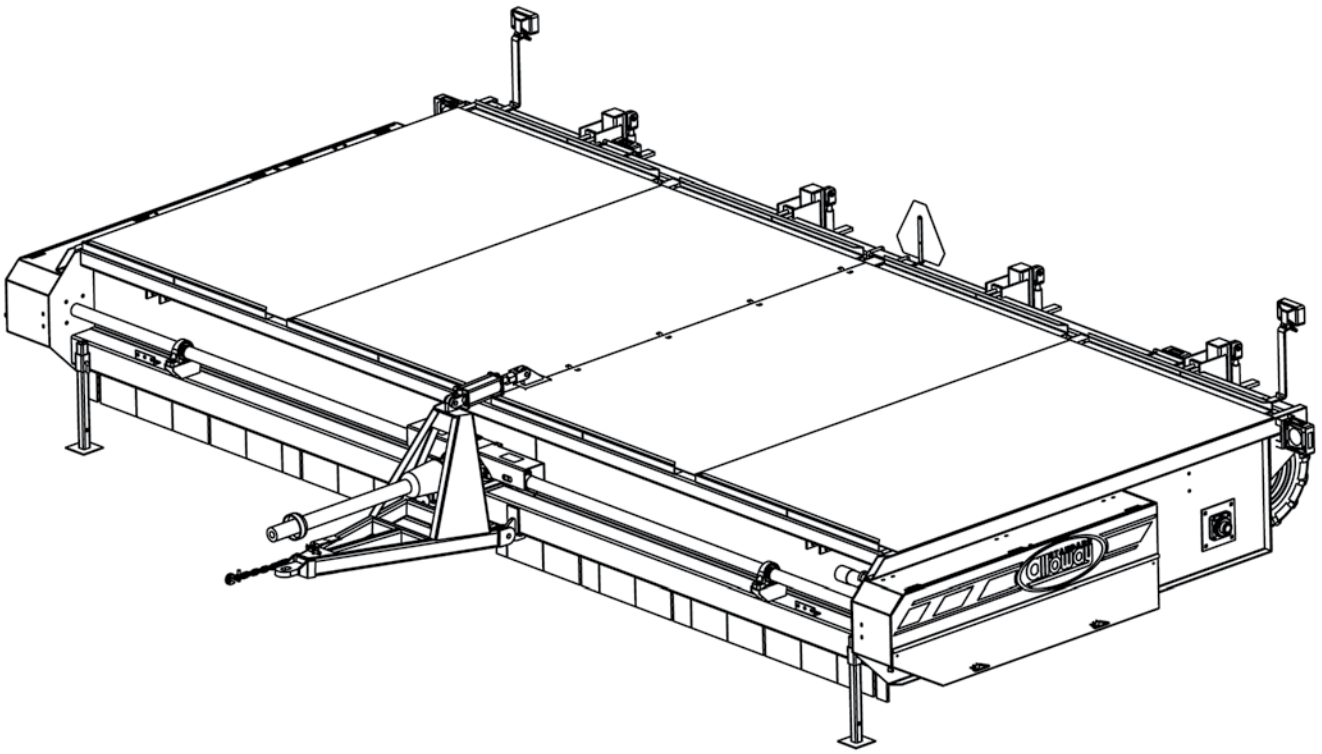
2008 - 2009

BEET DEFOLIATOR



OPERATOR'S MANUAL

PN-50032208 (Rev. 5/08)

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!

DANGER 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.

STANDARD 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.

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.

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.**
- **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.**

SAFETY RULES

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

- 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.

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

- 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 underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath 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.

(Safety Rules continued on next page)

SAFETY RULES

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

(Safety Rules continued from previous page)

- **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.**
- **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 going 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.**
  - **Electrocution 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 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.**

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 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.**
- **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.**

SAFETY RULES

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

- **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 underneath equipment lowered to the ground or raised, unless it is properly blocked and secured. Never place any part of the body underneath 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.**
- **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.**
- **Do not handle blades with bare hands. 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

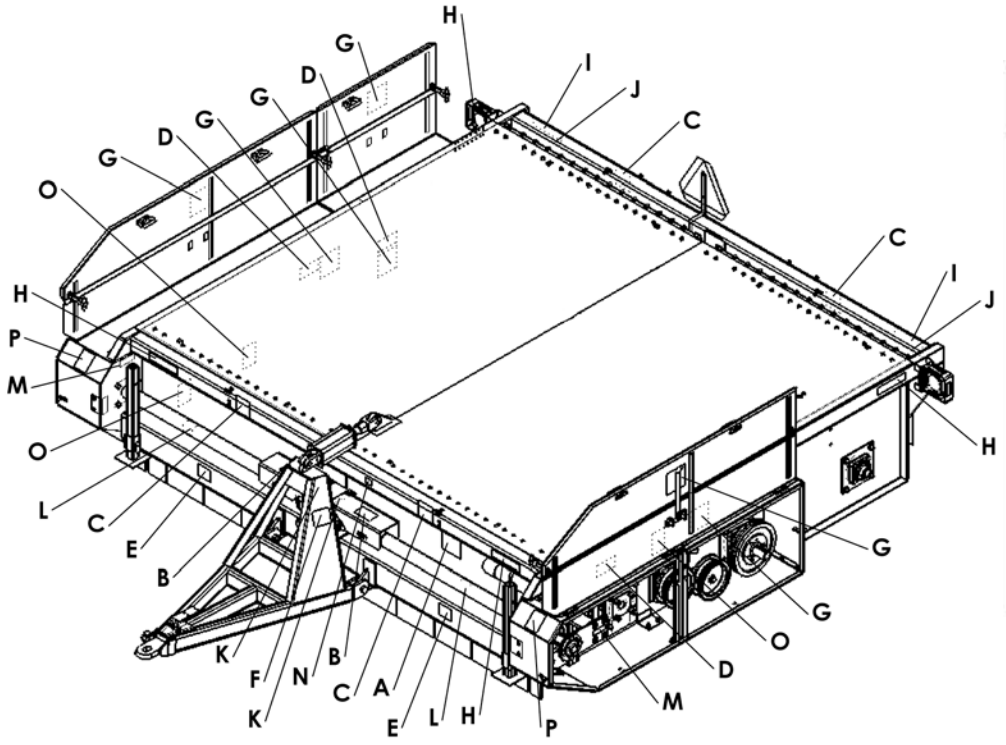
- **Follow manual instructions for storage.**
- **Keep children and bystanders away from storage area.**

NOTES

SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Replace Immediately If Damaged!



A - PN 500-3-0977

CAUTION

1. Read Operator's Manual before starting.
2. Stop tractor engine, place all controls in neutral, lower machine to the ground, set park brake, remove ignition key, and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
3. Keep all guards and access doors closed and secured before operating.
4. Keep hands, feet, hair and clothing away from moving parts.
5. Do not allow riders.
6. Do not enter rotor area when engine is running.
7. Never exceed a safe travel speed when transporting.
8. Use hazard flashers when transporting.
9. Use drawbar pin with retainer and attach safety pin.
10. Wear appropriate hearing protection for prolonged exposure to excessive noise.
11. Review safety instructions annually.

B - PN 100-3-1367

WARNING

SAFETY GUARD DO NOT REMOVE

C - PN 500-3-0981

DANGER

ROTATING FLAIL HAZARD

To prevent serious injury or death from rotating flails:

1. Stop engine, remove ignition key and wait for moving parts to stop before opening cover.
2. Open cover fully to prevent accidental closing.
3. Never enter flail area when engine is running.
4. Keep others away.

500-3-0981

D - PN 500-3-0980

WARNING

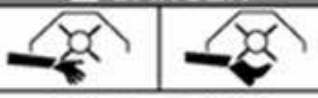
MISSING SHIELD HAZARD

To prevent serious injury or death:

1. Install and secure shields before operating.
2. Keep hands, feet, hair, and clothing away from moving parts.

E - PN 500-3-0982

DANGER



ROTATING FLAIL HAZARD

To prevent serious injury or death from rotating flails:

1. Stop engine, remove ignition key, and wait for moving parts to stop before servicing.
2. Keep hands and feet away from flails when engine is running.
3. Keep other people away.

F - PN 500-3-0978

WARNING

ROTATING DRIVELINE HAZARD

To prevent serious injury or death from rotating driveline:

1. Keep all guards in place when operating.
2. Operate only at 1000 RPM.
3. Keep hands, feet, clothing and hair away from moving parts

500-3-0978

G - PN 500-3-0979

WARNING

ROTATING PART HAZARD

To prevent serious injury or death from rotating parts:

1. Close and secure guard before operating.
2. Shut off engine and wait for moving parts to stop before opening to adjust, service, lubricate, or unplug.
3. Keep hands, feet, hair, and clothing away from moving parts.

(Safety Decals continued on next page)

SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Replace Immediately If Damaged!

H - PN 200-3-4004
AMBER REFLECTOR

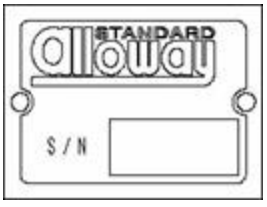
I - PN 200-3-4005
RED REFLECTOR

J - PN 200-3-4034
RED-ORANGE
FLOURESCENT
REFLECTOR

K - PN 506-3-0194

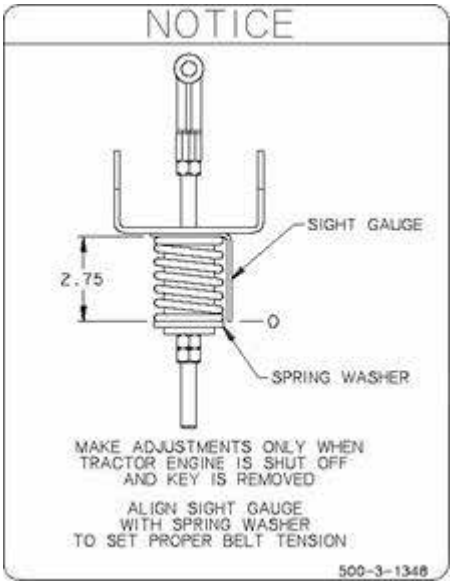
M - PN 500-3-1149

N-SERIAL NUMBER PLATE



L - PN 903-17456

O - PN 500-3-1348



P - PN 500-3-1690

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/ marking 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 Beet 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.

DATE	OPERATOR'S NAME	OPERATOR'S SIGNATURE

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.

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.

⚠ WARNING

- **Safety instructions are important! Read all attachment and power unit manuals; follow all safety rules and safety decal information. (Replacement manuals are available from your dealer). Failure to follow instructions or safety rules can result in serious injury or death.**
- **Never allow children or untrained persons to operate equipment.**
- **Make sure shields and guards are properly installed and in good condition. Replace if damaged.**
- **Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.**
- **Keep bystanders away from equipment.**
- **Operate tractor PTO at the RPM speed stated in "Specifications" section.**
- **Before dismounting power unit or performing any service or maintenance, follow these steps: disengage power to implement, lower the 3-point hitch and all raised components to the ground, operate valve levers to release any hydraulic pressure, set parking brake, stop engine, remove key, and unfasten seat belt.**

⚠ WARNING

- **Never allow riders on power unit or attachment.**
- **Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.**
- **Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.**

⚠ CAUTION

- **Always sit in tractor 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 tractor engine.**
- **Always comply with all state and local lighting and marking requirements.**
- **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.**

PRINCIPAL COMPONENTS

The Alloway Beet Defoliator consists of three rotating drums that have steel or rubber flails. The flails remove the foliage from the plant. Rotational power to the drums is provided from the tractor PTO through a series of belts on each side of the machine.

An optional scalper package is available on the back of the machine to cut off the top of the remaining beet.

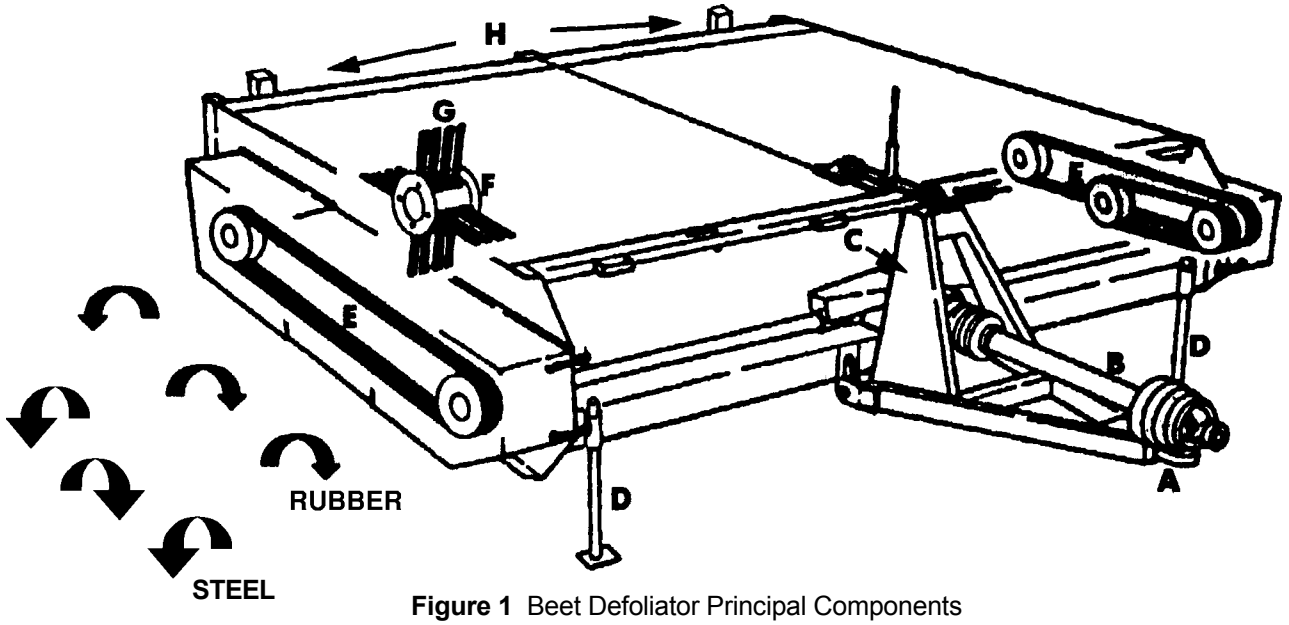


Figure 1 Beet Defoliator Principal Components

A. Hitch
B. Input Driveline
C. Gearbox
D. Stands
E. Belt
F. Rotor
G. Flails
H. Wheels

Break-in of the Beet Defoliator

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 after completing 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.

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 beet defoliator.**

___ GENL-LUBE--Check all lubrication points and grease as instructed in Lubrication Schedule.

___ Use only a tractor of adequate power and weight to pull the unit.

___ Check that the unit is properly attached to the tractor. On pull-type unit, be sure there is a mechanical retainer through the drawbar pin and the safety chain is installed.

___ Check oil level in gearbox. Add oil as required.

___ Check that the PTO driveline turns freely and that the driveline can telescope easily.

___ Check tire pressure. Bring to specified level.

___ Check flails. Inspect for damage or breakage. Make sure they swing freely on their mount. Repair or replace as required.

___ Check the condition of all drive belts. Align as required. Replace those that are frayed or broken. Refer to Belt Replacement.

___ Check the condition of the scalpers. Adjust or repair as required. Refer to Scalpers.

___ Inspect all hydraulic lines, hoses, couplers, and fittings. Tighten, repair, or replace any leaking or damaged components.

___ Close and secure all guards, doors, and covers.

Choosing the Correct Equipment

To ensure safe and reliable operation of the beet defoliator, use a tractor with the correct specifications. Use the following guidelines to select the correct tractor.

PTO

The defoliator is equipped with a PTO driveline yoke to fit a 1-3/8" 21 spline shaft on the tractor. An optional 1-3/4" 20 spline yoke is available from the factory if required. Be sure to match the yoke to your tractor shaft.

IMPORTANT

Do not use an adapter on the tractor shaft. It will alter the drawbar dimension and can affect the strength of the shaft.

Hydraulic System

The tractor hydraulic system must be capable of 8 gpm (22 lpm) at 2,500 psi (1700 kPa). Either closed-centered or open-centered system can be used. A remote outlet is required for each circuit.

Figure PTO Driveline

Drawbar

The tractor drawbar must be set to provide 16" (406 mm) between the end of the PTO shaft and the center of the drawbar pin.

IMPORTANT

Do not use PTO shaft adapters. They will change the drawbar dimension and can cause driveline failures.

NOTE: Verify that no driveline interference occurs through all phases of operation (bottoming out).

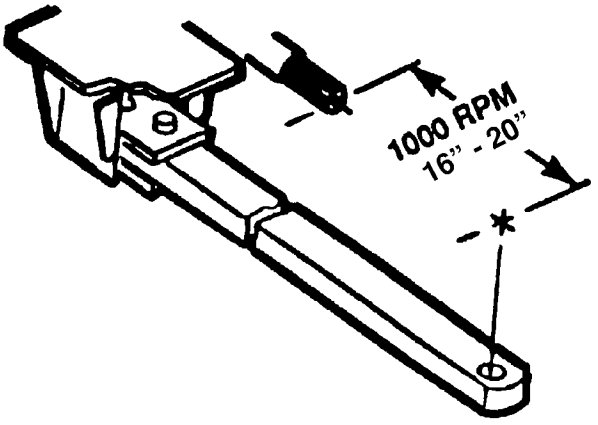


Figure 2 Drawbar Dimension

Attaching the Defoliator to the Tractor

Place unit on a level, dry area free of debris and other foreign objects

⚠ WARNING

Keep bystanders away from equipment.

1. Clear the area of all bystanders.
2. Provide enough clearance to back the tractor safely into the unit.

⚠ CAUTION

Do not allow anyone to stand between tractor and unit when backing up to the unit.

3. **Back slowly and align the drawbar with the hitch.**
4. **Shut off the tractor, place all controls in neutral, set the parking brake, remove the key, and wait for all moving parts to stop.**
5. **Use the ratchet on top of the hitch A-frame to set the height (9 row model and smaller). The operator must supply his own hydraulic cylinder on the 12-row model.**
6. On the 12-row defoliator, connect the hoses from the hitch cylinder to the tractor hydraulics to raise or lower the hitch.
7. Use the hardened drawbar pin with provisions for a mechanical retainer. Install a retainer, such as a Klik pin.
8. **Be sure the drawbar is pinned in its center position.**
9. **Attach the safety chain around the drawbar or cage to prevent unexpected separation. Provide sufficient slack for turning.**
10. **Connect the PTO driveline.**
11. **Check that the driveline telescopes easily and that the shield rotates freely with no interference.**
12. Attach the driveline to the tractor by retracting the locking collar; slide the yoke over the shaft and push on the yoke until the lock collar clicks into position. Be sure the yoke is locked in position.
13. **Attach the anchor chain on the driveline shield to the frame.**

Connect the Hydraulics

1. **Use a clean cloth or paper towel to clean the couplers on the end of the hoses and the area around the couplers on the tractor.**
2. Insert the male ends into the couplers on the tractor. Be sure they are locked in place.

⚠ WARNING

Keep hands and body away from pressurized lines. Use paper or cardboard, not hands or other 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 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.

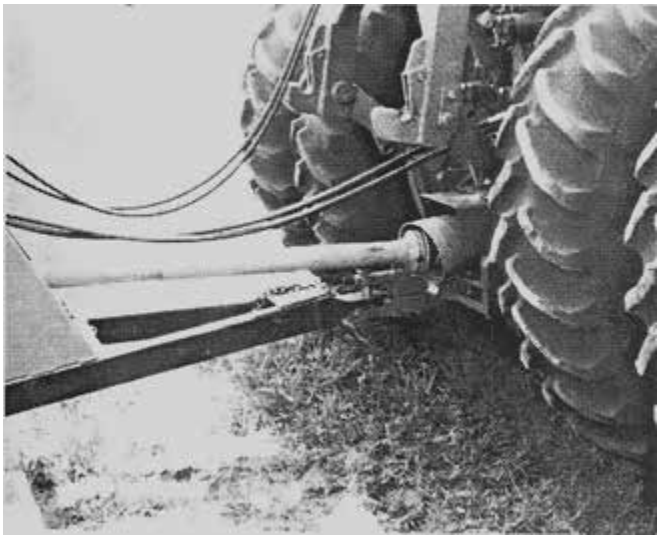


Figure 3 Driveline and hydraulics attached

3. Route the hoses along the hitch and secure in position with clips, tape, or plastic ties. Provide sufficient slack for turning.

Complete Attachment

1. Use ratchet or hydraulic cylinder on the hitch to lower the hitch and transfer the weight to the drawbar. See Figure 4.
2. Unpin the front frame stands. Raise the stands and pin them in their stowed positions. See Figure 5.

Removing the Defoliator from the Tractor

Reverse the above procedure when unhooking from the tractor.

Figure 4 Hitch Ratchet

Figure 5 Stand

Machine Settings

The machine can give its best performance only if it is properly set to work in the existing condition. It may be necessary to change the machine settings during the working day if the machine is moved to a new field, or the operating conditions change.

Review this section to be familiar with the adjustments available to match the machine to the working conditions.

Machine Leveling

The frame must be set level when working in the field to be sure that the flails contact the plants evenly at any place under the frame. Set when the machine is on firm, level ground. Use a tape to measure the distance between the frame and the ground, or place a level on top of the frame.

1. Use the ratchet or hydraulic cylinder on the hitch (Figure 4) to level the frame in the direction of travel.
2. Turn the adjustment crank on the rear wheels (Figure 7) to level the machine from side to side. Loosen the “U” bolt on the wheel strut, turn the crank and re-tighten the bolt.

Figure 6 Hitch Ratchet

Figure 7 Rear Wheels

Machine Settings (continued)

Flail Height

Best results are obtained when the flails contact the sugar beets approximately 1/2 inch (12 mm) below the crown. This will allow the flails to remove the foliage from the beets during a pass.

Set the height of the flails by changing the height of the machine from the ground. Machine height is set with the ratchet or hydraulic cylinder on the hitch and the height of the rear wheels.

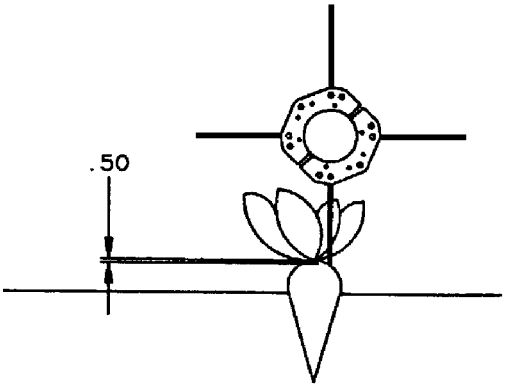


Figure 8 Flail Height

IMPORTANT

■ **Maintain a level machine at all times.**

In soft or wet conditions, the tires will sink into the soil and the machine should be raised to maintain the flail contact line of 1/2 inch (12 mm) below the crown.

In crop conditions where the beet crown extends above the ground and can be knocked over, the flails can be set so that they just contact the crown.

Do not allow the flails to contact the ground. They will pick up dirt, sticks, stones and other material that can be thrown out and cause injury. This will also cause rapid wear or breakage.

Figure 9 Machine Height

Flail Spacing

Set flail position on the drum to follow beet rows exactly and to clean the low foliage from both sides of the crown. Change spacing of flail sets by loosening the clamping bolts on the head, and sliding the entire assembly to its new position on the rotor

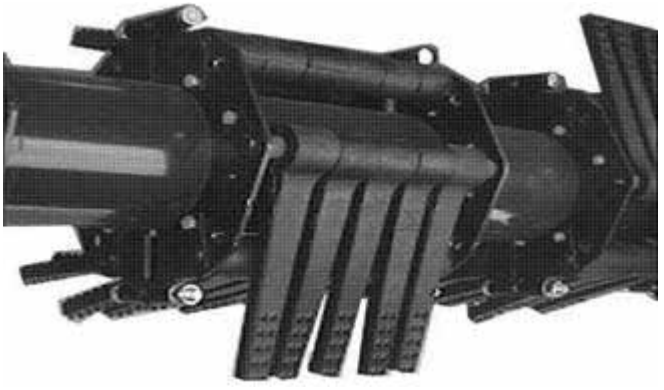


Figure 10 Flail Assembly

Machine Settings (continued)

Wheel Spacing

The rear wheels must be set to track directly between the rows. Any other positions can lead to beet contact and damage or knocking the beet out of the ground.

Change the wheel assembly position by jacking up the machine, loosening the top mounting bolts (Figure 11), and sliding the assembly to its desired position. Re-tighten the bolts and remove jacks.

Figure 11 Wheel Mounting Bolts

Stabilizer Wheel Position

Stabilizer wheels located on the front corners of the 12 row machine (Figure 12) must be set to run in the center of the rows to prevent plant damage.

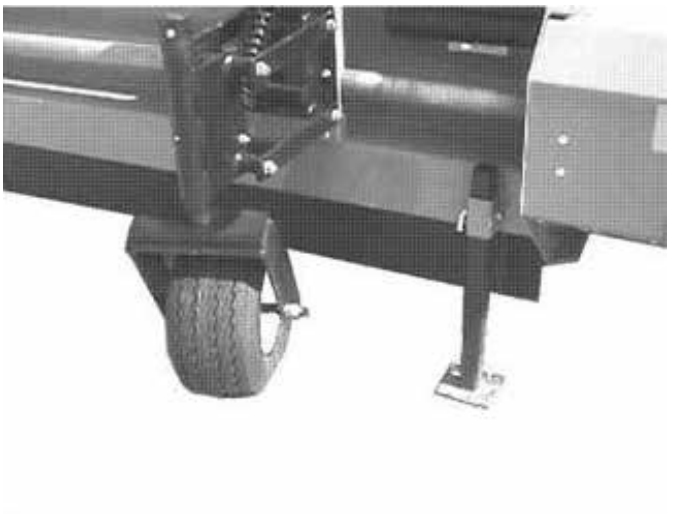


Figure 12 Stabilizer Wheel Position

Scalper Settings (Optional)

Three types of scalpers are available:

- Knife (Figure 14)
- Circular (parallel arms)
  (not shown; refer to Parallel Arm Rotary Scalper)
- Circular (arms)
  (not shown, refer to Rotary Scalper Long Arm)

Scalpers cut the top of the crown and are positioned on the back of the machine.

The shoe, ahead of the cutting surface, must be set at the proper angle. This will allow sufficient space for the knives to cut the green portion of the beets without tipping them over.

IMPORTANT

Severe equipment damage may occur if attempting to go in reverse with the scalper arms down. Always raise scalper arms before going in reverse.

Figure 14 Knife Scalper

FIELD OPERATION

The Alloway beet defoliator is designed with the flexibility to operate well in almost any kind of crop and terrain conditions. However, the operator is responsible for being familiar with all operating and safety procedures and following them.

Each operator should review this Field Operation section at the start of the season and as often as required to be familiar with the unit.

Operators should also review the Pre-Operation Check List, Attaching the Defoliator to the Tractor, and Transporting the Unit.

⚠ 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.**
- **Always comply with all state and local lighting and marking requirements.**
- **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.**
- **Do not allow bystanders in the area when operating, attaching, removing, assembling, or servicing equipment.**
- **Never allow riders on power unit or attachment.**
- **Before dismounting power unit or performing any service or maintenance, follow these steps: disengage power to implement, lower the 3-point hitch and all raised components to the ground, operate valve levers to release any hydraulic pressure, set parking brake, stop engine, remove key, and unfasten seat belt.**
- **Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.**
- **Make sure shields and guards are properly installed and in good condition. Replace if damaged.**
- **Never allow children or untrained persons to operate equipment.**

⚠ WARNING

- **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.**
- **Keep hands, feet, hair, and clothing away from equipment while engine is running. Stay clear of all moving parts.**
- **Inspect and clear area of stones, branches, or other hard objects that might be thrown, causing injury or damage.**
- **Operate tractor PTO at the RPM speed stated in "Specifications" section.**

⚠ CAUTION

- **Always sit in tractor 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 tractor engine.**

Transporting the Unit

⚠ WARNING

■ **Never allow riders on power unit or attachment.**

⚠ CAUTION

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

1. Be sure all bystanders are clear of the unit.
2. Be sure center cutter is disengaged and has stopped turning (if so equipped).
3. Be sure the unit is securely attached to the tractor and all retainer pins are installed.
4. Be sure safety chain is installed on pull-type model.
5. Raise the machine.
6. Clean the SMV emblem, lights, and reflectors and be sure they are working.
7. Be sure you are in compliance with all applicable lighting and marking regulations when transporting. Check with your local authorities.
8. Never transport the unit faster than 20 mph (32 km/h). The ratio of the tractor weight to the defoliator weight plays an important role in defining acceptable travel speed. Table 1 summarizes the recommended travel speed-to-weight ratio.

Table 1: Speed vs. Weight Ratio

Road Speed	**Fully equipped or loaded implement(s) weight relative to towing machine weight**
Up to 32 km/h (20 mph)	1 to 1 or less
Up to 16 km/h (10 mph)	2 to 1 or less
Do not tow	more than 2 to 1

Preparing for Operation

1. Attach the machine to the tractor
2. Lubricate the machine.
3. Review and follow the pre-operation checklist. See Pre-Operation Check List.
4. Review Transporting the Unit, before transporting to the field.
5. Pull into the field and line up with the first set of rows.
6. Determine the machine parameters that require setting before starting use. See Machine Settings.
7. Close and secure all guards, covers and access doors.

