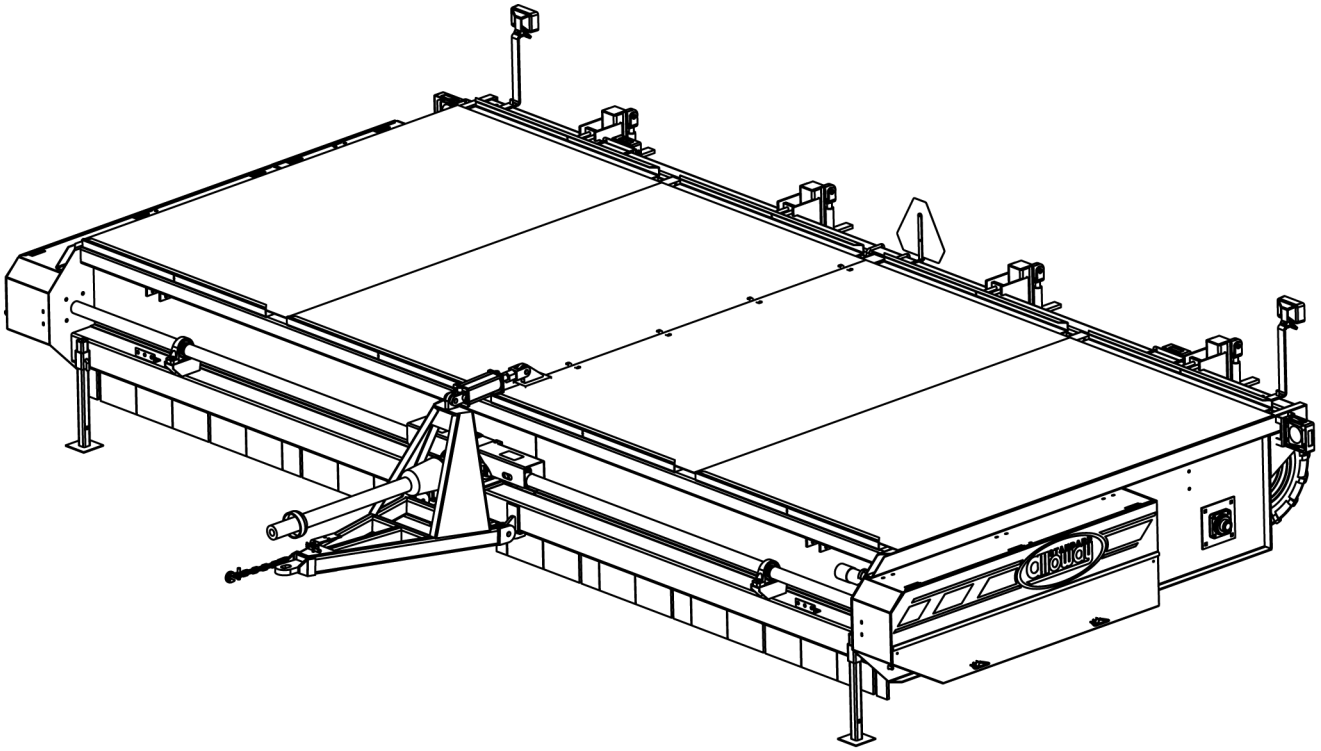
STANDARD alloway

BEET DEFOLIATOR



OPERATOR'S MANUAL

500-5-0001 (2011)

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!

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

TABLE OF CONTENTS

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.**

(Safety Rules continued on next page)

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

(Safety Rules continued from previous page)

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

- **Connect PTO driveline directly to power unit PTO shaft. Never use adapter sleeves or adapter shafts. Adapters can cause driveline failures due to incorrect spline or incorrect operating length and can result in personal injury or death.**

- **Inspect rubber flaps and swing rod before each use. Replace if damaged or missing. Flaps must pivot and hang freely so there are no gaps. Do not put equipment into service until repaired.**

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

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

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

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

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

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

(Safety Rules continued on next page)

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

(Safety Rules continued from previous page)

TRANSPORTING

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

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

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

- **Always attach safety chain to tractor drawbar when transporting unit.**

- **Always raise unit and install transport locks before transporting. Leak down or failure of mechanical or hydraulic system can cause equipment to drop.**

- **Never exceed 20 MPH during transport. See the Speed vs. Weight Ratio Table in "Field Operation, Transporting the Unit" for proper tow vehicle to machine weight ratios.**

- **Watch for hidden hazards on the terrain.**

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

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

- **Do not operate PTO during transport.**

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

- **Do not operate or transport on steep slopes.**

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

- **Do not operate or transport equipment while under the influence of alcohol or drugs.**

OPERATION

- **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.**

- **Keep bystanders away from equipment.**

- **Do not operate or transport equipment while under the influence of alcohol or drugs.**

- **Operate only in daylight or good artificial light.**

- **Avoid contact with electrical wires.**

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

(Safety Rules continued on next page)

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

(Safety Rules continued from previous page)

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

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

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

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

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

■ **Do not operate PTO during transport.**

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

■ **Do not operate or transport on steep slopes.**

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

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

■ **Watch for hidden hazards on the terrain during operation.**

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

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

■ **Always raise scalper arms before 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.**

(Safety Rules continued on next page)

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

(Safety Rules continued from previous page)

MAINTENANCE

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

■ **Before working 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.**

■ **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.**

(Safety Rules continued on next page)

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

(Safety Rules continued from previous page)

STORAGE

- **Follow manual instructions for storage.**

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

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

CHECK LISTS

DELIVERY CHECK LIST
(DEALER'S RESPONSIBILITY)

—— Check that all safety decals are installed and in good condition. Replace if damaged.

—— 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.

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."

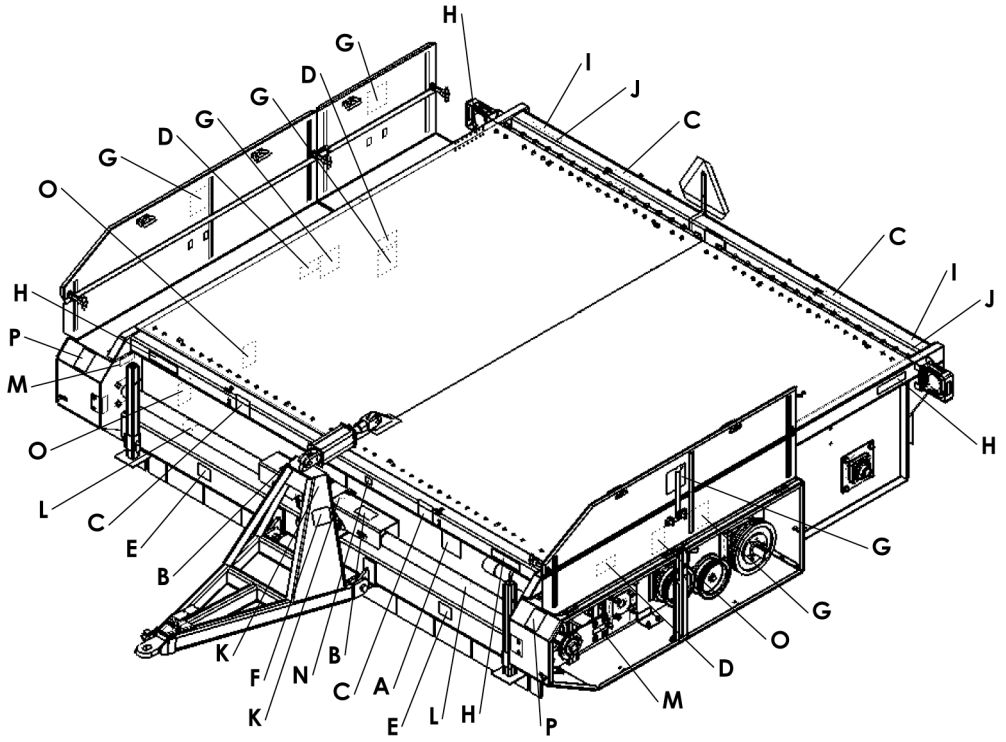
—— Check that tractor hydraulic reservoir has been serviced and that hydraulic system and all functions have been operated through full cylinder stroke to purge air from system.

—— 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.

SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

Replace Immediately If Damaged!



A. 500-3-0977 Caution (1-11)

B. 100-3-1367 Safety Guard

C. 500-3-0981 Rotating Flails

D. 500-3-0980 Missing Shields Warning

E. 500-3-0982 Rotating Flails

F. 500-3-0978 Rotating PTO

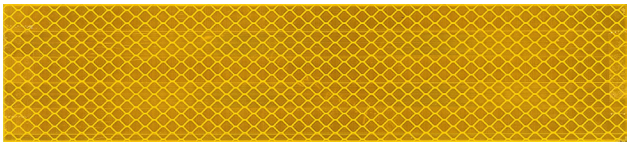
(Safety Decals continued on next page)

SAFETY & INSTRUCTIONAL DECALS

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

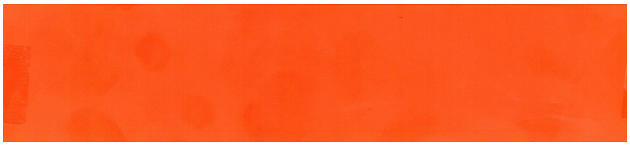
Replace Immediately If Damaged!

G. 500-3-0979 Rotating Part



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

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

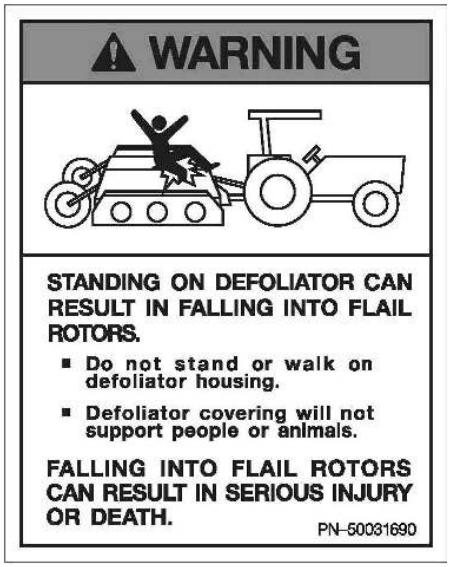


J. 200-3-4034 Orange Fluorescent Reflector 9 x 2

K. 506-3-0194 Shield Missing Warning

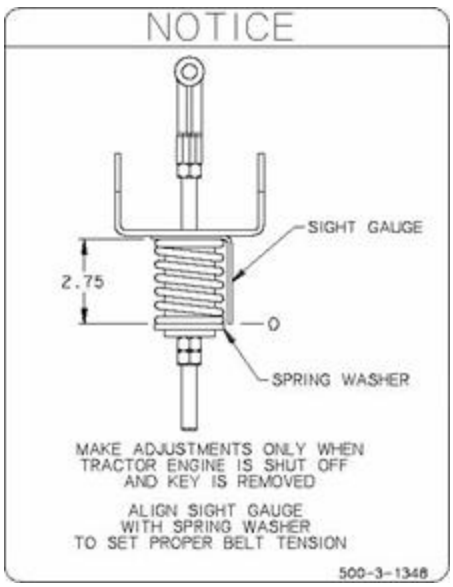
M. 500-3-1149 Belt Tension

N. 200-3-1366 Serial Number Tag



P. 500-3-1690 Do Not Walk / Stand

L. 903-17456 Driveline Safety Sign



O. 500-3-1348 Belt Tension

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 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

- **Keep bystanders away from equipment.**
- **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.**

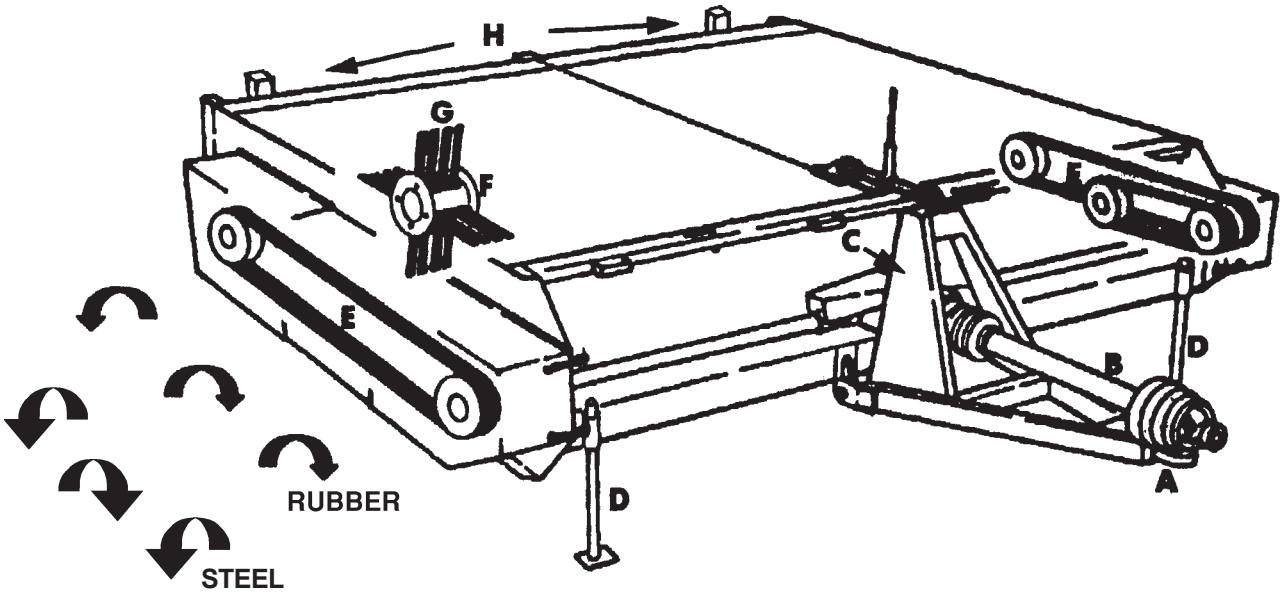
CAUTION

- **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.



