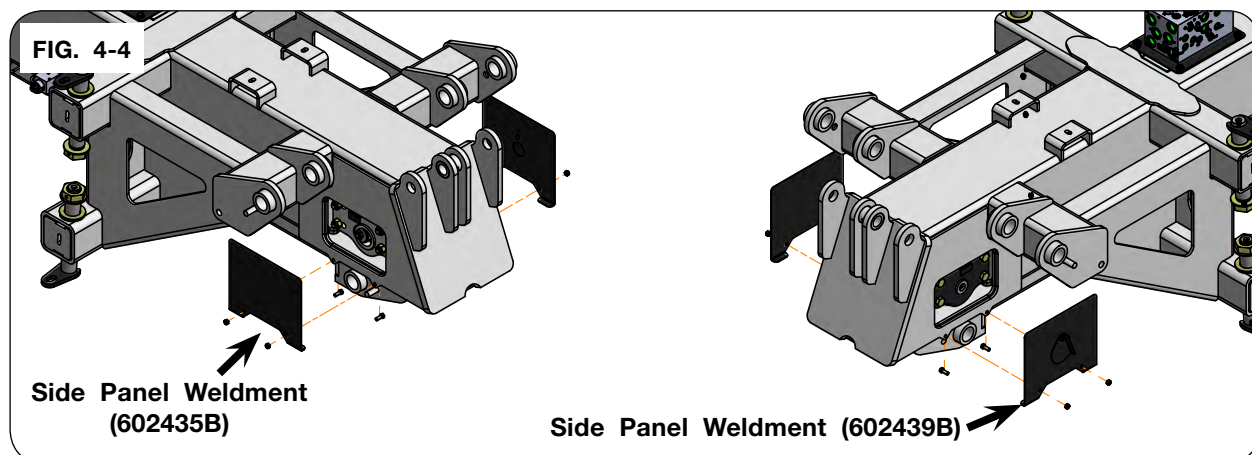
### **WARNING**

- 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.

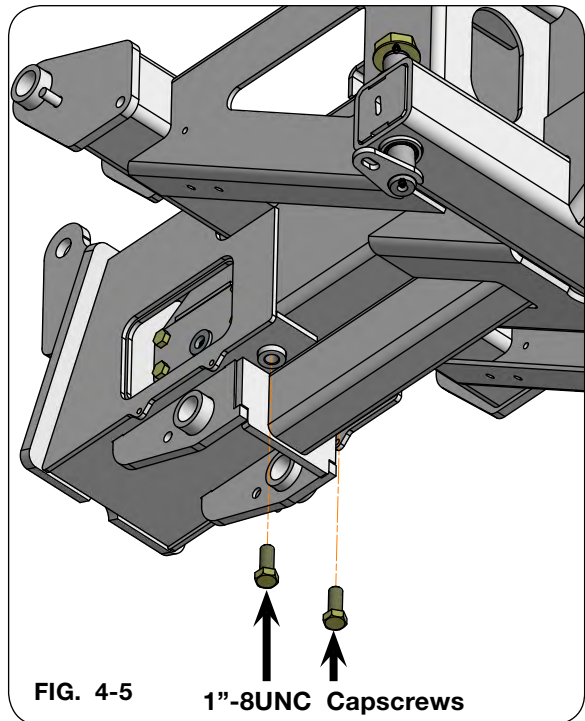
### Rear Roller Assembly Replacement

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)

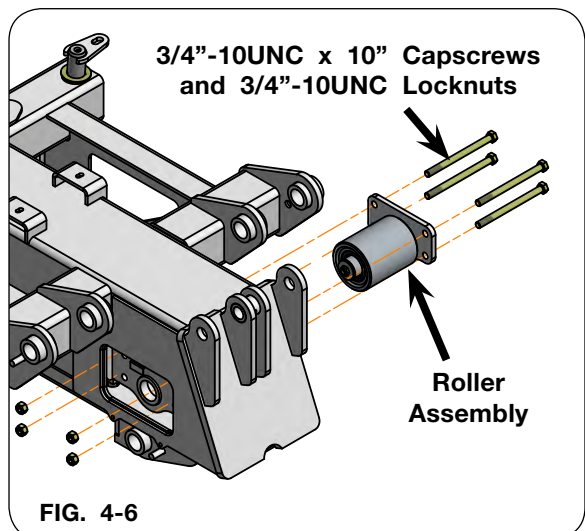


## Roller Assembly Replacement (continued)

2. 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.

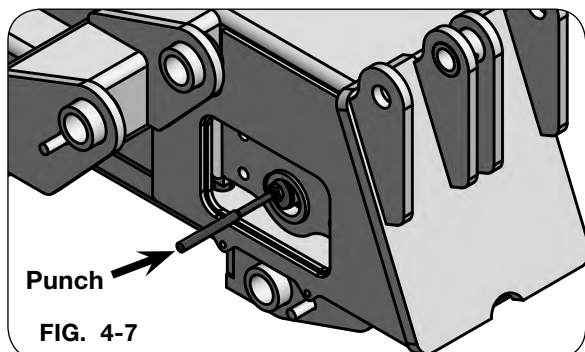


3. Remove and save the 3/4"-10UNC x 10" capscrews (9390-450) and 3/4"-10UNC locknuts (9802) retaining the roller assembly (602186B). (FIG. 4-6)



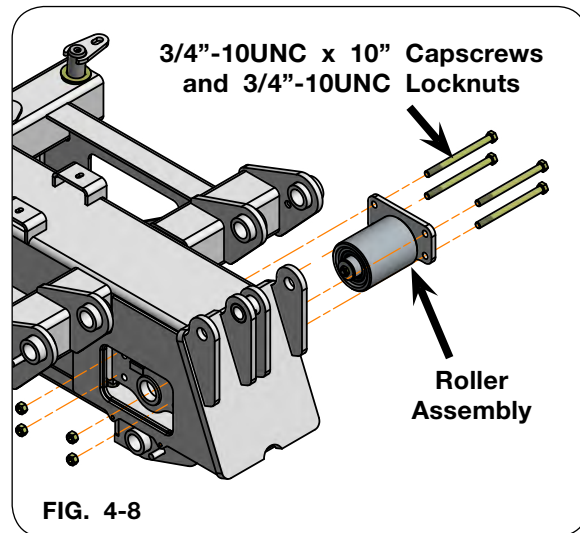
**NOTE:** If necessary, use a punch on the end of the spindle to help drive the assembly. (FIG. 4-7)

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

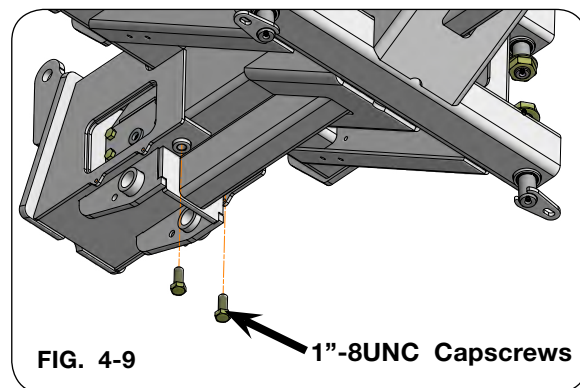


## Roller Assembly Replacement (continued)

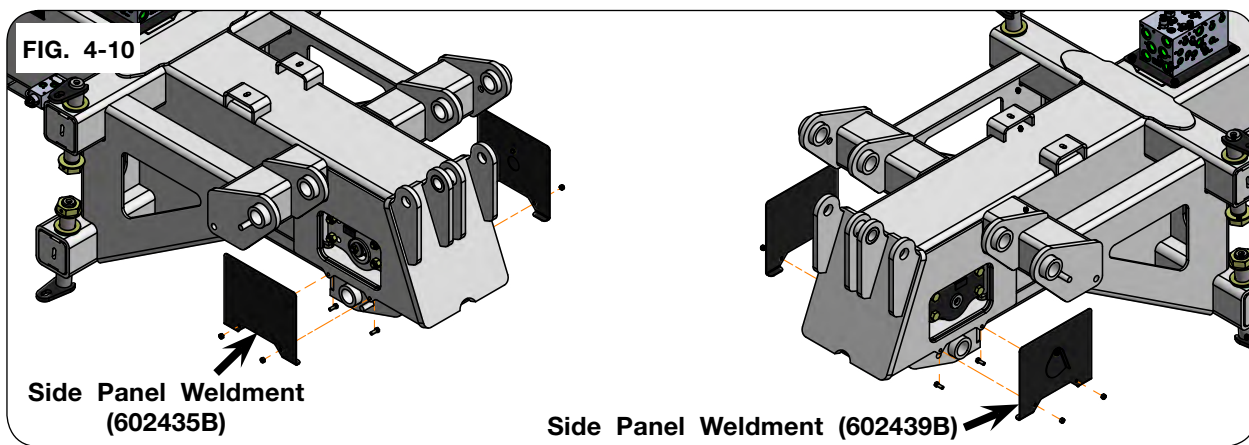
4. Replace roller assembly (602186B) and retain into position with the 3/4"-10UNC x 10" capscrews (9390-450) and 3/4"-10UNC locknuts (9802) previously removed. (FIG. 4-8)



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)

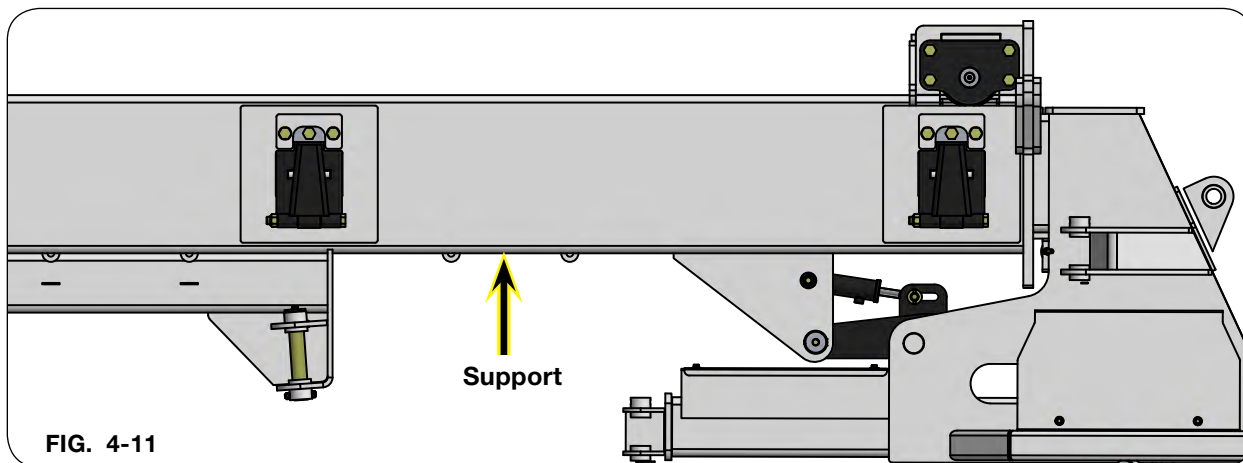




## Roller Assembly Replacement (continued)

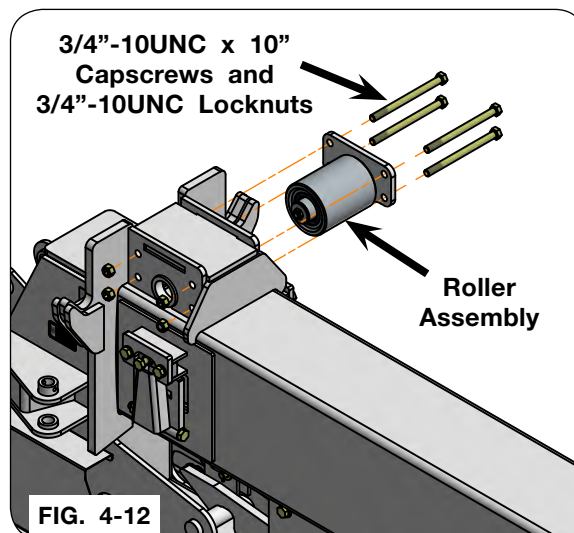
### Front Roller Assembly Replacement

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.

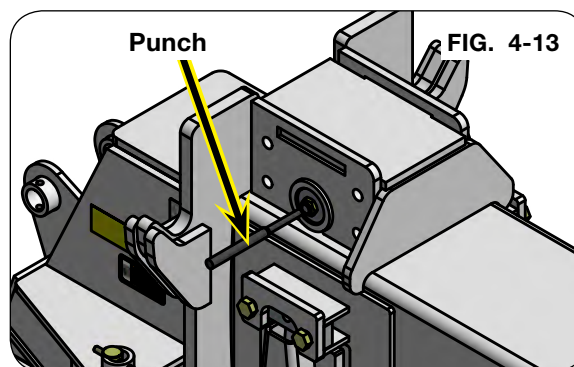
2. Remove and save the 3/4"-10UNC x 10" capscrews (9390-450) and 3/4"-10UNC locknuts (9802) retaining the roller assembly (602186B). (FIG. 4-12)



**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" capscrews (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)

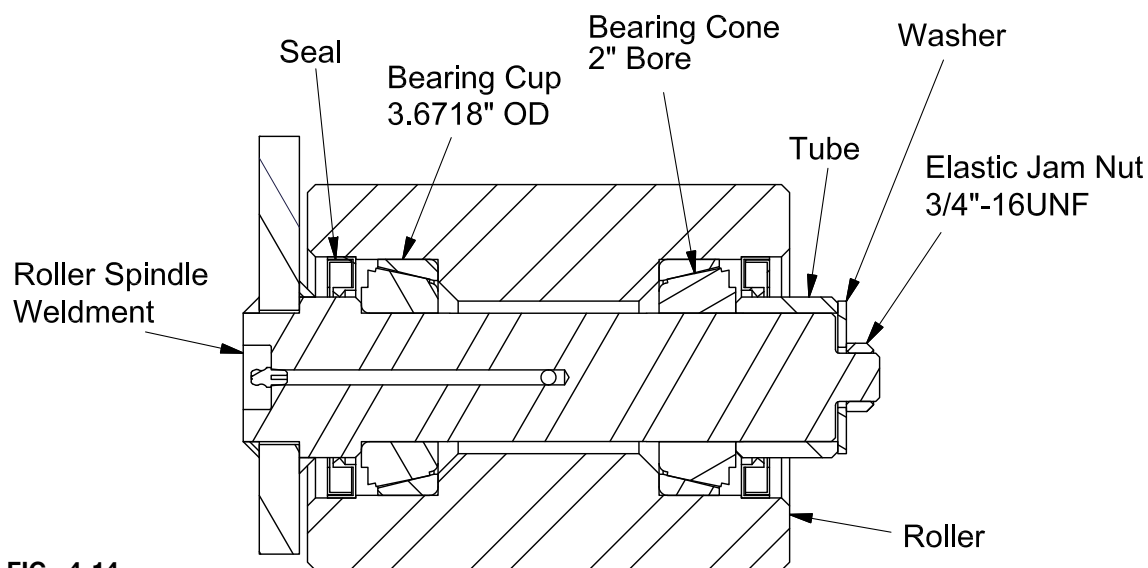


FIG. 4-14

## TerrainPro2 Row Unit

### **WARNING**

- BE SURE THAT THE IMPLEMENT IS SECURELY BLOCKED TO PREVENT FALLING. FAILURE TO DO SO COULD RESULT IN INJURY OR DEATH.
- 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.

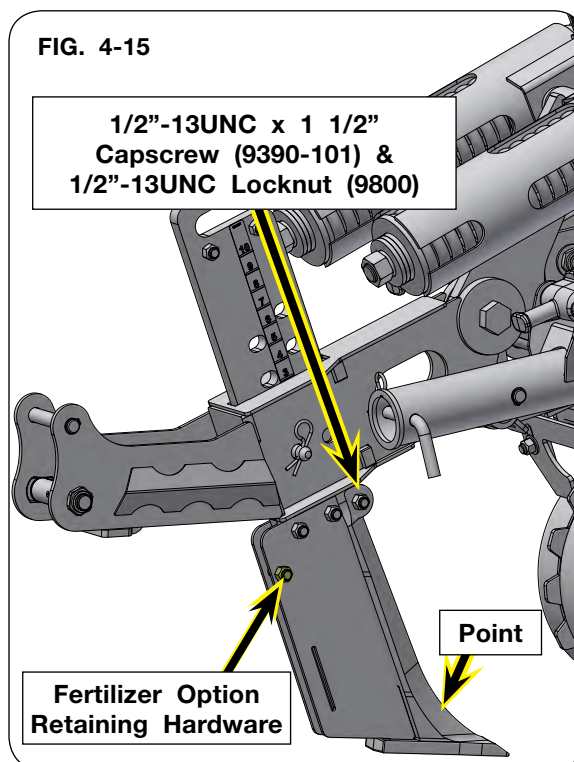
### **CAUTION**

- 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 1/2" capscrew (9390-101) and 1/2"-13UNC locknut (9800). (FIG. 4-15)
3. Loosen the center wear plates 1/2"-13UNC x 1 1/2" capscrews (9390-101) and 1/2"-13UNC locknuts (9800). (FIG. 4-15)
4. Remove and save the 1/2"-13UNC x 1 1/2" capscrew (9390-101) and 1/2"-13UNC locknut (9800). (FIG. 4-15)
5. Remove the point (601983B). (FIG. 4-15)



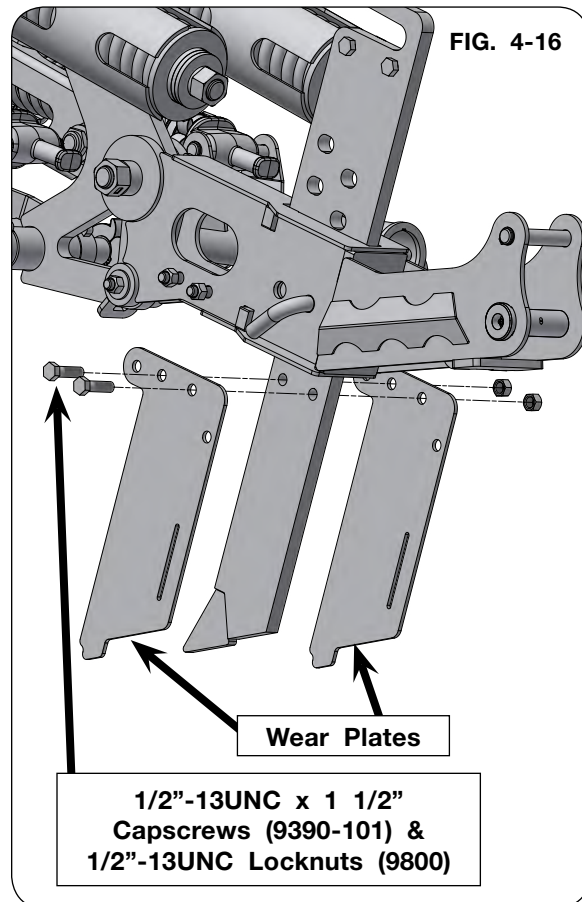
### TerrainPro2 Row Unit (continued)

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

7. Remove the wear plate 1/2"-13UNC x 1 1/2" capscrews (9390-101) and 1/2"-13UNC locknuts (9800). (FIG. 4-16)

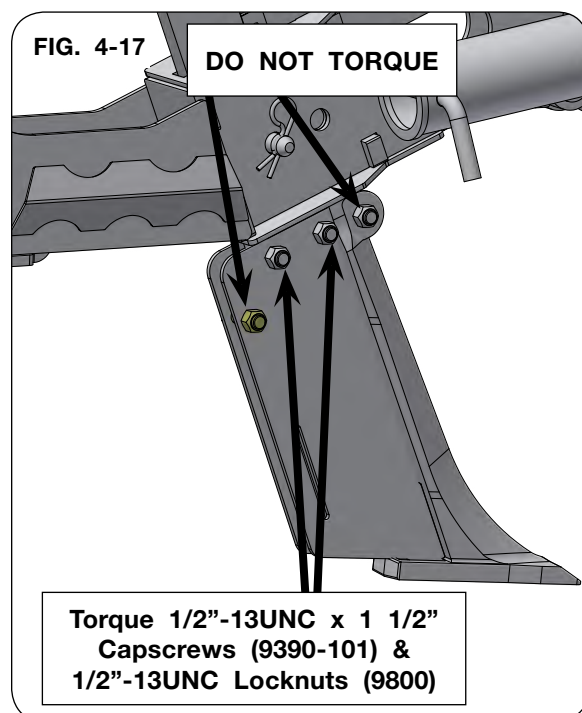
8. Replace wear plates (604842B) and loosely secure with previously removed 1/2"-13UNC x 1 1/2" capscrews (9390-101) and 1/2"-13UNC locknuts (9800). (FIG. 4-16)

9. Install point (601983B) and secure with previously removed 1/2"-13UNC x 1 1/2" capscrew (9390-101) 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 1/2" capscrew (9390-101) and 1/2"-13UNC locknut (9800) (FIG. 4-17). **DO NOT TORQUE HARDWARE.**

11. Torque the center wear plates 1/2"-13UNC x 1 1/2" capscrews (9390-101) and 1/2"-13UNC locknuts (9800) according to "Torque Chart" in MAINTENANCE section. (FIG. 4-17)



## TerrainPro2 Row Unit (continued)

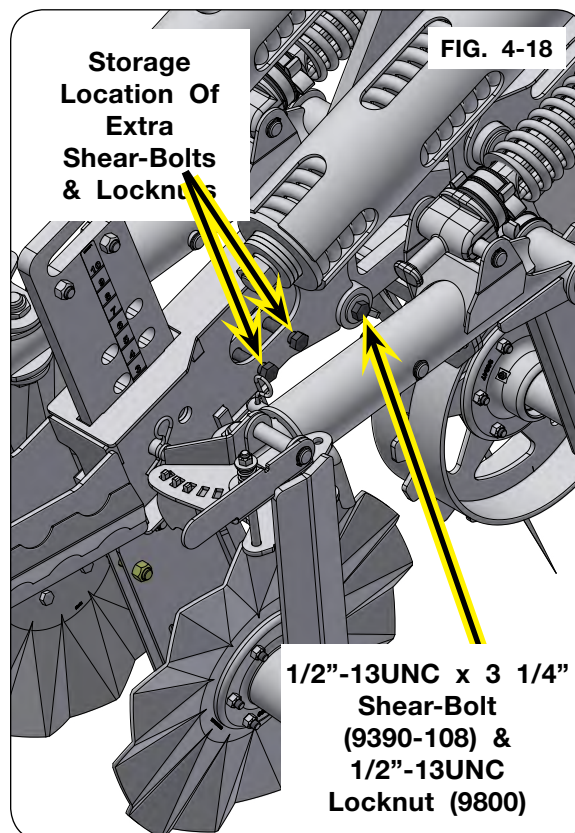
### Shear-Bolt Replacement

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

#### **WARNING**

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

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."





## TerrainPro2 Row Unit (continued)

### Lead Coulter Spring Replacement

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

#### **WARNING**

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

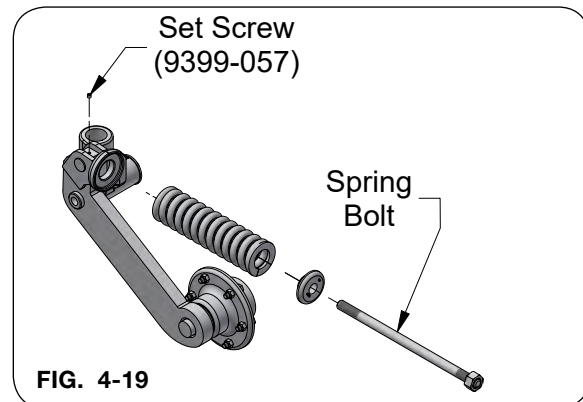
#### **CAUTION**

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

#### **IMPORTANT**

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

1. Loosen the set screw retaining the spring bolt on the coulters arm (FIG. 4-19).
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.

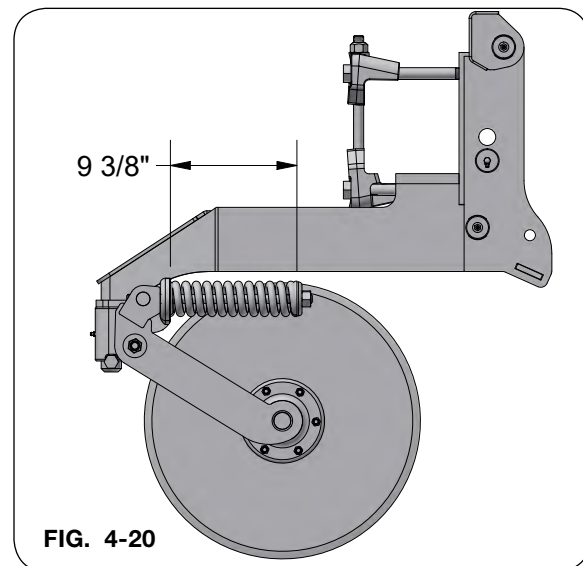


4. Tighten bolt until the spring is compressed to 9 3/8" (FIG. 4-20).

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

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

5. Tighten set screw to secure bolt.



### 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.

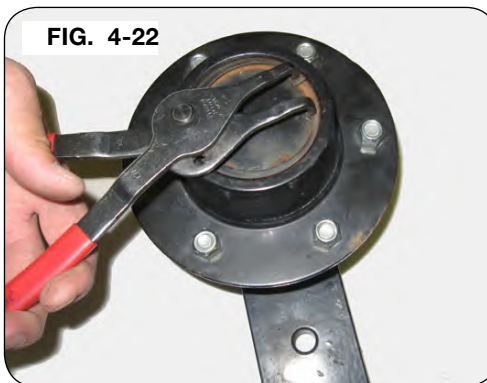


FIG. 4-22

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

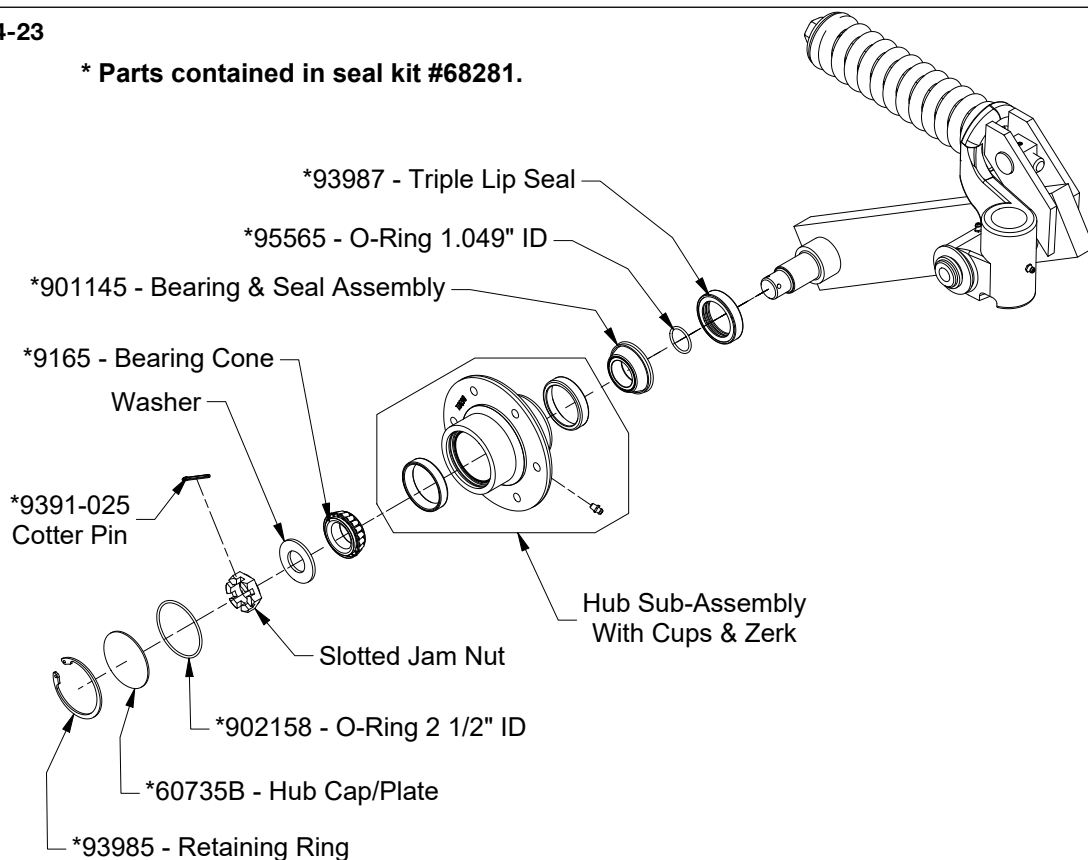
4. Remove the cotter pin securing the slotted nut.
5. Unscrew the nut and carefully remove the hub from the spindle.
6. Remove the components, clean and inspect for any damage or wear. If even the slightest imperfection exists, replace the component(s). Once the hub is dismantled, always replace the 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 coultter 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 cotter pin and verify it has clearance to the hub cap. Cotter Pin should be tight to nut/spindle.
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.