Starting the Machine

1. Start the tractor engine and run at low idle.
2. Slowly engage the tractor PTO.

IMPORTANT

■ **Engage and disengage the PTO at low idle engine RPM to minimize shock loads to the drive train.**

3. Slowly increase engine speed to the rated PTO speed of 1000 RPM.
4. Put the tractor in gear and proceed down the field.

Stopping the Machine

1. Take the tractor out of gear.
2. Slowly decrease engine speed down to the idle RPM.
3. Slowly disengage PTO clutch.

IMPORTANT

■ **Disengage clutch slowly. On newer tractors the PTO brake will stop the shaft in less than one revolution and create shock loads in the drive train if the clutch is not disengaged slowly.**

4. Stop engine and set park brake before dismounting.

Ground Speed

The defoliator works well at 3 to 6 mph (5 to 10 Kmph) depending on type of job. The operator is responsible for checking the condition of the beets and setting the speed required for the best defoliating. For best results:

1. Increase speed if the beet tops are completely cleaned of foliage.
2. Increase speed if beets are being pulled out of the ground (or raise the flails).
3. Decrease speed if foliage is left on the crown or on the sides (or lower flails).

Flail Patterns

When delivered from the factory, the flail patterns are set as shown in Figure 15. Maintain this pattern at all times.

Do not allow the flails to hit the ground where they might pick up dirt, sticks, stones and other debris that can be thrown out and cause injury. This will also cause rapid wear or breakage.

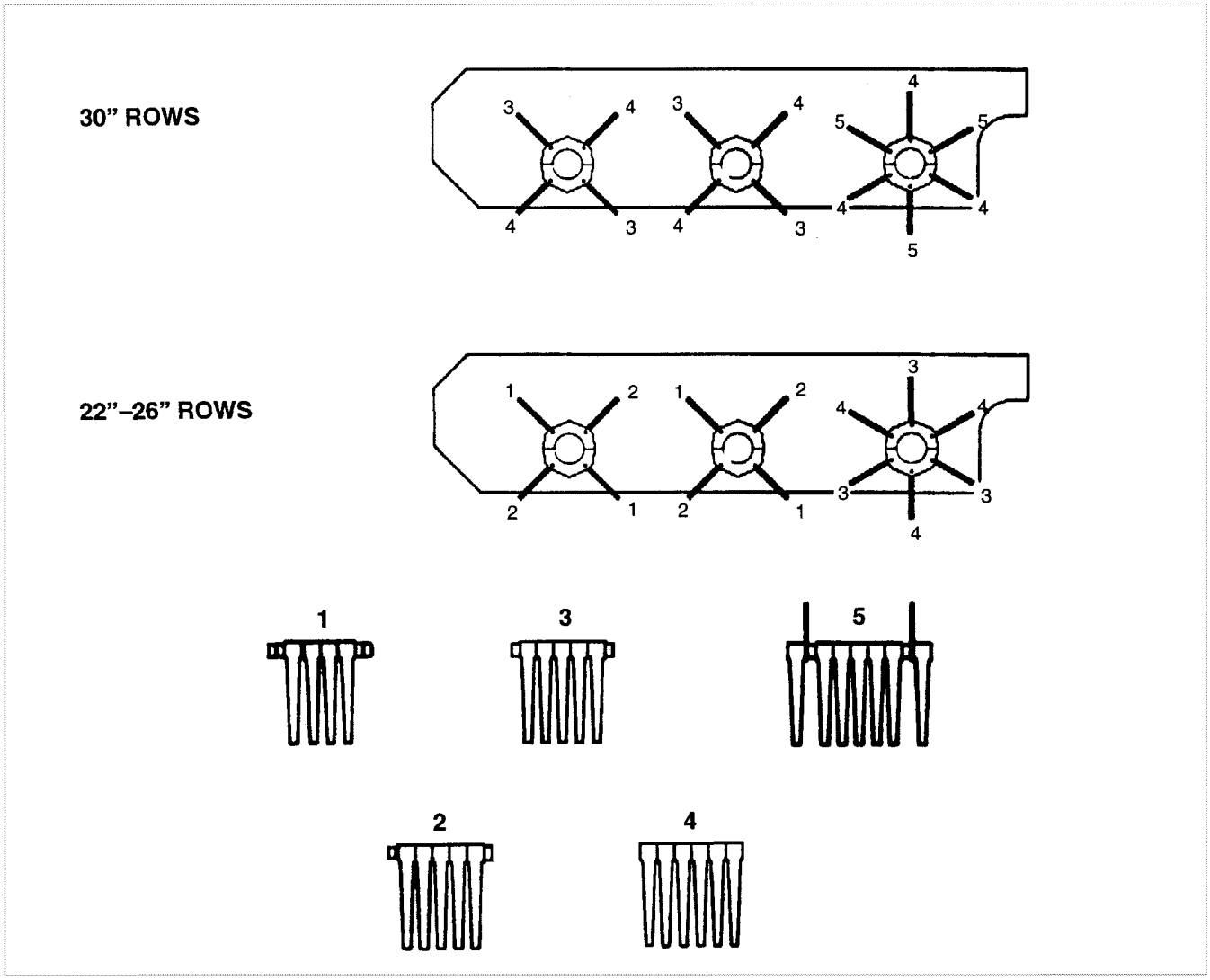


Figure 15 Flail Patterns

Operating the Defoliator

1. Operate the machine at its rated speed of 1000 rpm at all times. Effective removing of beet tops depends on the flail tip speed. A slower speed can result in foliage being left on the beets.
2. Operate the machine at rated speed at the end of the row until the last drum has passed over the beets.
3. When turning at the end of the field, it may be necessary to skip a machine width of rows before turning back into the field. This will depend on the width of the machine, the width of the headland, and the turning radius of the tractor.
4. Although the driveline may be equipped with an optional constant velocity (CV) joint, turning angles are limited. (See Figure 16.) Do not exceed the working angles. Turn off the machine when making sharp turns.
5. When starting a new field, or when operating conditions change:
   - **a.** Travel 50 feet into the field.
   - **b.** Shut off the tractor, place all controls in neutral, set the parking brake, remove the key, and wait for all moving parts to stop.
   - **c.** Go behind the machine and inspect the beets.
   - **d.** Check the flail spacing, wheel spacing, machine height, and scalper setting (if so equipped.)
   - **e.** Adjust as needed.

Turning

The front universal is equipped with a constant velocity (CV) joint to allow for turning. Although the CV joint allows for sharper turns than a regular drive-line, it does have some limitations. Refer to Figure 16.

CV joint angle should not exceed 80 degrees in either operating or standstill condition of the driveline. Larger angles will damage the joint.

The angle should never exceed 35 degrees when the driveline is under full load.

IMPORTANT

■ **Disengage PTO when making sharp turns.**

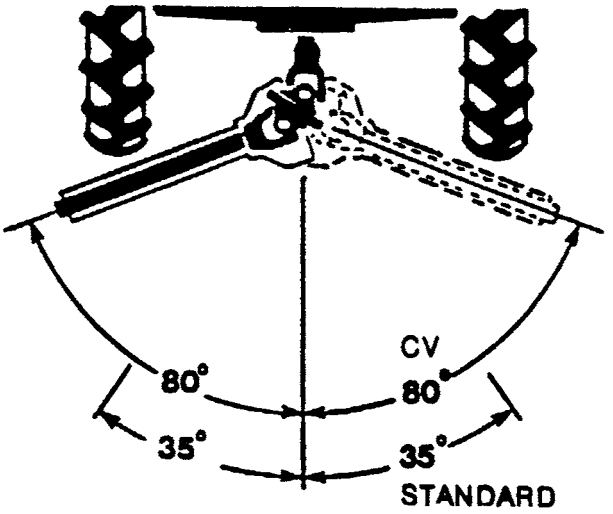


Figure 16 Driveline Angles

Hazard Area

⚠ WARNING

■ **Make certain all movement of implement components has stopped before approaching for service.**

Stay away from front, side and rear of unit while it is running. Flails can pick up stones, sticks, wire, and other debris and throw it out with enough force to severely injure bystanders.

Keep out of shaded area shown in Figure 17.

Shut down unit and wait for moving parts to stop before approaching.

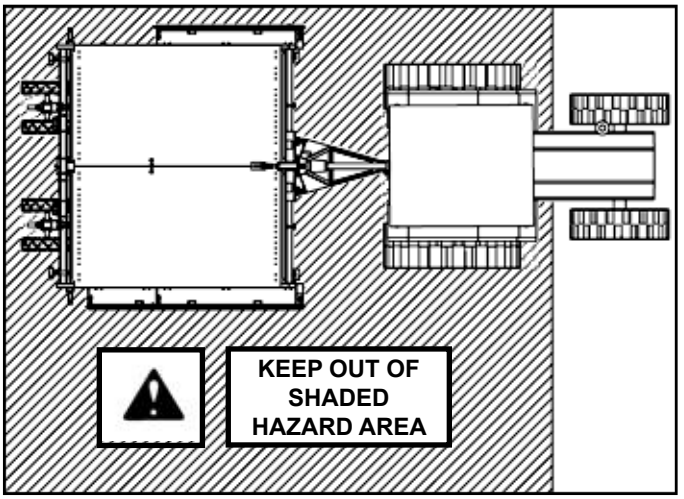


Figure 17 Hazard Area

ADDITIONAL EQUIPMENT (Optional)

Rear Steer

1. Mount rear steer components to back of defoliator body. Refer to Rear Steer Components, and Rear Steer Plumbing Components, in the parts section for hardware and assembly instructions.
2. Attach the sight gauge on defoliator and the hose clamp to adjustable bar. Be sure the sight gauge and hose clamp are aligned when wheels are straight.

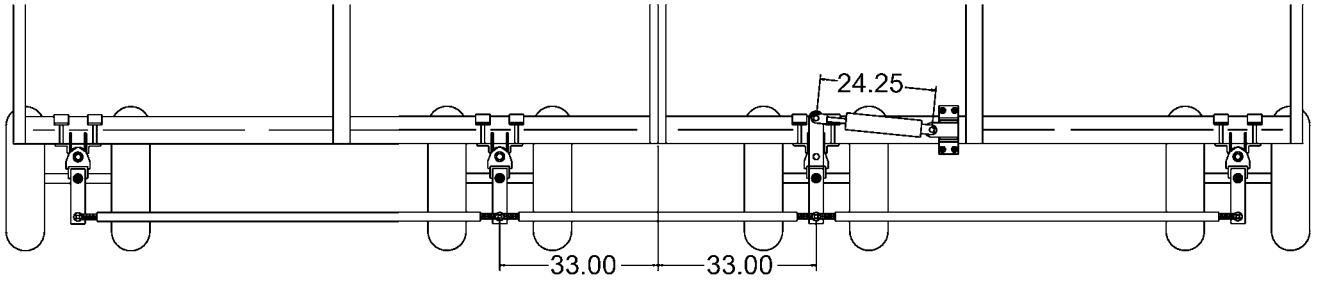


Figure 18 Rear Steer (12 Row 22)

Stabilizer Struts

1. Mount stabilizer struts to the front of defoliator. Refer to Stabilizer Wheel Components, in the parts section, for assembly.
2. Adjust up and down so the parallel linkage is low in the front in operating position. See Figure 19. This allows maximum upward travel when operating. Pin #10 limits the downward travel of the wheel for road transport. This may be left installed when operating.

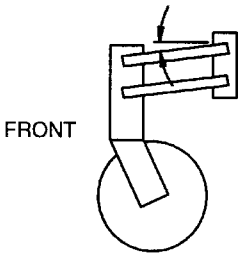


Figure 19 Stabilizer Strut

Steel Flail

Units Adjust seasonally.

NOTE: This is not a field adjustment, but rather a seasonal adjustment.

Set the front drum in either the upper or lower position that best accommodates the variety of sugar beet you are defoliating. The machine is shipped from the factory with the drum in the upper (normal) position. This setting has the steel flail tips 4” higher than the rubber flail tips. The lower setting would put the steel flails only 2” higher than the rubber flails.

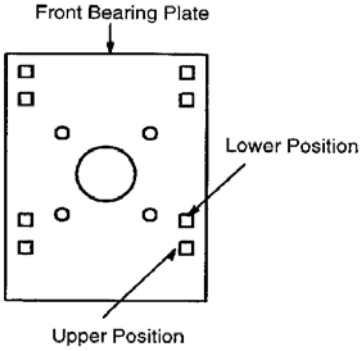


Figure 20 Steel Flail Adjustment

STORAGE

Storage

⚠ WARNING

■ **Keep children and bystanders away from storage area.**

IMPORTANT

■ **Store in a dry, level area. Support the base with planks if required.**

After the season's use, inspect all major components of the defoliator. Repair or replace any worn or damaged components to prevent unnecessary downtime at the start of next season.

To assure a long, trouble-free life, follow this procedure when preparing the unit for storage:

1. Open all access doors and canvas covers. Be sure the prop rods are in place and secured with pins

⚠ WARNING

■ **Equipment may be pictured with covers open for instructional purposes. Never operate equipment with covers open.**

2. Thoroughly wash the machine using a pressure washer to remove all dirt, mud, debris and residue.
3. Inspect the flails, flail assemblies, and drums for damage or entangled material. Repair or replace damaged parts. Remove all entangled material.
4. Inspect all hydraulic hoses, line, couplers and fittings. Tighten any loose fittings. Replace any hose that is badly cut, nicked, abraded, or is separating from the crimped end of a fitting.
5. Inspect drive belts. Replace any that are damaged. Adjust any not to the specified tension.
6. Lubricate all grease fittings. Make sure that all grease cavities have been filled with grease to remove any water residue from the washing.
7. Touch up paint nicks and scratches to prevent rusting.
8. Close and secure access doors and canvas covers.

Figure 21 Open Covers

Figure 22 Scalper Storage

9. Move to storage area.
10. Select an area that is dry, level and free of debris.
11. Unhook from tractor (see Removing the Defoliator from the Tractor, page 15).
12. Lower the scalpers to the ground for storage.
13. Store the machine in an area away from human activity.
14. Do not allow children to play on or around the stored machine.

SERVICE & MAINTENANCE

⚠ 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.**
- **Equipment may be pictured with covers open for instructional purposes. Never operate equipment with covers open.**
- **Keep all persons away from operator control area while performing adjustments, service, or maintenance.**
- **Make sure shields and guards are properly installed and in good condition. Replace if damaged.**
- **Never go underneath equipment (lowered to the ground or raised) unless it is properly blocked and secured. Never place any part of the body underneath 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.**
- **Do not handle blades with bare hands. Careless or improper handling may result in serious injury.**
- **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.**

⚠ 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; and respirator or filter mask where appropriate.**
- **Make certain all movement of equipment components has stopped before approaching for service.**

Lubricants

1. **Grease**
   Use an SAE multi-purpose high temperature grease with extreme pressure (EP) performance. An SAE multi-purpose lithium-based grease is also acceptable.
2. **Gearbox Oil**
   Use an SAE 85W90 gear oil for all operating conditions. Capacity: 2-1/2 U.S. quarts (2.13 liters).
3. **Storing Lubricants**
   Your unit can operate at top efficiency only if clean lubricants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contaminants.

Greasing

NOTE: Use the Lubrication Service Record, page 31 to keep a record of all scheduled maintenance.

1. Use a hand-held grease gun for all greasing.
2. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
3. Replace and repair broken fittings immediately.
4. If fittings will not take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

Lubrication Schedule

The period recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication or oil changes. Refer to Figure 24 for details.

Daily or 10 Hours

1. Lubricate PTO driveline, position A, Figure 22 and Figure 24.
2. Use dipstick to check gearbox oil level.

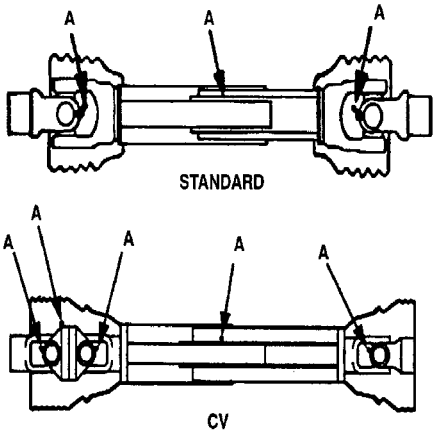
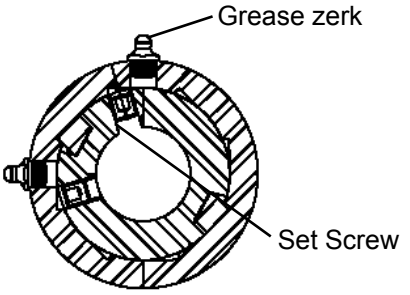


Figure 22 Driveline

Figure 23 Dipstick



For PTO installation, remove grease zerks to gain access to the set screws for locking PTO onto gearbox.

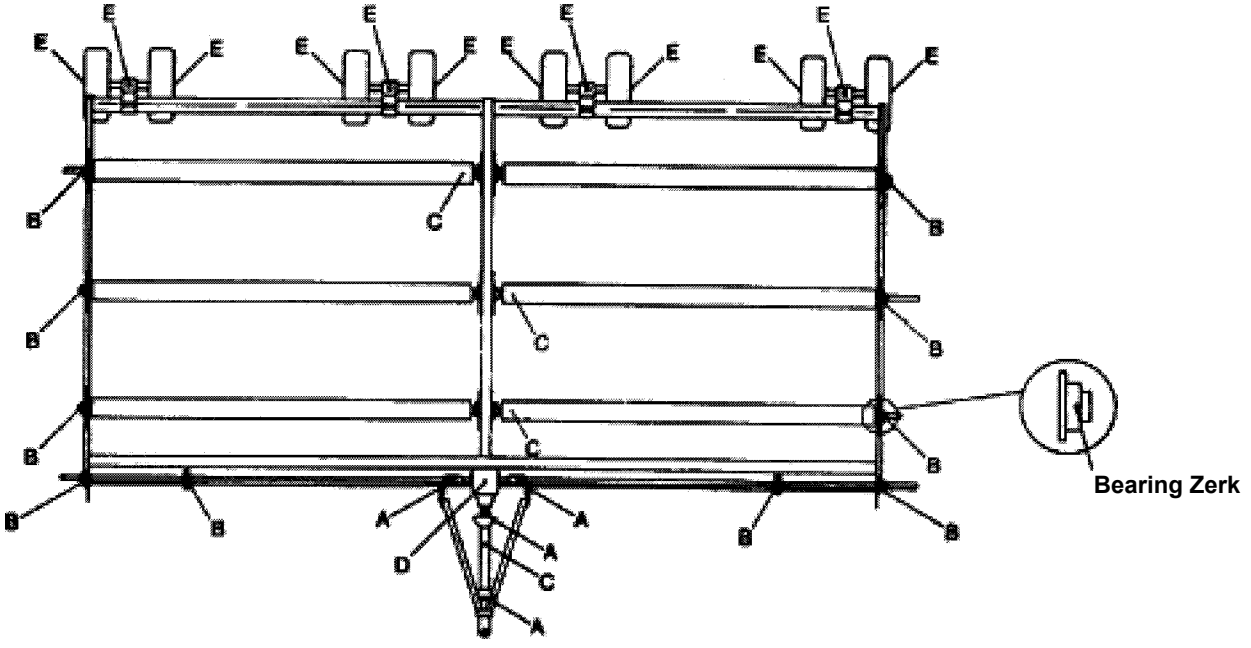


Figure 24 Lubrication Diagram

20 Hours

1. Lubricate bearing zerk with one shot of grease at each B position (13 positions). See Figure 25.
2. Lubricate couplers with 10 shots of grease at each C position.

If you remove the flail tube from 9 - 12 row defoliators, thoroughly clean both halves of the drive couplers and apply new grease to all gear teeth. You must remove grease zerk C when replacing the flail tube to allow air to purge from the coupler assembly. Then replace the grease zerk and follow lubrication schedule.

40 Hours

1. Lubricate PTO driveline (1 location).
2. Lubricate scalper pivot bearings (4 locations each scalper).

Annually

1. Change gearbox oil.
2. At the start and end of the season, lubricate the scalper and hitch screw jacks (1 location each screw jack).
3. At the start and end of the season, lubricate the trailing wheel pivots - position E (1 location each pivot).

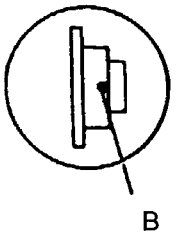


Figure 25 Position B

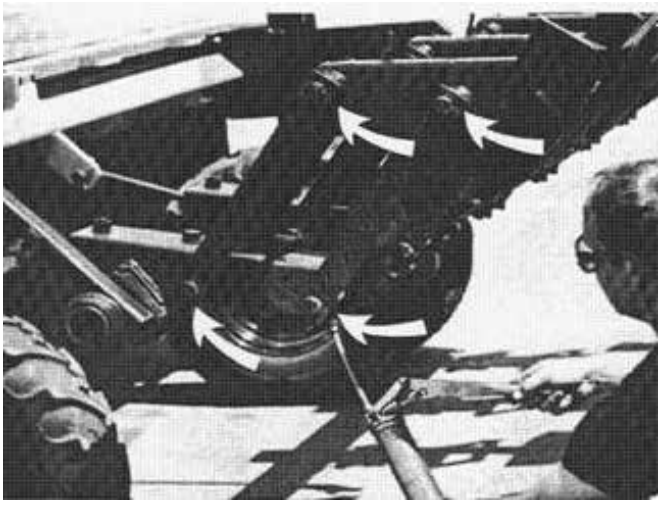


Figure 26 Scalper pivot bearings

Changing Gearbox Oil

Although the oil in the gearbox never wears out, dust, dirt and moisture can enter through the breather when the oil heats up and cools down during operation. These contaminants must be removed on a regular basis to ensure a long life for the working components. In very dusty or dirty conditions, change the oil twice a year.

To change oil, follow this procedure:

1. **Shut off tractor, place all controls in neutral, set parking brake, remove key, and wait for all moving parts to stop.**
2. **Clear the area of all bystanders.**
3. **Place a pan under the drain plug. Remove the drain, fill, and level plugs.**
4. **Allow the gearbox to drain for 10 minutes.**

   NOTE: It is best to drain the oil when the gearbox is hot to remove the most contaminants. Use a stiff probe to clean the breather hole in the fill plug.
5. **Install and tighten the drain plug.**
6. **Dispose of the used oil in an approved container.**
7. **Add 1 quart of SAE 85W90 gear oil through the fill plug. Check, using the dipstick.**
8. **Install and tighten the level and fill plugs**

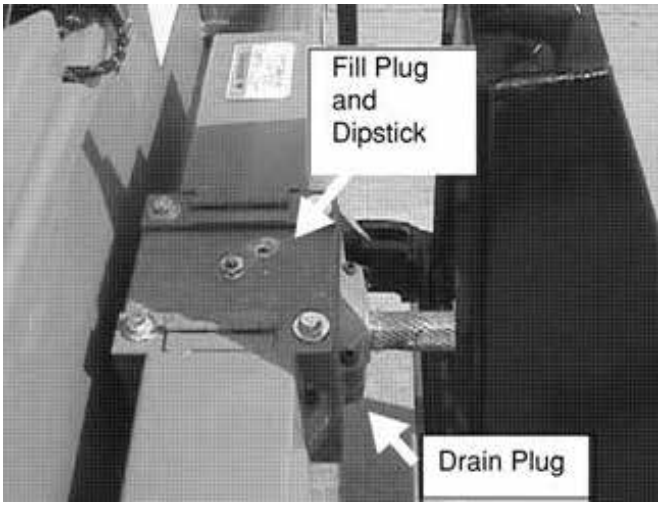


Figure 27 Gearbox, fill and drain plugs

Lubrication Service Record

NOTE: See prior pages for details.
Copy this page to continue service record.

✔ = CHECK
L = LUBRICATE
C = CHANGE
R = REPACK

HOURS OF SERVICE																
SERVICED BY																
10 Hours or daily																
L PTO Driveline (8)																
✔ Gearbox oil level																
20 Hours																
L PTO Driveline telescope section																
L Rotor splined couplers																
L Wheel mounting tube bearings																
40 Hours																
L Rotor end bearing																
L U-Joint(1)																
L Overrunning clutch (1)																
Annually																
C Gearbox oil																
R Wheel bearings																
L Ratchets																
L Center Hanger Bearings																

Wheel Spacing

The rear wheels are designed to move along the frame to align them with the rows. To adjust the spacing of the wheels, follow this procedure:

1. Shut off tractor, place all controls in neutral, set parking brake, remove key, and wait for all moving parts to stop.
2. Clear the area of all bystanders.
3. Use a jack with sufficient capacity to lift the frame. Place planks under the jack for extra support if required.
4. Measure from the centerline of the machine to determine the required spacing. Mark the position on the frame.
5. Lift the frame until the wheels have cleared the ground.
6. Loosen the wheel assembly mounting bolts.
7. Slide the assembly along the frame to the required position.

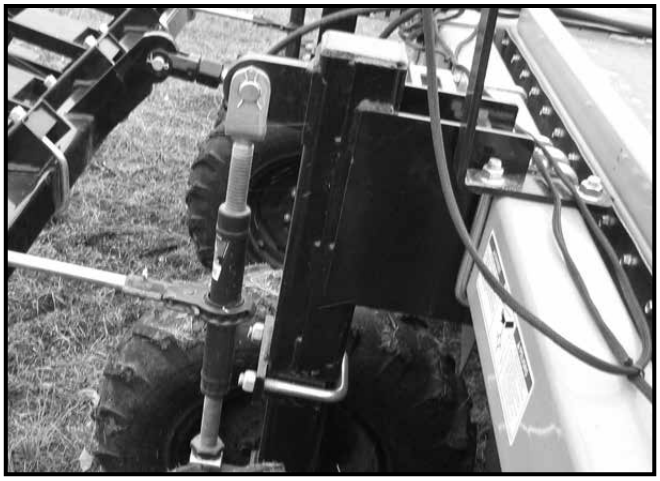


Figure 28 Wheel Mounting Bolts (Small Tires)

8. Tighten the mounting bolts to their specified torque levels.
9. Lower frame and remove jack.

Flail Spacing

The flails are mounted to an assembly or head that clamps to the rotating drum. To adjust the head position, follow this procedure:

1. Shut off tractor, place all controls in neutral, set parking brake, remove key, and wait for all moving parts to stop.
2. Clear the area of all bystanders.
3. Disconnect driveline from the tractor.
4. Open the canvas covers.
5. Measure from the center line of the machine to determine the required spacing.
6. Loosen the assembly clamping nuts.

⚠ CAUTION

■ **Equipment may be pictured with covers open for instructional purposes. Never operate equipment with covers open.**

7. Slide or tap assembly to the desired position
8. Tighten clamping bolts to their specified torque level.
9. Repeat with other head assemblies as required.
10. Close and secure canvas covers.
11. Attach driveline to the tractor.

Figure 29 Rubber Flails

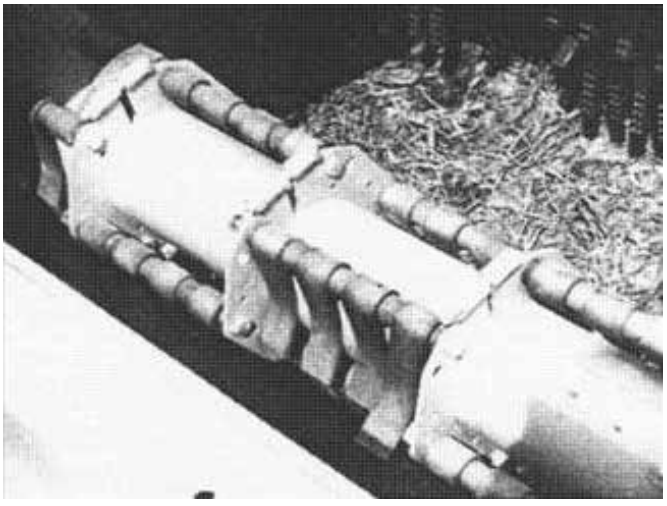


Figure 30 Steel Flails

Flail Replacement

The flails swing on pins through the head. When replacing damaged or broken flails, follow this procedure:

1. Shut off tractor, place all controls in neutral, set parking brake, remove key, and wait for all moving parts to stop.
2. Clear the area of all bystanders.
3. Disconnect driveline from tractor.
4. Open canvas covers.
5. Remove the mounting bolt and cotter pin.
6. Slide pin out to release flails.
7. Replace with new flail. Be sure to assemble the spacers and bushings in their appropriate positions. See Parts Section and Flail Patterns.
8. Re-install bolt and cotter pin. Tighten bolt to specified torque.
9. Repeat with other flails as required.

⚠ CAUTION

Equipment may be pictured with covers open for instructional purposes. Never operate equipment with covers open.

10. Remove 5/8 locknut.
11. Tap out 5/8 x 3 1/2 carriage bolt.
12. Remove flails and bushing.
13. Install new bushing and flail.
14. Install bolt and nut.
15. Tighten bolt and nut.
16. Close and secure access doors and covers and install secure guards before resuming work.
17. Attach driveline to tractor.

