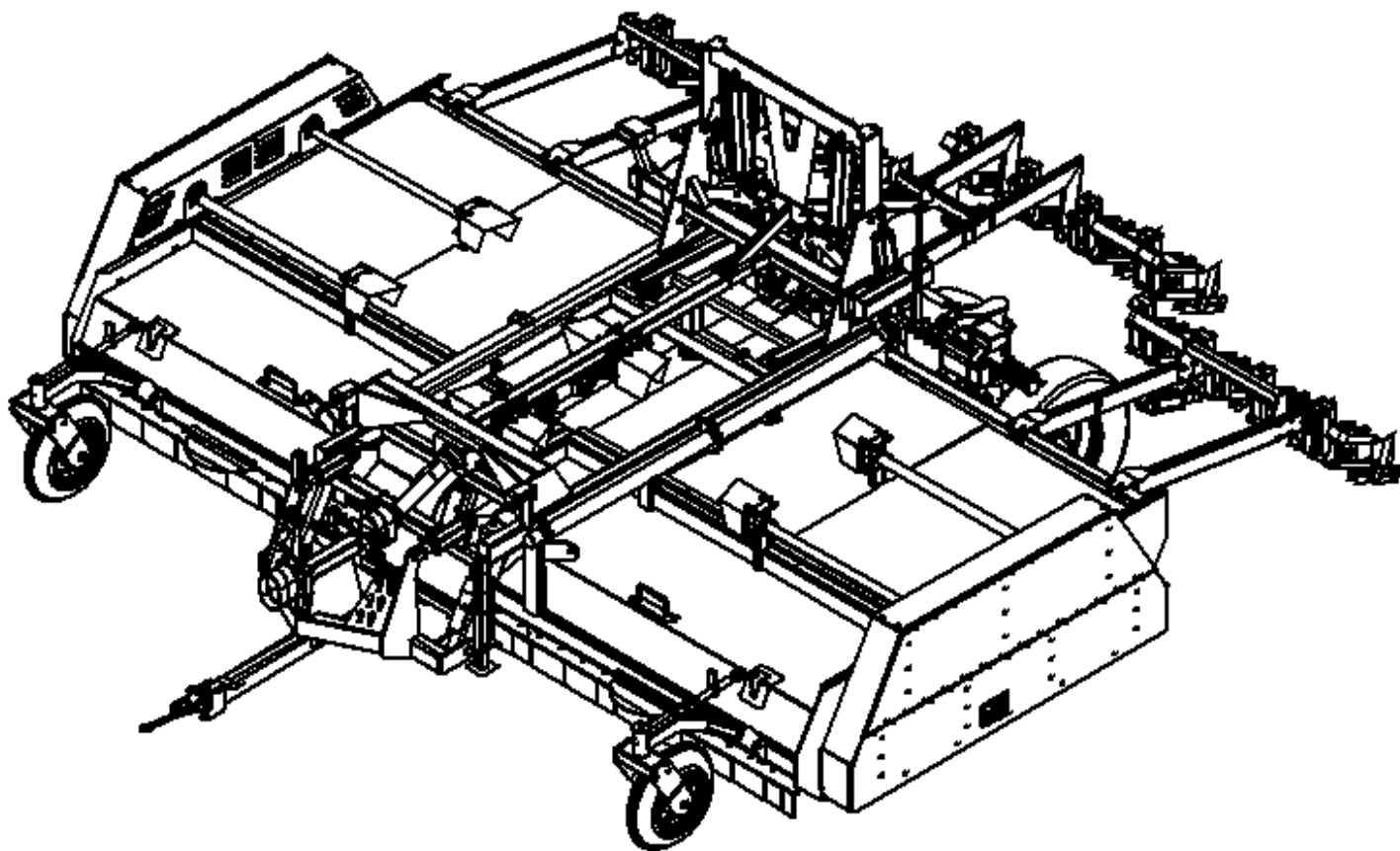


# FOLDING S-SERIES BEET DEFOLIATOR 2022

**ALLOWAY** 



FDS 12R22

## OPERATOR'S MANUAL

## TO THE DEALER:

Assembly and proper installation of this product is the responsibility of the Alloway dealer. Read manual instructions and safety rules. Make sure all items on the Dealer's Pre-Delivery and Delivery Check Lists in the Operator's Manual are completed before releasing equipment to the owner.

The dealer must complete the Warranty Registration included in this manual. Both dealer and customer must sign the registration which certifies that all Dealer Check List items have been completed. The dealer is to return the prepaid postage portion to Alloway, give one copy to the customer and retain one copy.

**Note: Warranty credit is subject to this form being completed and returned.**

## TO THE OWNER:

Read this manual before operating your Alloway equipment. The information presented will prepare you to do a better and safer job. Keep this manual handy for ready reference. Require all operators to read this manual carefully and become acquainted with all the adjustment and operating procedures before attempting to operate. Replacement manuals can be obtained from your dealer.

The equipment you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and upkeep. Lubricate the unit as specified. Observe all safety information in this manual and safety decals on the equipment.

For service, your authorized Alloway dealer has trained mechanics, genuine Alloway service parts and the necessary tools and equipment to handle all your needs.

Use only genuine Alloway service parts. Substitute parts will void the warranty and may not meet standards required for safe and satisfactory operation. Record the model number and serial number of your equipment in the spaces provided:

**Model:** \_\_\_\_\_ **Date of Purchase** \_\_\_\_\_

**Serial Number: (see Safety Decal section for location)** \_\_\_\_\_

Provide this information to your dealer to obtain correct repair parts.

Throughout this manual, the term **IMPORTANT** is used to indicate that failure to observe can cause damage to equipment. The terms **CAUTION**, **WARNING** and **DANGER** are used in conjunction with the Safety-Alert Symbol, (a triangle with an exclamation mark), to indicate the degree of hazard for items of personal safety.



This Safety-Alert Symbol indicates a hazard and means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.



**WARNING**

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury and includes hazards that are exposed when guards are removed



**CAUTION**

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

**IMPORTANT**

Indicates that failure to observe can cause damage to equipment.

**NOTE**

Indicates helpful information.

**ALLOWAY**

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## GENERAL INFORMATION

The purpose of this manual is to assist you in operating and maintaining your Beet Defoliator. Read it carefully. It furnishes information and instructions that will help you achieve years of dependable performance. These instructions have been compiled from extensive field experience and engineering data. Some information may be general in nature due to unknown and varying operating conditions. However, through experience and these instructions, you should be able to develop procedures suitable to your particular situation.

The illustrations and data used in this manual were current at the time of printing, but due to possible inline production changes, your machine may vary slightly in detail. We reserve the right to redesign and change the machines as may be necessary without notification.



### WARNING

- **Some illustrations in this manual show the Beet Defoliator with safety shields removed to provide a better view. The Beet Defoliator should never be operated with any safety shielding removed.**

Throughout this manual, references are made to right and left direction. These are determined by standing behind the equipment facing the direction of forward travel.

# SPECIFICATIONS

Number of Rows: ..... 8 - 12

Row Spacing: ..... 20 - 30 in (51 - 76 cm)

Transport Width (Folded): ..... 14' 4" (4.4 m)

Overall Width (Operation): ..... 25' 6" (7.8 m)

Transport Height (Folded): ..... 13' 4" (4.1 m)

Tractor PTO Speed: ..... 1000 RPM

Tire Size: ..... (Traction Tire) 11.2 X 24

Tire Pressure: ..... 20 PSI (137.9 kPa)

Flail Types: ..... Steel (Cup-knife / L-Knife) or Rubber

Scalper (Rotating Disc Type): ..... Optional

Weight (Cup-Knife): ..... 14,400 lbs (6530 kg)

Weight (L-Knife): ..... 13,800 lbs (6260 kg)

Weight (Rubber Flail): ..... 13,200 lbs (5990 kg)

Weight (Scalper Attachment): ..... 2,800 lbs (1270 kg)





# SAFETY RULES

## ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!



Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by a single careless act of an operator.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

It has been said "The best safety device is an informed, careful operator." We ask you to be that kind of an operator.

The designed and tested safety of this equipment depends on it being operated within the limitations as explained in this manual.

### TRAINING

- **Safety instructions are important! Read all attachment and power unit manuals; follow all safety rules and safety decal information. (Replacement manuals are available from dealer). Failure to follow instructions or safety rules can result in serious injury or death.**
- **If you do not understand any part of this manual and need assistance, see your dealer.**
- **Know your controls and how to stop engine and attachment quickly in an emergency.**
- **Operators must be instructed in and be capable of the safe operation of the equipment, its attachments and all controls. Do not allow anyone to operate this equipment without proper instructions.**
- **Keep hands and body away from pressurized lines. Use paper or cardboard, not body parts to check for leaks. Wear safety goggles. Hydraulic fluid under pressure can easily penetrate skin and will cause serious injury or death.**
- **Make sure that all operating and service personnel know that in the event hydraulic fluid penetrates skin, it must be surgically removed as soon as possible by a doctor familiar with this form of injury, or gangrene, serious injury or death will result. CONTACT A PHYSICIAN IMMEDIATELY IF FLUID ENTERS SKIN OR EYES. DO NOT DELAY.**

- **Never allow children or untrained persons to operate equipment.**

### PREPARATION

- **Check that all hardware is tight and properly installed. Always tighten to torque chart specifications unless instructed otherwise in this manual.**
- **Air in hydraulic systems can cause erratic operation and allows loads or equipment components to drop unexpectedly. Before operating or allowing anyone to approach the equipment, purge any air in the system by operating all hydraulic functions several times after connecting equipment, connecting hoses, or doing any hydraulic maintenance.**
- **Make sure all hydraulic hoses, fittings and valves are in good condition and not leaking before starting power unit or using equipment. Check and route hoses carefully to prevent damage. Hoses must not be twisted, bent sharply, kinked, frayed, pinched, or come into contact with any moving parts. Operate moveable components through full operational range to check clearances. Replace any damaged hoses immediately.**
- **Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing and head; and respirator or filter mask where appropriate.**
- **Ensure implement is properly attached, adjusted and in good operating condition.**
- **Make sure spring-activated locking pin or collar slides freely and is seated firmly in tractor PTO spline groove.**
- **Before starting power unit, check all equipment driveline guards for damage and make sure they rotate freely on all drivelines. Replace any damaged guards. If guards do not rotate freely on drivelines, repair and replace bearings before operating.**

*(Safety Rules continued on next page)*



# **SAFETY RULES**

## **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



*(Safety Rules continued from previous page)*

■ **Power unit must be equipped with ROPS or ROPS CAB and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS systems in “locked up” position at all times.**

■ **Connect PTO driveline directly to power unit PTO shaft. Never use adapter sleeves or adapter shafts. Adapters can cause driveline failures due to incorrect spline or incorrect operating length and can result in personal injury or death.■ Inspect rubber flaps and swing rod before each use. Replace if damaged or missing. Flaps must pivot and hang freely so there are no gaps. Do not put equipment into service until repaired.**

■ **Remove accumulated debris from this equipment, tractor and engine to avoid fire hazard.**

■ **Ensure all safety decals are installed. Replace if damaged. (See Safety Decals section for location.)**

■ **Ensure shields and guards are properly installed and in good condition. Replace if damaged.**

■ **A minimum 20% of tractor and equipment weight must be on tractor front wheels when attachments are in transport position. Without this weight, tractor could tip over, causing personal injury or death. The weight may be attained with a loader, front wheel weights, ballast in tires or front tractor weights. When attaining the minimum 20% weight on the front wheels, you must not exceed the Roll Over Protection Structure (ROPS) weight certification. Weigh the tractor and equipment. Do not estimate.**

■ **Make sure hydraulic hoses and cylinders are fully purged of air before operating. Keep all persons away and fill the system by raising and lowering all functions several times. Air in the system can allow components to fall unexpectedly.**

■ **Inspect and clear area of stones, branches or other hard objects that might be thrown, causing injury or damage.**

*(Safety Rules continued on next page)*



# **SAFETY RULES**

## **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



*(Safety Rules continued from previous page)*

### **TRANSPORTING**

- Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS systems in “locked up” position at all times.
- Always sit in power unit seat when operating controls or starting engine. Securely fasten seat belt, place transmission in neutral, engage brake and ensure all other controls are disengaged before starting power unit engine.
- A minimum 20% of tractor and equipment weight must be on the tractor front wheels when attachments are in transport position. Without this weight, tractor could tip over, causing personal injury or death. The weight may be attained with a loader, front wheel weights, ballast in tires or front tractor weights. Weigh the tractor and equipment. Do not estimate.
- Always attach safety chain to tractor drawbar when transporting unit.
- Always raise unit and install transport locks before transporting. Leak down or failure of mechanical or hydraulic system can cause equipment to drop.
- Never exceed 20 MPH during transport. See the Speed vs. Weight Ratio Table in "Field Operation, Transporting the Unit" for proper tow vehicle to machine weight ratios.
- Watch for hidden hazards on the terrain.
- Always comply with all state and local lighting and marking requirements.
- Never allow riders on power unit or attachment.
- Do not operate PTO during transport.
- Look down and to the rear and make sure area is clear before operating in reverse.
- Do not operate or transport on steep slopes.

- Use extreme care and reduce ground speed on slopes and rough terrain.
  - Do not operate or transport equipment while under the influence of alcohol or drugs.
- 

### **OPERATION**

- Do not operate or transport equipment while under the influence of alcohol or drugs.
- Equipment may be pictured with covers open for instructional purposes. Never operate equipment with covers open.
- Do not allow bystanders in the area when operating, attaching, removing, assembling or servicing equipment.
- Do not allow anyone to stand between tractor and unit when backing up to unit.
- Never go under equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body under equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures, or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator's Manual instructions for working under equipment and blocking requirements or have work done by a qualified dealer.
- Keep bystanders away from equipment.
- Do not operate or transport equipment while under the influence of alcohol or drugs.
- Operate only in daylight or good artificial light.
- Avoid contact with electrical wires.
- Keep hands, feet, hair and clothing away from equipment while engine is running. Stay clear of all moving parts.

*(Safety Rules continued on next page)*



# **SAFETY RULES**

## **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



*(Safety Rules continued from previous page)*

■ Always comply with all state and local lighting and marking requirements.

■ Never allow riders on power unit or attachment.

■ Power unit must be equipped with ROPS or ROPS cab and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS systems in "locked up" position at all times.

■ Always sit in power unit seat when operating controls or starting engine. Securely fasten seat belt, place transmission in neutral, engage brake and ensure all other controls are disengaged before starting power unit engine.

■ Operate tractor PTO at the RPM speed stated in "Specifications" section.

■ Do not operate PTO during transport.

■ Look down and to the rear and make sure area is clear before operating in reverse.

■ Do not operate or transport on steep slopes.

■ Do not stop, start or change directions suddenly on slopes.

■ Use extreme care and reduce ground speed on slopes and rough terrain.

■ Watch for hidden hazards on the terrain during operation.

■ Stop power unit and equipment immediately upon striking an obstruction. Turn off engine, remove key, inspect and repair any damage before resuming operation.

■ Never work on scalper attachment in the raised position. Lower scalpers to the ground and service each unit individually.

■ Always raise scalper arms before traveling in reverse.

■ Always connect safety chain from equipment to towing vehicle when transporting.

■ **AVOID INJURY OR DEATH FROM POWER LINES:**

- Stay away from power lines.
- Electrocutation can occur without direct contact.
- Check clearances before raising implement.
- Do not leave the operator's seat if any part of the tractor or implement contacts electric lines.

■ Before servicing, adjusting, repairing or unplugging, stop tractor engine, place all controls in neutral, set park brake, remove ignition key and wait for all moving parts to stop.

■ Before working under a raised implement, read and follow all Operator's Manual instructions and safety rules. Implement must be attached to tractor. Lift cylinder locks must be installed and lift cylinders lowered against locks. Hydraulic system leak down, hydraulic system failures or movement of control levers can cause equipment to drop unexpectedly and cause severe injury or death.

*(Safety Rules continued on next page)*



# **SAFETY RULES**

## **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**



*(Safety Rules continued from previous page)*

### **MAINTENANCE**

- Before servicing, adjusting, repairing or unplugging, stop tractor engine, place all controls in neutral, set park brake, remove ignition key and wait for all moving parts to stop.
- Before working under a raised implement, read and follow all Operator's Manual instructions and safety rules. Implement must be attached to tractor. Lift cylinder locks must be installed and lift cylinders lowered against locks. Hydraulic system leak down, hydraulic system failures, or movement of control levers can cause equipment to drop unexpectedly and cause severe injury or death.
- Service and maintenance work not covered in OWNER SERVICE must be done by a qualified dealership. Special skills, tools and safety procedures may be required. Failure to follow these instructions can result in serious injury or death.
- Do not modify or alter or permit anyone else to modify or alter the equipment or any of its components in any way.
- Your dealer can supply original equipment hydraulic accessories and repair parts. Substitute parts may not meet original equipment specifications and may be dangerous.
- Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing and head; and respirator or filter mask where appropriate.
- Do not allow other people in the area when operating, attaching, removing, assembling or servicing equipment.
- Never go under equipment lowered to the ground or raised, unless it is properly blocked and secured. Never place any part of the body under equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator's Manual instructions for working under and

blocking requirements or have work done by a qualified dealer.

- Ensure implement is properly attached, adjusted and in good operating condition.
- Never perform service or maintenance with engine running.
- Make sure hydraulic hoses and cylinders are fully purged of air before operating. Keep all persons away and fill the system by raising and lowering all functions several times. Air in the system can allow components to fall unexpectedly.
- Keep all persons away from operator control area while performing adjustments, service or maintenance.
- Make certain all movement of implement components has stopped before approaching for service.
- Wear cut and abrasion resistant work gloves when handling blades. Careless or improper handling may result in serious injury.
- Tighten all bolts, nuts and screws to torque chart specifications. Check that all cotter pins are installed securely to ensure equipment is in a safe condition before operating.
- Ensure all safety decals are installed. Replace if damaged. (See Safety Decals section for location.)
- Ensure shields and guards are properly installed and in good condition. Replace if damaged.
- Do not disconnect hydraulic lines until machine is securely blocked or placed in lowest position and system pressure is released by operating all valve control levers.

### **STORAGE**

- Follow manual instructions for storage.
- Keep children and bystanders away from storage area.

# CHECK LISTS

## PRE-DELIVERY CHECK LIST

(DEALER'S RESPONSIBILITY)

Inspect the equipment thoroughly after assembly to ensure it is set up properly before delivering it to the customer.

The following check lists are a reminder of points to inspect. Check off each item as it is found satisfactory or after proper adjustment is made.

- Check that all safety decals are installed and in good condition. Replace if damaged.
- Check that shields and guards are properly installed and in good condition. Replace if damaged.
- Check that PTO shaft is properly installed.
- Properly attach implement to tractor and make all necessary adjustments.
- Check all bolts to be sure they are tight.
- Check wheel bolts for proper torque.
- Check that all cotter pins and safety pins are properly installed. Replace if damaged.
- Check and grease all lubrication points as identified in "Service, lubrication information."
- Check the level of gearbox fluids before delivery. Service, if required, as specified in the "Service, lubrication information."
- Check that tractor hydraulic reservoir has been serviced and that hydraulic system and all functions have been operated through full cylinder stroke to purge air from system.
- After pressurizing and operating all Defoliator functions, stop tractor and make sure there are no leaks in the hydraulic system. Follow all safety rules when checking for leaks.

## DELIVERY CHECK LIST

(DEALER'S RESPONSIBILITY)

- Show customer how to make adjustments and select proper PTO speed.
- Show customer how to make adjustments.
- Instruct customer how to lubricate and explain importance of lubrication.
- Point out the safety decals. Explain their meaning and the need to keep them in place and in good condition. Emphasize the increased safety hazards when instructions are not followed.
- Present Operator's Manual and request that customer and all operators read it before operating equipment. Point out the manual safety rules, explain their meanings and emphasize the increased safety hazards that exist when safety rules are not followed.
- Show customer how to make sure driveline is properly installed and that spring-activated locking pin or collar slides freely and is seated in groove on tractor PTO shaft.
- Show customer the safe, proper procedures to be used when mounting, dismounting and storing equipment.
- Explain to customer that when equipment is transported on a road or highway, safety devices should be used to give adequate warning to operators of other vehicles.
- Explain to customer that when equipment is transported on a road or highway, a Slow Moving Vehicle (SMV) sign should be used to provide adequate warning to operators of other vehicles.
- Explain to customer that when towing on a public road to comply with all state and local lighting/marketing laws and to use a safety tow chain.
- Make customer aware of optional equipment available so that customer can make proper choices as required.
- Point out all guards and shields. Explain their importance and the safety hazards that exist when not kept in place and in good condition.

## OPERATOR SIGN-OFF RECORD

Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by an operator's single careless act.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, judgement and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

It has been said “The best safety device is an informed, careful operator.” We ask you to be that kind of operator.

Alloway Equipment Company follows the general safety standards specified by the American Society of Agricultural Engineers (ASAE) and the

Occupational Safety and Health Administration (OSHA).

Anyone who will be operating and/or maintaining the Folding Defoliator must read and clearly understand all Safety, Operating and Service & Maintenance information presented in this manual.

Do not operate or allow anyone else to operate this equipment until this information has been reviewed. Review this information annually, before the season start-up. Make periodic reviews of the Safety and Operation sections a standard practice for those using any of your equipment.

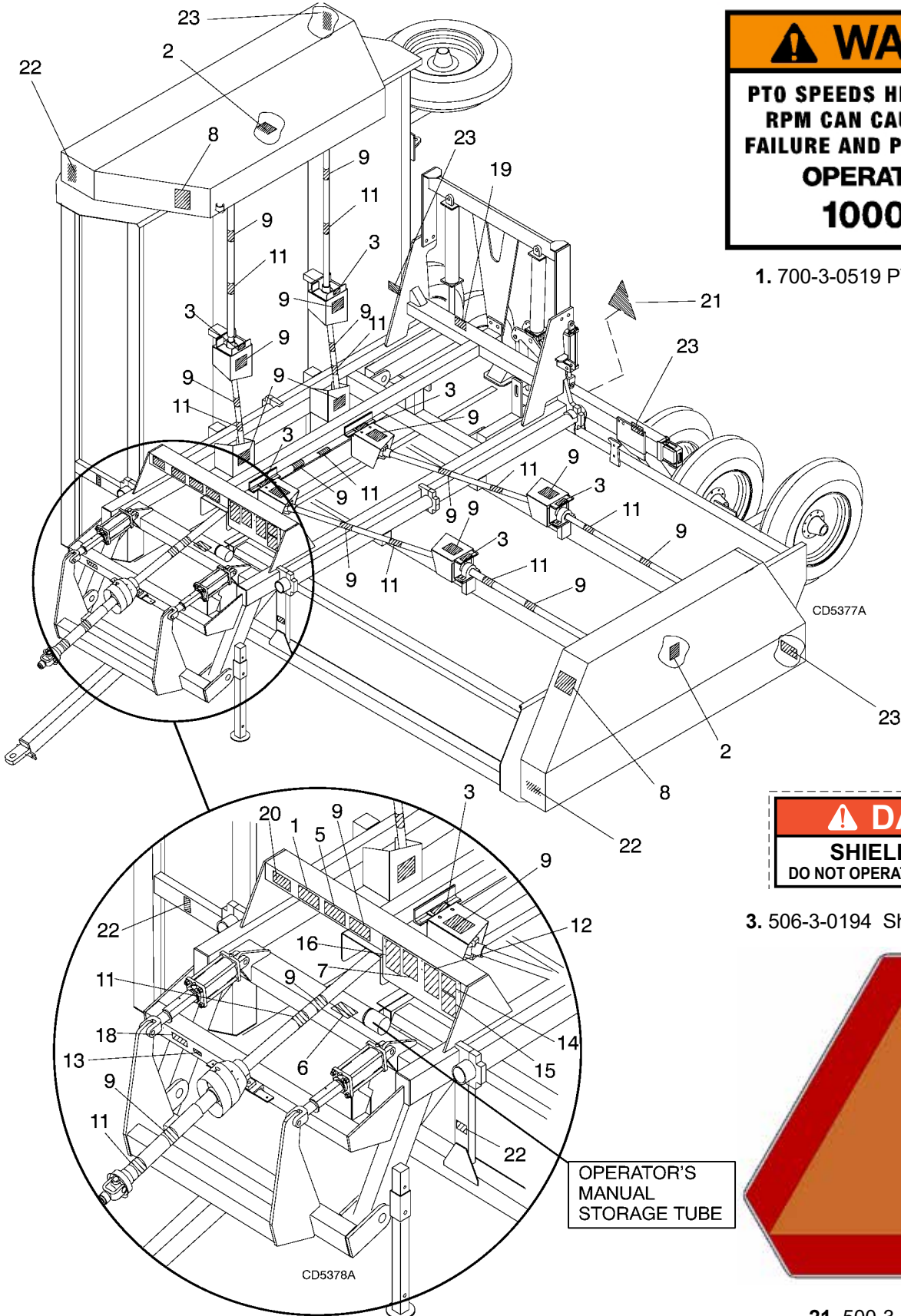
Use the following Operator Sign-off Record to verify that each operator has read and understood the information in this manual and has been instructed in the safe operation of the defoliator.

[illegible]



# SAFETY & INSTRUCTIONAL DECALS

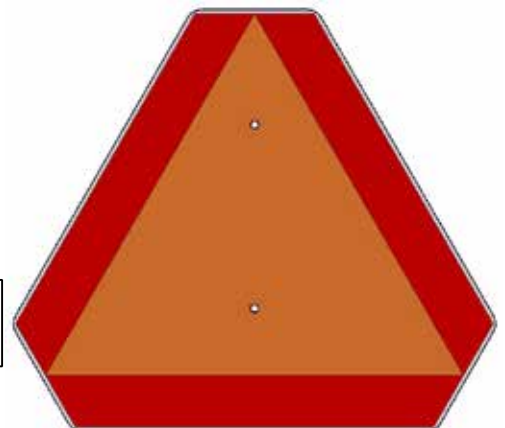
ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!  
Replace Immediately If Damaged!



1. 700-3-0519 PTO Speed Warning



3. 506-3-0194 Shield Missing Danger



21. 500-3-1696 SMV Sign

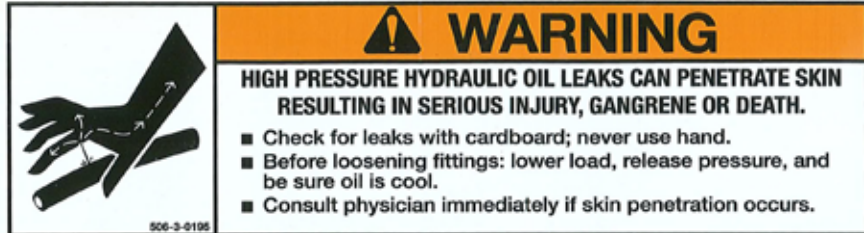
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# SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!  
Replace Immediately If Damaged!



5. 506-3-0195 Hydraulic Pressure Warning



6. 506-3-0192 Manual Container Warning



9. 506-3-0196 Rotating Driveline Warning



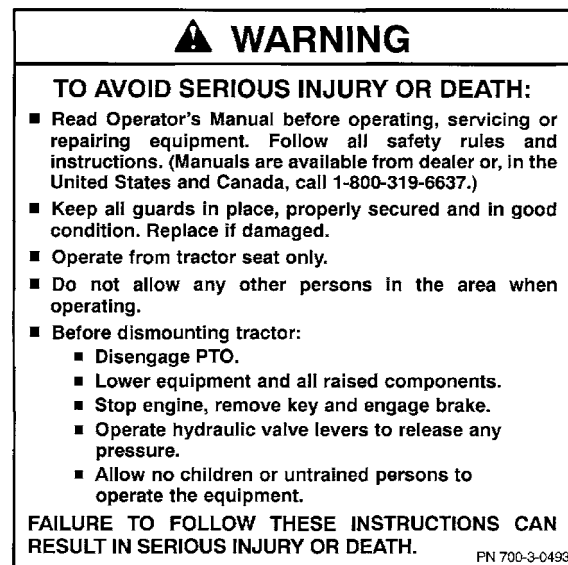
B. 100-3-1367 Safety Guard



11. 903-17456 Driveline Safety Sign



13. 200-3-1366 Serial Number Tag

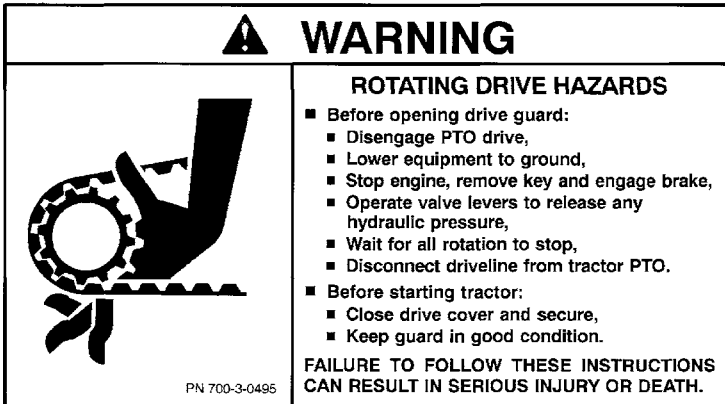


7. 700-3-0493 Read Manual Warning

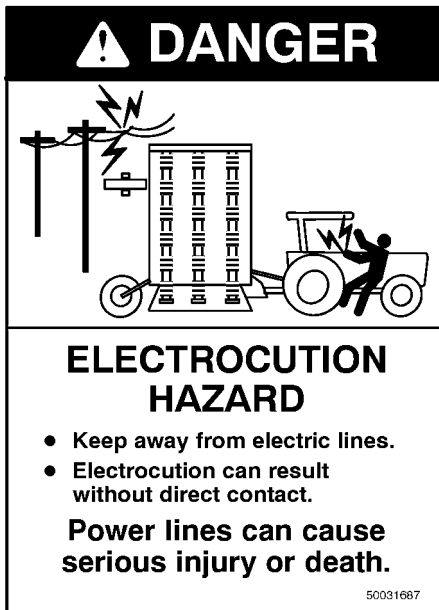


# SAFETY & INSTRUCTIONAL DECALS

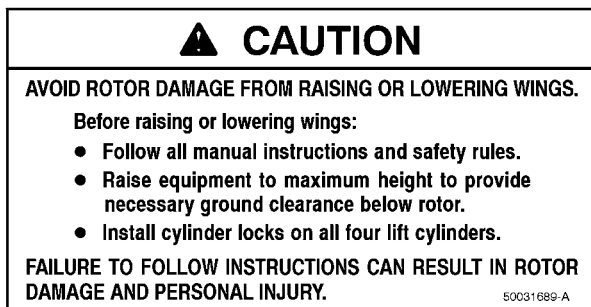
**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**  
**Replace Immediately If Damaged!**



8. 700-3-0495 Rotating Drive Hazard



14. 500-3-1687 Electrocution Hazard



20. 500-3-1689 Rotor Damage Warning



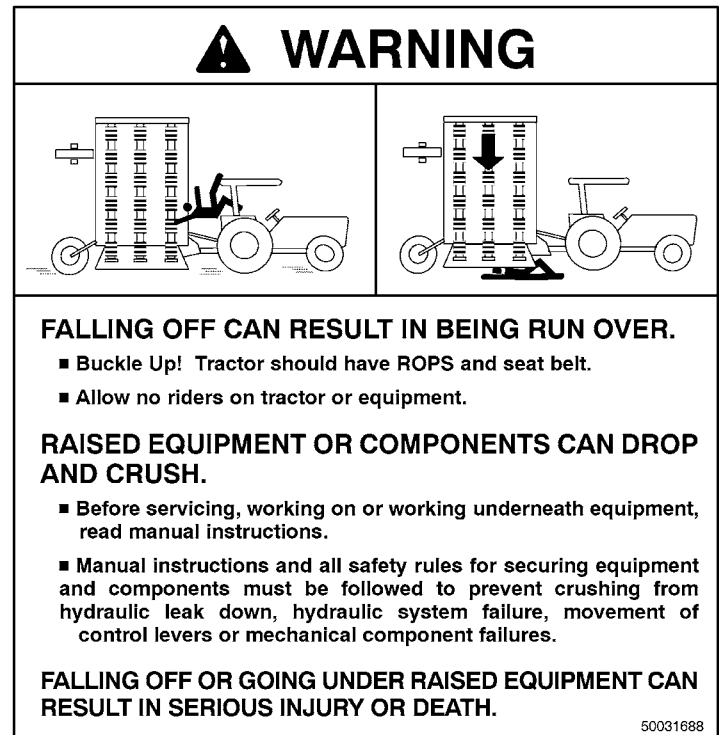
H. 200-3-4004 Amber Reflector 9 x 2



I. 200-3-4005 Red Reflector 9 x 2



J. 200-3-4034 Orange Fluorescent Reflector 9 x 2



12. 500-3-1688 Raised Equipment Warning

(Safety Decals continued on next page)

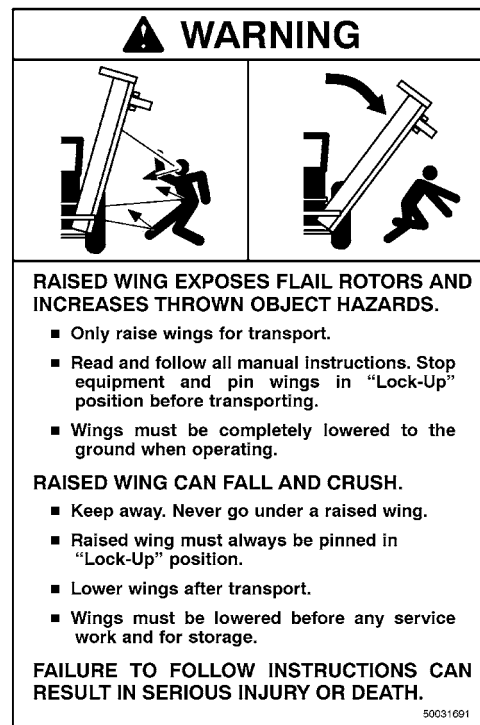


# SAFETY & INSTRUCTIONAL DECALS

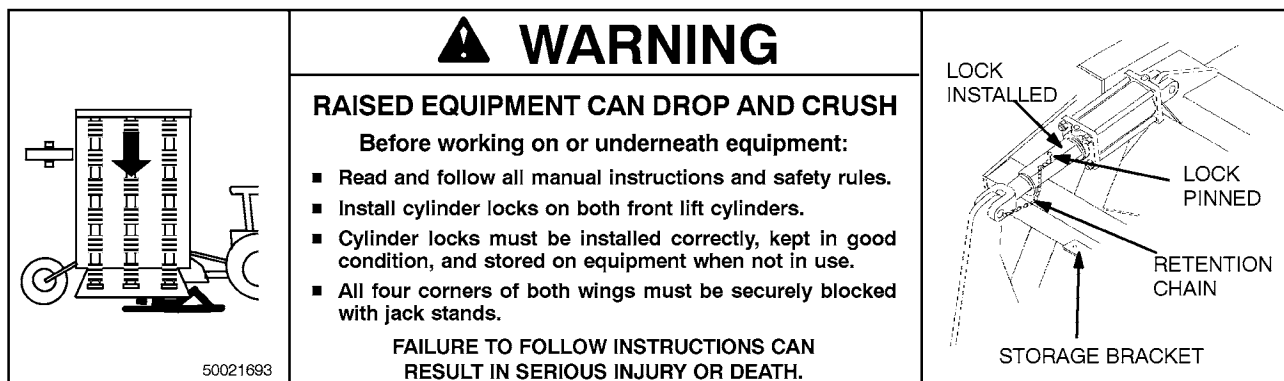
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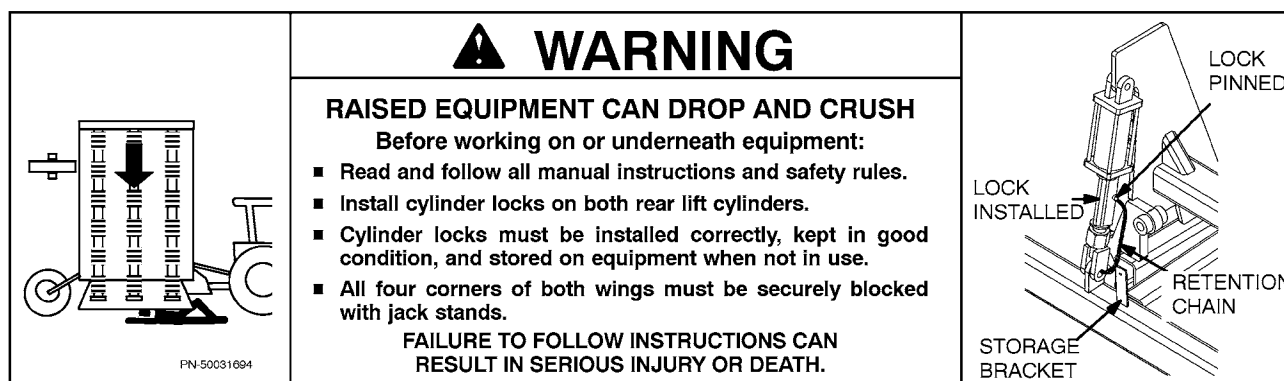
15. 500-3-1690 Stand/Walk on Defoliator Warning



16. 500-3-1691 Raised Wing Hazard



18. 500-3-1693 Front Transport Lock Warning



19. 500-3-1694 Rear Transport Lock Warning



# OPERATION

Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by an operator's single careless act.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, judgment and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

It has been said "The best safety device is an informed, careful operator." We ask you to be that kind of operator.



## WARNING

- Operators must be instructed in and be capable of the safe operation of the equipment, its attachments and all controls. Do not allow anyone to operate this equipment without proper instructions.
- Never allow children or untrained persons to operate equipment.



## CAUTION

- If you do not understand any part of this manual and need assistance, see your dealer.
- Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing and head.



## WARNING

- Make sure spring-activated locking pin or collar slides freely and is seated firmly in tractor PTO spline groove.
- Before starting tractor, check all equipment driveline guards for damage and make sure they rotate freely on all drivelines. Replace any damaged guards. If guards do not rotate freely on drive-lines, repair and replace bearings before operating.

The Alloway Beet Defoliator is designed to efficiently remove the foliage from sugar beets. A series of rubber or steel flails on three drums cleans the top of the beet, leaving the exposed crown.

Be familiar with the defoliator before starting.

The owner is responsible for training operators in the safe operation of the defoliator.

- **A minimum 20% of tractor and equipment weight must be on tractor front wheels with attachments in transport position. Without this weight, tractor could tip over causing personal injury or death. The weight may be attained with a loader, front wheel weights, ballast in tires or front tractor weights. Weigh the tractor and equipment. Do not estimate.**



## WARNING

- Make sure all safety decals are installed. Replace if damaged. (See Safety Decals section for location.)
- Make sure shields and guards are properly installed and in good condition. Replace if damaged.
- Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.
- Never walk, stand or place yourself or others under a raised wing or in the path of a lowering wing. Hydraulic system leak down, hydraulic system failures, mechanical failures or movement of control levers can cause wings to drop unexpectedly and cause severe injury or death.
- Keep bystanders away from equipment.
- Never go under equipment lowered to the ground or raised, unless it is properly blocked and secured. Never place any part of the body under equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator's Manual instructions for working underneath and blocking requirements, or have work done by a qualified dealer.

## Operation Continued

- Keep hands, feet, hair and clothing away from equipment while engine is running. Stay clear of all moving parts.

- Never allow riders on power unit or attachment.

- Power unit must be equipped with ROPS or ROPS CAB and seat belt. Keep seat belt securely fastened. Falling off power unit can result in death from being run over or crushed. Keep foldable ROPS systems in “locked up” position at all times.



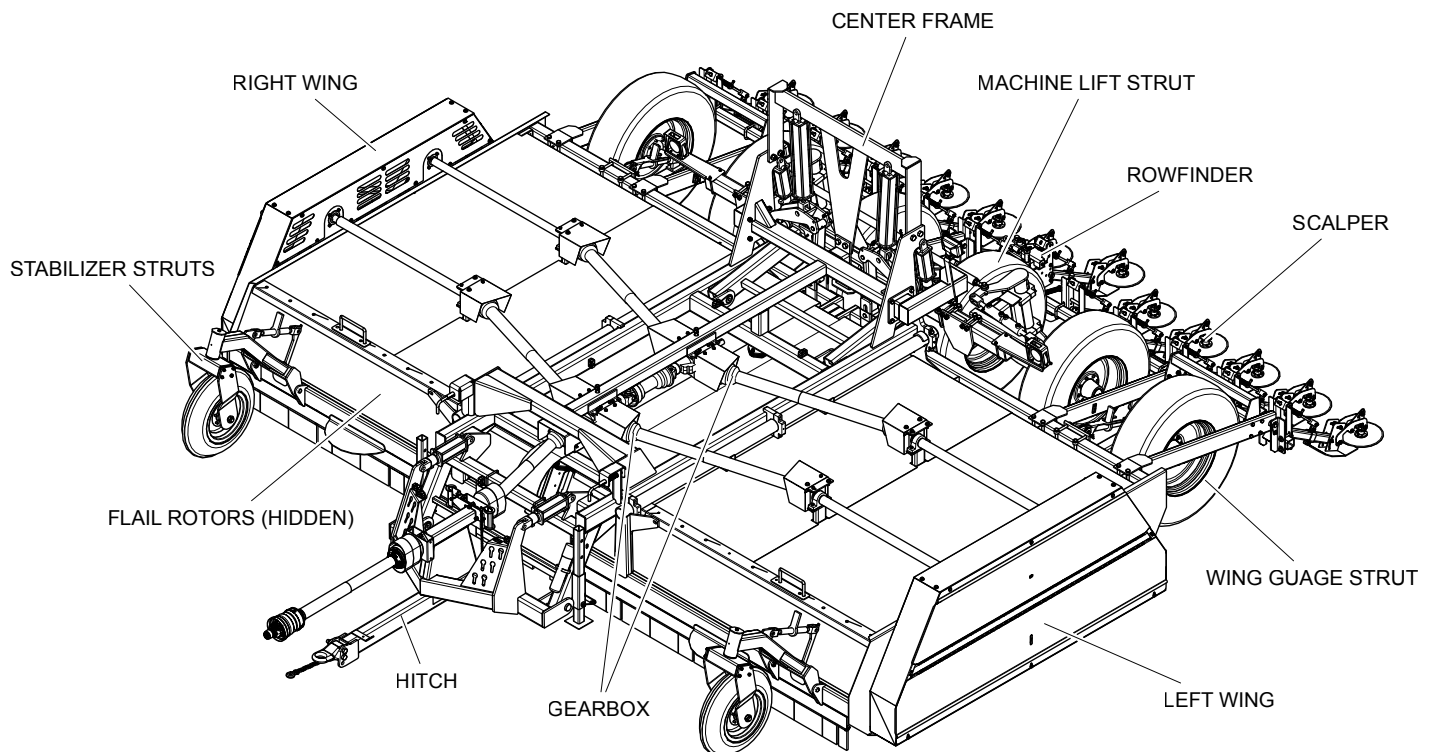
### CAUTION

- Operate only in daylight or good artificial light.

- Always comply with all state and local lighting and marking requirements.



- Avoid contact with electrical wires.



**Figure 1.** Principal Components

### PRINCIPAL COMPONENTS

The Alloway Folding Defoliator is built as three major components.

- a) Right Wing Assembly
- b) Left Wing Assembly
- c) Center Frame

The center frame is supported by hydraulically adjustable wheel struts and the hydraulically adjustable hitch. The main driveline and two gearboxes are mounted to the center frame.

Each wing assembly holds three flail rotor assemblies, their drive components and a manually adjustable wing gauge wheel.

Optional scalper attachments can be mounted directly to each wing assembly.

Optional rear wheel steering struts are available.

## Operation Continued

### PRE-OPERATION CHECK LIST

(OWNER'S RESPONSIBILITY)

#### IMPORTANT

■ **This Pre-Operation Check List is provided for the operator. It is important to follow for both personal safety and maintenance of the Folding Defoliator.**

To assure safe and efficient operation, it is essential that each machine operator read and understand the operating procedures and related safety requirements outlined in this manual.

Complete the Pre-Operation Check List after the first hour of field operation and before each shift thereafter.

- Show customer how to make adjustments.
- Keep Operator's Manual in storage tube for ready reference and use.
- Review and follow all safety rules and safety decal instructions on pages 5 through 12.
- Check that all safety decals are installed and in good condition. Replace if damaged.
- Check that all shields and guards are properly installed and in good condition. Replace if damaged.
- Check that all hardware and cotter pins are properly installed and secured.
- Check the condition of all flails and check that they swing freely. Replace any damaged or broken flails.
- Check the condition of the scalpels. Adjust or repair as required.
- Check tire pressures. Service as necessary.
- Check that equipment is properly and securely attached to tractor.

- Make sure driveline spring-activated locking collar slides freely and is seated firmly in tractor PTO spline groove.
- Before starting tractor, check all equipment driveline guards for damage and make sure they rotate freely on all drivelines. Replace any damaged guards. If guards do not rotate freely on drivelines, repair and replace bearings before operating.
- Do not allow riders.
- Check and keep all bystanders away from equipment working area.
- Check the condition of all drive belts. Tension or align as required. Replace any that are frayed or broken.
- Check all lubrication points and grease as instructed in "Service, lubrication information" Make sure the PTO slip joint is lubricated and that the gearbox fluid levels are correct.
- Set tractor PTO at correct rpm for your equipment.
- Check that all hydraulic hoses and fittings are in good condition and not leaking before starting tractor. Check that hoses are not twisted, bent sharply, kinked, frayed or pulled tight. Replace any damaged hoses immediately.
- Raise and lower equipment to make sure air is purged from hydraulic cylinders and hoses.
- Make sure tractor 3-point lift links do not interfere with hydraulic hoses or driveline throughout full turning range.
- Make sure tractor ROPS or ROPS CAB and seat belt are in good condition. Keep seat belt securely fastened during operation to prevent falling off.
- Before starting engine, operator must be in tractor seat with seat belt fastened. Place transmission in neutral or park, engage brake and disengage tractor PTO.
- Check that rubber flaps are in good condition, pivot freely and hang without gaps.



## Operation Continued

### BREAK-IN PROCEDURE

The following should be observed when operating the unit for the first time:

1. Attach PTO shaft. Remove grease zerks to gain access to the set screws for tightening on unit.

#### After operating for 1/2 hour or five acres

2. Check all nuts, bolts and other fasteners. Tighten to specifications given in the Bolt Torque Chart, page 66.
3. Check and re-torque on flail mounting bracket fasteners
4. Tighten wheel bolts to specifications given in the Bolt Torque Chart, page 66.
5. Check that the flails are in good condition and swing freely.
6. Check oil level in the gearbox. Add oil as required.
7. Check that the PTO driveline shield turns freely.
8. Lubricate all grease points.

#### After operating for 5 hours

9. Repeat Steps 1 through 6 above.
10. Check the tension of the drive belts. Refer to the Service and Maintenance section for the procedure. Adjust as required.

