



# MODEL MS3110

## MULTI-SPINDLE ROTARY MOWER

Published 10/23

Part No. 50083639

## OPERATOR'S MANUAL



This Operator's Manual is an integral part of the safe operation of this machine and must be maintained with the unit at all times. **READ, UNDERSTAND, and FOLLOW** the Safety and Operation Instructions contained in this manual before operating the equipment. *C01-Cover\_B*

Safety Video

Important Operating and Safety Instructions are found in the Mower Safety Video that can be instantly accessed on the internet at: [www.algqr.com/bve](http://www.algqr.com/bve)



[www.algqr.com/bve](http://www.algqr.com/bve)



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Bush Hog Web Page





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<p><b>Manual do Operador</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"> <a href="http://www.algqr.com/bmp">www.algqr.com/bmp</a> </p>	<p><b>Benutzerhandbuch</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"> D813    <a href="http://www.algqr.com/bmg">www.algqr.com/bmg</a> </p>

Safety Video



[www.algqr.com/bve](http://www.algqr.com/bve)

Operator's & Parts Manuals



[www.algqr.com/bpm](http://www.algqr.com/bpm)

General Safety



[www.algqr.com/bme](http://www.algqr.com/bme)

➤ **BE SAFE!**

➤ **BE ALERT!**

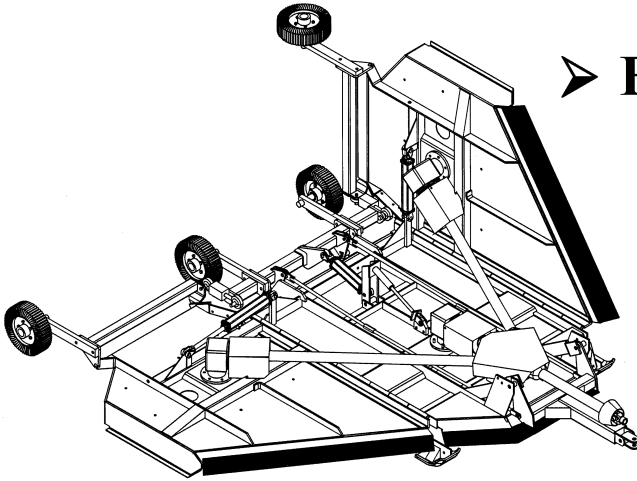
➤ **BE ALIVE!**

➤ **BE TRAINED**  
**before operating**  
**the Mower!**

Safety Video



[www.algqr.com/bve](http://www.algqr.com/bve)



## *Safety Training Makes the Difference*

In order to reduce accidents and enhance the safe operation of mowers, *Bush Hog*, in cooperation with other industry manufacturers has developed the AEM/FEMA Industrial and Agricultural Mower Safety Practices video and guide book.

The video will familiarize and instruct mower-tractor operators in safe practices when using industrial and agricultural mowing equipment. It is important that Every Mower Operator be educated in the operation of their mowing equipment and be able to recognize the potential hazards that can occur while operating a mower. This video, along with the mower operator's manual and the warning messages on the mower, will significantly assist in this important education.

Your Authorized *Bush Hog* Dealer may have shown this video and presented you a DVD Video when you purchased your mower. If you or any mower operator have not seen this video, **Watch the Video, Read this Operator's Manual, and Complete the Video Guidebook** before operating your new mower. If you do not understand any of the instructions included in the video or operator's manual or if you have any questions concerning safety of operation, contact your supervisor, dealer or *Bush Hog*.

If you would like a VHS video tape of the video, please mail AEMVideo@alamo-group.com or Fax AEM VHS Video at (830) 372-9529 or mail in a completed copy of the form on the back of this page to AEM VHS Video 1502 E Walnut Street, Seguin, TX 78155. and request the VHS video version. Please include your name, mailing address, mower model and serial number.

Every operator should be trained for each piece of equipment (Tractor and Mower), understand the intended use, and the potential hazards before operating the equipment.

The information and material listed above along with this Operator's Manual can assist you in meeting the OSHA requirement for annual operator training.

### **OSHA TRAINING REQUIREMENTS**

**The following training requirements have been taken from Title 29, Code of Federal Regulations Part 1928.57 (a) (6). [www.osha.gov](http://www.osha.gov)**

Operator instructions. At the time of initial assignment and at least annually thereafter the employer shall instruct every employee who operates an agricultural tractor and implements in the safe operating practices and servicing of equipment with which they are or will be involved, and of any other practices dictated by the work environment.

**Bush Hog will provide  
one (1) AEM Mower Safety Practices Video**

Please Send Me: ☐ VHS Format – AEM/FEMA Mower Operator Safety Video  
☐ DVD Format – AEM/FEMA Mower Operator Safety Video  
☐ Mower Operator's Manual  
☐ AEM Mower Operator's Safety Manual

Requester Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Requester Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_

Zip Code: \_\_\_\_\_

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

Date Purchased: \_\_\_\_\_ Dealer Salesperson: \_\_\_\_\_

Dealership Name: \_\_\_\_\_ Dealership Location: \_\_\_\_\_

Mail to:

AEM Video Services

1502 E. Walnut Street

Seguin, TX 78155

Or Fax to:

(830) 372-9529

Or Email to:

AEMVideo@alamo-group.com

## To the Owner/Operator/Dealer

This Operator's Manual is an integral part of the safe operation of this machine and must be maintained with the implement at all times. A Manual canister is provided on the implement where this manual can be properly stored. If you lose or damage this manual a free replacement manual can be obtained from an authorized Bush Hog dealer or by down loading the manual from the Bush Hog website [www.bushhog.com](http://www.bushhog.com)

**BEFORE YOU START! READ, UNDERSTAND, and FOLLOW** the information provided in this manual, the AEM Mower Safety manual and the tractor operator's manual carefully to learn how to operate and service your machine properly. Failure to do so could result in personal injury to you and bystanders. All implements with moving parts are potentially hazardous. Every effort has been made to ensure that the machine is safe but operators must avoid engaging in unsafe practices and follow the written instructions provided. The manufacturer has designed this implement to be used with all its safety equipment properly attached to minimize the chance of accidents.

**SAFETY FIRST.** Completely read and understand the safety section of this manual before operating this equipment. Do not allow anyone to operate this equipment who has not fully read and understood this manual. Contact your Dealer to explain any instructions that you do not fully understand.

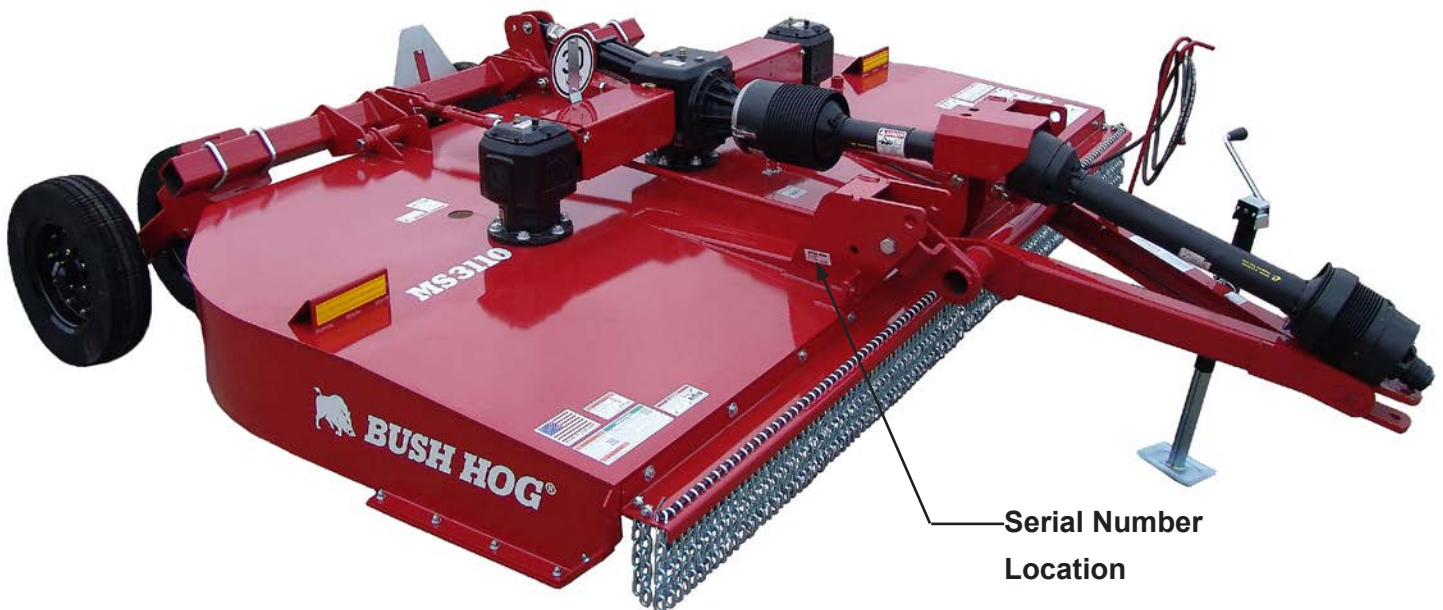
The care you give your Bush Hog Implement will greatly determine your satisfaction with its performance and its service life. Carefully read and follow the instructions in this manual to provide you with a thorough understanding of your new implement and its intended use and service requirements.

All references made in this manual to right, left, front, rear, top or bottom are as viewed facing the direction of forward travel with the implement properly attached to the tractor.

Replacement Parts information is located in a separate Parts Manual. Bush Hog mowers use balanced and matched system components for blade carriers, blades, cuttershafts, knives, knife hangers, rollers, drivetrain components, and bearings. These parts are made and tested to Bush Hog specifications. Non-genuine "will fit" parts do not consistently meet these specifications. The use of "will fit" parts may reduce mower performance, void warranties, and present a safety hazard. Use genuine Bush Hog mower parts for economy and safety.

For future reference, record your Bush Hog product model number and serial number.

Dealer		Telephone		Model Number	
Owner		Purchase Date:		Serial Number	





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# **SAFETY SECTION**

# SAFETY

## GENERAL SAFETY INSTRUCTIONS AND PRACTICES

A careful operator is the best operator. Safety is of primary importance to the manufacturer and should be to the owner/operator. Most accidents can be avoided by being aware of your equipment, your surroundings, and observing certain precautions. The first section of this manual includes a list of Safety Messages that, if followed, will help protect the operator and bystanders from injury or death. Read and understand these Safety Messages before assembling, operating or servicing this Implement. This equipment should only be operated by those persons who have read the manual, who are responsible and trained, and who know how to do so responsibly.



The Safety Alert Symbol combined with a Signal Word, as seen below, is used throughout this manual and on decals which are attached to the equipment. The Safety Alert Symbol means: "ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!" The Symbol and Signal Word are intended to warn the owner/operator of impending hazards and the degree of possible injury faced when operating this equipment.

Practice all usual and customary safe working precautions and above all---remember safety is up to YOU. Only YOU can prevent death or serious injury from unsafe practices.



Indicates a hazardous situation that, if not avoided, WILL result in DEATH OR VERY SERIOUS INJURY.



Indicates a hazardous situation that, if not avoided, COULD result in DEATH OR SERIOUS INJURY.



Indicates a hazardous situation that, if not avoided, MAY result in MINOR OR MODERATE INJURY.



Identifies special instructions or procedures that, if not strictly observed, could result in damage to, or destruction of the machine, attachments or the environment.







Indicates information considered important, but not hazard-related (e.g. messages relating to property damage).

**NOTE:** Identifies points of particular interest for more efficient and convenient operation or repair.

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Death or serious injury may occur unless care is taken to follow the warnings and instructions stated in this Manual and in the Safety Messages on the implement. Always follow the instruction in this manual and use good common sense to avoid hazards.



Pictographs are used throughout this manual to help bring your visual attention to safety issues.

SAFETY HAZARD	SAFETY AVOIDANCE	SAFETY PREVENTION
<p>Pictograph surrounded by a triangle indicates a Safety Hazard that must be avoided.</p> <p>Example:</p>  <p>Equipment contacting overhead electrical lines</p>	<p>Pictograph in a circle with blue or black background, by itself or inside a box, indicates an avoidance procedure or action that should be followed to prevent injuries.</p> <p>Example:</p>  <p>Wear safety footwear.</p>  <p>Always shut off engine and remove key before working on equipment.</p>	<p>A circle with a slash through it indicates an action that is prohibited.</p> <p>Example:</p>  <p>No Smoking</p>

**NOTE:** If you want a translation of this safety section in one of the following Languages, please contact: Translations at 1502 E. Walnut Street Seguin, TX 78155; Fax: (830) 372-9529; Safety Section Translations are available in Spanish, Portuguese, French, German, Russian. PN GS-01

# SAFETY

## OPERATOR SAFETY

				
Read and understand Operator's Manual	Always wear Safety Glasses with side shields marked to comply with ANSI Z87	Wear Hard Hat Safety Shoes	Never use Drugs or Alcohol when operating equipment	Wear Safety Vest when operating on or near roads



**TO AVOID DEATH OR SERIOUS INJURY DO THE FOLLOWING:**

- **READ, UNDERSTAND** and **FOLLOW** Operator's Manual instructions, Warnings and Safety Messages.
- **WEAR SAFETY GLASSES** with side shields (marked with ANSI Z87), safety shoes, hard hat, hearing protection and gloves when operating or repairing equipment
- **WEAR** appropriate breathing respirator when operating in dusty conditions to avoid respiratory diseases.
- **DO NOT WEAR** loose clothing or jewelry to avoid rotating parts entanglement injury.
- **DO NOT USE DRUGS** or **ALCOHOL** before or while operating equipment.
- **DO NOT ALLOW** anyone to operate equipment under the influence of drug or alcohol.
- **CONSULT** medical professional for medication impairment side effects.
- **STAY ALERT**, prolonged operation can cause fatigue, **STOP** and **REST**.

## GENERAL OPERATING SAFETY

### VISIBILITY CONDITIONS WHEN MOWING:

- **OPERATE IN DAYLIGHT** or with lights that gives at least 100 yards clear visibility.
- **BE ABLE TO SEE** and identify passersby, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects.

### GROUND SPEED WHEN MOWING:

- **NORMAL SPEED** range is between 2 to 5mph.
- **ADJUST MOWING SPEED** for terrain conditions and grass type, density and cut height.
- **REDUCE MOWING SPEED** when near steep slopes, ditches, drop-offs, overhead obstructions, power lines and to avoid debris and foreign objects.

### INSECT INFESTATION

- Do Not operate in areas where bees or insects may attack unless you **WEAR PROTECTIVE CLOTHING** or use enclosed tractor cab.

### PTO SPEED:


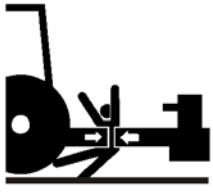
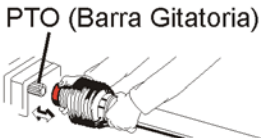
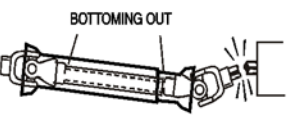
- **DO NOT EXCEED IMPLEMENT RATED PTO SPEED**
- **AVOID** exceeding rated PTO speeds that may result in broken drivelines or blade failures.

### SAFETY SIGNS:

- **REPLACE** missing, damaged or unreadable safety signs immediately. *PN OS01*

# SAFETY

## CONNECTING OR DISCONNECTING IMPLEMENT SAFETY

			
Stop Tractor Remove Key Read Manual	Crushing injury between tractor and implement	Make sure PTO shaft is securely attached to tractor	Make sure PTO shaft are proper length



**TO AVOID DEATH OR SERIOUS INJURY FROM BEING CRUSHED BY TRACTOR OR IMPLEMENT:**

**WHEN BACKING tractor to implement hitch:**

- **DO NOT ALLOW BYSTANDERS** between tractor and implement

**BEFORE connecting and disconnecting implement hitch:**

- **STOP TRACTOR ENGINE**, place transmission into park, engage parking brake and remove key.

**WHEN connecting and disconnecting implement hitch:**

- **DO NOT** crawl or walk under raised mower or wing.
- **USE** tongue **JACK** to lift heavy implement tongues to control implement tongue movement.
- **AVOID** overloading jack to prevent jack failure and injury.

**WHEN CONNECTING IMPLEMENT DRIVELINE:**

**TO AVOID implement driveline coming loose during operation:**

- **LUBRICATE** yoke spring locking collar to ensure it freely slides on PTO shaft
- **SECURELY** seat yoke locking balls in PTO shaft groove.
- **PUSH** and **PULL DRIVELINE** on both the tractor and implement **PTO SHAFTS** to ensure it is **SECURELY ATTACHED**

**TO AVOID broken driveline during operations:**

- **CHECK** driveline for proper length between PTO shaft and implement gearbox shaft.
- Drivelines too short can pull apart or disengage.
- Drivelines too long can bottom out.
- Bottoming driveline telescoping assembly will stop sliding and become solid.
- Driveline bottoming can push through support bearings and break off PTO shaft.

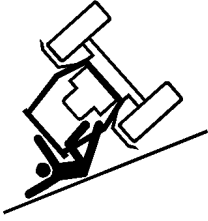
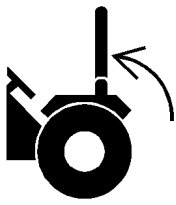

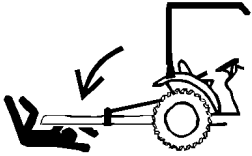
**CONTACT DEALER if implement driveline does not match Tractor PTO shaft:**

- **DO NOT USE PTO ADAPTER.**  
Using a **PTO** adapter can cause:
  - Excessive vibration, thrown objects, blade and implement failures by doubling operating speed.
  - Increased working length exposing unshielded driveline areas and entanglement hazards.

**DO NOT** connect the Mower to a tractor with the PTO directly connected to the Tractor transmission. **PN CD02**

# SAFETY

## CRUSHING HAZARDS

			
Crushing injury from roll over	Lock ROPS in up position	Always wear seatbelt	Crushing injury implement falling



**TO AVOID DEATH OR SERIOUS INJURY FROM FALLING OFF TRACTOR, EQUIPMENT RUN OVER, ROLLOVER AND CRUSHING BY FALLING WING OR IMPLEMENT:**

- **USE ROPS** and **SEAT BELT** equipped tractors for mowing operations.
- **KEEP ROPS** lock in up position.
- **ALWAYS BUCKLE UP** seat belt when operating tractor and equipment.
- **ONLY OPERATE** tractor and equipment while seated in tractor seat.

### WHEN RAISING OR LOWERING IMPLEMENT:

- Raise or lower **ONLY WHILE SEATED** in tractor seat with seat belt buckled.
- Raise or lower **ONLY** when implement tongue is securely attached to tractor drawbar TO AVOID implement tip over.
- **KEEP BYSTANDERS CLEAR** of area TO AVOID crushing.

**LIFTED Equipment can fall from mechanical or hydraulic failure or inadvertent Control Lever movement.**



**TO AVOID EQUIPMENT FALLING while working near or under lifted wings, components and implements raised by 3-Pointed tractor hitch:**

- **SECURELY SUPPORT** or **block up** raised equipment and components.
- **BLOCK UP** and securely support equipment before putting hands, feet or body under raised equipment or lifted components.

### WHEN PARKING Implement and Tractor:

- **LOWER** implement, **LOCK** or **BLOCK** lifted parts before leaving equipment.
- **NEVER** leave implement unattended in a raised position.



**TO AVOID CHILDREN FALLING OFF OR BEING CRUSHED BY EQUIPMENT:**


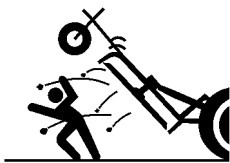

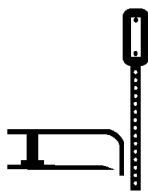
- **NEVER ALLOW** children to play on or around Tractor or Implement.

### WHEN UNHITCHING IMPLEMENT:

- **LOWER** implement, **LOCK** or **BLOCK** lifted parts before leaving equipment.
- **USE** tongue jack to control implement tongue movement.
- **USE** tongue **JACK** to lift heavy implement tongues.
- **AVOID** overloading jack to prevent jack failure and injury. **PN CH02**

# SAFETY

## THROWN OBJECTS HAZARDS

			
Mower Thrown Objects Hazard	Raised Mower Thrown Objects	Inspect Area remove foreign objects	Do not let blades contact solid objects

**⚠ DANGER** ROTARY MOWERS CAN THROW OBJECTS 300 FEET OR MORE UNDER ADVERSE CONDITIONS.

### TO AVOID DEATH OR SERIOUS INJURY TO OPERATOR OR BYSTANDERS FROM THROWN OBJECTS:

- KEEP bystanders 300 feet away

### STOP MOWING IF PASSERSBY ARE WITHIN 300 FEET UNLESS:

- **ALL THROWN OBJECT SHIELDING** including, Front and Rear Deflectors, Chains Guards, Steel Guards, Bands, Side Skirts and Skid Shoes in place and in good condition when mowing.
- Mower sections or wing are adjusted to be close and parallel to ground without exposing blades.
- **MOWING AREA** has been inspected and foreign materials and debris have been removed.
- **PASSERSBY** are inside enclosed vehicle.

### INSPECT AREA FOR POTENTIAL THROWN OBJECTS BEFORE MOWING:

- **REMOVE** debris, rocks, wire, cable, metal objects and other foreign material from area.  
Wire, cable, rope, chains and metal objects can be thrown or swing outside deck with great velocity:
  1. **MARK** objects that cannot removed.
  2. **AVOID** these objects when mowing.

### HIGH GRASS and WEED AREA INSPECTION:

- **INSPECT** for and **REMOVE** any hidden large debris.
- **MOW** at Intermediate height
- **INSPECT** and remove remaining debris
- **MOW** at final height.

### MOWER THROWN OBJECT SHIELDING:




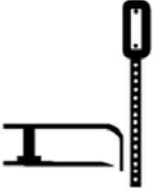
- **KEEP** all thrown object shielding including, Front and Rear Deflectors, Chains Guards, Steel Guards, Bands, Side Skirts and Skid Shoes in place and in good condition when mowing.
- **DO NOT OPERATE** with any thrown object shielding missing, damaged or removed.

### RIGHT OF WAY (Highway) MOWING

- **USE DOUBLE CHAIN GUARDS** for highway, right-of-way, parks or greenbelt mowing or all other mowing where human dwellings, vehicles, or livestock could be within 300 feet of the mower.
- No shielding is 100% effective in preventing thrown objects. To Reduce Possibility of Injury:
  1. **MAINTAIN MOWER SHIELDING**, side skirts, skid shoes, and blades in good operational condition,
  2. **RAISE CUTTING HEIGHT** to **6 INCHES** minimum,
  3. **INSPECT AREA** thoroughly before mowing to **REMOVE** potential **THROWN OBJECT HAZARDS**,
  4. **NEVER ALLOW BLADES** to **CONTACT SOLID OBJECTS** like wire, rocks, post, curbs, guardrails, or ground while mowing. *PN T002*

# SAFETY

## THROWN OBJECTS HAZARD (CONTINUED)

			
Mower Thrown Objects Hazard	Raised Mower Thrown Objects	Inspect Area remove foreign objects	Do not let blades contact solid objects

### MOWER OPERATION:

- **DO NOT** exceed mower's rated Cutting Capacity or cut non-vegetative material.
- **USE ENCLOSED TRACTOR CABS** when two or more mowers are operating in mowing area.
- **ADJUST** mower sections or wing close and parallel to ground without exposing blades
- **ADJUST** cutting **HEIGHT** to **AVOID BLADE CONTACT** with solid objects like wire, rocks, posts, curbs, guard rails and fixed obstructions.
- **DO NOT** operate mower when mower is raised or in transport position
- **STOP MOWING** immediately if blades strike heavy objects, fixed structures, metal guard rails and concrete structures:
  1. **BLADES CAN FAIL** from impact and objects can be thrown with great velocity.
  2. **INSPECT** and **REPLACE** any damaged blades.
  3. **CHECK** blade carrier balance and **REPLACE** if damaged.
- **DO NOT** mow in standing water **TO AVOID** possible **BLADE FAILURE**.
- **AVOID MOWING** in reverse:
  1. **STOP PTO** and back up mower.
  2. **LOWER** mower, engage **PTO** and mow forward.
- **STOP PTO** and **BLADES** when raising implement or the mower to transport position.
- **DO NOT ENGAGE PTO** with mower in transport position.
- **STOP** mowing when **EXCESSIVE VIBRATION** occurs:
  1. **STOP PTO** and tractor **ENGINE**.
  2. **INSPECT** mower for vibration source
  3. **REPLACE** any damage parts and bent or damaged **BLADES**. *PN T002-X*

# SAFETY

## RUN OVER HAZARDS

		
Operator run over hazard	Rider fall off run over hazard	Rider fall off run over hazard

**⚠ DANGER** TO AVOID DEATH OR SERIOUS INJURY FROM FALLING OFF TRACTOR OR EQUIPMENT RUN OVER:


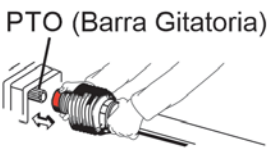
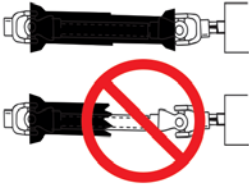
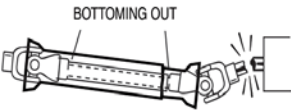
- **USE ROPS** and **SEAT BELT** equipped tractors for mowing operations.
- **KEEP ROPS** locked in **UP** position.
- **ONLY** start tractor while seated in tractor seat.
- **ALWAYS BUCKLE UP** seat belt when operating tractor and equipment.
- **ONLY OPERATE** tractor and equipment while seated in tractor seat.
- **NEVER ALLOW RIDERS** on tractor or implement.

### **WHEN MOUNTING AND DISMOUNTING TRACTOR:**

- **ONLY** mount or dismount when tractor and moving parts are stopped.
- **STOP ENGINE AND PTO**, engage parking brake, lower implement, allow all moving parts to stop and remove key before dismounting from tractor. *PN R001*

# SAFETY

## PTO ENTANGLEMENT HAZARDS

			
Entanglement hazard Do Not approach or touch a rotating PTO driveshaft	Make sure PTO shaft is securely attached Do Not Use PTO Adapter	DO NOT Operate if PTO shields are damaged or missing	Make sure PTO shafts are proper length



**DANGER**

**KEEP AWAY FROM ROTATING DRIVELINES AND ELEMENTS TO AVOID DEATH OR SERIOUS INJURY:**

**STAY AWAY** and **KEEP** hands, feet and body **AWAY** from rotating blades, drivelines and parts until all moving elements have stopped.

- **STOP, LOOK and LISTEN** before approaching the mower to make sure all rotating motion has stopped.
- **ROTATING COMPONENTS CONTINUE** to **ROTATE** after the PTO is shut off.

### PTO SHIELDING:

#### TO AVOID DEATH OR SERIOUS INJURY FROM ENTANGLEMENT WHEN OPERATING IMPLEMENT:

- **KEEP PTO** shields, integral driveline shields and input shields installed
- **DO NOT OPERATE** mower without shields and guards in place or missing
- **REPAIR OR REPLACE** if damage, broken or missing
- **ALWAYS REPLACE GUARDS** that have been removed for service or maintenance.
- Do Not use PTO or PTO guard as a step.

#### TO AVOID broken driveline during operations:

- **CHECK** driveline for proper length between PTO shaft and implement gearbox shaft. *(Refer to Instructions in Operation Section)*
- Drivelines too short can pull apart or disengage.
- Drivelines too long can bottom out.  
Bottoming driveline telescoping assembly will stop sliding and become solid.
- Driveline bottoming can push through support bearings and break off PTO shaft
- **AVOID** sharp turns or lift mower to heights to cause driveline "knocking".
- Lubricate driveshaft-telescoping components weekly.



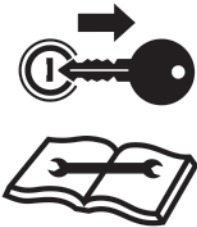
#### CONTACT DEALER if implement driveline does not match Tractor PTO shaft:

- **DO NOT USE PTO ADAPTER.**

Using a PTO adapter can cause excessive vibration, thrown objects, blade and implement failures by doubling operating speed. Increased working length exposing unshielded driveline areas. **PN PE01**

# SAFETY

## MOWER BLADE CONTACT HAZARDS

		
Do not put fingers underneath mower	Do not put foot underneath Mower	Stop Tractor Remove Key Read Manual



**DANGER**

**KEEP AWAY FROM ROTATING BLADES TO AVOID DEATH OR SERIOUS INJURY FROM BLADE CONTACT:**

- **STAY AWAY** and **KEEP HANDS, FEET** and **BODY AWAY** from rotating blades, drivelines and parts until all moving elements have stopped.
- **DO NOT** put hands or feet under mower decks
- **STOP** rotating **BLADES** disengage PTO and wait for blade to stop rotating before raising mower deck or wings
- **STOP LOOK** and **LISTEN** before approaching the mower to make sure all rotating motion has stopped.
- **IF A MATERIAL BLOCKAGE** occurs in the inlet or discharge areas of the mower, **SHUT DOWN TRACTOR ENGINE**, disengage the PTO and wait for all rotating motion to stop. Place the tractor in park position, engage the parking brake and remove the key before leaving the operator's seat. Clear the blockage before proceeding with mowing. Be sure to keep feet and hands clear of the mower blades. If you raise the mower or mower wing to access the blockage, engage the wing lock up latch and securely block up the mower before placing any parts of the body beneath the mower. **PN MB01**

# SAFETY

## HIGH PRESSURE OIL LEAK HAZARD

SAFETY

		
High pressure oil penetrating skin	High pressure oil eroding skin	Using cardboard to check for oil leaks



**DANGER**

**TO AVOID DEATH OR SERIOUS INJURY FROM HIGH PRESSURE HYDRAULIC OIL LEAKS PENERATING SKIN:**

- **DO NOT OPERATE** equipment with oil or fuel leaks.
- **KEEP** all hydraulic hoses, lines and connections in **GOOD CONDITION** and **TIGHT** before applying system pressure.
- **RELIEVE HYDRAULIC PRESSURE** before disconnecting lines or working on the system.
- **REMOVE** and replace hose if you suspect it leaks. Have dealer test it for leaks.

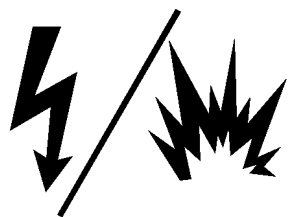
**HIGH PRESSURE FLUID LEAKS CAN BE INVISIBLE.**

**WHEN CHECKING FOR HYDRAULIC LEAKS AND WORKING AROUND HYDRAULIC SYSTEMS:**

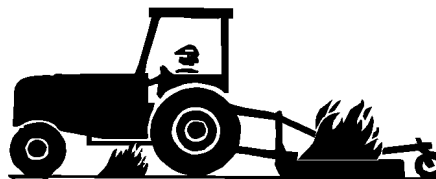
- **ALWAYS WEAR** safety glasses with side shields (marked with ANSI Z87) and impenetrable gloves.
- **USE** paper or cardboard to search for leaks.
- **DO NOT USE** hands or body parts to search for leak.
- **KEEP** hands and body **AWAY** from pin holes and nozzles ejecting hydraulic fluid.
- Injected Hydraulic fluid may cause gangrene if not surgically removed immediately by a doctor familiar with this form of injury. **PN HP01**

# SAFETY

## ELECTRICAL & FIRE HAZARDS



Strike and explosion Hazard  
Blades Contacting Utility or  
Gas Lines



Do not operate near fires.  
Keep mower deck clear of  
debris



**DANGER**

**TO AVOID DEATH OR SERIOUS INJURY FROM ELECTRICAL CONTACT WHEN WORKING AROUND ELECTRICAL POWER LINES, GAS LINES AND UTILITY LINES:**




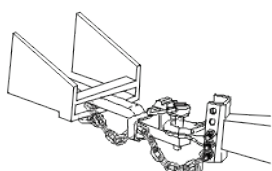

- **INSPECT** mowing area for overhead or underground electrical power lines, obstructions, gas lines, cables and Utility, Municipal, or other type structure.
- **DO NOT** allow mower to contact with any Utility, Municipal, or type of structures and obstructions.
- **CALL 811** and 1-800-258-0808 for identify buried utility lines.

**FIRE PREVENTION GUIDELINES while Operating, Servicing, and Repairing Mower and Tractor to reduce equipment and grass fire Risk:**

- **EQUIP** Tractor with a **FIRE EXTINGUISHER**
- **DO NOT OPERATE** mower on a tractor equipped with under frame exhaust
- **DO NOT SMOKE** or have open flame near Mower or Tractor
- **DO NOT DRIVE** into burning debris or freshly burnt area
- **AVOID FIRE IGNITION** by not allowing mower blade to contact solid objects like metal or rock.
- **ADJUST SLIP CLUTCHES** to avoid excessive slippage and clutch plate heating.
- **CLEAR** any grass clippings or debris buildup around mower drivelines, slip clutches, and gearboxes.
- **SHUT OFF ENGINE** while refueling. *PN EF02*

# SAFETY

## TRANSPORTING HAZARDS

				
Use SMV signs and Flashing Lights	Loss of Control Stopping Hazard	Loss of Control Speeding Hazard	Use Safety Tow Chain - Tractor to Implement	Engage Transport Locks



**TO AVOID DEATH OR SERIOUS INJURY WHEN TOWING OR TRANSPORTING EQUIPMENT:**

- **KEEP** transport speed **BELOW** 20 mph to maintain control of equipment.
- **REDUCE SPEED** on inclines, on turns and in poor towing conditions.
- **DO NOT TOW** with trucks or other vehicles
- **USE** only properly sized and equipped tractor for towing equipment.
- **FOLLOW** all local traffic regulations.

### TRACTOR REQUIREMENTS FOR TOWING OR TRANSPORTING IMPLEMENTS:

- **ONLY TRANSPORT** with tractor with **ROPS** in the raised position.
- **USE** properly sized and equipped tractor that exceeds implement weight by at least 20%
- **KEEP** 20% of tractor weight on front wheels to maintain safe steering.

### BEFORE TRANSPORTING OR TOWING IMPLEMENT:

#### TRACTOR INSPECTION:

- **CHECK** steering and braking for proper operation and in good condition.
- **CHECK SMV** sign, reflectors and warning lights for proper operation and visibility behind unit.
- **CHECK** that your driving vision is not impaired by tractor, cab, or implement while seated in tractor seat.
- **ADJUST** your operating position, mirrors, and implement transport for clear vision for traveling and traffic conditions.

### PREPARE IMPLEMENT FOR TRANSPORTING OR TOWING:

- **DISENGAGE PTO**
- **RAISE MOWER**
- **REMOVE** any cut material collected on mower deck.

### TOWED MOWERS - ENGAGE TRANSPORT LOCKS AND SAFETY CHAINS:

- **INSTALL** center axle cylinder transport stops or pins
- **ATTACH** implement **SAFETY CHAIN** to tractor

### DETERMINE STOPPING CHARACTERISTICS OF TRACTOR AND IMPLEMENT FOR TRANSPORTING OR TOWING:

#### BRAKING TESTS:

- **APPLY** brakes at increasing speeds
- Observe **STOPPING** distances increases with increased speeds.
- **DETERMINE** the maximum safe transport speed that does not exceed 20 mph

### DETERMINE MAXIMUM TURNING SPEED BEFORE OPERATING ON ROADS OR UNEVEN GROUND:

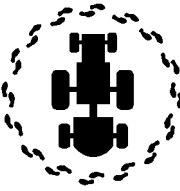
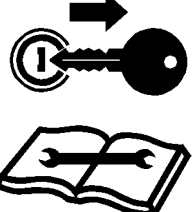
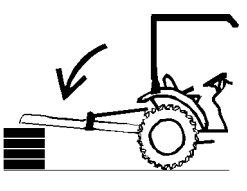
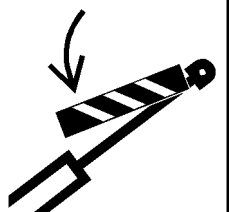

- **TEST** equipment in slowly increasing speed in turns to determine it can be operated at higher speeds.
- **USE REDUCED** turning speeds in sharp turns to avoid equipment turning over.

### WHEN TOWING OR TRANSPORTING EQUIPMENT:

- Always **WEAR SEAT BELT** when operating or transporting mower.
- **USE** low speeds to avoid overturn with raised wings.
- **USE** low speeds and gradual steering on curves, hills, rough or uneven surfaces and on wet roads.
- **TURN ON** tractor **FLASHING WARNING LIGHTS**.
- **INSTALL** Magnetic Towing Lights on Implement if required and ensure they are properly functioning before transporting on public roads.
- **ALLOW** clearance for implement swing while turning. **PN TH02\_A**

# SAFETY

## HAZARDS WITH MAINTENANCE OF IMPLEMENT

				
Periodically inspect all moving parts, lubricate drivelines, and tighten all fasteners	Stop engine remove key before conducting maintenance	Block up implement before servicing Use large blocks on soft or wet soil	Engage cylinder transport locks	Inspect Blades for damage or cracks



**AVOID DEATH OR SERIOUS INJURY FROM COMPONENT FAILURE BY KEEPING IMPLEMENT IN GOOD OPERATING CONDITION IN PERFORMING PROPER SERVICE, REPAIRS AND MAINTENANCE.**

### BEFORE PERFORMING SERVICE, REPAIRS AND MAINTENANCE ON THE IMPLEMENT:

SECURE EQUIPMENT FOR SERVICE

BLOCK OUT POTENTIAL ENERGY HAZARDS; Rotating Parts, Raised Components, Hydraulic Pressure.

- **STOP ENGINE**, engage parking brake and allow all moving parts to stop and remove key before dismounting from tractor seat.
- **PLACE** implement on ground or securely block up raised equipment. Use large blocks on soft or wet soil.
- **PUSH** and **PULL** Remote Hydraulic Cylinder lever to relieve hydraulic pressure.
- **DISCONNECT IMPLEMENT driveline** from tractor PTO Shaft.

**WEAR SAFETY GLASSES** with side shields (marked with ANSI Z87), **PROTECTIVE GLOVES** and follow **SAFETY PROCEDURES** when performing service, repairs and maintenance on the implement:

- Always **WEAR** protective **GLOVES** when handling chemicals or worn component with sharp edges.
- Always **WEAR GLOVES** and **SAFETY GLASSES** with side shields (marked with ANSI Z87) when servicing components
- **AVOID CONTACT** with hot hydraulic oil tanks, pumps, motors, valves and hose connection surfaces.
- **SECURELY** support or **BLOCK UP** raised implement, framework and lifted components before working underneath equipment.
- **STOP** any implement movements and **SHUT-OFF TRACTOR** engine before doing any work procedures.
- **USE** ladder or raised stands to reach high equipment areas inaccessible from ground.
- **ENSURE** good footing by standing on solid flat surfaces when getting on implement to perform work.
- **FOLLOW** manufacturer's instructions in handling oils, solvents, cleansers, and other chemical agents.
- **DO NOT** change any factory-set hydraulic calibrations to avoid component or equipment failures.
- **DO NOT** modify or alter implement, functions or components.
- **DO NOT WELD** or repair rotating mower components. These may cause vibrations and component failures being thrown from mower.

### PERFORM SERVICE, REPAIRS, LUBRICATION AND MAINTENANCE OUTLINED IN IMPLEMENT MAINTENANCE SECTION:

- **INSPECT** for loose fasteners, worn or broken parts, leaky or loose fittings, missing or broken cotter keys and washers on pins, and all moving parts for wear.
- **REPLACE** any worn or broken parts with authorized service parts.
- **LUBRICATE** unit as specified by lubrication schedule
- **NEVER** lubricate, adjust or remove material while it is running or in motion.
- **TORQUE** all bolts and nuts as specified.

### BLADE INSPECTION:

- **REPLACE** bent, damage, cracked or broken blades immediately with new blades.
- **AVOID** blade failures and thrown broken blades. **DO NOT** straighten, weld, or weld hard-facing blades.

### SAFETY SHIELDS, GUARDS AND SAFETY DEVICES INSPECTION:

- **KEEP** all Deflectors, Chain Guards, Steel Guards, Gearbox Shields, and PTO integral shields, Bands, Side Skirts and Skid Shoes in place and in good condition.
- **REPLACE** any missing, broken or worn safety shields, guards and safety devices.



**WARNING**

**Cancer and Reproductive Harm** [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov) **PN HM01**

## **PARTS INFORMATION**

### PARTS INFORMATION

Bush Hog mowers use balanced and matched system components for blade carriers, blades, cuttershafts, knives, knife hangers, rollers, drivetrain components, and bearings. These parts are made and tested to Bush Hog specifications. Non-genuine "will fit" parts do not consistently meet these specifications. The use of "will fit" parts may reduce mower performance, void warranties, and present a safety hazard. Use genuine Bush Hog mower parts for economy and safety. (SPBH-1)

**SEE YOUR BUSH HOG DEALER**

Operator's & Parts Manuals

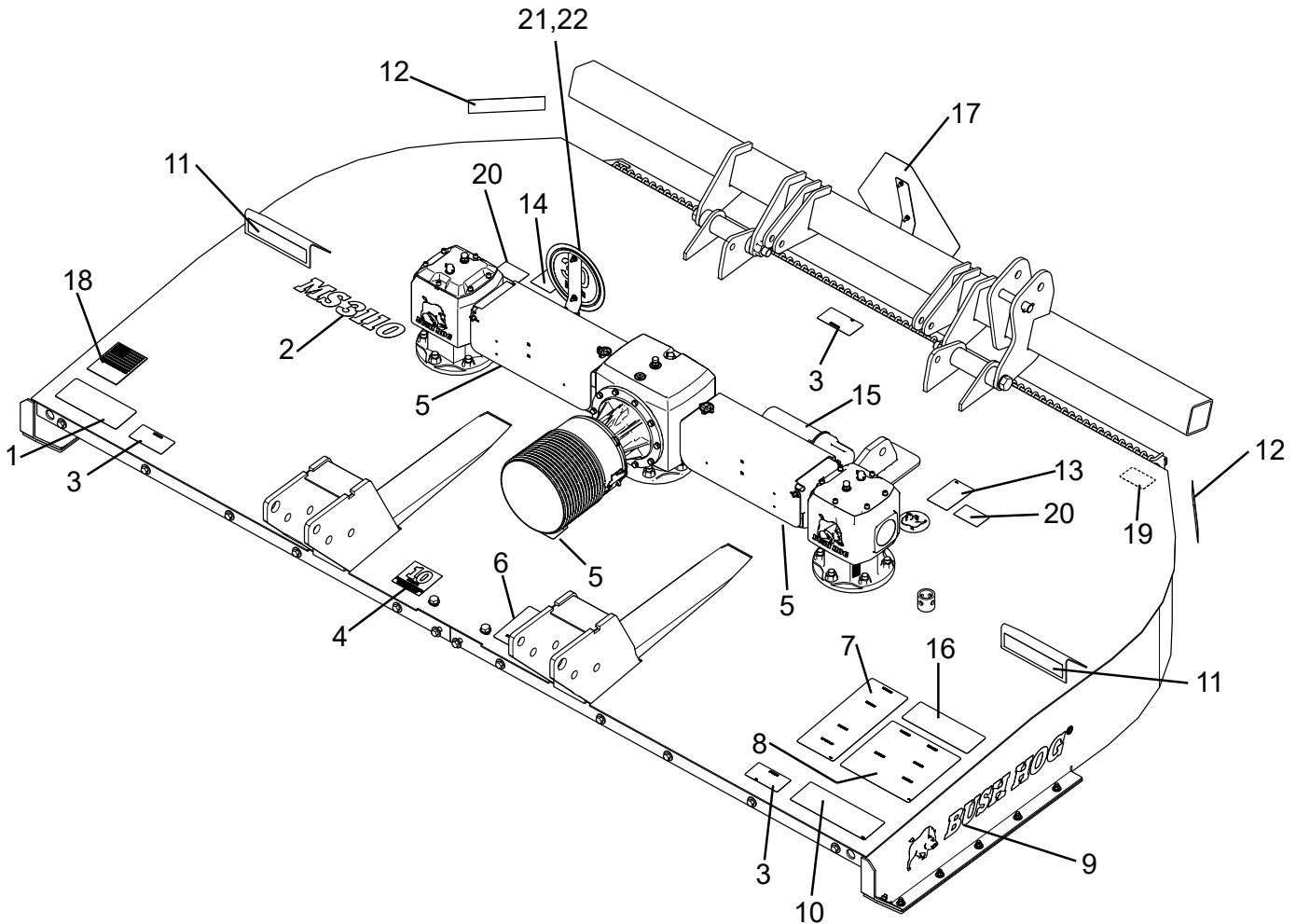


[www.algqr.com/bpm](http://www.algqr.com/bpm)

# SAFETY

## DECAL LOCATION

**NOTE:** Bush Hog supplies safety decals on this product to promote safe operation. Damage to the decal may occur while in shipping, use, or reconditioning. Bush Hog cares about the safety of its customers, operators, and bystanders, and will replace the safety decals on this product in the field, free of charge (Some shipping and handling charges may apply). Contact your Bush Hog dealer to order replacement decals.



# SAFETY

ITEM	PART NO.	QTY.	TYPE	DESCRIPTION
1	D559	1	WARNING	Genuine Bush Hog Parts
2	50086634	1	NAME	MS3110 Model Decal
3	D614	2	DANGER	Thrown Object Hazard
4	50081789	1	INFORMATION	Warranty, 10 Year Gearbox
5	D546	3	DANGER	Guard Missing - Do Not Operate
6	D547	1	DANGER	Rotating D/L Entanglement
7	D553	1	WARNING	Multi-Hazard
8	D549	1	DANGER	Thrown Object Hazard
9	50080370	1	LOGO	Bush Hog
10	D581	1	INSTRUCT	Lubrication Chart
11	50031212	1	REFLECTOR	Amber Reflector
12	50031214	2	REFLECTOR	Red Reflector
13	D551	2	WARNING	Blade Rotation, CCW
14	D552	1	WARNING	Blade Rotation, CW
15	50035829	1		Canister, Operator's Manual
	50083639	1		Operator's Manual
16	D813	1	DANGER	Multi-Language Safety Decal
17	94359	1	REFLECTOR	SMV Sign
18	50074259	1	USA DECAL	Made in USA
19	D454	1	WARNING	Crushing Hazard
20	D608	2	WARNING	Blade Timing
21	50082007	1	INSTRUCT	Safety Information Symbol (20 mile/h)
22	50082010	1	INSTRUCT	Safety Information Symbol (30 km/h)
23	D1085	1	INSTRUCT	Towing Vehicle Mass (not shown)
24	D884	1	WARNING	Jackstand (not shown)

# SAFETY

## DECAL DESCRIPTION

**WARNING**

**TO AVOID DEATH OR SERIOUS INJURY:**

- ONLY use genuine Bush Hog replacement parts, which have been validated and tested to use on Bush Hog equipment by the manufacturer.
- The equipment manufacturer cannot verify the material or structural integrity of third-party supplied non-genuine replacement parts.
- Using non-genuine parts can result in the part failing, creating hazardous conditions for operator and bystanders.

Contact local dealer or Bush Hog about repair parts at:  
2501 Griffin Ave., Selma, AL 36701  
Customer Service: 800-363-6096.  
Email: [contactus@bushhog.com](mailto:contactus@bushhog.com) [www.algqr.com/bpm](http://www.algqr.com/bpm)



**WARNING**  
**Cancer and Reproductive Harm**  
[www.P65 Warnings.ca.gov](http://www.P65Warnings.ca.gov)

**IMPORTANT**


**BE AWARE  
BE ALERT  
BE ALIVE** **BE TRAINED  
Before Operating this Mower**



To prevent serious injury to yourself and/or bystanders, be trained in Safe Mowing Practices. Alamo Group Companies as well as AEM and FEMA provide training material that is critical for your Safety and the Safety of others when operating this equipment. Make these Safety Procedures an important part of every workday. Read and understand the Operator's Manual.

Do not let untrained individuals operate this equipment. Contact your Dealer, AEM ([www.aem.org](http://www.aem.org)), FEMA (314-878-2304, [www.FarmEquip.org](http://www.FarmEquip.org)), or Alamo Group ([www.Alamo-Group.com](http://www.Alamo-Group.com)) for information on training material or courses that provide training in Safer Operating Practices for Mowers.

D559

**WARNING**



**THROWN OBJECT HAZARD**

Blades striking each other can result in broken parts and thrown objects.

**To avoid injury and broken parts:**

- Time blades perpendicular to each other.

D608



# SAFETY

## ! WARNING



### TO AVOID DEATH OR SERIOUS INJURY FROM HIGH PRESSURE HYDRAULIC OIL LEAKS PENETRATING SKIN:

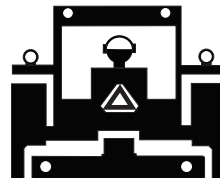
- DO NOT OPERATE equipment with oil or fuel leaks.
- KEEP all hydraulic hoses, lines and connections in good condition and tight before applying system pressure.
- Relieve hydraulic pressure before disconnecting lines or working on the system.
- REMOVE and replace hose if you suspect it leaks. Have dealer test it for leaks.

### HIGH PRESSURE FLUID LEAKS CAN BE INVISIBLE. WHEN CHECKING FOR HYDRAULIC LEAKS AND WORKING AROUND HYDRAULIC SYSTEMS:

- DO NOT use hands to check for leaks.
- ALWAYS WEAR safety glasses with side shields (marked to comply with ANSI Z87) and impenetrable gloves.
- USE paper or cardboard to search for leaks.
- KEEP hands and body AWAY from pin holes and nozzles ejecting hydraulic fluid.
- Hydraulic fluid may cause gangrene if not surgically removed immediately by a doctor familiar with this form of injury.

D553\_1

## ! WARNING



### TO AVOID DEATH OR SERIOUS INJURY WHEN TOWING EQUIPMENT:

- DO NOT TOW with trucks or other vehicles.
- ONLY transport with properly sized and equipped tractor. (see Operator's Manual)
- ATTACH implement SAFETY CHAIN to tractor.
- CHECK SMV sign, SIS sign, reflectors and warning lights for visibility behind unit.
- TURN ON tractor flashing warning lights.

### TO AVOID LOSS OF TOWING CONTROL:

- DO NOT tow at speeds over 20 mph.
- REDUCE SPEED on inclines, in turns and in poor towing conditions.

D553\_2

# SAFETY

## ⚠ WARNING

### TO AVOID EQUIPMENT AND GRASS FIRES:

- CLEAR AWAY grass or debris from slip clutches, gearboxes, drivelines and decks.

### TO AVOID FIRE IGNITION:

- DO NOT ALLOW BLADES TO CONTACT rocks, metal or solid objects.

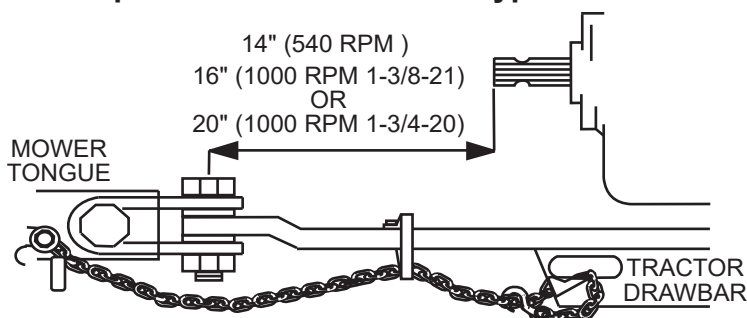


D553\_3

## IMPORTANT

### Required for Standard Pull Type Units.

D553\_4



Attach Safety Chain securely.

D553

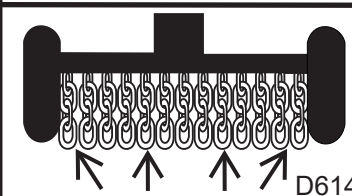
## ⚠ DANGER

### THROWN OBJECT HAZARD

#### TO AVOID DEATH OR SERIOUS INJURY:

DO NOT OPERATE if Thrown Object Shielding is damaged or missing.

MAINTAIN Thrown Object Shielding



D614

# SAFETY

**! DANGER**



**TO AVOID DEATH OR SERIOUS INJURY FROM DRIVELINE CONTACT, DRIVELINE SEPARATION OR PTO STUB SHAFT FAILURE:**

- STOP, LOOK and LISTEN for rotating motion before approaching implement.
- STAY AWAY and KEEP hands, feet and body AWAY from driveline & rotating parts until all moving elements have stopped.
- ALWAYS shut off PTO before dismounting.
- DO NOT operate if PTO shields are damaged or missing.
- PUSH AND PULL on yoke until collar clicks and locks yoke in place.
- CHECK driveline guards for free rotation and sufficient overlap to avoid unshielded areas.
- DO NOT USE PTO ADAPTER.



**! WARNING**

OPERATE THIS MACHINE AT  
**540 RPM**  
TRACTOR PTO SPEED ONLY.  
Overspeeding PTO may cause component failure resulting in bodily injury.  
TRACTOR PTO ROTATION: CLOCKWISE



D547

**! WARNING**

**EXPLOSION HAZARD**

**RELEASE ALL AIR PRESSURE BEFORE LOOSENING BOLTS.  
FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH**  
MAX. SPEED: 20 MPH, MAX. WEIGHT: 4000 LBS., MAX. AIR PRESSURE: 40PSI

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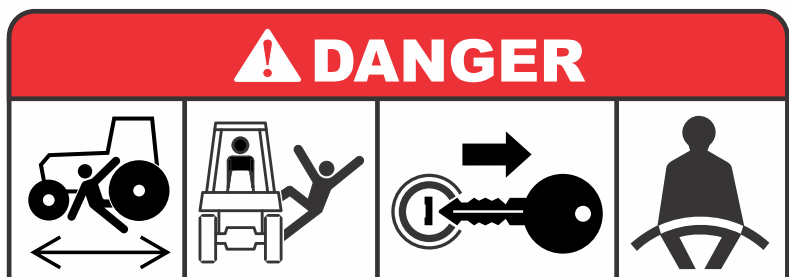
# SAFETY



## THROWN OBJECTS HAZARD D549\_1

**Mower can throw objects up to 300 feet. TO AVOID DEATH OR SERIOUS INJURY to operator or bystanders:**

- STOP mowing if bystanders or traffic come within 300 feet.
- DO NOT OPERATE with thrown object shielding removed.
- KEEP thrown object shielding in place and in good condition during operation. Thrown Objects shielding is subject to wear.
- REPAIR OR REPLACE shielding if damaged, broken or missing. See Operator's Manual for all Shields and Guards.
- INSPECT area for potential mower thrown object hazards before mowing.
- Remove and AVOID objects such as wire, cable, metal objects and all other foreign material.
- DO NOT ALLOW blades to contact solid objects like wire, rocks, posts, curbs or guard rails.
- DO NOT OPERATE in transport position or with wings off ground.






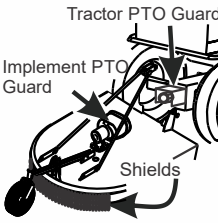

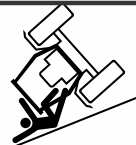

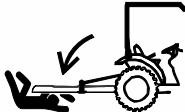




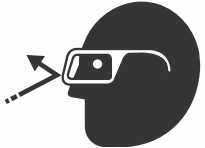
## Run Over Hazard - Death or Injury

**TO AVOID DEATH OR SERIOUS INJURY:**

- ALWAYS BUCKLE UP seat belt.
- ONLY START Tractor while seated in the operator's seat.
- STOP ENGINE and PTO, engage parking brake, lower implement, allow all moving parts to stop and remove key before dismounting from tractor.
- KNOW HOW to stop tractor and equipment quickly for an emergency.
- DO NOT MOUNT or DISMOUNT Tractor in motion.
- NEVER ALLOW riders on tractor or implement.
- NEVER ALLOW children to operate or ride on tractor or implement.
- KEEP BYSTANDERS CLEAR of area before moving tractor or implement.
- KEEP ALERT and AVOID hitting stumps, holes, ruts, and uneven terrain.
- AVOID tree limbs, brush and other overhanging objects that can strike and throw the operator from seat.

D549\_4

# SAFETY

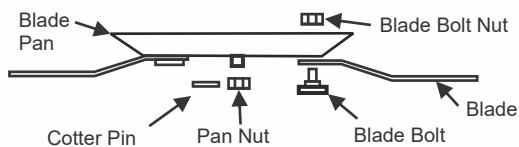
 <b>DANGER</b>			
<b>ENTANGLEMENT HAZARD</b>			
<p><b>TO AVOID DEATH OR SERIOUS INJURY:</b></p> <ul style="list-style-type: none"> <li>• DO NOT operate without guards in place and in good condition. PTO and gearbox guarding are SUBJECT TO WEAR.</li> <li>• STAY AWAY and KEEP hands, feet and body AWAY from rotating blades, drivelines and parts that continue to move after power shut-off. WAIT until all moving elements have stopped.</li> <li>• ALWAYS REPLACE GUARDS that have been removed for service or maintenance.</li> <li>• STOP, LOOK and LISTEN for rotating motion before approaching implement.</li> <li>• DO NOT STEP ON drivelines or guards.</li> </ul>		<p>Tractor PTO Guard</p> <p>Implement PTO Guard</p> <p>Shields</p> 	
<p>D549_2</p>			
 <b>DANGER</b>			
<b>Crushing Hazard - Death or Injury</b>			
<p><b>TO AVOID DEATH OR SERIOUS INJURY:</b></p> <ul style="list-style-type: none"> <li>• USE tractor equipped with <u>R</u>ollover <u>P</u>rotective <u>S</u>tructure ("ROPS") including roll bar and seat belt. Keep roll bar in raised position.</li> <li>• STAND CLEAR when removing transport latch, lowering or raising wings.</li> <li>• IMPLEMENT CAN FALL from hydraulic failure or accidental operation of controls.</li> <li>• BLOCK UP and securely support equipment before putting hands, feet or body under raised equipment or lifted components.</li> <li>• RAISE AND SECURE LOCK Wing Transport Latch before transporting mower on roadways or working under wing.</li> </ul>			
<p>D549_3</p>			
 <b>DANGER</b>			
	 <p>www.algqr.com/bme</p>		
<p><b>TO AVOID DEATH OR SERIOUS INJURY:</b></p> <ul style="list-style-type: none"> <li>• READ AND UNDERSTAND the provided Operator's Manuals, safety signs and information decals for tractor and implement before operating equipment.</li> <li>• CONTACT DEALER immediately if you do not have manuals.</li> <li>• CONTACT DEALER to explain any instructions not fully understood.</li> <li>• ALWAYS WEAR safety glasses with side shields (marked with ANSI Z87).</li> <li>• WEAR hard hat, safety shoes and gloves for protection when operating equipment.</li> </ul>			
<p>D549_5</p>		<p>D549</p>	

# SAFETY

## ⚠ WARNING

### TO AVOID DEATH OR SERIOUS INJURY FROM BLADE ATTACHMENT FAILURE:

- Torque pan nut (450 ft lbs) and blade nut (600 ft lbs) after first 8 hours of use to ensure proper seating and tightness of components.
- ALWAYS replace blades in pairs.
- ALWAYS replace blades with new bolts and nuts.



## BLADE ROTATION

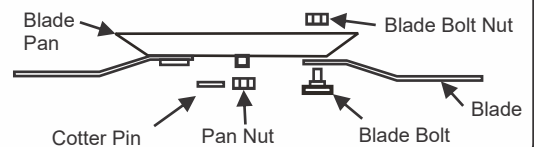


D551

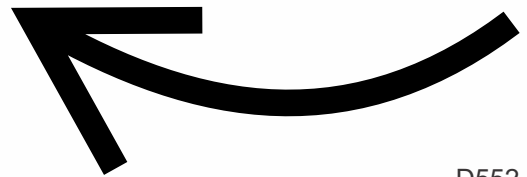
## ⚠ WARNING

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- ALWAYS replace blades in pairs.
- ALWAYS replace blades with new bolts and nuts.



## BLADE ROTATION



D552

## ⚠ DANGER

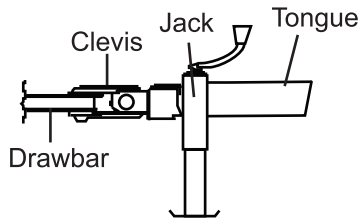
D546



**GUARD MISSING**  
**To Avoid Death Or Serious Injury Do Not Operate**

# SAFETY

## ⚠ WARNING



Rated Vertical: 2300 lbs  
Loads Side: 320 lbs

### TO AVOID SERIOUS INJURY:

- Fully engage jack retaining pin.
- Lower mower to ground so jack is positioned vertically.
- DO NOT exceed rated loads.

D884

## NOTICE

Do not tow at speeds greater than 20 MPH(30 KM/H).

Ensure mass of towing vehicle is at least 2/3 times the mass of the towed machinery.

Be sure to park on level ground to a maximum of 10% ground slope.

D1085

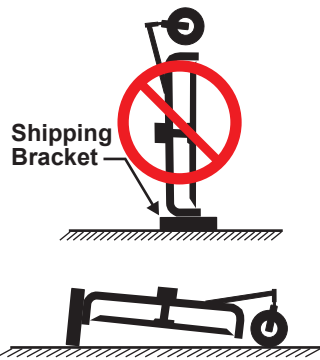
## ⚠ WARNING

### Crushing Hazard

#### To avoid injury from mower falling over:

- DO NOT store mower vertically on shipping brackets.
- Store mower lying down.

