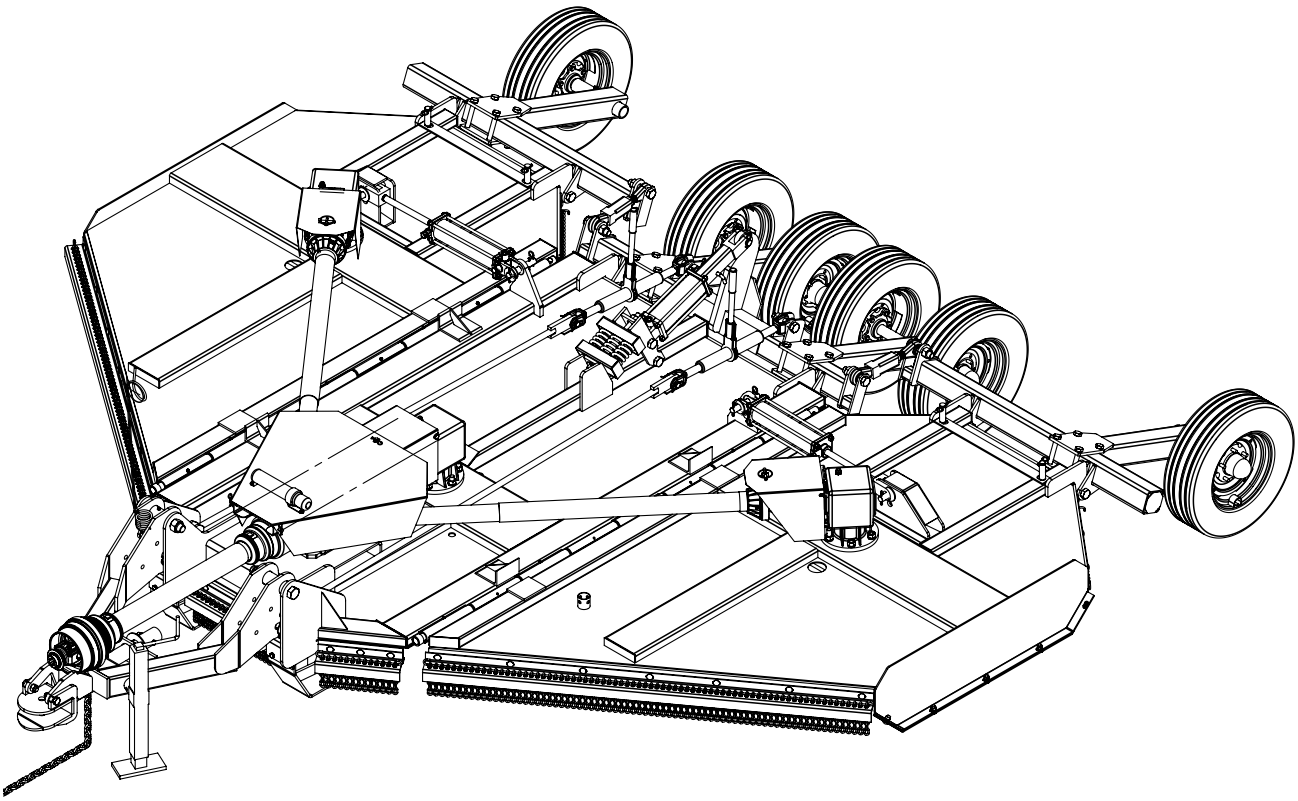
KODIAK
BY PALADIN

# OPERATOR'S MANUAL

# ROTARY CUTTER
# 3615 Flex Wing



**SERIAL NUMBER: _____**

**MODEL NUMBER: _____**

**Manual Number: KDK06-0191**

**Rev. 3**



7/9/18

## READ ENTIRE OPERATOR'S & PARTS MANUAL BEFORE OPERATING!

**DANGER!** **ROTATING BLADE HAZARD! STAY BACK!**
**OBJECTS CAN BE THROWN!**
**DO NOT operate near bystanders.**
**DO NOT place hands or feet under deck while in operation or with engine running.**

**DANGER!** **FLYING DEBRIS HAZARD. CLEAR AREA OF BYSTANDERS AND LIVESTOCK BEFORE OPERATING. THE ROTARY CUTTER IS CAPABLE OF PRODUCING LARGE AMOUNTS OF FLYING DEBRIS IN ALL DIRECTIONS.**

**WARNING!** **Before leaving the operator's seat: Lower the attachment and place unit on the ground. Disengage PTO. Turn off engine. Engage parking brake. Remove key and wait for all blade rotation to stop.**

**WARNING!** **All rotating parts must be shielded. Do not operate without all PTO driveline, tractor and rotary cutters guards in place.**

**WARNING!** **These rotary cutters should not be operated with the back of the unit more than 15" (381 mm) above the ground.**

**If there is any portion of this manual or function you do not understand, contact your local authorized dealer or the manufacturer.**

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# PREFACE

## GENERAL COMMENTS

Congratulations on the purchase of your new product! This product was carefully designed and manufactured to give you many years of dependable service. Only minor maintenance (such as cleaning and lubricating) is required to keep it in top working condition. Be sure to observe all maintenance procedures and safety precautions in this manual and on any safety decals located on the product and on any equipment on which the attachment is mounted.

This manual has been designed to help you do a better, safer job. Read this manual carefully and become familiar with its contents.

**WARNING! Never let anyone operate this unit without reading the "Safety Precautions" and "Operating Instructions" sections of this manual.**
**Always choose hard, level ground to park the vehicle on and set the brake so the unit cannot roll.**

Unless noted otherwise, right and left sides are determined from the operator's control position when facing forward.

**NOTE: The illustrations and data used in this manual were current (according to the information available to us) at the time of printing, however, we reserve the right to redesign and change the attachment as may be necessary without notification.**

## BEFORE OPERATION

The primary responsibility for safety with this equipment falls to the operator. Make sure the equipment is operated only by trained individuals that have read and understand this manual. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or the manufacturer to obtain further assistance. Keep this manual available for reference. Provide the manual to any new owners and/or operators.

## SAFETY ALERT SYMBOL

This is the "Safety Alert Symbol" used by this industry. This symbol is used to warn of possible injury. Be sure to read all warnings carefully. They are included for your safety and for the safety of others working with you.

## SERVICE

Use only manufacturer replacement parts. Substitute parts may not meet the required standards.

Record the model and serial number of your unit on the cover of this manual. The parts department needs this information to insure that you receive the correct parts.

## SOUND AND VIBRATION

Sound pressure levels and vibration data for this attachment are influenced by many different parameters: some items are listed below (not inclusive):

- prime mover type, age, condition, with or without cab enclosure and configuration
- operator training, behavior, stress level
- job site organization, working material condition, environment

Based on the uncertainty of the prime mover, operator, and job site, it is not possible to get precise machine and operator sound pressure levels or vibration levels for this attachment.

**NOTE: A list of all Paladin Patents can be found at http://www.paladinattachments.com/patents.asp.**

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# SAFETY STATEMENTS

**THIS SYMBOL BY ITSELF OR WITH A WARNING WORD THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.**

**DANGER** — **THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.**

**WARNING** — **THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.**

**CAUTION** — **THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY.**

**NOTICE** — **NOTICE IS USED TO ADDRESS PRACTICES NOT RELATED TO PHYSICAL INJURY.**

# GENERAL SAFETY PRECAUTIONS

**WARNING!**

## READ MANUAL PRIOR TO INSTALLATION

Improper installation, operation, or maintenance of this equipment could result in serious injury or death. Operators and maintenance personnel should read this manual, as well as all manuals related to this equipment and the prime mover thoroughly before beginning installation, operation, or maintenance. **FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND THE PRIME MOVER'S MANUAL(S).**

## READ AND UNDERSTAND ALL SAFETY STATEMENTS

Read all safety decals and safety statements in all manuals prior to operating or working on this equipment. Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation. Know and follow good work practices when assembling, maintaining, repairing, mounting, removing, or operating this equipment.

## KNOW YOUR EQUIPMENT

Know your equipment's capabilities, dimensions, and operations before operating. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order with all safety devices intact. Check all hardware to ensure it is tight. Make certain that all locking pins, latches, and connection devices are properly installed and secured. Remove and replace any damaged, fatigued, or excessively worn parts. Make certain all safety decals are in place and are legible. Keep decals clean, and replace them if they become worn or hard to read.

# GENERAL SAFETY PRECAUTIONS

**WARNING!**

## PROTECT AGAINST FLYING DEBRIS

Always wear proper safety glasses, goggles, or a face shield when driving pins in or out, or when any operation causes dust, flying debris, or any other hazardous material.

**WARNING!**

## LOWER OR SUPPORT RAISED EQUIPMENT

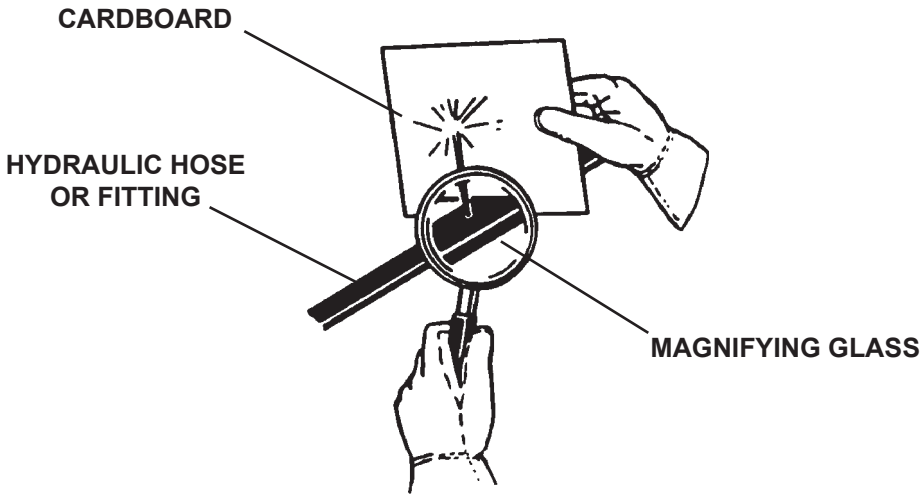
Do not work under raised booms without supporting them. Do not use support material made of concrete blocks, logs, buckets, barrels, or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower booms to ground level or on blocks. Lower booms and attachments to the ground before leaving the cab or operator's station.

**WARNING!**

## USE CARE WITH HYDRAULIC FLUID PRESSURE

Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Hydraulic leaks under pressure may not be visible. Before connecting or disconnecting hydraulic hoses, read your prime mover's operator's manual for detailed instructions on connecting and disconnecting hydraulic hoses or fittings.

- Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.
- If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.
- Wear safety glasses, protective clothing, and use a piece of cardboard or wood when searching for hydraulic leaks. **DO NOT USE YOUR HANDS! SEE ILLUSTRATION.**



# GENERAL SAFETY PRECAUTIONS

**WARNING!**

## DO NOT MODIFY MACHINE OR ATTACHMENTS

Modifications may weaken the integrity of the attachment and may impair the function, safety, life, and performance of the attachment. When making repairs, use only the manufacturer's genuine parts, following authorized instructions. Other parts may be substandard in fit and quality. Never modify any ROPS (Roll Over Protective Structure) or FOPS (Falling Object Protective Structure) equipment or device. Any modifications must be authorized in writing by the manufacturer.

**WARNING!**

## SAFELY MAINTAIN AND REPAIR EQUIPMENT

- Do not wear loose clothing or any accessories that can catch in moving parts. If you have long hair, cover or secure it so that it does not become entangled in the equipment.
- Work on a level surface in a well-lit area.
- Use properly grounded electrical outlets and tools.
- Use the correct tools for the job at hand. Make sure they are in good condition for the task required.
- Wear the protective equipment specified by the tool manufacturer.

## SAFELY OPERATE EQUIPMENT

Do not operate equipment until you are completely trained by a qualified operator in how to use the controls, know its capabilities, dimensions, and all safety requirements. See your machine's manual for these instructions.

- Keep all step plates, grab bars, pedals, and controls free of dirt, grease, debris, and oil.
- Never allow anyone to be around the equipment when it is operating.
- Do not allow riders on the attachment or the prime mover.
- Do not operate the equipment from anywhere other than the correct operator's position.
- Never leave equipment unattended with the engine running, or with this attachment in a raised position.
- Do not alter or remove any safety feature from the prime mover or this attachment.
- Know your work site safety rules as well as traffic rules and flow. When in doubt on any safety issue, contact your supervisor or safety coordinator for an explanation.

**WARNING!**

## CALIFORNIA PROPOSITION 65 WARNING

This product may contain a chemical known to the state of California to cause cancer, or birth defects or other reproductive harm.  www.P65Warnings.ca.gov

# EQUIPMENT SAFETY PRECAUTIONS

**WARNING!**

## KNOW WHERE UTILITIES ARE

Observe overhead electrical and other utility lines. Be sure equipment will clear them. When digging, call your local utilities for location of buried utility lines, gas, water, and sewer, as well as any other hazard you may encounter.

**WARNING!**

## EXPOSURE TO RESPIRABLE CRYSTALLINE SILICA DUST ALONG WITH OTHER HAZARDOUS DUSTS MAY CAUSE SERIOUS OR FATAL RESPIRATORY DISEASE.

It is recommended to use dust suppression, dust collection and if necessary personal protective equipment during the operation of any attachment that may cause high levels of dust.

**WARNING!**

## REMOVE PAINT BEFORE WELDING OR HEATING

Hazardous fumes/dust can be generated when paint is heated by welding, soldering or using a torch. Do all work outside or in a well ventilated area and dispose of paint and solvent properly. Remove paint before welding or heating.

When sanding or grinding paint, avoid breathing the dust. Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

**WARNING!**

## END OF LIFE DISPOSAL

At the completion of the useful life of the unit, drain all fluids and dismantle by separating the different materials (rubber, steel, plastic, etc.). Follow all federal, state and local regulations for recycling and disposal of the fluid and components.

## OPERATING THE ATTACHMENT

- PTO Operated Attachment: Rotating driveline contact can cause death. Do not operate without all driveline, tractor and equipment shields in place.
- Check driveline shields turn freely on driveline.
- Block off work area from bystanders, livestock, etc. Flying debris can cause severe injury or death.
- Make sure no one is behind the equipment or for several hundred feet in any direction around the equipment when in operation. Never allow anyone to ride on or approach the rotary cutter when in operation.
- Check driveline connections before operation. Be sure quick disconnect locks are operating and locked.
- Do not stand between prime mover and cutter during installation.
- Keep hands, feet and clothing away from power driven parts while tractor engine is running. Failure to do so will result in serious injury or death from rotating blades or PTO shaft.
- Clear work area of all objects that could be thrown or picked up by the cutter.
- Do not raise the attachment when the blades are rotating.
- Operate only from the operator's station.
- Do not exceed specified RPM of your cutter.
- Be sure all guards, shields, covers & deflector chains are properly installed before operating unit.
- Never try to board or exit equipment while it is running.
- Test all controls before you begin operation.

# EQUIPMENT SAFETY PRECAUTIONS

## OPERATING THE ATTACHMENT

- Keep cutter deck clear of debris. There is a risk of fire when dry material accumulates and contacts heat generated from rotating blades.
- Always keep the blade carrier and blade bolts tight. Loose blades could easily penetrate a quarter inch steel plate and/or seriously injure personnel.
- When operating on slopes, drive up and down, not across. Avoid steep hillside operation, which could cause the prime mover to overturn and increases the chance for thrown objects.
- Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the vehicle.
- An operator must not use drugs or alcohol, which can change his or her alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he or she can safely operate equipment.
- Never leave the attachment unattended with engine running. Always make sure all rotation has stopped, both skids are on the ground, PTO is disengaged, parking brake is engaged, engine is turned off and the keys are removed before exiting the prime mover.

## TRANSPORTING THE ATTACHMENT

- Travel only with the attachment in a safe transport position to prevent uncontrolled movement. Drive slowly over rough ground and on slopes.
- Disengage PTO, install cylinder stops, raise wings and install wing locks before transporting.
- When transporting on a trailer: Secure attachment using tie down accessories that are capable of maintaining attachment stability.
- Disconnect PTO from tractor and use extra care when loading or unloading the attachment onto a truck or trailer.
- When driving on public roads use safety lights, reflectors, Slow Moving Vehicle signs etc., to prevent accidents. Check local government regulations that may affect you.
- Do not drive close to ditches, excavations, etc., cave in could result.
- Do not smoke when refueling the prime mover. Allow room in the fuel tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.

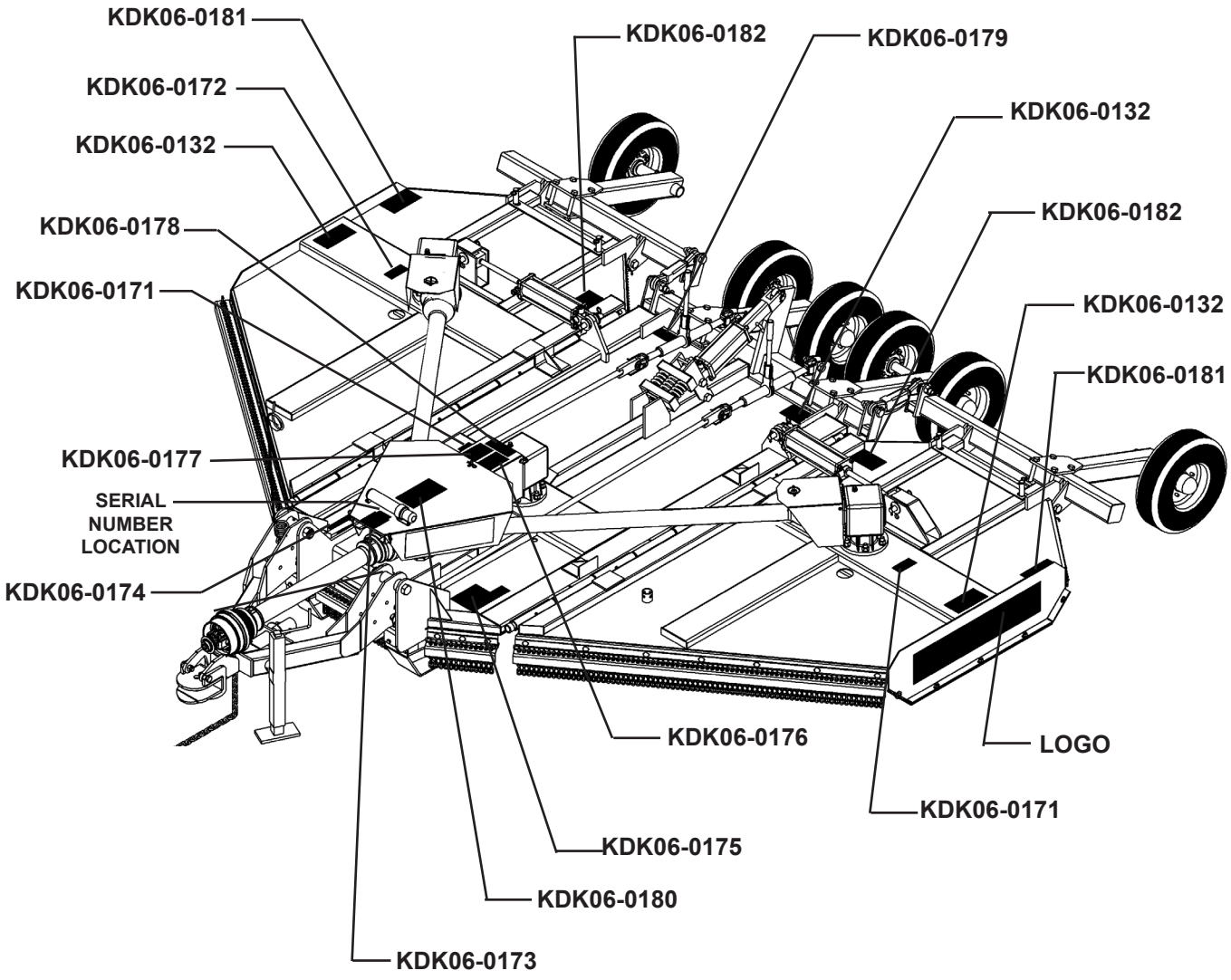
## MAINTAINING THE ATTACHMENT

- Before performing maintenance, lower the attachment until it is resting on the skid shoes, disengage the PTO, apply the brakes, turn off the engine and remove the key. Be sure all rotation has stopped before exiting the prime mover or approaching the cutter. Disengage the PTO shaft before making any adjustments or repairs.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator manual's before any repair is made. After completing maintenance or repair, check for correct functioning of the attachment. If not functioning properly, always tag "DO NOT OPERATE" until all problems are corrected.
- If attachment must be raised for maintenance or any other reason, block the unit securely. Serious damage or personal injury could result.
- Worn, damaged, or illegible safety decals must be replaced. New safety decals can be ordered from Paladin.
- Never work under a raised attachment unless PTO has been disengaged and cutter is securely blocked.