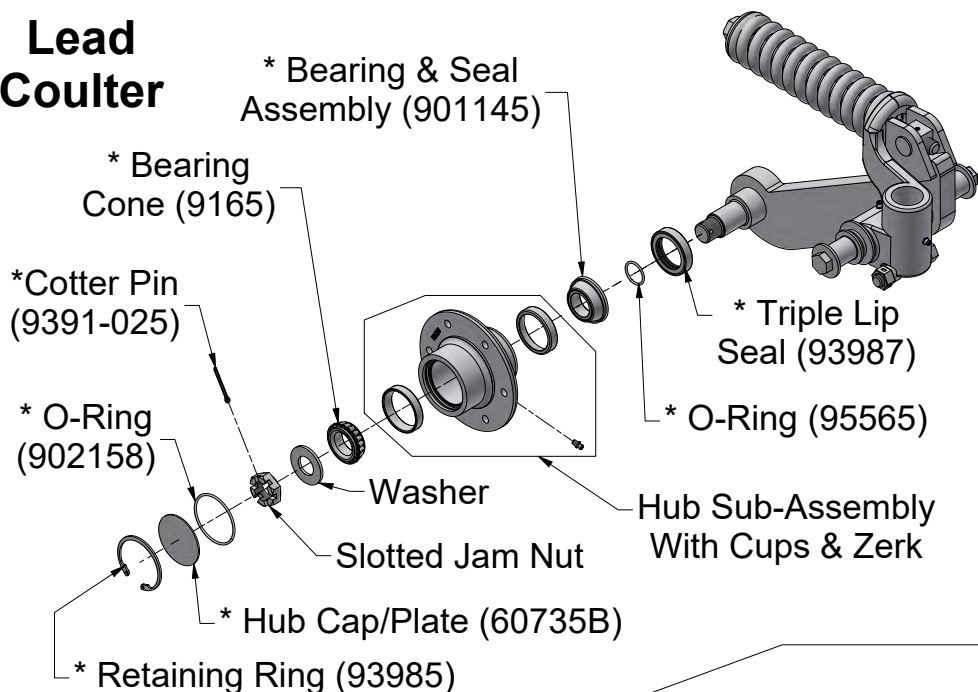
FIG. 4-24

## 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

### Lead Coulter



### Closing Coulter

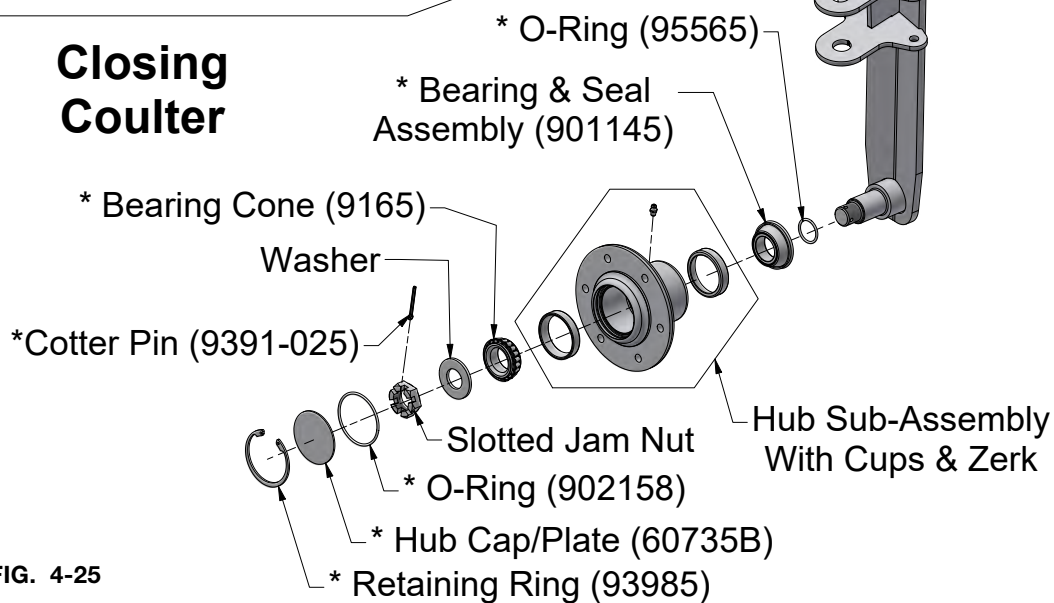


FIG. 4-25



### 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/plate (60735B). Remove the cotter pin (9391-025) and torque nut (94795) to 40 ft.-lbs.
  3. After tightening, retest the hub for wobble by repeating Step #1. If no wobble exists, reattach the cotter pin (9391-025) and hub cap/plate (60735B). If wobble still exists, continue with the following steps.
    - a. Remove the slotted jam nut (94795) and washer/bushing (94800) from the spindle.

#### **IMPORTANT**

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

- *Always replace the seal if dismantling the hub. Failure to do so could result in premature failure of hub and its components.*
- d. Replace any damaged parts before reassembling the components. Be sure to remove any debris or dirt and repack bearings with an SAE approved hub grease.
  - e. Assemble O-ring (95565) onto spindle.
  - f. Apply grease to lubricate the seal (901145).

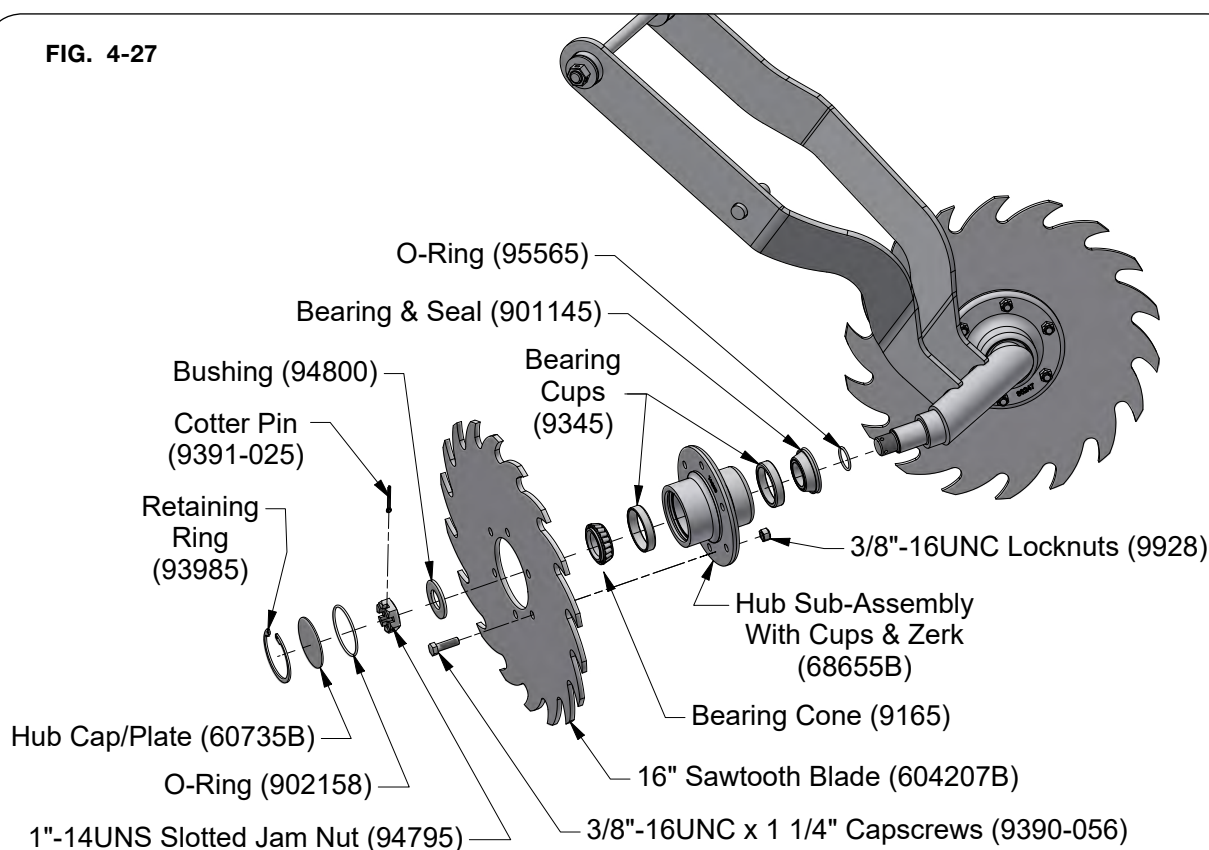
## Row Cleaner Wheel Hub Adjustment (continued)

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

### IMPORTANT

- Rotate coultter hub when torquing jam nut. Doing this will prevent flats from forming on bearings.
- h. Assemble slotted jam nut (94795) to spindle. While rotating hub, tighten nut to 40 Ft.-Lbs. DO NOT rotate hub again until step l.
  - i. Back-off slotted jam nut (94795) until it becomes loose without rotating hub.
  - j. Finger tighten slotted jam nut without rotating hub.
  - k. Tighten slotted jam nut to align the next notch with hole in the spindle.
  - l. Check for looseness in the hub. It should not wiggle. If it does, tighten the slotted jam nut one more slot and repeat this step.
  - m. Check hub rotation for excessive drag. There should be a slight resistance. If there is excessive drag, repeat procedures starting with step h.
  - n. Install cotter pin (9391-025). It should be tight to nut/washer.
  - o. Add grease through hub zerk until grease extends above the washer all around cavity.
  - p. Install O-ring (902158), hub cap (60735B), and retaining ring (93985).
  - q. Paint hub cap and retaining ring.

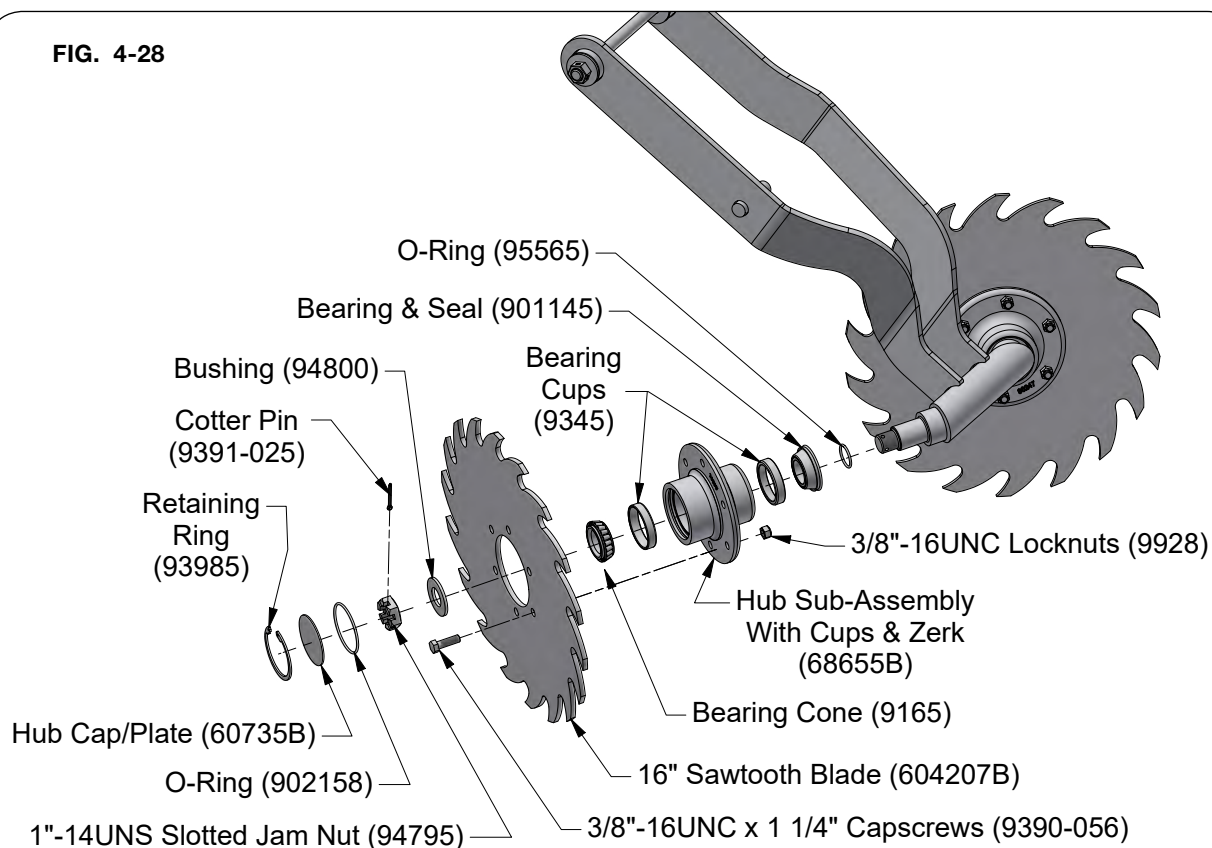
FIG. 4-27



### Row Cleaner Wheel Replacement

1. To replace a worn sawtooth blade (604207B), remove and save the 3/8"-16UNC locknuts (9928) and 3/8"-16UNC x 1 1/4" capscrews (9390-056). (FIG. 4-28)
2. Replace and reinstall sawtooth blade (604207B) and hardware. (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



- **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

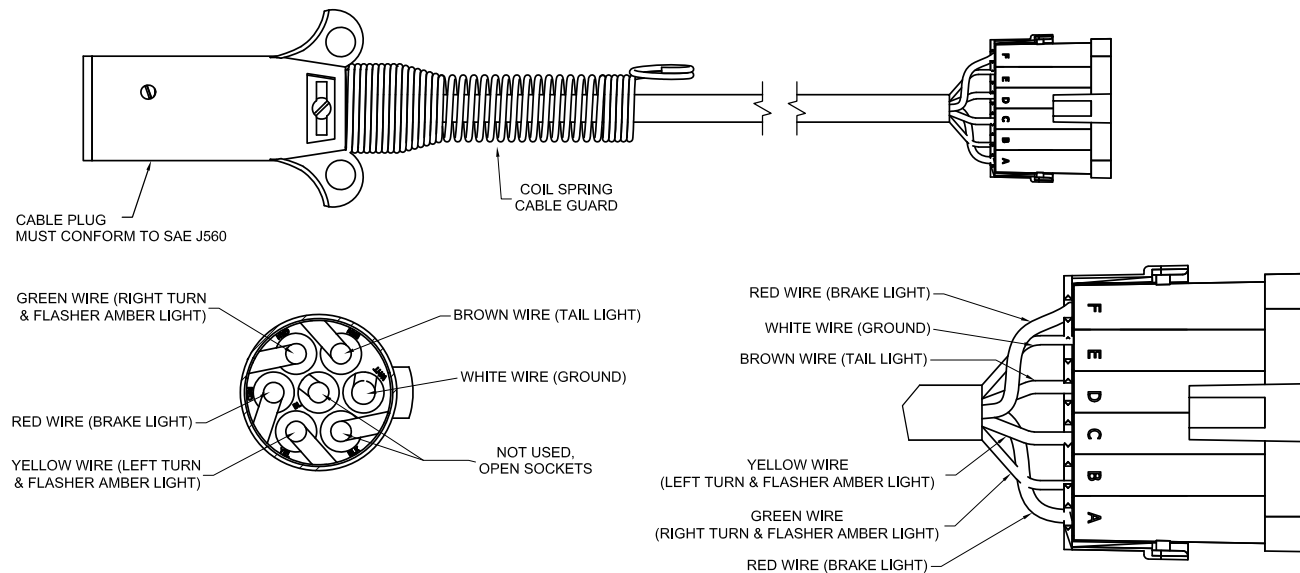
PROBABLE CAUSE	CORRECTION
<b>Poor Penetration</b>	
Frame is not level	See the OPERATION section "Leveling Frame" for instructions
Ground is too hard for hitch control setting	Adjust the hitch control position. See the OPERATION section "Load and Depth control"
Worn or dull tool points	Replace with new tool points
<b>Plugging</b>	
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
<b>Implement Running Crooked In Field</b>	
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"

## Troubleshooting (continued)

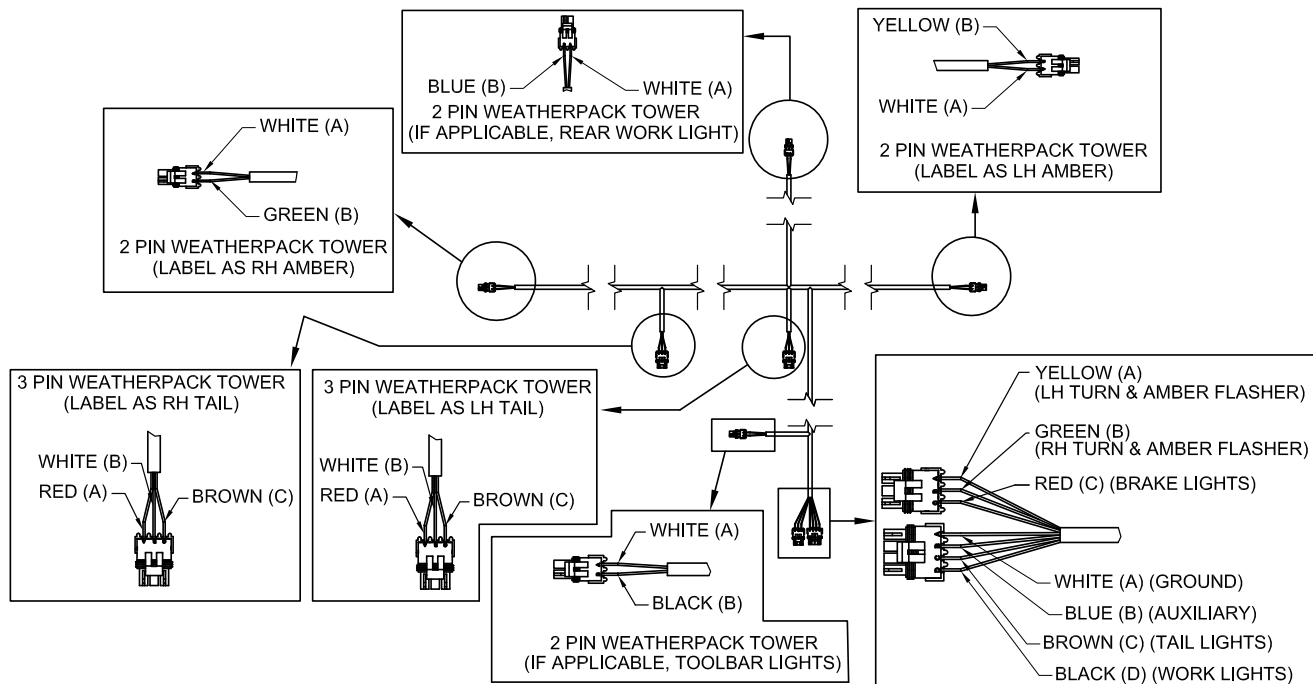
PROBABLE CAUSE	CORRECTION
<b>Shanks Not Resetting Into Ground After Tripping</b>	
Ground conditions hard or the unit is being operated very deep	While moving, raise Raptor slightly to reset, then lower and resume operation
<b>Excessive Soil Disturbance</b>	
Main frame not level, running downhill	Level 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 coulters angle or move coulters apart
Not enough sealing	Increase closing down pressure, increase coulters angle or move coulters closer
<b>Folding</b>	
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)



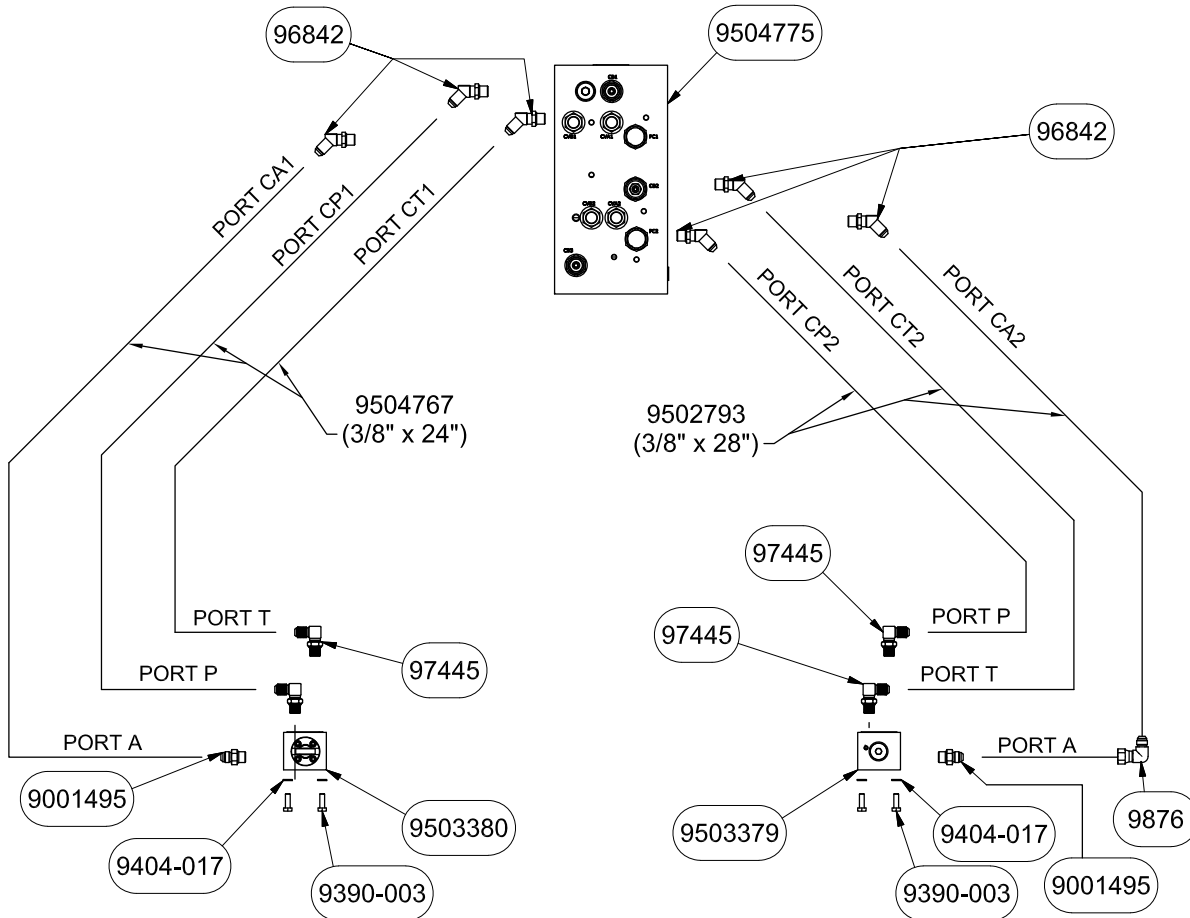
### Electrical Harness - Light 418" (44999)





## Schematics - Hydraulic (continued)

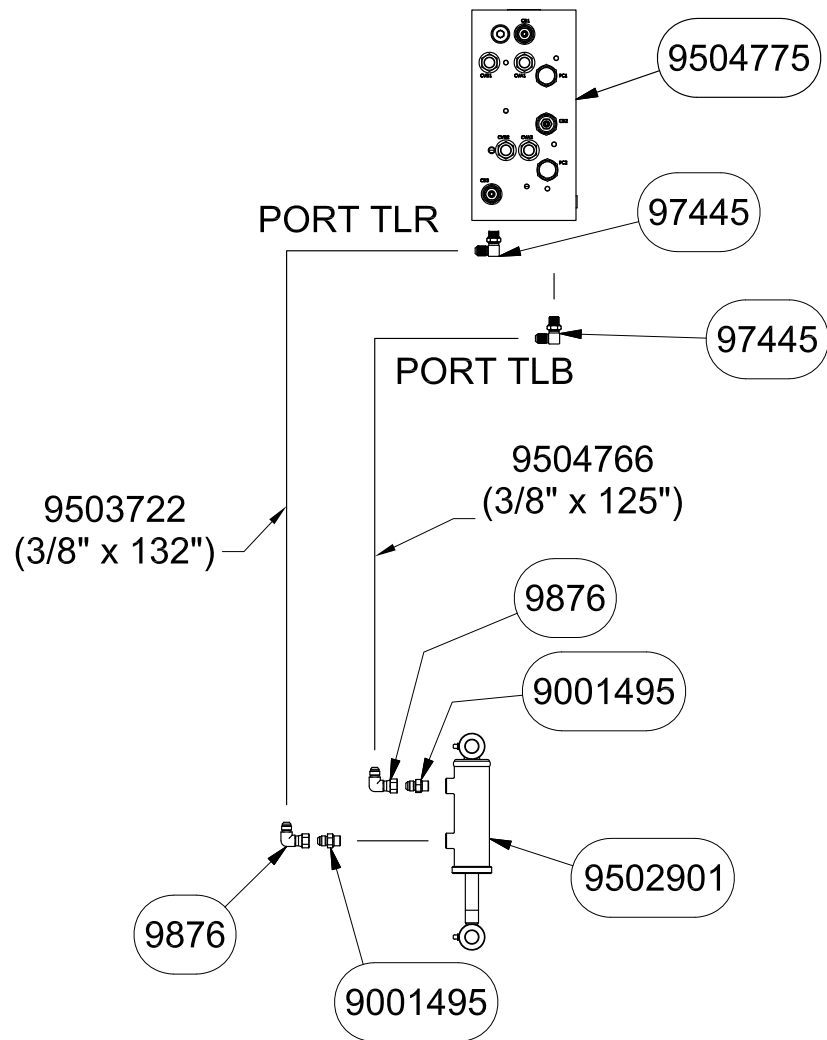
### Supply Valve Assembly To Sequence Valves





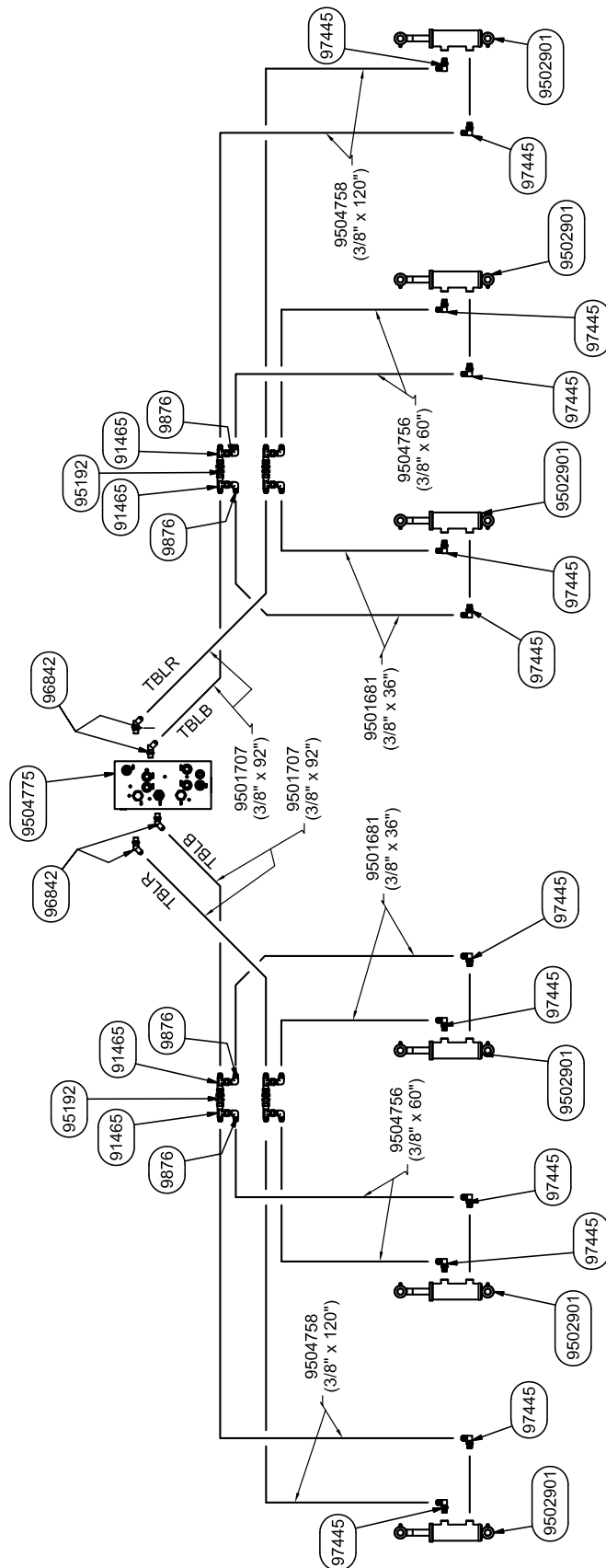
## Schematics - Hydraulic (continued)

### Supply Valve Assembly to Tongue Latch



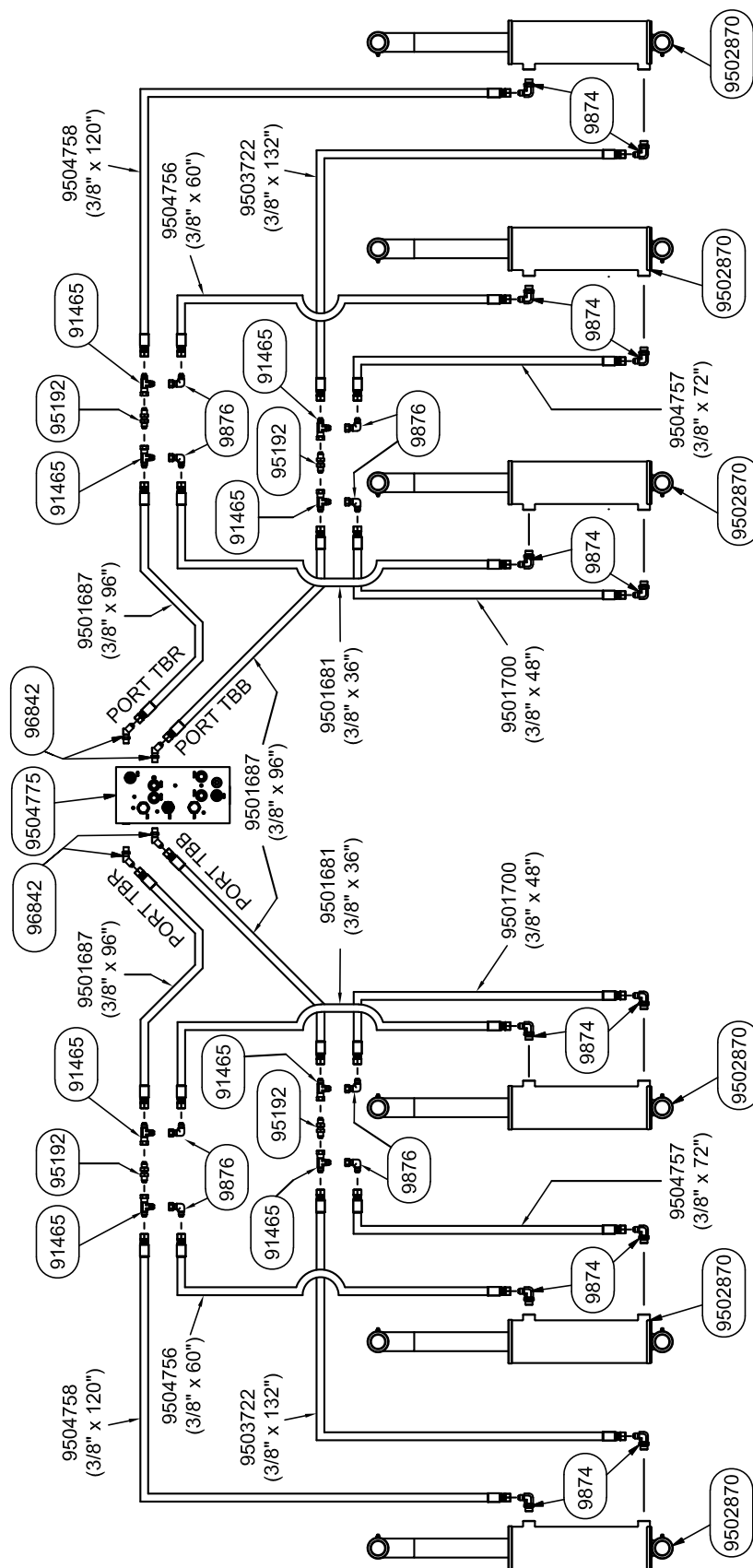
## Schematics - Hydraulic (continued)