D454



# SAFETY

<b>! PELIGRO</b>	<b>! DANGER</b>
<p>Si no puede leer inglés: antes de poner en funcionamiento este equipo, solicite que alguien le traduzca los mensajes de seguridad o vaya al sitio web para consultar los mensajes de seguridad y las etiquetas ya traducidos.</p>	<p>Si vous ne pouvez pas lire l'anglais: avant d'utiliser l'équipement, demandez à une personne de vous traduire les messages de sécurité ou allez sur le site Internet pour voir la traduction des autocollants et des messages de sécurité.</p>
<p><b>El Manual del Operador   Seguridad vídeo</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p style="text-align: center;"> <a href="http://www.algqr.com/bms">www.algqr.com/bms</a>   <a href="http://www.algqr.com/bvs">www.algqr.com/bvs</a> </p>	<p><b>Manuel de l'Opérateur</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"> <a href="http://www.algqr.com/bmf">www.algqr.com/bmf</a> </p>

<b>! PERIGO</b>	<b>! GEFAHR</b>
<p>Caso você não leia inglês: antes de operar o equipamento, peça para alguém traduzir as mensagens de segurança ou visite a web e obtenha tais mensagens ou os decalques traduzidos.</p>	<p>Falls Sie nicht Englisch sprechen: Bevor Sie die Geräte in Betrieb nehmen, bitten Sie eine Englisch sprechende Person darum, Ihnen die Sicherheitsmeldung zu übersetzen, oder besuchen Sie die Website; dort finden Sie übersetzte Aufkleber und Sicherheitsmeldungen.</p>
<p><b>Manual do Operador</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"> <a href="http://www.algqr.com/bmp">www.algqr.com/bmp</a> </p>	<p><b>Benutzerhandbuch</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"> D813   <a href="http://www.algqr.com/bmg">www.algqr.com/bmg</a> </p>

## **FEDERAL LAWS AND REGULATIONS**

This section is intended to explain in broad terms the concept and effect of federal laws and regulations concerning employer and employee equipment operators. This section is not intended as a legal interpretation of the law and should not be considered as such.

### **Employer-Employee Operator Regulations**

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

#### **This Act Seeks:**

"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

#### **DUTIES**

Sec. 5 (a) Each employer-

- (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
- (2) shall comply with occupational safety and health standards promulgated under this Act.
- (b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

### **OSHA Training Requirements**

**Title 29, Code of Federal Regulations Part 1928.57(a)(6). [www.osha.gov](http://www.osha.gov)**

Operator instructions. At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee who operates an agricultural tractor and implements in the safe operating practices and servicing of equipment with which they are or will be involved, and of any other practices dictated by the work environment.

Keep all guards in place when the machine is in operation;

Permit no riders on equipment

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

### **Employer Responsibilities:**

To ensure employee safety during Tractor and Implement operation, it is the employer's responsibility to:

1. Train the employee in the proper and safe operation of the Tractor and Implement.
2. Require that the employee read and fully understand the Tractor and Implement Operator's manual.
3. Permit only qualified and properly trained employees to operate the Tractor and Implement.
4. Maintain the Tractor and Implement in a safe operational condition and maintain all shields and guards on the equipment.
5. Ensure the Tractor is equipped with a functional ROPS and seat belt and require that the employee operator securely fasten the safety belt and operate with the ROPS in the raised position at all times.
6. Forbid the employee operator to carry additional riders on the Tractor or Implement.
7. Provide the required tools to maintain the Tractor and Implement in a good safe working condition and provide the necessary support devices to secure the equipment safely while performing repairs and service.
8. Require that the employee operator stop operation if bystanders or passersby come within 300 feet.

### **Child Labor Under 16 Years of Age**

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)

INDUSTRIAL/AGRICULTURAL MOWER

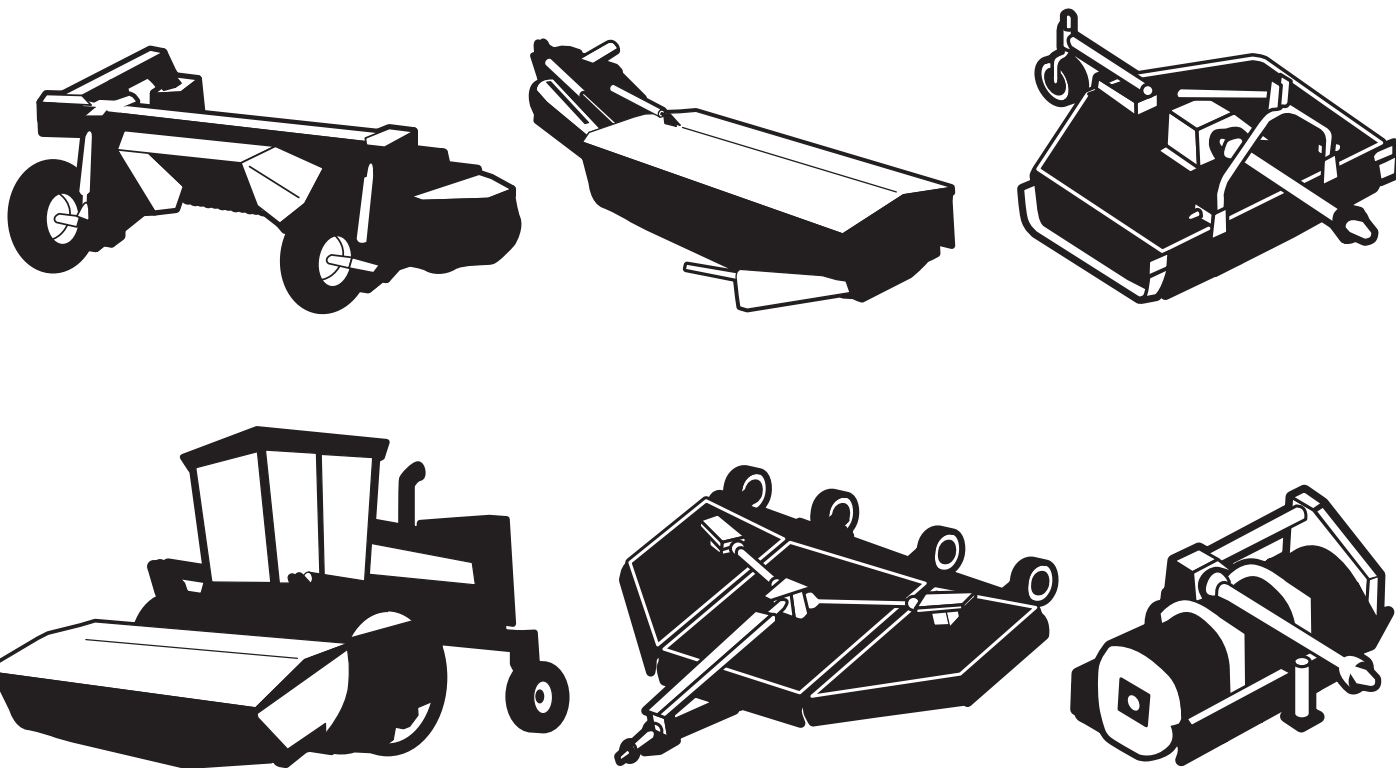
**AEM** 

Association of  
Equipment Manufacturers



# SAFETY MANUAL

FOR OPERATING AND MAINTENANCE PERSONNEL



ISBN 978-1-937029-54-8

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## Acknowledgment

We wish to thank the members of the Association of Equipment Manufacturers for their invaluable contributions in preparing this Safety Manual.

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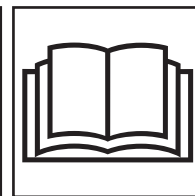
## Foreword

This safety manual is intended to point out some of the basic safety situations that may be encountered during the normal operation and maintenance of your machine and to instruct you in safety practices for dealing with these conditions. This manual is **NOT** a substitute for the manufacturer's operator's manual(s).

Additional precautions may be necessary, or some instructions may not apply, depending on equipment, attachments and conditions at the job site or in the service area. The manufacturer has no direct control over equipment application, operation, inspection, or maintenance. Therefore, it is **YOUR** responsibility to use good safety practices in these areas.

The information provided in this manual supplements the specific information about your machine that is contained in the manufacturer's operator's manual(s). Other information that may affect the safe operation of your machine may be contained in the following:

- Safety signs
- Insurance requirements
- Employer safety and training programs
- Safety codes
- Local, state/provincial, and federal laws, rules, and regulations



**Read and understand  
manuals before  
operating**

**IMPORTANT!** Before you operate this machine, make sure you have the manufacturer's operator's manual(s) for this machine and all attachments. If the manufacturer's operator's manuals are missing, obtain replacements from your employer, equipment dealer, or directly from the manufacturer. Keep this safety manual and the manufacturer's operator's manuals with the machine at all times. Read and understand all applicable manuals.

Safety videos and other training resources are available from some manufacturers and dealers. The AEM Industrial/Agricultural Mower Safety video is available to train and reinforce good safety practices. This video is available at [www.safetymaterials.org](http://www.safetymaterials.org). Operators are encouraged to periodically review these resources.

# Safety Alerts

## Safety Alert Symbol

This Safety Alert Symbol means: **“Attention! Stay alert! Your safety is involved!”**



The Safety Alert Symbol is used to alert you to potential hazards and identifies important safety messages on equipment, safety signs, in manuals, or elsewhere. When you see this symbol, be alert to the possibility of death or personal injury. Carefully read the message that follows and inform other operators. Follow instructions in the safety message.

## Signal Words

Signal words are distinctive words that are typically found on safety signs on the mower and other job site equipment. These words may also be found in this manual and the manufacturer's operator's manuals. These words are intended to alert the operator to a hazard and the degree of severity of the hazard.



**DANGER** indicates a hazardous situation that, if not avoided, will result in death or serious injury.



**WARNING** indicates a hazardous situation that, if not avoided, could result in death or serious injury.



**CAUTION** indicates a hazardous situation that, if not avoided, may result in minor or moderate injury.



**NOTICE** is used to address practices not related to physical injury.

## A Word to the User/Operator

It is **YOUR** responsibility to read and understand this safety manual and the manufacturer's operator's manual(s) before operating this equipment. This safety manual takes you step by step through the working day.

Graphics have been provided to help you understand the text.

Hazard recognition and accident prevention depend upon you being alert, careful, and properly trained in the inspection, operation, transport, maintenance, and storage of this equipment.

Remember that **YOU** are the key to safety. Good safety practices not only protect you but also protect the people around you. Study this manual and the manufacturer's operator's manual(s) for the specific machine. Make them a working part of your safety program. Keep in mind that this safety manual is written only for industrial/agricultural mowers.

After studying the manufacturer's operator's manual(s) and this safety manual, please contact the equipment manufacturer with any remaining questions.



Read and understand manuals before operating

**Practice all customary safe working precautions and remember:**

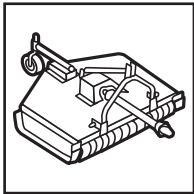
**Safe operation is up to you!**

**You can prevent death or serious injury caused by unsafe work practices!**

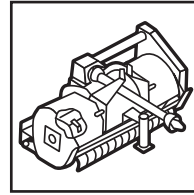
# Types of Industrial/Agricultural Mowers

## Industrial/Agricultural Mower Types

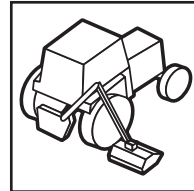
Mowers are used for clipping pastures, shredding crop residue, cutting heavy brush, and mowing waterways, right-of-ways, roadsides or highways. Also, these mowers are used for cutting grass and other growth in public areas such as parks and cemeteries.



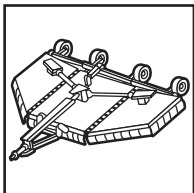
**Rotary**



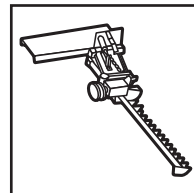
**Flail**



**Boom**



**Folding wing rotary**



**Sickle bar**

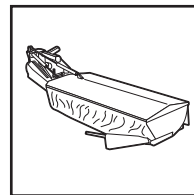
# Types of Industrial/Agricultural Mowers

## Agricultural Disc Mower Types

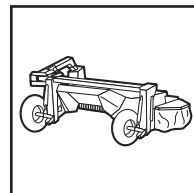
Disc mowers are designed and equipped to cut hay crops at higher field speed.

Disc mower conditioners mow and condition crops.

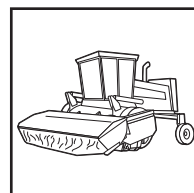
Self-propelled windrowers mow and form conditioned hay into windrows.



**Disc Mower**



**Disc mower conditioner**



**Self-propelled windrower**

# Follow a Safety Program

## For Safe Operation

You must be a qualified and authorized operator to safely operate this machine. You must clearly understand the written instructions supplied by the manufacturer, be trained—including actual operation—and know the safety rules and regulations for the job site. It is a good safety practice to point out and explain safety signs and practices to others, and to make sure they understand the importance of following these instructions.



**Never operate while impaired by alcohol or drugs**

**⚠ WARNING!** Death or serious injury could result from operating machinery while impaired by drugs or alcohol. Drugs and alcohol affect operator alertness, coordination, and the ability to safely operate the equipment. **Never operate the machine while impaired by use of alcohol or drugs. Never knowingly allow anyone to operate the machine when their alertness or coordination is impaired.**

An operator taking prescriptions or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to safely operate this equipment.

### Be Alert!

Know where to get assistance. Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone. Know how to use a first aid kit and fire extinguisher/fire suppression system; know their location and practice getting to them. Ensure they have been properly tested and maintained.

Let others know where you will be working, and what time you will be returning. In case of an emergency, you want others to know where to find you.

### Be Aware!

Take advantage of training programs offered.

Know the proper response to a fire or chemical spill on your machine.

# Follow a Safety Program

## Be Careful!

Human error is the result of many factors: carelessness, fatigue, sensory overload, preoccupation, unfamiliarity with the machine or attachments, or drugs and alcohol, to name a few. You can avoid death or serious injury caused by these and other unsafe work practices. Be careful; never assume accidents cannot happen to you.

For your safety and the safety of others, act safely and encourage your fellow workers to act safely as well.

## Protect Yourself

Wear the proper personal clothing and all personal protective equipment (PPE) issued to you or called for by job conditions.

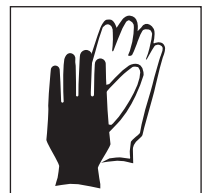
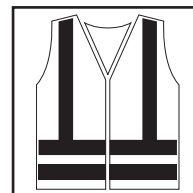
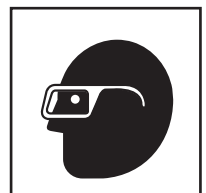
You may need:

- Hard hat
- Safety shoes
- Safety glasses, goggles, or face shield
- Heavy duty gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask

Wear whatever is needed to protect yourself—do not take chances.

**⚠ WARNING!** Avoid death or serious injury from entanglement. **Do not wear loose or frayed clothing or accessories that could catch on moving parts.**

Examples of items to avoid include flopping cuffs, dangling neckties and scarves, wallets attached to chains, jewelry, wrist bands and wrist watches.



# Follow a Safety Program

## Know the Rules

Most job sites have rules governing equipment use and maintenance. Before you start work at a new location, check with the supervisor or safety coordinator. Ask about the rules you will be expected to obey.

OSHA enforces federal laws within the United States that apply to the safe operation, application, and maintenance of equipment on some job sites. It is the employer's responsibility to comply with these laws. A federal representative may periodically inspect a job site to see that these laws are being followed.

There may be other local, state/provincial, federal laws or international organizations that regulate the use of this equipment, along with specific job site or employer rules. It is important that you know and comply with all applicable laws and rules, **including those requiring operator training and certification.**

**These are some of the rules you must work by:**

- A Roll-over Protective Structure (ROPS) and seat belt-equipped tractor is a federal government (OSHA) requirement for operator protection during mowing operations. An enclosed cab provides additional operator protection from thrown objects. Check your mower operator's manual(s) to see if a tractor cab is also required.

- Only qualified and authorized individuals may operate this equipment.
- Inspect your machine and attachments before each use as specified by the manufacturer and your employer. Ensure an attachment is properly installed.
- Know the limitations and operating characteristics of your equipment. Do not overload or misuse it.
- Never modify or remove any part of the machine (except for qualified service personnel; then make sure the part is re-installed or replaced if defective or worn out).



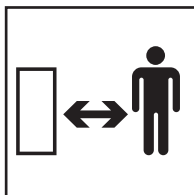
**Know and understand  
rules of operation**



**Fasten  
your  
seat belt**

# Follow a Safety Program

- Wear proper clothing and personal protective equipment (PPE).
- Never allow children to play near, ride on or operate the equipment. Children are not qualified to operate this equipment.
- Do not allow riders.
- Keep bystanders 300 ft (92 m) from the mowing operation for rotary mowers and 100 ft (31 m) for disc mowers.



**Keep bystanders  
away**



**Watch out for  
thrown objects**

- Know the work area before you use the equipment. Be aware of possible terrain hazards that you may encounter. Remove or mark obstacles and debris that could damage or be thrown by the mower.
- Properly install all shields and guards before operating the machine.
- Only use attachments and parts that are approved by the manufacturer.
- Whenever you leave your machine, lower the machine and/or all attachments, set the parking brake, shut off the engine and cycle the hydraulic control levers and remove the key before leaving the operator's station. (See page 38, **Safe Shutdown.**)
- Use three-point contact (handholds and steps) and face the equipment when mounting or dismounting. (See page 21, **Mount and Dismount Properly.**)

# Follow a Safety Program

## Know the Equipment

Read and understand the DANGER, WARNING, CAUTION, and NOTICE safety labels and other informational signs on the machine, the attachments, and in the manufacturer's operator's manuals. Ask your supervisor or dealer to explain any information you do not understand. Failure to obey safety instructions could result in death or serious injury.

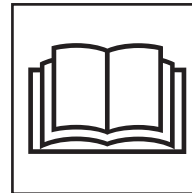
### Know the following about your equipment:

- Function, purpose, and use of all controls
- Correct operating speeds
- Braking and steering characteristics
- Slope and uneven terrain capabilities and proper operation
- Turning radius and clearances
- How to quickly stop equipment in an emergency

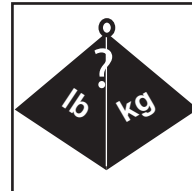
Keep in mind that rain, snow, ice, loose gravel, soft ground, slopes, and other site conditions can affect your machine's operating capabilities. Make sure you are thoroughly familiar with your machine's stability, braking, traction, and other handling characteristics under any conditions you are likely to encounter.

**IMPORTANT:** This manual covers safe practices for industrial/agricultural mower equipment. If your machine is equipped with other devices or special attachments, read the manufacturer's operator's manual(s) and safety manuals pertaining to that equipment before using it.

Make sure all the manufacturer's protective structures, guards, shields, screens and panels are in good repair, in place and securely fastened. Damaged, missing or weakened safety components can create a hazardous situation for you as the operator. Never remove or modify any safety components including thrown object shielding on a mower.



**Read and understand manuals before operating**



**Know machine capacity and operating characteristics**

## Prepare for Safe Operation

### Check and Use All Available Safety Devices

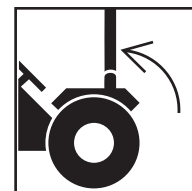
To protect you and others around you, your machine may be equipped with the safety equipment listed below. Additional equipment may be required or some items may not apply, depending on attachments used, job site conditions, or applicable job site rules. Check that each required item is securely in place and in operating condition:

- Seat belt
- Roll-over Protective Structure (ROPS)
- Operating and warning lights
- Safety signs
- Guards
- Mirrors
- First aid kit
- Fire extinguisher/fire suppression system
- Windshield wiper/defroster

Use them! Never remove or disconnect any safety device.

Know which devices are required for protection during your specific operation and use them.

**⚠ WARNING! Never remove or modify a ROPS except when servicing the machine.** Reinstall it correctly before releasing the machine back into service. Death or serious injury could result.



**Never modify a ROPS**



**Fasten your seat belt**

# Prepare for Safe Operation

## Inspect the Machines

Before beginning your workday, check for the following as applicable and repair or replace as needed. Additional details and descriptions are provided throughout this manual. Perform daily and periodic maintenance procedures as instructed by the manufacturer.



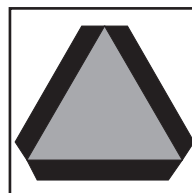
Check all  
safety devices

### Machine Condition

Ensure all components are in operating condition. Check for the following as applicable:

- ROPS is present and, if foldable, is in raised and secured position.
- Cab is in good condition and windows and doors function properly.
- PTO master shield is properly installed and functioning.

- Operator station platform is clear of tools, objects, and debris. Associated steps, handholds, or railings are clean and functional.
- Seat belt, anchors, and buckle are in proper working condition.
- Mower PTO driveline yokes, couplers, and shields are in good operating condition.
- Cutting elements and attachment hardware are not worn, damaged or missing. Never try to repair worn or damaged parts; always replace parts with genuine OEM parts.
- Thrown object guarding system is complete and installed.
- Lighting and marking devices such as warning flashers, turn signals, brake lights, work lights, Slow Moving Vehicle (SMV) emblems, Speed Identification Signs (SIS), if applicable, and reflective materials are visible and in operational condition.



Use lighting  
and marking

# Prepare for Safe Operation

- Keep the operator platform surface clean and free of grease, oil dirt, snow or ice. Steps and handholds must be clean and functional.
- All other guards and shields are correctly installed and in good condition.
- Hydraulic system components are properly secured and not damaged or leaking.
- Wheels and tires are not damaged or missing parts, tires are at the correct pressure, and lug nuts or bolts are at the correct torque.

### Machine Attachment

Ensure all attachments are in operating condition. Check the following attachments as applicable:

- Mechanical attaching systems are correctly connected.
- Drawbar hitch pin with positive retention
- Safety tow chain
- 3 point hitch or other coupling/locking features
- Hydraulic hoses are connected and functioning properly.
- Hydraulic hoses are properly supported to avoid damage.

- Hydraulic functions operate as expected.
- Couplers are not leaking.
- Lighting devices such as warning flashers, turn signals, taillights, stop (brake) lights, and work lights are connected and functioning properly.

### Machine Compatibility

Specifications of the tractor, skid steer, or windrower must be sufficient to operate the mower for all modes of operation and transport. Refer to the operator's manuals or contact the dealer for specifications. Check the following specifications as applicable:

- PTO shaft size and spline count
- PTO shaft rotational direction
- Mechanical attachment such as 3-point hitch, drawbar, or other coupling/locking features
- Hydraulic and/or electrical system performance and connection

# Prepare for Safe Operation

## Avoid Injury From Raised Equipment

Avoid possible crushing injury from falling mower or other raised equipment.

Before working near or under raised mower or equipment parts:

- Securely support or block up raised mower or equipment parts according to the operator's manual.
- Securely support, block up or lock up wings with approved locking devices or lower mower or equipment parts to the ground.
- Use transport locks when transporting mower on public roads.

**⚠ WARNING!** Prevent possible crushing injury from falling equipment. Hydraulic system or part failure could allow unsupported equipment to fall. **Do not go under raised equipment unless it is properly supported according to the operator's manual.**



Avoid crushing - block up or securely support mower

## Pressurized Fluid Injection Hazard

**⚠ WARNING!** Accidental injection of pressurized fluid into the hands or body is dangerous and could result in death or serious injury. Pressurized fluids include oil, hydraulic fluid or water. **Use caution when checking fluid leaks as pressurized fluids can penetrate skin or eyes, causing serious personal injury.**



Pressurized fluid can inject into the body

If a leak is discovered:

- Ensure engine is turned off; relieve pressure in fluid system.
- Wear proper hand and eye protection.
- Visually examine the fluid lines in the vicinity of the leak for breaks or cracks. **Do not** use your hand to check for leaks.
- Repair or replace fluid lines per manufacturer's recommendation.

# Prepare for Safe Operation

Fluid injection injuries are not always obvious. Victims have reported such injuries feel like a bee sting or splinter under the skin. If you suspect you have a fluid injection injury, do not take chances. Seek proper medical care immediately. Be sure attending medical professional understands that injury may be caused from a fluid injection. If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury.



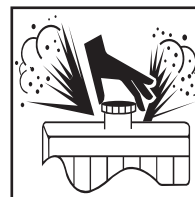
Wear proper hand and eye protection

## Check the Cooling System

When checking the cooling system, follow the manufacturer's instructions to ensure the engine is turned off and cool to prevent the fan from unexpectedly starting. Ensure the coolers and engine compartment are clean and free from debris, which could ignite and cause a fire.

If the machine is air-cooled, be sure the cooling unit has an unobstructed air flow. If it is liquid-cooled, check coolant level (at overflow tank, if provided).

**⚠ WARNING!** Allow the radiator to cool before checking the level. Hot radiator fluids could escape as steam and burn you. (See page 44, **Engine Coolant Hazards.**)



Allow radiator to cool before removing cap slowly

# Prepare for Safe Operation

## Clean Up

Clean windows, lights, and safety signs.

Make sure the operator's area, steering levers, pedals, joysticks, steps, and grab handles are clean. Oil, grease, grass, leaves, needles, snow, ice, mud, or debris in these areas could cause you to slip and fall, or lose control of the machine. Clean your footwear of excess mud before entering the machine.

Remove all personal items or other objects from the operator's area. Secure these items in a toolbox or remove them from the machine.

## Use Caution When Fueling

**⚠ WARNING!** Avoid injury from fire or explosion. **Never fill the fuel tank with the engine running, while smoking or when near an open flame.**

Never overfill the tank or spill fuel. If fuel is spilled, clean it up immediately.

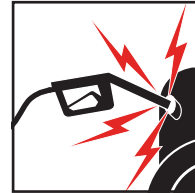
Be sure to use the correct type and grade of fuel.

Ground the fuel funnel or nozzle against the filler neck to prevent sparks that could ignite fuel vapors. Be sure to replace the fuel fill cap, if equipped, when you are done.

## Ultra-Low Sulfur Diesel (ULSD) Fuel Hazard

### Avoid Static Electricity Risk When Fueling

**⚠ WARNING!** Ultra-Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations. Avoid death or serious injury from fire or explosion; **consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices.**



Static discharge during fueling can cause explosion



No smoking and no open flames

# Prepare for Safe Operation

## Exhaust Fumes in a Closed Space Can Kill

Vent exhaust and assure a flow of fresh air if an internal combustion engine is used in a closed space.

**⚠ WARNING!** Exhaust fumes from diesel, gasoline or LP gas engines can kill. **Do not breathe exhaust fumes from any kind of engine.**



Ventilate work area

## Operating in Flammable/Explosive Atmospheres

**⚠ WARNING!** A standard machine equipped with a spark arrestor/spark arresting muffler cannot be operated in flammable or explosive atmospheres. Using them in flammable or explosive atmospheres can result in fires and/or explosions which could cause serious injury or death.

**Use only an approved industrial/agricultural mower with a label designation of G, GS, D, DS, DY, LP, LPS, G/LP, or GS/LPS.** See Code of Federal Regulations (OSHA) 29 CFR Part 1910.178 to determine permissible areas where these machines can be operated.



Do not operate in explosive/flammable atmosphere

# Prepare for Safe Operation

## Know the Working Area

Learn as much about your working area as possible.

### Check at Ground or Floor Level

Before you operate, inspect the surface over which you will travel. Look for holes, slide areas, drop-offs, and obstacles such as rocks, stumps or utilities. Look for rough spots or hidden obstacles on surfaces which could cause a collision or loss of control. Look for oil spills, wet spots, and slippery surfaces. Check for location of creeks and gullies. Look for soft soil, deep mud, standing water or marshy areas. Watch for anything that might make you lose control or cause the machine to roll over.

Plan travel routes ahead of time, in order to make sure you can see and protect bystanders. Pick up debris that can puncture tires.

### Plan Your Work

Correct unsafe conditions. Do not operate in problem areas where debris and obstacles cannot be removed or marked.

Analyze mowing area to determine:

- The most efficient mowing procedure.
- The height of the material to be mowed.
- Operating terrain conditions.
- How to best use forward mowing pattern.
- The potential for bystanders or passers-by to be exposed to thrown objects.

### Check Overhead

Check the clearances of doorways, canopies, and overheads. Know exactly how much clearance you have under overhead power and telephone cables.

**⚠ DANGER!** Death or serious injury will result from touching or being near a machine that is in contact with or near an energized electrical source. **Never approach power lines with any part of the machine or load unless all local, state/provincial and federal (OSHA) required safety precautions have been taken.** Use caution because high voltage sources can arc without contact.

When working near power lines, you must assume all lines are energized.

# Prepare for Safe Operation

## Mount and Dismount Properly

Always use three-point contact when mounting or dismounting the machine. Three-point contact means one hand and two feet, or two hands and one foot, in contact with the machine at all times.

Never mount or dismount while carrying tools or objects that prevent three-point contact. Put parts or tools down. Maintaining proper contact, climb or dismount, and then pick up the object.

Face the machine when you enter or leave the machine.

Clean shoes and wipe hands. Clean steps and handholds of chemical residue, snow, ice, mud or oil.

During mounting and dismounting:

- Use handholds and step plates.
- Never use steering wheels, joysticks or controls as handholds.
- Never jump on or off the machine.
- Never mount or dismount from a moving machine.

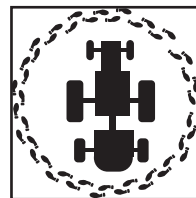


Use three points  
of contact when  
mounting or  
dismounting

## Warn Personnel Before Starting

Before starting, walk completely around the machine.

**Make sure no one is under the machine, on it, or close to it.** Let others know you are starting up and do not start until everyone is completely clear of the machine. As the equipment operator, you are responsible for the safe use of the machine, so always make sure you have communicated your work plans to others on the site.



Before starting,  
walk completely  
around mower

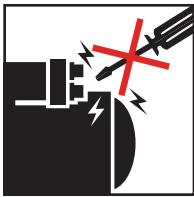
# Start Safely

## Starting the Engine

**⚠ WARNING!** Start the engine from the operator's seat only. **Never attempt to start the engine by shorting across starter terminals or reaching the key from outside the operator's station.** The machine may move unexpectedly, which could cause death or serious injury to anyone in its path.

Know the exact starting procedure for your machine. See the manufacturer's operator's manual(s) for starting.

- Sit in the operator's seat and adjust the seat so you can operate all the controls properly.
- Fasten the seat belt, if equipped.
- Always keep cab doors closed and Operator Protective Structure (OPS) windows and screens in place.
- Familiarize yourself with warning devices, gauges and operating controls.
- Make sure controls are in the neutral/locked position.
- Check PTO disengagement.



Never start engine  
by shorting across  
starter terminals

- Clear the area of all persons.
- Sound the horn.
- Start the engine following the instructions in the manufacturer's operator's manual(s).

If necessary to run the engine or operate the machine in an enclosed area, ensure there is adequate ventilation.

**⚠ WARNING!** Exhaust fumes can kill. **Do not breathe exhaust fumes!**

### Starting Aids

If you have trouble starting the engine and need to use jumper cables, follow the instructions in manufacturer's operator's manual(s). **Jump-starting is a two-person operation.** The operator must be in the operator's seat when jump-starting so the machine will be under control when the engine starts.

**⚠ WARNING!** Improper jump-starting procedures may cause death or serious injury from a battery explosion or a run-away machine. **Always use proper jump-starting procedure.** (See page 46,



# Start Safely

## Battery Hazards.)

Ether/cold-start fluid is **HIGHLY FLAMMABLE**. Before using it, always read the instructions on the ether/cold-start fluid container and the instructions in the manufacturer's operator's manual(s).

**⚠ WARNING!** Avoid injury from explosion or fire. If the engine is equipped with a glow plug pre-heater or other intake manifold type pre-heater, follow manufacturer's instructions before using ether/cold-start fluid.

## After Starting Engine

Observe gauges, instruments, and indicator lights to assure that they are functioning and their readings are within the operating range.

## Run an Operating Check

Do not use a machine that is not in proper operating condition. It is your responsibility to check the condition of all systems and to run the check in a safe area.

## Test Controls

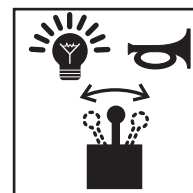
Industrial/agricultural mowers come equipped with various control configurations, patterns, and operating modes, each with their own handling characteristics. Some have selectable or configurable controls, to suit personal preferences or specific applications.

Make sure that you know which control pattern you have selected and that you understand how the machine will handle when using that control pattern.

Make sure the machine is operating properly by doing the following:

- With the control levers or joysticks in neutral, test engine speed control.
- Operate each pedal, lever or joystick to make sure all functions are correct.
- Operate the travel control lever(s) or joysticks to ensure correct operation in forward and reverse. Test steering to the right and to the left, while moving slowly in a clear, safe area.
- Check the parking brake and service brakes according to the manufacturer's operator's manual(s).

**⚠ WARNING!** Before operating the machine under working conditions, **be certain you can control both speed and direction of the machine.** Any loss of control could result in death or serious injury.



Operate  
instruments  
and controls  
smoothly

# Operate Safely

## Masked Visibility Areas

Machines have areas where the operator's visibility of the job site can be affected by the machine itself. ROPS posts, attachments, even items in the cab, could limit your view of the surrounding area and possibly mask hazards or people around you. These masked visibility areas vary from machine to machine, and it is very important that you are aware of these areas before operating your machine.

Follow these safety precautions to reduce the hazards posed by masked visibility areas:

- Pay particular attention when raising or lowering the mower or the attachment, because masked visibility areas can change.
- Look around the machine before operating. Objects near the machine and close to the ground can be difficult to see from the operator's station.
- Always look in the direction of travel, including reverse. A back-up alarm is no substitute for looking behind you when operating the machine in reverse.
- Keep bystanders away, even if your machine is equipped with a back-up alarm.

## Remember These Rules

Stay in the operator's seat with the seat belt fastened when operating.

Make sure you have adequate visibility and sufficient lighting during operation.

Be in control of the machine at all times.

## Remember the Other Person

Never allow an untrained or unqualified person to operate the machine. If operated improperly, this machine can cause death or serious injury.

**⚠ WARNING!** The industrial/agricultural mower is a one-person machine. Avoid death or serious injury—**never permit riders!**

**⚠ WARNING!** Keep clear of all rotating components. Wrapping or entanglement may result in serious injury or death.



# Operate Safely

Be sure that everyone is in the clear, **at least 300 feet (92 m) away for rotary mowers, or 100 feet (31 m) for disc mowers**, and operate in accordance with federal, local, state/provincial laws or manufacturer recommendations that apply to this equipment and its use. It is important that you know and comply with all specific work site or employer rules. Awareness on your part can prevent accidents.

## Back up Safely

Check that the back-up alarm, if equipped, is working properly. Remember, **a back-up alarm is not a substitute for looking to the rear when operating the machine in reverse**. Always look around before you back up the machine. Be sure that everyone is in the clear. Drive forward whenever possible. **ALWAYS LOOK IN THE DIRECTION OF TRAVEL.**

## Follow Safe Operating Practices

Make these safe practices part of your daily routine:

- Keep your seat belt, if equipped, fastened.
- Operate the controls smoothly—don't jerk the steering levers or joysticks.
- Avoid sudden stops, starts or turns.
- Use care and good judgment.
- Never attempt to operate the controls unless properly seated in the operator's station.

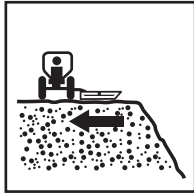
**⚠ WARNING!** Avoid death or serious injury! **Keep your entire body inside the operator's station while operating the machine.** Never work with your head, arms, feet, or legs beyond the operator's station.

# Operate Safely

## Watch Out for Hazardous Working Conditions

Be alert for hazards. Know where you are at all times. Watch for branches, cables, or doorways.

Caution should be used when working along the tops of banks or slopes. Always operate the machine perpendicular to the bank. Keep away from the edge.



Operate perpendicular to banks – stay back from the edge

**⚠ WARNING! Never operate the machine close to the edge of an overhang or gully.** The edges could collapse or a slide could occur causing death or serious injury.

Use caution when working along runways, banks and slopes. Keep away from the edges of drop-offs.

When working near hazardous conditions, have a spotter work with you to look for hazards. Make certain they stay a safe distance from your machine.

## Traveling on Job Site

Take it slow and easy when traveling through congested areas. Traffic courtesy pays off.

Give the right-of-way to loaded machines. Maintain a safe distance from other machines. Pass cautiously.

Don't obstruct your vision when traveling or working. (See page 24, **Masked Visibility Areas.**)

### Travel Safely

When traveling over rough terrain, **SLOW DOWN** to prevent losing control.

Avoid steep slopes or unstable surfaces. Do not drive across an excessively steep slope under any circumstances. Before operating on slopes, check the surface conditions for adequate traction. Loss of traction can cause the machine to slide and tip.

**⚠ WARNING! Avoid death or serious injury. Travel up and down slopes with the heavy end of the machine pointed uphill.**

**⚠ WARNING! Avoid death or serious injury. Make sure you can see where you are going.**

# Operate Safely

## Rules of the Road

If the machine is to be driven or transported over the road, refer to the manufacturer's operator's manual for instruction.

Check local regulations for required equipment markings, lights, flashers, etc., while traveling on public roads. Lights are required on mowers that obscure tractor taillights and/or other warning lights.

When traveling on public roads or streets, obey all traffic regulations applicable to your machine.

Make sure lights and warning signs are in place and visible. Make sure a Slow Moving Vehicle (SMV) emblem and Speed Identification Sign (SIS), if applicable, is installed and visible to any vehicle approaching from the rear.

Find out if you must use an escort vehicle. Approach intersections with caution; observe speed and traffic control signs. Avoid panic stops and sharp turns.

Like any responsible operator, be considerate of other drivers. If traffic backs up behind you, it is a good idea to pull over periodically and allow traffic to pass when it is safe to do so.

Stop at all railroad crossings and look both ways before proceeding. Never park in traffic areas. If it is necessary to stop at night, pull off the road and set up flares or reflectors. When driving at night, use appropriate lights.

### Watch Out for Obstacles

Adjust your speed to conditions. Avoid traveling over obstacles such as logs, tree stumps or rough terrain whenever possible.

Keep your machine under control.

Before entering underpasses, tunnels or bunkers, check for oncoming traffic or obstructions.



Obey traffic regulations

# Operate Safely

## Transporting Safety Tips

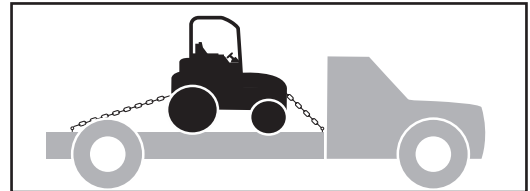
Always wear your seat belt when loading or unloading your machine from a transport device, such as a flatbed truck.

When transporting a machine, follow the manufacturer's recommended loading, tying down and unloading procedures.

Several precautions are applicable to all machines:

- Keep bystanders away.
- Load and unload on a level surface.
- Maintain proper visibility by loading or unloading in well-lit areas, and away from other vehicles, equipment or buildings.
- Block transport vehicle so it cannot move.
- Ensure trailer bed and ramps are in good condition.
- Use ramps of adequate size and strength, with a low angle and proper height.
- Rear of trailer must be blocked or supported.
- Keep trailer bed and ramps free of clay, oil, ice, snow, and other materials which can become slippery.
- Back the machine up the ramp onto the transport vehicle. If the machine is equipped with a heavy attachment it may be necessary to drive forward onto the transport vehicle.

- Cover or remove rear-facing SMV sign on the machine, if equipped, to avoid confusing drivers following the transport vehicle.
- Chain and block the machine securely for transport. Use tie-down points as marked on the machine by the manufacturer. Follow the manufacturer's instructions in the operator's manual for tying down.
- Unload the machine by driving off in the opposite direction; do not turn the machine around.



**Chain and block  
mower securely  
for transport**

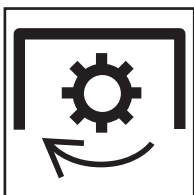
# Operate Safely

## Power Takeoff (PTO) System

Be sure to operate the tractor at the mower's rated PTO rpm speed.

When operating a tractor with a transmission-driven PTO system, a rotary mower will have a significant flywheel effect and may continue to propel the tractor. This type of tractor should be equipped and operated as follows:

- Install a driveline equipped with an over-running clutch.
- Give yourself sufficient maneuvering room and time by anticipating turns, stops and speed reductions.



**Use proper  
PTO speed**

## Hitching Mower to Tractor

### Three-point hitch-mounted mowers:

- Refer to mower and tractor manufacturer's operator's manuals.
- Place tractor's hydraulic power lift (rockshaft) selector lever in down position to avoid unexpected movement.
- Front-end weights may be needed to maintain steering control and front-end stability. Refer to the manufacturers' operator's manual(s).
- When backing the tractor up to the mower, NEVER allow anyone between the tractor and the mower.
- Attach the mower to the tractor three-point links and securely pin in position.
- Securely attach the driveline to the tractor PTO.
- Push and pull on the driveline to ensure it is locked onto the PTO shaft.
- Lower the master shield into place if it is movable.

# Operate Safely

## Pull-type hitch-mounted mowers:

- Refer to mower and tractor manufacturer's operator's manuals.
- Remove three-point hitch quick coupler, if equipped.
- Adjust tractor drawbar length for 540 or 1000 rpm PTO operation.
- When backing the tractor up to the mower, NEVER allow anyone between the tractor and the mower.
- Attach only to drawbar hitch.
- Properly attach the mower safety tow chain to the tractor.
- Securely attach the driveline to the tractor PTO. Push and pull on the driveline to ensure it is locked onto the PTO. Lower the master shield into place.
- Hook up the mower hydraulic hoses to the tractor.
- Make sure the wings, or raised mower decks, are supported by the cylinders before removing the transport locks. Never use force to release the transport or wing locks. The wings or decks could fall and crush you.



Confirm wings are supported before releasing locks

## Skid steer-mounted mowers

- Refer to mower and skid steer loader manufacturer's operator's manuals.
- Lower the lift arms and title the loader's coupler forward.
- Drive the loader slowly forward until the top edge of the coupler is completely under the top flange of the mower attachment mounting frame.
- Tilt the coupler backward until the attachment is slightly off the ground. This will cause the mower attachment mounting frame to fit up against the front of the coupler.
- Engage the coupler pins or wedges. Check to be sure the coupler pins or wedges are fully engaged and locked to the mower.
- Hook up the mower hydraulic hoses to the loader.

# Operate Safely

## Make the Right Start

Mow only in daylight or good artificial light conditions.

Avoid serious injury or death from mower-thrown objects or blade contact:

- Keep chain shields, flexible or solid deflector shields or discharge chutes in place and in good repair.
- Keep bystanders at least 300 ft (92 m) from a rotary mower or 100 ft (31 m) from a disc mower during mowing operation.
- Never direct mower discharge toward anyone.
- Keep hands, feet and other body parts away from rotating parts, blades and discharge openings.
- Do not operate mower in transport position.

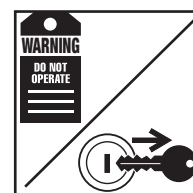
Do not approach a mower until all motion has stopped.

Mower PTO drive engagement:

- Raise mower to maximum cutting height.
- Engage PTO at low engine rpm.
- Increase engine rpm to mower's rated rpm PTO speed.
- Lower mower to desired cutting height.
- Stop and shut down immediately if the mower strikes an obstruction.
- Inspect and repair any mower damage before resuming mowing.
- Do not operate mower with severe vibrations or with unusual noise.

**Avoid bending blades** — Help prevent mower blades from bending or cracking by avoiding contact with solid objects. Mower blades are intended to cut grass, shrubs, woody vegetation and small trees and limbs. They are not intended to contact solid objects such as rocks, concrete or steel posts. Inspect the area prior to mowing. Remove or clearly mark any solid objects and mow around them.

**Replace damaged blades!** — Inspect the mower blade(s) daily or after hitting any solid object. IF a mower blade becomes damaged (bent, gouged or cracked) or worn more than 25 percent of the original size, it should be removed and replaced with a new blade. Always use the original manufacturer's blades. Aftermarket brand blades may not meet the mower manufacturer's strength, hardness and ductility requirements.



Do not operate a damaged mower

# Operate Safely

## Mower-Thrown Objects

Depending on the designed purpose, mowers are designed to cut grass, weeds, brush and crops. The mower blades have been designed and tested for rugged use. The mower blades, however, are not intended to contact solid objects like rocks, concrete or metal. Such impact can cause objects to be thrown. Bystanders should never be within 300 ft (92 m) of an operating rotary mower or within 100 ft (31 m) of an operating disc mower. Stop operation if anyone comes within the safety distance for the mower type.

Mower shielding is designed to reduce the risk of thrown objects and must be properly maintained and in place during mowing operations.



Watch out for  
thrown objects

The risk of serious injury or death from thrown objects can be significantly reduced by following three rules. **If all of these safety rules are not followed, the mowing operation must be stopped.**

**First** — Inspect the area prior to mowing and remove stones, branches, wire, cable, metal, glass and other solid objects before operating. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator.

In non-crop areas with grass and weeds high enough to hide objects that could be struck by the blades, inspect the area and remove or mark large debris or obstacles.

Mow the area at an intermediate height. Inspect the area closely and remove or mark any remaining debris or obstacles. Mow again at desired final height.

**Second** — Mower-thrown object shielding must be used when operating near roads, parks, populated areas or other areas where thrown objects could injure bystanders or damage property. Follow the manufacturer's operator's manual.

**Third** — Cross diagonally when mowing through ditches, sharp dips, and drops. Raise the mower to prevent the mower blades from hitting the ground.

# Operate Safely

**Disc Mowers** — When using a disc mower it is important to know the area to be mowed. If the operator has mowed the field before and is familiar with all obstacles that may be present, it is sufficient to watch ahead of the mower path for any additional objects that may have entered the field. Be ready to stop or avoid any objects that could be hazardous if thrown by the mower. If you plan to mow an unfamiliar field and it is next to a traveled road or people may be within 100ft (31 m) of the mower you must inspect, and clean or mark the field.

## Mowing In Reverse

Do not mow while traveling in reverse. Objects are more likely to be thrown and can travel further.

Shut off the PTO, wait for the blades to stop turning, raise the mower, and then back up.

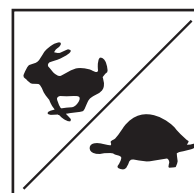
Mow traveling in the forward direction.

## Mowing Ground Speed

Proper ground speed depends on terrain conditions and grass type, density and height to be cut:

- Follow manufacturer's recommended operating speeds.
- Use slower ground speed for mowing tall, dense grass.
- Use faster ground speed for mowing medium height, thin grass and under smooth terrain conditions.
- Use slower ground speed for mowing in rough, sloping or unfamiliar terrain.

Disc mowers are designed to use faster ground speeds for operating in fields clear of debris and surface hazards.



Use proper  
ground speed

# Operate Safely

## Extremely Tall Grass Mowing

You may need to mow extremely tall, non-crop grass twice. (See page 32, **Mower-Thrown Objects**.)

First mowing pass:

- Shut the mower and tractor down using proper equipment shut down practice before dismounting tractor. (See page 38, **Safe Shut Down**.)
- Inspect the area and remove or mark debris and obstacles.
- Cut grass higher (10-15 inches/ 250–400 mm) to avoid hidden objects.

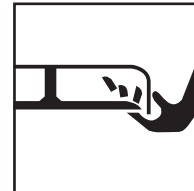
Second mowing pass:

- Shut the mower and tractor down using proper equipment shut down practice before dismounting tractor.
- Inspect the area and remove or mark debris and obstacles.
- Cut grass at desired height and, when possible, 90 degrees to the first mowing pass.

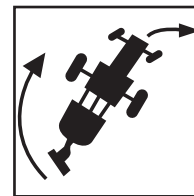
## Watch Equipment Clearances

Three-point hitch and side-mounted mowers have a larger turning arc than pull-type mowers. Allow sufficient clearance for mower swing while turning.

Do not allow bystanders near the tractor and mower when moving or transporting the tractor and mower.



Stop blade before unclogging



Provide adequate clearance for mower swing

# Operate Safely

## Under Mount Mower Safety Practices

When mowing with an under mount mower:

- Keep removable discharge chute in place and over discharge opening.
- Never stand on a mower housing when the tractor engine is operating.
- Distribute grass clippings with discharge chute facing mowed area.
- Before clearing a clogged mower or discharge chute, shut down your machine using proper equipment shut down practice. (See page 38, **Safe Down**.)



Keep chute in place



Do not approach energized power lines

## Wing or Boom Mower Overhead Obstruction Hazards and Risks

Check for overhead obstructions with raised wing or boom mowers to avoid serious injury or death by contact with:

- Electrical power lines and apparatus.
- Low tree limbs.
- Other overhead obstructions.
- Maintain specified distance from power lines and apparatus. Never approach energized power lines or apparatus with any part of your machine unless all local, state/provincial and federal (OSHA) required safety precautions have been taken. Use caution.

**⚠ DANGER!** Avoid electrocution or serious injury from contact with or inadequate clearance to energized power lines or apparatus. Do not allow the machine or attachment to approach or contact any power line. Do not approach or touch any machine in contact with a power line.

# Operate Safely

## Wing and Side Mount Mowers Safety Practices

Raised wing positions reduce shielding protection and increases the thrown object and blade contact hazard risks.

**Avoid possible serious injury or death by thrown objects or blade contact from raising and lowering wings during mowing operations:**

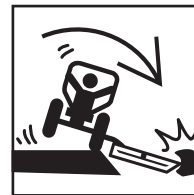
- Do not mow with bystanders within 300 ft (92 m) of a rotary mower or within 100 ft (31 m) of a disc mower.
- Be sure no one is near mower while raising or lowering wings.
- Shut off the PTO and wait for all rotating elements to stop before raising the mower deck or wing section.
- Only raise wing to clear objects in the mowing path or to match ground slope.
- Lower raised wing to ground after clearing object or ground slope conditions.
- Stop mowing if anyone approaches closer than the safety distance for the mower type.

## Ditch Bank Mowing Safety Practices

Use care when mowing ditch banks. Watch for washouts, eroded areas and mowing obstructions along the ditch banks. Hitting obstructions with side-mount or boom mowers may swerve the tractor's front end toward the ditch.

Raised wing and boom mower ditch bank operations may reduce the mower's thrown object shielding effectiveness for the mower operator's protection.

- Use enclosed ROPS cabs, special protective enclosures and other operator shielding available from the manufacturer when performing these operations.
- Inspect mowing area and remove or mark all foreign objects and debris to be avoided by mower.



**Avoid hitting obstructions**

# Operate Safely

## Uneven Terrain Mowing Safety Practices

Tractor and mower stability is reduced on slopes and uneven terrain.

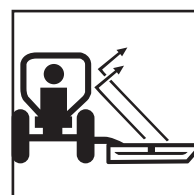
As in all conditions when mowing, use tractors equipped with ROPS and seat belt. **Make sure the ROPS are raised and locked in place and always wear your seat belt.**

Prevent tractor and mower overturns and maintain equipment stability control:

- Review tractor and mower operator's manuals for operating safety practices on slopes and uneven terrain conditions. Explain the practices to those users and operators who cannot read.
- Avoid extremely steep slope operations.
- Use care to maintain control over the equipment when operating in these conditions.
- Increase tractor stability by adding wheel weights, ballast and increasing wheel spacing to maximum. Refer to operator's manual for recommendations.
- Maintain minimum ground speed.
- Make wide and gradual turns.
- Avoid sudden starts, stops, and turns when operating up, down, or across slopes.

- Do not raise rear-mount or side-mount mowers or mower wings from the ground during these operations.
- Keep alert for holes, bumps, ruts, rocks, stumps or other obstructions that could overturn the machine.
- Avoid slippery ground conditions that could cause loss of control and overturn of tractor and mower.
- Avoid bottoming and striking the ground by diagonal crossing of sharp dips and drops.

Use care in maintaining equipment stability during all uneven terrain and slope mowing operations. You are the final judge as to any slope that can be safely negotiated.



**Use enclosed ROPS cabs or protective enclosures**

# Shut Down Safely

## Select a Proper Parking Site

When shutting down, park the machine in a designated area out of traffic, select level ground whenever possible. Lower raised equipment to the ground. If you must park on a slope or incline, position the machine at right angles to the slope, engage the parking brake, and block the wheels.

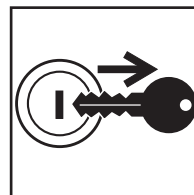
**⚠ WARNING!** Avoid death or serious injury from unintended movement of the machine. **Never leave a machine unattended with the engine running.**

## Safe Shutdown

The detailed shutdown procedure is given in your manufacturer's manual(s). In general, this includes:

- Stop machine.
- Ensure all wheels are on the ground.
- Position controls in neutral or locked position.
- Engage parking brake.
- Idle engine for short cool-down period.
- Disengage PTO clutch and transmission drive.
- Lower mower to ground.
- Lower wings of wing mowers to ground.
- Stop engine and remove ignition key, if equipped.
- Cycle hydraulic controls to eliminate pressure.

- Raise operator seat/restraint bar(s), if equipped.
- Unbuckle seat belt/restraint.
- Lock covers and enclosures, if equipped.
- Shut off master electric switch, if equipped.
- When you leave the machine, wait for all moving parts to stop before dismounting. Always maintain three-point contact with the steps and grab handles. Face the machine as you dismount. Never jump off machine.
- Block wheels if on a slope or incline.



Shut engine off,  
remove key

# Perform Maintenance Safely

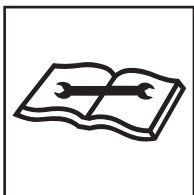
## Know What You're Doing

Maintenance on this type of machine is not for inexperienced or untrained personnel. It can be hazardous unless performed properly. Be sure you have the necessary skill, information, correct tools, and proper equipment to do the job safely.

Be sure to maintain the equipment according to the manufacturer's instructions. Regularly check the operation of the protective and safety devices.

**Do not** perform any work on a machine unless you are authorized and qualified to do so.

If you have been authorized to perform maintenance, **read the manufacturer's operator's, maintenance, and service manuals.** Study the instructions: check the lubrication charts, examine all the instruction messages on the machine.



Maintain equipment

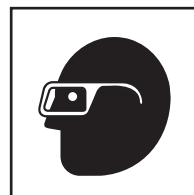
## Protect Yourself

Wear all the proper personal clothing and all the PPE issued to you or called for by job conditions.

You may need:

- Hard hat
- Safety shoes
- Safety glasses, goggles or face shield
- Heavy duty gloves
- Hearing protection
- Reflective clothing
- Wet weather gear
- Respirator or filter mask

Wear whatever is needed to protect yourself. Do not take chances.



# Perform Maintenance Safely

**⚠ WARNING!** Avoid death or serious injury from entanglement. **Do not wear loose clothing or accessories. Stay away from all rotating components when the engine is running.** Contact, wrapping or entanglement with rotating or moving parts could result in death or serious injury.

Wear a proper chemical resistant apron and chemical resistant gloves when working with corrosives. Wear cut resistant gloves and safety shoes when handling wooden blocks or sharp-edged metal.

Always use safety glasses, goggles or a face shield. They provide eye protection from fluids under pressure, during grinding and while servicing batteries. Protection is also needed from flying debris, liquids and loose material produced by equipment, tools and pressurized air/water.

Wear a face shield and follow manufacturer's instructions when you disassemble spring-loaded components or work with battery acids. Keep pockets free of all objects that could fall out and drop into machinery.

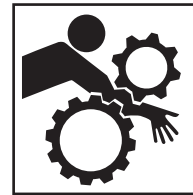
Handle tools and heavy parts sensibly, with regard for the safety of yourself and others. Lower items; don't drop them.

## Mower Parts and Your Safety

Mower manufacturers use specific fasteners and specially designed parts to meet mowing operations requirements. Critical parts such as self-locking blade bolts, blades, pins, shields and other special items have specific strength, design and fit requirements for the make and model mower you are using.

Avoid possible death and serious injury from unapproved parts or modifications:

- Do not substitute common hardware for original manufacturer's blade bolts or other special part items.
- Do not substitute blades, pins shields or other critical parts.
- Do not use higher strength bolts to replace original manufacturer's shear bolts.



**Avoid rotating parts**

# Perform Maintenance Safely

## Prepare the Work Area

- Position the machine in a level area out of the way of other working equipment.
- Make sure there is adequate light, ventilation and clearance.
- Remove oil, grease or water to eliminate any slippery surfaces.
- Clean around the area to be serviced to minimize contamination.

## Prepare the Machine

Stored energy sources (electrical, mechanical, hydraulic, pneumatic, chemical, thermal, etc.) must be controlled or reduced to a practical minimum before performing any maintenance, repair, or service procedures.

Safety practices to prevent potential injuries from energy-releasing sources include:

- Disengage PTO before shutting off engine
- Place controls in NEUTRAL or LOCKED position before shutting off engine
- Set parking brake or block wheels.
- Allow all moving parts to stop.
- Lower mower to the ground.
- Lower wings to the ground on wing mowers.

- Shut off engine.
- Follow your manufacturer's recommendation for relieving hydraulic system pressure.
- Lock ignition, remove key, if equipped, and take it with you.
- Look and listen for evidence of moving parts before dismounting.
- Shut off master electrical switch, if equipped.
- Securely support or block up machine before working underneath machine or other lifted components.
- Securely support, block up, or lock up other components with approved locking devices before working near or underneath them.
- Relieve pressure before disconnecting or disassembling any pressurized system.
- Block or relieve spring pressure before disassembling any spring-loaded mechanism.
- Avoid flames, sparks, or smoking near any fuel, hydraulic fluid or other flammable material such as mowing debris.



**Avoid falls, clean slippery surfaces**

# Perform Maintenance Safely

Attach a “DO NOT OPERATE” warning tag to the control levers. Lockout/tagout the unit according to the manufacturer’s operating manual. If there is a key, remove it and take it with you.

Install approved support device(s) when working under or near raised equipment.

**⚠ WARNING!** Unsupported raised machines or other equipment may drop unexpectedly. **Never go under equipment when raised unless supported by an approved support device(s).** Death or serious crushing injury could result from falling equipment.

Remove only guards or covers that provide access to the area being serviced. Replace all guards and covers when work is complete.

**⚠ WARNING!** Avoid injury or death. **Never work on machinery with the engine running unless instructed by the manufacturer’s manuals for specific service.**



Use a “DO NOT OPERATE” tag

## Common Maintenance Safety Practices

### Use Proper Ventilation

If it is necessary to run an engine in an enclosed area, remove the exhaust fumes from the area with an exhaust pipe extension.



Ventilate work area

**⚠ WARNING!** Exhaust fumes contain carbon monoxide which could be deadly if inhaled. **Never operate any type of engine without proper ventilation. EXHAUST FUMES CAN KILL.**

# Perform Maintenance Safely

### Use Jacks and Hoists Carefully

Safety stands or blocks must be located on a rigid part of the machine. Do not position stands under axles or wheel supports that may rotate.

**⚠ WARNING!** Prevent crushing injury. **Never use concrete blocks for supports. They could collapse under even light loads which may cause serious injury or death.**

If you must work beneath raised equipment, always use hoists, jack-stands or other rigid and stable supports designed and approved for the intended load. When using jacks or hoists always be sure they are adequately supported.

Make sure the hoists or jacks you use are in good repair. Never use jacks with cracked, bent, or twisted parts. Never use frayed, twisted or pinched cables. Never use bent or distorted hooks.



Avoid crushing, use proper support for raised equipment

### Fuel Hazards

**⚠ WARNING!** Avoid serious injury or death. **Always use approved fuel containers and/or fuel dispensing equipment to reduce the risk of explosion or fire.**

Always observe these practices to reduce the possibility of a serious accident:

- Shut off engine and ignition during refueling.
- Turn off all electrical switches.
- Ground the fuel nozzle against the filler neck
- Keep sparks and open flames away from fuel. Do not smoke while refueling or when handling fuel containers.
- Do not cut or weld on or near fuel lines, tanks or containers.
- Do not overfill the tank or spill fuel. Clean up spilled fuel immediately.



No smoking and no open flames

# Perform Maintenance Safely

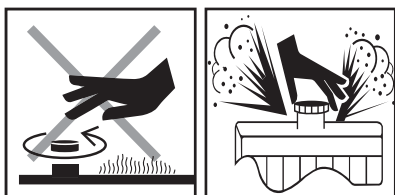
## Ultra-Low Sulfur Diesel (ULSD) Hazard

**⚠ WARNING!** Ultra-Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with higher sulfur content. Avoid death or serious injury from fire or explosion; **consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices.**

## Engine Coolant Hazards

**⚠ WARNING!** Avoid serious injury or death. Liquid cooling systems build up pressure as the engine gets hot, so **use caution before removing the radiator cap.**

- Stop the engine and wait for the system to cool.
- Wear protective clothing and safety glasses.
- Turn the radiator cap slowly to the first stop to allow the pressure to escape before removing completely.



**Allow radiator to cool before removing cap slowly**

## Hydraulic System Hazards

Be sure to follow manufacturer's instructions for relieving fluid pressure before performing any maintenance. The hydraulic system is pressurized whenever the engine is on and may hold pressure even after the engine is shut off. Cycle hydraulic controls, including auxiliary hydraulic control (if equipped), after the engine is shut off.