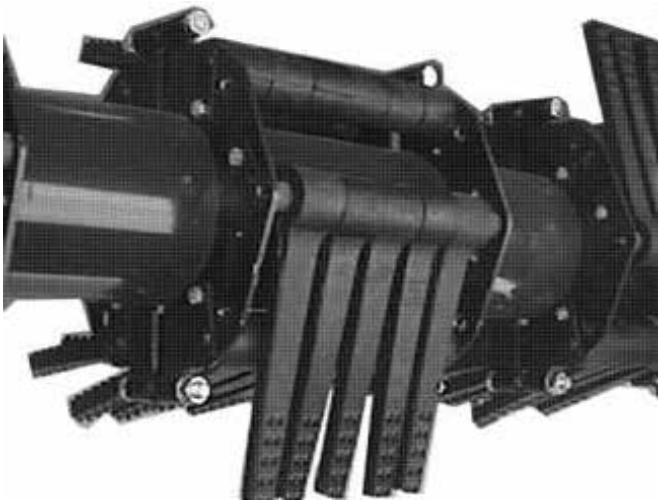


Figure 31 Flail Assembly

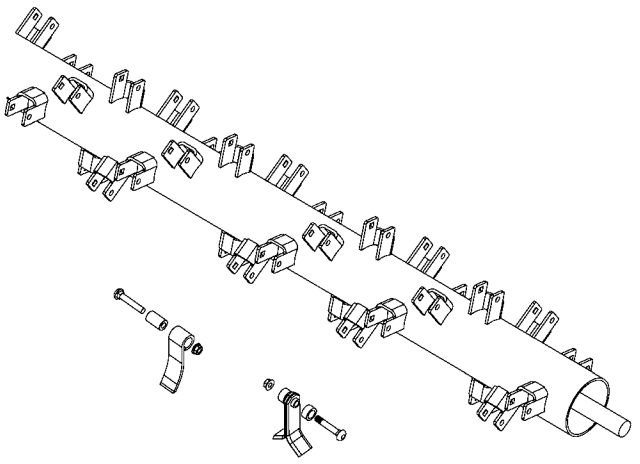


Figure 32 Steel Flails

Belt Tension

The drive belts transmit power to turn the drums and flails. Belt tension must be maintained to insure proper machine performance. Overtightening will cause belts and pulleys to run hot; loose belts will allow slipping. Either condition will cause rapid wear and failure.

When the machine is new, or after installing new belts, tension should be checked and adjusted as required every 4 to 5 hours for 2 to 3 days - until belts have “run in.”

To check belt tension, follow this procedure:

1. Shut off tractor, place all controls in neutral, set parking brake, remove key, and wait for all moving parts to stop.
2. Clear the area of all bystanders.
3. Disconnect driveline from tractor.
4. Open belt access doors and fasten prop rods.
5. Align sight gauge with spring washer to set proper belt tension. Do not over-tighten.
6. Close and secure access doors and covers and install secure guards before resuming work.
7. Attach driveline to tractor.

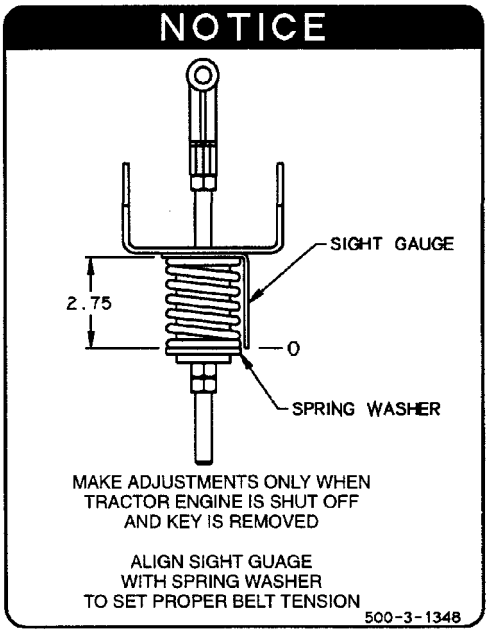


Figure 33 Belt Tension Gauge

Bearing Lock Collars

Bearings are held on the shaft by locking collars. Always install locking collars in the direction of shaft rotation.

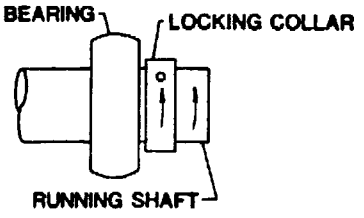


Figure 34 Locking Collar

Belt Replacement

Belts must be maintained in good condition at the proper tension to obtain expected performance. When they fray or separate, they must be replaced. Do not use belt dressings at any time. Keeping the belts at the required tension will prevent slippage.

To replace belts, follow this procedure:

1. Shut off tractor, place all controls in neutral, set parking brake, remove key, and wait for all moving parts to stop.
2. Clear the area of all bystanders.
3. Disconnect driveline from tractor.
4. Open the belt access doors.
5. Loosen the bolts on the belt tensioner arm.
6. Remove belt.
7. Install new belt. Do not force belt over pulley and damage the cords.

IMPORTANT

Use only genuine Alloway replacement parts

8. Tension the belt. See Belt Tension, page 34.
9. Check that all pulleys are aligned.
10. Check the tension of the new belt every 4 to 5 hours the first 2 or 3 days of operation. Adjust as required.
11. Close and secure access doors and covers and install secure guards before resuming work.
12. Attach driveline to the tractor.

Flail Tube Hanger Bearing

Flail tube hanger bearings on 6 row, 9 row, and 12 row: 30" steel machines require annual maintenance (lubrication) and inspection. Follow this procedure:

1. Shut off tractor, place all controls in neutral set parking brake, remove key, and wait for all moving parts to stop.
2. Clear the area of all bystanders.
3. A rolling floor jack is required to slide the flail tube away from the bearing hanger plate for annual greasing and inspection.
4. Locate the bearing. The hanger bearing is located on the tail shaft flail tube (tube without a drive sheath attached).
5. Support center hanger plate with floor jack.
6. Remove the four 5/8 x 1 -1/2 carriage bolts from the tail shaft bearing plate and 3/4 hanger plate bolt.
7. Lower and move back until tubes can be separated.
8. Remove the bearing protector lock/collar.
9. Wipe the bearing clean and inspect the grease seal.
10. Lubricate bearing zerk with 3 to 4 shots of grease.

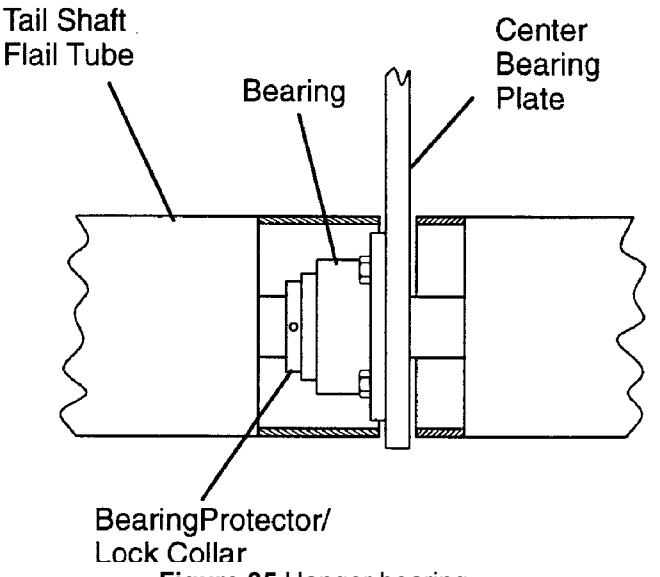


Figure 35 Hanger bearing

11. Slide tube back onto coupler and re-attach tail shaft bearing.
12. Repeat for all three hanger bearings.

NOTE: Do not lube new bearings.

Scalpers

Scalpers must be set for each crop and operating condition. The scalper should be set to cut off only the green portion of the beet.

Set the shoe angle:

a. Loosen bolts (1) and (2), Figures 36a, 36b & 36c.

b. Move shoe to desired angle.

c. Tighten bolts to specified torque level.

Knife Scalper

To adjust the knife scalper, follow this procedure:

1. Set the cutting edge of the knife at the lowest portion of the assembly to prevent skipping over the beets.

2. Set knife height and angle:

a. Loosen bolts (3) and (4), Figures 36a & 36b.

b. Move knife to desired height and angle.

c. Tighten bolts to specified torque level.

4. Down pressure position:

a. Increase spring tension to decrease skipping (5).

b. Decrease spring tension if scalper pulls beets out of ground.

5. Float position:

a. Increase spring tension for less pressure on shoe (5).

b. Decrease spring tension for more pressure on shoe.

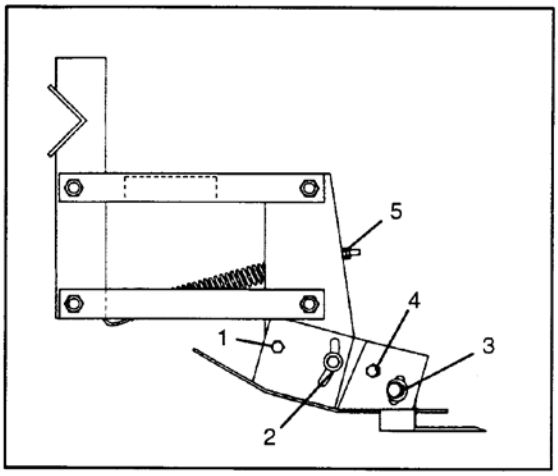


Figure 36a. Knife Scalper (Down Pressure)

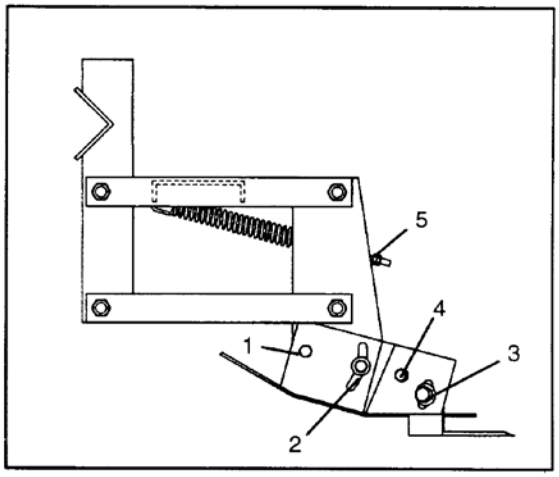


Figure 36b. Knife Scalper (Float)

Cicular Scalper

To adjust the circular scalper, follow this procedure:

1. Set the angle of the assembly so the cutting edge of the disc is the lowest portion of the scalper. This will prevent skipping the beets.

IMPORTANT

The shoe angle "A" should be set as small as possible without pushing beets over.

2. Set disc height:

a. Move disc assembly to desired height.

b. Tighten bolts (1), (2) and (3) to specified torque level.

IMPORTANT

Do not set disc to run on or below ground level.

3. Use the spring bolt to set spring tension (5).

a. Increase tension to minimize skipping.
b. Decrease tension if disc pulls beet over.

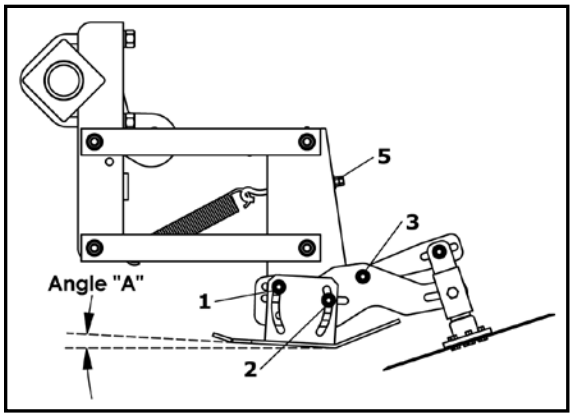


Figure 36c. Circular Scalper

Figure 36 Scalper Settings

TROUBLE SHOOTING

The Alloway Beet Defoliator uses rubber or 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	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 slow down
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	Slow down
	Running slow (tractor)	Increase 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 too slow	Increase ground speed
	Scalper pulling beets out of ground	Adjust scalper
Defoliator vibrates	Driveline doesn't telescope	Remove, disassemble, and clean telescoping joint
	Flail tube out of balance	Balance tube

STANDARD alloway

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BEET DEFOLIATOR
430, 622, 630, 822, 1222

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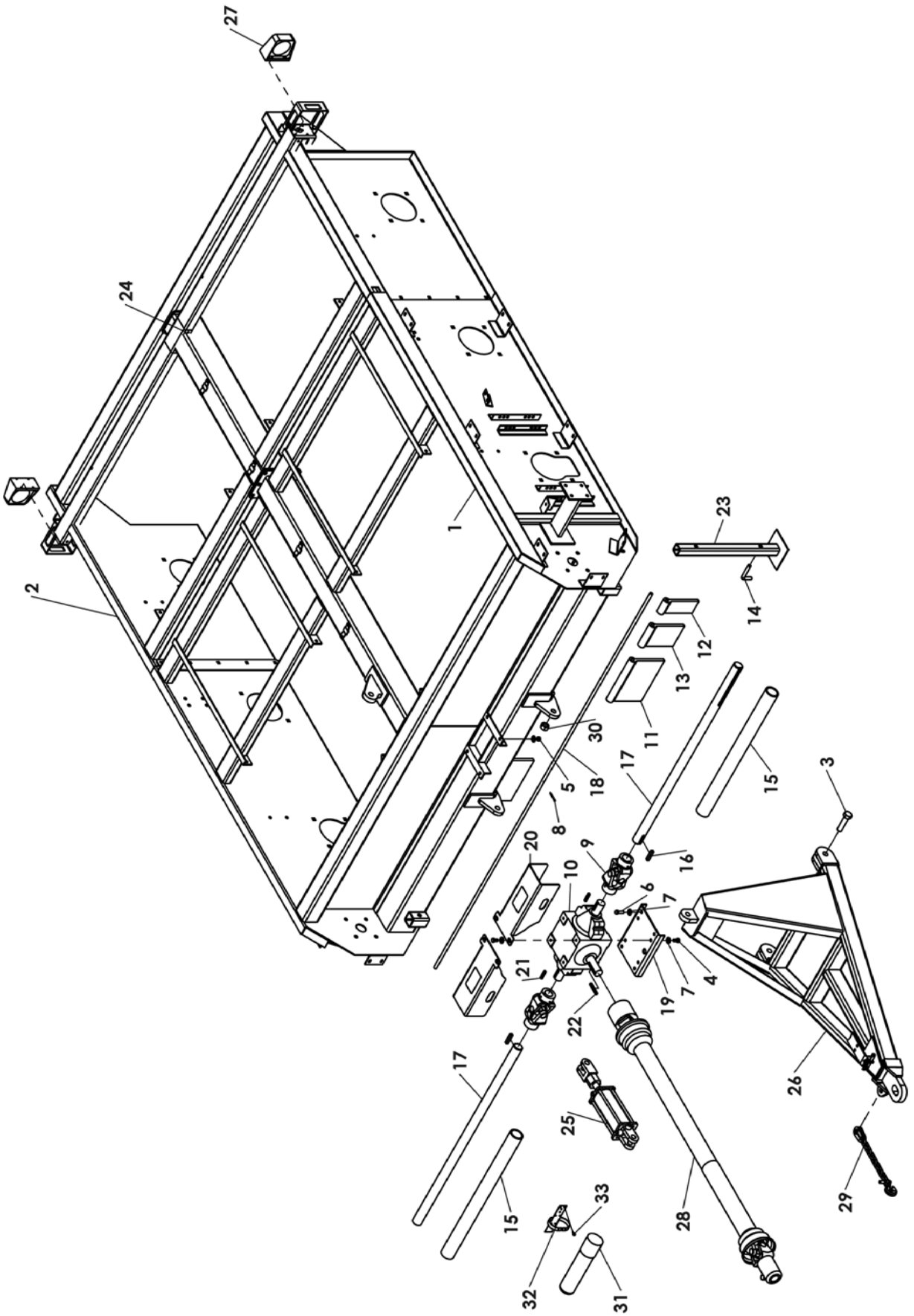
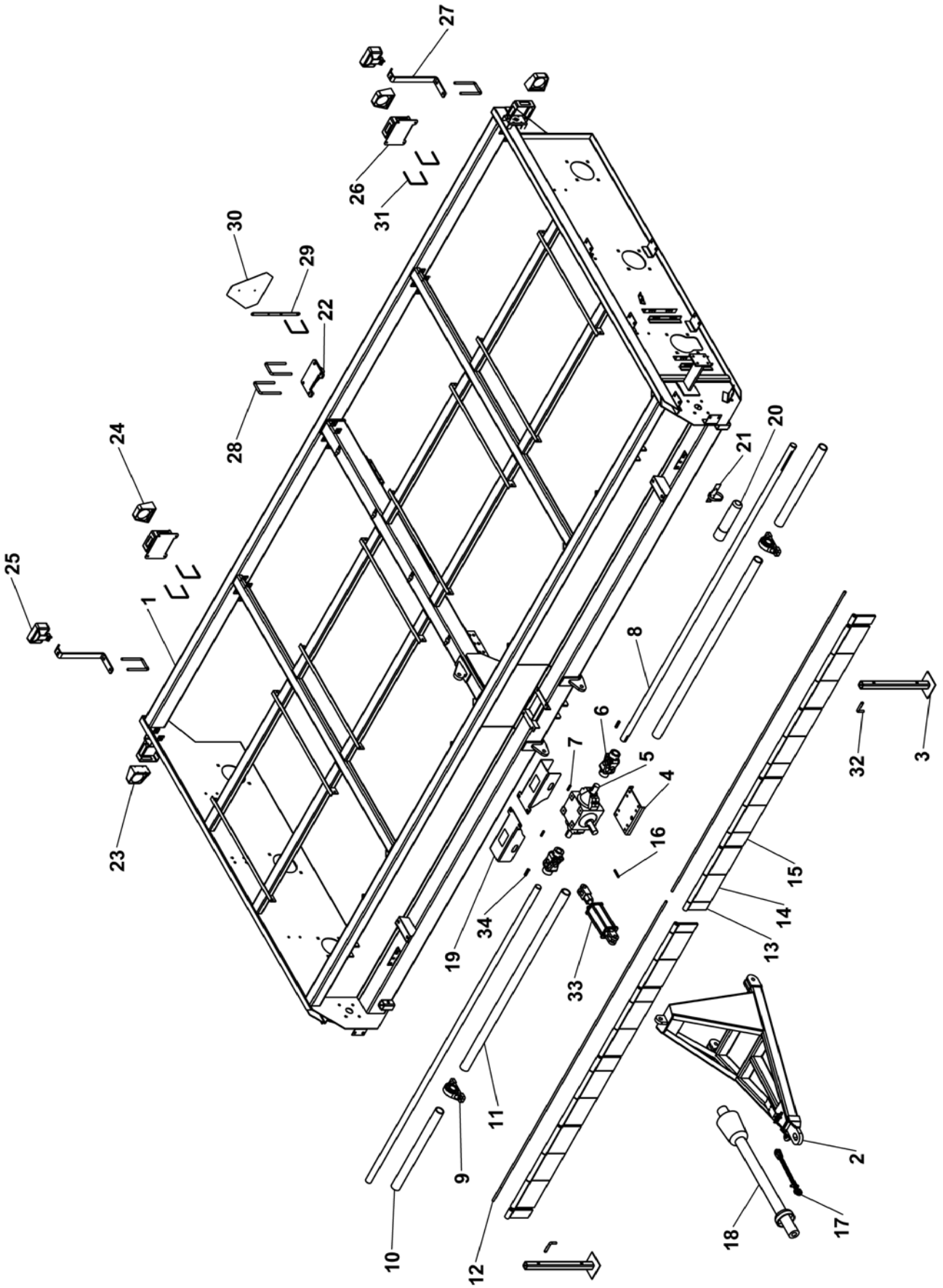
FRAME COMPONENTS (430, 622, 624)



FRAME COMPONENTS PARTS LIST (430, 622, 624)

REF	PART	DESCRIPTION	QTY
1	500-2-1031	Front Body Weld, 120” Wide, (430 Narrow)	1
	500-2-0964	Front Body Weld, 132” Wide, (430 Wide, 622)	
	500-2-1033	Front Body Weld, 144” Wide, (624)	
	500-2-1059	Front Body Weld, (6R45cm)	
2	500-2-1032	Rear Body Weld, 120” Wide, (430 Narrow)	1
	500-2-0967	Rear Body Weld, 132” Wide, (430 Wide, 622)	
	500-2-1034	Rear Body Weld, 144” Wide, (624)	
	500-2-1051	Rear Body Weld, (6R45cm)	
3	900-01527	1 NC x 4 Hex Bolt GR5 ZP	2
4	900-01221	1/2 NC x 1 Hex Bolt	2
5	900-06009	1/2 NC Hex Nut	1
6	900-01225	1/2 NC x 1-1/2 Hex Bolt GR5	1
7	900-11035	1/2 Flat Washer	4
8	900-23043	3/16 x 1-1/2 Cotter Pin	1
9	903-05038	U-Joint - 1.75 x 2 Keyed 44R	2
10	903-15399	Gear Box - Superior 615AKF	1
11	505-3-1089	Flap Shield 12”	6
12	505-3-0868	Flap Shield 3-1/2”	2
13	505-3-1097	Flap Shield 6”	4
14	505-3-0279	Pin, Park Stand	2
15	500-3-1668	Shield Tube, (430 Narrow) 41.50” Long	2
	500-3-1656	Shield Tube, (622), (430 Wide) 47.50” Long	2
	500-3-1664	Shield Tube, (624) 53.50” Long	2
	500-3-2252	Shield Tube, (45cm) 53.50” Long	2
16	500-3-1662	Key - 1/2 x 2-1/2 Square	2
17	500-3-1667	Cross Shaft, (430 Narrow) 58” Long	2
	500-3-1666	Cross Shaft, (622), (430 Wide) 64” Long	2
	500-3-1665	Cross Shaft, (624) 70” Long	2
	500-3-2253	Cross Shaft, (6R45cm) 70” Long	2
18	500-3-1138	Rod, Flap (430 Narrow) 122-1/2” OAL	1
	500-3-1136	Rod, Flap (622) 134-1/2” OAL	1
	500-3-1139	Rod, Flap (624)146-1/2” OAL	1
	500-3-2254	Rod, Flap (6R45cm)146-1/2” OAL	1
19	500-3-1178	Gearbox Plate	1
20	500-2-0537	Shield with Decal	2
21	100-3-3333	Key, 3/8 x 3/8 x 2	2
22	120-3-0192	Key, 3/8 x 3/8 x 3	1
23	500-2-0531	Park Stand	2
24	500-3-1207	Rear Cross Channel	2
25	905-21400	Hydraulic Cylinder - 3.5 x 8	1
26	500-2-0036	Hitch	1
27	904-01154	Amber Lamp	2
28	903-18088	PTO Shaft (STD) 1-3/8” (See page 74)	1
	903-18089	PTO Shaft (STD) 1-3/4” (See page 74)	1
	903-17621	PTO Shaft, C.V. 1-3/8” (See page 75)	1
	903-17754	PTO Shaft, C.V. 1-3/4” (See page 75)	1
29	905-07123	Tow Chain Safety 21,000 LB	1
30	900-06019	1 NC Hex Nut ZP	2
31	100-3-3957	Tube Manual Storage	1
32	100-3-3958	Clamp Manual Storage	1
33	900-17110	1/4 NF x 5/8 HEX Washer Head Set Screw	2
111	903-01428	Belt, 35V2500	1
NS	500-2-0731	Light Kit, Complete	1
NS	500-3-2168	Wire Harness, 6 & 8 Row Rigid	1

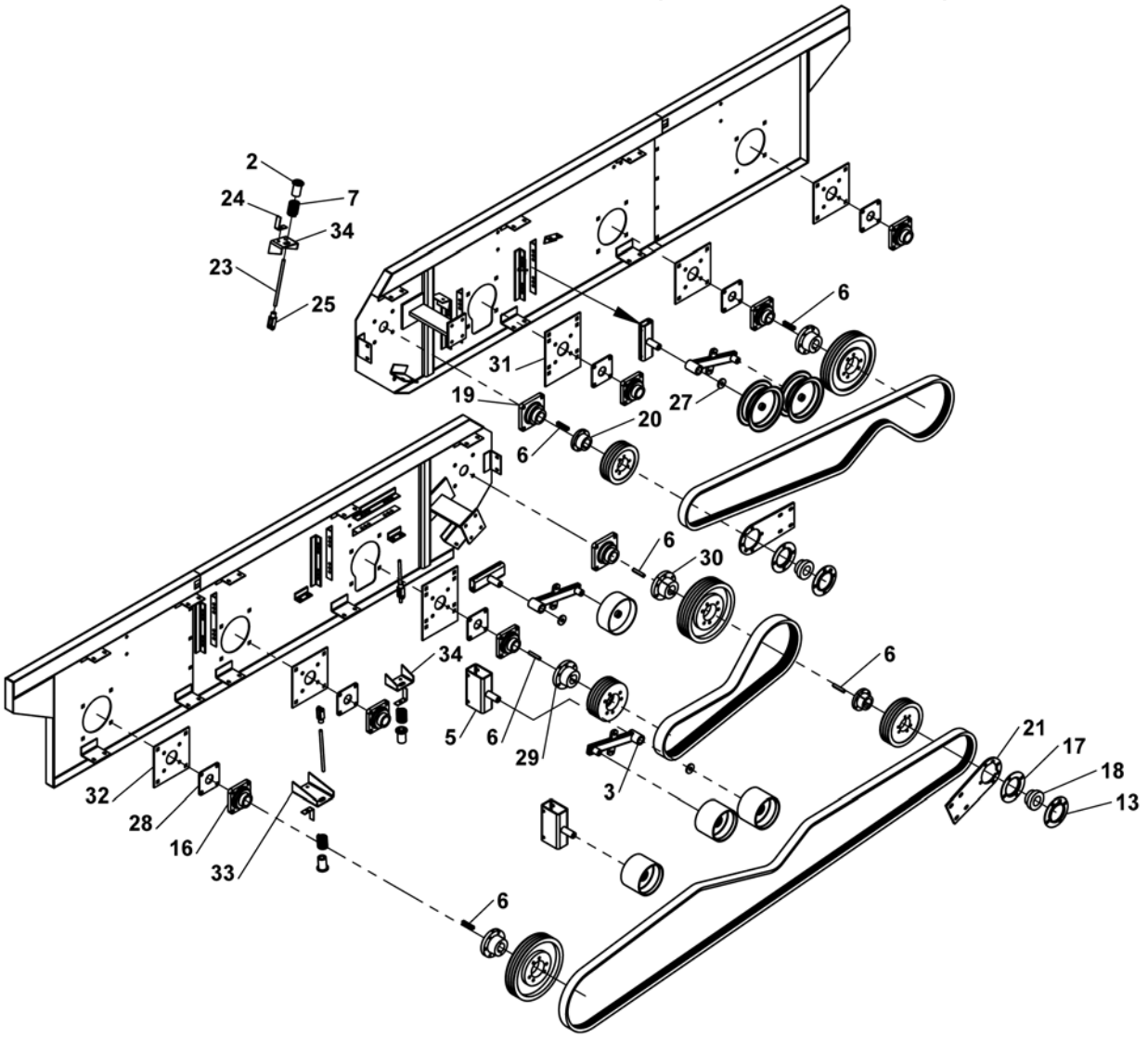
FRAME COMPONENTS (630, 822, 922, 1222)



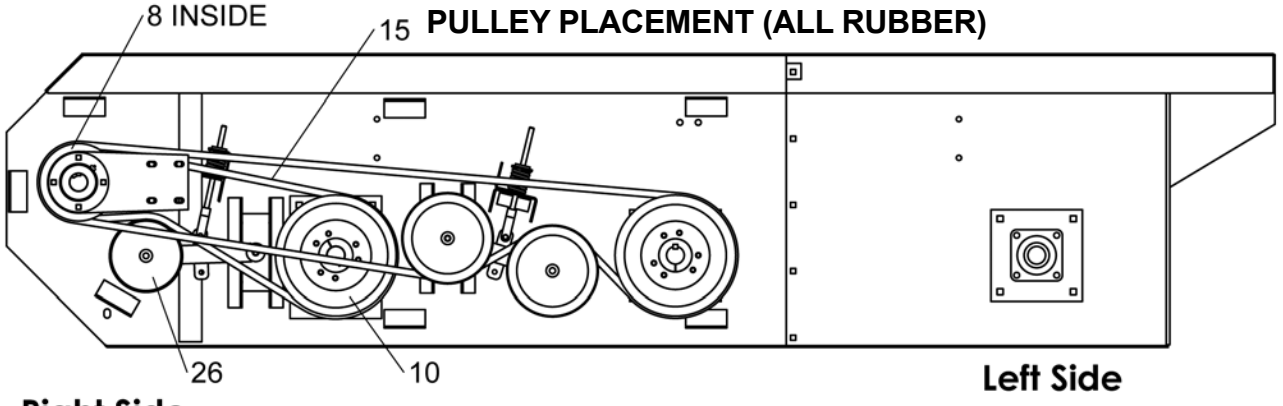
FRAME COMPONENTS PARTS LIST (630, 822, 922, 1222)