#### After operating for 10 hours

11. Repeat steps 1 through 6.
12. Check tension of drive belts. Adjust as required.

#### After operating for 15 and 20 hours

13. Check tension of drive belts. Adjust as required.

### EQUIPMENT MATCHING

Use only a tractor with adequate power and weight to operate this Defoliator. The following specifications are guidelines for a proper match.

#### PTO

Tractor must be equipped with a 1000 RPM PTO, never operate at 540 rpm. The Defoliator driveline can be ordered with a tractor yoke that matches a 1-3/8" 21-spline shaft or a 1-3/4" 20-spline shaft. Carefully measure PTO driveline in operating positions to ensure that there is proper engagement between male and female shaft to prevent the driveline from coming apart or bottoming out. Standard PTO driveline must not be shorter than 40.13" or longer than 56.63" in any position during operation, as shown in Figure 2.



#### WARNING

■ Connect PTO driveline directly to tractor PTO shaft. Never use adapter sleeves or adapter shafts. Adapters can cause driveline failures due to incorrect spline or incorrect operating length and result in personal injury or death. The use of adapters will void warranty due to damaged caused to the tractor PTO, PTO driveshaft or implement.

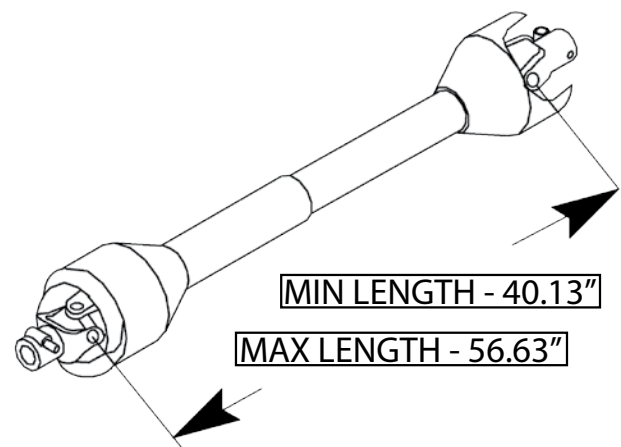


Figure 2a. PTO Driveline Operating Length



## Operation Continued

### CV DRIVELINE TURNING LIMITS

Do not exceed a turning angle of 80 degrees at the head of the Constant Velocity driveline or damage will occur.

### IMPORTANT

■ The CV PTO shaft allows the operator to make relatively short turns at the end of the field without disengaging the PTO drive. However do not make turns tighter than 80 degrees from straight position. If turning radius must exceed 80 degrees, disengage tractor PTO before starting the turn.

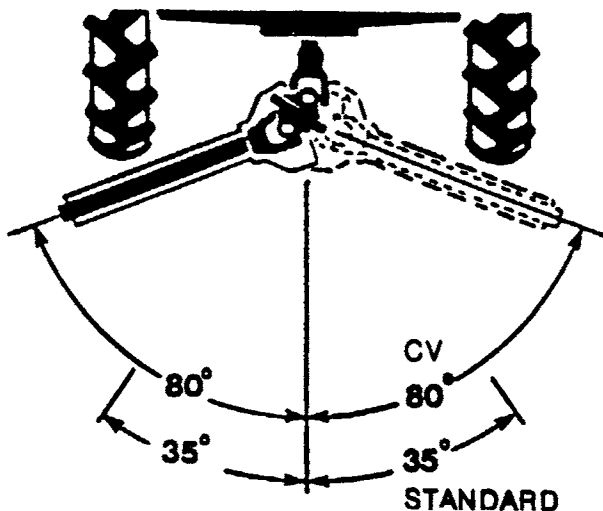


Figure 2b. Driveline Angles

### HYDRAULIC SYSTEM

The tractor hydraulic system must be capable of supplying 8 gpm (22 lpm) at 2000 psi (13,900 kPa). The tractor must be equipped with a minimum of three operator-controlled hydraulic remote valves (one additional valve is required if optional rear steering is used). See Figure 6 Tractor Connection (Typical) for specific Hydraulic System connections

### DRAWBAR WITH CLEVIS

The tractor drawbar must be set to provide 16 - 20" (406 mm - 508 mm) between the end of the PTO shaft and the center of the drawbar pin. A tractor manufacturer's clevis hitch (hammer strap and hitch pin) must be installed.

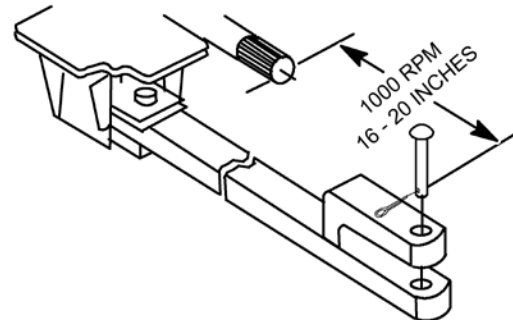


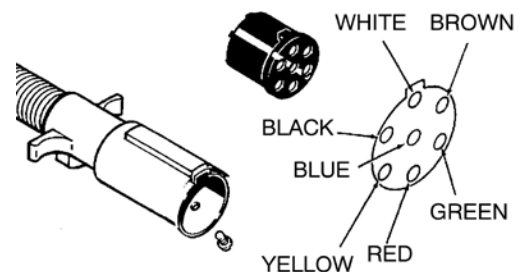
Figure 3. Drawbar Dimensions

### ELECTRICAL SYSTEM (Figure 4)

The tractor must be equipped with a SAE J560a 7-pin electrical connector. When connected to the Defoliator, turn signals and warning flashers will operate with the tractor lighting system.

The Defoliator is equipped with warning flashers and turn signals located on each rear corner of the center frame. Warning lights must be functional whenever the Defoliator is transported on public highways.

See your tractor operator manual for instructions on warning light and turn signal operation. If warning lights and turn signals do not function correctly, see your Alloway dealer.



|        |   |                            |
|--------|---|----------------------------|
| White  | - | Ground                     |
| Black  | - | Field Lights (not used)    |
| Blue   | - | Auxiliary Power (not used) |
| Red    | - | Auxiliary Power (not used) |
| Yellow | - | Left Turn Signal           |
| Green  | - | Right Turn Signal          |
| Brown  | - | Tail Light                 |

Figure 4. 7-Pin Electrical Connector

## Operation Continued

### TRACTOR BALLAST

The tractor should be equipped with manufacturer's maximum allowable front end ballast for operational and transport stability.

### PROPERLY MOUNT AND DISMOUNT TRACTOR

Proper safety procedures should be followed when mounting tractor. The operator should be in the tractor seat with the seat belt securely fastened and any foldable ROPS system should be in the "locked-up" position before starting the engine or operating any controls.

Whenever the operator is required to leave the tractor seat, follow proper safety procedures. The "proper dismounting procedure" is to stop the engine, set brakes, remove the ignition key and wait for all moving parts to stop before removing seat belt to dismount. After dismounting the tractor, secure wheels with chocks.

Hydraulically raise the Defoliator, stop engine, set park brake and wait for all moving parts to stop and remove ignition key before dismounting.

Install cylinder locks on front hitch/lift cylinders as shown in Figure 6

### ATTACHING DEFOLIATOR TO TRACTOR

**Note:** The following procedure presumes that the Defoliator is in "STORED POSITION" as described on page 23, with rear wheel/lift cylinder locks installed.

Make sure there are no bystanders between tractor and Defoliator or in the area.

Carefully back up until the tractor drawbar aligns with the Defoliator hitch.

Stop engine, set parking brake, wait for all moving parts to stop and remove ignition key before dismounting.

Clean hydraulic couplers and fittings to avoid oil contamination.

Connect hydraulic hoses controlling front hitch/lift cylinders to remote valve #2 hydraulic couplers on the tractor. Connect these hoses so moving operator control lever forward lowers Defoliator (raises hitch tongue) and moving operator control lever rearward raises Defoliator (lowers hitch tongue).

From tractor seat, hydraulically position height of Defoliator hitch and back up tractor to allow tractor clevis to align with Defoliator hitch.

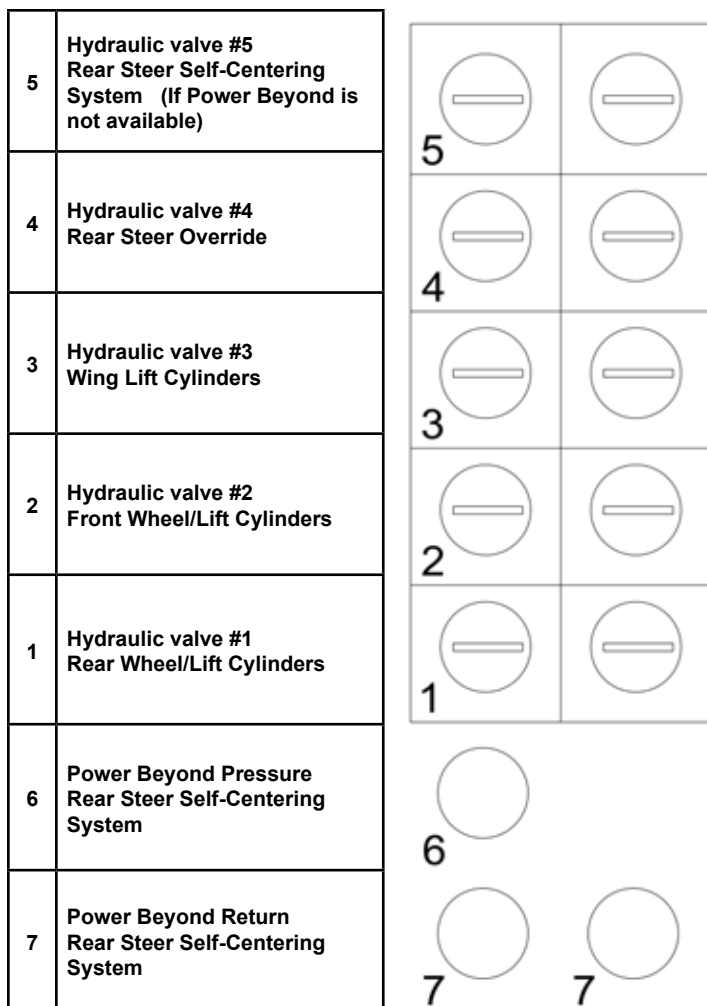
Install tractor manufacturer's clevis hitch pin and secure with tractor manufacturer's lock mechanism.

Attach the safety chain to the drawbar support of the tractor.

Connect remaining hydraulic lines as listed in Figure 5 at right. Note that this is a typical configuration and your tractor may deviate from this layout.

Insert the 7-pin male Defoliator electrical cable into the tractor female connector. Route electrical wires to prevent chafing, abrasion, or contact with rotating components. Configuration of electrical cable is shown in Figure 4.

## Operation Continued



**Figure 5.** Tractor Connection (Typical)



**Figure 6.** Front Hitch/Lift Cylinder Locks (Installed)

Check that all PTO driveline guards are in place and driveshaft telescopes correctly. Attach PTO driveshaft to tractor and make sure locking pin or collar is fully engaged.

Verify that all tractor hydraulic control lever movements are correct before operating or transporting the Defoliator.



**Figure 7.** Parking Stand in Raised Position

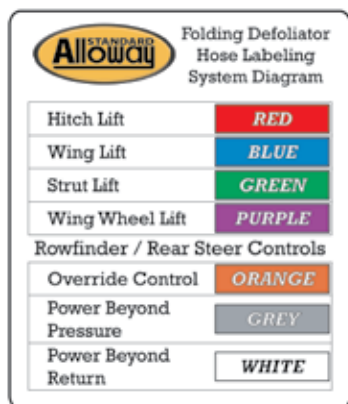
Raise parking stands and secure in raised position as shown in Figure 7. Make sure all cylinder locks are in place.

## Operation Continued

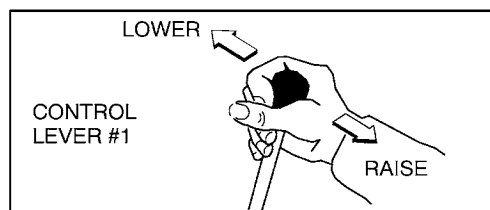
### VERIFICATION OF CONTROL MOVEMENTS

Comply with all Safety Rules and start the tractor. Check that all tractor hydraulic control lever movements operate the Defoliator correctly as shown in Figures 9-12.

Defoliator movements must be correct before proceeding with field operation. If movements are not correct, recheck all hydraulic coupler connections and make necessary changes.

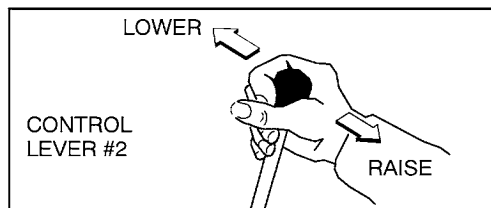


**Figure 8.** Hose Labeling Diagram



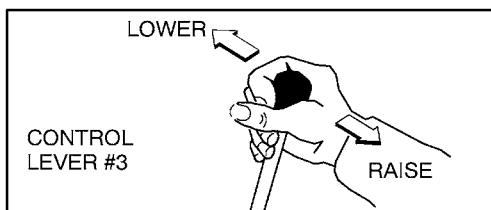
- Handle forward - Lower Rear of Defoliator
- Handle back - Raise Rear of Defoliator

**Figure 9.** Rear Wheel/Lift Cylinders



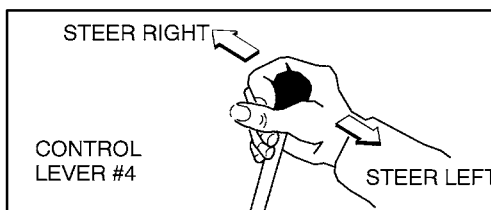
- Handle forward - Lower Front of Defoliator
- Handle back - Raise Front of Defoliator

**Figure 10.** Front Hitch/Lift Cylinders



- Handle forward - Lower Wings to Operating Position
- Handle back - Raise Wings to Transport Position

**Figure 11.** Wing Raise/Lower Cylinders



- Handle forward - Defoliator Steers to Right
- Handle back - Defoliator Steers to Left

**Figure 12.** Rear Steering Cylinders (Optional)

## Operation Continued

### DISCONNECTING DEFOLIATOR FROM TRACTOR

After following the instructions for “Disconnecting Defoliator from Tractor” the Defoliator will be in “STORED POSITION.” In “STORED POSITION,” Defoliator wings must be lowered to rest on wing gauge wheels, rear wheel/lift cylinder locks installed, both parking stands lowered, front hitch in lowered position, PTO driveline in storage bracket and unit parked on a hard level surface.

Always be aware of hydraulic system leak-down. Never place any part of your body underneath equipment or between moveable parts.

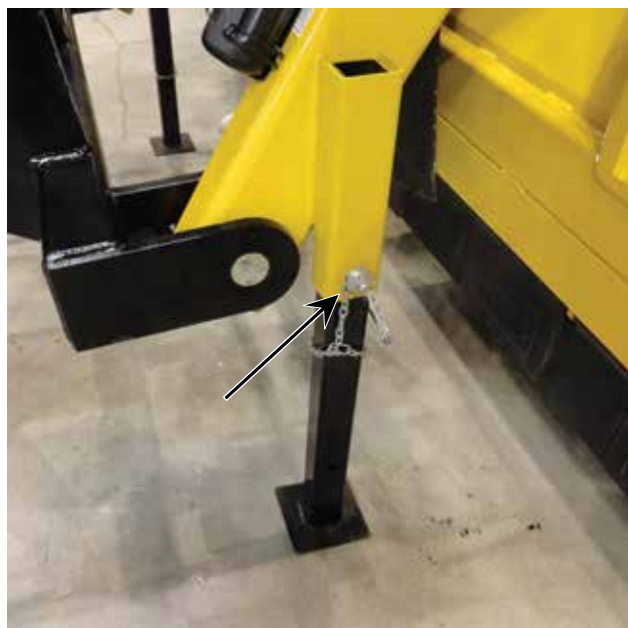
Check that park stands, park stand brackets, park lockpins and lockpin retaining chains are in good condition. Replace any missing or damaged park stand component immediately.

Park Defoliator on a hard level surface.

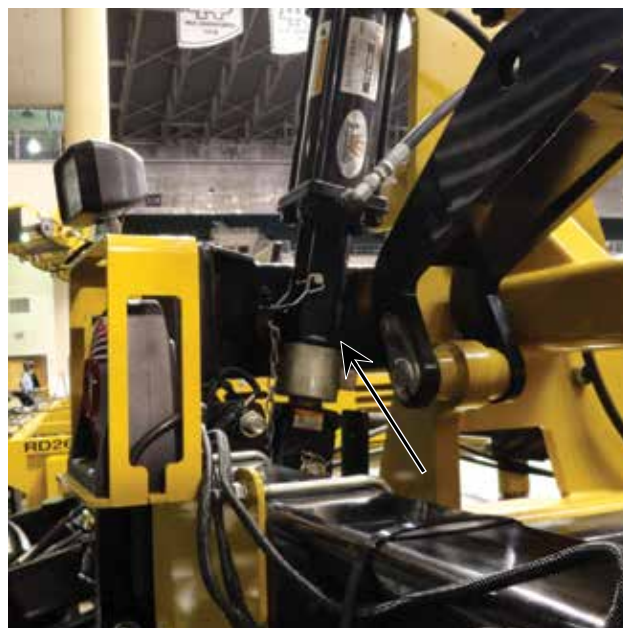
If Defoliator wings are in the raised transport position, carefully lower wings as instructed in “**LOWERING WINGS to OPERATING POSITION**”

Stop the engine, set brakes, remove ignition key and wait for all moving parts to stop before dismounting.

Set and secure parking stands in lowered position (Figure 13).

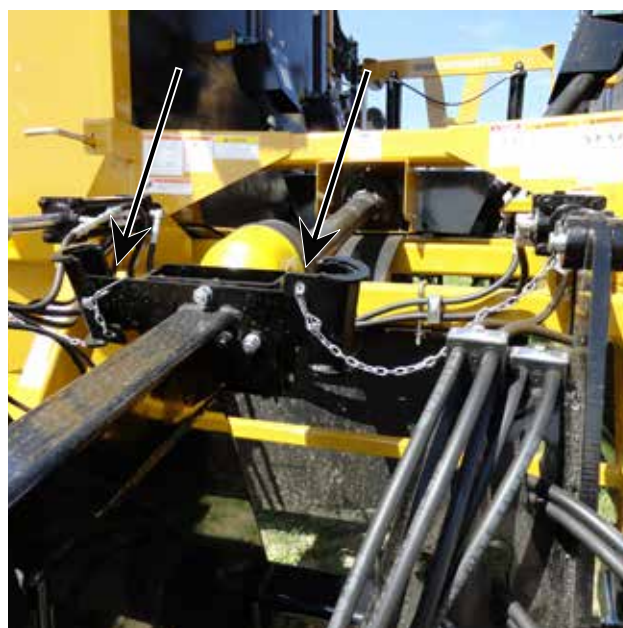


**Figure 13.** Parking Stand in Lowered Position (Right Side Shown)



**Figure 14.** Install Rear Wheel/Lift Cylinder Locks as shown

Lower Defoliator to rest on rear cylinder locks and parking stands. Raise hitch slightly from tractor drawbar so that drawbar pin can be removed.



**Figure 15.** Front Hitch/Lift Cylinder Lock Storage



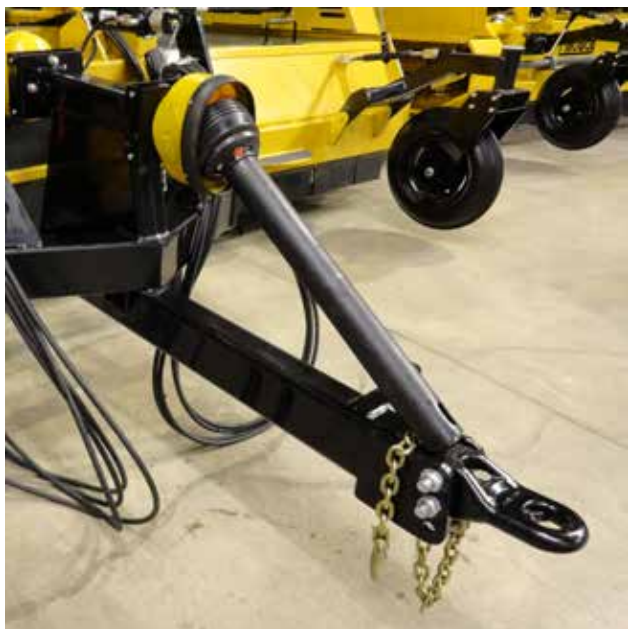
## Operation Continued

Stop engine, set parking brake, remove ignition key and wait for all moving parts to stop before dismounting.

Remove drawbar pin.

Disconnect PTO from tractor shaft and place PTO on PTO storage rest, Figure 16. Carefully drive tractor ahead far enough to disengage hitch from tractor drawbar.

Disconnect hydraulic lines and electrical connector.



**Figure 16. PTO Rest**

## RAISING WINGS TO TRANSPORT POSITION



### WARNING

■ Never walk, stand or place yourself or others under a raised wing or in the path of a lowering wing. Hydraulic system leak down, hydraulic system failures, mechanical failures or movement of control levers can cause wings to drop unexpectedly and cause severe injury or death.



### CAUTION

■ Before raising or lowering wings, front hitch/lift and rear wheel/lift cylinders must be fully extended and all four cylinder locks installed. This prevents rotor and bearing support damage that can result from ground contact.

When raising wings to transport position, the Defoliator must be attached to the tractor with front hitch/lift and rear wheel/lift cylinder locks installed.(Figure 7, Figure 14)

Place wing lock pins in Operate position. (Figure 17a)

Fully raise front and rear of Defoliator. Move tractor control lever #3 to raise wings to transport position.

Stop engine, set parking brake, wait for all moving parts to stop. Remove ignition key before dismounting.



**Figure 17a. Lock Pin Operate (Lowered) Position**

## Operation Continued

Move wing lock pins to Transport position. (Figure 17b)

Lower hydraulic cylinders to rest on cylinder locks.



**Figure 17b.** Lock Pin Transport (Raised) Position

### LOWERING WINGS TO OPERATE POSITION



#### WARNING

■ Never walk, stand or place yourself or others under a raised wing or in the path of a lowering wing. Hydraulic system leak down, hydraulic system failures, mechanical failures or movement of control levers can cause wings to drop unexpectedly and cause severe injury or death.



#### CAUTION

■ Before raising or lowering wings, front hitch/lift and rear wheel/lift cylinders must be fully extended and all four cylinder locks installed. This prevents rotor and bearing support damage that can result from ground contact.

When lowering wings to operating position, the Defoliator must be properly attached to the tractor on level ground, with front hitch/lift and rear wheel/lift cylinder locks installed and pinned as shown in Figure 7 and Figure 14.

Use tractor hydraulic lever #3 to relieve pressure on wing lock pins.

Stop engine, set parking brake, wait for all moving parts to stop and remove ignition key before dismounting.

Pull and turn lock-up pins to place in Operate(Lowered) position as shown in Figure 17a.

Lower the wings to rest the wing gauge wheels on the ground.

Retract wing cylinders completely to allow wings to follow ground contour during operation.

**Note:** Pull ahead several feet to align swivel wing wheels with travel direction before making final field adjustments.



**Figure 18.** Rear Wheel/Lift Cylinder Lock Storage

## Operation Continued

### FIELD OPERATION

The Alloway Defoliator will give best performance if it is properly set to work in existing conditions.

#### IMPORTANT

■ **Field conditions may require additional fine adjustment since tractor tracks are usually lower from cultivating and other previous field operations.**

Machine setting may require adjustment within or between fields as conditions change. Changes in soil moisture, soil density or even beet varieties may affect performance.

Defoliator must be adjusted so that wheels are centered between rows and rubber flail assemblies are centered over beet rows. All flail tips should be about 1/2" above the ground.

Before entering the field initially, the machine should be unfolded on firm and level ground.

#### LEVELING THE DEFOLIATOR

Place Defoliator wings in operating position.

Remove front hitch/lift and rear wheel/lift cylinder locks.

Lower rear of machine until the rubber flail tips contact the beets 1/2" below the crown.

Lower the front of the machine until the Defoliator wings are parallel to the ground. Adjust front hitch/lift and rear wheel/lift cylinder stop collars (Figure 21) to establish the operating position of the center frame. Fine adjustment may be required to match field conditions.

Adjust wing gauge wheels so that wings are level across the beet tops.

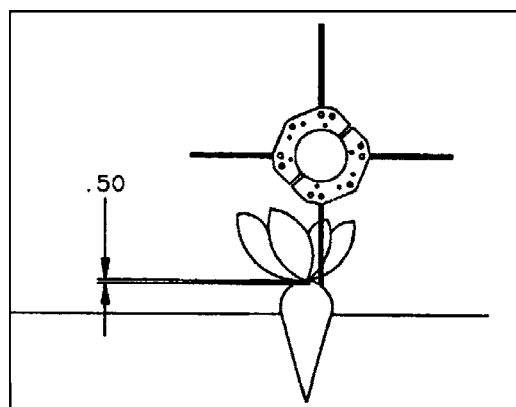
Adjust the ratchet jacks on each gauge wheel strut to level the wings and establish flail cutting height.

On machines equipped with steel flail front rotor, the steel flail tips are 4" shorter than the rubber flail tips. Steel flails should remove only greens and not damage beet crowns, while rubber flails remove the residual foliage and deposit leaves between the beet rows.

Machines may be equipped with rubber flails on all rotors. The load of leaf removal should be split between the #1 and #2 rotor. For that reason fewer flails are used on the #1 rotor.



**Figure 21.** Rear Wheel/Lift Cylinder Stop Collars



**Figure 22.** Leveling Defoliator



**Figure 23.** Gauge Wheel Ratchet Jack



## Operation Continued

### ENTERING FIELD

Pull into the field with the tractor centered on the first set of rows.

Lower the machine front and rear to the pre-set position. Scalpers will automatically lower after the rear depth control cylinders bottom out.

### STARTING DEFOLIATOR

With the tractor engine at idle, slowly engage the PTO and choose your forward speed setting. Recommended speed in average conditions is 2 to 3 mph.

Increase engine speed to PTO speed.

Release clutch and move tractor forward following the beet rows.

If the performance of the Defoliator is not satisfactory, stop the unit and make any necessary adjustments.

### STOPPING DEFOLIATOR

Reduce engine speed and depress clutch. Take tractor out of gear. After engine has slowed to idle, disengage PTO.

### IMPORTANT

■ **Never disengage PTO at high RPM because the inertia of the turning rotors in the Defoliator can damage the tractor PTO brake.**

Stop engine, set parking brake, wait for all moving parts to stop and remove ignition key before dismounting.

Check behind the Defoliator to observe performance.

Further fine-adjustment on wing gauge wheels and/or center carrier may be needed for satisfactory performance.

### FIELD PERFORMANCE

Many factors will influence the performance of the Defoliator:

- Bulk of leaf canopy
- Moisture content of foliage Frozen leaves
- Beet varieties
- Beet stand
- Cultivating job
- Forward speed
- Soil moisture content Height of beds

The operator will have to adjust the machine accordingly.

In soft or wet conditions, the tires will sink into the soil and the machine should be raised to maintain the flail contact point 1/2" below the beet crown.

In conditions where beets extend above the ground and are easily knocked over, adjust flails to contact beet at or just below the crown.

Do not allow the flails to contact the ground. Dirt, stones or other material can be thrown from under the machine.

Running flails too low causes high flail wear and breakage, higher fuel consumption and more debris build-up inside the machine. Tall beets may be uprooted and kicked between rows.

### REAR STEERING (Optional)



**Figure 24.** Rear Steering

Rear wheel steering struts are used when additional maneuverability is required. Tractor must be equipped with a fourth hydraulic control lever if rear steering is to be used.

To operate the rear steering, connect hydraulic hoses so that moving the #4 control lever forward steers the Defoliator to the right and moving the #4 control lever rearward moves the Defoliator to the left.

Use the rear steering system to adjust the offset of the Defoliator for field operation.

Ensure that rear steering is “centered” for transport and is tracking directly behind the tractor.

### SCALPERS (Optional)



#### **WARNING**

- **Do not handle blades with bare hands. Careless or improper handling may result in serious injury.**

The scalper option available from Alloway is a non-driven, mechanically rotating disc. Scalper lift cylinders operate in parallel with the rear wheel lift cylinders. When raising the rear of the Defoliator, scalper attachments will raise first. When lowering the rear of the Defoliator, scalper attachments will lower last.

#### **IMPORTANT**

- **Always raise scalpels before backing. Fully raise scalpels before folding wings.**

The disc will rotate and a sharp cutting edge is exposed to do the scalping job. When properly adjusted, it will stay free of debris and consistently cut the required amount of the beet crown.

Uneven beet stands and closely spaced beets will cause less than perfect performance. Adjust to regulate thickness of slice to be removed.

Forward speed changes will affect performance.

In any working position, forward edge of disc should be lower than rear edge.

Scalpels are factory pre-set but require fine adjustment for individual conditions.



#### **CAUTION**

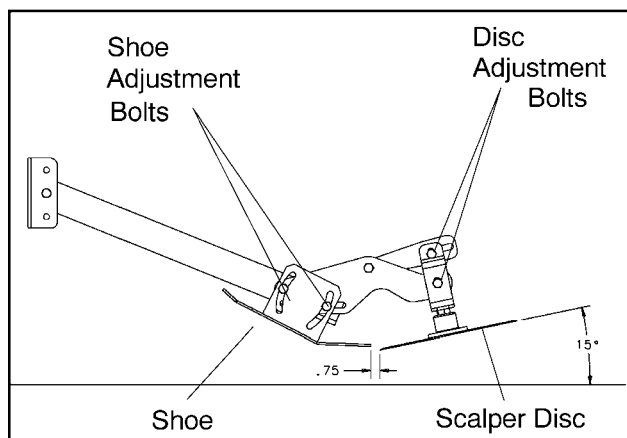
- **Never work on scalper attachment in the raised position. Lower scalpels to the ground and service each unit individually.**

Loosen shoe adjustment bolts (Figure 25) and adjust scalper shoe. The trailing surface of the shoe should be nearly horizontal.

Loosen disc adjustment bolts to adjust disc operating pitch. Adjust pitch of scalper disk to slice beets as required.

When adjustments are complete, tighten bolts to specifications given in torque chart. Follow similar steps for adjusting knife scalpels.

## Operation Continued



**Figure 25. Scalper Adjustment**



**Figure 26. Disc Scalper Attachment**

## TRANSPORTING THE DEFOLIATOR

When transporting on public roads, wings must be raised to transport position. Follow instructions in "Raising Wings to Transport Position."

Make sure reflector, lights and SMV sign are clean and clearly visible to other traffic.

Do not allow riders.

Use hazard flashers on tractor when transporting.

Never exceed safe travel speed. Slow down when making turns and traveling on rough roads or shoulders.

Use a tractor of sufficient size and front ballast to ensure safe steering.

Lock foot brake pedals together for even application during road travel.

## DEFOLIATOR STORAGE

Lower wings to operating position and disconnect Defoliator from tractor as described in "Disconnecting Defoliator from Tractor." Defoliator should be in "STORED POSITION" and be supported by parking stands (Figure 27) rear wheel/lift cylinder locks (Figure 14) and wing gauge wheels.

Gauge wheel screw jacks may be adjusted to support wings in a level position.

Store Defoliator in an area away from children and bystanders.

Do not allow children to play on or around the stored unit.

Store in a dry, level area.



**Figure 27. Parking Stand**  
SERIAL #



# OWNER SERVICE

Safety is a primary concern in the design and manufacture of our products. Unfortunately, our efforts to provide safe equipment can be wiped out by an operator's single careless act.

In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, judgement and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

It has been said "The best safety device is an informed, careful operator."

We ask you to be that operator.

The information in this section is written for the operator who possesses basic mechanical skills. Should you need help, your dealer has trained service technicians available. For your protection, read and follow all safety information in this manual.



## WARNING

■ **Service and maintenance work not covered in OWNER SERVICE must be done by a qualified dealership. Special skills, tools and safety procedures may be required. Failure to follow these instructions can result in serious injury or death.**

■ **Before working underneath a raised implement, read and follow all operator's manual instructions and safety rules. Implement must be attached to tractor, lift cylinder locks must be installed and lift cylinders lowered against locks. Hydraulic system leak down, hydraulic system failures, or movement of control levers can cause equipment to drop unexpectedly and cause severe injury or death.**

■ **Never perform service or maintenance with engine running.**

■ **Do not disconnect hydraulic lines until engine is stopped, tractor is properly secured, equipment and all components are lowered to the ground and system pressure is released by operating all valve control levers.**

■ **Keep all persons away from operator control area while performing adjustments, service or maintenance.**

■ **Never go under equipment lowered to the ground or raised, unless it is properly blocked and secured. Never place any part of the body under equipment or between moveable parts even when the engine has been turned off. Hydraulic system leak down, hydraulic system failures, mechanical failures or movement of control levers can cause equipment to drop or rotate unexpectedly and cause severe injury or death. Follow Operator's Manual instructions for working under and blocking requirements, or have work done by a qualified dealer.**



## CAUTION

■ **Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Wear sturdy, rough-soled work shoes and protective equipment for eyes, hair, hands, hearing and head.**

## BLOCKING

Do not work under the Defoliator unless it is properly attached to the tractor and blocked securely.

When properly attached, the unit will be anchored to minimize front-to-rear movement.

Do not work on Defoliator with wings in any intermediate position.

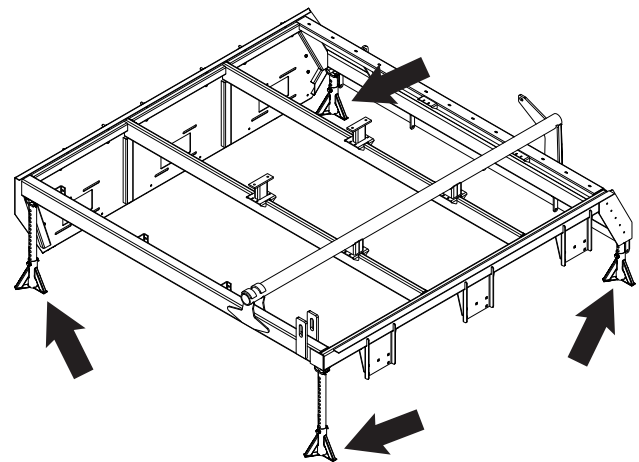


Figure 28. Jackstand Locations

For any service work requiring working under the Defoliator, the following blocking instructions must be followed.

The Defoliator must be properly attached to a tractor located on a hard level surface.

## Owner Service Continued

The Defoliator wings must be lowered to operating position with wing gauge wheels adjusted to support the wings during service.

Front and rear cylinder locks must be properly installed. Do not use a bent or damaged cylinder lock or retaining pin. Replace any damaged or lost cylinder lock components immediately.

Place a jackstand with a minimum load rating of 4000 lbs under wing frames at each corner of right and left wings as shown in Figure 28. Adjust jackstands so that they securely support the Defoliator during service.

Tractor park brake must be engaged, wheels chocked, and PTO shaft disconnected from tractor.

## LUBRICATION

### GEARBOX OIL

Use 80W90 gear lube. Capacity: 2 US quarts.

### GREASING

Use a multi-purpose high temperature grease.

**Note:** Over-greasing can cause damage to bearing seals.

- Use hand held grease gun to avoid blown seals.
- Wipe grease fittings clean to avoid contamination.
- Replace or repair broken fittings immediately.
- If fittings do not accept grease, remove zerk and clean passageway.

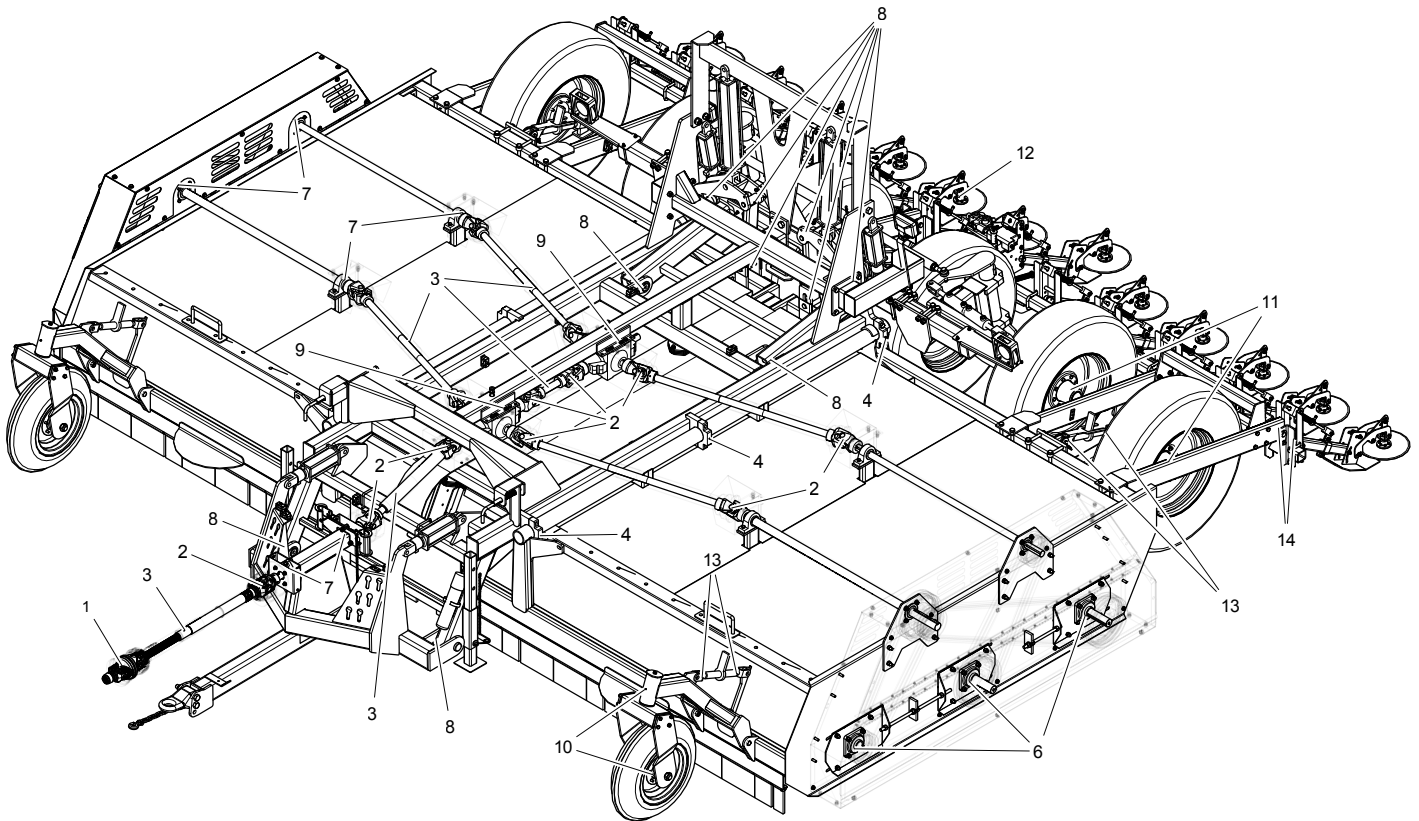


Figure 29. Lubrication Points

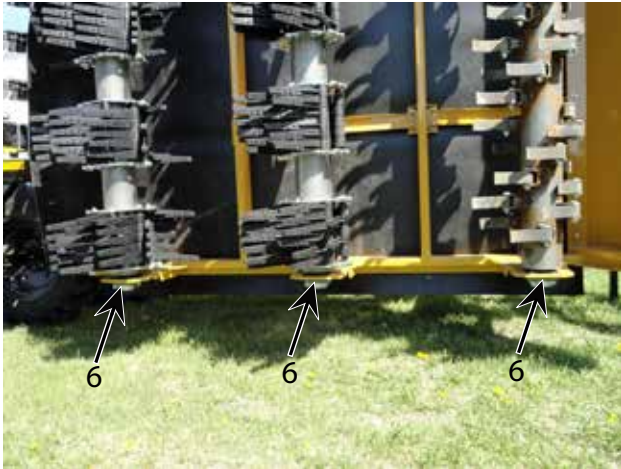


## Owner Service *Continued*

### Sealed Bearing Information (Figure 30)

Moisture and contaminants can be trapped behind bearing seals.

Usually a single pump from a hand held grease gun every 40 hours of operation will be sufficient to force moisture out and lubricate bearing.



**Figure 30.** Inside Rotor Bearings  
**Grease Intervals**

#### 10 Hours

1. Grease CV PTO portion of the driveline.
2. Grease PTO driveline with regular universals and shield zerks.

#### 20 Hours

3. Grease all telescoping drive shafts on top of the machine including shield zerks.
4. Grease wing hinge points and all lift arm linkages.

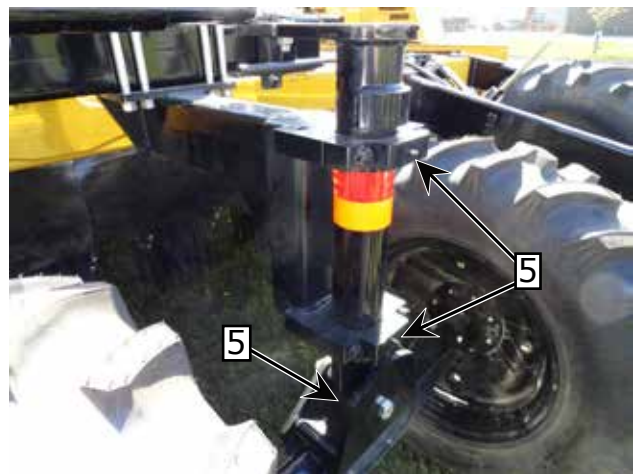
#### 40 Hours

5. Grease rear steering pivots (Figure 31).
6. Grease all rotor bearings (Figure 29, 30).
7. Grease all line shaft bearings.
8. Grease hitch and rear carrier hinge points.

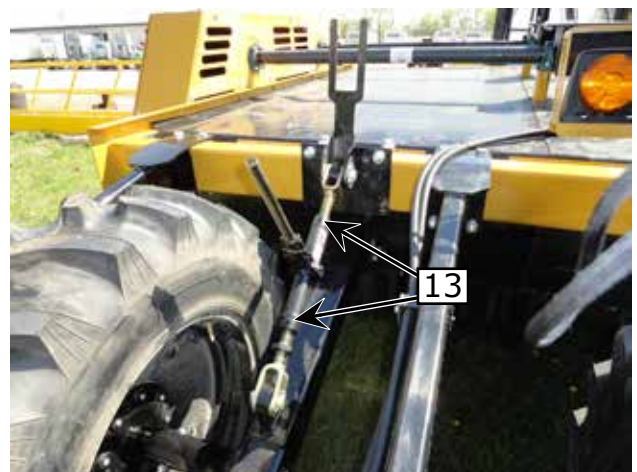
### Annually

9. Change oil in gearboxes / Clean breathers
10. Grease Stabilizer Wheel
11. Grease carrier wheel bearings.
12. Inspect scalper bearings.
13. Grease gauge wheel jack screws (Figure 29, 32).
14. Grease Scalper Pivots.

Grease all zerks after washing and at beginning and end of season to remove potential moisture from bearings.



**Figure 31.** Rear Steering Pivots



**Figure 32.** Gauge Wheel Jack Screws



# MAINTENANCE

## DRIVE BELT TENSION

Banded drive belts are used to transmit power to the rotor shafts. Improperly adjusted belts will create heat and result in poor performance and fast belt wear. It is wise to check belts every 4 to 5 hours, if they feel cool to touch, they are properly adjusted. Any high heat should signal a need for adjustment.

**Note:** Heat buildup can also be caused by running flails too close to the ground or excessive debris build up inside the Defoliator.

### Adjusting Belt Tension (Figure 33)

Stop tractor engine, put all controls in neutral, remove ignition key and wait for all moving parts to stop before dismounting.

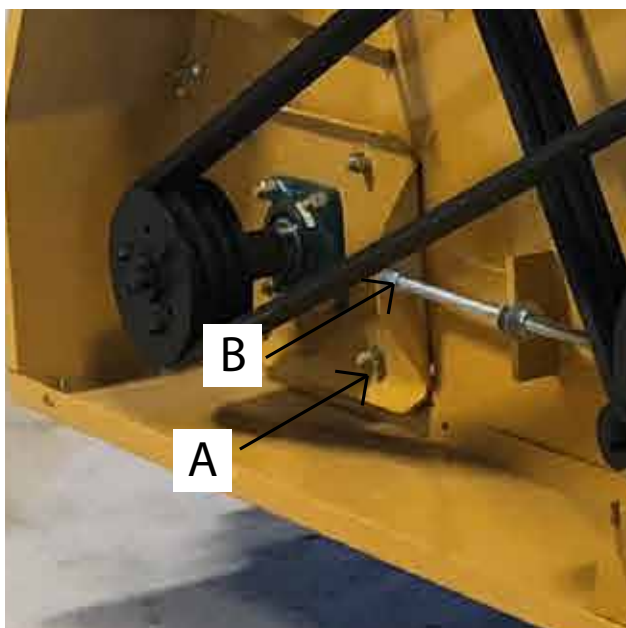
Open and secure lower belt housing shields.

Loosen bearing plate anchor bolts (A).

Adjust nuts on tightener rod (B) until proper tension is reached.

Retighten bearing plate (A).

Close and secure belt housing shields.



**Figure 33.** Belt Tension Adjustment - Belt Box

### Replacing Drive Belts (Figure 33 & Figure 34)

Stop tractor engine, put all controls in neutral, remove ignition key and wait for all moving parts to stop before dismounting.

Open and secure lower belt housing shields.

Loosen bearing plate anchor bolts (A).

Loosen nuts on tightener rod and bring rotor shaft to the extreme loose position.

Replace belt on sheaves as shown in Figure 33 and Figure 34.

Adjust nuts on tightener rod (B) until proper tension is reached.

Retighten bearing plate bolts (A).

Close and secure belt housing shields



**Figure 34.** Rotor Upper Drive Pulleys

## Owner Service *Continued*

### FLAIL REPLACEMENT

Position Defoliator resting securely on blocks as described in “Blocking Method for Defoliator Service,” Figure 28.



### WARNING

■ Never walk, stand or place yourself or others under a raised wing or in the path of a lowering wing. Hydraulic system leak down, hydraulic system failures, mechanical failures or movement of control levers can cause wings to drop unexpectedly and cause severe injury or death.

### IMPORTANT

■ Always replace opposite pairs of knives and mounting hardware simultaneously to maintain rotor balance. Never operate defoliator with broken or missing knives.

#### L-Knife/Cup Knife

Remove bolt from flail bracket and remove flail. See Figure 35 below.

Replace flail and flail bushing. Tighten bolt to specifications given in Torque Chart.



**Figure 35.** L-Knives, Cup Knives

#### Rubber Flail

Rubber flails are attached to adjustable flail heads, which are clamped to the rotor. (Figure 36)

To replace rubber flails, remove flail pin retaining bolt and withdraw pin. Remove flail assembly as a unit. Head clamping bolts may need to be loosened to make disassembly easier.