# DECALS

## GENERAL INFORMATION

The diagram on this page shows the location of all the decals used on your attachment. The decals are identified by their part numbers, with reductions of the actual decals located on the following page. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before operating the attachment. They contain information you need to know for both safety and attachment longevity.




**IMPORTANT:** Keep all safety decals clean and legible. Replace all missing, illegible, or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced. Safety decals are available, free of charge, from your local dealer or Paladin.

**REPLACING SAFETY DECALS**: Clean the area of application with nonflammable solvent, then wash the same area with soap and water. Allow the surface to fully dry. Remove the backing from the safety decal, exposing the adhesive surface. Apply the safety decal to the position shown in the diagram above and smooth out any bubbles.

# DECALS


PART #KDK06-0132
WARNING! NO RIDERS


PART #KDK06-0173
GEARBOX WARRANTY


PART #KDK06-0171
BLADE ROTATION - CW


PART #KDK06-0172
BLADE ROTATION - CCW

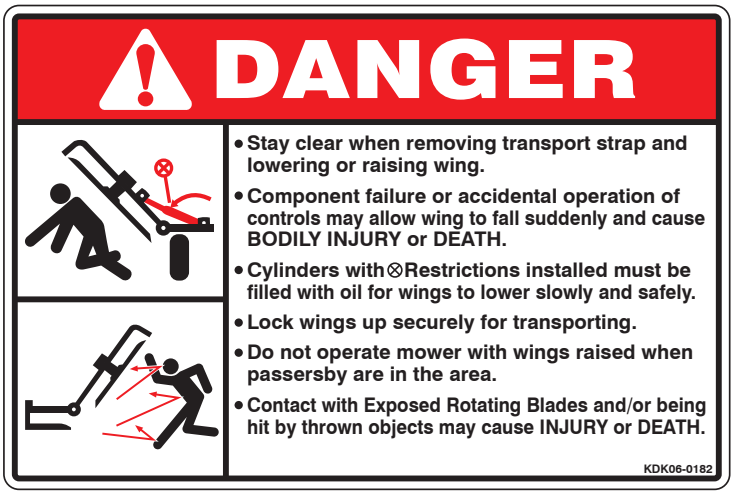

PART #KDK06-0177
DANGER! ROTATING DRIVELINE


PART #KDK06-0176
DANGER! SHIELD MISSING


PART #KDK06-0179
WARNING! HIGH PRESSURE FLUID

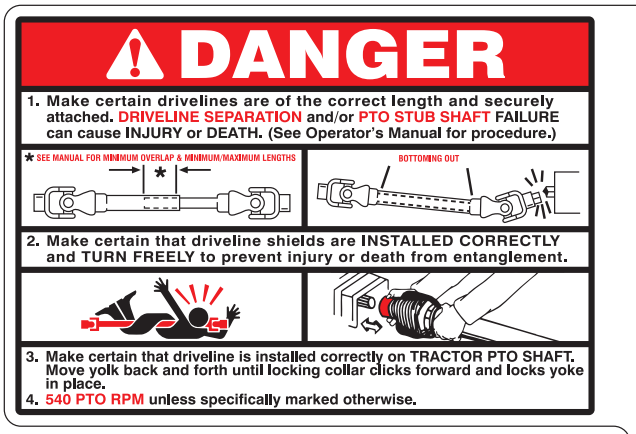

PART #KDK06-0178
WARNING! FIRE HAZARD


PART #KDK06-0181
DANGER! ROTATING BLADES



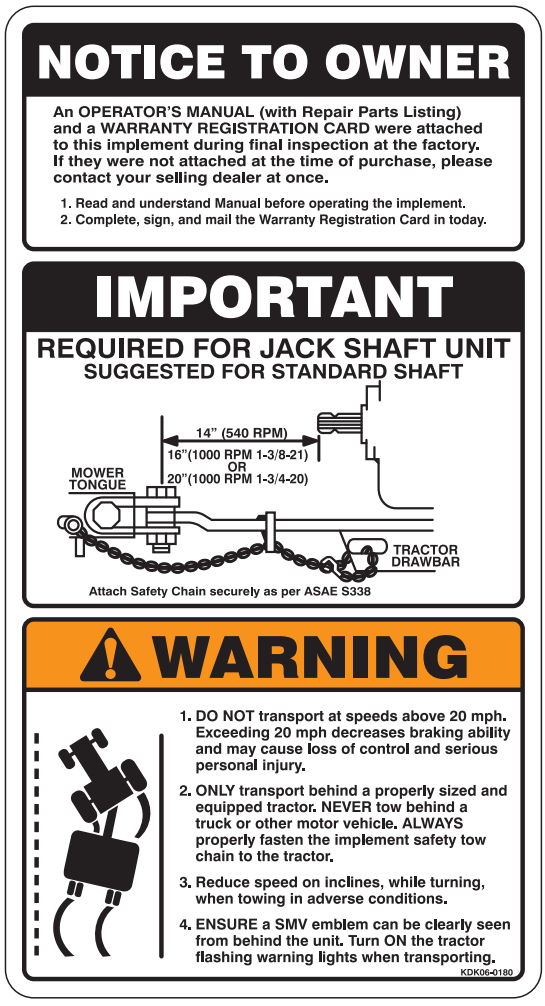

PART #KDK06-0182
DANGER! WING SAFETY

# DECALS





**PART #KDK06-0174L**
**DANGER! DRIVELINE/GENERAL SAFETY**
**(TWO DECALS)**




**PART #KDK06-0180**
**WARNING! TRANSPORTING**


**PART #KDK06-0175**
**WARNING! SHIELDS**

**NOTE: CONTACT YOUR LOCAL DEALER TO PURCHASE MODEL NUMBER AND LOGO DECALS.**

# PREOPERATION

## TRACTOR REQUIREMENTS

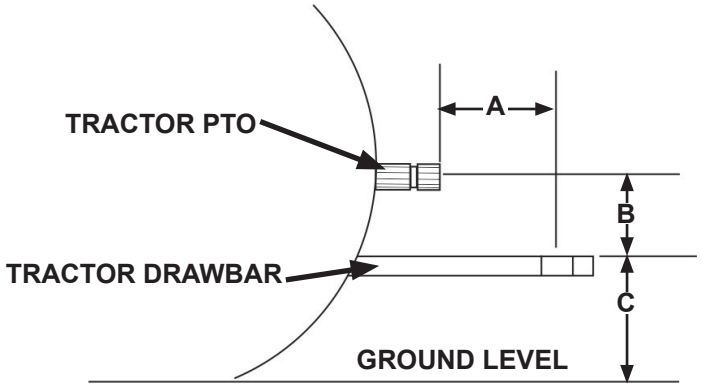
The horsepower required to operate the cutter depends on several operating factors including but not limited to, the vegetation, terrain, operator experience, condition of the cutter and condition of the tractor. Operating the cutter with a tractor that does not have adequate power may damage the tractor engine while operating the cutter with a tractor that has too much power may damage the cutter by overpowering the unit in heavy cutting conditions.

Tractor requirements:

- PTO horsepower (HP) 60-120.
- Drawbar vertical weight capacity 2500 lbs. (Tongue weight on cutter 1960 lbs).
- PTO RPM 540 or 1000 RPM (cutter ordered according to tractor PTO RPM).
- Minimum is Dual remote hydraulics (wings fold up/down simultaneously) or Three sets of remote hydraulics (wings fold up/down independently).
- Approved Roll-Over Protective Structure (ROPS) or ROPS cab. Keep ROPS locked in the UP position.
- Seatbelt.
- Slow Moving Vehicle (SMV) emblem.
- PTO master shield.

Once you have determined that your prime mover meets the Tractor Requirements listed you must verify the drawbar set up distances. These distances must be maintained to prevent PTO damage.

## DRAWBAR SET-UP:




| DRAWBAR SET-UP | |
|---|---|
| A | 14” - 16” |
| B | 8” - 10” |
| C | 18” - 22” |

**WARNING! Ballast weights may need to be added to your tractor to maintain 20% weight on front axle. Refer to your tractor operator’s manual to determine proper ballast requirements.**

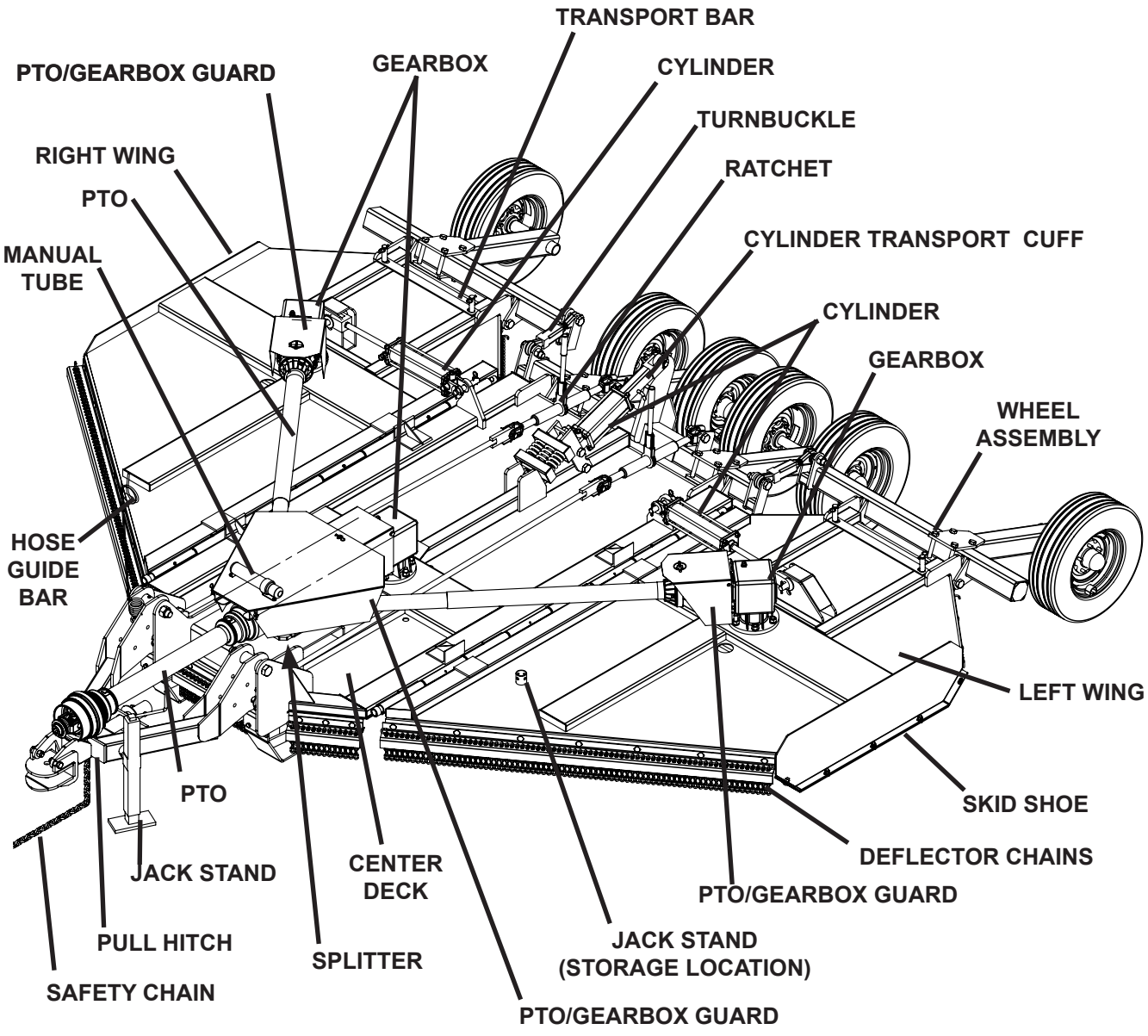
**Always refer to the tractor operator’s manual to ensure compatibility and maximum safety.**

**WARNING! Do not use a PTO drive adapter to attach your cutter driveline to a non-matching tractor PTO. Serious personal injury and/or equipment failure can result. Consult an authorized dealer for assistance if the cutter PTO does not match the tractor PTO.**

# PREOPERATION

## NOMENCLATURE

Throughout this manual, reference is made to various rotary cutter components. The purpose of this page is to acquaint you with the various names of these components. This knowledge will be helpful when reading through this manual or when ordering service parts.



# INSTALLATION

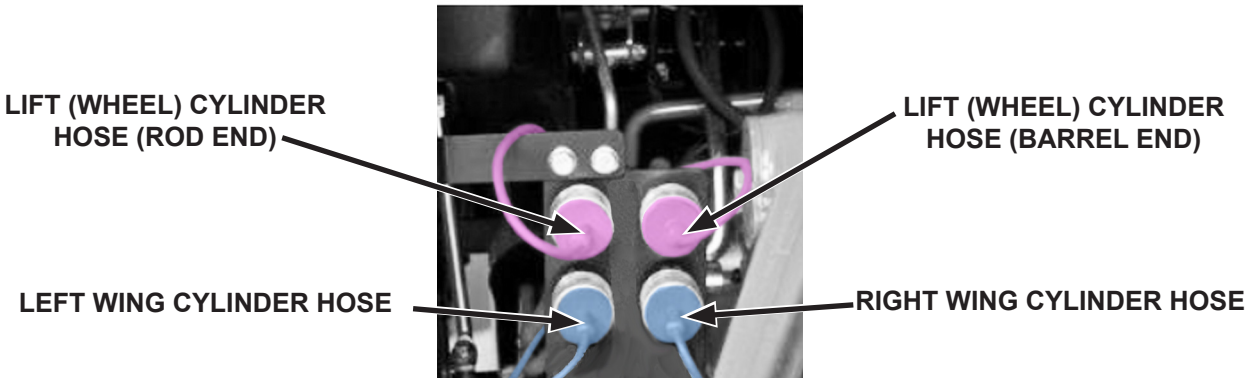
## GENERAL INFORMATION

The following instructions will help you set up and install the flex wing rotary cutter onto your tractor. Read all safety warnings, decals and operating instructions before operating the cutter. If there is any portion of this manual that you do not understand, contact your dealer.

The 3615 cutters are shipped with the hydraulic cylinders and hoses plumbed for use with tractors which have two or three rear remote hydraulics . Male quick couplers for all four hoses must be purchased from your dealer for installing the cutter to your prime mover. Each rear remote valve on your prime mover performs only one operation.

## DUAL REAR REMOTE HYDRAULIC SET UP - TWO HYDRAULIC VALVES

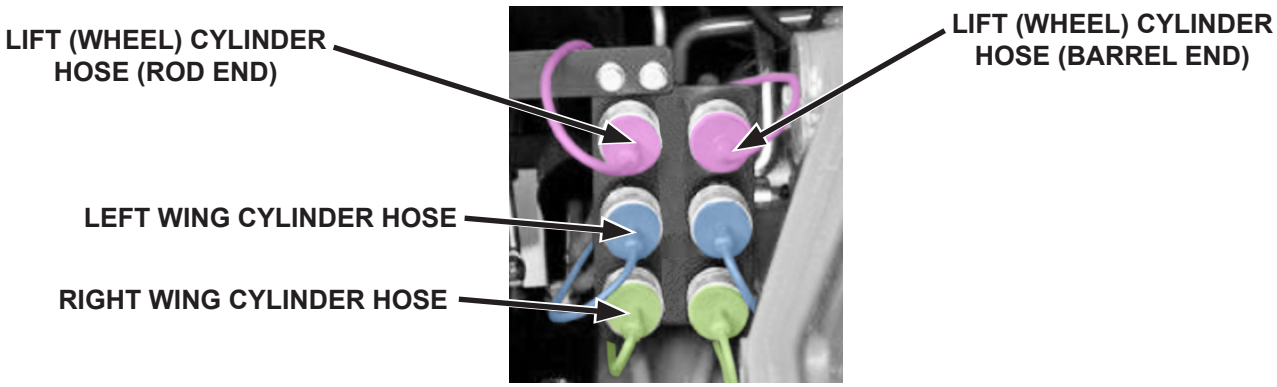
If your tractor is equipped with dual rear remote hydraulics: The first valve is needed to lift the cutter. The lift (wheel control) cylinder connects to both ports of the first valve while the hoses from each of the wing cylinders will occupy the ports of the second valve. The wings unfold with gravity and fold by hydraulic power. This arrangement requires the folding and locking UP of the wings to be done individually since they are powered by the same valve. As you activate the second hydraulic valve in the forward direction, one wing will raise. Once the wing is in the FOLDED UP position, follow your prime mover's safety shut down procedure and shut down the prime mover. Install the transport bar onto the wing cylinder. **(NOTE: Continuing to activate the valve in the forward direction after the wing is FOLDED UP will proceed to lower the opposite wing.)** Return to the tractor and active the second hydraulic valve again, this time in the reverse direction, until the second wing is in the FOLDED UP position and repeat the process for installing the transport bar onto wing cylinder. The valve controlling the wings must remain in the float position while unfolding the wings. To lower the wings: apply system pressure and remove the transport bars one at a time. With valve in the float position, allow gravity to lower the wings to the ground. See Steps 15 through 19 in Set-Up Instructions.



# INSTALLATION

## THREE REAR REMOTE HYDRAULIC SET UP - THREE HYDRAULIC VALVES

If your tractor is equipped with three rear remote hydraulics: The first valve is needed to lift the cutter. The lift (wheel control) cylinder connects to both ports of the first valve while the hoses from each of the wing cylinders will occupy one port of the second and third valve. The wings unfold with gravity and fold by hydraulic power. This arrangement allows for the folding and locking UP of the wings to be done independently since they are powered by their own valve. To FOLD UP each wing you will activate the second valve until that wing is in the FOLDED UP position and then activate the third valve until the remaining wing is in the FOLDED UP position. Follow your prime mover's safety shut down procedure and shut down the prime mover. Install the transport bars onto the both wing cylinders. The valves controlling the wings must remain in the float position while unfolding the wings. To lower the wings: apply system pressure and remove the transport bars one at a time. With the second and third valve in the float position, allow gravity to lower the wings to the ground. See Steps 15 through 19 in Set-Up Instructions.