## Supply Valve Assembly to Toolbar Latch



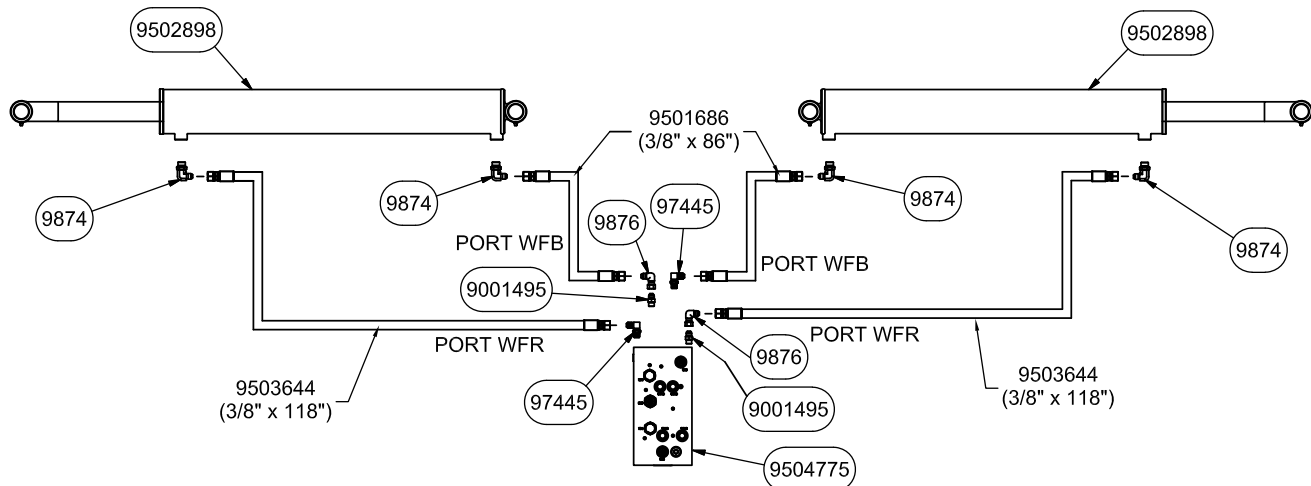
## Schematics - Hydraulic (continued)

### Supply Valve Assembly to Toolbar Fold



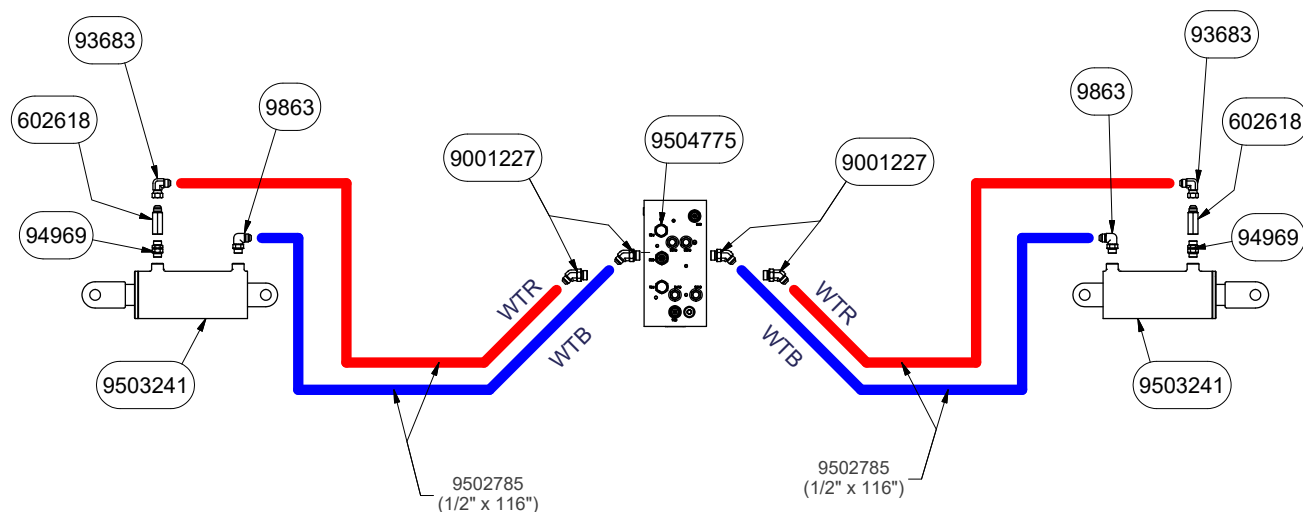
## Schematics - Hydraulic (continued)

### Supply Valve Assembly to Wings

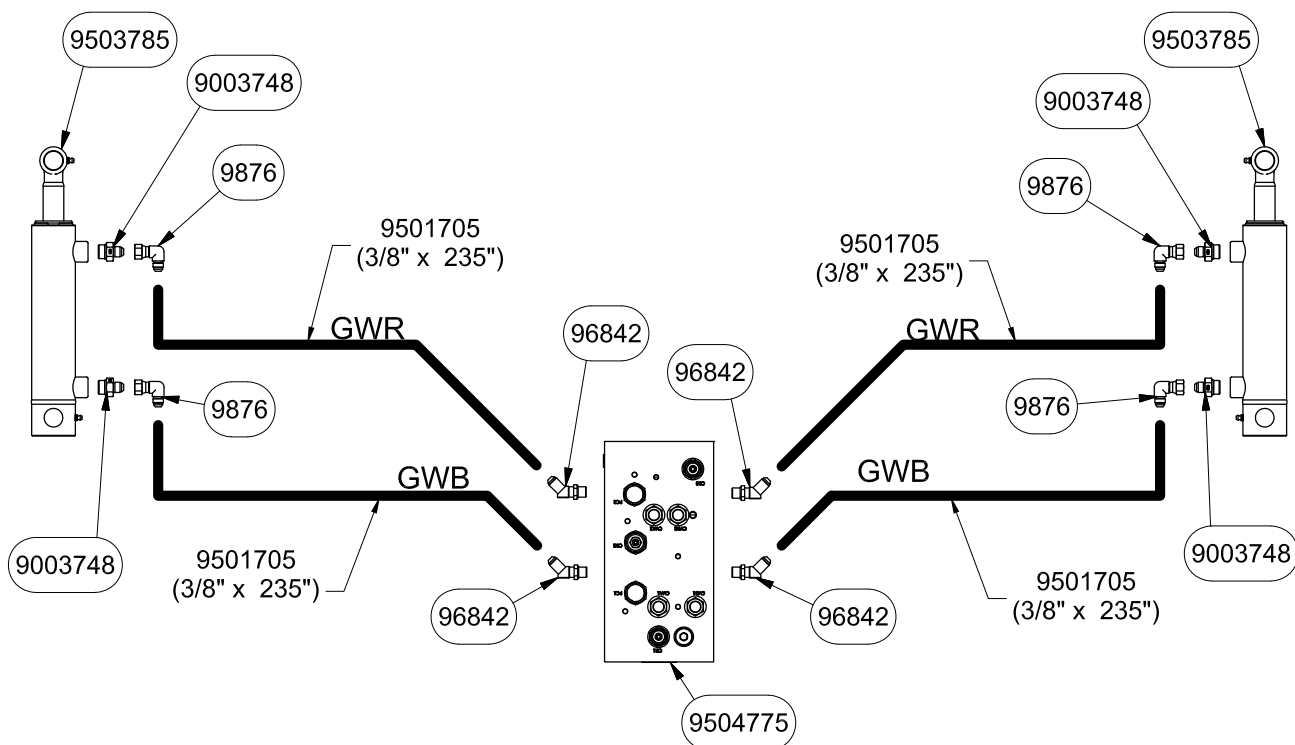


## Schematics - Hydraulic (continued)

### Supply Valve Assembly to Wing Tilt



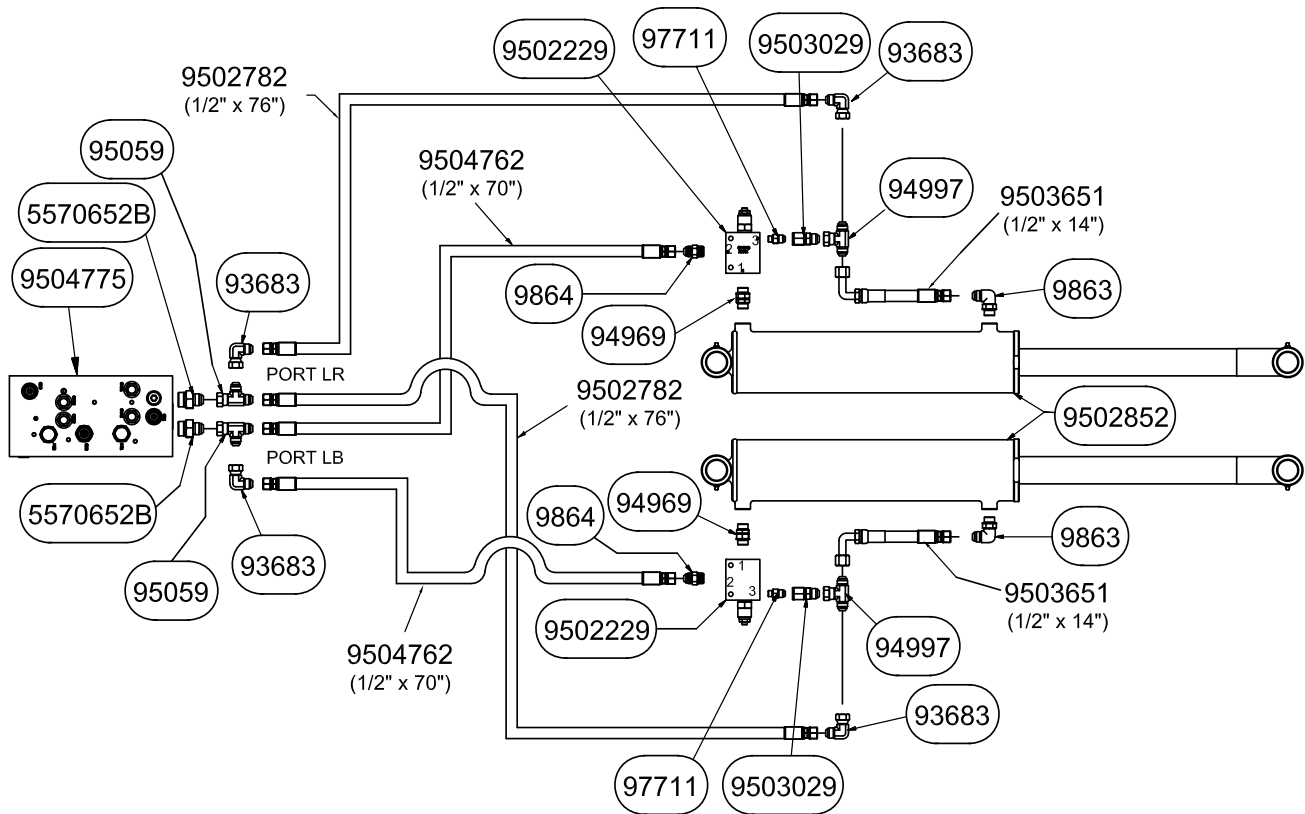
### Supply Valve Assembly to Gauge Wheels





## Schematics - Hydraulic (continued)

## Supply Valve Assembly to Parallel Link/Main Lift-Lower



### 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

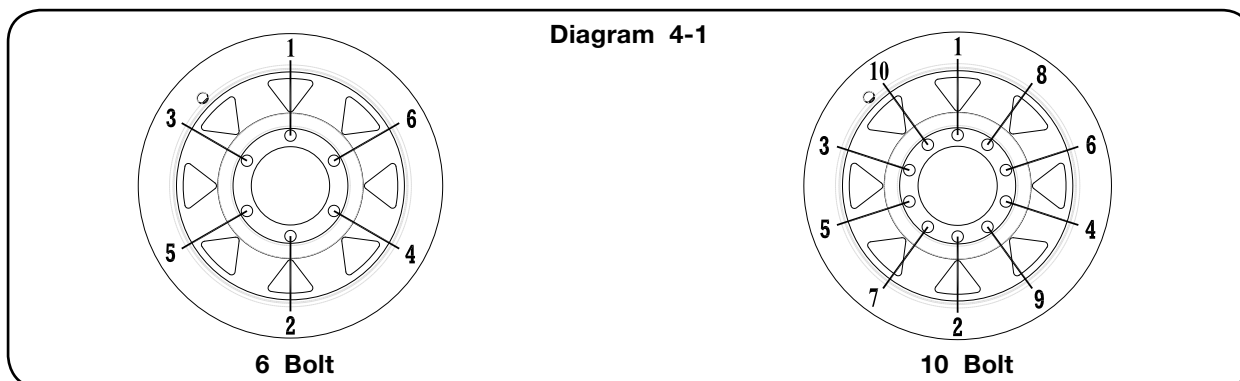
### Wheel Nut Torque

#### **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.



### 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](http://www.firestoneag.com)  
Phone 800-847-3364

Titan                [www.titan-intl.com](http://www.titan-intl.com)  
or                    Phone 800-USA-BEAR  
Goodyear           Fax 515-265-9301

Carlisle            [www.carlisletire.com](http://www.carlisletire.com)  
Phone 800-260-7959  
Fax 800-352-0075

Greenball           [www.greenball.com](http://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.

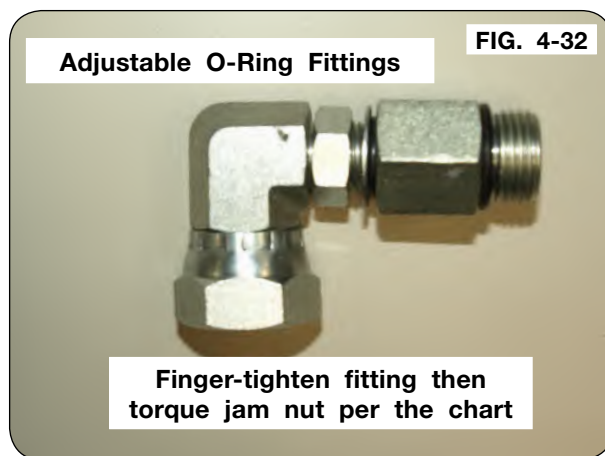
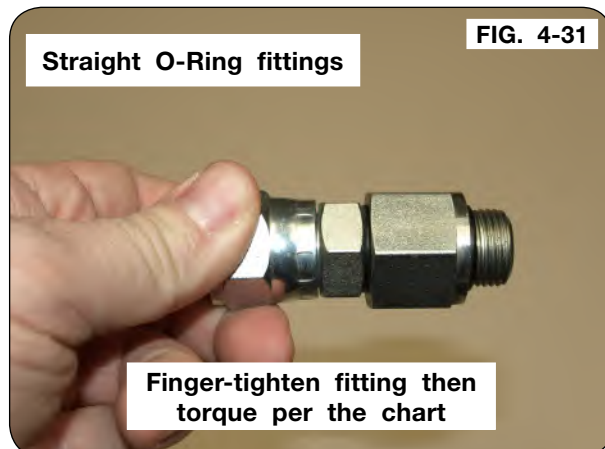
## Hydraulic Fittings - Torque and Installation

### 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

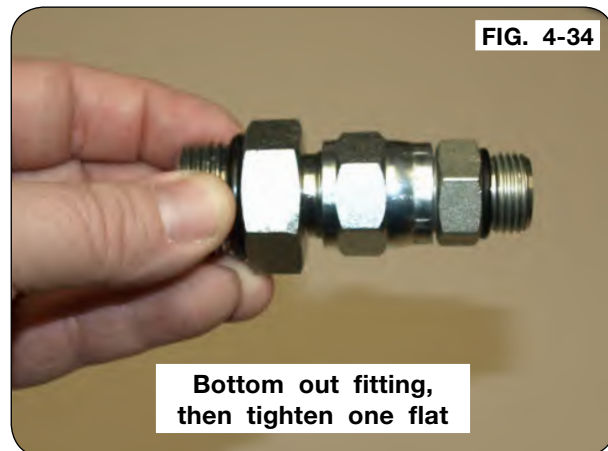
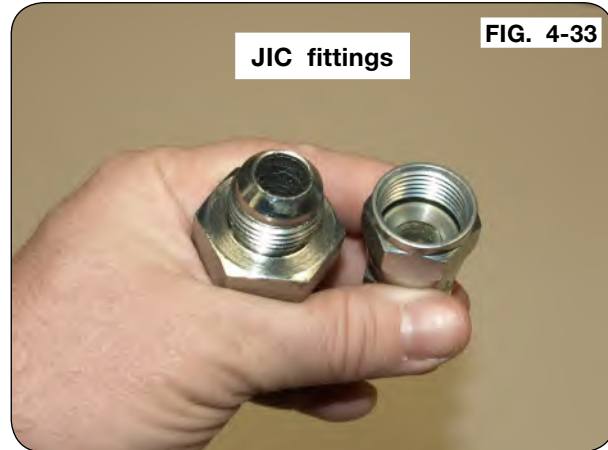


### Hydraulic Fittings - Torque and Installation (continued)

#### 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.



## **SECTION V**

# **Parts**

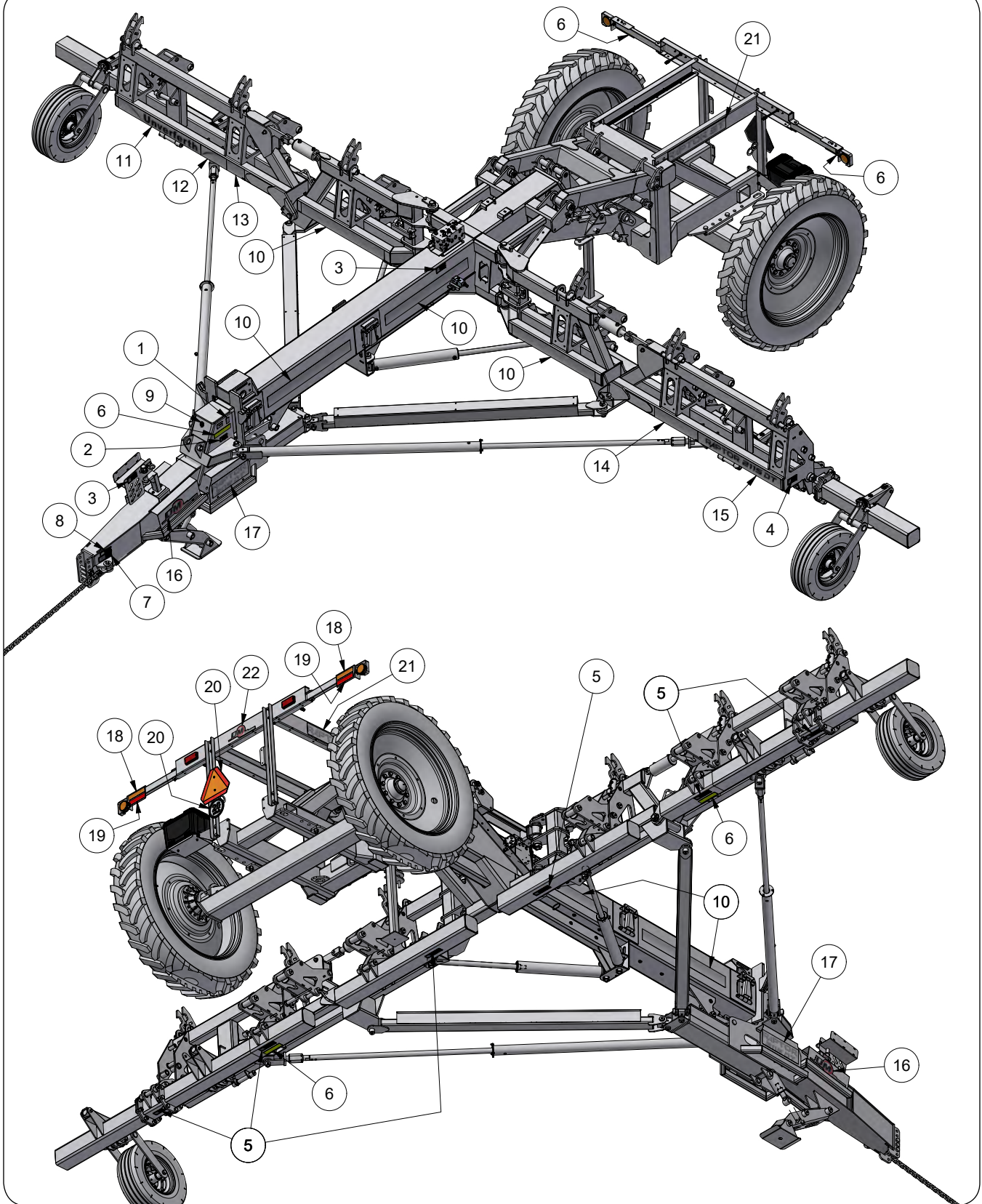
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# PULL-TYPE RAPTOR — Parts

## Decals

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



# PULL-TYPE RAPTOR — Parts

## Decals

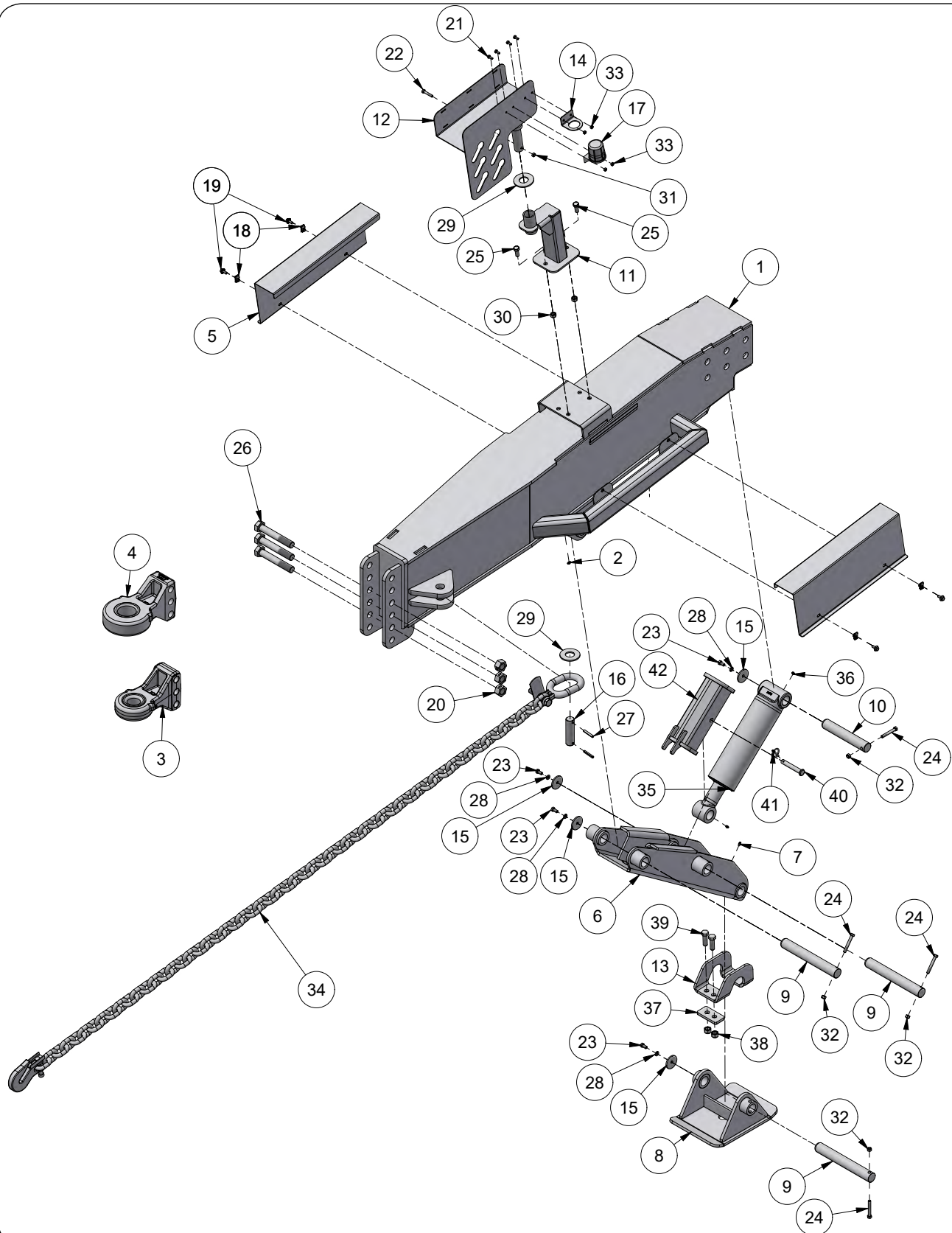
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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=	6	
7	94094	Decal, WARNING "Rising or Falling Tongue"	1	
8	97575	Decal, CAUTION "Transport Chain"	1	
9	9008715	Decal, SIS 20MPH	1	
	9008721	Decal, SIS 30KPH		
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	9505043	Decal, Model Raptor 2115 ST (5 1/4" x 46")	1	
	9505042	Decal, Model Raptor 2130 ST (5 1/4" x 46")		
	9505045	Decal, Model Raptor 2115 DT (5 1/4" x 46")		
	9505044	Decal, Model Raptor 2130 DT (5 1/4" x 46")		
	9505047	Decal, Model Raptor 2115 LT (5 1/4" x 46")		
	9505046	Decal, Model Raptor 2130 LT (5 1/4" x 46")		
16	9503731	Decal, UM Logo w/Text (6.2" x 20")	2	
17	9505037	Decal, Model Raptor 2115 ST (6.8" x 20")	2	
	9505036	Decal, Model Raptor 2130 ST (6.8" x 20")		
	9505039	Decal, Model Raptor 2115 DT (6.8" x 20")		
	9505038	Decal, Model Raptor 2130 DT (6.8" x 20")		
	9505041	Decal, Model Raptor 2115 LT (6.8" x 20")		
	9505040	Decal, Model Raptor 2130 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	
	9008714	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/](http://www.unverferth.com/parts/) for the most current parts listing.



# PULL-TYPE RAPTOR — Parts

## Tongue, Hitches, Jack, & Hose Holder Components

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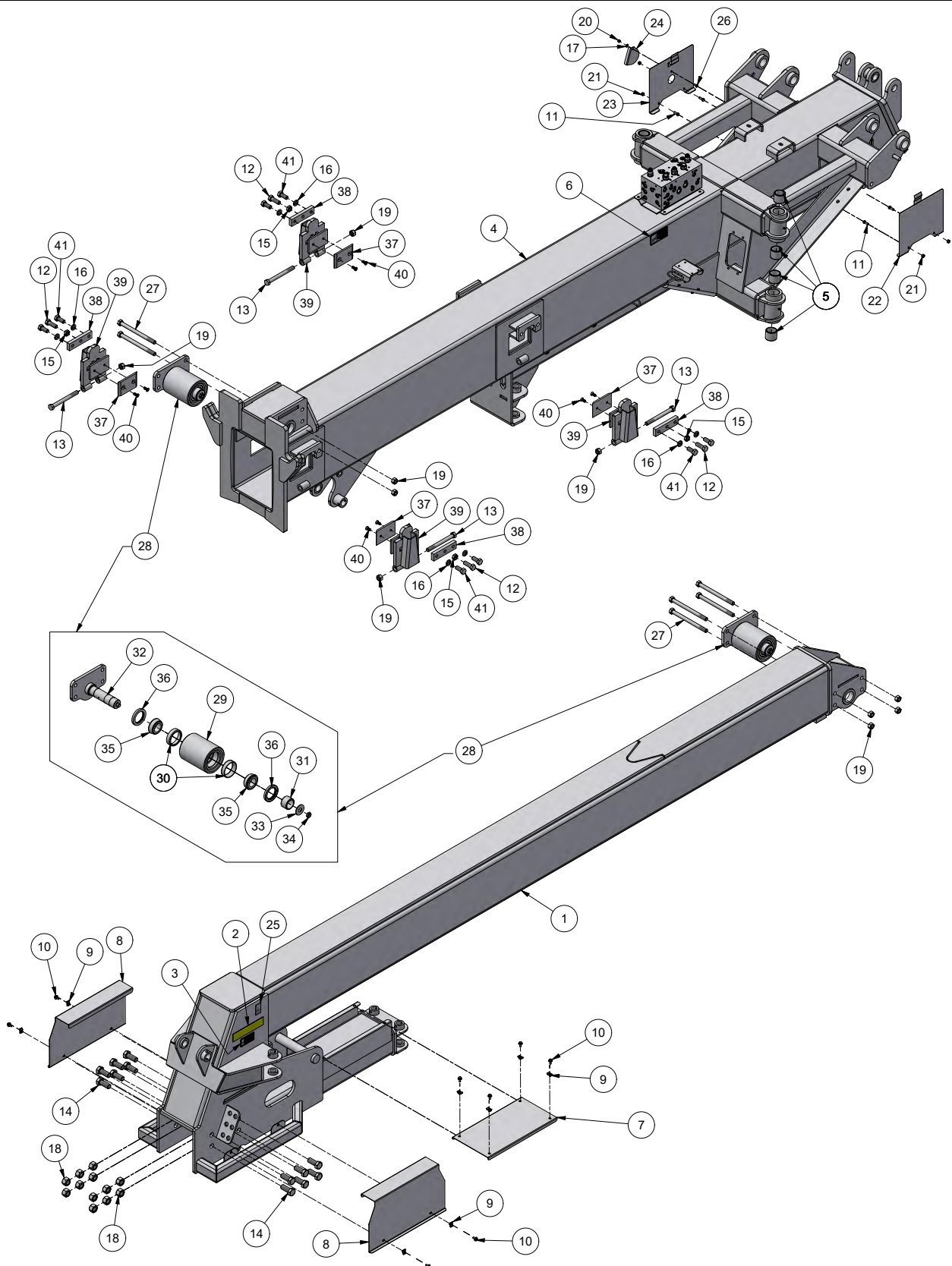
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	602251G	Toolbar Tongue Weldment (Green) w/Decals	1	Includes Item 2
	602251R	Toolbar Tongue Weldment (Red) w/Decals		
2	91160	Grease Zerk	1	
3	JAP3228	Ball Swivel Hitch, CAT4	1	
4	JAP3229	Ball Swivel Hitch, CAT5	1	
5	602471G	Side Panel Plate (Green)	2	
	602471R	Side 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/](http://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/](http://www.unverferth.com/parts/) for the most current parts listing.