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

Figure 1. Beet Defoliator Principal Components

BEET DEFOLIATOR BREAK-IN

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.**

—— Check that all safety decals are installed and in good condition. Replace if damaged.

—— 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.**

DRAWBAR

The tractor drawbar must be set to provide 16" (406mm) 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).

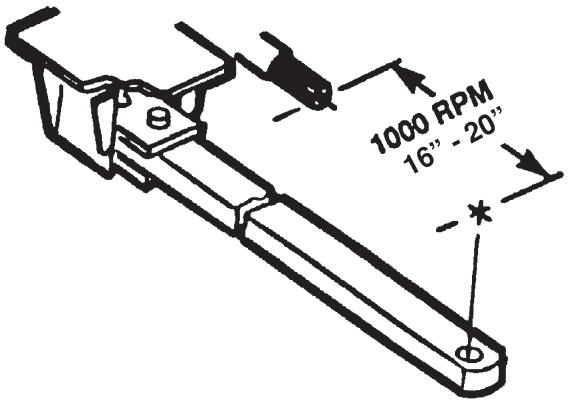


Figure 2a. Drawbar Dimesion

Figure 2b. PTO Driveline

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.

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.

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

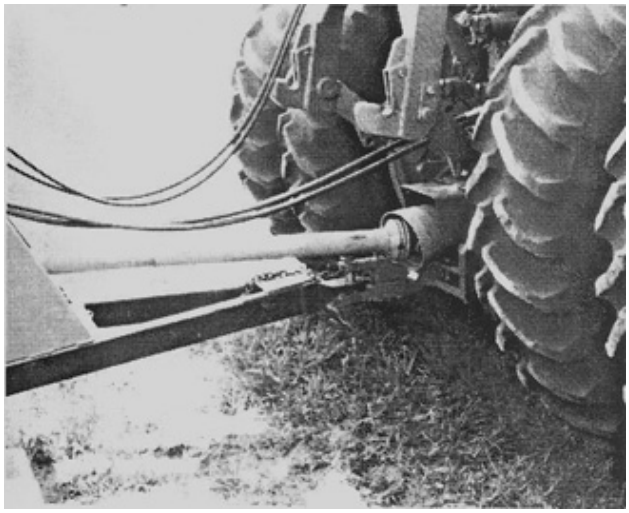


Figure 3. Driveline and Hydraulics Attached

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.**

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.

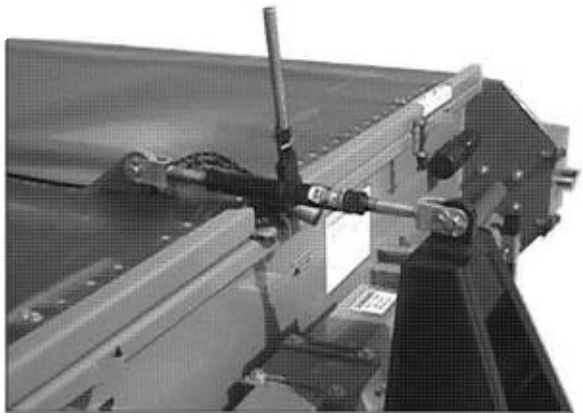


Figure 4. Hitch Ratchet

Figure 5. Parking 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.

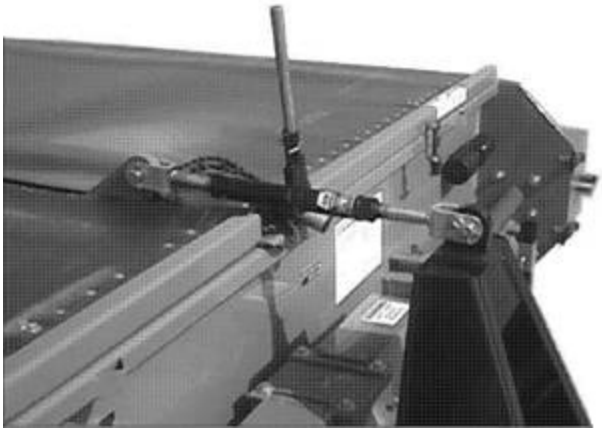


Figure 6. Hitch Ratchet

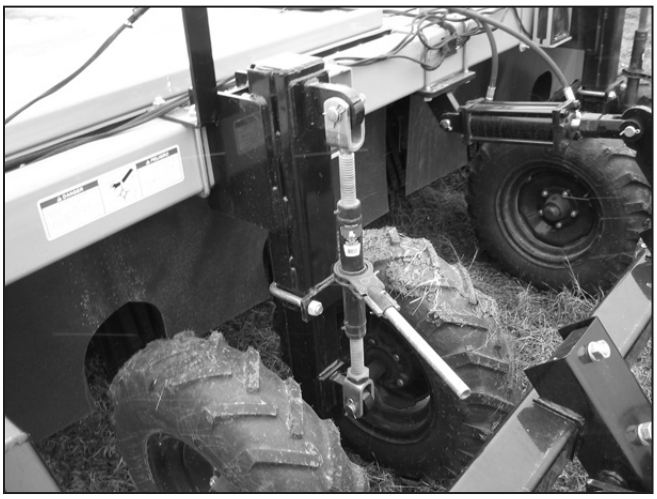


Figure 7. Rear Wheels

(Machine Settings continued on next page)

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.

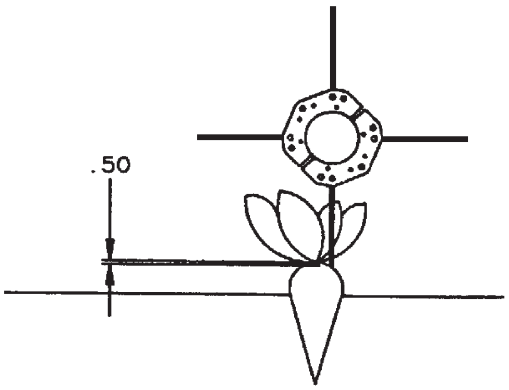


Figure 8. Flail Height

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

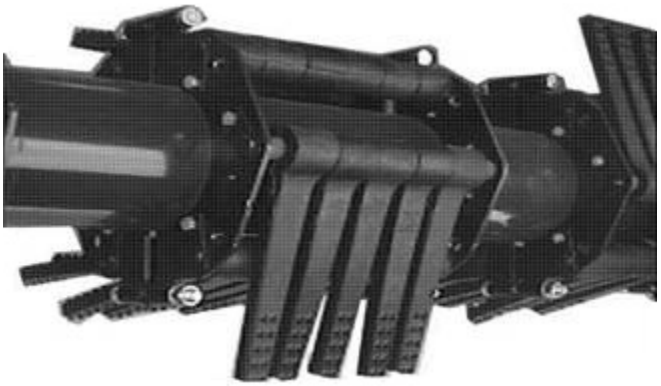


Figure 10. Flail Assembly

(Machine Settings continued on next page)

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.

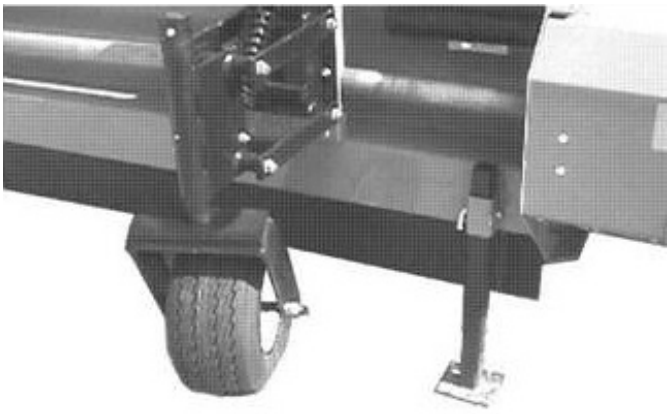


Figure 12. Stabilizer Wheel Position

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 Scalpers

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.**

1. 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.

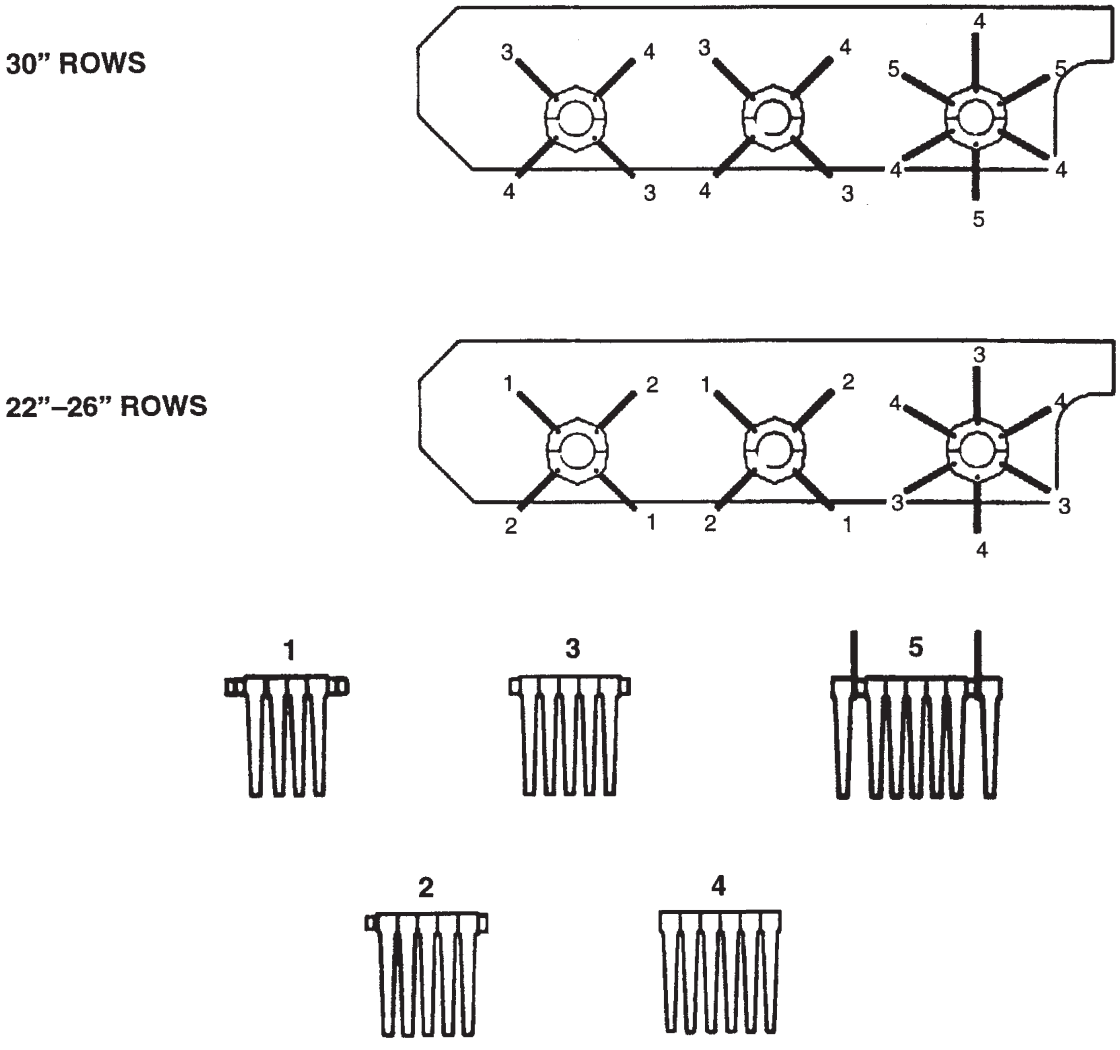


Figure 15. Flail Patterns

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.**

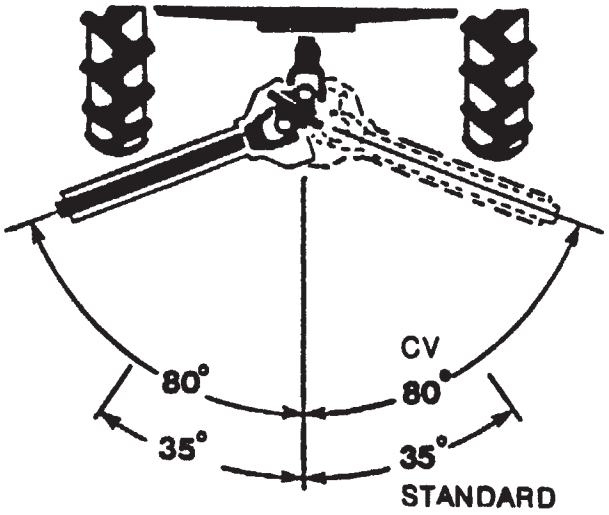


Figure 16. Driveline Angles

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.

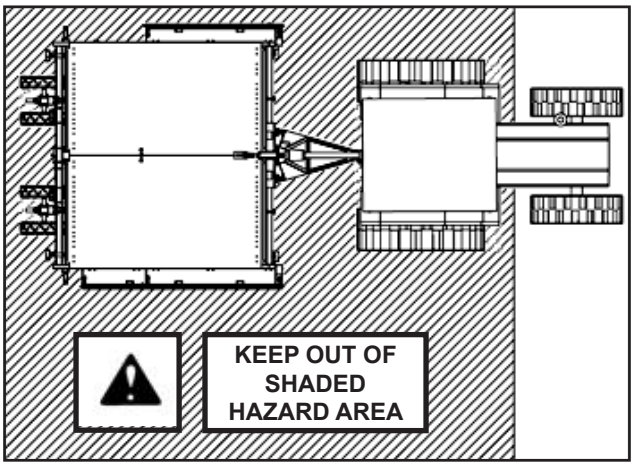


Figure 17. Hazard Area

ADDITIONAL EQUIPMENT (Optional)

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.