**Check for leaks and inspect hoses**

During inspection of the hydraulic system:

- Wait for fluid to cool before disconnecting the lines. Hot hydraulic fluid can cause **severe burns**.
- Wear appropriate eye protection. Hydraulic fluid can cause permanent eye injury.
- When venting or filling the hydraulic system, loosen the filler cap slowly and remove it gradually.
- **Never** reset any relief valve in the hydraulic system to a pressure higher than recommended by the manufacturer.

# Perform Maintenance Safely

## Pressurized Fluid Injection Hazard

**⚠ WARNING!** Accidental injection of pressurized fluid into the hands or body is dangerous and could result in death or serious injury. Pressurized fluids include oil, hydraulic fluid, water or fuel. **Use caution when checking fluid leaks as pressurized fluid can penetrate skin or eyes, causing serious personal injury.**

If a leak is discovered:

- Ensure engine is turned off; relieve pressure in fluid system.
- Wear proper hand and eye protection.
- Visually examine the fluid lines in the vicinity of the leak for breaks or cracks. **Do not** use your hand to check for leaks.
- Repair or replace fluid lines according to the manufacturer's recommendations.



**Pressurized fluid can inject into the body**

Fluid injection injuries are not always obvious. Victims have reported such injuries feel like a bee sting or splinter under the skin. If you suspect you have a fluid injection injury, do not take chances. Seek proper medical care immediately. If any fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury.

## Electrical System Hazards

### Light Bulbs and Illumination

Some machines are equipped with High-Intensity Discharge (HID) Xenon light bulbs which operate at very high voltage. Do not begin installation of HID-Xenon lamps unless the lamps are turned off, the engine is turned off, the key is removed (if equipped), and you are wearing appropriate eye protection.

**⚠ WARNING!** Do not look directly into HID-Xenon lamps. Eye damage could occur.

Wear gloves and safety glasses when handling bulbs. Dangerous voltage sparks may occur and cause injury or damage to the connector. See manufacturer's warnings packaged with replacement bulbs.

# Perform Maintenance Safely

Before working on the electrical system, disconnect the battery cable(s).

- Remove the battery negative (–) cable(s) first.
- When reconnecting the battery, connect the battery negative (–) cable(s) last.

## Battery Hazards

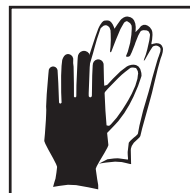
The liquid in batteries contains acid, which is a POISON and could cause SEVERE CHEMICAL BURNS.

Avoid injury:

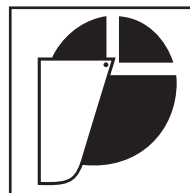
- Wear a face shield to prevent contact with your eyes.
- Wear chemical-resistant gloves and clothing to keep electrolyte off your skin and regular clothing.

**⚠ WARNING!** Liquid from the battery will damage eyes or skin on contact. **Always wear a face shield to avoid liquid in eyes.**

If liquid from the battery contacts your eyes, flush immediately with clean water and get medical attention. Wear chemical-resistant gloves and protective clothing to keep liquid off your skin. If liquid contacts exposed skin or clothing, wash off immediately with clean water. If liquid is ingested, drink large quantities of water or milk. DO NOT induce vomiting. Seek medical attention immediately.



**Wear hand protection**



**Wear face protection**

# Perform Maintenance Safely

## Avoid Explosion

**⚠ WARNING!** Avoid serious injury from explosion. Lead-acid batteries produce extremely explosive gases especially when being charged. **Keep arcs, sparks, flames and lighted tobacco away.**

- **Do not** smoke near batteries.
- Keep batteries away from arcs, sparks and open flames.
- Provide adequate ventilation.

**Never** check the battery by placing a metal object across the battery posts. The resulting spark could cause an explosion.

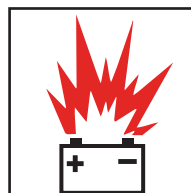
**⚠ WARNING!** Avoid serious injury from battery explosion. **Do not charge a battery or jump-start the engine if the battery is frozen.**

Warm to 60°F (15.5°C) or the battery may explode and could cause serious injury.

Safety rules during battery jump-starting:

- Follow the instructions for proper battery jump-starting, as specified in the manufacturer's manual.
- Be sure the machines are not touching.

- Observe the polarity of the batteries and connections.
- Make the final cable connection to the engine or the farthest ground point away from the battery. Never make the final connection at the starter or dead battery. Sparks may ignite the explosive gases present at the battery.
- When disconnecting cables, remove the cables in reverse order of connection (e.g., final connection first).



**Avoid sparks and open flames near batteries**



**When jump-starting, observe polarity and make final connection at ground point**

# Perform Maintenance Safely

## Tire and Wheel Maintenance

Check your tires and wheels daily because the stability of the machine can be dramatically affected by tire pressure or damage to tires or wheels.

Check tires for:

- Correct pressure
- Cuts and bulges
- Nails or other punctures
- Uneven or excessive wear
- Condition of valve stems and caps

Check wheels for:

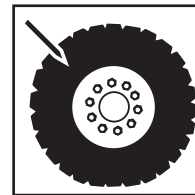
- Damage to the rims
- Missing or loose lug nuts or bolts
- Misalignment

All tire service should be performed by a qualified tire service center or by an authorized service person who has been properly trained in the procedures and use of safety equipment designed for tire servicing.

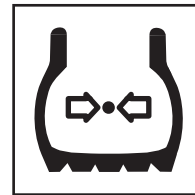
**⚠ WARNING!** The types of wheels and tires usually found on this equipment require special care when servicing to prevent death or serious injury. **Do not inflate the tires above the recommended pressure.**

Keep wheel lug nuts tightened to manufacturer's recommendations.

An increase in tire pressure during operation is normal, and should NOT be reduced.



Check tires and wheels for damage



Maintain proper tire pressure

# Perform Maintenance Safely

Never reinflate a tire that has been run flat or seriously under-inflated without removing the tire from the rim. Have the tire and rim closely inspected for damage before remounting.

When adding air to a tire, do so from a distance. Always use a long hose with a self-attaching chuck; stand away from the tire sidewall and to one side as far as possible.

Do not inflate tires with flammable gases or from systems using an alcohol injector.

Never cut or weld on a rim with an inflated tire mounted on it. This could cause explosive decompression.

Check that the tire size and rim are correctly matched.

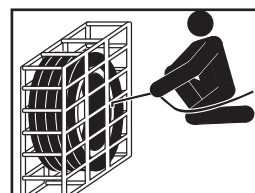
When replacing the tires, ensure the tires are of the appropriate rating specified by the manufacturer.

**⚠ WARNING!** Avoid death or serious injury. **Always use a safety cage or cable restraints when inflating a repaired tire.**

Tires should not be operated at speeds higher than their rated speed.



Avoid tire explosion



Use safety devices when inflating tires

# Perform Maintenance Safely

## Mower Blade Maintenance

Do not take chances using damaged or bent blades. The mower manufacturers from the Association of Equipment Manufacturers (AEM) and the Farm Equipment Manufacturers Association (FEMA) advocate that you do not reuse, straighten, hard face or weld mower blades. Death or serious injury could result if a broken blade is thrown from a mower.

It takes a great amount of impact force to bend the blade. This impact force often results in the blades being gouged or chipped. After a blade is damaged by a gouge or chip a blade failure is much more likely to occur. When a blade is severely bent, a microscopic crack may be created in the blade. Straightening the blade does not remove or repair this crack, but may cause additional cracks. Additional stresses during mowing operations can result in an unexpected blade failure.

**⚠ WARNING!** Using a damaged or straightened mower blade can result in the blade breaking and being thrown into the operator or a bystander causing death or serious injury. The price of a new blade is small compared to the potential for the serious injury that could result from a bent or broken blade being thrown from the mower.

## Roll-Over Protective Structure (ROPS) and Falling Object Protective Structure (FOPS) Safety Precautions

Do not remove the ROPS/FOPS except for service. Reinstall all parts correctly before allowing the machine back into service.

Do not modify ROPS/FOPS in any manner. Unauthorized modifications such as welding, drilling, cutting or adding attachments could weaken the structure and reduce your protection. Replace ROPS/FOPS if subjected to rollover or damage. Do NOT attempt to repair them. See the manufacturer's manual(s) for complete instructions and inspection requirements.

# Perform Maintenance Safely

## Complete Service and Repairs Before Machine is Released

Tighten all bolts, fittings, and connections to torques specified by the manufacturer.

Inspect for leftover components such as cotter pins, washers, lock nuts, etc., after completing service. Replace any missing parts.

Start the engine and check for leaks. (See page 44, **Hydraulic System Hazards**.) Operate all controls to make sure the machine is functioning properly. Test the machine if necessary. After testing, shut down and check the work you performed.

Recheck all fluid levels before releasing the equipment for operation.

All parts should be inspected during repair and replaced if worn, cracked or damaged. Excessively worn or damaged parts could fail and cause injury or death.

Install all guards, covers, and shields after servicing. Refill and recharge pressure systems only with manufacturer-approved or recommended fluids.



**Pressurized fluid can inject into the body**

<b>Checklist</b>	
<input checked="" type="checkbox"/>	_____
<input checked="" type="checkbox"/>	_____
<input checked="" type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

**Verify service work when completed**

# Notes

# **A Final Word to the User**

You have just finished reading the AEM Industrial/Agricultural Mower Safety Manual. It is impossible for this manual to cover every safety situation that you may encounter on a daily basis. Your knowledge of these safety precautions and your application to the basic rules of safety will help to build good judgment in all situations. Our objective is to help you develop, establish, and maintain good safety habits to make operating an industrial or agricultural mower easier and safer for you.

**Many pictorials in this safety manual can be downloaded at <http://pictorials.aem.org>.**

**For additional publications, visit our website at [www.safetymaterials.org](http://www.safetymaterials.org).**

## **Palabras finales para el usuario**

Acaba de terminar de leer el Manual de Seguridad de la segadora agrícola/industrial de AEM. Resulta imposible abarcar en este manual todas las situaciones de seguridad que podrían presentarse a diario. Su conocimiento de estas precauciones de seguridad y el cumplimiento con las normas de seguridad básicas le ayudarán a desarrollar un criterio sensato en todas las situaciones. Nuestro objetivo es ayudarlo a desarrollar, establecer y mantener buenos hábitos de seguridad para hacer que el uso de la segadora agrícola o industrial resulte más sencillo y sea más seguro para usted.

Muchas de las ilustraciones que figuran en este manual de seguridad pueden descargarse desde <http://pictorials.aem.org>.

Si desea conocer otras publicaciones, visite nuestro sitio web: [www.safetymaterials.org](http://www.safetymaterials.org).



# Realizar el servicio de mantenimiento de manera segura

## Precauciones de seguridad

**de la estructura de protección contra volcaduras (ROPS) y de la estructura protectora contra objetos que caen (FOPS)**

No elimine los sistemas ROPS/FOPS, salvo que deba realizarse un mantenimiento de servicio. Vuelva a instalar todas las piezas correctamente antes de la puesta en marcha de la máquina.

No modifique de ninguna manera los sistemas ROPS/FOPS. Las modificaciones no autorizadas, por ejemplo, soldaduras, perforaciones, cortes o agregado de accesorios podrían debilitar la estructura y reducir su protección. Reemplace los sistemas ROPS/FOPS si sufrieron volcaduras o se dañaron. NO intente repararlos. Consulte los manuales del fabricante para obtener información sobre las indicaciones completas y los requisitos de inspección.

# Realizar el servicio de mantenimiento de manera segura

## Reparaciones y servicio completo antes de autorizar el uso de la máquina

Ajuste todos los pernos, los accesorios y las conexiones a las torsiones que indique el fabricante.

Fíjese que no hayan quedado componentes olvidados, por ejemplo, pasadores de chaveta, arandelas, contratuercas, etc., después de realizar el servicio. Reemplace las piezas que falten.

Arranque el motor y fíjese que no haya fugas. (Consulte la página 44, **Peligros del sistema hidráulico**). Opere todos los controles para asegurarse de que la máquina esté funcionando correctamente. Pruebe la máquina si fuese necesario. Después de probarla, apáguela y revise el trabajo que realizó.

Vuelva a controlar todos los niveles de fluidos antes de autorizar el uso del equipo.



El fluido presurizado puede penetrar en el cuerpo.

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Lista de verificación

Una vez completado, verifique el servicio de mantenimiento.

Se deben inspeccionar todas las piezas durante la reparación y reemplazarse si están gastadas, dañadas o con rajaduras. Las piezas muy gastadas o dañadas podrían fallar y provocar lesiones o la muerte de una persona.

Instale todas las protecciones, las cubiertas y las carcasas después de realizar el servicio de mantenimiento. Vuelva a llenar y recargar los sistemas de presión solo con los fluidos que aprueba o recomienda el fabricante.

# Realizar el servicio de mantenimiento de manera segura

## Mantenimiento de neumáticos y ruedas

Verifique sus neumáticos y ruedas diariamente ya que la estabilidad de la máquina puede verse sumamente afectada por la presión de los neumáticos o daños en los neumáticos o las ruedas.

Verifique en los neumáticos lo siguiente:

- Presión correcta
- Cortes y protuberancias
- Clavos u otras perforaciones
- Desgaste desparejo o excesivo
- Estado de los vástagos y tapas de válvulas

Verifique en las ruedas lo siguiente:

- Daños en los rines
- Tuercas o pernos de rines flojos o faltantes
- Desalineación

Todo el servicio de los neumáticos debe realizarse por un centro de servicio de neumáticos calificado o por personal de servicio autorizado debidamente capacitado sobre los procedimientos y el uso del equipo de seguridad diseñado para el servicio de mantenimiento de neumáticos.

# Realizar el servicio de mantenimiento de manera segura

Al reemplazar los neumáticos, asegúrese de que sean del valor nominal especificado por el fabricante.

**⚠ ¡ADVERTENCIA!** Evite las lesiones graves o la muerte de una persona. **Siempre utilice una jaula de seguridad o sujeciones de cables al inflar un neumático reparado.** Los neumáticos no deben operarse a velocidades superiores a su velocidad nominal.

Nunca vuelva a inflar un neumático que se ha desinflado por completo o seriamente sin quitar el neumático del rin. Haga inspeccionar detenidamente el neumático y el rin en busca de daños antes de volver a montarlos.

Al agregar aire a un neumático, hágalo a una cierta distancia. Siempre utilice una manguera larga con una boquilla autoajustable; manténgase alejado del flanco del neumático y hacia un lado lo más lejos posible.

No infle los neumáticos con gases inflamables o con sistemas que utilizan un inyector de alcohol.

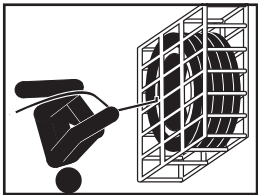
Nunca corte ni suelde en un rin con un neumático inflado montado en él. Esto podría causar una descompresión explosiva.

Verifique que el tamaño del neumático y el rin coincidan.

Evite que exploten los neumáticos



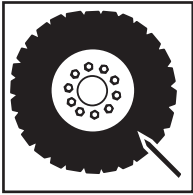
Use dispositivos de seguridad al inflar los neumáticos.



Mantenga la presión de neumáticos adecuada



Verifique que los neumáticos y las ruedas no estén dañados



**⚠ ¡ADVERTENCIA!** Los tipos de ruedas y neumáticos que se suelen encontrar en este equipo requieren un cuidado especial al realizar el servicio de mantenimiento para evitar lesiones graves o la muerte. **No infle los neumáticos por encima de la presión recomendada.**

Mantenga las tuercas de rines apretadas según las recomendaciones del fabricante.

Un aumento en la presión de los neumáticos durante la operación es normal, y NO se debe reducir.

# Realizar el servicio de mantenimiento de manera segura

- Antes de trabajar en el sistema eléctrico, desconecte los cables de la batería.
- Retire primero los cables negativos (-) de la batería.
- Al volver a conectar la batería, conecte en última instancia los cables negativos (-) de la batería.

## Peligros de la batería

El líquido de las baterías contiene ácido, que es un VENENO y podría provocar QUEMADURAS QUÍMICAS GRAVES.

Evite las lesiones:

- Use una máscara de protección facial para evitar el contacto con los ojos.
- Use vestimenta y guantes resistentes a las sustancias químicas para mantener los electrolitos alejados del cuerpo y de la vestimenta de uso diario.

**¡ADVERTENCIA!** Si el líquido de la batería entra en contacto con los ojos o la piel, les ocasionará un daño. Siempre use una máscara de protección facial para evitar que el líquido entre en contacto con los ojos.



Utilice protección para las manos.



Utilice protección para el rostro.

Si el líquido de la batería entrara en contacto con los ojos, láveselos de inmediato con agua limpia y busque atención médica. Use vestimenta de protección y guantes resistentes a las sustancias químicas para mantener el líquido alejado de la piel. Si el líquido entra en contacto con la vestimenta o la piel expuestas, lávese de inmediato la piel y límpiese de inmediato la vestimenta con agua limpia. Si se ingiere líquido, beba una cantidad abundante de agua o leche. NO induzca el vómito. Busque atención médica de inmediato.

## Evite las explosiones

**¡ADVERTENCIA!** Evite las lesiones graves a causa de las explosiones. Las baterías de plomo y ácido generan gases sumamente explosivos, en especial, cuando se cargan. Mantenga lejos los arcos, las chispas, las llamas y los cigarrillos encendidos.

- No fume cerca de las baterías.
- Manténgalas alejadas de los arcos, las chispas y las llamas abiertas.
- Proporcione una ventilación adecuada.

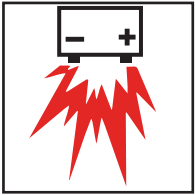
Nunca revise la batería colocando un objeto de metal a lo largo de los postes de la batería. La chispa que se genere podría provocar una explosión.

**¡ADVERTENCIA!** Evite las lesiones graves a causa de las explosiones de la batería. No cargue una batería ni arranque el motor si la batería está congelada.

Llévela a una temperatura de 60 °F (15.5 °C) o la batería podría explotar y provocar lesiones graves.

Normas de seguridad durante el arranque de la batería:

- Siga las indicaciones para arrancar adecuadamente la batería, según se indica en el manual del fabricante.
- Asegúrese de que las máquinas no se toquen.
- Observe la polaridad de las baterías y las conexiones.



Evite las chispas y las llamas abiertas cerca de las baterías



Al arrancar la batería, observe la polaridad y realice la conexión final en el punto de la puesta a tierra.

- Realice la conexión final de los cables al motor o al punto de la puesta a tierra más alejado de la batería. Nunca realice la conexión final en el motor de arranque o la batería muerta. Las chispas podrían causar combustión de los gases explosivos que se encuentran en la batería.
- Al desconectar los cables, retírelos en el orden inverso de la conexión (es decir, por último, la primera conexión).

# Realizar el servicio de mantenimiento de manera segura

## Peligros del sistema hidráulico

Asegúrese de seguir las indicaciones del fabricante para liberar la presión de fluidos antes de realizar algún servicio de mantenimiento. El sistema hidráulico está presurizado siempre que el motor está encendido y puede retener presión incluso después de que se apague el motor. Complete el ciclo de los controles hidráulicos, incluido el control hidráulico auxiliar, si hubiera, después de apagar el motor.

Verifique que no haya fugas e inspeccione las mangueras



Durante la inspección del sistema hidráulico:

- Espere a que el fluido se enfríe antes de desconectar las líneas. El fluido hidráulico caliente puede provocar quemaduras graves.
- Utilice una protección adecuada para los ojos. El fluido hidráulico puede provocar lesiones permanentes en los ojos.
- Al ventilar o llenar el sistema hidráulico, afloje lentamente la tapa del recipiente de llenado y quítela gradualmente. **Nunca** configure una válvula de alivio del sistema hidráulico a una presión superior a la que recomienda el fabricante.

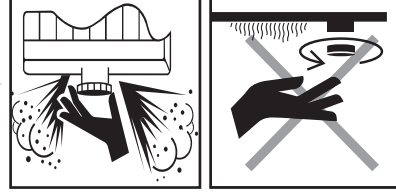
## Peligro del diesel ultra bajo en azufre (ULSD)

**¡ADVERTENCIA!** El diesel ultra bajo en azufre (ULSD) posee un mayor peligro de ignición estática que las formulaciones anteriores de diesel con un mayor contenido de azufre. Evite la muerte o las lesiones graves provocadas por incendios o explosiones. **Consulte a su proveedor de combustible o del sistema de suministro** para asegurarse de que el sistema de suministro cumpla con las normas de carga de combustible para las prácticas adecuadas de puesta a tierra y enlace.

## Peligros del refrigerante del motor

**¡ADVERTENCIA!** Evite las lesiones graves o la muerte. Los sistemas de enfriamiento líquidos acumulan presión a medida que el motor se calienta; por lo tanto, **actúe con precaución antes de retirar la tapa del radiador.**

- Detenga el motor y espere a que se enfríe el sistema.
- Use ropa de protección y anteojos de seguridad.
- Gire lentamente la tapa del radiador hasta el primer tope para dejar liberar presión antes de retirar la tapa por completo.



Deje que el radiador se enfríe antes de retirar lentamente la tapa

**Peligro de penetración de fluidos presurizados**  
**¡ADVERTENCIA!** La penetración accidental de fluido presurizado en las manos o el cuerpo es peligrosa y podrá derivar en la muerte de una persona o la aparición de lesiones graves. Entre los fluidos presurizados se encuentran el aceite, el fluido hidráulico, el agua o el combustible. **Actúe con precaución al revisar las fugas de fluido ya que los fluidos presurizados pueden penetrar en la piel o los ojos y provocar lesiones personales graves.**

Si se detecta una fuga:

- Asegúrese de que el motor esté apagado; libere la presión en el sistema de fluidos.
- Utilice una protección adecuada para las manos y los ojos. Examine visualmente las líneas de fluido en las inmediaciones de la fuga para detectar roturas o rajaduras. **No** utilice las manos para verificar la presencia de fugas. Repare o reemplaze las líneas de fluidos de acuerdo con las recomendaciones del fabricante.



El fluido presurizado puede penetrar en el cuerpo.

## Peligros del sistema eléctrico Lámparas e iluminación

Algunas máquinas vienen equipadas con lámparas xenón de alta intensidad de descarga (HID, por sus siglas en inglés) que operan a voltajes muy altos. No comience la instalación de las lámparas xenón de HID, salvo que las lámparas y el motor estén apagados, se haya retirado la llave, si hubiera, y lleve una protección adecuada para los ojos.

**¡ADVERTENCIA!** No mire directamente una lámpara xenón de HID. Se podría producir un daño a los ojos.

Use guantes y anteojos de seguridad cuando manipule las lámparas. Es posible que ocurran chispas eléctricas peligrosas, las que pueden producir lesiones o dañar el conector. Consulte las advertencias del fabricante que vienen con las lámparas de reemplazo.

# Realizar el servicio de mantenimiento de manera segura

## Prácticas comunes para un mantenimiento seguro

Tenga una ventilación adecuada.

Si debe encender un motor en un área cerrada, saque los humos del escape del área con una extensión del tubo de escape.



Ventile el área de trabajo.



**ADVERTENCIA!** Los humos del escape contienen monóxido de carbono, que puede ser mortal si se inhala. Nunca opere ningún tipo de motor sin una ventilación adecuada. LOS HUMOS DEL ESCAPE PUEDEN CAUSAR LA MUERTE.

Coloque una etiqueta de advertencia que diga "NO OPERAR" a las palancas de control.  
Bloquee/coloque una etiqueta de no operar de acuerdo con el manual de operación del fabricante. Si hubiera una llave, retírela y llévela con usted.

Instale dispositivos de soporte aprobados al trabajar cerca o debajo de equipos elevados.

**ADVERTENCIA!** Las máquinas u otros equipos sin apoyo o elevados pueden caer sorpresivamente. Nunca se

coloque debajo de un equipo elevado a menos que

esté apoyado sobre dispositivos de soporte aprobados.

La caída de equipos puede producir la muerte de una persona o la aparición de lesiones graves por aplastamiento.

Retire solo las protecciones o las cubiertas que brinden

acceso al área donde se realizará el mantenimiento.

Vuelva a colocar todas las protecciones y las cubiertas

cuando haya finalizado el trabajo.

**ADVERTENCIA!** Evite las lesiones o la muerte.

Nunca trabaje en una máquina con el motor en funcionamiento, salvo que así se indique en los manuales

del fabricante para servicios de mantenimiento específicos.



Utilice una etiqueta que diga "NO OPERAR".

## Utilice gatos y grúas con cuidado.

Las plataformas o los bloques de seguridad deben colocarse en una parte rígida de la máquina. No coloque las plataformas debajo de ejes o ruedas que puedan rotar.

**ADVERTENCIA!** Evite las lesiones por aplastamiento.

Nunca use bloques de concreto como soporte.

Podrían derrumbarse, incluso sosteniendo cargas livianas,

y provocar lesiones graves o la muerte de una persona.

Si debe trabajar debajo de un equipo elevado, siempre use

grúas, gatos u otros apoyos rígidos y estables diseñados

y aprobados para la carga en cuestión. Al usar gatos o

grúas asegúrese de que estén bien apoyadas.

Asegúrese de que las grúas o los gatos estén en

buenas condiciones. Nunca use gatos con piezas

torcidas o dobladas. Nunca use cables pelados,

o deformados.



Evite el aplastamiento, utilice un apoyo adecuado para los equipos elevados

# Realizar el servicio de mantenimiento de manera segura

## Peligros del combustible

**ADVERTENCIA!** Evite las lesiones graves o la muerte.

Siempre use recipientes para combustible o equipos

dispensadores de combustible aprobados para reducir

el riesgo de explosión o incendio.

Siempre respete estas prácticas para reducir la posibilidad

de que ocurra un accidente grave:

- Apague el motor y el encendido durante una recarga

- de combustible.

- Apague todos los interruptores eléctricos.

- Realice la puesta a tierra la boquilla de combustible con

- el cuello de llenado.

- Mantenga las chispas y las llamas alejadas del

- combustible. No fume mientras recarga combustible o

- cuando manipula los recipientes de combustible.

- No corte ni suelde en las líneas, los tanques o

- los recipientes de combustible ni cerca de ellos.

- No desborde el tanque ni derrame combustible. Limpie de

- inmediato el combustible derramado.

Prohibido fumar  
llamas abiertas  
y prohibidas las



# Realizar el servicio de mantenimiento de manera segura

## Piezas de la segadora y su seguridad

- Los fabricantes de segadoras utilizan sujetadores específicos y piezas diseñadas especialmente para cumplir con los requisitos de las operaciones de corte. Las piezas críticas como pernos de cuchilla autobloqueantes, cuchillas, pasadores, carcassas y otros elementos especiales tienen requisitos específicos de resistencia, diseño y ajuste para la segadora de la marca y el modelo que está utilizando. Evite posibles lesiones graves o muerte por piezas no aprobadas o modificaciones:
- No sustituya piezas de ferretería comunes por pernos de cuchilla u otras piezas especiales originales del fabricante.
- No sustituya cuchillas, pasadores, carcassas u otras piezas esenciales.
- No utilice pernos de mayor resistencia para reemplazar los pernos de seguridad originales del fabricante.



Evite las piezas que roten.

**⚠️ ADVERTENCIA!** Evite la muerte de una persona o la aparición de lesiones graves provocadas por los atoramientos. **No use vestimenta ni accesorios holgados. Manténgase alejado de los componentes que rotan cuando el motor esté funcionando.** El contacto, el enrollamiento o el atascamiento con las piezas que rotan o se mueven podrán derivar en la muerte de una persona o la aparición de lesiones graves.

Utilice un delantal adecuado resistente a sustancias químicas y guantes resistentes a sustancias químicas para trabajar con corrosivos. Utilice guantes resistentes a los cortes y calzado de seguridad cuando manipule bloques de madera o metales con punta cortante. Siempre use anteojos de seguridad, gafas de seguridad o una máscara de protección facial. Protegen los ojos de los fluidos bajo presión, al triturar y cuando se realiza el mantenimiento a las baterías. También se debe proteger contra los escombros, los líquidos y el material suelto que desprendan la máquina, las herramientas y el aire/agua presurizados.

Use una máscara de protección facial y siga las indicaciones del fabricante cuando desarme componentes con resorte o cuando trabaje con ácidos de la batería. Mantenga los bolsillos libres de todo tipo de objeto que pueda caerse y entrar en la máquina. Manipule con cuidado las herramientas y las piezas pesadas para protegerse a usted y a terceros. Baje los artículos, no los arroje.

## Prepare el área de trabajo.

- Coloque la máquina en un área nivelada, que no entorpezca el paso de otros equipos de trabajo.
- Asegúrese de que la luz, la ventilación y el espacio sean adecuados.
- Retire el aceite, la grasa o el agua para eliminar las superficies resbaladizas.
- Limpe alrededor del área donde se realizará el mantenimiento para reducir la contaminación.

## Preparar la máquina

Se deben controlar o reducir al mínimo las fuentes de energía almacenadas (eléctrica, mecánica, hidráulica, neumática, química, térmica, etc.) antes de realizar algún servicio de mantenimiento o reparación. Entre las prácticas de seguridad para evitar posibles lesiones provocadas por fuentes que liberen energía se incluyen las siguientes:

- Desconecte la PTO antes de apagar el motor.
- Coloque los controles en posición NEUTRAL o DE BLOQUEO antes de apagar el motor.
- Accione el freno de estacionamiento o bloquee las ruedas.
- Detenga todas las piezas que se muevan.
- Baje la segadora al suelo.
- Baje las alas al suelo en segadoras de ala.
- Apague el motor.



Evite las caídas, limpie las superficies resbaladizas.

- Siga las recomendaciones del fabricante para liberar la presión del sistema hidráulico.
- Trabe el encendido, retire la llave (si hubiera) y llévela con usted.
- Observe y escuche si hay indicios de piezas que se muevan antes de bajar.
- Apague el interruptor eléctrico principal (si hubiera). Apoye bien o bloquee la máquina antes de trabajar debajo de ella u otros componentes elevados.
- Apoye bien o bloquee otros componentes con dispositivos de bloqueo aprobados antes de trabajar cerca o debajo de ellos.
- Libere la presión antes de desconectar o desarmar un sistema presurizado.
- Bloquee o libere la presión de los resortes antes de desarmar algún mecanismo con resorte.
- Evite la presencia de llamas, chispas o humo cerca de cualquier tipo de combustible, fluido hidráulico u otro material inflamable, por ejemplo, residuos de corte.

# Apagar de manera segura

## Seleccione un lugar adecuado para estacionar

Al apagar la máquina, estacione en un área designada fuera del tránsito, preferentemente, a nivel del suelo cuando sea posible. Baje el equipo elevado al suelo. Si debe estacionar en una pendiente o inclinación, coloque la máquina en ángulos rectos con respecto a la pendiente, accione el freno de estacionamiento y bloquee las ruedas.

**¡ADVERTENCIA!** Evite la muerte de una persona o la aparición de lesiones graves provocadas por los movimientos accidentales de la máquina. **Nunca deje una máquina sin supervisión con el motor encendido.**

## Apagado seguro

El procedimiento de apagado detallado se encuentra en los manuales del fabricante. En general, esto incluye lo siguiente:

- Detenga la máquina.
- Asegúrese de que todas las ruedas estén sobre el suelo.
- Coloque los controles en posición neutral o de bloqueo.
- Accionar el freno de mano.
- Desactivar el motor durante un breve periodo para que se enfríe.
- Desconecte el embrague de la PTO y la transmisión.
- Baje la segadora al suelo.
- Baje las alas de las segadoras de ala al suelo.
- Detenga el motor y retire la llave de encendido, si hubiera.
- Complete el ciclo de todos los controles hidráulicos para eliminar la presión.
- Eleve el asiento/barra(s) de sujeción del operador, si hubiera.

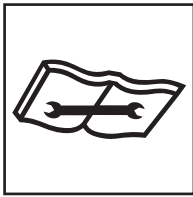
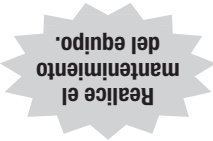
# Realizar el servicio de mantenimiento de manera segura

## Protéjase

Use toda la vestimenta de personal adecuada y el EPP que se le entregue o que se requiera dadas las condiciones laborales. Es posible que necesite lo siguiente:

- Casco
- Calzado de seguridad
- Anteojos de seguridad, gafas de seguridad o máscara de protección facial
- Guantes para tareas pesadas
- Protección auditiva
- Vestimenta reflectante
- Indumentaria para clima húmedo
- Respirador o máscara con filtro

Use todo lo que necesite para protegerse. No corra riesgos.



**Sepa lo que está haciendo.** El mantenimiento de este tipo de máquina no debe realizarse por personal sin experiencia o capacitación. Es peligroso, salvo que se realice correctamente. Asegúrese de contar con las habilidades, la información, las herramientas correctas y el equipo adecuado para realizar el trabajo de manera segura. Asegúrese de realizar el mantenimiento del equipo de acuerdo con las indicaciones del fabricante. Revise con regularidad el funcionamiento de los dispositivos de protección y seguridad. No realice ningún tipo de trabajo en una máquina salvo que esté autorizado y calificado para hacerlo. Si esta autorizado para realizar el mantenimiento, **lea los manuales de operación, de mantenimiento y de servicio del fabricante.** Analice las indicaciones: revise las tablas de lubricación, examine todos los mensajes con indicaciones que haya en la máquina.

# Operar de manera segura

## Prácticas de seguridad para el corte en orillas de zanjas

Tenga cuidado al cortar en orillas de zanjas. Esté atento a derrumbes, áreas erosionadas y obstrucciones de corte a lo largo de las orillas de las zanjas. Golpear obstáculos con segadoras laterales o de brazo puede hacer que el extremo delantero del tractor se desvíe hacia la zanja.

Las operaciones de corte en orillas de zanjas con alas arrojadors o cuchillas al levantar y bajar las alas durante las operaciones de corte:

- No corte con transeúntes dentro de 300 pies (92 m) de una segadora rotativa o dentro de 100 pies (31 m) de una segadora de disco.
- Asegúrese de que nadie está cerca de la segadora mientras levanta o baja las alas.
- Apague la PTO y espere que todos los elementos en rotación se detengan antes de levantar la plataforma de la segadora o la sección del ala.
- Solo levante el ala para despejar objetos en la trayectoria de corte o para adaptarse a la pendiente del terreno.
- Baje el ala elevada al suelo después de despejar el objeto o las condiciones del terreno.
- Detenga el corte si alguien se acerca más de la distancia de seguridad para el tipo de segadora.



Evite golpear obstrucciones.

## Prácticas de seguridad para segadoras de alas y montadas en el lateral

Las posiciones elevadas de las alas reducen la protección de la carcasa y aumentan los riesgos de peligro por objetos arrojadors y contacto con las cuchillas.

Evite posibles lesiones graves o la muerte por objetos arrojadors o contacto con las cuchillas al levantar y bajar las alas durante las operaciones de corte:

- No corte con transeúntes dentro de 300 pies (92 m) de una segadora rotativa o dentro de 100 pies (31 m) de una segadora de disco.
- Asegúrese de que nadie está cerca de la segadora mientras levanta o baja las alas.
- Apague la PTO y espere que todos los elementos en rotación se detengan antes de levantar la plataforma de la segadora o la sección del ala.
- Solo levante el ala para despejar objetos en la trayectoria de corte o para adaptarse a la pendiente del terreno.
- Baje el ala elevada al suelo después de despejar el objeto o las condiciones del terreno.
- Detenga el corte si alguien se acerca más de la distancia de seguridad para el tipo de segadora.

## Prácticas de seguridad para el corte en terrenos irregulares

La estabilidad del tractor y la segadora se reduce en pendientes y terrenos irregulares.

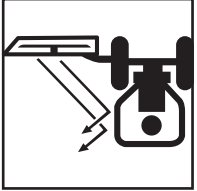
Como en todas las condiciones de corte, utilice tractores equipados con ROPS y cinturón de seguridad. **Asegúrese de que el sistema TOPS/ROPS esté elevado y asegurado en su lugar y siempre utilice el cinturón de seguridad.**

Evite los vuelcos del tractor y la segadora, y mantenga el control de la estabilidad del equipo:

- Revise los manuales del operador del tractor y la segadora para conocer las prácticas de operación seguras en pendientes y condiciones de terreno irregulares. Explique las prácticas a aquellos usuarios y operadores que no pueden leer.
- Evite operar en pendientes sumamente empinadas. Tome precauciones para mantener el control sobre el equipo cuando opera en estas condiciones.
- Aumente la estabilidad del tractor agregando contrapesos en las ruedas, lastre y aumentando el espacio entre las ruedas al máximo. Consulte el manual del operador para obtener recomendaciones.
- Mantenga una velocidad de corte mínima.
- Realice giros graduales y amplios.
- Evite arranques, paradas y giros bruscos cuando opere hacia arriba, abajo o a través de pendientes.

# Operar de manera segura

- No levante las segadoras montadas en la parte trasera o lateral, ni las alas desde el suelo durante estas operaciones.
  - Manténgase alerta ante hoyos, protuberancias, surcos, rocas, tocónes u otras obstrucciones que podrían volcar la máquina.
  - Evite las condiciones con suelo resbaladizo que podrían provocar la pérdida del control y volcar el tractor y la segadora.
  - Evite golpear y tocar el suelo cruzando en diagonal zanjas y desniveles pronunciados.
- Tome precauciones para mantener la estabilidad del equipo durante operaciones de corte en terrenos irregulares y pendientes. Usted es el juez final en cuanto a cualquier pendiente que pueda ser negociada de manera segura.



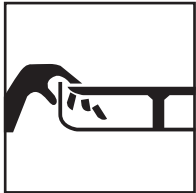
Utilice cabinas ROPS cerradas o recintos de protección

# Operar de manera segura

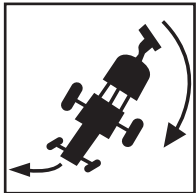
## Observar los espacios libres del equipo

El enganche de tres puntos y las segadoras montadas en el lateral tienen un arco de giro más grande que las segadoras de enganche de tracción. Permita que haya suficiente espacio libre para que la segadora se mueva al girar. No permita que haya transeúntes cerca del tractor y la segadora cuando se mueven o transportan.

Detenga la cuchilla antes de desatascarla.



Proporcione un espacio adecuado para que la segadora gire.

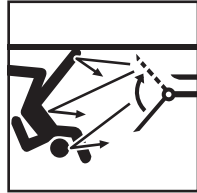


## Corte de hierba extremadamente alta

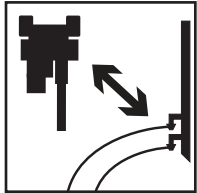
- Es posible que necesite cortar dos veces la hierba extremadamente alta y no cultivada. (Consulte la página 32, **Objetos arrojados por la segadora**).
- Primera pasada de corte:
- Apague la segadora y el tractor utilizando la práctica adecuada de apagado del equipo antes de bajarse el tractor. (Consulte la página 38, **Apagado seguro**).
  - Inspecciones el área y retire o señale escombros u obstáculos.
  - Corte la hierba más alta (10 a 15 pulgadas/ 250 a 400 mm) para evitar objetos ocultos.
- Segunda pasada de corte:
- Apague la segadora y el tractor utilizando la práctica adecuada de apagado del equipo antes de bajarse el tractor.
  - Inspecciones el área y retire o señale escombros u obstáculos.
  - Corte la hierba a la altura deseada y, cuando sea posible, en un ángulo de 90 grados con respecto a la primera pasada de corte.

## Prácticas de seguridad para segadoras montadas en la parte inferior

- Cuando corte con una segadora montada en la parte inferior:
- Mantenga las tolvas de descarga extraíbles en su lugar y sobre la abertura de descarga.
  - Nunca se sitúe sobre la carcasa de una segadora cuando el motor del tractor esté en funcionamiento.
  - Distribuya los recortes de hierba con la tolva de descarga orientada hacia el área cortada.
  - Antes de desatascar la segadora o la tolva de descarga, apague la máquina siguiendo la práctica adecuada de apagado del equipo. (Consulte la página 38, **Apagado seguro**).



Mantenga la tolva en su lugar.



No se acerque a las líneas eléctricas con energía.

**¡PELIGRO!** Evite electrocución o lesiones graves por contacto o falta de espacio libre adecuado con líneas eléctricas o aparatos energizados. No permita que la máquina o el accesorio se acerque o entre en contacto con ninguna línea eléctrica. No se acerque ni toque ninguna máquina en contacto con una línea eléctrica.

- Líneas eléctricas y aparatos eléctricos.
  - Ramas bajas de árboles.
  - Otras obstrucciones en la parte superior.
  - Mantenga la distancia especificada de las líneas eléctricas y los aparatos. Nunca se acerque a las líneas eléctricas o aparatos energizados con ninguna parte de la máquina, salvo que se hayan tomado todas las precauciones de seguridad que se requieran a nivel local, estatal/provincial y federal (OSHA). Actúe con precaución.
- Revise la presencia de obstrucciones en la parte superior con las segadoras de ala o brazo elevados para evitar lesiones graves o la muerte por entrar en contacto con lo siguiente:

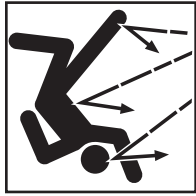
## Riesgos y peligros de obstrucciones en la parte superior de segadoras de alas o brazos

# Operar de manera segura

## Objetos arrojados por la segadora

Dependiendo del propósito diseñado, las segadoras están diseñadas para cortar hierba, maleza, arbustos y cultivos. Las cuchillas de la segadora han sido diseñadas y probadas para un uso resistente. Sin embargo, estas no están destinadas a entrar en contacto con objetos sólidos como rocas, cemento o metal. Dicho impacto puede provocar que se despidan objetos. Los transeúntes nunca deberían estar dentro de 300 pies (92 m) de una segadora rotativa en funcionamiento o de 100 pies (31 m) de una segadora de disco en funcionamiento. Detenga la operación si alguien se encuentra dentro de la distancia de seguridad para el tipo de segadora.

La carcasa de la segadora está diseñada para reducir el riesgo de arrojar objetos y se debe mantener correctamente y en su lugar durante las operaciones de corte.



Tenga cuidado con los objetos despididos.

El riesgo de lesiones graves o muerte a raíz de objetos arrojados puede reducirse significativamente siguiendo tres reglas. **Si no se siguen todas estas reglas de seguridad, la operación de corte debe detenerse.**

**Primero:** Inspeccione el área antes de cortar y retire piedras, ramas, alambre, cables, metal, vidrio y otros objetos sólidos antes de operar. Cuando no sea posible quitar algún objeto, el operador debe marcarlo de manera clara y evitarlo cuidadosamente.

En áreas no cultivadas con hierba y maleza lo suficientemente altos como para ocultar objetos que podrían ser golpeados por las cuchillas, inspeccione el área y retire o marque grandes escombros u obstáculos.

Corte el área a una altura intermedia. Inspecciones el área detenidamente y retire o señale cualquier escombros u obstáculo restante. Corte nuevamente a la altura final deseada.

**Segundo:** La carcasa de protección contra objetos arrojados por la segadora debe utilizarse cuando se opera en caminos, parques, áreas pobladas u otras áreas donde los objetos arrojados podrían lastimar a transeúntes o dañar la propiedad. Siga el manual del operador del fabricante.

**Tercero:** Cruce diagonalmente cuando corte en zanjas, depresiones pronunciadas y desniveles. Eleve la segadora para evitar que las cuchillas golpeen el suelo.

# Operar de manera segura

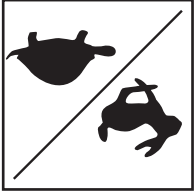
## Velocidad de corte de la segadora

La velocidad de corte adecuada depende de las condiciones de la hierba y de la altura de la hierba que se cortará:

- Siga las velocidades de funcionamiento recomendadas por el fabricante.
- Utilice una velocidad de corte más lenta para cortar hierba alta y densa.
- Utilice una velocidad de corte más rápida para cortar hierba de altura media, menos densa y en condiciones de terreno llano.
- Utilice una velocidad de corte más lenta para cortar en terrenos irregulares, inclinados o desconocidos.

Las segadoras de disco están diseñadas para utilizar velocidades de corte más rápidas al operar en campos libres de escombros y peligros en la superficie.

Utilice la velocidad de corte adecuada



No corte mientras se desplaza hacia atrás. Es más probable que se arrojen objetos y puedan llegar más lejos.

Apague la PTO, espere que las cuchillas dejen de girar, eleve la segadora y luego retroceda.

Corte desplazándose hacia adelante.

## Cortar marcha atrás

**Segadoras de disco:** Cuando utilice una segadora de disco es importante que conozca el área que se cortará. Si el operador ha cortado el campo antes y conoce todos los obstáculos que se pueden presentar, es suficiente observar hacia adelante el camino de la segadora para ver si hay objetos adicionales que puedan haber ingresado al campo. Este listo para detenerse o evitar cualquier objeto que podría ser peligroso si es arrojado por la segadora. Si planea cortar un campo desconocido y está cerca de un camino transitado o podría haber personas dentro de los 100 pies (31 m) de la segadora, debe inspeccionar y limpiar o señalar el campo.

## Operar de manera segura

### Segadoras montadas en minicargadores

- Consulte los manuales del operador de la segadora y el minicargador del fabricante.
- Baje los brazos de elevación e incline hacia adelante el acoplador de la cargadora.
- Conduzca la cargadora lentamente hacia adelante hasta que el borde superior del acoplador esté completamente debajo del reborde superior del marco de montaje del accesorio de la segadora.
- Incline el acoplador hacia atrás hasta que el accesorio esté levemente levantado del suelo. Esto provocará que el marco de montaje del accesorio de la segadora se ajuste contra la parte frontal del acoplador.
- Conecte los pasadores o cuñas del acoplador. Asegúrese de que los pasadores o cuñas del acoplador estén completamente conectados y trabados en la segadora.
- Conecte las mangueras hidráulicas de la segadora a la cargadora.

### Segadoras montadas con enganches de tracción:

- Consulte los manuales del operador de la segadora y el tractor del fabricante.
- Retire el acoplador rápido del enganche de tres puntos, si lo hubiere.
- Ajuste la longitud de la barra de tracción del tractor para operación de la PTO a 540 o 1000 rpm.
- Cuando retroceda el tractor hacia la segadora, NUNCA deje que nadie se coloque entre el tractor y la segadora.
- Conecte solo al enganche de la barra de tracción.
- Asegure correctamente la cadena de remolque de seguridad de la segadora al tractor.
- Conecte de manera segura la línea de transmisión a la PTO del tractor. Tire y empuje de la línea de transmisión para asegurarse de que esté bloqueada en la PTO.
- Baje la carcasa principal en su lugar.
- Conecte las mangueras hidráulicas de la segadora al tractor.
- Asegúrese de que las alas o plataformas elevadas de la segadora estén soportadas por los cilindros antes de retirar las trabas de transporte. Nunca utilice la fuerza para liberar las trabas de transporte o de las alas. Las alas o plataformas podrían caer y aplastarlo.



Compruebe que las alas estén apoyadas antes de liberar las trabas.

## Operar de manera segura

### Realizar el arranque adecuado

Corte solo durante el día o en buenas condiciones de iluminación artificial.

Evite las lesiones graves o la muerte debido a objetos arrojados por la segadora o el contacto con cuchillas:

- Mantenga en su lugar y en buen estado las carcasas de cadena, las carcasas deflectoras flexibles o sólidas, o las tolvas de descarga.
- Mantenga alejados a los transeúntes como mínimo a 300 pies (92 m) de la segadora rotativa o a 100 pies (31 m) de la segadora de disco durante la siega.
- Nunca dirija la descarga de la segadora hacia una persona.
- Mantenga alejadas manos, pies y otras partes del cuerpo de las piezas rotativas, cuchillas y aberturas de descarga.
- No opere la segadora en posición de transporte.

No se acerque a una segadora hasta que todos los movimientos se hayan detenido.

Acoplamiento de la transmisión de la PTO de la segadora:

- Eleve la segadora a la altura de corte máxima.
- Conecte la PTO a bajas rpm del motor.
- Aumente las rpm del motor a la velocidad de rpm de la PTO especificada para la segadora.
- Baje la segadora a la altura de corte deseada.
- Deténgase y apáguela inmediatamente si la segadora golpea un obstáculo.
- Inspeccione y repare cualquier daño en la segadora antes de continuar con el corte.
- No opere la segadora si presenta vibraciones fuertes o ruidos inusuales.



No opere una segadora dañada.

**Evite doblar las cuchillas:** Ayude a prevenir que las cuchillas de la segadora se doblen o rompan evitando el contacto con objetos sólidos. Las cuchillas de la segadora están diseñadas para cortar hierba, arbustos, vegetación boscosa y árboles pequeños y ramas. No están destinadas a estar en contacto con objetos sólidos como rocas, cemento o postes de acero. Inspeccione el área antes de cortar. Retire o señale claramente cualquier objeto sólido y corte alrededor.

**Reemplace las cuchillas dañadas:** Inspeccione las cuchillas de la segadora diariamente o después de golpear un objeto sólido. Si una cuchilla de la segadora se daña (se dobla, raja o rompe) o se desgasta más del 25 por ciento del tamaño original, se debe retirar y reemplazar por una nueva. Siempre utilice las cuchillas originales del fabricante. Las cuchillas de marcas no originales pueden no cumplir con los requisitos del fabricante de resistencia, dureza y ductilidad.

# Operar de manera segura

## Consejos de seguridad para el transporte

Siempre use el cinturón de seguridad al subir o bajar la máquina de un dispositivo de traslado, por ejemplo, un camión de plataforma.

Al trasladar una máquina, siga los procedimientos para subir, amarrar y bajar que recomienda el fabricante.

Varias precauciones se aplican a todas las máquinas:

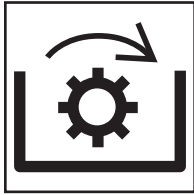
- Mantenga alejados a los transeúntes.
- Suba y baje en una superficie nivelada.
- Mantenga una visibilidad adecuada; para ello, suba o baje en áreas bien iluminadas y lejos de otros vehículos, equipos o construcciones.
- Bloquee el vehículo de traslado para que no pueda moverse.
- Asegúrese de que la plataforma y las rampas del remolque estén en buenas condiciones.
- Utilice rampas con el tamaño y la resistencia correspondientes, con un ángulo bajo y una altura adecuada.
- La parte posterior del remolque debe estar bloqueada o sostenida.
- Mantenga la plataforma y las rampas del remolque libres de arcilla, aceite, hielo, nieve y otros materiales que puedan resbalar.
- Retroceda la máquina hacia arriba de la rampa sobre el vehículo de traslado. Si la máquina cuenta con un accesorio pesado, podría ser necesario conducir hacia adelante sobre el vehículo de traslado.

## Sistema de toma de fuerza (PTO)

Asegúrese de operar el tractor a la velocidad de rpm de la PTO especificada para la segadora.

Cuando se opera un tractor con un sistema de PTO impulsado por transmisión, una segadora rotativa tendrá un efecto volante significativo y puede continuar impulsando el tractor. Este tipo de tractor debería estar equipado y operado como se indica a continuación:

- Instale una línea de transmisión equipada con un embrague de rueda libre.
- Proporcióñese suficiente espacio y tiempo para maniobrar anticipando los giros, las paradas y las reducciones de velocidad.



Utilice la velocidad de la PTO adecuada

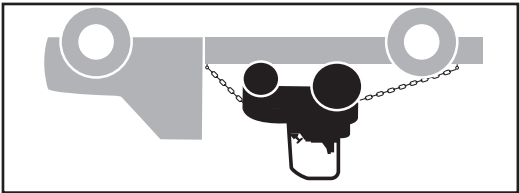
## Enganchar la segadora al tractor

### Segadoras con enganches de tres puntos:

- Consulte los manuales del operador de la segadora y el tractor del fabricante.
- Coloque la palanca selectora del elevador hidráulico (eje oscilante) del tractor en posición descendente para evitar movimientos inesperados.
- Es posible que se necesiten contrapesos delanteros para mantener el control de la dirección y la estabilidad delantera. Consulte los manuales del operador del fabricante.
- Cuando retroceda el tractor hacia la segadora, NUNCA deje que nadie se coloque entre el tractor y la segadora.
- Conecte la segadora a los enganches de tres puntos del tractor y asegure el pasador en su posición.
- Conecte de manera segura la línea de transmisión a la PTO del tractor.
- Tire y empuje de la línea de transmisión para asegurarse de que esté bloqueada en el eje de la PTO.
- Baje la carcasa principal en su lugar si es móvil.

# Operar de manera segura

Encadene y bloquee la segadora de manera segura para el traslado



- Cubra o retire el cartel de VML que está en la parte posterior de la máquina, si hubiera, para evitar confundir a los conductores que siguen el vehículo de traslado.
- Encadene y bloquee la máquina de manera segura para el traslado. Utilice puntos de amarre, según indica el fabricante en la máquina. Siga las indicaciones de amarre del fabricante que figuran en el manual del operador.
- Baje la máquina desplazándola en la dirección opuesta, no gire la máquina.

## Tenga cuidado con las condiciones laborales peligrosas

Esté atento a los peligros. Sepa dónde está en todo momento. Tenga cuidado con las ramas, los cables o las puertas. Se requiere precaución al trabajar en las partes superiores de terrapienes o pendientes. Siempre opere la máquina en forma perpendicular al terrapién. Manténgase alejado del borde.



Opere de manera perpendicular a los terrapienes; manténgase alejado de los bordes.

**! ADVERTENCIA! Nunca opere la máquina cerca del borde de una saliente o un barranco.** Los bordes podrían derrumbarse o podría producirse un desprendimiento y derivar en la muerte de una persona o la aparición de lesiones graves. Actúe con precaución al trabajar en pistas, terrapienes y pendientes. Manténgase alejado de los bordes de las cuestas. Al trabajar cerca de condiciones peligrosas, procure que haya un observador para detectar la presencia de peligros. Asegúrese de que permanezcan a una distancia segura de su máquina.

## Operar de manera segura

### Desplazamiento en el área de trabajo

Desplácese despacio y con calma en áreas congestionadas. Vale la pena ser gentil en estos casos. Deje pasar primero a las máquinas con carga. Mantenga una distancia segura con otras máquinas. Circule con precaución. No obstruya su visión al desplazarse o trabajar. (Consulte la página 24, **Áreas con visibilidad obstruida**).

### Desplazar la máquina de manera segura

Al desplazarse sobre terreno desnivelado, **REDUZCA LA MARCHA** para evitar perder el control. Evite las pendientes empinadas o las superficies inestables. En ningún caso se desplace de un lado a otro sobre pendientes excesivamente empinadas. Antes de operar en pendientes, verifique las condiciones de la superficie para asegurar una tracción adecuada. La pérdida de tracción podría hacer que la máquina se resbale y vuelque.

**! ADVERTENCIA! Evite las lesiones graves o la muerte de una persona. Desplácese hacia arriba y abajo de las pendientes con el extremo pesado de la máquina apuntando cuesta arriba.**

**! ADVERTENCIA! Evite las lesiones graves o la muerte de una persona. Asegúrese de poder ver hacia dónde está yendo.**

## Operar de manera segura

### Tener cuidado con los obstáculos

Deténgase en todos los cruces de ferrocarril y mire a ambos lados antes de proceder. Nunca estacione en áreas con tránsito. Si es necesario detenerse de noche, salga del camino y coloque las balizas o los reflectores. Al conducir de noche, utilice las luces adecuadas.

Ajuste su velocidad a las condiciones. Evite viajar sobre obstáculos, como troncos, tocones de árboles o terreno accidentado siempre que sea posible.

Mantenga su máquina bajo control.

Antes de ingresar a pasos a desnivel, túneles o pasos subterráneos, verifique el tránsito que se aproxima o si hay obstrucciones.



Obedezca las normas de tránsito

Si la máquina se debe conducir o transportar sobre la carretera, consulte el manual del fabricante para obtener instrucciones. Consulte las regulaciones locales para conocer las señalizaciones, luces, luces intermitentes, etc. requiridas al desplazarse por caminos públicos. Se requiere iluminación en las segadoras que obstruyen las luces traseras del tractor u otras luces de advertencia. Al desplazarse en calles o caminos públicos, obedezca todas las reglamentaciones de tránsito que se aplican a su máquina. Asegúrese de que las luces y los letreros de advertencia estén en su lugar y visibles. Asegúrese de que haya un emblema de vehículo de movimiento lento (VML) y la Señal de Identificación de Velocidad (SIS, por sus siglas en inglés), si corresponde, colocados y de que sean visible para cualquier vehículo que se acerque desde atrás. Averigüe si tiene que usar un vehículo escolta. Acérquese a las intersecciones con precaución; observe los letreros de control de velocidad y tránsito. Evite las frenadas de pánico y los giros abruptos. Como cualquier operador responsable, sea considerado periódicamente y permitir que el tránsito pase cuando es seguro hacerlo.

# Operar de manera segura

## Recordar estas normas

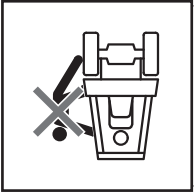
Permanezca en el asiento del operador con el cinturón de seguridad ajustado cuando opere.  
Asegúrese de que tiene visibilidad adecuada y suficiente iluminación durante la operación.  
Tenga el control de la máquina en todo momento.

## Recordar a las otras personas

Nunca permita que una persona sin capacitación o no calificada opere la máquina. Si se opera inadecuadamente, esta máquina podría provocar la muerte o lesiones graves.

**!ADVERTENCIA!** En la segadora agrícola/industrial solo entra una persona. Evite la muerte de una persona o la aparición de lesiones graves; **no permita nunca que haya acompañantes!**

**!ADVERTENCIA!** Manténgase alejado de todos los componentes en rotación. El enrollamiento o el atascamiento podría provocar lesiones graves o la muerte.



No permita el traslado de pasajeros.

## Áreas con visibilidad obstruida

Las máquinas tienen áreas donde la visibilidad del área de trabajo del operador puede verse afectada por la máquina en sí. Los postes del sistema ROPS, los accesorios e, incluso, los artículos de la cabina podrían limitar la visión del área circundante y, posiblemente, impedir la visualización de peligros o de las personas que estén alrededor. Estas áreas con visibilidad obstruida varían de una máquina a otra.

Es muy importante que esté al tanto de estas áreas antes de operar la máquina.

Siga estas precauciones de seguridad para reducir los peligros que plantean las áreas con visibilidad obstruida:

- Preste particular atención al elevar o bajar la segadora o el accesorio porque pueden cambiar las áreas con visibilidad obstruida.
- Mire alrededor de la máquina antes de operar. Los objetos que están cerca de la máquina y del piso pueden ser difíciles de observar desde la estación del operador.
- Siempre mire en la dirección que se desplazará, incluida la marcha atrás. La alarma de retroceso no reemplaza la obligación de mirar hacia atrás cuando opera la máquina en reversa.
- Mantenga alejados a los transeúntes, incluso cuando la máquina posea una alarma de retroceso.

# Operar de manera segura

## Seguir las prácticas de operación segura

Incluya estas prácticas seguras en su rutina:

- Mantenga ajustado el cinturón de seguridad (si hubiera). Opere suavemente los controles; no sacuda las palancas de dirección ni los mandos de control.
- Evite las detenciones, los arranques o los giros repentinos. Actúe con cuidado y aplique un criterio sensato.
- Nunca intente operar los controles salvo que esté correctamente sentado en la estación del operador.

**!ADVERTENCIA!** Evite las lesiones graves o la muerte de una persona. **Cuando utilice la máquina, mantenga todo el cuerpo dentro de la cabina del operador.** Nunca trabaje con la cabeza, los brazos, los pies o las piernas fuera de la estación del operador.

## Retroceder de manera segura

Asegúrese de que todas las personas estén a salvo, **al menos a 300 pies (92 m) de la segadora rotativa o a 100 pies (31 m) de la segadora de disco**, y opere de acuerdo con las leyes provinciales/estatales, locales, federales o las recomendaciones del fabricante que aplican a este equipo y su uso. Es importante que conozca y cumpla con todas las reglas específicas del lugar de trabajo o del empleador. El conocimiento de su parte puede evitar accidentes.

**Retroceder de manera segura**

Verifique que la alarma de retroceso (si hubiera) esté funcionando correctamente. Recuerde: **la alarma de retroceso no reemplaza la obligación de mirar hacia atrás cuando opera en reversa.** Siempre mire alrededor antes de retroceder la máquina. Asegúrese de que todas las personas estén a salvo. Conduzca hacia adelante siempre que sea posible. **SIEMPRE MIRE EN LA DIRECCIÓN QUE SE DESPLAZARÁ.**

# Arrancar de manera segura

## Arranque del motor

**!ADVERTENCIA!** Arranque el motor solo desde el asiento

del operador. **Nunca intente arrancar el motor puentando las terminales o llegando a la llave desde el exterior de la estación del operador.** La máquina podría moverse inesperadamente, lo que podría provocar lesiones graves o la muerte de las personas que se encuentren en su camino.

Conozca el procedimiento de arranque exacto de su máquina. Consulte los manuales de operación del fabricante para obtener información sobre el arranque.