# INSTALLATION

## SET UP INSTRUCTIONS

1. Back the prime mover to within a couple feet of the cutter while aligning the prime mover drawbar with the clevis on the cutter hitch. Following your prime mover "Safety Shutdown Procedure" shut off the prime mover. Attach hoses from lift cylinder and wings to tractor remote hydraulics as per your application. **NOTE: Hydraulic couplers may be purchased from your nearest dealer for your prime mover.**

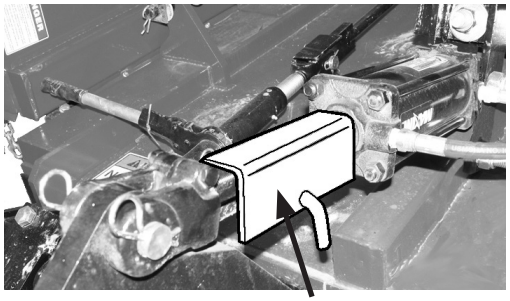
**PRIME CYLINDERS:**

Hydraulic cylinders must be primed before proceeding with the set up of the cutter. With shipping band still supporting wing tailwheels and transport bars installed on wing cylinders prime the cylinders by holding the valve control levers in the raised position until the cylinders fully retract (wing cylinders) and extend (lift/wheel cylinder). Place control levers in the float position and repeat process.

**DANGER!** **Wing cylinders must be primed before removing transport bars to lower wings. Keep all bystanders clear of wing area at all times when transport bars are not installed.**

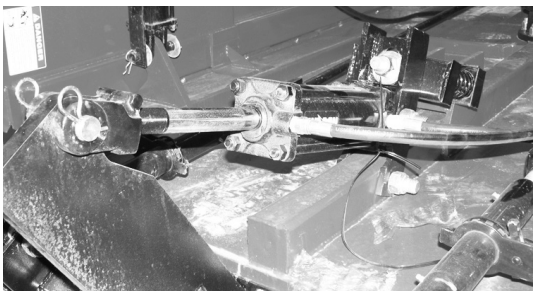
2. Extend lift/wheel cylinder using tractor controls. This will lower the wheels and allow for removal of cylinder transport cuff. Remove transport cuff. See Figure #1A and #1B

**FIGURE 1A**



**TRANSPORT CUFF**

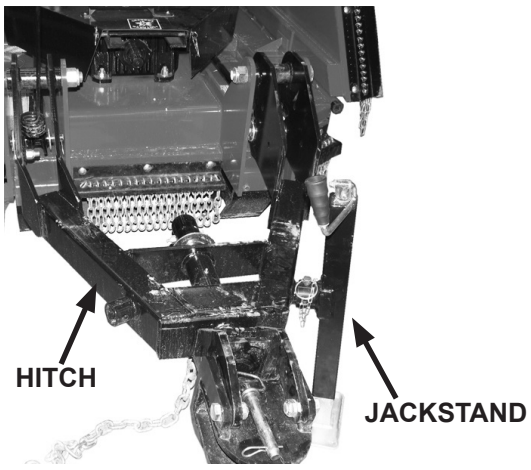
**FIGURE 1B**



**TRANSPORT CUFF REMOVED**

3. Retract cylinder until cutter is resting on skid shoes.
4. Hitch is shipped installed on cutter. Rotate into position and install jackstand onto side of hitch. See Figure #2
5. Remove shipping banding from the hitch and control (leveling) rods.
6. Disconnect control rods from rear ratchets and raise hitch slightly using the jack to gain access to mounting pins.

**FIGURE #2**



# INSTALLATION

7. Remove pins and install control rods to hitch. Lower hitch using the jack and reattach rods to rear ratchets. See Figure #3A and #3B

**FIGURE #3A**

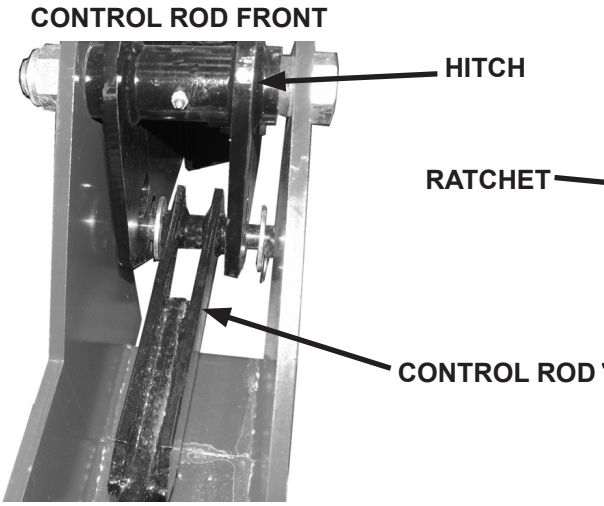
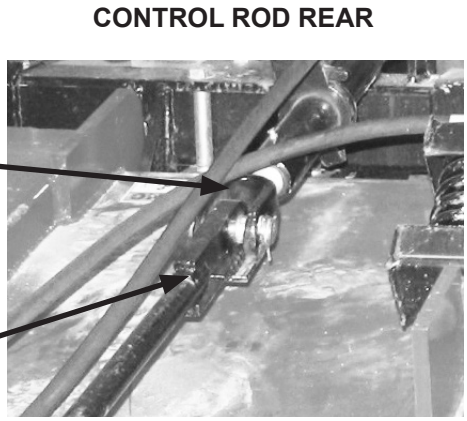
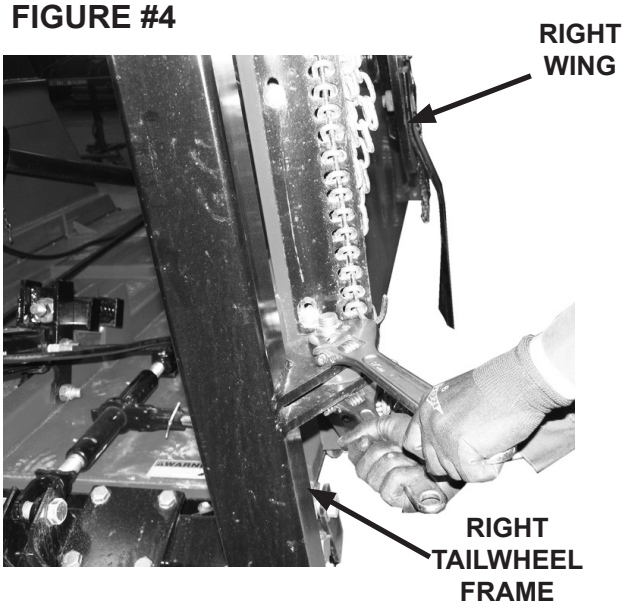



**FIGURE #3B**



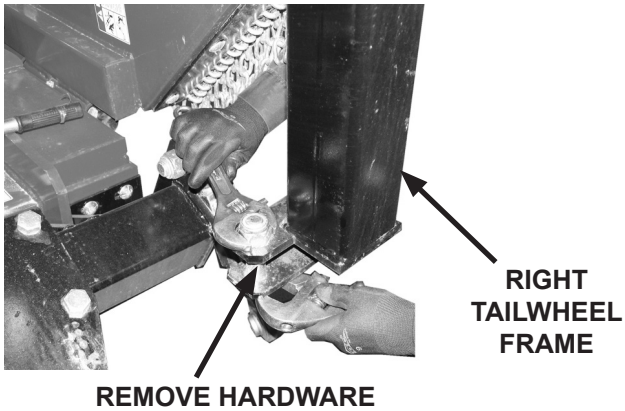

8. Loosen the 1” lock nuts that are securing the right tailwheel frame to the right wing These must be loosened slightly to allow the axle to pivot and were tightened for shipping purposes only. (Do not retighten.) See Figure #4

**FIGURE #4**




9. Remove the hardware at the end of the tailwheel frame and retain for installation of the turnbuckle. See Figure #5

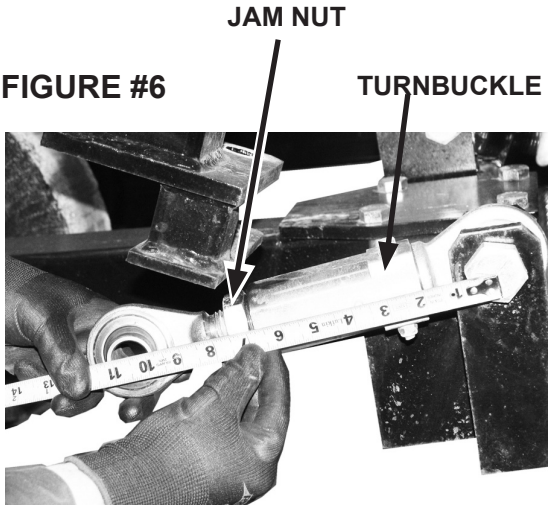
**FIGURE #5**



# INSTALLATION

10. Loosen jam nut on the right turnbuckle and adjust until center of ball swivels are approximately 10.50” apart. Do not retighten jam nut. See Figure #6

**FIGURE #6**

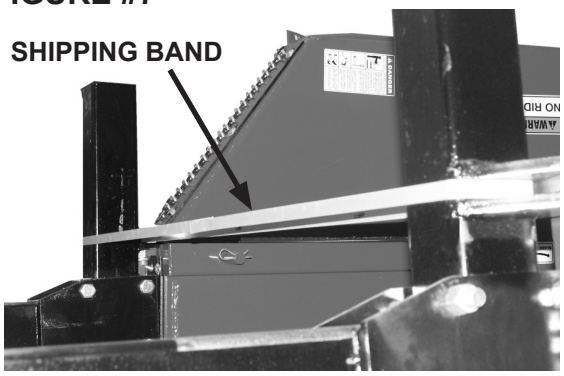



**10.50” CENTER TO CENTER**

11. Cut shipping band between the left and right tailwheel frames. See Figure #7

**DANGER!** **Stand clear of wing area and keep all bystanders clear of wing area when removing shipping band. A falling wing can cause serious injury or death.**

**FIGURE #7**

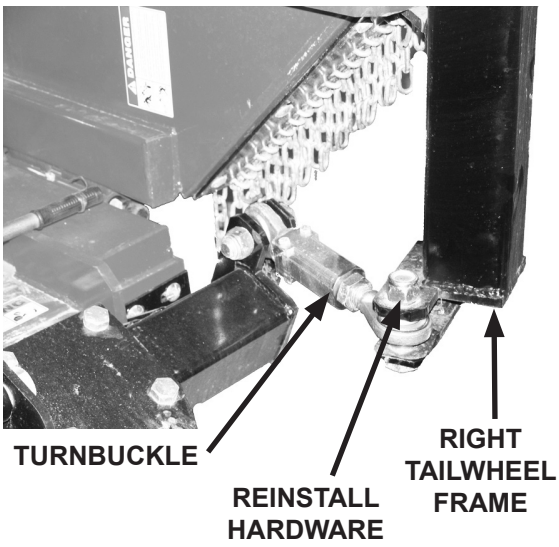



12. Rotate right tailwheel frame out just enough to connect turnbuckle using the hardware removed in Step #9. Torque to specification See “Bolt Torque Specification” section. See Figure #8

13. Tighten 1” lock nuts snug that secure the right tailwheel frame to the right wing. Do not overtighten. The tailwheel frame needs to be able to pivot during operation. See Figure #4

14. Repeat Steps #8 through #13 for left wing and tailwheel frame.

**FIGURE #8**



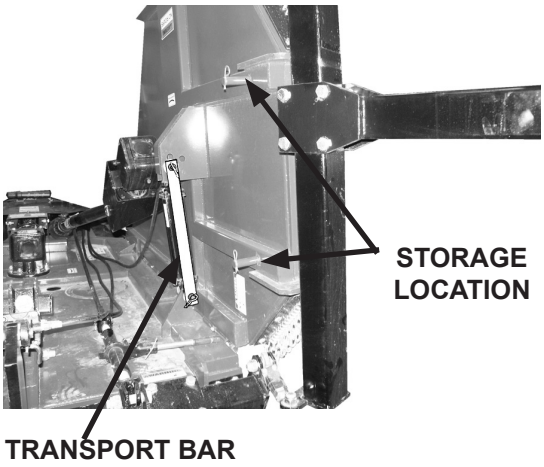

**DANGER!** **Keep all personnel out of the area of the wing decks. Do not allow anyone near wings during the folding or unfolding process. Contact with a falling wing will cause serious bodily injury or death.**

# INSTALLATION

15. Start the prime mover and raise both wings to release any tension on the transport bars.
16. Shut down the tractor following the safety shut down procedure in your prime mover operator's manual.

17. Remove the transport bars by removing the hairpin clips on both wing cylinders. Verify that no one is in the wing deck area before removing the transport bars. See Figure #9 **IMPORTANT: NEVER remove transport bars that have tension on them.**
18. Install the transport bars in their respective storage locations and secure with hairpin clips provided.
19. Restart tractor and lower both left and right wings. The wings unfold with gravity but the valve controlling the wings must remain in the float position while unfolding the wings.

**FIGURE #9**




## ATTACHING CUTTER TO TRACTOR

**DANGER! CRUSH HAZARD! Do not allow anyone in the area between prime mover and cutter during installation. Severe injury or death could occur.**

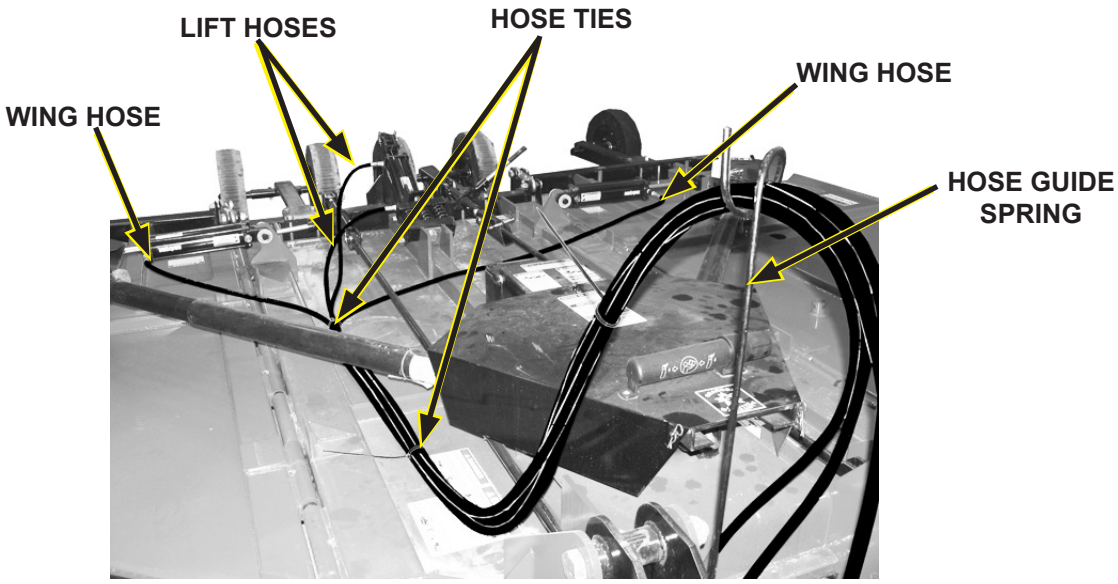
1. Store the top link in the storage hook and raise the lower 3-point arms up.
2. Raise or lower the jackstand on the cutter to align clevis with tractor drawbar. Drawbar should fit between the upper and lower plates of the clevis and be adjusted per the dimensions listed under "Drawbar Set-Up" in the Preoperation section of this manual.
3. Back tractor slowly, aligning the holes in the drawbar with clevis on cutter hitch. Ensure all hydraulic hoses are away from the hitch area when attaching cutter to tractor.
4. Shut down the tractor following the "Safety Shut Down Procedure" for your prime mover.
5. Install a 1" high strength drawbar pin and clip securing the cutter to the tractor.
6. Remove the jackstand from the hitch and install in its storage location on the left wing.
7. Securely attach hitch safety chain to the tractor with just enough slack to allow for turning.

**IMPORTANT: A safety chain with tensile strength equal to or greater than the gross weight of the cutter must be connected between the tractor and cutter. This will help control the cutter in the event the hitch becomes disconnected from the drawbar. Make sure the chain is attached to a secure location on the tractor and not to an intermediate support. After connecting both ends of the safety chain, drive the tractor to the right and left to check for proper chain length. Adjust length as necessary and allow only enough slack in the chain to make a maximum turn in both directions. When not in use, store the safety chain off the ground. Replace the safety chain if one or more links or end hook is broken, stretched or otherwise damaged or deformed.**

# INSTALLATION

8. Route hoses through the loop in the hose guide spring. Attach hoses from lift cylinder and wings to tractor remote hydraulics as per your application. (Be sure to connect the wing hoses to rear remote outlets that are equipped with a float option and set the tractor control lever in the float position before operating.) **NOTE: Hydraulic couplers may be obtained from your nearest dealer for your prime mover.**
9. Secure hoses together with hose ties to keep them away from pinch areas caused by folding the wings up and down, raising and lowering the deck or when making turns. See Figure #1

**FIGURE #1**

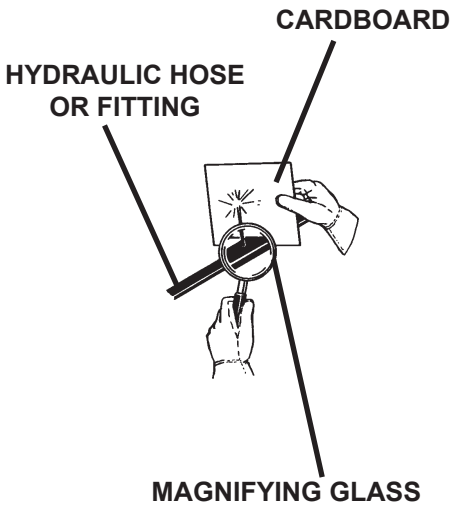



**WINGS FOLDED DOWN FOR CLARITY PURPOSES**

**WARNING!** **Escaping fluid under pressure can have sufficient force to penetrate the skin, causing serious personal injury. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands to search for suspected leaks.**

**Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.**

**If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.**



# INSTALLATION

## DRIVELINE INSTALLATION

**DANGER! ENTANGLEMENT HAZARD! Do not engage tractor PTO while connecting or disconnecting driveline or when anyone is standing near the driveline. Serious injury or death could occur.**

***NOTICE: To prevent machine damage do not attempt to operate a 540 RPM driveline at 1000 RPM or a 1000 RPM driveline at 540 RPM. Many tractors provide for both 540 and 1000 RPM PTO's. Verify compatibility between tractor RPM and cutter RPM and do not operate cutter above its rated PTO speed.***

1. Rotate the front half of the splitter guard up and discard the shaft protector from the splitter gearbox shaft. See Figure #1

**FIGURE #1**

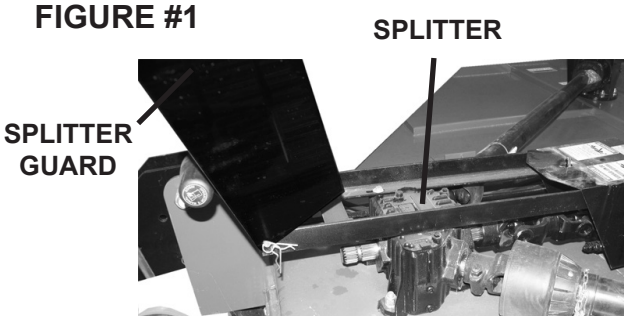



**FIGURE #2**

2. Loosen the bolt on the bolted end of the PTO driveline. Attach to splitter gearbox input shaft. Tighten lock nut to correct torque specification. See Figure #2


3. Attach the PTO from the cutter to the tractor: Slide the front section of the PTO into the back section and attach to the PTO shaft at the rear of the tractor. (Pull back on the driveline yoke collar and align the splines of the yoke with the PTO shaft. Push yoke onto the PTO shaft releasing the locking collar.) **NOTE: Push and pull both ends of the driveline back and forth until locked in place.**

**WARNING! The locking collar must slide freely and the locking balls seated in the groove on the tractor PTO shaft before operating. A driveline not attached correctly could come loose from the tractor resulting in personal injury and damage to the attachment.**

4. Attach front and back driveline chains to the cutter and tractor to prevent shields from turning. **NOTE: If chains are damaged or missing replace before operating cutter.**

***NOTICE: The PTO is customized for your specific application. If the PTO shaft is too long, severe PTO and gearbox damage is possible. DO NOT FORCE THE PTO TO FIT. Warranty is void if the correct PTO is not install*ed. The telescoping tubes must overlap by at least 1/3 of their length while in use.**

# INSTALLATION

**WARNING! Do not use a PTO adapter to attach your cutter to a non-matching tractor PTO. Serious personal injury and/or equipment failure can result. Consult an authorized dealer for assistance if the cutter PTO does not match the tractor PTO.**

## DETACHING CUTTER FROM TRACTOR

See “Storage” at the end of the “Operation” section of this manual if detaching cutter for a long period of time or at the end of the season.