REF	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0573	Body Weld (1222)	1
	500-2-0964	Front Body Weld (430 / 622)	1
	500-2-0967	Rear Body Weld (430 / 622)	1
	500-2-0591	Body Weld (822 / 630)	1
2	500-2-0036	Hitch (1222 / 822 / 630)	1
3	500-2-0531	Parking Stand	2
4	500-3-1178	Gearbox Plate	1
5	903-15399	Gearbox	1
6	903-05038	U-Joint - 1.75 X 2	2
	903-17710	Yoke, 2”	2
	903-17525	Repair Kit	2
7	100-3-3333	Key - 3/8 X 3/8 X 2	2
8	500-3-0988	Cross Shaft 130 5/8” (1222)	2
	500-3-1661	Cross Shaft 88” (822 / 630)	2
	500-3-1666	Cross Shaft 64” (430 / 622)	2
9	901-01142	Pillow Block Bearing 2”	2
10	500-3-0866	Tube, Shield 34” (1222)	2
11	505-3-0867	Tube, Shield 78” (1222)	2
	500-3-1660	Tube, Shield 71 1/2” (822 / 630)	2
	500-3-1656	Tube, Shield 47 1/2” (430 / 622)	2
12	500-3-1142	Rod, Flap 132 11/16” (1222)	2
	500-3-1140	Rod, Flap 89” (822 / 630)	2
	500-3-1136	Rod, Flap 134 1/2” (430 / 622)	1
13	505-3-0868	Flap Shield 3-1/2”	A/R
14	505-3-1089	Flap Shield 12”	A/R
15	505-3-1097	Flap Shield 6”	A/R
16	120-3-0192	Key 3/8 X 3/8 X 3	1
17	905-07123	Tow Chain	1
18	----------	PTO Shaft (See Pages 74, 75)	1
19	500-2-0537	Shield with Decal	2
20	100-3-3957	Tube Manual Storage	1
21	100-3-3958	Clamp Manual Storage	1
22	500-2-0795	Ear Weldment	1
23	904-01154	Amber Lamp	2
24	904-01155	Red Lamp	2
25	500-3-1721	Light, Field	2
26	500-2-0930	Red Light Bracket	2
27	500-3-1720	Bracket, Field Light	2
28	200-3-0017	U-Bolt 5/8 X 4 X 7.5 X 1.5	4
29	500-3-2091	SMV Mount	1
30	500-3-1696	SMV Sign	1
31	900-35000	U-Bolt 3/8 X 6 X 5 X 1.5	5
32	505-3-0279	Pin Park Stand	2
33	905-21400	Hydraulic Cylinder - 3.5 X 8	1
34	500-3-1662	Key - 1/2 X 2-1/2 Square	2
NS	500-3-2201	Wire Harness, 12 Row Rigid	1

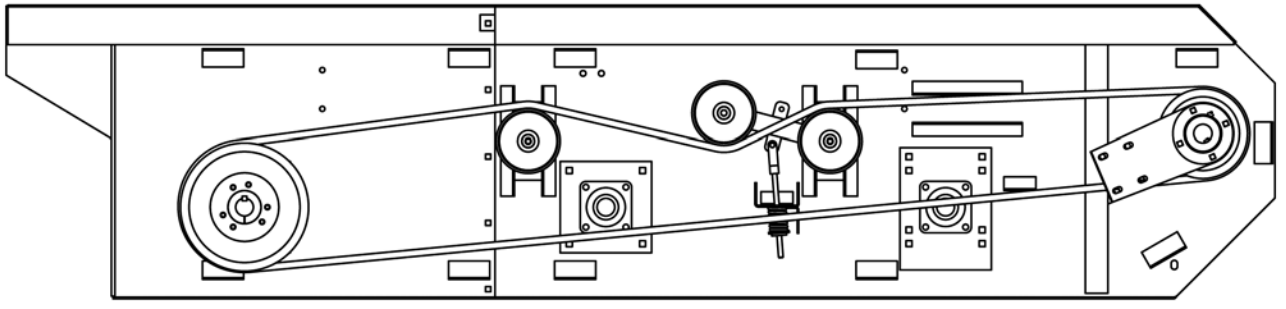
BELT DRIVE COMPONENTS (630, 822, 922, 1222)



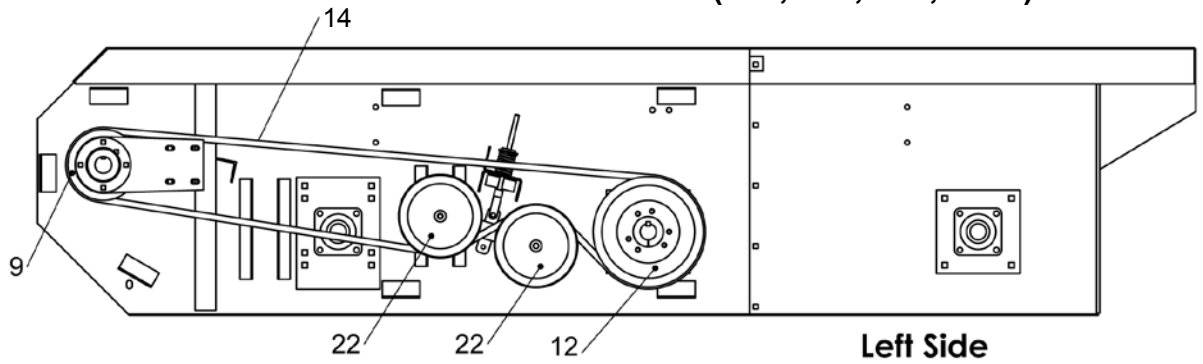
PULLEY PLACEMENT (ALL RUBBER)

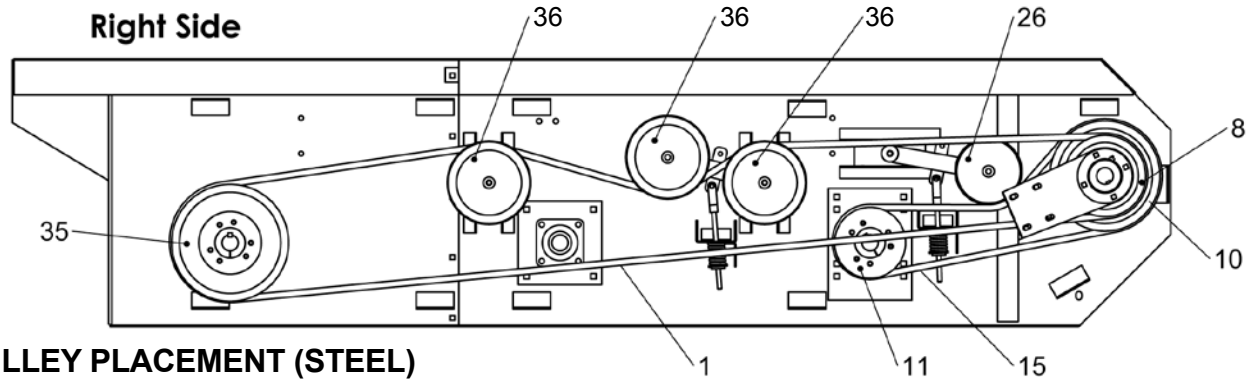


Right Side



BELT DRIVE COMPONENTS (630, 822, 922, 1222)



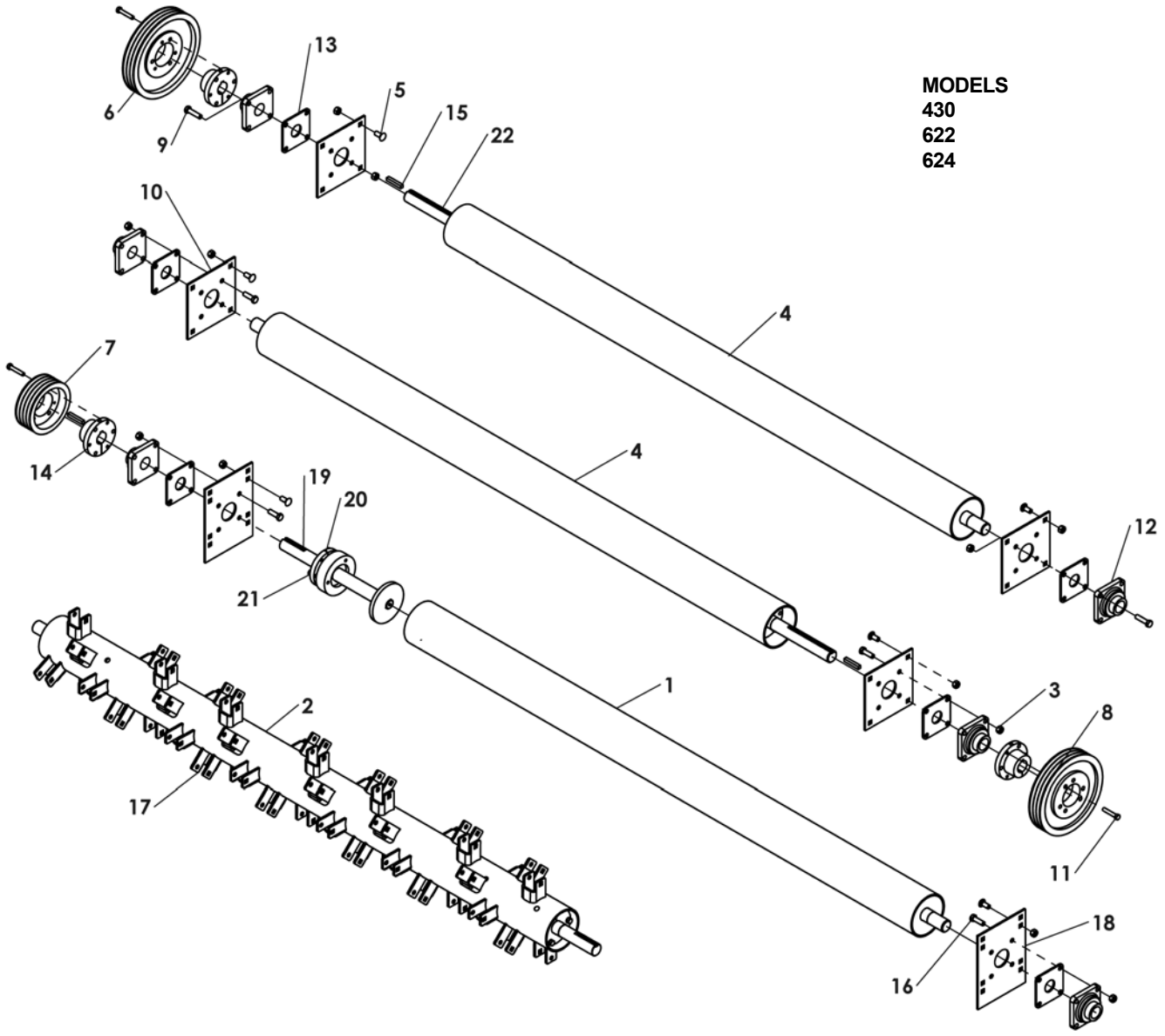


PULLEY PLACEMENT (STEEL)

REF	PART NUMBER	DESCRIPTION	QTY.
1	903-01436	Belt - 5/5V2500 (1222 / 822 / 630)	1
	903-01428	Belt - 3/5V2500 (622 / 624)	1
2	500-2-0580	Spring Support Weld	3
3	500-2-0574	Pivot Arm Assembly	3
4	500-2-0564	Pivot Base Weld Short	2
5	500-2-0565	Pivot Base Weld Long	2
6	100-3-3331	Key - 1/2 X 1/2 X 3	6
7	905-14005	Spring - 2.25 OD X .25 Wire X 5.25 FL X 7.25 COILS	3
8	903-08438	Pulley 5/5V975 - (1222 / 822 / 630)	1
	903-08398	Pulley - 3/5V975 (622 / 624)	1
9	903-08389	Pulley - 4/5V850 (1222 / 822 / 630)	1
	903-08399	Pulley - 35V850 (622 / 624)	1
10	903-08391	Pulley - 5/5V1320 (1222 / 822 / 630)	1
	903-08388	Pulley - 4/5V1320 (622 / 624)	1
11	903-08390	Pulley - 5/5V850 (1222 / 822 / 630)	1
	903-08389	Pulley - 4/5V850 (622 / 624)	1
12	903-08388	Pulley - 4/5V1320 (1222 / 822 / 630)	1
	903-08397	Pulley - 3/5V1320 (622 / 624)	1
13	901-01315	Flange 4 Hole 100mm PF211H LUBE	2
14	903-01424	Belt 4/5V1700 (1222 / 822 / 630)	1
	903-01427	Belt 3/5V1700 (622 / 624)	1
15	903-01426	Belt 5/5V950 (1222 / 822 / 630)	1
	903-01429	Belt 4/5V950 (622 / 624)	1

REF	PART NUMBER	DESCRIPTION	QTY.
16	901-01282	Bearing - NANFS 210-31 1.9375	6
17	901-01314	Flange 4 Hole 100mm PF211H	2
18	901-01079	2.00 Insert Bearing NA-211-32	2
19	901-01008	Bearing - NANFS 211-32 2.00	2
20	500-3-1060	Hub 2” Type E (1222 / 822 / 630)	2
	500-3-1659	Hub 2” Type SF (622 / 624)	2
21	500-3-1653	Bearing Plate 2”	2
22	500-3-1249	Flanged Pulley, 3.25” Wide (1222 / 822 / 630)	2
	500-3-1295	Flanged Pulley, 3.25” Wide (622 / 624)	2
23	500-3-1250	Threaded Rod	3
24	500-3-1255	Sight Gage	3
25	500-3-1247	Clevis	3
26	500-3-1248	8” OD Flat Pulley	1
27	500-3-1246	Special Washer	3
28	500-3-0990	Plastic Shield	6
29	500-3-1059	Hub 1 15/16” Type E	3
30	500-3-1060	Hub 2” Type E	1
31	500-3-1201	Bearing Plate Front	2
32	500-3-1202	Bearing Plate Rear	4
33	500-3-1221	Bracket Spring Mount Long	1
34	500-3-1222	Bracket Spring Mount Short	2
35	903-08439	Pulley - 5/5V1400 (1222 / 822 / 630)	1
	903-08396	Pulley - 3/5V1400 (622 / 624)	1
36	500-2-0777	7” OD Flat Pulley (1222 / 822 / 630)	3
	500-3-1295	Flanged Pulley, 3.25” WIDE (622 / 624)	3

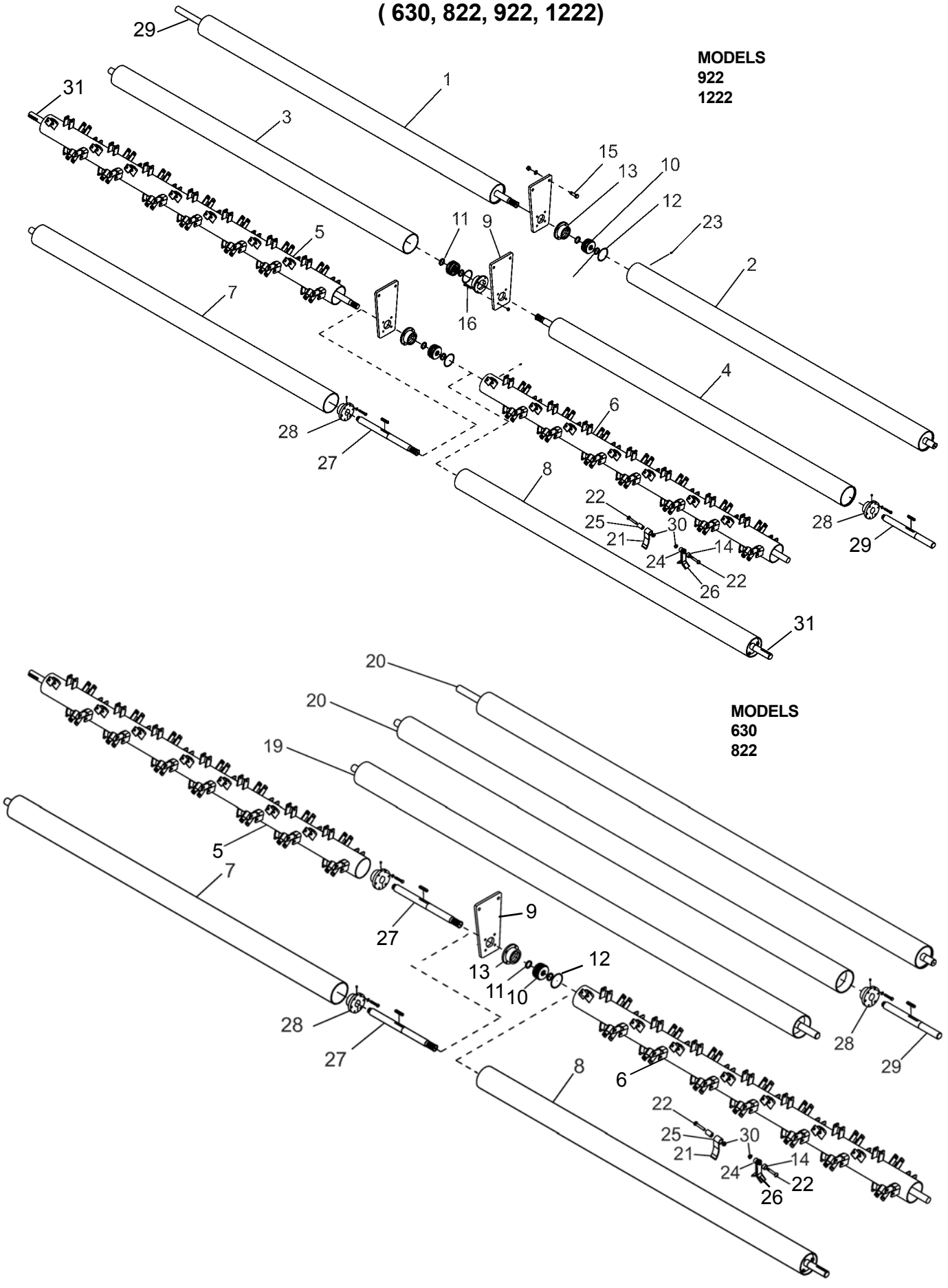
FLAIL TUBE COMPONENTS
(430, 622, 624)



FLAIL TUBE COMPONENTS
(430, 622, 624)

REF	PART NUMBER	DESCRIPTION	QTY
1	500-2-0378	Tube Weldment, Front Balanced, 430 Narrow	1
	500-2-0308	Tube Weldment, Front Balanced, 622 and 430 Wide	1
	500-2-0380	Tube Weldment, Front Balanced, 624	1
2	500-2-0734	Tube Weldment, 430 “L”	1
	500-2-0629	Tube Weldment, 622 “L”	1
	500-2-0735	Tube Weldment, 624 “L”	1
	500-2-1064	Tube Weldment, 6R45cm “L”	1
3	900-06013	5/8 NC Hex Nut	12
4	500-2-0379	Tube Weldment, Center and Rear, 430 Narrow	2
	500-2-0214	Tube Weldment, Center and Rear, 622 and 430 Wide	2
	500-2-0381	Tube Weldment, Center and Rear, 624	2
	500-2-0214	Tube Weldment, Center and Rear, 6R45cm	2
5	900-01784	5/8 NC x 1-1/2 Carriage Bolt	6
6	903-08396	Pulley - 35V1400E	1
7	903-08366	Pulley, 4C13 (Rubber)	1
	903-08372	Pulley, 4C10 (Steel Cup)	1
	903-08365	Pulley, 4C8.5 (Steel L Knife)	1
	903-08389	Pulley - 45V850E	1
8	903-08397	Pulley - 4B80SK	1
9	900-03147	5/8 NC x 2-1/2 Hex Bolt	2
10	500-3-1202	Bearing Plate Rear	4
11	900-02526	1/2 NC x 2-3/4 F.T. Tap Bolt	6
12	901-01282	Bearing Assembly, W/Seal	6
13	500-3-0990	Plastic Bearing Shield	6
14	500-3-1059	Hub, 1-15/16” Type E	3
15	100-3-3331	Key, 1/2x1/2x3	4
16	900-01345	5/8 NC x 2 Hex Bolt	4
17	500-3-1734	Clip, L / Cup	A/R
18	500-3-1201	Bearing Plate Front	2
19	500-3-0865	Shaft, Short	1
20	500-3-1060	Hub, 2” Type E W/KW	1
21	900-11013	1/2 Lock Washer	3
22	500-3-0863	Shaft, Long	1

FLAIL TUBE COMPONENTS
(630, 822, 922, 1222)

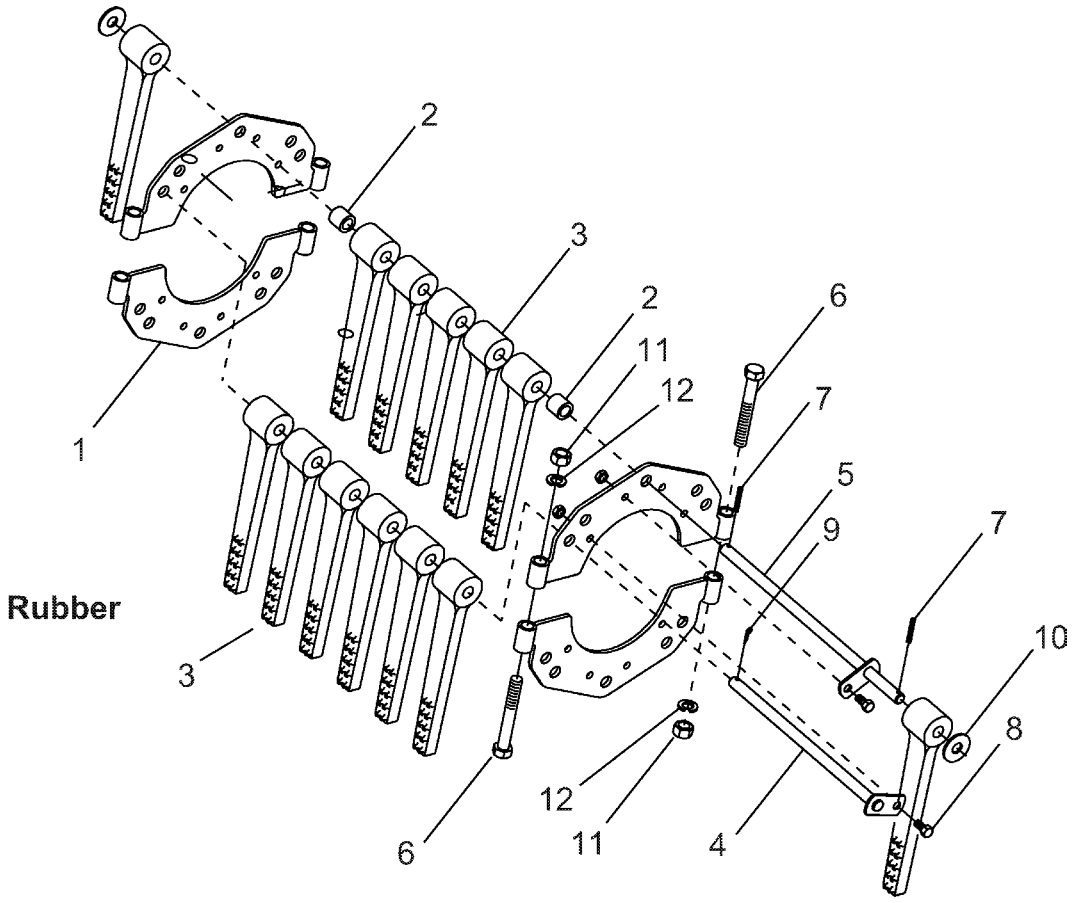


FLAIL TUBE COMPONENTS
(630, 822, 922, 1222)

REF	PART NO.	DESCRIPTION	QTY
1	500-2-0556	Flail Tube Weldment, Drive (1222)	1
2	500-2-0555	Flail Tube Weldment (1222)	1
3	500-2-0555	Flail Tube Weldment (1222)	1
4	500-2-0556	Flail Tube Weldment, Drive (1222)	1
5	500-2-0779	Front Flail Tube “L/Cup” Drive (1222)	1
	500-2-0775	Front Flail Tube “L/Cup” Drive (630/822)	1
6	500-2-0780	Front Flail Tube “L/Cup” Driven (1222)	1
	500-2-0776	Flail Tube “L/Cup” Driven (630, 822)	1
7	500-2-0555	Flail Tube Weld (1222) Rubber	1
8	500-2-0557	Front Flail Tube Weldment, Rubber	1
9	500-2-0633	Center Bearing Plate Weld	A/R
10	500-3-0338	Drive Hub	A/R
11	900-39030	Snap Ring	6
12	901-09126	O-Ring	A/R
13	500-2-0598	Bearing Assembly	A/R
	901-01300	Housing	A/R
	901-01280	Insert Bearing	A/R
	901-01281	90 mm Bearing Protector	A/R
14	500-3-1736	Spacer	A/R
15	900-01409	3/4 x 2-3/4 Hex Bolt	A/R
16	900-01233	1/2x2-1/2 Hex Bolt	A/R
18	500-2-0776	Flail Tube “L/Cup” Driven (630, 822)	1
19	500-2-0632	Front Flail Tube Weld (630, 822) Rubber	1
20	500-2-0383	Flail Tube Weldment (630, 822)	2
21	505-3-0972	Steel Cup Knife	A/R
22	900-01792	5/8 NC x 3-1/2 Carriage Bolt	A/R
23	905-15001	Zerk, 1/8 NPT Straight	3
24	500-3-1733	Bushing, “L” Knife	A/R
25	505-3-0405	Bushing, Cup	A/R
26	500-3-1735	“L” Knife	A/R
27	500-3-0785	Center Shaft	A/R
28	500-3-1060	Type E Hub	A/R
29	500-3-0863	Shaft, Long	A/R
30	900-06145	5/8 Spiralock Flange Nut 6v8	A/R
31	500-3-0865	Shaft, Short	A/R

A/R = As Required

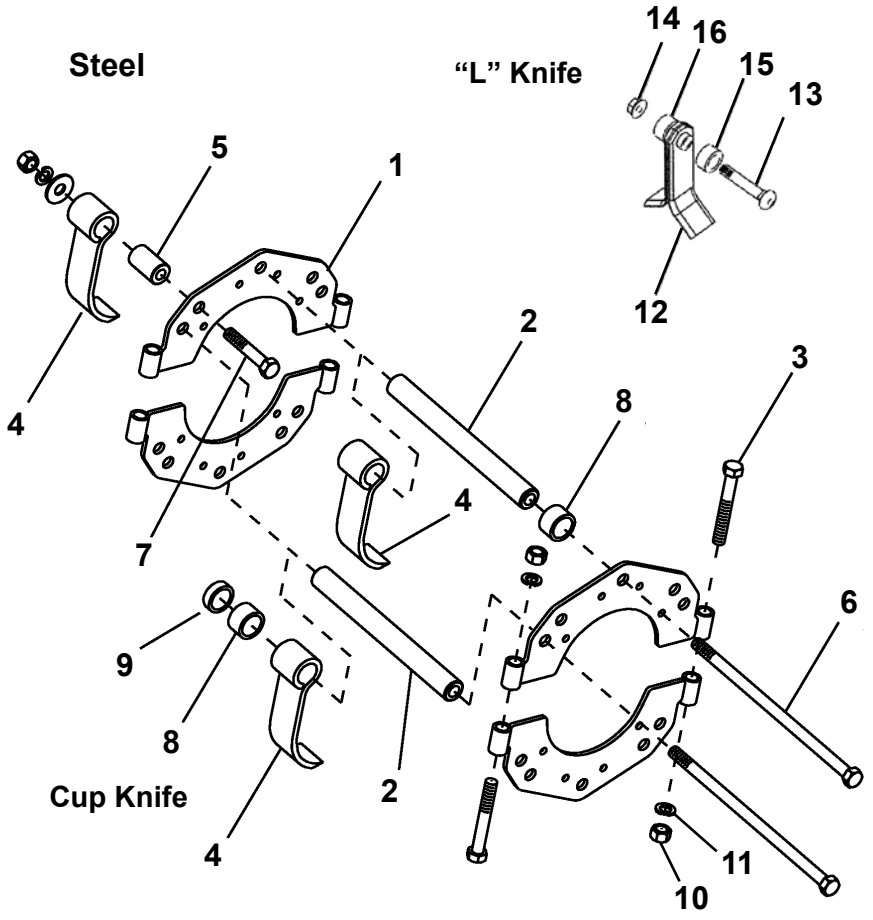
FLAIL COMPONENTS



REF	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0067	Flail Mounting Bracket	A/R
2	500-3-0151	1” Spacer	A/R
3	500-3-0316	Rubber Flail	A/R
4	500-2-0068	Rubber Flail Pin	A/R
5	500-2-0069	Rubber Flail Pin Extension	A/R
6	900-01363	5/8 NCx 4-1/2 Hex Bolt	A/R
7	900-29153	Roll Pin, 7/32x1-1/2	A/R
8	900-01105	3/8 NC x 3/4 Hex Bolt	A/R
9	900-23041	3/16x1 Cotter Pin	A/R
10	900-11131	Washer, Nylon 5/8 ID	A/R
11	900-06014	5/8 NC Hex Nut	A/R
12	900-11015	5/8 Lockwasher	A/R