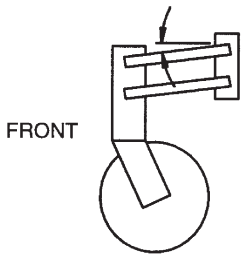


Figure 19. Stabilizer Strut

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.

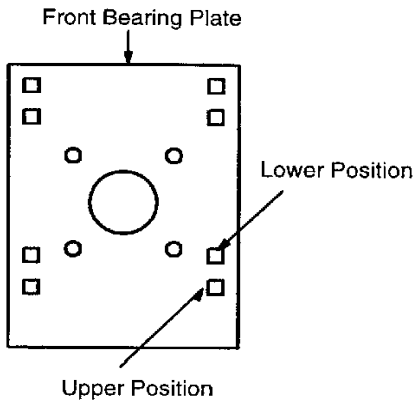


Figure 20. Steel Flail Adjustment

STORAGE

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.

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.

Figure 21. Open Covers

Figure 22. Scalper Storage

SERVICE & MAINTENANCE

WARNING

■ Keep children and bystanders away from storage area.

■ 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 leverscan 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

Use the Lubrication Service Record (Page 36), to keep a record of all schedualed maintenance.

1. Grease

Use and SAE multi-purpose hight temperature grease with extreme pressure (EP) performance. A SAE multi-purpose lithium-based grease is aslo 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 lubriacants are used. Use clean containers to handle all lubricants. Store them in an area protected from dust, moisture, and other contaminants.

GREASING

Use the Lubrication Service Record (Page 31), to keep a record of all schedualed 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

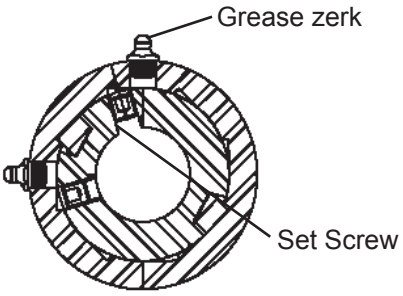
1. Lubricate PTO driveline, position A, Figure 22 and Figure 24.

2. Use dipstick to check gearbox oil level.

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.



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

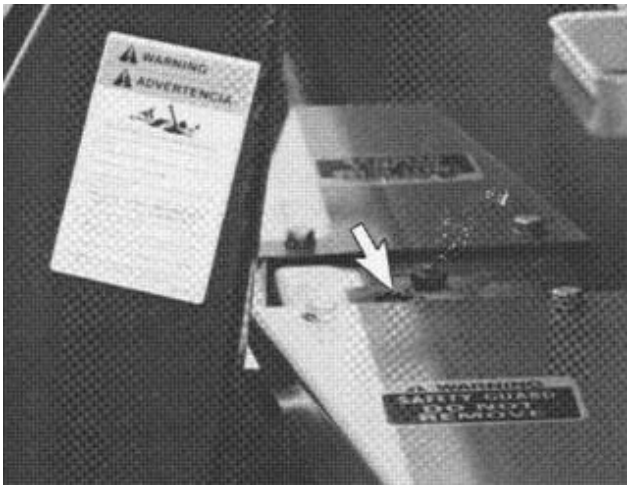


Figure 23. Dipstick

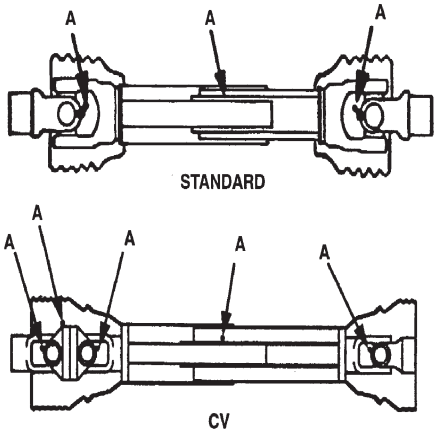


Figure 22. Driveline

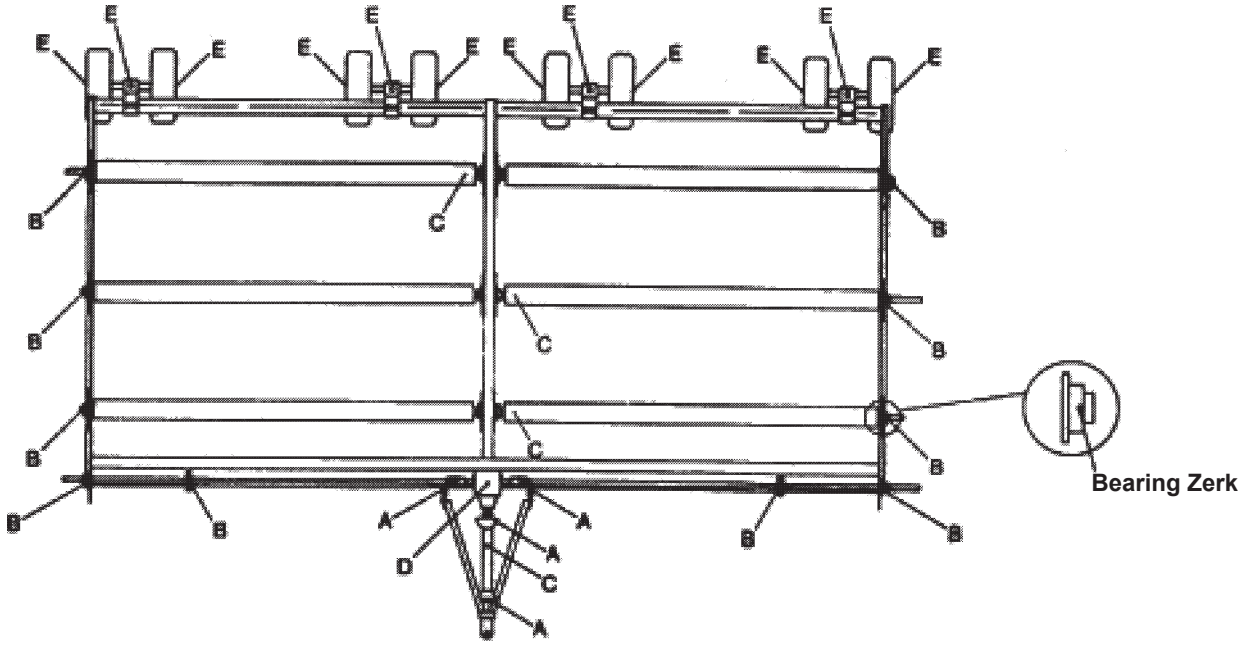


Figure 24. Lubrication Diagram

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).

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.

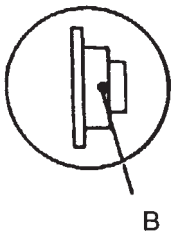


Figure 25. Position B

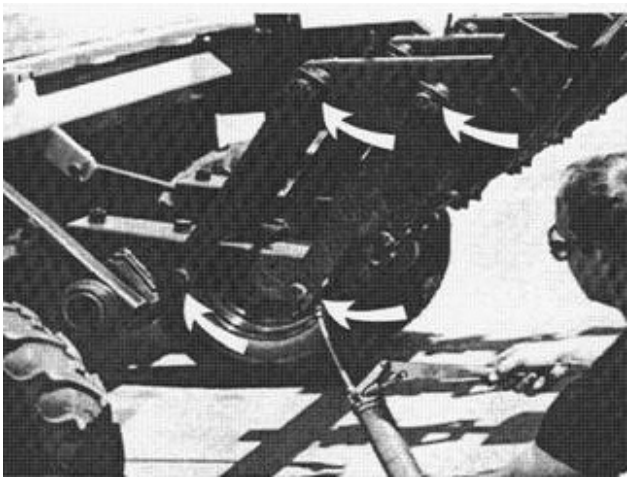


Figure 26. Scalper Pivot Bearings

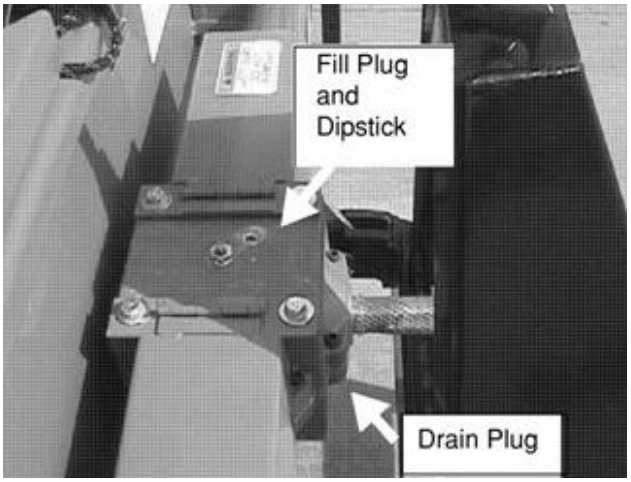


Figure 27. Gearbox, Fill & Drain Plugs

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

Service & Maintenance *Continued*

Lubrication Service Record

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

✓ = CHECK **C** = CHANGE
L = LUBRICATE **R** = REPACK

Date:	Serviced By:	10 Hours or Daily		20 Hours			40 Hours			Annually			
		L PTO Driveline	✓ Gearbox Oil Level	L PTO Driveline (Telescope Section)	L Rotor Splined Couplers	L Wheel Mounting Tube Bearings	L Rotor End Bearing	L U-Joint	L Overrunning Clutch	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.

Figure 28. Wheel Mounting Bolts (Small Tires)

7. Slide the assembly along the frame to the required position.

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. **3.** Disconnect driveline from the tractor.

4. **4.** Open the canvas covers.

5. **5.** Measure from the center line of the machine to determine the required spacing.

6. **6.** Loosen the assembly clamping nuts.

⚠ CAUTION

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

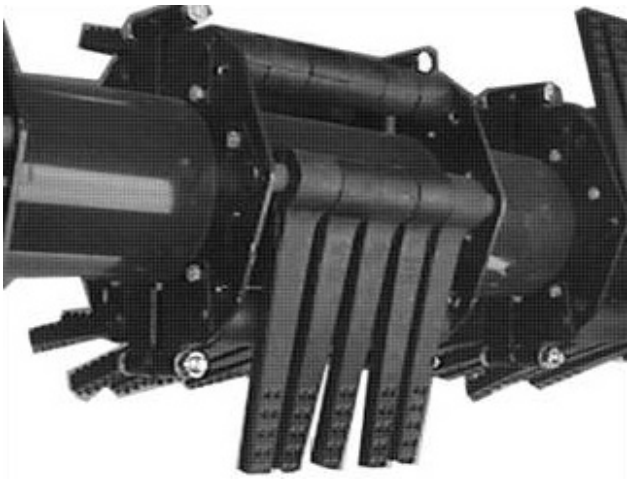


Figure 29. Rubber Flails

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.

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.

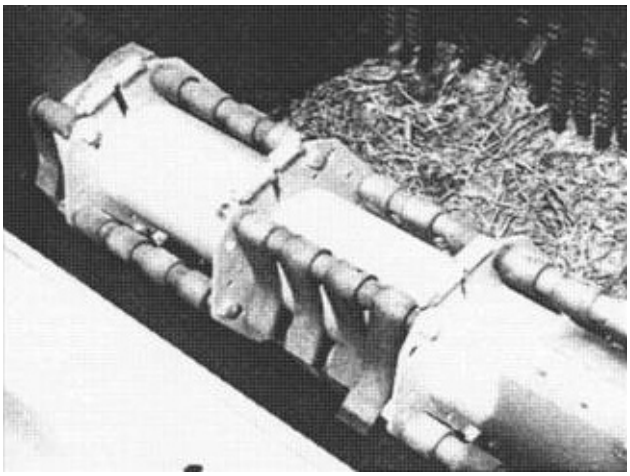


Figure 30. Steel Flails

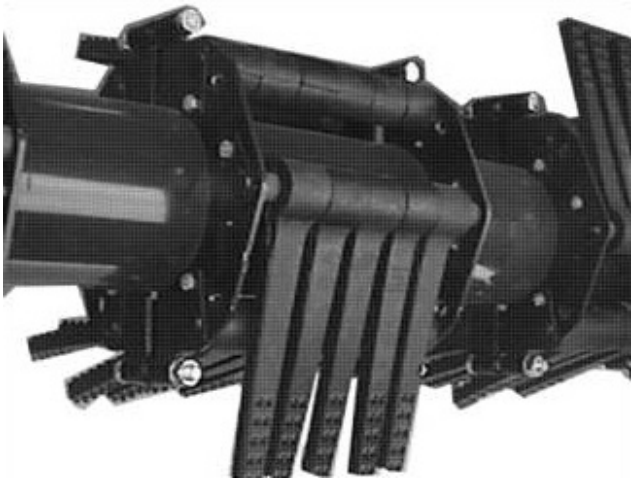


Figure 31. Flail Assembly

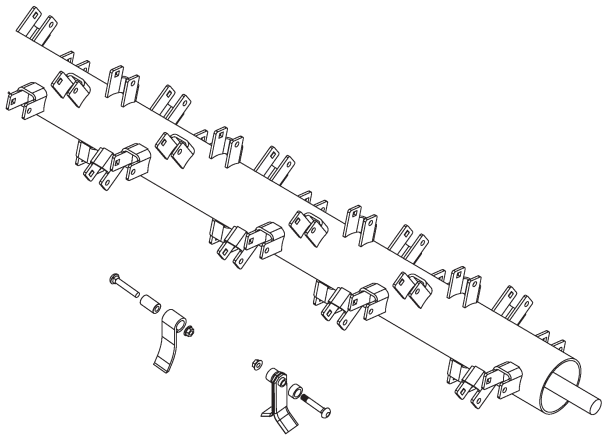


Figure 32. Steel Flails

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.

