MacDon

R113/R116 Pull-Type Rotary Disc Mower Conditioner

Operator's Manual

169820 Revision A

Original Instruction

The harvesting specialists.

R113 13-Foot Rotary Disc Pull-Type Mower Conditioner

Published November, 2014

Introduction

This instructional manual contains operating and maintenance procedures for the MacDon R113 13-Foot And R116 16-Foot Rotary Disc Pull-Type Mower Conditioners. Your new mower conditioner is designed to cut, condition, and lay a wide variety of grasses and hay crops in windrows.

Carefully read all the material provided before attempting to unload, assemble, or use the machine.

Use this manual as your first source of information about the machine. If you follow the instructions provided in this manual, your mower conditioner will work well for many years. A parts catalog also is supplied with your new mower conditioner. If you require more detailed service information, a technical manual is available from your Dealer.

Use the “Table of Contents” and “Index” to guide you to specific topics. Study the “Table of Contents” to familiarize yourself with how the material is organized. Keep this manual handy for frequent reference and to pass on to new Operators or Owners. Call your Dealer if you need assistance, information, or additional copies of this manual.

Store the operator’s manual and the parts catalog in the plastic manual case at the right side of the mower conditioner.

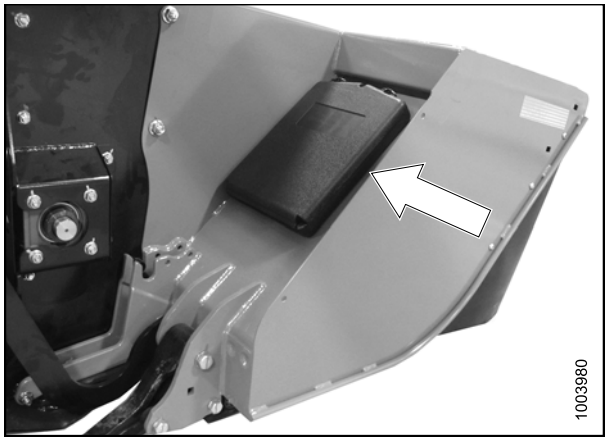

Figure 1: Manual Storage Case

Serial Numbers

Record the serial number of the mower conditioner in the space provided below.

Mower Conditioner Serial Number _____

Year of Manufacture _____

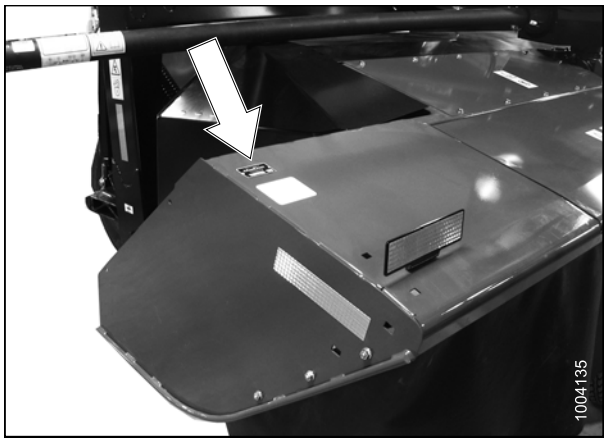

Figure 2: Mower Conditioner Serial Number Location

Swivel Hitch Year of Manufacture _____

Figure 3: Swivel Hitch Identification Plate Location

1 Safety

1.1 Safety Alert Symbols

This safety alert symbol indicates important safety messages in this manual and on safety signs on the .

This symbol means:

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

Carefully read and follow the safety message accompanying this symbol.

Why is safety important to you?

- Accidents disable and kill
- Accidents cost
- Accidents can be avoided

Figure 1.1: Safety Symbol

1.2 Signal Words

Three signal words, *DANGER*, *WARNING*, and *CAUTION* are used to alert you to hazardous situations. The appropriate signal word for each situation has been selected using the following guidelines:

DANGER

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

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. It may also be used to alert against unsafe practices.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may be used to alert against unsafe practices.

1.3 General Safety

CAUTION

The following are general farm safety precautions that should be part of your operating procedure for all types of machinery.

Protect yourself.

- When assembling, operating, and servicing machinery, wear all the protective clothing and personal safety devices that **COULD** be necessary for the job at hand. Don't take chances. You may need the following:
  - A hard hat
  - Protective footwear with slip resistant soles
  - Protective glasses or goggles
  - Heavy gloves
  - Wet weather gear
  - A respirator or filter mask
- Be aware that exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protection devices such as ear muffs or ear plugs to help protect against objectionable or loud noises.

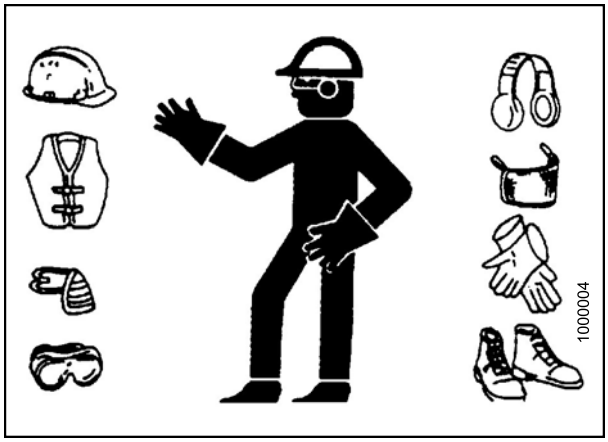

Figure 1.2: Safety Equipment

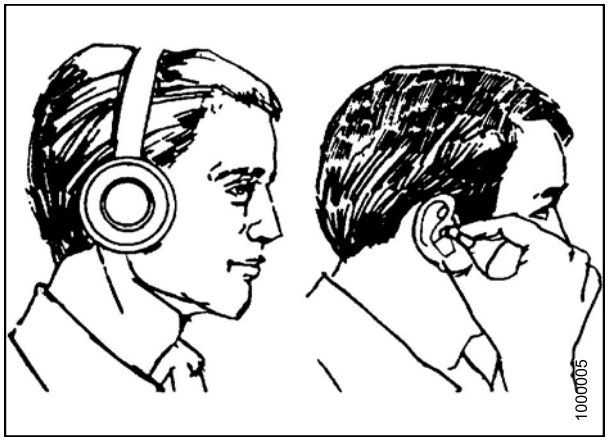

Figure 1.3: Safety Equipment

- Provide a first aid kit for use in case of emergencies.
- Keep a fire extinguisher on the machine. Be sure the fire extinguisher is properly maintained. Be familiar with its proper use.
- Keep young children away from the machinery at all times.
- Be aware that accidents often happen when the Operator is tired or in a hurry to get finished. Take the time to consider the safest way. Never ignore warning signs of fatigue.

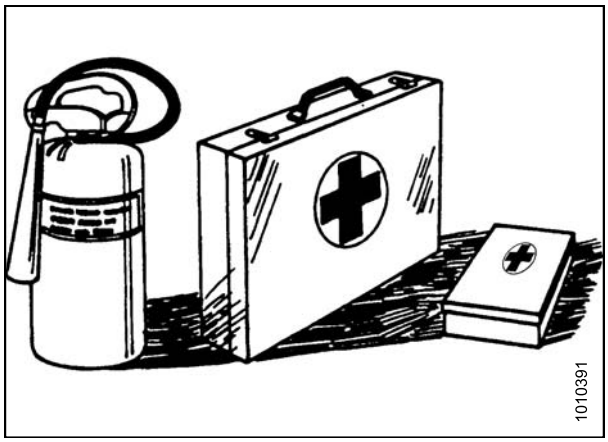

Figure 1.4: Safety Equipment

- Wear close-fitting clothing and cover long hair. Never wear dangling items such as scarves or bracelets.
- Keep all shields in place. Never alter or remove safety equipment. Make sure driveline guards can rotate independently of the shaft and can telescope freely.
- Use only service and repair parts made or approved by the equipment manufacturer. Substituted parts may not meet strength, design, or safety requirements.

Figure 1.5: Safety Around Equipment

- Keep hands, feet, clothing, and hair away from moving parts. Never attempt to clear obstructions or objects from a machine while the engine is running.
- Do **NOT** modify the machine. Non-authorized modifications may impair machine function and/or safety. It may also shorten the machine's life.
- Stop the engine and remove the key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

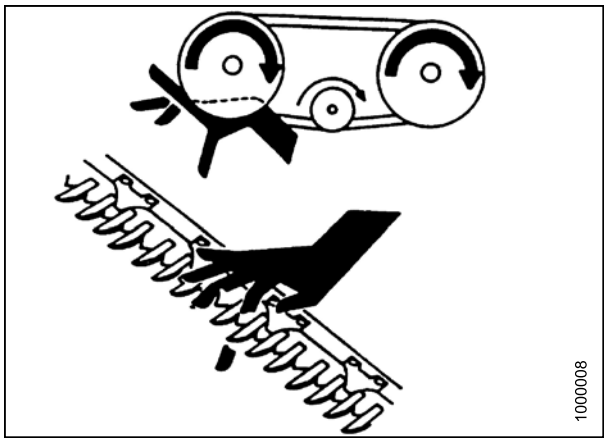

Figure 1.6: Safety Around Equipment

- Keep the service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Be sure all electrical outlets and tools are properly grounded.
- Keep work area well lit.
- Keep machinery clean. Straw and chaff, on a hot engine, are a fire hazard. Do **NOT** allow oil or grease to accumulate on service platforms, ladders, or controls. Clean machines before storage.
- Never use gasoline, naphtha, or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.
- When storing machinery, cover sharp or extending components to prevent injury from accidental contact.

Figure 1.7: Safety Around Equipment

1.4 Maintenance Safety

To ensure your safety while maintaining the machine:

- Review the operator's manual and all safety items before operation and/or maintenance of the machine.
- Place all controls in Neutral, stop the engine, set the park brake, remove the ignition key, and wait for all moving parts to stop before servicing, adjusting, and/or repairing.
- Follow good shop practices:
  - Keep service areas clean and dry
  - Be sure electrical outlets and tools are properly grounded
  - Use adequate lighting for the job at hand
- Relieve pressure from hydraulic circuits before servicing and/or disconnecting the machine.
- Make sure all components are tight and that steel lines, hoses, and couplings are in good condition before applying pressure to a hydraulic system.
- Keep hands, feet, clothing, and hair away from all moving and/or rotating parts.
- Clear the area of bystanders, especially children, when carrying out any maintenance and repairs or when making any adjustments.
- Install transport lock or place safety stands under the frame before working under the .
- If more than one person is servicing the machine at the same time, be aware that rotating a driveline or other mechanically driven component by hand (for example, accessing a lube fitting) will cause drive components in other areas (belts, pulleys, and knife) to move. Stay clear of driven components at all times.
- Wear protective gear when working on the machine.
- Wear heavy gloves when working on knife components.

Figure 1.8: Safety Around Equipment

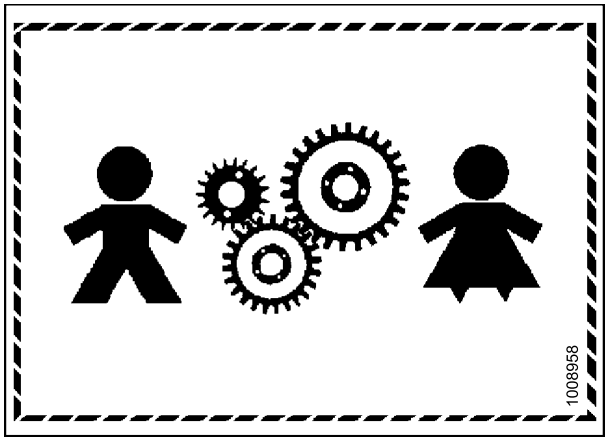

Figure 1.9: Equipment NOT Safe for Children

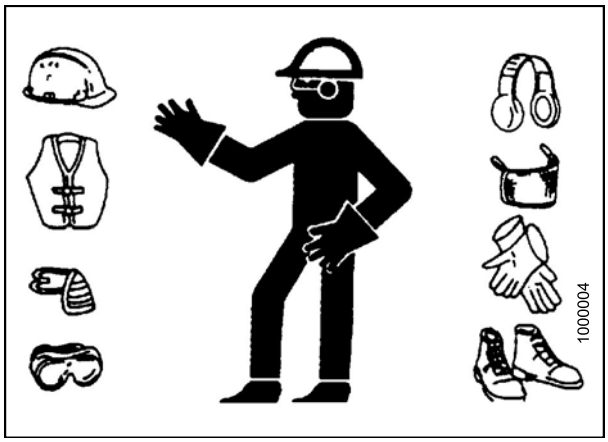

Figure 1.10: Safety Equipment

1.5 Hydraulic Safety

- Always place all hydraulic controls in Neutral before dismounting.
- Make sure that all components in the hydraulic system are kept clean and in good condition.
- Replace any worn, cut, abraded, flattened, or crimped hoses and steel lines.
- Do **NOT** attempt any makeshift repairs to the hydraulic lines, fittings, or hoses by using tapes, clamps, cements, or welding. The hydraulic system operates under extremely high pressure. Makeshift repairs will fail suddenly and create a hazardous and unsafe condition.

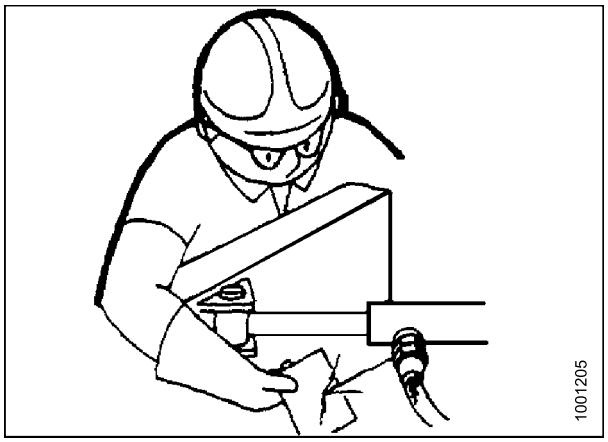

Figure 1.11: Testing for Hydraulic Leaks

- Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of cardboard as a backstop instead of hands to isolate and identify a leak.
- If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin.

Figure 1.12: Hydraulic Pressure Hazard

- Make sure all components are tight and that steel lines, hoses, and couplings are in good condition before applying pressure to a hydraulic system.

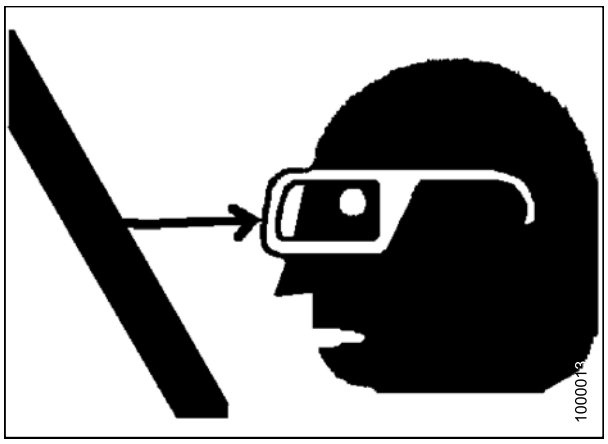

Figure 1.13: Safety Around Equipment

1.6 Tire Safety

- Follow proper procedures when mounting a tire on a wheel or rim. Failure to do so can produce an explosion that may result in serious injury or death.

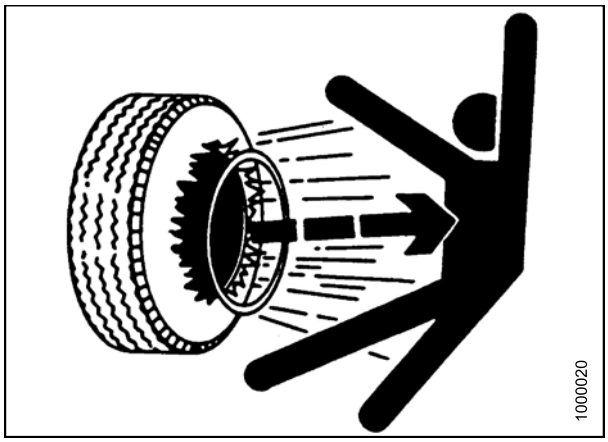

Figure 1.14: Overinflated Tire

- Do **NOT** attempt to mount a tire unless you have the proper training and equipment.
- Have a qualified tire dealer or repair service perform required tire maintenance.

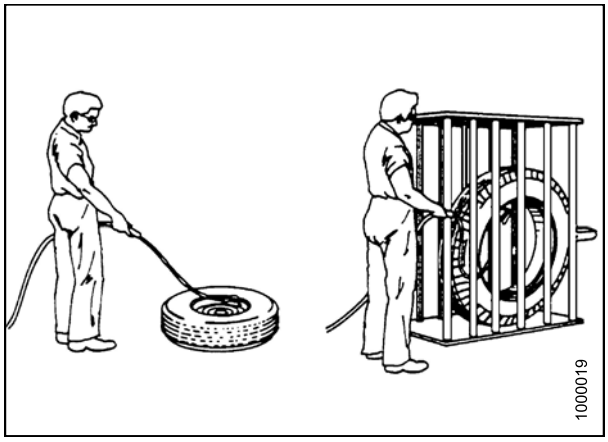

Figure 1.15: Safely Filling a Tire with Air

1.7 Safety Signs

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or become illegible.
- If original parts on which a safety sign was installed are replaced, be sure the repair part also bears the current safety sign.
- Safety signs are available from your Dealer Parts Department.

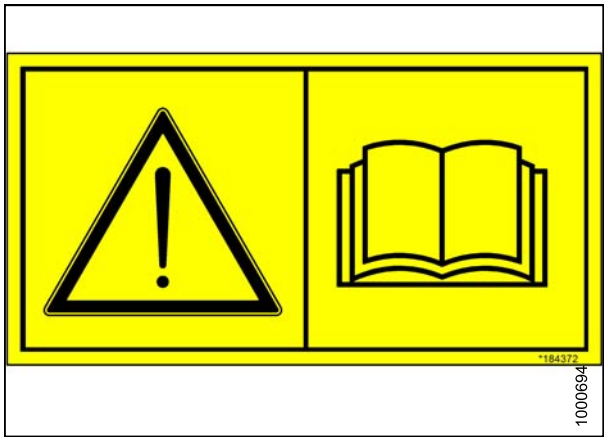

Figure 1.16: Operator's Manual Decal

1.7.1 Installing Safety Decals

1. Clean and dry the installation area.
2. Decide on the exact location before you remove the decal backing paper.
3. Remove the smaller portion of the split backing paper.
4. Place the sign in position and slowly peel back the remaining paper, smoothing the sign as it is applied.
5. Prick small air pockets with a pin and smooth out.

1.8 Locating Safety Sign Decals

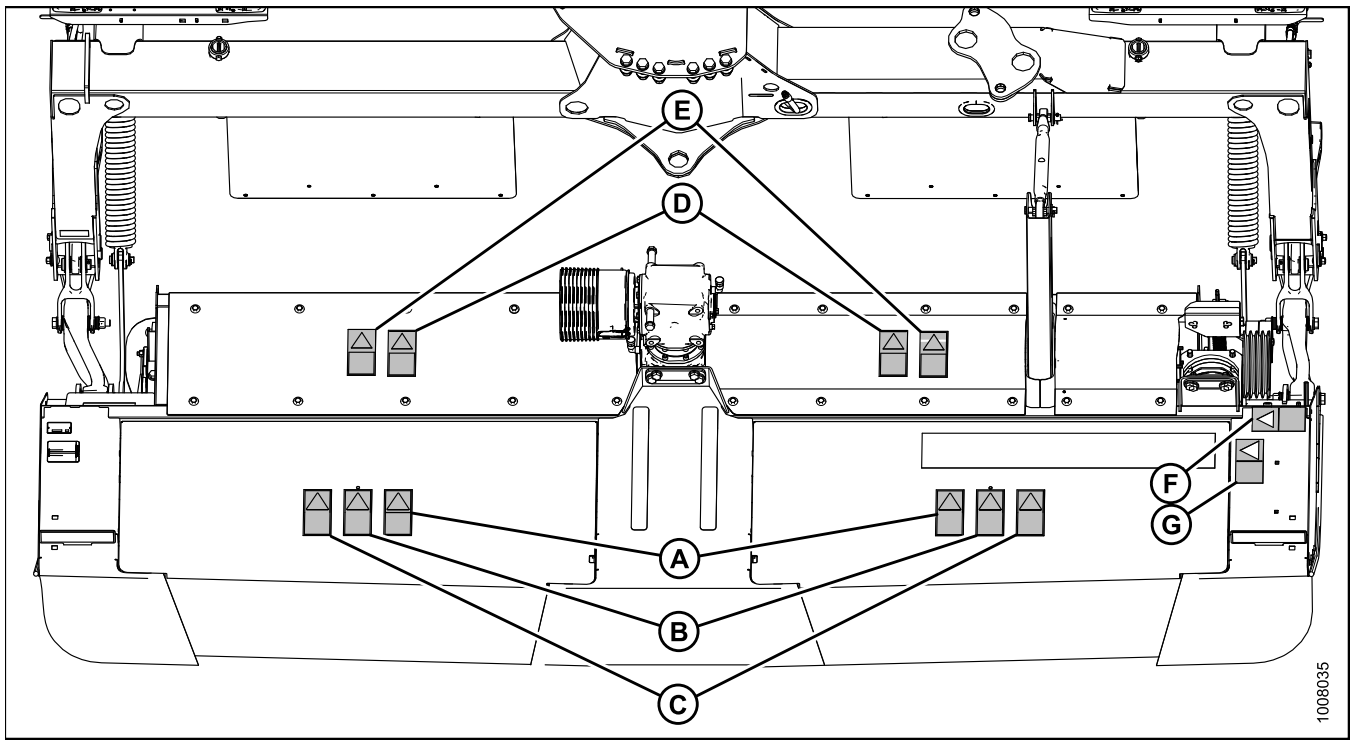

Figure 1.17: Safety Sign Decal Locations

A - MD #194466
B - MD #247167
C - MD #194465
D - MD #190546
E - MD #247166
F - MD #113482
G - MD #174474

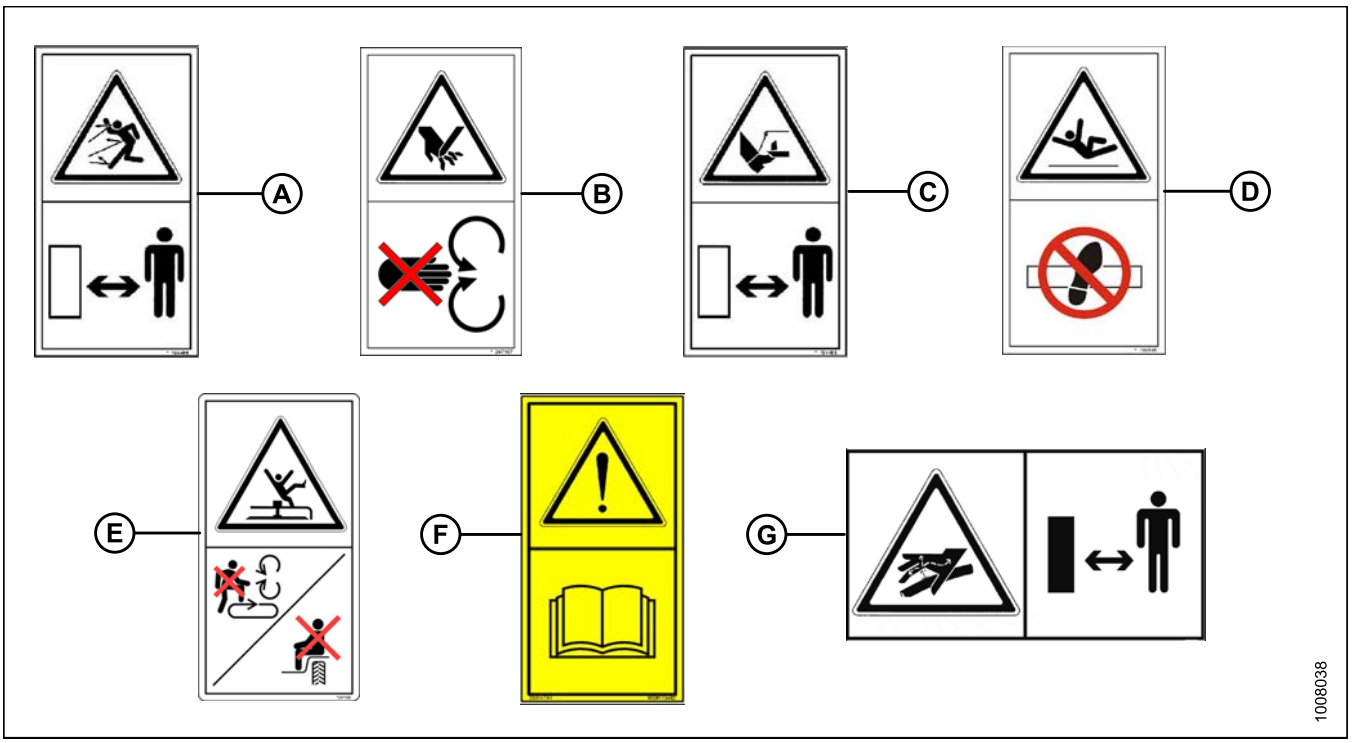

Figure 1.18: Safety Sign Decals

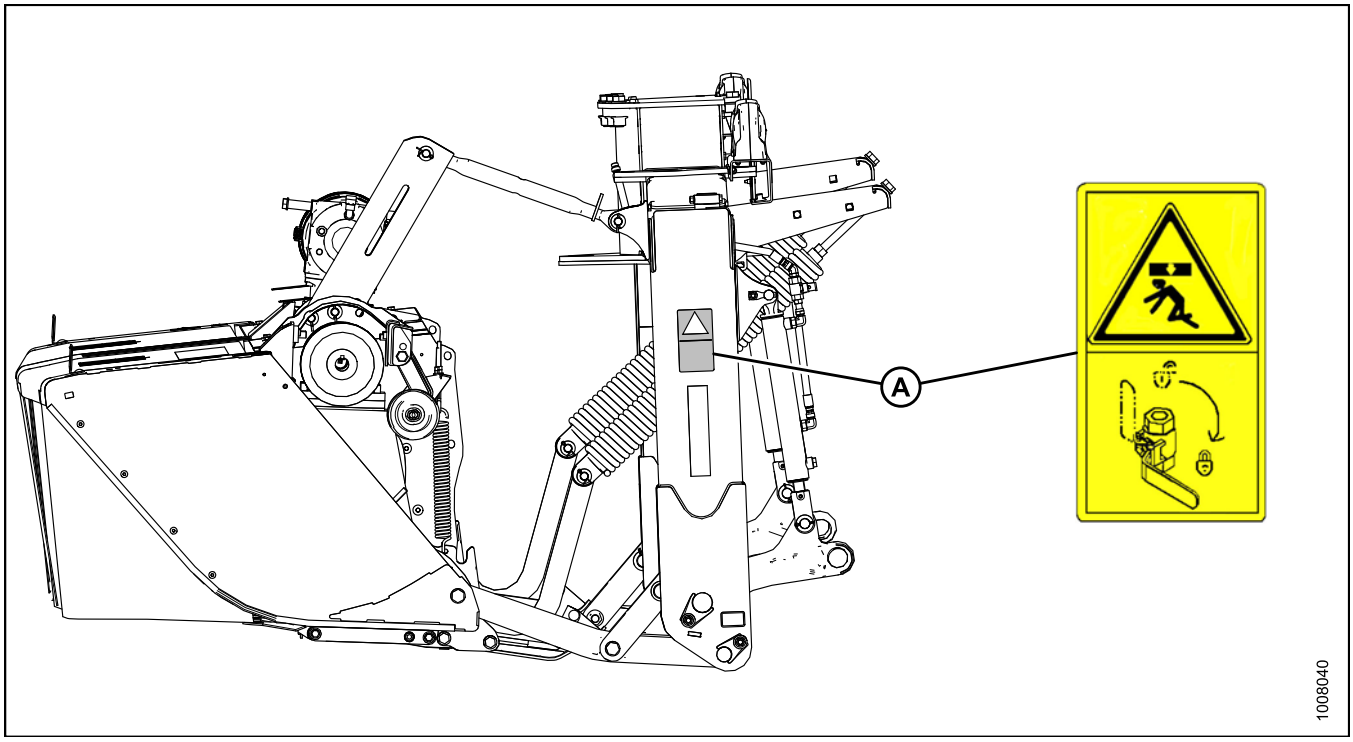

Figure 1.19: Safety Sign Decal Location

A - MD #171287

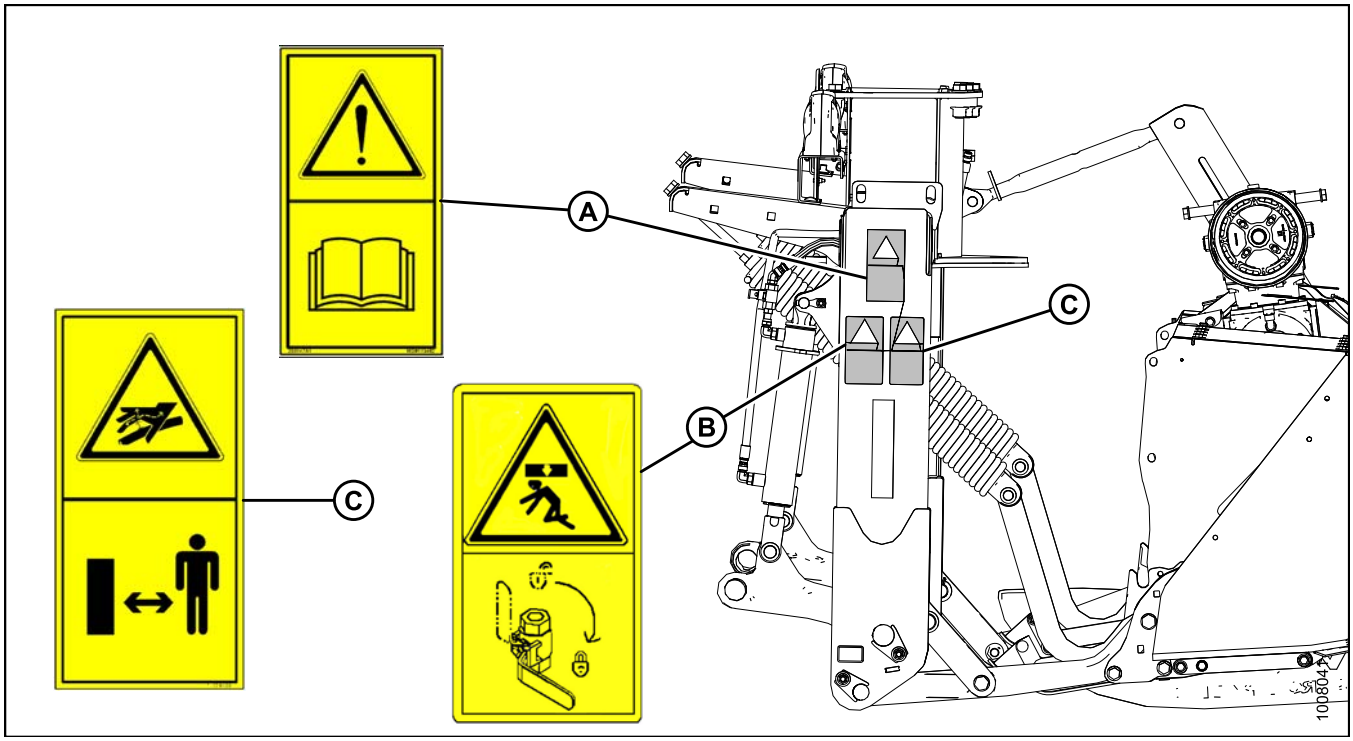

Figure 1.20: Safety Sign Decal Locations

A - MD #113482 **B - MD #171287** **C - MD #174436**

1.9 Understanding Safety Signs

NOTE:
This is a general list of safety sign definitions, and every decal may not necessarily be applied to your machine.

MD #113482

General hazard pertaining to machine operation and servicing.

CAUTION

- Read the operator's manual, and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
- Do not allow untrained persons to operate the machine.
- Review safety instructions with all Operators annually.
- Ensure that all safety signs are installed and legible.
- Make certain everyone is clear of machine before starting engine, and during operation.
- Keep riders off the machine.
- Keep all shields in place and stay clear of moving parts.
- Disengage mower conditioner drive, put transmission in Neutral, and wait for all movement to stop before leaving operator's position.
- Shut off engine and remove key from ignition before servicing, adjusting, lubricating, cleaning, or unplugging machine.
- Engage locks to prevent lowering of mower conditioner before servicing in the raised position.
- Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

Figure 1.21: MD #113482

MD #166466

Hydraulic Pressure Oil Hazard

CAUTION

- High pressure oil easily punctures skin causing serious injury, gangrene, or death.
- If injured, seek emergency medical help.
- Do not use finger or skin to check for leaks.
- Lower load or relieve hydraulic pressure before loosening fittings.

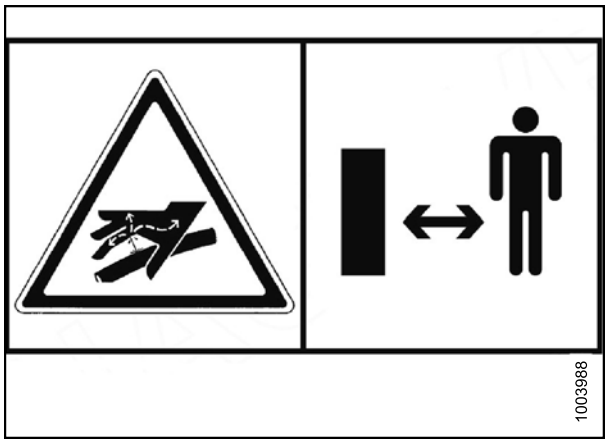

Figure 1.22: MD #166466

MD #171280

Lock pull-type (PT) hydraulic for transport

WARNING

- Charge cylinder with oil before towing.
- Rotate valve handle to lock in transport position.
- Maximum towing speed 20 mph (32 km/h).
- Failure to comply could result in death or serious injury.

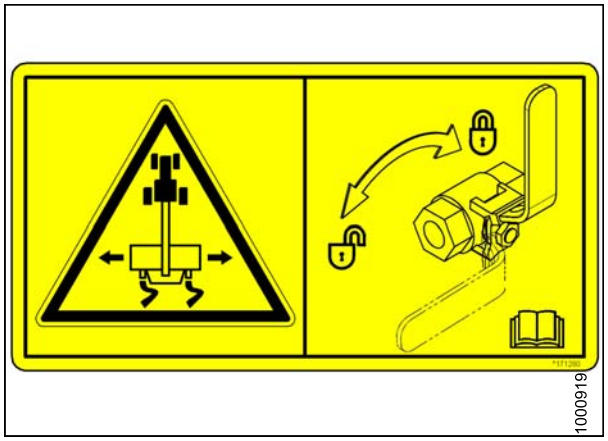

Figure 1.23: MD #171280

MD #171281

Hot fluid under pressure

CAUTION

- Coolant is under pressure and may be hot. Never remove radiator cap when engine is hot.

Figure 1.24: MD #171281

MD #174432

Raised reel hazard

WARNING

- To avoid injury from fall of raised reel—fully raise reel, stop engine, remove key, and engage mechanical lock on each reel support arm before working on or under reel.
- Refer to your operator's manual.

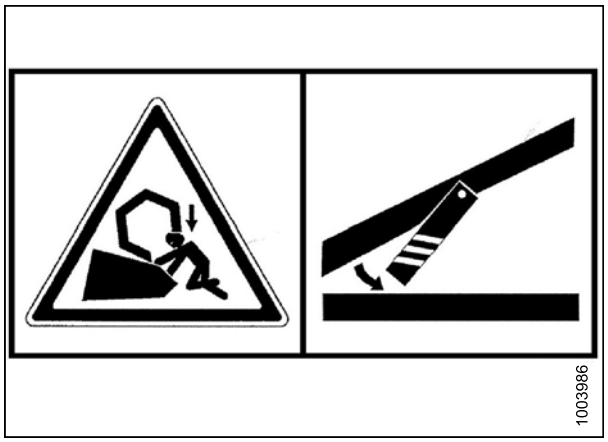

Figure 1.25: MD #174432

MD #174434

Raised mower conditioner hazard

DANGER

- Rest mower conditioner on ground or engage mechanical locks before going under unit.

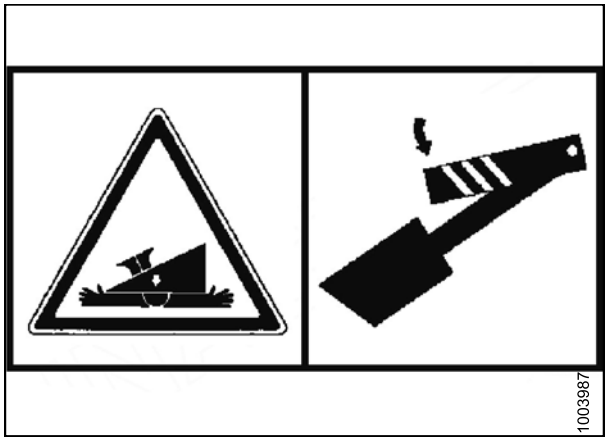

Figure 1.26: MD #174434

MD #174436

High pressure oil hazard

CAUTION

- High pressure oil easily punctures skin causing serious injury, gangrene, or death.
- If injured, seek emergency medical help. Immediate surgery is required to remove oil.
- Do not use finger or skin to check for leaks.
- Lower load or relieve hydraulic pressure before loosening fittings.

Figure 1.27: MD #174436

MD #174682

Auger entanglement hazard

CAUTION

- To avoid injury from entanglement with rotating auger, stand clear of mower conditioner while machine is running.

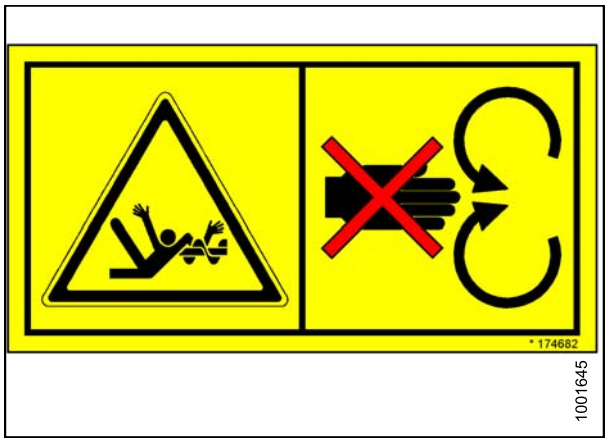

Figure 1.28: MD #174682

MD #184385

Entanglement hazard

CAUTION

- To avoid injury from entanglement with rotating auger, stand clear of while machine is running.

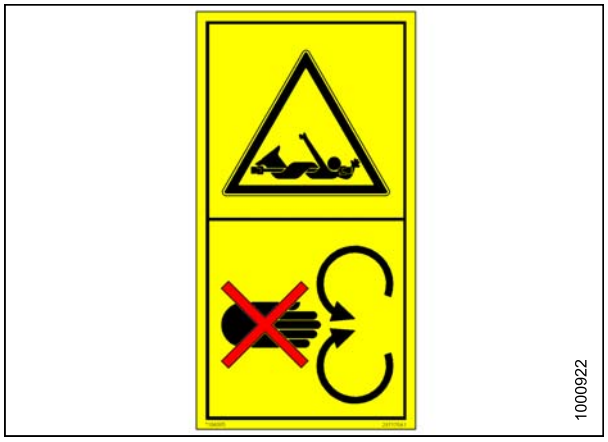

Figure 1.29: MD #184385

MD #184386

Pinch hazard

WARNING—KEEP AWAY

- Failure to comply could result in death or serious injury.

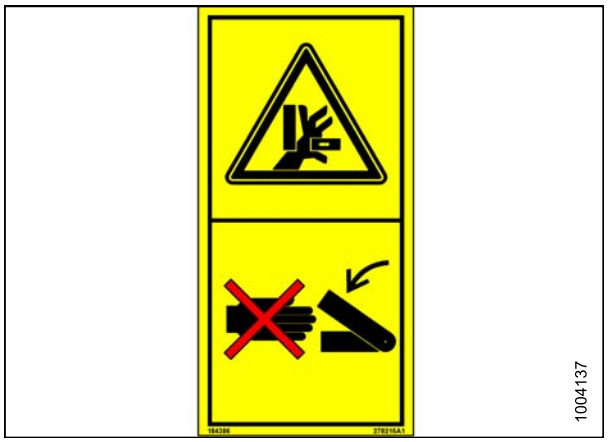

Figure 1.30: MD #184386

MD #190546

Slippery surface

WARNING—DON'T PLACE FOOT

- Do not use this area as a step or platform.
- Failure to comply could result in serious injury or death.

Figure 1.31: MD #190546

MD #194462

Engage lock

WARNING

- Engage safety lock before going under unit.
- Failure to comply could result in death or serious injury.

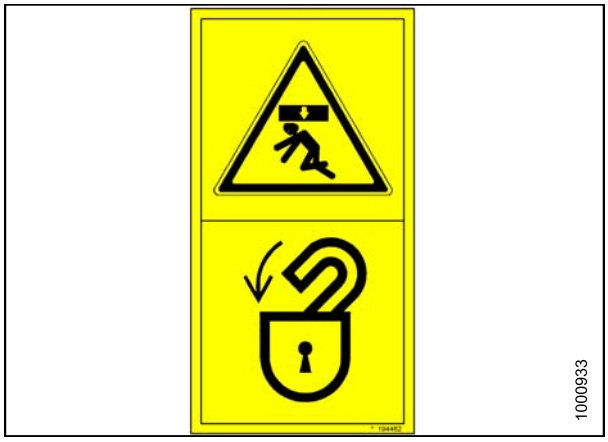

Figure 1.32: MD #194462

MD #194464

Shut down for service

WARNING

- Remove key from ignition.
- Read the mower conditioner and tractor manufacturer's manuals for inspection and maintenance instructions.

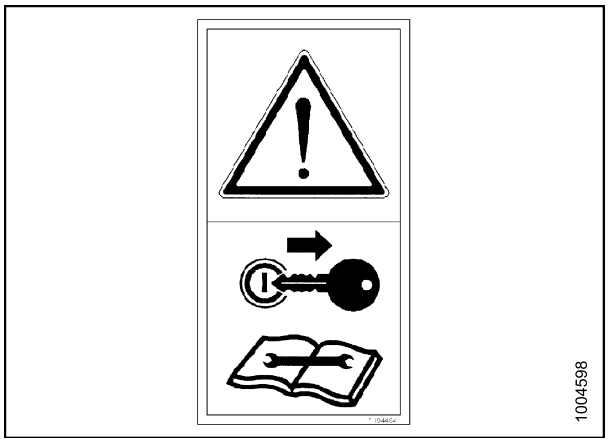

Figure 1.33: MD #194464

MD #194465

Rotating cutters

WARNING—STAND CLEAR

- Contact with blades or thrown objects can result in serious injury or death.
- Do not stand on or near machine when in operation.
- Do not operate with covers or curtains open or removed.
- Shut off tractor and remove key before opening covers.

Figure 1.34: MD #194465

MD #194466

Rotating fingers under hood

WARNING—STAND CLEAR

- Crop materials exiting at high speed.
- Stop machine, look, listen, and wait for all movement to stop before approaching.
- Failure to comply could result in death or serious injury.

Figure 1.35: MD #194466

MD #194521

Shield missing

WARNING

- Guard missing. Do not operate.
- Read the mower conditioner and tractor manufacturer's and manuals for inspection and maintenance instructions.
- Failure to comply will result in death or serious injury.

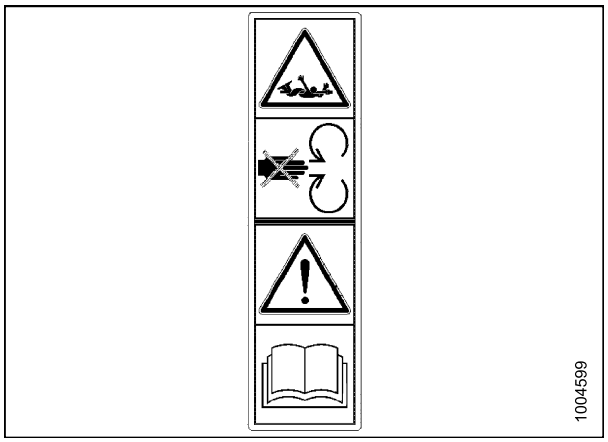

Figure 1.36: MD #194521

MD #247165

Moving into working/transport position hazard

WARNING

- To avoid injury, read the tractor and mower manufacturer's manuals before moving into either transport or working position.

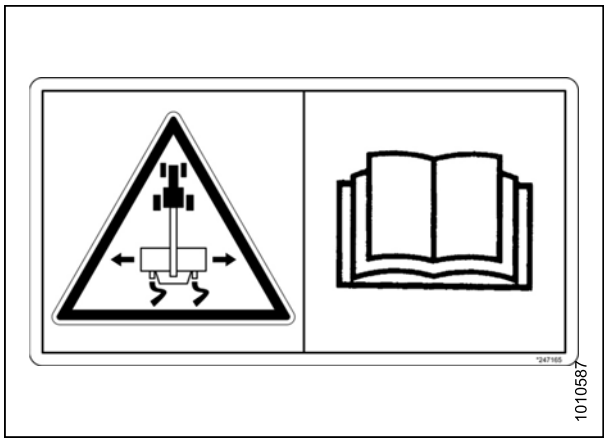

Figure 1.37: MD #247165

MD #247166

Moving implement hazard

WARNING

- To avoid injury, do not mount or ride machine while the machine is in motion.

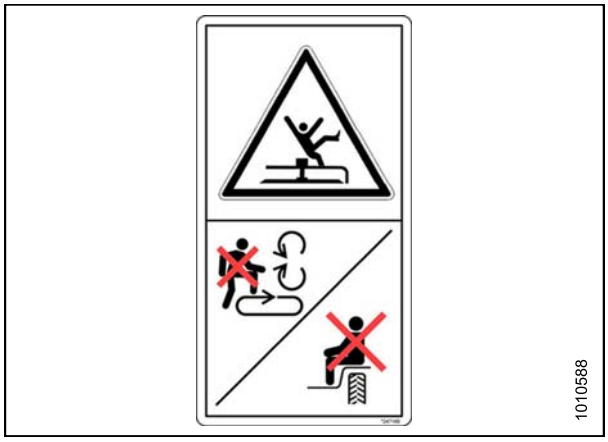

Figure 1.38: MD #247166

MD #247167

Rotating blades

WARNING

- Disengage power take-off, shut off tractor, and remove key before opening covers.
- Listen and look for evidence of rotation before lifting cover.
- Rotating cutters may continue to rotate after power is shut off due to inertia.

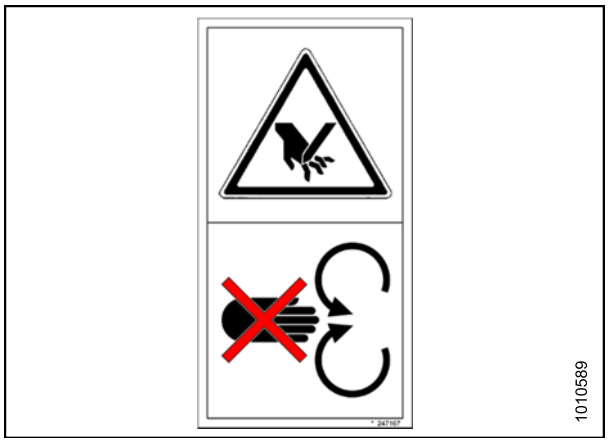

Figure 1.39: MD #247167

2 Reference

2.1 Owner/Operator Responsibilities

CAUTION

- **It is your responsibility to read and understand this manual completely before operating the mower conditioner. Contact your MacDon Dealer if an instruction is not clear to you.**
- **Follow all safety messages in the manual and on safety decals on the machine.**
- **Remember that YOU are the key to safety. Good safety practices protect you and the people around you.**
- **Before allowing others to operate the mower conditioner, for however short a time or distance, make sure they have been instructed in its safe and proper use.**
- **Review the manual and all safety related items with all Operators annually.**
- **Be alert for other Operators not using recommended procedures or not following safety precautions. Correct these mistakes immediately before an accident occurs.**
- **Do NOT modify the machine. Unauthorized modifications may impair the function and/or safety and affect machine life.**
- **The safety information given in this manual does not replace safety codes, insurance needs, or laws governing your area. Be sure your machine meets the standards set by these regulations.**
- **Ensure that the tractor is properly equipped to safely operate the mower conditioner. This may include adding ballast according to tractor operator's manual requirements for attachments of this size and mass.**

2.2 Operational Safety

CAUTION

Follow these safety precautions:

- **Follow all safety and operational instructions provided in your operator's manuals.**
- **Never attempt to start the engine or operate the machine except from the seat.**
- **Check the operation of all controls in a safe and clear area before starting work.**
- **Do NOT allow riders on the equipment.**

CAUTION

- **Never start or move the machine until you are sure all bystanders have cleared the area.**
- **Avoid travelling over loose fill, rocks, ditches, or holes.**
- **Drive slowly through gates and doorways.**
- **If possible, travel uphill or downhill when working on inclines. Be sure to keep transmission in gear while travelling downhill.**
- **Never attempt to get on or off a moving machine.**
- **Do NOT get off the tractor while the mower conditioner is in operation–stop forward movement of the tractor, and stop the power take-off.**
- **Stop tractor engine, and remove key before adjusting or removing plugged material from the machine. A child or even a pet could engage the drive.**
- **Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect the machine. Follow proper shutdown procedure shown in *3.13 Shutdown Procedure, page 59*.**
- **Operate only in daylight or good artificial light.**

CAUTION

- **Keep everyone several hundred feet away from your operation. Ensure bystanders are never in line with the front or rear of the machine. Stones or other foreign objects can be ejected with force from either end.**

Figure 2.1: MD #194466

2.3 Definitions

The following terms and abbreviations may be used in this manual:

Term	Definition
API	American Petroleum Institute
ASTM	American Society of Testing and Materials
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut.
Center-link	A hydraulic cylinder or turnbuckle type link between the mower conditioner and the carrier frame that tilts the mower conditioner.
Endwise Transport System	Kit available as a Dealer installed option that allows the mower conditioner to be towed on roadways while remaining within the legal width restrictions on most roads and highways.
Finger tight	Finger tight is a reference position where sealing surfaces or components are making contact with each other and the fitting has been tightened to a point where the fitting is no longer loose.
FFFT	Flats from finger tight
Hex key	A hex key or Allen key (also known by various other synonyms) is a tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in the head (internal-wrenching hexagon drive).
hp	Horsepower
Mower conditioner	A machine that cuts and conditions hay, and is pulled by an agricultural tractor.
n/a	Not applicable
NPT	National Pipe Thread: A style of fitting used for low pressure port openings. Threads on NPT fittings are uniquely tapered for an interference fit.
Nut	An internally threaded fastener that is designed to be paired with a bolt.
ORB	O-ring boss: A style of fitting commonly used in port opening on manifolds, pumps, and motors.
ORFS	O-ring face seal: A style of fitting commonly used for connecting hoses and tubes. This style of fitting also is commonly called ORS, which stands for O-ring seal.
PTO	Power Take-Off
Rotary mower conditioner	The part of the mower conditioner that cuts and conditions the crop.
rpm	Revolutions Per Minute
SAE	Society of Automotive Engineers
Screw	A headed and externally threaded fastener that threads into preformed threads or forms its own thread in one of the mating parts.
TFFT	Turns from finger tight

Torque	The product of a force X lever arm length, usually measured in foot-pounds (ft·lbf) or Newton-meters (N·m).
Torque angle	A tightening procedure where the fitting is assembled to a precondition (finger tight) and then the nut is turned further a number of degrees or a number of flats to achieve its final position.
Torque-tension	The relationship between the assembly torque applied to a piece of hardware and the axial load it induces in the bolt or screw.
Tractor	Agricultural type tractor.
Truck	A four-wheel highway/road vehicle weighing no less than 7,500 lb (3,400 kg).
Washer	A thin cylinder with a hole or slot located in the center and is to be used as a spacer, load distribution element, or a locking mechanism.

2.4 Component Identification

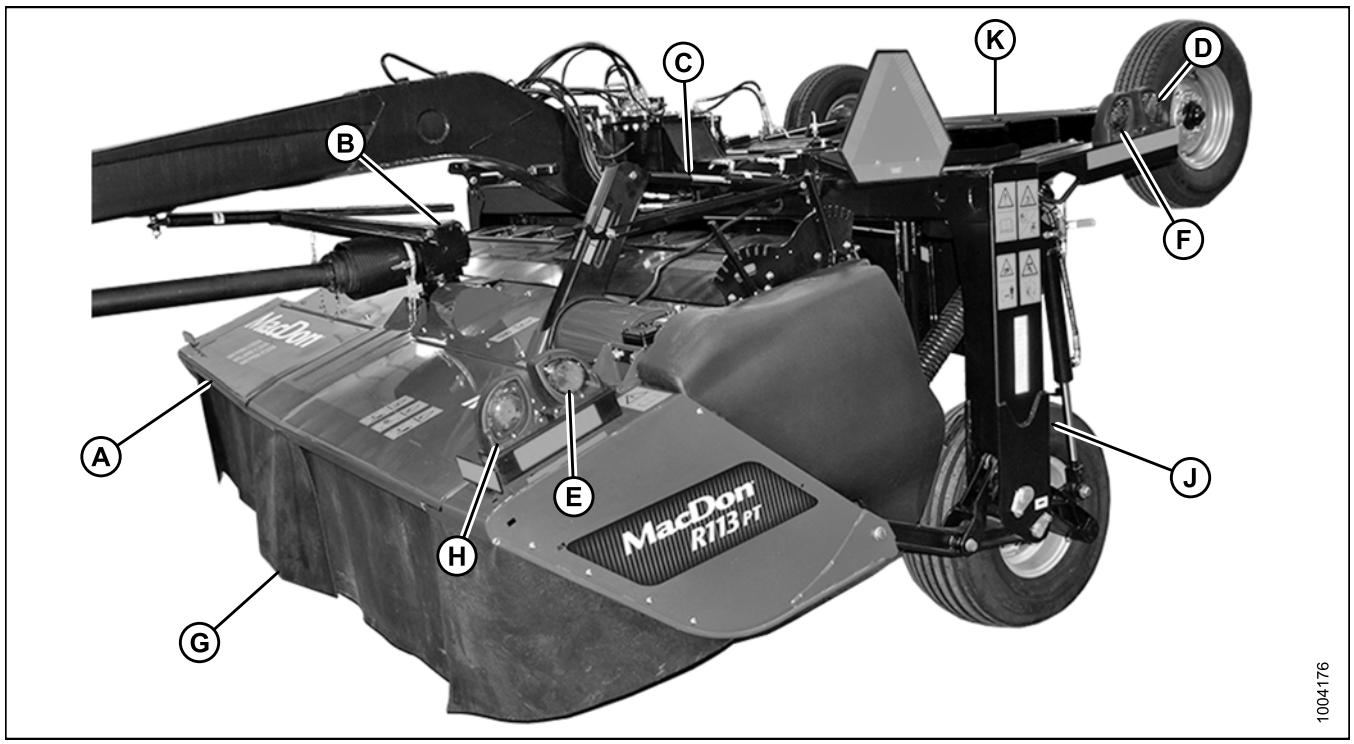

Figure 2.2: Mower with Finger Conditioner

A - Cutterbar Door
B - Rear Swivel Gearbox
C - Center-Link
D - Amber Hazard/Turn Signal Light
E - Red Tail/Brake Light
F - Red Tail/Brake Light
G - Front Curtains
H - Amber Hazard/Turn Signal Light
J - Carrier Frame
K - Optional Endwise Transport System

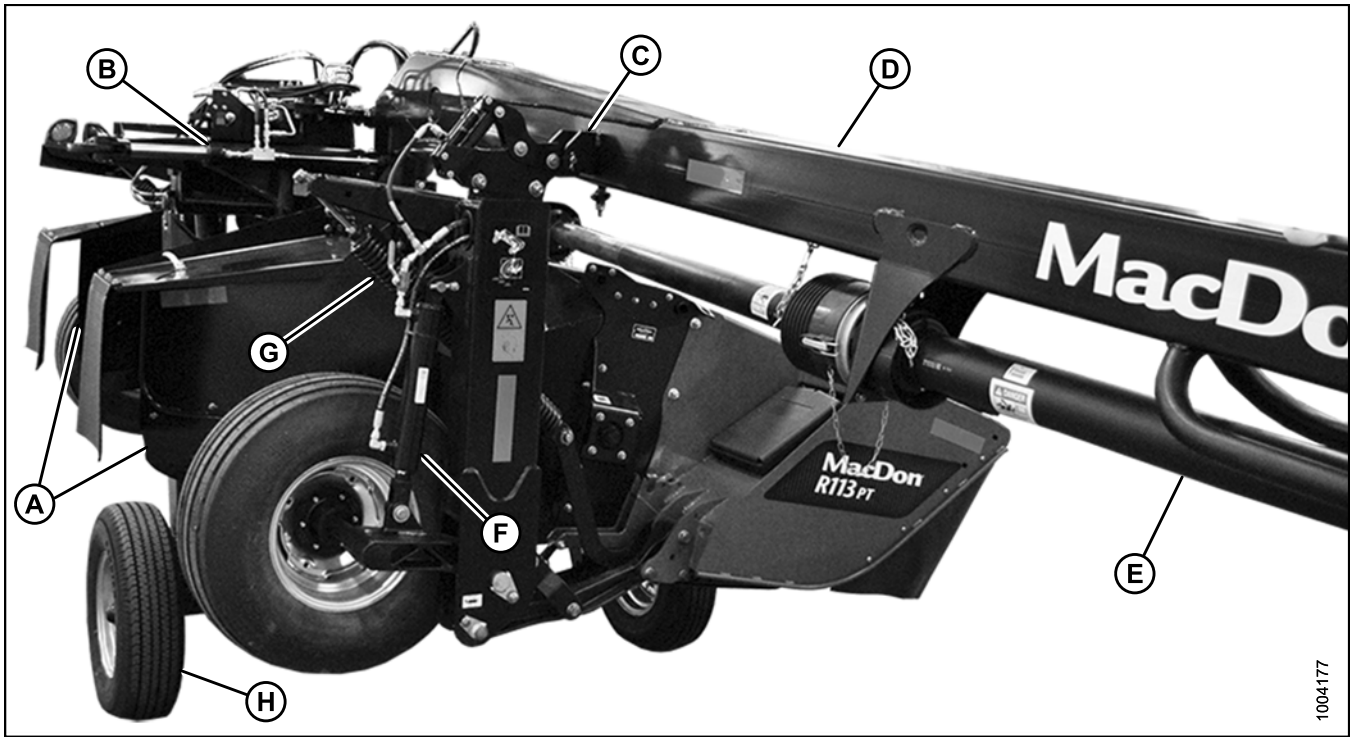

Figure 2.3: Mower with Finger Conditioner

A - Side Deflector
B - Steering Cylinder
C - Transport Latch
D - Articulated Power Turn (APT) Hitch
E - Driveline
F - Lift Cylinder
G - Float Spring
H - Optional Endwise Transport Deployed

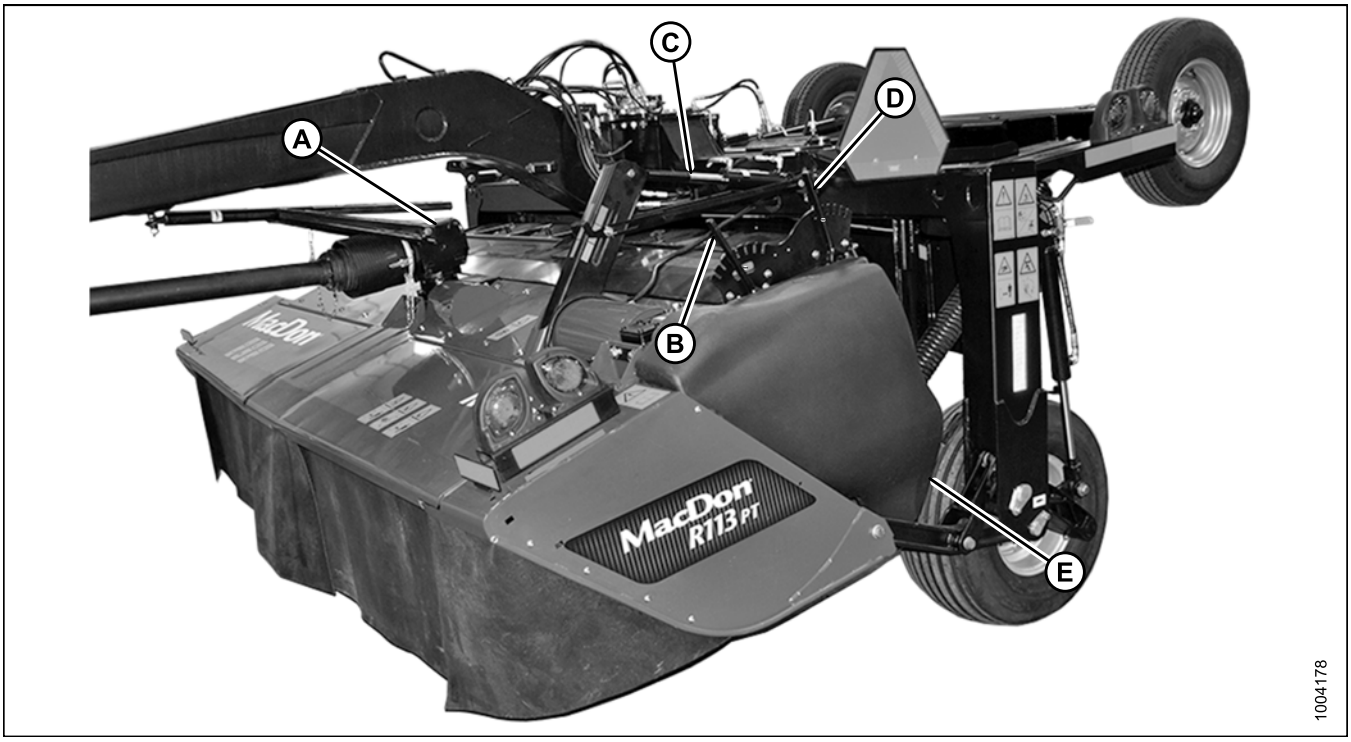

Figure 2.4: Mower with Finger Conditioner

A - Rear Swivel Gearbox
B - Forward Baffle Control
C - Hydraulic Center-Link
D - Rear Deflector Control
E - Driveshield

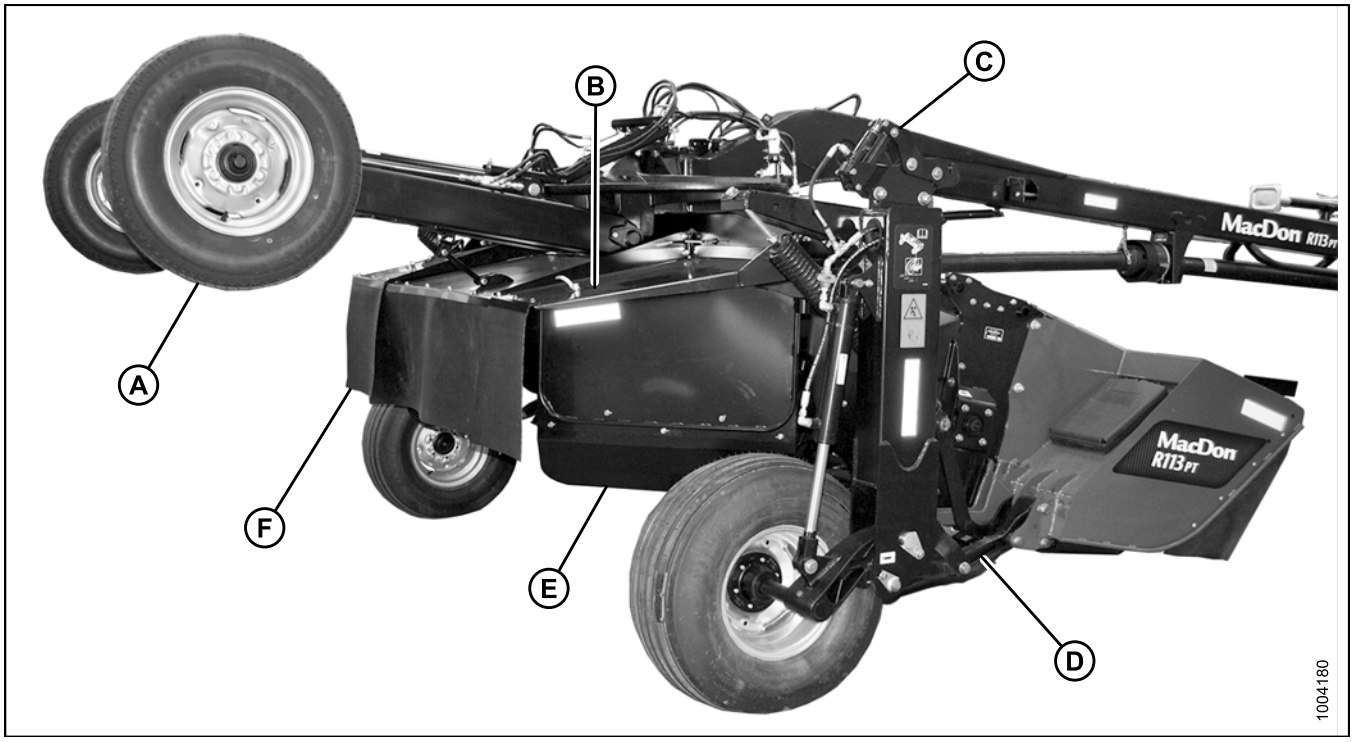

Figure 2.5: Mower with Finger Conditioner

A - Optional Endwise Transport **B - Forming Shield Cover** **C - Transport Latch**
D - Skid Shoe **E - Side Deflector** **F - Rear Curtain**

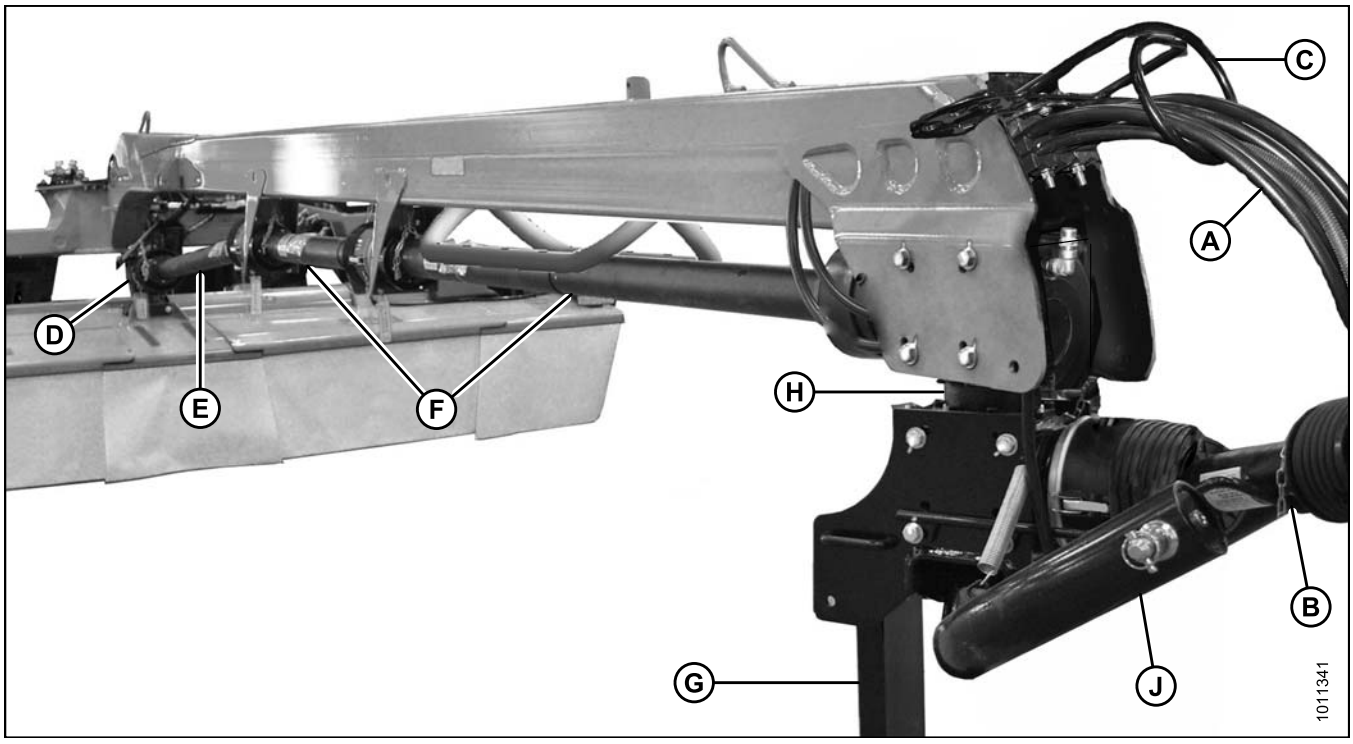

Figure 2.6: Hitch and Driveline

A - Control Hoses **B - Primary Driveline** **C - Hose Support** **D - Rear Swivel Gearbox** **E - Clutch Driveline**
F - Hitch Driveline **G - Jack** **H - Forward Swivel Gearbox** **J - Two-Point Hitch**

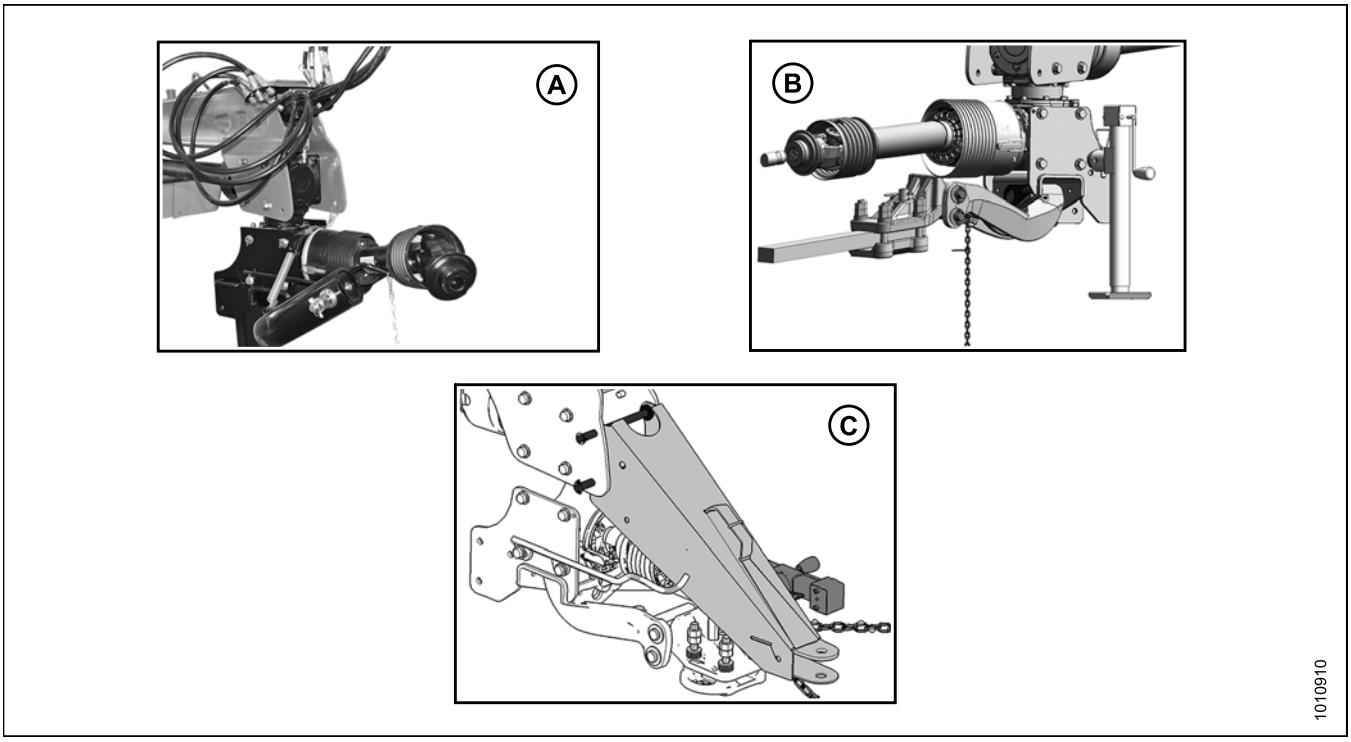

Figure 2.7: Hitch Options

A - Tractor Two-Point Hitch Adapter **B - Tractor Drawbar Hitch Adapter** **C - Truck Transport Hitch Adapter**

2.5 Product Specifications

NOTE:
Specifications and design are subject to change without notice or obligation to revise previously sold units.

Table 2.1 Mower Conditioner Specifications

Components		13-Foot	16-Foot
Frame and Structure			
Transport Width	without ETO[1]	13 ft.-4 in. (4063 mm)	16 ft.-6 in. (5027 mm)
	with ETO[2]	8 ft.-9 in. (2743 mm)	
Transport Length	without ETO	27 ft.-6 in. (8382 mm)	28 ft.-3 in. (8610)
	with ETO	32 ft.-7 in. (8382 mm)	33 ft.-4 in. (10,160 mm)
Estimated Weight	without ETO	5440 lb (2470 kg)	6550 lb (2974 kg)
	with ETO	6190 lb (2810 kg)	7300 lb (3314 kg)
Carrier		Pull-type	
Lighting		Two red tail-lights and two amber signal/hazard lights	
Tires	Carrier	15 in. / 31 x 13.5–15 NHS 8 ply field tires	
	ETO	ST235/80 R16 LR E	
Tread Width	without ETO	12 ft.-1 in. (3682 mm)	
	with ETO	7 ft.-11 in. (2413 mm)	
Manual Storage		Plastic case on mower conditioner right end backsheet	
Cutterbar			
Quantity of Cutting Discs		8	10
Knives per Disc		Two 11 degrees bevel down reversible	
Disc Speed		2652 rpm	
Knife Tip Speed Range		188 mph (84.7 m/s)	
Effective Cutting Width		156-5/8 in. (3978 mm)	194-5/8 in. (4942 mm)
Cutting Height		1-1/16 in. (27 mm)	
Cutting Angle Range		0–7 degrees below horizontal	
Skid Shoes		Two adjustable	Four adjustable
Geartrain Protection		Shearable disc spindles	
Deflectors		Two drum-type converging	Four drum-type converging
Drives			
Tractor PTO		1-3/8 in. (35 mm) dia. 21 spline, or 1-3/4 in. (44 mm) dia. 20 spline	
Mechanical		Gearbox and driveline	
Conditioner: Roll Type			
Drive		4HB belt driven enclosed timing gearbox and driveline	

1. Endwise Transport Option
2. Without crop dividers

Components		13-Foot	16-Foot
Conditioner System		Intermeshing rolls (steel or polyurethane)	
Conditioner Speed		900 rpm	
Length of Rolls		10 ft.–9 in. (3275 mm)	
Roll Diameter			
Intermeshing Steel Bars		9 in. (229 mm) / 7 in. (179 mm) tube	
Intermeshing Polyurethane Bars		10 in.. (254 mm) / 8 in. (203 mm) tube	
Swath Width		36–114 in. (915–2896 mm)	
Forming Shields		Carrier mounted assembly with adjustable side deflectors	
Conditioner: Finger Type			
Drive		4HB belt driven	
Conditioner System		V-shaped tines on rotating drum	
Conditioner Speed		896[3] rpm	
Rotor Length		10 ft.-9 in. (3275 mm)	
Rotor Diameter		25-1/2 in. (648 mm) / 6 in. (152 mm) tube	
Swath Width		36–114 in. (915–2896 mm)	
Forming Shields		Carrier mounted assembly with adjustable side deflectors	
Ground Speed			
Recommended Cutting		5–10 mph (8–15 km/h)	
Recommended Transport		20 mph (30 km/h)	
Tractor Requirements			
PTO Power - Minimum		100 hp (74 kW)	125 hp (93 kW)
Hydraulics[4]	Pressure	2000 psi (13.71 MPa)	
	Controls	Two double-acting / One single-acting[5]	
Hitch		Draw bar, two-point, or quick attach	

NOTE:
Tractor must be equipped with a cab.

3. Can be set to 600 rpm by interchanging the pulleys.
4. Endwise Transport System option uses same hydraulic circuit as hitch swing.
5. Single-acting header lift circuit is converted to double-acting when Endwise Transport System option is installed.

3 Operation

3.1 Lift Cylinder Lock-Out Valves

Engaging lift cylinder lock-out valves before servicing, repairing, or unplugging your machine will prevent unintentional raising or lowering of the mower conditioner.

3.1.1 Engaging Locks

WARNING

To avoid bodily injury or death from fall of raised machine, always lock out lift cylinders before going under mower conditioner for any reason.

IMPORTANT:
Connect hoses so that moving the cylinder control lever backward raises the mower conditioner, and moving the cylinder control lever forward lowers the mower conditioner. Refer to *3.8.3 Connecting Hydraulics, page 49* for more information.