Note location of flails, spacers and bushings. Replace any worn, damaged or missing components in their correct location. Insert flail pin through assembly and install retaining bolt. Tighten flail pin retaining bolt to specifications in Torque Chart.

Inspect flail heads to determine that they are securely clamped to rotor. If flail heads are not attached securely, tighten clamping bolts to specifications in Torque Chart.



**Figure 36.** Rubber Flail Assemblies



# TROUBLE SHOOTING

The Alloway Folding Defoliator uses rubber and steel flails on drums to remove foliage from the tops of sugar beets. It is a simple and reliable system that requires minimal maintenance. The following table lists problems, causes and solutions that you may

encounter. If you encounter a problem that is difficult to solve even after reading through this table, please call your local Alloway dealer. When calling, please have this manual and your unit's serial number ready.

| PROBLEM                            | POSSIBLE CAUSE                                                | SOLUTION                                                                            |
|------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Drums won't turn                   | Tractor PTO defective                                         | Repair tractor PTO                                                                  |
|                                    | Broken cross shaft or drive coupler on central hanger bearing | Replace (9 or 12 row units only)                                                    |
| Rapid belt wear                    | Machine plugged                                               | Unplug machine                                                                      |
|                                    | Pulleys out of alignment                                      | Align pulleys                                                                       |
|                                    | Loose or overtightened belts                                  | Adjust belt tension                                                                 |
|                                    | Overloaded/Running too low                                    | Raise unit or decrease ground speed                                                 |
| Flails breaking                    | Machine too low                                               | Raise machine                                                                       |
|                                    | Hitting rocks or other debris                                 | Clean field better before planting                                                  |
| Tires don't turn                   | Mud buildup                                                   | Adjust tire pressure to 15-20 psi                                                   |
| Beet crown not clean               | Machine too high                                              | Lower the machine                                                                   |
|                                    | Flails broken                                                 | Replace broken flails                                                               |
|                                    | Traveling too fast                                            | Decrease ground speed                                                               |
|                                    | Running slowly (tractor engine)                               | Increase engine speed to rated PTO RPM                                              |
|                                    | Need a scalper                                                | Install and set scalper                                                             |
|                                    | Scalper bounces                                               | Increase scalper spring tension                                                     |
| Beets are pulled out of the ground | Machine too low                                               | Raise machine                                                                       |
|                                    | Machine moving too slowly                                     | Increase ground speed                                                               |
|                                    | Scalper pulling beets out of ground                           | Adjust scalper                                                                      |
| Defoliator vibrates                | Driveline doesn't telescope                                   | Remove, disassemble and clean telescoping joint                                     |
|                                    |                                                               | Balance tube                                                                        |
|                                    | Flail tube out of balance                                     | Replace missing knives or rubber flails. Always replace in pairs 180 degrees apart. |

# TROUBLE SHOOTING

This Troubleshooting section applies specifically to Rear Steering system of the defoliator.

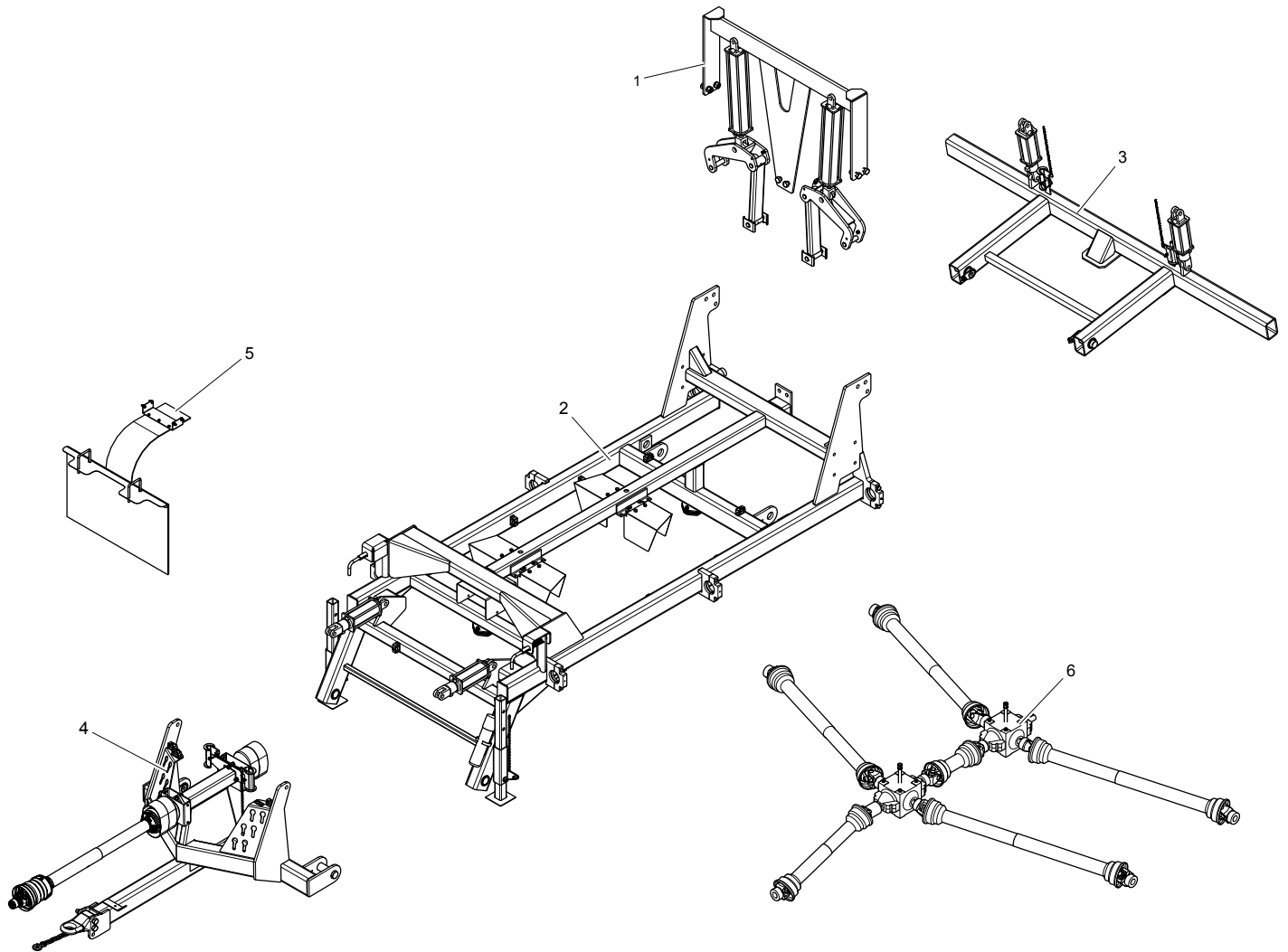
Please contact your dealer's service department if you encounter a malfunction not addressed in this section.

| PROBLEM                                        | CAUSE                                                                                                                                                                                        | SOLUTION                                                                                                                                            |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Steering valve does not respond when activated | Steering Valve not connected to Power Beyond output<br>Coupler checking flow between tractor and valve<br>Faulty hydraulic couplers                                                          | Connect Steering Valve to Power Beyond output<br>Inspect quick coupler on tractor and defoliator<br>Identify and replace faulty coupler             |
| Weak, slow steering operation                  | Load sensing signal not present. Test by creating deadhead situation to force high pressure standby.<br>Pressure Reducing Valve flow obstructed by debris<br>Tractor hydraulic oil level low | Identify and remove load signal blockage between tractor and steering valve<br>Remove and clean valve 6<br>Add hydraulic oil to tractor's reservoir |
|                                                | Tractor hydraulic system has insufficient pressure                                                                                                                                           | Inspect hydraulic system and repair or replace components causing problem                                                                           |
|                                                | Tractor load sensing responds with inadequate pressure                                                                                                                                       | Inspect load sensing circuit components to identify problem                                                                                         |
| Will not maintain neutral steering             | Directional Valve not closing because of contamination                                                                                                                                       | Remove and clean valve 5A and/or 5B.                                                                                                                |
| Excessive hydraulic noise                      | Steering valve connected directly to SCV                                                                                                                                                     | Connect Steering Valve to Power Beyond output                                                                                                       |
| Hydraulic system overheating                   | Row Centering Valve relief valve pressure setting too low                                                                                                                                    | Set relief valve pressure higher                                                                                                                    |

### FOLDING BEET DEFOLIATOR

|                                                   |          |
|---------------------------------------------------|----------|
| CENTER FRAME .....                                | 40 - 47  |
| MAST .....                                        | 41       |
| CENTER FRAME AND STRUT MOUNT .....                | 42 - 43  |
| HITCH.....                                        | 44 - 45  |
| MUD FLAP.....                                     | 46       |
| DRIVE.....                                        | 47       |
| WING ASSEMBLIES .....                             | 48 - 55  |
| WING SHIELD.....                                  | 48 - 49  |
| WING FRAME .....                                  | 50 - 53  |
| WING COVER.....                                   | 54 - 55  |
| DRIVE BELT ASSEMBLY .....                         | 56 - 57  |
| FLAIL DRUM COMPONENTS.....                        | 58 - 59  |
| FLAIL COMPONENTS .....                            | 60 - 63  |
| WING STRUT COMPONENTS .....                       | 64 - 65  |
| FIXED STRUT ASSEMBLY.....                         | 66 - 67  |
| PIVOT STRUT ASSEMBLY.....                         | 68 - 69  |
| STEERABLE STRUT COMPONENTS.....                   | 70 - 75  |
| ROW FINDER.....                                   | 76 - 85  |
| ROW FINDER COMPONENTS.....                        | 76 - 77  |
| TOOLBAR ROW FINDER COMPONENTS.....                | 78 - 79  |
| SCALPER ROW FINDER COMPONENTS.....                | 80 - 81  |
| ROW FINDER PARALLEL LINK MOUNT COMPONENTS .....   | 82 - 83  |
| ROW FINDER PARALLEL LINK MOUNT (44" STRUTS) ..... | 84 - 85  |
| HYDRAULIC COMPONENTS .....                        | 86 - 87  |
| REAR STEER HYDRAULIC COMPONENTS .....             | 88       |
| ROW FINDER HYDRAULIC COMPONENTS.....              | 89       |
| WING LIFT HYDRAULIC COMPONENTS.....               | 90       |
| HUB & SPINDLE COMPONENTS .....                    | 91       |
| GEARBOX - SUPERIOR (4-WAY) .....                  | 92       |
| DRIVE SHAFT COMPONENTS.....                       | 93 - 97  |
| SCALPER ASSEMBLIES .....                          | 98 - 104 |
| STABILIZER WHEEL COMPONENTS .....                 | 105      |
| LIGHT KIT .....                                   | 106      |

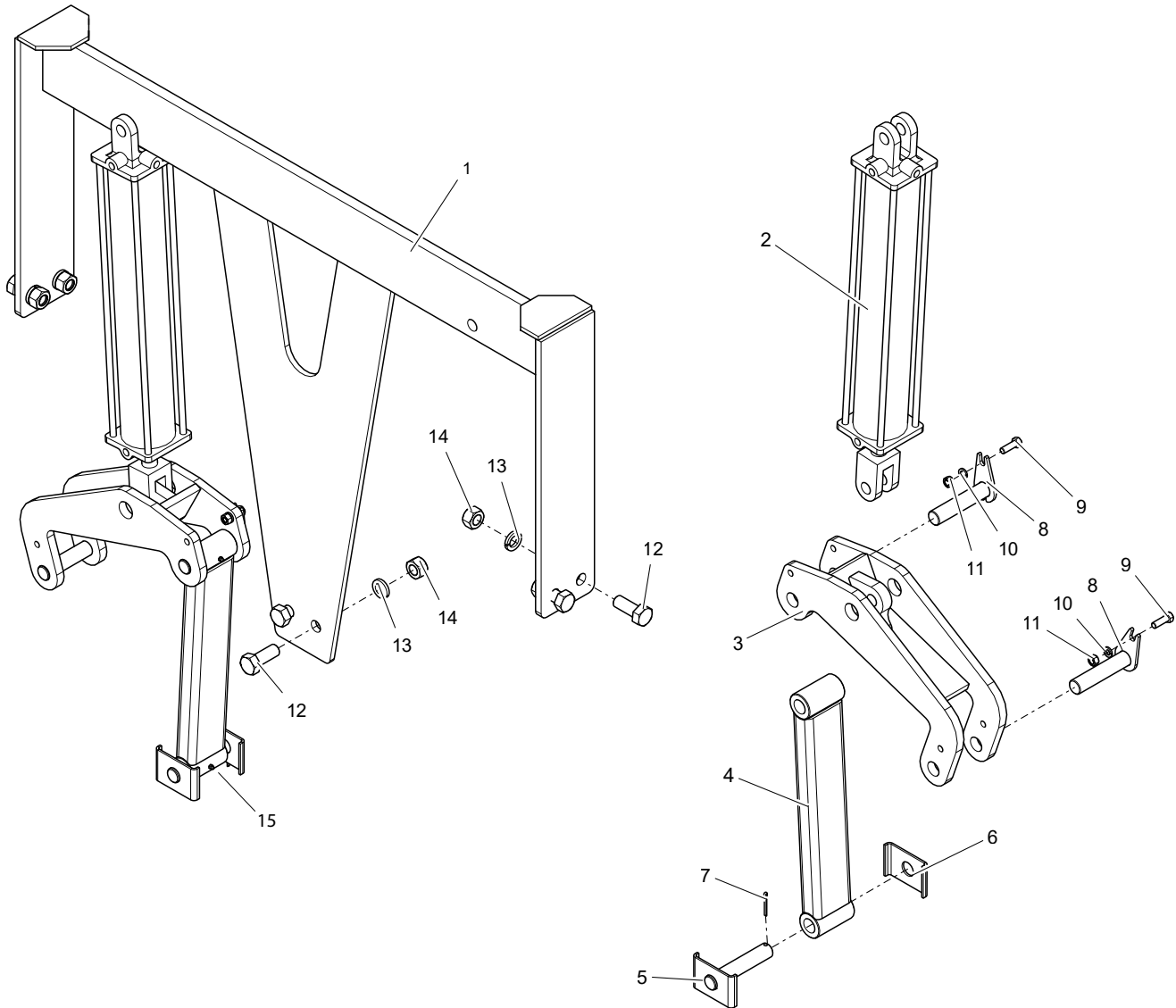
## FRAME COMPONENTS - COMPLETE ASSEMBLY



| ITEM NO. | PAGE NUMBER | DESCRIPTION          |
|----------|-------------|----------------------|
| 1        | 37          | MAST SECTION         |
| 2        | 38 - 39     | CENTER FRAME SECTION |
| 3        | 39          | STRUT MOUNT SECTION  |
| 4        | 40          | HITCH SECTION        |
| 5        | 41          | MUD FLAP SECTION     |
| 6        | 42          | DRIVE SECTION        |



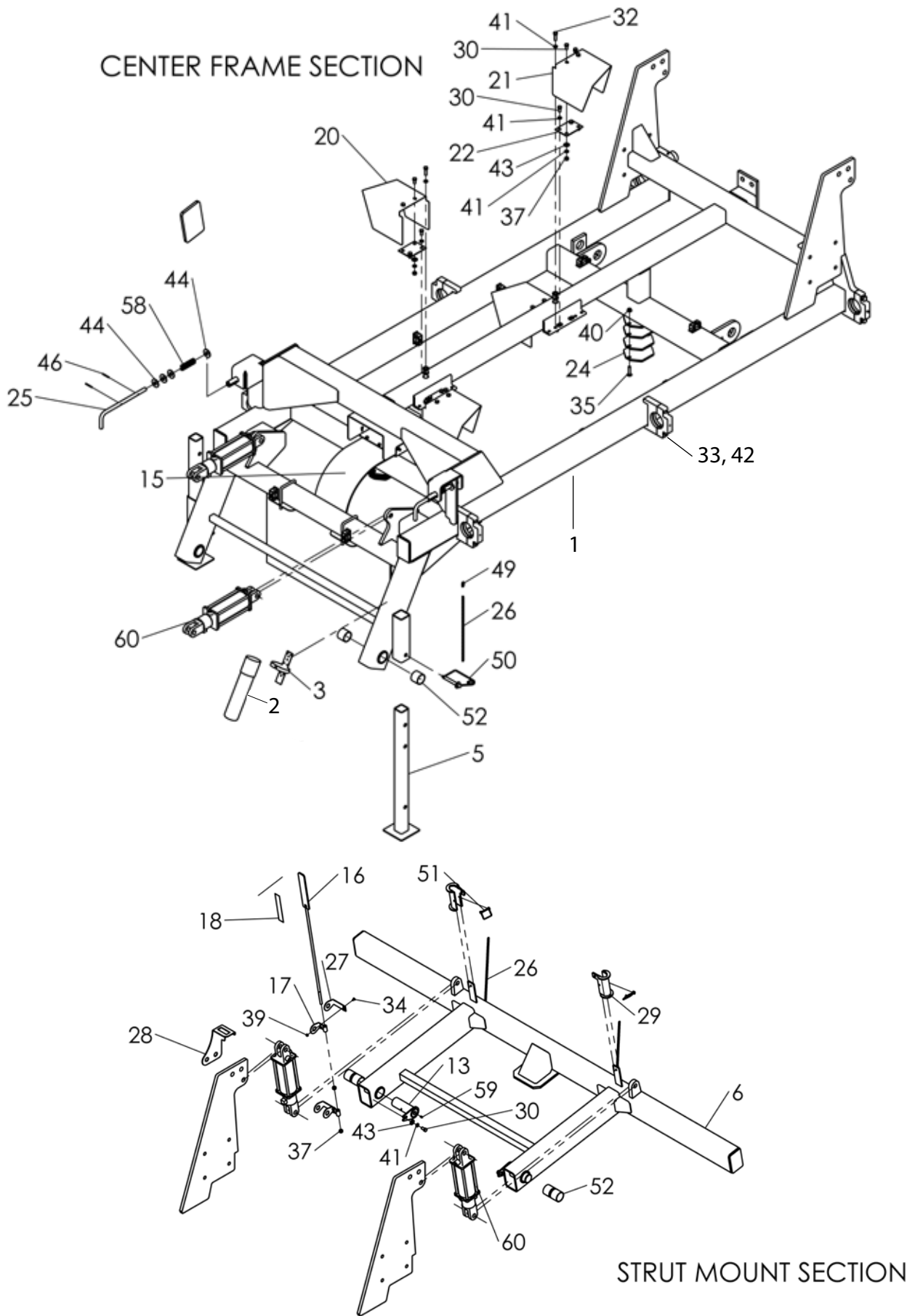
## FRAME COMPONENTS - MAST SECTION



| ITEM NO. | PART NUMBER | DESCRIPTION                          | QTY. |
|----------|-------------|--------------------------------------|------|
| 1        | 500-2-0661  | TOP BAR WELD                         | 1    |
| 2        | 905-21417   | CYLINDER, 4 X 24 W/ 3/4-16 ORB PORTS | 2    |
|          | 905-21415   | SEAL KIT, 4 X 24                     |      |
| 3        | 500-2-0662  | LINK ARM WELD                        | 2    |
| 4        | 500-2-0954  | PIVOT TUBE WELD                      | 2    |
| 5        | 500-2-0685  | CHANNEL PIN WELD                     | 2    |
| 6        | 500-3-1510  | CHANNEL PIN CAP                      | 2    |
| 7        | 900-23045   | PIN, COTTER 3/16 X 2                 | 2    |
| 8        | 500-2-0684  | PIN WELD, 1-1/4                      | 4    |
| 9        | 900-01225   | BOLT, HEX HEAD 1/2 X 1-1/2, GR5 ZP   | 4    |
| 10       | 900-11013   | WASHER, LOCK 1/2                     | 4    |
| 11       | 900-06009   | NUT, HEX HEAD 1/2                    | 4    |
| 12       | 900-01515   | BOLT, HEX HEAD 1 X 2-1/2, GR5 ZP     | 6    |
| 13       | 900-11021   | WASHER, LOCK 1                       | 6    |
| 14       | 900-06019   | NUT, HEX HEAD 1                      | 6    |
| 15       | 905-15024   | ZERK 1/4-28 UNF STRAIGHT             | 4    |

500-2-0708      CENTER FRAME ASSY - FUD

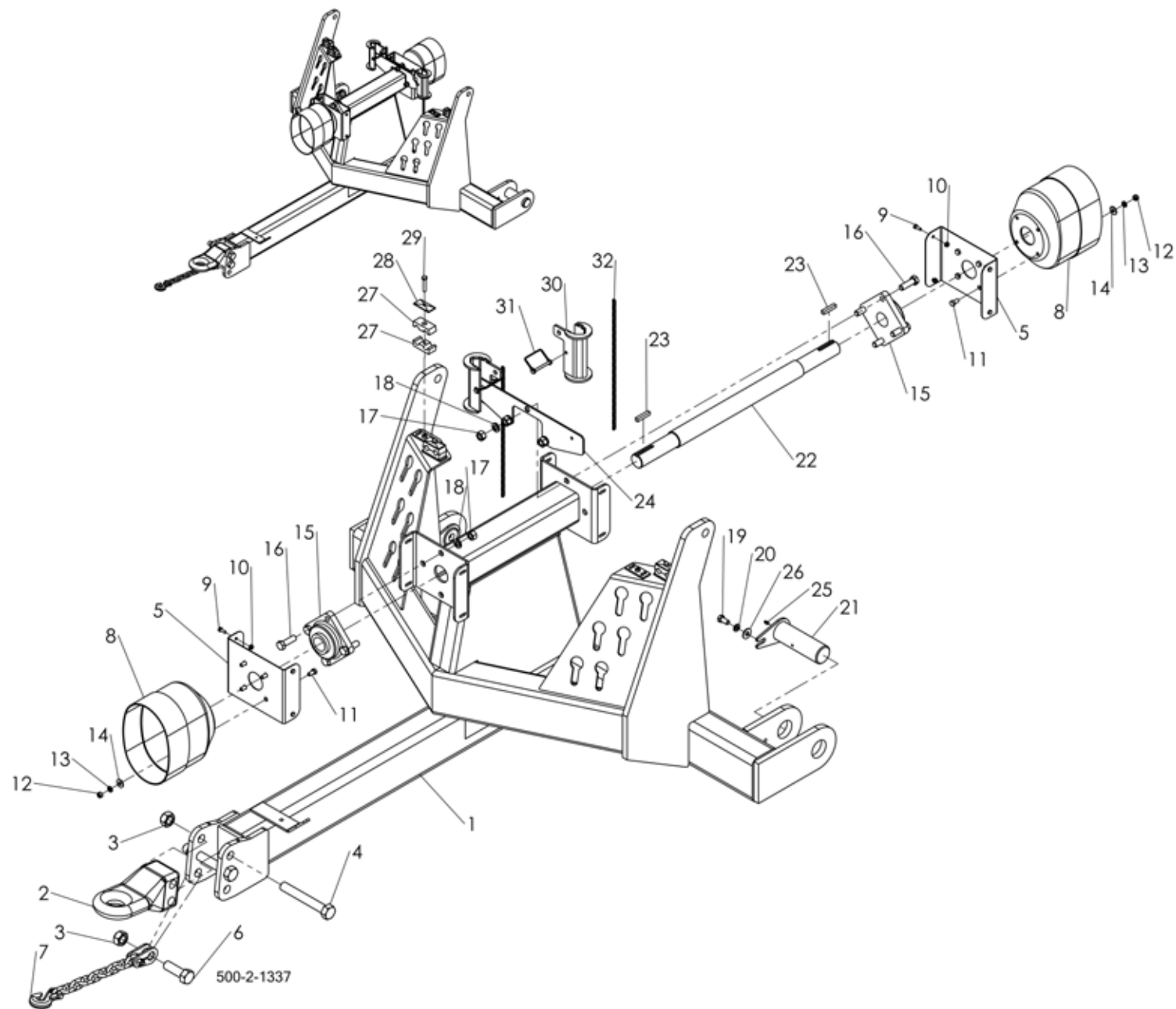
FRAME COMPONENTS - CENTER FRAME AND STRUT MOUNT SECTION



## FRAME COMPONENTS - CENTER FRAME AND STRUT MOUNT SECTION

| ITEM NO. | PART NUMBER | DESCRIPTION                                           | QTY. |
|----------|-------------|-------------------------------------------------------|------|
| 1        | 500-2-0664  | CENTER FRAME WELD                                     | 1    |
| 2        | 100-3-3957  | TUBE MANUAL STORAGE                                   | 1    |
| 3        | 100-3-3958  | CLAMP MANUAL STORAGE                                  | 1    |
| 5        | 500-2-0658  | <b>STAND - MAINFRAME</b>                              | 2    |
| 6        | 500-2-1688  | <b>STRUT MOUNT WELD</b>                               | 1    |
| 13       | 500-2-0748  | PIN WELD STRUT MOUNT                                  | 2    |
| 15       | 500-2-1026  | FRONT FLAP ASSY                                       | 1    |
| 16       | 500-2-1473  | HEIGHT GAUGE INDICATOR WELDMENT                       | 1    |
| 17       | 500-2-1481  | OFFSET HEIGHT GAUGE BRACKET WELDMENT                  | 2    |
| 18       | 500-3-1011  | DECAL, HYD STRUT DEPTH GAUGE                          | 1    |
| 20       | 500-3-1679  | GEAR BOX SHIELD RH                                    | 2    |
| 21       | 500-3-1680  | GEAR BOX SHIELD LH                                    | 2    |
| 22       | 500-3-1684  | RUBBER HINGE                                          | 4    |
| 24       | 500-3-2621  | SPACER PLATE - WING ANGLE (PAINTED)                   | 6    |
| 25       | 500-3-2749  | PIN - FRONT WING LOCK                                 | 2    |
| 26       | 500-3-2858  | FUD RETAINING CHAIN                                   | 4    |
| 27       | 500-3-3051  | OFFSET HEIGHT GAUGE OUTSIDE                           | 2    |
| 28       | 500-3-3053  | OFFSET HEIGHT GAUGE INDICATOR                         | 1    |
| 29       | 700-2-0159  | CYLINDER STOP, SHORT, WELDMENT                        | 2    |
| 30       | 900-01221   | BOLT HEX 1/2" X 1"                                    | 18   |
| 32       | 900-01227   | BOLT HH 1/2-13 NC X 1-3/4 GRD 5 ZP                    | 8    |
| 33       | 900-01417   | HEX BOLT-3/4NC X 3.75 GR5 ZP                          | 12   |
| 34       | 900-01645   | BOLT, CRG 1/4 NC X 1/2 GR5 ZP                         | 4    |
| 35       | 900-01754   | 1/2-13 X 2 1/4 CARRAGE BOLT ZP                        | 4    |
| 37       | 900-06009   | NUT HEX 1/2-13 NC                                     | 14   |
| 39       | 900-06135   | NUT WHIZ 1/4-20 NC                                    | 4    |
| 40       | 900-06143   | NUT WHIZ 1/2-13 NC GRD 5 ZP                           | 4    |
| 41       | 900-11013   | WASHER LOCK 1/2                                       | 30   |
| 42       | 900-11017   | WASHER, LOCK, 3/4, ZP                                 | 12   |
| 43       | 900-11035   | WASHER FLAT 1/2                                       | 10   |
| 44       | 900-11038   | WASHER FLAT 3/4                                       | 8    |
| 46       | 900-29138   | PIN ROLL 3/16 X 2                                     | 4    |
| 49       | 900-42051   | 1/8" QUICK LINK                                       | 2    |
| 50       | 900-42054   | LOCK UP PIN                                           | 2    |
| 51       | 900-42055   | SNAPPER PIN .25 X 2.50 USABLE LENGTH                  | 2    |
| 52       | 901-01318   | BUSHING - 2.25 ID X 2.50 OD X 2 LONG SPLIT            | 8    |
| 58       | 905-14022   | SPRING - 1.25 OD X .105 WIRE X 4.00 LONG X 12.5 COILS | 2    |
| 59       | 905-15024   | ZERK 1/4-28 UNF STRAIGHT                              | 2    |
| 60       | 905-21400   | HYD CYL - 3.5 X 8                                     | 4    |
|          | 500-2-0708  | CENTER FRAME ASSY - FUD                               |      |

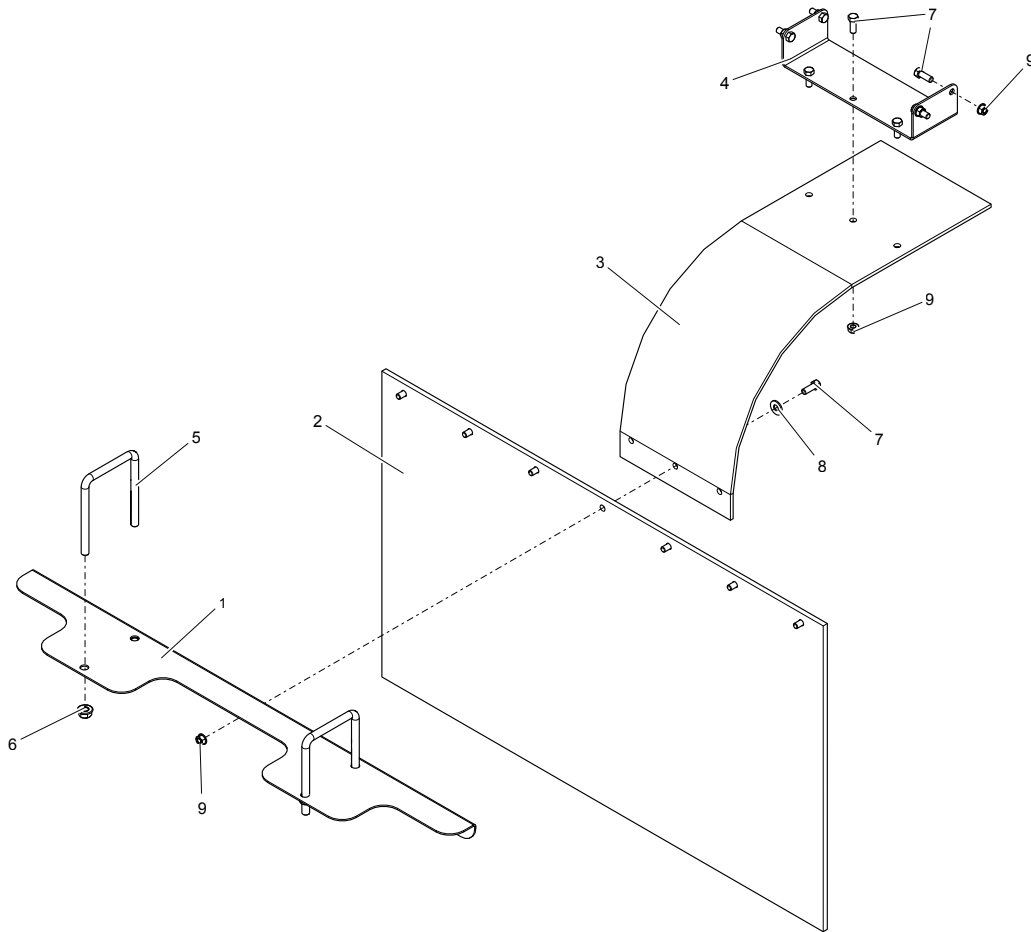
## FRAME COMPONENTS - HITCH SECTION



## FRAME COMPONENTS - HITCH SECTION

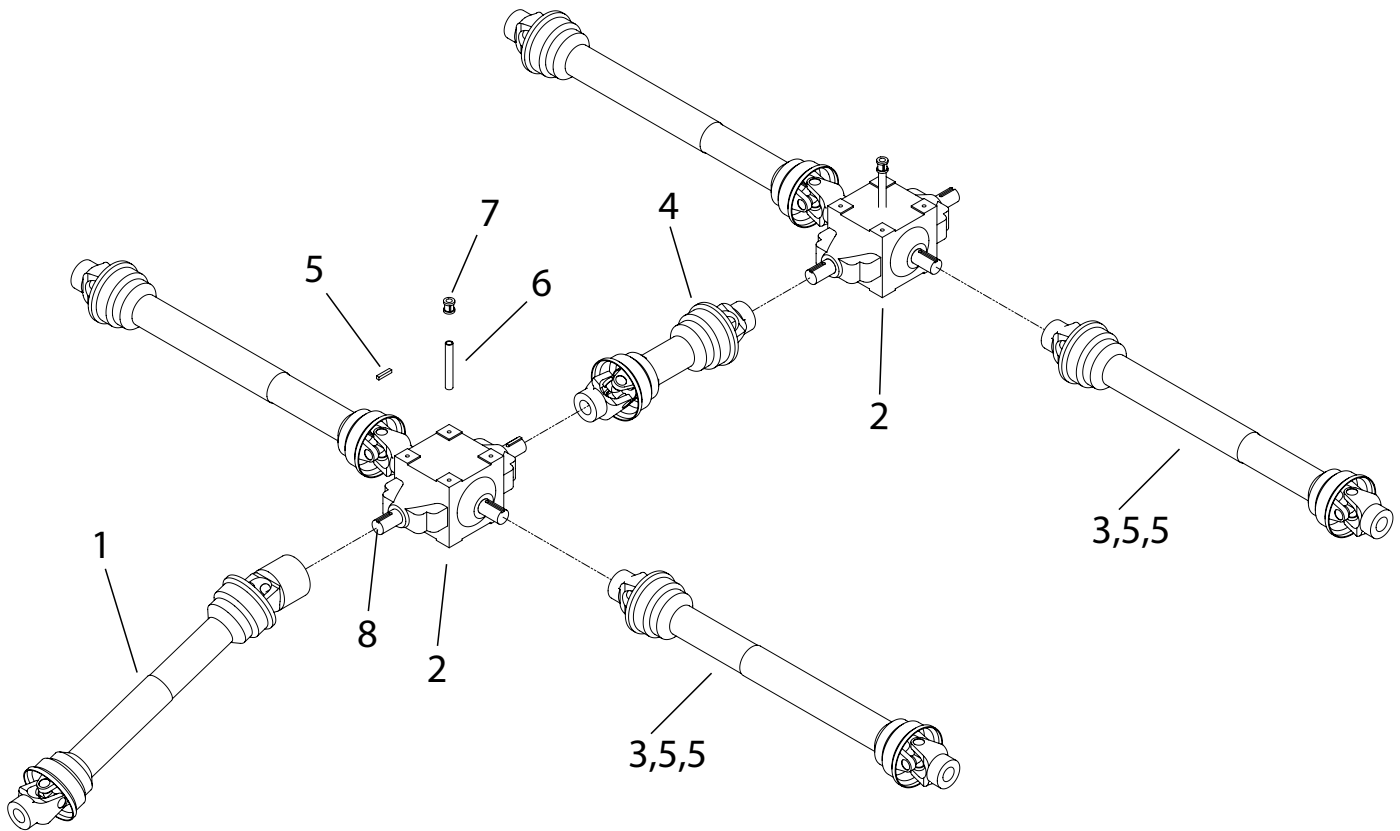
| ITEM NO. | PART NUMBER | DESCRIPTION                          | QTY. |
|----------|-------------|--------------------------------------|------|
| 1        | 500-2-1336  | HITCH WELDMENT - LONG                | 1    |
| 2        | 505-3-0831  | HITCH TONGUE COMP CAT3               | 1    |
| 3        | 900-06514   | NUT HEX 5/8-11 NC ZP                 | 3    |
| 4        | 900-01519   | BOLT, HH, 1-8 x 3, GR5 ZP            | 2    |
| 5        | 500-3-2164  | GUARD BRACKET                        | 2    |
| 6        | 900-01519   | BOLT HEX ½" X 1"                     | 1    |
| 7        | 905-07123   | TOW CHAIN SAFETY 21,000 LB           | 1    |
| 8        | 903-18007   | SNAPPER PIN .25 X 2.50 USABLE LENGTH | 2    |
| 9        | 900-01005   | 1/4-20 X 1 ZP HEX BOLT               | 8    |
| 10       | 900-06135   | NUT HEX 3/8 SS                       | 8    |
| 11       | 900-01105   | BOLT HH 3/8-16 NC X 3/4              | 8    |
| 12       | 900-06005   | BOLT, HH 5/16 X 1-3/4, GR5 ZP        | 8    |
| 13       | 900-11011   | NUT WHIZ 1/4-20 NC                   | 8    |
| 14       | 900-11033   | WASHER LOCK 1/2                      | 8    |
| 15       | 901-01185   | CLAMP BODY                           | 2    |
| 16       | 900-01345   | BOLT HH 3/8-16 NC X 3/4              | 8    |
| 17       | 900-06013   | BOLT, HH, 1-8 x 7, GR5 ZP            | 8    |
| 18       | 900-11015   | WASHER LOCK 3/8                      | 8    |
| 19       | 900-01221   | 1/4-20 X 1 ZP HEX BOLT               | 2    |
| 20       | 900-11013   | NUT, LOCK, 1" NC, TOP, ZP            | 2    |
| 21       | 700-2-0019  | PIN WELDMENT - HITCH MOUNT           | 2    |
| 22       | 500-3-2742  | PTO TRANSFER SHAFT                   | 1    |
| 23       | 100-3-3333  | KEY - 3/8 X 3/8 X 2                  | 2    |
| 24       | 500-3-2847  | FRONT TRANSPORT LOCK HOLDER          | 1    |
| 25       | 905-15024   | BEARING - NANFS 209-28 1.75          | 2    |
| 26       | 900-11035   | WASHER LOCK 5/8 ZP                   | 2    |
| 27       | 900-31069   | CLAMP BODY - HOSE HOLDER             | 6    |
| 28       | 900-31068   | WASHER FLAT 3/8 ZP                   | 3    |
| 29       | 900-02356   | BOLT HH 5/8-11 NC X 2 GRD 5 ZP       | 3    |
| 30       | 700-2-0159  | PIN - HITCH MOUNT                    | 2    |
| 31       | 900-42055   | COVER PLATE                          | 2    |
| 32       | 500-3-2858  | FUD RETAINING CHAIN                  | 2    |
|          | 500-2-1337  | FUD LONG HITCH ASSY                  |      |

## FRAME COMPONENTS - MUD FLAP SECTION



| ITEM NO. | PART NUMBER | DESCRIPTION                    | QTY. |
|----------|-------------|--------------------------------|------|
| 1        | 500-3-2211  | FRONT FLAP MOUNT               | 1    |
| 2        | 700-3-1220  | RUBBER FLAP                    | 1    |
| 3        | 500-3-2238  | DEFLECTOR SHIELD - DIVIDER     | 1    |
| 4        | 500-3-2237  | DEFLECTOR SHIELD MOUNT         | 1    |
| 5        | 100-3-2582  | U-BOLT 1/2 X 4 X 5.5           | 2    |
| 6        | 900-06143   | NUT, SPIRALOCK FLANGE 1/2      | 4    |
| 7        | 900-06139   | NUT, SERR FLANGE 3/8           | 14   |
| 8        | 900-11033   | WASHER, FLAT 3/8               | 7    |
| 9        | 900-01109   | BOLT, HEX HEAD 3/8 X 1, GR5 ZP | 14   |
|          | 500-2-1026  | FRONT FLAP ASSY                |      |

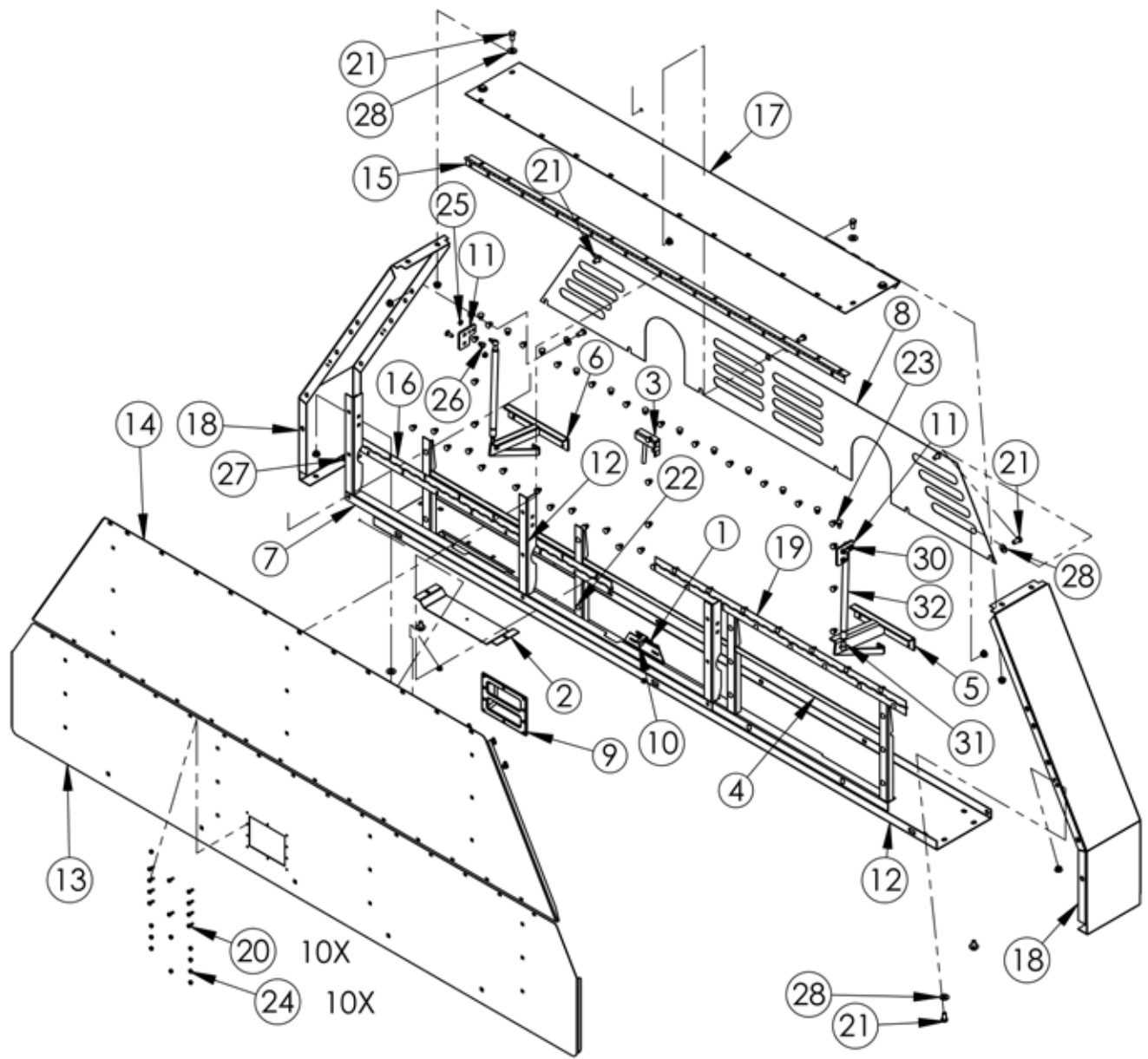
## FRAME COMPONENTS - DRIVE SECTION



| ITEM NO. | PART NUMBER | DESCRIPTION                                 | QTY. |
|----------|-------------|---------------------------------------------|------|
| 1        | 903-18308   | HITCH EXTENSION DRIVE SHAFT                 | 1    |
| 2        | 903-15560   | GEARBOX, SUPERIOR R-600 (1:1.35 GEAR RATIO) | 2    |
| 3        | 903-18055   | WING DRIVE SHAFT                            | 4    |
| 4        | 903-18198   | JUMP DRIVE SHAFT                            | 1    |
| 5        | 100-3-3333  | KEY 3/8 X 3/8 X 2                           | 12   |
| 6        | 905-01238   | NIPPLE, 1/2 NPT X 6 (GALVANIZED)            | 2    |
| 7        | 905-01189   | COUPLING 1/2 NPT (STAINLESS STEEL)          | 2    |
| 8        | 500-3-2617  | WASHER - PTO                                | 1    |