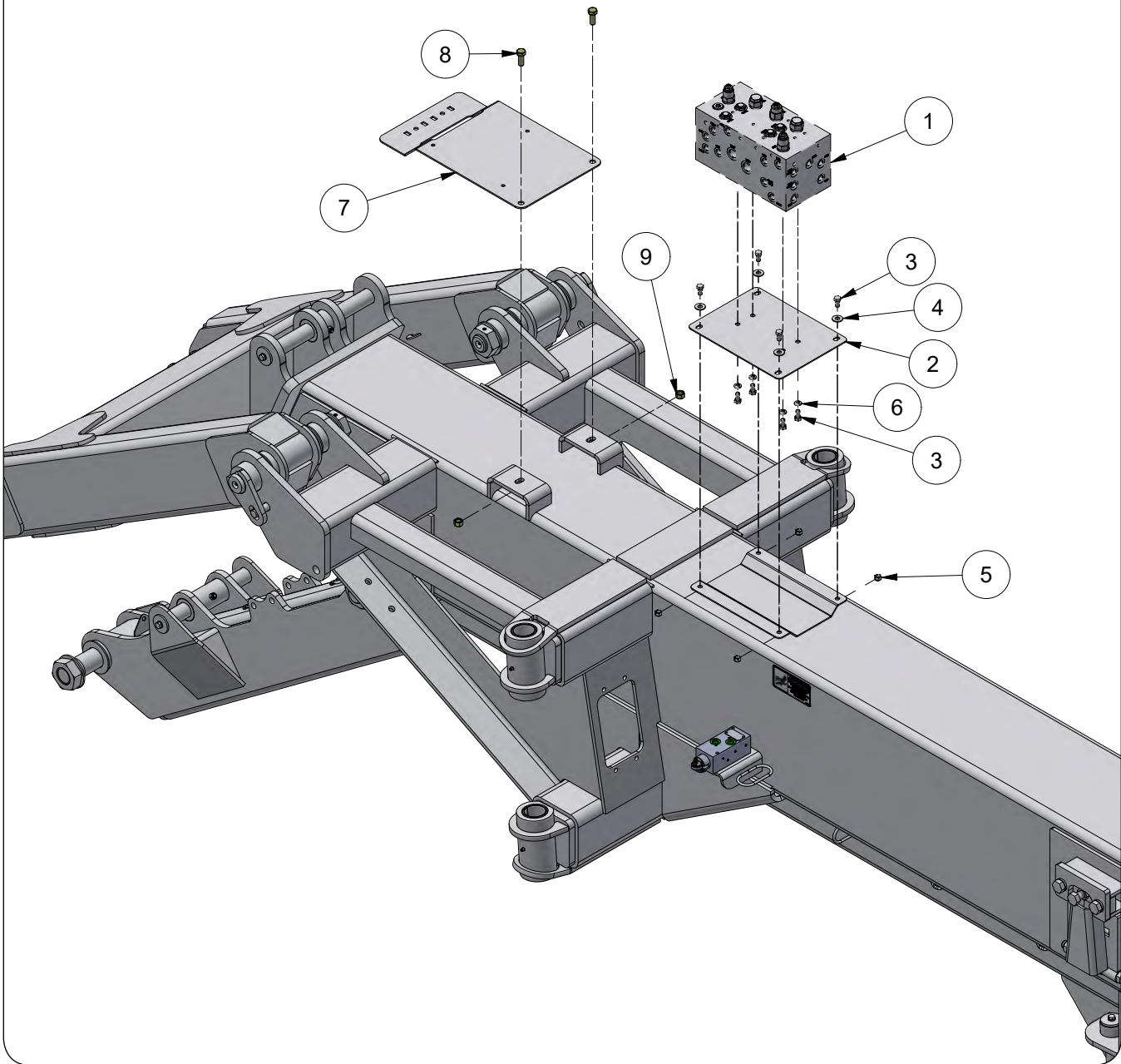
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	603459G	Tongue Extension Weldment (Green)	1	Includes Items 2, 3 & 25
	603459R	Tongue Extension Weldment (Red)		
2	9003127	Reflector, AMBER	2	
3	97961	Decal, WARNING "Read & Understand Manual..."	1	
4	603460G	Main Frame Weldment (Green)	1	Includes Items 5 & 6
	603460R	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/](http://www.unverferth.com/parts/) for the most current parts listing.



## PULL-TYPE RAPTOR — Parts

### Valve, Mounting Plate and Hardware Components

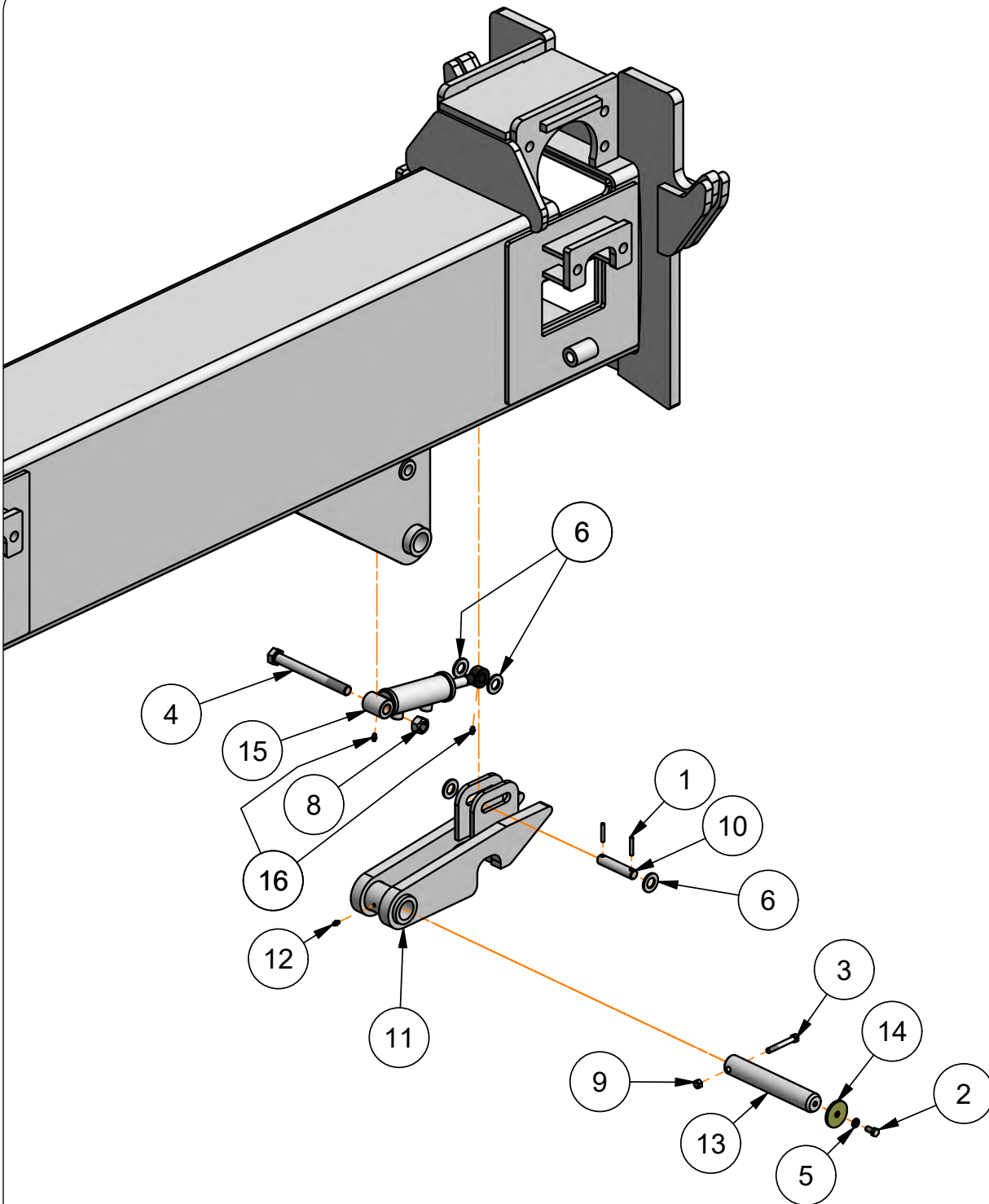
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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	
7	604422B	Plate w/Slots =Black=	1	
8	9390-100	Capscrew, 1/2"-13UNC x 1 1/4" G5	2	
9	9800	Locknut/Top, 1/2"-13UNC	2	

## PULL-TYPE RAPTOR — Parts

### Latch Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



## PULL-TYPE RAPTOR — Parts

### Latch Components

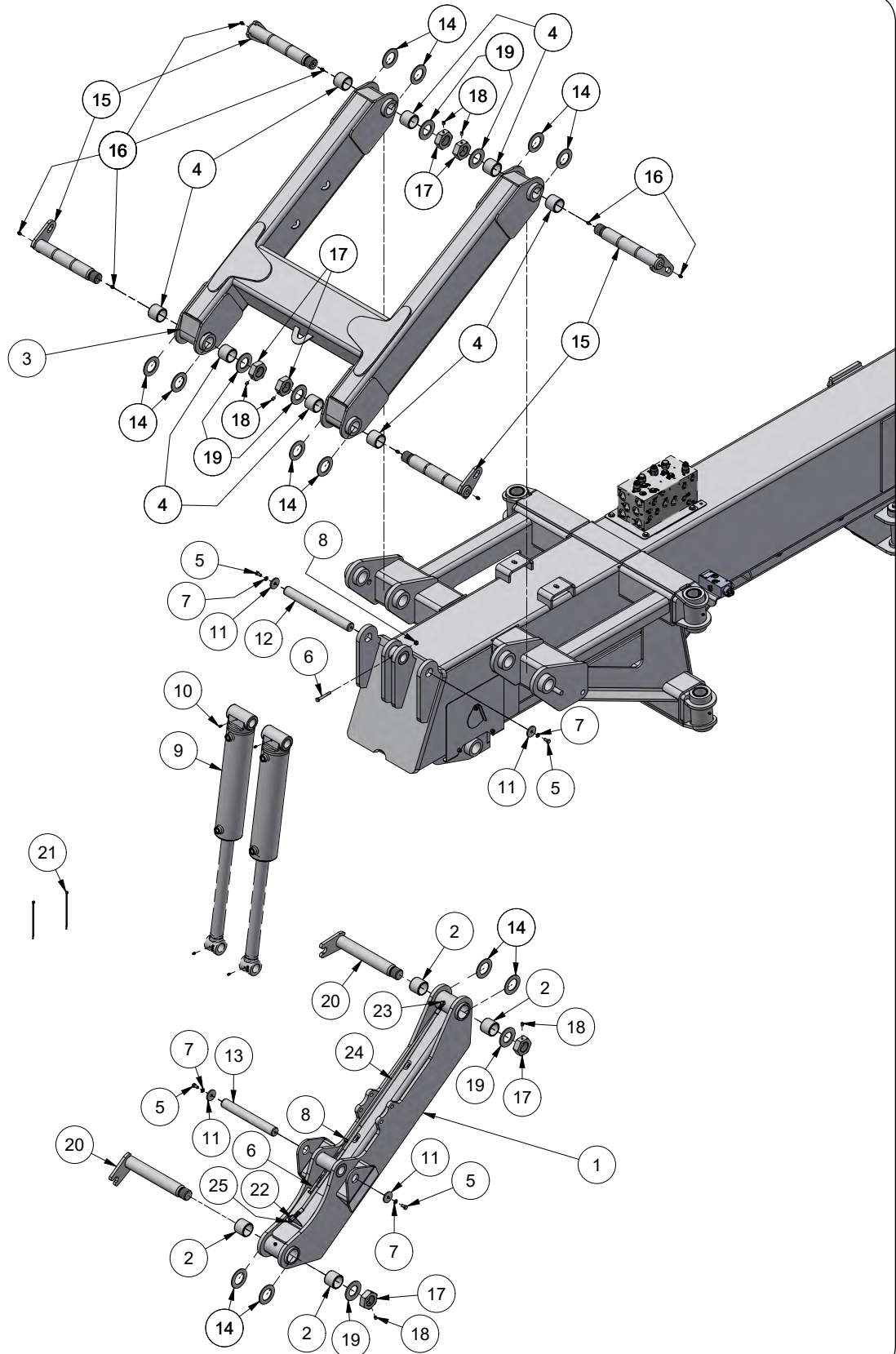
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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/](http://www.unverferth.com/parts/) for the most current parts listing.



# PULL-TYPE RAPTOR — Parts

## Parallel Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

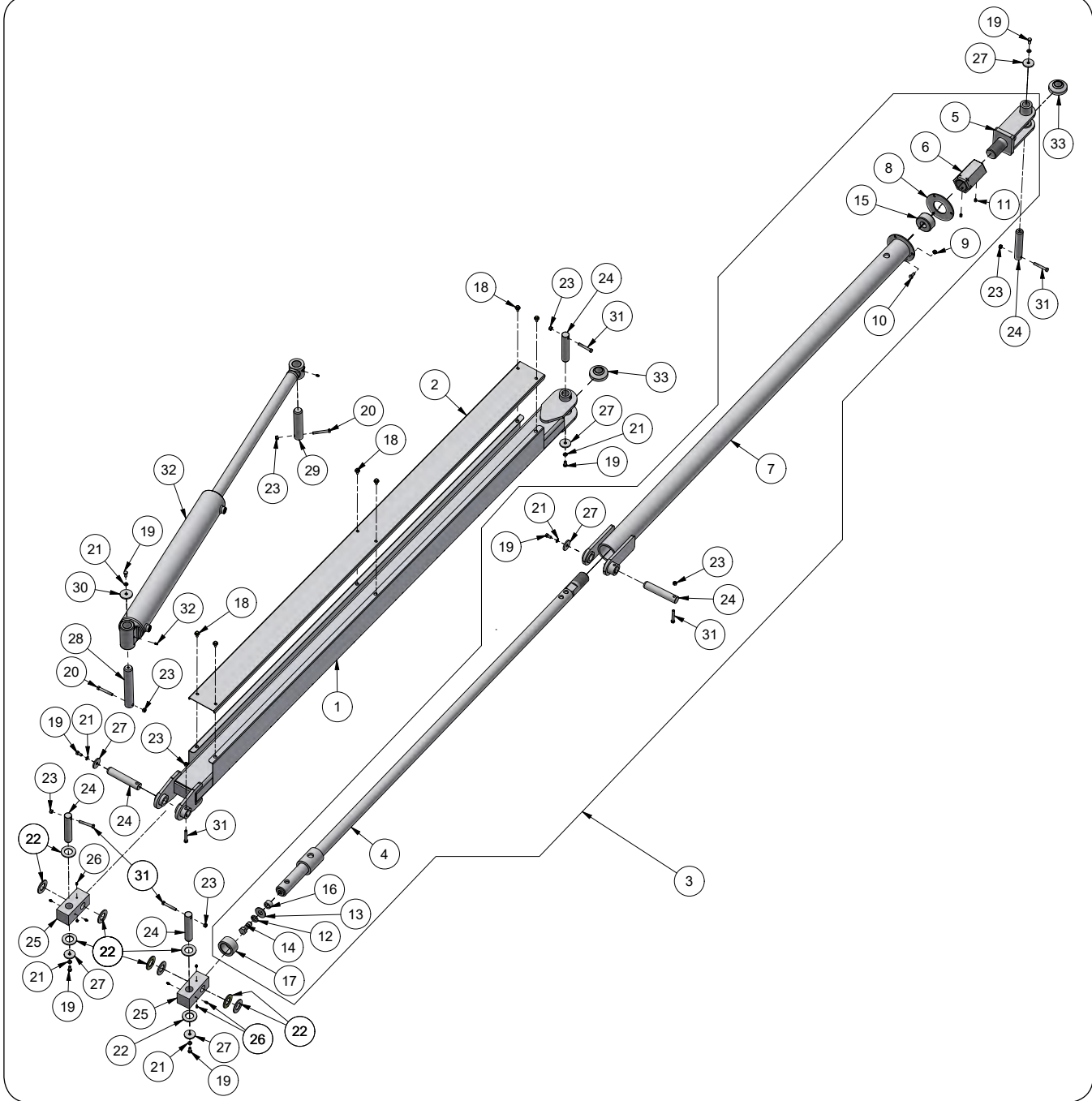
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	601971G	Lower Parallel Arm Weldment (Green)	1	Includes Item 2
	601971R	Lower Parallel Arm Weldment (Red)		
2	9504245	Spring Tension Bushing, 2.383" OD x 2.030" ID x 2"	4	
3	601977G	Upper Parallel H-Frame Weldment (Green)	1	Includes Item 4
	601977R	Upper Parallel 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
	9504769	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	
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

## Truss Components (Main Frame To Wings)

Please visit [www.unverferth.com/parts/](http://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/](http://www.unverferth.com/parts/) for the most current parts listing.

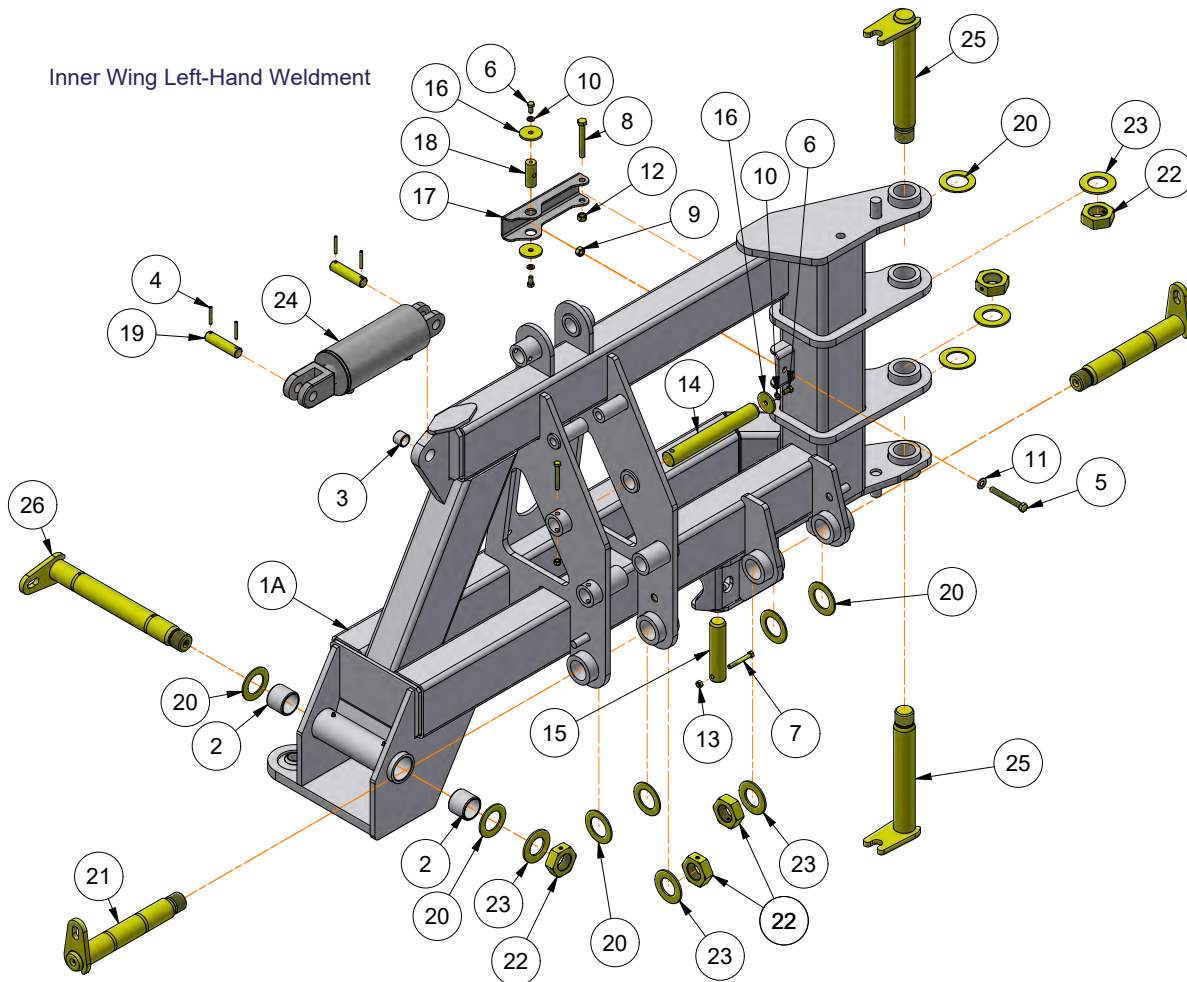
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	602220G	Truss Weldment (Green)	2	
	602220R	Truss Weldment (Red)		
2	602418G	Panel (Green)	2	
	602418R	Panel (Red)		
3	602750G	Truss Assembly (Green)	2	
	602750R	Truss Assembly (Red)		
4	602744G	Truss Weldment Inner (Green)	1	
	602744R	Truss Weldment Inner (Red)		
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 Zerk	4	
26	91160	Grease Zerk	8	
27	601264	Washer, 1 7/8" OD x 0.44" ID (Stainless Steel)	20	
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	
	9504769	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

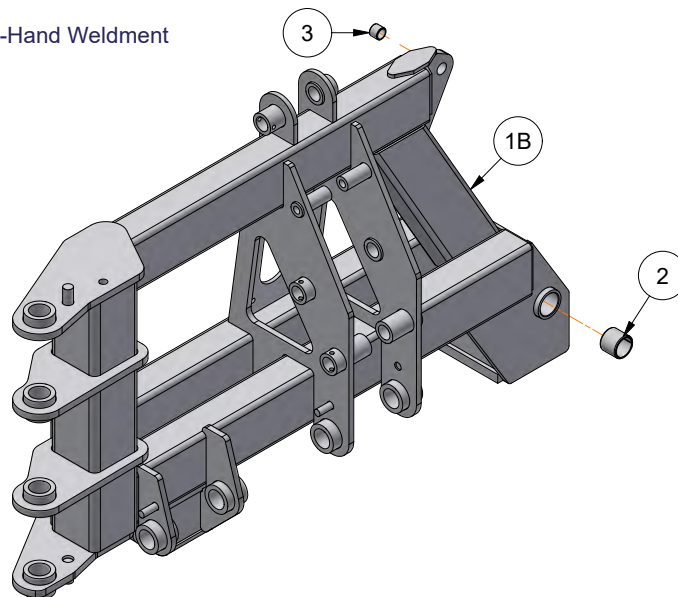
## Inner Wing Components

Please visit [www.unverferth.com/parts/](http://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

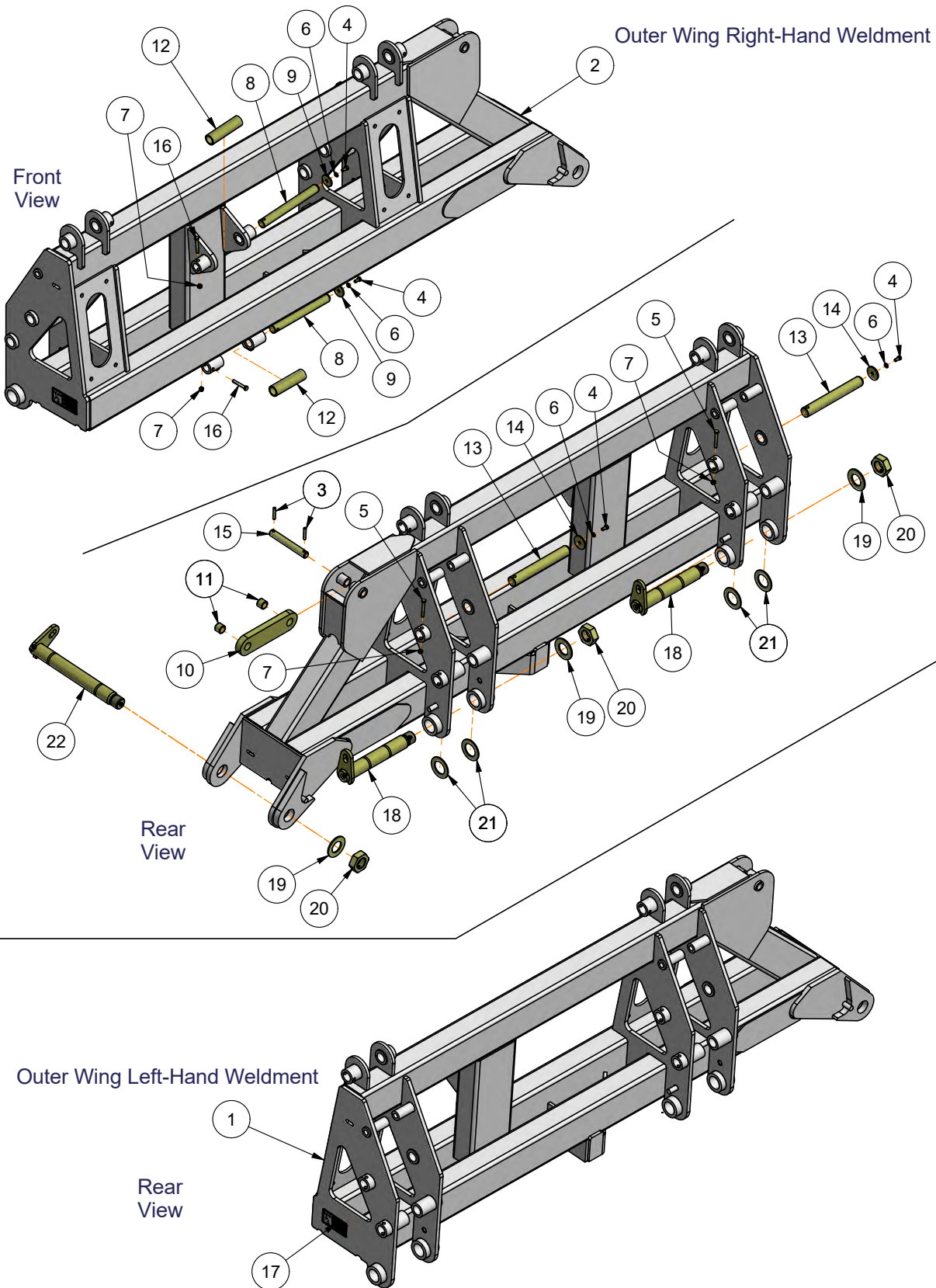
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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"	4	
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	
	9504125	Seal Kit	-	
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/](http://www.unverferth.com/parts/) for the most current parts listing.