1. Move cylinder control lever (A) backward to position (B) to fully raise machine.

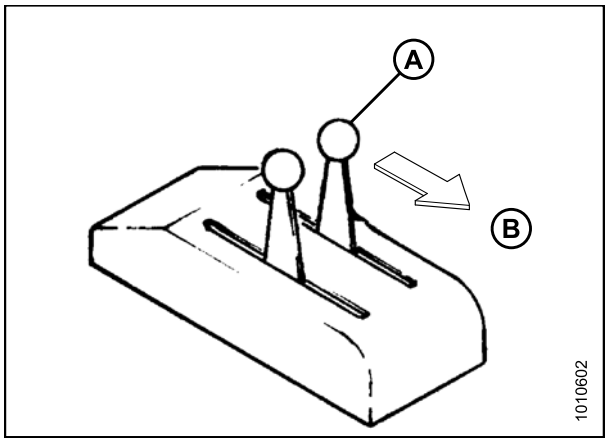

Figure 3.1: Tractor Cylinder Control Lever

2. Close the lock-out valve (A) on each lift cylinder by turning the handle to the horizontal position.

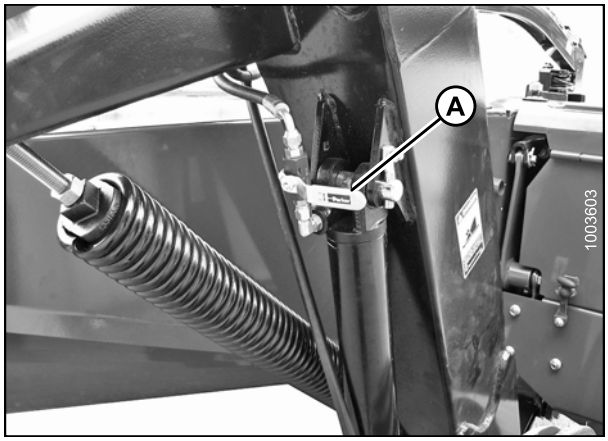

Figure 3.2: Cylinder Lock-Out Valve

3.1.2 Disengaging Locks

1. Open the lock-out valve (A) on each lift cylinder by turning the handle to the vertical position.

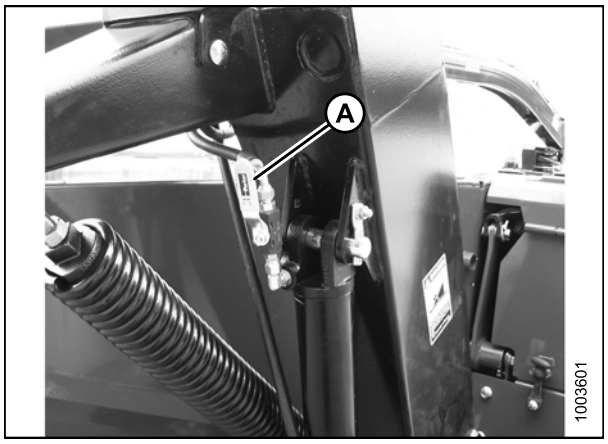

Figure 3.3: Cylinder Lock-Out Valve

2. Move cylinder control lever (A) forward to position (B) to lower machine.

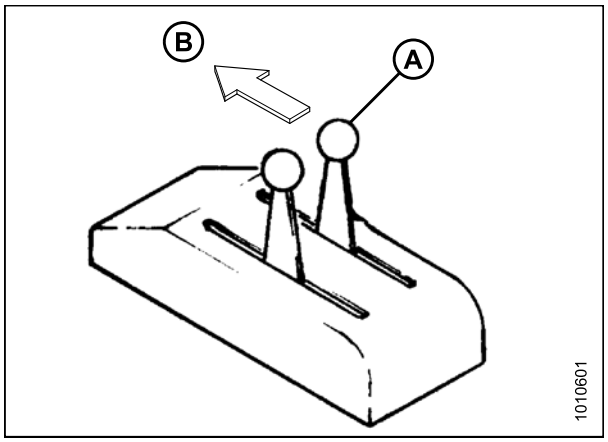

Figure 3.4: Tractor Cylinder Control Lever

3.2 Driveshields

3.2.1 Opening Driveshields

CAUTION

Do NOT operate the machine without the driveshields in place and secured.

NOTE:
Images shown are for left side driveshield—right side driveshield is similar.

1. Remove lynch pin (A) and tool (B) from pin (C).

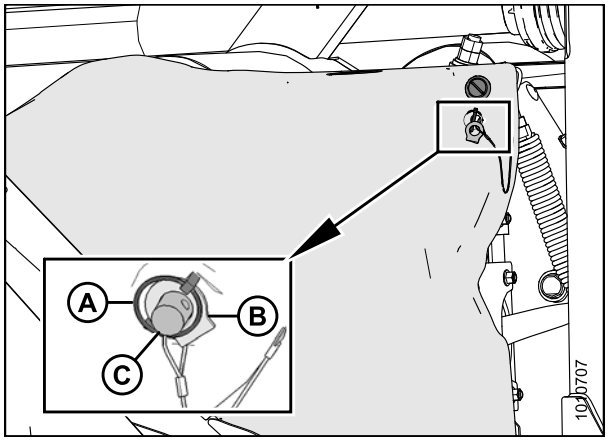

Figure 3.5: Driveshield

2. Insert flat end of tool (A) into latch (B) and turn it counterclockwise to unlock.

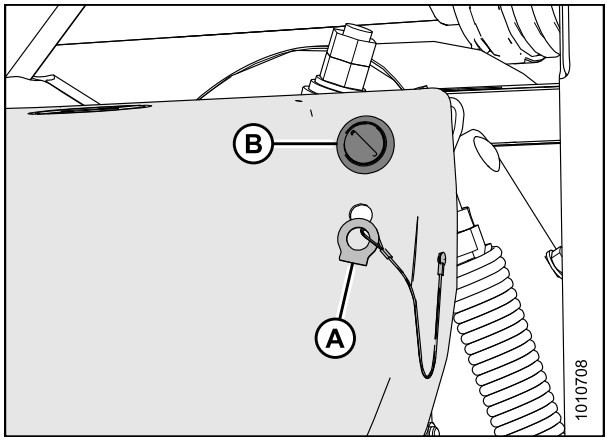

Figure 3.6: Driveshield Latch

3. Pull top of driveshield (A) away from mower conditioner to open.

   NOTE:
   For improved access, lift driveshield off the pins at the base of the shield, and lay the shield on the mower conditioner.

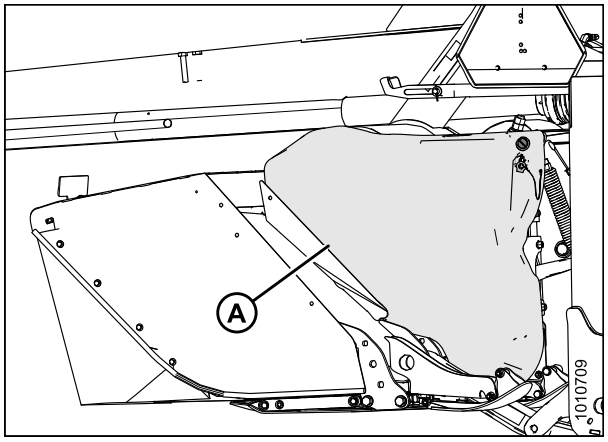

Figure 3.7: Driveshield

3.2.2 Closing Driveshields

⚠ CAUTION

Do NOT operate the machine without the driveshields in place and secured.

NOTE:
Images shown are for left side driveshield—right side driveshield is similar.

1. Position driveshield onto pins at base of driveshield (if necessary).
2. Push driveshield (A) to engage latch (B).
3. Check that driveshield is properly secured.

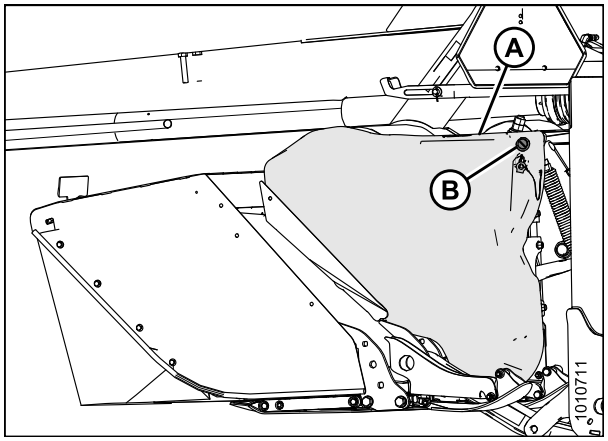

Figure 3.8: Driveshield and Latch

4. Replace tool (B) and lynch pin (A) on pin (C).

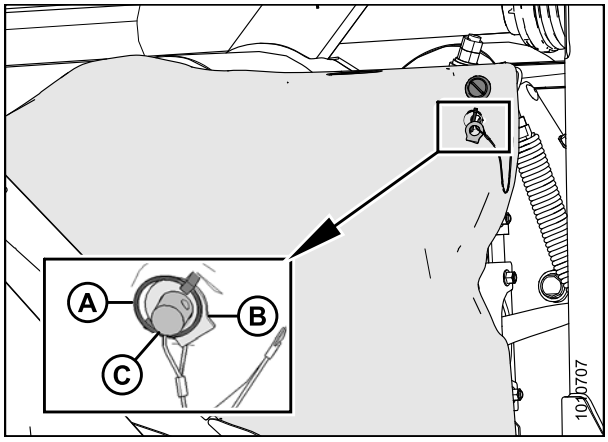

Figure 3.9: Tool to Unlock Driveshield

3.3 Driveline Shield Cone

3.3.1 Removing Driveline Shield Cone

WARNING

Do NOT operate the machine without the driveline shield cones in place and the lever clamps securely fastened.

1. Release two lever clamps (A) using a screwdriver or similar prying tool.
2. Unhook safety chain (B) from hitch, and ensure that chain is secured to the shield cone and metal plate.

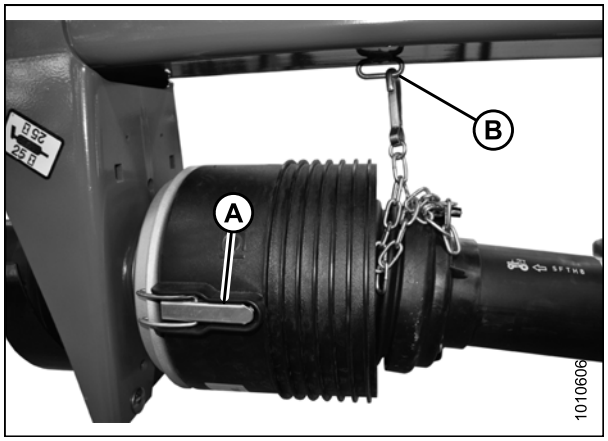

Figure 3.10: Driveline Shield Cone and Lever Clamp

3. Remove shield cone from metal plate (A) and slide cone along drive shaft.

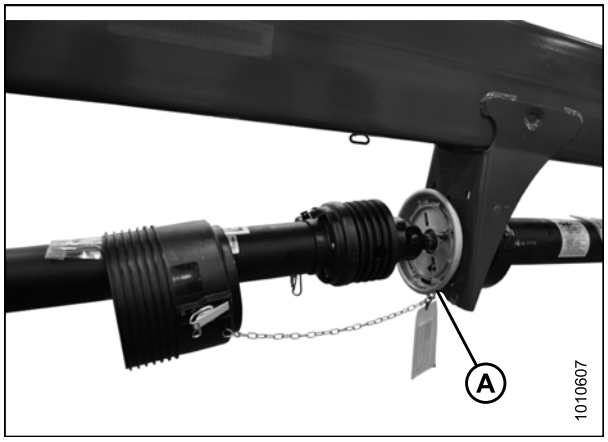

Figure 3.11: Driveline Shield Cone Removed from Metal Plate

3.3.2 Installing Driveline Shield Cone

WARNING

Do NOT operate the machine without the driveline shield cones in place and the lever clamps securely fastened.

1. Slide shield cone along drive shaft until it is seated in metal plate (A).

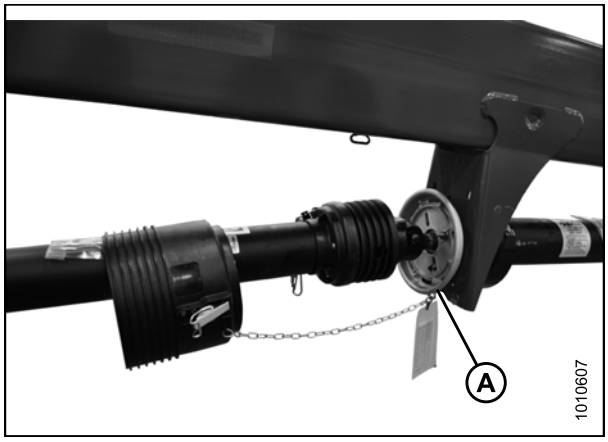

Figure 3.12: Driveline Shield Cone Removed from Metal Plate

2. Securely fasten two lever clamps (A) to metal plate (B).
3. Attach safety chain (C) to hitch, and ensure that chain is secured to the shield cone and metal plate.

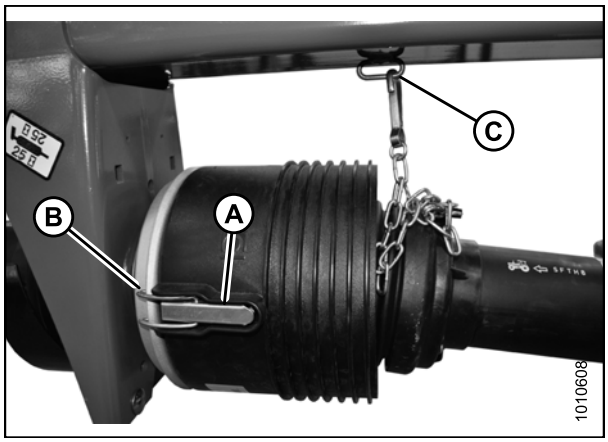

Figure 3.13: Driveline Shield Cone and Lever Clamp

3.4 Cutterbar Doors

WARNING

Do NOT operate the machine without all the cutterbar doors down or without curtains installed and in good condition.

There are two doors (A) that provide access to the cutterbar area.

Rubber outboard curtains (B) are attached to each front corner, and an inboard curtain (C) is installed at the center fixed cover location. Always keep these curtains down when operating the mower conditioner.

IMPORTANT:
Replace curtains if they become worn or damaged. Refer to *4.5.6 Curtains, page 160* or contact your Dealer for replacement instructions.

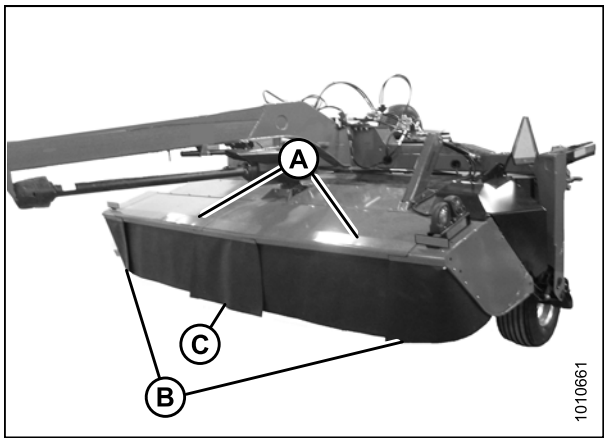

Figure 3.14: Cutterbar Doors and Curtains

3.4.1 Opening Cutterbar Doors

1. Lift door at front to move to open position.

   NOTE:
   Center header beneath hitch to open both doors.

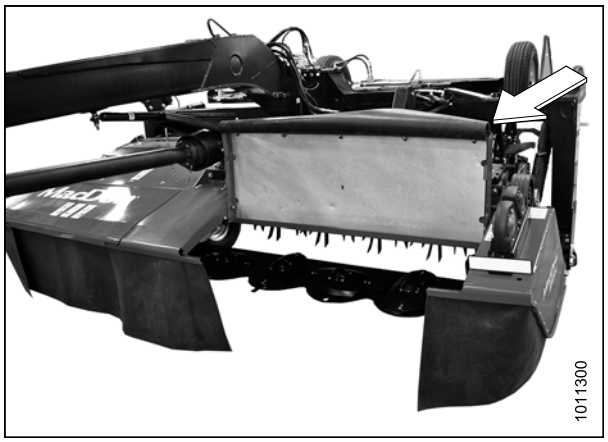

Figure 3.15: Open Cutterbar Door

3.4.2 Closing Cutterbar Doors

CAUTION

To avoid injury, keep hands and fingers away from corners of doors when closing.

1. Pull door at top to move to closed position.

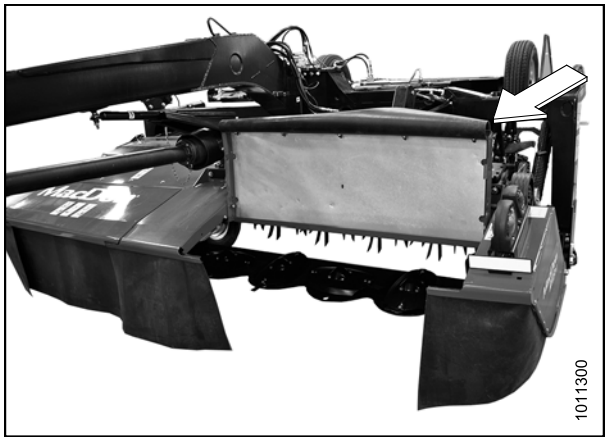

Figure 3.16: Cutterbar Door

2. Ensure that curtains hang properly and completely enclose cutterbar area.

Figure 3.17: Cutterbar Doors in Closed Position

3.5 Daily Startup Check

Perform the following checks each day before startup:

CAUTION

- **Ensure tractor and mower conditioner are properly attached, all controls are in neutral, and tractor brakes are engaged.**
- **Clear the area of other persons, pets etc. Keep children away from machinery. Walk around the mower conditioner to make sure no one is under, on, or close to it.**
- **Wear close fitting clothing and protective shoes with slip resistant soles. As well, carry with you any protective clothing and personal safety devices that could be necessary throughout the day. Don't take chances.**
- **Remove foreign objects from the machine and surrounding area.**

Protect yourself. You may need the following:

- A hard hat
- Protective footwear with slip resistant soles
- Protective glasses or goggles
- Heavy gloves
- Wet weather gear
- A respirator or filter mask

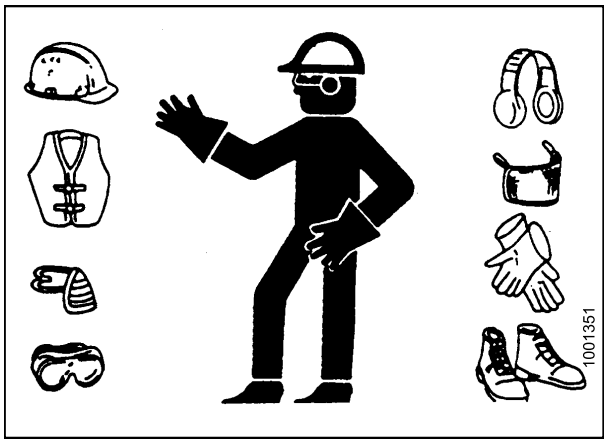

Figure 3.18: Safety Equipment

Hearing protection

- Be aware that exposure to loud noise can cause impairment or loss of hearing. Wear suitable hearing protection devices such as ear muffs or ear plugs to help protect against objectionable or loud noises.

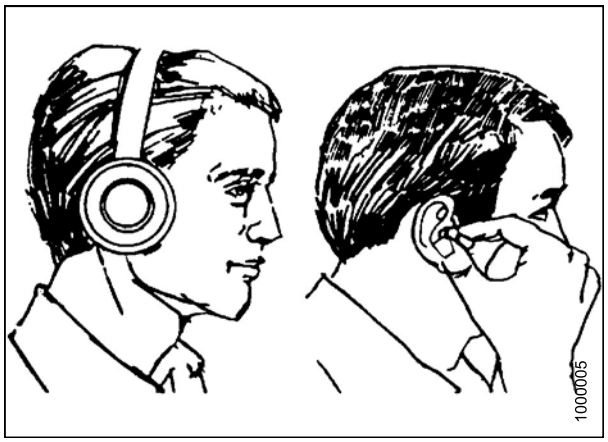

Figure 3.19: Safety Equipment

1. Check the machine for leaks or any parts that are missing, broken, or not working correctly.

   NOTE:
   Use proper procedure when searching for pressurized fluid leaks. Refer to *4.7.1 Hydraulic Hoses and Lines, page 224*.

2. Clean all lights and reflective surfaces on the machine, and check lights for proper operation.
3. Perform all daily maintenance. Refer to *4.4.1 Maintenance Schedule/Record, page 121*.

3.6 Preparing Tractor for Mower Conditioner

3.6.1 Tractor Requirements

Table 3.1 Tractor Requirements

Mower Width	Minimum Power	Minimum Drawbar Capacity	Minimum Hydraulics
13-Foot	100 hp (75 kW)	In accordance with ASAE	2000 psi (13.7 MPa)
16-Foot	125 hp (93 kW)		

NOTE:
Tractor must be equipped with a seven-terminal outlet to supply power to the mower conditioner's hazard lights.

NOTE:
Static vertical load on drawbar is 2000 lb. (907 kg).

3.6.2 Adjusting the Drawbar

CAUTION

Shut off tractor, engage parking brake, and remove key before working around hitch.

1. Adjust tractor drawbar to meet the specifications listed in Table *3.2 ASAE Standard A482 Specifications, page 42*.
2. Secure the tractor drawbar so the hitch-pin hole is directly below the driveline.

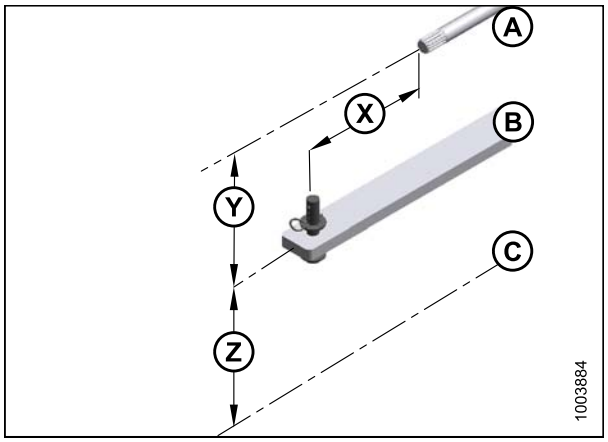

Figure 3.20: Tractor Drawbar Adjustments

A - PTO **B - Tractor Drawbar** **C - Ground**
X - Dimension X **Y - Dimension Y** **Z - Dimension Z**

Table 3.2 ASAE Standard A482 Specifications

Dimension	1000 rpm Power Take-Off	
	1-3/8 in. Diameter	1-3/4 in. Diameter
X	16 in. (406 mm)	20 in. (508 mm)
Y	7-7/8–13-3/4 in. (200–350 mm) **8 in. (203 mm) recommended**	
Z	13–17 in. (330–432 mm) **16 in. (406 mm) recommended**	

3.7 Setting Up the Mower Conditioner Hitch

MacDon R113 and R116 mower conditioners are shipped from the factory fitted for either a drawbar or two-point hitch, and your Dealer will have installed the proper hitch adapter for your tractor. The procedure for installing the drawbar hitch adapter onto the tractor drawbar is described in the following section.

3.7.1 Installing Drawbar Hitch Adapter

CAUTION

Shut off tractor, engage parking brake, and remove key before working around hitch.

1. Remove hairpin (F) and pin (E) so that drawbar adapter assembly can drop free from casting.
2. If necessary, loosen four jam nuts (A), and then loosen four nuts (B) so that hitch adapter (C) will slide onto tractor drawbar (D).
3. Align hole in adapter (C) with hole in drawbar (D) and install pin (E) from underside. Secure with hairpin (F).
4. Gradually tighten the four nuts (B) to 400 ft·lbf (540 N·m).

   NOTE:
   Ensure hardened nuts supplied with adapter are used.

5. Tighten four jam nuts (A).

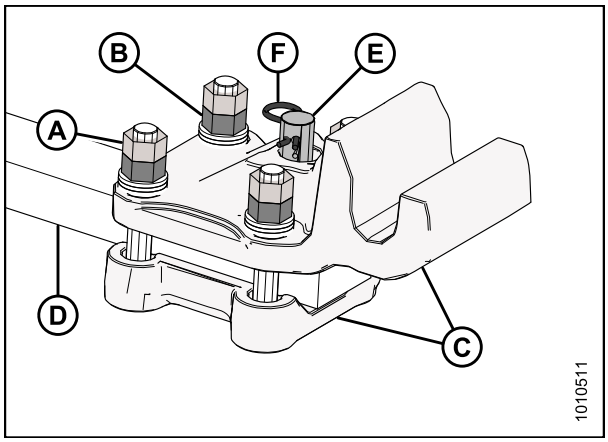

Figure 3.21: Drawbar Hitch Adapter

3.8 Attaching Mower Conditioner to the Tractor

3.8.1 Attaching with Drawbar Hitch

CAUTION

Shut off tractor, engage parking brake, and remove key before working around hitch.

1. Remove lynch pin (A) from clevis pin (B), and remove clevis pin from mower conditioner hitch.

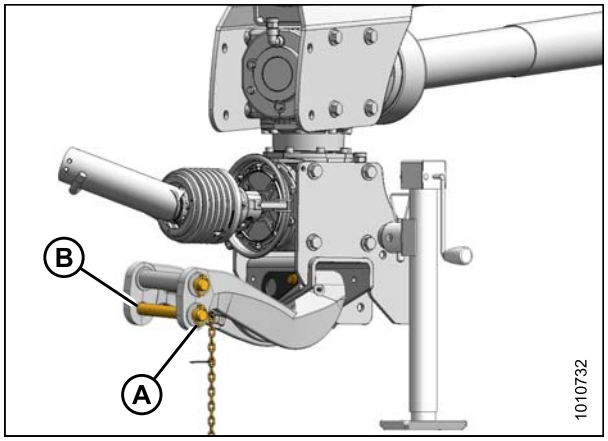

Figure 3.22: Mower Conditioner Hitch

2. Move tractor to position drawbar hitch adapter (A) under pin (B) in mower conditioner hitch. Adjust height as necessary with jack (C).
3. Shut down tractor and remove key from ignition.

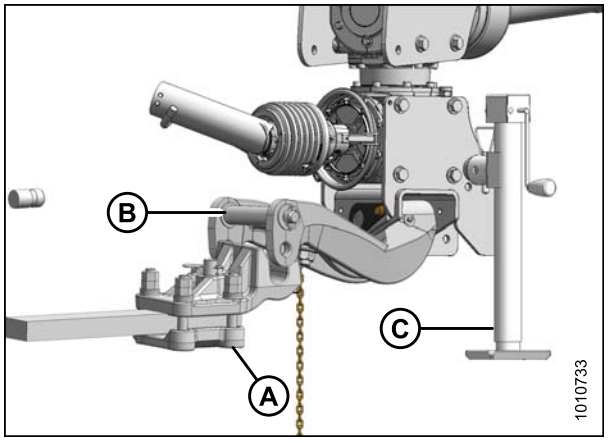

Figure 3.23: Mower Conditioner Hitch

4. Lower hitch with jack (A) so that pin (B) engages drawbar hitch adapter (C).
5. Install clevis pin (D) and secure with lynch pin (E).

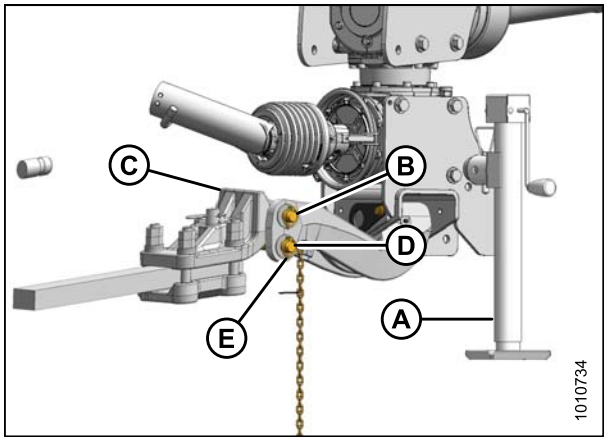

Figure 3.24: Mower Conditioner Hitch

6. Position driveline (A) onto tractor power take-off (PTO).
7. Pull back collar (B) on driveline (A), and push driveline until it locks. Release collar.
8. Route safety chain (C) from mower conditioner through chain support (D) on drawbar hitch adapter and around tractor drawbar support. Lock hook on chain.

   NOTE:
   If the tractor has a three-point hitch, lift the links as far as possible to prevent damage to the hitch.

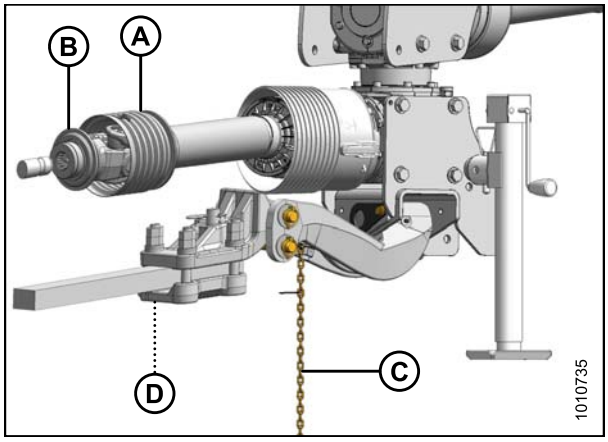

Figure 3.25: PTO Driveline

9. Raise jack (A), and remove pin (B).

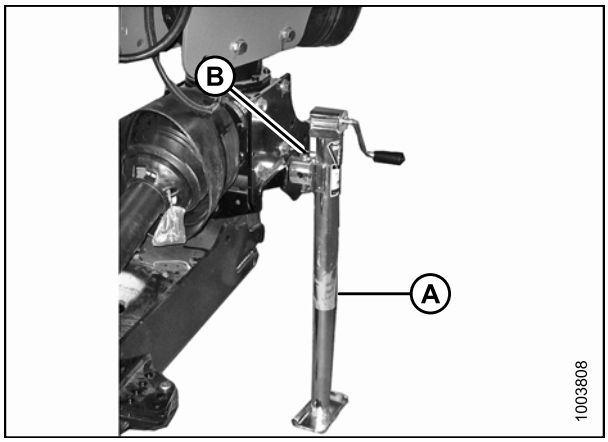

Figure 3.26: Hitch Jack

10. Move jack (A) to storage position on top of hitch, and secure with pin (B).
11. Proceed to *3.8.3 Connecting Hydraulics, page 49*.

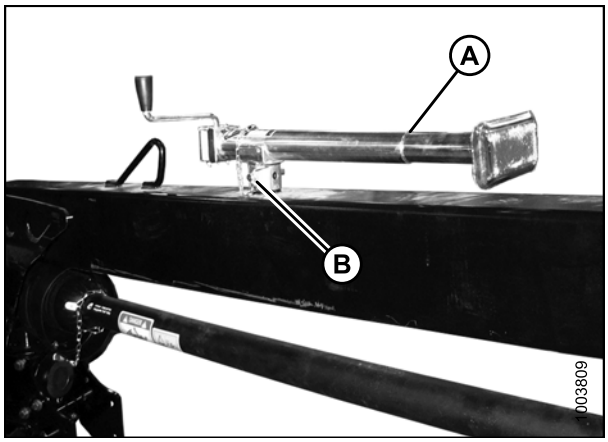

Figure 3.27: Jack Storage

3.8.2 Attaching with Two-Point Hitch

Follow these steps to attach the Category II, IIIN, and III two-point hitches:

⚠ CAUTION

Shut off tractor, engage parking brake, and remove key before working around hitch.

1. Position tractor and align tractor hitch arms (A) with hitch adapter (B). Shut off tractor and remove key.
2. Remove lynch pins (C) and washers from hitch adapter.

   NOTE:
   If tractor is equipped with a Category III hitch, use a bushing (MacDon #224322) on each hitch pin.

3. Secure arms (A) onto adapter pins (C) with lynch pins (springs not shown).
4. Install anti-sway bars (not shown) on tractor hitch to stabilize lateral movement of hitch arms (A). Refer to your tractor operator's manual.
5. Check distance (C) between tractor power take-off (PTO) shaft (A) and mower conditioner hitch gearbox shaft (B) (without the front half of the driveline attached).
6. Ensure that measurement does NOT exceed the dimensions listed in Table *3.3 Distance between Hitch Gearbox and Tractor PTO, page 46*.

Table 3.3 Distance between Hitch Gearbox and Tractor PTO

Driveline Shaft Size	Distance (C)
1-3/8 in. (34 mm)	27 in. (750 mm)
1-3/4 in. (43 mm)	31 in. (800 mm)

7. Position driveline (A) onto tractor PTO shaft making sure that driveline is approximately level.
8. Pull back collar on driveline (A) and push driveline until it locks. Release collar.

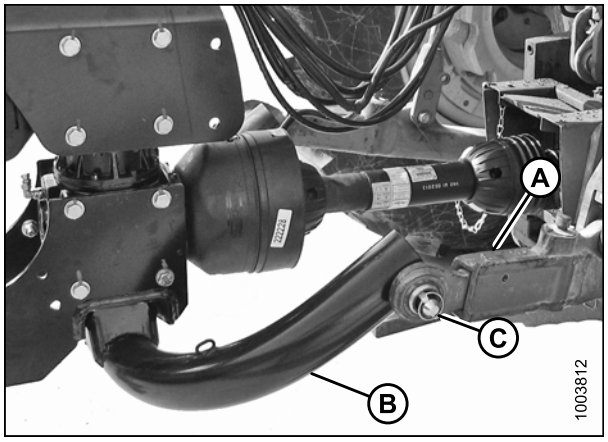

Figure 3.28: Two-Point Hitch Configuration (Springs Not Shown)

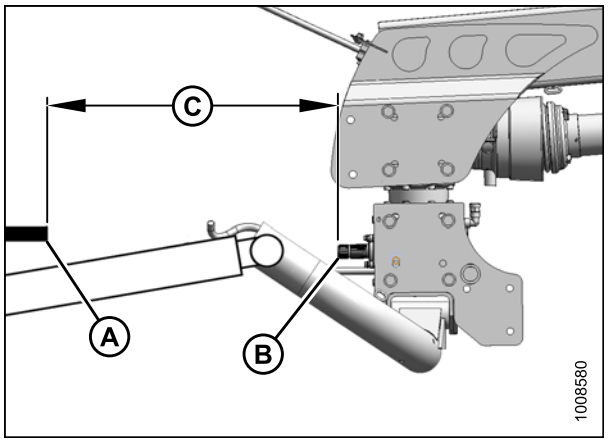

Figure 3.29: Allowable Driveline Length

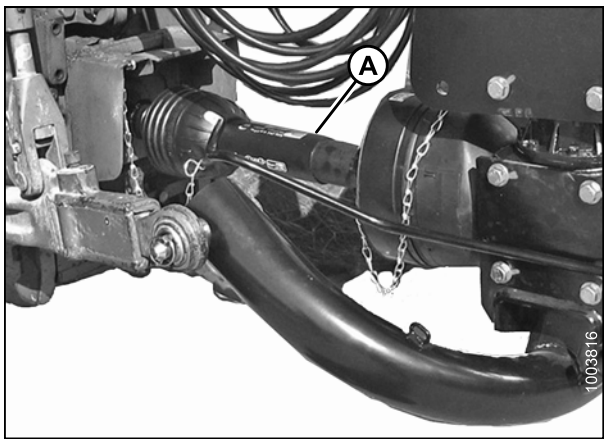

Figure 3.30: Mower Conditioner Driveline Attached to Tractor PTO (Springs Not Shown)

9. Start tractor and raise hitch so that stand (A) is off the ground. Shut down tractor and remove key from ignition.
10. Remove inner hairpin (B) and pull lock (C) to release stand.

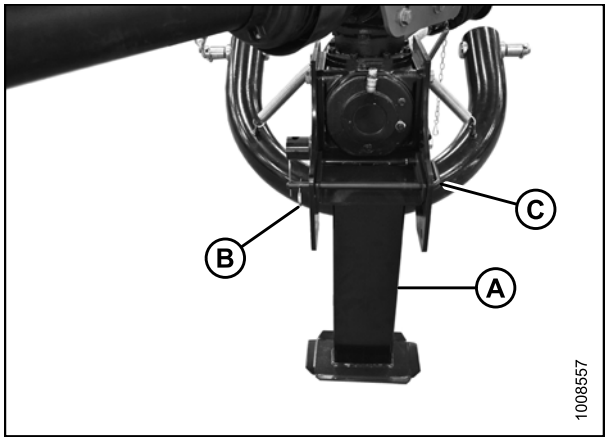

Figure 3.31: Hitch Stand

11. Raise stand (A), rotate lock (B) clockwise to vertical position, and re-engage lock (B) to hold the stand in the storage location.

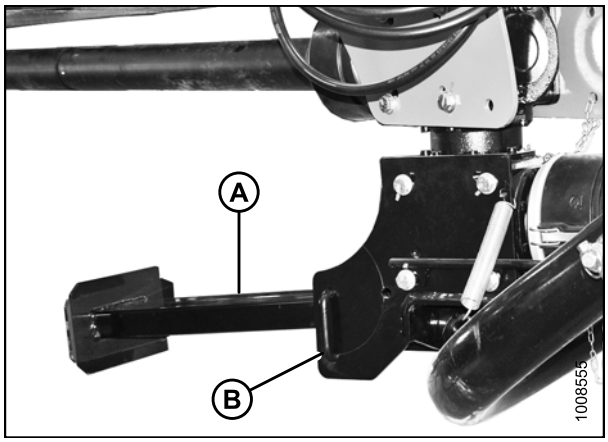

Figure 3.32: Hitch Stand

12. Secure lock with lynch pin (A).

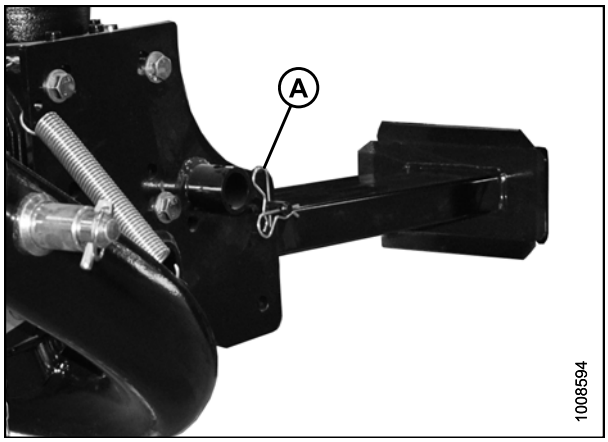

Figure 3.33: Hitch Stand

3.8.3 Connecting Hydraulics

WARNING

Do NOT use remote hydraulic system pressures over 3000 psi (20,684 kPa). Check your tractor operator's manual for remote system pressure.

NOTE:
Refer to colored bands on hoses to identify lift, steering/transport, and tilt hose sets.

Table 3.4 Hydraulic System Hoses

System	Hose	Tractor Hydraulics
Lift	A (1 hose standard 2 hoses with ETO installed)	Control 1
Steering and Transport	B (2 hoses)	Control 2
Mower Conditioner Tilt	C (2 hoses)	Control 3

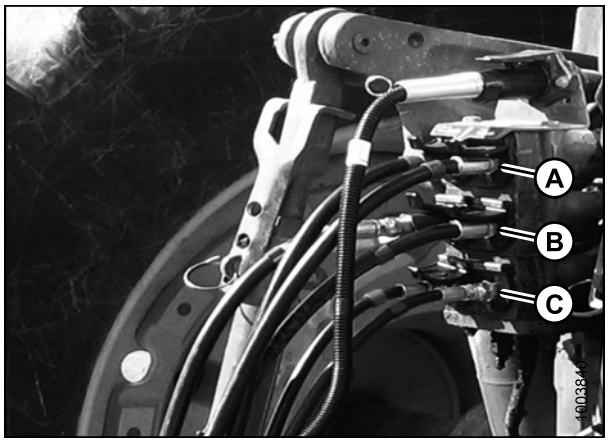

Figure 3.34: Hydraulic Connections

1. Connect one **LIFT** cylinder hose (A) (two hoses required if endwise transport system installed) to activate the following tractor hydraulic controls:

Table 3.5 Lift System

Control Lever Position	Cylinder Movement	Mower Conditioner Movement
Forward	Retract	Lower
Backward	Extend	Raise

2. Connect two **STEERING** cylinder hoses (B) to activate the following tractor hydraulic controls:

Table 3.6 Steering and Transport System

Control Lever Position	Cylinder Movement	Mower Conditioner Direction
Forward	Extend	Right
Backward	Retract	Left

3. Connect two mower conditioner **TILT** cylinder hoses (C) to activate the following tractor hydraulic controls: (Not required with mechanical center-link.)

Table 3.7 Mower Conditioner Tilt System

Control Lever Position	Cylinder Movement	Mower Conditioner Movement
Forward	Retract	Lower
Backward	Extend	Raise

3.8.4 Connecting Electrical Wiring Harness

1. Ensure that Pin #4 (A) in the tractor receptacle is **NOT** continuously energized (refer to your tractor operator's manual, and if required, remove the appropriate fuse.

   IMPORTANT:
   Older model tractors may have Pin #4 (A) energized as an accessory circuit; however, pin position (B) is used to supply power to the mower conditioner's brake lights.

2. Connect the mower conditioner wiring harness connector (C) to the tractor receptacle.

   NOTE:
   The connector is designed to fit tractors equipped with a round seven-pin receptacle (SAE J560).

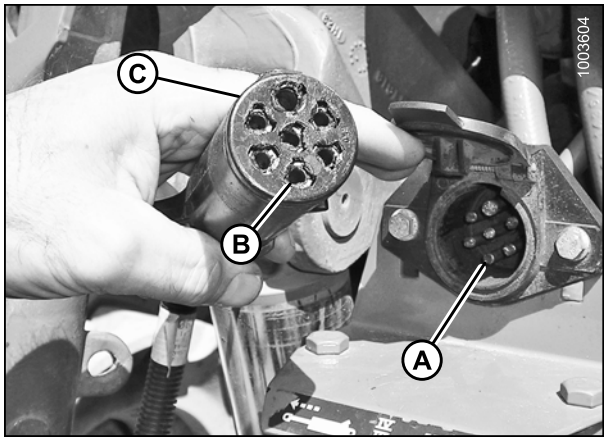

Figure 3.35: Electrical Wiring Harness and Receptacle

3.9 Detaching Mower Conditioner from Tractor

3.9.1 Detaching from Drawbar

CAUTION

- **To prevent accidental movement of tractor, shut off engine, engage parking brake, and remove key.**
- **To maintain stability, always lower the machine completely. Block mower conditioner wheels before detaching from tractor.**

1. Park machine on flat, level surface.
2. Lower mower conditioner onto blocks or leave mower conditioner raised.

   NOTE:
   If leaving mower conditioner in raised position, close lift cylinder safety valves.

3. Shut off engine and remove key.
4. Move remote cylinder control valve lever back and forth to relieve stored hydraulic pressure.
5. Disconnect hydraulic hoses and electrical harness. Store hose ends and electrical connector in hose support (A) at front of hitch as shown.

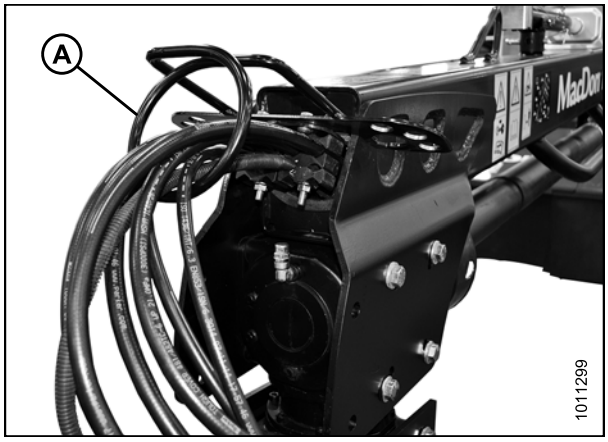

Figure 3.36: Hose Support

6. Pull pin (B) securing jack (A) at storage location.

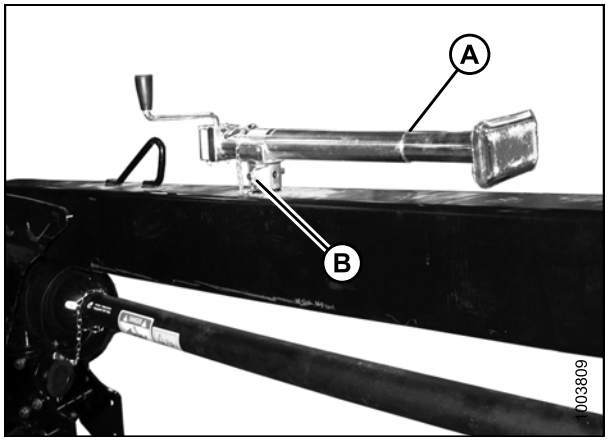

Figure 3.37: Jack Storage

7. Move jack (A) to working position at front of hitch and secure with pin (B).
8. Lower jack to take weight off tractor drawbar.
9. Disconnect safety chain (C) from drawbar and store on mower conditioner hitch.
10. Pull back collar (D) on driveline, slide coupler off tractor power take-off shaft, and rest driveline on hook (not shown).

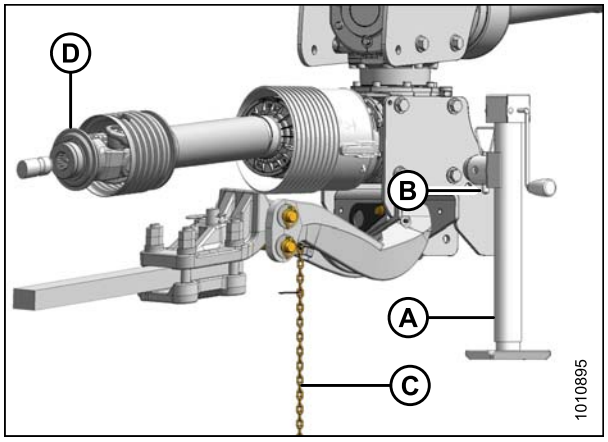

Figure 3.38: Driveline and Jack

11. Remove lynch pin (E), and remove clevis pin (D).
12. Raise mower conditioner hitch using jack (A) until pin (B) disengages and clears drawbar hitch adapter (C).

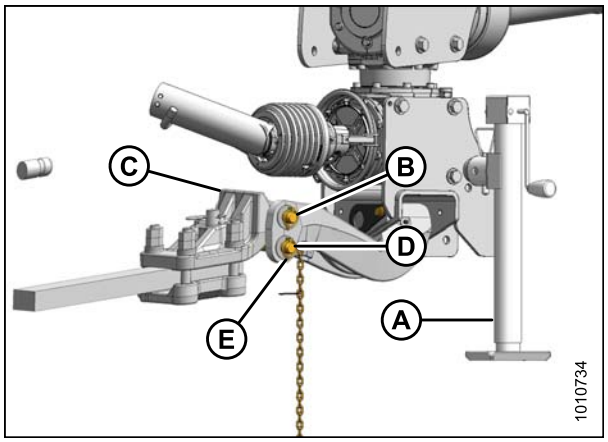

Figure 3.39: Mower Conditioner Hitch

13. Replace clevis pin (B) and secure with lynch pin (A).

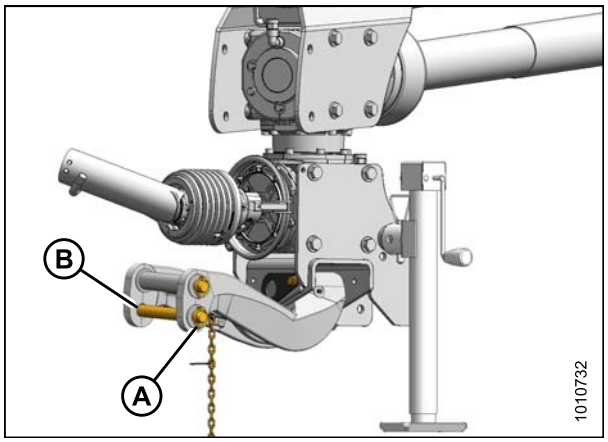

Figure 3.40: Mower Conditioner Hitch

3.9.2 Detaching from Two-Point Hitch

CAUTION

- **To prevent accidental movement of tractor, shut off engine, engage parking brake, and remove key.**
- **To maintain stability, always lower the machine completely. Block mower conditioner wheels before detaching from tractor.**

1. Park machine on flat level surface.
2. Lower mower conditioner onto blocks or leave mower conditioner raised.

   NOTE:
   If leaving mower conditioner in raised position, engage lift cylinder lock-out valves.

3. Shut off engine and remove key.
4. Move remote cylinder control valve lever back and forth to relieve stored hydraulic pressure.
5. Disconnect hydraulic hoses and electrical harness. Store hose ends and electrical connector in hose support (A) at front of hitch as shown.

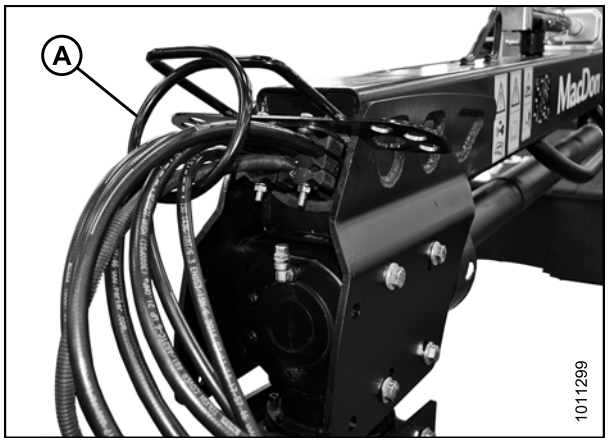

Figure 3.41: Hose Support

6. Pull back collar (A) on driveline, slide coupler off tractor power take-off shaft, and rest driveline on hook (not shown).

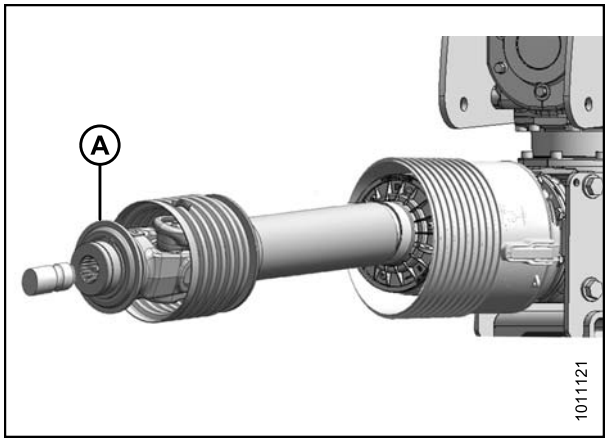

Figure 3.42: Driveline

7. Remove inboard hairpin (A) from lock (B).

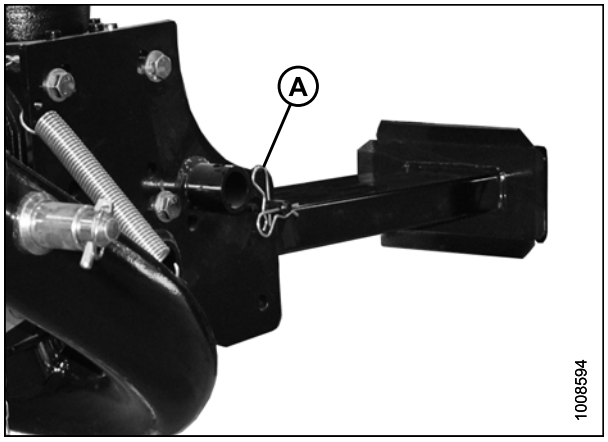

Figure 3.43: Inboard Hairpin

8. Hold stand (A), and pull lock (B) to disengage stand.

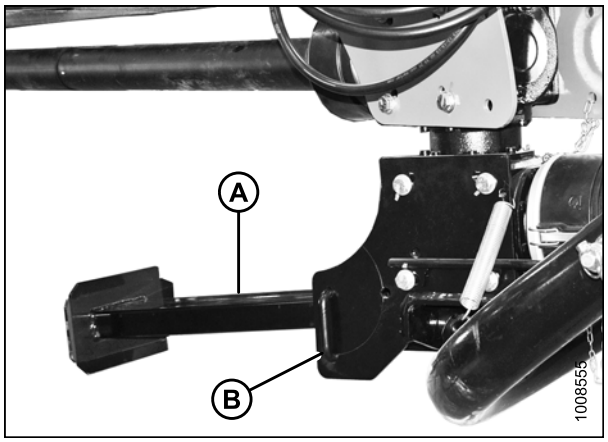

Figure 3.44: Hitch Stand and Lock

9. Lower stand (A), rotate lock (C) counterclockwise to horizontal position, and push to engage stand.
10. Check that stand (A) is locked.
11. Secure lock (C) with hair pin (B).
12. Start tractor and lower hitch to take weight off tractor hitch points.
13. Shut down tractor and remove key from ignition.

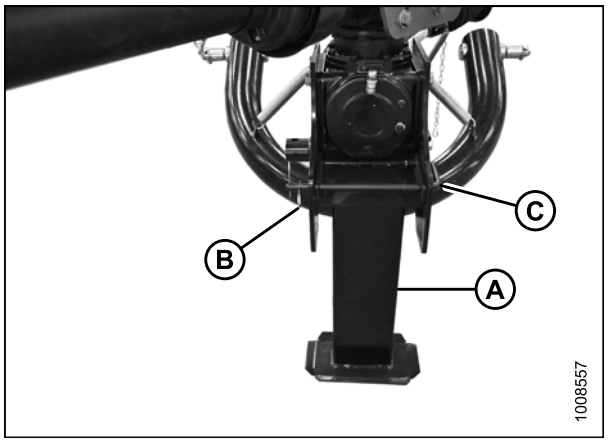

Figure 3.45: Hitch Stand in Lowered Position

14. Remove lynch pins (A) and washers and swing tractor arms (B) away from hitch adapter.

    NOTE:
    If tractor is equipped with a quick hitch system, it is **NOT** necessary to remove pins (A).

15. Replace lynch pins (A) and washers in mower conditioner hitch.
16. Slowly drive tractor away from mower conditioner.

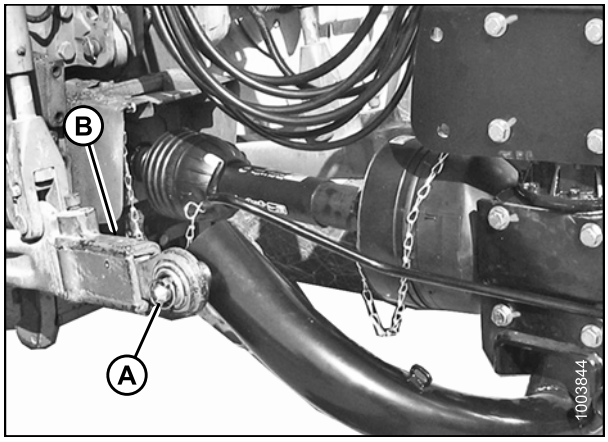

Figure 3.46: Lynch Pins and Tractor Arms

3.10 Breaking-In the Mower Conditioner

After attaching the mower conditioner to the tractor for the first time, operate the machine at low speed for five minutes while watching and listening **from the operator's seat** for binding or interfering parts.

NOTE:
Be especially alert and attentive until you become familiar with the sound and feel of your new mower conditioner.

CAUTION

Before investigating an unusual sound or attempting to correct a problem, shut off tractor, engage parking brake, and remove key.

NOTE:
Refer to *4.4.2 Break-In Inspections, page 123* to determine the service interval for your mower conditioner, and complete the scheduled break-in inspection procedures.

3.11 Engaging the Power Take-Off (PTO)

DANGER

Be sure all bystanders are clear of the machine before engaging the PTO. Never leave tractor seat with the PTO engaged.

1. Move the mower conditioner up to the standing crop, and slowly engage the PTO.
2. Ensure tractor PTO is running at 1000 rpm before starting to cut.
3. Disengage the PTO when not operating the mower conditioner.

3.12 Raising and Lowering Mower Conditioner

3.12.1 Lift Cylinders

Two hydraulic cylinders (A), one at each end of the carrier, raise or lower the mower conditioner when the tractor's cylinder control lever in the cab is activated.

The lift system is equipped with a lock-out valve (B) at each cylinder which prevents the cylinder from extending or retracting due to inadvertent movement of the lift control. Refer to *3.1 Lift Cylinder Lock-Out Valves , page 31*.

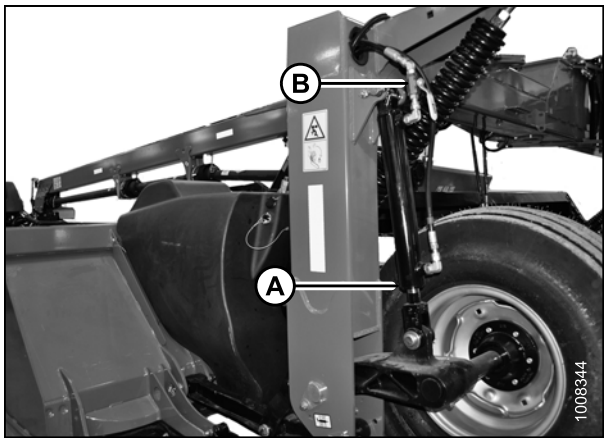

Figure 3.47: Lift Cylinder

3.12.2 Lift Control

The mower conditioner raise/lower control is not normally used to control cutting height because cutting is usually performed with the cutterbar on the ground.

This control is used to raise the mower conditioner to clear obstacles and windrows during field operation, to adjust the mower conditioner height for maintenance, and to raise the mower conditioner for storage or for transport behind a tractor.

DANGER

Be sure all bystanders are clear of the machine before raising or lowering mower conditioner.

1. Activate the cylinder control lever (A) to raise or lower the mower conditioner.
   a. To lower mower conditioner, move lever forward to position (B).
   b. To raise mower conditioner, move lever backward to position (C).

   IMPORTANT:
   Connect hydraulic hoses so that moving control lever (A) backward raises the mower conditioner. Refer to *3.8.3 Connecting Hydraulics, page 49* for more information.

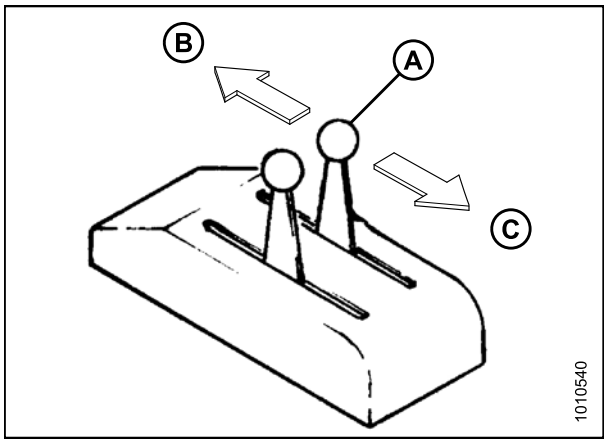

Figure 3.48: Tractor Cylinder Control Lever

3.13 Shutdown Procedure

CAUTION

Before leaving the tractor seat for any reason:

- **Park on level ground if possible.**
- **Lower the mower conditioner fully.**
- **Place all controls in NEUTRAL or PARK.**
- **Disengage the power take-off.**
- **Engage the park brake.**
- **Stop engine and remove key from ignition.**
- **Wait for all movement to stop.**
- **Lock tractor's anti-vandalism covers and closures when leaving the machine unattended.**

3.14 Maneuvering/Steering the Mower Conditioner

IMPORTANT:
The valve on the steering line must be in the working, or open position (handle in line with hose), for the steering system to operate.

Steering is controlled by the tractor's remote hydraulic system. The hitch provides the ability to do the following:

- Move the mower conditioner into field position.
- Make right angle turns in either direction.
- Steer around objects on both sides.
- Perform straight-line field cutting on either side of the tractor.

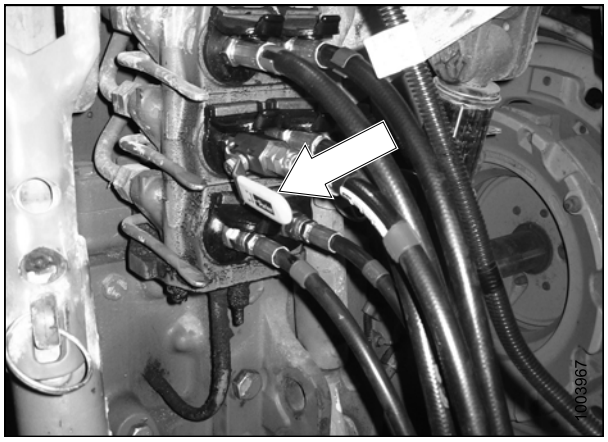

Figure 3.49: Steering Line Valve in Working (Open) Position

1. Activate steering control lever (A) to maneuver mower conditioner into the desired path of travel.
   a. Move lever **forward** to position (B) to steer the mower conditioner to the right.
   b. Move lever **backward** to position (C) to steer the mower conditioner to the left.

   IMPORTANT:
   Operate the steering control lever (A) only briefly, and return it to the NEUTRAL or OFF position as soon as the mower conditioner reaches the desired path of travel.

   IMPORTANT:
   Connect hydraulic hoses so that moving the steering control lever (A) backward steers the mower conditioner to the left and moving lever forward steers the mower conditioner to the right. Refer to *3.8.3 Connecting Hydraulics, page 49* for more information.

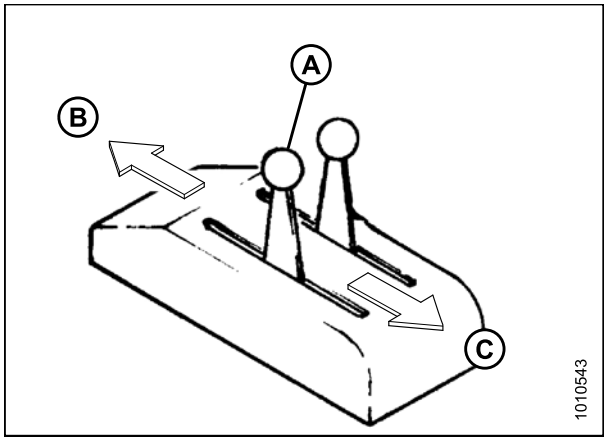

Figure 3.50: Tractor Steering Control Lever Positions

3.14.1 Right-Side Operation

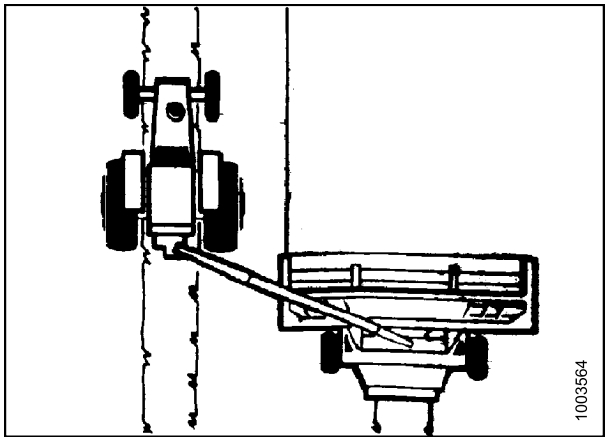

Figure 3.51: Right-Side Operation

1. Move steering control lever (A) **forward** to position (B) until the mower conditioner reaches the desired path of travel on the right side of the tractor.

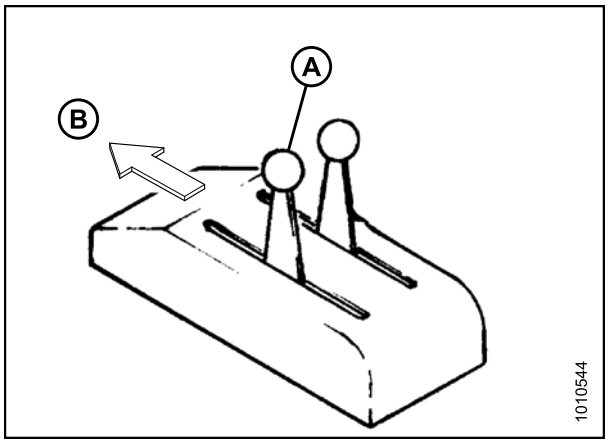

Figure 3.52: Tractor Steering Control Lever

3.14.2 Left-Side Operation

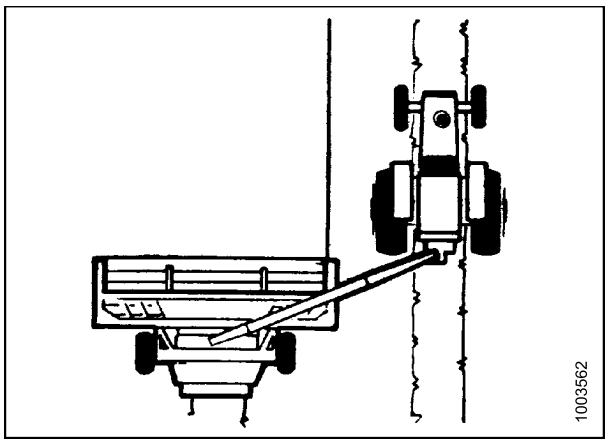

Figure 3.53: Left-Side Operation

1. Move steering control lever (A) **backward** to position (B) until the mower conditioner reaches the desired path of travel on the left side of the tractor.

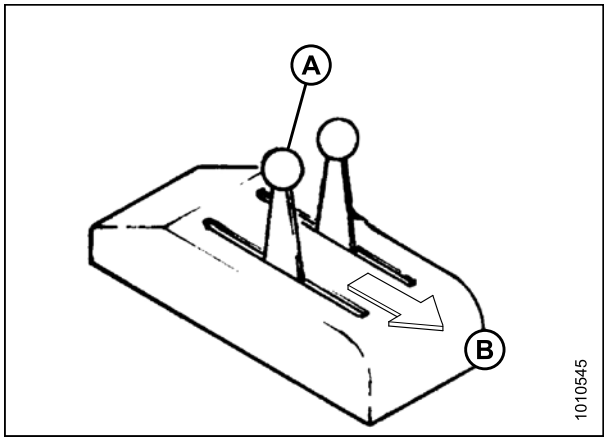

Figure 3.54: Tractor Steering Control Lever

3.14.3 Avoiding Obstacles

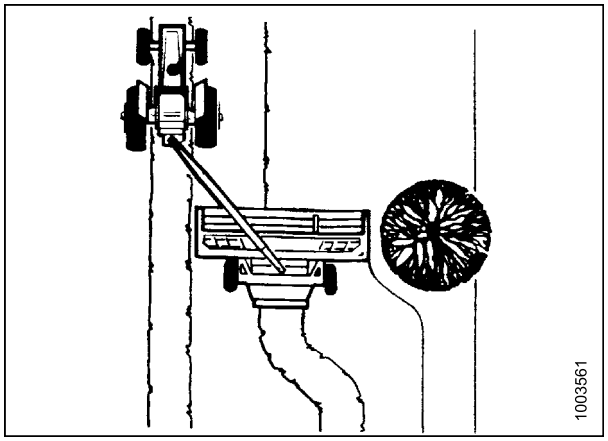

Figure 3.55: Mower Conditioner Steered around Obstacle

1. Activate steering control lever (A) to maneuver mower conditioner into the desired path of travel.
   a. Move lever **forward** to position (B) to steer the mower conditioner to the right.
   b. Move lever **backward** to position (C) to steer the mower conditioner to the left.

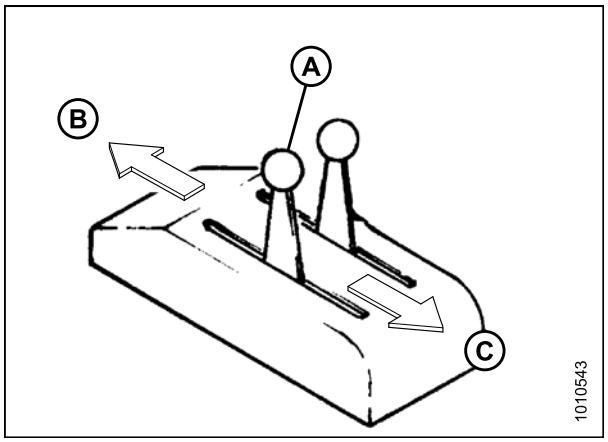

Figure 3.56: Tractor Steering Control Lever

3.14.4 Square Corners

The following procedure is intended only as a guide for developing a turning procedure for your tractor and mower conditioner. Specific distances are not given due to the differing maneuverability of various tractors.

1. Guide the tractor sharply away from the crop when approaching a corner. Steer the mower conditioner to maintain a straight cut as the tractor moves away from the crop.
2. Ensure the mower conditioner cuts past where the new corner will begin, and immediately raise the mower conditioner until the skid shoes clear the ground. Steer the mower conditioner as sharply as possible away from the uncut crop.
3. Drive past the corner, and steer the tractor sharply back towards the uncut crop.

   IMPORTANT:
   Ensure that the inside tractor tire does **NOT** contact the mower conditioner's hitch.

4. Position the tractor so it is straddling the last cut windrow. As the mower conditioner finishes turning, steer it back towards the uncut crop, align the mower conditioner with the crop edge, and lower mower conditioner to cutting height.

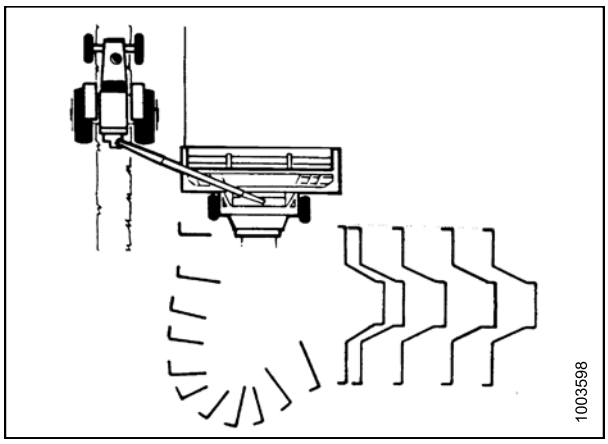

Figure 3.57: Square Corners

3.14.5 180-Degree Turn

NOTE:
When cutting back and forth on one side of the field, approximately 50 ft. (15 m) is required at each end of the field to make a 180-degree turn-around.

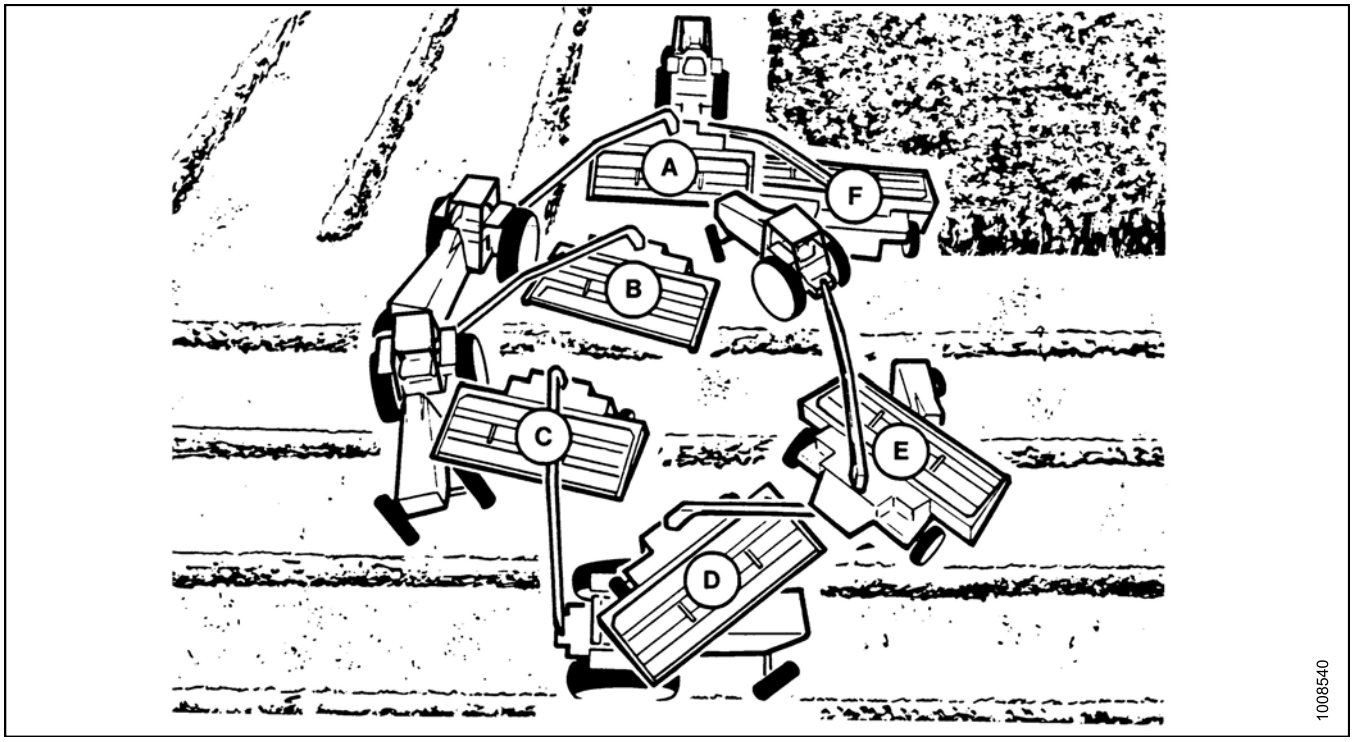

Figure 3.58: 180-Degree Turn

1. Guide the tractor away from the uncut crop beginning at position (A) while steering the mower conditioner in a straight line until it cuts through the end of the row.
2. Ensure the mower conditioner cuts past the end of the row, and immediately raise the mower conditioner until the skid shoes clear the ground. Steer the mower conditioner as sharply as possible away from the uncut crop.

   NOTE:
   For ease of operation, both steering control levers can be activated with one hand and held until the steering cylinder completes its stroke.

3. Proceed to position (B), and start turning the tractor back towards the uncut crop.

   IMPORTANT:
   Ensure that the inside tractor tire does **NOT** contact the mower conditioner's hitch.
4. Continue turning towards the uncut crop as shown in positions (C) and (D) while steering the mower conditioner towards the outside of the turning circle. Maintain hitch-to-tire clearance throughout the turn.
5. Complete the tractor turn as shown in position (E), and position the tractor so it is straddling the last cut windrow. Align the mower conditioner with the edge of the uncut crop.
6. Proceed to position (F), lower mower conditioner to cutting height, and begin a new cut through the field.

3.15 Transporting the Mower Conditioner

The mower conditioner in normal field mode or in endwise transport mode can be transported on public roads by towing with a tractor or a truck. Refer to *3.15.2 Transporting with a Tractor, page 66* or *3.15.3 Transporting with a Truck, page 67*.

Endwise towing requires the optional endwise transport system. Refer to *3.15.6 Endwise Transport System Option, page 71* for towing the mower conditioner in this mode.

CAUTION

- **Be aware of roadside obstructions, oncoming traffic, and bridges.**
- **Travel at safe speeds to ensure complete machine control and stability at all times. Do NOT exceed 20 mph (32 km/h). Reduce speed for corners and slippery conditions.**
- **Use tractor lights and mower conditioner flashing amber and red tail-lights when transporting on roads in order to provide adequate warning to operators of other vehicles.**
- **Do NOT transport the mower conditioner on a road or highway at night or in reduced visibility conditions such as rain or fog.**
- **Ensure that hitch on transporting vehicle is capable of handling a 2000 lb. (907 kg) static vertical load.**

3.15.1 Preparing Mower Conditioner for Transport

1. Charge the steering circuit as follows:
   a. Connect the two steering cylinder hoses (A) to the tractor's hydraulic circuit (refer to *3.8.3 Connecting Hydraulics, page 49* for more detailed instructions).
   b. Steer the mower conditioner completely to the left, then steer the mower conditioner completely to the right. Repeat three or four times.
2. Steer the mower conditioner so that it is centered behind the towing vehicle.