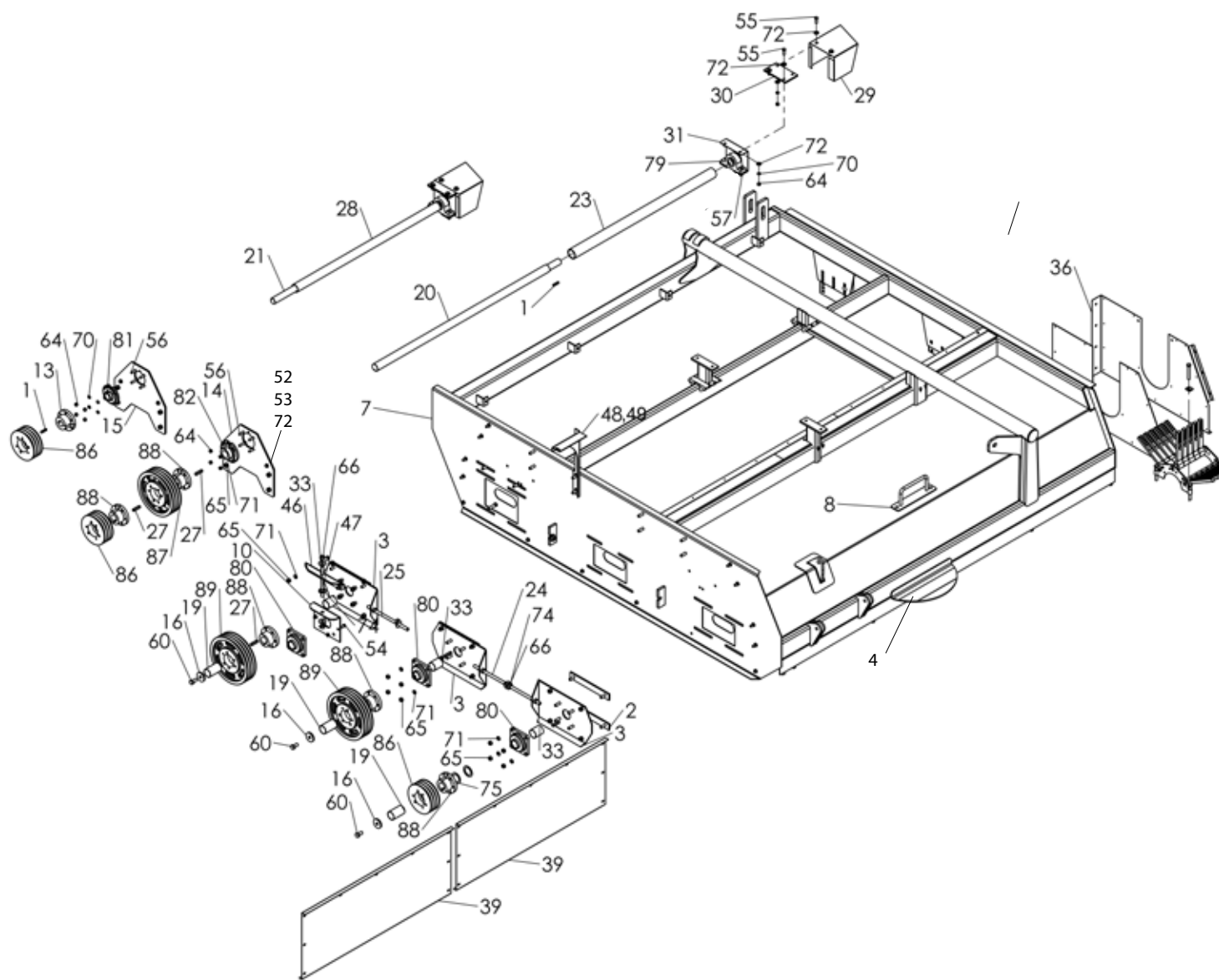
WING SHIELD COMPONENTS



## WING SHIELD COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                              | QTY. |
|----------|-------------|------------------------------------------|------|
| 1        | 500-2-1646  | S-SERIES BOTTOM ROD WELDMENT             | 1    |
| 2        | 500-2-1652  | S-SERIES BOTTOM COVER WELD               | 1    |
| 3        | 500-2-1653  | S-SERIES FUD UPPER LATCH WELD            | 1    |
| 4        | 500-2-1654  | S-SERIES FUD LOWER DOOR BRACE HORIZONTAL | 1    |
| 5        | 500-2-1680  | S-SERIES FUD DOOR SHOCK MOUNT WELD (LH)  | 1    |
| 6        | 500-2-1681  | S-SERIES FUD DOOR SHOCK MOUNT WELD (RH)  | 1    |
| 7        | 500-2-1686  | S-SERIES FUD UPPER DOOR BRACE WELD       | 1    |
| 8        | 500-3-1632  | COVER, INNER BELT BOX                    | 1    |
| 9        | 500-3-4799  | S SERIES FLUSH GRAB HANDLE               | 1    |
| 10       | 500-3-5083  | PLATE- HANDLE                            | 1    |
| 11       | 500-3-5086  | PLATE- GAS SPRING MOUNT                  | 2    |
| 12       | 500-3-5099  | S-SERIES BOLT ON BOTTOM WRAP (LH)        | 1    |
|          | 500-3-5145  | S-SERIES BOLT ON BOTTOM WRAP (RH)        | 1    |
| 13       | 500-3-5103  | S-SERIES FUD LOWER DOOR                  | 1    |
| 14       | 500-3-5104  | S-SERIES FUD UPPER DOOR                  | 1    |
| 15       | 500-3-5306  | TOP BELT BOX HINGE 3/8"-S SERIES FUD     | 1    |
| 16       | 500-3-5111  | S-SERIES FUD BELT BOX BOTTOM FRONT HINGE | 1    |
| 17       | 500-3-5112  | S-SERIES BOX TOP WRAP                    | 1    |
| 18       | 500-3-5115  | S-SERIES FUD SIDE WRAP                   | 2    |
| 19       | 500-3-5307  | CENTER BELT BOX HINGE 3/8                | 1    |
| 20       | 900-01005   | 1/4-20 X 1 ZP HEX BOLT                   | 10   |
| 21       | 900-01221   | BOLT HEX 1/2" X 1"                       | 13   |
| 22       | 900-01645   | BOLT, CRG 1/4 NC X 1/2 GR5 ZP            | 89   |
| 23       | 900-01694   | CARRIAGE BOLT 3/8 NC X 3/4               | 4    |
| 24       | 900-06135   | NUT WHIZ 1/4-20 NC                       | 10   |
| 25       | 900-06137   | NUT WHIZ 5/16-18 NC                      | 4    |
| 26       | 900-06139   | NUT WHIZ 3/8-16 NC                       | 93   |
| 27       | 900-06143   | NUT WHIZ 1/2-13 NC GRD 5 ZP              | 13   |
| 28       | 900-11035   | WASHER FLAT 1/2                          | 13   |
| 29       | 905-06022   | ROTARY LATCH- ALLEGIS PART #1-300 ZN RH  | 1    |
| 30       | 905-06026   | BALL STUD, GAS SPRING 10" STROKE         | 4    |
| 31       | 905-06027   | SAFETY CLIP, GAS SPRING 10" STROKE       | 4    |
| 32       | 905-06030   | GAS SPRING 10" STROKE, 200 LBS           | 2    |
|          | 500-2-1679  | FOLDING S-SERIES WING SHIELD ASSY (LH)   |      |
|          | 500-2-1655  | FOLDING S-SERIES WING SHIELD ASSY (RH)   |      |

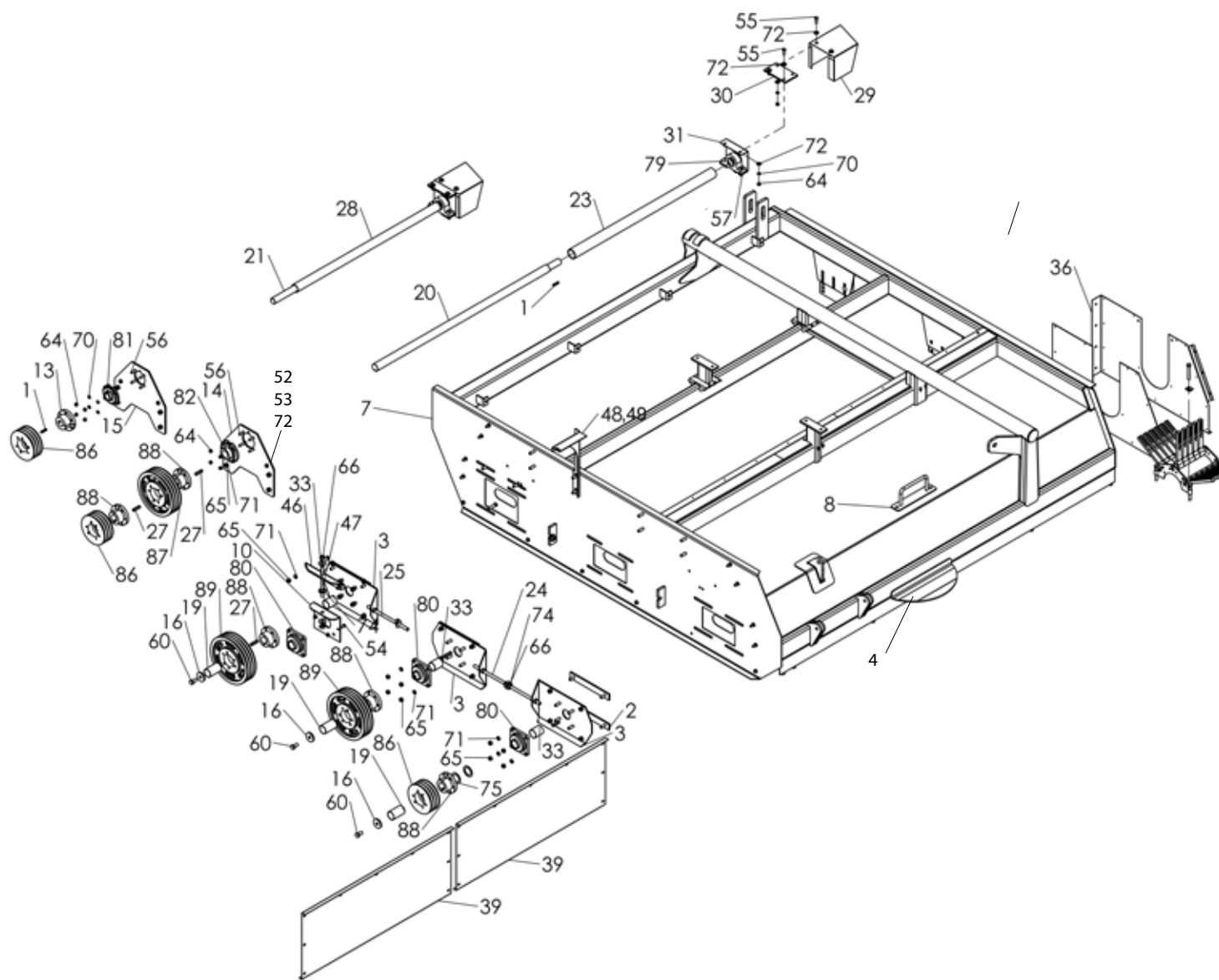
WING FRAME COMPONENTS



## WING FRAME COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                             | QTY. |
|----------|-------------|-----------------------------------------|------|
| 1        | 100-3-3333  | KEY - 3/8 X 3/8 X 2                     | 3    |
| 2        | 500-2-0671  | SLIDE STRAP WELD                        | 7    |
| 3        | 500-2-0672  | BEARING SLIDE WELDMENT                  | 2    |
| 4        | 500-3-2898  | ANTI-SKID STRIP FUD WINGS               |      |
| 7        | 500-2-1589  | S-SERIES FUD WING WELDMENT RH 12-22     | 1    |
|          | 500-2-1591  | S-SERIES FUD WING WELDMENT LH 12-22     | 1    |
| 8        | 500-2-1599  | S-SERIES FUD HANDLE                     | 1    |
| 10       | 500-2-1611  | ADJUSTABLE DRUM PLATE WELDMENT          | 1    |
| 13       | 500-3-1058  | TYPE E HUB 1-3/4 BORE                   | 1    |
| 14       | 500-3-1461  | REAR UPPER PLATE                        | 1    |
| 15       | 500-3-1462  | REAR UPPER PLATE                        | 1    |
| 16       | 500-3-1463  | WASHER                                  | 3    |
| 19       | 500-3-1540  | MECHANICAL STEEL TUBE                   | 3    |
| 20       | 500-3-1544  | FRONT OUTPUT SHAFT                      | 1    |
| 21       | 500-3-1546  | REAR OUTPUT SHAFT                       | 1    |
| 23       | 500-3-1627  | SHAFT SHIELD WING                       | 1    |
| 24       | 500-3-1628  | THREADED ROD (LONG)                     | 1    |
| 25       | 500-3-1629  | THREADED ROD (SHORT)                    | 1    |
| 27       | 500-3-1662  | KEY - 1/2 X 2-1/2 SQUARE                | 5    |
| 28       | 500-3-1681  | SHAFT SHIELD                            | 1    |
| 29       | 500-3-1682  | PILLOW BLOCK SHIELD (RH)                | 2    |
|          | 500-3-1683  | PILLOW BLOCK SHIELD (LH)                |      |
| 30       | 500-3-1685  | RUBBER HINGE                            | 2    |
| 31       | 500-3-1686  | PILLOW BLOCK BRACKET                    | 2    |
| 33       | 500-3-2488  | MECHANICAL STEEL TUBE                   | 3    |
| 36       | 500-3-4960  | S-SERIES FUD INNER SIDE SHEET LH        | 1    |
|          | 500-3-4941  | S-SERIES FUD INNER SIDE SHEET RH        | 1    |
| 39       | 500-3-4951  | S-SERIES FUD SHROUD COVER 12-22         | 2    |
| 45       | 500-3-5013  | S-SERIES FUD REAR BEARING SLIDE PLATE   | 1    |
| 46       | 500-3-5018  | S-SERIES FUD BOLT ON ADJUSTER PLATE     | 1    |
| 47       | 500-3-5022  | THREADED ROD ADJUSTABLE DRUM            | 1    |
| 48       | 500-3-5156  | S-SERIES FUD DOOR REAR UPPER BRACE (LH) | 1    |
| 49       | 500-3-5151  | S-SERIES FUD DOOR UPPER BRACE (LH)      | 1    |
|          | 500-3-5152  | S-SERIES FUD DOOR UPPER BRACE (RH)      | 1    |
| 52       | 900-06143   | 1/2 NC SPIRALOCK NUT ZP GR5             |      |
| 53       | 900-01221   | BOLT HEX 1/2" X 1"                      |      |
| 54       | 900-01223   | BOLT HH 1/2-13 NC X 1-1/4 GRD 5 ZP      | 2    |
| 55       | 900-01225   | BOLT HH 1/2-13 NC X 1-1/2 GRD 5         | 8    |
| 56       | 900-01229   | BOLT HH 1/2-13 NC X 2 GRD 5             | 12   |
| 57       | 900-01233   | BOLT HH 1/2-13 NC X 2-1/2 GRD 5         | 4    |
| 60       | 900-01399   | 3/4-NC X 1-1/2 HEX BOLT                 | 3    |
| 64       | 900-06009   | NUT HEX 1/2-13 NC                       | 20   |
| 65       | 900-06013   | NUT HEX 5/8-11 NC ZP                    | 97   |
| 66       | 900-06015   | NUT HEX 3/4-10 NC ZP                    | 14   |

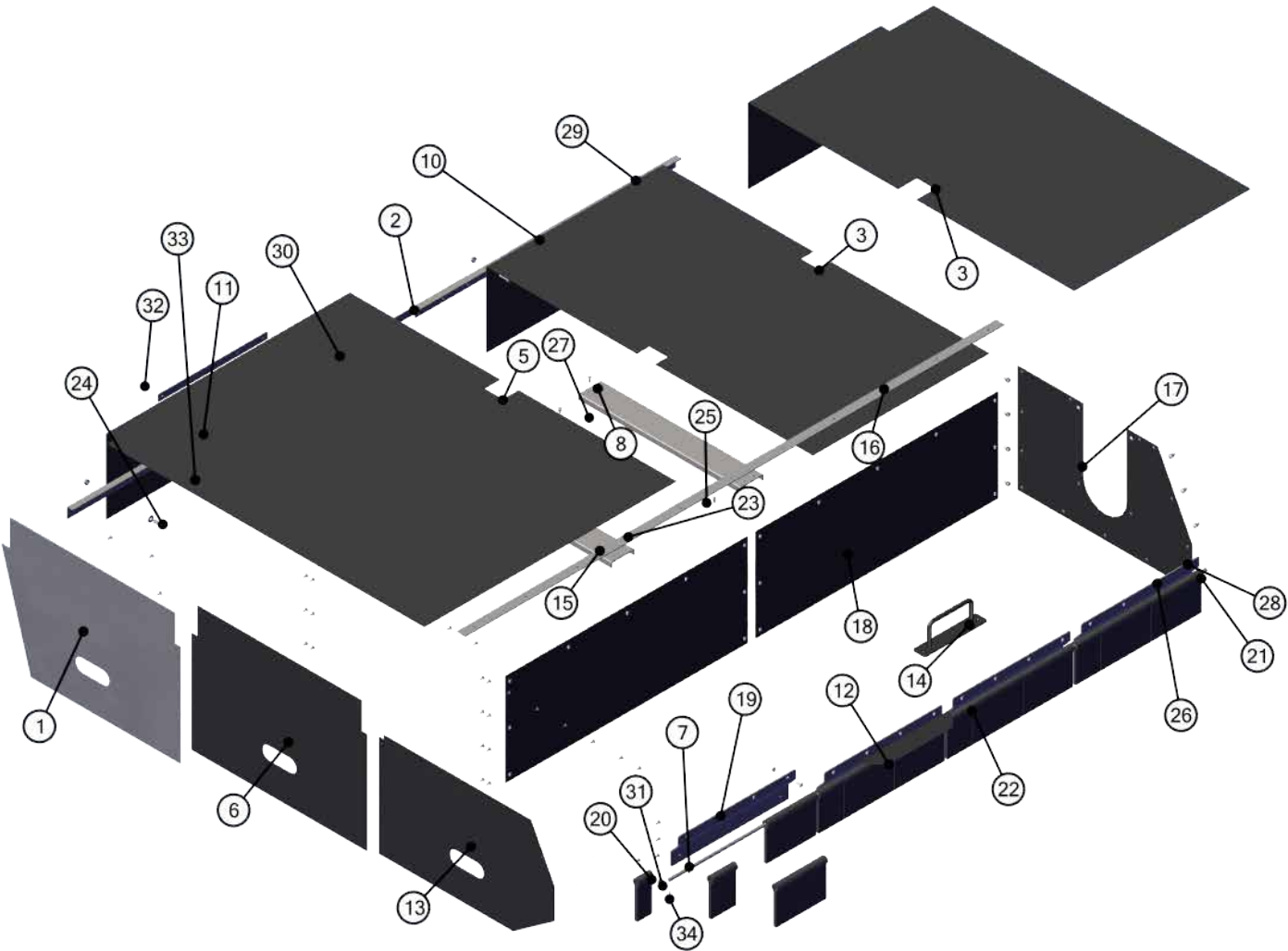
WING FRAME COMPONENTS



## WING FRAME COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                                         | QTY. |
|----------|-------------|-----------------------------------------------------|------|
| 70       | 900-11013   | WASHER LOCK 1/2                                     | 20   |
| 71       | 900-11015   | WASHER LOCK 5/8 ZP                                  | 97   |
| 72       | 900-11035   | WASHER FLAT 1/2                                     | 30   |
| 74       | 900-11038   | WASHER FLAT 3/4                                     | 8    |
| 75       | 900-11072   | 2-1/4" NAR RIM MACHINE BUSHING - 3-1/4"OD           | 4    |
| 79       | 901-01272   | BRG 1.75 PILLOW BLOCK (ECCENTRIC LOCK COLLAR)       | 2    |
| 80       | 901-01311   | BEARING - UCF 211-35 2.19 4-BOLT                    | 3    |
| 81       | 901-01415   | BRG ASSY, 1-3/4 DODGE PILOTED FLG FC-SXR-112 (209)  | 1    |
| 82       | 901-01416   | BRG ASSY, 2-3/16 DODGE PILOTED FLG FC-SXR-203 (211) | 1    |
| 86       | 903-08362   | PULLY, 3C8.5 (STEEL)                                | 3    |
| 87       | 903-08363   | PULLY, 3C13 (STEEL)                                 | 1    |
| 88       | 903-08420   | TYPE E HUB 2-3/16 BORE                              | 5    |
| 89       | 903-08421   | PULLY, 3C14 (RUBBER)                                | 2    |
|          | 500-2-1590  | S-SERIES FUD WING ASSY - LEFT (12-22) W/O KNIVES    |      |
|          | 500-2-1588  | S-SERIES FUD WING ASSY - RIGHT (12-22) W/O KNIVES   |      |

WING COVER COMPONENTS

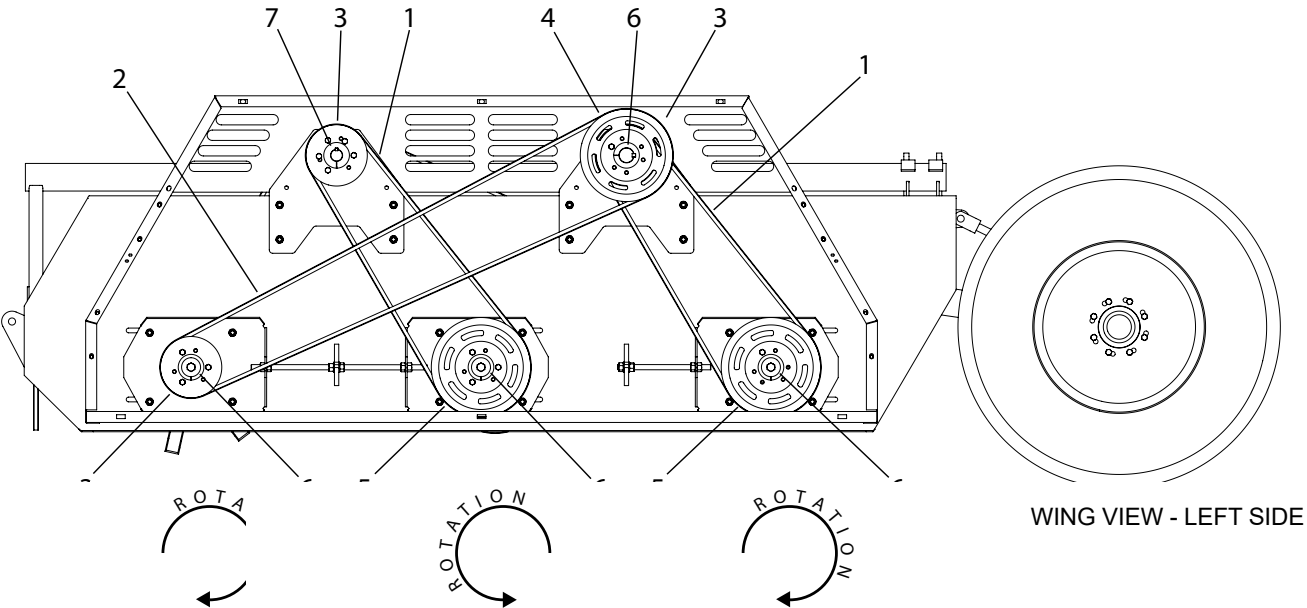
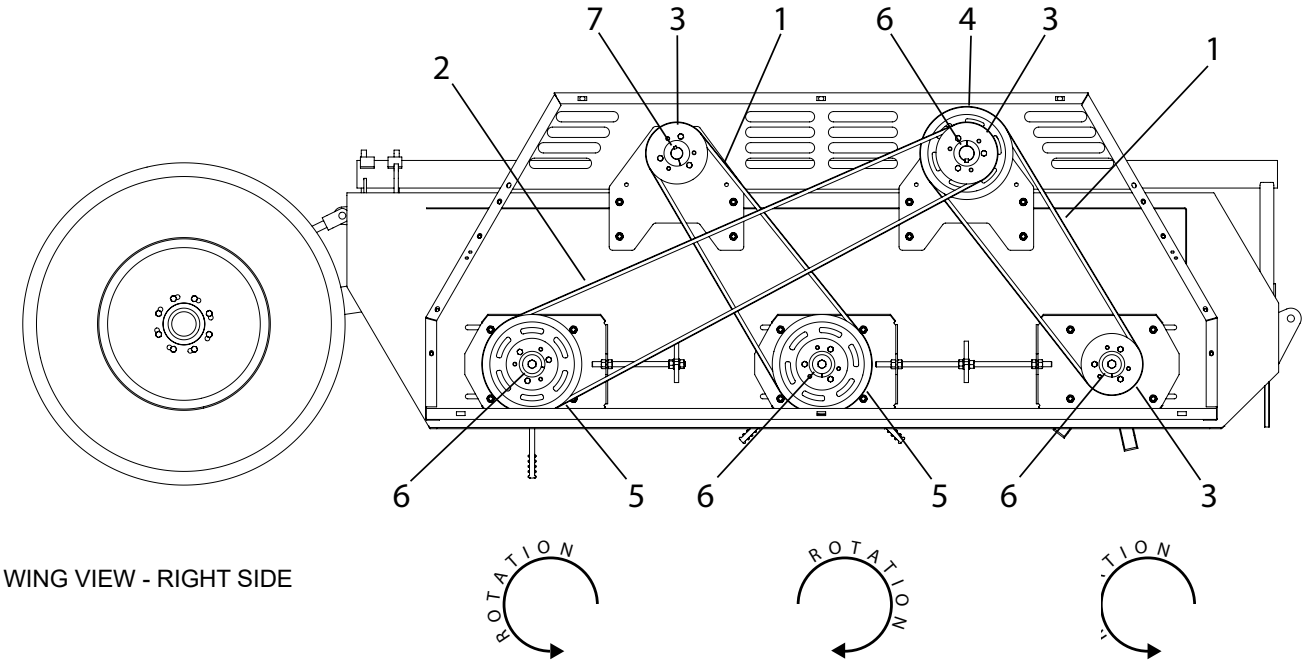


## WING COVER COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                                       | QTY. |
|----------|-------------|---------------------------------------------------|------|
| 1        | 500-3-1514  | REAR LINER PLASTIC                                | 1    |
| 2        | 500-3-1533  | CANVAS CLAMP STRIP                                | 3    |
| 3        | 500-3-1613  | MID LINER PLASTIC                                 | 1    |
| 4        | 500-3-1636  | ROD FLAP                                          | 1    |
| 5        | 500-3-2380  | CHANNEL - COVER SPLICE BACK                       | 2    |
| 6        | 500-2-1599  | S-SERIES FUD HANDLE                               | 1    |
| 7        | 500-2-1377  | REAR TOP TIE ANGLE WELD                           | 1    |
| 9        | 500-3-2898  | ANTI-SKID STRIP FUD WINGS                         | 1    |
| 10       | 500-3-4932  | S-SERIES FUD FRONT PLASTIC                        | 1    |
| 11       | 500-3-4953  | S-SERIES FUD OUTER RUBBER 12R22                   | 1    |
| 12       | 500-3-4943  | S-SERIES FUD MID RUBBER 12R22                     | 1    |
| 13       | 500-3-4944  | S-SERIES FUD INNER RUBBER 12R22                   | 1    |
| 14       | 500-2-1599  | S-SERIES FUD HANDLE                               | 1    |
| 15       | 500-3-4955  | S-SERIES FUD TOP CANVAS STRAP #1 12-22            | 1    |
| 16       | 500-3-4957  | S-SERIES FUD TOP CANVAS STRAP #2 12-22            | 1    |
| 17       | 500-3-4961  | INNER SIDE SHEET PLASTIC                          | 1    |
| 18       | 500-3-4989  | SHROUD PLASTIC 12R22                              | 2    |
| 19       | 500-3-5254  | FLAP STOP PLATE FUD-12R22                         | 4    |
| 20       | 505-3-0868  | FLAP SHIELD 3-1/2"                                | 1    |
| 21       | 505-3-1089  | FLAP SHIELD 12"                                   | 8    |
| 22       | 505-3-1097  | FLAP SHIELD 6"                                    | 4    |
| 23       | 900-01009   | 1/4-20 X 1 ZP HEX BOLT                            | 0    |
| 24       | 900-01229   | 1/2-13 X 2 HEX BOLT GRD 5                         | 12   |
| 25       | 900-01648   | CARRIAGE BOLT 1/4-20 X 1 ZP                       | 8    |
| 26       | 900-01695   | CARRIAGE BOLT 3/8 NC X 1 ZP                       | 18   |
| 27       | 900-06135   | WHIZ NUT - 1/4 - 20                               | 8    |
| 28       | 900-06139   | 3/8 NC FLANGED WHIZ NUT                           | 18   |
| 29       | 900-06143   | 1/2 NC SPIRALOCK NUT ZP GR5                       | 14   |
| 30       | 900-11035   | 1/2 FLAT WASHER                                   | 35   |
| 31       | 900-11037   | WASHER, FLAT, 5/8",                               | 1    |
| 32       | 900-16964   | TEK SCREW, 1/4-14UNC x 1-1/2                      | 15   |
| 33       | 900-21489   | RIVIT 3/16" (#66) ZP                              | 46   |
| 34       | 900-23043   | 3/16 X 1 1/2 COTTER PIN                           | 2    |
|          | 500-2-1590  | S-SERIES FUD WING ASSY - LEFT (12-22) W/O KNIVES  |      |
|          | 500-2-1588  | S-SERIES FUD WING ASSY - RIGHT (12-22) W/O KNIVES |      |



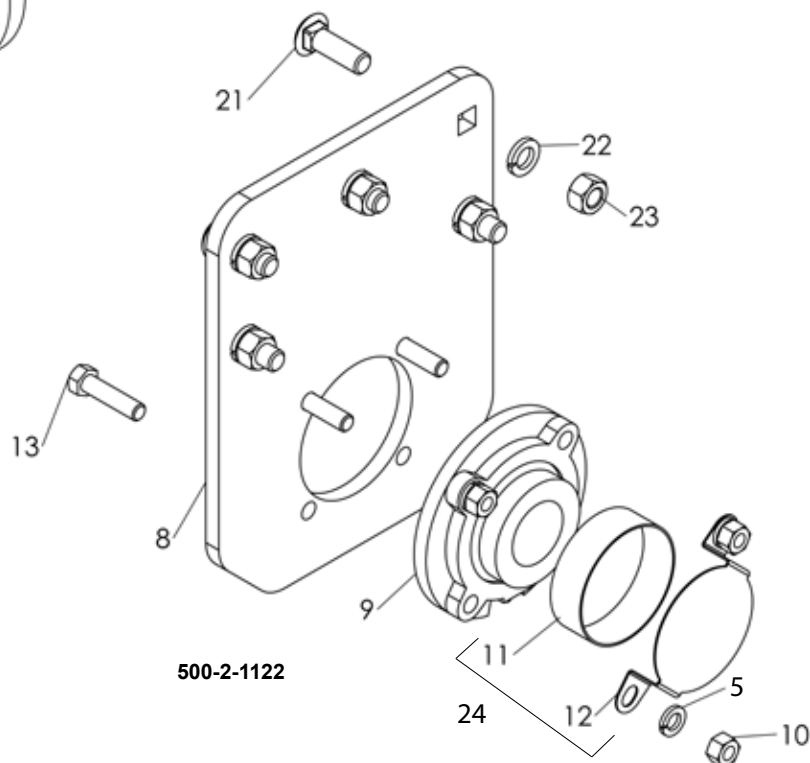
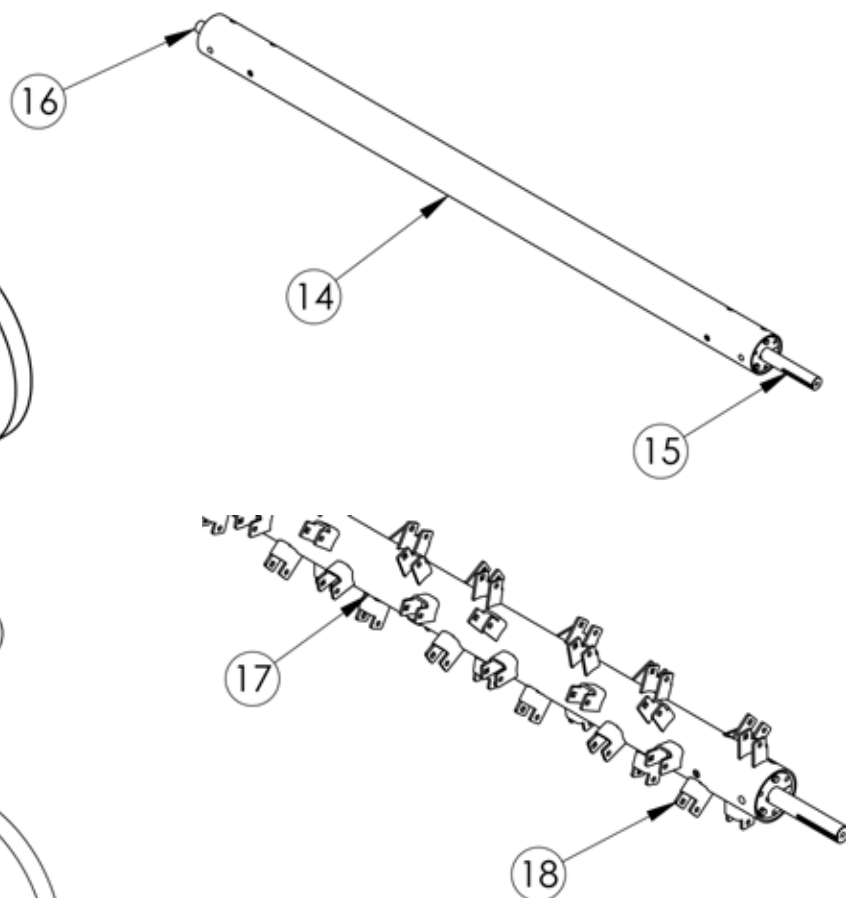
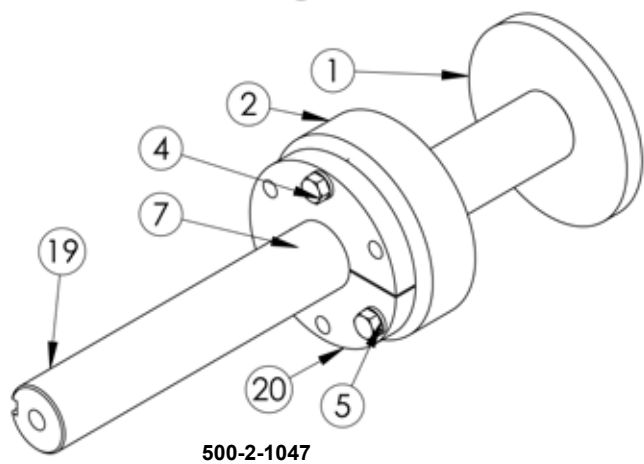
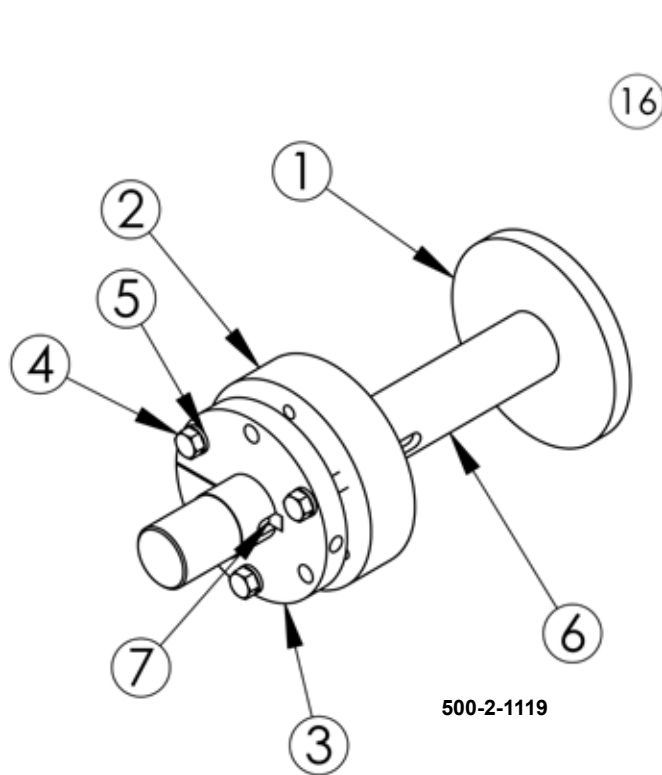
DRIVE BELT ASSEMBLY



## DRIVE BELT ASSEMBLY

| ITEM NO. | PART NUMBER | DESCRIPTION                   | QTY. |
|----------|-------------|-------------------------------|------|
| 1        | 903-01433   | BELT, 3C105, HY-T TORQUE TEAM | 2    |
| 2        | 903-01434   | BELT, XC175, HY-T TORQUE TEAM | 1    |
| 3        | 903-08362   | SHEAVE, QD, 3C8.5-E           | 3    |
| 4        | 903-08363   | SHEAVE, QD, 3C13.0-E          | 1    |
| 5        | 903-08421   | SHEAVE, QD, 3C14.0-E          | 1    |
| 6        | 903-08420   | BUSHING, QD, 2-3/16, TYPE E   | 5    |
| 7        | 500-3-1058  | BUSHING, QD, 1-3/4, TYPE E    | 1    |

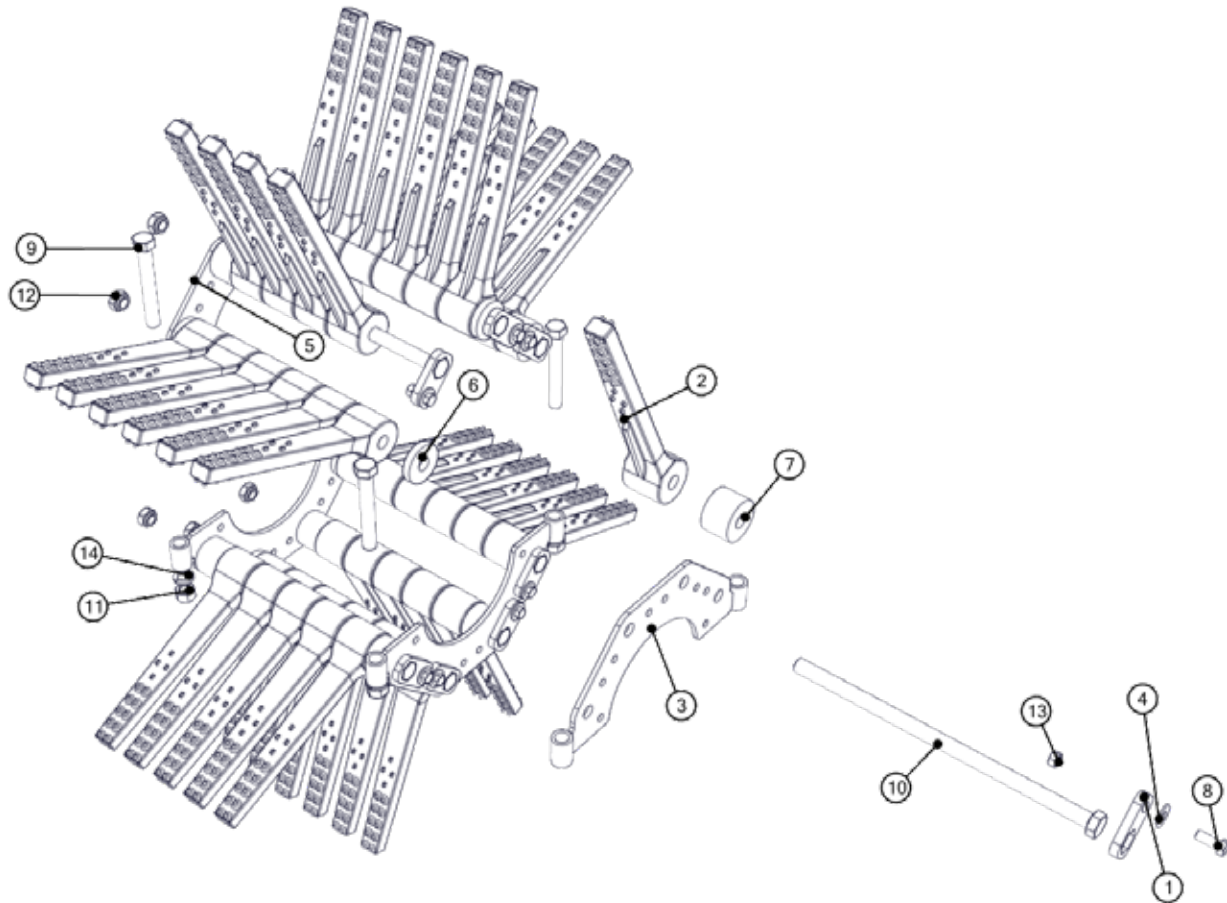
# FLAIL DRUM COMPONENTS



## FLAIL DRUM COMPONENTS

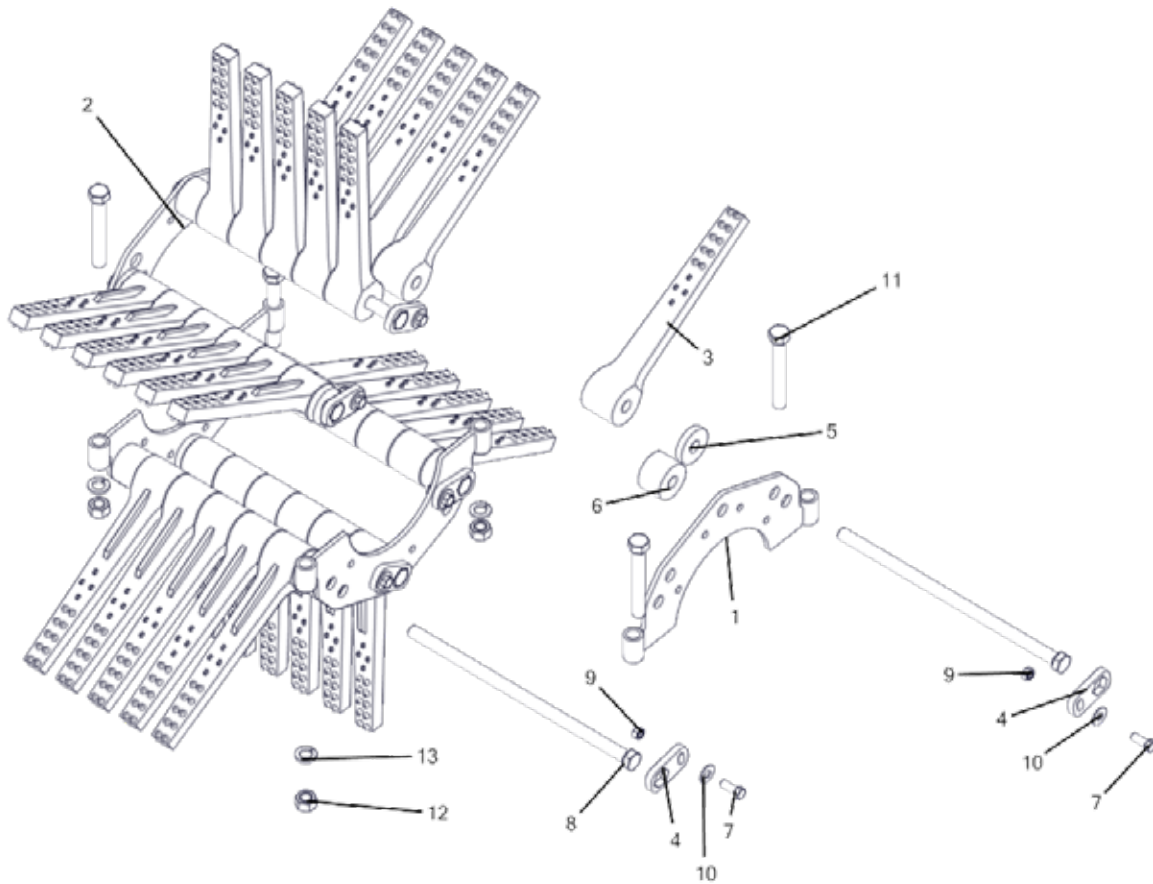
| ITEM NO. | PART NUMBER | DESCRIPTION                                                  | QTY. |
|----------|-------------|--------------------------------------------------------------|------|
| 1        | 505-3-0144  | DONUT INNER                                                  | 1    |
| 2        | 505-3-0147  | MOUNTING HUB - MACHINED                                      | 1    |
| 3        | 500-3-1060  | HUB 2" TYPE "E" W/KW                                         | 1    |
| 4        | 900-02526   | BOLT HEX 1/2 X 2-3/4 GR 5                                    | 2    |
| 5        | 900-11013   | WASHER LOCK 1/2                                              | 3    |
| 6        | 500-3-2367  | STUB SHAFT - FUD                                             | 1    |
| 7        | 100-3-3331  | KEY - 1/2 X 1/2 X 3                                          | 1    |
| 8        | 500-3-2382  | MOUNTING PLATE - HANGER BEARING (FRONT AND CENTER FLAILS)    | 1    |
|          | 500-3-5012  | ADJUSTABLE MOUNTING PLATE - HANGER BEARING (REAR FLAIL ONLY) |      |
| 9        | 901-01408   | BRG ASSY, 1-15/16 DODGE D-LOK PILOTED FLANGE FC-DL-115 (210) | 1    |
| 10       | 900-06009   | NUT HEX 1/2-13 NC                                            | 4    |
| 11       | 500-3-2753  | D-LOK CAP                                                    |      |
| 12       | 500-3-2754  | D-LOK BOLT PLATE                                             |      |
| 13       | 900-01229   | BOLT HH 1/2-13 NC X 2 GRD 5                                  | 4    |
| 14       | 500-3-2243  | FLAIL DRUM - 1222 FUD                                        | 1    |
| 15       | 500-2-1047  | SHAFT SUB ASSEMBLY - 2.19"                                   | 1    |
| 16       | 500-2-1119  | STUB SHAFT ASSEMBLY - FUD (BEARING)                          | 1    |
| 17       | 500-2-1118  | FLAIL DRUM WELD - FUD (BEARING)                              | 1    |
| 18       | 500-3-1734  | CLIP - L/CUP                                                 | 60   |
| 19       | 500-3-1550  | OUTER STUB SHAFT                                             | 3    |
| 20       | 903-08420   | TYPE E HUB 2-3/16 BORE                                       | 1    |
| 21       | 900-01786   | CARRIAGE BOLT 5/8 NC X 2 NC                                  | 5    |
| 22       | 900-11015   | WASHER LOCK 5/8 ZP                                           | 5    |
| 23       | 900-06013   | NUT HEX 5/8-11 NC ZP                                         | 5    |
| 24       | 500-2-1339  | D-LOK BEARING CAP (REF 11 & 12)                              | 1    |
|          | 500-2-1118  | FLAIL DRUM WELD - FUD (BEARING)                              |      |
|          | 500-2-1122  | BEARING PLATE ASSY - PILOTED BEARING (FUD)                   |      |
|          | 500-2-1123  | FLAIL TUBE ASSY - (L-KNIVES) RH FUD - PILOTED BRG            |      |
|          | 500-2-1130  | FLAIL TUBE ASSY - (L-KNIVES) LH FUD - PILOTED BRG            |      |
|          | 500-2-1124  | FLAIL TUBE WELD - FUD RH (PILOTED BEARING)                   |      |
|          | 500-2-1129  | FLAIL TUBE WELD - FUD LH (PILOTED BEARING)                   |      |

## FLAIL COMPONENTS 8-BOLT



| ITEM NO. | PART NUMBER | DESCRIPTION                                   | QTY. |
|----------|-------------|-----------------------------------------------|------|
| 1        | 500-3-5249  | PLATE-FLAIL MOUNT HEX HEAD STOP               | 3    |
| 2        | 500-3-2578  | RUBBER FLAIL 12" TAPERED 62B BF12T NOFFSINGER | 22   |
| 3        | 500-2-1757  | PLATE, FLAIL MOUNTING BRACKET - 8 PIN         | 1    |
| 4        | 900-11033   | FLAT WASHER 3/8 ZP                            | 3    |
| 5        | 500-2-1475  | FLAIL BRACKET - 8 PIN                         | 1    |
| 6        | 500-3-5252  | SPACER 3/8" X 2" DIA- RUBBER FLAIL            | 2    |
| 7        | 500-3-5261  | SPACER 1.375" X 2" DIA- RUBBER FLAIL          | 4    |
| 8        | 900-01109   | BOLT HEX 3/8UNC X 1 GR 5                      | 3    |
| 9        | 900-01363   | HEX BOLT 5/8 NC X 4 1/2 GD 5 ZP               | 4    |
| 10       | 900-01394   | HEX BOLT- 5/8 X 14 UNC ZP                     | 8    |
| 11       | 900-06013   | NUT, HH, 5/8-11, ZP                           | 4    |
| 12       | 900-06337   | WELD NUT HEX 5/8 UNC                          | 4    |
| 13       | 900-06500   | NUT HEX 3/8 TOP LOCK                          | 3    |
| 14       | 900-11015   | WASHER, LOCK, 5/8, ZP                         | 4    |
|          | 500-2-1756  | HALF RUBBER FLAIL ASSEMBLY 6-5-6-5 8-BOLT     | 2    |
|          | 500-2-1758  | FULL RUBBER FLAIL ASSEMBLY 8-BOLT             |      |