1. Reduce engine RPM and disengage PTO.
2. Park the cutter on a level, hard surface.
3. If detaching with wings down: Lower the cutter to the ground, relieve pressure in hydraulic lines, apply brakes, shut off engine and remove the key. Be sure all rotation has stopped before exiting the prime mover.
4. Disengage the PTO shaft from the tractor. Collapse driveline by pushing tractor end towards splitter.
5. Install the jackstand onto the hitch and adjust to remove the weight of the cutter off the drawbar.
6. Remove the hitch pin connecting the cutter to the tractor and disconnect hydraulic couplers. Unhook safety chain.
7. Drive tractor forward several feet.
8. Lower the jack until the cutter is resting on the front skid shoes.
9. Store the hoses and PTO shaft off the ground to prevent damage.

## LEVELING

The tractor will need to be attached to the cutter and parked on a hard flat surface before leveling or adjusting the pitch of the cutter. The pitch adjustment is primarily to compensate for the different heights of tractor draw bars along with altering the cutting performance. **NOTE: Operating the cutter at any pitch other than parallel to the ground will produce a slightly uneven cut.**

**DANGER! Do not allow anyone in the area between prime mover and cutter during installation. Severe injury or death could occur.**

Follow the instructions for “Attaching Cutter to Tractor” to install the cutter onto your prime mover. Disengage and disconnect PTO from tractor. Fold wings into transport position by referring to the rear remote hydraulic set up at the front of the “Installation” instructions in this manual for the number of rear remote hydraulics available on your tractor. Install Transport Bars. You are now ready to start the leveling process.

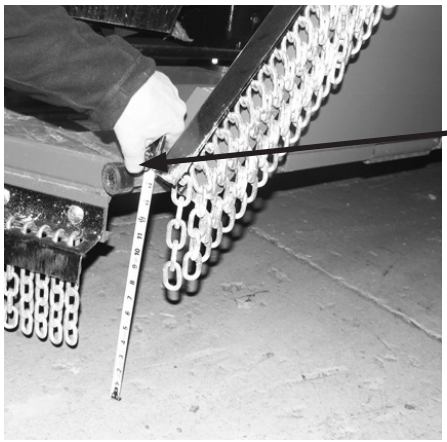
***OPERATING TIP:*** If cutting in dense material, operating the cutter with the rear slightly higher than the front will allow for an increase volume of cut material to exit from underneath the cutter. This will decrease the cutter horsepower requirements.

# INSTALLATION

## CENTER DECK LEVELING

1. Using the hydraulic lift, position center deck so front skid shoes are 2-3” off ground.
2. Properly shut down the tractor and remove the key before dismounting.
3. On both sides of the center deck are the wing hinges. Measure distance from hinge to ground at front and back. These should be equal distance off the ground on both sides at the back and 1” closer to the ground on both sides at the front. See Figure #1A and #1B

**FIGURE #1A**



**MEASURE FROM HINGE PIN TO THE GROUND**

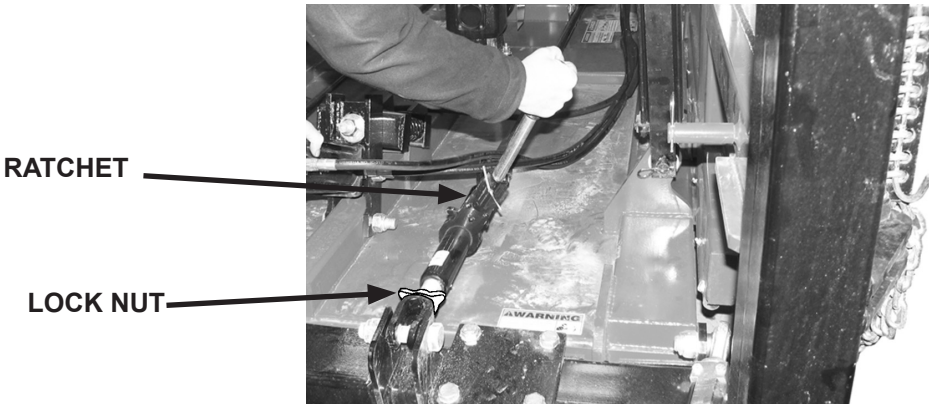
**(FRONT AND BACK ON HINGE PINS ON LEFT AND RIGHT SIDE OF CUTTER)**

**FIGURE #1B**

**To Adjust Center Deck:**

a. Loosen locking nuts.
b. Turn ratchet on both leveling rods until hinges incline from front to back by 1” with front being closer to the ground. Shortening the leveling rods will raise the front of the cutter and lengthening the leveling rods will lower the front of the cutter. Alternate from one rod to the other. See Figure #2
c. Verify that both sides are an equal distance from the ground.

**FIGURE #2**



# INSTALLATION

4. Once desired pitch is attained, make a final adjustment to the rods so that each will be under the same amount of tension. **NOTE: This may be done by tapping the rods and tuning them to the same sound.**
5. Tighten locking nut. See Figure #3
6. Go to “Wing Deck Leveling”.

**FIGURE #3**


**SETTING DECK PITCH:**

Positioning the cutter level with the ground during operation will maintain an even cutting pattern and even spreading of the cut grass.

If the cutter is slightly lower in the front (up to 1” (25.4mm) it will decrease the required horsepower which will increase fuel efficiency and you can increase ground speed. We recommend setting the cutter lower in the front for heavier cutting applications. Too low in the front will cause skipping, uneven cutting and excessive blade wear.

If the cutter is slightly lower in the back it will increase horsepower and decrease ground speed. This will allow for increased mulching of the grass and improved distribution of cut material. We recommend setting the cutter slightly lower in the back for a more finished result. Too low in the rear will result in skipping, uneven cutting and excessive wear on tailwheels with the rear skirt dragging and causing balling up problems.

The blades contacting the ground can result in excessive slipping of the slip clutch and increased thrown objects from under the cutting deck.

**IMPORTANT: Adjust leveling rods the same amount and maintain equal tension in the rods. Improper adjustment may cause rods to snap or bend. Retighten the jam nuts after the deck pitch has been set.**

**IMPORTANT: If the cutter is allowed to rest on the ground in order to relieve tension on the rods, the tongue must be disconnected from the tractor to allow it to move.**

## WING DECK LEVELING

1. Remove transport bars and lower wings by following Steps #15 through #19 in the “Set-Up Instructions” in this Manual.
2. With wings lowered, pull forward 8’ to allow wheels to properly align and lower cutter until the center deck skids are approximately 1” - 2” off the ground.
3. Activate the control levers to the wings to relieve hydraulic pressure in the system.
4. Check wings to see if they are level with center deck.

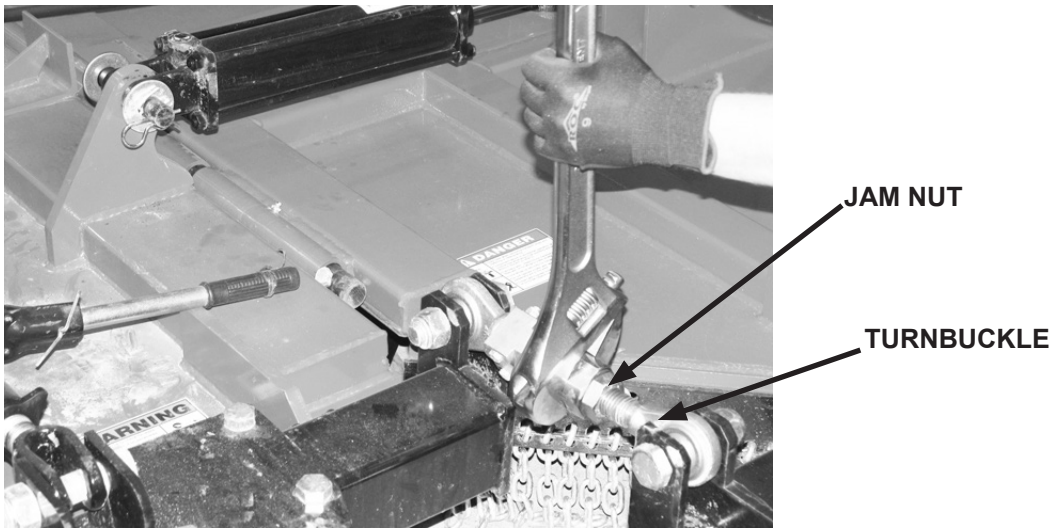
**To Adjust**:

a. **<u>Outer wing edge is higher than center deck:</u>** Loosen jam nut and rotate turnbuckle counterclockwise to lower outer wing edge until level. Tighten jam nut to correct torque. See Figure #1

b. **<u>Outer wing edge is lower than center deck:</u>** Loosen jam nut and rotate turnbuckle clockwise to raise outer wing edge until wing is level. Tighten jam nut to correct torque. See Figure #1

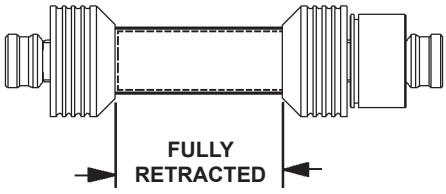
# INSTALLATION

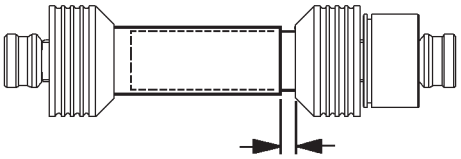
**FIGURE #1**




## POWER (PTO) SHAFT ADJUSTMENT

Confirm the minimum and maximum working lengths of the driveshaft. The telescoping tubes must overlap by at least 1/3 of their length while in use. The (PTO) drive assembly may need to be shortened to fit up to your tractor correctly and to prevent the drive assembly from "bottoming out" and causing extensive damage to the tractor PTO drive assembly.




The shaft assembly is shortest when the shaft is straight inline with the attachment. There should be a minimum of .50" (13mm) of free travel before the shaft is fully retracted. To check:

a. Lower the attachment until the shaft is parallel to the ground and is straight inline with the attachment gearbox.
b. Check to see if there is a minimum of .50" free travel.

If there is not at least .50" (13mm) of free travel DO NOT OPERATE ATTACHMENT.

***NOTICE: IF THE DRIVE SHAFT "BOTTOMS OUT" BEFORE IT IS STRAIGHT INLINE WITH THE ATTACHMENT, STOP AND CALL YOUR NEAREST DEALER OR THE ATTACHMENT MANUFACTURER BEFORE OPERATING.***

**CAUTION** **FAILURE TO HAVE THE REQUIRED DISTANCE OF CLEARANCE WILL DAMAGE THE POWER TAKE OFF (PTO) OF YOUR TRACTOR.**

# OPERATION

**INTENDED USE:** The Flex Wing Rotary Cutter is designed for cutting grass, weeds, brush and trees up to 4" (102mm) in diameter while still maintaining a 15" (381mm) maximum ground clearance. The flex wing design allows this unit to follow the contours of the land. Use in any other way is considered contrary to the intended use.

## GENERAL INFORMATION

Simplicity of operation is one of the key features of your attachment. There are only a few adjustments to check. It is important however to be familiar with, and know the controls and adjustments on both the attachment and the tractor. Such knowledge is crucial for safe, efficient operation of equipment. Take the time to learn how they operate now.

The 15' flex wing cutter consists of a center deck with two variable position wings which together have a cutting width of 15' (457.2cm). Wing operating angles and machine cutting height are independently controlled using hydraulic cylinders. Self-leveling control rod linkage maintains a level cutter at all cutting heights. Power from the tractor PTO is split at the power divider (splitter) gearbox and supplied to each of the blade gearboxes. Each blade gearbox has two free swinging uplift blades designed to cut grass, cornstalks and light brush. Free swinging blades reduce the shock impact when a stationary object is hit. Slip clutches are installed on each gearbox for additional protection. Front and rear chain deflectors are also included as standard equipment.

## THE TRACTOR

Your attachment mounts to the drawbar of the tractor. Due to this arrangement, thorough knowledge of the tractor and all of its controls is necessary for attachment operation. Read your tractor owner's manual for information regarding tractor operation before attempting to use the attachment.

## BEFORE OPERATION

**Before operating the cutter:**

- Perform all Routine Daily Maintenance Procedures listed in the Maintenance section of this manual.
- Adjust pitch (Installation Section) and cutting height (Operation Section) for your job site application.
- Check PTO is securely connected to the tractor and cutter.
- Remove or secure the lower 3-point hitch arms in the raised position to ensure they do not interfere with the driveline, hoses or hitch.
- Check that hoses are routed away from PTO's and all other pinch points.
- Start tractor and carefully verify that drawbar, tires and all other equipment on the tractor does not contact the cutter or driveline.
- Visually verify that there is nothing under the cutter and all parts are assembled correctly.
- Inspect the work site, removing all foreign objects, rocks and debris that the blades could come into contact with. If objects are too big to remove, mark the area clearly and avoid blade contact. If the grass/weeds are too high to find the smaller objects and debris that could be struck by the blades, it is recommended to mow the area high, keep all bystanders completely out of the area, then remove the smaller objects and debris and mow again at a lower height.

# OPERATION

**DANGER!** **All safety guards, shields and devices must be installed and inspected daily for missing or broken components. Replace broken, missing or worn items at once to reduce personal injury or death from thrown objects, entanglement, or blade contact.**

**DANGER!** **ROTATING BLADE HAZARD! STAY BACK!**
**OBJECTS CAN BE THROWN!**
**DO NOT operate near bystanders.**
**DO NOT place hands or feet under deck while in operation or with engine running.**

**DANGER!** **Do not allow riders on the attachment or tractor.**

**WARNING!** **Before leaving the operator's seat: Lower the attachment. Make sure all rotation has stopped, skids are on the ground, PTO is disengaged, parking brake is engaged, engine is turned off and the keys are removed.**

## ADJUSTING CUTTING HEIGHT

Cutting height range is from 2" - 15" (5.1-38.1cm). When selecting a cutting height, you should take into consideration the area of operation. If the ground is rolling and has mounds the blades can contact, set the cutting height accordingly. The cutting height is approximately the same height as the front center skid shoe.

1. Position the cutter on a hard level surface and disconnect the PTO from the tractor.
2. Fold wings into transport position by referring to the rear remote hydraulic set up at the front of the "Installation" instructions in this manual for the number of rear remote hydraulics available on your tractor. Install transport bars.
3. Using four jackstands adjusted to the same height, place one at the front on each side of the center deck hinge point area and one at the back on each side of the center deck hinge point area.
4. Lower the center deck onto the jackstands with the rear wheels on the ground.
5. Loosen jam nuts on the control rods and adjust the ratchet's. Make sure both control rods are adjusted evenly. Tighten jam nuts.
6. Raise the center section and remove the jackstands. The front of the cutter will be approximately 1/2" (13mm) lower than the rear.

To adjust the height of the cutter so that it is higher in the front than the rear, place 1" - 1.50" (25.4-38.1mm) blocks on top of the front jackstands. To adjust wing height, loosen the jam nut on the turnbuckles. Lengthening the turnbuckle will raise the wing and shortening the turnbuckle will lower the wing. The rear edge of the wing should be parallel to the ground.

# OPERATION

## GROUND SPEED AND PTO RPM

Ground speed will depend on the terrain, grass type and density along with height of vegetation. The PTO should be at full rated RPM to maintain a clean cut but do not exceed the rated PTO RPM for your cutter. For most cutting operations we recommend a ground speed of 2-5 MPH (3-8 K/H). Adjust ground speed to maintain the rated PTO speed to prevent overloading the cutter and tractor.

Follow your tractor operator's manual and safety precautions for operating a rear mounted attachment. Operate only from the operator's seat with seatbelt securely fastened. Your tractor must be equipped with ROPS or an enclosed cab.

We recommend that you plan your driving pattern in advance to minimize turning and approach ditches at an angle to prevent over-collapse of the driveline.

**WARNING! Exceeding the rated PTO speed for your attachment (540 or 1000 RPM depending on your cutter) can result in serious injury or death along with driveline and attachment damage.**

1. Position the height and pitch of the cutter for your terrain, grass type and density.
2. Block off the work area from all bystanders, children, livestock and vehicles. Never operate the cutter in populated areas where thrown objects could injure people or damage property.

**WARNING! Never engage the PTO with the cutter deck raised, exposing yourself or anyone else to the rotating blades. If blades are visible then the unit is raised too high.**

3. Following your tractor operator's manual for starting procedures, start the tractor and set the engine speed at idle (approximately 1000 RPM) before engaging the tractor PTO.
4. Slowly increase engine speed until the PTO is running at the rated speed (540 or 1000 RPM depending on your cutter and tractor). Maintain PTO speed throughout cutting operation.

**WARNING! Initial start up vibration is normal and should stop after approximately 3-5 seconds. If you encounter unusual or excessive vibration or noise disengage the PTO immediately. Inspect the attachment to determine the cause and repair or tag "DO NOT OPERATE" until all problems are corrected.**

**NOTE: Gearbox protection is provided by a slip clutch with replacement disc. The slip clutch is designed to slip when excessive torsional loads occur.**

5. Slowly proceed forward into the work area adjusting ground speed to accommodate the terrain and vegetation height, type and density.

**IMPORTANT: Grease level in the gearbox must be checked after 5-10 minutes of initial operation. Grease should be level with pipe plug.**

6. When you get to the end of a pass be sure to leave additional clearance for the added length of the tractor with cutter. The angle between the tractor and cutter should not be so great that a clattering of the U-joints occurs. Sharp turns cause premature failure of the joints and damage to the cutter and tractor.

7. When done mowing or need to dismount from the tractor; Reduce engine RPM and disengage PTO. Stop on level ground, place tractor in park, set parking break, turn off engine and remove the key. Do not leave tractor operators station until all blade movement has come to a complete stop.

## TROUBLESHOOTING OPERATING CONDITIONS:

Below are listed a few operating conditions and suggestions on how to possibly correct them.

**DANGER!**  **Rotary cutters are capable of throwing objects a great distance causing serious injury or death. Keep all bystanders several hundred feet away from mowing area.**

**GRASS TOO LONG OR THICK**: If cutting heavy vegetation, you may need to slow travel speed while maintaining PTO RPM or double cut to achieve the desired results. In certain conditions tractor tires may roll the grass down resulting in an uneven cut when the grass fails to rebound before reaching the cutting blades. Tall material should be cut twice. Cut the material higher on the first pass. Cut at the desired height at 90° on the second pass.