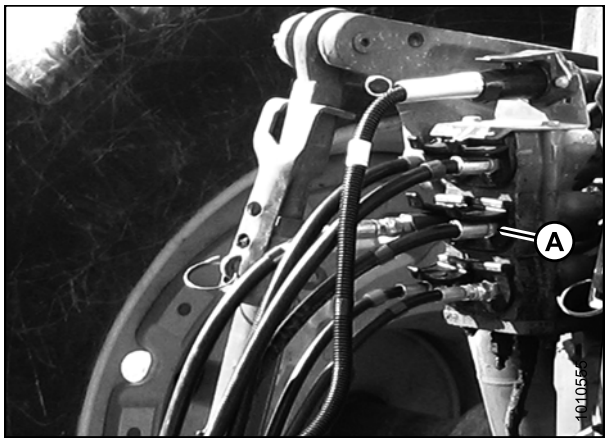

Figure 3.59: Hydraulic Connection

3. Close the steering lock-out valve by turning the handle to the vertical position.

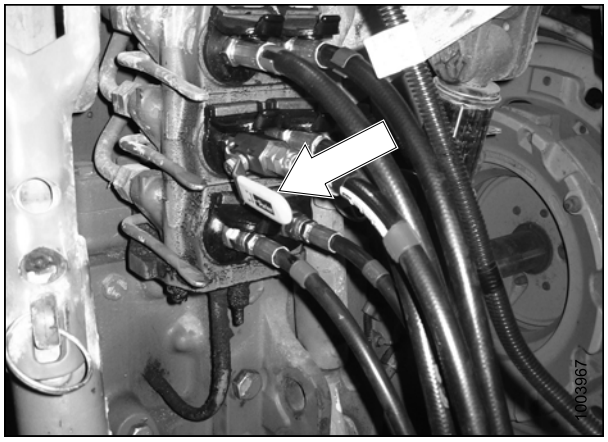

Figure 3.60: Steering Lock-Out Valve in Open Position

4. Raise the mower conditioner fully, and close the cylinder lock-out valve (A) on each lift cylinder by turning the handle to the horizontal position.

WARNING

Do NOT tow unless the steering cylinder is fully charged. If steering cylinder is not fully charged, loss of control, injury, or death could result.

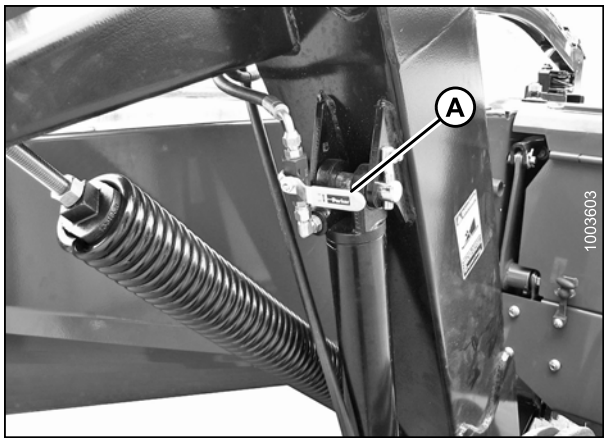

Figure 3.61: Cylinder Lock-Out Valve

5. Move jack (A) to storage position on side of hitch, and secure with pin (B).
6. Ensure tires are properly inflated.
7. Keep Slow Moving Vehicle (SMV) sign, reflectors, and lights clean and visible at rear of mower conditioner.

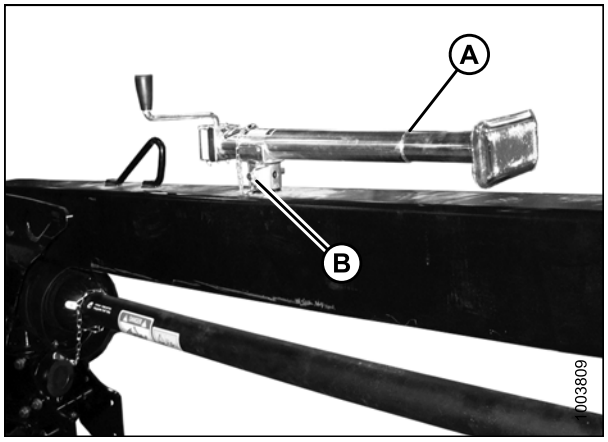

Figure 3.62: Jack in Storage Position

3.15.2 Transporting with a Tractor

If towing endwise with the optional endwise transport system, refer to *Converting from Field to Transport Mode, page 71* to prepare the mower conditioner for transport; otherwise, refer to *3.15.1 Preparing Mower Conditioner for Transport, page 65*.

1. Hook-up mower conditioner to tractor (refer to *3.8 Attaching Mower Conditioner to the Tractor, page 44*).

   NOTE:
   The hydraulic hoses (A) do not need to be attached to the tractor for towing. Ensure they are securely stored on the hitch.

   NOTE:
   The power take-off (PTO) driveline (B) does not need to be attached for towing purposes.

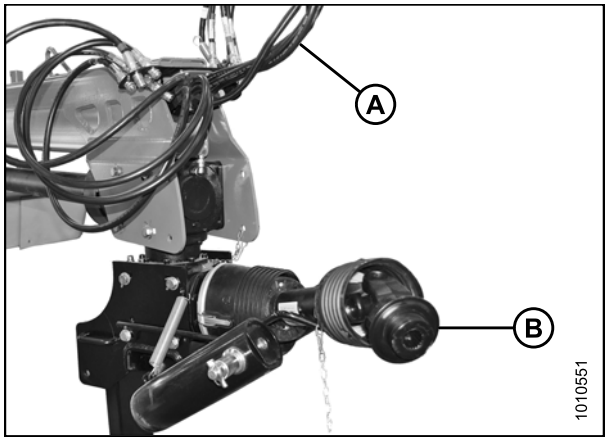

Figure 3.63: Mower Conditioner Hitch

2. Store driveline (B) on hook (C) (if PTO driveline is not attached), and remove forward half (A) of driveline. Store forward half of driveline in cab for transport.
3. Ensure that hitch safety chain is properly attached to towing tractor. Provide only enough slack in chain to permit turning.
4. Check local laws for width regulations and lighting or marking requirements before transporting on roads.
5. Do NOT exceed 20 mph (32 km/h).

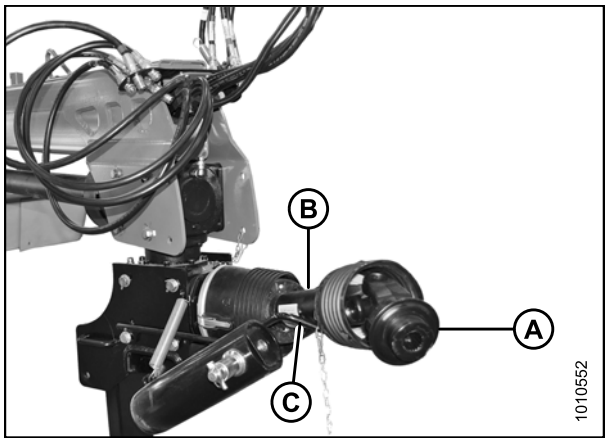

Figure 3.64: Mower Conditioner Hitch

3.15.3 Transporting with a Truck

CAUTION

Do NOT tow with a vehicle weighing less than 7500 lb. (3400 kg). Ensure that the capacity of the towing vehicle is sufficient to maintain control.

If towing endwise with the optional endwise transport system, refer to *Converting from Field to Transport Mode, page 71* to prepare the mower conditioner for transport; otherwise, refer to *3.15.1 Preparing Mower Conditioner for Transport, page 65*.

1. Store hydraulic hoses (A) on the hitch.
2. Place driveline (C) in hook (D).
3. Remove the forward half (B) of driveline and store in truck for transport.

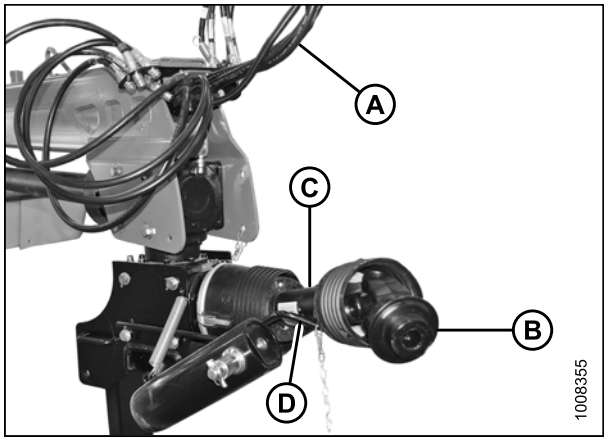

Figure 3.65: Mower Conditioner Hitch

4. Remove pins (A) from transport hitch (B).

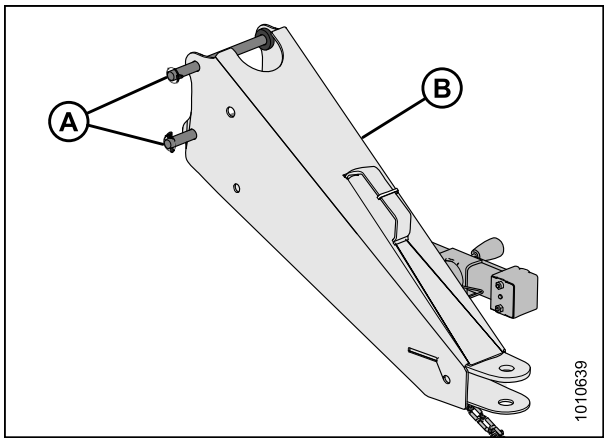

Figure 3.66: Transport Hitch

5. Position transport hitch (A) on mower conditioner hitch, install pins (B), and secure with lynch pins.
6. Lift the mower conditioner hitch with jack, and attach mower conditioner to truck.
   a. **Two-Point Hitch** (not shown): Rotate stand to storage position.
   b. **Drawbar Hitch**: Remove jack (C) from working position, store on hitch, and secure with pin.

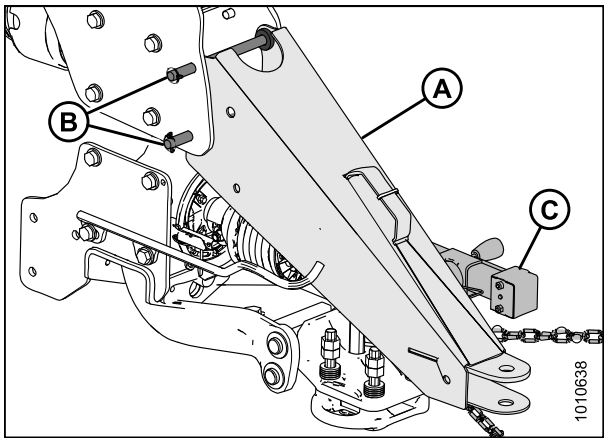

Figure 3.67: Transport Hitch Installed

7. Wrap safety chain around hitch and attach to truck frame (A).
8. Connect electrical harness (B).
9. Check local laws for width regulations and lighting or marking requirements before transporting on roads.
10. Do not exceed 20 mph (32 km/h).

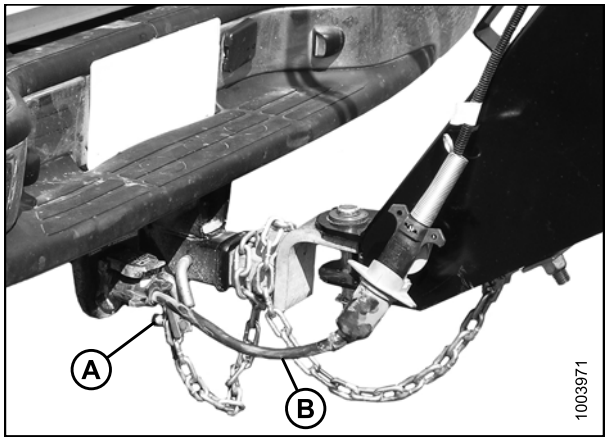

Figure 3.68: Safety Chain and Electrical Harness

3.15.4 Transport Lighting

Without Endwise Transport System Option

The mower conditioner is equipped with two bidirectional amber lights (A) located on the outboard edges of the carrier frame that function as flashing hazard lights and turn signals.

The red lights (B) located on the inboard side of the amber lights function as both tail and brake lights. Refer to *3.8.4 Connecting Electrical Wiring Harness, page 50* for information about connecting the mower conditioner's electrical harness to the tractor.

Amber reflective tape (C) is applied to various locations on the front and sides of the mower conditioner, hitch, and carrier frame. Red reflective tape (D) is applied to various locations on the mower conditioner.

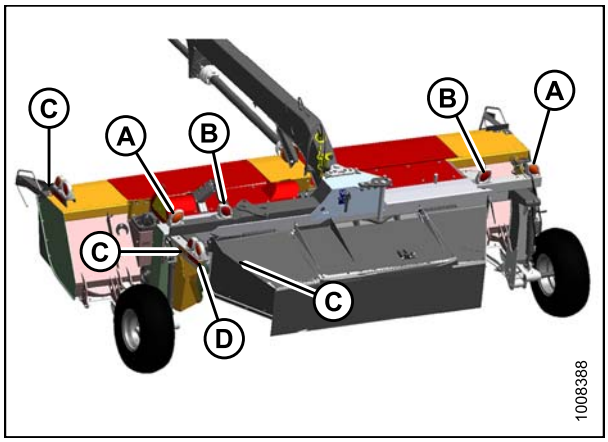

Figure 3.69: Transport Lighting and Reflective Tape Locations

With Endwise Transport System Option

The mower conditioner is equipped with two bidirectional amber lights (A) located on the outboard edges of the carrier frame that function as flashing hazard lights and turn signals.

The red lights (B) located on the inboard side of the amber lights function as both tail and brake lights. Refer to *3.8.4 Connecting Electrical Wiring Harness, page 50* for information about connecting the mower conditioner's electrical harness to the tractor.

Amber reflective tape (C) is applied to various locations on the front and sides of the mower conditioner, hitch, and carrier frame. Red reflective tape (D) is applied to the rear of the mower conditioner.

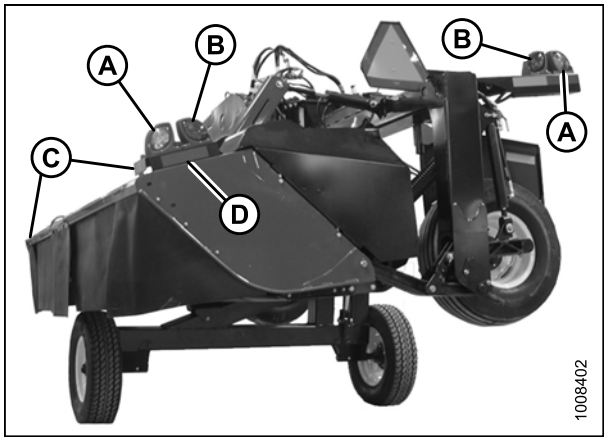

Figure 3.70: Transport Lighting and Reflective Tape Locations

3.15.5 Converting from Transport to Field Mode (without Optional Endwise Transport System)

DANGER

Engage brake, stop engine, and remove key from ignition before leaving operator's seat for any reason.

1. Stop engine and remove key from ignition.
2. Connect all hydraulic hoses (refer to *3.8.3 Connecting Hydraulics, page 49*), and connect electrical wiring harness.
3. Open the steering lock-out valve by turning the handle to the horizontal position.

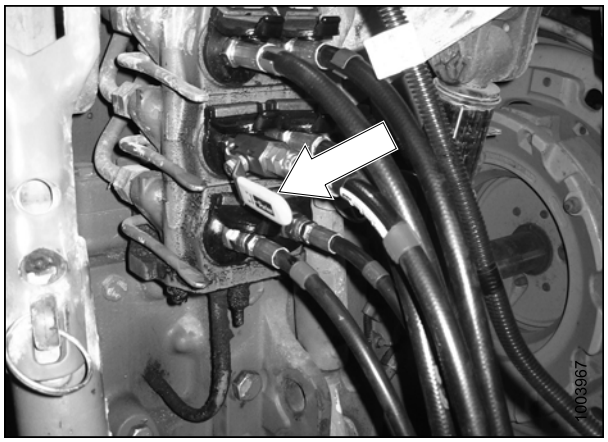

Figure 3.71: Steering Lock-Out Valve in Open Position

4. Open the lock-out valve (A) on each lift cylinder by turning the handle to the vertical position.

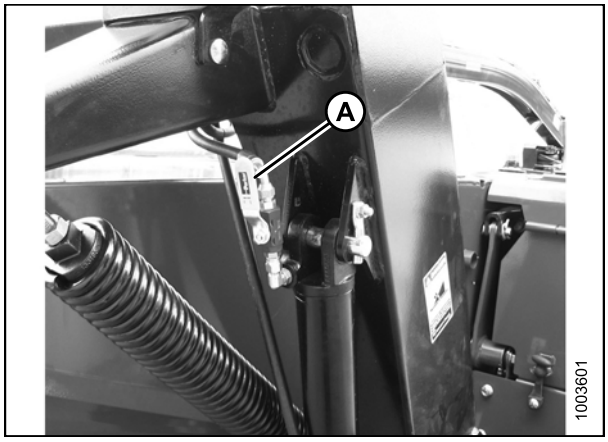

Figure 3.72: Cylinder Lock-Out Valve

3.15.6 Endwise Transport System Option

The optional endwise transport system allows the mower conditioner to be towed on roadways while remaining within the legal width restrictions on most roads and highways.

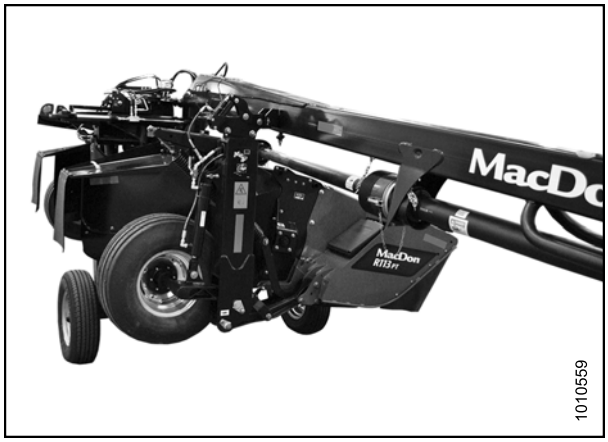

Figure 3.73: Endwise Transport System

Converting from Field to Transport Mode

DANGER

Stop the power take-off (PTO) before swinging the unit into transport mode. The cutting discs continue to spin after the drive is turned off.

WARNING

Ensure cutterbar doors are properly closed before converting the machine from field to transport mode to prevent equipment damage.

1. Start tractor if not running. Do **NOT** operate the mower conditioner.
2. Raise the mower conditioner fully.
3. Align the hitch to the tractor.
4. Operate the steering control lever to swing the mower conditioner clockwise until the mower moves to the right of center.

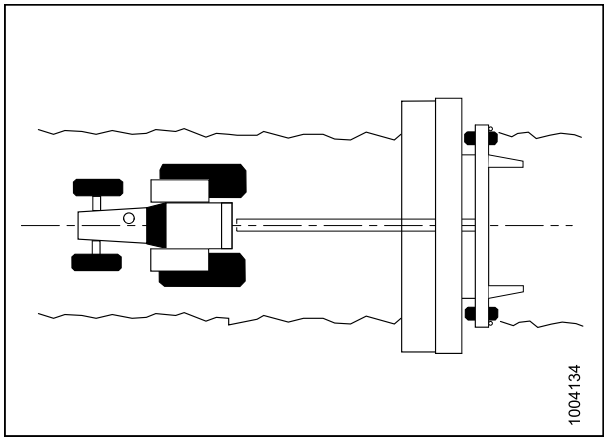

Figure 3.74: Hitch Aligned to Tractor

NOTE:
When cam bearing nut (A) is aligned with the green section of the transport alignment gauge decal (B) and the transport switch is set to transport mode, hydraulic oil is diverted from the hitch swing (steering) circuit to the transport circuit.

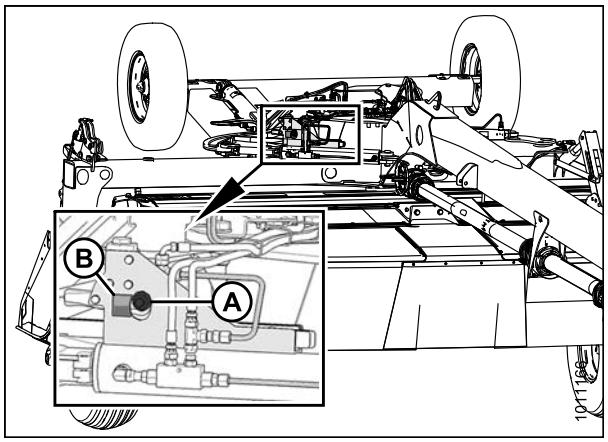

Figure 3.75: Endwise Transport System Cam Bearing Nut

5. Move transport switch from field mode (A) to transport mode (B) and ensure that light (C) is NOT illuminated.
6. Continue operating the steering control lever until the transport sequence is complete.

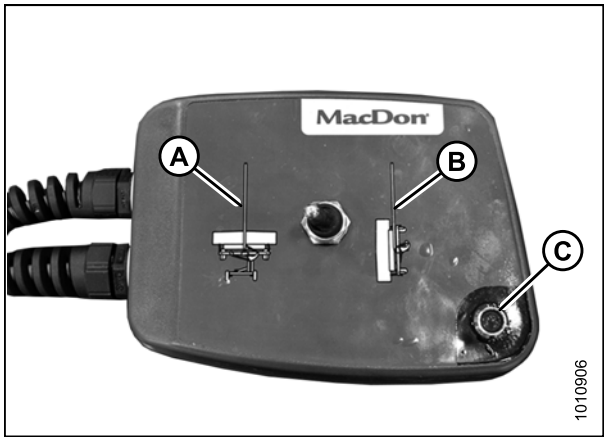

Figure 3.76: Transport Switch

7. Hold the swing cylinder control lever until the transport assembly (A) has lifted the carrier frame (B) off the ground and has rotated the right side of the carrier frame towards hitch (C).
8. Release the swing cylinder control lever when the carrier frame (B) has stopped rotating.

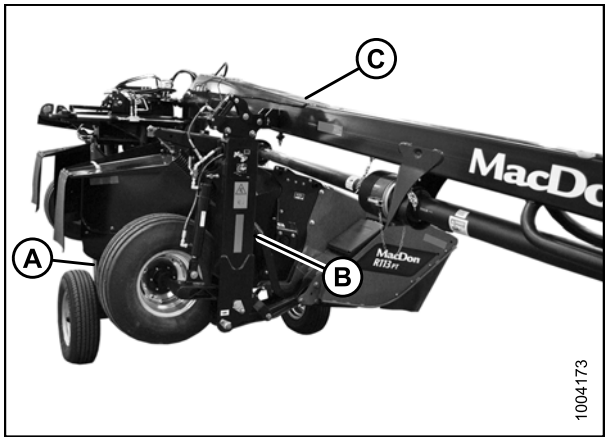

Figure 3.77: Transport Assembly and Lifted Carrier Frame

9. Operate the lift control lever to lower the mower conditioner onto the transport assembly cutterbar support pad (A), to raise the field wheels (B), and to engage transport latch (C) onto hitch (D).
10. Cycle the steering circuit to ensure the carrier frame and hitch are locked together.
11. Activate the hazard lights (E) on the tractor and mower conditioner. Check that all lights are working.
12. Ensure that the slow moving vehicle sign (F) is visible from behind the mower conditioner.

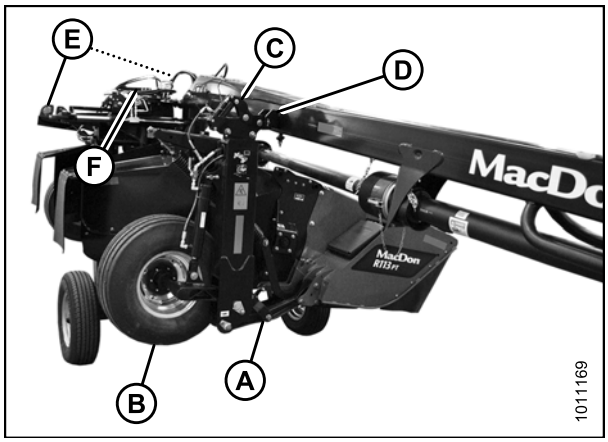

Figure 3.78: Mower Conditioner in Transport Mode

CAUTION

Do NOT exceed speeds that are beyond your comfort level.

Converting from Transport to Field Mode

DANGER

Do not swing the machine in to, or out of, transport mode until you are certain that all persons, animals, and objects are clear of the unit's swivel range.

1. Operate the lift cylinder control lever (as if raising the mower conditioner) to fully extend the lift cylinders (A) and raise the cutterbar off the transport assembly support pad (B). The carrier frame latch (C) will automatically open.

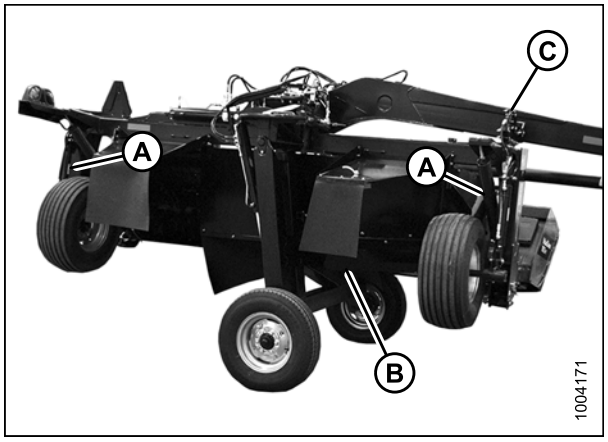

Figure 3.79: Lift Cylinders and Carrier Frame Latch

2. Operate the steering control lever to swing the mower conditioner clockwise (as if steering to the right).
3. Continue operating the steering control lever to raise the transport assembly (A) and lower the carrier (B) onto the field wheels.

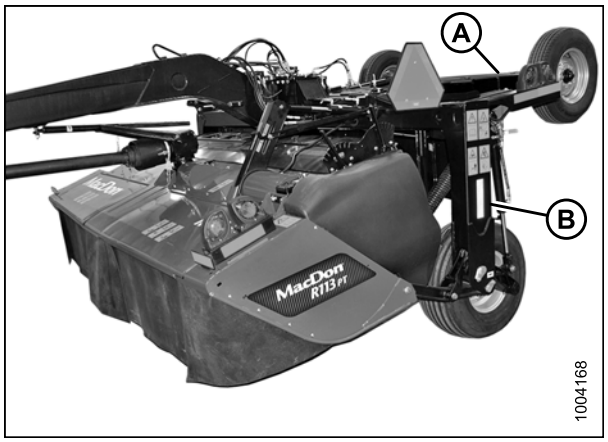

Figure 3.80: Transport Assembly Raised — Carrier Lowered

4. Move transport switch from transport mode (B) to field mode (A) and ensure that light (C) is illuminated.

   NOTE:
   Transport sequencing is now complete and the steering circuit is active.

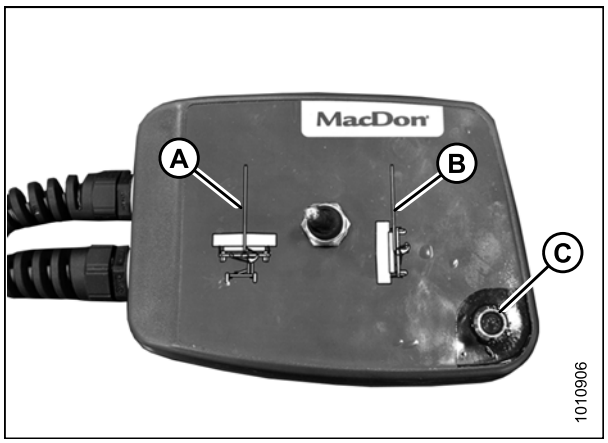

Figure 3.81: Transport Switch

3.16 Operating the Mower Conditioner

Satisfactory operation of the mower conditioner in all situations requires making proper adjustments to suit various crops and conditions.

Correct operation reduces crop loss and increases productivity. As well, proper adjustments and timely maintenance will increase the length of service you receive from your machine.

The variables listed in Table *3.8 Mower Conditioner Performance Variables, page 75* and detailed on the following pages will affect the performance of your mower conditioner. You will quickly become adept at adjusting your machine to produce the desired results. Although most of the adjustments have been set at the factory, the settings can be changed to suit your crop conditions.

Table 3.8 Mower Conditioner Performance Variables

Variable	Refer to
Mower Conditioner Float	*3.16.1 Mower Conditioner Float, page 75*
Mower Conditioner Angle	*3.16.2 Mower Conditioner Angle, page 77*
Cutting Height	*3.16.3 Cutting Height, page 78*
Ground Speed	*3.16.4 Ground Speed, page 80*
Conditioning: Roll Type	*3.16.5 Conditioning: Roll Type, page 80*
Conditioning: Finger Type	*3.16.6 Conditioning: Finger Type, page 87*

3.16.1 Mower Conditioner Float

Mower conditioner float springs are normally set so a force of approximately 95–105 lbf (426–471 N) is required to lift either end of the mower conditioner just off the ground when the hitch is centered.

In rough or stony conditions, however, it may be preferable to apply less force in order to protect cutting components.

NOTE:
When float setting is light, it may be necessary to reduce ground speed in order to prevent excessive bouncing and leaving a ragged cut.

Adjusting Float

IMPORTANT:
Float setting (or lifting force) must be equal on both ends of the mower conditioner. Machines with roll conditioners require the same spring tension on both sides. Machines with finger conditioners require slightly more tension on the left side.

1. Center mower conditioner directly behind the tractor.

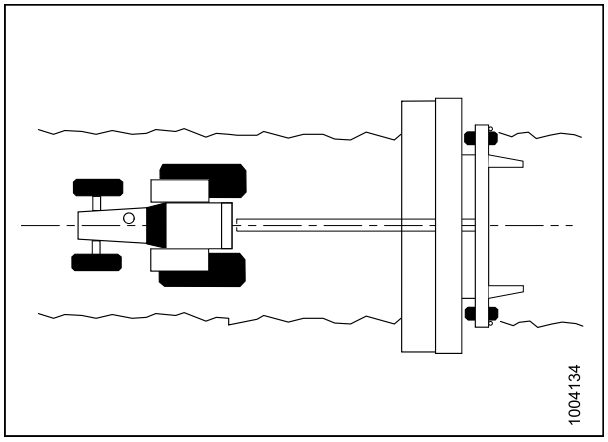

Figure 3.82: Mower Conditioner Centered behind Tractor

WARNING

To avoid bodily injury or death from unexpected start-up or fall of raised machine: stop engine, remove key, and engage lift cylinder lock-out valves before going under machine.

2. Raise mower conditioner fully, shut off engine, and remove key.

3. Close the cylinder lock-out valve (A) on each lift cylinder by turning the handle to the horizontal position.
4. Back jam nut (B) away from spring.
   a. Turn adjuster bolt (C) clockwise (towards spring) to increase float.
   b. Turn adjuster bolt (C) counterclockwise (away from spring) to decrease float.
5. Tighten jam nut (B) against spring insert to secure the setting.
6. Open the lock-out valve (A) on each lift cylinder by turning the handle to the vertical position.
7. Lower mower conditioner and check mower conditioner float at each end.

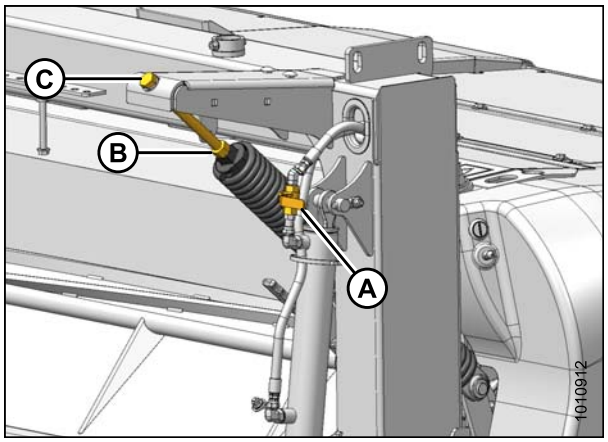

Figure 3.83: Lift Cylinder Lock-Out Valve, Jam Nut, and Adjuster Bolt

NOTE:
Adjustments to other operating variables may affect float setting; therefore, be sure to check the float and readjust if necessary after adjusting cutting height or mower conditioner angle.

NOTE:
Float will also be affected if the tractor's drawbar height is greater or less than 16 in. (406 mm)—check and readjust float as required.

3.16.2 Mower Conditioner Angle

Mower conditioner (or cutterbar) angle adjustment can range from 0–5° below horizontal using the mechanical center-link and from 0–7° below horizontal using the hydraulic center-link.

Choose an angle that maximizes performance for your crop and field conditions. A flatter angle provides better clearance in stony conditions, whereas a steeper angle is required in down crops for better lifting action.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

Adjusting Mower Conditioner Angle: Mechanical

1. Lower mower conditioner so that cutterbar is resting on the ground.
2. Loosen nut (A).
3. Rotate the turnbuckle sleeve (B) so that the turnbuckle decreases in length in order to **decrease** (flatten) mower conditioner angle.
4. Rotate the turnbuckle sleeve (B) so that the turnbuckle increases in length in order to **increase** (steepen) mower conditioner angle.
5. Tighten nut (A), but do NOT over-tighten. A slight tap with a small hammer is sufficient.
6. Check cutting height and readjust if required.
7. Check mower conditioner float, and adjust if required. Refer to *3.16.1 Mower Conditioner Float, page 75*.

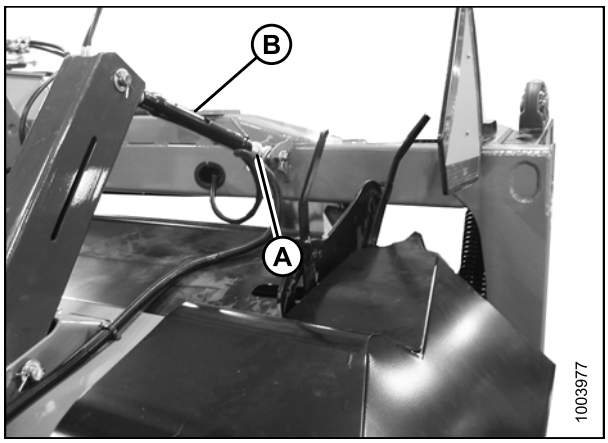

Figure 3.84: Mechanical Center-Link

Adjusting Mower Conditioner Angle: Hydraulic

NOTE:
The mower conditioner angle can be adjusted from the tractor without shutting down the mower conditioner.

1. Operate the tractor hydraulic control so that cylinder (C) retracts and moves gauge (D) toward the green zone (A) in order to **decrease** (flatten) mower conditioner angle.
2. Operate the tractor hydraulic control so that cylinder (C) extends and moves gauge (D) toward the red zone (B) in order to **increase** (steepen) mower conditioner angle.

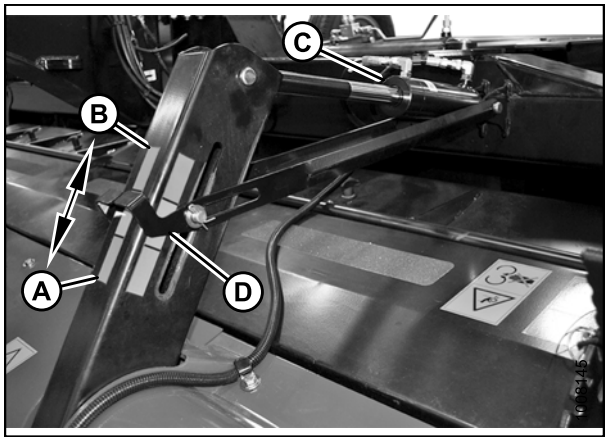

Figure 3.85: Hydraulic Center-Link

3.16.3 Cutting Height

Cutting height is determined by a combination of the cutterbar/mower conditioner angle and skid shoe settings.

Adjust cutting height for optimum cutting performance while preventing excessive build-up of mud and soil inside the mower conditioner that can lead to poor crop flow and increased wear on cutting components.

To choose an angle that maximizes performance for your crop and field conditions, refer to *3.16.2 Mower Conditioner Angle, page 77*.

- Lowering the skid shoes and decreasing mower conditioner angle increases the cutting height resulting in longer stubble lengths that helps material dry faster. This may be desirable in stony conditions to help reduce damage to cutting components.
- Raising the skid shoes and increasing mower conditioner angle decreases the cutting height resulting in a shaved crop.

To minimize cutterbar damage, scooping soil, or soil build-up at the cutterbar in damp conditions, mower conditioner float should be set as light as possible without causing excessive bouncing.

NOTE:
When float setting is light, it may be necessary to reduce ground speed in order to prevent excessive bouncing and leaving a ragged cut.

Adjusting Cutting Height

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

1. Raise mower conditioner fully, stop engine, and remove key.
2. Loosen bolts (C) and remove bolts, nuts, and washers (D).
3. Raise (A) or lower (B) skid shoe.

   NOTE:
   Skid shoes have two adjustment settings: Fully raised (A) or fully lowered (B).

4. Reinstall and tighten bolts, nuts, and washers (D).
5. Tighten bolts (C).

   NOTE:
   13-foot mower conditioners have one skid shoe per side and 16-foot mower conditioners have two skid shoes per side.

6. Check mower conditioner float (refer to *Adjusting Float, page 75*).
7. Adjust mower conditioner angle to desired working position using the machine's mower conditioner angle controls. If angle is not critical, set it to mid-position. Refer to *3.16.2 Mower Conditioner Angle, page 77*.

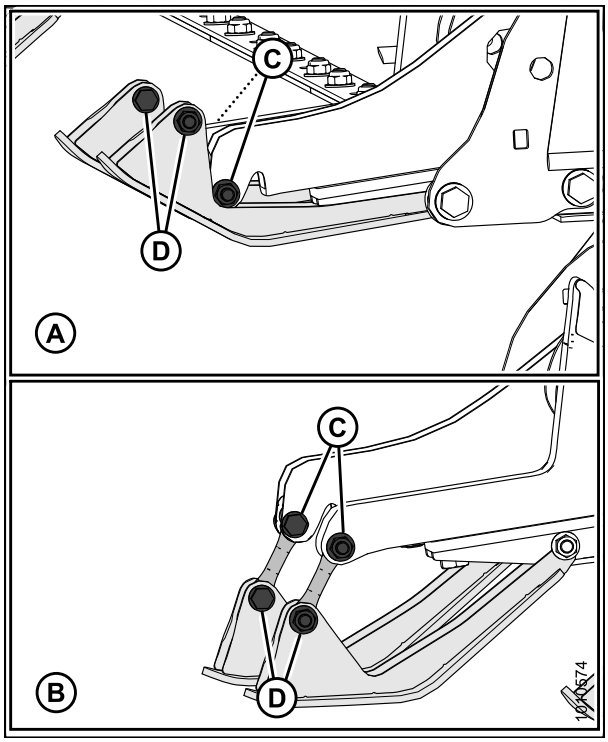

Figure 3.86: Skid Shoes

3.16.4 Ground Speed

CAUTION

Reduce speed when turning, crossing slopes, or travelling over rough ground.

Choose a ground speed that allows the cutterbar and conditioner to cut the crop smoothly and evenly. Try different combinations of mower conditioner speed and ground speed to suit your specific crop. Refer to your tractor operator's manual for changing ground speed.

In tough cutting conditions (such as native grasses), set the disc speed to MAXIMUM.

In light crops, reduce the mower conditioner's disc speed while maintaining ground speed.

NOTE:
Operating the mower conditioner at the minimum disc speed will extend the wear life of cutting components.

The example shown in Figure *3.87: Ground Speed for 13-Foot Mower Conditioner, page 80* illustrates the relationship between ground speed and area cut for a 13-foot mower conditioner. The chart demonstrates that a ground speed of 13 mph (21 km/h) would produce an area cut of approximately 20 acres (8 hectares) per hour.

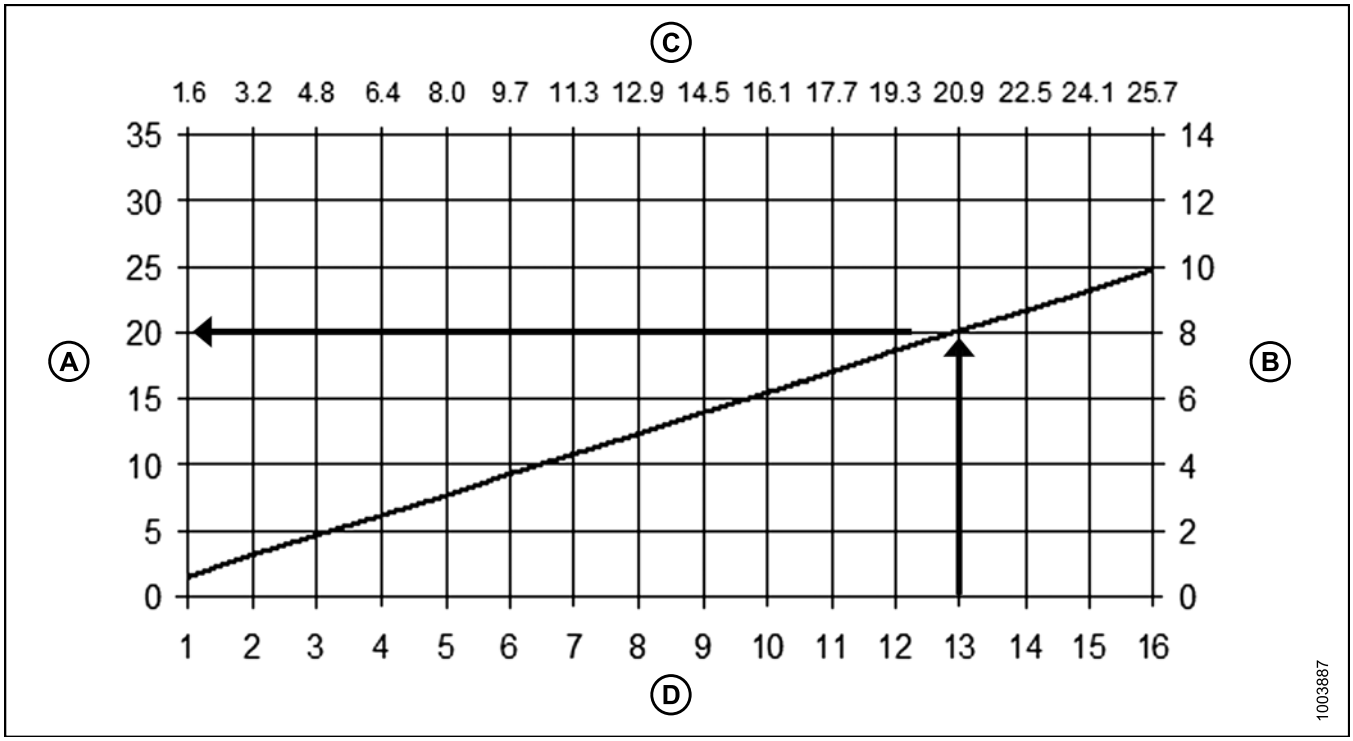

Figure 3.87: Ground Speed for 13-Foot Mower Conditioner

A - Acres/Hour **B - Hectares/Hour** **C - Kilometers/Hour** **D - Miles/Hour**

3.16.5 Conditioning: Roll Type

Rolls condition the crop by crimping and crushing the stem in several places allowing the release of moisture and resulting in faster drying times.

Roll Gap

The degree to which the crop is conditioned as it passes through the rolls is controlled by the roll gap which is factory set at 1/4 in. (6 mm) for steel rolls and approximately 1/8 in. (3 mm) for polyurethane (poly) rolls.

Correct conditioning of alfalfa, clover, and other legumes is achieved when 90% of the stems show cracking, but no more than 5% of the leaves are damaged. Set enough roll gap to produce these results. Poly rolls are better suited for crushing stems while providing less crimping and are recommended for these types of crops.

A larger gap (up to 1 in. [25 mm]) may be desirable in thick stemmed cane-type crops; however, too large a gap may cause feeding problems. Steel rolls are recommended for these types of situations.

Grass type crops may require less gap for proper feeding and conditioning.

IMPORTANT:
If using settings below the factory setting, visually inspect the roll gap.

Checking Roll Gap: Poly Rolls

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully.
2. Stop engine and remove key.
3. Insert a feeler gauge through the inspection hole in the conditioner endsheet to check roll gap on **poly** roll conditioners.

   NOTE:
   For information about roll gap on **steel** roll conditioners, refer to *Adjusting Roll Gap: Steel Rolls, page 82*.

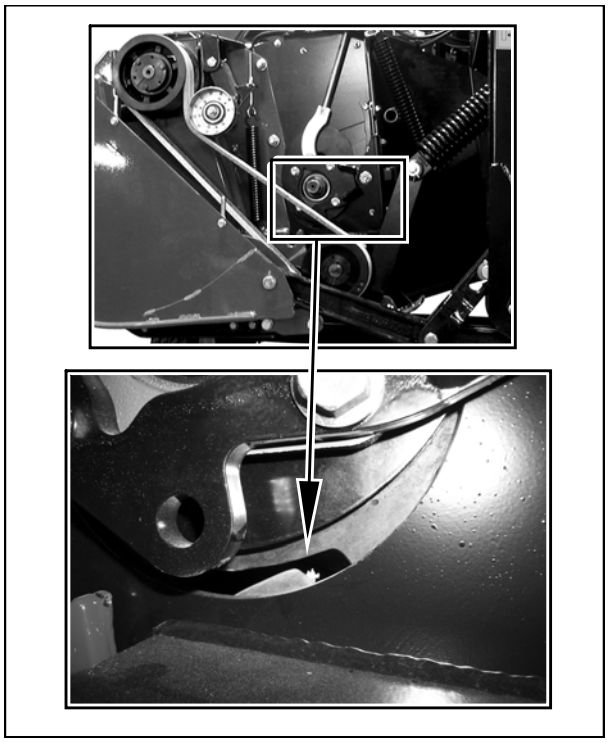

Figure 3.88: Poly Roll Conditioner

Adjusting Roll Gap: Steel Rolls

1. Lower mower conditioner fully.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

2. Stop engine and remove key.
3. Loosen and back off upper jam nut (A) on both sides of conditioner.
4. Turn lower nut (B) clockwise to raise the upper roll and **increase** roll gap (C).

   NOTE:
   The amount of thread protruding through the jam nut indicates roll gap (C). Factory setting is 1/4 in. (6 mm) which equates to 1/4 in. (6 mm) of roll gap.

   NOTE:
   When adjusting roll gap, be sure the same amount of thread is protruding on both sides of the conditioner roll to achieve a consistent gap across the rolls.

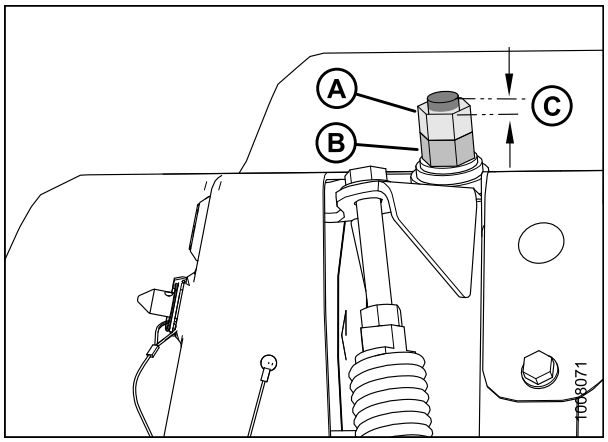

Figure 3.89: Jam Nut, Adjusting Nut, and Roll Gap

5. Turn lower nut (B) counterclockwise to lower the upper roll and **decrease** roll gap (C).
6. Tighten jam nuts (A) on both sides.

Adjusting Roll Gap: Poly Rolls

The roll gap setting on poly rolls is more sensitive than on steel rolls because the poly rolls operate at smaller gaps and the conditioning is less aggressive.

1. Lower mower conditioner fully.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

2. Stop engine and remove key.

3. Loosen and back off upper jam nut (A) on both sides of conditioner.
4. Turn stop nut (B) counterclockwise until upper roll rests on lower roll. Ensure both rolls intermesh.
5. Turn stop nut (B) one full turn clockwise to raise the upper roll and achieve a 3 mm roll gap..

   NOTE:
   When adjusting roll gap, be sure the same amount of thread is protruding on both sides of the conditioner roll to achieve a consistent gap across the rolls.
6. Tighten jam nuts (A) on both sides.
7. Rotate the rolls manually and use a feeler gauge at the ends of the rolls to check that the actual gap is no less than 5/64 in. (2 mm) and no more than 5/32 in. (4 mm).

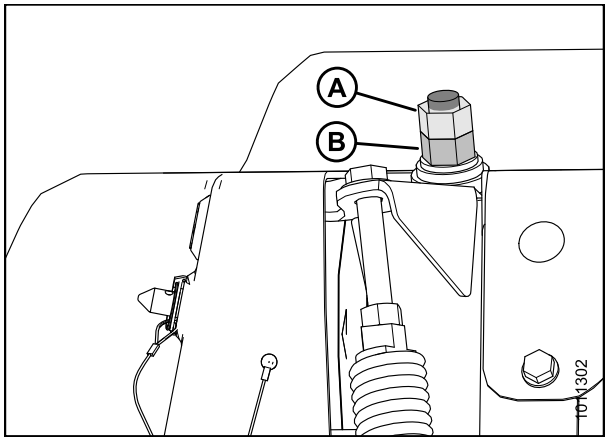

Figure 3.90: Jam Nut, Adjusting Nut, and Roll Gap

Roll Tension

Roll tension (the pressure holding the rolls together) is factory set to maximum and is adjustable. To reduce tension—reduce pressure.

Heavy crops or tough forage can cause the rolls to separate; therefore, maximum roll tension is required to ensure that materials are sufficiently crimped.

To prevent over-conditioning of light alfalfa and short grasses, apply less roll tension.

Adjusting Roll Tension

Roll tension is factory set to maximum and can be adjusted as follows:

⚠ DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, shut down mower conditioner and tractor, and remove key.

2. Loosen jam nut (A) on both sides of conditioner.
3. Turn the spring drawbolt (B) clockwise to tighten spring (C) and **increase** roll tension.
4. Turn the spring drawbolt (B) counterclockwise to loosen spring (C) and **decrease** roll tension.
5. Measure the amount of exposed thread on the spring drawbolt (B) at each end of the conditioner. The measurement (D) should be 1/2–9/16 in. (12–15 mm) for both poly and steel roll conditioners.

   IMPORTANT:
   Turn each bolt equal amounts. Each turn of the bolt changes the roll tension by approximately 7.2 lbf (32 N).

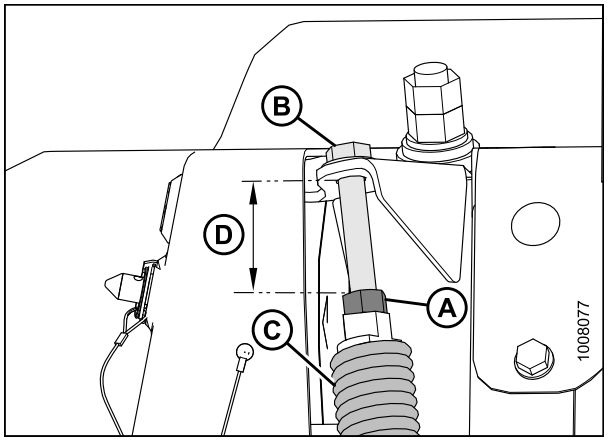

Figure 3.91: Left Side Shown – Right Side Opposite

6. Tighten jam nuts (A) on both sides.

Roll Timing

IMPORTANT:
Roll timing on is critical when the roll gap is decreased because conditioning is affected, and the bars may contact each other.

For proper conditioning, the rolls must be properly timed with the bar on one roll centered between two bars on the other roll. The factory setting should be suitable for most crop conditions.

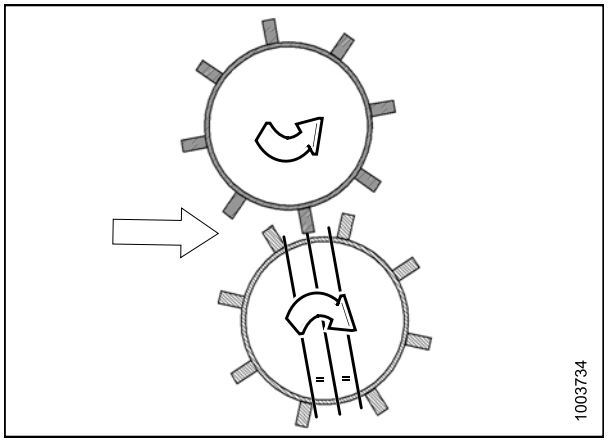

Figure 3.92: Properly Timed Rolls

Checking Roll Timing

⚠ DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, stop engine, and remove key from ignition.
2. Open the right side driveshield (refer to *3.2.1 Opening Driveshields, page 33*).

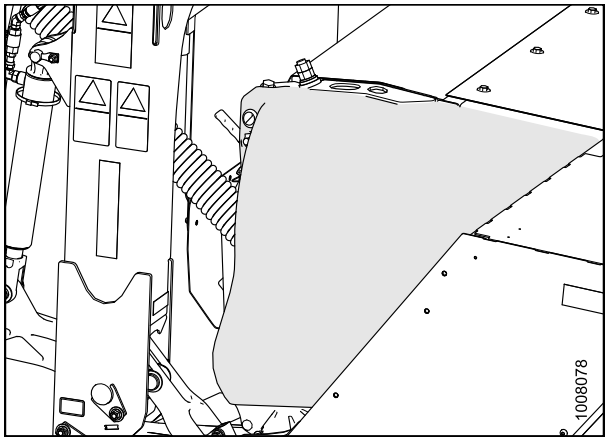

Figure 3.93: Right Side Driveshield

3. Examine the four bolts (A) in slots of yoke plate (B) on upper roll universal shaft. The timing is set during assembly and the flange bolt locations are marked—ensure bolts are centered between the marks to avoid having to reset the timing.

   NOTE:
   Only three bolts shown in the illustration.

4. Adjust roll timing if necessary. Refer to *Adjusting Roll Timing, page 85*.

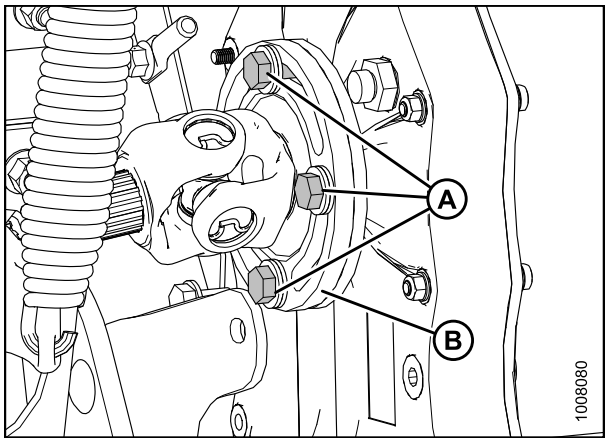

Figure 3.94: Bolts in Slots of Yoke Plate

Adjusting Roll Timing

1. Loosen four bolts (A) in slots of yoke plate (B) on upper roll universal shaft.

   NOTE:
   Only three bolts shown in the illustration.

2. Manually rotate upper roll until it stops. Make a mark on yoke flange to align with the center of one of the bolt (A) heads.
3. Manually rotate upper roll in opposite direction until it stops. Make a second mark on yoke flange to align with the bolt.
4. Determine the center between the two marks, and mark a third line on the yoke flange.
5. Rotate the upper roll until the bolt lines up with the third line.
6. Apply blue Loctite® and tighten bolts (A) to secure the position. Torque to 70 ft·lbf (95 N·m).

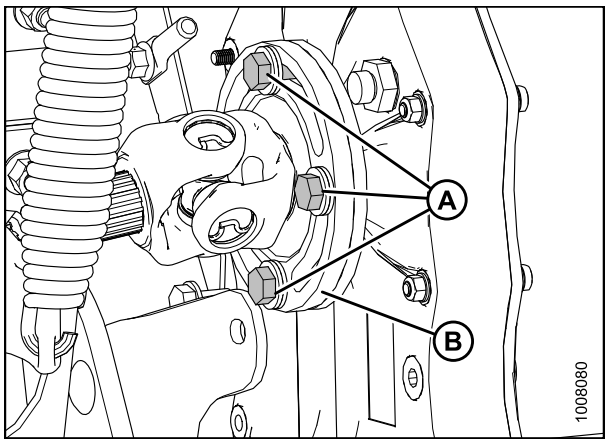

Figure 3.95: Bolts in Slots of Yoke Plate

Forming Shields: Roll Conditioner

WARNING

Keep everyone several hundred feet away from your operation. Ensure bystanders are never in line with the front or rear of the machine. Stones or other foreign objects can be ejected from either end with force.

The position of the forming shields controls the width and placement of the windrow. Deciding which forming shield position to use is based on the following factors:

- Weather conditions (rain, sun, humidity, wind)
- Type and yield of crop
- Available drying time
- Method of processing (bales, silage, green-feed)

A wider windrow will generally dry faster and more evenly resulting in less protein loss. Fast drying is especially important in areas where the weather allows only a few days to cut and bale. Refer to *3.17 Haying Tips, page 98*, for more information.

A narrower windrow may be preferable for ease of pick-up and when drying is not critical (for example, when cutting for silage or green-feed).

Positioning Side Deflectors: Roll Conditioner

The position of the side deflectors controls the width and placement of the windrow. To ensure windrow placement is centered with respect to the carrier wheels, set each side deflector adjuster bar to the same hole position on both sides of the conditioner.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Remove lynch pin (A) from adjuster bar (B).
2. Lift adjuster bar (B) out of plate, move deflector (C) to desired position, and insert adjuster bar into hole in plate.
3. Install lynch pin (A) into adjuster bar (B).
4. Repeat for other side.

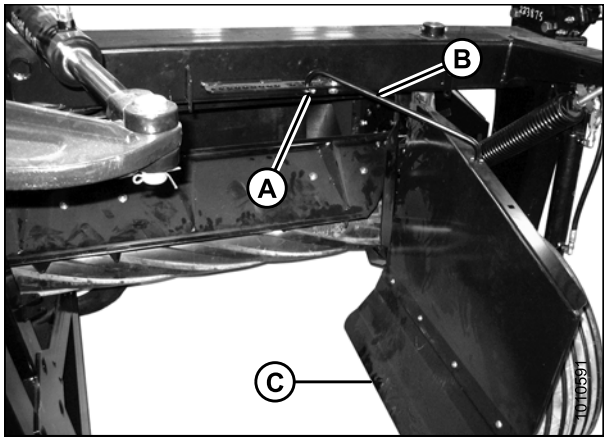

Figure 3.96: Side Deflector and Adjuster Bar

Positioning Rear Baffle: Roll Conditioner

The rear baffle primarily determines the height of the windrow but can also affect the width. It is located immediately behind and above the conditioning rolls and can be positioned to do the following:

- Direct the crop flow into the forming shield for narrow and moderate width windrows.
- Direct crop downward to form a wide swath.
- Assist with even material distribution across windrows by using adjustable crop fins mounted to the rear baffle.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Remove lynch pin (A) securing rear baffle adjustment lever (B) to bracket (C).
2. Pull rear baffle adjustment lever (B) in inboard direction to disengage from bracket (C).
3. Position rear baffle adjustment lever (B) as follows:
   - Move lever forward to **raise** baffle.
   - Move lever backward to **lower** baffle.
4. Release rear baffle adjustment lever (B) so that tab engages hole in bracket (C).
5. Secure baffle adjustment with lynch pin (A).

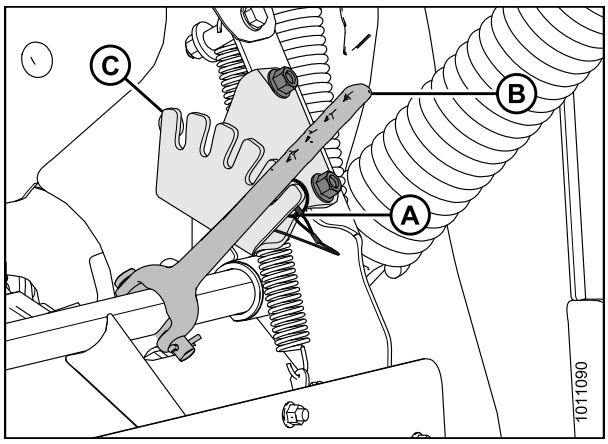

Figure 3.97: Right Side of Conditioner

3.16.6 Conditioning: Finger Type

The finger type conditioner is most commonly used to harvest grass crops. Conditioning is achieved when the finger type rotor moves the crop across the conditioning baffle which strips away the waxy coating from the plants.

The degree to which the crop is conditioned as it passes through the conditioner is controlled by the clearance between the finger and the internal baffle and by the rotational speed of the fingers (refer to *Changing Finger Rotor Speed, page 89*).

Internal Intensity Baffle

Conditioning intensity is controlled by adjusting clearance **'X'** between the rotor and the baffle.

There are seven clearance positions from 5/16—2-3/4 in. (8–71 mm). The setting chosen depends on crop volume and the desired level of conditioning.

The highest clearance setting is recommended for heavy crops, and the lowest clearance setting should be used for maximum conditioning in average crops.

The baffle is located immediately in front of and above the finger rotor and can be positioned as follows:

- To reduce clearance for more conditioning.
- To increase clearance for less conditioning.

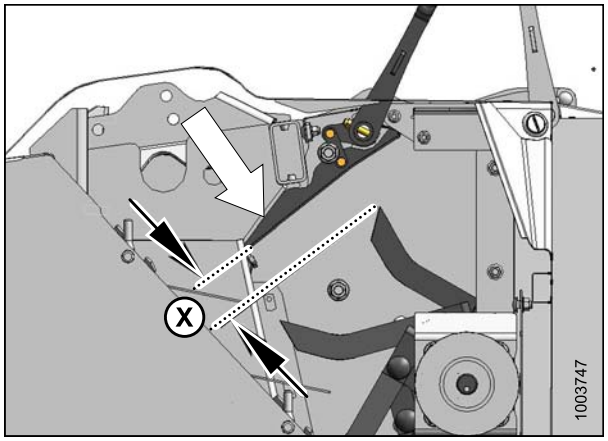

Figure 3.98: Internal Intensity Baffle

Adjusting Internal Intensity Baffle Clearance

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Pull internal intensity baffle adjustment lever (A) in the outboard direction to disengage tab from adjustment plate (B).
2. Position internal intensity baffle adjustment lever (A) as follows:
   - Move lever forward to **lower** baffle and decrease clearance.
   - Move lever backward to **raise** baffle and increase clearance.
3. Release internal intensity baffle adjustment lever (A) so that tab engages hole in adjustment plate (B).

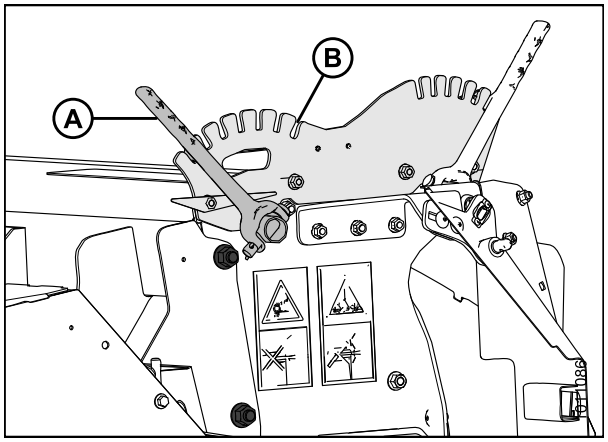

Figure 3.99: Internal Intensity Baffle Adjustment Lever

Finger Rotor Speed

The finger rotor is set to 900 rpm at the factory, but it can be set to operate at 600 rpm or 900 rpm depending on crop conditions, volume, and the desired amount of conditioning.

In sensitive crops, 600 rpm may be a suitable speed to minimize crop damage; in light crops and dry grasses, 900 rpm may be a more effective speed; at 900 rpm, crop damage can occur and power consumption will increase.

Changing Finger Rotor Speed

The following outlines the procedure for changing finger speed change by changing the pulleys:

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

NOTE:

- For **900 rpm**, mount the larger pulley to the conditioner drive gearbox and the smaller pulley to the input shaft of the conditioner assembly.
- For **600 rpm**, mount the smaller pulley to the conditioner drive gearbox, and the larger pulley to the input shaft of the conditioner assembly.

1. Turn jam nut (A) counterclockwise to unlock tension adjustment.
2. Turn jam nut (A) and adjuster nut (B) counterclockwise to fully collapse tensioner spring (C) and release the tension from conditioner drive belt (D).
3. Remove drive belt (D).

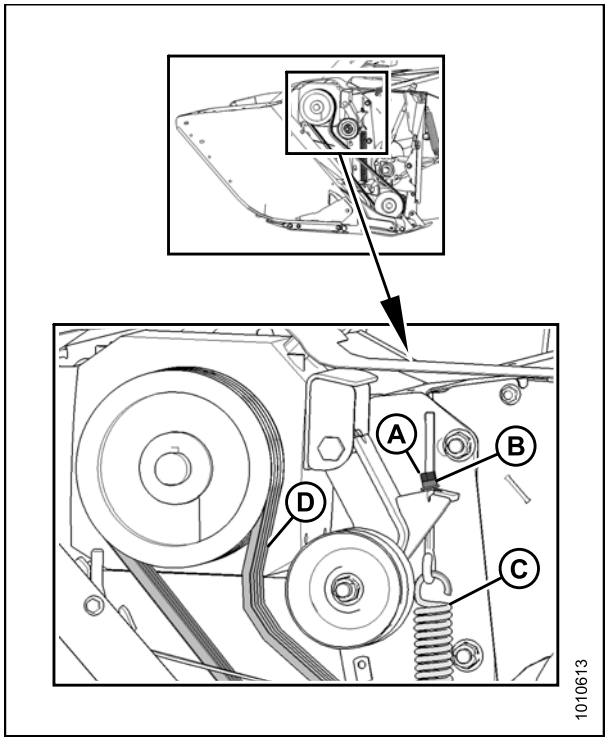

Figure 3.100: Drive Belt and Pulleys on Left Side of Conditioner

4. Measure and record the distance from the shaft end to the taper lock bushing face (A) on both pulleys.
5. Remove three bolts (B) and insert them into the three threaded bores.
6. Apply uniform pressure to the taper lock bushing by slightly tightening each bolt in a circular pattern until the taper lock bushing comes free.
7. Repeat Step *5., page 90* and Step *6., page 90* on the second pulley.
8. Swap the pulleys.

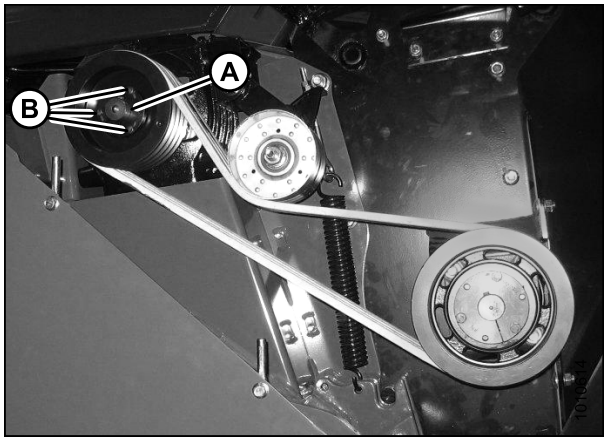

Figure 3.101: Drive Belt and Pulleys on Left Side of Conditioner

9. Slip the taper lock bushing (A) onto the shaft at the same depth measurement recorded in Step *4., page 90*. Pulley will be drawn into taper lock when tightening.
10. Repeat Step *9., page 90* for the second pulley.
11. Verify pulley face alignment by using a long straight edge (verified straight), and bridge both faces to a tolerance of 3/16 in. (5 mm).

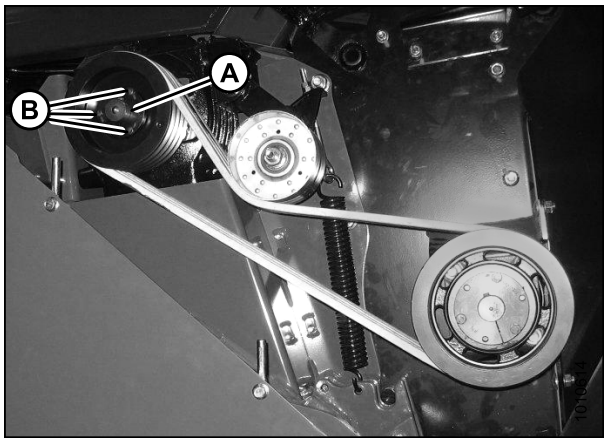

Figure 3.102: Drive Belt and Pulleys on Left Side of Conditioner

12. Install drive belts (A).
13. Remove jam nut (B).
14. Turn adjuster nut (C) to remove all slack from tensioner.

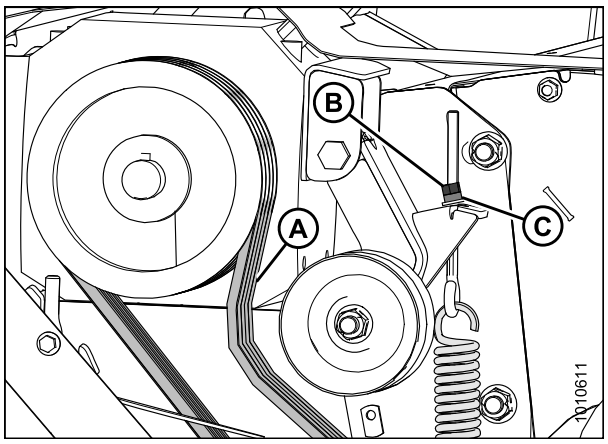

Figure 3.103: Jam Nut and Adjuster Nut on Left Side of Conditioner

15. Measure the length of tensioner spring (A), and turn adjuster nut (B) to adjust spring length to 14-3/8 in. to conform with spring tension decal (C).

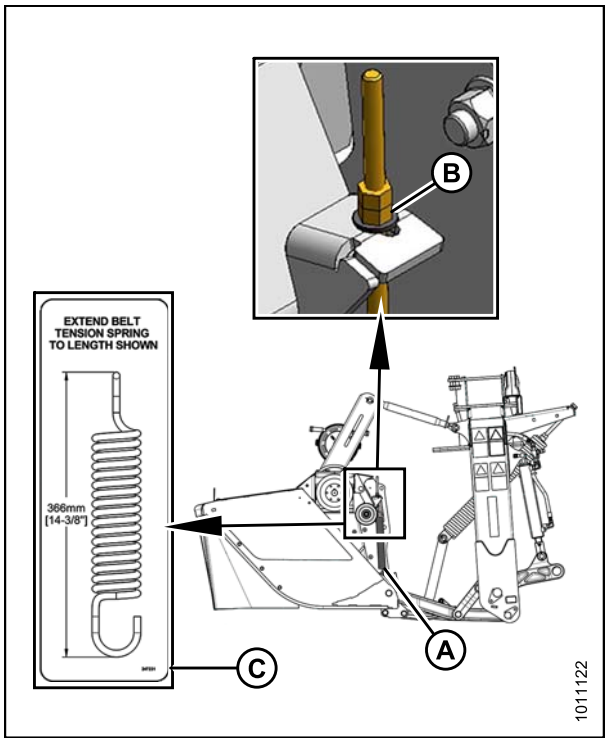

Figure 3.104: Spring Tension Decal

16. Install jam nut (A).
17. Hold a wrench on adjuster nut (B) and turn jam nut (A) clockwise into adjuster nut to lock tension adjustment.
18. Verify that pulleys run true and if any of the pulleys wobble, proceed to Step *1., page 89* and repeat procedure to reinstall taper locks on the affected pulleys.

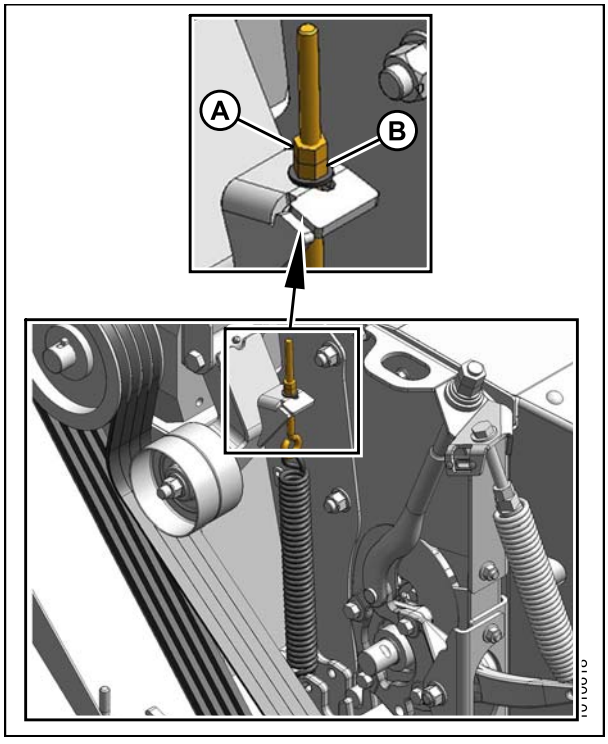

Figure 3.105: Conditioner Drive

Forming Shields: Finger Conditioner

The position of the forming shields controls the width and placement of the windrow. Deciding which forming shield position to use is based on the following factors:

- Weather conditions (rain, sun, humidity, wind)
- Type and yield of crop
- Available drying time
- Method of processing (bales, silage, green-feed)

A wider windrow will generally dry faster and more evenly resulting in less protein loss. Fast drying is especially important in areas where the weather allows only a few days to cut and bale. For more information, refer to *3.17 Haying Tips, page 98*.

A narrower windrow may be preferable for ease of pick-up and when drying is not critical (for example, when cutting for silage or green-feed).

Positioning Side Deflectors: Finger Conditioner

The position of the side deflectors controls the width and placement of the windrow. To ensure windrow placement is centered with respect to the carrier wheels, adjust both side deflectors to the same position.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Loosen handle (A) on cover.
2. Move side deflector (B) to desired position and tighten handle (A).
3. Repeat for other side.

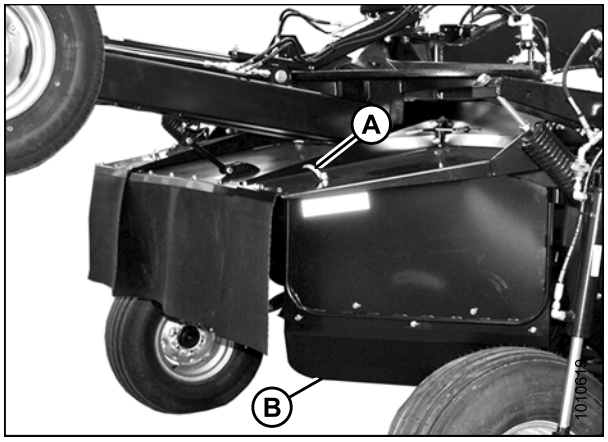

Figure 3.106: Right Side Shown – Left Side Opposite

Positioning Rear Baffle: Finger Conditioner

The rear baffle determines the width and height of the windrow. It is located immediately behind and above the conditioner and can be positioned to do the following:

- Direct the crop flow into the forming shield for narrow and moderate width windrows.
- Direct crop downward to form a wide swath.

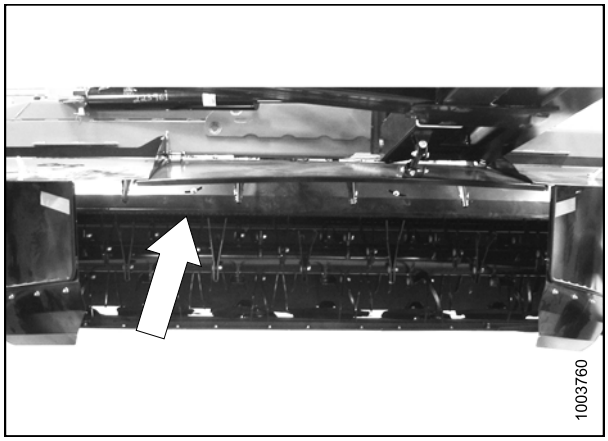

Figure 3.107: Finger Conditioner Rear Baffle

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Pull rear baffle adjustment lever (A) in the outboard direction to disengage tab from adjustment plate (B).
2. Position rear baffle adjustment lever (A) as follows:
   - Move lever forward to **raise** baffle.
   - Move lever backward to **lower** baffle.
3. Release rear baffle adjustment lever (A) so that tab engages hole in adjustment plate (B).

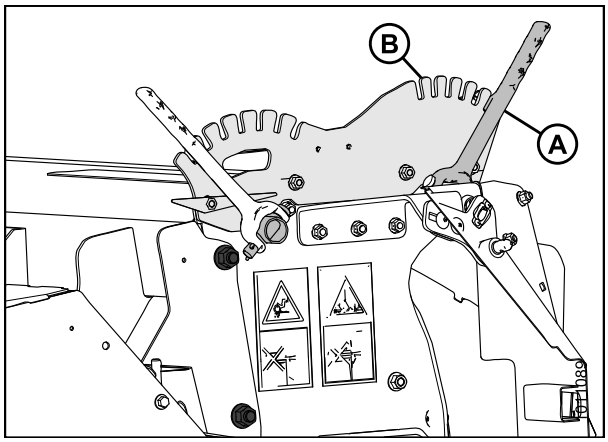

Figure 3.108: Rear Baffle Adjustment Lever

3.16.7 Cutterbar Deflector

Cutterbar deflectors attach to the cutterbar just below the conditioner rolls and provide improved feeding into the conditioner rollers by preventing crop from feeding under the rolls when cutting heavy crops with long stems. Cutterbar deflectors may not be well-suited for are all environments, such as sandy conditions, and and are easily removed or installed in the field.

Removing Cutterbar Deflectors

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

1. Raise mower conditioner fully, shut down tractor, and remove key from ignition.
2. Close lift cylinder safety valves.
3. Clean debris from deflectors and deflector area.