## FLAIL COMPONENTS 6-BOLT

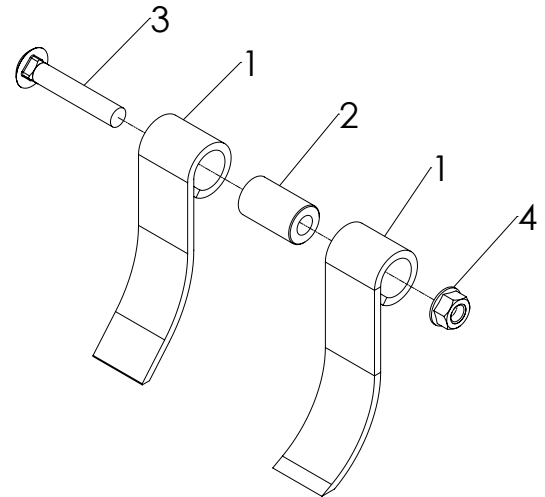


| ITEM NO. | PART NUMBER | DESCRIPTION                                   | QTY. |
|----------|-------------|-----------------------------------------------|------|
| 1        | 500-2-0067  | FLAIL MTG BRACKET WELD                        | 1    |
| 2        | 500-2-1755  | FLAIL MTG BRACKET WELD 6 BOLT                 | 1    |
| 3        | 500-3-2578  | RUBBER FLAIL 12" TAPERED 62B BF12T NOFFSINGER | 16   |
| 4        | 500-3-5249  | PLATE-FLAIL MOUNT HEX HEAD STOP               | 3    |
| 5        | 500-3-5252  | SPACER 3/8" X 2" DIA- RUBBER FLAIL            | 2    |
| 6        | 500-3-5261  | SPACER 1.375" X 2" DIA- RUBBER FLAIL          | 4    |
| 7        | 900-01109   | BOLT HEX 3/8UNC X 1 GR 5                      | 3    |
| 8        | 900-01394   | HEX BOLT- 5/8 X 14 UNC ZP                     | 3    |
| 9        | 900-06500   | NUT HEX 3/8 TOP LOCK                          | 3    |
| 10       | 900-11033   | FLAT WASHER 3/8 ZP                            | 3    |
| 11       | 900-01363   | HEX BOLT 5/8 NC X 4 1/2 GD 5 ZP               | 4    |
| 12       | 900-06013   | NUT, HH, 5/8-11, ZP                           | 4    |
| 13       | 900-11015   | WASHER, LOCK, 5/8, ZP                         | 4    |
|          | 500-2-1752  | HALF RUBBER FLAIL ASSEMBLY 6-5-6 (6 BOLT)     |      |
|          | 500-2-1753  | HALF RUBBER FLAIL ASSEMBLY 5-6-5 (6 BOLT)     |      |
|          | 500-2-1754  | FULL RUBBER FLAIL ASSEMBLY- 6 BOLT            |      |



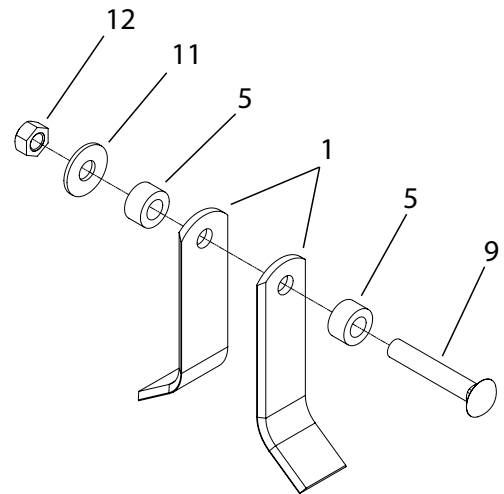
## KNIFE COMPONENTS

CUP KNIFE



| ITEM NO. | PART NUMBER | DESCRIPTION                                         | QTY. |
|----------|-------------|-----------------------------------------------------|------|
| 1        | 505-3-0972  | FLAIL, CUP, SHORT 6-3/16" ACME 195391 (BEFORE 2007) | 2    |
|          | 505-3-0004  | FLAIL, CUP, LONG 7 " ACME 195391 (BEFORE 2007)      |      |
| 2        | 505-3-0405  | BUSHING CUP KNIFE                                   | 1    |
| 3        | 900-01792   | BOLT CARRIAGE 5/8-11 X 3.50                         | 1    |
| 4        | 900-06145   | NUT WHIZ 5/8-11 NC                                  | 1    |
|          | 500-2-0787  | CUP KNIFE CLUSTER                                   |      |

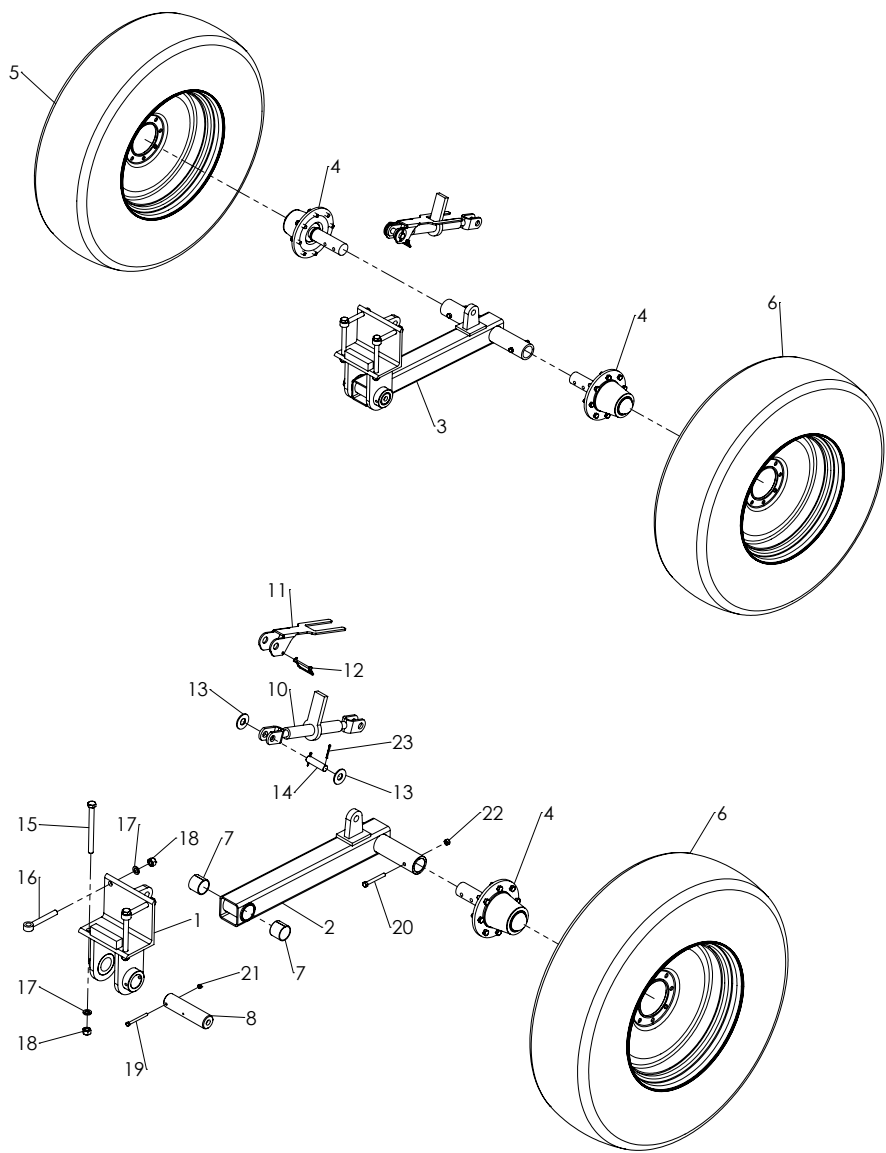
L-KNIFE



| ITEM NO. | PART NUMBER | DESCRIPTION                                            | QTY. |
|----------|-------------|--------------------------------------------------------|------|
| 1        | 505-3-0001  | L-KNIFE (SMALL HOLE)                                   | -    |
|          | 500-3-1735  | L-KNIFE (LARGE HOLE)                                   | -    |
| 5        | 500-3-2134  | SPACER, SMALL HOLE                                     | -    |
| 5        | 500-3-1736  | SPACER, LARGE HOLE                                     | -    |
| 9        | 900-03064   | BOLT, CARRIAGE 5/8 NC X 3-3/4, GR8 ZP (PARTIAL THREAD) | -    |
| 11       | 900-11037   | WASHER, FLAT 5/8                                       | -    |
| 12       | 900-06508   | NUT, TOP LOCK 5/8 NC, GR8                              | -    |
|          | 500-2-0963  | L-KNIFE CLUSTER                                        |      |



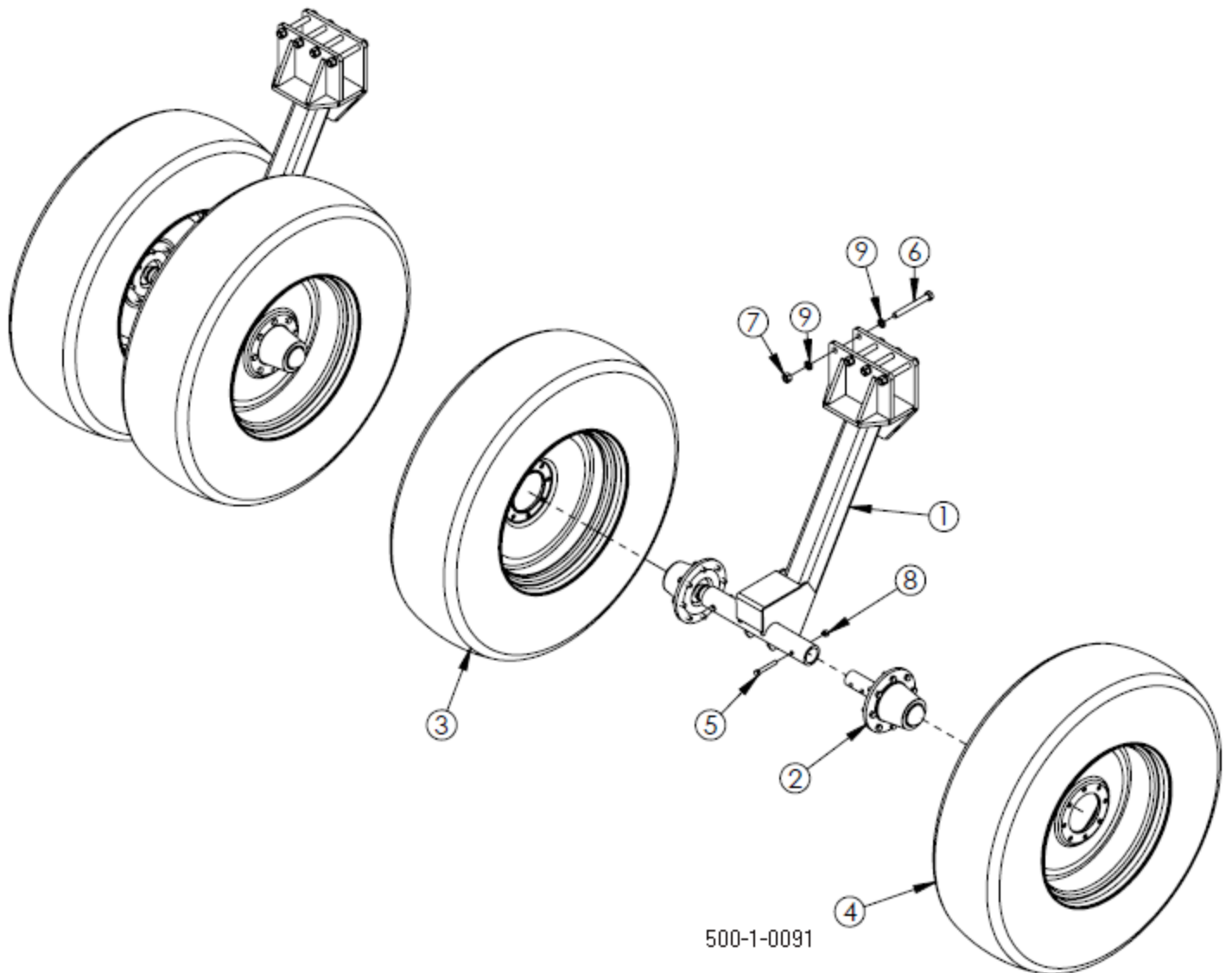
WING STRUT COMPONENTS



## WING STRUT COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                       | QTY.  |
|----------|-------------|-----------------------------------|-------|
| 1        | 500-2-0686  | MOUNTING ANGLE                    | 1     |
| 2        | 500-2-0763  | WING STRUT (SINGLE TIRE) - LH     |       |
|          | 500-2-1452  | WING STRUT (SINGLE TIRE) - RH     |       |
| 3        | 500-2-1121  | WING STRUT (DUAL TIRE)            |       |
| 4        | 700-2-0165  | HUB & SPINDLE ASSEMBLY            | 1 - 2 |
| 5        | 700-2-0168  | TIRE & RIM ASSY (RH)              | 1     |
|          | 905-09130   | TIRE, 12.4-24                     | -     |
|          | 905-09127   | RIM, 24 x 10                      | -     |
| 6        | 700-2-0167  | TIRE & RIM ASSY (LH)              | 1     |
|          | 905-09130   | TIRE, 12.4-24                     | -     |
|          | 905-09127   | RIM, 24 x 10                      | -     |
| 7        | 901-01318   | BUSHING                           | 2     |
| 8        | 500-3-2257  | STRUT PIN                         | 1     |
| 9        | 905-15024   | STRAIGHT ZERK, 1/4-28             | 1     |
| 10       | 905-23014   | RATCHET JACK                      | 1     |
| 11       | 500-3-2202  | RATCHET JACK LOCK                 | 1     |
| 12       | 900-42065   | SNAP PIN                          | 1     |
| 13       | 900-11040   | FLAT WASHER, 1"                   | 2     |
| 14       | 500-3-2203  | RATCHET JACK PIN                  | 1     |
| 15       | 900-01437   | BOLT, 3/4 NC x 8-1/2              | 2     |
| 16       | 900-03463   | EYE BOLT, 3/4 NC x 6              | 2     |
| 17       | 900-11017   | WASHER LOCK, 3/4                  | 4     |
| 18       | 900-06015   | NUT, 3/4 NC                       | 4     |
| 19       | 900-01133   | BOLT, 3/8 NC X 4                  | 1     |
| 20       | 900-01245   | BOLT, 1/2 NC X 4                  | -     |
| 21       | 900-06500   | TOPLOCK NUT, 3/8 NC               | 1     |
| 22       | 900-06504   | TOPLOCK NUT, 1/2 NC               | -     |
| 23       | 900-23045   | PIN, COTTER, 3/16 X 2             | 2     |
|          | 500-1-0292  | KIT, DUAL REAR WING STRUT FUD     |       |
|          | 500-2-1212  | STANDARD FUD WING STRUT ASSY (RH) |       |
|          | 500-2-1213  | STANDARD FUD WING STRUT ASSY (LH) |       |

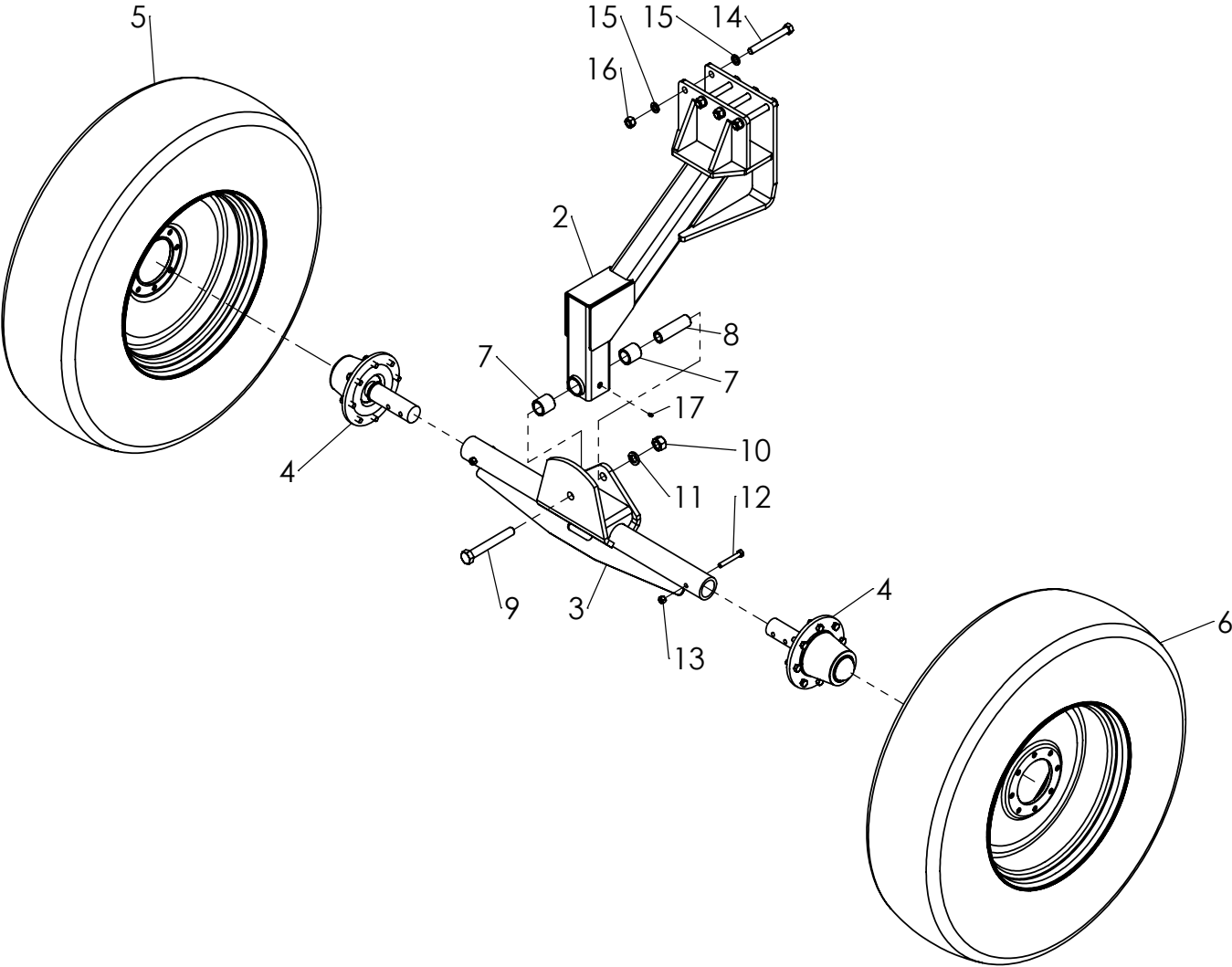
## FIXED STRUT COMPONENTS



## FIXED STRUT COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                    | QTY. |
|----------|-------------|--------------------------------|------|
| 1        | 500-2-0657  | CENTER STRUT (22")             | 1    |
| 2        | 700-2-0165  | HUB & SPINDLE ASSY             | 2    |
| 3        | 700-2-0167  | TRACTION TIRE ASSY (LH)        | 1    |
|          | 905-09130   | - TIRE, 12.4 X 24              |      |
|          | 905-09127   | - RIM, 24 x 10 x 8 BOLT        |      |
| 4        | 700-2-0168  | TRACTION TIRE ASSY (RH)        | 1    |
|          | 905-09130   | - TIRE, 12.4 X 24              |      |
|          | 905-09127   | - RIM, 24 x 10 x 8 BOLT        |      |
| 5        | 900-01241   | BOLT, 1/2 NC x 3-1/2           | 2    |
| 6        | 900-01429   | BOLT, 3/4 NC X 6-1/2           | 4    |
| 7        | 900-06015   | NUT, 3/4 NC                    | 4    |
| 8        | 900-06504   | TOPLOCK NUT, 1/2 NC            | 2    |
| 9        | 900-11017   | LOCK WASHER, 3/4"              | 8    |
|          | 500-1-0091  | 22" FIXED REAR STRUTS (2 PAIR) |      |

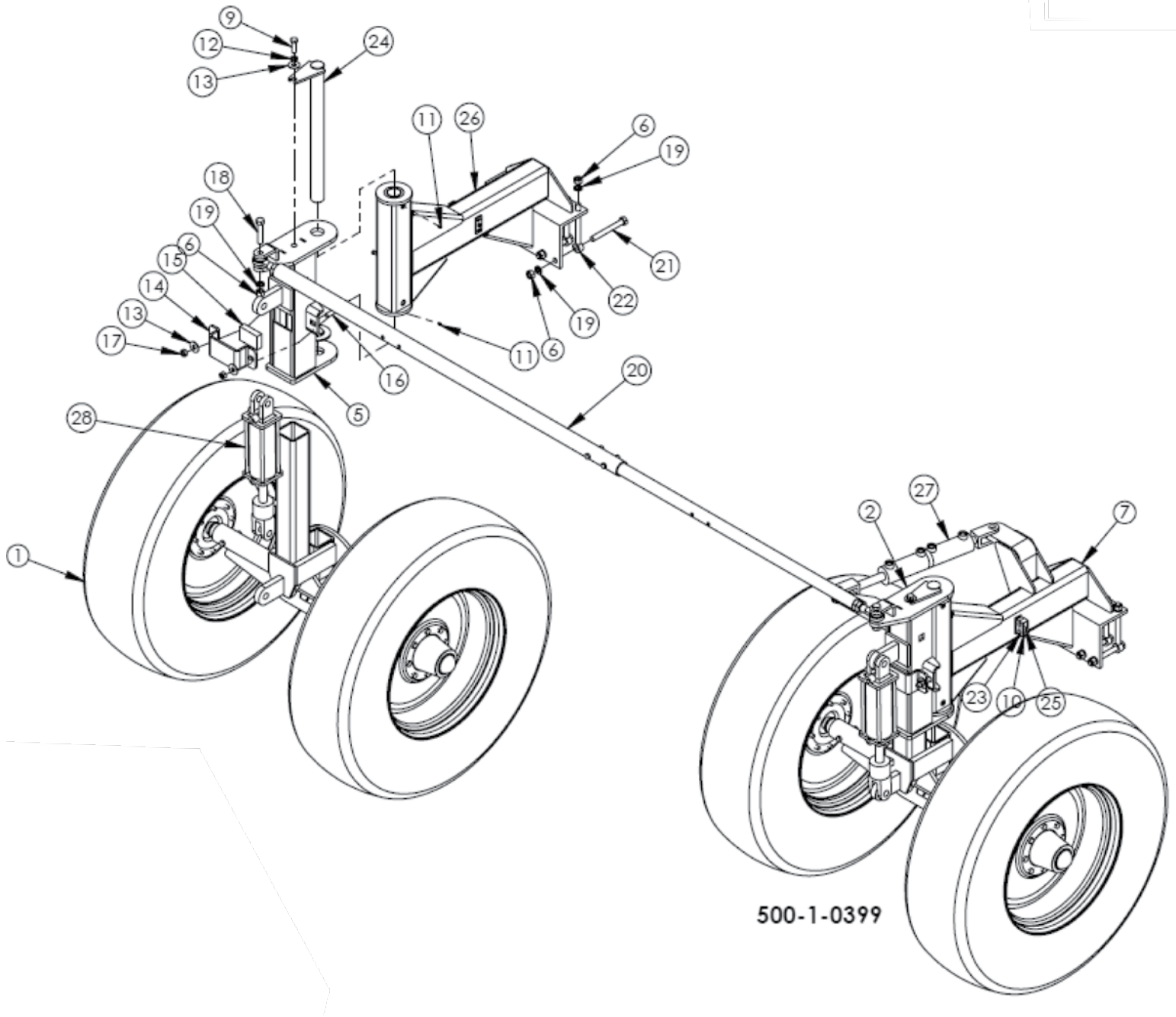
PIVOT STRUT COMPONENTS



## PIVOT STRUT COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION              | QTY. |
|----------|-------------|--------------------------|------|
| 1        | 500-2-0657  | CENTER STRUT (22")       | 1    |
| 2        | 500-2-1167  | UPPER PIVOT CENTER STRUT | 1    |
| 3        | 500-2-1042  | SPINDLE HOLDER (30")     | 1    |
|          | 500-2-1274  | SPINDLE HOLDER (40")     |      |
|          | 500-2-1151  | SPINDLE HOLDER (44")     |      |
| 4        | 700-2-0165  | HUB & SPINDLE ASSY       | 2    |
| 5        | 700-2-0167  | TRACTION TIRE ASSY (LH)  | 1    |
|          | 905-09130   | - TIRE, 12.4 X 24        |      |
|          | 905-09127   | - RIM, 24 x 10 x 8 BOLT  |      |
| 6        | 700-2-0168  | TRACTION TIRE ASSY (RH)  | 1    |
|          | 905-09130   | - TIRE, 12.4 X 24        |      |
|          | 905-09127   | - RIM, 24 x 10 x 8 BOLT  |      |
| 7        | 500-3-1151  | PIVOT BUSHING (BRONZE)   | 2    |
| 8        | 500-3-2236  | PIVOT BUSHING (STEEL)    | 1    |
| 9        | 900-01541   | BOLT, 1 NC x 7-1/2       | 1    |
| 10       | 900-06019   | NUT, 1 NC                | 1    |
| 11       | 900-11021   | LOCK WASHER, 1"          | 1    |
| 12       | 900-01241   | BOLT, 1/2 NC x 3-1/2     | 2    |
| 13       | 900-06504   | TOPLOCK NUT, 1/2 NC      | 2    |
| 14       | 900-01429   | BOLT, 3/4 NC X 6-1/2     | 4    |
| 15       | 900-11017   | LOCK WASHER, 3/4"        | 8    |
| 16       | 900-06015   | NUT, 3/4 NC              | 4    |
| 17       | 905-15024   | STRAIGHT ZERK, 1/4-28    | -    |
|          | 500-1-0312  | 30" PIVOT STRUTS         |      |
|          | 500-1-0333  | 40" PIVOT STRUTS         |      |
|          | 500-1-0285  | 44" PIVOT STRUTS         |      |

## STEERABLE STRUT COMPONENTS



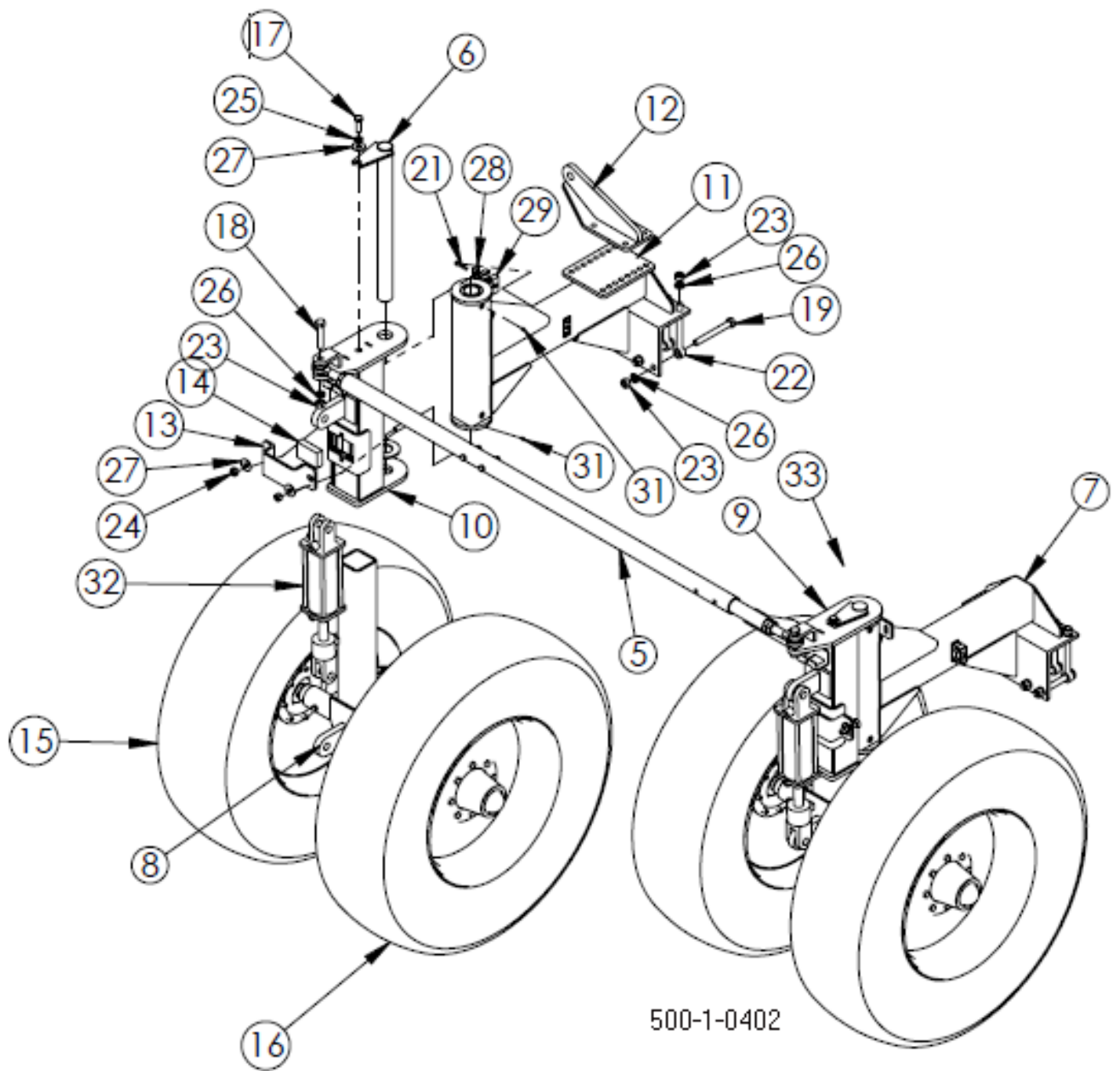
500-1-0399

## STEERABLE STRUT COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                                                                   | QTY. |
|----------|-------------|-------------------------------------------------------------------------------|------|
| 1        | 700-2-0167  | TIRE AND RIM ASSY 2                                                           | 2    |
| 2        | 500-2-1356  | STRUT LOWER PIVOT - REAR STEER 1                                              | 1    |
| 3        | 500-2-1362  | LOWER STRUT ASSEMBLY, REAR STEER 44" 2                                        | 2    |
| 4        | 700-2-0168  | TIRE AND RIM ASSY RH 2                                                        | 2    |
| 5        | 500-2-1359  | STRUT LOWER PIVOT - REAR STEER WO/EAR 1                                       | 1    |
| 6        | 900-06015   | NUT, HH, 3/4-10, ZP 18                                                        | 18   |
| 7        | 500-2-1357  | STRUT UPPER WELD -(REAR STEER ) 1                                             | 1    |
| 8        | 901-01145   | THRUST BEARING 2                                                              | 2    |
| 9        | 900-01345   | - BOLT, HH, 5/8-11 X 2, GR5 ZP 2                                              | 2    |
| 10       | 900-31068   | - COVER PLATE 2                                                               | 2    |
| 11       | 905-15024   | - ZERK 1/4-28 UNF STRAIGHT 4                                                  | 4    |
| 12       | 900-11015   | WASHER, LOCK, 5/8, ZP 2                                                       | 2    |
| 13       | 900-11037   | - WASHER, FLAT, 5/8" 6                                                        | 6    |
| 14       | 500-3-2517  | - PRESSURE PLATE 2                                                            | 2    |
| 15       | 500-3-2519  | WEAR PLATE - UHMW 2                                                           | 2    |
| 16       | 900-01790   | CARRIAGE BOLT 5/8 NC X 3 NC 4                                                 | 4    |
| 17       | 900-06508   | NUT HEX 5/8 UNC TOP LOCK 4                                                    | 4    |
| 18       | 900-01417   | HEX BOLT-3/4NC X 3.75 GR5 ZP 2                                                | 2    |
| 19       | 900-11017   | WASHER, LOCK, 3/4, ZP 18                                                      | 18   |
| 20       | 500-2-1205  | ADJUSTMENT TUBE ASSY - REAR STEER 1                                           | 1    |
| 21       | 900-01429   | HEX BOLT - 3/4NC X 6-1/2 GR5 ZP 8                                             | 8    |
| 22       | 900-03462   | EYE BOLT 3/4 X 8 8                                                            | 8    |
| 23       | 900-31069   | CLAMP BODY - HOSE HOLDER 4                                                    | 4    |
| 24       | 500-2-1358  | PIN WELD 2                                                                    | 2    |
| 25       | 900-02356   | BOLT, HH 5/16 X 1-3/4, GR5 ZP 2                                               | 2    |
| 26       | 500-2-1360  | STRUT UPPER WELD -(REAR STEER ) WO/EAR 1                                      | 1    |
| 27       | 905-21452   | DOUBLE CYLINDER - 1.25 X 2.5 X 4 STROKE PER SIDE                              | 1    |
| 28       | 905-21400   | HYD CYL - 3.5 X 8 2                                                           | 2    |
| 29       | 500-1-0341  | HOSE KIT - REAR STEER (DOUBLE CYLINDER KIT) 132"                              | 1    |
| 30       | 500-1-0350  | HOSE KIT - STEERABLE STRUTS 132" - 154" STRUT SPA                             | 1    |
| 31       | 500-1-0080  | DEPTH GAUGE KIT, HYDRAULIC STRUTS 1                                           | 1    |
| 32       | 500-1-0363  | KIT - CYLINDER TRANSPORT LOCK (2 PAIRS) 1                                     | 1    |
|          | 500-1-0399  | 2 PAIR LARGE TIRES - STEERABLE PIVOT STRUTS<br>132" STRUT SPACING, 44" STRUTS |      |



## STEERABLE STRUT COMPONENTS

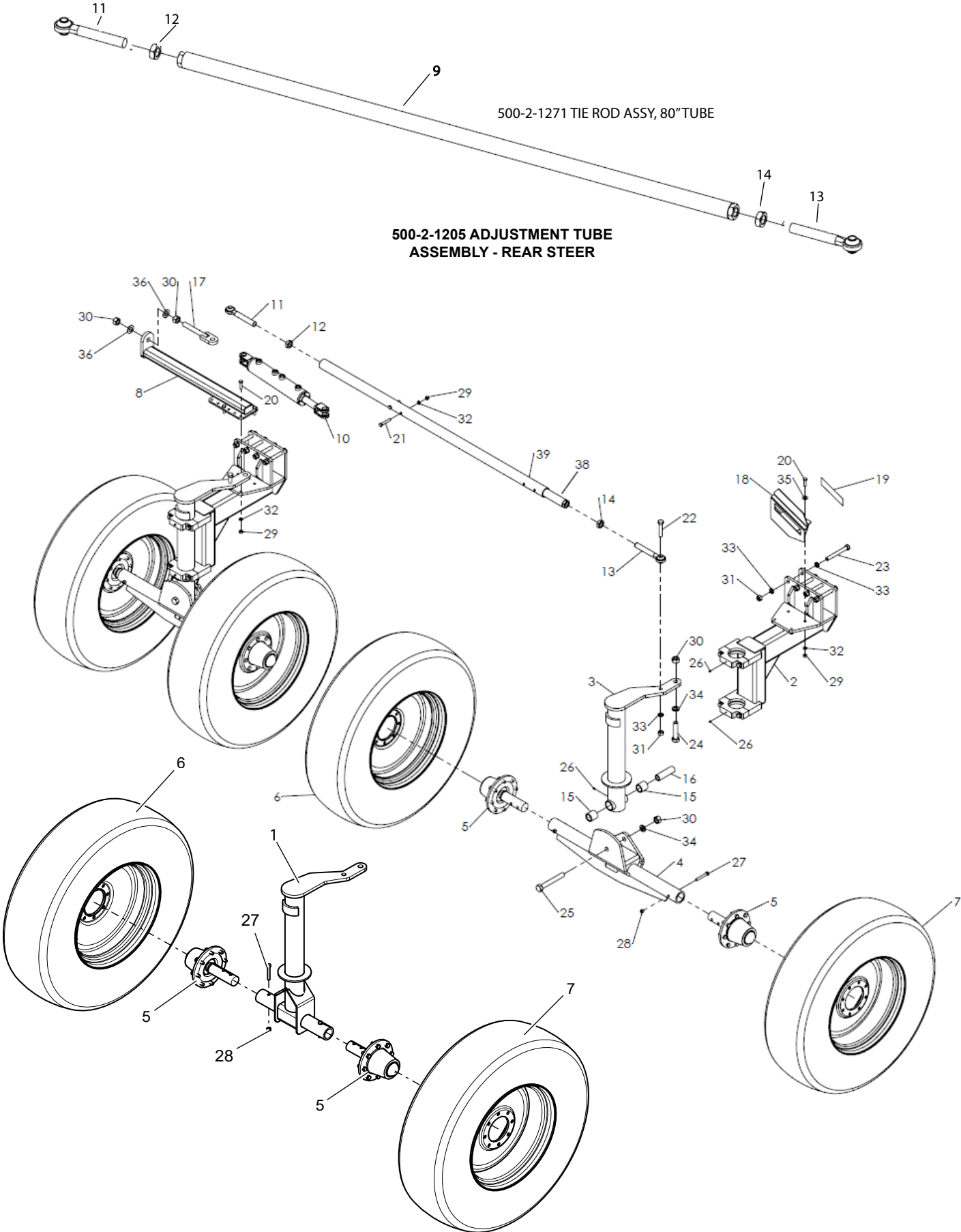


500-1-0402

## STEERABLE STRUT COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                                                                  | QTY. |
|----------|-------------|------------------------------------------------------------------------------|------|
| 1        | 500-1-0080  | DEPTH GAUGE KIT, HYDRAULIC STRUTS                                            | 1    |
| 2        | 500-1-0363  | KIT - CYLINDER TRANSPORT LOCK (2 PAIRS)                                      | 1    |
| 3        | 500-1-0417  | HOSE KIT - REAR STEER (HARDLINE) 88" - 110" STRUT                            | 1    |
| 4        | 500-1-0420  | HOSE KIT - STEERABLE STRUTS 88" - 110" STRUT SPACING (FLOW DIVIDER)          | 1    |
| 5        | 500-2-1205  | ADJUSTMENT TUBE ASSY - REAR STEER                                            | 1    |
| 6        | 500-2-1358  | PIN WELD                                                                     | 2    |
| 7        | 500-2-1360  | STRUT UPPER WELD -(REAR STEER ) WO/EAR                                       | 1    |
| 8        | 500-2-1363  | LOWER STRUT ASSEMBLY, REAR STEER - 30" PIVOTING                              | 2    |
| 9        | 500-2-1459  | STRUT LOWER PIVOT - REAR STEER (2013)                                        | 1    |
| 10       | 500-2-1460  | - STRUT LOWER PIVOT - REAR STEER WO/EAR (2013)                               | 1    |
| 11       | 500-2-1470  | - STRUT UPPER WELD - REAR STEER (DRIVE)                                      | 1    |
| 12       | 500-2-1471  | RIGID REAR STEER ADJUSTMENT WELD                                             | 1    |
| 13       | 500-3-2517  | - PRESSURE PLATE                                                             | 2    |
| 14       | 500-3-2519  | WEAR PLATE - UHMW                                                            | 2    |
| 15       | 700-2-0167  | - TIRE AND RIM ASSY                                                          | 2    |
| 16       | 700-2-0168  | - TIRE AND RIM ASSY RH                                                       | 2    |
| 17       | 900-01345   | BOLT, HH, 5/8-11 X 2, GR5 ZP                                                 | 2    |
| 18       | 900-01417   | HEX BOLT-3/4NC X 3.75 GR5 ZP                                                 | 2    |
| 19       | 900-01429   | HEX BOLT - 3/4NC X 6-1/2 GR5 ZP                                              | 8    |
| 20       | 900-01790   | CARRIAGE BOLT 5/8 NC X 3 NC                                                  | 4    |
| 21       | 900-02356   | BOLT, HH 5/16 X 1-3/4, GR5 ZP                                                | 2    |
| 22       | 900-03462   | EYE BOLT 3/4 X 8                                                             | 8    |
| 23       | 900-06015   | NUT, HH, 3/4-10, ZP                                                          | 18   |
| 24       | 900-06508   | NUT HEX 5/8 UNC TOP LOCK                                                     | 4    |
| 25       | 900-11015   | WASHER, LOCK, 5/8, ZP                                                        | 2    |
| 26       | 900-11017   | WASHER, LOCK, 3/4, ZP                                                        | 18   |
| 27       | 900-11037   | WASHER, FLAT, 5/8"                                                           | 6    |
| 28       | 900-31068   | COVER PLATE                                                                  | 2    |
| 29       | 900-31069   | CLAMP BODY - HOSE HOLDER                                                     | 4    |
| 30       | 901-01145   | THRUST BEARING                                                               | 2    |
| 31       | 905-15024   | ZERK 1/4-28 UNF STRAIGHT                                                     | 4    |
| 32       | 905-21400   | HYD CYL - 3.5 X 8                                                            | 2    |
| 33       | 905-21452   | DOUBLE CYLINDER - 1.50 X 2.5 X 4 STROKE PER SIDE                             | 1    |
|          | 500-1-0402  | 2 PAIR LARGE TIRES - STEERABLE PIVOT STRUTS<br>90" STRUT SPACING, 30" STRUTS |      |

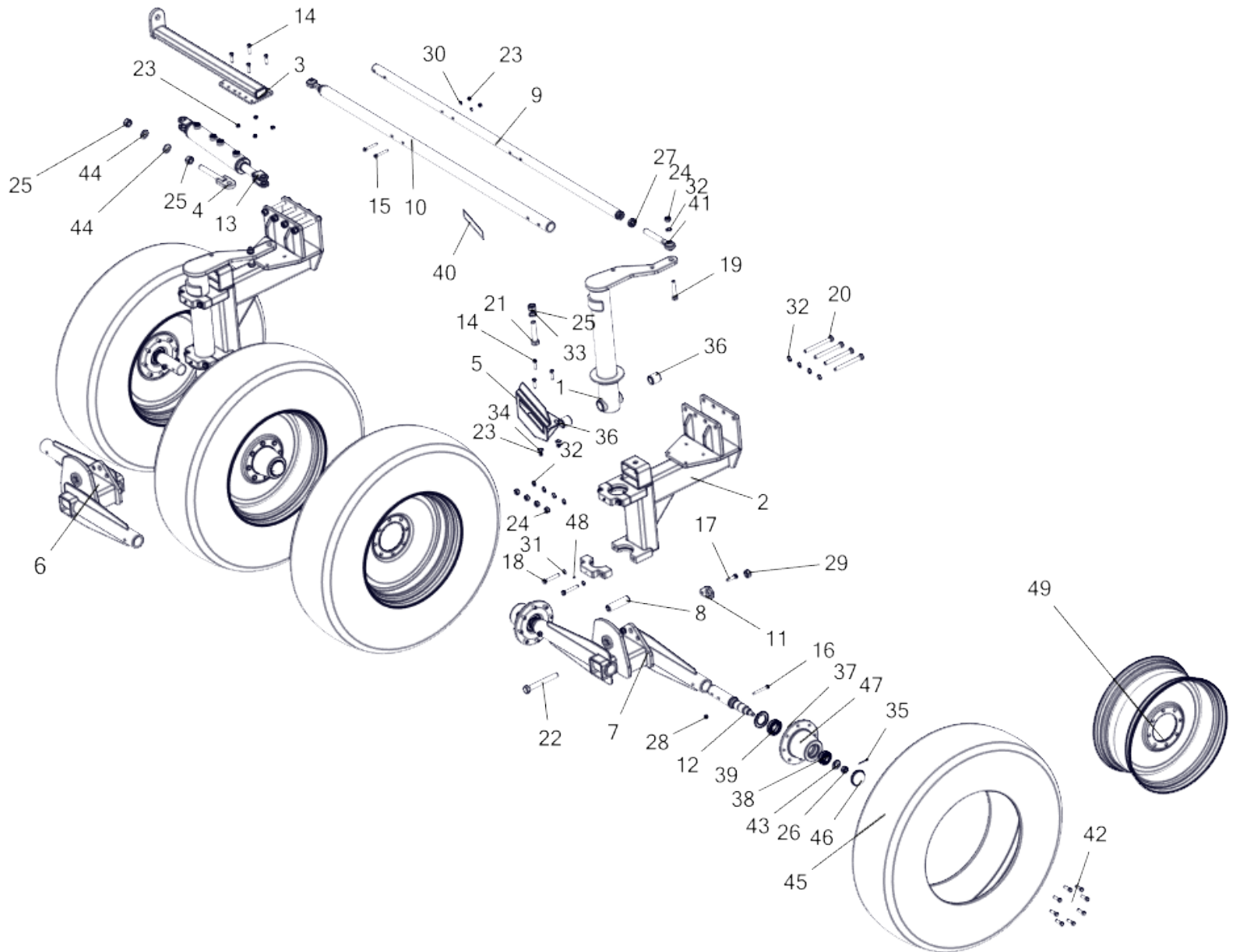
STEERABLE STRUT COMPONENTS (before 2018)



## STEERABLE STRUT COMPONENTS (before 2018)

| ITEM NO. | PART NUMBER | DESCRIPTION                                      | QTY. |
|----------|-------------|--------------------------------------------------|------|
| 1        | 500-2-1240  | WHEEL STRUT, REAR STEER (22")                    | 2    |
| 2        | 500-2-1444  | ADJUSTABLE REAR STEER WELD                       | 2    |
| 3        | 500-2-1229  | VERTICAL PIVOT - REAR STRUT ASSY (30", 40", 44") | 2    |
| 4        | 500-2-1042  | SPINDLE HOLDER (30")                             | 2    |
|          | 500-2-1274  | SPINDLE HOLDER (40")                             |      |
|          | 500-2-1151  | SPINDLE HOLDER (44")                             |      |
| 5        | 700-2-0165  | HUB & SPINDLE ASSY                               | 4    |
| 6        | 700-2-0167  | TRACTION TIRE ASSY (LH)                          | 2    |
|          | 905-09130   | - TIRE, 12.4 X 24                                |      |
|          | 905-09127   | - RIM, 24 x 10 x 8 BOLT                          |      |
| 7        | 700-2-0168  | TRACTION TIRE ASSY (RH)                          | 2    |
|          | 905-09130   | - TIRE, 12.4 X 24                                |      |
|          | 905-09127   | - RIM, 24 x 10 x 8 BOLT                          |      |
| 8        | 500-2-1445  | ADJUSTABLE REAR STEER ARM (FUD)                  | 1    |
| 9        | 500-2-1272  | TIE ROD WELDMENT, 72" TUBE (40")                 |      |
| 10       | 905-21452   | DOUBLE CYLINDER                                  | 1    |
| 11       | 903-05031   | PIVOT LINK (RH)                                  | -    |
| 12       | 900-06288   | JAM NUT, 1" (RH)                                 | -    |
| 13       | 903-05030   | PIVOT LINK (LH)                                  | -    |
| 14       | 900-06310   | JAM NUT, 1" (LH)                                 | -    |
| 15       | 500-3-1151  | PIVOT BUSHING (BRONZE)                           | 4    |
| 16       | 500-3-2236  | PIVOT BUSHING (STEEL)                            | 2    |
| 17       | 500-2-1446  | ADJUSTABLE REAR STEER EYE BOLT                   | 1    |
| 18       | 500-2-1484  | STEERING GUAGE WELD                              | 1    |
| 19       | 902-15117   | DECAL, STEERING INDICATOR                        | 1    |
| 20       | 900-01227   | BOLT, 1/2 NC X 1-3/4                             | -    |
| 21       | 900-01237   | BOLT, 1/2 NC X 3                                 | -    |
| 22       | 900-01417   | BOLT, 3/4 NC X 3-3/4                             | -    |
| 23       | 900-01429   | BOLT, 3/4 NC X 6-1/2                             | -    |
| 24       | 900-01529   | BOLT, 1 NC X 4-1/2                               | -    |
| 25       | 900-01541   | BOLT, 1 NC X 7-1/2                               | -    |
| 26       | 905-15024   | STRAIGHT ZERK, 1/4-28                            | -    |
| 27       | 900-01241   | BOLT, 1/2 NC X 3-1/2                             | -    |
| 28       | 900-06504   | TOPLOCK NUT, 1/2 NC                              | -    |
| 29       | 900-06009   | NUT, 1/2 NC                                      | -    |
| 30       | 900-06019   | NUT, 1 NC                                        | -    |
| 31       | 900-06015   | NUT, 3/4 NC                                      | -    |
| 32       | 900-11013   | LOCK WASHER, 1/2"                                | -    |
| 33       | 900-11017   | LOCK WASHER, 3/4"                                | -    |
| 34       | 900-11021   | LOCK WASHER, 1"                                  | -    |
| 35       | 900-11035   | WASHER, 1/2"                                     | -    |
| 36       | 905-09068   | WASHER, 1" SAE                                   | -    |
| 38       | 500-2-1203  | ADJUSTMENT TUBE WELD - REAR STEER                | 1    |
| 39       | 500-2-1204  | OUTER ADJUSTMENT TUBE WELD - REAR STEER          | 1    |
|          | 500-1-0334  | REAR STEER FUD 40" TIRE SPACING                  |      |
|          | 500-1-0340  | REAR STEER FUD 22" TIRE SPACING                  |      |
|          | 500-1-0313  | REAR STEER FUD 30" TIRE SPACING                  |      |
|          | 500-1-0311  | REAR STEER FUD 44" TIRE SPACING                  |      |