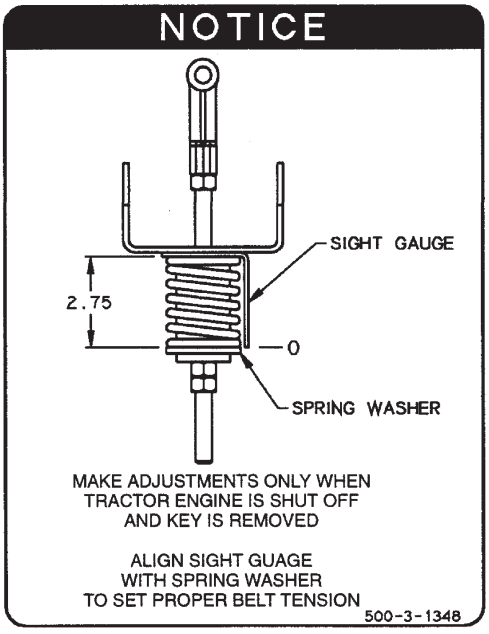


Figure 33. Belt Tension Guage

BEARING LOCK COLLARS

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

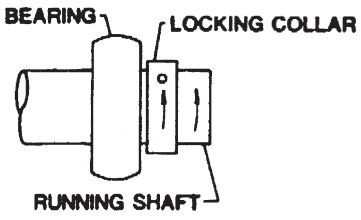


Figure 34. Locking Collar

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.

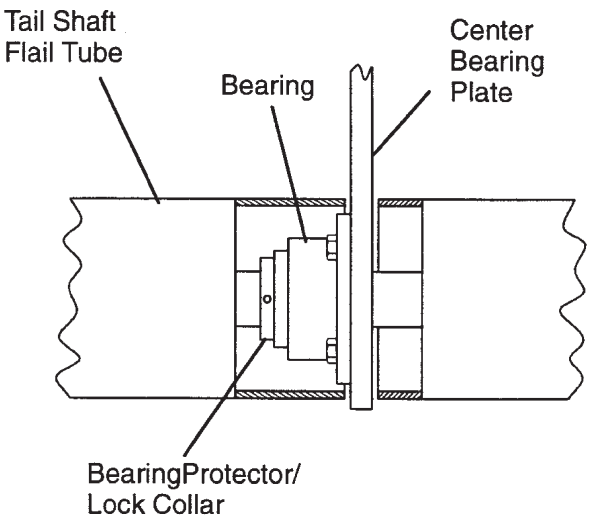


Figure 35. Hanger Bearings

9. Wipe the bearing clean and inspect the grease seal.

10. Lubricate bearing zerk with 3 to 4 shots of grease.

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.

3. Down pressure position:

a. Increase spring tension to decrease skipping (5).
b. Decrease spring tension if scalper pulls beets out of ground.

4. Float position:

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

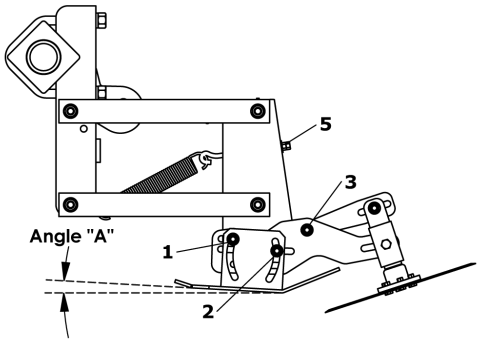


Figure 36c. Circular Scalper

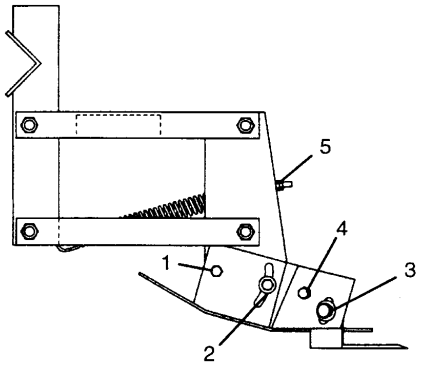


Figure 36a. Knife Scalper (Down Pressure)

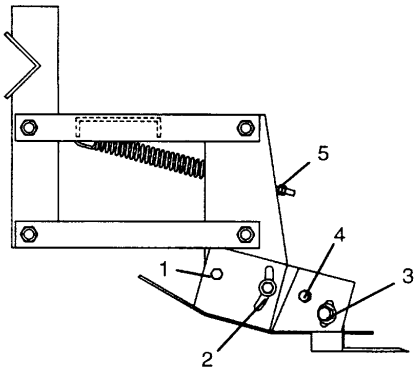


Figure 36b. Knife Scalper (Float)

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.

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.

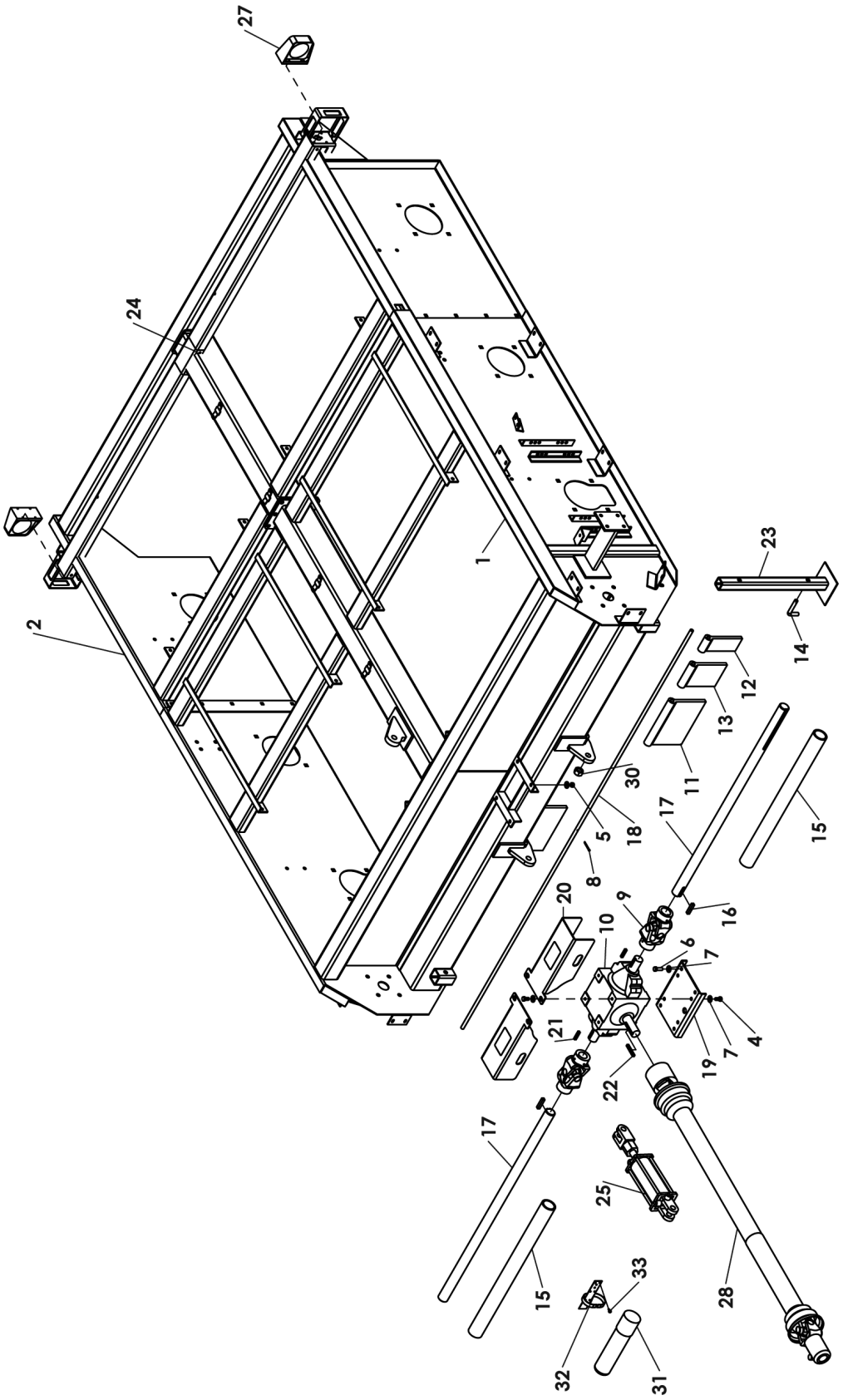
PROBLEM	CAUSE	SOLUTION
Drums won't turn	Tractor PTO defective	Repair tractor PTO
	Broken cross shaft or drive coupler on central hanger bearing	Replace (9 or 12 row units only)
Rapid belt wear	Machine plugged	Unplug machine
	Pulleys out of alignment	Align pulleys
	Loose or overtightened belts	Adjust 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

PARTS INDEX

BEET DEFOLIATOR

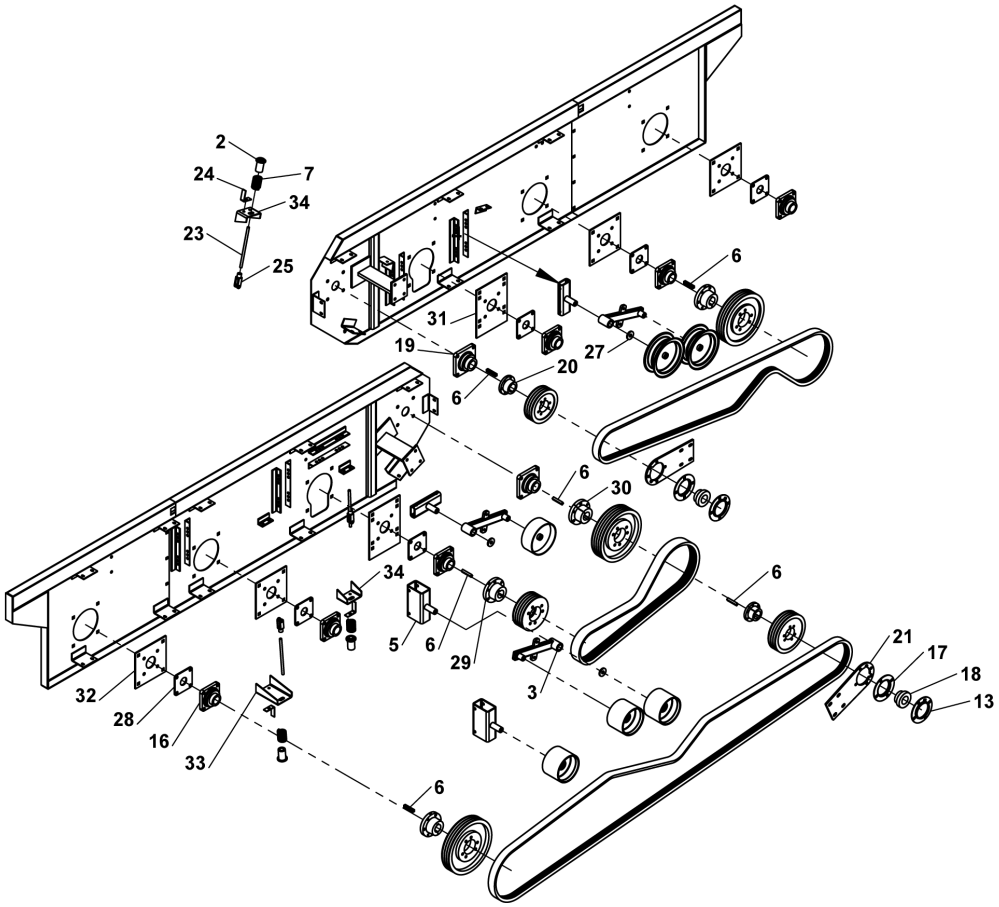
FRAME COMPONENTS

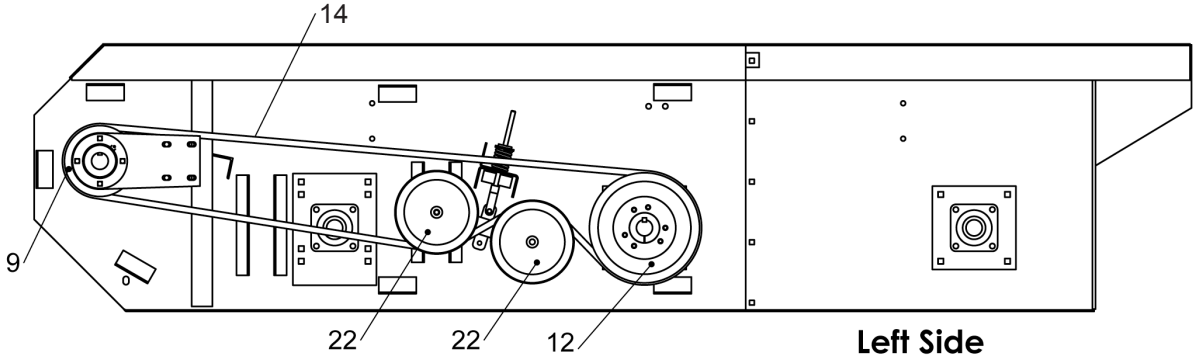


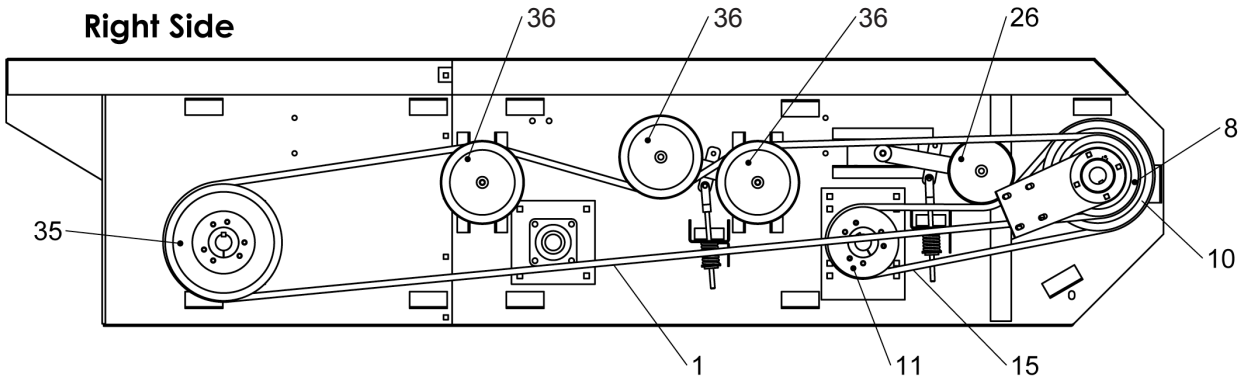
FRAME COMPONENTS

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-1059	FRONT BODY WELD	
2	500-2-1051	REAR BODY WELD	
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	500-3-2252	SHIELD TUBE	2
16	500-3-1662	KEY - 1/2 X 2-1/2 SQUARE	2
17	500-3-2253	CROSS SHAFT	2
18	500-3-2254	ROD, FLAP	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
27	904-01154	AMBER LAMP	2
28	903-17621	PTO SHAFT, C.V. 1-3/8”	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