A/R = As Required

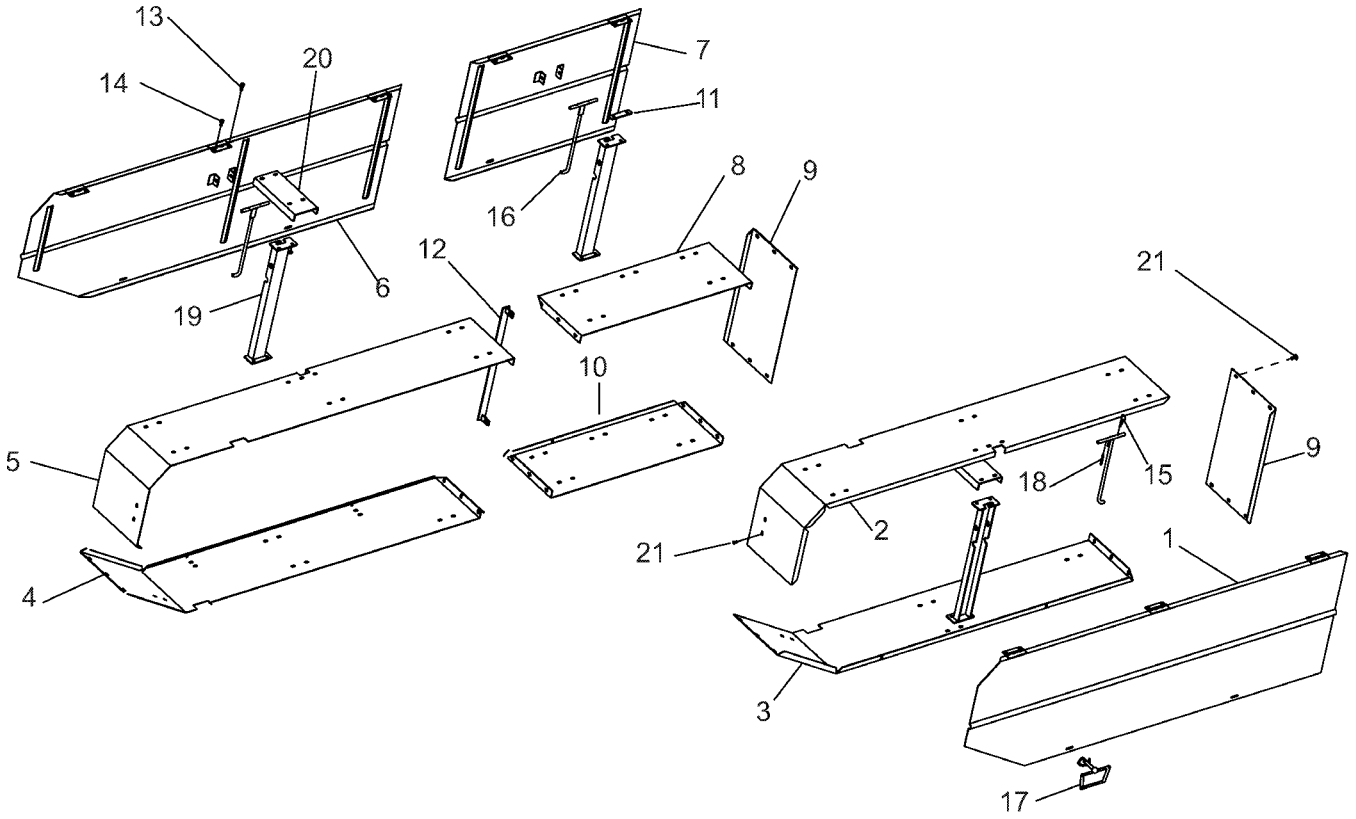
FLAIL COMPONENTS



REF	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0067	Flail Mounting Bracket	A/R
2	500-3-1065	Bushing, Long	A/R
3	900-01363	5/8 NCx 4-1/2 Hex Bolt	A/R
4	505-3-0004	Steel Flail	A/R
	505-3-0972	Steel Flail (2001-2006 production)	A/R
5	505-3-0405	Bushing, Wear	A/R
6	900-03036	5/8 NCX 14 Hex Bolt	A/R
7	900-01357	5/8 NCx 3-1/2 Hex Bolt	A/R
8	500-3-1066	1" Spacer	A/R
9	500-3-1067	1/2" Spacer	A/R
10	900-06014	5/8 NC Hex Nut	A/R
11	900-11015	5/8 Lockwasher	A/R
12	505-3-0001	Steel "L" Knife	A/R
13	900-03064	5/8-11 NC x 3.75 Carriage Bolt, GD 8	A/R
14	900-06508	5/8 NC Top Lock Hex Nut	A/R
15	500-3-2134	Spacer	A/R
16	900-11037	5/8 Flat Washer	A/R

A/R = As Required

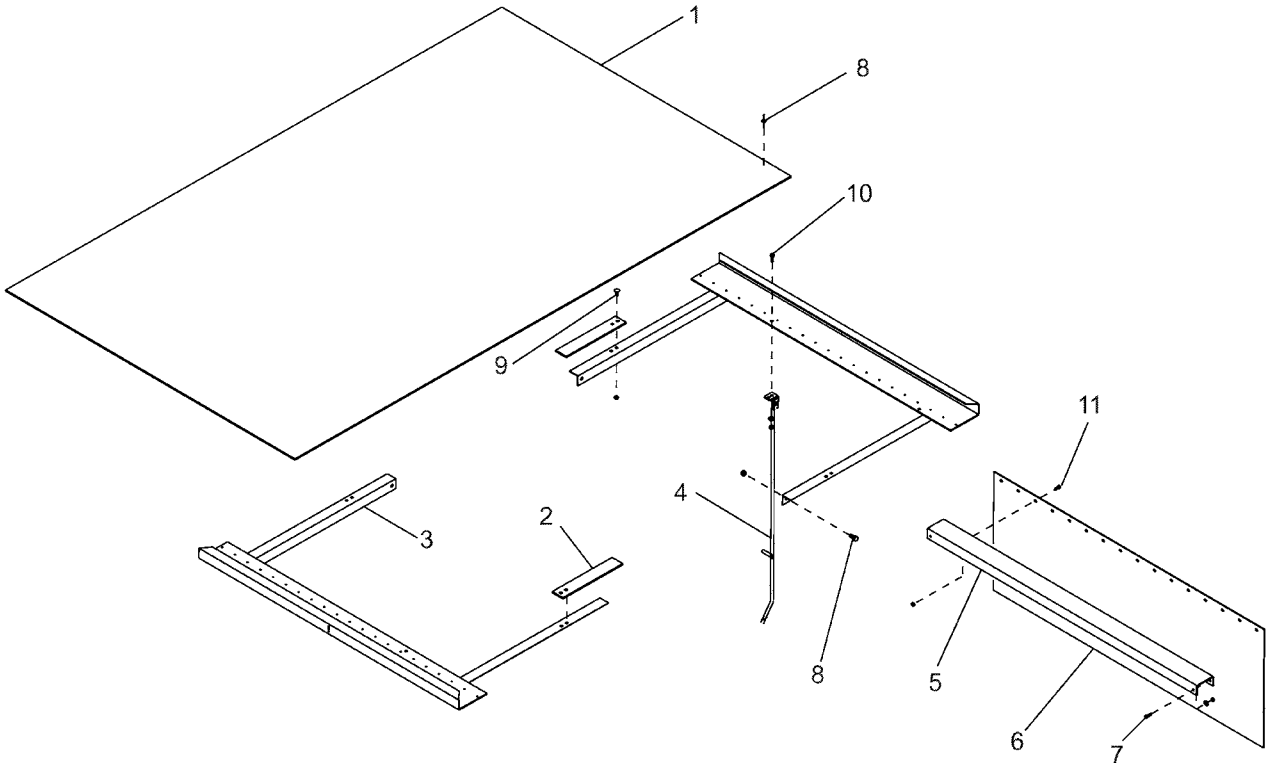
BELT COVER COMPONENTS



REF	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0581	Front Door Weld (LH)	1
2	500-3-1256	Top Side Shield (LH)	1
3	500-3-1258	Bottom Side Shield (LH)	1
4	500-3-1259	Bottom Side Shield (RH)	1
	500-3-1738	Bottom Side Shield Ext RH (1222)	1
5	500-3-1257	Top Side Shield (RH)	1
	500-3-1737	Top Side Shield Ext RH (1222)	1
6	500-2-0582	Front Door Weld (RH)	1
7	500-2-0583	Rear Door Weld	1
8	500-3-1284	Rear Top Shield (RH)	1
	500-3-1739	Rear Top Side Shield RH Ext (1222)	1
9	500-3-1260	Back Side Shield (LH)	2
	500-3-1740	Rear Bottom Side Shield RH Ext (1222)	1
10	500-3-1261	Rear Bottom Side Shield	1
	500-3-1741	Back Side Shield Ext (1222)	1
11	500-3-1277	Spacer Support Channel	1
12	500-2-0587	Door Support	1
13	900-01109	3/8 x 1 Hex Bolt	A/R
14	900-01105	3/8 x 3/4 Hex Bolt	A/R
15	900-25004	1/8” Hair Pin	3
16	500-2-0585	Prop Rod Weld	3
17	905-04032	Spring Latch	2
18	900-29126	3/16x3/4 Roll Pin	3
19	500-2-0584	Support Weldment, Side Cover	3
20	500-3-1269	Top Support Channel	2
	500-3-1742	Top Support Channel Ext (1222)	1
21	900-01694	3/8 x 3/4 Carriage Bolt	A/R
	500-3-0407	Bracket, Rubber Latch	
	905-04019	Rubber Latch	
	905-04025	Hood Bracket	

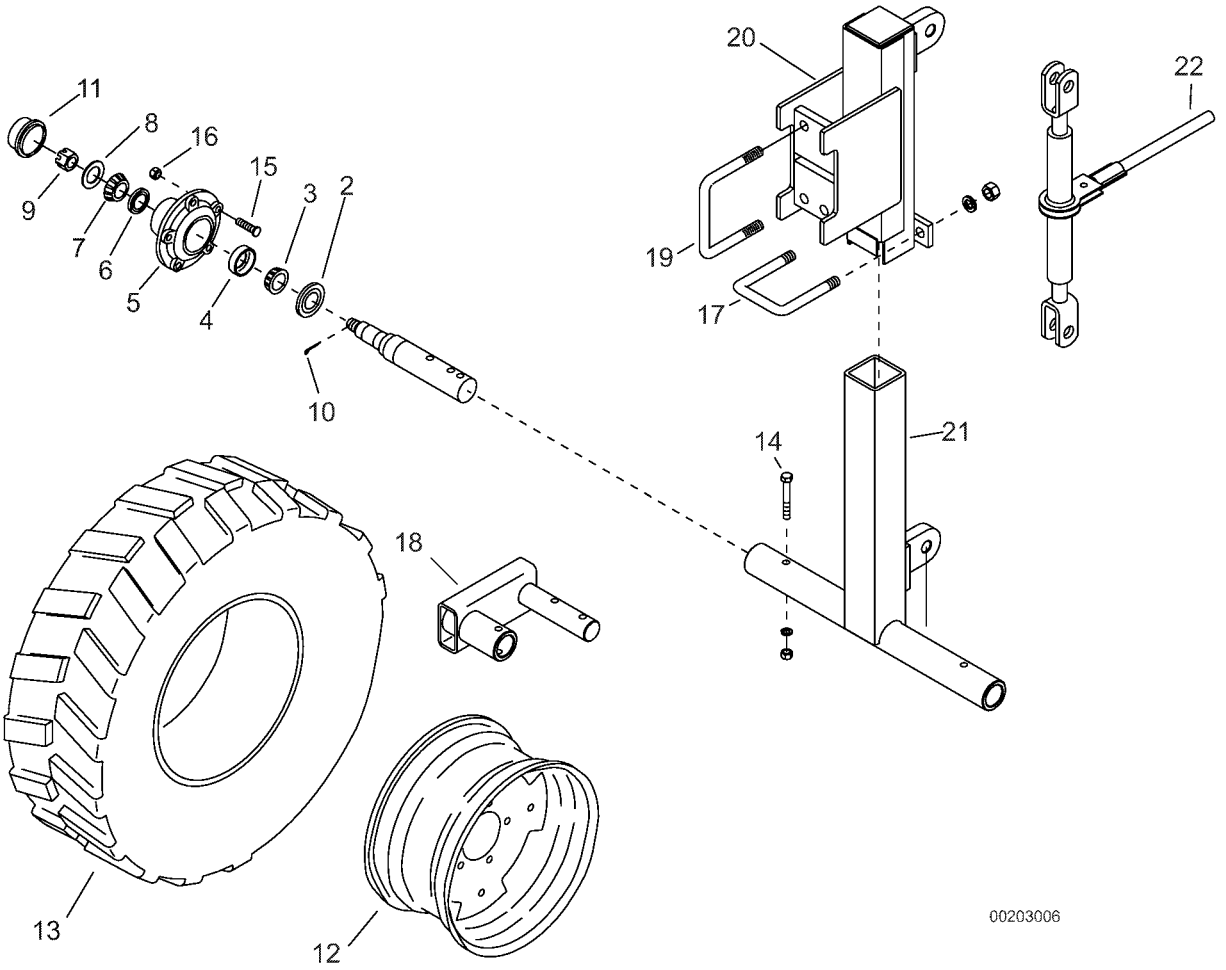
A/R = As Required

COVER COMPONENTS



REF	PART NUMBER	DESCRIPTION	QTY.
1	500-3-0746	Cover, 430	2
	500-3-0747	Cover, 622, 430 Wide and 1222	2
	500-3-0748	Cover, 624	2
	500-3-0749	Cover, 630 and 822	2
2	500-3-1233	Pinch Protector	4
3	500-2-0715	Pivot Bracket Weldment, 430	4
	500-2-0575	Pivot Bracket Weldment, 430 Wide, 622 and 1222	4
	500-2-0714	Pivot Bracket Weldment, 624	4
	500-2-0594	Pivot Bracket Weldment, 630 and 822	4
4	500-2-0586	Prop Rod Weld Top Cover	8
5	500-3-0960	Cross Channel, 430	2
	500-3-1207	Cross Channel, 430 Wide, 622 and 1222	3
	500-3-0962	Cross Channel, 624	2
	500-3-1292	Cross Channel, 630 and 822	A/R
	500-3-1317	Cross Channel, 922 short	2
	500-3-1318	Cross Channel, 922 long	1
6	500-3-0734	Rear Flap, 430	2
	500-3-0969	Rear Flap, 430 Wide, 622 and 1222	2
	500-3-0736	Rear Flap, 624	2
	500-3-0737	Rear Flap, 630	2
7	900-01139	3/8 NC x 5-1/2 Hex Bolt	4
8	900-01221	1/2 NC x 1 Hex Bolt	A/R
9	900-01695	3/8 x 1 Carr. Bolt	A/R
10	900-01109	3/8 x 1 Hex Bolt	A/R
11	900-03419	5/16 NC x 3/4 Whiz Lock Hex Bolt	A/R
NS	500-3-0407	Bracket, Rubber Latch	A/R
NS	905-04019	Rubber Latch	A/R
NS	905-04025	Bracket Hood	A/R

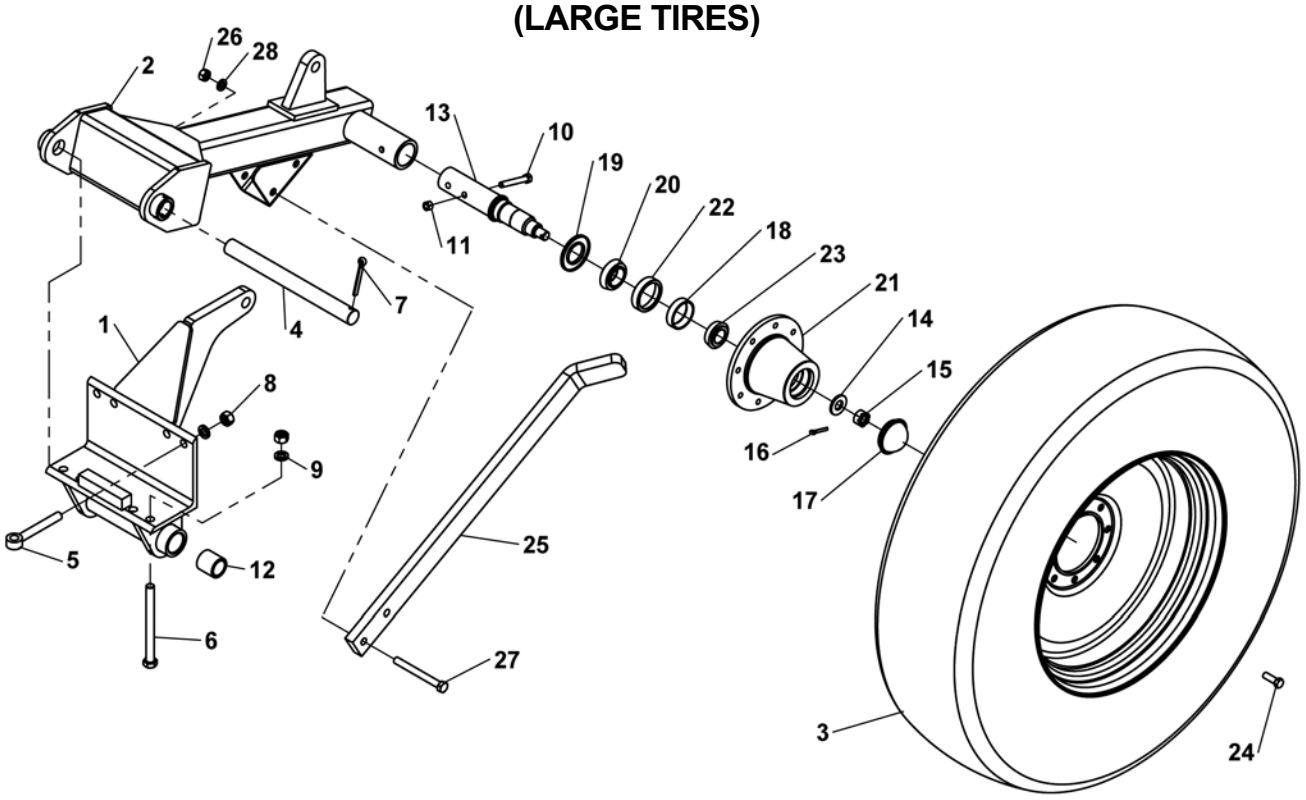
REAR STRUT COMPONENTS (SMALL TIRES)



REF	PART NUMBER	DESCRIPTION	QTY.
1	500-3-0136	Spindle	1
2	901-09002	Seal	1
3	901-01023	Bearing Cone	1
4	901-01022	Bearing Cup, Inner	1
5	905-09003	Hub with Cups, 517	1
6	901-01016	Bearing Cup, Outer	1
7	901-01015	Bearing Cone	1
8	905-09067	Washer	1
9	900-06060	7/8 NF Slotted Hex Nut	1
10	900-23043	Cotter Pin, 3/16 x 1-1/2	1
11	905-09009	Dust Cap	1
12	905-09078	Rim, 15”x6”x5Bolt	1
13	905-09100	Traction Tire, 7.50 x 15	1
14	900-01241	1/2 NCx 3-1/2 Hex Bolt	2
15	905-09117	Stud Bolt, 1/2 NFx 1-7/8	5
16	905-09011	Wheel Nut, 1/2 NF	5
17	200-3-1440	U-Bolt, 3/4x4x4	1
18	500-2-0533	Pivot Weldment	2
19	200-3-0024	U-Bolt, 3/4 NC x 6 x 5-1/2 Long	2
20	500-2-0576	Upper Strut Weld	1
21	500-2-0577	Lower Strut Weldment 22”	1
	500-2-0595	Lower Strut Weldment 30”	1
22	200-2-0705	Ratchet Jack W/Pipe	1
NS	900-12043	3/16 x 1-1/2 Cotter Pin	1
NS	500-2-0157	Tire and Rim Assembly, Right	2
NS	500-2-0158	Tire and Rim Assembly, Left	2
NS	500-2-0161	Hub and Spindle Assembly (Ref 1-11)	1
NS	100-2-1051	Hub Assembly (Ref. 2, 3, 4, 5, 6, 7, and 11)	1

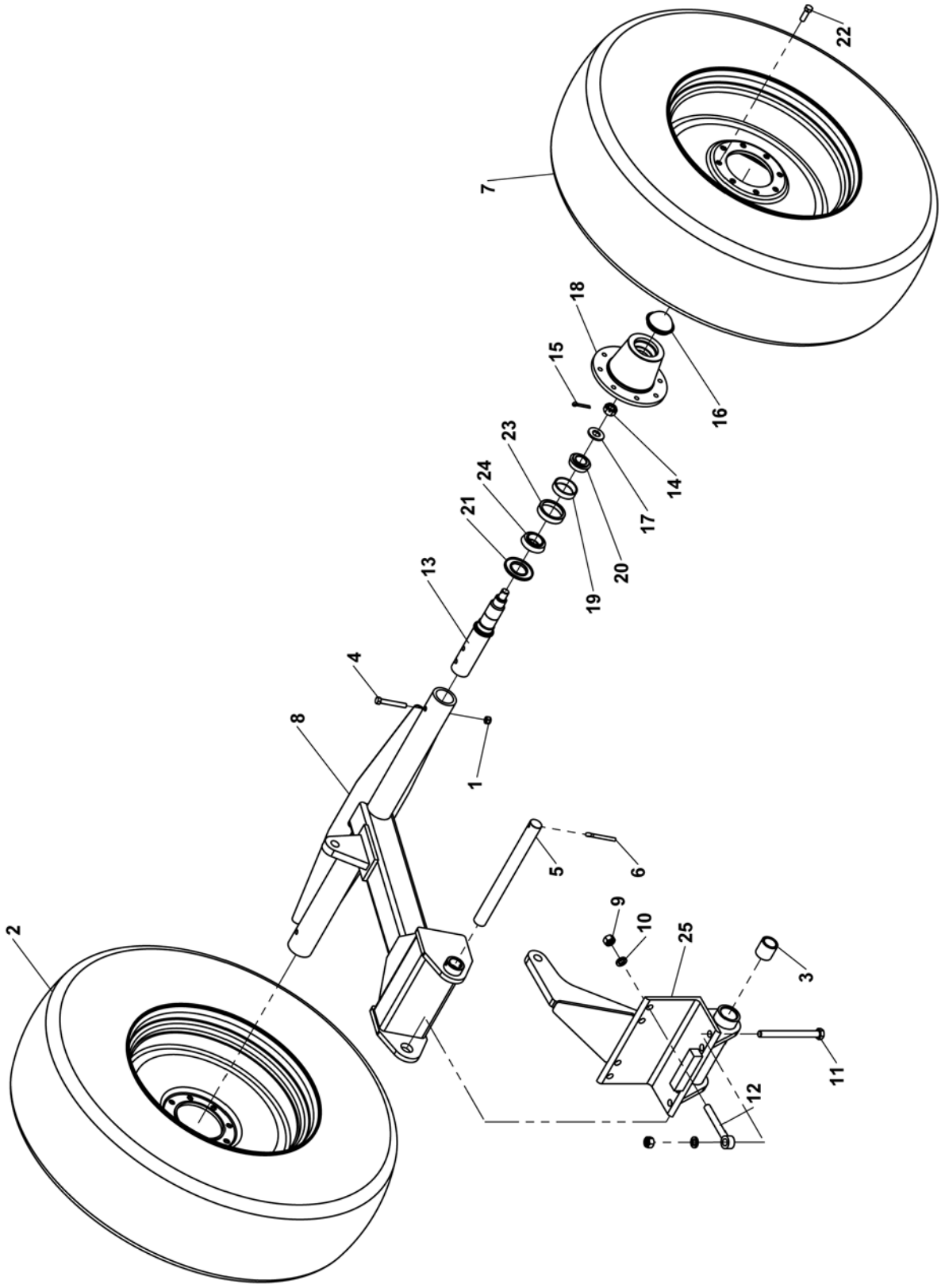
NS = Not Shown

REAR STRUT - SINGLE WHEEL COMPONENTS (LARGE TIRES)



REF	PART NUMBER	DESCRIPTION	QTY.
1	500-2-1046	Mounting Angle Weldment - Rear Strut	1
2	500-2-0993	Rear Strut Weld - Rigid	1
3	700-2-0168	Tire and Rim Assy RH (Shown)	1
	700-2-0167	Tire and Rim Assy LH	
4	500-3-1328	Pin, Pivot	1
5	900-03463	3/4-10 Eye Bolt	4
6	900-01437	Hex Bolt - 3/4 NC X 8-1/2 GR5	4
7	900-23084	3/8 X 3-1/2 Cotter Pin	1
8	900-06015	Hex Nut - 3/4 NC	8
9	900-11017	3/4 Lock Washer	8
10	900-01241	1/2-13 X 3.5” Hex Bolt	1
11	900-06504	Nut Hex 1/2 NC Top Lock ZP	1
12	500-3-1151	Bushing	2
13	700-3-0143	Spindle Rear Strut	1
14	905-09067	Washer, Flat	1
15	900-06060	Slotted Hex Nut 7/8 -14 NF	1
16	900-23064	Cotter Pin - 1/4 X 2	1
17	905-09135	Hub Cap	1
18	901-01324	Bearing Timken 25821	1
19	901-09215	Seal	1
20	901-01325	Bearing Timken 25590	1
21	905-09136	Hub with Cups, Harvester	1
22	901-01152	Bearing Timken 25520	1
23	901-01326	Bearing Timken 25877	1
24	905-09039	Wheel Bolt 9/16-18 X 1-11/16	8
25	500-3-2259	Wheel Scraper - 12.4 x 24 Tire	1
26	900-06013	Nut Hex 5/8 NC	2
27	900-01369	Hex Bolt - 5/8 NC X 6 GR5	2
28	900-11015	Washer, Lock, 5/8	2
	500-2-1030	Rear Strut Assy - Single LH	1
	500-2-0996	Rear Strut Assy - Single RH	

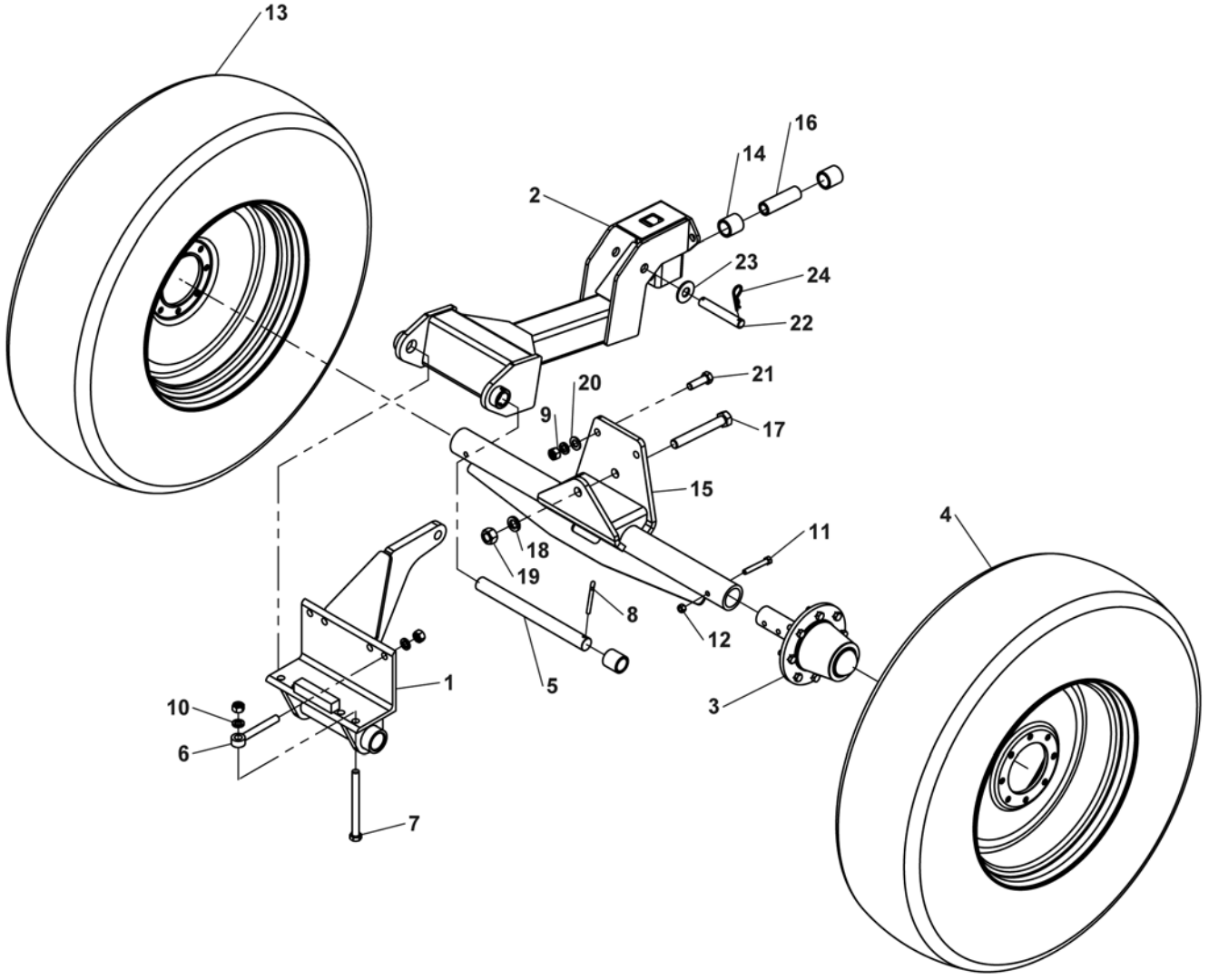
REAR STRUT - DUAL WHEEL COMPONENTS



REAR STRUT - DUAL WHEEL COMPONENTS

REF	PART NUMBER	DESCRIPTION	QTY.
1	900-06504	Nut Hex 1/2 NC Top Lock ZP	2
2	700-2-0168	Tire and Rim Assy RH	1
3	500-3-1151	Bushing	2
4	900-01241	1/2-13 X 3.5” Hex Bolt	2
5	500-3-1328	Pin, Pivot	1
6	900-23084	3/8 X 3-1/2 Cotter Pin	1
7	700-2-0167	Tire and Rim Assy	1
8	500-2-1023	Rear Strut Weld - Dual 30”	
	500-2-0998	Rear Strut Weld - Dual 22”	
9	900-06015	Hex Nut - 3/4 NC	8
10	900-11017	3/4 Lock Washer	8
11	900-01437	Hex Bolt - 3/4 NC X 8-1/2 GR5	4
12	900-03463	3/4-10 Eye Bolt	4
13	700-3-0143	Spindle Rear Strut	1
14	900-06060	Slotted Hex Nut 7/8 -14 NF	1
15	900-23064	Cotter Pin - 1/4 X 2	1
16	905-09135	Hub Cap	2
17	905-09067	Washer, Flat	1
18	905-09136	Hub with Cups, Harvester	1
19	901-01324	Bearing Timken 25821	1
20	901-01326	Bearing Timken 25877	1
21	901-09215	Seal	1
22	905-09039	Wheel Bolt 9/16-18 X 1-11/16	1
23	901-01152	Bearing Timken 25520	1
24	901-01325	Bearing Timken 25590	1
25	500-2-1046	Mounting Angle Weldment - Rear Strut	1