   IMPORTANT:
   Do **NOT** remove plug (B).

4. Remove three bolts (C) securing deflector (A) to cutterbar using an 8 mm hex key and a 16 mm socket and remove deflector.
5. Repeat for other deflector.
6. Store deflectors and hardware in a safe place.

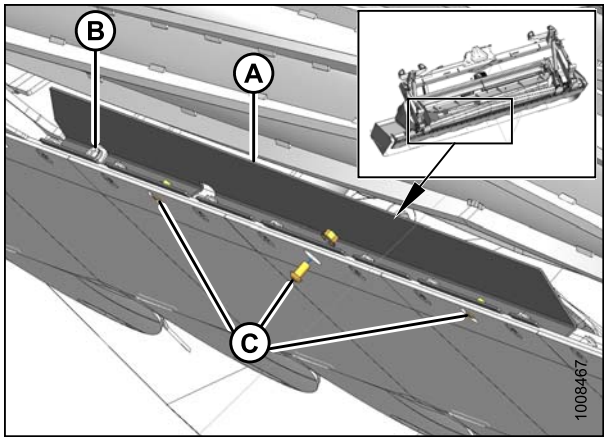

Figure 3.109: Left Cutterbar Deflector Viewed from Underside of Cutterbar

Installing Cutterbar Deflectors

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

1. Raise mower conditioner fully, shut down tractor, and remove key from ignition.
2. Close lift cylinder safety valves.
3. Clean debris from ledge and the six mounting holes along aft edge of cutterbar.
4. Position left deflector (A) (with cut-out for cutterbar drain plug (B)) on top of ledge along the aft end of the cutterbar, and align existing fasteners and cutterbar plug with slots in deflector (A).
5. Install three button hex head socket M10 bolts (C) with locknuts in the holes with the heads facing down.

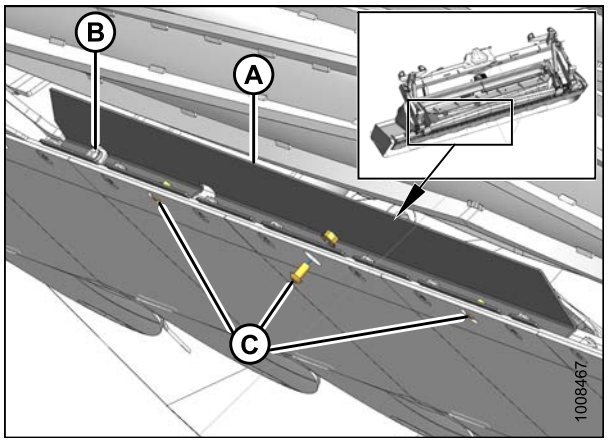

Figure 3.110: Left Cutterbar Deflector Viewed from Underside of Cutterbar

6. Repeat Step *3., page 94* to Step *5., page 94* to install right deflector (A).
7. Align deflectors at position (B) and tighten bolts (C) to specified torque with a 16 mm socket and an 8 mm hex key.

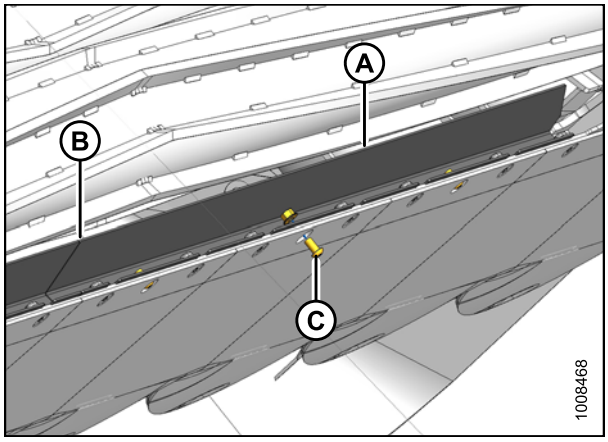

Figure 3.111: Right Cutterbar Deflector Viewed from Underside of Cutterbar

3.16.8 Tall Crop Divider Option

Tall crop dividers (one on each end of the mower conditioner) assist in clean crop dividing and cutterbar entry in tall crops. Tall crop dividers are not adjustable, but they are removable.

Removing Tall Crop Divider

DANGER

Stop engine and remove key from ignition before leaving Operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, shut down tractor and mower conditioner, and remove key.
2. Open cutterbar doors.

Figure 3.112: Cutterbar Doors

3. Remove three bolts (A), and remove deflector (B).
4. Reinstall three bolts (A).
5. Repeat for opposite side.
6. Close cutterbar doors.

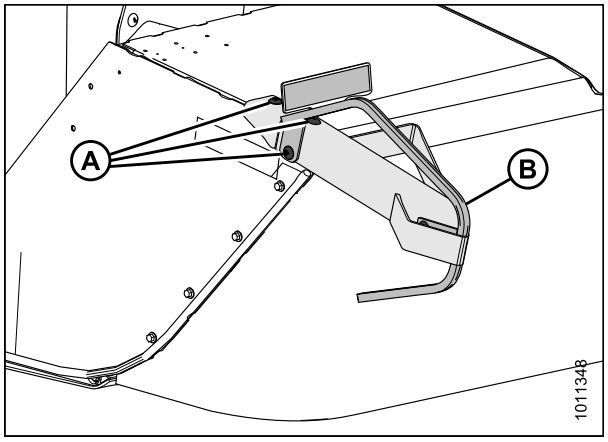

Figure 3.113: Deflector and Hardware

Installing Tall Crop Divider

DANGER

Stop engine, and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, shut down tractor and mower conditioner, and remove key.
2. Open cutterbar doors.

Figure 3.114: Cutterbar Doors

3. Remove three bolts (A) and nuts where the deflector (B) will be mounted.
4. Position deflector (B) on mower conditioner, and reinstall three bolts (A) and nuts. Tighten nuts.
5. Repeat for opposite side.
6. Close cutterbar doors.

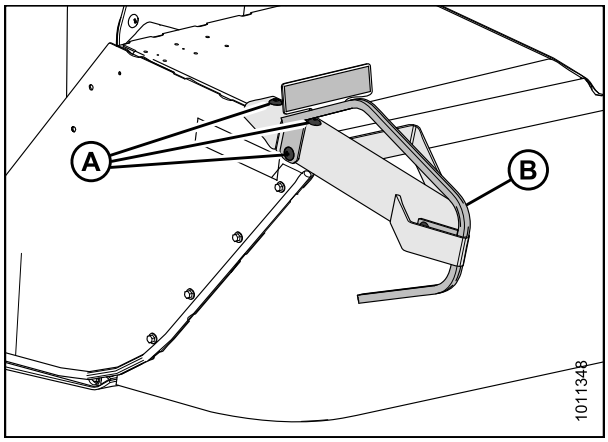

Figure 3.115: Deflector and Hardware

3.17 Haying Tips

3.17.1 Curing

Curing crops quickly helps maintain the highest quality because for each day that hay lies on the ground, 5% of the protein is lost.

Leaving the windrow as wide and fluffy as possible results in the quickest curing. Cured hay should be baled as soon as possible.

3.17.2 Topsoil Moisture

Table 3.9 Topsoil Moisture Levels

Level	% Moisture	Condition
Wet	Over 45%	Soil is muddy
Damp	25–45%	Shows footprints
Dry	Under 25%	Surface is dusty

- On wet soil, the general rule of “wide and thin” does not apply. A narrower windrow will dry faster than hay left flat on wet ground.
- When the ground is wetter than the hay, moisture from the soil is absorbed by the hay above it. Determine topsoil moisture level before cutting. Use a moisture tester or estimate level.
- If ground is wet due to irrigation, wait until soil moisture drops below 45%.
- If ground is wet due to frequent rains, cut when weather allows and let the forage lie on wet ground until it dries to the moisture level of the ground.
- Cut hay will dry only to the moisture level of the ground beneath it, so consider moving the windrow to drier ground.

3.17.3 Weather and Topography

- Cut as much hay as possible by midday when drying conditions are best.
- Fields sloping south get up to 100% more exposure to the sun’s heat than do north sloping fields. If hay is baled and chopped, consider baling the south facing fields and chopping those facing north.
- When relative humidity is high, the evaporation rate is low and hay dries slowly.
- If there is no wind, saturated air becomes trapped around the windrow. Raking or tedding will expose the hay to fresh, less saturated air.
- Cut hay perpendicular to the direction of the prevailing winds if possible.

3.17.4 Windrow Characteristics

Producing windrows with the recommended characteristics will achieve the greatest results. Refer to *3.16 Operating the Mower Conditioner, page 75* for instructions on adjusting the mower conditioner.

Table 3.10 Recommended Windrow Characteristics

Characteristic	Advantage
High and fluffy	Enables airflow through windrow which is more important to the curing process than direct sunlight
Consistent formation (not bunching)	Permits an even flow of material into the baler, chopper, etc.
Even distribution of material across windrow	Results in even and consistent bales to minimize handling and stacking problems
Properly conditioned	Prevents excessive leaf damage

3.17.5 Driving on Windrow

Driving on previously cut windrows that will not be raked can lengthen drying time by a full day. If practical, set forming shields to produce a narrower windrow that the machine can straddle.

NOTE:
Driving on the windrow in high-yield crops may be unavoidable if a full width windrow is necessary.

3.17.6 Raking and Tedding

Raking or tedding speeds up drying; however, the resulting leaf loss may outweigh the benefits. There is little or no advantage to raking or tedding if the ground beneath the windrow is dry.

Large windrows on damp or wet ground should be turned over when moisture levels reach 40–50%. Hay should not be raked or tedded at moisture levels below 25%, however, or excessive yield loss will result.

3.17.7 Using Chemical Drying Agents

Hay drying agents work by removing wax from legume surfaces and enabling water to escape and evaporate faster. However, treated hay lying on wet ground will absorb ground moisture faster.

Before deciding to use a drying agent, carefully compare the relative costs and benefits for your area.

3.18 Leveling the Mower Conditioner

The support linkages are factory-set to provide the proper level for the mower conditioner and should not normally require adjustment. The float springs are **NOT** used to level the mower conditioner.

If the mower conditioner is **NOT** level, check the tire pressure and ensure proper inflation. Refer to *Inflating Tires, page 222*.

Component damage in the mower conditioner support system may occur if the mower conditioner cannot be leveled. See your MacDon Dealer.

3.19 Unplugging the Mower Conditioner

DANGER

Stop tractor engine and remove key before removing plugged material from mower conditioner. A child or even a pet could engage the drive.

1. Stop forward movement of the tractor and stop the power take-off (PTO).
2. Raise the mower conditioner fully, shut down the tractor engine, and remove the key.
3. Engage lift cylinder lock-out valves.

WARNING

Wear heavy gloves when working around cutterbar.

4. Open cutterbar doors and clean off cutterbar or rolls by hand.

Figure 3.116: Cutterbar Doors

4 Maintenance and Servicing

The following instructions provide information about routine mower conditioner service. Detailed maintenance and service information is contained in the technical service manual that is available from your Dealer. A parts catalog is located in a plastic case at the right end of the mower conditioner.

Log hours of operation and use the maintenance record provided (refer to *4.4.1 Maintenance Schedule/Record, page 121*) to keep track of your scheduled maintenance.

4.1 Preparing Machine for Servicing

CAUTION

To avoid personal injury, before servicing mower conditioner or opening drive covers, perform the following procedures:

1. Lower the mower conditioner fully. If necessary to service in the raised position, always close lift cylinder valves.
2. Disengage power take-off (PTO).
3. Stop engine and remove key.
4. Engage park brake.
5. Wait for all moving parts to stop.

4.2 Recommended Safety Procedures

- Park on level surface when possible. Securely block wheels if mower conditioner is parked on an incline. Follow all recommendations in your tractor operator's manual.
- Wear close-fitting clothing and cover long hair. Never wear dangling items such as scarves or bracelets.

Figure 4.1: Safety Around Equipment

- Wear protective shoes with slip-resistant soles, a hard hat, protective glasses or goggles, and heavy gloves.

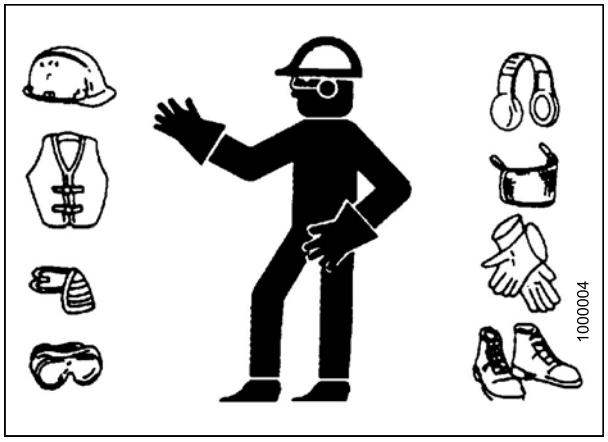

Figure 4.2: Safety Equipment

- Be aware that if more than one person is servicing the machine at the same time, rotating a driveline or other mechanically driven component by hand (for example, to access a lube fitting) will cause drive components in other areas (belts, pulleys, and discs) to move. Stay clear of driven components at all times.

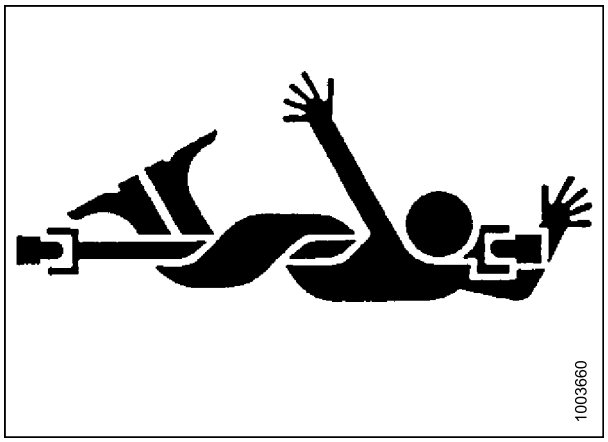

Figure 4.3: Safety Around Equipment

- Be prepared if an accident should occur. Know where the first aid kits and fire extinguishers are located, and know how to use them.

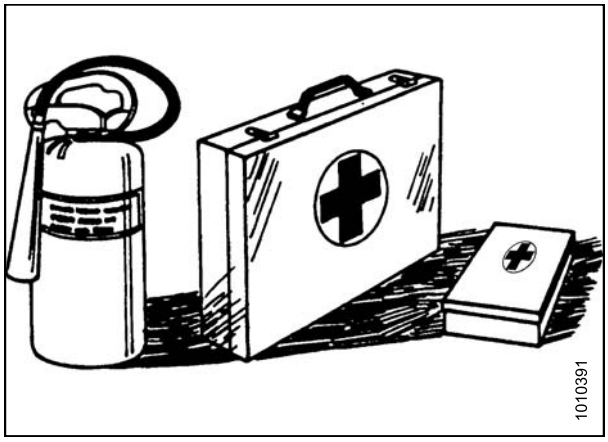

Figure 4.4: Safety Equipment

- Keep the service area clean and dry. Wet or oily floors are slippery. Wet spots can be dangerous when working with electrical equipment. Be sure all electrical outlets and tools are properly grounded.

Figure 4.5: Safety Around Equipment

- Use adequate light for the job at hand.
- Replace all shields removed or opened for service.
- Use only service and repair parts made or approved by the equipment manufacturer. Substituted parts may not meet strength, design, or safety requirements.
- Keep machinery clean. Never use gasoline, naphtha, or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.

4.3 Maintenance Specifications

4.3.1 Recommended Lubricants

Keep your machine operating at top efficiency by using only clean lubricants and by ensuring the following:

- Use clean containers to handle all lubricants.
- Store lubricants in an area protected from dust, moisture, and other contaminants.

IMPORTANT:
Do NOT overfill the cutterbar when adding lubricant. Over filling could result in overheating and failure of cutterbar components.

Table 4.1 Recommended Lubricants

Lubricant	Specification	Description	Use	Capacities
Grease	SAE Multipurpose	High temperature extreme pressure (EP) performance with 1% max. Molybdenum Disulphide (NLGI Grade 2) lithium base	As required unless otherwise specified	—
		High temperature extreme pressure (EP) performance with 10% max. Molybdenum Disulphide (NLGI Grade 2) lithium base	Driveline slip-joints	—
Gear Lubricant	SAE LS 85W-90	High thermal and oxidation stability API service class GL-5	Cutterbar	13-Foot: 8.3 qts (US) (8 liters) 16-Foot: 10.4 qts (US) (10 liters)
	E 85W-140	Gear lubricant API service class GL-5	Conditioner drive gearbox	0.5 qts (US) (0.7 liters)
			Mower conditioner drive gearbox	1.9 qts (US) (1.8 liters)
			Front and rear swivel gearbox	Upper: 1.3 qts (US) (1.3 liters) Lower: 2 qts (US) (1.9 liters)

4.3.2 Torque Specifications

The following tables provide the correct torque values for various bolts, cap screws, and hydraulic fittings.

- Tighten all bolts to the torque values specified in the charts (unless otherwise noted throughout this manual).
- Replace hardware with the same strength and grade of bolt.
- Use the torque value tables as a guide and periodically check tightness of bolts.
- Understand torque categories for bolts and cap screws by using their identifying head markings.

SAE Bolt Torque Specifications

Torque values shown in the following tables are valid for non-greased, or non-oiled threads and heads; therefore, do **NOT** grease or oil bolts or cap screws unless otherwise specified in this manual.

Table 4.2 SAE Grade 5 Bolt and Grade 5 Free Spinning Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
1/4-20	*106	*117	11.9	13.2
5/16-18	*218	*241	24.6	27.1
3/8-16	32	36	44	48
7/16-14	52	57	70	77
1/2-13	79	87	106	118
9/16-12	114	126	153	170
5/8-11	157	173	212	234
3/4-10	281	311	380	420
7/8-9	449	496	606	669
1-8	611	676	825	912

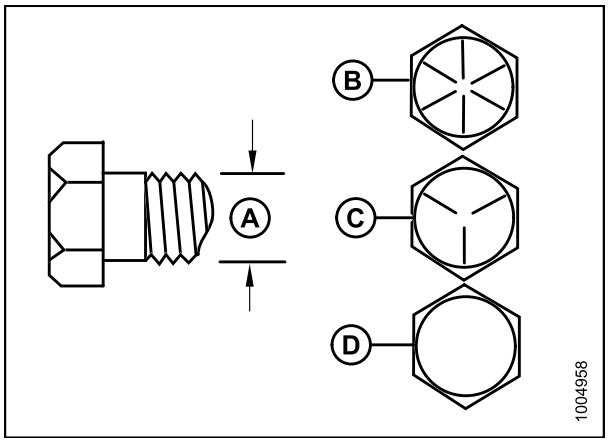

Figure 4.6: Bolt Grades

A - Nominal Size **B - SAE-8**
C - SAE-5 **D - SAE-2**

Table 4.3 SAE Grade 5 Bolt and Grade F Distorted Thread Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
1/4-20	*72	*80	8.1	9
5/16-18	*149	*164	16.7	18.5
3/8-16	22	24	30	33
7/16-14	35	39	48	53
1/2-13	54	59	73	80
9/16-12	77	86	105	116
5/8-11	107	118	144	160
3/4-10	192	212	259	286
7/8-9	306	338	413	456
1-8	459	507	619	684

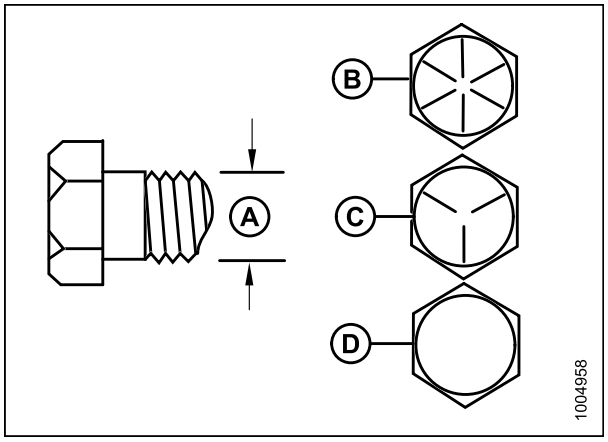

Figure 4.7: Bolt Grades

A - Nominal Size **B - SAE-8**
C - SAE-5 **D - SAE-2**

Table 4.4 SAE Grade 8 Bolt and Grade G Distorted Thread Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
1/4-20	*150	*165	16.8	18.6
5/16-18	18	19	24	26
3/8-16	31	34	42	46
7/16-14	50	55	67	74
1/2-13	76	84	102	113
9/16-12	109	121	148	163
5/8-11	151	167	204	225
3/4-10	268	296	362	400
7/8-9	432	477	583	644
1-8	647	716	874	966

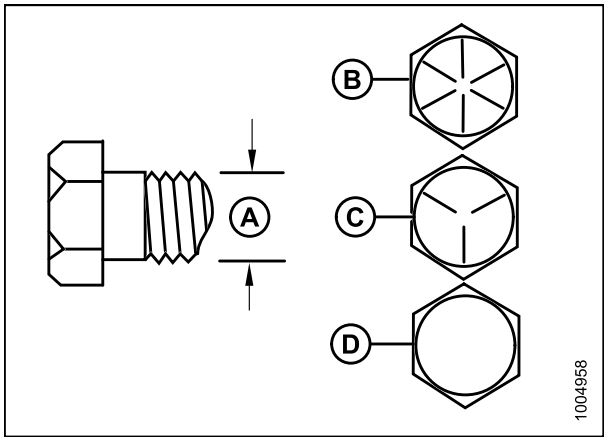

Figure 4.8: Bolt Grades

A - Nominal Size **B - SAE-8**
C - SAE-5 **D - SAE-2**

Table 4.5 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
1/4-20	*150	*165	16.8	18.6
5/16-18	26	28	35	38
3/8-16	46	50	61	68
7/16-14	73	81	98	109
1/2-13	111	123	150	166
9/16-12	160	177	217	239
5/8-11	221	345	299	330
3/4-10	393	435	531	587
7/8-9	633	700	855	945
1-8	863	954	1165	1288

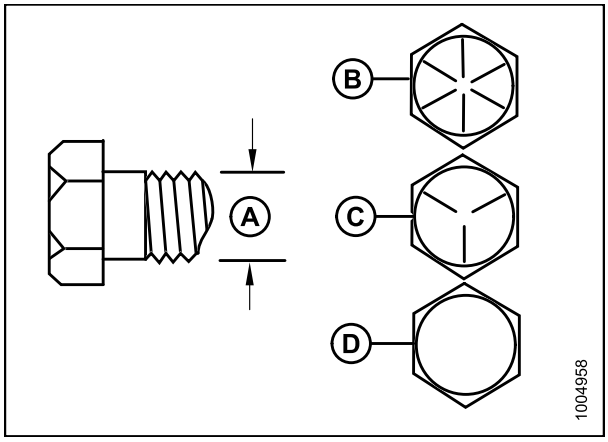

Figure 4.9: Bolt Grades

A - Nominal Size **B - SAE-8**
C - SAE-5 **D - SAE-2**

Metric Bolt Specifications

Table 4.6 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
3-0.5	*13	*14	1.4	1.6
3.5-0.6	*20	*22	2.2	2.5
4-0.7	*29	*32	3.3	3.7
5-0.8	*59	*66	6.7	7.4
6-1.0	*101	*112	11.4	12.6
8-1.25	20	23	28	30
10-1.5	40	45	55	60
12-1.75	70	78	95	105
14-2.0	113	124	152	168
16-2.0	175	193	236	261
20-2.5	341	377	460	509
24-3.0	589	651	796	879

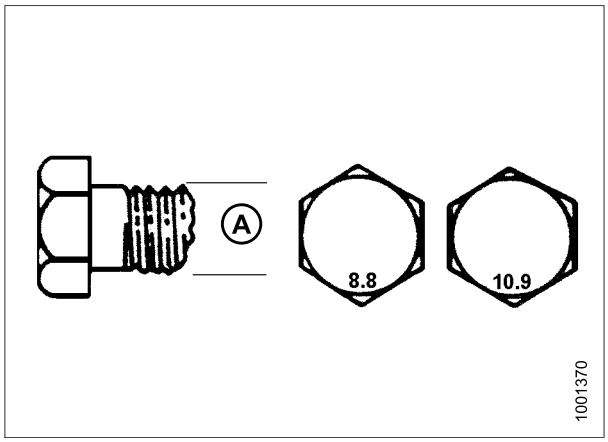

Figure 4.10: Bolt Grades

Table 4.7 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
3-0.5	*9	*10	1	1.1
3.5-0.6	*14	*15	1.5	1.7
4-0.7	*20	*22	2.3	2.5
5-0.8	*40	*45	4.5	5
6-1.0	*69	*76	7.7	8.6
8-1.25	*167	*185	18.8	20.8
10-1.5	28	30	37	41
12-1.75	48	53	65	72
14-2.0	77	85	104	115
16-2.0	119	132	161	178
20-2.5	233	257	314	347
24-3.0	402	444	543	600

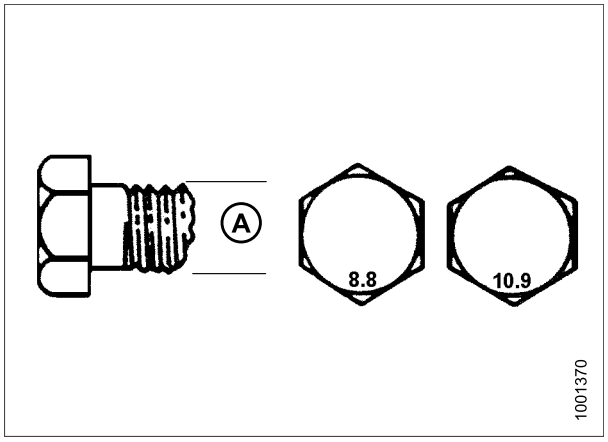

Figure 4.11: Bolt Grades

Table 4.8 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
3-0.5	*18	*19	1.8	2
3.5-0.6	*27	*30	2.8	3.1
4-0.7	*41	*45	4.2	4.6
5-0.8	*82	*91	8.4	9.3
6-1.0	*140	*154	14.3	15.8
8-1.25	28	31	38	42
10-1.5	56	62	75	83
12-1.75	97	108	132	145
14-2.0	156	172	210	232
16-2.0	242	267	326	360
20-2.5	472	521	637	704
24-3.0	815	901	1101	1217

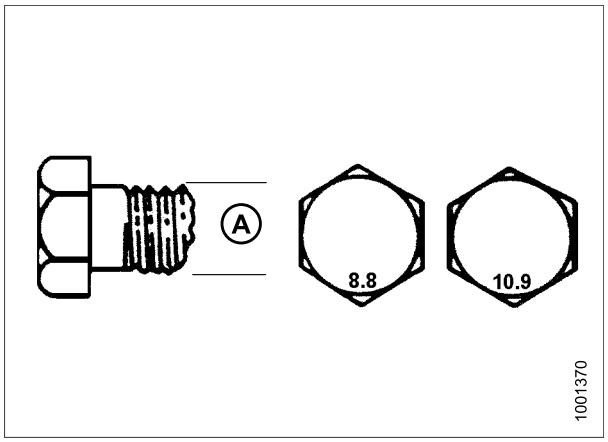

Figure 4.12: Bolt Grades

Table 4.9 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

Nominal Size (A)	Torque (ft·lbf) (*in·lbf)		Torque (N·m)	
	Min.	Max.	Min.	Max.
3-0.5	*12	*13	1.3	1.5
3.5-0.6	*19	*21	2.1	2.3
4-0.7	*28	*31	3.1	3.4
5-0.8	*56	*62	6.3	7
6-1.0	*95	*105	10.7	11.8
8-1.25	19	21	26	29
10-1.5	38	42	51	57
12-1.75	66	73	90	99
14-2.0	106	117	143	158
16-2.0	165	182	222	246
20-2.5	322	356	434	480
24-3.0	556	614	750	829

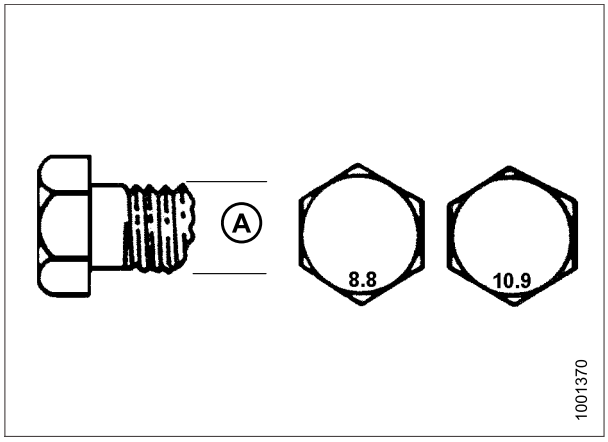

Figure 4.13: Bolt Grades

Metric Bolt Specifications Bolting into Cast Aluminum

Table 4.10 Metric Bolt Bolting into Cast Aluminum

Nominal Size (A)	Bolt Torque			
	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	ft·lbf	N·m	ft·lbf	N·m
M3	–	–	1	–
M4	–	–	2.6	4
M5	–	–	5.5	8
M6	6	9	9	12
M8	14	20	20	28
M10	28	40	40	55
M12	52	70	73	100
M14	–	–	–	–
M16	–	–	–	–

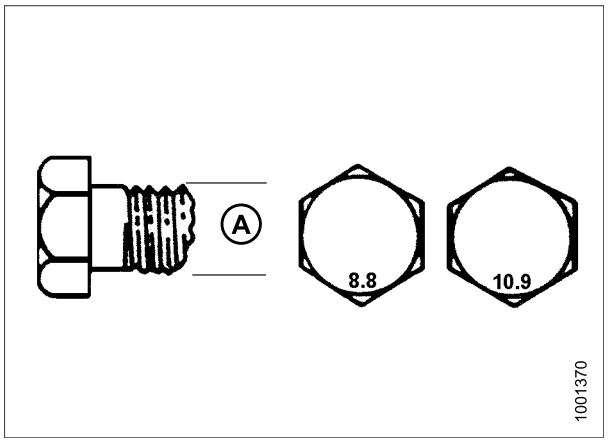

Figure 4.14: Bolt Grades

Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D), and thread nut (E) onto fitting without lubrication until contact has been made between the flared surfaces.
3. Torque the fitting nut (E) to the specified number of flats from finger tight (FFFT) or to a given torque value shown in Table *4.11 Flare-Type Hydraulic Tube Fittings, page 113*.
4. Use two wrenches to prevent fitting (D) from rotating. Place one wrench on the fitting body (D), and tighten nut (E) with the other wrench to the torque shown.
5. Assess the final condition of the connection.

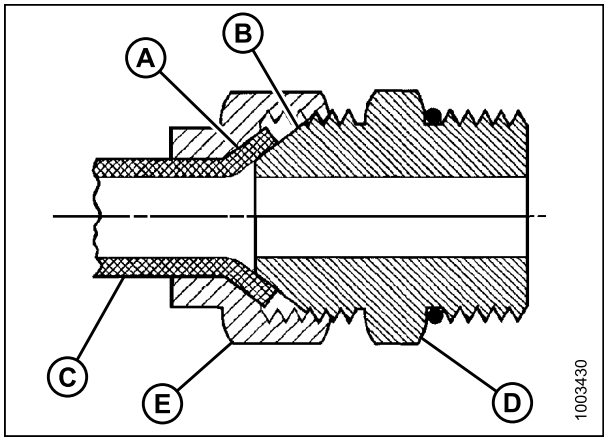

Figure 4.15: Hydraulic Fitting

Table 4.11 Flare-Type Hydraulic Tube Fittings

SAE No.	Tube Size O.D.(in.)	Thread Size (in.)	Nut Size Across Flats (in.)	Torque Value[6]		Flats from Finger Tight (FFFT)	
				ft·lbf	N·m	Flats	Turns
3	3/16	3/8	7/16	6	8	1	1/6
4	1/4	7/16	9/16	9	12	1	1/6
5	5/16	1/2	5/8	12	16	1	1/6
6	3/8	9/16	11/16	18	24	1	1/6
8	1/2	3/4	7/8	34	46	1	1/6
10	5/8	7/8	1	46	62	1	1/6
12	3/4	1-1/16	1-1/4	75	102	3/4	1/8
14	7/8	1-3/8	1-3/8	90	122	3/4	1/8
16	1	1-5/16	1-1/2	105	142	3/4	1/8

6. Torque values shown are based on lubricated connections as in reassembly.

O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Back off the lock nut (C) as far as possible. Ensure that washer (D) is loose and is pushed toward the lock nut (C) as far as possible.
3. Check that O-ring (A) is **NOT** on the threads and adjust if necessary.
4. Apply hydraulic system oil to the O-ring (A).

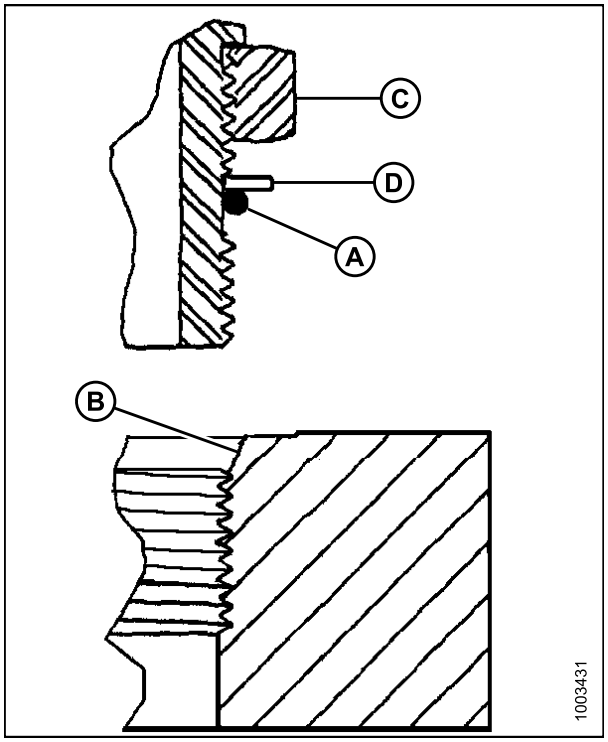

Figure 4.16: Hydraulic Fitting

5. Install fitting (B) into port until back up washer (D) and O-ring (A) contact the part face (E).
6. Position angle fittings by unscrewing no more than one turn.
7. Turn lock nut (C) down to washer (D) and tighten to torque shown. Use two wrenches, one on fitting (B) and the other on lock nut (C).
8. Check the final condition of the fitting.

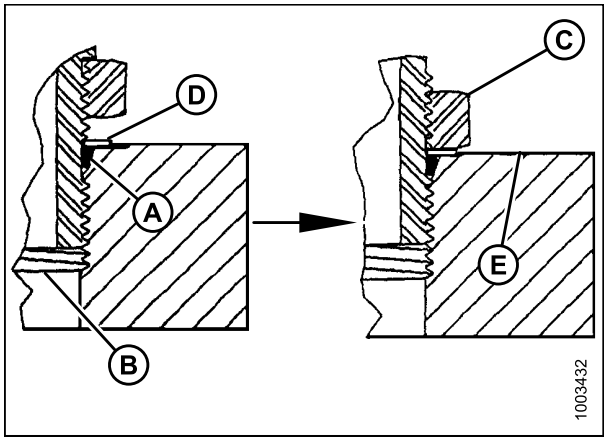

Figure 4.17: Hydraulic Fitting

Table 4.12 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value[7]	
		ft·lbf (*in·lbf)	N·m
-3	3/8-24	*106–115	12–13
-4	7/16–20	14–15	19–21
-5	1/2–20	15–24	21–33
-6	9/16–18	19–21	26–29
-8	3/4–16	34–37	46–50
-10	7/8–14	55–60	75–82
-12	1-1/16-12	88–97	120–132
-14	1-3/8-12	113–124	153–168
-16	1-5/16-12	130–142	176–193
-20	1-5/8-12	163–179	221–243
-24	1-7/8-12	199–220	270–298

7. Torque values shown are based on lubricated connections as in reassembly.

O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is **NOT** on the threads and adjust if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting (C) into port until fitting is hand tight.
5. Torque fitting (C) according to the values in Table *4.13 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable), page 116*.
6. Check the final condition of the fitting.

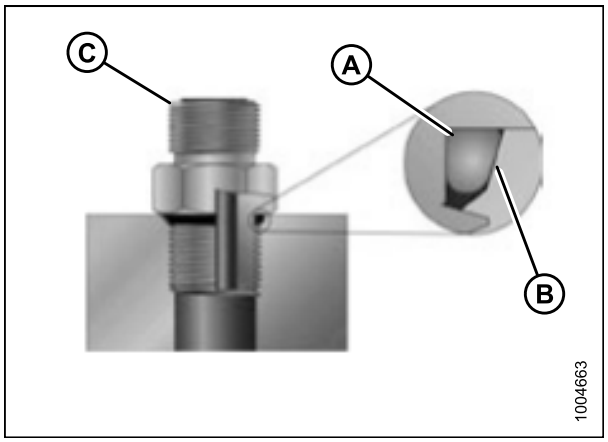

Figure 4.18: Hydraulic Fitting

Table 4.13 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

SAE Dash Size	Thread Size (in.)	Torque Value[8]	
		ft·lbf (*in·lbf)	N·m
-3	3/8-24	*106–115	12–13
-4	7/16–20	14–15	19–21
-5	1/2–20	15–24	21–33
-6	9/16–18	19–21	26–29
-8	3/4–16	34–37	46–50
-10	7/8–14	55–60	75–82
-12	1-1/16-12	88–97	120–132
-14	1-3/8-12	113–124	153–168
-16	1-5/16-12	130–142	176–193
-20	1-5/8-12	163–179	221–243
-24	1-7/8-12	199–220	270–298

8. Torque values shown are based on lubricated connections as in reassembly.

O-Ring Face Seal (ORFS) Hydraulic Fittings

1. Check components to ensure that the sealing surfaces and fitting threads are free of burrs, nicks, scratches, or any foreign material.

Figure 4.19: Hydraulic Fitting

2. Apply hydraulic system oil to the O-ring (B).
3. Align the tube or hose assembly so that the flat face of the sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fittings according to the values in Table *4.14 O-Ring Face Seal (ORFS) Hydraulic Fittings, page 118*.

   NOTE:
   If applicable, hold the hex on the fitting body (E) to prevent rotation of fitting body and hose when tightening the fitting nut (D).

6. Use three wrenches when assembling unions or joining two hoses together.
7. Check the final condition of the fitting.

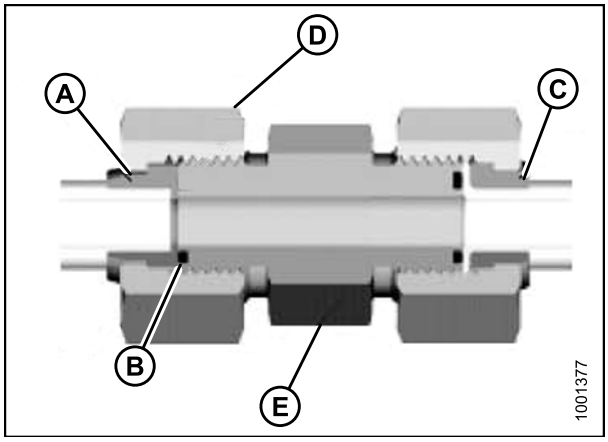

Figure 4.20: Hydraulic Fitting

Table 4.14 O-Ring Face Seal (ORFS) Hydraulic Fittings

SAE Dash Size	Thread Size (in.)	Torque Value[9]	
		ft·lbf (*in·lbf)	N·m
-3	Note[10]	–	–
-4	9/16–18	18–21	25–28
-5	Note[10]	–	–
-6	11/16-16	29–32	40–44
-8	13/16-16	41–45	55–61
-10	1–14	59–65	80–88
-12	1-3/16-12	85–94	115–127
-14	Note[10]	–	–
-16	1-7/16-12	111–122	150–165
-20	1-11/16-12	151–167	205–226
-24	2–12	232–256	315–347
-32	2-1/2-12	376–414	510–561

9. Torque values and angles shown are based on lubricated connection as in reassembly.
10. O-ring face seal type end not defined for this tube size.

4.3.3 Conversion Chart

Table 4.15 Conversion Chart

Quantity	Inch-Pound Units		Factor	SI Units (Metric)	
	Unit Name	Abbreviation		Unit Name	Abbreviation
Area	Acres	acres	x 0.4047 =	Hectares	ha
Flow	Us gallons per minute	gpm	x 3.7854 =	Liters per Minute	L/min
Force	Pounds force	lbf	x 4.4482 =	Newtons	N
Length	Inch	in.	x 25.4 =	Millimeters	mm
	Foot	ft.	x 0.305 =	Meters	m
Power	Horsepower	hp	x 0.7457 =	Kilowatts	kW
Pressure	Pounds per square inch	psi	x 6.8948 =	Kilopascals	kPa
			x .00689 =	Megapascals	MPa
			÷ 14.5038 =	Bar (Non-SI)	bar
Torque	Pound feet or foot pounds	ft·lbf	x 1.3558 =	Newton Meters	N·m
	Pound inches or inch pounds	in·lbf	x 0.1129 =	Newton Meters	N·m
Temperature	Degrees Fahrenheit	˚F	(˚F-32) x 0.56 =	Celsius	˚C
Velocity	Feet per minute	ft/min	x 0.3048 =	Meters per Minute	m/min
	Feet per second	ft/s	x 0.3048 =	Meters per Second	m/s
	Miles per hour	mph	x 1.6063 =	Kilometres per Hour	km/h
Volume	Us gallons	US gal	x 3.7854 =	Liters	L
	Ounces	oz.	x 29.5735 =	Milliliters	ml
	Cubic inches	$in.^3$	x 16.3871 =	Cubic Centimetres	cm^3 or cc
Weight	Pounds	lbs	x 0.4536 =	Kilograms	kg

4.4 Maintenance Requirements

Periodic maintenance requirements are organized according to service intervals.

Regular maintenance is the best insurance against early wear and untimely breakdowns. Following the maintenance schedule will increase your machine's life.

When servicing the machine, refer to the specific headings in this section and use only fluids and lubricants specified in *4.3.1 Recommended Lubricants, page 106*.

Log hours of operation, use the maintenance record, and keep copies of your maintenance records (refer to *4.4.1 Maintenance Schedule/Record, page 121*).

If a service interval specifies more than on timeframe, e.g., "100 hours or Annually", service the machine at whichever interval is reached first.

IMPORTANT:
Recommended intervals are for average conditions. Service the machine more often if operating under adverse conditions (severe dust, extra heavy loads, etc.).

CAUTION

Carefully follow all safety messages, refer to *4.2 Recommended Safety Procedures, page 104*.

4.4.1 Maintenance Schedule/Record

ACTION:	✓ - Check	♦ - Lubricate	▲ - Change

✎	Hour Meter Reading																	
✎	Service Date																	
✎	Serviced By																	
FIRST USE		Refer to *4.4.2 Break-In Inspections, page 123*																
100 HOURS OR ANNUALLY		Refer to *4.4.3 Preseason Servicing, page 123*. It is recommended that annual maintenance be done prior to the start of the operating season.																
✓	Wheel Bolt Torque - Refer to *Checking Wheel Bolts, page 220*.																	
♦	Wheel Hub Bearings - Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.																	
✓	Conditioner Drive Belt - Refer to *4.6.5 Conditioner Drive Belt, page 207*.																	
✓	Roll Conditioner Drive Gearbox - Refer to *4.6.6 Conditioner Drive Gearbox, page 211*.																	
✓	Mower Conditioner Drive Gearbox Lube Level - Refer to *4.6.7 Mower Conditioner Drive Gearbox, page 213*.																	
✓	Driveline Gearboxes (4) Lube Levels - Refer to *4.6.8 Forward and Rear Swivel Gearboxes, page 219*.																	
END OF SEASON		Refer to *4.4.4 End-of-Season Servicing, page 124*																
10 HOURS OR DAILY																		
♦	Hydraulic Hoses and Lines - Refer to *4.7.1 Hydraulic Hoses and Lines, page 224*.	**NOTE: MacDon recommends keeping a record of daily maintenance as evidence of a properly maintained machine; however, daily maintenance records are not required to meet normal warranty conditions.**																
♦	Cutter Blades, Deflectors and Discs - Refer to *4.5 Cutterbar, page 136*.																	
▲	Tire Pressure - Refer to *Inflating Tires, page 222*.																	
25 HOURS																		
♦	Lower Link Pivots - Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.	**NOTE: MacDon recommends keeping a record of daily maintenance as evidence of a properly maintained machine; however, daily maintenance records are not required to meet normal warranty conditions.**																
♦	Hitch Pivot - Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.																	
▲	Roll Conditioner Drive Gearbox - Refer to *4.6.6 Conditioner Drive Gearbox, page 211*.																	
♦	Drive Belt Tensioner - Refer to *4.6.5 Conditioner Drive Belt, page 207*.																	
♦	Roll/Finger Shaft Bearings - Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.																	

50 HOURS																			
♦	Cutterbar Lube (First 50 and 250 hours) - Refer to *Checking Lubricant Level, page 136*.																		
♦	Roll Universal Shafts - Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.																		
♦	Hitch Driveline Universals - Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.																		
♦	PTO Shaft and Universals - Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.																		
▲	Mower Conditioner Drive Gearbox Lube (First 50 and 250 hours) - Refer to *4.6.7 Mower Conditioner Drive Gearbox, page 213*.																		
▲	Driveline Gearboxes (4) Lube (First 50 and 250 hours) - Refer to *4.6.8 Forward and Rear Swivel Gearboxes, page 219*.																		
250 HOURS																			
▲	Cutterbar Lube - Refer to *Checking Lubricant Level, page 136*.																		
▲	Roll Conditioner Drive Gearbox - Refer to *4.6.6 Conditioner Drive Gearbox, page 211*.																		
▲	Mower Conditioner Drive Gearbox Lube - Refer to *4.6.7 Mower Conditioner Drive Gearbox, page 213*.																		
▲	Driveline Gearboxes (4) Lube - Refer to *4.6.8 Forward and Rear Swivel Gearboxes, page 219*.																		

4.4.2 Break-In Inspections

Table 4.16 Break-In Inspection Schedule

Inspection Interval	Item	Refer to
1 Hour	Wheel bolts	*Checking Wheel Bolts, page 220*
5 Hours	Check for loose hardware and tighten to required torque.	*4.3.2 Torque Specifications, page 106*
	Check drive belt tension.	*Inspecting Conditioner Drive Belt, page 207*
25 Hours	Check drive belt tension.	*Inspecting Conditioner Drive Belt, page 207*
50 Hours	Check drive belt tension.	*Inspecting Conditioner Drive Belt, page 207*
	Change cutterbar lubricant.	*4.5.1 Cutterbar Lubrication, page 136*. **Use only specified amount. Do NOT overfill.**
	Change roll conditioner drive gearbox lubricant.	*4.6.6 Conditioner Drive Gearbox, page 211*
	Change swivel gearbox (4) lubricant.	*4.6.8 Forward and Rear Swivel Gearboxes, page 219*
	Change mower conditioner drive gearbox lubricant.	*4.6.7 Mower Conditioner Drive Gearbox, page 213*
250 Hours	Change cutterbar lubricant.	*4.5.1 Cutterbar Lubrication, page 136*
	Change swivel gearbox (4) lubricant.	*4.6.8 Forward and Rear Swivel Gearboxes, page 219*
	Change mower conditioner drive gearbox lubricant.	*4.6.7 Mower Conditioner Drive Gearbox, page 213*

4.4.3 Preseason Servicing

CAUTION

- **Review the operator's manual to refresh your memory on safety and operating recommendations.**
- **Review all safety signs and other decals on the mower conditioner and note hazard areas.**
- **Ensure all shields and guards are properly installed and secured. Never alter or remove safety equipment.**
- **Make certain you understand and have practiced safe use of all controls. Know the capacity and the operating characteristics of the machine.**
- **Check the first aid kit and fire extinguisher. Know where they are and how to use them.**

Perform the following procedures at the beginning of each operating season:

1. Lubricate machine completely. Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.
2. Check tire pressure and adjust as required. Refer to *Inflating Tires, page 222*.
3. Perform all annual maintenance. Refer to *4.4.1 Maintenance Schedule/Record, page 121*.

4.4.4 End-of-Season Servicing

Perform the following procedures at the end of each operating season:

CAUTION

Never use gasoline, naphtha, or any volatile material for cleaning purposes. These materials may be toxic and/or flammable.

CAUTION

Cover cutterbar to prevent injury from accidental contact.

1. Clean the mower conditioner thoroughly.
2. Store in a dry, protected place if possible. If stored outside, always cover mower conditioner with a waterproof canvas or other protective material.
3. Raise mower conditioner and engage lift cylinder lock-outs.
4. Use blocks to take the weight off the mower conditioner's tires if possible.
5. Repaint all worn or chipped painted surfaces to prevent rust.
6. Loosen drive belt.
7. Lubricate the mower conditioner thoroughly leaving excess grease on fittings to keep moisture out of bearings.
8. Apply grease to exposed threads, cylinder rods, and sliding surfaces of components.
9. Oil cutterbar components to prevent rust.
10. Check for worn components and repair as necessary.
11. Check for broken components and order replacements from your Dealer. Immediate repair of these items will save time and effort at beginning of next season.
12. Replace or tighten any missing or loose hardware. Refer to *4.3.2 Torque Specifications, page 106*.
13. Remove divider rods (if equipped) to reduce space required for inside storage.

4.4.5 Lubricating the Mower Conditioner

WARNING

To avoid personal injury, before servicing mower conditioner or opening drive covers, refer to *4.1 Preparing Machine for Servicing, page 103*.

Greasing points are marked on the machine by decals showing a grease gun and the grease interval in hours of operation.

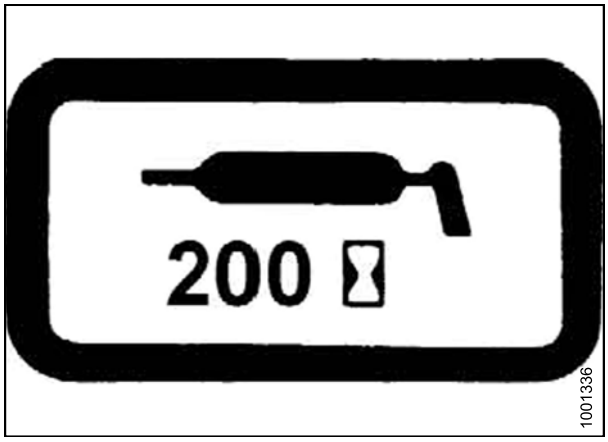

Figure 4.21: Grease Interval Decal

Log hours of operation and use the maintenance schedule provided to keep a record of scheduled maintenance. Refer to *4.4.1 Maintenance Schedule/Record, page 121*.

Greasing Procedure

CAUTION

Stop engine, and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Open driveshields at ends of mower conditioner to access greasing points. Refer to *3.2.1 Opening Driveshields, page 33*.
2. Use only recommended lubricants specified in this manual. Refer to *4.3.1 Recommended Lubricants, page 106*.
3. Wipe grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
4. Inject grease through fitting with grease gun until grease overflows fitting, except where noted.
5. Leave excess grease on fitting to keep out dirt.
6. Replace any loose or broken fittings immediately.
7. If fitting will NOT take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.
8. Use clean High Temperature Extreme Pressure grease only.

Service Intervals

Every 25 Hours

NOTE:
Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

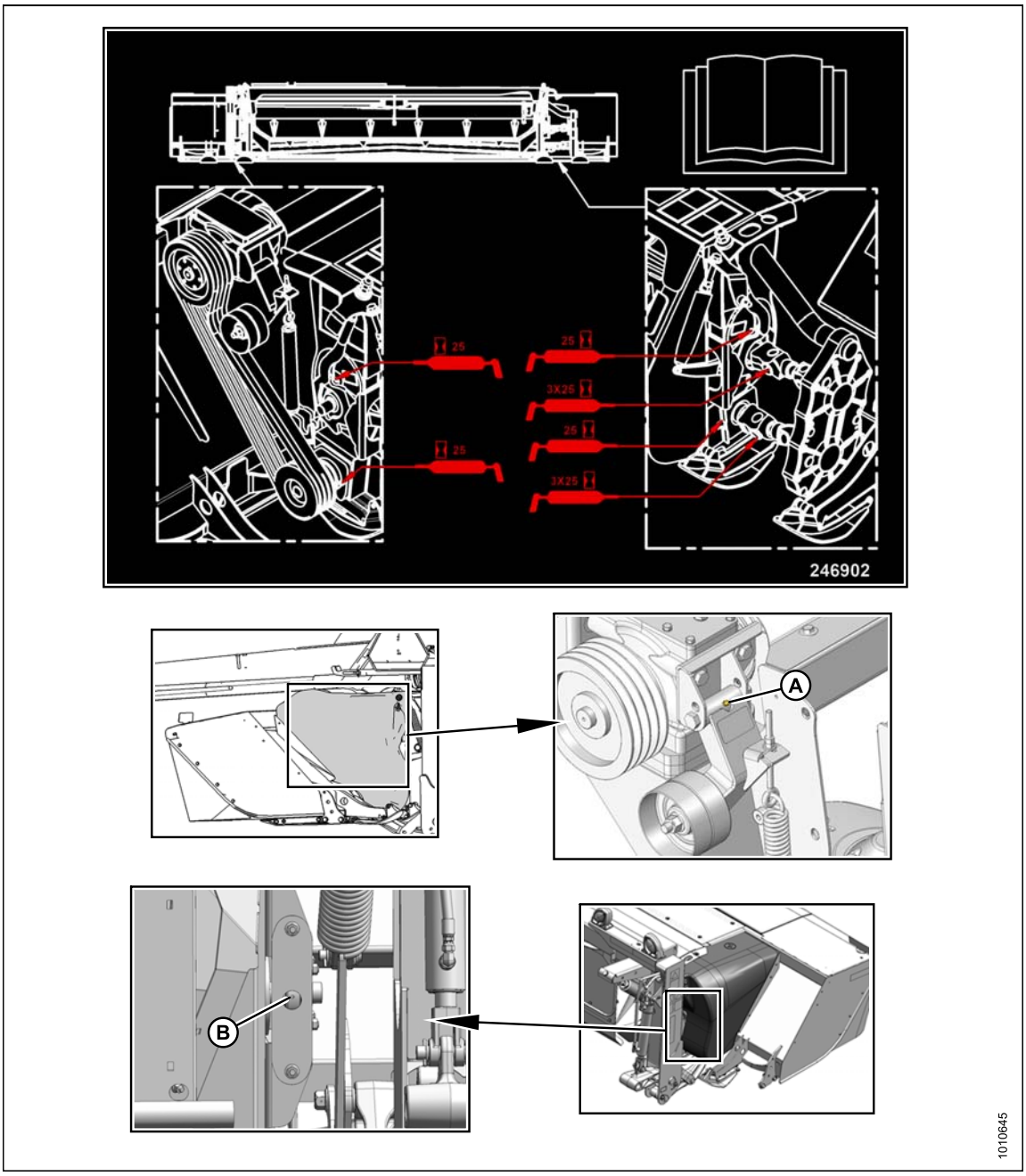

Figure 4.22: Every 25 Hours

A - Conditioner Drive Idler

B - Bearing for Finger-Type Conditioner

NOTE:
Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

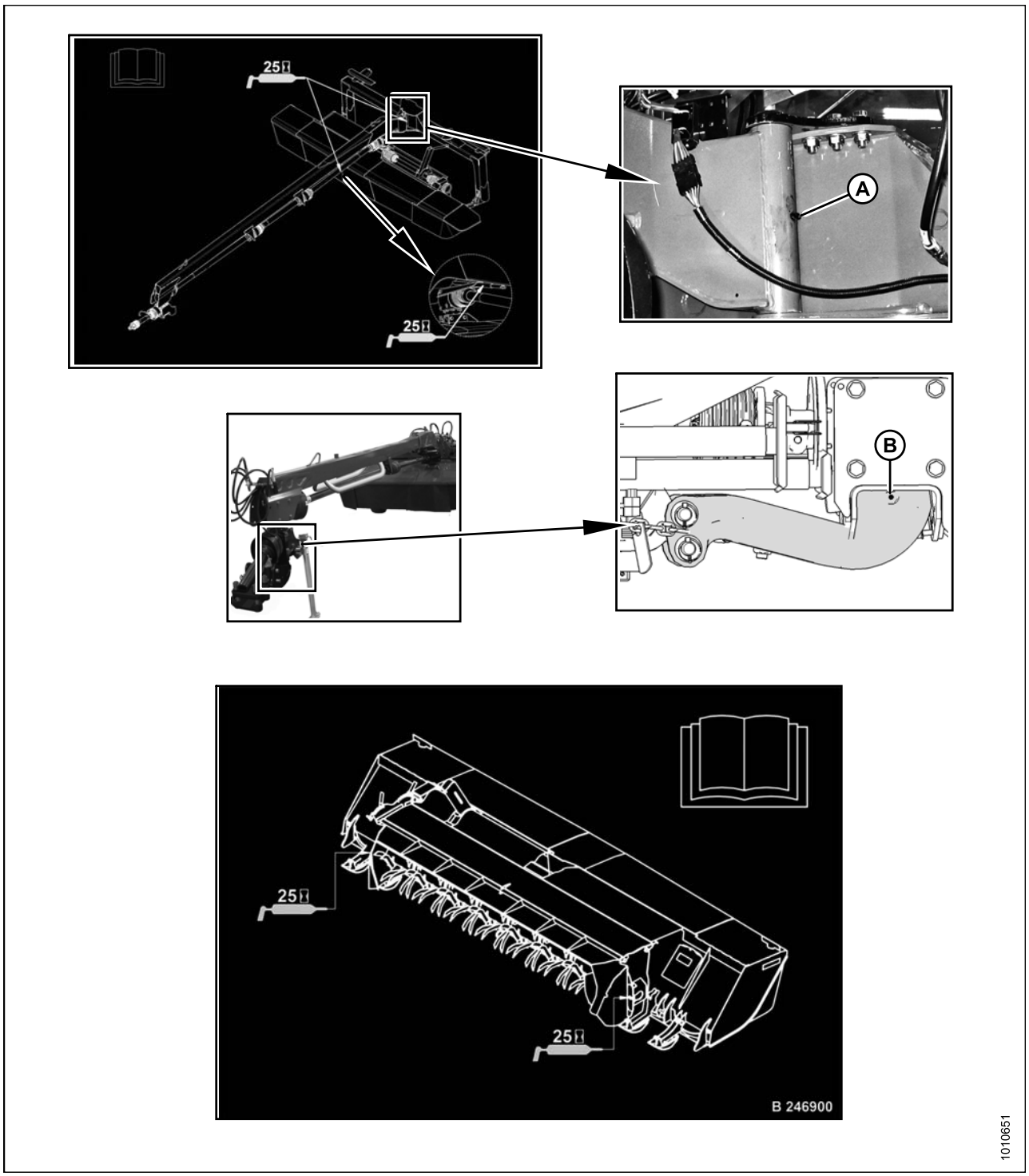

Figure 4.23: Every 25 Hours

A - Hitch Steering Pivot

B - Tractor Hitch Pivot

NOTE:
It may be necessary to remove and replace the driveline shield cones during the greasing procedure. Refer to *3.3 Driveline Shield Cone, page 36* for more information.

NOTE:
Use High Temperature Extreme Pressure (EP2) Performance with 10% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

1. Apply grease to driveline slip-joint grease zerks.

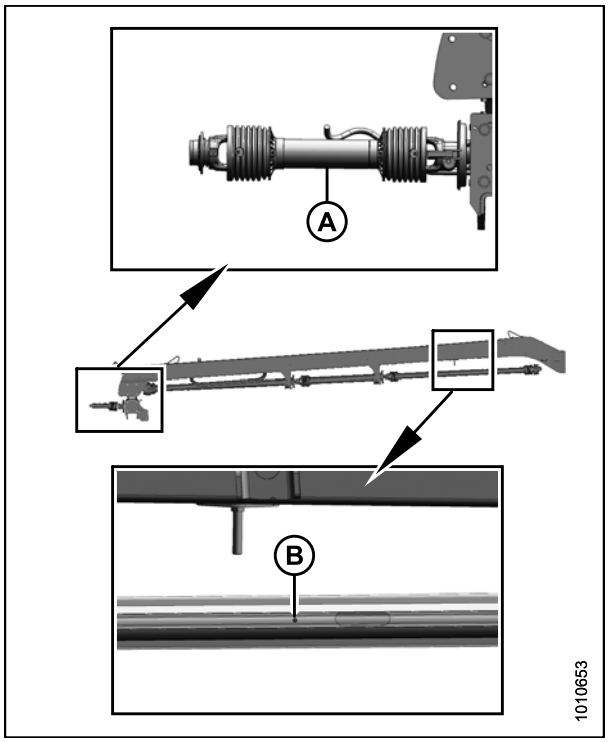

Figure 4.24: Every 25 Hours

A - Primary Driveline Slip-Joint B - Driveline Slip-Joint

NOTE:
Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

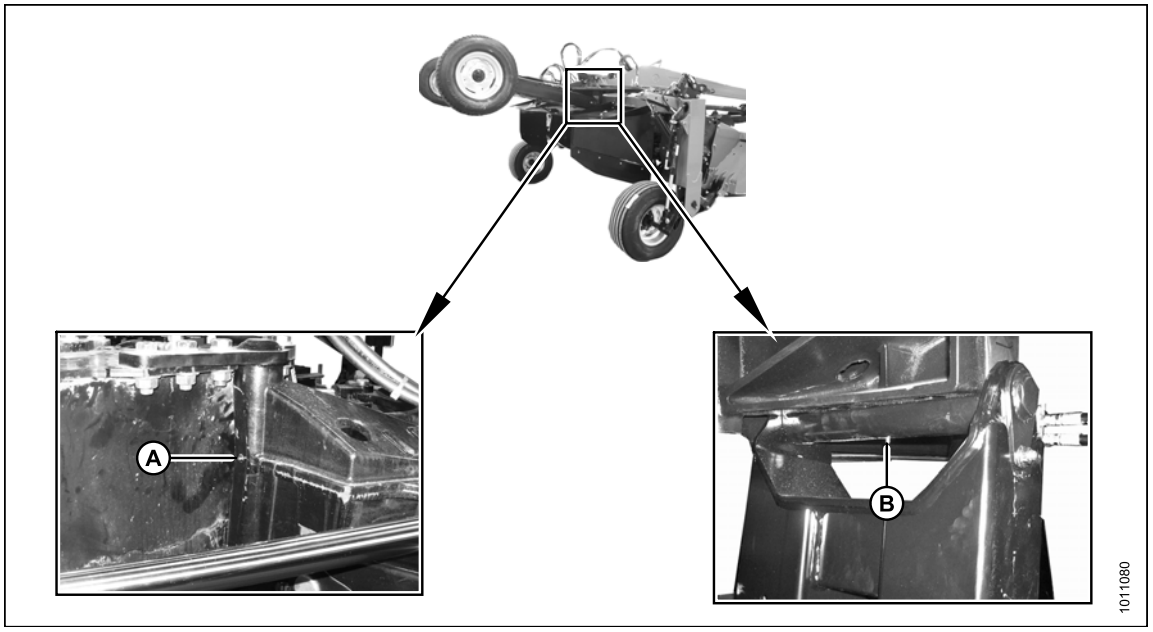

Figure 4.25: Every 25 Hours

A - Endwise Transport Casting Pivot **B - Endwise Transport Wheel Frame Pivot**

NOTE:
Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

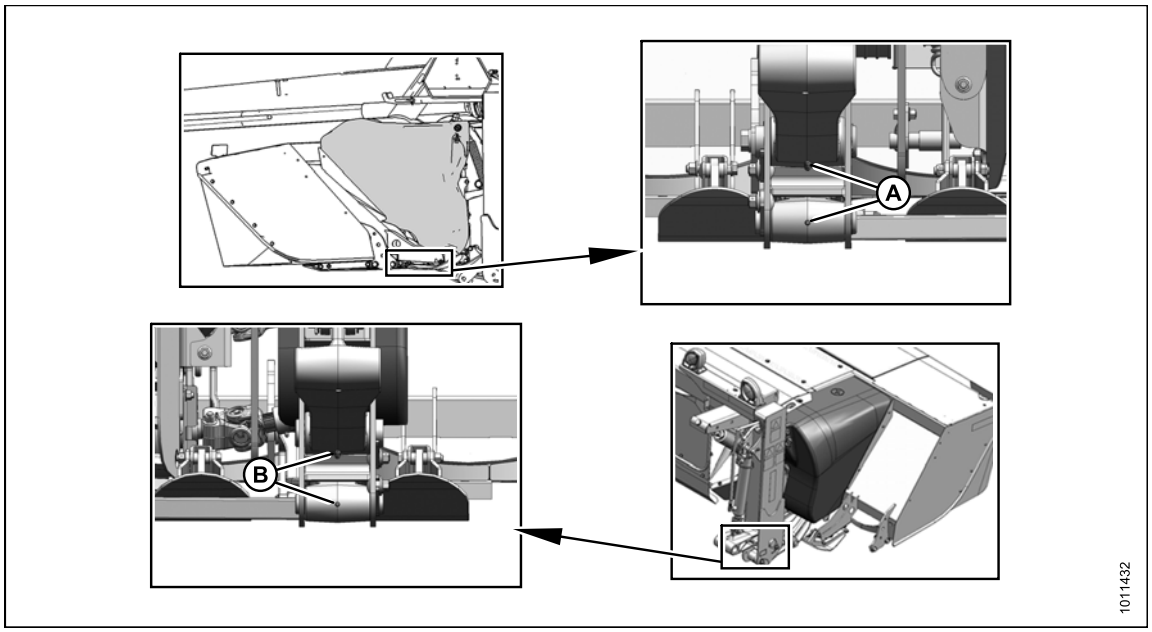

Figure 4.26: Every 25 Hours

A - Mower Conditioner Lift Linkage – Left **B - Mower Conditioner Lift Linkage – Right**

Every 50 Hours

NOTE:
Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

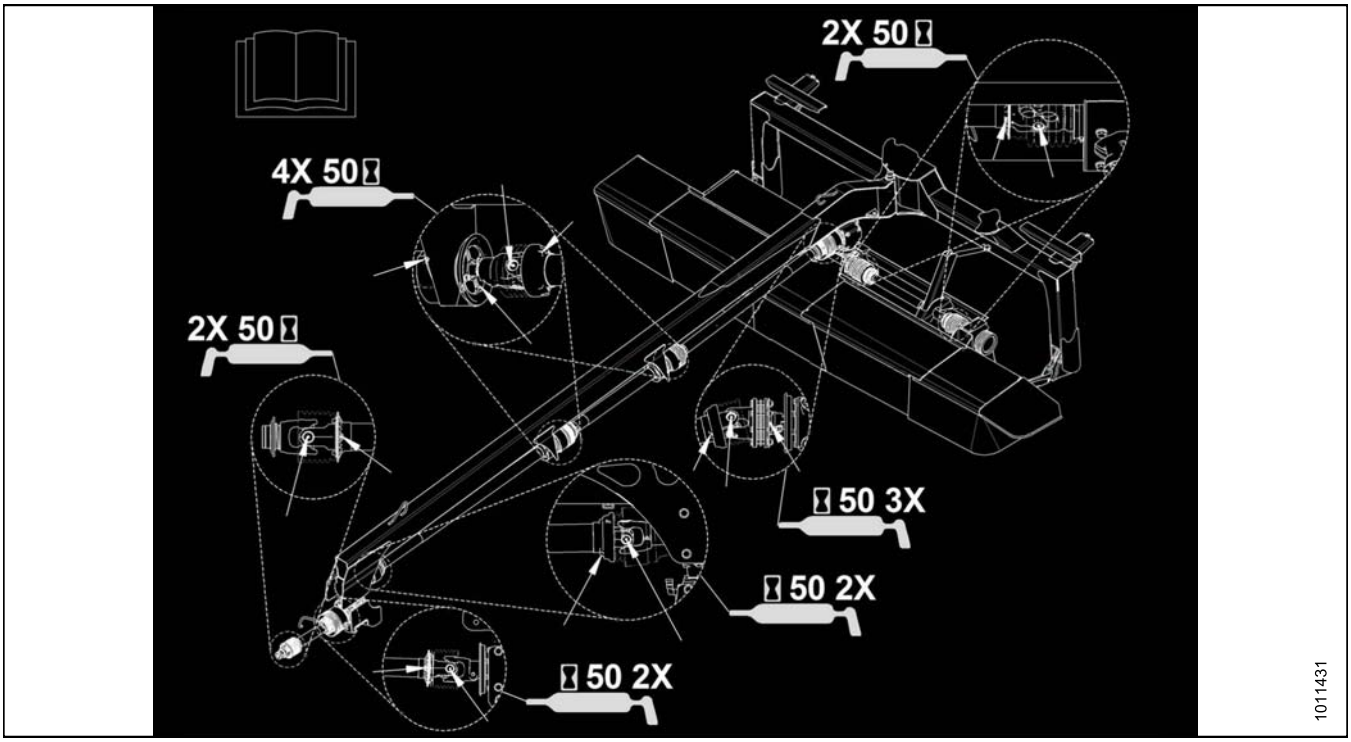

Figure 4.27: Every 50 Hours

Every 100 Hours

1. Ensure top of hitch and mower conditioner are horizontal, remove check plug from swivel gearbox, and verify that oil slightly runs out when removed.

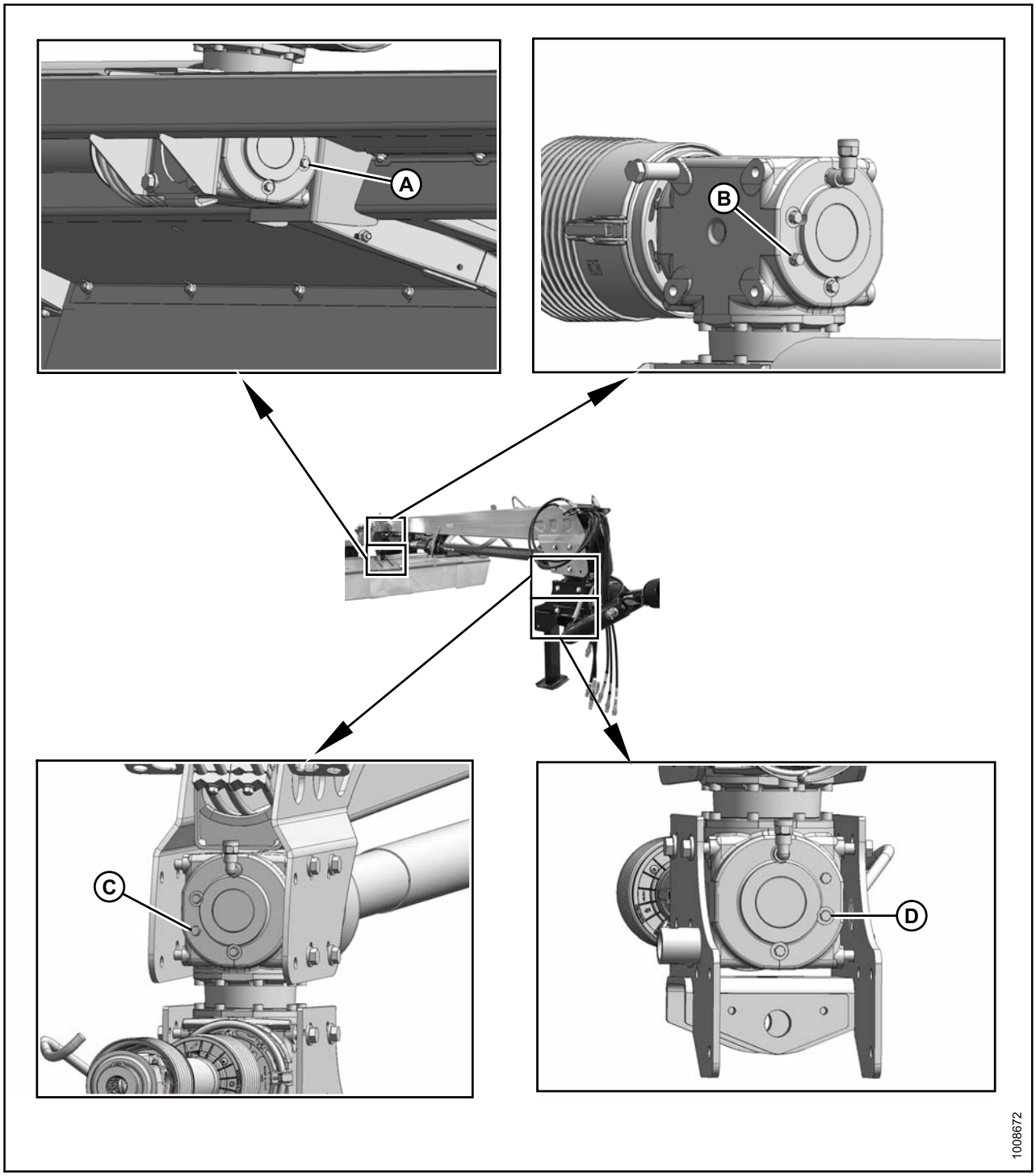

Figure 4.28: Every 100 Hours

A - Check Plug - Swivel Gearbox
B - Check Plug - Swivel Gearbox
C - Check Plug - Swivel Gearbox
D - Check Plug - Swivel Gearbox

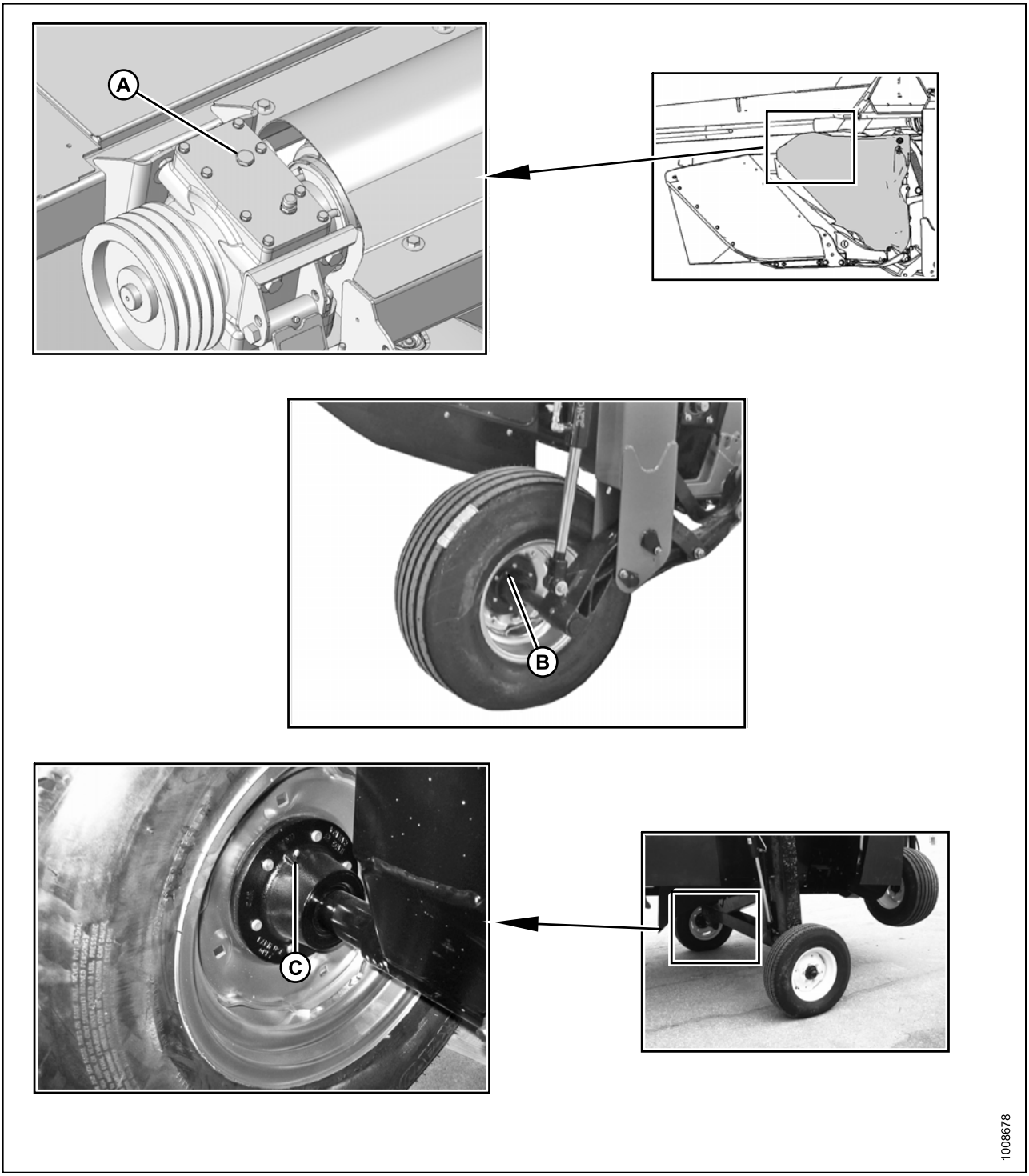

Figure 4.29: Every 100 Hours

A - Check Plug - Mower Conditioner Drive Gearbox[11]

B - Bearing - Field Wheel (2 Places)[12]

C -Bearing - Endwise Transport Option (2 Places)

11. Remove check plug from conditioner drive gearbox as shown and check oil level.
12. Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base

Every 250 Hours

1. Change lubricant in locations (A), (B), and (C). Refer to the following sections for more information:
   - *4.5.1 Cutterbar Lubrication, page 136*.
   - *Checking and Changing Conditioner Gearbox Oil, page 211*.
   - *Lubricating Mower Conditioner Drive Gearbox, page 214*.