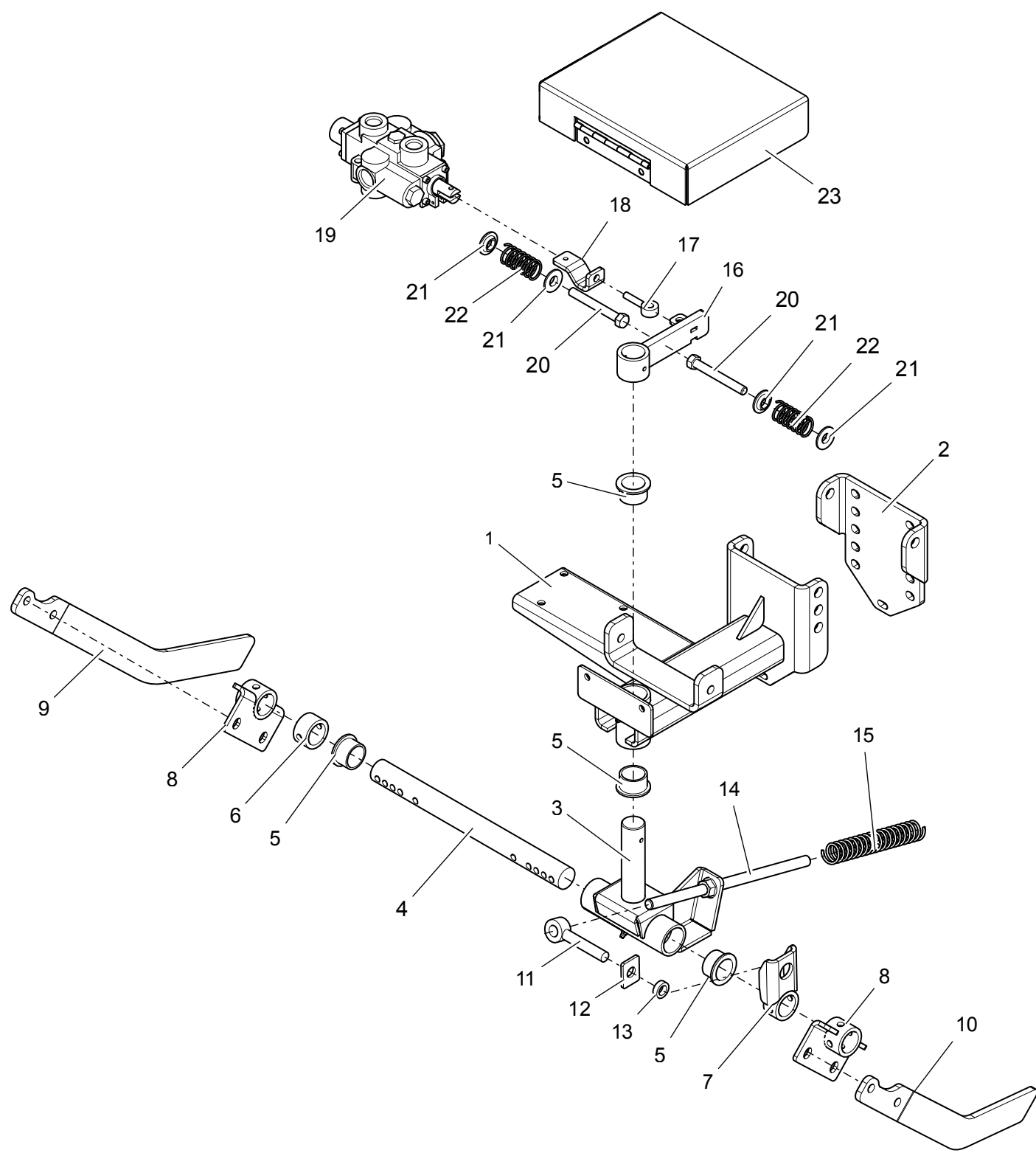
## REAR STEER - OFFSET DUAL LARGE TIRE (STEERABLE) COMPONENTS



## REAR STEER - OFFSET DUAL LARGE TIRE (STEERABLE) COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                                      | QTY. |
|----------|-------------|--------------------------------------------------|------|
| 1        | 500-2-1229  | - VERTICAL PIVOT - REAR STRUT ASSY               | 1    |
| 2        | 500-2-1444  | - FUD ADJUSTABLE REAR STEER STRUT WELD           | 1    |
| 3        | 500-2-1445  | ADJUSTABLE REAR STEER ARM (FUD)                  | 1    |
| 4        | 500-2-1446  | ADJUSTABLE REAR STEER EYE BOLT                   | 1    |
| 5        | 500-2-1484  | - STEERING GAUGE WELD (FUD)                      | 1    |
| 6        | 500-2-1779  | - TANDEM 44" SPINDLE HOLDER LH - STEERABLE FUD   | 1    |
| 7        | 500-2-1781  | TANDEM 44" SPINDLE HOLDER RH - STEERABLE FUD     | 1    |
| 8        | 500-3-2236  | BUSHING - WHEEL STRUT (PIVOT)                    | 1    |
| 9        | 500-2-1203  | ADJUSTMENT TUBE WELD - REAR STEER                | 1    |
| 10       | 500-2-1204  | OUTER ADJUSTMENT TUBE - REAR STEER               | 1    |
| 11       | 500-3-5297  | BOLT HOLD- REAR STEER                            | 1    |
| 12       | 700-3-0143  | SPINDLE REAR STRUT                               | 1    |
| 13       | 905-21452   | DOUBLE CYLINDER - 1.50 X 2.5 X 4 STROKE PER SIDE | 1    |
| 14       | 900-01227   | BOLT HEX ½ X 1 ¾ GR 5 ZP                         | 7    |
| 15       | 900-01237   | BOLT HEX ½-13 X 3                                | 2    |
| 16       | 900-01241   | BOLT, HH, 1/2-13 x 3-1/2, GR5 ZP                 | 2    |
| 17       | 900-01345   | BOLT, HH, 5/8-11 X 2, GR5 ZP                     | 1    |
| 18       | 900-01357   | SCREW, CAP 5/8 X 3-½ UNC                         | 2    |
| 19       | 900-01417   | HEX BOLT-3/4NC X 3.75 GR5 ZP                     | 2    |
| 20       | 900-01429   | HEX BOLT - 3/4NC X 6-1/2 GR5 ZP                  | 4    |
| 21       | 900-01529   | BOLT, HH 1 NC X 4-1/2 GR5 ZP (FULL THREAD)       | 1    |
| 22       | 900-01541   | HEX BOLT - 1NC X 7-1/2 GR5 ZP                    | 1    |
| 23       | 900-06009   | NUT HEX 1/2 UNC                                  | 7    |
| 24       | 900-06015   | NUT, HH, 3/4-10, ZP                              | 2    |
| 25       | 900-06019   | 1-8 HEX NUT                                      | 3    |
| 26       | 900-06060   | SLOTTED HEX NUT 7/8 -14 NF                       | 1    |
| 27       | 900-06310   | 1-1/8 NC JAM LEFT HAND ZP                        | 1    |
| 28       | 900-06504   | NUT, LOCK, TOP, 1/2-13, GR C ZP                  | 2    |
| 29       | 900-06514   | NUT, LOCK, 1 NC                                  | 1    |
| 30       | 900-11013   | WASHER, LOCK 1/2                                 | 7    |
| 31       | 900-11015   | WASHER, LOCK, 5/8, ZP                            | 2    |
| 32       | 900-11017   | WASHER, LOCK, 3/4, ZP                            | 8    |
| 33       | 900-11021   | LOCK WASHER - 1                                  | 1    |
| 34       | 900-11035   | 1/2 FLAT WASHER                                  | 3    |
| 35       | 900-23064   | COTTER PIN - 1/4 X 2                             | 1    |
| 36       | 901-01146   | BRONZE BUSHING 1.5 ID X 2.0 OD X 2 LONG          | 1    |
| 37       | 901-01152   | BEARING CUP (TIMKEN #25520)                      | 1    |
| 38       | 901-01324   | BEARING CUP (TIMKEN #25821)                      | 1    |
| 39       | 901-09215   | GREASE SEAL                                      | 1    |
| 40       | 902-15117   | DECAL, STEERING INDICATOR (FUD)                  | 1    |
| 41       | 903-05030   | UNIBALL 3/4" X 1-1/8 NC LH                       | 1    |
| 42       | 905-09039   | WHEEL BOLT 9/16-18 X 1-11/16                     | 8    |
| 43       | 905-09067   | WASHER, 7/8 SAE"                                 | 1    |
| 44       | 905-09068   | WASHER, 1 SAE                                    | 2    |
| 45       | 905-09130   | TIRE 12.4-24                                     | 1    |
| 46       | 905-09135   | HUB CAP                                          | 1    |
| 47       | 905-09182   | HUB ONLY"                                        | 1    |
| 48       | 905-15024   | ZERK 1/4-28 UNF STRAIGHT                         | 3    |
| 49       | 905-09127   | RIM 24 X 10, 88T                                 | 1    |
|          | 500-2-1778  | TANDEM 44" PIVOT REAR STEER STRUT ASSY LH - FUD  |      |

ROW FINDER COMPONENTS

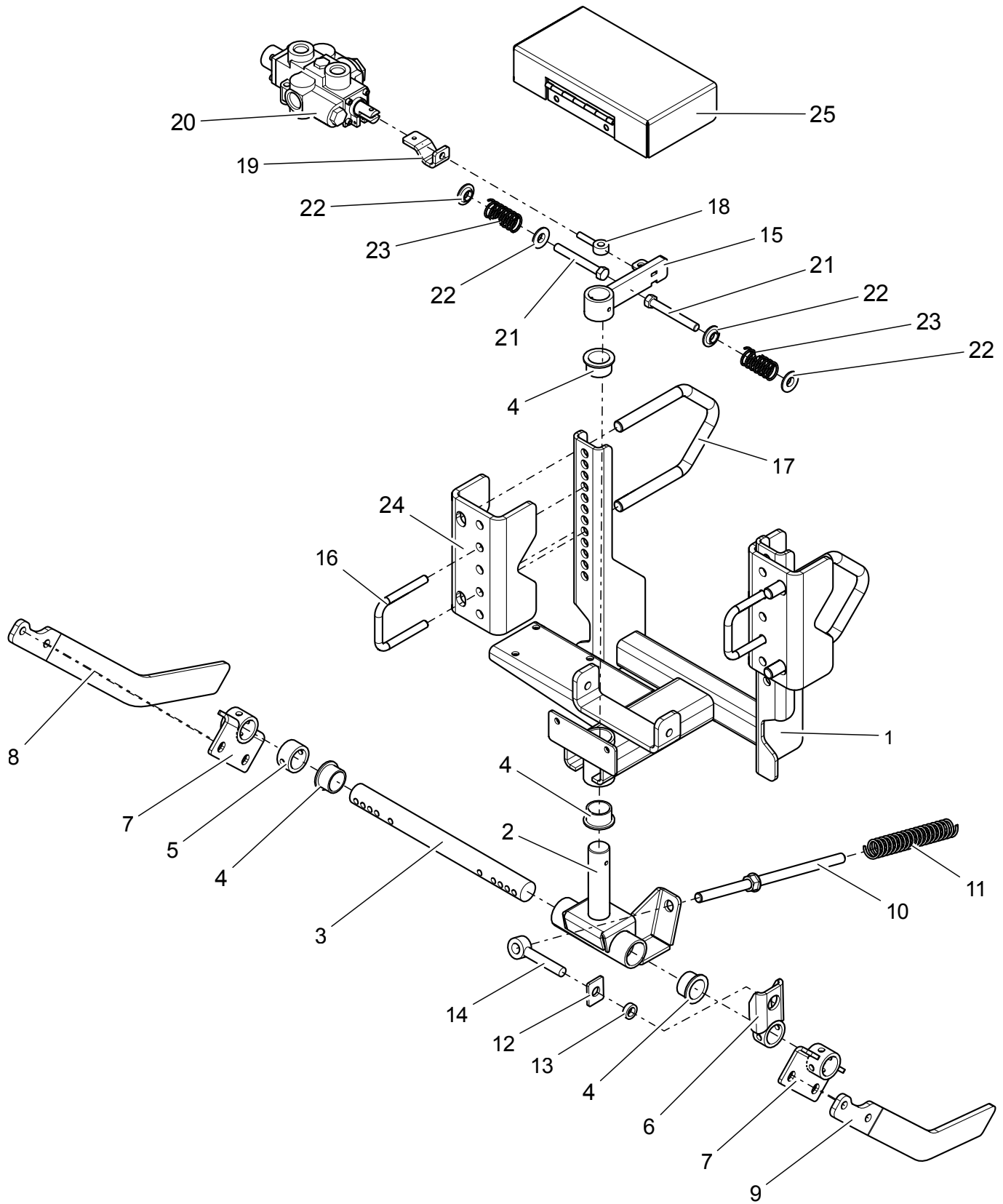


## ROW FINDER COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                  | QTY. |
|----------|-------------|------------------------------|------|
| 1        | 500-2-1249  | PIVOT MOUNT                  | 1    |
| 2        | 700-3-2186  | INNER PIVOT MOUNT            | 1    |
| 3        | 700-2-0851  | BOTTOM PIVOT                 | 1    |
| 4        | 700-3-2170  | PIVOT SHAFT                  | 1    |
| 5        | 700-3-0383  | BUSHING (OILITE)             | 4    |
| 6        | 700-3-2182  | LOCK COLLAR                  | 1    |
| 7        | 700-2-0853  | SPRING TENSIONER             | 1    |
| 8        | 700-2-0854  | FINGER MOUNT                 | 2    |
| 9        | 700-3-2188  | FINGER (LH)                  | 1    |
| 10       | 700-3-2189  | FINGER (RH)                  | 1    |
| 11       | 900-03465   | EYE BOLT                     | 1    |
| 12       | 700-3-2187  | INSIDE WASHER                | 1    |
| 13       | 700-3-2183  | BUSHING (TENSIONER)          | 1    |
| 14       | 700-2-0856  | TENSIONER ROD                | 1    |
| 15       | 905-14007   | TENSIONER SPRING             | 1    |
| 16       | 700-2-0850  | STEERING PADDLE              | 1    |
| 17       | 903-05044   | ROD END EYE BOLT             | 1    |
| 18       | 700-3-2343  | ADJUSTMENT PLATE             | 1    |
| 19       | 905-03262   | CONTROL VALVE                | 1    |
| 20       | 900-01245   | BOLT, 1/2 NC x 4             | 2    |
| 21       | 700-3-2185  | SPRING RETAINER              | 4    |
| 22       | 905-14022   | SPRING                       | 2    |
| 23       | 500-2-1250  | TOP COVER                    | 1    |
|          | 500-2-1248  | ROW FINDER COMPLETE ASSEMBLY | -    |



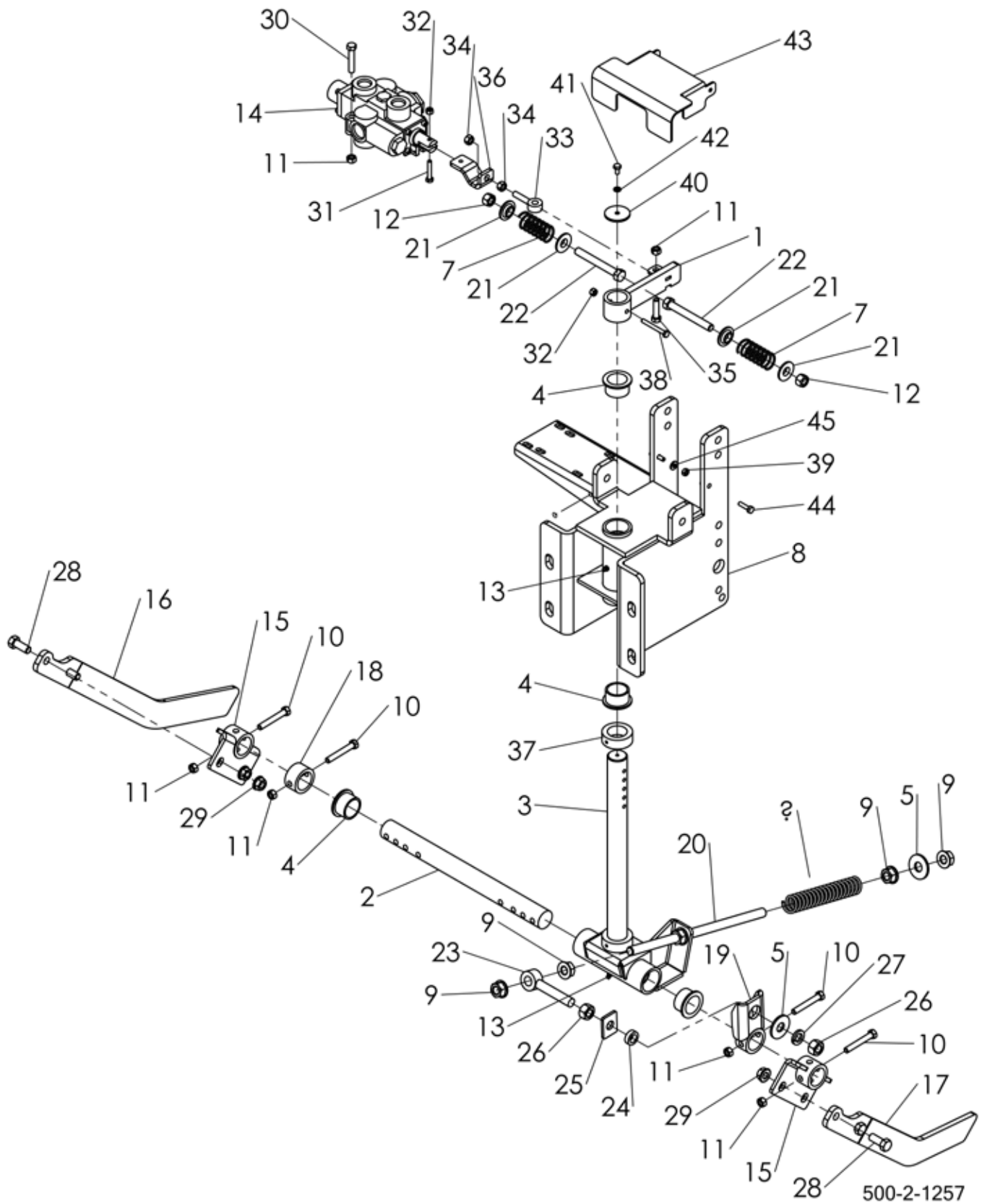
# TOOLBAR ROW FINDER COMPONENTS



## TOOLBAR ROW FINDER COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                  | QTY. |
|----------|-------------|------------------------------|------|
| 1        | 500-2-1168  | PIVOT MOUNT                  | 1    |
| 2        | 700-2-0851  | BOTTOM PIVOT                 | 1    |
| 3        | 700-3-2170  | PIVOT SHAFT                  | 1    |
| 4        | 700-3-0383  | BUSHING (OILITE)             | 4    |
| 5        | 700-3-2182  | LOCK COLLAR                  | 1    |
| 6        | 700-2-0853  | SPRING TENSIONER             | 1    |
| 7        | 700-2-0854  | FINGER MOUNT                 | 2    |
| 8        | 700-3-2188  | FINGER (LH)                  | 1    |
| 9        | 700-3-2189  | FINGER (RH)                  | 1    |
| 10       | 700-2-0856  | TENSIONER ROD                | 1    |
| 11       | 905-14007   | TENSIONER SPRING             | 1    |
| 12       | 700-3-2187  | INSIDE WASHER                | 1    |
| 13       | 700-3-2183  | BUSHING (TENSIONER)          | 1    |
| 14       | 900-03465   | EYE BOLT                     | 1    |
| 15       | 700-2-0850  | STEERING PADDLE              | 1    |
| 16       | 500-3-1578  | U-BOLT, 1/2NC x 3 x 4        | 2    |
| 17       | 500-3-0635  | A-BOLT, 3/4NC x 4 x 4        | 2    |
| 18       | 903-05044   | ROD END EYE BOLT             | 1    |
| 19       | 700-3-2343  | ADJUSTMENT PLATE             | 1    |
| 20       | 905-03262   | CONTROL VALVE                | 1    |
| 21       | 900-01245   | BOLT, 1/2 NC x 4             | 2    |
| 22       | 700-3-2185  | SPRING RETAINER              | 4    |
| 23       | 905-14022   | SPRING                       | 2    |
| 24       | 500-3-2548  | ADAPTER MOUNT                | 2    |
| 25       | 700-2-0908  | TOP COVER                    | 1    |
|          | 500-2-1169  | ROW FINDER COMPLETE ASSEMBLY | -    |

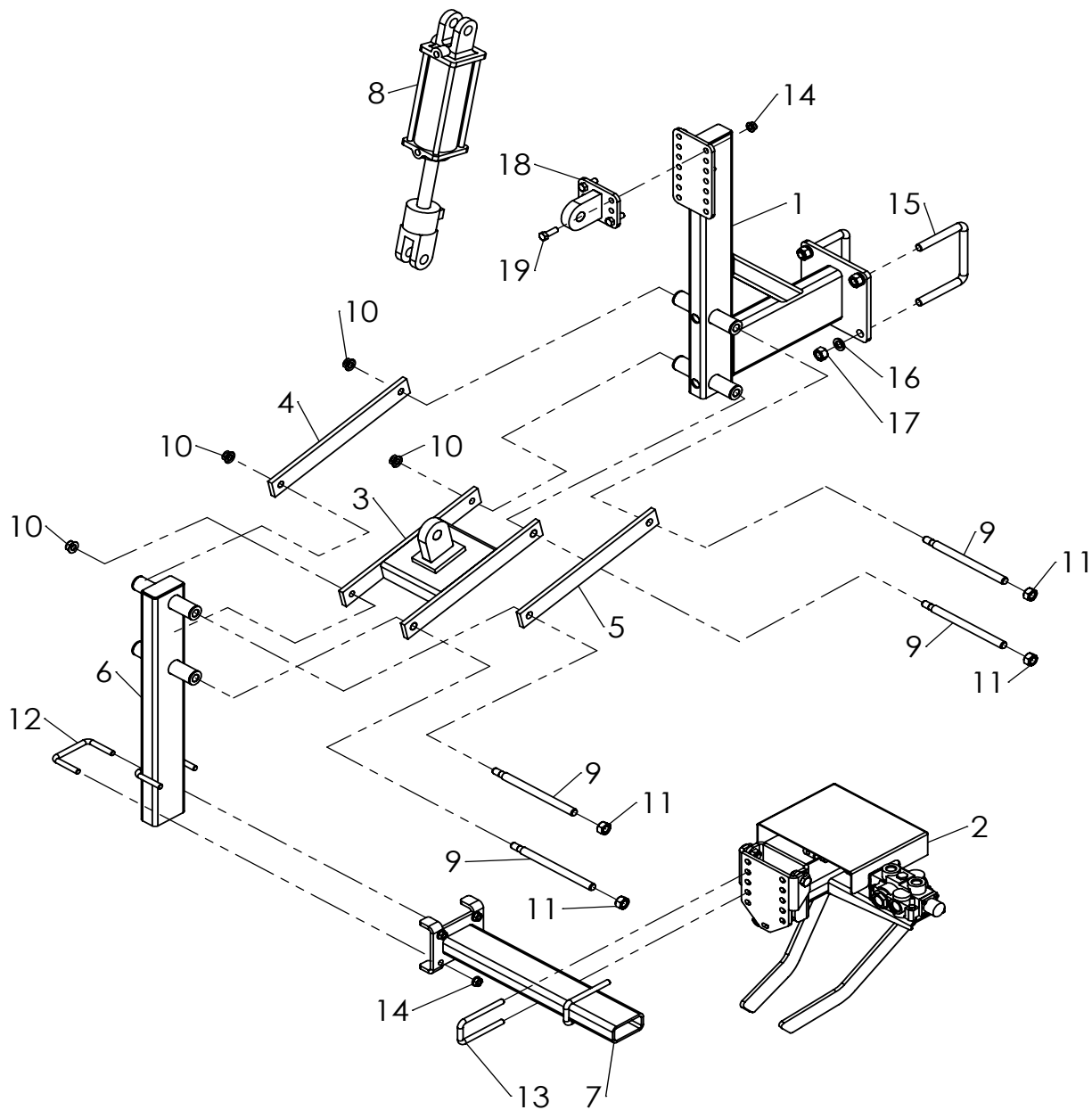
# CIRCULAR SCALPER ROW FINDER COMPONENTS



## CIRCULAR SCALPER ROW FINDER COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                                           | QTY. |
|----------|-------------|-------------------------------------------------------|------|
| 1        | 700-2-0850  | STEERING PADDLE WELD                                  | 1    |
| 2        | 700-3-2170  | SHAFT HORIZONTAL PIVOT                                | 1    |
| 3        | 500-2-1258  | LRG PIVOT WELD                                        | 1    |
| 4        | 700-3-0383  | OILITE BUSHING - FF-1618-1                            | 4    |
| 5        | 900-11037   | WASHER, FLAT, 5/8"                                    | 2    |
| 6        | 905-14007   | SPRING - 1.245 OD X .148 WIRE X .4029 P X 7.75 LONG   | 1    |
| 7        | 905-14022   | SPRING - 1.25 OD X .105 WIRE X 4.00 LONG X 12.5 COILS | 2    |
| 8        | 500-2-1259  | PIVOT MOUNT WELD (ROW FINDER)                         | 1    |
| 9        | 900-06145   | 5/8 WHIZ NUT                                          | 4    |
| 10       | 900-01121   | 3/8NC X 2-1/2 HEX BOLT GR 5                           | 4    |
| 11       | 900-06500   | NUT HEX 3/8 TOP LOCK                                  | 8    |
| 12       | 900-06504   | NUT, LOCK, TOP, 1/2-13, GR C ZP                       | 2    |
| 13       | 905-15024   | ZERK 1/4-28 UNF STRAIGHT                              | 2    |
| 14       | 905-03262   | ROW FINDER VALVE                                      | 1    |
| 15       | 700-2-0854  | FINGER MOUNT WELD                                     | 2    |
| 16       | 700-3-2188  | FINGER - LH                                           | 1    |
| 17       | 700-3-2189  | FINGER - RH                                           | 1    |
| 18       | 700-3-2182  | TUBE-DOWN PRESURE BAR (PAINTED)                       | 1    |
| 19       | 700-2-0853  | SPRING TENSIONER WELD                                 | 1    |
| 20       | 700-2-0856  | THREADED ROD - ROW FINDER                             | 1    |
| 21       | 700-3-2185  | COMPRESSION SPRING RETAINER                           | 4    |
| 22       | 900-01245   | 1/2 X 4 HEX BOLT GR5 ZP                               | 2    |
| 23       | 900-03465   | EYE BOLT 5/8 X 3                                      | 1    |
| 24       | 700-3-2183  | BUSHING - DOWN PRESSURE SPRING                        | 1    |
| 25       | 700-3-2187  | INSIDE WASHER - EYEBOLT                               | 1    |
| 26       | 900-06013   | NUT, HH, 5/8-11, ZP                                   | 2    |
| 27       | 900-11015   | WASHER, LOCK, 5/8, ZP                                 | 1    |
| 28       | 900-01223   | BOLT, HEX HEAD, 1/2" X 1-1/4", GR5, ZP                | 4    |
| 29       | 900-06143   | 1/2 NC SPIRALOCK NUT ZP GR5                           | 4    |
| 30       | 900-01117   | 3/8 NC X 2 HEX BOLT GR 5                              | 3    |
| 31       | 900-01013   | HEX BOLT 1/4 NC X 1 1/2 GD5 ZP                        | 1    |
| 32       | 900-06496   | 1/4-20 TOP LOCK HEX NUT                               | 2    |
| 33       | 903-05044   | EYEBOLT - ROD END                                     | 1    |
| 34       | 900-06006   | NUT, HEX HEAD 3/8 NF, ZP                              | 2    |
| 35       | 900-01113   | 3/8NC X 1-1/2 HEX BOLT GR 5                           | 1    |
| 36       | 700-3-2343  | ADJUSTMENT PLATE - ROW FINDER                         | 1    |
| 37       | 901-01323   | SET COLLAR - 1.38                                     | 1    |
| 38       | 900-03112   | 1/4-20 X 2 1/4 HEX HEAD GR8ZP                         | 1    |
| 39       | 900-06001   | 1/4-20 HEX NUT                                        | 2    |
| 40       | 500-3-2705  | PLATE - DROP PLATE                                    | 1    |
| 41       | 900-01001   | .25 UNC X 1/2 BOLT                                    | 1    |
| 42       | 900-11009   | 1/4 SPRING LOCK WASHER ZP                             | 1    |
| 43       | 500-3-2704  | ROW FINDER TOP COVER                                  | 1    |
| 44       | 900-01009   | 1/4-20 X 1 ZP HEX BOLT                                | 2    |
| 45       | 900-11031   | 1/4 FLAT WASHER                                       | 2    |
|          | 500-2-1257  | ROW FINDER ASSEMBLY                                   |      |

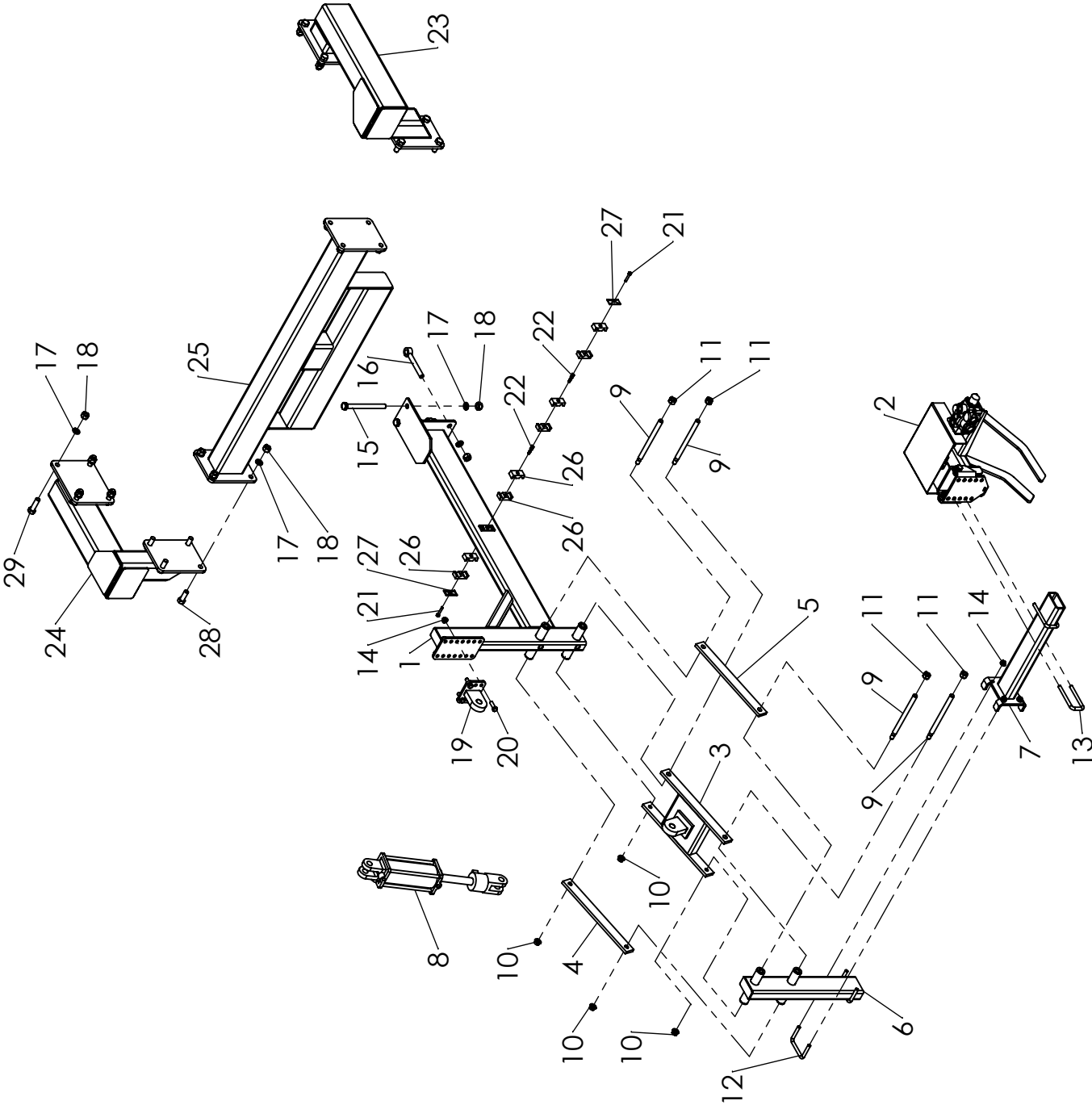
ROW FINDER PARALLEL LINK MOUNT



## ROW FINDER PARALLEL LINK MOUNT

| ITEM NO. | PART NUMBER | DESCRIPTION                                  | QTY. |
|----------|-------------|----------------------------------------------|------|
| 1        | 500-2-1080  | UPPER MOUNT                                  | 1    |
| 2        | 500-2-1248  | ROW FINDER                                   | 1    |
| 3        | 500-2-1081  | H-ARM                                        | 1    |
| 4        | 500-3-0991  | CONNECTING ARM (5/8" HOLES)                  | 1    |
| 5        | 500-3-0992  | CONNECTING ARM (3/4" HOLES)                  | 1    |
| 6        | 500-2-1079  | LOWER MOUNT                                  | 1    |
| 7        | 500-2-1029  | HORIZONTAL MOUNT                             | 1    |
| 8        | 905-21400   | CYLINDER, 3-1/2 x 8                          | 1    |
|          | 905-21380   | - SEAL KIT ( <b>PRINCE CYLINDERS ONLY</b> )  |      |
|          | 905-21401   | - SEAL KIT ( <b>MONARCK CYLINDERS ONLY</b> ) |      |
| 9        | 200-3-2631  | PARALLEL LINK PIN                            | 4    |
| 10       | 900-06145   | SPIRALOCK NUT, 5/8 NC                        | 4    |
| 11       | 900-06510   | TOP LOCK NUT, 3/4 NC                         | 4    |
| 12       | 200-3-1445  | U-BOLT, 1/2 NC x 4 x 3                       | 2    |
| 13       | 200-3-1447  | U-BOLT, 1/2 NC x 2 x 5-1/4                   | 2    |
| 14       | 900-06143   | SPIRALOCK NUT, 1/2 NC                        | 12   |
| 15       | 200-3-0024  | U-BOLT, 3/4 NC x 6 x 5-1/2                   | 2    |
| 16       | 900-11017   | LOCK WASHER, 3/4                             | 4    |
| 17       | 900-06015   | NUT, 3/4 NC                                  | 4    |
| 18       | 500-2-1474  | ADJUSTABLE CYLINDER EAR WELD                 | 1    |
| 19       | 900-01225   | BOLT, 1/2 NC X 1-1/2                         | 4    |
|          | 500-1-0182  | ROW FINDER REAR TUBE MOUNT KIT               |      |

ROW FINDER PARALLEL LINK MOUNT (44" STRUTS)

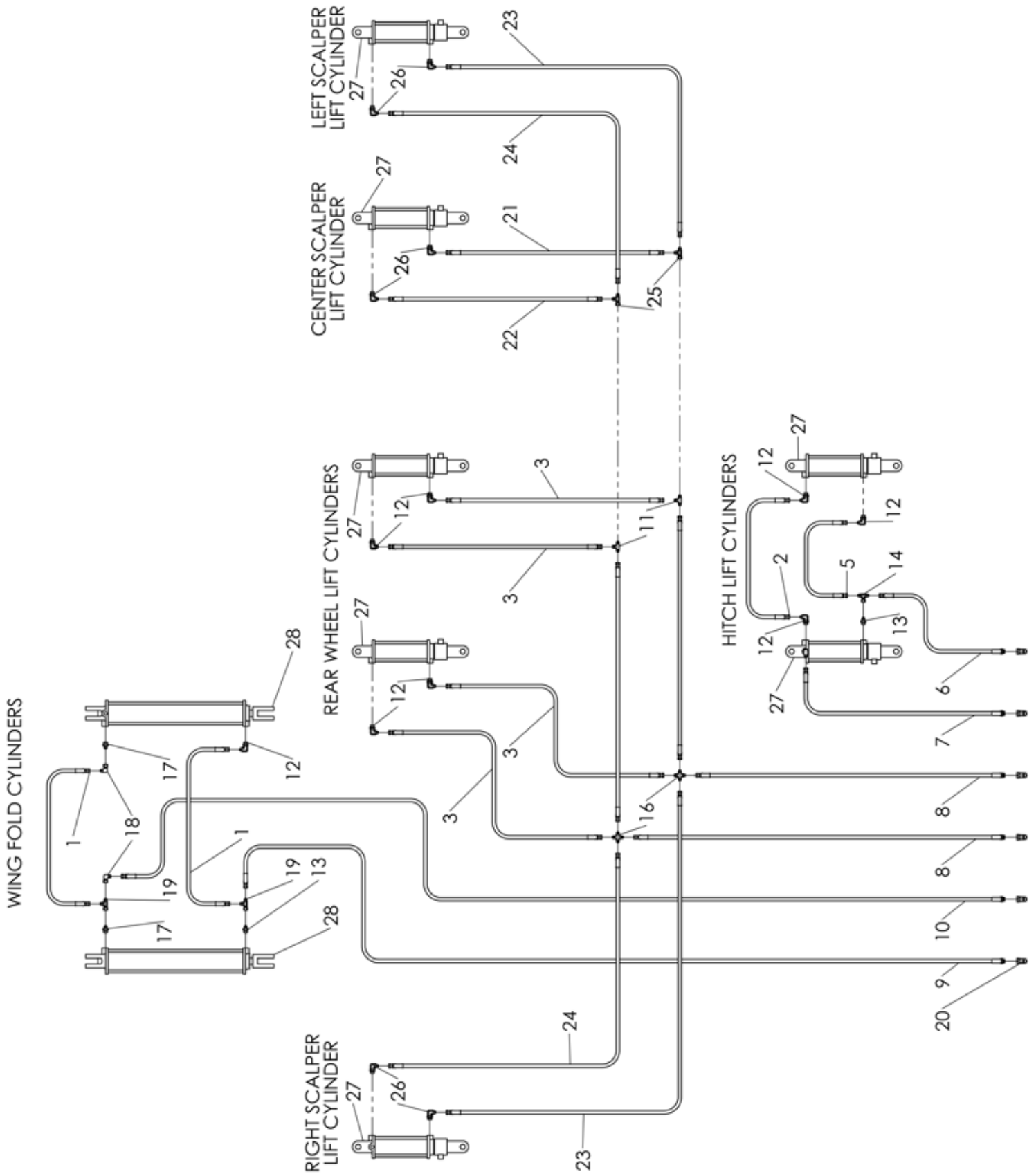


## ROW FINDER PARALLEL LINK MOUNT (44" STRUTS)

| ITEM NO. | PART NUMBER | DESCRIPTION                                  | QTY. |
|----------|-------------|----------------------------------------------|------|
| 1        | 500-2-1254  | UPPER MOUNT                                  | 1    |
| 2        | 500-2-1248  | ROW FINDER                                   | 1    |
| 3        | 500-2-1081  | H-ARM                                        | 1    |
| 4        | 500-3-0991  | CONNECTING ARM (5/8" HOLES)                  | 1    |
| 5        | 500-3-0992  | CONNECTING ARM (3/4" HOLES)                  | 1    |
| 6        | 500-2-1255  | LOWER MOUNT                                  | 1    |
| 7        | 500-2-1029  | HORIZONTAL MOUNT                             | 1    |
| 8        | 905-21400   | CYLINDER, 3-1/2" x 8                         | 1    |
|          | 905-21380   | - SEAL KIT ( <b>PRINCE CYLINDERS ONLY</b> )  |      |
|          | 905-21401   | - SEAL KIT ( <b>MONARCK CYLINDERS ONLY</b> ) |      |
| 9        | 200-3-2631  | PARALLEL LINK PIN                            | 4    |
| 10       | 900-06145   | SPIRALOCK NUT, 5/8 NC                        | 4    |
| 11       | 900-06510   | TOP LOCK NUT, 3/4 NC                         | 4    |
| 12       | 200-3-1445  | U-BOLT, 1/2 NC x 4 x 3                       | 2    |
| 13       | 200-3-1447  | U-BOLT, 1/2 NC x 2 x 5-1/4                   | 2    |
| 14       | 900-06143   | SPIRALOCK NUT, 1/2 NC                        | 12   |
| 15       | 900-01437   | BOLT, 3/4 NC x 8-1/2                         | 2    |
| 16       | 900-03463   | EYE BOLT, 3/4 NC x 6                         | 2    |
| 17       | 900-11017   | LOCK WASHER, 3/4                             | 20   |
| 18       | 900-06015   | NUT, 3/4 NC                                  | 20   |
| 19       | 500-2-1474  | ADJUSTABLE CYLINDER EAR WELD                 | 1    |
| 20       | 900-01225   | BOLT, 1/2 NC X 1-1/2                         | 4    |
| 21       | 900-02356   | BOLT, 5/16 NC X 1-3/4                        | 2    |
| 22       | 900-31071   | BOLT, STACKING 5/16 UNC                      | 2    |
| 23       | 500-2-1233  | SCALPER SET BACK WELD - RH                   | 1    |
| 24       | 500-2-1231  | SCALPER SET BACK WELD - LH                   | 1    |
| 25       | 500-2-1234  | SCALPER CROSS TUBE WELD                      | 1    |
| 26       | 900-31069   | CLAMP BODY                                   | 8    |
| 27       | 900-31068   | COVER PLATE AND BOLT                         | 2    |
| 28       | 900-01403   | BOLT, 3/4 NC X 2                             | 8    |
| 29       | 900-01407   | BOLT, 3/4 NC X 2-1/2                         | 8    |
|          | 500-1-0366  | ROW FINDER REAR TUBE MOUNT KIT (44" STRUTS)  |      |



# HYDRAULIC COMPONENTS



## HYDRAULIC COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                                                  | QTY.    |   |
|----------|-------------|--------------------------------------------------------------|---------|---|
| 1        | 905-19136   | 3/8 HOSE, 6FJX x 6FJX                                        | 41.50"  | 2 |
| 2        | 905-19141   | 3/8 HOSE, 6FJX x 6FJX                                        | 50.00"  | 1 |
| 3        | 905-19134   | 3/8 HOSE, 6FJX x 6FJX                                        | 53.50"  | 4 |
| 4        | 905-19135   | 3/8 HOSE, 6FJX x 6FJX                                        | 58.00"  | 2 |
| 5        | 905-19142   | 3/8 HOSE, 6FJX x 6FJX                                        | 70.00"  | 1 |
| 6        | 905-19140   | 3/8 HOSE, 6FJX x 8MB                                         | 138.00" | 1 |
| 7        | 905-19139   | 3/8 HOSE, 6FJX x 8MB                                         | 150.00" | 1 |
| 8        | 905-19133   | 3/8 HOSE, 6FJX x 8MB                                         | 252.00" | 2 |
| 9        | 905-19127   | 3/8 HOSE, 6FJX x 8MB                                         | 300.00" | 1 |
| 10       | 905-19138   | 3/8 HOSE, 6FJX x 8MB                                         | 324.00" | 1 |
| 11       | 905-03112   | ADAPTER, TEE, 6MJ                                            |         | 2 |
| 12       | 905-03114   | ADAPTER, 90° ELBOW, 6MJ x 8MB                                |         | 9 |
| 13       | 905-03115   | ADAPTER, STRAIGHT, 6MJ x 8MB                                 |         | 2 |
| 14       | 905-03127   | ADAPTER, TEE, 6MJ x 6MJ x 6FJX                               |         | 1 |
| 15       | 905-03140   | ADAPTER, CAP, 6FJ                                            |         | 4 |
| 16       | 905-03141   | ADAPTER, CROSS, 6MJ                                          |         | 2 |
| 17       | 905-03162   | ADAPTER, RESTRICTOR, 6MJ x 8MB (1/16 HOLE)                   |         | 2 |
| 18       | 905-03163   | ADAPTER, 90° ELBOW, 6MJ x 6JFX                               |         | 2 |
| 19       | 905-03199   | ADAPTER, TEE, 6FJX x 6MJ x 6MJ                               |         | 2 |
| 20       | 905-19126   | QUICK COUPLER, 8FB                                           |         | 6 |
|          | 500-2-0709  | MAIN FRAME HYDRAULIC KIT <b>*DOES NOT INCLUDE CYLINDERS*</b> |         | - |