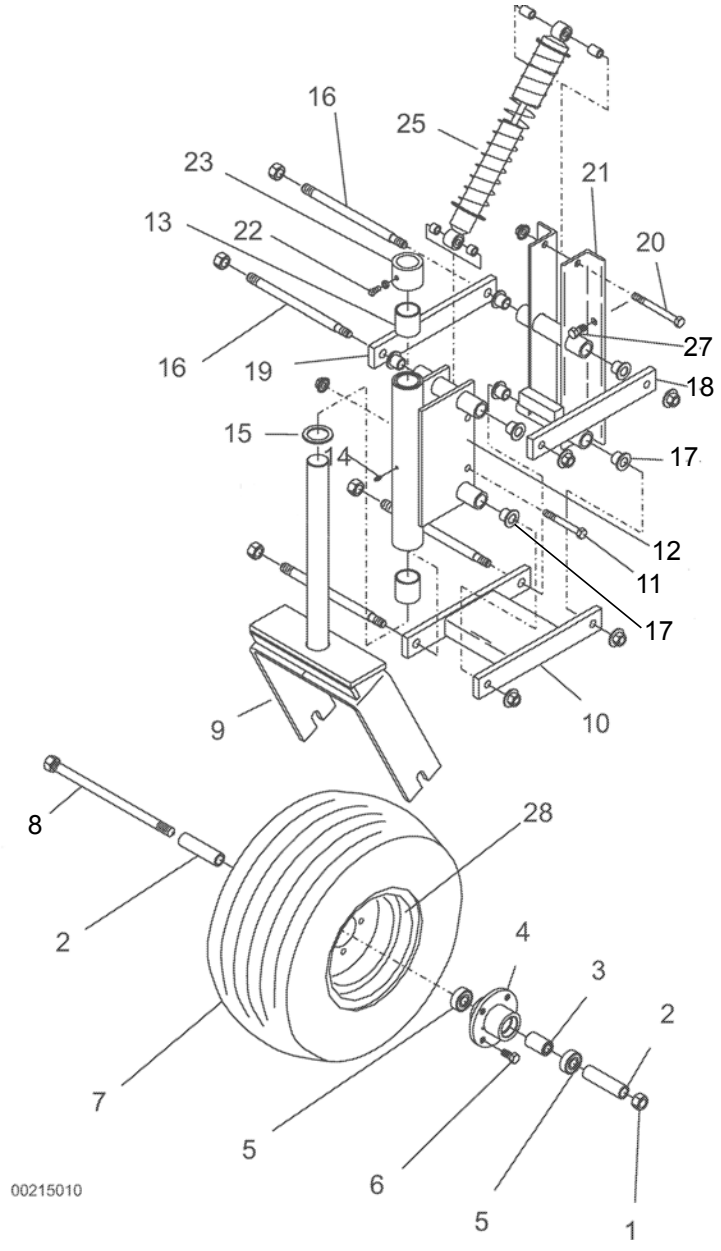
REAR STRUT - DUAL WHEEL (PIVOT) COMPONENTS



REAR STRUT - DUAL WHEEL (PIVOT) COMPONENTS

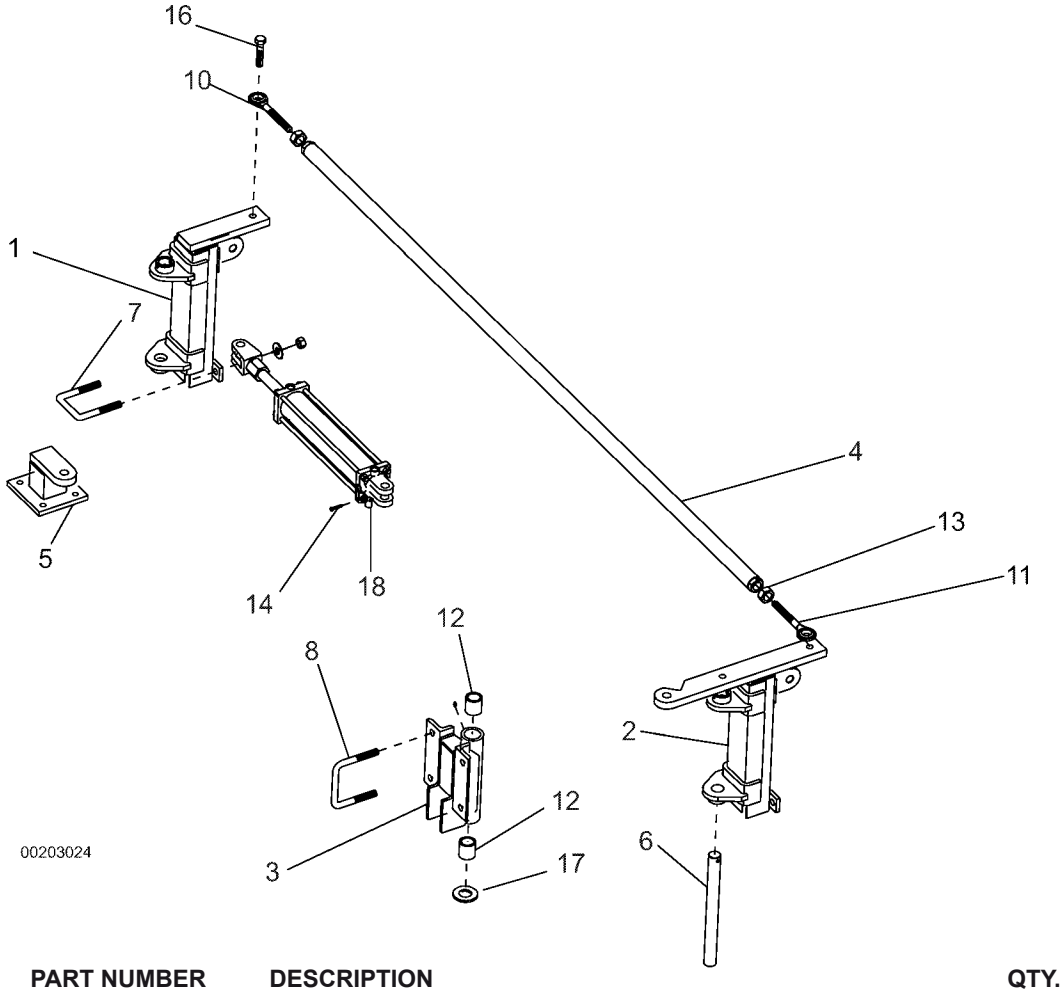
REF	PART NUMBER	DESCRIPTION	QTY.
1	500-2-1046	Mounting Angle Weldment - Rear Strut	1
2	500-2-0171	Rear Strut Weld - Dual (Pivot)	1
3	700-2-0165	Spindle Hub Assembly	2
4	700-2-0167	Tire and Rim Assy	1
5	500-3-1328	Pin, Pivot	1
6	900-03463	3/4-10 Eye Bolt	4
7	900-01437	Hex Bolt - 3/4 NC X 8-1/2 GR5	4
8	900-23084	3/8 X 3-1/2 Cotter Pin	1
9	900-06015	Hex Nut - 3/4 NC	9
10	900-11017	3/4 Lock Washer	9
11	900-01241	Hex Bolt - 1/2 NC X 3-1/2	2
12	900-06504	Nut Hex 1/2 NC Top Lock ZP	2
13	700-2-0168	Tire and Rim Assy RH	1
14	500-3-1151	Bushing	4
15	500-2-1042	Spindle Holder - 30” Wheel Spacing (Pivot)	1
	500-2-1072	Spindle Holder - 44” Wheel Spacing (Pivot)	
16	500-3-2236	Bushing - Wheel Strut (Pivot)	1
17	900-01541	Hex Bolt - 1 NC X 7-1/2 GR5 ZP	1
18	905-11021	1 Lock Washer	1
19	900-06019	Nut Hex 1 NC	1
20	900-11038	3/4 Flat Washer	2
21	900-01407	Hex Bolt - 3/4 NC X 2-1/2 ZP	1
22	500-3-2270	Pin - Cylinder	1
24	900-11040	1 Flat Washer	2
25	900-25007	3/16 (#6) Hitch Pin	2
	500-2-1044	Rear Strut Assy - Dual 30” (Pivot)	
	500-2-1073	Rear Strut Assy - Dual 44” (Pivot)	

STABILIZER WHEEL COMPONENTS



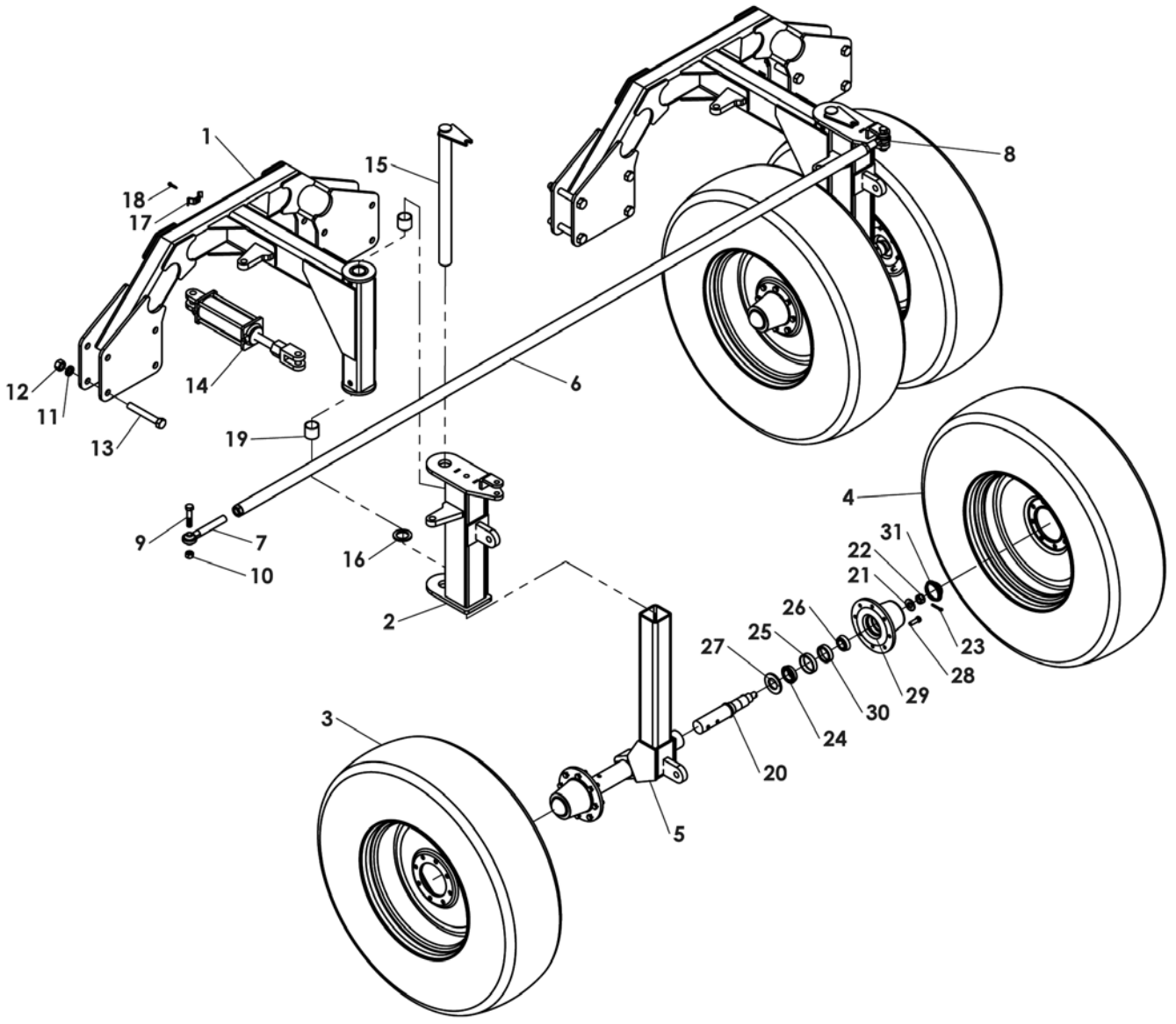
REF	PART NUMBER	DESCRIPTION	QTY.
1	900-06510	Top Lock Nut	1
2	505-3-0817	Spacer, Axle	2
3	505-3-0796	Axle Tube	1
4	505-2-0406	Hub Assembly	1
5	901-01278	Bearing, Peer	2
6	905-09010	1/2 NF x 1-1/16 Wheel Bolt	4
7	905-09121	Wheel and Tire Assembly	1
8	505-2-0400	Bolt Weldment	1
9	505-2-0398	Caster Weldment	1
10	200-2-1412	H-Weldment	1
11	900-01245	1/2 x 4 Hex Bolt	1
12	505-2-0396	Tube Weldment	1
13	901-01261	Oilite Bushing	2
14	905-15024	Grease Zerk, 1/4-28 Straight	1
15	901-01259	Thrust Bearing	1
16	200-3-2631	Pin, Plated	4
17	200-3-0877	Oilite Flange Bushing	8
18	200-3-2628	Parallel Arm, LH	1
19	200-3-2629	Parallel Arm, RH	1
20	900-01249	1/2 x 5 Hex Bolt	1
21	505-2-0402	Mounting Angle Weldment	1
22	900-16031	3/8 x 3/4 Square Head Set Screw	1
23	500-3-0928	Collar	1
24	505-3-0816	Spacer Tube, Bottom	2
25	500-3-1047	Shock	1
26	505-3-0815	Spacer Tube, Top	2
27	900-01221	1/2 NC x 1 Hex Bolt	4
28	905-09123	Rim	1
NS	500-2-0552	Strut Mount (not shown)	1

REAR STEER COMPONENTS (SMALL TIRES)



REF	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0625	Tube Weldment (RH)	1
2	500-2-0624	Tube Weldment (LH)	1
3	500-2-0623	Pivot Tube Weldment	2
4	500-2-0412	Adjustment Tube, 102” Long Tube (430, 622)	1
	500-2-0524	Adjustment Tube, 80” Long Tube (630)	1
		(1222)	2
	500-2-0238	Adjustment Tube, 58” Long Tube (1222)	1
5	500-2-0621	Cylinder Mount Weldment	1
6	500-3-1328	Pin, Pivot	2
7	200-3-1440	U-Bolt, 3/4 NC x 4 x 5-1/2 (1222)	4
		(430, 622, 630)	2
	200-3-0017	U-Bolt, 5/8 NC x 4 x 7-1/2	2
8	200-3-0024	U-Bolt, 3/4 NC x 6 x 5-1/2 (1222)	8
		(430, 622, 630)	4
9	210-3-0199	Hose Holder (1222)	3
		(430, 622, 630)	4
10	903-05030	Pivot Link, 3/4” Uni-Ball, LH Thread	1
11	903-05031	Pivot Link, 3/4” Uni-Ball, RH Thread	1
12	901-01146	Bronze Bushing	4
13	900-06288	1-1/8 NC Jam Nut (RH)	1
	900-06310	1-1/8 NC Jam Nut (LH)	1
14	900-16964	1/4 x 1-1/4 Tek Screw	3
15	900-23084	3/8 x 3-1/2, Cotter Pin	2
16	900-01415	3/4 NC x 3-1/2 Hex Bolt	2
	900-01425	3/4 NC x 5-1/2 Hex Bolt (1222 Only)	2
17	500-3-0538	Spacer Bushing	2
18	905-21400	Cylinder Rear Steer	1

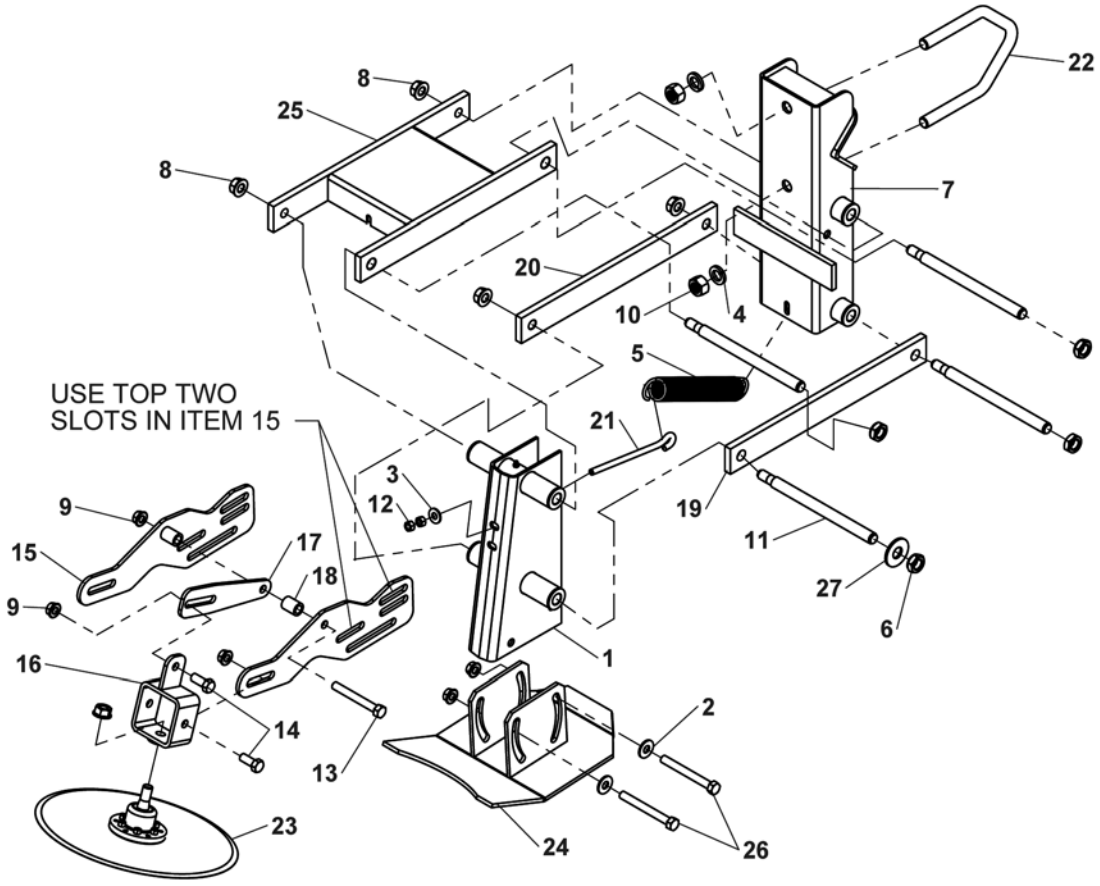
REAR STEER COMPONENTS (LARGE TIRES)



REAR STEER COMPONENTS (LARGE TIRES)

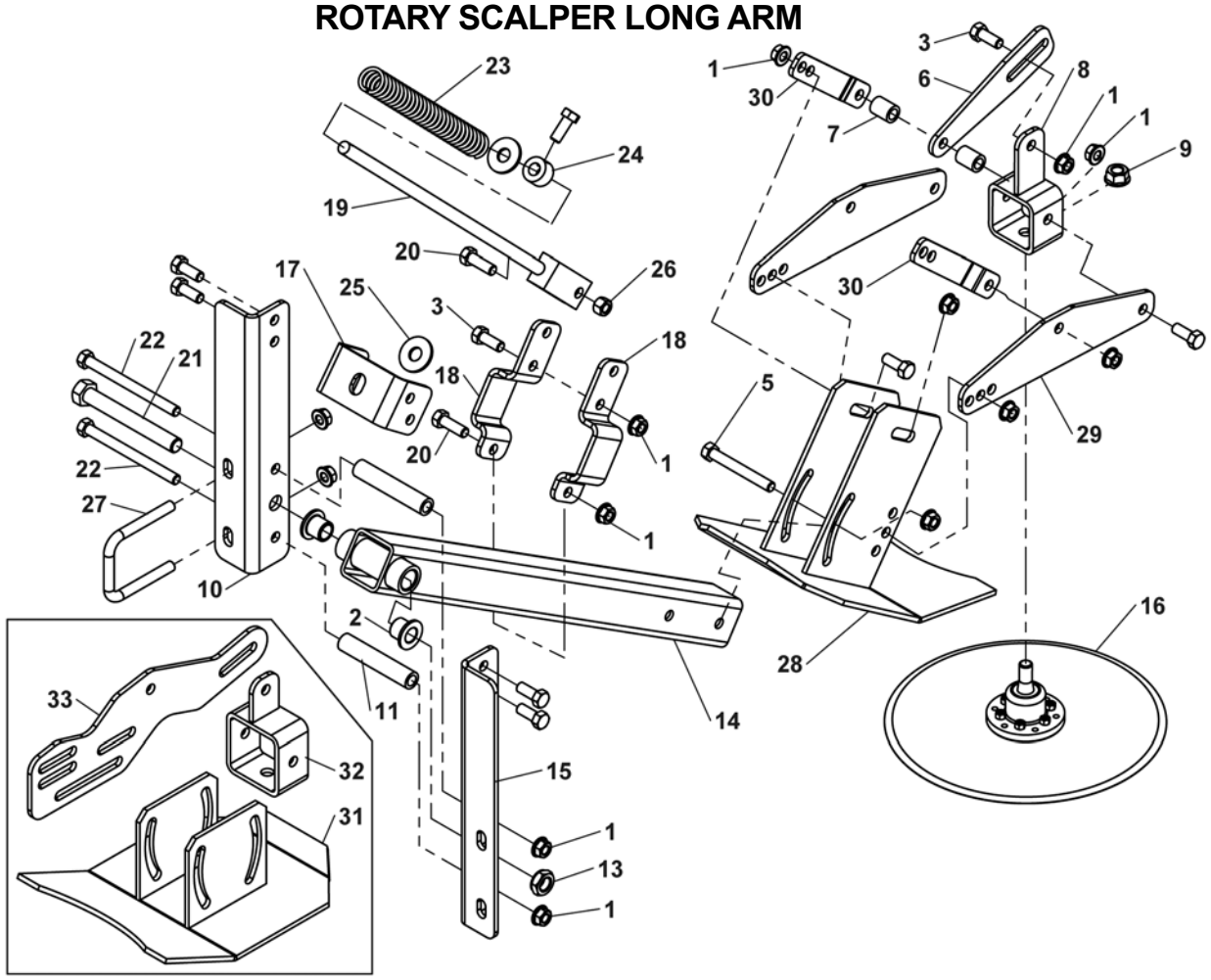
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0923	Strut Upper Weld	2
2	500-2-0829	Strut Lower Pivot	2
3	700-2-0167	Tire and Rim Assy	2
4	700-2-0168	Tire and Rim Assy RH	2
5	500-2-0940	Lower Strut Assembly, Rear Steer	2
6	500-2-0835	Weld Adjustment Tube	1
7	903-05030	Uniball 3/4" X 1-1/8 NC LH	1
8	903-05031	Uniball 3/4" X 1-1/8 NC RH	1
9	900-01415	Bolt Hex 3/4 X 3-1/2 NC ZP	2
10	900-06015	Hex Nut - 3/4 NC	2
11	900-11021	Lock Washer - 1	16
12	900-06019	1-8 Hex Nut	16
13	900-02930	1-8 X 7" Hex Bolt	16
14	905-21400	Hyd Cylinder - 3.5 X 8	1
15	500-2-0828	Pin Weld	2
16	500-3-2066	Bearing Thrust	2
17	210-3-0199	Hose Holder	6
18	900-16964	TEK Screw, 1/4-14UNC x 1-1/2	6
19	200-3-4081	Bushing Bronze	2
20	700-3-0143	Spindle Rear Strut	1
21	905-09067	Flat Washer	1
22	900-06060	Slotted Hex Nut - 7/8-14 NF	1
23	900-23064	Cotter Pin - 1/4 x 2	1
24	901-01325	Bearing Timken 25590	2
25	901-01152	Bearing Timken 25520	2
26	901-01326	Bearing Timken 25877	2
27	901-09215	Seal	2
28	905-09039	Wheel Bolt 9/16-18 x 1-11/16	16
29	905-09136	Hub with Cups	2
30	901-01324	Bearing Timken 25821	2
31	905-09135	Hub Cap	2
32	500-2-0957	Hose Kit (For 12 Row Rigid)	1
	500-1-0127	Rear Steer Kit, 2 PR Big Wheels	