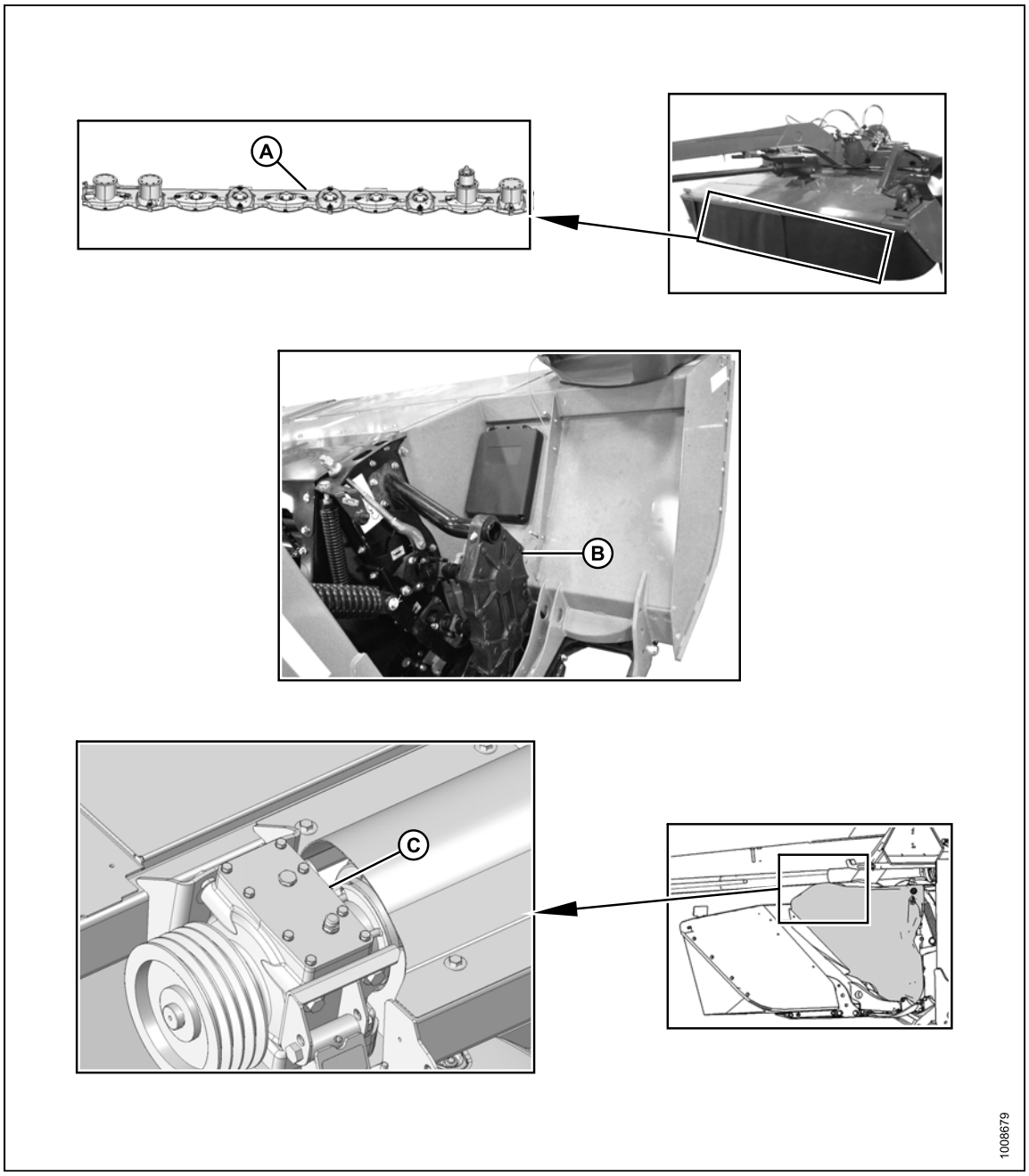

Figure 4.30: Every 250 Hours

A - Cutterbar Lubrication Location **B - Conditioner Drive Gearbox** **C - Mower Conditioner Drive Gearbox**

2. Change lubricant in hitch swivel gearboxes (A), (B), (C), and (D). Refer to *4.6.8 Forward and Rear Swivel Gearboxes, page 219*.

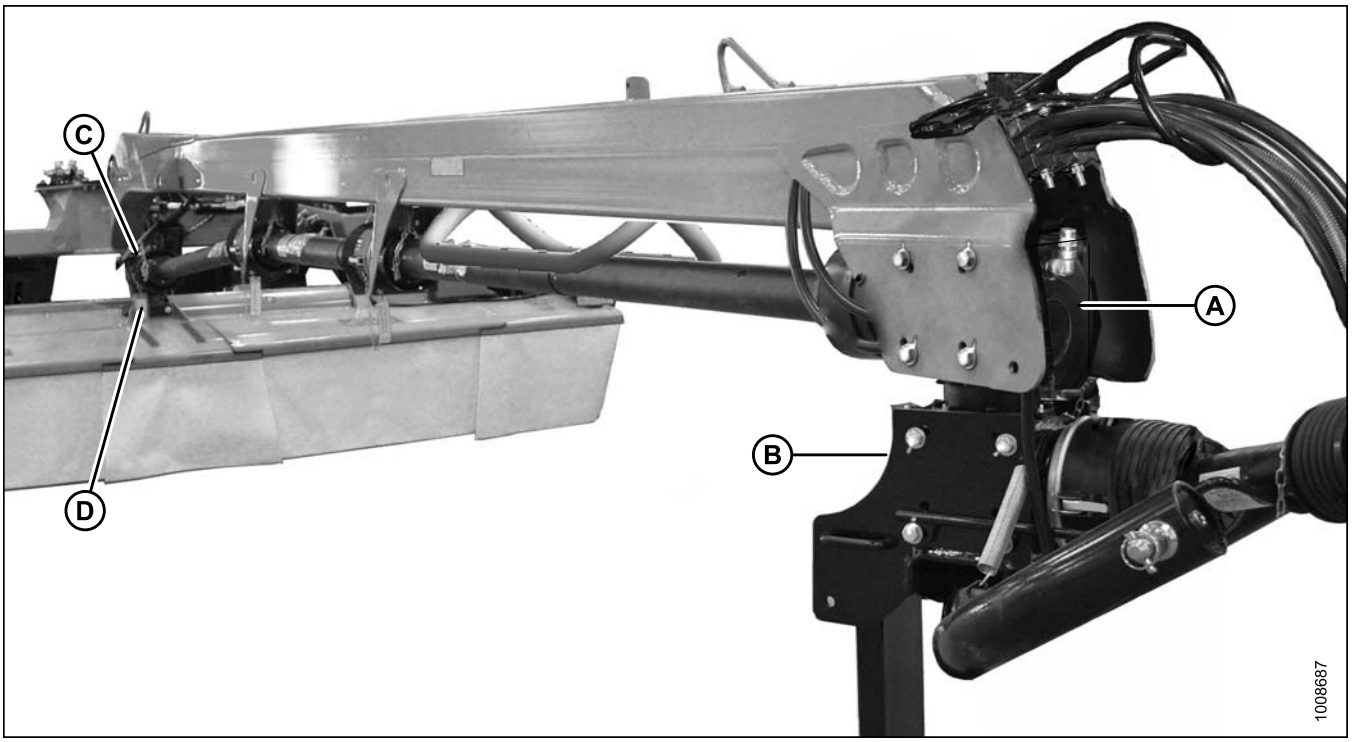

Figure 4.31: Every 250 Hours

A - Upper Forward Gearbox **B - Lower Forward Gearbox** **C - Upper Rear Gearbox** **D - Lower Rear Gearbox**

4.5 Cutterbar

The cutterbar does not require regular maintenance other than checking and changing the lubricant at regular intervals. Refer to *4.4.1 Maintenance Schedule/Record, page 121*.

IMPORTANT:
Check the lubricant level when the lubricant is warm. If the lubricant is cold, idle the machine for about 10 minutes prior to checking.

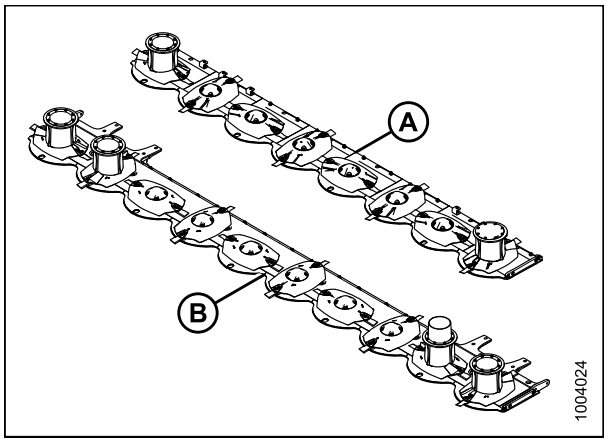

Figure 4.32: 13- and 16-Foot Cutterbars

A - 13-Foot Cutterbar **B - 16-Foot Cutterbar**

4.5.1 Cutterbar Lubrication

Checking Lubricant Level

IMPORTANT:
Check the lubricant level when the lubricant is warm. If the lubricant is cold, idle the machine for approximately 10 minutes prior to checking.

1. Park the mower conditioner on level ground.
2. Position header so that the cutterbar is approximately level.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

3. Shut down the mower conditioner and remove key.
4. Open cutterbar doors.

Figure 4.33: Cutterbar Doors

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

5. Use a spirit level to ensure the cutterbar is level in both directions. Raise or lower mower conditioner accordingly.

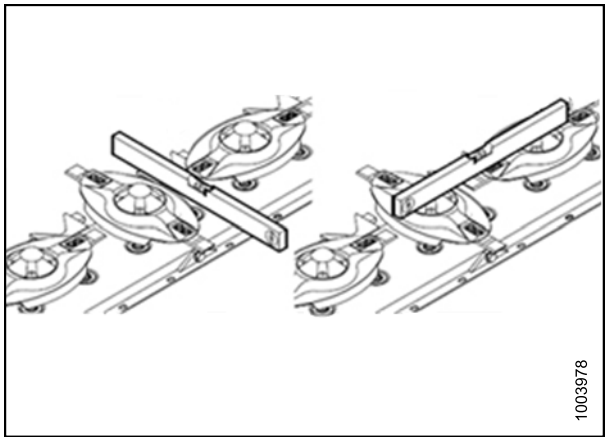

Figure 4.34: Spirit Level on Cutterbar

6. Remove oil level inspection plug (A) and O-ring (B) from cutterbar.
7. Add SAE 90 lubricant if required (oil level must be up to the bore). Refer to *Filling Cutterbar, page 139*.
8. Check O-ring (B) for breaks or cracks and replace if necessary.
9. Install plug (A) and O-ring (B). Tighten securely.

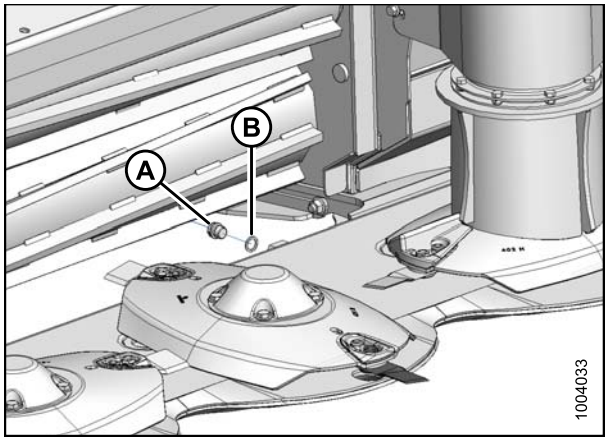

Figure 4.35: Inspection Plug and O-Ring

Draining Cutterbar

1. Park the mower conditioner on level ground.
2. Place a block under each end of the mower conditioner.

   NOTE:
   Block mower conditioner so one end is higher than the opposite end.

3. Clean around cutterbar end plate (B).
4. Place a suitably sized container under lower end of cutterbar.
5. Remove two M10 hex head bolts (A) and washers, and remove cutterbar end plate (B) from lower end of cutterbar.

   IMPORTANT:
   Do NOT flush the cutterbar.

6. Allow sufficient time for lubricant to drain, replace cutterbar end plate (B) and two M10 hex head bolts (A) and washers, and tighten.
7. Properly dispose of lubricant.

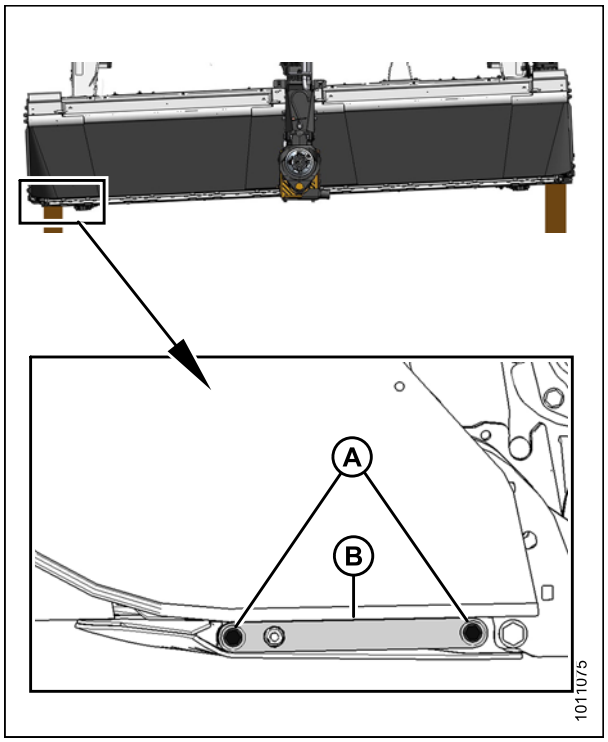

Figure 4.36: Tilted Mower Conditioner and Cutterbar End Plate

Filling Cutterbar

1. Add exactly 10-1/2 quarts (US) (10 liters) of SAE 90 lubricant through filler hole (A) at high end of cutterbar for ten disc cutterbar, and add exactly 8-1/2 quarts (US) (8 liters) of SAE 90 lubricant for eight disc cutterbar.

   IMPORTANT:
   Do NOT overfill the cutterbar. Overfilling can cause overheating and damage to, or failure of, cutterbar components.

2. Replace filler plug (A).
3. Start engine and raise mower conditioner.
4. Stop engine and engage mower conditioner lift cylinder lock-outs.
5. Remove blocks.
6. Check lubricant level. Refer to *Checking Lubricant Level, page 136*.

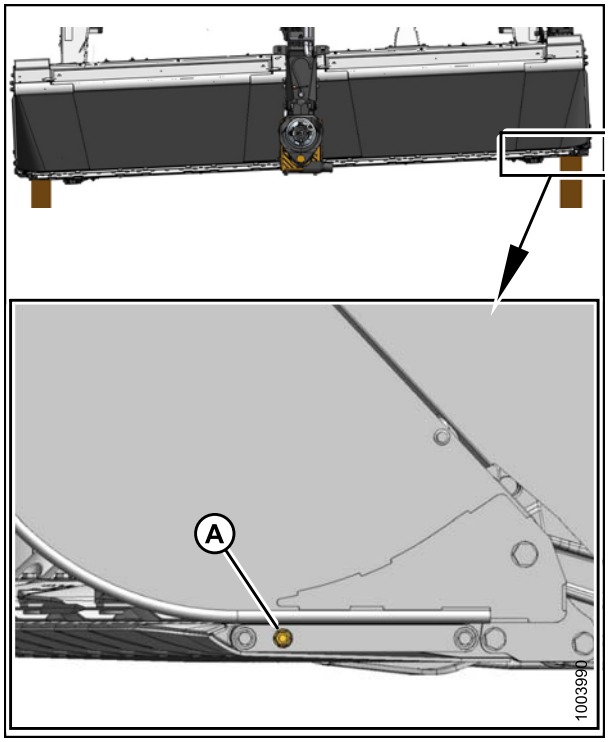

Figure 4.37: Tilted Mower Conditioner and Cutterbar Filler Plug

4.5.2 Cutterbar Disc Maintenance

Perform daily inspections to ensure that cutterbar discs have not suffered damage from rocks or experienced excessive wear from abrasive working conditions.

Cutterbar discs are interchangeable and can be moved to a spindle that rotates in the opposite direction as long as it is in usable condition and the blades are oriented to cut in the correct direction.

The cutterbar discs are **NOT** repairable and must be replaced if severely damaged or worn.

IMPORTANT:
If holes appear in a cutterbar disc, replace the disc immediately. Do **NOT** attempt to repair the cutterbar discs. Always use factory replacement parts.

Inspecting Cutterbar Discs

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

CAUTION

Damaged blades may damage the cutterbar and result in poor cutting performance. Replace damaged blades at earliest possible opportunity.

1. Ensure that the cutter blade fasteners (A) are securely attached to the cutterbar disc and that nut shields (B) are present and undamaged. Replace as required.
2. Check that the cutterbar disc bolts (C) are securely attached to the spindles.
3. Inspect the cutterbar disc surface (D) for cracks, excessive wear, and disc distortion. Replace as required.
4. Inspect the cutterbar disc edges (E) for cracks, excessive wear, and edge distortion. Replace as required.

   NOTE:
   Cutterbar discs are NOT repairable and must be replaced if damaged.

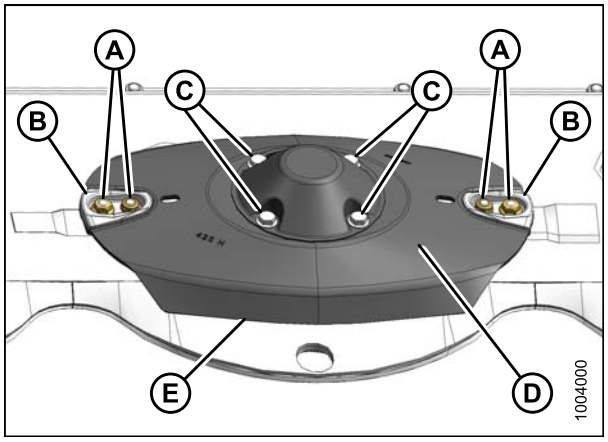

Figure 4.38: Cutterbar Disc

Removing Cutterbar Discs

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Raise mower conditioner fully, shut off engine, and remove key.
2. Engage lift cylinder lock-out valves.
3. Open cutterbar door(s). Refer to *3.4.1 Opening Cutterbar Doors, page 38*.

Figure 4.39: Cutterbar Doors

4. Place a pin (or equivalent) in the front hole of the rock guard (B) to prevent disc rotation while loosening bolts.
5. Remove four M12 bolts (A) and washers.

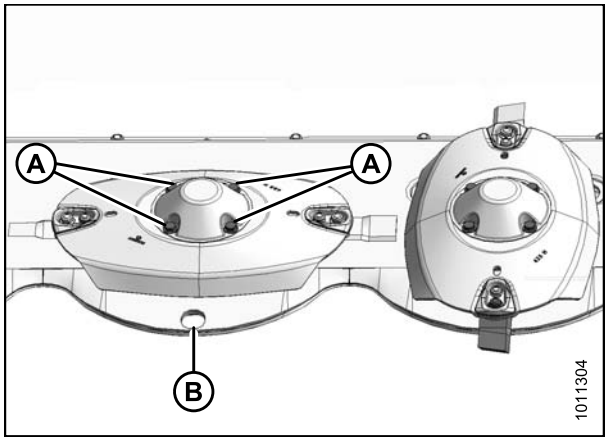

Figure 4.40: Cutterbar Disc Bolts

6. Remove cutterbar disc cap (A).
7. Remove cutterbar disc (B).

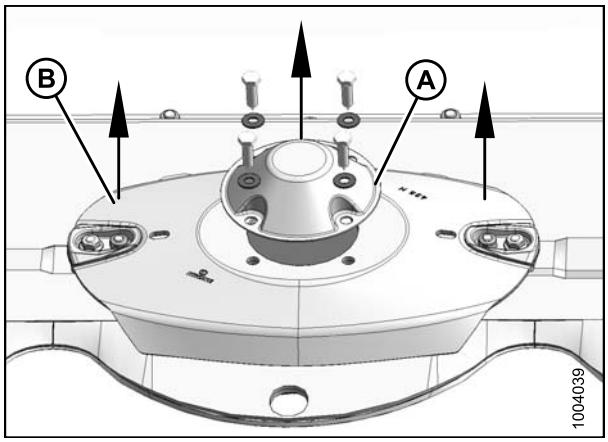

Figure 4.41: Cutterbar Disc and Cap

Installing Cutterbar Discs

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Place a pin (or equivalent) in the front hole of the rock guard (D) to prevent disc rotation while tightening bolts.
2. Position new disc (A) on spindle ensuring that it is positioned at a 90° angle in relation to the adjacent discs.
3. Install cutter disc cap (B) and secure assembly with four M12 bolts and washers (C). Torque bolts to 63 ft·lbf (85 N·m).

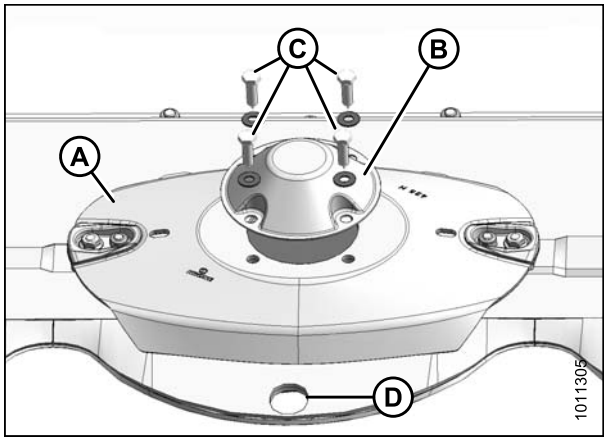

Figure 4.42: Cutterbar Disc and Cap

WARNING

Ensure cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

4. Remove pin (or equivalent) from front hole of rock guard.
5. Close cutterbar doors (refer to *3.4.2 Closing Cutterbar Doors, page 38*).

Figure 4.43: Cutterbar Doors in Closed Position

4.5.3 Cutterbar Spindles

Discs are factory installed to produce three crop-streams, but disc rotation patterns can be changed to suit crop conditions.

To prevent damage to the cutterbar and drive systems, each disc is attached to a spindle containing a shear pin (A). If the disc contacts a large object such as a stone or stump, the pins will shear and the disc will stop rotating and move upwards while remaining attached to the spindle with a snap ring (B). Refer to *4.5.10 Cutterbar Spindle Shear Pin, page 184* to replace shear pin.

IMPORTANT:

- Spindles that rotate counterclockwise have left-handed threading and machined grooves on the spindle nut.
- Spindles that rotate clockwise have right-handed threading.

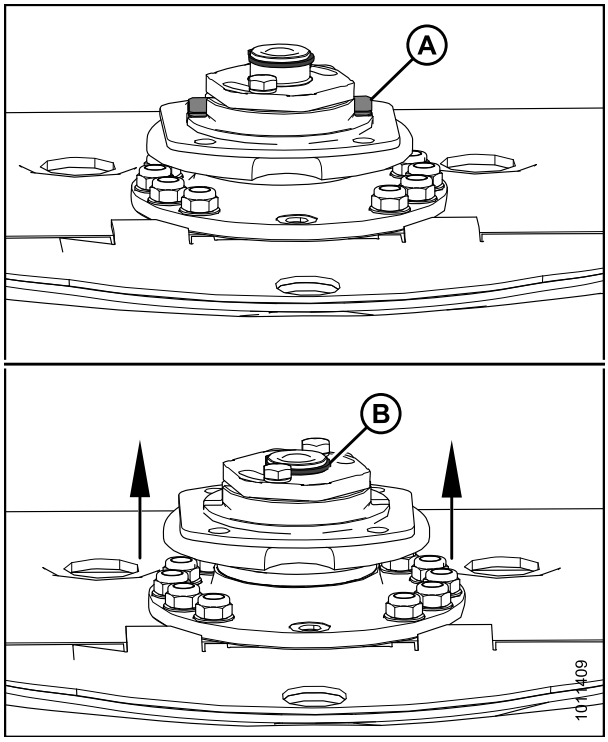

Figure 4.44: Cutterbar Spindles

Reducing or increasing the number of crop streams will produce the following results:

- Reducing the number of crop streams will result in narrower windrows.
- Increasing the number of crop streams will result in smoother, wider windrows.

NOTE:
Increasing the number of crop streams will also increase the number of diverging disc pairs which may negatively affect cut quality in certain conditions.

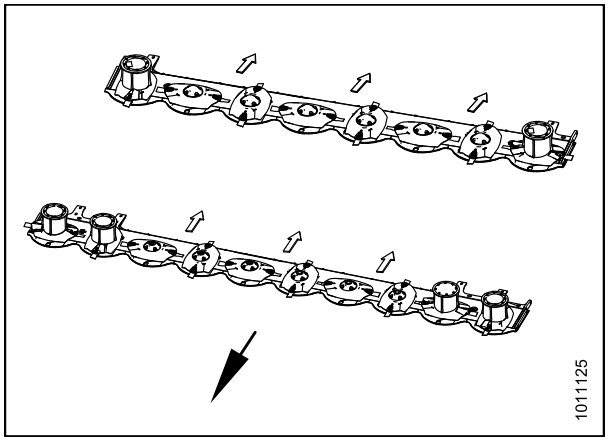

Figure 4.45: 13- and 16-Foot Cutterbar

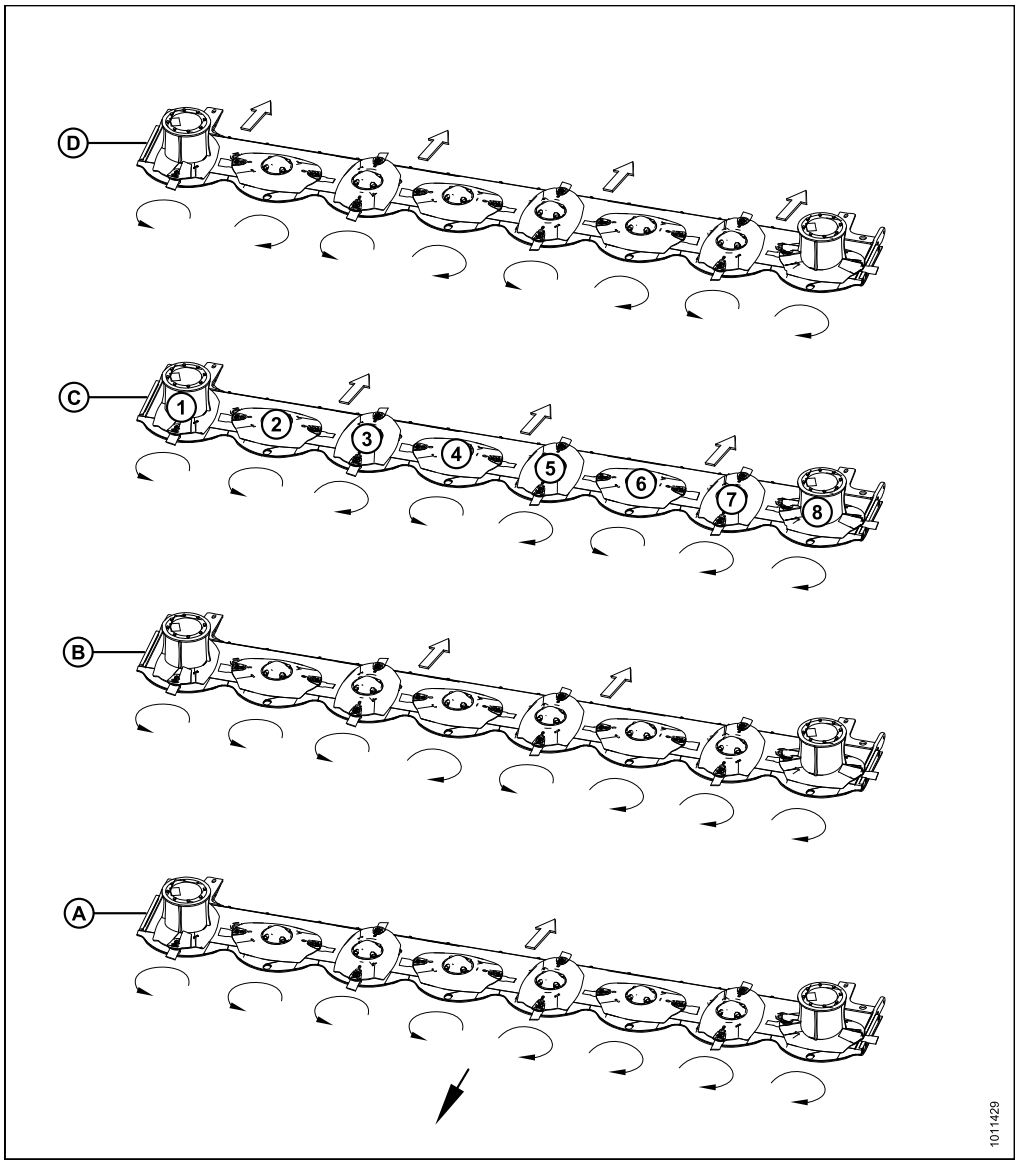

Figure 4.46: 13-Foot (8 Disc) Spindle Rotation Pattern and Crop Streams

A - One Crop-Stream **B - Two Crop-Streams** **C - Three Crop-Streams** **D - Four Crop-Streams**

13-Foot (8 Disc) Spindle Rotation Patterns

Changing from three crop-streams (C) to one crop-stream (A):

- Swap disc three and disc six.

Changing from three crop-streams (C) to two crop-streams (B):

- Swap disc three and disc four, and;
- Swap disc five and disc six.

Changing from three crop-streams (C) to four crop-streams (D):

- Swap disc two and disc three;
- Swap disc four and disc five, and;
- Swap disc six and disc seven.

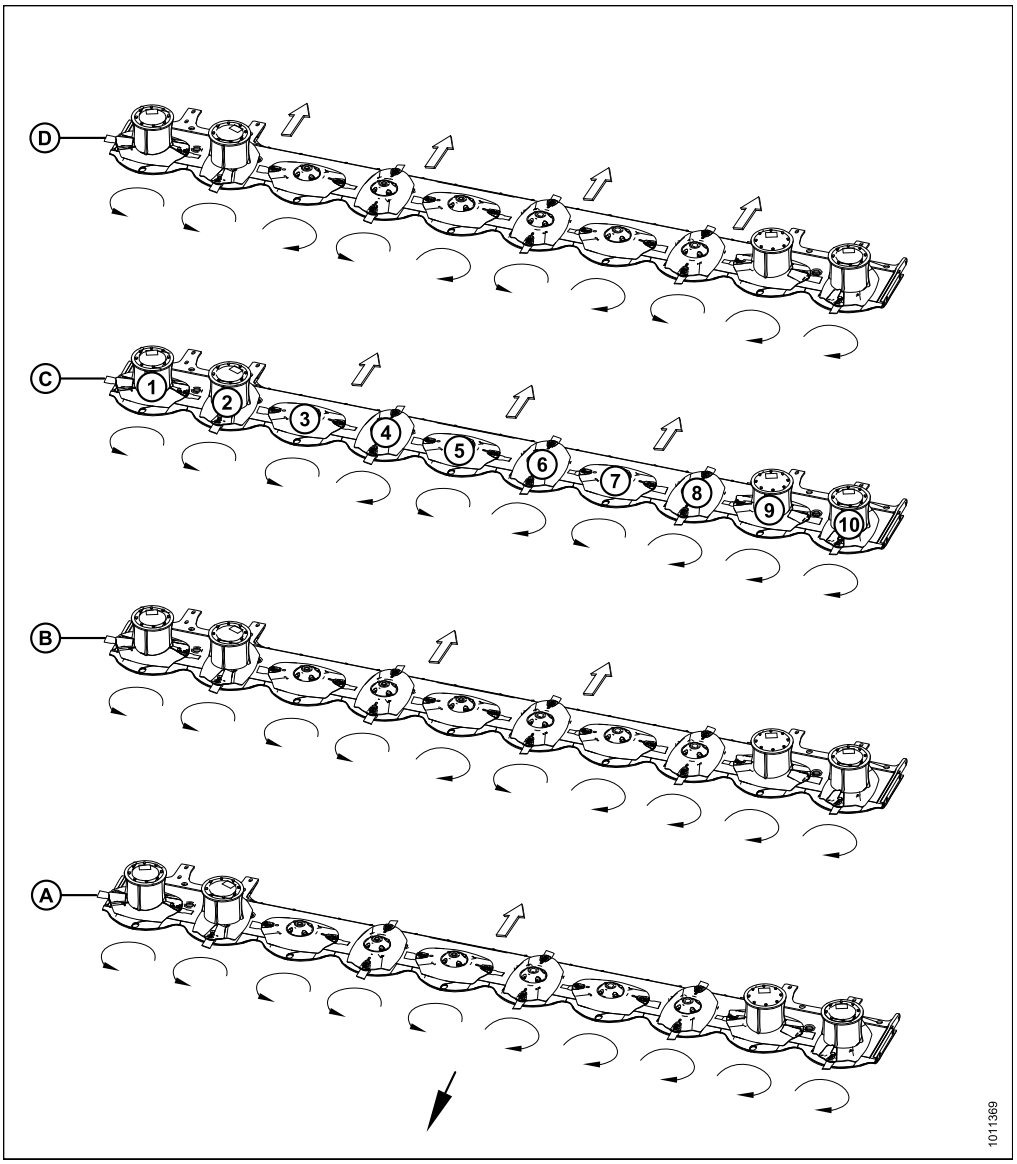

Figure 4.47: 16-Foot (10 Disc) Spindle Rotation Pattern and Crop Streams

A - One Crop-Stream **B - Two Crop-Streams** **C - Three Crop-Streams** **D - Four Crop-Streams**

16-Foot (10 Disc) Spindle Rotation Patterns

Changing from three crop-streams (C) to one crop-stream (A):

- Swap disc four and disc seven.

Changing from three crop-streams (C) to two crop-streams (B):

- Swap disc four and disc five, and;
- Swap disc six and disc seven.

Changing from three crop-streams (C) to four crop-streams (D):

- Swap disc three and disc four;
- Swap disc five and disc six, and;
- Swap disc seven and disc eight.

Removing Cutterbar Spindles

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Lower mower conditioner fully, shut off engine, and remove key.

   NOTE:
   Ensure mower conditioner is on a flat, level surface and is tilted all the way back before removing spindles to prevent oil from spilling from the cutterbar.

2. Open cutterbar door(s).

Figure 4.48: Cutterbar Doors

3. Place a pin (or equivalent) in the front hole of the rock guard (B) to prevent disc rotation while loosening bolts.
4. Remove four M12 bolts (A) and washers.

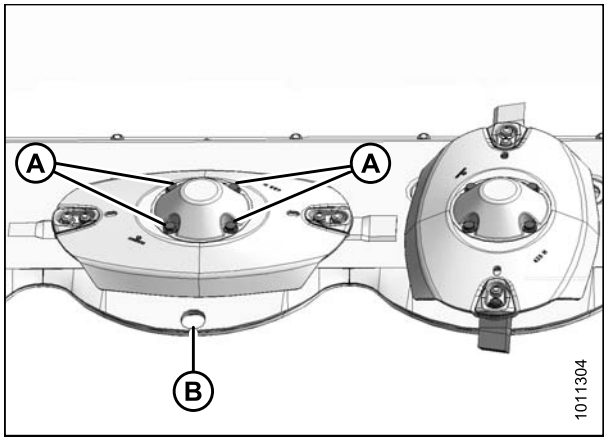

Figure 4.49: Cutterbar Disc Bolts

5. Remove cutterbar disc cap (A).
6. Remove cutterbar disc (B).

   IMPORTANT:
   Blades are rotation specific. It is necessary to switch entire disc when swapping spindles.

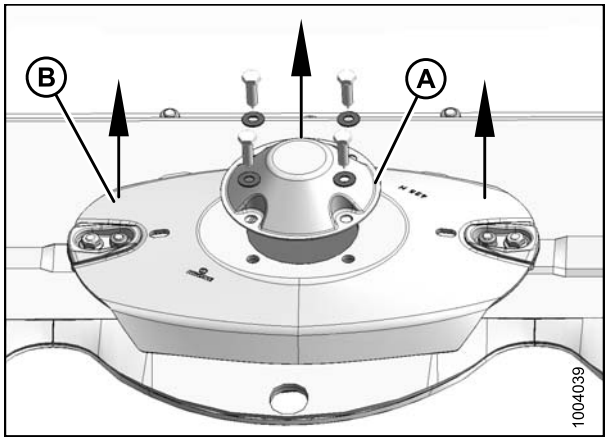

Figure 4.50: Cutterbar Disc and Cap

7. Remove spacer plate (A).

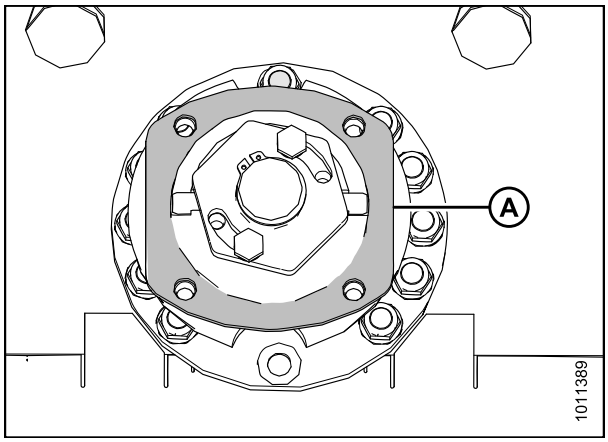

Figure 4.51: Spacer Plate

8. Rotate spindle hub (A) to access nuts, and remove 11 M12 lock nuts (B) and washers.

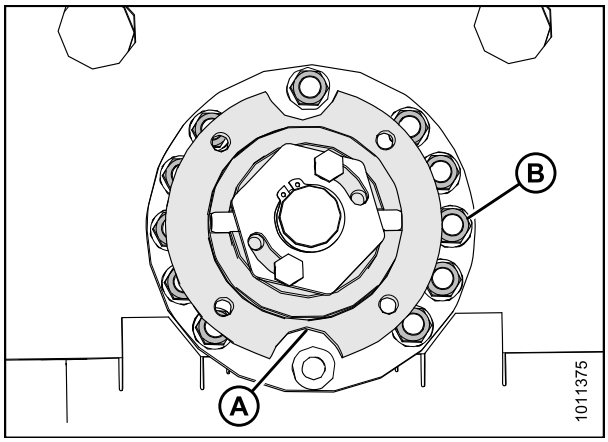

Figure 4.52: Left-Hand Spindle Hub and Hardware

9. Remove spindle (A) from cutterbar.

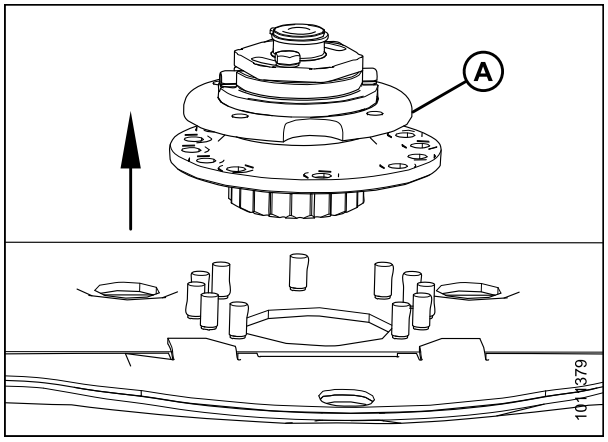

Figure 4.53: Left-Hand Spindle

Installing Cutterbar Spindles

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

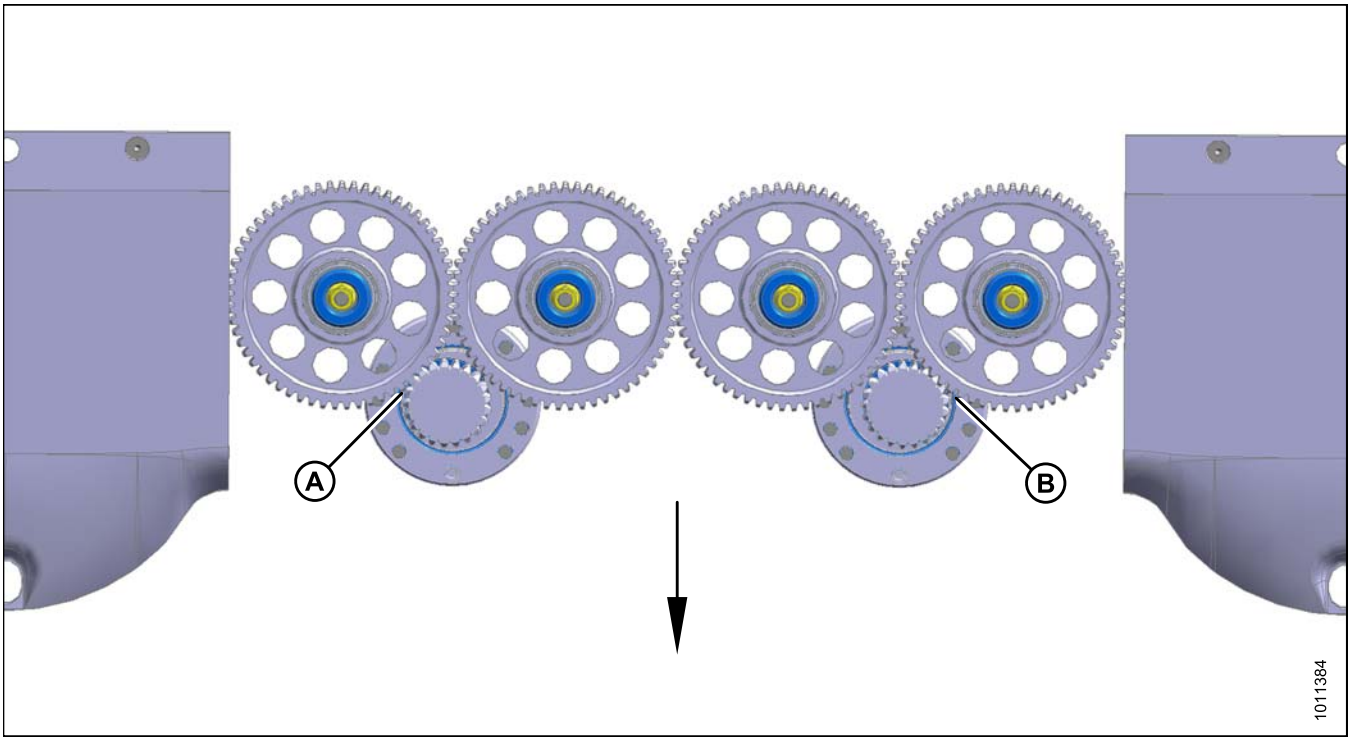

Figure 4.54: Underside of Cutterbar Spindles Installed in Cutterbar

IMPORTANT:
Right-hand discs (A) and left-hand discs (B) are timed and must be at 90° when reinstalled. Misaligned discs could result in the following:

- Cutter blades of co-rotating discs hitting each other.
- Cutter blades of diverging discs will hitting adjacent discs.

Check clearance before tightening spindle to the cutterbar. Turn disc by hand to ensure cutter blades do not contact each other or adjacent discs. If contact occurs, remove spindle, rotate 90°, and reinstall. Remove and reinstall spindles as many times as necessary to achieve proper alignment.

NOTE:
Right-hand discs (A) and left-hand discs (B) are slightly offset as shown depending on which idler gear the spindle is turning.

- Spindles that rotate clockwise have left-handed threading.
- Spindles that rotate counterclockwise have right-handed threading.

1. Lower mower conditioner fully, shut off engine, and remove key.

   NOTE:
   Ensure mower conditioner is on a flat, level surface and is tilted all the way back while installing spindles to prevent oil from spilling from the cutterbar.

2. Open cutterbar door(s).

Figure 4.55: Cutterbar Doors

3. Determine suitable spindle rotation pattern for crop conditions. Refer to *4.5.3 Cutterbar Spindles, page 143*.

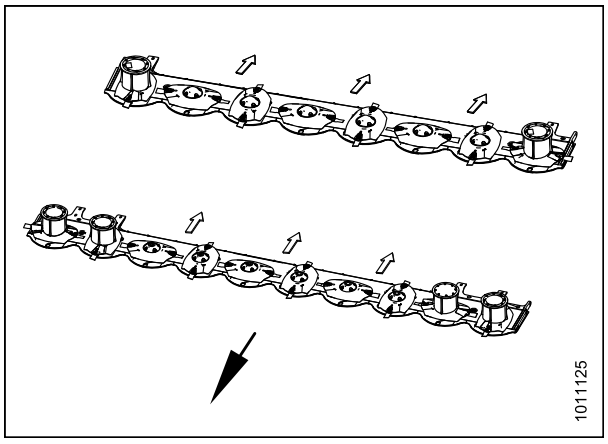

Figure 4.56: 13- and 16-Foot Cutterbar

4. Ensure that spindle O-ring (A) is properly seated, cleaned, and undamaged.

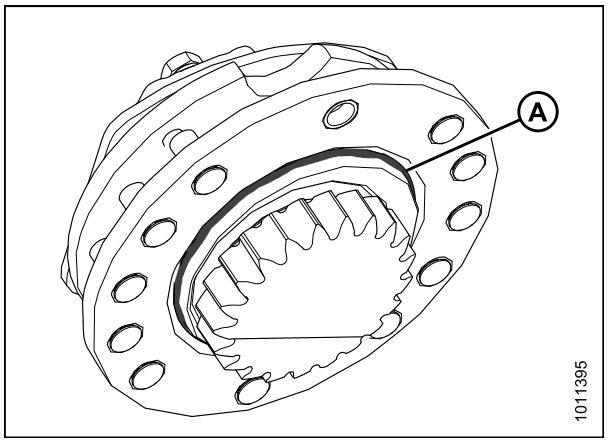

Figure 4.57: Left-Hand Spindle O-Ring

5. Insert spindle (A) into cutterbar.

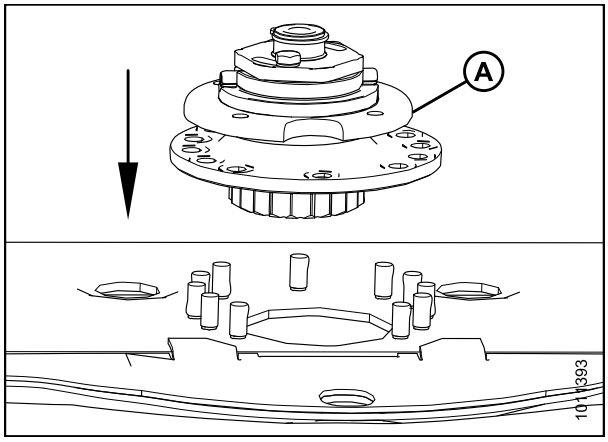

Figure 4.58: Left-Hand Spindle

6. Insert studs (A) into spindle as shown.

   NOTE:
   Plugs are factory installed as shown in position (B) but may come loose over time. Ensure studs are inserted into proper location.

   IMPORTANT:
   Ensure clockwise spindles rotate clockwise and counterclockwise spindles (with machined grooves) rotate counterclockwise. The offset gear design makes it possible to install spindles having an opposite rotation of what is intended which will prevent discs from spinning up after impact resulting in cutterbar component damage.

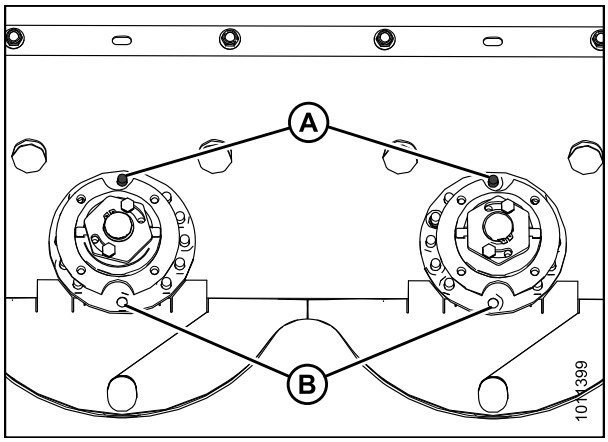

Figure 4.59: Spindle Orientation

7. Rotate spindle hub (A) to access studs, and install 11 M12 lock nuts (B) and washers. Torque bolts to 37 ft·lbf (50 N·m).

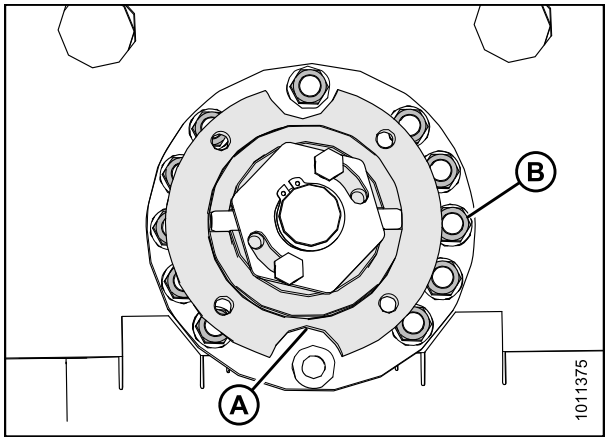

Figure 4.60: Left-Hand Spindle Hub and Hardware

8. Install spacer plate (A).

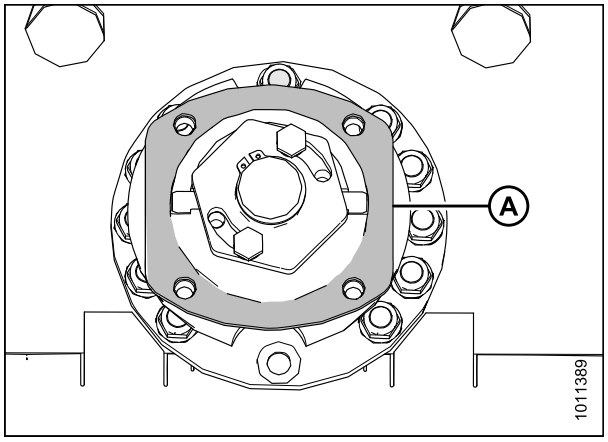

Figure 4.61: Spacer Plate

9. Place a pin (or equivalent) in the front hole of the rock guard (D) to prevent disc rotation while tightening bolts.

   IMPORTANT:
   Blades are rotation specific. It is necessary to switch entire disc when swapping spindles.

10. Position disc (A) on spindle ensuring that it is positioned at a 90° angle in relation to the adjacent discs.

    NOTE:
    Turn disc (A) by hand to ensure cutter blades do not contact each other or adjacent discs.

11. Install cutter disc cap (B) and secure assembly with four M12 bolts and washers (C). Torque bolts to 63 ft·lbf (85 N·m).

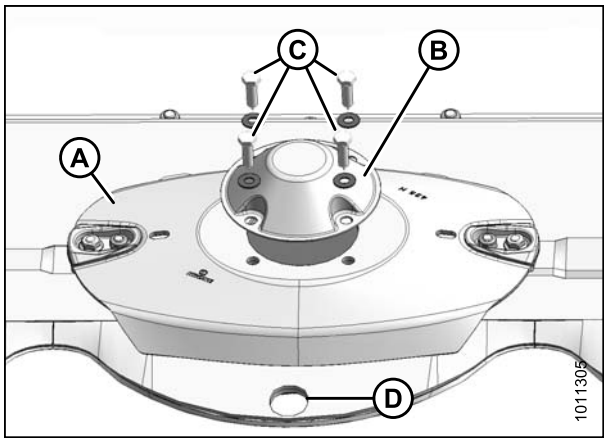

Figure 4.62: Cutterbar Disc and Cap

WARNING

Ensure cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

12. Remove pin (or equivalent) from front hole of rock guard.
13. Close cutterbar doors (refer to *3.4.2 Closing Cutterbar Doors, page 38*).

Figure 4.63: Cutterbar Doors in Closed Position

4.5.4 Cutter Blades

Each disc has two cutter blades (A) attached at opposite ends that are free to rotate horizontally on a specially designed shoulder bolt.

The blade has two cutting edges and can be flipped over so that the blade does not need replacing as often.

The blades are NOT repairable and must be replaced if severely damaged or worn.

IMPORTANT:
Always use factory replacement parts.

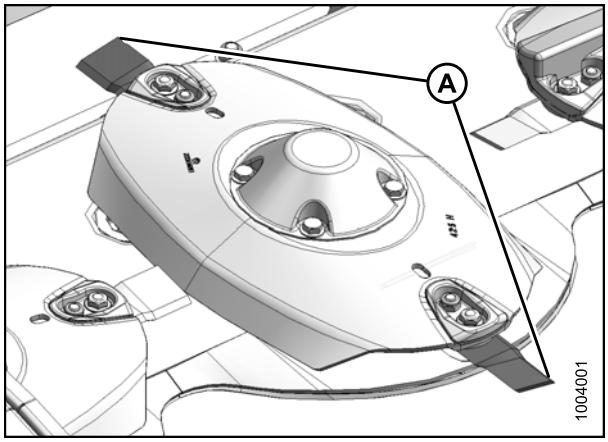

Figure 4.64: Cutter Blades

Inspecting Cutter Blades

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

CAUTION

Damaged blades may damage the cutterbar and result in poor cutting performance. Replace damaged blades at earliest possible opportunity.

1. Check daily that the cutter blades are securely attached to the disc.
2. Inspect blades for cracks, wear beyond safe operating limits (C), and distortion.
3. Replace blades immediately if any problems occur.

   IMPORTANT:
   Blades should be replaced in pairs or the disc may become unbalanced and cause damage to the cutterbar.

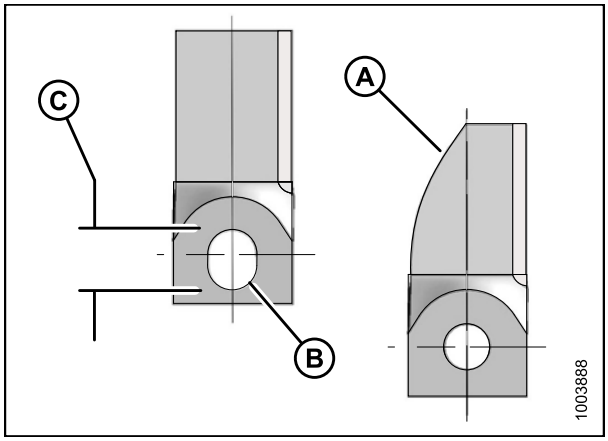

Figure 4.65: Cutter Blades

A - Blade Wear to Center Line
B - Elongated Hole
C - Maximum Elongation 13/16 in. (21 mm)

IMPORTANT:
The cutter blades have cutting edges on both sides so the blades can be turned over and reused. The twist in each blade determines if the cutting direction is clockwise or counterclockwise. If you are unsure which direction the spindles rotate, refer to *4.5.3 Cutterbar Spindles, page 143*.

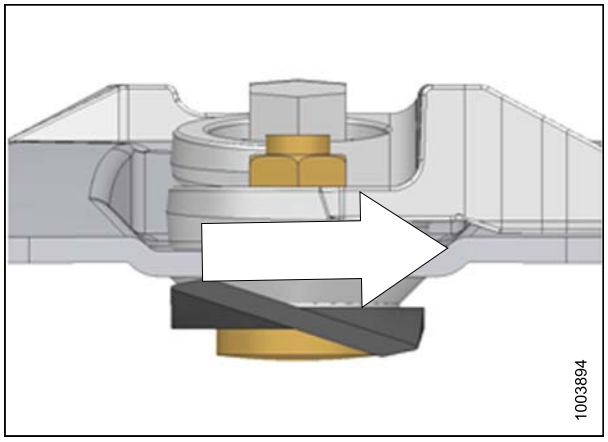

Figure 4.66: Counterclockwise Disc Rotation Direction

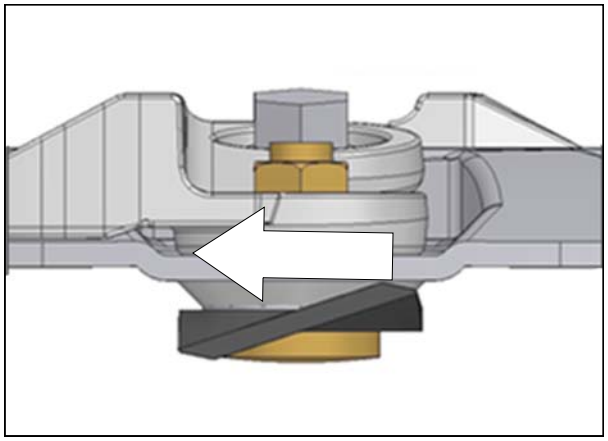

Figure 4.67: Clockwise Disc Rotation Direction

Inspecting Cutter Blade Hardware

1. Inspect blade attachment hardware each time blades are changed.
2. Check and replace bolts under the following conditions:
   a. Bolt has been removed and reinstalled five times.
   b. Head (A) is worn flush with bearing surface of blade.
   c. Diameter of bolt neck is worn (B) to 1/8 in. (3 mm) or less.
   d. Bolt is cracked (C).
   e. Bolt is visibly distorted (D).
   f. Bolt shows evidence of interference (E) with adjacent parts.

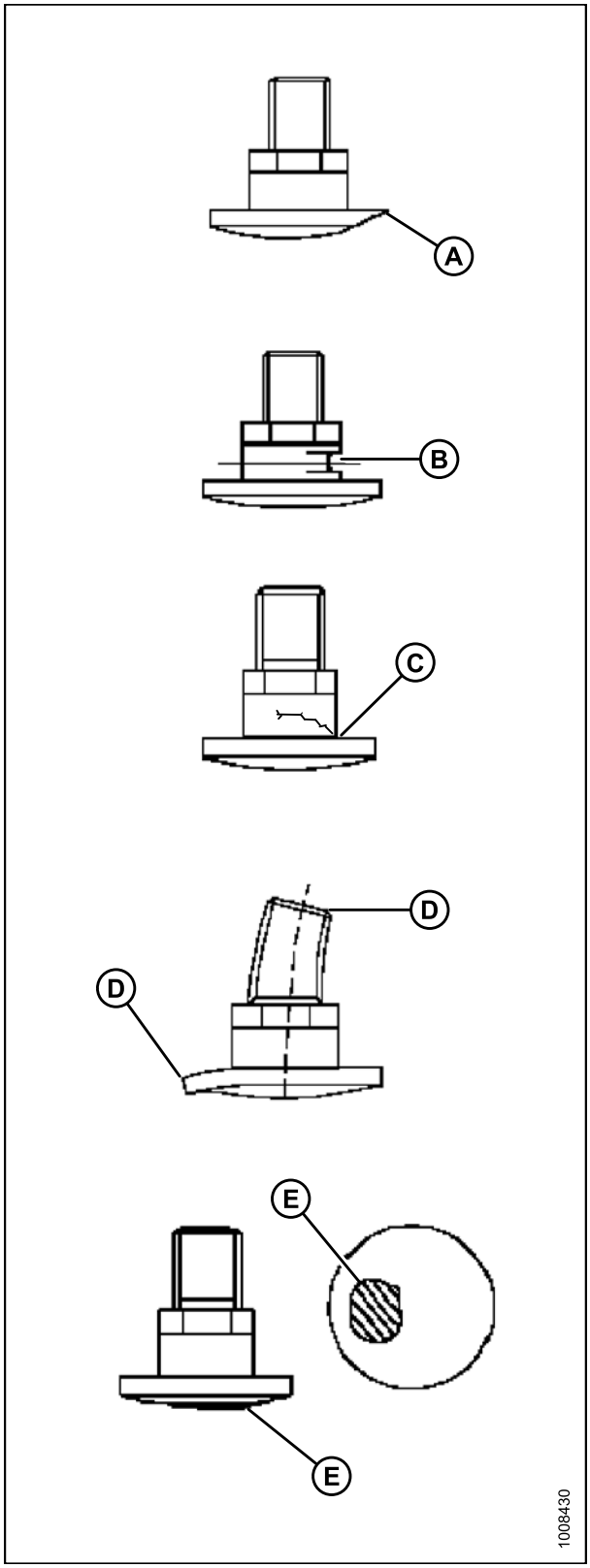

Figure 4.68: Cutter Blade Bolts

3. Check and replace nuts under the following conditions:
   a. Nut has been previously installed—nuts are one-time-use only.
   b. Nut shows signs of wear (A) that is more than half the original height (B).
   c. Nut is cracked.

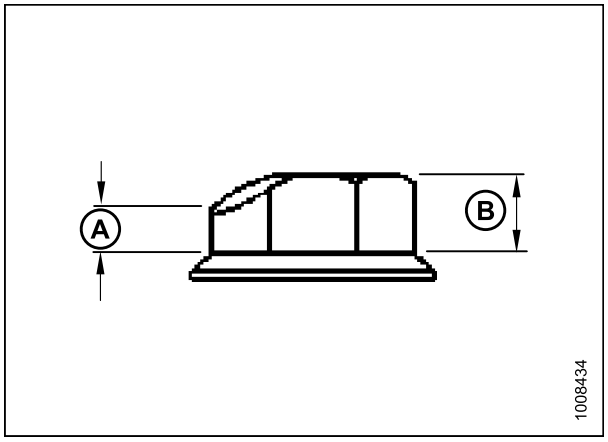

Figure 4.69: Cutter Blade Nut

Removing Cutter Blades

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Raise mower conditioner fully, shut off engine, and remove key.
2. Engage lift cylinder lock-out valves.
3. Open cutterbar door(s).

Figure 4.70: Cutterbar Doors

4. Rotate disc (A) so that blade (B) faces forward and lines up with hole (C) in rock guard.

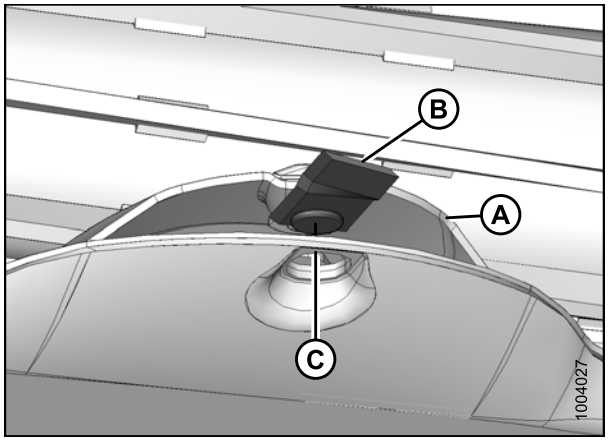

Figure 4.71: Cutter Blade Aligned with Hole in Rock Guard

5. Place a pin (or equivalent) in the front hole of the rock guard to prevent disc rotation while loosening blade bolts.
6. Clean debris from blade attachment area.
7. Remove nut (A) and **discard**.

   IMPORTANT:
   Nuts are one-time-use only. When flipping or changing a blade, replace using a **new** nut only.

8. Remove shoulder bolt (B) and blade (C).

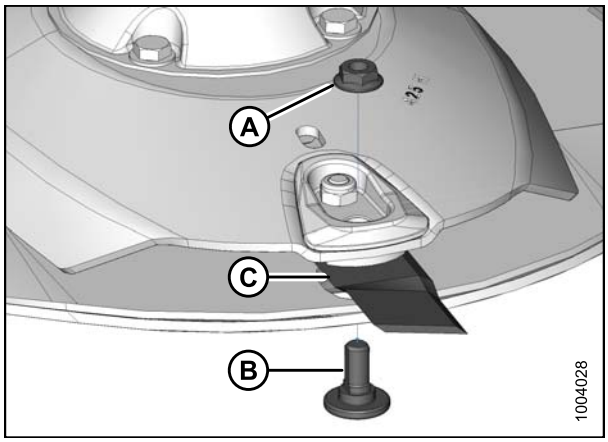

Figure 4.72: Nut, Shoulder Bolt, and Cutter Blade

Installing Cutter Blades

⚠ CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

IMPORTANT:
If you are unsure which direction the spindles rotate, refer to *4.5.3 Cutterbar Spindles, page 143*.

1. Place a pin (or equivalent) in the front hole of the rock guard to prevent disc rotation while tightening blade bolts.
2. Install new or reversed blade (A) with shoulder bolt (B) onto disc (C).

   IMPORTANT:
   Nuts are one-time-use only. When flipping or changing a blade, replace using a **new** nut only.

3. Install new nut (D) and torque to 92 ft·lbf (125 N·m).

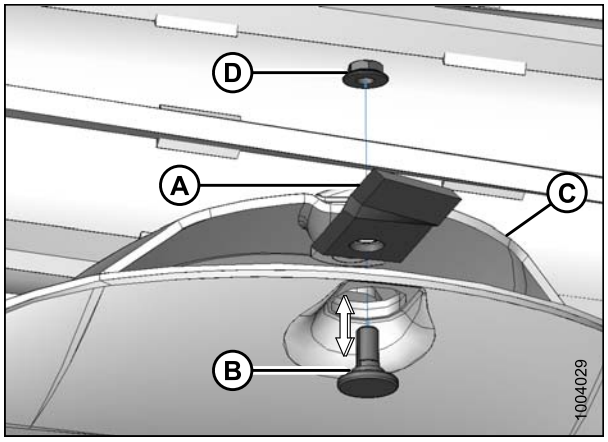

Figure 4.73: Nut, Shoulder Bolt, and Cutter Blade

⚠ WARNING

Ensure cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

4. Remove pin (or equivalent) from front hole of rock guard.
5. Close cutterbar doors (refer to *3.4.2 Closing Cutterbar Doors, page 38*).

Figure 4.74: Cutterbar Doors in Closed Position

4.5.5 Cutterbar Doors

⚠ WARNING

Do NOT operate the machine without all the cutterbar doors down or without curtains installed and in good condition.

There are two doors (A) that provide access to the cutterbar area.

Rubber outboard curtains (B) are attached to each front corner, and an inboard curtain (C) is installed at the center fixed cover location. Always keep these curtains down when operating the mower conditioner.

IMPORTANT:
Replace curtains if they become worn or damaged. Refer to *4.5.6 Curtains, page 160* or contact your Dealer for replacement instructions.

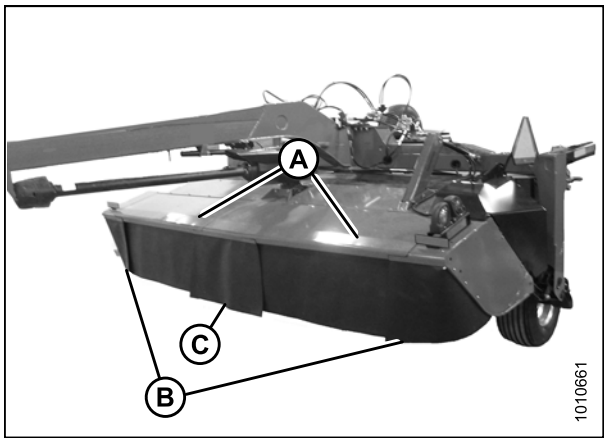

Figure 4.75: Cutterbar Doors and Curtains

Inspecting Cutterbar Doors

1. Ensure that door operates smoothly and lies flat when closed. Adjust if necessary.
2. Inspect hinge pin bolts (A) and tighten if loose.
3. Check door for cracks and repair if required.
4. Check for exposed metal surfaces and surface rust. Repair and repaint if necessary.
5. Check shield/curtain bolts (B) and replace if missing or tighten if loose.

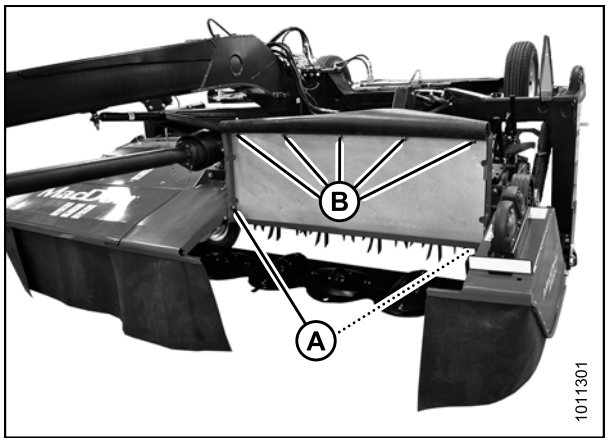

Figure 4.76: Cutterbar Door

Opening Cutterbar Doors

1. Lift door at front to move to open position.

   NOTE:
   Center header beneath hitch to open both doors.

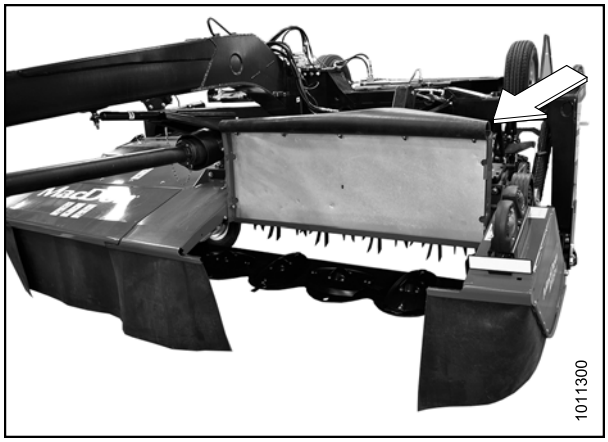

Figure 4.77: Open Cutterbar Door

Closing Cutterbar Doors

⚠ CAUTION

To avoid injury, keep hands and fingers away from corners of doors when closing.

1. Pull door at top to move to closed position.

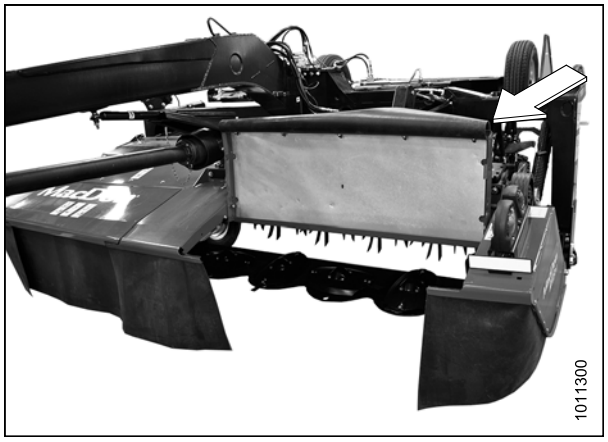

Figure 4.78: Cutterbar Door

2. Ensure that curtains hang properly and completely enclose cutterbar area.

Figure 4.79: Cutterbar Doors in Closed Position

4.5.6 Curtains

Rubber curtains are installed at the following locations:

- Inboard curtain (A) attached to the center fixed cover.
- Door curtains (B) attached to each cutterbar door.
- Outboard curtains (C) attached to each front corner.
- Top cover (not shown) on finger conditioners only.

The curtains form a barrier that minimizes the risk of thrown objects being ejected from the cutterbar area. Always keep curtains down during operation.

Replace the curtains if they become worn or damaged.

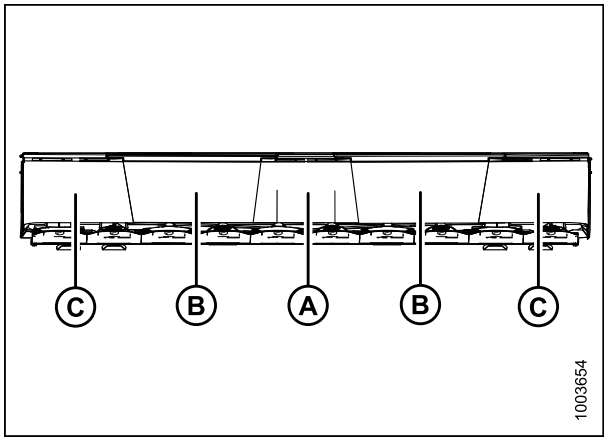

Figure 4.80: Cutterbar Curtains

Inspecting Curtains

WARNING

Do NOT operate the machine without all the cutterbar doors down or without curtains installed and in good condition.

CAUTION

To avoid injury, keep hands and fingers away from corners of doors when closing.

Rubber curtains are attached to each door and at the front corners and center fixed cover. The cutterbar curtains are very important to reduce the potential for thrown objects. Always keep these curtains down when operating the mower conditioner.

Check cutterbar curtains for the following conditions:

- Rips and tears: Replace curtain.
- Cracking: While the curtain may look whole, this is an indicator that failure is imminent—replace curtain.
- Missing bolts: Replace missing hardware before operating.

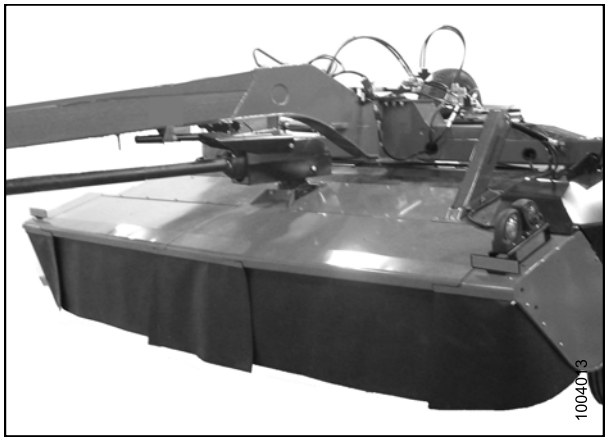

Figure 4.81: Cutterbar Curtains

Removing Cutterbar Door Curtains

The procedure for removing cutterbar door curtains is the same for both doors.

1. Open cutterbar door. Refer to *Opening Cutterbar Doors, page 159*.

Figure 4.82: Cutterbar Doors

2. Remove five nuts (A) from the bolt studs.
3. Remove shield panel (B).
4. Remove curtain (C).

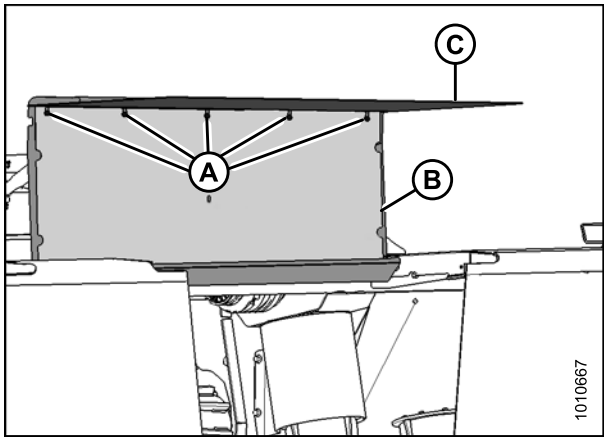

Figure 4.83: Nuts Securing Shield Panel and Curtain to Cutterbar Door

Installing Cutterbar Door Curtains

The procedure for installing cutterbar door curtains is the same for both sides.

1. Insert the cutterbar door bolts into the precut curtain holes (A).

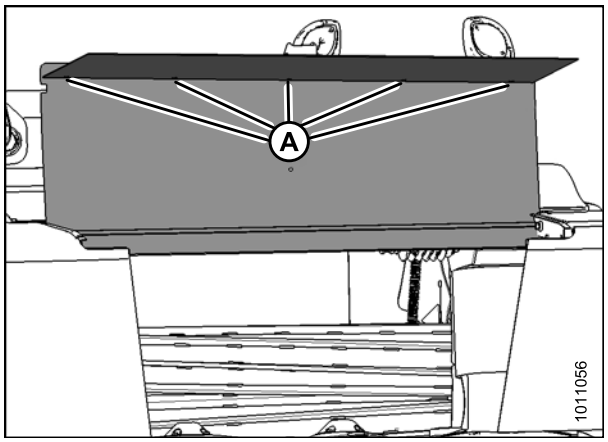

Figure 4.84: Curtain Installed onto Bolts

2. Install shield panel (A).
3. Install five nuts (B) onto bolt studs and torque to 23 ft·lbf (32 N·m).

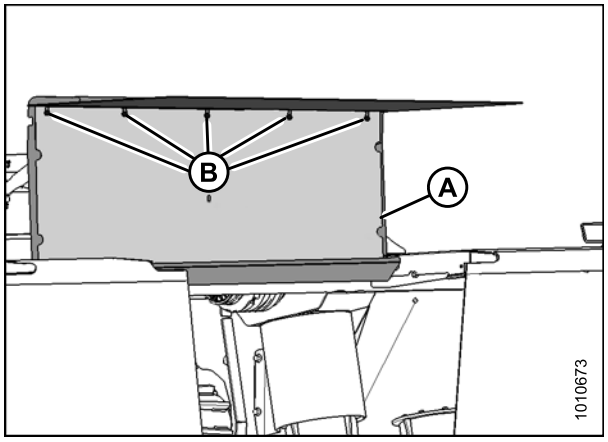

Figure 4.85: Shield Panel Installed with Nuts

4. Close cutterbar door. Refer to *Closing Cutterbar Doors, page 159*.

Figure 4.86: Cutterbar Doors in Closed Position

Removing Cutterbar Inboard Curtain

1. Open cutterbar doors to gain access to inboard curtain nuts. Refer to *Opening Cutterbar Doors, page 159*.

Figure 4.87: Cutterbar Doors

2. Remove two M10 carriage head bolts (A) and nuts securing curtain assembly (B) to the mower conditioner, and remove curtain assembly.