# PULL-TYPE RAPTOR — Parts

## Outer Wing Components

Please visit [www.unverferth.com/parts/](http://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	
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	

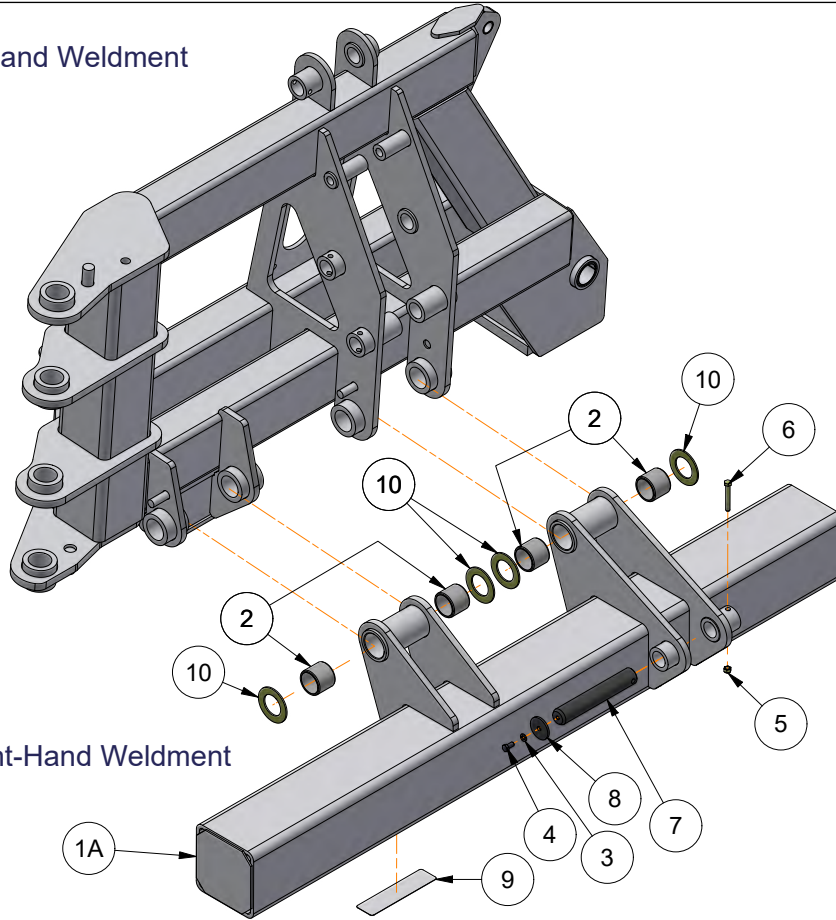


## PULL-TYPE RAPTOR — Parts

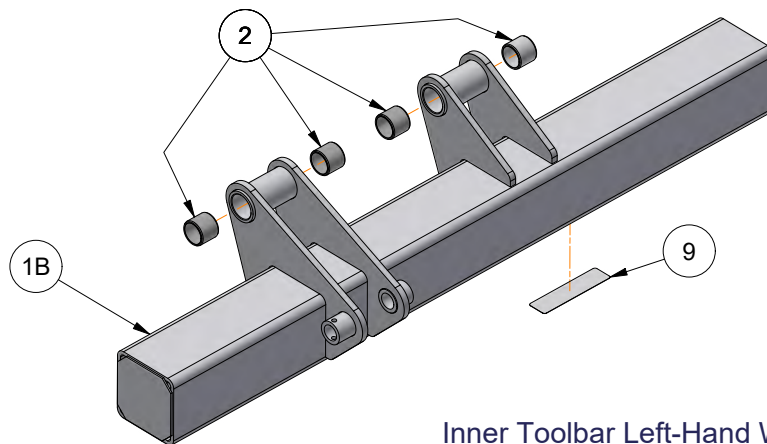
### Inner Toolbar Components

Please visit [www.unverferth.com/parts/](http://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

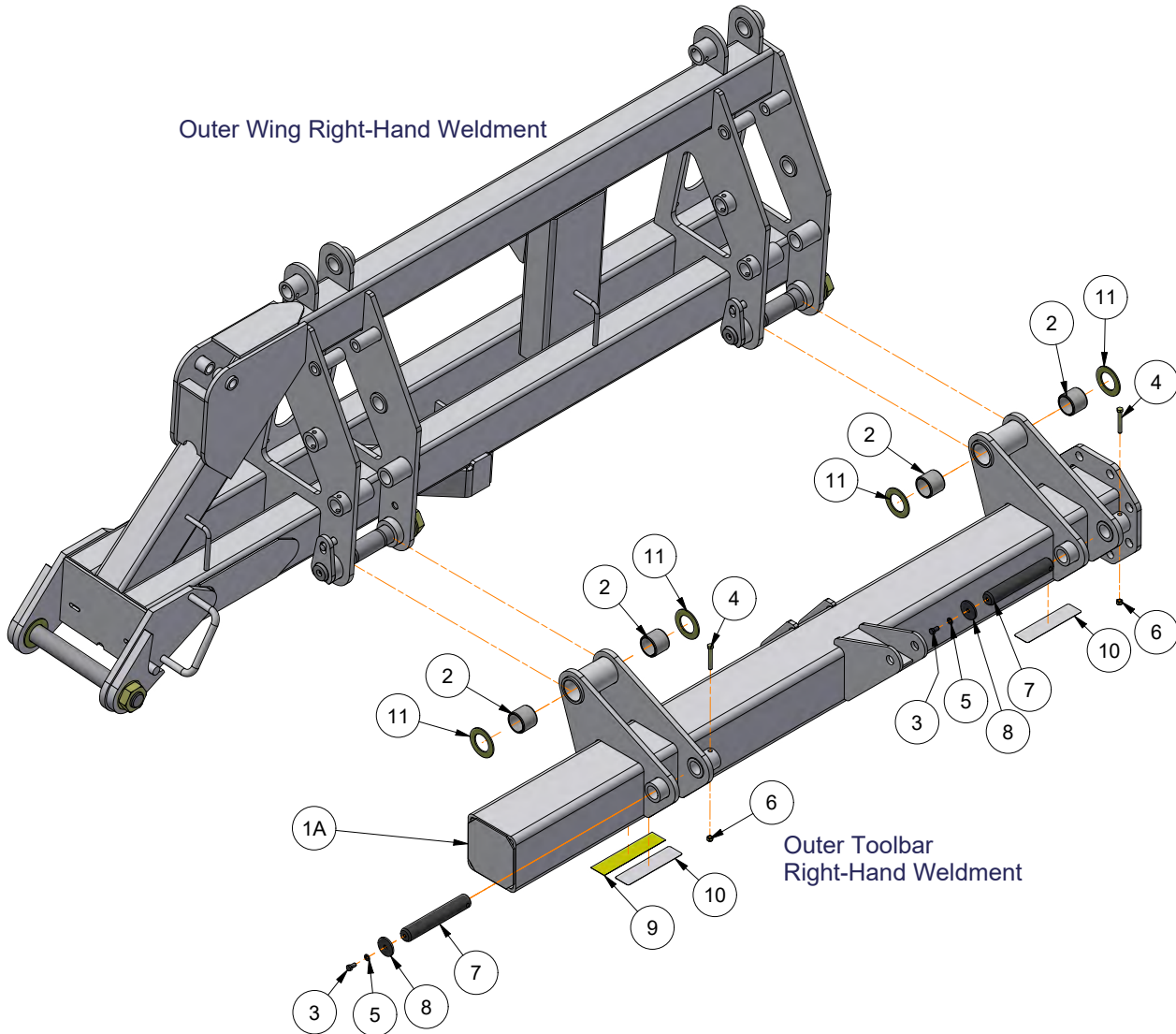
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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	

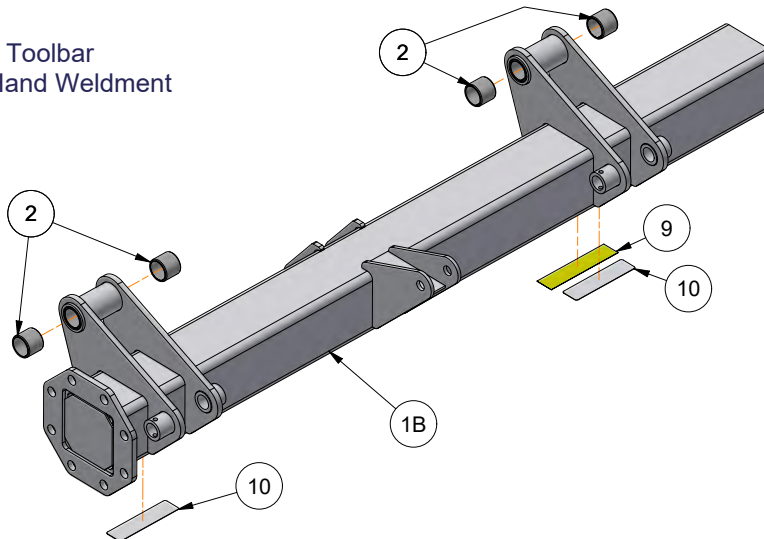
# PULL-TYPE RAPTOR — Parts

## Outer Toolbar Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



Outer Toolbar  
Left-Hand Weldment



## PULL-TYPE RAPTOR — Parts

### Outer Toolbar Components

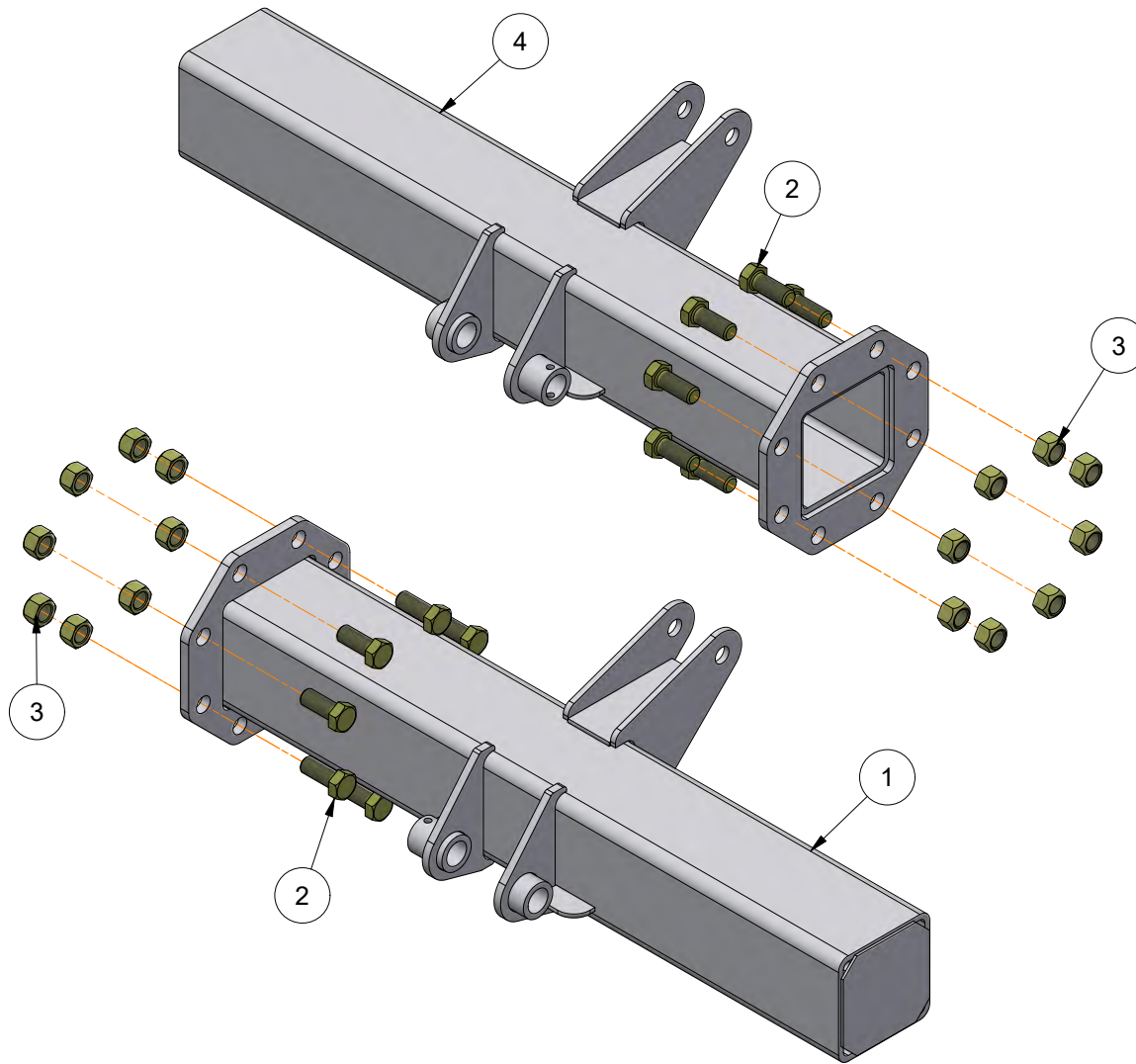
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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/](http://www.unverferth.com/parts/) for the most current parts listing.



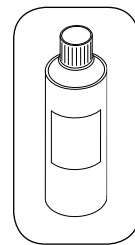
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	604389G	Toolbar Extension Assembly =Green=	1	Includes Items 1-3
	604389R	Toolbar Extension Assembly =Red=		
1	604387G	Toolbar Extension LH Weldment =Green=	1	
	604387R	Toolbar Extension LH Weldment =Red=		
2	9390-185	Capscrew, 1"-8UNC x 2 1/2" G5	16	
3	9663	Locknut, 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/](http://www.unverferth.com/parts/) for the most current parts listing.

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

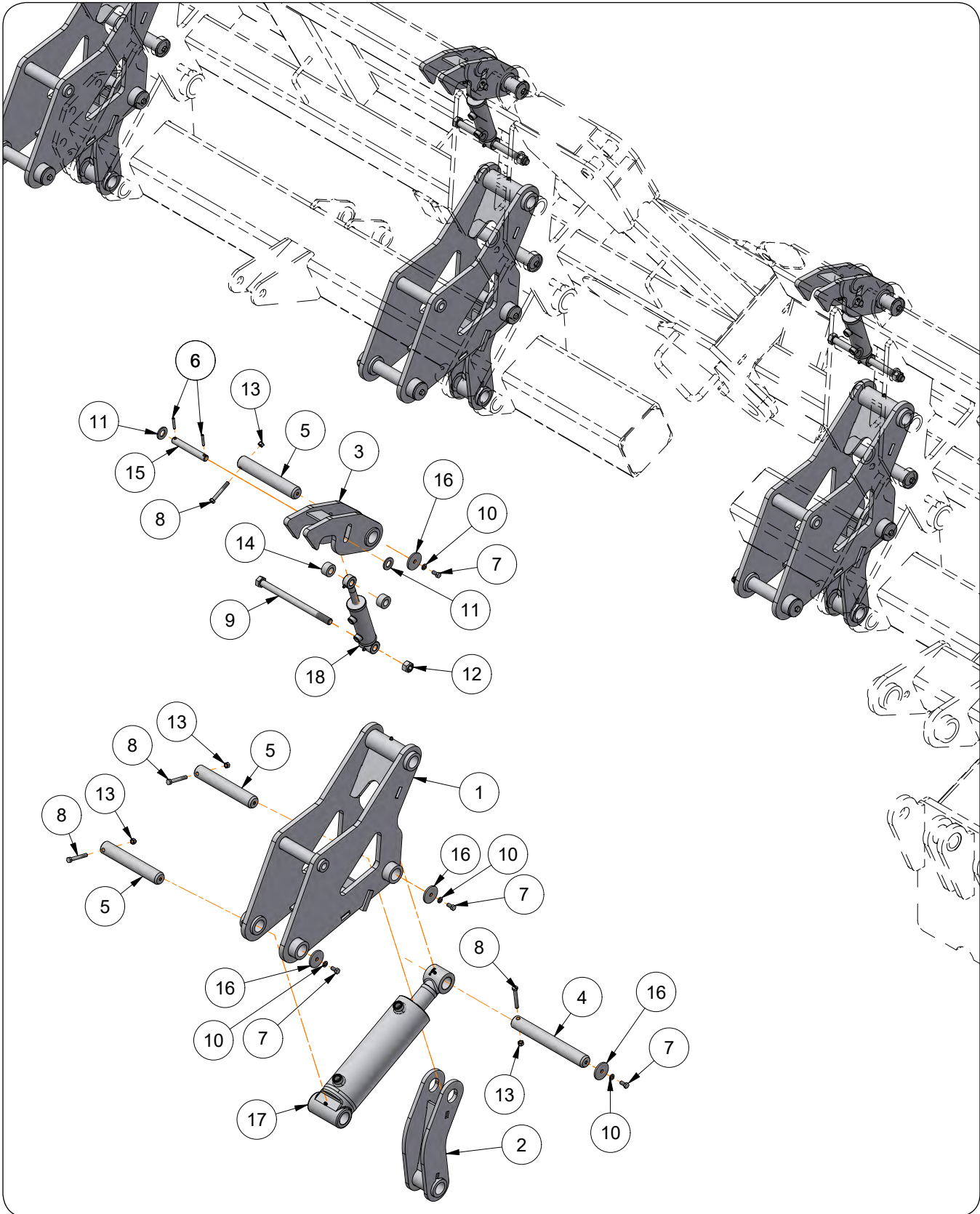




## PULL-TYPE RAPTOR — Parts

### Toolbar Fold and Latch Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



## PULL-TYPE RAPTOR — Parts

### Toolbar Fold and Latch Components

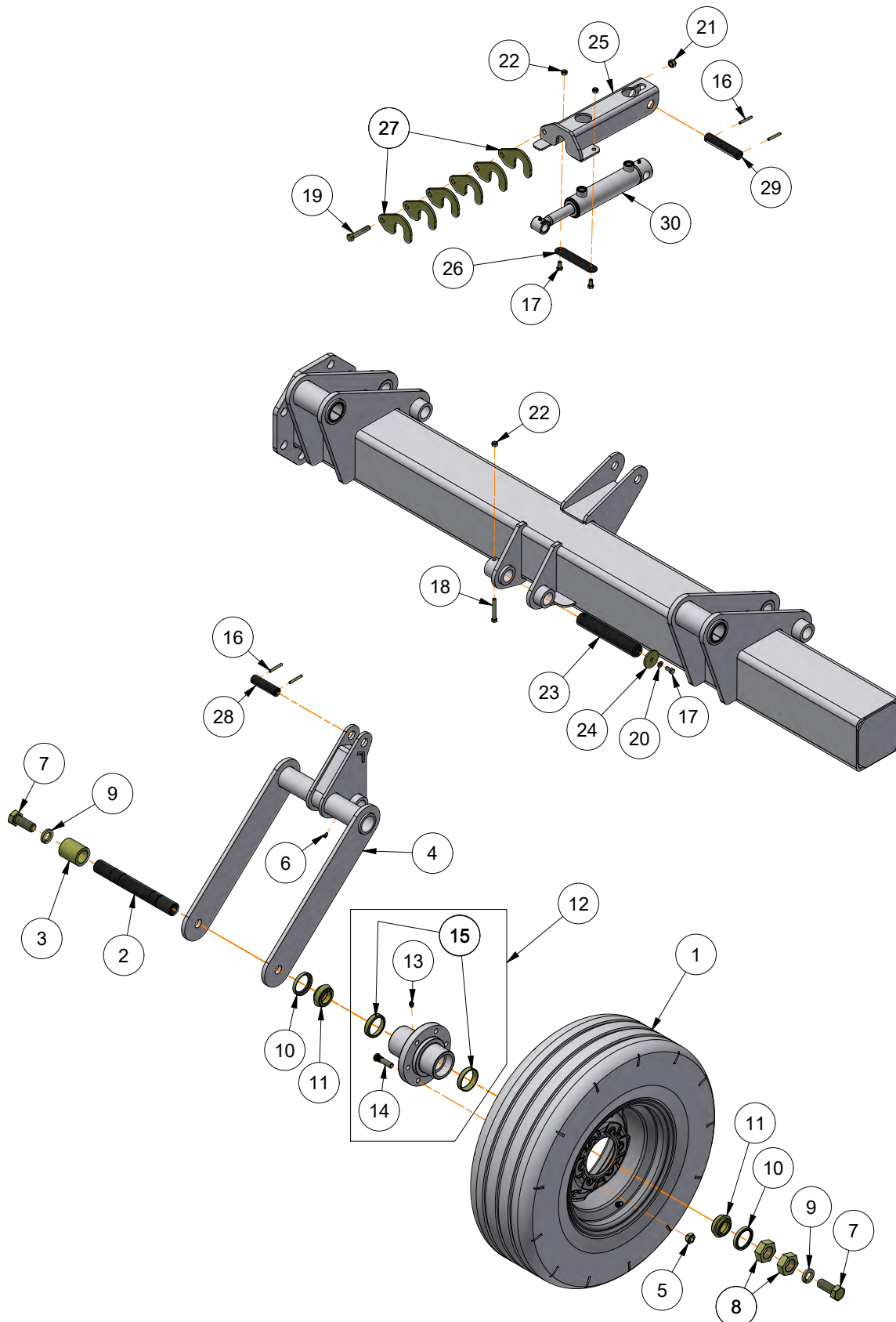
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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/](http://www.unverferth.com/parts/) for the most current parts listing.



# PULL-TYPE RAPTOR — Parts

## Gauge Wheel Components

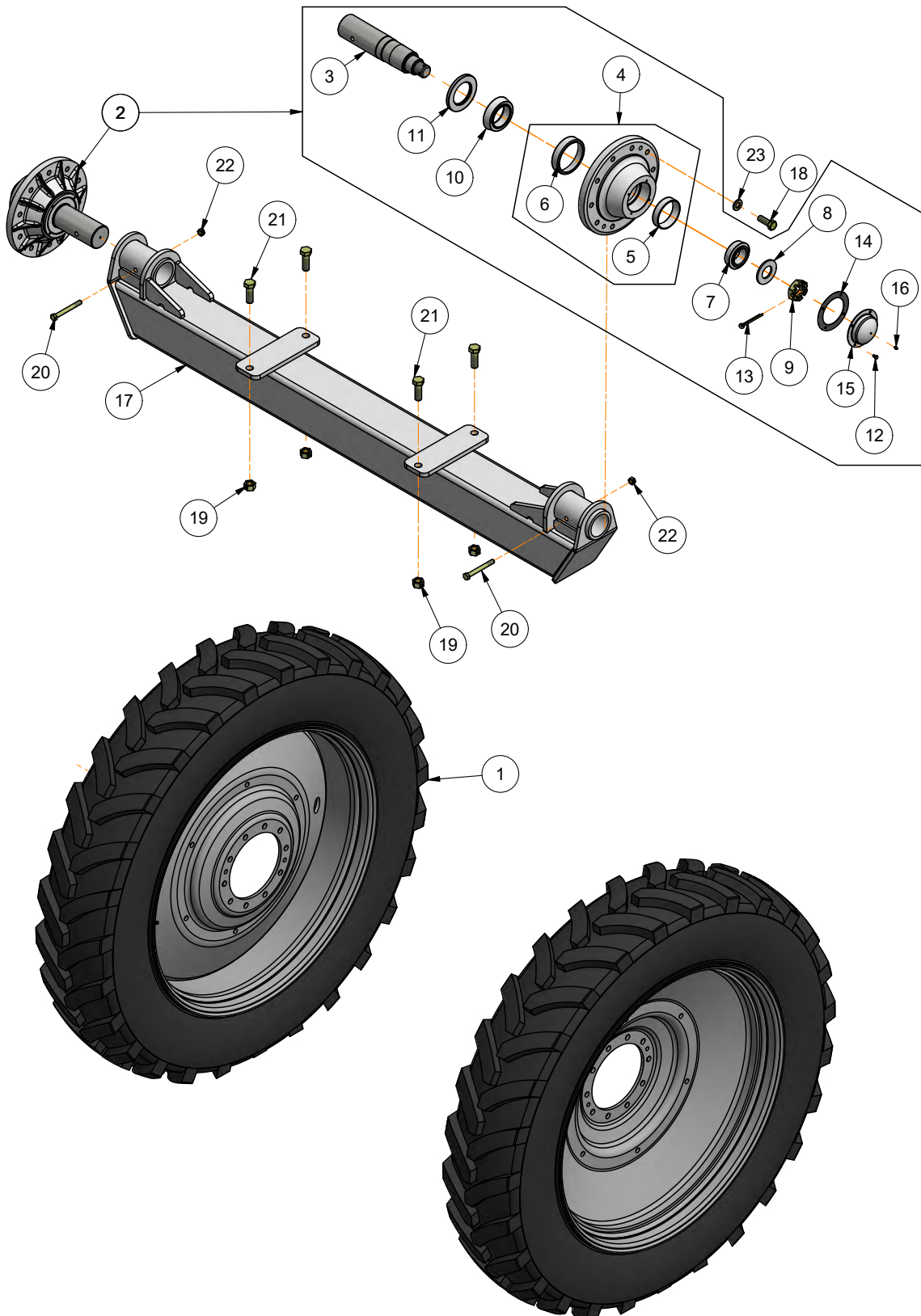
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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/](http://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/](http://www.unverferth.com/parts/) for the most current parts listing.

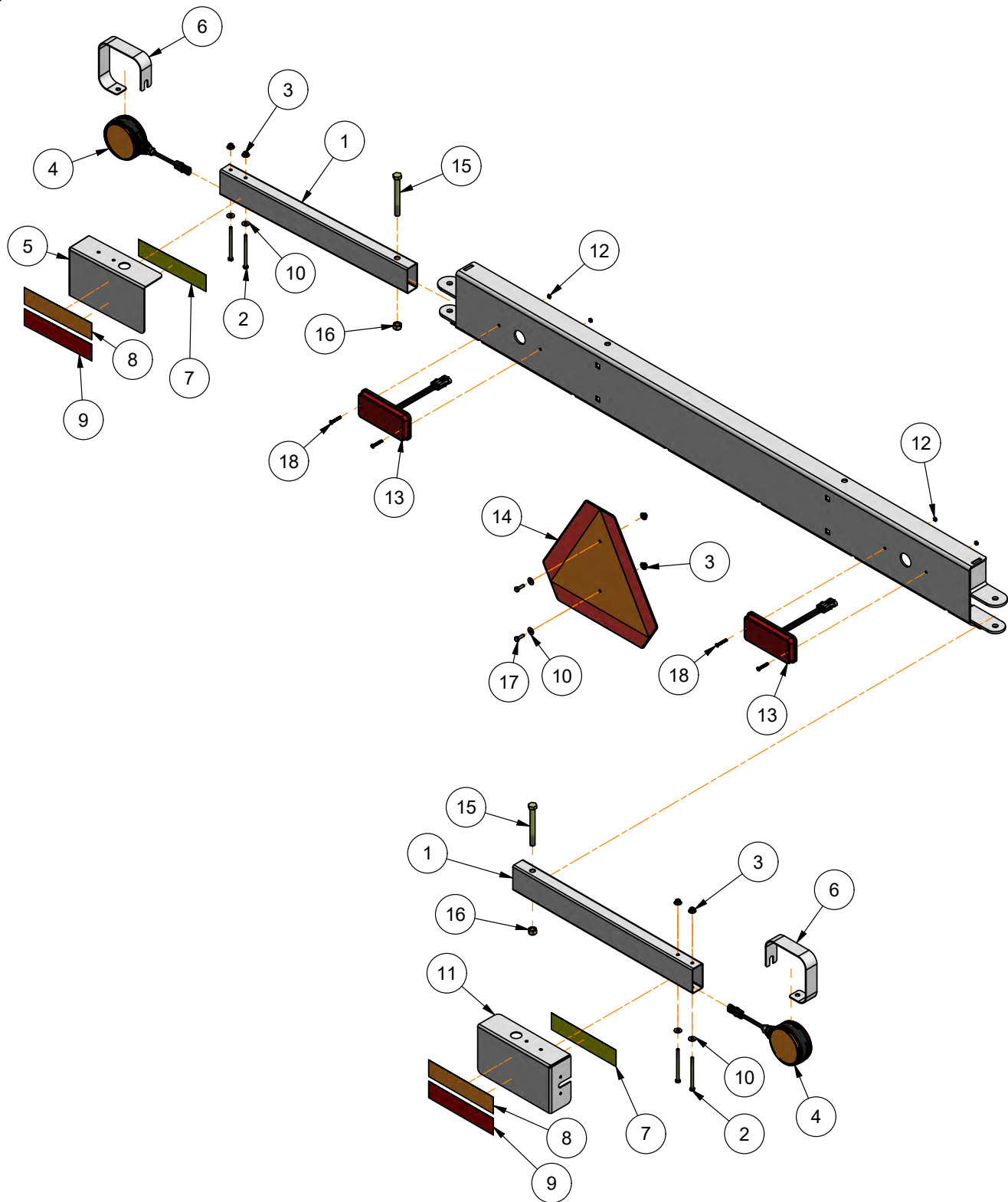
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	16477SM/902519	Wheel & Tire Assembly (Tire TL380/90R46MT)	2	
	16477SM	13" x 46" Formed Plate Wheel	2	
	93300	Valve Stem	2	
2	401593B	Hub & Spindle Assembly (Black)	2	Includes Items 3-16
3	401580	Spindle	2	
4	401144B	Hub Sub Assembly (Black)	2	Includes items 5-6
5	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	286171B	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/](http://www.unverferth.com/parts/) for the most current parts listing.



## PULL-TYPE RAPTOR — Parts

### Tillage Only Cart — Lighting and SMV Components

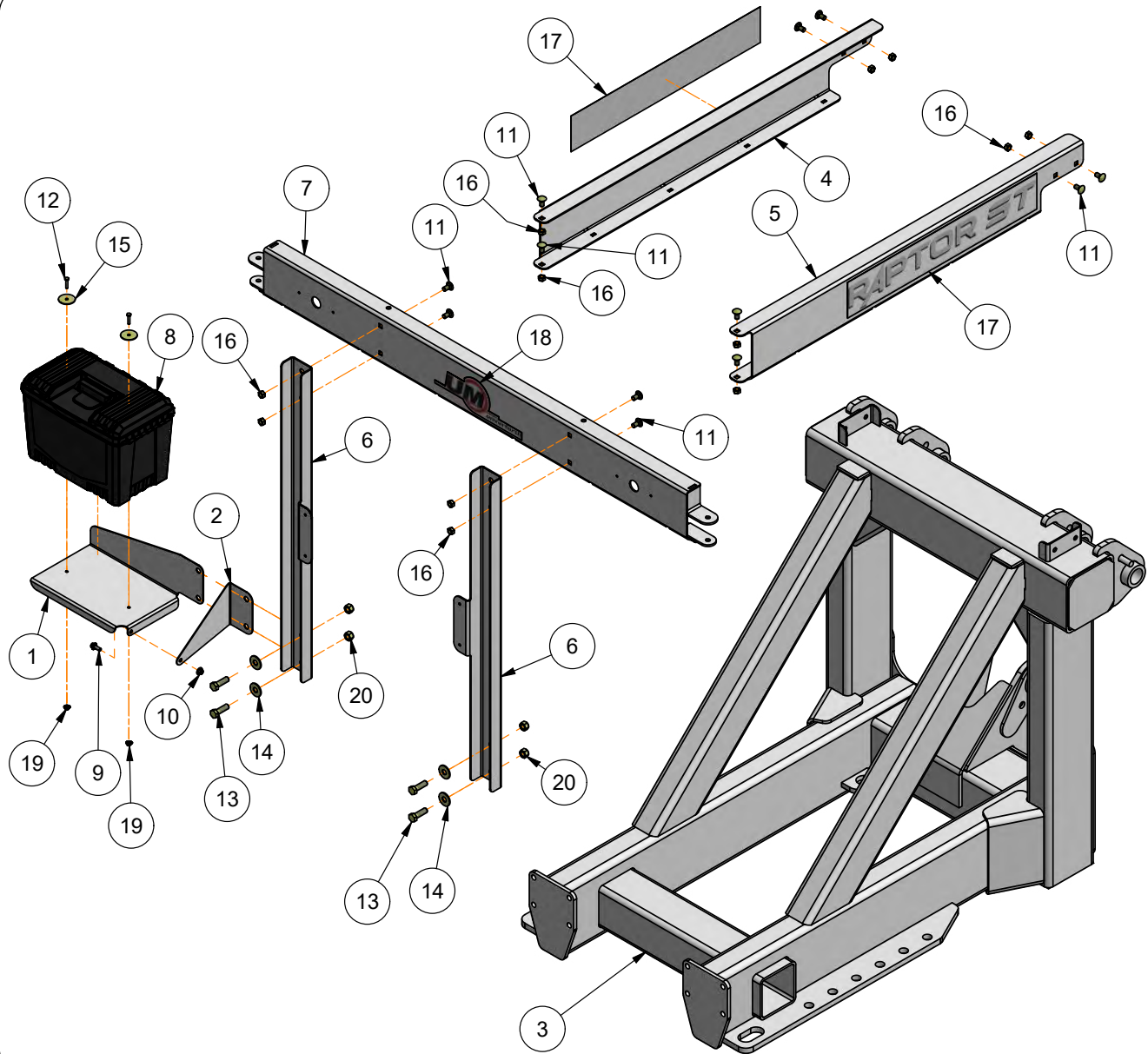
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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/](http://www.unverferth.com/parts/) for the most current parts listing.