PARALLEL ARM ROTARY SCALPER



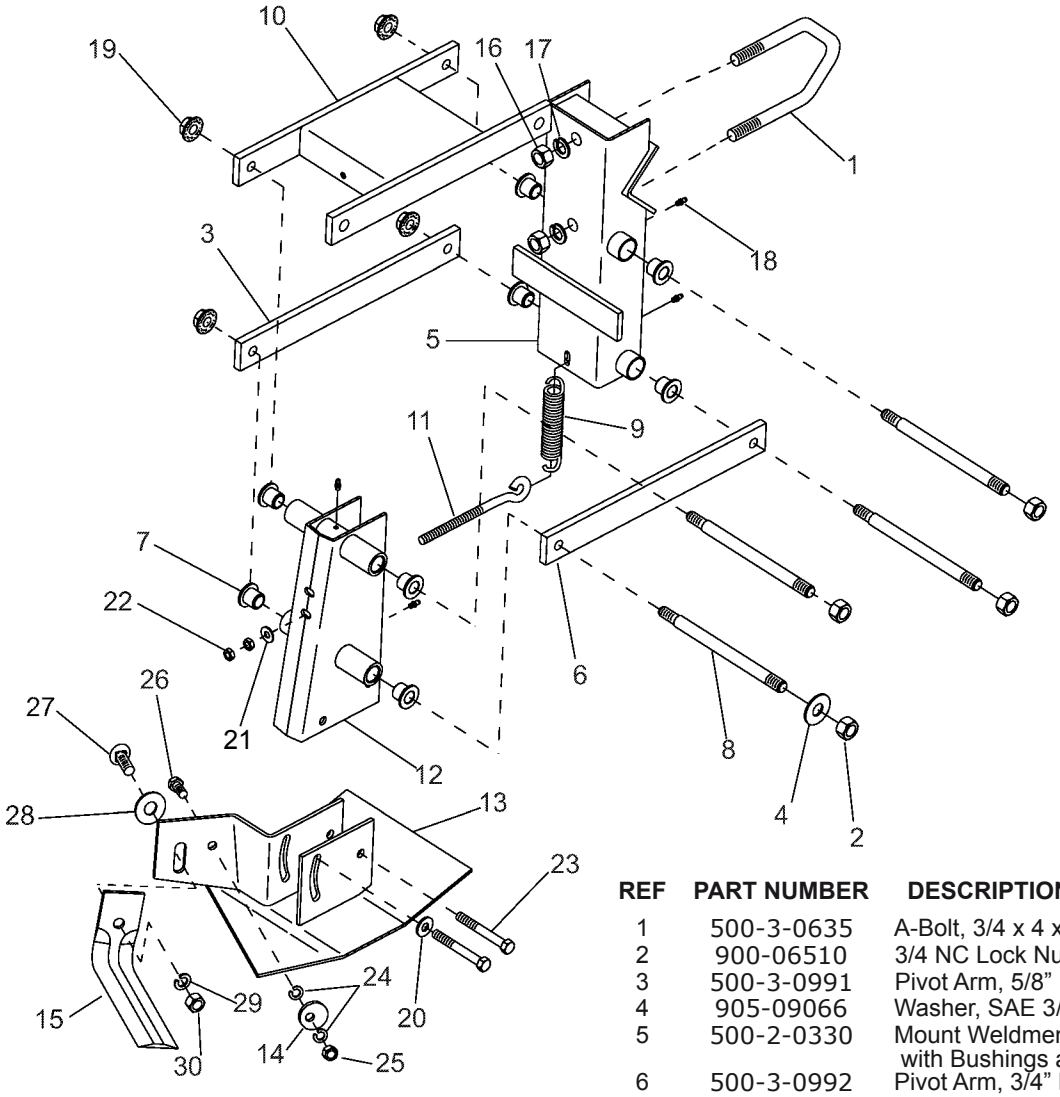
REF	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0338	Upright Weld	1
2	900-11035	1/2 Flat Washer, ZP	2
3	900-11033	3/8 Flat Washer, ZP	1
4	900-11017	3/4 Lock Washer	2
5	400-3-0263	Spring, GM and Allowboom	
6	900-06510	3/4 NC Top Lock Nut, ZP	4
7	500-2-0330	Mount Weld	1
8	900-06145	5/8 NC Spiralock Flange Nut	5
9	900-06143	1/2 NC Spiralock Flange Nut	6
10	900-06015	3/4 NC Hex Nut ZP	2
11	200-3-2631	Pin, Plated	4
12	900-06005	3/8 NC Hex Nut, ZP	2
13	900-01245	1/2 NC x 4 Hex Bolt, GR5	1
14	900-01223	1/2 NC x 1-1/4 Hex Bolt	3
15	500-3-1563	Plate, Bracket, Rear Top	2
16	500-2-0774	Bracket, Pivot	1
17	500-3-1557	Strap, Top Rear, Adj.	1
18	500-3-1556	Rear Spacer Tube	2
19	500-3-0992	Bar, 3/4 Holes	1
20	500-3-0991	Bar, 5/8 Holes	1
21	500-3-0675	3/8 Eye Bolt x 8” Long	1
22	500-3-0635	A-Bolt, 3/4 x 4 x 4	1
23	500-2-0762	Hub Assy, Scalper	1
	500-3-1582	Disc	1
	901-09219	Hub Assy	1
	901-09220	Hub Repair Kit	1
24	500-2-0704	Scalper Shoe Weld	1
25	500-2-0518	H-Weld	1
26	900-01247	1/2 NC x 4-1/2 Hex Bolt GR5	2

ROTARY SCALPER LONG ARM



REF	PART NUMBER	DESCRIPTION	QTY.
1	900-06143	1/2 NC Spiralock Nut GR5 ZP	20
2	200-3-0877	Bushing Flanged	2
3	900-01223	1/2 NC X 1-1/4 Hex Bolt	11
4	900-11035	1/2 Flat Washer	2
5	900-01245	1/2 NC x 4 Hex Bolt GR5 ZP	2
6	500-3-1557	Top Rear Adjusting Strap	1
7	500-3-1556	Rear Spacer Tube	2
8	500-2-1067	Weldment, Scalper Pivot Narrow	1
9	900-06145	5/8 NC Spiralock Flange Nut	1
10	500-3-1754	Plate, Formed, RH	1
11	500-3-1561	Tube, Front Spreader	2
12	900-01247	1/2 NC x 4-1/2 Hex Bolt GR5 ZP	1
13	900-06510	3/4 NC Top Lock nut	1
14	500-2-0705	Tube Weldment	1
15	500-3-1755	Plate, Formed, LH	1
16	500-2-0762	Hub Assembly, Scalper	1
17	500-3-1756	Plate - Spring	1
18	500-3-1757	Ear - Clamp	2
19	500-2-0072	Lift Rod Weldment	1
20	900-01225	1/2 NC x 1-1/2 Hex Bolt GR5	2
21	900-01427	3/4 NC x 6 Hex Bolt GR5 ZP	1
22	900-01253	1/2 NC x 6 Hex Bolt GR5	2
23	500-3-0157	Spring - Lift Rod	1
24	500-3-0172	Collar - Retaining Spring	1
25	900-11037	5/8 Flat Washer	2
26	900-06504	1/2 NC Top Lock Hex Nut ZP	1
27	500-3-1758	1/2 x 3-1/2 x 4-1/2 x 1 U-Bolt	2
28	500-2-1068	Scalper Shoe Weldment	1
29	500-3-2261	Link Bar - Shoe	2
30	500-3-2265	Adjustment Arm - Scalper Shoe	2
31	500-2-0704	Scalper Shoe Weldment (Prior to 2007)	1
32	500-2-0774	Weldment, Scalper Pivot (Prior to 2007)	1
33	500-3-1563	Plate Bracket, Rear Top (Prior to 2007)	1

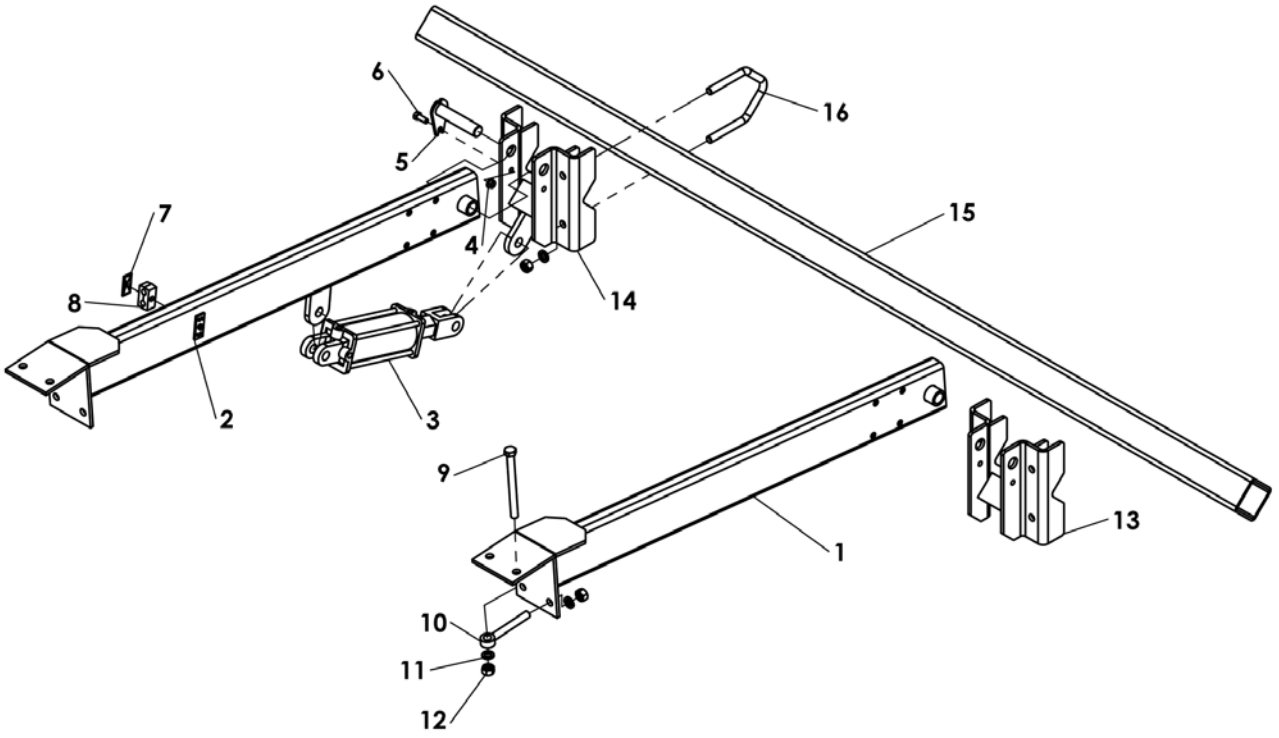
KNIFE SCALPER COMPONENTS



REF	PART NUMBER	DESCRIPTION	QTY.
1	500-3-0635	A-Bolt, 3/4 x 4 x 4	1
2	900-06510	3/4 NC Lock Nut	4
3	500-3-0991	Pivot Arm, 5/8" Holes	1
4	905-09066	Washer, SAE 3/4"	A/R
5	500-2-0330	Mount Weldment with Bushings and Zerks	1
6	500-3-0992	Pivot Arm, 3/4" Holes	1
7	200-3-0877	Flanged Bushing	8
8	200-3-2631	Pin	4
9	400-3-0263	Spring	1
10	500-2-0518	H-Weldment	1
11	500-3-0675	Eye Bolt, 3/8 NC x 8 long	1
12	500-2-0338	Upright Weldment with Bushings and Zerks	1
13	500-2-0335	Shoe Weldment, Left (shown)	1
	500-20336	Shoe Weldment, Right	1
14	500-3-0201	Eccentric Spacer	1
15	500-3-0910	Knife Scalper	1
16	900-06015	3/4 NC Hex Nut	2
17	900-11017	3/4" Lock Washer	2
18	905-15024	1/4 UNF Straight Zerk	6
19	900-06145	5/8 NC Whiz Nut	4
20	900-11035	1/2 Flat Washer	2
21	900-11033	3/8 Flat Washer	1
22	900-06005	3/8 Hex Nut	2
23	900-01245	1/2 NC x 4 Hex Bolt	2
24	900-11013	1/2 Lock Washer	4
25	900-06009	1/2 NC Hex Nut	3
26	900-01223	1/2 NC x 1-1/4 Hex Nut	1
27	900-01784	5/8 x 1-1/2 Carriage Bolt	1
28	900-11038	3/4 Flat Washer	1
29	900-11015	5/8 Lock Washer	1
30	900-06013	5/8 NC Hex Nut	1

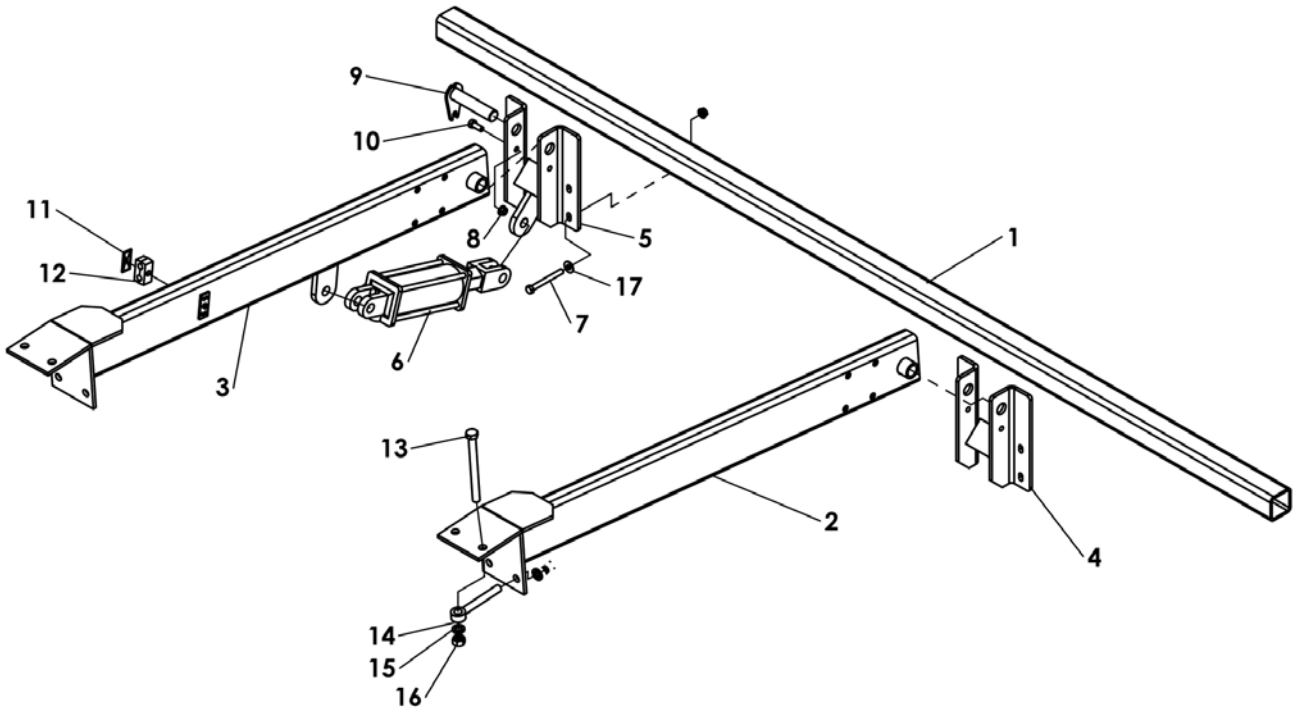
A/R = As Required

SCALPER TOOLBAR WITH PARALLEL LINK COMPONENTS



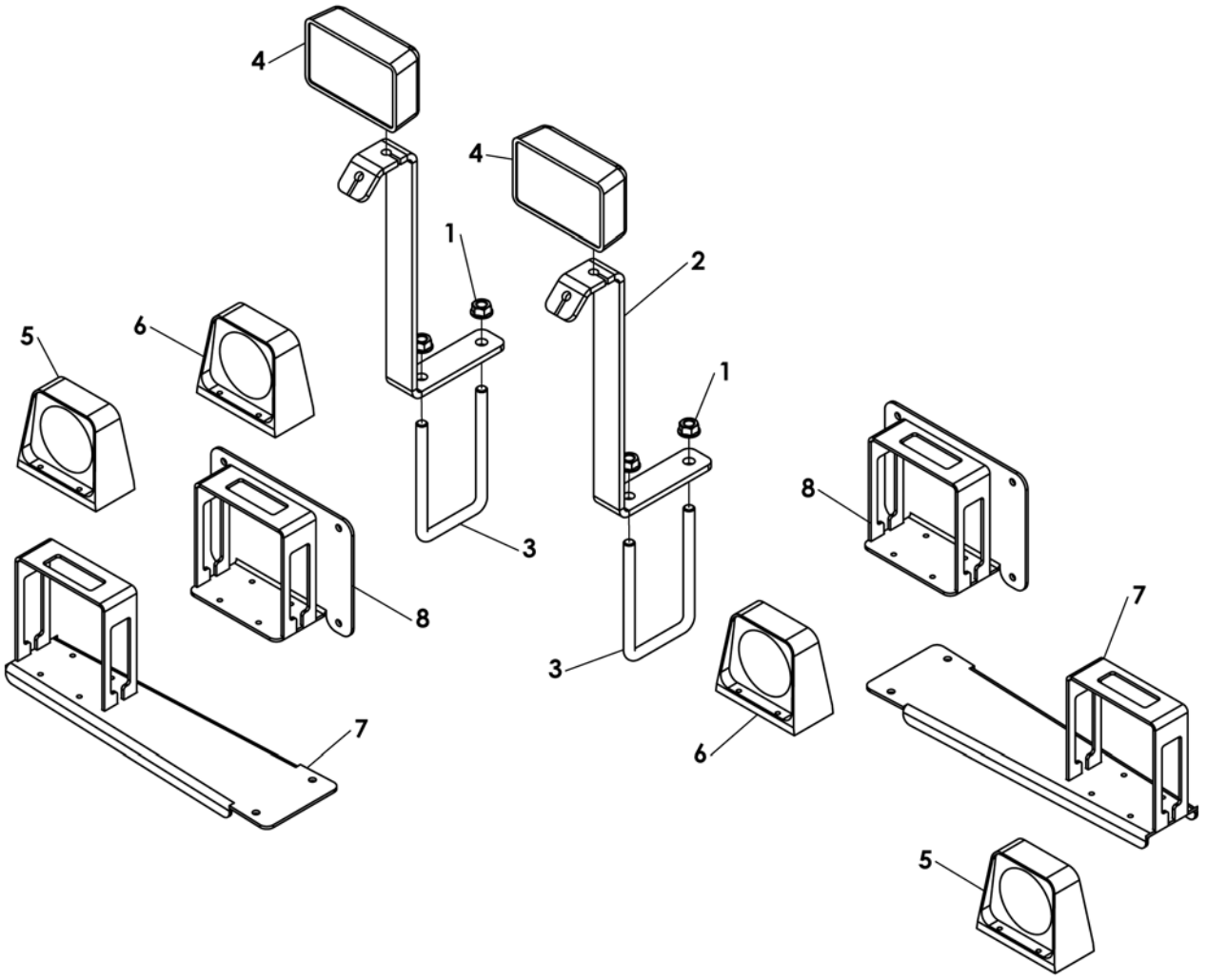
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0692	Outer Setback Arm Weldment (Large Tires)	A/R
	500-2-1040	Outer Setback Arm Weldment (Small Tires)	A/R
2	500-2-0691	Inner Setback Arm Weldment (Large Tires)	A/R
	500-2-1041	Inner Setback Arm Weldment (Small Tires)	A/R
3	905-21400	Hydraulic Cylinder - 3.5 X 8	A/R
4	900-06143	1/2 NC Spiral Lock Nut ZP GR5	A/R
5	500-2-0684	1-1/4" Pin Weldment	A/R
6	900-01223	1/2 NC X 1-1/2 Hex Bolt GR 5	A/R
7	900-31068	Cover Plate and Bolt	A/R
8	900-31069	Clamp Body	A/R
9	900-01437	Hex Bolt - 3/4 NC X 8-1/2 GR5	A/R
10	900-03463	3/4-10 Eye Bolt	A/R
11	900-11017	3/4 Lock Washer	A/R
12	900-06015	Hex Nut - 3/4 NC	A/R
13	500-2-0942	Scalper Mount Outer	A/R
14	500-2-0941	Scalper Mount Inner	A/R
15	500-3-2094	Scalper Tube (430, 622)	1
		(1222)	2
	500-3-2183	Scalper Tube (630, 822)	1
	500-3-2184	Scalper Tube (922)	1
16	500-3-0635	3/4-10 X 4 A Bolt	A/R

SCALPER TOOLBAR WITH STRAIGHT ARM COMPONENTS



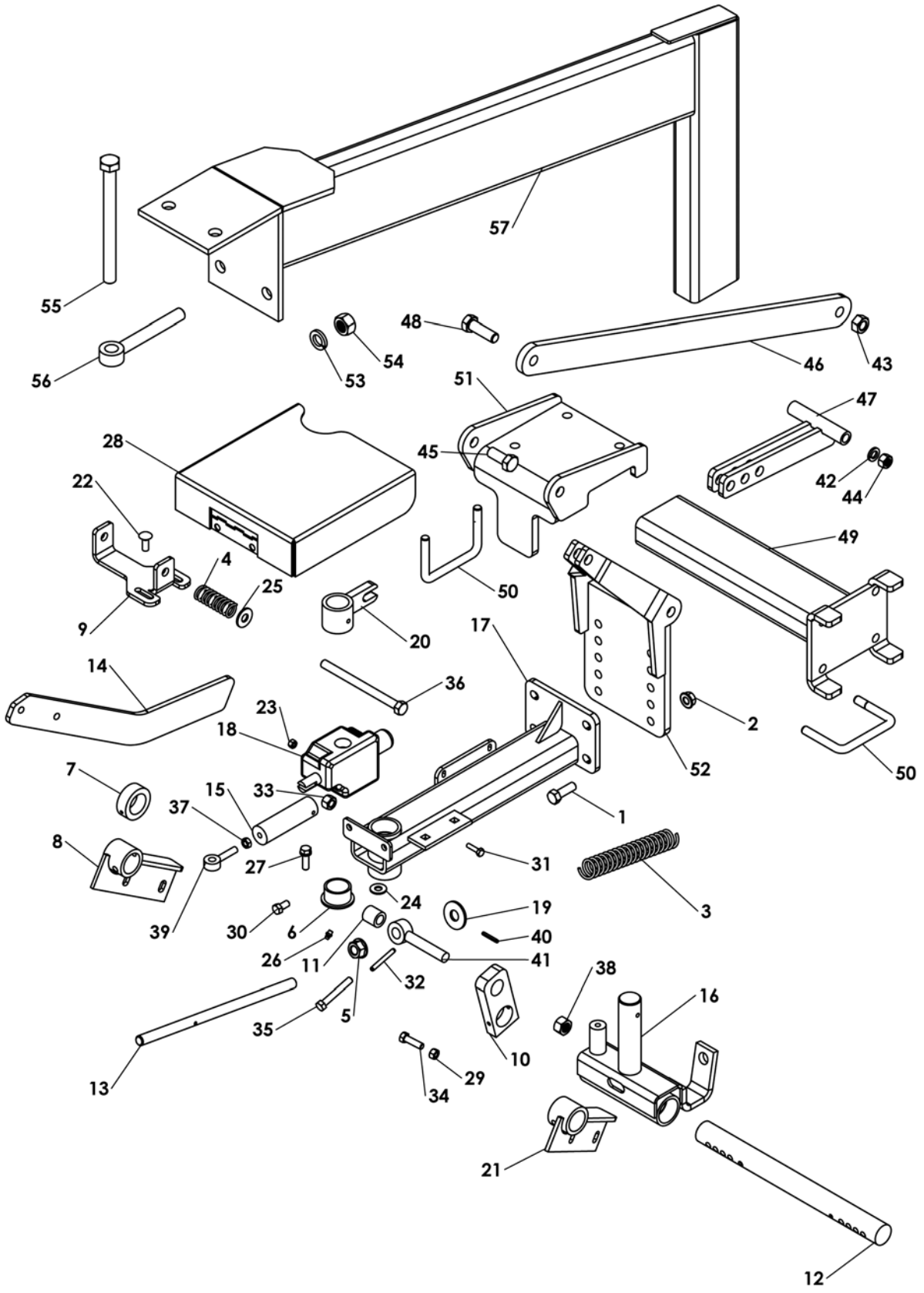
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-3-1579	Scalper Tube (430, 622)	1
		(1222)	2
	500-3-2181	Scalper Tube (630, 822)	1
	500-3-2182	Scalper Tube (922)	1
2	500-2-0692	Outer Setback Arm Weldment (Large Tires)	A/R
	500-2-1040	Outer Setback Arm Weldment (Small Tires)	A/R
3	500-2-0691	Inner Setback Arm Weldment (Large Tires)	A/R
	500-2-1041	Inner Setback Arm Weldment (Small Tires)	A/R
4	500-2-0696	Scalper Mount Outer	A/R
5	500-2-0695	Scalper Mount Inner	A/R
6	905-21400	Hydraulic Cylinder - 3.5 X 8	A/R
7	900-01247	1/2 NC X 4-1/2 Hex Bolt GR 5 ZP	A/R
8	900-06143	1/2 NC Spiral Lock Nut ZP GR5	A/R
9	500-2-0684	1-1/4" Pin Weldment	A/R
10	900-01223	1/2 NC X 1-1/2 Hex Bolt GR 5	A/R
11	900-31068	Cover Plate and Bolt	A/R
12	900-31069	Clamp Body	A/R
13	900-01437	Hex Bolt - 3/4 NC X 8-1/2 GR5	A/R
14	900-03463	3/4-10 Eye Bolt	A/R
15	900-11017	3/4 Lock Washer	A/R
16	900-06015	Hex Nut - 3/4 NC	A/R
17	900-11035	1/2 Flat Washer	A/R

LIGHT KIT COMPONENTS



REF.	PART NUMBER	DESCRIPTION	QTY.
1	900-06145	Nut, Flange, 5/8” NC GR8	4
2	500-3-1720	Bracket, Field Light	2
3	200-3-0017	U-Bolt 5/8 x 4 x 7.25” Long	2
4	500-3-1721	Light, Field	2
5	904-01154	Amber Lamp	2
6	904-01155	Red Lamp	2
7	500-2-0929	Amber Light Bracket	2
8	500-2-0930	Red Light Bracket	2
9	500-3-2168	Wire Harness, 6 & 8 Row (Not Shown)	1
	500-3-2201	Wire Harness, 12 Row (Not Shown)	
	500-1-0109	Field Light Bracket Kit (Ref 1, 2, 3)	

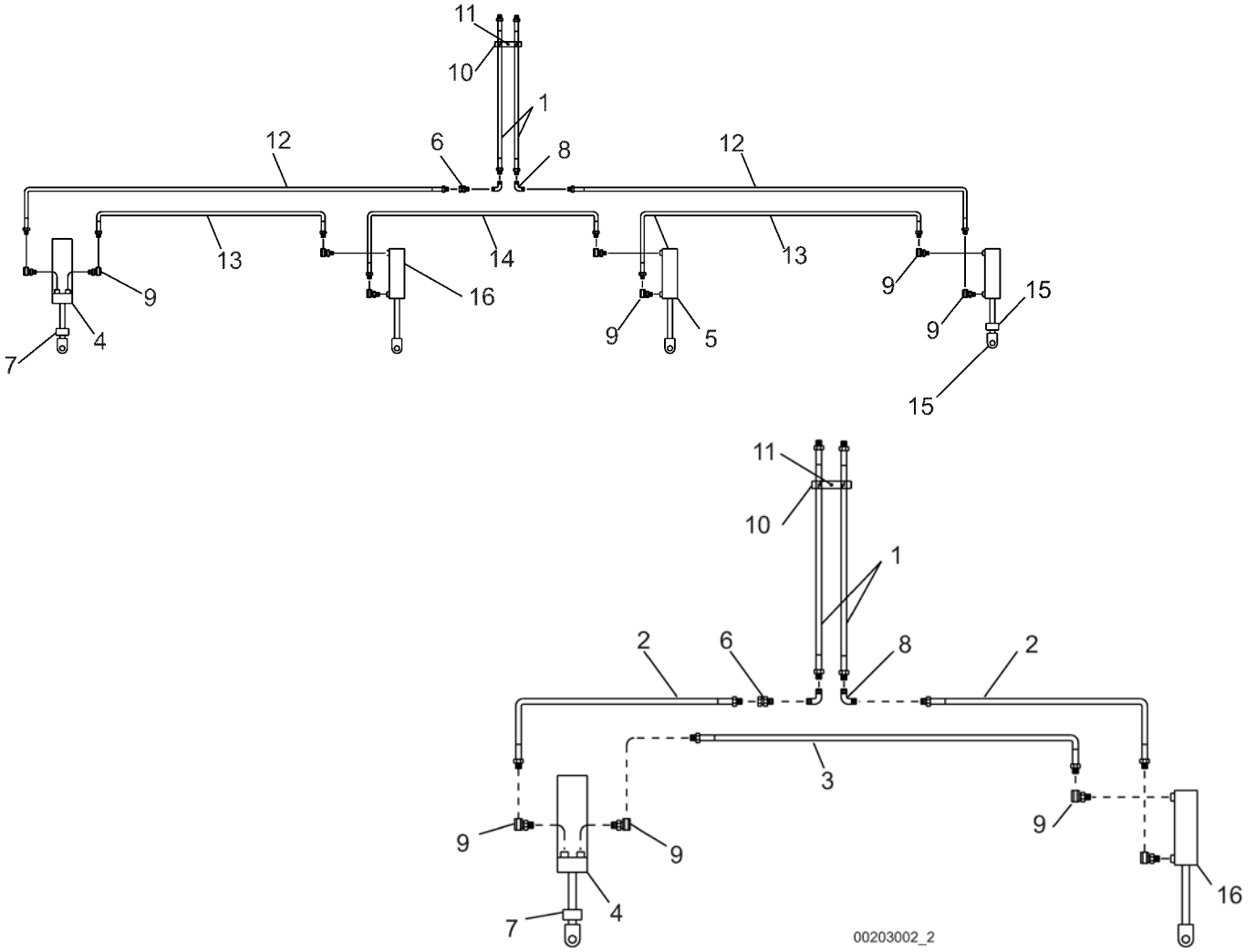
HYDRAULIC ROW FINDER COMPONENTS



HYDRAULIC ROW FINDER COMPONENTS PARTS LIST

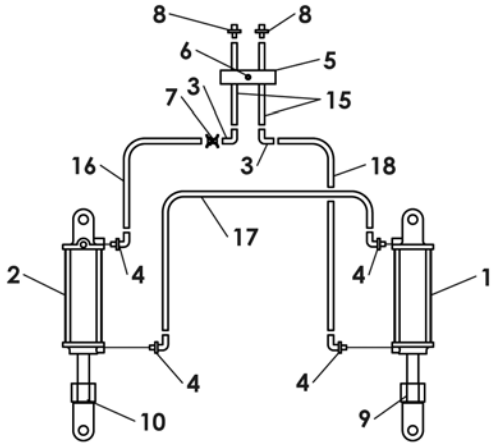
REF	PART NUMBER	DESCRIPTION	QTY.
1	900-01225	1/2 NC X 1-1/2 Hex Bolt GR 5	4
2	900-06143	1/2 NC Spirallock Nut ZP GR5	12
3	905-14007	Spring - 1.245 OD X .148 Wire X .4029 P X 7.75 Long	1
4	905-14006	Spring - 1.00 OD X .128 Wire X 2.95 Long X .2993 Pitch	2
5	900-06145	5/8 Whiz Nut	4
6	700-3-0383	Oilite Bushing - FF-1618-1	4
7	901-01323	Set Collar - 1.38	1
8	700-2-0123	Finger Weld RH	1
9	700-3-0339	Plate Spring	1
10	700-3-0349	Block, Down Pressure	1
11	700-3-0350	Bushing, Down Pressure Block	1
12	700-3-0351	Shaft Horz Pivot	1
13	700-3-0352	Rod Row Finder	1
14	700-3-0356	Finger	2
15	700-3-0382	Shaft, Tie Rod - Row Finder	1
16	700-2-0112	Pivot Weld	1
17	700-2-0103	Pivot Mount Weld	1
18	905-03116	Directional Control Valve	1
19	900-11037	Washer, Flat, 5/8”	3
20	700-2-0106	Steering Paddle Weld	1
21	700-2-0124	Finger Weld LH	1
22	900-01695	Carriage Bolt 3/8 NC X 1 ZP	2
23	900-06496	1/4-20 Top Lock Hex Nut	3
24	900-11033	Flat Washer 3/8 ZP	2
25	900-11035	1/2 Flat Washer	4
26	905-15024	Zerk 1/4-28 UNF Straight	1
27	900-11011	Washer, Lock	1
28	700-2-0632	Top Cover - Row Finder	1
29	900-06500	Nut Hex 3/8 Top Lock	10
30	900-01105	3/8-16 X .75” Hex Bolt	2
31	900-01069	1/4 NC X 1-3/4 Hex Bolt	3
32	900-29182	1/4 X 2 Roll Pin	2
33	900-06504	Nut Hex 1/2 NC Top Lock ZP	1
34	900-01111	3/8NC X 1-1/4 Hex Bolt GR 5	5
35	900-01121	3/8NC X 2-1/2 Hex Bolt GR 5	2
36	900-01255	Hex FL Bolt 1/2 UNC X 6-1/2	2
37	900-06273	Hex Jam Nut 3/8-NF (WIP)	1
38	900-06013	Nut Hex 5/8 UNC	2
39	903-05044	Eyebolt - Rod End	1
40	900-29132	Pin Roll 3/16 X 1-1/4	1
41	900-03465	Eye Bolt 5/8 X 3	1
42	900-11013	Washer, Lock 1/2	1
43	900-06508	Nut Hex 5/8 UNC Top Lock	4
44	900-06009	Nut Hex 1/2 UNC	1
45	900-01341	Hex Bolt 5/8 NC X 1-1/2 NC GR5 ZP	2
46	500-3-2198	Bar - Rowfinder Pivot	1
47	500-2-1007	Anchor - Row Finder Pivot	1
48	900-01345	5/8” X 2 NC Hex Bolt	2
49	500-2-1005	Horizontal Adj Tube - Row Finder	1
50	200-3-1445	U-Bolt 4 x 3 x 1/2	4
51	500-2-1006	Bottom Pivot Plate - Row Finder	1
52	500-2-1004	Adj Plate Weld - Row Finder	1
53	900-11017	3/4 Lock Washer	4
54	900-06015	Hex Nut - 3/4 NC	4
55	900-01437	Hex Bolt - 3/4 NC X 8-1/2 GR5	2
56	900-03463	3/4-10 Eye Bolt	2
57	500-2-1003	Mount Weld - Row Finder - Rigid	1
	500-1-0157	Hydraulic Row Finder - Rigid	