**BRUSH TOO BIG IN DIAMETER:** The rotary cutter is NOT designed to cut trees larger than the specifications indicated in the Intended Use.

**CUTTING LARGE BRUSH AND SMALL TREES:** If brush is within recommendations and the cutter is not cutting satisfactorily, check sharpness of the blades (see “Maintenance”) and cut by approaching the area with the brush or tree to the right side of center. This will bend the tree in such a fashion that the cutting blades will cut from the top (outside) of the bend and not the bottom (inside) for a cleaner cut. DO NOT BACK OVER LARGE BRUSH OR SMALL TREES.

**BRUSH TOO THICK OR HEAVY:** If cutting heavy or thick brush, you may need to slow travel speed while maintaining PTO RPM, to prevent overloading. If the blades seem to be unable to handle the volume of brush, slow down the travel speed until the unit reaches full speed before proceeding. If still not obtaining a uniform cut see “CUTTING LARGE BRUSH AND SMALL TREES”.

**SCALPING THE GROUND or BOTTOMING OUT:** Be aware of changes in the terrain. Stay alert for drop-off’s and holes. Check the terrain and the deck position before proceeding to cut.

**CROSSING DITCHES AND/OR STEEP INCLINES:** Cut ditches and inclines at an angle. DO NOT travel up and down ditches or steep inclines that will allow the main driveline inner profile to penetrate into the outer housing until the assembly becomes solid (driveline at its extreme shortest length). This can cause serious damage to the tractor and cutter by pushing the PTO into the tractor, through the support bearings or downward breaking the PTO shaft. When driving over the crest of a hill, drive at an angle. If the tongue reaches an angle of 20° or more the driveline could contact the hitch causing extensive driveline damage.

**WARNING!**  **Damage caused by over-collapsing the driveline may allow the driveline to come loose from the tractor which could result in severe personal injury to the operator or bystanders and/or extensive damage to the tractor or attachment.**

# OPERATION

**STRIKING FOREIGN OBJECTS:** Stay alert for rocks, fencing, abandoned wells, septic tanks or other foreign objects. If the cutter comes into contact with a foreign object, stop the unit, shut off the engine, remove the key and disconnect the PTO. Inspect the unit and repair any damage before restarting and continuing cutting. (Never try to weld or straighten damaged blades.) Inspect the work area for any other items, and if they are too large to be removed from the area, they should be clearly flagged.

## STORAGE

The following storage procedure will help you to keep your attachment in top condition. It will also help you get off to a good start the next time your rotary cutter is needed. We therefore strongly recommend that you take the extra time to follow these procedures whenever your unit will not be used for an extended period of time.

Follow “Detaching Cutter from Tractor” instructions in the installation section of this manual

- Clean the unit thoroughly, removing all mud, dirt, and grease.
- Check blades and sharpen or replace if necessary. Replace all blades at the same time and do not try to weld or straighten damaged blades; loss of integrity may result.
- Inspect for visible signs of wear, breakage, or damage. Order any parts required, and make the necessary repairs to avoid delays when starting next season. **NOTE: Purchase only approved replacement parts.**
- Tighten all loose capscrews and nuts.
- Replace decals if damaged, or in unreadable condition.
- Apply a rust-preventive spray to all moving parts and to the bottom of the deck.
- Place the driveline off the ground and away from water, dirt or other contaminants.
- Coat exposed portions of the cylinder rods with grease.
- Seal hydraulic system from contaminants and secure all hydraulic hoses off the ground to help prevent damage.
- Store the unit in a dry and protected place. Leaving the unit outside will materially shorten its life.

**Additional Precautions for Long Term Storage:**

- Touch up all unpainted and exposed areas with paint, to prevent rust.

## REMOVING FROM STORAGE

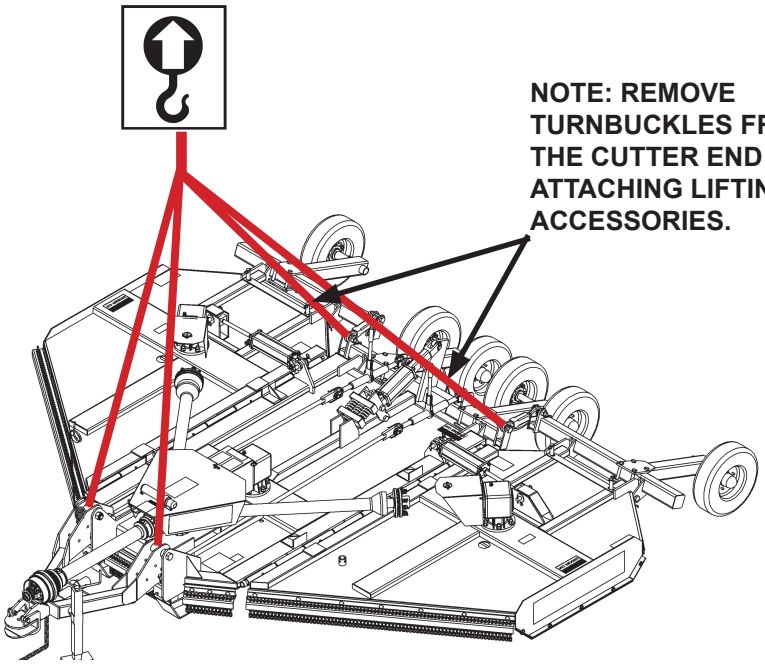
- Remove all protective coverings.
- Check all nuts and bolts for proper tightness, especially those securing the motor, bearing housing and blades.
- Check hydraulic hoses for damage and leaks. Replace if required.
- Inspect slip clutch lining plates to ensure they are not seized from rust or corrosion. See Maintenance section and correct before operating.

## LIFT POINTS

Lifting points are identified by lifting decals where required. Lifting at other points is unsafe and can damage attachment. Do not attach lifting accessories around cylinders or in any way that may damage hoses or hydraulic components. See Diagram

# OPERATION

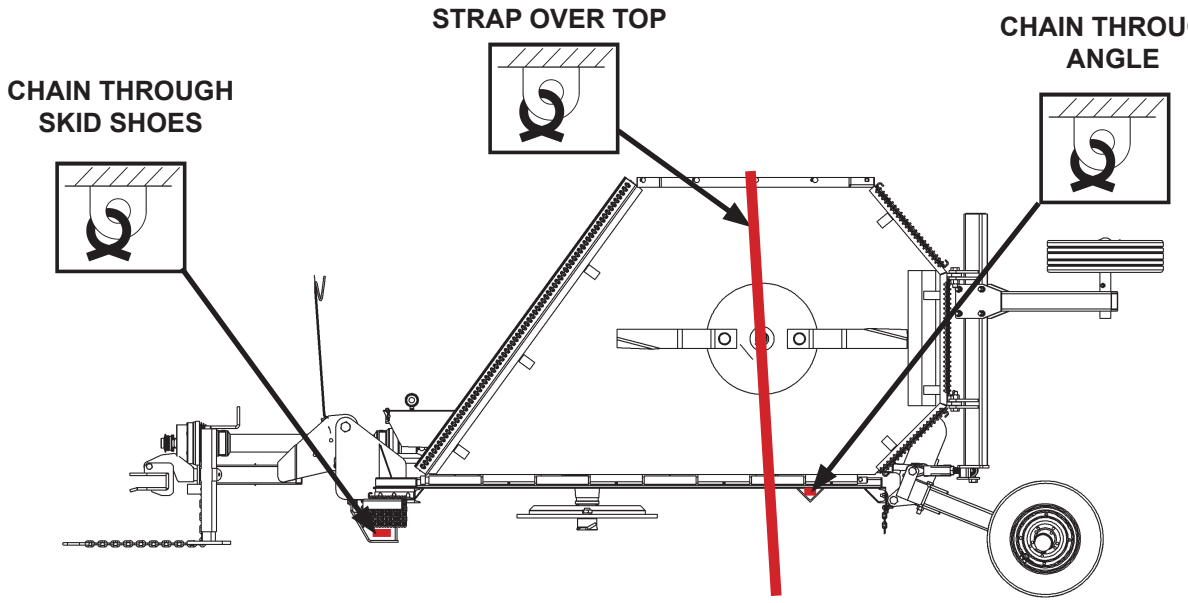
- Attach lifting accessories to unit at recommended lifting points.
- Bring lifting accessories together to a central lifting point.
- Lift gradually, maintaining the equilibrium of the unit.




**WARNING!** **Use lifting accessories (chains, slings, ropes, shackles and etc.) that are capable of supporting the size and weight of your attachment. Secure all lifting accessories in such a way to prevent unintended disengagement. Failure to do so could result in the attachment falling and causing serious personal injury or death.**

## TIE DOWN POINTS

Tie down points are identified by tie down decals where required. Securing to trailer at other points is unsafe and can damage attachment. Do not attach tie down accessories around cylinders or in any way that may damage hoses or hydraulic components. See Diagram



# OPERATION

- Attach tie down accessories to unit as recommended.
- Check unit stability before transporting.

**WARNING! Verify that all tie down accessories (chains, slings, ropes, shackles and etc.) are capable of maintaining attachment stability during transporting and are attached in such a way to prevent unintended disengagement or shifting of the unit. Failure to do so could result in serious personal injury or death.**

## TRANSPORTING

Follow all local government regulations that may apply along with recommended tie down points and any equipment safety precautions at the front of this manual when transporting your attachment.

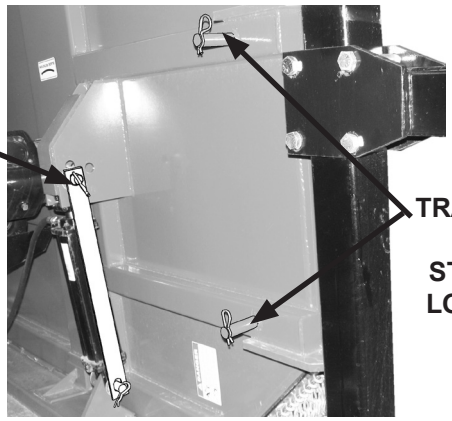
Only transport with tractor ROPS in the raised position, seatbelt on and PTO disengaged. When transporting between sites take extra care that you do not obscure tractor SMV emblem.

1. Disengage PTO and wait for all blade movement to stop.

2. Raise cutter (lower wheel assembly) and install cylinder transport cuff (A) on wheel assembly cylinder. See Figure #1

**FIGURE #1**


**FIGURE #2**



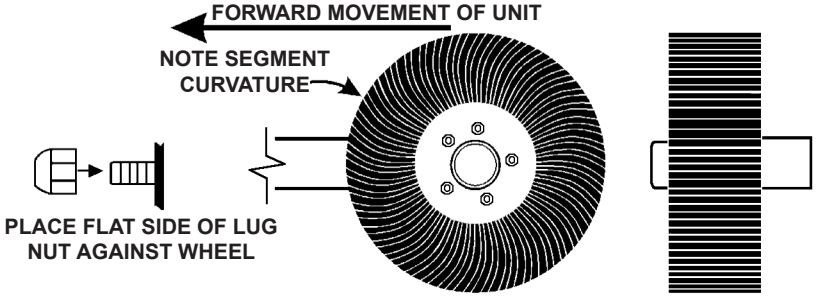

3. Raise wings and install transport bar on wing cylinders. See Figure #2

**WARNING! Always install transport bars on wing cylinders before transporting between work sites or on public roadways. Wings could fall causing serious injury or death.**

***NOTICE: Laminated tires should not exceed 15 MPH (24 K/H) in even the best of conditions, excessive speeds can cause damage to the tires and cutter.***

**LAMINATED TIRE**

Sectional tires must be installed with the rubber segments laying with the ground.



4. Check tires and wheel bolts before and after transport. Check hitch pins, bolts, tires and hubs before transporting.
5. Connect the safety chain to tractor. **NOTE: Safety chain must have a strength rating equal to or greater than the gross weight of the towed attachment.**

**IMPORTANT: A safety chain with tensile strength equal to or greater than the gross weight of the cutter must be connected between the tractor and cutter. This will help control the cutter in the event the hitch becomes disconnected from the drawbar. Make sure the chain is attached to a secure location on the tractor and not to an intermediate support. After connecting both ends of the safety chain, drive the tractor to the right and left to check for proper chain length. Adjust length as necessary and allow only enough slack in the chain to make a maximum turn in both directions. When not in use, store the safety chain off the ground. Replace the safety chain if one or more links or end hook is broken, stretched or otherwise damaged or deformed.**

**IMPORTANT: Reduce tractor speed when turning and leave enough clearance so the cutter does not contact obstacles such as buildings, trees or fences.**

# LUBRICATION

## GENERAL INFORMATION

Economical and efficient operation of any machine is dependent upon regular and proper lubrication of all moving parts with a quality lubricant. Neglect leads to reduced efficiency, heavy draft, wear, breakdown, and needless replacement parts.

All parts provided with grease fittings should be lubricated as indicated. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

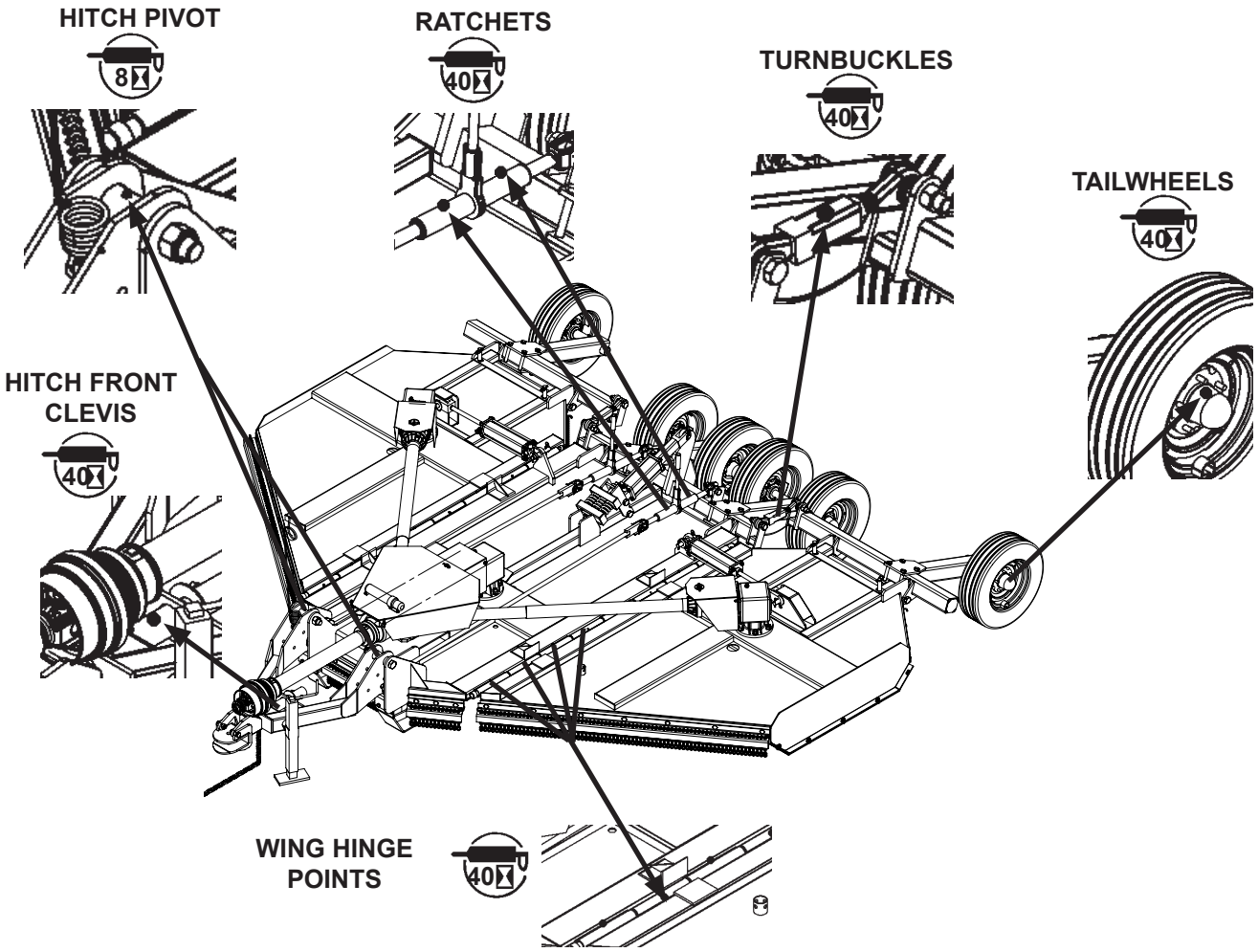
**IMPORTANT: Avoid excessive greasing. Dirt collects on exposed grease and greatly increases wear. After greasing, wipe off excessive grease from fittings.**

### LUBRICATION

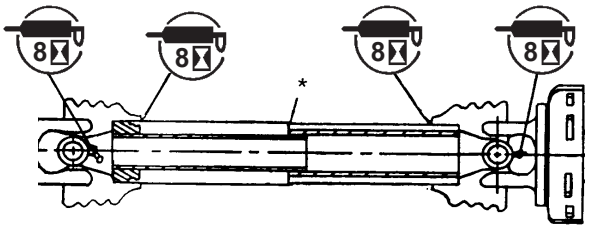
Every 8 hours: Lubricate grease fittings on hitch pivot points and driveline universal joints and shield fittings.

Every 40 hours: Lubricate grease fittings on tailwheels, turnbuckles, ratchets, hitch front clevis and wing hinge points.

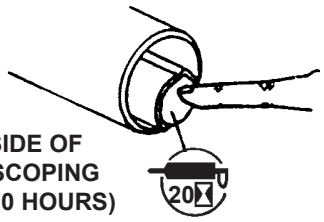
Every 20 hours: lubricate PTO driveline inner tube before putting attachment into operation and every 20 hours thereafter.



# LUBRICATION




(Swing joint sideways for greasing.)




GREASE INSIDE OF OUTER TELESCOPING TUBE (EVERY 20 HOURS)

*** When used in winter the outer tube must be greased to prevent it freezing solid!**

## GEARBOX

The grease/oil level in the gearboxes should be checked daily. Proper level of lubricant in the gearboxes is approx. 85 oz (2.5 L) and in the splitter gearbox 61 oz (1.8 L). Fill as needed with EP-0 grease or equivalent.

**TO CHECK:**

Lubricant level must be checked with the unit on a level surface and after running the cutter for approximately 5-10 minutes to warm up the grease.

**WARNING! Always disengage PTO, apply the brakes, turn off the engine, remove the key and wait for all rotation to stop before dismounting from tractor.**

Remove pipe plug from side of gearbox. Lubricant should be at the same level as the bottom of the plug.