- Ubíquese en el asiento del operador y ajústelo para que pueda operar adecuadamente todos los controles.
- Ajustese el cinturón de seguridad, si cuenta con él.
- Siempre mantenga las puertas de la cabina cerradas y las ventanas y pantallas de la estructura de protección del operador (OPS) en su lugar.
- Familiarícese con los dispositivos de advertencia, los medidores y los controles operativos.
- Asegúrese de que los controles estén en la posición neutral o de bloqueo.
- Verifique el desenganche de la PTO.



Nunca arranque el motor puentando las terminales

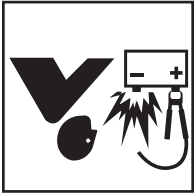
## Auxiliares de arranque

**!ADVERTENCIA!** Los humos del escape pueden causar la muerte. **No respire los humos del escape!**

- Procure que no quede ninguna persona en el área.
- Haga sonar la bocina.
- Arranque el motor siguiendo las indicaciones en los manuales de operación del fabricante.

Si se tuviera que encender el motor u operar la máquina en un área cerrada, asegúrese de que haya una ventilación adecuada.

**!ADVERTENCIA!** Un puentado inadecuado puede provocar lesiones graves o la muerte de una persona si se produce una explosión de la batería o si la máquina comienza a andar. **Siempre siga los procedimientos adecuados de puentado.** (Consulte la página 46, Peligros de la batería).



# Arrancar de manera segura

Asegúrese de saber el patrón de control que seleccionó y de comprender cómo funcionará la máquina con ese patrón de control.

Asegúrese de que la máquina esté funcionando correctamente; para ello, realice lo siguiente:

- Con las palancas o los mandos de control en posición neutral, pruebe el control de velocidad del motor.
- Opere cada pedal, palanca o mando de control para cerciorarse de que todas las funciones sean correctas.
- Opere las palancas o los mandos de control de desplazamiento para asegurar la operación correcta hacia adelante y en reversa. Desplazándose lentamente en un área despejada y segura, pruebe la dirección hacia la derecha e izquierda.
- Revise los frenos de estacionamiento y de servicio de acuerdo con los manuales de operación del fabricante.

**!ADVERTENCIA!** Antes de operar la máquina por motivos laborales, asegúrese de poder controlar la velocidad y la dirección de la máquina. La pérdida de control podrá derivar en la muerte de una persona o la aparición de lesiones graves.



Opere los instrumentos y controles de manera correcta.

Las segadoras agrícolas/industriales vienen equipadas con diversas configuraciones de control, patrones y modos de operación; cada uno con sus características propias de manejo. Algunas tienen controles seleccionables o configurables para ajustarse a las preferencias personales o a las aplicaciones específicas.

## Probar los controles

No utilice una máquina que no esté en buenas condiciones de operación. Es su responsabilidad verificar el estado de todos los sistemas y de realizar la revisión en un área segura.

## Realizar una revisión de operación

Mire los medidores, los instrumentos y las luces de advertencia para asegurarse de que estén funcionando y de que sus lecturas se encuentren dentro de los valores operativos.

## Después de arrancar el motor

Los fluidos de éter/arranque en frío son ALTAMENTE INFLAMABLES. Antes de usarlos, siempre lea las indicaciones del recipiente del fluido de éter/arranque en frío y los manuales de operación del fabricante.

**!ADVERTENCIA!** Evite las lesiones provocadas por las explosiones o los incendios. Si el motor tiene una bujía de precalentamiento u otro tipo de colector de admisión de usar el fluido de éter/arranque en frío.

# Prepararse para una operación segura

## Conozca el área de trabajo

Obtenga la mayor cantidad de información posible sobre su área de trabajo.

### Controle el nivel del suelo o piso

Antes de operar, inspeccione la superficie por la que se desplazará. Busque hoyos, áreas resbaladizas, desniveles y obstáculos como rocas, troncos u otros elementos. Fíjese que no haya lugares irregulares ni obstáculos escondidos en las superficies que puedan provocar un accidente o la pérdida de control. Fíjese que no haya derrames de aceite, lugares mojados y superficies resbaladizas. Verifique la ubicación de arroyos y barrancas. Fíjese que no haya suelo blando, barro profundo, agua estancada ni zonas pantanosas. Fíjese que no haya nada que pueda hacerle perder el control o hacer que la máquina se dé vuelta.

Planifique anticipadamente el recorrido, así puede ver y proteger a los transeúntes. Recoja los escombros que puedan perforar los neumáticos.

### Planifique su trabajo.

Corrija las condiciones inseguras. No opere en área problemáticas donde no se pueden retirar o señalizar escombros y obstáculos.

# Prepararse para una operación segura

## Subir y bajar correctamente

Siempre utilice un contacto de tres puntos al subir o bajar de la máquina. Un contacto de tres puntos significa una mano y dos pies o dos manos y un pie en contacto con la máquina en todo momento.

Nunca suba ni baje mientras lleve herramientas u objetos que le impidan tener un contacto de tres puntos. Apoye las piezas o las herramientas. Manteniendo un contacto adecuado, suba o baje y, luego, recoja el objeto.

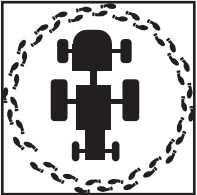
Mire hacia la máquina cuando se suba o baje de ella. Limpíese el calzado y las manos. Retire los residuos químicos, la nieve, el hielo, el barro o el aceite de los peldaños y los pasamanos.

Al subir y bajar:

- Utilice los pasamanos y las placas de los peldaños.
- Nunca utilice volantes, mandos de control ni controles como pasamanos.
- Nunca salte para subir o bajar de la máquina.
- Nunca suba ni baje de una máquina en movimiento.



Utilice un contacto de tres puntos al subir o bajar.



Antes de comenzar, camine alrededor de toda el área de la segadora.

**Avisar al personal antes de comenzar**

Antes de comenzar, camine alrededor de toda el área de la máquina. **Asegúrese de que no haya ninguna persona debajo de la máquina, en ella o próxima a ella.** Aviseles a las personas que va a usar la máquina y no la use hasta que todos se alejen de ella. Como operador del equipo, usted es responsable del uso seguro de la máquina; por lo tanto, asegúrese siempre de haber comunicado sus planes de trabajo al resto de las personas que estén en el lugar.

### Verifique los espacios aéreos.

- El procedimiento de corte más eficiente.
- La altura del material a cortar.
- Condiciones del terreno de operación.
- Cómo utilizar de la mejor manera el patrón de corte hacia adelante.
- La posibilidad de transeúntes o personas cercanas de quedar expuestos a objetos despididos.

### ¡PELIGRO! Tocar o estar próximo a una máquina que está en contacto con una fuente eléctrica con corriente o cerca de esta podrá derivar en la muerte de una persona o en la aparición de lesiones graves. Nunca se acerque a las líneas eléctricas con ninguna parte de la máquina ni con la carga, salvo que se hayan tomado todas las precauciones de seguridad que se requieran a nivel local, estatal/provincial y federal (OSHA). Se requiere precaución porque las fuentes con alto voltaje pueden generar un arco sin contacto.

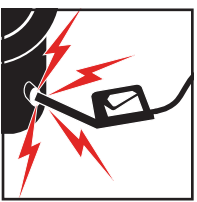
Al trabajar cerca de las líneas de energía, deberá suponer que todas las líneas están con corriente.

# Prepararse para una operación segura

## Peligro de combustible diesel ultra bajo en azufre (ULSD)

**Evite el riesgo de electricidad estática al cargar combustible.**

**¡ADVERTENCIA!** El diesel ultra bajo en azufre (ULSD, por sus siglas en inglés) posee un mayor peligro de ignición estática que las formulaciones anteriores de diesel. Evite la muerte o las lesiones graves provocadas por incendios o explosiones. **Consulte a su proveedor de combustible o del sistema de suministro** para asegurarse de que el sistema de combustible para las prácticas adecuadas de puesta a tierra y enlace.



La descarga estática durante la carga de combustible puede provocar una explosión.



Prohibido fumar y prohibidas las llamas abiertas

# Prepararse para una operación segura

## Operar en ambientes inflamables/explosivos

**¡ADVERTENCIA!** Una máquina estándar equipada con un supresor de chispas/silenciador de detención de chispas no se puede operar en atmósferas inflamables o explosivas. El uso en ambientes inflamables o explosivos puede provocar incendios o explosiones que podrían derivar en lesiones graves o la muerte.

**Use solo una segadora agrícola/industrial aprobada con una designación de G, GS, D, DS, DY, LP, LPS, G/LP o GS/LPS en la etiqueta.** Consulte el Código de Reglamentaciones Federales (OSHA) 29 CFR Parte 1910.178 para determinar las áreas en las que se pueden operar estas máquinas.



No opere en ambientes inflamables/explosivos

## Limpieza

Limpie ventanas, luces y letreros de seguridad. Asegúrese de que el área del operador, las palancas de dirección, los pedales, los mandos de control, los peldaños y las manijas estén limpios. La presencia de aceite, grasa, hierba, hojas, agujas, nieve, hielo, barro o escombros en estas áreas podría hacer que se resbale y caiga, o bien que pierda el control de la máquina. Limpie el exceso de barro de las botas antes de ingresar en la máquina. Retire todos los objetos personales u otros artículos del área del operador. Coloque estos objetos en una caja de herramientas o retírelos de la máquina.

## Actúe con precaución al cargar combustible.

**¡ADVERTENCIA!** Evite las lesiones provocadas por incendios o explosiones. **Nunca llene el tanque de combustible con el motor encendido, mientras fuma o cerca de una llama abierta.**

Nunca desborde el tanque ni derrame combustible. Si se derrama combustible, límpielo de inmediato. Asegúrese de usar el tipo y el grado correctos de combustible. Realice la puesta a tierra del embudo o de la boquilla de combustible con el cuello de llenado para evitar las chispas que puedan generar vapores de combustible. Asegúrese de volver a colocar la tapa del depósito de combustible, si hubiera, cuando termine.



Ventile el área de trabajo.

## Los humos del escape en un espacio cerrado pueden causar la muerte

Ventile el escape y asegure un flujo de aire fresco si se utiliza un motor de combustión interna en un espacio cerrado. **¡ADVERTENCIA!** Los humos del escape de motores diesel, con gasolina o gas licuado del petróleo pueden causar la muerte. **No respire los humos del escape de ningún tipo de motor.**

# Prepararse para una operación segura

## Peligro de penetración de fluidos presurizados

**¡ADVERTENCIA!** La penetración accidental de fluido presurizado en las manos o el cuerpo es peligrosa y podrá derivar en la muerte de una persona o la aparición de lesiones graves. Entre los fluidos presurizados se encuentran el aceite, el fluido hidráulico o el agua. **Actúe con precaución al revisar las fugas de fluido ya que los fluidos presurizados pueden penetrar en la piel o los ojos y provocar lesiones personales graves.**

El fluido presurizado puede penetrar en el cuerpo.



- Si se detecta una fuga:
- Asegúrese de que el motor esté apagado; libere la presión en el sistema de fluidos.
- Utilice una protección adecuada para las manos y los ojos.
- Examine visualmente las líneas de fluido en las inmediaciones de la fuga para detectar roturas o rajaduras.
- No utilice las manos para verificar la presencia de fugas.
- Repare o reemplace las líneas de fluido, de acuerdo con la recomendación del fabricante.

## Evitar lesiones provocadas por equipos elevados

Evite cualquier posible lesión por aplastamiento por caída de la segadora u otro equipo elevado.

Antes de trabajar cerca o debajo de la segadora o piezas del equipo elevadas:

- Apoye o bloquee de manera segura la segadora o las piezas del equipo elevadas de acuerdo con el manual del operador.
- Apoye, bloquee o trabde de manera segura las alas con dispositivos de bloqueo aprobados o baje la segadora o las piezas del equipo al suelo.
- Utilice las trabas de transporte cuando traslade la segadora en caminos públicos.

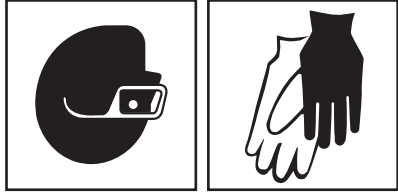
**¡ADVERTENCIA!** Prevenga posibles lesiones por aplastamiento por caídas de equipos. La falla del sistema hidráulico o de una pieza podría generar que los equipos sin apoyo se caigan. **No pase debajo de equipos elevados a menos que estén apoyados correctamente de acuerdo con el manual del operador.**

Evite el aplastamiento: bloquee o apoye de manera segura la segadora.



Las lesiones por penetración de fluidos no siempre son evidentes. Las víctimas informaron que estas lesiones son como la picadura de una abeja o una espina debajo de la piel. Si sospecha que ha sufrido una lesión por penetración de fluidos, no corra riesgos. Busque de inmediato la atención médica correspondiente. Asegúrese de que el profesional médico comprenda que la lesión puede haber sido causada por una inyección de fluidos. Si le penetra algún fluido en la piel, un médico familiarizado con este tipo de lesiones deberá extraerlo quirúrgicamente al cabo de algunas horas.

Utilice una protección adecuada para las manos y los ojos



**¡ADVERTENCIA!** Deje que el radiador se enfríe antes de controlar el nivel. Los fluidos calientes del radiador pueden escaparse como vapor y quemarle. (Consulte la página 44, Peligros del refrigerante del motor.)

Cuando verifique el sistema de enfriamiento, siga las instrucciones del fabricante para asegurarse de que el motor esté apagado y frío para evitar que el ventilador arranque inesperadamente. Asegúrese de que los enfriadores y el compartimiento del motor estén limpios y libres de escombros, ya que podrían encenderse y provocar un incendio. Si la máquina se enfría con aire, asegúrese de que no esté obstruido el flujo de aire de la unidad de enfriamiento. Si se entra con líquidos, revise el nivel del refrigerante (en el tanque de desbordamiento, si se proporciona).

**Deje que el radiador se enfríe antes de retirar lentamente la tapa**



# Prepararse para una operación segura

## Inspeccione las máquinas

Antes de comenzar su jornada laboral, controle lo siguiente según corresponda y repare o reemplaze lo necesario. A lo largo de este manual se proporcionan detalles y descripciones adicionales. Realice los procedimientos de mantenimiento diarios y periódicos, de acuerdo con las indicaciones del fabricante.



Verifique todos los dispositivos de seguridad

## Condición de la máquina

Asegúrese de que todos los componentes estén en condiciones de operación. Verifique lo siguiente según corresponda:

- La ROPS está presente y, si es plegable, está elevada y en posición segura.
- La cabina está en buenas condiciones, y las ventanas y puertas funcionan correctamente.
- La carcasa principal de la toma de fuerza (PTO, por sus siglas en inglés) está instalada y funciona correctamente.
- La plataforma de la estación del operador está despejada de herramientas, objetos y escombros.
- Los escalones, asideros o barandillas asociados están limpios y funcionales.

## Accesorios de la máquina

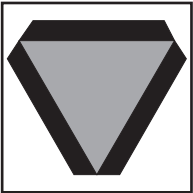
- Mantenga la superficie de la plataforma del operador limpia y libre de grasa, aceite, suciedad, nieve o hielo. Los escalones y asideros deben estar limpios y ser funcionales.
- Todas las demás protecciones y carcasas están correctamente instaladas y en buenas condiciones.
- Los componentes del sistema hidráulico están asegurados de manera correcta y no están dañados ni tienen fugas.
- Las ruedas y los neumáticos no están dañados ni le faltan piezas, los neumáticos tienen la presión correcta y las tuercas o pernos tienen la torsión adecuada.

Asegúrese de que todos los accesorios estén en condiciones de operación. Verifique los siguientes accesorios según corresponda:

- Los sistemas de fijación mecánica están conectados correctamente.
- Pasador de enganche de la barra de tracción con retención positiva.
- Cadena de remoique de seguridad.
- Enganche de 3 puntos u otras características de acoplamiento/bloqueo.
- Las mangueras hidráulicas están conectadas y funcionando correctamente.
- Las mangueras hidráulicas están correctamente apoyadas para evitar daños.
- Las funciones hidráulicas funcionan según lo esperado.

## Compatibilidad de la máquina

- Los acopladores no tienen fugas.
- Los dispositivos de iluminación, como luces intermitentes de advertencia, señales de giro, luces traseras, luces de freno y luces de trabajo están conectadas y funcionando correctamente.



Utilice iluminación y señalización

- El cinturón de seguridad, los anclajes y la hebilla están en condiciones de funcionamiento adecuadas.
- Los yugos, acopladores y carcasas de la línea de transmisión de la PTO de la segadora están en buenas condiciones de funcionamiento.
- Elementos de corte y accesorios de sujeción no están desgastados, dañados ni en falta. Nunca intente reparar piezas desgastadas o dañadas; siempre reemplácelas con piezas originales OEM.
- El sistema de protección contra objetos despedido está completo e instalada.
- Los dispositivos de iluminación y señalización, como luces intermitentes de advertencia, señales de giro, luces de freno, luces de trabajo, emblemas de vehículo de movimiento lento (VML), señales de identificación de velocidad (SIS, por sus siglas en inglés), si corresponde, y materiales reflectantes son visibles y están en condiciones de funcionamiento.

# Seguir un programa de seguridad

## Conocer el equipo

Lea y comprenda las etiquetas de seguridad de PELIGRO, ADVERTENCIA, PRECAUCIÓN y AVISO, y demás letreros informativos que aparezcan en la máquina, los accesorios y los manuales de operación del fabricante. Pídale a su supervisor o al distribuidor que le expliquen la información que no comprende. El incumplimiento de las indicaciones de seguridad podrá derivar en la muerte de una persona o la aparición de lesiones graves.

### Conozca lo siguiente sobre el equipo:

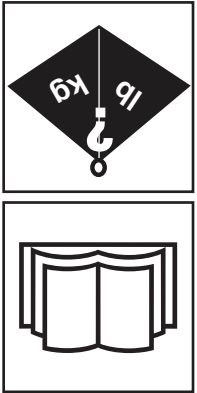
- Función, propósito y uso de todos los controles
  - Velocidades correctas de operación
  - Características de frenado y dirección
  - Capacidades para andar sobre terrenos con pendientes
  - Radio y espacio para girar
  - Cómo detener rápidamente el equipo ante una emergencia
- Tenga en cuenta que la lluvia, la nieve, el hielo, las piedras sueltas, el suelo blando, las pendientes y otras condiciones del lugar pueden afectar las capacidades de operación de la máquina. Asegúrese de estar absolutamente familiarizado con la estabilidad, los frenos, la tracción y demás características de manejo de la máquina en todas las condiciones que es probable que se le presenten.

## Verifique y use todos los dispositivos de seguridad que estén disponibles.

Con el fin de protegerlos a usted y a otras personas, es posible que su máquina incluya los equipos de seguridad que se indican a continuación. Es posible que se requiera un equipo adicional o que algunos artículos no se necesiten, según los accesorios que se utilicen, las condiciones del área de trabajo o las normas pertinentes del área de trabajo. Verifique que cada artículo que se requiera esté debidamente colocado y en condiciones de operación:

- Cinturón de seguridad.
  - Estructura de protección contra vuelcos (ROPS, por sus siglas en inglés).
  - Luces de operación y advertencia.
  - Letreros de seguridad
  - Espejos
  - Kit de primeros auxilios
  - Extintor/sistema de extinción de incendios
  - Limpiaaparabrisas/desempañador
- ¡Úselos! Nunca retire ni desconecte ningún dispositivo de seguridad.

## Prepararse para una operación segura



Conozca la capacidad y las características operativas de la máquina

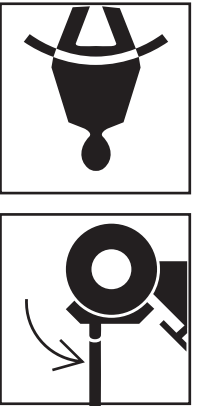
Lea y comprenda los manuales antes de operar una máquina

**IMPORTANTE:** En este manual se cubren las prácticas seguras del equipo de segadoras agrícolas/industriales. Si su máquina está equipada con otros dispositivos o accesorios especiales, lea los manuales de operación y de seguridad del fabricante correspondientes a ese equipo en cuestión antes de usarlo.

Asegúrese de que todas las estructuras de protección, protecciones, carcasas, pantallas y paneles del fabricante estén en buenas condiciones, en su lugar y bien sujetos. Los componentes de seguridad dañados, faltantes o flojos pueden provocar una situación peligrosa para usted como operador. Nunca retire ni modifique ningún componente de seguridad, incluída la carcasa contra objetos despididos de una segadora.

Sepa que dispositivos se requieren por motivos de protección durante una operación en particular y úselos.

**¡ADVERTENCIA! Nunca retire ni modifique una ROPS, salvo cuando se realice el mantenimiento de la máquina. Vuelva a instalarla correctamente antes de la puesta en marcha de la máquina.** Esto puede derivar en la muerte de una persona o la aparición de lesiones graves.



Ajustese el cinturón de seguridad.

Nunca modifique una ROPS

# Seguir un programa de seguridad

## Conozca las normas

La mayoría de las áreas de trabajo tienen normas que rigen el uso y el mantenimiento de los equipos. Antes de empezar a trabajar en un lugar nuevo, consulte al supervisor o coordinador de seguridad. Pregunte sobre las normas que deberá obedecer.

La OSHA hace cumplir las leyes federales dentro del territorio de los Estados Unidos que regulan la operación, la aplicación y el mantenimiento seguros de los equipos en algunas áreas de trabajo. Es responsabilidad del empleador cumplir con estas leyes. Es posible que un representante federal inspeccione periódicamente un área de trabajo para asegurarse de que se estén siguiendo estas leyes.

Es posible que haya otras leyes locales, estatales/provinciales, federales u organizaciones internacionales que regulen el uso de este equipo, además de las normas específicas del área de trabajo o del empleador. Es importante que conozca y cumpla con todas las leyes y normas pertinentes, incluidas aquellas que requieren la capacitación y certificación del operador.

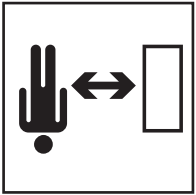
### Estas son algunas de las normas que rigen su trabajo:

- Un tractor equipado con cinturón de seguridad y una estructura de protección contra vuelcos (ROPS) es un requisito del gobierno federal (OSHA) para la protección del operador durante las operaciones de siega. Una cabina cerrada le proporciona al operador protección adicional contra objetos despididos. Consulte los manuales del operador de su segadora para conocer si también se requiere una cabina de tractor.
- Solo las personas calificadas y autorizadas podrán operar este equipo.

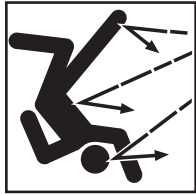
# Seguir un programa de seguridad

## Conozca las normas

- Utilice la vestimenta y el equipo de protección personal (EPP) adecuados.
- Nunca deje que los niños jueguen cerca del equipo, se suban en él o lo operen. Los niños no están calificados para operar este equipo.
- No lleve pasajeros.
- Mantenga a los transeúntes a 300 pies (92 m) de la operación de las segadoras rotativas y a 100 pies (31 m) de las segadoras de disco.



Mantenga alejados a los transeúntes.



Tenga cuidado con los objetos despididos.

- Conozca el área de trabajo antes de usar el equipo. Sea consciente de los posibles peligros del terreno que pueda encontrar. Retire o señale los obstáculos y escombros que podrían dañar o ser despididos por la segadora.
- Instale correctamente todas las carcasas y protecciones antes de operar la máquina.
- Solo use accesorios y piezas aprobados por el fabricante. Siempre que abandone la máquina, baje la máquina o todos los accesorios, aplique el freno de estacionamiento, apague el motor y gire las palancas de control hidráulico, y retire la llave antes de dejar la estación del operador. (Consulte la página 38, **Apagado seguro**.)
- Utilice un contacto de tres puntos (pasamanos y peldaños) y mire el equipo al subir o bajar. (Consulte la página 21, **Subir y bajar correctamente**.)



Conozca y comprenda las normas de operación



Ajustese el cinturón de seguridad.

# Seguir un programa de seguridad

## Para una operación segura

Para operar esta máquina de manera segura, debe estar autorizado y calificado. Debe comprender con claridad las instrucciones por escrito que brinda el fabricante, haber recibido capacitación — que incluye operar la máquina — y conocer las normas y regulaciones de seguridad del área de trabajo. Es una buena práctica de seguridad señalar y explicar los letreros y las prácticas de seguridad a terceros, y asegurarse de que estos comprendan la importancia de seguir estas indicaciones.



**! ADVERTENCIA!** Operar maquinaria mientras se está bajo los efectos del alcohol o las drogas puede derivar en la muerte de una persona o la aparición de lesiones graves. Las drogas y el alcohol afectan el estado de alerta, la coordinación y la capacidad del operador de operar el equipo de manera segura. **Nunca opere la máquina si está bajo los efectos del alcohol o las drogas. Nunca permita que otra persona opere la máquina si sabe que su estado de alerta o coordinación están afectados.**

## !Tenga cuidado!

Los errores humanos son el resultado de muchos factores: descuido, cansancio, sobrecarga sensorial, preocupación, desconocimiento de la máquina o de los accesorios, consumo de drogas y alcohol, por nombrar algunos. Puede evitar la muerte de una persona o la aparición de lesiones graves provocadas por estas y otras prácticas laborales inseguras. Tenga cuidado; nunca dé por sentado que los accidentes no le sucederán a usted. Por su seguridad y la de terceros, actúe de manera segura y aliente a sus compañeros de trabajo a que también lo hagan.

## Protéjase

Use toda la vestimenta personal apropiada y el equipo de protección personal (EPP) que se le entregue o que se requiera dadas las condiciones laborales. Es posible que necesite lo siguiente:

- Casco
- Calzado de seguridad
- Anteojos de seguridad, gafas de seguridad o máscara de protección facial
- Guantes para tareas pesadas
- Protección auditiva
- Vestimenta reflectante
- Indumentaria para clima húmedo
- Respirador o máscara con filtro

Los operadores que tomen medicamentos recetados o de venta libre deben consultar a un profesional médico respecto de cualquier efecto secundario del medicamento que pueda afectar su capacidad de operar este equipo de manera segura.

## !Esté alerta!

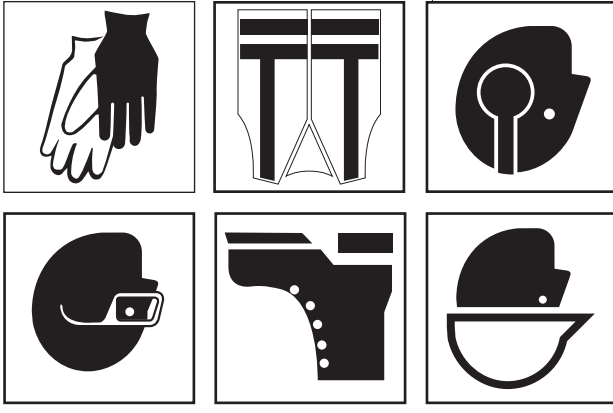
Sepa dónde acudir para solicitar ayuda. Mantenga los números de emergencia de médicos, ambulancias, hospitales y cuarteles de bomberos cerca de su teléfono. Sepa cómo usar un kit de primeros auxilios y un extintor/sistema de extinción de incendios. Sepa su ubicación y practique llegar a ellos. Asegúrese de que se les hayan hecho las pruebas y el mantenimiento correspondientes. Informe a otras personas dónde va a trabajar y a qué hora estará regresando. Si llega a ocurrir una emergencia, es conveniente que otras personas sepan dónde encontrarlo.

## !Esté atento!

Aproveche los programas de capacitación que se ofrecen. Conozca la respuesta adecuada ante un incendio o derrame químico en su máquina.

# Seguir un programa de seguridad

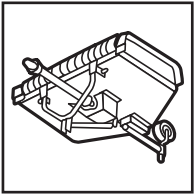
Use todo lo que necesite para protegerse, no corra riesgos. **! ADVERTENCIA!** Evite la muerte de una persona o la aparición de lesiones graves provocadas por los atoramientos. **No use vestimenta ni accesorios holgados o deshilachados que puedan quedar atrapados en las piezas que se mueven.** Entre los artículos que debe evitar se incluyen, a modo de ejemplo, puños que se caigan, corbatas y bufandas que cuelguen, carteras con cadena, joyas, pulseras y relojes de pulsera.



# Tipos de segadoras agrícolas/industriales

## Tipos de segadora agrícola/industrial

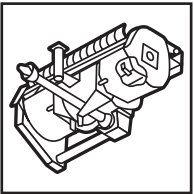
Las segadoras se utilizan para recortar pastizales, triturar residuos de cultivos, cortar vegetación densa y cortar cursos de agua, derechos de paso, bordes de caminos o carreteras. También, estas segadoras se utilizan para cortar hierba y otra vegetación en áreas públicas como parques y cementerios.



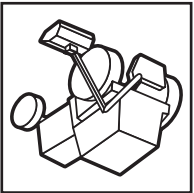
Rotativa



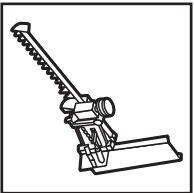
Rotativa de ala plegable



Desbrozadora



De brazo

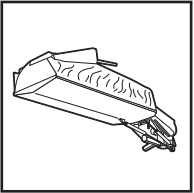


Con barra en forma de hoz

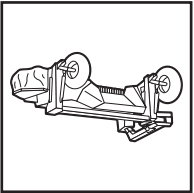
# Tipos de segadoras agrícolas/industriales

## Tipos de segadoras agrícolas de discos

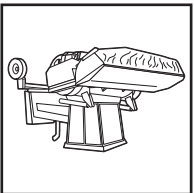
Las segadoras de discos están diseñadas y equipadas para cortar cultivos de heno a mayor velocidad en el campo.



Segadora de disco



Segadora acondicionadora de disco



Segadora hileradora autopropulsada

Las segadoras acondicionadoras de disco cortan y acondicionan los cultivos.

Las segadoras hileradoras autopropulsadas cortan y forman hileras de heno acondicionado.

# Alertas de seguridad

## Indicaciones de advertencia

Las indicaciones de advertencia son palabras distintas que suelen encontrarse en letreros de seguridad de la segadora y en otros equipos del área de trabajo. Estas indicaciones también pueden encontrarse en este manual y en los manuales del operador. El objetivo de estas indicaciones es alertar al operador sobre un peligro y su gravedad.

**PELIGRO** indica una situación peligrosa que, si no se evita, derivará en la muerte de una persona o la aparición de lesiones graves.



**ADVERTENCIA** indica una situación peligrosa que, si no se evita, podría derivar en la muerte de una persona o la aparición de lesiones graves.



**ATENCIÓN** indica una situación peligrosa que, si no se evita, podría derivar en una lesión menor o moderada.



**AVISO** Se utiliza para abordar prácticas que no están relacionadas con una lesión física.



## Símbolo de Alerta de seguridad

Este símbolo de alerta de seguridad significa lo siguiente: **“¡Atención! Permanezca en alerta! Su seguridad está en riesgo!”**



El símbolo de alerta de seguridad se utiliza para alertarlo sobre peligros potenciales e identifica mensajes de seguridad importantes en el equipo, en letreros de seguridad, en manuales o en cualquier otro lugar. Cuando vea este símbolo, manténgase alerta ante la posibilidad de muerte de una persona o aparición de lesiones personales. Lea atentamente el mensaje que sigue e infórmeles a otros operadores. Siga las indicaciones del mensaje de seguridad.

# Información para el usuario/operador

Recuerde que **USTED** es la clave de la seguridad. Las buenas prácticas de seguridad no solo lo protegen a usted, sino que también protegen a las personas que le rodean. Analice este Manual y los manuales de operación del fabricante de la máquina específica. Incluyalos en su programa de seguridad. Tenga en cuenta que este manual de seguridad está escrito únicamente para segadoras agrícolas/industriales. Si, después de analizar los manuales de operación del fabricante y este Manual de Seguridad tiene alguna pregunta, comuníquese con el fabricante del equipo.

**Ponga en práctica todas las precauciones laborales seguras habituales y recuerde lo siguiente:**  
**!La operación segura depende de usted!**  
**!Puede evitar la muerte o las lesiones graves provocadas por las prácticas laborales inseguras!**

**Lea y comprenda los manuales antes de operar una máquina**



Es **su** responsabilidad leer y comprender este Manual de Seguridad y los manuales de operación del fabricante antes de operar este equipo. En este Manual de Seguridad, se indica paso a paso cómo es una jornada laboral. Se proporcionan gráficos para ayudarle a comprender el texto. El reconocimiento de los peligros y la prevención de los accidentes dependen de su estado de alerta, atención y de la capacitación adecuada que reciba en las áreas de inspección, operación, transporte, mantenimiento y almacenamiento de este equipo.

El objetivo de este Manual de Seguridad es señalar algunas de las situaciones de seguridad básicas que pueden presentarse durante la operación y el mantenimiento habituales de su máquina e indicarle las prácticas seguras para tratar estas situaciones. Este manual **NO** reemplaza los manuales de operación del fabricante.

Es posible que deban tenerse otras precauciones o que algunas indicaciones no se apliquen, según el equipo, los accesorios y las condiciones en el área de trabajo o de servicio. El fabricante no ejerce ningún tipo de control directo sobre la aplicación, la operación, la inspección o el mantenimiento del equipo. Por lo tanto, es **SU** responsabilidad aplicar buenas prácticas de seguridad en estas áreas.

La información que se proporciona en este Manual complementa la información específica sobre su máquina, que se incluye en los manuales de operación del fabricante. Entre los documentos que podrían contener información que podría incidir en la operación segura de su máquina, se encuentran los siguientes:

- Letreros de seguridad
- Requisitos del seguro
- Programas de seguridad y capacitación del empleador
- Códigos de seguridad
- Leyes, normas y regulaciones locales, estatales/provinciales y federales

# Introducción



Lea y comprenda los manuales antes de operar una máquina

**¡IMPORTANTE!** Antes de operar esta máquina, asegúrese de tener los manuales de operación del fabricante de esta máquina y de todos los accesorios. Si no tiene el manual de operación del fabricante, pídale una copia a su empleador, al distribuidor o, directamente, al fabricante. En todo momento, conserve en la máquina este manual de seguridad y los manuales de operación del fabricante. Lea y comprenda todos los manuales pertinentes. Algunos fabricantes y distribuidores ofrecen videos de seguridad y otros recursos de capacitación. El video de seguridad de la segadora agrícola/industrial de la AEM está disponible para capacitarse y reforzar las buenas prácticas de seguridad. Este video está disponible en [www.safetymaterials.org](http://www.safetymaterials.org). Se alienta a los operadores a que revisen periódicamente estos recursos.

# Agradecimientos

Queremos agradecerles a los miembros de la Asociación de Fabricantes de Equipos por su valiosa contribución para la elaboración de este Manual de seguridad.

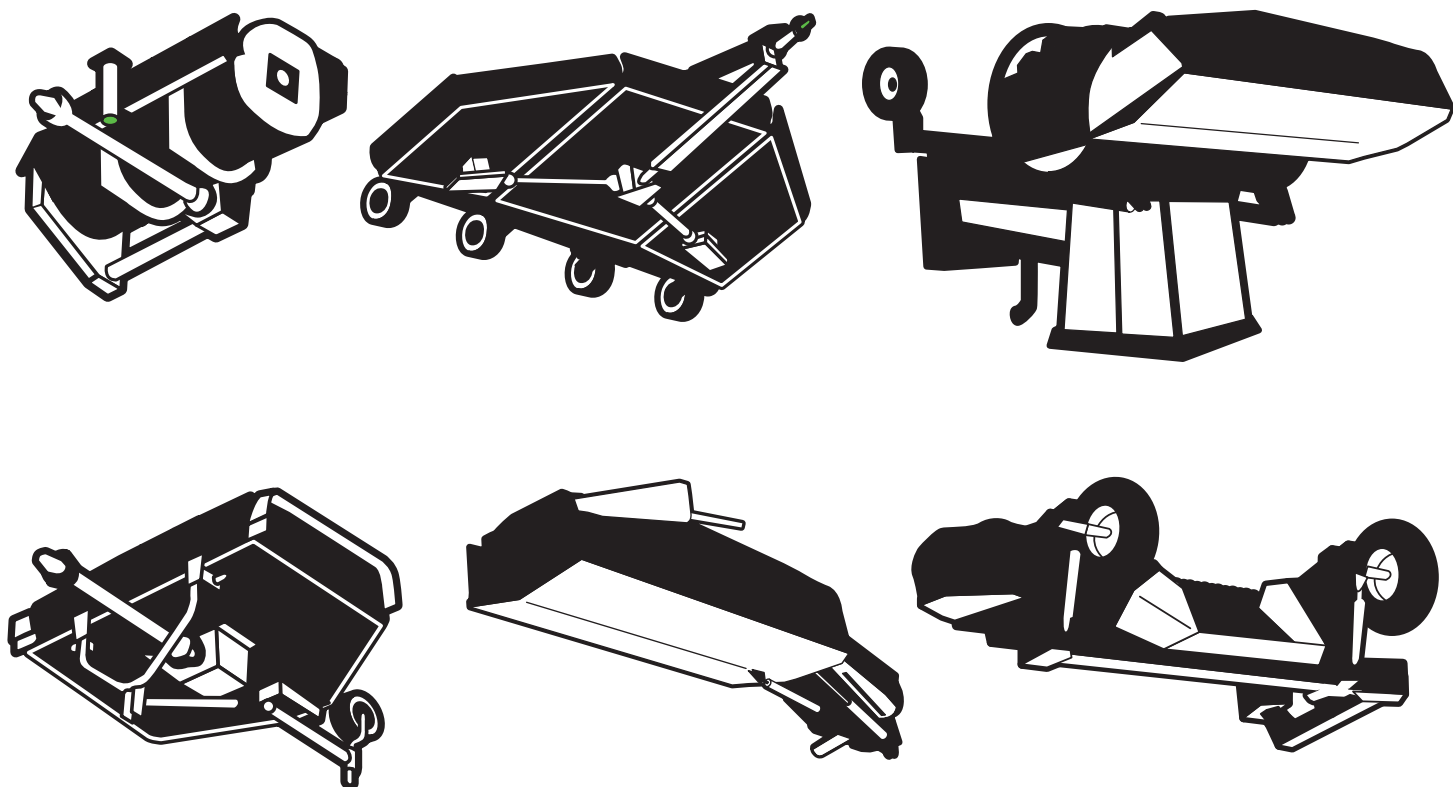
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Revisado 01/03, 09/10 y 01/24

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# MANUAL DE SEGURIDAD



PARA EL PERSONAL DE OPERACIÓN Y MANTENIMIENTO

SEGADORA AGRÍCOLA/INDUSTRIAL

**AEM**  
Asociación de  
Fabricantes de Equipos



# INTRODUCTION SECTION

# INTRODUCTION

We are pleased to have you as a Bush Hog customer. Your Rotary Cutter has been carefully designed with care and built with quality materials by skilled workers to give maximum service with minimum down time. This manual is provided to give you the necessary operating and maintenance instructions for keeping your rotary cutter in top operating condition. Careful use and timely service saves extensive repairs and costly downtime losses. Please read this manual thoroughly. Understand what each control is for and how to use it.

Bush Hog typically offers three types of shielding to protect the operator, passerby, livestock, and property from thrown objects... deflectors, single chain guards, and double chain guards. Shielding should be selected based on the intended use of the mower. Double chain guards or deflectors should be used for highway, right-of-way, parks or greenbelt mowing or all other mowing where human dwellings, vehicles, or livestock could be within 300 feet of the mower. Chain guards are more durable, provide a longer service life and require less maintenance and replacement than deflectors. Single chain guards may be sufficient for agriculture and other mower use only where passersby or property are not within 300 feet of the mower during operation.

No shielding is 100% effective in preventing thrown objects. The possibility of injury and property damage from this hazard can be substantially reduced by selecting proper shielding, maintaining the mower and shielding in good operational condition, inspecting the area for foreign debris before mowing, operating the mower at a minimum cutting height of 1-1/2", and keep unprotected persons at a minimum distance of 300 feet from the mower at all times during operation.

Safety is of primary importance to the owner/operator and to the manufacturer. Observe all safety precautions detailed on the machine and noted throughout the manual for safe operation of implement. If any assistance or additional information is needed, contact your authorized Bush Hog dealer. The owner/operator/dealer should know and understand the Safety Messages before assembly and be aware of the hazards of operating this cutter during assembly, use, and maintenance. The Safety Alert Symbol combined with a Signal Word, as seen below, is intended to warn the owner/operator of impending hazards and the degree of possible injury faced when operating this machine.



Indicates an imminently hazardous situation that, if not avoided, WILL result in DEATH OR VERY SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, COULD result in DEATH OR SERIOUS INJURY.



Indicates an imminently hazardous situation that, if not avoided, MAY result in MINOR INJURY.



Identifies special instructions or procedures that, if not strictly observed, could result in damage to, or destruction of the machine, attachments or the environment.

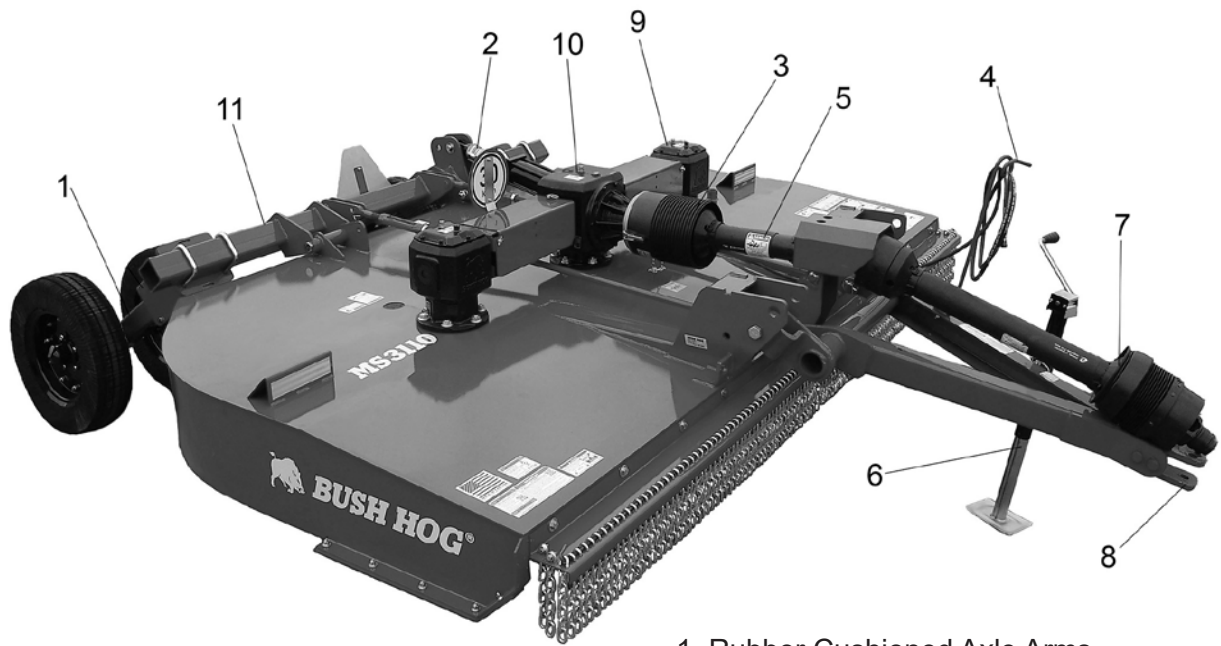
# INTRODUCTION

The Bush Hog MS3110 Rotary Mower is designed for medium duty applications, cutting grass, stalks and brush up to 3-1/2" in diameter. Free swinging blades provide a smooth even cut and will swing back when a stationary object is hit. A slip clutch on the input driveline and rubber couplings on the cross shafts also dampen the impact of the blades hitting a stationary object. Shock absorbing rubber cushions are mounted between the axle arm mounting bracket to reduce shock loads during operation and transporting. These cutters are available with either pull, semi-mount or 3-Point Hitches.

Literature Page



[www.algqr.com/ble](http://www.algqr.com/ble)



1. Rubber Cushioned Axle Arms
2. Hydraulic Cylinder
3. Shielded Slip Clutch
4. Hose Holder
5. Jackshaft
6. Jackstand
7. C.V. Universal Joint
8. Tongue Clevis
9. Outboard Gearbox
10. Transfer Gearbox
11. Axle Assembly

**NOTE:** All references made in this manual to right, left, front, rear, top or bottom are as viewed facing the direction of forward travel with implement properly attached to tractor.

# INTRODUCTION

## EQUIPMENT SPECIFICATIONS

MS3110	
Cutting Width	10'6"
Cutting Height	1-1/2" - 13"
Cutting Capacity	3-1/2" Diameter
Hitch	Cat. 2 or 3 Std. & Quick Hitch / Self-Leveling Pull-Type
Transport Width	11'1"
Deck Thickness	7 Gauge
Side Bands	1/4" x 13"
Driveline	ASAE Category 5
Driveline Protection	4-Plate Slip Clutch
Gearbox Rating (HP)	210" (Transfer) 210" (Cutting)
Tractor PTO Speed	540
Minimum Tractor PTO HP	60 (pull), 75 (Lift)
Blade Holders	7 ga. Round Pans
Blades	1/2" x 4" Uplift
Blade Tip Speed	16.881 fpm
Safety Shielding	Front Single or Double Row Chains / Rear Metal Band or Single or Double Row Chains
Approximate Weight	3,100 lb.
10-Year Gearbox Limited Warranty / 1-Year Machine Limited Warranty	

## KEY OPERATION POINTS

- Cutting performance and distribution are best when cutter is level from side to side and front to rear.
- In extra heavy material, rear chains will allow better discharge and better distribution than solid rear deflectors or bands.
- Never operate the Mower below full PTO speed of 540 or 1000 rpm.
- To reduce uneven grass cutting and streaking.
  - make sure blades are not bent and are in good condition.
  - reduce ground speed to allow more cutting time.
- Corn should be cut at 5 to 6 mph. If full PTO rpm cannot be maintained, use one lower gear.
- If Tractor engine is bogging down, shift tractor to a lower gear
- For maximum performance and service life, Always use Genuine Bush Hog replacement parts

## OPERATING NOISE LEVEL / SOUND PRESSURE

The sound levels at the operator's ear from the attached machine (rotary cutter) are at least 10 dB (A) below the levels from Typical Agricultural tractors used to power and transport this machine. Therefore, the Noise emission values given by the OEM of the Agricultural tractor used to power and transport this machine would be valid when this machine is attached to and operated by the Agricultural tractor in all OEM recommended applications.

# INTRODUCTION

## **LIMITED WARRANTY**

Bush Hog warrants to the original purchaser of any new Bush Hog equipment, purchased from an authorized Bush Hog dealer, that the equipment be free from defects in material and workmanship for a period of one (1) year for non-commercial, state and municipalities' use and ninety (90) days for commercial use from date of retail sale. The obligation of Bush Hog to the purchaser under this warranty is limited to the repair or replacement of defective parts.

Replacement or repair parts installed in the equipment covered by this limited warranty are warranted for ninety (90) days from the date of purchase of such part or to the expiration of the applicable new equipment warranty period, whichever occurs later. Warranted parts shall be provided at no cost to the user at an authorized Bush Hog dealer during regular working hours. Bush Hog reserves the right to inspect any equipment or parts which are claimed to have been defective in material or workmanship.

In addition to the standard Limited Warranty shown above, Bush Hog also provides:

A TEN-YEAR (120 months) GEARBOX LIMITED WARRANTY\* (6 Years Full Coverage; Parts Only for Years 7 through 10) provided they have been properly maintained† and have not been subjected to abuse or mis-use except as limited below.

### **\*WARRANTY LIMITATIONS - GEARBOX**

- A. Gearbox warranty extends to the original purchaser of a Bush Hog Rotary Cutter Only.
- B. Warranty claimant must provide proper product registration and original receipt for purchase.
- C. Bush Hog reserves the right to warrant Gearboxes and components at our discretion based on photographic or video evidence of product failure.
- D. If Bush Hog deems a Gearbox failed due to defects in materials or workmanship, users' Gearboxes may be rebuilt by Bush Hog or replaced by new or rebuilt Gearboxes at the option of Bush Hog.

A ONE-YEAR (12 months) LIMITED WARRANTY\*\* on the DRIVELINE components provided they have been properly maintained† and have not been subjected to abuse or mis-use.

### **\* \*\*WARRANTY LIMITATIONS - DRIVELINE**

- A. A ONE-YEAR (12 months) DRIVELINE LIMITED WARRANTY applies to SHIELDS except where evidence of wear from contact with other parts on the shield voids this warranty.
- B. Shield Bearings are wearing parts and are not warrantable.
- C. Slip-Clutch Plates are wearing parts and are not warrantable. Evidence of "burning up" Slip-Clutch Plates due to improper adjustment will void warranty on Slip-Clutch Parts.

† NOTE - "properly maintained" specifically includes, but is not limited to:

- A) Running Gearboxes with the proper amount of the correct lubricant.
- B) Adjusting Slip-Clutches correctly to provide proper protection for Driveline and Gearbox components.
- C) Proper lubrication of all DRIVELINE components as specified.
- D) Maintaining proper bearing preload on all Gearbox shafts.

# INTRODUCTION

## DISCLAIMER OF IMPLIED WARRANTIES & CONSEQUENTIAL DAMAGES

Bush Hog's obligation under this limited warranty, to the extent allowed by law, is in lieu of all warranties, implied or expressed, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE and any liability for incidental and consequential damages with respect to the sale or use of the items warranted. Such incidental and consequential damages shall include but not be limited to: transportation charges other than normal freight charges; cost of installation other than cost approved by Bush Hog; duty; taxes; charges for normal service or adjustment; loss of crops or any other loss of income; rental of substitute equipment, expenses due to loss, damage, detention or delay in the delivery of equipment or parts resulting from acts beyond the control of Bush Hog.

## THIS LIMITED WARRANTY SHALL NOT APPLY:

1. To vendor items which carry their own warranties.
2. If the unit has been subjected to misapplication, abuse, misuse, negligence, fire or other accident.
3. If parts not made or supplied by Bush Hog have been used in connection with the unit, if, in the sole judgment of Bush Hog such use affects its performance, stability or reliability.
4. If the unit has been altered or repaired outside of an authorized Bush Hog dealership in a manner which, in the sole judgment of Bush Hog, affects its performance, stability or reliability.
5. To normal maintenance service and normal replacement items such as gearbox lubricant, hydraulic fluid, worn blades, or to normal deterioration of such things as belts and exterior finish due to use or exposure.
6. To expendable or wear items such as teeth, chains, sprockets, belts, springs and any other items that in the company's sole judgment is a wear item.

**IN ORDER FOR WARRANTIES TO BE PROCESSED, PRODUCT WARRANTY REGISTRATION MUST BE FILED WITH BUSH HOG THROUGH THE SELLING DEALER.**

Retain original purchase receipt and record the model number, serial number and date of purchase. This information will be helpful to your dealer if parts or services are required.

MODEL NUMBER \_\_\_\_\_

SERIAL NUMBER \_\_\_\_\_

DATE OF PURCHASE \_\_\_\_\_

**NO EMPLOYEE OR REPRESENTATIVE OF BUSH HOG IS AUTHORIZED TO CHANGE THIS LIMITED WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY UNLESS SUCH CHANGE IS MADE IN WRITING AND SIGNED BY BUSH HOG'S SERVICE MANAGER, 2501 GRIFFIN AVE., SELMA, AL. 36703**

# **ASSEMBLY SECTION**

Assembly Section 3-1

# ASSEMBLY

## DEALER SET-UP INSTRUCTIONS

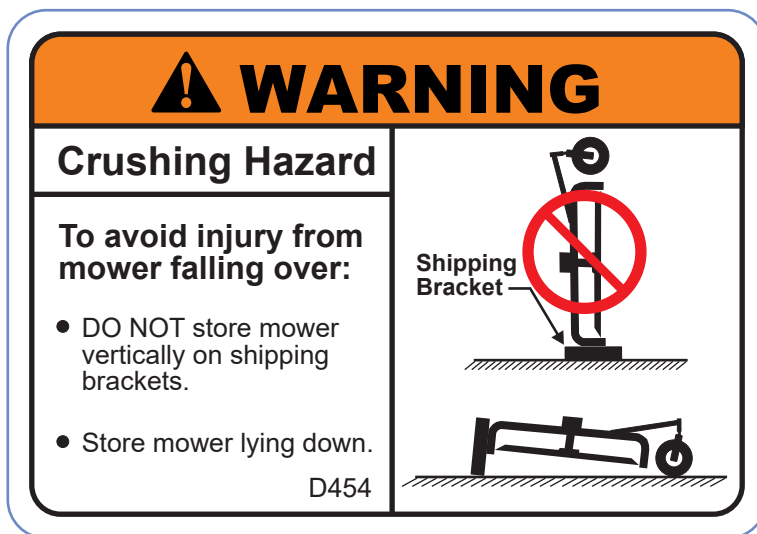
The mower as received from the factory is partially assembled and requires minimum time to complete assembly and is ready for sale.

This mower is shipped vertically with shipping brackets. These shipping brackets are intended for use in transporting the mower from the factory to dealer.



**DO NOT** use these brackets to store the unit. **DO NOT** store mower vertically, the mower can fall over resulting in death or serious injury. To avoid injury always store mower lying down on flat ground.

Assembly will be easier if components are aligned and loosely assembled before tightening hardware. Refer to bolt torque chart in Maintenance Section. All bolts are grade 5 unless other wise specified.



**DO NOT** attempt any assembly while the machine is still attached to the shipping bracket and standing in the vertical position.

Serious injury or death could occur from the machine falling over.

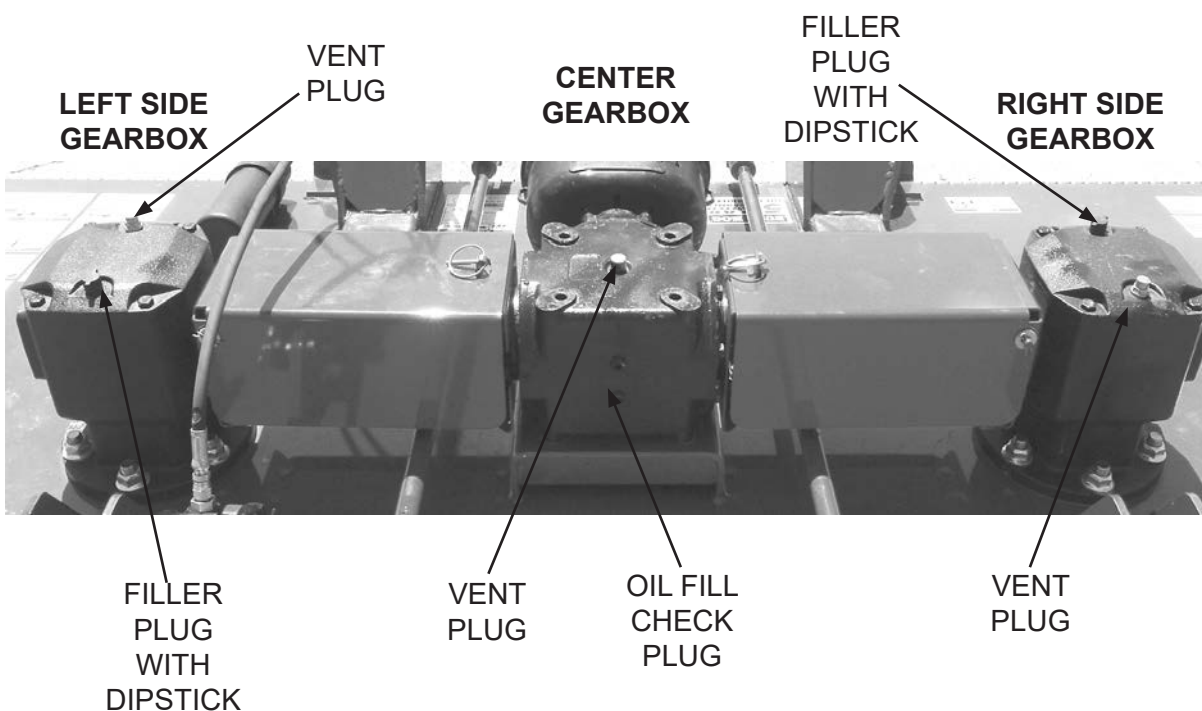
Assembly must be performed with the machine placed on a hard level surface with the shipping bracket removed.

## ASSEMBLY

### NOTICE!

The MS3110 is shipped WITHOUT OIL in the Gearboxes and must be filled before connecting to the Tractor and placed in operation!

**USE EP80W-90 OR EP85W-140**

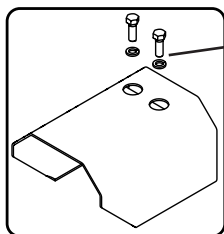


### OIL FILL PROCEDURE DO NOT OVER FILL GEARBOXES.

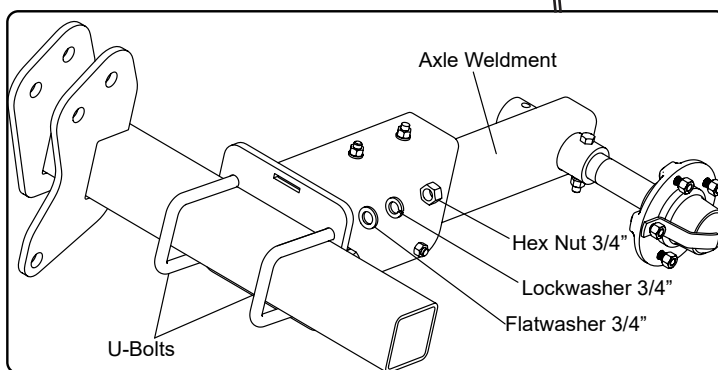
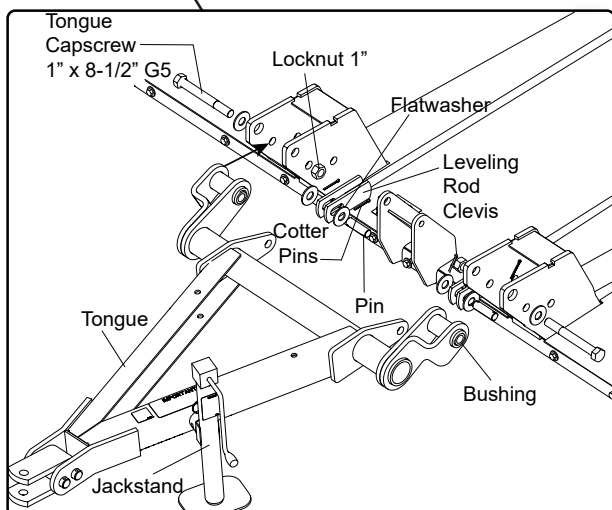
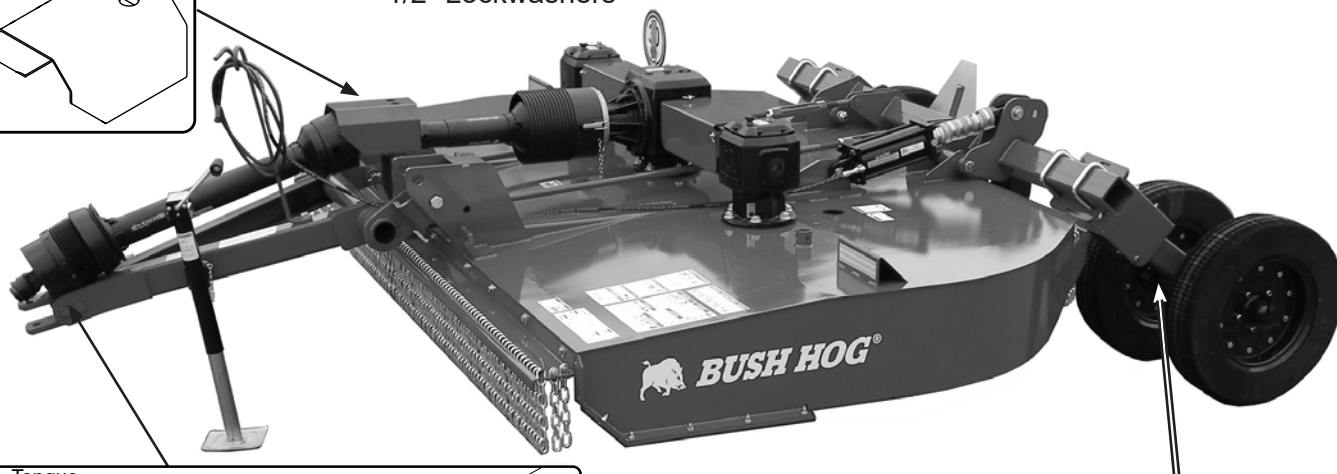
1. Remove the oil filler plugs on top the Left and Right side Gearboxes
2. Add Approximately 149 oz. (4.7 QT) of EP80W-90 or EP85W-140 Gear Oil per box.
3. Check with dipstick on the filler plug.
4. Remove the vent plug from the top of the Center Gearbox and the top check plug from the back of the Center Gearbox. Fill with 222 oz. (6.9 QT.) of EP80W-90 or EP85W-140 Gear Oil until oil runs out the check plug hole.
5. Reinstall the vent plug and the check plug.