HYDRAULIC STRUT PLUMBING COMPONENTS (PRIOR TO 2007)

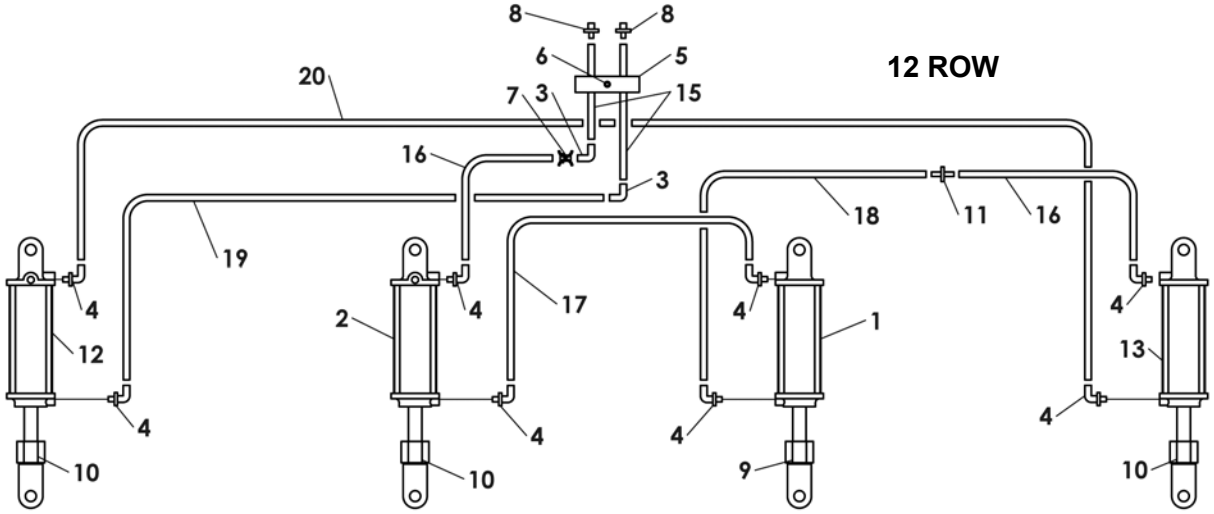


REF	PART NUMBER	DESCRIPTION	QTY.
1	210-2-0179	3/8 Hose,1/2MP x 1/2MP x 220	2
2	210-2-0174	3/8 Hose, 1/2 MP x 1/2 MP x 73	2
3	210-2-0185	3/8 Hose, 1/2 MP x 1/2 MP x 160	1
4	500-2-0721	Hydraulic Cylinder Assy., 3-3/4 x 8R	1
	905-21398	Hydraulic Cylinder, (With Depth Stop Nut)	1
	905-21405	Seal Kit, 3-3/4 x 8R	
5	905-21291	Hydraulic Cylinder, 3.25 x 8R	1
	905-21372	Seal Kit, 3.25 x 8R	1
6	905-01531	1/2 Swivel Restrictor, 1/16	1
7	905-21407	Depth Stop Nut	1
8	905-01004	Elbow, 1/2 NPT x 90 Deg	2
9	905-01528	Elbow, 3/4 MORB x 1/2 FPT x 90 Deg.	4
10	210-3-0199	Hose Holder	4
11	900-16964	1/4 x 1-1/2 Tek Screw	4
12	210-2-0175	3/8 Hose, 1/2 MP x 1/2 MP x 142	2
13	210-2-0172	3/8 Hose, 1/2 MP x 1/2 MP x 134	2
14	210-2-0181	3/8 Hose, 1/2 MP x 1/2 MP x 122	1
15	905-21292	Hydraulic Cylinder, 3 x 8R	1
	905-21373	Seal Kit, 3 x 8R	1
	905-21305	Stop nut	1
16	905-21290	Hydraulic Cylinder, 3-1/2 x 8R	1
	905-21371	Seal Kit, 3-1/2 x 8R	1

HYDRAULIC STRUT PLUMBING COMPONENTS



6 OR 8 ROW

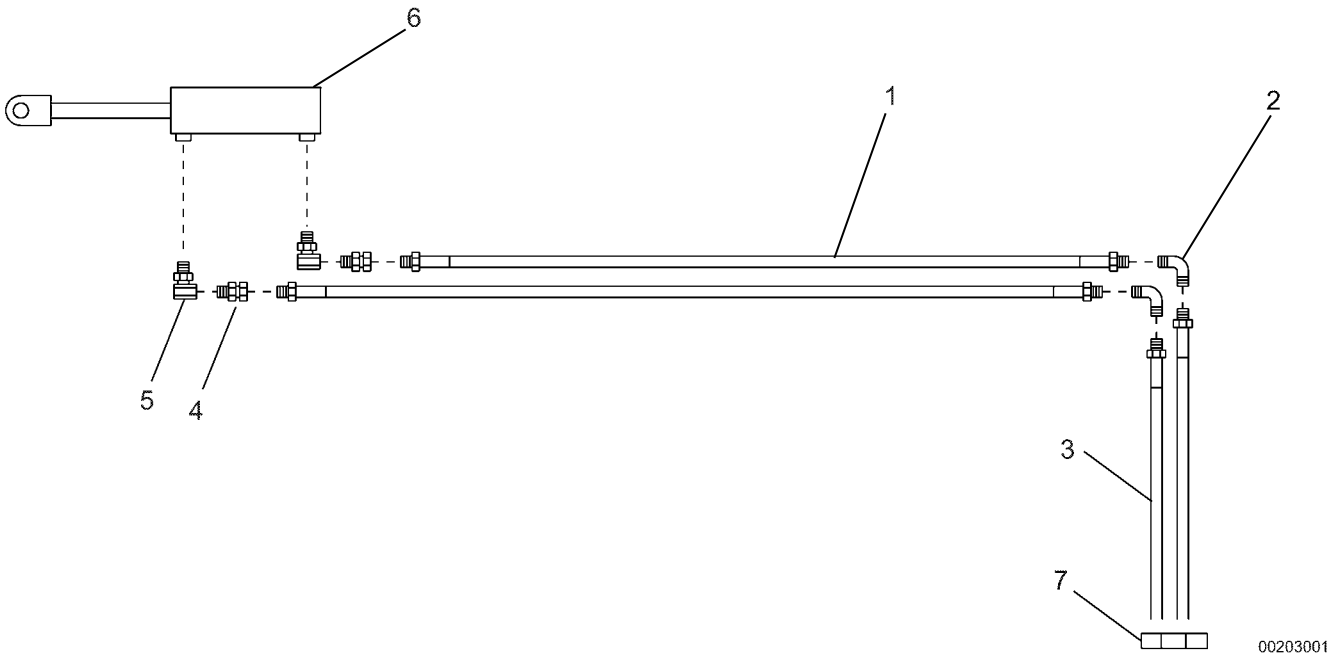


12 ROW

REF	PART NUMBER	DESCRIPTION	QTY.
1	905-21290	Hydraulic Cylinder - 3.5 x 8R	1
2	905-21398	Hydraulic Cylinder - 3.75 X 8R	1
3	905-03163	Elbow 90, 1/2 NPT	2
4	905-03114	Elbow 90, 6MJIC x 3/4 MOP	A/R
5	210-3-0199	Hose Holder	1
6	900-16964	TEK Screw, 1/4-14UNC x 1-1/2	1
7	905-03220	Restrictor 1/16” 6FJIC X 6MJIC	1
8	905-19126	Quick Coupler	2
9	905-21407	Large Mechanical Depth Stop Nut	1
10	905-21305	Mechanical Depth Stop Nut	A/R
11	905-03111	Nipple, 6MJIC x 6MJIC	1
12	905-21292	Hydraulic Cylinder - 3 X 8R	1
13	905-21291	Hydraulic Cylinder - 3.25 X 8R	1
14	905-07091	32” Nylon Cable Tie (Not Shown)	6
15	905-19180	3/8 Hose, 8MORB x 6FJIC x 252”	2
16	905-19170	3/8 Hose, 6FJIC x 6FJIC x 64” (6 or 8 Row) (12 Row)	1 2
17	905-19151	3/8 Hose, 6FJIC x 6FJIC x 134”	1
18	905-19196	3/8 Hose, 6FJIC x 6FJIC x 72”	1
19	905-19122	3/8 Hose, 6FJIC x 6FJIC x 175”	1
20	905-19187	3/8 Hose, 6FJIC x 6FJIC x 288”	1
	500-1-0191	Hydraulic Hose Kit, Single Outside Struts	
	500-1-0140	Hydraulic Strut Optional Hose Kit, 2 Pair Big Wheels 12R22	

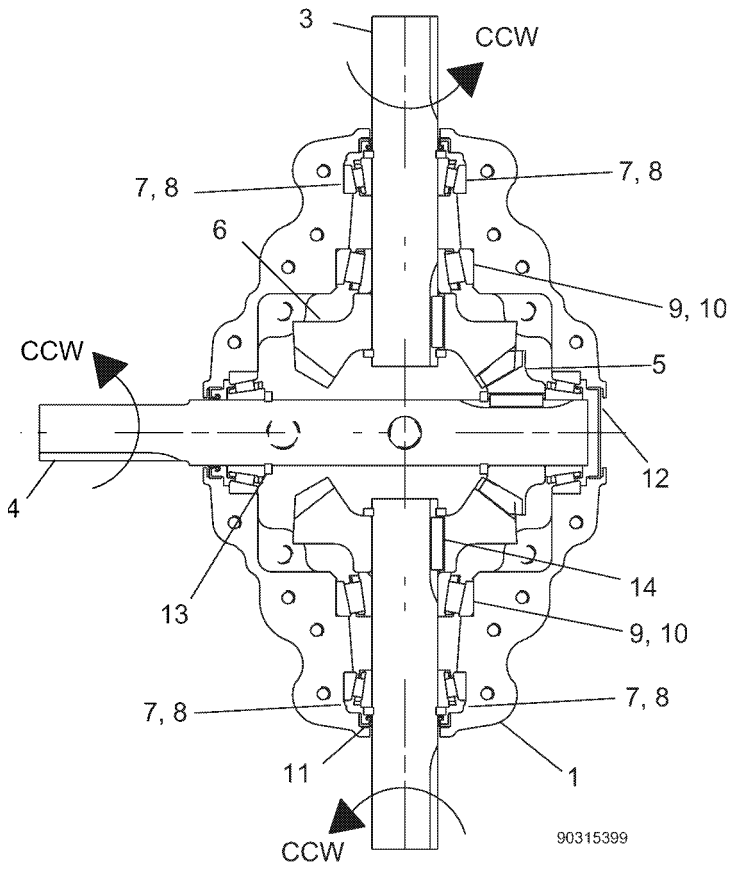
REAR STEER PLUMBING COMPONENTS

12-Row



REF	PART NUMBER	DESCRIPTION	QTY.
1	210-2-0183	3/8 Hose, 1/2 MP x 1/2 MP x 60	2
2	905-01004	Elbow, 1/2 NPT x 90 Deg.	2
3	210-2-0201	3/8 Hose, 1/2 MP x 1/2 MP x 235	2
4	905-01531	1/2 Swivel Restrictor, 1/16	2
5	905-01528	Elbow, 90°, 3/4 MORB x 1/2 FPT	2
6	905-21369	Rear Steer Cylinder	1
7	210-3-0199	Hose Holder	AR

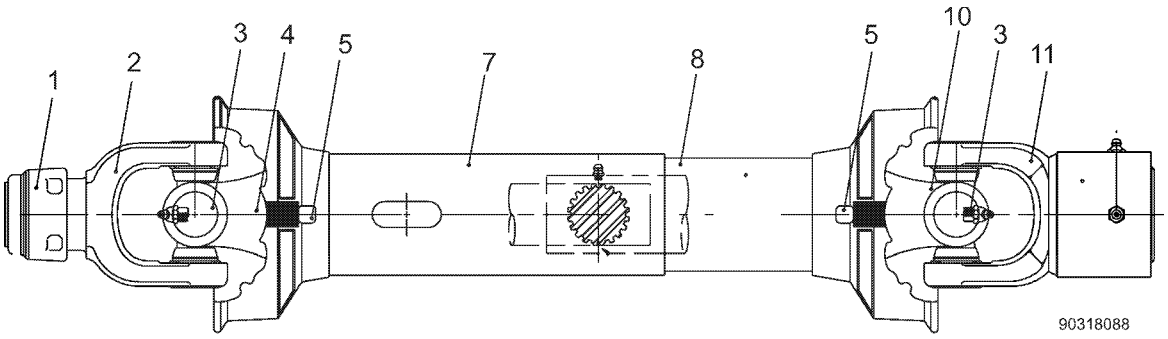
GEAR BOX (SUPERIOR)



REF	PART NUMBER	DESCRIPTION	QTY.
1	903-15291	Casting, Machine bottom threaded	1
NS	903-15292	Casting, Machine top half	1
3	903-15398	Shaft, Pinion 600100 1.75/2.0 K	2
4	903-15393	Shaft, Cross 600100 1.50/3.0 K	1
5	903-15321	Gear, 1.5:1, 20 Tooth, #651010	1
6	903-15320	Gear, 1.5:1, 30 Tooth, #651030	2
7	901-01150	Bearing Cone 25581	4
8	901-01152	Bearing Cup 25520	4
9	901-01151	Bearing Cone 3782	2
10	901-01153	Bearing Cup 3720	2
11	901-09125	Seal, TC-1.750-2.437-.312	3
12	903-15397	End Plug, BPC-.328-SMBR	1
13	900-39030	Retaining Ring, 1.750	6
14	903-15343	Key	3
NS	900-03033	Bolt, 3/8-16 x 2.25 SHCS	16
NS	905-03078	Plug, 1/2-1/4 NPT SCHD w/3M	1
NS	905-15411	Dip Stick	1
NS	905-03080	Plug, Vent 5 PSI	1
NS	905-15359	Bushing, 1/2 NPT to 1/4 NPT	1
		Gear Box, Complete, Keyed	1

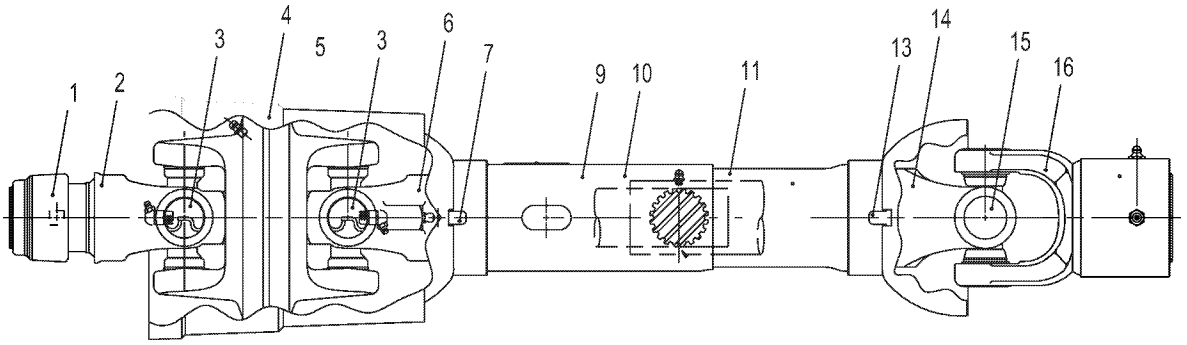
NS = Not Shown

PTO SHAFT (WEASLER)



REF	PART NUMBER	DESCRIPTION	QTY.
1	903-17772	Safety Slide Lock Repair Kit, 1-3/4”	1
	903-18106	Safety Slide Lock Repair Kit, 1-3/8”	1
2	903-18108	Safety Slide Lock Yoke Assembly, 1-3/4”	1
	903-18116	Safety Slide Lock Yoke Assembly, 1-3/8”	1
3	903-17525	44R Cross and Bearing Kit	2
4	903-18109	Yoke and Shaft (1.69-20 Spline)	1
5	903-17774	Nylon Repair Kit (Not Shown)	2
7	903-18110	Outer Guard	1
8	903-18111	Inner Guard	1
10	903-18112	Yoke, Tube and Slip Sleeve	1
11	903-17721	Overrunning Clutch Assembly	1
	903-18088	PTO Shaft, Complete 1-3/8”	1
	903-18089	PTO Shaft, Complete 1-3/4”	1
	903-18113	Tractor Half w/Guard 1-3/4”	1
	903-18115	Tractor half 1-3/8	1
	903-18114	Implement half 1-3/8	1

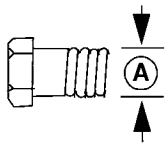
PTO SHAFT (WEASLER)
(CONSTANT VELOCITY)



REF	PART NUMBER	DESCRIPTION	QTY.
1	903-17427	Safety Slide Lock Repair Kit, 1-3/8”	1
	903-17772	Safety Slide Lock Repair Kit, 1-3/4”	1
2	903-17711	Safety Slide Lock Yoke Assembly, 1-3/8”	1
	903-17771	Safety Slide Lock Yoke Assembly, 1-3/4”	1
3	903-17712	Cat. 5 Cross & Bearing Kit	2
4	903-17714	Bell Ext. w/Nylon Centralizer	1
5	903-17713	C.V. Center Housing Assy	1
6	903-17715	Yoke & Shaft (1.69-20 Spline)	1
NS	903-17773	Nylon Repair Kit (Not Shown)	1
NS		Centralizer (Not shown, included in item 4)	1
10	903-17717	Outer Guard	1
11	903-17719	Inner Guard	1
NS	903-17774	Nylon Repair Kit (Not Shown)	1
14	903-17718	Yoke, Tube and Slip Sleeve	1
15	903-17525	44R Cross & Bearing Kit	1
16	903-17721	Overrunning Clutch Assembly	1
	903-17621	PTO Shaft, Complete 1-3/8”	1
	903-17987	Tractor Half 1-3/8”	1
	903-17754	PTO Shaft, Complete 1-3/4”	1
	903-17986	Tractor Half 1-3/4”	1
	903-17990	Implement Half	1

BOLT 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. Always use the proper tool for tightening hardware: SAE for SAE hardware and Metric for metric hardware. Make sure fastener threads are clean and you start thread engagement properly.
All torque values are given to specifications used on hardware defined by SAE J1701 & J1701M JUL96.



SAE SERIES TORQUE CHART

SAE Grade 2 (No Dashes)

SAE Bolt Head Identification

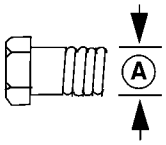
SAE Grade 5 (3 Radial Dashes)

SAE Grade 8 (6 Radial Dashes)

A Diameter	Wrench Size	MARKING ON HEAD					
		SAE2		SAE5		SAE8	
		Lbs.-Ft.	N-m	Lbs.-Ft.	N-m	Lbs.-Ft.	N-m
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”	467	634	722	979	1020	1383

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.



METRIC SERIES TORQUE CHART

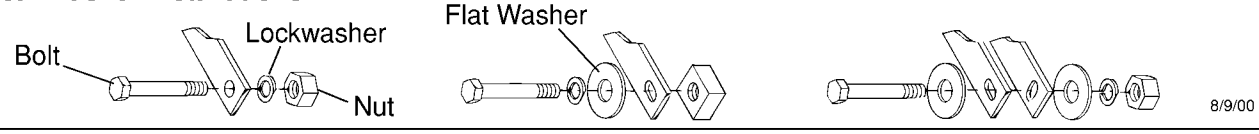
Metric Grade 8.8

Metric Bolt Head Identification

Metric Grade 10.9

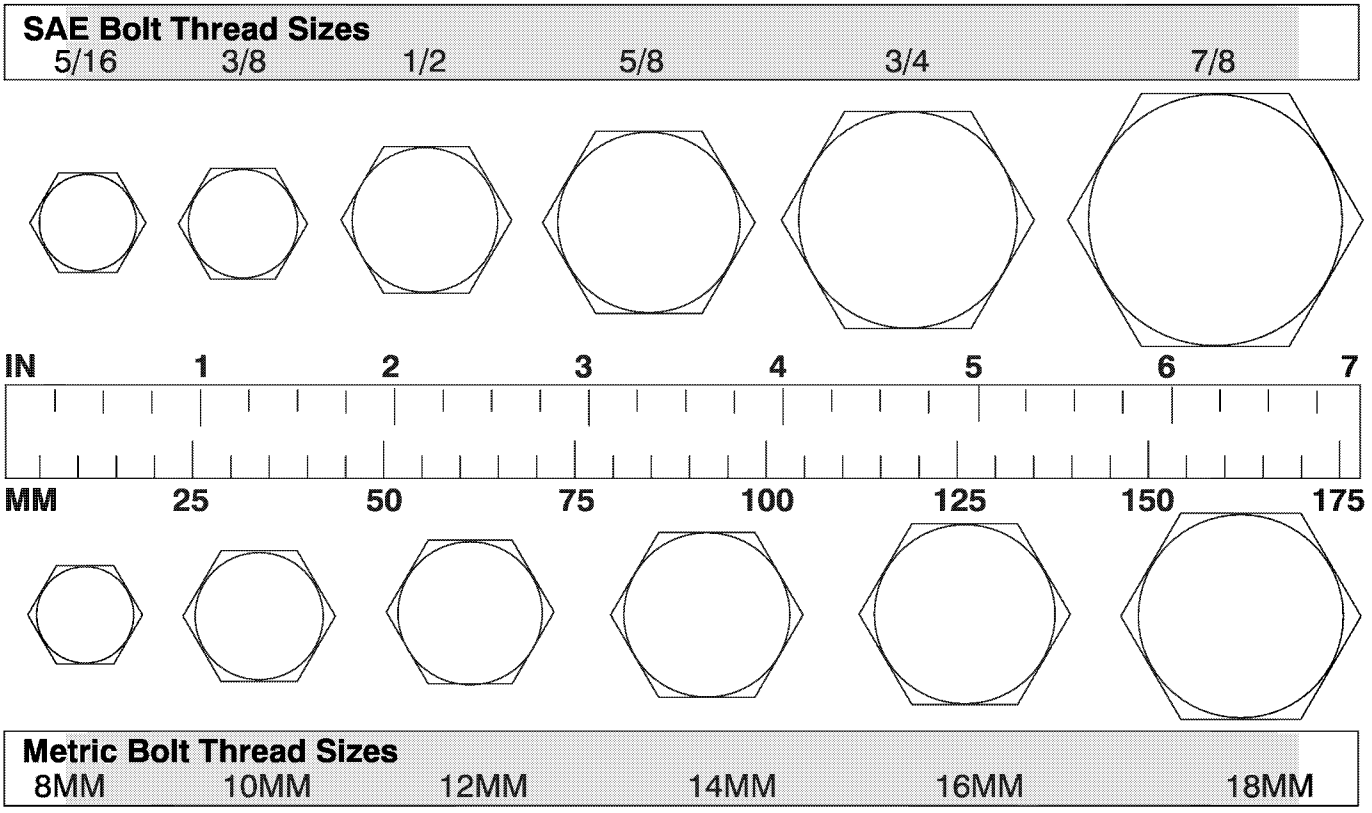
A Diameter & Thread Pitch (Millimeters)	Wrench Size	COARSE THREAD				FINE THREAD				A Diameter & Thread Pitch (Millimeters)
		MARKING ON HEAD				MARKING ON HEAD				
		Metric 8.8		Metric 10.9		Metric 8.8		Metric 10.9		
		N-m	Lbs.-Ft.	N-m	Lbs.-Ft.	N-m	Lbs.-Ft.	N-m	Lbs.-Ft.	
6x1.0	10 mm	8	6	11	8	8	6	11	8	6x1.0
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
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	22x1.5
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



BOLT SIZE CHART

NOTE: Chart shows bolt thread sizes and corresponding head (wrench) sizes for standard SAE and Metric Bolts.



ABBREVIATIONS

AG ..... Agriculture
ATF ..... Automatic Transmission Fluid
BSPP ..... British Standard Pipe Parallel
BSPTM ..... British Standard Pipe Tapered Male
CV ..... Constant Velocity
CCW ..... Counter-Clockwise
CW ..... Clockwise
F ..... Female
GA ..... Gauge
GR (5, etc.) ..... Grade (5, etc.)
HHCS ..... Hex Head Cap Screw
HT ..... Heat Treated
JIC ..... Joint Industry Council 37° Degree Flare
LH ..... Left Hand
LT ..... Left
m ..... Meter
mm ..... Millimeter
M ..... Male
MPa ..... Mega Pascal
N ..... Newton
NC ..... National Coarse
NF ..... National Fine
NPSM ..... National Pipe Straight Mechanical
NPT ..... National Pipe Tapered
NPT SWF ..... National Pipe Tapered Swivel Female
ORBM ..... 0-Ring Boss - Male
P ..... Pitch
PBY ..... Power Beyond
psi ..... Pounds per Square Inch
PTO ..... Power Take Off
QD ..... Quick Disconnect
RH ..... Right Hand
ROPS ..... Roll Over Protective Structure
RPM ..... Revolutions Per Minute
RT ..... Right
SAE ..... Society of Automotive Engineers
UNC ..... Unified Coarse
UNF ..... Unified Fine
UNS ..... Unified Special

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WARRANTY

Please Enter Information Below and Save For Future Reference.

Date Purchased: _____ From (Dealer): _____

Model Number: _____ Serial Number: _____

ALLOW AY STANDARD, d/b/a ALLOW AY, 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, a ALLOWAY authorized dealer or distributor, and/or a 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 ALLOWAYS' 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 ALLOWAYS' 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 14th Ave.NW
Fargo, North Dakota 58102
701-356-4983

STANDARD alloway

WARRANTY

ALLOWAY STANDARD, d/b/a ALLOWAY, warrants this product to be free from defect in material and workmanship for a period of ninety (90) days 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.

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.

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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:

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4230 14th Ave.NW
Fargo, North Dakota 58102
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PART NUMBER

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4230 14th Ave NW.
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