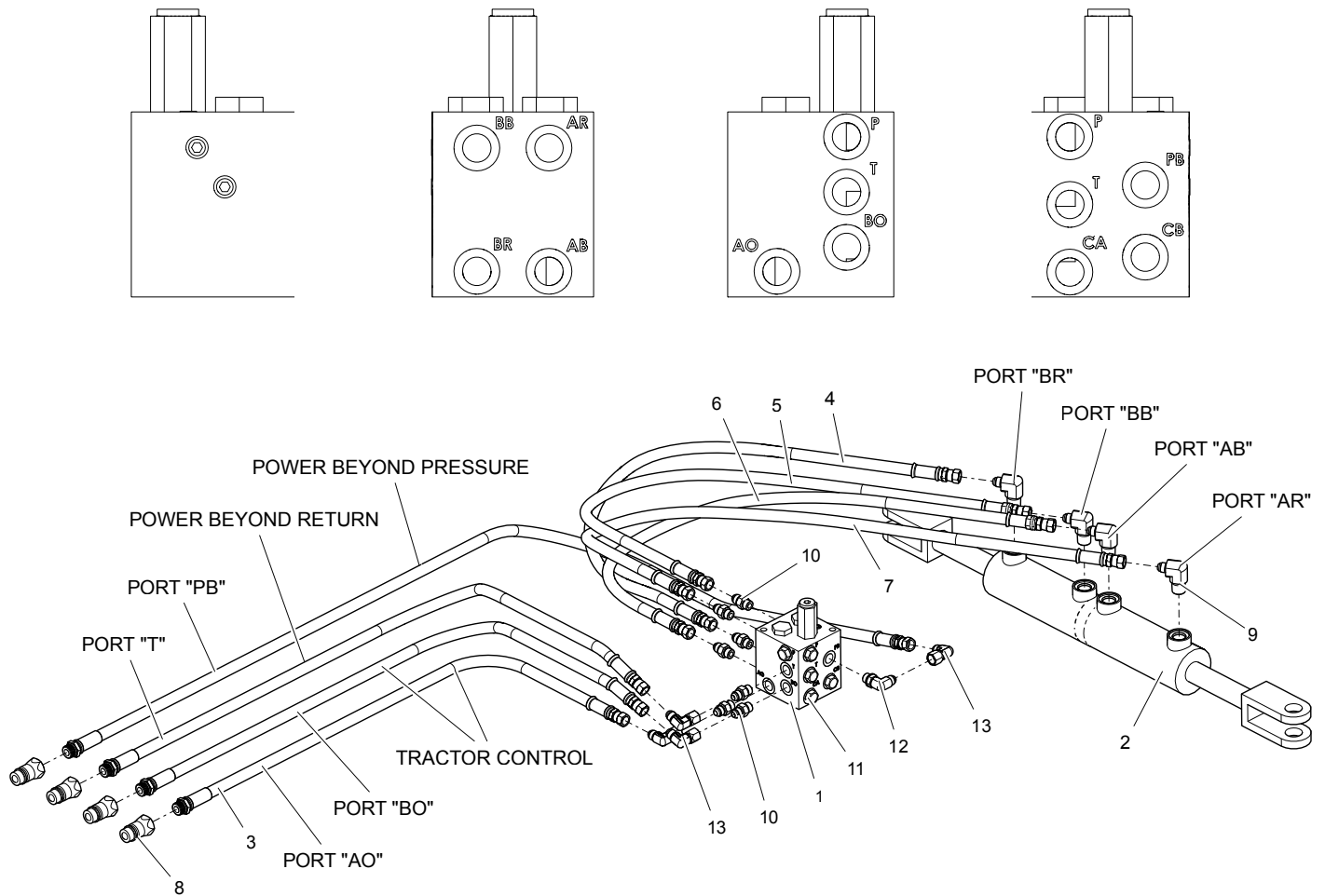
## SCALPER HYDRAULIC COMPONENTS

| ITEM NO. | PART NUMBER | DESCRIPTION                                               | QTY.    |   |
|----------|-------------|-----------------------------------------------------------|---------|---|
| 21       | 905-19193   | 3/8 HOSE, 6FJX x 6FJX                                     | 106.00" | 1 |
| 22       | 905-19147   | 3/8 HOSE, 6FJX x 6FJX                                     | 111.00" | 1 |
| 23       | 905-19155   | 3/8 HOSE, 6FJX x 6FJX                                     | 120.00" | 2 |
| 24       | 905-19143   | 3/8 HOSE, 6FJX x 6FJX                                     | 130.00" | 2 |
| 25       | 905-03199   | ADAPTER, TEE, 6FJX x 6MJ x 6MJ                            |         | 2 |
| 26       | 905-03114   | ADAPTER, 90° ELBOW, 6MJ x 8MB                             |         | 6 |
|          | 500-1-0265  | SCALPER HYDRAULIC KIT <b>*DOES NOT INCLUDE CYLINDERS*</b> |         | - |

## HYDRAULIC CYLINDERS

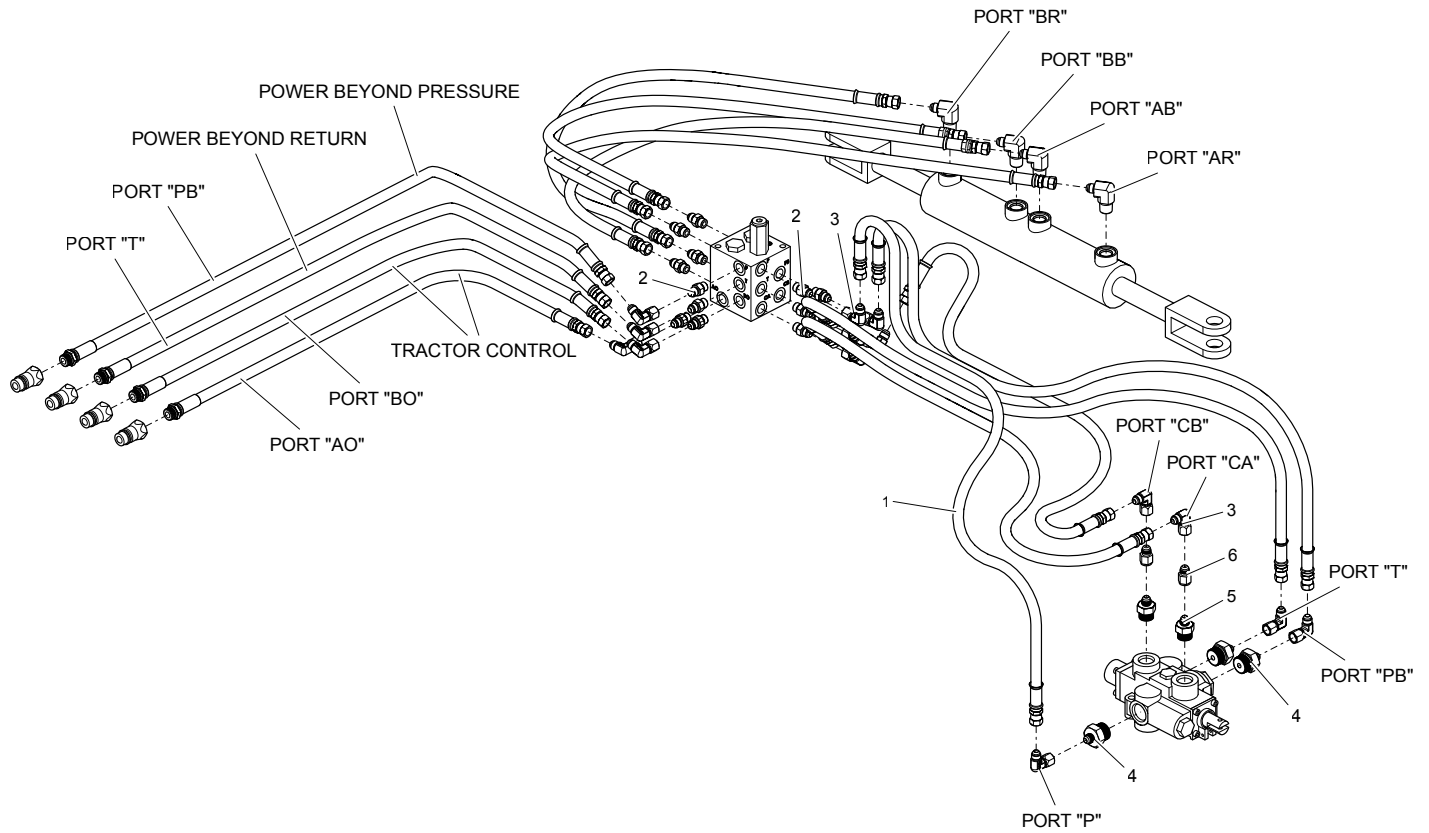
| ITEM NO. | PART NUMBER | DESCRIPTION                   | QTY. |
|----------|-------------|-------------------------------|------|
| 27       | 905-21400   | HYD CYL - 3.5 BORE X 8 STROKE | 7    |
| 28       | 905-21417   | HYD CYL - 4 BORE X 24 SROKE   | 2    |

## REAR STEER HYDRAULIC COMPONENTS



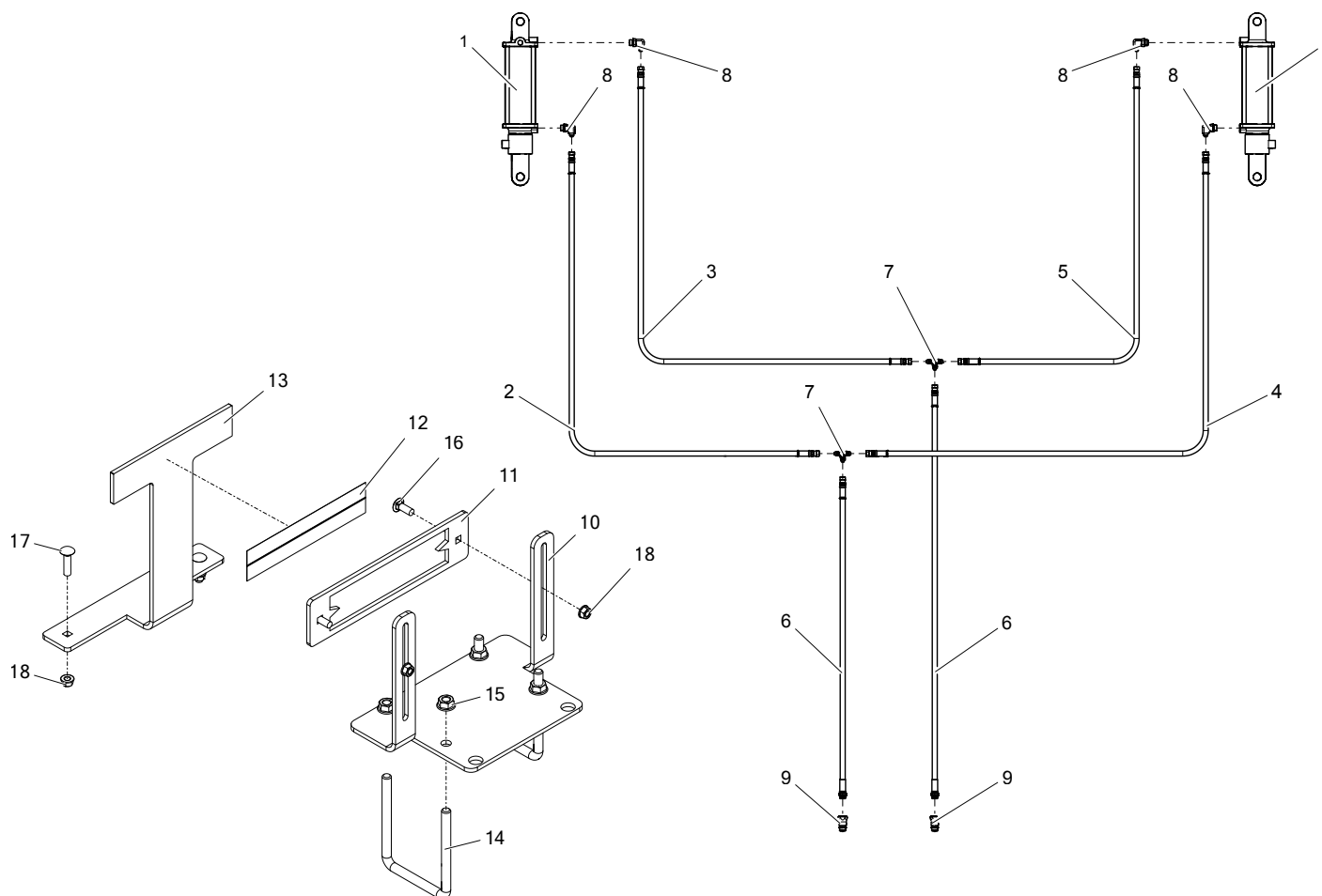
| ITEM NO. | PART NUMBER | DESCRIPTION                                         | QTY. |
|----------|-------------|-----------------------------------------------------|------|
| 1        | 905-03263   | MANIFOLD BLOCK                                      | 1    |
| 2        | 905-21452   | DOUBLE CYLINDER                                     | 1    |
| 3        | 905-19213   | 3/8 HOSE, 8MB x 6FJX                                | 4    |
| 4        | 905-19190   | 3/8 HOSE, 6FJX x 6FJX                               | 1    |
| 5        | 905-19118   | 3/8 HOSE, 6FJX x 6FJX                               | 1    |
| 6        | 905-19237   | 3/8 HOSE, 6FJX x 6FJX                               | 1    |
| 7        | 905-19215   | 3/8 HOSE, 6FJX x 6FJX                               | 1    |
| 8        | 905-19126   | QUICK COUPLER, 8FB                                  | 4    |
| 9        | 905-03117   | ADAPTER, 90° ELBOW, 6MJ x 8MP                       | 4    |
| 10       | 905-03120   | ADAPTER, STRAIGHT, 6MJ x 6MB                        | 7    |
| 11       | 905-03265   | ADAPTER, PLUG, 6MB                                  | 5    |
| 12       | 905-03264   | ADAPTER, 90° ELBOW, 6MJ x 6MB                       | 1    |
| 13       | 905-03163   | ADAPTER, 90° ELBOW, 6MJ x 6FJX                      | 4    |
|          | 500-1-0342  | REAR STEER HOSE KIT *DOES NOT INCLUDE HYD CYLINDER* | -    |

## ROW FINDER HYDRAULIC COMPONENTS



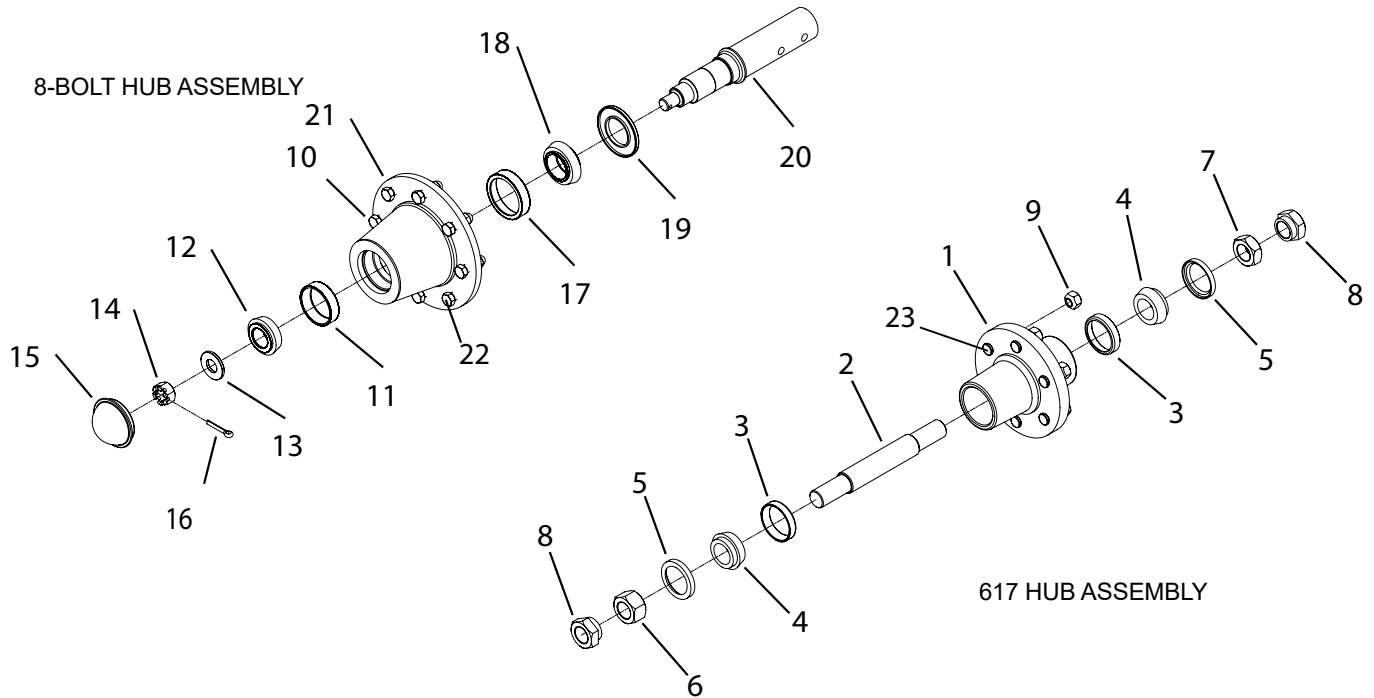
| ITEM NO. | PART NUMBER | DESCRIPTION                         | QTY.    |
|----------|-------------|-------------------------------------|---------|
| 1        | 905-19155   | 3/8 HOSE, 6FJX x 6FJX               | 120.00" |
| 2        | 905-03120   | ADAPTER, STRAIGHT, 6MJ x 6MB        | 6       |
| 3        | 905-03163   | ADAPTER, 90° ELBOW, 6MJ x 6FJX      | 10      |
| 4        | 905-03210   | ADAPTER, STRAIGHT, 6MJ x 12MB       | 3       |
| 5        | 905-03198   | ADAPTER, STRAIGHT, 6MJ x 10MB       | 2       |
| 6        | 905-03220   | ADAPTER, 1/16 RESTRICTOR, 6FJ x 6MJ | 1       |
|          | 500-1-0343  | ROW FINDER HOSE KIT                 |         |

## WING LIFT HYDRAULIC COMPONENTS



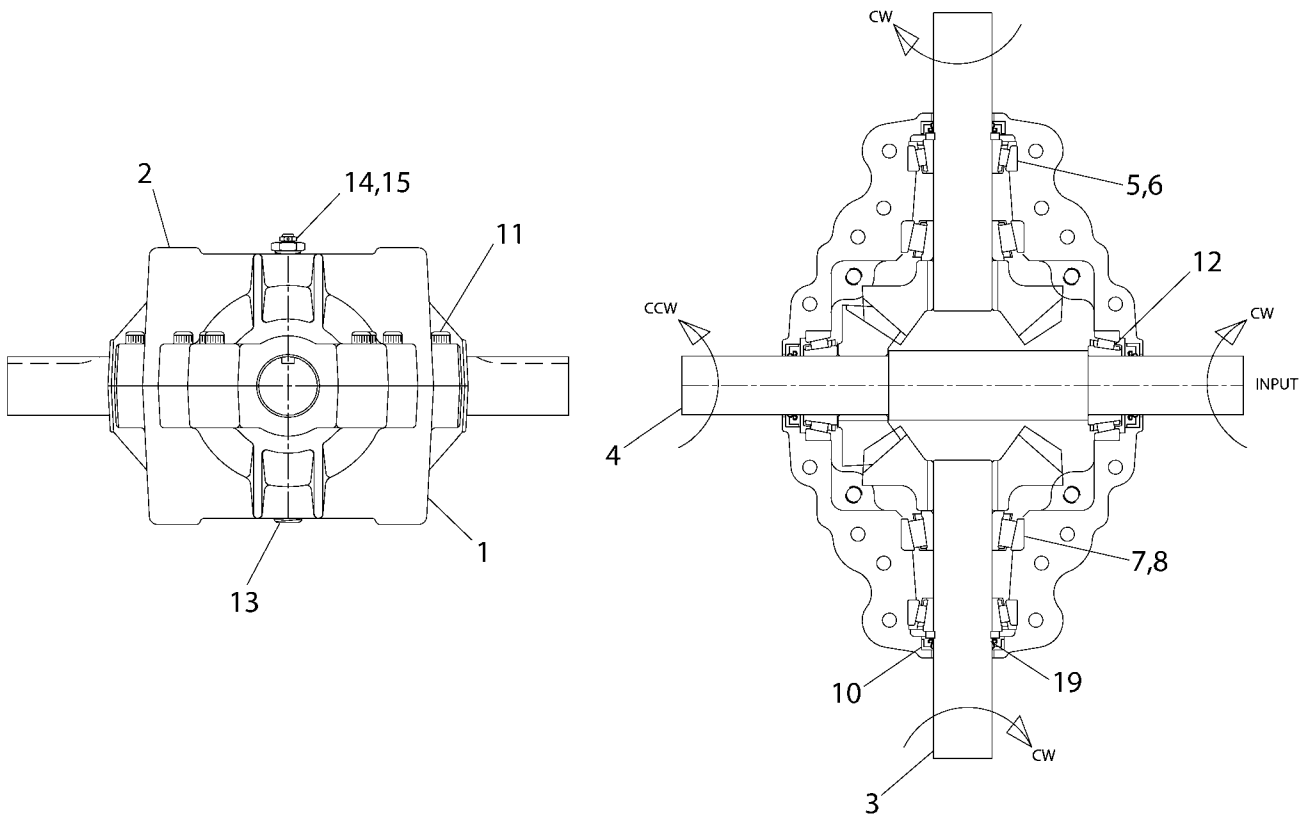
| ITEM NO. | PART NUMBER | DESCRIPTION                                            | QTY. |
|----------|-------------|--------------------------------------------------------|------|
| 1        | 905-21400   | CYLINDER, 3-1/2 x 8                                    | 2    |
| 2        | 905-19155   | 3/8 HOSE, 6FJX x 6FJX 120.00"                          | 1    |
| 3        | 905-19143   | 3/8 HOSE, 6FJX x 6FJX 130.00"                          | 1    |
| 4        | 905-19177   | 3/8 HOSE, 6FJX x 6FJX 183.00"                          | 1    |
| 5        | 905-19171   | 3/8 HOSE, 6FJX x 6FJX 193.00"                          | 1    |
| 6        | 905-19133   | 3/8 HOSE, 6FJX x 8MB 252.00"                           | 2    |
| 7        | 905-03112   | ADAPTER, TEE, 6MJ                                      | 2    |
| 8        | 905-03114   | ADAPTER, 90° ELBOW, 6MJ x 8MB                          | 4    |
| 9        | 905-19126   | QUICK COUPLER, 8FB                                     | 2    |
| 10       | 500-3-1923  | FRONT BRACKET                                          | 1    |
| 11       | 500-3-1922  | POINTER                                                | 1    |
| 12       | 200-3-4034  | DECAL, ORANGE                                          | 1    |
| 13       | 500-3-2877  | FLAG BRACKET                                           | 1    |
| 14       | 100-3-2582  | U-BOLT, 1/2 NC x 4 x 5-1/2                             | 2    |
| 15       | 900-06143   | NUT, SPIRALOCK, 1/2 NC                                 | 4    |
| 16       | 900-01695   | BOLT, CARRIAGE, 3/8 NC x 1                             | 2    |
| 17       | 900-01697   | BOLT, CARRIAGE, 3/8 NC x 1-1/2                         | 2    |
| 18       | 900-06139   | NUT, SPIRALOCK, 3/8 NC                                 | 4    |
|          | 500-2-0866  | WING LIFT HOSE KIT <b>*DOES NOT INCLUDE CYLINDERS*</b> |      |
|          | 500-1-0112  | WING LIFT KIT <b>*INCLUDES CYLINDERS*</b>              |      |

## HUB & SPINDLE ASSEMBLY COMPONENTS



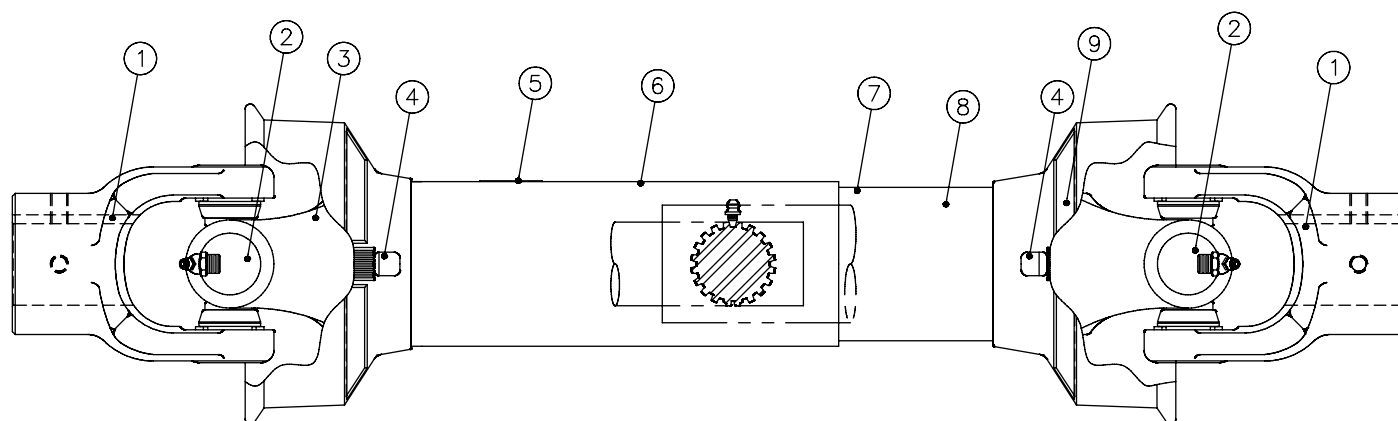
| ITEM NO. | PART NUMBER | DESCRIPTION                              | QTY. |
|----------|-------------|------------------------------------------|------|
| 1        | 905-09082   | HUB W/ CUPS (617)                        | 1    |
| 2        | 200-3-1240  | FORK SPINDLE                             | 1    |
| 3        | 901-01148   | BEARING CUP                              | 2    |
| 4        | 901-01149   | BEARING CONE                             | 2    |
| 5        | 901-09127   | SEAL                                     | 2    |
| 6        | 900-06024   | NUT, HEX HEAD 1-1/4 NF, ZP               | 1    |
| 7        | 900-06291   | NUT, HEX HEAD, JAM 1-1/4 NF, ZP          | 1    |
| 8        | 200-3-1847  | NUT, HEX HEAD, SHOULDER 1-1/4 NF         | 2    |
| 9        | 905-09134   | NUT, HEX HEAD, WHEEL 9/16 NF             | 6    |
| 10       | 905-09136   | HUB W/ CUPS (8-BOLT)                     | 1    |
|          | 905-09182   | HUB ONLY (8-BOLT)                        |      |
| 11       | 901-01324   | BEARING CUP                              | 1    |
| 12       | 901-01326   | BEARING CONE                             | 1    |
| 13       | 905-09067   | WASHER, 7/8 SAE                          | 1    |
| 14       | 900-06060   | NUT, HEX HEAD, SLOTTED 7/8 NF            | 1    |
| 15       | 905-09135   | HUB CAP                                  | 1    |
| 16       | 900-23064   | PIN, COTTER 1/4 X 2                      | 1    |
| 17       | 901-01152   | BEARING CUP                              | 1    |
| 18       | 901-01325   | BEARING CONE                             | 1    |
| 19       | 901-09215   | SEAL                                     | 1    |
| 20       | 700-3-0143  | SPINDLE                                  | 1    |
| 21       | 905-09011   | NUT, HEX HEAD, WHEEL 1/2 NF              |      |
| 22       | 905-09039   | WHEEL BOLT 9/16-18 X 1-11/16             |      |
| 23       | 905-09117   | STUD 1-7/8" X 1/2-20                     |      |
|          | 700-2-0165  | SPINDLE HUB ASSEMBLY 8 BOLT STRUT MOUNT  |      |
|          | 200-2-0928  | HUB & SPINDLE ASSEMBLY 6 BOLT FORK MOUNT |      |

## GEARBOX - SUPERIOR (4-WAY)



| ITEM NO. | PART NUMBER | DESCRIPTION                    | QTY. |
|----------|-------------|--------------------------------|------|
| 1        | 903-15526   | CASTING, MACH 600              | 1    |
| 2        | 903-15525   | CASTING, MACH 600              | 1    |
| 3        | 903-15561   | ASSY, STUB SHAFT/GEAR R600     | 2    |
| 4        | 903-15562   | ASSY, CROSS SHAFT/GEAR         | 1    |
| 5        | 901-01150   | BEARING CONE 25581             | 3    |
| 6        | 901-01152   | BEARING CUP 25520              | 4    |
| 7        | 901-01151   | BEARING CONE 3782              | 2    |
| 8        | 901-01153   | BEARING CUP 3720               | 2    |
| 9        | 900-39030   | RETAINING RING, EXT 1.750 SHFT | 2    |
| 10       | 901-09125   | SEAL TC-1.750-2.437-.312       | 4    |
| 11       | 900-03033   | BOLT, 3/8-16 X 2.25 SHCS       | 16   |
| 12       | 901-01328   | BEARING CONE 25580             | 1    |
| 13       | 905-03078   | PLUG, 1/2-14 NPT SCHD W/3M     | 1    |
| 14       | 905-03080   | PLUG, VENT 5PSI                | 1    |
| 15       | 905-15359   | BUSHING, 1/2 NPT TO 1/8 NPT    | 1    |
|          | 903-15560   | GEARBOX, COMPLETE              |      |

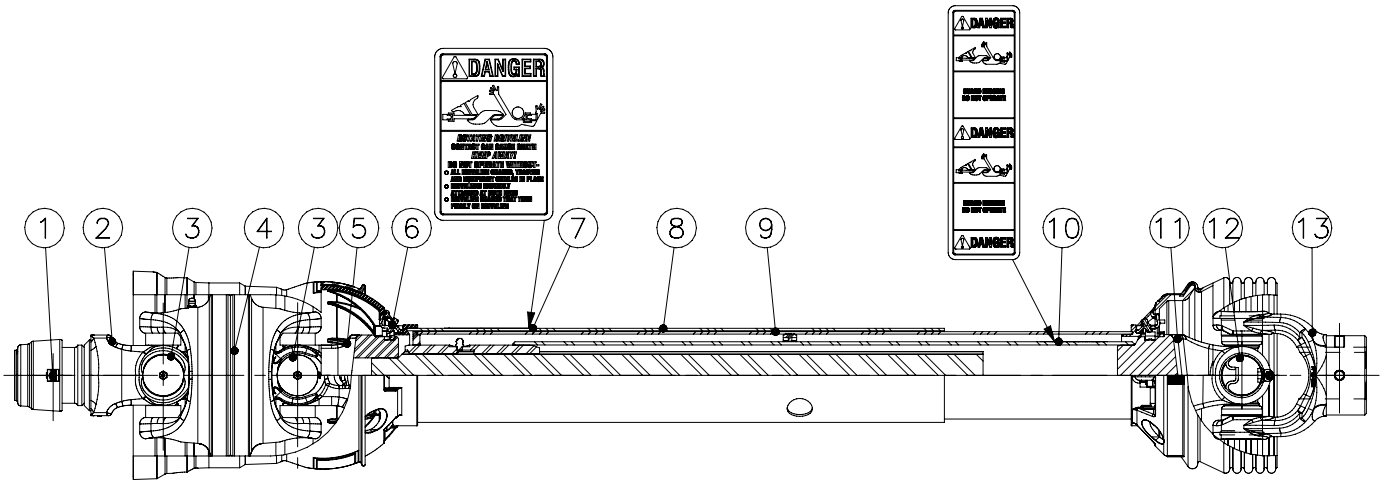
## JUMP DRIVE SHAFT COMPONENTS



| ITEM NO. | PART NUMBER | DESCRIPTION                    | QTY. |
|----------|-------------|--------------------------------|------|
| 1        | 903-17639   | Q.D. YOKE ASSEMBLY             | 2    |
| 2        | 903-17525   | 44R CROSS & BEARING KIT        | 2    |
| 3        | 903-18208   | YOKE & SHAFT (1.31 SQ.)        | 1    |
| 4        | 903-18271   | GUARD REPAIR KIT (NOT SHOWN)   | 1    |
| 5        | 903-17455   | SAFETY SIGN                    | 1    |
| 6        | 903-18276   | OUTER GUARD                    | 2    |
| 7        | 903-18277   | INNER GUARD                    | 1    |
| 8        | 903-18247   | SAFETY SIGN (NOT SHOWN)        | 1    |
| 9        | 903-18248   | GUARD REPAIR KIT (NOT SHOWN)   | 1    |
| 10       | 903-18209   | YOKE, TUBE & SLIP SLEEVE       | 1    |
|          | 903-18207   | GUARD SET                      |      |
|          | 903-18198   | JUMP PTO DRIVE SHAFT, COMPLETE |      |

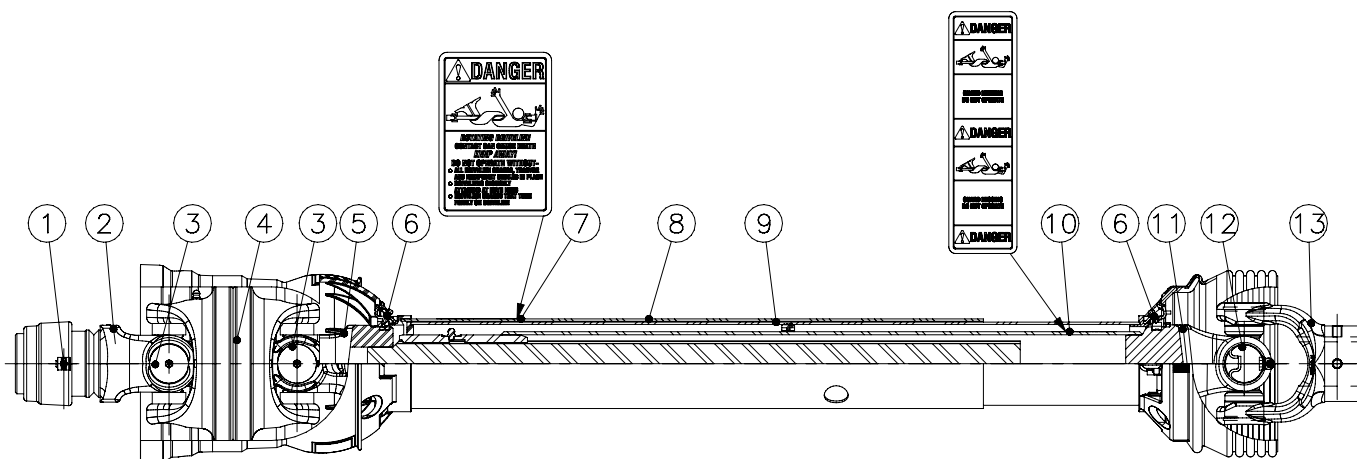


## 1-3/8" PTO WWCV DRIVE SHAFT COMPONENTS



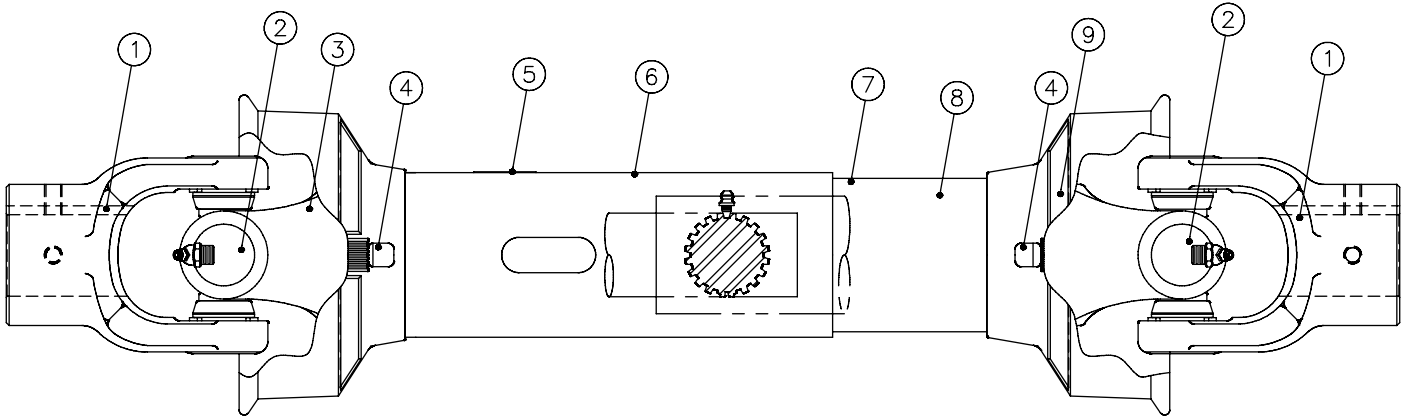
| ITEM NO. | PART NUMBER | DESCRIPTION                            | QTY. |
|----------|-------------|----------------------------------------|------|
| 1        | 903-18106   | SSL / AUTO-LOK REPAIR KIT              | 1    |
| 2        | 903-18334   | WWCV AUTO-LOK YOKE ASSEMBLY            | 1    |
| 3        | 903-18328   | AB8/AW24/CAT 6 80° EBL CROSS KIT       | 2    |
| 4        | 903-18329   | WWCV CENTER HOUSING                    | 1    |
| 5        | 903-18415   | WWCV YOKE & SHAFT (1.69-20)            | 1    |
| 6        | 903-18248   | GUARD REPAIR KIT                       | 1    |
| 7        | 903-17455   | SAFETY SIGN                            | 1    |
| 8        | 903-18361   | OUTER GUARD                            | 1    |
| 9        | 903-18362   | INNER GUARD                            | 1    |
| 10       | 903-17456   | SAFETY SIGN                            | 1    |
| 11       | 903-18363   | YOKE, TUBE & SLIP SLEEVE               | 1    |
| 12       | 903-17239   | 55E CROSS KIT                          | 1    |
| 13       | 903-18364   | YOKE                                   | 1    |
|          | 903-18411   | WWCV PTO DRIVE SHAFT, 1-3/8", COMPLETE |      |

## 1-3/4" PTO WWCV DRIVE SHAFT COMPONENTS



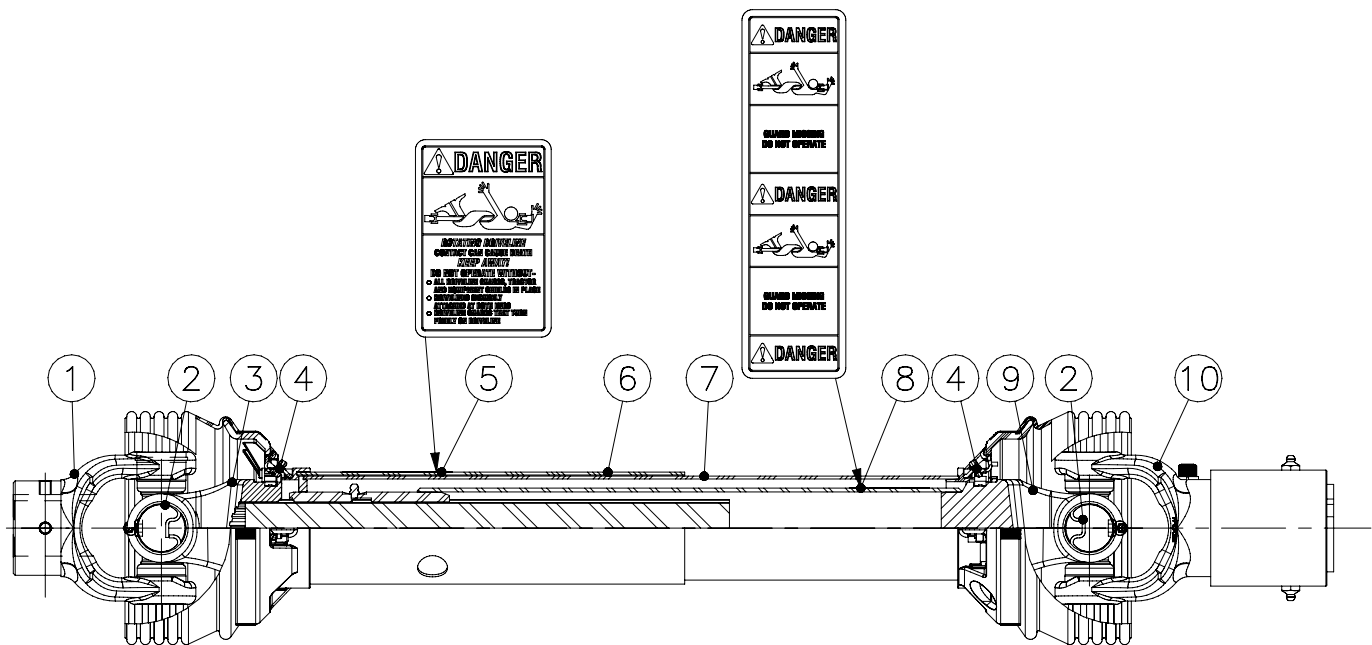
| ITEM NO. | PART NUMBER | DESCRIPTION                                | QTY. |
|----------|-------------|--------------------------------------------|------|
| 1        | 903-17772   | SSL / AUTO-LOK REPAIR KIT                  | 1    |
| 2        | 903-18327   | WWCV AUOT-LOK YOKE ASSEMBLY                | 1    |
| 3        | 903-18328   | AB8/AW24/CAT 6 80° EBL CROSS & BEARING KIT | 2    |
| 4        | 903-18329   | WWCV CENTER HOUSING                        | 1    |
| 5        | 903-18418   | WWCV YOKE & SHAFT (1.69-20)                | 1    |
| 6        | 903-18248   | GUARD REPAIR KIT                           | 1    |
| 7        | 903-17455   | SAFETY SIGN                                | 1    |
| 8        | 903-18371   | OUTER GUARD                                | 1    |
| 9        | 903-18372   | INNER GUARD                                | 1    |
| 10       | 903-17456   | SAFETY SIGN                                | 1    |
| 11       | 903-18373   | YOKE, TUBE & SLIP SLEEVE                   | 1    |
| 12       | 903-17239   | 55E CROSS & BEARING KIT                    | 1    |
| 13       | 903-18364   | YOKE                                       | 1    |
|          | 903-18412   | WWCV PTO DRIVE SHAFT, 1-3/4", COMPLETE     |      |

## WING DRIVE SHAFT COMPONENTS



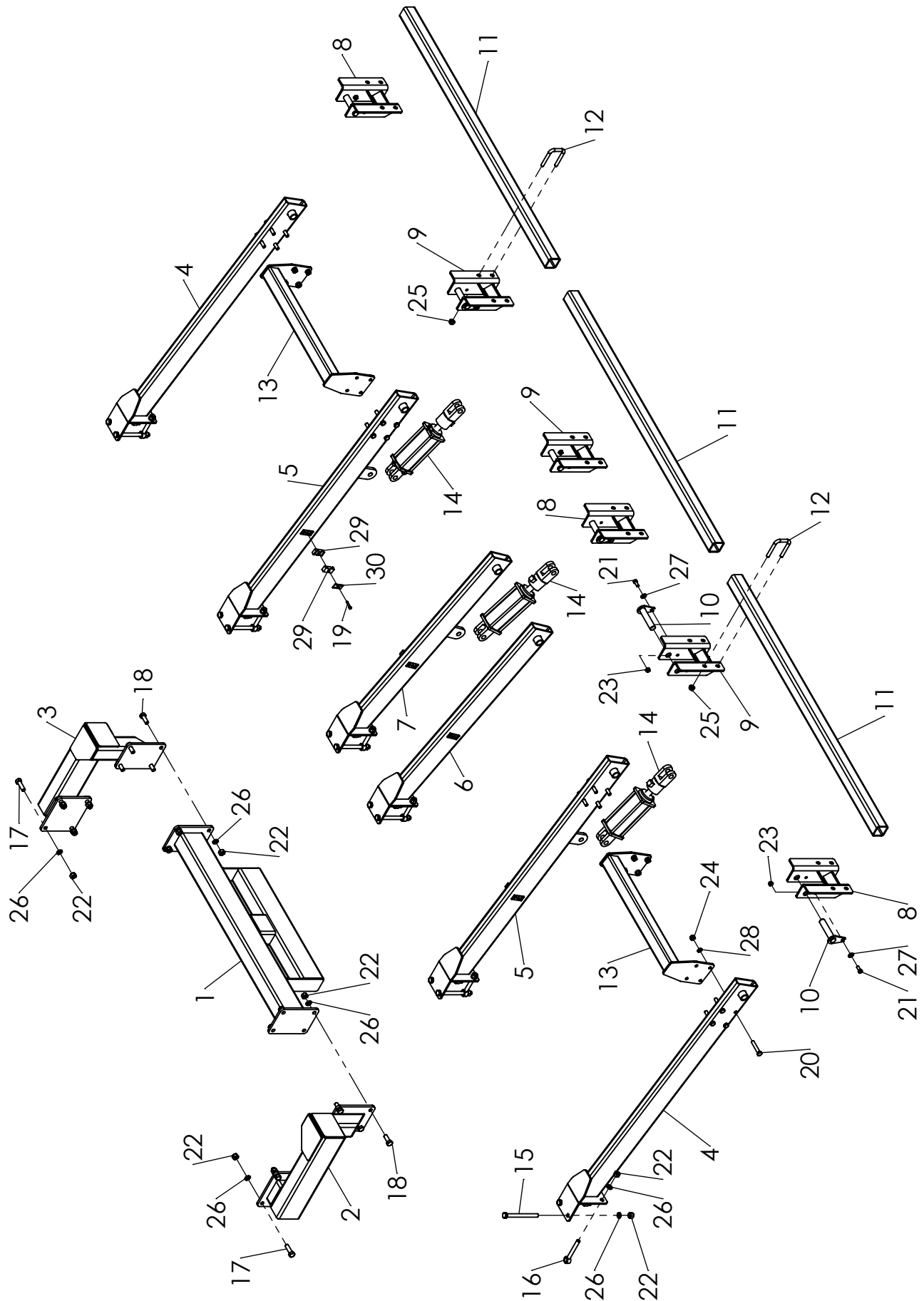
| ITEM NO. | PART NUMBER | DESCRIPTION                | QTY. |
|----------|-------------|----------------------------|------|
| 1        | 903-17639   | YOKE                       | 2    |
| 2        | 901-17525   | 44R CROSS & BEARING KIT    | 2    |
| 3        | 903-18079   | YOKE & SHAFT (1.69-20)     | 1    |
| 4        | 903-17851   | GUARD REPAIR KIT           | 2    |
| 5        | 903-18080   | OUTER GUARD                | 1    |
| 6        | 903-18081   | INNER GUARD                | 1    |
| 7        | 903-18082   | YOKE, TUBE & SLIP SLEEVE   | 1    |
|          | 903-18055   | WING DRIVE SHAFT, COMPLETE | -    |

## HITCH EXTENSION DRIVE SHAFT COMPONENTS



| ITEM NO. | PART NUMBER | DESCRIPTION                           | QTY. |
|----------|-------------|---------------------------------------|------|
| 1        | 903-18364   | YOKE                                  | 1    |
| 2        | 903-17239   | 55E CROSS & BEARING KIT               | 2    |
| 3        | 903-18378   | YOKE & SHAFT (1.69-20)                | 1    |
| 4        | 903-17774   | GUARD REPAIR KIT                      | 2    |
| 5        | 903-17455   | SAFETY SIGN                           | 1    |
| 6        | 903-18379   | OUTER GUARD                           | 1    |
| 7        | 903-18380   | INNER GUARD                           | 1    |
| 8        | 903-17456   | SAFETY SIGN                           | 1    |
| 9        | 903-18381   | YOKE, TUBE & SLIP SLEEVE              | 1    |
| 10       | 903-18382   | OVERRUNNING CLUTCH ASM.               | 1    |
|          | 903-18308   | HITCH EXTENSION DRIVE SHAFT, COMPLETE | -    |