# ASSEMBLY

## Pull Type Hitch Model Assembly



Pillow Block Bearing Shield  
1/2" x 1-1/2" Capscrews  
1/2" Lockwashers

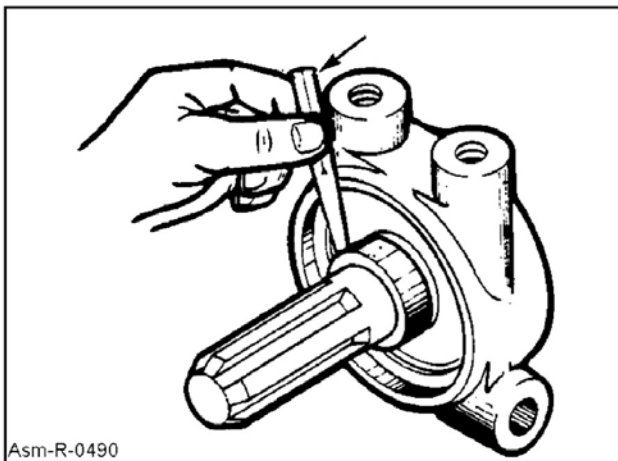
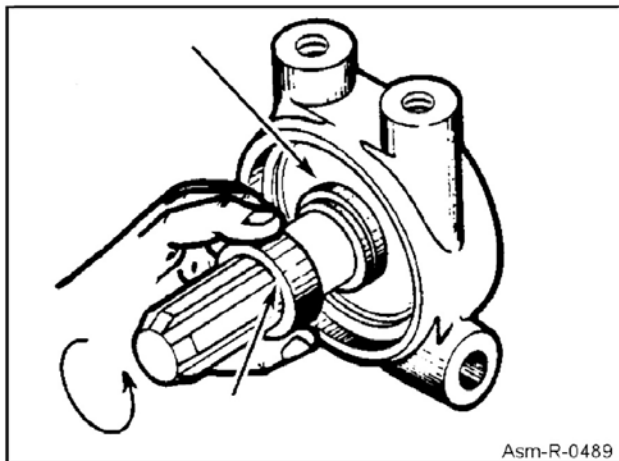


**WARNING** This assembly process should only be performed after the machine is removed from the shipping stand and laying on a level surface!

1. Fill the Gearbox Assemblies with EP80W-90 or EP85W-140 Gear Oil. (See Assembly Section Page 3-3). Allow time for oil to seep through bearings to lower level housing before checking oil level.
2. Remove the Tongue from its shipping position. Mount the Tongue between the struts and align the holes with the lower front holes in the struts (be sure the Bushings are in the Tongue). Attach the Tongue with the 1" x 8-1/2" bolts and 1" locknuts furnished.
3. Place the struts on the Tongue between the Clevis ends of the leveling rods. A flatwasher is placed to the outside on each side of the clevis against the slotted hole of the clevis and the clevis pin placed through the Clevis and Tongue. Use the cotter pins furnished to secure in place.
4. Remove the Axle Arm Assemblies from the shipping position and re-attach so they are to the rear of the machine.
5. Install the Jackstand to the mounting lug on the Tongue.

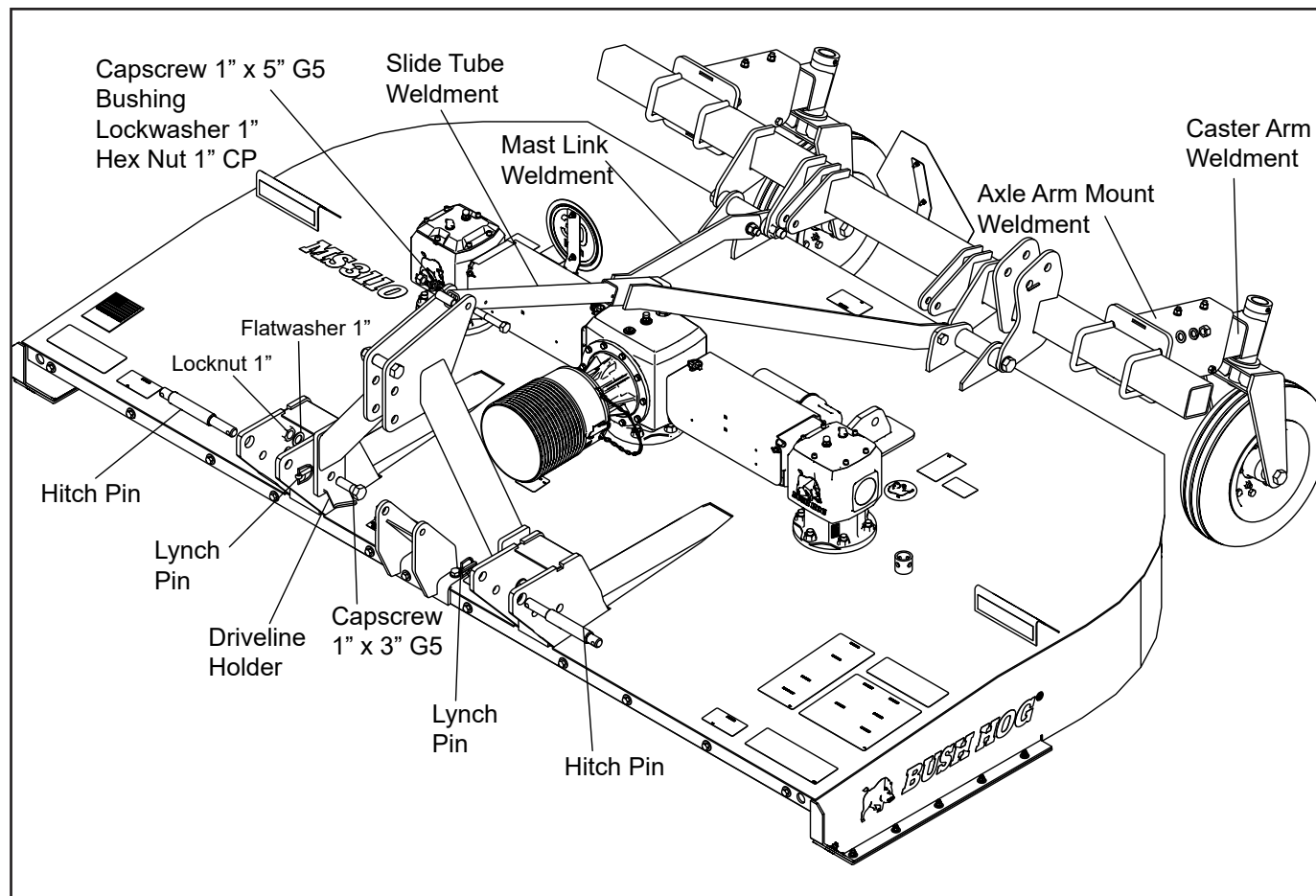
# ASSEMBLY

6. Attach the Hose Holder Rod to the tongue on the left side hole using 5/8" x 2" bolt, flatwasher, lockwasher and hex nut.
7. Place Lock Collar on the Jackshaft and slide the collar up to the bearing and twist until it slips over the extension ring of the bearing.
8. Turn the collar quickly in the direction of shaft rotation to tighten. (Asm-R-0489)
9. Place a punch in the blind hole in the collar. Strike the punch in the direction of shaft rotation to lock collar against the inner ring of the bearing. (Asm-R-0490)
10. Attach the Bearing Shield to the top of the Pillow Block Bearing using (2) 1/2" x 1-1/4" bolts and 1/2" lockwashers.
11. Attach the Driveline to the Jackshaft. (See Adjusting Slip Clutch Assembly Section page 3-6).



# ASSEMBLY

## 3- Point Hitch Model Assembly



**WARNING** This assembly process should only be performed after the machine is removed from the shipping stand and laying on a level surface!

1. Fill the Gearbox Assemblies with EP80W-90 or EP85W-140 Gear Oil. (See Assembly Section Page 3-3). Allow time for oil to seep through bearings to lower level housing before checking oil level.
2. Remove the Caster Assemblies from the shipping position and re-install to the axles in the rear facing position using the original hardware.
3. Slightly loosen the Mast attaching bolts and place the mast in the upright position. Re-tighten the bolts.
4. Bring the Slide Tube attached to the Mast Strut to the top of the mast. Place the Bushing through the hole in the Slide Tube.
5. Align the Slide Tube and Bushing between the struts on top of the mast and align the holes.
6. Place the 1" x 5" Capscrew through the Mast and Slide Tube and attach with a 1" Lockwasher and 1" Hex Nut and tighten.
7. Attach the Driveline Holder to the R.H. Strut with a 1" x 3" Capscrew, Lockwasher and Hex Nut.
8. Place the Hitch Pins in the Struts and pin in place with the Lynch Pins provided.
9. Attach the Slip Clutch end of the Driveline to the Center Gearbox Input Shaft. (See ADJUSTING SLIP CLUTCH Assembly Section 3-6).

# ASSEMBLY

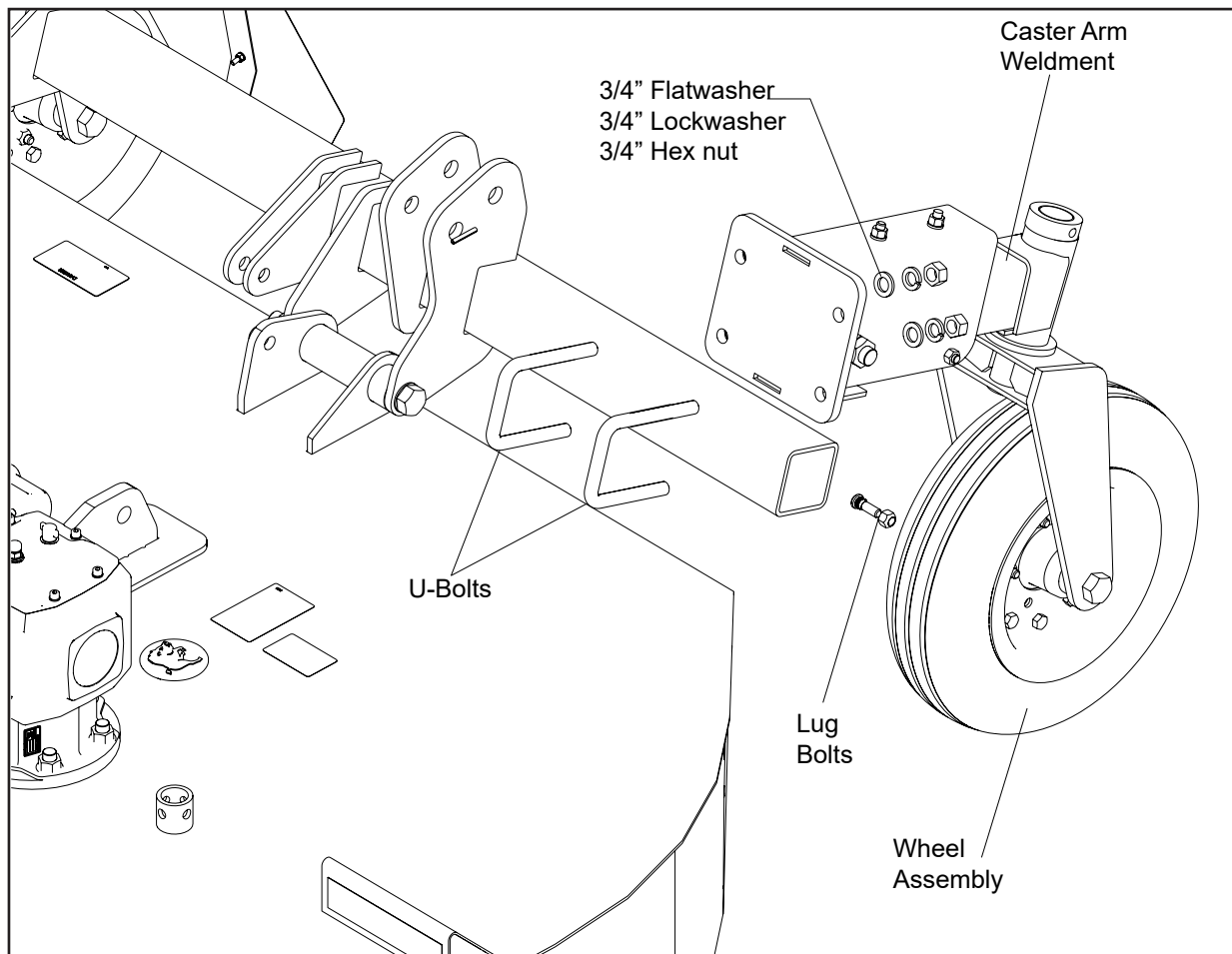
## Semi-Mount Model Assembly

1. Semi Mount Models do not require the Mast or Struts and Flex Links used on the 3 Point Lift models.
2. Cat.II Hitch Pins with Cat. III Bushings and Spacer Bushings are shipped installed to the lift points of the cutter.
3. Install the Driveline Holder to the right hand inside strut using the hole the shipping stand was bolted to. Use the 1" x 2-1/2" capscrew, 1" lockwasher and 1" hex nut to attach the Driveline Holder.

## Tailwheel Installation 3-Point Lift, Semi-Mount and Pull Models

### TAILWHEEL ASSEMBLY

1. Remove the Lift Arm Assemblies from the shipping position.
2. Place the Lift Arm Assembly to the axle assembly as shown in the illustration below and attach with two U-bolts provided.
3. Install four 3/4" flatwashers, 3/4" lockwashers & 3/4" hex nuts - (2 per U-bolt) and tighten.
4. Remove the lug bolts from the hub and install the wheel assembly making sure the lug bolts are securely tightened.

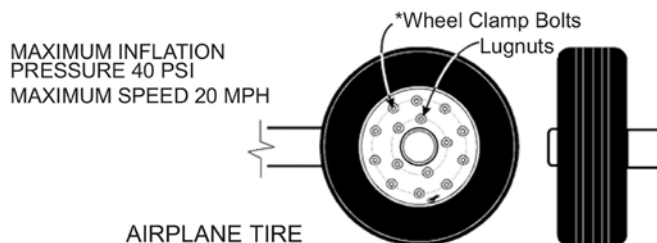
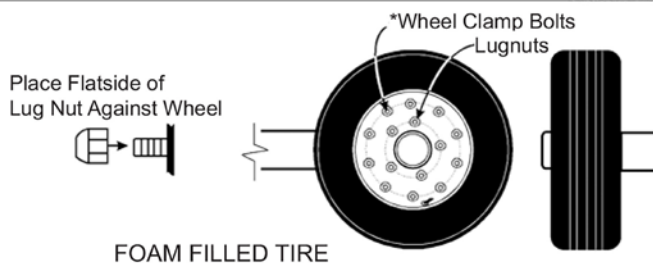
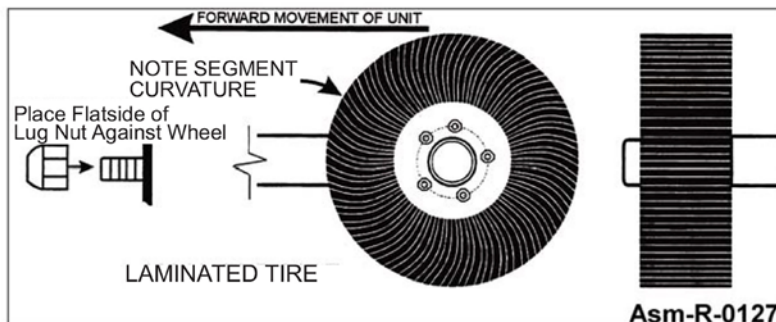


# ASSEMBLY

## Tires and Wheels

Before installing any tires and wheels make certain the Cutter is jacked up high enough and is securely supported. When installing laminated or airplane tires, be sure the flat side of the lug nut is against the wheel. There are only four types of tires that can be used on this cutter DO NOT USE ANY OTHER TYPE OF TIRE OR WHEEL, such as automotive tires and rims. DO NOT EXCEED THE MAXIMUM SPEED FOR EACH TYPE OF TIRE. Excessive speed can cause damage to the machine, tire and wheel.

When installing Laminated Tires and Wheels note the direction of travel and curvature of rubber segments of the tire and install as shown in illustration below. Do not exceed 20 M.P.H. on Laminated Tires. Before separating wheel halves on Airplane Tires, let all the air out of the tire by removing the valve core to make certain no air pressure is left in the tube before separating the wheel halves to dismount tire. \*DO NOT LOOSEN WHEEL CLAMP BOLTS BEFORE PRESSURE IS REMOVED FROM TUBE AND TIRE TO PREVENT EXPLOSIVE SEPARATION OF WHEEL HALVES WITH POSSIBLE SERIOUS BODILY INJURY.

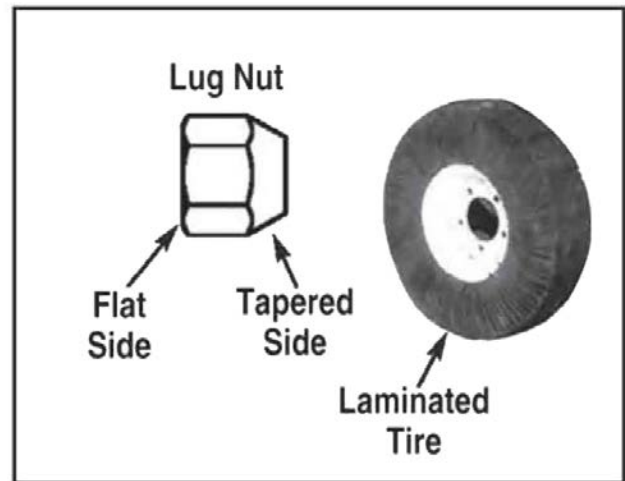


	<b>WARNING</b>	<b>EXPLOSION HAZARD</b>
<b>RELEASE ALL AIR PRESSURE BEFORE LOOSENING BOLTS. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH</b>		
MAX. SPEED: 20 MPH, MAX. WEIGHT: 4000 LBS., MAX. AIR PRESSURE: 40PSI		

1006348

# ASSEMBLY

**NOTE:** When mounting the 294 Laminated Tire and Wheel to the hubs, the Lug Nuts must be placed on the Lug Bolt so the Flat side of the Lug Nut is against the rim. All other Tires and Wheels attach Tapered Side to rim.

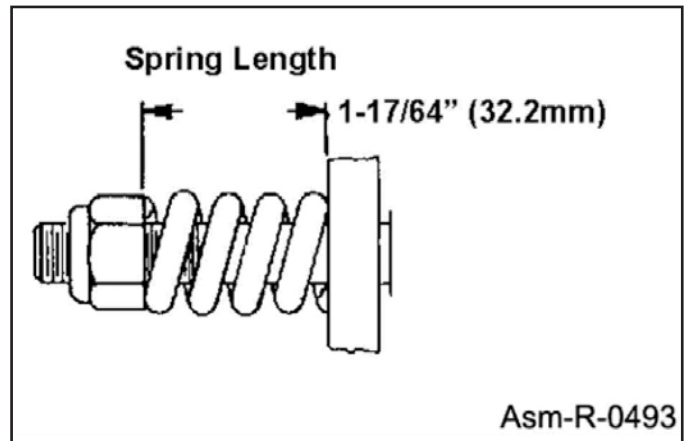


## Adjusting Slip Clutch

**NOTE:** Loosen eight nuts retaining clutch springs 1/3 turn or until spring can be turned with fingers.

With tractor at idle speed, engage tractor PTO drive for 2-3 seconds. Clutch should slip without turning blades. If clutch does not slip, contact the Bush Hog Service Department.

Retighten nuts to within 1/64" of original position. Initial spring length is shown at right.

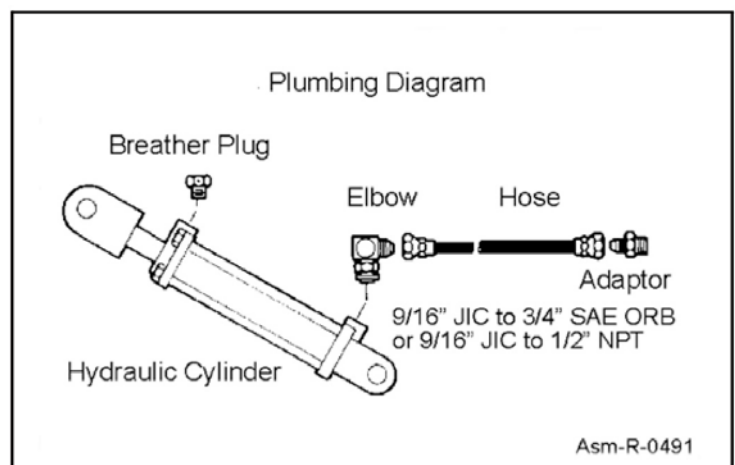


Failure to retighten spring nuts to original position may cause damage to implement and/or tractor due to improper slip clutch torque setting.

## Hydraulic Connections

**NOTE:** Check the hydraulic connections to the Axle Cylinder to be sure all connections are tight. Route the Hydraulic Hose through the Hose Holder mounted on the tongue.

Attach the appropriate hydraulic coupling for the tractor to the Hydraulic Hose.





# OPERATION SECTION

# OPERATION

## BUSH HOG MS3110 SERIES ROTARY MOWER OPERATION INSTRUCTIONS

Bush Hog rotary mowers are manufactured with quality material by skilled workers. These mowers are designed to cut grass, weeds, small brush and other vegetative material up to 3-1/2" diameter in areas such as pastures and along highway right-of-ways. The mower is equipped with protective deflectors and/or chain guards to prevent objects being thrown from the mower by the blades, however, no shielding is 100% effective. All shields, guards, deflectors, and chains equipped on the unit must be maintained on the mower in good operational condition.

It is the operator's responsibility to be knowledgeable of all potential operating hazards and to take every reasonable precaution to ensure oneself, others, animals, and property are not injured or damaged by the mower, tractor, or a thrown object. Do not operate the mower if passersby, pets, livestock, or property are within 300 feet of the unit unless:

- **ALL THROWN OBJECT SHIELDING** including, Front and Rear Deflectors, Chains Guards, Steel Guards, Bands, Side Skirts and Skid Shoes in place and in good condition when mowing.
- **MOWER SECTIONS OR WING** are adjusted to be close and parallel to ground without exposing blades.
- **MOWING AREA** has been inspected and foreign materials and debris have been removed.
- **PASSERSBY** are inside enclosed vehicle.

This section of the Operator's Manual is designed to familiarize, instruct, and educate safe and proper mower use to the operator. Pictures contained in this section are intended to be used as a visual aid to assist in explaining the operation of a rotary mower. Some pictures may show shields removed for purposes of clarity. **NEVER OPERATE** this implement without all shields in place and in good operational condition. The operator must be familiar with the mower and tractor operation and all associated safety practices before operating the mower and tractor. Proper operation of the mower, as detailed in this manual, will help ensure years of safe and satisfactory use of the mower

**IMPORTANT:** To avoid mower damage, retorque all bolts after the first 10 hours of operation. Re-tighten blade carrier retaining nut on gearbox lower shafts to 450 ft. lbs.

**READ AND UNDERSTAND THE ENTIRE OPERATING INSTRUCTIONS AND SAFETY SECTION OF THIS MANUAL AND THE TRACTOR MANUAL BEFORE ATTEMPTING TO USE THE TRACTOR AND IMPLEMENT.** If you do not understand any of the instructions, contact your nearest authorized dealer for a full explanation. Pay close attention to all safety signs and safety messages contained in this manual and those affixed to the implement and tractor. OPS-U- 0001

**READ, UNDERSTAND, and FOLLOW** the following Safety Messages. Death or serious injury may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2)



Si no lee ingles, pida ayuda a alguien que si lo lea para que le traduzca las medidas de seguridad. (SG-3)



# OPERATION

## 1. OPERATOR REQUIREMENTS

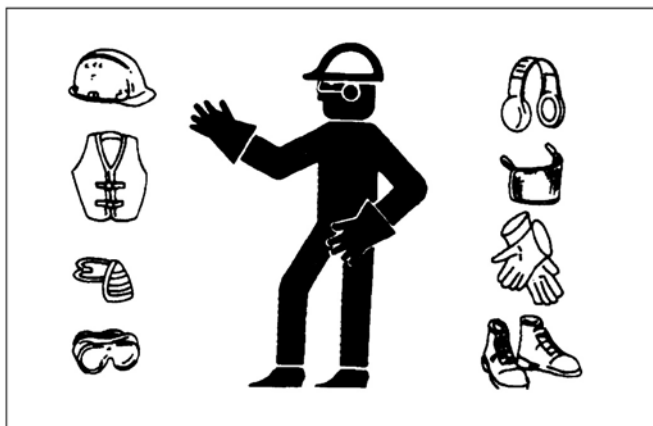
Safe operation of the unit is the responsibility of a qualified operator. A qualified operator has read and understands the implement and tractor Operator's Manuals and is experienced in implement and tractor operation and all associated safety practices. In addition to the safety messages contained in this manual, safety signs are affixed to the implement and tractor. If any part of the operation and safe use of this equipment is not completely understood, consult an authorized dealer for a complete explanation.

If the operator cannot read the manuals for themselves or does not completely understand the operation of the equipment, it is the responsibility of the supervisor to read and explain the manuals, safety practices, and operating instructions to the operator.

Safe operation of equipment requires that the operator wear approved Personal Protective Equipment (PPE) for the job conditions when attaching, operating, servicing, and repairing the equipment. PPE is designed to provide operator protection and includes the following safety wear:

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Always Wear Safety Glasses (with side shields marked to comply with ANSI Z87)
- Hard Hat
- Steel Toe Safety Footwear
- Gloves
- Hearing Protection
- Close Fitting Clothing
- Respirator or Filter Mask (depends on operating conditions) OPS-U- 0002



**DO NOT** use drugs or alcohol immediately before or while operating the Tractor and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. NEVER knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Death or serious injury to the operator or others could result if the operator is under the influence of drugs or alcohol. (SG-27)



# OPERATION

## 2. TRACTOR REQUIREMENTS

The tractor used to operate the mower must have the power capacity to lift, pull, and operate the Power Take Off (PTO) at the mower's rated speed while traveling at a ground speed between 2 and 5 MPH. Operating the mower with a tractor that does not meet the following requirements may cause tractor or mower damage and be a potential danger to the operator and passersby.

### Tractor Requirements and Capabilities

ASABE approved CAB with Protective Structure (ROPS) or ROPS cab and Seat Belt.

Tractor Safety Devices.....Slow Moving Vehicle (SMV) emblem, lighting, PTO master shield

Tractor Horsepower

Minimum.....Lift - 75 HP, Pull - 60 HP, & Semi-Mount - 60 HP

Hitch - Lift Type Mower

Lifting Capacity.....2400 lbs.

3-Point Hitch.....CAT II - III & CAT II-III Quick Hitch

Semi-Mount

3 Point Hitch.....CAT II - III

Hydraulics.....Optional

Pull Type Mower

Drawbar.....14" extended length, safety chain attachment point

Hydraulics.....Optional

Front End Weights.....As needed to maintain 20% weight on front axle

Power Take Off.....540 RPM 1-3/8" 6-Spline, 1000 RPM 1-3/8" 21-Spline or  
1000 RPM 1-3/4" dia. 20-Spline Output Shaft

### 2.1 Rops and Seat Belt

The tractor must be equipped with a Roll-Over-Protective-Structure (ROPS) (tractor cab or roll-bar) and seat belt to protect the operator from falling off the tractor, especially during a roll over where the driver could be crushed and killed. Only operate the tractor with the ROPS in the raised position and seat belt fastened. Tractor models not equipped with a ROPS and seat belt should have these life saving features installed by an authorized dealer. OPS-U- 0003



#### WARNING

Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Death or serious injury can result from falling off the tractor and/or becoming pinned or trapped under the tractor or implement particularly during a rollover accident.



# OPERATION

## **2.2 Tractor Safety Devices**

If transporting or operating the tractor and implement near a public roadway, the tractor must be equipped with proper warning lighting and a Slow Moving Vehicle (SMV) emblem which are clearly visible from the rear of the unit. Lights and a SMV emblem must be equipped directly on implements if the visibility of the tractor warning signals are obscured.

Maintain all manufacturer equipped safety shields and guards. Always replace shields and guards that were removed for access to connect, service, or repair the tractor or implement. Never operate the tractor PTO with the PTO master shield missing or in the raised position. OPS-U- 0004

## **2.3 Tractor Horsepower**

The power required to operate a mower is determined by the tractor PTO horsepower. For most mowing conditions, the MS3110 Series lift mower requires a tractor with at least 75 HP and the semi-mount and pull type mower require at least 60 HP. Operating the mower with a tractor that does not have adequate power may damage the tractor engine. Exceeding 90 HP may cause mower damage by overpowering the unit in heavy cutting conditions.

## **2.4 3-Point Hitch**

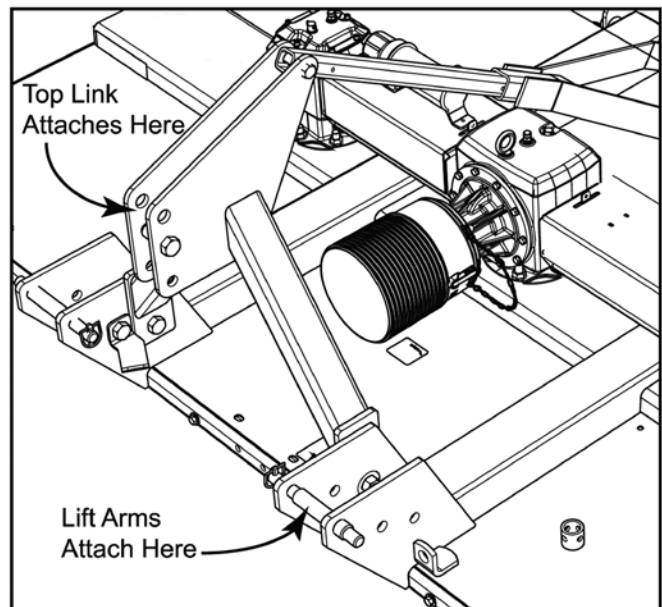
Lift Type Mower-The tractor 3-point hitch must be rated to lift at least 2400 lbs.

The Model MS3110 Series is designed to be mounted on a tractor with CAT II or CAT III 3-Point or CAT II or CAT III Quick Hitch.

Refer to the tractor operator's manual for the category of the tractor being used. If the hitch does not conform to ASABE dimensions, the mower may not fit or raise properly. Consult an authorized dealer for possible modification procedures to mount non-conforming hitches.

Depending on the hitch category, certain size pins are used to attach the mower to the tractor. Quick Hitch requires 1-7/16 diameter lower pin and 1-1/4 diameter upper pin. CAT II hitches require 1-1/8 lower pins and 1 inch upper pins. CAT III hitches require 1-7/16 lower pins and 1-1/4 upper pin diameters.

Our 3-Point Quick Hitch is designed to connect to a Quick-Attach coupler making mounting and dismounting your mower easier. The 3-Point Quick Hitch is also designed to connect the mower to a tractor's 3-point linkage without the use of a Quick Attach Coupler.



# OPERATION

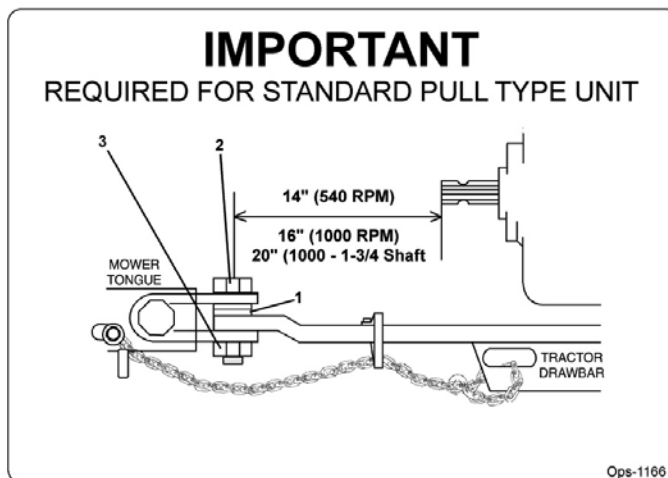
## 2.5 Drawbar - Pull Type Mower

For pull type mowers (540 and 1000 RPM) equipped with an equal-angle driveline, the tractor drawbar must be positioned as follows:

540 RPM at 14" Drawbar

1000 RPM, 1-3/8 at 16" Drawbar

1000 RPM, 1-3/4 at 20" Drawbar



## 2.6 Front End Weight

A minimum of 20% total tractor weight must be maintained on the tractor front end at all times. Front end weight is critical to maintain steering control and to prevent the tractor from rearing up while driving. If the front end is too light, add weight until a minimum of 20% total weight is reached on the front tires. Front weights and weight carriers can be purchased through an authorized tractor dealership. OPS-U- 0005

## 2.7 Power Take Off (PTO)

This mower is designed to operate at a PTO speed of 540. Most tractors operate at either 540, or a combination of 540 and 1000 RPM PTO speeds. The operating speed of the mower and tractor can be determined by the number of splines on the driveline yoke and PTO output shaft. Those operating at 540 RPM will have a 6-spline shaft and those operating at 1000 RPM will have a 21-spline shaft or a 1-3/4" 20-spline shaft.

If operating an older model tractor where the tractor's transmission and PTO utilize one master clutch, an over-running clutch must be used between the PTO output shaft and the driveline of the mower. An authorized tractor dealer can provide the over-running clutch and its installation if needed. OPS-R- 0066\_C



**DO NOT** use a PTO adapter to attach a non-matching Implement driveline to a Tractor PTO. Use of an adapter can double the operating speed of the Implement resulting in excessive vibration, thrown objects, and blade and implement failure. Adapter use will also change the working length of the driveline exposing unshielded driveline areas. Serious bodily injury and/or equipment failure can result from using a PTO adapter. Consult an authorized dealer for assistance if the Implement driveline does not match the Tractor PTO. (S3PT-14)

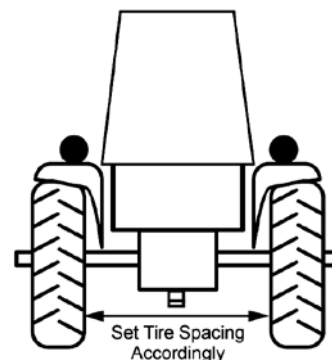
# OPERATION

**⚠ WARNING** Never operate the Tractor and Mower if the Implement input driveline is directly connected to the Tractor transmission. Tractor braking distances can be substantially increased by the momentum of the rotating Mower Blades driving the Tractor transmission even though the Tractor clutch has been disengaged. Install an over running clutch between the Tractor PTO and the Mower driveline to prevent this potentially dangerous situation. (S3PT-16)

**⚠ DANGER** Do Not connect the PTO driveline to the tractor or operate the implement unless the implement is securely connected to the tractor.

## 2.8 Tire Spacing

**⚠ WARNING** The tire spacing of the tractor must be sufficient to maintain stability on the type of terrain where it is intended to be operated and for the type of implement that is being operated. Always refer to the tractor Operator's Manual or consult the tractor's authorized dealer for instructions on sufficient tire spacing or to change tractor tire spacing. Operating without sufficient tire spacing to maintain stability can result in loss of control of the tractor, a rollover accident and death or serious injury.



**⚠ WARNING** Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Death or serious injury can result from falling off the tractor and/or becoming pinned or trapped under the tractor or implement particularly during a rollover accident.



## 3. GETTING ON AND OFF THE TRACTOR

Before getting onto the tractor, the operator must read and completely understand the implement and tractor operator manuals. If any part of either manual is not completely understood, consult an authorized dealer for a complete explanation. (OPS-U-007)

**⚠ WARNING** Do Not mount or dismount the Tractor while the tractor is moving. Mount the tractor only when the Tractor and all moving parts are completely stopped. (SG-12)



### 3.1 Boarding the Tractor

Use both hands and equipped handrails and steps for support when boarding the tractor. Never use control levers for support when mounting the tractor. Seat yourself in the operator's seat and secure the seat belt around you.

Never allow passengers to ride on the tractor or attached equipment. Riders can easily fall off and be seriously injured or killed from falling off and being ran over. It is the operator's responsibility to forbid all extra riders at all times. (OPS-U-008)

# OPERATION



## DANGER

Never allow children to operate, ride on, or come close to the Tractor or Implement. Usually, 16-17 year old children who are mature and responsible can operate the Implement with adult supervision, if they have read and understand the Operator's Manuals, have been trained in proper operation of the Tractor and Implement, and are physically large enough to reach and operate the controls easily. (SG-11)



## DANGER

Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in death or serious injury. (SG-10)



### 3.2 Dismounting the Tractor

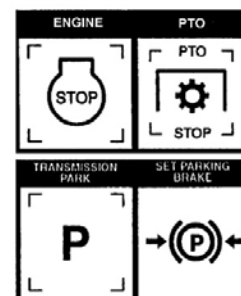
Before dismounting, park the tractor and implement on a reasonably level surface, apply the parking brake, idle the engine down, disengage the PTO, and lower the implement to the ground. Shut down the tractor engine according to the operator's manual, remove the key, and wait for all motion to completely stop. Never leave the seat until the tractor, its engine and all moving parts have come to a complete stop.

Use hand rails and steps when exiting the tractor. Be careful of your step and use extra caution when mud, ice, snow or other matter has accumulated on the steps or hand rails. Use all handrails and steps for support and never rush or jump off the tractor. (OPS-U-0009)



## DANGER

Before leaving the tractor seat lower the implement, set the parking brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the tractor shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Tractor that is moving or while the engine is running. Operate the Tractor controls from the tractor seat only. (SG-9)



## 4. STARTING THE TRACTOR

The operator must have a complete understanding of the placement, function, and operational use of all tractor controls before starting the tractor. Review the tractor operator's manual and consult an authorized dealer for tractor operation instructions if needed.

### Essential Tractor Controls:

- Locate the light control switch.
- Locate the engine shut off control.
- Locate the brake pedals and the clutch.
- Locate the PTO control.
- Locate the 3-Point hitch control lever.
- Locate the hydraulic remote control levers

### Before starting the tractor ensure the following:

- Conduct all pre-start operation inspection and service according to the tractor operator's manual.
- Make sure all guards, shields, and other safety devices are securely in place.
- The parking brake is on.
- The PTO control lever is disengaged.
- The 3-Point hitch control lever is in the lowered position.
- The hydraulic remote control levers are in the neutral position.
- The tractor transmission levers are in park or neutral.

Refer to the tractor owner's manual for tractor starting procedures. Only start the tractor while seated and belted in the tractor operator's seat. Never bypass the ignition switch by short circuiting the starter solenoid.

After the tractor engine is running, avoid accidental contact with the tractor transmission to prevent sudden and unexpected tractor movement. OPS-U-0028



**DANGER**

Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)



**DANGER**

Start tractor only when properly seated in the Tractor seat. Starting a tractor in gear can result in death or injury. Read the Tractor operators manual for proper starting instructions. (SG-13)



## 5. CONNECTING THE MOWER TO THE TRACTOR

Use extreme caution when connecting the mower to the tractor. The mower should be securely resting at ground level or setting on blocks. Keep hands and feet from under the mower deck and clear of pinch points between the tractor hitch arms and mower pins. OPS-R-0001



**DANGER**

Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15)

# OPERATION

## 5.1 Connecting the Mower - Lift Type and Semi-Mount Type

1. Make sure the tractor is equipped with the correct PTO Shaft. Change shafts if needed.
2. Shorten or remove the tractor drawbar to avoid interference when raising and lowering the mower.
3. Board the tractor and start the engine. Position the tractor to the mower with the 3-Point lift arms positioned between the respective set of mower A-frame lift lugs. **Note:** Set the 3-Point lift control to "Position Control" so that the lift arms maintain a constant height when attaching the mower. See the tractor Operator's Manual for correct settings when attaching 3-Point equipment.
4. Turn off the tractor engine, set the parking brake, place the tractor in park, and dismount.
5. One lift arm at a time, align arm end hole between the set of holes of A-frame lift lugs. Insert hitch pin through the lug and arm holes and insert retaining pin into hitch pin. Walk around to opposite side and repeat procedure for remaining lift arm and hitch pin.
6. Lift Mowers - Extend or retract the 3-Point top link to align its end hole with the holes of the mower's top link. Insert the top link hitch pin and insert retaining pin into hitch pin. Adjust any lower link check chains, guide blocks, or sway blocks to prevent the mower from swaying side to side and possible contact with tractor rear tires.



**NOTE:** PTO Shield Cover Not Shown For Clarity



## 5.2 3-Point Quick Hitch

Our 3-Point Quick Hitch is designed to connect to a Quick-Attach Coupler making mounting and dismounting your mower easier. The 3-Point Quick Hitch is also designed to connect the cutter to a tractor's three-point linkage without the use of a Quick-Attach Coupler.



# OPERATION

## 5.3 Connecting Mower - Lift Type (Quick Hitch)



### WARNING

Crushing Hazard between Quick-Hitch and Implement. Do not allow anyone to stand between the Quick-Hitch and implement during hook-up operations. Never operate the hydraulic 3-Point lift controls while someone is directly behind the tractor.

1. Make certain the implement's upper and lower hitch pins are secured.
2. Lower the tractor's 3-Point lift until the three Quick-Hitch hooks are lower than the implements hitch pins. Carefully back the tractor to align the Quick-Hitch hooks under the implement's hitch pins.
3. Slowly raise the tractor's 3-Point lift until the lower Quick-hitch hooks lock into place over the implement's 3-Point hitch pins.

**IMPORTANT:** Make certain the implement's top 3-Point hitch pin is captured by the Quick-Hitch top 3-Point hook. If not consult your Quick Hitch manual for required adjustment.

**IMPORTANT:** The Quick Hitch will move mower further from tractor which will require checking the following:

1. Driveline length
2. Tractor stability



## 5.4 Safety Tow Chain

If the mower is towed on a public roadway, a safety chain with tensile strength equal to or greater than the gross weight of the mower must be connected between the tractor and mower. This will help control the implement in the event the tongue 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 to protect it from mud or standing water by wrapping the chain around the tongue. Replace the safety chain if one or more links or end fittings are broken, stretched or otherwise damaged or deformed. OPS-U-0039

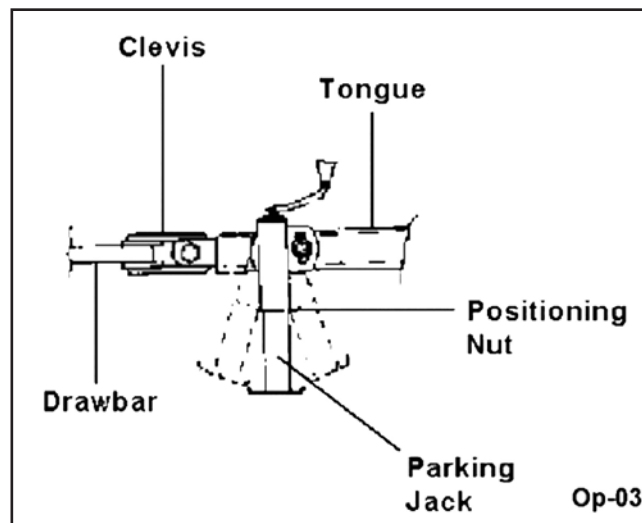
**IMPORTANT:** Scan this QR Code with your smart phone to link to the PAMI Safe Implement Hitching Manual for more information on correctly connecting agricultural tractors to implements. Or type in your internet browser the following web address: [www.algqr.com/hme](http://www.algqr.com/hme) Ops-0008-MISC



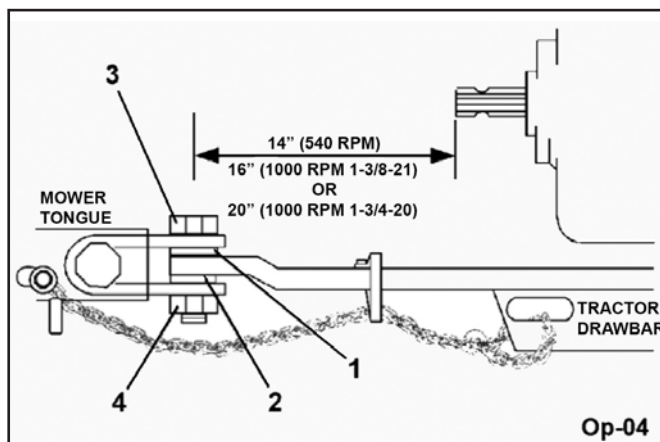
# OPERATION

## 5.5 Connecting the Mower - Pull Type

1. Make sure the tractor is equipped with the correct PTO shaft and the drawbar is extended 14" from the end of the PTO shaft to the hitch point.
2. Block the mower wheels in place and use the attached parking jack to raise or lower the tongue clevis to the height of the tractor drawbar. **Note:** Always place jack foot on firm surface or place board under jack for support.
3. Board the tractor and start the engine. Back the tractor to the mower aligning the drawbar hitch hole with the mower hitch clevis. Turn off the tractor engine, set the parking brake, place the tractor in park, and dismount.



4. To attach the mower, place two 1" flatwashers (1) positioned under top lip of tongue clevis and to the top of drawbar. Add additional 1" flatwashers (2) between the bottom of drawbar and bottom lip of clevis to fill open space. Insert a 1" x 4-1/2" grade 5 or 8 bolt (3) through clevis and drawbar and retain in position with a 1" locknut (4). The bolt and locknut should be tightened securely to support the tongue properly without springing or breaking the clevis. Never attach mower to the tractor with a pin not having a nut.
5. Securely attach mower safety chain to tractor drawbar or drawbar support frame.
6. Lower the jack until the tongue is completely supported by the drawbar. Remove jack from the tongue and place on storage bracket of mower main frame.
7. If using a hydraulic cylinder, connect hydraulic hose ends into tractor hydraulic ports.



## 6. SETTING THE MOWER

Properly setting the cutting height is essential for efficient and safe operation. A properly set mower will make a more uniform cut, distribute clippings more evenly, require minimal tractor work, and follow the contour of uneven terrain. **NOTE:** Avoid very low cutting heights, striking the ground with the blades gives the most damaging shock loads and will cause damage to the mower and drive. Blades contacting the ground may cause objects to be thrown out from under the mower deck. Always avoid operating the mower at a height which causes the blades to contact the ground. OPS-U- 0010

# OPERATION

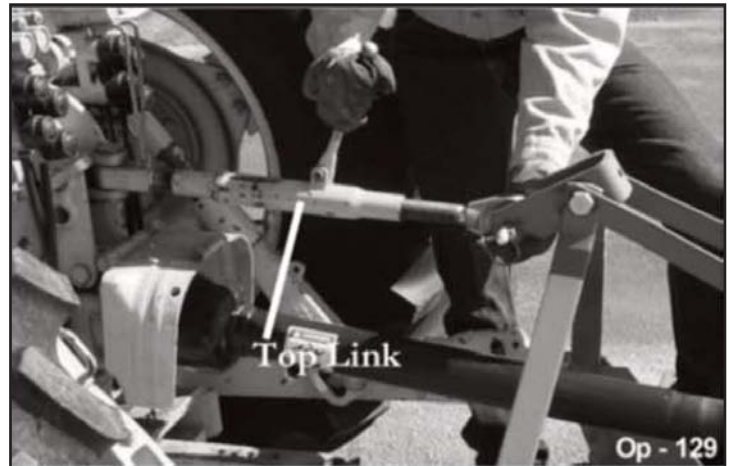


Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent failing which could cause serious injury or even death. (SG-14)



## 6.1 Setting Mower Height - Lift Type

1. Park the tractor and mower on level ground.
2. Using the 3-Point hitch control lever, position the front of the mower with its side skids 1" less off the ground than desired cut height. For example, for a 3" cut, position the skids 2" from the ground. Set the 3-Point control lever stop at this position to maintain this height when raising and lowering the mower.
3. Shut down the tractor and remove the key.
4. Level the mower deck front to rear by extending or retracting the 3-Point top link.



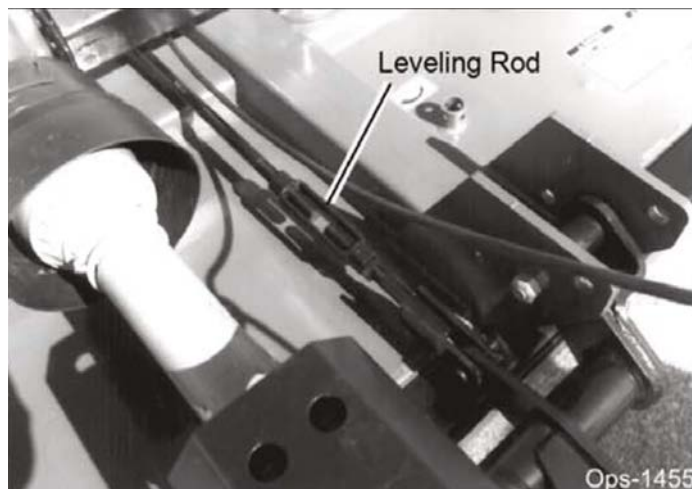
5. Level the mower side to side by manipulating one lower lift arm length. On most tractors, at least one of the lift arms is designed to allow for manipulation of its length. Shortening or extending will allow for deck leveling from side to side
6. Securely block up the mower at this height.
7. Extend the tractor's top 3-Point link so that when lifting the mower, the front of the deck will raise 2 to 2-1/2" before the tailwheel(s) leaves the ground. This will allow the mower to follow the contour of uneven terrain.



# OPERATION

## 6.2 Setting Mower Height - Pull Type

1. Park the tractor and mower on level ground.
2. Using the tailwheel ratchet jack or hydraulic cylinder, position the mower so the skid shoes are 1" less off the ground than the desired final cut height. For example, if a 3" cut is desired, raise or lower the mower until the skid shoes are 2" off the ground. If a hydraulic cylinder is used, stroke control spacers can be placed on the hydraulic shaft to maintain a set cutting height each time the mower is raised and lowered.
3. Adjust the mower leveling rod so that the front of the mower is approximately 3/4" lower than the rear.



## 6.3 Setting Deck Pitch

### Lower Horse Power - Better Fuel Efficiency

To increase fuel efficiency and lower horsepower requirements for mower operation, the mower should be operated with the deck approximately 3/4" LOWER IN THE FRONT THAN THE REAR. Operating the mower at this pitch will allow the mower to cut the grass only once and requires less work from the tractor.

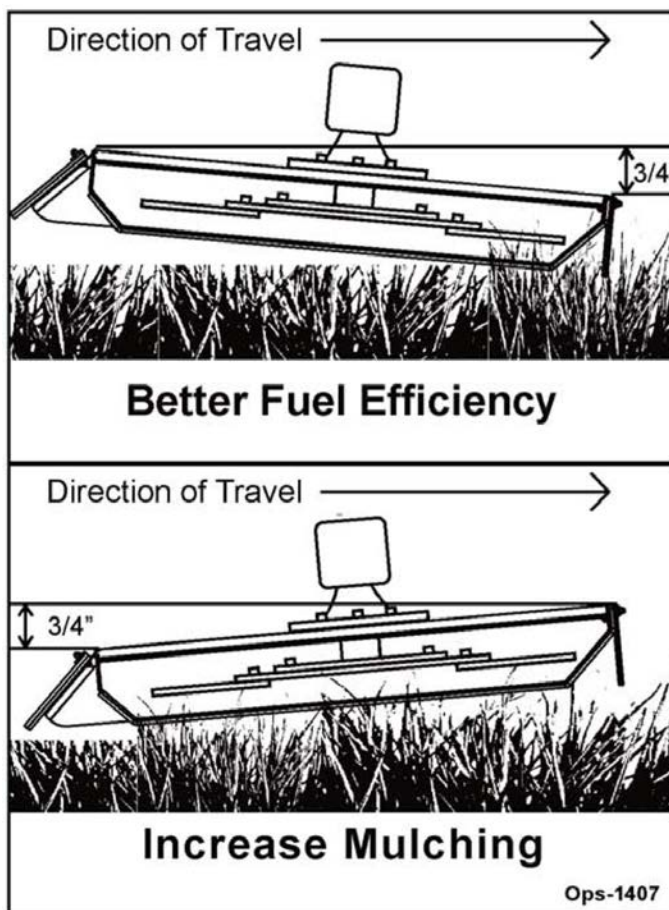
### Increase Mulching

To increase mulching of the grass or crop material during mower operation, the mower should be operated with the deck approximately 3/4" HIGHER IN THE FRONT THAN THE REAR.

Operating the mower at this pitch will allow the mower to cut the grass twice and can result in a more even cut and improved distribution of the cut material.

### IMPORTANT:

Adjust the leveling rods the same amount and maintain equal tension in the rods. Improper adjustment may cause rods to snap or bend. Retighten the jamnuts after the deck pitch has been set (OPS-U-0041)



## 7. DRIVELINE ATTACHMENT

The driveline yoke and tractor PTO shaft must be dirt free and greased for attachment.

To connect the mower driveline to the tractor PTO output shaft, pull the driveline yoke collar back and align the grooves and splines of the yoke with those of the PTO shaft. Push the driveline yoke onto the PTO shaft, release the locking collar, and position the yoke until the locking collar balls are seated onto the PTO shaft. Push and pull the driveline back and forth several times to ensure a secure attachment. OPS-R-0003\_I



### **! WARNING**

When attaching the Implement input driveline to the Tractor PTO, it is important that the connecting yoke spring activated locking collar slides freely and the locking balls are seated securely in the groove on the Tractor PTO shaft. Push and pull the driveline back and forth several times to ensure it is securely attached. A driveline not attached correctly to the Tractor PTO shaft could come loose and result in personal injury and damage to the Implement. (S3PT-17)

### 7.1 Driveline Length Check

### **! WARNING**

Before operating the Implement, check to make sure the Implement input driveline will not bottom out or become disengaged. Bottoming out occurs when the inner shaft penetrates the outer housing until the assembly becomes solid-it can shorten no more. Bottoming out can cause serious damage to the Tractor PTO by pushing the PTO into the Tractor and through the support bearings or downward onto the PTO shaft, breaking it off. A broken driveline can cause personal injury. (S3PT-18)

When fitting the mower to the tractor, the telescoping driveline must be inspected to ensure that at its most compressed position, the profiles do not “bottom out”, and when at its farthest extended position, there is sufficient engagement between the profiles to operate safely. At its shortest length, there must be at least a 1” clearance between each profile end and opposite profile universal joint. At its farthest operating extension, a minimum profile engagement of 12” must be maintained.

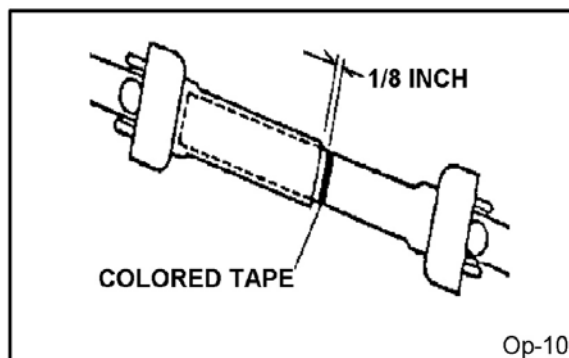
**IMPORTANT:** Scan this QR Code with your smart phone to link to the ADMA Driveline Safety Manual for more information on the safe use of a driveline during normal operation and maintenance. Or type in your internet browser the following web address: [www.algqr.com/dme](http://www.algqr.com/dme) Ops-0009-MISC



# OPERATION

## “Bottoming Out” Check Procedure

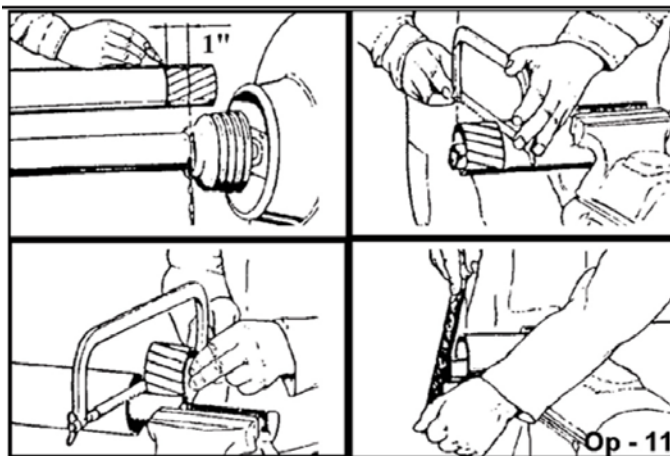
- Disconnect driveline from the tractor and slide the profiles together until fully compressed.
- Place a mark on the inner shield 1/8” from the end of the outer shield.
- Reattach the driveline to the PTO Shaft.
- **Lift and Semi-Mount Type** - Raise the mower/  
**Pull Type** - Turn sharply and watch the driveline as it approaches the mark. If the distance between the mark and the end of the outer shield tube becomes less than 2” at any point, the driveline must be shortened. OPS-R-0004\_D



Driveline in maximum compressed position

## Shorten the driveline profiles as follows:

- Remove the driveline from the tractor.
- Position the mower (Lift and Semi-Mount Type Raise and lower/ Pull Type - Turn sharply) to the point with the shortest distance between the tractor PTO shaft and cutter gearbox. Shut down the tractor and securely block the mower in this position.
- Pull driveline apart and reattach yoke to PTO shaft.
- Hold driveline sections parallel to one another and measure back 1” from yoke of each shaft and place mark on opposite section. Cut this length off with a saw.
- Round off all sharp edges and debur.
- Thoroughly grease then reinstall the driveline.
- Recheck for proper operation.



## Engagement Check Procedure

- With the driveline attached, position the mower to the point where the telescoping driveline is at its maximum extension. Completely shut down the tractor and secure in position.
- Mark the inner driveline shield 1/8” from the end of the outer shield.
- Disconnect the driveline from the tractor and separate the two driveline halves.
- Measure the distance from the mark to the end of the inner profile. This length is the amount the driveline profiles were engaged.
- If the engaged length is less than 12” for a CV driveline and less than 6” for a non-CV driveline, the shaft is considered too short and should be replaced with a longer shaft. Consult an authorized dealer to purchase the required driveline length.

**NOTE:** When raising the mower, at least 1” clearance must be maintained between the driveline and the mower deck. If necessary, place an upper lift stop on the 3-Point hitch control lever to limit the height the mower can be raised. OPS-R-0005-G

# OPERATION

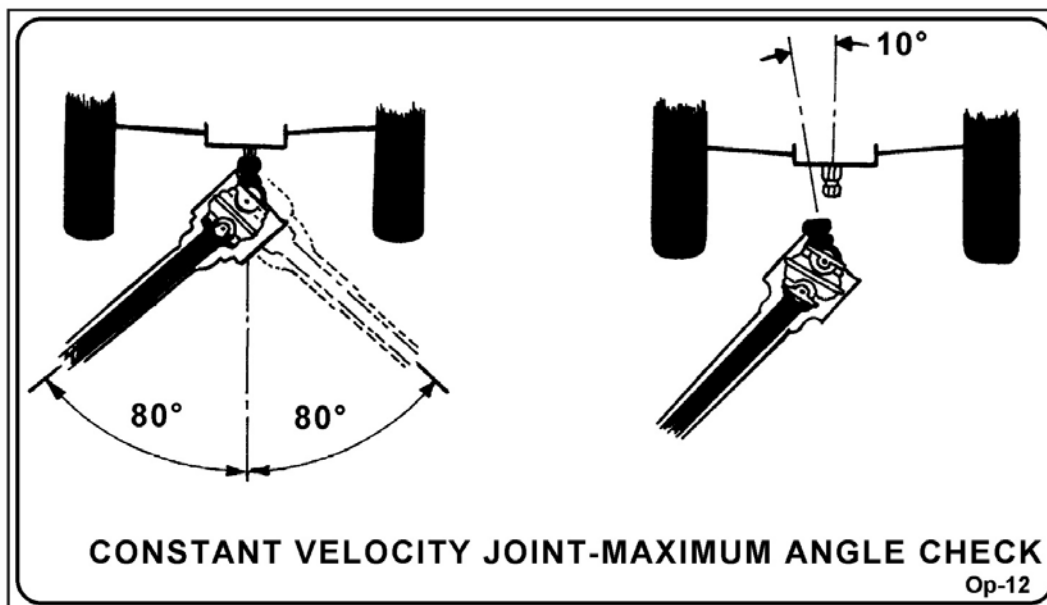
## 7.2 Constant Velocity (CV) Driveline

Mowers are equipped with a Constant Velocity (CV) driveline, the maximum turning angle between the tractor and mower must be determined to ensure the joint angle does not over-extend which can cause CV joint damage. Constant Velocity joints enable the driveline to operate smoothly with no vibrations and clattering at angles up to  $80^{\circ}$ . Angles greater than  $80^{\circ}$  will result in mechanical damage to the CV joint and mower driveline.

The Constant Velocity joint must be lubricated every 20-40 hours of operation as specified in the Maintenance Section. Failure to properly lubricate the joint will result in accelerated wear and joint component failure.