## PULL-TYPE RAPTOR — Parts

### Tillage Only Cart — Frame and Toolbox Components

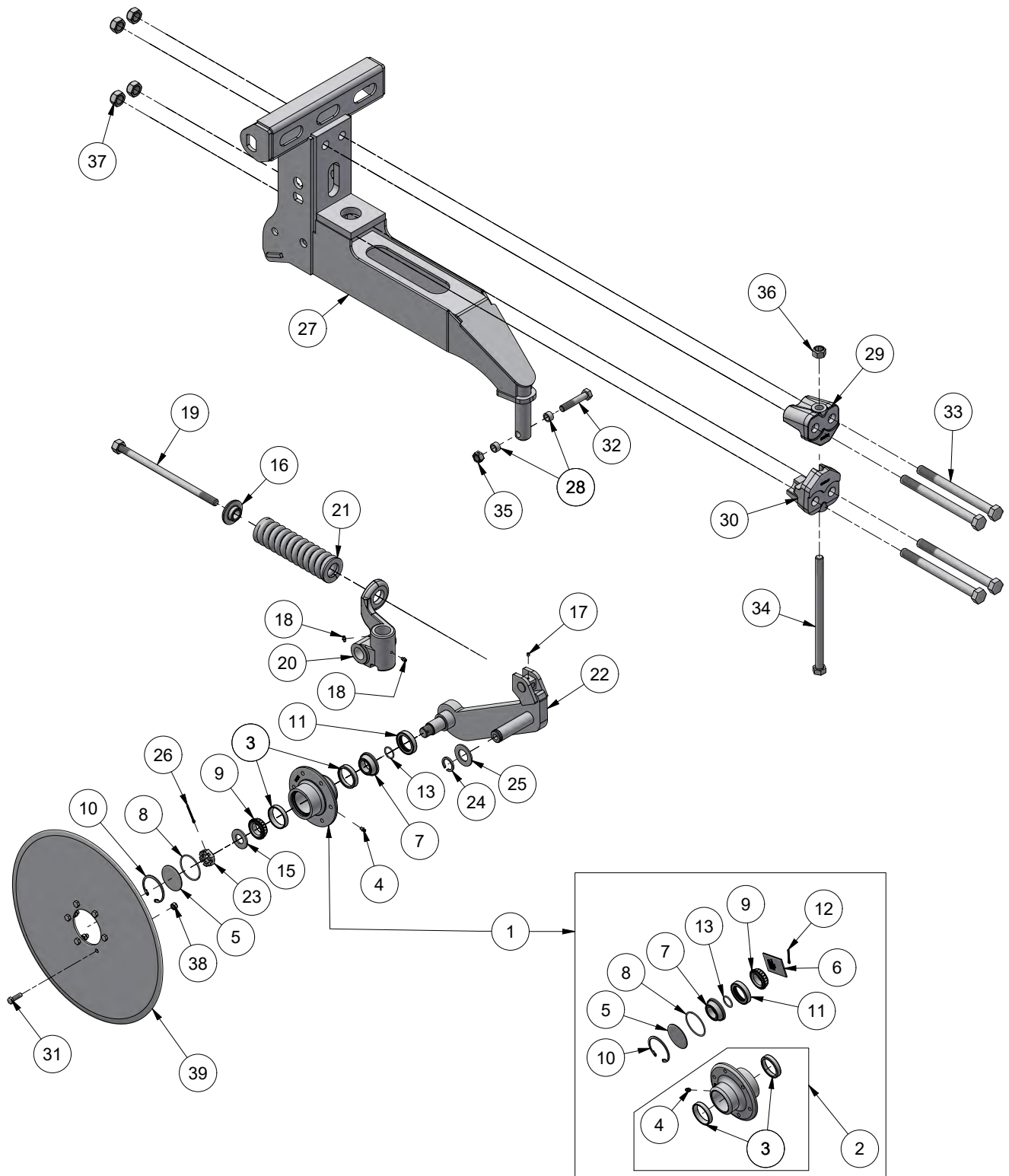
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

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

## TerrainPro2 Row Unit – Lead Coulter & Row Cleaner Components

**Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.**



# PULL-TYPE RAPTOR — Parts

## TerrainPro2 Row Unit — Lead Coulter & Row Cleaner Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

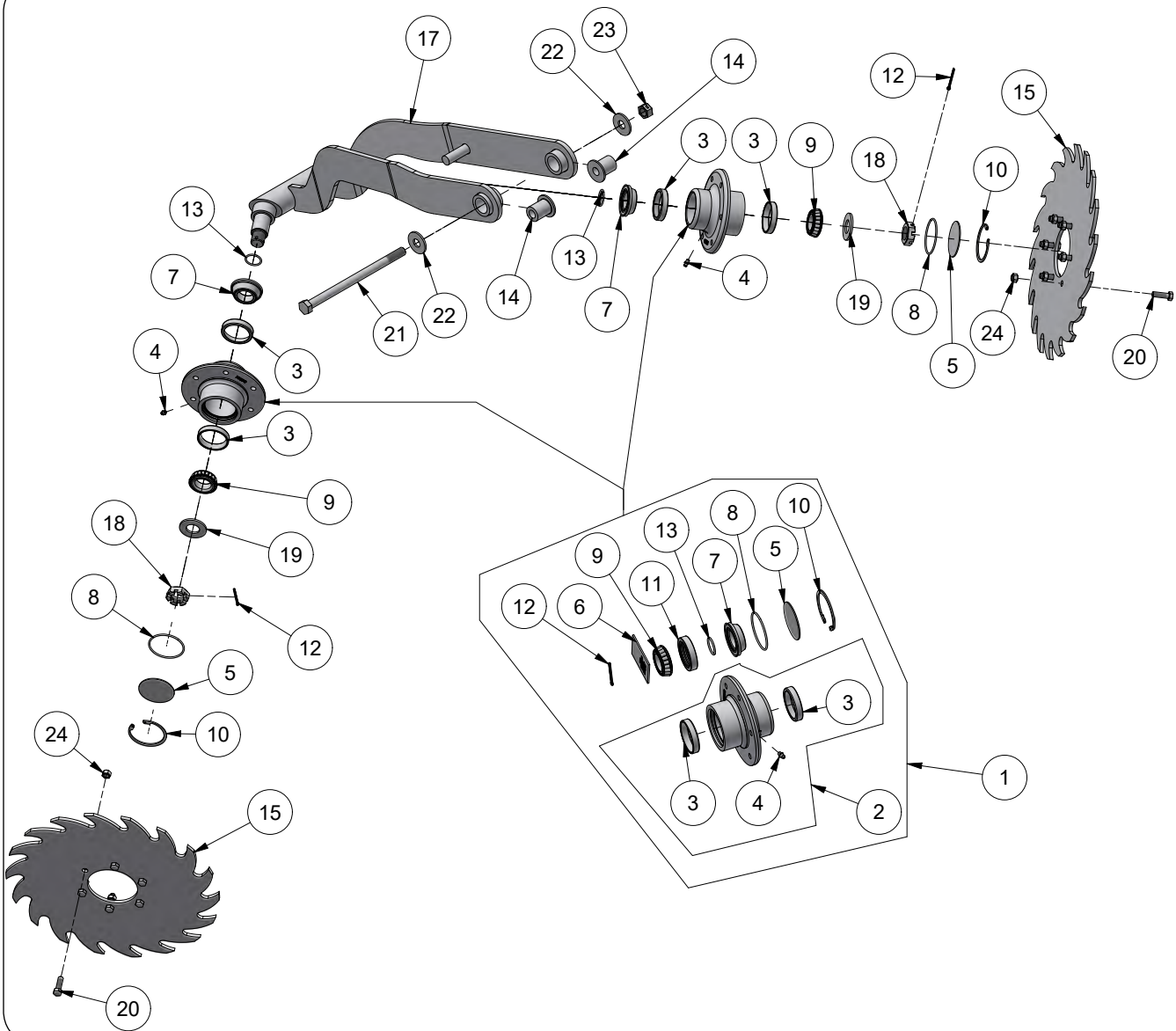
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	64533	Hub 6 Bolt Assembly	1	Includes Items 2-13
2	68655B	Hub 6 Bolt Subassembly with Bearing Cups & Zerk	1	Includes Items 3-4
3	9345	Bearing Cup, 2.328" Dia. (LM67010)	2	
4	9501603	Grease Zerk 1/4-28 (Stainless Steel)	1	
5	60735B	Hub Cap/Plate, 2.656" Dia. =Black=	1	
6	66684	Instruction Sheet	1	
7	901145	Bearing & Seal Assembly	1	
8	902158	O-Ring, 2 1/2" ID	1	
9	9165	Bearing Cone, 1.250" Bore (LM67048)	1	
10	93985	Retaining Ring, 2 9/16" Dia.	1	
11	93987	Seal, Triple Lip For 1 3/4" Dia. Spindle	1	
12	9391-025	Cotter Pin, 1/8" Dia. x 1 1/2"	1	
13	95565	O-Ring, 1.049" ID	1	
14	603847B	Coulter Combo Assembly =Black=	1	
15	94800	Bushing, 2" OD x 1.01" ID x .126	1	
16	82826B	Spring Washer =Black=	1	
17	9399-057	Set Screw, 1/4"-20UNC x 1/4 Cup Point/Hex Socket	1	
18	91160	Grease Zerk	1	
19	83371B	Spring Rod Weldment 3/4" Dia. =Black=	1	
20	82823B	Swivel LH Bracket =Black=	1	
21	94756B	Compression Spring, 2 5/8" Dia. x 10 5/8"	1	
22	603846	Coulter Arm Weldment	1	
23	94795	Slotted Jam Nut, 1-14UNS	1	
24	94144	Retaining Ring, 1 1/4" Dia. Shaft	1	
25	92528	Bushing, 2 1/4" OD x 1 1/4" ID	1	
26	9391-025	Cotter Pin, 1/8" Dia. x 1 1/2"	1	
27	603860B	Row Unit Base Weldment =Black=	1	
28	604841	Bushing, .875" OD x .635" ID x .50"	2	
29	67072B	Clamp, Top =Black=	1	
30	67073B	Clamp, Bottom =Black=	1	
31	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	6	
32	9390-129	Capscrew, 5/8"-11UNC x 3 1/4" G5	1	
33	9390-457	Capscrew, 7/8"-9UNC x 10" G5	4	
34	9503094	Capscrew, 3/4"-10UNC x 13" G5	1	
35	95905	Locknut/Center, 5/8"-11UNC	1	
36	9802	Locknut/Top, 3/4"-10UNC	1	
37	98420	Locknut/Top, 7/8"-9UNC	4	
38	9928	Locknut/Top, 3/8"-16UNC	6	
39	99986	Coulter Blade, 20 7/16" Dia. Smooth	1	



## PULL-TYPE RAPTOR — Parts

### TerrainPro2 Row Unit — Row Cleaner Wheel Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



## PULL-TYPE RAPTOR — Parts

### TerrainPro2 Row Unit — Row Cleaner Wheel Components

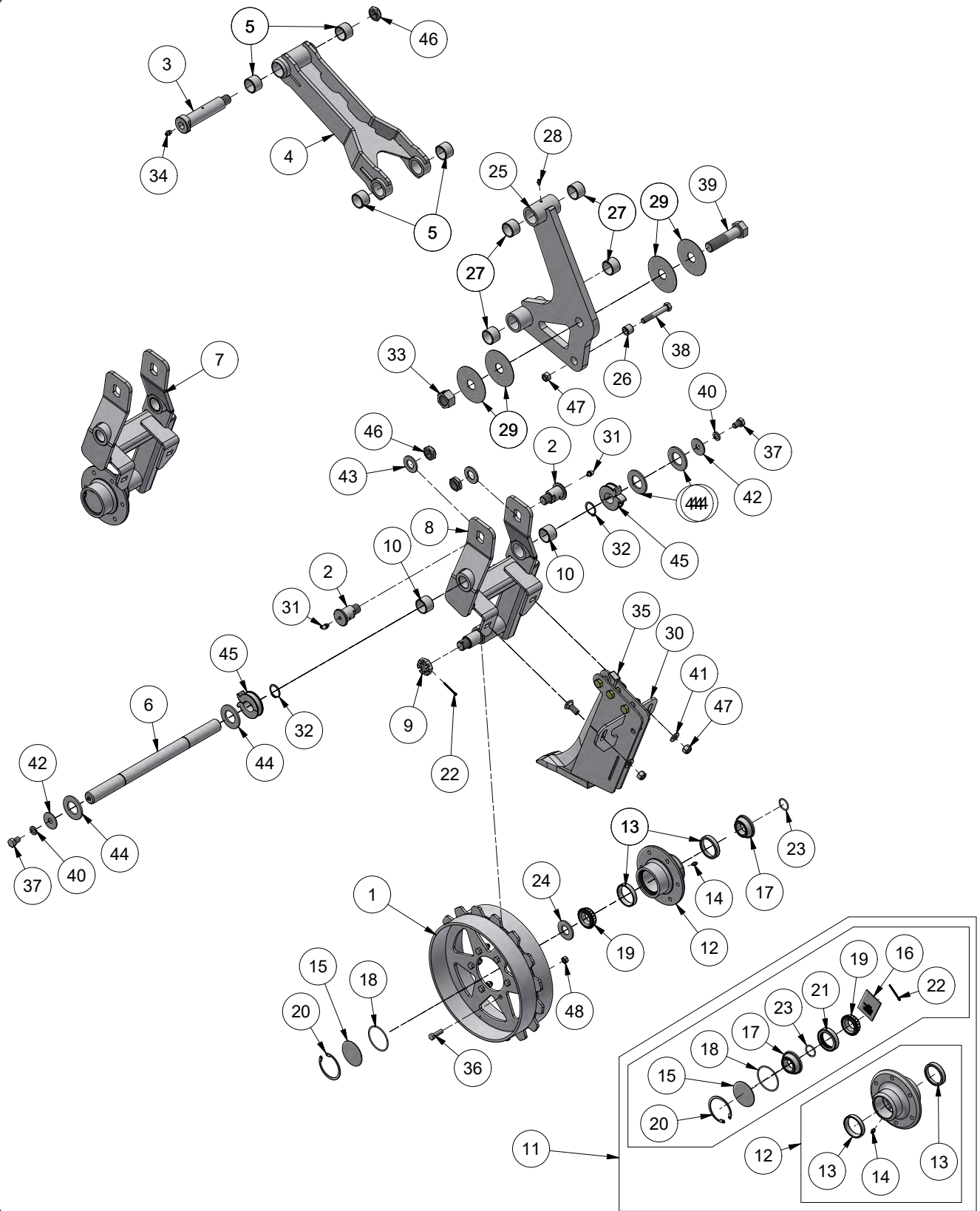
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	47742B	Row Cleaner Assembly =Black=		
1	64533	Hub 6 Bolt Assembly	1	Includes Items 2-13
2	68655B	Hub 6 Bolt Subassembly with Bearing Cups & Zerk	1	Includes Items 3-4
3	9345	Bearing Cup, 2.328" Dia. (LM67010)	2	
4	9501603	Grease Zerk 1/4-28 (Stainless Steel)	1	
5	60735B	Hub Cap/Plate, 2.656" Dia. =Black=	1	
6	66684	Instruction Sheet	1	
7	901145	Bearing & Seal Assembly	1	
8	902158	O-Ring, 2 1/2" ID	1	
9	9165	Bearing Cone, 1.250" Bore (LM67048)	1	
10	93985	Retaining Ring, 2 9/16" Dia.	1	
11	93987	Seal, Triple Lip For 1 3/4" Dia. Spindle	1	
12	9391-025	Cotter Pin, 1/8" Dia. x 1 1/2"	1	
13	95565	O-Ring, 1.049" ID	1	
14	603864	Bushing w/Flange, 1 3/4" Dia. x 1.56"	2	
15	604207B	16" Saw Tooth Row Cleaner Blade =Black=	2	
16	604249B	Row Cleaner Frame & Hub Assembly =Black=	1	
17	604250B	Row Cleaner Frame Weldment =Black=	1	
18	94795	Slotted Jam Nut, 1-14UNS	2	
19	94800	Bushing, 2" OD x 1.01" ID x .126	2	
20	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	36	
21	9390-443	Capscrew, 5/8"-11UNC x 10" G5	1	
22	9405-100	Flat Washer, 5/8" USS	4	
23	95905	Locknut/Center, 5/8"-11UNC	2	
24	9928	Locknut/Top, 3/8"-16UNC	38	

# PULL-TYPE RAPTOR — Parts

## TerrainPro2 Row Unit — Depth Control Wheel Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



# PULL-TYPE RAPTOR — Parts

## TerrainPro2 Row Unit — Depth Control Wheel Components

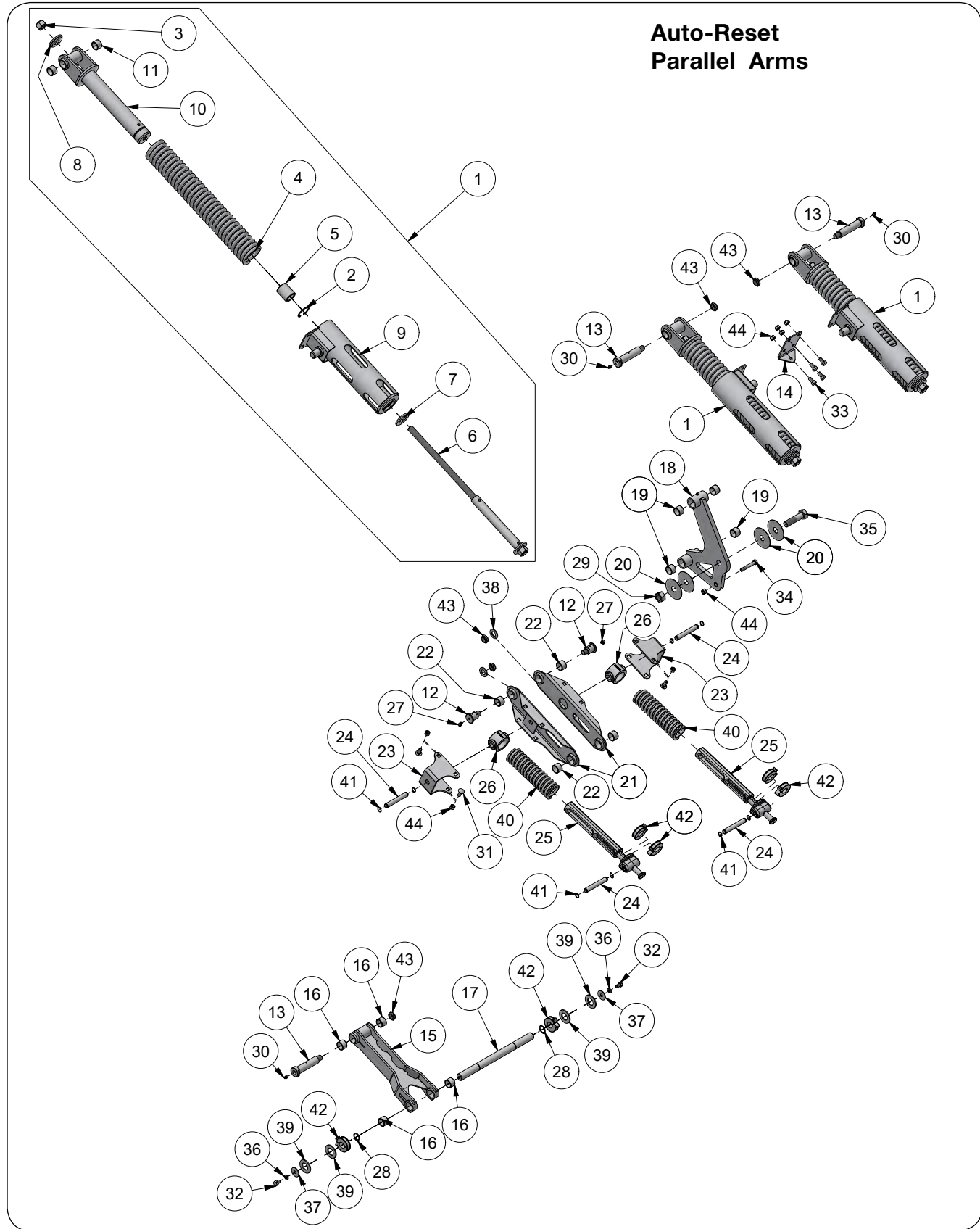
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	603894B	Gauge Wheel Weldment =Black=	1	
2	603946	Pin, 1.75" Dia. x 2.44"	2	
3	603948	Pin, 1.75" Dia. x 6.44"	1	
4	604221B	Lower Pull Arm Weldment =Black=	1	Includes Item 5
5	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	4	
6	604253	Pin, 1.25" Dia. x 17 5/8" w/1/2"-13UNC Threaded End	1	
7	604254B	Gauge Wheel Mount Arm Assembly =Black=	1	Includes Items 8-10
8	604255B	Gauge Wheel Mount Arm Weldment =Black=	1	Includes Items 9-10
9	94795	Slotted Jam Nut, 1"-14UNS	1	
10	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	2	
11	64533	Hub 6 Bolt Assembly	1	Includes Items 12-24
12	68655B	Hub 6 Bolt Subassembly with Bearing Cups & Zerk	1	Includes Items 13-14
13	9345	Bearing Cup, 2.328" Dia. (LM67010)	2	
14	9501603	Grease Zerk	1	
15	60735B	Hub Cap/Plate, 2.656" Dia. =Black=	1	
16	66684	Instruction Sheet	1	
17	901145	Bearing & Seal Assembly	1	
18	902158	O-Ring, 2 1/2" ID	1	
19	9165	Bearing Cone, 1.250" Bore (LM67048)	1	
20	93985	Retaining Ring, 2 9/16" Dia.	1	
21	93987	Triple Lip Seal, 1.75" Dia. Shaft	1	
22	9391-025	Cotter Pin, 1/8" Dia. x 1 1/2"	1	
23	95565	O-Ring, 1.049" ID	1	
24	94800	Machinery Bushing, 2" OD x 1.01" ID	1	
25	604260B	Shank Trip Bracket Weldment =Black=	1	Includes Items 26-28
26	601688	Bushing, 1" OD x 17/32" ID	1	
27	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	4	
28	91160	Grease Zerk, 1/4-28	1	
29	604266	Washer, 3 7/8" OD x 1.06" ID (Stainless Steel)	4	
30	604825B	Scraper plate =Black=	1	
31	9000875	90° Grease Zerk	4	
32	9006084	Retaining Ring, 1 1/4"	2	
33	92199	Locknut/Center, 1"-8UNC	1	
34	93426	Grease Zerk, 1/8-27 NPT	4	
35	9388-103	Carriage Bolt, 1/2"-13UNC x 1 1/4" G5	10	
36	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	36	
37	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	2	
38	9390-108	Capscrew, 1/2"-13UNC x 3 1/4" G5	3	
39	9390-191	Capscrew, 1"-8UNC x 4" G5	1	
40	9404-025	Lock Washer, 1/2"	4	
41	9405-086	Flat Washer, 1/2" SAE	2	
42	9405-090	Flat Washer, 1/2"	4	
43	9405-110	Flat Washer, 7/8" SAE	4	
44	9405-128	Flat Washer, 1 1/4" SAE	4	
45	9504667	Stroke Control Spring, 3/4" Spacer	6	
46	96976-034	Locknut/Thin, 7/8"-9UNC	10	
47	9800	Locknut/Top, 1/2"-13UNC	19	
48	9928	Locknut/Top, 3/8"-16UNC	38	

## PULL-TYPE RAPTOR — Parts

### TerrainPro2 Row Unit — Auto-Reset Parallel Arm Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



# PULL-TYPE RAPTOR — Parts

## TerrainPro2 Row Unit — Auto-Reset Parallel Arm Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	603895B	Spring Assembly =Black=	2	Used on Auto-Reset Shank Includes Items 2-11
2	9006206	Retaining Ring, 2.49" Dia.	1	
3	9663	Locknut/Top, 1"-8UNC	1	
4	9502536	Compression Spring	1	
5	600767	Bushing Guide, 2.125" OD x 1.533" ID x 2.5"	1	
6	600771	Spring Rod Weldment	1	
7	69741PL	Washer/Plate, 2 3/4" OD x 1.515" ID	1	
8	601728	Step Washer	1	
9	603896	Spring Retainer Weldment	1	
10	603951	Spring Guide Weldment	1	
11	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	2	
12	603946	Pin, 1.75" Dia. x 2.44"	4	
13	603948	Pin, 1.75" Dia. x 6.44"	3	
14	603949B	Plate, 3 3/4" x 7 13/32" =Black=	1	
15	604221B	Lower Pull Arm Weldment =Black=	1	
16	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	4	
17	604253	Pin, 1.25" Dia. x 17 5/8" w/1/2"-13UNC Internal Ends	1	
18	604260B	Shank Trip Bracket Weldment =Black=	1	
19	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	4	
20	604333B	Parallel Link Weldment =Black=	2	
21	604331	Plate 8" x 18 3/4"	1	
22	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	2	
23	604334B	Trunnion Mount Plate =Black=	2	
24	604345	Pin, .75" Dia. x 5 1/8" w/Grooves	4	
25	604473B	Spring Guide =Black=	2	
26	604474B	U-Joint =Black=	2	
27	9000875	90° Grease Zerk	4	
28	9006084	Retaining Ring 1 1/4"	2	
29	92199	Locknut/Center, 1"-8UNC	1	
30	93426	Grease Zerk, 1/8-27 NPT	4	
31	9388-103	Carriage Bolt, 1/2"-13UNC x 1 1/4" G5	10	
32	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	2	
33	9390-099	Capscrew, 1/2"-13UNC x 1" G5	4	
34	9390-108	Capscrew, 1/2"-13UNC x 3 1/4" G5	3	
35	9390-191	Capscrew, 1"-8UNC x 4" G5	1	
36	9404-025	Lock Washer, 1/2"	4	
37	9405-090	Flat Washer, 1/2"	4	
38	9405-110	Flat Washer, 7/8" SAE	4	
39	9405-128	Flat Washer, 1 1/4" SAE	4	
40	9503079B	Compression Spring, 3" Dia. x 10.31" =Black=	2	
41	9503560	Retaining Ring External, 3/4" Nominal Shaft Dia.	18	
42	9504667	Stroke Control Spring, 3/4" Spacer	6	
43	96976-034	Locknut/Thin, 7/8"-9UNC	10	
44	9800	Locknut/Top, 1/2"-13UNC	19	

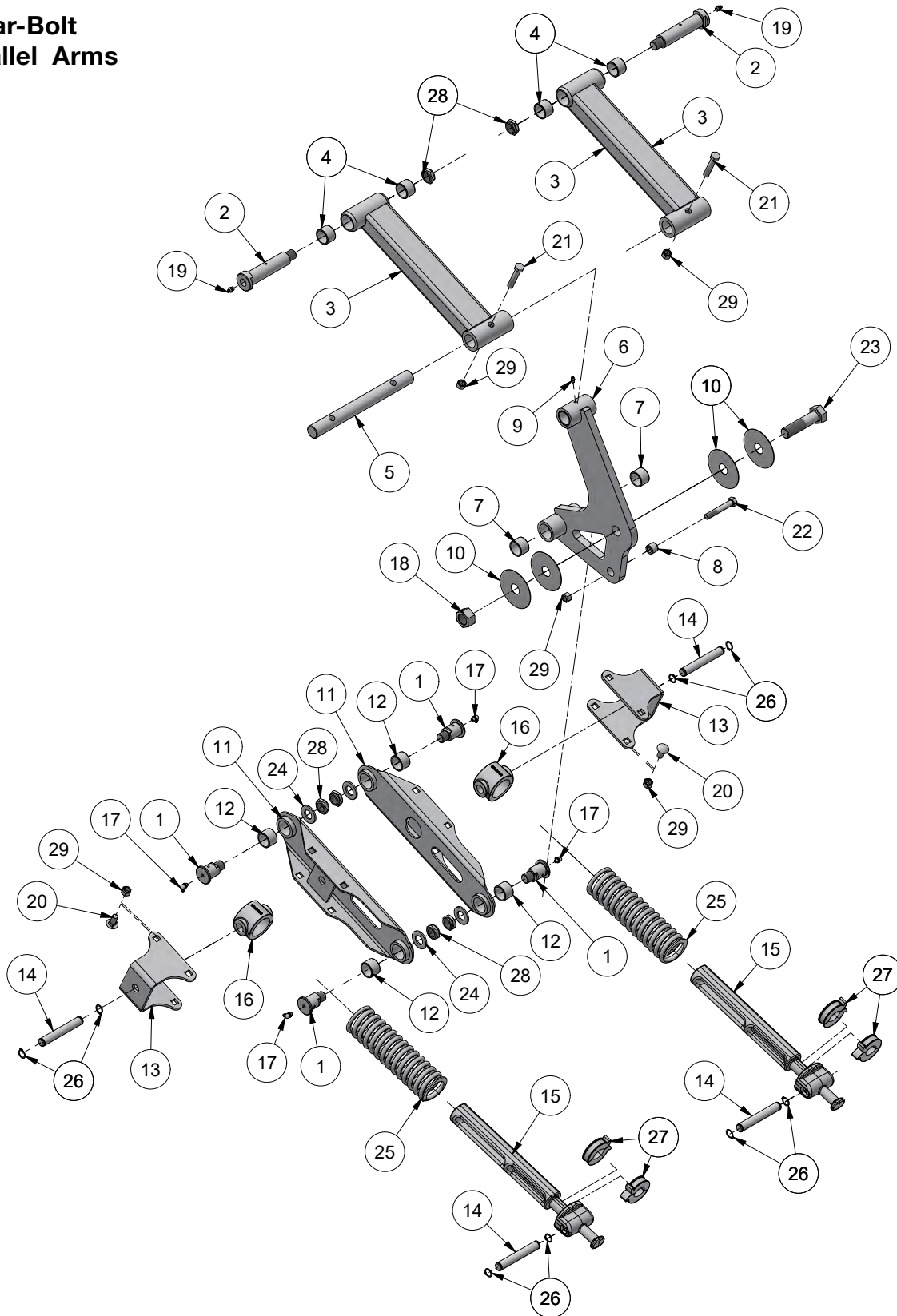


## PULL-TYPE RAPTOR — Parts

### TerrainPro2 Row Unit — Shear-Bolt Parallel Arm Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

#### Shear-Bolt Parallel Arms



## PULL-TYPE RAPTOR — Parts

### TerrainPro2 Row Unit — Shear-Bolt Parallel Arm Components

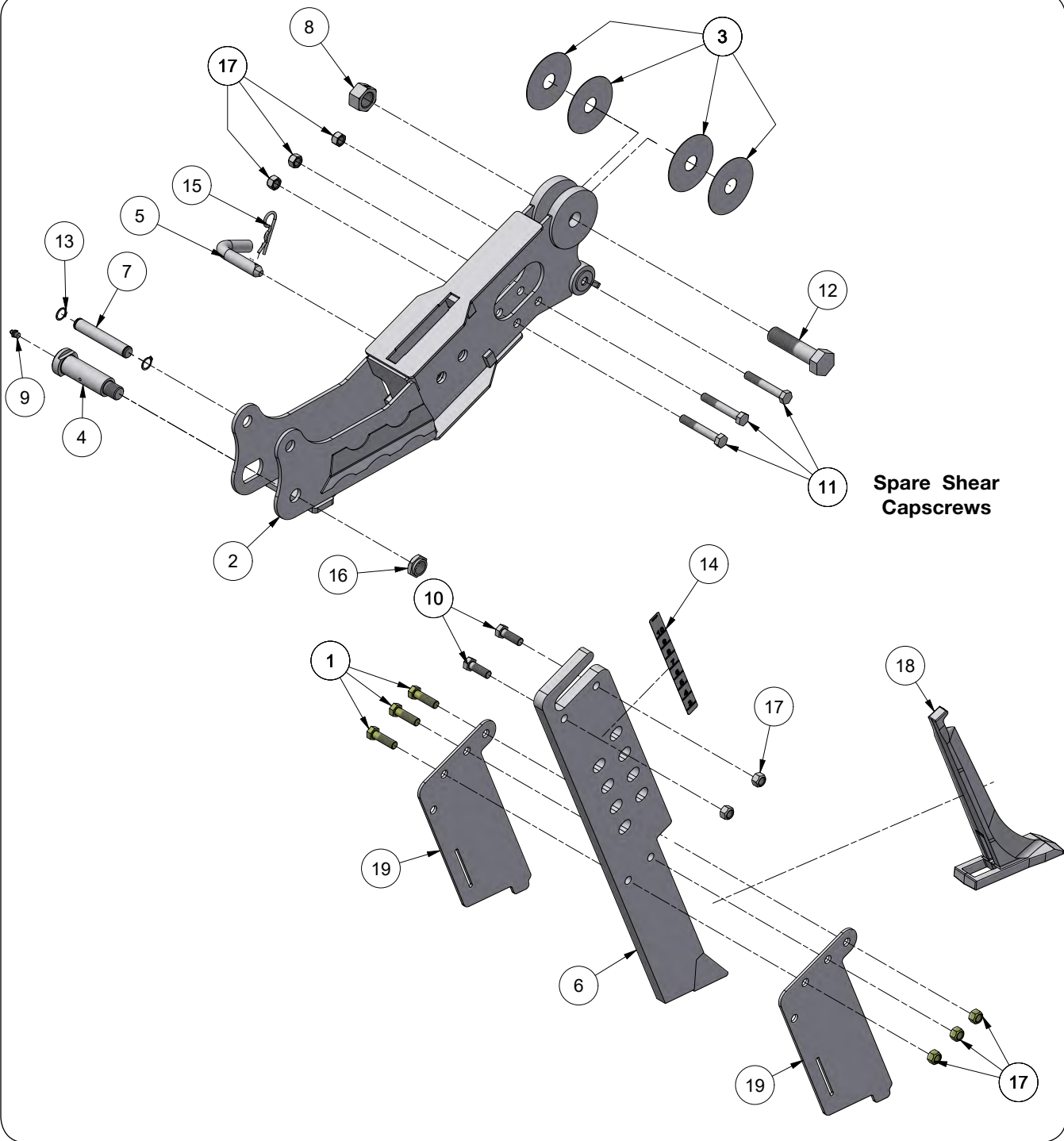
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	603946	Pin, 1.75" Dia. x 2.44"	4	
2	603948	Pin, 1.75" Dia. x 6.44"	2	
3	604008B	Shear-Bolt Link Weldment =Black=	2	
4	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	2	
5	604011	Pin, 1.25" Dia. x 12 1/2"	1	
6	604260B	Shank Trip Bracket Weldment =Black=	1	
7	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	2	
8	601688	Bushing, 1" OD x 17/32" ID x 3/4"	1	
9	91160	Grease Zerk, 1/4-28	1	
10	604266	Washer, 3 7/8" OD x 1.06" ID (Stainless Steel)	4	
11	604333B	Parallel Link Weldment =Black=	2	
12	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	2	
13	604334B	Trunnion Mount Plate =Black=	2	
14	604345	Pin, .75" Dia. x 5 1/8" w/Grooves	4	
15	604473B	Spring Guide =Black=	2	
16	604474B	U-Joint =Black=	2	
17	9000875	90° Grease Zerk	4	
18	92199	Locknut/Center, 1"-8UNC	1	
19	93426	Grease Zerk, 1/8-27 NPT	2	
20	9388-103	Carriage Bolt, 1/2"-13UNC x 1 1/4" G5	8	
21	9390-106	Capscrew, 1/2"-13UNC x 2 3/4" G5	2	
22	9390-108	Capscrew, 1/2"-13UNC x 3 1/4" G5	3	
23	9390-191	Capscrew, 1"-8UNC x 4" G5	1	
24	9405-110	Flat Washer, 7/8" SAE	4	
25	9503079B	Compression Spring, 3" Dia. x 10.31" =Black=	2	
26	9503560	Retaining Ring External, 3/4" Nominal Shaft Dia.	8	
27	9504667	Stroke Control Spring, 3/4" Spacer	4	
28	96976-034	Locknut/Thin, 7/8"-9UNC	6	
29	9800	Locknut/Top, 1/2"-13UNC	10	