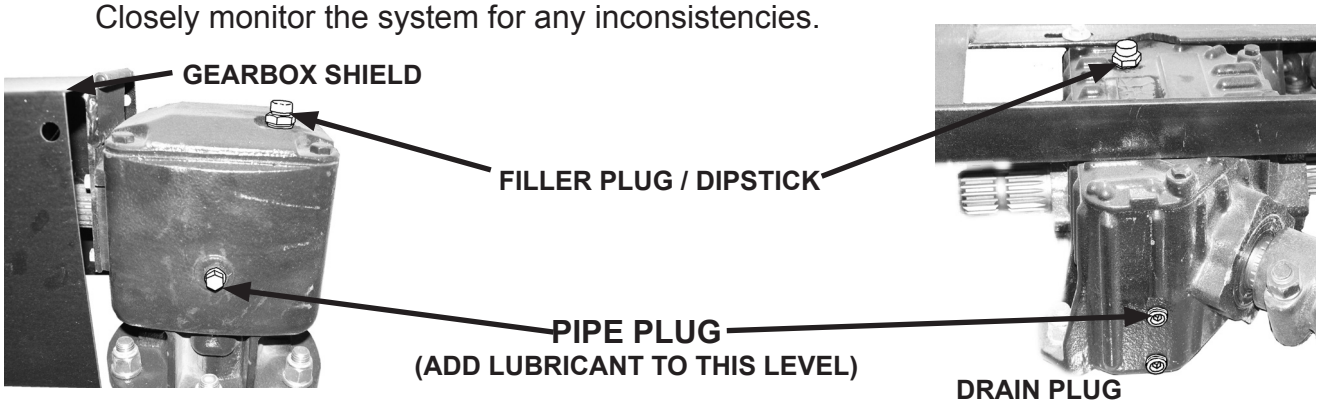
**TO ADD:**

Remove filler plug/dipstick from top of gearbox and add EP 0 or equivalent grease up to the pipe plug. Replace pipe plug and filler plug/dipstick. NOTE: Grease will liquefy as it is heated during operation.

**TO CHANGE OIL:**

Although EP-0 grease is compatible with other types of grease it is recommended that when changing greases, the cutter be cleaned of old grease whenever possible or flushed with a liberal amount of semi-fluid grease while the unit is in operation. **NOTE: Use of a suction or siphon pump to drain grease may be required.**

Closely monitor the system for any inconsistencies.




**IMPORTANT: DO NOT OVERFILL, AS TOO MUCH LUBRICANT MAY RUPTURE THE GEAR BOX SEALS.**

# MAINTENANCE

## GENERAL INFORMATION

Regular maintenance is the key to long equipment life and safe operation. Maintenance requirements have been reduced to an absolute minimum. However, it is very important that these maintenance functions be performed as described.

**WARNING! Always disengage PTO, apply the brakes, turn off the engine, remove the key and wait for all rotation to stop before dismounting from tractor.**

| PROCEDURE | DAILY | EVERY 40 HOURS | EVERY 120 HOURS |
|---|---|---|---|
| Check mounting hardware on blades and tighten to 450 ft. lbs. (610 N.m). | ✔ | | |
| Check all other hardware and tighten, if necessary. See Bolt Torque Specifications. | ✔ | | |
| Check blades and blade pan for damage and replace or sharpen as required. | ✔ | | |
| Check all Safety guards and devices are installed correctly. | ✔ | | |
| Replace any missing or damaged bolts or nuts with approved replacement parts. | ✔ | | |
| Inspect attachment for any worn parts or cracked welds. Repair as required. | ✔ | | |
| Check hydraulic system for leaks or damaged hoses. Tighten or replace as necessary. | ✔ | | |
| Check for missing or illegible Safety / Warning Decals. Replace as needed. | ✔ | | |
| Lubricate grease fittings on hitch pivot points and driveline universal joints and shield fittings. See Lubrication Section | ✔ | | |
| Check oil level in gearbox and add if necessary. See Lubrication Section | ✔ | | |
| Lubricate grease fittings on tailwheels, turnbuckles, ratchets, hitch front clevis and wing hinge points. See Lubrication Section | | ✔ | |
| Check hubs for excessive play on spindle and repack bearings. | | | ✔ |

## INSPECT BLADES FOR DAMAGE:

Inspect blades for abnormal wear. Check for cracks, notches or chipped areas, bent or deformed blades or if the cutting edge has been excessively worn (more than .50” or 13mm). Always replace the blades in pairs and at the same time.

## INSPECT BLADE PAN FOR DAMAGE:

Inspect blade pan for damage caused by contacting an immovable object. This could cause excessive vibration and/or noise. Replace as required.

## SLIP CLUTCH

Perform a slip clutch operational check and adjustment if attachment has been in storage for 30 days or longer. See Maintenance section.

# MAINTENANCE

## WHEEL HUBS

Check hubs every 120 hours for excessive play on spindle and repack bearings with new grease.

Tighten bearing adjustment nut to eliminate lateral movement on spindle while allowing hub rotation if needed.

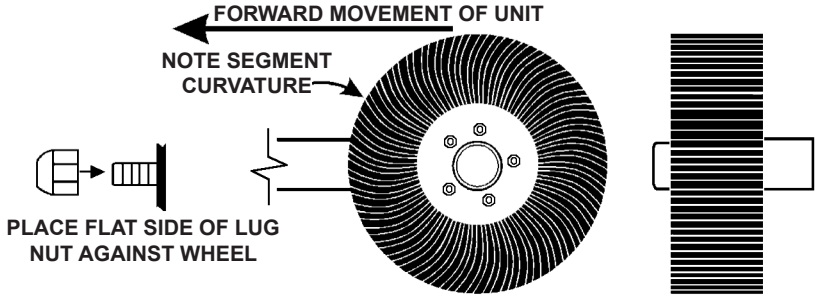
## TIRES

Six-Wheel axle arrangement with four tires on transport axle and one on each wing axle.

**<u>Laminated Tires</u>: Constructed of laminated layers of solid rubber that will never go flat.**

***NOTICE: Laminated tires should not exceed 15 MPH (24 K/H) in even the best of conditions, excessive speeds can cause damage to the tires and cutter.***

**LAMINATED TIRE**




Sectional tires must be installed with the rubber segments laying with the ground.

**<u>Airplane Tires</u>: Built tough to withstand the rugged use a cutter receives and to provide a smoother ride when transporting. Airplane tires should not exceed 20 MPH (32 K/H) and should always be installed with the cone side of the lug nut to the inside (towards the rim).**

**WARNING: Explosive separation of tire and rim parts can cause serious injury or death. Release all air pressure before loosening bolts.**

Do not attempt to mount a tire unless you have the proper equipment and experience. Always maintain a tire pressure of 40-80 PSI depending on operating conditions and do not inflate tires above the recommended pressure. Never weld or heat a wheel and tire assembly. The heat can cause an increase in air pressure and result in tire explosion. Welding can structurally weaken or deform the wheel.

When inflating tires, use a clip-on check and an extension hose long enough to allow you to stand to the side and not in front of or over the tire assembly Use a safety case if available.

Check wheels for low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts. Never remove split rim assembly hardware with tire inflated.

## SKID SHOES

### WING SKID SHOE REPLACEMENT

***NOTICE: Excessive wear on skid shoes can weaken side panels and require extensive repairs on the cutter. Always replace skid shoes at the first sign they are wearing thin.***

# MAINTENANCE

1. Remove .50” carriage bolts, washers and nylock nuts securing the left skid shoe to the left wing. Inspect carriage bolts for wear and replace if needed.
2. Attach new skid shoe to cutter using existing or new carriage bolts, washers and nylock nuts.
3. Tighten to specification. See Bolt Torque Specification Section.
4. Repeat for the right skid shoe on the right wing.

**CENTER SKID SHOE REPLACEMENT**

1. Remove the eight .50” capscrews and nylock nuts securing the two main skid shoes to the center deck.
2. Position the new main skid shoes in place and secure with existing capscrews and nylock nuts.
3. Torque to specification. See Bolt Torque Specification Section.

## SUSPENSION SPRING SHOCK ABSORBERS

***NOTICE: Spring Shock Absorbers are preset at the factory to allow for spring movement. Tightening lock nuts may damage cutter.***

## SLIP CLUTCH

**WARNING! Always disengage PTO, apply the brakes, turn off the engine, remove the key and wait for all rotation to stop before dismounting from tractor.**

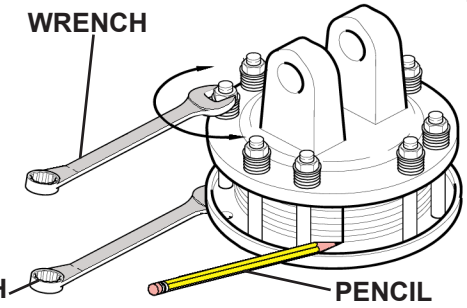
**CAUTION! Slip clutches that have been in use or have been slipped for only 2-3 seconds during run-in may be too hot to touch. Allow clutch to cool before working on it.**

***NOTICE: Prior to initial operation and after long periods of inactivity, slip the friction discs to remove oxidation and moisture. Moisture allows discs to slip easily and oxidation prevents discs from slipping, causing driveline damage. Failure to remove oxidation and moisture from slip clutch will void PTO driveline warranty.***

Friction clutches must be capable of slippage during operation to protect gearboxes, drivelines and other drive train parts. Friction clutches should be “run-in” prior to initial operation and after periods of inactivity to remove any oxidation from the friction surfaces. Repeat “run-in” at the beginning of each season ad when moisture seizes the inner friction plates.

## CLUTCH RUN-IN

1. Using a pencil or other marker, scribe a line across the exposed edges of the clutch plates and friction discs.
2. Carefully loosen each of the 8 spring retainer nuts by exactly 2 revolutions. (This requires a second wrench to hold the end of the retainer bolt in order to count the exact number of revolutions.)



3. Make sure the area is clear of all bystanders and it is safe to operate the cutter.
4. Start tractor and engage PTO drive for 2-3 seconds to permit slippage of the clutch surfaces. Disengage PTO and then re-engage a second time for 2-3 seconds. Disengage PTO, shut off tractor, remove the key and wait for all movement to stop before dismounting from the tractor.
5. Inspect clutch and ensure that the scribed markings made on the clutch plates in Step #1 have changed position. If scribed markings are still aligned then slippage has not occurred. A clutch that has not slipped must be disassembled to separate the friction disc plates. See “Clutch Disassembly and Inspection”.
6. If scribed markings have changed position, tighten each of the 8 spring retainer nuts on the clutch housing exactly 2 revolutions to restore clutch to original pressure setting.
7. Allow clutch to cool to ambient temperature before operating. Clutch is now ready for use.
8. The clutch should be checked during the first hour of operation and periodically each week. An additional set of scribe marks can be added to check for slippage.

## CLUTCH DISASSEMBLY AND INSPECTION

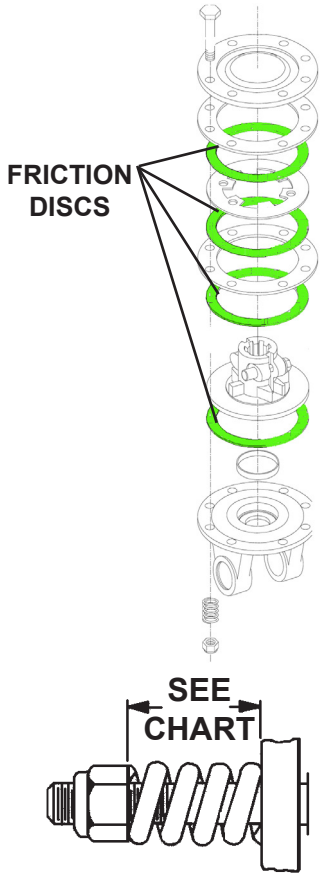
If friction discs do not slip during the run-in procedure then the clutch must be disassembled to separate the friction discs.

***NOTICE: Not all clutches are assembled the same with the same number of components. Be sure to record the order and orientation of your clutch components during disassembly.***

1. Remove spring retaining nuts, springs and bolts.
2. Separate each friction disc from the metal surface adjacent to it.
3. Inspect all parts for excessive wear and condition. Clean all re-usable parts. The original friction disk thickness is .12” (1/8”) and should be replaced if it falls below .06” (1/16th).

**NOTE: If clutches have been slipped to the point of “smoking” the friction discs may be damaged and should be replaced. Heat build-up may also affect the yoke joints.**

4. Reassemble each friction disc next to the metal plate it was separated from. Re-install retaining bolts, springs and nuts.
5. Tighten each spring retainer bolt until the correct spring length has been obtained. See Chart




| PTO PART NUMBER | SPRING LENGTH |
|---|---|
| KDK03-0028 | 1.06” (27mm) |

**NOTE: All spring lengths should be the same. Adjust any nut on any spring that is unequal.**

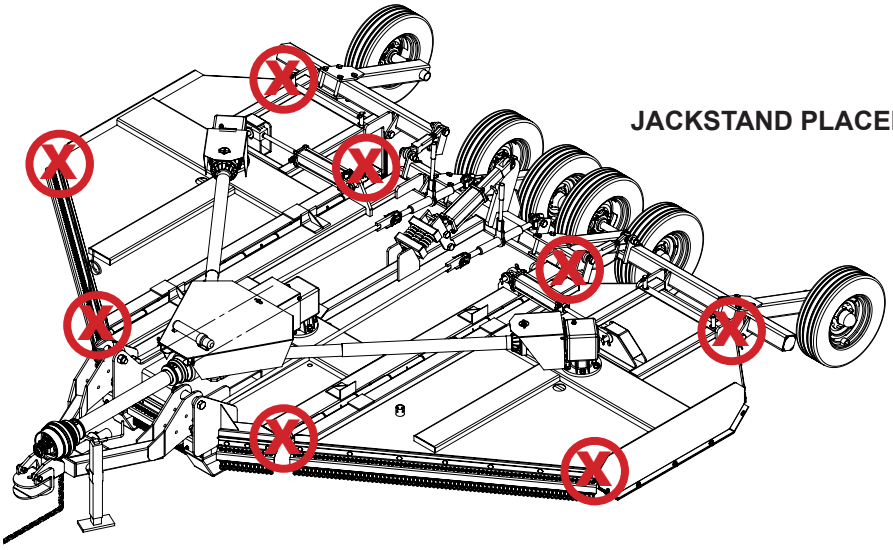
6. Check clutch slippage.
7. If further adjustment is required, do so in 1/3 turn increments. **IMPORTANT: Adjust only to provide sufficient torque to prevent slippage under normal conditions**. Occasional slippage for drive train protection is normal. If satisfactory results cannot be obtained contact your nearest dealer.

***NOTICE: Do not overtighten nut and cause spring to become "solid". This will cause shaft failure.***

## BLOCKING

**WARNING!** **Never work underneath equipment 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 failure, mechanical failure and accidental movement of control levers can cause equipment to drop or rotate unexpectedly causing severe injury or death.**

**WARNING!** **Always disengage PTO, apply the brakes, turn off the engine, remove the key and wait for all rotation to stop before dismounting from tractor. Disconnect driveline from tractor PTO before working on cutter blades.**



**JACKSTAND PLACEMENT LOCATIONS (X)**

1. Jackstands with a load rating of 1000 lbs. or more are the only approved blocking device for this cutter. Position jackstands, as shown, under the cutter before working underneath unit.
2. Consider unit stability before working underneath the cutter. Jackstands will not ensure your safety. The working surface must be level and solid and the jackstands in workable condition. Test stability before working underneath cutter.
3. If cutter is still attached to the tractor, block rear wheels on the tractor front and back.

# MAINTENANCE

## BLADE MAINTENANCE

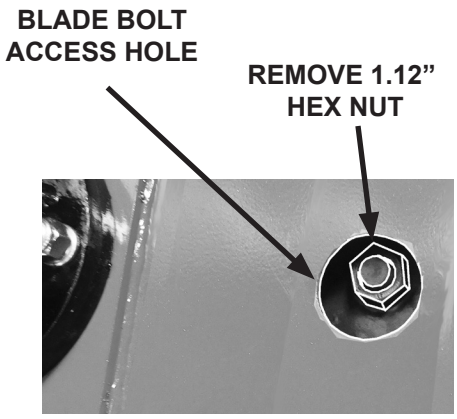
**WARNING! Always disengage PTO, apply the brakes, turn off the engine, remove the key and wait for all rotation to stop before dismounting from tractor. Disconnect driveline from tractor PTO before working on cutter blades.**

Cutter must be blocked up and stability checked before performing any blade maintenance, installation or sharpening. See “Blocking”

The blades and blade pan should be inspected regularly (every 8 hours) to ensure the pan is not damaged and the blades are sharp, tightened correctly, and intact. Always replace the blades in pairs. Not replacing both blades at the same time will result in an out-of-balance condition that will contribute to premature bearing wear. NEVER try to weld or straighten damaged blades, as loss of blade integrity may result. Small nicks can be ground out when sharpening.

## BLADE REMOVAL

1. Remove blades with unit securely blocked off the ground and PTO disconnect from tractor and cutter.
2. Rotate until one of the blades is positioned under the access hole on the top of the deck and using a 1-11/16” socket, remove the special nut and lock washer. (Blade bolt is keyed and will not turn freely.) You can now remove the blade mounting bolt and the blade.
3. Repeat step #3 for the remaining blade.
4. Using a punch, drive the blade bolt out of the blade holder.
5. If replacing with new blades go to Blade Installation.



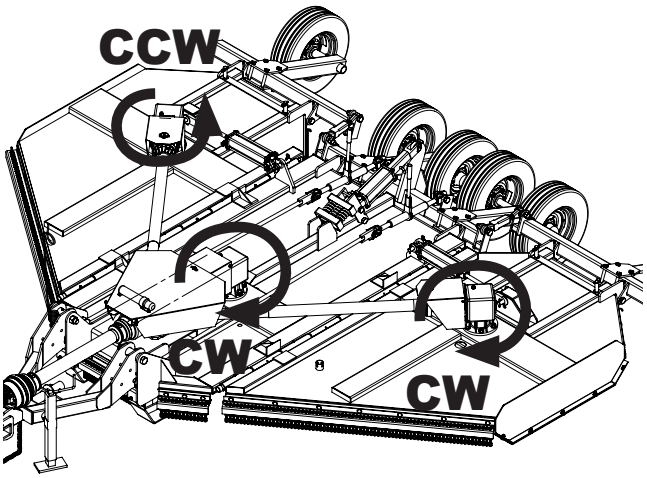

## BLADE SHARPENING

- Both blades should be sharpened at the same angle as the original cutting edge and must be replaced or re-ground at the same time to maintain proper balance in the cutting unit.
- Do not remove more material than necessary.
- Do not heat and pound out a cutting edge.
- Do not grind to a razor edge. Leave a blunt cutting edge approximately 1/16” (2mm) thick.
- Always grind so end of blade remains square to the cutting edge.
- Do not sharpen back side of any single edge cutting blade.
- Both blades should weigh the same after sharpening with no more than 1.5 oz. (.68kg) difference.

# MAINTENANCE

## BLADE INSTALLATION

1. Insert new blade bolts into new (or sharpened) blades so the flair in the blade tip is UP. Align notch in hole with protrusion on bolt into blade and blade holder. Strike head of bolt with a heavy hammer to seat. Install new washers and lock nuts and torque to 450 ft. lbs. (610 N.m). **NOTE: Be sure you are installing left blades on the left wing, the right blades on the right wing and the center blades on the center deck.** Cutting blades must be installed with cutting edge leading in rotation.