### CV Driveline Maximum Angle Check Procedure

- With the mower attached to the tractor and the driveline disconnected from the tractor PTO stub make a hard left turn until there is approximately a 1" clearance between the left rear tractor tire and mower frame or tongue.
- Stop and completely shut down the tractor. Place the tractor in Park and apply the Parking Brake before dismounting.
- Check the CV joint at this maximum turning radius by holding the driveline yoke above the PTO shaft and then angle the CV joint to its maximum angle. A minimum difference of 10 degrees between the center line of the yoke and the PTO shaft must be maintained to ensure the joint will not be over angled. If the joint cannot be angled at least  $10^{\circ}$ , there is a potential problem of over-angling the joint while making sharp turns.
- Solutions: To ensure the joint is not damaged, check the following:
  - Check the drawbar length to ensure that it is at the proper length for the RPM speed of the mower.
  - Move the tractor rear tires wider apart to limit the tractor turning radius.
  - Position the mower at multiple angles and perform the above procedure. Determine the sharpest turning radius that maintains a safe operating angle and note this position to the operator.(OPS-R-0006\_A)



# OPERATION

## 8. PRE-OPERATION INSPECTION AND SERVICE

Before each use, a pre-operation inspection and service of the implement and tractor must be performed. This includes routine maintenance and scheduled lubrication, inspecting that all safety devices are equipped and functional, and performing needed repairs. DO NOT operate the unit if the pre-operation inspection reveals any condition affecting safe operation. Perform repairs and replacement of damaged and missing parts as soon as noticed. By performing a thorough pre-operation inspection and service, valuable down time and repair cost can be avoided. OPS-U-0029



### DANGER

Always disconnect the main PTO Driveline from the Tractor before performing service on the Implement. Never work on the Implement with the tractor PTO driveline connected and running. Rotating Parts, Blades or Drivelines could turn without warning and cause immediate entanglement, injury or death. (S3PT-11)



### DANGER

Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported or blocked up to prevent sudden or inadvertent falling which could cause serious injury or even death. (SG-14)



### WARNING

Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21)



### WARNING

#### TO AVOID DEATH OR SERIOUS INJURY:

- ONLY use genuine Bush Hog replacement parts, which have been validated and tested to use on Bush Hog equipment by the manufacturer.
- The equipment manufacturer cannot verify the material or structural integrity of third-party supplied non-genuine replacement parts.
- Using non-genuine parts can result in the part failing, creating hazardous conditions for operator and bystanders.

Contact local dealer or Bush Hog about repair parts at:

2501 Griffin Ave., Selma, AL 36701

Customer Service: 800-363-6096.

Email: [contactus@bushhog.com](mailto:contactus@bushhog.com) [www.algqr.com/bpm](http://www.algqr.com/bpm)



### WARNING

Cancer and Reproductive Harm

[www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

### IMPORTANT

BE AWARE  
BE ALERT  
BE ALIVE

#### BE TRAINED

Before Operating this Mower



To prevent serious injury to yourself and/or bystanders, be trained in Safe Mowing Practices. Alamo Group Companies as well as AEM and FEMA provide training material that is critical for your Safety and the Safety of others when operating this equipment. Make these Safety Procedures an important part of every workday. Read and understand the Operator's Manual.

Do not let untrained individuals operate this equipment. Contact your Dealer, AEM ([www.aem.org](http://www.aem.org)), FEMA (314-878-2304, [www.FarmEquip.org](http://www.FarmEquip.org)), or Alamo Group ([www.Alamogroup.com](http://www.Alamogroup.com)) for information on training material or courses that provide training in Safer Operating Practices for Mowers.

D559

## **8.1 Tractor Pre-Operation Inspection / Service**

Refer to the tractor operator's manual to ensure a complete pre-operation inspection and scheduled service is performed according to the manufacturers recommendations. The following are some of the items that require daily service and inspection:

- Tire condition/air pressure
- Wheel lug bolts
- Steering linkage
- PTO shield
- SMV sign is clean and visible
- Tractor's lights are clean and functional
- Tractor Seat belt is in good condition
- Tractor ROPS is in good condition
- ROPS is in the raised position
- No tractor oil leaks
- Radiator free of debris
- Engine oil level and condition
- Engine coolant level and condition
- Power brake fluid level
- Power steering fluid level
- Fuel condition and level
- Sufficient lubrication at all lube points
- Air filter condition OPS-U-0030



## **8.2 Mower Pre-Operation Inspection / Service**

Before each mower use, a complete inspection and service is required to ensure the mower is in a good and safe working condition. Damaged and/or broken parts should be repaired and/or replaced immediately. To ensure the mower is ready for operation, conduct the following. OPS-R-0007

The operator's manual and safety signs affixed on the unit contain important instructions on the safe and proper use of the equipment. Maintain these important safety features on the implement in good condition to ensure the information is available to the operator at all times.

- Ensure the manual canister is secured to the equipment with the operator's manual inside.
- Ensure all safety signs are in place and legible. Replace missing, damaged, and illegible decals. OPS-U- 0011



# OPERATION

- Perform scheduled lubrication as detailed in the maintenance section
- Ensure all decals are in place and legible.
- Ensure the driveline is securely attached to tractor. Make sure the driveline yoke locking collar is securely seated in the grooves of the PTO shaft by pushing and pulling the yoke several times.
- Lift and Semi-Mount Type: Inspect that the 3-Point hitch pins are the proper size, correctly installed, and secured to the tractor lift arms with retaining pins inserted.
- Pull Type: Inspect that the hitch bolt is the correct size, that washers are inserted between the drawbar and hitch clevis, and the locknut is securely tightened. (OPS-R-0008\_F)

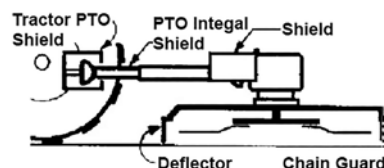


- Ensure deflectors and/or chain guards are in position and not damaged. Replace worn, broken, and missing pieces. (OPS-R-0038)



## DANGER

All Safety Shields, Guards and Safety devices including (but not limited to) - the Deflectors, Chain Guards, Steel Guards, Gearbox Shields, PTO integral shields, and Retractable Door Shields should be used and maintained in good working condition. All safety devices should be inspected carefully at least daily for missing or broken components. Missing, broken, or worn items must be replaced at once to reduce the possibility of death or serious injury from thrown objects, entanglement, or blade contact. (SGM-3)



# OPERATION

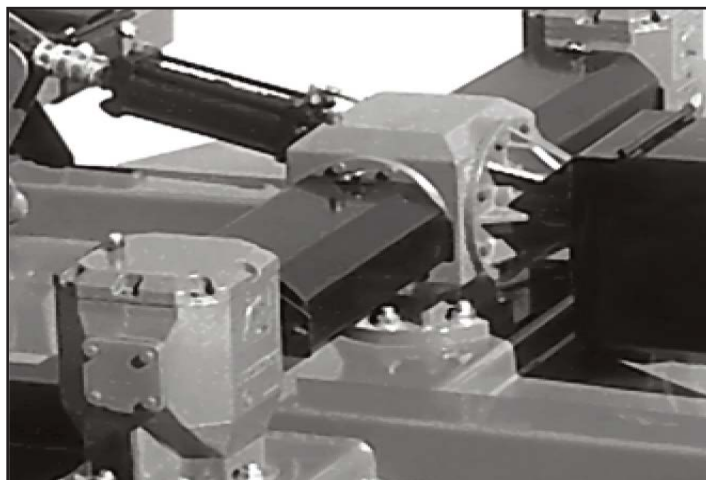
- Lift Type-Ensure the axle clamps and clamps are properly installed and are tight.
- Pull and Semi-Mount Type-Ensure that the tailwheel ratchet or hydraulic cylinder is installed and retained correctly to provide the desired cutting height.
- Inspect all bolts and screws and tighten to the recommended torque. OPS-R-0039\_J



- Ensure the tractor PTO master shield and the mower slip clutch shield are in place, lowered, and in good condition.
- Ensure the driveline integral shield is in good condition and rotates freely.
- Ensure the driveline slip clutch (if equipped) is properly adjusted. OPS-R-0039



- Inspect the gearbox oil level. A low oil level is a warning sign that the gearbox may be cracked or its seal is damaged and needs replacement.
- Ensure the gearbox vent is in place and free from clogs. OPS-R-0040\_D



## OPERATION

- Inspect blades and blade bolts for looseness and excessive wear. Make sure the mower is securely blocked up before crawling beneath. Replace damaged, worn and missing blades as complete sets to maintain rotary balance during operation.
- Ensure carrier hub nut is tightened with the cotter pin inserted and spread.
- Ensure the blade carriers are properly timed to avoid blade contact during operation.
- See instructions to properly time blades in the Maintenance Section. OPS-R-0041 \_B



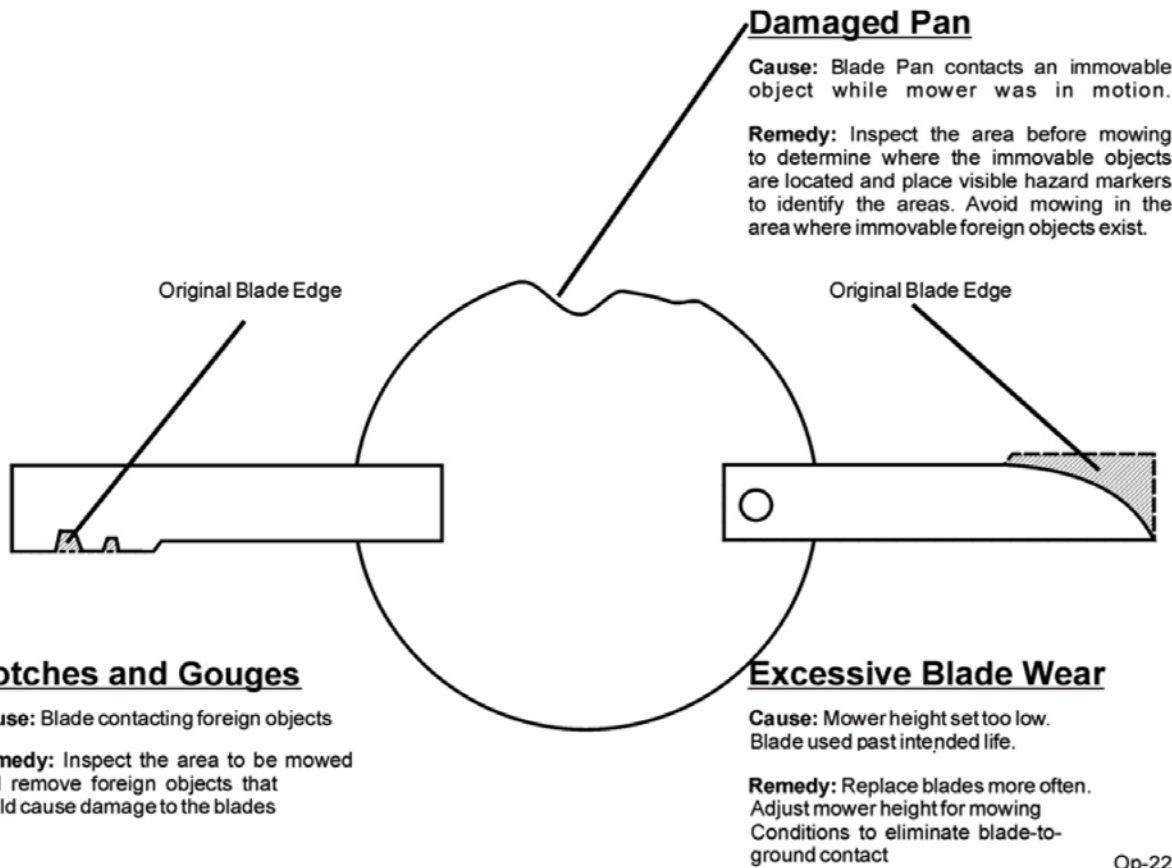
- Ensure each hydraulic cylinder is installed and retained correctly. Ensure the proper size pins are used to retain the cylinders in place and are secured with pins.
- Check for hydraulic oil leaks on the cylinders, along the hydraulic lines, and at tractor hydraulic ports. **IMPORTANT:** DO NOT use your hands to check for oil leaks. Use a piece of heavy paper or cardboard to check for hydraulic oil leaks. OPS-R-0013\_H



# OPERATION

## 8.3 Cutting Component Inspection

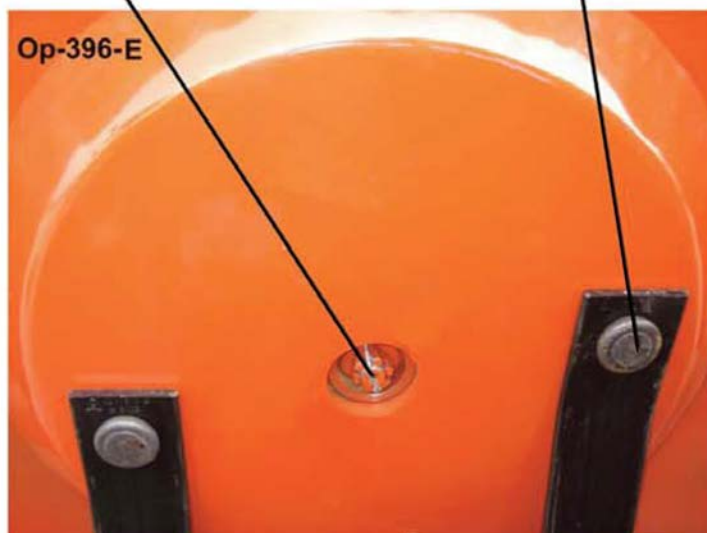
Inspect blade pan and blade assembly for the following:



OPS-U-0031

Check Output Shaft Nut Torque  
Torque to 450 ft-lbs.

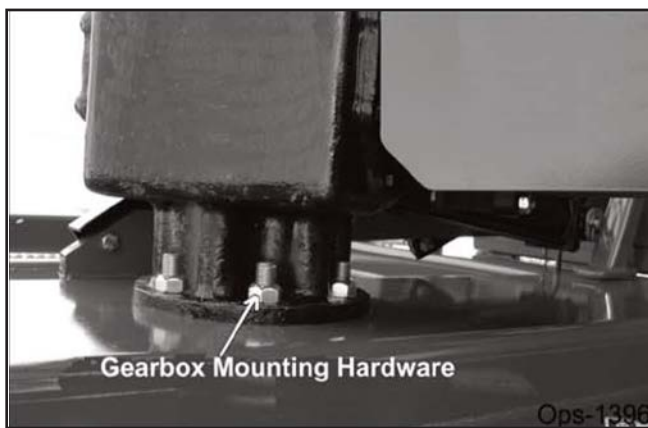
Check Blade Bolt Torque.  
Torque to 600 ft-lbs.



# OPERATION

**WARNING** Operating the mower with loose blade hardware will damage the blade holder or blades and can result in blade breakage or blade fastener failure. Broken blades or bolts can be thrown out from under the mower for distances up to 300 feet. When the blades are replaced, the fastening hardware must be replaced. Check and retighten the blade hardware after the first eight hours of operation. In severe cutting conditions, recheck the blade carrier and blade bolt. Torque every 50 hours.

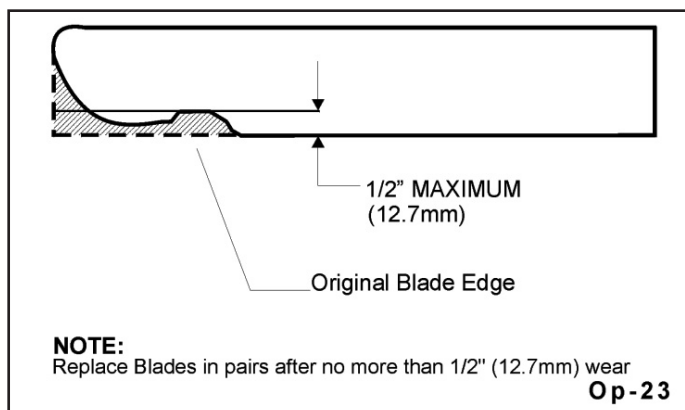
**IMPORTANT** To help prevent structural damage caused by loose hardware, tighten gearbox mounting hardware as specified. Check the fastener torque after first 8 hours of use and every 50 hours thereafter.



**DANGER** Inspect the Blades daily for abnormal wear, REPLACE BOTH BLADES on that carrier IMMEDIATELY if either blade has:

- Become bent or deformed from it's original shape, or
- Any cracks are visible, or
- Deep gouges in the blade's surface are present, or
- Gouges or chipped areas in the cutting edge are larger than 1/2" (12.7mm), or
- The material on the leading edge has been worn away by more than 1/2"(12.7mm)

Failure to replace abnormally worn blades may lead to catastrophic failure of the blades and ejection of the broken part with tremendous force which may cause serious bodily injury or death. (OPS-U-0032)



# OPERATION

## 8.4 Blade Bolt Inspection

Inspect Blade Bolt Head daily for wear as follows:

### **Excessive Blade Bolt Wear**

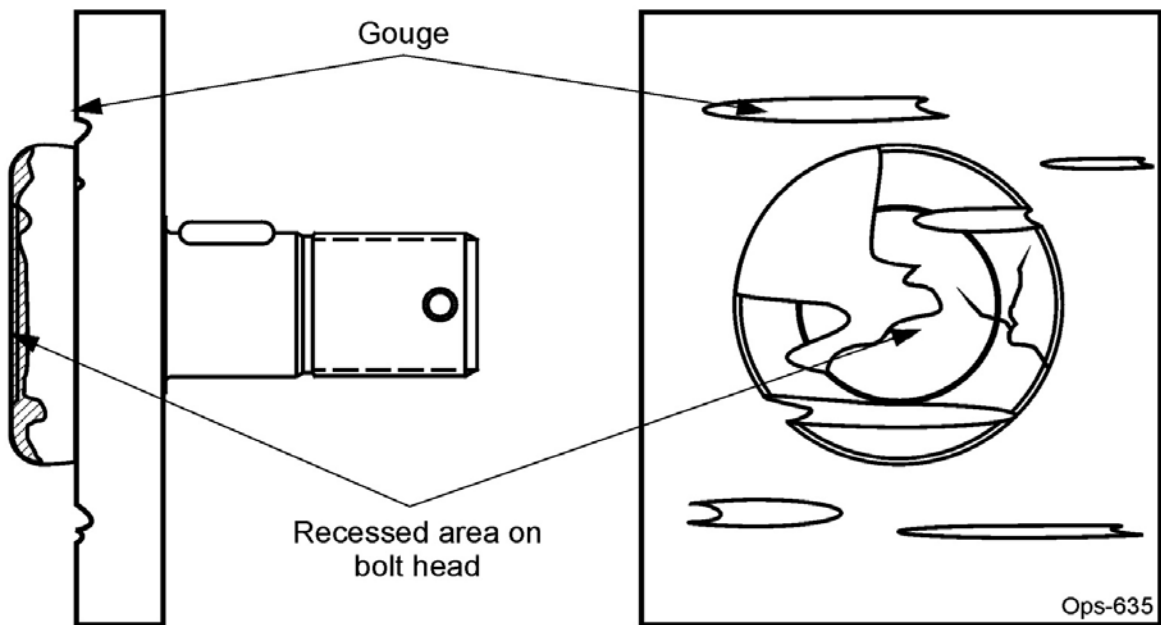
**Cause:** Blade Bolt contacts a foreign or solid object while Blade is in motion.

**Remedy:** Inspect the area before mowing to determine where the foreign objects are located and place visible hazard markers to identify the areas where immovable foreign objects exist, and avoid hitting the objects.

### **Notches and Gouges**

**Cause:** Blade Bolt contacting foreign objects.

**Remedy:** Inspect area to be mowed and remove foreign objects that could cause damage to the blade bolt.



**DANGER**

Inspect the Blade Bolt Heads daily for abnormal wear. REPLACE BOTH BLADE BOLTS on the Blades IMMEDIATELY if either blade bolt has:

- Visible cracks or
- If the recessed area on blade bolt is worn off or
- If Blade Bolt has gouges or chipped areas.

Failure to replace abnormally worn blade bolts may lead to catastrophic failure of the blades and ejection of the broken part which may cause serious bodily injury or death.

**Always replace Blade Bolts with new bolts whenever replacing the Blades. OPS-U-0037**

# OPERATION

## Tractor PRE-OPERATION Inspection



**BUSH HOG®**

Tractor ID#: \_\_\_\_\_ Make: \_\_\_\_\_

Date: \_\_\_\_\_ Shift: \_\_\_\_\_



### WARNING

Before conducting the inspection, make sure the tractor engine is off, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the implement is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.

Item	Condition at Start of Shift	Specific Comments if not O.K.
The flashing lights function properly		
The SMV Sign is clean and visible		
The tires are in good condition with proper pressure		
The wheel lug bolts are tight		
The tractor brakes are in good condition		
The steering linkage is in good condition		
There are no visible oil leaks		
The hydraulic controls function properly		
The ROPS or ROPS Cab is in good condition		
The seatbelt is in place and in good condition		
The 3-point hitch is in good condition		
The drawbar pins are securely in place		
The PTO master shield is in place		
The engine oil level is full		
The brake fluid level is full		
The power steering fluid level is full		
The fuel level is adequate		
The engine coolant fluid level is full		
The radiator is free of debris		
The air filter is in good condition		

Operator's Signature: \_\_\_\_\_

**DO NOT OPERATE an UNSAFE TRACTOR or IMPLEMENT**

# OPERATION



## Rotary Mower PRE-OPERATION Inspection

Mower ID# \_\_\_\_\_

Date \_\_\_\_\_

**IMPORTANT:** Scan this QR Code for an electronic copy of this inspection sheet.



### WARNING

Before conducting the inspection, make sure the tractor engine is off, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the mower is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.

Item	Condition at Start of Shift	Specific Comments if not O.K.
The Operator's Manual is in the canister on the mower		
All safety decals are in place and legible		
The tongue/hitch connection bolts & pins are tight		
There are no cracks in tongue or hitch		
The tow chain is secured to the tractor & mower		
The hydraulic cylinders pins are tight		
There are no leaking or damaged hoses		
The mower deck is clear of cut grass and debris		
Chain guards/deflectors are in place & in good condition		
Driveline/gearbox shields are in good condition		
Driveline clutches are in good condition; not frozen		
Driveline telescoping members & U-joints are lubricated		
Driveline yokes are securely attached to PTO & mower		
Gearbox mounting bolts are tight		
Gearbox oil is at the proper level		
Blade carrier retaining nut is tight		
Blades are not chipped cracked or bent		
Blade bolts are tight		
Wheel lug nuts are tight		
Transport locks are in good condition		

Make \_\_\_\_\_

Shift \_\_\_\_\_

Operator's Signature: \_\_\_\_\_

**DO NOT OPERATE an UNSAFE TRACTOR or MOWER**

# OPERATION

## 9. DRIVING THE TRACTOR AND IMPLEMENT

Safe tractor transport requires the operator possess a thorough knowledge of the model being operated and precautions to take while driving with an attached implement. Ensure the tractor has the capacity to handle the weight of the implement and the tractor operating controls are set for safe transport. To ensure safety while driving the tractor with an attached implement, review the following. OPS-U- 0012



### DANGER

Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23)



### WARNING

Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor and Implement and how it handles before transporting on streets and highways. Make sure the Tractor steering and brakes are in good condition and operate properly.



Before transporting the Tractor and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

Test the tractor at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Tractor and Implement. As you increase the speed of the Tractor the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.

Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the tractor and implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.

Only transport the Tractor and Implement at the speeds which allow you to properly control the equipment.

Be aware of the operating conditions. Do Not operate the Tractor with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. (SG-19)



# OPERATION

## 9.1 Starting the Tractor

The procedure to start the tractor is model specific. Refer to the tractor operator's manual for starting procedures for your particular tractor. Consult an authorized dealer if the starting procedure is unclear. Ensure the 3-point control lever is in the lowered position and the PTO is disengaged before starting the tractor. OPS-U-0033



## 9.2 Brake and Differential Lock Setting

Make sure the tractor brakes are in good operating condition. Tractor brakes can be set to operate independently allowing single rear wheel braking action or locked together to provide simultaneous rear wheel braking. FOR MOST DRIVING AND OPERATING CONDITIONS, THE BRAKE PEDALS SHOULD BE LOCKED TOGETHER TO PROVIDE THE MOST EFFECTIVE BRAKING ACTION.

Always disengage the tractor differential lock when turning. When engaged the differential lock will prevent or limit the tractor from turning. During normal cutting conditions, locking the differential provides no benefit and should not be used. OPS-U- 0013



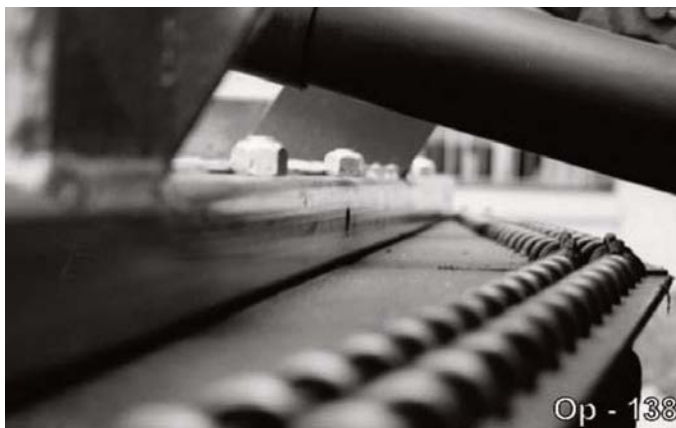
### **⚠ WARNING**

Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes. When operating down a hill or on wet or rain slick roads, the braking distance increases; use extreme care and reduce your speed in these conditions. When operating in traffic, always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy.

# OPERATION

## **9.3 Raising the Mower**

Using the tractor 3-Point hitch control lever-lift type or hydraulic remote lever-pull and semi-mount type, raise the mower high enough to clear all ground obstacles. When raising the mower, make sure all connection points are securely attached and at least 1" clearance is maintained between the driveline and the deck. If necessary, place an upper lift stop on the 3-point hitch control lever to limit the height the mower can be raised to avoid driveline damage. OPS-R-0042\_A



## **9.4 Driving the Tractor and Mower**

Start off driving at a slow speed and gradually increase your speed while maintaining complete control of the tractor and mower. Moving slowly at first will also prevent the tractor from rearing up and loss of steering control. The tractor should never be operated at speeds that cannot be safely handled or which will prevent the operator from stopping quickly during an emergency. If the power steering or engine ceases operating, stop the tractor immediately as the tractor will be difficult to control.

Perform turns with the tractor and mower at slow speeds to determine how the tractor with an attached mower handles a turn. Determine the safe speed to maintain proper control of the tractor when making turns. When turning with a towed implement, the overall working length of the unit is increased. Allow additional clearance for the mower when turning.

To avoid overturns, drive the tractor with care and at safe speeds, especially when operating over rough ground, crossing ditches or slopes, and turning corners. Tractor wheel tread spacing should be increased when working on inclines or rough ground to reduce the possibility of tipping.

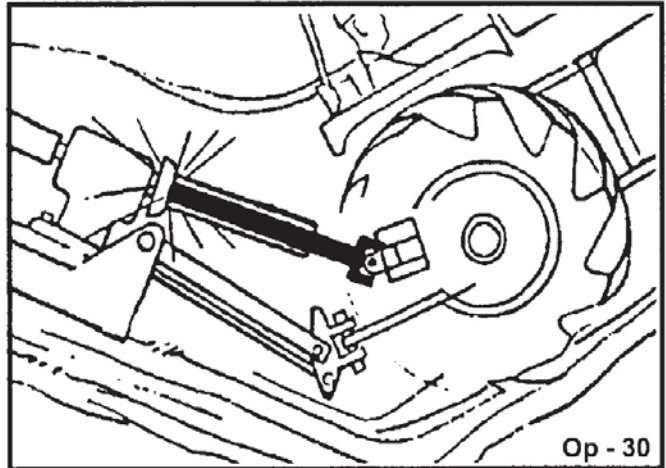
Use extreme caution when operating on steep slopes. Keep the tractor in a low gear when going downhill. DO NOT coast or free-wheel downhill. OPS-R-0019



# OPERATION

## 9.5 Crossing Ditches and Steep Inclines

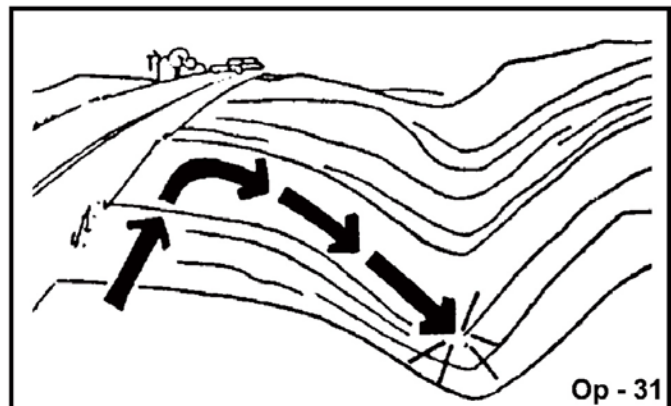
When crossing ditches with steep banks or going up sharp inclines, it is possible that the main driveline inner profile will penetrate into the outer housing to its maximum depth until the assembly becomes solid (driveline is at its extreme shortest length). This type of abusive operation can cause serious damage to the tractor and mower drive by pushing the PTO into the tractor and through the support bearings or downward onto the PTO shaft, breaking it off.



**WARNING** Damage resulting from over-collapse of the driveline's inner profile and its outer housing may allow the driveline to come loose from the Tractor which could cause bodily injury to the operator or bystanders and/or extensive damage to the Tractor or Implement. OPS-R-0020

When confronted with an incline or ditch, do not approach from an angle which is perpendicular or straight on as damaged to over collapse of the driveline may occur.

When crossing such terrain, the implement should be fully lowered for a lower center of gravity and added stability. OPS-R-0021

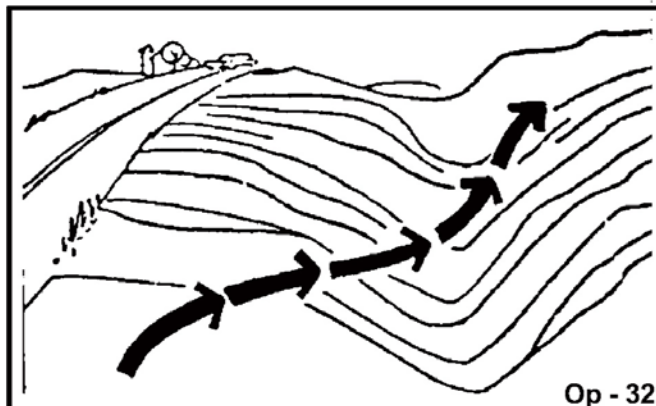


**INCORRECT: DO NOT approach ditch straight on**

## OPERATION

Inclines and ditches should be approached along a line which is at an angle as shown. This type of path will reduce the possibility of over-collapse of the driveline and resulting damage. If the gradient is so steep that such an approach increases the possibility of a tractor roll-over, select an alternate crossing path.

When operating the tractor and mower across slopes and inclines, through ditches, and other uneven terrain conditions, it is important to maintain sufficient deck to ground clearance. Blade contact with the ground may cause soil, rocks and other debris to be thrown out from under the mower resulting in possible injury and/or property damage. Ground contact also produces a severe shock load on the mower drive and to the mower blades resulting in possible damage and premature wear. OPS-R-0022



**CORRECT: Approach ditch at an angle**

### **10. OPERATING THE TRACTOR AND IMPLEMENT**

**THE OPERATOR MUST COMPLETELY UNDERSTAND HOW TO OPERATE THE TRACTOR AND IMPLEMENT AND ALL CONTROLS BEFORE ATTEMPTING TO OPERATE.** The operator must read and understand the Safety and Operation Sections of the implement and tractor operator's manuals. These manuals must be read and explained to any operator who cannot read. Never allow someone to operate the implement and tractor without complete operating instructions.

Before starting any operation, the operator must become familiar with the area to be worked in and any obstacles and hazards contained within to ensure safety to the operator, bystanders, and equipment. Special attention should be paid to foreign debris, rough terrain, steep slopes, and passersby and animals in the area. OPS-U-0015

#### **⚠ WARNING**

Extreme care should be taken when operating near loose objects such as gravel, rocks, wire, and other debris. Inspect the area before mowing. Foreign objects should be removed from the site to prevent machine damage and/or bodily injury or even death. Any objects that cannot be removed must be clearly marked and carefully avoided by the operator. Stop mowing immediately if blades strike a foreign object. Repair all damage and make certain rotor or blade carrier is balanced before resuming mowing. (SGM-05)



# OPERATION

## **!WARNING**

Many varied objects, such as wire, cable, rope, or chains, can become entangled in the operating parts of the mower head. These items could then swing outside the housing at greater velocities than the blades. Such a situation is extremely hazardous and could result in serious injury or even death. Inspect the cutting area for such objects before mowing. Remove any like object from the site. Never allow the cutting blades to contact such items. (SGM-06)

### **10.1 Foreign Debris Hazards**

Before mowing, inspect the area to make sure there are no foreign objects that the mower blades could hit or become entangled with. Remove all foreign objects and debris. If objects are too big to remove, mark them clearly and be sure to prevent the mower blades from contacting them.

If you hit a solid object or foreign debris, stop the mower and tractor at once. Immediately idle the engine speed and disengage the PTO. Wait for all mower rotating motion to stop, then raise the mower and move the tractor and implement off the object. Inspect the area and remove, or mark the location of the debris. Inspect the condition of the mower and make any needed repairs immediately. Make sure the blades are not damaged and the carrier is balanced before resuming operation.

Always wear your seat belt securely fastened and only operate the tractor and mower with the ROPS in the raised position. If the tractor or mower hits a tree stump, rock, or bump, a sudden movement could throw you off of the seat and under the tractor and/or mower. The seat belt is your best protection from falling off the tractor and the ROPS provides protection from being crushed during a tractor roll-over. OPS-R-0023



**Remove Foreign Material**



**RAISE MOWER OVER SOLID OBJECTS**

### **10.2 Bystanders/Passersby Precautions**

If a bystander comes within 300 feet of the tractor while the mower is being operated, stop the tractor at once, idle the engine and disengage the PTO. Do not engage the PTO again until all bystanders are well past the 300 foot distance. OPS-R-0024

# OPERATION



## DANGER

Rotary Mowers are capable under adverse conditions of throwing objects for great distances (300 ft (100 m) or more) and causing death or serious injury. Follow safety messages carefully.



STOP MOWING IF PASSERSBY ARE WITHIN 300 Feet (100 m) UNLESS:

- Front and Rear Deflectors, Chain Guards, or Bands are installed and in good, workable condition;
- Mower sections or Wings are running close to and parallel to the ground without exposed Blades;
- Passersby are outside the existing thrown-object zone;
- All areas have been thoroughly inspected and all foreign material such as rocks, cans, glass, and general debris has been removed.

**NOTE:** Where there are grass and weeds high enough to hide debris that could be struck by the blades, the area should be: inspected and large debris removed, mowed at an intermediate height, inspected, closely with any remaining debris being removed, and mowed again at desired final height. (This will also reduce power required to mow, reduce wear and tear on the Mower drivetrain, spread cut material better, reduce streaking, and make the final cut more uniform). (SRM-01)

### 10.3 Engaging the Power Take Off (PTO)

Before engaging the PTO, make certain that the area is clear of bystanders and passersby. The implement must be completely lowered and the deck positioned at a safe operating height. NEVER engage the PTO with the implement in the raised position.

Set the tractor engine speed at approximately 1,000 RPM before engaging the PTO. Shift the PTO control to the on position, and slowly increase the engine speed until the PTO is operating at the rated speed. If you hear unusual noises or see or feel abnormal vibrations, disengage the PTO immediately. Inspect the implement to determine the cause of the noise or vibration and repair the abnormality. (OPS-U-0027)



## WARNING

Do Not let the Blades turn when the Mower Deck is raised for any reason, including clearance or for turning. Raising the Mower deck exposes the Cutting Blades which creates a potentially serious hazard and could cause serious injury or even death from objects thrown from the Blades. (SRM-07)



## WARNING

Do Not put hands or feet under mower decks. Blade Contact can result in serious injury or even death. Stay away until all motion has stopped and the decks are securely blocked up. (SGM-09)



# OPERATION

## **10.4 RPM and Ground Speed**

Ground speed for mowing will depend upon the height, type, and density of vegetation to be cut. Recommended speed for efficient mower performance is between 2 and 5 mph(3-8 kph). Operate the mower at its full rated PTO speed to maintain blade speed for a clean cut. Refer to the tractor operator's manual or the tractor instrument panel for the engine speed and gear to provide the required PTO and desired ground speed. Make sure that the mower is operating at its full rated speed before entering the vegetation to be cut. If it becomes necessary to temporarily regulate engine speed, increase or decrease the throttle gradually.

Ground speed is achieved by transmission gear selection and not by the engine operating speed. The operator may be required to experiment with several gear range combinations to determine the best gear and range which provides the most ideal performance from the mower and most efficient tractor operation. As the severity of cutting conditions increase, the ground speed should be decreased by selecting a lower gear to maintain the proper operating PTO speed. OPS-R-0025



**WARNING** Do Not exceed the rated PTO speed for the Implement. Excessive PTO speeds can cause Implement driveline or blade failures resulting in death or serious injury. (SG-26)



**WARNING** Mow at the speed that you can safely operate and control the tractor and mower. The correct mowing speed depends on terrain condition and grass type, density, and height of cut. Normal ground speed range is from 2 to 5 mph(3-8 kph). Use slow mowing speeds when operating on or near steep slopes, ditches, drop-offs, overhead obstructions, power lines, or when debris and foreign objects are to be avoided. (SGM-07)

## **10.5 Operating the Mower**

The mower is designed to cut vegetative material up to 3-1/2" in diameter. Travel at a speed that allows the mower sufficient time to cut through the vegetation and maintain the operating speed at 540 rpm to prevent overloading the mower and tractor and to produce a clean cut. Choose a driving pattern that provides the maximum pass length and minimizes turning. Remember, sharp blades produce cleaner cuts and require less power.

Under certain conditions, tractor tires may roll some grasses down preventing them from being cut at the same height as the surrounding area. When this occurs, reduce the tractor ground speed while maintaining the operating speed of the mower. A slower ground speed will permit grasses to at least partially rebound and be cut. Taking a partial cut and/or reversing the direction of travel may also help produce a cleaner cut.

Avoid mowing in the reverse direction when possible. In situations where the mower must be backed to access areas to be cut, make sure there are no persons or other foreign debris behind the mower before mowing in reverse. When mowing in reverse, operate the tractor and mower at a much reduced ground speed to ensure control is maintained of the tractor and cutter. OPS-R-0026\_H

# OPERATION

**!WARNING** Do Not Mow with two machines in the same area except with Cab Tractors with the windows closed. (SGM-11)

**!WARNING** Mow only in conditions where you have clear visibility in daylight or with adequate artificial lighting. Never mow in darkness or foggy conditions where you cannot clearly see at least 300 feet (90 m) in front and to the sides of the tractor and mower. Make sure that you can clearly see and identify passersby, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects. If you are unable to clearly see these type of items discontinue mowing. (SGM-1)

**!WARNING** Avoid mowing in reverse direction when possible. Check to make sure there are no persons behind the mower and use extreme care when maneuvering in reverse. Mow only at a slow ground speed where you can safely operate and control the tractor and mower. Never mow an area that you have not inspected and removed debris or foreign material. (SGM-08)

**!WARNING** Follow these guidelines to reduce the risk of equipment and grass fires while operating, servicing, and repairing the Mower and Tractor:

- Equip the Tractor with a fire extinguisher in an accesible location.
- Do Not operate the Mower on a Tractor with an underframe exhaust.
- Do Not smoke or have an open flame near the Mower and Tractor.
- Do Not drive into burning debris or freshly burnt areas.
- Ensure slip clutches are properly adjusted to prevent excessive slippage and plate heating.
- Never allow clippings or debris to collect near drivelines, slip clutches, and gearboxes. Periodically shut down the Tractor and Mower and clean clippings and collected debris from the mower deck. (SGM-12)



When you get to the end of a pass, slightly raise the mower (2-4") before turning. Never raise the mower entirely while the blades are turning. If the mower must be raised higher than 12" from ground level, disengage the tractor PTO and wait for all mower rotation to come to a complete stop before proceeding to raise the mower. (OPS-R-0027\_B)



Op - 145

# OPERATION

## **! WARNING**

Do not let the Blades turn when the Mower Deck is raised for any reason, including clearance or for turning. Raising the Mower deck exposes the Cutting Blades which creates a potentially serious hazard and could cause serious injury or even death from objects thrown from the Blades. (SRM-07)



Large, dense, or wet vegetation may need to be mowed in two or more passes to achieve a uniform cut. In such conditions, raise the cutting height to 12" or more on the first pass. OPS-R-0043



Then lower the mower to the desired height and mow the vegetation a second time. If possible, select a mowing pattern that is at a 90 degree angle to the first pass to reduce streaking for a more uniform cut. OPS-R-0044



Stay alert and watch for trees, low hanging limbs, power lines, and other overhead obstacles and solid ground objects while you are operating. Use care to avoid hitting these items. OPS-R-0028\_A



# OPERATION

## 10.6 Right of Way (Highway) Mowing

- **USE DOUBLE CHAIN GUARDS** for highway, right-of-way, parks, greenbelt mowing, or all other mowing where human dwellings, vehicles, or livestock could be within 300 feet of the mower.
- No shielding is 100% effective in preventing thrown objects. To Reduce Possibility of Injury:
  1. **MAINTAIN MOWER SHIELDING** in good operational condition.
  2. **DAILY INSPECT** the condition of the Thrown Object Guards, mower Side Skirts, and skid shoes: Replace or repair worn or damaged guards.
  3. **DAILY INSPECT** the condition of the Blades and Blade Bolts. Replace any cracked, worn, bent or damage blades. Always replace blade bolts and nuts when replacing blades. Make sure the blade bolts are properly tightened.
  4. **RAISE CUTTING HEIGHT** to 6 INCHES minimum.
  5. **INSPECT AREA** thoroughly before mowing to **REMOVE** potential **THROWN OBJECT HAZARDS**
  6. **NEVER ALLOW BLADES to CONTACT SOLID OBJECTS** like wire, rocks, posts, curbs, guard rails, or ground while mowing.



### **DANGER**

**ROTARY MOWERS CAN THROW OBJECTS 300 FEET OR MORE UNDER ADVERSE CONDITIONS.**

**TO AVOID DEATH OR SERIOUS INJURY TO OPERATOR OR BYSTANDERS FROM THROWN OBJECTS:**

### **INSPECT AREA FOR POTENTIAL THROWN OBJECTS BEFORE MOWING:**

- **REMOVE** debris, rocks, wire, cable, metal objects and other foreign material from area. Wire, cable, rope, chains and metal objects can be thrown or swung outside deck with great velocity:
  1. **MARK** objects that cannot be removed.
  2. **AVOID** these objects when mowing.

### **STOP MOWING IF PASSERSBY IS WITHIN 300 FEET UNLESS:**

- **All THROWN OBJECT SHIELDING** including Front and Rear Deflectors, Chain Guards, Steel Guards, Bands, Side Skirts and Skid Shoes are in place and in good condition when mowing.
- **MOWER SECTIONS OR WINGS** are adjusted to be close and parallel to ground without exposing blades.
- **MOWING AREA** has been inspected and foreign materials and debris have been removed.
- **PASSERSBY** are inside enclosed vehicle. **OPS-U-0040**

# OPERATION

## 10.7 Shutting Down the Implement

To shut down attached mower head, first bring the tractor to a complete stop. Decrease engine RPM to idle then disengage cutterhead. The mower head will come to a complete stop within a suitable amount of time. Do not engage or disengage the cutterheads at a high RPM unless there is an emergency situation.

Park the tractor on a level surface, place the transmission in park or neutral and apply the parking brake, lower the attached implement to the ground, shut down the engine, remove the key, and wait for all motion to come to a complete stop before exiting the tractor. OPS-U- 0016



## 11. DISCONNECTING THE MOWER FROM THE TRACTOR

Before disconnecting the mower, the PTO must be disengaged and blade rotation at a complete stop. Move the mower to a level storage location and lower it to the ground. If the mower is not resting securely on the ground, block the mower up securely before attempting to disconnect it from the tractor.

Use extreme care to keep feet and hands from under the mower and clear of any pinch points caused by the tractor hitch arms and mower pins. OPS-R-003\_A



Never stand or allow another person to stand between a running Tractor and the Mower when disconnecting the Implement from the Tractor 3-point hitch.

# OPERATION



## DANGER

Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15)



## WARNING

Never unhitch without using the Tongue Jack. The Tongue is very heavy. Attempting to lift the Tongue without using the Tongue Jack could cause strains or other injury. Allowing the tongue to fall suddenly and unexpectedly could result in crushing injury. Use the Tongue Jack for lifting the Implement only. Overloading the Tongue Jack can cause failure with possible serious bodily injury or even death. (STI-04)

**Lift-Type Mower** - To disconnect the mower, first extend the tractor 3-Point hitch top link to remove tension on the top link hitch pin. When the pin is loose and easy to rotate, remove the pin from the mower. Next remove both lower hitch pins.

**Pull-Type Mower** - To disconnect the mower, first relieve hydraulic pressure by moving the control lever back and forth several times. Lower the parking jack and raise the mower until the tongue clevis is no longer resting on the tractor drawbar and is supported solely by the jack. Make sure that the jack foot is securely resting at ground level or supported by a block. Then remove the hitch bolt, locknut, and washers. If a hydraulic cylinder was used, remove its hose end from the tractor port and secure it to the mower to prevent contact with dirt.

After disconnecting the 3 lift points, remove the mower driveline from the tractor PTO shaft. Lay the driveline down carefully to avoid damaging the driveline or its shield. Do not let the driveline fall into mud or dirt, which can contaminate the bearing and shorten the life of the driveline. OPS-R-0031\_A



## 12. MOWER STORAGE

Properly preparing and storing the mower at the end of the season is critical to maintaining its appearance and to help ensure years of dependable service. The following are suggested storage procedures:

- Thoroughly clean all debris off the mower to prevent damage from rotting grass and standing water.
- Lubricate all mower grease points and fill gearbox oil levels as detailed in the maintenance section.
- Tighten all bolts and pins to the recommended torque.
- Check the mower for worn and damaged parts. Perform repairs and make replacements immediately so that the mower will be ready for use at the start of the next season.
- Store the mower in a clean, dry place with the mower housing resting securely on blocks or at ground level.
- Keep the driveline yoke from sitting in water, dirt and other contaminants.
- Use spray touch-up enamel where necessary to prevent rust and maintain the appearance of the mower.



It is critical that driveline clutches slip when an obstacle or heavy load is encountered to avoid mower and/or tractor damage. If the mower sits outside for an extended period of time or is exposed to rain and/or humid air, the clutch lining plates must be inspected to ensure they are not frozen together from rust or corrosion. If the mower has been exposed to such conditions, at the start of each mowing season, and any time it is suspected that the slip clutch plates may be frozen together, readjust the slip clutch as detailed in Seasonal Clutch Maintenance of the maintenance section in this manual. OPS-R-0032\_A



Never allow children or other persons to ride on the Tractor or Implement.  
Falling off can result in serious injury or death. (SG-10)



## 13. TRANSPORTING THE TRACTOR AND IMPLEMENT

Inherent hazards of operating the tractor and implement and the possibility of accidents are not left behind when you finish working in an area. Therefore, the operator must employ good judgement and safe operation practices when transporting the tractor and implement between locations. By using good judgement and following safe transport procedures, the possibility of accidents while moving between locations can be substantially minimized. OPS-U- 0017

# OPERATION

Before transporting the tractor and mower, idle the tractor engine, disengage the PTO and wait for all mower moving parts to come to a complete stop. Once all mower parts are completely stopped, raise the mower to transport height. **NOTE:** When raising the mower, maintain 1" clearance between the driveline and mower deck. If additional mower deck height is needed for safe transport, disconnect the driveline from the tractor and secure its end to the mower deck. The mower can then be raised to the maximum lift height. OPS-R-0033\_A

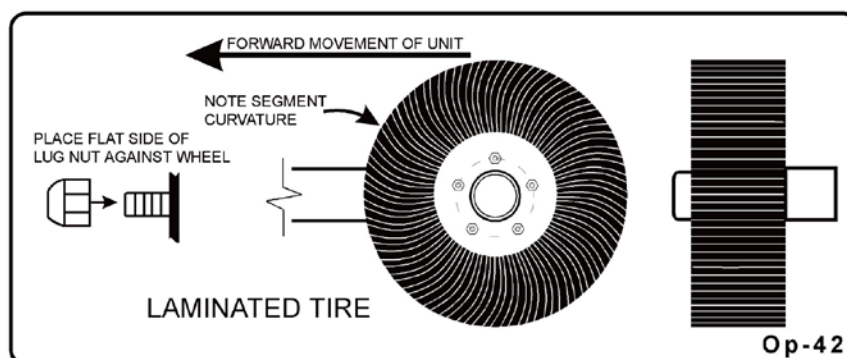


If the tractor's hydraulic pump is not independent of the tractor PTO, or if the tractor PTO has to be run to have hydraulic power, disconnect the mower driveline from the tractor PTO output shaft. Secure the driveline to the mower deck to prevent driveline damage or loss during transport. OPS-R-0034



## 13.1 Tire and Wheels

Laminated Sectional Tires are designed for conditions where puncture proof performance is required and the mower will not be transported for long distances on roadways. Transport speed for laminated tires should not exceed 15 MPH. Excessive speed can cause damage to the machine and tire sections. Laminated tires must be installed such that the rubber segments lay with the ground.



# OPERATION

## 13.2 Transporting on Public Roadways

Extreme caution should be used when transporting the tractor and implement on public roadways. The tractor must be equipped with all required safety warning features including a SMV emblem and flashing warning lights to alert drivers of the tractor's presence. Remember that roadways are primarily designed for automotive drivers and most drivers will not be looking out for you, therefore, you must look out for them. Check your side view mirrors frequently and remember that vehicles will approach quickly because of the tractor's slower speed. Be extremely cautious when the piece of equipment that you are towing is wider than the tractor tire width and/or extends beyond your lane of the road.

Make sure that a proper size safety tow chain is secured between the tractor and implement before entering a public road. OPS-U- 0019

Implements 12 feet wide or wider are required to use additional flashing warning lights when transporting on public roads or highways. Install, as indicated in the assembly section of this manual, the magnetic towing lights that came with your implement. Make sure that magnetic towing lights are placed on top of deck near the outside of the implement and are connected to the tractor and working properly before transporting implement on public roads.



**WARNING** **INSTALL** Magnetic Towing Lights on Implement 12 feet wide or wider and ensure they are properly functioning before transporting on public roads. Make sure lights are visible to traffic following and approaching implement.



The SMV (Slow-Moving Vehicle) emblem is universal symbol used to alert drivers of the presence of equipment traveling on roadways at a slow speed. SMV signs are a triangular bright orange with reflective red trim for both easy day and night visibility. Make sure the SMV sign is clean and visible from the rear of the unit before transporting the tractor and implement on a public roadway. Replace the SMV emblem if faded, damaged, or no longer reflective. OPS-U- 0020



Make sure that all tractor flashing warning lights, headlights, and brake/tail lights are functioning properly before proceeding onto public roads. While newer model tractors have plenty of lighting to provide warning signals and operating lighting, most older models are only equipped with operating lights. Consult an authorized tractor dealer for lighting kits and modifications available to upgrade the lighting on older tractor models. OPS-U- 0021



# OPERATION

When operating on public roads, have consideration for other road users. Pull to the side of the road occasionally to allow all following traffic to pass. Do not exceed the legal speed limit set in your country for agricultural tractors. Always stay alert when transporting the tractor and implement on public roads. Use caution and reduce speed if other vehicles or pedestrians are in the area. OPS-U- 0022\_A



Reduce speed before turning or applying the brakes. Ensure that both brake pedals are locked together when operating on public roads. OPS-U- 0023



## **13.3 Hauling the Tractor and Implement**

Before transporting a loaded tractor and implement, measure the height and width dimensions and gross weight of the complete loaded unit. Ensure that the load will be in compliance with the legal limits set for the areas that will be traveled through.

Use adequately sized and rated trailers and equipment to transport the tractor and implement. Consult an authorized dealer to determine the proper equipment required. Using adequately sized chains, heavy duty straps, cables and/or binders, securely tie down both the front and rear of the tractor utilizing the proper tie down locations as specified by the tractor manufacturer.

Arrange the chains so that when tightened, the chains are pulling downward and against themselves. Carefully tighten the securing chains or other fasteners using boomers or binders to apply maximum tension. Use extreme care when attaching and removing the securing devices as the extreme tension involved when released has the potential to inflict serious injury.

While hauling the tractor and implement, make occasional stops to check that the tractor and implement have not moved or shifted and that the securing chains have maintained tension. If during transport a hard braking, sharp turning, or swerving action was performed, stop at the next safe location to inspect the security of the load.

## 14. TROUBLE SHOOTING GUIDE

Problem	Possible Cause	Remedy
Uneven Cut	Excessive ground speed	Reduce ground speed.
	Blades worn, dull, or bent.	Replace blades. (Refer to "Maintenance" section).
	Mower not level side to side.	Adjust. (Refer to "Assembly" section)
	Improper height adjustment.	Adjust Mower height. (Refer to "Assembly" section)
	Low tractor tire pressure on one side.	Adjust tire pressure. (Refer to your tractor operator's manual)
Uncut Material	Turning too fast.	Reduce ground speed when turning.
	Tractor tires push grass down.	Adjust your tractor wheel spacing. (Refer to "Operation" section)
	Damaged Mower pan	Repair or replace as necessary.
	Excessive ground speed	Reduce ground speed.
Poor Shredding	RPM too low	Use full PTO speed. (Refer to your tractor operator's manual)
	Improper blade for direction of cut.	Install blades so rotation is correct.
	Excessive ground speed.	Raise the front of Mower relative to the rear to hold and circulate material longer. (Refer to the "Operation Section-Setting the Mower-Setting Deck Height") Reduce ground speed.
Windrowing or Uneven Material Distribution	Cutting too high.	Lower cutting height. (Refer to the "Operation Section-Setting the Mower Setting Deck Pitch")
	Material heavy and lush.	Raise the front of Mower relative to the rear. (Refer to the "Operation Section Setting the Mower- Setting Deck Height")
	Excessive ground speed	Reduce ground speed.
	Conditions too wet.	Wait for conditions to dry. Reduce ground speed.


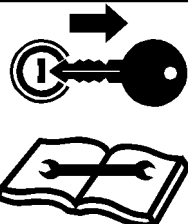
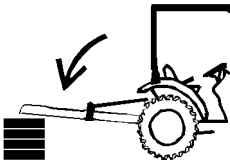
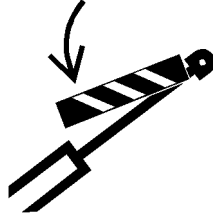

# OPERATION

Blade Bolts Working Loose	Bolts not tightened. Bolt hole elongated or oversized.	Tighten Bolts to 600 ft./lbs. Replace Blade Carrier.
Gearbox Noisy	Low Lubricant. Rough gears. Worn Bearing.	Check lubricant level. Run in or change Gears. Replace Bearing.
Gearbox Leaking	Damaged Oil Seal. Bent Shaft. Oil Seal Race rough. Oil Seal installed wrong. Oil Seal not sealing in the housing  Oil level too high. Gasket damaged. Bolts loose. Sand hole in casting.	Replace Seal. Replace Oil Seal and Shaft. Replace Shaft or repair Race. Replace Seal. Replace Seal or use a sealant on O.D. of Seal.  Drain oil to proper level. Replace Gasket. Tighten Bolts. Replace castings or gearbox.
Streaking Conditions	Conditions too wet for cutting. Blades unable to cut that part of grass pressed down by path of tractor tires.  Dull blades. Height of cutter lower at rear or front.	Allow grass to dry before cutting. Slow ground speed of tractor but keep engine running at full PTO rpm  Lowering the cutting height may help. Sharpen or replace blades. See Cutting Height Instructions.
Gearbox Overheating	Low on lubricant. Improper type lubricant. Excessive trash build-up around gearbox.  Bearing or gears set up improperly.	Fill to level plug. Replace with proper lubricant. Remove trash.  Consult your Dealer.
Shear Pin Shears Excessively	Tractor PTO not being run at 540 RPM.  Heavy Material.  Not using proper pin.  PTO engaged at high engine RPM Cutting in rocky conditions Blade carrier RPM too high. Blades not properly heat treated.	Run at 540 RPM.  Reduce ground speed. Raise cutting height.  Replace only with recommended shear pin.  Idle engine to engage PTO Increase cutting height. Check gearbox ratios. Consult your Dealer.

# MAINTENANCE SECTION

# MAINTENANCE

## HAZARDS WITH MAINTENANCE OF IMPLEMENT

				
Periodically inspect all moving parts, lubricate drivelines, and tighten all fasteners	Stop engine remove key before conducting maintenance	Block up implement before servicing Use large blocks on soft or wet soil	Engage cylinder transport locks	Inspect Blades for damage or cracks

### **WARNING**

**AVOID DEATH OR SERIOUS INJURY FROM COMPONENT FAILURE BY KEEPING IMPLEMENT IN GOOD OPERATING CONDITION IN PERFORMING PROPER SERVICE, REPAIRS AND MAINTENANCE.**

#### **BEFORE PERFORMING SERVICE, REPAIRS AND MAINTENANCE ON THE IMPLEMENT:**

**SECURE EQUIPMENT FOR SERVICE**

**BLOCK OUT POTENTIAL ENERGY HAZARDS;** Rotating Parts, Raised Components, Hydraulic Pressure.

- **STOP ENGINE**, engage parking brake and allow all moving parts to stop and remove key before dismounting from tractor seat.
- **PLACE** implement on ground or securely block up raised equipment. Use large blocks on soft or wet soil.
- **PUSH** and **PULL** Remote Hydraulic Cylinder lever to relieve hydraulic pressure.
- **DISCONNECT IMPLEMENT driveline** from tractor PTO Shaft.

**WEAR SAFETY GLASSES** with side shields (marked with ANSI Z87), **PROTECTIVE GLOVES** and follow **SAFETY PROCEDURES** when performing service, repairs and maintenance on the implement:

- Always **WEAR** protective **GLOVES** when handling chemicals or worn component with sharp edges.
- Always **WEAR GLOVES** and **SAFETY GLASSES** with side shields (marked with ANSI Z87) when servicing components
- **AVOID CONTACT** with hot hydraulic oil tanks, pumps, motors, valves and hose connection surfaces.
- **SECURELY** support or **BLOCK UP** raised implement, framework and lifted components before working underneath equipment.
- **STOP** any implement movements and **SHUT-OFF TRACTOR** engine before doing any work procedures.
- **USE** ladder or raised stands to reach high equipment areas inaccessible from ground.
- **ENSURE** good footing by standing on solid flat surfaces when getting on implement to perform work.
- **FOLLOW** manufacturer's instructions in handling oils, solvents, cleansers, and other chemical agents.
- **DO NOT** change any factory-set hydraulic calibrations to avoid component or equipment failures.
- **DO NOT** modify or alter implement, functions or components.
- **DO NOT WELD** or repair rotating mower components. These may cause vibrations and component failures being thrown from mower.

#### **PERFORM SERVICE, REPAIRS, LUBRICATION AND MAINTENANCE OUTLINED IN IMPLEMENT MAINTENANCE SECTION:**

- **INSPECT** for loose fasteners, worn or broken parts, leaky or loose fittings, missing or broken cotter keys and washers on pins, and all moving parts for wear.
- **REPLACE** any worn or broken parts with authorized service parts.
- **LUBRICATE** unit as specified by lubrication schedule
- **NEVER** lubricate, adjust or remove material while it is running or in motion.
- **TORQUE** all bolts and nuts as specified.

#### **BLADE INSPECTION:**

- **REPLACE** bent, damage, cracked or broken blades immediately with new blades.
- **AVOID** blade failures and thrown broken blades. **DO NOT** straighten, weld, or weld hard-facing blades.

#### **SAFETY SHIELDS, GUARDS AND SAFETY DEVICES INSPECTION:**

- **KEEP** all Deflectors, Chain Guards, Steel Guards, Gearbox Shields, and PTO integral shields, Bands, Side Skirts and Skid Shoes in place and in good condition.
- **REPLACE** any missing, broken or worn safety shields, guards and safety devices.



### **WARNING**

**Cancer and Reproductive Harm** [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov) **PN HM01**

# MAINTENANCE

## PARTS INFORMATION

Bush Hog mowers use balanced and matched system components for blade carriers, blades, cuttershafts, knives, knife hangers, rollers, drivetrain components, and bearings. These parts are made and tested to Bush Hog specifications. Non-genuine "will fit" parts do not consistently meet these specifications. The use of "will fit" parts may reduce mower performance, void warranties, and present a safety hazard. Use genuine Bush Hog mower parts for economy and safety. (SPBH-1)

## SEE YOUR BUSH HOG DEALER

Before operating your Rotary Cutter, make sure it is properly lubricated and thoroughly inspected. Only a minimum of time and effort is required to regularly lubricate and maintain this machine to provide long life and trouble free operation.



**WARNING** Always disengage the PTO before raising the Rotary Cutter for transporting or making adjustments.

**NOTE:** Some guards and shields have been removed from the illustrations and pictures for instructional clarity. DO NOT operate implement without all shields and guards in place and in good condition.