BELT DRIVE COMPONENTS



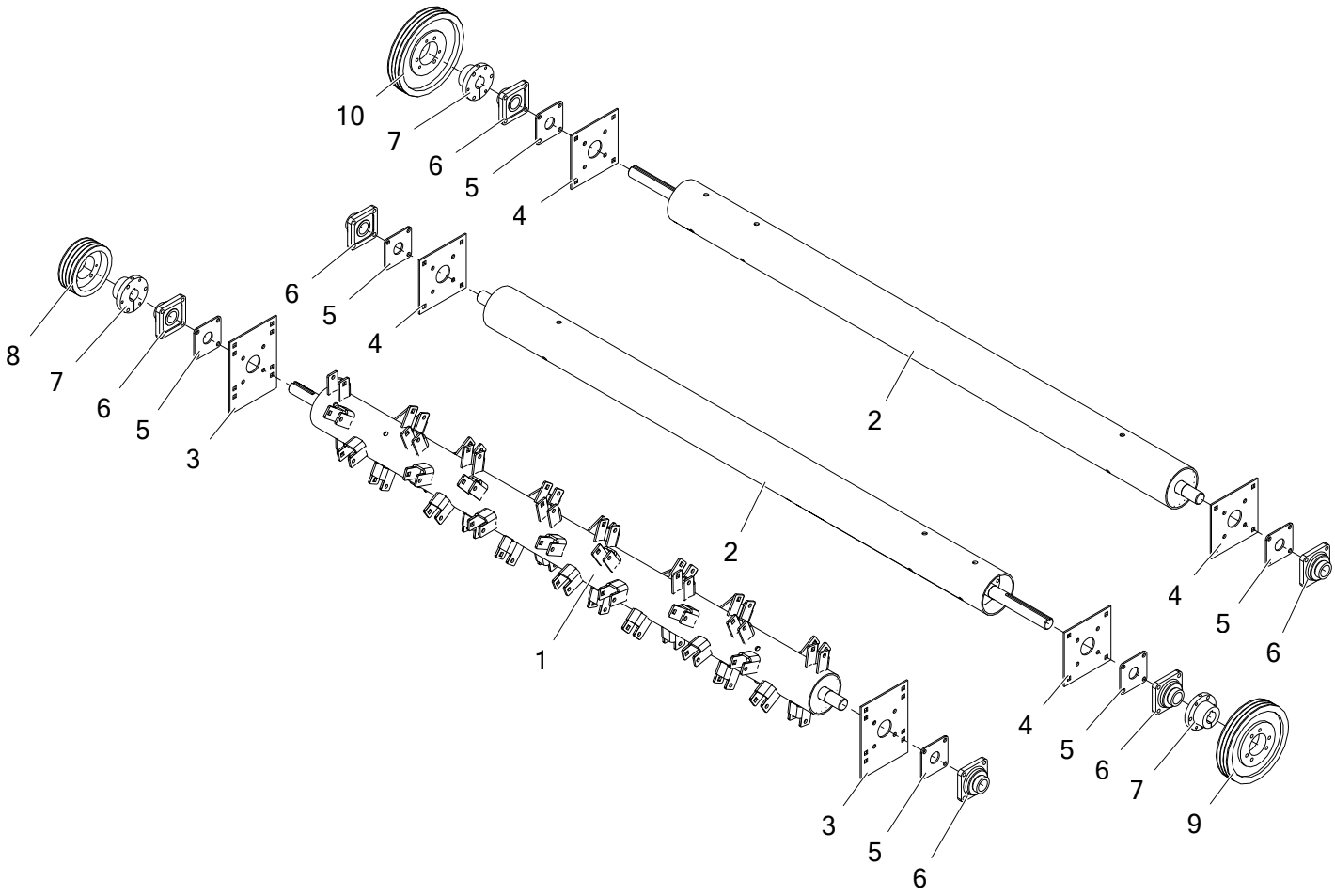




BELT DRIVE COMPONENTS

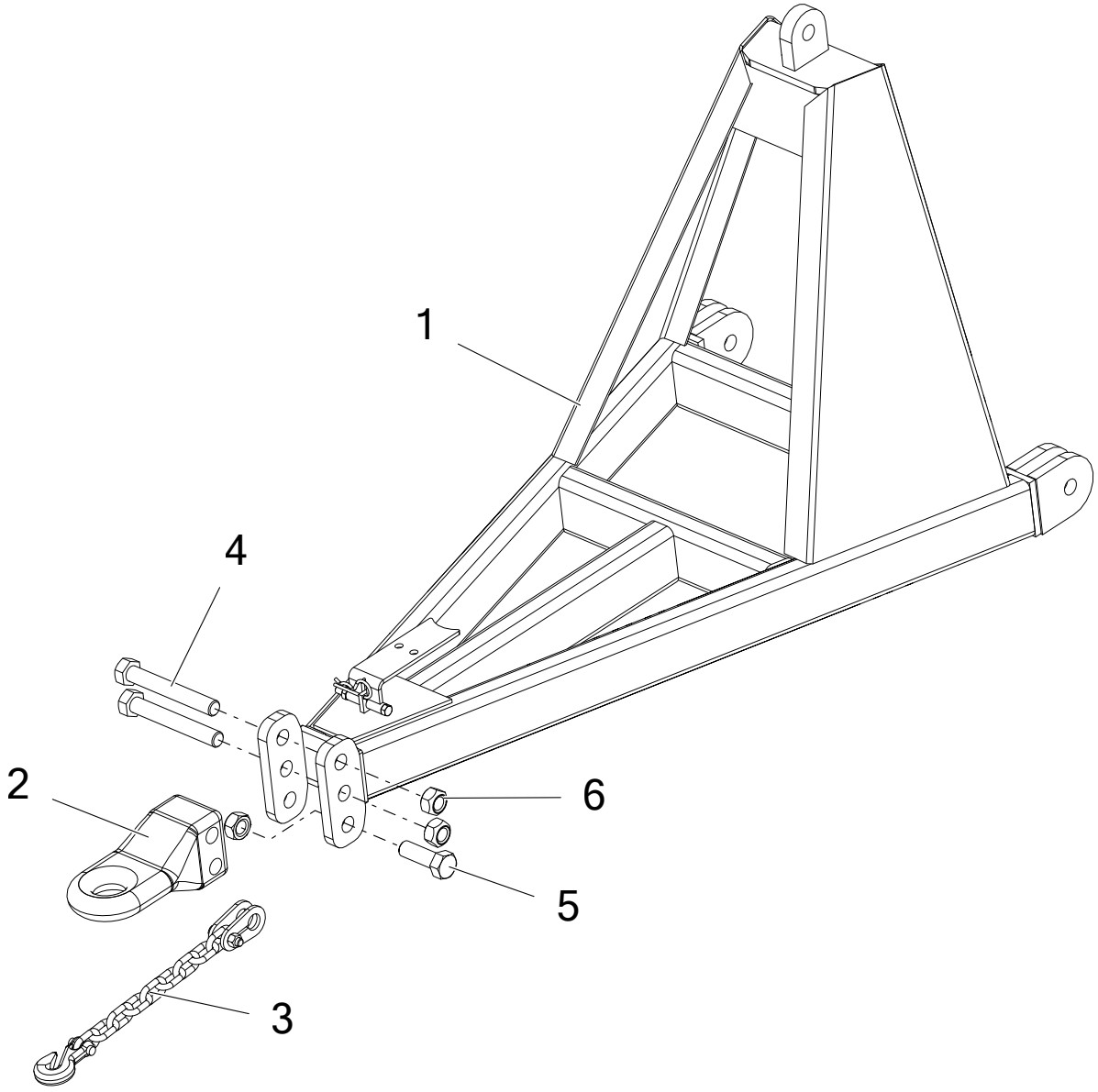
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	903-01428	BELT - 3/5V2500	1
2	500-2-0580	SPRING SUPPORT WELD	3
3	500-2-0574	PIVOT ARM ASSEMBLY	3
4	500-2-0564	PIVOT BASE WELD SHORT	2
5	500-2-0565	PIVOT BASE WELD LONG	2
6	100-3-3331	KEY - 1/2 X 1/2 X 3	6
7	905-14005	SPRING - 2.25 OD X .25 WIRE X 5.25 FL X 7.25 COILS	3
8	903-08398	PULLEY - 3/5V975	1
9	903-08399	PULLEY - 35V850	1
10	903-08388	PULLEY - 4/5V1320	1
11	903-08389	PULLEY - 4/5V850	1
12	903-08397	PULLEY - 3/5V1320	1
13	901-01315	FLANGE 4 HOLE 100MM PF211H LUBE	2
14	903-01427	BELT 3/5V1700	1
15	903-01429	BELT 4/5V950	1
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	500-3-1659	HUB 2” TYPE SF	2
21	500-3-1653	BEARING PLATE 2”	2
22	500-3-1295	FLANGED PULLEY, 3.25” WIDE	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	903-08396	PULLEY - 3/5V1400	1
36	500-3-1295	FLANGED PULLEY, 3.25” WIDE	3

FLAIL TUBE COMPONENTS



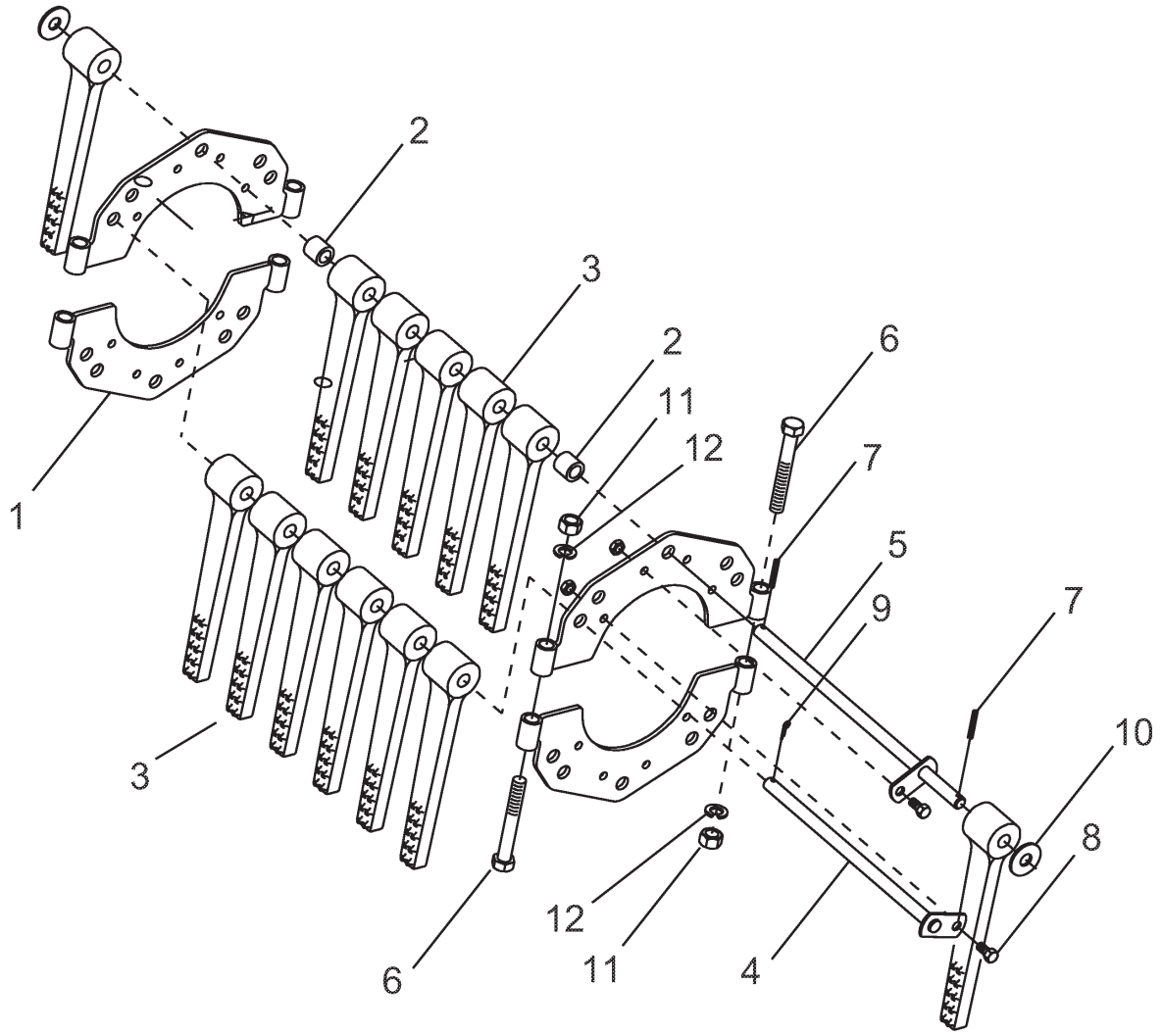
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-1064	FLAIL TUBE WELD (KNIVES)	1
2	500-2-1054	FLAIL TUBE WELD (SMOOTH)	2
3	500-3-1201	FRONT BEARING PLATE	2
4	500-3-1202	CENTER / REAR BEARING PLATE	4
5	500-3-0990	BEARING SHIELD	6
6	901-01282	1-15/16 BEARING	6
7	500-3-1059	1-15/16 HUB, TYPE E	3
8	903-08389	PULLEY, 4/5V850	1
9	903-08397	PULLEY, 3/5V1320	1
10	903-08396	PULLEY, 3/5V1400	1