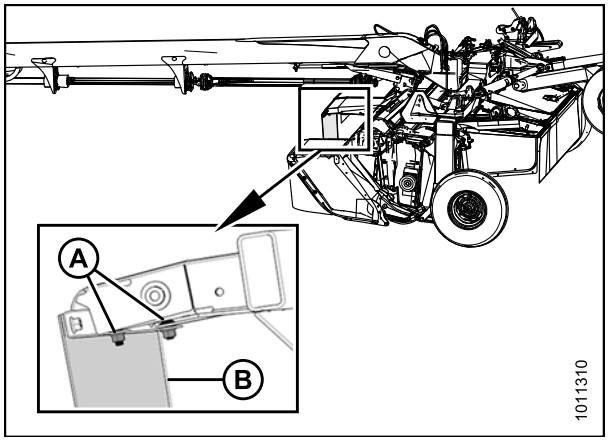

Figure 4.88: Inboard Curtain

3. Remove four nuts (A) from weld studs on center shield, remove two curtain brackets (B), and remove curtain.

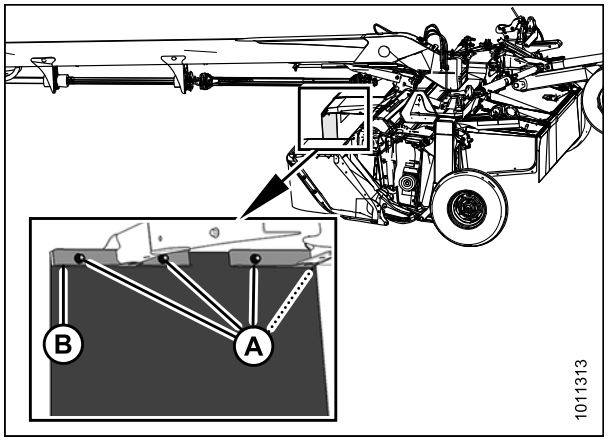

Figure 4.89: Inboard Curtain, Nuts, and Brackets

Installing Cutterbar Inboard Curtain

1. Open cutterbar doors to gain access to inboard curtain nuts. Refer to *Opening Cutterbar Doors, page 159*.

Figure 4.90: Cutterbar Doors

2. Install curtain onto weld studs on center shield, install two curtain brackets (B), and secure with four nuts (A).

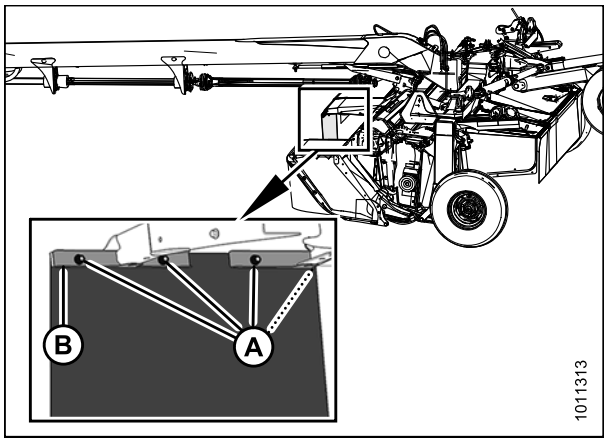

Figure 4.91: Inboard Curtain and Brackets

3. Secure two curtain brackets (A) to center shield using two M10 carriage head bolts (B) and nuts.
4. Torque bolts (A) to 30 ft·lbf (40 N·m).

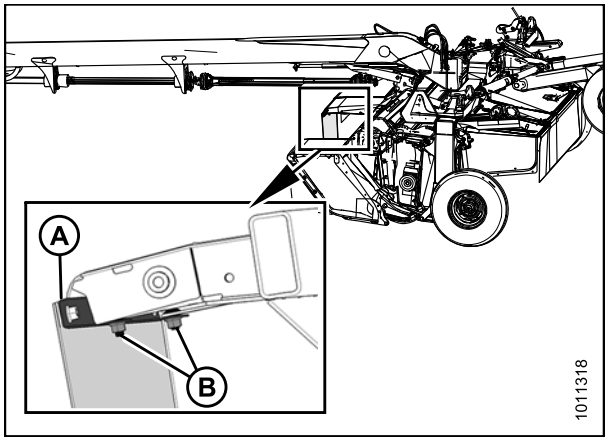

Figure 4.92: Inboard Curtain Attached to Mower Conditioner

Removing Outboard Curtains

The procedure for removing outboard curtains is the same for both sides.

1. Open cutterbar door. Refer to *Opening Cutterbar Doors, page 159*.

Figure 4.93: Cutterbar Doors

2. Remove four cap screws (A), nuts, and large washers securing outboard curtain to endsheet.

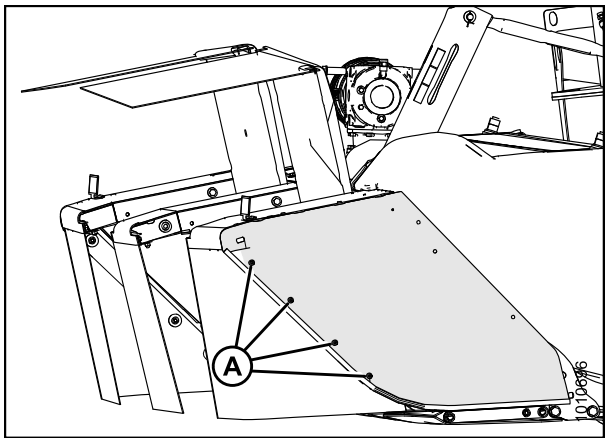

Figure 4.94: Left Side Endsheet

3. Remove two nuts (A) from bolt studs.
4. Remove the square neck carriage head bolt (B), slide out the bracket, and remove curtain (C).

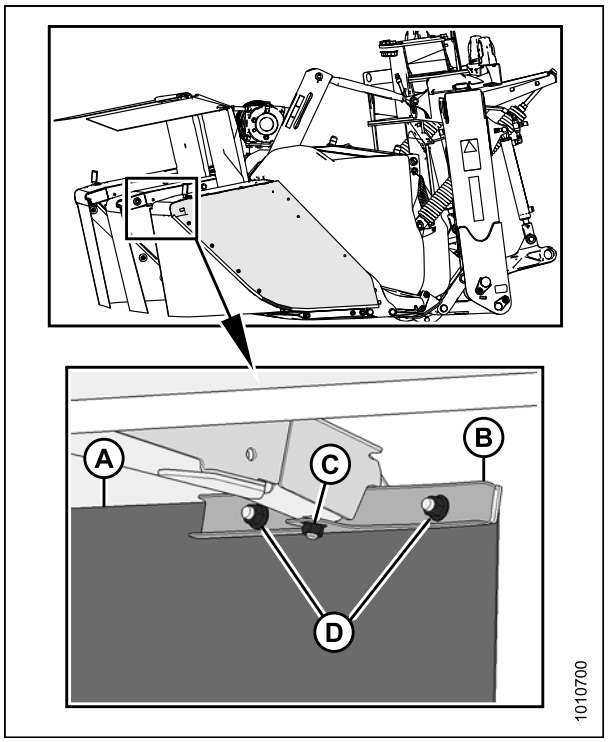

Figure 4.95: Outboard Curtain

Installing Outboard Curtains

The procedure for installing outboard curtains is the same for both sides.

1. Open cutterbar door. Refer to *Opening Cutterbar Doors, page 159*.

Figure 4.96: Cutterbar Doors

2. Install curtain (A) into bracket (B).
3. Install two nuts (D) and tighten.
4. Slide bracket (B) into position, and install the square neck carriage head bolt and flange nut (C).
5. Torque flange nut (C) to 30 ft·lbf (40 N·m).

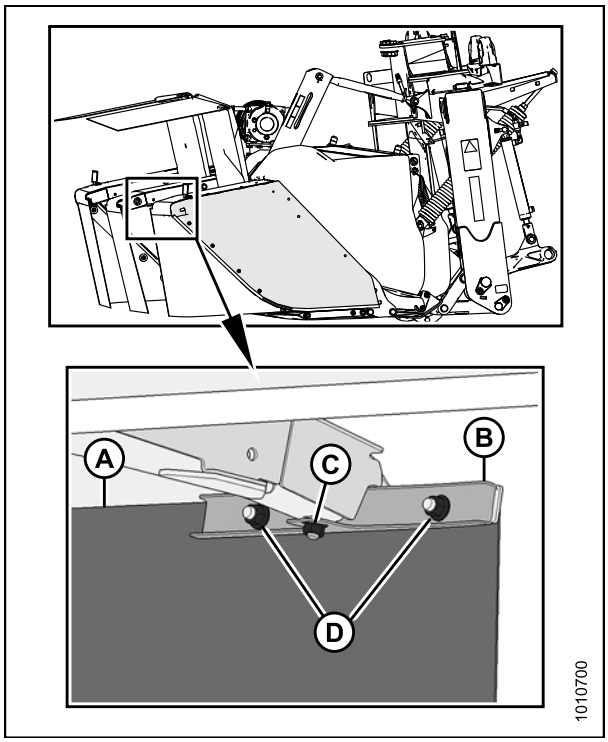

Figure 4.97: Outboard Curtain

6. Install four cap screws (A), nuts, and large washers to secure outboard curtain to endsheet.

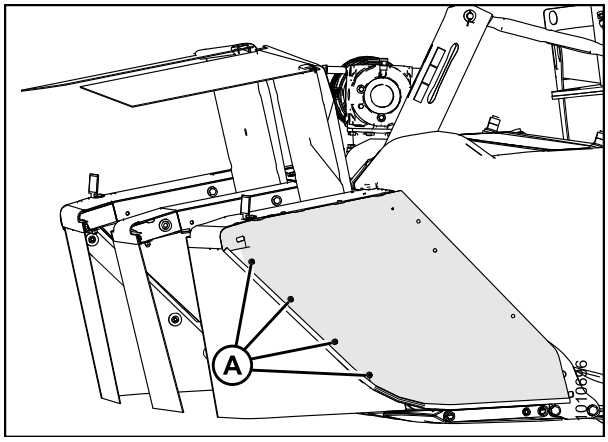

Figure 4.98: Left Side Endsheet

4.5.7 Accelerators

Accelerators (A) are mounted on each outboard disc and are designed to quickly move cut material off the disc and into the conditioner. One pair of accelerators is installed at each outboard end of a 13-foot mower conditioner, whereas a 16-foot mower conditioner has two pairs.

Periodically inspect accelerators for damage and loose or missing fasteners and replace as necessary.

IMPORTANT:
Always replace accelerators in pairs to ensure proper disc balance.

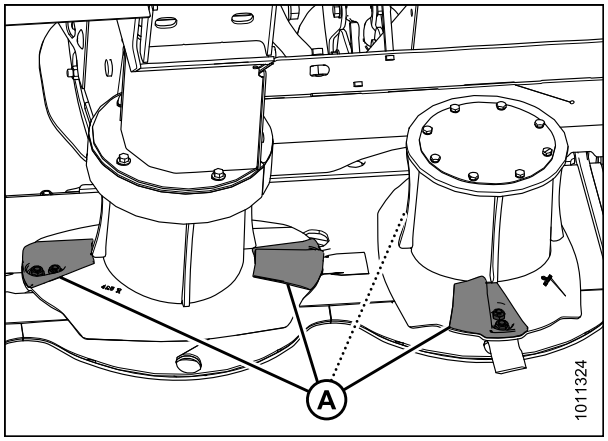

Figure 4.99: 16-Foot Mower Conditioner

Inspecting Accelerators

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Raise mower conditioner fully, stop engine, and remove key.
2. Engage lift cylinder lock-out valves (refer to *3.1.1 Engaging Locks, page 31*).
3. Open cutterbar doors.

CAUTION

Cutter blades have two cutting edges. Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

4. Inspect accelerators for damage and wear, and replace if worn to 50% or more of their original height or if they are no longer effectively moving crop.
5. Check for loose or missing fasteners and tighten or replace missing fasteners.

Figure 4.100: Cutterbar Doors

Removing Accelerators

1. Raise mower conditioner fully, shut off engine, and remove key.
2. Engage lift cylinder lock-out valves (refer to *3.1.1 Engaging Locks, page 31*).
3. Remove nut (A), flange bolt (B), and cutter blade (C) from disc.

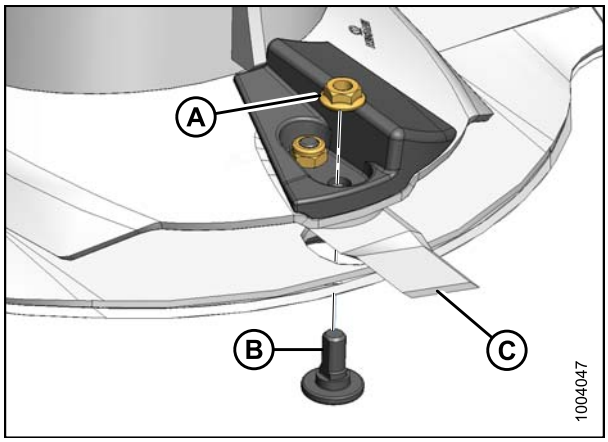

Figure 4.101: Cutter Blade and Disc

4. Use a hex key to remove bolt (A).

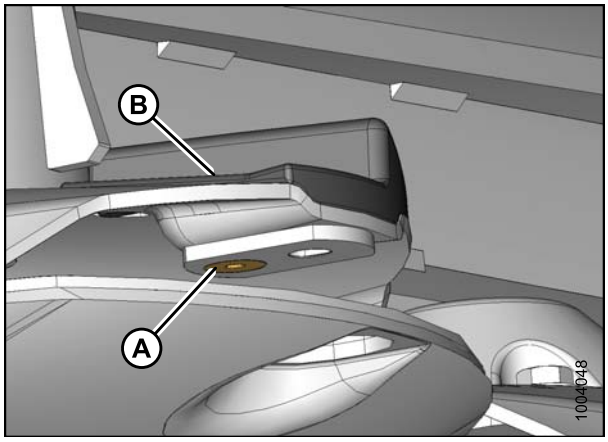

Figure 4.102: Hex-Socket Bolt

5. Remove lock nut (A), accelerator (B), blade holder (C), and hex-socket bolt (D).

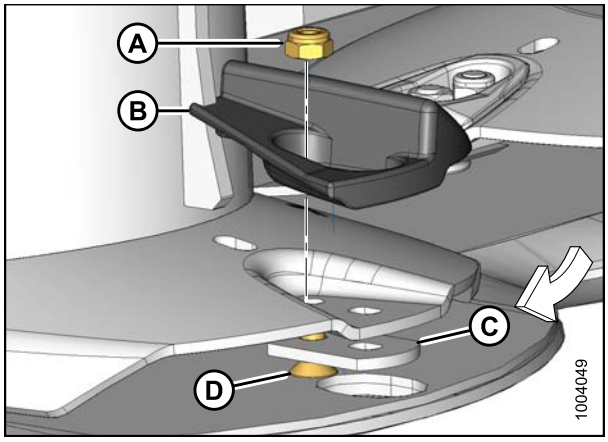

Figure 4.103: Accelerator and Hardware

Installing Accelerators

1. Place a wooden block between two cutterbar discs to prevent disc rotation while tightening blade bolts.

   IMPORTANT:
   Accelerators can operate in a clockwise or counterclockwise direction. Verify the direction of the disc before installing accelerators. If you are unsure which direction the spindle rotates, refer to *4.5.3 Cutterbar Spindles, page 143*.

2. Install lock nut (A), accelerator (B), blade holder (C) and hex-socket bolt (D). Do **NOT** tighten at this time.

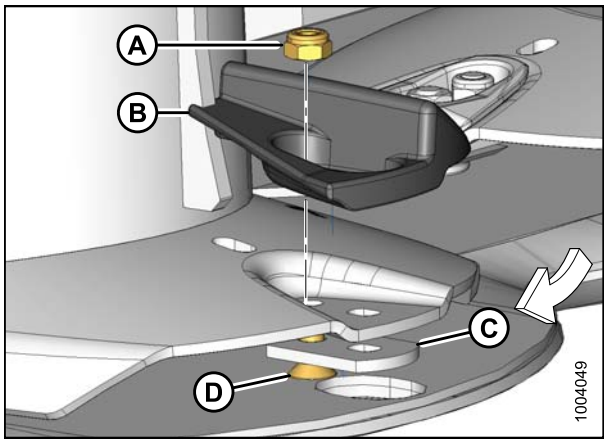

Figure 4.104: Accelerator and Hardware

3. Install nut (A), flange bolt (B), and cutter blade (C) onto disc.
4. Torque each nut to 92 ft·lbf (125 N·m).

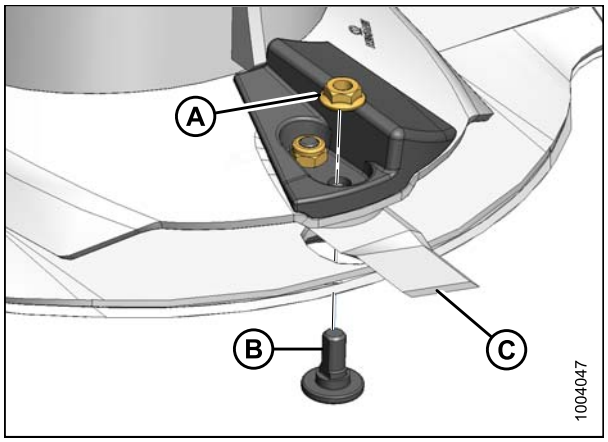

Figure 4.105: Cutter Blade and Disc

WARNING

Ensure cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

5. Remove wooden block.
6. Close cutterbar doors (refer to *Closing Cutterbar Doors, page 159*).

Figure 4.106: Cutterbar Doors in Closed Position

4.5.8 Rock Guards

The machine is equipped with rock guards at each cutting disc location. Rock guards prevent the cutterbar from digging into the ground and protect the disc from coming in contact with stones and other debris.

Inspecting Rock Guards

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Raise mower conditioner fully, stop engine, and remove key.
2. Engage lift cylinder lock-out valves (refer to *3.1.1 Engaging Locks, page 31*).
3. Inspect rock guards for severe damage, wear, and distortion, and replace if worn to 75% or more of their original thickness.
4. Check for loose or missing fasteners and tighten or replace missing fasteners.

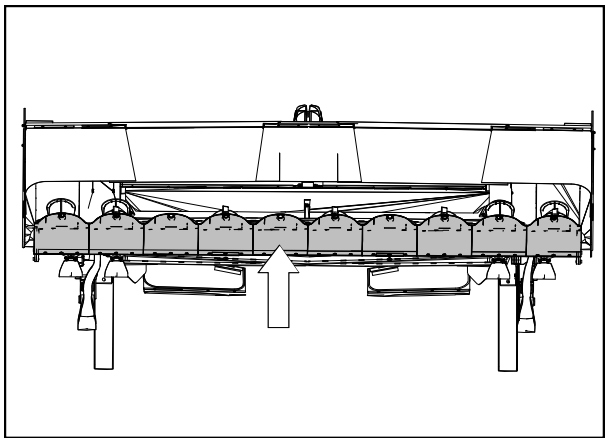

Figure 4.107: Rock Guards

Removing Rock Guards

1. Remove two hex head screws, washers, and lock nuts (A).

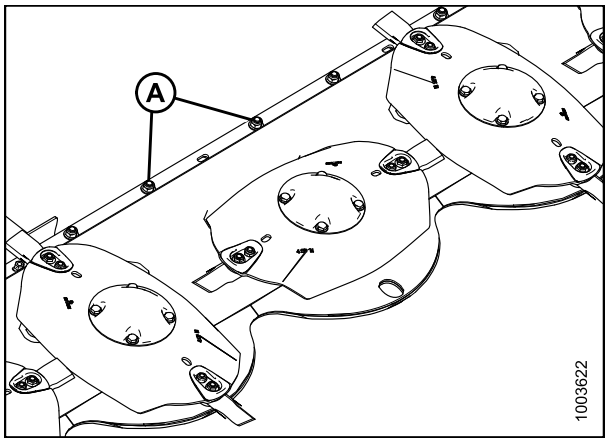

Figure 4.108: Rock Guard Hardware

2. Slide rock guard (A) forward in the direction of arrow (B) and remove.

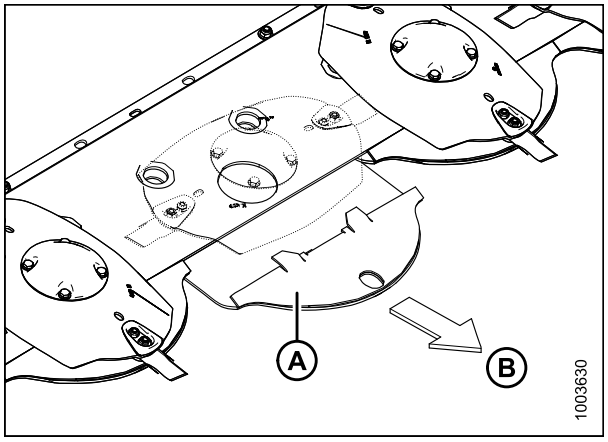

Figure 4.109: Rock Guard Removed from Cutterbar

Installing Rock Guards

1. Guide rock guard onto cutterbar until tabs (A) sit on top of the cutterbar while bottom back bolt holes line up.

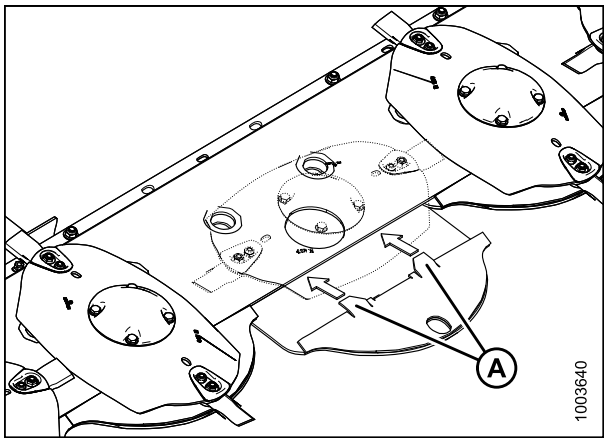

Figure 4.110: Rock Guard Installed on Cutterbar

2. Install two hex head screws, washers, and lock nuts (A). Torque to 50 ft·lbf (68 N·m).

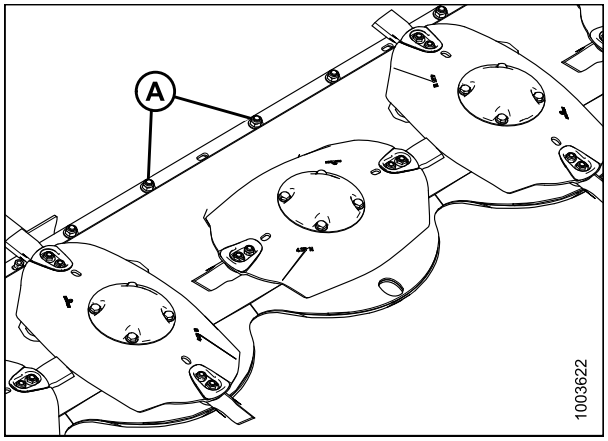

Figure 4.111: Rock Guard Hardware

4.5.9 Rotary Deflectors

The rotary deflectors are designed to deliver cut material from the ends of the cutterbar and help maintain an even flow of crop into the conditioner. Rotary deflectors are attached to only the two outboard discs at each end of the cutterbar.

IMPORTANT:
The outboard deflectors (B) are approximately 29/32 in. (23 mm) smaller in diameter than the inboard deflectors (A).

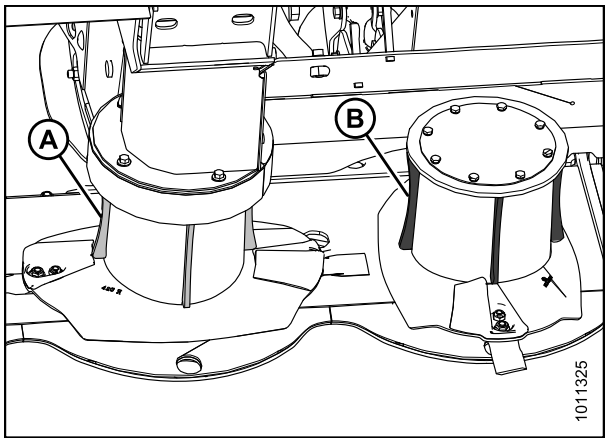

Figure 4.112: Rotary Deflectors

A - Driven Rotary Deflector **B - Non-Driven Rotary Deflector**

Inspecting Rotary Deflectors

Inspect rotary deflectors daily for signs of damage or wear.

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

1. Lower mower conditioner fully, shut off engine, and remove key.
2. Open cutterbar doors.

Figure 4.113: Cutterbar Doors

3. Inspect deflectors (A) and (B) for damage and wear, and replace if deflectors are worn at the center to 50% or more of their original thickness. Do **NOT** repair deflectors.
4. Examine drums for significantly sized dents. Replace dented drums to prevent an imbalance in the cutterbar.
5. Check for loose or missing fasteners and tighten or replace missing fasteners.

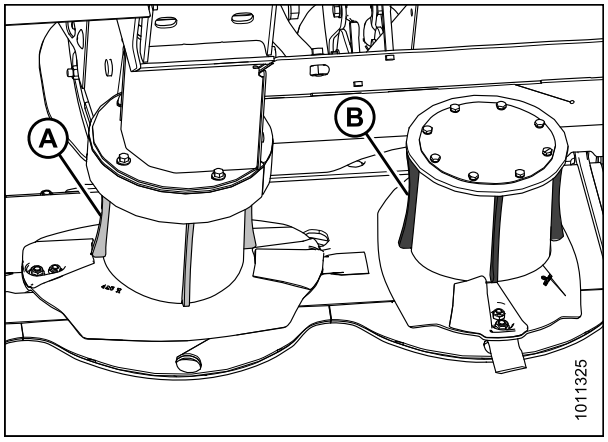

Figure 4.114: Rotary Deflectors

WARNING

Ensure cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

6. Close cutterbar doors.

Removing Driven Rotary Deflectors and Driveline

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

NOTE:
Images shown are for left side rotary deflector and driveline—right side rotary deflector and driveline is similar.

1. Open cutterbar doors (refer to *Opening Cutterbar Doors, page 159*).

Figure 4.115: Cutterbar Doors

2. Remove four M10 hex flange head bolts (A) and remove vertical drive shield (B).

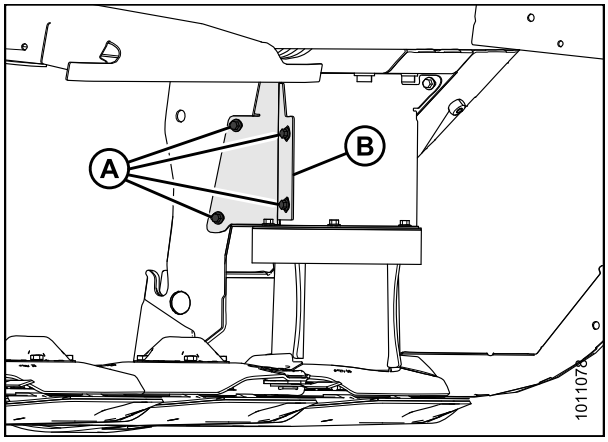

Figure 4.116: Vertical Drive Shield

3. Remove two M10 hex flange head bolts (A) and remove cover plate (B).

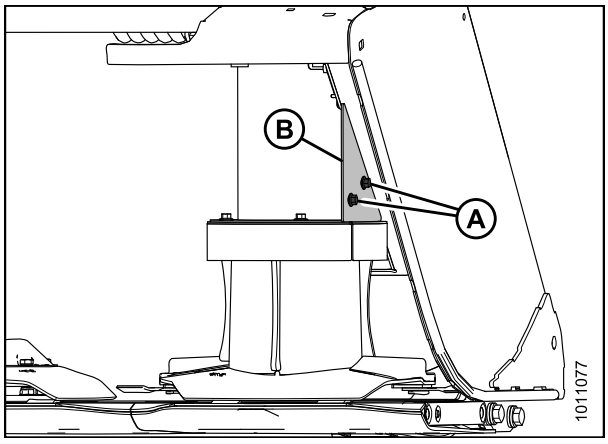

Figure 4.117: Cover Plate

4. Remove four M10 hex flange head bolts (A), and remove top plate (B) and drum top (C).

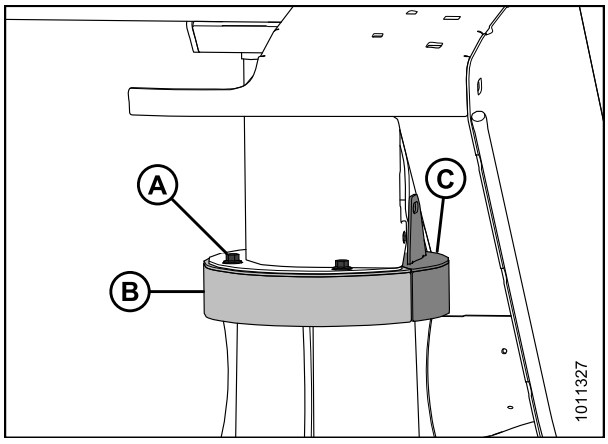

Figure 4.118: Top Plate and Drum Top

5. Remove M10 hex flange head bolt (A) and remove vertical shield (B).

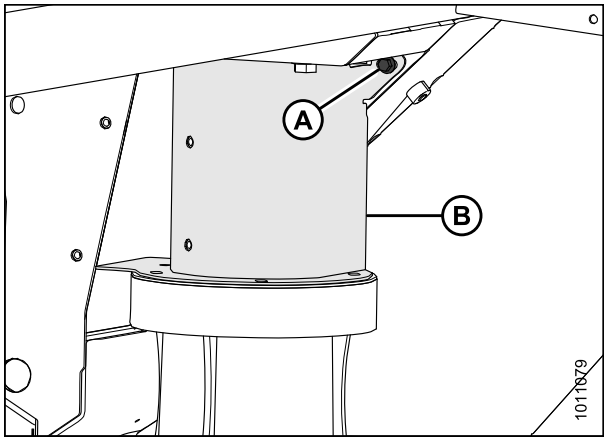

Figure 4.119: Vertical Shield

6. Remove eight M8 hex flange head bolts (A), and remove two drum shields (B).

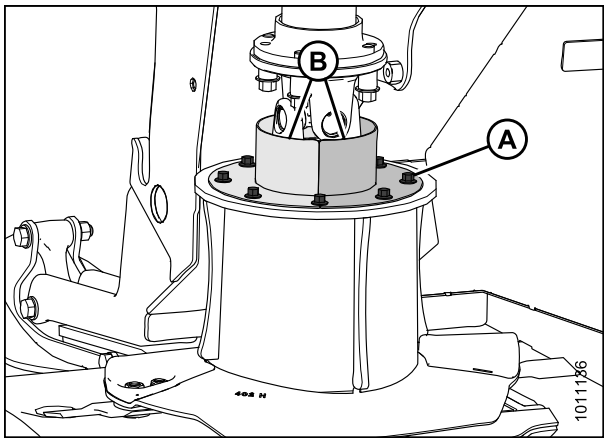

Figure 4.120: Drum Shields

7. Remove four M12 hex flange head bolts (A) and spacers securing driveline assembly (B) to hub drive (C).

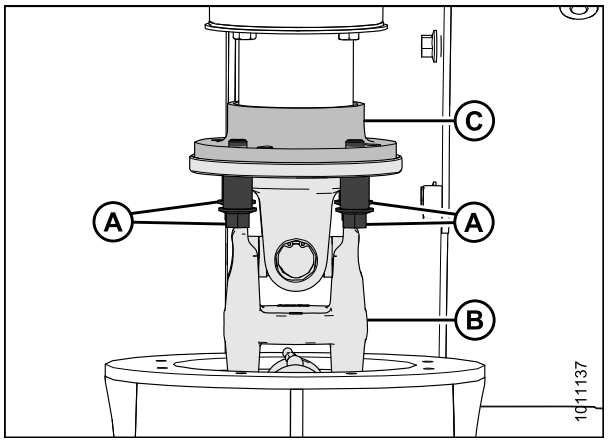

Figure 4.121: Driveline Hardware

8. Slide driveline (A) downwards, tilt to the side, and pull driveline up and out of drum (cut away view of drum and tube shield shown for improved clarity).

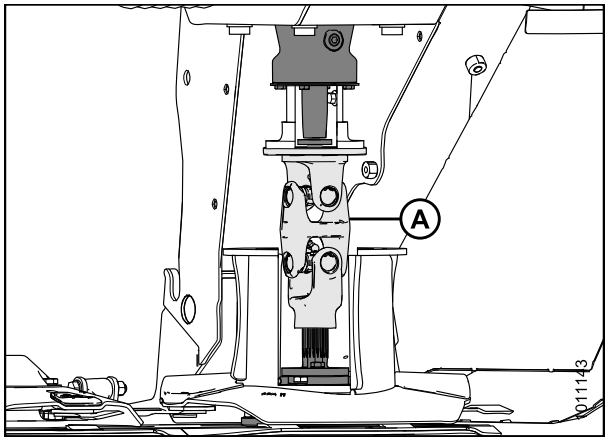

Figure 4.122: Vertical Driveline (Cut Away View Shown)

9. Look down into the rotary deflector, and use a 12 in. extension and 16 mm deep socket to remove the four M12 bolts (A) and washers holding the deflector disc in place.
10. Remove deflector disc assembly.

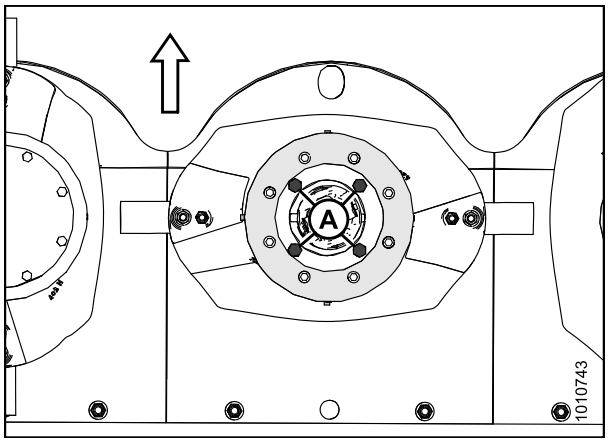

Figure 4.123: Driven Rotary Deflector (Top View)

Installing Driven Rotary Deflectors and Driveline

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

NOTE:
Images shown are for left side rotary deflector and driveline—right side rotary deflector and driveline is similar.

NOTE:
Arrow indicates forward direction.

1. Position the rotary deflector disc assembly as shown.
2. Use a 12 in. extension and 16 mm deep socket to install the four M12 bolts (A) and washers that hold the deflector disc in place. Torque to 63 ft·lbf (85 N·m).

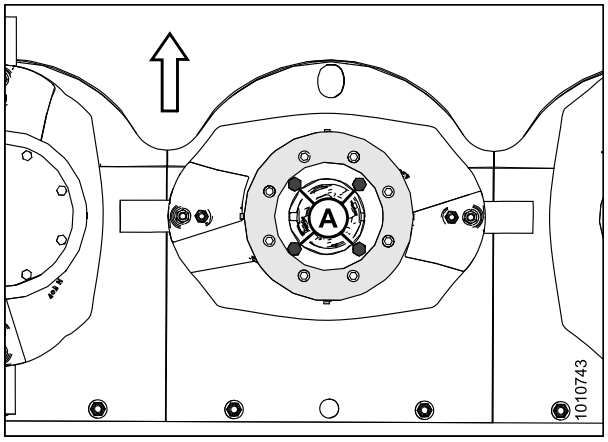

Figure 4.124: Driven Rotary Deflector (Top View)

3. Lubricate spindle splines (A) with high temperature extreme pressure (EP2) performance with 10% max. Molybdenum Disulphide (NLGI Grade 2) lithium base grease (cut away view of drum and tube shield shown for improved clarity).

NOTE:
Do **NOT** use this grease for bearings.

4. Insert driveline (B) at an angle and guide it past hub drive (C) and drum (D).
5. Insert splined spindle end (A) into splined bore of driveline (B).

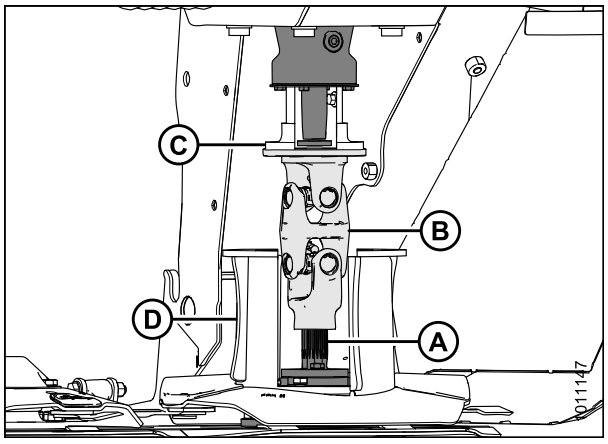

Figure 4.125: Vertical Driveline (Cut Away View Shown)

6. Place a bead of Loctite® Blue 242 around threads, and install four M12 hex flange head bolts (A) and spacers to secure driveline assembly (B) to hub drive (C). Torque bolts to 70 ft·lbf (95 N·m).

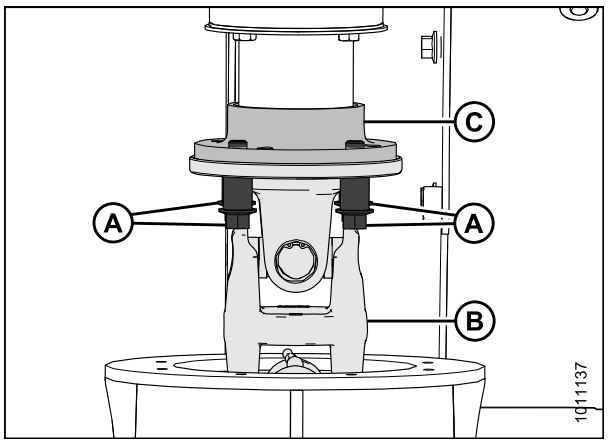

Figure 4.126: Driveline Hardware

7. Position two drum shields (B) as shown, and secure with eight M8 hex flange head bolts (A).

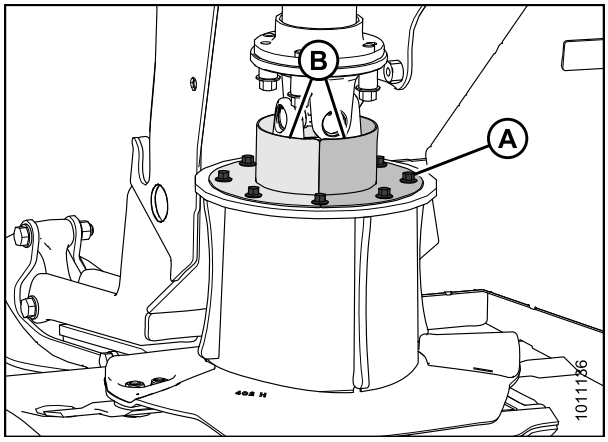

Figure 4.127: Drum Shields

8. Position vertical shield (B) as shown, and install M10 hex flange head bolt (A).

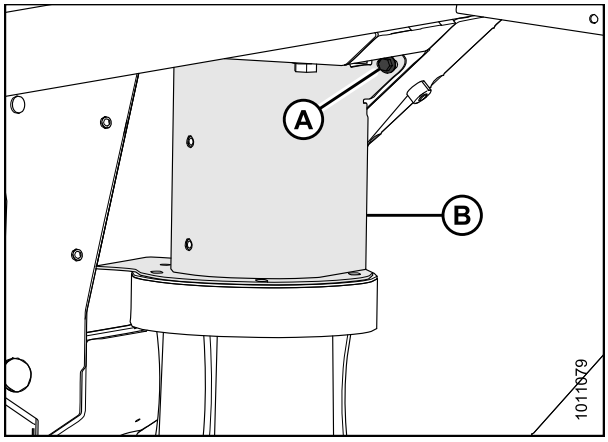

Figure 4.128: Vertical Shield

9. Position top plate (B) and drum top (C) onto drum as shown, and secure with four M10 hex flange head bolts (A).

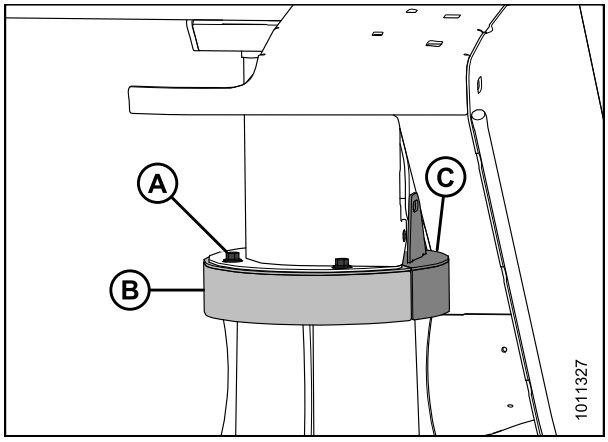

Figure 4.129: Top Plate and Drum Top

10. Install cover plate (A), insert top M10 hex flange head bolt (B) through cover plate and top plate (C), and install lower M10 hex flange head bolt (D) through cover plate and vertical shield (E). Tighten bolts.

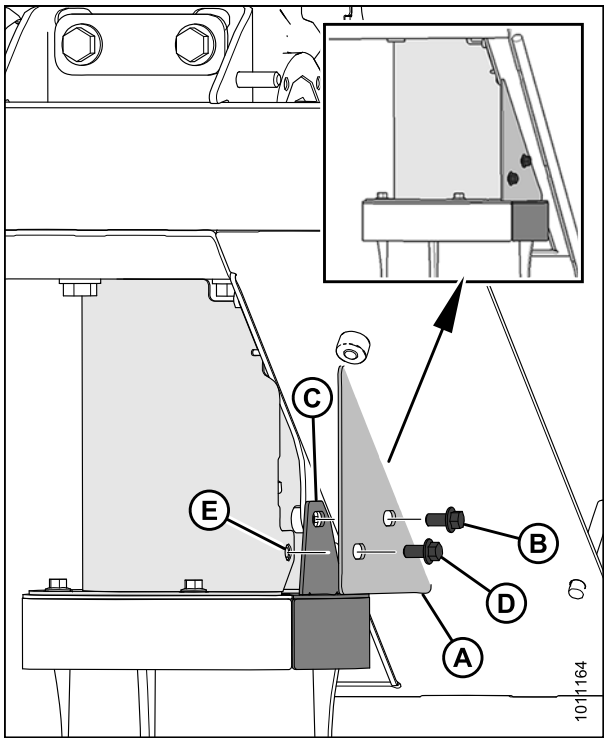

Figure 4.130: Cover Plate

11. Install vertical drive shield (B) using four M10 hex flange head bolts (A).

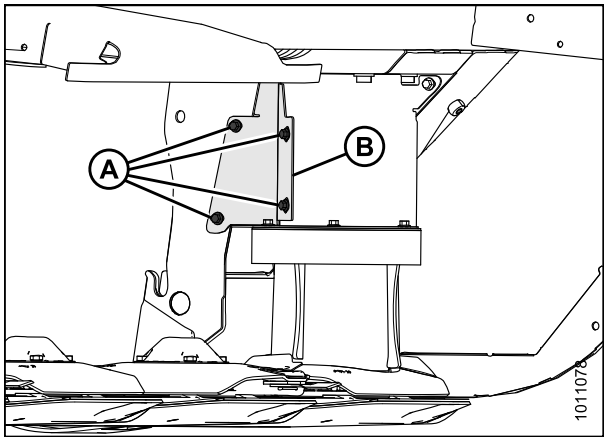

Figure 4.131: Vertical Drive Shield

WARNING

Ensure cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

12. Close cutterbar doors (refer to *Closing Cutterbar Doors, page 159*).

Figure 4.132: Cutterbar Doors in Closed Position

Removing Non-Driven Rotary Deflectors

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Open cutterbar doors (refer to *Opening Cutterbar Doors, page 159*).

Figure 4.133: Cutterbar Doors

NOTE:
Arrow indicates forward direction.

2. Place a wooden block between two cutterbar discs to prevent disc rotation while loosening blade bolts.
3. Remove eight M8 bolts (A) and washers securing the cover to the non-driven rotary deflector.

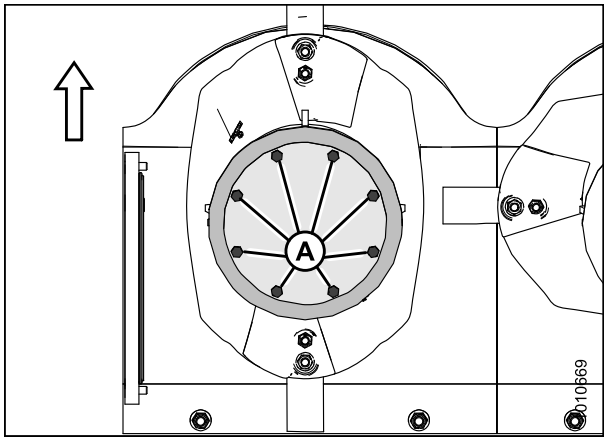

Figure 4.134: 16-Foot Mower Conditioner Shown

4. Remove the four M10 bolts inside the deflector drum using a 12 in. extension and 16 mm socket.
5. Remove wooden block.
6. Remove rotary deflector.

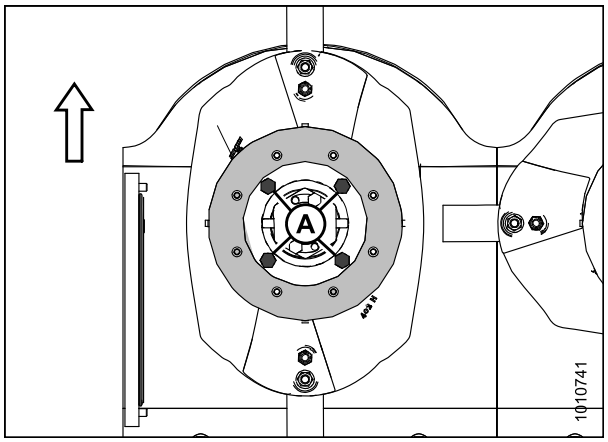

Figure 4.135: Non-Driven Rotary Deflector (Top View)

Installing Non-Driven Rotary Deflectors

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

NOTE:
Arrow indicates forward direction.

1. Orient each disc at a 90° angle relative to the neighboring discs.

NOTE:
Discs are direction specific. It is important to ensure proper disc orientation.

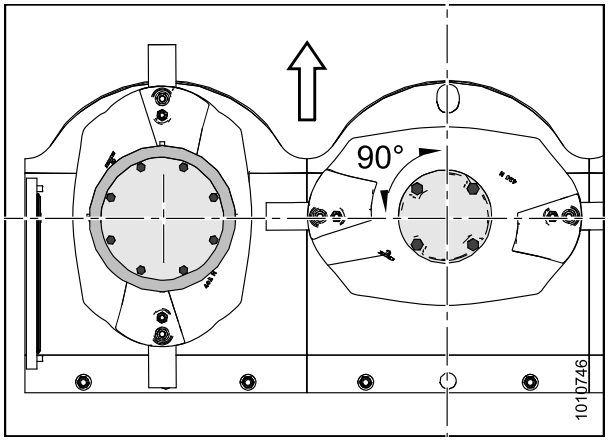

Figure 4.136: Cutterbar Discs (Top View)

2. Position the non-driven rotary deflector.
3. Use a 12 in. extension and 16 mm deep socket to install the four M10 bolts (A) and washers that hold the deflector disc in place. Torque to 40 ft·lbf (55 N·m).

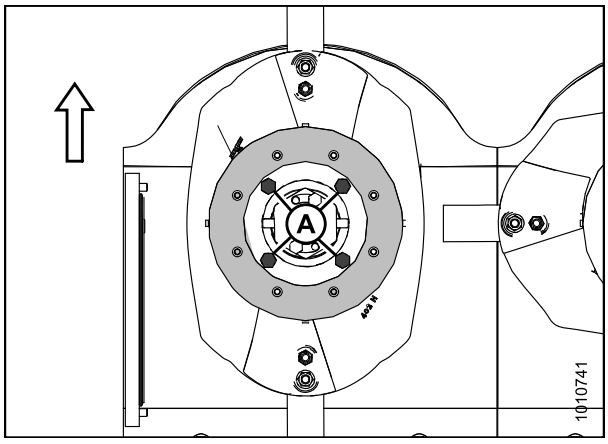

Figure 4.137: Non-Driven Rotary Deflector (Top View)

4. Install eight M8 bolts (A) and washers to secure the cover to the non-driven rotary deflector and torque to 20 ft·lbf (28 N·m).

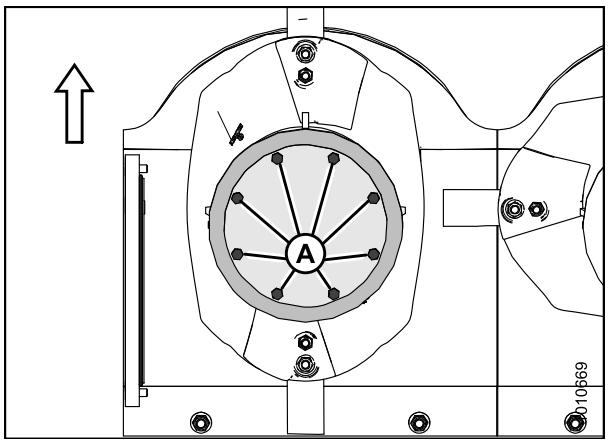

Figure 4.138: 16-Foot Mower Conditioner Shown

WARNING

Ensure cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

5. Close cutterbar doors (refer to *Closing Cutterbar Doors, page 159*).

Figure 4.139: Cutterbar Doors in Closed Position

4.5.10 Cutterbar Spindle Shear Pin

To prevent damage to the cutterbar and drive systems, each disc is attached to a spindle containing a shear pin (A). If the disc contacts a large object such as a stone or stump, the pins will shear and the disc will stop rotating and move upwards while remaining attached to the spindle with a snap ring (B).

IMPORTANT:

- **Ensure correct orientation of the shear pins during replacement.**
- **Spindles that rotate clockwise have left-handed threading.**
- **Spindles that rotate counterclockwise have right-handed threading.**

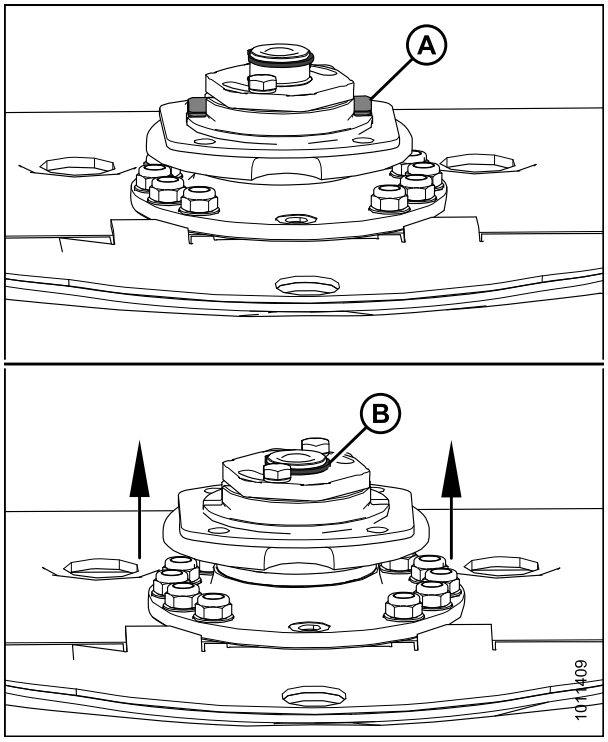

Figure 4.140: Cutterbar Spindles

Removing Cutterbar Spindle Shear Pin

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Raise mower conditioner fully, shut off engine, and remove key.
2. Engage lift cylinder lock-out valves (refer to *3.1.1 Engaging Locks, page 31*).
3. Open cutterbar doors and clean debris from work area.

Figure 4.141: Cutterbar Doors

4. Remove disc assemblies from cutterbar as follows:
   - **Cutterbar Disc** (A): Refer to *Removing Cutterbar Discs, page 140*.
   - **Driven Rotary Deflector** (B): Refer to *Removing Driven Rotary Deflectors and Driveline, page 174*.
   - **Non-Driven Rotary Deflector** (C): Refer to *Removing Non-Driven Rotary Deflectors, page 181*.

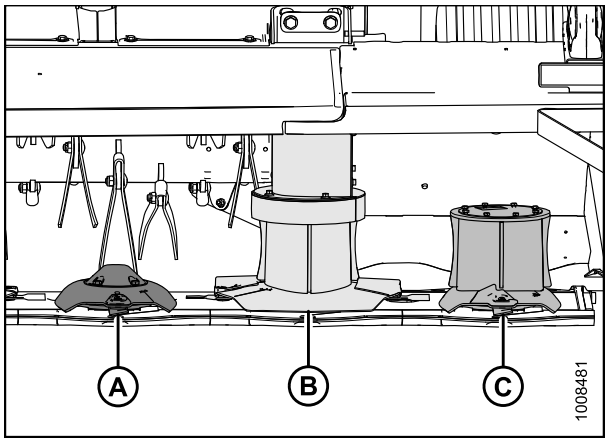

Figure 4.142: Cutterbar Disc Assemblies

5. Remove damaged shear pin (A) from pinion using a pin punch and hammer. Do NOT damage the pin bore on the pinion.
6. Refer to *Installing Cutterbar Spindle Shear Pin, page 186*.

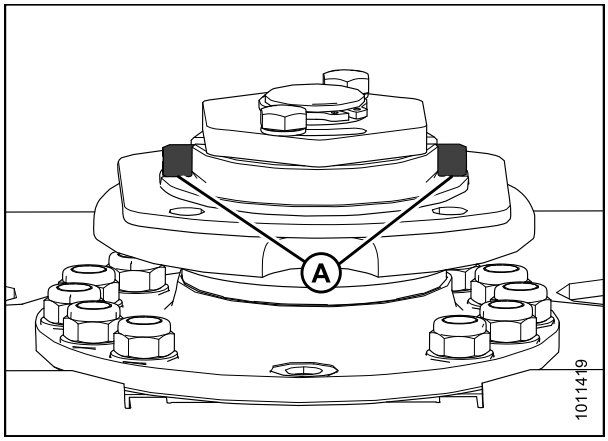

Figure 4.143: Shear Pin

Installing Cutterbar Spindle Shear Pin

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Remove two M10 bolts (A) and washers.

   NOTE:
   Do NOT damage the nuts or threads during disassembly.

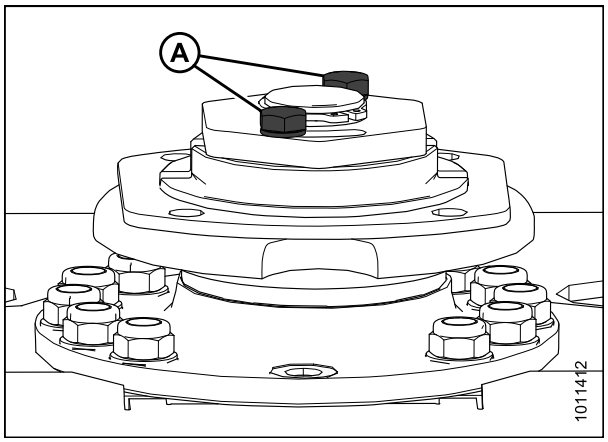

Figure 4.144: Cutterbar Spindle

2. Remove M12 bolt and remove safecut spindle-nut wrench (A) from left side shield plate.

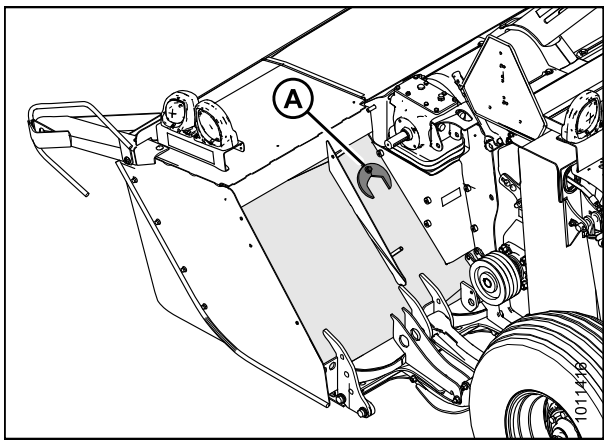

Figure 4.145: Safecut Spindle-Nut Wrench Location

3. Identify left-hand or right-hand markings on spindle nut.

   IMPORTANT:
   Distinguish between left-hand and right-hand markings as follows:

   - Left-hand spindle nuts (A) have distinctive grooved bevels (C) on the corners—right-hand spindle nuts (B) do not.
   - Left-hand pinion shafts (D) have distinctive grooves on the face—right-hand pinions (E) do not.

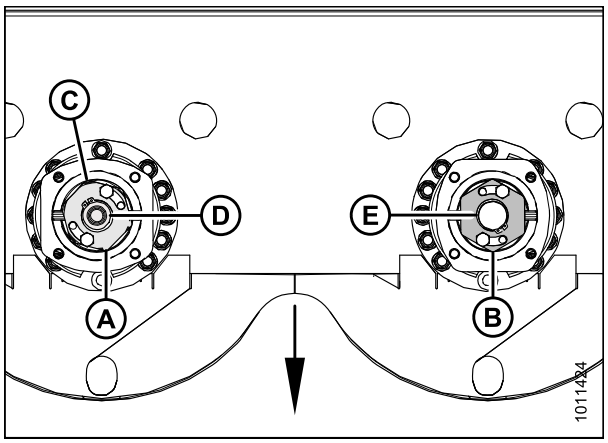

Figure 4.146: Left-Hand and Right-Hand Markings

4. Use safecut spindle-nut wrench removed in Step *2., page 186* to torque spindle nut (A) to 221 ft·lbf (300 N·m).

   NOTE:
   Turn left-hand threads clockwise to tighten, and turn right-hand threads counterclockwise to tighten.

5. Return safecut spindle-nut wrench to left side shield plate.

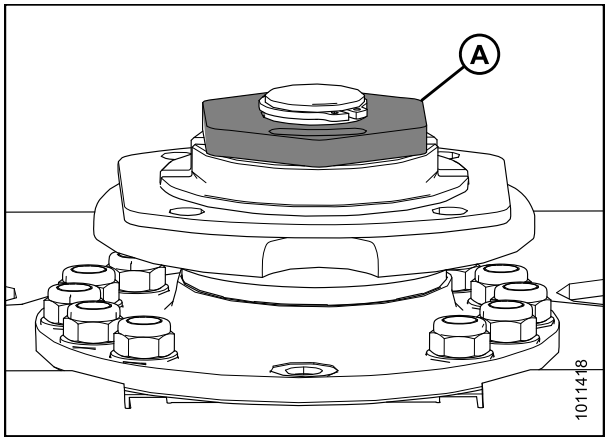

Figure 4.147: Spindle Nut

6. Align slots in hub (A) with hole in shaft (B).

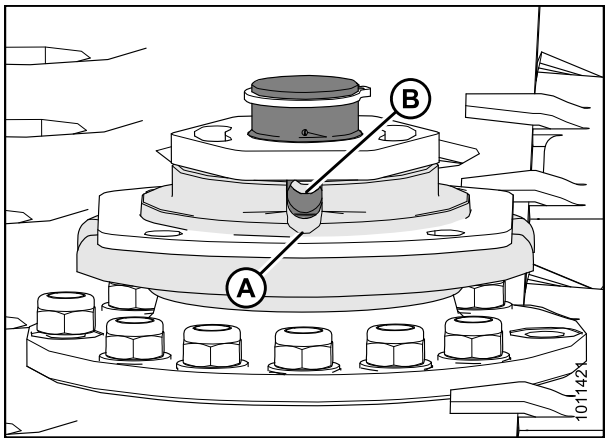

Figure 4.148: Hub and Shaft Alignment

7. Observe orientation of groove in shear pin (A).

   IMPORTANT:
   New shear pin must be installed in same orientation with slot or groove on horizontal plane parallel to cutterbar.

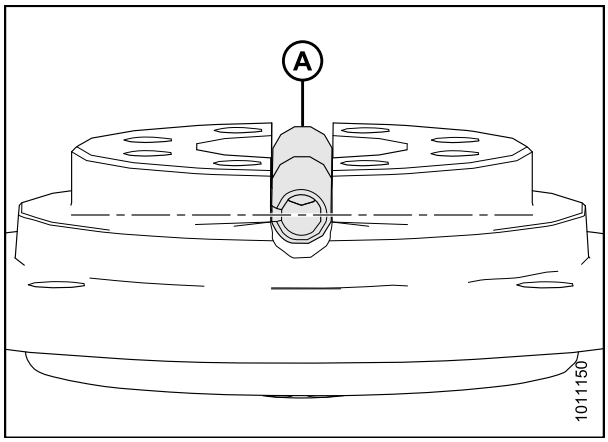

Figure 4.149: Shear Pin Orientation

8. Use a pin punch and hammer to install one shear pin (A) so that the outermost end is flush with hub landing (B).

   IMPORTANT:
   Proper shear pin orientation during installation is critical. Shear pin grooves must be facing the same direction and oriented on a horizontal plane parallel to the cutterbar.

9. Repeat procedure for opposite side.

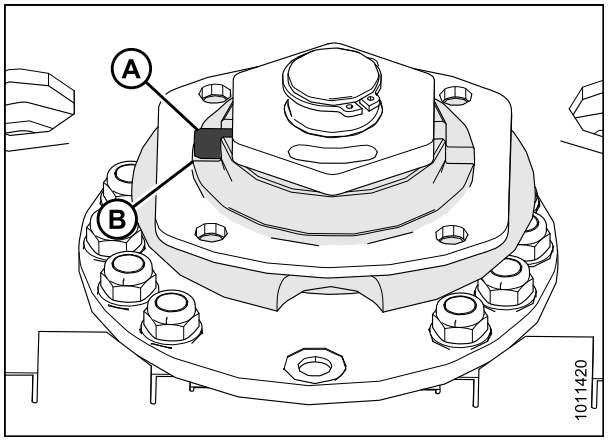

Figure 4.150: Shear Pin Orientation

10. Install two M10 bolts (A) and washers. Torque to 40 ft·lbf (55 N·m).

    NOTE:
    Inspect bolt threads and replace if damaged.

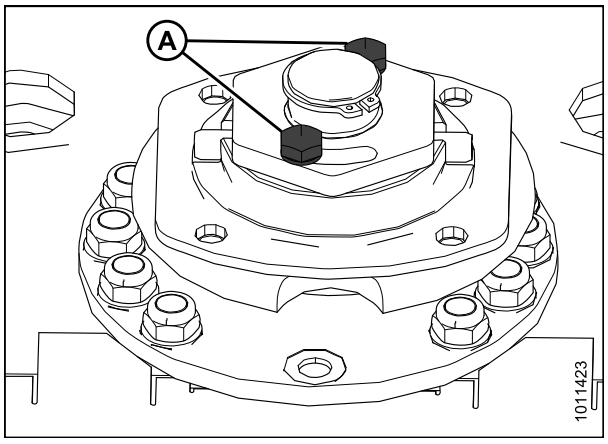

Figure 4.151: Cutterbar Spindle

11. Install disc assemblies onto cutterbar as follows:
    - **Cutterbar Disc** (A): Refer to *Installing Cutterbar Discs, page 141*.
    - **Driven Rotary Deflector** (B): Refer to *Installing Driven Rotary Deflectors and Driveline, page 177*.
    - **Non-Driven Rotary Deflector** (C): Refer to *Installing Non-Driven Rotary Deflectors, page 182*.

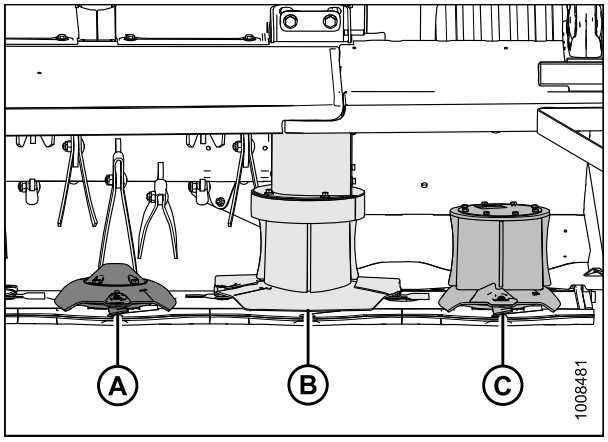

Figure 4.152: Cutterbar Disc Assemblies

WARNING

Ensure cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

12. Close cutterbar doors (refer to *Closing Cutterbar Doors, page 159*).

Figure 4.153: Cutterbar Doors in Closed Position

4.6 Drive Systems

4.6.1 Primary Driveline

The primary driveline transfers power from the tractor's power take-off (PTO) to the mower conditioner's forward swivel gearbox. No maintenance is required other than regular lubrication. Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.

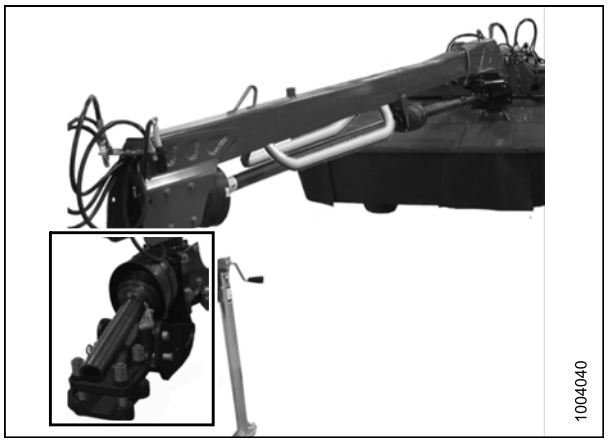

Figure 4.154: Primary Driveline

Removing Primary Driveline

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Stop engine, and remove key from ignition.
2. Unhook unit from the tractor. Refer to *3.9 Detaching Mower Conditioner from Tractor, page 51*.
3. Release two lever clamps (A) using a screwdriver or similar prying tool.

Figure 4.155: Driveline Shield Cone and Lever Clamp

4. Slide driveline shield cone away from gearbox.
5. Loosen nut (A) and use a hammer to release yoke from taper pin lock.
6. Pull driveline off gearbox.
7. Remove driveline guard if necessary. Refer to *Removing Driveline Guard, page 204*.

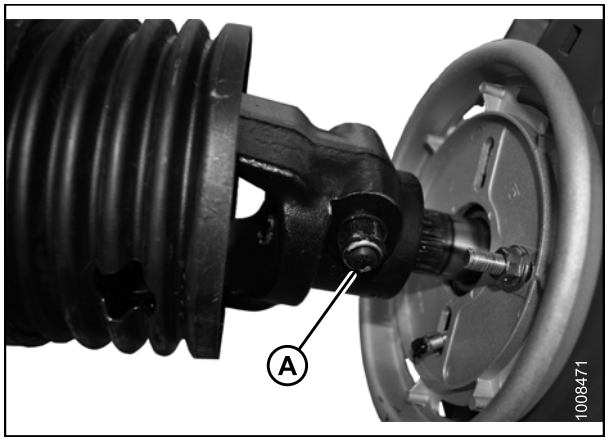

Figure 4.156: Bolt Securing Driveline to Gearbox

Installing Primary Driveline

1. Install driveline guard onto driveline (if previously removed). Refer to *Installing Driveline Guard, page 205*.
2. Position driveline as shown, and orient tapered pin so groove of pin lines up with groove of shaft. Torque to 110 ft·lbf (149 N·m).

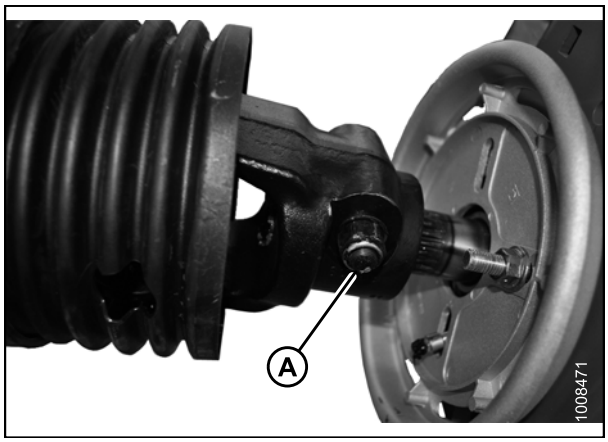

Figure 4.157: Bolt Installed in Yoke

3. Slide shield cone towards the gearbox, and securely fasten two lever clamps (A) to the metal plate.

Figure 4.158: Shield Clipped to Driveline

4. Attach the male half (A) of driveline to the female half, and position onto storage hook (B) or connect to tractor power take-off (PTO). To attach unit to tractor, refer to *3.8 Attaching Mower Conditioner to the Tractor, page 44*.

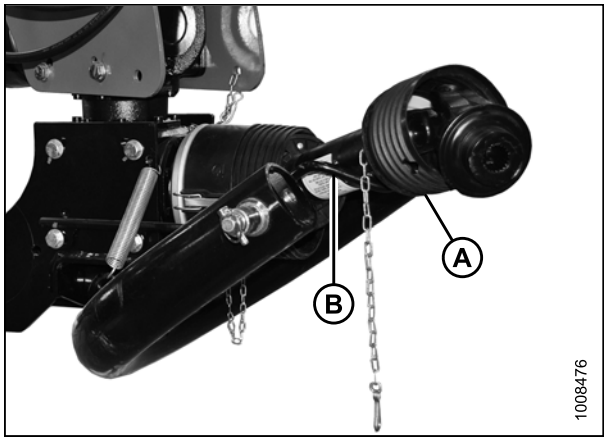

Figure 4.159: Primary Driveline

4.6.2 Hitch Driveline

The hitch driveline is a solid shaft that connects the forward swivel gearbox to the clutch driveline. The hitch driveline is supported by a bearing at the approximate midpoint of the hitch. Replace the driveline if there are signs of damage, vibration, or excessive noise.

No maintenance is required other than regular lubrication. Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.

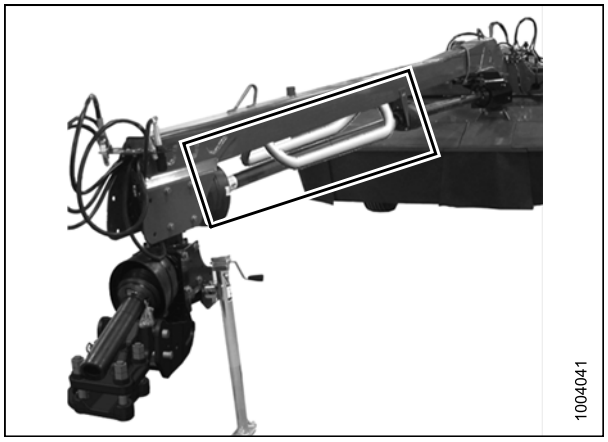

Figure 4.160: Hitch Driveline

Removing Hitch Driveline

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Stop engine, and remove key from ignition.
2. Disconnect clutch driveline (A) at the center support. Do not remove entire driveline. Refer to *Removing Clutch Driveline, page 199*.

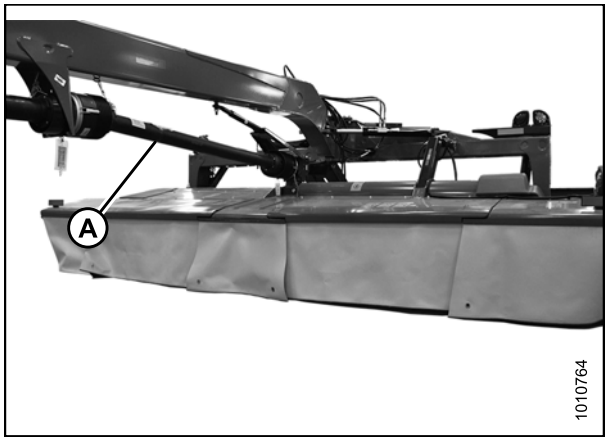

Figure 4.161: Clutch Driveline

3. Remove three screws (A) from driveshield cover, and slide driveline away from center support.
4. Remove two bolts (B), and slide the metal shield (C) away from center support.

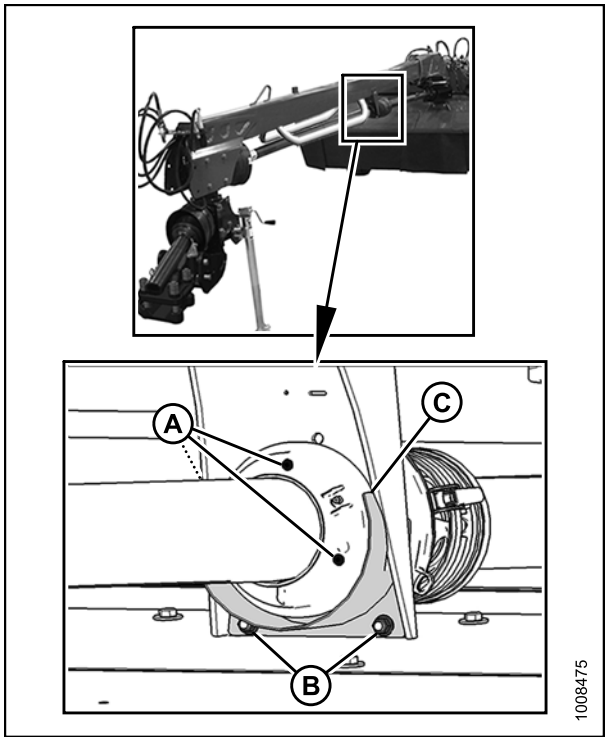

Figure 4.162: Driveline Cover and Shield Installed at Center Support

5. Remove two bolts (A) that secure metal plate (B) to the center support.

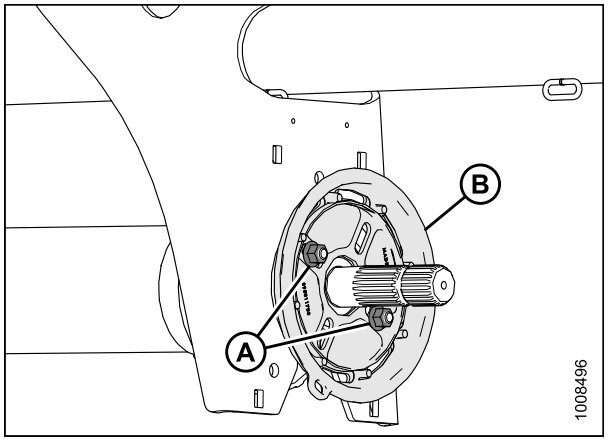

Figure 4.163: Metal Plate

6. Remove spacer (A).

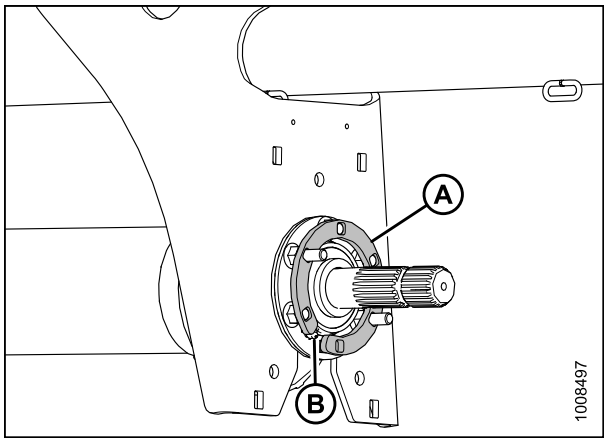

Figure 4.164: Spacer

7. Support driveline and remove five nuts (A), flange with grease fitting (B), ball bearing (C), flange (D), and unlock bearing lock collar.

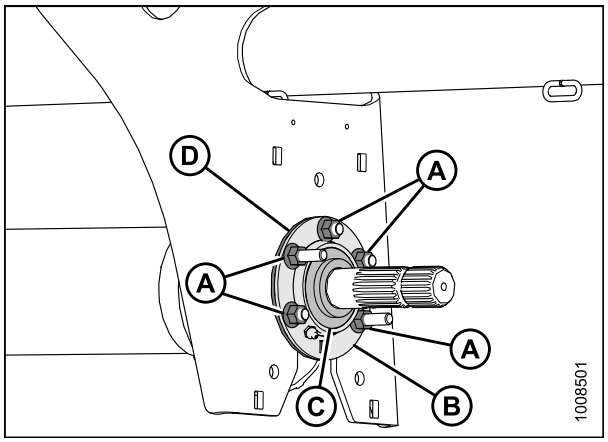

Figure 4.165: Ball Bearing and Flanges

8. Lower driveline from center support.

   NOTE:
   Bolts may or may not be removed. If removing bolts, note position of the long (A) and short (B) bolts.