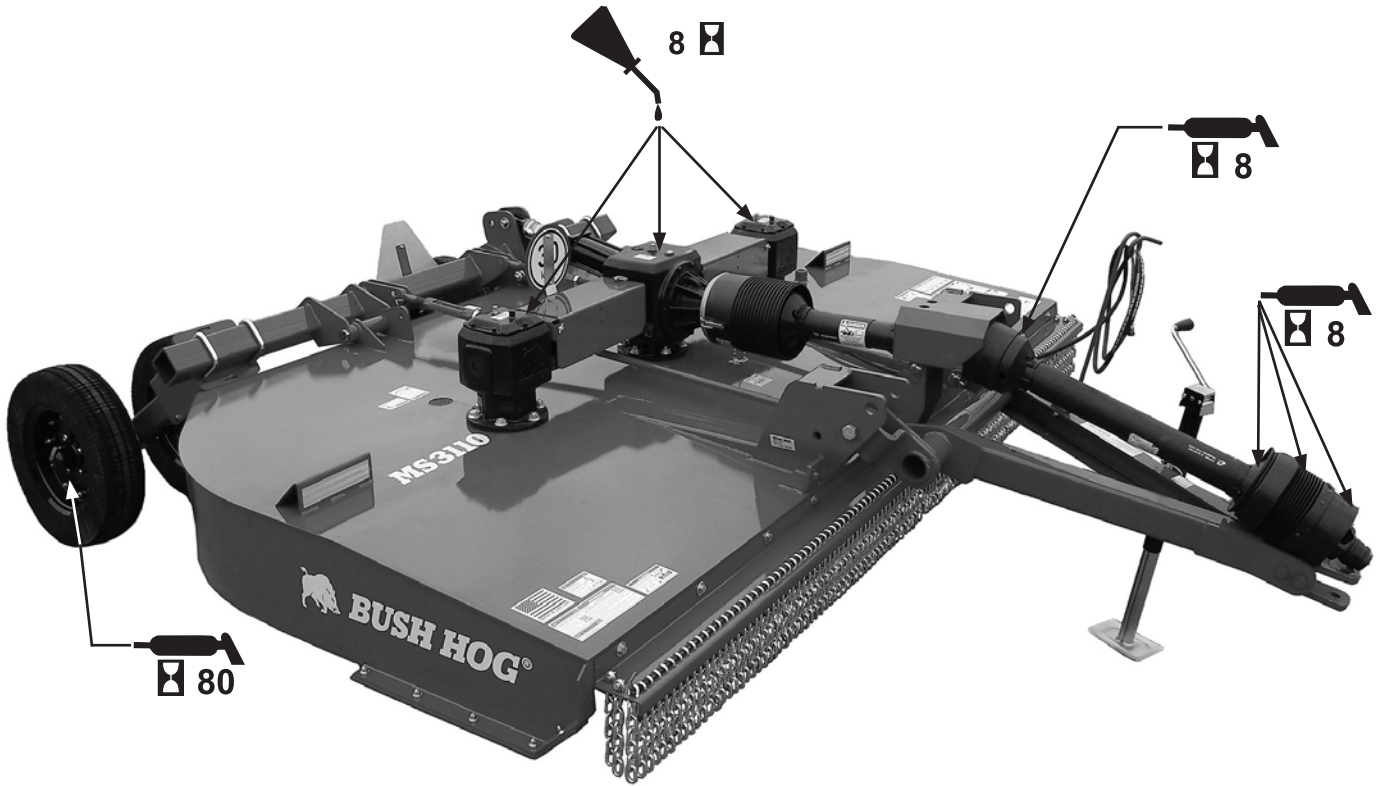
## LUBRICATION


Do not let excess grease collect on or around parts, particularly when operating in sandy areas. The illustrations on the next page shows lubrication points (Figure Mnt-R-0473). The chart gives the frequency of lubrication in hours, based on normal operating conditions. Severe or unusual conditions may require more frequent lubrication.

Use Multi-Purpose Gear Oil when required in Gearbox. Use N.L.G.I #2 grease for all locations designated with grease gun. Be sure to clean the fitting thoroughly before using grease gun. Failure to maintain proper lubrication will result in damage to U-joints, gearbox, and/or driveshaft. Figure Mnt-R-0333/Mnt-R-0394


# MAINTENANCE

## MOWER GREASE AND OIL POINTS





Check Gear Oil- Use  
EP80W-90 or EP85W-140



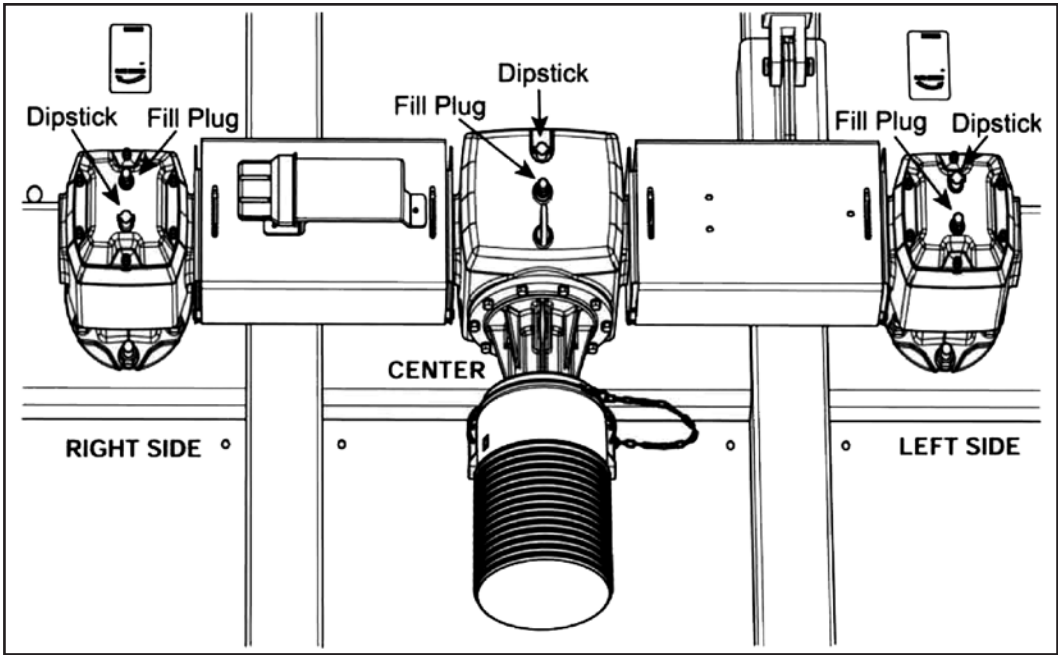
Use N.L.G.I. #2 Grease

# MAINTENANCE

## GEARBOX

**NOTE:** These Gearboxes are shipped dry from the factory and must be filled to the proper levels before operating the machine.

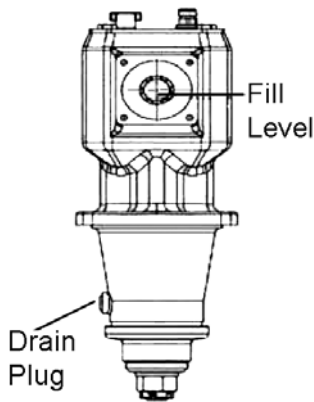
Fill the Gearbox Assemblies with EP80W-90 or EP85W-140 Gear Oil. (See Table 1 Gearbox Oil Capacities). Allow time for oil to seep through bearings to lower level housing before checking oil level. It is recommended that the oil level be checked after the first 8-10 hours after the initial operation.



Use EP80W-90 or EP85W-140 Gear Oil for all locations shown according to instructions.

**NOTE:** Overfilling the Gearbox will cause pressure to build up and cause Oil Seals to leak. (See Table 1)

**ATTENTION:** If the Gearbox suddenly starts making an unusual noise, stop at once, check for leaks, and refill Gearbox as required.



**TABLE 1: GEARBOX OIL CAPACITY**  
(USE EP80W-90 or EP85W-140 GEAR OIL)

OIL CAPACITY			
MODEL	LEFT	CENTER	RIGHT
MS3110	149 oz. (4.7 QT.)	222 oz. (6.9 QT.)	149 oz. (4.7 QT.)

# MAINTENANCE

## DRIVELINES



### CAUTION

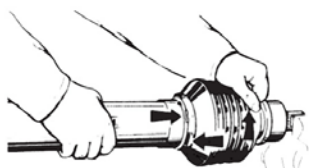
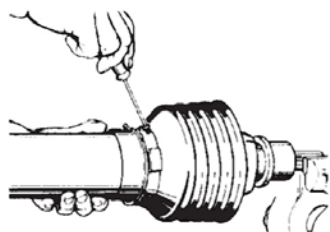
Many of the equipment components are **HEAVY** (70 lbs. or greater) and Special Lifting Procedures are recommended. Use lifting assistance such as mechanical assistance, two people, and proper lifting techniques when connecting or installing the driveshaft to reduce the possibility of back injuries.

The Drivelines and U-Joints should be inspected each morning before the mower is started.

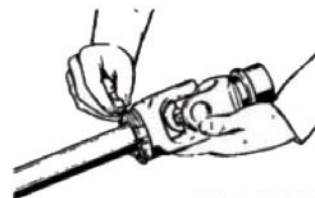
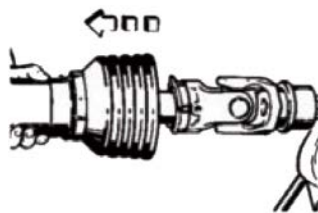
The U-Joint on the Drivelines undergo extreme forces when the unit is turning. It is important that the U-Joints be greased per schedule before the unit is started. The U-Joints are located at each end of the Drivelines. The U-Joint assemblies are accessible by rotating the Driveline Safety Shield until the hole in the Shield matches up with the Grease Fitting. Lubricate all fittings with a good quality Lithium Soap compatible E.P. grease meeting the N.L.G.I. #2 specifications and containing no more than 1% Molybdenum Disulfide. An E.P. grease meeting the N.L.G.I. #2 specifications and containing 3% Molybdenum Disulfide may be substituted in the telescoping members only. Inspect the U-Joint for wear by holding the shaft on one side of the U-Joint while trying to rotate the shaft on the other side of the U-Joint. If there is noticeable movement in the Driveline replace the U-Joint before it causes severe damage to the Driveline.

## MAIN & JACKSHAFT DRIVELINE SHIELDS

To remove the main inner driveline shield, Remove the locking screws. Align the bearing tabs with the cone pockets. FIGURE Mnt-0026. Remove the half-guard and remove the bearing ring. FIGURE Mnt-R-0012.



Mnt-0026

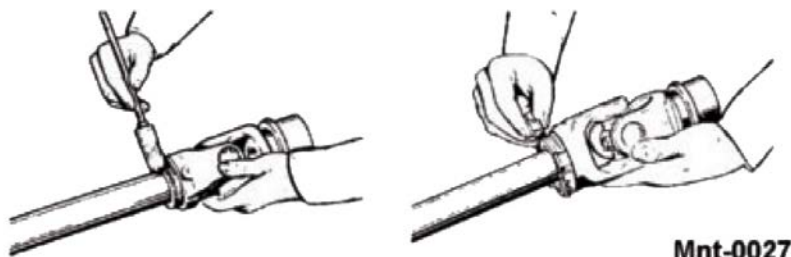


Mnt-R-0012

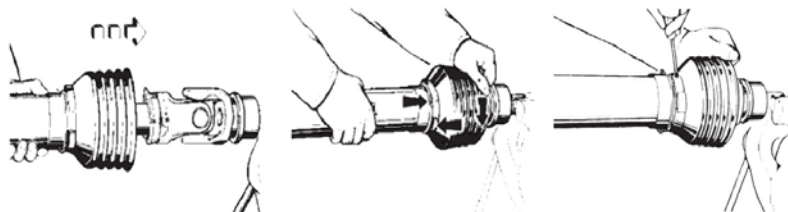
Inspect the driveline shield for worn areas or cracks. If the shield has any dents or cracks, replace the Shield. While the Shields are off, examine the Driveline for signs of abnormal wear, bent or twisted shafts, or cracks in the shafts or tubes. Check to see that the Drivelines telescope easily. If the Drivelines do not telescope properly or show signs of abnormal wear, the shaft should be repaired or replaced.

# MAINTENANCE

To assemble the main inner driveline shield, grease the yoke groove and inner profile tube. Attach the bearing ring in groove with recesses facing profile tube. FIGURE Mnt-0027. Slide on the half shield. Turn the cone until it engages correctly. Install locking screws. FIGURE Mnt-0028.



Mnt-0027



Mnt-0028

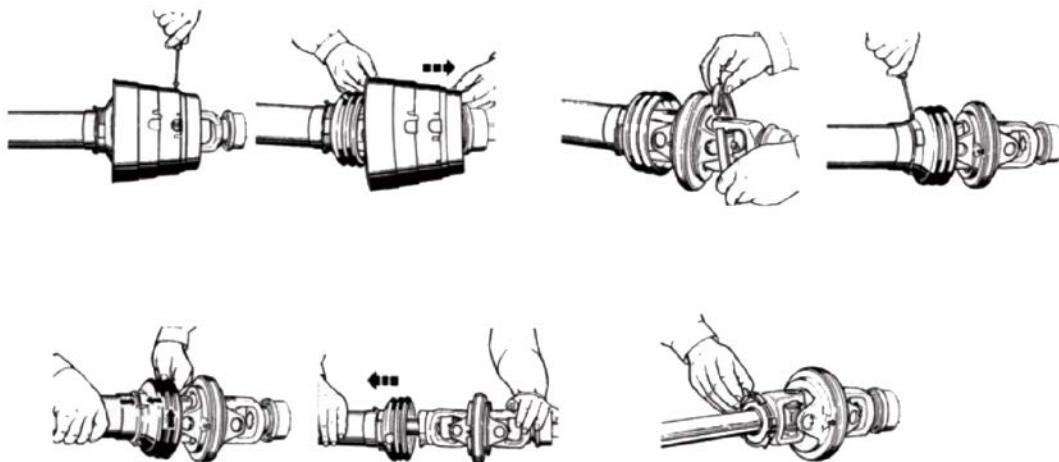
## IMPORTANT!

Check that Guard Missing Decal on steel tube under inner guard and Rotating Driveline Decal are firmly affixed, undamaged and readable. If not, replace.



## MAIN CV DRIVELINE SAFETY SHIELD

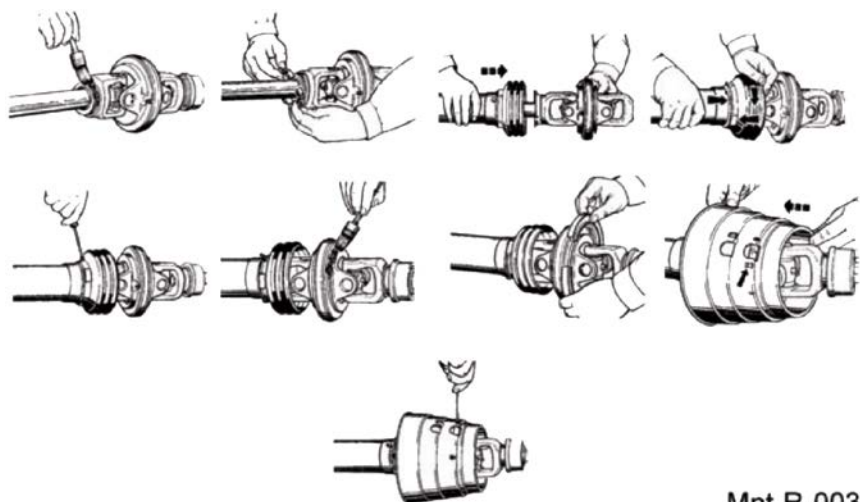
To remove the outer CV cone, remove the locking screws from shield cone. Remove cone over yoke. Mnt-R-0038. Remove bearing ring and remove the locking screws from inner shield cone. Mnt-R-0038. Turn inner cone to assembly position and remove half shield. Remove bearing ring. Mnt-R-0038



Mnt-R-0038

# MAINTENANCE

To assemble outer CV driveline, grease yoke groove and inner profile tube. Attach bearing ring on groove with recesses facing profile tube. Slide on half shield with cone. Turn cone until it engages correctly. Tighten locking screws. Grease bearing groove in double yoke. Insert bearing ring. Slide guard cone for double yoke over cam from the connecting end. Make sure holes for screws are visible. Tighten locking screws. Mnt-R-0039



Mnt-R-0039

## IMPORTANT!

Check that Guard Missing Decal on steel tube under inner guard and Rotating Driveline Decal are firmly affixed, undamaged and readable. If not, replace.



Mnt-R-0362



**IMPORTANT:** Scan this QR Code with your smart phone to link to the ADMA Driveline Safety Manual for more information on the safe use of a driveline during normal operation and maintenance. Or type in your internet browser the following web address: [www.algqr.com/dme](http://www.algqr.com/dme) Ops-0009-MISC



# MAINTENANCE

## BLADE SERVICING

Inspect blades before each use to determine that they are properly installed and in good condition. Replace any blade that is bent, excessively nicked, worn, or has any other damage. Small nicks can be ground out when sharpening.

### **! WARNING**

Use only original equipment blades on this cutter. They are made of special heat-treated alloy steel. Substitute blades may not meet specifications and may fail in a hazardous manner that could cause injury.

### **! DANGER**

Replace bent or broken blade with new blades. NEVER ATTEMPT TO STRAIGHTEN OR WELD ON BLADES SINCE THIS WILL LIKELY CRACK OR OTHERWISE DAMAGE THE BLADE WITH SUBSEQUENT FAILURE AND POSSIBLE SERIOUS INJURY FROM THROWN BLADES. (SGM-10)

- Manually wiggle the blade carriers to check for any looseness.
- Re-tighten any loose parts.
- Recheck torque every 50 hours.

### **IMPORTANT**

Operating with loose blade hardware will damage the blade holder and blades. Whenever the blades have been removed or replaced, the hardware must be retightened after the first eight hours of operation. On new units check blade hardware and the blade nut torque after first 8 hours.

### **IMPORTANT**

Operating with loose blade holder will damage the blade holder and output shaft, two initial tightenings are required. Retighten after one hour and again after the day of operation. In severe cutting conditions or commercial use, a daily inspection is required.

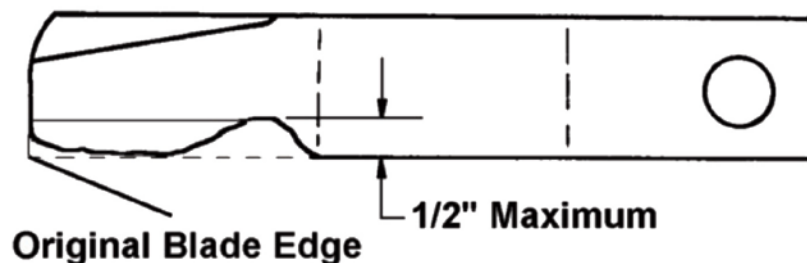
### **IMPORTANT**

To help prevent structural damage caused by loose hardware, tighten gear case hardware as specified. Check torque after first 8 hours of use and every 50 hours thereafter.

### **! DANGER**

Inspect Blades daily for abnormal wear. If Blades have a notch worn into the leading edge at the lower bend more than a 1/2" DEEP (due to running in gravel and/or the ground), REPLACE BOTH BLADES ON THAT CARRIER IMMEDIATELY. Failure to replace such abnormally worn blades may lead to catastrophic failure of the blade and ejection of the broken part with tremendous force which may cause bodily injury or death.

**NOTE:** Replace Blades in pairs after no more than 1/2" notch wear. Use only genuine Bush Hog replacement blades!



Mnt-R-0034

# MAINTENANCE

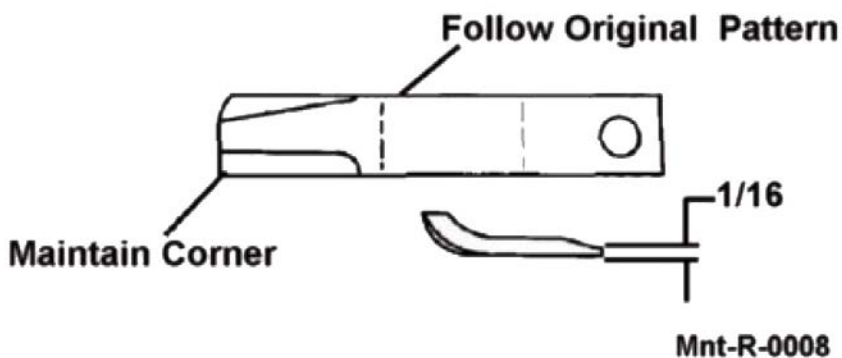
## BLADE SHARPENING

Always sharpen both blades at same time to maintain balance. Follow original sharpening pattern as shown in FIGURE Mnt-R-0008. Always sharpen blades by grinding. Do Not heat and pound out edge. Do Not sharpen blade to a razor edge, but leave a 1/16" blunt edge. Do Not sharpen back side of blade.

**IMPORTANT:** When sharpening blades, grind each blade the same amount to maintain balance. The difference in blade weights should not exceed 1 ounce. Unbalanced blades will cause excessive vibration which can damage gear box bearings. Vibration may also cause structural cracks in cutter housing.

**! DANGER** Avoid personal injury. Always block the cutter up to prevent it from falling when the blades and/or carrier are being serviced.

**! WARNING** Do not heat or weld on hard surface blades as this can alter material strength causing blades to fail in a hazardous manner that could cause injury.



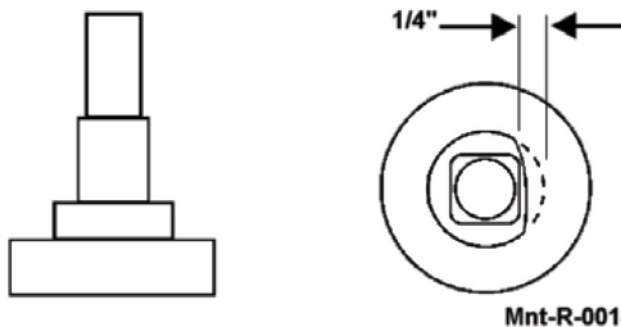
**NOTE:** Replace Blades in pairs after no more than 1/2" notch wear!

## BLADE REMOVAL

To remove blades for sharpening or replacement, remove nut from blade bolt.

**Note:** Inspect locknut after removal and replace if threads are damaged.

Always replace nut when replacing blade bolt. When installing blades be sure and check blade bolt pivot diameter for wear. Replace bolt if worn more than 1/4 inch at any point. Install blade bolts with partially worn side of bolt either toward or away from center. Tighten locknut to 600 ft. lbs.



**! WARNING** Avoid personal injury. Blade and/or blade carrier removal should be done only with the tractor engine shut off, key removed, in neutral, parking brake on, PTO disengaged, and the cutter blocked in the raised position.

# MAINTENANCE

## BLADE BOLT INSPECTION

Inspect Blade Bolt Head daily for wear as follows:

### **Excessive Blade Bolt Wear**

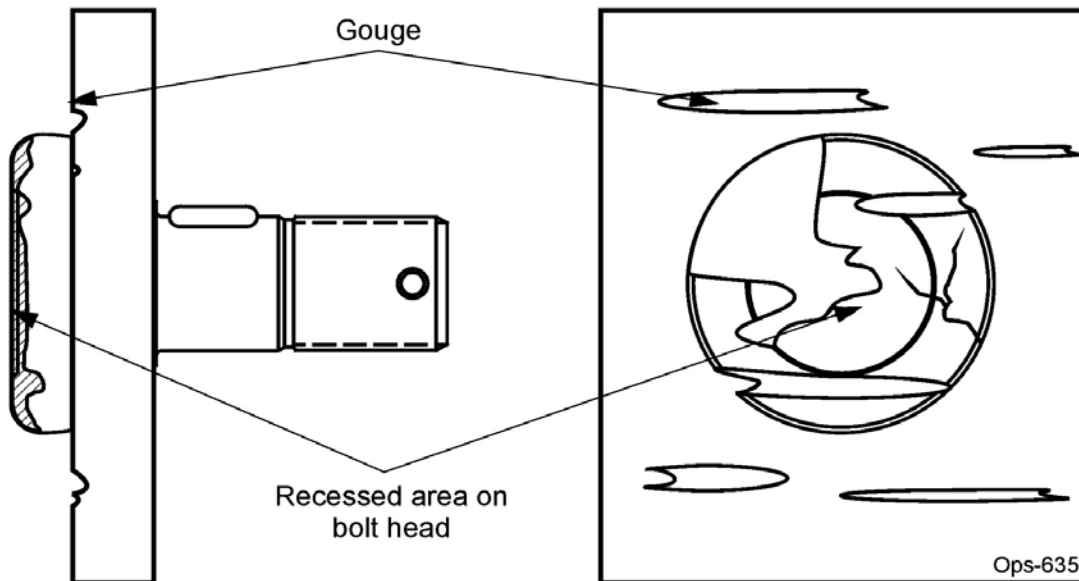
**Cause:** Blade Bolt contacts a foreign or solid object while Blade is in motion.

**Remedy:** Inspect the area before mowing to determine where the foreign objects are located and place visible hazard markers to identify the areas where immovable foreign objects exist, and avoid hitting the objects.

### **Notches and Gouges**

**Cause:** Blade Bolt contacting foreign objects.

**Remedy:** Inspect area to be mowed and remove foreign objects that could cause damage to the blade bolt.



**DANGER**

Inspect the Blade Bolt Heads daily for abnormal wear. REPLACE BOTH BLADE BOLTS on Blades IMMEDIATELY if either blade bolt has:

- Visible cracks or
- If the recessed area on blade bolt is worn off or
- If Blade Bolt has gouges or chipped areas.

Failure to replace abnormally worn blade bolts may lead to catastrophic failure of the blades and ejection of the broken part which may cause serious bodily injury or death.

**Always replace Blade Bolts with new Bolts whenever replacing the Blades.** OPS-U-0037

## BLADE HOLDER ASSEMBLY

### **Removal**

1. Remove cotter pin and loosen slotted nut on gearbox shaft. Loosen but do not remove the nut until the blade carrier is loosened.
2. Align blade bolt with access hole in top of cutter deck. Use long bar inserted through blade bolt access hole with end against blade bar. Strike opposite end of bar with sledge hammer. Rotate blade carrier 180 degrees and repeat process.

# MAINTENANCE

## **BLADE CARRIER INSTALLATION**

Clean the splines on both the blade carrier and output shaft. Position carrier on the gearbox output shaft and install special washer, and nut.

Tighten nut holding blade carrier to minimum 450 ft. pounds, strike the carrier near the hub several times with a heavy hammer to seat the hub. Use a suitable spacer over the nut to prevent damage to the nut and threads. Retighten the nut to 450 ft. pounds. Install cotter pin and spread.

### **IMPORTANT**

Operating the mower with a loose blade pan or holder can damage the taper connection on the gearbox output shaft. To ensure proper seating between the blade holder and output shaft, check and tighten the retaining nut after the first day of operation. Recheck the blade carrier attachment each morning before operating. Grasp the carrier firmly with both hands and try to push and pull the carrier with one hand while pulling and pushing with the other hand to try to rock or oscillate the blade carrier. If the carrier is loose, retighten the retaining nut before operating the mower.

### **IMPORTANT**

Always recheck gearbox output shaft slotted blade carrier retaining nut torque after a few hours operation.

### **! WARNING**

Avoid personal injury. Do not work under cutter without support blocks to keep frame from falling.

# MAINTENANCE

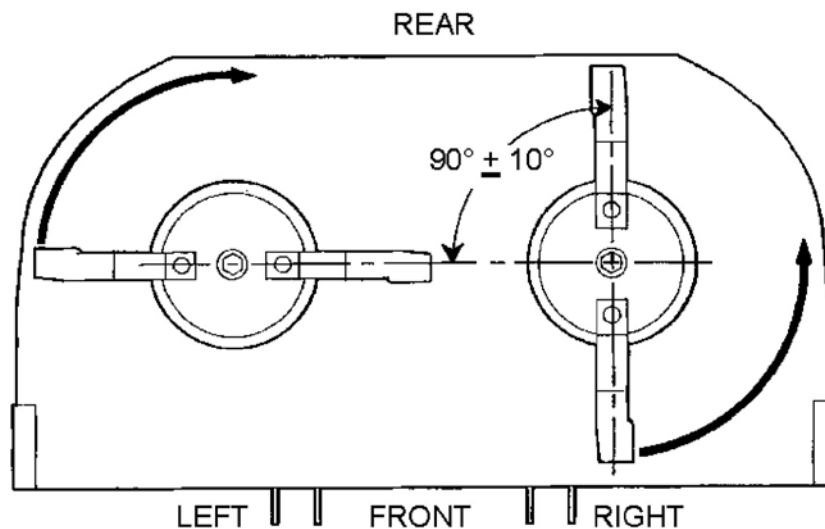
## **BLADE TIMING AND ROTATION**

Blades on multi-spindle mowers overlap cutting paths to ensure a complete cut across the width of the mower and to compensate for blade tip wear. If a gearbox has been repaired, a blade carrier or side driveline has been removed, or other maintenance performed which altered the factory set blade carrier timing, the blades must be re-timed to ensure they will not collide while rotating.

## **BLADE TIMING PROCEDURE**

1. Raise the mower to minimum height to allow sufficient clearance between the mower deck and ground to visually inspect blade carriers.
2. Completely shut down the tractor and secure the tractor in position by placing the tractor in park and setting the parking brake. Securely block the mower at this height.
3. On a side gearbox, remove connecting driveline coupler.
4. Manually rotate carriers until blades are positioned at near 90 degree angle from one another.
5. Replace connecting driveline and coupler.
6. Manually spin carriers a complete rotation to ensure blades do not collide with one another.

### Blade Pan Timing As Viewed From Bottom Of Cutter



Mnt-R-0495

# MAINTENANCE

## **SLIP CLUTCH**

### **Slip Clutch Operational Check**

After the implement has been stored for 30 days or more, perform the following operational check.

- A. Loosen eight nuts retaining clutch springs 1/3 turn or until spring can be turned with fingers.
- B. With tractor at idle speed, engage tractor PTO drive for 2-3 seconds. Clutch should slip without turning blades. If clutch does not slip, contact your authorized Bush Hog Dealer.
- C. Retighten nuts to within 1/64" of original position. Initial spring length is shown in Figure Asm-R-0493.

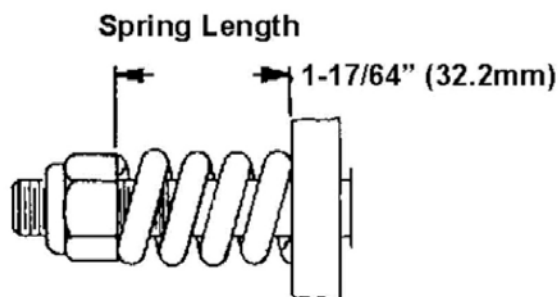
### **Slip Clutch Adjustment**

The slip clutch is factory preset to the correct torque for protecting implement and tractor. Periodic adjustment is recommend: refer to Slip Clutch Operational Check. Should adjustment be needed, first check to be sure all spring lengths are the same. Initial spring length is shown in Figure Asm-R-0493. If necessary, adjust nut on any spring that is unequal. Adjust all eight spring retaining nuts 1/3 of a turn (2 flats on a nut) and check clutch slippage. If further adjustment is necessary, do so in 1/3 turn increments. Adjust only to provide sufficient torque to prevent slippage under normal conditions. Occasional slippage is normal for drivetrain protection. If satisfactory results cannot be obtained consult your Bush Hog dealer.



**WARNING** OVERTIGHTENING SPRING NUTS MAY CAUSE DAMAGE TO IMPLEMENT AND/OR TRACTOR DUE TO INCORRECT SLIP CLUTCH TORQUE SETTING. ALWAYS FOLLOW THE PROPER ADJUSTMENT PROCEDURE.

### **Spring Length**



Asm-R-0493

# MAINTENANCE

## **STORAGE**

Your rotary cutter represents an investment from which you should get the greatest possible benefit. Therefore, when the season is over, the cutter should be thoroughly checked and prepared for storage so that a minimum amount of work will be required to put it back into operation for the next season. The following are suggested storage procedures:

1. Thoroughly clean the cutter.
2. Lubricate the cutter as covered in Maintenance Section.
3. Tighten all bolts and pins to the recommended torque.
4. Check the cutter for worn or damaged parts. Make replacements immediately.
5. Place driveline in storage position resting on bracket.
6. Store the cutter in a clean, dry place with the cutter housing resting on blocks.
7. Use spray touch-up enamel where necessary to prevent rust and maintain the appearance of the cutter.



## **PROPER TORQUE FOR FASTENERS**

The chart lists the correct tightening torque for fasteners. When bolts are to be tightened or replaced, refer to this chart to determine the grade of bolts and the proper torque except when specific torque values are assigned in manual text.

RECOMMENDED TORQUE IN FOOT POUNDS UNLESS OTHERWISE STATED IN THE MANUAL\*

**NOTE:** These values apply to fasteners as received from supplier, dry or when lubricated with normal engine oil. They do not apply if special graphited or molydisulphide greases or other extreme pressure lubricants are used. This applies to both UNF fine and UNC coarse threads.

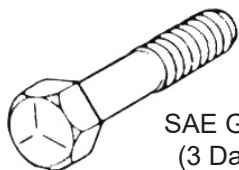
# MAINTENANCE

## TORQUE SPECIFICATIONS - DRY TORQUE

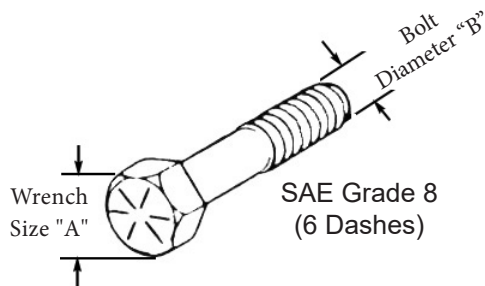
### AMERICAN Bolt Head Markings



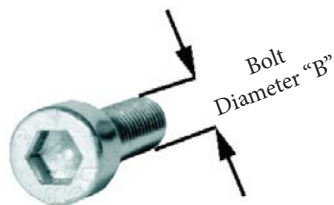
SAE Grade 2  
(No Dashes)



SAE Grade 5  
(3 Dashes)



SAE Grade 8  
(6 Dashes)

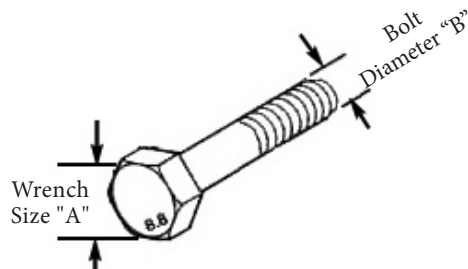


All Capscrews  
SAE Grade 8

Proper Torque for American Fasteners.  
Recommended Torque in Foot Pounds (Newton Meters)\*

WRENCH SIZE (IN.) "A"	BOLT DIAMETER (IN.) "B" AND THREAD SIZE	SAE GRADE 2	SAE GRADE 5	SAE GRADE 8
7/16	1/4 - 20 UNC	6 (7)	8 (11)	12 (16)
7/16	1/4 - 28 UNF	6 (8)	10 (13)	14 (18)
1/2	5/16 - 18 UNC	11 (15)	17 (23)	25 (33)
1/2	5/16 - 24 UNF	13 (17)	19 (26)	27 (37)
9/16	3/8 - 16 UNC	20 (27)	31 (42)	44 (60)
9/16	3/8 - 24 UNF	23 (31)	35 (47)	49 (66)
5/8	7/16 - 14 UNC	32 (43)	49 (66)	70 (95)
5/8	7/16 - 20 UNF	36 (49)	55 (75)	78 (106)
3/4	1/2 - 13 UNC	49 (66)	76 (103)	106 (144)
3/4	1/2 - 20 UNF	55 (75)	85 (115)	120 (163)
7/8	9/16 - 12 UNC	70 (95)	109 (148)	153 (207)
7/8	9/16 - 18 UNF	79 (107)	122 (165)	172 (233)
15/16	5/8 - 11 UNC	97 (131)	150 (203)	212 (287)
15/16	5/8 - 18 UNF	110 (149)	170 (230)	240 (325)
1-1/8	3/4 - 10 UNC	144 (195)	266 (360)	376 (509)
1-1/8	3/4 - 16 UNF	192 (260)	297 (402)	420 (569)
1-5/16	7/8 - 9 UNC	166 (225)	430 (583)	606 (821)
1-5/16	7/8 - 14 UNF	184 (249)	474 (642)	668 (905)
1-1/2	1 - 8 UNC	250 (339)	644 (873)	909 (1232)
1-1/2	1 - 12 UNF	274 (371)	705 (955)	995 (1348)
1-1/2	1 - 14 UNF	280 (379)	721 (977)	1019 (1381)
1-11/16	1-1/8 - 7 UNC	354 (480)	795 (1077)	1288 (1745)
1-11/16	1-1/8 - 12 UNF	397 (538)	890 (1206)	1444 (1957)
1-7/8	1-1/4 - 7 UNC	500 (678)	1120 (1518)	1817 (2462)
1-7/8	1-1/4 - 12 UNF	553 (749)	1241 (1682)	2013 (2728)
2-1/16	1-3/8 - 6 UNC	655 (887)	1470 (1992)	2382 (3228)
2-1/16	1-3/8 - 12 UNF	746 (1011)	1672 (2266)	2712 (3675)
2-1/4	1-1/2 - 6 UNC	870 (1179)	1950 (2642)	3161 (4283)
2-1/4	1-1/2 - 12 UNF	979 (1327)	2194 (2973)	3557 (4820)

### METRIC



Numbers appearing on bolt  
heads indicate ASTM class.

Proper Torque for Metric Fasteners.  
Recommended Torque in Foot Pounds (Newton Meters)\*

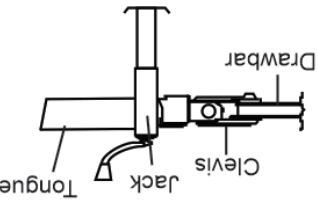
WRENCH SIZE (mm) "A"	BOLT DIA. (mm) "B"	ASTM 4.6	ASTM 8.8	ASTM 9.8	ASTM 10.9
8	5	1.8 (2.4)		5.1 (6.9)	6.5 (8.8)
10	6	3 (4)		8.7 (12)	11.1 (15)
13	8	7.3 (10)		21.1 (29)	27 (37)
16	10	14.5 (20)		42 (57)	53 (72)
18	12	25 (34)	74 (100)	73 (99)	93 (126)
21	14	40 (54)	118 (160)	116 (157)	148 (201)
24	16	62 (84)	167 (226)	181 (245)	230 (312)
30	20	122 (165)	325 (440)		449 (608)
33	22		443 (600)		611 (828)
36	24	211 (286)	563 (763)		778 (1054)
41	27		821 (1112)		1138 (1542)
46	30	418 (566)	1119 (1516)		1547 (2096)

\*Use 75% of the specified torque value  
for plated fasteners. Use 85% of the  
specified torque values for lubricated  
fasteners.

SEGURIDAD

<b>⚠ DANGER</b>	<b>⚠ PELIGRO</b>
<b>GUARD MISSING</b> To avoid death or serious injury Do Not Operate	<b>FALTA LA CUBIERTA</b> Para evitar la muerte o lesión seria No Opere
 D546 SP	
<b>⚠ DANGER</b>	<b>⚠ PELIGRO</b>

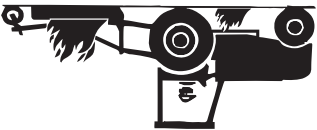


<b>⚠ WARNING</b>	
	
Rated Vertical: 2300 lbs	Loads Side: 320 lbs
<b>TO AVOID SERIOUS INJURY:</b>	
<ul style="list-style-type: none"><li>• Fully engage jack retaining pin.</li><li>• Lower mower to ground so jack is positioned vertically.</li><li>• DO NOT exceed rated loads.</li></ul>	
<b>⚠ ADVERTENCIA</b>	
<b>PARA EVITAR LESION SERIA:</b>	
<ul style="list-style-type: none"><li>• Aplique completamente el perno de retencion al gato.</li><li>• Baje la cortador al piso para que el gato este posicionado verticalmente.</li><li>• NO exceda las cargas calculadas.</li></ul>	
D884 SP	

<b>NOTICE</b>	<b>AVISO</b>
<p>Do not tow at speeds greater than 20 MPH (30 KM/H).</p> <p>Ensure mass of towing vehicle is at least 2/3 times the mass of the towed machinery.</p> <p>Be sure to park on level ground to a maximum of 10% ground slope.</p>	<p>No remolque a velocidades superiores a 20 MPH (30 KM/H).</p> <p>Asegúrese de que el peso del vehículo remolcador sea al menos 2/3 veces el peso de la maquinaria remolcada.</p> <p>Asegúrese de estacionarse en un terreno nivelado con una pendiente máxima del 10%.</p>
D1085	D1085

**⚠️ ADVERTENCIA**

**⚠️ WARNING**



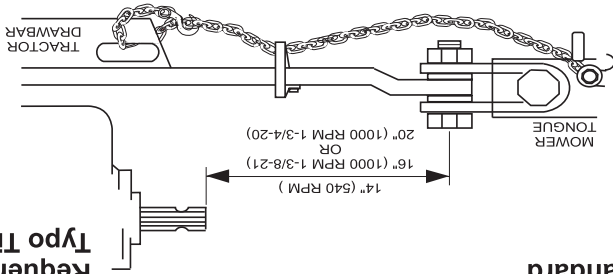
**PARA EVITAR INCENDIOS DE EQUIPO Y CÉSPED:**  
● QUITÉ el césped o escombros de embrague deslizante, caja de engranajes, líneas de conducción y cubiertas.  
**PARA EVITAR INCENDIOS POR IGNICIÓN:**  
● NO PERMITA QUE LAS LAMINAS CONTACTEN piedras, metal o objetos sólidos.

**TO AVOID EQUIPMENT AND GRASS FIRES:**

● CLEAR AWAY grass or debris from slip clutches, gearboxes, drivelines and decks.  
● DO NOT ALLOW BLADES TO CONTACT rocks, metal or solid objects.

**IMPORTANTE**

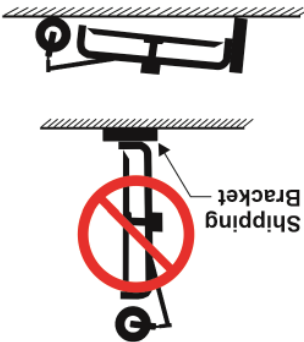
**Requerido for Standard Pull Type Units.**  
**Requerido por Unidades de Tipo Tirón Estándar.**



D553-4  
D553

**⚠️ ADVERTENCIA**

**⚠️ WARNING**



**Crushing Hazard**

**To avoid injury from mower falling over:**

● DO NOT store mower vertically on shipping brackets.

● Store mower lying down.

**Riesgo de Aplastamiento**

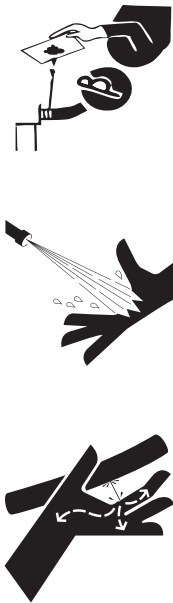
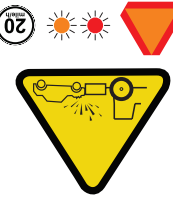
**Para evitar lesión por la caída de la cortadora:**

● NO almacene la cortadora verticalmente en los soportes de transporte.

● Almacene en posición acostada.

D454

# SEGURIDAD

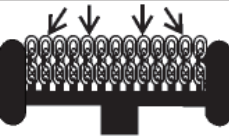
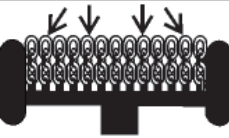
<p><b>⚠️ ADVERTENCIA</b></p> <p><b>PARA EVITAR MUERTE O LESION GRAVE POR LA PENETRACION A LA PIEL POR ALTA PRESION DE ACEITE HIDRAULICO:</b></p> <ul style="list-style-type: none"> <li>• NO OPERE el equipo con fugas de aceite o combustible.</li> <li>• MANTENGA todas las mangueras hidráulicas, líneas y conexiones en buenas condiciones y apretadas antes de aplicar presión al sistema.</li> <li>• Relieve la presión hidráulica antes de desconectar las líneas o trabajar en le sistema.</li> <li>• QUITE y reemplace la manguera si sospecha que hay fuga.</li> </ul> <p><b>FUGAS DE ALTA PRESION PUEDEN SER INVISIBLES. AL VERIFICAR POR FUGAS HIDRAULICAS Y TRABAJANDO ALREDEDOR DE SISTEMAS HIDRAULICOS:</b></p> <ul style="list-style-type: none"> <li>• NO use las manos para verificar si hay agujeros.</li> <li>• SIEMPRE USE lentes de seguridad y guantes impermeables. (Marcado para cumplir con ANSI Z87)</li> <li>• USE papel o un cartón para buscar agujeros.</li> <li>• NO USE las manos o partes del cuerpo para buscar agujeros.</li> <li>• MANTENGA manos y cuerpo LEJOS de agujeros de alfiler y boquillas que expulsan el líquido hidráulicos.</li> </ul> <p>D553-1</p>		<p><b>⚠️ WARNING</b></p> <p><b>TO AVOID DEATH OR SERIOUS INJURY FROM HIGH PRESSURE HYDRAULIC OIL LEAKS PENETRATING SKIN:</b></p> <ul style="list-style-type: none"> <li>• DO NOT OPERATE equipment with oil or fuel leaks.</li> <li>• KEEP all hydraulic hoses, lines and connections in good condition and tight before applying system pressure.</li> <li>• Relieve hydraulic pressure before disconnecting lines or working on the system.</li> <li>• REMOVE and replace hose if you suspect it leaks. Have dealer test it for leaks.</li> </ul> <p><b>HIGH PRESSURE FLUID LEAKS CAN BE INVISIBLE. WHEN CHECKING FOR AROUND HYDRAULIC SYSTEMS:</b></p> <ul style="list-style-type: none"> <li>• DO NOT use hands to check for leaks.</li> <li>• ALWAYS WEAR safety glasses with side shields (marked to comply with ANSI Z87) and impermeable gloves.</li> <li>• USE paper or cardboard to search for leaks.</li> <li>• KEEP hands and body AWAY from pin holes and nozzles ejecting hydraulic fluid.</li> <li>• Hydraulic fluid may cause gangrene if not surgically removed immediately by a doctor familiar with this form of injury.</li> </ul>
<p><b>⚠️ ADVERTENCIA</b></p> <p><b>PARA EVITAR MUERTE O LESION GRAVE AL REMOLCAR EL EQUIPO:</b></p> <ul style="list-style-type: none"> <li>• NO REMOLQUE con camion o cualquier otro vehículo.</li> <li>• SOLO transporte con un tractor bien equipado y de tamaño adecuado (vea el Manual de Operador)</li> <li>• APLIQUE LA CEDENA DE SEGURIDAD al tractor.</li> <li>• VERIFIQUE EL SMV, SIS reflectors, y luces intermitentes de advertencia pueden ser vistos claramente por detrás de la unidad.</li> <li>• PRIENDA las luces intermitentes de advertencia.</li> </ul> <p><b>PARA EVITAR PERDIDA DE CONTROL DE REMOLQUE:</b></p> <ul style="list-style-type: none"> <li>• NO remolque en velocidades arriba de 20 mph.</li> <li>• REDUZCA LA VELOCIDAD en inclinas, en vueltas y en la pobres condiciones de remolque.</li> </ul> <p>D553-2</p>		<p><b>⚠️ WARNING</b></p> <p><b>TO AVOID DEATH AND SERIOUS INJURY WHEN TOWING EQUIPMENT:</b></p> <ul style="list-style-type: none"> <li>• DO NOT TOW with trucks or other vehicles.</li> <li>• ONLY transport with properly sized and equipped tractor. (see Operator's Manual)</li> <li>• ATTACH implement SAFETY CHAIN to tractor.</li> <li>• CHECK SMV sign, SIS sign reflectors &amp; warning lights for visibility behind unit.</li> <li>• TURN ON tractor flashing warning lights.</li> </ul> <p><b>TO AVOID LOSS OF TOWING CONTROL:</b></p> <ul style="list-style-type: none"> <li>• DO NOT tow at speeds over 20 mph.</li> <li>• REDUCE SPEED on inclines, in turns and in poor towing conditions.</li> </ul>









# SEGURIDAD

## SEGURIDAD

<b>! PELIGRO</b>	
<p>Si no puede leer inglés: antes de poner en funcionamiento este equipo, solicite que alguien le traduzca los mensajes de seguridad o vaya al sitio web para consultar los mensajes de seguridad y las etiquetas ya traducidos.</p>	<p>El Manual del Operador Seguridad vídeo</p>   <p><a href="http://www.algqr.com/bvs">www.algqr.com/bvs</a></p>
<p>Si vous ne pouvez pas lire l'anglais: avant d'utiliser l'équipement, demandez à une personne de vous traduire les messages de sécurité ou allez sur le site Internet pour voir la traduction des autocollants et des messages de sécurité.</p>	<p>Manuel de l'Opérateur</p>   <p><a href="http://www.algqr.com/bmf">www.algqr.com/bmf</a></p>

<b>! PERIGO</b>	
<p>Caso você não leia inglês: antes de operar o equipamento, peça para alguém traduzir as mensagens de segurança ou visite a web e obtenha tais mensagens ou os decalques traduzidos.</p>	<p>Manual do Operator</p>   <p><a href="http://www.algqr.com/bmp">www.algqr.com/bmp</a></p>
<p>Falls Sie nicht Englisch sprechen: Bevor Sie die Geräte in Betrieb nehmen, bitten Sie eine Englisch sprechende Person darum, Ihnen die Sicherheitsmeldung zu übersetzen, oder besuchen Sie die Website; dort finden Sie übersetzte Aufkleber und Sicherheitsmeldungen.</p>	<p>Benutzerhandbuch</p>   <p><a href="http://www.algqr.com/bmg">www.algqr.com/bmg</a></p>

<b>! DANGER</b>	
<p><b>THROWN OBJECT HAZARD</b></p> <p>DO NOT OPERATE if Thrown Object Shielding is damaged or missing.</p> <p>↑</p> <p>HERE</p> 	<p><b>! PELIGRO</b></p> <p>RIESGO DE OBJETOS LANZADOS</p> <p>PARA EVITAR LESION SERIA O MUERTE: NO OPERE si la Cubierta de Objetos Lanzados esta dañada o falta.</p> <p>MANTENGA la Cubierta de Objetos Lanzados</p> <p>↑</p> <p>AQUI</p> 

<div>  <b>WARNING</b> </div> <div> <p>Cancer and Reproductive Harm www.P65Warnings.ca.gov</p> </div>		<div>  <b>ADVERTENCIA</b> </div> <div> <p>Cáncer y Daño Reproductivo www.P65Warnings.ca.gov</p> </div>	
<div> <p><b>BE AWARE</b> <b>BE ALERT</b> <b>Before Operating</b> <b>this Mower</b></p> <p><b>BE TRAINED</b></p> </div> <div> <p>To prevent serious injury to yourself and/or bystanders, be trained in Safe Mowing Practices. Alamo Group Companies as well as AEM and FEMA provide training of others when operating this equipment. Make these Safety Procedures an important part of every workday. Read and understand the Operator's Manual. Do not let untrained individuals operate this equipment. Contact your Dealer, AEM (www.aem.org), FEMA (314-878-2304), or www.FarmEquipment.org, or Alamo Group (www.Alamogroup.com) for information on training material or courses that provide training in Safe Operating Practices for Mowers.</p> </div> <div>  <p>www.algqr.com/bve</p> </div>		<div> <p><b>ESTE CONSCIENTE</b> <b>ESTE ALERTO</b> <b>Antes de Funcionar</b> <b>SEA ENTRENADO</b></p> <p><b>ESTE VIVO</b> <b>Cortacésped</b></p> </div> <div> <p>Para prevenir lesiones graves a usted y/o personas presentes, sea entrenado en la Práctica de Segar Seguro. Compañías de Alamo Group así como AEM y FEMA proporcionan material para entrenar que es esencial para su seguridad y la seguridad de otros al operar este equipo. Haga estos procedimientos de seguridad una parte importante de su día de trabajo. Lea y entienda el Manual de Operadores. No permita que personas sin entrenamiento funcionen este equipo. Contacte a su distribuidor, AEM (www.aem.org), FEMA (314-878-2304, www.FarmEquipment.org), o Alamo Group (www.Alamogroup.com) para la información sobre el material de entrenamiento o cursos que ofrecen el entrenamiento de Prácticas de Operación para Cortadoras.</p> </div> <div>  <p>www.algqr.com/bvs</p> </div>	
<div>  <b>WARNING</b> </div> <div> <p>TO AVOID DEATH OR SERIOUS INJURY:</p> <ul style="list-style-type: none"> <li>ONLY use genuine BUSH HOG replacement parts, which have been validated and tested to use on Bush Hog equipment by the manufacturer.</li> <li>The equipment manufacturer cannot verify the material or structural integrity of third-party supplied non-genuine replacement parts.</li> <li>Using non-genuine parts can result in the part failing, creating hazardous conditions for operator and bystanders.</li> </ul> <p>Contact local dealer or Bush Hog about repair parts at:</p> <p>2501 Griffin Ave., Selma, AL 36701 Customer Service: 800-363-6096 Email: contactus@bushhog.com</p> </div> <div>  <p>www.algqr.com/bpm</p> </div>		<div>  <b>ADVERTENCIA</b> </div> <div> <p>PARA EVITAR MUERTE O LESION GRAVE:</p> <ul style="list-style-type: none"> <li>El uso de piezas no originales puede provocar el fallo de la pieza, creando condiciones peligrosas para el operador y personas presentes.</li> <li>SOLO use piezas de repuesto genuinas de Bush Hog, que han sido validados y probados para usar en equipo Bush Hog por el fabricante.</li> <li>El fabricante del equipo no puede verificar el material o integridad estructural de piezas de repuesto no genuino suministrados.</li> </ul> <p>Contacte a su distribuidor local o BUSH HOG sobre partes de reparo at:</p> <p>2501 Griffin Ave., Selma AL 36701 Servicio al Cliente: 800-363-6096 Correo Electronico: contactus@bushhog.com</p> </div> <div>  <p>www.algqr.com/bpm</p> </div>	



**PELIGRO**

**PARA EVITAR LESION SERIA O MUERTE:**

- LEA Y ENTIENDA el Manual de Operador proporcionado, signos de seguridad y calcomanías informativas para el tractor y implemento antes de operar el equipo.
- CONTACTE AL DISTRIBUIDOR inmediatamente si no tiene los manuales.
- CONTACTE AL DISTRIBUIDOR para que le explique cualquier instrucciones que no entienda completamente.
- SIEMPRE USE lentes de seguridad.
- USE un casco, zapatos de seguridad y guantes para su protección cuando esta operando el equipo.



**DANGER**

**TO AVOID DEATH OR SERIOUS INJURY:**

- READ AND UNDERSTAND the provided Operator's Manuals, safety signs and information decals for tractor and implement before operating equipment.
- CONTACT DEALER immediately if you do not have manuals.
- CONTACT DEALER to explain any instructions not fully understood.
- ALWAYS WEAR safety glasses with side shields (marked with ANSI Z87).
- WEAR hard hat, safety shoes and gloves for protection when operating equipment.

D549 SP 5



**WARNING**

**THROWN OBJECT HAZARD**  
Blades striking each other can result in broken parts and thrown objects.  
**To avoid injury and broken parts:**

- Time blades perpendicular to each other.

**RIESGO OBJETOS LANZADOS**  
Las cuchillas que se golpean una al otra puede resultar en partes rotas y partes lanzadas.  
**Para evitar herida y partes rotas:**






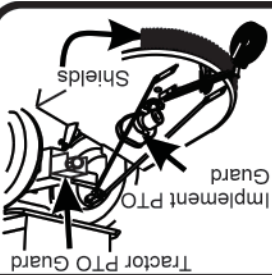
- Calcule perpendicular las cuchillas una al otra.

**ADVERTENCIA**

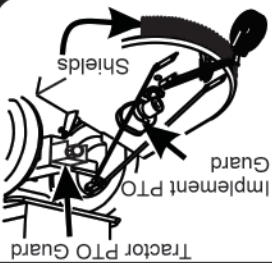
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SEGURIDAD

															
<p><b>PELIGRO</b></p>		<p><b>Riesgo de Aplastamiento - Muerte o Lesion</b></p>		<p><b>PARA EVITAR MUERTE O LESION GRAVE:</b></p>		<p>● USE un tractor equipado con Estructura Protectora Contra Vuelcos ("ROPS") incluyendo barra antivuelco y cinturón de seguridad. Mantenga la barra antivuelco en la posición elevada.</p> <p>● PERMANEZCA ALEJADO al quitar el seguro de transporte, y al bajar o subir las alas.</p> <p>● EL IMPLEMENTO SE PUEDE CAER por el mal funcionamiento hidráulico o operación accidental de los controles.</p> <p>● BLOQUEE y soporte con seguridad el equipo antes de poner manos, pies o cuerpo debajo del equipo o componentes levantados.</p> <p>● LEVANTAR Y ASEGURAR EL BLOQUEE del cierre de transporte del ala antes transportar la cortadora de césped en carreteras o trabajar bajo las alas.</p>		<p><b>DANGER</b></p>		<p><b>Crushing Hazard - Death or Injury</b></p>		<p><b>TO AVOID DEATH OR SERIOUS INJURY :</b></p> <p>D549 SP 4</p> <p>● USE tractor equipped with Rollover Protective Structure ("ROPS") including roll bar and seat belt. Keep roll bar in raised position.</p> <p>● STAND CLEAR when removing transport latch, lowering or raising wings.</p> <p>● IMPLEMENT CAN FALL from hydraulic failure or accidental operation of controls.</p> <p>● BLOCK UP and securely support equipment before putting hands, feet or body under raised equipment or lifted components.</p> <p>● RAISE AND SECURE LOCK Wing Transport Latch before transporting mower on roadways or working under wing.</p>			

															
<b>PELIGRO</b>		<b>RIESGO DE ENREDAMIENTO</b>		<b>PARA EVITAR LESION SERIA O MUERTE:</b>		<ul style="list-style-type: none"><li>• NO opere sin la cubierta protectora en su lugar y en buen estado. Toma De Fuerza (Barra Gritatoria) y guardias de caja de engranaje son SUJETO AL ESCASTE.</li><li>• MANTENGASE ALEJADO y MANTENGA manos, pies y cuerpo LEJOS de las cuchillas girando, líneas de conducción, y partes que siguen moviendose después de que el poder es apagado. ESPERE hasta que todos los elementos móviles se han parado.</li><li>• SIEMPRE REEMPLACE CUBIERTAS que han sido quitadas para servicio o mantenimiento.</li><li>• DETENGASE, OBSERVE y ESCUCHE por el movimiento de rotación antes de acercarse al implemento.</li><li>• NO PISE EN las líneas de conducción o cubiertas.</li></ul>		<b>! DANGER</b>		<b>ENTANGLEMENT HAZARD</b>		<b>TO AVOID DEATH OR SERIOUS INJURY:</b>		<ul style="list-style-type: none"><li>• DO NOT operate without guards in place and in good condition. PTO and gearbox guarding are SUBJECT TO WEAR.</li><li>• STAY AWAY and KEEP hands, feet and body AWAY from rotating blades, drivelines and parts that continue to move after power shut-off. WAIT until all moving elements have stopped.</li><li>• ALWAYS REPLACE GUARDS that have been removed for service or maintenance.</li><li>• STOP, LOOK and LISTEN for rotating motion before approaching implement.</li><li>• DO NOT STEP ON drivelines or guards.</li></ul>	

D549 SP 3



# SEGURIDAD

**PELIGRO**

**Riesgo de Atropello Lesión o Muerte**

**PARA EVITAR LESION SERIA O MUERTE:**

- SIEMPRE ABROCHE el cinturón de seguridad.
- SOLO ENCIENDA el tractor mientras que esta sentado en el asiento del operador.
- PARE EL MOTOR Y Toma De Fuerza (Barro Gítoría), aplique el freno de mano, baje el implemento, y deje que todas las partes movi paren completamente, y quite la llave antes de desmontar el tractor.
- ENTIENDA COMO parar el tractor y equipo rapidamente en caso de una emergencia.
- NO MONTE o DESMONTE el tractor en movimiento.
- NUNCA PERMITA pasajeros en el tractor o implemento.
- NUNCA PERMITA que niños operen o se monten en el tractor o implemento.
- MANTENGA LAS PERSONAS PRESENTES LEJOS de la area antes de mover el tractor o implemento.
- MANTENGASE ALERTO y EVITE golpes en troncos, agujeros, pozos o terreno en desnivel.
- EVITE las ramas de árbol, maleza y algun otros objetos que sobresalen que puedan golpear y tumbar el operador del asiento.

**Run Over Hazard - Death or Injury**

**TO AVOID DEATH OR SERIOUS INJURY:**

- ALWAYS BUCKLE UP seat belt.
- ONLY START Tractor while seated in the operator's seat.
- STOP ENGINE and PTO, engage parking brake, lower implement, allow all moving parts to stop and remove key before dismounting from tractor.
- KNOW HOW to stop tractor and equipment quickly for an emergency.
- DO NOT MOUNT or DISMOUNT Tractor in motion.
- NEVER ALLOW riders on tractor or implement.
- NEVER ALLOW children to operate or ride on tractor or implement.
- KEEP BYSTANDERS CLEAR of area before moving tractor or implement.
- KEEP ALERT and AVOID hitting stumps, holes, ruts, and uneven terrain.
- AVOID tree limbs, brush and other overhanging objects that can strike and throw the operator from seat.