HITCH COMPONENTS



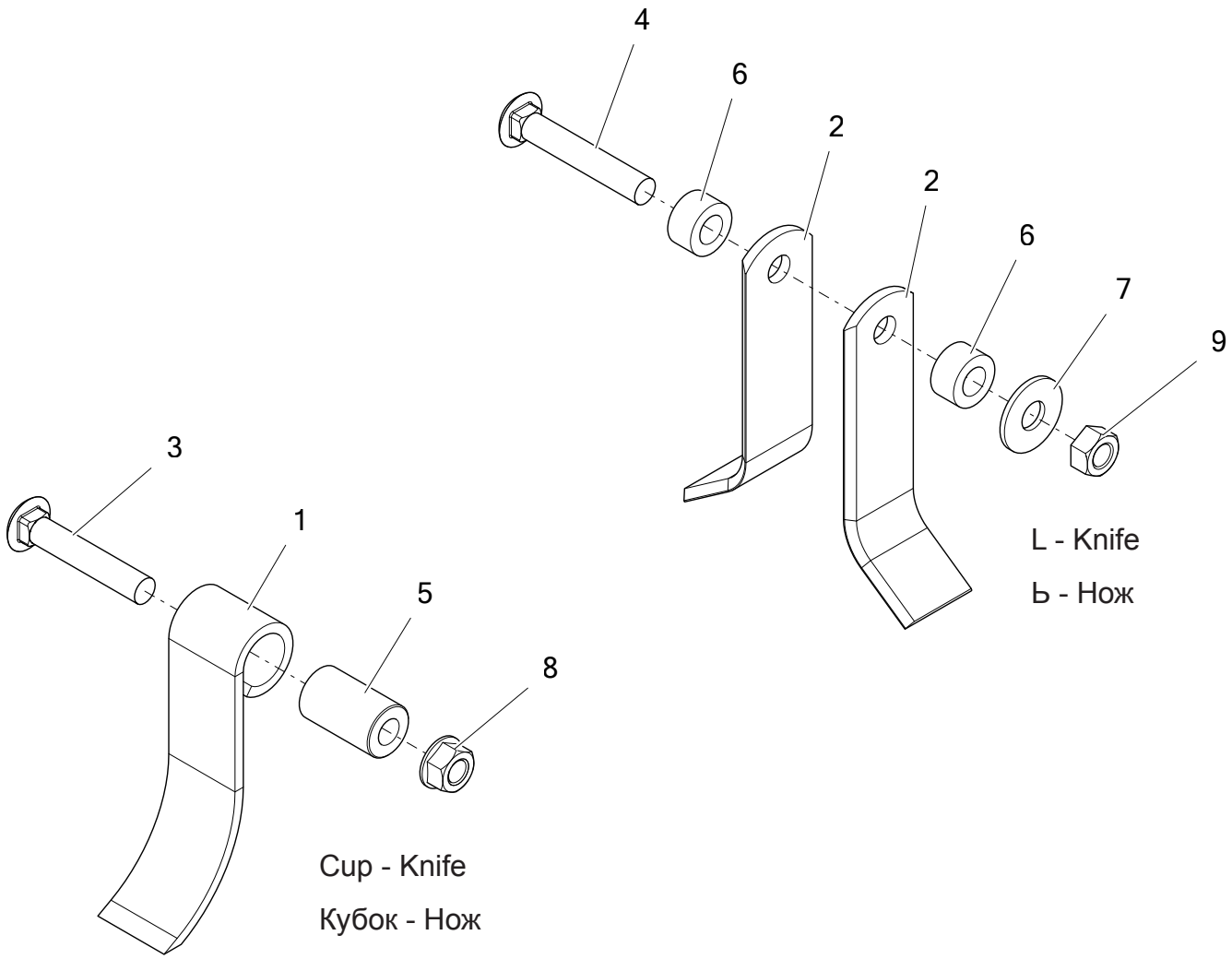
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0036	HITCH FRAME	
2	505-3-0831	HITCH, CAT-3	1
3	905-07123	SAFETY CHAIN	1
4	900-02930	BOLT, 1 NC x 7	2
5	900-01519	BOLT, 1 NC x 3	1
6	900-06514	LOCK NUT, 1 NC	3
	500-2-1216	HITCH, COMPLETE KIT	

RUBBER FLAIL COMPONENTS



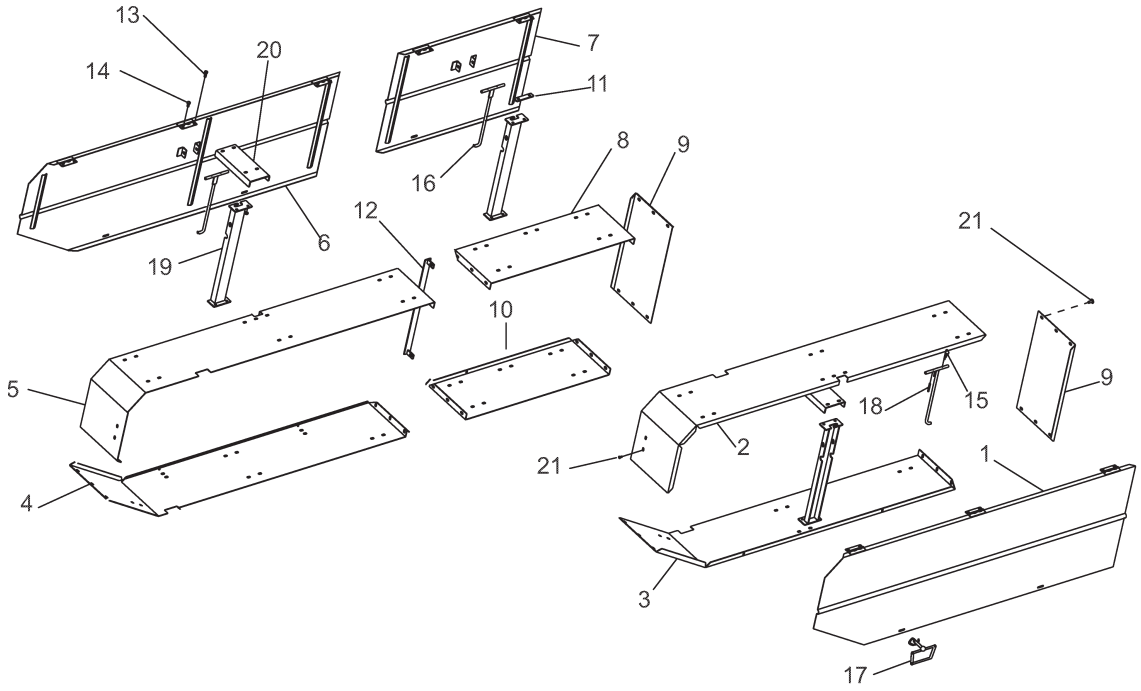
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0067	FLAIL MOUNTING BRACKET	-
2	500-3-0151	1” SPACER	-
3	500-3-0316	RUBBER FLAIL	-
4	500-2-0068	RUBBER FLAIL PIN	-
5	500-2-0069	RUBBER FLAIL PIN EXTENSION	-
6	900-01363	5/8 NCX 4-1/2 HEX BOLT	-
7	900-29153	ROLL PIN, 7/32X1-1/2	-
8	900-01105	3/8 NC X 3/4 HEX BOLT	-
9	900-23041	3/16X1 COTTER PIN	-
10	900-11131	WASHER, NYLON 5/8 ID	-
11	900-06014	5/8 NC HEX NUT	-
12	900-11015	5/8 LOCKWASHER	-

STEEL FLAIL COMPONENTS



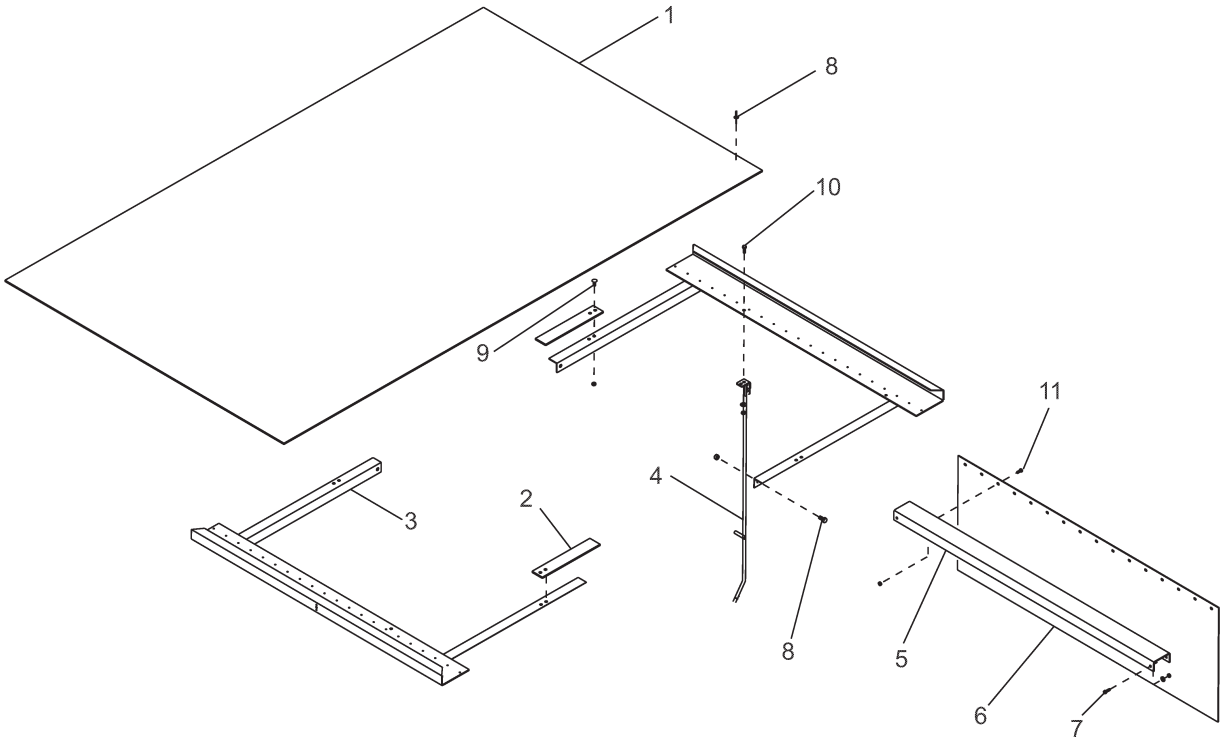
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	505-3-0972	SHORT FLAIL CUP, 6.19”	1
2	505-3-0001	L - KNIFE FLAIL	2
3	900-01792	CARRIAGE BOLT, 5/8 NC X 3-1/2”	1
4	900-03064	CARRIAGE BOLT, 5/8 NC X 3-3/4”	1
5	505-3-0405	HARDENED WEAR BUSHING	1
6	500-3-2134	TUBE SPACER	2
7	900-11037	FLAT WASHER, 5/8	1
8	900-06145	SPIRALOCK NUT, 5/8 NC	1
9	900-06508	TOP LOCK NUT, 5/8 NC	1
-	500-2-0963	L - KNIFE CLUSTER KIT * INCLUDES #2, #4, #6, #7, #9 *	-
-	500-2-0787	CUP - KNIFE CLUSTER KIT * INCLUDES #1, #3, #5, #8 *	-