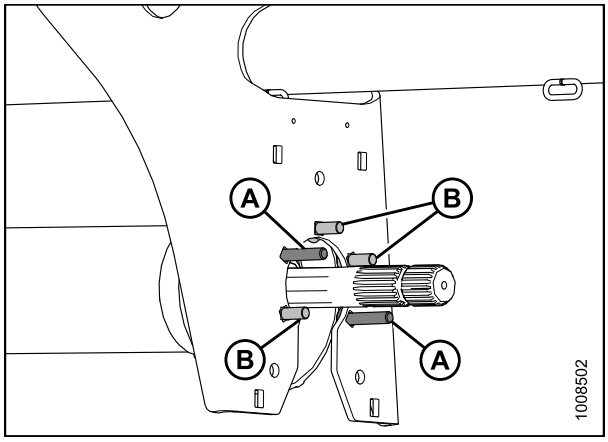

Figure 4.166: Long and Short Bolts Installed at Center Support

9. Slide forward end of hitch driveline (A) away from swivel gearbox shaft.

   NOTE:
   There are two hitch drivelines installed on 16-foot mower conditioners.

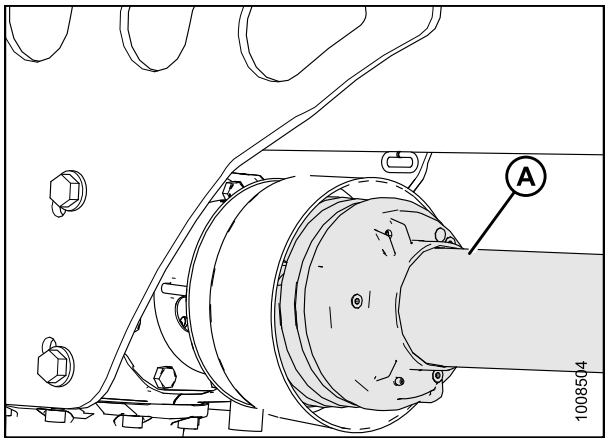

Figure 4.167: Forward End of Hitch

10. Remove driveline guard if necessary. Refer to *Removing Driveline Guard, page 204*.

Installing Hitch Driveline

1. Install driveline guard onto driveline (if previously removed). Refer to *Installing Driveline Guard, page 205*.

2. Position forward end of hitch driveline (A) onto forward swivel gearbox shaft and push onto shaft.

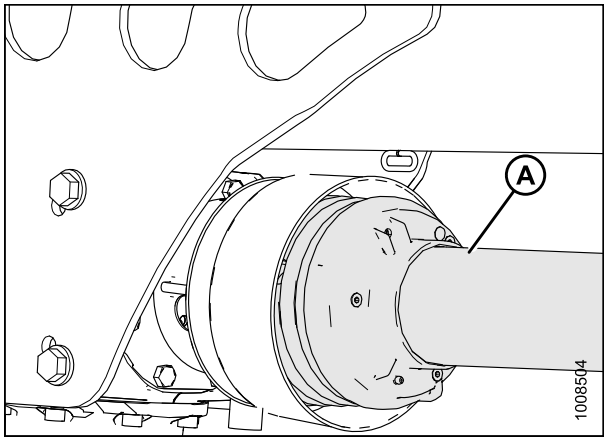

Figure 4.168: Forward End of Hitch

3. Position shaft end of hitch driveline onto center support.
4. Install two long bolts (A) and three short bolts (B) exactly as shown.

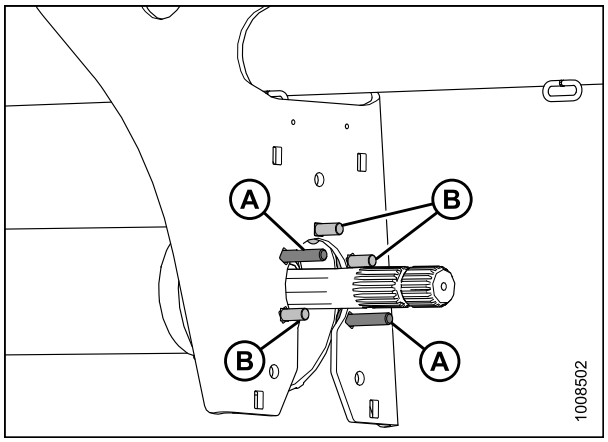

Figure 4.169: Long and Short Bolts

5. Install flange (A).
6. Ensure the distance (B) between the tip of the shaft and the front face of the center support is 5-1/2 in. (+/- 5/32 in.) (140 mm [+/- 4 mm]).

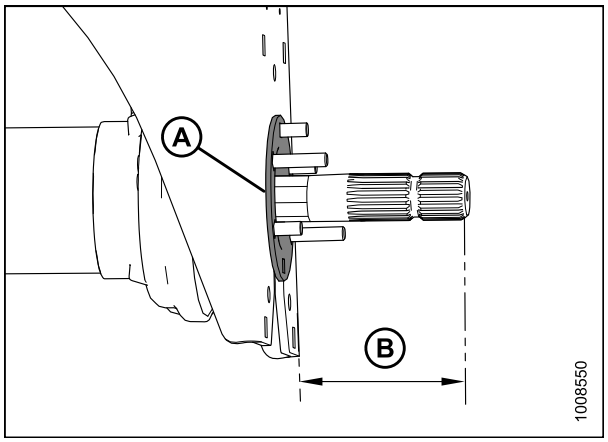

Figure 4.170: Flange Installed at Center Support

7. Ensure bearing lock collar is on the backside of the support bracket, and install ball bearing (C), flange (B) with grease fitting (D), and five nuts (A).

   IMPORTANT:
   Grease fitting (D) must be positioned 90° from long bolts as shown.

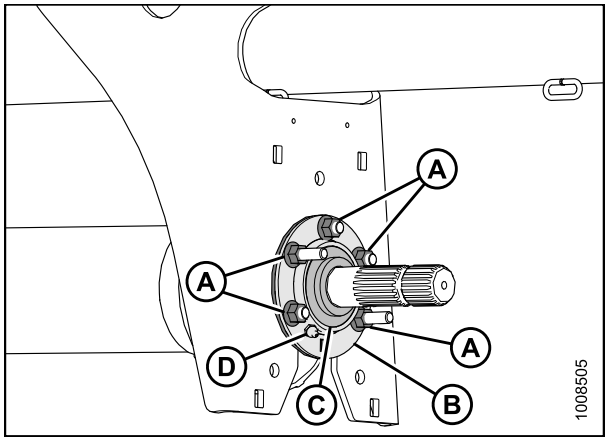

Figure 4.171: Flange

8. Install spacer (A) with cutout in spacer aligned with grease fitting (B).

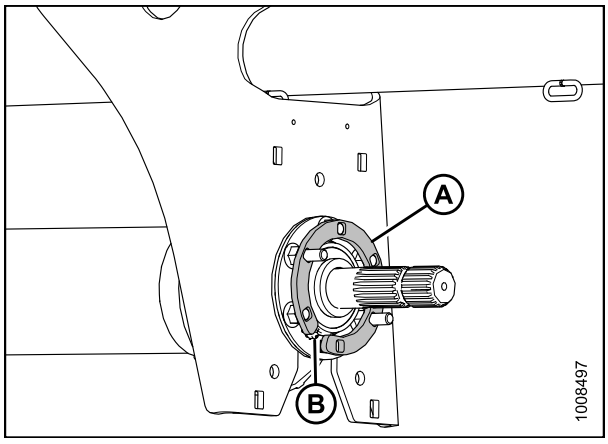

Figure 4.172: Spacer Installed at Center Support

9. Position metal plate (B) on center support.
10. Apply Loctite® 243 Blue and secure metal plate (B) using two nuts (A) while ensuring loop (C) on metal plate is positioned on lower side as shown.
11. Torque nuts (A) to 15 ft·lbf (20 N·m).

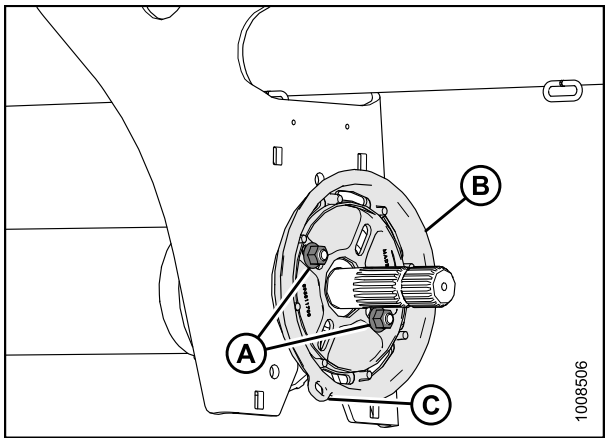

Figure 4.173: Metal Plate Attached to Center Support

12. Position driveshield cover on center support and secure with three screws (A).
13. Install metal shield (B) with two bolts.

NOTE:
There are two hitch drivelines for installation on 16-foot mower conditioners.

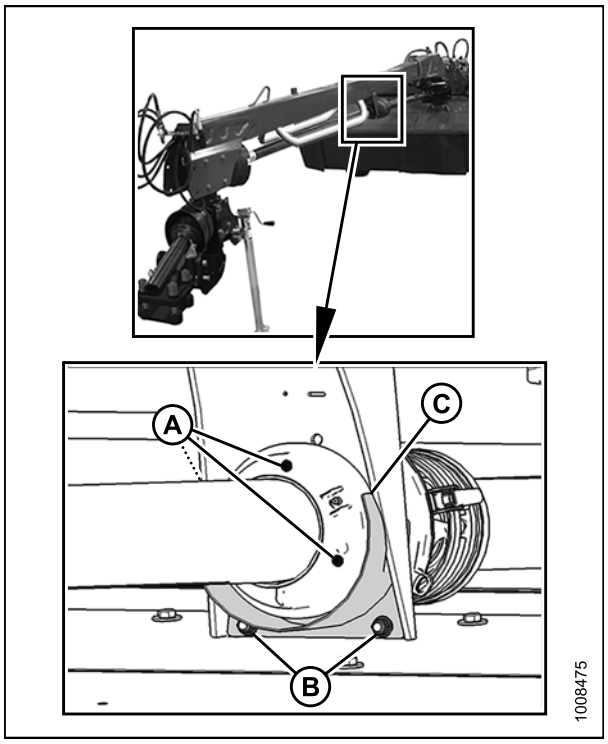

Figure 4.174: Driveline Cover and Shield Installed at Center Support

14. Install clutch driveline (A) at center support. Refer to *Installing Clutch Driveline, page 201*.

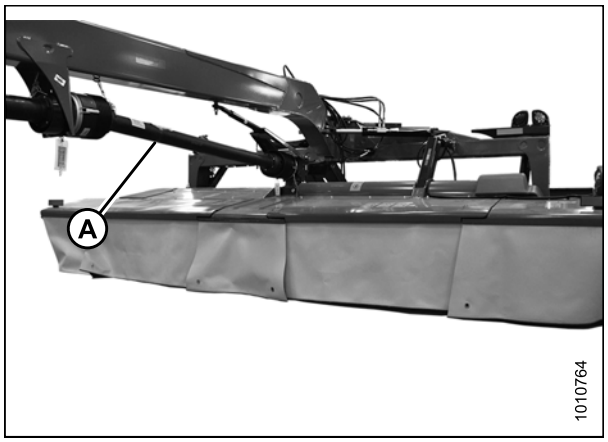

Figure 4.175: Clutch Driveline Installed at Center Support

4.6.3 Clutch Driveline

The clutch driveline (A) transfers power from the hitch driveline to the rear swivel gearbox through a clutch mechanism.

Replace the driveline if there are signs of damage, vibration, excessive noise, or if the clutch needs replacing.

No maintenance is required other than regular lubrication. Refer to *4.4.5 Lubricating the Mower Conditioner, page 125*.

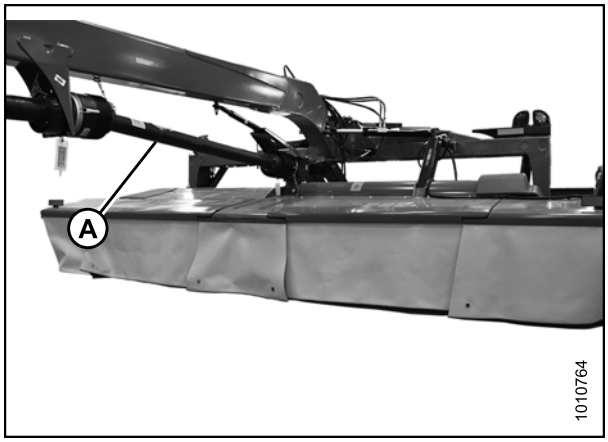

Figure 4.176: Clutch Driveline

Removing Clutch Driveline

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Stop engine, and remove key from ignition.
2. Release two lever clamps (A) using a screwdriver or similar prying tool.
3. Unhook safety chain (B) from hitch, and ensure that chain is secured to the shield cone and metal plate (C).

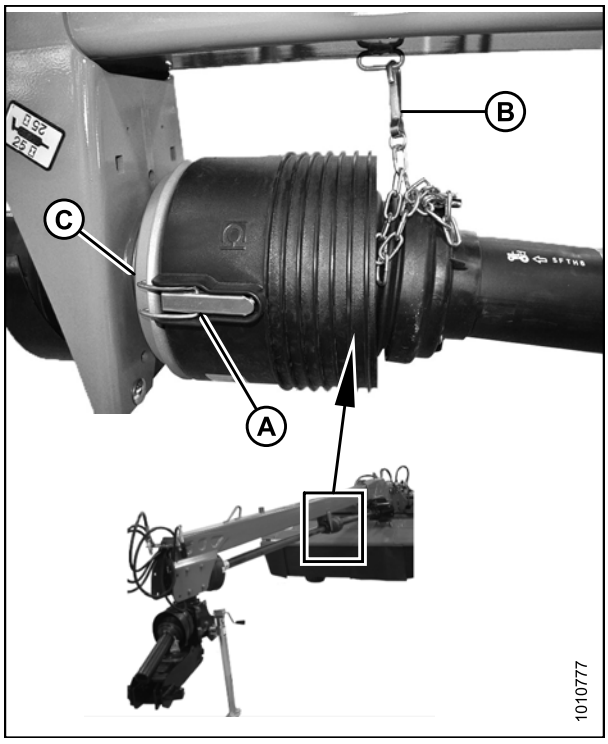

Figure 4.177: Driveline Shield Cone

4. Remove driveline shield cone from metal plate, and slide driveline shield cone (A) away from center support.
5. Loosen nut (B) and use a hammer to release yoke from taper pin lock.

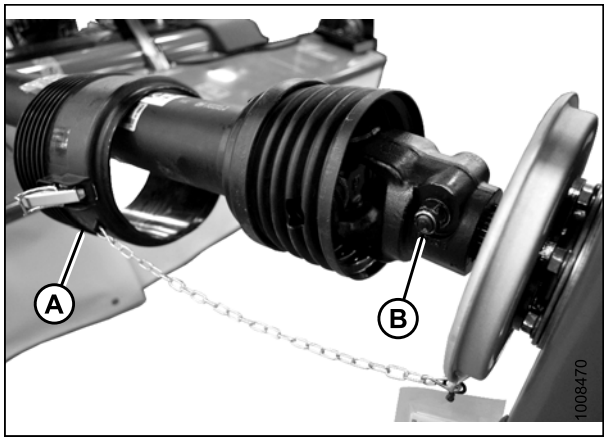

Figure 4.178: U-Joint

6. Slide clutch driveline (A) off hitch driveline.
7. Separate the driveline (A).

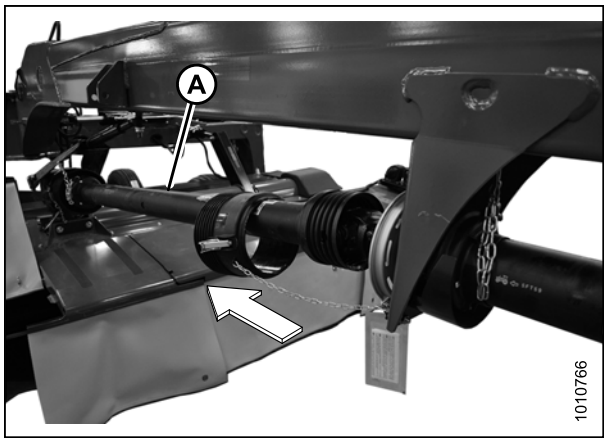

Figure 4.179: Driveline

8. Release two lever clamps (A) on the shield cone installed at the rear swivel gearbox.

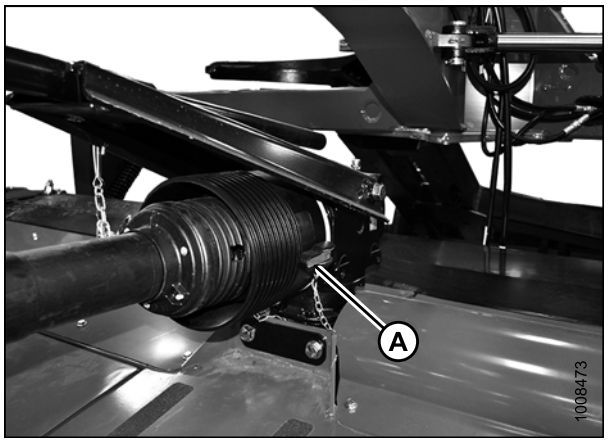

Figure 4.180: Driveline Shield Cone

9. Slide shield away from gearbox.
10. Loosen nut (A), use a hammer to release driveline from taper pin lock, and pull driveline off gearbox shaft.

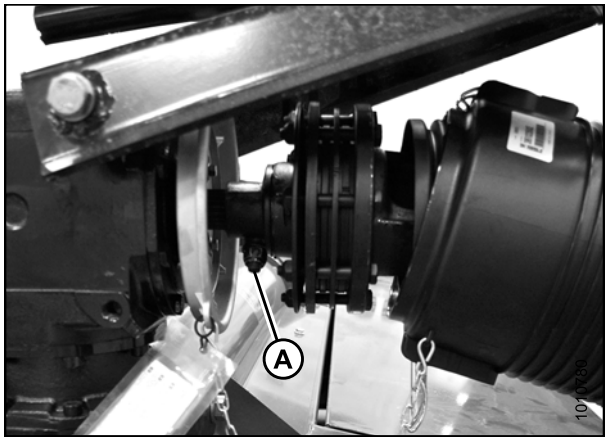

Figure 4.181: Driveline and Gearbox

11. Remove driveline guard if necessary. Refer to *Removing Driveline Guard, page 204*.

Installing Clutch Driveline

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Stop engine, and remove key from ignition.
2. Install driveline guard onto driveline (if previously removed). Refer to *Installing Driveline Guard, page 205*.
3. Position driveline to the gearbox shaft as shown, install tapered pin into yoke, and secure with nut (A). Torque to 110 ft·lbf (149 N·m).

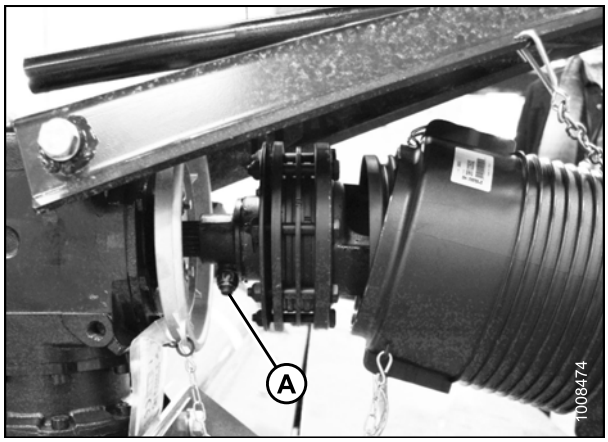

Figure 4.182: Driveline and Gearbox

4. Slide the shield cone to the gearbox and secure with the two lever clamps (A).

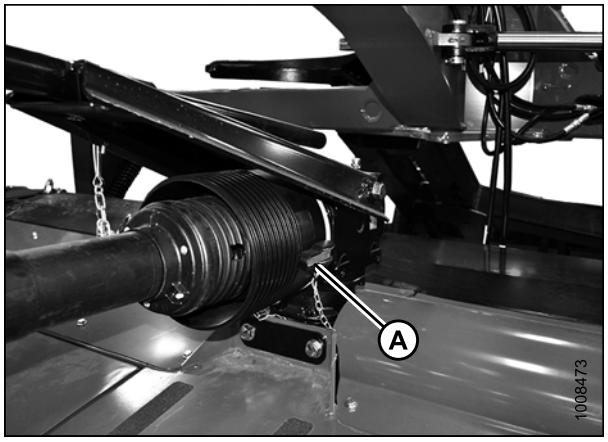

Figure 4.183: Driveline Shield Cone

5. Assemble forward half (A) of clutch driveline onto female half, and attach to shaft on hitch driveline (B).

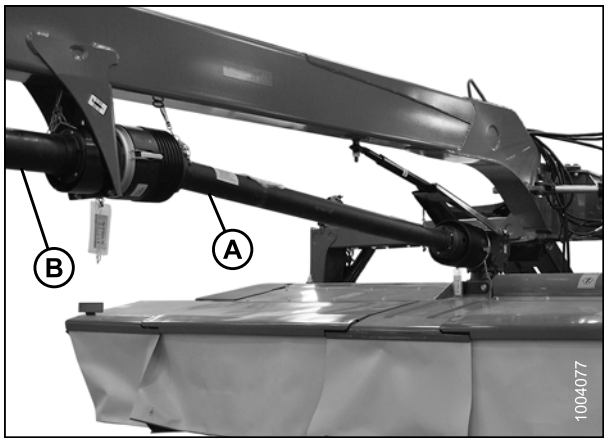

Figure 4.184: Clutch Driveline Attached to Hitch Driveline

6. Install tapered pin into U-joint and secure with nut (A).

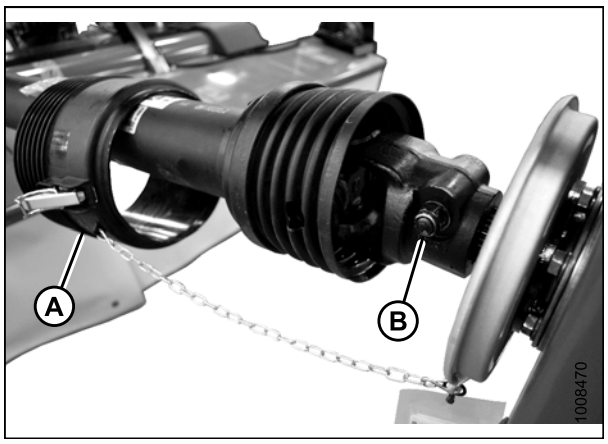

Figure 4.185: U-Joint

7. Slide shield cone onto metal plate (C) attached to center support, secure with two lever clamps (A), and hook safety chain (B) to hitch.

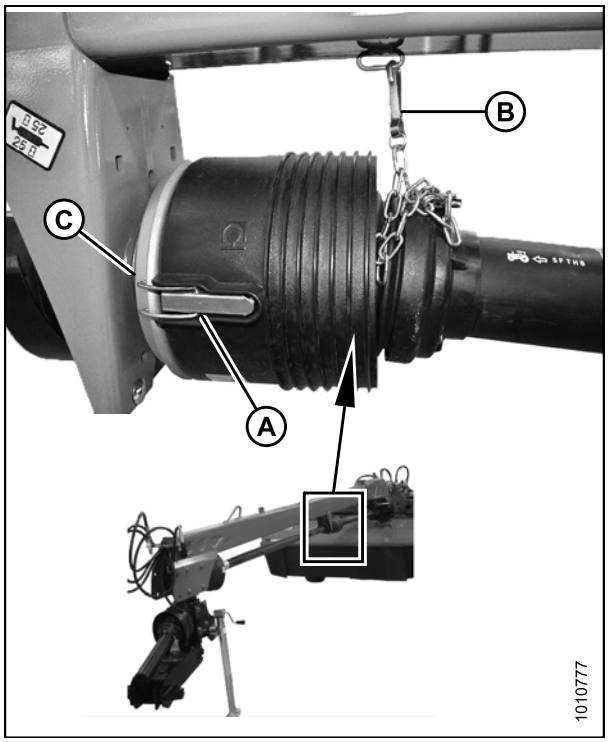

Figure 4.186: Driveline Shield Cone

4.6.4 Driveline Guard

Removing Driveline Guard

WARNING

Do NOT operate the machine without the driveline guards in place and securely fastened.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Stop engine, and remove key from ignition.
2. Remove driveline shield cone (A). Refer to *3.3.1 Removing Driveline Shield Cone, page 36*.
3. Remove driveline (B). Refer to the following:
   - **Primary Driveline**: *Removing Primary Driveline, page 190*
   - **Hitch Driveline**: *Removing Hitch Driveline, page 192*
   - **Clutch Driveline**: *Removing Clutch Driveline, page 199*

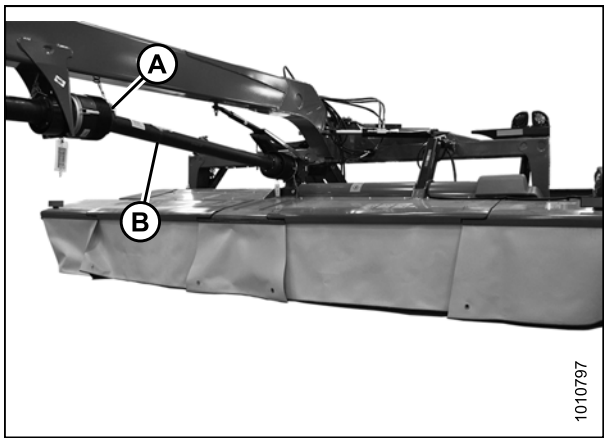

Figure 4.187: Driveline and Driveline Shield Cone

4. Remove three self-tapping Phillips head screws (A) from base cone (B).

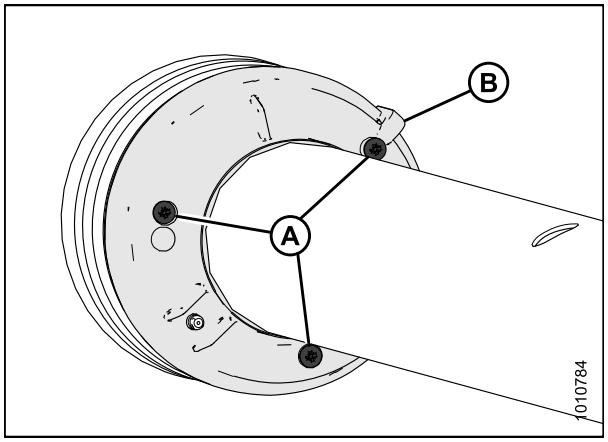

Figure 4.188: Phillips Head Screws Installed in Base Cone

5. Remove base cone (A) and shield tube (B) from driveline (not shown) and outer cone (C).

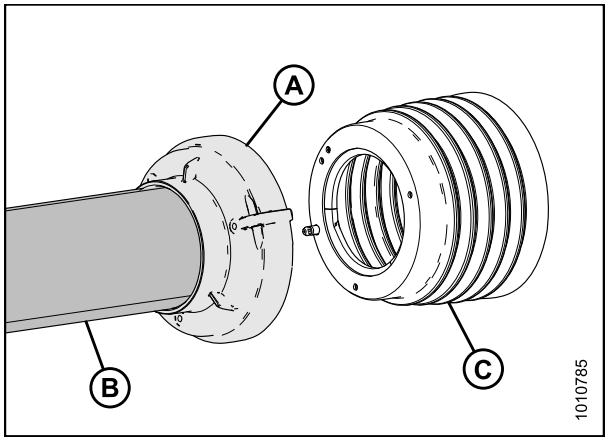

Figure 4.189: Base Cone and Shield Tube Removed from Outer Cone

6. Remove shield support (A) from outer cone (B).

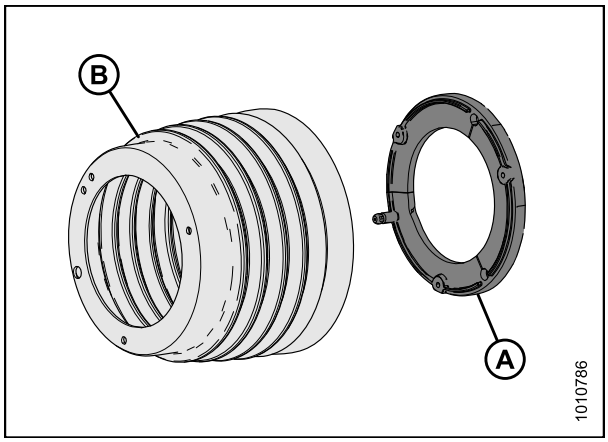

Figure 4.190: Shield Support Removed from Outer Cone

Installing Driveline Guard

WARNING

Do NOT operate the machine without the driveline guards in place and securely fastened.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Stop engine, and remove key from ignition.
2. Grease the bearing groove (A) on the inner yokes.

   NOTE:
   Use High Temperature Extreme Pressure (EP2) Performance with 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base unless otherwise specified.

3. Fit shield support (B) to the bearing groove (A), and ensure that grease fitting (C) faces the drive tube.

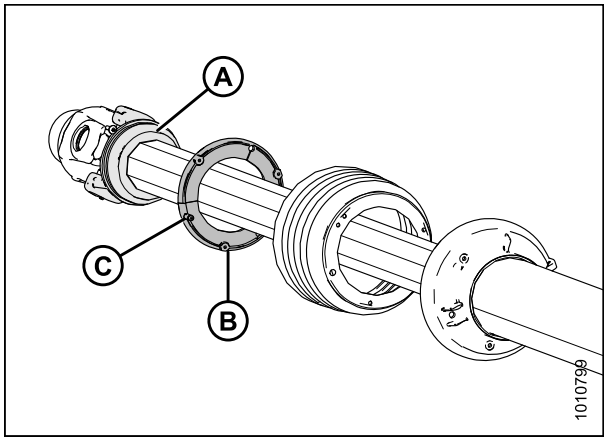

Figure 4.191: Inner Yoke and Shield Support

4. Install shield support (A) into outer cone (B), and ensure that grease fitting (C) is inserted into the proper hole.

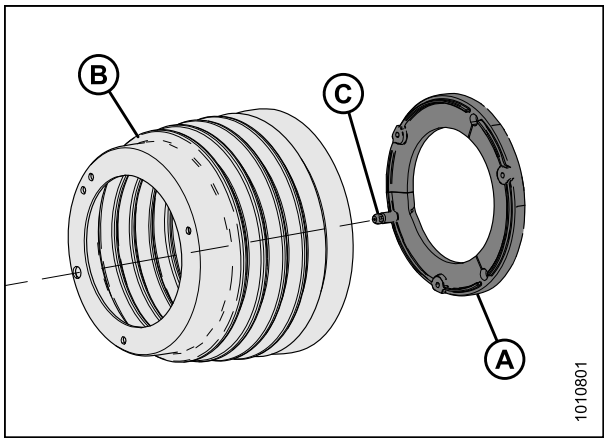

Figure 4.192: Shield Support and Outer Cone

5. Attach the base cone (A) and shield tube (B) to the outer cone (C).

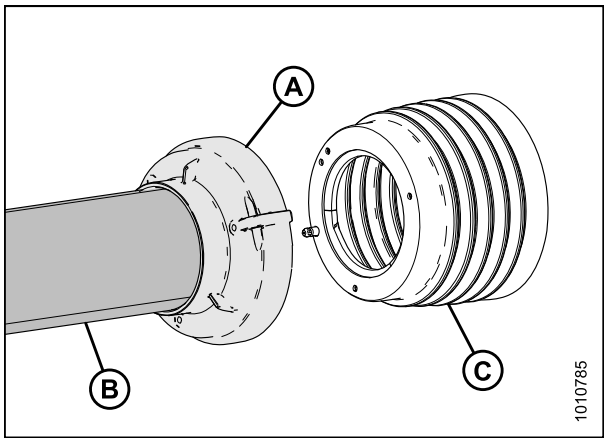

Figure 4.193: Base Cone, Shield Tube, and Outer Cone

6. Install three self-tapping Phillips head screws (A) into base cone (B).

   NOTE:
   Hand tighten only using an appropriate screw driver. Do NOT use a powered tool to tighten screws.

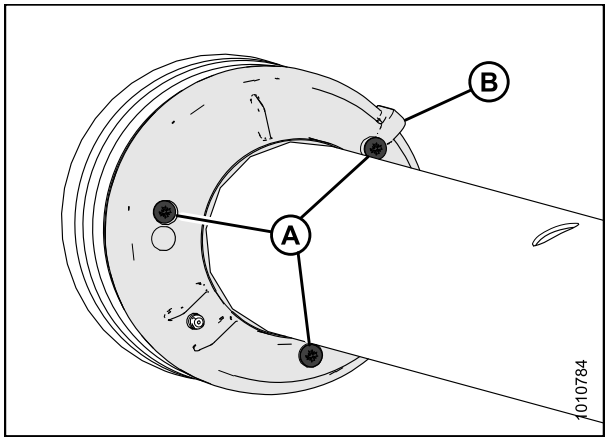

Figure 4.194: Phillips Head Screws Installed in Base Cone

7. Install driveline (A). Refer to the following:
   - **Primary Driveline**: *Removing Primary Driveline, page 190*
   - **Hitch Driveline**: *Removing Hitch Driveline, page 192*
   - **Clutch Driveline**: *Removing Clutch Driveline, page 199*
8. Install driveline shield cone (B). Refer to *3.3.1 Removing Driveline Shield Cone, page 36*.

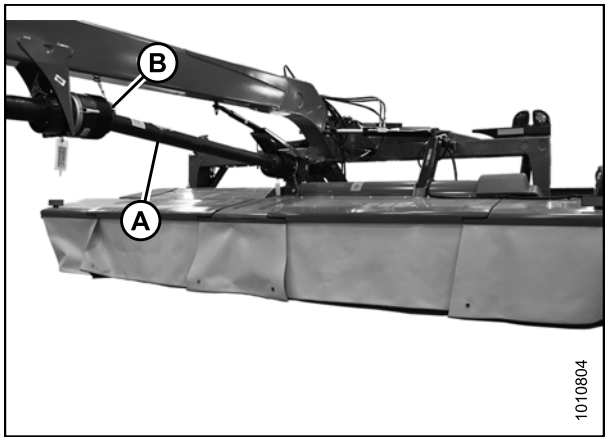

Figure 4.195: Driveline

4.6.5 Conditioner Drive Belt

The conditioner drive belt is located inside the left driveshield and is tensioned with a spring tensioner.

The tension is factory set and should not require adjustment.

Inspecting Conditioner Drive Belt

Check the belt tension and inspect for damage or wear every 100 hours or annually (preferably before the start of the cutting season).

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, turn off engine, and remove key.
2. Open the left side driveshield (A) (refer to *3.2.1 Opening Driveshields, page 33*).

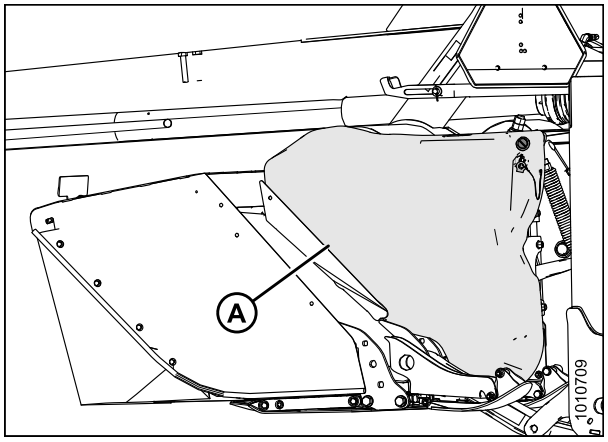

Figure 4.196: Left Side Driveshield

3. Inspect drive belt (A) and replace if damaged or cracked.
4. Check that jam nut (B) and adjuster nut (C) are tight.

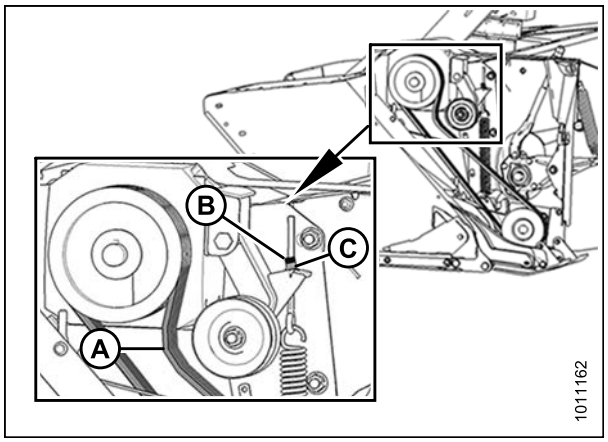

Figure 4.197: Conditioner Drive

5. Measure the length of tensioner spring (A), and ensure spring length is 14-3/8 in. in accordance with spring tension decal (B). If spring length requires adjustment, refer to *Installing Conditioner Drive Belt, page 209*.
6. Close driveshield (refer to *3.2.2 Closing Driveshields, page 34*).

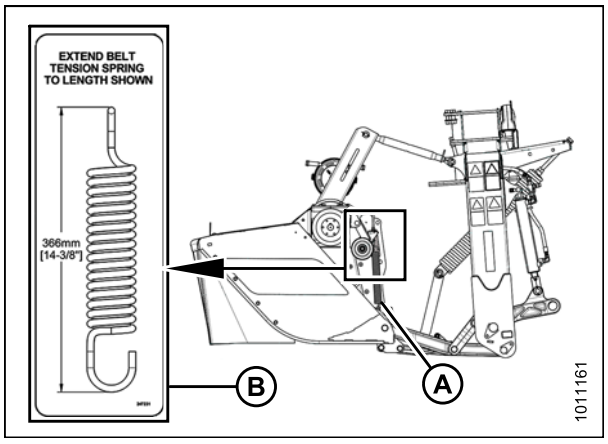

Figure 4.198: Spring Tension Decal

Removing Conditioner Drive Belt

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, turn off engine, and remove key.
2. Remove the left driveshield (A) (refer to *4.9.1 Removing Driveshields, page 227*).

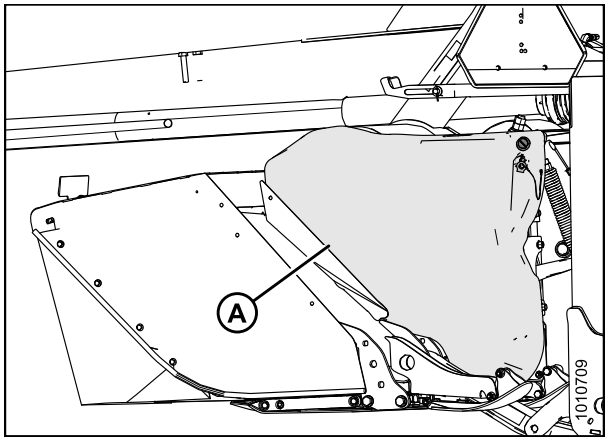

Figure 4.199: Left Driveshield

3. Turn jam nut (A) counterclockwise to unlock tension adjustment.
4. Turn jam nut (A) and adjuster nut (B) counterclockwise to fully collapse tensioner spring (C) and release the tension from conditioner drive belt (D).
5. Remove drive belt (D).

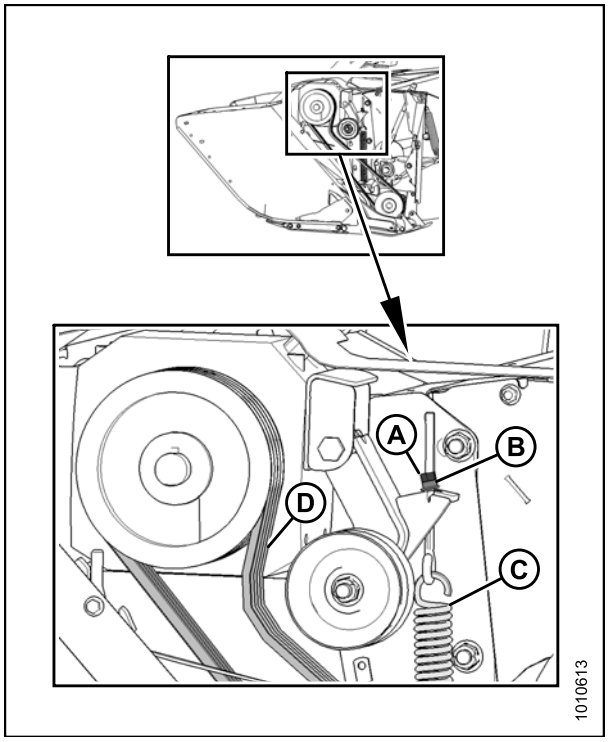

Figure 4.200: Conditioner Drive

Installing Conditioner Drive Belt

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, turn off engine, and remove key.
2. Install drive belt (A) onto driven pulley (C) first, and then onto drive pulley (B) ensuring that the belt is in the pulley grooves.

   NOTE:
   If necessary, loosen jam nut and adjuster nut to relieve spring tension.

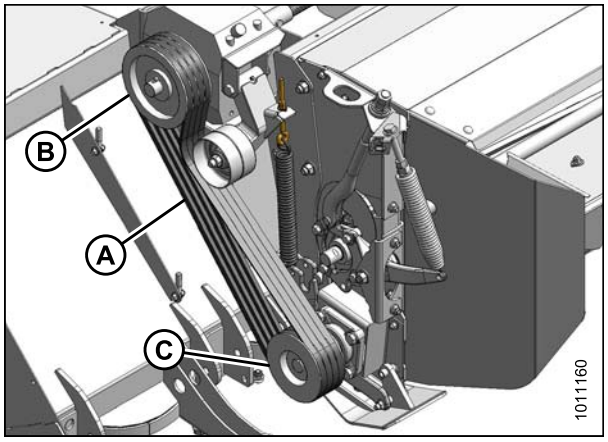

Figure 4.201: Conditioner Drive

3. Measure the length of tensioner spring (A), and adjust spring length to 14-3/8 in. to conform with spring tension decal (B).

   NOTE:
   Tensioner springs hook into different locations on different types of conditioners.

   Adjust drive belt tension as follows:

   a. Loosen jam nut (C).
   b. Increase spring length (tension) by turning adjuster nut (D) **clockwise**.
   c. Decrease spring length (loosen) by turning adjuster nut (D) **counterclockwise**.
   d. Tighten jam nut (C).

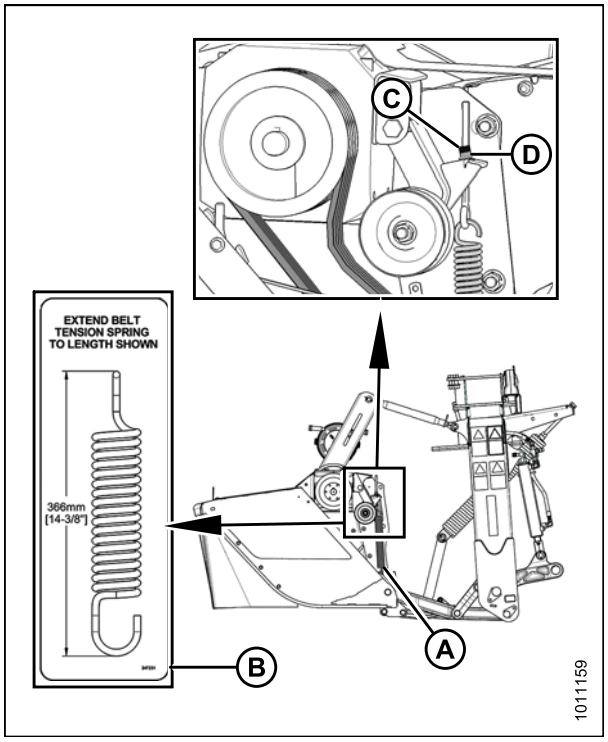

Figure 4.202: Spring Tension Decal

4. Install left driveshield (A) (refer to *4.9.2 Installing Driveshields, page 228*).

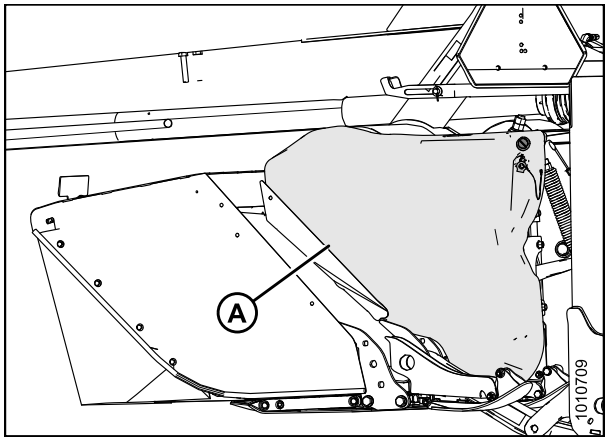

Figure 4.203: Left Driveshield

4.6.6 Conditioner Drive Gearbox

The conditioner drive gearbox, located inside the drive compartment at the right side of the mower conditioner, transfers power from the gearbox to the conditioner rolls.

The gearbox does not require routine maintenance or service other than checking and changing the oil. If repairs are required, however, remove it and have it serviced by your MacDon Dealer.

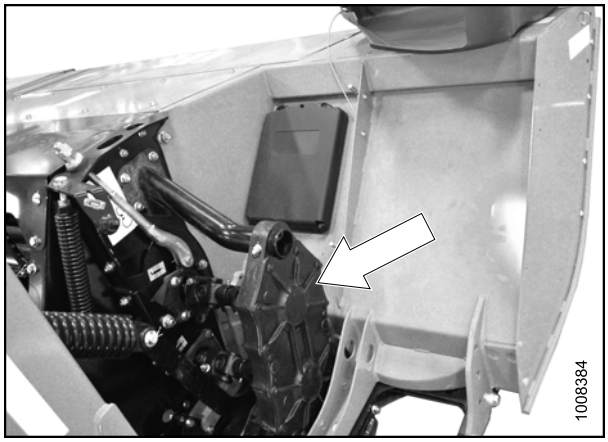

Figure 4.204: Conditioner Drive Gearbox

Checking and Changing Conditioner Gearbox Oil

Change oil after the first 50 hours of operation. Perform subsequent oil changes every 100 hours or annually (preferably before the start of the cutting season).

IMPORTANT:
Check the gearbox oil level when the oil is warm. If the oil is cold, idle the machine for approximately 10 minutes prior to checking.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, turn off engine, and remove key.
2. Remove the right driveshield (A) (refer to *4.9.1 Removing Driveshields, page 227*).

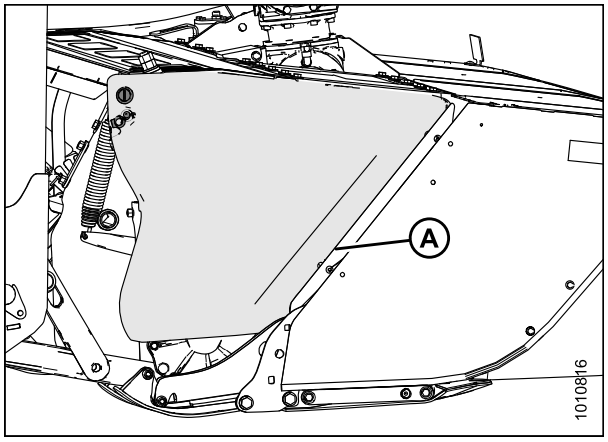

Figure 4.205: Right Driveshield

Checking Conditioner Gearbox Oil Level

3. Clean around oil level plug (A) on inboard side of gearbox.
4. Remove oil level plug (A), and check that oil level is even with the hole.
5. Top up oil level with SAE 85W-140 gear oil if necessary.
6. Replace oil level plug (A) and tighten.

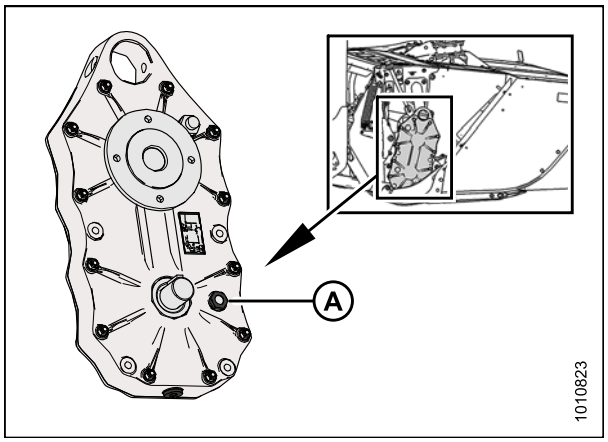

Figure 4.206: Oil Level Plug

Changing Conditioner Gearbox Oil

WARNING

To avoid bodily injury or death from unexpected start-up or fall of raised machine: stop engine, remove key, and engage lift cylinder lock-out valves before going under machine.

7. Raise mower conditioner to provide sufficient access to oil drain plug (A), shut off engine, and remove key.
8. Close the cylinder lock-out valve on each lift cylinder by turning the handle to the horizontal position. Refer to *3.1 Lift Cylinder Lock-Out Valves , page 31*.
9. Clean around oil drain plug (A) on bottom of gearbox and around oil level plug (B) on inboard side of gearbox.
10. Place a suitably sized container underneath conditioner gearbox.
11. Remove oil drain plug (A) using a hex key.
12. Allow sufficient time for oil to drain, replace oil drain plug (A), and tighten.
13. Remove oil level plug (B) and fill with SAE 85W-140 gear oil until the oil level is even with the bore hole.
14. Replace oil level plug (B) and tighten.
15. Properly dispose of oil.

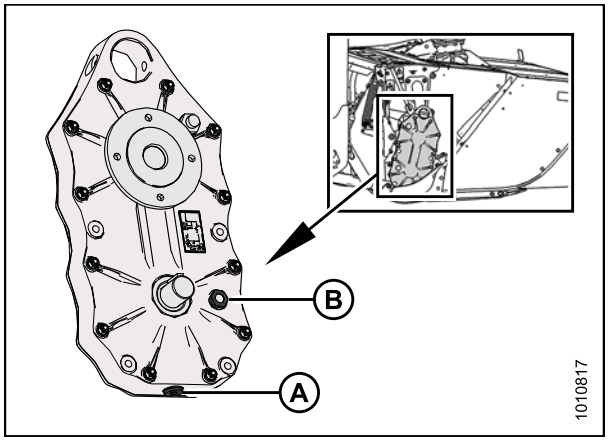

Figure 4.207: Oil Level and Drain Plug

4.6.7 Mower Conditioner Drive Gearbox

The mower conditioner drive gearbox, located inside the drive compartment at the left side of the mower conditioner, transfers power from the rear swivel gearbox to the conditioner and cutterbar.

If the gearbox requires repair, remove it and have it serviced at your MacDon Dealer.

For service intervals, refer to *4.4.1 Maintenance Schedule/Record, page 121*.

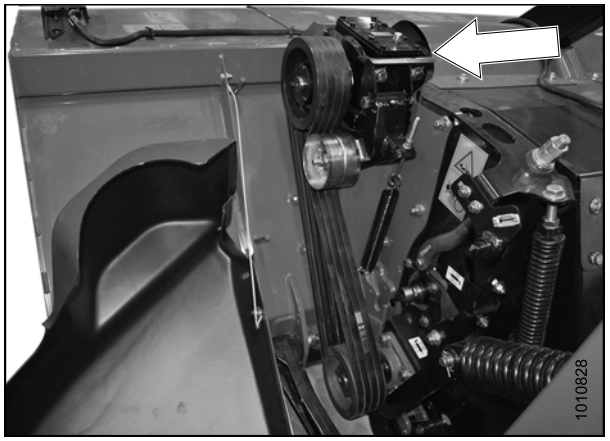

Figure 4.208: Left Side of Mower Conditioner

Lubricating Mower Conditioner Drive Gearbox

Checking Lubricant

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Stop engine and remove key from ignition.
2. Open left side driveshield (refer to *3.2.1 Opening Driveshields, page 33*).
3. Clean area around dipstick (A).
4. Remove dipstick (A) using a 22 mm socket. Check lubricant level on dipstick and ensure level is between the upper and lower mark.
5. Reinstall dipstick (A) and tighten.

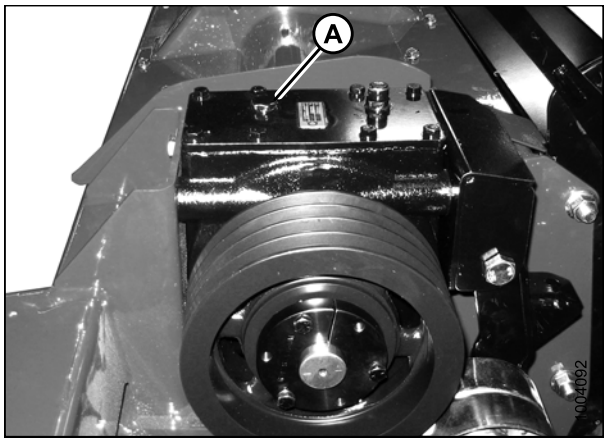

Figure 4.209: Left Side of Mower Conditioner

Draining Lubricant

IMPORTANT:
Drain the gearbox lubricant when the lubricant is warm. If the lubricant is cold, idle the machine for approximately 10 minutes prior to draining.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, stop engine, and remove key from ignition.
2. Open left side cutterbar door (refer to *Opening Cutterbar Doors, page 159*).

Figure 4.210: Cutterbar Doors

3. Remove four M10 hex flange head bolts (A) and remove vertical drive shield (B).

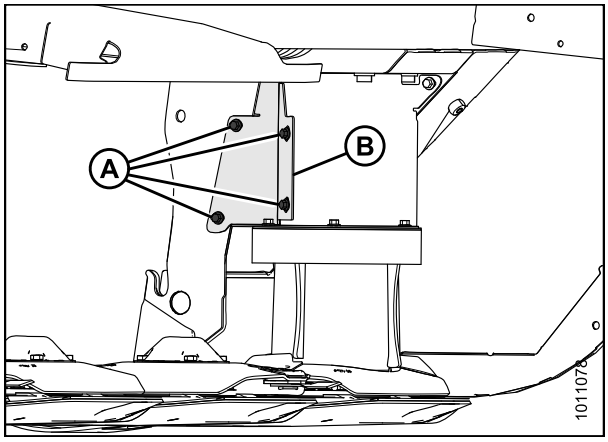

Figure 4.211: Vertical Drive Shield

4. Remove two M10 hex flange head bolts (A) and remove cover plate (B).

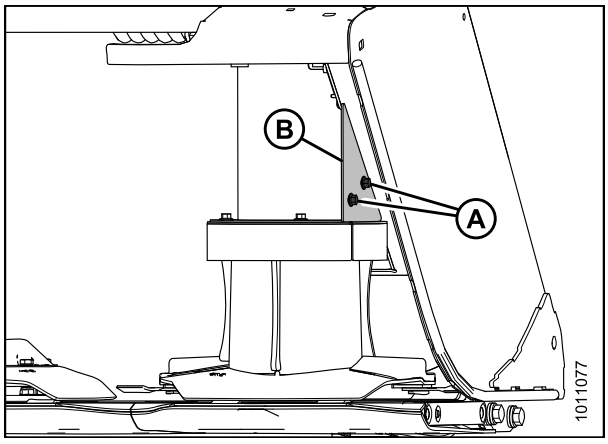

Figure 4.212: Cover Plate

5. Remove four M10 hex flange head bolts (A), and remove top plate (B) and drum top (C).

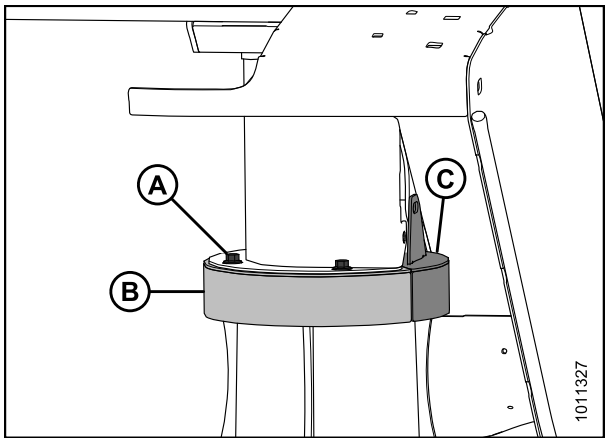

Figure 4.213: Top Plate and Drum Top

6. Remove M10 hex flange head bolt (A) and remove vertical shield (B).

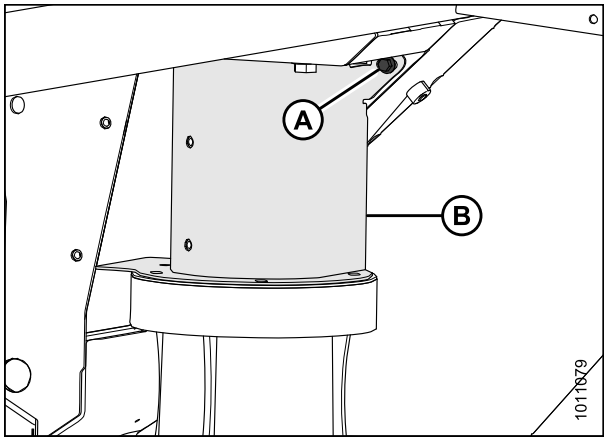

Figure 4.214: Vertical Shield

7. Place a suitably sized container under drain plug (A), and remove plug using a 17 mm socket.
8. Allow sufficient time for lubricant to drain, replace drain plug (A), and tighten.
9. Properly dispose of oil.

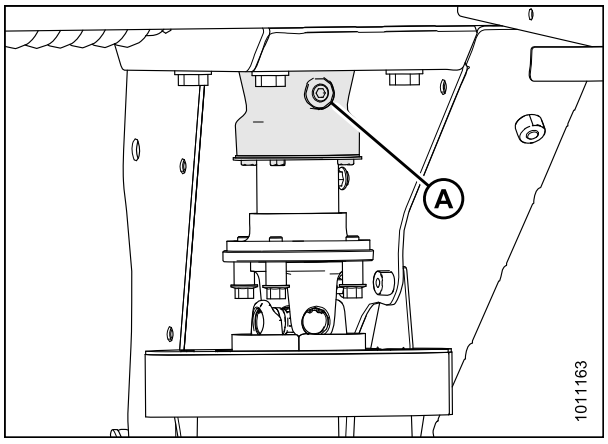

Figure 4.215: Mower Conditioner Drive Gearbox Drain Plug

10. Position vertical shield (B) as shown, and install M10 hex flange head bolt (A).

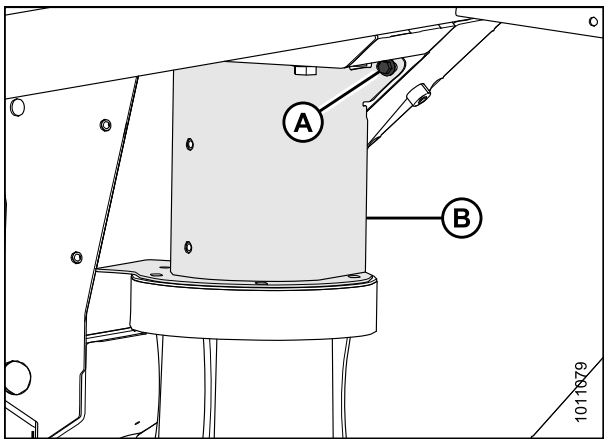

Figure 4.216: Vertical Shield

11. Position top plate (B) and drum top (C) onto drum as shown, and secure with four M10 hex flange head bolts (A).

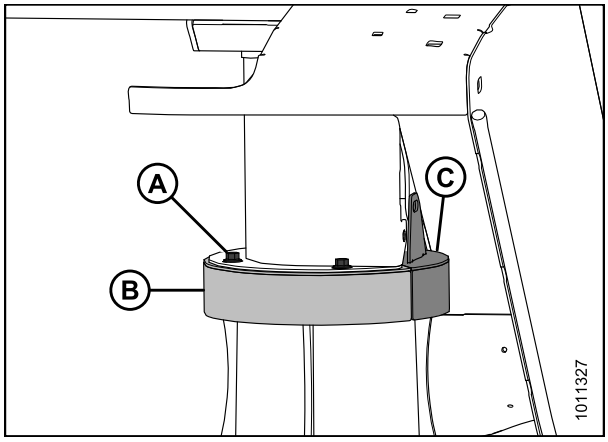

Figure 4.217: Top Plate and Drum Top

12. Install cover plate (A), insert top M10 hex flange head bolt (B) through cover plate and top plate (C), and install lower M10 hex flange head bolt (D) through cover plate and vertical shield (E). Tighten bolts.

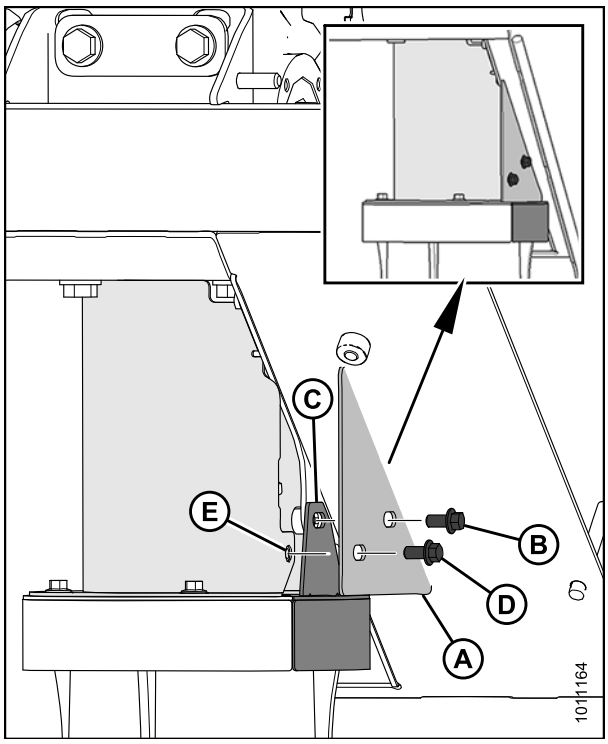

Figure 4.218: Cover Plate

13. Install vertical drive shield (B) using four M10 hex flange head bolts (A).

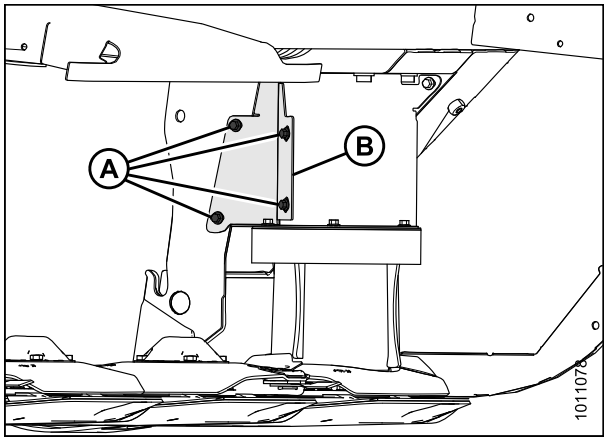

Figure 4.219: Vertical Drive Shield

WARNING

Ensure cutterbar is completely clear of foreign objects. Foreign objects can be ejected with considerable force when the machine is started and may result in serious injury or machine damage.

14. Close cutterbar doors (refer to *Closing Cutterbar Doors, page 159*).

Figure 4.220: Cutterbar Doors in Closed Position

Adding Lubricant

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, stop engine, and remove key from ignition.
2. Open left side cutterbar door (refer to *Opening Cutterbar Doors, page 159*).

Figure 4.221: Cutterbar Doors

3. Clean area around dipstick (A).
4. Remove dipstick (A) using a 22 mm socket.
5. Add 1.9 US qts (1.8 liters) of E 85W140 gear lubricant to gearbox through dipstick hole (A).
6. Check lubricant level on dipstick and ensure level is between the upper and lower mark. Add lubricant as required.
7. Reinstall dipstick (A) and tighten.
8. Close left side cutterbar door.

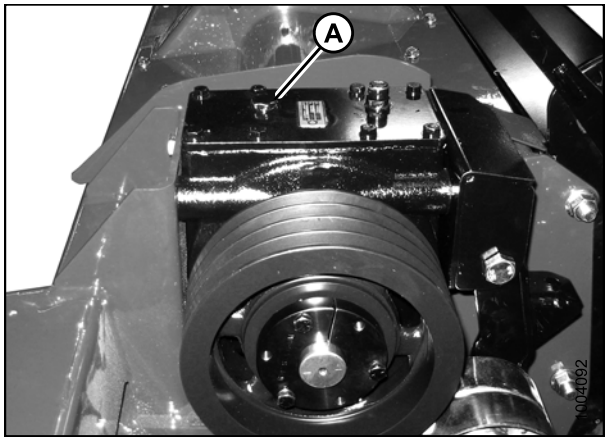

Figure 4.222: Left Side of Mower Conditioner

4.6.8 Forward and Rear Swivel Gearboxes

The rear swivel gearbox transfers power from the clutch driveline to the mower conditioner drive gearbox. The gearbox consists of an upper and lower gearbox.

If the gearbox requires repair, remove it and have it serviced at your MacDon Dealer.

For service intervals, refer to *4.4.1 Maintenance Schedule/Record, page 121*.

Checking Lubricant: Forward and Rear Swivel Gearboxes

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

Check plugs are located at the same position on each gearbox and need to be removed in order to check the lubricant level. Check lubricant level when the lubricant is warm. The lubricant should be visible or slightly draining from the port if filled to the correct level. Refer to *4.4.1 Maintenance Schedule/Record, page 121* for required service intervals.

1. Clean area around check plug (A).
2. Remove plug using a 15 mm socket. Check lubricant level and ensure lubricant is visible or slightly draining form the port.
3. Add lubricant if required. Refer to *Adding Lubricant: Forward and Rear Swivel Gearboxes, page 220*.
4. Reinstall check plug (A) and tighten.

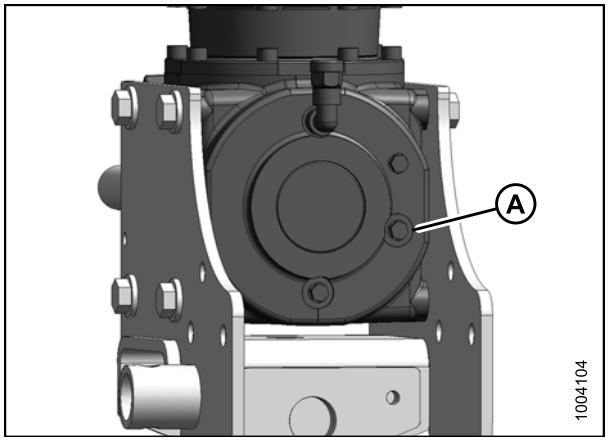

Figure 4.223: Swivel Gearbox Check Plug

Draining Lubricant: Forward and Rear Swivel Gearboxes

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Place a suitably sized container under drain plug (A), and remove plug using a 17 mm socket.

   NOTE:
   Removing check plug (B) will contribute to faster draining.

2. Allow sufficient time for lubricant to drain, replace drain plug (A), check plug (B) (if removed), and tighten plugs.
3. Properly dispose of used lubricant and clean up any spills.

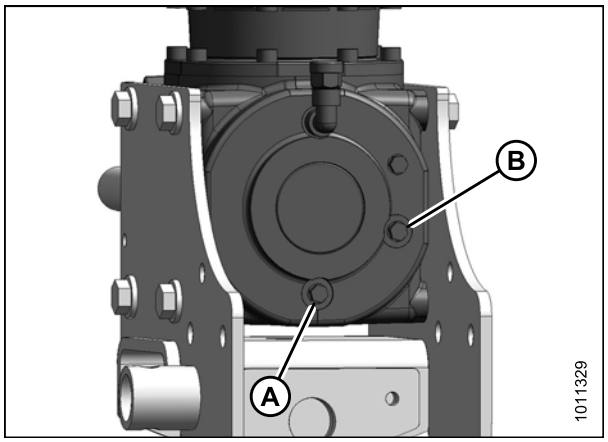

Figure 4.224: Swivel Gearbox Drain Plug

Adding Lubricant: Forward and Rear Swivel Gearboxes

1. Clean area around check plug (A) and breather/filler plug (B).
2. Remove check plug (A) and breather/filler plug (B).
3. Ensure lubricant level is visible or begins to drain through check port (A), and add E 85W140 gear lubricant to gearbox through port (B) as required. Refer to *4.3.1 Recommended Lubricants, page 106* for capacity of each gearbox.
4. Reinstall check plug (A) and breather/filler plug (B) and tighten.

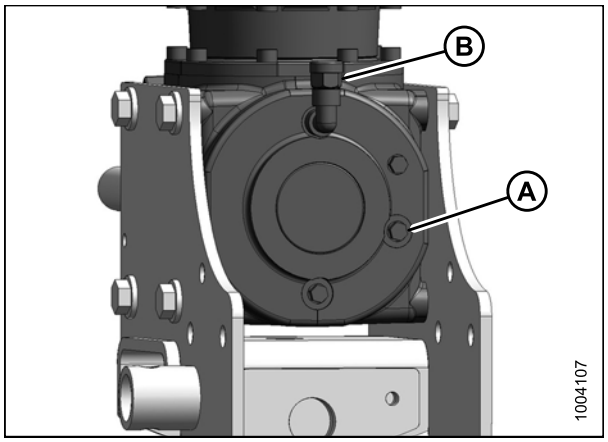

Figure 4.225: Swivel Gearbox

4.6.9 Wheels and Tires

Checking Wheel Bolts

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

IMPORTANT:
Check and tighten field wheel bolts and transport system wheel bolts (if installed) after the first hour of operation and every 100 hours thereafter.

1. Torque wheel bolts to 120 ft·lbf (160 N·m) using the tightening sequence shown.

   NOTE:
   Whenever a wheel is installed, check torque after one hour of operation.

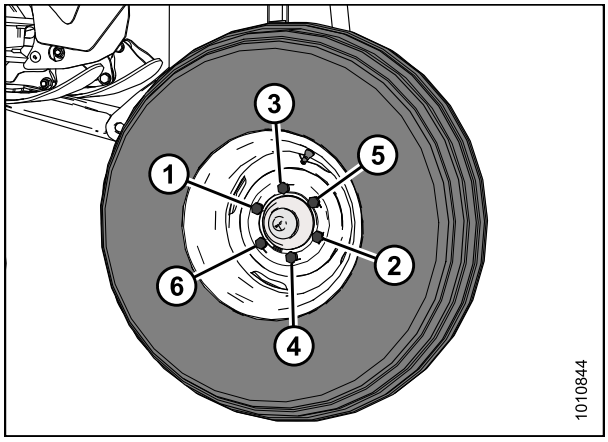

Figure 4.226: Tightening Sequence

Removing Wheels

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Place blocks (A) under opposite wheel to prevent machine from moving if mower conditioner is not attached to towing vehicle.
2. Position jack under frame leg (B).
3. Loosen wheel bolts slightly.
4. Operate jack to raise wheel off ground.
5. Place blocks or a stand under frame leg.
6. Remove wheel bolts and remove wheel.

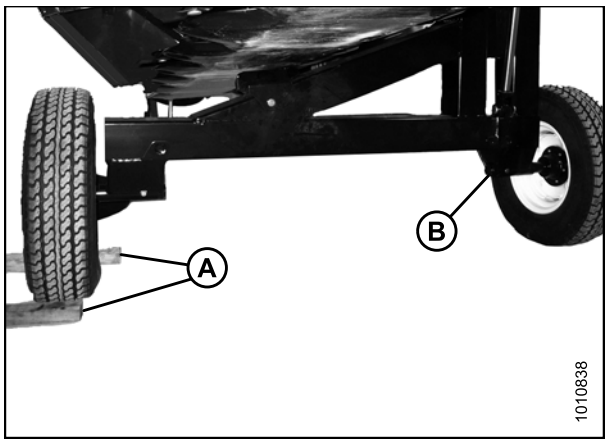

Figure 4.227: Transport Wheel

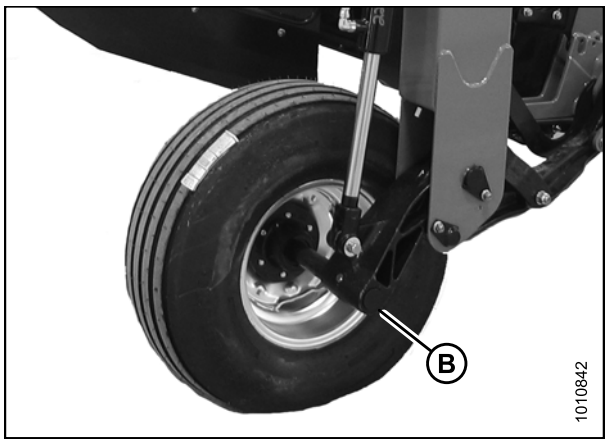

Figure 4.228: Field Wheel

Installing Wheels

⚠ CAUTION

When installing wheel, be sure to match countersunk holes with bolt head profiles. Holes that are not countersunk do NOT correctly seat the bolts.

1. Position wheel on spindle, install bolts, and partially tighten.

   IMPORTANT:
   Be sure valve stem points away from wheel support.

2. Remove blocks or stand and lower jack until tire contacts the ground.
3. Torque bolts to 120 ft·lbf (160 N·m) following the tightening sequence shown.
4. Lower jack completely and remove from work area.

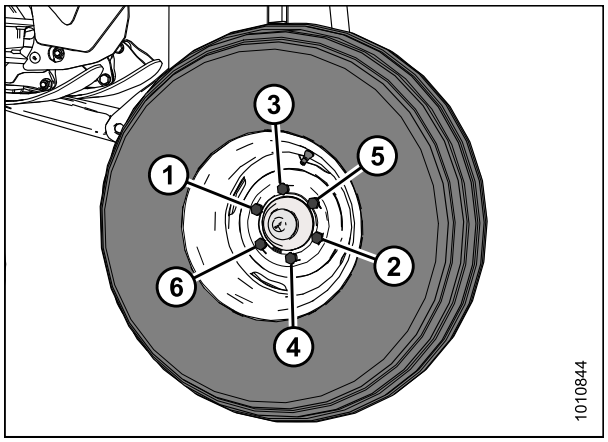

Figure 4.229: Tightening Sequence

Inflating Tires

Check tire pressure daily. Maintain pressure at 30 psi (207 kPa) for field wheels and 80 psi (552 kPa) for optional transport system wheels.

⚠ WARNING

- **Service tires safely.**
- **A tire can explode during inflation which could cause serious injury or death.**

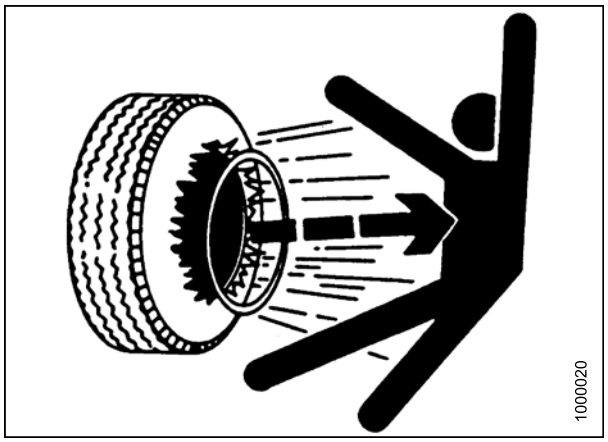

Figure 4.230: Overinflated Tire

WARNING

- **Do NOT stand over tire. Use a clip-on chuck and extension hose.**
- **Never exceed air pressure of 35 psi (241 kPa) for field tires and 40 psi (276 kPa) for transport tires when seating the bead on the rim.**
- **Do NOT exceed maximum inflation pressure indicated on tire label.**
- **Replace tires that have defects.**
- **Replace wheel rims that are cracked, worn, or severely rusted.**
- **Never weld a wheel rim.**
- **Never use force on an inflated or partially inflated tire.**
- **Make sure the tire is correctly seated before inflating to operating pressure.**
- **If the tire is not correctly positioned on the rim or is overinflated, the tire bead can loosen on one side causing air to escape at high speed and with great force. An air leak of this nature can thrust the tire in any direction endangering anyone in the area.**
- **Make sure all the air is removed from the tire before removing the tire from the rim.**
- **Do NOT remove, install, or repair a tire on a rim unless you have the proper equipment and experience to perform the job.**
- **Take the tire and rim to a qualified tire repair shop.**

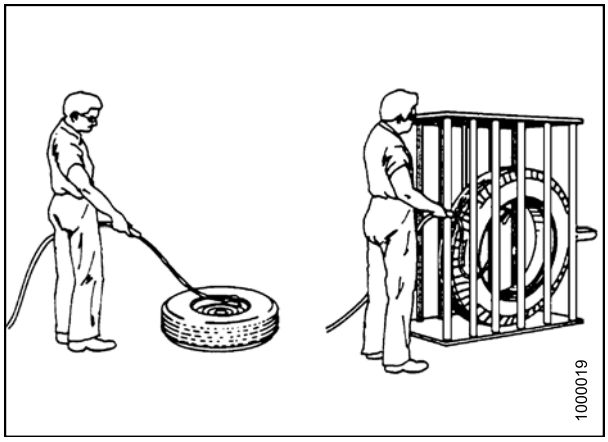

Figure 4.231: Safely Filling a Tire with Air

4.7 Hydraulics

4.7.1 Hydraulic Hoses and Lines

Check hydraulic hoses and lines daily for signs of leaks.