**PELIGRO**

**RIESGO DE OBJETOS LANZADOS**

**Cortacésped puede lanzar objetos hasta 300 pies. PARA EVITAR LESION SERIA O MUERTE a operadores y personas presentes: Pare de segar si personas o tráfico se acercan entre 300 pies del área de segar.**

- NO OPERE sin la cubierta para objetos lanzados.
- MANTENGA la cubierta para objeto lanzado en su lugar y en buenas condiciones. Los protectores de objetos lanzados son sujetos al desgaste.
- REPARE O REEMPLACE cubiertas si son dañadas, quebradas, o si faltan.
- INSPECCIONE el área por si hay riesgos potenciales de objetos lanzados antes de segar.
- REMUEVA y EVITE objetos como alambre, cable, objetos de metal y todo otro material extraño.
- NO DEJE que las cuchillas contacten los objetos sólidos como alambre, rocas, postes, borde de banqueta, o barandillas.
- NO OPERE en posición de transporte o con las alas levantadas.

**THROWN OBJECTS HAZARD**

**DANGER**

**Mower can throw objects up to 300 feet. TO AVOID DEATH OR SERIOUS INJURY to operator or bystanders:**

- STOP mowing if bystanders or traffic come within 300 feet.
- DO NOT OPERATE with thrown object shielding removed.
- KEEP thrown object shielding in place and in good condition during operation. Thrown Objects shielding is subject to wear.
- REPAIR OR REPLACE shielding if damaged, broken or missing. See Operator's Manual for all Shields and Guards.
- INSPECT area for potential mower thrown object hazards before mowing.
- Remove and AVOID objects such as wire, cable, metal objects and all other foreign material.
- DO NOT ALLOW blades to contact solid objects like wire, rocks, posts, curbs or guard rails.
- DO NOT OPERATE in transport position or with wings off ground.

D549 SP 1

MS3110

10/23

Sección de Seguridad 1-19



**▲ WARNING**

**▲ ADVERTENCIA**

**TO AVOID DEATH OR SERIOUS INJURY FROM BLADE ATTACHMENT FAILURE:**

- Torque pan nut (450 ft lbs) and blade nut (600 ft lbs) after first 8 hours of use to ensure proper seating and tightness of components.
- ALWAYS replace blades in pairs.
- ALWAYS replace blades with new bolts and nuts.

**PARA EVITAR MUERTE O LESION GRAVE POR EL FALLO DEL ACOPLAMIENTO DE LAS CUCHILLAS:**

- Apriete los tornillos de cuchillas a torsión de 600 libras/pie y de 450 libras/pie de cuchillas a 450 libras/pie.
- Siempre reemplace las cuchillas en pares.
- SIEMPRE reemplace las cuchillas con tornillos y tuercas nuevas.

**BLADE ROTATION**

**ROTACIÓN DE CUCHILLAS**

**▲ WARNING**

**▲ ADVERTENCIA**

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**BLADE ROTATION**

**ROTACIÓN DE CUCHILLAS**

# SEGURIDAD

## INFORMACIÓN DE PARTES

### INFORMACIÓN DE PARTES

Las cortadoras BUSH HOG usan balancías y componentes de sistema seleccionado para los portadores de cuchillas, cuchillas, eje de cortar, navaja, suspensiones de navajas, los rodillos, los componentes de línea motriz, y cojinetes. Estas partes son echas y probadas a la especificaciones de BUSH HOG. Partes que no son auténticas no regularmente llegan con estas especificaciones. El uso de partes que no son auténticas puede reducir el funcionamiento de la cortadora, anular garantías, y presentar un peligro de seguridad. Use partes de cortadora auténticas de BUSH HOG por economía y seguridad. (SPBH-1 SP)

### CONTACTE A SU DISTRIBUIDOR BUSH HOG

Manuales de Partes Y Operador



[www.algqr.com/bpm](http://www.algqr.com/bpm)



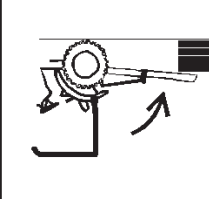
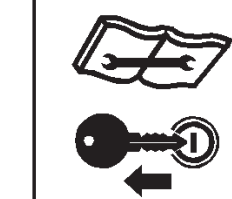
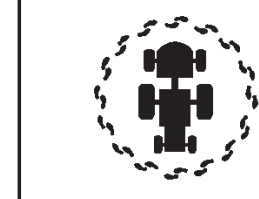
**NOTA: Si necesita un manual completamente en español por favor de ponerse en contacto a:**  
**Translations, dirección 1502 E. Walnut Street Seguin, TX 78155; Fax: (830) 372-9529**

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Sección de Seguridad 1-16

RIESGOS CON EL MANTENIMIENTO DEL IMPLEMENTO Continuada

				
Inspeccione las cuchillas para detectar daños o fisuras	Coloque las trabas de transporte cilíndricas	Bloquee el implemento antes de repararlo. Utilice bloques grandes sobre suelo blando o húmedo	Apague el motor. Quite la llave antes de realizar tareas de mantenimiento.	Inspeccione periódicamente todas las partes móviles, lubrique las líneas de conducción y ajuste todas las sujeciones.

**MANTENGA LOS IMPLEMENTOS EN BUENAS CONDICIONES DE FUNCIONAMIENTO, A TRAVÉS DE UN SERVICIO, REPARACIÓN O MANTENIMIENTO APROPIADO.**

**REALICE LAS TAREAS DE SERVICIO, REPARACIÓN Y MANTENIMIENTO QUE SE DESCRIBEN EN LA SECCIÓN DE MANTENIMIENTO DEL IMPLEMENTO:**

- **INSPECCION** el implemento para detectar sujeciones sueltas, partes gastadas o rotas, ajustes sueltos o con filtraciones, que los pasadores tengan chavetas y arandelas, y las partes móviles para detectar el desgaste.
- **REEMPLACE** todas las partes gastadas o rotas con repuestos autorizados.
- **LUBRIQUE** la unidad tal como se especifica en el cronograma de lubricación.
- **NUNCA** lubrique, ajuste o quite material mientras el equipo está en funcionamiento o movimiento.
- **AJUSTE** todas las tuercas y pernos tal como se especifica.

**INSPECCIÓN DE CUCHILLAS:**

- **REEMPLACE** las cuchillas dobladas, dañadas, agrietadas o rotas inmediatamente por cuchillas nuevas.
- **EVITE** fallas de las cuchillas y que vuelen trozos de cuchillas. **NO** enderece, suelde o suelde con superficies rígidas.

**INSPECCIÓN DE PROTECTORES DE SEGURIDAD, GUARDAS Y DISPOSITIVOS DE SEGURIDAD:**


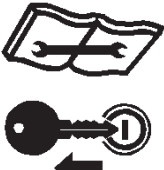
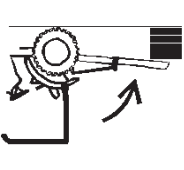

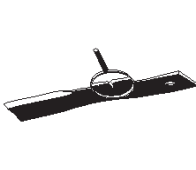
- **MANTENGA** en su lugar y en buen estado todos los deflectores, protectores de cadena, protectores de acero, cubiertas de caja de engranajes, cubiertas integrales de PTO, bandas, faldones laterales y zapatas antideslizantes.
- **REEMPLACE** cualquier protector, cubierta o dispositivo de seguridad faltante, roto o gastado.



**Cáncer y daño reproductivo** [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov) PN HM02 SP

SEGURIDAD



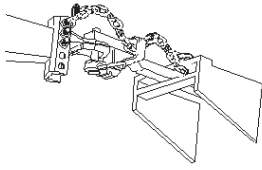

RIESGOS CON EL MANTENIMIENTO DEL IMPLEMENTO

	Inspeccione periódicamente todas las partes móviles, lubrique las líneas de conducción y ajuste todas las sujeciones.
	Apague el motor. Quite la llave antes de realizar tareas de mantenimiento.
	Bloquee el implemento antes de repararlo. Utilice bloques grandes sobre suelo blando o húmedo
	Coloque las trabas de transporte cilíndricas
	Inspeccione las cuchillas para detectar daños o fisuras

**ADVERTENCIA**  
MANTENGA LOS IMPLEMENTOS EN BUENAS CONDICIONES DE FUNCIONAMIENTO, A TRAVÉS DE UN SERVICIO, REPARACIÓN O MANTENIMIENTO APROPIADO.

- ANTES DE REALIZAR TAREAS DE SERVICIO, REPARACIÓN Y MANTENIMIENTO DEL IMPLEMENTO:**
- ASEGURE EL EQUIPO PARA EL SERVICIO**
  - BLOQUEE LOS RIESGOS POTENCIALES DE ENERGÍA:** piezas giratorias, componentes levantados, presión hidráulica.
  - APAGUE EL MOTOR Y EL PTO**, coloque el freno de mano, descienda el implemento, espere a que se detengan todas las partes móviles y quite la llave antes de bajarse del tractor.
  - COLOQUE** el implemento sobre el suelo o trabe de manera segura los equipos elevados. Utilice bloques grandes sobre suelo blando o húmedo.
  - EMPÚJE Y JALE** la palanca del Cilindro Hidráulico Remoto para liberar la presión hidráulica.
  - DESCONECTE** la línea de conducción del **IMPLEMENTO** del **EJE DE PTO** del tractor.
  - USE GAFAS DE SEGURIDAD** (con protecciones laterales marcadas para cumplir con ANSI Z87) y **GUANTES PROTECTORES** y siga todos los **PROCEDIMIENTOS DE SEGURIDAD** al realizar tareas de servicio, reparación y mantenimiento sobre el implemento:
  - Siempre **USE GUANTES** protectores al manipular las hojas, cuchillas, bordes filosos o un componente desgastado con bordes filosos.
  - Siempre **USE GUANTES** y **GAFAS DE SEGURIDAD** (con protecciones laterales marcadas para cumplir con ANSI Z87) al reparar componentes en caliente
  - EVITE EL CONTACTO** con tanques de aceite hidráulico, bombas, motores, válvulas y superficies de conexión de mangueras calientes.
  - SUJETE FIRMEMENTE** o **TRABE EN POSICIÓN ELEVADA** todos los implementos, bastidores y componentes elevados antes de trabajar sobre los equipos que se encuentran debajo.
  - DETENGA** el movimiento de todos los implementos y **APAGUE EL MOTOR DEL TRACTOR** antes de realizar ninguna tarea.
  - USE** una escalera o gradas elevadas para alcanzar áreas altas del equipo a las que no se pueda acceder desde la tierra.
  - ASEGURESE** de estar bien apoyado sobre superficies sólidas planas al subirse al implemento para realizar tareas.
  - SIGA** las instrucciones del fabricante sobre cómo manipular los lubricantes, solventes, limpiadores y otros agentes químicos.
  - NO** cambie ninguna calibración hidráulica de fábrica para evitar fallas de los componentes o equipos.
  - NO** modifique o altere el implemento, las funciones o componentes.
  - NO SUELDE** o repare los componentes de la cortadora. Esto puede causar vibraciones y fallas de los componentes que se desprendan de la cortadora. PN HM01-A-SP

RIESGOS EN TRANSPORTE

			
Use señales de SMV (vehículo de movimiento lento) y balizas	Peligro de detención por pérdida de control	Peligro de velocidad excesiva por pérdida de control	Coloque las trabas de transporte
Use la cadena de remolque de seguridad – Tractor a implemento			

PARA EVITAR LESIONES GRAVES O LA MUERTE AL REMOLCAR O TRANSPORTAR EQUIPOS:



- **MANTENGA** la velocidad de transporte **POR DEBAJO DE 20** millas por hora para mantener el control del equipo.
- **REDUZCA LA VELOCIDAD** en terreno inclinado, en las curvas y en condiciones de remolque desfavorables.
- **NO REMOLQUE** camiones u otros vehículos
- **USE** un tractor de tamaño adecuado y equipado en función del equipo de remolque.
- **SIGA** todas las reglamentaciones de tránsito locales.
- **REQUISITOS DEL TRACTOR PARA REMOLCAR O TRANSPORTAR IMPLEMENTOS:**
- **SÓLO TRANSPORTE** en el tractor con el mecanismo **ROPS** (antivuelco) en posición elevada.
- **USE** un tractor de tamaño adecuado y equipado, que supere el peso del implemento en al menos un 20%
- **MANTENGA EL 20%** del peso del tractor en las ruedas frontales para mantener la dirección en forma segura.
- **ANTES DE TRANSPORTAR O REMOLCAR EL IMPLEMENTO:**
- **INSPECCIÓN DEL TRACTOR:**
- **VERIFIQUE** la dirección y los frenos para asegurarse el correcto funcionamiento y las condiciones adecuadas.
- **VERIFIQUE LLEVAR EL AVISO DE SMV**, los reflectores y las luces de advertencia para la adecuada operación y visibilidad detrás de la unidad.
- **VERIFIQUE** que no haya impedimentos a la visión mientras conduce, en el tractor, la cabina o el implemento, sentado en el asiento del tractor.
- **AJUSTE** su posición de conducción, los espejos y el transporte del implemento para tener una visión clara para condiciones de conducción y tránsito.

**PREPARE EL IMPLEMENTO PARA EL TRANSPORTE O EL REMOLQUE:**

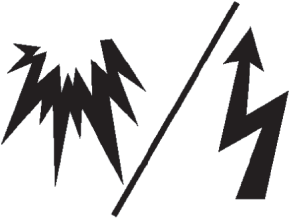
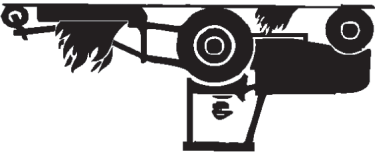
- **DESAPLIQUE EL PTO**
- **ELEVE LA CORTADORA**
- **QUITTE** todo material cortado que se acumule en la plataforma de la cortadora.
- **CORTADORA AL REMOLQUE-INSTALE TRABAS DE TRANSPORTE Y CADENA DE SEGURIDAD:**
- **INSTALE** los padores o pernos de transporte en el cilindro de eje central.
- **AJUSTE LA CADENA DE SEGURIDAD** del implemento al tractor.
- **DETERMINAR LAS CARACTERÍSTICAS DE DETENCIÓN DEL TRACTOR Y EL IMPLEMENTO PARA EL TRANSPORTE O REMOLQUE:**

- **PRUEBAS DE FRENADO:**
- **FRENE** a velocidades en aumento.
- **Observe** las distancias de **DETECCIÓN** con el aumento de velocidad.
- **DETERMINE** la velocidad de transporte máxima segura que no supere las 20 millas por hora
- **DETERMINE LA VELOCIDAD DE GIRO MÁXIMA ANTES DE OPERAR EN CARRETERAS O TERRENO IRREGULAR:**

- **PONGA A PRUEBA** el equipo aumentando lentamente la velocidad en las curvas para determinar si se puede operar a mayor velocidad.
- **USE MENORES** velocidades de giro en las curvas pronunciadas para evitar el vuelco.
- **AL REMOLCAR O TRANSPORTAR EL EQUIPO:**
- **Siempre USE EL CINTURÓN DE SEGURIDAD** al operar o transportar la cortadora.
- **USE** bajas velocidades para evitar el vuelco con el implemento elevado.
- **USE** bajas velocidades y dirección gradual en las curvas, colinas, o en superficies irregulares o poco uniformes, y en carreteras mojadas.
- **ENCIENDA LAS BALIZAS DE ADVERTENCIA** del tractor.
- **INSTALE** las luces magnéticas de remolque en el apero si es necesario y asegúrese de que funcionen correctamente antes de transportarlo por la vía pública.
- **TENGA EN CUENTA** el espacio necesario para el vaivén del implemento en las curvas. *PN TH02A SP*

SEGURIDAD

RIESGOS ELÉCTRICOS Y DE FUEGO

	Riesgo de choque y explosión Contacto de paletas con líneas de servicios o gas
	No opere cerca de fuego. Mantenga limpia la plataforma de la cortadora

**PARA EVITAR LESIONES GRAVES O LA MUERTE POR CONTACTO ELÉCTRICO AL TRABAJAR CERCA DE CABLES ELÉCTRICOS, LÍNEAS DE GAS Y DE SERVICIOS:**

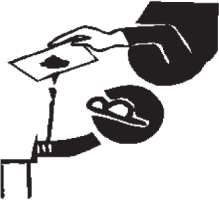




- **INSPECCIONE** el área de corte para que no interfiera con cables de alimentación eléctricos subterráneos, obstrucciones, líneas de gas, cables y servicios, estructuras municipales o de otro tipo.
- **MANTENGA** todas las alas elevadas a 3 metros (10 pies) o una mayor distancia de todos los cables de alimentación y obstrucciones elevadas.
- **NO** ponga en contacto la cortadora con ninguna estructura u obstrucción de servicios o municipales.
- **LLAME** AL 811 y al 1-800-258-0808 para identificar cables de servicios subterráneos.

**PAUTAS DE PREVENCIÓN DE INCENDIOS durante la operación, reparación y servicio de la cortadora y el tractor, a fin de reducir el riesgo de incendio del equipo y de la vegetación:**

- El tractor debe estar **EQUIPADO CON MATAFUEGOS**
- **NO OPERE** la cortadora sobre un tractor equipado con escape debajo del bastidor
- **NO FUME** ni acerque fuego directo a la cortadora o el tractor
- **NO CONDUZCA** sobre residuos encendidos o en áreas recientemente quemadas
- **EVITE LA FORMACIÓN DE CHISPAS** al no permitir que la hoja de la cortadora entre en contacto con objetos sólidos como metal o roca.
- **AJUSTE LOS EMBRAGUES DESLIZANTES** para evitar el deslizamiento excesivo y el calentamiento de la placa del embrague.
- **LIMPIE** todo resto de hierba o residuo acumulado alrededor de las líneas de conducción de la cortadora, los embragues deslizantes y cajas de cambios.
- **APAGUE EL MOTOR** al cargar combustible. *PN EF02 SP*

RIESGO DE FILTRACION DE ACEITE HIDRAULICO DE ALTA PRESION

		
Usar cartón para detectar filtraciones de aceite	Erosión de la piel por el aceite de alta presión	Penetración de aceite de alta presión en la piel



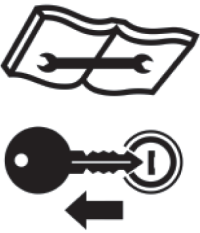
**PARA EVITAR LESIONES GRAVES O LA MUERTE POR PENETRACIÓN DE FILTRACIONES DE ACEITE HIDRAULICO DE ALTA PRESIÓN:**



- **MANTENGA** todas las mangueras hidráulicas, líneas y conexiones en **BUEN ESTADO** y **AJUSTADAS** antes de aplicar presión al sistema.
- **LIBERE LA PRESIÓN HIDRÁULICA** antes de desconectar las líneas o trabajar en el sistema.
- **QUIT**E y reemplace la manguera si sospecha que tiene filtraciones. Solicite al distribuidor que verifique si hay filtraciones.
- **LAS FILTRACIONES DE LÍQUIDO DE ALTA PRESIÓN PUEDEN NO SER VISIBLES.**
- **AL VERIFICAR FILTRACIONES HIDRÁULICAS Y TRABAJAR CERCA DE LOS SISTEMAS HIDRÁULICOS:**
  - **SIEMPRE USE** gafas de seguridad y guantes impermeables.
  - **USE** papel o cartón para verificar si hay filtraciones.
  - **NO USE** las manos o partes del cuerpo para detectar filtraciones.
  - **MANTENGA** las manos y el cuerpo **LEJOS** de los orificios de clavijas y boquillas de eyección de fluido hidráulico. El fluido hidráulico puede causar gangrena si no es extirpado quirúrgicamente de inmediato por un médico especializado en este tipo de lesiones. *PN HP01 SP*

SEGURIDAD

RIESGO DEL CONTACTO A LAS CUCHILLAS DE CORTADORA



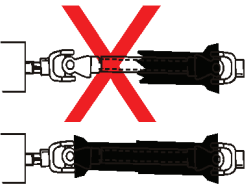
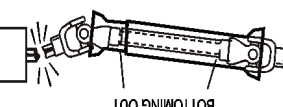
	No ponga los dedos debajo de la cortadora
	No ponga el pie debajo de la cortadora
	Detenga el tractor. Quite la llave. Lea el Manual

**PELIGRO** MANTÉNGASE LEJOS DE LAS CUCHILLAS GIRATORIAS PARA EVITAR LESIONES GRAVES O LA MUERTE POR CONTACTO CON LA CUCHILLA:

- **MANTÉNGASE LEJOS y NO ACERQUE LAS MANOS, LOS PIES y EL CUERPO** a las cuchillas giratorias, líneas de conducción y partes hasta que todos los elementos móviles se hayan detenido.
- **NO** ponga las manos o los pies debajo de las plataformas de la cortadora
- **DETENGA** las **CUCHILLAS** giratorias antes de elevar la plataforma de la cortadora o las alas para asegurarse de que se haya detenido todo el movimiento giratorio.
- Si se produce un bloqueo de material en las áreas de entrada y descarga de la cortadora, **APAGUE EL MOTOR DEL TRACTOR**, desenganche la toma de fuerza y espere a que todo movimiento de rotación se detenga. Coloque el tractor en posición de estacionamiento, ponga el freno de estacionamiento y retire la llave antes de abandonar el asiento del operador. Despejar la obstrucción antes de proceder con la siega. Asegúrese de mantener los pies y las manos alejadas de las cuchillas de la cortadora. Si se eleva las alas del cortacésped o segadoras para acceder a la obstrucción, enganche las trabas de cierre y bloquee con seguridad la cortadora antes de colocar cualquier parte del cuerpo por debajo de la segadora.

PN MB01 SP

RIESGO DE ENREDO POR EL PTO

	<p>Peligro de enredo</p>
	<p>PTO (Barra Gítratoria)</p>
	<p>No opere la máquina si las cubiertas de PTO están dañadas o faltantes</p>
	<p>Asegúrese de que los ejes de PTO sean del largo adecuado</p>

⚠ PELIGRO

MANTÉNGASE ALEJADO DE LAS LÍNEAS DE CONDUCCIÓN Y OTROS ELEMENTOS GIRATORIOS PARA EVITAR LESIONES GRAVES O LA MUERTE:

**MANTÉNGASE LEJOS y NO ACERQUE** las manos, los pies y el cuerpo a las cuchillas giratorias, líneas de conducción y partes hasta que todos los elementos móviles se hayan detenido.

- **DETENGA** la cortadora, **EXAMÍNELA y PRESTE ATENCIÓN A LOS SONIDOS** antes de acercarse a la cortadora para asegurarse de que se haya detenido todo el movimiento giratorio.
- **LOS ELEMENTOS GIRATORIOS SIGUEN ROTANDO** una vez apagada la PTO.

PROTECCIÓN DE LA PTO:

**PARA EVITAR LESIONES GRAVES O LA MUERTE POR ENREDO AL OPERAR EL IMPLEMENTO:**

- **MANTENGA** instalados los protectores, las cubiertas integrales de las líneas de conducción y las cubiertas de entrada
- **NO OPERE** la cortadora si los protectores o cubiertas no están bien colocados o faltan.
- **REEMPLACE O REPARÉLOS** si faltan, están dañados o rotos
- **SIEMPRE REEMPLACE LOS PROTECTORES** que se han quitado para tareas de reparación o mantenimiento.

**PARA EVITAR** que la línea de conducción se rompa durante las operaciones:

- **VERIFIQUE** que la línea de conducción tenga el largo adecuado entre el eje de **PTO** y el eje de la caja de cambios del implemento.
- Las líneas de conducción demasiado cortas se pueden soltar o romper.
- Las líneas de conducción demasiado largas pueden tocar el suelo.
- Un ensamblaje telescópico de la línea de conducción que toque el suelo no se deslizará y se solidificará.
- Si la línea de conducción toca el suelo, puede atravesar los cojinetes de soporte y romper el eje de **PTO**.
- **EVITE** hacer curvas pronunciadas o elevar la cortadora a alturas que puedan hacer caer la línea de conducción.
- Lubrique los componentes telescópicos del eje de transmisión en forma semanal.

**COMUNIQUESE CON EL DISTRIBUIDOR** si la línea de conducción del implemento no coincide con el eje de PTO del tractor:

- **NO UTILICE UN ADAPTADOR DE PTO.**

El uso de un adaptador de **PTO** puede causar vibración excesiva, caída de objetos, fallas de las cuchillas y el implemento como consecuencia de la duplicación de la velocidad operativa. El aumento de la longitud de trabajo puede exponer áreas desprotegidas de la línea de conducción. *PN PE01 SP*

SEGURIDAD

RIESGO DE ATROPELLO

		
Riesgo de atropello del operador	Riesgo de atropello por caída del operador	Riesgo de atropello por caída del operador

**⚠ PELIGRO** PARA EVITAR LESIONES GRAVES O LA MUERTE POR CAÍDA DEL TRACTOR O ATROPELLO DEL EQUIPO:

- USE tractores equipados con SISTEMA ANTIVUELCO (ROPS) y CINTURONES DE SEGURIDAD para las operaciones de corte.
  - MANTENGA EL SISTEMA ROPS trabado en posición vertical.
  - SÓLO ENCIENDA el tractor sentado en el asiento del tractor.
  - SIEMPRE ABROCHESE el cinturón de seguridad al operar el tractor y los equipos.
  - SÓLO OPERE el tractor y el equipo sentado en el asiento del tractor.
  - NUNCA LLEVE A OTRAS PERSONAS en el tractor o implemento.
- AL SUBIR Y BAJAR DEL TRACTOR:**
- SÓLO suba o baje del tractor cuando éste y sus partes móviles estén detenidos.
  - APAGUE EL MOTOR Y LA TDF, coloque el freno de mano, descienda del implemento, espere a que se detengan todas las partes móviles y quite la llave antes de bajarse del tractor. *PN R001 SP*

RIESGO DE OBJETOS LANZADOS Continuada

	Peligro de objetos lanzados por la cortadora
	Objetos lanzados desde cortadora elevada
	Inspeccione el área. Quite los objetos extraños
	No permita que las cuchillas entren en contacto con objetos sólidos

OPERACIÓN DE LA CORTADORA:

- **NO** exceda la capacidad de corte nominal de la cortadora, ni corte elementos que no sean vegetación.
- **USE CABINAS DE TRACTOR CERRADAS** cuando haya dos o más cortadoras operando en un mismo sector.
- **AJUSTE** las secciones de la cortadora o la ala cercana y paralela al suelo sin exponer las cuchillas
- **AJUSTE LA ALTURA** de corte para **EVITAR EL CONTACTO DE LAS CUCHILLAS** con objetos sólidos, como alambres, piedras, postes, cordones, guardarrailles y obstrucciones fijas.
- **NO** opere la cortadora con la(s) ala(s) elevada(s) o en posición de transporte.
- **DETENGA LA CORTADORA** de inmediato si las cuchillas entran en contacto con objetos pesados, estructuras fijas, guardarrailles de metal y estructuras de cemento:
- 1. **LAS CUCHILLAS PUEDEN FALLAR** con el impacto y los objetos pueden ser arrojados a gran velocidad.
- 2. **INSPECCIONE y REEMPLACE** las cuchillas dañadas.
- 3. **VERIFIQUE** el equilibrio del porta cuchillas y **REEMPLACELO** si está dañado.
- **NO** opere la cortadora en agua **PARA EVITAR** una posible **FALLA DE LAS CUCHILLAS**.
- **EVITE OPERAR LA CORTADORA** en reversa:
- 1. **DETENGA EL PTO** y retroceda la cortadora.
- 2. **DESCIENDA** la cortadora, encienda el **PTO** y corte hacia adelante.
- **DETENGA EL PTO** y las **CUCHILLAS** al elevar el implemento o la cortadora a posición de transporte.
- **NO** **ENCIENDA EL PTO** con la cortadora en posición de transporte.
- **DETENGA** la cortadora cuando se produzca **VIBRACIÓN EXCESIVA**:
- 1. **DETENGA EL PTO Y EL MOTOR** del tractor.
- 2. **INSPECCIONE** la cortadora para detectar la fuente de la vibración
- 3. **REEMPLACE** toda parte dañada o las **CUCHILLAS** dobladas o dañadas. *PN T002-X-SP*

SEGURIDAD

RIESGO DE OBJETOS LANZADOS

	Peligro de objetos lanzados por la cortadora
	Objetos lanzados desde cortadora elevada
	Inspeccione el área. Quite los objetos extraños
	No permita que las cuchillas entren en contacto con objetos sólidos

**PELIGRO**

LAS CORTADORAS GIRATORIAS PUEDEN ARROJAR OBJETOS A 90 METROS (300 PIES) O MÁS EN CONDICIONES ADVERSAS.

PARA EVITAR LESIONES GRAVES O LA MUERTE AL OPERADOR O TRANSEÚNTES COMO CONSECUENCIA DE OBJETOS ARROJADOS:

- **MANTENGA** a los transeúntes a 100 metros de distancia (300 pies)
- **NO OPERE LA CORTADORA SI HAY PERSONAS A MENOS DE 100 METROS(300 PIES), SALVO QUE:**

- Todos los **PROTECTORES CONTRA OBJETOS ARROJADOS** estén colocados y en buen funcionamiento al operar la cortadora, entre los que se incluyen los deflectores frontales y traseros, los protectores de cadena, los protectores de acero, las bandas, los faldones laterales y las zapatas antideslizantes.

- Las partes de la cortadora o la ala estén ajustadas cerca y paralelas al suelo, sin exponer las cuchillas.
- Se ha inspeccionado el **ÁREA DE CORTE** y se han quitado todos los materiales extraños y residuos.

- **LOS TRANSEÚNTES** estén en el interior de un vehículo cerrado.
- **ANTES DE OPERAR LA CORTADORA, INSPECCIONE EL ÁREA PARA DETECTAR LA POSIBILIDAD DE OBJETOS QUE PUEDAN SER LANZADOS:**

- **QUITE** residuos, piedras, cables, alambres, objetos metálicos y cualquier otro objetos extraños del área.
- Los alambres, cables, sogas, cadenas y objetos metálicos pueden ser arrojados o salir desprendidos de la plataforma a gran velocidad:

- 1. **MARQUE** los objetos que no se puedan quitar.
- 2. **EVITE** estos objetos cuando use la cortadora.

**INSPECCIÓN DEL ÁREA PARA DETECTAR HIERBA ALTA Y MALEZAS:**

- **INSPECCION Y QUITA** cualquier residuo oculto de gran tamaño.
- **PASE LA CORTADORA** a una altura intermedia
- **INSPECCIONE** y quite el residuo restante
- **PASE LA CORTADORA** a la altura final

**PROTECCIÓN CONTRA OBJETOS ARROJADOS DE LA CORTADORA:**

- **MANTENGA** todos los protectores contra objetos arrojados en su lugar y en buen funcionamiento al operar la cortadora, entre los que se incluyen los deflectores frontales y traseros, los protectores de cadena, los protectores de acero, las bandas, los faldones laterales y las zapatas antideslizantes.

- **NO OPERE LA CORTADORA** si falta algún protector contra objetos arrojados, o si éstos están dañados.
- **DERECHO DE PASO (autopista) CON LA CORTADORA**

- **UTILICE PROTECTORES DE CADENA DOBLES** para autopistas, derecho de paso, parques o cortes en cinturón verde donde pueda haber viviendas, vehículos o ganado dentro de los 100 metros (300 pies) de la cortadora.
- Ninguna protección ofrece una eficacia del 100% en la prevención de objetos arrojados. Para reducir la posibilidad de que se produzcan lesiones:

- 1. **MANTENGA LOS PROTECTORES DE LA CORTADORA**, los faldones laterales, la zapatas antideslizantes y las cuchillas en buen estado de funcionamiento.
- 2. **ELEVE LA ALTURA DE CORTE a 15 CM (6 PULGADAS)** como mínimo.

- 3. **INSPECCIONE EL ÁREA** con cuidado antes de pasar la cortadora para **ELIMINAR** el posible riesgo de **OBJETOS ARROJADOS,**
- 4. **NUNCA PERMITA QUE LAS CUCHILLAS EN MOVIMIENTO ENTREN EN CONTACTO CON OBJETOS SÓLIDOS** como alambres, piedras, postes, cordones, guardarraíles o el suelo. *PN T002 SP*

RIESGO DE APLASTAMIENTO

			
Lesión aplastante por vuelco	Trabe el sistema ROPS (antivuelco) en la posición vertical	Siempre utilice cinturón de seguridad	Lesión aplastante por caída de implemento

**PELIGRO** PARA EVITAR UNA LESIÓN GRAVE O LA MUERTE POR CAÍDA DEL TRACTOR, O EL APLASTAMIENTO, VUELCO Y APLASTAMIENTO DE UN EQUIPO POR LA CAÍDA DE UNA ALA O UN IMPLEMENTO:

- USE tractores equipados con SISTEMA ANTIVUELCO (ROPS) y CINTURONES DE SEGURIDAD para las operaciones de corte.
- MANTENGA EL SISTEMA ROPS trabado en posición vertical.
- SIEMPRE ABROCHESE el cinturón de seguridad al operar el tractor y los equipos.
- SOLO OPERE el tractor y el equipo sentado en el asiento del tractor.
- AL ELEVAR O DESCENDER EL IMPLEMENTO:
  - Eleve o descienda SÓLO CUANDO ESTÉ SENTADO en el asiento del tractor, con el cinturón de seguridad ajustado.
  - Eleve o descienda SÓLO cuando la lengüeta del implemento esté firmemente ajustada a la barra de tracción del tractor.
  - PARA EVITAR EL vuelco del implemento:
- MANTENGA A LOS TRANSSEUNTES FUERA del área de operación PARA EVITAR accidentes por aplastamiento.
- Los equipos ELEVADOS se pueden caer por fallas mecánicas o hidráulicas o por un movimiento inesperado de la palanca de control.

**ADVERTENCIA**

- PARA EVITAR LA CAÍDA DEL EQUIPO al trabajar cerca o debajo de los componentes o implementos elevados por un enganche de tractor de 3 puntos:
- SUJETE CON FIRMEZA o bloquee en posición vertical todos los equipos, alas y componentes elevados.
- BLOQUEE EN POSICIÓN VERTICAL y sujete con firmeza el equipo antes de poner las manos, los pies o el cuerpo debajo de los equipos o componentes elevados.
- AL ESTACIONAR el implemento y el tractor:
  - DESCienda el implemento, TRABE o BLOQUEE las partes elevadas antes de alejarse del equipo.
  - NUNCA deje un implemento sin atención en posición elevada.

**ADVERTENCIA**

- NUNCA DEJE que los niños jueguen sobre el tractor o los implementos, ni en sus alrededores.
- WHEN UNHITCHING IMPLEMENT:
  - AL DESENGANCHAR EL IMPLEMENTO:
    - DESCienda el implemento, TRABE o BLOQUEE las partes elevadas antes de alejarse del equipo.
    - USE el gato de la lengüeta para controlar el movimiento de la lengüeta del implemento
    - USE el GATO de la lengüeta para elevar lengüetas de implementos pesados.
    - EVITE recargar el gato para evitar falla al gato y una lesión al operador. PN CH02 SP

SEGURIDAD

SEGURIDAD DE CONECTAR O DESCONECTAR IMPLEMENTO

	Detenga el tractor Quite la llave Lea el Manual
	Lesión opresiva entre tractor e implemento
	Asegúrese de que el eje de TDF esté firmemente ajustado al tractor
	Asegúrese de que el eje de TDF sea del largo adecuado

**PELIGRO**

PARA EVITAR LESIONES GRAVES O LA MUERTE POR APLASTAMIENTO POR EL TRACTOR O IMPLEMENTO:

- **AL DAR MARCHA ATRAS** el tractor hacia el enganche del implemento:
- **NO PERMITA QUE HAYA PERSONAS** entre el tractor y el implemento

**ANTES de conectar y desconectar el enganche del implemento:**

- **APAGUE EL MOTOR DEL TRACTOR**, coloque la palanca en "estacionar", ponga el freno de mano y saque la llave.

**Al conectar y desconectar el enganche del implemento:**

- **NO** se agache o camine debajo de la cortadora o la ala en posición elevada.
- **USE el GATO** con lengüeta para elevar lengüetas de implementos pesados a fin de controlar el movimiento de la lengüeta del implemento.
- **EVITE** recargar el gato para evitar una falla de éste y una lesión al operador.

**AL CONECTAR LA LÍNEA DE CONDUCCIÓN DEL IMPLEMENTO:**

**PARA EVITAR que la línea de conducción del implemento se suelte durante la operación:**

- **LUBRIQUE** el anillo de cierre del resorte del yugo para asegurarse de que se deslice libremente sobre el eje de **PTO**
- **ASEGURE** las bolas de cierre del yugo en la muesca del eje de **PTO**.
- **PRESIONE y JALE DE LA LÍNEA DE CONDUCCIÓN DEL EJE DE TOMA DE FUERZA(PTO)** del tractor y del implemento para asegurarse de que estén **FIRMEMENTE SUJETADOS**

**PARA EVITAR que la línea de conducción se rompa durante las operaciones:**

- **VERIFIQUE** que la línea de conducción tenga el largo adecuado entre el eje de **PTO** y el eje de la caja de cambios del implemento.
- Las líneas de conducción demastado cortas se pueden soltar o romper.
- Las líneas de conducción demastado largas pueden tocar el suelo.
- Un ensamble telescópico de la línea de conducción que toque el suelo no se deslizará y se solidificará.
- Si la línea de conducción toca el suelo, puede atravesar los cojinetes de soporte y romper el eje de **PTO**.

**COMUNIQUESE CON EL DISTRIBUIDOR si la línea de conducción del implemento no coincide con el eje de TDF del tractor:**

• **NO UTILICE UN ADAPTADOR DE PTO.**

- El uso de un adaptador de **PTO** puede ocasionar:
  - Vibración excesiva, caída de objetos, fallas de la hoja y el implemento como consecuencia de la duplicación de la velocidad opera-
  - tiva.
  - Mayor extensión de trabajo, lo que deja expuestas áreas desprotegidas de la línea de conducción e implica el riesgo de enredo con otros objetos.

**NO conecte la cortadora a un tractor con la TDF directamente conectada a la transmisión del tractor. PN CD02 SP**

# SEGURIDAD

## SEGURIDAD DEL OPERADOR

	Lea con atención el Manual del Operador
	Siempre use gafas de seguridad
	Use casco y calzado protector
	Nunca consuma drogas o alcohol mientras opera el equipo
	Utilice chaleco de seguridad al operar en o cercas de carreteras

**ADVERTENCIA** PARA EVITAR LESIONES GRAVES O LA MUERTE, SIGA LAS SIGUIENTES INSTRUCCIONES:

- **LEA, COMPROMETA y SIGA** las instrucciones del Manual del Operador, al igual que las Advertencias y Mensajes de Seguridad.
- **USE GAFAS DE SEGURIDAD**, calzado protector, casco, protección auditiva y guantes al operar o reparar el equipo
- **USE** un aparato de respiración apropiado al operar en condiciones polvorosas a fin de evitar contraer enfermedades respiratorias.
- **NO USE** prendas sueltas o joyas que se puedan enredar con las partes giratorias y causar una lesión.
- **NO CONSUMA DROGAS o ALCOHOL** antes o durante la operación del equipo.
- **NO PERMITA** que nadie opere el equipo bajo los efectos negativos de las drogas o el alcohol.
- **CONSULTE** a un médico para conocer los efectos desfavorables de la medicación sobre los sentidos.
- **MANTÉNGASE ALERTA**, la operación prolongada puede causar fatiga. **HAGA UNA PAUSA y DESCANSE.**

## SEGURIDAD DE OPERACIÓN GENERAL

### CONDICIONES DE VISIBILIDAD AL USAR LA CORTADORA:

- **OPERE LA CORTADORA CON LUZ SOLAR** o con luz que aporte una visibilidad nítida de más de 90 metros (100 yardas).
- **DEBE PODER VISUALIZAR** e identificar transeúntes, terrenos empinados, pozos, desniveles, obstrucciones elevadas, cables de alimentación, residuos y objetos extraños.

### VELOCIDAD RESPECTO AL SUELO AL USAR LA CORTADORA:

- El rango de **VELOCIDAD NORMAL** es de entre 2 y 5 millas por hora.
- **AJUSTE LA VELOCIDAD DE CORTE** según las condiciones del terreno y el tipo de césped, la densidad y la altura del corte.
- **REDUZCA LA VELOCIDAD DE CORTE** al acercarse a inclinaciones empinadas, pozos, desniveles, obstrucciones elevadas, cables de alimentación y para evitar residuos y objetos extraños.

### INFESTACIÓN CON INSECTOS

- No opere en áreas susceptibles al ataque de abejas o insectos, salvo que **USE PRENDAS PROTECTORAS** o una cabina de tractor cerrada.

### VELOCIDAD DE PTO:

- **NO EXCEDA LA VELOCIDAD DE PTO NOMINAL DEL IMPLEMENTO**
- **EVITE** superar las velocidades nominales de PTO, porque puede causar roturas en la línea de conducción o fallas de las cuchillas.
- **SEÑALES DE SEGURIDAD:**

- **REEMPLACE** cualquier señal de seguridad faltante, dañada o ilegible. *PN OS01 SP*

El mejor operador es un operador cuidadoso. La seguridad es de importancia fundamental para el fabricante, y también debería serlo para el propietario u operador. La mayoría de los accidentes se pueden evitar prestando suma atención al equipo, al ambiente circundante, y tomando algunas precauciones. La primera sección de este manual incluye una lista de Mensajes de Seguridad que deben observarse para contribuir a la protección del operador y otras personas frente a lesiones o la muerte. Lea con atención estos Mensajes de Seguridad antes de ensamblar, operar o reparar este implemento. Este equipo sólo debe ser operado por personas que hayan leído el manual, responsables y calificadas, que sepan cómo hacerlo de manera responsable.



El Símbolo de Alerta de Seguridad se utiliza en combinación con una Señal Verbal, tal como la que se muestra a continuación, en todo este manual y en los autoadhesivos adheridos a los equipos. El Símbolo de Alerta de Seguridad significa:

**Adopte todas las medidas habituales para trabajar en forma segura y, sobre todo, recuerde que la seguridad depende de USTED. Sólo USTED puede impedir una lesión grave o la muerte a causa de prácticas no seguras.**

Indica una situación peligrosa inminente que, de no ser evitada, OCASIONARA la MUERTE O UNA LESIÓN MUY GRAVE.

**MUERTE O UNA LESIÓN MUY GRAVE.**

**Indica una situación peligrosa inminente que, de no ser evitada, PODRÍA OCASIONAR la MUERTE O UNA LESIÓN MUY GRAVE.**

**MUERTE O UNA LESION MUY GRAVE.**

Indica una situación peligrosa inminente que, de no ser evitada, **PODRÍA OCASIONAR UNA LESIÓN MENOR.**

## UNA LESION MENOR.

Identifica instrucciones o procedimientos específicos que, de no observarse estrictamente, podrían ocasionar daños o la destrucción de la maquinaria, los accesorios o el entorno.

## Importante

**PRECAUCIÓN**



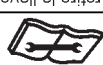

**ADVERTENCIA**

**! PELIGRO**

este manual y use el sentido común para evitar situaciones peligrosas.

**LEA CON ATENCIÓN Y RESPETE** los siguientes Mensajes de Seguridad. Si no se siguen cuidadosamente las advertencias e instrucciones indicadas en este Manual y en los Mensajes de Seguridad del implemento, se pueden producir lesiones graves o la muerte. Siempre siga las instrucciones de este manual y use el sentido común para evitar situaciones peligrosas.



<p><b>PREVENCIÓN DE SEGURIDAD</b></p>	<p>Un círculo con una barra indica una acción que está prohibida.</p> <p>EJEMPLO:</p>  <p>No FUMAR</p>
<p><b>PROCEDIMIENTO DE EVITACIÓN</b></p>	<p>El pictograma por sí mismo o dentro de una caja indica un procedimiento de evitación que se debe seguir para evitar lesiones.</p> <p>EJEMPLO:</p>   <p>Apague siempre el motor y retire la llave antes de trabajar en el equipo.</p>
<p><b>PELIGRO DE SEGURIDAD</b></p>	<p>El pictograma rodeado por un triángulo indica un peligro de seguridad que debe evitarse.</p> <p>EJEMPLO:</p>  <p>Evitar el contacto con líneas eléctricas aéreas</p>

**NOTA:** Si desea obtener una traducción de esta sección de seguridad en alguno de los siguientes idiomas, comuníquese con: Translations, a la dirección 1502 E. Walnut Street Seguin, TX 78155; Fax: (830) 372-9529; La Sección de Seguridad está disponible en español, portugués, francés, alemán, ruso. PN 6501 SP

# SECCIÓN DE SEGURIDAD



## Instrucciones de operaciones antes de la entrega del DISTRIBUIDOR al CLIENTE

El distribuidor deberá informar al comprador de este producto las condiciones, disposiciones y procedimientos de garantía aplicables; informar la responsabilidad del comprador de capacitar a sus operadores para la operación segura; revisar el contenido del Manual del Operador, incluido el equipo de seguridad, la operación segura y el mantenimiento; y revisar las Señales de Seguridad que se encuentran en el implemento (y en el tractor, de ser posible).

- **IMPLEMENTOS:** He explicado que los deflectores, protectores de cadena o faldones sólidos se deben mantener en buenas condiciones de reparación y se deben instalar, excepto en zonas donde personas, vehículos, ganado u otros bienes no corran peligro por objetos arrojados, y en los casos en que dichos equipos de seguridad impedirían un desempeño razonable de la cortadora en su tarea asignada.

- **LÍNEAS DE CONDUCCIÓN:** Me he asegurado de que todos los protectores de líneas de conducción, de caja de engranajes y otros están en buenas condiciones de reparación y firmemente sujetados para prevenir lesiones por enredo u objetos arrojados.
- **MÁQUINAS HIDRÁULICAS:** He explicado la necesidad de usar aceite hidráulico limpio, cambiar los filtros según las instrucciones, detener filtraciones, prevenir daños por operar con aceite demasiado caliente, cuidar las mangueras, usar mangueras del tipo correcto, mantener la presión operativa especificada y prevenir el posible riesgo de que el aceite penetre en la piel.

- **IMPLEMENTOS PLEGABLES:** He explicado que no es posible proteger contra objetos arrojados cuando el cabezal está elevado del suelo y que el operador es responsable de verificar que no existan personas en las inmediaciones. He explicado que el brazo o cabezal de cortadora elevado puede entrar en contacto con obstrucciones elevadas y dañar cables y líneas telefónicas, y posiblemente causar lesiones. He explicado que el brazo o cabezal extendido, o el brazo retráido, puede entrar en contacto con cables de alimentación y causar lesiones o la muerte por electrocución, y que el operador es responsable de evitar dichos riesgos.

### SERVICIO ANTES DE LA ENTREGA VERIFIQUE Y AJUSTE O LUBRIQUE SEGÚN SEA NECESARIO

Consulte los detalles en el Manual del Operador  
Inspección realizada – Garantía y procedimientos de seguridad explicados – Instalación realizada

#### LUBRICACIÓN E HIDRÁULICA

- ☐ Caja de engranajes (niveles de aceite)
- ☐ Nivel de aceite hidráulico (tanque externo)
- ☐ Nivel de aceite hidráulico del tractor
- ☐ Mangueras hidráulicas (no retorcidas y ajustadas)
- ☐ Propulsor de bomba frontal (conjunto ajustado y eje bien alineado)

#### CORTADORA

- ☐ Pernos de husillo y motor bien ajustados
- ☐ Nivel de aceite del husillo
- ☐ Pernos de porta cuchillas bien ajustados/pasadores de retención colocados
- ☐ Nivel y altura de corte de la cortadora ajustados
- ☐ Cojinetes del eje de corte lubricados
- ☐ Todas las piezas metálicas bien ajustadas
- ☐ Presión de aire y neumáticos/tuercas de rueda (bien ajustadas)
- ☐ Cojinetes de rueda (verificar, engrasar y hacer carga previa)

#### ACCESORIOS E INSTALACIÓN

- ☐ Deflectores frontales y traseros
- ☐ Accesorios de trituración
- ☐ Sentido de giro de las hojas correcto
- ☐ Vigas y brazos de eje
- ☐ Lengüeta y barras de control (instaladas y ajustadas)
- ☐ Todos los pernos, pasadores y tuercas (ajuste correcto)

#### CONEXIONES DE CORTADORA A TRACTOR

- ☐ Longitud de barra de enganche (verificar y fijar)
- ☐ Pivote y conexiones de bastidor en A
- ☐ Barras de control (ajustadas iguales)
- ☐ Altura de eje (ajustar)
- ☐ Altura de corte (ajustar)
- ☐ Verificación de pre-operación de kit de montaje
- ☐ Alea de cortadora (ajustar nivel con el centro)
- ☐ Alea de cortadora (verificar operación de elevación correcta)
- ☐ Líneas de conducción C.V. (verificar radio de giro máx.)
- ☐ Enganche de tracción (ajuste de altura)
- ☐ Piezas metálicas de montaje bien ajustadas

#### ELEMENTOS DE SEGURIDAD

- ☐ Protectores (operación e instalación)
- ☐ Embrague de línea de conducción (limitador de ajuste) (ajustar y poner en marcha)
- ☐ Autoadhesivos de seguridad (colocados)
- ☐ Manual del Operador (entregado)
- ☐ Protector de TDF del tractor (instalado)
- ☐ Emblema S.M.V. (instalado de ser necesario)
- ☐ Gato con lengüeta (instalación y operación)
- ☐ Cadena de remolque de seguridad (instalada)
- ☐ Manual de Seguridad de Línea de Conducción ADMA (entregado)
- ☐ Manual de Seguridad de Cortadora AEM (entregado en porta manual)
- ☐ Se mostró el Video de Seguridad de Cortadora AEM al comprador

**Bush Hog está dispuesto a suministrar un (1) Video de Prácticas de Seguridad para Cortadoras AEM**

Por favor enviar: ☐ Video de Seguridad para el Operador de Cortadoras AEM/FEMA – formato VHS

☐ Video de Seguridad para el Operador de Cortadoras AEM/FEMA – formato DVD

☐ Manual del Operador de la Cortadora

☐ Manual de Seguridad del Operador de la Cortadora AEM

Nombre del solicitante \_\_\_\_\_ Teléfono: \_\_\_\_\_

Dirección del solicitante \_\_\_\_\_

Ciudad \_\_\_\_\_

Estado \_\_\_\_\_

Código postal \_\_\_\_\_

Modelo de cortadora \_\_\_\_\_ Número de serie \_\_\_\_\_

Fecha de compra \_\_\_\_\_ Vendedor del distribuidor \_\_\_\_\_

Nombre del distribuidor \_\_\_\_\_ Dirección del distribuidor \_\_\_\_\_

Enviar por correo a:

AEM Video Services

1502 E. Walnut Street

Seguin, TX 78155

O enviar por fax a:

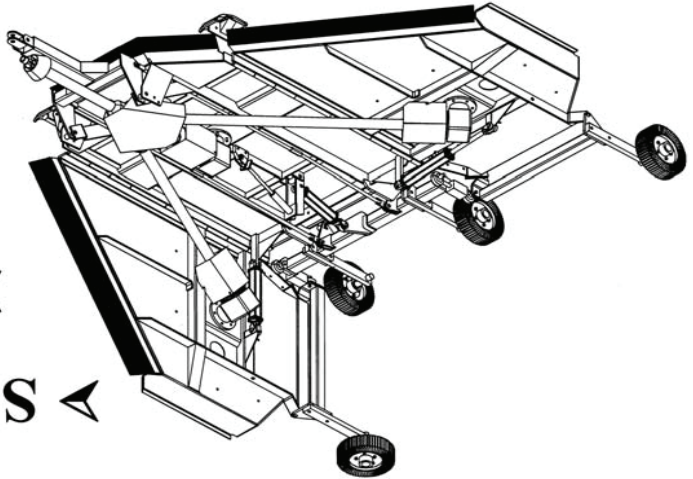
(830) 372-9529

O enviar por correo electrónico a:

AEMVideo@alamo-group.com

Bush Hog Image-SP

## **Entrenamiento de Seguridad** **Hace la Diferencia**



➤ **Sea Seguro**

➤ **Sea Alerto**

➤ **Sea Vivo**

➤ **Sea Entrenado**

**antes de funcionar  
el cortacésped**



[www.aligqr.com/bvs](http://www.aligqr.com/bvs)

Vídeo de Seguridad

A fin de reducir la tasa de accidentes y mejorar la operación segura de las cortadoras, Alamo Group Ag Division se ha asociado con otros fabricantes de la industria para desarrollar el vídeo y la guía de Prácticas de Seguridad para Cortadoras Industriales y Agrícolas AEM/FEMA.

El vídeo explica a los operadores de tractores y cortadoras las prácticas seguras que deben adoptar cuando operan sus equipos de corte y puedan reconocer los posibles peligros que pueden surgir al operar una cortadora. Este vídeo, en conjunto con el manual del operador de la cortadora y los mensajes de advertencia que se encuentran en la cortadora, serán muy útiles para complementar este aprendizaje tan importante. Es posible que su distribuidor autorizado de Bush Hog le haya mostrado este vídeo y le haya entregado una copia en DVD cuando adquirió su cortadora. Si usted o algún operador de cortadora no vio el vídeo, mire el vídeo, lea este Manual del Operador, y complete la Guía del Vídeo antes de operar su cortadora nueva. Si no comprende alguna de las instrucciones del vídeo o del manual del operador, o si tiene alguna pregunta acerca de la operación segura, comuníquese con su supervisor, con el distribuidor o con Alamo Group Ag.

Si desea recibir una copia del vídeo en VHS, envíe un mensaje de correo electrónico a [AEMVideo@alamo-group.com](mailto:AEMVideo@alamo-group.com) o un fax al (830) 372-9529, o envíe por correo una copia rellena del formulario que se encuentra al dorso de esta página a AEM VHS Video 1502 E Walnut Street, Seguin, TX 78155, y solicite la versión en VHS. Indique su nombre, dirección postal, modelo de cortadora y número de serie.

Cada uno de los operadores debe recibir capacitación para cada equipo (tractor y cortadora), comprender el uso previsto, y comprender los posibles peligros antes de operar el equipo.

La información y material mecionado en la información anterior junto con el Manual de Operador puede asistir en cumplir con los requisitos de OSHA para el entrenamiento anual del Operador.

### **REQUISITOS DE ENTRENAMIENTO DEL OSHA**

**Los siguientes requisitos de entrenamiento se an toma da del Título 29, código de la pieza de regulaciones federales 1928.57 (a) (6), [www.osha.gov](http://www.osha.gov)**

Instrucciones del operador. A la hora de la asignación inicial y por lo menos anualmente después de eso, el empleador mandará a cada empleado quien opera un tractor agrícola o implemento en las practicas de operación segura y el mantenimiento de el equipo con el cual el empleado esté, o estará implicado y de cualquier otras prácticas dictados por el ambiente laboral.

Al propietario/operador/distribuidor

Este Manual del Operador es una parte esencial de la operación segura de esta máquina y se debe mantener con la unidad siempre. El implemento incluye un porta manual donde se puede guardar el manual de manera adecuada. Si el manual se extravía o se daña, puede solicitar otra copia sin cargo a un distribuidor autorizado de Bush Hog o descargarlo del sitio web de Bush Hog ([www.bushhog.com](http://www.bushhog.com)).

ANTES DE COMENZAR LEA, COMPRENDA Y SIGA la información incluida en este manual, el Manual de Seguridad de la Cortadora AEM y el manual del operador del tractor para conocer cómo operar la máquina y realizar tareas de servicio correctamente. De lo contrario, podría sufrir lesiones u ocasionar lesiones a terceros. Todos los implementos con partes móviles son potencialmente peligrosos. Cada esfuerzo ha sido hecho para asegurar que la máquina esté segura, pero los operadores deben evitar entrar en prácticas peligrosas y seguir las instrucciones escritas que son proporcionadas. El fabricante ha diseñado este implemento para ser usado con todos sus equipos de seguridad correctamente sujetos para minimizar la probabilidad de accidentes.

LA SEGURIDAD PRIMERO. Lea con atención la totalidad de la sección de seguridad de este manual antes de operar el equipo. No permita que nadie opere el equipo sin haber leído y comprendido la totalidad de este manual. Comuníquese con el distribuidor si necesita explicación sobre alguna instrucción que no haya comprendido del todo.

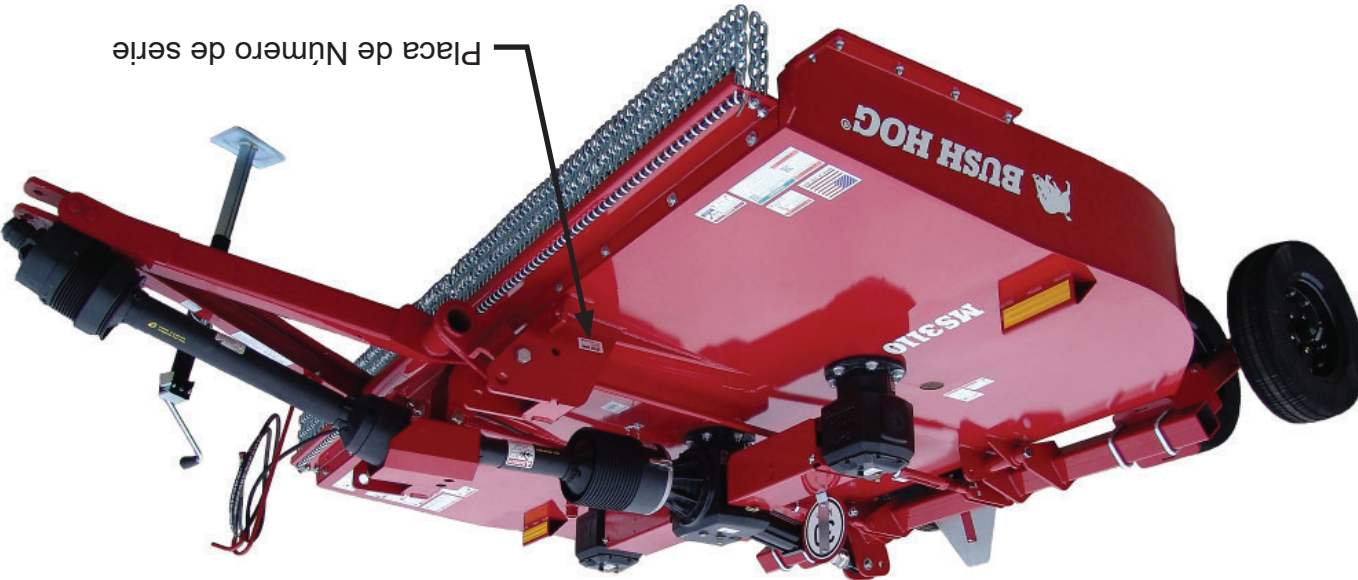
Los cuidados que brinde a su implemento Bush Hog determinarán en gran medida su satisfacción con el desempeño y la vida útil del equipo. Lea con atención y siga las instrucciones de este manual para comprender cabalmente su nuevo implemento, su uso previsto, y sus requisitos de servicio.

Todas las referencias que se hacen en este manual a derecha, izquierda, frontal, trasero, arriba y abajo corresponden a la perspectiva en el sentido del desplazamiento hacia delante con el implemento correctamente sujeto al tractor.

La información sobre repuestos se encuentra por separado en el Manual de Partes. Las cortadoras Bush Hog utilizan componentes del sistema equilibrados y coincidentes para porta cuchillas, cuchillas, ejes de corte, hojas, ganchos para hojas, rodillos, componentes de los engranajes, y cojinetes. Estas partes se fabrican y se prueban según las especificaciones de Bush Hog. Las partes compatibles no genuinas no siempre cumplen con estas especificaciones. El uso de partes no genuinas puede perjudicar el desempeño de la cortadora, anular la garantía y presentar un riesgo para la seguridad. Use partes genuinas Bush Hog para ahorrar dinero y maximizar la seguridad.

Para referencia futura, registre el número de modelo y el número de serie de BUSH HOG que ha adquirido.

Distribuidor	Teléfono	Número de Modelo	Número de Serie	Dueño



# MODEL MS3110

## ROTARY MOWER

CORTADORA/TRITURADORA GIRATORIA

Parte n°. 50083639

## MANUAL DE OPERADOR

# BUSH HOG®



Publicado en 10/23



Este Manual del Operador es una parte esencial de la operación segura de esta máquina y se debe mantener con la unidad siempre. LEA, ENTIENDA, Y SIGA las Instrucciones de Seguridad y Operación contenidas en este manual antes de operar el equipo. C01-Cover SP\_B

Importantes instrucciones de operación y las instrucciones de seguridad se encuentran en el video Cortacésped Sobre Seguridad que se puede acceder instantáneamente en el internet en: [www.algqr.com/bvs](http://www.algqr.com/bvs)



[www.algqr.com/bvs](http://www.algqr.com/bvs)

Video de Seguridad



# BUSH HOG®

2501 Griffin Ave.  
Selma, AL 36703

334-874-2700

Correo electrónico: [www.bush-hog.com](http://www.bush-hog.com)

Página Web de Bush Hog



[www.algqr.com/bwe](http://www.algqr.com/bwe)



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