BELT COVER COMPONENTS



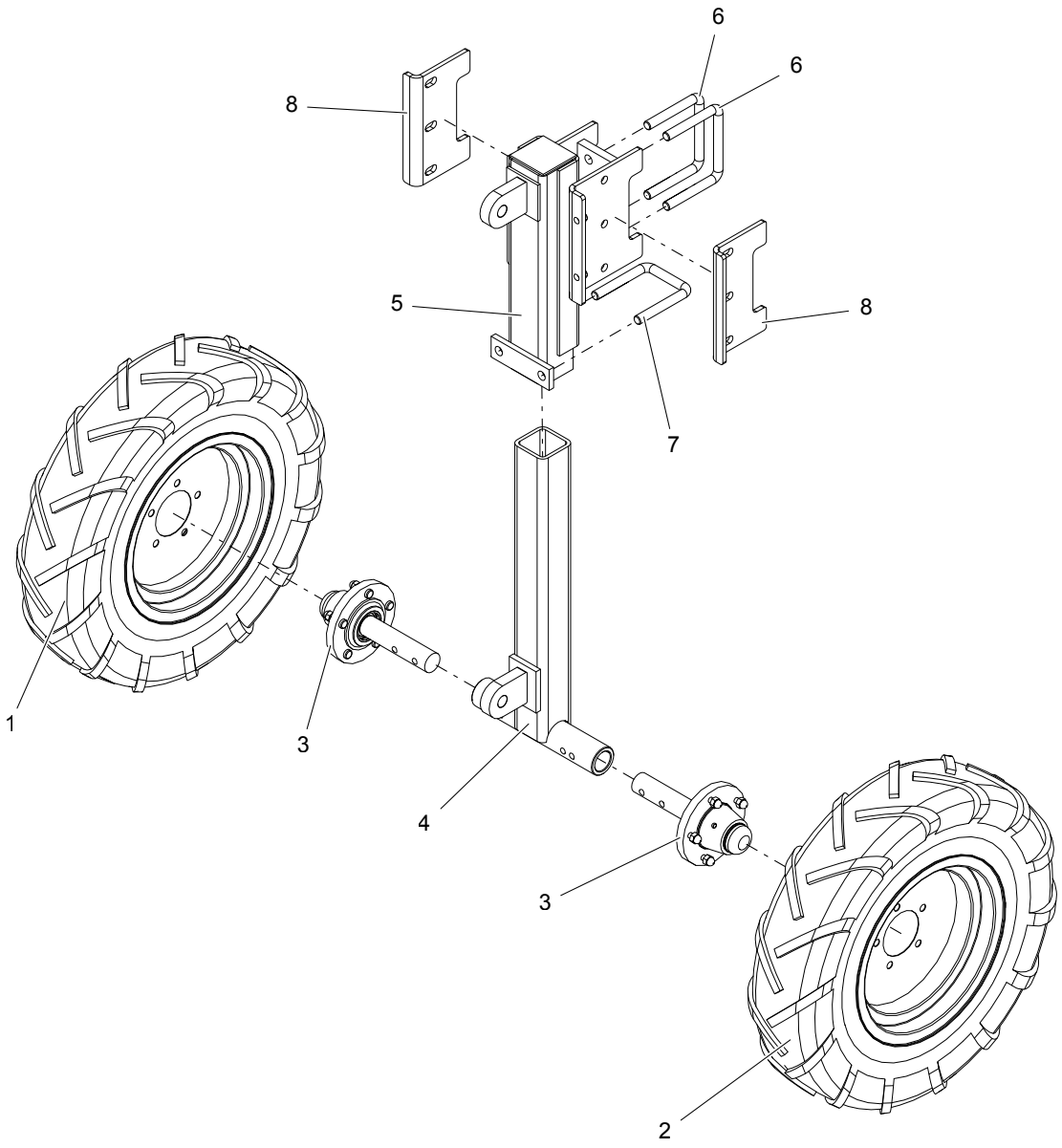
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0581	FRONT DOOR WELD (LH)	1
2	500-3-1256	TOP SIDE SHIELD (LH)	1
3	500-3-1258	BOTTOM SIDE SHIELD (LH)	1
4	500-3-1738	BOTTOM SIDE SHIELD (RH)	1
5	500-3-1737	TOP SIDE SHIELD (RH)	1
6	500-2-0582	FRONT DOOR WELD (RH)	1
7	500-2-0583	REAR DOOR WELD	1
8	500-3-1739	REAR TOP SIDE SHIELD (RH)	1
9	500-3-1741	BACK SIDE SHIELD	1
10	500-3-1740	REAR BOTTOM SIDE SHIELD (RH)	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	-
14	900-01105	3/8 X 3/4 HEX BOLT	-
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
21	900-01694	3/8 X 3/4 CARRIAGE BOLT	-
-	500-3-0407	BRACKET, RUBBER LATCH	-
-	905-04019	RUBBER LATCH	-
-	905-04025	HOOD BRACKET	-

TOP COVER COMPONENTS



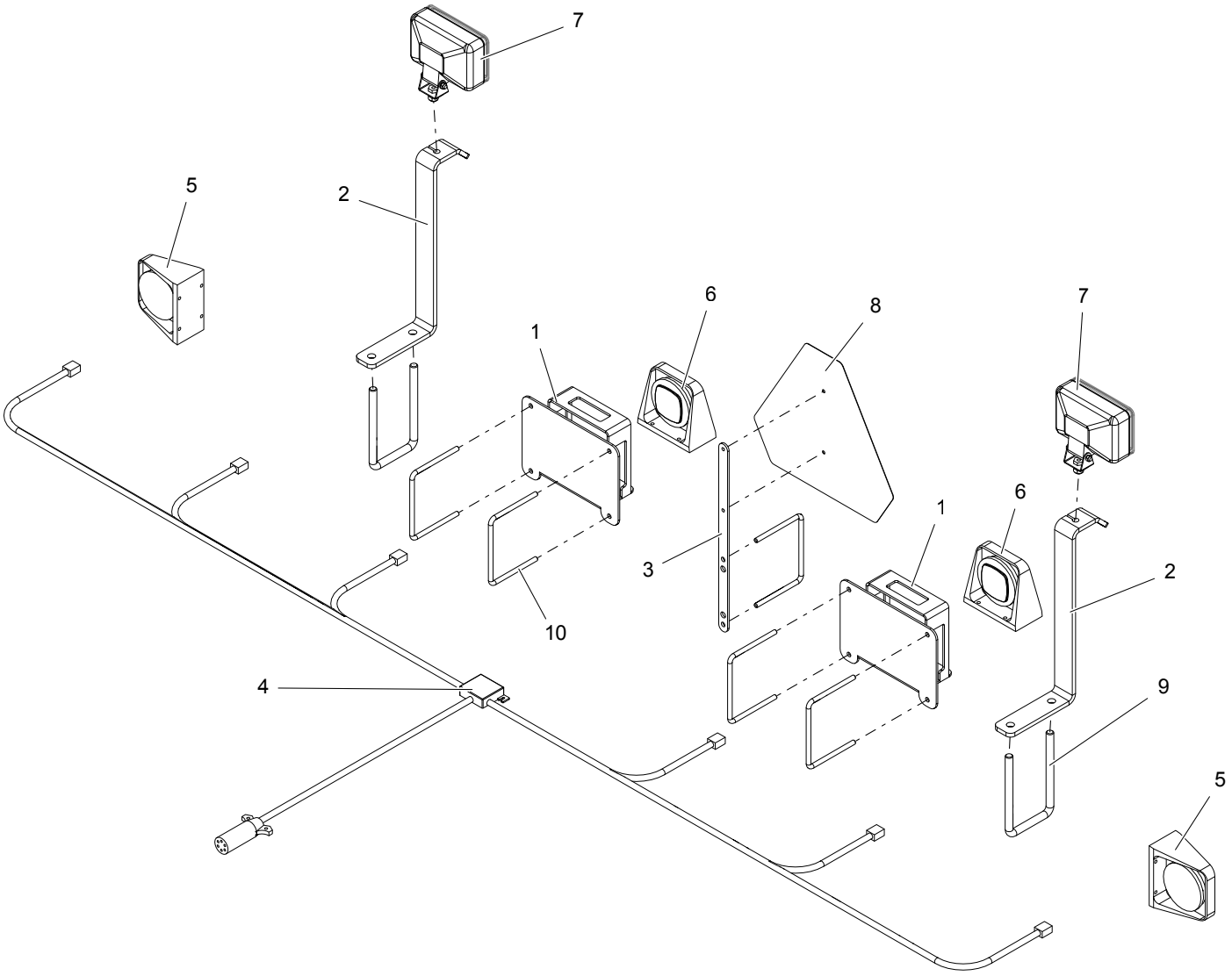
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-3-2598	COVER	2
2	500-3-1233	PINCH PROTECTOR	4
3	500-2-1052	PIVOT BRACKET WELDMENT	4
4	500-2-0586	PROP ROD WELD TOP COVER	8
5	500-3-2591	CROSS CHANNEL	2
6	500-3-2592	REAR FLAP	2
7	900-01139	3/8 NC X 5-1/2 HEX BOLT	4
8	900-01221	1/2 NC X 1 HEX BOLT	-
9	900-01695	3/8 X 1 CARR. BOLT	-
10	900-01109	3/8 X 1 HEX BOLT	-
11	900-03419	5/16 NC X 3/4 WHIZ LOCK HEX BOLT	-
-	500-3-0407	BRACKET, RUBBER LATCH	-
-	905-04019	RUBBER LATCH	-
-	905-04025	BRACKET HOOD	-

REAR STRUT COMPONENTS



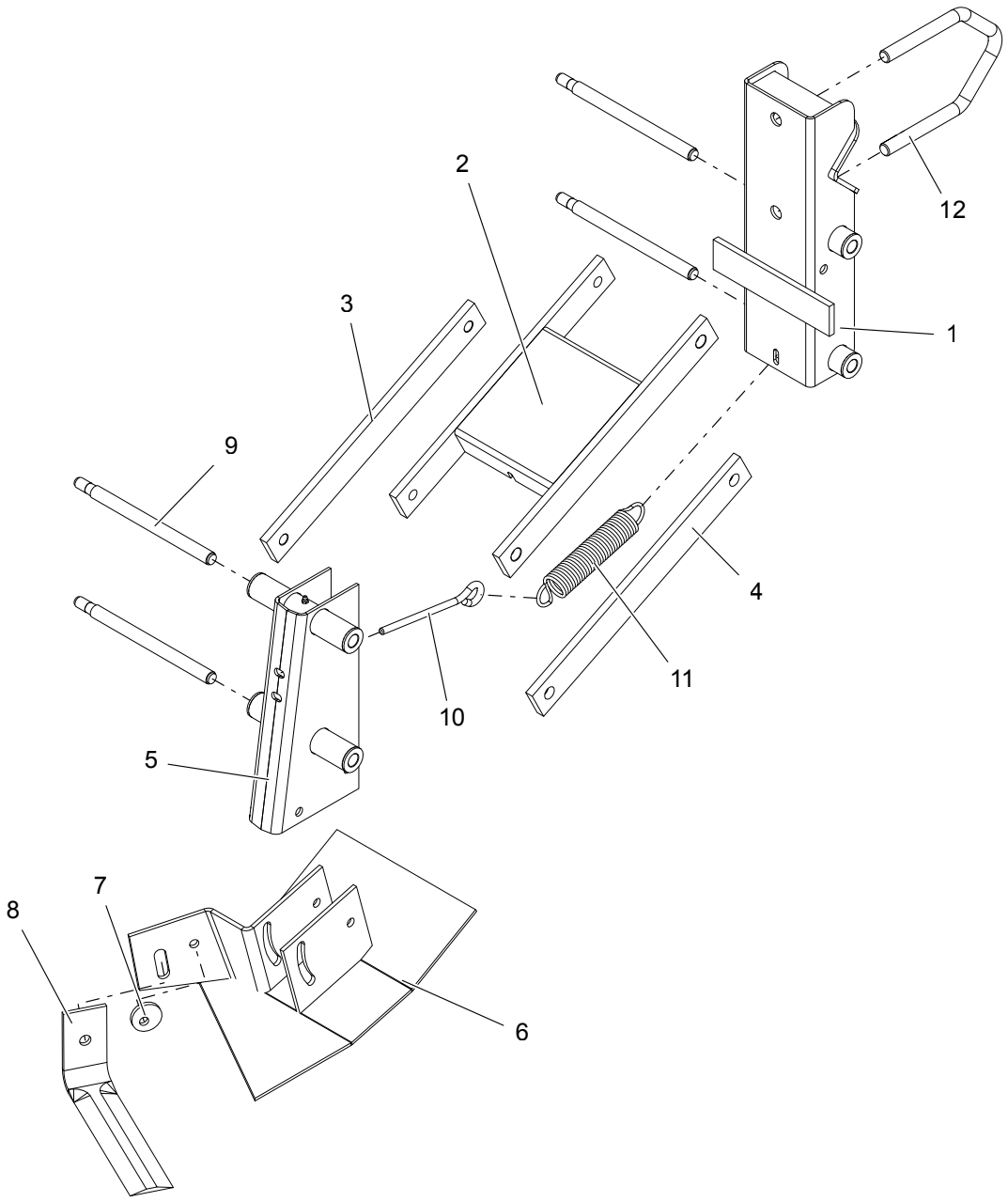
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0157	TRACTION TIRE ASSY (RH)	1
	905-09100	- TIRE, 7.6 x 15	
	905-09078	- RIM, 15 x 6 x 5 BOLT	
2	500-2-0158	TRACTION TIRE ASSY (LH)	1
	905-09100	- TIRE, 7.6 x 15	
	905-09078	- RIM, 15 x 6 x 5 BOLT	
3	500-2-0972	HUB & SPINDLE ASSY	2
4	500-2-0973	LOWER STRUT (22”)	1
5	500-2-0576	UPPER STUT	1
6	200-3-0024	U-BOLT, 3/4 NC x 6 x 5-1/2	2
7	200-3-1440	U-BOLT, 3/4 NC x 4 x 5-1/2	1
8	500-3-2421	ADJUSTMENT PLATE	2
-	905-23014	RATCHET JA	1