## PULL-TYPE RAPTOR — Parts

### TerrainPro2 Row Unit — Shank Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



## PULL-TYPE RAPTOR — Parts

### TerrainPro2 Row Unit — Shank Components

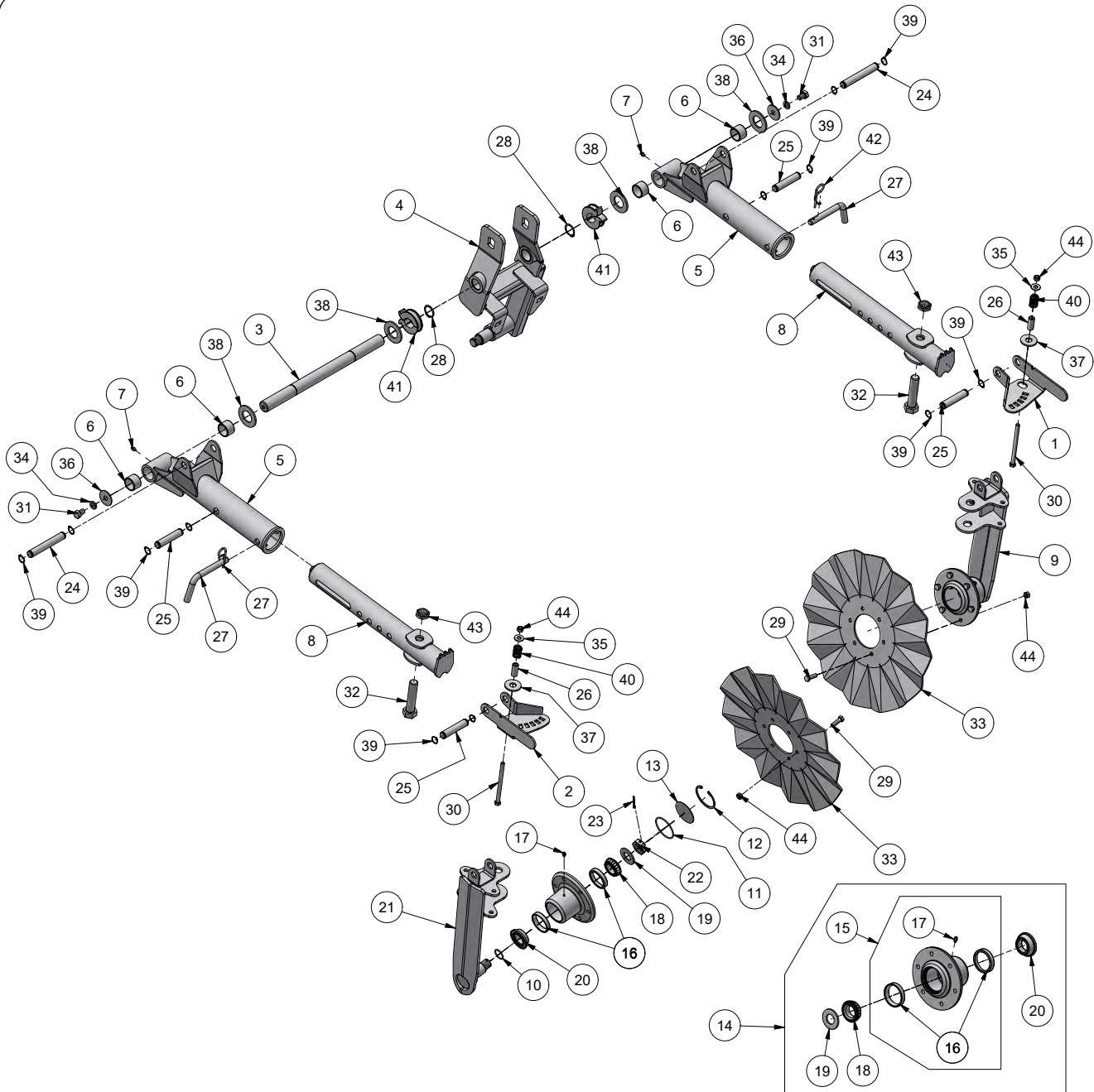
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	9390-102	Capscrew, 1/2"-13UNC x 1 3/4" G5	3	
2	604265B	Shank Mount Bracket Weldment =Black=	1	
3	604266	Washer, 3 7/8" Dia. (Stainless Steel)	4	
4	604273	Pin, 1.75" Dia. x 5.06" w/Threaded End	1	
5	604282	Bent Pin, 3/4" Dia.	1	
6	604320B	Shank Weldment =Black=	1	
7	604829	Pin, .75" Dia. x 4 1/2" w/Grooves	1	
8	92199	Locknut/Center, 1"-8UNC	1	
9	93426	Grease Zerk, 1/8-27 NPT	1	
10	9390-101	Capscrew, 1/2"-13UNC x 1 1/2" G5	2	
11	9390-108	Capscrew, 1/2"-13UNC x 3 1/4" G5	3	Shear-Bolts
12	9390-191	Capscrew, 1"-8UNC x 4" G5	1	
13	9503560	Retaining Ring External (Stainless Steel), 3/4"	2	
14	9504571	Decal, Shank Depth	1	
15	95959	Hairpin Cotter, .1562" Dia. x 3"	1	
16	96976-034	Locknut/Thin, 7/8"-9UNC	1	
17	9800	Locknut/Top, 1/2"-13UNC	8	
18	602025CG	Point Casting Strip-Till (CADI) 2 1/4" x 14 3/16" x 7 23/32"	1	Recommended for Abrasive Rock-Free Soils
	601983B	Point Casting Strip-Till (ADI) 2 1/4" x 14 3/16" x 7 23/32"		Standard Point
19	604842B	Wear Plate	2	

# PULL-TYPE RAPTOR — Parts

## TerrainPro2 Row Unit — Closing Coulter Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



# PULL-TYPE RAPTOR — Parts

## TerrainPro2 Row Unit — Closing Coulter Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

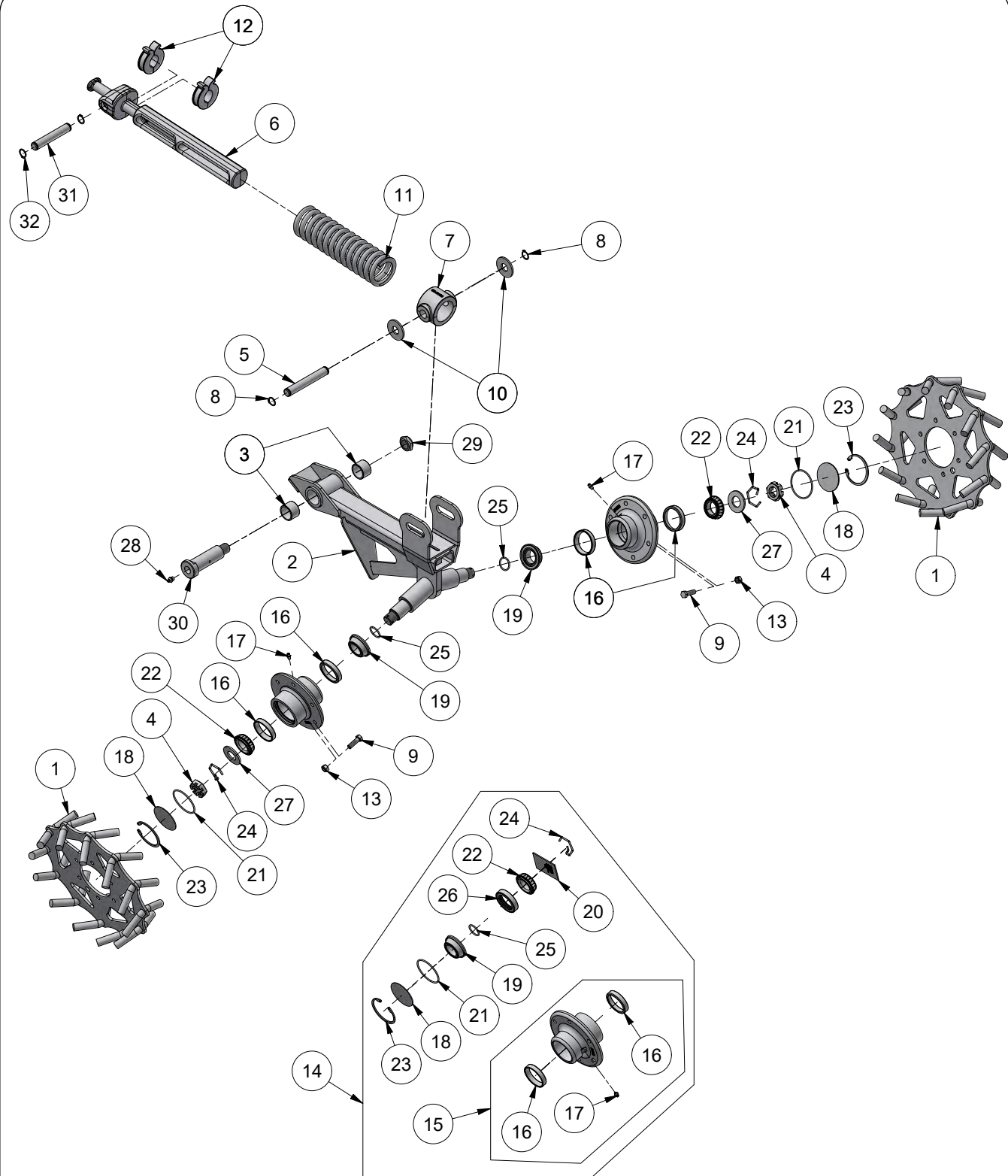
ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	604002B	Sealer Angle Bracket Weldment Right-Hand =Black=	1	
2	604003B	Sealer Angle Bracket Weldment Left-Hand =Black=	1	
3	604253	Pin, 1.25" Dia. x 17 5/8" w/Internal Ends	1	
4	604254B	Gauge Wheel Mount Arm Assembly =Black=	1	
5	604280B	Sealer Arm Housing Weldment =Black=	2	Includes Items 6-7
6	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	2	
7	91160	Grease Zerk, 1/4-28	1	
8	604285B	Sealer Arm Slider Weldment =Black=	2	
9	604294B	Sealer Post Assembly =Black=	2	Includes Items 10-26
10	95565	O-Ring, 1.049" ID	1	
11	902158	O-Ring, 2 1/2" ID	1	
12	93985	Retaining Ring, 2 9/16" Dia.	1	
13	60735B	Hub Cap/Plate, 2.656" Dia. =Black=	1	
14	603081B	Hub 6-Bolt Assembly =Black=	1	Includes Items 15-20
15	603083B	Hub 6-Bolt Sub-Assembly =Black=	1	Includes Items 16-17
16	9345	Bearing Cup, 2.328" Dia. (LM67010)	2	
17	91160	Grease Zerk	1	
18	9165	Bearing Cone, 1.250" Bore (LM67048)	1	
19	94800	Machinery Bushing, 2" OD x 1.01" ID	1	
20	901145	Bearing & Seal Assembly	1	
21	604293B	Sealer Post Weldment =Black=	1	Includes Item 22
22	94795	Slotted Jam Nut, 1"-14UNS	1	
23	9391-025	Cotter Pin, 1/8" Dia. x 1 1/2"	1	
24	604345	Pin, .75" Dia. x 5 1/8" w/Grooves	4	
25	604600	Pin, .75" Dia. x 3 5/8" w/Grooves	4	
26	604606B	Tube, 5/8" OD x .407" ID x 1 7/16"	2	
27	84979	Bent Pin, 5/8" Dia. x 4" Grip w/Haripin Cotter	2	
28	9006084	Retaining Ring, 1 1/4"	2	
29	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	36	
30	9390-070	Capscrew, 3/8"-16UNC x 5 1/2" G5	2	
31	9390-097	Capscrew, 1/2"-13UNC x 3/4" G5	2	
32	9390-172	Capscrew, 7/8"-9UNC x 4" G5	2	
33	93931	Coulter Blade, 17" Dia. (Wave)	2	
34	9404-025	Lock Washer, 1/2"	4	
35	9405-076	Flat Washer, 3/8" USS	2	
36	9405-090	Flat Washer, 1/2"	4	
37	9405-100	Flat Washer, 5/8" USS	4	
38	9405-128	Flat Washer, 1 1/4" SAE	4	
39	9503560	Retaining Ring External (Stainless Steel), 3/4"	18	
40	9504248	Compression Spring, 0.85" Dia. x 1 1/4"	2	
41	9504667	Stroke Control Spring, 3/4" Spacer	6	
42	9504901	Twist Clip, .156" Dia.	2	
43	96976-034	Locknut/Thin, 7/8"-9UNC	10	
44	9928	Locknut/Top, 3/8"-16UNC	38	



## PULL-TYPE RAPTOR — Parts

### TerrainPro2 Row Unit — Conditioners & Extension Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



## PULL-TYPE RAPTOR — Parts

### TerrainPro2 Row Unit — Conditioners & Extension Components

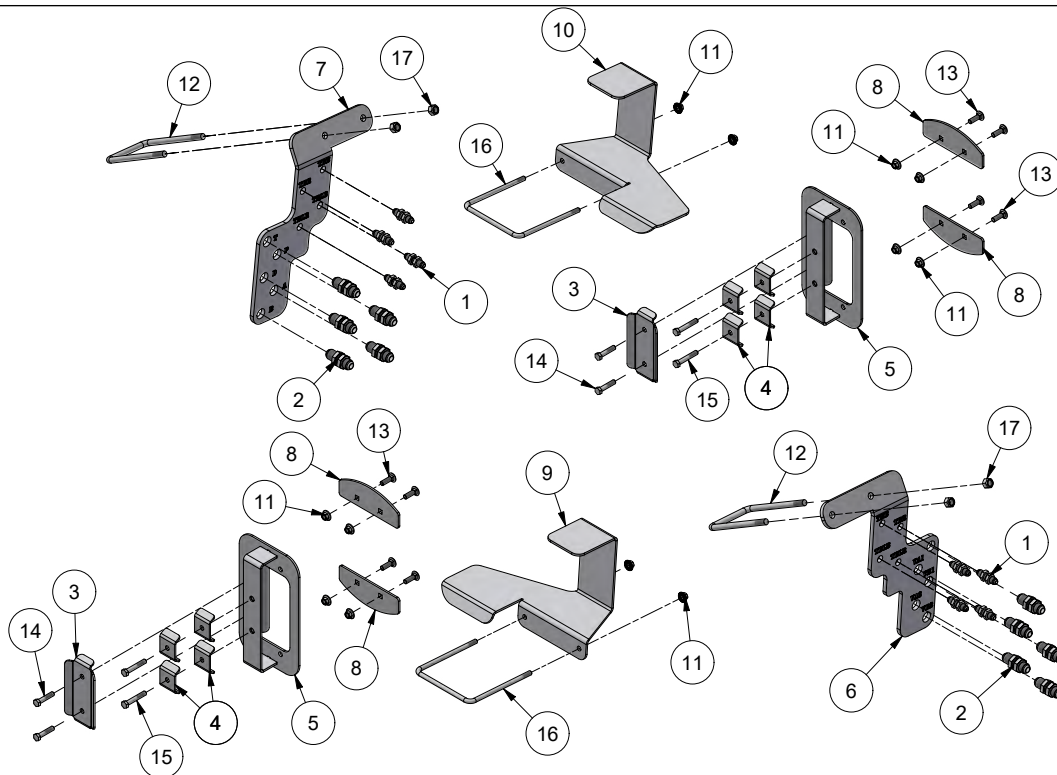
Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

ITEM	PART NO.	DESCRIPTION	QTY	NOTES
	604386B	Crowfoot Conditioner Wheel Assembly =Black=	1	Includes Items 1-27
1	604270B	Crowfoot Conditioning Wheel Weldment =Black=	2	
2	604275B	Crowfoot Conditioner Mount Weldment =Black=	1	Includes Items 3-4
3	98637B	Bushing, 1.5" OD x 1.28" ID x 1"	2	
4	94795	Slotted Jam Nut, 1"-14UNS	2	
5	604345	Pin, .75" Dia. x 5 1/8" w/Grooves	1	
6	604473B	Spring Guide Casting =Black=	1	
7	604474B	U-Joint Casting =Black=	1	
8	903145-018	Retaining Ring External, 3/4" Dia.	2	
9	9390-056	Capscrew, 3/8"-16UNC x 1 1/4" G5	12	
10	9405-106	Flat Washer, 3/4" USS	2	
11	9503079B	Compression Spring, 3" Dia. x 10.31" =Black=	1	
12	9504667	Stroke Control Spring, 3/4" Spacer	2	
13	9928	Locknut/Top, 3/8"-16UNC	12	
14	64533	Hub 6 Bolt Assembly	2	Includes Items 15-26
15	68655B	Hub 6 Bolt Subassembly with Bearing Cups & Zerk	1	Includes Items 16-17
16	9345	Bearing Cup, 2.328" Dia. (LM67010)	2	
17	9501603	Grease Zerk	1	
18	60735B	Hub Cap/Plate, 2.656" Dia. =Black=	1	
19	901145	Bearing & Seal Assembly	1	
20	66684	Instruction Sheet	1	
21	902158	O-Ring, 2 1/2" ID	1	
22	9165	Bearing Cone, 1.250" Bore (LM67048)	1	
23	93985	Retaining Ring, 2 9/16" Dia.	1	
24	9391-025	Cotter Pin, 1/8" Dia. x 1 1/2"	1	
25	95565	O-Ring, 1.049" ID	1	
26	93987	Triple Lip Seal, 1.75" Dia. Shaft	1	
27	94800	Machinery Bushing, 2" OD x 1.01" ID	2	
28	93426	Grease Zerk, 1/8-27 NPT	1	
29	96976-034	Locknut/Thin, 7/8"-9UNC	1	
30	604273	Pin, 1.75" Dia. x 5.06" w/Threaded End	1	
31	604829	Pin, .75" Dia. x 4 1/2" w/Grooves	1	
32	9503560	Retaining Ring External (Stainless Steel), 3/4"	2	

## PULL-TYPE RAPTOR — Parts

### Hydraulic Hose Holder Components

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

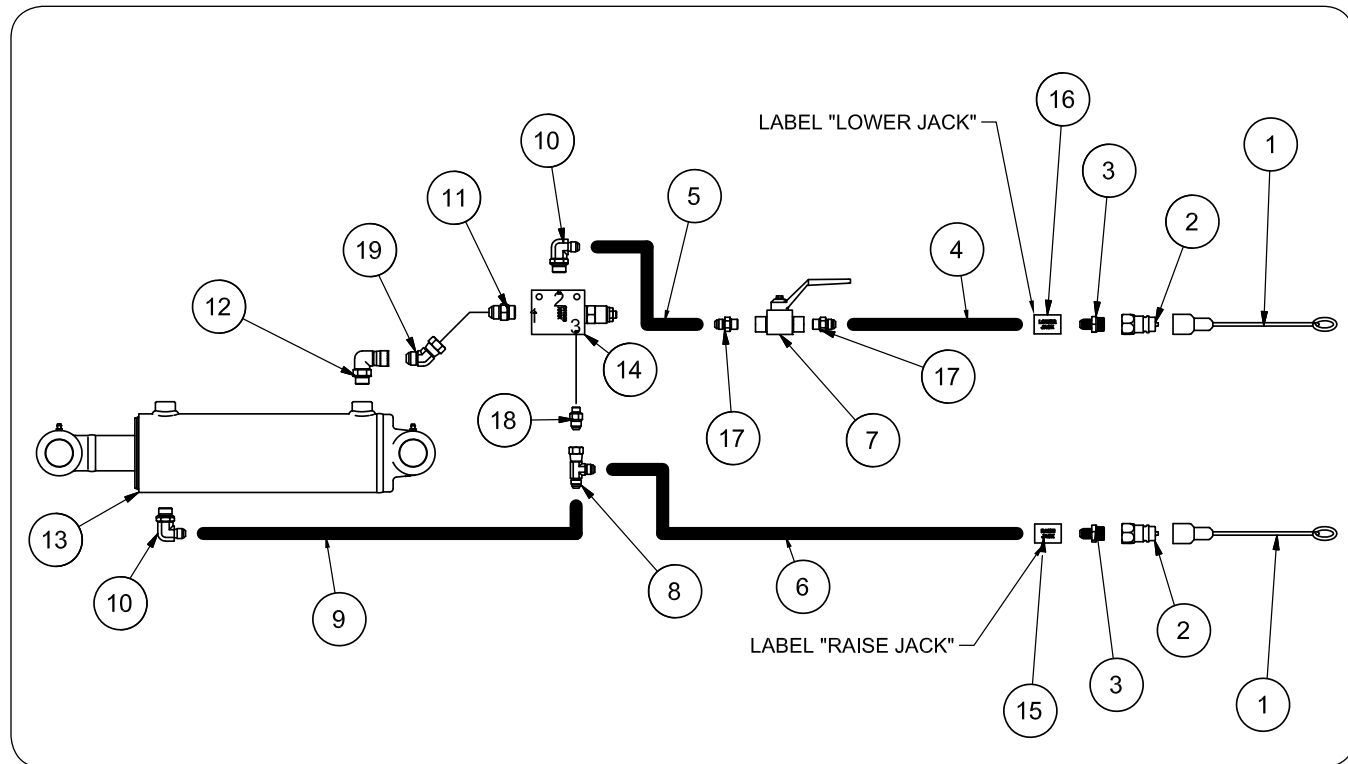


ITEM	PART NO.	DESCRIPTION	QTY
1	95192	Bulkhead Union, 9/16-18 JIC Male x 9/16-18 JIC Male Thread with Nut	8
2	9005789	Bulkhead Union, 7/8-14 JIC Male UNF Thread with Nut	10
3	604395B	Clamp Plate =Black=	2
4	604398B	Clamp Plate =Black=	8
5	604402B	Hose Holder Weldment =Black=	2
6	604416B	Plate, Left-Hand =Black=	1
7	604417B	Plate, Right-Hand =Black=	1
8	604421B	Plate =Black=	4
9	604477B	Hydraulic Hose Holder Left-Hand =Black=	1
10	604478B	Hydraulic Hose Holder Right-Hand =Black=	1
11	91263	Nut/Large Flange, 3/8"-16UNC	12
12	91323	U-Bolt, 1/2"-13UNC x 7 1/8", 4 9/16" C/C	2
13	9388-052	Carriage Bolt, 3/8"-16UNC x 1 1/4" G5	8
14	9390-058	Capscrew, 3/8"-16UNC x 1 3/4" G5	4
15	9390-060	Capscrew, 3/8"-16UNC x 2 1/4" G5	4
16	JBP3351	U-Bolt, 3/8"-16UNC x 7", 6 7/16" C/C	2
17	9800	Locknut/Top, 1/2"-13UNC	6
18	9390-100	Capscrew, 1/2"-13UNC x 1 1/4" G5	2

# PULL-TYPE RAPTOR — Parts

## Hydraulic Components — Jack

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

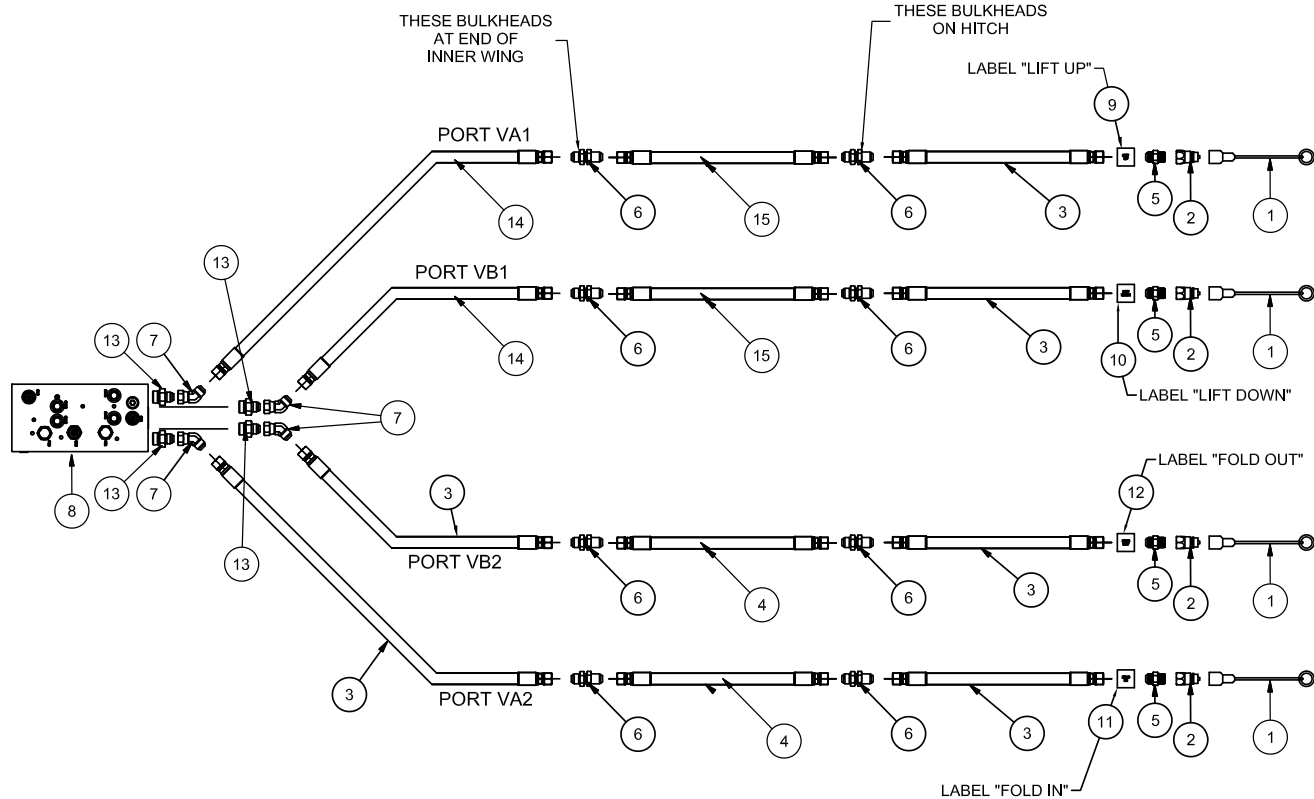


ITEM	PART NO.	DESCRIPTION	QTY
1	91511	Dust Cap	2
2	91383	Male Tip Coupling, 3/4"-16 Female O-Ring	2
3	92927	Adapter, 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	2
4	9503721	Hose, 3/8" x 18" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	1
5	9503722	Hose, 3/8" x 132" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	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 Zerk	1
	9504769	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/](http://www.unverferth.com/parts/) for the most current parts listing.