2. Check blades to be sure they swing freely a 360° rotation.

## REPLACING BLADE PAN

**WARNING! Always disengage PTO, apply the brakes, turn off the engine, remove the key and wait for all rotation to stop before dismounting from tractor. Disconnect driveline from tractor PTO before working under cutter.**

Cutter must be blocked up and stability checked before performing any maintenance on the blades or blade pan. See “Blocking”

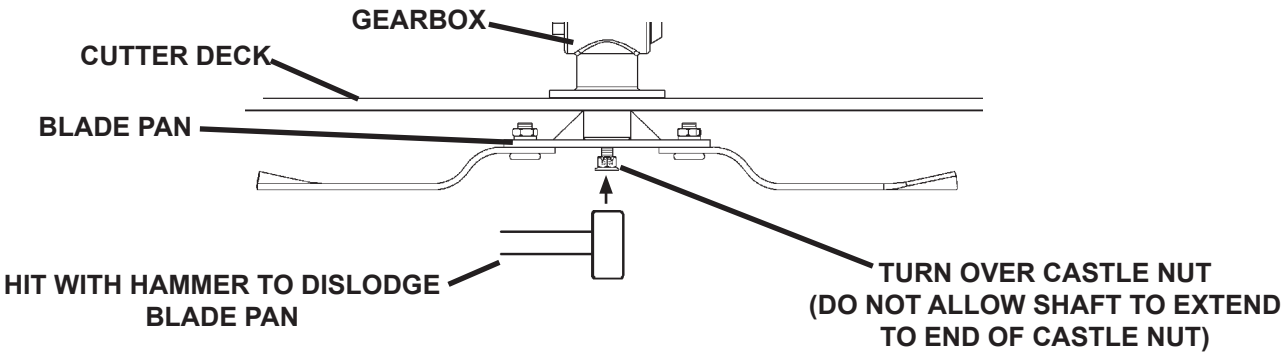
The blade pans should be inspected regularly to ensure the pan and the bearing hub are not damaged, warped, or bent.

1. Remove cotter pin and castle nut on the bottom of the gearbox shaft securing the blade pan to the gearbox.

**NOTE: Be prepared for the weight of the blade pan with the blades attached to fall when the castle nut is removed.**

2. If the blade pan does not fall when the castle nut is removed it may be necessary to turn the castle nut around and partially thread the nut back onto the gearbox shaft. Tap the end of the ***nut*** to dislodge the pan from the shaft. Take care that the shaft does not extend past the end of the nut as shaft damage will occur if it comes into contact with the hammer. (Blade pan will drop to the castle nut once it is free from the shaft.)

# MAINTENANCE




3. With the blade pan dislodged from the shaft, hold in place while you remove the castle nut. Be prepared for the weight of the blade pan to fall once the castle nut is removed.
4. Remove the blade pan and install new pan and blades onto the gearbox shaft.
5. Torque to 200-210 ft. lbs. (271-285 N.m) and install cotter pin. Bend both ends of cotter pin in opposite directions around the castle nut.

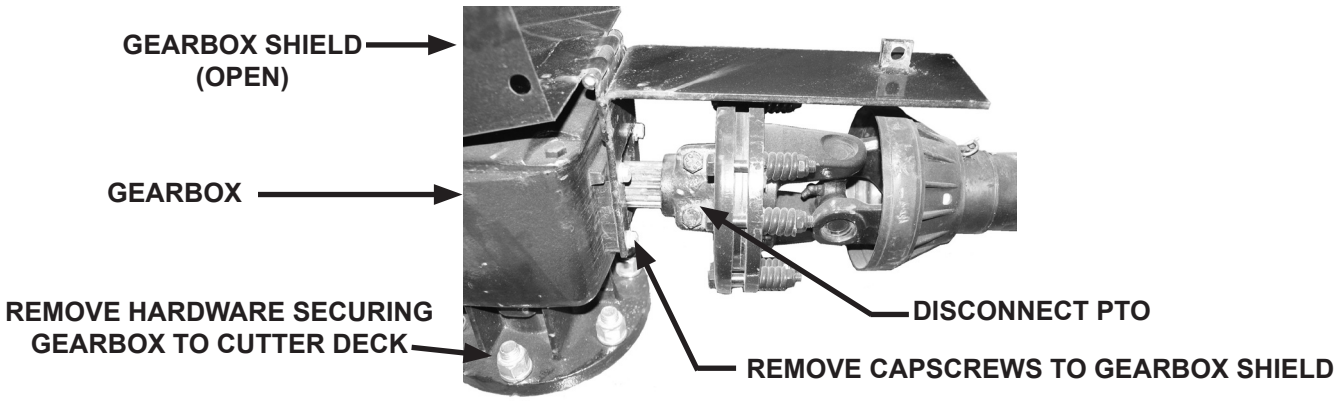
## REPLACING GEARBOX

**WARNING! Always disengage PTO, apply the brakes, turn off the engine, remove the key and wait for all rotation to stop before dismounting from tractor. Disconnect driveline from tractor PTO before working under cutter.**

Cutter must be blocked up and stability checked before performing any maintenance underneath the cutter deck. See “Blocking”

**Wing Gearboxes**

1. Remove the blade pan assembly from the gearbox shaft. “See Replacing Blade Pan
2. Disconnect PTO driveline from the gearbox. See Diagram
3. Remove the gearbox shield from the front of the gearbox by removing (4) capscrews. Retain hardware. See Diagram
4. Unbolt gearbox from cutter and retain the hardware. See Diagram

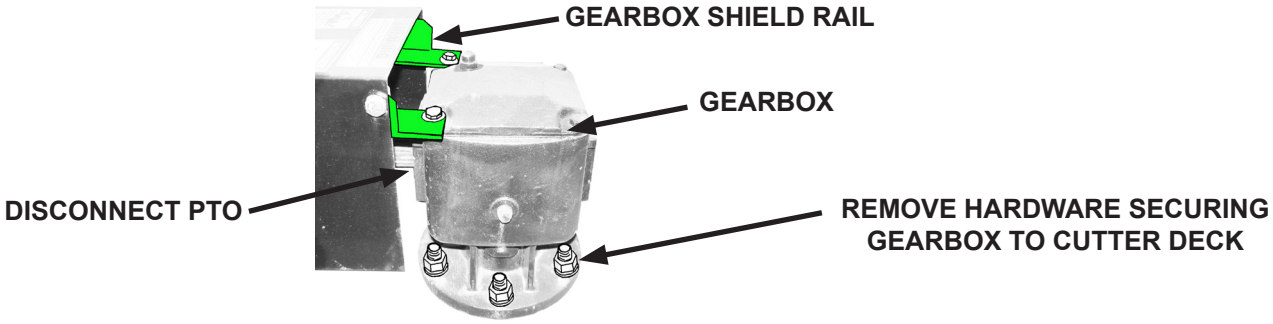



5. Position the new gearbox onto cutter deck in the same location and orientation as the old one.
6. Install gearbox by reversing the procedure.

7. Torque castle nut holding the blade pan to the gearbox shaft to 200-210 ft. lbs. (271-285 N.m) and install cotter pin. Bend both ends of cotter pin in opposite directions around the castle nut.
8. Check new gearbox for lubricant before operating and recheck for correct level of lubricant after 5-10 minutes of operation.

**Center Gearbox**

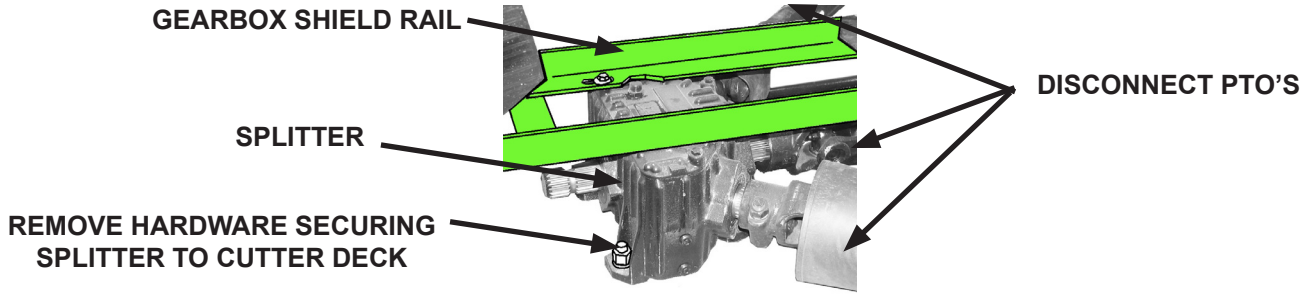
1. Remove the blade pan assembly from the gearbox shaft. “See Replacing Blade Pan”.
2. Disconnect PTO driveline from the gearbox. See Diagram
3. Remove the gearbox shield rail. Retain hardware. See Diagram




4. Unbolt gearbox from cutter and retain the hardware. See Diagram
5. Position the new gearbox onto cutter deck in the same location and orientation as the old one.
6. Install gearbox by reversing the procedure.
7. Torque castle nut holding the blade pan to the gearbox shaft to 200-210 ft. lbs. (271-285 N.m) and install cotter pin. Bend both ends of cotter pin in opposite directions around the castle nut.
8. Check new gearbox for lubricant before operating and recheck for correct level of lubricant after 5-10 minutes of operation.

**Splitter Gearbox**

1. Disconnect PTO drivelines from the splitter. See Diagram
2. Remove the gearbox shield rail. Retain hardware. See Diagram
3. Unbolt splitter from cutter and retain the hardware. See Diagram
4. Position new splitter onto cutter deck in same location and orientation as the old one.
5. Install splitter by reversing the procedure.
6. Check new splitter gearbox for lubricant before operating and recheck for correct level of lubricant after 5-10 minutes of operation.



# MAINTENANCE

## REPLACING GEARBOX SEALS

1. Following steps #1 through #4 under “REPLACING GEARBOX”, remove the gearbox from the cutter. The unit must be blocked securely off the ground to gain access to the castle nut holding the blade pan (stumpjumper) to the lower end of the gearbox.
2. Remove the old input seal and replace with the new seal.
3. The output shaft seal requires removal of the bottom cap to gain access to the seal.
4. Re-install the gearbox following steps #5 through #8 under “REPLACING GEARBOX”.

***Further disassembly or field replacement of gearbox components will void warranty.***

# MAINTENANCE

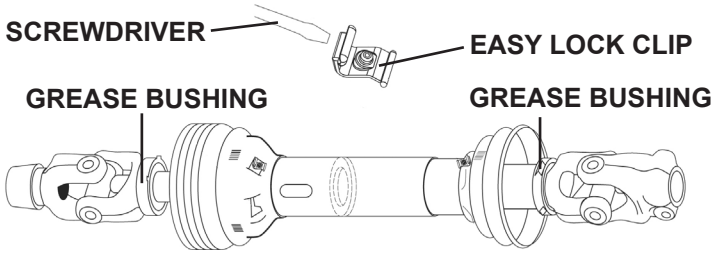
## PTO DRIVE ASSEMBLY

The following instructions will assist in replacing the safety shields on your PTO drive assembly. Keep all PTO guards and shields in place at all times.

**IMPORTANT**: Cutter maintenance does not require you to go between the tractor and the cutter with the driveline installed. Before replacing, servicing or removing the cutter from the tractor, shut off the tractor, set the parking brake and remove the keys.

When replacing damaged or missing PTO shields, disconnect the rotary cutter from the tractor and remove the driveline from the cutter.

1. To remove damaged guards, use a screwdriver to release the "*easy lock*" clip on the driveline. Turn the bushing to disengage and remove the guard.




**IMPORTANT**: Check that the "***Guard Missing***" decal on the steel tube under the inner guard and "***Rotating Driveline***" decal on the outer guard are both firmly affixed and legible. If not, replace them before re-connecting the driveline to the cutter.

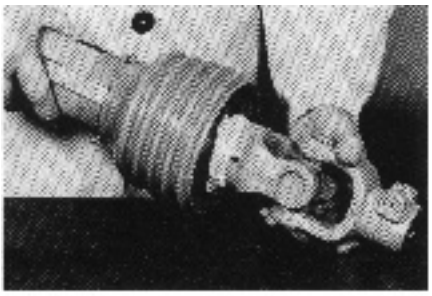
2. Clean and grease the bushing groove before installing the bushing. Grease any remaining bushings in the guard.
3. Slide the new guard half over the driveline and insert bushing tabs into the openings in the guard.


4. Turn the bushing until it engages into the guard.
5. Push the "*easy lock*" clip into position. The bushing and guard are now secure.

# MAINTENANCE

SAFETY SHIELD

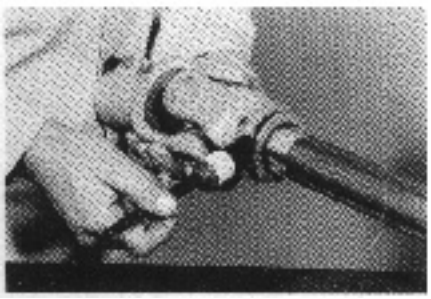
## DISASSEMBLY



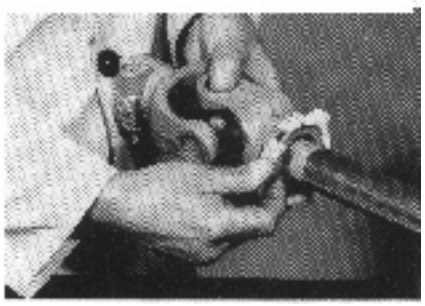
Use special tool SW21 to release bearing locking tabs and remove the shield from PTO drive shaft half.

Or, clamp the PTO yoke in the vise as shown to create pressure on the locking tabs and use a flat bladed screw driver to release one tab at a time to remove shield.

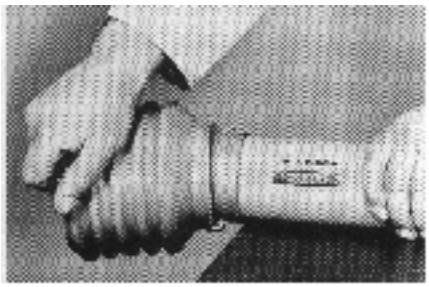
## ASSEMBLY



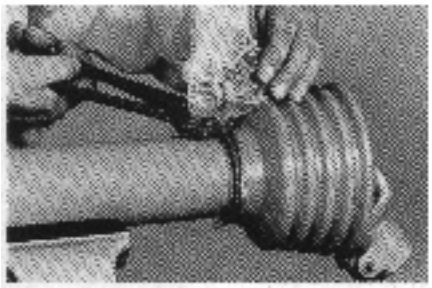
Grease the shield bearing groove on the yoke and the telescoping tube before assembly.



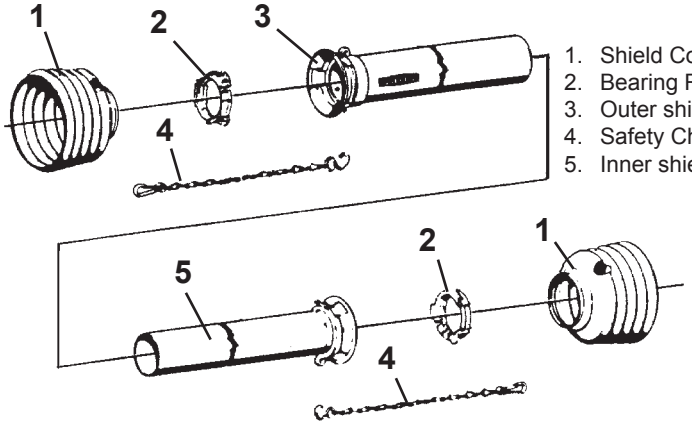
Place bearing ring in groove with the locking tabs nearest the telescoping tube side.



To remove the old shield cone, cut the cone near the bearing cap being careful not to damage the cap. Heat the new shield cone by placing the contact portion in water heated to approximately 180° F. until it is very flexible. Then, pull it over the tube and on to the bearing cap. As it cools, the cone will return to its natural size and become secure for normal function.



To mount the shield on to the half shaft, place it over the telescoping member, align the locking tabs on the bearing in the appropriate channels of the bearing cap and push the shield into place or apply light blows until all three locking tabs are visible in the openings.

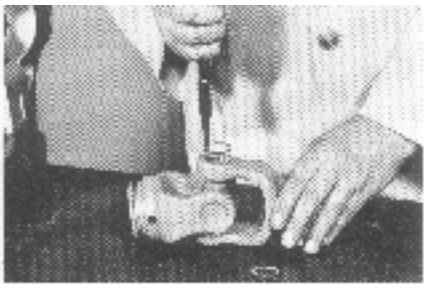



1. Shield Cone
2. Bearing Ring
3. Outer shield tube with bearing cap
4. Safety Chain
5. Inner shield tube with bearing cap

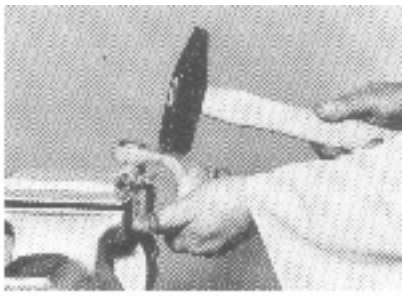
# MAINTENANCE

U-JOINT

## DISASSEMBLY

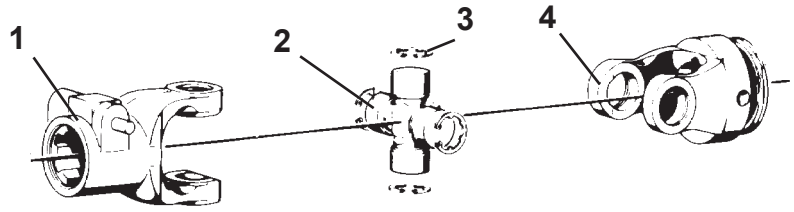


Remove retaining rings (3).



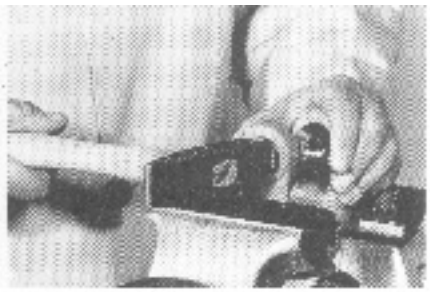
Place joint in the vise as illustrated (do not clamp tight) and with light hammer blows, drive up the bearing bushing.

Use special tool SW23 or SW27 to clamp the bearing bushing in the vise. Using either light hammer blows or by twisting the yoke, remove the bearing bushing.



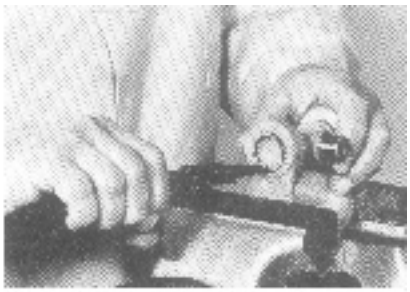

1. Quick-disconnect yoke coupling
2. Cross and bearing kit coupling
3. Retaining ring
4. Inboard yoke

## ASSEMBLY

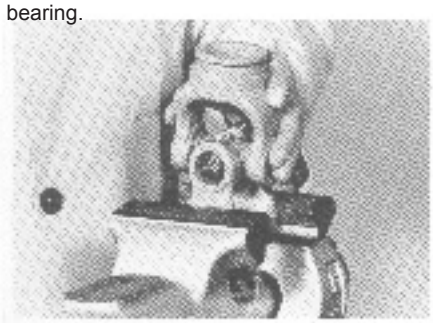


Clamp the yoke in the vise as illustrated. Remove the bearing bushing from the cross kit and place the cross into one of the yokes. Begin mounting the bearings by extending the cross journal out through the bearing bore. Place a bearing on it and holding the cross with one hand to position the bearing, tap with light hammer blows until you notice resistance. Do the same for the opposite bearing.

Using a flat surfaced drift punch or special tool SW28 drive the bearing in until the annular groove is visible.

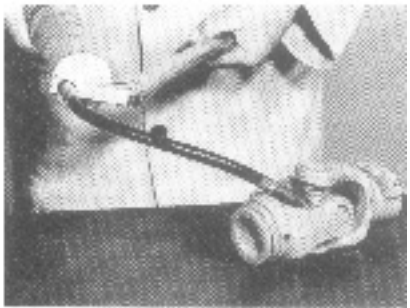


Replace the retaining ring, make sure it is properly seated.