LIGHT KIT COMPONENTS



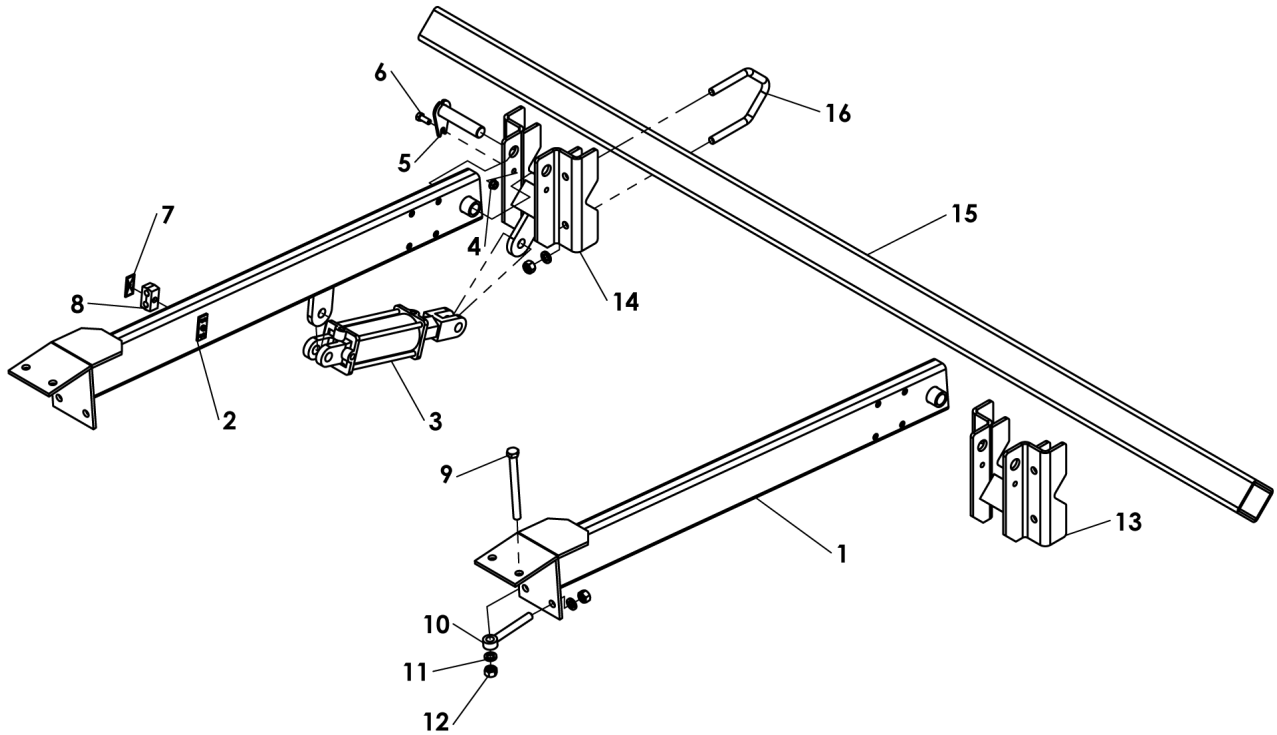
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0930	RED LIGHT BRACKET	2
2	500-3-1720	FIELD LIGHT BRACKET	2
3	500-3-2091	SMV MOUNT	1
4	500-3-2168	WIRE HARNESS (4R30 - 8R22)	1
5	904-01154	AMBER LAMP	2
6	904-01155	RED LAMP	2
7	500-3-1721	FIELD LIGHT	2
8	500-3-1696	SMV SIGN	1
9	200-3-0017	U-BOLT, 5/8 NC x 4 x 7-1/4	2
10	900-35000	U-BOLT, 3/8 NC x 6 x 5	5
	500-1-0109	FIELD LIGHT BRACKET KIT * INCLUDES #2, #9 *	-
	500-1-0185	LIGHT KIT * INCLUDES #1 - #10 *	-

SCALPER COMPONENTS



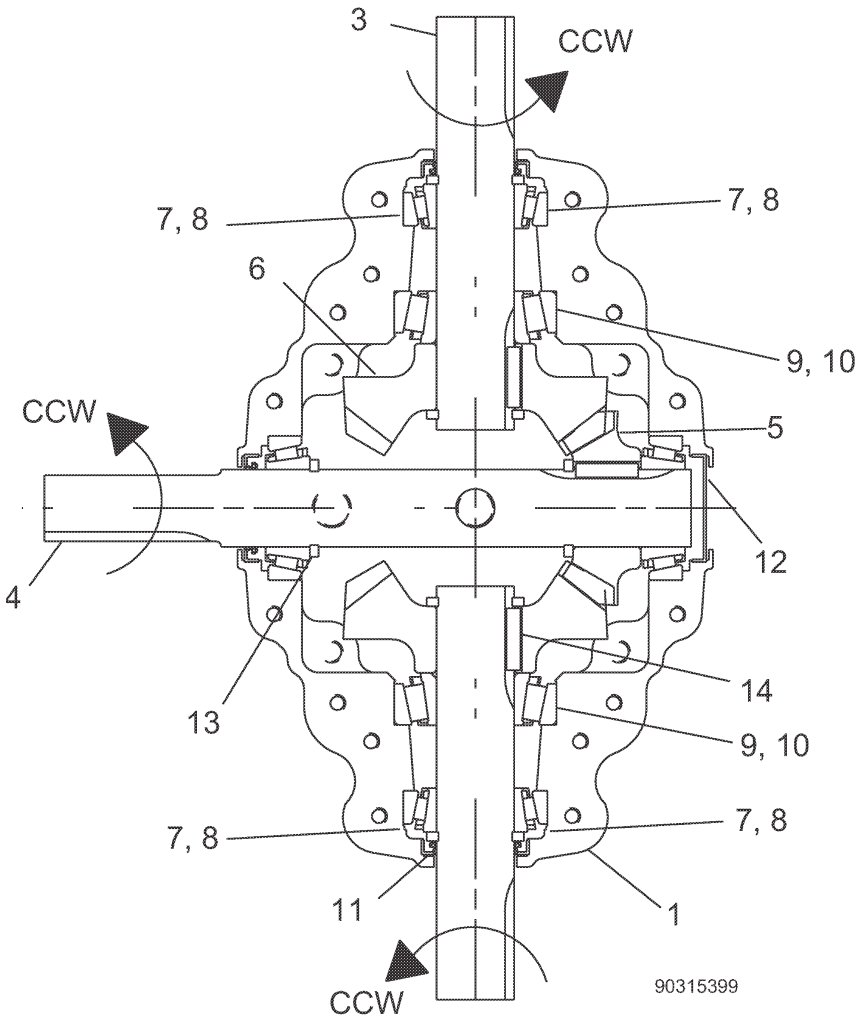
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-0330	UPPER MOUNT	1
2	500-2-0518	"H" LINKAGE ARM	1
3	500-3-0991	LINKAGE ARM (LH)	1
4	500-3-0992	LINKAGE ARM (RH)	1
5	500-2-0338	LOWER SHOE MOUNT	1
6	500-2-0335	SHOE (LH)	1
	500-2-0336	SHOE (RH)	
7	500-3-0201	ECCENTRIC SPACER	1
8	500-3-0910	KNIFE SCALPER	1
9	200-3-2631	PIN	4
10	500-3-0675	EYE BOLT, 3.8 x 8	1
11	400-3-0263	EXTENSION SPRING	1
12	500-3-0635	A-BOLT, 3/4 NC x 4 x 4	1

SCALPER TOOLBAR COMPONENTS



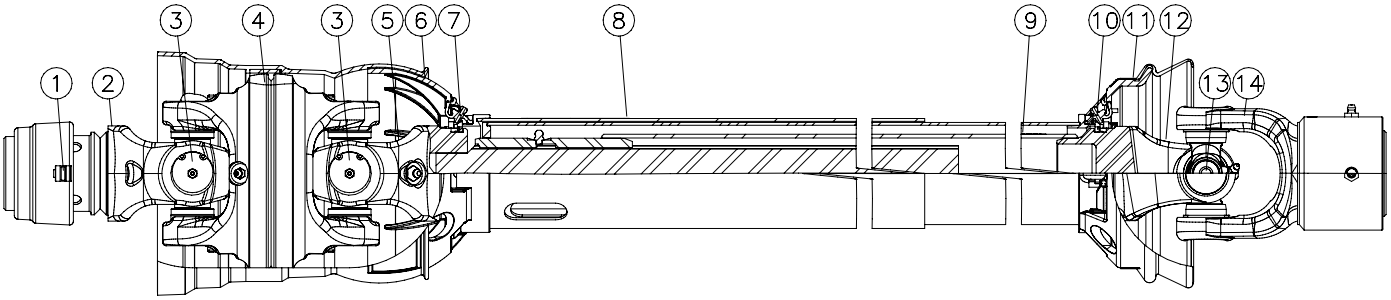
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	500-2-1040	OUTER SETBACK ARM WELDMENT	-
2	500-2-1041	INNER SETBACK ARM WELDMENT	-
3	905-21400	HYDRAULIC CYLINDER - 3.5 X 8	-
4	900-06143	1/2 NC SPIRAL LOCK NUT ZP GR5	-
5	500-2-0684	1-1/4" PIN WELDMENT	-
6	900-01223	1/2 NC X 1-1/2 HEX BOLT GR 5	-
7	900-31068	COVER PLATE AND BOLT	-
8	900-31069	CLAMP BODY	-
9	900-01437	HEX BOLT - 3/4 NC X 8-1/2 GR5	-
10	900-03463	3/4-10 EYE BOLT	-
11	900-11017	3/4 LOCK WASHER	-
12	900-06015	HEX NUT - 3/4 NC	-
13	500-2-0942	SCALPER MOUNT OUTER	-
14	500-2-0941	SCALPER MOUNT INNER	-
15	500-3-2599	SCALPER TUBE	1
16	500-3-0635	3/4-10 X 4 A BOLT	-

GEARBOX COMPONENTS



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	903-15291	CASTING, MACHINE BOTTOM THREADED	1
-	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
-	900-03033	BOLT, 3/8-16 X 2.25 SHCS	16
-	905-01159	PLUG, 1/2-1/8 NPT SCHD W/3M	1
-	905-15411	DIP STICK	1
-	905-03080	PLUG, VENT 5 PSI	1
-	905-15359	BUSHING, 1/2 NPT TO 1/4 NPT	1
		GEAR BOX, COMPLETE, KEYED	1

PTO DRIVE SHAFT COMPONENTS



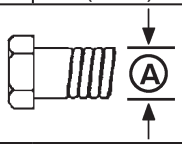
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	903-17427	SSL / AUTO-LOK REPAIR KIT	1
2	903-18334	WWCV AUTO-LOK YOKE	1
3	903-18328	AB8/AW24/CAT 6 80° PBL CROSS KIT	1
4	903-18329	WWCV CENTER HOUSING	1
5	903-18405	WWCV YOKE & SHAFT (1.69-20 SPLINE)	1
6	-	OUTER GUARD	1
7	903-18395	GUARD REPAIR KIT	2
8	903-17455	SAFETY SIGN	1
9	903-17456	SAFETY SIGN	1
10	903-18248	GUARD REPAIR KIT	
11	-	INNER GUARD	1
12	903-17718	YOKE, TUBE, & SLIP SLEEVE	1
13	903-17525	44E CROSS & BEARING KIT	1
14	903-17721	OVERRUNNING CLUTCH	1
	903-17717	GUARD SET * INCLUDES #6, #10 *	
	903-18406	COMPLETE PTO DRIVE SHAFT, COMPLETE	

BOLT TORQUE CHART

SAE Series Torque Chart

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

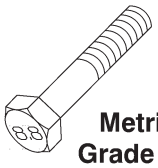
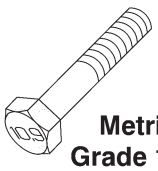
Make sure fastener threads are clean and you properly start thread engagement.

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

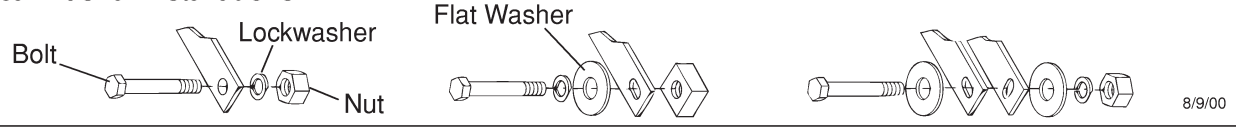
Metric Series Torque Chart

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

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

Ⓐ Diameter & Thread Pitch (Millimeters)	Wrench Size	**COARSE THREAD** MARKING ON HEAD				**FINE THREAD** MARKING ON HEAD				Ⓐ Diameter & Thread Pitch (Millimeters)	**Metric Bolt Head Identification**
		Metric 8.8		**Metric 10.9**		**Metric 8.8**		**Metric 10.9**			
		Nm	ft./lb.	Nm	ft./lb.	Nm	ft./lb.	Nm	ft./lb.		
6x1.0	10 mm	8	6	11	8	8	6	11	8	6x1.0	 **Metric Grade 8.8**
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	 **Metric Grade 10.9**
22 x 2.5	34 mm	451	332	623	460	495	365	684	505	22 x 1.5	
24 x 3.0	36 mm	571	421	790	583	623	459	861	635	24 x 2.0	
30 x 3.0	46 mm	1175	867	1626	1199	1258	928	1740	1283	30 x 2.0	

Typical Washer Installations



ABBREVIATIONS

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

INDEX

WARRANTY

Please Enter Information Below and Save For Future Reference.

Date Purchased: _____ From (Dealer): _____

Model Number:_____ Serial Number: _____

ALLOWAY 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 One (1) year, ninety (90) days for Service Parts, from the date of delivery of the product to the original purchaser.

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

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

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

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

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

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

STANDARD alloway

PART NUMBER

500-5-0001

Alloway Standard Inc.

4230 14th Ave NW.
Fargo, ND 58102

Tele : 877-275-8714

Fax : 701-356-4985