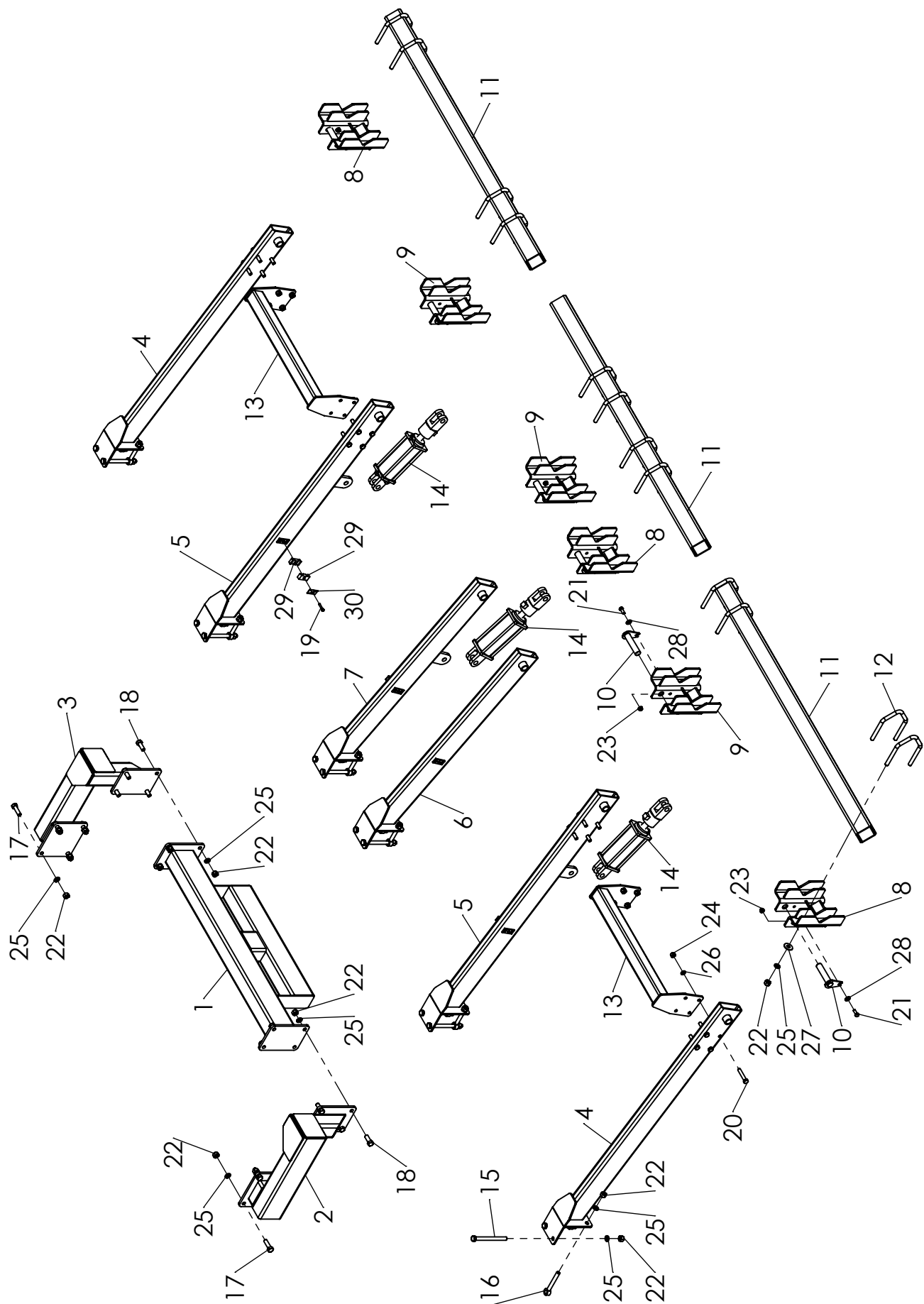
# SCALPER TOOLBAR COMPONENTS - STRAIGHT ARM



## SCALPER TOOLBAR COMPONENTS - STRAIGHT ARM

| ITEM NO. | PART NUMBER | DESCRIPTION                              | QTY. |
|----------|-------------|------------------------------------------|------|
| 1        | 500-2-1234  | CROSS TUBE                               | 1    |
| 2        | 500-2-1231  | MOUNT ARM (LH)                           | 1    |
| 3        | 500-2-1233  | MOUNT ARM (RH)                           | 1    |
| 4        | 500-2-1437  | WING SETBACK LONG ARM W/O CYLINDER EAR   | 2    |
| 5        | 500-2-1436  | WING SETBACK LONG ARM W/ CYLINDER EAR    | 2    |
| 6        | 500-2-1435  | CENTER SETBACK LONG ARM W/O CYLINDER EAR | 1    |
| 7        | 500-2-1434  | CENTER SETBACK LONG ARM W/ CYLINDER EAR  | 1    |
| 8        | 500-2-1440  | SCALPER TUBE MOUNT W/O EAR - EXTENDED    | 3    |
| 9        | 500-2-1439  | SCALPER TUBE MOUNT W/ EAR - EXTENDED     | 3    |
| 10       | 500-2-0684  | 1-1/4" PIN                               | 6    |
| 11       | 500-3-2572  | SCALPER TUBE                             | 3    |
| 12       | 900-35026   | U-BOLT, 5/8NC x 3 x 4-1/2                | -    |
| 13       | 500-2-1144  | WING SPREADER BAR                        | 2    |
| 14       | 905-21400   | CYLINDER, 3-1/2 x 8                      | 3    |
| 15       | 900-01437   | BOLT, 3/4 NC x 8-1/2                     | -    |
| 16       | 900-03463   | EYE BOLT, 3/4NC x 6                      | -    |
| 17       | 900-01407   | BOLT, 3/4 NC x 2-1/2                     | -    |
| 18       | 900-01403   | BOLT, 3/4 NC x 2                         | -    |
| 19       | 900-02356   | BOLT, 5/16 NC x 1-3/4                    | -    |
| 20       | 900-01357   | BOLT, 5/8 NC x 3-1/2                     | -    |
| 21       | 900-01223   | BOLT, 1/2 NC x 1-1/4                     | -    |
| 22       | 900-06015   | NUT, 3/4 NC                              | -    |
| 23       | 900-06143   | 1/2 NC SPIRALOCK NUT                     | -    |
| 24       | 900-06013   | NUT, 5/8 NC                              | -    |
| 25       | 900-06145   | NUT, SPIRALOCK FLANGE 5/8 NC             | -    |
| 26       | 900-11017   | LOCK WASHER, 3/4                         | -    |
| 27       | 900-11035   | WASHER, 1/2                              | -    |
| 28       | 900-11015   | LOCK WASHER, 5/8                         | -    |
| 29       | 900-31069   | CLAMP BODY - HOSE HOLDER                 | -    |
| 30       | 900-31068   | COVER PLATE                              | -    |
|          | 500-1-0250  | CIRCULAR SCALPER W/STRAIGHT ARM ASSEMBLY |      |

SCALPER TOOLBAR COMPONENTS - PARALLEL LINK

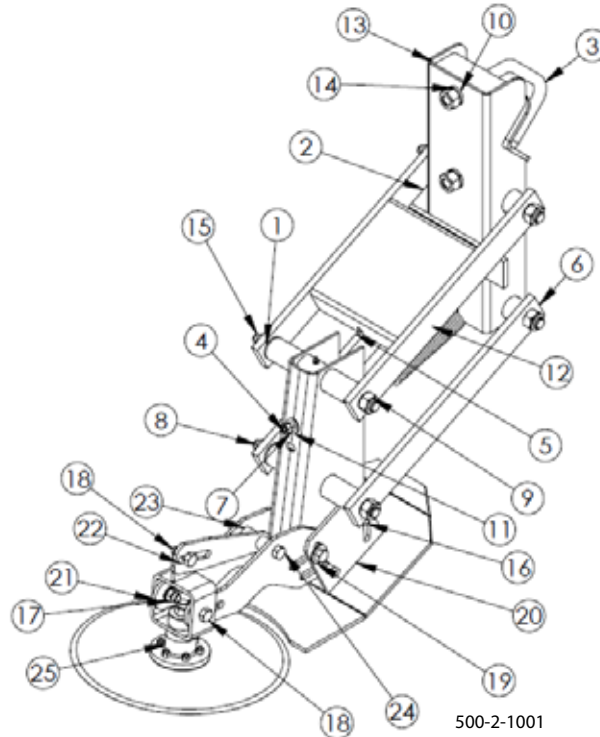


## SCALPER TOOLBAR COMPONENTS - PARALLEL LINK

| ITEM NO. | PART NUMBER | DESCRIPTION                                     | QTY. |
|----------|-------------|-------------------------------------------------|------|
| 1        | 500-2-1234  | CROSS TUBE                                      | 1    |
| 2        | 500-2-1231  | MOUNT ARM (LH)                                  | 1    |
| 3        | 500-2-1233  | MOUNT ARM (RH)                                  | 1    |
| 4        | 500-2-1437  | WING SETBACK LONG ARM W/O CYLINDER EAR          | 2    |
| 5        | 500-2-1436  | WING SETBACK LONG ARM W/ CYLINDER EAR           | 2    |
| 6        | 500-2-1435  | CENTER SETBACK LONG ARM W/O CYLINDER EAR        | 1    |
| 7        | 500-2-1434  | CENTER SETBACK LONG ARM W/ CYLINDER EAR         | 1    |
| 8        | 500-2-0942  | SCALPER TUBE MOUNT W/O EAR                      | 3    |
| 9        | 500-2-0941  | SCALPER TUBE MOUNT W/ EAR                       | 3    |
| 10       | 500-2-0684  | 1-1/4" PIN                                      | 6    |
| 11       | 500-3-2558  | SCALPER TUBE                                    | 3    |
| 12       | 500-3-0635  | A-BOLT, 3/4 NC X 4 X 4                          | -    |
| 13       | 500-2-1144  | WING SPREADER BAR                               | 2    |
| 14       | 905-21400   | CYLINDER, 3-1/2 x 8                             | 3    |
| 15       | 900-01437   | BOLT, 3/4 NC x 8-1/2                            | -    |
| 16       | 900-03463   | EYE BOLT, 3/4NC x 6                             | -    |
| 17       | 900-01407   | BOLT, 3/4 NC x 2-1/2                            | -    |
| 18       | 900-01403   | BOLT, 3/4 NC x 2                                | -    |
| 19       | 900-02356   | BOLT, 5/16 NC x 1-3/4                           | -    |
| 20       | 900-01357   | BOLT, 5/8 NC x 3-1/2                            | -    |
| 21       | 900-01223   | BOLT, 1/2 NC x 1-1/4                            | -    |
| 22       | 900-06015   | NUT, 3/4 NC                                     | -    |
| 23       | 900-06143   | 1/2 NC SPIRALOCK NUT                            | -    |
| 24       | 900-06013   | NUT, 5/8 NC                                     | -    |
| 25       | 900-11017   | LOCK WASHER, 3/4                                | -    |
| 26       | 900-11015   | LOCK WASHER, 5/8                                | -    |
| 27       | 900-11038   | WASHER, 3/4                                     | -    |
| 28       | 900-11035   | WASHER, 1/2                                     | -    |
| 29       | 900-31069   | CLAMP BODY - HOSE HOLDER                        | -    |
| 30       | 900-31068   | COVER PLATE                                     | -    |
|          | 500-1-0251  | CIRCULAR KNIFE SCALPER W/PARALLEL LINK ASSEMBLY |      |
|          | 500-1-0252  | KNIFE SCALPER W/PARALLEL LINK ASSEMBLY          |      |

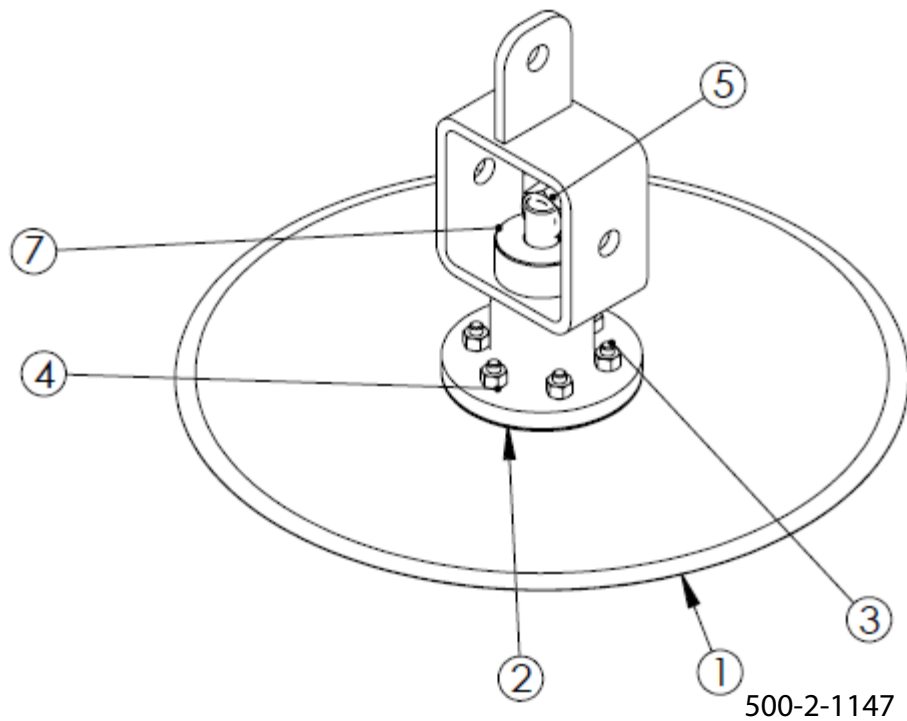


## CIRCULAR SCALPER ASSEMBLY W/PARALLEL LINK



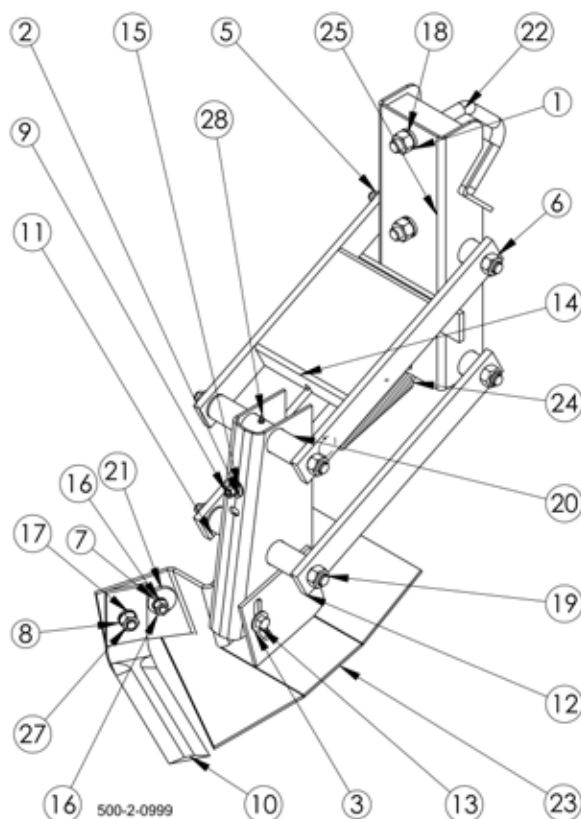
| ITEM NO. | PART NUMBER | DESCRIPTION                                      | QTY. |
|----------|-------------|--------------------------------------------------|------|
| 1        | 500-2-0338  | UPRIGHT WELDMENT                                 | 1    |
| 2        | 500-2-0518  | H WELD KNIFE SCALPER                             | 1    |
| 3        | 500-3-0635  | 3/4-10 X 4 A BOLT                                | 1    |
| 4        | 500-3-0675  | 3/8 EYE BOLT X 8" LG                             | 1    |
| 5        | 500-3-0991  | PIVOT ARM, 5/8" HOLES                            | 1    |
| 6        | 500-3-0992  | PIVOT ARM, 3/4" HOLES                            | 1    |
| 7        | 900-06005   | NUT HEX 3/8                                      | 2    |
| 8        | 900-06145   | 5/8 WHIZ NUT                                     | 4    |
| 9        | 900-06510   | 3/4 NUT, HEX TOP LOCK                            | 4    |
| 10       | 900-11017   | 3/4 LOCK WASHER                                  | 2    |
| 11       | 900-11033   | FLAT WASHER 3/8 ZP                               | 1    |
| 12       | 400-3-0263  | SPRING                                           | 1    |
| 13       | 500-2-0330  | MOUNT WELD                                       | 1    |
| 14       | 900-06015   | HEX NUT - 3/4 NC                                 | 2    |
| 15       | 200-3-2631  | PLATED PIN                                       | 4    |
| 16       | 900-01247   | 1/2 X 4-1/2 HEX BOLT GR5 ZP                      | 2    |
| 17       | 900-06143   | 1/2 NC SPIRALOCK NUT ZP GR5                      | 6    |
| 18       | 900-01223   | 1/2 NC X 1-1/2 HEX BOLT GR 5                     | 3    |
| 19       | 900-11035   | 1/2 FLAT WASHER                                  | 2    |
| 20       | 500-2-0704  | SCALPER SHOE WELD                                | 1    |
| 21       | 500-3-1563  | PLATE BRACKET, REAR TOP                          | 2    |
| 22       | 500-3-1557  | STRAP, TOP REAR, ADJ.                            | 1    |
| 23       | 500-3-1556  | REAR SPACER TUBE                                 | 2    |
| 24       | 900-01245   | 1/2 X 4 HEX BOLT GR5 ZP                          | 1    |
| 25       | 500-2-1147  | HUB AND DISC ASSEMBLY (SEE DETAIL - FACING PAGE) | 1    |
|          | 500-2-1001  | CIRCULAR SCALPER ASSEMBLY W/PARALLEL LINK        |      |

## CIRCULAR SCALPER HUB AND DISK ASSEMBLY



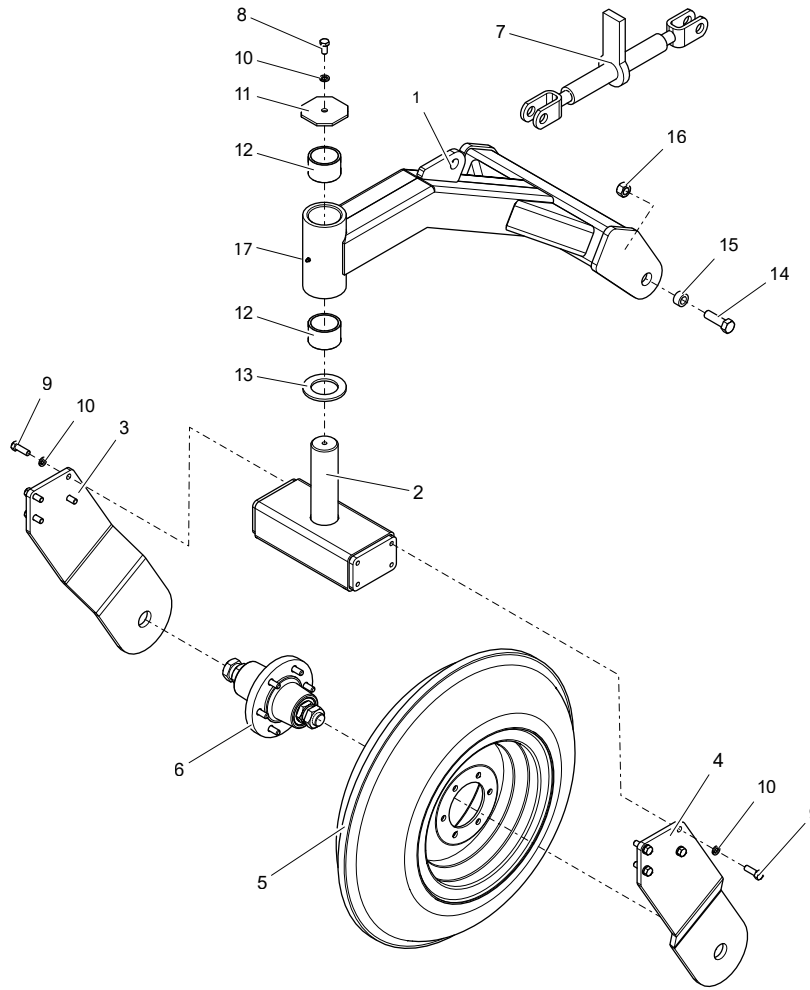
| ITEM NO. | PART NUMBER | DESCRIPTION                                                     | QTY. |
|----------|-------------|-----------------------------------------------------------------|------|
| 1        | 500-3-1582  | SCALPER DISC                                                    |      |
| 2        | 500-3-1940  | DISC, COVER                                                     |      |
| 3        | 900-01005   | 1/4-20 X 1 ZP HEX BOLT                                          |      |
| 4        | 900-06496   | 1/4-20 TOP LOCK HEX NUT                                         |      |
| 5        | 905-09178   | HUB ASSY - ROTARY DISC SCALPER                                  |      |
| 6        | 900-06462   | NUT, NYLOCK, 5/8-11, HTM ROLLER                                 |      |
| 7        | 500-2-1146  | WELDMENT, SCALPER PIVOT                                         |      |
|          | 500-2-1147  | HUB AND DISC ASSY - PARALLEL LINK CIRCULAR SCALPER (LONG SHAFT) |      |

## STRAIGHT KNIFE SCALPER - PARALLEL ARM



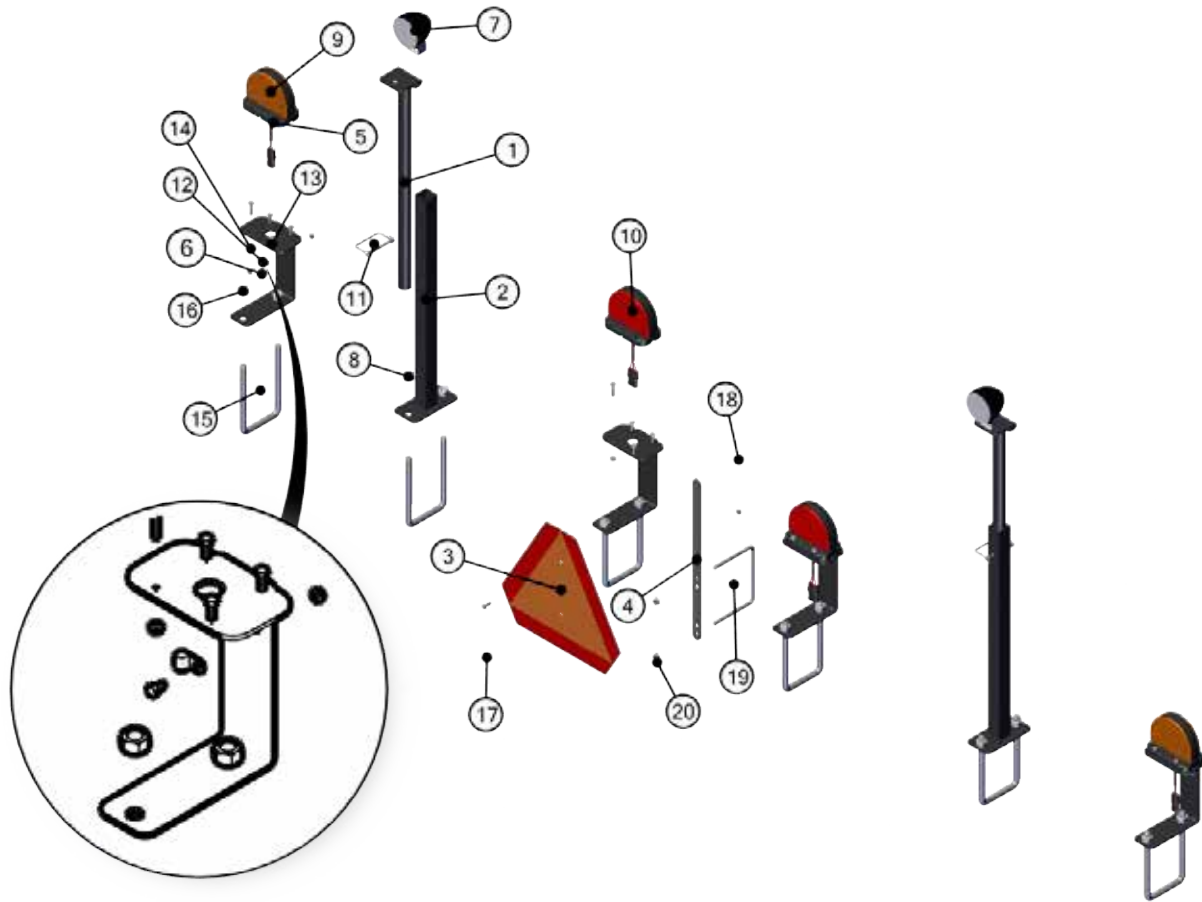
| ITEM NO. | PART NUMBER | DESCRIPTION                               | QTY. |
|----------|-------------|-------------------------------------------|------|
| 1        | 900-11017   | WASHER LOCK 3/4 ZP                        | 2    |
| 2        | 900-11033   | WASHER FLAT 3/8 ZP                        | 1    |
| 3        | 900-11035   | WASHER FLAT 1/2                           | 2    |
| 4        | 900-11038   | WASHER FLAT 3/4                           | 1    |
| 5        | 900-06145   | NUT WHIZ 5/8-11 NC                        | 4    |
| 6        | 900-06510   | 3/4 NUT, HEX TOP LOCK                     | 4    |
| 7        | 900-11013   | WASHER LOCK 1/2                           | 4    |
| 8        | 900-11015   | WASHER LOCK 5/8 ZP                        | 1    |
| 9        | 500-3-0675  | EYE BOLT, 3.8 x 8                         | 1    |
| 10       | 500-3-0910  | KNIFE SCALPER                             | 1    |
| 11       | 500-3-0991  | LINKAGE ARM (LH)                          | 1    |
| 12       | 500-3-0992  | LINKAGE ARM (RH)                          | 1    |
| 13       | 900-01245   | BOLT HH 1/2-13 NC X 4 GRD 5 ZP            | 2    |
| 14       | 500-2-0518  | "H" LINKAGE ARM                           | 1    |
| 15       | 900-06005   | NUT HEX 3/8                               | 2    |
| 16       | 900-06009   | NUT HEX 1/2-13 NC                         | 3    |
| 17       | 900-06013   | NUT HEX 5/8-11 NC ZP                      | 1    |
| 18       | 900-06015   | NUT HEX 3/4-10 NC ZP                      | 2    |
| 19       | 200-3-2631  | PIN                                       | 4    |
| 20       | 500-2-0338  | LOWER SHOE MOUNT                          | 1    |
| 21       | 500-3-0201  | ECCENTRIC SPACER                          | 1    |
| 22       | 500-3-0635  | A-BOLT, 3/4 NC x 4 x 4                    | 1    |
| 23       | 500-2-0335  | SHOE (LH)                                 | 1    |
|          | 500-2-0336  | SHOE (RH)                                 | 1    |
| 24       | 400-3-0263  | EXTENSION SPRING                          | 1    |
| 25       | 500-2-0330  | UPPER MOUNT                               | 1    |
|          | 500-2-0999  | KNIFE SCALPER ASSEMBLY LH W/PARALLEL LINK |      |
|          | 500-2-1000  | KNIFE SCALPER ASSEMBLY RH W/PARALLEL LINK |      |

## STABILIZER WHEEL COMPONENTS



| ITEM NO. | PART NUMBER | DESCRIPTION                                | QTY. |
|----------|-------------|--------------------------------------------|------|
| 1        | 500-2-1128  | UPPER ARM                                  | 1    |
| 2        | 200-2-0689  | CASTER PIVOT BASE                          | 1    |
| 3        | 200-3-2621  | SIDE PLATE, LH                             | 1    |
| 4        | 200-3-2622  | SIDE PLATE, RH                             | 1    |
| 5        | 200-2-0988  | TIRE & WHEEL ASSEMBLY, 600 X 16SL MONORIB  | 1    |
|          | 905-09019   | - TIRE, 600 X 16 SINGLE RIB IMP            |      |
|          | 905-09157   | - RIM, 16 X 4.5E, 6 BOLT                   |      |
| 6        | 200-2-0928  | HUB & SPINDLE ASSEMBLY (617) - SEE PAGE 67 | 1    |
| 7        | 905-23014   | RATCHET JACK, HEAVY DUTY                   | 1    |
| 8        | 900-01221   | BOLT, HEX HEAD, 1/2 NC X 1, GR5 ZP         | 1    |
| 9        | 900-01225   | BOLT, HEX HEAD, 1/2 NC X 1-1/2, GR5 ZP     | 8    |
| 10       | 900-11013   | WASHER, LOCK 1/2                           | 9    |
| 11       | 200-3-1219  | RETAINER PLATE                             | 1    |
| 12       | 200-3-1766  | BUSHING, OILITE, CASTER PIVOT              | 2    |
| 13       | 200-3-1233  | WASHER, OILITE                             | 1    |
| 14       | 900-01407   | BOLT, HEX HEAD 3/4 NC X 2-1/2, GR5 ZP      | 2    |
| 15       | 500-3-2399  | BUSHING, STEEL                             | 2    |
| 16       | 900-06015   | NUT, 3/4 NC                                | 2    |
| 17       | 905-15024   | ZERK 1/4-28 UNF STRAIGHT                   | 1    |
|          | 500-1-0290  | STABILIZER WHEELS (PAIR)                   |      |

## LIGHT KIT COMPONENTS



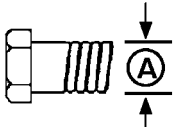
| ITEM NO. | PART NUMBER | DESCRIPTION                          | QTY. |
|----------|-------------|--------------------------------------|------|
| 1        | 500-2-1540  | S SERIES FIELD LIGHT TOP WELDMENT    | 1    |
| 2        | 500-2-1541  | S SERIES FIELD LIGHT BASE WELDMENT   | 1    |
| 3        | 500-3-1696  | SMV SIGN                             | 1    |
| 4        | 500-3-2091  | SMV MOUNT                            | 1    |
| 5        | 500-3-2196  | 12 ROW FUD WIRE HARNESS              | 1    |
| 6        | 500-3-5282  | LIGHT MOUNT- GROTE HALF MOON         | 1    |
| 7        | 904-01346   | TRILLIANT WORK LIGHT                 | 1    |
| 8        | 900-06013   | NUT, HH, 5/8-11, ZP                  | 2    |
| 9        | 904-01363   | GROTE, HALF MOON LIGHT- AMBER        | 1    |
| 10       | 904-01364   | GROTE, HALF MOON LIGHT- RED          | 4    |
| 11       | 900-42065   | SNAPPER PIN .25 X 3.00 USABLE LENGTH | 1    |
| 12       | 904-01365   | VIBRATION DAMPING LOOP CLAMP 3/8"    | 1    |
| 13       | 900-01001   | BOLT, HH 1/4 X 1/2 G5 ZP             | 4    |
| 14       | 900-06135   | WHIZ NUT - 1/4 - 20                  | 5    |
| 15       | 200-3-0017  | U-BOLT 5/8 X 4 X 7.5 X 1.5           | 6    |
| 16       | 900-01011   | BOLT, HH 1/4 X 1-1/4 G5 ZP           | 4    |
| 17       | 900-01005   | 1/4-20 X 3/4 ZP HEX BOLT             | 2    |
| 18       | 900-06496   | 1/4-20 TOP LOCK HEX NUT              | 2    |
| 19       | 900-35000   | U-BOLT 3/8 X 6 X 5 X 1.5             | 1    |
| 20       | 900-06139   | 3/8 NC FLANGED WHIZ NUT              | 2    |
|          | 500-1-0396  | LIGHT KIT FUD                        |      |

# BOLT TORQUE CHART

## SAE Series Torque Chart

Always tighten hardware to these values unless a different torque value or tightening procedure is listed for a specific application. Fasteners must always be replaced with the same grade as specified in the manual parts list.

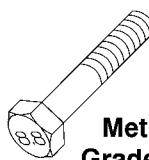
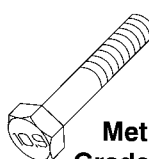
Make sure fastener threads are clean and you properly start thread engagement.

| SAE Bolt Head Identification |                |  SAE Grade 2<br>(No Dashes) |        |  SAE Grade 5<br>(3 Radial Dashes) |        |  SAE Grade 8<br>(6 Radial Dashes) |        |
|------------------------------|----------------|--------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------|--------|----------------------------------------------------------------------------------------------------------------------|--------|
| Ⓐ<br>Diameter<br>(Inches)    | Wrench<br>Size | MARKING ON HEAD                                                                                              |        |                                                                                                                    |        |                                                                                                                      |        |
|                              |                | SAE 2                                                                                                        |        | SAE 5                                                                                                              |        | SAE 8                                                                                                                |        |
|                              |                | ft./lb.                                                                                                      | (Nm)   | ft./lb.                                                                                                            | (Nm)   | ft./lb.                                                                                                              | (Nm)   |
| 1/4"                         | 7/16'          | 6                                                                                                            | (8)    | 10                                                                                                                 | (13)   | 14                                                                                                                   | (18)   |
| 5/16'                        | 1/2"           | 12                                                                                                           | (17)   | 19                                                                                                                 | (26)   | 27                                                                                                                   | (37)   |
| 3/8"                         | 9/16"          | 23                                                                                                           | (31)   | 35                                                                                                                 | (47)   | 49                                                                                                                   | (67)   |
| 7/16"                        | 5/8"           | 36                                                                                                           | (48)   | 55                                                                                                                 | (75)   | 78                                                                                                                   | (106)  |
| 1/2"                         | 3/4"           | 55                                                                                                           | (75)   | 85                                                                                                                 | (115)  | 120                                                                                                                  | (163)  |
| 9/16"                        | 13/16"         | 78                                                                                                           | (106)  | 121                                                                                                                | (164)  | 171                                                                                                                  | (232)  |
| 5/8"                         | 15/16"         | 110                                                                                                          | (149)  | 170                                                                                                                | (230)  | 240                                                                                                                  | (325)  |
| 3/4"                         | 1-1/8"         | 192                                                                                                          | (261)  | 297                                                                                                                | (403)  | 420                                                                                                                  | (569)  |
| 7/8"                         | 1-5/16"        | 306                                                                                                          | (416)  | 474                                                                                                                | (642)  | 669                                                                                                                  | (907)  |
| 1"                           | 1-1/2"         | 350                                                                                                          | (475)  | 680                                                                                                                | (925)  | 1020                                                                                                                 | (1383) |
| 1-1/8"                       | 1-11/16"       | 450                                                                                                          | (610)  | 885                                                                                                                | (1200) | <div>Bolt Diameter</div>         |        |
| 1-1/4"                       | 1-7/8"         | 600                                                                                                          | (815)  | 1255                                                                                                               | (1700) |                                                                                                                      |        |
| 1-3/8"                       | 2-1/16"        | 675                                                                                                          | (915)  | 1620                                                                                                               | (2200) |                                                                                                                      |        |
| 1-1/2"                       | 2-1/4'         | 920                                                                                                          | (1250) | 2200                                                                                                               | (2900) |                                                                                                                      |        |

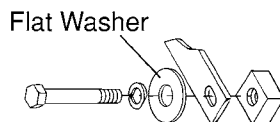
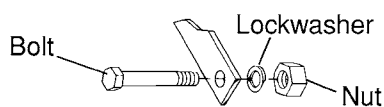
## Metric Series Torque Chart

Use only metric tools on metric hardware. Always tighten hardware to these values unless a different torque value or tightening procedure is listed for a specific application. Fasteners must always be replaced with the same grade.

Make sure fastener threads are clean and you properly start thread engagement.

| Ⓐ<br>Diameter<br>& Thread<br>Pitch<br>(Millimeters) | Wrench<br>Size | COARSE THREAD   |         |             |         | FINE THREAD     |         |             |         | Ⓐ<br>Diameter<br>& Thread<br>Pitch<br>(Millimeters) | Metric<br>Bolt Head<br>Identification                                                                                 |
|-----------------------------------------------------|----------------|-----------------|---------|-------------|---------|-----------------|---------|-------------|---------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
|                                                     |                | MARKING ON HEAD |         |             |         | MARKING ON HEAD |         |             |         |                                                     |                                                                                                                       |
|                                                     |                | Metric 8.8      |         | Metric 10.9 |         | Metric 8.8      |         | Metric 10.9 |         |                                                     |                                                                                                                       |
|                                                     |                | Nm              | ft./lb. | Nm          | ft./lb. | Nm              | ft./lb. | Nm          | ft./lb. |                                                     |                                                                                                                       |
| 6x1.0                                               | 10 mm          | 8               | 6       | 11          | 8       | 8               | 6       | 11          | 8       | 6x1.0                                               | <br><b>Metric<br/>Grade 8.8</b>  |
| 8x1.25                                              | 13 mm          | 20              | 15      | 27          | 20      | 21              | 16      | 29          | 22      | 8x1.0                                               |                                                                                                                       |
| 10x1.5                                              | 16 mm          | 39              | 29      | 54          | 40      | 41              | 30      | 57          | 42      | 10x1.25                                             |                                                                                                                       |
| 12x1.75                                             | 18 mm          | 68              | 50      | 94          | 70      | 75              | 55      | 103         | 76      | 12x1.25                                             |                                                                                                                       |
| 14x2.0                                              | 21 mm          | 109             | 80      | 151         | 111     | 118             | 87      | 163         | 120     | 14x1.5                                              | <br><b>Metric<br/>Grade 10.9</b> |
| 16x2.0                                              | 24 mm          | 169             | 125     | 234         | 173     | 181             | 133     | 250         | 184     | 16x1.5                                              |                                                                                                                       |
| 18x2.5                                              | 27 mm          | 234             | 172     | 323         | 239     | 263             | 194     | 363         | 268     | 18x1.5                                              |                                                                                                                       |
| 20 x 2.5                                            | 30 mm          | 330             | 244     | 457         | 337     | 367             | 270     | 507         | 374     | 20x1.5                                              |                                                                                                                       |
| 22 x 2.5                                            | 34 mm          | 451             | 332     | 623         | 460     | 495             | 365     | 684         | 505     | 22 x 1.5                                            |                                                                                                                       |
| 24 x 3.0                                            | 36 mm          | 571             | 421     | 790         | 583     | 623             | 459     | 861         | 635     | 24 x 2.0                                            |                                                                                                                       |
| 30 x 3.0                                            | 46 mm          | 1175            | 867     | 1626        | 1199    | 1258            | 928     | 1740        | 1283    | 30 x 2.0                                            |                                                                                                                       |

## Typical Washer Installations



8/9/00

# ABBREVIATIONS

|                    |                                            |               |                                               |
|--------------------|--------------------------------------------|---------------|-----------------------------------------------|
| AG .....           | Agriculture                                | NC .....      | National Course                               |
| ASAE .....         | American Society of Agricultural Engineers | NF .....      | National Fine                                 |
| ATF .....          | Automatic Transmission Fluid               | NPSM .....    | National Pipe Straight Mechanical             |
| BSPP .....         | British Standard Pipe Parallel             | NPT .....     | National Pipe Tapered                         |
| BSPTM .....        | British Standard Pipe Tapered Male         | NPT SWF ..... | National Pipe Tapered Swivel Female           |
| CV .....           | Constant Velocity                          | Nm .....      | Newton Meter                                  |
| CCW .....          | Counter-Clockwise                          | OSHA .....    | Occupational Safety and Health Administration |
| CW .....           | Clockwise                                  | P .....       | Pitch                                         |
| DIA .....          | Diameter                                   | PBY .....     | Power Beyond                                  |
| EP .....           | Extreme Pressure                           | psi .....     | Pounds per Square Inch                        |
| F .....            | Female                                     | PTO .....     | Power Take Off                                |
| FB .....           | Female O-Ring Boss                         | QD .....      | Quick Disconnect                              |
| FJ .....           | Female Boss                                | RH .....      | Right Hand                                    |
| FJX .....          | Female Swivel JIC                          | ROPS .....    | Roll Over Protection Structure                |
| FP .....           | Female Pipe                                | RPM .....     | Revolutions Per Minute                        |
| ft./lb. ....       | Foot Pound                                 | RT .....      | Right                                         |
| GA .....           | Gauge                                      | SAE .....     | Society of Automotive Engineers               |
| GR (5, etc.) ..... | Grade (5, etc.)                            | SMV .....     | Slow Moving Vehicle                           |
| HHCS .....         | Hex Head Cap Screw                         | UNC .....     | Unified Coarse                                |
| HT .....           | Heat Treated                               | UNF .....     | Unified Fine                                  |
| in .....           | Inch                                       | UNS .....     | Unified Special                               |
| JIC .....          | Joint Industry Council 37° Flare           | ZP .....      | Zinc Plate                                    |
| kg .....           | Kilogram                                   |               |                                               |
| km/h .....         | Kilometers Per Hour                        |               |                                               |
| lb .....           | Pound                                      |               |                                               |
| LH .....           | Left Hand                                  |               |                                               |
| LT .....           | Left                                       |               |                                               |
| in .....           | Inches                                     |               |                                               |
| m .....            | Meter                                      |               |                                               |
| mm .....           | Millimeter                                 |               |                                               |
| M .....            | Male                                       |               |                                               |
| MB .....           | Male O-Ring Boss                           |               |                                               |
| MJ .....           | Male JIC                                   |               |                                               |
| MJX .....          | Male Swivel JIC                            |               |                                               |
| MP .....           | Male Pipe                                  |               |                                               |
| MPa .....          | Mega Pascal                                |               |                                               |
| MPH .....          | Miles Per Hour                             |               |                                               |
| N .....            | Newton                                     |               |                                               |

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# WARRANTY

Please Enter Information Below and Save For Future Reference.

Date Purchased: \_\_\_\_\_ From (Dealer): \_\_\_\_\_

Model Number: \_\_\_\_\_ Serial Number: \_\_\_\_\_

ALLOWAY STANDARD, d/b/a ALLOWAY, warrants this product to be free from defect in material and workmanship for TWELVE (12) MONTHS COMMENCING ON THE DATE OF DELIVERY OF THE PRODUCT TO THE ORIGINAL PURCHASER.

Under no circumstances will this Warranty apply in the event that the product, in the good faith opinion of ALLOWAY, has been subjected to improper operation, improper maintenance, misuse, or an accident. This Warranty does not apply in the event that the product has been materially modified or repaired by someone other than ALLOWAY, an ALLOWAY authorized dealer or distributor and/or an ALLOWAY authorized service center. This Warranty does not cover normal wear or tear, or normal maintenance items. This Warranty also does not cover repairs made with parts other than those obtainable through ALLOWAY.

This Warranty is extended solely to the original purchaser of the product. Should the original purchaser sell or otherwise transfer this product to a third party, this Warranty does not transfer to the third party purchaser in any way. There are no third party beneficiaries of this Warranty.

ALLOWAY makes no warranty, express or implied, with respect to tires or other parts or accessories not manufactured by ALLOWAY. Their respective manufacturers, if any, provide warranties for these items, separately. ALLOWAY'S obligation under this Warranty is limited to, at ALLOWAY'S option, the repair or replacement, free of charge, of the product if ALLOWAY, in its sole discretion, deems it to be defective or in noncompliance with this Warranty. The product must be returned to ALLOWAY with proof of purchase within thirty (30) days after such defect or noncompliance is discovered or should have been discovered, routed through the dealer and distributor from whom the purchase was made, transportation charges prepaid. ALLOWAY shall complete such repair or replacement within a reasonable time after ALLOWAY receives the product. THERE ARE NO OTHER REMEDIES UNDER THIS WARRANTY. THE REMEDY OF REPAIR OR REPLACEMENT IS THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE OF THIS WARRANTY. ALLOWAY MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALLOWAY SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY AND/OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

ALLOWAY shall not be liable for any incidental or consequential losses, damages or expenses, arising directly or indirectly from the product, whether such claim is based upon breach of contract, breach of warranty, negligence, strict liability in tort or any other legal theory. Without limiting the generality of the foregoing, Alloway specifically disclaims any damages relating to (i) lost profits, business, revenues or goodwill; (ii) loss of crops; (iii) loss because of delay in harvesting; (iv) any expense or loss incurred for labor, supplies, substitute machinery or rental; or (v) any other type of damage to property or economic loss.

This Warranty is subject to any existing conditions of supply, which may directly affect ALLOWAY'S ability to obtain materials or manufacture replacement parts.

No agent, representative, dealer, distributor, serviceperson, salesperson, or employee of any company, including without limitation, ALLOWAY, its authorized dealers, distributors, and service centers, is authorized to alter, modify, or enlarge this Warranty.

This Warranty is effective only if the warranty registration card is returned within ten (10) days.

Answers to any questions regarding warranty service and locations may be obtained by contacting:

Alloway  
4230 14<sup>th</sup> Ave.NW  
Fargo, North Dakota 58102  
701-356-4983





## WARRANTY

ALLOWAY STANDARD, d/b/a ALLOWAY, warrants this product to be free from defect in material and workmanship for a period of One (1) year, ninety (90) days for Service Parts, from the date of delivery of the product to the original purchaser.

Under no circumstances will this Warranty apply in the event that the product, in the good faith opinion of ALLOWAY, has been subjected to improper operation, improper maintenance, misuse, or an accident. This Warranty does not cover normal wear or tear, or normal maintenance items.

This Warranty is extended solely to the original purchaser of the product. Should the original purchaser sell or otherwise transfer this product to a third party, this Warranty does not transfer to the third party purchaser in any way. There are no third party beneficiaries of this Warranty.

ALLOWAY'S obligation under this Warranty is limited to, at ALLOWAY'S option, the repair or replacement, free of charge, of the product If ALLOWAY, in its sole discretion, deems it, to be defective or in noncompliance with this Warranty. The product must be returned to ALLOWAY with proof of purchase within thirty (30) days after such defect or noncompliance is discovered or should have been discovered, routed through the dealer and distributor from whom the purchase was made, transportation charges prepaid. ALLOWAY shall complete such repair or replacement within a reasonable time after ALLOWAY receives the product. THERE ARE NO OTHER REMEDIES UNDER THIS WARRANTY. THE REMEDY OF REPAIR OR REPLACEMENT IS THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY.

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ALLOWAY shall not be liable for any incidental or consequential losses, damages or expenses, arising directly or indirectly from the product, whether such claim is based upon breach of contract, breach, of warranty, negligence, strict liability in tort or any other legal theory. Without limiting the generality of the foregoing, Alloway specifically disclaims any damages relating to (i) lost profits, business, revenues or goodwill; (ii) loss of crops; (iii) loss because of delay in harvesting; (iv) any expense or loss incurred for labor, supplies, substitute machinery or rental; or (v) any other type of damage to property or economic loss.

This Warranty is subject to any existing conditions of supply, which may directly affect ALLOWAYS' ability to obtain materials or manufacture replacement parts.

No agent, representative, dealer, distributor, service person, salesperson, or employee of any company, including without limitation, ALLOWAY, Its authorized dealers, distributors, and service centers, IS authorized to alter, modify, or enlarge this Warranty.

Answers to any questions regarding warranty service and locations may be obtained by contacting:

Alloway  
4230 14<sup>th</sup> Ave.NW  
Fargo, North Dakota 58102  
701-356-4983



**PART NUMBER**  
**500-5-0027**

**ALLOWAY** 

*Quality • Innovation*

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Fax: 1-701-356-4985