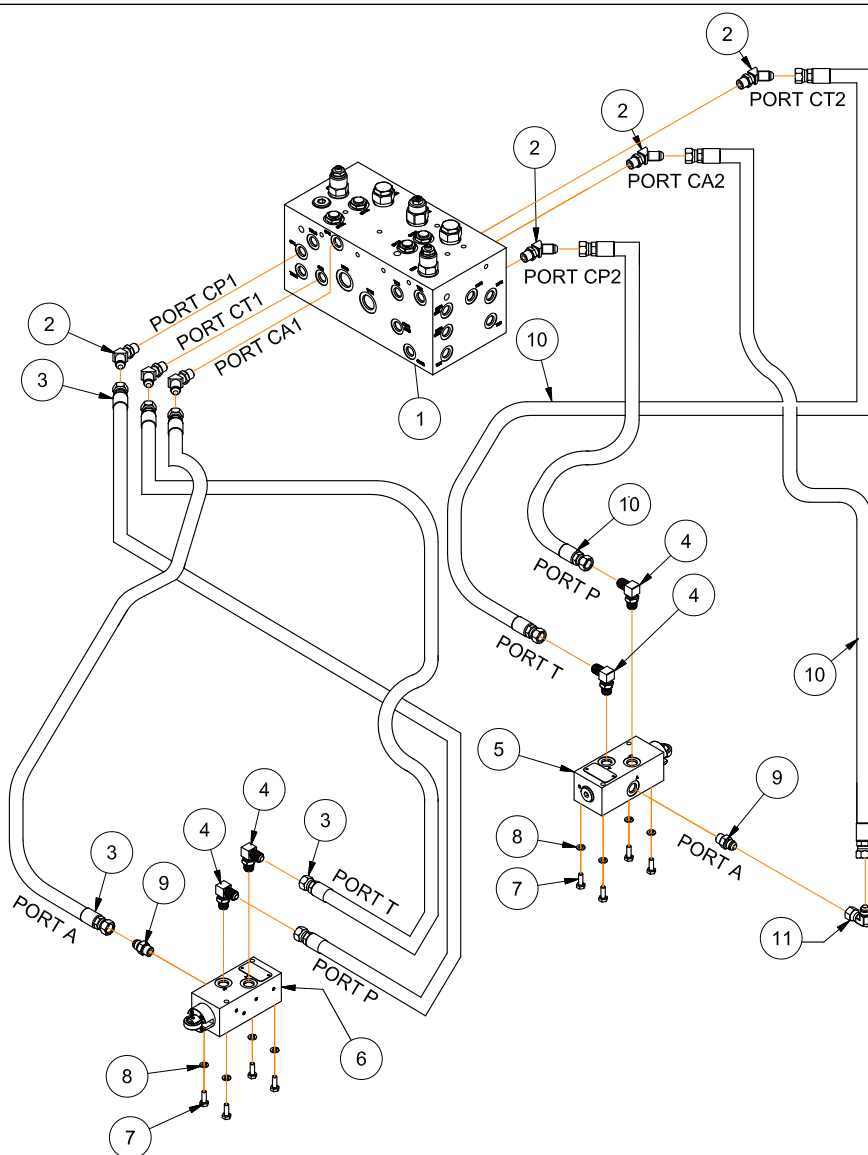


ITEM	PART NO.	DESCRIPTION	QTY
1	91511	Dust Cap	4
2	95477	Pioneer Male Tip 7/8"-14 Female O-Ring	4
3	9503648	Hose, 5/8" x 108" (7/8"-14 JIC Female x 7/8"-14 JIC Female)	6
4	9504744	Hose, 5/8" x 216" (7/8"-14 JIC Female x 7/8"-14 JIC Female)	2
5	9002443	Adapter, 7/8"-14 JIC Male x 7/8"-14 O-Ring Male	4
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 — Supply Valve To Sequence Valves

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



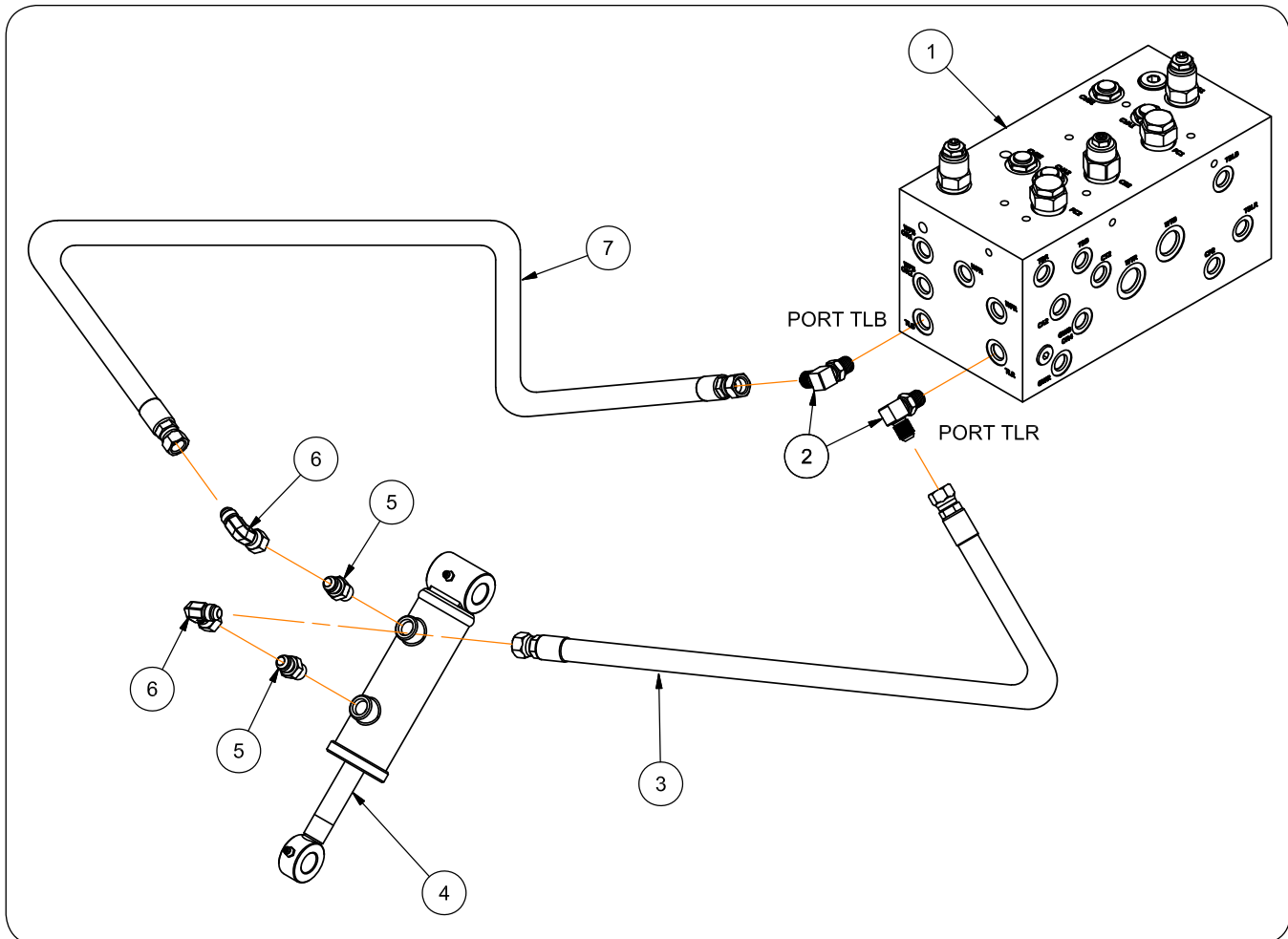
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	6
3	9504767	Hose, 3/8" x 24" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	3
4	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
5	9504584	Hydraulic Cam Valve (Normally Closed)	1
6	9504585	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	1



## PULL-TYPE RAPTOR — Parts

### Hydraulic Components — Supply Valve to Tongue Latch

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

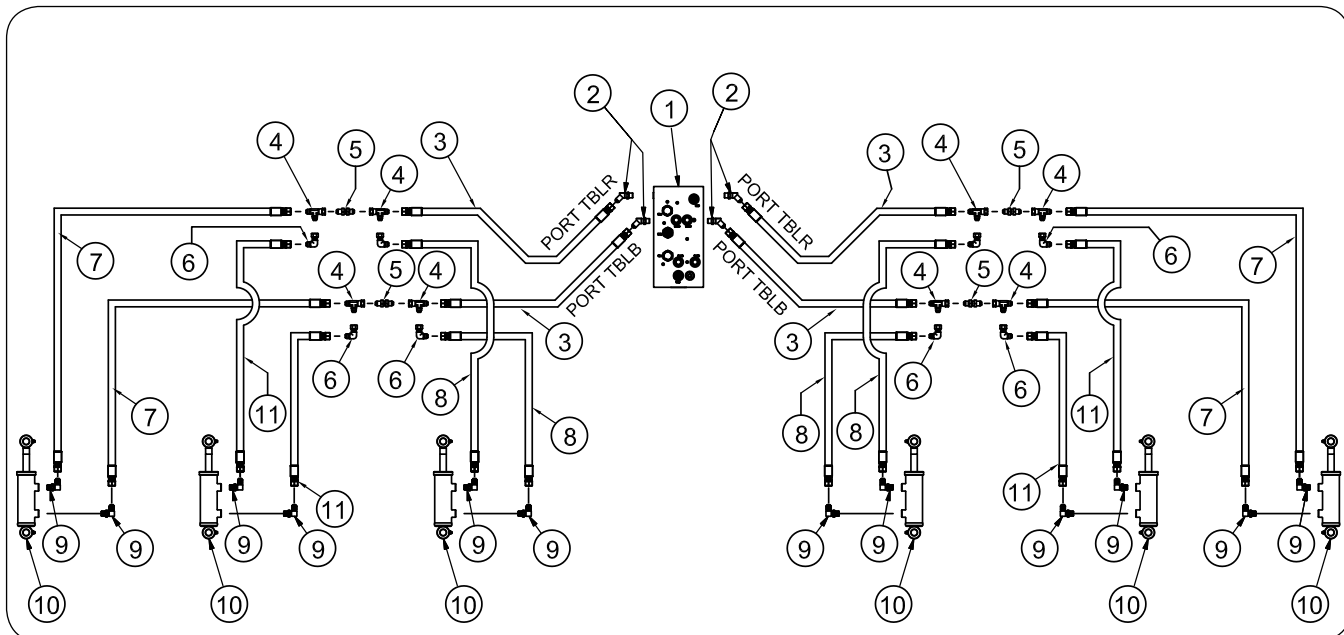


ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
3	9503809	Hose, 3/8" x 150" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	1
4	9502901	Cylinder, 1 1/2" x 2" (3000 PSI) w/Grease Zerks	1
5	9001495	Adapter, 9/16"-18 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 Toolbar Latch

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

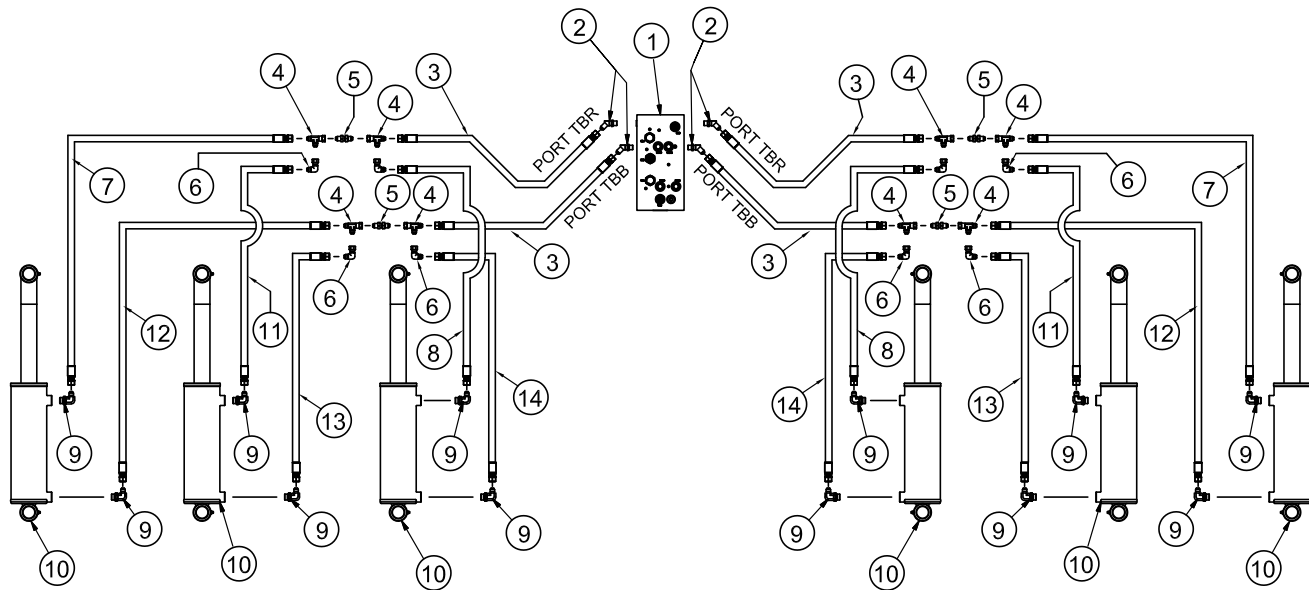


ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
3	9501707	Hose, 3/8" x 92" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
4	91465	Tee, 9/16"-18 JIC Male x 9/16"-18 JIC Female x 9/16"-18 JIC Male	8
5	95192	Bulkhead 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 Zerk	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 Fold

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

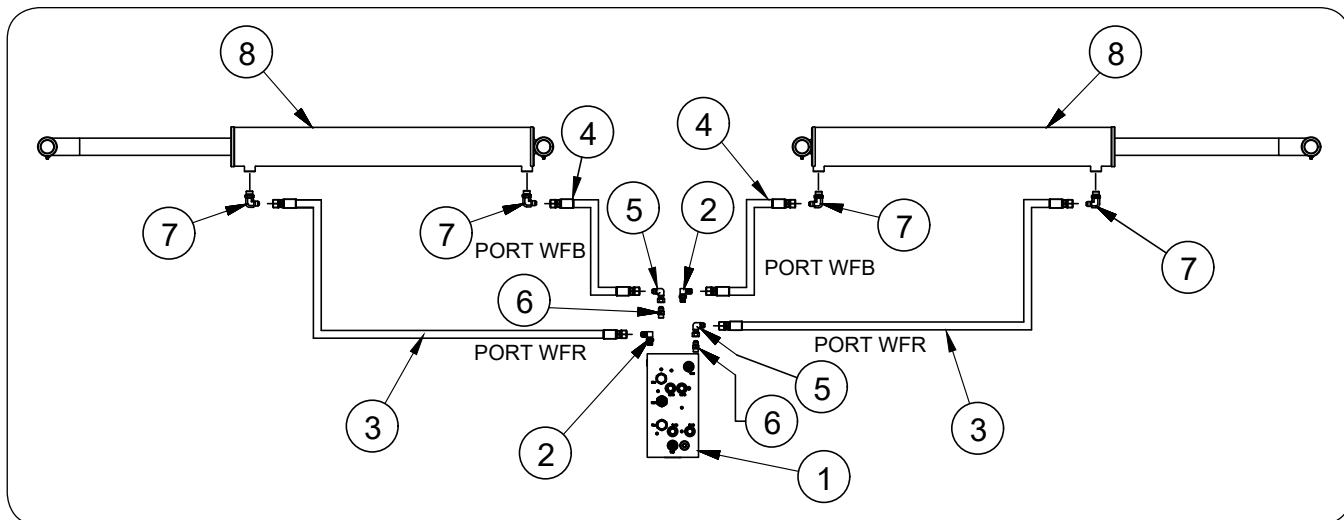


ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
3	9501687	Hose, 3/8" x 96" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
4	91465	Tee, 9/16"-18 JIC Male x 9/16"-18 JIC Female x 9/16"-18 JIC Male	8
5	95192	Bulkhead 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
	9504769	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 Wings

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

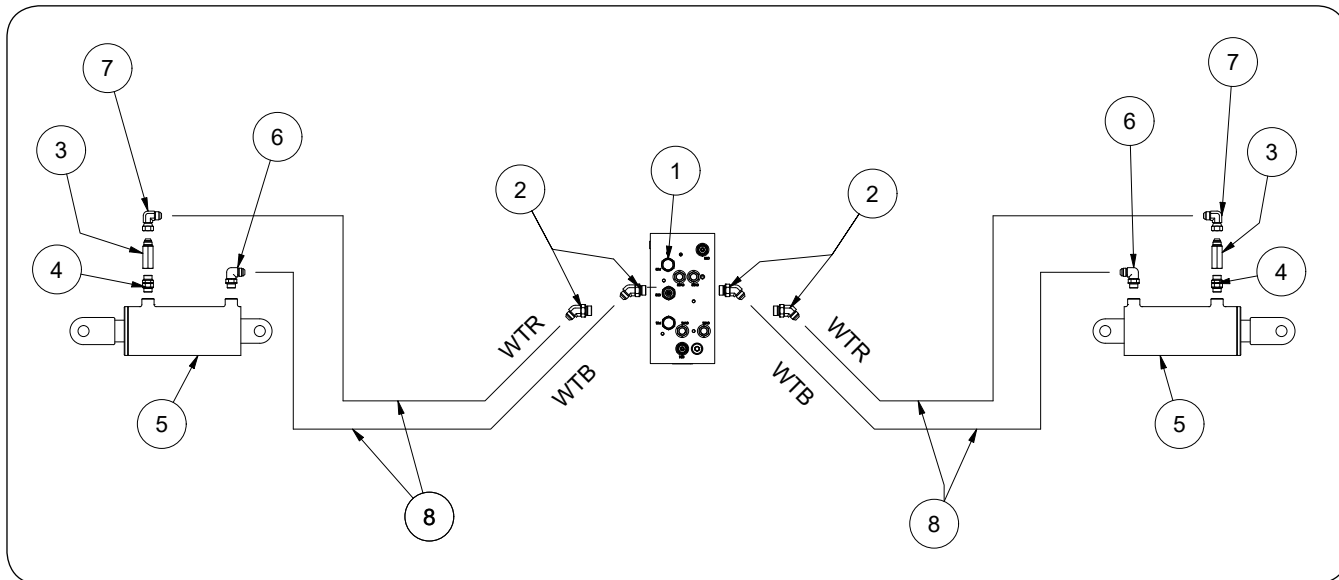


ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	97445	90° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	2
3	9503644	Hose, 3/8" x 118" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
4	9501686	Hose, 3/8" x 86" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	2
5	9876	90° 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 Zerk	2
	9504769	Seal Kit	AR

# PULL-TYPE RAPTOR — Parts

## Hydraulic Components Supply Valve To Wing Tilt

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.

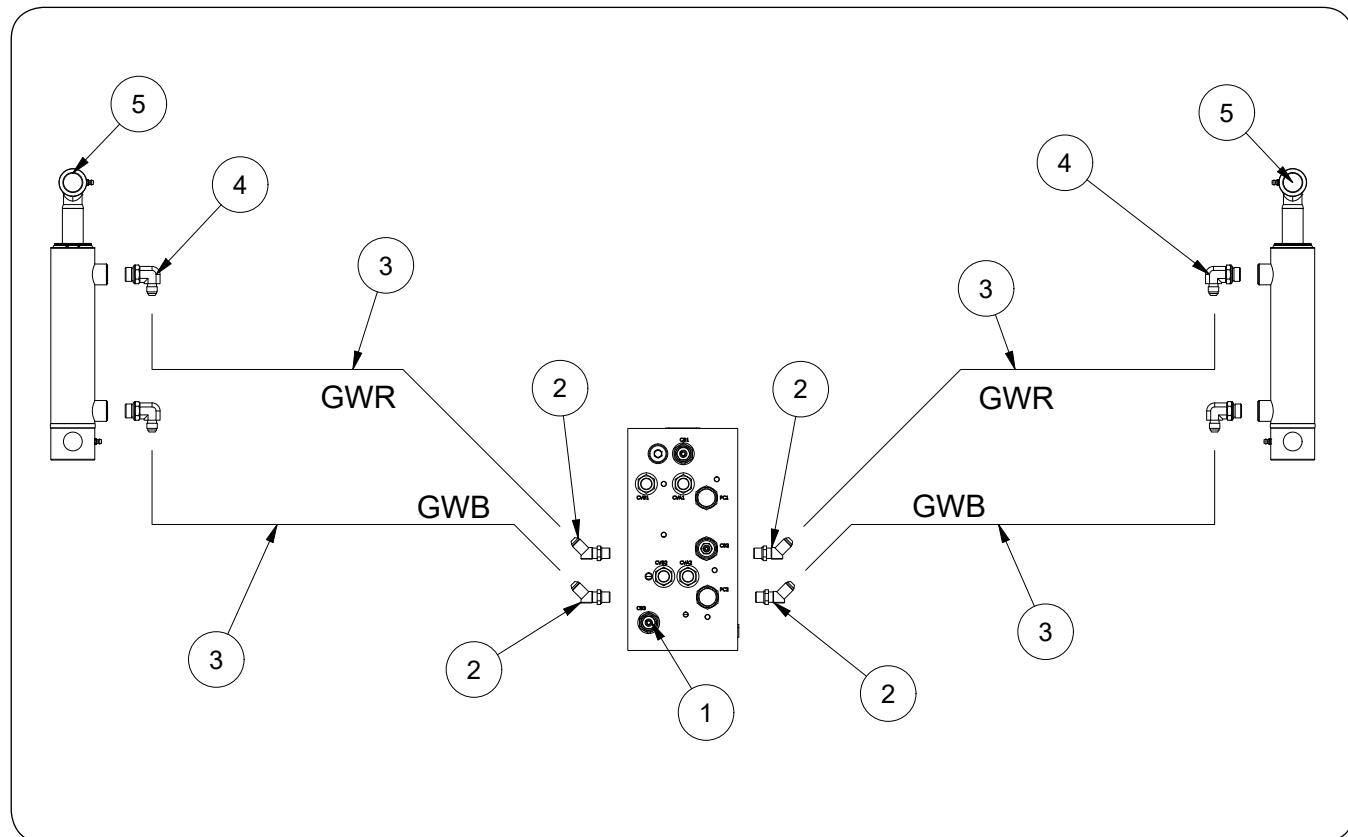


ITEM	PART NO.	DESCRIPTION	QTY	NOTES
1	9504775	Valve Assembly - Multi Function Toolbar	1	
2	9001227	45° Elbow, 3/4"-16 JIC Male x 7/8"-14 O-Ring Male	4	
3	602618	In-Line Check Valve w/0.031 Restrictor (3/4-16UNF O-Ring Male/Female Orifice)	2	
4	94969	Adapter, 3/4"-16 O-Ring Male x 3/4"-16 O-Ring Male	2	
5	9503241	Cylinder, 4" x 6" (3000 PSI)	2	
	9504125	Seal Kit		
6	9863	90° Elbow, 3/4"-16 JIC Male x 3/4"-16 O-Ring Male	2	
7	93683	90° Elbow, 3/4-16 JIC Male x 3/4"-16 JIC Female	2	
8	9502785	Hose, 1/2" x 116" (3/4"-16 JIC Female x 3/4"-16 JIC Female)	4	

# PULL-TYPE RAPTOR — Parts

## Hydraulic Components — Supply Valve To Gauge Wheels

Please visit [www.unverferth.com/parts/](http://www.unverferth.com/parts/) for the most current parts listing.



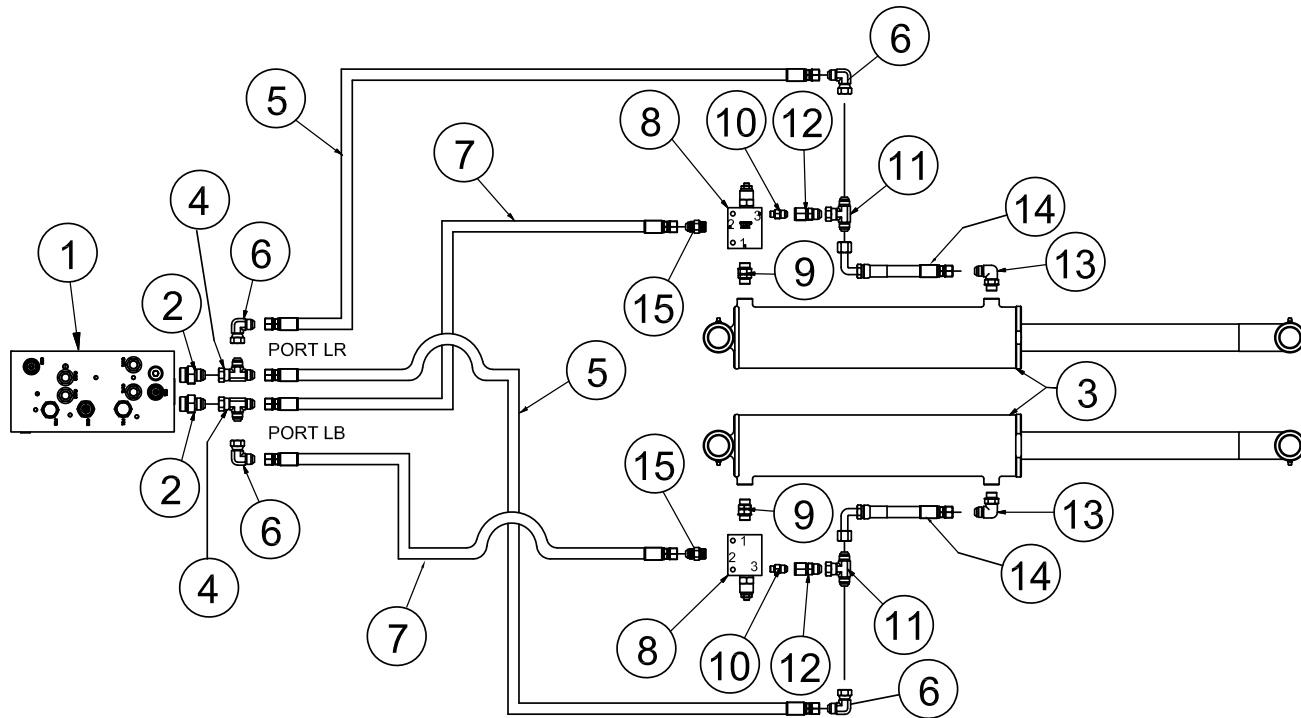
ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	96842	45° Elbow, 9/16"-18 JIC Male x 9/16"-18 O-Ring Male	4
3	9501705	Hose, 3/8" x 235" (9/16"-18 JIC Female x 9/16"-18 JIC Female)	4
4	9874	90° Elbow, 9/16"-18 JIC Male x 3/4"-16 O-Ring Male	4
5	9503785	Cylinder, 2" x 6" (3000 PSI) w/Grease Zerk	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/](http://www.unverferth.com/parts/) for the most current parts listing.

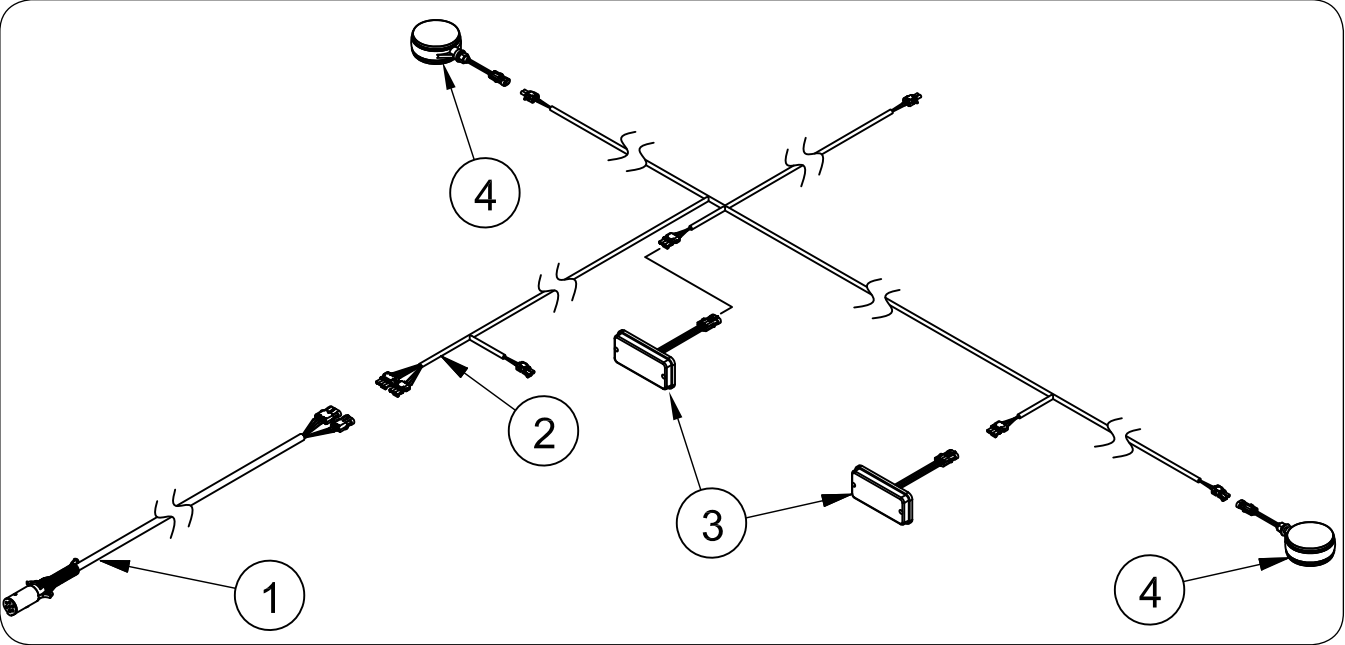


ITEM	PART NO.	DESCRIPTION	QTY
1	9504775	Valve Assembly - Multi Function Toolbar	1
2	5570652B	Adapter, 3/4"-16 JIC Male x 1 1/16"-12 O-Ring Male	2
3	9502852	Cylinder, 4" x 16" (3000 PSI) w/Grease Zerks	2
	9504769	Seal Kit	AR
4	95059	Tee, 3/4"-16 JIC Male x 3/4"-16 JIC Female x 3/4"-16 JIC Male	2
5	9502782	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

## Electrical Components

Please visit [www.unverferth.com/parts/](http://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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