⚠ WARNING

- **Avoid high-pressure fluids. Escaping fluid can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes and nozzles which eject fluids under high pressure.**
- **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 or gangrene may result.**

Figure 4.232: Hydraulic Pressure Hazard

- **Use a piece of cardboard or paper to search for leaks.**

IMPORTANT:
Keep hydraulic coupler tips and connectors clean. Allowing dust, dirt, water, or foreign material to enter the system is the major cause of hydraulic system damage. Do NOT attempt to service hydraulic systems in the field. Precision fits require a perfectly clean connection during overhaul.

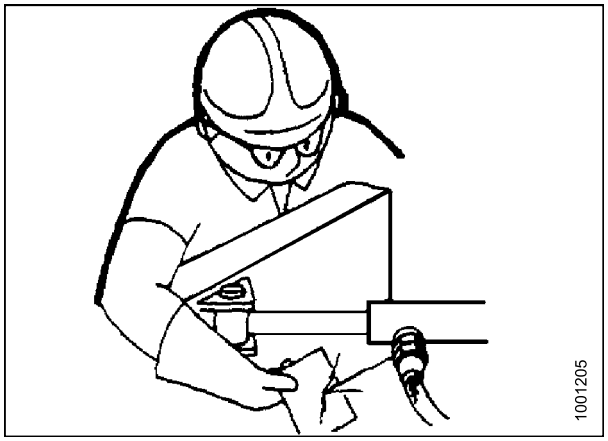

Figure 4.233: Testing for Hydraulic Leaks

4.7.2 Hydraulic Cylinders

The hydraulic cylinders do not require routine maintenance or service. Occasionally visually inspect cylinders for signs of leaks or damage and if repairs are required, remove them and have them serviced by your MacDon Dealer.

4.8 Electrical

4.8.1 Maintaining Electrical System

1. Use electrical tape and cable ties as required to prevent wires from dragging or rubbing.
2. Keep lights clean and replace defective bulbs.

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

4.8.2 Servicing Amber Hazard/Signal Lights

Replacing Amber Hazard/Signal Bulb

1. Remove two Phillips screws from fixture, and remove the plastic lens.
2. Replace bulb, and reinstall plastic lens and screws. Bulb—Trade #1157.

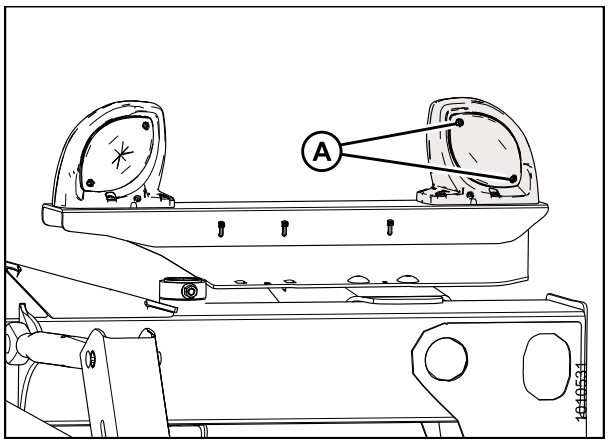

Figure 4.234: Plastic Lens and Screws

Replacing Amber Hazard/Signal Light Fixture

1. Cut plastic cable ties (A) securing harness covering to light.
2. Retrieve connections from inside harness covering (approximately 6 in. [150 mm] from light) and disconnect wires (not shown). If necessary, remove tape.
3. Remove the four nuts (B) securing light to bracket and remove light. Pull wires through hole in bracket.
4. Feed connectors of new light (not shown) through hole in bracket, and position light onto bracket.
5. Install four nuts (B) and tighten.
6. Connect wires to connectors in harness, and re-secure harness covering with tape and plastic cable ties (A) as required.

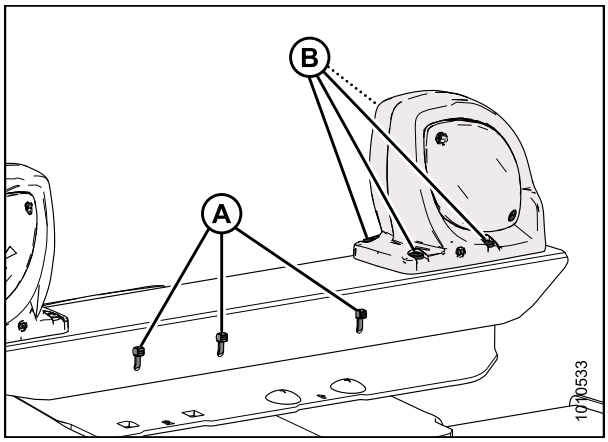

Figure 4.235: Amber Hazard Light and Mounting Bracket

4.8.3 Servicing Red Brake/Tail Lights

Replacing Red Brake/Tail Light Bulb

1. Remove two Phillips screws from fixture, and remove the plastic lens.
2. Replace bulb, and reinstall plastic lens and screws. Bulb—Trade #1157.

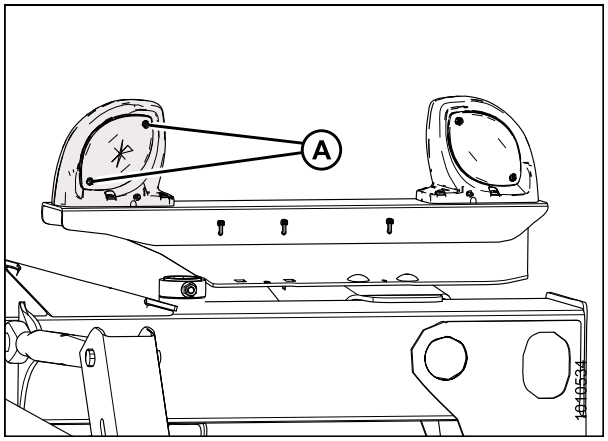

Figure 4.236: Plastic Lens and Screws

Replacing Red Brake/Tail Light Fixture

1. Cut plastic cable ties (A) securing harness covering to light.
2. Retrieve connections from inside harness covering (approximately 6 in. [150 mm] from light) and disconnect wires (not shown). If necessary, remove tape.
3. Remove the four nuts (B) securing light to bracket and remove light. Pull wires through hole in bracket.
4. Feed connectors of new light (not shown) through hole in bracket, and position light onto bracket.
5. Install four nuts (B) and tighten.
6. Connect wires to connectors in harness, and re-secure harness covering with tape and plastic cable ties (A) as required.

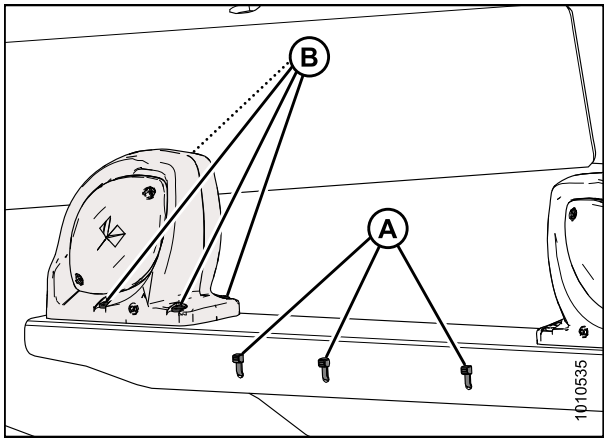

Figure 4.237: Red Hazard Light and Mounting Bracket

4.9 Driveshields

4.9.1 Removing Driveshields

CAUTION

Do NOT operate the machine without the driveshields in place and secured.

NOTE:
Images shown are for left side driveshield—right side driveshield is similar.

1. Remove lynch pin (A) and tool (B) from pin (C).

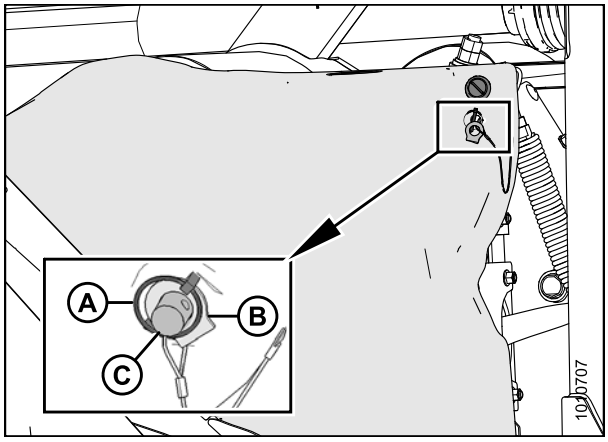

Figure 4.238: Tool to Unlock Driveshield

2. Insert flat end of tool (A) into latch (B) and turn it counterclockwise to unlock.

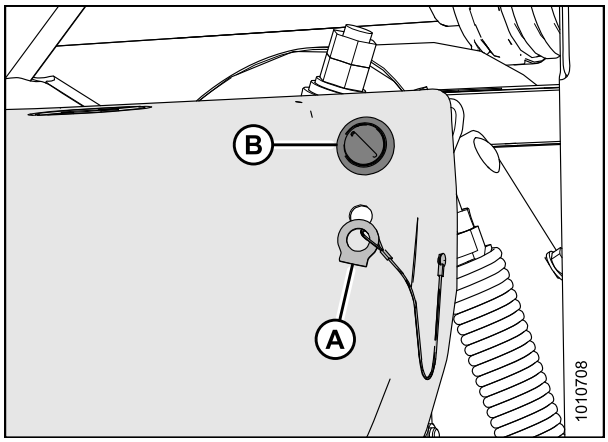

Figure 4.239: Tool to Unlock Driveshield and Latch

3. Pull top of driveshield (A) away from mower conditioner and lift off the pins at the base of the shield to remove.

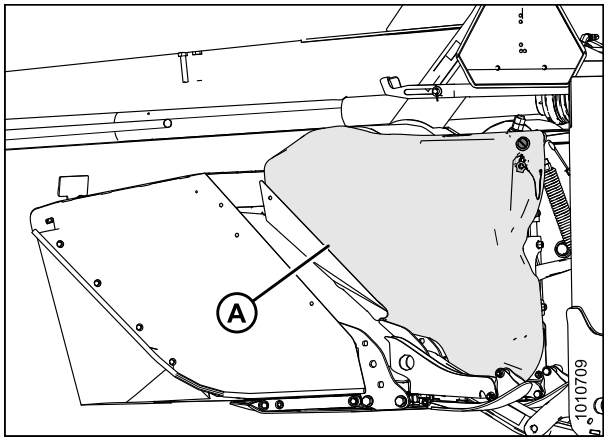

Figure 4.240: Driveshield

4.9.2 Installing Driveshields

⚠ CAUTION

Do NOT operate the machine without the driveshields in place and secured.

NOTE:
Images shown are for left side driveshield—right side driveshield is similar.

1. Position driveshield onto pins at base of driveshield.
2. Push driveshield (A) to engage latch (B).
3. Check that driveshield is properly secured.

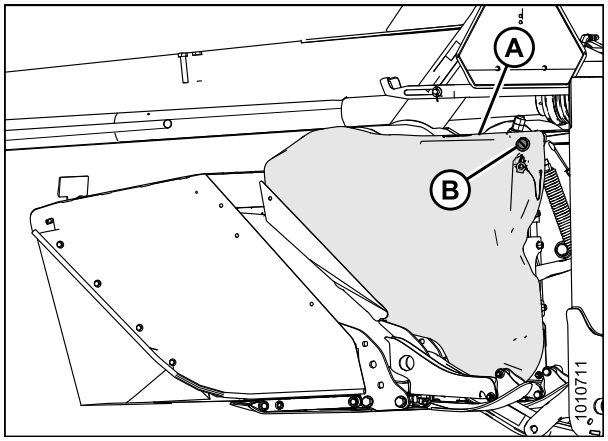

Figure 4.241: Driveshield and Latch

4. Replace tool (B) and lynch pin (A) on pin (C).

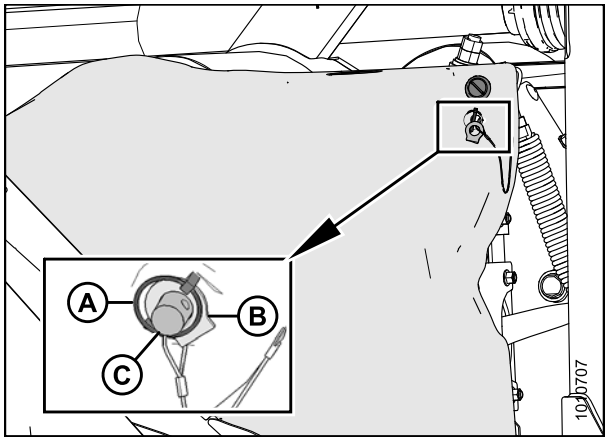

Figure 4.242: Tool to Unlock Driveshield

4.9.3 Replacing Driveshield Latch

CAUTION

Do NOT operate the machine without the driveshields in place and secured.

NOTE:
Images shown are for left side driveshield—right side driveshield is similar.

1. Remove driveshield (A). Refer to *4.9.1 Removing Driveshields, page 227*.

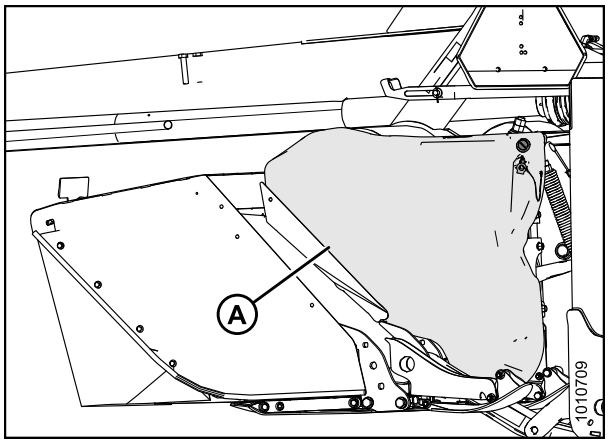

Figure 4.243: Driveshield

2. Remove hex nut (A) and flat washer securing latch to backside of driveshield, replace latch if worn or damaged, and reinstall nut and washer.

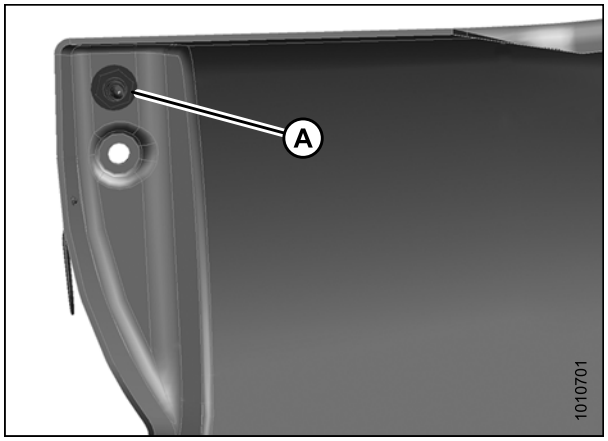

Figure 4.244: Backside of Driveshield

3. Remove two carriage bolts (A), replace stud and clip assembly (B) if worn or damaged, and reinstall carriage bolts.
4. Install driveshield. Refer to *4.9.2 Installing Driveshields, page 228*.

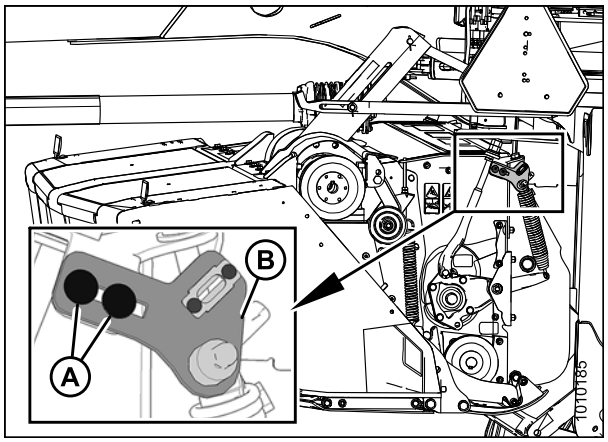

Figure 4.245: Stud and Clip Assembly

4.10 Roll Conditioner

4.10.1 Inspecting Roll Conditioner

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Lower mower conditioner fully, stop engine, and remove key.
2. Engage lift cylinder lock-out valves (refer to *3.1.1 Engaging Locks, page 31*).
3. Remove left and right driveshields (A). Refer to *4.9.1 Removing Driveshields, page 227*.

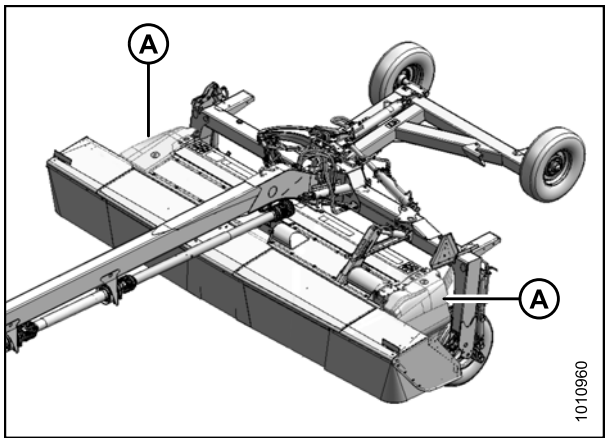

Figure 4.246: Driveshields

4. Inspect left side roll conditioner bearing (A) for signs of wear or damage.

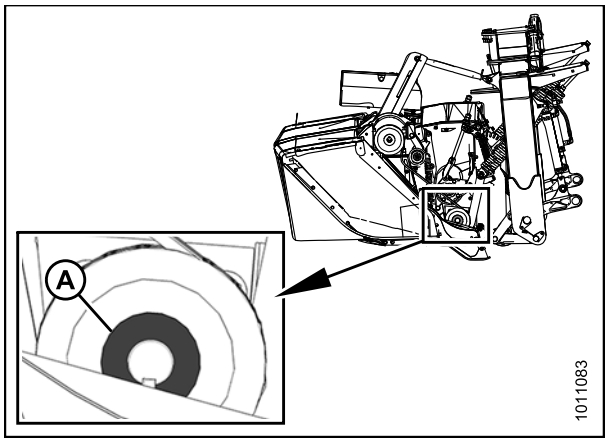

Figure 4.247: Left Side Roll Conditioner Bearing

5. Inspect right side roll conditioner U-joints (A) for signs of wear or damage.

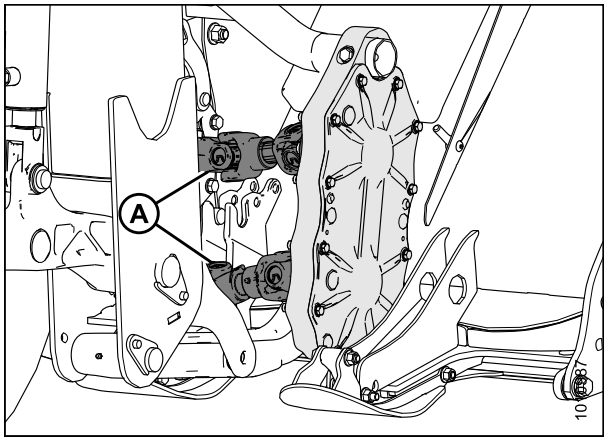

Figure 4.248: Right Side Roll Conditioner U-Joints

6. Inspect right side roll conditioner gearbox bearings (A) for signs of wear or damage.

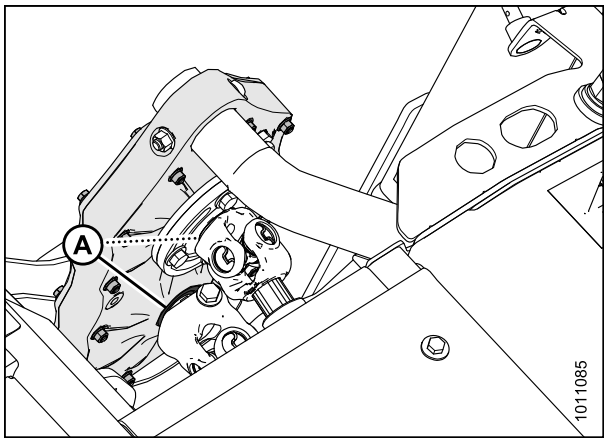

Figure 4.249: Right Side Roll Conditioner Gearbox Bearings

4.11 Finger Conditioner

4.11.1 Inspecting Finger Conditioner

DANGER

To avoid bodily injury or death from unexpected start-up or fall of a raised machine, stop engine, remove key, and engage header lift cylinder lock-out valves before going under machine for any reason.

CAUTION

Exercise caution when working around the blades. Blades are sharp and can cause serious injury. Wear gloves when handling blades.

1. Lower mower conditioner fully, stop engine, and remove key.
2. Engage lift cylinder lock-out valves (refer to *3.1.1 Engaging Locks, page 31*).
3. Remove left and right driveshields (A). Refer to *4.9.1 Removing Driveshields, page 227*.

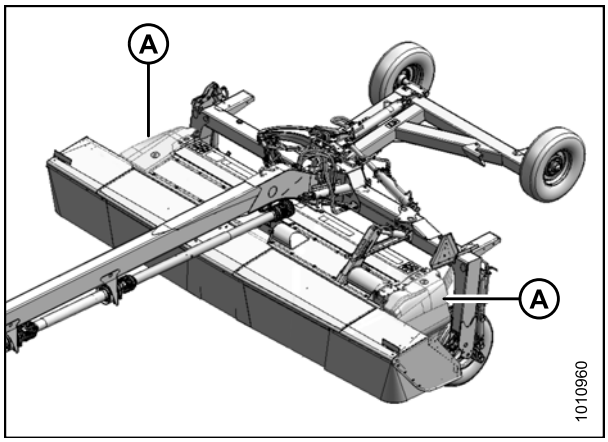

Figure 4.250: Driveshields

4. Open cutterbar doors.

Figure 4.251: Cutterbar Doors

5. Check rotor fingers (A) for damage and replace any bent fingers to prevent rotor imbalance.

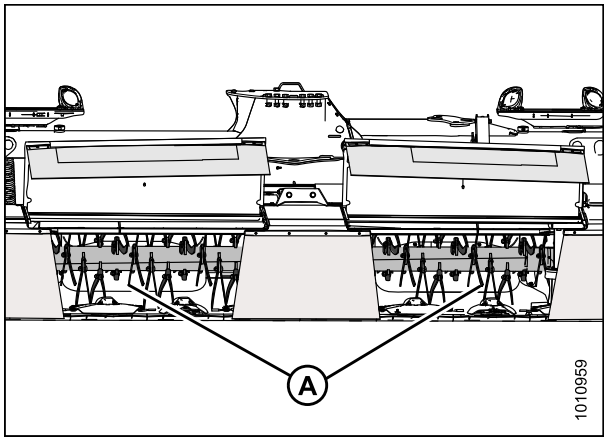

Figure 4.252: Rotor Fingers

6. Remove the left driveshield (refer to *4.9.1 Removing Driveshields, page 227*).
7. Inspect left side rotor bearing (A) for signs of wear or damage.

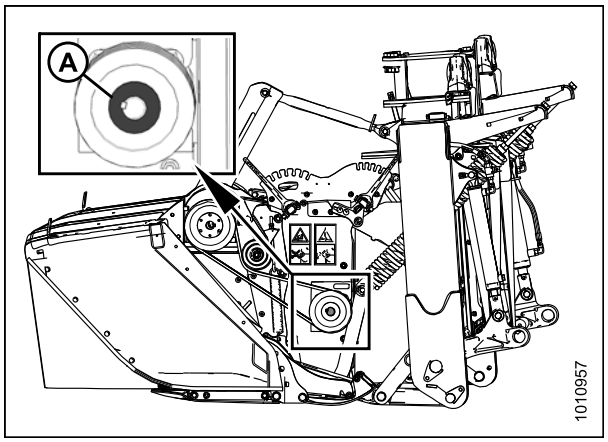

Figure 4.253: Left Rotor Bearing

8. Remove the right driveshield (refer to *4.9.1 Removing Driveshields, page 227*).
9. Inspect right side rotor bearing (A) for signs of wear or damage, and replace bearing if necessary.

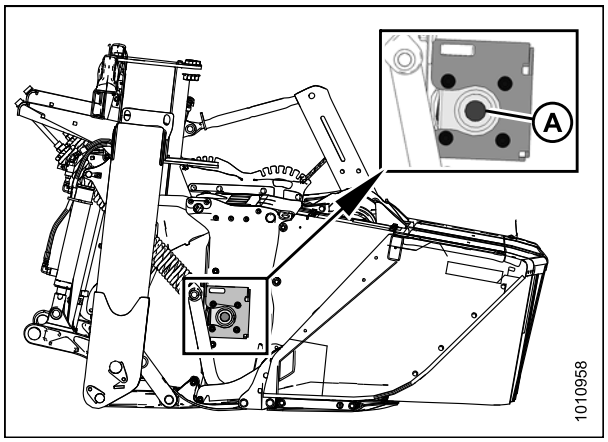

Figure 4.254: Right Side Rotor Bearing

4.12 Changing the Conditioner

The R113 and R116 Pull-Type Mower Conditioners are factory equipped with either a finger conditioner or one of two types of roll conditioners. Conditioners can be changed before or after delivery, and this instruction describes the procedure. These instructions apply to both types of conditioners, but exceptions are identified where applicable.

4.12.1 Separating Header from Carrier

Before removing or installing the conditioner, the header and carrier must be separated and the mower conditioner must be attached to a tractor.

1. Start tractor and center mower conditioner behind tractor.
2. Raise header fully, set header center link to mid-position, and shut down the tractor. Remove key from ignition.

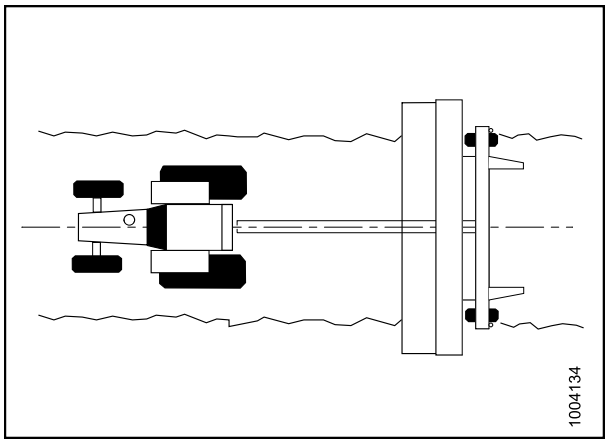

Figure 4.255: Hitch Aligned to Tractor

NOTE:
The float adjuster bolt is easier to turn when the header is in the raised position.

3. Close header lift cylinder lock-out valves (A).
4. Loosen jam nut (B) on adjuster bolt.
5. Turn out adjuster bolt (C) on each float spring until 17-3/4 in. (400 mm) of thread is exposed.

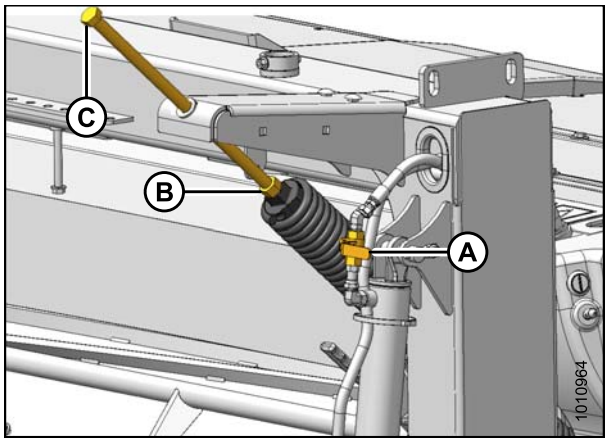

Figure 4.256: Float Spring Adjuster Bolt

6. Open lift cylinder lock-out valves (A) (handle is vertical).
7. Start tractor and fully lower header.
8. Shutdown tractor and remove key from ignition.
9. Check that float adjuster bolts (B) are loose. Back off adjuster bolts as required.
10. Remove float adjuster bolt (B) from spring on **LEFT** side only. Keep spring from dropping when bolt is removed.

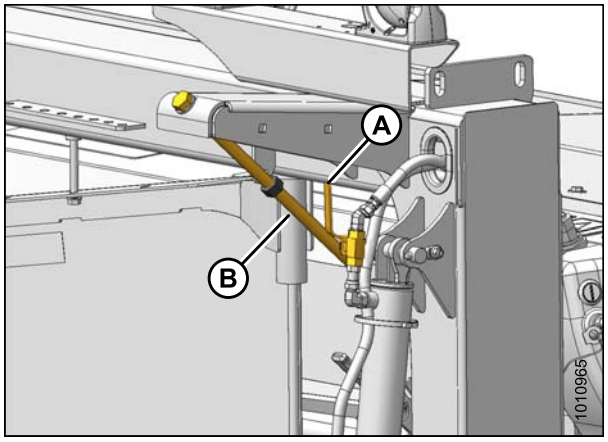

Figure 4.257: Lift Cylinder Lock-Out Valve

11. Remove left and right driveshields (A). Refer to *4.9.1 Removing Driveshields, page 227*.

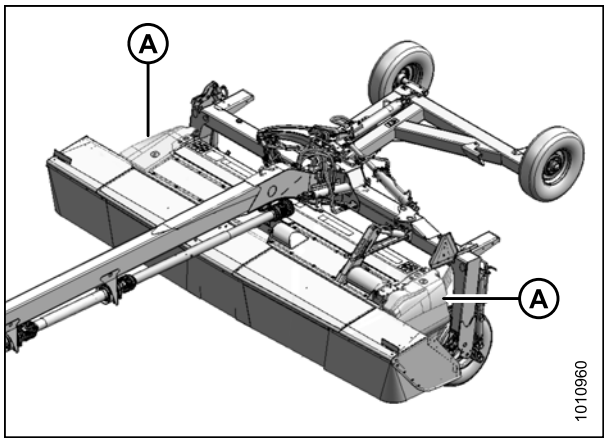

Figure 4.258: Driveshields

12. Remove conditioner drive belt as follows:
    a. Back off jam nut and tensioner nut (B) on belt idler until belts (A) are loose and can be removed.
    b. Remove the four belts.

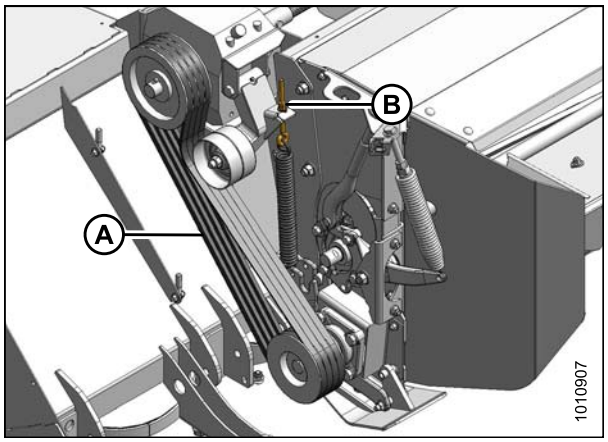

Figure 4.259: Conditioner Drive

13. Remove the M20 nut (A), washers, and hex head bolt (B) securing carrier leg (C) and float spring arm (D) to header at right end of header.
14. Move float spring arm (D) clear of conditioner and remove bolt (B).

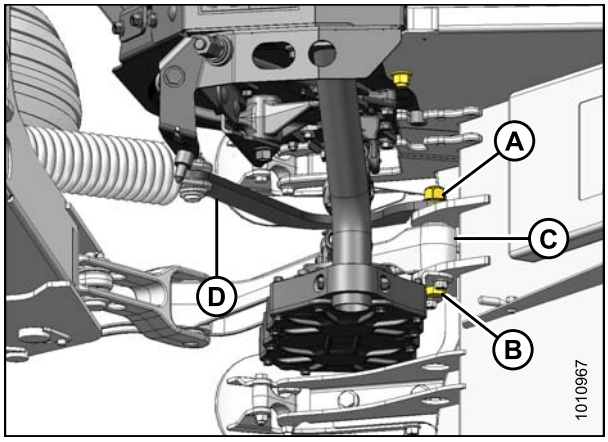

Figure 4.260: Right Side of Carrier

15. Remove the M20 nut (A), washers, and hex head bolt (B) securing carrier leg (C) to header at left end of header.

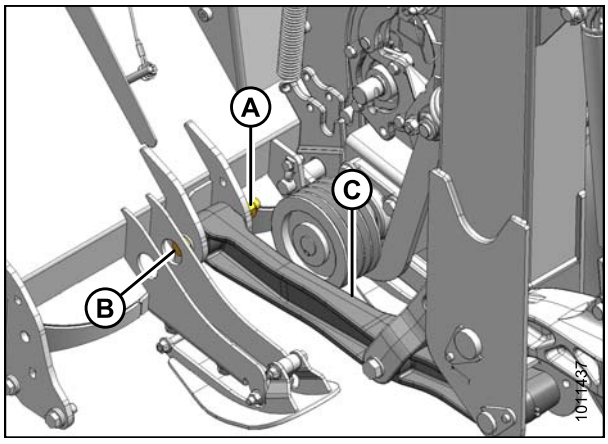

Figure 4.261: Right Side of Conditioner

16. Remove forward pin (A) connecting center-link (B) to anchor (C) and separate center-link from anchor. Reinstall pin in anchor to store.
17. Remove forward pin (D) and four washers (E) attaching indicator links (F) to anchor (B). Reinstall pin and washers in anchor to store.
18. Secure center-link and indicator links to carrier frame with a strap or wire to prevent them from contacting the header during separation.

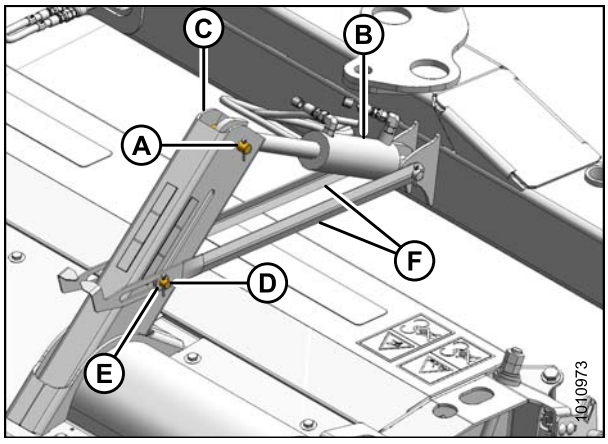

Figure 4.262: Center-Link and Indicator Links

19. Remove two hex head bolts (A) and spacers (B) securing steering arm (C) to gearbox.
20. Lift steering arm (C) off gearbox and secure arm to hitch (D) with a strap or wire.
21. Reinstall hex head bolts (A) and spacers (B) into gearbox.
22. Disconnect aft driveline (E) from header drive gearbox. Refer to *Removing Clutch Driveline, page 199*.
23. Secure driveline (E) to hitch (D) with a strap or wire.

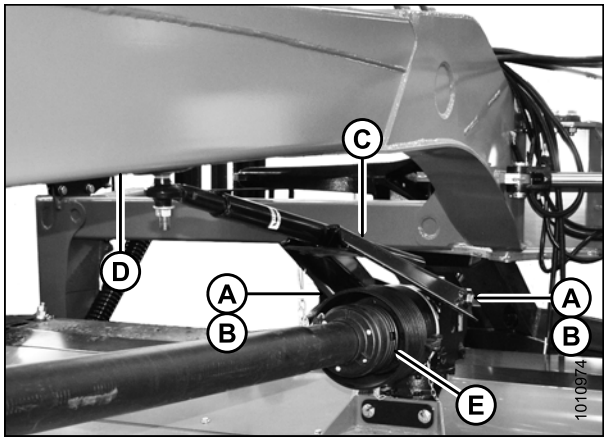

Figure 4.263: Aft Driveline and Hitch

24. If endwise transport system is installed, disconnect wiring harness (A) at light assembly (B).
25. Remove plastic ties (E), clamp (D) and clips (C). Retain for reinstallation.
26. Temporarily attach harness to carrier.

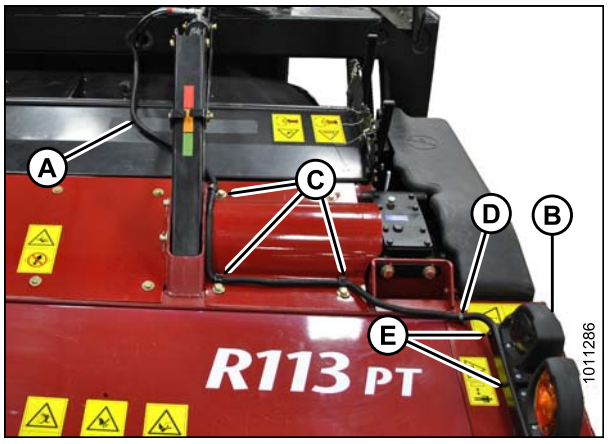

Figure 4.264: Electrical Harness

27. Start tractor, slowly back carrier (A) off header (B), and maneuver carrier away from header.

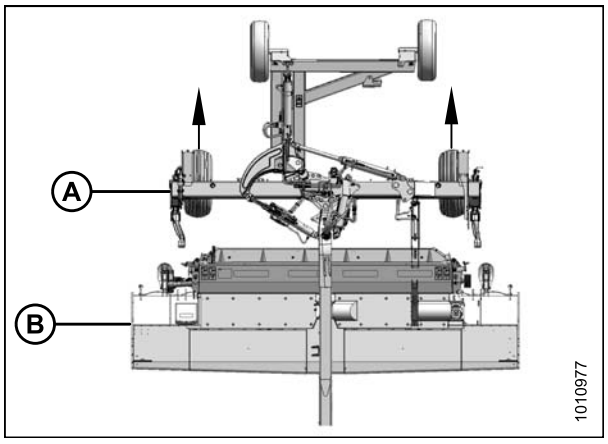

Figure 4.265: Carrier Removed from Header

4.12.2 Removing the Conditioner

CAUTION

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the mast while detaching the conditioner from the header.

1. Attach a spreader bar (A) to a forklift or equivalent, and attach chains to lugs (B) on conditioner. Use a chain rated for overhead lifting with a minimum working load of 2500 lb (1135 kg).

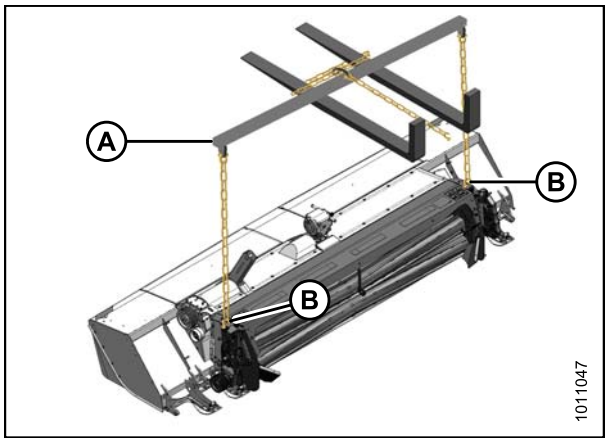

Figure 4.266: Spreader Bar

DANGER

To prevent the conditioner from falling backward, ensure lifting chains are secure and tight. Failure to do so may result in death or serious injury.

2. Move forward baffle adjustment handle (A) to fully lowered raised (B) to access M16 hex head bolt (C).

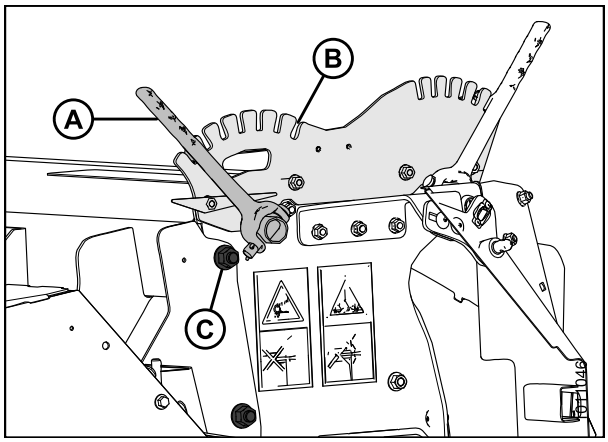

Figure 4.267: Left Side of Conditioner

3. Remove two M16 hex head bolts (A) from each side of conditioner that secure it to header. Lift conditioner slightly forward to take load off bolts and to hold the conditioner after the bolts are removed. Retain hardware for reinstallation.

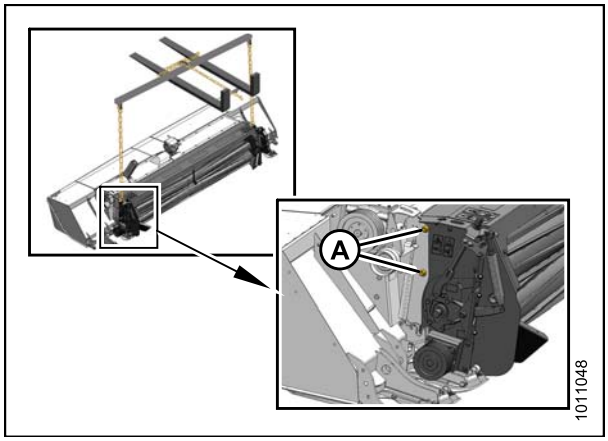

Figure 4.268: Left Side of Conditioner Shown—Right Side Similar

CAUTION

Stand clear when detaching the conditioner.

4. Lift conditioner (A) off header (B), and move it away from work area.

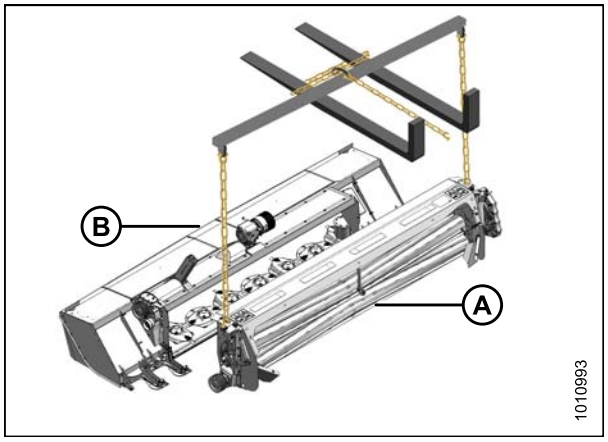

Figure 4.269: Conditioner

4.12.3 Installing the Conditioner

CAUTION

Ensure spreader bar is secured to the forks so that it cannot slide off the forks or towards the mast while detaching the conditioner from the header.

1. Attach a spreader bar (A) to a forklift or equivalent and attach chains to lugs (B) on conditioner. Use a chain rated for overhead lifting with a minimum working load of 2500 lb (1135 kg).
2. Lift conditioner (A) and position it into header opening.

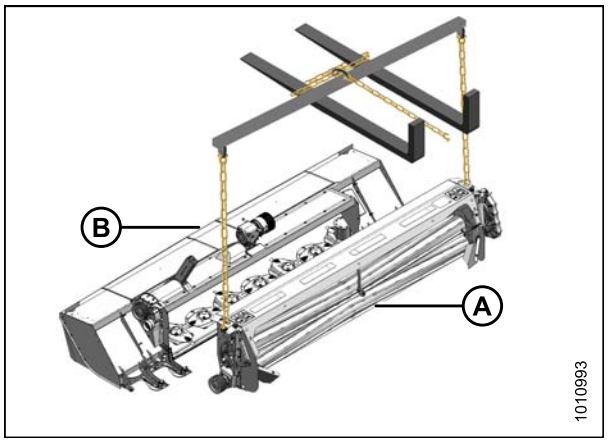

Figure 4.270: Conditioner

3. Carefully align pin (A) at each end of conditioner with lug (B) on header, and lower conditioner so that pins (A) engage lugs (B) on header.

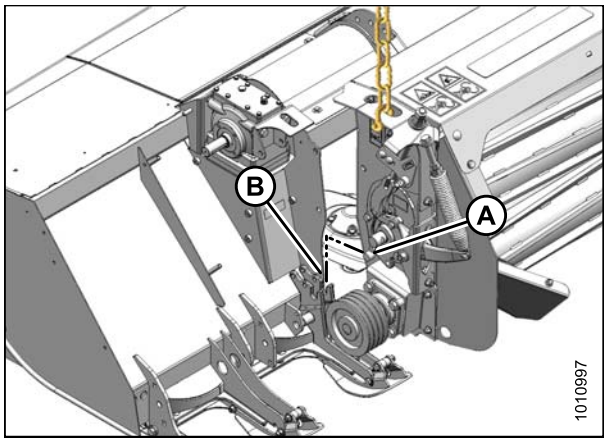

Figure 4.271: Conditioner Pins

4. Align mounting holes and install four M16x40 hex head bolts (A) with heads facing inboard towards conditioner (two per side). Secure with M16 center lock flanged nuts and torque to 126 lbf·ft (170 N·m).
5. Remove lifting chains from conditioner and move lifting device clear of work area.

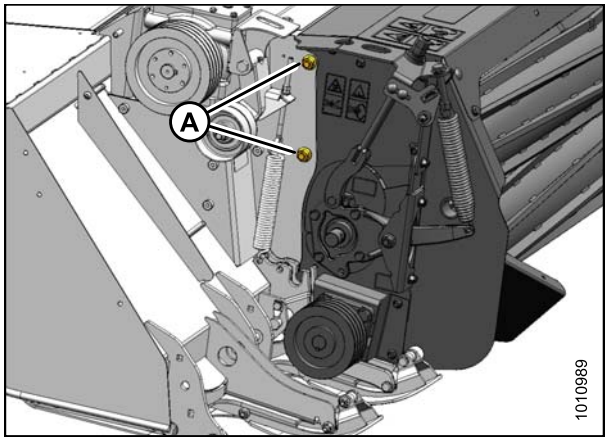

Figure 4.272: Left Side Shown – Right Side Similar

4.12.4 Assembling Header and Carrier

The carrier must be attached to a tractor for the header and carrier to be assembled.

1. Start tractor and maneuver carrier (A) directly behind the mower conditioner (B) so carrier legs line up with the header attachment points.
2. Drive slowly forward to engage the carrier legs (C) into the header attachment brackets.

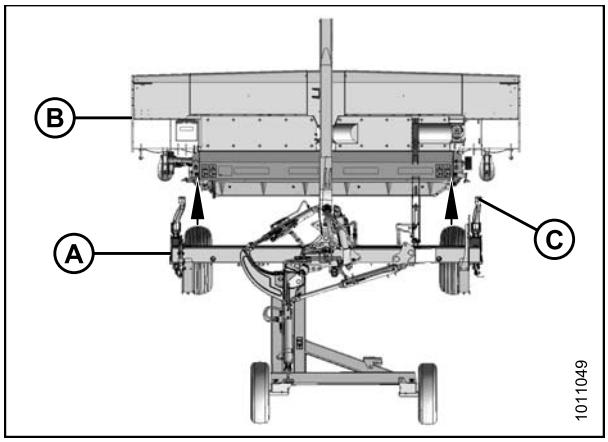

Figure 4.273: Carrier Aligned with Mower Conditioner

3. Align left side carrier leg (A) with header brackets, and install M20x40 bolt (B) with hardened washer (C).
4. Install three hardened washers (D) and flanged lock nut (E) on bolt (B).
5. Torque bolt (B) to 250 lbf·ft (339 N·m).

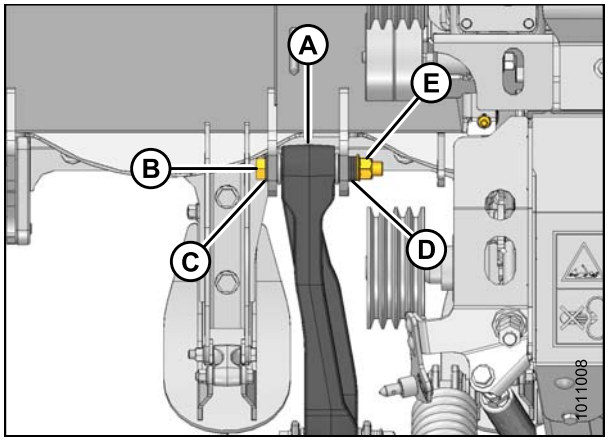

Figure 4.274: Left Carrier Leg

6. Align right side carrier leg (A) with header brackets, and install M20x40 bolt (B) with hardened washer (C).
7. Install hardened washer (D), spacer (E), float tension arm (F), and flanged lock nut (G) on bolt (B).
8. Torque bolt (B) to 250 lbf·ft (339 N·m).

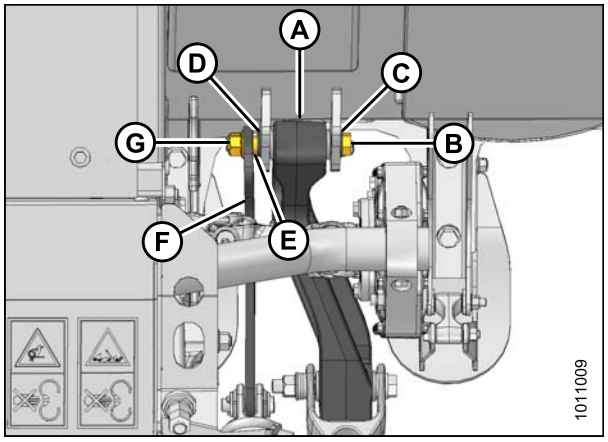

Figure 4.275: Right Side Carrier Leg

9. Undo strapping or wire supporting driveline to hitch (D), and connect driveline (E) to header drive gearbox. Refer to *Installing Clutch Driveline, page 201*.
10. Remove hex head bolts (A) and spacers (B) from gearbox.
11. Undo strapping or wire supporting steering arm to hitch, and position steering arm weldment (C) on gearbox.
12. Secure steering arm to gearbox with spacers (B) and hex head bolts (A). Apply red Loctite® to front holes and torque bolts to 150 lbf·ft (203 N·m).

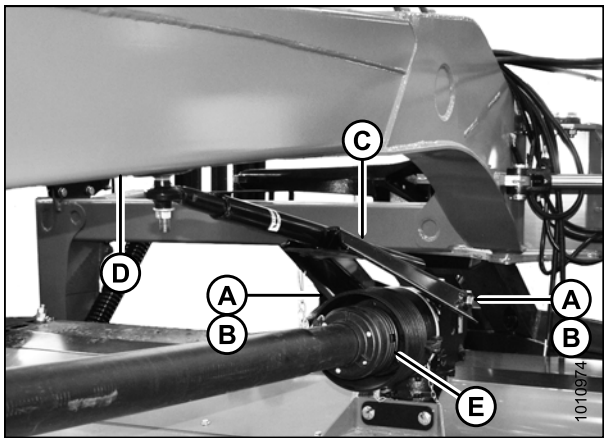

Figure 4.276: Aft Driveline and Hitch

13. Undo strapping or wire securing center-link (B) and indicator links (F) to carrier frame.
14. Remove pins and hardware from anchor (C).
15. Attach center-link (B) to anchor (C) with clevis pin (A) and secure with cotter pin.
16. Attach indicator links (F) to anchor with clevis pin (D) and washers (E). Install washers (E) on both sides of each indicator link (F).

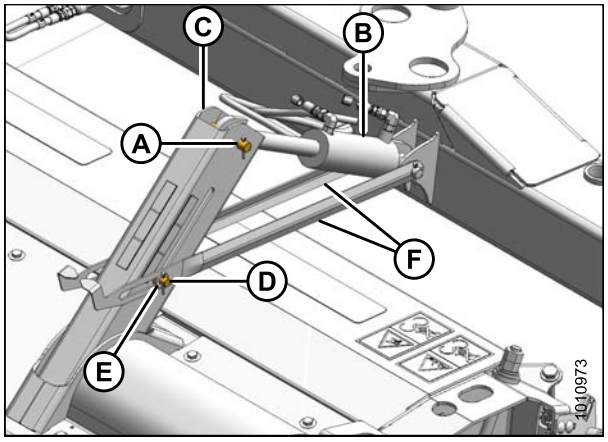

Figure 4.277: Center-Link and Indicator Links

NOTE:
Ensure proper pulley configuration installation—large pulley installed onto gearbox for roll conditioner, and small pulley installed onto gearbox for finger conditioner.

17. Install conditioner drive belts (A) onto pulleys.
18. Check that tensioner spring is installed at correct location:
    - Hole (D) for roll conditioner
    - Hole (E) for finger conditioner
19. Tighten idler tensioner nut (C) until spring length (B) measures 14-3/8 in. (365 mm).
20. Tighten jam nut.
21. Check that lift cylinder lock-out valves (A) are open.
22. Start tractor and fully raise header.
23. Shut down tractor and remove key from ignition.
24. Close both lift cylinder lock-out valves (A).
25. At left side of carrier, install tensioner bolt (B) into spring.
26. Turn in both float spring tensioner bolts (B) to achieve the following exposed thread (C) measurements:
    - 5-11/16—6-1/8 in. (145—155 mm) for 13 ft.
    - 3-3/4—4-1/8 in. (95—105 mm) for 16 ft.
27. Replace the driveshields. Refer to *4.9.2 Installing Driveshields, page 228*.

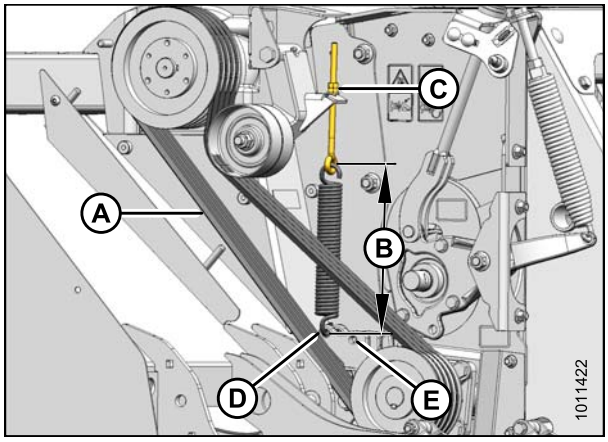

Figure 4.278: Conditioner Drive

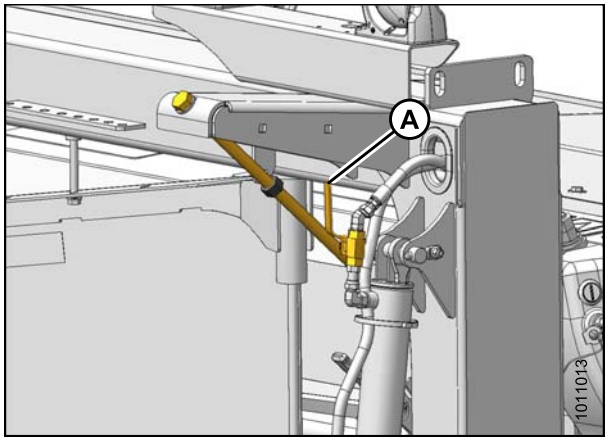

Figure 4.279: Lift Cylinder Lock-Out Valve

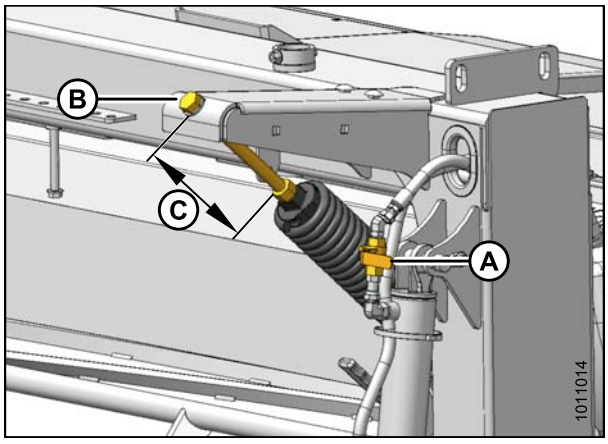

Figure 4.280: Right Side Shown—Left Side Similar

28. If endwise transport system is installed, reconnect electrical harness (A) to the lights (B) and secure harness to shielding using existing clips (C) and (D).
29. Secure harness to light bracket with plastic tie wraps (E).

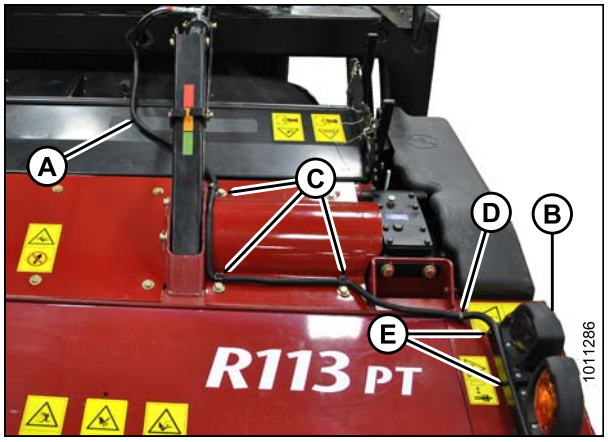

Figure 4.281: Electrical Harness

4.13 Shield (No Conditioner)

4.13.1 Removing Shield (No Conditioner)

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, turn off engine, and remove key.
2. Remove driveshields (A) (refer to *4.9.1 Removing Driveshields, page 227*).

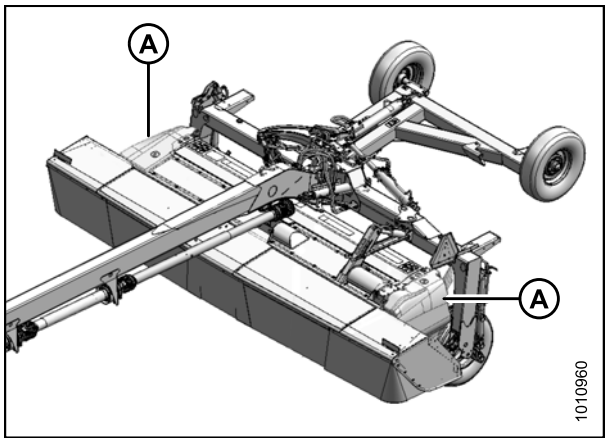

Figure 4.282: Driveshields

3. Remove four M16 hex head bolts (A), nuts, and flat washers securing shield (B) to panel on mower conditioner (C).

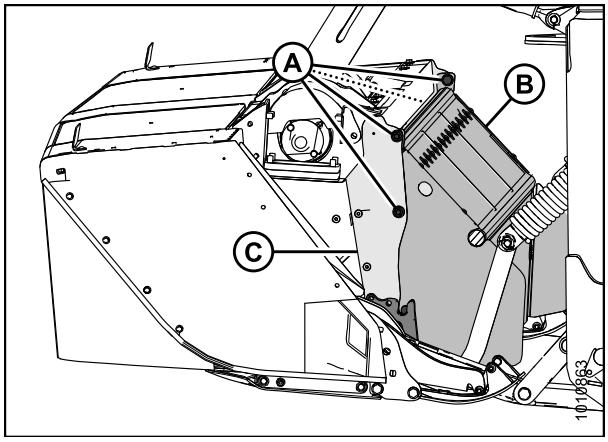

Figure 4.283: Shield (No Conditioner)

4. Lift shield (A) until pins (B) disengage from slots in support (C) and shield on panel (D).

   NOTE:
   Remove field wheels and spindles (or flip them around) if they are in the way.

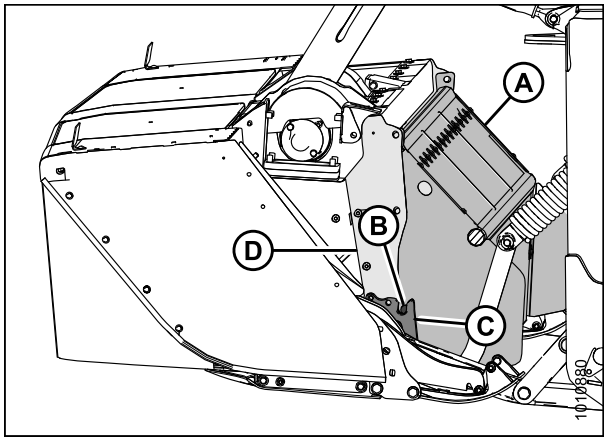

Figure 4.284: Shield (No Conditioner)

5. Remove shield (A) from mower conditioner.

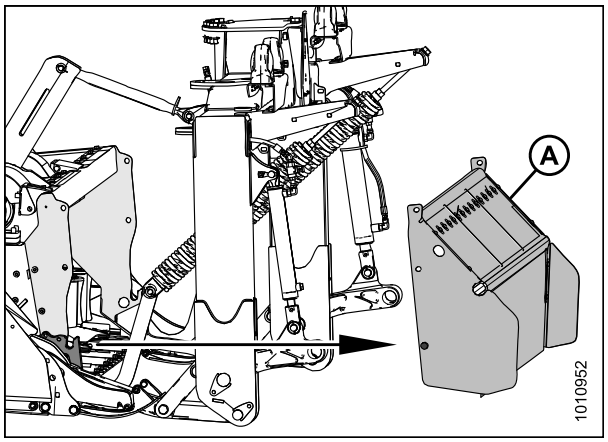

Figure 4.285: Shield (No Conditioner) Removed from Mower Conditioner

4.13.2 Installing Shield (No Conditioner)

DANGER

Stop engine and remove key from ignition before leaving operator's seat for any reason. A child or even a pet could engage an idling machine.

1. Lower mower conditioner fully, turn off engine, and remove key.
2. Position shield (A) on mower conditioner.

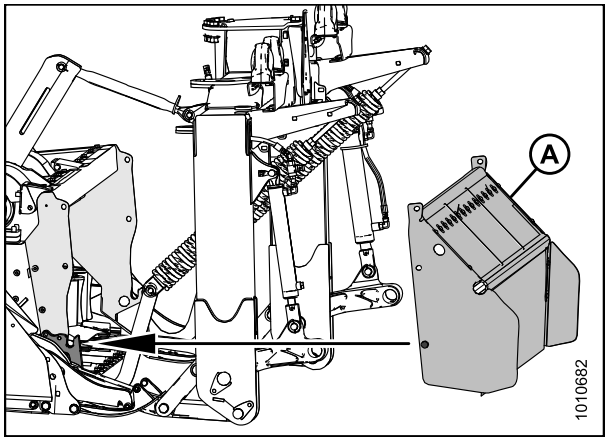

Figure 4.286: Shield (No Conditioner) Removed from Mower Conditioner

3. Lift shield (A) until pins (B) engage in slots in cutterbar support (C) and shield on panel (D).

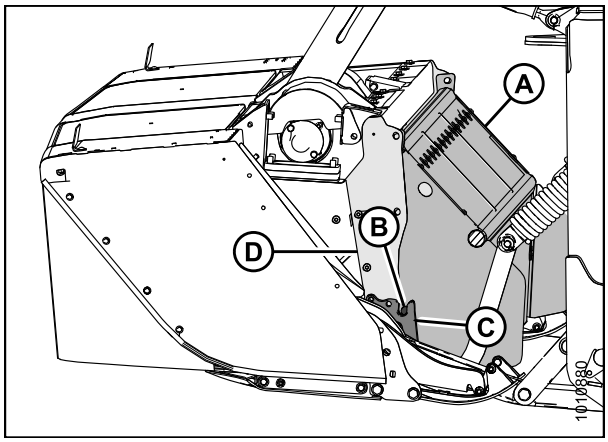

Figure 4.287: Shield (No Conditioner)

4. Install four M16 hex head bolts (A), nuts, and flat washers to secure shield (B) to panel (C) (ensure bolt heads face inboard towards conditioner).

   NOTE:
   Install field wheels and spindles (or flip them around) if previously removed or reversed.

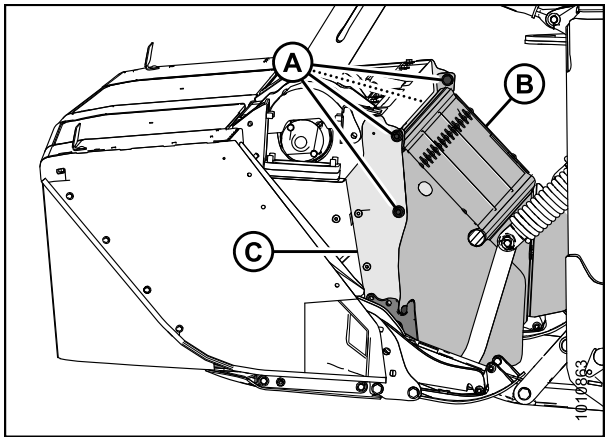

Figure 4.288: Shield (No Conditioner)

5. Install driveshields (A) (refer to *4.9.2 Installing Driveshields, page 228*).

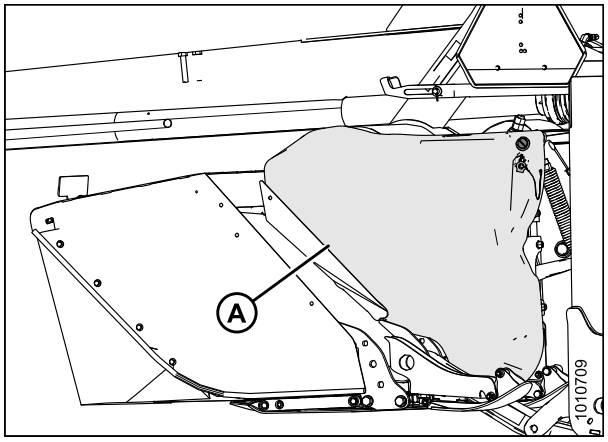

Figure 4.289: Left Driveshield

5 Troubleshooting

5.1 Troubleshooting Mower Performance

Symptom	Problem	Solution	Refer to
Cutterbar plugging	Dull, bent, or badly worn blades	Replace blades.	*4.5.4 Cutter Blades, page 153*
	Build-up of dirt between rock guards	Decrease mower conditioner angle and increase flotation. In some conditions, it may be necessary to carry mower conditioner slightly with lower skid shoes.	*3.16.3 Cutting Height, page 78*
	Conditioner drive belt slipping	Adjust conditioner drive belt tension.	*4.6.5 Conditioner Drive Belt, page 207*
Ragged or uneven cutting of crop	Mower conditioner flotation too light, causing bouncing	Adjust to heavier float setting.	*3.16.1 Mower Conditioner Float, page 75*
	Excessive ground speed	Reduce ground speed.	*3.16.4 Ground Speed, page 80*
	Downed crop	Adjust mower conditioner angle to cut closer to ground.	*3.16.2 Mower Conditioner Angle, page 77*
Strips of uncut crop left on field	Bent or dull cutter blades	Replace blades.	*4.5.4 Cutter Blades, page 153*
	Build-up of dirt between rock guards	Decrease mower conditioner angle and increase flotation.	*3.16.2 Mower Conditioner Angle, page 77*, and *3.16.1 Mower Conditioner Float, page 75*.
	Ground speed too slow	Increase ground speed.	*3.16.4 Ground Speed, page 80*
	Foreign object on cutterbar	Disengage mower conditioner and stop engine. When all moving parts have completely stopped, remove foreign object.	*3.19 Unplugging the Mower Conditioner, page 101*

Symptom	Problem	Solution	Refer to
Conditioner rolls plugging	Ground speed too fast	Reduce ground speed.	*3.16.4 Ground Speed, page 80*
	Roll gap too large for proper feeding	Decrease roll gap.	*Roll Gap, page 81*
	Roll gap too small in thick-stemmed cane-type crops	Increase roll gap.	*Roll Gap, page 81*
	Baffle set too low	Raise baffle.	*Internal Intensity Baffle, page 88*
	Foreign object between rolls	Disengage mower conditioner and stop engine. When all moving parts have completely stopped, remove foreign object.	*3.19 Unplugging the Mower Conditioner, page 101*
	Cutting height too low	Decrease mower conditioner angle to raise cutting height.	*3.16.2 Mower Conditioner Angle, page 77*
	Backing into windrow	Raise mower conditioner before backing up.	*3.12 Raising and Lowering Mower Conditioner, page 58*
	Rolls improperly timed	Adjust roll timing.	*Roll Timing, page 84*
Uneven formation and bunching of windrow	Rear deflector bypassing or dragging crop	Adjust rear deflector for proper crop control.	*3.16.7 Cutterbar Deflector, page 94*
	Forming shields improperly adjusted	Adjust forming shields.	*Forming Shields: Roll Conditioner, page 86*, or *Forming Shields: Finger Conditioner, page 92*.
	Roll gap too large	Adjust roll gap.	*Roll Gap, page 81*
Cutting height varies from one side to the other	Float not properly balanced	Adjust mower conditioner float.	*3.16.1 Mower Conditioner Float, page 75*
Not cutting short enough in down crop	Broken, bent, or dull blades	Replace blades, or turn blades over.	*4.5.4 Cutter Blades, page 153*
	Ground speed too fast	Reduce ground speed.	*3.16.4 Ground Speed, page 80*
	Cutting height too high	Adjust to steeper mower conditioner angle in order to lower cutting height if field conditions allow.	*3.16.2 Mower Conditioner Angle, page 77*
Material being pulled out by roots when cutting, tall crop leaning into machine	Crop in conditioner rolls before crop is cut	Increase roll gap.	*Roll Gap, page 81*
Damaged leaves and broken stems	Insufficient roll gap	Adjust roll spacing.	*Roll Gap, page 81*
	Roll timing off	Check roll timing and adjust if necessary.	*Roll Timing, page 84*

Symptom	Problem	Solution	Refer to
Slow crop drying	Rolls not crimping crop sufficiently	Decrease roll gap.	*Roll Gap, page 81*
	Crop is bunched in windrow	Adjust forming shields/baffle.	*Forming Shields: Roll Conditioner, page 86*, *Forming Shields: Finger Conditioner, page 92*, and *Internal Intensity Baffle, page 88*.
Excessive drying or bleaching of crop	Excessive crimping	Increase roll gap.	*Roll Gap, page 81*
	Crop is spread too wide in windrow	Adjust forming shields.	*Forming Shields: Roll Conditioner, page 86*, or *Forming Shields: Finger Conditioner, page 92*.
Plugging behind end rotary deflectors	Ground speed too slow	Increase ground speed.	*3.16.4 Ground Speed, page 80*
Poorly formed or bunchy windrows	Forming shields not properly adjusted	Adjust forming shields.	*Forming Shields: Roll Conditioner, page 86*, or *Forming Shields: Finger Conditioner, page 92*.
Windrow too wide (finger conditioner)	Crop not throwing far enough	Adjust internal intensity baffle, or adjust finger rotor speed.	*Internal Intensity Baffle, page 88*, or *Finger Rotor Speed, page 88*.

5.2 Troubleshooting Mechanical Issues

Symptom	Problem	Solution	Refer to
Excessive noise	Bent cutter blade	Replace blade.	*4.5.4 Cutter Blades, page 153*
	Conditioner roll timing off	Check roll timing, and adjust if necessary.	*Roll Timing, page 84*
	Conditioner roll gap too small	Check roll gap, and adjust if necessary.	*Roll Gap, page 81*
Excessive vibration or noise in mower conditioner	Mud deposits on conditioner rolls	Clean rolls.	*3.19 Unplugging the Mower Conditioner, page 101*
	Conditioner rolls contacting each other	Increase roll gap.	*Roll Gap, page 81*
		Check roll timing.	*Roll Timing, page 84*
Excessive heat in cutterbar	Too much oil in cutterbar	Drain oil, and refill with specified amount.	*4.5.1 Cutterbar Lubrication, page 136*
Frequent blade damage	Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	*3.19 Unplugging the Mower Conditioner, page 101*
	Material wrapped around spindle	Remove disc and remove material.	*3.19 Unplugging the Mower Conditioner, page 101*
	Cutting too low in rocky field conditions	Decrease mower conditioner angle. Increase flotation.	*3.16.2 Mower Conditioner Angle, page 77*, and *3.16.1 Mower Conditioner Float, page 75*.
	Mower conditioner float set too heavy	Increase flotation.	*3.16.1 Mower Conditioner Float, page 75*
	Ground speed too high in rocky field conditions. At high ground speed, mower conditioner tends to dig rocks from ground instead of floating over them.	Reduce ground speed.	*3.16.4 Ground Speed, page 80*
	Blade incorrectly mounted	Check all blade mounting hardware, and ensure blades move freely.	*4.5.4 Cutter Blades, page 153*
	Bevel-up blades more susceptible to damage	Switch to bevel-down blades.	*4.5.4 Cutter Blades, page 153*

Symptom	Problem	Solution	Refer to
Excessive wear of cutting components	Mower conditioner angle too steep	Reduce mower conditioner angle.	*3.16.2 Mower Conditioner Angle, page 77*
	Crop residue and dirt deposits on cutterbar	Clean cutterbar.	*3.19 Unplugging the Mower Conditioner, page 101*
	Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	*3.19 Unplugging the Mower Conditioner, page 101*
Breakage of conditioner drive belt	Improper belt tension	Adjust conditioner drive belt tension.	*4.6.5 Conditioner Drive Belt, page 207*
	Belt not in proper groove in pulley	Move belt to proper groove.	*4.6.5 Conditioner Drive Belt, page 207*
	Foreign object between rolls	Disengage mower conditioner and stop engine. When all moving parts have completely stopped, remove foreign object.	*3.19 Unplugging the Mower Conditioner, page 101*
	Belt pulleys and idlers misaligned	Align pulleys and idler.	*4.6.5 Conditioner Drive Belt, page 207*
Machine pulling to one side	Mower conditioner dragging on one end and pulling to that side	Adjust mower conditioner flotation on both ends.	*3.16.1 Mower Conditioner Float, page 75*
	Low tire pressure on one side	Check and correct tire pressure (30 psi [207 kPa]).	*4.6.9 Wheels and Tires, page 220*
Disc does not start when engaging power take-off (PTO)	Mud on cutterbar	Remove mud from cutterbar. Do not allow mud to dry on cutterbar.	*3.19 Unplugging the Mower Conditioner, page 101*
	Primary driveline not connected.	Connect driveline.	*4.6.1 Primary Driveline, page 190*

6 Options and Attachments

6.1 Tall Crop Divider Kit

Tall crop dividers attach to the ends of the mower conditioner for clean crop dividing and cutterbar entry in tall crops. The kit includes left and right dividers and attachment hardware.

MD #B5800

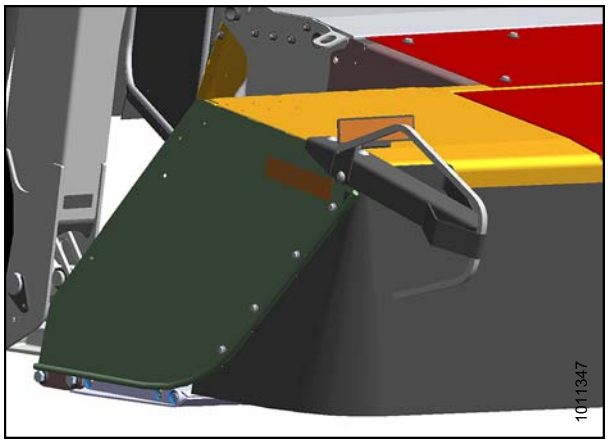

Figure 6.1: Right Side Tall Crop Divider

6.2 Hydraulic Center-Link Kit

The hydraulic center-link kit replaces the standard mechanical link and uses a hydraulic cylinder and separate tractor hydraulic circuit to adjust mower conditioner angle. The kit includes installation instructions.

MD #B5760

Figure 6.2: Hydraulic Center-Link

6.3 Truck Transport Hitch

The truck transport hitch connects the mower conditioner to a truck for towing on the road. The kit includes the transport hitch, attachment hardware, and safety chain.

MD #B5802

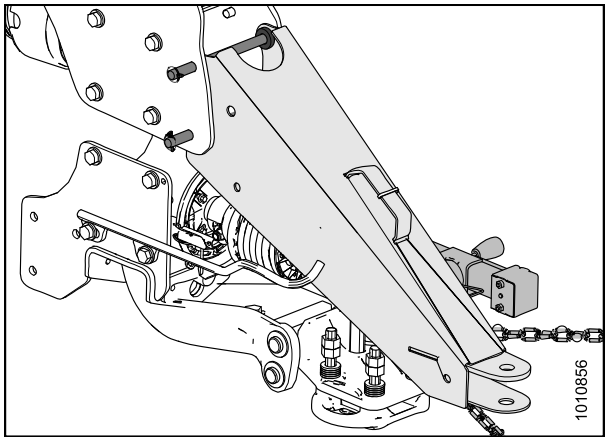

Figure 6.3: Truck Transport Hitch

6.4 Endwise Transport System

The endwise transport system allows the mower conditioner to be towed on roadways while remaining within the legal width restrictions on most roads and highways.

The kit is available as a Dealer-installed option and includes all hardware and installation instructions

MD #B5759 and

MD #B5949

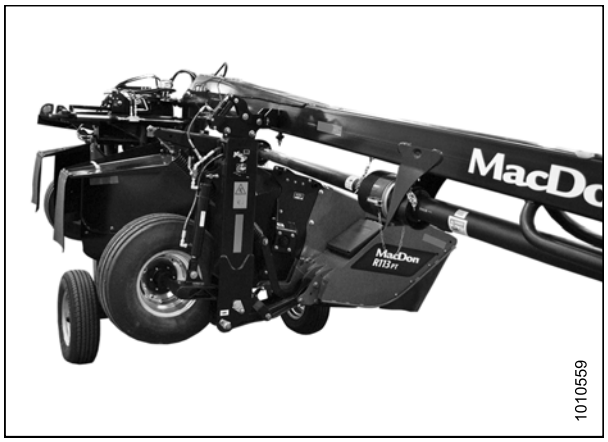

Figure 6.4: Endwise Transport System

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