When installing the second yoke and bearings, make sure the grease zerk is positioned on the proper side for easy access when lubricating. Replace the bearings as described previously using the cross journal to help guide the bearings into the bore.

Relieve the stress from the bearings and yoke by applying several sharp hammer blows to the yoke ears.



Grease the joint. Note that all four bearings are properly purged and rotate to make sure the U-joint will move freely.

# TROUBLESHOOTING

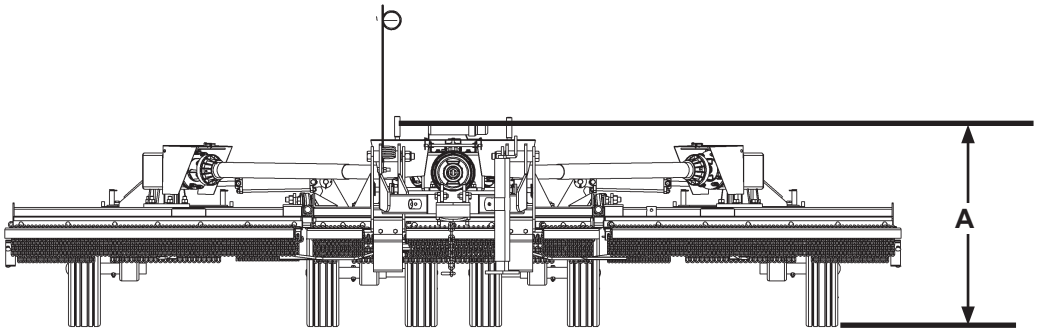
| PROBLEM | POSSIBLE CAUSE | POSSIBLE SOLUTION |
|---|---|---|
| **EXCESSIVE VIBRATION** | Driveline bent. | Replace driveline or distribution shaft. |
| | Blades damaged or worn. | Replace worn blades as a set. |
| | Blade pan damaged. | Replace blade pan. |
| | Blades not swinging freely. | Check for obstructions, correct bolt torque or blade damage. Make adjustment or replace blades to ensure blade movement. |
| **UNUSUAL NOISE** | Loose blade bolts. | Tighten bolts. See Bolt Torque Specifications |
| | Bent blade pan or blades. | Replace blade pan or blades. |
| | Deck bent causing contact with blades. | Straighten deck. |
| | Gearbox grease insufficient. | Check seals in gearbox and fill to proper level. |
| **POOR CUTTING** | Not maintaining proper PTO speed. | Check PTO speed with tachometer and operate at proper RPM. |
| | Improper clutch adjustment. | Adjust according to Maintenance Section. |
| | Forward travel exceeds blade speed for material type. | Adjust forward speed. |
| | Blades dull. | Sharpen or replace blades. |
| **MACHINE STREAKING** | Cutting height too high, leaving wheel tracks. | Adjust for shorter cut height and decrease forward travel speed. |
| | Not maintaining proper RPM speed. | Maintain proper RPM speed. |
| | Excessive travel speed. | Decrease forward travel speed. |
| | Wing section cuts higher or lower than center. | Adjust turnbuckle connecting center tail-wheel frame to wing tailwheel frame. See Wing Deck Leveling in Installation Section. |
| **PTO WILL NOT TELESCOPE** | Improper lubrication. | Separate and fill female tube half full of grease. |
| | PTO twisted. | Replace twisted portion. Do not allow blades to come into contact with the ground. |
| | Bent PTO. | PTO too long. Size to tractor according to manual. |
| | Shields damaged. | Replace. |
| **PTO TWISTED** | Over torqued. | Do not allow blades to come into contact with the ground. |
| | Not maintaining correct PTO speed. | Maintain proper PTO speed. |
| **WING CYLINDER MOVING TOO SLOW** | Orifice is plugged. | Remove fitting and unplug orifice. |

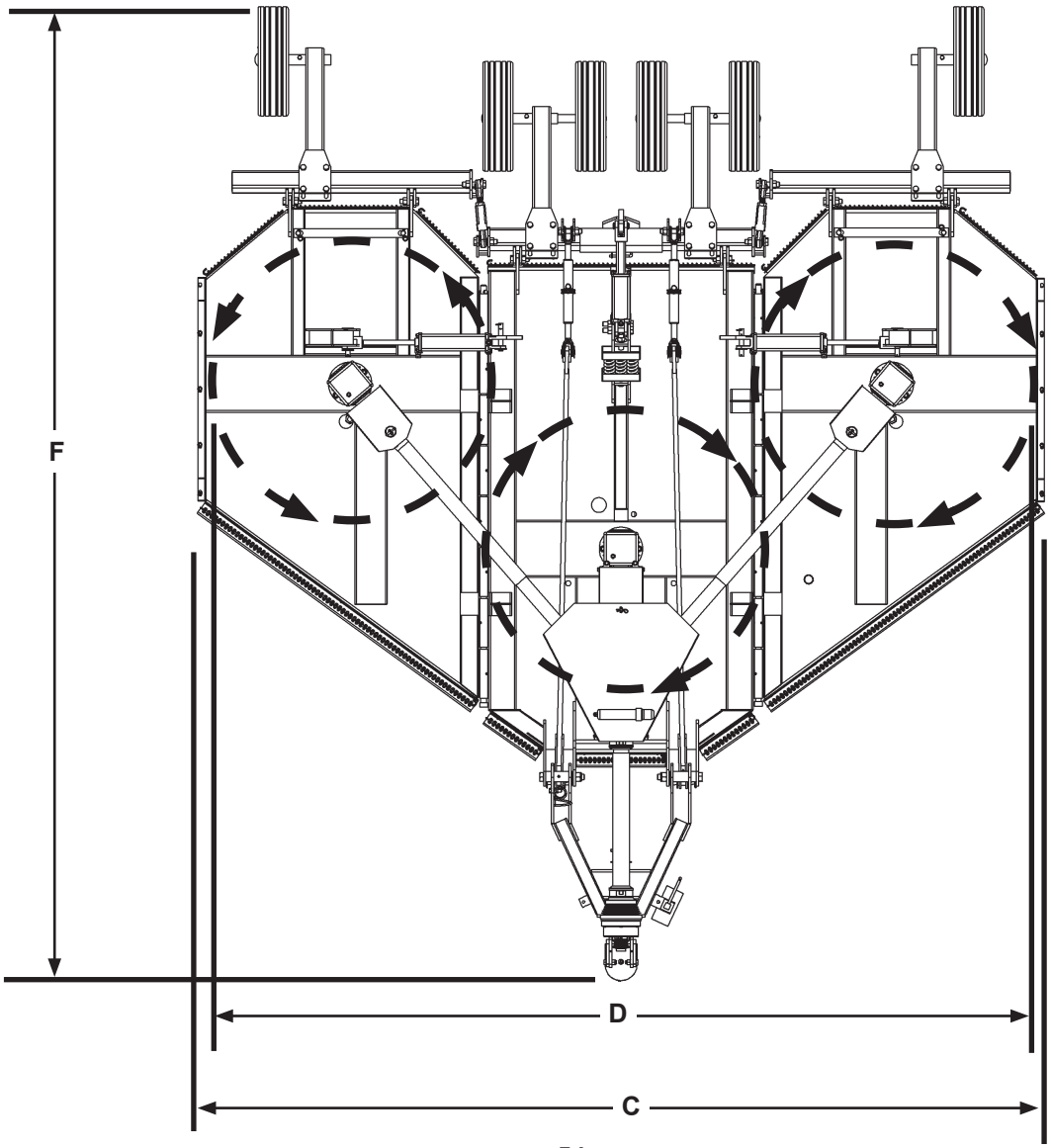
# TROUBLESHOOTING

| PROBLEM | POSSIBLE CAUSE | POSSIBLE SOLUTION |
|---|---|---|
| **UNEVEN CUT** | Blades damaged or worn. | Replace worn blades as a set. |
| | Excessive ground speed. | Reduce ground speed. |
| | Damaged blade pan. | Replace or repair as needed. |
| | Improper height adjustment. | Adjust rotary cutter height. |
| | Wing section cuts higher or lower than center. | Adjust turnbuckle connecting center tail-wheel frame to wing tailwheel frame. See Wing Deck Leveling in Installation Section. |
| **WINDROWING** | Material heavy and dense. | Raise the front of the cutter higher than the rear. |
| | Excessive ground speed. | Reduce ground speed. |
| | Conditions too wet. | Wait for material to dry and reduce ground speed. |
| **GEARBOX NOISY** | Low lubricant level. | Add grease. See Lubrication Section |
| **GEARBOX OVERHEATING** | Low lubricant level. | Add grease. See Lubrication Section |
| | Improper type of lubricant. | Replace with proper lubricant. See Lubrication Section |
| | Excessive trash buildup around gearbox. | Clean around gearbox. |
| **OIL SEAL LEAKING** | Gearbox overfilled. | Drain oil to fill plug level on gearbox. See Lubrication Section |
| | Seals damaged. | Replace Seals. |
| | Grass or wire wrapped on shaft in seal area. | Clean off wrapped material and check seal areas daily. |
| **EXCESSIVE CLUTCH SLIPPAGE** | Scalping the ground. | Raise cutting height. |
| | Clutch is not properly adjusted. | Adjust clutch per instruction. See Maintenance Section |
| | Clutch plates worn. | Replace clutch plates. |
| | Foreign object caught between clutch plates. | Remove Foreign object. |
| **BLADES LOCK UP** | Blades locked together (overlapped) when wings were raised to transport position. | Use pry bar to separate blades before lowering wings. |
| | Tractor has instant on PTO. | Engage PTO at low RPM and then slowly increase engine speed to full PTO speed. |
| | Tractor has instant off PTO. | Decrease engine speed slowly to an idle and then disengage PTO. |

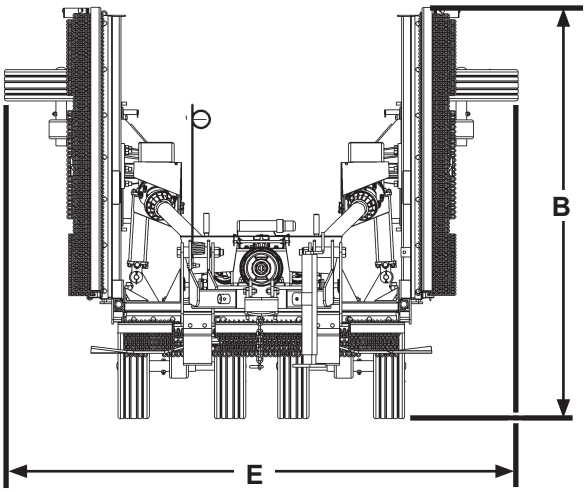
# SPECIFICATIONS

**SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFOR.**



# SPECIFICATIONS




## 3615 FLEX WING ROTARY CUTTER

### DESCRIPTION

| | |
|---|---|
| A. Overall Operating Height (airplane tires) | 37” (94.0cm) |
| B. Transport Height | 87” (221.0cm) |
| C. Overall Width | 187” (475.0cm) |
| D. Cutting Width | 178” (452.1cm) |
| E. Transport Width | 109“ (276.9cm) |
| F. Overall Length | 200” (508.0cm) |
| Weight | 5220 lbs (2368kg) |
| Tongue Weight | 1960 lbs (889kg) |
| Drawbar Vertical Weight | 2500 lbs (1134kg) |

| | |
|---|---|
| Cutting Height | 2”- 15” (5.1-38.1cm) |
| Cutting Capacity (Max. Cutting Diameter) | 4.00” (10.2cm) |
| Blades | .50” X 4” (1.3 x 10.2cm) |
| Blade Overlap | 6.50” (16.5cm) |
| Deck Thickness | 3/16” or 7 GA Steel |
| Hitch Type | Pull Hitch (Swivel Pivot) |
| PTO Drive Shaft | Series 8 with CV |
| Gearbox | 190 HP (235 HP Splitter) |
| Slip Clutch | Standard |
| Blade Pan | .75” Solid Round |
| Wheel Type (Qty 6) | 4x8 Laminated (Optional Airplane Tires) |

# BOLT TORQUE SPECIFICATIONS

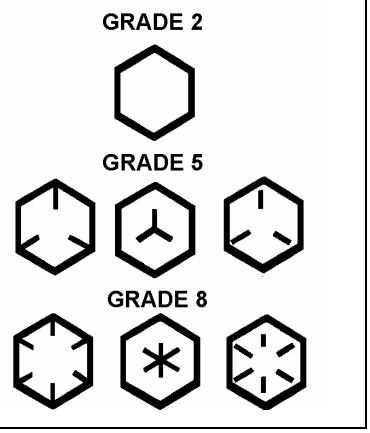
## GENERAL TORQUE SPECIFICATION TABLES

Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.

## SAE BOLT TORQUE SPECIFICATIONS

**NOTE: The following torque values are for use with extreme pressure lubricants, plating or hard washer applications Increase torque 15% when using hardware that is unplated and either dry or lubricated with engine oil.**

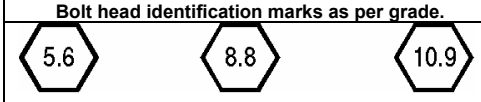
| Bolt Size | | SAE GRADE 5 TORQUE | | | | SAE GRADE 8 TORQUE | | | | Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Pounds Feet | | Newton-Meters | | Pounds Feet | | Newton-Meters | | |
| Inches | Millimeters | UNC | UNF | UNC | UNF | UNC | UNF | UNC | UNF | |
| 1/4 | 6.35 | 8 | 9 | 11 | 12 | 10 | 13 | 14 | 18 | |
| 5/16 | 7.94 | 14 | 17 | 19 | 23 | 20 | 25 | 27 | 34 | |
| 3/8 | 9.53 | 30 | 36 | 41 | 49 | 38 | 46 | 52 | 62 | |
| 7/16 | 11.11 | 46 | 54 | 62 | 73 | 60 | 71 | 81 | 96 | |
| 1/2 | 12.70 | 68 | 82 | 92 | 111 | 94 | 112 | 127 | 152 | |
| 9/16 | 14.29 | 94 | 112 | 127 | 152 | 136 | 163 | 184 | 221 | |
| 5/8 | 15.88 | 128 | 153 | 174 | 207 | 187 | 224 | 254 | 304 | |
| 3/4 | 19.05 | 230 | 275 | 312 | 373 | 323 | 395 | 438 | 536 | |
| 7/8 | 22.23 | 340 | 408 | 461 | 553 | 510 | 612 | 691 | 830 | |
| 1 | 25.40 | 493 | 592 | 668 | 803 | 765 | 918 | 1037 | 1245 | |
| 1-1/8 | 25.58 | 680 | 748 | 922 | 1014 | 1088 | 1224 | 1475 | 1660 | |
| 1-1/4 | 31.75 | 952 | 1054 | 1291 | 1429 | 1547 | 1700 | 2097 | 2305 | |
| 1-3/8 | 34.93 | 1241 | 1428 | 1683 | 1936 | 2023 | 2312 | 2743 | 3135 | |
| 1-1/2 | 38.10 | 1649 | 1870 | 2236 | 2535 | 2686 | 3026 | 3642 | 4103 | |




## METRIC BOLT TORQUE SPECIFICATIONS

**NOTE: The following torque values are for use with metric hardware that is unplated and either dry or lubricated with engine oil. Reduce torque 15% when using hardware that has extreme pressure lubricants, plating or hard washer applications.**

Bolt head identification marks as per grade.




| Size of Bolt | Grade No. | Pitch (mm) | Pounds Feet | Newton-Meters | Pitch (mm) | Pounds Feet | Newton-Meters |
|---|---|---|---|---|---|---|---|
| M6 | 5.6 | 1.0 | 3.6-5.8 | 4.9-7.9 | - | - | - |
| | 8.8 | | 5.8-.4 | 7.9-12.7 | | - | - |
| | 10.9 | | 7.2-10 | 9.8-13.6 | | - | - |
| M8 | 5.6 | 1.25 | 7.2-14 | 9.8-19 | 1.0 | 12-17 | 16.3-23 |
| | 8.8 | | 17-22 | 23-29.8 | | 19-27 | 25.7-36.6 |
| | 10.9 | | 20-26 | 27.1-35.2 | | 22-31 | 29.8-42 |
| M10 | 5.6 | 1.5 | 20-25 | 27.1-33.9 | 1.25 | 20-29 | 27.1-39.3 |
| | 8.8 | | 34-40 | 46.1-54.2 | | 35-47 | 47.4-63.7 |
| | 10.9 | | 38-46 | 51.5-62.3 | | 40-52 | 54.2-70.5 |
| M12 | 5.6 | 1.75 | 28-34 | 37.9-46.1 | 1.25 | 31-41 | 42-55.6 |
| | 8.8 | | 51-59 | 69.1-79.9 | | 56-68 | 75.9-92.1 |
| | 10.9 | | 57-66 | 77.2-89.4 | | 62-75 | 84-101.6 |
| M14 | 5.6 | 2.0 | 49-56 | 66.4-75.9 | 1.5 | 52-64 | 70.5-86.7 |
| | 8.8 | | 81-93 | 109.8-126 | | 90-106 | 122-143.6 |
| | 10.9 | | 96-109 | 130.1-147.7 | | 107-124 | 145-168 |
| M16 | 5.6 | 2.0 | 67-77 | 90.8-104.3 | 1.5 | 69-83 | 93.5-112.5 |
| | 8.8 | | 116-130 | 157.2-176.2 | | 120-138 | 162.6-187 |
| | 10.9 | | 129-145 | 174.8-196.5 | | 140-158 | 189.7-214.1 |
| M18 | 5.6 | 2.0 | 88-100 | 119.2-136 | 1.5 | 100-117 | 136-158.5 |
| | 8.8 | | 150-168 | 203.3-227.6 | | 177-199 | 239.8-269.6 |
| | 10.9 | | 175-194 | 237.1-262.9 | | 202-231 | 273.7-313 |
| M20 | 5.6 | 2.5 | 108-130 | 146.3-176.2 | 1.5 | 132-150 | 178.9-203.3 |
| | 8.8 | | 186-205 | 252-277.8 | | 206-242 | 279.1-327.9 |
| | 10.9 | | 213-249 | 288.6-337.4 | | 246-289 | 333.3-391.6 |

# PARTS

In order to provide you with the most UP-TO-DATE part information, all parts for this attachment have been moved to our website at ***www.paladinattachments.com/Manuals***. Please use these diagrams and parts lists to locate replacement parts.

When servicing your attachment, remember to use only original manufacturer replacement parts. Substitute parts may not meet the standards required for safe, dependable operation.

To facilitate parts ordering when contacting the factory, please have the product control number (PCN or C/N) or model and serial number of your product ready to ensure that you receive the correct parts for your specific attachment.

The product control number, model and serial number for your attachment should be recorded in the space provided on the cover of this manual. This information may be obtained from the serial number identification plate located on your attachment.

**NOTE: Most daily and emergency parts orders (in stock) received by 10:30 A.M. (Eastern Standard Time) will be shipped UPS Ground the same day received. UPS Next Day orders must be received by 1:30 PM (Eastern Standard Time.)**

**SERVICE DEPARTMENT**
(734) 996-9116
(800) 456-7100

**For Fax and E-mail Orders**
PLC_Sales@paladinattachments.com
(734) 996-9014

# WARRANTY

In order to provide you with the most UP-TO-DATE Warranty information, Paladin Warranty Statement and Warranty Procedures along with Warranty Registration and Claim Forms have been moved to our website at ***www.paladinattachments.com***.